

Electrical Sector Solutions

# Volume 9: OEM



**EATON**

*Powering Business Worldwide*

Tab 1—Circuit Protection .....	V9-T1-1
Tab 2—Motor Control and Protection .....	V9-T2-1
Tab 3—Logic Devices .....	V9-T3-1
Tab 4—Operator Interface .....	V9-T4-1
Tab 5—Sensors and Limit Switches .....	V9-T5-1
Tab 6—Machine Integration .....	V9-T6-1
Appendix 1—Eaton Terms & Conditions .....	V9-A1-1



## Dimensions, Weights and Ratings

Dimensions, weights and ratings given in this catalog **are approximate and should not be used for construction purposes**. Drawings containing exact dimensions are available upon request. All listed product specifications and ratings are subject to change without notice. Photographs are representative of production units.

## Terms and Conditions

All prices and discounts are subject to change without notice. When price changes occur, they are published in Eaton's *Price and Availability Digest* (PAD). All orders accepted by Eaton's Electrical Sector are subject to the general terms and conditions as set forth in Appendix 1—Eaton Terms & Conditions.

## Technical and Descriptive Publications

This catalog contains brief technical data for proper selection of products. Further information is available in the form of technical information publications and illustrated brochures. If additional product information is required, contact your local Eaton Products Distributor, call **1-800-525-2000** or visit our website at **www.eaton.com**.

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These catalog pages do not purport to cover all details or variations in equipment, nor to provide for every possible contingency to be met in connection with installation, operation or maintenance. Should further information be desired or should particular problems arise which are not covered sufficiently for the purchaser's purposes, the matter should be referred to the local Eaton Products Distributor or Sales Office. The contents of this catalog shall not become part of or modify any prior or existing agreement, commitment or relationship. The sales contract contains the entire obligation of Eaton's Electrical Sector. The warranty contained in the contract between the parties is the sole warranty of Eaton. Any statements contained herein do not create new warranties or modify the existing warranty.



Powering Business Worldwide

**Eaton is a global leader in power distribution, power quality, control and automation, and monitoring products.**

At Eaton, we believe a reliable, efficient and safe power system is the foundation of every successful enterprise. Through innovative technologies, cutting-edge products and our highly skilled services team, we empower businesses around the world to achieve a powerful advantage.

In addition, Eaton is committed to creating and maintaining powerful customer relationships built on a foundation of excellence. From the products we manufacture to our dedicated customer service and support, we know what's important to you.

## Solutions

Eaton takes the complexity out of power systems management with a holistic and strategic approach, leveraging our industry-leading technology, solutions and services. We focus on the following three areas in all we do:

- Reliability—maintain the appropriate level of power continuity without disruption or unexpected downtime
- Efficiency—minimize energy usage, operating costs, equipment footprint and environmental impact
- Safety—identify and mitigate electrical hazards to protect what you value most

## Using the Eaton Catalog Library

As we grow, it becomes increasingly difficult to include all products in one or two comprehensive catalogs. Knowing that each user has their specific needs, we have created a library of catalogs for our products that when complete, will contain 15 volumes. Since the volumes will continuously be a work in progress and updated, each volume will stand alone. Refer to our volume directory, MZ08100001E, for a quick glance of where to look for the products you need. The 15 volumes include:

- Volume 1—Residential and Light Commercial (CA08100002E)
- Volume 2—Commercial Distribution (CA08100003E)
- Volume 3—Power Distribution and Control Assemblies (CA08100004E)
- Volume 4—Circuit Protection (CA08100005E)
- Volume 5—Motor Control and Protection (CA08100006E)
- Volume 6—Solid-State Motor Control (CA08100007E)
- Volume 7—Logic Control, Operator Interface and Connectivity Solutions (CA08100008E)
- Volume 8—Sensing Solutions (CA08100010E)
- Volume 9—Original Equipment Manufacturer (CA08100011E)
- Volume 10—Enclosed Control (CA08100012E)
- Volume 11—Vehicle and Commercial Controls (CA08100013E)
- Volume 12—Aftermarket, Renewal Parts and Life Extension Solutions (CA08105001E)
- Volume 13—Counters, Timers and Tachometers (CA08100015E)—Available in electronic format only
- Volume 14—Fuses (CA08100016E)—Available in electronic format only
- Volume 15—Solar Inverters and Electrical Balance of System (CA08100018E)

These volumes are not all-inclusive of every product, but they are meant to be an overview of our product lines. For our full range of product solutions and additional product information, consult [Eaton.com/electrical](http://Eaton.com/electrical) and other catalogs and product guides in our literature library. These references include:

- The Consulting Application Guide (CA08104001E)
- The Eaton Power Quality Product Guide (COR01FYA)

If you don't have the volume that contains the product or information that you are looking for, not to worry. You can access every volume of the catalog library at [Eaton.com/electrical](http://Eaton.com/electrical) in the Literature Library.

By installing our Automatic Tab Updater (ATU), you can be sure you always have the most recent version of each volume and tab.

**Circuit Breakers**



**Fuse Blocks and Fuse Holders**



**Rotary Disconnect Switches**



**1.1 Circuit Breakers**

Product Overview .....	<b>V9-T1-2</b>
Series G Molded Case Circuit Breakers .....	<b>V9-T1-5</b>
Series G Motor Circuit Protectors .....	<b>V9-T1-8</b>
Series G Motor Protector Breakers .....	<b>V9-T1-10</b>
Universal Molded Case Circuit Breakers .....	<b>V9-T1-13</b>
QUICKLAG Type QC Miniature Circuit Breakers— Cable-In/Cable-Out Type QC .....	<b>V9-T1-19</b>
FAZ-NA UL 489 Circuit Breakers .....	<b>V9-T1-25</b>
FAZ UL 1077 Circuit Breakers .....	<b>V9-T1-28</b>
Series NRX Low Voltage Power Breakers .....	<b>V9-T1-33</b>
Magnum Low Voltage Power Breakers .....	<b>V9-T1-36</b>

**1.2 Fuse Blocks and Fuse Holders**

Product Overview .....	<b>V9-T1-44</b>
C350 Series .....	<b>V9-T1-45</b>

**1.3 Rotary Disconnect Switches**

Open Rotary Disconnects .....	<b>V9-T1-46</b>
Enclosed Rotary Disconnects .....	<b>V9-T1-62</b>

For our complete product offering, see Volume 4—Circuit Protection, CA08100005E and Volume 5—Motor Control and Protection, CA08100006E.



## Product Overview

### Circuit Breaker Selection Guide



Description	Series G Molded Case Circuit Breaker		Universal Molded Case Circuit Breakers		QUICKLAG® Type QC Miniature Circuit Breakers
	Page V9-T1-5		Page V9-T1-13		Page V9-T1-19
<b>General Applications</b>	Line protection—molded case switch, motor circuit protection (combination tested with Eaton starters and contactors) thermal-magnetic and electronic trip units.		Line protection—feeder and branch thermal-magnetic trip unit.		Used to provide branch circuit protection in cable-in/out panel or DIN rail mount applications.
<b>Technical Data</b>					
Maximum current rating	2500A		600A		100A
Maximum voltage—AC	690 Vac		480 Vac		240 Vac
Maximum voltage—DC	250 Vdc		250 Vdc		80 Vdc
Poles	1, 2, 3, 4		1, 2, 3		QC = 1, 2, 3, 4 QCD = 1, 2, 3 QCR/QCF = 1, 2, 3
Max. interrupting capacities See individual catalogs for limitations and back-up protection requirements.	Three-pole at 240V E = 200 kA J = 200 kA L = 200 kA	Three-pole at 480V E = 100 kA J = 200 kA L = 200 kA	Three-pole at 240V G = 25 kA (480/277) F = 25 kA J = 35 kA K = 35 kA L = 35 kA	Three-pole at 480V GI = 14 kA (480/277) GD = 22 kA F = 14 kA J = 20 kA K = 20 kA L = 20 kA	65 kA at 240 Vac 5 kA at 80 Vdc
<b>Approvals</b>	UL® 489 IEC 60947-2 CE	CSA® KEMA-KEUR CCC	UL 489CE IEC 60947-2	CE CSA	UL 489 CSA 22.2
<b>Environmental Data</b>					
Humidity	Non-condensing 100% relative humidity		Non-condensing 100% relative humidity		—
Shock	—		—		—
Vibration	—		—		—
Operating temperature	-20° to 70°C (-4° to 158°F) derating applies		-20° to 70°C (-4° to 158°F) derating applies		40°C (104°F)
Dielectric strength	Below 250A 6 kV Above 250A 8 kV		Below 250A 6 kV Above 250A 8 kV		1960 Vac (acc. to UL 489)
Insulation resistance	750 Vac		750 Vac		—
Endurance/life	250A: EG, JG = 8,000 operations 630A: LG = 6,000 operations		250A: Gi = 10,000 operations Fi = 8,000 operations 400A: Ji, Ki, Li = 6,000 operations		>10,000 operations
Approximate weight	E Three-pole—2.88 lbs (1.04 kg) J Three-pole—5.06 lbs (2.30 kg) L Three-pole—12.36 lbs (5.61 kg)		G Three-pole—2.10 lbs (0.95 kg) F Three-pole—4.5 lbs (2.0 kg) J Three-pole—12.50 lbs (5.7 kg) K Three-pole—11.50 lbs (5.2 kg)		QC Single-pole—0.36 lbs (162.8 g) Two-pole—0.61 lbs (274.9 g) Three-pole—1.14 lbs (518.3 g) QCD Single-pole—0.43 lbs (195.3 g) Two-pole—0.89 lbs (401.9 g) Three-pole—1.34 lbs (605.6 g) QCR Single-pole—0.22 lbs (97.9 g) Two-pole—0.48 lbs (215.8 g) Three-pole—0.70 lbs (315.6 g) QCF Single-pole—0.24 lbs (109.9 g) Two-pole—0.50 lbs (225.2 g) Three-pole—0.74 lbs (335.1 g)
Mounting configuration	Backpan, plug-in adapter, DIN rail (E)		Backpan, DIN rail (G)		Panel mount, front mount, 35 mm DIN rail mountable

For our complete product offering, see Volume 4—Circuit Protection, CA08100005E.

Circuit Breaker Selection Guide, continued



**FAZ-NA UL 489  
Miniature Circuit Breakers**

**FAZ UL 1077  
Miniature Circuit Breakers—  
Supplementary Protectors**

Description	Page V9-T1-25	Page V9-T1-28
<b>General Applications</b>	Used to provide branch circuit protection in cable-in/out DIN rail mount applications.	Used to provide overcurrent protection where branch protection (for example UL 489 MCCB) is already provided or not required. Replacement for fuses used as supplementary protectors.
<b>Technical Data</b>		
Maximum current rating	40A	63A
Maximum voltage—AC	480/277 Vac (240/415 Vac IEC)	480/277 Vac
Maximum voltage—DC	48 Vdc	65 Vac Single-pole 130 Vac Two-pole
Poles	1, 2, 3	1, 2, 3
Max. interrupting capacities See individual catalogs for limitations and back-up protection requirements.	10 kA UL/CSA; 15 kA IEC/EN 60947-2	IEC 240/415V 10 kA UL/CSA 120V 10 kA 240V 10 kA 277V 6 kA 480V 6 kA
<b>Approvals</b>	UL 489 CE; IEC/EN 60947-2 CSA 22.2	UL 1077 CE; IEC/EN 60947-2; IEC/EN 60898 CSA 22.2 235
<b>Environmental Data</b>		
Humidity	Acc. IEC 60068-2 (25° to 55°C/ 77° to 131°F, 90–95% RH)	—
Shock	Acc. IEC 60068-2-27 (40g half sine wave for 10 ms—3 axes) (15g half sine wave for 20 ms—3 axes)	—
Vibration	Acc. to IEC 60068-2-6 5–100 Hz/1.0 mm/0.7g (3 axes)	—
Operating temperature	30°C (86°F)	—
Dielectric strength	1960 Vac (acc. to UL 489)	—
Insulation resistance	100M ohms at 500 Vdc	—
Endurance/life	>20,000 operations	—
Approximate weight	Single-pole—0.27 lbs (121.0g) Two-pole—0.53 lbs (242.0g) Three-pole—0.80 lbs (363.0g)	Single-pole—0.26 lbs (120.0g) Two-pole—0.54 lbs (244.9g) Three-pole—0.83 lbs (376.5g)
Mounting contribution	35 mm DIN rail mountable	35 mm DIN rail mountable

For our complete product offering, see Volume 4—Circuit Protection, CA08100005E.

#### Circuit Breaker Selection Guide, continued



**Series NRX  
Low Voltage Power Breakers**

Page V9-T1-33



**Magnum  
Low Voltage Power Breakers**

Page V9-T1-36

**Description**

**General Applications**

Solution for where space is at a premium or when equipment dimensions are critical when upgrading or retrofitting current systems. Offering the power and performance of a power breaker in the compact size of a molded case breaker. With its reduced weight and compact dimensions, you can mount two times as many feeder breakers and reduce the overall enclosure density up to 50%.

Enables comprehensive solutions to meet and exceed the unique and wide-ranging requirements of today's global power distribution systems. Designed and engineered for ultimate custom configuration and application flexibility in metal enclosed switchgear and power distribution enclosures.

**Technical Data**

Maximum current rating	630–1600A	800–6300A
Maximum voltage—AC	220–690 Vac	Up to 690 Vac
Maximum voltage—DC	—	—
Poles	3, 4	3, 4
Max. interrupting capacities See individual catalogs for limitations and back-up protection requirements.	65 kAIC at 480 Vac Max. withstand capacities 42 kAIC	200 kA at 480 Vac Max. withstand capacities 100 kAIC CL fuseless 200 kA at 635 Vac with integral limiters

**Approvals**

UL 1006 Component UL 489 Component IEC 60947-2	UL 1066 IEC 60947-2 KEMA
--	--------------------------------

**Environmental Data**

Humidity	—	—
Shock	—	—
Vibration	—	—
Operating temperature	–25° to 70°C	–25° to 70°C
Dielectric strength	—	—
Insulation resistance	—	—
Endurance/life	10,000 electrical operations 20,000 mechanical operations	—
Approximate weight	Three-pole breaker + cassette—85 lbs (39 kg) Three-pole breaker—53 lbs (24 kg) Four-pole breaker + cassette—104 lbs (47 kg) Four-pole breaker—67 lbs (30 kg)	—
Mounting configuration	Rear-connected, front-connected, surface mounting, mounting bracket, fixed, drawout breaker with cassette	Fixed or drawout with cassette rear-connected, front-connected

For our complete product offering, see Volume 4—Circuit Protection, CA08100005E.



Series G Molded Case Circuit Breakers



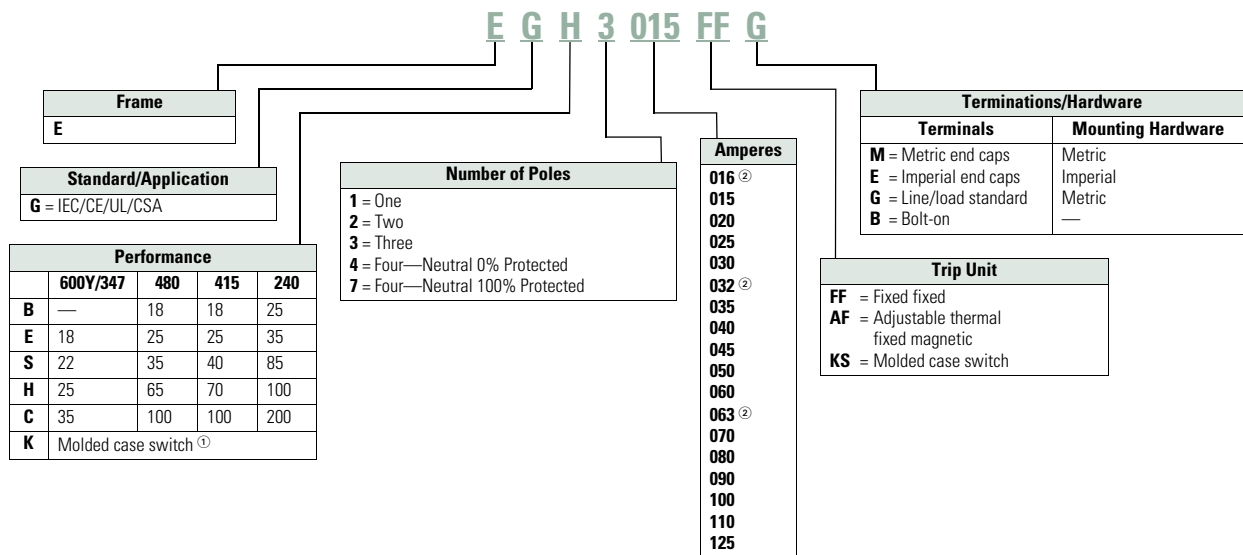
Features

- Field-fit accessories
- Common accessories through 630A
- Space-saving footprint
- High-performance current limiting designs up to 200 kAIC at 480V
- Global ready: UL, CSA, CE, IEC, KEMA-KEUR listings
- Complete breaker includes frame, trip unit, standard terminals and mounting hardware

Catalog Number Selection

Series G® Molded Case Circuit Breakers

EG Frame



Notes

- ① Available only as 125 and 160A sizes.
- ② Is not UL rated.

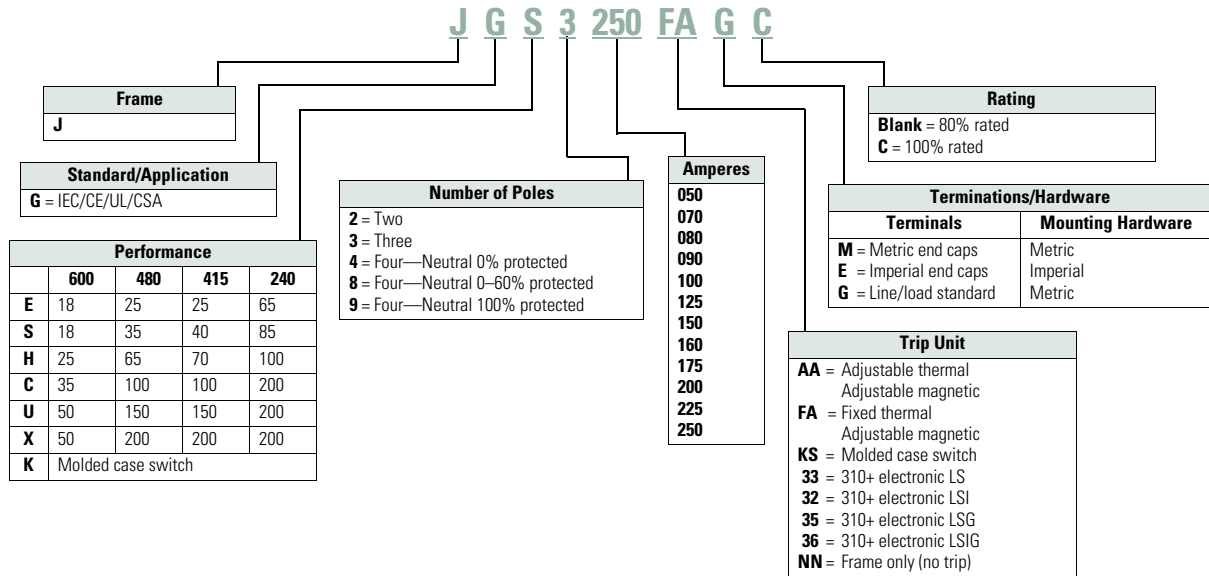
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## Circuit Protection

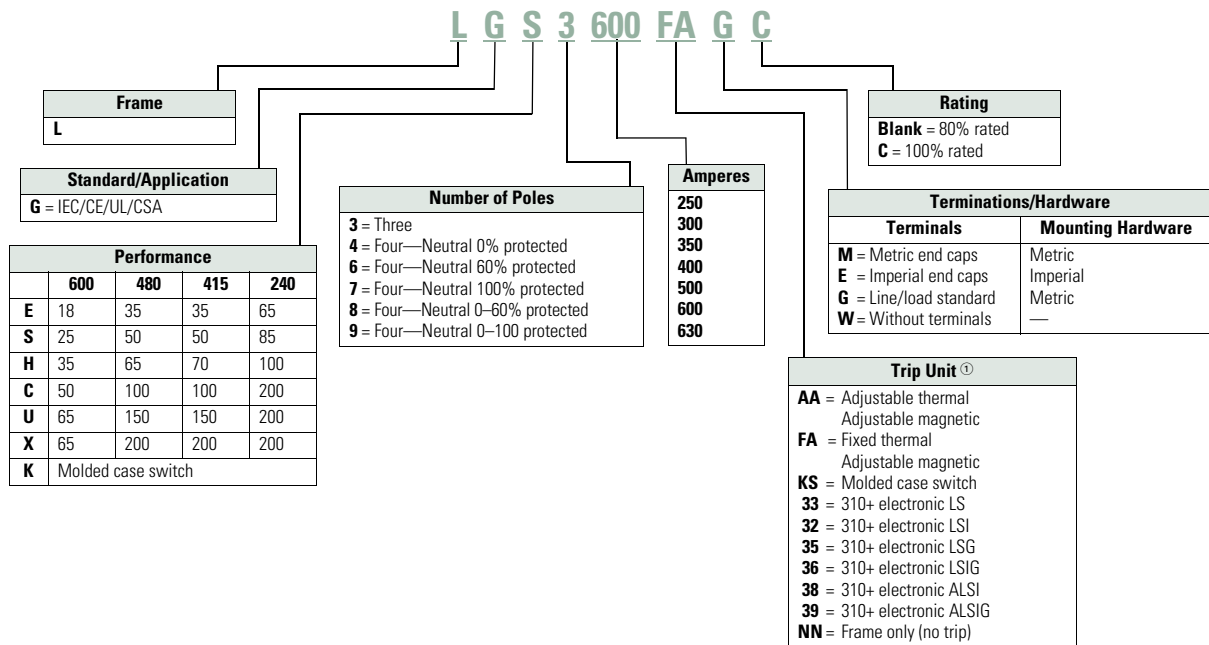
### Circuit Breakers

1

#### JG Frame



#### LG Frame



**Note**

① A = Arc reduction, L = Long, S = Short, I = Instantaneous, G = Ground.

## Product Selection

### Series G Molded Case Circuit Breakers

Approximate Dimensions are in Inches

#### EG Frame

Maximum Continuous Amperes at 40°C ①

Three-Pole 3.00 W x 5.50 H x 2.99 D  
Fixed Thermal  
Fixed Magnetic

IC Rating: 25 kAIC at 415 and 480 Vac

15	EGE3015FFG
20	EGE3020FFG
25	EGE3025FFG
30	EGE3030FFG
35	EGE3035FFG
40	EGE3040FFG
45	EGE3045FFG
50	EGE3050FFG
60	EGE3060FFG
70	EGE3070FFG
80	EGE3080FFG
90	EGE3090FFG
100	EGE3100FFG
125	EGE3125FFG

Maximum Continuous Amperes at 40°C

Three-Pole 3.00 W x 5.50 H x 2.99 D  
Fixed Thermal  
Fixed Magnetic

IC Rating: 70 kAIC at 415 Vac, 65 kAIC at 480 Vac

15	EGH3015FFG
20	EGH3020FFG
25	EGH3025FFG
30	EGH3030FFG
35	EGH3035FFG
40	EGH3040FFG
45	EGH3045FFG
50	EGH3050FFG
60	EGH3060FFG
70	EGH3070FFG
80	EGH3080FFG
90	EGH3090FFG
100	EGH3100FFG
125	EGH3125FFG

#### JG Frame

Maximum Continuous Amperes

Three-Pole 4.13 W x 7.00 H x 3.57 D  
Magnetic Range  
Fixed Thermal Adjustable Magnetic

IC Rating: 25 kAIC at 415 and 480 Vac

70	350–700	JGE3070FAG
90	450–900	JGE3090FAG
100	500–1000	JGE3100FAG
125	625–1250	JGE3125FAG
150	750–1550	JGE3150FAG
175	875–1750	JGE3175FAG
200	1000–2000	JGE3200FAG
225	1125–2250	JGE3225FAG
250	1250–2500	JGE3250FAG

Maximum Continuous Amperes

Three-Pole 4.13 W x 7.00 H x 3.57 D  
Magnetic Range  
Fixed Thermal Adjustable Magnetic

IC Rating: 70 kAIC at 415 Vac, 65 kAIC at 480 Vac

70	350–700	JGH3070FAG
90	450–900	JGH3090FAG
100	500–1000	JGH3100FAG
125	625–1250	JGH3125FAG
150	750–1550	JGH3150FAG
175	875–1750	JGH3175FAG
200	1000–2000	JGH3200FAG
225	1125–2250	JGH3225FAG
250	1250–2500	JGH3250FAG

#### LG Frame

Ampere Rating

Three-Pole 5.48 W x 10.13 H x 4.09 D  
Fixed Thermal Adjustable Magnetic

IC Rating: 35 kAIC at 415 and 480 Vac

250	LGE3250FAG
300	LGE3300FAG
350	LGE3350FAG
400	LGE3400FAG
500	LGE3500FAG
600	LGE3600FAG

Ampere Rating

Three-Pole 3.00 W x 5.50 H x 2.99 D  
Fixed Thermal Adjustable Magnetic

IC Rating: 70 kAIC at 415 Vac, 65 kAIC at 480 Vac

250	LGH3250FAG
300	LGH3300FAG
350	LGH3350FAG
400	LGH3400FAG
500	LGH3500FAG
600	LGH3600FAG

#### Note

① 16, 32, 63A are not UL listed ratings.

#### Series G Motor Circuit Protector



#### Features

- Instantaneous only protector
- Designed for use in combination with motor starters
- Adjustable to motor FLA
- UL recognized component, File E7819 motor circuit protectors

### Product Selection

#### Series G Motor Circuit Protectors

##### EG Frame—480 Vac, 600Y/347 Vac Maximum

Continuous Amperes	Cam Setting	Motor Full Load Current Amperes <sup>①</sup>	MCP Trip Setting <sup>②</sup>	MCP Catalog Number
3	A	0.69–0.91	9	<b>HMCPE003A0C</b>
	B	1.1–1.3	15	
	C	1.6–1.7	21	
	D	2.0–2.2	27	
	E	2.3–2.5	30	
	F	2.6–2.8	33	
7	A	1.5–2.0	21	<b>HMCPE007C0C</b>
	B	2.6–3.1	35	
	C	3.7–3.9	49	
	D	4.8–5.2	63	
	E	5.3–5.7	70	
	F	5.8–6.1	77	
15	A	3.4–4.5	45	<b>HMCPE015E0C</b>
	B	5.7–6.8	75	
	C	8.0–9.1	105	
	D	10.4–11.4	135	
	E	11.5–12.6	150	
	F	12.7–13.0	165	
30	A	3.9–9.1	90	<b>HMCPE030H1C</b>
	B	11.5–13.7	150	
	C	16.1–18.3	210	
	D	20.7–22.9	270	
	E	23.0–25.2	300	
	F	25.3–26.1	330	

Continuous Amperes	Cam Setting	Motor Full Load Current Amperes <sup>①</sup>	MCP Trip Setting <sup>②</sup>	MCP Catalog Number
50	A	11.5–15.2	150	<b>HMCPE050K2C</b>
	B	19.2–22.9	250	
	C	26.9–30.6	350	
	D	34.6–38.3	450	
	E	38.4–42.1	500	
	F	42.2–43.5	550	
70	A	16.1–30.6	210	<b>HMCPE070M2C</b>
	B	26.9–32.2	350	
	C	37.6–42.9	490	
	D	48.4–53.7	630	
	E	53.8–59.1	700	
	F	59.2–60.9	770	
100	A	23.0–30.6	300	<b>HMCPE100R3C</b>
	B	38.4–46.0	500	
	C	53.8–61.4	700	
	D	69.2–76.8	900	
	E	76.9–84.5	1000	
	F	84.6–87.0	1100	
100	A	38.4–46.0	500	<b>HMCPE100T3C</b>
	B	57.6–65.2	750	
	C	76.9–84.5	1000	
	D	③	1250	
	E	③	1375	
	F	③	1500	

#### Notes

- ① Motor FLA ranges are typical. The corresponding trip setting is at 13 times the minimum FLA value shown. Where a 13 times setting is required for an intermediate FLA value, alternate cam settings and/or MCP ratings should be used.
- ② For DC applications, actual trip levels are approximately 40% higher than values shown.
- ③ Settings above 10 x I<sub>n</sub> are for special applications, where the ampere rating of the disconnecting means cannot be less than 115% of the motor full load ampere rating.

**JG Frame—600 Vac Maximum, 250 Vdc Maximum**

<b>Continuous Amperes</b>	<b>MCP Trip Range Amperes</b>	<b>MCP Catalog Number</b>
250	500–1000	<b>HMCPJ250D5L</b>
	625–1250	<b>HMCPJ250F5L</b>
	750–1500	<b>HMCPJ250G5L</b>
	875–1750	<b>HMCPJ250J5L</b>
	1000–2000	<b>HMCPJ250K5L</b>
	1125–2250	<b>HMCPJ250L5L</b>
	1250–2500	<b>HMCPJ250W5L</b>

**LG Frame—600 Vac Maximum, 250 Vdc Maximum**

<b>Continuous Amperes</b>	<b>MCP Trip Range Amperes</b>	<b>MCP Catalog Number</b>
600	1250–2500	<b>HMCP600L6G</b>
	1500–3000	<b>HMCP600N6G</b>
	1750–3500	<b>HMCP600R6G</b>
	2000–4000	<b>HMCP600X6G</b>
	2250–4500	<b>HMCP600Y6G</b>
	2500–5000	<b>HMCP600P6G</b>
	3000–6000	<b>HMCP600M6G</b>

**Series G Motor Protector Breakers****Features**

- Eliminates need for separate overload relay
- Can be used with contactor to eliminate need for overload relay and still create manual motor control
- Meets requirement for motor branch protection, including:
  - Disconnecting means
  - Branch circuit short-circuit protection
  - Overload protection
- UL 489 listed, IEC 60947-02 rated
- Phase unbalance, phase loss protection and high load alarm
- Optional pre-detection trip relay

**Product Selection****Series G Motor Protector Breakers**

For pre-trip alarm option, order Style Number 5721B31G02.

**JG Frame Motor Protector Circuit Breakers,  
250A Maximum Rated Current**

Continuous Amperes	35 kAIC Catalog Number	65 kAIC Catalog Number
50	JGMPS050G	JGMPH050G
100	JGMPS100G	JGMPH100G
160	JGMPS160G	JGMPH160G
250	JGMPS250G	JGMPH250G

**LG Frame Motor Protector Circuit Breakers,  
630A Maximum Rated Current**

Continuous Amperes	50 kAIC Catalog Number	65 kAIC Catalog Number
250	LGMP250G	LGMPH250G
400	LGMP400G	LGMPH400G
600	LGMP600G	LGMPH600G
630 ①	LGMP630G	LGMPH630G

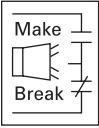
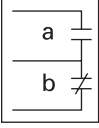
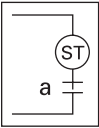
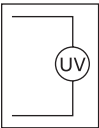
**Note**

① 630A is not a UL listed rating. 600A is the maximum UL or CSA rating for LG breaker.



Accessories

Field Fit Kit Catalog Numbers

	Description	Pole Location	Frame— EG, JG and LG
<b>Alarm Lockout</b> 	<b>Alarm Lockout</b>		
	Make/break	Right	ALM1M1BEPK ①
	2 make/2 break	Right	ALM2M2BEPK ②
<b>Auxiliary Switch</b> 	<b>Auxiliary Switch</b>		
	1A, 1B	Right	AUX1A1BPK
	2A, 2B	Right	AUX2A2BPK
<b>Auxiliary Switch/Alarm Lockout</b>			
	—	Right	AUXALRMEPK ③
<b>Shunt Trip</b> 	<b>Shunt Trip—Standard</b>		
	120 Vac	Left	SNT120CPK ④
	240 Vac	Left	SNT120CPK ④
	12 Vdc	Left	SNT012CPK
	24 Vdc	Left	SNT060CPK
	48 Vdc	Left	SNT060CPK
	380–600 Vac	Left	SNT480CPK ⑤
<b>Undervoltage Release Mechanism</b> 	<b>Undervoltage Release Mechanism</b>		
	110–127 Vac	Left	UVR120APK
	208–240 Vac	Left	UVR240APK
	24 Vac	Left	UVR024APK
	24 Vdc	Left	UVR024DPK
	48–60 Vdc	Left	UVR048DPK
	12 Vac/Vdc	Left	UVR012CPK
	48–60 Vac	Left	UVR048APK
	120 Vdc	Left	UVR125DPK
	220–250 Vdc	Left	UVR250DPK
	380–500 Vac	Left	UVR480APK
525–600 Vac	Left	UVR600APK	

Multiwire Connectors Ordering Information (Package of 3)

High SCCR ratings are available for Power Distribution blocks with Series G MCCBs. See **Tab 6**.

Maximum Amperes	Wires per Terminal	Wire Size Range AWG Cu	Frame	Kit Catalog Number
125	3	14–2	EG	3TA125E3K
125	6	14–6	EG	3TA125E6K
250	3	14–2	JG	3TA250FJ3
250	6	14–6	JG	3TA250FJ6

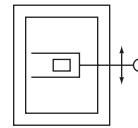
Terminal Shields

Location	Number of Poles	Frame	IP30 Protection Catalog Number
Line	3	EG	EFTS3K
Line	4	EG	EFTS4K
Line or load	2, 3	JG	FJTS3K
Line or load	4	JG	FJTS4K

Interphase Barriers (Package of 2)

Number of Poles	Frame	Catalog Number
3 or 4	EG	EIPBK
3	JG	FJIPBK
4	JG	FJIPBK4
3 or 4	LG	IPB3

Flex Shaft Handles



Flex Shaft Handle Mechanisms

Breaker Frame	Flexible Shaft Length in ft (m)	
	4 (1.2)	7 (2.1)
	Catalog Number	Catalog Number
EG	EHMFS04	EHMFS07
JG	JHMFS04	JHMFS07
LG	LHMFS04	LHMFS07

Universal Direct Handle Mechanism



Universal Direct Handle Mechanisms

Frame	With Interlock Catalog Number		Without Interlock Catalog Number	
	Black Handle Color	Red Handle Color	Black Handle Color	Red Handle Color
EG	EHMCCBI	EHMCCR	EHMCCB	EHMCCR
JG	JHMCCBI	JHMCCR	JHMCCB	JHMCCR
LG	LHMCCBI	LHMCCR	LHMCCB	LHMCCR

Notes

- ① Part number for JG and LG is ALM1M1BJPK.
- ② Part number for JG and LG is ALM2M2BJPK.
- ③ Part number for JG and LG is AUXALRMJPK.
- ④ 110–125 Vdc, 50/60 Hz.
- ⑤ 380–600 Vdc, 50/60 Hz.

#### Rotary Handle Mechanisms



#### High Performance Rotary Handle Mechanisms (Complete Kit Includes Handle, Shaft and Mechanism)

Color	Rating Type UL	IP	EG Frame <sup>①</sup> Catalog Number	JG Frame Catalog Number	LG Frame Catalog Number
Black/blue	1/12/3R	20/54/55	EGHMVD06B	JGHMVD06B	LGHMVD06B
			EGHMVD12B	JGHMVD12B	LGHMVD12B
			EGHMVD24B	JGHMVD24B	LGHMVD24B
Red/yellow	1/12/3R	20/54/55	EGHMVD06R	JGHMVD06R	LGHMVD06R
			EGHMVD12R	JGHMVD12R	LGHMVD12R
			EGHMVD24R	JGHMVD24R	LGHMVD24R
Black/blue	4/4X	66	EGHMVD06BX	JGHMVD06BX	LGHMVD06BX
			EGHMVD12BX	JGHMVD12BX	LGHMVD12BX
			EGHMVD24BX	JGHMVD24BX	LGHMVD24BX
Red/yellow	4/4X	66	EGHMVD06RX	JGHMVD06RX	LGHMVD06RX
			EGHMVD12RX	JGHMVD12RX	LGHMVD12RX
			EGHMVD24RX	JGHMVD24RX	LGHMVD24RX

#### External Accessories

Description	Fit Type	Frame EG	JG	LG
Non-padlockable handle block	Field	EFHB	—	—
Padlockable handle block	Field	EFPHB	—	—
Padlockable handle block off-only	Field	EFPHBOFF	FJPHBOFF	LBHPOFF
Padlockable handle lock hasp	Field	EFPHL	FJPHL	LPHL
Padlockable handle lock hasp off-only	Field	EFPHLOFF	FJPHLOFF	LPHLOFF
Kirk key interlock kit <sup>②③</sup>	Field	—	KYKJG	KYKLG
Castell key interlock kit <sup>③④</sup>	Field	—	CTKJG	CTKLG
Slide bar interlock <sup>⑤</sup>	Field	EFSBI	FJSBI	LGSBI
Walking beam interlock	Three-pole	EG3WBI	JG3WBI	LG3WBI
	Four-pole	EG4WBI	JG4WBI	LG4WBI
Electrical operator	120/240 Vac	MOPEG240C	MOPJG240C	MOPLG240C
	125 Vdc	MOPEG240C	MOPJG240C	MOPLG240C
Plug-in adapters	Three-pole	PAD3E	PAD3J	PAD3L
	Four-pole	PAD4E	PAD4J	PAD4L
Rear connecting studs	Field	EFRCSDL	FJRCSDL	3P-LRCS3WK
		EFRCSDS	FJRCSDS	4P-LRCS4WK
		EFRCSWL	FJRCSWL	—
		EFRCSWS	FJRCSWS	—

#### Notes

- ① Compatible with three-pole and four-pole EG breakers only.
- ② Provision only.
- ③ See Volume 4—Circuit Protection, CA08100005E, Tab 2, for bolt projection dimensions.
- ④ Castell bolt mounting hole must be 10 mm.
- ⑤ Requires two breakers.

Universal Molded Case Circuit Breakers



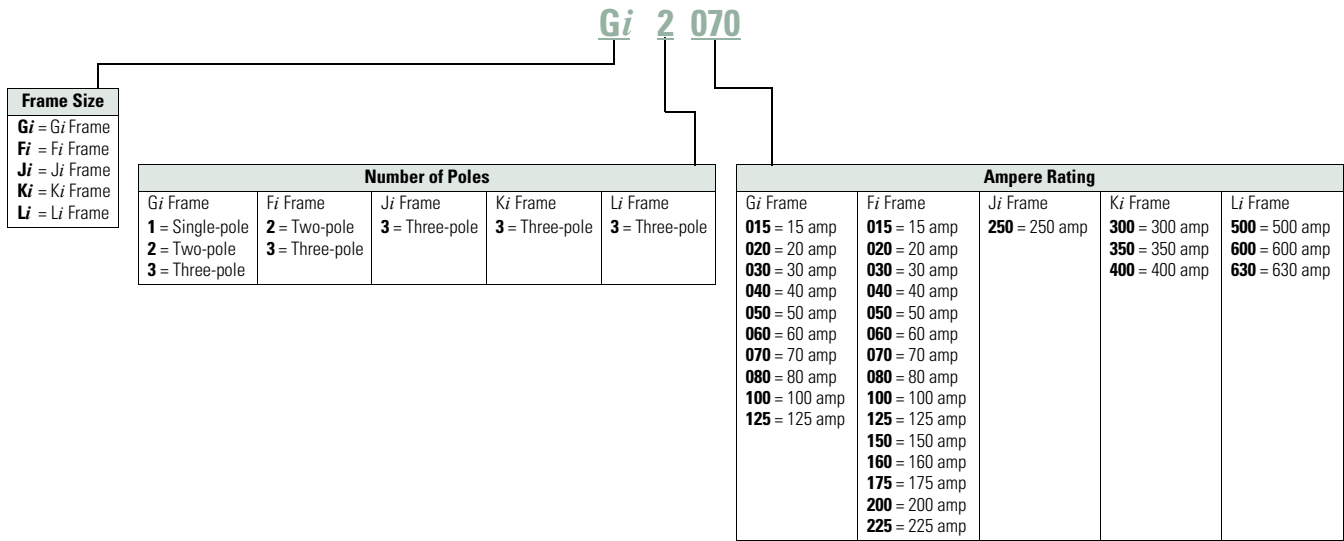
Features

- Universal design for both NEMA® (UL 489) and IEC (IEC 947-2) standards
- Suitable for 50°C application
- Factory-sealed thermal magnetic trip unit
- Standard interrupting ratings
- Includes mounting hardware and terminals

Catalog Number Selection

Universal Molded Case Circuit Breakers

Universal Molded Case



## Product Selection

### Universal Molded Case Circuit Breakers

#### Three-Pole

Approximate Dimensions are in Inches

#### Universal G Frame

Description	Amperes	Catalog Number <sup>①</sup>	
3 W x 4-7/8 H x 2-13/16 D (optional DIN rail kit available catalog number GDIN, package of ten)	15	<b>Gi3015</b>	
	20	<b>Gi3020</b>	
	25	<b>Gi3025</b>	
	30	<b>Gi3030</b>	
<b>Voltage</b>	<b>Interrupting Rating</b>		
380–415	18/5K	35	<b>Gi3035</b>
480/277	14K	40	<b>Gi3040</b>
		45	<b>Gi3045</b>
		50	<b>Gi3050</b>
		60	<b>Gi3060</b>

#### Universal F Frame

Description	Amperes	Catalog Number <sup>①</sup>	
4-1/8 W x 6 H x 3-3/8 D	15	<b>Fi3015L</b>	
	20	<b>Fi3020L</b>	
	30	<b>Fi3030L</b>	
	35	<b>Fi3035L</b>	
<b>Voltage</b>	<b>Interrupting Rating</b>		
415	18/9K	40	<b>Fi3040L</b>
480	20K	50	<b>Fi3050L</b>
		60	<b>Fi3060L</b>
		70	<b>Fi3070L</b>
		80	<b>Fi3080L</b>
		90	<b>Fi3090L</b>
		100	<b>Fi3100L</b>
		125	<b>Fi3125L</b>
		150	<b>Fi3150L</b>
		175	<b>Fi3175L</b>
		200	<b>Fi3200L</b>
		225	<b>Fi3225L</b>

#### Universal J Frame

Description	Amperes	Catalog Number <sup>①</sup>
4-1/8 W x 10 H x 4-1/16 D	225	<b>Ji3225L</b>
	250	<b>Ji3250L</b>
<b>Voltage</b>	<b>Interrupting Rating</b>	
415	25/13K	
480	20K	

#### Universal K Frame

Description	Amperes	Catalog Number <sup>①</sup>
5-1/2 W x 10-1/8 H x 4-1/16 D	300	<b>Ki3300L</b>
	350	<b>Ki3350L</b>
	400	<b>Ki3400L</b>
<b>Voltage</b>	<b>Interrupting Rating</b>	
415	25/13K	
480	20K	

#### Universal L Frame

Description	Amperes	Catalog Number <sup>①</sup>
8-1/4 W x 10-3/4 H x 4.37 D	500	<b>Li3500</b>
	600	<b>Li3600</b>
<b>Voltage</b>	<b>Interrupting Rating</b>	
415	25/13K	
480	20K	

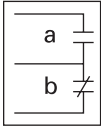
#### Note

<sup>①</sup> Metric mounting hardware.

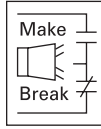
Accessories

Internal Accessories

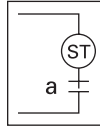
Auxiliary Switch (Right-Pole Mounted)



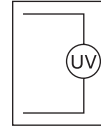
Bell Alarm (Right-Pole Mounted)



Shunt Trip (Left-Pole Mounted)



UVR (Left-Pole Mounted)



Configuration	Add This Suffix to Catalog Number	Configuration	Add This Suffix to Catalog Number	Voltage Range	Add This Suffix to Catalog Number	Voltage Range	Add This Suffix to Catalog Number
<b>Universal G Frame</b>							
1NO/1NC	<b>A3</b>	1 make/1 break	<b>B3</b>	24 Vac	<b>S7</b>	24 Vac 50/60 Hz	<b>T2</b>
2NO/2NC	<b>A6</b>			120 Vac	<b>S1</b>	48 Vac 50/60 Hz	<b>T3</b>
				240 Vac	<b>S2</b>	60 Vac 50/60 Hz	<b>T4</b>
				12 Vdc	<b>S3</b>	120 Vac 50/60 Hz	<b>T1</b>
				24 Vdc	<b>S4</b>	240 Vac 50/60 Hz	<b>T8</b>
						220 Vac 50 Hz	<b>T7</b>
						440 Vac 50 Hz	<b>T11</b>
						480 Vac 60 Hz	<b>T12</b>
<b>Universal F Frame</b>							
1NO/1NC	<b>A06</b>	1 make/1 break	<b>B06</b>	12–24 Vac/Vdc	<b>S02</b>	12 Vac	<b>U02</b>
2NO/2NC	<b>A13</b>			48–127 Vac or 48–60 Vdc	<b>S06</b>	24 Vac	<b>U06</b>
				208–380 Vac or 110–127 Vdc	<b>S10</b>	48 Vac/Vdc	<b>U38</b>
				415–600 Vac or 220–250 Vdc	<b>S14</b>	110–127 Vac	<b>U14</b>
						208–240 Vac	<b>U18</b>
						380–480 Vac	<b>U22</b>
						525–600 Vac	<b>U26</b>
						12 Vdc	<b>U30</b>
						24 Vdc	<b>U34</b>
						125 Vdc	<b>U42</b>
						220–250 Vdc	<b>U46</b>
<b>Universal J Frame</b>							
1NO/1NC	<b>A06</b>	1 make/1 break	<b>B06</b>	12–24 Vac/Vdc	<b>S42</b>	12 Vac	<b>U06</b>
2 NO/2NC	<b>A13</b>			48–60 Vac/Vdc	<b>S50</b>	24 Vac	<b>U10</b>
				110–240 Vac or 110–125 Vdc	<b>S10</b>	48–60 Vac	<b>U14</b>
				380–440 Vac or 220–50 Vdc	<b>S14</b>	110–127 Vac	<b>U18</b>
				480–600 Vac	<b>S18</b>	208–240 Vac	<b>U22</b>
						380–480 Vac	<b>U26</b>
						12 Vdc	<b>T02</b>
						24 Vdc	<b>T06</b>
						48–60 Vdc	<b>T10</b>
						110–125 Vdc	<b>T14</b>
						220–250 Vdc	<b>T18</b>

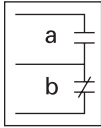
If both an auxiliary switch and bell alarm are required, add B13 to the catalog number (right-pole mounted). Auxiliary switch and bell alarm are 240V rated.

If both an auxiliary switch and bell alarm are required, add C05 to the catalog number (right-pole mounted). Auxiliary switch and bell alarm are 600V rated.

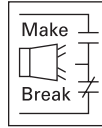
If both an auxiliary switch and bell alarm are required, add C05 to the catalog number (right-pole mounted). Auxiliary switch and bell alarm are 600V rated.

#### Internal Accessories, continued

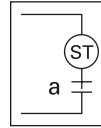
**Auxiliary Switch (Right-Pole Mounted)**



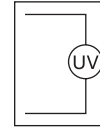
**Bell Alarm (Right-Pole Mounted)**



**Shunt Trip (Left-Pole Mounted)**



**UVR (Left-Pole Mounted)**



Configuration	Add This Suffix to Catalog Number	Configuration	Add This Suffix to Catalog Number	Voltage Range	Add This Suffix to Catalog Number	Voltage Range	Add This Suffix to Catalog Number		
<b>Universal K Frame</b>									
1NO/1NC	<b>A06</b>	1 make/1 break	<b>B06</b>	12–24 Vac/Vdc	<b>S42</b>	12 Vac	<b>U06</b>		
2NO/2NC	<b>A13</b>			48–60 Vac/Vdc	<b>S50</b>	24 Vac	<b>U10</b>		
If both an auxiliary switch and bell alarm are required, add C05 to the catalog number (right-pole mounted). Auxiliary switch and bell alarm are 600V rated.				110–240 Vac or 110–125 Vdc	<b>S10</b>	48–60 Vac	<b>U14</b>		
								110–127 Vac	<b>U18</b>
				380–440 Vac or 220–250 Vdc	<b>S14</b>	208–240 Vac	<b>U22</b>		
						380–480 Vac	<b>U26</b>		
				480–600 Vac	<b>S18</b>	12 Vdc	<b>T02</b>		
						24 Vdc	<b>T06</b>		
		48–60 Vdc	<b>T10</b>						
		110–125 Vdc	<b>T14</b>						
		220–250 Vdc	<b>T18</b>						
<b>Universal L Frame</b>									
1NO/1NC	<b>A06</b>	1 make/1 break	<b>B06</b>	12–24 Vac/Vdc	<b>S02</b>	12 Vac	<b>U06</b>		
2NO/2NC	<b>A13</b>			48–60 Vdc	<b>S06</b>	24 Vac	<b>U10</b>		
If both an auxiliary switch and bell alarm are required, add C05 to the catalog number (right-pole mounted). Auxiliary switch and bell alarm are 600V rated.				48–60 Vac	<b>S86</b>	48–60 Vac	<b>U14</b>		
				110–240 Vac	<b>S10</b>	110–127 Vac	<b>U18</b>		
				110–125 Vdc	<b>S42</b>	208–240 Vac	<b>U22</b>		
				380–440 Vac or 220–250 Vdc	<b>S14</b>	380–480 Vac	<b>U26</b>		
				480–600 Vac	<b>S18</b>	12 Vdc	<b>T02</b>		
						24 Vdc	<b>T06</b>		
		48–60 Vdc	<b>T10</b>						
		110–125 Vdc	<b>T14</b>						
		220–250 Vdc	<b>T18</b>						



## Handle Mechanisms

## Handle Mechanisms

## Type 1/12 Universal Rotary

Ordering Information <sup>①</sup>

Shaft Length in Inches (mm)	Handle Color	Complete Catalog Number	Flange Flex Shaft Type 1, 3R, 12 Versions
--------------------------------	-----------------	----------------------------	--

**Universal G Frame**

6 (152.4)	Black	<b>GHMVD06B</b>	3-ft length; order <b>F0S03C</b>
12 (304.8)	Black	<b>GHMVD12B</b>	4-ft length; order <b>F0S04C</b>
6 (152.4)	Red	<b>GHMVD06R</b>	5-ft length; order <b>F0S05C</b>
12 (304.8)	Red	<b>GHMVD12R</b>	6-ft length; order <b>F0S06C</b>

**Universal F Frame**

6 (152.4)	Black	<b>FHMVD06B</b>	3-ft length; order <b>F1S03C</b>
12 (304.8)	Black	<b>FHMVD12B</b>	4-ft length; order <b>F1S04C</b>
6 (152.4)	Red	<b>FHMVD06R</b>	5-ft length; order <b>F1S05C</b>
12 (304.8)	Red	<b>FHMVD12R</b>	6-ft length; order <b>F1S06C</b>
			7-ft length; order <b>F1S07C</b>
			8-ft length; order <b>F1S08C</b>
			9-ft length; order <b>F1S09C</b>
			10-ft length; order <b>F1S10C</b>

**Universal J Frame**

6 (152.4)	Black	<b>JHMVD06B</b>	3-ft length; order <b>F2S03C</b>
12 (304.8)	Black	<b>JHMVD12B</b>	4-ft length; order <b>F2S04C</b>
6 (152.4)	Red	<b>JHMVD06R</b>	5-ft length; order <b>F2S05C</b>
12 (304.8)	Red	<b>JHMVD12R</b>	6-ft length; order <b>F2S06C</b>
			7-ft length; order <b>F2S07C</b>
			8-ft length; order <b>F2S08C</b>
			9-ft length; order <b>F2S09C</b>
			10-ft length; order <b>F2S10C</b>

**Universal K Frame**

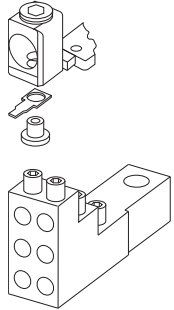
6 (152.4)	Black	<b>KHMVD06B</b>	3-ft length; order <b>F3S03C</b>
12 (304.8)	Black	<b>KHMVD12B</b>	4-ft length; order <b>F3S04C</b>
6 (152.4)	Red	<b>KHMVD06R</b>	5-ft length; order <b>F3S05C</b>
12 (304.8)	Red	<b>KHMVD12R</b>	6-ft length; order <b>F3S06C</b>
			7-ft length; order <b>F3S07C</b>
			8-ft length; order <b>F3S08C</b>
			9-ft length; order <b>F3S09C</b>
			10-ft length; order <b>F3S10C</b>

**Note**

<sup>①</sup> Only available as complete handle mechanism. Parts not sold separately.

### Terminals and Termination Accessory Devices

#### Terminal/Termination Devices



#### Universal G Frame

Terminals (Included with Breaker)		Optional Multiwire Lugs (Load End Only)	
15–20 A	25–100A	Three-Hole Version	Six-Hole Version
14–2 AWG Cu/Al	10–1/0 AWG Cu/Al	(3) 14–2 AWG Order <b>3TA100G3K</b>	(6) 14–6 AWG Order <b>3TA100G6K</b>
2.5–4 mm <sup>2</sup> Cu/Al	4–50 mm <sup>2</sup> Cu/Al		

#### Universal F Frame

Terminals (Included with Breaker)			Optional Multiwire Lugs (Load End Only)	
10–20A	25–100A	110–225A	Three-Hole Version	Six-Hole Version
14–10 AWG Cu/Al	14–1/0 AWG Cu/Al	4–4/0 AWG Cu/Al	(3) 14–2 AWG Order <b>3TA150F3K</b>	(6) 14–6 AWG Order <b>3TA150F6K</b>
2.5–4 mm <sup>2</sup> Cu/Al	2.5–50 mm <sup>2</sup> Cu/Al	25–95 mm <sup>2</sup> Cu/Al		

#### Universal J Frame

Terminals (Included with Breaker)		Optional Multiwire Lugs (Load End Only)	
70–250A		Three-Hole Version	Six-Hole Version
4–350 kcmil AWG Cu/Al		(3) 14–2 AWG Order <b>3TA250J3K</b>	(6) 14–6 AWG Order <b>3TA250J6K</b>
25–150 mm <sup>2</sup> Cu/Al			

#### Universal K Frame

Terminals (Included with Breaker)		Optional Multiwire Lugs (Load End Only)	
300–350A	400A	Three-Hole Version	Six-Hole Version
250–500 kcmil AWG Cu/Al	3/0–200 (2) AWG Cu/Al	(3) 12–2/0 AWG Order <b>3TA400K3K</b>	(6) 14–2/0 AWG Order <b>3TA400K6K</b>
120–240 mm <sup>2</sup> Cu/Al	95–120 mm <sup>2</sup> Cu/Al		

#### Universal L Frame

Terminals (Included with Breaker)		Optional Multiwire Lugs (Load End Only)	
500A	600A	Three-Hole Version	Six-Hole Version
(2) 250–300 kcmil Cu/Al	(2) 400–500 kcmil Cu/Al	—	—
120–150 mm <sup>2</sup> Cu/Al	185–250 mm <sup>2</sup> Cu/Al		

**QUICKLAG Type QC Miniature Circuit Breakers—Cable-In/Cable-Out Type QC**



**Features**

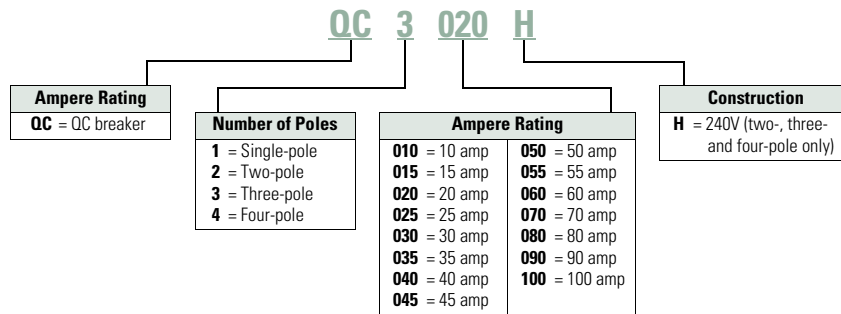
For Cable-In/Cable-Out Panel Mount Applications

- Single-, two-, three- and four-pole options
- Built and listed to UL 489
- All products UL and CSA listed
- All products 10–100A are HACR rated

**Catalog Number Selection**

**QUICKLAG Type QC Miniature Circuit Breakers—Cable-In/Cable-Out Type QC**

**Type QC Miniature Circuit Breakers**



**Product Selection**

**QUICKLAG Type QC 10,000 Ampere I.C. Thermal-Magnetic Breakers**

**Note:** For non-automatic switches, see Volume 4—Circuit Protection, CA08100005E, Tab 1.

Continuous Ampere Rating at 40°C	Single-Pole, 120/240 Vac Catalog Number	Two-Pole, 120/240 Vac Catalog Number	Three-Pole, 240 Vac Catalog Number
10	QC1010	QC2010	—
15	QC1015 ①②	QC2015	QC3015H
20	QC1020 ①②	QC2020	QC3020H
30	QC1030	QC2030	QC3030H
40	QC1040	QC2040	QC3040H
50	QC1050	QC2050	QC3050H
60	—	QC2060	QC3060H
70	—	QC2070	QC3070H
100	QC1100	QC2100	QC3100H

**Notes**

- ① Switching duty rated for 120 Vac fluorescent light applications only.
- ② For special low-magnetic breaker, order QC1015L1 or QC1020L1.

#### QUICKLAG Type QC Miniature Circuit Breakers—Cable-In/Cable-Out Type QCD



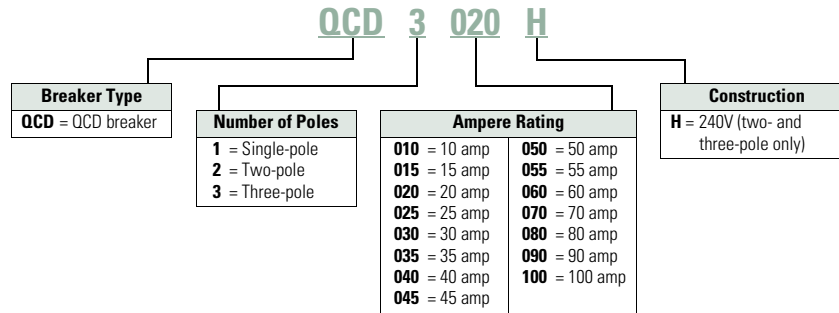
#### Features

For Cable-In/Cable-Out DIN rail Mount HVAC Applications

- Single-, two- and three-pole options
- Modular construction
- DIN mounted (symmetrical rail 35 in x 7.5 in DIN/EN 50 022)
- Flexible power feed connection: wire size, position
- Same breaker size for entire rating range
- Field-mountable accessories: finger-shroud proof, quick connect terminals, jumper units

#### Catalog Number Selection

##### QUICKLAG Type QC Miniature Circuit Breakers—Cable-In/Cable-Out Type QCD



#### Product Selection

##### QUICKLAG Type QCD 10,000 Ampere I.C. Thermal-Magnetic Breakers

Continuous Ampere Rating at 40°C	Single-Pole, 120/240 Vac Catalog Number	Two-Pole, 120/240 Vac Catalog Number	Three-Pole, 240 Vac Catalog Number
10	QCD1010	QCD2010	—
15	QCD1015	QCD2015	QCD3015H
20	QCD1020	QCD2020	QCD3020H
30	QCD1030	QCD2030	QCD3030H
40	QCD1040	QCD2040	QCD3040H
50	QCD1050	QCD2050	QCD3050H
60	QCD1060	QCD2060	QCD3060H
70	—	QCD2070	QCD3070H
100	—	QCD2100	QCD3100H

**QUICKLAG Type QC Miniature Circuit Breakers—Cable-In/Cable-Out 1/2-Inch Wide Types QCR, QCF**



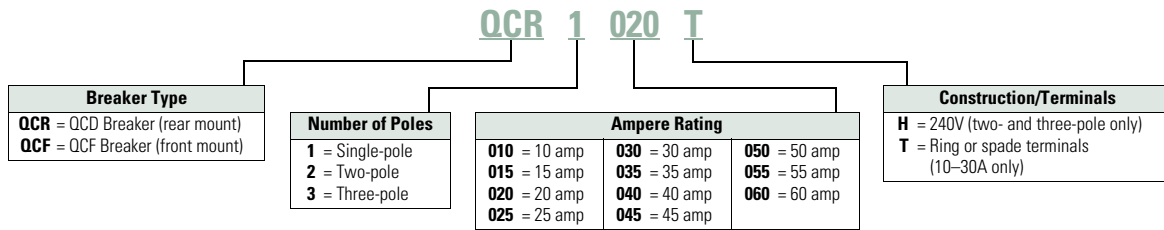
**Features**

When Space is at a Premium

- QCR: For DIN rail mount cable-in/cable-out applications
- QCF: For front-mount through-the-door cable-in/cable-out applications
- 1/2 in (12.7 mm) wide per pole
- Three-position handle: ON, tripped (center), OFF
- Thermal-magnetic protection
- Single-, two- and three-pole
- 10 kAIC at 120/240 Vac, 10–60A
- 10 kAIC at 240 Vac, 10–30A

**Catalog Number Selection**

**QUICKLAG Type QC Miniature Circuit Breakers—Cable-In/Cable-Out 1/2-Inch Wide Types QCR, QCF**



**Product Selection**

**QUICKLAG Type QCR Breakers 10 kAIC Interrupting Ratings ①②③④**

Continuous Ampere Rating at 40°C	Single-Pole 120/240 Vac Catalog Number	Two-Pole 120/240 Vac Catalog Number	Three-Pole 240 Vac Catalog Number
10	QCR1010 QCR1010T	QCR2010 QCR2010T	—
15	QCR1015 ⑤ QCR1015T ⑤	QCR2015 QCR2015T	QCR3015H QCR3015HT
20	QCR1020 ⑤ QCR1020T ⑤	QCR2020 QCR2020T	QCR3020H QCR3020HT
25	QCR1025 —	QCR2025 —	QCR3025H QCR3025HT
30	QCR1030 —	QCR2030 —	QCR3030H QCR3030HT
35	QCR1035	QCR2035	—
40	QCR1040	QCR2040	—
45	QCR1045	QCR2045	—
50	QCR1050	QCR2050	—
55	QCR1055	—	—
60 ⑥	QCR1060	QCR2060	—

**QUICKLAG Type QCF Breakers 10 kAIC Interrupting Ratings ①②③**

Continuous Ampere Rating at 40°C	Single-Pole 120/240 Vac Catalog Number	Two-Pole 120/240 Vac Catalog Number	Three-Pole 240 Vac Catalog Number
10	QCF1010 QCF1010T	QCF2010 QCF2010T	—
15	QCF1015 ⑤ —	QCF2015 —	QCF3015H QCF3015HT
20	QCF1020 ⑤ —	QCF2020 —	QCF3020H QCF3020HT
25	QCF1025 —	QCF2025 —	QCF3025H QCF3025HT
30	QCF1030 —	QCF2030 —	QCF3030H QCF3030HT
40	QCF1040	QCF2040	—
50	QCF1050	QCF2050	—
60 ⑥	QCF1060	QCF2060	—

**Notes**

- ① Standard breaker terminals are box type lugs.
- ② Breakers with "T" catalog number suffix are suitable for line and load side ring terminal connection (#10-32 plus/minus terminal screw provided).
- ③ Breakers with "P" catalog number suffix are suitable for terminating two 10 AWG quick-connect type terminals per phase on breaker load side.
- ④ Breakers with shunt trip (extra pole required on breaker right-hand side) are available on single-, two- and three-pole.
- ⑤ All 15 and 20A single-pole breakers are SWD (switching duty) rated for fluorescent lighting applications.
- ⑥ 60/75°C Cu/Al wire on all ratings except 60A, which requires Cu only conductor.

#### Accessories

##### Type QCR and QCF

Description	Catalog Number
Steel mounting clip mounts QCR breaker if individual mounting is required. Quantity two required for single- and two-pole and four required for three-pole breakers.	<b>QCRMTGFT</b>
Removable padlock device for single-pole QCR or QCF breaker.	<b>QCRFPL1P</b>
Removable padlock device for multi-pole QCR or QCF breaker.	<b>QCRFPLMP</b>
Padlock bracket assembly for QCR or QCF single- or multi-pole breakers (OFF only).	<b>QCRFLOFF</b>
Padlock bracket for QCR, lock-off only.	<b>QCRPLOFF</b>
QUICKLAG Type C Spacer	<b>QCRSPACER</b>

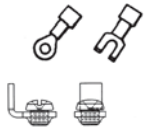
##### QUICKLAG Type C Spacer



##### QCR and QCF Ring or Spade Lug Terminals

QCR and QCF ring or spade lug terminals (10–30A ratings only). Factory installed line and load side terminals each equipped with a #10-32 screw suitable for terminating one 10 AWG wire with insulated ring or spade type terminal as shown.

**Suffix "T"**





**QUICKLAG Type QC Miniature Circuit Breakers—Cable-In/Cable-Out  
1/2-Inch Wide Types QCGF, QCGFEP**



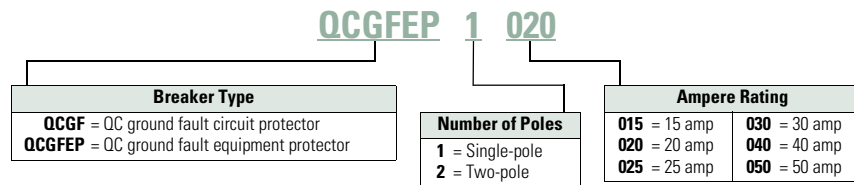
**Features**

For Cable-In/Cable-Out Panel-Mount Applications

- QUICKLAG ground fault circuit breakers, Class A GFCI:
- Built and tested to UL 943
- 5 mA trip sensitivity
- QUICKLAG ground fault equipment protectors:
  - Built and tested to UL 1053
  - 30 mA trip sensitivity
- All products UL and CSA listed

**Catalog Number Selection**

**QUICKLAG Type QC Miniature Circuit Breakers—  
Cable-In/Cable-Out Ground Fault and Equipment Protector Types QCGF, QCGFEP**






**Product Selection**

**Types QCGF and QCGFEP Thermal-Magnetic Breakers**

Continuous Ampere Rating at 40°C	Single-Pole, 120/240 Vac Catalog Number	Two-Pole, 120/240 Vac Catalog Number
<b>Ground Fault Circuit Breakers—5 mA Sensitivity</b>		
QUICKLAG Type: QCGF 10,000 Ampere I.C.		
15	QCGF1015	QCGF2015
20	QCGF1020	QCGF2020
30	QCGF1030	QCGF2030
40	QCGF1040	QCGF2040
50	—	QCGF2050
<b>Ground Fault Equipment Protectors—30 mA Sensitivity</b>		
QUICKLAG Type: QCGFEP 10,000 Ampere I.C.		
15	QCGFEP1015	QCGFEP2015
20	QCGFEP1020	QCGFEP2020
30	QCGFEP1030	QCGFEP2030
40	QCGFEP1040	QCGFEP2040
50	—	QCGFEP2050

### Accessories

#### Type QC Miniature Circuit Breakers

	Accessory <sup>①</sup>	Description	Catalog Number
<b>Handle Locks</b> 	Handle locks: Non-padlockable <sup>②</sup>	QUICKLAG type P, B, C—single-pole	<b>QL1NPL</b>
		QUICKLAG type P, B, C—two-, three-pole	<b>QL23NPL</b>
	Handle locks: Padlockable	QUICKLAG type P, B, C—single-pole	<b>QL1PL</b>
		QUICKLAG type C—single-, two-, three-pole	<b>QC123PL</b>
		QUICKLAG type C—single-, two-, three-pole (off only)	<b>QCD123PLOFF</b>
<b>Handle Tie</b> 	Handle tie	QUICKLAG handle tie—single-pole	<b>QL1HT</b>
		QUICKLAG handle tie—three-pole	<b>QL3HT</b>
<b>Hardware</b> 	Mounting hardware	QUICKLAG type C face mounting clip	<b>QCFLIP</b>
		QUICKLAG type C face mounting plate—single-pole	<b>QC1FP</b>
		QUICKLAG type C face mounting plate—two-pole	<b>QC2FP</b>
		QUICKLAG type C face mounting plate—three-pole	<b>QC3FP</b>
		QUICKLAG type C face mounting plate and lock-off (off only)—two-pole <sup>③</sup>	<b>QC2FPLOFF</b>
		QUICKLAG type C face mounting plate and lock-off (off only)—three-pole	<b>QC3FPLOFF</b>
		QUICKLAG type C base mounting clamp	<b>QCBCLIP</b>
		QUICKLAG base mounting plate—six poles total	<b>QC6BP</b>
		QUICKLAG type C base mounting plate, six-poles total— heavy-duty screw-secured	<b>QC6BPS</b>
		QUICKLAG type C (QCD) two-way jumper unit with cover	<b>QCDJ2</b>
		QUICKLAG type C (QCD) four-way jumper unit with cover	<b>QCDJ4</b>
		QUICKLAG type C (QCD) six-way jumper unit with cover	<b>QCDJ6</b>
		QUICKLAG type C (QCD) two-way jumper unit, no cover	<b>QCDJ2T</b>
		QUICKLAG type C (QCD) four-way jumper unit, no cover	<b>QCDJ4T</b>
		QUICKLAG type C (QCD) six-way jumper unit, no cover	<b>QCDJ6T</b>
		QUICKLAG type QCD finger protection attachment	<b>QCDFP</b>
	QUICKLAG type C DIN rail adapter	<b>QCDINADAPT</b>	

#### Notes

- ① See **Page V9-T1-22** for QCR and QCF accessories.
- ② Can lock in ON or OFF position.
- ③ Suitable for ground fault breakers.

FAZ-NA UL 489 Circuit Breakers



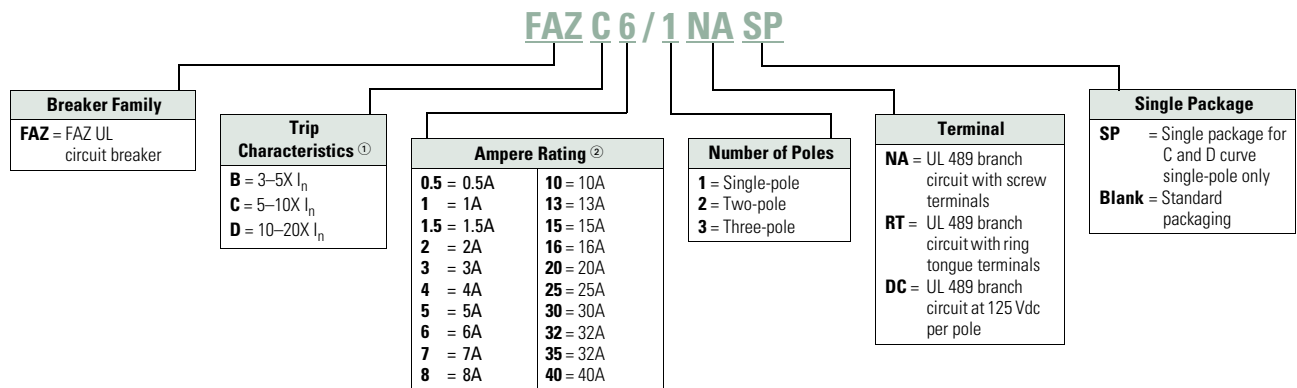
Features

- UL 489 listed DIN rail mounted miniature circuit breakers up to 40A current rating
- Current limiting design provides fast short-circuit interruption that reduces let-through energy
- Thermal-magnetic overcurrent protection
  - Three levels of short-circuit protection, categorized by B, C and D curves
- Ring-tongue terminals available
- Complete line of accessories

Catalog Number Selection

FAZ-NA UL 489 Circuit Breakers

FAZ-NA UL 489



Notes

- ① I<sub>n</sub> = Rated current for instantaneous trip characteristics.
- ② B curve starts at 1 ampere.

## Product Selection

## FAZ-NA UL 489 Circuit Breakers— 10 kAIC, 14 kAIC B Curve (15–25A)

Amperes	Single-Pole <sup>①</sup> Catalog Number	Two-Pole Catalog Number	Three-Pole Catalog Number
<b>B Curve (3–5X I<sub>n</sub> Current Rating)</b>			
1	FAZ-B1/1-NA	FAZ-B1/2-NA	FAZ-B1/3-NA
1.5	FAZ-B1.5/1-NA	FAZ-B1.5/2-NA	FAZ-B1.5/3-NA
2	FAZ-B2/1-NA	FAZ-B2/2-NA	FAZ-B2/3-NA
3	FAZ-B3/1-NA	FAZ-B3/2-NA	FAZ-B3/3-NA
4	FAZ-B4/1-NA	FAZ-B4/2-NA	FAZ-B4/3-NA
5	FAZ-B5/1-NA	FAZ-B5/2-NA	FAZ-B5/3-NA
6	FAZ-B6/1-NA	FAZ-B6/2-NA	FAZ-B6/3-NA
7	FAZ-B7/1-NA	FAZ-B7/2-NA	FAZ-B7/3-NA
8	FAZ-B8/1-NA	FAZ-B8/2-NA	FAZ-B8/3-NA
10	FAZ-B10/1-NA	FAZ-B10/2-NA	FAZ-B10/3-NA
13	FAZ-B13/1-NA	FAZ-B13/2-NA	FAZ-B13/3-NA
15	FAZ-B15/1-NA	FAZ-B15/2-NA	FAZ-B15/3-NA
16	FAZ-B16/1-NA	FAZ-B16/2-NA	FAZ-B16/3-NA
20	FAZ-B20/1-NA	FAZ-B20/2-NA	FAZ-B20/3-NA
25	FAZ-B25/1-NA	FAZ-B25/2-NA	FAZ-B25/3-NA
30	FAZ-B30/1-NA	FAZ-B30/2-NA	FAZ-B30/3-NA
32	FAZ-B32/1-NA	FAZ-B32/2-NA	FAZ-B32/3-NA
35 <sup>②</sup>	FAZ-B35/1-NA	FAZ-B35/2-NA	FAZ-B35/3-NA
40 <sup>②</sup>	FAZ-B40/1-NA	FAZ-B40/2-NA	FAZ-B40/3-NA

## FAZ-RT UL 489 Circuit Breakers with Ring-Tongue Terminals— 10 kAIC, 14 kAIC B Curve (15–25A)

Amperes	Single-Pole <sup>①</sup> Catalog Number	Two-Pole Catalog Number	Three-Pole Catalog Number
<b>B Curve with Ring-Tongue Terminals (3–5X I<sub>n</sub> Current Rating)</b>			
1	FAZ-B1/1-RT	FAZ-B1/2-RT	FAZ-B1/3-RT
1.5	FAZ-B1.5/1-RT	FAZ-B1.5/2-RT	FAZ-B1.5/3-RT
2	FAZ-B2/1-RT	FAZ-B2/2-RT	FAZ-B2/3-RT
3	FAZ-B3/1-RT	FAZ-B3/2-RT	FAZ-B3/3-RT
4	FAZ-B4/1-RT	FAZ-B4/2-RT	FAZ-B4/3-RT
5	FAZ-B5/1-RT	FAZ-B5/2-RT	FAZ-B5/3-RT
6	FAZ-B6/1-RT	FAZ-B6/2-RT	FAZ-B6/3-RT
7	FAZ-B7/1-RT	FAZ-B7/2-RT	FAZ-B7/3-RT
8	FAZ-B8/1-RT	FAZ-B8/2-RT	FAZ-B8/3-RT
10	FAZ-B10/1-RT	FAZ-B10/2-RT	FAZ-B10/3-RT
13	FAZ-B13/1-RT	FAZ-B13/2-RT	FAZ-B13/3-RT
15	FAZ-B15/1-RT	FAZ-B15/2-RT	FAZ-B15/3-RT
16	FAZ-B16/1-RT	FAZ-B16/2-RT	FAZ-B16/3-RT
20	FAZ-B20/1-RT	FAZ-B20/2-RT	FAZ-B20/3-RT
25	FAZ-B25/1-RT	FAZ-B25/2-RT	FAZ-B25/3-RT
30	FAZ-B30/1-RT	FAZ-B30/2-RT	FAZ-B30/3-RT
32	FAZ-B32/1-RT	FAZ-B32/2-RT	FAZ-B32/3-RT
35 <sup>②</sup>	FAZ-B35/1-RT	FAZ-B35/2-RT	FAZ-B35/3-RT
40 <sup>②</sup>	FAZ-B40/1-RT	FAZ-B40/2-RT	FAZ-B40/3-RT

## FAZ-NA UL 489 Circuit Breakers— 10 kAIC, 14 kAIC C Curve (15–25A)

Amperes	Single-Pole <sup>③</sup> Catalog Number	Two-Pole Catalog Number	Three-Pole Catalog Number
<b>C Curve (5–10X I<sub>n</sub> Current Rating)</b>			
0.5	FAZ-C0.5/1-NA-SP	FAZ-C0.5/2-NA	FAZ-C0.5/3-NA
1	FAZ-C1/1-NA-SP	FAZ-C1/2-NA	FAZ-C1/3-NA
1.5	FAZ-C1.5/1-NA-SP	FAZ-C1.5/2-NA	FAZ-C1.5/3-NA
2	FAZ-C2/1-NA-SP	FAZ-C2/2-NA	FAZ-C2/3-NA
3	FAZ-C3/1-NA-SP	FAZ-C3/2-NA	FAZ-C3/3-NA
4	FAZ-C4/1-NA-SP	FAZ-C4/2-NA	FAZ-C4/3-NA
5	FAZ-C5/1-NA-SP	FAZ-C5/2-NA	FAZ-C5/3-NA
6	FAZ-C6/1-NA-SP	FAZ-C6/2-NA	FAZ-C6/3-NA
7	FAZ-C7/1-NA-SP	FAZ-C7/2-NA	FAZ-C7/3-NA
8	FAZ-C8/1-NA-SP	FAZ-C8/2-NA	FAZ-C8/3-NA
10	FAZ-C10/1-NA-SP	FAZ-C10/2-NA	FAZ-C10/3-NA
13	FAZ-C13/1-NA-SP	FAZ-C13/2-NA	FAZ-C13/3-NA
15	FAZ-C15/1-NA-SP	FAZ-C15/2-NA	FAZ-C15/3-NA
16	FAZ-C16/1-NA-SP	FAZ-C16/2-NA	FAZ-C16/3-NA
20	FAZ-C20/1-NA-SP	FAZ-C20/2-NA	FAZ-C20/3-NA
25	FAZ-C25/1-NA-SP	FAZ-C25/2-NA	FAZ-C25/3-NA
30	FAZ-C30/1-NA-SP	FAZ-C30/2-NA	FAZ-C30/3-NA
32	FAZ-C32/1-NA-SP	FAZ-C32/2-NA	FAZ-C32/3-NA
35 <sup>②</sup>	FAZ-C35/1-NA-SP	FAZ-C35/2-NA	FAZ-C35/3-NA
40 <sup>②</sup>	FAZ-C40/1-NA-SP	FAZ-C40/2-NA	FAZ-C40/3-NA

## FAZ-RT UL 489 Circuit Breakers with Ring-Tongue Terminals— 10 kAIC, 14 kAIC C Curve (15–25A)

Amperes	Single-Pole <sup>③</sup> Catalog Number	Two-Pole Catalog Number	Three-Pole Catalog Number
<b>C Curve with Ring-Tongue Terminals (5–10X I<sub>n</sub> Current Rating)</b>			
0.5	FAZ-C0.5/1-RT-SP	FAZ-C0.5/2-RT	FAZ-C0.5/3-RT
1	FAZ-C1/1-RT-SP	FAZ-C1/2-RT	FAZ-C1/3-RT
1.5	FAZ-C1.5/1-RT-SP	FAZ-C1.5/2-RT	FAZ-C1.5/3-RT
2	FAZ-C2/1-RT-SP	FAZ-C2/2-RT	FAZ-C2/3-RT
3	FAZ-C3/1-RT-SP	FAZ-C3/2-RT	FAZ-C3/3-RT
4	FAZ-C4/1-RT-SP	FAZ-C4/2-RT	FAZ-C4/3-RT
5	FAZ-C5/1-RT-SP	FAZ-C5/2-RT	FAZ-C5/3-RT
6	FAZ-C6/1-RT-SP	FAZ-C6/2-RT	FAZ-C6/3-RT
7	FAZ-C7/1-RT-SP	FAZ-C7/2-RT	FAZ-C7/3-RT
8	FAZ-C8/1-RT-SP	FAZ-C8/2-RT	FAZ-C8/3-RT
10	FAZ-C10/1-RT-SP	FAZ-C10/2-RT	FAZ-C10/3-RT
13	FAZ-C13/1-RT-SP	FAZ-C13/2-RT	FAZ-C13/3-RT
15	FAZ-C15/1-RT-SP	FAZ-C15/2-RT	FAZ-C15/3-RT
16	FAZ-C16/1-RT-SP	FAZ-C16/2-RT	FAZ-C16/3-RT
20	FAZ-C20/1-RT-SP	FAZ-C20/2-RT	FAZ-C20/3-RT
25	FAZ-C25/1-RT-SP	FAZ-C25/2-RT	FAZ-C25/3-RT
30	FAZ-C30/1-RT-SP	FAZ-C30/2-RT	FAZ-C30/3-RT
32	FAZ-C32/1-RT-SP	FAZ-C32/2-RT	FAZ-C32/3-RT
35 <sup>②</sup>	FAZ-C35/1-RT-SP	FAZ-C35/2-RT	FAZ-C35/3-RT
40 <sup>②</sup>	FAZ-C40/1-RT-SP	FAZ-C40/2-RT	FAZ-C40/3-RT

## Notes

- ① Two-piece order. Quantities of two per box.
- ② 240 Vac rated only.
- ③ Option for single packaging on single-pole C and D curves only; add suffix SP when ordering.

**FAZ-NA UL 489 Circuit Breakers— 10 kAIC, 14 kAIC  
D Curve (13–20A)**

Amperes	Single-Pole <sup>①</sup> Catalog Number	Two-Pole Catalog Number	Three-Pole Catalog Number
<b>D Curve (10–20X I<sub>n</sub> Current Rating)</b>			
0.5	FAZ-D0.5/1-NA-SP	FAZ-D0.5/2-NA	FAZ-D0.5/3-NA
1	FAZ-D1/1-NA-SP	FAZ-D1/2-NA	FAZ-D1/3-NA
1.5	FAZ-D1.5/1-NA-SP	FAZ-D1.5/2-NA	FAZ-D1.5/3-NA
2	FAZ-D2/1-NA-SP	FAZ-D2/2-NA	FAZ-D2/3-NA
3	FAZ-D3/1-NA-SP	FAZ-D3/2-NA	FAZ-D3/3-NA
4	FAZ-D4/1-NA-SP	FAZ-D4/2-NA	FAZ-D4/3-NA
5	FAZ-D5/1-NA-SP	FAZ-D5/2-NA	FAZ-D5/3-NA
6	FAZ-D6/1-NA-SP	FAZ-D6/2-NA	FAZ-D6/3-NA
7	FAZ-D7/1-NA-SP	FAZ-D7/2-NA	FAZ-D7/3-NA
8	FAZ-D8/1-NA-SP	FAZ-D8/2-NA	FAZ-D8/3-NA
10	FAZ-D10/1-NA-SP	FAZ-D10/2-NA	FAZ-D10/3-NA
13	FAZ-D13/1-NA-SP	FAZ-D13/2-NA	FAZ-D13/3-NA
15	FAZ-D15/1-NA-SP	FAZ-D15/2-NA	FAZ-D15/3-NA
16	FAZ-D16/1-NA-SP	FAZ-D16/2-NA	FAZ-D16/3-NA
20	FAZ-D20/1-NA-SP	FAZ-D20/2-NA	FAZ-D20/3-NA
25	FAZ-D25/1-NA-SP	FAZ-D25/2-NA	FAZ-D25/3-NA
30	FAZ-D30/1-NA-SP	FAZ-D30/2-NA	FAZ-D30/3-NA
32	FAZ-D32/1-NA-SP	FAZ-D32/2-NA	FAZ-D32/3-NA
35 <sup>②</sup>	FAZ-D35/1-NA-SP	FAZ-D35/2-NA	FAZ-D35/3-NA
40 <sup>②</sup>	FAZ-D40/1-NA-SP	FAZ-D40/2-NA	FAZ-D40/3-NA

**FAZ-NA-DC UL 489 Circuit Breakers— 10 kAIC at  
125 Vdc Per Pole**

Amperes	Single-Pole <sup>③</sup> Catalog Number	Two-Pole Catalog Number
<b>C Curve (5–10X I<sub>n</sub> Current Rating)</b>		
2	FAZ-C2/1-NA-DC-SP	FAZ-C2/2-NA-DC
3	FAZ-C3/1-NA-DC-SP	FAZ-C3/2-NA-DC
4	FAZ-C4/1-NA-DC-SP	FAZ-C4/2-NA-DC
5	FAZ-C5/1-NA-DC-SP	FAZ-C5/2-NA-DC
6	FAZ-C6/1-NA-DC-SP	FAZ-C6/2-NA-DC
7	FAZ-C7/1-NA-DC-SP	FAZ-C7/2-NA-DC
8	FAZ-C8/1-NA-DC-SP	FAZ-C8/2-NA-DC
10	FAZ-C10/1-NA-DC-SP	FAZ-C10/2-NA-DC
13	FAZ-C13/1-NA-DC-SP	FAZ-C13/2-NA-DC
15	FAZ-C15/1-NA-DC-SP	FAZ-C15/2-NA-DC
16	FAZ-C16/1-NA-DC-SP	FAZ-C16/2-NA-DC
20	FAZ-C20/1-NA-DC-SP	FAZ-C20/2-NA-DC
25	FAZ-C25/1-NA-DC-SP	FAZ-C25/2-NA-DC
30	FAZ-C30/1-NA-DC-SP	FAZ-C30/2-NA-DC
32	FAZ-C32/1-NA-DC-SP	FAZ-C32/2-NA-DC
35	FAZ-C35/1-NA-DC-SP	FAZ-C35/2-NA-DC
40	FAZ-C40/1-NA-DC-SP	FAZ-C40/2-NA-DC

**Notes**

- ① Option for single packaging on single-pole C and D curves only; add suffix SP when ordering.  
 ② 240 Vac rated only.  
 ③ Option for single packaging on single-pole C curves only; add suffix SP when ordering.

**FAZ-RT UL 489 Circuit Breakers with Ring-Tongue  
Terminals— 10 kAIC, 14 kAIC D Curve (13–20A)**

Amperes	Single-Pole <sup>①</sup> Catalog Number	Two-Pole Catalog Number	Three-Pole Catalog Number
<b>D Curve with Ring-Tongue Terminals (10–20X I<sub>n</sub> Current Rating)</b>			
0.5	FAZ-D0.5/1-RT-SP	FAZ-D0.5/2-RT	FAZ-D0.5/3-RT
1	FAZ-D1/1-RT-SP	FAZ-D1/2-RT	FAZ-D1/3-RT
1.5	FAZ-D1.5/1-RT-SP	FAZ-D1.5/2-RT	FAZ-D1.5/3-RT
2	FAZ-D2/1-RT-SP	FAZ-D2/2-RT	FAZ-D2/3-RT
3	FAZ-D3/1-RT-SP	FAZ-D3/2-RT	FAZ-D3/3-RT
4	FAZ-D4/1-RT-SP	FAZ-D4/2-RT	FAZ-D4/3-RT
5	FAZ-D5/1-RT-SP	FAZ-D5/2-RT	FAZ-D5/3-RT
6	FAZ-D6/1-RT-SP	FAZ-D6/2-RT	FAZ-D6/3-RT
7	FAZ-D7/1-RT-SP	FAZ-D7/2-RT	FAZ-D7/3-RT
8	FAZ-D8/1-RT-SP	FAZ-D8/2-RT	FAZ-D8/3-RT
10	FAZ-D10/1-RT-SP	FAZ-D10/2-RT	FAZ-D10/3-RT
13	FAZ-D13/1-RT-SP	FAZ-D13/2-RT	FAZ-D13/3-RT
15	FAZ-D15/1-RT-SP	FAZ-D15/2-RT	FAZ-D15/3-RT
16	FAZ-D16/1-RT-SP	FAZ-D16/2-RT	FAZ-D16/3-RT
20	FAZ-D20/1-RT-SP	FAZ-D20/2-RT	FAZ-D20/3-RT
25	FAZ-D25/1-RT-SP	FAZ-D25/2-RT	FAZ-D25/3-RT
30	FAZ-D30/1-RT-SP	FAZ-D30/2-RT	FAZ-D30/3-RT
32	FAZ-D32/1-RT-SP	FAZ-D32/2-RT	FAZ-D32/3-RT
35 <sup>②</sup>	FAZ-D35/1-RT-SP	FAZ-D35/2-RT	FAZ-D35/3-RT
40 <sup>②</sup>	FAZ-D40/1-RT-SP	FAZ-C40/2-RT	FAZ-D40/3-RT

# 1.1

## Circuit Protection

### Circuit Breakers

1

#### FAZ UL 1077 Circuit Breakers



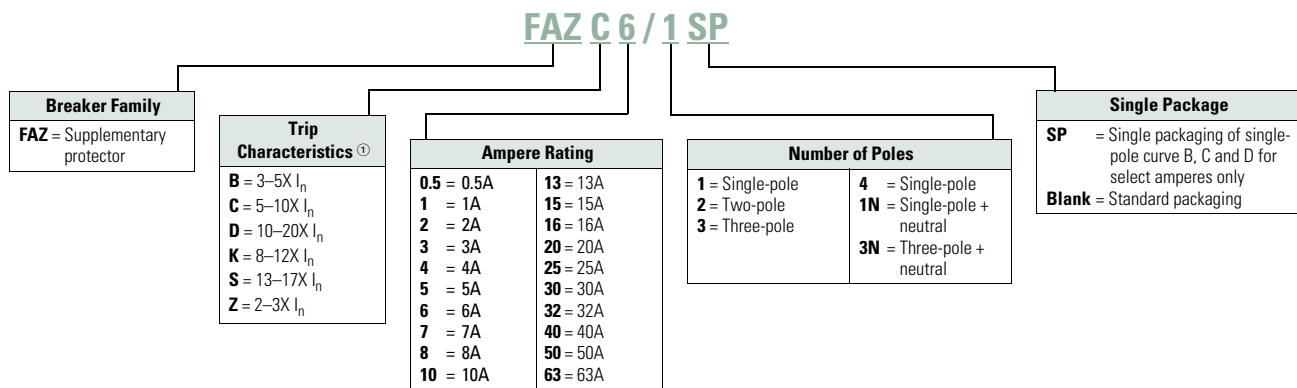
#### Features

- UL 1077 recognized DIN rail mounted supplemental protectors up to 63A
- Current limiting design provides fast short-circuit interruption that reduces let-through energy
- Thermal-magnetic overcurrent protection
  - Three levels of short-circuit protection, categorized by B, C and D curves
- Ideal replacement for fuses that are applied as supplemental protection
- Complete line of accessories

#### Catalog Number Selection

##### FAZ UL 1077 Circuit Breakers

##### FAZ UL 1077



**Note**

①  $I_n$  = Rated current for instantaneous trip characteristics.

## Product Selection

### B Curve (3–5X I<sub>n</sub> Current Rating)—Designed for Resistive or Slightly Inductive Loads <sup>①</sup>

Amperes	Single-Pole <sup>②</sup> Catalog Number	Two-Pole Catalog Number	Three-Pole Catalog Number
1	FAZ-B1/1-SP	FAZ-B1/2	FAZ-B1/3
2	FAZ-B2/1-SP	FAZ-B2/2	FAZ-B2/3
3	FAZ-B3/1-SP	FAZ-B3/2	FAZ-B3/3
4	FAZ-B4/1-SP	FAZ-B4/2	FAZ-B4/3
5	FAZ-B5/1-SP	FAZ-B5/2	FAZ-B5/3
6	FAZ-B6/1-SP	FAZ-B6/2	FAZ-B6/3
7	FAZ-B7/1-SP	FAZ-B7/2	FAZ-B7/3
8	FAZ-B8/1-SP	FAZ-B8/2	FAZ-B8/3
10	FAZ-B10/1-SP	FAZ-B10/2	FAZ-B10/3
12	FAZ-B12/1-SP	FAZ-B12/2	FAZ-B12/3
13	FAZ-B13/1-SP	FAZ-B13/2	FAZ-B13/3
15	FAZ-B15/1-SP	FAZ-B15/2	FAZ-B15/3
16	FAZ-B16/1-SP	FAZ-B16/2	FAZ-B16/3
20	FAZ-B20/1-SP	FAZ-B20/2	FAZ-B20/3
25	FAZ-B25/1-SP	FAZ-B25/2	FAZ-B25/3
30	FAZ-B30/1-SP	FAZ-B30/2	FAZ-B30/3
32	FAZ-B32/1-SP	FAZ-B32/2	FAZ-B32/3
40	FAZ-B40/1-SP	FAZ-B40/2	FAZ-B40/3
50	FAZ-B50/1-SP	FAZ-B50/2	FAZ-B50/3
63	FAZ-B63/1-SP	FAZ-B63/2	FAZ-B63/3

### B Curve (3–5X I<sub>n</sub> Current Rating)—Designed for Resistive or Slightly Inductive Loads, continued <sup>①</sup>

Amperes	Four-Pole	Single-Pole + Neutral	Three-Pole + Neutral
1	FAZ-B1/4	FAZ-B1/1N	FAZ-B1/3N
2	FAZ-B2/4	FAZ-B2/1N	FAZ-B2/3N
3	FAZ-B3/4	FAZ-B3/1N	FAZ-B3/3N
4	FAZ-B4/4	FAZ-B4/1N	FAZ-B4/3N
5	FAZ-B5/4	FAZ-B5/1N	FAZ-B5/3N
6	FAZ-B6/4	FAZ-B6/1N	FAZ-B6/3N
7	FAZ-B7/4	FAZ-B7/1N	FAZ-B7/3N
8	FAZ-B8/4	FAZ-B8/1N	FAZ-B8/3N
10	FAZ-B10/4	FAZ-B10/1N	FAZ-B10/3N
12	FAZ-B12/4	FAZ-B12/1N	FAZ-B12/3N
13	FAZ-B13/4	FAZ-B13/1N	FAZ-B13/3N
15	FAZ-B15/4	FAZ-B15/1N	FAZ-B15/3N
16	FAZ-B16/4	FAZ-B16/1N	FAZ-B16/3N
20	FAZ-B20/4	FAZ-B20/1N	FAZ-B20/3N
25	FAZ-B25/4	FAZ-B25/1N	FAZ-B25/3N
30	FAZ-B30/4	FAZ-B30/1N	FAZ-B30/3N
32	FAZ-B32/4	FAZ-B32/1N	FAZ-B32/3N
40	FAZ-B40/4	FAZ-B40/1N	FAZ-B40/3N
50	FAZ-B50/4	FAZ-B50/1N	FAZ-B50/3N
63	FAZ-B63/4	FAZ-B63/1N	FAZ-B63/3N

#### Notes

- <sup>①</sup> In North America, these switches are UL recognized and CSA Certified as supplementary protection devices. Per the intent of NEC (National Electrical Code), Article 240, and CEC (Canadian Electrical Code), Part 1 C22.1, supplementary breakers cannot be used as a substitute for the branch circuit protective device. They can be used to provide overcurrent protection within an appliance or other electrical equipment where branch circuit overcurrent protection is already provided, or is not required.
- <sup>②</sup> Option for single packaging on single-pole B, C and D curves only; add suffix SP when ordering.

### 1 C Curve (5–10X I<sub>n</sub> Current Rating)—Designed Inductive Loads <sup>①</sup>

Amperes	Single-Pole <sup>②</sup> Catalog Number	Two-Pole Catalog Number	Three-Pole Catalog Number
0.5	FAZ-C0.5/1-SP	FAZ-C0.5/2	FAZ-C0.5/3
1	FAZ-C1/1-SP	FAZ-C1/2	FAZ-C1/3
1.6	FAZ-C1.6/1-SP	FAZ-C1.6/2	FAZ-C1.6/3
2	FAZ-C2/1-SP	FAZ-C2/2	FAZ-C2/3
3	FAZ-C3/1-SP	FAZ-C3/2	FAZ-C3/3
4	FAZ-C4/1-SP	FAZ-C4/2	FAZ-C4/3
5	FAZ-C5/1-SP	FAZ-C5/2	FAZ-C5/3
6	FAZ-C6/1-SP	FAZ-C6/2	FAZ-C6/3
7	FAZ-C7/1-SP	FAZ-C7/2	FAZ-C7/3
8	FAZ-C8/1-SP	FAZ-C8/2	FAZ-C8/3
10	FAZ-C10/1-SP	FAZ-C10/2	FAZ-C10/3
13	FAZ-C13/1-SP	FAZ-C13/2	FAZ-C13/3
15	FAZ-C15/1-SP	FAZ-C15/2	FAZ-C15/3
16	FAZ-C16/1-SP	FAZ-C16/2	FAZ-C16/3
20	FAZ-C20/1-SP	FAZ-C20/2	FAZ-C20/3
25	FAZ-C25/1-SP	FAZ-C25/2	FAZ-C25/3
30	FAZ-C30/1-SP	FAZ-C30/2	FAZ-C30/3
32	FAZ-C32/1-SP	FAZ-C32/2	FAZ-C32/3
40	FAZ-C40/1-SP	FAZ-C40/2	FAZ-C40/3
50	FAZ-C50/1-SP	FAZ-C50/2	FAZ-C50/3
63	FAZ-C63/1-SP	FAZ-C63/2	FAZ-C63/3

### C Curve (5–10X I<sub>n</sub> Current Rating)—Designed Inductive Loads, continued <sup>①</sup>

Amperes	Four-Pole	Single-Pole + Neutral	Three-Pole + Neutral
0.5	FAZ-C0.5/4	FAZ-C0.5/1N	FAZ-C0.5/3N
1	FAZ-C1/4	FAZ-C1/1N	FAZ-C1/3N
1.6	FAZ-C1.6/4	FAZ-C1.6/1N	FAZ-C1.6/3N
2	FAZ-C2/4	FAZ-C2/1N	FAZ-C2/3N
3	FAZ-C3/4	FAZ-C3/1N	FAZ-C3/3N
4	FAZ-C4/4	FAZ-C4/1N	FAZ-C4/3N
5	FAZ-C5/4	FAZ-C5/1N	FAZ-C5/3N
6	FAZ-C6/4	FAZ-C6/1N	FAZ-C6/3N
7	FAZ-C7/4	FAZ-C7/1N	FAZ-C7/3N
8	FAZ-C8/4	FAZ-C8/1N	FAZ-C8/3N
10	FAZ-C10/4	FAZ-C10/1N	FAZ-C10/3N
13	FAZ-C13/4	FAZ-C13/1N	FAZ-C13/3N
15	FAZ-C15/4	FAZ-C15/1N	FAZ-C15/3N
16	FAZ-C16/4	FAZ-C16/1N	FAZ-C16/3N
20	FAZ-C20/4	FAZ-C20/1N	FAZ-C20/3N
25	FAZ-C25/4	FAZ-C25/1N	FAZ-C25/3N
30	FAZ-C30/4	FAZ-C30/1N	FAZ-C30/3N
32	FAZ-C32/4	FAZ-C32/1N	FAZ-C32/3N
40	FAZ-C40/4	FAZ-C40/1N	FAZ-C40/3N
50	FAZ-C50/4	FAZ-C50/1N	FAZ-C50/3N
63	FAZ-C63/4	FAZ-C63/1N	FAZ-C63/3N

#### Notes

- <sup>①</sup> In North America, these switches are UL recognized and CSA Certified as supplementary protection devices. Per the intent of NEC (National Electrical Code), Article 240, and CEC (Canadian Electrical Code), Part 1 C22.1, supplementary breakers cannot be used as a substitute for the branch circuit protective device. They can be used to provide overcurrent protection within an appliance or other electrical equipment where branch circuit overcurrent protection is already provided, or is not required.
- <sup>②</sup> Option for single packaging on single-pole B, C and D curves only; add suffix SP when ordering.



**D Curve (10–20X I<sub>n</sub> Current Rating)—Designed for Inductive Loads** <sup>①</sup>

Amperes	Single-Pole <sup>②</sup> Catalog Number	Two-Pole Catalog Number	Three-Pole Catalog Number
0.5	FAZ-D0.5/1-SP	FAZ-D0.5/2	FAZ-D0.5/3
1	FAZ-D1/1-SP	FAZ-D1/2	FAZ-D1/3
2	FAZ-D2/1-SP	FAZ-D2/2	FAZ-D2/3
3	FAZ-D3/1-SP	FAZ-D3/2	FAZ-D3/3
4	FAZ-D4/1-SP	FAZ-D4/2	FAZ-D4/3
5	FAZ-D5/1-SP	FAZ-D5/2	FAZ-D5/3
6	FAZ-D6/1-SP	FAZ-D6/2	FAZ-D6/3
7	FAZ-D7/1-SP	FAZ-D7/2	FAZ-D7/3
8	FAZ-D8/1-SP	FAZ-D8/2	FAZ-D8/3
10	FAZ-D10/1-SP	FAZ-D10/2	FAZ-D10/3
13	FAZ-D13/1-SP	FAZ-D13/2	FAZ-D13/3
15	FAZ-D15/1-SP	FAZ-D15/2	FAZ-D15/3
16	FAZ-D16/1-SP	FAZ-D16/2	FAZ-D16/3
20	FAZ-D20/1-SP	FAZ-D20/2	FAZ-D20/3
25	FAZ-D25/1-SP	FAZ-D25/2	FAZ-D25/3
30	FAZ-D30/1-SP	FAZ-D30/2	FAZ-D30/3
32	FAZ-D32/1-SP	FAZ-D32/2	FAZ-D32/3
40	FAZ-D40/1-SP	FAZ-D40/2	FAZ-D40/3
50 <sup>③</sup>	FAZ-D50/1-SP	FAZ-D50/2	FAZ-D50/3
63 <sup>③</sup>	FAZ-D63/1-SP	FAZ-D63/2	FAZ-D63/3

**D Curve (10–20X I<sub>n</sub> Current Rating)—Designed for Inductive Loads, continued** <sup>①</sup>

Amperes	Four-Pole	Single-Pole + Neutral	Three-Pole + Neutral
0.5	FAZ-D0.5/4	FAZ-D0.5/1N	FAZ-D0.5/3N
1	FAZ-D1/4	FAZ-D1/1N	FAZ-D1/3N
2	FAZ-D2/4	FAZ-D2/1N	FAZ-D2/3N
3	FAZ-D3/4	FAZ-D3/1N	FAZ-D3/3N
4	FAZ-D4/4	FAZ-D4/1N	FAZ-D4/3N
5	FAZ-D5/4	FAZ-D5/1N	FAZ-D5/3N
6	FAZ-D6/4	FAZ-D6/1N	FAZ-D6/3N
7	FAZ-D7/4	FAZ-D7/1N	FAZ-D7/3N
8	FAZ-D8/4	FAZ-D8/1N	FAZ-D8/3N
10	FAZ-D10/4	FAZ-D10/1N	FAZ-D10/3N
13	FAZ-D13/4	FAZ-D13/1N	FAZ-D13/3N
15	FAZ-D15/4	FAZ-D15/1N	FAZ-D15/3N
16	FAZ-D16/4	FAZ-D16/1N	FAZ-D16/3N
20	FAZ-D20/4	FAZ-D20/1N	FAZ-D20/3N
25	FAZ-D25/4	FAZ-D25/1N	FAZ-D25/3N
30	FAZ-D30/4	FAZ-D30/1N	FAZ-D30/3N
32	FAZ-D32/4	FAZ-D32/1N	FAZ-D32/3N
40	FAZ-D40/4	FAZ-D40/1N	FAZ-D40/3N
50 <sup>③</sup>	FAZ-D50/4	FAZ-D50/1N	FAZ-D50/3N
63 <sup>③</sup>	FAZ-D63/4	FAZ-D63/1N	FAZ-D63/3N

**Notes**

- <sup>①</sup> In North America, these switches are UL recognized and CSA Certified as supplementary protection devices. Per the intent of NEC (National Electrical Code), Article 240, and CEC (Canadian Electrical Code), Part 1 C22.1, supplementary breakers cannot be used as a substitute for the branch circuit protective device. They can be used to provide overcurrent protection within an appliance or other electrical equipment where branch circuit overcurrent protection is already provided, or is not required.
- <sup>②</sup> Option for single packaging on single-pole B, C and D curves only; add suffix SP when ordering.
- <sup>③</sup> IEC 60947-2 only.

## Accessories

## FAZ-NA UL 489 Breakers

Description	Catalog Number
Two-pole contact or auxiliary contact/trip indicating contact	Z-NHK <sup>①</sup>
Auxiliary contact	Z-IHK-NA
Shunt trip 110–415 Vac	FAZ-XAA-NA110-415VAC
Shunt trip 12–110 Vac	FAZ-XAA-NA12-110VAC
Padlock hasp	IS/SPE-1TE
Busbar—single-pole, 6 terminals <sup>②③④⑤</sup>	Z-SV/UL-16/1P-1TE/6
Busbar—single-pole, 12 terminals <sup>②③④⑤</sup>	Z-SV/UL-16/1P-1TE/12
Busbar—single-pole, 18 terminals <sup>②③④⑤</sup>	Z-SV/UL-16/1P-1TE/18
Busbar—two-pole, 6 terminals <sup>②③④⑤</sup>	Z-SV/UL-16/2P-2TE/6
Busbar—two-pole, 12 terminals <sup>②③④⑤</sup>	Z-SV/UL-16/2P-2TE/12
Busbar—two-pole, 18 terminals <sup>②③④⑤</sup>	Z-SV/UL-16/2P-2TE/18
Busbar—three-pole, 6 terminals <sup>②③④⑤</sup>	Z-SV/UL-16/3P-3TE/6
Busbar—three-pole, 12 terminals <sup>②③④⑤</sup>	Z-SV/UL-16/3P-3TE/12
Busbar—three-pole, 18 terminals <sup>②③④⑤</sup>	Z-SV/UL-16/3P-3TE/18
Three-pole busbar shroud	ZV-BS-UL
Extension terminal—35 mm <sup>2</sup> (2–14 AWG)	Z-EK/35/UL
Bus connector—conductors up to 50 mm <sup>2</sup> (~1/0 AWG)	Z-EB/50/UL

## FAZ UL 1077 Auxiliary Contacts

Description	Rated Operational Voltage	Catalog Number
<b>Standard Auxiliary Contacts</b>		
1NO/1NC Installs on left side of FAZ or shunt trip Max. one per FAZ (1077) device Switches when FAZ is tripped electrically or manually	230 Vac	FAZ-XHIN11
1 changeover contact Installs on left side of FAZ or shunt trip Max. one per FAZ (1077) device Switches when FAZ is tripped electrically or manually	230 Vac	FAZ-XHINW1
<b>Auxiliary/Trip Indicating Contact</b>		
Small selector screw changes mode Two Form C (changeover) contacts Installs on left side of FAZ or shunt trip Auxiliary contacts switch when FAZ is tripped electrically or manually Trip indicating contact switches only when FAZ is tripped electrically	230 Vac	FAZ-XAM002
<b>Undervoltage Trip</b>		
Prevents FAZ from operating unless voltage is present	115 Vac	FAZ-XUA(115VAC)
Installs on left side of FAZ	230 Vac	FAZ-XUA(230VAC)
Includes test button	400 Vac	FAZ-XUA(400VAC)
<b>Shunt Trip</b>		
Allows remote trip of FAZ Installs on left side of FAZ	12–110 Vac 12–60 Vdc	FAZ-XAA-C-12-110VAC
	110–415 Vac 110–230 Vdc	FAZ-XAA-C-110-415VAC

## FAZ UL 1077 Busbar System

Rated Operational Current	Number of Poles per Device	Number of Terminals	Catalog Number <sup>⑤</sup>
<b>Without Auxiliary Contacts</b>			
80A	1	57	BB-UL-18/1P-1M/57
	2	56	BB-UL-18/2P-2M/56
	3	57	BB-UL-18/3P-3M/57
100A	1	57	BB-UL-25/1P-1M/57
	2	56	BB-UL-25/2P-2M/56
	3	57	BB-UL-25/3P-3M/57
<b>Auxiliary/Trip Indicating Contacts</b>			
80A	1	37	BB-UL-18/1P-1.5M/37
	2	46	BB-UL-18/2P+AS-2.5M/46
	3	48	BB-UL-18/3P+AS-3.5M/48
100A	1	37	BB-UL-25/1P-1.5M/37
	2	46	BB-UL-25/2P+AS-2.5M/46
	3	48	BB-UL-25/3P+AS-3.5M/48

## Pin Type Incoming Supply Terminals

Description	Catalog Number
Accommodates conductors from 6–35 mm <sup>2</sup> /#10–2 AWG 4–5.5 Nm/35–50 lb-in / Two- and three-pole	BB-UL-TEP/35

## Pin Type Incoming Supply Terminals—Single-Phase Only

Description	Catalog Number
Accommodates conductors from 6–35 mm <sup>2</sup> /#10–2 AWG 4–5.5 Nm/35–50 lb-in	BB-UL-TEPA/35

## Protective Accessories

Description	Catalog Number
For covering unused terminals	BB-IP/5
Prevents reactivation of the device during maintenance Holds one padlock	IS/SPE-1TE

## Bus Incoming Supply Terminals

Description	Catalog Number
50 mm <sup>2</sup> #14–1 AWG 75 Deg wire 115 A/Y, 480V UL 160 A/Y 690V IEC	BB-UL-TE/50

## Busbar End Cap

Description	Poles	Catalog Number
Install after cutting busbar	2 and 3	BB-UL-EC/3
Protects end of busbar	1	BB-UL-EC/1

## Notes

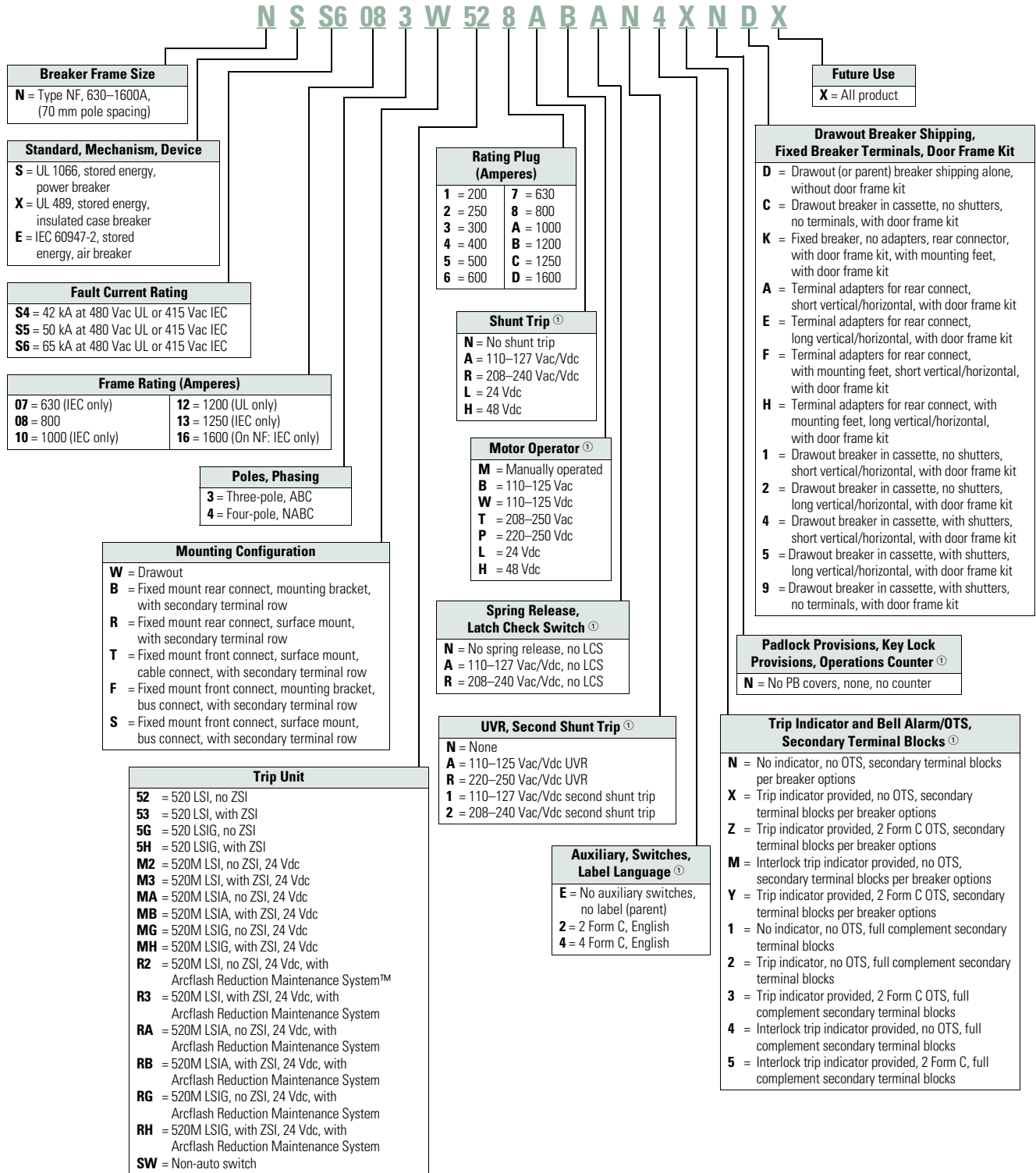
- ① Voltage of FAZ-NA circuit breaker is limited to 300V with this auxiliary contact installed.
- ② Do not cut commoning link.
- ③ A maximum of three commoning links may be used in conjunction. Each breaker connected to the commoning link must have the same number of poles for proper use.
- ④ Not for use with ring-tongue circuit breakers.
- ⑤ Bus may be center fed for high current capacity.

**Series NRX Low Voltage Power Breakers****Series NRX™ Low Voltage Power Breakers****Features**

- Rogowski coil does not saturate like iron core sensors, and one sensor accommodates 200–1600A range. Never change a sensor, and NO CTs are required
- Tension clamp secondary terminals—10A continuous rating at 600V meets UL/CSA/RoHS and UL-94 V0. Mounted directly to fixed breaker or drawout cassette they reduce wiring and provide clean, organized wiring schemes
- Breaker mounted communication modules for INCOM™, Modbus® and PROFIBUS® mount directly to the cassette, reducing the space and room required for communication capability
- With the patent pending simple design of the fold-up cassette, all items in a cassette are replaceable without removing the cassette from the cell
- Plug-and-play accessories—no special tools needed. Accessories come with plug and wires ready to install

### Catalog Number Selection

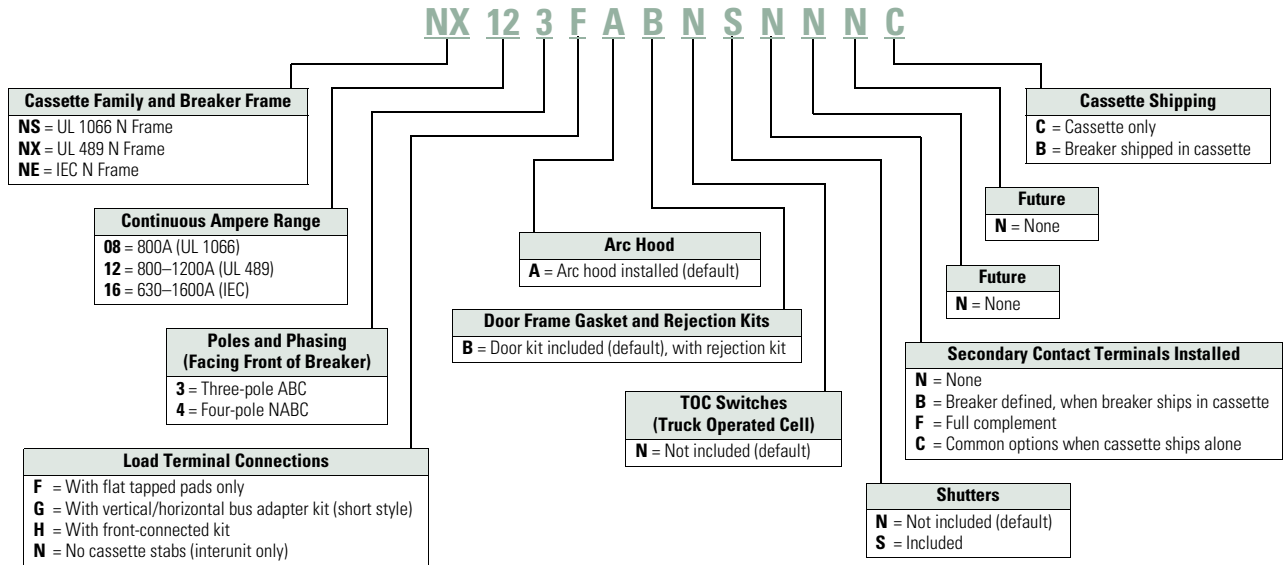
Series NRX Power Breakers (Exclusionary Rules Apply)



**Note**  
 ① Contact Eaton for available voltages. Not all voltages are currently available.

Catalog Number Selection

Series NRX Cassettes



Product Selection

Series NRX Low Voltage Power Breakers

Breaker Frame	Industry Standard	Fault Current Rating (kAIC)	Frame Rating in Amperes	Poles	Mounting	Trip Unit	Rating Plug	Part Number ②
N	UL 1066	42	800	3	Drawout ①	520 LSI (No ZSI)	800	NSS4083W528
N	UL 1066	42	800	4	Fixed	520 LSI (No ZSI)	800	NSS4084B528
N	UL 1066	50	800	3	Drawout ①	520 LSI (No ZSI)	800	NSS5083W528
N	UL 1066	50	800	4	Fixed	520 LSI (No ZSI)	800	NSS5084B528
N	UL 1066	65	800	3	Drawout ①	520 LSI (No ZSI)	800	NSS6083W528
N	UL 1066	65	800	3	Fixed	520 LSI (No ZSI)	800	NSS6083B528
N	UL 1066	65	800	4	Drawout ①	520 LSI (No ZSI)	800	NSS6084W528
N	UL 1066	65	800	4	Fixed	520 LSI (No ZSI)	800	NSS6084B528
N	UL 489	42	800	3	Drawout ①	520 LSI (No ZSI)	800	NXS4083W528
N	UL 489	42	1200	4	Drawout ①	520 LSI (No ZSI)	1200	NXS4124W528
N	UL 489	50	800	3	Fixed	520 LSI (No ZSI)	800	NXS5083B528
N	UL 489	50	1200	4	Fixed	520 LSI (No ZSI)	1200	NXS5124B528
N	UL 489	65	800	3	Drawout ①	520 LSI (No ZSI)	800	NXS6083W528
N	UL 489	65	800	4	Fixed	520 LSI (No ZSI)	800	NSS6084B528
N	UL 489	65	1200	3	Drawout ①	520 LSI (No ZSI)	1200	NXS6123W528
N	UL 489	65	1200	4	Fixed	520 LSI (No ZSI)	1200	NXS6124B528
N	IEC	42	630	3	Drawout ①	520 LSI (No ZSI)	630	NES4073W527
N	IEC	42	1600	4	Drawout ①	520 LSI (No ZSI)	1600	NES4164W52D
N	IEC	50	630	3	Fixed	520 LSI (No ZSI)	630	NES5073B527
N	IEC	50	1600	4	Fixed	520 LSI (No ZSI)	1600	NES5164B52D
N	IEC	65	630	3	Drawout ①	520 LSI (No ZSI)	630	NES6073W527
N	IEC	65	800	4	Fixed	520 LSI (No ZSI)	800	NES6084B528
N	IEC	65	1250	3	Fixed	520 LSI (No ZSI)	1250	NES6133B52C
N	IEC	65	1600	4	Drawout ①	520 LSI (No ZSI)	1600	NES6164W52D

Notes

- ① See Page V9-T1-34 for cassette selection for drawout breakers.
- ② See selection above for accessories in positions 12–20.

**Magnum Low Voltage Power Breakers****Features**

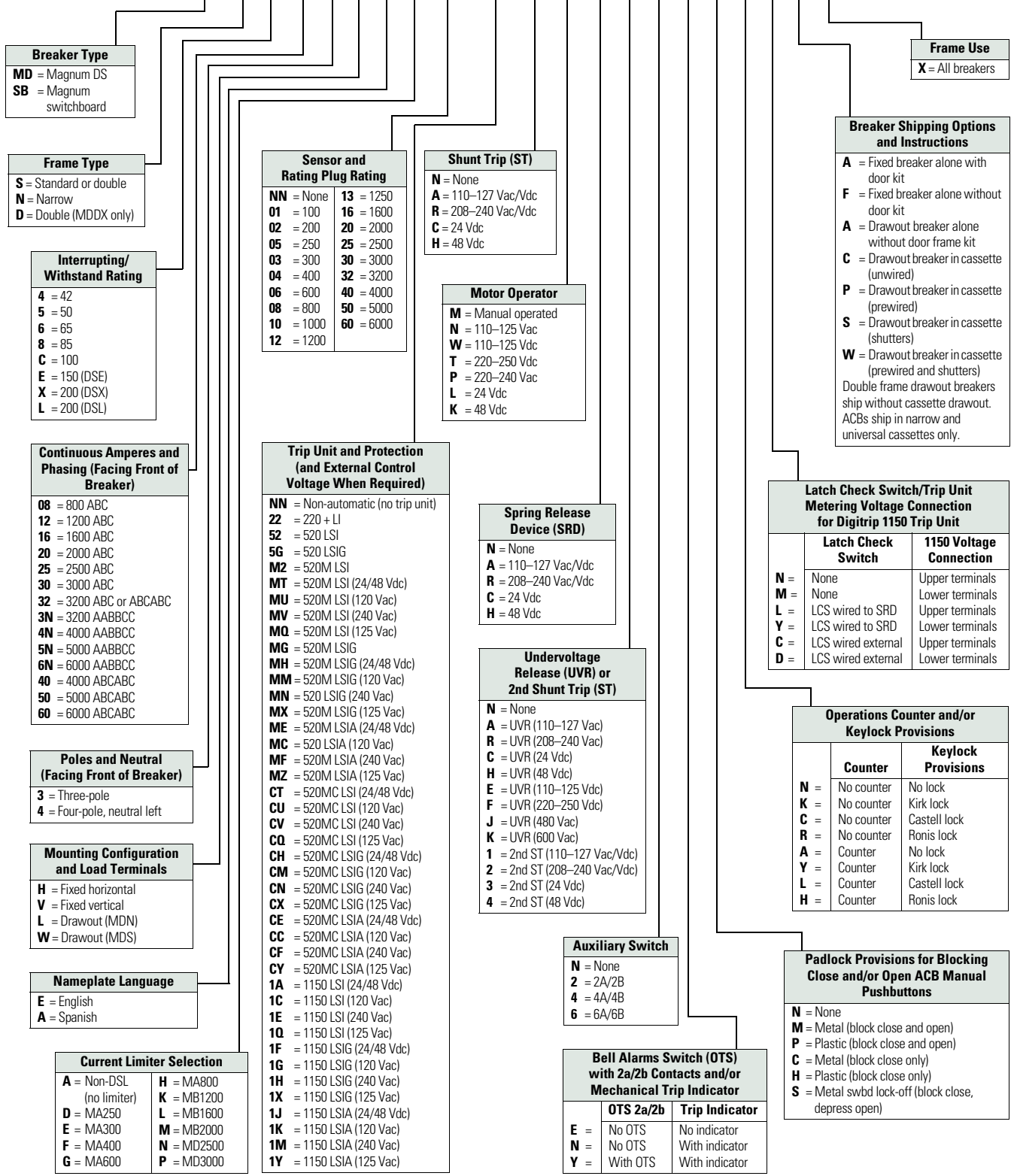
- Rated up to 6300A with interrupting ratings up to 200 kAIC and withstand ratings up to 100 kAIC
- Magnum® DS is UL 1066 listed for one-half second short-time withstand rating, and rated for 30 cycles. It is a switchgear class product to meet UL 1558 switchgear standards
- Magnum SB is a UL 1066 listed product with one-half second short-time withstand rating at three cycles to meet switchboard class product specifications, such as UL 891
- Magnum DS MDDX is the highest interrupting performance in a non-current limiting breaker construction rated up to 200 kAIC with 100 kAIC short-time withstand
- The Magnum DS, Magnum SB and Magnum IEC lines all offer the smallest double narrow 4000A frame available

**Magnum Low Voltage Power Breakers**

Catalog Number Selection

Magnum ANSI/UL Low Voltage Power Breakers

MD S 4 12 3 V E A 06 MU A W C H N E H K L A X



**Breaker Type**  
**MD** = Magnum DS  
**SB** = Magnum switchboard

**Frame Type**  
**S** = Standard or double  
**N** = Narrow  
**D** = Double (MDDX only)

**Interrupting/Withstand Rating**  
**4** = 42  
**5** = 50  
**6** = 65  
**8** = 85  
**C** = 100  
**E** = 150 (DSE)  
**X** = 200 (DSX)  
**L** = 200 (DSL)

**Continuous Amperes and Phasing (Facing Front of Breaker)**  
**08** = 800 ABC  
**12** = 1200 ABC  
**16** = 1600 ABC  
**20** = 2000 ABC  
**25** = 2500 ABC  
**30** = 3000 ABC  
**32** = 3200 ABC or ABCABC  
**3N** = 3200 AABBC  
**4N** = 4000 AABBC  
**5N** = 5000 AABBC  
**6N** = 6000 AABBC  
**40** = 4000 ABCABC  
**50** = 5000 ABCABC  
**60** = 6000 ABCABC

**Poles and Neutral (Facing Front of Breaker)**  
**3** = Three-pole  
**4** = Four-pole, neutral left

**Mounting Configuration and Load Terminals**  
**H** = Fixed horizontal  
**V** = Fixed vertical  
**L** = Drawout (MDN)  
**W** = Drawout (MDS)

**Nameplate Language**  
**E** = English  
**A** = Spanish

**Current Limiter Selection**  
**A** = Non-DSL (no limiter)  
**D** = MA250  
**E** = MA300  
**F** = MA400  
**G** = MA600  
**H** = MA800  
**K** = MB1200  
**L** = MB1600  
**M** = MB2000  
**N** = MD2500  
**P** = MD3000

**Sensor and Rating Plug Rating**  
**NN** = None  
**01** = 100  
**02** = 200  
**03** = 250  
**04** = 300  
**05** = 400  
**06** = 600  
**08** = 800  
**10** = 1000  
**12** = 1250  
**13** = 1250  
**16** = 1600  
**20** = 2000  
**25** = 2500  
**30** = 3000  
**32** = 3200  
**40** = 4000  
**50** = 5000  
**60** = 6000

**Shunt Trip (ST)**  
**N** = None  
**A** = 110–127 Vac/Vdc  
**R** = 208–240 Vac/Vdc  
**C** = 24 Vdc  
**H** = 48 Vdc

**Motor Operator**  
**M** = Manual operated  
**N** = 110–125 Vac  
**W** = 110–125 Vdc  
**T** = 220–250 Vdc  
**P** = 220–240 Vac  
**L** = 24 Vdc  
**K** = 48 Vdc

**Trip Unit and Protection (and External Control Voltage When Required)**  
**NN** = Non-automatic (no trip unit)  
**22** = 220 + LI  
**52** = 520 LSI  
**5G** = 520 LSIG  
**M2** = 520M LSI  
**MT** = 520M LSI (24/48 Vdc)  
**MU** = 520M LSI (120 Vac)  
**MV** = 520M LSI (240 Vac)  
**MQ** = 520M LSI (125 Vac)  
**MG** = 520M LSIG  
**MH** = 520M LSIG (24/48 Vdc)  
**MM** = 520M LSIG (120 Vac)  
**MN** = 520 LSIG (240 Vac)  
**MX** = 520M LSIG (125 Vac)  
**ME** = 520M LSIA (24/48 Vdc)  
**MC** = 520 LSI (120 Vac)  
**MF** = 520M LSIA (240 Vac)  
**MZ** = 520M LSIA (125 Vac)  
**CT** = 520MC LSI (24/48 Vdc)  
**CU** = 520MC LSI (120 Vac)  
**CV** = 520MC LSI (240 Vac)  
**CQ** = 520MC LSI (125 Vac)  
**CH** = 520MC LSIG (24/48 Vdc)  
**CM** = 520MC LSIG (120 Vac)  
**CN** = 520MC LSIG (240 Vac)  
**CX** = 520MC LSIG (125 Vac)  
**CE** = 520MC LSIA (24/48 Vdc)  
**CC** = 520MC LSIA (120 Vac)  
**CF** = 520MC LSIA (240 Vac)  
**CY** = 520MC LSIA (125 Vac)  
**1A** = 1150 LSI (24/48 Vdc)  
**1C** = 1150 LSI (120 Vac)  
**1E** = 1150 LSI (240 Vac)  
**1Q** = 1150 LSI (125 Vac)  
**1F** = 1150 LSIG (24/48 Vdc)  
**1G** = 1150 LSIG (120 Vac)  
**1H** = 1150 LSIG (240 Vac)  
**1X** = 1150 LSIG (125 Vac)  
**1J** = 1150 LSIA (24/48 Vdc)  
**1K** = 1150 LSIA (120 Vac)  
**1M** = 1150 LSIA (240 Vac)  
**1Y** = 1150 LSIA (125 Vac)

**Spring Release Device (SRD)**  
**N** = None  
**A** = 110–127 Vac/Vdc  
**R** = 208–240 Vac/Vdc  
**C** = 24 Vdc  
**H** = 48 Vdc

**Undervoltage Release (UVR) or 2nd Shunt Trip (ST)**  
**N** = None  
**A** = UVR (110–127 Vac)  
**R** = UVR (208–240 Vac)  
**C** = UVR (24 Vdc)  
**H** = UVR (48 Vdc)  
**E** = UVR (110–125 Vdc)  
**F** = UVR (220–250 Vdc)  
**J** = UVR (480 Vac)  
**K** = UVR (600 Vac)  
**1** = 2nd ST (110–127 Vac/Vdc)  
**2** = 2nd ST (208–240 Vac/Vdc)  
**3** = 2nd ST (24 Vdc)  
**4** = 2nd ST (48 Vdc)

**Auxiliary Switch**  
**N** = None  
**2** = 2A/2B  
**4** = 4A/4B  
**6** = 6A/6B

**Bell Alarms Switch (OTS) with 2a/2b Contacts and/or Mechanical Trip Indicator**

	OTS 2a/2b	Trip Indicator
<b>E</b>	No OTS	No indicator
<b>N</b>	No OTS	With indicator
<b>Y</b>	With OTS	With indicator

**Frame Use**  
**X** = All breakers

**Breaker Shipping Options and Instructions**  
**A** = Fixed breaker alone with door kit  
**F** = Fixed breaker alone without door kit  
**A** = Drawout breaker alone without door frame kit  
**C** = Drawout breaker in cassette (unwired)  
**P** = Drawout breaker in cassette (prewired)  
**S** = Drawout breaker in cassette (shutters)  
**W** = Drawout breaker in cassette (prewired and shutters)  
 Double frame drawout breakers ship without cassette drawout. ACBs ship in narrow and universal cassettes only.

**Latch Check Switch/Trip Unit Metering Voltage Connection for Digitrip 1150 Trip Unit**

	Latch Check Switch	1150 Voltage Connection
<b>N</b>	None	Upper terminals
<b>M</b>	None	Lower terminals
<b>L</b>	LCS wired to SRD	Upper terminals
<b>Y</b>	LCS wired to SRD	Lower terminals
<b>C</b>	LCS wired external	Upper terminals
<b>D</b>	LCS wired external	Lower terminals

**Operations Counter and/or Keylock Provisions**

	Counter	Keylock Provisions
<b>N</b>	No counter	No lock
<b>K</b>	No counter	Kirk lock
<b>C</b>	No counter	Castell lock
<b>R</b>	No counter	Ronis lock
<b>A</b>	Counter	No lock
<b>Y</b>	Counter	Kirk lock
<b>L</b>	Counter	Castell lock
<b>H</b>	Counter	Ronis lock

**Padlock Provisions for Blocking Close and/or Open ACB Manual Pushbuttons**  
**N** = None  
**M** = Metal (block close and open)  
**P** = Plastic (block close and open)  
**C** = Metal (block close only)  
**H** = Plastic (block close only)  
**S** = Metal swbd lock-off (block close, depress open)

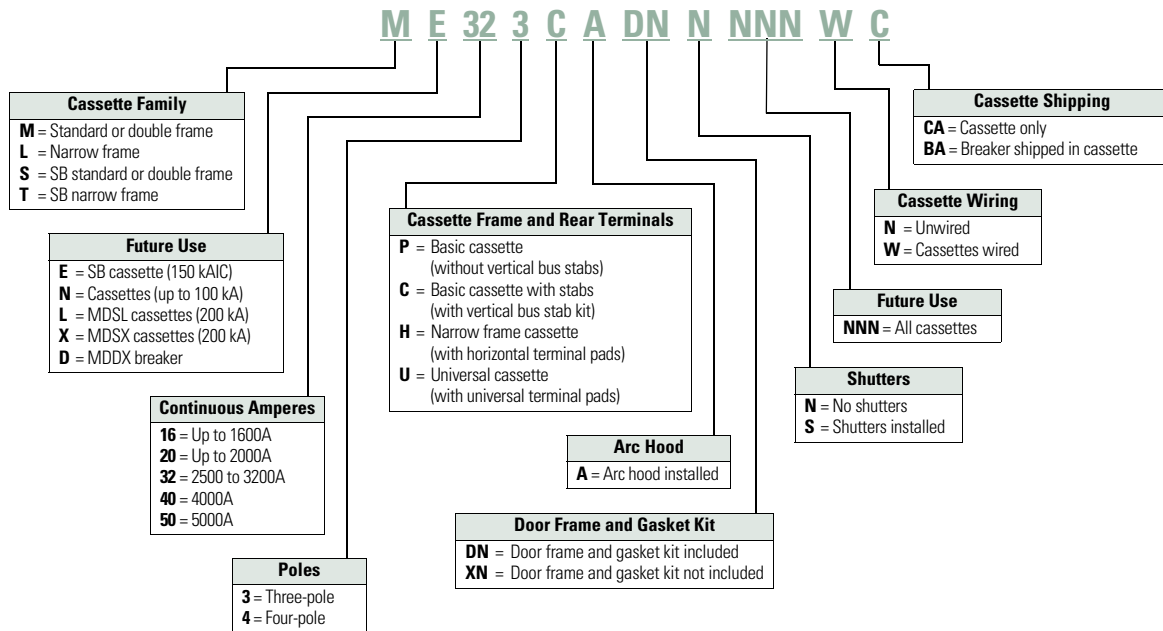
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## Circuit Protection

### Circuit Breakers

1

#### Magnum ANSI/UL Low Voltage Air Circuit Breaker Cassettes





Magnum IEC Low Voltage Air Circuit Breakers

MW I 4 08 3 H E A - 02 22 A M A A 2 E M K L A X

**Breaker Frame**

**I** = Standard or double  
**N** = Narrow  
**K** = Special 1100 Vac ACB

**Interrupting I<sub>CU</sub>**

**4** = 40 kA  
**5** = 50 kA  
**6** = 65 kA  
**8** = 85 kA  
**C** = 100 kA  
**2** = 25 kA (1100 Vac MWK)

**Continuous Amperes and Phasing (Facing Front of Breaker)**

**08** = 800 ABC  
**10** = 1000 ABC  
**12** = 1250 ABC  
**16** = 1600 ABC  
**20** = 2000 ABC  
**25** = 2500 ABC  
**32** = 3200 ABC  
**4N** = 4000 AABBC  
**5N** = 5000 AABBC  
**6N** = 6300 AABBC  
**40** = 4000 ABCABC  
**50** = 5000 ABCABC  
**60** = 6300 ABCABC

**Poles and Neutral (Facing Front of Breaker)**

**3** = Three  
**4** = Four (neutral left)  
**R** = Four (reserved for neutral right)

**Mounting Configuration and Load Terminals**

**H** = Fixed horizontal  
**V** = Fixed vertical  
**L** = Drawout horizontal

**Nameplate Language**

**E** = English  
**A** = Spanish

**Sensor and Rating Plug Rating**

<b>NN</b> = None	<b>13</b> = 1250
<b>02</b> = 200	<b>16</b> = 1600
<b>05</b> = 250	<b>20</b> = 2000
<b>03</b> = 300	<b>25</b> = 2500
<b>04</b> = 400	<b>30</b> = 3000
<b>06</b> = 600	<b>32</b> = 3200
<b>07</b> = 630	<b>40</b> = 4000
<b>08</b> = 800	<b>50</b> = 5000
<b>10</b> = 1000	<b>63</b> = 6300
<b>12</b> = 1200	

**Trip Unit Protection, (and External Control Voltage When Required)**

**NN** = Non-automatic (no trip unit)  
**22** = 220 LI  
**52** = 520 LSI  
**5W** = 520i LSIG  
**M2** = 520M LSI  
**MT** = 520M LSI (24–48 Vdc)  
**MU** = 520M LSI (120 Vac)  
**MV** = 520M LSI (240 Vac)  
**MW** = 520Mi LSIG  
**MJ** = 520Mi LSIG (24–48 Vdc)  
**MK** = 520Mi LSIG (120 Vac)  
**ML** = 520Mi LSIG (240 Vac)  
**ME** = 520M LSI/A (24–48 Vdc)  
**MC** = 520M LSI/A (120 Vac)  
**MF** = 520M LSI/A (240 Vac)  
**CT** = 520MC LSI  
**CU** = 520MC LSI  
**CV** = 520MC LSI  
**CE** = 520MC LSI/A  
**CC** = 520MC LSI/A  
**CJ** = 520MC LSI/A  
**CF** = 520MCi LSIG  
**CK** = 520MCi LSIG  
**CL** = 520MCi LSIG  
**1W** = 1150i LSI (24–48 Vdc)  
**1N** = 1150i LSI (120 Vac)  
**1P** = 1150i LSI (240 Vac)  
**1R** = 1150i LSI/A (24–48 Vdc)  
**1S** = 1150i LSI/A (120 Vac)  
**1T** = 1150i LSI/A (240 Vac)

**Auxiliary Switch**

**N** = None  
**2** = 2A/2B  
**4** = 4A/4B  
**6** = 6A/6B

**Shunt Trip Attachment (STA)**

**N** = None  
**A** = 110–127 Vac  
**R** = 208–240 Vac  
**C** = 24 Vdc  
**H** = 48 Vdc

**Motor Operator**

**M** = Manual operated  
**N** = 110–125 Vac  
**W** = 110–125 Vdc  
**T** = 220–250 Vdc  
**P** = 220–250 Vac  
**L** = 24 Vdc  
**K** = 48 Vdc

**Spring Release Device (SRD)**

**N** = None  
**A** = 110–127 Vac/Vdc  
**R** = 208–240 Vac/Vdc  
**C** = 24 Vdc  
**H** = 48 Vdc

**Undervoltage Release (UVR) or 2nd Shunt Trip Attachment (STA)**

**N** = None  
**A** = 110–127 Vac  
**R** = 208–240 Vac  
**C** = 24 Vdc  
**H** = 48 Vdc  
**E** = 110–125 Vdc  
**F** = 220–250 Vdc  
**G** = 32 Vdc  
**X** = 380–415 Vac  
**J** = 480 Vac  
**K** = 600 Vac  
**1** = 2nd STA (110–127 Vac/Vdc)  
**2** = 2nd STA (208–250 Vac/Vdc)  
**3** = 2nd STA (24 Vdc)  
**4** = 2nd STA (48 Vdc)

**Future Use**

**X** = All ACBs

**ACB Shipping Instructions**

**A** = Fixed ACB with door kit  
**F** = Fixed ACB without door kit  
**A** = D/O ACB only without door kit  
**C** = D/O ACB in cassette (unwired)  
**P** = D/O ACB in cassette (prewired)  
**S** = D/O ACB in cassette (shutters)  
**W** = D/O ACB in cassette (prewired and shutters)  
 Double frame D/O ACBs ship without cassette

**Latch Checking Switch/Trip Unit Metering Voltage Connection for Digitrip 1150 Trip Unit**

	Latch Check Switch	1150 Voltage Connection
<b>N</b> =	None	Upper terminals
<b>M</b> =	None	Lower terminals
<b>L</b> =	LCS wired to SRD	Upper terminals
<b>Y</b> =	LCS wired to SRD	Lower terminals
<b>C</b> =	LCS wired external	Upper terminals
<b>D</b> =	LCS wired external	Lower terminals

**Operations Counter and/or Keylock Provisions**

	Counter	Keylock Provisions
<b>N</b> =	No counter	No lock
<b>K</b> =	No counter	Kirk lock
<b>C</b> =	No counter	Castell lock
<b>R</b> =	No counter	Ronis lock
<b>A</b> =	Counter	No lock
<b>T</b> =	Counter	Kirk lock
<b>L</b> =	Counter	Castell lock
<b>H</b> =	Counter	Ronis lock

**Padlock Provisions for Blocking Close and/or Open ACB Manual Pushbuttons**

**N** = None  
**M** = Metal (block close and open)  
**P** = Plastic (block close and open)  
**C** = Metal (block close only)  
**H** = Plastic (block close only)

**Bell Alarms Switch (OTS) with 2a/2b Contacts and/or Mechanical Trip Indicator**

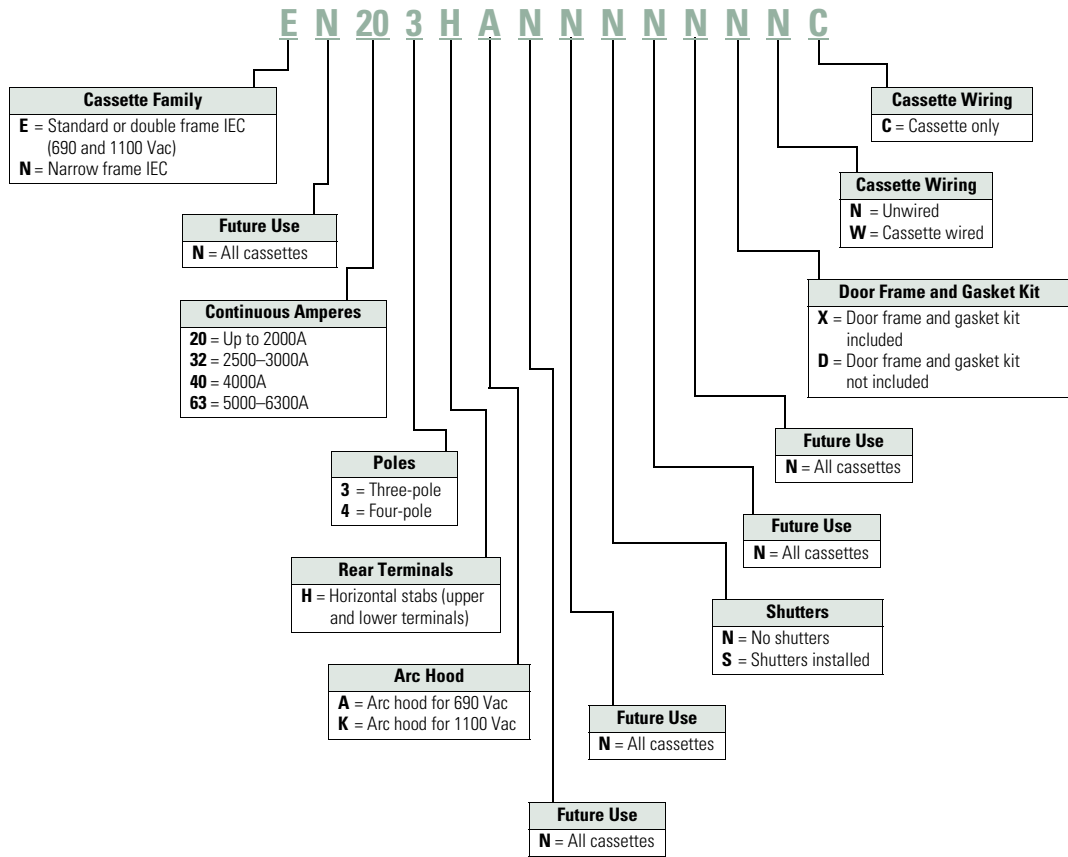
	OTS 2a/2b	Trip Indicator
<b>E</b> =	No OTS	No indicator
<b>N</b> =	No OTS	With indicator
<b>Y</b> =	With OT	With indicator

# 1.1

## Circuit Protection

### Circuit Breakers

#### 1 Magnum IEC Low Voltage Air Circuit Breaker Cassettes



## Product Selection

### Magnum DS Switchgear Class UL 1066 Low Voltage Power Circuit Breakers

Frame Type	RMS Symmetrical Current Ratings kA 50/60 Hz <sup>①</sup>			Short Time Current Rating	Frame Amperes	Breaker Type <sup>②</sup>	
	Interrupting at 254 Vac	Interrupting at 508 Vac	Interrupting at 635 Vac				
Narrow	42	42	42	42	800	<b>MDN-408</b>	
	50	50	50	50		<b>MDN-508</b>	
	65	65	65	65		<b>MDN-608</b>	
	100	100	65	20		<b>MDN-C08</b>	
Standard	42	42	42	42	800	<b>MDS-408</b>	
	65	65	65	65		<b>MDS-608</b>	
	85	85	85	85		<b>MDS-808</b>	
	100	100	100	85		<b>MDS-C08</b>	
	200	200	200	—		<b>MDS-L08</b> <sup>③</sup>	
Narrow	42	42	42	42	1600	<b>MDN-416</b>	
	50	50	50	50		<b>MDN-516</b>	
	65	65	65	65		<b>MDN-616</b>	
	100	100	65	30		<b>MDN-C16</b>	
	Standard	65	65	65		65	1600
85		85	85	85	<b>MDS-816</b>		
100		100	100	85	<b>MDS-C16</b>		
200		200	200	—	<b>MDS-L16</b> <sup>③</sup>		
200		200	④	30	<b>MDS-X16</b> <sup>⑤</sup>		
Narrow	65	65	65	65	2000	<b>MDN-620</b>	
	100	100	65	35		<b>MDN-C20</b>	
Standard	65	65	65	65	2000	<b>MDS-620</b>	
	85	85	85	85		<b>MDS-820</b>	
	100	100	100	85		<b>MDS-C20</b>	
	200	200	200	—		<b>MDS-L20</b> <sup>③</sup>	
	200	200	④	30		<b>MDS-X20</b> <sup>⑤</sup>	
	65	65	65	65		3200	<b>MDS-632</b>
85	85	85	85	<b>MDS-832</b>			
100	100	100	85	<b>MDS-C32</b>			
Double	200	200	④	50	3200	<b>MDS-X32</b> <sup>⑤</sup>	
Double (N)	85	85	④	85	4000	<b>MDN-840</b>	
	100	100	④	100		<b>MDN-C40</b>	
Double	85	85	85	85	4000	<b>MDS-840</b>	
	100	100	100	100		<b>MDS-C40</b>	
	200	200	④	50		<b>MDS-X40</b> <sup>⑤</sup>	
	200	200	④	100	4000	<b>MDD-X40</b>	
	85	85	85	85		5000	<b>MDS-850</b>
	100	100	100	100			<b>MDS-C50</b>
	200	200	④	50	6000	<b>MDS-X50</b> <sup>⑤⑦</sup>	
	200	200	④	100		<b>MDD-X50</b>	
	100	100	100	100		<b>MDS-C60</b> <sup>⑦</sup>	
	200	200	④	100		<b>MDD-X60</b>	

#### Notes

- ① Interrupting ratings shown based on breaker equipped with integral Digitrip RMS trip unit. Interruption ratings for non-automatic breakers are equal to the published short time current rating. These interruption ratings are based on the standard duty cycle consisting of an open operation, a 15-second interval and a close-open operation, in succession, with delayed tripping in case of short-delay devices. The standard duty cycle for short time ratings consists of maintaining the rated current for two periods of 1/2 seconds each, with a 15-second interval of zero current between the two periods.
- ② See **Page V9-T1-40** for selection of trip unit and accessories. See **Page V9-T1-40** for cassette selection for drawout breakers.
- ③ Magnum MDSL current limiting power circuit breaker with integral current limiters. Current limiter selected determines short time and maximum instantaneous trip rating. Maximum voltage rating is 600 Vac.
- ④ Product to be tested. Contact Eaton for product rating.
- ⑤ Magnum MDSX current limiting power circuit breaker with fast opening contacts.
- ⑥ Contact Eaton for availability.
- ⑦ Breaker applied in a tested fan-cooled enclosure.

## Magnum SB Switchboard Class UL 1066 Insulated Case Low Voltage Power Circuit Breakers

Frame Type	RMS Symmetrical Current Ratings kA 50/60 Hz <sup>①</sup>			Short Time Current Rating	Frame Amperes	Breaker Type <sup>②</sup>
	Interrupting at 254 Vac	Interrupting at 508 Vac	Interrupting at 635 Vac			
Narrow	50	50	35	20	800	<b>SBN-508</b>
	65	65	42	20		<b>SBN-608</b>
	100	100	65	20		<b>SBN-C08</b>
Standard	65	65	65	20	800	<b>SBS-608</b>
	100	100	85	20		<b>SBS-C08</b>
	200	150	②	30		<b>SBS-E08</b> <sup>③</sup>
Narrow	50	50	35	25	1200	<b>SBN-512</b>
	65	65	42	25		<b>SBN-612</b>
	100	100	65	25		<b>SBN-C12</b>
Standard	65	65	65	25	1200	<b>SBS-612</b>
	100	100	85	25		<b>SBS-C12</b>
	200	150	②	30		<b>SBS-E12</b> <sup>③</sup>
Narrow	50	50	35	30	1600	<b>SBN-516</b>
	65	65	42	30		<b>SBN-616</b>
	100	100	65	30		<b>SBN-C16</b>
Standard	65	65	65	30	1600	<b>SBS-616</b>
	100	100	85	30		<b>SBS-C16</b>
	200	150	②	30		<b>SBS-E16</b> <sup>③</sup>
Narrow	65	65	65	35	2000	<b>SBN-620</b>
	100	100	65	35		<b>SBN-C20</b>
Standard	65	65	65	35	2000	<b>SBS-620</b>
	100	100	85	35		<b>SBS-C20</b>
	200	150	②	30		<b>SBS-E20</b> <sup>③</sup>
Narrow	65	65	65	45	2500	<b>SBS-625</b>
	100	100	85	45		<b>SBS-C25</b>
Double	200	150	②	50		<b>SBS-E25</b> <sup>③</sup>
Standard	65	65	65	50	3000	<b>SBS-630</b>
	100	100	85	50		<b>SBS-C30</b>
Double	200	150	②	50		<b>SBS-E30</b> <sup>③</sup>
Double (N)	85	85	③	85	4000	<b>SBN-840</b>
	100	100	③	100		<b>SBN-C40</b>
Double	85	85	85	85	5000	<b>SBS-840</b>
	100	100	100	100		<b>SBS-C40</b>
	200	150	②	50		<b>SBS-E40</b> <sup>③</sup>
Double	85	85	85	85	5000	<b>SBS-850</b>
	100	100	100	100		<b>SBS-C50</b>
Double	200	150	②	50	6000	<b>SBS-E50</b> <sup>③④</sup>
	100	100	100	100		<b>SBS-C60</b> <sup>④</sup>

**Notes**

- ① Interrupting ratings shown based on breaker equipped with integral Digitrip RMS trip unit. Interruption ratings for non-automatic breakers are equal to the published short time current rating. These interruption ratings are based on the standard duty cycle consisting of an open operation, a 15-second interval and a close-open operation, in succession, with delayed tripping in case of short-delay devices. The standard duty cycle for short time ratings consists of maintaining the rated current for two periods of 1/2 seconds each, with a 15-second interval of zero current between the two periods.
- ② Product to be tested. Contact Eaton for product rating.
- ③ Magnum SBSE current limiting power circuit breaker with fast opening contacts.
- ④ Breaker applied in a tested fan-cooled enclosure.

## Magnum IEC 60947-2 Rated Low Voltage Air Circuit Breakers

Frame Amperes	Breaker Type	Frame Type	rms Symmetrical Current Ratings kA <sup>①</sup>			Withstand Rating I <sub>CW</sub> 1-Sec/3-Sec	Fixed Internal Inst. Trip	Available Current Sensor and Rating Plugs for Digitrip RMS Trip Unit (Establishes Breaker I <sub>n</sub> Rating)
			Interrupting at 240 Vac I <sub>CU</sub> = I <sub>CS</sub>	Interrupting at 440 Vac I <sub>CU</sub> = I <sub>CS</sub>	Interrupting at 690 Vac I <sub>CU</sub> = I <sub>CS</sub>			
800	MWN-408	Narrow	40	40	40	40/—	—	200, 250, 300, 400, 630, 800
	MWN-508	Narrow	50	50	50	50/—	—	
	MWN-608	Narrow	65	65	65	65/40	—	
	MWI-608	Standard	65	65	65	65/—	—	
	MWI-808	Standard	85	85	85	85/65	—	
	MWI-C08	Standard	100	100	85	85/65	85	
1000	MWN-410	Narrow	40	40	40	40/—	—	200, 250, 300, 400, 630, 800, 1000
	MWN-510	Narrow	50	50	50	50/—	—	
	MWN-610	Narrow	65	65	65	65/40	—	
	MWI-610	Standard	65	65	65	65/—	—	
	MWI-810	Standard	85	85	85	85/65	—	
	MWI-C10	Standard	100	100	85	85/65	85	
1250	MWN-412	Narrow	40	40	40	40/—	—	200, 250, 300, 400, 630, 800, 1000, 1250
	MWN-512	Narrow	50	50	50	50/—	—	
	MWN-612	Narrow	65	65	65	65/40	—	
	MWI-612	Standard	65	65	65	65/—	—	
	MWI-812	Standard	85	85	85	85/65	—	
	MWI-C12	Standard	100	100	85	85/65	85	
1600	MWN-516	Narrow	50	50	50	50/—	—	200, 250, 300, 400, 630, 800, 1000, 1250, 1600
	MWN-616	Narrow	65	65	65	65/40	—	
	MWI-616	Standard	65	65	65	65/—	—	
	MWI-816	Standard	85	85	85	85/65	—	
	MWI-C16	Standard	100	100	85	85/65	85	
2000	MWN-520	Narrow	50	50	50	50/30	—	200, 250, 300, 400, 630, 800, 1000, 1250, 1600, 2000
	MWN-620	Narrow	65	65	65	65/40	—	
	MWI-620	Standard	65	65	65	65/50	—	
	MWI-820	Standard	85	85	85	85/65	—	
	MWI-C20	Standard	100	100	85	85/65	85	
2500	MWI-625	Standard	65	65	65	65/—	—	200, 250, 300, 400, 630, 800, 1000, 1250, 1600, 2000, 2500
	MWI-825	Standard	85	85	85	85/65	—	
	MWI-C25	Standard	100	100	85	85/65	85	
3200	MWI-632	Standard	65	65	65	65/50	—	200, 250, 300, 400, 630, 800, 1000, 1250, 1600, 2000, 2500, 3200
	MWI-832	Standard	85	85	85	85/65	—	
	MWI-C32	Standard	100	100	85	85/65	85	
4000	MWI-64N	Double	65	65	65	65/—	—	2000, 2500, 3200, 4000
	MWI-84N	Double	85	85	85	85/—	—	
	MWI-C4N	Double	100	100	100	100/—	—	
5000	MWI-85N	Double	85	85	85	85/—	—	2500, 3200, 4000, 5000
	MWI-C5N	Double	100	100	100	100/—	—	
6300	MWI-86N	Double	85	85	85	85/—	—	3200, 4000, 5000, 6300
	MWI-C6N	Double	100	100	100	100/—	—	

**Note**

<sup>①</sup> Interrupting ratings shown based on breaker equipped with integral Digitrip RMS trip unit. Interruption ratings for non-automatic breakers are equal to the published breaker I<sub>CW</sub> rating.

## Product Overview

### Fuse Blocks and Fuse Holders



<b>Description</b>	<b>C350 Series</b>
	<b>Page V9-T1-45</b>
<b>Technical Data</b>	
Number of poles	Up to 3
Mounting	35 mm flat or 32 mm asymmetrical DIN rail (with optional adapter)
Terminal ratings	600V, 30A
Housing construction	Thermoplastic UL 94VO flammability rating
Clip/terminal construction	Tin-plated copper alloy
Screw/pressure plate construction	Zinc-plated steel
Dielectric strength	1200V
<b>Approvals</b>	
	UL, CSA

For our complete product offering, see Volume 4—Circuit Protection, CA08100005E.

**C350 Series Fuse Blocks and Fuse Holders**



**Features**

- Space-saving design
- Rated 600V, 30A
- UL approved for motor loads

**Product Selection**

**C350 Series**

**Fuse Blocks and Fuse Holders**

Wire Termination	Number of Poles	250V			600V				
		30A Catalog Number	Carton Qty.	60A Catalog Number	Carton Qty.	30A Catalog Number	Carton Qty.	60A Catalog Number	Carton Qty.
<b>Class H Fuse Holders</b>									
Single collar (box lug)—sized to ampere rating	1	<b>W231HA</b>	10	<b>W261HA</b>	10	<b>W631HA</b>	10	<b>W661HA</b>	1
	2	<b>W232HA</b>	5	<b>W262HA</b>	5	<b>W632HA</b>	5	<b>W662HA</b>	1
	3	<b>W233HA</b>	5	<b>W263HA</b>	5	<b>W633HA</b>	1	<b>W663HA</b>	2
<b>Class M Fuse Holders</b>									
Combination of double quick-connect, 20A max., and binding head screw, #10 max., Cu/Al	1	—	—	—	—	<b>WM631F</b>	10	—	—
	2	—	—	—	—	<b>WM632F</b>	8	—	—
	3	—	—	—	—	<b>WM633F</b>	6	—	—
Combination of double quick-connect, 20A max., and pressure plate screw, #10 max., Cu only	1	—	—	—	—	<b>WM631G</b>	10	—	—
	2	—	—	—	—	<b>WM632G</b>	8	—	—
	3	—	—	—	—	<b>WM633G</b>	6	—	—
<b>Class R Fuse Holders</b>									
Single collar (box lug)—sized to ampere rating	1	<b>WR231HA</b>	10	—	—	<b>WR631HA</b>	10	—	—
	2	—	—	—	—	<b>WR632HA</b>	5	—	—
	3	<b>WR233HA</b>	5	<b>WR263HA</b>	1	<b>WR633HA</b>	5	<b>WR663HA</b>	5
Combination of double quick-connect, 20A max., and binding head screw, #10 max., Cu/Al	1	—	—	—	—	—	—	—	—
	2	—	—	—	—	<b>WMR632F</b>	1	—	—
	3	—	—	—	—	<b>WMR633F</b>	6	—	—
Combination of double quick-connect, 20A max., and pressure plate screw, #10 max., Cu only	1	—	—	—	—	<b>WMR631G</b>	10	—	—
	3	—	—	—	—	<b>WMR633G</b>	6	—	—
<b>Class R Fuse Holder, Type WRR Control Transformer Fuse Block</b>									
Combination of double quick-connect, 20A max., and pressure plate screw, #14–#10 Cu only	3	—	—	—	—	<b>WRR633G</b>	6	—	—

#### 1

### Open Rotary Disconnects

#### Product Overview

#### Rotary Disconnect Switch Selection Guide



**R5 Series  
Non-Fusible 16–80A**



**R9 Series  
Non-Fusible 30–100A Compact**



**R9 Series  
Non-Fusible 100–1200A**

**Description**

**Page V9-T1-48**

**Page V9-T1-50**

**Page V9-T1-52**

**Product Description**

R5 Series (UL 508 listed) products are manually operated modular switches. Load break switching and isolation provide safety solutions for any low voltage circuit, particularly for machine and control circuits. The R5 Series products are manual motor controllers suitable as motor disconnect.

The R9 Series (UL 98 listed) non-fusible 30–100A compact range ensures making or breaking on load and safety isolation for low voltage electrical circuits, particularly for machine control circuits up to 600V.

The R9 Series (UL 98 listed) non-fusible 100–1200A are manually operated multipole load-break switches. Quick-make, quick-break design provides safety isolation for any low voltage circuit.

**Approvals**

UL 508 listed, Guide NLRV, File E165150  
CSA C22.2 No. 14, File 217736  
IEC 60947-3, EN 60947-3  
CCC

UL 98, File E222859  
CSA 22.2 No. 4, File 217736  
IEC 60947-3  
EN 60947-3

UL 98, File E222859  
CSA 22.2 No. 4, File 217736  
IEC 60947-3  
EN 60947-3



**R9 Series  
Fusible 30–800A**



**R9 Series  
DC Rated Disconnects**



**Manual Transfer Switches**

**Description**

**Page V9-T1-54**

**Page V9-T1-59**

**Page V9-T1-60**

**Product Description**

R9 Series (UL 98 listed) Fusible 30–800A manual operated multi-pole fusible disconnect switches use double break contacts per pole that ensure complete isolation of the fuse when the switch is in the OFF position.

When installed with fuses, they provide protection for low voltage electrical installations against short circuit and overload.

UL listed disconnect switches 600 Vdc for photovoltaic applications 100 to 400A

R9 Series (UL 98 listed) DC rated disconnects are manually operated multi-pole load break switches. They provide safety isolation for any low voltage circuit in a photovoltaic application.

R9 Series (UL 98 listed) non-fusible disconnects are heavy-duty manual transfer switches, they transfer load manually between two low voltage circuits and provide safety disconnection.

These switches are extremely durable and are tested and approved for use in the most demanding applications as resistive load or total system applications.

**Approvals**

UL 98, File E222859 for 30 to 800A ratings  
UL 489, File E305341 for H Frame switches  
CSA 22.2 No. 4, File 217736  
CSA 22.2 No. 5, File 217736, H Frame only  
IEC 60947-1, EN 60947-1  
IEC 60947-3, EN 60947-3  
CE mark  
NFPA® 79

UL 98, cULus®, File E222859  
CSA 22.2 No. 4, File 217736 ①  
IEC 60947-3  
EN 60947-3  
IEC 60-364-7-712 (Rules for the installations and sites special—photovoltaic applications)

UL 98, cULus, File E222859  
UL 1008 (2011)  
CSA 22.2 No. 4, File 217736  
IEC 60947-3  
EN 60947-3

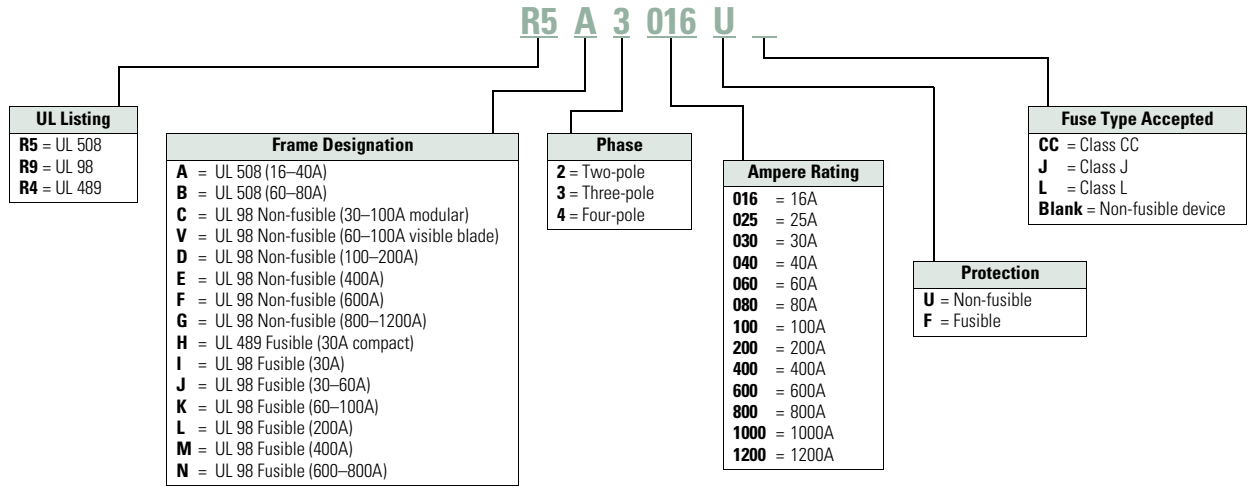
**Note**

① Q4 2010

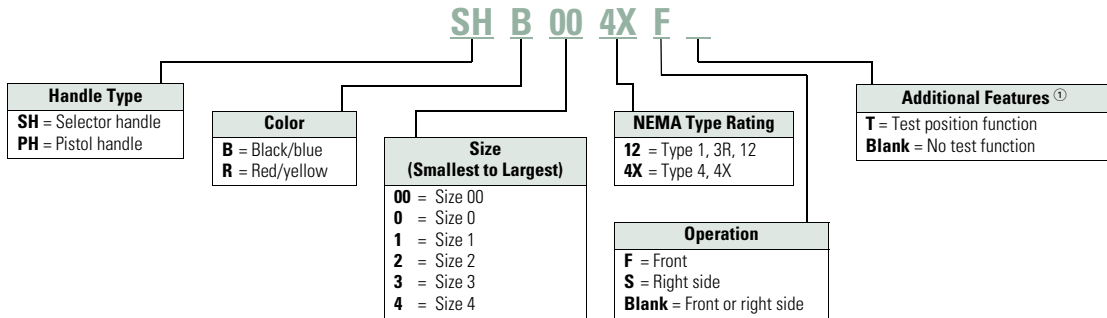


Catalog Number Selection

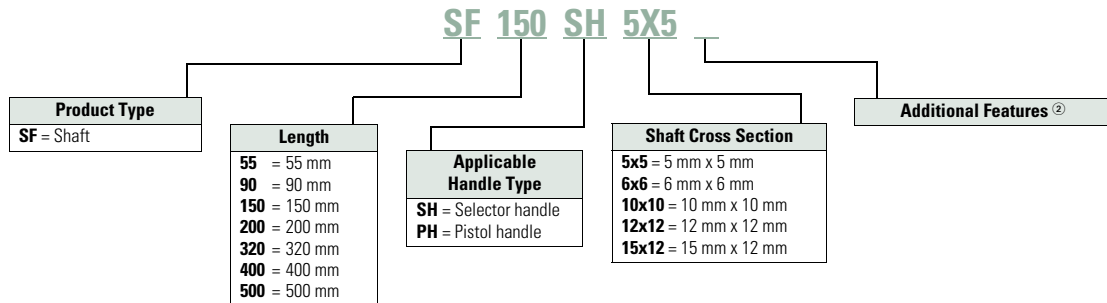
Disconnects



External Handles



Shafts



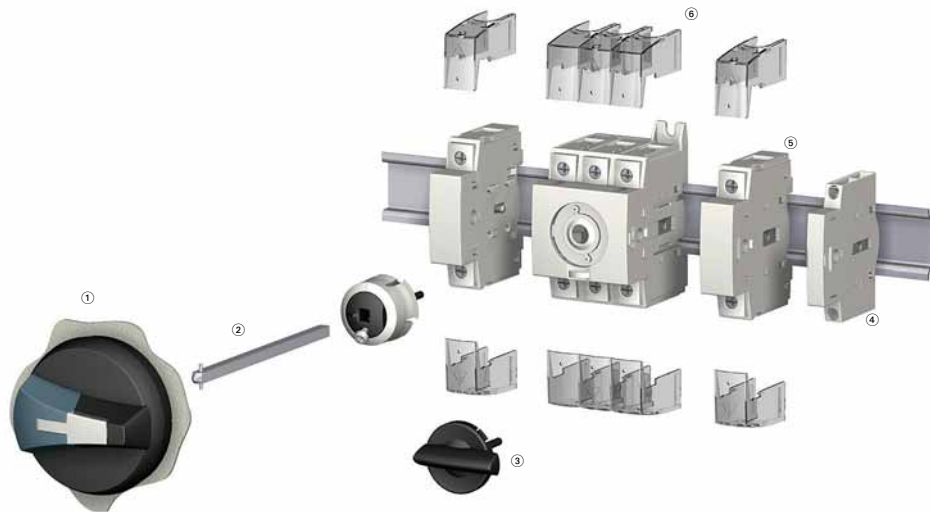
Notes

- ① **HV** at the end of some catalog numbers indicates use with H and V switches only. Not all handles are designed to go with all disconnects. Consult specific section of the catalog for available options.
- ② **H** at the end of some catalog numbers indicates use with H Frame switches only. Not all shafts are designed to go with all disconnects. Consult specific section of the catalog for available options.

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**R5 Series Non-Fusible 16–80A****Features**

- Up to 65 kAIC short-circuit rating
- Direct or external operation
- Compact footprint
- DIN rail or base mount
- Wide range of accessories
- Modular design
- Padlockable design (direct, toggle and external handles)

**R5 Series Non-Fusible 16–80A****Product Identification**

- ① External front handle
- ② Shaft extension for external handle
- ③ Direct handle
- ④ Auxiliary contacts
- ⑤ Switched fourth-pole module
- ⑥ Terminal shroud

**Note:** For further details, please see the installation instructions supplied with each device.

**Product Selection**

**Direct Operation**



Switch body + Direct handle

**External Operation**



Switch body + Shaft + External handle

**R5 Series**



Ampere Rating	Three-Pole Toggle Switch Only <sup>①</sup>	Three-Pole Rotary Switch Only	Direct Handle	Front and Right External Handle SH00 (Choose One)	Front and Right External Handle SH0 (Choose One)	Three-Position Front External Handle SH00 (Black) <sup>②</sup>	Shaft for SH0 and SH00—5 x 5 mm—In (mm)
16	—	<b>R5A3016U</b>	<b>DHR5</b>	SH00 Black 3R, 12 <b>SHB00N12</b>	SH0 Black 3R, 12 <b>SHB0N12</b>	SH00 4, 4X I–0–II Open transition <b>SHB00MTSOT</b>	2.20 (55.5) <b>SF55SH5X5</b>
25	—	<b>R5A3025U</b>					
30	<b>T5A3030U</b>	<b>R5A3030U</b>					3.50 (90.0) <b>SF90SH5X5</b>
40	<b>T5A3040U</b>	<b>R5A3040U</b>					
60	<b>T5B3060U</b>	<b>R5B3060U</b>		SH00 Red 3R, 12 <b>SHR00N12</b>	SH0 Red 3R, 12 <b>SHR0N12</b>	SH00 4, 4X I–I+II–II Closed transition <b>SHB00MTSCT</b>	5.90 (150.0) <b>SF150SH5X5</b>
80	<b>T5B3080U</b>	<b>R5B3080U</b>		SH00 Black 4, 4X <b>SHB00N4X</b>	SH0 Black 4, 4X <b>SHB0N4X</b>		7.90 (200.0) <b>SF200SH5X5</b>
				SH00 Red 4, 4X <b>SHR00N4X</b>	SH0 Red 4, 4X <b>SHR0N4X</b>		12.60 (320.0) <b>SF320SH5X5</b>

**Accessories**



Ampere Rating	Switched Fourth-Pole Module	Unswitched Neutral Module	Auxiliary Contacts (Choose One)	Terminal Shrouds	Conversion Kit (Choose One) <sup>②</sup>	Door Mounting Kit <sup>③</sup>
16	<b>S4PR516</b>	<b>UNMR5A</b>	1NO + 1NC <b>AC1NON</b>	1P <b>TS1R5A</b>	6/8 pole <b>CKR568</b>	<b>DMK</b>
25	<b>S4PR525</b>					
30	<b>S4PR530</b>			3P <b>TS3R5A</b>	Changeover switch Open transition I–0–II	
40	<b>S4PR540</b>		2NO <b>AC2N</b>		<b>MTSCKR50T</b>	
60	<b>S4PR560</b> <sup>②</sup>	<b>UNMR5B</b>		1P <b>TS1R5B</b>		
80	<b>S4PR580</b> <sup>②</sup>			3P <b>TS3R5B</b>	Changeover switch Closed transition I–I+II–II <b>MTSCKR5CT</b>	

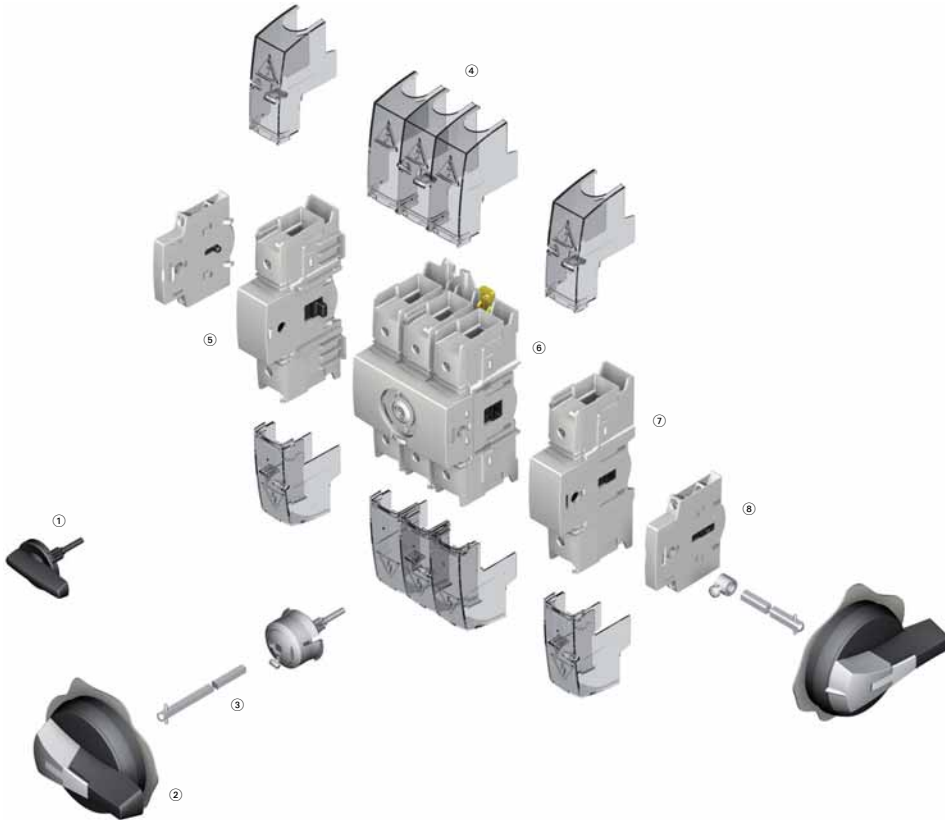
**Notes**

- ① Toggle version includes direct handle.
- ② Available Q2 2011.
- ③ Includes shaft and accessory cap.

1

**Non-Fusible 30–100A Compact****Features**

- Rating three-pole from 30A to 100A
- Direct or external operation handle (padlockable in ON position)
- Double breaking per phase
- Small footprint

**R9 Series Non-Fusible 30–100A Compact****Product Identification**

- ① Direct handle
- ② Door interlocked external handle
- ③ Shaft extension
- ④ Terminal shrouds
- ⑤ Unswitched neutral pole
- ⑥ Switch body
- ⑦ Switched fourth-pole module
- ⑧ Modular type auxiliary contacts

**Note:** For further details, please see the installation instructions supplied with each device.

**Product Selection**

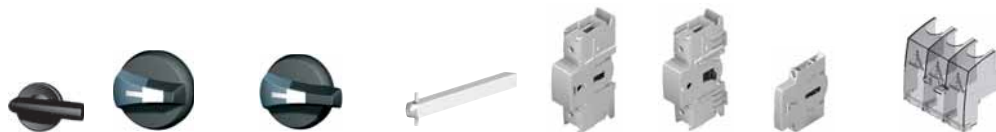
**Direct Operation**



**External Operation**



**R9 Series 30–100A**

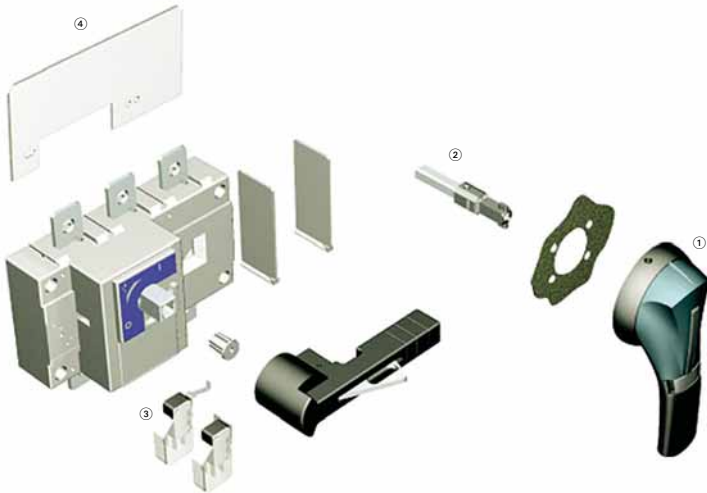


Ampere Rating (Frame)	Number of Poles	Switch Body Only	Direct Handle	Front and Right External Handle SH00 (Choose One)	Front and Right External Handle SH0 (Choose One)	Shaft for SH0 and SH00 Handles—In (mm) (Choose One)	Switched Fourth-Pole Module	Unswitched Neutral Module	Auxiliary Contacts (Choose One)	Terminal Shrouds (Choose One)
30 (C Frame)	3	<b>R9C3030U</b>	<b>DHR9</b>	SH00 Black 3R, 12 <b>SHB00N12</b>	SH0 Black 3R, 12 <b>SHB0N12</b>	2.20 (55.5) <b>SF55SH5X5</b>	<b>S4PR930</b>	Neutral <b>UNMR9C</b>	1NO + 1NC <b>AC1NONC</b>	1P <b>TS1R9</b>
60 (C Frame)	3	<b>R9C3060U</b>		SH00 Red 3R, 12 <b>SHR00N12</b>	SH0 Red 3R, 12 <b>SHR0N12</b>	3.50 (90.0) <b>SF90SH5X5</b>	<b>S4PR960</b>		2NO <b>AC2N</b>	3P <b>TS3R9CV</b>
100 (C Frame)	3	<b>R9C3100U</b>		SH00 Black 4, 4X <b>SHB00N4X</b>	SH0 Black 4, 4X <b>SHB0N4X</b>	5.91 (150.0) <b>SF150SH5X5</b>	<b>S4PR9100</b>			
				SH00 Red 4 4X <b>SHR00N4X</b>	SH0 Red 4 4X <b>SHR0N4X</b>	7.87 (200.0) <b>SF200SH5X5</b>				
						12.60 (320.0) <b>SF320SH5X5</b>				

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**Non-Fusible 100–1200A****Features**

- High thermal and dynamic withstand ratings
- Arduous categories of applications
- High electrical and mechanical endurances

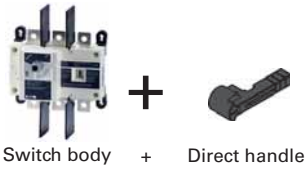
**R9 Series Non-Fusible 100–1200A****Product Identification**

- ① External front handle
- ② Shaft extensions for external handle
- ③ Configurable U-type ACs, for pre-break and signalling or TEST
- ④ Terminal Screens

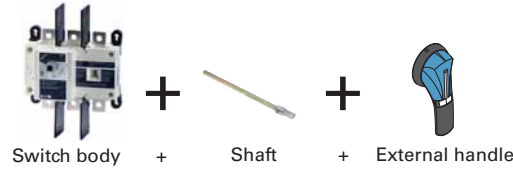
**Note:** For further details, please see the installation instructions supplied with each device.

**Product Selection**

**Direct Operation**



**External Operation**



**R9 Series Non-Fusible 100–1200A**



Ampere Rating (Frame)	Number of Poles	Switch Body Only	Direct Handle	Door Interlocked External Pistol Handle (Choose One)	Shaft Extensions for External Handle—In (mm) (Choose One)	Auxiliary Contacts	Terminal Screens (Choose One)	Terminal Lugs <sup>③</sup>					
100 (D Frame)	3	<b>R9D3100U</b>	<b>DHR9DE</b>	Size 2, Black 1, 3R, 12 Defeatable <b>PHB2N12F</b>	7.90 (200.0) <b>SF200PH10X10</b>	1NO + 1NC <b>AC1N0NCDE</b> <b>AC1N0NCDELL</b>	3-pole, Line side only <b>TS3R9DT</b>	<b>LK3R9DL</b> <b>LK4R9DL</b>					
	4	<b>R9D4100U</b>											
200 (D Frame)	3	<b>R9D3200U</b>	<b>DHR9DE</b>	Size 2, Red 1, 3R, 12 Defeatable <b>PHR2N12F</b>	12.60 (320.0) <b>SF320PH10X10</b>	2NO + 2NC <b>AC2N0NCDE</b> <b>AC2N0NCDELL</b>	3-pole, Load side only <b>TS3R9DB</b>	<b>LK3R9DL</b> <b>LK4R9DL</b>					
	4	<b>R9D4200U</b>											
400 (E Frame)	3	<b>R9E3400U</b>	<b>DHR9DE</b>	Size 2, Black 4, 4X Defeatable <b>PHB2N4XF</b>	15.70 (400.0) <b>SF400PH10X10</b>	2NO + 2NC <b>AC2N0NCDE</b> <b>AC2N0NCDELL</b>	4-pole, Line or load side <b>TS4R9DTB</b>	<b>LK3R9EM</b> <b>LK4R9EM</b>					
	4	<b>R9E4400U</b>											
	3	<b>R9E3600U</b>							Size 3, Black 4, 4X Defeatable <b>PHB3N4XF</b>	7.90 (200.0) <b>SF200PH15X12</b>	1NO AC U Type <b>AC1N0R9</b> <sup>②</sup>	3-pole, Line side only <b>TS3R9F</b> <sup>①</sup>	<b>LK3R9FN</b> <b>LK4R9FN</b>
	4	<b>R9E4600U</b>											
800 (G Frame)	3	<b>R9G3800U</b>	<b>DHR9FG</b>	Size 3, Red 4, 4X Defeatable <b>PHR3N4XF</b>	12.60 (320.0) <b>SF320PH15X12</b>	1NC AC U Type <b>AC1NCR9</b> <sup>②</sup>	3-pole, Load side only <b>TS3R9G</b> <sup>①</sup>	<b>LK6R9G</b> <b>LK8R9G</b>					
	4	<b>R9G4800U</b>											
1000 (G Frame)	3	<b>R9G31000U</b>	<b>DHR9FG</b>	Size 3, Red 4, 4X Defeatable <b>PHR3N4XF</b>	1.70 (400.0) <b>SF400PH15X12</b>	1NC AC U Type <b>AC1NCR9</b> <sup>②</sup>	4-pole, Line or load side <b>TS4R9G</b> <sup>①</sup>	<b>LK6R9G</b> <b>LK8R9G</b>					
	4	<b>R9G41000U</b>											
1200 (G Frame)	3	<b>R9G31200U</b>	<b>DHR9FG</b>	Size 4, Black 4, 4X Defeatable <b>PHB4N4XF</b>	19.7 (500.0) <b>SF500PH15X12</b>	1NC AC U Type <b>AC1NCR9</b> <sup>②</sup>	3-pole, Line side only <b>TS3R9F</b> <sup>①</sup>	<b>LK3R9FN</b> <b>LK4R9FN</b>					
	4	<b>R9G41200U</b>											
				Size 4, Red 4, 4X Defeatable <b>PHR4N4XF</b>									

**Notes**

- ① Top (line side) supplied as standard.
- ② Auxiliary contact requires holder (catalog number ACHFG) when used on F and G Frame switches (non-fusible 600–1200A).
- ③ Each catalog number is for line or load side. For both line and load, please order two sets.

1

## Fusible 30–800A



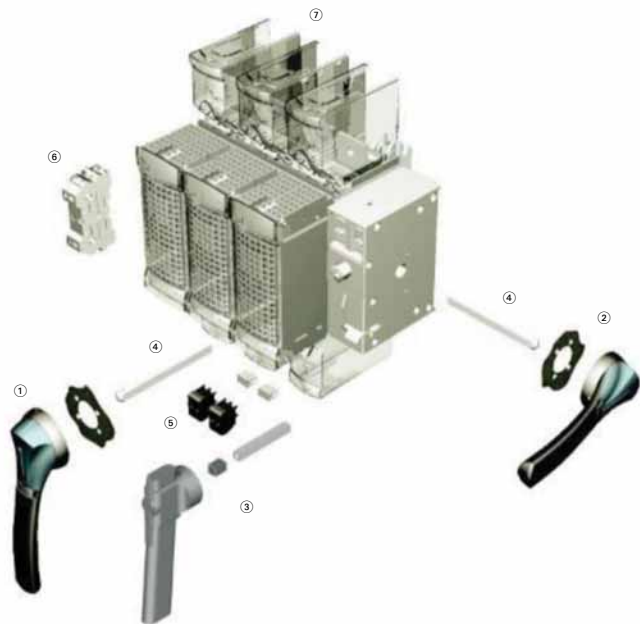
## Features

- Load break functionality
- Double break contacts
- Up to 200 kA short-circuit rating with Class CC, J or L fuses
- Compact footprints
- Defeatable pistol handles automatically re-latch when the panel door is closed
- Front or right side operation
- NFPA 79 compliant kits
- Two-, three- and four-pole devices

## R9 Series Fusible 30–800A

R9 Fusible 30A/CC and 30A/J (H Frame)—  
Direct and External Operation**Product Identification**

- ① External front handles
- ② Direct handle
- ③ Shaft extensions for external handles
- ④ Configurable U Type ACs, for pre-break and signaling or TEST

R9 Fusible 30A/J–800A/L (I–N Frames)—  
Direct and External Operation**Product Identification**

- ① External front handles
- ② External right side handle (not applicable for N Frame 600/800A)
- ③ Direct handle
- ④ Shaft extensions for external handles
- ⑤ Configurable U Type ACs, for pre-break and signaling or TEST
- ⑥ Side auxiliary contacts
- ⑦ Terminal shrouds



**Product Selection**

**Direct Operation**



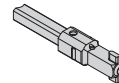
Switch body + Direct handle

**External Operation**



Switch body + Shaft + External handle

**Front and Right Side Operation**



Ampere Rating (Frame) (Fuse Class)	Number of Poles	Switch Body Only	Direct Handle	External Selector Handle (Choose One)	Shaft Extension for Selector Handle Only (Choose One)	External Front Pistol Handle	External Right Side Pistol Handle
30 Compact (H Frame) (CC)	3	<b>R4H3030FCC</b>	<b>DHR9HC</b>	Black 1,3R,12 <b>SHB0N12HV</b>	7.90 (200.0) <b>SF200SH5X5H</b>	Black 1,3R,12 <b>PHB1N12F</b>	—
30 (H Frame) (CC)	3 + switched neutral	<b>R4H3030FCCSN</b>		Red 1,3R,12 <b>SHRON12HV</b>	12.60 (320.0) <b>SF320SH5X5H</b>	Red 1,3R,12 <b>PHR1N12F</b>	
30 Compact (H Frame) (J)	3	<b>R4H3030FJ</b>	<b>DHR9HJ</b>	Black 4,4X <b>SHB0N4XHV</b>	15.70 (400.0) <b>SF400SH5X5H</b>	Black 4,4X <b>PHB1N4XF</b>	
30 (H Frame) (J)	3 + switched neutral	<b>R4H3030FJSN</b>		Red 4,4X <b>SHRON4XHV</b>		Red 4,4X <b>PHR1N4XF</b>	
30 (I Frame) (CC)	3	<b>R9I3030FCC</b>	<b>DHR9J2M</b>	—	—		
	4	<b>R9I4030FCC</b>					
30 (J Frame) (J)	2	<b>R9J2030FJ</b>				Black 4,4X (w/ TEST Position) <b>PHB1N4XFT</b>	Black 4, 4X <b>PHB1N4XS</b>
	3	<b>R9J3030FJ</b>					
	4	<b>R9J4030FJ</b>					
60 ① (J Frame) (J)	2	<b>R9J2060FJ</b>				Red 4,4X (w/ TEST Position) <b>PHR1N4XFT</b>	Red 4, 4X <b>PHR1N4XS</b>
	3	<b>R9J3060FJ</b>					
	4	<b>R9J4060FJ</b>					

**Note**

① 100 kA short-circuit rating.

# 1.3

## Circuit Protection

### Rotary Disconnect Switches

1

#### Front and Right Side Operation, continued



Ampere Rating (Frame) (Fuse Class)	Number of Poles	Switch Body Only	Shaft Extensions for Pistol Handle Only In (mm) (Choose One)	NFPA 79 Kit	Auxiliary Contacts (Choose One)	S Type Auxiliary Contacts (Choose One)	Terminal Shrouds
30 Compact (H Frame) (CC)	3	<b>R4H3030FCC</b>	7.90 (200.0) <b>SF200PH5X5</b>	<b>NFPA79H</b>	1 AC NO <b>AC1NOR9</b>	—	Integral to switch
30 (H Frame) (CC)	3 + switched neutral	<b>R4H3030FCCSN</b>	12.60 (320.0) <b>SF320PH5X5</b>		1 AC NC <b>AC1NCR</b>		
30 Compact (H Frame) (J)	3	<b>R4H3030FJ</b>	15.70 (400.0) <b>SF400PH5X5</b>				
30 (H Frame) (J)	3 + switched neutral	<b>R4H3030FJSN</b>					
30 (I Frame) (CC)	3	<b>R9I3030FCC</b>	7.90 (200.0) <b>SF200PH10X10</b>	<b>NFPA79JKL</b>		1 AC NO + NC <b>AC1N01NCJ2N</b>	
	4	<b>R9I4030FCC</b>					
30 (J Frame) (J)	2	<b>R9J2030FJ</b>	12.60 (320.0) <b>SF320PH10X10</b>			2 AC NO + NC <b>AC2N02NCJ2N</b>	
	3	<b>R9J3030FJ</b>					
	4	<b>R9J4030FJ</b>	15.70 (400.0) <b>SF400PH10X10</b>				
60 <sup>Ⓢ</sup> (J Frame) (J)	2	<b>R9J2060FJ</b>				1 AC NO + NC w/ TEST <b>AC1N01NCJ2NT</b>	
	3	<b>R9J3060FJ</b>	19.70 (500.0) <b>SF500PH10X10</b>				
	4	<b>R9J4060FJ</b>				2 AC NO + NC w/ TEST <b>AC2N02NCJ2NT</b>	

**Note**

Ⓢ 100 kA short-circuit rating.

## Front and Right Side Operation, continued



Ampere Rating (Frame) (Fuse Class)	Number of Poles	Switch Body Only	Direct Handle (Black)	External Front Pistol Handle (Choose One)	External Right Side Pistol Handle (Choose One)
60 ① (K Frame) (J)	2	<b>R9K2060FJ</b>	<b>DHR9J2M</b>	Black 1,3R,12 <b>PHB2N12F</b>	Black 4, 4X <b>PHB2N4XS</b>
	3	<b>R9K3060FJ</b>			
	4	<b>R9K4060FJ</b>			
100 (K Frame) (J)	2	<b>R9K2100FJ</b>		Red 1,3R,12 <b>PHR2N12F</b>	Red 4, 4X <b>PHR2N4XS</b>
	3	<b>R9K3100FJ</b>			
	4	<b>R9K4100FJ</b>			
200 (L Frame) (J)	2	<b>R9L2200FJ</b>		Black 4,4X <b>PHB2N4XF</b>	
	3	<b>R9L3200FJ</b>			
	4	<b>R9L4200FJ</b>			
400 (M Frame) (J)	3	<b>R9M3400FJ</b>		Red 4,4X <b>PHR2N4XF</b>	
	4	<b>R9M4400FJ</b>			
600 (N Frame) (J)	2	<b>R9N2600FJ</b>	<b>DHR9N</b>	Black 4, 4X <b>PHB3N4XF</b>	
	3	<b>R9N3600FJ</b>			
	4	<b>R9N4600FJ</b>			
800 (N Frame) (L)	2	<b>R9N2800FL</b>		Red 4,4X <b>PHR3N4XF</b>	
	3	<b>R9N3800FL</b>			
	4	<b>R9N4800FL</b>			

**Note**

① 200 kA short-circuit rating.

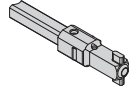
# 1.3

## Circuit Protection

### Rotary Disconnect Switches

1

#### Front and Right Side Operation, continued



Ampere Rating (Frame) (Fuse Class)	Number of Poles	Switch Body Only	Shaft Extensions for External Handle In (mm) (Choose One)	NFPA 79 Kit	Auxiliary Contacts (Choose One)	Auxiliary Contacts (Choose One)	Terminal Shrouds
60 <sup>Ⓢ</sup> (K Frame) (J)	2	<b>R9K2060FJ</b>	7.90 (200.0)	<b>NFPA79JKL</b>	1 AC NO <b>AC1NOR9</b>	1 AC NO + NC <b>AC1N01NCJ2N</b>	Integral to switch
	3	<b>R9K3060FJ</b>	Pistol <b>SF200PH10X10</b>				
	4	<b>R9K4060FJ</b>					
100 (K Frame) (J)	2	<b>R9K2100FJ</b>	12.60 (320.0)	<b>AC1NCR9</b>	1 AC NC <b>AC1NCR9</b>	2 AC NO + NC <b>AC2NO2NCJ2N</b>	
	3	<b>R9K3100FJ</b>	Pistol <b>SF320PH10X10</b>				
	4	<b>R9K4100FJ</b>					
200 (L Frame) (J)	2	<b>R9L2200FJ</b>	15.70 (400.0)			1 AC NO + NC w/ TEST <b>AC1N01NCJ2NT</b>	<b>TSR9L2</b>
	3	<b>R9L3200FJ</b>	Pistol <b>SF400PH10X10</b>				<b>TSR9L3</b>
	4	<b>R9L4200FJ</b>	19.70 (500.0) Pistol <b>SF500PH10X10</b>				<b>TSR9L4</b>
400 (M Frame) (J)	3	<b>R9M3400FJ</b>				2 AC NO + NC w/ TEST <b>AC2NO2NCJ2NT</b>	<b>TSR9M3</b>
	4	<b>R9M4400FJ</b>					<b>TSR9M4</b>
600 (N Frame) (J)	2	<b>R9N2600FJ</b>	7.90 (200.0)	<b>NFPA79N</b>		1 AC NO + NC <b>AC1N01NCJ2N</b>	<b>TSR9N2</b>
	3	<b>R9N3600FJ</b>	Pistol <b>SF200PH12X12</b>				<b>TSR9N3</b>
	4	<b>R9N4600FJ</b>					<b>TSR9N4</b>
800 (N Frame) (L)	2	<b>R9N2800FL</b>	12.60 (320.0)			2 AC NO + NC <b>AC2NO2NCJ2N</b>	<b>TSR9N2</b>
	3	<b>R9N3800FL</b>	Pistol <b>SF320PH12X12</b>				<b>TSR9N3</b>
	4	<b>R9N4800FL</b>	15.70 (400.0) Pistol <b>SF400PH12X12</b>				
			19.70 (500.0) Pistol <b>SF500PH12X12</b>				<b>TSR9N4</b>

**Note**

<sup>Ⓢ</sup> 200 kA short-circuit rating.

DC Rated Disconnects

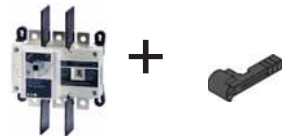


Features

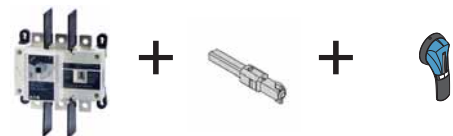
- Switching technology
- Up to 600 Vdc according to UL 98/CSA
- Up to 1000 Vdc according to IEC 947-3

R9 Series DC Rated Disconnects

Product Selection

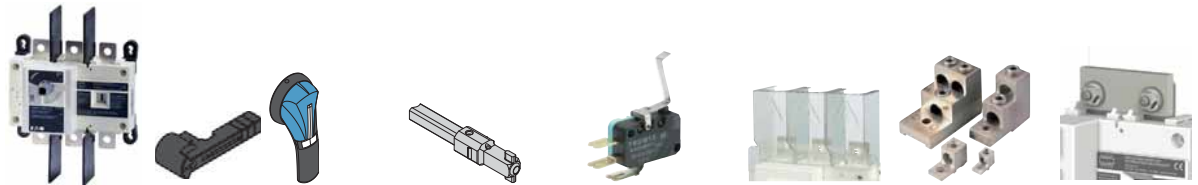


Switch body + Direct handle



Switch body + Shaft + External handle

Front Operation—Three- and Four-Pole



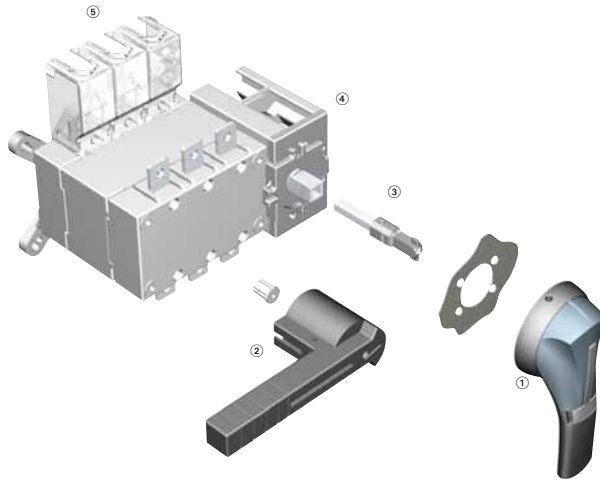
Ampere Rating	Number of Poles	Switch Body	Direct Handle	External Handle (Choose One)	Shaft for External Handle In (mm) (Choose One)	Auxiliary Contacts (Choose One)	Terminals Shroud	Terminal Lugs	Jumpers for Connecting Poles in Series
100	3	<b>R9D3100UDC</b>	<b>DHR9DE</b>	S2 Type	7.90 (200.0)	C Type	3P ②	3P ④	2 pieces
	4	<b>R9D4100UDC</b>		Black 1, 3R, 12 ①	<b>SF200PH10X10</b>	1st Contact NO+NC	<b>TS3R9DT</b>	<b>LK3R9DL</b>	<b>DCJUMP2</b>
200	3	<b>R9D3200UDC</b>		<b>PHB2N12F</b>	12.60 (320.0)	<b>AC1NONCDE</b>	3P ③	4P ④	3 pieces
	4	<b>R9D4200UDC</b>		Red/Yellow 1, 3R, 12 ①	<b>SF320PH10X10</b>	2nd Contact NO+NC	<b>TS3R9DB</b>	<b>LK4R9DL</b>	<b>DCJUMP3</b>
400	3	<b>R9E3400UDC</b>		Black 4, 4X ①	15.7 0 (400.0)	<b>AC2NONCDE</b>	4P ④		
	4	<b>R9E4400UDC</b>		<b>PHB2N4XF</b>	<b>SF400PH10X10</b>		<b>TS4R9DTB</b>		
	3			Red/Yellow 4, 4X ①			3P ②	3P ④	2 pieces
	4			<b>PHR2N4XF</b>			<b>TS3R9ET</b>	<b>LK3R9EM</b>	<b>DCJUMPE2</b>
							3P ③	4P ④	3 pieces
							4P ④		
							<b>TS3R9EB</b>	<b>LK4R9EM</b>	<b>DCJUMPE3</b>
							<b>TS4R9ETB</b>		

Notes

- ① Defeatable handle.
- ② Top (line side).
- ③ Bottom (load side).
- ④ Top or bottom (line or load side).

**Manual Transfer Switches****Features**

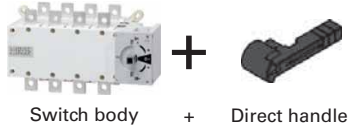
- Three load break positions (I, 0, II)
- On load switching
- Direct or external handle
- 480 Vac total system
- 600 Vac resistive load

**Manual Transfer Switches****Product Identification**

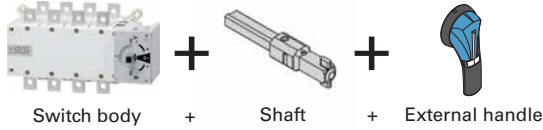
- ① External front handle
- ② Direct handle
- ③ Shaft extension for external handle
- ④ Pre-break ACs (standard on 600–1200A)
- ⑤ Terminal Screen

**Product Selection**

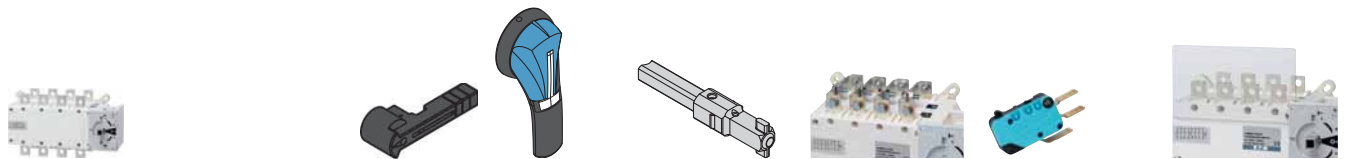
**Direct Operation**



**External Operation**



**Manual Transfer Switches—UL 98 Standard ①**



Ampere Rating	Number of Poles	Switch Body Only ①	Direct Handle (Black)	External Three-Position Handle (Choose One)	Shaft Extensions for External Handle In (mm) (Choose One)	Bridging Bars	Auxiliary Contacts	Terminal Screens ②	
100	3	<b>RMTS3100U</b>	<b>DHMTSSL</b>	Size 2, Black I–0–II Type 4/4X <b>PHB2N4X3P</b>	7.90 (200.6) <b>SF200PH10X10</b>	3P <b>BB3P200</b>	NO/NC <b>AC1NONCMTS400</b>	3P <b>TS3MTS200TB</b>	
	4	<b>RMTS4100U</b>			12.60 (320.0) <b>SF320PH10X10</b>			4P <b>BB4P200</b>	4P <b>TS4MTS200TB</b>
200	3	<b>RMTS3200U</b>		Size 2, Red I–0–II Type 4/4X <b>PHR2N4X3P</b>	15.70 (398.8) <b>SF400PH10X10</b>	4P <b>BB4P200</b>	Low level <b>AC1NONCMTS400LL ③</b>	4P <b>TS4MTS200TB</b>	
	4	<b>RMTS4200U</b>							
400	3	<b>RMTS3400U</b>		Size 3, Black I–0–II Type 4/4X <b>PHB3N4X3P</b>	7.90 (200.6) <b>SF200PH15X12</b>	3P <b>BB3P400</b>		3P <b>TS3MTS400TB</b>	
	4	<b>RMTS4400U</b>			12.60 (320.0) <b>SF320PH15X12</b>			4P <b>BB4P400</b>	4P <b>TS4MTS400TB</b>
					15.70 (398.8) <b>SF400PH15X12</b>				
600	3	<b>RMTS3600U</b>	<b>DHMTSDL</b>	Size 4, Black I–0–II Type 4/4X <b>PHB4N4X3P</b>		3P <b>BB3P600</b>	NO/NC contact standard	3P <b>TS3MTS600</b>	
	4	<b>RMTS4600U</b>						4P <b>BB4P600</b>	4P <b>TS4MTS600</b>
800	3	<b>RMTS3800U</b>	<b>DHMTSDLM</b>	Size 4, Red I–0–II Type 4/4X <b>PHR4N4X3P</b>		3P <b>BB3P1200</b>		3P <b>TS3MTS1200</b>	
	4	<b>RMTS4800U</b>				4P <b>BB4P1200</b>		4P <b>TS4MTS1200</b>	
1200	3	<b>RMTS31200U</b>				4P <b>BB4P1200</b>		4P <b>TS4MTS1200</b>	
	4	<b>RMTS41200U</b>							

**Notes**

- ① All ratings, 100–1200A, are UL 98 listed. Switches are to be UL 1008 listed in 2011.
- ② Line or load (top or bottom); for both line and load, order two kits.
- ③ Low level auxiliary contact—gold plated for minimal resistance—for PLC applications.

**Enclosed Rotary Disconnects****Features**

- Padlockable in the OFF position (up to three padlocks) to meet OSHA lockout requirements
- Available in 16–80A ratings
- 600 Vac, three- and four-pole non-fusible device
- Rated for making and breaking loads
- Accepts auxiliary contacts; capability to signal PLC controllers
- Ground lug connection provided
- Possibility of adding one power pole and one auxiliary contact
- NEMA Type 1, 3R, 12, 4, 4X
- 65kAIC rating when applied downstream from appropriate fusing

**Enclosed Rotary Disconnects**

Provide users with the ability to lock directly wired motor loads in the OFF position to comply with OSHA lockout/tagout regulations. Also for machine applications that require compact, economical disconnect switches.

Enclosed rotary disconnect switches allow safe control and safe disconnect of any motor application.

Open rotary disconnects can be found on **Pages V9-T1-46 to V9-T1-61** and full information in Volume 5, Motor Control and Protection, CA08100006E, Tab 8.



## Product Selection

## Enclosed Rotary Non-Fusible

Ampere Rating	Maximum Horsepower Ratings				NEMA 1 ① Enclosure Indoor Catalog Number	NEMA 12 ①② Enclosure Dust-Tight/ Rainproof Catalog Number	NEMA 4X ① Enclosure Corrosion-Resistant, Stainless Steel Catalog Number	NEMA 4X ① Enclosure Corrosion-Resistant, Non-Metallic Catalog Number	NEMA 4X Enclosure Polycarbonate- Non-Metallic Catalog Number
	Three-Phase AC		480V	600V					
<b>Three-Pole, 600 Vac</b>									
16	3	5	10	10	ER53016UG	ER53016UD	ER53016UW	ER53016UX	—
25	7-1/2	7-1/2	15	20	ER53025UG	ER53025UD	ER53025UW	ER53025UX	—
30	7-1/2	7-1/2	15	20	ER53030UG	ER53030UD	ER53030UW	ER53030UX	ER53030UPYR ③④
40	7-1/2	7-1/2	20	25	ER53040UG	ER53040UD	ER53040UW	ER53040UX	—
60	15	15	30	30	ER53060UG	ER53060UD	ER53060UW	ER53060UX	ER53060UPYR ③④
80	15	20	40	40	ER53080UG	ER53080UD	ER53080UW	ER53080UX	—
<b>Four-Pole, 600 Vac</b>									
16	3	5	10	10	ER54016UG	ER54016UD	ER54016UW	ER54016UX	—
25	7-1/2	7-1/2	15	20	ER54025UG	ER54025UD	ER54025UW	ER54025UX	—
30	7-1/2	7-1/2	20	25	ER54030UG	ER54030UD	ER54030UW	ER54030UX	—
40	7-1/2	7-1/2	20	25	ER54040UG	ER54040UD	ER54040UW	ER54040UX	—

## Accessories for Enclosed Rotary Disconnects ③④

Disconnect Ampere Rating	Switched Fourth Pole	Unswitched Neutral Pole	Auxiliary Contacts (Choose One)	Terminal Shrouds
16	S4PR516	UNMR5A	1NO + 1NC AC1NONC	Single-pole TS1R5A
25	S4PR525			
30	S4PR530		2NC AC2NC	Three-pole TS3R5A
40	S4PR540			
60	S4PR560 ⑦	UNMR5B ⑦		Single-pole TS1R5B
80	S4PR580 ⑦			Three-pole TS3R5B

## Notes

- ① For CSA listed switches, add prefix letter "C" to the front of the catalog number.
- ② NEMA Type 12 enclosures (16–80A) can be field modified to meet NEMA Type 3R rainproof requirements when a factory-provided drain hole is opened.
- ③ YR suffix indicates **Y**ellow cover with **R**ed handle. For **G**ray cover with **B**lack handle, replace "YR" with "GB." For **G**ray cover with **R**ed handle, replace "YR" with "GR."
- ④ cULus only.
- ⑤ Ordered and shipped as separate components—not integral to enclosed device.
- ⑥ Enclosed disconnects can accept one power pole, neutral or up to two auxiliary contacts (one mounted on either side of switch).
- ⑦ Available 2011.

Contact the Safety Switch Flex Center (1-888-329-9272) for factory-installed accessories or other special modifications.

**Contactors**



**Motor Protection and Monitoring Relays**



**Manual Motor Protectors and Controllers**



**Soft Starters**



**Drives**



**2.1 Contactors**

Product Overview ..... V9-T2-2

Compact Definite Purpose Contactors ..... V9-T2-3

50 mm C25 Definite Purpose Contactors ..... V9-T2-5

**XT** IEC Miniature Contactors ..... V9-T2-7

**XT** IEC Contactors ..... V9-T2-9

**2.2 Motor Protection and Monitoring Relays**

Product Overview ..... V9-T2-15

D65 Series Monitoring Relays ..... V9-T2-17

D65C Series Monitoring Relays ..... V9-T2-19

**XT** IEC Miniature Overload Relays ..... V9-T2-22

XTOB, XTOT Thermal Overload Relays ..... V9-T2-23

**XT** Electronic Overload Relays ..... V9-T2-26

Motor Insight Overload and Monitoring Relays ..... V9-T2-32

**2.3 Manual Motor Protectors and Controllers**

Product Overview ..... V9-T2-36

**XT** IEC Manual Motor Protectors ..... V9-T2-37

**XT** IEC Manual and Combination Motor Controllers ..... V9-T2-41

**2.4 Soft Starters**

Product Overview ..... V9-T2-47

DS7 Soft Start Controller ..... V9-T2-48

DS6 Soft Start Controller ..... V9-T2-50

S611 Soft Starter ..... V9-T2-51

S801+ Soft Starter ..... V9-T2-55

S811+ Soft Starter ..... V9-T2-58

**2.5 Drives**

Product Overview ..... V9-T2-65

M-Max Machinery Drive ..... V9-T2-66

SVX9000 Drives ..... V9-T2-68

For our complete product offering, see Volume 5—Motor Control and Protection, CA08100006E and Volume 6—Solid-State Motor Control, CA08100007E.

# 2.1

## Motor Control and Protection

### Contactors

#### Product Overview

#### Contactors Selection Guide

2



Description	Definite Purpose Contactors	X7IEC Miniature Contactors	X7IEC Contactors
	Page V9-T2-3	Page V9-T2-7	Page V9-T2-9
Type	Definite purpose	IEC	IEC
Approvals	UL <sup>®</sup> Recognized, CSA <sup>®</sup> , CE, ARI, RoHS	UL, IEC EN 60947, CE, CSA, RoHS	UL, IEC EN 60947, CE, CSA, RoHS
Technical Data			
Pole configurations	1P, 2P, 3P, 4P	3P, 4P	3P, 4P
Inductive Amp ratings	To 360A	To 8.8A (AC-3)	To 1600A (AC-3)
Resistive Amp ratings	To 360A	To 20A (AC-1)	To 3185A (AC-1)
Typical electrical operations	To 300,000	To 750,000	To 1,400,000

For our complete product offering, see Volume 5—Motor Control and Protection, CA08100006E.

Compact Definite Purpose Contactors



Features

- Insulation voltage: 690V
- Current rated and hp/kW rated
- Magnet coil: Class F, 155°C
- Contact arc covers are standard on all contactors

Product Selection

Compact Definite Purpose Contactors—Open Type

Ampere Ratings ①

Inductive Full Load	Resistive	Locked Rotor 240–277V	Catalog Number ②
<b>Single-Pole</b>			
30	40	150	C25ANB130_
40	50	240	C25ANB140_
<b>Single-Pole with Shunt</b>			
30	40	150	C25CNB130_
40	50	240	C25CNB140_
<b>Two-Pole</b>			
25	35	150	C25BNB225_
30	40	150	C25BNB230_
40	50	240	C25BNB240_

Magnet Coil Selection

AC Coil Voltage 50/60 Hz	Coil Suffix
24	T
110–120	A
208–240	B

Notes

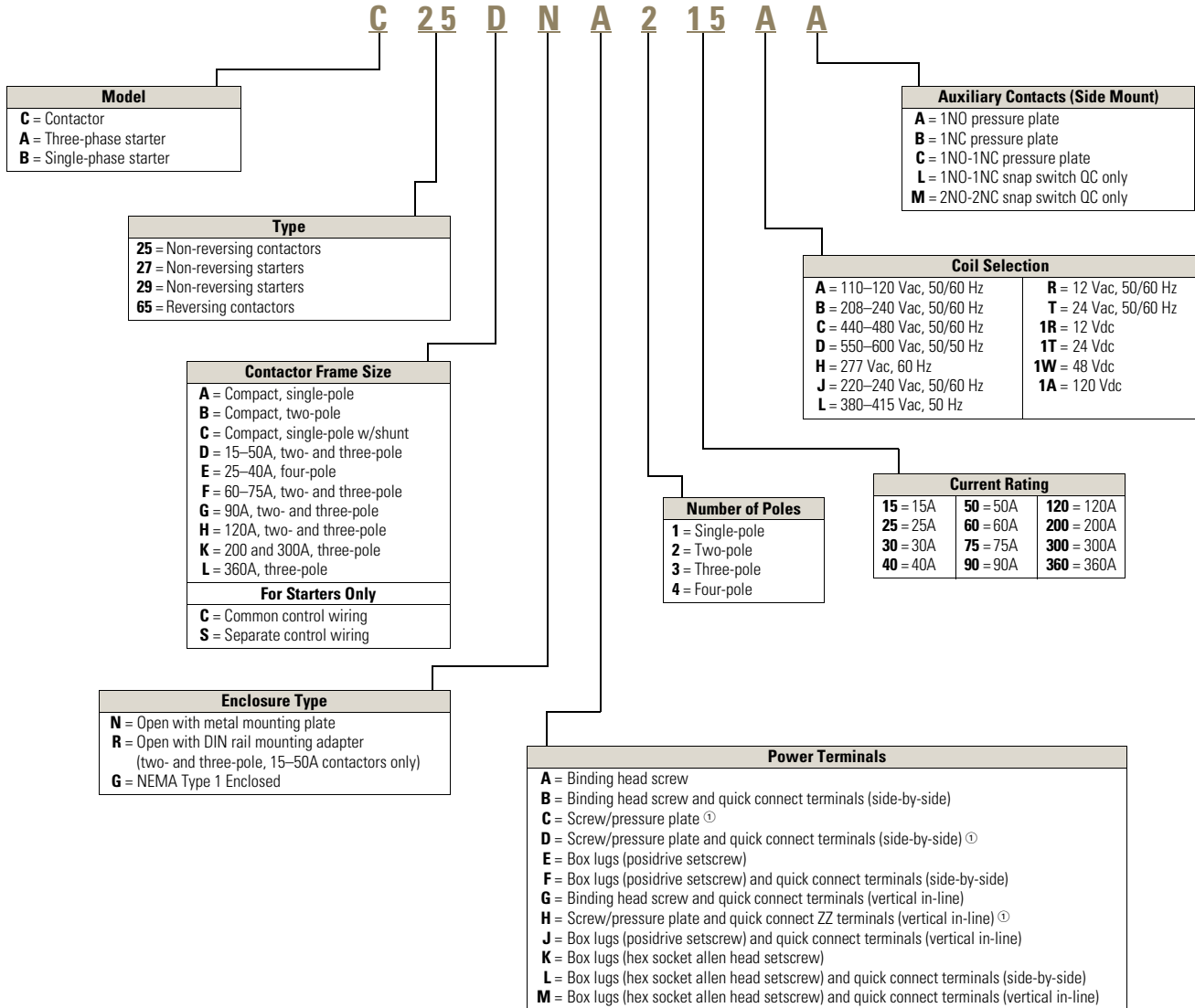
- ① Rating per pole.
- ② Replace underscore ( \_ ) in catalog number with coil suffix letter from table at left.

#### Catalog Number Selection

#### Definite Purpose Contactors

2

#### Definite Purpose Contactors



**Note**

① Not available on 50A devices.

50 mm C25 Definite Purpose Contactors



Features

- Contactors are dual-rated with inductive and resistive ratings, as well as horsepower and kilowatt ratings
- Contactors rated 15–50A are available with DIN rail mount as a factory installed option
- Magnet coil: Class B (C25E, F, G, H and K), 130°C
- Ambient temperature: 150°F (65°C) maximum

Product Selection

50 mm C25 Definite Purpose Contactors

C25 Contactors—Open Type

Rating, Amperes Inductive Full Load	Resistive per Pole	Line Voltage	Locked Rotor	Maximum Motor Horsepower		Open Type with Metal Mounting Plate Catalog Number <sup>①②</sup>	Open Type with DIN Rail Adapter Catalog Number <sup>①②</sup>
				Single-Phase	Three-Phase		
15	20	230	90	2	3	C25DND315_	C25DRD315_
		460	75	—	5		
		575	60	—	5		
25	35	230	150	3	7-1/2	C25DND325_	C25DRD325_
		460	125	—	10	C25END425_	
		575	100	—	10		
30	40	230	180	5	10	C25DND330_	C25DRD330_
		460	150	—	15	C25END430_	
		575	120	—	15		
40	50	230	240	7-1/2	10	C25DNF340_	C25DRF340_
		460	200	—	20	C25ENF440_	
		575	160	—	20		
50	65	230	300	10	15	C25DNJ350_	C25DRJ350_
		460	250	—	30		
		575	200	—	30		
60	75	230	360	10	20	C25FNF360_	—
		460	300	—	40		
		575	240	—	40		
75	90	230	450	15	20	C25FNF375_	—
		460	375	—	50		
		575	300	—	50		

Magnet Coil Selection

Voltage	Coil Suffix	
60 Hz	50 Hz	
<b>AC</b> <sup>③</sup>		
24 <sup>④</sup>	24	<b>T</b>
110–120 <sup>⑤</sup>	110–120 <sup>⑤</sup>	<b>A</b>
208–240 <sup>⑤</sup>	208–240	<b>B</b>
<b>DC</b> <sup>⑥</sup>		
24		<b>1T</b>

Notes

- ① Replace underscore ( \_ ) in catalog number with magnet coil suffix from table at left.
- ② Carton quantities including 20 individually packaged units are available for two- and three-pole units through 60A inductive.
- ③ Class H AC coils available as option for 15–50A contactor. Add 2 before AC coil suffix letter.
- ④ Available through 120A.
- ⑤ 104–120V 50/60 Hz for 60A, 75A and all four-pole contactors (25–40A).
- ⑥ Contactors with DC coils (only available up to 75A) include an early break NC auxiliary contact, C320KGD1.

# 2.1

## Motor Control and Protection

### Contactors

#### Reversing and Two-Speed Contactors—Open Type—Unwired, Mechanically Interlocked Only

2

Rating, Amperes Inductive Full Load	Resistive per Pole	Line Voltage	Locked Rotor	Maximum Motor Horsepower		Open Type with Metal Mounting Plate Catalog Number <sup>①</sup>
				Single-Phase	Three-Phase	
15	20	230	90	2	3	<b>C65DND315_</b>
		460	75	—	5	
		575	60	—	5	
25	35	230	150	3	7-1/2	<b>C65DND325_</b>
		460	125	—	10	
		575	100	—	10	
30	40	230	180	5	10	<b>C65DND330_</b>
		460	150	—	15	
		575	120	—	15	
40	50	230	240	7-1/2	10	<b>C65DNF340_</b>
		460	200	—	20	
		575	160	—	20	
50	65	230	300	10	15	<b>C65DNJ350_</b>
		460	250	—	30	
		575	200	—	30	

#### Magnet Coil Selection

Voltage 60 Hz	50 Hz	Coil Suffix <sup>②</sup>
24	24	<b>T</b>
110–120 <sup>③</sup>	110–120 <sup>③</sup>	<b>A</b>
208–240 <sup>④</sup>	208–240	<b>B</b>

#### Notes

- ① Replace underscore ( \_ ) with magnet coil suffix from table at left.
- ② Class H AC coils available as option for 15–50A contactor. Add Z before AC coil suffix letter.
- ③ 104–120V 50/60 Hz for 60A, 75A.
- ④ Available through 50A.

### XTIEC Miniature Contactors



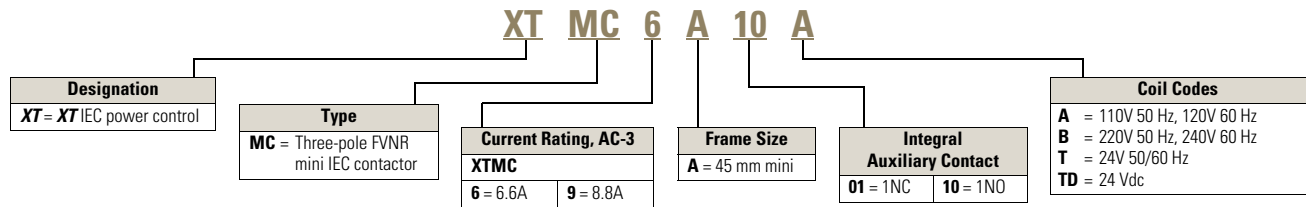
### Features

- Reversing or non-reversing
- Three- and four-pole configurations
  - Three-pole XTMC
  - Four-pole XTMF
- Panel or DIN rail mounting
- IP20 finger and back-of-hand proof
- Direct mount with XTOM miniature overload relays

## Catalog Number Selection

### XTIEC Miniature Contactors

#### Miniature Contactors



## Product Selection

### Full Voltage Non-Reversing Miniature Contactors

Operational Current AC-3 Amp Rating 380/400V	Conventional Free Air Thermal Current AC-1 at 50°C	Maximum kW Ratings AC-3 Three-Phase Motors, 50–60 Hz				Maximum Three-Phase Motor Ratings Single-Phase hp Ratings				Maximum Three-Phase Motor Ratings Three-Phase hp Ratings				Number of Power Poles	Auxiliary Contacts	Catalog Number—Screw Terminals ①
		220–240V	380–400V	550V	660/690V	115V	200V	230V	200V	230V	460V	575V				
6.6	20	1.5	3	3	3	1/4	3/4	1	1-1/2	2	3	3	3	1NO	XTMC6A10_	
6.6	20	1.5	3	3	3	1/4	3/4	1	1-1/2	2	3	3	3	1NC	XTMC6A01_	
8.8	20	2.2	4	4	4	1/2	1	1-1/2	2	3	5	5	3	1NO	XTMC9A10_	
8.8	20	2.2	4	4	4	1/2	1	1-1/2	2	3	5	5	3	1NC	XTMC9A01_	
8.8	20	2.2	4	4	4	1/2	1	1-1/2	2	3	5	5	4	—	XTMF9A00_	

### Magnet Coil Suffix

Coil Voltage	Suffix Code
110V 50 Hz, 120V 60 Hz	A
220V 50 Hz, 240V 60 Hz	B
24V 50/60 Hz	T
24 Vdc	TD ②
415V 50 Hz, 480V 60 Hz	C
550V 50 Hz, 600V 60 Hz	D
208V 60 Hz	E

### IEC Utilization Categories

- AC-1: Non-inductive or slightly inductive loads.
- AC-3: Squirrel cage motors—starting, switching of motors during running.
- AC-4: Squirrel cage motors—starting, plugging, inching.

### Notes


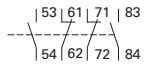
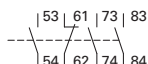
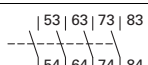
- ① Underscore ( \_ ) indicates magnet coil suffix required. See table at left.
- ② With DC operation: Integrated diode resistor combination, coil rating 2.6W.



#### Accessories

2

#### Front Mount Auxiliary Contacts <sup>①</sup>

Conventional Free Air Thermal Current, $I_{th} = I_{\theta}$ , AC-1 in Amps	Contact Configuration	Contact Sequence	Package Qty.	Catalog Number—Screw Terminals
10	1NO-1NC		5	<b>XTMCXFA11</b>
10	2NO-2NC		5	<b>XTMCXFA22</b>
10	3NO-1NC		5	<b>XTMCXFA31</b>
10	4NO		5	<b>XTMCXFA40</b>

#### XT IEC Miniature Contactors

Description	Package Qty.	Catalog Number
Mechanical interlock	5	<b>XTMCXML</b>
Reversing link kit—main current wiring for reversing contactors and starters	1	<b>XTMCXRL</b> <sup>②</sup>
Connector—for mechanically arranging contactors and timing relays in combinations	50	<b>XTMCXCN</b> <sup>③</sup>

#### Notes

- ① For two contactors with AC or DC operated magnet system that are horizontally or vertically mounted, the distance between contactors is 0 mm, and the mechanical lifespan is  $2.5 \times 10^6$  operations. The following control cables are integrated as part of the electrical interlock:  
K1M: A1—K2M: 21; K1M: 21—K2M: A1.
- ② Reversing link kit does not include mechanical interlock.
- ③ 0 mm distance between contactors.

### XT IEC Contactors



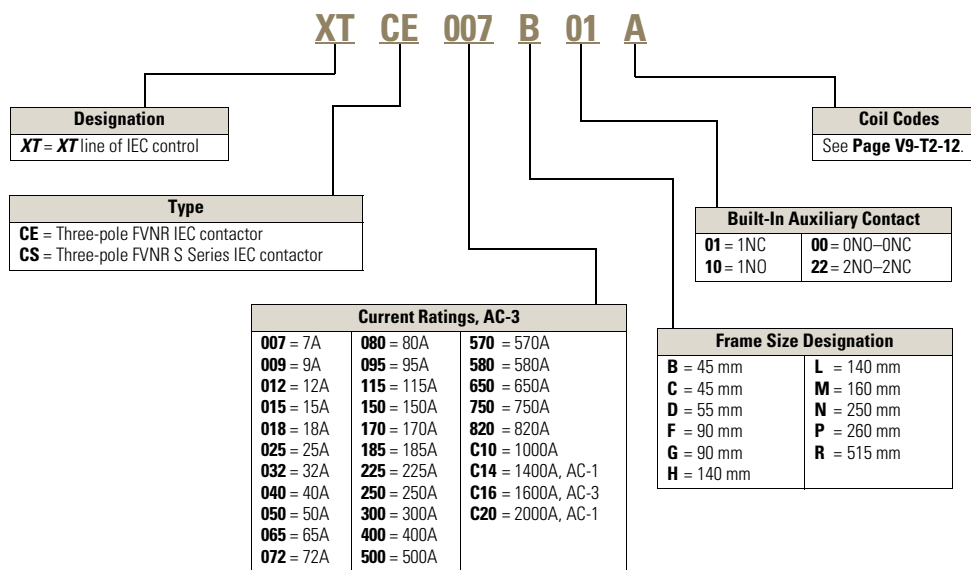
### Features

- Reversing or non-reversing contactors
- AC-3 contactor ratings to 1600A and AC-1 contactor ratings to 2000A
- Panel or DIN rail mounting to 65A
- IP20 finger and back-of-hand proof
- Built-in NO or NC auxiliary contacts to 32A
- Built-in surge suppression on DC coils XTCE Frame B-G and AC or DC coils on XTCE Frame L-R
- Can be used with **XT** or C396 overload relays
- Can be used with XTPR MMPs for manual motor controllers or UL508 Type F combination motor controllers

### Catalog Number Selection

#### XT IEC Contactors

#### Contactors



# 2.1

## Motor Control and Protection

### Contactors

#### Product Selection

2

#### Full Voltage Non-Reversing Three-Pole Contactors, Frames B–G

UL/CSA Ratings	IEC Ratings										Maximum kW Ratings AC-3 Three-Phase Motors 50–60 Hz				Auxiliary Contacts	Catalog Number—Screw Terminals <sup>①②</sup>
	UL General Purpose Amp Rating	Single-Phase hp Ratings			Three-Phase hp Ratings				AC-3 I <sub>e</sub> (A)	AC-1 (40°C) I <sub>e</sub> = I <sub>th</sub> (A)	220/230V	380/400V	415V	660/690V		
<b>Frame B</b>																
20	1/4	3/4	1	1-1/2	2	3	5	7	22	2.2	3	4	3.5	1NO	XTCE007B10_	
20	1/4	3/4	1	1-1/2	2	3	5	7	22	2.2	3	4	3.5	1NC	XTCE007B01_	
20	1/2	1	1-1/2	3	3	5	7-1/2	9	22	2.5	4	5.5	4.5	1NO	XTCE009B10_	
20	1/2	1	1-1/2	3	3	5	7-1/2	9	22	2.5	4	5.5	4.5	1NC	XTCE009B01_	
20	1	2	2	3	3	10 <sup>③</sup>	10	12	22	3.5	5.5	7	6.5	1NO	XTCE012B10_	
20	1	2	2	3	3	10 <sup>③</sup>	10	12	22	3.5	5.5	7	6.5	1NC	XTCE012B01_	
20	1	2	3	5	5	10 <sup>③</sup>	10	15.5	22	4	7.5	8	7	1NO	XTCE015B10_	
20	1	2	3	5	5	10 <sup>③</sup>	10	15.5	22	4	7.5	8	7	1NC	XTCE015B01_	
<b>Frame C</b>																
40	2	2	3	5	5	10 <sup>③</sup>	15	18	40	5	7.5	10	11	1NO	XTCE018C10_	
40	2	2	3	5	5	10 <sup>③</sup>	15	18	40	5	7.5	10	11	1NC	XTCE018C01_	
40	2	3	5	7-1/2	10	15	20	25	45	7.5	11	14.5	14	1NO	XTCE025C10_	
40	2	3	5	7-1/2	10	15	20	25	45	7.5	11	14.5	14	1NC	XTCE025C01_	
40	3	5	5	10	10	20	25	32	45	10	15	18	17	1NO	XTCE032C10_	
40	3	5	5	10	10	20	25	32	45	10	15	18	17	1NC	XTCE032C01_	
<b>Frame D</b>																
63	3	5	7-1/2	10	15	30	40	40	60	12.5	18.5	24	23	—	XTCE040D00_	
80	3	7-1/2	10	15	20	40	50	50	80	15.5	22	30	30	—	XTCE050D00_	
88	5	10	15	20	25	50	60	65	98	20	30	39	35	—	XTCE065D00_	
88	5	10	15	20	25	50	60	72	98	22	37	41	35	—	XTCE072D00_	
<b>Frame F</b>																
125	7-1/2	15	15	25	30	60	75	80	110	25	37	48	63	—	XTCE080F00_	
125	7-1/2	15	15	25	40	75	75	95	130	30	45	57	75	—	XTCE095F00_	
<b>Frame G</b>																
160	10	25	25	40	50	100	100	115	160	37	55	70	90	—	XTCE115G00_	
180	10	25	30	40	60	125	125	150	190	48	75	91	96	—	XTCE150G00_	
225 <sup>④</sup>	10	25	30	40	60	125	125	170	225	52	90	100	96	—	XTCE170G00_	

#### Notes

The 7–32A XTCE contactors have positively driven contacts between the integrated auxiliary contact and the auxiliary contact module as well as within the auxiliary contact modules.

The 40–65A XTCE contactors have positively driven contacts within the auxiliary contact module. Six auxiliary contacts are possible with a combination of side mounted and front mount auxiliary contacts.

DC operated contactors (Frames B–G, 7–150A) have a built-in suppressor circuit.

Frames B–C contactors with 1NC built-in auxiliary are mirror contacts (XTCE...B01\_–XTCE...C01\_).

① Underscore ( ) indicates magnet coil suffix required. See **Page V9-T2-12**.

② For spring cage terminals, insert C after the fourth digit of the catalog number. Example: XTCE C 007B10A.

For 7–12A XTCEC contactors, the power, auxiliary and coil terminals are spring cage.

For 18–32A XTCEC contactors, the auxiliary and coil terminals are spring cage.

For 40–150A XTCEC contactors, the coil terminals only are spring cage.

③ For electrical life contactor application data, see Volume 5—Motor Control and Protection, CA08100006E, Tab 1.

④ For 180–225A, use 2 x 3/0 AWG wire.

Full Voltage Non-Reversing Three-Pole Contactors, Frames H–R

UL General Purpose Amp Rating	UL/CSA Ratings				IEC Ratings		Maximum kW Ratings AC-3 Three-Phase Motors 50–60 Hz					Auxiliary Contacts	Catalog Number <sup>②</sup>
	Three-Phase hp Ratings				AC-3 I <sub>e</sub> (A)	AC-1 (40°C) I <sub>e</sub> = I <sub>th</sub> (A)	220/230V	380/400V	415V	660/690V <sup>①</sup>	1000V <sup>①</sup>		
<b>Frame H – Electronic Coil</b>													
250	50	60	125	150	185	337	55	90	—	140	108	2NO-2NC	XTCE185H22_
250	60	75	150	200	225	386	70	110	—	215	108	2NO-2NC	XTCE225H22_
<b>Frame L – Standard Coil (110/120V, 230/240 Vac Coil Only)</b>													
300	75	100	200	250	250	429	75	132	148	240	108	2NO-2NC	XTCE250L22_
350	100	125	250	300	300	490	90	160	—	195	132	2NO-2NC	XTCE300L22_
<b>Frame L – Electronic Coil</b>													
300	75	100	200	250	250	429	75	132	148	240	108	2NO-2NC	XTCE250L22_
350	100	125	250	300	300	490	90	160	—	195	132	2NO-2NC	XTCE300L22_
<b>Frame M – Standard Coil (110/120V, 230/240 Vac Coil Only)</b>													
450	125	150	300	400	400	612	125	200	240	344	132	2NO-2NC	XTCE400M22_
550	150	200	400	500	500	857	155	250	300	344	132	2NO-2NC	XTCE500M22_
<b>Frame M – Electronic Coil</b>													
450	125	150	300	400	400	612	125	200	240	344	132	2NO-2NC	XTCE400M22_
550	150	200	400	500	500	857	155	250	300	344	132	2NO-2NC	XTCE500M22_
<b>Frame N – Electronic Coil</b>													
630	200	200	400	600	580	980	185	315	348	560	600	2NO-2NC	XTCE580N22_ <sup>③</sup>
700	200	250	500	600	650	1041	205	355	390	630	600	2NO-2NC	XTCE650N22_ <sup>③</sup>
800	250	300	600	700	750	1102	240	400	455	720	800	2NO-2NC	XTCE750N22_ <sup>③</sup>
850	290	350	700	860	820	1225	260	450	500	750	800	2NO-2NC	XTCE820N22_ <sup>③</sup>
1100	350	420	850	980	1000	1225	315	560	610	1000	1000	2NO-2NC	XTCEC10N22_ <sup>③</sup>
<b>Frame P – Electronic Coil</b>													
1400	—	—	—	—	—	1714	—	—	—	—	—	2NO-2NC	XTCEC14P22_ <sup>③</sup>
<b>Frame R – Electronic Coil</b>													
1600	560	640	1200	1300	1600	2200	500	900	900	1600	1700	2NO-2NC	XTCEC16R22_ <sup>③</sup>
2000	—	—	—	—	—	2450	—	—	—	—	—	2NO-2NC	XTCEC20R22_ <sup>③</sup>

Contactor Application Data

Catalog Prefix	Electrical Life (Operations) for 10 hp, 480V (14.2A) Applications
XTCE012B	1 million
XTCE015B	1.2 million
XTCE018C	2 million

Notes

AC and DC operated contactors have a built-in suppressor circuit (Frames L–R, 185–2000A).

① For 185–500A contactors at 660/690V or 1000V: Do not reverse directly.

② Underscore ( \_ ) indicates magnet coil suffix required. See Page V9-T2-12.

③ When operating the 580–2000A XTCE contactors with frequency inverters, the suppressor on the load side must be removed. The load side suppressor must also be removed when performing a high-voltage test—see Pub51204, Pub51209.

Full Voltage Non-Reversing Three-Pole Contactors—Contact Sequence (Circuit Symbols), Standard Offering

Contactor Frame	Auxiliary Contacts	Contact Sequence
B–C	1NO	A1 1 3 5 13 A2 2 4 6 14
B–C	1NC	A1 1 3 5 21 A2 2 4 6 22
D–G	—	A1 1 3 5 A2 2 4 6
L–R	2NO-2NC	A1 1 3 5 13 21 31 43 A2 2 4 6 14 22 32 44

# 2.1

## Motor Control and Protection

### Contactors

2

#### Magnet Coil Suffix

Coil Voltage	Suffix Code
<b>Frames B–F</b>	
110V 50 Hz, 120V 60 Hz	<b>A</b>
220V 50 Hz, 240V 60 Hz	<b>B</b>
24V 50/60 Hz	<b>T</b>
24 Vdc	<b>TD</b>
415V 50 Hz, 480V 60 Hz	<b>C</b>
550V 50 Hz, 600V 60 Hz	<b>D</b>
208V 60 Hz	<b>E</b>
<b>Frame G</b>	
100–120V 50/60 Hz	<b>A</b>
190–240V 50/60 Hz	<b>B</b>
24V 50/60 Hz	<b>T</b>
24–27 Vdc	<b>TD</b>
480–500V 50/60 Hz	<b>C</b>

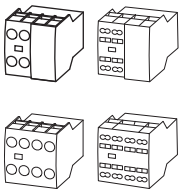




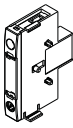

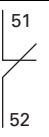
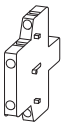

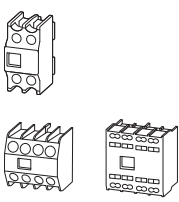




Coil Voltage	Suffix Code
<b>Frame H</b>	
100–120V 50/60 Hz	<b>A</b>
190–240V 50/60 Hz	<b>B</b>
480–500V 50/60 Hz	<b>C</b>
24–27 Vdc	<b>TD</b>
<b>Frames L–M, S-Series</b>	
110–120V 50/60 Hz	<b>A</b>
220–240V 50/60 Hz	<b>B</b>
<b>Frame N</b>	
110–250V 40–60 Hz/DC	<b>A</b>
250–500V 40–60 Hz	<b>C</b>
24–48 Vdc	<b>TD</b>
<b>Frames P–R</b>	
220–250V 50–60 Hz/DC	<b>B</b>

#### XTCR Reversing Contactor Components

Qty.	Frame	B	C	D	F	G
2	Contactors	<b>XTCE...B01_</b>	<b>XTCE...B01_</b>	<b>XTCE...D00_</b>	<b>XTCE...F00_</b>	<b>XTCE...G00_</b>
2	Auxiliary contact	<b>XTCEXFAC20</b>	<b>XTCEXFAC20</b>	<b>XTCEXFBG11</b>	<b>XTCEXFBG11</b>	<b>XTCEXFBG11</b>
1	Mechanical interlock	<b>XTCEXMLB</b>	<b>XTCEXMLC</b>	<b>XTCEXMLD</b>	<b>XTCEXMLG</b>	<b>XTCEXMLG</b>
1	Reversing link kit	<b>XTCEXRLB</b>	<b>XTCEXRLC</b>	<b>XTCEXRLD</b>	<b>XTCEXRLG</b>	<b>XTCEXRLG</b>

### Accessories

#### Auxiliary Contacts—Frames B–G

		Conventional Thermal Current, Open at 60°C $I_{th} = I_{th}$ , AC-1 in Amps	Poles	Contact Configuration	Circuit Symbol	Pkg. Qty.	Catalog Number—Screw Terminals
<b>Frames B–C</b>		<b>Frames B–C—Front (Top) Mount</b> ①					
	16	2	2NO		5	<b>XTCEXFAC20</b>	
	16	2	1NO-1NC		5	<b>XTCEXFAC11</b>	
	16	4	4NO		5	<b>XTCEXFAC40</b>	
	16	4	2NO-2NC		5	<b>XTCEXFAC22</b>	
<b>Frame B</b>		<b>Frame B—Side Mount</b> ①②					
	16	1	1NO		1	<b>XTCEXSAB10</b>	
	16	1	1NC		1	<b>XTCEXSAB01</b>	
<b>Frame C</b>		<b>Frame C—Side Mount</b> ①					
	10	2	1NO-1NC		1	<b>XTCEXSACC11</b> ①	
<b>Frames D–G</b>		<b>Frames D–G</b> ③					
	16	2	2NO		5	<b>XTCEXFBG20</b>	
	16	2	1NO-1NC		5	<b>XTCEXFBG11</b>	
	16	4	4NO-0NC		5	<b>XTCEXFBG40</b>	
	16	4	2NO-2NC		5	<b>XTCEXFBG22</b>	

#### Notes

Interlocked opposing contacts, to IEC/EN 60947-5-1 Annex L (positively driven), within the auxiliary contact modules (not NO [early make] and NC [late break] contacts) and for the built-in auxiliary contacts of the XTCE007\_–XTCE032\_ Auxiliary break contact can be used as mirror contact to IEC/EN 60947-4-1 Annex F (not NC [late break] contact). No auxiliary contacts can be fitted between two contactors.

① Frames B–C cannot use both a side AND a top mount auxiliary contact at the same time.

② Can be mounted to the left side of contactor only.

Cannot be used in combination with front (top) mount auxiliary contacts or mechanical interlocks.

③ For Frame D, six auxiliary contacts maximum (can be a combination of side and top mount units).

#### Side Mount Auxiliary Contacts—Frames D–R, 40–2000A

##### Conventional Free Air

Thermal Current,  
 $I_{th} = I_e$ , AC-1 in Amps

Poles

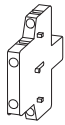
Contact  
Configuration

Circuit Symbol

Pkg. Qty.

Catalog Number—  
Screw Terminals

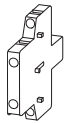
##### Frames D–R



##### Frame D–R ①②

10	2	1NO-1NC		1	<b>XTCEXSBN11</b>
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##### Frames H–R



##### Frames H–R (Screw Mount) ②

10	2	1NO-1NC		1	<b>XTCEXSBR11</b>
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#### Mechanical Interlock ③

For Use with ...

Package Qty.

Catalog Number

##### XTCEXMLB

XTCE007B–XTCE015B, XTCE020B

5

**XTCEXMLB**



##### XTCEXMLC

XTCE018C–XTCE032C

1

**XTCEXMLC**

XTCE032C–XTCE045C

XTCE040D–XTCE072D

XTCE063D–XTCE080D

1

**XTCEXMLD**

XTCE080F–XTCE170G

1

**XTCEXMLG ④**

XTCE125G–XTCE200G



##### XTCEXMLM

XTCE185H–XTCE570M

1

**XTCEXMLM**

XTCE580N–XTCEC10N

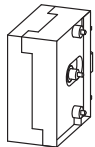
1

**XTCEXMLN ④**

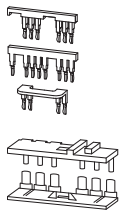
XTCE500M–XTCE570M with XTCE500N–XTCEC10N

1

**XTCEXMLNM ④**



#### Reversing Link Kits



#### Reversing Link Kits

For Use with ...

Package Qty.

Catalog Number

XTCE007B–XTCE015B

1

**XTCEXRLB ⑤**

XTCE018C–XTCE032C

1

**XTCEXRLC**

XTCE040D–XTCE065D

1

**XTCEXRLD**

XTCE080F–XTCE150G

1

**XTCEXRLG**

#### Notes

- ① For Frame D, six auxiliary contacts maximum (can be a combination of side and top mount units).
- ② For Frames F–R, eight auxiliary contacts maximum (can be a combination of side and top mount units).
- ③ For two contactors with AC or DC operated magnet system which are horizontally or vertically mounted. For B–G frames, mechanical lifespan is 2.5 x 10<sup>6</sup> operations and the distance between contactors is 0 mm. For L–N frames, mechanical lifespan is 5 x 10<sup>6</sup> operations and no auxiliary contact can be mounted between the mechanical interlock and the contactor—the distance between contactors is 15 mm.
- ④ XTCEXMLG, XTCEXMLN and XTCEXMLNM consist of an interlock element and mounting plate.
- ⑤ Also includes interlocking bridge (XTCEXLB). The following control cables are integrated for electrical interlock:  
K1M: A1–K2M: 21; K1M: 21–K2M: A1; K1M: A2–K2M: A2.

### Product Overview

#### Monitoring Relays Selection Guide



Description	D65 Series Page V9-T2-17	D65C Series Page V9-T2-19
<b>Approvals</b>	cULus, CE	RoHS, cURus, cULus, CE
<b>Features</b>	Various combinations of protection available Compact cases for easy mounting LED indicators for quick troubleshooting	Monitors AC single-phase currents from 0.1–10 A External CT can be used to extend ranges LED indicates output relay status Choice of fixed or user-adjustable settings
<b>Contact Data</b>		
Configuration	SPDT or DPDT	—
Maximum allowable load	10A	Less than 5 VA
Material	—	—
Resistance	—	—
Dielectric strength	2000V	—
<b>Coil Data</b>		
AC	24–480 Vac	—
DC	24–120 Vdc	—
Power		
VA (Vac)	5 VA	—
Watts (Vdc)	—	—
<b>General Data</b>		
Ambient temperature		
Operational	–4° to 149°F (–20° to 65°C)	–20° to 131°F (–28° to 55°C)
Maximum pick-up	<= 500 milliseconds	Overcurrent: Adjustable throughout current range monitored Undercurrent: Fixed at 5% above adjustable drop-out setting
Maximum release	<= 500 milliseconds	Overcurrent: Fixed at 95% of pick-up setting for D65CE; adjustable from 50–95% of pick-up setting for D65CEK Undercurrent: Adjustable throughout current range monitored
Life		
Mechanical operations	10 million	10 million
Electrical operations	100,000	100,000

For our complete product offering, see Volume 5—Motor Control and Protection, CA08100006E.



## Overload Relays Selection Guide


**XTIEC Miniature Overload Relays**

**XTOB, XTOT Thermal Overload Relays**

**XT Electronic Overload Relays**

**Motor Insight Overload and Monitoring Relays**

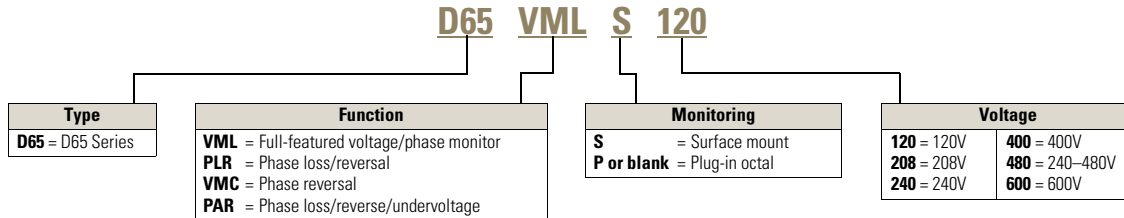
Description	XTIEC Miniature Overload Relays Page V9-T2-22	XTOB, XTOT Thermal Overload Relays Page V9-T2-23	XT Electronic Overload Relays Page V9-T2-26	Motor Insight Overload and Monitoring Relays Page V9-T2-32
Relay type	Thermal bi-metal	Thermal bi-metal	Electronic	Electronic
FLA range	0.1–12A	0.1–630A	0.1–1500A	1–540A
FLA max.:min. ratio	Approx. 1.5:1	Approx. 1.5:1	5:1	18:1 and 9:1
Trip class	10	10	Selectable 10A/10/20/30	5–30, stepped by 1's
Reset type	Selectable manual/automatic	Selectable manual/automatic	Selectable manual/automatic/remote	Selectable manual/automatic/remote
Direct connect to <b>XT</b> contactor	Yes, XTMC	Yes, XTCE	Yes, XTCE	—
Direct connect to DP contactor	—	—	Yes	—
Standalone mounting	—	Panel or DIN	Panel or DIN	Panel
Thermal overload protection	Yes	Yes	Yes	Yes, programmable
Jam	—	—	—	Yes, programmable
Current unbalance protection	—	—	Yes, selectable	Yes, programmable
Single-phasing	—	—	Yes, fixed level	Yes, fixed on or off
Ground fault	—	—	Yes, fixed	Yes, programmable
Phase reversal	—	—	—	Yes, programmable
Undercurrent	—	—	—	Yes, programmable
Overcurrent	—	—	—	—
Low power/high power	—	—	—	Yes, programmable
Overvoltage/undervoltage	—	—	—	Yes, programmable
Voltage unbalance	—	—	—	Yes, programmable
Current per phase and average rms	—	—	—	Yes
Current unbalance percent	—	—	Yes	Yes
Ground fault current	—	—	Yes	Yes
Voltage per phase and average rms	—	—	—	Yes
Voltage unbalance percent	—	—	—	Yes
Power/power factor	—	—	—	Yes
Thermal capacity	—	—	Yes	Yes
Frequency	—	—	Yes	Yes
Motor run hours	—	—	—	Yes
Motor starts count	—	—	—	Yes
Time to restart after fault	—	—	—	Yes
Overload status	—	—	Yes	Yes
Programmable reset timers/attempts	—	—	—	Yes
Programmable trip delays	—	—	—	Yes
Programmable auxiliary contact	—	—	—	Yes (120 Vac control-power version)
Communications with I/O	—	—	Yes (Modbus® RTU, DeviceNet™, PROFIBUS®, Modbus TCP, EtherNet/IP)	Yes (Modbus RTU, DeviceNet, PROFIBUS, Modbus TCP, EtherNet/IP)
Remote display	—	—	—	Yes (NEMA 1, 12, and 3R)
Lockable user interface or tamperproof	—	—	Yes	Yes
Alarm no-trip mode	—	—	—	Yes, for GF and line faults
Diagnostics	—	—	—	Yes, 10 fault queue

For our complete product offering, see Volume 5—Motor Control and Protection, CA08100006E.

### Catalog Number Selection

#### D65 Series Monitoring Relays

##### D65 Series



#### D65 Series Full-Featured Voltage/Phase Monitor

##### Features

- Full-featured voltage/phase monitoring relays
- Undervoltage, overvoltage, phase imbalance, phase loss (single-phasing), phase reversal
- Universal voltage range of 208–480V provides the flexibility to cover a variety of applications; 120V and 600V units also available
- Automatic or manual reset after the fault condition is corrected
- User-adjustable settings include nominal voltage, percent phase imbalance, undervoltage drop-out, time delay on undervoltage and time delay on restart after fault

##### Product Selection

D65VML\_

#### D65VML Series



Style	Operating Voltage, 50/60 Hz	Catalog Number
Surface-mount (DIN rail or panel)	120V	D65VMLS120
	208–480V	D65VMLS480
	600V	D65VMLS600
Plug-in (DIN rail)	120V	D65VMLP120
	208–480V	D65VMLP480 ①
8-pin socket	—	D3PA2 ②
8-pin IP20 rated socket	—	D3PA6

#### D65 Series Phase Reversal Monitoring Relays

##### Features

- Protects against phase reversal
- One version works on 208–480V three-phase systems
- 10A SPDT output contacts

##### Product Selection

D65VMC\_

#### D65VMC Series



Style	Nominal Voltage, 50/60 Hz	Catalog Number
Plug-in	120V	D65VMC120
	208–480V	D65VMC480 ①

##### Notes

- ① Requires a 600V rated socket when used on system voltages greater than 300V.
- ② The D3PA2 socket is rated 10A, 600V.

**D65 Series Phase Loss and Reversal Monitoring Relays****Features**

2

- Protects against phase loss and phase reversal
- LED indicates both normal and fault conditions
- 10A SPDT output contacts

**Product Selection****D65PLR\_****D65PLR Series**

Style	Nominal Voltage, 50/60 Hz	Catalog Number
Plug-in	120V	<b>D65PLR120</b>
	208V	<b>D65PLR208</b>
	240V	<b>D65PLR240</b>
	400V	<b>D65PLR400</b> ①
	480V	<b>D65PLR480</b> ①

**D65 Series Phase Loss, Reversal and Undervoltage****Features**

- Protects against phase loss, phase reversal and undervoltage
- Undervoltage setting is adjustable from 75–95% of nominal
- LED indicates both normal and fault conditions
- 10A SPDT output contacts

**Product Selection****D65PAR\_****D65PAR Series**

Style	Nominal Voltage, 60 Hz	Undervoltage Range	Catalog Number
Plug-in	120V	90–115V	<b>D65PAR120</b>
	208V	156–198V	<b>D65PAR208</b>
	240V	180–230V	<b>D65PAR240</b>
	400V	300–380V	<b>D65PAR400</b> ①
	480V	360–460V	<b>D65PAR480</b> ①

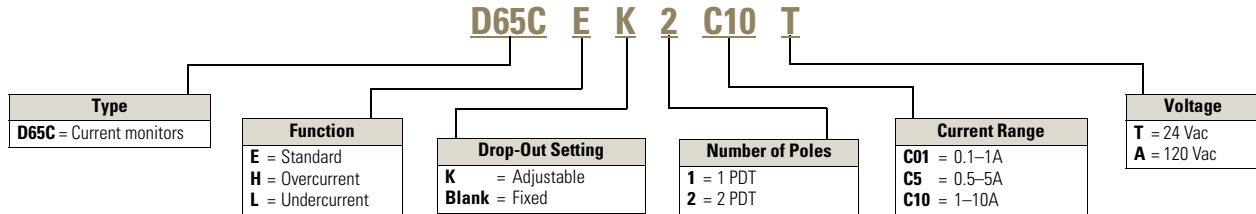
**Note**

① Requires a 600V rated socket when used on system voltages greater than 300V.

### Catalog Number Selection

#### D65C Series Monitoring Relays

##### D65C Series



#### D65CE Standard Current Monitoring Relays

##### Features

- Monitors AC single-phase currents
- Three separate current monitoring ranges covering 0.1–10 amperes
- External CT can be used to extend ranges
- Fixed 100 ms pick-up and drop-out time delay

##### Product Selection

#### D65CE\_ D65CE Series



Pick-Up Setting	Drop-Out Setting	Input Voltage	Current Range Monitored	Catalog Number
<b>SPDT – 8-Pin Plug-In</b>				
Adjustable	Fixed (at 95% of pick-up)	24 Vac	0.1–1A	<b>D65CE1C01T</b>
			0.5–5A	<b>D65CE1C5T</b>
			1–10A	<b>D65CE1C10T</b>
	120 Vac		0.1–1A	<b>D65CE1C01A</b>
			0.5–5A	<b>D65CE1C5A</b>
			1–10A	<b>D65CE1C10A</b>
Adjustable (50–95% of pick-up)	24 Vac		0.1–1A	<b>D65CEK1C01T</b>
			0.5–5A	<b>D65CEK1C5T</b>
			1–10A	<b>D65CEK1C10T</b>
	120 Vac		0.1–1A	<b>D65CEK1C01A</b>
			0.5–5A	<b>D65CEK1C5A</b>
			1–10A	<b>D65CEK1C10A</b>
<b>DPDT – 11-Pin Plug-In</b>				
Adjustable	Fixed (at 95% of pick-up)	24 Vac	0.1–1A	<b>D65CE2C01T</b>
			0.5–5A	<b>D65CE2C5T</b>
			1–10A	<b>D65CE2C10T</b>
	120 Vac		0.1–1A	<b>D65CE2C01A</b>
			0.5–5A	<b>D65CE2C5A</b>
			1–10A	<b>D65CE2C10A</b>
Adjustable (50–95% of pick-up)	24 Vac		0.1–1A	<b>D65CEK2C01T</b>
			0.5–5A	<b>D65CEK2C5T</b>
			1–10A	<b>D65CEK2C10T</b>
	120 Vac		0.1–1A	<b>D65CEK2C01A</b>
			0.5–5A	<b>D65CEK2C5A</b>
			1–10A	<b>D65CEK2C10A</b>

#### D65CH Series, Overcurrent Monitors

#### Features

- Monitors AC single-phase currents for overcurrent conditions
- Three separate current monitoring ranges covering 0.1–10 amperes
- External CT can be used to extend ranges
- Adjustable pick-up setting with either fixed or adjustable drop-out setting
- Adjustable time delay of 0.1–10 seconds on pick-up
- Fixed 100 ms time delay on drop-out
- LED indicates output

#### Product Selection

D65CH\_

#### D65CH Series



Pick-Up Setting	Drop-Out Setting	Input Voltage	Current Range Monitored	Catalog Number	
<b>SPDT—8-Pin Plug-In</b>					
Adjustable	Fixed (at 95% of pick-up)	24 Vac	0.1–1A	<b>D65CH1C1T</b>	
			0.5–5A	<b>D65CH1C5T</b>	
			1–10A	<b>D65CH1C10T</b>	
	Adjustable (50–95% of pick-up)	120 Vac	0.1–1A	<b>D65CH1C1A</b>	
			0.5–5A	<b>D65CH1C5A</b>	
			1–10A	<b>D65CH1C10A</b>	
		24 Vac	0.1–1A	<b>D65CHK1C1T</b>	
			0.5–5A	<b>D65CHK1C5T</b>	
			1–10A	<b>D65CHK1C10T</b>	
120 Vac	0.1–1A	<b>D65CHK1C1A</b>			
	0.5–5A	<b>D65CHK1C5A</b>			
	1–10A	<b>D65CHK1C10A</b>			
	<b>DPDT—11-Pin Plug-In</b>				
	Adjustable	Fixed (at 95% of pick-up)	24 Vac	0.1–1A	<b>D65CH2C1T</b>
				0.5–5A	<b>D65CH2C5T</b>
1–10A				<b>D65CH2C10T</b>	
Adjustable (50–95% of pick-up)			120 Vac	0.1–1A	<b>D65CH2C1A</b>
				0.5–5A	<b>D65CH2C5A</b>
				1–10A	<b>D65CH2C10A</b>
			24 Vac	0.1–1A	<b>D65CHK2C1T</b>
				0.5–5A	<b>D65CHK2C5T</b>
				1–10A	<b>D65CHK2C10T</b>
120 Vac		0.1–1A	<b>D65CHK2C1A</b>		
		0.5–5A	<b>D65CHK2C5A</b>		
		1–10A	<b>D65CHK2C10A</b>		

### D65CL Series, Undercurrent Monitoring Relays

#### Features

- Monitors AC single-phase currents for undercurrent conditions
- Three separate current monitoring ranges covering 0.1–10 amperes
- External CT can be used to extend ranges
- Adjustable drop-out setting with fixed pick-up setting
- Adjustable time delay of 0.1–10 seconds on drop-out
- Fixed 100 ms time delay on pick-up

#### Product Selection

D65CL\_

#### D65CL Series



Pick-Up Setting	Drop-Out Setting	Input Voltage	Current Range Monitored	Catalog Number
<b>SPDT – 8-Pin Plug-In</b>				
Adjustable	Fixed (at 5% of drop-out)	24 Vac	0.1–1A	<b>D65CL1C1T</b>
			0.5–5A	<b>D65CL1C5T</b>
			1–10A	<b>D65CL1C10T</b>
		120 Vac	0.1–1A	<b>D65CL1C1A</b>
			0.5–5A	<b>D65CL1C5A</b>
			1–10A	<b>D65CL1C10A</b>
<b>SPDT – 11-Pin Plug-In</b>				
Adjustable	Fixed (at 5% of drop-out)	24 Vac	0.1–1A	<b>D65CL2C1T</b>
			0.5–5A	<b>D65CL2C5T</b>
			1–10A	<b>D65CL210T</b>
		120 Vac	0.1–1A	<b>D65CL2C1A</b>
			0.5–5A	<b>D65CL2C5A</b>
			1–10A	<b>D65CL2C10A</b>

# 2.2

## Motor Control and Protection

### Motor Protection and Monitoring Relays

#### XTIEC Miniature Overload Relays

2



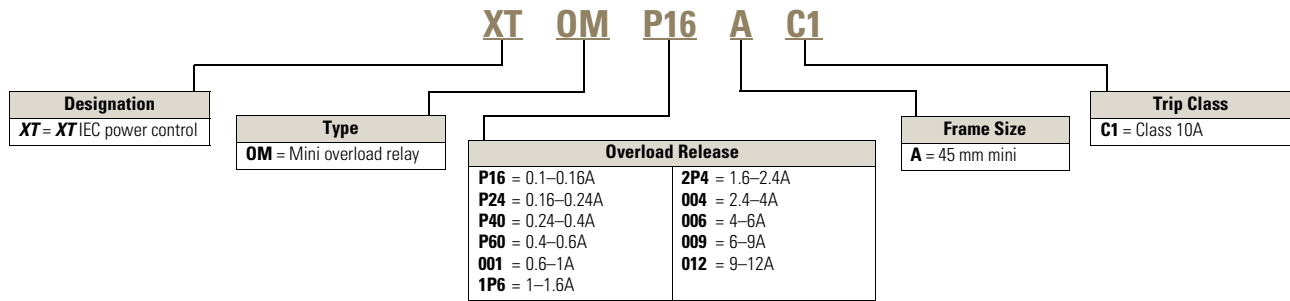
#### Features

- Trip class 10A
- Ambient temperature compensated  $-5^{\circ}$  to  $50^{\circ}\text{C}$  ( $23^{\circ}$  to  $122^{\circ}\text{F}$ )
- Selectable manual/automatic reset
- 1NO-1NC auxiliary contact as standard
- Direct mount with XTMC contactors

### Catalog Number Selection

#### XTIEC Miniature Overload Relays

#### Miniature Overload Relays



### Product Selection

#### Miniature Overload Relays ①②

Overload Release It	Trip Class	Contact Sequence	Contact Configuration	Short Circuit Protection (A)		Circuit Breaker	CEC/NEC Fuse	Catalog Number
				Type 1 Coordination, gG/gL	Type 2 Coordination, gG/gL			
0.1–0.16A	10A	97 95	1NO-1NC	20	0.5	15	—	XTOMP16AC1
0.16–0.24A				20	1	15	—	XTOMP24AC1
0.24–0.4A		2 4 6 98 96		20	2	15	—	XTOMP40AC1
0.4–0.6A				20	2	15	—	XTOMP60AC1
0.6–1A				20	4	15	3	XTOM001AC1
1–1.6A				20	6	15	6	XTOM1P6AC1
1.6–2.4A				20	6	15	6	XTOM2P4AC1
2.4–4A				20	10	15	15	XTOM004AC1
4–6A				20	10	15	20	XTOM006AC1
6–9A				20	10	15	35	XTOM009AC1
9–12A				—	—	—	45	XTOM012AC1

#### Notes

- ① Short-circuit protection: Observe the maximum permissible fuse of the contactor with direct device mounting. See MN03402002E for more information.
- ② When fitted directly to the contactor, a clearance of at least 5 mm is required between the overload relays.

**XTOB, XTOT Thermal Overload Relays**



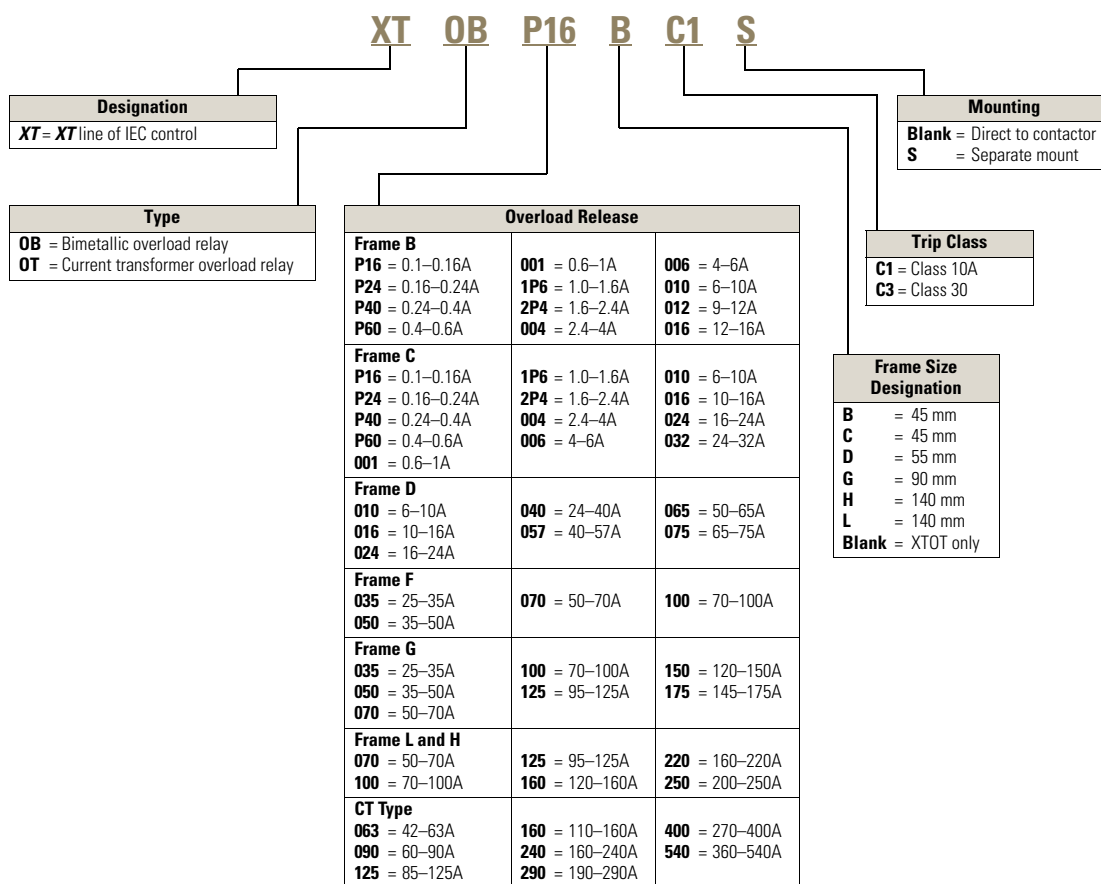
### Features

- Direct mount to **XT** contactors or separate mount
- Class 10A
- Up to 630A

### Catalog Number Selection

#### XTOB, XTOT Thermal Overload Relays

#### Thermal Overload Relays





#### Product Selection

2

#### XTOB, XTOT Thermal Overload Relays

Overload Releases, I <sub>r</sub>	Contact Sequence	Contact Configuration	For Use with Contactor Ampere Range	Short-Circuit Protection (A)		
				Maximum Circuit Breaker	CEC/NEC Fuse	Catalog Number
<b>Frame B—Direct Mount to XTCE...B Contactor</b>						
0.1–0.165		1NO-1NC	7–15A	25	3	<b>XTOBP16BC1</b>
0.16–0.24			7–15A	25	3	<b>XTOBP24BC1</b>
0.24–0.4			7–15A	25	3	<b>XTOBP40BC1</b>
0.4–0.6			7–15A	25	3	<b>XTOBP60BC1</b>
0.6–1			7–15A	25	3	<b>XTOB001BC1</b>
1–1.6			7–15A	25	6	<b>XTOB1P6BC1</b>
1.6–2.4			7–15A	25	6	<b>XTOB2P4BC1</b>
2.4–4			7–15A	25	15	<b>XTOB004BC1</b>
4–6			7–15A	25	20	<b>XTOB006BC1</b>
6–10			7–15A	25	35	<b>XTOB010BC1</b>
9–12			9–15A	25	45	<b>XTOB012BC1</b>
12–16			12–15A	30	45	<b>XTOB016BC1</b>
<b>Frame C—Direct Mount to XTCE...C Contactor</b>						
0.6–1		1NO-1NC	18–32A	25	3	<b>XTOB001CC1</b>
1–1.6			18–32A	25	6	<b>XTOB1P6CC1</b>
1.6–2.4			18–32A	25	6	<b>XTOB2P4CC1</b>
2.4–4			18–32A	25	15	<b>XTOB004CC1</b>
4–6			18–32A	25	20	<b>XTOB006CC1</b>
6–10			18–32A	25	25	<b>XTOB010CC1</b>
10–16			18–32A	30	25	<b>XTOB016CC1</b>
16–24			18–32A	30	25	<b>XTOB024CC1</b>
24–32			25–32A	30	25	<b>XTOB032CC1</b>
<b>Frame D—Direct Mount to XTCE...D Contactor</b>						
6–10		1NO-1NC	40–72A	25	25	<b>XTOB010DC1</b>
10–16			40–72A	25	25	<b>XTOB016DC1</b>
16–24			40–72A	30	25	<b>XTOB024DC1</b>
24–40			40–72A	125	125	<b>XTOB040DC1</b>
40–57			50–72A	150	150	<b>XTOB057DC1</b>
50–65			65–72A	150	200	<b>XTOB065DC1</b>
65–75			72A	150	200	<b>XTOB075DC1</b>
<b>Frames F–G—Direct Mount to XTCE...F or XTCE...G Contactor</b>						
35–50		1NO-1NC	80–170A	150	200	<b>XTOB050GC1</b>
50–70			80–170A	150	200	<b>XTOB070GC1</b>
70–100			80–170A	400	400	<b>XTOB100GC1</b>
95–125			80–170A	500	400	<b>XTOB125GC1</b>
120–150			80–170A	600	600	<b>XTOB150GC1</b>
145–175			150–170A	600	600	<b>XTOB175GC1</b>

#### Notes

Short circuit protection: Observe the maximum permissible fuse of the contactor with direct device mounting. See MN03402001E for more information on overload relays for Frames B–G.

Trip Class: 10A

Suitable for protection of EEx e-motors. EC prototype test certificate available upon request.

Observe manuals MN03402001E and MN03407001E. See documentation—manuals for overload monitoring of EEx e-motors.

### XTOB, XTOT Thermal Overload Relays, continued

Overload Releases, I <sub>r</sub>	Contact Sequence	Contact Configuration	For Use with Contactor Ampere Range	Short-Circuit Protection (A)		Catalog Number
				Maximum Circuit Breaker	CEC/NEC Fuse	
<b>Frames F–G—Separate Mount</b>						
35–50		1NO-1NC	80–170A	150	200	<b>XTOB050GC1S</b>
50–70		80–170A	150	200	<b>XTOB070GC1S</b>	
70–100		80–170A	400	400	<b>XTOB100GC1S</b>	
95–125		80–170A	500	400	<b>XTOB125GC1S</b>	
120–150		80–170A	600	600	<b>XTOB150GC1S</b>	
145–175		150–170A	600	600	<b>XTOB175GC1S</b>	
<b>Frame H—Separate Mount</b>						
50–70		1NO-1NC	185–250A	150	200	<b>XTOB070HC1</b>
70–100		185–250A	400	400	<b>XTOB100HC1</b>	
95–125		185–250A	500	400	<b>XTOB125HC1</b>	
120–160		185–250A	600	600	<b>XTOB160HC1</b>	
160–220		185–250A	600	800	<b>XTOB220HC1</b>	
200–250		225–250A	600	700	<b>XTOB250HC1</b>	
<b>Frame L—Direct Mount to XTC (E or S)...L or Separate Mount</b>						
50–70		1NO-1NC	185–250A	150	200	<b>XTOB070LC1</b>
70–100		185–250A	400	400	<b>XTOB100LC1</b>	
95–125		185–250A	500	400	<b>XTOB125LC1</b>	
120–160		185–250A	600	600	<b>XTOB160LC1</b>	
160–220		185–250A	800	800	<b>XTOB220LC1</b>	
200–250		225–250A	600	700	<b>XTOB250LC1</b>	

### Current Transformer Operated Overload Relay

Overload Releases, I <sub>r</sub>	Contact Sequence	Contact Configuration	For Use with Contactor Ampere Range	Short-Circuit Protection (A)		Catalog Number
				Maximum Circuit Breaker	CEC/NEC Fuse	
<b>Frames M–N—Separate Mount</b>						
160–240		1NO-1NC	300–500A	600	700	<b>XTOT240C3S</b>
190–290		300–500A	600	700	<b>XTOT290C3S</b>	
270–400		300–500A	1000	1000	<b>XTOT400C3S</b>	
360–540		500A	600	1000	<b>XTOT540C3S</b>	
420–630		630A	600	1000	<b>XTOT630C3S</b>	

### Accessories

#### Adapter



#### DIN-Rail or Panel-Mount Adapter, Frames C–D ①

For Use With...	Package Qty.	Catalog Number
XTOB...CC1	5	<b>XTOBXDINC</b>
XTOB...DC1	2	<b>XTOBXDIND</b>

#### Notes

Short circuit protection: Observe the maximum permissible fuse of the contactor with direct device mounting. See MN03402001E for more information on overload relays for Frames B–G.

Trip Class: 10A

Suitable for protection of EEx e-motors. EC prototype test certificate available upon request.

Observe manuals MN03402001E and MN03407001E. See documentation—manuals for overload monitoring of EEx e-motors.

① Can be snap fitted on a top hat rail (DIN rail) or can be screw fitted.

#### XT Electronic Overload Relays

2



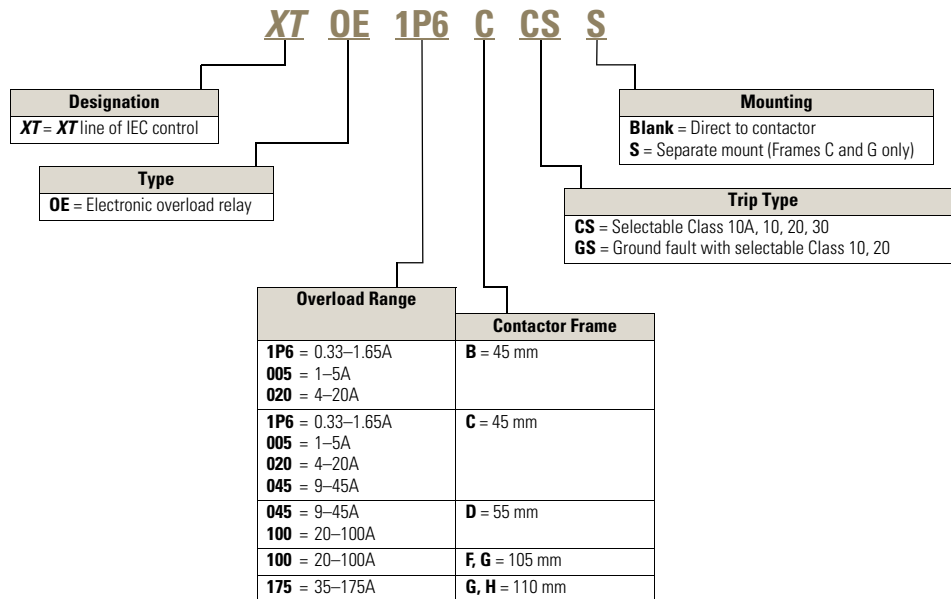
#### Features

- Direct mount to **XT** contactors or separate mount
- Standard version: selectable trip class (10A, 10, 20, 30) with selectable manual or auto reset
- Broad 5:1 FLA range
- Self-powered design, will accept AC voltages from 12–690V 50/60 Hz
- Electrically isolated 1NO-1NC contacts (push-to-test)
- FLA range of 0.1–1500A

### Catalog Number Selection

#### XT Electronic Overload Relays

#### XT Electronic Overload Relay—IEC ①



**Note**

① See Page V9-T2-27 for Product Selection.

### Product Selection

#### XT Electronic Overload Relays

45 mm XT for Direct Mount



#### XT Electronic Overload Relays for Direct Mount to XT Contactors

For Use with XT Contactor Frame	For Use with Contactor	Overload Range (Amps)	Contact Sequence	Frame Size	Auxiliary Contact Configuration	Type	Catalog Number
B	XTCE007B..., XTCE009B..., XTCE012B..., XTCE015B...	0.33–1.65		45 mm	NO-NC	ZEB12-1,65	<b>XTOE1P6BCS</b>
		1–5				ZEB12-5	<b>XTOE005BCS</b>
		4–20				ZEB12-20	<b>XTOE020BCS</b>
C	XTCE018C..., XTCE025C..., XTCE032C	0.33–1.65		45 mm	NO-NC	ZEB32-1,65	<b>XTOE1P6CCS</b>
		1–5				ZEB32-5	<b>XTOE005CCS</b>
		4–20				ZEB32-20	<b>XTOE020CCS</b>
		9–45				ZEB32-45	<b>XTOE045CCS</b>
D	XTCE040D..., XTCE050D..., XTCE065D..., XTCE072D...	9–45		45 mm	NO-NC	ZEB65-45	<b>XTOE045DCS</b>
		20–100		55 mm		ZEB65-100	<b>XTOE100DCS</b>
F	XTCE080F..., XTCE095F...	20–100		55 mm	NO-NC	ZEB150-100	<b>XTOE100GCS</b>
G	XTCE115G..., XTCE150G..., XTCE170G...	20–100		55 mm	NO-NC	ZEB150-100	<b>XTOE100GCS</b>
		35–175		110 mm		ZEB150-175	<b>XTOE175GCS</b>
H	XTCE185H...	35–175		110 mm	NO-NC	ZEB225-175	<b>XTOE175HCS</b>

45 mm XT for Direct Mount with Ground Fault



#### XT Electronic Overload Relays with Ground Fault for Direct Mount to XT Contactors

For Use with XT Contactor Frame	For Use with Contactor	Overload Range (Amps)	Contact Sequence	Frame Size	Auxiliary Contact Configuration	Type	Catalog Number
B	XTCE007B..., XTCE009B..., XTCE012B..., XTCE015B...	0.33–1.65		45 mm	NO-NC	ZEB12-1,65-GF	<b>XTOE1P6BGS</b>
		1–5				ZEB12-5-GF	<b>XTOE005BGS</b>
		4–20				ZEB12-20-GF	<b>XTOE020BGS</b>
C	XTCE018C..., XTCE025C..., XTCE032C	0.33–1.65		45 mm	NO-NC	ZEB32-1,65-GF	<b>XTOE1P6CGS</b>
		1–5				ZEB32-5-GF	<b>XTOE005CGS</b>
		4–20				ZEB32-20-GF	<b>XTOE020CGS</b>
		9–45				ZEB32-45-GF	<b>XTOE045CGS</b>
D	XTCE040D..., XTCE050D..., XTCE065D..., XTCE072D...	9–45		45 mm	NO-NC	ZEB65-45-GF	<b>XTOE045DGS</b>
		20–100		55 mm		ZEB65-100-GF	<b>XTOE100DGS</b>
F	XTCE080F..., XTCE095F...	20–100		55 mm	NO-NC	ZEB150-100-GF	<b>XTOE100GGS</b>
G	XTCE115G..., XTCE150G..., XTCE170G...	20–100		55 mm	NO-NC	ZEB150-100-GF	<b>XTOE100GGS</b>
		35–175		110 mm		ZEB150-175-GF	<b>XTOE175GGS</b>
H	XTCE185H...	35–175		110 mm	NO-NC	ZEB225-175-GF	<b>XTOE175HGS</b>

# 2.2

## Motor Control and Protection

### Motor Protection and Monitoring Relays

2

#### 1-5A OL with CTs



#### XT Electronic Overload Relays for use with Large Frame XT Contactors (L-R)

Use CTs and 1-5A **XT** overload relay. CT kit does not include overload relay (order separately).

XT Contactor Frame	For Use with IEC Contactor Amp Range (AC-3)	CT Range (Amps)	Description	CT Kit Catalog Number	Terminal Size	Overload Relay Catalog Number	Overload Relay with Ground Fault Catalog Number
L, M	185–500A	60-300	300: 5 panel-mount CT kit with integrated lugs	ZEB-XCT300	750 kcmil (2) 250 kcmil 3/0 Cu/Al	XTOE005CCSS	XTOE005CGSS
M, N	300–820A	120-600	600: 5 panel-mount CT kit with integrated, pass through holes	ZEB-XCT600	(2) 750 kcmil 3/0 Cu/Al	XTOE005CCSS	XTOE005CGSS
N	580–1000A	200-1000	1000: 5 panel-mount CT kit with integrated, pass through holes	ZEB-XCT1000	(3) 750 kcmil 3/0 Cu/Al	XTOE005CCSS	XTOE005CGSS
R	1600A	300-1500	1500: 5 panel-mount CT kit with integrated, pass through holes	ZEB-XCT1500	(4) 750 kcmil 1/0 Cu/Al	XTOE005CCSS	XTOE005CGSS

#### 45 mm XT for Separate Mount



#### XT Electronic Overload Relays for Separate Mount

Overload Range (Amps)	Frame Size	Contact Sequence	Type	Overload Relay Catalog Number	Overload Relay with Ground Fault Catalog Number
<b>Overload Relay</b>					
0.33–1.65	45 mm	1 3 5 97 95	ZEB32-1,65/KK	XTOE1P6CCSS	XTOE1P6CGSS
1–5			ZEB32-5/KK	XTOE005CCSS	XTOE005CGSS
4–20		2 4 6 98 96	ZEB32-20/KK	XTOE020CCSS	XTOE020CGSS
9–45			ZEB32-45/KK	XTOE045CCSS	XTOE045CGSS
20–100	55 mm		ZEB150-100/KK	XTOE100GCSS	XTOE100GGSS
35–175	110 mm		ZEB150-175/KK	XTOE175GCSS	XTOE175GGSS

#### XT Electronic Overload Relay for Pass-Through Design




Pass-through design does not include any lugs to land wires. Terminate motor leads directly on contactor.

Overload Range (Amps)	Frame Size	Contact Sequence	Type	Overload Relay Catalog Number	Overload Relay with Ground Fault Catalog Number
35–175	110 mm	1 3 5 97 95	ZEB150-175/PT	XTOE175GCSP	XTOE175GGSP

### Accessories

#### CT Kits

#### Accessories

	Description	Catalog Number
<b>Safety Cover</b> 	<b>Safety Cover</b> Clear Lexan cover that mounts on top of the FLA dial and DIP switches when closed.	<b>ZEB-XSC</b>
<b>Reset Bar</b> 	<b>Reset Bar</b> Assembles to the top of the overload to provide a larger target area for door mounted reset operators.	<b>ZEB-XRB</b>
<b>Remote Reset</b> 	<b>Remote Reset</b> Remote reset module (24 Vdc) ① Remote reset module (120 Vac) ① Remote reset module (24 Vac) ①	<b>C440-XCOM</b> <b>ZEB-XRR-120</b> <b>ZEB-XRR-24</b>

#### Communication

The C440 is provided with two levels of communication capability.

##### Basic Communication via Expansion Module—Monitoring Only

Basic communication on the C440 is accomplished using an expansion module. The expansion module plugs into the expansion bay on the C440 overload relay, enabling communications with the overload via their Modbus RTU (RS-485) network. No additional parts are required. See figure below.



**Basic Communication—Modbus**

##### Advanced Communication—Monitoring and Control

C440 also has the ability to communicate on industrial protocols such as DeviceNet, PROFIBUS, Modbus RTU and Modbus TCP, and Ethernet (planned) while providing control capability using I/O.

An expansion module (mentioned earlier) combined with a communication adapter and a communication module allows easy integration onto the customer's network. See figure below.



**Advanced Communication—Communication Adapter with Communication Module**

##### Advanced Communication—Communication Module

The communication adapter comes standard with four inputs and two outputs (24 Vdc or 120 Vac) while providing the customer with flexible mounting options (DIN rail or panel). See figure below,

**Note**

① Customer can wire remote mounted button to reset module (that is, 22 mm pushbutton, catalog number M22-D-B-GB14-K10).

# 2.2

## Motor Control and Protection



### Motor Protection and Monitoring Relays

2

The following information can be viewed using the communication option:

- Motor status—running, stopped, tripped or resetting
- Individual rms phase currents (A, B, C)
- Average of three-phase rms current
- Percent thermal capacity
- Fault codes (only available prior to reset)
- Percent phase unbalance
- Ground fault current and percent
- Overload relay settings—trip class, DIP switch selections, reset selections
- Modbus address (can be set over the network)

#### Communication Accessories

	Description	Catalog Number
<b>Expansion Module</b>	Expansion module (Remote Reset/Modbus RTU, RS-485 Communication)	<b>C440-XCOM</b>
		
<b>Communication Adapter</b>	Communication adapter kit (DIN C Panel mounted adapter, required for advance communication option)	<b>C440-COM-ADP</b>
		
	DeviceNet communication module kit—120V I/O (consists of C440-XCOM + C441K + C440-COM-ADP)	<b>C440-DN-120</b>
	DeviceNet communication module kit—24 Vdc I/O (consists of C440-XCOM + C441L + C440-COM-ADP)	<b>C440-DN-24</b>
	PROFIBUS communication module kit—120V I/O (consists of C440-XCOM + C441S + C440-COM-ADP)	<b>C440-DP-120</b>
	PROFIBUS communication module kit—24V I/O (consists of C440-XCOM + C441Q + C440-COM-ADP)	<b>C440-DP-24</b>
	Modbus communication module kit—120V I/O (consists of C440-XCOM + C441N + C440-COM-ADP)	<b>C440-MOD-120</b>
	Modbus communication module kit—24 Vdc I/O (consists of C440-XCOM + C441P + C440-COM-ADP)	<b>C440-MOD-24</b>
	Modbus TCP / EtherNet/IP communication module kit—120V I/O (consists of C440-XCOM + C441U)	<b>C440-ET-120</b>
	Modbus TCP / EtherNet/IP communication module kit—24V I/O (consists of C440-XCOM + C441V)	<b>C440-ET-24</b>

### Short Circuit Ratings (North America CSA, cUL)

Changes to UL 508A and NEC in recent years have brought a focus to control panel safety with regard to short-circuit current ratings (SCCR). Eaton’s C440 electronic overload relays combined with **XT** series IEC and Freedom Series NEMA contactors provide a wide variety of SCCR solutions needed for a variety of applications. The SCCR data in this document reflects the latest information as of April 2010.

### C440/XT Standalone Overload Relays (XT, C440)

Overload FLA Range	Maximum Operating Voltage	Standard-Fault Short Circuit Data			High-Fault Short Circuit Data Fuses (RK5, J, CC)			Thermal-Magnetic Circuit Breakers		
		600V (kA)	Maximum Fuse Size (A) (RK5)	Maximum Breaker Size (A)	480V (kA)	600V (kA)	Maximum Fuse Size	480V (kA)	600V (kA)	Maximum Breaker Size
0.33–1.65A	600 Vac	1	6	15	—	—	—	—	—	—
1–5A	600 Vac	5	20	20	100	100	30	100	35	20
4–20A	600 Vac	5	80	80	100	100	100	100	35	80
9–45A	600 Vac	5	175	175	100	100	100	100	35	100/175 (480/600)
20–100A	600 Vac	10	400	400	100	100	200	150	35	250/400 (480/600)
28–140A	600 Vac	10	450	500	100	100	400	100	65	400
35–175A	690 Vac	10	500 (gG)	350 (690 Vac) 320 (415 Vac)	100	100	500 (gG)	100 (415 Vac)	—	350 (LGC3350) 320 (N2MH3)

### IEC XT Starters with XT Electronic Overload Relays

Contactor Frame Size	Maximum Operating Voltage	High-Fault Short Circuit Data Fuses (RK5, J, CC)		Maximum Fuse Size	Thermal-Magnetic Circuit Breakers		
		480V	600V		480V	600V	Maximum Breaker Size
B	1–5A	100	100	30	—	—	—
	4–20A	100	100	30	—	—	—
C	1–5A	100	100	60	—	—	—
	4–20A	100	100	60	—	—	—
	9–45A	100	100	60	—	—	—
D	9–45A	100	100	200	65	35	175
	20–100A	100	100	200	65	35	175
F	20–100A	100	100	200	65	65	350
G	20–100A	100	100	200	65	65	350
	35–175A	100	100	400	65	30	250 (480 Vac) 350 (600 Vac)
H	35–175A	100	100	400	65	30	400



#### Motor Insight Overload and Monitoring Relays

2



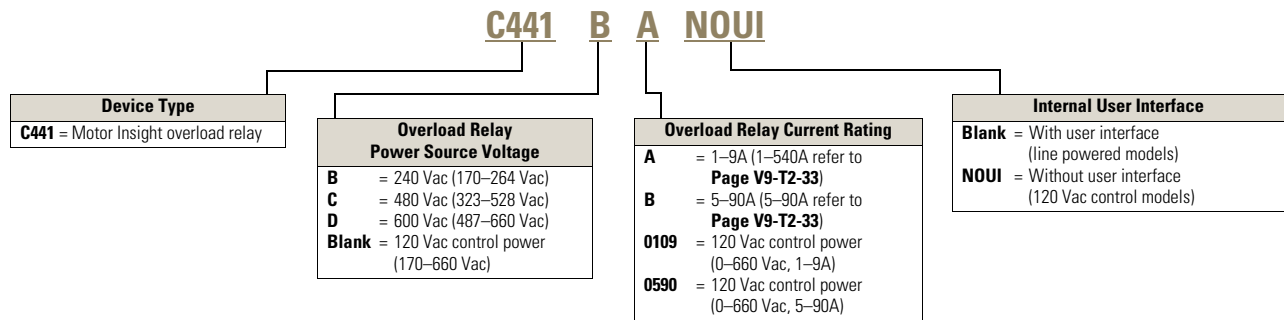
#### Features

- Power, voltage and current monitoring, ground fault, flexible communications, motor and line protection in a single package
- Monitor energy consumption at individual loads to avoid peak demand charges
- Protect pumps from dead-head or starved conditions
- 0–660V, 1–540A with two relays
- Remote display allows for configuration without opening the panel, providing additional operator safety

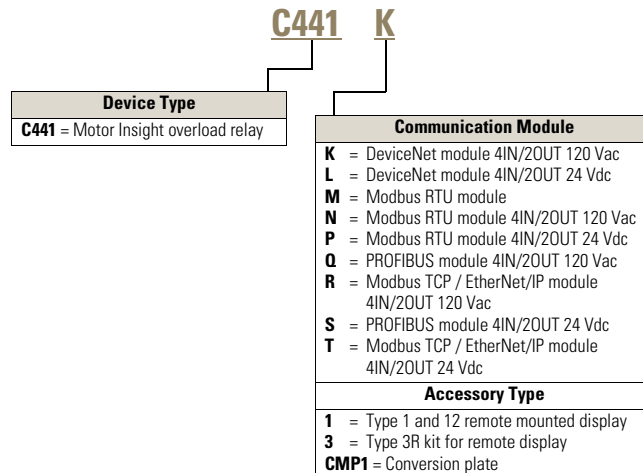
### Catalog Number Selection

#### Motor Insight Overload and Monitoring Relays

##### Motor Insight Overload Relays



##### Motor Insight Overload Relays—Communications Modules and Accessory Types



### Product Selection

#### Motor Insight



#### Motor Insight

Power Source	Monitoring Range	Current Range	Catalog Number
240 Vac (170–264)	170–264 Vac	1–9A	<b>C441BA</b>
		5–90A	<b>C441BB</b>
480 Vac (323–528)	323–528 Vac	1–9A	<b>C441CA</b>
		5–90A	<b>C441CB</b>
600 Vac (489–660)	489–660 Vac	1–9A	<b>C441DA</b>
		5–90A	<b>C441DB</b>
120 Vac (93.5–132)	170–660 Vac	1–9A	<b>C4410109NOUI</b>
		5–90A	<b>C4410590NOUI</b>

#### Motor Insight CT Multiplier and Wire Wrap Schedule

Catalog Number <sup>①</sup>	Motor FLA	Number of Loops	Number of Conductors Through CT Primary	CT Multiplier Setting	External CT Kit Catalog Number <sup>②</sup>
<b>Current Range: 5–90A</b>					
<b>C441_B and C4410590NOUI</b>	5–22.5A	3	4	4	—
	6.67–30A	2	3	3	—
	10–45A	1	2	2	—
	20–90A	0	1	1	—
<b>Current Range: 1–9A</b>					
<b>C441_A and C4410109NOUI</b>	1–5A	1	2	2	—
	2–9A	0	1	1	—
	60–135A	0	1	150–(150:5)	<b>C441CTKIT150</b>
	120–270A	0	1	300–(300:5)	<b>C441CTKIT300</b>
	240–540A	0	1	600–(600:5)	<b>C441CTKIT600</b>

#### Notes

<sup>①</sup> Underscore indicates Operating Voltage Code required.  
Operating Voltage Codes:

Code	Voltage
<b>B</b>	240 Vac
<b>C</b>	480 Vac
<b>D</b>	600 Vac
<b>&lt;empty&gt;</b>	120 Vac Control Power

<sup>②</sup> Any manufacturer's CTs may be used.

**Modbus Communication Module**

<b>Description</b>	<b>I/O</b>	<b>Catalog Number</b>
Modbus communication module	None	<b>C441M</b>
Modbus communication module 4IN/2OUT	120 Vac	<b>C441N</b>
Modbus communication module 4IN/2OUT	240 Vdc	<b>C441P</b>

**PROFIBUS Communication Module**

<b>Description</b>	<b>I/O</b>	<b>Catalog Number</b>
PROFIBUS communication module 4IN/2OUT	120 Vac	<b>C441S</b>
PROFIBUS communication module 4IN/2OUT	24 Vdc	<b>C441Q</b>

**DeviceNet Modules**



<b>Description</b>	<b>I/O</b>	<b>Catalog Number</b>
DeviceNet communication module	120 Vac	<b>C441K</b>
DeviceNet communication module	24 Vdc	<b>C441L</b>

**Ethernet Communication Module**

<b>Description</b>	<b>I/O</b>	<b>Catalog Number</b>
Modbus TCP / EtherNet/IP communication module 4IN/2OUT	120 Vac	<b>C441R</b>
Modbus TCP / EtherNet/IP communication module 4IN/2OUT	24 Vdc	<b>C441T</b>

### Accessories

#### Motor Insight

	Description	Catalog Number
<b>Remote Display</b>	Remote display Type 1	<b>C4411</b>
		
<b>Kit for Remote display</b>	Type 3R kit for remote display (remote display not included)	<b>C4413</b>
		
	Adaptive mounting plate	<b>C441CMP1</b>

#### Communication Cables

The Remote Display requires a communication cable to connect to the Motor Insight overload relay.

#### Communication Cable Lengths

Length in Inches (meters)	Catalog Number
9.8 (0.25)	<b>D77E-QPIP25</b>
39.4 (1.0)	<b>D77E-QPIP100</b>
78.7 (2.0)	<b>D77E-QPIP200</b>
118.1 (3.0)	<b>D77E-QPIP300</b>

#### Note

① Underscore indicates operating voltage code required.

## Product Overview

## 2

## Manual Motor Protectors and Controllers Selection Guide



Description	<b>XTPB Pushbutton Manual Motor Protectors</b>	<b>XTPR Rotary Manual Motor Protectors</b>	<b>XTSC Manual Motor Controllers</b>	<b>XTFC Combination Motor Controllers</b>
	<b>Page V9-T2-37</b>	<b>Page V9-T2-37</b>	<b>Page V9-T2-41</b>	<b>Page V9-T2-41</b>
Operator style	Pushbutton	Rotary	Rotary	Rotary
Components	Manual motor protector	Manual motor protector	Manual motor protector contactor connector kit	Manual motor protector contactor connector kit line side adapter
UL 508 Type E	—	Yes, with line side adapter	—	—
UL 508 Type F	—	—	—	Yes
Branch motor circuit functions	Disconnect	Disconnect	Disconnect	Disconnect
	Controller (manual)	Controller (manual)	Controller (manual and remote)	Controller (manual and remote)
	Short circuit protection	Short circuit protection	Short circuit protection	Short circuit protection
	Motor overload protection	Motor overload protection	Motor overload protection	Motor overload protection
FLA range	0.1–25A	0.1–65A	0.1–65A	0.1–65A

### XTIEC Manual Motor Protectors



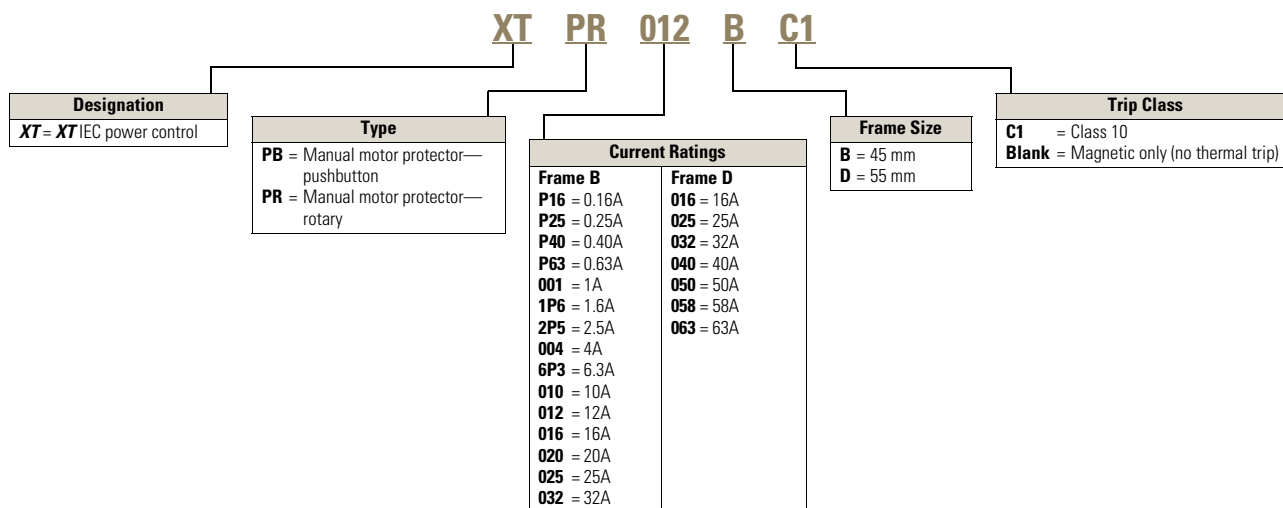
### Features

- ON/OFF rotary handle with lockout provision
- Class 10 overload protection
- Motor applications from 0.1–63A
- Built-in heater and magnetic trip elements to protect the motor
- Adjustment dial for setting motor FLA
- XTPR Rotary MMP with a lineside adapter is rated for UL 508 Type E

### Catalog Number Selection

#### XTIEC Manual Motor Protectors

#### Manual Motor Protectors



## Product Selection

## 2

## XTPB Pushbutton Manual Motor Protectors—Global and North American Ratings

Motor Protective Device with Thermal and Magnetic Trip

**Note:** Service Factor (SF)—Setting  $I_r$  of current scale in dependence of load factor:

SF = 1.15 →  $I_r = 1 \times I_n \text{ mot}$

SF = 1 →  $I_r = 0.9 \times I_n \text{ mot}$

Rated Uninterrupted Current— $I_u = I_e$ (Amps)	FLA Adjustment Range/Overload Release— $I_r$ (A)	Short Circuit Release— $I_{rm}$ (A)	Maximum Motor Ratings ①						Maximum hp Rating—P (hp) UL 508/CSA C 22.2 No. 14 Three-Phase				Screw Terminals— Catalog Number
			Maximum kW Rating AC-3—P (kW) Three-Phase			Maximum hp Rating—P (hp) UL 508/CSA C 22.2 No. 14 Three-Phase			200V	240V	480V	600V	
			220–240V	380–415V	440V	500V	660–690V						
<b>Frame B</b>													
0.16	0.1–0.16	2.2	—	—	—	—	0.06	②	②	②	②		XTPBP16BC1
0.25	0.16–0.25	3.5	—	0.06	0.06	0.06	0.12	②	②	②	②		XTPBP25BC1
0.4	0.25–0.4	5.6	0.06	0.09	0.12	0.12	0.18	②	②	②	②		XTPBP40BC1
0.63	0.4–0.63	8.8	0.09	0.12	0.18	0.25	0.25	②	②	②	②		XTPBP63BC1
1	0.63–1	14	0.12	0.25	0.25	0.37	0.55	②	②	1/2	1/2		XTPB001BC1
1.6	1–1.6	22	0.25	0.55	0.55	0.75	1.1	②	②	3/4	1		XTPB1P6BC1
2.5	1.6–2.5	35	0.37	0.75	1.1	1.1	1.5	1/2	1/2	1	1-1/2		XTPB2P5BC1
4	2.5–4	56	0.75	1.5	1.5	2.2	3	1	1	2	3		XTPB004BC1
6.3	4–6.3	88	1.1	2.2	3	3	4	1-1/2	1-1/2	3	5		XTPB6P3BC1
10	6.3–10	140	2.2	4	4	4	7.5	3	3	7-1/2	10		XTPB010BC1
12	8–12	168	3	5.5	5.5	5.5	11	3	3	7-1/2	10		XTPB012BC1
16	10–16	224	4	7.5	9	9	12.5	3	5	10	10		XTPB016BC1
20	16–20	280	5.5	9	11	12.5	15	5	5	10	15		XTPB020BC1
25	20–25	350	5.5	12.5	12.5	15	22	5	7-1/2	15	20		XTPB025BC1

**Notes**

① Select manual motor protectors by full load amperes. Maximum motor ratings (kW, hp) are for reference only.

② In this range, calculate motor rating according to rated current. Specified values to NEC® 430.6(A)(1).

### XTPR Rotary Manual Motor Protectors with Screw Terminals—Global Ratings and North American Ratings

Motor Protective Device with Thermal and Magnetic Trip

**Note:** Service Factor (SF)—Setting  $I_r$  of current scale in dependence of load factor:

$$SF = 1.15 \rightarrow I_r = 1 \times I_n \text{ mot}$$

$$SF = 1 \rightarrow I_r = 0.9 \times I_n \text{ mot}$$

Rated Uninterrupted Current— $I_u = I_e$ (Amps)	FLA Adjustment Range/Overload Release— $I_r$ (A)	Short Circuit Release— $I_{rm}$ (A)	Maximum Motor Ratings ①					Maximum hp Rating—P (hp) UL 508/CSA C 22.2 No. 14 Three-Phase				Screw Terminals— Catalog Number ③
			Maximum kW Rating AC-3—P (kW) Three-Phase	220–240V	380–415V	440V	500V	660–690V	200V	240V	480V	
<b>Frame B</b>												
0.16	0.1–0.16	2.2	—	—	—	—	0.06	②	②	②	②	XTPRP16BC1
0.25	0.16–0.25	3.5	—	0.06	0.06	0.06	0.12	②	②	②	②	XTPRP25BC1
0.4	0.25–0.4	5.6	0.06	0.09	0.12	0.12	0.18	②	②	②	②	XTPRP40BC1
0.63	0.4–0.63	8.8	0.09	0.12	0.18	0.25	0.25	②	②	②	②	XTPRP63BC1
1	0.63–1	14	0.12	0.25	0.25	0.37	0.55	②	②	1/2	1/2	XTPR001BC1
1.6	1–1.6	22	0.25	0.55	0.55	0.75	1.1	②	②	3/4	1	XTPR1P6BC1
2.5	1.6–2.5	35	0.37	0.75	1.1	1.1	1.5	1/2	1/2	1	1-1/2	XTPR2P5BC1
4	2.5–4	56	0.75	1.5	1.5	2.2	3	1	1	2	3	XTPR004BC1
6.3	4–6.3	88	1.1	2.2	3	3	4	1-1/2	1-1/2	3	5	XTPR6P3BC1
10	6.3–10	140	2.2	4	4	4	7.5	3	3	7-1/2	10	XTPR010BC1
12	8–12	168	3	5.5	5.5	5.5	11	3	3	7-1/2	10	XTPR012BC1
16	10–16	224	4	7.5	9	9	12.5	3	5	10	10	XTPR016BC1
20	16–20	280	5.5	9	11	12.5	15	5	5	10	15	XTPR020BC1
25	20–25	350	5.5	12.5	12.5	15	22	5	7-1/2	15	20	XTPR025BC1
32	25–32	448	7.5	15	15	22	30	7-1/2	10	25	30	XTPR032BC1
<b>Frame D</b>												
16	10–16	224	4	7.5	9	9	12.5	3	5	10	15	XTPR016DC1
25	16–25	350	5.5	12.5	12.5	15	22	7-1/2	7-1/2	20	25	XTPR025DC1
32	25–32	448	7.5	15	17.5	22	22	10	10	25	30	XTPR032DC1
40	32–40	560	11	20	22	24	30	10	15	30	40	XTPR040DC1
50	40–50	700	14	25	30	30	45	10	15	30	40	XTPR050DC1
58	50–58	812	17	30	37	37	55	—	—	40	—	XTPR058DC1
65	55–65	882	18.5	34	37	45	55	—	—	—	—	XTPR063DC1

**Notes**

- ① Select manual motor protectors by full load amperes. Maximum motor ratings (kW, hp) are for reference only.
- ② In this range, calculate motor rating according to rated current. Specified values to NEC 430.6(A)(1).
- ③ Catalog number shown comes with screw terminals. For Frame B devices up to 16A, spring cage terminals are available. For spring cage terminals on line and load sides, insert a "C" into the catalog number in the 5th position—Example: XTPRC \_BC1. For spring cage terminals on the load side only, insert an "SC" into the catalog number in the 5th and 6th positions—Example: XTPRSC \_BC1.



# 2.3

## Motor Control and Protection

### Manual Motor Protectors and Controllers

2

#### XTPR Manual Self-Protected Motor Starters—North American Ratings, UL 508 Type E ②

Motor Protective Device with Thermal and Magnetic Trip

**Note:** A UL 508 Type E self-protected manual combination starter (XTPR) consists of a manual motor protector (XTPR) and a UL listed line side adapter (e.g., XTPAXLSA). The Type E self-protected manual combination starter alone is a legitimate short-circuit protective device and disconnect means for the downstream motor, while the contactor has been added to provide remote operation of the motor circuit.

Rated Uninterrupted Current— $I_u = I_e$ (Amps)	FLA Adjustment Range/Overload Release— $I_r$ (A)	Short Circuit Release— $I_{rm}$ (A)	Maximum Motor Ratings ①				Rated Short Circuit Breaking Capacity (kA)			Line Side Adapter— Catalog Number ②	Manual Motor Protector Screw Terminals— Catalog Number
			Maximum hp Rating—P (hp) Three-Phase				240V	480–277V	600–247V		
			220V	240V	480–277V	600–247V	240V	480–277V	600–247V		
<b>Frame B</b>											
0.16	0.1–0.16	2.2	③	③	1/2	1/2	50	50	50	XTPAXLSA	XTPRP16BC1
0.25	0.16–0.25	3.4	③	③	1/2	1/2	50	50	50	XTPAXLSA	XTPRP25BC1
0.4	0.25–0.4	5.6	③	③	1/2	1/2	50	50	50	XTPAXLSA	XTPRP40BC1
0.63	0.4–0.63	8.8	③	③	1/2	1/2	50	50	50	XTPAXLSA	XTPRP63BC1
1	0.63–1	14	③	③	1/2	1/2	50	50	50	XTPAXLSA	XTPR001BC1
1.6	1–1.6	22	③	③	3/4	3/4	50	50	50	XTPAXLSA	XTPR1P6BC1
2.5	1.6–2.5	35	1/2	1/2	1	1-1/2	50	50	50	XTPAXLSA	XTPR2P5BC1
4	2.5–4	56	3/4	1	2	3	50	50	50	XTPAXLSA	XTPR004BC1
6.3	4–6.3	88	1	1-1/2	3	5	50	50	50	XTPAXLSA	XTPR6P3BC1
10	6.3–11	140	3	3	7-1/2	10	50	50	50	XTPAXLSA	XTPR010BC1
12	8–12	168	3	3	7-1/2	—	42	42	—	XTPAXLSA	—
16	10–16	224	3	5	10	—	42	42	—	XTPAXLSA	XTPR016BC1
20	16–20	280	5	5	—	—	42	42	—	XTPAXLSA	XTPR020BC1
25	20–25	350	5	7-1/2	15	—	18	18	—	XTPAXLSA	XTPR025BC1
32	25–32	448	7-1/2	10	25	—	18	18	—	XTPAXLSA	XTPR032BC1
<b>Frame D</b>											
16	10–16	224	3	5	10	10	50	50	50	XTPAXLSAD	XTPR016DC1
25	16–25	350	7-1/2	7-1/2	20	25	50	50	50	XTPAXLSAD	XTPR025DC1
32	25–32	448	10	10	25	30	50	50	50	XTPAXLSAD	XTPR032DC1
40	32–40	560	10	10	30	40	50	50	50	XTPAXLSAD	XTPR040DC1
50	40–50	700	10	15	30	—	65	65	—	XTPAXLSAD	XTPR050DC1
58	50–58	812	15	15	40	—	65	65	—	XTPAXLSAD	XTPR058DC1
65	55–65	882	15	15	40	—	65	65	—	XTPAXLSAD	XTPR063DC1

**Notes**

- ① Select manual motor protectors by full load amperes. Maximum motor ratings (kW, hp) are for reference only.
- ② UL 508 Type E starters are assembled from a standard XTPR and a special incoming terminal line side adapter (XTPAXLSA or XTPAXLSAD).
- ③ In this range, calculate motor rating according to rated current. Specified values to NEC 430.6(A)(1).

**XT IEC Manual and Combination Motor Controllers**



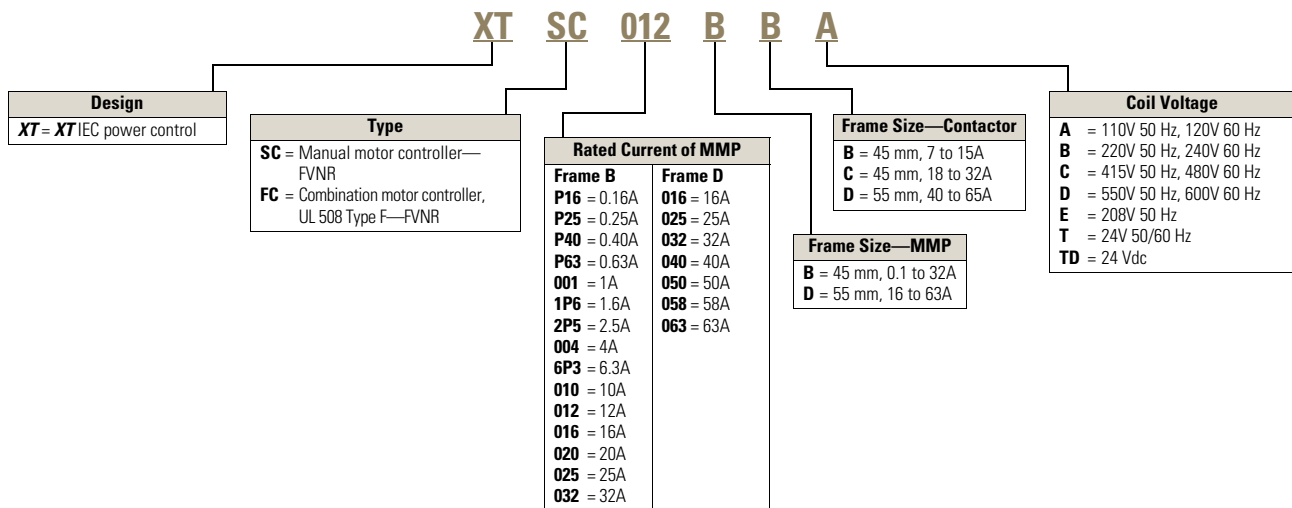
### Features

- ON/OFF rotary handle with lockout provision
- Class 10 overload protection
- Adjustment dial for setting motor FLA
- Built-in surge suppression on DC coils as standard
- Assembled manual motor controllers consist of manual motor protector, contactor, connector kit and 1NO-1NC auxiliary contact for MMP
- Assembled combination motor controllers consist of manual motor protector, contactor, connector kit, 1NO-1NC auxiliary contact for MMP and line side adapter
- Combination motor controllers are UL 508 Type F rated, and provide the following functions in a single device
  - Disconnect, short circuit protection, motor overload protection, motor controller

### Catalog Number Selection

#### XT IEC Manual and Combination Motor Controllers

#### Manual and Combination Motor Controllers



#### Product Selection

#### 2 XTSC Manual Motor Controllers (MMC)/Starter Combinations

Factory Assembled Motor Protective Device with Thermal and Magnetic Trip + Contactor

FLA Adjustment Range (A) ①	Short Circuit Release— $I_{rm}$ (A)	Maximum Motor Ratings—P ②								Assembled Manual Motor Controller ③ Non-Reversing— Catalog Number
		Maximum kW Rating AC-3—P (kW) Three-Phase			Maximum hp Rating—P (hp) Three-Phase					
		220–240V	380–415V	500V	660–690V	200V	240V	480V	600V	
<b>Frame B MMP + Frame B Contactor</b>										
0.1–0.16	3.2	—	—	—	0.06	④	④	1/2	1/2	XTSCP16BB_
0.16–0.25	3.5	—	0.06	0.06	0.12	④	④	1/2	1/2	XTSCP25BB_
0.25–0.4	5.6	0.06	0.09	0.12	0.18	④	④	1/2	1/2	XTSCP40BB_
0.4–0.63	8.82	0.09	0.18	0.25	0.25	④	④	1/2	1/2	XTSCP63BB_
0.63–1	14	0.12	0.25	0.37	0.55	④	④	1/2	1/2	XTSC001BB_
1–1.6	22.4	0.25	0.55	0.75	1.1	④	④	3/4	1	XTSC1P6BB_
1.6–2.5	35	0.37	0.75	1.1	1.5	1/2	1/2	1	1-1/2	XTSC2P5BB_
2.5–4	56	0.75	1.5	2.2	3	1	1	2	3	XTSC004BB_
4–6.3	88.2	1.1	2.2	3	4	1-1/2	1-1/2	3	5	XTSC6P3BB_
6.3–10	140	2.2	4	4	7.5	3	3	7-1/2	10	XTSC010BB_
8–12	168	3	5.5	5.5	11	3	3	7-1/2	10	XTSC012BB_
10–16	224	4	7.5	9	12.5	3	3	10	10	XTSC016BB_
<b>Frame B MMP + Frame C Contactor</b>										
10–16	224	4	7.5	9	12.5	3	3	10	10	XTSC016BC_
16–20	280	5.5	9	12.5	15	5	5	10	15	XTSC020BC_
20–25	350	5.5	11	15	22	5	7-1/2	15	20	XTSC025BC_
25–32	448	7.5	15	22	30	7-1/2	10	20	25	XTSC032BC_
<b>Frame D MMP + Frame C Contactor</b>										
10–16	224	4	7.5	9	12.5	3	5	10	15	XTSC016DC_
16–25	350	5.5	12.5	12.5	22	7-1/2	7-1/2	20	25	XTSC025DC_
25–32	448	7.5	15	17.5	22	10	10	25	30	XTSC032DC_
<b>Frame D MMP + Frame D Contactor</b>										
32–40	560	11	20	22	30	10	—	30	30	XTSC040DD_
40–50	700	14	25	30	45	15	15	30	40	XTSC050DD_
50–58	812	17	30	37	55	—	—	40	—	XTSC058DD_
55–65	882	18.5	34	37	55	—	—	40	—	XTSC063DD_

#### Notes

The assembled Manual Motor Controller (MMC) consists of an XTPR Manual Motor Protector (MMP) and an XTCE contactor. For Frame B MMP + Frame B Contactor assemblies, the XTSC can be mounted directly on DIN rail without an adapter. The contactors are supported mechanically with a mechanical connection element (included in XTPAXTPCB). For 16A and above, the assembly is mounted via a DIN rail adapter plate (XTPAXTPCPC, XTPAXTPCPD) and the electrical connection is made with electrical contact modules (XTPAXECMC, XTPAXECMD), both included in XTPAXTPCC and XTPAXTPCD.

Service Factor (SF)—Setting  $I_r$  of current scale in dependence of load factor:

SF = 1.15 →  $I_r = 1 \times I_n$  mot

SF = 1 →  $I_r = 0.9 \times I_n$  mot

① Overload release— $I_r$ .

② Select manual motor protectors by full load amperes. Maximum motor ratings (kW, hp) are for reference only.

③ Underscore (\_) indicates magnet coil suffix required. See **Page V9-T2-43**.

④ In this range, calculate motor rating according to rated current. Specified values to NEC 430.6(A)(1).

### XTFC Combination Motor Controllers (CMC), UL 508 Type F

Factory Assembled Motor Protective Device with Thermal and Magnetic Trip + Contactor + Required Line Side Adapter

FLA Adjustment Range (A) ①	Short Circuit Release— $I_{rm}$ (A)	Maximum Motor Ratings—P ②								Assembled Manual Motor Controller ③ Non-Reversing— Catalog Number
		Maximum kW Rating AC-3—P (kW) Three-Phase			Maximum hp Rating—P (hp) Three-Phase					
		220–240V	380–415V	500V	660–690V	200V	240V	480V	600V	
<b>Frame B MMP + Frame B Contactor</b>										
0.1–0.16	2.2	—	—	—	0.06	④	④	1/2	1/2	XTFCP16BB_
0.16–0.25	3.5	—	0.06	0.06	0.12	④	④	1/2	1/2	XTFCP25BB_
0.25–0.4	5.6	0.06	0.09	0.12	0.18	④	④	1/2	1/2	XTFCP40BB_
0.4–0.63	8.82	0.09	0.18	0.25	0.25	④	④	1/2	1/2	XTFCP63BB_
0.63–1	14	0.12	0.25	0.37	0.55	④	④	1/2	1/2	XTFC001BB_
1–1.6	22.4	0.25	0.55	0.75	1.1	④	④	3/4	1	XTFC1P6BB_
1.6–2.5	35	0.37	0.75	1.1	1.5	1/2	1/2	1	1-1/2	XTFC2P5BB_
2.5–4	56	0.75	1.5	2.2	3	1	1	2	3	XTFC004BB_
4–6.3	88.2	1.1	2.2	3	4	1-1/2	1-1/2	3	5	XTFC6P3BB_
6.3–10	140	2.2	4	4	7.5	3	3	7-1/2	10	XTFC010BB_
8–12	168	3	5.5	5.5	11	3	3	7-1/2	—	XTFC012BB_
10–16	224	4	7.5	9	12.5	3	5	10	—	XTFC016BB_
<b>Frame B MMP + Frame C Contactor</b>										
10–16	224	4	7.5	9	12.5	3	5	10	—	XTFC016BC_
16–20	280	5.5	9	12.5	15	5	5	—	—	XTFC020BC_
20–25	350	5.5	11	15	22	5	7-1/2	15	—	XTFC025BC_
25–32	448	7.5	15	22	30	7-1/2	10	20	—	XTFC032BC_
<b>Frame D MMP + Frame C Contactor</b>										
10–16	224	4	7.5	9	12.5	3	5	10	10	XTFC016DC_
16–25	350	5.5	12.5	12.5	22	7-1/2	7-1/2	20	25	XTFC025DC_
25–32	448	7.5	15	17.5	22	10	10	25	30	XTFC032DC_
<b>Frame D MMP + Frame D Contactor</b>										
32–40	560	11	20	22	30	10	10	30	40	XTFC040DD_
40–50	700	14	25	30	45	10	15	30	—	XTFC050DD_
50–58	812	17	30	37	55	15	15	40	—	XTFC058DD_
55–65	882	18.5	34	37	55	15	15	40	—	XTFC063DD_

### Magnet Coil Suffix

Coil Voltage	Suffix Code
110V 50 Hz, 120V 60 Hz	<b>A</b>
220V 50 Hz, 240V 60 Hz	<b>B</b>
24V 50/60 Hz	<b>T</b>
24 Vdc	<b>TD</b> ⑤
415V 50 Hz, 480V 60 Hz	<b>C</b>
550V 50 Hz, 600V 60 Hz	<b>D</b>
208V 60 Hz	<b>E</b>

### Notes

The assembled Combination Motor Controller (CMC) consists of an XTPR Manual Motor Protector (MMP) and an XTCE contactor and a required Line Side Adapter. For Frame B MMP + Frame B Contactor assemblies, the XTFC and XTFR can be mounted directly on DIN rail without an adapter. The contactors are supported mechanically with a mechanical connection element (included in XTPAXTPCB, XTPAXRPCR).

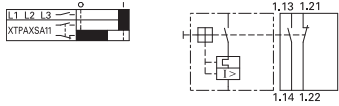
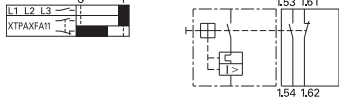
For 16A and above, the assembly is mounted via a DIN rail adapter plate (XTPAXTPCPC, XTPAXTPCPD) and the electrical connection is made with electrical contact modules (XTPAXECMC, XTPAXECMD), both included in XTPAXTPCC and XTPAXTPCD.  $SF = 1.15 \rightarrow I_r = 1 \times I_n \text{ mot}$   
 $SF = 1 \rightarrow I_r = 0.9 \times I_n \text{ mot}$

- ① Overload release— $I_r$ .
- ② Select combination motor controllers by full load amperes. Maximum motor ratings (kW, hp) are for reference only.
- ③ Underscore ( \_ ) indicates magnet coil suffix required. See table at left.
- ④ In this range, calculate motor rating according to rated current. Specified values to NEC 430.6(A)(1).
- ⑤ With DC operation: Integrated diode-resistor combination, coil rating 2.6W.

#### Accessories

2

#### Auxiliary Contacts

Contact Configuration	Contact Sequence	Screw Terminals Pkg. Qty.	Catalog Number
<b>Side-Mount</b>			
1NO-1NC		5	<b>XTPAXSA11</b>
<b>Front-Mount</b>			
1NO-1NC		5	<b>XTPAXFA11</b>

#### Rotary Handle Mechanism



#### IP65 Rotary Handle Mechanism ①②③

Description	Pkg. Qty.	Catalog Number
<b>Complete Kits—Includes Handle, Shaft and Required Hardware</b>		
Rotary handle mechanism IP65 black—for use on main switches to IEC/EN 60204.	1	<b>XTPAXRHMB</b>
Rotary handle mechanism IP65 red/yellow—for use on main switch with emergency-stop function to IEC/EN 60204.	1	<b>XTPAXRHMR</b>
Rotary handle mechanism IP65 black—for use on main switches to IEC/EN 60204 where XTPR is mounted 90° from vertical.	1	<b>XTPAXRHM90B</b>
Rotary handle mechanism IP65 red/yellow—for use on main switch with emergency-stop function to IEC/EN 60204 where XTPR is mounted 90° from vertical.	1	<b>XTPAXRHM90RY</b>

#### Shunt Release



#### Shunt Release

Pkg. Qty.	Screw Terminals— Catalog Number
2	<b>XTPAXSR120V60H</b>
2	<b>XTPAXSR240V60H</b>
2	<b>XTPAXSR480V60H</b>
2	<b>XTPAXSR24VDC</b>

#### Undervoltage Release



#### Undervoltage Release

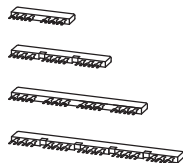
Pkg. Qty.	Screw Terminals— Catalog Number
2	<b>XTPAXUVR120V60H</b>
2	<b>XTPAXUVR240V60H</b>
2	<b>XTPAXUVR480V60H</b>

#### Notes

- ① With ON/OFF switch position and “+” (tripped), lockable with three padlocks, 4–8 mm hasp. Can be locked in the OFF position, if required.
- ② Rotary handle mechanisms ship with door interlock disabled. See instruction publication with product for how to enable door interlock.
- ③ Not for use with XTPAXFAEM20 early-make front-mount auxiliary contact.

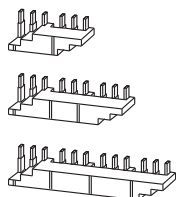
### Three-Phase Commoning Links <sup>①</sup>

#### MMP—Frame B



For Use With...	Qty MMP	Length of Link (mm)	Unit Width (mm)	Pkg. Qty.	Catalog Number
<b>Frame B</b>					
MMP with no side-mounted auxiliaries or voltage releases	2	90	45	10	<b>XTPAXCLKA2</b>
	3	135	45	10	<b>XTPAXCLKA3</b>
	4	180	45	10	<b>XTPAXCLKA4</b>
	5	225	45	10	<b>XTPAXCLKA5</b>

#### MMP—Frame D



For Use With...	Qty MMP	Length of Link (mm)	Unit Width (mm)	Pkg. Qty.	Catalog Number
<b>Frame D</b>					
MMP with no side-mounted auxiliaries or voltage releases	2	110	55	1	<b>XTPAXCLKA2D</b>
	3	165	55	1	<b>XTPAXCLKA3D</b>
	4	220	55	1	<b>XTPAXCLKA4D</b>

#### Incoming Terminal



### Incoming Terminal for Three-Phase Commoning Link <sup>②</sup>

For Use With...	Pkg. Qty.	Catalog Number
B Frame XTPR, XTPB	5	<b>XTPAXIT</b>

#### Line-Side Adapter



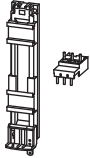
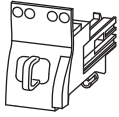
### Line-Side Adapter <sup>③</sup>

For Use With...	Pkg. Qty.	Catalog Number
B Frame XTPR to create a UL 508 type E/F manual combination starter	5	<b>XTPAXLSA</b>
D Frame XTPR to create a UL 508 type E/F manual combination starter	1	<b>XTPAXLSAD</b> <sup>④</sup>

#### Notes

- ① Protected against accidental contact. B Frame short circuit proof Ue = 690V, Iu = 63A; D Frame short circuit proof Ue = 690V, Iu = 128A. Frame B links can be combined by rotating mounting. Frame D links cannot be combined.
- ② For three-phase commoning link, protected against accidental contact, Ue = 690V, Iu = 63A; for conductor cross-sections: 2.5–25 mm<sup>2</sup> stranded; 2.5–16 mm<sup>2</sup> flexible with ferrules, AWG 14-6.
- ③ XTPAXLSA is for three-phase commoning link, finger- and back-of-hand proof, Ue = 690V, Iu = 60A; for conductor cross sections: 2.5–25 mm<sup>2</sup> stranded, 2.5–16 mm<sup>2</sup> flexible with ferrule, AWG 14-6.
- ④ XTPAXLSAD cannot be combined with three-phase commoning links.

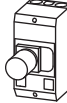
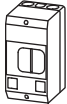
#### Non-Reversing Starters



#### Combination Connection Kits for Connection of XTPR MMP with XTCE Contactor

For Use With...	Description	Std. Pack	Catalog Number
<b>Non-Reversing Starters</b>			
XTPR...B + XTCE...B	Comprised of: Mechanical connection element for XTPR...B and contactor Main current wiring between XTPR...B and contactor in tool-less plug connection Cable guidance Use contactor auxiliary switch XTCEXFAT_ Control cable guidance: max. six cables up to 2.5 mm <sup>2</sup> external diameter or four cables up to 3.5 mm <sup>2</sup> external diameter.	1	<b>XTPAXTPCB</b>
XTPR...B + XTCE...C XTPR...D + XTCE...D	Comprised of: DIN rail adapter plate Main current wiring between XTPR and contactor	1	<b>XTPAXTPCC</b> <b>XTPAXTPCD</b>

#### Insulated Enclosures



#### Insulated Enclosures for Surface Mounting

Degree of Protection	For Use With...	Description	Catalog Number
<b>XTPB Pushbutton Manual Motor Protectors—North American Usage</b> <sup>①②</sup>			
IP65 NEMA 3R, 4X, 12, 13	XTPB MMP only or with: XTPAXFA_, XTPBXFAEM20, XTPAXSA_, XTPAXUVR_, XTPAXSR_, XTPAXCL	With actuating diaphragm	<b>XTPBXENAS65</b>
IP65 NEMA 3R, 4X, 12, 13	XTPB MMP only or with: XTPAXFA_, XTPBXFAEM20, XTPAXUVR_, XTPAXSR_, XTPAXCL	With emergency-stop (E-stop) pushbutton actuator, red/yellow	<b>XTPBXENASES65</b>
<b>B Frame (0.1–32A) XTPR Rotary Manual Motor Protectors—North American Usage</b> <sup>③</sup>			
IP55 NEMA 1, 12, 3R	B Frame XTPR Only or with: XTPAXSA_ and XTPAXFA_, XTPAXUVR_ and XTPAXFA_, XTPAXSR_ and XTPAXFA_, XTPAXCL	With red/yellow rotary handle for use as emergency-stop switch to VDE 0113	<b>XTPAXENAS55RY</b>
<b>D Frame (10–65A) XTPR Rotary Manual Motor Protectors</b> <sup>④⑤</sup>			
IP65 NEMA 1, 12, 3R, 4X	D Frame XTPR only or with: XTPAXFA_, XTPAXFAEM20, XTPAXSA_, XTPAXSATR_, XTPAXUVR_, XTPAXSR_, XTPAXCL	With red/yellow rotary handle for use as emergency-stop switches to IEC/EN 60204	<b>XTPAXENCSD65RY</b>

#### Notes

- ① Built-in terminal for PE(N).
- ② North American enclosures come with conduit adapters for use with 1/2 NPT.
- ③ Built-in N and PE terminal, lower part without knockouts.
- ④ Integrated terminal for PE(N) connection.
- ⑤ % Metric knockouts:  
Top ÷ bottom: M25/M32  
In backplate: M25/M32  
Control cable entry: M20

### Product Overview

#### Soft Starters Selection Guide



Description	DS7	DS6	S611	S801+	S811+
	Page V9-T2-48	Page V9-T2-50	Page V9-T2-51	Page V9-T2-55	Page V9-T2-58
<b>Power</b>					
Current range (A)	4–32	41–200	26–414	11–1000	11–1000
Phases	Two-phase control	Two-phase control	Three-phase	Three-phase	Three-phase
Input voltage (line voltage)	0–460V	0–460V	0–600V	0–600V; 690V on V and T Frame	0–600V; 690V on V and T Frame
Horsepower range	460V: 2–20 hp	460V: 30–150 hp	460V: 40–350 hp	460V: 25–800 hp	460V: 25–800 hp
Internal run-bypass	Yes	Yes	Yes	Yes	Yes
Inside-the-delta control	—	—	—	Yes	Yes
<b>Control</b>					
User interface	Dials	Dials	LED and keypad	Dials and DIP switches	LCD and keypad
Control voltage	24 Vac/Vdc or 120–240 Vac	24 Vdc	120 Vac	24 Vdc	24 Vdc
Communications	—	—	Modbus RTU, EtherNet/IP, Modbus TCP, PROFIBUS, DeviceNet	—	Modbus RTU, EtherNet/IP, Modbus TCP
Program relays	—	—	Yes	Yes	Yes
<b>Soft Start</b>					
Voltage ramp initial current	5–85% LRT	5–85% LRT	5–85% LRT	5–85% LRT	5–85% LRT
Voltage ramp time	1–30 sec	1–30 sec	0.5–180 sec	0.5–180 sec	0.5–180 sec
Current limit	—	—	5–85% LRT	5–85% LRT	5–85% LRT
Current limit time	—	—	0.5–180 sec	0.5–180 sec	0.5–180 sec
Kick start current	—	—	5–85% LRT	5–85% LRT	5–85% LRT
Kick start time	—	—	0–2 sec	0–2 sec	0–2 sec
Jog	—	—	—	Yes	Yes
<b>Soft Stop</b>					
Stop ramp time	0–30 sec	0–30 sec	0–60 sec	0–60 sec	0–60 sec
Pump control	—	—	Optional	Optional	Optional
<b>Environmental</b>					
Operating temperature	0° to 40°C	0° to 40°C	–20° to 50°C	–30° to 50°C	–30° to 50°C
Humidity	0–95% noncondensing	0–95% noncondensing	0–95% noncondensing	0–95% noncondensing	0–95% noncondensing
Altitude	<2000M	<2000M	<2000M	<2000M	<2000M



#### DS7 Soft Start Controller



#### Features

- Small size
- Patented asymmetric delay angle control—makes torque behavior similar to a three-phase control device
- Integrated bypass
- It can take 24 Vac/Vdc or 110V/230 Vac control voltage
- Mechanical and electrical toolless assembly with MMPs
- Low cost solution compared to three-phase control devices
- Full UL approval

### Product Selection

#### DS7 Soft Start Controller

Please refer to Application Note AP03901006E for additional information on proper size selection.

#### DS7 Soft Start Controller—Frame 1



#### DS7 Soft Start Controllers—Horsepower Ratings— 10 Second Ramp, One Start per Hour, 300% Current Limit at 40°C ①

Rated Current (A)	Motor Power (hp)			Maximum Allowable Breaker Size	Maximum Allowable Fuse Size	Recommended XTOB Overload (Direct Connect) ②	Recommended XTOE Overload ②	MMP ②	Connection Kit to MMP	Catalog Number
	200V	230V	480V							
3.7	0.75	0.75	2	HFD3015	15A Class RK5	XTOB004BC1	XTOE005BCS	XTPR004BC1	XTPAXTPCB	<b>DS7-340SX004NO-N</b> ③ <b>DS7-342SX004NO-N</b> ④
6.9	1.5	2	3	HFD3015	15A Class RK5	XTOB006BC1 ①	XTOE020BCS	XTPR6P3BC1	XTPAXTPCB	<b>DS7-340SX007NO-N</b> ③ <b>DS7-342SX007NO-N</b> ④
7.8	2	2	5	HFD3020	20A Class RK5	XTOB010BC1	XTOE020BCS	XTPR010BC1	XTPAXTPCB	<b>DS7-340SX009NO-N</b> ③ <b>DS7-342SX009NO-N</b> ④
11	3	3	7.5	HFD3030	20A Class RK5	XTOB012BC1	XTOE020BCS	XTPR012BC1	XTPAXTPCB	<b>DS7-340SX012NO-N</b> ③ <b>DS7-342SX012NO-N</b> ④
15.2	3	5	10	HFD3035	25A Class RK5	XTOB016CC1	XTOE020CCS	XTPR016BC1	XTPAXTPCC	<b>DS7-340SX016NO-N</b> ③ <b>DS7-342SX016NO-N</b> ④
22	5	7.5	15	HFD3060	40A Class RK5	XTOB024CC1	XTOE045CCS	XTPR025BC1	XTPAXTPCC	<b>DS7-340SX024NO-N</b> ③ <b>DS7-342SX024NO-N</b> ④
32	7.5	10	20	HFD3070	50A Class RK5	XTOB032CC1	XTOE045CCS	XTPR032BC1	XTPAXTPCC	<b>DS7-340SX032NO-N</b> ③ <b>DS7-342SX032NO-N</b> ④

#### Notes

- ① Actual motor FLAs vary. Verify these devices cover the motor specific FLA.
- ② Selections are based on motor FLA value at 480V.
- ③ 24 Vac/Vdc device.
- ④ 120/230 Vac device.

Please refer to Application Note AP03901006E for additional information on proper size selection.

**DS7 Soft Start Controller—Frame 1**



**DS7 Soft Start Controllers—Horsepower Ratings—  
10 Second Ramp, One Start per Hour, 400% Current Limit at 40°C ①**

Rated Current (A)	Motor Power (hp)			Maximum Allowable Breaker Size	Maximum Allowable Fuse Size	Recommended XTOB Overload (Direct Connect) ②	Recommended XTOE Overload ②	MMP ②	Connection Kit to MMP	Catalog Number
	200V	230V	480V							
3	0.5	0.5	1.5	HFD3015	15A Class RK5	XTOB004BC1	XTOE005BCS	XTPR004BC1	XTPAXTPCB	<b>DS7-340SX004NO-N</b> ③ <b>DS7-342SX004NO-N</b> ④
4.8	1	1	3	HFD3015	15A Class RK5	XTOB006BC1 ①	XTOE020BCS	XTPR6P3BC1	XTPAXTPCB	<b>DS7-340SX007NO-N</b> ③ <b>DS7-342SX007NO-N</b> ④
6.9	1.5	2	3	HFD3020	20A Class RK5	XTOB006BC1	XTOE020BCS	XTPR6P3BC1	XTPAXTPCB	<b>DS7-340SX009NO-N</b> ③ <b>DS7-342SX009NO-N</b> ④
9	2	2	5	HFD3030	20A Class RK5	XTOB010BC1	XTOE020BCS	XTPR010BC1	XTPAXTPCB	<b>DS7-340SX012NO-N</b> ③ <b>DS7-342SX012NO-N</b> ④
11	3	3	7.5	HFD3035	25A Class RK5	XTOB016CC1	XTOE020CCS	XTPR016BC1	XTPAXTPCC	<b>DS7-340SX016NO-N</b> ③ <b>DS7-342SX016NO-N</b> ④
17.5	5	5	10	HFD3060	40A Class RK5	XTOB016CC1	XTOE045CCS	XTPR016BC1	XTPAXTPCC	<b>DS7-340SX024NO-N</b> ③ <b>DS7-342SX024NO-N</b> ④
22	5	7.5	15	HFD3070	50A Class RK5	XTOB024CC1	XTOE045CCS	XTPR025BC1	XTPAXTPCC	<b>DS7-340SX032NO-N</b> ③ <b>DS7-342SX032NO-N</b> ④

**Notes**

- ① Actual motor FLAs vary. Verify these devices cover the motor specific FLA.
- ② Selections are based on motor FLA value at 480V.
- ③ 24 Vac/Vdc device.
- ④ 120/230 Vac device.

## DS6 Soft Start Controller



## Features

- Run bypass mode greatly reduces internal heating created by the power dissipation across the SCRs. The bypass contactor directly connects the motor to the line and improves system efficiency by reducing internal power losses
- Less heat minimizes enclosure size and cooling requirements, and maximizes the life of all devices in the enclosure
- LED displays device status and provides fault indication
- Variable ramp times and voltage control (torque control) settings provide unlimited starting configurations, allowing for maximum application flexibility
- Minimizes the peak inrush current's stress on the power system
- Minimizes peak starting torque to diminish mechanical system wear and damage

## Product Selection

## DS6 Soft Start Controller

For 400% ramp, see Volume 6—Solid-State Motor Control, CA08100007E, Tab 1.

## DS6 Soft Start Controller—Horsepower Rating, 10-Second Ramp, One Start per Hour, 300% Current Limit at 40°C

Rated Current (A)	Motor Power (hp)			Maximum Allowable Breaker Size a	Maximum Allowable Fuse Size ①	Recommended XT0B Overload	Recommended C396 Overload	Catalog Number
	200V	230V	460V					
40	10	10	30	HFD3150L	150A Class RK5	XTOB040DC1 ②	C396A2A045SELAX	DS6-34DSX041N0-N
52	15	20	40	HFD3200L	200A Class RK5	XTOB057DC1 ②	C396B2A075SELAX	DS6-34DSX055N0-N
65	20	25	50	HJD3250	200A Class RK5	XTOB065DC1 ②	C396B2A075SELAX	DS6-34DSX068N0-N
77	25	30	60	HKD3300	300A Class RK5	XTOB100GC1S	C396B2A110SELAX	DS6-34DSX081N0-N
96	30	30	75	HKD3350	350A Class RK5	XTOB100GC1S	C396B2A110SELAX	DS6-34DSX099N0-N
124	40	50	100	HKD3400	500A Class RK5	XTOB125GC1S	C396C2A150SELAX	DS6-34DSX134N0-N
156	50	60	125	HLD3450	500A Class RK5	XTOB160LC1 ③	C396A2A005SELAX ④	DS6-34DSX161N0-N
180	60	75	150	HLD3500	500A Class RK5	XTOB220LC1 ③	C396A2A005SELAX ④	DS6-34DSX196N0-N

## Power Supply Selection

Description	Catalog Number
85–264V input and 24V output	ELC-PS01
380–480V input and 24V output	PSS25F
100–240 Vac input and 24 Vdc output	PSG60E
380–480 Vac input and 24 Vdc output	PSG60F

## Notes

- ① Maximum values may be higher than allowed per NEC 430.52 and UL 508A 31.1.
- ② XT0BXDIND panel mounting adaptor must be used with this overload.
- ③ XT0BXTLL line and load lugs must be used with this overload.
- ④ C396CTK300 current transformer must be used with this overload.

S611 Soft Starter



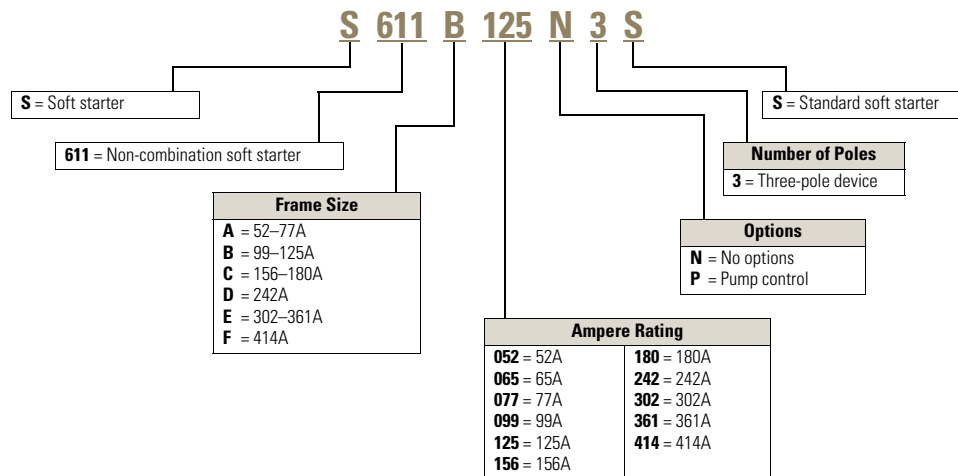
### Features

- Integrated bypass
- Integrated electronic overload protection
- 120V control
- Power monitoring
- Intuitive user interface
- Field serviceability (control board, contactors)
- Pump control option
- Modbus RTU native
- Plug-and-play EtherNet IP / Modbus TCP / PROFIBUS / DeviceNet adapters
- Control board mounted underneath the cover
- High fault combination rating up to 100 kA
- Available in NEMA 1/12/3R/4/4X enclosures

### Catalog Number Selection

#### S611 Soft Starter

#### Solid-State Soft Starter



## Product Selection

## 2

### Horsepower Ratings

**Note:** Always refer to motor plate FLA and ensure that the motor plate FLA is equal to or lower than the maximum current value in the tables.

#### S611



#### Standard Duty—300% Current for 15 Seconds, 115% Continuous

Maximum Current (Amps)	Horsepower Rating				Catalog Number
	208V	240V	480V	600V	
52	15	15	40	50	S611A052N3S
65	20	20	50	60	S611A065N3S
77	25	25	60	75	S611A077N3S
99	30	30	75	100	S611B099N3S
125	40	40	100	125	S611B125N3S
156	50	60	125	150	S611C156N3S
180	60	60	150	150	S611C180N3S
242	75	75	200	250	S611D242N3S
302	100	100	250	300	S611E302N3S
361	125	150	300	350	S611E361N3S
414	150	150	350	450	S611F414N3S

#### Standard Duty Plus—350% FLA for 30 Seconds, 115% Continuous

Maximum Current (Amps)	Horsepower Rating				Catalog Number
	208V	240V	480V	600V	
52	15	15	40	50	S611A052N3S
65	20	20	50	60	S611A065N3S
71	20	25	60	75	S611A077N3S
99	30	30	75	100	S611B099N3S
119	40	40	100	125	S611B125N3S
156	50	60	125	150	S611C156N3S
180	60	60	150	150	S611C180N3S
242	75	75	200	250	S611D242N3S
302	100	100	250	300	S611E302N3S
361	125	150	300	350	S611E361N3S
407	150	150	350	400	S611F414N3S

**Note:** Always refer to motor plate FLA and ensure that the motor plate FLA is equal to or lower than the maximum current value in the tables.

#### S611



#### Heavy Duty—500% FLA for 30 Seconds, 125% Continuous

Maximum Current (Amps)	Horsepower Rating		480V	600V	Catalog Number
	208V	240V			
49	15	15	40	50	S611A052N3S
83	25	30	60	75	S611B099N3S
142	40	60	125	150	S611C156N3S
225	75	75	200	200	S611D242N3S
256	75	100	200	250	S611E361N3S
285	100	125	250	300	S611F414N3S

#### Severe Duty—600% FLA for 30 Seconds, 125% Continuous

Maximum Current (Amps)	Horsepower Rating		480V	600V	Catalog Number
	208V	240V			
41	10	15	30	40	S611A052N3S
69	20	30	60	60	S611B099N3S
117	30	50	100	125	S611C180N3S
187	60	75	150	200	S611D242N3S
213	75	75	150	200	S611E361N3S
238	75	100	200	250	S611F414N3S

## Accessories

### Optional Accessory Kits

Description	S611 Current Rating	Accessory Kit Part Number
User interface remote mounting kit—3.28 ft (1m)	52–414A	S611-RMK-100
User interface remote mounting kit—6.56 ft (2m)	52–414A	S611-RMK-200
User interface remote mounting kit—9.84 ft (3m)	52–414A	S611-RMK-300
User interface communication cable—3.28 ft (1m)	52–414A	D77E-QPIP100
User interface communication cable—6.56 ft (2m)	52–414A	D77E-QPIP200
User interface communication cable—9.84 ft (3m)	52–414A	D77E-QPIP300
Lug kit—mechanical	52–77A	S611-LUG-M01
	99–125A	S611-LUG-M02
	156–242A	S611-LUG-M03
	302–414A	S611-LUG-M04

## Options

2

### Pump Control

For pump control option, change the **8th** digit in the Catalog Number to **P**, as in S611XXX**P**3S.

## Replacement Parts

### S611 Replacement Components

Description	Part Number
User interface	S611-KEYPAD
User interface communication cable—0.25m (0.82 ft)	D77E-QPIP25
Control board assembly—52A standard	S611-PCB-052S
Control board assembly—65A standard	S611-PCB-065S
Control board assembly—77A standard	S611-PCB-077S
Control board assembly—99A standard	S611-PCB-099S
Control board assembly—125A standard	S611-PCB-125S
Control board assembly—156A standard	S611-PCB-156S
Control board assembly—180A standard	S611-PCB-180S
Control board assembly—242A standard	S611-PCB-242S
Control board assembly—302A standard	S611-PCB-302S
Control board assembly—361A standard	S611-PCB-361S
Control board assembly—414A standard	S611-PCB-414S
Control board assembly—52A pump	S611-PCB-052P
Control board assembly—65A pump	S611-PCB-065P
Control board assembly—77A pump	S611-PCB-077P
Control board assembly—99A pump	S611-PCB-099P
Control board assembly—125A pump	S611-PCB-125P
Control board assembly—156A pump	S611-PCB-156P
Control board assembly—180A pump	S611-PCB-180P
Control board assembly—242A pump	S611-PCB-242P
Control board assembly—302A pump	S611-PCB-302P
Control board assembly—361A pump	S611-PCB-361P
Control board assembly—414A pump	S611-PCB-414P
Frame A/B CT	S611-CT-AB
Frame C/D CT	S611-CT-CD
Frame E/F CT	S611-CT-EF
Contactor assembly—52–180A	C25DNY172
Contactor assembly—242–414A	C25DNY173

S801+ Soft Starters



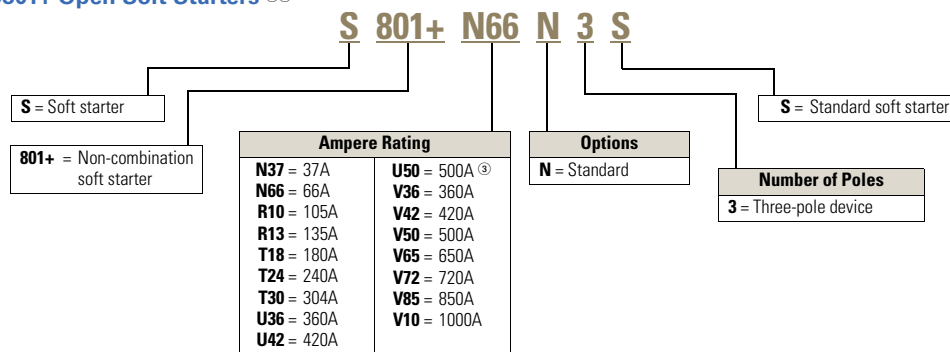
Features

- Smaller size
- Physically fits in place of most NEMA and IEC starters
- Built-in run bypass contactor
- Built-in overload protection
- Adjustable ramp times
- Adjustable kick start control
- Dial and DIP switch user interface (CIM)
- Alarm and warning capability
- Analog input

Catalog Number Selection

S801+ Soft Starter

S801+ Open Soft Starters ①②



Notes

- ① S801+T\_, S801+U\_ and S801+V\_ units require lug kits found on **Pages V9-T2-63**.
- ② All units require a 24 Vdc power supply found on catalog **Pages V9-T2-63**, or equivalent.
- ③ S801+U50N3S unit does not have IEC certification.



#### Product Selection

2

#### Standard Duty

S801+



#### Standard Duty— 15 Second Ramp, 300% Current Limit at 40°C, Inline Connection

Max. Current	Three-Phase Motors kW Rating (50 Hz)			hp Rating (60 Hz)				575–600V				Catalog Number
	230V	380–400V	440V	200V 1.0SF	1.15SF	230V 1.0SF	1.15SF	460V 1.0SF	1.15SF	1.0SF	1.15SF	
<b>Frame Size N</b>												
37	10	18.5	18.5	10	10	10	10	25	20	30	30	<b>S801+N37N3S</b>
66	18.5	30	37	20	15	20	20	50	40	60	50	<b>S801+N66N3S</b>
<b>Frame Size R</b>												
105	30	55	59	30	25	40	30	75	60	100	75	<b>S801+R10N3S</b>
135	40	63	80	40	30	50	40	100	75	125	100	<b>S801+R13N3S</b>
<b>Frame Size T</b>												
180	51	90	110	60	50	60	60	150	125	150	150	<b>S801+T18N3S</b>
240	75	110	147	75	60	75	75	200	150	200	200	<b>S801+T24N3S</b>
304	90	160	185	100	75	100	100	250	200	300	250	<b>S801+T30N3S</b>
<b>Frame Size U</b>												
360	110	185	220	125	100	150	125	300	250	350	300	<b>S801+U36N3S</b>
420	129	220	257	150	125	175	150	350	300	450	350	<b>S801+U42N3S</b>
500	150	257	300	150	150	200	150	400	350	500	450	<b>S801+U50N3S</b> ①
<b>Frame Size V</b>												
360	110	185	220	125	100	150	125	300	250	350	300	<b>S801+V36N3S</b>
420	129	220	257	150	125	175	150	350	300	450	350	<b>S801+V42N3S</b>
500	150	257	300	150	150	200	150	400	350	500	450	<b>S801+V50N3S</b>
650	200	355	425	250	200	250	200	500	450	600	500	<b>S801+V65N3S</b>
720	220	400	450	—	—	300	250	600	500	700	600	<b>S801+V72N3S</b>
850	257	475	500	—	—	350	300	700	600	900	700	<b>S801+V85N3S</b>
1000	277	525	550	—	—	400	350	800	700	900	800	<b>S801+V10N3S</b>

**Note**

① S801+U50N3S does not have IEC certification.

### Severe Duty

S801+



#### Severe Duty—>30 Second Ramp, >300% Current Limit

Max. Current	Three-Phase Motor kW Rating (50 Hz)			hp Rating (60 Hz)								Catalog Number
	230V	380–400V	440V	200V 1.0SF	1.15SF	230V 1.0SF	1.15SF	460V 1.0SF	1.15SF	575V 1.0SF	1.15SF	
<b>Frame Size N</b>												
22	5.5	10	11	5	5	7-1/2	5	15	10	20	15	<b>S801+N37N3S</b>
42	11	18.5	22	10	10	15	10	30	25	40	30	<b>S801+N66N3S</b>
<b>Frame Size R</b>												
65	15	30	33	15	15	20	15	50	40	50	50	<b>S801+R10N3S</b>
80	22	40	45	25	20	30	25	60	50	75	60	<b>S801+R13N3S</b>
<b>Frame Size T</b>												
115	33	59	63	30	30	40	30	75	75	100	100	<b>S801+T18N3S</b>
150	45	80	90	50	40	50	50	100	100	150	125	<b>S801+T24N3S</b>
192	55	100	110	60	50	75	60	150	125	200	150	<b>S801+T30N3S</b>
<b>Frame Size U</b>												
240	75	110	147	75	60	75	75	200	150	200	200	<b>S801+U36N3S</b>
305	90	160	185	100	75	100	100	250	200	300	250	<b>S801+U42N3S</b>
365	110	185	220	125	100	150	125	300	250	350	300	<b>S801+U50N3S</b> ①
<b>Frame Size V</b>												
240	75	110	147	75	60	75	75	200	150	200	200	<b>S801+V36N3S</b>
305	90	160	185	100	75	100	100	250	200	300	250	<b>S801+V42N3S</b>
365	110	185	220	125	100	150	125	300	250	350	300	<b>S801+V50N3S</b>
420	129	220	257	150	125	150	150	350	300	450	350	<b>S801+V65N3S</b>
480	147	257	295	150	150	200	150	400	350	500	450	<b>S801+V72N3S</b>
525	160	280	335	150	150	200	150	450	350	500	450	<b>S801+V85N3S</b>
600	185	315	375	200	150	250	200	500	450	600	500	<b>S801+V10N3S</b>

**Note**

① S801+U50N3S unit does not have IEC certification.

Type S811+ Soft Starters



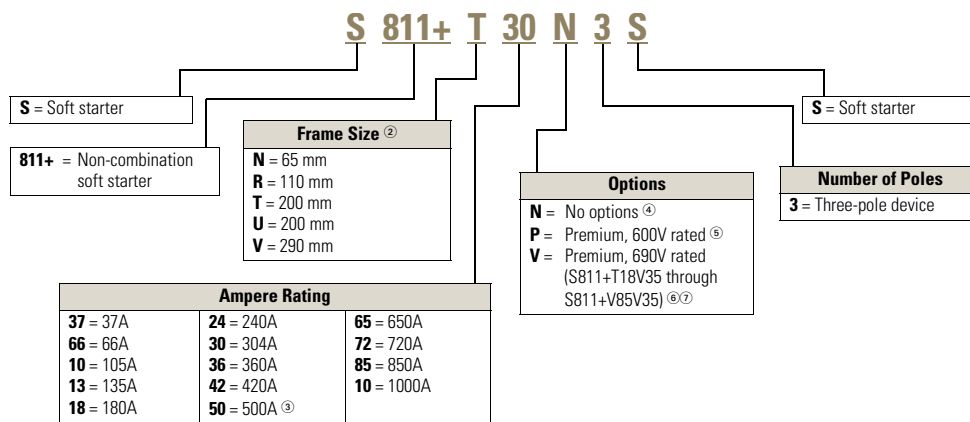
### Features

- Smaller size
- Physically fits in place of most NEMA and IEC starters
- Built-in run bypass contactor
- Built-in overload protection
- Adjustable ramp times
- Adjustable kick start control
- Native Modbus RTU and QCP communication
- kW and power factor measurement
- Cloning feature
- Alarm and warning capability
- Analog input
- Digital interface
- Pump control option
- Inside-the-delta capability

### Catalog Number Selection

#### S811+ Soft Starter

#### S811+ Open Soft Starters ①



#### Notes

- ① All units require a 24 Vdc power supply found on catalog **Page V9-T2-63**, or equivalent.
- ② S811+T\_, S811+U\_ and S811+V\_ units require lug kits found on **Page V9-T2-63**.
- ③ S811+U50\_ unit does not have IEC certification.
- ④ Level/Edge Sense, Inline or Inside-the-Delta wiring configuration.
- ⑤ Level/Edge Sense, Inline or Inside-the-Delta wiring configuration, pump control and extended ramp.
- ⑥ Not available in S811+U\_.
- ⑦ Level/Edge Sense, Inline wiring configuration, pump control, extended ramp.

Product Selection

Standard Duty

S811+



Standard Duty— 15 Second Ramp, 300% Current Limit at 40°C, Inline Connection

Max. Current	Three-Phase Motors kW Rating (50 Hz)			hp Rating (60 Hz)						575–690V <sup>①</sup>		Catalog Number
	230V	380–400V	440V	200V 1.0SF	1.15SF	230V 1.0SF	1.15SF	460V 1.0SF	1.15SF	1.0SF	1.15SF	
<b>Frame Size N</b>												
37	10	18.5	18.5	10	10	10	10	25	20	30	30	S811+N37N3S
66	18.5	30	37	20	15	20	20	50	40	60	50	S811+N66N3S
<b>Frame Size R</b>												
105	30	55	59	30	25	40	30	75	60	100	75	S811+R10N3S
135	40	63	80	40	30	50	40	100	75	125	100	S811+R13N3S
<b>Frame Size T</b>												
180	51	90	110	60	50	60	60	150	125	150	150	S811+T18N3S
240	75	110	147	75	60	75	75	200	150	200	200	S811+T24N3S
304	90	160	185	100	75	100	100	250	200	300	250	S811+T30N3S
<b>Frame Size U</b>												
360	110	185	220	125	100	150	125	300	250	350	300	S811+U36N3S
420	129	220	257	150	125	175	150	350	300	450	350	S811+U42N3S
500	150	257	300	150	150	200	150	400	350	500	450	S811+U50N3S <sup>②</sup>
<b>Frame Size V</b>												
360	110	185	220	125	100	150	125	300	250	350	300	S811+V36N3S
420	129	220	257	150	125	175	150	350	300	450	350	S811+V42N3S
500	150	257	300	150	150	200	150	400	350	500	450	S811+V50N3S
650	200	355	425	250	200	250	200	500	450	600	500	S811+V65N3S
720	220	400	450	—	—	300	250	600	500	700	600	S811+V72N3S
850	257	475	500	—	—	350	300	700	600	900	700	S811+V85N3S
1000	277	525	550	—	—	400	350	800	700	900	800	S811+V10N3S

Notes

- ① 690V is available only from S811+T18V3S through S811+V85V3S. Not available on S811+U...V3S.
- ② S811+U50\_ rating does not have IEC certification.

#### Severe Duty

2

S811+



#### Severe Duty—30 Second Ramp and/or 450% Current Limit at 50°C, Inline Connection

Max. Current	Three-Phase Motors kW Rating (50 Hz)			hp Rating (60 Hz)				575–690V <sup>①</sup>				Catalog Number
	230V	380–400V	440V	200V 1.0SF	1.15SF	230V 1.0SF	1.15SF	460V 1.0SF	1.15SF	1.0SF	1.15SF	
<b>Frame Size N</b>												
22	5.5	10	11	5	5	7-1/2	5	15	10	20	15	<b>S811+N37N3S</b>
42	11	18.5	22	10	10	15	10	30	25	40	30	<b>S811+N66N3S</b>
<b>Frame Size R</b>												
65	15	30	33	15	15	20	15	50	40	50	50	<b>S811+R10N3S</b>
80	22	40	45	25	20	30	25	60	50	75	60	<b>S811+R13N3S</b>
<b>Frame Size T</b>												
115	33	59	63	30	30	40	30	75	75	100	100	<b>S811+T18N3S</b>
150	45	80	90	50	40	50	50	100	100	150	125	<b>S811+T24N3S</b>
192	55	100	110	60	50	75	60	150	125	200	150	<b>S811+T30N3S</b>
<b>Frame Size U</b>												
240	75	110	147	75	60	75	75	200	150	200	200	<b>S811+U36N3S</b>
305	90	160	185	100	75	100	100	250	200	300	250	<b>S811+U42N3S</b>
<b>Frame Size V</b>												
240	75	110	147	75	60	75	75	200	150	200	200	<b>S811+V36N3S</b>
305	90	160	185	100	75	100	100	250	200	300	250	<b>S811+V42N3S</b>
365	110	185	220	125	100	150	125	300	250	350	300	<b>S811+V50N3S</b>
420	129	220	257	150	125	150	150	350	300	450	350	<b>S811+V65N3S</b>
480	147	257	295	150	150	200	150	400	350	500	450	<b>S811+V72N3S</b>
525	160	280	335	150	150	200	150	450	350	500	450	<b>S811+V85N3S</b>
575	172	303	370	200	150	250	200	500	450	600	500	<b>S811+V10N3S</b>

**Note**

① 690V is available only from S811+T18V3S through S811+V85V3S. Not available on S811+U...V3S.

### Inside-the-Delta, Standard Duty

S811+



#### Standard Duty—15 Second Ramp, 300% Current Limit at 40°C, Inside-the-Delta Connection

Max. Continuous Motor Line Current	Three-Phase Motor kW Rating (50 Hz)			hp Rating (60 Hz)								Catalog Number
	230V	380–400V	440V	200V		230V		460V		575V		
				1.0SF	1.15SF	1.0SF	1.15SF	1.0SF	1.15SF	1.0SF	1.15SF	
<b>Frame Size N</b>												
65	10	18.5	18.5	15	15	15	15	40	30	50	50	<b>S811+N37N3S</b>
114	18.5	30	37	30	25	30	30	75	60	100	75	<b>S811+N66N3S</b>
<b>Frame Size R</b>												
182	30	55	59	50	40	60	50	125	100	150	125	<b>S811+R10N3S</b>
234	40	63	80	60	50	75	60	150	125	200	150	<b>S811+R13N3S</b>
<b>Frame Size T</b>												
311	51	90	110	100	75	100	100	250	200	250	250	<b>S811+T18N3S</b>
415	75	110	147	125	100	125	125	300	250	300	300	<b>S811+T24N3S</b>
526	90	160	185	150	125	150	150	400	300	400	400	<b>S811+T30N3S</b>
<b>Frame Size U</b>												
623	110	185	220	200	150	250	200	450	400	550	450	<b>S811+U36N3S</b>
727	129	220	257	250	200	300	250	550	450	700	550	<b>S811+U42N3S</b>
865	150	257	300	250	250	300	250	600	550	750	700	<b>S811+U50N3S</b> <sup>①②</sup>
<b>Frame Size V</b>												
623	110	185	220	200	150	250	200	450	400	550	450	<b>S811+V36N3S</b>
727	129	220	257	250	200	300	250	550	450	700	550	<b>S811+V42N3S</b>
865	150	257	300	250	250	300	250	600	550	750	700	<b>S811+V50N3S</b>
1125	200	355	425	400	300	400	300	750	700	900	750	<b>S811+V65N3S</b>
1246	—	—	—	—	—	—	—	—	—	—	—	<b>S811+V72N3S</b>
1471	—	—	—	—	—	—	—	—	—	—	—	<b>S811+V85N3S</b>
—	—	—	—	—	—	—	—	—	—	—	—	<b>S811+V10N3S</b>

**Notes**

- ① 15 sec start, 300% inrush, 40°C, 1 start every 15 minutes. If these start parameters are exceeded, please refer to S811+V50\_.
- ② S811+U50\_ unit does not have IEC certification.

#### Inside-the-Delta, Severe Duty

2

S811+



#### Severe Duty—30 Second Ramp and/or 450% Current Limit at 50°C, Inside-the-Delta Connection

Max. Continuous Motor Line Current	Three-Phase Motor												Catalog Number
	kW Rating (50 Hz)			hp Rating (60 Hz)									
				200V		230V		460V		575V			
	230V	380–400V	440V	1.0SF	1.15SF	1.0SF	1.15SF	1.0SF	1.15SF	1.0SF	1.15SF		
<b>Frame Size N</b>													
39	5.5	10	11	7-1/2	7-1/2	10	7-1/2	25	15	30	25	<b>S811+N37N3S</b>	
73	11	18.5	22	15	15	25	15	50	40	60	50	<b>S811+N66N3S</b>	
<b>Frame Size R</b>													
111	15	30	33	25	25	30	25	75	60	75	75	<b>S811+R10N3S</b>	
138	22	40	45	40	30	50	40	100	75	120	100	<b>S811+R13N3S</b>	
<b>Frame Size T</b>													
199	33	59	63	50	50	60	50	125	125	150	150	<b>S811+T18N3S</b>	
257	45	80	90	75	60	75	75	150	150	250	200	<b>S811+T24N3S</b>	
324	55	100	110	100	75	100	100	250	200	300	250	<b>S811+T30N3S</b>	
<b>Frame Size U</b>													
415	75	110	147	125	100	125	125	300	250	300	300	<b>S811+U36N3S</b>	
526	90	160	185	150	120	150	150	400	300	450	400	<b>S811+U42N3S</b>	
623	110	185	220	200	150	250	200	450	400	550	450	<b>S811+U50N3S</b> <sup>①</sup>	
<b>Frame Size V</b>													
415	75	110	147	125	100	125	125	300	250	300	300	<b>S811+V36N3S</b>	
526	90	160	185	150	120	150	150	400	300	450	400	<b>S811+V42N3S</b>	
623	110	185	220	200	150	250	200	450	400	550	450	<b>S811+V50N3S</b>	
727	129	220	257	250	200	250	250	550	450	700	550	<b>S811+V65N3S</b>	
816	147	257	295	250	250	300	250	600	550	750	700	<b>S811+V72N3S</b>	
908	160	280	335	250	250	300	250	700	550	750	700	<b>S811+V85N3S</b>	
—	—	—	—	—	—	—	—	—	—	—	—	<b>S811+V10N3S</b>	

**Note**

① S811+U50\_ unit does not have IEC certification.

**Accessories**

**Lug Kits**

S811+T\_, S811U\_ and S811+V\_ soft starters each have different lug options based on your wiring needs. Each lug kit contains three lugs that can be mounted on either the load or line side.

**Lug Kit**



**Lug Kits**

S811+ Catalog Number	Description	Kits Required	Catalog Number
S811+T_, S811+U_	2 cable connections, 4 AWG to 1/0 cable	2	EML22
	1 cable connection, 4/0 to 500 kcmil cable		EML23
	2 cable connections, 4/0 to 500 kcmil cable		EML24
	1 cable connection, 2/0 to 300 kcmil cable		EML25
	2 cable connections, 2/0 to 300 kcmil cable		EML26
S811+V_	2 cable connections, 4/0 to 500 kcmil cable	2	EML28
	4 cable connections, 4/0 to 500 kcmil cable		EML30
	6 cable connections, 4/0 to 500 kcmil cable		EML32
	4 cable connections, 2/0 to 300 kcmil cable		EML33 ①

**Power Supplies**

24 Vdc power supply that can be used with the S811+ SSRV or as a stand-alone device.

**Power Supplies**

Description	Catalog Number
85–264 Vac input 24 Vdc output	PSG240E
360–575 Vac input 24 Vdc output	PSG240F

**Lug Cover Kits**

Replacement covers for the S811+T\_, S811+U\_ and S811+V\_ soft starters are available in case of damage to the existing covers.

**Lug Cover Kits**

Description	Catalog Number
Lug cover S811+T_, S811+U_	EML27
Lug cover S811+V_	EML34

**IP20 Kits**

**IP20 Kits**

Description	Catalog Number
S811+N_	SS-IP20-N
S811+R_	SS-IP20-R
S811+T_ and S811+U_	SS-IP20-TU
S811+V_	SS-IP20-V

**Surge Suppressors**

The surge suppressor can mount on either the line or load side of the soft starter. It is designed to clip the line voltage (or load side induced voltage).

**Surge Suppressor**



**Surge Suppressors**

Description	Catalog Number
600V MOV for S811+_ units	EMS39
690V MOV for S811+_ units ②	EMS41

**Notes**

- ① The EML33 does not have a CSA listing.
- ② S811+T\_ only.



# 2.4

## Motor Control and Protection

### Soft Starters

2

#### Mounting Plates

The mounting plates are designed to help make it easy to install or retrofit the soft starter into enclosures and MCCs. The soft starter can be mounted onto the plate prior to installation. The mounting plate is designed with tear drop mounting holes for easier installation.

#### Mounting Plates

Description	Catalog Number
S811+N_	EMM13N
S811+R_	EMM13R
S811+T_ and S811+U_	EMM13T
S811+V_	EMM13V

#### Vibration Plates

The vibration plates allow the soft starter to be applied in high shock and vibration applications. The vibration plate allows vibration up to 5g and shock in up to 40g. The soft starter is mounted onto the vibration plate prior to installation in the panel.

#### Vibration Plates

Description	Catalog Number
S811+N_	EMM14N
S811+R_	EMM14R
S811+T_ and S811+U_	EMM14T
S811+V_	EMM14V

#### Adapter Plates

The adapter plate allows customers to retrofit a S811+V\_ soft starter with the S811+U\_ soft starter.

#### Adapter Plates

Description	Catalog Number
Adapter plates	EMM13U

#### Control Wire Connector

#### Control Wire Connector

Description	Catalog Number
12-pin, 5 mm pitch connector for control wiring	EMA75

#### Digital Interface Module

The Digital Interface Module (DIM) is available as a replacement part.

#### DIM

Description	Catalog Number
Blank cover (filler)	EMA68
DIM for standard unit	EMA91
Panel mounting kit	
3 ft cable	EMA69A
5 ft cable	EMA69B
8 ft cable	EMA69C
10 ft cable	EMA69D

### Options

#### S811+ Premium

In addition to what is already there in the S811+ standard, these devices offer pump control and extended ramp functions.

#### S811+ Premium

Current Range	Catalog Number
11–37	S811+N37P3S
20–66	S811+N66P3S
32–105	S811+R10P3S
42–135	S811+R13P3S
56–180	S811+T18P3S
75–240	S811+T24P3S
95–304	S811+T30P3S
112–360	S811+U36P3S
131–420	S811+U42P3S
156–500	S811+U50P3S <sup>①</sup>
112–360	S811+V36P3S
131–420	S811+V42P3S
156–500	S811+V50P3S
203–650	S811+V65P3S
225–720	S811+V72P3S
265–850	S811+V85P3S
312–1000	S811+V10P3S

#### Note

① S811+U50\_ unit does not have IEC certification.

#### S811+ Premium 690V Option

In addition to what is already there in S811+ standard, this product offers 690V, pump control and extended ramp functions.

#### S811+ Premium 690V Option

Current Range	Catalog Number
56–180	S811+T18V3S
75–240	S811+T24V3S
95–304	S811+T30V3S
112–360	S811+V36V3S
131–420	S811+V42V3S
156–500	S811+V50V3S
203–650	S811+V65V3S
225–720	S811+V72V3S
265–850	S811+V85V3S

#### Cooling Fan Kit

The EMM18 cooling fan kit mounts on either side of any frame size S811+ soft starter to provide additional printed circuit board cooling in high ambient operating temperatures.

#### Cooling Fan Kit

Description	Catalog Number
Fan kit	EMM18

**Product Overview**

**Drives Selection Guide**



Description	M-Max Machinery Drives			SVX9000 Drives					
	Page V9-T2-66			Page V9-T2-68					
<b>Frame</b>	<b>FS1</b>	<b>FS2</b>	<b>FS3</b>	<b>FR4</b>	<b>FR5</b>	<b>FR6</b>	<b>FR7</b>	<b>FR8</b>	<b>FR9</b>
<b>Dimensions (in Inches)</b>									
Height	6.16	7.68	10.33	12.9	16.5	2.2	24.8	30.1	45.3
Width	2.58	3.54	3.94	5	5.6	7.6	9.3	11.5	18.9
Depth	4.02	4.13	4.41	7.5	8.4	9.3	10.1	13.5	13.4
<b>I/O</b>	Six digital inputs Two analog inputs (V and mA) One analog output One digital output Two relay outputs RS-485 interface (Modbus RTU)			Six digital inputs Two analog inputs (V and mA) Two digital outputs, form C relays One digital output, open collector One analog output Varied communication options					

#### M-Max Machinery Drive



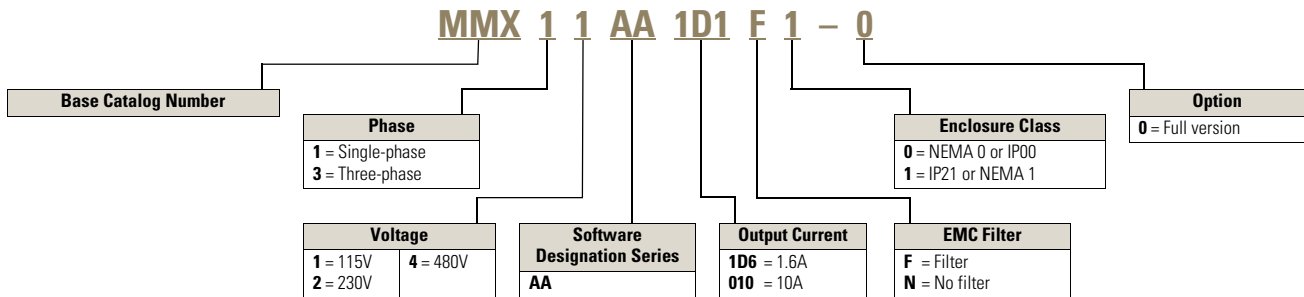
#### Features

- Ease of use—plug and play, start-up wizard, advanced diagnostic capability, copy/paste parameters without powering drive
- Compact, space-saving design
- Availability—short lead-times, stocked at multiple locations
- Aftermarket support organization with industry-leading drive specialists for pre- and post-sale support
- Rugged and reliable—50°C rating, 150% overload for one min., 200% starting current for two secs. in every 20 sec. period, conformal coated boards, two year warranty
- RoHS compliance

### Catalog Number Selection

#### M-Max™ Machinery Drive

#### Machinery Drive



**Product Selection**

**M-Max Machinery Drive**

P (kW)	P (hp)	I <sub>N</sub> (A)	Catalog Number
<b>Input 115V Single-Phase</b>		<b>Out 230V Three-Phase</b>	
0.25	0.33	1.7	<b>MMX11AA1D7N0-0</b>
0.37	0.5	2.4	<b>MMX11AA2D4N0-0</b>
0.55	0.75	2.8	<b>MMX11AA2D8N0-0</b>
0.75	1	3.7	<b>MMX11AA3D7N0-0</b>
1.1	1.5	4.8	<b>MMX11AA4D8F0-0</b>
<b>Input 230V Single-Phase</b>		<b>Out 230V Three-Phase</b>	
0.25	0.33	1.7	<b>MMX12AA1D7F0-0</b>
0.37	0.5	2.4	<b>MMX12AA2D4F0-0</b>
0.55	0.75	2.8	<b>MMX12AA2D8F0-0</b>
0.75	1	3.7	<b>MMX12AA3D7F0-0</b>
1.1	1.5	4.8	<b>MMX12AA4D8F0-0</b>
1.5	2	7	<b>MMX12AA7D0F0-0</b>
2.2	3	9.6	<b>MMX12AA9D6F0-0</b>
<b>Input 230V Three-Phase</b>		<b>Out 230V Three-Phase</b>	
0.25	0.33	1.7	<b>MMX32AA1D7N0-0</b>
0.37	0.5	2.4	<b>MMX32AA2D4N0-0</b>
0.55	0.75	2.8	<b>MMX32AA2D8N0-0</b>
0.75	1	3.7	<b>MMX32AA3D7N0-0</b>
1.1	1.5	4.8	<b>MMX32AA4D8F0-0</b>
1.5	2	7	<b>MMX32AA7D0F0-0</b>
2.2	3	11	<b>MMX32AA011F0-0</b>

P (kW)	P (hp)	I <sub>N</sub> (A)	Catalog Number
<b>Input 480V Three-Phase</b>		<b>Out 480V Three-Phase</b>	
0.37	0.5	1.3	<b>MMX34AA1D3F0-0</b>
0.55	0.75	1.9	<b>MMX34AA1D9F0-0</b>
0.75	1	2.4	<b>MMX34AA2D4F0-0</b>
1.1	1.5	3.3	<b>MMX34AA3D3F0-0</b>
1.5	2	4.3	<b>MMX34AA4D3F0-0</b>
2.2	3	5.6	<b>MMX34AA5D6F0-0</b>
3	4	7.6	<b>MMX34AA7D6F0-0</b>
4	5.5	9	<b>MMX34AA9D0F0-0</b>
5.5	7.5	12	<b>MMX34AA012F0-0</b>
7.5	10	14	<b>MMX34AA014F0-0</b>
<b>Input 575V Three-Phase</b>		<b>Out 575V Three-Phase</b>	
1	1.7	2	<b>MMX35AA1D7N0-0</b>
2	2.7	3.6	<b>MMX35AA2D7N0-0</b>
3	3.9	5	<b>MMX35AA3D9N0-0</b>
5	6.1	7.6	<b>MMX35AA6D1N0-0</b>
7.5	9	10.4	<b>MMX35AA9D0N0-0</b>

**Accessories**

**Kits**

Description	Catalog Number
Drive to PC communication module	<b>MMX-COM-PC</b>
Type 1 and IP21 kit for Frame 1	<b>MMX-IP21-FS1</b>
Type 1 and IP21 kit for Frame 2	<b>MMX-IP21-FS2</b>
Type 1 and IP21 kit for Frame 3	<b>MMX-IP21-FS3</b>

**Optional Communication Modules**

Description	Catalog Number
Communication adapter kit	<b>MMX-NET-XA</b>
CANopen network card	<b>XXM-NET-CO-A</b>
PROFIBUS DP network card with serial connection	<b>XXM-NET-PS-A</b>
PROFIBUS DP network card with sub-D connection	<b>XXM-NET-PD-A</b>
DeviceNet network card	<b>XXM-NET-DN-A</b>

#### SVX9000 Drives



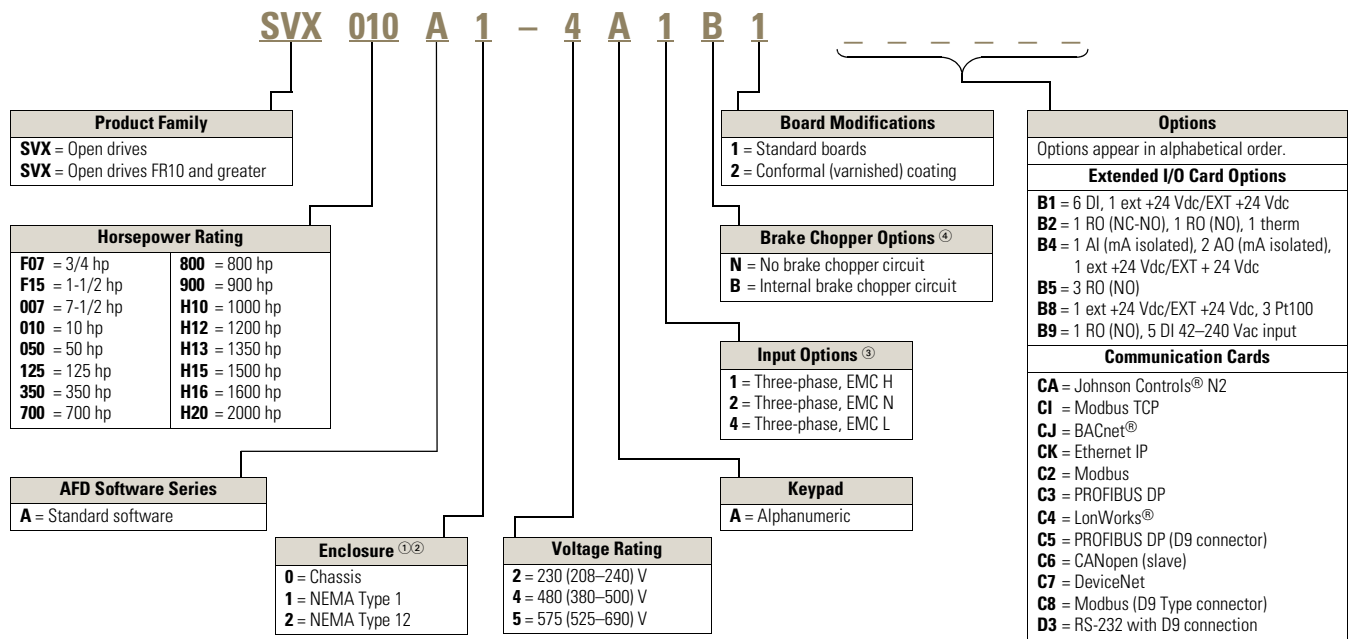
#### Features

- Integrated 3% line reactors standard on drives from FR4 through FR9
- EMI/RFI filters standard up to 200 hp I<sub>H</sub> 480V, 100 hp I<sub>H</sub> 230V
- Quick start wizard built into the programming of the drive ensures a smooth start-up
- LOCAL/REMOTE operation from keypad
- Copy/paste function allows transfer of parameter settings from one drive to the next
- Standard Type 12 keypad on all drives
- Hand-held auxiliary 240V power supply allows programming/monitoring of control module without applying full power to the drive

### Catalog Number Selection

#### SVX9000 Drives

#### SVX9000



#### Notes

- ① 480V drives 250 hp (IH) and larger are available with enclosure style 0 (chassis); 690V drives 200 hp (IH) and larger are available with enclosure style 0 (chassis).
- ② 480V and 690V FR10 freestanding drives are available with enclosure style 1 (NEMA Type 1) and enclosure style 2 (NEMA Type 12). FR11 freestanding drives only available with enclosure style 1 (NEMA Type 1).
- ③ All 230V drives and 480V drives up to 200 hp (IH) are only available with input option 1 (EMC level H). 480V drives 250 hp (IH) or larger are available with input option 2 (EMC level N). 480V drives are available with input option 4 (EMC level L). 575V drives 200 hp (IH) or larger are only available with input option 2. 575V drives up to 150 hp (IH) are only available with input option 4 (EMC level L).
- ④ 480V drives up to 30 hp (IH) are only available with brake chopper option B. 480V drives 40 hp (IH) or larger come standard with brake chopper option N. 230V drives up to 15 hp (IH) are only available with brake chopper option B. 230V drives 20 hp or larger come standard with brake chopper option N. All 575V drives come standard without brake chopper option (N). N = No brake chopper.

**Product Selection**

**208–240V, Type 1 Drive**

Frame Size	Delivery Code	hp (I <sub>H</sub> )	Current (I <sub>H</sub> )	hp (I <sub>L</sub> )	Current (I <sub>L</sub> )	Catalog Number
FR4	W	3/4	3.7	1	4.8	SVXF07A1-2A1B1
		1	4.8	1-1/2	6.6	SVX001A1-2A1B1
		1-1/2	6.6	2	7.8	SVXF15A1-2A1B1
		2	7.8	3	11	SVX002A1-2A1B1
		3	11	—	12.5	SVX003A1-2A1B1
FR5	W	—	12.5	5	17.5	SVX004A1-2A1B1
		5	17.5	7-1/2	25	SVX005A1-2A1B1
		7-1/2	25	10	31	SVX007A1-2A1B1
FR6	W	10	31	15	48	SVX010A1-2A1B1
		15	48	20	61	SVX015A1-2A1B1
FR7	W	20	61	25	75	SVX020A1-2A1N1
		25	75	30	88	SVX025A1-2A1N1
		30	88	40	114	SVX030A1-2A1N1
FR8	W	40	114	50	140	SVX040A1-2A1N1
		50	140	60	170	SVX050A1-2A1N1
		60	170	75	205	SVX060A1-2A1N1
FR9	W	75	205	100	261	SVX075A1-2A1N1
		100	261	—	—	SVX100A1-2A1N1

**525–690V, Type 1 Drive**

Frame Size	Delivery Code	hp (I <sub>H</sub> )	Current (I <sub>H</sub> )	hp (I <sub>L</sub> )	Current (I <sub>L</sub> )	Catalog Number
FR6	W	2	3.33	3	4.5	SVX002A1-5A4N1
		3	4.5	—	5.5	SVX003A1-5A4N1
		—	5.5	5	7.5	SVX004A1-5A4N1
		5	7.5	7-1/2	10	SVX005A1-5A4N1
		7-1/2	10	10	13.5	SVX007A1-5A4N1
		10	13.5	15	18	SVX010A1-5A4N1
		15	18	20	22	SVX015A1-5A4N1
		20	22	25	27	SVX020A1-5A4N1
		25	27	30	34	SVX025A1-5A4N1
		FR7	W	30	34	40
40	41			50	52	SVX040A1-5A4N1
FR8	W	50	52	60	62	SVX050A1-5A4N1
		60	62	75	80	SVX060A1-5A4N1
		75	80	100	100	SVX075A1-5A4N1
FR9	W	100	100	125	125	SVX100A1-5A4N1
		125	125	150	144	SVX125A1-5A4N1
		150	144	—	170	SVX150A1-5A4N1
		—	170	200	208	SVX175A1-5A4N1

**380–500V, Type 1 Drive**

Frame Size	Delivery Code	hp (I <sub>H</sub> )	Current (I <sub>H</sub> )	hp (I <sub>L</sub> )	Current (I <sub>L</sub> )	Catalog Number
FR4	W	1	2.2	1-1/2	3.3	SVX001A1-4A1B1
		1-1/2	3.3	2	4.3	SVXF15A1-4A1B1
		2	4.3	3	5.6	SVX002A1-4A1B1
		3	5.6	5	7.6	SVX003A1-4A1B1
		5	7.6	—	9	SVX005A1-4A1B1
		—	9	7-1/2	12	SVX006A1-4A1B1
FR5	W	7-1/2	12	10	16	SVX007A1-4A1B1
		10	16	15	23	SVX010A1-4A1B1
		15	23	20	31	SVX015A1-4A1B1
FR6	W	20	31	25	38	SVX020A1-4A1B1
		25	38	30	46	SVX025A1-4A1B1
		30	46	40	61	SVX030A1-4A1B1
FR7	W	40	61	50	72	SVX040A1-4A1N1
		50	72	60	87	SVX050A1-4A1N1
		60	87	75	105	SVX060A1-4A1N1
FR8	W	75	105	100	140	SVX075A1-4A1N1
		100	140	125	170	SVX100A1-4A1N1
		125	170	150	205	SVX125A1-4A1N1
FR9	W	150	205	200	261	SVX150A1-4A1N1
		200	245	250	300	SVX200A1-4A1N1

## Accessories

## Option Board Kits

2

Option Kit Description <sup>①</sup>	Allowed Slot Locations <sup>②</sup>	Field Installed Catalog Number	Factory Installed Option Designator	SVX Ready Programs Basic
<b>Standard I/O Cards</b>				
2 RO (NC/NO)	B	<b>OPTA2</b>	—	X
6 DI, 1 DO, 2 AI, 1AO, 1 +10 Vdc Ref, 2 Ext +24 Vdc/Ext +24 Vdc	A	<b>OPTA9</b>	—	X
<b>Extended I/O Card Options</b>				
2 RO, therm—SPX only	B	<b>OPTA3</b>	A3	—
Encoder low volt +5V/15V/24V—SPX only	C	<b>OPTA4</b>	A4	—
Encoder high volt +15V/24V—SPX only	C	<b>OPTA5</b>	A5	—
Double encoder—SPX only	C	<b>OPTA7</b>	A7	X
6 DI, 1 DO, 2 AI, 1 AO—SPX only	A	<b>OPTA8</b>	A8	—
3 DI (encoder 10–24V), out +15V/+24V, 2 DO (pulse+direction)—SPX only	C	<b>OPTAE</b>	AE	X
6 DI, 1 ext +24 Vdc/Ext +24 Vdc	B, C, <b>D</b> , E	<b>OPTB1</b>	B1	—
1 RO (NC/NO), 1 RO (NO), 1 therm	B, C, <b>D</b> , E	<b>OPTB2</b>	B2	—
1 AI (mA isolated), 2 AO (mA isolated), 1 Ext +24 Vdc/Ext +24 Vdc	B, C, <b>D</b> , E	<b>OPTB4</b>	B4	X
3 RO (NO)	B, C, <b>D</b> , E	<b>OPTB5</b>	B5	—
1 Ext +24 Vdc/Ext +24 Vdc, 3 Pt100	B, C, <b>D</b> , E	<b>OPTB8</b>	B8	—
1 RO (NO), 5 DI 42–240 Vac input	B, C, <b>D</b> , E	<b>OPTB9</b>	B9	—
<b>Communication Cards</b>				
Modbus	D, <b>E</b>	<b>OPTC2</b>	C2	X
Johnson Controls N2 <sup>③</sup>	D, <b>E</b>	<b>OPTC2</b>	CA	—
Modbus TCP	D, <b>E</b>	<b>OPTCI</b>	CI	X
BACnet	D, <b>E</b>	<b>OPTCJ</b>	CJ	X
Ethernet IP	D, <b>E</b>	<b>OPTCK</b>	CK	X
PROFIBUS DP	D, <b>E</b>	<b>OPTC3</b>	C3	X
LonWorks	D, <b>E</b>	<b>OPTC4</b>	C4	X
PROFIBUS DP (D9 connector)	D, <b>E</b>	<b>OPTC5</b>	C5	X
DeviceNet	D, <b>E</b>	<b>OPTC7</b>	C7	X
Modbus (D9 type connector)	D, <b>E</b>	<b>OPTC8</b>	C8	X
Adapter—SPX only	D, <b>E</b>	<b>OPTD1</b>	D1	X
Adapter—SPX only	D, <b>E</b>	<b>OPTD2</b>	D2	X
RS-232 with D9 connection	D, <b>E</b>	<b>OPTD3</b>	D3	X
<b>Keypad</b>				
9000X series local/remote keypad (replacement keypad)	—	<b>KEYPAD-LOC/REM</b>	—	—
9000X series remote mount keypad unit (keypad not included, includes 10 ft cable, keypad holder, mounting hardware)	—	<b>OPTRMT-KIT-9000X</b>	—	—
9000X Series RS-232 cable, 13 ft	—	<b>PP00104</b>	—	—

**Notes**

<sup>①</sup> AI = Analog Input; AO = Analog Output, DI = Digital Input, DO = Digital Output, RO = Relay Output.

<sup>②</sup> Option card must be installed in one of the slots listed for that card. Slot indicated in bold is the preferred location.

<sup>③</sup> OPTC2 is a multi-protocol option card.

### Miscellaneous Options

Description	Catalog Number
<b>9000XDrive</b> A PC-based tool for controlling and monitoring of the SVX9000. Features include: loading parameters that can be saved to a file or printed, setting references, starting and stopping the motor, monitoring signals in graphical or text form, and real-time display. To avoid damage to the drive or computer, SVDriveable must be used.	<b>9000XDRIVE</b>
<b>SVDriveable</b> 6 ft (1.8m) RS-232 cable (22 gauge) with a 7-pin connector on each end. Should be used in conjunction with the 9000XDrive option to avoid damage to the SVX9000 or computer. The same cable can be used for downloading specialized applications to the drive.	<b>SVDRIVECABLE</b>

### NEMA Type 12 Conversion Kit

**Note:** The NEMA Type 12 kit option is used to convert a NEMA Type 1 to a NEMA Type 12 drive. The NEMA Type 12 kit consists of a metal drive shroud, fan kit for some frames, adapter plate and plugs.

Frame Size	Delivery Code	Approximate Dimensions in Inches (mm)			Approximate Weight in lb (kg)	Catalog Number
		Length	Width	Height		
FR4	W	13 (330)	7 (178)	4 (102)	4 (1.8)	<b>OPTN12FR4</b>
FR5	W	16 (406)	8 (203)	7 (178)	5 (2.3)	<b>OPTN12FR5</b>
FR6	W	21 (533)	10 (254)	5 (127)	7 (3.2)	<b>OPTN12FR6</b>



## Relays



## easy Programmable Relay



## XC152 PLCs



## XV HMI-PLCs



## Preset Counters



## Hour Meters



## Encoders



## 3.1 Relays

Product Overview .....	V9-T3-2
Terminal Block Relays .....	V9-T3-8
General Purpose Plug-In Relays .....	V9-T3-9
General Purpose Type AA Relays .....	V9-T3-23
XTRE Control Relays .....	V9-T3-24
Solid-State Relays .....	V9-T3-26
TR Series Timing Relays .....	V9-T3-29

## 3.2 Programmable Controllers

Product Overview .....	V9-T3-33
Fusion Integrated Machine Controller .....	V9-T3-36
easy Programmable Relays .....	V9-T3-37
easy802/806 Programmable Relays with SmartWire-DT .....	V9-T3-41
XC152 PLCs with and without SmartWire-DT .....	V9-T3-42
XV Series HMI-PLCs with and without SmartWire-DT .....	V9-T3-44
ELC Series Programmable Logic Controllers .....	V9-T3-46

## 3.3 Preset Counters

Product Overview .....	V9-T3-49
1/16 DIN LCD Preset Counter .....	V9-T3-50
1/8 DIN Eclipse Series Preset Counter .....	V9-T3-51

## 3.4 Ratemeters

Product Overview .....	V9-T3-52
Courier Series Battery Powered Ratemeter .....	V9-T3-53
Eclipse Series 1/8 DIN LED Ratemeter .....	V9-T3-54

## 3.5 Hour Meters

Product Overview .....	V9-T3-55
Electromechanical Hour Meters .....	V9-T3-56
Electronic LCD Hour Meters .....	V9-T3-57

## 3.6 Totalizers

Product Overview .....	V9-T3-58
Electromechanical Totalizers .....	V9-T3-59
Electronic 1/32 DIN Totalizers .....	V9-T3-60
Electronic Courier Series Battery Powered LCD Totalizers .....	V9-T3-61
Electronic 1/8 DIN LED Totalizers .....	V9-T3-62

## 3.7 Encoders

Product Overview .....	V9-T3-63
Shaft Encoders .....	V9-T3-64

For our complete product offering, see Volume 7—Logic Control, Operator Interface and Connectivity Solutions, CA08100008E and PG05400001E

#### Product Overview

#### Relays Selection Guide



3

Description	XR Series Terminal Block Relays			D1 Series	D2 Series		
	Page V9-T3-8			Page V9-T3-9	Page V9-T3-11		
Approvals							
Features	Pluggable relay allows easy field replacement, LED indicator standard, functional plug-in bridges available Only 6.2 mm wide for SP and 14 mm wide for DP DIN rail mounting			Polycarbonate cover Indicator lamp and pushbutton available Panel and DIN mounting		Polycarbonate cover Indicator lamp and pushbutton available Panel, DIN and flange mounting Latching	
<b>Contact Data</b>							
Configuration	SPDT	DPDT	OctoCoupler	SPDT	DPDT	DPDT Latching	4PDT
Maximum allowable load	6A or 10A	6A	2A	20A	10A	10A	10A
Material	—			Silver alloy	Silver alloy		
Dielectric strength between poles	—			1500V	1500V		
<b>Coil Data</b>							
AC	24 Vac or 120 Vac			6–240 Vac	6–240 Vac		
DC	12, 24, 110 Vdc			6–110 Vdc	6–110 Vdc		
Power							
VA (Vac)	1.5			0.9 VA	1.2 VA		
Watts (Vdc)	0.12			0.7 Watts	0.9 Watts		
<b>General Data</b>							
Ambient temperature							
Storage	—			–40° to 185°F (–40° to 85°C)	–40° to 185°F (–40° to 85°C)		
Operational	–4° to 140°F (–20° to 60°C)			–40° to 131°F (–40° to 55°C)	–40° to 131°F (–40° to 55°C)		
Response time	Available upon request			20 milliseconds	20 milliseconds		
Life							
Mechanical operations	20 million			10 million	10 million		
Electrical operations	—			100,000	200,000		

For our complete product offering, see Volume 7—Logic Control, Operator Interface and Connectivity Solutions, CA08100008E and PG05400001E.

Relays Selection Guide, continued



Description	D3 Series		D4 Series		D5 Series	
	Page V9-T3-13		Page V9-T3-15		Page V9-T3-16	
Approvals						
Features	Polycarbonate cover Indicator lamp and pushbutton available Panel and DIN mounting 8- or 11-pin octal plug-in Latching (D3PR version)		Polycarbonate cover Indicator lamp available Panel and DIN mounting Socket has built-in hold-down spring		Polycarbonate cover Indicator lamp and pushbutton available Panel, DIN and PC board mounting	
<b>Contact Data</b>						
Configuration		DPDT	3PDT	SPDT	DPDT	3PDT
Maximum allowable load	16A	16A	16A	10A at 250 Vac	5A at 240 Vac	16A
Material	Silver alloy		AgCdO		Silver alloy	
Dielectric strength between poles	1500V		5000V		1500V	
<b>Coil Data</b>						
AC	6–240 Vac		6–240 Vac		6–240 Vac	
DC	6–110 Vdc		6–110 Vdc		6–110 Vdc	
Power						
VA (Vac)	3 VA, 1.4 Watts (D3PR and DPF)		0.9 VA		3 VA	
Watts (Vdc)	2 VA 1.64 Watts (D3PR5 latching)		0.5 Watts		1.4 Watts	
<b>General Data</b>						
Ambient temperature						
Storage	–40° to 185°F (–40° to 85°C)		–40° to 158°F (–40° to 70°C)		–40° to 185°F (–40° to 85°C)	
Operational	–40° to 131°F (–40° to 55°C)		–40° to 158°F (–40° to 70°C)		–40° to 131°F (–40° to 55°C)	
Response time	20 milliseconds		15 milliseconds		206 milliseconds	
Life						
Mechanical operations	5 million (D3PR and D3PF) 10 million (D3PR5 latching)		10 million		5 million	
Electrical operations	100,000		100,000		100,000	

For our complete product offering, see Volume 7—Logic Control, Operator Interface and Connectivity Solutions, CA08100008E and PG05400001E.

#### Relays Selection Guide, continued



**D7 Series**

Page V9-T3-18



**D8 Series**

Page V9-T3-20



**D9 Series**

Page V9-T3-22

Description	D7 Series				D8 Series		D9 Series	
Approvals								
Features	Polycarbonate cover Indicator lamp and pushbutton available Panel, DIN and flange mounting				Dust cover Panel, DIN and flange mounting Quick-connect and screw terminals		Dust cover Pushbutton available Panel mounting Screw terminals	
<b>Contact Data</b>								
Configuration							4PST	
	SPDT	DPDP	3PDT	4PDT	SPST-NO	DPST-NO	NO	NC
Maximum allowable load	20A	15A	15A	15A	30A at 220 Vac	25A at 220 Vac	25A at 220 Vac	8A at 220 Vac
Material	Silver alloy				AgCdO		AgCdO	
Dielectric strength between poles	1500V	1500V	2500V	2500V	4000V		4000V	
<b>Coil Data</b>								
AC	6–240 Vac				6–240 Vac		24–240 Vac	
DC	6–110 Vdc				12–24 Vdc		12–110 Vdc	
Power								
VA (Vac)	1.2 VA	1.2 VA	1.5 VA	1.5 VA	2.5 VA		2.6 VA	
Watts (Vdc)	0.9 Watts	0.9 Watts	1.4 Watts	1.5 Watts	1.9 Watts		2.0 Watts	
<b>General Data</b>								
Ambient temperature								
Storage	–40° to 185°F (–40° to 85°C)				–4° to 185°F (–20° to 85°C)		–13° to 140°F (–25° to 60°C)	
Operational	–40° to 131°F (–40° to 55°C)				–4° to 131°F (–20° to 55°C)		–13° to 140°F (–25° to 60°C)	
Response time	20 milliseconds (30 milliseconds for latching)				30 milliseconds		50 milliseconds	
Life								
Mechanical operations	10 million				5 million		1 million	
Electrical operations	100,000	100,000	200,000	200,000	100,000		100,000	

For our complete product offering, see Volume 7—Logic Control, Operator Interface and Connectivity Solutions, CA08100008E and PG05400001E.

Relays Selection Guide, continued



Description	Type AA Series Page V9-T3-23	XTRE Series Page V9-T3-24	D93 Series Page V9-T3-26
Approvals			
Features	Available blowout magnets for high DC switching Available auxiliary switches Combo head screws for simple hook-up Riveted construction for long service life	Four-pole configurations IP20 finger and back-of-hand proof Positively driven contacts between the relay and auxiliary contact modules as well as within the auxiliary contact modules	All solid-state circuitry with no moving parts to wear Compact, panel mounting for flexible installation Isolated input and output terminals to protect the system from electrical noise Internal snubber circuitry to protect the SSR from transients
<b>Contact Data</b>			
Configuration	DPDT	NO-NC variations in a four-pole relay plus four-pole auxiliary module	SPST-NO (Triac, Zero-cross or MOSFET)
Maximum allowable load	40A	16A	10–75A
Material	Silver cadmium oxide, gold flashed	—	—
Dielectric strength between pole	1500V	6000 Vac	4000 Vac
<b>Coil Data</b>			
AC	6–600 Vac	12–600 Vac	90–280 Vac
DC	6–220 Vdc	24–240 Vdc	3–32 Vdc
Power			
VA (Vac)	10 VA	3.3 VA	Available upon request
Watts (Vdc)	4 Watts	3 Watts	Available upon request
<b>General Data</b>			
Ambient temperature			
Storage	–40° to 185°F (–40° to 85°C)	–40° to 176° (–40° to 80°C)	–40° to 100°C
Operational	–40° to 131°F (–40° to 55°C)	–13° to 140°F (–25° to 60°C)	–40° to 80°C
Response time	35/50 milliseconds	12/31 milliseconds	Available upon request
Life			
Mechanical operations	—	20 million	—
Electrical operations	6000	100,000	—

For our complete product offering, see Volume 7—Logic Control, Operator Interface and Connectivity Solutions, CA08100008E and PG05400001E.

#### Relays Selection Guide, continued



Description	D96 Series	D99 Series	Universal TR Series
	Page V9-T3-27	Page V9-T3-28	Page V9-T3-29
Approvals			
Features	<p>All solid-state circuitry has no moving parts to wear</p> <p>Integral heat sink eliminates the need for added accessories and installation</p> <p>Flexible mounting allows DIN rail or panel mounting without additional hardware or tools</p> <p>Isolated input and output terminals protect the system from electrical noise</p> <p>Internal snubber circuitry protects the SSR from transients</p>	<p>All solid-state circuitry has no moving parts to wear</p> <p>Integral heat sink eliminates the need for added accessories and installation</p> <p>Flexible mounting allows DIN rail or panel mounting without additional hardware or tools</p> <p>Isolated input and output terminals protect the system from electrical noise</p> <p>Internal snubber circuitry protects the SSR from transients</p>	<p>Multiple user-selectable timing functions and timing ranges in a single unit reduce product variations and stock keeping units (SKUs)</p> <p>Universal input voltages from 12 or 24–240 Vac or Vdc eliminate the need to order and stock separate coil voltages</p> <p>Compact, DIN rail mountable case reduces panel size</p> <p>Advanced LED indication makes troubleshooting easy</p> <p>Staggered terminal locations allow access to lower-level terminals after wiring</p> <p>SPDT or DPDT contacts with 8A ratings</p>
<b>Contact Data</b>			
Configuration	SPST-NO (DC switch, zero-cross or random)	SPST-NO (zero cross)	SPDT and DPDT
Maximum allowable load	8–15A	10–40A	8A
Material	—	—	—
Dielectric strength between pole	2500 (4000 on random) Vac	4000 Vac	—
<b>Coil Data</b>			
AC	90–280 Vac	90–280 Vac	24–240 Vac SPDT, 12–240 Vac DPDT
DC	3–32 Vdc (3.5–32 Vdc on DC switch)	3–32 Vdc	24–240 Vdc SPDT, 12–240 Vdc DPDT
Power			
VA (Vac)	Available upon request	Available upon request	4 VA SPDT, 6 VA DPDT
Watts (Vdc)	Available upon request	Available upon request	1.5 Watts SPDT, 2W DPDT
<b>General Data</b>			
Ambient temperature			
Storage	–40° to 100°C	–40° to 100°C	–25° to 70°C
Operational	–30° to 80°C	–30° to 80°C	–25° to 55°C
Response time	Available upon request	Available upon request	100 ms
Life			
Mechanical operations	—	—	20,000,000
Electrical operations	—	—	200,000

For our complete product offering, see Volume 7—Logic Control, Operator Interface and Connectivity Solutions, CA08100008E and PG05400001E.

Relays Selection Guide, continued



Description	TMR5 Series Page V9-T3-30	TMR6 Series Page V9-T3-31	TMRP Series Page V9-T3-32
Approvals			
Features	<p>Various configurations available with fixed or adjustable time delays</p> <p>Single operating voltage for simple set-up</p> <p>Plugs in standard 8- or 11-pin octal sockets</p>	<p>Provides OFF delay function without requiring input voltage during OFF time delay</p> <p>Duplicates operation of pneumatic OFF delay timers</p> <p>Each unit has eight timing ranges built in, covering 0.05 seconds to 30 minutes</p> <p>Selecting a range is easy using a rotary switch (no math is required or DIP switches to set)</p> <p>Uses industry-standard 8-pin octal socket</p> <p>10A DPDT output contacts</p>	<p>Multiple user-selectable timing functions and timing ranges in a single unit reduce product variations and stock keeping units (SKUs)</p> <p>Universal input voltages from 12–240 Vac/Vdc eliminate the need to order and stock separate coil voltages</p> <p>Timing ranges up to 9990 hours</p> <p>Dual LED indication makes troubleshooting easy</p> <p>Flexible design for backpanel, through-panel (45 mm x 45 mm cutout), or DIN rail mounting</p> <p>SPDT or DPDT contacts with 12A ratings</p> <p>Plastic dust cover keeps out contaminants and eliminates accidental set point changes</p> <p>Use with standard Eaton D3 sockets</p>
<b>Contact Data</b>			
Configuration	DPDT	DPDT	SPDT and DPDT
Maximum allowable load	10A	10A	12A
Material	—	—	—
Dielectric strength between pole	2000V	2000V	—
<b>Coil Data</b>			
AC	12–240 Vac	24, 120 or 240 Vac	12–240 Vac
DC	12–240 Vdc	24, 120 or 240 Vdc	12–240 Vdc
Power			
VA (Vac)	2 VA	2 VA	2.5 VA
Watts (Vdc)	—	—	2 Watts
<b>General Data</b>			
Ambient temperature			
Storage	—	—	–40° to 85°C
Operational	–4° to 149°F (–20° to 65°C)	–18° to 150°F (–28° to 65°C)	–10° to 55°C
Response time	100 milliseconds	—	25 milliseconds
Life			
Mechanical operations	10 million	2,000,000	10 million
Electrical operations	100,000	100,000	100000

For our complete product offering, see Volume 7—Logic Control, Operator Interface and Connectivity Solutions, CA08100008E and PG05400001E.

# 3.1

## Logic Devices

### Relays

3

#### Terminal Block Relays



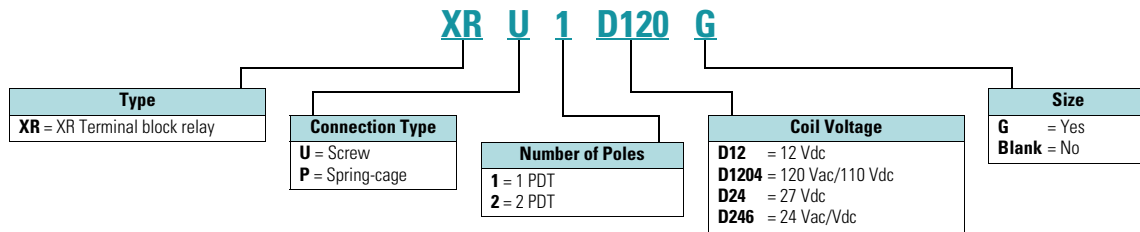
#### Features

- Pluggable relay allows for field replacement
- Functional plug-in bridges
- LED status indication
- Only 6.2 mm wide for single pole versions, 14 mm wide for double pole

### Catalog Number Selection

#### Terminal Block Relays

#### Terminal Block Relays



### Product Selection

#### Standard Terminal Block Relays

Contacts	Rated Current	Supply Voltage	Standard Pack	Catalog Number
<b>1PDT Screw Connection</b>				
No	6A	12 Vdc	10	<b>XRU1D12</b>
No	6A	120 Vac/110 Vdc	10	<b>XRU1D120U</b>
Yes	6A	120 Vac/110 Vdc	10	<b>XRU1D120UG</b>
No	6A	24 Vdc	10	<b>XRU1D24</b>
No	6A	24 Vac/Vdc	10	<b>XRU1D24U</b>
Yes	6A	24 Vac/Vdc	10	<b>XRU1D24UG</b>
<b>1PDT Spring-Cage Connection</b>				
No	6A	12 Vdc	10	<b>XRP1D12</b>
No	6A	120 Vac/110 Vdc	10	<b>XRP1D120U</b>
No	6A	24 Vdc	10	<b>XRP1D24</b>
No	6A	24 Vac/Vdc	10	<b>XRP1D24U</b>
<b>DPDT Screw Connection</b>				
No	6A	12 Vdc	10	<b>XRU2D12</b>
No	6A	120 Vac/110 Vdc	10	<b>XRU2D120U</b>
No	6A	24 Vdc	10	<b>XRU2D24</b>
No	6A	24 Vac/Vdc	10	<b>XRU2D24U</b>



General Purpose Plug-In Relays—D1 Series



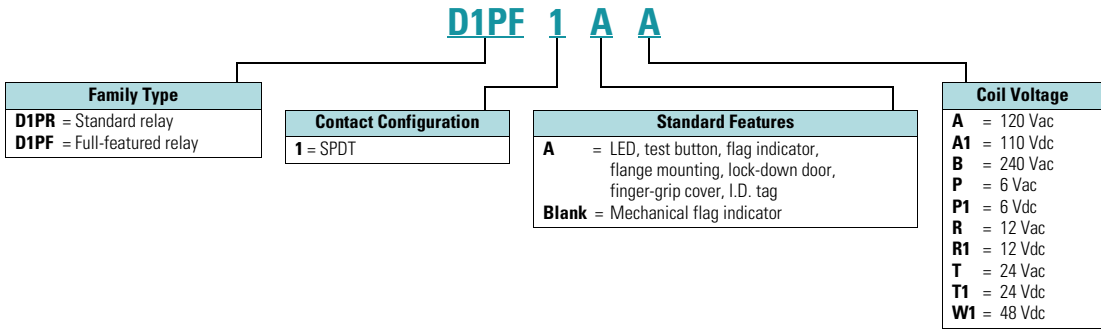
Features

- Compact relay capable of breaking relatively large load currents
- The contact operation can be easily checked by push-to-test button
- Panel and DIN rail mounting
- Flag indicator shows relay status in manual or powered condition
- LED status lamp shows coil “ON” or “OFF” status—ideal for use in low light applications
- Push-to-test button allows for manual operation of relay without the need for coil power
- Lock-down door holds pushbutton and contacts in the operate position when activated
- Finger-grip cover allows operator to remove relays from sockets easily
- ID tag/write label to identify relays in multiple-relay circuits
- Bi-polar LED allows for reverse polarity applications

Catalog Number Selection

General Purpose Plug-In Relays

D1 Series ①



Note

① For deciphering catalog numbers. Do not use for ordering as not all combinations are readily available.

## Product Selection

### General Purpose Plug-In Relays—D1PR/D1PF

Coil Voltage	Contact Configuration	Coil Resistance (Ohms)	Catalog Number
<b>Full Featured</b>			
6 Vac	SPDT	12.2	<b>D1PF1AP</b>
6 Vdc	SPDT	47	<b>D1PF1AP1</b>
12 Vac	SPDT	46	<b>D1PF1AR</b>
12 Vdc	SPDT	188	<b>D1PF1AR1</b>
24 Vac 50/60 Hz	SPDT	180	<b>D1PF1AT</b>
24 Vdc	SPDT	750	<b>D1PF1AT1</b>
48 Vac	SPDT	720	<b>D1PF1AW</b>
48 Vdc	SPDT	2,600	<b>D1PF1AW1</b>
110 Vdc	SPDT	13,800	<b>D1PF1AA1</b>
120 Vac 50/60 Hz	SPDT	4,430	<b>D1PF1AA</b>
240 Vac 50/60 Hz	SPDT	15,720	<b>D1PF1AB</b>

Coil Voltage	Contact Configuration	Coil Resistance (Ohms)	Catalog Number
<b>Plain Cover</b>			
6 Vac	SPDT	12.2	<b>D1PR1P</b>
6 Vac	SPDT	47	<b>D1PR1P1</b>
12 Vac	SPDT	46	<b>D1PR1R</b>
12 Vac	SPDT	188	<b>D1PR1R1</b>
24 Vac	SPDT	750	<b>D1PR1T1</b>
48 Vac	SPDT	720	<b>D1PR1W</b>
48 Vac	SPDT	2,600	<b>D1PR1W1</b>
110 Vdc	SPDT	13,800	<b>D1PR1A1</b>
120 Vac 50/60 Hz	SPDT	4,430	<b>D1PR1A</b>
240 Vac	SPDT	15,270	<b>D1PR1B</b>

## Accessories

### D1PR/D1PF Socket and Accessories

Type	Standard Pack	Catalog Number
Socket	10	<b>D1PAA</b>
Flange mount adapter	25	<b>PFC-D11</b>
Metal spring clip	25	<b>PMC-1781</b>

General Purpose Plug-In Relays—D2 Series



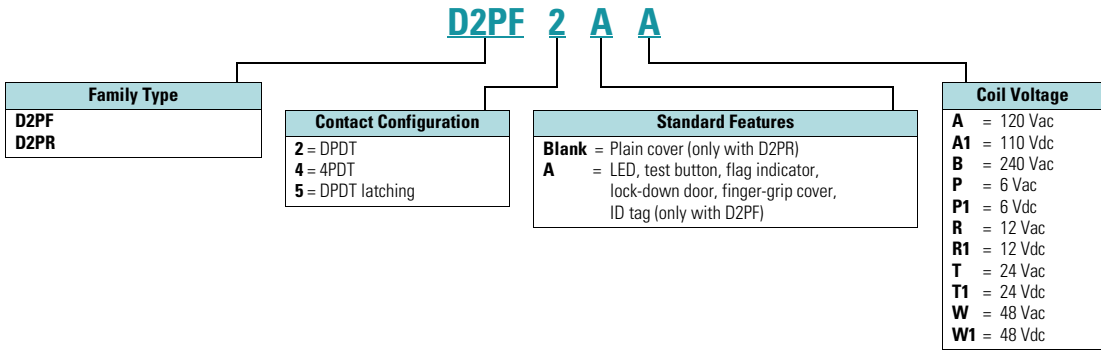
Features

- Ultra-high sensitivity relay with quick response
- Designed small, two-pole type break 5A load and four-pole type, 3A load
- High reliability, long life
- Panel, DIN rail and flange mounting
- Small size

Catalog Number Selection

General Purpose Plug-In Relays

D2 Series ①



Product Selection

D2PF/D2PR Relay/Socket Quick Reference

Relay Type	Socket	Clip
D2PR2	D2PAL	PWC-D24
D2PF2		PQC-1782
	D2PA6	PQC-1342
D2PR4	D2PAP	PWC-D24
D2PF4		PQC-1782
	D2PA7	PWC-D24
		PQC-1782
	D2PA6	PQC-1342
D2PR5	D2PA4	PYC-A1

Note

① For deciphering catalog numbers.  
Do not use for ordering as not all combinations are readily available.

## General Purpose Plug-In Relays—D2PR/D2PF

Coil Voltage	Contact Configuration	Coil Resistance (Ohms)	Catalog Number
<b>Full Featured Style</b>			
6 Vac	DPDT	9.6	<b>D2PF2AP</b>
6 Vdc	DPDT	40	<b>D2PF2AP1</b>
12 Vac	DPDT	46	<b>D2PF2AR</b>
12 Vdc	DPDT	160	<b>D2PF2AR1</b>
24 Vac	DPDT	180	<b>D2PF2AT</b>
24 Vdc	DPDT	650	<b>D2PF2AT1</b>
48 Vdc	DPDT	2,600	<b>D2PF2AW1</b>
110/125 Vdc	DPDT	11,000	<b>D2PF2AA1</b>
120 Vac	DPDT	4,430	<b>D2PF2AA</b>
220/240 Vac	DPDT	15,720	<b>D2PF2AB</b>
12 Vac	4PDT	46	<b>D2PF4AR</b>
12 Vdc	4PDT	160	<b>D2PF4AR1</b>
24 Vac	4PDT	180	<b>D2PF4AT</b>
24 Vdc	4PDT	650	<b>D2PF4AT1</b>
48 Vdc	4PDT	2,600	<b>D2PF4AW1</b>
110/125 Vdc	4PDT	11,000	<b>D2PF4AA1</b>
120 Vac	4PDT	4,430	<b>D2PF4AA</b>
220/240 Vac	4PDT	15,720	<b>D2PF4AB</b>

Coil Voltage	Contact Configuration	Coil Resistance (Ohms)	Catalog Number
<b>Plain Cover Style</b>			
6 Vdc	DPDT	40	<b>D2PR2P1</b>
12 Vdc	DPDT	160	<b>D2PR2R1</b>
24 Vac	DPDT	180	<b>D2PR2T</b>
24 Vdc	DPDT	650	<b>D2PR2T1</b>
48 Vdc	DPDT	2,600	<b>D2PR2W1</b>
110/125 Vdc	DPDT	11,000	<b>D2PR2A1</b>
120 Vac	DPDT	4,430	<b>D2PR2A</b>
220/240 Vac	DPDT	15,720	<b>D2PR2B</b>
6 Vac	4PDT	9.6	<b>D2PR4P</b>
6 Vdc	4PDT	40	<b>D2PR4P1</b>
12 Vac	4PDT	46	<b>D2PR4R</b>
12 Vdc	4PDT	160	<b>D2PR4R1</b>
24 Vac	4PDT	180	<b>D2PR4T</b>
24 Vdc	4PDT	650	<b>D2PR4T1</b>
110/125 Vdc	4PDT	11,000	<b>D2PR4A1</b>
120 Vac	4PDT	4,430	<b>D2PR4A</b>
220/240 Vac	4PDT	15,720	<b>D2PR4B</b>

## Accessories

## D2PF/D2PR Sockets and Accessories

Type	Standard Pack	Catalog Number
Socket	1	<b>D2PAL</b> ①
Socket	10	<b>D2PA6</b>
Socket	1	<b>D2PAP</b> ①
Socket	10	<b>D2PA7</b> ①
Socket	5	<b>D2PA4</b>
Flange mount adapter	25	<b>PFC-D2D72</b>
Plastic ejector clip	10	<b>PWC-D24</b>
Metal spring clip	25	<b>PQC-1782</b>
Metal spring clip	25	<b>PQC-1342</b>
Hold-down spring	100	<b>PYC-A1</b>

**Note**

① Protection category (finger safe), EN 60529 IP20.

General Purpose Plug-In Relays—D3 Series



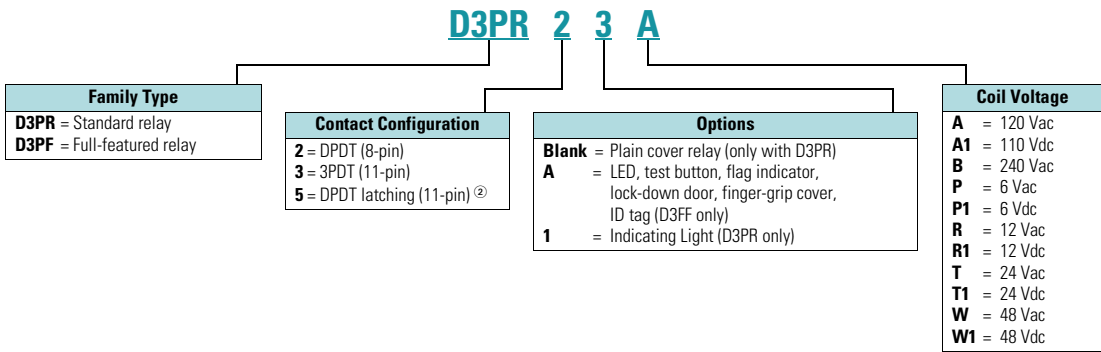
Features

- Compact relay capable of breaking relatively large load currents
- The contact operation can be easily checked by push-to-test button
- Panel and DIN rail mounting
- 8- or 11-pin octal plug-in

Catalog Number Selection

General Purpose Plug-In Relays

D3 Series ①



Product Selection

D3 Relay/Socket Quick Reference

Relay Type	Socket	Clip
D3PR2	D3PA6	PQC-1332
D3PF2	D3PAL8	PQC-1351
	D3PA2	PQC-1351
D3PR3	D3PA7	PQC-1332
D3PF3	D3PAL11	PQC-1351
	D3PA3	PQC-1351
D3PR5	D3PA7	PQC-1351
	D3PAL11	PQC-1351
	D3PA3	PQC-1351

Notes

- ① For deciphering catalog numbers. Do not use for ordering as not all combinations are readily available.
- ② D3PR only.

## General Purpose Plug-In Relays—D3PR/D2PF

Coil Voltage	Contact Configuration	Coil Resistance (Ohms)	Catalog Number
<b>Full Featured Style</b>			
120 Vac	DPDT	1,700	<b>D3PF2AA</b>
240 Vac	DPDT	7,200	<b>D3PF2AB</b>
12 Vdc	DPDT	120	<b>D3PF2AR1</b>
24 Vdc	DPDT	470	<b>D3PF2AT1</b>
48 Vdc	DPDT	1,800	<b>D3PF2AW1</b>
120 Vac	3PDT	1,700	<b>D3PF3AA</b>
220/240 Vac	3PDT	7,200	<b>D3PF3AB</b>
6 Vdc	3PDT	32	<b>D3PF3AP1</b>
24 Vac	3PDT	72	<b>D3PF3AT</b>
24 Vdc	3PDT	470	<b>D3PF3AT1</b>
48 Vdc	3PDT	1,800	<b>D3PF3AW1</b>
<b>Plain Cover Style</b>			
120 Vac	DPDT	1,700	<b>D3PR2A</b>
110/125 Vdc	DPDT	10,000	<b>D3PR2A1</b>
220/240 Vac	DPDT	7,200	<b>D3PR2B</b>
6 Vac	DPDT	4.2	<b>D3PR2P</b>

Coil Voltage	Contact Configuration	Coil Resistance (Ohms)	Catalog Number
<b>Plain Cover Style, continued</b>			
6 Vdc	DPDT	32	<b>D3PR2P1</b>
12 Vac	DPDT	18	<b>D3PR2R</b>
12 Vdc	DPDT	120	<b>D3PR2R1</b>
24 Vac	DPDT	72	<b>D3PR2T</b>
24 Vdc	DPDT	470	<b>D3PR2T1</b>
48 Vac	DPDT	290	<b>D3PR2W</b>
48 Vdc	DPDT	1,800	<b>D3PR2W1</b>
120 Vac	3PDT	1,700	<b>D3PR3A</b>
110/125 Vdc	3PDT	10,000	<b>D3PR3A1</b>
220/240 Vac	3PDT	7,200	<b>D3PR3B</b>
12 Vac	3PDT	18	<b>D3PR3R</b>
12 Vdc	3PDT	120	<b>D3PR3R1</b>
24 Vac	3PDT	72	<b>D3PR3T</b>
24 Vdc	3PDT	470	<b>D3PR3T1</b>
48 Vdc	3PDT	1,800	<b>D3PR3W1</b>

## Accessories

## D2PF/D2PR Sockets and Accessories

Type	Standard Pack	Catalog Number
Socket	1	<b>D3PA6</b> ①
Socket	10	<b>D3PAL8</b> ①
Socket	10	<b>D3PA2</b>
Socket	1	<b>D3PA7</b> ①
Socket	10	<b>D3PAL11</b> ①
Socket	10	<b>D3PA3</b>
Metal spring clip	25	<b>PQC-1332</b>
Metal spring clip	10	<b>PQC-1351</b>

**Note**

① Protection category (finger safe) EN 60529 IP20.

General Purpose Plug-In Relays—D4 Series



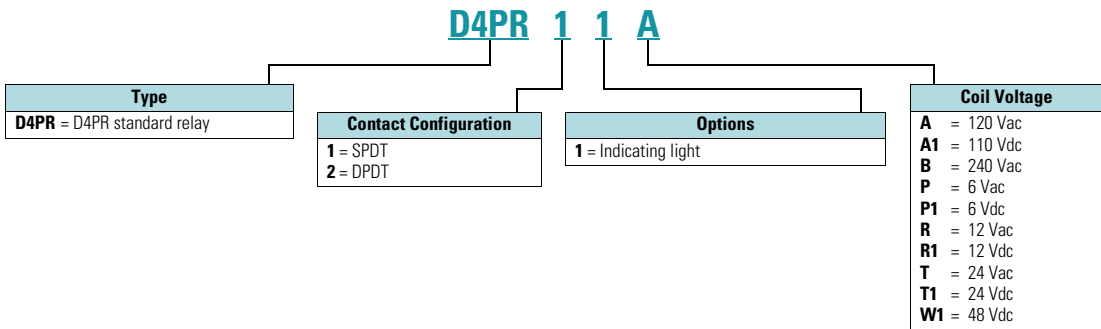
Features

- Slim-styled power relay
- Socket has built-in hold-down clip
- Panel or DIN rail mounting

Catalog Number Selection

General Purpose Plug-In Relays—D4 Series

D4 Series ①



Product Selection

D4 Relay/Socket Quick Reference

Relay Type	Socket	Hold Down Clip
D4PR1	D4PA1	②
D4PR2	D4PA2	②

D4 Series

Coil Voltage ③	Catalog Number	Coil Voltage ③	Catalog Number	Coil Voltage ③	Catalog Number
<b>Standard SPDT</b>		<b>Standard DPDT</b>		<b>DIN Rail Sockets</b>	
24 Vac	<b>D4PR1T</b>	24 Vac	<b>D4PR2T</b>	Single-Pole	<b>D4PA1</b>
120 Vac	<b>D4PR1A</b>	120 Vac	<b>D4PR2A</b>	Two-Pole	<b>D4PA2</b>
24 Vdc	<b>D4PR1T1</b>	12 Vdc	<b>D4PR2R1</b>	<b>Accessories</b>	
<b>SPDT with Indicating Light</b>		24 Vdc	<b>D4PR2T1</b>	DIN rail end stop	<b>PFP-M</b>
24 Vac	<b>D4PR11T</b>	<b>DPDT with Indicating Light</b>			
120 Vac	<b>D4PR11A</b>	120 Vac	<b>D4PR21A</b>		
24 Vdc	<b>D4PR11T1</b>	24 Vdc	<b>D4PR21T1</b>		

Notes

- ① For deciphering catalog numbers. Do not use for ordering as not all combinations are readily available.
- ② Socket has built-in hold down spring.
- ③ Additional coil voltages available—consult sales office or customer support center.

# 3.1

## Logic Devices

### Relays

3

#### General Purpose Plug-In Relays—D5 Series



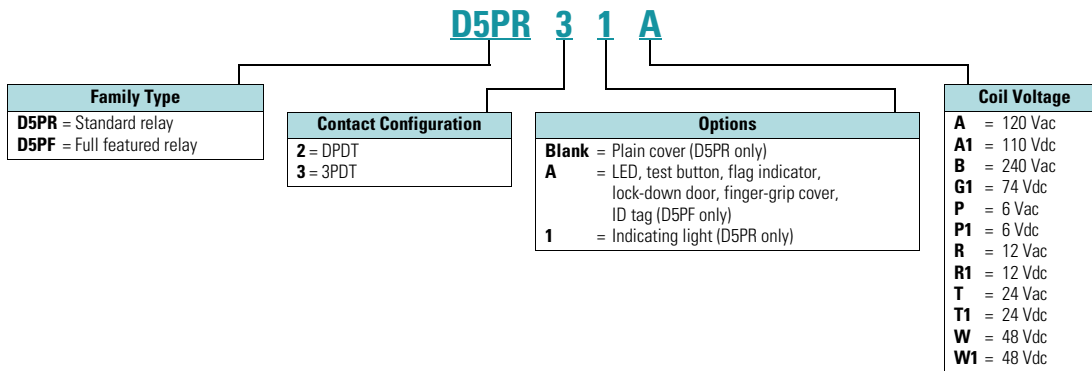
#### Features

- Industrial rated 300V, 15A relay in two-pole and three-pole configurations
- Compact design can be panel or DIN rail mounted

#### Catalog Number Selection

##### General Purpose Plug-In Relays—D5 Series

##### D5 Series ①



#### Product Selection

##### D5 Relay/Socket Quick Reference

Relay Type	Socket	Clip
D5PR2	D5PAL	PQC-1351
D5PF2	D5PA2	PQC-1351
D5PR3	D5PA3L	PQC-1351
D5PF3	D5PA3S	PQC-1351

##### Note

- ① For deciphering catalog numbers.  
Do not use for ordering as not all combinations are readily available.



## General Purpose Plug-In Relays—D5

Coil Voltage	Contact Configuration	Coil Resistance (Ohms)	Catalog Number
<b>Full Featured</b>			
120 Vac	DPDT	1,700	<b>D5PF2AA</b>
110/125 Vdc	DPDT	10,000	<b>D5PF2AA1</b>
220/240 Vac	DPDT	7,200	<b>D5PF2AB</b>
12 Vdc	DPDT	120	<b>D5PF2AR1</b>
24 Vac	DPDT	72	<b>D5PF2AT</b>
24 Vdc	DPDT	470	<b>D5PF2AT1</b>
48 Vdc	DPDT	1,800	<b>D5PF2AW1</b>
120 Vac	3PDT	1,700	<b>D5PF3AA</b>
110/125 Vdc	3PDT	10,000	<b>D5PF3AA1</b>
220/240 Vac	3PDT	7,200	<b>D5PF3AB</b>
12 Vdc	3PDT	120	<b>D5PF3AR1</b>
24 Vac	3PDT	72	<b>D5PF3AT</b>
<b>Plain Cover</b>			
120 Vac	DPDT	1,700	<b>D5PR2A</b>
110/125 Vdc	DPDT	10,000	<b>D5PR2A1</b>
220/240 Vac	DPDT	7,200	<b>D5PR2B</b>
74 Vdc	DPDT	4,800	<b>D5PR2G1</b>
6 Vac	DPDT	4.2	<b>D5PR2P</b>

Coil Voltage	Contact Configuration	Coil Resistance (Ohms)	Catalog Number
<b>Plain Cover, continued</b>			
6 Vdc	DPDT	32	<b>D5PR2P1</b>
12 Vac	DPDT	18	<b>D5PR2R</b>
12 Vdc	DPDT	120	<b>D5PR2R1</b>
24 Vac	DPDT	72	<b>D5PR2T</b>
24 Vdc	DPDT	470	<b>D5PR2T1</b>
48 Vac	DPDT	290	<b>D5PR2W</b>
48 Vdc	DPDT	1,800	<b>D5PR2W1</b>
120 Vac	3PDT	1,700	<b>D5PR3A</b>
110/125 Vdc	3PDT	10,000	<b>D5PR3A1</b>
220/240 Vac	3PDT	7200	<b>D5PR3B</b>
74 Vdc	3PDT	4,800	<b>D5PR3G1</b>
6 Vac	3PDT	4.2	<b>D5PR3P</b>
6 Vdc	3PDT	32	<b>D5PR3P1</b>
12 Vac	3PDT	18	<b>D5PR3R</b>
12 Vdc	3PDT	120	<b>D5PR3R1</b>
24 Vac	3PDT	72	<b>D5PR3T</b>
24 Vdc	3PDT	470	<b>D5PR3T1</b>
48 Vdc	3PDT	1,800	<b>D5PR3W</b>

## Accessories

## D5 Sockets and Accessories

Description	Standard Pack	Catalog Number
Socket	10	<b>D5PAL</b> ①
Socket	10	<b>D5PA2</b>
Socket	10	<b>D5PA3L</b>
Socket	10	<b>D5PA3S</b>
Metal spring clip	10	<b>PQC-1351</b>

**Note**

① Protection category (finger safe), EN 60529 IP20.

# 3.1

## Logic Devices

### Relays

3

#### General Purpose Plug-In Relays—D7 Series



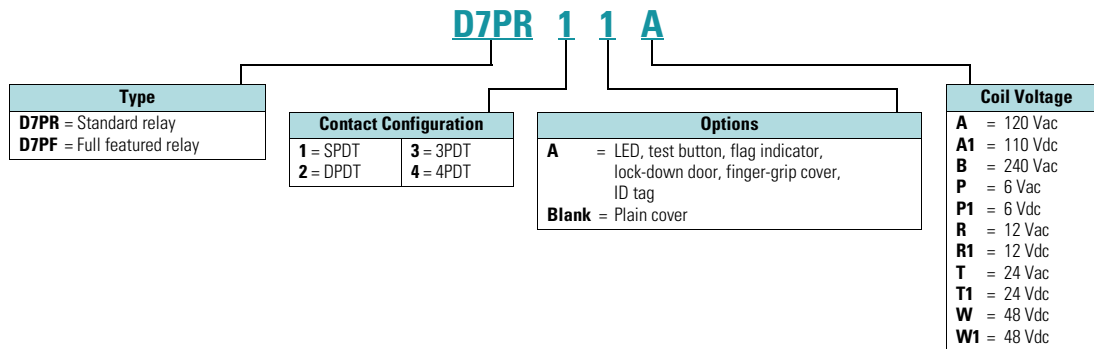
#### Features

- Arc barrier equipped relay with high dielectric strength
- Panel, DIN rail and flange mounting

### Catalog Number Selection

#### General Purpose Plug-In Relays—D7 Series

##### D7 Series ①



### Product Selection

#### D7 Relay/Socket Quick Reference

Relay Type	Socket/Adapter	Clip
D7PR1	D7PAA	PQC-1342
D7PR2		PQC-1349
D7PF1	D7PA9	PQC-1342
D7PF2	PFC-D2D72	—
D7PR3	D7PAB	PQC-1783 PMC-1783
D7PF3	PFC-D73	—
D7PR4	D7PAD	PQC-1784 PMC-1784
D7PF4	PFC-D74	—

#### Note

- ① For deciphering catalog numbers.  
Do not use for ordering as not all combinations are readily available.

**General Purpose Plug-In Relays—D7**

Coil Voltage	Contact Configuration	Coil Resistance (Ohms)	Catalog Number
<b>Full Featured</b>			
120 Vac	SPDT	4,430	<b>D7PF1AA</b>
6 Vac	SPDT	9.6	<b>D7PF1AP</b>
6 Vdc	SPDT	40	<b>D7PF1AP1</b>
12 Vac	SPDT	46	<b>D7PF1AR</b>
24 Vdc	SPDT	650	<b>D7PF1AT1</b>
48 Vac	SPDT	788	<b>D7PF1AW</b>
48 Vdc	SPDT	2,600	<b>D7PF1AW1</b>
120 Vac	DPDT	4,430	<b>D7PF2AA</b>
110/125 Vdc	DPDT	11,000	<b>D7PF2AA1</b>
220/240 Vac	DPDT	15,720	<b>D7PF2AB</b>
6 Vac	DPDT	9.6	<b>D7PF2AP</b>
6 Vdc	DPDT	40	<b>D7PF2AP1</b>
12 Vac	DPDT	46	<b>D7PF2AR</b>
12 Vdc	DPDT	160	<b>D7PF2AR1</b>
24 Vac	DPDT	180	<b>D7PF2AT</b>
24 Vdc	DPDT	650	<b>D7PF2AT1</b>
48 Vac	DPDT	788	<b>D7PF2AW</b>
48 Vdc	DPDT	2,600	<b>D7PF2AW1</b>
120 Vac	3PDT	2,770	<b>D7PF3AA</b>
6 Vac	3PDT	6	<b>D7PF3AP</b>
6 Vdc	3PDT	25	<b>D7PF3AP1</b>
12 Vac	3PDT	25.3	<b>D7PF3AR</b>
24 Vac	3PDT	103	<b>D7PF3AT</b>
24 Vdc	3PDT	400	<b>D7PF3AT1</b>
48 Vac	3PDT	412	<b>D7PF3AW</b>
48 Vdc	3PDT	1,600	<b>D7PF3AW1</b>
120 Vac	4PDT	2,220	<b>D7PF4AA</b>
110/125 Vdc	4PDT	7,340	<b>D7PF4AA1</b>
240 Vac	4PDT	9,120	<b>D7PF4AB</b>
6 Vac	4PDT	5.4	<b>D7PF4AP</b>
6 Vdc	4PDT	24	<b>D7PF4AP1</b>
12 Vac	4PDT	21.2	<b>D7PF4AR</b>
12 Vdc	4PDT	96	<b>D7PF4AR1</b>
24 Vac	4PDT	84.5	<b>D7PF4AT</b>
24 Vdc	4PDT	388	<b>D7PF4AT1</b>
48 Vdc	4PDT	1,550	<b>D7PF4AW</b>
48 Vac	4PDT	410	<b>D7PF4AW1</b>

Coil Voltage	Contact Configuration	Coil Resistance (Ohms)	Catalog Number
<b>Plain Cover</b>			
120 Vac	SPDT	4,430	<b>D7PR1A</b>
110/125 Vdc	SPDT	11,000	<b>D7PR1A1</b>
220/240 Vac	SPDT	15,720	<b>D7PR1B</b>
6 Vac	SPDT	9.6	<b>D7PR1P</b>
12 dc	SPDT	160	<b>D7PR1R1</b>
24 Vac	SPDT	180	<b>D7PR1T</b>
24 Vdc	SPDT	650	<b>D7PR1T1</b>
48 Vdc	SPDT	2600	<b>D7PR1W1</b>
120 Vac	DPDT	4,430	<b>D7PR2A</b>
110/125 Vdc	DPDT	11,000	<b>D7PR2A1</b>
220/240 Vac	DPDT	15,720	<b>D7PR2B</b>
6 Vac	DPDT	9.6	<b>D7PR2P</b>
6 Vdc	DPDT	40	<b>D7PR2P1</b>
12 Vac	DPDT	46	<b>D7PR2R</b>
12 Vdc	DPDT	160	<b>D7PR2R1</b>
24 Vac	DPDT	180	<b>D7PR2T</b>
24 Vdc	DPDT	650	<b>D7PR2T1</b>
120 Vac	3PDT	2,770	<b>D7PR3A</b>
240 Vac	3PDT	12,100	<b>D7PR3B</b>
6 Vac	3PDT	6	<b>D7PR3P</b>
12 Vac	3PDT	25.3	<b>D7PR3R</b>
12 Vdc	3PDT	100	<b>D7PR3R1</b>
24 Vac	3PDT	103	<b>D7PR3T</b>
24 Vdc	3PDT	400	<b>D7PR3T1</b>
48 Vdc	3PDT	1,600	<b>D7PR3W1</b>
120 Vac	4PDT	2,220	<b>D7PR4A</b>
110/125 Vdc	4PDT	7,340	<b>D7PR4A1</b>
240 Vac	4PDT	9,120	<b>D7PR4B</b>
6 Vac	4PDT	5.4	<b>D7PR4P</b>
24 Vac	4PDT	84.5	<b>D7PR4T</b>
24 Vdc	4PDT	388	<b>D7PR4T1</b>
48 Vdc	4PDT	1,550	<b>D7PR4W1</b>

**Accessories**

**D7 Sockets and Accessories**

Type	Standard Pack	Catalog Number
Socket	—	D7PAA ①
Socket	1	D7PA9
Socket	—	D7PAD ①
Socket	—	D7PAB ①
Flange mount adapter	25	PFC-D2D72
Flange mount adapter	25	PFC-D73
Flange mount adapter	25	PFC-D74

**Note**

① Protection category (finger safe) EN 60529 IP20.

Type	Standard Pack	Catalog Number
Metal spring clip	25	PQC-1342
Plastic ID clip	10	PQC-1349
Metal spring clip	25	PQC-1784
Plastic ID clip	10	PMC-1784
Hold-down spring	25	PYC-B2
Metal spring clip	10	PQC-1783
Plastic ID clip	10	PMC-1783

# 3.1

## Logic Devices

### Relays

3

#### General Purpose Plug-In Relays—D8 Series



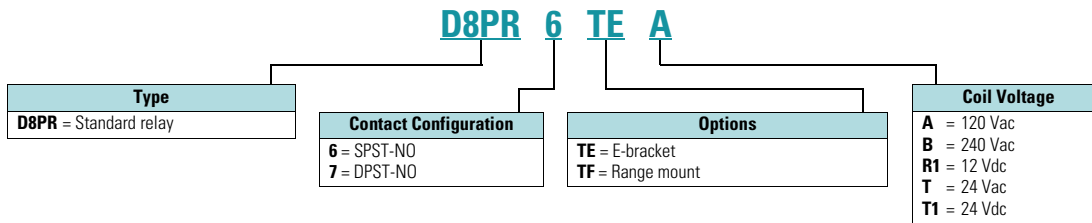
#### Features

- Allows switching of 25A and 30A loads
- A high-capacity, high-withstand voltage relay compatible with momentary voltage drops
- No contact chattering for momentary voltage drops up to 50% of rated voltage

#### Catalog Number Selection

##### General Purpose Plug-In Relays—D8 Series

##### D8 Series ①



#### Product Selection

##### D8 Relay/Socket Quick Reference

Relay Type	Mounting Bracket	Adapter Track/ Panel Mount	Front Connecting Sockets Track/ Panel Mount
D8PR6TE	D8PA5	D8PA1	D8PA2
D8PR7TE	D8PA5	D8PA1	D8PA2

#### Note

- ① For deciphering catalog numbers.  
Do not use for ordering as not all combinations are readily available.

**D8 Series**

Coil Voltage	Catalog Number
<b>SPST E-Bracket</b>	
24 Vac	D8PR6TET
24 Vdc	D8PR6TET1
<b>SPST Flange Mount</b>	
120 Vac	D8PR6TFA
24 Vdc	D8PR6TFT1
<b>DPST E-Bracket</b>	
120 Vac	D8PR7TEA
<b>DPST Flange Mount</b>	
120 Vac	D8PR7TFA
24 Vdc	D8PR7TFT1

**Accessories****D8 Series Sockets and Accessories**

Description	Standard Pack	Catalog Number
<b>Sockets</b>		
DIN rail adapter	10	D8PA1
Screw terminal adapter	10	D8PA2
Bracket adapter	10	D8PA5
<b>Accessory</b>		
DIN rail end stop	100	PFP-M

#### General Purpose Plug-In Relays—D9 Series



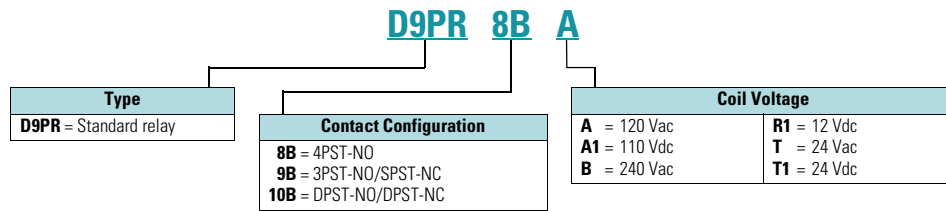
#### Features

- Ideal for three-phase motor control applications
- No contact chattering for momentary voltage drops up to 50% of rated voltage
- Push-to-test button is a standard feature to check contact operation

### Catalog Number Selection

#### General Purpose Plug-In Relays—D9 Series

##### D9 Series ①



### Product Selection

#### D9 Series

Coil Voltage	Catalog Number
<b>4PST-NO Power Relay</b>	
24 Vac	D9PR8BT
120 Vac	D9PR8BA
240 Vac	D9PR8BB
24 Vdc	D9PR8BT1
<b>3PST-NO/SPST-NC Power Relay</b>	
120 Vac	D9PR9BA
<b>DPST-NO/DPST-NC Power Relay</b>	
24 Vac	D9PR10BT
120 Vac	D9PR10BA
24 Vdc	D9PR10BT1

#### Note

- ① For deciphering catalog numbers.  
Do not use for ordering as not all combinations are readily available.

General Purpose Type AA Relays



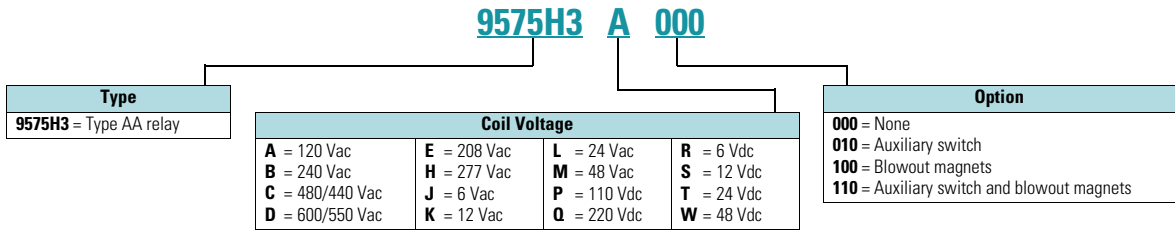
Features

- Type AA panel mounted relays are rated (each pole) 40A up to 300 Vac, 50/60 Hz; 5A at 480/600 Vac, 50/60 Hz and 40A at 28 Vdc
- 9575H Series 3000 relays are ideal for applications when controlling smaller loads such as single-phase motors

Catalog Number Selection

General Purpose Type AA Relays

Type AA



Product Selection

Type AA Relays

Relay Style	Catalog Number <sup>①</sup>
Relay (DPDT)	9575H3_000
Relay with auxiliary switch	9575H3_010
Relay with blowout magnets	9575H3_100
Relay with auxiliary switch and blowout magnets	9575H3_110

Coil Voltage Selection Table

Coil Voltage	Hz	Suffix Code
<b>Volts AC</b>		
120	50/60	<b>A</b>
240	50/60	<b>B</b>
480/440	60/50	<b>C</b>
600/550	60/50	<b>D</b>
208	50/60	<b>E</b>
277	50/60	<b>H</b>
6	50/60	<b>J</b>
12	50/60	<b>K</b>
24	50/60	<b>L</b>
48	50/60	<b>M</b>

Coil Voltage	Hz	Suffix Code
<b>Volts DC</b>		
110	—	<b>P</b>
220	—	<b>Q</b>
6	—	<b>R</b>
12	—	<b>S</b>
24	—	<b>T</b>
48	—	<b>W</b>

Note

① Underscore ( \_ ) indicates missing coil voltage suffix code. See table above.

#### XTRE Control Relays



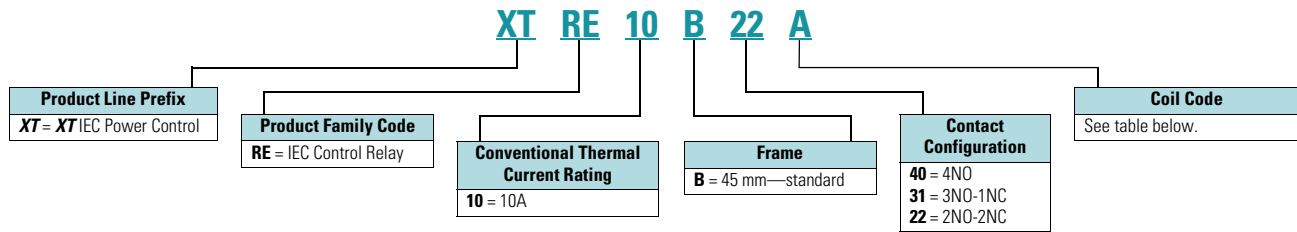
#### Features

- 16A conventional thermal current (open at 60°C  $I_{th}$ )
- Four-pole configurations
  - 4NO
  - 3NO-1NC
  - 2NO-2NC
- Expandable to eight-pole with add-on front-mount auxiliary contacts
- Built-in surge suppression on DC coils

#### Catalog Number Selection

##### XTRE Control Relays

##### XTRE Relays



#### Product Selection

##### XTRE Control Relays

Conventional Thermal Current $I_{th}$ (A), Open at 60°C	Contact Configuration	Rated Operational Current AC-15 $I_o$ (A)			Circuit Symbol	Catalog Number—Screw Terminals ①
		220–240V	380–414V	500V		
16	4NO	6	4	1.5		XTRE10B40_
16	3NO-1NC	6	4	1.5		XTRE10B31_
16	2NO-2NC	6	4	1.5		XTRE10B22_ ②

##### Coil Voltage Suffix





Coil Voltage	Suffix Code	Coil Voltage	Suffix Code	Coil Voltage	Suffix Code
110V 50 Hz, 120V 60 Hz	A	24 Vdc	TD	550V 50 Hz, 600V 60 Hz	D
220V 50 Hz, 240V 60 Hz	B	415V 50 Hz, 480V 60 Hz	C	208V 60 Hz	E
24V 50/60 Hz	T				

##### Notes

- ① Underscore (\_) indicates magnet coil suffix required. See table above.
- ② DC operated control relays XTRE(C)10B22\_ can only be combined with two-pole auxiliary contacts.



Front Mount Auxiliary Contacts for Use with XTRE Control Relays ①

Conventional Thermal Current I <sub>th</sub> (A), Open at 60°C	Poles	Rated Operational Current AC-15 I <sub>e</sub> (A)			Contact Configuration	Circuit Symbol	Package Quantity	Catalog Number—Screw Terminals
		220V 230V 240V	380V 400V 415V	500V				
16	2	6	3	1.5	2NO		5	XTCEXFAC20v
16	2	6	3	1.5	1NC-1NC		5	XTCEXFAC11
16	4	6	3	1.5	4NO		5	XTCEXFAC40
16	4	6	3	1.5	2NO-2NC		5	XTCEXFAC22

Note

① Interlocked opposing contacts, to IEC/EN 60947-5-1 Annex L (positively driven), within the auxiliary contact modules (not NOE and NCL contacts) and between the auxiliary contacts and built-in contacts of the XTRE control relays.

# 3.1

## Logic Devices

### Relays

3

#### Solid-State Relays—D93 Series



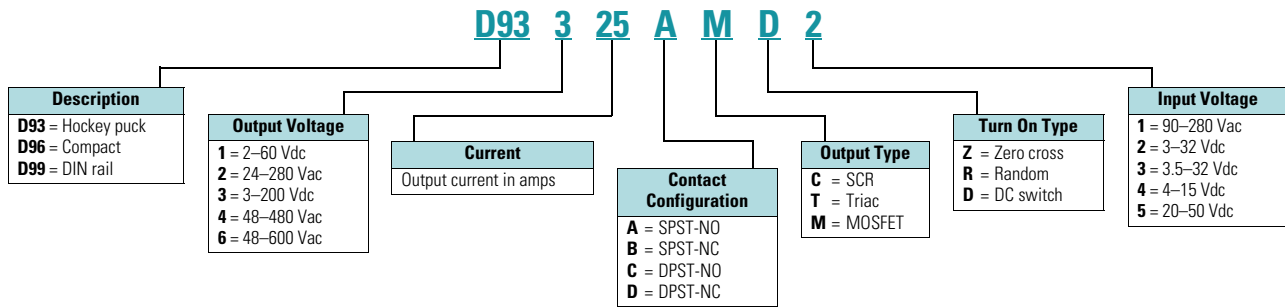
#### Features

- All solid-state circuitry with no moving parts to wear
- Compact, panel mounting for flexible installation
- Isolated input and output terminals to protect the system from electrical noise
- Internal snubber circuitry to protect the SSR from transients
- UL®/cUL® listed—UL 508
- CSA® certified
- CE marked
- RoHS compliant

#### Catalog Number Selection

#### Solid-State Relays—D93 Series

#### D93 Series



#### Product Selection

#### D93 Series

Input Voltage	Output Voltage	Contact Configuration	Switching Type	Rated Current Load (A)	Catalog Number
90–280 Vac	24–280 Vac	SPST-NO	Zero cross	10	D93210ACZ1
3–32 Vdc	24–280 Vac	SPST-NO	Zero cross	10	D93210ACZ2
3–32 Vdc	24–280 Vac	SPST-NO	Triac	10	D93210ATZ2
90–280 Vac	24–280 Vac	SPST-NO	Zero cross	25	D93225ACZ1
3–32 Vdc	24–280 Vac	SPST-NO	Zero cross	25	D93225ACZ2
3–32 Vdc	24–280 Vac	SPST-NO	Triac	25	D93225ATZ2
90–280 Vac	24–280 Vac	SPST-NO	Zero cross	40	D93240ACZ1
3–32 Vdc	24–280 Vac	SPST-NO	Zero cross	40	D93240ACZ2
3–32 Vdc	24–280 Vac	SPST-NO	Triac	40	D93240ATZ2
90–280 Vac	24–280 Vac	SPST-NO	Zero cross	50	D93250ACZ1
3–32 Vdc	24–280 Vac	SPST-NO	Zero cross	50	D93250ACZ2
90–280 Vac	24–280 Vac	SPST-NO	Zero cross	75	D93275ACZ1
3–32 Vdc	24–280 Vac	SPST-NO	Zero cross	75	D93275ACZ2
3–32 Vdc	3–200 Vdc	SPST-NO	MOSFET	12	D93312AMD2
3–32 Vdc	3–200 Vdc	SPST-NO	MOSFET	25	D93325AMD2
3–32 Vdc	3–200 Vdc	SPST-NO	MOSFET	40	D93340AMD2

#### Accessory

#### Heat Sink Accessory

Description	Catalog Number
Heat sink	D93HS1

Solid-State Relays—D96 Series



Features

- All solid-state circuitry has no moving parts to wear
- Integral heat sink eliminates the need for added accessories and installation
- Flexible mounting allows DIN rail or panel mounting without additional hardware or tools
- Isolated input and output terminals protect the system from electrical noise
- Internal snubber circuitry protects the SSR from transients
- UL/cUL listed—UL 508
- CSA certified
- CE marked
- RoHS compliant

Product Selection

Solid-State Relays—D96 Series

D96 Series

Input Voltage	Output Voltage	Contact Configuration	Switching Type	Rated Current Load (A)	Catalog Number
3.5–32 Vdc	3–50 Vdc	SPST-NO	DC switch	15	D96115ACZ3
3.5–32 Vdc	3–150 Vac	SPST-NO	DC switch	8	D96208ACZ3
90–280 Vac	24–280 Vac	SPST-NO	Random	10	D96210ACR1
3–32 Vdc	24–280 Vac	SPST-NO	Random	10	D96210ACR2
90–280 Vac	24–280 Vac	SPST-NO	Zero cross	10	D96210ACZ1
3–32 Vdc	24–280 Vac	SPST-NO	Zero cross	10	D96210ACZ2
3–32 Vdc	24–280 Vac	SPST-NC	Random	10	D96210BCR2
90–280 Vac	48–480 Vac	SPST-NO	Random	10	D96410ACR1
3–32 Vdc	48–480 Vac	SPST-NO	Random	10	D96410ACR2
90–280 Vac	48–480 Vac	SPST-NO	Zero cross	10	D96410ACZ1
3–32 Vdc	48–480 Vac	SPST-NO	Zero cross	10	D96410ACZ2
90–280 Vac	48–600 Vac	SPST-NO	Random	10	D96610ACR1
90–280 Vac	48–600 Vac	SPST-NO	Zero cross	10	D96610ACZ1
3–32 Vdc	48–600 Vac	SPST-NO	Zero cross	10	D96610ACZ2

## Solid-State Relays—D99 Series



## Features

- All solid-state circuitry has no moving parts to wear
- Integral heat sink eliminates the need for added accessories and installation
- Flexible mounting allows DIN rail or panel mounting without additional hardware or tools
- Isolated input and output terminals protect the system from electrical noise
- Internal snubber circuitry protects the SSR from transients
- UL/cUL listed—UL 508
- CSA certified
- CE marked
- RoHS compliant

## Product Selection

## Solid-State Relays—D99 Series

## D99 Series

Input Voltage	Output Voltage	Contact Configuration	Switching Type	Rated Current Load (A)	Catalog Number
90–280 Vac	24–280 Vac	SPST-NO	Zero cross	10	<b>D99210ACZ1</b>
3–32 Vdc	24–280 Vac	SPST-NO	Zero cross	10	<b>D99210ACZ2</b>
90–280 Vac	24–280 Vac	SPST-NO	Zero cross	25	<b>D99225ACZ1</b>
3–32 Vdc	24–280 Vac	SPST-NO	Zero cross	25	<b>D99225ACZ2</b>
90–280 Vac	24–280 Vac	SPST-NO	Zero cross	40	<b>D99240ACZ1</b>
3–32 Vdc	24–280 Vac	SPST-NO	Zero cross	40	<b>D99240ACZ2</b>
90–280 Vac	48–600 Vac	SPST-NO	Zero cross	10	<b>D99610ACZ1</b>
3–32 Vdc	48–600 Vac	SPST-NO	Zero cross	10	<b>D99610ACZ2</b>
90–280 Vac	48–600 Vac	SPST-NO	Zero cross	25	<b>D99625ACZ1</b>
3–32 Vdc	48–600 Vac	SPST-NO	Zero cross	25	<b>D99625ACZ2</b>
90–280 Vac	48–600 Vac	SPST-NO	Zero cross	40	<b>D99640ACZ1</b>
3–32 Vdc	48–600 Vac	SPST-NO	Zero cross	40	<b>D99640ACZ2</b>

Universal TR Series Timing Relays



Features

- Multiple user-selectable timing functions and timing ranges in a single unit reduce product variations and stock keeping units (SKUs)
- Universal input voltages from 12 or 24–240 Vac/Vdc eliminate the need to order and stock separate coil voltages
- Compact, DIN rail mountable case reduces panel size
- Advanced LED indication makes troubleshooting easy
- Staggered terminal locations allow access to lower-level terminals after wiring
- SPDT or DPDT contacts with 8A ratings
- cULus listed
- CE marked
- RoHS compliant
- IEC/EN 61812

Product Selection

Universal TR Series Timing Relays

Universal TR Series

Supply Voltage	Description	Catalog Number
<b>4-Function</b>		
24–240 Vac/Vdc	Compact DIN rail mount, SPDT	<b>TRL04</b>
<b>7-Function</b>		
24–240 Vac/Vdc	Compact DIN rail mount, SPDT	<b>TRL07</b>
12–240 Vac/Vdc	Compact DIN rail mount, DPDT	<b>TRL27</b>
	Asymmetrical pulse generator, DPDT	<b>TRW27</b>

#### TMR5 Series Timing Relays



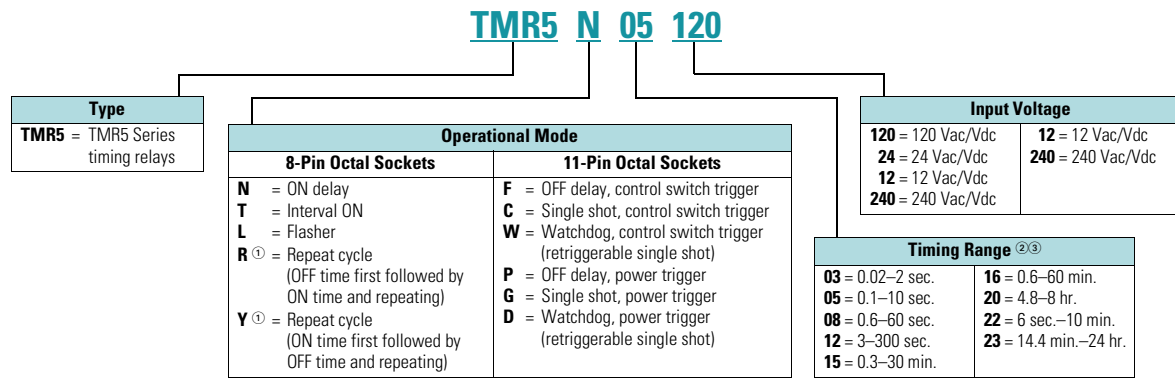
#### Features

- Single timing range for each unit
- Ranges available from 0.02 sec. to 24 hours
- Wide variety of functions available
- 10A DPDT output contacts

#### Catalog Number Selection

##### TMR5 Series Timing Relays

##### TMR5 Series



#### Product Selection

##### TMR5 Time Delay Relays

Input Voltage	Socket	Timing Range	Catalog Number
<b>ON Delay</b>			
120 Vac/Vdc	8-pin	0.1–10 sec.	TMR5N05120
120 Vac/Vdc		0.6–60 sec.	TMR5N08120
24 Vac/Vdc		0.1–10 sec.	TMR5N0524
24 Vac/Vdc		0.6–60 sec.	TMR5N0824
<b>OFF Delay, Control Switch Trigger</b>			
120 Vac/Vdc	11-pin	0.1–10 sec.	TMR5F05120
120 Vac/Vdc		0.6–60 sec.	TMR5F08120
24 Vac/Vdc		0.1–10 sec.	TMR5F0524
24 Vac/Vdc		0.6–60 sec.	TMR5F0824
<b>Interval ON</b>			
120 Vac/Vdc	8-pin	0.1–10 sec.	TMR5T05120
120 Vac/Vdc		0.6–60 sec.	TMR5T08120
24 Vac/Vdc		0.1–10 sec.	TMR5T0524
24 Vac/Vdc		0.6–60 sec.	TMR5T0824

Input Voltage	Socket	Timing Range	Catalog Number
<b>Single Shot, Control Switch Trigger</b>			
120 Vac/Vdc	11-pin	0.1–10 sec.	TMR5C05120
120 Vac/Vdc		0.6–60 sec.	TMR5C08120
24 Vac/Vdc		0.1–10 sec.	TMR5C0524
24 Vac/Vdc		0.6–60 sec.	TMR5C0824
<b>Repeat Cycle (OFF Time First Followed by ON Time and Repeating)</b>			
120 Vac/Vdc	8-pin	0.1–10 sec.	TMR5R05120
120 Vac/Vdc		0.6–60 sec.	TMR5R08120
24 Vac/Vdc		0.1–10 sec.	TMR5R0524
24 Vac/Vdc		0.6–60 sec.	TMR5R0824
<b>Repeat Cycle (ON Time First Followed by OFF Time and Repeating)</b>			
120 Vac/Vdc	8-pin	0.1–10 sec.	TMR5Y05120
120 Vac/Vdc		0.6–60 sec.	TMR5Y08120
24 Vac/Vdc		0.1–10 sec.	TMR5Y0524
24 Vac/Vdc		0.6–60 sec.	TMR5Y0824

#### Notes

- ① Indicates DUAL knob unit. All dual knob units can have independently selectable and adjustable ON and OFF times. If different ON and OFF times are desired, add two codes for time ranges in the part number. The first code listed indicates the first timing range of the unit (OFF time for R, ON time for Y) and the second code indicates the second timing range (ON time for R, OFF Time for Y).
- ② Any time range can be created as a custom unit. Contact Eaton for details.
- ③ Fixed time delay settings are available for orders of 50 pieces or more.

TMR6 Series Timing Relays



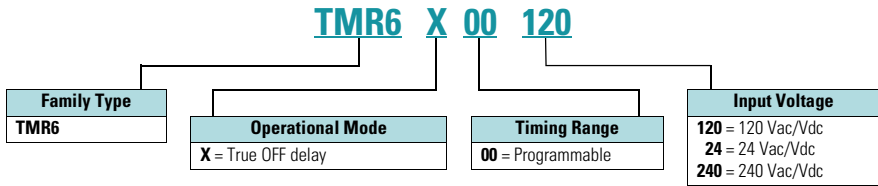
Features

- Provides OFF delay function without requiring input voltage during OFF time delay
- Duplicates operation of pneumatic OFF delay timers
- Each unit has eight timing ranges built in, covering 0.05 seconds to 30 minutes
- Selecting a range is easy using a rotary switch (no math is required or DIP switches to set)
- Uses industry-standard
- 8-pin octal socket
- 10A DPDT output contacts
- cRUus
- UL listed (with Eaton socket)
- RoHS compliant
- CE marked

Catalog Number Selection

TMR6 Series Timing Relays

TMR6 Series



Product Selection

TMR6 True OFF Delay Relays

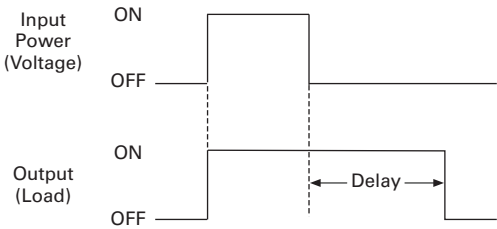
Input Voltage	Timing Range	Catalog Number
120 Vac/Vdc	0.05 sec.–30 min. (user selectable, eight ranges)	TMR6X00120
24 Vac/Vdc		TMR6X0024
240 Vac/Vdc		TMR6X00240

Accessories

Accessories for Use with TMR6 Time Delay Relays

Description	Standard Pack	Catalog Number
8-pin socket	10	D3PA2
Hold-down spring	10	D65CHDS

True OFF Delay



## TMRP Series Timing Relays



3

## Features

- Multiple user-selectable timing functions and timing ranges in a single unit reduce product variations and stock keeping units (SKUs)
- Universal input voltages from 12–240 Vac/Vdc eliminate the need to order and stock separate coil voltages
- Timing ranges up to 9990 hours
- Dual LED indication makes troubleshooting easy
- Flexible design for back-panel, through-panel (45 mm x 45 mm cutout), or DIN rail mounting
- SPDT or DPDT contacts with 12A ratings
- Plastic dust cover keeps out contaminants and eliminates accidental set point changes
- Use with standard Eaton D3 sockets
- UL recognized
- CE marked
- RoHS compliant

## Product Selection

## TMRP Series Timing Relays

## TMRP Timing Relays

Supply Voltage	Description	Catalog Number
<b>10-Function</b>		
12–240 Vac/Vdc	Control switch trigger, DPDT	<b>TMRP5100</b>
	Control switch trigger, SPDT	<b>TMRP5101</b>
	Power trigger, DPDT	<b>TMRP5102</b>



## Product Overview

### Programmable Controllers Selection Guide



Description	Fusion Integrated Machine Controllers Page V9-T3-36	easy Programmable Relays Page V9-T3-37	MFD-Titan Multi-Functional Displays Page V9-T3-40	ELC Series PLCs Page V9-T3-46
<b>User Interface</b>				
LCD display (text/graphics)	3-, 4- or 5-line text (embedded)	4-line text (embedded)	4-line text and graphics (embedded)	Text and graphics thru HMI/ or ELC-GP (external)
Seven-segment display	—	—	4 characters (simulated)	PA only = 2 digital
Keypad for programming	Yes	Optional	Optional	—
Hand-held programmer	—	—	—	Available for all
Potentiometers	Simulated using display	Simulated using optional display	Simulated using optional display	PC/PH = two embedded
<b>I/O Digital</b>				
Embedded digital input types	3.5–30 Vdc	12 Vdc/24 Vdc 24 Vac or 110/240 Vac	24 Vac or 110/240 Vac (using MFD I/O)	24 Vdc or 110/240 Vac
Embedded digital output types	24 Vdc transistor or high current relay (5A resistive)	24 Vdc transistor or high current relay (8A resistive)	24 Vdc transistor or high current relay (8A resistive) (using MFD I/O)	24 Vdc transistor or relay
Embedded digital inputs/outputs per unit	10 control inputs 3 counter inputs/ 2 transistors 5 relays	easy500 = 8/4 easy700/800 = 12 (6 or 8)	12/4 (using MFD I/O)	PA = 4/2 PB = 8/6 PC/PH = 8/4 PV = 16/12
Expansion digital input types	—	24 Vdc or 110/240 Vac	24 Vdc or 110/240 Vac	24 Vdc or 110/240 Vac
Expansion digital output types	—	24 Vdc transistor or high current relay (8A resistive)	24 Vdc transistor or high current relay (8A resistive)	24 Vdc transistor, relay or high current relay (6A resistive)
Max. digital I/O includes embedded and expansion	20	easy500 = 12 easy700/800 = 40 easy800 (link up to 8 expanded units using easyNet) = 320	(link up to 8 expanded units with easyNet) = 320	PA/PB/PC/PH = 112 in/112 out and embedded PV = 240 in/240 out embedded
<b>I/O Analog</b>				
Embedded analog input quantity and types	2 at 4–20 mA 2 at 0–10 Vdc	Optional on 24 Vac or DC input units easy500 = 2 easy700 = 4 easy819/821 = N/A easy820/822 = 1 All 0 to +10 Vdc	Optional on 24 Vac or Vdc input units = 4 All 0 to +10 Vdc	PA = 2 at either –10 to +10 Vdc or –20 to +20 mA
Embedded analog input resolution	6.5 bit	10 bit	10 bit	12 bit
Embedded analog outputs quantity and types	1 at 4–20 mA 1 at 0–10 Vdc	Optional easy820/822 = 1 All 0 to +10 Vdc	Available using MFD-RA17 or MFD-TA17 MFD I/O Modules = 1 All 0 to +10 Vdc	PA = 2 at either –10 to +10 Vdc or –20 to +20 mA
Embedded analog output resolution	6.5 bit	10 bit	10 bit	12 bit
Expansion analog input types	—	0	0	–10 to +10 Vdc or –20 to +20 mA
Expansion analog input resolution	—	—	—	V = 12 bits, I = 11 or 13 bits ①
Expansion analog outputs types	—	0	0	0 to 20 mA, 4 to 20 mA 0 to 10 Vdc, 2 to 10 Vdc ①

**Note**

① Combo modules have 11 bit resolution; analog input-only modules support 13 bit.

For our complete product offering, see Volume 7—Logic Control, Operator Interface and Connectivity Solutions, CA08100008E and PG05400001E.

#### Programmable Controllers Selection Guide, continued



**Fusion Integrated Machine Controllers**



**easy Programmable Relays**



**MFD-Titan Multi-Functional Displays**



**ELC Series PLCs**

Description	Fusion Integrated Machine Controllers	easy Programmable Relays	MFD-Titan Multi-Functional Displays	ELC Series PLCs
<b>I/O Analog</b>				
Expansion analog output resolution	—	—	—	Voltage = 14 bit Current = 11 or 12 bit ①
Max. expansion analog inputs/outputs	—	0/0	0/0	Up to 32/up to 32 (max. using eight combo modules = 32 in + 16 out)
<b>I/O Specialty Inputs</b>				
RTD PT100	—	—	—	Four point expansion module
Thermocouple	—	—	—	Four point expansion module
<b>Programming</b>				
Programming tools	Software or front panel	Software; on-board keypad; memory module transfer	Software; on-board keypad; memory module transfer	Software; memory module transfer; hand-held programmer
Program size	100 rungs with up to 6 contacts and 1 coil per rung	easy500/700 = 128 rungs easy800 = 256 rungs	MFD = 256 rungs	PB = 4k steps PA/PC/PH = 8k steps PV = 16k steps
Programming languages	Ladder	Ladder; function block	Ladder; function block	Instructions, ladder, sequential function chart
Timers	8	easy500/700 = 16 easy800 = 32	32	PB = 128 PA/PC/PH/PV = 244 standard with additional timers for subroutine and retentive applications
General counters	8	easy500/700 = 16 easy800 = 32	32	PB = 128 PA/PC/PH = 235 PV = 253
High speed counters Quantity at max. speed (pulse train output use may limit maximum counter frequency)	Up to 14 kHz with five presets and prewarn	1 kHz	3 kHz	PB = up to 4, 2 at 20 kHz PA/PC = up to 6, 1 at 30 kHz and 1 at 10 kHz PH = up to 8, 1 at 100 kHz and 1 at 30 kHz PV = up to 8, 2 at 200 kHz 2 at 20 kHz; and 2 at 10 kHz
Pulse train outputs Quantity at max. speed (high speed input use may limit maximum speed for outputs)	—	—	—	PB = 2 at 10 kHz PA/PC = 1 at 30 kHz; and 1 at 10 kHz PH = 1 at 100 kHz; and 1 at 30 kHz PV = up to 2 at 200 kHz; and 1 at 40 kHz
Real time clock	Yes	easy500 = Optional easy700/800 = Yes	Yes	PA/PC/PH/PV = Yes Not available on PB

**Note**

① Combo modules have 11 bit resolution; analog input-only modules support 13 bit.

For our complete product offering, see Volume 7—Logic Control, Operator Interface and Connectivity Solutions, CA08100008E and PG05400001E.

Programmable Controllers Selection Guide, continued



**Fusion Integrated Machine Controllers**



**easy Programmable Relays**



**MFD-Titan Multi-Functional Displays**



**ELC Series PLCs**

Description	Fusion Integrated Machine Controllers	easy Programmable Relays	MFD-Titan Multi-Functional Displays	ELC Series PLCs
<b>Communications</b>				
Ports	1 RS-232/RS-485	Programming only	Programming only	1 RS-232 device or programming 1 RS-485 master or device
DeviceNet	—	easy700/800 = device only	Device only	PA/PB/PC/PH = device only PV = master and device
Ethernet OPC	—	easy700/800 = device only	Device only	PA/PB/PC/PH = device only PV = limited master and device
ASi	—	easy700/800 = device only	Device only	—
PROFIBUS-DP	—	easy700/800 = device only	Device only	—
CANopen	—	easy700/800 = device only	Device only	—
Modbus Serial	Device only	—	—	ASCII/RTU master and device
<b>General Specifications</b>				
CSA Hazardous location Class I, Division 2	—	Yes	—	—
Agency certifications	UL/cUL/CE	UL/CSA/CE/C-Tick	UL/CSA/CE/C-Tick	cULus/CE/C-Tick
Operating temperature range	0° to 50°C (32° to 122°F)	-25° to 55°C (-13° to 131°F)	-25° to 55°C (-13° to 131°F) Display -5° to 50°C	0° to 55°C (32° to 131°F)
Storage/transport temperature range	-20° to 70°C (-4° to 158°F)	-40° to 70°C (-40° to 158°F)	-40° to 70°C (-40° to 158°F)	-25° to 70°C (-13° to 158°F)
Nominal operating power	100/240 Vac 24 Vdc 12 Vdc	100/240 Vac 24 Vdc 12 Vdc	100/240 Vac 24 Vdc	24 Vdc 110/240 Vac using ELC power supply

For our complete product offering, see Volume 7—Logic Control, Operator Interface and Connectivity Solutions, CA08100008E and PG05400001E.

**Fusion® Integrated Machine Controller****Features**

- User-configurable operator interface with back-lit LCD display and 18-button tactile feedback keypad
- High-speed counter with five presets and prewarn, totalizer, batch counter and ratemeter
- 10 parameter sets
- 13 digital inputs
- (2) 4–20 mA inputs
- (2) 0–10V input
- (3) Form C, 2 Form A, 2 NPN transistor, (1) 4–20 mA, and (1) 0–10V output
- RS-232 and RS-485 serial communications
- 100-line ladder logic processor for ultimate flexibility
- Configuration software included
- Type 4X enclosure

**Product Selection****Fusion Integrated Machine Controller****Fusion Integrated Machine Controller**

Description	Catalog Number
Fusion integrated machine controller—10–30 Vdc power	<b>57550400</b>
Fusion integrated machine controller—85–265 Vac power	<b>57551400</b>

easy500/700/800 Programmable Relays



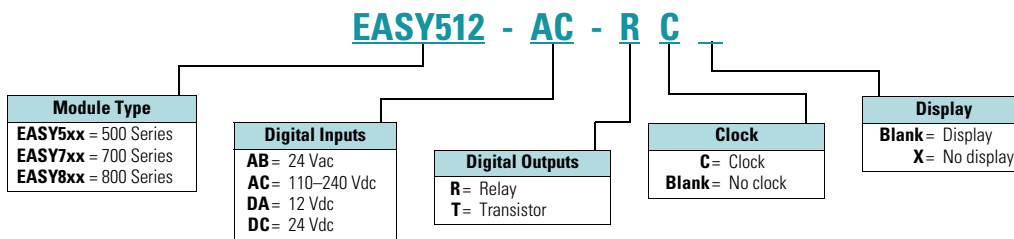
Features

- easy500 Series—for controlling small applications with up to 12 input/output signals
- easy700 Series—for controlling medium-sized applications with up to 40 input/output signals
- easy800 Series—for controlling large-scale applications with up to 320 input/output signals; use easyNet for applications beyond 40 I/O
- Available with or without 2.5 in LCD display
- DIN rail mounted or panel mounted using optional mounting feet

Catalog Number Selection

easy Programmable Relays

easy500/700/800



**Note:** Not all combinations are possible. See selection tables.

#### Product Selection

3

##### easy500—Display



#### easy500 Programmable Relays (Standalone)

Description	Inputs					Outputs		Catalog Number
	24 Vac	110–240 Vac	12 Vdc	24 Vdc	Analog ①	Relay	Transistor	
<b>Display</b>								
12 I/O, no clock	—	8	—	—	—	4	—	EASY512-AC-R
	—	—	—	8	2	4	—	EASY512-DC-R
12 I/O, clock	8	—	—	—	2	4	—	EASY512-AB-RC
	—	8	—	—	—	4	—	EASY512-AC-RC
	—	—	8	—	2	4	—	EASY512-DA-RC
	—	—	—	8	2	4	—	EASY512-DC-RC
	—	—	—	8	2	—	4	EASY512-DC-TC
<b>No Display</b>								
12 I/O, clock	8	—	—	—	2	4	—	EASY512-AB-RCX
	—	8	—	—	—	4	—	EASY512-AC-RCX
	—	—	8	—	2	4	—	EASY512-DA-RCX
	—	—	—	8	2	4	—	EASY512-DC-RCX
	—	—	—	8	2	—	4	EASY512-DC-TCX

##### easy500—No Display



##### easy700—Display



#### easy700 Programmable Relays (Expandable and Networkable)

Description	Inputs					Outputs		Catalog Number
	24 Vac	110–240 Vac	12 Vdc	24 Vdc	Analog ①	Relay	Transistor	
<b>Display</b>								
18 I/O, clock	12	—	—	—	4	6	—	EASY719-AB-RC
	—	12	—	—	—	6	—	EASY719-AC-RC
	—	—	12	—	4	6	—	EASY719-DA-RC
18 I/O, no clock	—	—	—	12	4	6	—	EASY719-DC-RC
	—	—	—	12	4	—	8	EASY721-DC-TC
<b>No Display</b>								
18 I/O, clock	12	—	—	—	4	6	—	EASY719-AB-RCX
	—	12	—	—	—	6	—	EASY719-AC-RCX
	—	—	12	—	4	6	—	EASY719-DA-RCX
18 I/O, no clock	—	—	—	12	4	6	—	EASY719-DC-RCX
	—	—	—	12	4	—	8	EASY721-DC-TCX

##### easy700—No Display



##### easy800—Display



#### easy800 Programmable Relays (Expandable and Networkable)

Description	Inputs			Outputs			Catalog Number
	110–240 Vac	24 Vdc	Analog ①	Relay	Transistor	Analog	
<b>Display</b>							
18 I/O, clock	12	—	—	6	—	—	EASY819-AC-RC
	—	12	4	6	—	—	EASY819-DC-RC
19 I/O, clock	—	12	4	6	—	1	EASY820-DC-RC
20 I/O, clock	—	12	4	—	8	—	EASY821-DC-TC
21 I/O, clock	—	12	4	—	8	1	EASY822-DC-TC
<b>No Display</b>							
18 I/O, clock	12	—	—	6	—	—	EASY819-AC-RCX
	—	12	4	6	—	—	EASY819-DC-RCX
19 I/O, clock	—	12	4	6	—	1	EASY820-DC-RCX
20 I/O, clock	—	12	4	—	8	—	EASY821-DC-TCX
21 I/O, clock	—	12	4	—	8	1	EASY822-DC-TCX

**Note**

① Analog inputs optional. Use of analog inputs will result in a decrease in the same number of available digital inputs.

**EASY618\_**

**Digital I/O Expansion Modules**

Can be used via easyLink.



Supply Voltage	Digital Inputs	Outputs		Catalog Number
		Relay 10A (UL)	Transistor	
100–240 Vac	12	6	—	<b>EASY618-AC-RE</b>
24 Vdc	12	6	—	<b>EASY618-DC-RE</b>
24 Vdc	12	—	8	<b>EASY620-DC-TE</b>
24 Vdc	6	4	—	<b>EASY410-DC-RE</b>
24 Vdc	6	—	4	<b>EASY410-DC-TE</b>
24 Vdc	—	2	—	<b>EASY202-RE</b>
For distributed connection of a digital input/output expansion at up to 98 ft (30m) distance				<b>EASY200-EASY</b>

**EASY406\_**

**Analog I/O Expansion Modules**

Can be used via easyLink.



Supply Voltage	Inputs		Digital Outputs		Analog Outputs	Catalog Number
	Digital/ Analog	Can Be Used for Digital	Relay 10A (UL)	Transistor		
24 Vdc	1/2	2	—	2	1	<b>EASY406-DC-ME</b>
24 Vdc	1/6	2	—	2	2	<b>EASY411-DC-ME</b>

**EASY209-SE**

**Ethernet Gateway Module**



Description	Catalog Number
Ethernet gateway Serial interface easyRelay or MFD-...CP8/CP10_ to Ethernet, for connecting to easyOPC server, easySoft or easyCom	<b>EASY209-SE</b>

**EASY204-DP**

**Network Interface Modules**



Description	Catalog Number
DeviceNet interface module	Addresses available 0 to 63 <b>EASY222-DN</b>
PROFIBUS-DP interface module	Device addresses available 1 to 126 <b>EASY204-DP</b>
AS-Interface interface module with 4 in and 4 out	Device: 4 inputs, 4 outputs, 4 parameter bits Addresses available 0 to 31 <b>EASY205-ASI</b>
CANopen interface module	Addresses available 1 to 127 <b>EASY221-CO</b>

**MFD-80-B**



**MFD-Titan Display/Operator Unit**

Monochrome display 132 x 64 pixels with switchable backlight and removable front frame.

Description	Keypad	Eaton Logo	Catalog Number
MFD display, NEMA 4X indoor rated	—	—	<b>MFD-80-X</b>
MFD display, NEMA 4X indoor rated	—	■	<b>MFD-80</b>
MFD display/keypad, NEMA 4X in conjunction with MFD-XM-80 protective diaphragm	■	—	<b>MFD-80-B-X</b>
MFD display/keypad, NEMA 4X in conjunction with MFD-XM-80 protective diaphragm	■	■	<b>MFD-80-B</b>

**MFD-CP4**



**MFD-Titan Text/Graphics Display Modules**

Combine with MFD-80\_ to use as remote text/graphics display.

Supply Voltage	Description	Catalog Number
100–240 Vac	AC power supply / communication module (no cable)	<b>MFD-AC-CP4</b>
	AC module for easy500/700 relays and cable MFD-CP4-500-CAB5	<b>MFD-AC-CP4-500</b>
	AC module for easy800 relays and cable MFD-CP4-800-CAB5	<b>MFD-AC-CP4-800</b>
24 Vdc	DC power supply / communication module (no cable)	<b>MFD-CP4</b>
	DC module for easy500/700 relays and cable MFD-CP4-500-CAB5	<b>MFD-CP4-500</b>
	DC module for easy800 relays and cable MFD-CP4-800-CAB5	<b>MFD-CP4-800</b>

**MFD-CP**



**MFD-Titan Controller Module**

Attach to MFD-80\_ display/operator unit and add MFD-Titan I/O modules as needed.

Supply Voltage	Description	Catalog Number
100–240 Vac	Program and screen memory	<b>MFD-AC-CP8-ME</b>
	Program and screen memory, with easyNet	<b>MFD-AC-CP8-NT</b>
24 Vdc	Program and screen memory	<b>MFD-CP8-ME</b>
	Program and screen memory, with easyNet	<b>MFD-CP8-NT</b>
	Double program and screen memory (as MFD-CP8)	<b>MFD-CP10-ME</b>
	Double program and screen memory (as MFD-CP8), with easyNet	<b>MFD-CP10-NT</b>

**MFD-R16**



**MFD-Titan I/O Modules**

Attach to back of MFD-Titan controller modules.

Supply Voltage	Description	Inputs <sup>①</sup>		Outputs			Catalog Number
		Digital	Analog	Relay	Transistor	Analog	
100–240 Vac	16 I/O	12	—	4	—	—	<b>MFD-AC-R16</b>
24 Vdc		12	4	4	—	—	<b>MFD-R16</b>
		12	4	—	4	—	<b>MFD-T16</b>
24 Vdc	17 I/O	12	4	4	—	1	<b>MFD-RA17</b>
		12	4	—	4	1	<b>MFD-TA17</b>

**MFD-TP\_**



**MFD-Titan I/O Modules with Temperature Detection**

For use with MFD-CP8\_ from device version 08, MFD-CP10.

Supply Voltage	Inputs			Outputs			Temperature Ranges	Catalog Number
	Digital	Can Be Used For Analog	Pt100	Relay 10A (UL)	Transistor	Analog		
24 Vdc	6	2	2	—	4	—	–40° to +90°C/0° to +250°C/0° to +400°C	<b>MFD-TP12-PT-A</b>
	6	2	2	—	4	—	–200° to +200°C/0° to +850°C	<b>MFD-TP12-PT-B</b>
	6	2	—	—	4	—	–40° to +90°C/0° to +250°C	<b>MFD-TP12-NI-A</b>
	6	2	2	—	4	1	–40° to +90°C/0° to +250°C/0° to +400°C	<b>MFD-TAP13-PT-A</b>
	6	2	2	—	4	1	–200° to +200°C/0° to +850°C	<b>MFD-TAP13-PT-B</b>
	6	2	—	—	4	1	–40° to +90°C/0° to +250°C	<b>MFD-TAP13-NI-A</b>

**Note**

① Analog inputs optional.



**easy802/806 Programmable Relays with SmartWire-DT**



**Features**

- Combines the functions of an easy800 with direct connection to SmartWire-DT
- Exchange of data as well as power supply for the SmartWire-DT devices and contactors
- Up to 99 SmartWire-DT nodes in total with up to 166 inputs/ outputs that can be connected
- Up to eight easy806 controllers can be connected via easyNet
- easy806 controllers include four high-speed inputs, two of which can be outputs
- Serial interface for programming or connection of an MFD remote text display or XV touch panel

**Product Selection**

**easy802/806 Programmable Relays with SmartWire-DT**

Control relay for connection of SmartWire-DT and simultaneously for supply of power to the SmartWire-DT devices, such as switchgear and contactors.

**EASY802-DC-SWD**



**easy800 with SmartWire-DT**

Supply Voltage	Description	Catalog Number
24 Vdc	Control relay with SmartWire-DT	<b>EASY802-DC-SWD</b>

**EASY806-DC-SWD**



24 Vdc	Control relay with SmartWire-DT, four inputs, two of which can be used as outputs (transistor 24 Vdc, 0.1A), easyNet onboard	<b>EASY806-DC-SWD</b>
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XC152 PLC



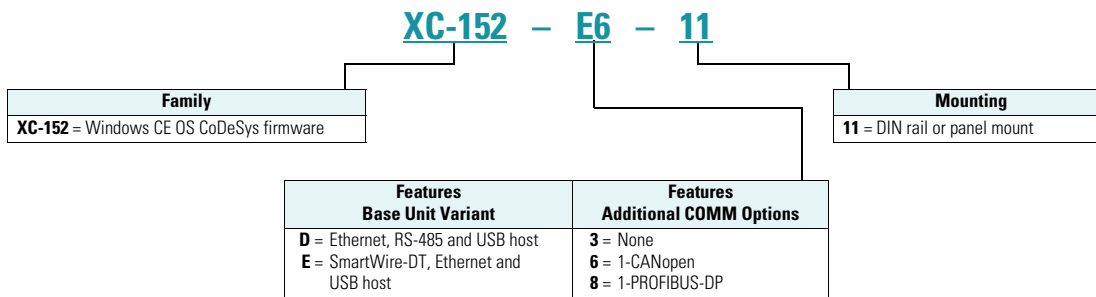
### Features

- CoDeSys PLC and Web visualization
- Galileo/CoDeSys remote visualization
- Ethernet port on all models
- Windows® CE 5 operating system
- 32-bit RISC CPU at 400 MHz
- 64 MB internal memory
- SD card slot for external memory
- Run/Stop switch
- Optional: Integrated SmartWire-DT master for 99 nodes
- Optional: RS-232, RS-485, PROFIBUS-DP/MPI, CANopen/easyNet

### Catalog Number Selection

#### XC152 PLCs with and without SmartWire-DT

#### XC PLC



## Product Selection

### XC152 PLC



#### XC152 PLC

CoDeSys Firmware	Fieldbus Type	RS-232	RS-485	Ethernet	Catalog Number
Y	CANopen	Y	Y	Y	<b>XC-152-D6-11</b>
Y	PROFIBUS-DP	Y	Y	Y	<b>XC-152-D8-11</b>

### XC152 PLC SmartWire-DT



#### XC152 PLC SmartWire-DT

CoDeSys Firmware	Fieldbus Type	RS-232	RS-485	Ethernet	SmartWire-DT	Catalog Number
Y	None	Y	None	Y	Y	<b>XC-152-E3-11</b>
Y	CANopen	None	Y	Y	Y	<b>XC-152-E6-11</b>
Y	PROFIBUS-DP	None	Y	Y	Y	<b>XC-152-E8-11</b>

## Accessories

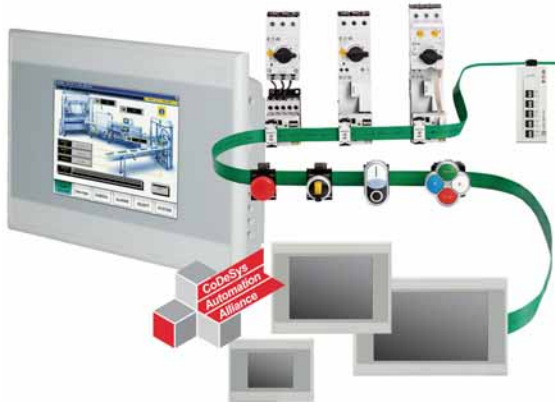
### XC PLC Accessories

Description	Catalog Number
PLC programming software, single seat license	<b>SW-XSOFT-CODESYS-2-S</b> ①
PLC programming software, multiple seat license	<b>SW-XSOFT-CODESYS-2-M</b> ①
SD memory card	<b>MEMORY-SD-A1-S</b>

#### Note

① For details on SW-XSoft-CoDeSys software, see Volume 7—Logic Control, Operator Interface and Connectivity Solutions, CA08100008E, Tab 4.

XV Series HMI-PLC



### Features

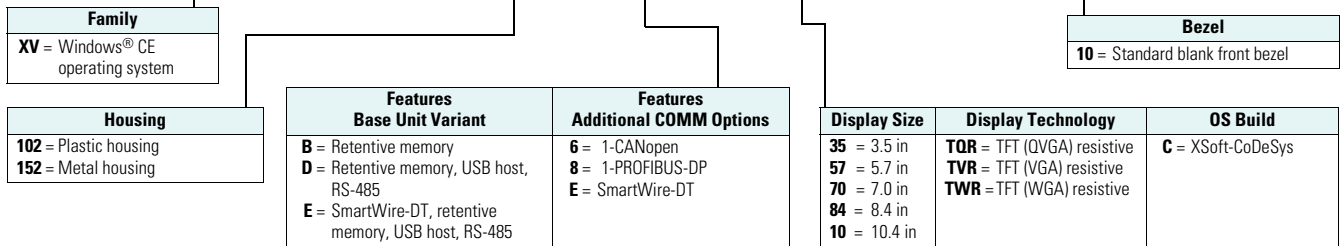
- High resolution resistive touch TFT displays
- Brilliant image display with 65,536 colors
- 3.5 in, 5.7 in or 7 in widescreen displays in robust plastic housings and bezels, or 5.7 in, 8.4 in or 10.4 in displays in high-end aluminum front bezels and metal housings
- Ethernet and RS-485 serial ports on all models
- PROFIBUS-DP or CANopen master on all models larger than 3.5 inches
- Programmable with IEC 61131-3 compliant XSoft-CoDeSys software
- Built-in SmartWire-DT master for 99 nodes
- Easy connection direct to motor control components or I/O modules on the SmartWire-DT flat cable
- Web/remote visualization
- RISC CPU 32-bit 400 MHz
- 64 MB memory
- SD card slot

### Catalog Number Selection

#### XV Series HMI-PLCs with and without SmartWire-DT

#### XV HMI-PLC

**XV - 102 - E6 - 35TQRG - 10**



## Product Selection

### XV HMI-PLC



### XV HMI-PLC

Display Size/Type	Display Resolution	CoDeSys Firmware	Fieldbus Type	RS-485	Ethernet	Catalog Number
<b>Plastic Housing</b>						
3.5 in TFT Resistive	QVGA 320x240	Y	CANopen	Y	Y	<b>XV-102-B6-35TQRC-10</b>
		Y	PROFIBUS-DP	Y	Y	<b>XV-102-B8-35TQRC-10</b>
5.7 in TFT Resistive	VGA 640x480	Y	CANopen	Y	Y	<b>XV-102-D6-57TVRC-10</b>
		Y	PROFIBUS-DP	Y	Y	<b>XV-102-D8-57TVRC-10</b>
7.0 in TFT Resistive	WGA 800x480	Y	CANopen	Y	Y	<b>XV-102-D6-70TWRC-10</b>
		Y	PROFIBUS-DP	Y	Y	<b>XV-102-D8-70TWRC-10</b>
<b>Metal Housing</b>						
5.7 in TFT Resistive	VGA 640x480	Y	CANopen	Y	Y	<b>XV-152-D6-57TVRC-10</b>
		Y	PROFIBUS-DP	Y	Y	<b>XV-152-D8-57TVRC-10</b>
8.4 in TFT Resistive	VGA 640x480	Y	CANopen	Y	Y	<b>XV-152-D6-84TVRC-10</b>
		Y	PROFIBUS-DP	Y	Y	<b>XV-152-D8-84TVRC-10</b>
10.4 in TFT Resistive	VGA 640x480	Y	CANopen	Y	Y	<b>XV-152-D6-10TVRC-10</b>
		Y	PROFIBUS-DP	Y	Y	<b>XV-152-D8-10TVRC-10</b>

### XV HMI-PLC with SmartWire-DT



### XV HMI-PLC SmartWire-DT

Display Size/Type	Display Resolution	CoDeSys Firmware	Fieldbus Type	RS-485	Ethernet	SmartWire-DT	Catalog Number
<b>Plastic Housing</b>							
3.5 in TFT	QVGA 320x240	Y	None	None	Y	Y	<b>XV-102-BE-35TQRC-10</b>
5.7 in TFT	VGA 640x480	Y	CANopen	Y	Y	Y	<b>XV-102-E6-57TVRC-10</b>
		Y	PROFIBUS-DP	Y	Y	Y	<b>XV-102-E8-57TVRC-10</b>
7.0 in TFT	WGA 800x480	Y	CANopen	Y	Y	Y	<b>XV-102-E6-70TWRC-10</b>
		Y	PROFIBUS-DP	Y	Y	Y	<b>XV-102-E8-70TWRC-10</b>
<b>Metal Housing</b>							
5.7 in TFT	VGA 640x480	Y	CANopen	Y	Y	Y	<b>XV-152-E6-57TVRC-10</b>
		Y	PROFIBUS-DP	Y	Y	Y	<b>XV-152-E8-57TVRC-10</b>
8.4 in TFT	VGA 640x480	Y	CANopen	Y	Y	Y	<b>XV-152-E6-84TVRC-10</b>
		Y	PROFIBUS-DP	Y	Y	Y	<b>XV-152-E8-84TVRC-10</b>
10.4 in TFT	VGA 640x480	Y	CANopen	Y	Y	Y	<b>XV-152-E6-10TVRC-10</b>
		Y	PROFIBUS-DP	Y	Y	Y	<b>XV-152-E8-10TVRC-10</b>

## Accessories

### XV HMI-PLC Accessories

Description	Catalog Number
HMI-PLC programming software, single seat license	<b>SW-XSOFT-CODESYS-2-S</b> ①
HMI-PLC programming software, multiple seat license	<b>SW-XSOFT-CODESYS-2-M</b> ①
SD memory card	<b>MEMORY-SD-A1-S</b>
XV-102 parts kit (1 power conductor, 8 mounting brackets, 1 sealing strip, 1 touch pen)	<b>ACC-TP-57-KG-1</b>
XV-152 parts kit (1 power conductor, 8 mounting brackets, 1 sealing strip, 1 touch pen)	<b>ACC-TP-10-12-RES-1</b>

#### Note

① For details on SW-XSoft-CoDeSys software, see Volume 7—Logic Control, Operator Interface and Connectivity Solutions, CA08100008E, Tab 4.

#### ELC Programmable Logic Controllers



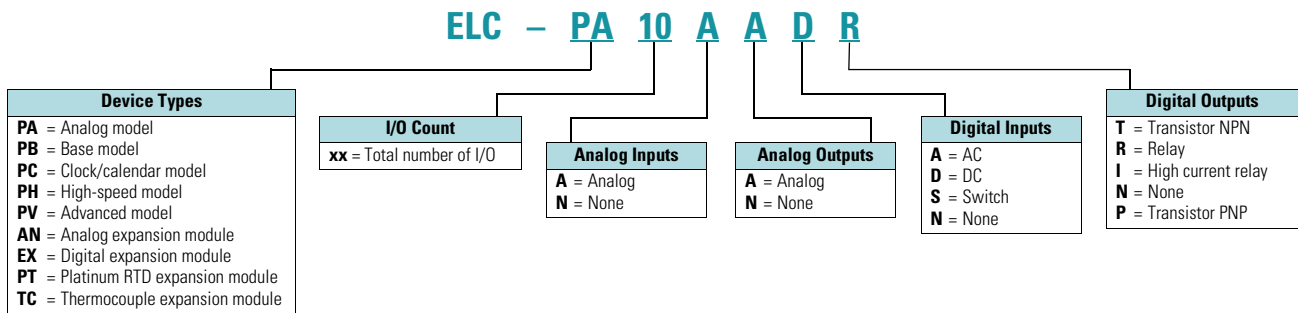
#### Features

- Modular PLC logic platform with a range of basic to sophisticated CPUs
- Ethernet and DeviceNet master communications
- Distributed I/O for EtherNet/IP, Modbus TCP, PROFIBUS-DP, DeviceNet and Modbus serial networks

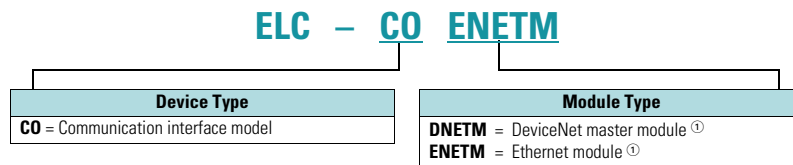
### Catalog Number Selection

#### ELC Series Programmable Logic Controllers

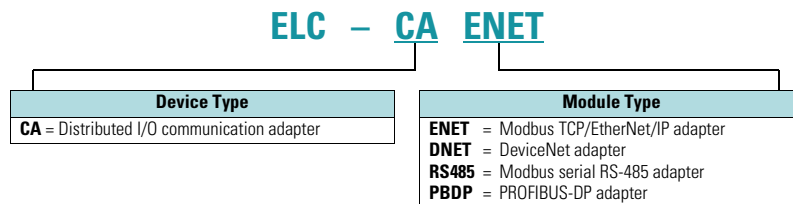
##### Controllers and Expansion Modules



##### Master Communication Modules



##### Distributed I/O Adapter Modules



**Note**

① Left side communications module.

## Product Selection

### Controllers

Description	Inputs	Outputs	Analog	High Speed I/O	Maximum Current Consumption (at 24 Vdc)	Catalog Number
ELC-PB Model and 14 I/O built-in	(8) 24 Vdc	(6) Relay, 1.5A	—	(2) 20 kHz inputs	150 mA	<b>ELC-PB14NNDR</b>
	(8) 24 Vdc	(6) Transistor, 100 mA	—	(2) 20 kHz inputs	150 mA	<b>ELC-PB14NNDT</b>
ELC-PC Model and 12 I/O built-in	(8) 24 Vdc	(4) Relay, 1.5A	—	(1) 30 kHz inputs	150 mA	<b>ELC-PC12NNDR</b>
	(8) 24 Vdc	(4) Transistor, 100 mA	—	(1) 30 kHz inputs	150 mA	<b>ELC-PC12NNDT</b>
	(8) 110 Vac	(4) Relay, 1.5A	—	(1) 30 kHz inputs	150 mA	<b>ELC-PC12NNAR</b>
ELC-PH Model and 12 I/O built-in	(8) 24 Vdc	(4) Transistor, 100 mA	—	(1) 100 kHz inputs	170 mA	<b>ELC-PH12NNDT</b>
ELC-PA Model and 10 I/O built-in	(4) 24 Vdc	(2) Relay, 1.5A	(2) In and (2) Out	(1) 30 kHz inputs	210 mA	<b>ELC-PA10AADR</b>
	(4) 24 Vdc	(2) Relay, 1.5A	(2) In and (2) Out	(1) 30 kHz inputs	210 mA	<b>ELC-PA10AADT</b>
ELC-PV Model and 28 I/O built-in	(16) 24 Vdc	(12) Relay, 1.5A	—	(2) 200 kHz inputs	220 mA	<b>ELC-PV28NNDR</b>
	(16) 24 Vdc	(12) Transistor, 100 mA	—	(2) 200 kHz inputs	220 mA	<b>ELC-PV28NNDT</b>

### Distributed I/O Adapter Modules

Description	Catalog Number
Modbus TCP/EtherNet/IP I/O adapter	<b>ELC-CAENET</b>
Modbus serial RS-485 I/O adapter	<b>ELC-CARS485</b>
DeviceNet I/O adapter	<b>ELC-CADNET</b>
PROFIBUS-DP I/O adapter	<b>ELC-CAPBDP</b>

### Network Communication Master Modules (Left Side Bus)

Description	Catalog Number
Ethernet Modbus TCP (master/node)	<b>ELC-COENETM</b>
DeviceNet scanner (master/node)	<b>ELC-CODNETM</b>

### Digital Expansion Modules (Right Side Bus)

Description	Inputs	Outputs	Maximum Current Consumption (at 24 Vdc)	Catalog Number
8 DC input module	(8) 24 Vdc	—	50 mA	ELC-EX08NNDN
16 DC input module	(16) 24 Vdc	—	100 mA	ELC-EX16NNDN
8 DC input/output module	(4) 24 Vdc	(4) Transistor (sink), 0.3A	70 mA	ELC-EX08NNDT
16 DC input/output module	(8) 24 Vdc	(8) Transistor (sink), 0.3A	90 mA	ELC-EX16NNDT
16 DC input/output module	(8) 24 Vdc	(8) Transistor (source), 0.3A	100 mA	ELC-EX16NNDP
8 DC input/relay output module	(4) 24 Vdc	(4) Relay, 1.5A	70 mA	ELC-EX08NNDR
16 DC input/relay output module	(8) 24 Vdc	(8) Relay, 1.5A	90 mA	ELC-EX16NNDR
8 AC input module	(8) 110 Vac	—	50 mA	ELC-EX08NNAN
8 Transistor output module	—	(8) Transistor (sink), 0.3A	70 mA	ELC-EX08NNNT
8 Relay output module	—	(8) Relay, 1.5A	70 mA	ELC-EX08NNNR
6 High current relay output module	—	(6) Relay, 6A	70 mA	ELC-EX06NNNI
8 Toggle switch input module	(8) Switches	—	20 mA	ELC-EX08NNSN

### Analog and Temperature Expansion Modules (Right Side Bus)

Description	Analog Inputs	Analog Outputs	Maximum Current Consumption (at 24 Vdc)	Catalog Number
4 Analog input module	4	—	90 mA	ELC-AN04ANNN
2 Analog output module	—	2	125 mA	ELC-AN02NANN
4 Analog output module	—	4	170 mA	ELC-AN04NANN
6 Analog input/output module	4	2	90 mA	ELC-AN06AANN
4 Thermocouple input module (J, K, R, S and T)	4	—	90 mA	ELC-TC04ANNN
4 Platinum RTD input module (PT100)	4	—	90 mA	ELC-PT04ANNN

### Specialty Expansion Modules (Right Side Bus)

Description	Catalog Number
Single axis motion control module (Add up to 8 modules per controller)	ELC-MC01
RS-485 Easy Connect adapter (DB9, RJ12, 2-pin connections to RS-485)	ELC-485APTR

### Accessories and Software

Description	Catalog Number
ELC programming software	ELCSOFT
24 Vdc, 1A power supply	ELC-PS01
24 Vdc, 2A power supply	ELC-PS02
Cable to connect a PC or a GP unit to ELC, 1 meter (DB9 pin female to 8-pin DIN)	ELC-CBPCELC1
Cable to connect a PC or a GP unit to ELC, 3 meters (DB9 pin female to 8-pin DIN)	ELC-CBPCELC3
Cable to connect a PC to a GP unit, 3 meters (DB9 pin female to DB9 pin female)	ELC-CBPCEGP3
Program transfer module for ELC controllers	ELC-ACPGMXFR
Plate mount for specialty modules, qty. 10	ELC-ACCOVER



**Product Overview**

**Preset Counters Selection Guide**



Description	E5-148-C1400 Page V9-T3-50	E5-648-C Series Page V9-T3-50	Eclipse Series Page V9-T3-51
Display	Two-line LCD	Two-line LCD	LED
Power supply	Replaceable lithium batteries	10–30 Vdc or 90–260 Vac	9–30 Vdc or 85–265 Vac
Number of digits	6	6	6
Panel cut-out size	45 x 45 mm (1/16 DIN)	45 x 45 mm (1/16 DIN)	92 x 45 mm (1/8 DIN)
Scaling capability	—	Yes	Yes
Number of presets	1	2 or 4	2
Max. counting speed	25 Hz	10 kHz	Up to 8,250 Hz
Front panel protection	IP65	IP65	Type 4X
Other features/functions	—	Timer/rate indicator	Analog retransmission/RS-485 communications
Relay rating(s)	2A	3A	5A

For our complete product offering, see Volume 7—Logic Control, Operator Interface and Connectivity Solutions, CA08100008E and PG05400001E.

1/16 DIN LCD Preset Counter



### Features

Battery powered

- Two-line LC displays count, preset and level of the output
- Replacement for electromechanical preset counters
- No power supply necessary (battery operated)
- Count and reset input electrically separated from counter through optocoupler input range 12–250 Vac/Vdc

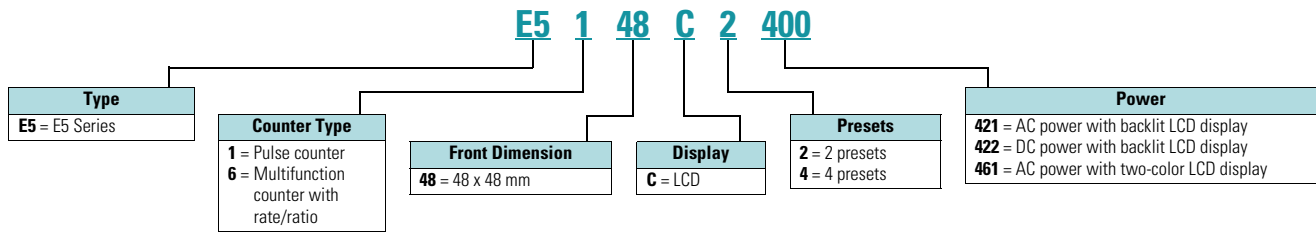
AC/DC powered

- Two-line LCD with optional two-color display
- Programmable as impulse counter, frequency meter or time meter with sign and zero blanking
- Batch mode
- Add/subtract/ratio functions

### Catalog Number Selection

#### 1/16 DIN LCD Preset Counter

#### LCD Preset Counter



### Product Selection

#### 1/16 DIN LCD

Description	Catalog Number
<b>Battery Powered 1 Preset LCD</b>	
Battery power 1.89 x 1.89 in (48 x 48 mm)	<b>E5-148-C1400</b>
<b>AC/DC Powered 2 Preset LCD</b>	
90–260 Vac power 1.89 x 1.89 in (48 x 48 mm)	<b>E5-648-C2421</b>
10–30 Vdc power 1.89 x 1.89 in (48 x 48 mm)	<b>E5-648-C2422</b>
<b>AC Powered 4 Preset Two-Color LCD</b>	
90–260 Vac power 1.89 x 1.89 in (48 x 48 mm)	<b>E5-648-C4461</b>

1/18 DIN Eclipse Series Preset Counter



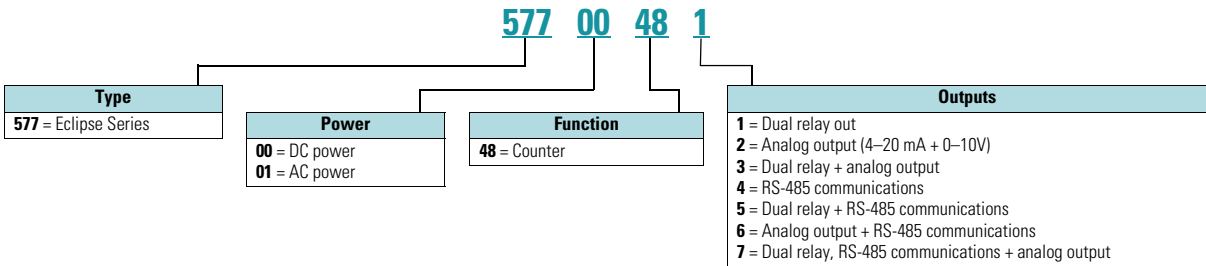
Features

- 1/8 DIN cutout
- Type 4X front panel protection
- Seven-segment LED display

Catalog Number Selection

1/18 DIN Eclipse Series Preset Counter

Eclipse Series Preset Counter



Product Selection

LED Count Control, 6-Digit

Description	Catalog Number
Relay out, 9–30 Vdc power	57700481
Relay out, 85–265 Vac power	57701481
Relay and analog out, 9–30 Vdc power	57700483
Relay and analog out, 85–265 Vac power	57701483
Relay and RS-485 out, 9–30 Vdc power	57700485
Relay and RS-485 out, 85–265 Vac power	57701485
Relay, analog and RS-485 out, 9–30 Vdc power	57700487
Relay, analog and RS-485 out, 85–265 Vac power	57701487

#### Product Overview

#### Ratemeters Selection Guide

3



Description	Courier Series	Eclipse Series
	Page V9-T3-53	Page V9-T3-54
Display	LCD	LED
Power supply	Replaceable lithium battery	9–30 Vdc or 85–265 Vac
Number of digits	5	6
Panel cut-out size	68 x 33 mm	92 x 45 mm (1/8 DIN)
Scaling capability	Yes	Yes
Number of presets	—	2 (with optional relay out model)
Update time	700 ms	500 ms
Front panel protection	Type 4X	Type 4X
Other features/functions	Optional backlight, optional extended temperature range	Analog retransmission/RS-485 communications
Relay rating(s)	—	5A

For our complete product offering, see Volume 7—Logic Control, Operator Interface and Connectivity Solutions, CA08100008E and PG05400001E.

Courier Series Battery Powered Ratemeter



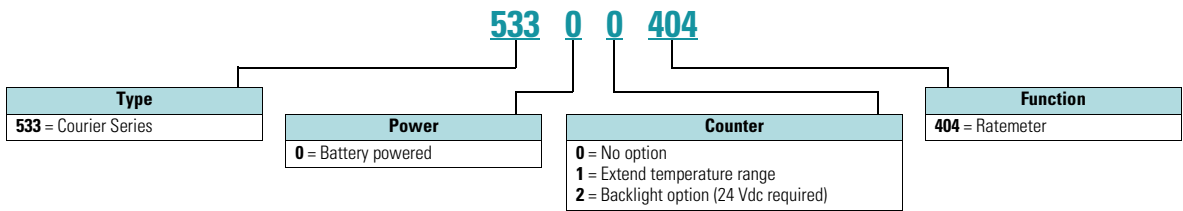
Features

- 1/Tau ratemeter
- Scaling capabilities
- Type 4X protection
- Internal battery: 3V, lithium

Catalog Number Selection

Courier Series Battery Powered Ratemeter

Courier Series



Product Selection

1/Tau LCD Ratemeter

Description	Catalog Number
Battery powered	53300404

Eclipse Series 1/8 DIN LED Ratemeter



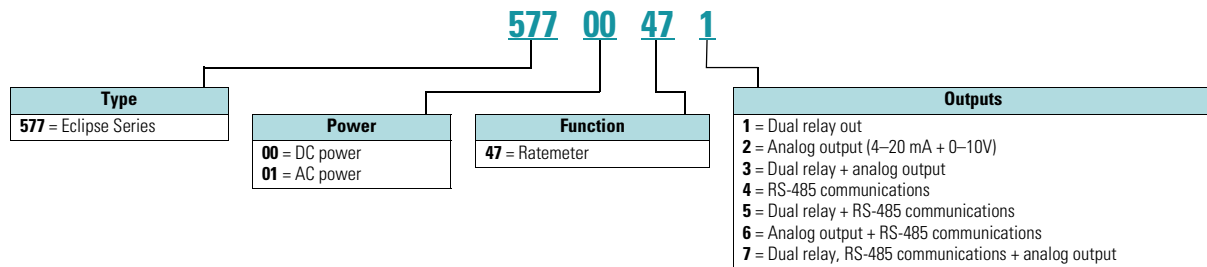
### Features

- 1/8 DIN cutout
- Type 4X front panel protection
- Front panel programming

### Catalog Number Selection

#### Eclipse Series 1/8 DIN LED Ratemeter

#### Eclipse Series



### Product Selection

#### Eclipse Series 5-Digit LED Ratemeter

Description	Catalog Number
9–30 Vdc	57700470
9–30 Vdc, alarms	57700471
9–30 Vdc, analog out	57700472
9–30 Vdc, alarms, analog out	57700473
9–30 Vdc, RS-485	57700474
9–30 Vdc, alarms, RS-485	57700475
9–30 Vdc, analog out, RS-485	57700476
9–30 Vdc, alarms, analog out, RS-485	57700477
85–265 Vac	57701470
85–265 Vac, alarms	57701471
85–265 Vac, analog out	57701472
85–265 Vac, alarms, analog out	57701473
85–265 Vac, RS-485	57701474
85–265 Vac, alarms, RS-485	57701475
85–265 Vac, analog out, RS-485	57701476
85–265 Vac, alarms, analog out, RS-485	57701477

## Product Overview

### Hour Meters Selection Guide



Description	T48 Series Page V9-T3-56	6-T-3H Series Page V9-T3-56	E5-224 Series Page V9-T3-57	E42 Series Page V9-T3-57
Panel cut-out size	45 x 45 mm (1/16 DIN)	50.8 mm (2 in) round	22 x 45 mm (1/32 DIN)	52.3 mm (2.06 in) round OR 24 x 36.8 mm
Display type	Mechanical	Mechanical	LCD	LCD
Number of digits	7 for AC versions, 8 for DC versions	6	8	6
Power supply	10–30 Vdc or 100–130 Vac	115 Vac	Internal battery	12–60 Vdc or 48–230 Vac
Timing method	Synchronous motor	Quartz	Solid-state	Solid-state
Front panel protection	IP65	Type 4X	IP65	No protection ratings
Resolution	0.1 hour	0.1 hour	0.1 second	0.1 hour

For our complete product offering, see Volume 7—Logic Control, Operator Interface and Connectivity Solutions, CA08100008E and PG05400001E.

#### Electromechanical Hour Meters



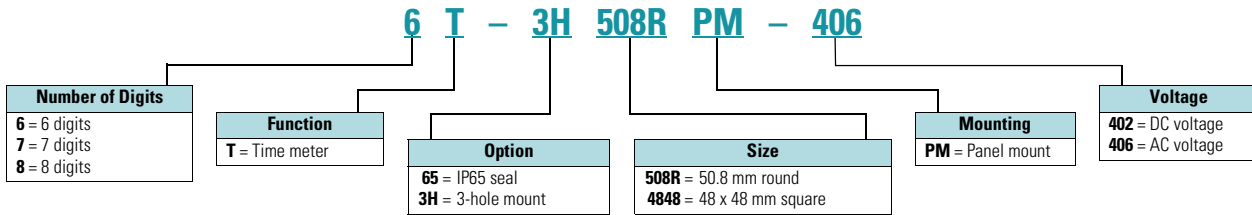
#### Features

- 1/16 DIN
  - High shock-resistance
  - Without reset
  - Data retention if power is lost
- 71.1 mm round
- 6-digit hour meter for round panel cut-out
  - Low cost
  - Waterproof
  - Type 4X protection

#### Catalog Number Selection

##### Electromechanical Hour Meters

##### Hour Meters



#### Product Selection

##### Electromechanical Hour Meters

Description	Catalog Number
<b>1/16 DIN</b>	
10–30 Vdc, 1.89 x 1.89 in (48 x 48 mm)	<b>8-T-65-4848PM-402</b>
100–130 Vac, 1.89 x 1.89 in (48 x 48 mm)	<b>7-T-65-4848PM-406</b>
<b>71.1 mm Round</b>	
115 Vac, 2.80 in (71.1 mm) round	<b>6-T-3H-508RPM-406</b>
10–80 Vdc, 2.80 in (71.1 mm) round	<b>6-T-3H-508RPM-402</b>

#### Accessories

##### DIN Rail Adapter



##### DIN Rail Adapter

Description	Catalog Number
DIN rail adapter for DIN electromechanical hour meter	<b>T4848DINADAPT</b>



**Electronic LCD Hour Meters**



**Features**

Battery powered

- Low price and high efficiency
- Large 8-digit LCD display, height of the figures 0.31 in (8 mm)
- Different time ranges from 0.1 second to 100,000 hours
- Lifetime of the battery is approximately eight years

AC/DC powered

- Solid-state hour meters
- Record and display up to 99,999.9 hours, rollover and continue timing
- EEPROM memory can retain data for 25+ years
- Time accumulation indicated by flashing hourglass icon

**Product Selection**

**Electronic LCD Hour Meters**

**LCD Hour Meters**

Description	Catalog Number
<b>Battery Powered 1/32 DIN 8-Digit LCD</b>	
Hours/minutes, 0.94 x 1.89 in (24 x 48 mm)	<b>E5-224-C0440</b>
Hours/minutes, 10–260V input, 0.94 x 1.89 in (24 x 48 mm)	<b>E5-224-C0448</b>
Minutes/seconds, 0.94 x 1.89 in (24 x 48 mm)	<b>E5-224-C0450</b>
Minutes/seconds, 10–260V input 0.94 x 1.89 in (24 x 48 mm)	<b>E5-224-C0458</b>
<b>AC/DC Powered Round LCD</b>	
Elapsed hour meter, 48–150 Vdc/100–230 Vac	<b>E42DIR48230</b>
Elapsed hour meter w/reset, 48–150 Vdc/100–230 Vac	<b>E42DIR48230R</b>
Elapsed hour meter, 12–48 Vdc/20–60 Vac	<b>E42DIR1260</b>
<b>AC/DC Powered Compact Rectangular LCD</b>	
Elapsed hour meter, 48–150 Vdc/100–230 Vac	<b>E42DI2448230</b>
Elapsed hour meter, w/reset, 48–150 Vdc/100–230 Vac	<b>E42DI2448230R</b>
Elapsed hour meter, 12–48 Vdc/20–60 Vac	<b>E42DI241260</b>

### Product Overview

#### Totalizers Selection Guide



Description	Electromechanical Micro Page V9-T3-59	SE Series Page V9-T3-59	E5-024-C Series Page V9-T3-60	E5-x24-E Series Page V9-T3-60
Display type	Mechanical	Mechanical	LCD	LED
Number of digits	7	6	8	6
Power supply	12 Vdc	12 or 24 Vdc, 120 or 240 Vac	Internal battery	10–30 Vdc
Mounting configuration(s)	Front panel (13 x 30 mm cut-out)	Base mount, bottom mount, top mount, or front panel mount	Front panel 22 x 45 mm (1/32 DIN)	Front panel 22 x 45 mm (1/32 DIN)
Maximum counting speed	25 Hz	10 Hz	12 kHz	20 kHz
Count reset method(s)	—	—	Front panel or electronic, can be locked out	Front panel or electronic, can be locked out
Front panel protection	IP65	—	IP65	IP65

#### Totalizers Selection Guide, continued



Description	Courier Series Page V9-T3-61	E5-496 Series Page V9-T3-62	Eclipse Series Page V9-T3-62
Display type	LCD	LED	LED
Number of digits	8	6	6
Power supply	Replaceable battery	10–30 Vdc or 90–260 Vac	9–30 Vdc or 85–265 Vac
Mounting configuration(s)	Front panel 68 x 33 mm	Front panel 92 x 45 mm (1/8 DIN)	Front panel 92 x 45 mm (1/8 DIN)
Maximum counting speed	10 kHz	60 kHz	8.2 kHz
Count reset method(s)	Front panel or electronic, can be locked out	Front panel or electronic, can be locked out	Front panel or electronic, can be locked out
Front panel protection	Type 4X	IP65	Type 4X

For our complete product offering, see Volume 7—Logic Control, Operator Interface and Connectivity Solutions, CA08100008E and PG05400001E.

Electromechanical Totalizers



Features

- Micro display
- Low power consumption; suitable for battery consumption
- Small dimensions
- Long service life

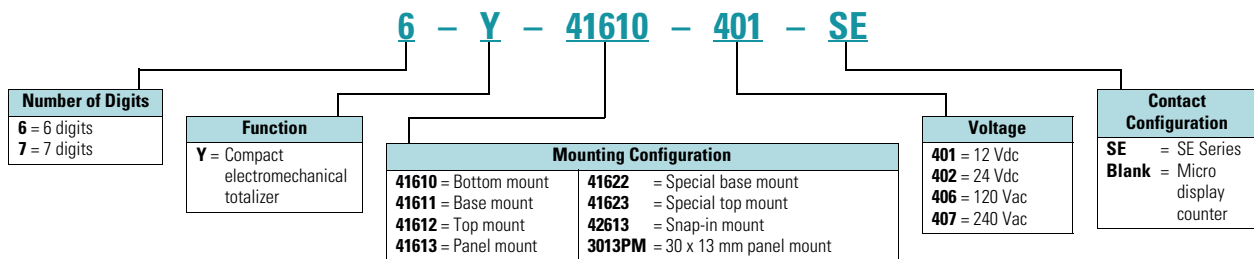
SE Series

- Low-cost electromechanical counter
- Multiple voltage ranges for almost any application
- Compact with various mounting options

Catalog Number Selection

Electromechanical Totalizers

Totalizers



Product Selection

Micro Display Counter

Description	Catalog Number
Micro display counter—12 Vdc	7-Y-3013PM-401

SE Series Electromechanical Totalizers

Description	Catalog Number	Order Number
<b>6-Digit Counter</b>		
Bottom mount sub-miniature 12 Vdc	6-Y-41610-401-SE	41610401
Bottom mount sub-miniature 24 Vdc	6-Y-41610-402-SE	41610402
Bottom mount sub-miniature 120 Vac	6-Y-41610-406-SE	41610406
Bottom mount sub-miniature 240 Vac	6-Y-41610-407-SE	41610407
Base mount sub-miniature 12 Vdc	6-Y-41611-401-SE	41611401
Base mount sub-miniature 24 Vdc	6-Y-41611-402-SE	41611402
Base mount sub-miniature 120 Vac	6-Y-41611-406-SE	41611406
Base mount sub-miniature 240 Vac	6-Y-41611-407-SE	41611407
Top mount sub-miniature 12 Vdc	6-Y-41612-401-SE	41612401
Top mount sub-miniature 24 Vdc	6-Y-41612-402-SE	41612402
Top mount sub-miniature 120 Vac	6-Y-41612-406-SE	41612406
Top mount sub-miniature 240 Vac	6-Y-41612-407-SE	41612407
Panel mount sub-miniature 12 Vdc	6-Y-41613-401-SE	41613401
Panel mount sub-miniature 24 Vdc	6-Y-41613-402-SE	41613402

Description	Catalog Number	Order Number
<b>6-Digit Counter, continued</b>		
Panel mount sub-miniature 120 Vac	6-Y-41613-406-SE	41613406
Panel mount sub-miniature 240 Vac	6-Y-41613-407-SE	41613407
Special base mount sub-miniature 12 Vdc	6-Y-41622-401-SE	41622401
Special base mount sub-miniature 24 Vdc	6-Y-41622-402-SE	41622402
Special base mount sub-miniature 120 Vac	6-Y-41622-406-SE	41622406
Special base mount sub-miniature 240 Vac	6-Y-41622-407-SE	41622407
Special top mount sub-miniature 12 Vdc	6-Y-41623-401-SE	41623401
Special top mount sub-miniature 24 Vdc	6-Y-41623-402-SE	41623402
Special top mount sub-miniature 120 Vac	6-Y-41623-406-SE	41623406
Special top mount sub-miniature 240 Vac	6-Y-41623-407-SE	41623407
Snap-in mount sub-miniature 12 Vdc	6-Y-42613-401-SE	42613401
Snap-in mount sub-miniature 24 Vdc	6-Y-42613-402-SE	42613402
Snap-in mount sub-miniature 120 Vac	6-Y-42613-406-SE	42613406
Snap-in mount sub-miniature 240 Vac	6-Y-42613-407-SE	42613407

#### Electronic 1/32 DIN Totalizers



#### Features

Battery powered LCD

- Low price and high efficiency
- Large 8-digit LCD display, height of the figures 0.31 in (8 mm)
- Lifetime of the battery is approximately 8 years

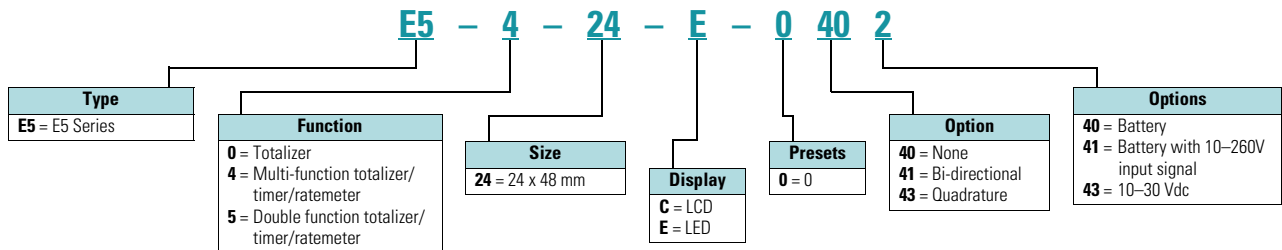
DC Powered LED

- Display counter adding and subtracting
- Position display
- Frequency counter/ratemeter
- Timer
- Supply voltage: 10–30 Vdc with reverse polarity protection
- Polarity of inputs: programmable, NPN or PNP

#### Catalog Number Selection

##### Electronic 1/32 DIN Totalizers

##### Electronic Totalizers



#### Product Selection

##### 1/32 DIN LCD Totalizers

Description	Catalog Number
<b>Battery Powered 8-Digit LCD Totalizer</b>	
0.94 x 1.89 in (24 x 48 mm) LCD totalizer	<b>E5-024-C0400</b>
10–260V input 0.94 x 1.89 in (24 x 48 mm) LCD totalizer	<b>E5-024-C0408</b>
Count up/down 0.94 x 1.89 in (24 x 48 mm) LCD totalizer	<b>E5-024-C0410</b>
<b>DC Powered 6-Digit LED Totalizer</b>	
LED single channel totalizer, 10–30 Vdc power 0.94 x 1.89 in (24 x 48 mm)	<b>E5-024-E0402</b>
LED multifunction totalizer/timer/ratemeter, 10–30 Vdc power 0.94 x 1.89 in (24 x 48 mm)	<b>E5-424-E0402</b>
LED double-function totalizer/timer/ratemeter, 10–30 Vdc power 0.94 x 1.89 in (24 x 48 mm)	<b>E5-524-E0402</b>
LED totalizer with quadrature, 10–30 Vdc power 0.94 x 1.89 in (24 x 48 mm)	<b>E5-024-E0432</b>

Electronic Courier Series Battery Powered LCD Totalizers



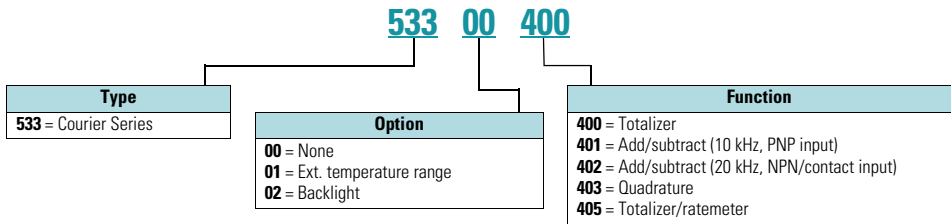
Features

- 8-digit totalizer
- 1/Tau ratemeter is an additional capability on the 53300405 only
- Scaling capabilities
- Remote reset terminal
- Type 4X protection
- Internal battery: 3V, lithium, replaceable battery

Catalog Number Selection

Electronic Courier Series Battery Powered LCD Totalizers

Courier Series



Product Selection

Courier Series, 8-Digit LCD Totalizers

Description	Catalog Number
Totalizer, battery	53300400
Add/subtract (10k Hz, PNP input) totalizer, battery	53300401
Add/subtract (20 Hz, NPN/contact input) totalizer, battery	53300402
Quadrature (10k Hz, PNP input) totalizer, battery	53300403
Totalizer/ratemeter, battery	53300405

## Electronic 1/8 DIN LED Totalizers



## Features

## LED Multifunction

- Display counter adding and subtracting
- Position display
- Frequency counter/ratemeter
- Display: 6-digit red, 7-segment LED display; 0.55 in (14 mm) high
- Polarity of inputs: programmable, NPN or PNP for all inputs

## Eclipse Series

- 1/8 DIN cutout
- Type 4X front panel protection
- Front panel programming

## Product Selection

## Electronic 1/8 DIN LED Totalizers

## 1/8 DIN LED Totalizers

Description	Catalog Number
<b>LED Multifunction Counter/Timer/Ratemeter</b>	
90–260 Vac power 3.78 x 1.89 in (96 x 48 mm)	<b>E5-496-E0401</b>
10–30 Vdc power 3.78 x 1.89 in (96 x 48 mm)	<b>E5-496-E0402</b>
<b>Eclipse Series LED Totalizer</b>	
9–30 Vdc power	<b>57700480</b>
85–265 Vac power	<b>57701480</b>
Analog out, 9–30 Vdc power	<b>57700482</b>
Analog out, 85–265 Vac power	<b>57701482</b>
RS-485 out, 9–30 Vdc power	<b>57700484</b>
RS-485 out, 85–265 Vac power	<b>57701484</b>
RS-485 out and analog out, 9–30 Vdc power	<b>57700486</b>
RS-485 out and analog out, 85–265 Vac power	<b>57701486</b>

Product Overview

Encoders Selection Guide



Description	Cube	Right-Angled
	<b>Page V9-T3-64</b>	<b>Page V9-T3-64</b>
Power supply	5–28 Vdc	5–28 Vdc
Output signal	NPN transistor	NPN transistor
Pulses per revolution	Up to 600	Up to 1,800
Maximum shaft speed	6000 RPM	8000 RPM
Mounting configuration(s)	Face or base mounted	Flange mounted
Shaft size	3/8 in	3/8 in
Maximum axial loading	10 lbs	80 lbs
Quadrature output available	Yes	Yes

For our complete product offering, see Volume 7—Logic Control, Operator Interface and Connectivity Solutions, CA08100008E and PG05400001E.

#### Shaft Encoders



#### Features

Cube style

- 5–28 Vdc input power
- Single channel and quadrature models
- 3/8 in (9.5 mm) double-ended shaft

Right-angled

- 5–28 Vdc input power
- Quadrature output, two square waves
- Flange mounting
- 3/8 in (9.5 mm) shaft diameter

### Product Selection

#### Shaft Encoders

##### Cube Shaft Encoders

Description	Catalog Number
<b>Single Channel</b>	
60 pulses per revolution	<b>38150060</b>
100 pulses per revolution	<b>38150100</b>
120 pulses per revolution	<b>38150120</b>
600 pulses per revolution	<b>38150600</b>
<b>Quadrature</b>	
60 pulses per revolution	<b>38151060</b>
100 pulses per revolution	<b>38151100</b>
120 pulses per revolution	<b>38151120</b>
600 pulses per revolution	<b>38151600</b>

##### Right-Angled Shaft Encoders, Size 20

Description	Catalog Number
100 pulses per revolution	<b>38159100</b>
120 pulses per revolution	<b>38159120</b>
600 pulses per revolution	<b>38159600</b>
1000 pulses per revolution	<b>381591000</b>
1800 pulses per revolution	<b>381591800</b>



**Pushbuttons and Pilot Devices**



**Stacklights**



**Panel Meters**



**Operator Interfaces and Programming Software**



<b>4.1 Pushbutton and Pilot Devices</b>	
Product Overview .....	<b>V9-T4-2</b>
M22—22.5 mm Modular Pushbutton.....	<b>V9-T4-4</b>
10250T—30 mm Pushbuttons .....	<b>V9-T4-37</b>
<b>4.2 Stacklights</b>	
Product Overview .....	<b>V9-T4-49</b>
E26 Stacklights .....	<b>V9-T4-50</b>
<b>4.3 Panel Meters</b>	
Product Overview .....	<b>V9-T4-54</b>
Digital Panel Meters .....	<b>V9-T4-55</b>
<b>4.4 Operator Interfaces and Programming Software</b>	
Product Overview .....	<b>V9-T4-56</b>
ELC-GP Graphics Panel .....	<b>V9-T4-59</b>
HMi Operator Interface .....	<b>V9-T4-60</b>
XV Operator Interface .....	<b>V9-T4-62</b>
XP Operator Interface .....	<b>V9-T4-65</b>

For our complete product offering, see Volume 7—Logic Control, Operator Interface and Connectivity Solutions, CA08100008E.

## Product Overview

### Pushbuttons and Pilot Devices Selection Guide



M22—22.5 mm Modular Pushbuttons



10250T—30 mm Pushbuttons

Description	M22—22.5 mm Modular Pushbuttons Page V9-T4-4	10250T—30 mm Pushbuttons Page V9-T4-37
<b>Ease of Use</b>		
Mounting nut on operator installation	Yes	Yes
Mounting adapter installation/removal	Easy	—
Contact block installation	Snaps on mounting adapter	Screw in
Contact block/light unit installation/removal	Easy	Easy
Visible actuator indication from rear	Yes	Yes
Optional spring cage terminations	Yes	—
Optional quick-connect terminations	Yes	Yes
Built-in or separate anti-rotation locking ring installation	Built-in	Built-in
Mounting time	Low	Low
Removal time	Low	Low
<b>Flexibility and Modularity</b>		
Field convertible pushbuttons—color or inscribed button caps	Yes	—
Field convertible pushbuttons—maintained to momentary	Yes	—
Field convertible selector switches—momentary to maintained	Yes	—
Field convertible key selector switches—key removal position	Yes	—
Universal voltage range LED light units <sup>①</sup>	Yes	—
Stackable contact blocks	Yes	—
Enclosed limit switch contacts <sup>②</sup>	Yes	—
<b>Safety and Security</b>		
ISO/EN 13850/EN 418 rated E-stops	Yes	Yes
Safety yellow E-stop enclosures	Yes	—
Secure anti-rotation mounting	Good	Good
Self-monitoring contact blocks	Yes, available 4Q 2010	No
<b>Communications</b>		
ASi bus network communications	Yes	—
DeviceNet network communications	—	—
PROFIBUS-DP network communications	—	—
<b>Esthetics and Ergonomics</b>		
Low profile design	Yes	—
Low power integrated LED illuminated devices	Yes	—
Permanent and wear-resistant markings	Yes	—
Square bezel pushbuttons and pilot lights	—	—

#### Notes

<sup>①</sup> Eaton's M22 LED light units come in two convenient universal ranges: 12–30 Vac/Vdc and 85–244 Vac.

<sup>②</sup> Eaton's M22 pushbutton, selector switch, and E-stop operators can be attached directly to Eaton's LS Series miniature limit switches.

For our complete product offering, see Volume 7—Logic Control, Operator Interface and Connectivity Solutions, CA08100008E.

## Pushbuttons and Pilot Devices Selection Guide, continued



M22—22.5 mm Modular Pushbuttons



10250T—30 mm Pushbuttons

Description	M22—22.5 mm Modular Pushbuttons	10250T—30 mm Pushbuttons
<b>Esthetics and Ergonomics</b>		
Positive detent on selector switches	Very good	Fair
Ergonomic dome shaped E-stop and palm switches	Yes	—
<b>Specialty Operator Types</b>		
Acoustic indicators (buzzers)	Yes	—
Double pushbutton operators	Yes	No
Elevator E-stops (with mechanical flag indication)	Yes	—
EMO E-stops	—	No
Four-way pushbutton operators	Yes	—
Joysticks	Yes	—
Potentiometers	Yes	Yes
Reset pushbutton operators	Yes	Yes
Selector pushbutton (roto-push) operators	—	—
Selector switches with key monitoring	—	—
Toggle switches	—	—
<b>Standards and Certifications</b>		
China Compulsory Certification—CCC (China)	Yes	—
Conformité Européenne—CE (Europe)	Yes	Yes
Canadian Standard Association—CSA (Canada)	Yes	Yes
Gosudarstvennyy Standart Russia—GOST R (Russia)	Yes	—
Underwriter's Laboratories—UL (United States)	Yes	Yes
<b>Marine Classification Societies</b>		
American Bureau of Shipping—ABS (United States)	—	—
Bureau Veritas—BV (France)	Yes	—
Det Norske Veritas—DNV (Norway)	Yes	—
Germanischer Lloyd—GL (Germany)	Yes	—
Lloyd's Register—LR (United Kingdom)	Yes	—
Polski Regestre Statkow—PRS (Poland)	—	—
Registro Italiano Navale—RINA (Italy)	—	—
Russian Maritime Register of Shipping—RMRS (CIS)	—	—
<b>Accessories</b>		
USB socket bulkhead interface	Yes	—
RJ45 socket bulkhead interface	Yes	—
Padlock attachments for pushbuttons	—	Yes
Padlock attachments for selector switches	—	Yes
Padlock attachments for E-stops	No	—
Protective shrouds for E-stops	Yes	Yes
DIN rail mounting adapter	Yes	—

For our complete product offering, see Volume 7—Logic Control, Operator Interface and Connectivity Solutions, CA08100008E.

# 4.1

## Operator Interface

### Pushbutton and Pilot Devices

M22—22.5 mm Modular Pushbutton



4

#### Features

Highly modular and versatile line

- Field convertible functions (pushbuttons and selector switches), maintained to momentary
- Customizable laser engraving capabilities

LED indicators

- 100,000 hours of life in high-vibration environments
- Lenses specifically designed for LED illumination

Rugged design

- Most pushbutton operators and contact blocks exceed 5 million mechanical operations
- All components have IP66 rating, and some carry IP67 and IP69K for washdown environment; see Volume 7—Logic Control, Operator Interface and Connectivity Solutions, CA08100008E, Tab 1 for further technical data

Innovative technologies

- ASi communicating devices
- Palm switches

#### Standards and Certifications



## Product Selection

## Non-Illuminated Pushbuttons, Flush, Momentary

## Complete Devices

	Bezel	Button Color	Contact Block Configuration <sup>①</sup>	Catalog Number
<b>M22-D-G-K10</b> 	Silver	Black	NO	<b>M22-D-S-K10</b>
			NC	<b>M22-D-S-K01</b>
			2NO	<b>M22-D-S-K20</b>
			2NC	<b>M22-D-S-K02</b>
			1NO-1NC	<b>M22-D-S-K11</b>
			Red	NO
	NC	<b>M22-D-R-K01</b>		
	2NO	<b>M22-D-R-K20</b>		
	2NC	<b>M22-D-R-K02</b>		
	1NO-1NC	<b>M22-D-R-K11</b>		
	Green	NO		<b>M22-D-G-K10</b>
		NC	<b>M22-D-G-K01</b>	
2NO		<b>M22-D-G-K20</b>		
2NC		<b>M22-D-G-K02</b>		
1NO-1NC		<b>M22-D-G-K11</b>		
<b>M22S-D-G-K10</b> 		Black	Black	NO
	NC			<b>M22S-D-S-K01</b>
	2NO			<b>M22S-D-S-K20</b>
	2NC			<b>M22S-D-S-K02</b>
	1NO-1NC			<b>M22S-D-S-K11</b>
	Red			NO
			NC	<b>M22S-D-R-K01</b>
			2NO	<b>M22S-D-R-K20</b>
			2NC	<b>M22S-D-R-K02</b>
			1NO-1NC	<b>M22S-D-R-K11</b>
			Green	NO
	NC			<b>M22S-D-G-K01</b>
	2NO			<b>M22S-D-G-K20</b>
	2NC			<b>M22S-D-G-K02</b>
	1NO-1NC			<b>M22S-D-G-K11</b>

**Note**

<sup>①</sup> All NC contact blocks are positively driven contact. (⊖)

#### Non-Illuminated Pushbuttons, Flush

##### Components


###### M22-XD-G





##### Button Plates ①

Color	Inscription	Catalog Number
Black	—	<b>M22-XD-S</b> ②
	Custom	<b>M22-XD-S-ETCH</b> ③
	STOP	<b>M22-XD-S-GB0</b>
	START	<b>M22-XD-S-GB1</b>
	CLOSE	<b>M22-XD-S-GB2</b>
	UP	<b>M22-XD-S-GB3</b>
	DOWN	<b>M22-XD-S-GB4</b>
	OFF	<b>M22-XD-S-GB5</b>
	ON	<b>M22-XD-S-GB6</b>
	TEST	<b>M22-XD-S-GB9</b>
	FORWARD	<b>M22-XD-S-GB15</b>
	REVERSE	<b>M22-XD-S-GB16</b>
	RAISE	<b>M22-XD-S-GB17</b>
	LOWER	<b>M22-XD-S-GB18</b>
	⊙	<b>M22-XD-S-X0</b>
	①	<b>M22-XD-S-X1</b>
	②	<b>M22-XD-S-X2</b>
+	<b>M22-XD-S-X4</b>	
⊖	<b>M22-XD-S-X5</b>	
①	<b>M22-XD-S-X7</b>	
Red	—	<b>M22-XD-R</b> ②
	Custom	<b>M22-XD-R-ETCH</b> ③
	STOP	<b>M22-XD-R-GB0</b>
	OFF	<b>M22-XD-R-GB5</b>
	⊙	<b>M22-XD-R-X0</b>
Green	—	<b>M22-XD-G</b> ②
	Custom	<b>M22-XD-G-ETCH</b> ③
	START	<b>M22-XD-G-GB1</b>
	ON	<b>M22-XD-G-GB6</b>
	①	<b>M22-XD-G-X1</b>
Blue	—	<b>M22-XD-B</b> ②
	Custom	<b>M22-XD-B-ETCH</b> ③
	RESET	<b>M22-XD-B-GB14</b>
	Ⓜ	<b>M22-XD-B-X6</b>
White	—	<b>M22-XD-W</b> ②
	Custom	<b>M22-XD-W-ETCH</b> ③
	START	<b>M22-XD-W-GB1</b>
	①	<b>M22-XD-W-X1</b>
Yellow	—	<b>M22-XD-Y</b> ②
	Custom	<b>M22-XD-Y-ETCH</b> ③
Black, red, green	—	<b>M22-XD-SRG</b>
Black, white, red, green, yellow, blue	—	<b>M22-XD-SWRGB</b>

##### Momentary Buttonless Operator

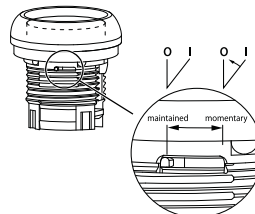
	Bezel	Catalog Number ④
<b>M22-D-X</b>	Silver	<b>M22-D-X</b>
		
<b>M22S-D-X</b>	Black	<b>M22S-D-X</b>
		
<b>M22-DG-X</b>	Silver guarded	<b>M22-DG-X</b>
		

##### Maintained Buttonless Operator ⑤

	Bezel	Catalog Number ④
<b>M22-DR-X</b>	Silver	<b>M22-DR-X</b>
		
<b>M22S-DR-X</b>	Black	<b>M22S-DR-X</b>
		




##### Notes

- ① For complete listing of available button plates and contact blocks, see Accessories, **Pages V9-T4-31 to V9-T4-36**.
- ② Minimum order quantity of (10).
- ③ When ordering, specify inscription per catalog number suffix from the Symbols Library (see Volume 7—Logic Control, Operator Interface and Connectivity Solutions, CA08100008E, Tab 1) into the Order Notes. For example, M22-XD-S-ETCH; Order Notes: Mark with symbol X91, Line item #\_.
- ④ Includes contact block mounting adapter.
- ⑤ Maintained pushbuttons can be converted in the field to momentary operation by switching the locking ring, which is accessible through the side of the operator body.



## Non-Illuminated Pushbuttons, Extended, Momentary

## Complete Devices

	Bezel	Button Color	Contact Block Configuration <sup>①</sup>	Catalog Number
<b>M22-DH-R-K10</b> 	Silver	Red	NO	<b>M22-DH-R-K10</b>
			NC	<b>M22-DH-R-K01</b>
			2NO	<b>M22-DH-R-K20</b>
			2NC	<b>M22-DH-R-K02</b>
			1NO-1NC	<b>M22-DH-R-K11</b>
<b>M22S-DH-R-K10</b> 	Black	Red	NO	<b>M22S-DH-R-K10</b>
			NC	<b>M22S-DH-R-K01</b>
			2NO	<b>M22S-DH-R-K20</b>
			2NC	<b>M22S-DH-R-K02</b>
			1NO-1NC	<b>M22S-DH-R-K11</b>
<b>M22-DGH-R-K10</b> 	Silver guarded	Red	NO	<b>M22-DGH-R-K10</b>
			NC	<b>M22-DGH-R-K01</b>
			2NO	<b>M22-DGH-R-K20</b>
			2NC	<b>M22-DGH-R-K02</b>
			1NO-1NC	<b>M22-DGH-R-K11</b>

**Note**

<sup>①</sup> All NC contact blocks are positively driven contact. ⊖

#### Non-Illuminated Pushbuttons, Extended

##### Components

###### M22-XDH-R



##### Button Plates <sup>①</sup>

Color	Inscription	Catalog Number
Black	—	M22-XDH-S <sup>②</sup>
	Custom	M22-XDH-S-ETCH <sup>③</sup>
	STOP	M22-XDH-S-GB0
	START	M22-XDH-S-GB1
	CLOSE	M22-XDH-S-GB2
	UP	M22-XDH-S-GB3
	DOWN	M22-XDH-S-GB4
	OFF	M22-XDH-S-GB5
	ON	M22-XDH-S-GB6
	TEST	M22-XDH-S-GB9
	FORWARD	M22-XDH-S-GB15
	REVERSE	M22-XDH-S-GB16
	RAISE	M22-XDH-S-GB17
	LOWER	M22-XDH-S-GB18
	Ⓞ	M22-XDH-S-X0
	①	M22-XDH-S-X1
	②	M22-XDH-S-X2
Red	—	M22-XDH-R <sup>②</sup>
	Custom	M22-XDH-R-ETCH <sup>③</sup>
	STOP	M22-XDH-R-GB0
	OFF	M22-XDH-R-GB5
	Ⓞ	M22-XDH-R-X0
	①	M22-XDH-R-X1
	②	M22-XDH-R-X2
Green	—	M22-XDH-G <sup>②</sup>
	Custom	M22-XDH-G-ETCH <sup>③</sup>
	START	M22-XDH-G-GB1
	ON	M22-XDH-G-GB6
Blue	—	M22-XDH-B <sup>②</sup>
	Custom	M22-XDH-B-ETCH <sup>③</sup>
	RESET	M22-XDH-B-GB14
White	—	M22-XDH-W <sup>②</sup>
	Custom	M22-XDH-W-ETCH <sup>③</sup>
	START	M22-XDH-W-GB1
Yellow	—	M22-XDH-Y <sup>②</sup>
	Custom	M22-XDH-Y-ETCH <sup>③</sup>
Black, red, green	—	M22-XDH-SRG
Black, white, red, green, yellow, blue	—	M22-XDH-SWRGYB

##### Momentary Buttonless Operator

Bezel Catalog Number <sup>④</sup>

###### M22-D-X



Silver

M22-D-X

###### M22S-D-X



Black

M22S-D-X

###### M22-DG-X



Silver guarded

M22-DG-X

##### Maintained Buttonless Operator <sup>⑤</sup>

Bezel Catalog Number <sup>④</sup>

###### M22-DR-X



Silver

M22-DR-X

###### M22S-DR-X

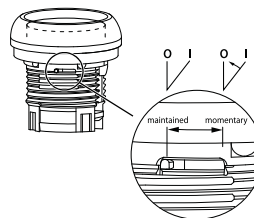


Black

M22S-DR-X

##### Notes



- ① For complete listing of available button plates and contact blocks, see Accessories, Pages V9-T4-31 to V9-T4-36.
- ② Minimum order quantity of (10).
- ③ When ordering, specify inscription per catalog number suffix from the Symbols Library (see Volume 7—Logic Control, Operator Interface and Connectivity Solutions, CA08100008E, Tab 1) into the Order Notes. For example, M22-XDH-S-ETCH; Order Notes: Mark with symbol X91, Line item #\_.
- ④ Includes contact block mounting adapter.
- ⑤ Maintained pushbuttons can be converted in the field to momentary operation by switching the locking ring, which is accessible through the side of the operator body.





## Illuminated Pushbuttons, Flush, Momentary

## Complete Devices

	Bezel	Button Color	Contact Block Configuration <sup>①</sup>	Light Unit Voltage	Catalog Number
	Silver	Red	NC	12–30 Vac/Vdc	<b>M22-DL-R-K01-R</b>
			NC	85–264 Vac	<b>M22-DL-R-K01-230R</b>
			2NC	12–30 Vac/Vdc	<b>M22-DL-R-K02-R</b>
			2NC	85–264 Vac	<b>M22-DL-R-K02-230R</b>
			1NO/1NC	12–30 Vac/Vdc	<b>M22-DL-R-K11-R</b>
			1NO/1NC	85–264 Vac	<b>M22-DL-R-K11-230R</b>
	Green	Green	NO	12–30 Vac/Vdc	<b>M22-DL-G-K10-G</b>
			NO	85–264 Vac	<b>M22-DL-G-K10-230G</b>
			2NO	12–30 Vac/Vdc	<b>M22-DL-G-K20-G</b>
			2NO	85–264 Vac	<b>M22-DL-G-K20-230G</b>
			1NO/1NC	12–30 Vac/Vdc	<b>M22-DL-G-K11-G</b>
			1NO/1NC	85–264 Vac	<b>M22-DL-G-K11-230G</b>
	White	White	NO	12–30 Vac/Vdc	<b>M22-DL-W-K10-W</b>
			NO	85–264 Vac	<b>M22-DL-W-K10-230W</b>
			2NO	12–30 Vac/Vdc	<b>M22-DL-W-K20-W</b>
			2NO	85–264 Vac	<b>M22-DL-W-K20-230W</b>
			1NO/1NC	12–30 Vac/Vdc	<b>M22-DL-W-K11-W</b>
			1NO/1NC	85–264 Vac	<b>M22-DL-W-K11-230W</b>
	Black	Red	NC	12–30 Vac/Vdc	<b>M22S-DL-R-K01-R</b>
			NC	85–264 Vac	<b>M22S-DL-R-K01-230R</b>
			2NC	12–30 Vac/Vdc	<b>M22S-DL-R-K02-R</b>
			2NC	85–264 Vac	<b>M22S-DL-R-K02-230R</b>
			1NO/1NC	12–30 Vac/Vdc	<b>M22S-DL-R-K11-R</b>
			1NO/1NC	85–264 Vac	<b>M22S-DL-R-K11-230R</b>
	Green	Green	NO	12–30 Vac/Vdc	<b>M22S-DL-G-K10-G</b>
			NO	85–264 Vac	<b>M22S-DL-G-K10-230G</b>
			2NO	12–30 Vac/Vdc	<b>M22S-DL-G-K20-G</b>
			2NO	85–264 Vac	<b>M22S-DL-G-K20-230G</b>
			1NO/1NC	12–30 Vac/Vdc	<b>M22S-DL-G-K11-G</b>
			1NO/1NC	85–264 Vac	<b>M22S-DL-G-K11-230G</b>
	White	White	NO	12–30 Vac/Vdc	<b>M22S-DL-W-K10-W</b>
			NO	85–264 Vac	<b>M22S-DL-W-K10-230W</b>
			2NO	12–30 Vac/Vdc	<b>M22S-DL-W-K20-W</b>
			2NO	85–264 Vac	<b>M22S-DL-W-K20-230W</b>
			1NO/1NC	12–30 Vac/Vdc	<b>M22S-DL-W-K11-W</b>
			1NO/1NC	85–264 Vac	<b>M22S-DL-W-K11-230W</b>

**Note**

<sup>①</sup> All NC contact blocks are positively driven contact. ⊖

#### Illuminated Pushbuttons, Flush

##### Components

###### M22-XDL-G



##### Button Lenses <sup>①</sup>

Color	Inscription	Catalog Number
Red	—	<b>M22-XDL-R</b> <sup>②</sup>
	Custom	<b>M22-XDL-R-ETCH</b> <sup>③</sup>
	STOP	<b>M22-XDL-R-GB0</b>
	OFF	<b>M22-XDL-R-GB5</b>
	Ⓞ	<b>M22-XDL-R-X0</b>
Green	—	<b>M22-XDL-G</b> <sup>②</sup>
	Custom	<b>M22-XDL-G-ETCH</b> <sup>③</sup>
	START	<b>M22-XDL-G-GB1</b>
	ON	<b>M22-XDL-G-GB6</b>
	Ⓛ	<b>M22-XDL-G-X1</b>
Blue	—	<b>M22-XDL-B</b> <sup>②</sup>
	Custom	<b>M22-XDL-B-ETCH</b> <sup>③</sup>
	RESET	<b>M22-XDL-B-GB14</b>
	Ⓜ	<b>M22-XDL-B-X6</b>
White	—	<b>M22-XDL-W</b> <sup>②</sup>
	Custom	<b>M22-XDL-W-ETCH</b> <sup>③</sup>
Yellow	—	<b>M22-XDL-Y</b> <sup>②</sup>
	Custom	<b>M22-XDL-Y-ETCH</b> <sup>③</sup>

##### Momentary Buttonless Operator

Bezel Catalog Number <sup>④</sup>

###### M22-DL-X



Silver

**M22-DL-X**

###### M22S-DL-X



Black

**M22S-DL-X**

###### M22-DGL-X



Silver guarded

**M22-DGL-X**

##### Maintained Buttonless Operator <sup>⑤</sup>

Bezel Catalog Number <sup>④</sup>

###### M22-DRL-X



Silver

**M22-DRL-X**

###### M22S-DRL-X

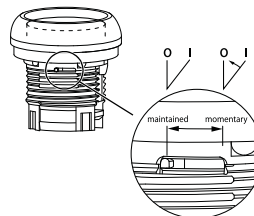


Black

**M22S-DRL-X**



##### Notes

- ① For complete listing of available button plates and contact blocks, see Accessories, **Pages V9-T4-31 to V9-T4-36**.
- ② Minimum order quantity of (10).
- ③ When ordering, specify inscription per catalog number suffix from the Symbols Library (see Volume 7—Logic Control, Operator Interface and Connectivity Solutions, CA08100008E, Tab 1) into the Order Notes. For example, M22-XDL-R-ETCH; Order Notes: Mark with symbol X91, Line item #\_.
- ④ Includes contact block mounting adapter.
- ⑤ Maintained pushbuttons can be converted in the field to momentary operation by switching the locking ring, which is accessible through the side of the operator body.



## Illuminated Pushbuttons, Extended, Momentary

## Complete Devices

	Bezel	Button Color	Contact Block Configuration <sup>①</sup>	Light Unit Voltage	Catalog Number
<b>M22-DLH-R-K11-R</b> 	Silver	Red	1NO/1NC	12–30 Vac/Vdc	<b>M22-DLH-R-K11-R</b>
			1NO/1NC	85–264 Vac	<b>M22-DLH-R-K11-230R</b>
	Black	Green	2NO	12–30 Vac/Vdc	<b>M22-DLH-G-K20-G</b>
			2NO	85–264 Vac	<b>M22-DLH-G-K20-230G</b>
		White	2NO	12–30 Vac/Vdc	<b>M22-DLH-W-K20-W</b>
			2NO	85–264 Vac	<b>M22-DLH-W-K20-230W</b>
<b>M22S-DLH-R-K11-R</b> 	Black	Red	1NO/1NC	12–30 Vac/Vdc	<b>M22S-DLH-R-K11-R</b>
			1NO/1NC	85–264 Vac	<b>M22S-DLH-R-K11-230R</b>
	Black	Green	2NO	12–30 Vac/Vdc	<b>M22S-DLH-G-K20-G</b>
			2NO	85–264 Vac	<b>M22S-DLH-G-K20-230G</b>
		White	2NO	12–30 Vac/Vdc	<b>M22S-DLH-W-K20-W</b>
			2NO	85–264 Vac	<b>M22S-DLH-W-K20-230W</b>

**Note**

<sup>①</sup> All NC contact blocks are positively driven contact. ⊖

#### Illuminated Pushbuttons, Extended

##### Components

###### M22-XDH-R





##### Button Lenses ①

Color	Inscription	Catalog Number
Red	—	<b>M22-XDLH-R</b> ②
	Custom	<b>M22-XDLH-R-ETCH</b> ③
	STOP	<b>M22-XDLH-R-GB0</b>
	OFF	<b>M22-XDLH-R-GB5</b>
	Ⓞ	<b>M22-XDLH-R-X0</b>
Green	—	<b>M22-XDLH-G</b> ②
	Custom	<b>M22-XDLH-G-ETCH</b> ③
	START	<b>M22-XDLH-G-GB1</b>
	ON	<b>M22-XDLH-G-GB6</b>
	Ⓛ	<b>M22-XDLH-G-X1</b>
Blue	—	<b>M22-XDLH-B</b> ②
	Custom	<b>M22-XDLH-B-ETCH</b> ③
	RESET	<b>M22-XDLH-B-GB14</b>
	Ⓜ	<b>M22-XDLH-B-X6</b>
White	—	<b>M22-XDLH-W</b> ②
	Custom	<b>M22-XDLH-W-ETCH</b> ③
Yellow	—	<b>M22-XDLH-Y</b> ②
	Custom	<b>M22-XDLH-Y-ETCH</b> ③

##### Momentary Buttonless Operator

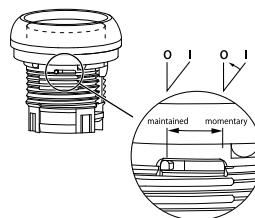
	Bezel	Catalog Number ④
<b>M22-DL-X</b>	Silver	<b>M22-DL-X</b>
		
<b>M22S-DL-X</b>	Black	<b>M22S-DL-X</b>
		
<b>M22-DGL-X</b>	Silver guarded	<b>M22-DGL-X</b>
		

##### Maintained Buttonless Operator ⑤

	Bezel	Catalog Number ④
<b>M22-DRL-X</b>	Silver	<b>M22-DRL-X</b>
		
<b>M22S-DRL-X</b>	Black	<b>M22S-DRL-X</b>
		

##### Notes

- ① For complete listing of available button plates and contact blocks, see Accessories, **Pages V9-T4-31 to V9-T4-36**.
- ② Minimum order quantity of (10).
- ③ When ordering, specify inscription per catalog number suffix from the Symbols Library (see Volume 7—Logic Control, Operator Interface and Connectivity Solutions, CA08100008E, Tab 1) into the Order Notes. For example, M22-XDH-S-ETCH; Order Notes: Mark with symbol X91, Line item #\_.
- ④ Includes contact block mounting adapter.
- ⑤ Maintained pushbuttons can be converted in the field to momentary operation by switching the locking ring, which is accessible through the side of the operator body.



## Indicating Lights, Flush

## M22-L-R-R



## Complete Devices

Lens Color	Light Color	Light Unit Voltage	Catalog Number
White	White	12–30 Vac/Vdc	M22-L-W-W
Red	Red		M22-L-R-R
Green	Green		M22-L-G-G
Yellow	White		M22-L-Y-W
Blue	Blue		M22-L-B-B
Amber	White		M22-L-A-W
White	White	85–264 Vac	M22-L-W-230W
Red	Red		M22-L-R-230R
Green	Green		M22-L-G-230G
Yellow	White		M22-L-Y-230W
Blue	Blue		M22-L-B-230B
Amber	White		M22-L-A-230W

## M22S-DLH-R-K11-R



## Complete Press-to-Test Units

Bezel	Button Color	Light Unit Voltage	Catalog Number
Silver	Red	12–30 Vac/Vdc	M22-T-R-R
	Blue		M22-T-B-B
	Yellow		M22-T-Y-W
	Green		M22-T-G-G
	White		M22-T-W-W
	Red	85–264 Vac	M22-T-R-230R
	Blue		M22-T-R-230B
	Yellow		M22-T-Y-230W
	Green		M22-T-G-230G
	White		M22-T-W-230W
Black	Red	12–30 Vac/Vdc	M22S-T-R-R
	Blue		M22S-T-B-B
	Yellow		M22S-T-Y-W
	Green		M22S-T-G-G
	White		M22S-T-W-W
	Red	85–264 Vac	M22S-T-R-230R
	Blue		M22S-T-B-230B
	Yellow		M22S-T-Y-230W
	Green		M22S-T-G-230G
	White		M22S-T-W-230W

## Components

## M22-XL-R

Lenses <sup>①</sup>

Color	Inscription	Catalog Number
Red	—	<b>M22-XL-R</b> <sup>②</sup>
	Custom	<b>M22-XL-R-ETCH</b> <sup>③</sup>
	OFF	<b>M22-XL-R-GB5</b>
Green	—	<b>M22-XL-G</b> <sup>②</sup>
	Custom	<b>M22-XL-G-ETCH</b> <sup>③</sup>
	ON	<b>M22-XL-G-GB6</b>
	REVERSE	<b>M22-XL-G-GB16</b>
Blue	—	<b>M22-XL-B</b> <sup>②</sup>
	Custom	<b>M22-XL-B-ETCH</b> <sup>③</sup>
	FAULT	<b>M22-XL-B-GB8</b>
White	—	<b>M22-XL-W</b> <sup>②</sup>
	Custom	<b>M22-XL-W-ETCH</b> <sup>③</sup>
	OFF	<b>M22-XL-W-GB5</b>
	ON	<b>M22-XL-W-GB6</b>
	FAULT	<b>M22-XL-W-GB8</b>
	FORWARD	<b>M22-XL-W-GB15</b>
Yellow	—	<b>M22-XL-Y</b> <sup>②</sup>
	Custom	<b>M22-XL-Y-ETCH</b> <sup>③</sup>
Amber	—	<b>M22-XL-A</b> <sup>②</sup>
	Custom	<b>M22-XL-A-ETCH</b> <sup>③</sup>

## M22-L-X



## Lensless Indicating Light

## Catalog Number

**M22-L-X**

## Notes

- ① For complete listing of available lenses and light units, see Accessories, **Pages V9-T4-31 to V9-T4-36**.
- ② Minimum order quantity of (10).
- ③ When ordering, specify inscription per catalog number suffix from the Symbols Library (see Volume 7—Logic Control, Operator Interface and Connectivity Solutions, CA08100008E, Tab 1) into the Order Notes. For example, M22-XL-R-ETCH; Order Notes: Mark with symbol X91, Line item #\_.

## Non-Illuminated Emergency Stops

M22-PV-K01

## Complete Devices



Type	Color	Contact Block Configuration <sup>①</sup>	Catalog Number
Push-pull	Red	NC	<b>M22-PV-K01</b>
		2NC	<b>M22-PV-K02</b>
		1NO-2NC	<b>M22-PV-K12</b>
Twist-to-release	Red	NC	<b>M22-PVT-K01</b>
		2NC	<b>M22-PVT-K02</b>
		1NO-2NC	<b>M22-PVT-K12</b>
Key release	Red	NC	<b>M22-PVS-K01</b>
		2NC	<b>M22-PVS-K02</b>
		1NO-2NC	<b>M22-PVS-K12</b>

## Components

Operators Only <sup>②</sup>

M22-PV



Type	Color	Catalog Number
Push-pull	Red	<b>M22-PV</b>
	Black	<b>M22S-PV</b>

M22S-PVT



Twist-to-release	Red	<b>M22-PVT</b>
	Black	<b>M22S-PVT</b>

Key release <sup>③</sup>	Red	<b>M22-PVS <sup>④</sup></b>
		<b>M22-PVS-MS2</b>
		<b>M22-PVS-MS3</b>
		<b>M22-PVS-MS4</b>
		<b>M22-PVS-MS5</b>
		<b>M22-PVS-MS6</b>
		<b>M22-PVS-MS7</b>
		<b>M22-PVS-MS8</b>

## Notes

- ① All NC contact blocks are positively driven contact. ↻
- ② Includes contact block mounting adapter.
- ③ Key included. For identical locks and keys, use the same key code. One key is included with actuator; additional keys are available as accessories.
- ④ Includes Key Code MS1.

#### Illuminated Emergency Stops

M22-PVL-K01-R

#### Complete Devices



Type	Button Color	LED Color	Contact Block Configuration <sup>①</sup>	Light Unit Voltage	Catalog Number
Push-pull	Red	Red	NC	12–30 Vac/Vdc	<b>M22-PVL-K01-R</b>
			2NC	12–30 Vac/Vdc	<b>M22-PVL-K02-R</b>
			1NO-2NC	12–30 Vac/Vdc	<b>M22-PVL-K12-R</b>
			NC	85–264 Vac	<b>M22-PVL-K01-230R</b>
			2NC	85–264 Vac	<b>M22-PVL-K02-230R</b>
			1NO-2NC	85–264 Vac	<b>M22-PVL-K12-230R</b>
Twist-to-release			NC	12–30 Vac/Vdc	<b>M22-PVLT-K01-R</b>
			2NC	12–30 Vac/Vdc	<b>M22-PVLT-K02-R</b>
			1NO-2NC	12–30 Vac/Vdc	<b>M22-PVLT-K12-R</b>
			NC	85–264 Vac	<b>M22-PVLT-K01-230R</b>
			2NC	85–264 Vac	<b>M22-PVLT-K02-230R</b>
			1NO-2NC	85–264 Vac	<b>M22-PVLT-K12-230R</b>

#### Components

#### Operators Only <sup>②</sup>

M22-PVL



Type	Color	Catalog Number
Push-pull	Red	<b>M22-PVL</b>
	Black	<b>M22S-PVL</b>

M22S-PVLT



Twist-to-release	Red	<b>M22-PVLT</b>
	Black	<b>M22S-PVLT</b>

#### Notes

<sup>①</sup> All NC contact blocks are positively driven contact. ⊖




<sup>②</sup> Includes contact block mounting adapter.



## Non-Illuminated Selector Switches

M22-WKV-K10

Complete Devices, Knob Type <sup>①</sup>

Type	Switching Position	Bezel	Contact Block Configuration <sup>②</sup>	Catalog Number
Two-position	Maintained 	Silver	NO	M22-WRK-K10
			1NO-1NC	M22-WRK-K11
			2NO-2NC	M22-WRK-K22
		Black	NO	M22S-WRK-K10
			1NO-1NC	M22S-WRK-K11
			2NO-2NC	M22S-WRK-K22
	Maintained V 	Silver	NO	M22-WKV-K10
			1NO-1NC	M22-WKV-K11
			2NO-2NC	M22-WKV-K22
		Black	NO	M22S-WKV-K10
			1NO-1NC	M22S-WKV-K11
			2NO-2NC	M22S-WKV-K22
Three-position	Maintained 	Silver	2NO	M22-WRK3-K20
			2NO-2NC	M22-WRK3-K22
			Black	2NO
		Black	2NO-2NC	M22S-WRK3-K22

**Notes**<sup>①</sup> Includes contact block mounting adapter.<sup>②</sup> All NC contact blocks are positively driven contact. ⊖

#### Non-Illuminated Selector Switches, continued

##### Components

M22-WK

##### Operators Only, Knob Type ①

4



Type	Switching Position	Bezel	Catalog Number
Two-position	Momentary ② 	Silver	<b>M22-WK</b>
		Black	<b>M22S-WK</b>
	Maintained 	Silver	<b>M22-WRK</b>
		Black	<b>M22S-WRK</b>
	Maintained V 	Silver	<b>M22-WKV</b>
		Black	<b>M22S-WKV</b>
Three-position	Momentary ② 	Silver	<b>M22-WK3</b>
		Black	<b>M22S-WK3</b>
	Maintained 	Silver	<b>M22-WRK3</b>
		Black	<b>M22S-WRK3</b>
	Maintained, return from left 	Silver	<b>M22-WRK3-2</b>
		Black	<b>M22S-WRK3-2</b>
	Maintained, return from right 	Silver	<b>M22-WRK3-1</b>
		Black	<b>M22S-WRK3-1</b>
Four-position	Maintained 	Silver	<b>M22-WRK4</b>
		Black	<b>M22S-WRK4</b>

##### Notes

- ① Includes contact block mounting adapter.
- ② Momentary selector switches can be converted in the field to maintained operation with the removal of a color coded adapter. See Volume 7—Logic Control, Operator Interface and Connectivity Solutions, CA0810008E, Tab 1.

**Non-Illuminated Selector Switches, continued**

**Components**

**M22S-WR3-X94**



**Operators Only, Rotary Type** <sup>①</sup>

Type	Switching Position	Bezel	Inscription	Catalog Number
Two-position	Momentary <sup>②</sup>	Silver	I-O	<b>M22-W</b>
		Black	I-O	<b>M22S-W</b>
	Maintained	Silver	I-O	<b>M22-WR</b>
			Custom	<b>M22-WR-ETCH</b> <sup>③</sup>
			AUTO-HAND	<b>M22-WR-X91</b>
			II-I	<b>M22-WR-X92</b>
		Black	I-O	<b>M22S-WR</b>
			Custom	<b>M22S-WR-ETCH</b> <sup>③</sup>
			AUTO-HAND	<b>M22S-WR-X91</b>
			II-I	<b>M22S-WR-X92</b>
Three-position	Momentary <sup>②</sup>	Silver	I-O-II	<b>M22-W3</b>
		Black	I-O-II	<b>M22S-W3</b>
	Maintained	Silver	I-O-II	<b>M22-WR3</b>
			Custom	<b>M22-WR3-ETCH</b> <sup>③</sup>
		Black	AUTO-O-MAN	<b>M22-WR3-X94</b>
			I-O-II	<b>M22S-WR3</b>
Four-position	Maintained	Silver	0-1-0-2-0-3-0-4	<b>M22-WR4</b>
		Black	0-1-0-2-0-3-0-4	<b>M22S-WR4</b>

**Notes**

- ① Includes contact block mounting adapter.
- ② Momentary selector switches can be converted in the field to maintained operation with the removal of a color coded adapter. See Volume 7—Logic Control, Operator Interface and Connectivity Solutions, CA08100008E, Tab 1.
- ③ When ordering, specify inscription per catalog number suffix from the Symbols Library (see Volume 7—Logic Control, Operator Interface and Connectivity Solutions, CA08100008E, Tab 1) into the Order Notes. For example, M22-WR3-ETCH; Order Notes: Mark with symbol X88, Line item #\_.

#### Illuminated Selector Switches

##### Components

M22-WLK-W



#### Operators Only, Knob Type <sup>①</sup>

Type	Switching Position	Bezel	Button Color	Catalog Number	
Two-position	Momentary <sup>②</sup>	Silver	White	<b>M22-WLK-W</b>	
			Red	<b>M22-WLK-R</b>	
			Green	<b>M22-WLK-G</b>	
			Yellow	<b>M22-WLK-Y</b>	
			Blue	<b>M22-WLK-B</b>	
			Black	<b>M22S-WLK-W</b>	
	Black	Momentary <sup>②</sup>	Black	White	<b>M22S-WLK-W</b>
				Red	<b>M22S-WLK-R</b>
				Green	<b>M22S-WLK-G</b>
				Yellow	<b>M22S-WLK-Y</b>
				Blue	<b>M22S-WLK-B</b>
				Black	<b>M22S-WLK-B</b>
	Maintained	Momentary <sup>②</sup>	Silver	White	<b>M22-WRLK-W</b>
				Red	<b>M22-WRLK-R</b>
				Green	<b>M22-WRLK-G</b>
				Yellow	<b>M22-WRLK-Y</b>
				Blue	<b>M22-WRLK-B</b>
				Black	<b>M22S-WRLK-W</b>
Black		Momentary <sup>②</sup>	Black	White	<b>M22S-WRLK-W</b>
				Red	<b>M22S-WRLK-R</b>
				Green	<b>M22S-WRLK-G</b>
				Yellow	<b>M22S-WRLK-Y</b>
				Blue	<b>M22S-WRLK-B</b>
				Black	<b>M22S-WRLK-B</b>
Maintained V	Maintained	Silver	White	<b>M22-WLKV-W</b>	
			Red	<b>M22-WLKV-R</b>	
			Green	<b>M22-WLKV-G</b>	
			Yellow	<b>M22-WLKV-Y</b>	
			Blue	<b>M22-WLKV-B</b>	
			Black	<b>M22S-WLKV-W</b>	
	Black	Maintained	Black	White	<b>M22S-WLKV-W</b>
				Red	<b>M22S-WLKV-R</b>
				Green	<b>M22S-WLKV-G</b>
				Yellow	<b>M22S-WLKV-Y</b>
				Blue	<b>M22S-WLKV-B</b>
				Black	<b>M22S-WLKV-B</b>

#### Notes

- ① Includes contact block mounting adapter.
- ② Momentary selector switches can be converted in the field to maintained operation with the removal of a color coded adapter. See Volume 7—Logic Control, Operator Interface and Connectivity Solutions, CA08100008E, Tab 1.





## Illuminated Selector Switches, continued

## Components

M22-WLK3-W



## Operators Only, Knob Type ①

Type	Switching Position	Bezel	Button Color	Catalog Number
Three-position	Momentary ② 	Silver	White	<b>M22-WLK3-W</b>
			Red	<b>M22-WLK3-R</b>
			Green	<b>M22-WLK3-G</b>
			Yellow	<b>M22-WLK3-Y</b>
			Blue	<b>M22-WLK3-B</b>
	Black	White	<b>M22S-WLK3-W</b>	
		Red	<b>M22S-WLK3-R</b>	
		Green	<b>M22S-WLK3-G</b>	
		Yellow	<b>M22S-WLK3-Y</b>	
		Blue	<b>M22S-WLK3-B</b>	
Maintained	Silver 	Silver	White	<b>M22-WRLK3-W</b>
			Red	<b>M22-WRLK3-R</b>
			Green	<b>M22-WRLK3-G</b>
			Yellow	<b>M22-WRLK3-Y</b>
			Blue	<b>M22-WRLK3-B</b>
	Black	White	<b>M22S-WRLK3-W</b>	
		Red	<b>M22S-WRLK3-R</b>	
		Green	<b>M22S-WRLK3-G</b>	
		Yellow	<b>M22S-WRLK3-Y</b>	
		Blue	<b>M22S-WRLK3-B</b>	
Maintained, return from right	Silver 	Silver	White	<b>M22-WRLK3-1-W</b>
			Red	<b>M22-WRLK3-1-R</b>
			Green	<b>M22-WRLK3-1-G</b>
			Yellow	<b>M22-WRLK3-1-Y</b>
			Blue	<b>M22-WRLK3-1-B</b>
	Black	White	<b>M22S-WRLK3-1-W</b>	
		Red	<b>M22S-WRLK3-1-R</b>	
		Green	<b>M22S-WRLK3-1-G</b>	
		Yellow	<b>M22S-WRLK3-1-Y</b>	
		Blue	<b>M22S-WRLK3-1-B</b>	
Maintained, return from left	Silver 	Silver	White	<b>M22-WRLK3-2-W</b>
			Red	<b>M22-WRLK3-2-R</b>
			Green	<b>M22-WRLK3-2-G</b>
			Yellow	<b>M22-WRLK3-2-Y</b>
			Blue	<b>M22-WRLK3-2-B</b>
	Black	White	<b>M22S-WRLK3-2-W</b>	
		Red	<b>M22S-WRLK3-2-R</b>	
		Green	<b>M22S-WRLK3-2-G</b>	
		Yellow	<b>M22S-WRLK3-2-Y</b>	
		Blue	<b>M22S-WRLK3-2-B</b>	

## Notes

① Includes contact block mounting adapter.








② Momentary selector switches can be converted in the field to maintained operation with the removal of a color coded adapter. See Volume 7—Logic Control, Operator Interface and Connectivity Solutions, CA08100008E, Tab 1.

#### Key-Operated Selector Switches <sup>①②</sup>

For additional key code options, see Volume 7—Solid-State Motor Control, CA08100008E, Tab 1.

#### Components

#### Operators Only <sup>③</sup>



Type	Switching Position	Key Code	Bezel	Key Removal Position	Catalog Number
<b>M22-WS</b> 	Two-position Momentary <sup>④</sup> 	MS1	Silver	Return from right, key removable left	<b>M22-WS</b>
			Black	Return from right, key removable left	<b>M22S-WS</b>
<b>M22S-WRS</b> 	Two-position Maintained 	MS1	Silver	Key removable left	<b>M22-WRS-A1</b>
			Black	Key removable left	<b>M22S-WRS-A1</b>
		MS1	Silver	Key removable left/right	<b>M22-WRS</b>
		MS1	Black	Key removable left/right	<b>M22S-WRS</b>
<b>M22-WS3-X93</b> 	Three-position Momentary <sup>④</sup> 	MS1	Silver	Return from left/right, key removable center	<b>M22-WS3</b>
			Black	Return from left/right, key removable center	<b>M22S-WS3</b>
	Maintained 	MS1	Silver	Key removable center	<b>M22-WRS3-A1</b>
			Silver	Key removable center/left	<b>M22-WRS3-A2</b>
			Silver	Key removable center/right	<b>M22-WRS3-A3</b>
			Silver	Key removable left/right	<b>M22-WRS3</b>
			Silver	Return from left, key removable center	<b>M22-WRS3-A7</b>
			Silver	Return from left, key removable center/right	<b>M22-WRS3-A6</b>
			Silver	Return from right, key removable left/center	<b>M22-WRS3-A4</b>
			Silver	Return from right, key removable center	<b>M22-WRS3-A5</b>
			Black	Key removable center	<b>M22S-WRS3-A1</b>
			Black	Key removable center/left	<b>M22S-WRS3-A2</b>
			Black	Key removable center/right	<b>M22S-WRS3-A3</b>
			Black	Key removable left/right/center	<b>M22S-WRS3</b>
			Black	Return from left, key removable center	<b>M22S-WRS3-A7</b>
			Black	Return from left, key removable center/right	<b>M22S-WRS3-A6</b>
Black	Return from right, key removable left/center	<b>M22S-WRS3-A4</b>			
Black	Return from right, key removable center	<b>M22S-WRS3-A5</b>			

#### Notes

- ① Includes one key.
- ② Key removal positions can be modified in the field using coding adapters; see Volume 7—Logic Control, Operator Interface and Connectivity Solutions, CA08100008E, Tab 1.
- ③ Includes contact block mounting adapter.
- ④ Momentary selector switches can be converted in the field to maintained operation with the removal of a color coded adapter. See Volume 7—Logic Control, Operator Interface and Connectivity Solutions CA08100008E, Tab 1.



**Mushroom Head Pushbuttons** ①

**Momentary Complete Devices**

	Bezel	Button Color	Contact Block Configuration ②	Catalog Number
 <p><b>M22-DP-R-K01</b></p>	Silver	Red	NC	<b>M22-DP-R-K01</b>
			2NC	<b>M22-DP-R-K02</b>
			1NO-2NC	<b>M22-DP-R-K12</b>
			1NO-1NC	<b>M22-DP-R-K11</b>
 <p><b>M22S-DP-R-K01</b></p>	Black	Red	NC	<b>M22S-DP-R-K01</b>
			2NC	<b>M22S-DP-R-K02</b>
			1NO-2NC	<b>M22S-DP-R-K12</b>
			1NO-1NC	<b>M22S-DP-R-K11</b>

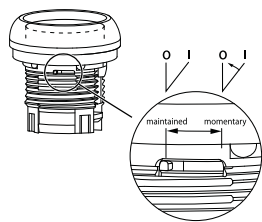
**Non-Illuminated Mushroom Head Pushbuttons, Maintained** ① ③

**Complete Devices**

	Bezel	Button Color	Contact Block Configuration ④	Catalog Number
 <p><b>M22-DP-R-K01</b></p>	Silver	Red	NC	<b>M22-DRP-R-K01</b>
			2NC	<b>M22-DRP-R-K02</b>
			1NO-2NC	<b>M22-DRP-R-K12</b>
			1NO-1NC	<b>M22-DRP-R-K11</b>
 <p><b>M22S-DP-R-K01</b></p>	Black	Red	NC	<b>M22S-DRP-R-K01</b>
			2NC	<b>M22S-DRP-R-K02</b>
			1NO-2NC	<b>M22S-DRP-R-K12</b>
			1NO-1NC	<b>M22S-DRP-R-K11</b>

**Notes**

- ① 35 mm diameter mushroom head button.
- ② Includes contact block mounting adapter. Ⓣ
- ③ Maintained pushbuttons can be converted in the field to momentary operation by switching the locking ring, which is accessible through the side of the operator body.
- ④ All NC contact blocks are positively driven contact. Ⓣ



#### Non-Illuminated Mushroom Head Pushbuttons ①

##### Components

###### M22-XDP-G



##### Mushroom Head Plates

Color	Inscription	Catalog Number
Black	—	<b>M22-XDP-S</b> ②
	Custom	<b>M22-XDP-S-ETCH</b> ③
	STOP	<b>M22-XDP-S-GB0</b>
	START	<b>M22-XDP-S-GB1</b>
	FORWARD	<b>M22-XDP-S-GB15</b>
	REVERSE	<b>M22-XDP-S-GB16</b>
	UP	<b>M22-XDP-S-GB3</b>
	DOWN	<b>M22-XDP-S-GB4</b>
	OFF	<b>M22-XDP-S-GB5</b>
	ON	<b>M22-XDP-S-GB6</b>
	⊙	<b>M22-XDP-S-X0</b>
	⓪	<b>M22-XDP-S-X1</b>
	⊕	<b>M22-XDP-S-X4</b>
⊖	<b>M22-XDP-S-X5</b>	
⓪	<b>M22-XDP-S-X7</b>	
Red	—	<b>M22-XDP-R</b> ②
	Custom	<b>M22-XDP-R-ETCH</b> ③
	STOP	<b>M22-XDP-R-GB0</b>
	OFF	<b>M22-XDP-R-GB5</b>
	⊙	<b>M22-XDP-R-X0</b>
Green	—	<b>M22-XDP-G</b> ②
	Custom	<b>M22-XDP-G-ETCH</b> ③
	START	<b>M22-XDP-G-GB1</b>
	ON	<b>M22-XDP-G-GB6</b>
	⊙	<b>M22-XDP-G-X0</b>
White	—	<b>M22-XDP-W</b> ②
	Custom	<b>M22-XDP-W-ETCH</b> ③
Yellow	—	<b>M22-XDP-Y</b> ②
	Custom	<b>M22-XDP-Y-ETCH</b> ③

###### M22-DP-G-X



##### Momentary Insertless Mushroom Head Operators

Bezel	Color	Catalog Number
Silver	Black	<b>M22-DP-S-X</b>
	Red	<b>M22-DP-R-X</b>
	Green	<b>M22-DP-G-X</b>
	Yellow	<b>M22-DP-Y-X</b>
Black	Black	<b>M22S-DP-S-X</b>
	Red	<b>M22S-DP-R-X</b>
	Green	<b>M22S-DP-G-X</b>
	Yellow	<b>M22S-DP-Y-X</b>

###### M22-DRP-G-X

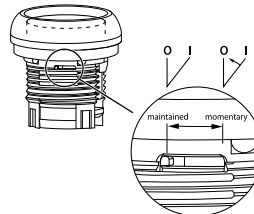


##### Maintained Insertless Mushroom Head Operators ④

Bezel	Color	Catalog Number
Silver	Black	<b>M22-DRP-S-X</b>
	Red	<b>M22-DRP-R-X</b>
	Green	<b>M22-DRP-G-X</b>
	Yellow	<b>M22-DRP-Y-X</b>
Black	Black	<b>M22S-DRP-S-X</b>
	Red	<b>M22S-DRP-R-X</b>
	Green	<b>M22S-DRP-G-X</b>
	Yellow	<b>M22S-DRP-Y-X</b>

##### Notes

- ① 35 mm diameter mushroom head button.
- ② Minimum order quantity of (10).
- ③ When ordering, specify inscription per catalog number suffix from the Symbols Library (see Volume 7—Logic Control, Operator Interface and Connectivity Solutions, CA08100008E, Tab 1) into the Order Notes.  
For example, M22-XDP-S-ETCH; Order Notes: Mark with symbol X91, Line item #\_.
- ④ Maintained pushbuttons can be converted in the field to momentary operation by switching the locking ring, which is accessible through the side of the operator body.






Components

Double Pushbuttons, Extended Pushbuttons and Center Light, Momentary

Operators Only ①

	Bezel	Color		Inscription		Catalog Number		
		Top	Bottom	Top	Bottom			
 <p>M22-DDL-GR-GB1-GB0</p>	Silver	Green	Red	—	—	M22-DDL-GR		
				Custom	Custom	M22-DDL-GR-ETCH ②		
				①	Ⓢ	M22-DDL-GR-X1-X0		
				START	STOP	M22-DDL-GR-GB1-GB0		
				—	—	M22-DDL-WS		
				Custom	Custom	M22-DDL-WS-ETCH ②		
		White	Black	Black	Black	—	—	M22-DDL-WS
						Custom	Custom	M22-DDL-WS-ETCH ②
						①	Ⓢ	M22-DDL-WS-X1-X0
						START	STOP	M22-DDL-WS-GB1-GB0
						—	—	M22-DDL-S
						Custom	Custom	M22-DDL-S-ETCH ②
Black	Black	Black	Black	—	—	M22-DDL-S-X4-X5		
				①	①	M22-DDL-S-X7-X7		
				Custom	Custom	M22S-DDL-GR		
				Custom	Custom	M22S-DDL-GR-ETCH ②		
				①	Ⓢ	M22S-DDL-GR-X1-X0		
				START	STOP	M22S-DDL-GR-GB1-GB0		
				—	—	M22S-DDL-WS		
Black	Black	Black	Black	Custom	Custom	M22S-DDL-WS-ETCH ②		
				①	Ⓢ	M22S-DDL-WS-X1-X0		
				START	STOP	M22S-DDL-WS-GB1-GB0		
				—	—	M22S-DDL-S		
				Custom	Custom	M22S-DDL-S-ETCH ②		
				+	—	M22S-DDL-S-X4-X5		
				①	①	M22S-DDL-S-X7-X7		

Notes

- ① Includes contact block mounting adapter.
- ② When ordering, specify inscription per catalog number suffix from the Symbols Library (see Volume 7—Logic Control, Operator Interface and Connectivity Solutions, CA08100008E, Tab 1) into the Order Notes. For example, M22-DDL-S-ETCH; Order Notes: Mark with symbol X91, Line item #\_.

# 4.1



## Operator Interface

### Pushbutton and Pilot Devices

4



#### Double Pushbuttons, Flush Top Pushbuttons and Center Light, Momentary

##### Operators Only <sup>①</sup>

	Bezel	Color Top	Bottom	Inscription Top	Bottom	Catalog Number
<b>M22-DDLF-GR</b> 	Silver	Green	Red	—	—	<b>M22-DDLF-GR</b>
		White	Black	—	—	<b>M22-DDLF-GR-ETCH</b> <sup>②</sup>
		Green	Red	⓪	⓪	<b>M22-DDLF-GR-X1-X0</b>
		White	Black	⓪	⓪	<b>M22-DDLF-GR-X1-X0</b>
		Green	Red	⓪	⓪	<b>M22-DDLF-GR-X1-X0</b>
<b>M22S-DDLF-GR-X1-X0</b> 	Black	Green	Red	—	—	<b>M22S-DDLF-GR</b>
		White	Black	—	—	<b>M22S-DDLF-GR-ETCH</b> <sup>②</sup>
		Green	Red	⓪	⓪	<b>M22S-DDLF-GR-X1-X0</b>
		White	Black	⓪	⓪	<b>M22S-DDLF-GR-X1-X0</b>
		Green	Red	⓪	⓪	<b>M22S-DDLF-GR-X1-X0</b>

#### Double Pushbuttons, Flush Top Pushbutton and Center Light, Extended Bottom Pushbutton, Momentary

##### Operators Only <sup>①</sup>

	Bezel	Color Top	Bottom	Inscription Top	Bottom	Catalog Number
<b>M22-DDLM-GR</b> 	Silver	Green	Red	—	—	<b>M22-DDLM-GR</b>
		White	Black	—	—	<b>M22-DDLM-GR-ETCH</b> <sup>②</sup>
		Green	Red	⓪	⓪	<b>M22-DDLM-GR-X1-X0</b>
		White	Black	⓪	⓪	<b>M22-DDLM-GR-X1-X0</b>
		Green	Red	⓪	⓪	<b>M22-DDLM-GR-X1-X0</b>
<b>M22S-DDLM-GR-X1-X0</b> 	Black	Green	Red	—	—	<b>M22S-DDLM-GR</b>
		White	Black	—	—	<b>M22S-DDLM-GR-ETCH</b> <sup>②</sup>
		Green	Red	⓪	⓪	<b>M22S-DDLM-GR-X1-X0</b>
		White	Black	⓪	⓪	<b>M22S-DDLM-GR-X1-X0</b>
		Green	Red	⓪	⓪	<b>M22S-DDLM-GR-X1-X0</b>

##### Notes

<sup>①</sup> Includes contact block mounting adapter.

<sup>②</sup> When ordering, specify inscription per catalog number suffix from the Symbols Library (see Volume 7—Logic Control, Operator Interface and Connectivity Solutions, CA08100008E, Tab 1) into the Order Notes. For example, M22-DDLM-GR-ETCH; Order Notes: Mark with symbol X91, Line item #\_.

## Four-Way Pushbuttons, Momentary

### Components

#### M22-D4-S-X7



#### Operators Only <sup>①</sup>

Type	Bezel	Color	Inscription	Catalog Number
Non-interlocked	Silver	Black	—	<b>M22-D4-S</b>
			Custom	<b>M22-D4-S-ETCH</b> <sup>②</sup>
			Directional arrows	<b>M22-D4-S-X7</b>
	Black	Black	—	<b>M22S-D4-S</b>
			Custom	<b>M22S-D4-S-ETCH</b> <sup>②</sup>
			Directional arrows	<b>M22S-D4-S-X7</b>
Interlocked	Silver	Black	—	<b>M22-DI4-S</b>
			Custom	<b>M22-DI4-S-ETCH</b> <sup>②</sup>
			Directional arrows	<b>M22-DI4-S-X7</b>
	Black	Black	—	<b>M22S-DI4-S</b>
			Custom	<b>M22S-DI4-S-ETCH</b> <sup>②</sup>
			Directional arrows	<b>M22S-DI4-S-X7</b>

## Joysticks

### Components

#### M22-WJ2H



#### Operators Only <sup>①</sup>

Bezel	Number of Directions	Switching Position	Catalog Number	
Silver	Two-position horizontal	Momentary	<b>M22-WJ2H</b>	
		Two switch points	<b>M22-WJ2H-2P</b>	
	Two-position horizontal	Maintained	<b>M22-WRJ2H</b>	
		Two-position vertical	Momentary	<b>M22-WJ2V</b>
	Two switch points		<b>M22-WJ2V-2P</b>	
	Two-position vertical	Maintained	<b>M22-WRJ2V</b>	
		Four-position	Momentary	<b>M22-WJ4</b>
	Two switch points		<b>M22-WJ4-2P</b>	
	Four-position	Maintained	<b>M22-WRJ4</b>	
		Black	Two-position horizontal	Momentary
	Two switch points			<b>M22S-WJ2H-2P</b>
	Two-position horizontal		Maintained	<b>M22S-WRJ2H</b>
Two-position vertical			Momentary	<b>M22S-WJ2V</b>
	Two switch points		<b>M22S-WJ2V-2P</b>	
Two-position vertical	Maintained		<b>M22S-WRJ2V</b>	
	Four-position		Momentary	<b>M22S-WJ4</b>
Two switch points			<b>M22S-WJ4-2P</b>	
Four-position	Maintained		<b>M22S-WRJ4</b>	

#### Notes

- <sup>①</sup> Includes contact block mounting adapter.
- <sup>②</sup> When ordering, specify inscription per catalog number suffix from the Symbols Library (see Volume 7—Logic Control, Operator Interface and Connectivity Solutions, CA08100008E, Tab 1) into the Order Notes. For example, M22-DDLM-GR-ETCH; Order Notes: Mark with symbol X91, Line item #\_

#### Potentiometers

##### M22-R10K



#### Complete Devices

Bezel	Resistance Rk	Catalog Number
Silver	1	M22-R1K
	4.7	M22-R4K7
	10	M22-R10K
	47	M22-R47K
	100	M22-R100K
	470	M22-R470K
Black	1	M22S-R1K
	4.7	M22S-R4K7
	10	M22S-R10K
	47	M22S-R47K
	100	M22S-R100K
	470	M22S-R470K
<b>Oversized Knob</b>		
Silver	1	M22-R1K-RH
	4.7	M22-R4K7-RH
	10	M22-R10K-RH
	47	M22-R47K-RH
	100	M22-R100K-RH
	470	M22-R470K-RH
Black	1	M22S-R1K-RH
	4.7	M22S-R4K7-RH
	10	M22S-R10K-RH
	47	M22S-R47K-RH
	100	M22S-R100K-RH
	470	M22S-R470K-RH

#### Acoustic Devices

##### M22-AMC-XAM



#### Complete Devices

Description	Decibel Rating	Catalog Number
Indicator with buzzer, black continuous tone, 18–30 Vac/Vdc	83 dB/ 10 cm	M22-AMC-XAM
Indicator with buzzer, black pulsed tone, 18–30 Vac/Vdc	83 dB/ 10 cm	M22-AMC-XAMP

##### M22-XAM



#### Components

Description	Decibel Rating	Catalog Number
Indicator without buzzer, black	83 dB/ 10 cm	M22-AMC
Buzzer only, continuous tone, 18–30 Vac/Vdc	83 dB/ 10 cm	M22-XAM
Buzzer only, pulsed tone, 18–30 Vac/Vdc	83 dB/ 10 cm	M22-XAMP

Through-the-Door Operators <sup>①</sup>

M22-DZ-B-X6

## Complete Devices



Color	Inscription	Catalog Number
Blue	—	M22-DZ-B
	RESET	M22-DZ-B-GB14
	Ⓡ	M22-DZ-B-X6
Red	—	M22-DZ-R
	Ⓢ	M22-DZ-R-X0
	STOP	M22-DZ-R-GB0

M22-DZ-X

## Buttonless Operator



Bezel	Catalog Number
Silver	M22-DZ-X

M22-XD-B

Button Plates <sup>②</sup>

Color	Inscription	Catalog Number
Blue	—	M22-XD-B <sup>③</sup>
	RESET	M22-XD-B-GB14
	Ⓡ	M22-XD-B-X6
Red	—	M22-XD-R <sup>③</sup>
	Ⓢ	M22-XD-R-X0
	STOP	M22-XD-R-GB0

## Bulkhead Interfaces

M22-USB-SA

USB Socket <sup>④⑤</sup>

Description	Catalog Number
Used for USB connection USB 2.0 Type A plug IP65 when closed IP20 when connected	M22-USB-SA

M22-RJ45-SA

RJ45 Socket <sup>⑥</sup>

Description	Catalog Number
Used for RJ45 Ethernet connection IP65 when closed IP20 when connected	M22-RJ45-SA

## Notes

- ① The pushrod is 3.24 in long and can be cut to length.
- ② Any combination of plate color and inscription is available.
- ③ Minimum order quantity of (10).
- ④ USB interface is complete with 2-ft-long USB cable.
- ⑤ UL and CSA pending.
- ⑥ RJ45 interface is an eight-wire connector.

#### ASi Adapter Modules

M22-ASI



#### Complete Devices

Description	Catalog Number
ASi adapter module	<b>M22-ASI</b>
ASi adapter module for base mounting	<b>M22-ASI-C</b>
ASi adapter module for E-stop	<b>M22-ASI-S</b>
ASi adapter module for E-stop base mounting	<b>M22-ASI-CS</b>

4

#### Complete Devices

#### Operator, Base and Contact Blocks <sup>①</sup>

FAK-S-KC11-I



Button Color	Contact Block Configuration <sup>②</sup>	Catalog Number
<b>Momentary</b>		
Black	1NO-1NC	<b>FAK-S-KC11-I</b>
Red	1NO-1NC	<b>FAK-R-KC11-I</b>
Yellow	1NO-1NC	<b>FAK-Y-KC11-I</b>

FAK-R-V-KC01-IY



Button Color	Contact Block Configuration <sup>②</sup>	Catalog Number
<b>Maintained</b>		
Red	NC	<b>FAK-R-V-KC01-IY</b>
	2NC	<b>FAK-R-V-KC02-IY</b>
	1NO-2NC	<b>FAK-R-V-KC12-IY</b>
	1NO-1NC	<b>FAK-R-V-KC11-IY</b>




#### Notes

<sup>①</sup> For complete listing of available contact blocks, see Accessories, Pages V9-T4-31 to V9-T4-36.

<sup>②</sup> All NC contact blocks are positively driven contact. ⊖

## Accessories

## Mounting Adapters

	Description	Catalog Number
<b>M22-A</b>	Contact block mounting adapter. ①	<b>M22-A</b>
		
<b>M22-A4</b>	Contact block mounting adapter, four-position (for use with four-way pushbuttons, joysticks and four-position selector switches only). ①	<b>M22-A4</b>
		
<b>M22-LS</b>	Allows mounting of M22 pushbuttons to LS-Titan limit switch bodies (for the full LS-Titan catalog section, see <b>PG08301004E</b> ). ①	<b>M22-LS</b>
		

## Contact Blocks

Mounting Location	Terminal Type	Contact Configuration ②	Package Qty.	Catalog Number		
Front	Screw	NO	1	<b>M22-K10</b>		
		NO	25	<b>M22-K10-B25</b>		
		NO	100	<b>M22-K10-B100</b>		
		NO, early-make	1	<b>M22-K10P</b>		
		NC	1	<b>M22-K01</b>		
		NC	25	<b>M22-K01-B25</b>		
		NC	100	<b>M22-K01-B100</b>		
		NC, late-break	1	<b>M22-K01D</b>		
		Base		NO	1	<b>M22-KC10</b>
NO	25			<b>M22-KC10-B25</b>		
NO	100			<b>M22-KC10-B100</b>		
NC	1			<b>M22-KC01</b>		
NC	25			<b>M22-KC01-B25</b>		
NC	100			<b>M22-KC01-B100</b>		
Front	Spring cage			NO	1	<b>M22-CK10</b>
				NC	1	<b>M22-CK01</b>
				NC, late-break	1	<b>M22-CK01D</b>
		2NO ③	1	<b>M22-CK20</b>		
		2NC ③	1	<b>M22-CK02</b>		
		NO-NC ③	1	<b>M22-CK11</b>		
		Base		NO	1	<b>M22-CKC10</b>
NC	1			<b>M22-CKC01</b>		

## Notes

- ① Included with each operator.  
 ② All NC contact blocks are positively driven contact. ⊖  
 ③ Not stackable.

M22-LED-W



#### Light Units

Terminal Type	Mounting Location	LED Color	Light Unit Voltage	Catalog Number	
Screw	Front	White	12–30 Vac/Vdc	<b>M22-LED-W</b>	
		Red		<b>M22-LED-R</b>	
		Green		<b>M22-LED-G</b>	
		Blue		<b>M22-LED-B</b>	
		White	85–264 Vac	<b>M22-LED230-W</b>	
		Red		<b>M22-LED230-R</b>	
		Green		<b>M22-LED230-G</b>	
		Blue		<b>M22-LED230-B</b>	
		White	207–264 Vac	<b>M22-LED230H-W</b>	
		Red		<b>M22-LED230H-R</b>	
		Green		<b>M22-LED230H-G</b>	
		Blue		<b>M22-LED230H-B</b>	
	Base	White	12–30 Vac/Vdc	<b>M22-LEDC-W</b>	
		Red		<b>M22-LEDC-R</b>	
		Green		<b>M22-LEDC-G</b>	
		Blue		<b>M22-LEDC-B</b>	
		White	85–264 Vac	<b>M22-LEDC230-W</b>	
		Red		<b>M22-LEDC230-R</b>	
		Green		<b>M22-LEDC230-G</b>	
		Blue		<b>M22-LEDC230-B</b>	
		White	207–264 Vac	<b>M22-LEDC230H-W</b>	
		Red		<b>M22-LEDC230H-R</b>	
		Green		<b>M22-LEDC230H-G</b>	
		Blue		<b>M22-LEDC230H-B</b>	
Spring cage	Front	White	12–30 Vac/Vdc	<b>M22-CLED-W</b>	
		Red		<b>M22-CLED-R</b>	
		Green		<b>M22-CLED-G</b>	
		Blue		<b>M22-CLED-B</b>	
		White	85–264 Vac	<b>M22-CLED230-W</b>	
		Red		<b>M22-CLED230-R</b>	
		Green		<b>M22-CLED230-G</b>	
		Blue		<b>M22-CLED230-B</b>	
		Base	White	12–30 Vac/Vdc	<b>M22-CLEDC-W</b>
			Red		<b>M22-CLEDC-R</b>
			Green		<b>M22-CLEDC-G</b>
			Blue		<b>M22-CLEDC-B</b>
	White		85–264 Vac	<b>M22-CLEDC230-W</b>	
	Red			<b>M22-CLEDC230-R</b>	
	Green			<b>M22-CLEDC230-G</b>	
	Blue			<b>M22-CLEDC230-B</b>	



**M22-XLED60****LED Resistor and Test Elements**

Terminal Type	Mounting Location	Element Type	Voltage	Catalog Number
Screw	Front	Resistor ①②	42–60 Vac/Vdc	<b>M22-XLED60</b>
			220 Vdc	<b>M22-XLED220</b>
		Test	12–240 Vac/Vdc	<b>M22-XLED-T</b>
			85–264 Vac	<b>M22-XLED230-T</b>

**Legend Plate Holders and Inserts, Pushbuttons and Double Pushbuttons ③****M22S-ST-X**

Description	Inscription	Catalog Number
Legend plate holder, without legend plate insert, for pushbuttons	—	<b>M22S-ST-X</b>
Legend plate holder, without legend plate insert, for double pushbuttons	—	<b>M22S-STDD-X</b>

**M22-XST-GB0**

Description	Inscription	Catalog Number
Legend plate insert	—	<b>M22-XST</b>
	Custom	<b>M22-XST-ETCH ④</b>
	STOP	<b>M22-XST-GB0</b>
	START	<b>M22-XST-GB1</b>
	OFF	<b>M22-XST-GB5</b>
	ON	<b>M22-XST-GB6</b>
	RUN	<b>M22-XST-GB7</b>
	FAULT	<b>M22-XST-GB8</b>
	OFF ON	<b>M22-XST-GB10</b>
	MAN. AUTO	<b>M22-XST-GB11</b>
	MAN. O AUTO	<b>M22-XST-GB12</b>
	HAND AUTO	<b>M22-XST-D11</b>
	HAND O AUTO	<b>M22-XST-D12</b>
	1	<b>M22-XST-X52</b>
2	<b>M22-XST-X53</b>	
0 I	<b>M22-XST-X88</b>	
0 - I	<b>M22-XST-X89</b>	
I O II	<b>M22-XST-X93</b>	

**Notes**



- ① Resistor units to be used with 12–30V light units.
- ② Refer to **IL04716002E** for use of resistor elements in series for higher DC voltage.
- ③ Legend plates are IP66 and NEMA 4X/13.
- ④ When ordering, specify inscription per catalog number suffix from the Symbols Library (see Volume 7—Logic Control, Operator Interface and Connectivity Solutions, CA08100008E, Tab 1) into the Order Notes. For example, M22-XD-S-ETCH; Order Notes: Mark with symbol X91, Line item #\_\_.

**Example**

To order a legend plate for a pushbutton with non-standard markings (FORWARD):

1. Select legend plate holder—M22S-ST-X.
2. Select legend plate insert—M22-XST-ETCH.
3. Select FORWARD from the Symbols Library, Volume 7—Logic Control, Operator Interface and Connectivity Solutions, CA08100008E, Tab 1, identified by GB15 suffix.
4. Indicate on the order form in the order notes—suffix GB15, line item # \_\_ .

#### Legend Plates, Complete ①



	Description	Inscription	Catalog Number		
<b>M22S-ST-GB0</b> 	For use with pushbuttons and indicating lights	Legend plate holder with insert	<b>M22S-ST-GB0</b>		
		STOP	<b>M22S-ST-GB1</b>		
		START	<b>M22S-ST-GB5</b>		
		OFF	<b>M22S-ST-GB6</b>		
		ON	<b>M22S-ST-GB7</b>		
		RUN	<b>M22S-ST-GB8</b>		
		FAULT	<b>M22S-ST-GB8</b>		
		1	<b>M22S-ST-X52</b>		
		2	<b>M22S-ST-X53</b>		
		Selector switches	—	OFF ON	<b>M22S-ST-GB10</b>
				MAN. AUTO	<b>M22S-ST-GB11</b>
				MAN. O AUTO	<b>M22S-ST-GB12</b>
HAND AUTO	<b>M22S-ST-D11</b>				
HAND O AUTO	<b>M22S-ST-D12</b>				
O I	<b>M22S-ST-X88</b>				
O - I	<b>M22S-ST-X89</b>				
I O II	<b>M22S-ST-X93</b>				
Emergency-stop operators	Rectangular yellow legend plate			—	<b>M22-XZK</b>
				Custom	<b>M22-XZK-ETCH</b> ②
		EMERGENCY-STOP	<b>M22-XZK-GB99</b>		
		Emergency-stop operators	Square yellow legend plate	—	<b>M22-XYK</b>
—	<b>M22-XYK-ETCH</b> ②				
EMERGENCY-STOP four-language	<b>M22-XYK1</b>				
EMERGENCY-STOP (top and bottom)	<b>M22-XYK5</b>				
Emergency-stop operators	Round yellow legend plate, 90 mm	—	<b>M22-XAK</b>		
		Custom	<b>M22-XAK-ETCH</b> ②		
		EMERGENCY-STOP four-language	<b>M22-XAK1</b>		
		EMERGENCY-STOP (top and bottom)	<b>M22-XAK5</b>		
Emergency-stop operators	Round yellow legend plate, 60 mm	—	<b>M22-XBK</b>		
		Custom	<b>M22-XBK-ETCH</b> ②		
		EMERGENCY-STOP four-language	<b>M22-XBK1</b>		
		EMERGENCY-STOP (top and bottom)	<b>M22-XBK5</b>		
<b>M22-XCK1</b> 	Four-way pushbutton, joystick and four-position selector switches	Silver square legend plate	<b>M22-XCK</b>		
		—	<b>M22-XCK-ETCH</b> ②		
		Custom	<b>M22-XCK1</b>		
		Four directional arrows	<b>M22-XCK2</b>		
		0-1-0-2-0-3-0-4	<b>M22-XCK3</b>		

#### Notes


① Legend plates are IP66 and NEMA 4X/13.

② When ordering, specify inscription per catalog number suffix from the Symbols Library (see Volume 7—Logic Control, Operator Interface and Connectivity Solutions, CA08100008E, Tab 1) into the Order Notes. For example, M22-XD-S-ETCH; Order Notes: Mark with symbol X91, Line item #\_.


**Surface Mounting Enclosures** ①

	Description	Catalog Number
	Yellow top, black base for emergency-stop operators	<b>M22-IY1-PG</b>
	One-element enclosure	<b>M22-I1-PG</b>
	Two-element enclosure	<b>M22-I2-PG</b>
	Three-element enclosure	<b>M22-I3-PG</b>
	Four-element enclosure	<b>M22-I4-PG</b>
	Six-element enclosure	<b>M22-I6-PG</b>
	M20 connecting screw	<b>M22-XI</b>
	M20 cord grip	<b>V-M20</b>






**Flush Mounting Plates, Aluminum**

	Finish	Rating	Catalog Number
	<b>One Hole</b>		
	Yellow paint for emergency-stop operators	—	<b>M22-EY1</b>
	Gray anodized	IP65	<b>M22-E1</b>
	<b>Two Holes</b>		
	Gray anodized	IP65	<b>M22-E2</b>
	<b>Three Holes</b>		
	Gray anodized	IP65	<b>M22-E3</b>
	<b>Four Holes</b>		
	Gray anodized	IP65	<b>M22-E4</b>
	<b>Five Holes</b>		
	Gray anodized	IP65	<b>M22-E5</b>
	<b>Six Holes</b>		
	Anodized	IP40	<b>M22-E6</b>




**Shrouds, Plastic**

	Description	Rating	Catalog Number
	One-element	IP55	<b>M22-H1</b>
	Two-element	IP55	<b>M22-H2</b>
	Three-element	IP55	<b>M22-H3</b>
	Four-element	IP40	<b>M22-H4</b>
	Five-element	IP40	<b>M22-H5</b>
	Six-element	IP40	<b>M22-H6</b>
	Mounting plate	—	<b>M22-XE5</b>
	Plaster keys for flush mounting	—	<b>M22-UPE</b>


**Selector Switch Accessories**

	Description	Catalog Number
	Plunger bridge ②	<b>M22-XW</b>
	Key cover	<b>M22-XWS</b>
	Key withdraw adapter ③	<b>M22-XC-R</b>
	Coding adapter	<b>M22-XC-Y</b>
	Guard ring	<b>M22-XGWK</b>

**Emergency Stop Operator Accessories**

	Description	Catalog Number
	Yellow guard ring	<b>M22-XGVP</b>
	Gray guard ring	<b>M22G-XGPV</b>
	Sealing shroud	<b>M22-PL-PV</b>

**Blanking Plugs**

	Color	Catalog Number
	Gray	<b>M22-B</b>
	Black	<b>M22S-B</b>

**Notes**

- ① Requires use of base mounted contact blocks.
- ② Plunger needed to actuate center-mounted contact blocks. Used for non-illuminated three-position selector switches only.
- ③ Enables a keyed selector switch to be set to user-selected key withdraw position.

# 4.1

## Operator Interface

### Pushbutton and Pilot Devices

4

#### Mounting Accessories

	Description	Catalog Number
	Telescopic clip with top-hat rail	<b>M22-TC</b>
	Telescopic clip	<b>M22-TA</b>
	Telescopic clip extension	<b>M22-TCV</b>
	DIN rail mounting adapter	<b>M22-IVS</b>
	Mounting ring	<b>M22-GR</b>
	Mounting ring tool	<b>M22-MS</b>
	Adapter ring set for 30 mm holes	<b>M22S-R30</b>

#### M22-T-D and M22-T-DD



#### Protective Diaphragm

For Use with ...	Catalog Number
Flush pushbuttons and indicating lights	<b>M22-T-D</b>
Double pushbuttons	<b>M22-T-DD</b>

#### M22-ADC4



#### Dust Covers

Description	Catalog Number
Contact block dust cover	<b>M22-XKDP</b>
Operator dust cover, max three contact blocks	<b>M22-ADC</b>
Operator dust cover, max four contact blocks	<b>M22-ADC4</b>

#### Kits

Description	Catalog Number
Includes one each: M22-XW, M22-XC-R, M22-XC-Y, M22S-B, M22-A, M22-XD-SWRGYB	<b>M22-KT1</b>

## 10250T—30 mm Pushbuttons



## Features

- Heavy-duty zinc die-cast construction
- Enclosed silver contacts with reliability nibs
- Diaphragm seals with drainage holes
- Grounding nibs on the operator casing

## Product Selection

## 10250T—30 mm Pushbuttons

## Flush Button



## Extended Button



## Mushroom Button



## Jumbo Mushroom



## Non-Illuminated Pushbutton Units—UL (NEMA) Type 3, 3R, 4, 4X, 12, 13

Contact Type	Button Color	Catalog Number			
		Flush Button	Extended Button	Mushroom Button	Jumbo Mushroom <sup>①</sup>
1NO	Black	10250T23B	10250T25B	10250T26B	10250T27B
	Red	10250T23R	10250T112-53	10250T122-53	10250T172-53
	Green	10250T23G	10250T25G	10250T26G	10250T27G
	Yellow	10250T23Y	10250T25Y	10250T26Y	10250T27Y
	Red—Engraved EMERG. STOP	—	—	—	10250T17213-53
1NC	Black	10250T101-51	10250T111-51	10250T121-51	10250T171-51
	Red	10250T102-51	10250T25R	10250T26R	10250T27R
	Green	10250T103-51	10250T113-51	10250T123-51	10250T173-51
	Yellow	10250T104-51	10250T120-51	10250T124-51	10250T174-51
	Red—Engraved EMERG. STOP	—	—	—	10250T29
1NO-1NC	Black	10250T30B	10250T31B	10250T32B	10250T33B
	Red	10250T30R	10250T31R	10250T32R	10250T33R
	Green	10250T30G	10250T31G	10250T32G	10250T33G
	Yellow	10250T30Y	10250T31Y	10250T32Y	10250T33Y
	Red—Engraved EMERG. STOP	—	—	—	10250T33
2NO	Black	10250T101-2	10250T111-2	10250T121-2	10250T171-2
	Red	10250T102-2	10250T112-2	10250T122-2	10250T172-2
	Green	10250T103-2	10250T113-2	10250T123-2	10250T173-2
	Yellow	10250T104-2	10250T120-2	10250T124-2	10250T174-2
	Red—Engraved EMERG. STOP	—	—	—	10250T17213-2
2NC	Black	10250T101-3	10250T111-3	10250T121-3	10250T171-3
	Red	10250T102-3	10250T112-3	10250T122-3	10250T172-3
	Green	10250T103-3	10250T113-3	10250T123-3	10250T173-3
	Yellow	10250T104-3	10250T120-3	10250T124-3	10250T174-3
	Red—Engraved EMERG. STOP	—	—	—	10250T17213-3

## Note

<sup>①</sup> Anodized aluminum head is not suitable for use in ultraviolet light applications.

24V Full Voltage Illuminated Pushbutton



#### Illuminated Pushbutton Units—UL (NEMA) Type 3, 3R, 4, 4X, 12, 13

Type	Voltage	Color	LED/Lamp Number	Catalog Number				
				Illuminated Pushbutton 1NO	1NO-1NC	1NC		
<b>LED Lamp</b>								
Full voltage	24 Vac/Vdc	Red	Bayonet base	10250T397LRD24-53	10250T397LRD24-1	10250T397LRD24-51		
				Green	10250T397LGD24-53	10250T397LGD24-1	10250T397LGD24-51	
				Amber	10250T397LAD24-53	10250T397LAD24-1	10250T397LAD24-51	
				Yellow	10250T397LYD24-53	10250T397LYD24-1	10250T397LYD24-51	
				Blue	10250T397LLD24-53	10250T397LLD24-1	10250T397LLD24-51	
				White	10250T397LWD24-53	10250T397LWD24-1	10250T397LWD24-51	
	120 Vac	Red		10250T397LRD2A-53	10250T397LRD2A-1	10250T397LRD2A-51		
				Green	10250T397LGD2A-53	10250T397LGD2A-1	10250T397LGD2A-51	
				Amber	10250T397LAD2A-53	10250T397LAD2A-1	10250T397LAD2A-51	
				Yellow	10250T397LYD2A-53	10250T397LYD2A-2	10250T397LYD2A-51	
				Blue	10250T397LLD2A-53	10250T397LLD2A-1	10250T397LLD2A-51	
				White	10250T397LWD2A-53	10250T397LWD2A-1	10250T397LWD2A-51	
	Transformer	120 Vac	Red		10250T411LRD06-53	10250T411LRD06-1	10250T411LRD06-51	
					Green	10250T411LGD06-53	10250T411LGD06-1	10250T411LGD06-51
					Amber	10250T411LAD06-53	10250T411LAD06-1	10250T411LAD06-51
					Yellow	10250T411LYD06-53	10250T411LYD06-1	10250T411LYD06-51
					Blue	10250T411LLD06-53	10250T411LLD06-1	10250T411LLD06-51
					White	10250T411LWD06-53	10250T411LWD06-1	10250T411LWD06-51
<b>Incandescent Lamp</b>								
Full voltage	24 Vac/Vdc	Red	#757	10250T476C21-53	10250T476C21-1	10250T476C21-51		
				Green	10250T476C22-53	10250T476C22-1	10250T476C22-51	
				Amber	10250T476C43-53	10250T476C43-1	10250T476C43-51	
				Yellow	10250T476C23-53	10250T476C23-1	10250T476C23-51	
				Blue	10250T476C24-53	10250T476C24-1	10250T476C24-51	
				Clear	10250T476C25-53	10250T476C25-1	10250T476C25-51	
	120 Vac/Vdc	Red	120MB	10250T476C26-53	10250T476C26-1	10250T476C26-51		
				Green	10250T471C21-53	10250T471C21-1	10250T471C21-51	
				Amber	10250T471C22-53	10250T471C22-1	10250T471C22-51	
				Yellow	10250T471C43-53	10250T471C43-1	10250T471C43-51	
				Blue	10250T471C23-53	10250T471C23-1	10250T471C23-51	
				Clear	10250T471C24-53	10250T471C24-1	10250T471C24-51	
	Transformer	120 Vac	Red	#755	10250T471C25-53	10250T471C25-1	10250T471C25-51	
					Green	10250T471C26-53	10250T471C26-1	10250T471C26-51
					Amber	10250T75R ①	10250T76R ①	10250T77R ①
					Yellow	10250T75G ①	10250T76G ①	10250T77G ①
					Blue	10250T75A ①	10250T76A ①	10250T77A ①
					Clear	10250T75Y ①	10250T76Y ①	10250T77Y ①
White	10250T75B ①	10250T76B ①	10250T77B ①					
	10250T75C ①	10250T76C ①	10250T77C ①					
White	10250T75W ①	10250T76W ①	10250T77W ①					

**Note**

① For flashing module catalog number 10250TFL1, add suffix code **FM** to listed catalog number. Example: 10250T75RFM.

Indicating Light Units

24V Full Voltage Illuminated Light



120 Vac Transformer Pres Test



Indicating Light Units—UL (NEMA) Type 3, 3R, 4, 4X, 12, 13 ①

Type	Voltage	Color	LED/Lamp Number	Catalog Number 24V Full Voltage Indicating Light—Red Catalog Number 10250T206NC1N	Catalog Number 120V AC Transformer Pres Test—Green Catalog Number 10250T74NG			
<b>LED Lamp</b>								
Full voltage	24 Vac/Vdc	Red	Bayonet base	10250T197LRP24	10250T297LRP24			
				10250T197LGP24	10250T297LGP24			
				10250T197LAP24	10250T297LAP24			
				10250T197LYP24	10250T297LYP24			
				10250T197LLP24	10250T297LLP24			
				10250T197LWP24	10250T297LWP24			
		120 Vac	Red	10250T197LRP2A	10250T297LRP2A			
				10250T197LGP2A	10250T297LGP2A			
				10250T197LAP2A	10250T297LAP2A			
				10250T197LYP2A	10250T297LYP2A			
				10250T197LLP2A	10250T297LLP2A			
				10250T197LWP2A	10250T297LWP2A			
		Transformer	120 VAC	Red	10250T181LRP06	10250T221LRP06		
					10250T181LGP06	10250T221LGP06		
					10250T181LAP06	10250T221LAP06		
					10250T181LYP06	10250T221LYP06		
					10250T181LLP06	10250T221LLP06		
					10250T181LWP06	10250T221LWP06		
<b>Incandescent Lamp</b>								
Full voltage	24 Vac/Vdc	Red	#757	10250T206NC1N	10250T235NC21			
				10250T206NC2N	10250T235NC22			
				10250T206NC19N	10250T235NC43			
				10250T206NC3N	10250T235NC23			
				10250T206NC4N	10250T235NC24			
				10250T206NC5N	10250T235NC25			
		Resistor		120 Vac/Vdc	Red	120MB	10250T201NC1N	10250T231NC21
							10250T201NC2N	10250T231NC22
							10250T201NC19N	10250T231NC43
							10250T201NC3N	10250T231NC23
							10250T201NC4N	10250T231NC24
							10250T201NC5N	10250T231NC25
Transformer ②	120 VAC	Red	#755	10250T34R	10250T74NR			
				10250T34G	10250T74NG			
				10250T34A	10250T74NA			
				10250T34Y	10250T74NY			
				10250T34B	10250T74NB			
				10250T34C	10250T74NC			
		White		10250T34W	10250T74NW			

Notes

- ① Standard indicating lights are rated UL (NEMA) 3S as well.
- ② For flashing lamp, add letter **F** to listed catalog number. Example: 10250T34RF.

# 4.1













## Operator Interface

### Pushbutton and Pilot Devices

4

#### Two-Position Push-Pull Units—UL (NEMA) Type 3, 3R, 4, 4X, 12, 13

Operator Position ①








	Operator Position ①		Button Type/Color	Contact Type	Mounting Location		Catalog Number
	Pull	Push			A	B	
<b>Two-Position Maintained Push, Maintained Pull</b>							
<b>10250T5B62-1X</b> 	0	X	40 mm/red	1NO			<b>10250T5B62-1X</b>
	X	0		1NC			
<b>10250T5B63-1X</b> 	0	X	40 mm engraved EMERG. STOP/red	1NO			<b>10250T5B63-1X</b>
	X	0		1NC			
<b>10250T5J63-1X</b> 	0	X	65 mm aluminum engraved EMERG. STOP/red	1NO			<b>10250T5J63-1X</b>
	X	0		1NC			
<b>10250ED1080-2</b> 	0	X	65 mm aluminum engraved EMERG. STOP/red Special security jumbo mushroom head	1NO			<b>10250ED1080-2</b>
	X	0		1NC			

#### Three-Position Push-Pull Units—UL (NEMA) Type 3, 3R, 4, 4X, 12, 13

Operator Position ①

10250T\_



	Operator Position ①			Button Type/Color	Contact Type	Mounting Location		Catalog Number
	Pull	Intermediate	Push			A	B	
<b>Three-Position Maintained Push, Momentary Pull</b>								
X	0	0	40 mm/black	1NC			<b>10250T9B60-3X</b>	
	X	0	40 mm/red	1NC				
	X	X	40 mm engraved EMERG. STOP/red					
<b>Three-Position Momentary Push, Momentary Pull</b>								
X	0	0	40 mm/black	1NC			<b>10250T4B60-3X</b>	
	X	X	40 mm/red	1NC				
0	0	X	40 mm/black	1NO			<b>10250T10B60-1X</b>	
	X	0	40 mm/red	1NC				

**Note**

① X = closed circuit, 0 = open circuit.



**Two-Position Push-Pull Operator**



**Two-Position Illuminated Maintained Push, Maintained Pull—UL (NEMA) Type 3, 3R, 4, 4X, 12, 13**

Operator Position ①

Maintained—Pull	Maintained—Push	Lamp	Type	Voltage	Contact Type	Mounting Location A B	LED/Lamp Number	Red Standard Push-Pull Catalog Number
0 X	X 0	LED	Full Voltage	24 Vac/Vdc	1NO		Bayonet base	<b>10250T597LRD24-1X</b>
				120 Vac/Vdc	1NC			<b>10250T597LRD2A-1X</b>
			Transformer	24 Vac				<b>10250T589LRD06-1X</b>
				120 Vac				<b>10250T563LRD06-1X</b>
0 X	X 0	Incandescent	Full voltage	24 Vac/Vdc	1NO		#757	<b>10250T579C47-1X</b>
			Resistor	120 Vac/Vdc	1NC		120MB	<b>10250T580C47-1X</b>
			Transformer	24 Vac			#755	<b>10250T589C47-1X</b>
				120 Vac				<b>10250T563C47-1X</b>

**Three-Position Push-Pull Operator**



**Three-Position Illuminated Momentary Push, Momentary Pull—UL (NEMA) Type 3, 3R, 4, 4X, 12, 13**

Operator Position ①

Momentary—Pull	Maintained—Intermediate	Momentary—Push	Lamp	Type	Voltage	Contact Type	Mounting Location A B	LED/Lamp Number	Red Standard Push-Pull Catalog Number
0 X	0 0	X 0	LED	Full voltage	24 Vac/Vdc	1NO		Bayonet base	<b>10250T1097LRD24-1X</b>
					120 Vac	1NC			<b>10250T1097LRD2A-1X</b>
				Transformer	24 Vac				<b>10250T1089LRD06-1X</b>
					120 Vac				<b>10250T1063LRD06-1X</b>
X X	0 X	0 0		Full voltage	24 Vac/Vdc	1NC		Bayonet base	<b>10250T497LRD24-3X</b>
					120 Vac	1NC			<b>10250T497LRD2A-3X</b>
				Transformer	24 Vac				<b>10250T489LRD06-3X</b>
					120 Vac				<b>10250T463LRD06-3X</b>
0 X	0 0	X 0	Incandescent	Full voltage	24 Vac/Vdc	1NO		#757	<b>10250T1079C47-1X</b>
				Resistor	120 Vac	1NC		120MB	<b>10250T1080C47-1X</b>
				Transformer	24 Vac			#755	<b>10250T1089C47-1X</b>
					120 Vac				<b>10250T1063C47-1X</b>
X X	0 X	0 0		Full voltage	24 Vac/Vdc	1NC		#757	<b>10250T479C47-3X</b>
				Resistor	120 Vac	1NC		120MB	<b>10250T480C47-3X</b>
				Transformer	24 Vac			#755	<b>10250T489C47-3X</b>
					120 Vac				<b>10250T463C47-3X</b>

**Note**

① X = closed circuit, 0 = open circuit.

# 4.1

## Operator Interface

### Pushbutton and Pilot Devices

#### Three-Position Push-Pull Operator



#### Three-Position Illuminated Maintained Push, Momentary Pull—UL (NEMA) Type 3, 3R, 4, 4X, 12, 13

##### Operator Position<sup>①</sup>

Momentary—  
Pull      Maintained—  
Intermediate      Momentary—  
Push

Operator Position <sup>①</sup>			Lamp	Type	Voltage	Contact Type	Mounting Location		LED/Lamp Number	Red Standard Push-Pull Catalog Number		
Momentary— Pull	Maintained— Intermediate	Momentary— Push					A	B				
X	0	0	LED	Full voltage	24 Vac/Vdc	1NC	o   o	Bayonet base		10250T997LRD24-3X		
X	X	0			120 Vac					1NC		o   o
					Transformer	24 Vac					10250T989LRD06-3X	
					120 Vac						10250T963LRD06-3X	
X	0	0	Incan- descent	Full voltage	24 Vac/Vdc	1NC	o   o	#757		10250T979C47-3X		
X	X	0			120 Vac					1NC		o   o
					Transformer	24 Vac					#755	10250T989C47-3X
					120 Vac							10250T963C47-3X

4

#### Potentiometers

#### Vertical or Horizontal<sup>②</sup> One-Hole Mounting



#### Potentiometer with Knob and Standard Dial Plate—Linear Type ±10%—UL (NEMA) Type 3, 3R, 4, 12, 13

Potentiometer Ohms	Catalog Number
<b>2 Watt (60V Max.) Single Potentiometer with Standard Aluminum Dial Plate<sup>③④</sup></b>	
1000	10250T331
2500	10250T332
5000	10250T338
10000	10250T333
25000	10250T334
50000	10250T335
Operator only <sup>⑤</sup>	10250T330
Alternative—black plastic large legend with standard markings	E34LP99

##### Notes

- ① X = closed circuit, 0 = open circuit.
- ② Shown with standard aluminum dial plate.
- ③ Large dial plate with space for legend is available at no charge. To order, add suffix **36** to catalog number. Example: 10250T331**36**. To order separately, see footnote ④ below.
- ④ Large dial plate has space at top for 15 letters. 3/32 in high. For custom stamped legend plates, order legend plate as separate item **10250TR30** and specify stamping.
- ⑤ For use with commercially purchased potentiometers having shaft dimensions per dimension drawing

**Selector Switch Units**

**Two-Position Maintained Switch**



**Two-Position Selector Switch—UL (NEMA) Type 3, 3R, 4, 4X, 12, 13**

Operator Position ①		Operator Action ②	Contact Type	Mounting Location		Non-Illuminated		Illuminated—120V Transformer	
X	0			A	B	Black Knob Catalog Number ③	Black Lever Catalog Number ③	Red Knob Catalog Number ③	Red Lever Catalog Number ③
X	0		1NC			<u>10250T20KB</u>	<u>10250T20LB</u>	<u>10250ED1117-KR</u>	<u>10250ED1117-LR</u>
0	X		1NO						

**Three-Position Maintained Switch**



**Three-Position Selector Switch—UL (NEMA) Type 3, 3R, 4, 4X, 12, 13**

Operator Position ①			Operator Action ②	Contact Type	Mounting Location		Non-Illuminated		Illuminated—120V Transformer	
X	0	0			A	B	Black Knob Catalog Number ③	Black Lever Catalog Number ③	Red Knob Catalog Number ③	Red Lever Catalog Number ③
X	0	0		1NO			<u>10250T21KB</u>	<u>10250T21LB</u>	<u>10250ED1117-2KR</u>	<u>10250ED1117-2LR</u>
0	0	X		1NO						
X	0	0		1NO			<u>10250T22KB</u>	<u>10250T22LB</u>	<u>10250ED1117-3KR</u>	<u>10250ED1117-3LR</u>
0	X	0		2NC (Series)						
0	0	X		1NO						

**Four-Position Maintained Switch**



**Four-Position Selector Switch—UL (NEMA) Type 3, 3R, 4, 4X, 12, 13**

Operator Position ①				Operator Action ②	Contact Type	Mounting Location		Non-Illuminated		Illuminated—120V Transformer	
X	0	0	0			A	B	Black Knob Catalog Number ③	Black Lever Catalog Number ③	Red Knob Catalog Number ③	Red Lever Catalog Number ③
X	0	0	0		1NC			<u>10250T46KB</u>	<u>10250T46LB</u>	<u>10250ED1117-4KR</u>	<u>10250ED1117-4LR</u>
0	X	0	0		1NO						
0	0	X	0		1NO						
0	0	0	X		1NC						

**Color Selection**

Illuminated						Non-Illuminated					
Color	Code Letter	Color	Code Letter	Color	Code Letter	Color	Code Letter	Color	Code Letter	Color	Code Letter
Red	<b>R</b>	White	<b>W</b>	Amber	<b>A</b>	Black	<b>B</b>	Green	<b>G</b>	Blue	<b>L</b>
Green	<b>G</b>	Blue	<b>B</b>	Clear	<b>C</b>	Red	<b>R</b>	White	<b>W</b>	Orange	<b>O</b>

**Notes**

① X = closed circuit, 0 = open circuit.

② M = Maintained.

③ To order different type or color selector switch, substitute the underlined character with appropriate suffix code from the Color Selection table. Example: 10250T20KG.

#### Legend Plates

##### Square Legend Plate



##### 1/2 Round Legend Plate



4

#### For Pushbutton Operators and Indicating Lights—Standard

Legend	Color of Field	Square <sup>①</sup> Catalog Number	1/2 Round Catalog Number	Legend	Color of Field	Square <sup>①</sup> Catalog Number	1/2 Round Catalog Number
<b>Blank—see table on Page V9-T4-46.</b>							
<b>Letters on Legend Plates Below are 3/16 in High</b>							
CLAMP	Black	10250TS90	10250TM90	OFF	Red	10250TS24	10250TM24
CLOSE		10250TS73	10250TM11	ON	Black	10250TS25	10250TM25
DOWN		10250TS74	10250TM12	OPEN		10250TS26	10250TM26
EMERG. STOP	Red	10250TS13	10250TM13	OUT		10250TS27	10250TM27
FAST	Black	10250TS75	10250TM14	POWER ON		10250TS80	10250TM80
FASTER		10250TS87	10250TM87	RAISE		10250TS28	10250TM28
FEEDER ON		10250TS94	10250TM94	READY		10250TS86	10250TM86
FEEDER OFF		10250TS95	10250TM95	RESET		10250TS29	10250TM29
FORWARD		10250TS15	10250TM15	REVERSE		10250TS30	10250TM30
HIGH		10250TS16	10250TM16	RUN		10250TS31	10250TM31
IN		10250TS17	10250TM17	SAFE		10250TS85	10250TM85
INCH		10250TS18	10250TM18	SLOW		10250TS32	10250TM32
JOG		10250TS19	10250TM19	SLOWER		10250TS88	10250TM88
JOG FOR.		10250TS20	10250TM20	START		10250TS33	10250TM33
JOG REV.		10250TS21	10250TM21	STOP	Red	10250TS34	10250TM34
LOW		10250TS22	10250TM22	TEST	Black	10250TS83	10250TM83
LOWER		10250TS23	10250TM23	TRANSFER		10250TS93	10250TM93
LUBE-FAIL		10250TS92	10250TM92	TRIP		10250TS84	10250TM84
MOTOR RUN		10250TS81	10250TM81	UNCLAMP		10250TS91	10250TM91
MOTOR STOP		10250TS82	10250TM82	UP		10250TS35	10250TM35

#### Blank Plastic Legend Plates—Square

Color Lettering	Field	Standard Catalog Number	Jumbo <sup>②</sup> Catalog Number	Extra Large Catalog Number
Black	White or silver <sup>③</sup>	10250TSP76	10250TLP76	10250TEP76
White	Red or black <sup>③</sup>	10250TSP77	10250TLP77	10250TEP77

#### Notes

- ① Square legend plates have a satin aluminum field. Color is on lower portion.
- ② Cannot be used on cast enclosures except for top row. Suitable for most sheet metal enclosures.
- ③ If legend plate is to be engraved, specify field color required.

## Square Legend Plate



## 1/2 Round Legend Plate



## For Selector Switch and Roto-Push Operators—Standard Size

Legend	Color of Field	Square <sup>①</sup> Catalog Number	1/2 Round Catalog Number	Legend	Color of Field	Square <sup>①</sup> Catalog Number	1/2 Round Catalog Number
<b>Blank—see table on Page V9-T4-46.</b>							
<b>Two-Position—5/32 in High Lettering</b>				<b>Three-Position—1/8 in High Lettering</b>			
FOR. REV.	Black	10250TS38	10250TM38	AUTO OFF HAND	Black	10250TS49	10250TM49
HAND AUTO		10250TS39	10250TM39	FOR. OFF REV.		10250TS50	10250TM50
HIGH LOW		10250TS40	10250TM40	FOR. SAFE REV.		10250TS69	10250TM69
JOG RUN		10250TS41	10250TM41	HAND OFF AUTO		10250TS51	10250TM51
MAN. AUTO		10250TS67	10250TM67	MAN. OFF AUTO		10250TS68	10250TM68
OFF ON		10250TS42	10250TM42	OPEN OFF CLOSE		10250TS53	10250TM53
OPEN CLOSE		10250TS43	10250TM43	RUN SAFE JOG		10250TS70	10250TM70
RUN JOG		10250TS44	10250TM44	UP OFF DOWN		10250TS54	10250TM54
SAFE RUN		10250TS45	10250TM45	ON STOP SAFE	Red	10250TS71	10250TM71
START JOG		10250TS46	10250TM46				
START STOP		10250TS47	10250TM47				
UP DOWN		10250TS48	10250TM48				

## 70 mm Round—Plastic Legend Plate



## 45 mm and 70 mm Plastic—Round

Color	Lettering	Field	Catalog Number
<b>45 mm</b>			
Blank		Yellow or red <sup>②</sup>	10250TRP78
<b>70 mm</b>			
Blank		Yellow or red <sup>②</sup>	10250TRP76
Red EMERG. STOP		Yellow	10250TRP79

For Push-Pull Units <sup>③</sup>

Legend	Color of Field	Square <sup>①</sup> Catalog Number	1/2 Round Catalog Number
<b>Standard Size—Letters on Legend Plates Below are 3/32 in High</b>			
PULL START/PUSH STOP	Green/red	10250TPP2	10250TR2
PUSH ON/PULL OFF	Black	10250TPP5	10250TR5
PULL OPEN/PUSH CLOSE	Black	10250TPP8	10250TR8
PULL UP/PUSH DOWN	Black	10250TPP11	10250TR11
<b>Jumbo Size—Letters on Legend Plates Below are 1/8 in High</b>			
PULL START/PUSH STOP	Green/red	10250TPP3	10250TR3
PULL ON/PUSH OFF	Black	10250TPP6	10250TR6
PULL OPEN/PUSH CLOSE	Black	10250TPP9	10250TR9
PULL UP/PUSH DOWN	Black	10250TPP12	10250TR12

**Notes**

- <sup>①</sup> Square legend plates have a satin aluminum field. Color is on lower portion.  
<sup>②</sup> If legend plate is to be engraved, specify field color required.  
<sup>③</sup> All push-pull legend plates include the symbols ≠ ∅ in the center of the plate.

## Blank and Custom Engraved Legend Plates



Style	Color					Four-Position Selector Switch		Push-Pull with Symbols <sup>④</sup>	
		Small Catalog Number	Standard Catalog Number	Jumbo <sup>①</sup> Catalog Number	Extra Large <sup>②</sup> Catalog Number	Custom <sup>③</sup> Catalog Number	Standard Catalog Number	Standard Catalog Number	Jumbo <sup>①</sup> Catalog Number
Square <sup>⑤</sup>	Black	10250TMS36	10250TS36	10250TL36	—	10250TS76	10250TS72	10250TPP17	10250TPP18
	Red	10250TMS37	10250TS37	10250TL37	—	—	—	—	—
	Green/red	—	—	—	—	—	—	10250TPP20	10250TPP21
	Satin alum.	—	—	—	10250TNP99	—	—	—	—
1/2 Round	Black	10250TP36	10250TM36	10250TJ36	—	—	10250TM72	10250TR17	10250TR18
	Red	10250TP37	10250TM37	10250TJ37	—	—	—	—	—
	Green/red	—	—	—	—	—	—	10250TR20	10250TR21
	Satin alum.	—	10250TM89	10250TJ89	—	—	—	—	—


**Notes**

- ① Cannot be used on cast enclosures except for top row. Suitable for most sheet metal enclosures.
- ② When used to meet Ford Motor Co. specifications, specify engraved legend. Cannot be used on standard cast or sheet metal enclosures.
- ③ Slightly larger than standard size for legends requiring more space—fits cast enclosures.
- ④ All push-pull legend plates include the symbols ≠ ∅ in the center of the plate.
- ⑤ Square legend plates have a satin aluminum field. Color is on lower portion.

## Accessories

## Accessories









	Description	Catalog Number
<b>Padlock Attachments</b>		
	<b>Padlocking Attachment for Flush Pushbutton Operators</b> Permits locking NC contacts in open position with 1/4 in padlock. Will not lock NO contact.	10250TA2
	<b>Padlocking Attachment for Use with Extended Pushbutton</b> Permits locking NC contacts in open position with 1/4 in padlock.	10250TA26
	<b>Padlocking Cover Guard</b> Cover locked over flush button makes it inaccessible or on extended button locks NC contacts open. Takes 1/4 in shank size padlock.	10250TA36
	<b>Padlock Hasp or Flip-Up Guard</b> When used with a 1/4 in padlock, makes flush and long button and knob selector switch inaccessible, but not locked down. Without the padlock, it is a flip-up guard. Padlock hasp can be removed before assembly.	10250TA38
	<b>Padlocking Attachment for Use with Flexible Weather Resistant Boot</b> Used on long button operators. Stainless steel. Use only for locking NC contacts open.	10250TA63
	<b>Padlock Attachment</b> For use with illuminated pushbuttons and maintained push-pull operators having standard button or lens only. Use 1/4 in padlock. Locks in down position only.	10250TA64
	<b>Padlocking Attachment for Non-Illuminated Knob Selector Switches</b> Provision for up to 5, 1/4 in padlocks.	10250TA11
<b>Shrouds and Guards</b>		
	<b>Shroud for Mushroom Head Operator</b> Prevents accidental operation. (Not for push-pull operators.)	10250TA6
	<b>Extended Retaining Nut</b> Replaces standard nut and provides guard for flush head pushbutton operators.	10250TA12
	<b>Guard for Illuminated Pushbutton</b>	10250TA15
	<b>Shroud</b> For jumbo mushroom head operator. Gray	10250TA56
	Yellow	10250TA56Y
	<b>Half Shroud—Yellow</b> For jumbo mushroom head operator.	10250ED1241
	<b>Fingerproof Shroud</b> 10 per package Fits new style contact blocks and light units.	10250TA101








	Description	Catalog Number
<b>Boots</b>		
	<b>Flexible Weather Resistant Boot</b> For use with button operators (extended buttons preferred). Temperature to -25°F (-32°C). (See Page V9-T4-48 for 10250TA96 Tightening Tool.) Black	10250TA3
	Red	10250TA4 ①
	Green	10250TA10
	<b>Transparent Boot</b> For regular illuminated pushbutton operators and PresTest—Temperature to -38°F (-39°C). ②	10250TA25
	<b>Boot for Flush Pushbutton</b> Clear	10250TA46
	Black	10250TA47
	Red	10250TA48
	Green	10250TA49
<b>Hardware and Kits</b>		
	<b>Thrust Washers</b> To meet Ford Motor Co. mounting specifications.	10250TK3
	<b>Contact Block Tape Seal</b> Seals plunger openings on last contact block. Order in multiples of 10 pieces.	10250TK5
	<b>Selector Switch Operator Gasket</b> Seals out dust from getting in between the cam and contact block plungers. Supplied as standard with all selector switches.	56-9337
	<b>Special Retaining Nut</b> To accommodate thick panel: Indicating lights	10250TA30
	PresTest, pushbuttons and selector switches	10250TA31
	<b>Terminal Block</b> Two terminals, each will accommodate two wire terminations.	10250TA62
	<b>Spacer Ring</b> Used when legend plate is not required.	10250TA8
	<b>Stacking Screw</b> Replaces transformer mounting screws on indicating light so terminal block 10250TA62 can be mounted to light to support and connect a series resistor. This screw also fits all contact blocks. Order in multiples of 10.	10250TA79

**Notes**

- ① Should not be used on flush button for STOP function.
- ② Not suitable for single contact block depth cast enclosure. Cover is too thick.

#### Accessories, continued

Description	Catalog Number
<b>Hardware and Kits, continued</b>	
<b>10250TA2_</b> 	
<b>Base Mounting Spacers</b> ① Equivalent to contact block in depth—complete with screws, washers, etc.	
1 block deep	<b>10250TA22</b>
2 block deep	<b>10250TA23</b>
<b>10250TKG_</b> 	
<b>Grounding Kits</b> Kits consist of a ring connector and a #6 screw for mounting connector to rear of contact block mounting screw.	
All components except standard indicating lights and PresTest indicating lights.	<b>10250TKG1</b>
Standard indicating lights	<b>10250TKG2</b> ②
PresTest indicating lights	<b>10250TKG3</b> ②
<b>10250TA7_</b> 	
<b>Contact Block Terminal Jumpers</b> Available in multiples of 100 only.	
Terminal to terminal—within block (short)	
100 per pkg.	<b>10250TA70</b>
1000 per pkg.	<b>10250TA70-2</b>
Terminal to terminal—block to block (long)	
100 per pkg.	<b>10250TA71</b>
1000 per pkg.	<b>10250TA71-2</b>
<b>Special Operators and Attachments</b>	
<b>10250TA5</b> 	<b>10250TA5</b>
<b>Wobble Stick</b> Complete with retaining nut—fits standard button.	
<b>10250TA14</b> 	<b>10250TA14</b>
<b>Lever Operator</b> For use with two vertically mounted flush pushbuttons.	
<b>10250TA_</b> 	
<b>Maintained Contact Attachment Release Button Assembly</b> ① Mechanically interlocks with another pushbutton and contact block (not included). Provides mode indication. Minimum hole centers 1.62 in (41.1 mm), maximum 2.31 in (58.8 mm).	
Black	<b>10250TA17</b>
Red	<b>10250TA18</b>
Green	<b>10250TA19</b>
Yellow	<b>10250TA20</b>
Same with long button—black	<b>10250TA39</b>
<b>10250TA1</b> 	<b>10250TA1</b>
<b>Maintained Contact Attachment</b> ① Mechanically interlocks two buttons and provides position indication for one. Use with two pushbutton operators and one or more contact blocks.	
<b>10250TA13</b> 	<b>10250TA13</b>
<b>Roto-Push Lever Operator</b> Used to provide lever operation for Roto-Push operators.	

Description	Catalog Number
<b>Special Light Modules</b>	
<b>10250TA79</b> 	<b>10250TMT8</b>
<b>Master Test (Dual Input) Module</b> Internal Form C relay suitable for either AC or DC applications. Total electrical isolation between monitored and test circuit. Fits all illuminated 10250T, E22, E30 and E34 devices. 48 Vdc	
<b>10250TFL_</b> 	<b>10250TFL2</b>
<b>Flasher Module</b> Changes any AC illuminated device to a controlled flashing light. Fits 10250T, E30 and E34 devices. 24V	
120V	<b>10250TFL1</b>
<b>10250ED986-4</b> 	<b>10250ED986-4</b>
<b>Flashing Incandescent Lamp</b> For use with 120V transformer type or 6V full voltage type indicating lights including PresTest and most E29 devices.	
<b>Hole Plugs</b>	
<b>10250TA7</b> 	<b>10250TA7</b>
<b>Plug</b> For unused holes—steel, painted gray (stainless steel, use <b>E30KT5</b> )	
<b>Tools</b>	
<b>10250TA95</b> 	<b>10250TA95</b>
Octagonal 10250T (notched to fit over selector switch lever), E29 and E30	
<b>E22CW</b> 	<b>E22CW</b>
E22, E30, E34 and octagonal 10250T (will not fit over selector switch levers)	
<b>10250TA96</b> 	<b>10250TA96</b>
<b>Tool for Tightening Boots</b> Used to install boot Catalog Numbers 10250TA3, A4, A10 and A25.	
<b>10250TA102</b> 	<b>10250TA102</b>
<b>10250T, E34 Allen Wrench</b> Used for removal of jumbo mushroom head.	
<b>10250TA74</b> 	<b>10250TA74</b>
<b>Lamp Removal Tools</b> For transformer type illuminated pushbuttons, push-pull and selector switches. Fits #12 lamp.	
<b>E30KV1</b> 	<b>E30KV1</b>
For full voltage and resistor type illuminated pushbuttons, push-pull and selector switches and E30.	
<b>E29KLT</b> 	<b>E29KLT</b>
Standard indicating lights. Fits #44, #755, #6S6 and #10S6.	

#### Notes

- ① Component only. Not to be used for custom built (factory assembled) stations.
- ② Not suitable for single contact block depth cast enclosure. Cover is too thick.



## Product Overview

### Product Selection Guide



<b>Description</b>	<b>E26</b>
	<b>Page V9-T4-50</b>
<b>Standards and Certifications</b>	
	CE 60947-5-1 UL 508—File #E131568 cUL C22.2 No. 14—File #E131568
Ingress protection	Stacklight base and light units: IP65, Type 4, 4X and 13 Alarm units: IP20, Type 1
Electrical shock protection	Stacklight base and light unit: IP2X Alarm units: IPOX
<b>Technical Data and Specifications</b>	
Mechanical ratings	Shock (IEC 68-2-27): 11 ms, 15g Vibration (IEC 68-2-6): 10 sweeps 10–150 Hz, 2g Bump (IEC 68-2-29): 1000 pulses, 6 ms, 15g
Climate conditions	Operating: maximum 104°F (40°C) at 95% RH, Temperature –4° to 140°F (–20° to 60°C) Storage: temperature –40° to 176°F (–40° to 80°C)
Materials	Cover: polycarbonate Lenses: polycarbonate Stacklight base: nylon Extension tubes: aluminum Mounting base: zinc die cast
Terminals	14–30 AWG (2.5–0.05 mm <sup>2</sup> ) for single conductors and 18–26 AWG (0.75–0.14 mm <sup>2</sup> ) for two conductors of the same size. Do not mix solid and stranded wire in the same terminal. Recommended tightening torque is 4.4–5.3 lb-in (0.5–0.6 Nm)
Electrical ratings	Insulation voltage (U <sub>i</sub> ): 690V Operational voltage (U <sub>o</sub> ): 250V Impulse withstand voltage (U <sub>imp</sub> ): 1.5 kV
Bulb specifications	Incandescent lamp type: BA15d Maximum lamp wattage: 6W Bulbs—average life: Incandescent: 7,000–12,000 hrs. (based on voltage) Xenon flasher: 20,000 hrs. LED: 60,000–100,000 hrs. (based on colors)
LED/Incandescent comparison	Incandescent lamps Average operating life of 7,000 hours Each lamp can be used with any color lens Low cost results in short-term savings  LED lamps Average operating life of 60,000–100,000 hours Low power consumption Extended life results in long-term savings

For our complete product offering, see Volume 7—Logic Control, Operator Interface and Connectivity Solutions, CA08100008E.

E26 Stacklights



4

**Features**

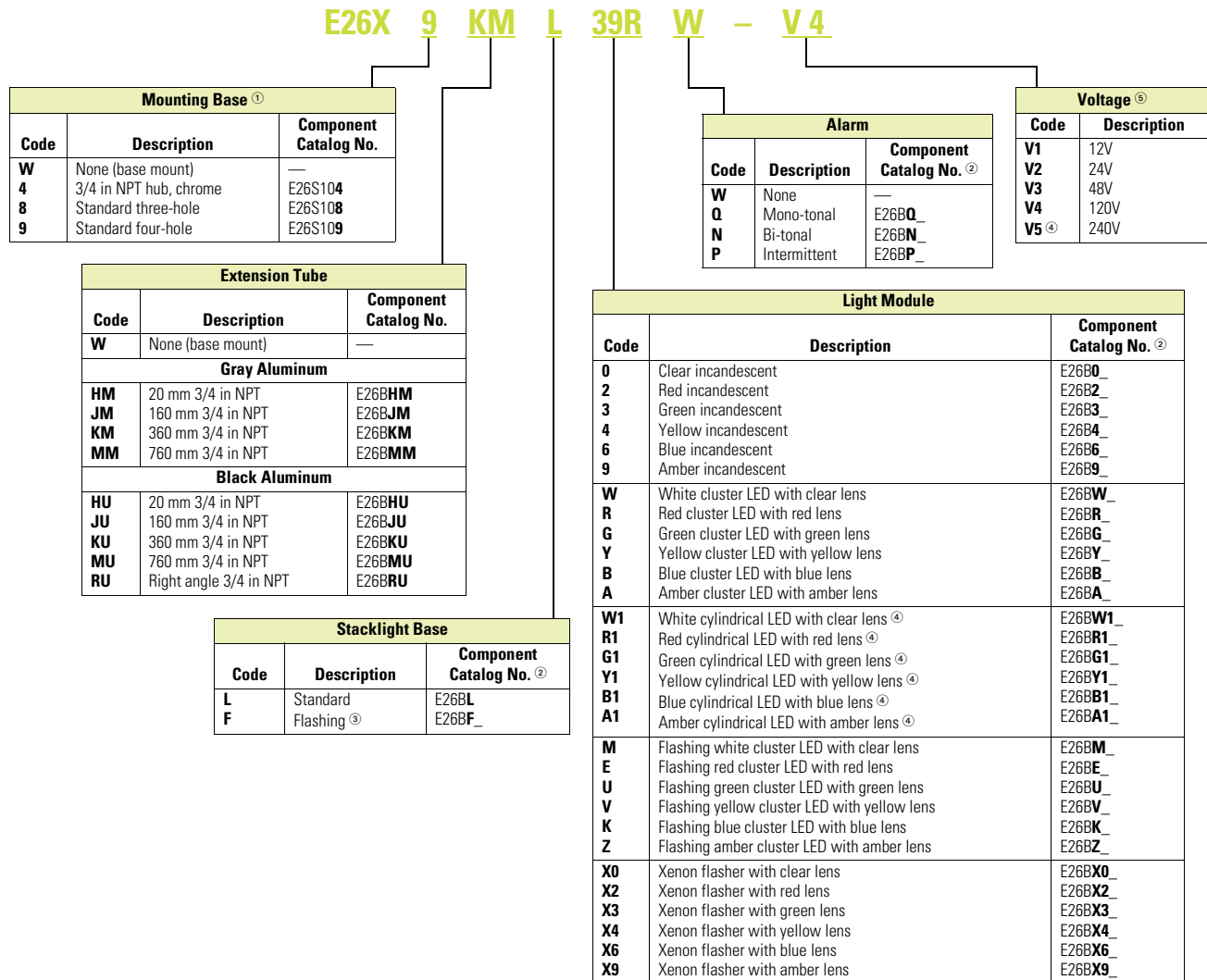
- Modular construction
- Six lens colors
- Variety of lamp types and voltages
- Mono-tonal, bi-tonal and intermittent audible alarms
- Combination of visible and audible alarms
- Modular components reduce inventory requirements, increase flexibility
- Steady and flashing modes allow one light to signal multiple conditions
- No-tools assembly permits easy lamp replacement

One, two and three-Light assembled stacklights:

- Base mountable
- Incandescent or LED versions
- 24V and 120V versions

Catalog Number Selection

E26 Stacklights



Voltage Codes

Voltage Code	Incandescent Lamp	Cluster LED	Cylindrical LED	Xenon Flasher	Flasher Base/Alarm
(Blank)	No lamp supplied	No LED supplied	No LED supplied	—	—
V1	12 Vac/Vdc	12 Vac/Vdc	12 Vac/Vdc	12 Vac/Vdc	12 Vac/Vdc
V2	24 Vac/Vdc	24 Vac/Vdc	24 Vac/Vdc	24 Vac/Vdc	24 Vac/Vdc
V3	48 Vac/Vdc	48 Vac/Vdc	48 Vac/Vdc	48 Vac/Vdc	48 Vac/Vdc
V4	120 Vac/Vdc	120 Vac	120 Vac	120 Vac	120 Vac/Vdc
V5	240 Vac/Vdc	240 Vac	—	240 Vac	240 Vac/Vdc

Notes

- ① Unless base mount is specified, an extension tube must be selected for a complete unit.
- ② Component catalog numbers for flashing bases, alarm units and light modules are incomplete and require the addition of a suffix code to specify the required voltage rating. See table above.
- ③ Flashing base is for use with incandescent lamps.
- ④ 240V not available for cylindrical LEDs.
- ⑤ If no voltage is specified, assembled stacklight will be supplied without lamps or LEDs.

## Product Selection

### Assembled Units

#### One-Light Unit Stacklight

Volts AC/DC	Alarm	First Level Color	Illumination Type	Catalog Number
24V	None	Red	Incandescent—steady	E26XWWL2W-V2
24V	None	Red	Cylindrical LED—steady	E26XWWLR1W-V2
24V	None	Green	Incandescent—steady	E26XWWL3W-V2
24V	None	Green	Cylindrical LED—steady	E26XWWLG1W-V2
24V	None	Amber	Incandescent—steady	E26XWWL9W-V2
24V	None	Amber	Cylindrical LED—steady	E26XWWLA1W-V2
120V	None	Red	Incandescent—steady	E26XWWL2W-V4
120V <sup>①</sup>	None	Red	Cylindrical LED—steady	E26XWWLR1W-V4
120V	None	Green	Incandescent—steady	E26XWWL3W-V4
120V <sup>①</sup>	None	Green	Cylindrical LED—steady	E26XWWLG1W-V4
120V	None	Amber	Incandescent—steady	E26XWWL9W-V4
120V <sup>①</sup>	None	Amber	Cylindrical LED—steady	E26XWWLA1W-V4

#### Two-Light Unit Stacklight

Volts AC/DC	Alarm	First Level Color	Illumination Type	Second Level Color	Illumination Type	Catalog Number
24V	None	Green	Incandescent—steady	Red	Incandescent—steady	E26XWWL32W-V2
24V	None	Green	Cylindrical LED—steady	Red	Cylindrical LED—steady	E26XWWLG1R1W-V2
120V	None	Green	Incandescent—steady	Red	Incandescent—steady	E26XWWL32W-V4
120V <sup>①</sup>	None	Green	Cylindrical LED—steady	Red	Cylindrical LED—steady	E26XWWLG1R1W-V4

#### Three-Light Unit Stacklight

Volts AC/DC	Alarm	First Level Color	Illumination Type	Second Level Color	Illumination Type	Third Level Color	Illumination Type	Catalog Number
24V	None	Green	Incandescent—steady	Amber	Incandescent—steady	Red	Incandescent—steady	E26XWWL392W-V2
24V	None	Green	Cylindrical LED—steady	Amber	Cylindrical LED—steady	Red	Cylindrical LED—steady	E26XWWLG1A1R1W-V2
120V	None	Green	Incandescent—steady	Amber	Incandescent—steady	Red	Incandescent—steady	E26XWWL392W-V4
120V <sup>①</sup>	None	Green	Cylindrical LED—steady	Amber	Cylindrical LED—steady	Red	Cylindrical LED—steady	E26XWWLG1A1R1W-V4

#### Note

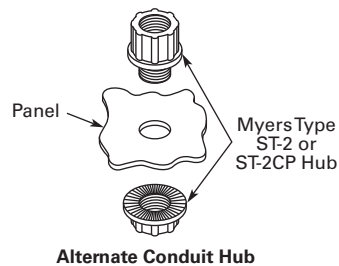
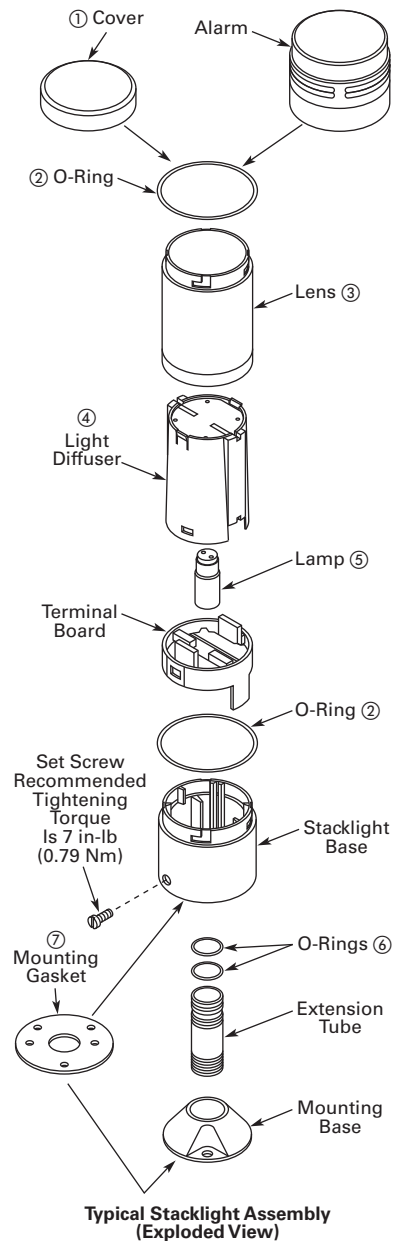
<sup>①</sup> LED modules have very low current draw and should not be used with triac output devices like PLC triac output modules. It is recommended that dry contact outputs be used to switch 120 Vac modules.

## Replacement Parts

### Stacklight Replacement Parts

Description	Notes	Diagram	Catalog Number
Replacement cover	Normally included with stacklight base	1	E26S68
Replacement lens O-ring	Normally included with light modules	2	E26S106 ①
Replacement lenses	Clear	3	E26S38
	Red		E26S39
	Green		E26S40
	Yellow		E26S41
	Blue		E26S42
	Amber		E26S43
Replacement Xenon strobe dual high (does not include lenses)	12 Vac/Vdc	4	E26S33
	24 Vac/Vdc		E26S34
	48 Vac/Vdc		E26S35
	120 Vac		E26S36
	240 Vac		E26S37
Replacement diffusers	White—normally supplied with incandescent light modules	4	E26S31
	Clear—normally supplied with LED light modules		E26S32
Replacement lamps	12V	5	E26S8
	24V		E26S9
	48V		E26S10
	120V		E26S11
	240V		E26S12
Replacement extension tube O-rings	Normally included with extension tubes	6	E26S107 ②
Replacement mounting gasket ③	Normally included with stacklight base	7	E26S105
Lamp removal tool	For E26 and E22 incandescent lamps		E22BA3

### Typical Stacklight Assemblies



#### Notes

- ① Sold in packages of 5 pieces.
- ② Sold in packages of 10 pieces.
- ③ Mounting gaskets have two sets of mounting holes—one set with center-to-center spacing of 1.75 in (44.5 mm) and another set with center-to-center spacing of 1.65 in (42 mm).

## Product Overview

### Product Selection Guide



**E5 Panel Meters**



**Eclipse Series Panel Meters**

Description	E5 Panel Meters Page V9-T4-55	Eclipse Series Panel Meters Page V9-T4-55
Number of digits	5	4
Display technology	7-segment LED	7-segment LED
Display character height	8 mm	14 mm
Panel cut-out size	1/32 DIN (25 x 50 mm)	1/8 DIN (45 x 92 mm)
Available outputs	None	Dual relay, analog, RS-485
Available inputs	0–10V/2–10V/0–20 mA/4–20 mA	DC volt, AC volt, DC amp, AC amp, 5A AC, Temperature (J, K, T, PT100 RTD), 4–20 mA/0–10V/1–5V
Front panel protection	IP65	NEMA 4X
Connection method	Screw terminal	Depluggable screw terminals
Scaling	Programmable end points, linear interpolation	Programmable end points, linear interpolation
Input power options	10–30 Vdc	9–30 Vdc or 85–264 Vac
Update time	500 ms	400 ms
Automatic min/max capture	Yes	Yes
Input for display-hold	Yes	—

For our complete product offering, see Volume 7—Logic Control, Operator Interface and Connectivity Solutions, CA08100008E.

Digital Panel Meters



Features

E5-324-E digital panel meters

- Galvanic isolation with protection against incorrect polarity
- Automatic min/max value detection
- Freely programmable characteristic curve end points
- Input range:
  - Single current measuring input (0/4–20 mA)
  - Single voltage measuring input (0/2–10V)

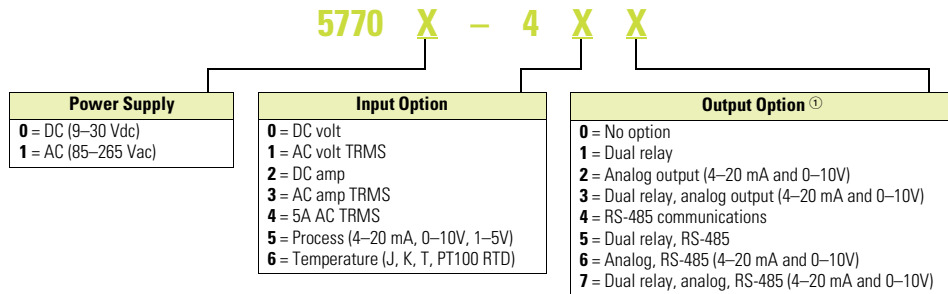
Eclipse Series digital panel meters

- Four full digits
- 1/8 DIN size
- Red, LED display
- Scalable display
- Flashing alarms
- Min/max data hold
- Optional analog, relay and RS-485 outputs
- Type 4X

Catalog Number Selection

Digital Panel Meters

Eclipse Series



Product Selection

E5-324-E0402



E5-324-E0402

Description	Catalog Number
LED digital panel meter, 24 x 48 mm	<b>E5-324-E0402</b>

Eclipse Series



Eclipse Series

Description	Catalog Number
Digital ammeter—5A AC, 85–264 Vac power	<b>57701440</b>
Digital ammeter—5A AC, 85–264 Vac power, 2 relay outputs	<b>57701441</b>
Digital process meter—4–20 mA/0–10V, 85–264 Vac power	<b>57701450</b>
Digital process meter—4–20 mA/0–10V, 85–264 Vac power, 2 relay outputs	<b>57701451</b>
Digital process meter—4–20 mA/0–10V, 85–264 Vac power, 2 relay outputs and analog retransmission	<b>57701453</b>
Digital temperature meter, 85–264 Vac power	<b>57701460</b>
Digital temperature meter, 85–264 Vac power, 2 relay outputs	<b>57701461</b>

Note

① Output options 0, 2, 4 are not available for models -41X and -43X.

#### Product Overview

#### Operator Interfaces and Programming Software Selection Guide



4

Description	ELC-GP Graphics Panel	HM/I Operator Interface
	<b>Page V9-T4-59</b>	<b>Page V9-T4-60</b>
Screen size	Two-line and four-line	3.5 in, 5.7 in, 8.0 in and 10.4 in
Screen options	Monochrome	Blue mode, grey scale, 256 color STN or 65k color TFT
Interface	Keypad only	Resistive touchscreen only or touchscreen and keypad
Communication ports	2 serial	3 serial; 1 or 2 USB; Expansion port for Ethernet Modbus TCP or Local I/O
Simultaneous protocols	1	3 or 4
Ethernet drivers	—	Yes
Upload/download	Serial cable	Serial, Ethernet, and/or USB
Operating system	Proprietary	Proprietary
Third-party software support	—	—
Screen saver	—	Yes

#### Operator Interfaces and Programming Software Selection Guide, continued



Description	XV Operator Interface	XP Operator Interface
	<b>Page V9-T4-62</b>	<b>Page V9-T4-65</b>
Screen size	3.5 in, 5.7 in, 7.0 in, 8.4 in and 10.4 in	8.4 in, 10.4 in, 12.1 in, 15.0 in and blind node (no screen)
Screen options	Color TFT, 64k colors; resolutions from QVGA (320 x 240) to WVGA (800 x 480)	Color TFT, 16 million colors; resolutions from SVGA (800 x 600) to UVGA (1600 x 1200)
Interface	Resistive touchscreen	Infrared, non-reflective safety glass
Communication ports	Ethernet, RS-232 and/or RS-485, USB	2 serial; 2 Ethernet; removable CompactFlash; 4 USB; VGA
Simultaneous protocols	3	5 or 8
Ethernet drivers	Yes	Yes
Upload/download	Serial, Ethernet, USB	Serial, Ethernet, USB
Operating system	Windows CE 5.0 Professional	Windows XP Embedded (protected)
Third-party software support	—	Yes
Screen saver	Yes	Yes

For our complete product offering, see Volume 7—Logic Control, Operator Interface and Connectivity Solutions, CA08100008E.



## Software Product Selection Guide

**Visual Designer****Galileo****HMIsoft****ELCSoftGP**

Description	Visual Designer	Galileo	HMIsoft	ELCSoftGP
Overview	Feature-rich software package with SCADA functionality and web serving capabilities that can be run on XV, XP, ePro PS operator interfaces or personal computers	Intuitive visualization tool. Use Galileo on XV-102-H_ units or on XV units running CoDeSys when a stronger visualization package is needed	Use <b>HMI</b> Soft to create, edit, upload and download applications to the <b>HMI</b> family of operator interfaces	Use ELCSoftGP to create, edit, upload and download applications to ELC Graphics Panels
<b>Catalog ID</b>				
Development software seat license	VISUALDCE (CE hardware) VISUALDXP5 (5-pack of VISUALDXP) VISUALDCE5 (5-pack of VISUALDCE) VISUALDXP (PCs, XPe, and CE hardware)	SW-GALILEO-S SW-GALILEO-M	HMISOFT	ELCSOFTGP
Runtime software for a PC	VISUALRTPC	•	N/A	N/A
<b>Time-Saving Editor Features</b>				
Online and offline simulation	•	•	•	—
Macro capability	•	•	•	—
VB scripting	•	—	—	—
Math and Logic	•	•	•	—
Multi-language	•	•	•	—
System/internal variables	•	•	•	—
Auto-scale application to different resolution/screen size	•	•	•	—
Scripting (IF, THEN, ELSE, GOTO)	•	•	•	—
Symbol factory/library	•	•	•	—
Master pages	• Screen groups	• Screen groups	•	—
User-created controls	•	•	—	—
Customizable application symbols	•	•	—	—
Action lists/math worksheets	•	• With macros	• With macros	—
Reusable controls, images and pages	• Via indirect tag and/or PLC assignments	•	—	—
Advanced search and replace	•	•	—	—
Advanced context sensitive help	•	•	—	—
Conversion of legacy PanelMate™ configurations	•	—	—	—
Optional PanelBuilder™ conversion utility	•	—	—	—
Online configuration/editing	•	—	—	—

#### Software Product Selection Guide, continued



4

Description	Visual Designer	Galileo	HMSoft	ELCSoftGP
<b>Runtime Features</b>				
Clock synchronization	•	•	•	•
Sound actions or control	•	•	•	•
Security	• Advanced multi-level	•	• Multi-level	•
Pop-up screens	• And group screens	•	•	—
Animated graphics	•	•	•	—
Real-time trending	•	•	•	—
Recipes	•	•	•	—
Report generation	•	•	—	—
Timer scheduling	•	•	•	—
Calendar scheduling	•	—	—	—
Notification of data and events via e-mail/text messaging	•	—	—	—
Data archiving	•	•	•	—
Archive to shared network drive	•	No (-)	—	—
Alarm and event archiving	•	•	—	—
Historical trending	•	•	•	—
Import/export from XML	•	•	—	—
Database interface	• ADO.net compliant	—	—	—
Vision system interfaces	•	•	—	—
Secure document and Web network browser	•	—	—	—
Remote access and control without having to install software on the remote PC	• Web Thin Client with Internet Explorer	—	—	—
Automatic scaling of Web clients	•	—	—	—
Remote desktop	• With UltraVNC and RemoteClient	• VNC and RemoteClient	—	—
Launch/control third-party applications	•	—	—	—
2-touch controls for safety	•	—	—	—
Embedded PLC logic	—	—	•	—

**ELC-GP Graphics Panel**



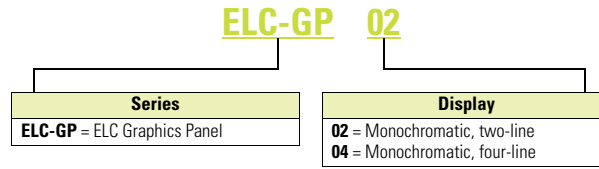
**Features**

- Simple to program and easily connects to ELC products
- Protocols—include Modbus ASCII/RTU, ASCII Slave and vendor-specific protocols from Allen-Bradley®, Siemens®, Mitsubishi®, Koyo® and many more

**Catalog Number Selection**

**ELC-GP Graphics Panel**

**ELC-GP**



**Product Selection**

**Graphics Panels**

Description	Catalog Number
160 x 32 pixels, 10 function keys, monochrome	<b>ELC-GP02</b>
128 x 64 pixels, 10 function keys, monochrome	<b>ELC-GP04</b>

**Accessories**

**Software and Accessories**

Description	Catalog Number
Programming software for GP units	<b>ELCSOFTGP</b>
Program transfer module	<b>ELC-GPXFERMOD</b>
Cable, PC to ELC-GPxx, 9.8 ft (3m)	<b>ELC-CBPCGP3</b>
Power supply, 24 watt, 1 amp	<b>ELC-PS01</b>
Power supply, 48 watt, 2 amp	<b>ELC-PS02</b>

# 4.4

## Operator Interface

### Operator Interfaces and Programming Software

4

#### HMI Operator Interface



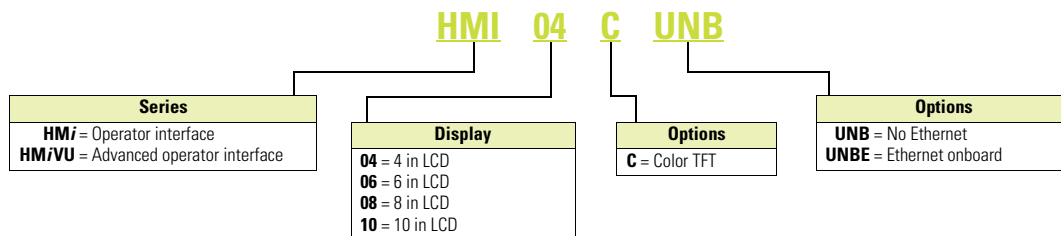
#### Features

- All units offer RS-232, RS-485 and RS-422 communications
- 6-, 8- and 10-inch models offer Ethernet communication options
- Retentive internal data storage

### Catalog Number Selection

#### HMI Operator Interface

##### HMI



### Product Selection

#### HMI Operator Interface

Description	Catalog Number
4-inch color TFT without expansion slot	<b>HMI04CU</b>
6-inch color TFT, no Ethernet	<b>HMIVU06CUNB</b>
8-inch color TFT, with Ethernet	<b>HMIVU08CUNBE</b>
10-inch color TFT, with Ethernet	<b>HMIVU10CUNBE</b>

## Accessories

### Software and Accessories

Description	Catalog Number
Programming software	HMISOFT

### Kits

Description	Catalog Number
<b>HMI</b> spare parts kits (includes several power connectors, battery doors, gaskets, mounting clips, etc.)	HMI-SPKIT

### Cable

Description	Catalog Number
1 meter cable to connect between the <b>HMI</b> and Eaton Logic Controller (ELC)	ELC-CBPCELC1
3 meter cable to connect between the <b>HMI</b> and Eaton Logic Controller (ELC)	ELC-CBPCELC3

### Power Supply

Description	Catalog Number
1 amp 24 Vdc power supply	ELC-PS01
2 amp 24 Vdc power supply	ELC-PS02

#### XV Operator Interface



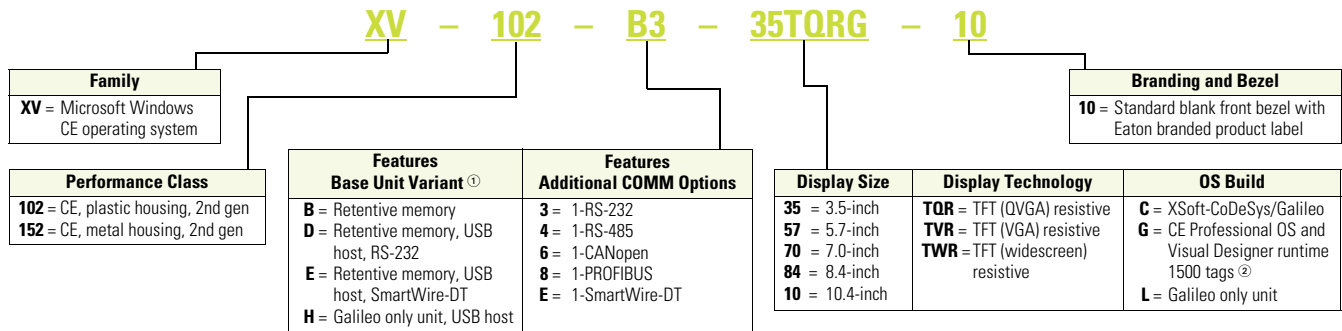
#### Features

- All XV models have a Microsoft Windows CE operating system
- Pre-licensed with Visual Designer runtime for up to 1500 tags, three simultaneous communication drivers, and one Web session
- Field upgrades are available for up to 4000 tags, three drivers, and two, four or eight simultaneous Web sessions

### Catalog Number Selection

#### XV Operator Interface

XV



### Product Selection

#### XV Operator Interface



#### XV Operator Interface with Visual Designer

Description	Catalog Number
XV 3.5-inch TFT, plastic housing, resistive touch, Ethernet and RS-232	<b>XV-102-B3-35TQRG-10</b>
XV 3.5-inch TFT, plastic housing, resistive touch, Ethernet and RS-485	<b>XV-102-B4-35TQRG-10</b>
XV 5.7-inch TFT, plastic housing, resistive touch, Ethernet, RS-232, RS-485	<b>XV-102-D4-57TVRG-10</b>
XV 7.0-inch TFT wide screen, plastic housing, resistive touch, Ethernet, RS-232, RS-485	<b>XV-102-D4-70TWRG-10</b>
XV 5.7-inch TFT, metal housing, resistive touch, Ethernet, RS-232, RS-485	<b>XV-152-D4-57TVRG-10</b>
XV 8.4-inch TFT, metal housing, resistive touch, Ethernet, RS-232, RS-485	<b>XV-152-D4-84TVRG-10</b>
XV 10.4-inch TFT, metal housing, resistive touch, Ethernet, RS-232, RS-485	<b>XV-152-D4-10TVRG-10</b>

#### Notes

- ① All 1xx performance class units have 400 MHz processor, 64 MB DRAM, 1 x 10/100 Ethernet, and 1 x USB device.
- ② Standard software on embedded hardware. These XV models have a Microsoft Windows CE 5.0 Professional operating system and are pre-licensed with Visual Designer runtime for up to 1500 tags, 3 simultaneous communication drivers, and 1 Web session. Field upgrades are available for up to 4000 tags, 3 drivers, and 2, 4 or 8 simultaneous Web sessions.

**XV Operator Interface with XSoft-CoDeSys**

Description	Catalog Number
XV 3.5-inch TFT plastic housing, resistive touch, CANopen	<b>XV-102-B6-35TQRC-10</b>
XV 3.5-inch TFT plastic housing, resistive touch, PROFIBUS	<b>XV-102-B8-35TQRC-10</b>
XV 3.5-inch TFT plastic housing, resistive touch, SmartWire-DT	<b>XV-102-BE-35TQRC-10</b>
XV 5.7-inch TFT plastic housing, resistive touch, CANopen	<b>XV-102-D6-57TVRC-10</b>
XV 5.7-inch TFT plastic housing, resistive touch, PROFIBUS	<b>XV-102-D8-57TVRC-10</b>
XV 5.7-inch TFT plastic housing, resistive touch, CANopen, SmartWire-DT	<b>XV-102-E6-57TVRC-10</b>
XV 5.7-inch TFT plastic housing, resistive touch, PROFIBUS, SmartWire-DT	<b>XV-102-E8-57TVRC-10</b>
XV 7.0-inch TFT plastic housing, resistive touch, CANopen	<b>XV-102-D6-70TWRC-10</b>
XV 7.0-inch TFT plastic housing, resistive touch, PROFIBUS	<b>XV-102-D8-70TWRC-10</b>
XV 7.0-inch TFT plastic housing, resistive touch, CANopen, SmartWire-DT	<b>XV-102-E6-70TWRC-10</b>
XV 7.0-inch TFT plastic housing, resistive touch, PROFIBUS, SmartWire-DT	<b>XV-102-E8-70TWRC-10</b>
XV 5.7-inch TFT metal housing, resistive touch, CANopen	<b>XV-152-D6-57TVRC-10</b>
XV 5.7-inch TFT metal housing, resistive touch, PROFIBUS	<b>XV-152-D8-57TVRC-10</b>
XV 5.7-inch TFT metal housing, resistive touch, CANopen, SmartWire-DT	<b>XV-152-E6-57TVRC-10</b>
XV 5.7-inch TFT metal housing, resistive touch, PROFIBUS, SmartWire-DT	<b>XV-152-E8-57TVRC-10</b>
XV 8.4-inch TFT metal housing, resistive touch, CANopen	<b>XV-152-D6-84TVRC-10</b>
XV 8.4-inch TFT metal housing, resistive touch, PROFIBUS	<b>XV-152-D8-84TVRC-10</b>
XV 8.4-inch TFT metal housing, resistive touch, CANopen, SmartWire-DT	<b>XV-152-E6-84TVRC-10</b>
XV 8.4-inch TFT metal housing, resistive touch, PROFIBUS, SmartWire-DT	<b>XV-152-E8-84TVRC-10</b>
XV 10.4-inch TFT metal housing, resistive touch, CANopen	<b>XV-152-D6-10TVRC-10</b>
XV 10.4-inch TFT metal housing, resistive touch, PROFIBUS	<b>XV-152-D8-10TVRC-10</b>
XV 10.4-inch TFT metal housing, resistive touch, CANopen, SmartWire-DT	<b>XV-152-E6-10TVRC-10</b>
XV 10.4-inch TFT metal housing, resistive touch, PROFIBUS, SmartWire-DT	<b>XV-152-E8-10TVRC-10</b>

**XV Operator Interface with Galileo Only**

Description	Catalog Number
XV 3.5-inch TFT plastic housing, resistive touch, Ethernet RS-232	<b>XV-102-H3-35TQRL-10</b>
XV 3.5-inch TFT plastic housing, resistive touch, Ethernet RS-485	<b>XV-102-H4-35TQRL-10</b>
XV 5.7-inch TFT plastic housing, resistive touch, Ethernet RS-232	<b>XV-102-H3-57TVRL-10</b>
XV 5.7-inch TFT plastic housing, resistive touch, Ethernet RS-485	<b>XV-102-H4-57TVRL-10</b>
XV 7.0-inch TFT plastic housing, resistive touch, Ethernet RS-232	<b>XV-102-H3-70TWRL-10</b>
XV 7.0-inch TFT plastic housing, resistive touch, Ethernet RS-485	<b>XV-102-H4-70TWRL-10</b>

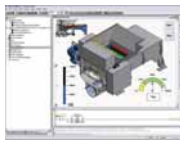
**Visual Designer****Visual Designer Software**

Description	Catalog Number
<b>Visual Designer Development Software License Key</b>	
For CE hardware	<b>VISUALDCE</b>
For PCs, XPe and CE hardware	<b>VISUALDXP</b>
For CE hardware, 5-pack of VISUALDCE	<b>VISUALDCE5</b>
For PCs, XPe hardware, 5-pack of VISUALDXP	<b>VISUALDXP5</b>

4

**Galileo Software****Galileo Development Software**

Description	Catalog Number
Single-seat license	<b>SW-GALILEO-S</b>
Multiple-seat license	<b>SW-GALILEO-M</b>

**XSoft-CoDeSys-2****XSoft-CoDeSys-2 Software**

Description	Catalog Number
Single Seat License	<b>SW-XSOFT-CODESYS-2-S</b>
Multiple Seat License (3)	<b>SW-XSOFT-CODESYS-2-M</b>

**Accessories****XV Family Accessories**

Description	Catalog Number
SD memory card for all XV models	<b>MEMORY-SD-A1-S</b>
Spare part kit for XV-102 models—1 power connector, 8 mounting brackets, 1 sealing strip, 1 touch pen	<b>ACC-TP-57-KG-1 XV-102</b>
Spare part kit for XV-152 models—1 power connector, 8 mounting brackets, 1 sealing strip, 1 touch pen	<b>ACC-TP-10-12-RES-1</b>



**XP Operator Interface**



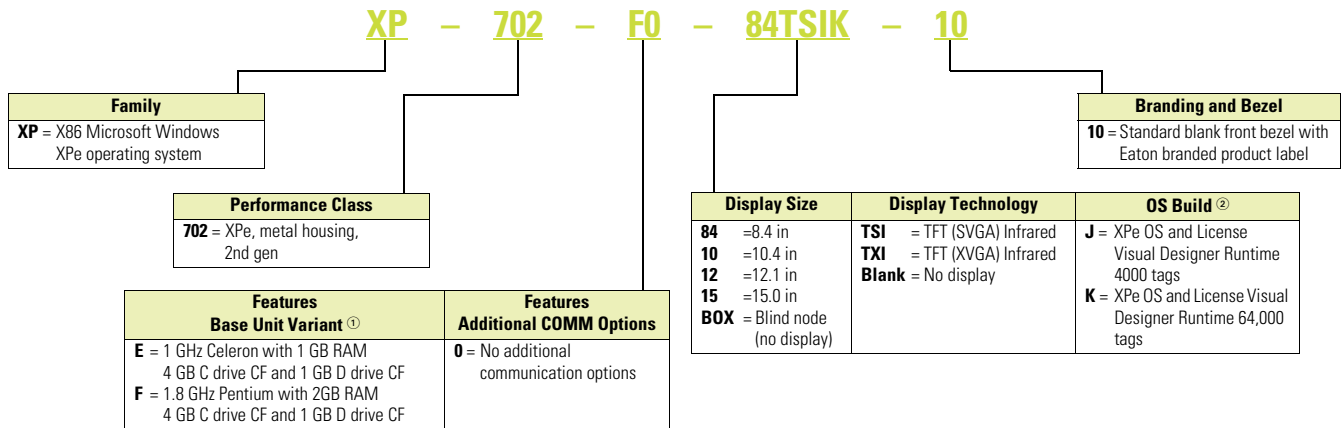
**Features**

- All XP models have a Microsoft Windows XP embedded operating system
- Pre-licensed with Visual Designer runtime
- Standard models are licensed for 4000 tags, five simultaneous communication drivers, and one Web session
- Enterprise models are licensed for 64,000 tags, eight simultaneous communication drivers, and one Web session
- Field upgrades are available for up to 64,000 tags, eight drivers, and 2, 4, 8, 16, 32, 64, 128, or 256 simultaneous Web sessions

**Catalog Number Selection**

**XP Operator Interface**

**XP**



**Notes**

- ① All 7xx Performance Class units have 1 x 10/100, 1 x 10/100/1000 Ethernet, 4 x USB Host V2.0, 2 x RS-232.
- ② Standard software on embedded hardware.

## Product Selection

## XP Operator Interface



## XP Operator Interface

Description	Catalog Number
XP 8.4 in TFT, 1 GHz Celeron, 1 GB RAM, 4 GB C drive, 1 GB D drive, 4000 tags, 5 drivers, 1 Web session	<b>XP-702-E0-84TSIJ-10</b>
XP 10.4 in TFT, 1 GHz Celeron, 1 GB RAM, 4 GB C drive, 1 GB D drive, 4000 tags, 5 drivers, 1 Web session	<b>XP-702-E0-10TSIJ-10</b>
XP 12.1 in TFT, 1 GHz Celeron, 1 GB RAM, 4 GB C drive, 1 GB D drive, 4000 tags, 5 drivers, 1 Web session	<b>XP-702-E0-12TSIJ-10</b>
XP 15.0 in TFT, 1 GHz Celeron, 1 GB RAM, 4 GB C drive, 1 GB D drive, 4000 tags, 5 drivers, 1 Web session	<b>XP-702-E0-15TSIJ-10</b>
XP blind node (no display), 1 GHz Celeron, 1 GB RAM, 4 GB C drive, 1 GB D drive, 4000 tags, 5 drivers, 1 Web session	<b>XP-702-E0-BOXJ-10</b>
XP 8.4 in TFT, 1.8 GHz Pentium, 2 GB RAM, 4 GB C drive, 1 GB D drive, 64k tags, 8 drivers, 1 Web session	<b>XP-702-F0-84TSIK-10</b>
XP 10.4 in TFT, 1.8 GHz Pentium, 2 GB RAM, 4 GB C drive, 1 GB D drive, 64k tags, 8 drivers, 1 Web session	<b>XP-702-F0-10TSIK-10</b>
XP 12.1 in TFT, 1.8 GHz Pentium, 2 GB RAM, 4 GB C drive, 1 GB D drive, 64k tags, 8 drivers, 1 Web session	<b>XP-702-F0-12TSIK-10</b>
XP 15.0 in TFT, 1.8 GHz Pentium, 2 GB RAM, 4 GB C drive, 1 GB D drive, 64k tags, 8 drivers, 1 Web session	<b>XP-702-F0-15TSIK-10</b>
XP blind node (no display), 1.8 GHz Pentium, 2 GB RAM, 4 GB C drive, 1 GB D drive, 64k tags, 8 drivers, 1 Web session	<b>XP-702-F0-BOXK-10</b>

## Visual Designer



## Visual Designer Software

Description	Catalog Number
<b>Visual Designer Development Software License Key</b>	
For PCs, XPe and CE hardware	<b>VISUALDXP</b>
For PCs, XPe hardware, 5-pack of VISUALDXP	<b>VISUALDXP5</b>
For a PC Runtime software license with a maximum of 64k tags, 8 drivers, 1 Web session	<b>VISUALRTPC</b>
Visual Designer development software and PC runtime software licenses for a max of 64k tags, 8 drivers, 1 Web session	<b>VISUALRTDEVPK</b>

## Galileo Software



## Galileo Development Software

Description	Catalog Number
Single-seat license	<b>SW-GALILEO-S</b>
Multiple-seat license	<b>SW-GALILEO-M</b>

## XSoft-CoDeSys-2



## XSoft-CoDeSys-2 Software

Description	Catalog Number
Single Seat License	<b>SW-XSOFT-CODESYS-2-S</b>
Multiple Seat License (3)	<b>SW-XSOFT-CODESYS-2-M</b>

**Limit Switches**



**Photoelectric Sensors**



**Inductive Sensors**



**Connectivity**



**5.1 Limit Switches**

Product Overview .....	V9-T5-2
E47 Precision .....	V9-T5-3
Compact Prewired .....	V9-T5-4
E49 Mini Metal .....	V9-T5-5
E50 Heavy-Duty Plug-In .....	V9-T5-6
LS-Titan Miniature DIN Switches .....	V9-T5-7

**5.2 Photoelectric Sensors**

Product Overview .....	V9-T5-9
Enhanced 50 Series .....	V9-T5-10
SM Series .....	V9-T5-12
Comet Series .....	V9-T5-13
E58 Harsh-Duty Series .....	V9-T5-15

**5.3 Inductive Sensors**

Product Overview .....	V9-T5-17
iProx .....	V9-T5-19
E57 Premium+ Series .....	V9-T5-20
E57 Premium+ Series Short Barrel .....	V9-T5-21
Global Proximity .....	V9-T5-22
E52 Cube Style .....	V9-T5-23

**5.4 Connectivity**

Product Overview .....	V9-T5-24
Global Plus Connector Cables .....	V9-T5-25

For our complete product offering, see Volume 8—Sensing Solutions, CA08100010E,

### Product Overview

#### Limit Switches Selection Guide



**E47 Precision Switches**



**Compact Prewired Switches**



**E49 Mini Metal Switches**



**E50 Heavy-Duty Plug-in Switches**



**LS-Titan Miniature DIN Switches**

Description	<b>E47 Precision Switches</b>	<b>Compact Prewired Switches</b>	<b>E49 Mini Metal Switches</b>	<b>E50 Heavy-Duty Plug-in Switches</b>	<b>LS-Titan Miniature DIN Switches</b>
	<b>Page V9-T5-3</b>	<b>Page V9-T5-4</b>	<b>Page V9-T5-5</b>	<b>Page V9-T5-6</b>	<b>Page V9-T5-7</b>
Overview	Specified when accurate repeatability, choice of operating forces and travel characteristics and tightly controlled action of cam or target in space restricted areas is of prime importance. Cost-effective and compact	Designed to be a versatile, slim device for hard-to-fit applications where sealing integrity is required; stackable ridge for ganged operations	Suitable for OEMs who require a small, cost-effective solution but cannot sacrifice durability and mechanical life as would be the case with a plastic IEC style switch	Versatile in design; high reliability; low maintenance costs with installation ease; best choice for heavy-duty limit switch applications; withstands physical and chemical abuse of harsh industrial environments	Eaton's LS-Titan limit switch line is a complete offering of safety position switches designed for worldwide application; economical insulated plastic or rugged metal enclosures and modular, plug-in operating heads and bodies make LS-Titan a flexible switching solution
Applications	Overhead, folding and elevator doors, sliding gates, automated guided vehicles and commercial instrumentation	Machine tool, food processing and packaging	Automatic vending machines, electronic assembly machines, elevators and lifts, injection molding, packaging	Punch presses, waste water treatment, machine tool, automotive, retrieval systems, industrial truck, car wash lines	Packaging, material handling, conveying, sorting and counting, positioning, and safety applications requiring positive opening contacts
Product features	Self-contained switches or with an enclosed cast housing for increased durability and conduit connection (1/2 in NPT) High current capacity for power load switching and motor handling capability Screw and solder terminations	Rugged aluminum alloy die cast housing Sealed construction with enclosure ratings of Type 4, 6 and 13 Prewired with 3M of 18 AWG, AWM 2517, 300V cable	Long life—rated for 10 million operations Pre-wired units with custom cable lengths available for high volume customers "Fingerproof" terminals protect against accidental shock	Modular operating heads, switch bodies and receptacles are interchangeable without field adjustment Order as complete assemblies or components for stocking and manufacturing flexibility 90 degree total travel, 5 degree pretravel characteristics are standard features	Modular, plug-in system (head and body components) Positive opening NC contacts for safety applications Wide variety of economical plastic and rugged metal versions available Operating heads can be rotated 90 degrees to suit specific direction of operation Unique electronic safety position switches (LSE models) provide analog (0–10 Vdc or 4–20 mA) outputs proportional to the actuator position and allow for easy configuration of a custom trip point Can be ordered as separate components (head and body) or as completely assembled switches
Contact ratings	NEMA A600, R300, AC-15, DC-13 15A/20A, 125 or 250 Vac	NEMA B300	5A at 250 Vac 5A at 30 Vdc	NEMA A600, R300 Lighted versions A150, R150 6A, 120 Vac; 10A continuous	AC-15, DC-13 6A at 240 Vac 3A at 24 Vdc 200 mA at 24 Vdc (LSE models)
Enclosure ratings	Enclosed—Type 1	Type 4, 6 and 13 IP67	IP65	Type 1, 3, 3S, 4, 4X, 6, 6P, 13 IP67	IP66, IP67
Construction	Basic—phenolic Enclosed—aluminum die cast	Aluminum alloy die cast	Zinc alloy	Zinc die cast	TBD
Approvals	UL® recognized CSA® certified	cULus	UL recognized	UL listed CSA certified IEC 947-5-1 TUV	Safety function by positive opening contacts per IEC/EN 60947-5-1 up to Category 4 per EN 954-1 TÜV-Rheinland certified for functional-safety (LSE models) CSA certified UL listed CE CCC

For our complete product offering, see Volume 8—Sensing Solutions, CA08100010E,

## E47 Precision



## Features

- The cost-effective solution for highly accurate switching applications
- Compact housings are ideal for use where space is restricted
- Precision, snap-action operators provide accurate repeatability of electrical and mechanical operating characteristics
- High current capacity (up to 20A) allows power load switching and motor handling capability
- Enclosed boot versions (shown on the left, in gray) shield actuators from debris
- Solder and spade terminals available
- 15A models shown, 20A models also available

## Product Selection

## E47 Precision

## Basic Switches

Description	Type	Catalog Number 15A	Specifications ①
Straight lever	Screw terminal	<b>E47BMS22</b>	OF max.—2.47 oz (70g)
			RF min.—0.49 oz (14g)
			PT max.—0.394 in (10 mm)
			OT max.—0.220 in (5.6 mm)
			MD max.—0.051 in (1.3 mm)
			FP max.—1.11 in (28.2 mm)
Standard lever	Screw terminal	<b>E47BMS20</b>	OP—0.748 in (19 mm)
			OF max.—3.53 oz (100g)
			RF min.—0.99 oz (28g)
			PT max.—0.197 in (5.0 mm)
			OT max.—0.079 in (2.0 mm)
			MD max.—0.039 in (1.0 mm)
Cross roller plunger	Screw terminal	<b>E47BMS11</b>	FP max.—0.976 in (24.8 mm)
			OP—0.748 in (19 mm)
			OF max.—12.3 oz (350g)
			RF max.—4.02 oz (114g)
			PT max.—0.016 in (0.4 mm)
			OT max.—0.14 in (3.58 mm)
Extended roller lever	Screw terminal	<b>E47BMS42</b>	MD max.—0.002 in (0.05 mm)
			OP—1.315 in (33.4 mm)
			OF max.—5.64 oz (160g)
			RF min.—0.78 oz (22g)
			PT max.—0.28 in (7.1 mm)
			OT max.—0.16 in (4 mm)
Roller lever	Screw terminal	<b>E47BMS30</b>	MD max.—0.04 in (1.02 mm)
			FP max.—1.437 in (36.5 mm)
			OP—1.189 in (30.2 mm)
			OF max.—5.64 oz (160g)
			RF min.—1.48 oz (42g)
			PT max.—0.106 in (2.7 mm)
			OT max.—0.094 in (2.4 mm)
			MD max.—0.02 in (0.5 mm)
			FP Mmax.—1.28 in (32.5 mm)
			OP—1.189 in (30.2 mm)

## Enclosed Switches

Description	Catalog Number	Specifications ①
Roller lever	<b>E47BLS32</b>	OF max.—20.1 oz (570g)
		RF min.—6.0 oz (1700g)
		PT max.—0.157 in (4.0 mm)
		OT max.—0.236 in (6.0 mm)
		MD max.—0.016 in (0.4 mm)
Booted roller lever	<b>E47BLS33</b>	OF max.—22.57 oz (640g)
		RF min.—8.11 oz (230g)
		PT max.—0.197 in (5.0 mm)
		OT max.—0.236 in (6.0 mm)
Booted roller plunger	<b>E47BLS08</b> <b>E47BLS12</b> (cross roller unit)	MD max.—0.016 in (0.4 mm)
		OF max.—17.64 oz (500g)
		RF min.—3.53 oz (100g)
		PT max.—0.039 in (1.0 mm)
		OT max.—0.138 in (3.5 mm)
Booted wobble	<b>E47BLS14</b>	MD max.—0.005 in (0.12 mm)
		OP—1.957 in (49.7 mm)
		OF max.—2.11 oz (60g)
		RF min.—0.88 oz (25g)
		PT max.—0.520 in (13.2 mm)
		OT max.—0.315 in (8.0 mm)
		MD max.—0.039 in (1.0 mm)

## Note

- ① OF = Operating Force; RF = Return Force; PT = Pre-Travel; OT = Overtravel; MD = Movement Differential; FP = Free Position; OP = Operating Position.

## Compact Prewired



5

## Features

- Rugged and dependable compact limit switch
- Rugged aluminum alloy die cast housing
- Sealed construction with enclosure ratings of Type 4, 6 and 13
- Prewired with 3m of 18 AWG, AWM 2517, 300V cable
- Stackable ridge for ganged operation

## Product Selection

## Compact Prewired

## Compact Prewired

Actuator Type	Operating Force (Maximum)	Reset Force (Minimum)	Overtravel (Minimum)	Pre-Travel	Movement Differential (Maximum)	Operating Position	Catalog Number
Pin plunger	42.3 oz (1.2 kg)	15.9 oz (450g)	0.118 in (3 mm)	0.07 in (1.8 mm)	0.008 in (0.2 mm)	0.62 ± 0.04 in (15.7 ± 1 mm)	<b>E47BCC05</b>
Sealed plunger	63.5 oz (1.8 kg)	15.9 oz (450g)	0.118 in (3 mm)	0.07 in (1.8 mm)	0.008 in (0.2 mm)	0.99 ± 0.04 in (24.9 ± 1 mm)	<b>E47BCC06</b>
Roller plunger	42.3 oz (1.2 kg)	15.9 oz (450g)	0.118 in (3 mm)	0.07 in (1.8 mm)	0.008 in (0.2 mm)	1.12 ± 0.04 in (28.5 ± 1 mm)	<b>E47BCC07</b>
Sealed roller plunger	63.5 oz (1.8 kg)	15.9 oz (450g)	0.118 in (3 mm)	0.07 in (1.8 mm)	0.008 in (0.2 mm)	1.35 ± 0.04 in (34.3 ± 1 mm)	<b>E47BCC08</b>
Cross roller plunger	42.3 oz (1.2 kg)	15.9 oz (450g)	0.118 in (3 mm)	0.07 in (1.8 mm)	0.008 in (0.2 mm)	1.12 ± 0.04 in (28.5 ± 1 mm)	<b>E47BCC11</b>
Sealed cross roller plunger	63.5 oz (1.8 kg)	15.9 oz (450g)	0.118 in (3 mm)	0.07 in (1.8 mm)	0.008 in (0.2 mm)	1.35 ± 0.04 in (34.3 ± 1 mm)	<b>E47BCC12</b>
Bevel plunger	42.3 oz (1.2 kg)	15.9 oz (450g)	0.118 in (3 mm)	0.07 in (1.8 mm)	0.008 in (0.2 mm)	1.12 ± 0.04 in (28.5 ± 1 mm)	<b>E47BCC13</b>
Roller lever	20.5 oz (580g)	5.3 oz (150g)	40°	25° max.	3°	—	<b>E47BCC15</b>
Wobble stick	5.3 oz (150g)	—	—	15° max.	—	—	<b>E47BCC20</b>

E49 Mini Metal



### Features

- Long life—rated for 10 million operations
- “Fingerproof” terminals protect against accidental shock
- Double-spring mechanism for contact reliability
- Captive screws on enclosure cover make wiring hassle-free
- SPDT double break

## Product Selection

### E49 Mini Metal

#### E49 Mini Metal

Operating Head Type	Specifications			Force to Operate Contacts	Minimum Return Force	Catalog Number—Assembled Units (Switch Body and Head) 1NO-1NC Contacts
	Travel to Operate Contacts	Travel to Reset Contacts	Total Travel			
Side rotary lever	20°	12°	70°	750g	100g	<b>E49G31AP3</b>
Adjustable side rotary lever	20°	12°	70°	750g	100g	<b>E49G31UP3</b>
Top pushbutton	0.06 in (1.5 mm)	0.04 in (1 mm)	0.22 in (5.5 mm)	900g	150g	<b>E49G31BP3</b>
Top push roller	0.06 in (1.5 mm)	0.04 in (1 mm)	0.22 in (5.5 mm)	900g	150g	<b>E49G31CP3</b>
Top push roller (90 degree roller)	0.06 in (1.5 mm)	0.04 in (1 mm)	0.22 in (5.5 mm)	900g	150g	<b>E49G31C1P3</b>
Adjustable rod lever	20°	12°	70°	750g	100g	<b>E49G31DP3</b>
Wobble stick (nylon coil)	1.18 in (30 mm)	—	—	150g	—	<b>E49G31NP3</b>
Wobble stick (metal coil)	1.18 in (30 mm)	—	—	150g	—	<b>E49G31VP3</b>
Wobble stick (metal rod)	1.18 in (30 mm)	—	—	150g	—	<b>E49G31MP3</b>
Wobble stick (whisker)	1.18 in (30 mm)	—	—	150g	—	<b>E49G31XM3</b>

#### E50 Heavy-Duty Plug-In



#### Features

- Modular, plug-in components (head, body and receptacle) provide application flexibility, reduced inventory and less downtime
- Manufactured to take the physical and environmental abuse (including cutting fluids and chemicals) of harsh industrial environments
- Chemical-resistant Viton® gaskets, seals and boots are standard, and so are captive, posi-drive screws
- 600V rating, ridge-topped contacts and wiping action assure continuity even to logic level circuits
- Rotary heads are field convertible clockwise, counterclockwise or both, without special tools

### Product Selection

#### E50 Heavy-Duty Plug-In

##### Assembled Switches—Standard

**Note:** Order assembled (as shown in this product guide) or as head, body, receptacle and lever components.

Operating Head Type		Catalog Number
Side rotary (requires an operating lever)	Standard spring return—E50DR1 ①	<b>E50AR1</b>
	Low force spring return—E50DL1 ①	<b>E50AL1</b>
	Maintained two-position—E50DM1	<b>E50AM1</b>
Side pushbutton, spring return—E50DS1		<b>E50AS1</b>
Side pushbutton, adjustable spring return—E50DS2		<b>E50AS2</b>
Side push roller, spring return—E50DS3 ②		<b>E50AS3</b>
Side pushbutton, maintained—E50DH1		<b>E50AH1</b>
Top pushbutton, spring return—E50DT1		<b>E50AT1</b>
Top pushbutton, adjustable spring return—E50DT2		<b>E50AT2</b>
Top push roller, spring return—E50DT3 ②		<b>E50AT3</b>
Wobble head, spring return (requires a wobble operator)	Standard duty—E50DW1	<b>E50AW1</b>
	Heavy-duty high strength steel—E50DW2	<b>E50AW2</b>

#### Notes

① CW (clockwise) and CCW (counterclockwise) operation, easily convertible to CW only or CCW only operation.

② Roller can be converted in the field between horizontal and vertical.



## LS-Titan Miniature DIN Switches






## Features

- Modular, plug-in system (head and body components)
- Safety rated, with positive opening contacts and TUV certification on electronic (LSE) models
- Wide variety of economical plastic and rugged metal versions available
- Operating heads can be rotated 90 degrees to suit specific direction of operation
- Unique electronic safety position switches (LSE models) provide analog (0–10 Vdc or 4–20 mA) outputs proportional to the actuator position and allow for easy configuration of a custom trip point
- Can be ordered as separate components (head and body) or as completely assembled switches

## Product Selection

## LS-Titan Miniature DIN Switches

## Plastic Safety Switches

Switch Body Catalog Number	LS-S02	LS-S20A	LS-S11S
Output Function	2NC with positive opening contacts	2NC with slow make/break	1NO and 1NC with positive opening contact
Terminal Connection	Screw terminal ①	Screw terminal ①	Screw terminal ①
Contact Sequence			

Description	Operating Head Type	Catalog Number—Assembled Switches		
	Catalog Number—Heads Only			
Top push roller plunger	LS-XP	LS-S02-P	LS-S20A-P	LS-S11S-P
Short roller lever	LS-XLS	LS-S02-LS	LS-S20A-LS	LS-S11S-LS
Angled roller	LS-XLA	LS-S02-LA	LS-S20A-LA	LS-S11S-LA
Rotary lever	LS-XRL	LS-S02-RL	LS-S20A-RL	LS-S11S-RL
Adjustable roller lever (with 18 mm roller)	LS-XRLA	LS-S02-RLA	LS-S20A-RLA	LS-S11S-RLA
Adjustable roller lever (with 40 mm roller)	LS-XRLA40	LS-S02-RLA40	LS-S20A-RLA40	LS-S11S-RLA40
Spring rod (wobble) ②	LS-XS	LS-S02-S	LS-S20A-S	LS-S11S-S

## Notes

① Cage clamp versions available. Contact Application Engineering.

② Not to be used as a safety position switch. Use only in conjunction with snap-action contact.

# 5.1

## Sensors and Limit Switches

### Limit Switches

5

#### Plastic Electronic Safety Position Switches

	<b>Switch Body Catalog Number</b>	<b>LSE-AI</b>	<b>LSE-AU</b>
	<b>Output Function</b>	Analog 4–20 mA	Analog 0–10V
	<b>Safety Functions and Approvals</b>	Additional diagnostic output that registers a 0V signal in the event of a fault. Self-test function continuously tests both outputs for overloads, short circuits to 0V and short circuits to +Ue. Certified by TÜV to EN 954-1, Category 3 or 4. Suitable for protection of people or processes.	
	<b>Contact Sequence</b>	Analog 4–20 mA	Analog 0–10V
	<b>Operating Head Type</b>		
<b>Description</b>	<b>Catalog Number—Heads Only</b>	<b>Catalog Number—Assembled Switches</b>	
Top push roller plunger	<b>LS-XP</b>	<b>LSE-AI-P</b>	<b>LSE-AU-P</b>
Short roller lever	<b>LS-XLS</b>	<b>LSE-AI-LS</b>	<b>LSE-AU-LS</b>
Angled roller	<b>LS-XLA</b>	<b>LSE-AI-LA</b>	<b>LSE-AU-LA</b>
Rotary lever	<b>LS-XRL</b>	<b>LSE-AI-RL</b>	<b>LSE-AU-RL</b>
Adjustable roller lever (with 18 mm Roller)	<b>LS-XRLA</b>	<b>LSE-AI-RLA</b>	<b>LSE-AU-RLA</b>
Adjustable roller lever (with 40 mm roller)	<b>LS-XRLA40</b>	<b>LSE-AI-RLA40</b>	<b>LSE-AU-RLA40</b>
Spring rod (wobble) ①	<b>LS-XS</b>	<b>LSE-AI-S</b>	<b>LSE-AU-S</b>

**Note**

① Not to be used as a safety position switch. Use only in conjunction with snap-action contact.

## Product Overview

### Photoelectric Sensors Selection Guide



Description	Enhanced 50 Series	SM Series	Comet Series	E58 Harsh-Duty Series
	Page V9-T5-10	Page V9-T5-12	Page V9-T5-13	Page V9-T5-15
Overview	Provides outstanding optical performance and application flexibility in a self-contained, industry-standard compact rectangular	Provides high performance and ease of use in an economical, miniature package	This high-performance, 18 mm flat tubular sensor family features a wide variety of models in all sensing modes	Designed to withstand the harshest physical, chemical and optical environments; available in 18 and 30 mm tubular enclosures
Sensing types and ranges	Thru-beam: 200 and 500 ft Reflex: 30 ft Polarized reflex: 16 ft Diffuse reflective: 5 and 10 ft Clear object detector: 45 in Infrared fiber optic: range varies with fiber Visible fiber optic: range varies with fiber	Thru-beam: 50 ft Polarized reflex: 10 ft Diffuse reflective: 8 in Perfect Prox <sup>®</sup> background rejection: 2 and 4 in	Thru-beam: 20 and 80 ft Reflex: 25 ft Polarized reflex: 15 and 10 ft Diffuse reflective: 8 and 24 in Focused diffuse reflective: 1.6 in Wide single diffuse: 6 in Fine spot Perfect Prox: 2 in Perfect Prox background rejection: 2, 4, 6 and 9 in Glass and plastic fiber optic: range varies with fiber	Thru-beam: 800 ft Reflex: 59 ft Polarized reflex: 34 ft Perfect Prox background rejection: 2, 4, 6 and 11 in
Product features	High optical performance, including 10-ft diffuse and 500-ft thru-beam versions Output options include a high-current 10A SPDT relay Built-in light/dark selection on all models	Highly visible LED indicators for power, output and alignment (TargetLock) TargetLock simplifies setup and ensures that the sensor operates at the highest level of reliability possible Perfect Prox models sense different colored targets at the same range and ignore objects in the background	The 18 mm tubular body has flat sides for added mounting flexibility Available in universal voltage AC/DC versions as well as DC only models Short circuit protection on all models	Designed to be the most rugged photoelectric sensor available Perfect Prox background rejection technology for unmatched optical performance Output status indicator is the brightest available and is visible from any angle and in any lighting condition
Operating voltage	24–240 Vac and 12–240 Vdc 10–40 Vdc	18–264 Vac and 18–50 Vdc 10–30 Vdc	90–132 Vac and 18–50 Vdc 20–264 Vac and 15–30 Vdc 10–30 Vdc	Two-wire models: 90–132 Vac and 18–50 Vac Three- and four-wire models: 20–132 Vac and 15–30 Vdc 10–30 Vdc
Output function	Selectable light or dark operate	Light and dark operate models available	Selectable light or dark operate	Light and dark operate models available
Maximum load current	DC units: 250 mA AC/DC units: 300 mA to 10A	AC/DC units—200 mA DC units—100 mA (NPN or PNP)	AC/DC units—300 mA DC units—250 mA (NPN), 100 mA (PNP)	AC/DC units—300 mA (100 mA for 18 mm diameter units) DC units—250 mA (NPN), 100 mA (PNP)
Enclosure ratings	IP67	Type 1, 3, 4, 4X, 6, 6P, 12 and 13 IP68	Type 1, 2, 3, 4, 4X, 6, 12 and 13	Type 1, 2, 3, 3R, 3S, 4, 4X, 6, 6P, 12, 12K and 13 IP69K
Response time range	DC operation: 2 ms AC operation: 15 ms	DC operation: 1 ms AC operation: 16 ms	DC operation: 1 ms AC operation: 10 ms 2W AC/DC operation: 32 ms	2 ms to 35 ms
Approvals	CSA approved Certified to UL standard, UL 508	UL listed cUL listed	UL recognized cUL recognized	UL listed cUL listed

#### Enhanced 50 Series



5

#### Features

- High-optical performance models, including a 500 ft (152m) thru-beam and a 10 ft (3m) diffuse reflective unit
- Output options include a 3A SPDT relay
- All units offer light/dark selection
- Logic options include ON-delay, OFF-delay and one-shot delay
- Fully potted construction for use in areas subject to washdown, high shock and/or vibration
- Choice of pre-wired power cable, built-in mini-connector, built-in micro-connector and pigtail micro-connector versions; standard pre-wired cable length is 6 ft (1.8m)

### Product Selection

#### Enhanced 50 Series

##### Enhanced 50 Series Sensors

Description	Voltage Range	Sensing Range	Optimum Range	Sensing Beam	Thru-Beam Component	Output Type	Time Delay	Connection Type	Catalog Number
Thru-beam standard range	10–40 Vdc	200 ft (61m)	0.1–100 ft (0.03–31m)	Infrared	Source	N/A	N/A	4-pin Euro (micro) connector	<b>1150E-6547</b>
					Detector	NPN/PNP 250 mA	No		<b>1250E-6547</b>
	12–240 Vdc 24–240 Vac	200 ft (61m)	0.1–100 ft (0.03–31m)	Infrared	Source	N/A	N/A	4-pin micro connector	<b>1150E-6543</b>
					Detector	Isolated output solid-state relay 300 mA at 240 Vac/Vdc	No		<b>1250E-6543</b>
Thru-beam extended range	10–40 Vdc	500 ft (152m)	0.1–250 ft (0.03–77m)	Infrared	Source	N/A	N/A	4-pin Euro (micro) connector	<b>1151E-6547</b>
					Detector	NPN/PNP 250 mA	No		<b>1251E-6547</b>
	12–240 Vdc 24–240 Vac	500 ft (152m)	0.1–250 ft (0.03–77m)	Infrared	Source	N/A	N/A	4-pin micro connector	<b>1151E-6543</b>
					Detector	Isolated output solid-state relay 300 mA at 240 Vac/Vdc	No		<b>1251E-6543</b>
					N/A	N/A	4-pin mini-connector	<b>1151E-6504</b>	
						SPDT EM relay 3A at 120 Vac	No	5-pin mini-connector	<b>1251E-6504</b>

## Reflex, Diffuse, and Clear Object Sensors

Description	Voltage Range	Sensing Range <sup>①</sup>	Optimum Range <sup>①</sup>	Sensing Beam	Output Type	Time Delay	Connection Type	Catalog Number
Standard reflex	10–40 Vdc	30 ft (9m)	0.5–15 ft (0.2–4.6m)	Visible red	NPN/PNP 250 mA	No	4-pin Euro (micro) connector	<b>1450E-6547</b>
	12–240 Vdc 24–240 Vac	30 ft (9m)	0.5–5 ft (0.2–4.6m)	Visible red	isolated output solid-state relay 300 mA at 240 Vac/Vdc	No	4-pin micro connector	<b>1450E-6543</b>
					SPDT EM relay 3A at 120 Vac	No	5-pin mini-connector	<b>1450E-6504</b>
Polarized reflex <sup>②</sup>	10–40 Vdc	16 ft (4.9m)	0.5–8 ft (0.2–2.5m)	Visible red	NPN/PNP 250 mA	No Yes	4-pin Euro (micro) connector	<b>1451E-6547</b> <b>1451E-8547</b>
	12–240 Vdc 24–240 Vac	16 ft (4.9m)	0.5–8 ft (0.2–2.5m)	Visible red	isolated output solid-state relay 300 mA at 240 Vac/Vdc	No	4-pin micro connector	<b>1451E-6543</b>
					SPDT EM relay 3A at 120 Vac	No	5-pin mini-connector	<b>1451E-6504</b>
Diffuse reflective extended range	10–40 Vdc	10 ft (3m) <sup>③</sup>	1–60 in (25–1520 mm) <sup>③</sup>	Infrared	NPN/PNP 250 mA	No	4-pin Euro (micro) connector	<b>1351E-6547</b>
	12–240 Vdc 24–240 Vac	10 ft (3m) <sup>③</sup>	1–60 in (25–1520 mm) <sup>③</sup>	Infrared	isolated output solid-state relay 300 mA at 240 Vac/Vdc	No	4-pin micro connector	<b>1351E-6543</b>
					SPDT EM relay 3A at 120 Vac	No	5-pin mini-connector	<b>1351E-6504</b>
Clear object detector	10–40 Vdc	45 in (1.2m)	1–24 in (25–610 mm)	Visible red	NPN/PNP 250 mA	No	4-pin Euro (micro) connector	<b>1452E-6547</b>
	12–240 Vdc 24–240 Vac	45 in (1.2m)	1–24 in (25–610 mm)	Visible red	isolated output solid-state relay 300 mA at 240 Vac/Vdc	No	4-pin micro connector	<b>1452E-6543</b>
					SPDT EM relay 3A at 120 Vac	No	5-pin mini-connector	<b>1452E-6504</b>

**Notes**

- <sup>①</sup> Ranges based on 3 in retroreflector for reflex sensors.  
<sup>②</sup> Polarized sensors may not operate with reflective tape. Test tape selection before installation.  
<sup>③</sup> Ranges based on 90% reflectance white card for diffuse reflective sensors.

## SM Series



## Features

- TargetLock technology makes SM Series™ the easiest photoelectric sensor to set up and use
- Highly visible LED indicators for power, output and TargetLock
- TargetLock simplifies setup and ensures the sensor operates at the highest level of reliability possible
- Perfect Prox models sense different colored targets at the same range and ignore objects in the background
- Visible beam on all models lets you see exactly where the sensor is pointing
- Compact size to fit in tight spaces
- Multiple mounting options, including industry-standard 18 mm threads
- Reverse polarity, overload and short circuit protection
- Full family includes thru-beam, polarized reflex, diffuse reflective and Perfect Prox background rejection

## Product Selection

## SM Series

## SM Series Sensors

Description	Operating Voltage	Sensing Range <sup>①</sup>	Optimum Range <sup>②</sup>	Cutoff Range	Field of View	Thru-Beam Component	Connection Type	Light Operate Catalog Number	Dark Operate Catalog Number
<b>Three-Wire and Four-Wire Sensors</b>									
Thru-beam	10–30 Vdc	50 ft (15m)	0.1–25 ft (30 mm–7.5m)	—	10 in (254 mm) diameter at 10 ft (3m)	Source	4-pin micro DC connector	<b>E65-SMTS15-HAD</b>	—
						Detector	4-pin micro DC connector	—	<b>E65-SMTD15-HDD</b>
Polarized reflex	18–264 Vac 50/60 Hz or 18–50 Vdc	10 ft (3m)	0.1–5 ft (30 mm–1.5m)	—	1 in (25 mm) diameter at 50 in (1.3m)	—	4-pin micro AC connector	—	<b>E65-SMPR3-GDD</b>
	10–30 Vdc	10 ft (3m)	0.1–5 ft (30 mm–1.5m)	—	1 in (25 mm) diameter at 50 in (1.3m)	—	4-pin micro AC connector	—	<b>E65-SMPR3-HDD</b>
Diffuse reflective	18–264 Vac 50/60 Hz or 18–50 Vdc	8 in (200 mm)	0.25–5 in (6–127 mm)	—	2 in (50 mm) diameter at 5 in (127 mm)	—	4-pin micro AC connector	<b>E65-SMSD200-GLD</b>	—
	10–30 Vdc	8 in (200 mm)	0.25–5 in (6–127 mm)	—	2 in (50 mm) diameter at 5 in (127 mm)	—	4-pin micro DC connector	<b>E65-SMSD200-HLD</b>	—
Perfect Prox	18–264 Vac 50/60 Hz or 18–50 Vdc	2 in (50 mm)	0.4–1.8 in (10–45 mm)	2.3 in (58 mm) and beyond	0.25 in (6 mm) diameter at 2.25 in (57 mm)	—	4-pin micro AC connector	<b>E65-SMPP050-GLD</b>	—
	10–30 Vdc	2 in (50 mm)	0.4–1.8 in (10–45 mm)	2.3 in (58 mm) and beyond	0.25 in (6 mm) diameter at 2.25 in (57 mm)	—	4-pin micro DC connector	<b>E65-SMPP050-HLD</b>	—

## Notes

① Sensor will detect a 90% reflectance white card at this range.

② Sensor will ignore a 90% reflectance white card at this range.

## Comet Series



## Features

- Industry-standard 18 mm diameter threaded body has flat sides allowing it to be mounted like a tubular sensor or against any flat surface
- Right-angle viewing models mount in a depth of only 6/10th of an inch
- Perfect Prox technology provides exceptional background rejection and application problem-solving
- Visible sensing beams let you see where the beam is aimed for quick setup and alignment
- Solid polyurethane housing completely encapsulates internal circuits for high resistance to shock and vibration

## Product Selection

## Comet Series

## Reflex Sensors

Description	Operating Voltage	Sensing Range <sup>①</sup>	Optimum Range <sup>①</sup>	Field of View	Sensing Beam	Connection Type	Catalog Number
<b>Three-Wire and Four-Wire Sensors</b>							
Standard reflex forward viewing	20–264 Vac 50/60 Hz or 15–30 Vdc (NPN)	25 ft (7.6m)	0.1–15 ft (0.03–4.5m)	1 in (25 mm) diameter at 50 in (1.3m)	Visible red beam	4-pin micro AC connector	<b>14102AQD03</b>
	10–30 Vdc (NPN and PNP)	25 ft (7.6m)	0.1–15 ft (0.03–4.5m)	1 in (25 mm) diameter at 50 in (1.3m)	Visible red beam	4-pin micro DC connector	<b>14102AQD07</b>
Polarized reflex forward viewing <sup>②</sup>	20–64 Vac 50/60 Hz or 15–30 Vdc (NPN)	15 ft (4.5m)	0.1–15 ft (0.03–4.5m)	1 in (25 mm) diameter at 50 in (1.3m)	Visible red beam	4-pin micro AC connector	<b>14101AQD03</b>
	10–30 Vdc (NPN and PNP)	15 ft (4.5m)	0.1–10 ft (0.03–4.5m)	1 in (25 mm) diameter at 50 in (1.3m)	Visible red beam	4-pin micro DC connector	<b>14101AQD07</b>
Polarized reflex right-angle viewing <sup>②③</sup>	20–264 Vac 50/60 Hz or 15–30 Vdc (NPN)	10 ft (3m)	0.1–15 ft (0.03–4.5m)	1 in (25 mm) diameter at 50 in (1.3m)	Visible red beam	4-pin micro AC connector	<b>14101RQD03</b>
	15–30 Vdc	10 ft (3m)	0.1–15 ft (0.03–1.5m)	1 in (25 mm) diameter at 50 in (1.3m)	Visible red beam	4-pin micro DC connector	<b>14101RQD07</b>

## Diffuse Reflective and Focused Diffuse Reflective Sensors

Description	Operating Voltage	Sensing Range <sup>④</sup>	Optimum Range	Field of View	Sensing Beam	Connection Type	Catalog Number
<b>Three-Wire and Four-Wire Sensors</b>							
Diffuse reflective forward viewing	20–264 Vac 50/60 Hz or 15–30 Vdc (NPN)	24 in (610 mm)	0.1–15 in (3–380 mm)	5 in (127 mm) diameter at 15 in (380 mm)	Infrared beam	4-pin micro AC connector	<b>13100AQD03</b>
	10–30 Vdc (NPN and PNP)						<b>13100AQD07</b>
Diffuse reflective right-angle viewing	20–264 Vac 50/60 Hz or 15–30 Vdc (NPN)	24 in (610 mm)	0.1–15 in (3–380 mm)	5 in (127 mm) diameter at 15 in (380 mm)	Infrared beam	4-pin micro AC connector	<b>13100RQD03</b>
	10–30 Vdc (NPN and PNP)						<b>13100RQD07</b>

## Notes

- ① Ranges based on a 3 in diameter retroreflector.
- ② Polarized reflex sensors may not operate with retroreflective tape. Test selected tape prior to installation.
- ③ Right-angle viewing polarized reflex models are rated Type 1 only.
- ④ Sensor will detect a 90% reflective white card at this range.

## Perfect Prox Background Rejection Sensor

Description	Operating Voltage	Nominal Range <sup>①</sup>	Optimum Range	Cutoff Range <sup>②</sup>	Field of View	Sensing Beam Type	Connection Type	Catalog Number
<b>Three-Wire and Four-Wire Sensors</b>								
Perfect Prox forward viewing	20–264 Vac 50/60 Hz or 15–30 Vdc (NPN)	2 in (50 mm) sharp cutoff	0.4–1.8 in (10–45 mm)	2.25 in (57 mm) and beyond	0.25 in (6 mm) diameter at 2.25 in (64 mm)	Visible red	4-pin micro AC connector	<b>13104AQD03</b>
		4 in (100 mm) sharp cutoff	0.5–3 in (13–76 mm)	5 in (127 mm) and beyond	0.35 in (9 mm) diameter at 5 in (127 mm)	Visible red		<b>13101AQD03</b>
	10–30 Vdc (NPN and PNP)	2 in (50 mm) sharp cutoff	0.4–1.8 in (10–45 mm)	2.25 in (57 mm) and beyond	0.25 in (6 mm) diameter at 2.25 in (64 mm)	Visible red	4-pin micro DC connector	<b>13104AQD07</b>
		4 in (100 mm) sharp cutoff	0.5–3 in (13–76 mm)	5 in (127 mm) and beyond	0.35 in (9 mm) diameter at 5 in (127 mm)	Visible red		<b>13101AQD07</b>
Perfect Prox right-angle viewing	20–264 Vac 50/60 Hz or 15–30 Vdc (NPN)	2 in (50 mm) sharp cutoff	0.4–1.8 in (10–45 mm)	2.25 in (57 mm) and beyond	0.25 in (6 mm) diameter at 2.25 in (64 mm)	Visible red	4-pin micro AC connector	<b>13104RQD03</b>
		4 in (100 mm) sharp cutoff	0.5–3 in (13–76 mm)	5 in (127 mm) and beyond	0.35 in (9 mm) diameter at 5 in (127 mm)	Visible red		<b>13104RS5003</b>
	10–30 Vdc (NPN and PNP)	2 in (50 mm) sharp cutoff	0.4–1.8 in (10–45 mm)	2.25 in (57 mm) and beyond	0.25 in (6 mm) diameter at 2.25 in (64 mm)	Visible red	4-pin micro DC connector	<b>13104RQD07</b>
		4 in (100 mm) sharp cutoff	0.5–3 in (13–76 mm)	5 in (127 mm) and beyond	0.35 in (9 mm) diameter at 5 in (127 mm)	Visible red		<b>13104RS5007</b>
Fine spot Perfect Prox forward viewing	20–264 Vac 50/60 Hz or 15–30 Vdc (NPN)	2 in (50 mm) sharp cutoff	0.9–1.8 in (23–45 mm)	2.25 in (57 mm) and beyond	0.05 in (1.3 mm) diameter at 1.7 in (43 mm)	Visible red	4-pin micro AC connector	<b>13105AQD03</b>
		10–30 Vdc (NPN and PNP)	2 in (50 mm) sharp cutoff	0.9–1.8 in (23–45 mm)	2.25 in (57 mm) and beyond	0.05 in (1.3 mm) diameter at 1.7 in (43 mm)	Visible red	4-pin micro DC connector

**Notes**

- ① Sensor will detect a 90% reflectance card at this range.  
 ② Sensor will ignore a 90% reflectance card at this range.



**E58 Harsh-Duty Series****Features**

- Sensors are available in 18 mm and 30 mm diameters
- Refined optics provide long range detection through high levels of lens or airborne contamination
- Perfect Prox technology provides exceptional background rejection and extremely high excess gain
- Resistant to the wide range of chemicals used in the automotive, food processing and forest products industries
- Suitable for high-temperature, high-pressure washdown (1200 psi)
- Visible sensing beam on all models lets you see where the beam is aimed for quick setup and alignment
- Output status indicator is the brightest available and is visible from any angle and in any lighting condition

**Product Selection****E58 Harsh-Duty Series****Thru-Beam and Reflex Sensors**

Description	Operating Voltage	Sensing Range	Optimum Range	Field of View	Thru-Beam Component	Connection Type	Catalog Number
<b>Three-Wire and Four-Wire Sensors</b>							
30 mm diameter thru-beam	20–132 Vac 50/60 Hz or 15–30 Vdc	800 ft (250m)	0.1–300 ft (0.03–90m)	33 in (830 mm) diameter at 25 ft (7.6m)	Source	4-pin micro AC connector	<b>E58-30TS250-GAP</b>
					Detector	4-pin micro AC connector	<b>E58-30TD250-GDP</b>
	10–30 Vdc	800 ft (250m)	0.1–300 ft (0.03–90m)	33 in (830 mm) diameter at 25 ft (7.6m)	Detector	4-pin micro DC connector	<b>E58-30TD250-HDP</b>
30 mm diameter reflex	20–132 Vac 50/60 Hz or 15–30 Vdc	59 ft (18m)	1–40 ft (0.03–12m)	6 in (150 mm) diameter at 20 ft (6m)	—	4-pin micro AC connector	<b>E58-30RS18-GDP</b>
					—	4-pin micro DC connector	<b>E58-30RS18-HDP</b>
30 mm diameter polarized reflex	20–132 Vac 50/60 Hz or 15–30 Vdc	34 ft (10m)	1–20 ft (0.03–6m)	6 in (150 mm) diameter at 20 ft (6m)	—	4-pin micro AC connector	<b>E58-30RP10-GDP</b>
					—	4-pin micro DC connector	<b>E58-30RP10-HDP</b>
	10–30 Vdc	34 ft (10m)	1–20 ft (0.03–6m)	6 in (150 mm) diameter at 20 ft (6m)	—	4-pin micro DC connector	<b>E58-30RP10-HDP</b>

## Perfect Prox Background Rejection Sensors

Description	Operating Voltage	Nominal Range <sup>①</sup>	Optimum Range <sup>②</sup>	Cutoff Range	Field of View	Connection Type	Catalog Number
<b>Two-Wire Sensors</b>							
18 mm diameter Perfect Prox	90–132 Vac 50/60 Hz or 18–50 Vdc	4 in (100 mm)	0.5–3 in (13–76 mm)	5 in (127 mm) and beyond	0.38 in (10 mm) diameter at 4 in (100 mm)	2m cable	<b>E58-18DP100-EL</b>
<b>Three-Wire and Four-Wire Sensors</b>							
18 mm diameter Perfect Prox	10–30 Vdc	4 in (100 mm)	0.5–3 inches (13–76 mm)	5 in (127 mm) and beyond	0.38 in (10 mm) diameter at 4 in (100 mm)	4-pin micro DC connector	<b>E58-18DP100-HLP</b>
30 mm diameter Perfect Prox	20–132 Vac 50/60 Hz or 15–30 Vdc	11 in (280 mm)	1–9 in (26–228 mm)	12.5 in (318 mm)	1.0 in (26 mm) diameter at 11 in (280 mm)	4-pin micro AC connector	<b>E58-30DPS280-GLP</b>
	10–30 Vdc	11 in (280 mm)	1–9 in (26–228 mm)	12.5 in (318 mm)	1.0 in (26 mm) diameter at 11 in (280 mm)	4-pin micro DC connector	<b>E58-30DPS280-HLP</b>

**Notes**

- ① Sensor will detect a 90% reflectance card at this range.  
 ② Sensor will ignore a 90% reflectance card at this range

## Product Overview

### Inductive Sensors Selection Guide



Description	iProx	E57 Premium+ Series	E57 Premium+ Series Short Barrel
	Page V9-T5-19	Page V9-T5-20	Page V9-T5-21
Overview	Standard features include extended sensing ranges, high noise-immunity, extreme durability and includes autoconfigure technology. Optional advanced features include output delay, speed detection and cloning with the ProxView Software	High-performance inductive sensors include stainless steel models, extended ranges and right-angle sensing	Full featured sensors with shorter overall length than standard tubular sensors
Applications	Automotive, machine tool, material handling where high sensing performance and inventory consolidation is a priority	A wide variety of applications, including those where customers require AC/DC universal inventory sensors	Automation, robotics, transfer lines, conveyors, material handling
Product features	Auto-configure technology automatically detects a sinking (NPN) or sourcing (PNP) connection and switches the sensor accordingly, without any user intervention Optional computer programming cable and windows-based ProxView configuration software makes it easy to customize sensors Clone the sensor to match the characteristics of more than 4,800 competitive models, or configure it to match your specific application needs	12, 18 and 30 mm diameters Two-wire and three-wire AC and DC sensors AC/DC models operate on 20–250 Vac or Vdc	Available in 12, 18 and 30 mm diameters Two-wire sensors offer 20–250 Vac or Vdc operation; AC only 20–135 Vac Three-wire models operate on 6–30 Vdc
Output ratings	AC—250–500 mA DC—300–500 mA	AC mode—250–500 mA DC mode—200 mA	AC—200–500 mA continuous DC—500 mA continuous
Enclosure ratings	Type 4, 4X, 6, 6P, 12, 13 IEC—IP67	Type 4, 4X, 6, 6P, 12, 13 IEC—IP67	Type 4, 4X, 6, 6P, 12, 13 IEC—IP67
Construction	Stainless steel	Stainless steel	Stainless steel Semi-shielded models: nickel-plated brass
Approvals	cUL listed	cUL listed	UL listed CSA certified

# 5.3

## Sensors and Limit Switches

### Inductive Sensors

#### Product Selection Guide, continued



5

Description	Global Proximity	E52 Cube Style
	Page V9-T5-22	Page V9-T5-23
Overview	This full-line, tubular proximity sensor family provides a cost-effective solution for high volume OEM use	A family of industry-standard, cube-sized inductive sensors with long range capabilities
Applications	Machine tool detection, press applications, cam detection, material handling, valve and shaft position, automotive assembly	Automotive, manufacturing, machinery OEMs
Product features	8, 12, 18 and 30 mm diameters Two-wire sensors available in AC or DC versions Three-wire sensors available in DC versions	Long inductive proximity ranges available (up to 40 mm sensing distance) Four-wire DC models have complementary outputs (1NO-1NC) Four-wire DC models use auto-configure technology, which allows the sensor to automatically adapt for NPN or PNP without user intervention
Output ratings	AC mode—200 mA DC mode—100 mA	AC—400 mA maximum DC—300 mA maximum
Enclosure ratings	IP67	Type 4, 4X, 6, 6P, 12, 13 IEC—IP67
Construction	Nickel-plated brass 8 mm nano stainless steel	Zinc alloy PPS, PL
Approvals	cCSAus	cULus

## iProx



## Features

- Available in AC two-wire, DC three-wire and unique DC four-wire with complementary (NO-NC) or dual NO outputs
- Auto-configure technology automatically detects a sinking (NPN) or sourcing (PNP) connection and switches the sensor accordingly, without any user intervention
- Reliably detect metal targets at ranges superior to conventional shielded or unshielded tubular sensors
- Quality construction using a stainless steel barrel, 360-degree dual-color LED indicator, Ryton® impact-resistant face cap and vibration-absorbing potting compound
- Resistant to extreme temperatures (–40°C)

## Product Selection

## iProx

## iProx Sensors

Description	Operating Voltage	Sensing Range	Shielding	Connection Type	NO Output <sup>①</sup> Catalog Number
<b>Three-Wire Sensors</b>					
12 mm diameter	6–48 Vdc	4 mm	Shielded	4-pin micro DC connector	<b>E59-M12A105D01-D1</b>
		10 mm	Unshielded	4-pin micro DC connector	<b>E59-M12C110D01-D1</b>
18 mm diameter	6–48 Vdc	8 mm	Shielded	4-pin micro DC connector	<b>E59-M18A108D01-D1</b>
		18 mm	Unshielded	4-pin micro DC connector	<b>E59-M18C116D01-D1</b>
30 mm diameter	6–48 Vdc	15 mm	Shielded	4-pin micro DC connector	<b>E59-M30A115D01-D1</b>
		29 mm	Unshielded	4-pin micro DC connector	<b>E59-M30C129D01-D1</b>

## iProx Complementary and Dual Output

Description	Operating Voltage	Sensing Range	Shielding	Output Type	Connection Type	Complementary Outputs (1NO-1NC) Catalog Number
<b>Four-Wire Sensors</b>						
12 mm diameter	6–48 Vdc	4 mm	Shielded	NPN (sinking)	4-pin micro DC connector	<b>E59-M12A105D01-D3NN</b>
				PNP (sourcing)	4-pin micro DC connector	<b>E59-M12A105D01-D3PP</b>
18 mm diameter	6–48 Vdc	18 mm	Unshielded	NPN (sinking)	4-pin micro DC connector	<b>E59-M18C116D01-D3NN</b>
				PNP (sourcing)	4-pin micro DC connector	<b>E59-M18C116D01-D3PP</b>

**Note**

① Sensors are ordered with pre-set outputs from the factory, but can be later programmed either NO or NC using ProxView software.

#### E57 Premium+ Series



#### Features

- High-performance inductive sensors include stainless steel models, extended ranges and right angle sensing
- New expanded offering of two-wire, three-wire, AC, DC, and AC/DC multiple range sensor models
- Designed with stainless steel barrel and new potting compound for robust, high-temperature, high-pressure washdown, as well as intense shock and vibration applications
- 360° output status indicator is visible from any angle and in any light condition
- Resettable short circuit protection and reverse polarity in select models
- Wide temperature range –13° to 158°F (–25° to 70°C) on cable, micro-style connections

### Product Selection

#### E57 Premium+ Series

##### E57 Premium+ Series

Description	Operating Voltage	Sensing Range (Sn)	Shielding	Connection Type ①	NO Output Catalog Number
<b>Three-Wire Sensors</b>					
12 mm diameter end sensing	6–48 Vdc	2 mm (standard range)	Shielded (NPN)	4-pin micro DC connector	<b>E57LAL12T110SD</b>
		2 mm (standard range)	Shielded (PNP)	4-pin micro DC connector	<b>E57LAL12T111SD</b>
		4 mm (standard range)	Unshielded (NPN)	4-pin micro DC connector	<b>E57LAL12T110ED</b>
		4 mm (standard range)	Unshielded (PNP)	4-pin micro DC connector	<b>E57LAL12T111ED</b>
18 mm diameter end sensing	6–48 Vdc	5 mm (standard range)	Shielded (NPN)	4-pin micro DC connector	<b>E57LAL18T110SD</b>
		5 mm (standard range)	Shielded (PNP)	4-pin micro DC connector	<b>E57LAL18T111SD</b>
		8 mm (standard range)	Unshielded (NPN)	4-pin micro DC connector	<b>E57LAL18T110ED</b>
		8 mm (standard range)	Unshielded (PNP)	4-pin micro DC connector	<b>E57LAL18T111ED</b>
		20 mm (extended range)	Non-embeddable (PNP)	4-pin micro DC connector	<b>E57-18LE20-BD</b>
		5 mm	Shielded (PNP)	4-pin micro DC connector	<b>E57RAL18T111SD</b>
30 mm diameter end sensing	6–48 Vdc	10 mm (standard range)	Shielded (PNP)	4-pin micro DC connector	<b>E57LAL30T111SD</b>
		15 mm (standard range)	Unshielded (PNP)	4-pin micro DC connector	<b>E57LAL30T111ED</b>

#### Note

- ① For cable lengths longer than 2 meters, add the number of the desired length in meters to the end of the listed catalog number (for catalog numbers ending with a number, add an **S** and then the length). Examples for a 5-meter cable: E57-18LE12-A becomes E57-18LE12-A**5**; E57LAL12A2 becomes E57LAL12A2**S5**.

**E57 Premium+ Series Short Barrel****Features**

- The same quality constructions of the E57 Premium+ standard models, but much shorter
- Designed with stainless steel barrel and impact-absorbing new potting compound for robust, high-temperature, high-pressure washdown, as well as intense shock and vibration applications
- 360° output status indicator is visible from any angle and in any light condition
- Resettable short circuit protection in AC/DC and DC models
- Reverse polarity protection in three-wire DC versions
- Small size to fit in tight spaces

**Product Selection****E57 Premium+ Series Short Barrel****Short Barrel Length Proximity Sensors**

Description	Operating Voltage	Sensing Range (Sn)	Shielding	Connection Type <sup>①</sup>	NO Output Catalog Number
<b>Three-Wire Sensors</b>					
12 mm diameter	6–48 Vdc	2 mm	Shielded (NPN)	4-pin micro DC connector	<b>E57SAL12T110SD</b>
			Shielded (PNP)	4-pin micro DC connector	<b>E57SAL12T111SD</b>
		4 mm	Unshielded (NPN)	4-pin micro DC connector	<b>E57SAL12T110ED</b>
			Unshielded (PNP)	4-pin micro DC connector	<b>E57SAL12T111ED</b>
18 mm diameter	6–48 Vdc	5 mm	Shielded (NPN)	4-pin micro DC connector	<b>E57SAL18T110SD</b>
			Shielded (PNP)	4-pin micro DC connector	<b>E57SAL18T111SD</b>
		8 mm	Unshielded (NPN)	4-pin micro DC connector	<b>E57SAL18T110ED</b>
			Unshielded (PNP)	4-pin micro DC connector	<b>E57SAL18T111ED</b>
30 mm diameter	6–48 Vdc	10 mm	Shielded (NPN)	4-pin micro DC connector	<b>E57SAL30T110SD</b>
			Shielded (PNP)	4-pin micro DC connector	<b>E57SAL30T111SD</b>
		15 mm	Unshielded (NPN)	4-pin micro DC connector	<b>E57SAL30T110ED</b>
			Unshielded (PNP)	4-pin micro DC connector	<b>E57SAL30T111ED</b>

**Note**

- <sup>①</sup> Cable models are supplied as standard with a 2-meter cable. A 5-meter cable is available by adding **S5** to the catalog number.  
Example: E57SAL12T110 becomes E57SAL12T110**S5**.

## Global Proximity



## Features

- Features solid performance and a basic feature set for reliable, cost-effective sensing
- Available in a variety of sizes to fit all applications: 8 mm, 12 mm, 18 mm and 30 mm diameters
- Operate on 10–30 Vdc in two-wire and three-wire (NPN or PNP) configurations
- Switching frequency of 2 kHz for DC models
- Shielded and unshielded versions available
- Terminations include 2m cable, micro-connector and nano-connector

## Product Selection

## Global Proximity

## Global Proximity Sensors

Description	Operating Voltage	Sensing Range	Shielding	Output Type	Connection Type	Catalog Number
<b>Three-Wire Sensors</b>						
8 mm diameter	10–30 Vdc	3 mm (extended range)	Shielded	NO (NPN)	4-pin micro DC connector	<b>E57-08GE03-CDB</b>
				NO (PNP)	4-pin micro DC connector	<b>E57-08GE03-GDB</b>
		6 mm (extended range)	Unshielded	NO (NPN)	4-pin micro DC connector	<b>E57-08GE06-CDB</b>
				NO (PNP)	4-pin micro DC connector	<b>E57-08GE06-GDB</b>
12 mm diameter	10–30 Vdc	5 mm (extended range)	Shielded	NO (NPN)	4-pin micro DC connector	<b>E57-12GE05-CDB</b>
				NO (PNP)	4-pin micro DC connector	<b>E57-12GE05-GDB</b>
				NO (NPN)	4-pin micro DC connector	<b>E57-12GE10-CDB</b>
		10 mm (extended range)	Unshielded	NO (PNP)	4-pin micro DC connector	<b>E57-12GE10-GDB</b>
				NO (NPN)	4-pin micro DC connector	<b>E57-12GE10-CDB</b>
				NO (PNP)	4-pin micro DC connector	<b>E57-12GE10-GDB</b>
18 mm diameter	10–30 Vdc	8 mm (extended range)	Shielded	NO (NPN)	4-pin micro DC connector	<b>E57-18GE08-CDB</b>
				NO (PNP)	4-pin micro DC connector	<b>E57-18GE08-GDB</b>
				NO (NPN)	4-pin micro DC connector	<b>E57-18GE18-CDB</b>
		18 mm (extended range)	Unshielded	NO (PNP)	4-pin micro DC connector	<b>E57-18GE18-GDB</b>
				NO (NPN)	4-pin micro DC connector	<b>E57-18GE18-CDB</b>
				NO (PNP)	4-pin micro DC connector	<b>E57-18GE18-GDB</b>
30 mm diameter	10–30 Vdc	15 mm (extended range)	Shielded	NO (NPN)	4-pin micro DC connector	<b>E57-30GE15-CDB</b>
				NO (PNP)	4-pin micro DC connector	<b>E57-30GE15-GDB</b>
				NO (NPN)	4-pin micro DC connector	<b>E57-30GE29-CDB</b>
		29 mm (extended range)	Unshielded	NO (PNP)	4-pin micro DC connector	<b>E57-30GE29-GDB</b>
				NO (NPN)	4-pin micro DC connector	<b>E57-30GE29-CDB</b>
				NO (PNP)	4-pin micro DC connector	<b>E57-30GE29-GDB</b>



**E52 Cube****Features**

- Rugged inductive sensors in industry-standard cube package
- Long inductive proximity ranges available (up to 40 mm sensing distance)
- Four-wire DC models have complementary outputs (1NO-1NC)
- Four-wire DC models use auto-configure technology, which allows the sensor to automatically adapt for NPN or PNP without user intervention
- Robust design featuring vibration and impact-absorbing potting compound
- Ideal for extreme temperatures or high-pressure washdown environments

**Product Selection**

**Note:** Micro-connector models shown; mini-connector models also available.

**E52 Cube Style****E52 Cube Inductive Proximity Sensors**

Description	Voltage Type	Output Configuration	Shielding	Output Type	Sensing Range	Connector Style	Catalog Number
<b>DC Four-Wire Sensors</b>							
Cube package (40 x 40 x 40 mm)	10–48 Vdc	NPN/PNP autoconfigure ①	Shielded	1NO-1NC	15 mm	DC 4-pin micro	<b>E52Q-DL15SAD01</b>
			Unshielded	1NO-1NC	15 mm	DC 4-pin micro	<b>E52Q-DL15UAD01</b>
			Shielded	1NO-1NC	20 mm	DC 4-pin micro	<b>E52Q-DL20SAD01</b>
			Unshielded	1NO-1NC	20 mm	DC 4-pin micro	<b>E52Q-DL20UAD01</b>
			Unshielded	1NO-1NC	25 mm	DC 4-pin micro	<b>E52Q-DL25UAD01</b>
			Unshielded	1NO-1NC	30 mm	DC 4-pin micro	<b>E52Q-DL30UAD01</b>
			Unshielded	1NO-1NC	35 mm	DC 4-pin micro	<b>E52Q-DL35UAD01</b>
			Unshielded	1NO-1NC	40 mm	DC 4-pin micro	<b>E52Q-DL40UAD01</b>

**Note**

① Autoconfigure technology allows the sensor to automatically adapt to NPN or PNP without user intervention.

#### Product Overview

##### Connectivity Selection Guide



5

Description	Global Plus Connector Cables
	<b>Page V9-T5-25</b>
Overview	Includes a wide variety of single- and double-connector cables in a variety of sizes (mini, micro, nano), lengths and jacket materials to fit any application
Sensing types and ranges	Nano (M8) Micro (M12) Mini
Product features	Industry standard connector types Industrial-duty polymer jackets consisting of PVC, PUR, or irradiated PUR Stranded copper conductors and polymer jackets provide a high resistance to bending motions Right angle units for applications that have constricted space
Enclosure ratings	Type 6P, IP68
Approvals	UL, cUL, CSA

## Global Plus Connector Cables



## Features

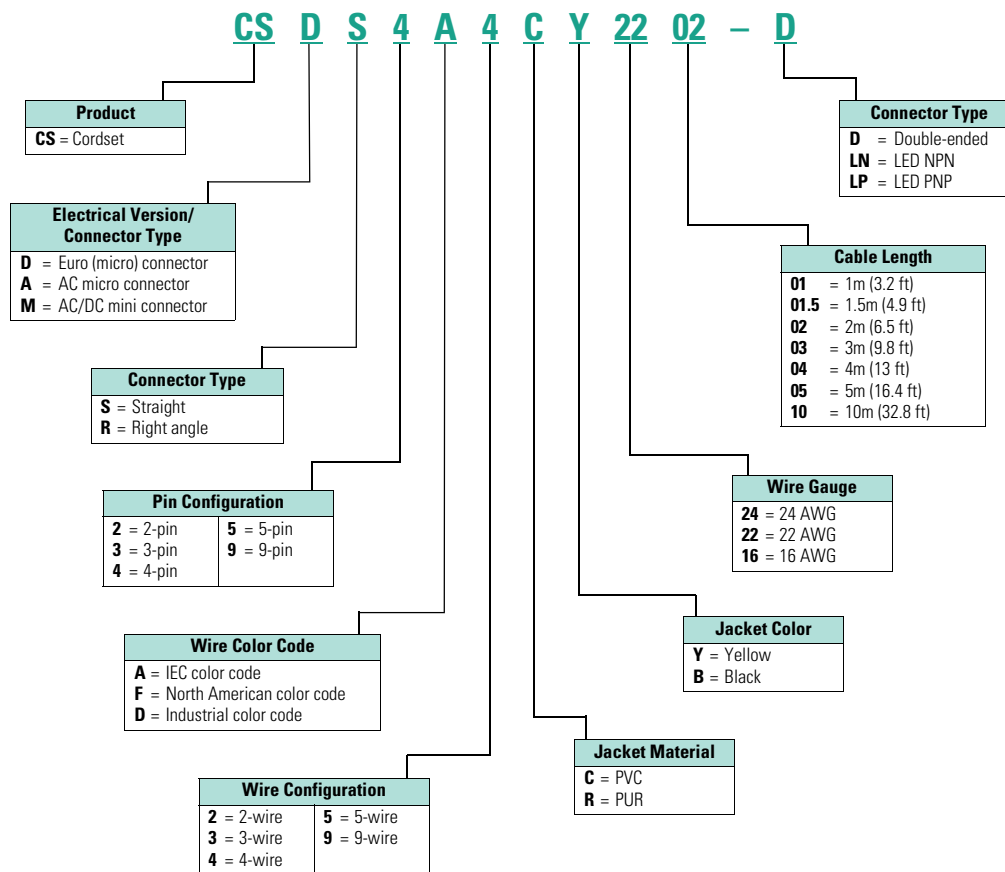
- Cost effective and reliable quick-disconnect cables
- A wide variety of single- and double-connector cables available
- Custom lengths are available upon request from the factory
- A full offering of nano, micro and mini connector cables in a variety of lengths and jacket materials available
- Field wireable accessories
- Straight and right-angle connector ends

## Catalog Number Selection

## Global Plus Connector Cables

## Global Plus

**Note:** This is a representative guide to the catalog numbering system. All possible combinations may not be available for ordering.





### Product Selection



#### Micro Style, Single-Connector Cables

Description	Voltage Style	Number of Pins	Gauge	Length	PVC Jacket Catalog Number	Pin Configuration/Wire Colors (Face View Female Shown)
<b>Standard Cables</b>						
Micro style straight female	DC	4-pin 3-wire	22 AWG	6 ft (2m)	<b>CSDS4A3CY2202</b>	 1-Brown 2-No wire 3-Blue 4-Black
		4-pin 4-wire	22 AWG	6 ft (2m)	<b>CSDS4A4CY2202</b>	 1-Brown 2-White 3-Blue 4-Black
		5-pin 5-wire	22 AWG	6 ft (2m)	<b>CSDS5A5CY2202</b>	 1-Brown 2-White 3-Blue 4-Black 5-Green/yellow
Micro style straight female	DC	4-pin 3-wire	22 AWG	6 ft (2m)	<b>CSDR4A3CY2202</b>	 1-Brown 2-No wire 3-Blue 4-Black
		4-pin 4-wire	22 AWG	6 ft (2m)	<b>CSDR4A4CY2202</b>	 1-Brown 2-White 3-Blue 4-Black
		5-pin 5-wire	22 AWG	6 ft (2m)	<b>CSDR5A5CY2202</b>	 1-Brown 2-White 3-Blue 4-Black 5-Green/yellow

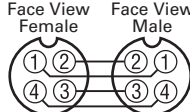
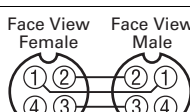
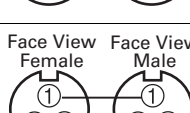
#### Mini Style, Single-Connector Cables

Description	Voltage Style	Number of Pins	Gauge	Length	PVC Jacket Catalog Number	Pin Configuration/Wire Colors (Face View Female Shown)
<b>Standard Cables</b>						
Mini style straight female	AC/DC	4-pin 4-wire	16 AWG	6 ft (2m)	<b>CSMS4A4CY1602</b>	 1-Black 2-Blue 3-Brown 4-White
	AC/DC	4-pin 5-wire	16 AWG	6 ft (2m)	<b>CSMS5D5CY1602</b>	 1-White 2-Red 3-Green 4-Orange 5-Black

## Nano Style, Single-Connector Cables

Description	Voltage Style	Number of Pins	Gauge	Length	PVC Jacket Catalog Number	Pin Configuration/Wire Colors (Face View Female Shown)
<b>Standard Cables</b>						
Nano style straight female	—	3-pin 3-wire	24 AWG	6 ft (2m)	<b>CSNS3A3CY2402</b>	 1-Brown 2-Blue 3-Black
Nano style right angle female	—	3-pin 3-wire	24 AWG	6 ft (2m)	<b>CSNR3A3CY2402</b>	 1-Brown 2-Blue 3-Black

## Micro and Mini Style, Double-Ended Connector Cables

Description	Voltage Style	Number of Pins	Gauge	Length	PVC Jacket Catalog Number	Pin Configuration/Wire Colors (Face View Female Shown)
<b>Standard Cables</b>						
Micro style straight female/male	DC	4-pin	22 AWG	6 ft (2m)	<b>CSDS4A4CY2202-D</b>	
Micro style straight female/ right angle male	DC	4-pin	22 AWG	6 ft (2m)	<b>CSDR4A4CY2202-D</b>	
Mini style straight female/male	AC/DC	3-pin	16 AWG	6 ft (2m)	<b>CSMS3F3CY1602-DP</b>	

**Modular Bus System**



**General Purpose Transformer**



**PSG Power Supplies**



**CHDB Series Power Distribution**



**XB Terminal Blocks**



<b>6.1</b>	<b>Modular Bus System for Hydraulic Magnetic Circuit Breakers</b>	
	Product Overview .....	V9-T6-2
	MDBS .....	V9-T6-3
	PDMB .....	V9-T6-4
<b>6.2</b>	<b>General Purpose and Industrial Control Transformers</b>	
	Product Overview .....	V9-T6-5
	General Purpose Transformers .....	V9-T6-6
	Industrial Control Transformers .....	V9-T6-8
<b>6.3</b>	<b>Power Supplies</b>	
	Product Overview .....	V9-T6-10
	PSG Power Supplies .....	V9-T6-11
	ELC Power Supplies .....	V9-T6-12
<b>6.4</b>	<b>Power Distribution Blocks</b>	
	Product Overview .....	V9-T6-13
	CHDB Series—Power Distribution Blocks, Enclosed and Open .....	V9-T6-14
	CH160 Series—Power Terminal Blocks .....	V9-T6-15
<b>6.5</b>	<b>Terminal Blocks and Accessories</b>	
	Product Overview .....	V9-T6-16
	<b>XB Series IEC Terminal Blocks</b> .....	V9-T6-17

For our complete product offering, see Volume 7—Logic Control, Operator Interface and Connectivity Solutions, CA08100008E

## Product Overview

### Modular Bus System Selection Guide



6

Description	Modular Distribution Busbar System (MDBS) Page V9-T6-3	Power Distribution Busbar Module (PDBM) Page V9-T6-4
<b>Technical Data</b>		
Voltage		
Type	AC or DC or both	DC
Vdc	to 110 Vdc nominal (77–137.5 Vdc)	to 72 Vdc nominal (55–90 Vdc)
Vac	to 380 Vac nominal (342–424 Vac); 50/60 Hz	—
Busbars	4 busbars	1, additional negative return busbar possible
Busbar rating	300A output	100A total output (up to 30A per breaker)
Mounting	Front panel	Front or rear panel
Breaker specifications		
Type	Hydraulic-magnetic	Hydraulic-magnetic
Series	AMR, AM1P (three-pole AMR in parallel)	J Series
Ratings	to 100A (single-pole), 300A (three-pole)	to 30A
Terminals	Plug-in bullet terminals	Fast-on
Number of breakers	3 and 5 breaker modules (any combination)	Maximum 12 positions (using 4-position modules)
Auxiliary contact	Via individual connections via trim trio connector	Individual signals via SMS, SUBD, or DT connectors
Dual control	Available	Available
<b>Dimensions</b>		
Module only—H x W x D in (mm)		
3-Breaker	3.31 x 2.25 x 4.095 (84 x 57.15 x 104)	—
4-Breaker	—	3.94 x 3.00 x 1.10 (100 x 76 x 28)
5-Breaker	3.31 x 3.74 x 4.095 (84 x 95 x 104)	—
Module including mounting blade, busbar, auxiliary switch— H x W x D in (mm)		
3-Breaker	4.53 x 2.25 x 5.52 (115 x 57.15 x 140)	—
4-Breaker	—	3.94 x 3.00 x 1.46 (100 x 76 x 37)
5-Breaker	4.53 x 3.74 x 5.52 (84 x 95 x 104)	—
<b>Weight</b>		
Weight (without busbars)		
3-Breaker	200g (7 oz)	—
4-Breaker ①	—	160g (5.65 oz)
5-Breaker	300g (10.6 oz)	—

#### Note

① With busbars.

## Modular Bus System for Hydraulic Magnetic Circuit Breakers

## Modular Bus System for Hydraulic Magnetic Circuit Breakers—MDBS



## Features

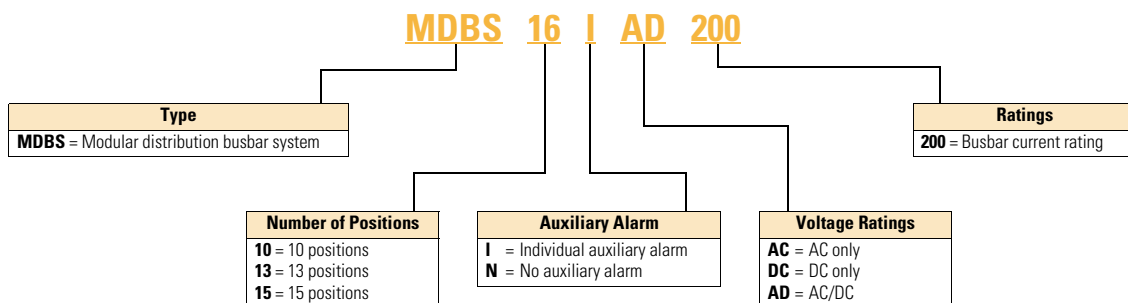
- Compact power distribution bus system design
- Number, type (AC vs. DC) and location of loads can be easily changed by adjusting the busbar components
- Saves installation time
- Available with or without individual alarm auxiliary switches
- Utilizes pluggable breakers for quick connection and ability to disconnect

6

## Catalog Number Selection

## Modular Bus System for Hydraulic Magnetic Circuit Breakers—MDBS

## Modular Bus System—MDBS Model



## Product Selection

## Modular Bus System—MDBS Model

Individual Auxiliary Alarm	Voltage	Number of Breaker Positions (Poles)	Catalog Number <sup>①</sup>
Yes	AC and DC	10	<b>MDBS-10-1-AD-200</b>
		13	<b>MDBS-13-1-AD-200</b>
		15	<b>MDBS-15-1-AD-200</b>
No	AC only	10	<b>MDBS-10-N-AD-200</b>
		13	<b>MDBS-13-N-AD-200</b>
		15	<b>MDBS-15-N-AD-200</b>

**Note**

- <sup>①</sup> These are typical catalog numbers that could be built using the modular system. Products are built-to-order according to specifications and can be provided with any number of positions.



# 6.1

## Machine Integration

### Modular Bus System for Hydraulic Magnetic Circuit Breakers

Modular Bus System for Hydraulic Magnetic Circuit Breakers—PDMB



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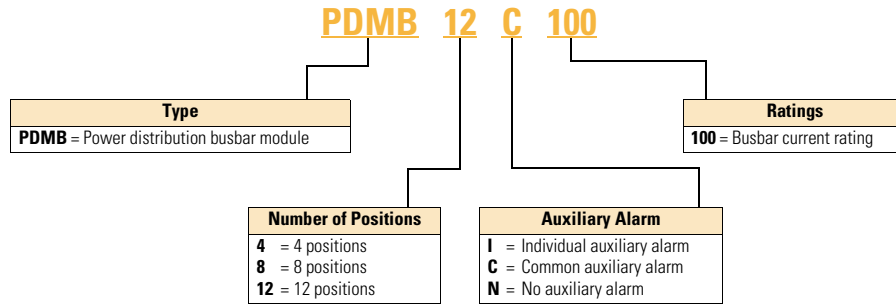
#### Features

- Compact power distribution bus system design
- Number, type (AC vs. DC) and location of loads can be easily changed by adjusting the busbar components
- Saves installation time
- Available with or without individual alarm auxiliary switches
- Utilizes pluggable breakers for quick connection and ability to disconnect

#### Catalog Number Selection

Modular Bus System for Hydraulic Magnetic Circuit Breakers—PDMB

##### Modular Bus System—PDMB Model



#### Product Selection

##### Modular Bus System—PDMB Model

Auxiliary Alarm	Busbar Current Rating	Number of Breaker Positions (Poles)	Catalog Number ①
Common	100A	4	<b>PDMB-4-C-100</b>
		8	<b>PDMB-8-C-100</b>
		12	<b>PDMB-12-C-100</b>
Individual	100A	4	<b>PDMB-4-1-100</b>
		8	<b>PDMB-8-1-100</b>
		12	<b>PDMB-12-1-100</b>
No auxiliary alarm	100A	4	<b>PDMB-4-N-100</b>
		8	<b>PDMB-8-N-100</b>
		12	<b>PDMB-12-N-100</b>

**Note**

① These are typical catalog numbers that could be built using the modular system. Products are built-to-order according to specifications and can be provided with any number of positions.

## Product Overview

### General Purpose and Industrial Control Transformers Selection Guide



Description	General Purpose Transformers	Industrial Control Transformers
	Page V9-T6-6	Page V9-T6-8
General applications	Typically used to step-down voltage from a high voltage to a lower, safer voltage. Commonly installed in or on other electrical equipment, such as machinery, switchboards, and motor control centers. Also installed as loose equipment.	Typically used to step-down voltage to a level suitable to operate a variety of electrically controlled devices. Must be installed inside an enclosure, panel, or other structure to provide protection from the surroundings.
Maximum primary voltage rating	600 Vac	600 Vac
Frequency	60 Hz standard (50/60 Hz optional)	50/60 Hz
Enclosure rating	Type 3R raintight	Open
Insulation system	180°C (356°F)	105°C (221°F)/130°C (266°F)/180°C (356°F)
Temperature rise		
Standard	115°C (239°F)	55°C (131°F)/80°C (176°F)/120°C (248°F)
Optional	80°C (176°F)	—
Approvals	UL® 506, UL 1561, CSA® C22.2	UL 506, CSA C22.2
Ratings		
50 VA	37.5 kVA single-phase	50 to 5,000 VA
3 kVA	75 kVA three-phase	—

### General Purpose Transformers



6

### Features

- Totally enclosed non-ventilated Type 3R enclosure
- 180°C insulation system
- Suitable for indoor or outdoor applications
- UL listed and CSA certified

## Catalog Number Selection

### General Purpose Transformers

#### General Purpose

**T S 20 N 11 S 05 A**

Prefix Options
<b>C</b> = CSA labeled ventilated transformer
<b>Marine Duty</b>
<b>QS</b> = EPM marine (1-Ph encapsulated)
<b>LY</b> = EPTM Marine (3-Ph encapsulated)
<b>RT</b> = DS-3M marine (1-Ph ventilated)
<b>MV</b> = DT-3M marine (3-Ph ventilated)

Type	
<b>S</b> = EP (single-phase encapsulated)	
<b>Y</b> = EPT (three-phase encapsulated)	
<b>T</b> = DS-3 (single-phase ventilated)	
<b>V</b> = DT-3 (three-phase ventilated)	
<b>P</b> = Mini-power center	
<b>Z</b> = Class 1 Division 2 Groups C and D	
<b>X</b> = Harmonic mitigating (three-phase ventilated)	
Nonlinear	
(three-phase ventilated)	(single-phase ventilated)
<b>H</b> = KT-4	<b>J</b> = KT-30
<b>B</b> = KT-9	<b>A</b> = KT-40
<b>N</b> = KT-13	<b>K</b> = KT-50
<b>G</b> = KT-20	<b>HT</b> = KT-4
	<b>NT</b> = KT-13
	<b>GT</b> = KT-20

Primary Voltage			
<b>13</b> = 110 x 220	<b>23</b> = 230	<b>43</b> = 416	<b>42</b> = 2400
<b>12</b> = 120	<b>24</b> = 240	<b>44</b> = 440	<b>46</b> = 4160
<b>10</b> = 120 x 240	<b>20</b> = 240 x 480	<b>45</b> = 450	<b>49</b> = 4800
<b>29</b> = 208	<b>27</b> = 277	<b>48</b> = 480	<b>40</b> = Export model
<b>72</b> = 200	<b>38</b> = 380	<b>57</b> = 575	<b>54</b> = 120/208/240/277
<b>25</b> = 220	<b>39</b> = 400	<b>60</b> = 600	

Taps
<b>D</b> = 2 at +2.5%, 2 at -2.5%
<b>E</b> = 1 at +5%, 1 at -5%
<b>F</b> = 1 at -10%
<b>G</b> = 2 at -5%
<b>J</b> = 4 at -2.5%
<b>K</b> = 1 at -10% x 2 at -5%
<b>L</b> = 2 at -5% x 4 at -2.5%
<b>M</b> = 2 at +2.5%, 4 at -2.5%
<b>N</b> = None
<b>R</b> = 1 at +5%, 2 at -5%
<b>P</b> = 1 at +5%, 2 at -5% x 2 at +2.5%, 4 at -2.5%
<b>T</b> = 1 at +4.2%, 1 at -4.2%
<b>U</b> = 1 at +2.5%, 3 at -2.5%
<b>W</b> = 1 at +3.5%, 1 at -3.5%
<b>X</b> = 2 at +3.1%, 2 at -3.1%

kVA		
<b>81</b> = 0.05	<b>07</b> = 7.5	<b>12</b> = 112.5
<b>85</b> = 0.075	<b>09</b> = 9	<b>49</b> = 150
<b>82</b> = 0.10	<b>10</b> = 10	<b>67</b> = 167
<b>83</b> = 0.15	<b>15</b> = 15	<b>22</b> = 225
<b>26</b> = 0.25	<b>21</b> = 22.5	<b>52</b> = 250
<b>51</b> = 0.50	<b>25</b> = 25	<b>33</b> = 300
<b>76</b> = 0.75	<b>30</b> = 30	<b>54</b> = 333
<b>01</b> = 1	<b>37</b> = 37.5	<b>55</b> = 500
<b>16</b> = 1.5	<b>45</b> = 45	<b>60</b> = 600
<b>02</b> = 2	<b>50</b> = 50	<b>77</b> = 750
<b>03</b> = 3	<b>75</b> = 75	<b>11</b> = 1000
<b>05</b> = 5	<b>99</b> = 100	<b>14</b> = 1500
<b>06</b> = 6		

Suffix Options	
<b>A...Y</b> = ①	<b>SR</b> = ⑩
<b>CU</b> = ②	<b>CE</b> = ⑪
<b>SS</b> = ③	<b>T</b> = ⑫
<b>ZZ</b> = ④	<b>EE</b> = ⑬
<b>NV</b> = ⑤	<b>NON</b> = ⑭
<b>X</b> = ⑥	<b>POS</b> = ⑮
<b>LS_</b> = ⑦	<b>NEG</b> = ⑯
<b>AF</b> = ⑧	<b>THR</b> = ⑰
<b>TR</b> = ⑨	

Phase		
<b>A</b> = Buck and boost	<b>F</b> = 115°C rise	<b>S</b> = Single
<b>B</b> = 80°C rise	<b>E</b> = Electrostatic shield	<b>T</b> = Three

Secondary Voltage			
<b>04</b> = 12/24	<b>28</b> = 208Y/120	<b>21</b> = 240/480	<b>48</b> = 480 delta
<b>06</b> = 16/32	<b>29</b> = 208	<b>27</b> = 277	<b>60</b> = 600 delta
<b>08</b> = 24/48	<b>25</b> = 220 delta	<b>38</b> = 380 delta	<b>61</b> = 600Y/346
<b>14</b> = 110/220	<b>31</b> = 220Y/127	<b>37</b> = 380Y/220	<b>42</b> = 2400
<b>12</b> = 120	<b>26</b> = 220 delta/110 midtap	<b>34</b> = 400Y/231	<b>41</b> = 4160Y/2400
<b>10</b> = 120 x 240	<b>22</b> = 240 delta/120 midtap	<b>51</b> = 416Y/240	<b>46</b> = 4160
<b>11</b> = 120/240	<b>64</b> = 240Y/139	<b>35</b> = 440Y/254	<b>49</b> = 4800
<b>54</b> = 127/254	<b>24</b> = 240 delta	<b>62</b> = 460Y/266	
<b>19</b> = 190Y/110	<b>20</b> = 240 x 480	<b>47</b> = 480Y/277	

### Notes

- Model number is not used on newly designed/redesigned transformers.
- Copper windings.
- Stainless steel enclosure (uses 316 stainless steel, does not imply a NEMA 4X rating).
- Open type core and coil assembly.
- Totally enclosed non-ventilated DS-3 or DT-3.
- 50/60 Hz.
- Low sound design. LS47 indicates low sound equal to 47 dB; LS42 indicates 42 dB.
- Fungus proof.
- Certified test report of standard production tests for the specific serial number to be shipped.
- Certified sound level report.
- CE Marked.
- Thermal indicator embedded in center coil. Suffix "TT" indicates two thermal indicators of different temperature ratings, are installed.
- NEMA TP-1 Energy Star energy efficient.
- 0° phase-shift (used with HMTs).
- +15° phase-shift (used with HMTs).
- 15° phase-shift (used with HMTs).
- 30° phase-shift (used with HMTs).

## Product Selection

### Single-Phase Encapsulated, 240 x 480—120/240, 115°C Rise

kVA	Catalog Number	Outline #	Wiring Diagram
0.05	<b>S20N11S81N</b>	52	3A
0.075	<b>S20N11S85N</b>	53	3A
0.1	<b>S20N11S82N</b>	54	3A
0.15	<b>S20N11S83N</b>	55	3A
0.25	<b>S20N11S26N</b>	56	3A
0.5	<b>S20N11S51N</b>	57	3A
0.75	<b>S20N11S76N</b>	58A	3A
1	<b>S20N11S01N</b>	59A	3A
1.5	<b>S20N11S16N</b>	67	3A
2	<b>S20N11S02N</b>	68	3A
3	<b>S20N11S03N</b>	176	3A
5	<b>S20N11S05N</b>	177	3A
7.5	<b>S20N11S07N</b>	178	3A
10	<b>S20N11S10N</b>	179	3A
15	<b>S20N11S15N</b>	180	3A
25	<b>S20L11S25N</b>	182	23A
37.5	<b>S20L11S37</b>	300A	248A

### Single-Phase Transformer Sizing Chart

Line current = (kVA x 1000)/line voltage.

kVA	Rated Line Voltage								
	120	208	240	277	480	600	2400	4160	4800
0.5	4.2	2.4	2.1	1.8	1	0.8	0.2	0.1	0.1
1	8.3	4.8	4.2	3.6	2.1	1.7	0.4	0.2	0.2
1.5	12.5	7.2	6.3	5.4	3.1	2.5	0.6	0.4	0.3
2	16.7	9.6	8.3	7.2	4.2	3.3	0.8	0.5	0.4
3	25	14.4	12.5	10.8	6.3	5	1.3	0.7	0.6
5	41.7	24	20.8	18.1	10.4	8.3	2.1	1.2	1
7.5	62.5	36.1	31.3	27.1	15.6	12.5	3.1	1.8	1.6
10	83.3	48.1	41.7	36.1	20.8	16.7	4.2	2.4	2.1
15	125	72.1	62.5	54.2	31.3	25	6.3	3.6	3.1
25	208.3	120.2	104.2	90.3	52.1	41.7	10.4	6	5.2
37.5	312.5	180.3	156.3	135.4	78.1	62.5	15.6	9	7.8
50	416.7	240.4	208.3	180.5	104.2	83.3	20.8	12	10.4
75	625	360.6	312.5	270.8	156.3	125	31.3	18	15.6
100	833.3	480.8	416.7	361	208.3	166.7	41.7	24	20.8
167	1391.7	802.9	695.8	602.9	347.9	278.3	69.6	40.1	34.8
250	2083.3	1201.9	1041.7	902.5	520.8	416.7	104.2	60.1	52.1
333	2775	1601	1387.5	1202.2	693.8	555	138.8	80	69.4

#### Industrial Control Transformers



#### Features

- Epoxy encapsulated
- 130°C insulation system
- 50/60 Hz operation
- UL listed and CSA certified

### Catalog Number Selection

#### Industrial Control Transformers

#### Industrial Control

**CE 0250 E 2F CE**

Type	
<b>C</b>	= Industrial control transformer
<b>CE</b>	= CE Marked control transformer

VA Rating	
<b>0025</b> = 25	<b>1000</b> = 1000
<b>0050</b> = 50	<b>1500</b> = 1500
<b>0075</b> = 75	<b>2000</b> = 2000
<b>0100</b> = 100	<b>3000</b> = 3000
<b>0150</b> = 150	<b>5000</b> = 5000
<b>0200</b> = 200	<b>Type AP Only:</b>
<b>0250</b> = 250	<b>0003</b> = 3000
<b>0300</b> = 300	<b>0005</b> = 5000
<b>0350</b> = 350	<b>0007</b> = 7500
<b>0500</b> = 500	<b>0010</b> = 10000
<b>0750</b> = 750	<b>0015</b> = 15000

Transformer Design	
<b>E</b>	= MTE
<b>K</b>	= MTK
<b>P</b>	= AP

	Voltage	
	Primary	Secondary
<b>AC</b>	= 380 x 415	24
<b>AG</b>	= 208/240/277/380/480	24
<b>1B</b>	= 120 x 240	24
<b>2A</b>	= 240 x 480, 230 x 460, 220 x 440	120/115/110
<b>2B</b>	= 240 x 480	24
<b>2C</b>	= 240 x 480	120 x 240
<b>2F</b>	= 230/460	115
<b>2G</b>	= 230/460	115/230
<b>2U</b>	= 220/380/440/550, 230/400/460/575, 240/416/480/600	23/110, 24/115, 25/120
<b>2V</b>	= 208/230/400/460/575	24/115/230
<b>2W</b>	= 208/230/400/460/575	115/230
<b>3A</b>	= 208/277	120
<b>3B</b>	= 115	24
<b>3C</b>	= 230/460/575	115/95
<b>3D</b>	= 208/380/416	115/95
<b>4B</b>	= 208/230/460/575	24
<b>4C</b>	= 550/575/600	110/115/120
<b>4D</b>	= 380/400/415	110 x 220
<b>4E</b>	= 208/230/460/575	115
<b>4H</b>	= 380/400/415	22/23/24
<b>4W</b>	= 550/575/600	22/23/24
<b>5E</b>	= 200/220/440, 208/230/460, 240/480	23/110, 24/115, 25/120
<b>6U</b>	= 240/416/480/600, 230/400/460/575, 220/380/440/550, 208/500	99/120/130, 95/115/125, 91/110/120, 85/100/110
<b>7G</b> ①	= 240 x 480	120/240

Modifications	
<b>Type MTE/MTK</b>	
<b>CE</b>	= CE marked control transformer
<b>FB</b>	= Factory-mounted two-pole primary fuse block for rejection type fuses
<b>FBN</b>	= Factory-mounted two-pole primary fuse block for non-rejection type fuses
<b>Q</b>	= Secondary fuse clips for 1/4 x 1-1/4 in fuses
<b>XX</b>	= No secondary fuse clips
<b>RT</b>	= Ring type terminals for connection to fuse block
<b>ES</b>	= Electrostatic shield
<b>FS</b>	= Factory-mounted finger-safe terminal shields
<b>Type AP</b>	
<b>B</b>	= Bottom mounted
<b>S</b>	= Side/wall mounted
<b>ES</b>	= Electrostatic shield
<b>CU</b>	= Copper windings
<b>Type MTA/MTC</b>	
<b>FB</b>	= Factory-mounted three-pole fuse block (two-pole primary rejection type with single-pole secondary non-rejection type)
<b>ES</b>	= Electrostatic shield
<b>L</b>	= Lead terminations

**Note**

① Type AP only.

**Product Selection****Primary 240 x 480,  
230 x 460, 220 x 440—  
Secondary 120/115/110**

VA	Catalog Number
25	C0025E2A
50	C0050E2A
75	C0075E2A
100	C0100E2A
150	C0150E2A
200	C0200E2A
250	C0250E2A
300	C0300E2A
350	C0350E2A
500	C0500E2A
750	C0750E2A
1000	C1000E2A
1500	C1500E2A

**Primary 240 x 480—  
Secondary 24**

VA	Catalog Number
50	C0050E2B
75	C0075E2B
100	C0100E2B
150	C0150E2B
200	C0200E2B
250	C0250E2B
300	C0300E2B
350	C0350E2B
500	C0500E2B
750	C0750E2B

**Primary 120 x 240—  
Secondary 24**

VA	Catalog Number
50	C0050E1B
75	C0075E1B
100	C0100E1B
150	C0150E1B
200	C0200E1B
250	C0250E1B
300	C0300E1B
350	C0350E1B
500	C0500E1B

#### Product Overview

#### Power Supplies Selection Guide

6



Description	PSG Power Supplies Page V9-T6-11	ELC Power Supplies Page V9-T6-12
<b>Technical Data</b>		
Output voltage	24 Vdc	24 Vdc
Input voltage	100–240 Vac/120–375 Vdc or 400–500 Vac/450–800 Vdc	100–240 Vac
Mounting	DIN rail	DIN rail/panel
Outrush current (current boost/surge)	150% of nominal	110% of nominal
Class 1, Division 2	Yes	Yes
Semi 47 approved	Yes	—
Housing material	Metal	Plastic
Adjustable output voltage	22–28 Vdc	—
Redundancy allowed	Yes	—
Connection	Large screw terminals	Large screw terminals
Overload/short circuit protection	Yes	Yes

## PSG Power Supplies



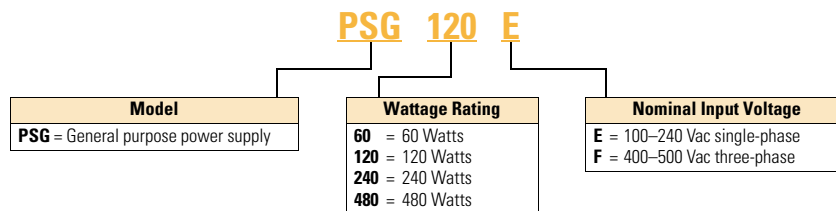
## Features

- Universal input voltages:
  - 100–240 Vac for single-phase units, 400–500 Vac for three-phase units
  - Rugged aluminum housing stands up to harsh environments
- Compact size, with common depth and height across all models allows for common panel depths and family consistency
- Heavy-duty screw terminals with finger-safe protective cover allow use of ring-lug terminals
- Class 1, Division 2 hazardous location rated

## Catalog Number Selection

## PSG Power Supplies

## PSG



## Product Selection

## Semi F47 Certified for Voltage Sag Immunity PSG Power Supply

Description	Catalog Number
Single-phase 100–240 Vac input, 24 Vdc/2.5A output	<b>PSG60E</b>
Three-phase 400–500 Vac input, 24 Vdc/2.5A output	<b>PSG60F</b>
Single-phase 100–240 Vac input, 24 Vdc/2.5A output	<b>PSG120E</b>
Three-phase 400–500 Vac input, 24 Vdc/2.5A output	<b>PSG120F</b>
Single-phase 100–240 Vac input, 24 Vdc/2.5A output	<b>PSG240E</b>
Three-phase 400–500 Vac input, 24 Vdc/2.5A output	<b>PSG240F</b>
Single-phase 100–240 Vac input, 24 Vdc/2.5A output	<b>PSG480E</b>
Three-phase 400–500 Vac input, 24 Vdc/2.5A output	<b>PSG480F</b>



## ELC Power Supplies



## Features

- Compact and low-cost source for 24 Vdc power
- Universal input voltage: 100–240 Vac
- Compact size, with common depth and height across models allows for common panel depths and family consistency
- Power On indication LED
- Integrated mounting hardware for panel mounting or DIN rail mounting

6

## Product Selection

## ELC Power Supplies

## ELC

Description	Catalog Number
24W, 1A power supply	ELC-PS01
48W, 2A power supply	ELC-PS02

## Product Overview

### Power Distribution Blocks Selection Guide



Description	CHDB Series (Open Style) Page V9-T6-14	CHDB Series (Enclosed Style) Page V9-T6-14	CH160 Series Page V9-T6-15
UL listing	UL 1953 for feeder circuits	UL 1953 for feeder circuits	UL 1059 for branch circuits
Protection degree	N/A—covers available	IP20 finger-safe	N/A—covers available
Number of poles	3	1	1, 2 or 3
Maximum current	310A	570A	840A
High SCCR	Yes	Yes	No

## CHDB Series—Power Distribution Blocks, Enclosed and Open



6

## Features

- High short-circuit current rating (SCCR) applications up to 200,000 amperes
- 600 Vac or Vdc (UL 1953), 690 Vac or Vdc
- DIN rail or panel mount (CHDB330F is panel mount only)
- Captive termination screws prevent lost screws
- Single-pole, gang mountable for multi-pole applications
- UL listed 1953, guide QPQS, file E256146
- CSA certified, class 6228-01, file 15364 (enclosed style)
- CE component IEC 60947-7-1 (enclosed style)
- IEC 60529, IP20 (finger-safe) under specific wiring conditions (enclosed style)

## Product Selection

## CHDB Series—Power Distribution Blocks, Enclosed and Open

## CHDB Series

Line Connection	Load Connection	Configuration	Amperes	Style	Poles	Catalog Number
2/0–#8 AWG	(4) #4–#14 AWG		175	Open	3	<b>CHDB2203</b>
2/0–#8 AWG	(6) #4–#14 AWG		175	Open	3	<b>CHDB3213</b>
300 kcmil–#4 AWG	(6) #4–#12 AWG		310	Open	3	<b>CHDB3233</b>
300 kcmil–#4 AWG	(12) #4–#14 AWG		310	Open	3	<b>CHDB3703</b>
300 kcmil–#4 AWG	(6) #2–#12 AWG		310	Open	3	<b>CHDB3713</b>
	(3) 1/0–#12 AWG		310	Open	3	<b>CHDB3713</b>
2/0–#8 AWG	2/0–#8 AWG		175	Enclosed <sup>①</sup>	1	<b>CHDB204F</b>
500 kcmil–#6 AWG	(6) #2–#14 AWG		380	Enclosed <sup>①</sup>	1	<b>CHDB330F</b>
300 kcmil–#4 AWG	(12) #4–#14 AWG		570	Enclosed <sup>①</sup>	1	<b>CHDB377F</b>

**Note**

<sup>①</sup> Finger-safe.

**CH160 Series—Power Terminal Blocks****Features**

- Ratings to 840A, 600V
- Molded material, black; UL rated 94V-0 thermoplastic
- Operating temperature: 302°F (150°C)
- Optional cover
- UL recognized
- CSA certified

**Product Selection****CH160 Series—Power Terminal Blocks****CH160 Series**

Line Connection	Load Connection	Connector Material and Ampacity	Catalog Number <sup>①</sup>
<b>CH162 Series</b>			
#2-#14 Cu/#8 Al	#2-#14 Cu/#8 Al	Al 115A	<b>CH16200_</b>
1/0-#14 Cu	1/0-#14 Cu	Cu 150A	<b>CH16201_</b>
2/0-#8 Cu/Al	2/0-#8 Cu/Al	Al 175A	<b>CH16204_</b>
2/0-#14 Cu/#8 Al	(4) #4-#14 Cu/#8 Al	Al 175A	<b>CH16220_</b>
<b>CH163 Series</b>			
250 MCM-#6 Cu	250 MCM-#6 Cu	Cu 255A	<b>CH16301_</b>
350 MCM-#6 Cu/Al	350 MCM-#6 Cu/Al	Al 310A	<b>CH16303_</b>
500 MCM-#6 Cu/Al	500 MCM-#6 Cu/Al	Al 380A	<b>CH16306_</b>
2/0-#14 Cu/Al	(6) #4-#14 Cu/#8 Al	Al 175A	<b>CH16321_</b>
350 MCM-#6 Cu/Al	(6) #4-#14 Cu/#8 Al	Al 310A	<b>CH16323_</b>
(2) 2/0-#14 Cu/#8 Al	(6) #4-#14 Cu/#8 Al	Al 350A	<b>CH16325_</b>
500 MCM-#6 Cu/Al	(6) #2-#14 Cu/#8 Al	Al 380A	<b>CH16330_</b>
350 MCM-#6 Cu/Al	(3) #2-#14 Cu/#8 Al	Al 310A	<b>CH16332_</b>
	(2) 1/0-#14 Cu/#8 Al	Al 310A	<b>CH16332_</b>
350 MCM-#6 Cu/Al	(12) #4-#14 Cu/#8 Al	Al 310A	<b>CH16370_</b>
350 MCM-#6 Cu/Al	(6) #2-#14 Cu/#8 Al	Al 310A	<b>CH16371_</b>
	(3) 1/0-#14 Cu/#8 Al	Al 310A	<b>CH16371_</b>
350 MCM-#6 Cu/Al	(21) #10-#14 Cu/#10 Al	Al 310A	<b>CH16372_</b>
350 MCM-#6 Cu/Al	(3) 1/0-#14 Cu/#8 Al	Al 310A	<b>CH16373_</b>
	(14) #10-#14 Cu/#8 Al	Al 310A	<b>CH16373_</b>
600 MCM-#2 Cu/Al	(12) #4-#14 Cu/#8 Al	Al 420A	<b>CH16375_</b>
600 MCM-#2 Cu/Al	(6) #2-#14 Cu/#8 Al	Al 420A	<b>CH16376_</b>
	(3) 1/0-#14 Cu/#8 Al	Al 420A	<b>CH16376_</b>
<b>CH165 Series</b>			
(2) 350 MCM-4 Cu/Al	(2) 350 MCM-4 Cu/Al	Al 620A	<b>CH16500_</b>
(2) 500 MCM-#6 Cu/Al	(2) 500 MCM-#6 Cu/Al	Al 760A	<b>CH16504_</b>
(2) 600 MCM-#2 Cu/Al	(4) 3/0-#8 Cu/Al	Al 840A	<b>CH16528_</b>
	(4) #4-#14 Cu/#8 Al	Al 840A	<b>CH16528_</b>
(2) 500 MCM-#6 Cu/Al	(12) #4-#14 Cu/#8 Al	Al 760A	<b>CH16530_</b>

**Note**

- <sup>①</sup> Incomplete catalog number—add code suffix **-1**, **-2**, **-3** for number of poles.  
Example: For a 150A 1/0-#14 Cu to 1/0-#14 Cu three-pole PDB, order CH16201-3.

## Product Overview

### Terminal Blocks and Accessories Selection Guide



6

Description	<b>XB Series IEC Terminal Blocks</b>
	<b>Page V9-T6-17</b>
Available connections	Screw terminal, spring cage, insulation displacement (IDC)
Insulation material	Polyamide 6.6
Dielectric strength	600 kV/cm
Creep resistance	600 CTI
Flammability rating	UL 94 V0
Continuous operating temperature	−40° to 257°F (−40° to 125°C)
UL recognized	Yes
CE approved	Yes
ATEX approved	Yes
Jumpers/bridging	Flexible jumper system with dual channel configurations

**XB Series IEC Terminal Blocks****Features**

- Maintenance-free connections
- Multi-conductor connections
- Flexible plug-in bridge system
- UL and cUL® recognized, CE approved
- LVD1 (Not all standards apply to all terminal blocks. Contact Eaton for details)
  - EN-60947-7-1; EN-60947-7-2; EN-60998-2-3; EN-60352-4/A1
- ATEX approval (EExe applications)

**Product Selection****XB Series IEC Terminal Blocks****Screw Connection Single Level—Through-Feed Terminal Blocks**

Terminal Width	5.2 mm	6.2 mm	8.2 mm		
Maximum Wire Size	12 AWG/2.5 mm <sup>2</sup>	10 AWG/4 mm <sup>2</sup>	8 AWG/6 mm <sup>2</sup>		
IEC 60 947-7-1 in V/A/AWG	800/32/26-12	800/41/26-10	800/57/24-8		
EN 50 019 <sup>Ⓢ</sup> in V/A/AWG	750/22/28/26-12	750/30/38/26-10	750/40/50/24-8		
UL-cUL Ratings in V/A/AWG	600/20/26-12	600/30/26-10	600/50/24-8		
Description	Color	Number of Positions	Catalog Number	Catalog Number	Catalog Number
<b>Product Selection</b>					
Screw connection single level—through-feed	Gray	—	<b>XBUT25</b>	<b>XBUT4</b>	<b>XBUT6</b>
	Blue	—	<b>XBUT25BU</b>	<b>XBUT4BU</b>	<b>XBUT6BU</b>
	Orange	—	—	<b>XBUT4OR</b>	—
	Yellow	—	—	<b>XBUT4YE</b>	—
	Red	—	—	<b>XBUT4RD</b>	—
	White	—	—	<b>XBUT4WH</b>	—
	Black	—	—	<b>XBUT4BK</b>	—
	Green	—	—	<b>XBUT4GN</b>	—
<b>Accessories</b>					
End cover	Gray	—	<b>XBACUT10</b>	<b>XBACUT10</b>	<b>XBACUT10</b>
Partition plate	Gray	—	<b>XBATUT10</b>	<b>XBATUT10</b>	<b>XBATUT10</b>
Plug-in bridge—for cross connections in the bridge shaft	Red	2	<b>XBAFBS25</b>	<b>XBAFBS26</b>	<b>XBAFBS28</b>
		3	<b>XBAFBS35</b>	<b>XBAFBS36</b>	—
		5	<b>XBAFBS55</b>	<b>XBAFBS56</b>	—
		10	<b>XBAFBS105</b>	<b>XBAFBS106</b>	—
		50	<b>XBAFBS505</b>	<b>XBAFBS506</b>	—

**Note**

<sup>Ⓢ</sup> EU type—examination certificate number: KEMA 05ATEX2158 U.

## Screw Connection Single Level—Through-Feed Terminal Blocks, continued

Terminal Width	5.2 mm	6.2 mm	8.2 mm		
Maximum Wire Size	12 AWG/2.5 mm <sup>2</sup>	10 AWG/4 mm <sup>2</sup>	8 AWG/6 mm <sup>2</sup>		
IEC 60 947-7-1 in V/A/AWG	800/32/26-12	800/41/26-10	800/57/24-8		
EN 50 019 <sup>①</sup> in V/A/AWG	750/22/28/26-12	750/30/38/26-10	750/40/50/24-8		
UL-cUL Ratings in V/A/AWG	600/20/26-12	600/30/26-10	600/50/24-8		
Description	Color	Number of Positions	Catalog Number	Catalog Number	Catalog Number

## Product Selection

Screw connection single level—through-feed	Gray	—	<b>XBUT10</b>	<b>XBUT16</b>	<b>XBUT35</b>
	Blue	—	<b>XBUT10BU</b>	<b>XBUT16BU</b>	<b>XBUT35BU</b>
	Orange	—	<b>XBUT10OR</b>	—	—
	Yellow	—	<b>XBUT10YE</b>	—	—
	Red	—	<b>XBUT10RD</b>	—	—
	White	—	—	—	—
	Black	—	—	—	—
	Green	—	—	—	—

## Accessories

End cover	Gray	—	<b>XBACUT10</b>	<b>XBACUT16</b>	②
Partition plate	Gray	—	<b>XBATUT10</b>	—	—
Plug-in bridge—for cross connections in the bridge shaft	Red	2	<b>XBAFBS210</b>	<b>XBAFBS212</b>	<b>XBAFBS216</b>
		3	—	—	—
		5	—	—	—
		10	—	—	—
		50	—	—	—

## Notes

- ① EU type—examination certificate number: KEMA 05ATEX2158 U.  
 ② XBUT35 has an enclosed design. The use of an end cover is not required.

## Screw Connection Single Level—Ground Blocks

Terminal Width Maximum Wire Size IEC 60 947-7-2 in V/A/AWG EN 50 019 <sup>①</sup> in V/A/AWG UL-cUL Ratings in V/A/AWG			10.2 mm 12 AWG/2.5 mm <sup>2</sup> —/—/26-12 —/—/26-12 —/—/26-12	6.2 mm 10 AWG/4 mm <sup>2</sup> —/—/26-10 —/—/26-10 —/—/26-10	8.2 mm 8 AWG/6 mm <sup>2</sup> —/—/24-8 —/—/24-8 —/—/24-8
Description	Color	Number of Positions	Catalog Number	Catalog Number	Catalog Number
<b>Product Selection</b>					
Screw connection single level ground block	Green/ yellow	—	<b>XBUT25PE</b>	<b>XBUT4PE</b>	<b>XBUT6PE</b>
<b>Accessories</b>					
End cover	Gray	—	<b>XBACUT10</b>	<b>XBACUT10</b>	<b>XBACUT10</b>
Partition plate	Gray	—	<b>XBATUT10</b>	<b>XBATUT10</b>	<b>XBATUT10</b>
Plug-in bridge—for cross connections in the bridge shaft	Red	2	<b>XBAFBS25</b>	<b>XBAFBS26</b>	<b>XBAFBS28</b>
		3	<b>XBAFBS35</b>	<b>XBAFBS36</b>	—
		5	<b>XBAFBS55</b>	<b>XBAFBS56</b>	—
		10	<b>XBAFBS105</b>	<b>XBAFBS106</b>	—
		50	<b>XBAFBS505</b>	<b>XBAFBS506</b>	—

## Screw Connection Single Level—Ground Blocks, continued

Terminal Width Maximum Wire Size IEC 60 947-7-2 in V/A/AWG EN 50 019 <sup>①</sup> in V/A/AWG UL-cUL Ratings in V/A/AWG			10.2 mm 12 AWG/2.5 mm <sup>2</sup> —/—/26-12 —/—/26-12 —/—/26-12	6.2 mm 10 AWG/4 mm <sup>2</sup> —/—/26-10 —/—/26-10 —/—/26-10	8.2 mm 8 AWG/6 mm <sup>2</sup> —/—/24-8 —/—/24-8 —/—/24-8
Description	Color	Number of Positions	Catalog Number	Catalog Number	Catalog Number
<b>Product Selection</b>					
Screw connection single level ground block	Green/ yellow	—	<b>XBUT10PE</b>	<b>XBUT16PE</b>	<b>XBUT35PE</b>
<b>Accessories</b>					
End cover	Gray	—	<b>XBACUT10</b>	<b>XBACUT16</b>	<sup>②</sup>
Partition plate	—	—	<b>XBATUT10</b>	—	—
Plug-in bridge—for cross connections in the bridge shaft	Red	2	<b>XBAFBS210</b>	<b>XBAFBS212</b>	<b>XBAFBS212</b>
		3	—	—	—
		5	—	—	—
		10	—	—	—
		50	—	—	—

**Notes**

<sup>①</sup> EU type—examination certificate number: KEMA 05ATEX2158 U.

<sup>②</sup> XBUT35PE has an enclosed design. The use of an end cover is not required.



## Screw Connection Multi-Conductor Terminal Blocks

Description	Color	Number of Positions	5.2 mm	6.2 mm
			12 AWG/2.5 mm <sup>2</sup> 500/28/26-12 150/20/26-12	10 AWG/4 mm <sup>2</sup> 500/39/26-10 150/30/26-10
Product Selection			Catalog Number	Catalog Number

Screw connection multi-conductor	Gray	—	<b>XBUT25D12</b>	<b>XBUT4D12</b>
		—	<b>XBUT25D22</b>	<b>XBUT4D22</b>
	Blue	—	<b>XBUT25D12BU</b>	<b>XBUT4D12BU</b>
		—	<b>XBUT25D22BU</b>	<b>XBUT4D22BU</b>
<b>Accessories</b>				
End cover	Gray	—	<b>XBACUT4D12</b>	<b>XBACUT4D12</b>
		—	<b>XBACUT4D22</b>	<b>XBACUT4D22</b>
End cover segment	Gray	—	<b>XBASUT4</b>	<b>XBASUT4</b>
Partition plate		—	<b>XBATUTD12</b>	<b>XBATUTD12</b>
			<b>XBATUTD22</b>	<b>XBATUTD22</b>
Plug-in bridge—for cross connections in the bridge shaft	Red	2	<b>XBAFBS25</b>	<b>XBAFBS26</b>
		3	<b>XBAFBS35</b>	<b>XBAFBS36</b>
		5	<b>XBAFBS55</b>	<b>XBAFBS56</b>
		10	<b>XBAFBS105</b>	<b>XBAFBS106</b>
		50	<b>XBAFBS505</b>	<b>XBAFBS506</b>

## Screw Connection Multi-Conductor Ground Blocks

Description	Color	Number of Positions	5.2 mm	6.2 mm
			12 AWG/2.5 mm <sup>2</sup> —/—/26-12 —/—/26-12	10 AWG/4 mm <sup>2</sup> —/—/26-10 —/—/26-10
Product Selection			Catalog Number	Catalog Number

Screw connection multi-conductor ground block	Green/ yellow	—	<b>XBUT25D12PE</b>	<b>XBUT4D12PE</b>
		—	<b>XBUT25D22PE</b>	<b>XBUT4D22PE</b>
<b>Accessories</b>				
End cover	Gray	—	<b>XBACUT4D12</b>	<b>XBACUT4D12</b>
		—	<b>XBACUT4D22</b>	<b>XBACUT4D22</b>
End cover segment	Gray	—	<b>XBASUT4</b>	<b>XBASUT4</b>
Partition plate		—	<b>XBATUTD12</b>	<b>XBATUTD12</b>
Plug-in bridge—for cross connections in the bridge shaft	Red	2	<b>XBAFBS25</b>	<b>XBAFBS26</b>
		3	<b>XBAFBS35</b>	<b>XBAFBS36</b>
		5	<b>XBAFBS55</b>	<b>XBAFBS56</b>
		10	<b>XBAFBS105</b>	<b>XBAFBS106</b>
		50	<b>XBAFBS505</b>	<b>XBAFBS506</b>

## Screw Connection Double Level Terminal Blocks

Description	Color	Number of Positions	6.2 mm	6.2 mm
			10 AWG/4 mm <sup>2</sup> 800/36/26-10 300/30/26-10	10 AWG/4 mm <sup>2</sup> —/—/26-10 —/—/26-10
<b>Product Selection</b>				
Screw connection double level	Gray	—	<b>XBUTT4</b>	—
	Blue	—	<b>XBUTT4BU</b>	—
	Red	—	<b>XBUTT4RD</b>	—
Screw connection double level—terminal block with potential distribution between the levels	Gray	—	<b>XBUTT4PV</b>	—
Screw connection double level—ground block	Green/ yellow	—	—	<b>XBUTT4PE</b>
<b>Accessories</b>				
End cover	Gray	—	<b>XBACUTT4</b>	<b>XBACUTT4</b>
Spacer plate	Gray	—	<b>XBDPUTT4</b>	<b>XBDPUTT4</b>
Partition plate	—	—	<b>XBATUTT4</b>	<b>XBATUTT4</b>
Plug-in bridge—for cross connections in the bridge shaft	Red	2	<b>XBAFBS26</b>	<b>XBAFBS26</b>
		3	<b>XBAFBS36</b>	<b>XBAFBS36</b>
		5	<b>XBAFBS56</b>	<b>XBAFBS56</b>
		10	<b>XBAFBS106</b>	<b>XBAFBS106</b>
		50	<b>XBAFBS506</b>	<b>XBAFBS506</b>

## Screw Connection Triple Level Sensor/Actuator Terminal Blocks

Description	Color	Number of Positions	6.2 mm	6.2 mm
			14 AWG/2.5 mm <sup>2</sup> 250/26/24-12 — 300/15/30-14	14 AWG/2.5 mm <sup>2</sup> — 250/30/24-12 300/15/30-14
<b>Product Selection</b>				
Screw connection triple level	Gray blue	—	<b>XB3UKA25</b>	<b>XB3UKF25</b>
Screw connection triple level w/red LED, 15–30 Vdc, 2.5–7.5A	Gray	—	<b>XB3UKA25L24</b>	—
Screw connection with ground connection	Gray	—	<b>XB3UKA24PE</b>	<b>XB3UKF24PE</b>
Screw connection with ground connection and LED indicator	Gray	—	<b>XB3UKA24PEL24</b>	—
<b>Accessories</b>				
Insertion bridge	Blue	80	<b>XBAEB80DIKB</b>	<b>XBAEB80DIKB</b>
	Red	80	<b>XBAEB80DIKR</b>	<b>XBAEB80DIKR</b>
	Blue	10	<b>XBAEB10DIKB</b>	<b>XBAEB10DIKB</b>
	Red	10	<b>XBAEB10DIKR</b>	<b>XBAEB10DIKR</b>
Blank marker strip (strip of 10)	White	—	<b>XBMBZB6</b> ①	<b>XBMBZB6</b> ①

**Note**

① For information on Printed Marking Tag Options, see **Page V9-T6-33**.

## Screw Connection Fuse Terminal Blocks

## Terminal Width

## Maximum Wire Size

IEC 60 947-7-3 in V/A/AWG

IEC 60 947-7-3 as Disconnected Terminal Block in V/A/AWG

UL-cUL Ratings in V/A/AWG

## Description

## Color

## Number of Positions

6.2 mm

10 AWG/4 mm<sup>2</sup>

①/6.3/26-10

600/6.3/26-10

Catalog Number

8.2 mm

8 AWG/6 mm<sup>2</sup>

①/10/24-8

400/10/24-8

Catalog Number

12 mm

6 AWG/16 mm<sup>2</sup>

②/3/20-4

800/10/20-6

300/20/22-6

Catalog Number

## Product Selection

Description	Color	Number of Positions	6.2 mm 10 AWG/4 mm <sup>2</sup> ①/6.3/26-10 600/6.3/26-10 Catalog Number	8.2 mm 8 AWG/6 mm <sup>2</sup> ①/10/24-8 400/10/24-8 Catalog Number	12 mm 6 AWG/16 mm <sup>2</sup> ②/3/20-4 800/10/20-6 300/20/22-6 Catalog Number
Fuse terminal block for 5 x 20 mm fuse	Black	—	<b>XBUT4FBE</b>	—	<b>XBUK10FBCCE</b>
Fuse terminal block for 6.3 x 32 mm (1/4 x 1-1/4 in) fuse	Black	—	—	<b>XBUT6FBN</b>	<b>XBUK10FBCN</b>
Fuse terminal block w/LED 12–30V, 1–2.5 mA	Black	—	<b>XBUT4FBEL24</b>	<b>XBUT6FBNL24</b>	—
Fuse terminal block w/LED 30–60V, 0.8–2.0 mA	Black	—	<b>XBUT4FBEL60</b>	<b>XBUT6FBNL60</b>	—
Fuse terminal block w/LED 110–250V, 0.5–2.5 mA	Black	—	<b>XBUT4FBEL250</b>	<b>XBUT6FBNL250</b>	—
Fuse terminal block w/LED 15–30V, 1–2.5 mA, 5 x 20 mm	Black	—	—	—	<b>XBUK10FBCCEL24</b>
Fuse terminal block w/LED 15–30V, 1–2.5 mA, 6.3 x 32 mm	Black	—	—	—	<b>XBUK10FBCNL24</b>
Fuse terminal block w/LED 110–250V, 0.5–1.1A, 5 x 20 mm	Black	—	—	—	<b>XBUK10FBCCEL250</b>
Fuse terminal block w/LED 110–250V, 0.5–1.1A, 6.3 x 32 mm	Black	—	—	—	<b>XBUK10FBCNL250</b>

## Accessories

End cover	—	—	③	③	—
Plug-in bridge—for cross connections in the bridge shaft	Red	2	<b>XBAFBS26</b>	<b>XBAFBS28</b>	—
		3	<b>XBAFBS36</b>	<b>XBAFBS38</b>	—
		5	<b>XBAFBS56</b>	<b>XBAFBS58</b>	—
		10	<b>XBAFBS106</b>	<b>XBAFBS108</b>	—
		50	<b>XBAFBS506</b>	<b>XBAFBS508</b>	—

## Notes

Max. power dissipation at 23°C (based on DIN EN 60 947-7-3: 2003-7. When selecting cartridge fuse inserts, please ensure that the maximum power dissipation specified above is not exceeded. Details can be obtained from the fuse suppliers. Cartridge fuse inserts 5 x 20 mm based on DIN EN 60 947-7-3: 2003-7.

Terminal Block	U (V)	Overload Protection		I <sub>max</sub> (A)
		Individual	Interconnected	
<b>XBUT4FBE</b>	250	1.6W	1.6W	6.3

If the fuse is defective, the downstream circuit is not off load.

- ① As disconnect terminal block 400V, as fuse terminal block 250V.
- ② The current is determined by the fuse used, the voltage by the selected light indicator.
- ③ XBUT4FBE and XBUT6FBN have an enclosed design. The use of an end cover is not required.

## Spring Cage Single Level—Through-Feed Terminal Blocks

Description	Color	Number of Positions	5.2 mm	6.2 mm	8.2 mm
			12 AWG/2.5 mm <sup>2</sup> 800/31/28-12 550/25/21/24-12 600/20/26-12	10 AWG/4 mm <sup>2</sup> 800/40/28-10 550/34/30/24-10 600/30/20-10	8 AWG/6 mm <sup>2</sup> 800/52/24-8 550/45/36/20-8 600/50/20-8
<b>Product Selection</b>					
Spring cage single level—through-feed	Gray	—	<b>XBPT25</b>	<b>XBPT4</b>	<b>XBPT6</b>
	Blue	—	<b>XBPT25BU</b>	<b>XBPT4BU</b>	<b>XBPT6BU</b>
	White	—	<b>XBPT25WH</b>	—	—
	Red	—	<b>XBPT25RD</b>	—	—
	Black	—	<b>XBPT25BK</b>	—	—
<b>Accessories</b>					
End cover	Gray	—	<b>XBACPT25</b>	<b>XBACPT4</b>	<b>XBACPT6</b>
Partition plate	—	—	<b>XBATPT4</b>	<b>XBATPT4</b>	<b>XBATPT6</b>
Plug-in bridge—for cross connections in the terminal center	Red	2	<b>XBAFBS25</b>	<b>XBAFBS26</b>	<b>XBAFBS28</b>
		3	<b>XBAFBS35</b>	<b>XBAFBS36</b>	—
		5	<b>XBAFBS55</b>	<b>XBAFBS56</b>	—
		10	<b>XBAFBS105</b>	<b>XBAFBS106</b>	—
		50	<b>XBAFBS505</b>	<b>XBAFBS506</b>	—

## Spring Cage Single Level—Through-Feed Terminal Blocks, continued

Description	Color	Number of Positions	10.2 mm	12 mm	16 mm
			6 AWG/10 mm <sup>2</sup> 800/65/24-6 550/50/63/16-6 600/65/16-6	4 AWG/16 mm <sup>2</sup> 800/90/24-4 550/65/82/16-4 600/50/16-4	2 AWG/35 mm <sup>2</sup> 800/125/14-2 750/108/14-2 600/115/14-2
<b>Product Selection</b>					
Spring cage single level—through-feed	Gray	—	<b>XBPT10</b>	<b>XBPT16</b>	<b>XBPT35</b>
	Blue	—	<b>XBPT10BU</b>	<b>XBPT16BU</b>	<b>XBPT35BU</b>
	White	—	—	—	—
	Red	—	—	—	—
	Black	—	—	—	—
<b>Accessories</b>					
End cover	Gray	—	<b>XBACPT10</b>	<b>XBACPT16</b>	②
Partition plate	—	—	—	—	—
Plug-in bridge—for cross connections in the terminal center	Red	2	<b>XBAFBS210</b>	<b>XBAFBS212</b>	<b>XBAFBS216</b>
		3	—	—	—
		5	—	—	—
		10	—	—	—
		50	—	—	—

**Notes**

① EU type—examination certificate number: KEMA 05ATEX2154 U (XBPT25), KEMA 05ATEX2155 U (XBPT4), KEMA 05ATEX2155 U (XBPT6), KEMA 05ATEX2156 U (XBPT10).

② XBPT35 has an enclosed design. The use of an end cover is not required.

## Screw Connection Single Level—Ground Blocks

Terminal Width			5.2 mm	6.2 mm	8.2 mm
Maximum Wire Size			12 AWG/2.5 mm <sup>2</sup>	10 AWG/4 mm <sup>2</sup>	8 AWG/6 mm <sup>2</sup>
IEC 60 947-7-2 in V/A/AWG			—/—/28-12	—/—/28-10	—/—/24-8
EN 50 019 <sup>①</sup> in V/A/AWG			—/—/24-12	—/—/24-10	—/—/20-8
UL-cUL Ratings in V/A/AWG			—/—/26-12	—/—/20-10	—/—/20-8
Description	Color	Number of Positions	Catalog Number	Catalog Number	Catalog Number
<b>Product Selection</b>					
Spring cage single level ground block	Green/ yellow	—	<b>XBPT25PE</b>	<b>XBPT4PE</b>	<b>XBPT6PE</b>
<b>Accessories</b>					
End cover	Gray	—	<b>XBACPT25</b>	<b>XBACPT4</b>	<b>XBACPT6</b>
Plug-in bridge—for cross connections in the terminal center	—	2	—	—	—

6

## Screw Connection Single Level—Ground Blocks, continued

Terminal Width			10.2 mm	12 mm	16 mm
Maximum Wire Size			6 AWG/10 mm <sup>2</sup>	4 AWG/16 mm <sup>2</sup>	2 AWG/35 mm <sup>2</sup>
IEC 60 947-7-2 in V/A/AWG			—/65/24-6	—/90/24-4	—/125/14-2
EN 50 019 <sup>①</sup> in V/A/AWG			—/—/16-6	—/—/16-4	—/—/14-2
UL-cUL Ratings in V/A/AWG			—/—/16-6	—/—/16-4	—/—/14-2
Description	Color	Number of Positions	Catalog Number	Catalog Number	Catalog Number
<b>Product Selection</b>					
Spring cage single level ground block	Green/ yellow	—	<b>XBPT10PE</b>	<b>XBPT16PE</b>	<b>XBPT35PE</b>
<b>Accessories</b>					
End cover	Gray	—	<b>XBACPT10</b>	<b>XBACPT16</b>	<sup>②</sup>
Plug-in Bridge — for cross connections in the terminal center	—	2	<b>XBAFBS210</b>	<b>XBAFBS212</b>	<b>XBAFBS216</b>

**Notes**

- <sup>①</sup> EU type—examination certificate number: KEMA 05ATEX2154 U (XBPT25PE), KEMA 05ATEX2155 U (XBPT4PE, XBPT6PE), KEMA 05ATEX2156 U (9XBPT10PE).  
<sup>②</sup> XBPT35PE has an enclosed design. The use of an end cover is not required.

## Spring Cage Multi-Conductor Terminal Blocks

Description	Color	Number of Positions	5.2 mm	6.2 mm
			12 AWG/2.5 mm <sup>2</sup>	10 AWG/4 mm <sup>2</sup>
			800/28/28-12	800/40/28-10
			550/25/21/24-12	550/34/29/24-10
			600/20/26-12	600/30/20-10
Product Selection				
Spring cage multi-conductor	Gray	—	<b>XBPT25D12</b>	<b>XBPT4D12</b>
		—	<b>XBPT25D22</b>	<b>XBPT4D22</b>
	Blue	—	<b>XBPT25D12BU</b>	<b>XBPT4D12BU</b>
		—	<b>XBPT25D22BU</b>	<b>XBPT4D22BU</b>
Spring cage multi-conductor with interrupted busbar	Gray	—	<b>XBPT25D22U</b>	<b>XBPT4D22U</b>
Accessories				
End cover	Gray	—	<b>XBACPT25D12</b>	<b>XBACPT4D12</b>
	—	—	<b>XBACPT24D22</b>	<b>XBACPT4D22</b>
End cover segment	Gray	—	<b>XBASPT25</b>	<b>XBASPT4</b>
Partition plate			<b>XBATPTD12</b>	<b>XBATPTD12</b>
			<b>XBATPTD22</b>	<b>XBATPTD22</b>
Plug-in bridge—for cross connections in the terminal center	Red	2	<b>XBAFBS25</b>	<b>XBAFBS26</b>
		3	<b>XBAFBS35</b>	<b>XBAFBS36</b>
		5	<b>XBAFBS55</b>	<b>XBAFBS56</b>
		10	<b>XBAFBS105</b>	<b>XBAFBS106</b>
		50	<b>XBAFBS505</b>	<b>XBAFBS506</b>

## Spring Cage Multi-Conductor Ground Blocks

Description	Color	Number of Positions	5.2 mm	6.2 mm
			12 AWG/2.5 mm <sup>2</sup>	10 AWG/4 mm <sup>2</sup>
			—/—/28-12	—/—/28-10
			—/—/24-12	—/—/24-10
			—/—/26-12	—/—/20-10
Product Selection				
Spring cage multi-conductor ground block	Green/yellow	—	<b>XBPT25D12PE</b>	<b>XBPT4D12PE</b>
		—	<b>XBPT25D22PE</b>	<b>XBPT4D22PE</b>
Accessories				
End cover	Gray	—	<b>XBACPT25D12</b>	<b>XBACPT4D12</b>
		—	<b>XBACPT25D22</b>	<b>XBACPT4D22</b>
End cover segment	Gray	—	<b>XBASPT25</b>	<b>XBASPT4</b>

**Note**

Ⓢ EU type—examination certificate number: KEMA 05ATEX2154 U (XBPT25D12, XBPT25D22), KEMA 05ATEX2155 U (XBPT4D12, XBPT4D22).

## Spring Cage Double Level Blocks

Description	Color	Number of Positions	5.2 mm	6.2 mm
			12 AWG/2.5 mm <sup>2</sup>	10 AWG/4 mm <sup>2</sup>
<b>Terminal Width</b>				
<b>Maximum Wire Size</b>				
IEC 60 947-7-1 in V/A/AWG				
EN 50 019 <sup>①</sup> in V/A/AWG				
<b>UL-cUL Ratings in V/A/AWG</b>				
			500/26/28-12	500/32/28-10
			420/23/19/24-12	420/32/27/24-10
			600/20/26-12	300/30/20-10
			<b>Catalog Number</b>	<b>Catalog Number</b>
<b>Product Selection</b>				
Spring cage double level block	Gray	—	<b>XBPTT25</b>	<b>XBPTT4</b>
	Blue	—	<b>XBPTT25BU</b>	<b>XBPTT4BU</b>
Spring cage double level ground block	Green/ yellow	—	<b>XBPTT25PE</b>	<b>XBPTT4PE</b>
Spring cage double level—terminal block with potential distribution between the levels	Gray	—	<b>XBPTT25PV</b>	<b>XBPTT4PV</b>
<b>Accessories</b>				
End cover	Gray	—	<b>XBACPTT25</b>	<b>XBACPTT4</b>
Partition plate	—	—	<b>XBATPTT4</b>	<b>XBATPTT4</b>
Plug-in bridge—for cross connections in the terminal center	Red	2	<b>XBAFBS25</b>	<b>XBAFBS26</b>
		3	<b>XBAFBS35</b>	<b>XBAFBS36</b>
		5	<b>XBAFBS55</b>	<b>XBAFBS56</b>
		10	<b>XBAFBS105</b>	<b>XBAFBS106</b>
		50	<b>XBAFBS505</b>	<b>XBAFBS506</b>

## Spring Cage Triple Level Blocks

Description	Color	Number of Positions	5.2 mm
			12 AWG/2.5 mm <sup>2</sup>
<b>Terminal Width</b>			
<b>Maximum Wire Size</b>			
IEC 60 947-7-1 in V/A/AWG			
<b>UL-cUL Ratings in V/A/AWG</b>			
500/28/28-12			
600/20/26-12			
			<b>Catalog Number</b>
<b>Product Selection</b>			
Spring cage triple level block	Gray	—	<b>XBPTK25</b>
Spring cage triple level—terminal block with potential distribution between the levels	Gray	—	<b>XBPTK25PV</b>
<b>Accessories</b>			
End cover	Gray	—	<b>XBACPT25K</b>
Plug-in bridge—for cross connections in the terminal center	Red	2	<b>XBAFBS25</b>
		3	<b>XBAFBS35</b>
		5	<b>XBAFBS55</b>
		10	<b>XBAFBS105</b>
		50	<b>XBAFBS505</b>

**Note**

<sup>①</sup> EU type—examination certificate number: KEMA 05ATEX2154 U (XBPTT25, XBPTT25PE), KEMA 05ATEX2155 U (XBPTT4, XBPTT4PE).

## Spring Cage Fuse Terminal Block

## Terminal Width

## Maximum Wire Size

IEC 60 947-7-3 with Fuse in V/A/AWG

IEC 60 947-7-3 as Disconnect Terminal Block in V/A/AWG

UL-cUL Ratings in V/A/AWG

Description	Color	Number of Positions	6.2 mm	8.2 mm
			10 AWG/4 mm <sup>2</sup> ①/③/28-10 250/6.3/28-10 300/6.3/24-10	10 AWG/4 mm <sup>2</sup> 400/10/28-10 400/10/28-10 300/10/24-10
Product Selection				
Fuse terminal block for 5 x 20 mm fuse	Black	—	<b>XBPT4FBE</b>	—
Fuse terminal block w/LED 15–30V, 3.5–8.1A	Black	—	<b>XBPT4FBEL24</b>	—
Fuse terminal block w/LED 30–60V, 0.8–2.0A	Black	—	<b>XBPT4FBEL60</b>	—
Fuse terminal block w/LED 110–250V, 0.5–1.0A	Black	—	<b>XBPT4FBEL250</b>	—
Fuse terminal block for 6.3 x 32 mm (1/4 x 1-1/4 in) fuse	Black	—	—	<b>XBPT4FBN</b>
Fuse terminal block w/LED 12–30V, 1.0–2.5 mA	Black	—	—	<b>XBPT4FBNL24</b>
Fuse terminal block w/LED 110–250V, 0.5–2.5 mA	Black	—	—	<b>XBPT4FBNL250</b>
Accessories				
Partition plate	—	—	<b>XBATPT4</b>	<b>XBATQTD12</b>
Plug-in bridge—for cross connections in the terminal center	Red	2	<b>XBAFBS26</b>	<b>XBAFBS28</b>
		3	<b>XBAFBS36</b>	—
		5	<b>XBAFBS56</b>	—
		10	<b>XBAFBS106</b>	—

## Notes

The cartridge fuse holders should be selected according to the maximum power dissipation (self-heating) of the cartridge fuse inserts. The thermal conditions in closed fuse holes should be checked according to the application and installation. Higher ambient temperatures are an additional strain on fuse inserts. In applications of this kind, the shift of the rated current should be taken into consideration accordingly. Max. power dissipation at 23°C (in acc. with IEC 60 947-7-3). When selecting cartridge fuse inserts, please ensure that the maximum power dissipation specified at right is not exceeded. Details can be obtained from the fuse suppliers. Cartridge fuse inserts 5 x 20 and 6.3 x 32 mm in acc. with IEC 60 947-7-3.

Terminal Block	U (V)	Individual	Interconnected
Overload Protection			
XBPT4FBN	400	1.6W	1.6W
XBPT4FBE	250	1.6W	1.6W
Short Circuit Protection Only			
XBPT4FBN	400	4W	2.5W
XBPT4FBE	250	4W	2.5W

① The current is determined by the fuse used, the voltage by the selected light indicator. See table above.



## Insulation Displacement Connection—Single Level Terminal Blocks

Terminal Width	5.2 mm	5.2 mm	6.2 mm	6.2 mm		
Maximum Wire Size	16 AWG/1.5 mm <sup>2</sup>	16 AWG/1.5 mm <sup>2</sup>	14 AWG/2.5 mm <sup>2</sup>	14 AWG/2.5 mm <sup>2</sup>		
Connection Data in V/A/AWG	800/17.5/24-16	—/—/24-16	800/24/20-14	—/—/20-14		
EN 50 019 <sup>Ⓢ</sup> in V/A/AWG	550/16/24-16	—/—/24-16	—	—		
UL-cUL Ratings in V/A/AWG	600/10/24-16	—/—/24-16	600/15/20-14	—/—/20-14		
Description	Color	Number of Positions	Catalog Number	Catalog Number	Catalog Number	Catalog Number
<b>Product Selection</b>						
IDC terminal block—single level	Gray	—	<b>XBQT15</b>	—	<b>XBQT25</b>	—
	Blue	—	<b>XBQT15BU</b>	—	<b>XBQT25BU</b>	—
IDC ground block—single level	Green/ yellow	—	—	<b>XBQT15PE</b>	—	<b>XBQT25PE</b>
<b>Accessories</b>						
End cover	Gray	—	<b>XBACQT15</b>	<b>XBACQT15</b>	<b>XBACQT25</b>	<b>XBACQT25</b>
Partition plate	—	—	<b>XBATQT25</b>	<b>XBATQT25</b>	<b>XBATQT25</b>	<b>XBATQT25</b>
Plug-in bridge	Red	2	<b>XBAFBS25</b>	<b>XBAFBS25</b>	<b>XBAFBS26</b>	<b>XBAFBS26</b>
		3	<b>XBAFBS35</b>	<b>XBAFBS35</b>	<b>XBAFBS36</b>	<b>XBAFBS36</b>
		5	<b>XBAFBS55</b>	<b>XBAFBS55</b>	<b>XBAFBS56</b>	<b>XBAFBS56</b>
		10	<b>XBAFBS105</b>	<b>XBAFBS105</b>	<b>XBAFBS106</b>	<b>XBAFBS106</b>
		50	<b>XBAFBS505</b>	<b>XBAFBS505</b>	<b>XBAFBS506</b>	<b>XBAFBS506</b>

## Insulation Displacement Connection—Multi-Conductor

Terminal Width	5.2 mm	5.2 mm	6.2 mm	6.2 mm		
Maximum Wire Size	16 AWG/1.5 mm <sup>2</sup>	16 AWG/1.5 mm <sup>2</sup>	14 AWG/2.5 mm <sup>2</sup>	14 AWG/2.5 mm <sup>2</sup>		
Connection Data in V/A/AWG	800/17.5/24-16	—/—/24-16	800/24/20-14	—/—/20-14		
EN 50 019 <sup>Ⓢ</sup> in V/A/AWG	550/16/24-16	—/—/24-16	—	—		
UL-cUL Ratings in V/A/AWG	600/10/24-16	—/—/24-16	600/15/20-14	—/—/20-14		
Description	Color	Number of Positions	Catalog Number	Catalog Number	Catalog Number	Catalog Number
<b>Product Selection</b>						
IDC terminal block—multi-conductor	Gray	—	<b>XBQT15D12</b>	—	<b>XBQT25D12</b>	—
		—	<b>XBQT15D22</b>	—	<b>XBQT25D12BU</b>	—
	Blue	—	<b>XBQT15D12BU</b>	—	—	—
		—	<b>XBQT15D22BU</b>	—	—	—
IDC ground block—multi-conductor	Green/ yellow	—	—	<b>XBQT15D12PE</b>	—	<b>XBQT25D12PE</b>
		—	—	<b>XBQT15D22PE</b>	—	—
<b>Accessories</b>						
End cover	Gray	—	<b>XBACQT15D12</b>	<b>XBACQT15D12</b>	<b>XBACQT25D12</b>	<b>XBACQT25D12</b>
		—	<b>XBACQT15D22</b>	<b>XBACQT15D22</b>	—	—
End cover segment	Gray	—	<b>XBASQT15</b>	<b>XBASQT15</b>	<b>XBASQT25</b>	<b>XBASQT25</b>
Partition plate		—	<b>XBATQTD12</b>	<b>XBATQTD12</b>	<b>XBATQTD12</b>	<b>XBATQTD12</b>
		—	<b>XBATQTD22</b>	<b>XBATQTD22</b>	—	—
Plug-in bridge	Red	2	<b>XBAFBS25</b>	<b>XBAFBS25</b>	<b>XBAFBS26</b>	<b>XBAFBS26</b>
		3	<b>XBAFBS35</b>	<b>XBAFBS35</b>	<b>XBAFBS36</b>	<b>XBAFBS36</b>
		5	<b>XBAFBS55</b>	<b>XBAFBS55</b>	<b>XBAFBS56</b>	<b>XBAFBS56</b>
		10	<b>XBAFBS105</b>	<b>XBAFBS105</b>	<b>XBAFBS106</b>	<b>XBAFBS106</b>
		50	<b>XBAFBS505</b>	<b>XBAFBS505</b>	<b>XBAFBS506</b>	<b>XBAFBS506</b>

**Note**

<sup>Ⓢ</sup> EU type—examination certificate number: KEMA 05ATEX2157 U (XBQT15, XBQT15PE), KEMA 05ATEX2160 U (XBQT25, XBQT25PE).

## Insulation Displacement Connection—Double Level

Terminal Width	5.2 mm	5.2 mm		
Maximum Wire Size	16 AWG/1.5 mm <sup>2</sup>	16 AWG/1.5 mm <sup>2</sup>		
Connection Data in V/A/AWG	800/17.5/24-16	—/—/24-16		
EN 50 019 <sup>①</sup> in V/A/AWG	420/15/24-16	—/—/24-16		
UL-cUL Ratings in V/A/AWG	600/10/24-16	—/—/24-16		
Description	Color	Number of Positions	Catalog Number	Catalog Number
<b>Product Selection</b>				
IDC terminal block—double level	Gray	—	<b>XBQTT15</b>	—
	Blue	—	<b>XBQTT15BU</b>	—
IDC ground block—double level	Green/ yellow	—	—	<b>XBQTT15PE</b>
<b>Accessories</b>				
End cover	Gray	—	<b>XBACQTT15</b>	<b>XBACQTT15</b>
Partition plate	—	—	<b>XBATQTT15</b>	<b>XBATQTT15</b>
Plug-in bridge	Red	2	<b>XBAFBS25</b>	<b>XBAFBS25</b>
		3	<b>XBAFBS35</b>	<b>XBAFBS35</b>
		5	<b>XBAFBS55</b>	<b>XBAFBS55</b>
		10	<b>XBAFBS105</b>	<b>XBAFBS105</b>
		20	<b>XBAFBS505</b>	<b>XBAFBS505</b>

## Insulation Displacement Connection Fuse Terminal Blocks

Terminal Width	6.2 mm		
Maximum Wire Size	14 AWG/2.5 mm <sup>2</sup>		
Connection Data in V/A/AWG	②/6.3/20-14		
UL-cUL Ratings in V/A/AWG	300/15/20-14		
Description	Color	Number of Positions	Catalog Number
<b>Product Selection</b>			
IDC fuse terminal block	Black	—	<b>XBQT25FBE</b>
		With LED 12–30V, 1–2.5 mA	<b>XBQT25FBEL24</b>
		With LED 30–60V, 0.8–2.0 mA	<b>XBQT25FBEL60</b>
		With LED 110–250, 0.5–2.5 mA	<b>XBQT25FBEL250</b>
<b>Accessories</b>			
End cover	Gray	—	<b>XBACQT25D12</b>
Partition plate	—	—	<b>XBATQTD12</b>
Plug-in bridge	Red	2	<b>XBAFBS26</b>
		3	<b>XBAFBS36</b>
		5	<b>XBAFBS56</b>
		10	<b>XBAFBS106</b>

**Notes**

① EU type—examination certificate number: KEMA 05ATEX2157 U.

② As disconnect terminal block, 400V; as fuse terminal block, 250V.

## Insulation Displacement Connection Disconnect and Component Terminal Blocks

Terminal Width	5.2 mm	5.2 mm		
Maximum Wire Size	16 AWG/1.5 mm <sup>2</sup>	16 AWG/1.5 mm <sup>2</sup>		
Connection Data in V/A/AWG	400/16/24-16	400/16/24-16		
UL-cUL Ratings in V/A/AWG	600/10/24-16	600/10/24-16		
Description	Color	Number of Positions	Catalog Number	Catalog Number
<b>Product Selection</b>				
IDC disconnect and component terminal block	Gray	—	<b>XBQT15MT</b>	<b>XBQT15TG</b>
<b>Accessories</b>				
End cover	Gray	—	<b>XBACQT15D12</b>	<b>XBACQT15D12</b>
End cover segment	Gray	—	<b>XBASQT15</b>	<b>XBASQT15</b>
Partition plate	—	—	<b>XBATQTD12</b>	<b>XBATQTD12</b>
Plug-in bridge	Red	2	<b>XBAFBS25</b>	<b>XBAFBS25</b>
		3	<b>XBAFBS35</b>	<b>XBAFBS35</b>
		5	<b>XBAFBS55</b>	<b>XBAFBS55</b>
		10	<b>XBAFBS105</b>	<b>XBAFBS105</b>
Component plug	Gray	—	—	<b>XBPCO</b>
Fuse plug	Black	—	—	<b>XBPFU</b>
Fuse plug with light indicator for 12–30V	Black	—	—	<b>XBPFUL24</b>
Fuse plug with light indicator for 110–250V	Black	—	—	<b>XBPFUL250</b>

## Miniature Circuit Breakers

Connection Data in Vac/Vdc	250/65		
Description	Color	Number of Positions	Catalog Number
<b>Product Selection</b>			
Thermal miniature circuit breaker			
Nominal current 0.1A	Black	—	<b>XBATCPT</b>
Nominal current 0.25A	Black	—	<b>XBATCPQ</b>
Nominal current 0.5A	Black	—	<b>XBATCPH</b>
Nominal current 1.0A	Black	—	<b>XBATCP1</b>
Nominal current 2.0A	Black	—	<b>XBATCP2</b>
Nominal current 3.0A	Black	—	<b>XBATCP3</b>
Nominal current 4.0A	Black	—	<b>XBATCP4</b>
Nominal current 6.0A	Black	—	<b>XBATCP6</b>
Nominal current 8.0A	Black	—	<b>XBATCP8</b>
Nominal current 10.0A	Black	—	<b>XBATCP10</b>

### Flat-Type Fuse Terminal Blocks

		8.2 mm	8.2 mm	
		8 AWG/6 mm <sup>2</sup>	8 AWG/6 mm <sup>2</sup>	
		250/—/24-8	250/—/24-8	
		300/30/26-8	300/30/26-8	
Description	Color	Number of Positions	Catalog Number	
<b>Product Selection</b>				
Flat-type fuse terminal block	Black	—	<b>XBUK6FSI</b>	—
Flat-type fuse terminal block with ...				
LED Red 12 Vdc, 2.0 mA	Black	—	—	<b>XBUK6FSIL12</b>
LED Red 24 Vdc, 2.0 mA	Black	—	—	<b>XBUK6FSIL24</b>

### Spring Cage Fuse Terminal Blocks

		8.2 mm	8.2 mm	
		10 AWG/4 mm <sup>2</sup>	10 AWG/4 mm <sup>2</sup>	
		400/30/28-10	400/30/28-10	
		300/30/24-10	300/30/24-10	
Description	Color	Number of Positions	Catalog Number	
<b>Product Selection</b>				
Spring cage fuse terminal block	Black	—	<b>XBPT4FSI</b>	—
Spring cage fuse terminal block with ...				
LED red 12 Vdc, 2.0 mA	Black	—	—	<b>XBPT4FSIL12</b>
LED red 24 Vdc, 2.0 mA	Black	—	—	<b>XBPT4FSIL24</b>

#### Accessories

##### End-Stop



##### End-Stops

Description	Size	Std. Pack	Catalog Number
Snap-on end stops	35 mm	50	<b>XBAES35N</b>
Universal end stops	35 mm	50	<b>XBAES35T</b>
	35 mm	50	<b>XBAES35C</b>

6

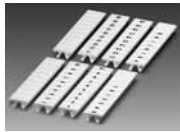
##### DIN Rails



##### DIN Rails—35 x 7.5 mm x 2m

Size	Std. Pack	Catalog Number
25	Slotted	<b>XBANS3575P</b>

##### Marker Strips



##### Marker Strips (Strip of 10)

Terminal Width (mm)	Std. Pack	Catalog Number
5.2	10	<b>XBMZB5</b>
6.2	10	<b>XBMZB6</b>
8.2	10	<b>XBMZB8</b>
10.2	10	<b>XBMZB10</b>
12	10	<b>XBMZB12</b>
16	10	<b>XBMZB15</b> <sup>①</sup>
Flat		
5.2	10	<b>XBMZBF5</b>
6.2	10	<b>XBMZBF6</b>
8.2	10	<b>XBMZBF8</b>
10.2	10	<b>XBMZBF10</b>
12	10	<b>XBMZBF12</b>
16	10	<b>XBMZBF15</b>

##### Marker Sheets

Terminal Width (mm)	Color	Std. Pack	Catalog Number
<b>Blank Marker Sheets</b>			
<b>Marker Sheets (10 rows of 12)</b>			
5.2	White	50	<b>XBMPZB5</b>
5.2	Blue	50	<b>XBMPZB5BU</b>
5.2	Red	50	<b>XBMPZB5RD</b>
5.2	Yellow	50	<b>XBMPZB5YE</b>
5.2	Green	50	<b>XBMPZB5GN</b>



<b>Marker Sheets (10 rows of 10)</b>			
6.2	White	50	<b>XBMPZB6</b>
6.2	Blue	50	<b>XBMPZB6BU</b>
6.2	Red	50	<b>XBMPZB6RD</b>
6.2	Yellow	50	<b>XBMPZB6YE</b>
6.2	Green	50	<b>XBMPZB6GN</b>

##### Flat Marker Sheets



<b>Flat Marker Sheets (10 rows of 10)</b>			
5.2	White	10	<b>XBMPZBF5</b>
5.2	Orange	10	<b>XBMPZBF5OG</b>
6.2	White	10	<b>XBMPZBF6</b>
6.2	Orange	10	<b>XBMPZBF6OG</b>
8.2	White	10	<b>XBMPZBF8</b>

##### Test Plugs



##### Test Plugs

Color	Std. Pack	Catalog Number
<b>2.3 mm</b>		
—	10	<b>XBATSPMSMT</b>
Blue	10	<b>XBATSPMSIHBU</b>
White	10	<b>XBATSPMSIHHW</b>
Red	10	<b>XBATSPMSIHRD</b>
Black	10	<b>XBATSPMSIHBK</b>
<b>4 mm</b>		
—	10	<b>XBATSPSMT</b>
Blue	10	<b>XBATSPSIHBU</b>
White	10	<b>XBATSPSIHHW</b>
Red	10	<b>XBATSPSIHRD</b>
Black	10	<b>XBATSPSIHBK</b>

##### Note

<sup>①</sup> All markers are strips of 10, except XBMZB15 which is a strip of 5.

**Printed Marking Tags****Terminal Block  
Marking Tag****Horizontal Printed  
Marking Tag****Marking Tags for 5.2 mm Wide Terminal Blocks**

Description		Catalog Number
ZB5 tags vertically numbered	1–10 ①	<b>XBMZB5V/1</b>
	11–20	<b>XBMZB5V/11</b>
	21–30	<b>XBMZB5V/21</b>
	31–40	<b>XBMZB5V/31</b>
	41–50	<b>XBMZB5V/41</b>
	51–60	<b>XBMZB5V/51</b>
	61–70	<b>XBMZB5V/61</b>
	71–80	<b>XBMZB5V/71</b>
	81–90	<b>XBMZB5V/81</b>
	91–100	<b>XBMZB5V/91</b>
ZBF5 tags vertically numbered	1–10 ①	<b>XBMZBF5V/1</b>
	11–20	<b>XBMZBF5V/11</b>
	21–30	<b>XBMZBF5V/21</b>
	31–40	<b>XBMZBF5V/31</b>
	41–50	<b>XBMZBF5V/41</b>
	51–60	<b>XBMZBF5V/51</b>
	61–70	<b>XBMZBF5V/61</b>
	71–80	<b>XBMZBF5V/71</b>
	81–90	<b>XBMZBF5V/81</b>
	91–100	<b>XBMZBF5V/91</b>

**Marking Tags for 6.2 mm Wide Terminal Blocks**

Description		Catalog Number
ZB6 tags vertically numbered	1–10 ①	<b>XBMZB6V/1</b>
	11–20	<b>XBMZB6V/11</b>
	21–30	<b>XBMZB6V/21</b>
	31–40	<b>XBMZB6V/31</b>
	41–50	<b>XBMZB6V/41</b>
	51–60	<b>XBMZB6V/51</b>
	61–70	<b>XBMZB6V/61</b>
	71–80	<b>XBMZB6V/71</b>
	81–90	<b>XBMZB6V/81</b>
	91–100	<b>XBMZB6V/91</b>
ZBF6 tags vertically numbered	1–10 ①	<b>XBMZBF6V/1</b>
	11–20	<b>XBMZBF6V/11</b>
	21–30	<b>XBMZBF6V/21</b>
	31–40	<b>XBMZBF6V/31</b>
	41–50	<b>XBMZBF6V/41</b>
	51–60	<b>XBMZBF6V/51</b>
	61–70	<b>XBMZBF6V/61</b>
	71–80	<b>XBMZBF6V/71</b>
	81–90	<b>XBMZBF6V/81</b>
	91–100	<b>XBMZBF6V/91</b>

**Notes**

See **Page V9-T6-34** for marking tags for 8.2–16 mm wide terminal blocks.

① For text printed horizontally, change “V” in catalog number to “H.”

Terminal Block  
Marking TagHorizontal Printed  
Marking Tag

### Marking Tags for 8.2 mm Wide Terminal Blocks

Description		Catalog Number
ZB8 tags vertically numbered	1–10 ①	<b>XBMZB8V/1</b>
	11–20	<b>XBMZB8V/11</b>
	21–30	<b>XBMZB8V/21</b>
	31–40	<b>XBMZB8V/31</b>
	41–50	<b>XBMZB8V/41</b>
	51–60	<b>XBMZB8V/51</b>
	61–70	<b>XBMZB8V/61</b>
	71–80	<b>XBMZB8V/71</b>
	81–90	<b>XBMZB8V/81</b>
	91–100	<b>XBMZB8V/91</b>
ZBF8 tags vertically numbered	1–10 ①	<b>XBMZBF8V/1</b>
	11–20	<b>XBMZBF8V/11</b>
	21–30	<b>XBMZBF8V/21</b>
	31–40	<b>XBMZBF8V/31</b>
	41–50	<b>XBMZBF8V/41</b>
	51–60	<b>XBMZBF8V/51</b>
	61–70	<b>XBMZBF8V/61</b>
	71–80	<b>XBMZBF8V/71</b>
	81–90	<b>XBMZBF8V/81</b>
	91–100	<b>XBMZBF8V/91</b>

### Marking Tags for 10.2 mm Wide Terminal Blocks

Description		Catalog Number
ZB10 tags vertically numbered	1–10 ①	<b>XBMZB10V/1</b>
	11–20	<b>XBMZB10V/11</b>
	21–30	<b>XBMZB10V/21</b>
ZBF10 tags vertically numbered	1–10 ①	<b>XBMZBF10V/1</b>
	11–20	<b>XBMZBF10V/11</b>
	21–30	<b>XBMZBF10V/21</b>

### Marking Tags for 12 mm Wide Terminal Blocks

Description		Catalog Number
ZB12 tags vertically numbered	1–10 ①	<b>XBMZB12V/1</b>
	11–20	<b>XBMZB12V/11</b>
	21–30	<b>XBMZB12V/21</b>
ZBF12 tags vertically numbered	11–10 ①	<b>XBMZBF12V/1</b>
	11–20	<b>XBMZBF12V/11</b>
	21–30	<b>XBMZBF12V/21</b>

### Marking Tags for 16 mm Wide Terminal Blocks

Description		Catalog Number
ZB15 tags vertically numbered	11–10 ①	<b>XBMZB15V/1</b>
	11–20	<b>XBMZB15V/11</b>
	21–30	<b>XBMZB15V/21</b>
ZBF15 tags vertically numbered	1–10 ①	<b>XBMZBF15V/1</b>
	11–20	<b>XBMZBF15V/11</b>
	21–30	<b>XBMZBF15V/21</b>

#### Note

① For text printed horizontally, change “V” in catalog number to “H.”

Eaton Terms & Conditions



## Terms & Conditions



### Contents

<i>Description</i>	<i>Page</i>
Terms and Conditions of Sale . . . . .	V9-A1-1
Terms of Payment . . . . .	V9-A1-2
Freight . . . . .	V9-A1-3
Warranty . . . . .	V9-A1-3

### Selling Policy (Supersedes Selling Policy 25-000, dated February 20, 2006)

#### Terms and Conditions of Sale

The Terms and Conditions of Sale set forth herein, and any supplements which may be attached hereto, constitute the full and final expression of the contract for the sale of products or services (hereinafter referred to as Product(s) or Services by Eaton Corporation (hereinafter referred to as Seller) to the Buyer, and supersedes all prior quotations, purchase orders, correspondence or communications whether written or oral between the Seller and the Buyer. Notwithstanding any contrary language in the Buyer's purchase order, correspondence or other form of acknowledgment, Buyer shall be bound by these Terms and Conditions of Sale when it sends a purchase order or otherwise indicates acceptance of this contract, or when it accepts delivery from Seller of the Products or Services.

THE CONTRACT FOR SALE OF THE PRODUCTS OR SERVICES IS EXPRESSLY LIMITED TO THE TERMS AND CONDITIONS OF SALE STATED HEREIN. ANY ADDITIONAL OR DIFFERENT TERMS PROPOSED BY BUYER ARE REJECTED UNLESS EXPRESSLY AGREED TO IN WRITING BY SELLER. No contract shall exist except as herein provided.

#### **Complete Agreement**

No amendment or modification hereto nor any statement, representation or warranty not contained herein shall be binding on the Seller unless made in writing by an authorized representative of the Seller. Prior dealings, usage of the trade or a course of performance shall not be relevant to determine the meaning of this contract even though the accepting or acquiescing party had knowledge of the nature of the performance and opportunity for objection.

#### **Quotations**

Written quotations are valid for 30 days from its date unless otherwise stated in the quotation or terminated sooner by notice.

Verbal quotations, unless accepted, expire the same day they are made.

A complete signed order must be received by Seller within 20 calendar days of notification of award, otherwise the price and shipment will be subject to re-negotiation.

#### **Termination and Cancellation**

Any order may be terminated by the Buyer only by written notice and upon payment of reasonable termination charges, including all costs plus profit.

Seller shall have the right to cancel any order at any time by written notice if Buyer breaches any of the terms hereof, becomes the subject of any proceeding under state or federal law for the relief of debtors, or otherwise becomes insolvent or bankrupt, generally does not pay its debts as they become due or makes an assignment for the benefit of creditors.



# Appendix 1—Eaton Terms & Conditions

Effective Date: November 1, 2008

## **Prices**

All prices are subject to change without notice. In the event of a price change, the effective date of the change will be the date of the new price or discount sheet, letter or telegram. All quotations made or orders accepted after the effective date will be on the new basis. For existing orders, the price of the unshipped portion of an order will be the price in effect at time of shipment.

## **Price Policy—Products and Services**

When prices are quoted as firm for quoted shipment, they are firm provided the following conditions are met:

1. The order is released with complete engineering details.
2. Shipment of Products are made, and Services purchased are provided within the quoted lead time.
3. When drawings for approval are required for any Products, the drawings applicable to those Products must be returned within 30\* calendar days from the date of the original mailing of the drawings by Seller. The return drawings must be released for manufacture and shipment and must be marked "APPROVED" or "APPROVED AS NOTED." Drawing re-submittals which are required for any other reason than to correct Seller errors will not extend the 30-day period.

\* 60 days for orders through contractors to allow time for their review and approval before and after transmitting them to their customers.

If the Buyer initiates or in any way causes delays in shipment, provision of Services or return of approval drawings beyond the periods stated above, the price of the Products or Services will be increased 1% per month or fraction thereof up to a maximum of 18 months from the date of the Buyer's order. For delays resulting in shipment or provision of Services beyond 18 months from the date of the Buyer's order, the price must be renegotiated.

## **Price Policy—BLS**

Refer to Price Policy 25-050.

## **Minimum Billing**

Orders less than \$1,000 will be assessed a shipping and handling charge of 5% of the price of the order, with a minimum charge of \$25.00 unless noted differently on Product discount sheets.

## **Taxes**

The price does not include any taxes. Buyer shall be responsible for the payment of all taxes applicable to, or arising from the transaction, the Products, its sale, value, or use, or any Services performed in connection therewith regardless of the person or entity actually taxed.

## **Terms of Payment**

### **Products**

Acceptance of all orders is subject to the Buyer meeting Seller's credit requirements. Terms of payment are subject to change for failure to meet such requirements. Seller reserves the right at any time to demand full or partial payment before proceeding with a contract of sale as a result of changes in the financial condition of the Buyer. Terms of Payment are either Net 30 days from the date of invoice of each shipment or carry a cash discount based on Product type. Specific payment terms for Products are outlined in the applicable Product discount schedules.

### **Services**

Terms of payment are net within 30 days from date of invoice for orders amounting to less than \$50,000.00.

Terms of payment for orders exceeding \$50,000.00 shall be made according to the following:

1. Twenty percent (20%) of order value with the purchase order payable 30 days from date of invoice.
2. Eighty percent (80%) of order value in equal monthly payments over the performance period payable 30 days from date of invoice.

Except for work performed (i) under a firm fixed price basis or (ii) pursuant to terms of a previously priced existing contract between Seller and Buyer, invoices for work performed by Seller shall have added and noted on each invoice a charge of 3% (over and above the price of the work) which is related to Seller compliance with present and proposed environmental, health, and safety regulations associated with prescribed requirements covering hazardous materials management and employee training, communications, personal protective equipment, documentation and record keeping associated therewith.

### **Adequate Assurances**

If, in the judgment of Seller, the financial condition of the Buyer, at any time during the period of the contract, does not justify the terms of payment specified, Seller may require full or partial payment in advance.

### **Delayed Payment**

If payments are not made in accordance with these terms, a service charge will, without prejudice to the right of Seller to immediate payment, be added in an amount equal to the lower of 1.5% per month or fraction thereof or the highest legal rate on the unpaid balance.

**Freight**

Freight policy will be listed on the Product discount sheets, or at option of Seller one of the following freight terms will be quoted.

**F.O.B.—P/S—Frt./Ppd. and Invoiced**

Products are sold F.O.B. point of shipment freight prepaid and invoiced to the Buyer.

**F.O.B.—P/S—Frt./Ppd. and Allowed**

Products sold are delivered F.O.B. point of shipment, freight prepaid and included in the price.

**F.O.B. Destination—Frt./Ppd. and Allowed**

At Buyer's option, Seller will deliver the Products F.O.B. destination freight prepaid and 2% will be added to the net price.

The term "freight prepaid" means that freight charges will be prepaid to the accessible common carrier delivery point nearest the destination for shipments within the United States and Puerto Rico unless noted differently on the Product discount sheets. For any other destination contact Seller's representative.

**Shipment and Routing**

Seller shall select the point of origin of shipment, the method of transportation, the type of carrier equipment and the routing of the shipment.

If the Buyer specifies a special method of transportation, type of carrier equipment, routing, or delivery requirement, Buyer shall pay all special freight and handling charges.

When freight is included in the price, no allowance will be made in lieu of transportation if the Buyer accepts shipment at factory, warehouse, or freight station or otherwise supplies its own transportation.

**Risk of Loss**

Risk of loss or damage to the Products shall pass to Buyer at the F.O.B. point.

**Concealed Damage**

Except in the event of F.O.B. destination shipments, Seller will not participate in any settlement of claims for concealed damage.

When shipment has been made on an F.O.B. destination basis, the Buyer must unpack immediately and, if damage is discovered must:

1. Not move the Products from the point of examination.
2. Retain shipping container and packing material.
3. Notify the carrier in writing of any apparent damage.
4. Notify Seller representative within 72 hours of delivery.
5. Send Seller a copy of the carrier's inspection report.

**Witness Tests/Customer Inspection**

Standard factory tests may be witnessed by the Buyer at Seller's factory for an additional charge calculated at the rate of \$2,500 per day (not to exceed eight (8) hours) per Product type. Buyer may final inspect Products at the Seller's factory for \$500 per day per Product type.

Witness tests will add one (1) week to the scheduled shipping date. Seller will notify Buyer fourteen (14) calendar days prior to scheduled witness testing or inspection. In the event Buyer is unable to attend, the Parties shall mutually agree on a rescheduled date. However, Seller reserves the right to deem the witness tests waived with the right to ship and invoice Products.

**Held Orders**

For any order held, delayed or rescheduled at the request of the Buyer, Seller may, at its sole option (1) require payment to be based on any reasonable basis, including but not limited to the contract price, and any additional expenses, or cost resulting from such a delay; (2) store Products at the sole cost and risk of loss of the Buyer; and/ or (3) charge to the Buyer those prices under the applicable price policy. Payment for such price, expenses and costs, in any such event, shall be due by Buyer within thirty (30) days from date of Seller's invoice. Any order so held delayed or rescheduled beyond six (6) months will be treated as a Buyer termination.

**Drawing Approval**

Seller will design the Products in line with, in Seller's judgment, good commercial practice. If at drawing approval Buyer makes changes outside of the design as covered in their specifications, Seller will then be paid reasonable charges and allowed a commensurate delay in shipping date based on the changes made.

**Drawing Re-Submittal**

When Seller agrees to do so in its quotation, Seller shall provide Buyer with the first set of factory customer approval drawing(s) at Seller's expense. The customer approval drawing(s) will be delivered at the quoted delivery date. If Buyer requests drawing changes or additions after the initial factory customer approval drawing(s) have been submitted by Seller, the Seller, at its option, may assess Buyer drawing charges. Factory customer approval drawing changes required due to misinterpretation by Seller will be at Seller's expense. Approval drawings generated by Bid Manager are excluded from this provision.

**Warranty****Warranty for Products**

Seller warrants that the Products manufactured by it will conform to Seller's applicable specifications and be free from failure due to defects in workmanship and material for one (1) year from the date of installation of the Product or eighteen (18) months from the date of shipment of the Product, whichever occurs first.

In the event any Product fails to comply with the foregoing warranty Seller will, at its option, either (a) repair or replace the defective Product, or defective part or component thereof, F.O.B. Seller's facility freight prepaid, or (b) credit Buyer for the purchase price of the Product. All warranty claims shall be made in writing.

Seller requires all non-conforming Products be returned at Seller's expense for evaluation unless specifically stated otherwise in writing by Seller.

This warranty does not cover failure or damage due to storage, installation, operation or maintenance not in conformance with Seller's recommendations and industry standard practice or due to accident, misuse, abuse or negligence. This warranty does not cover reimbursement for labor, gaining access, removal, installation, temporary power or any other expenses, which may be incurred in connection with repair or replacement.

This warranty does not apply to equipment not manufactured by Seller. Seller limits itself to extending the same warranty it receives from the supplier.

# Appendix 1—Eaton Terms & Conditions

Effective Date: November 1, 2008

## **Extended Warranty for Products**

If requested by the Buyer and specifically accepted in writing by Seller, the foregoing standard warranty for Products will be extended from the date of shipment for the period and price indicated below:

- 24 months—2% of Contract Price
- 30 months—3% of Contract Price
- 36 months—4% of Contract Price

## **Special Warranty (In and Out) for Products**

If requested by the Buyer and specifically accepted in writing by Seller, Seller will, during the warranty period for Products, at an additional cost of 2% of the contract price, be responsible for the direct cost of:

1. Removing the Product from the installed location.
2. Transportation to the repair facility and return to the site.
3. Reinstallation on site.

The total liability of Seller for this Special Warranty for Products is limited to 50% of the contract price of the particular Product being repaired and excludes expenses for removing adjacent apparatus, walls, piping, structures, temporary service, etc.

## **Warranty for Services**

Seller warrants that the Services performed by it hereunder will be performed in accordance with generally accepted professional standards.

The Services, which do not so conform, shall be corrected by Seller upon notification in writing by the Buyer within one (1) year after completion of the Services.

Unless otherwise agreed to in writing by Seller, Seller assumes no responsibility with respect to the suitability of the Buyer's, or its customer's, equipment or with respect to any latent defects in equipment not supplied by Seller. This warranty does not cover damage to Buyer's, or its customer's, equipment, components or parts resulting in whole or in part from improper maintenance or operation or from their deteriorated condition. Buyer will, at its cost, provide Seller with unobstructed access to the defective Services, as well as adequate free working space in the immediate vicinity of the defective Services and such facilities and systems, including, without limitation, docks, cranes and utility disconnects and connects, as may be necessary in order that Seller may perform its warranty obligations. The conducting of any tests shall be mutually agreed upon and Seller shall be notified of, and may be present at, all tests that may be made.

## **Warranty for Power Systems Studies**

Seller warrants that any power systems studies performed by it will conform to generally accepted professional standards. Any portion of the study, which does not so conform, shall be corrected by Seller upon notification in writing by the Buyer within six (6) months after completion of the study. All warranty work shall be performed in a single shift straight time basis Monday through Friday. In the event that the study requires correction of warranty items on an overtime schedule, the premium portion of such overtime shall be for the Buyer's account.

## **Limitation on Warranties for Products, Services and Power Systems Studies**

THE FOREGOING WARRANTIES ARE EXCLUSIVE EXCEPT FOR WARRANTY OF TITLE. SELLER DISCLAIMS ALL OTHER WARRANTIES INCLUDING ANY IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

CORRECTION OF NON-CONFORMITIES IN THE MANNER AND FOR THE PERIOD OF TIME PROVIDED ABOVE SHALL CONSTITUTE SELLER'S SOLE LIABILITY AND BUYER'S EXCLUSIVE REMEDY FOR FAILURE OF SELLER TO MEET ITS WARRANTY OBLIGATIONS, WHETHER CLAIMS OF THE BUYER ARE BASED IN CONTRACT, IN TORT (INCLUDING NEGLIGENCE OR STRICT LIABILITY), OR OTHERWISE.

## **Asbestos**

Federal Law requires that building or facility owners identify the presence, location and quantity of asbestos containing material (hereinafter "ACM") at work sites. Seller is not licensed to abate ACM. Accordingly, for any contract which includes the provision of Services, prior to (i) commencement of work at any site under a specific Purchase Order, (ii) a change in the work scope of any Purchase Order, the Buyer will certify that the work area associated with the Seller's scope of work includes the handling of Class II ACM, including but not limited to generator wedges and high temperature gaskets which include asbestos materials. The Buyer shall, at its expense, conduct abatement should the removal, handling, modification or reinstallation, or some or all of them, of said Class II ACM be likely to generate airborne asbestos fibers; and should such abatement affect the cost of or time of performance of the work then Seller shall be entitled to an equitable adjustment in the schedule, price and other pertinent affected provisions of the contract.

## **Compliance with Nuclear Regulation**

Seller's Products are sold as commercial grade Products not intended for application in facilities or activities licensed by the United States Nuclear Regulatory Commission for atomic purposes. Further certification will be required for use of the Products in any safety-related application in any nuclear facility licensed by the U.S. Nuclear Regulatory Commission.

**Returning Products**

Authorization and shipping instructions for the return of any Products must be obtained from Seller before returning the Products.

When return is occasioned due to Seller error, full credit including all transportation charges will be allowed.

**Product Notices**

Buyer shall provide the user (including its employees) of the Products with all Seller supplied Product notices, warnings, instructions, recommendations, and similar materials.

**Force Majeure**

Seller shall not be liable for failure to perform or delay in performance due to fire, flood, strike or other labor difficulty, act of God, act of any governmental authority or of the Buyer, riot, embargo, fuel or energy shortage, car shortage, wrecks or delays in transportation, or due to any other cause beyond Seller's reasonable control. In the event of delay in performance due to any such cause, the date of delivery or time for completion will be extended by a period of time reasonably necessary to overcome the effect of such delay.

**Liquidated Damages**

Contracts which include liquidated damage clauses for failure to meet shipping or job completion promises are not acceptable or binding on Seller, unless such clauses are specifically accepted in writing by an authorized representative of the Seller at its headquarters office.

**Patent Infringement**

Seller will defend or, at its option, settle any suit or proceeding brought against Buyer, or Buyer's customers, to the extent it is based upon a claim that any Product or part thereof, manufactured by Seller or its subsidiaries and furnished hereunder, infringes any United States patent, other than a claim of infringement based upon use of a Product or part thereof in a process, provided Seller is notified in reasonable time and given authority, information and assistance (at Seller's expense) for the defense of same. Seller shall pay all legal and court costs and expenses and court-assessed damages awarded therein against Buyer resulting from or incident to such suit or proceeding. In addition to the foregoing, if at any time Seller determines there is a substantial question of infringement of any United States patent, and the use of such Product is or may be enjoined, Seller may, at its option and expense: either (a) procure for Buyer the right to continue using and selling the Product; (b) replace the Product with non-infringing apparatus; (c) modify the Product so it becomes non-infringing; or (d) as a last resort, remove the Product and refund the purchase price, equitably adjusted for use and obsolescence. In no case does Seller agree to pay any recovery based upon its Buyer's savings or profit through use of Seller's Products whether the use be special or ordinary. The foregoing states the entire liability of Seller for patent infringement.

The preceding paragraph does not apply to any claim of infringement based upon: (a) any modification made to a Product other than by Seller; (b) any design and/or specifications of Buyer to which a Product was manufactured; or (c) the use or combination of Product with other products where the Product does not itself infringe. As to the above-identified claim situations where the preceding paragraph does not apply, Buyer shall defend and hold Seller harmless in the same manner and to the extent as Seller's obligations described in the preceding paragraph. Buyer shall be responsible for obtaining (at Buyer's expense) all license rights required for Seller to be able to use software products in the possession of Buyer where such use is required in order to perform any Service for Buyer.

With respect to a Product or part thereof not manufactured by Seller or its subsidiaries, Seller will attempt to obtain for Buyer, from the supplier(s), the patent indemnification protection normally provided by the supplier(s) to customers.

**Limitation of Liability**

THE REMEDIES OF THE BUYER SET FORTH IN THIS CONTRACT ARE EXCLUSIVE AND ARE ITS SOLE REMEDIES FOR ANY FAILURE OF SELLER TO COMPLY WITH ITS OBLIGATIONS HEREUNDER.

NOTWITHSTANDING ANY PROVISION IN THIS CONTRACT TO THE CONTRARY, IN NO EVENT SHALL SELLER BE LIABLE IN CONTRACT, IN TORT (INCLUDING NEGLIGENCE OR STRICT LIABILITY) OR OTHERWISE FOR DAMAGE TO PROPERTY OR EQUIPMENT OTHER THAN PRODUCTS SOLD HEREUNDER, LOSS OF PROFITS OR REVENUE, LOSS OF USE OF PRODUCTS, COST OF

CAPITAL, CLAIMS OF CUSTOMERS OF THE BUYER OR ANY SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES WHATSOEVER, REGARDLESS OF WHETHER SUCH POTENTIAL DAMAGES ARE FORESEEABLE OR IF SELLER HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

THE TOTAL CUMULATIVE LIABILITY OF SELLER ARISING FROM OR RELATED TO THIS CONTRACT WHETHER THE CLAIMS ARE BASED IN CONTRACT, IN TORT (INCLUDING NEGLIGENCE OR STRICT LIABILITY) OR OTHERWISE, SHALL NOT EXCEED THE PRICE OF THE PRODUCT OR SERVICES ON WHICH SUCH LIABILITY IS BASED.