



TECHNICAL SUBMITTAL



PROJECT TITLE:

Brookfield WPCA - 133 Pump Station

REVISION NO:

1

DATE:

7/25/24

CONTRACT NO:

TBA

SPECIFICATION:

Pump Replacement

LOCATION:

Brookfield, CT

FLEET JOB NO:

DE-03-1318

CUSTOMER PO NO:

20031 Pump Replacement



TAG NO.	MODEL	DESCRIPTION
TBA	VFD's	(2) Revere VFD's w/ RVSS Bypass

OWNER:

Brookfield, CT

G.A FLEET ASSOCIATES CONTACT:

New York & Connecticut Office:
6 International Drive, 2nd Floor Suite# 210
Rye Brook, NY 10573
Phone: (914) 835-4000
Fax: (914) 939-4850

FLEET PUMP & SERVICE CONTACT:

455 Knollwood Rd, White Plains, NY 10603
NY/NJ Phone: (914) 835-3801
NY/NJ Fax: (914) 835-2946
CT: (203) 661-2680



July 23, 2024

Brookfield WPCA
Attn: Haley Scott

Subject: Shop Drawing Review Comments (Revision 1)
Brookfield WPCA 133rd PS
Keystone Engineering
GAF job# DE-03-1318

Dear Haley,

Please find the response for your comments sent on 5/15/24 as follow:

1. 4X/SS316 not required, powder coated steel as typical of NEMA 12
 - a. Response: [Revere did not supply.](#)
2. Can enclosure be reduced to 24" wide and increase height as needed (48"? 60"?) very limited wall space. Reference contract document E-101 for proposed equipment layout in building.
 - a. Response: [Enclosure width has been reduced to 24.06", whilst the height has been increased to 60.06"](#)
3. Next size up VFD is required, pump FLA is 37 Amps and VFD shall be rated for heavy duty nominal rating.
 - a. Response: [VFD has been sized up, please refer to page 107 out of 131](#)
4. Add VFD reset command (typ of 2) from PLC per drawing E-602 to automatically reset VFDs after power loss.
 - a. Response: [VFD Reset command alongside RVSS reset command has been added. Please refer to page 130 out of 131](#)

Best Regards,

Isaiah Russell
Project Manager

Municipal Pumps and Process
Direct: 914-381-7949
irussell@gafleet.com | www.gafleet.com

G.A. Fleet Associates, Inc.
6 International Drive
2nd Floor, Suite # 210
Rye Brook, New York 10573

G. A. FLEET ASSOCIATES, INC.

New York/New Jersey
6 International Drive Suite
210
Rye Brook, NY 10573
(914) 835-4000
Fax (914) 835-1331

Connecticut
2389 Main St.
Glastonbury CT 06033
(860) 652-6604
Fax (860) 659-1625

FLEET PUMP AND SERVICE GROUP, INC

455 Knollwood Road
White Plains, NY 10603
NY/NJ: (914) 835-3801
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CT: (203) 661-2680



Brookfield WPCA 133 Pump Station
VFD Submittal

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VFD DOCUMENTATION FOR REVIEW/APPROVAL

G.A. Fleet Associates Sales Engineer's Submittal Sign-off Page

KEYSTONE ENGINEERING GROUP SHOP DRAWING REVIEW

Keystone's review is with respect to the design concept of the project and the information given in the Contract Documents only. The Contractor is still responsible for compliance with the Drawings and Specifications including all details pertaining to the work and equipment to be supplied for a complete and operable system. This shop drawing submittal is:

- Approved
- Revise/Resubmit
- Approved as Noted
(No Resubmittal Required)
- Approved as Noted
(Resubmittal Required)
- Approved as Noted
(Provide Requested Information Only)

Reviewed by Luis Ruiz 999 Date 08/09/2024

- P. 4 Should be 18, not 8



Brookfield WPCA 133 Pump Station VFD Submittal

CONTACTS

Engineer

TBA

Contractor

Brookfield
53A Commerce Rd., Unit 1
Brookfield, CT 06804

Representative

G. A. Fleet Associates, Inc.
6 International Drive, 2nd Floor Suite # 210
Rye Brook, NY 10573
Phone: 914-835-4000
Fax: 914-939-4850

Service & Parts

Fleet Pump & Service
455 Knollwood Rd.
White Plains, NY 10603
Phone: 914-835-3801
Fax: 914-835-2946

Equipment Manufacturer

Revere Control
5201 Princeton Way
Hoover, AL 35226
Phone: 205-824-0004



Brookfield WPCA 133 Pump Station VFD Submittal

EQUIPMENT INFORMATION

Variable Frequency Drive:

(2) Revere VFD w/ RVSS Bypass

- Enclosure, NEMA4X, 48"H X 36" W X 16" D, SS316



Brookfield WPCA 133 Pump Station VFD Submittal

G.A. FLEET CLARIFICATIONS

- VFDs to be installed by others.
- Fleet is not responsible for providing water to fill the pump station pit for start up, commissioning, or running the pumps under any circumstance for operation. This shall be provided under the contractor's scope of work.
- Videotaping of training: G.A. Fleet will provide training as specified; however, videotaping to be provided by others.

NOTE:

Please contact GA Fleet's Technical Services Department at techservices@gafleet.com with a minimum of 3 weeks notice to schedule Start-up, Commissioning, Training, or other service appointments.

Julia French, Technical Services Scheduler
Sal Rigaglia, Technical Services Manager



TECHNICAL SUBMITTAL

VFD DOCUMENTS FOR REVIEW/APPROVAL

FREE-STAND, TYPE 12, SINGLE OR DUAL ACCESS

INDUSTRY STANDARDS

UL 508A Listed; Type 12; File No. E61997
 cUL Listed per CSA C22.2 No. 94; Type 12; File No. E61997

NEMA/EEMAC Type 12
 E.I.A. RS310D
 CSA, File No. 42186, Type 12
 IEC 60529, IP55

Applicable industry standards only for enclosures with Seismic Accessories:
 NEBS- Telcordia GR-63-CORE Zone 4, tested with 1000lbs evenly distributed
 OSHPD Pre-Approval OPM-0247-13

APPLICATION

Available with front or front and rear access, these Type 12 enclosures have sturdy unibody construction and flexible internal mounting options.

SPECIFICATIONS

- 12 gauge steel
- Seams continuously welded and ground smooth; no holes or knockouts
- Stiffeners on back of two-door enclosures maintain flatness and increase rigidity
- Lifting eyes for easy handling
- 3-point latches operated by oil-tight key-locking handle
- Concealed, easy-to-remove hinges
- Data pockets are high-impact thermoplastic
- Internal mounting channels welded horizontally to sides at top, bottom and center
- Optional panels and rack mount angles can be mounted anywhere along channels
- Oil-resistant door gasket
- Bonding provision on door
- Provision for mounting fluorescent light

To meet GR-63-CORE Zone 4 seismic standards, Free-Stand enclosures must include the following accessories (purchased separately):

For Seismic Free-Stand with Panel

- Seismic Mounting Plate Kit
- Seismic Panel Mounting Kit
- Panel, Full-Length

For Seismic Free-Stand with Rack Angles

- Seismic Mounting Plate Kit
- Rack Mounting Angles - L-Style (Type RP), Full

FINISH

Two finishes available: ANSI 61 gray, polyester powder paint outside and inside; or ANSI 61 gray outside and white, polyester powder paint inside. Optional panels available with a white or conductive finish.

ACCESSORIES

Panels
 Rack Mounting Angels L-Style
 PANELISTE Enclosure Lights
 Floor Stand Kit
 SPECTRACOOOL Indoor/Outdoor
 Seismic Panel Mounting Plate Kits
 Seismic Panel Mounting Kits
 HF Side-Mount Filter Fans
 Steel, Stainless Steel and Non-Metallic Window Kits
 Electric Heaters
 HOL-SEALERS Hole Seals

NOTES

Please visit our Cooling Selection Tool at <https://coolingselection.nvent.com> to explore cooling products for your application.

MODIFICATION AND CUSTOMIZATION

Hoffman excels at modifying and customizing products to your specifications. Contact your local Hoffman sales office or distributor for complete information.

BULLETIN: A30



REVERE

VFD

Brookfield WPCA

Submittal, R1

Customer:

G.A. Fleet Associates
6 International Dr. Suite 210
Rye Brook, NY 10573
P.O. No. PO-058936

Vendor:

Revere Control Systems
5201 Princeton Way
Hoover, Alabama 35226
Job No. AE0174

Date:

July 18, 2024

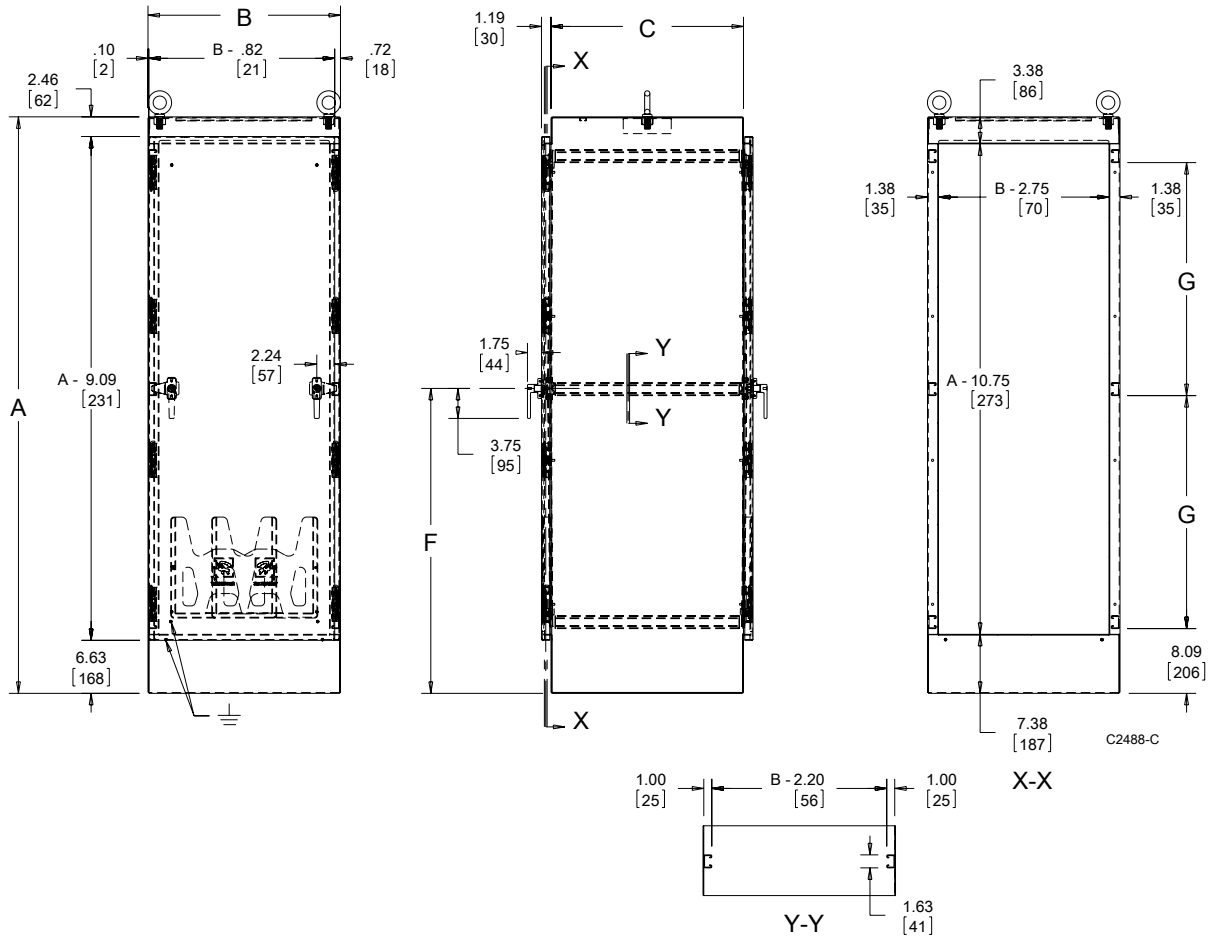
Standard Product **One-Door Dual-Access**

Catalog Number	AxBxC in.	AxBxC mm	Interior Finish	F (in.)	F (mm)	G (in.)	G (mm)	Number of Lifting Eyes	Number of Rack Units
A722424FSDAG	72.06 x 24.06 x 24.06	1830 x 611 x 611	Gray	38.03	966	29.12	740	2	35
A722424FSDA	72.06 x 24.06 x 24.06	1830 x 611 x 611	White	38.03	966	29.12	740	2	35
A723024FSDAG	72.06 x 30.06 x 24.06	1830 x 764 x 611	Gray	38.03	966	29.12	740	2	35
A723024FSDA	72.06 x 30.06 x 24.06	1830 x 764 x 611	White	38.03	966	29.12	740	2	35
A723624FSDAG	72.06 x 36.06 x 24.06	1830 x 916 x 611	Gray	38.03	966	29.12	740	2	35
A723624FSDA	72.06 x 36.06 x 24.06	1830 x 916 x 611	White	38.03	966	29.12	740	2	35
A903624FSDAG	90.06 x 36.06 x 24.06	2288 x 916 x 611	Gray	47.03	1195	38.12	968	2	45
A903624FSDA	90.06 x 36.06 x 24.06	2288 x 916 x 611	White	47.03	1195	38.12	968	2	45
A722430FSDAG	72.06 x 24.06 x 30.06	1830 x 611 x 764	Gray	38.03	966	29.12	740	4	35
A722430FSDA	72.06 x 24.06 x 30.06	1830 x 611 x 764	White	38.03	966	29.12	740	4	35
A722436FSDAG	72.06 x 24.06 x 36.06	1830 x 611 x 916	Gray	38.03	966	29.12	740	4	35
A722436FSDA	72.06 x 24.06 x 36.06	1830 x 611 x 916	White	38.03	966	29.12	740	4	35
A723636FSDAG	72.06 x 36.06 x 36.06	1830 x 916 x 916	Gray	38.03	966	29.12	740	4	35
A723636FSDA	72.06 x 36.06 x 36.06	1830 x 916 x 916	White	38.03	966	29.12	740	4	35
A903636FSDAG	90.06 x 36.06 x 36.06	2288 x 916 x 916	Gray	47.03	1195	38.12	968	4	45
A903636FSDA	90.06 x 36.06 x 36.06	2288 x 916 x 916	White	47.03	1195	38.12	968	4	45

Four lifting eyes are furnished if C = 30.06 (764mm) or more.

Removable 12.00 x 12.00 (305mm x 305mm) data pocket.

Seismic accessories are available for one-door enclosures.



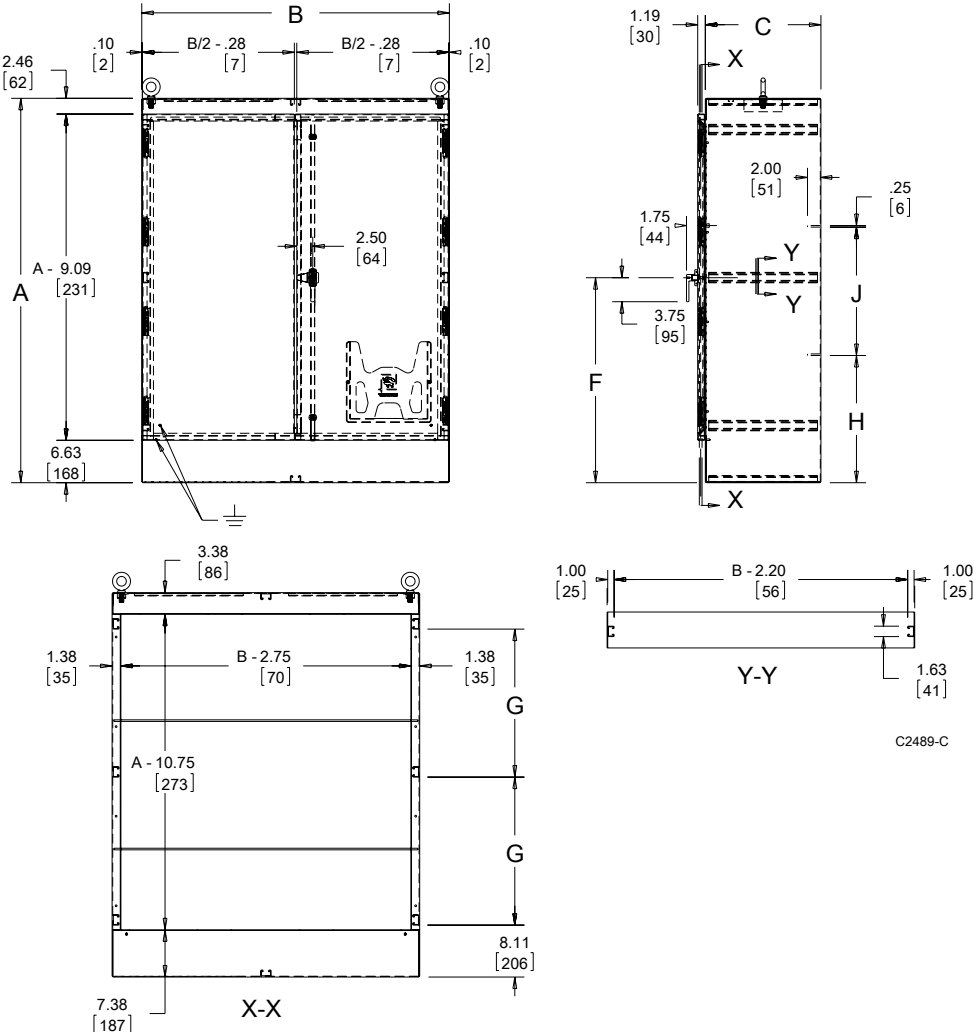
Standard Product **Two-Door Single-Access**

Catalog Number	AxBxC in.	AxBxC mm	Interior Finish	F (in.)	F (mm)	G (in.)	G (mm)	H (in.)	H (mm)	J (in.)	J (mm)	Number of Lifting Eyes	Number of Rack Units
A604818FSDG	60.06 x 48.06 x 18.06	1526 x 1221 x 459	Gray	32.03	814	23.12	587	19.88	505	20.03	509	2	28
A604818FSD	60.06 x 48.06 x 18.06	1526 x 1221 x 459	White	32.03	814	23.12	587	19.88	505	20.03	509	2	28
A724818FSDG	72.06 x 48.06 x 18.06	1830 x 1221 x 459	Gray	38.03	966	29.12	740	23.88	607	24.03	610	2	35
A724818FSD	72.06 x 48.06 x 18.06	1830 x 1221 x 459	White	38.03	966	29.12	740	23.88	607	24.03	610	2	35
A726018FSDG	72.06 x 60.06 x 18.06	1830 x 1526 x 459	Gray	38.03	966	29.12	740	23.88	607	24.03	610	2	35
A726018FSD	72.06 x 60.06 x 18.06	1830 x 1526 x 459	White	38.03	966	29.12	740	23.88	607	24.03	610	2	35
A727218FSDG	72.06 x 72.06 x 18.06	1830 x 1830 x 459	Gray	38.03	966	29.12	740	23.88	607	24.03	610	2	35
A727218FSD	72.06 x 72.06 x 18.06	1830 x 1830 x 459	White	38.03	966	29.12	740	23.88	607	24.03	610	2	35
A904820FSDG	90.06 x 48.06 x 20.06	2288 x 1221 x 510	Gray	47.03	1195	38.12	968	29.88	759	30.03	763	2	45
A904820FSD	90.06 x 48.06 x 20.06	2288 x 1221 x 510	White	47.03	1195	38.12	968	29.88	759	30.03	763	2	45
A907220FSDG	90.06 x 72.06 x 20.06	2288 x 1830 x 510	Gray	47.03	1195	38.12	968	29.88	759	30.03	763	2	45
A907220FSD	90.06 x 72.06 x 20.06	2288 x 1830 x 510	White	47.03	1195	38.12	968	29.88	759	30.03	763	2	45
A724824FSDG	72.06 x 48.06 x 24.06	1830 x 1221 x 611	Gray	38.03	966	29.12	740	23.88	607	24.03	610	2	35
A724824FSD	72.06 x 48.06 x 24.06	1830 x 1221 x 611	White	38.03	966	29.12	740	23.88	607	24.03	610	2	35
A726024FSDG	72.06 x 60.06 x 24.06	1830 x 1526 x 611	Gray	38.03	966	29.12	740	23.88	607	24.03	610	2	35
A726024FSD	72.06 x 60.06 x 24.06	1830 x 1526 x 611	White	38.03	966	29.12	740	23.88	607	24.03	610	2	35
A727224FSDG	72.06 x 72.06 x 24.06	1830 x 1830 x 611	Gray	38.03	966	29.12	740	23.88	607	24.03	610	2	35
A727224FSD	72.06 x 72.06 x 24.06	1830 x 1830 x 611	White	38.03	966	29.12	740	23.88	607	24.03	610	2	35
A907224FSDG	90.06 x 72.06 x 24.06	2288 x 1830 x 611	Gray	47.03	1195	38.12	968	29.88	759	30.03	763	2	45
A907224FSD	90.06 x 72.06 x 24.06	2288 x 1830 x 611	White	47.03	1195	38.12	968	29.88	759	30.03	763	2	45
A726036FSDG	72.06 x 60.06 x 36.06	1830 x 1526 x 916	Gray	38.03	966	29.12	740	23.88	607	24.03	610	4	35
A726036FSD	72.06 x 60.06 x 36.06	1830 x 1526 x 916	White	38.03	966	29.12	740	23.88	607	24.03	610	4	35
A907236FSDG	90.06 x 72.06 x 36.06	2288 x 1830 x 916	Gray	47.03	1195	38.12	968	29.88	759	30.03	763	4	45
A907236FSD	90.06 x 72.06 x 36.06	2288 x 1830 x 916	White	47.03	1195	38.12	968	29.88	759	30.03	763	4	45

Four lifting eyes are furnished if C = 30.06 (764mm) or more.

Removable 12.00 x 12.00 (305mm x 305mm) data pocket.

Seismic accessories are not applicable for two-door enclosures.



C2489-C

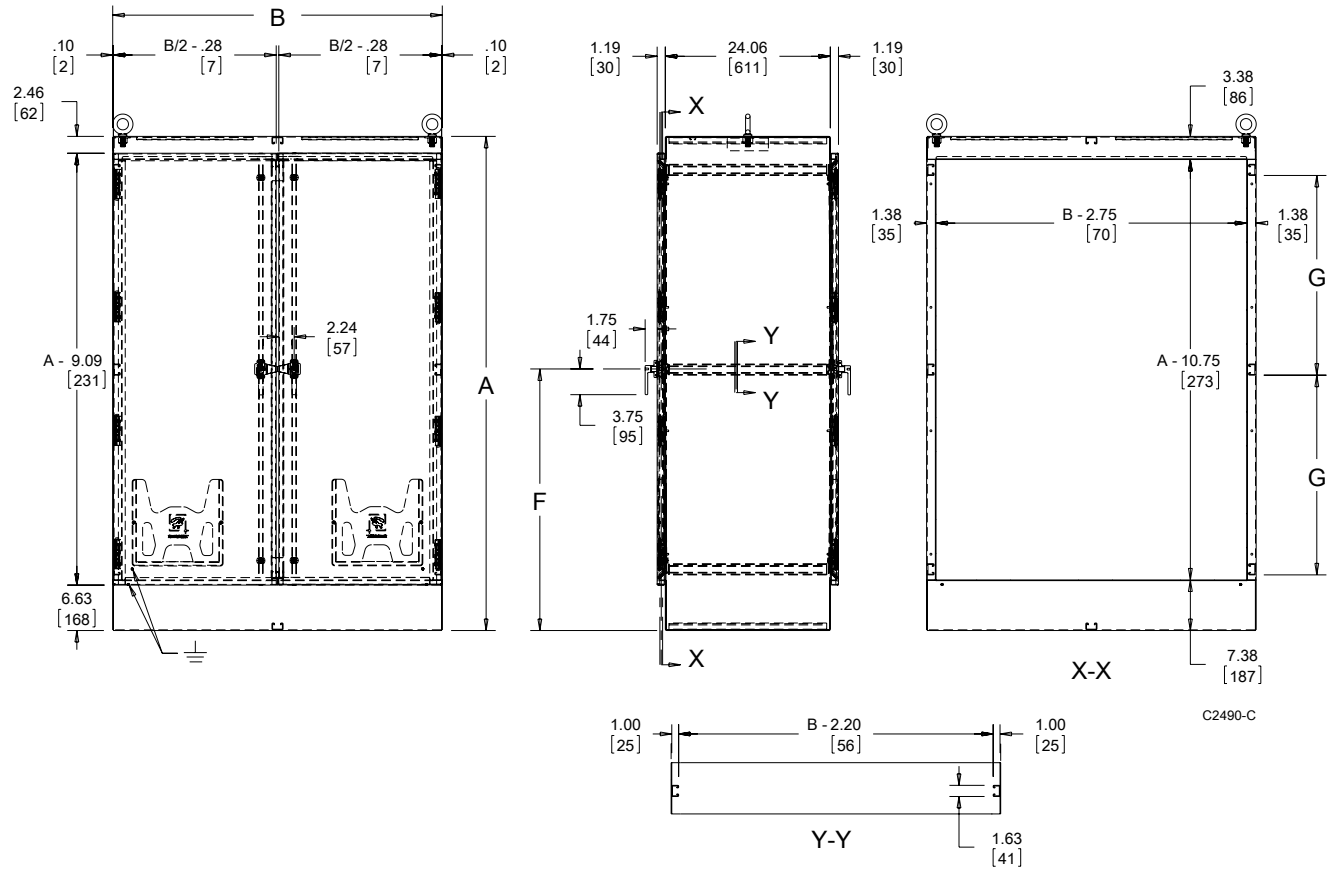
Standard Product **Two-Door Dual-Access**

Catalog Number	AxBxC in.	AxBxC mm	Interior Finish	F (in.)	F (mm)	G (in.)	G (mm)	Number of Lifting Eyes	Number of Rack Units
A724824FSDADG	72.06 x 48.06 x 24.06	1830 x 1221 x 611	Gray	38.03	966	29.12	740	2	35
A724824FSDAD	72.06 x 48.06 x 24.06	1830 x 1221 x 611	White	38.03	966	29.12	740	2	35
A726024FSDADG	72.06 x 60.06 x 24.06	1830 x 1526 x 611	Gray	38.03	966	29.12	740	2	35
A726024FSDAD	72.06 x 60.06 x 24.06	1830 x 1526 x 611	White	38.03	966	29.12	740	2	35
A727224FSDADG	72.06 x 72.06 x 24.06	1830 x 1830 x 611	Gray	38.03	966	29.12	740	2	35
A727224FSDAD	72.06 x 72.06 x 24.06	1830 x 1830 x 611	White	38.03	966	29.12	740	2	35
A726036FSDADG	72.06 x 60.06 x 36.06	1830 x 1526 x 916	Gray	38.03	966	29.12	740	4	35
A726036FSDAD	72.06 x 60.06 x 36.06	1830 x 1526 x 916	White	38.03	966	29.12	740	4	35
A907224FSDADG	90.06 x 72.06 x 24.06	2288 x 1830 x 611	Gray	47.03	1195	38.12	968	2	45
A907224FSDAD	90.06 x 72.06 x 24.06	2288 x 1830 x 611	White	47.03	1195	38.12	968	2	45

Four lifting eyes are furnished if C = 30.06 (764mm) or more.

Removable 12.00 x 12.00 (305mm x 305mm) data pocket.

Seismic accessories are not applicable for two-door enclosures.



Notes

SEISMIC ACCESSORIES



To meet GR-63-CORE Zone 4 seismic standards, Free-Stand enclosures must include the following accessories (purchased separately):

For Seismic Free-Stand with Panel

- Seismic Mounting Plate Kit
- Seismic Panel Mounting Kit
- Panel, Full-Length

For Seismic Free-Stand with Rack Angles

- Seismic Mounting Plate Kit
- Rack Mounting Angles - L-Style (Type RP), Full

SEISMIC MOUNTING PLATE KITS



Kit of six (6) stainless steel mounting plates install over the mounting holes in the base of the enclosure. The mounting plates come predrilled to accept 1/2-in., 5/8-in. or 3/4-in. diameter mounting hardware (not included). Plate dimensions are 3.75 x 3.75 x .25 in. (95 x 95 x 6 mm).

BULLETIN: DCY

Standard Product

Catalog Number	Description	Anchor Size
ASMP12SS	Seismic Mounting Plate, 1/2-in.	1/2 in.
ASMP58SS	Seismic Mounting Plate, 5/8-in.	5/8 in.
ASMP34SS	Seismic Mounting Plate, 3/4-in.	3/4 in.

SEISMIC PANEL MOUNTING KITS



Kit of two (2) panel supports install within the enclosure. Use mounting hardware furnished within these kits along with panel hardware to mount full panels.

BULLETIN: DCY

Standard Product

Catalog Number	Description	Fits Enclosure A in./mm
ASPANKIT60	Seismic Panel Mounting Kit, 60-in.	60 1524
ASPANKIT72	Seismic Panel Mounting Kit, 72-in.	72 1829
ASPANKIT90	Seismic Panel Mounting Kit, 90-in.	90 2286

PANELS



Full panels mount within the enclosure using seismic panel mounting kits. Panels are 12 gauge steel and are finished with white polyester power paint or a conductive, corrosion resistant coating.

BULLETIN: PNL30

Standard Product

Catalog Number	Description	Panel Size in./mm	Fits Enclosure A x B in./mm
A60P24F1	Steel	48.00 x 20.00 1219 x 508	60.00 x 24.00 1524 x 610
A60P24F1G	Conductive	48.00 x 20.00 1219 x 508	60.00 x 24.00 1524 x 610
A90P24F1	Steel	78.00 x 20.00 1981 x 508	90.00 x 24.00 90.00 x 24.00
A72P24F1	Steel	60.00 x 20.00 1524 x 508	72.00 x 24.00 1829 x 610
A72P24F1G	Conductive	60.00 x 20.00 1524 x 508	72.00 x 24.00 1829 x 610
A90P24F1G	Conductive	78.00 x 20.00 1981 x 508	90.00 x 24.00 90.00 x 24.00
A72P30F1	Steel	60.00 x 26.00 1524 x 660	72.00 x 30.00 1829 x 762
A72P30F1G	Conductive	60.00 x 26.00 1524 x 660	72.00 x 30.00 1829 x 762
A60P36F1	Steel	48.00 x 32.00 1219 x 813	60.00 x 36.00 1524 x 914
A60P36F1G	Conductive	48.00 x 32.00 1219 x 813	60.00 x 36.00 1524 x 914
A60P48F1	Steel	48.00 x 42.00 1219 x 1118	60.00 x 48.00 1524 x 1219
A72P36F1	Steel	60.00 x 32.00 1524 x 813	72.00 x 36.00 1829 x 914
A72P36F1G	Conductive	60.00 x 32.00 1524 x 813	72.00 x 36.00 1829 x 914
A90P36F1	Steel	78.00 x 32.00 1981 x 813	90.00 x 36.00 2286 x 914
A90P36F1G	Conductive	78.00 x 32.00 1981 x 813	90.00 x 36.00 2286 x 914

SIDE-MOUNTED PANELS



Panels provide extra mounting space on the sides of enclosures. 12 gauge steel side-mounting panels are painted white. Conductive panels are steel with a conductive, corrosion-resistant coating. Panels attach securely to mounting channels. Plated steel mounting hardware is furnished.

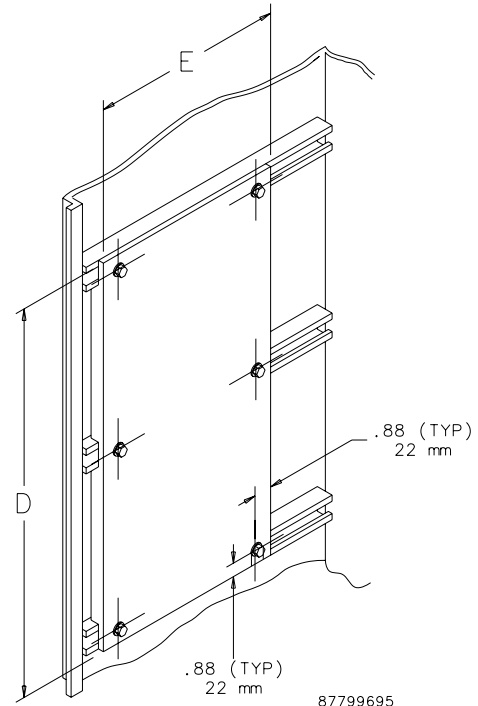
BULLETIN: PNL30

Catalog Number	Description	Panel Size D x E in./mm	Fits Enclosure A in./mm
A60SMP14	Painted steel	48.00 x 14.00 1219 x 356	60.00 1524
A60SMP14G	Conductive	48.00 x 14.00 1219 x 356	60.00 1524
A72SMP14	Painted steel	60.00 x 14.00 1524 x 356	72.00 1829
A72SMP14G	Conductive	60.00 x 14.00 1524 x 356	72.00 1829
A72SMP20	Painted steel	60.00 x 20.00 1524 x 508	72.00 1829
A72SMP20G	Conductive	60.00 x 20.00 1524 x 508	72.00 1829
A90SMP14	Painted steel	78.00 x 14.00 1981 x 356	90.00 2286
A90SMP14G	Conductive	78.00 x 14.00 1981 x 356	90.00 2286

Catalog Number	Description	Panel Size D x E in./mm	Fits Enclosure A in./mm
A90SMP20	Painted steel	78.00 x 20.00 1981 x 508	90.00 2286
A90SMP20G	Conductive	78.00 x 20.00 1981 x 508	90.00 2286

A90SMP14 and A90SMP14G will not fit 18.06-in. deep two-door enclosures (FSD style) if regular panel is also installed.

A90SMP20 and A90SMP20G will not fit 20.12-in. deep enclosures. Will not fit 24.12-in. deep two-door enclosures (FSD style) if regular panel is also installed.

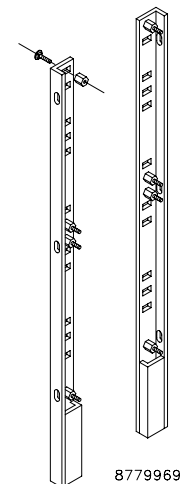


HEAVY DUTY PANEL SUPPORTS

Heavy Duty Panel Supports, sold in pairs, are used in place of the panel supports furnished with panels when heavy equipment will be installed on the panels. They extend to the bottom of the enclosure. Adjustable mounting studs allow mounting of different height panels or a combination of panels. Use mounting hardware furnished with panels.

BULLETIN: A80

Catalog Number	Fits Enclosure A in./mm	Support Length in./mm
A60FSHDPS	60.00 1524	57.25 1454
A72FSHDPS	72.00 1829	69.25 1759
A90FSHDPS	90.00 2286	87.25 2216



Product data sheet

Specifications





Industrial control transformer, Type T, 1 phase, 500VA, 240x480V primary, 120V secondary, 50/60Hz

9070T500D1

Main

Product Type	Industrial Control Transformer
Power Rating	500 VA
Type	T

Complementary

Number of Phases	1 phase
Power Rating	500 VA UL 500 VA CSA 500 VA NOM 300 VA
Temperature Rise	115 °C
Electrical Connection	Screw clamp terminals
Height	3.84 in (97.54 mm)
Width	4.5 in (114.30 mm)
Depth	5.49 in (139.45 mm)
Material	Copper winding
Fingersafe Cover Compatibility	FSC2

Environment

Certifications	UL listed file E61239 CSA file LR37055 guide 184-N-90
Enclosure Type	Not rated (open device)
Insulation Temperature	356 °F (180 °C)

Ordering and shipping details

Category	16201-9070 T (NOT TF) 250-2000VA
Discount Schedule	CP8
GTIN	785901904700
Nbr. of units in pkg.	1
Package weight(Lbs)	12.45 lb(US) (5.647 kg)
Returnability	Yes

* Price is "List Price" and may be subject to a trade discount – check with your local distributor or retailer for actual price.

Disclaimer: This documentation is not intended as a substitute for and is not to be used for determining suitability or reliability of these products for specific user applications

Country of origin	MX
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Packing Units

Unit Type of Package 1	PCE
Package 1 Height	6.10 in (15.494 cm)
Package 1 width	6.80 in (17.272 cm)
Package 1 Length	7.70 in (19.558 cm)

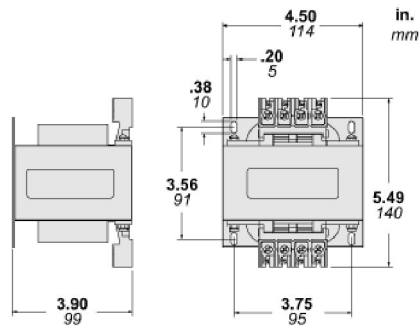
Offer Sustainability

Sustainable offer status	Green Premium product
California proposition 65	WARNING: This product can expose you to chemicals including: Phenyl glycidyl ether, which is known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov
REACH Regulation	REACH Declaration
EU RoHS Directive	Compliant EU RoHS Declaration
Mercury free	Yes
RoHS exemption information	Yes
China RoHS Regulation	China RoHS declaration Product out of China RoHS scope. Substance declaration for your information.
Environmental Disclosure	Product Environmental Profile
PVC free	Yes

Contractual warranty

Warranty	10 Years
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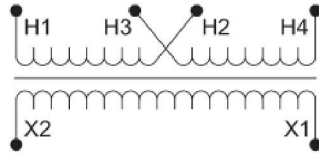
Approximate Dimensions



Connections and Wiring Diagrams

Voltage and Connection Options

Voltage Code	Voltages		Connections	
	Primary	Secondary	Primary	Secondary
D1	220 x 440	110	220/230/240 V: Connect to H1 and H4 Jumper H1 and H3 Jumper H2 with H4 440/460/480 V: Connect to H1 and H4 Jumper H2 with H3	Connect to X1 and X2
	230 x 460	115		
	240 x 480	120		



The PowerPact Advantage

- **Proven Performance:** Industry-leading circuit breaker innovation and protection for heavy-duty commercial and industrial applications.
- **Smart:** Integrated metering options provide a cost-effective solution to reduce energy consumption, optimize energy costs, and improve energy availability for your facilities.
- **Flexible:** Full range of thermal-magnetic and electronic trip molded case circuit breakers from 15 to 3000 A, delivering the ratings, configurations, and operators for your unique applications.
- **Simple:** Common catalog numbers, standardized ratings, and a full range of field-installable accessories make product selection, installation and maintenance easier than ever.
- **Common Design Features:** Mounting holes, door trim, and handle accessories

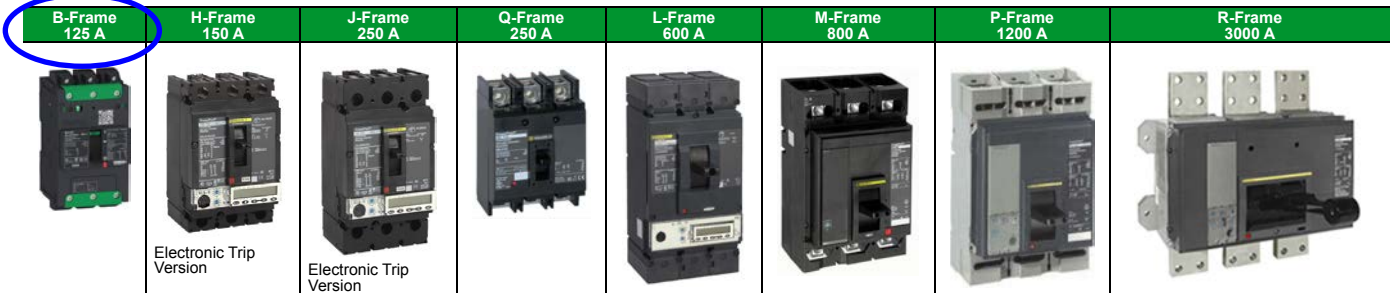


Table 7.46: PowerPact Interrupting Ratings

Voltage	Interrupting Rating						
	B	D	G	J	K	L	R
240 Vac	10 kA	25 kA	65 kA	100 kA	65 kA [1]	125 kA	200 kA
480 Vac	—	18 kA	35 kA	65 kA	65 kA [2]	100 kA	200 kA
600 Vac	—	14 kA	18 kA	25 kA	65 kA [2]	50 kA [3]	100 kA

Table 7.47: Common Catalog Numbering System

Frame	Rating	Termination	Poles	Voltage	Amperage ^[4]	Suffix Code	Suffix Code
H	G	L	3	6	1 5 0	A B	S A
			1=1 Pole 2=2 Pole 3=3 Pole 4=4 Pole	4=480 V 6=600 V	2A/2B Auxiliary Switch		110 Vac Shunt Trip

B	125 A Frame
H	150 A Frame
J	250 A Frame
Q	250 A Frame
L	600 A Frame
M	800 A Frame
P	1200 A Frame
R	3000 A Frame

	240 Vac	480 Vac	600Vac
B	10 kA	—	—
D	25 kA	18 kA	14 kA
G	65 kA	35 kA	18 kA
J	100 kA	65 kA	25 kA
K	100 kA	65 kA	65 kA
L	125 kA	100 kA	50 kA
R	200 kA	200 kA	100 kA

A	I-Line
L	Lugs on Both Ends
F	Bus Bar (No Lugs)
M	Lugs Line Side Only
P	Lugs Load End Only
N	Plug-in
D	Drawout
S	Rear Connected Studs

For more information:

- B-Frame Circuit Breakers, page 7-31
- H- and J-Frame Circuit Breakers, page 7-32
- Q-Frame Circuit Breakers, page 7-35
- L-Frame Circuit Breakers, page 7-37
- P-Frame Circuit Breakers, page 7-40
- R-Frame Circuit Breakers, page 7-41
- PowerPact™ H- and J-Frame Electronic Motor Circuit Protectors, page 7-47
- Motor Circuit Protectors and Motor Protector Circuit Breakers, page 7-49
- Automatic Switches, page 7-45
- 500 Vdc Circuit Breakers, page 7-44
- Mission Critical Circuit Breakers, page 7-43
- PowerPact™ Circuit Breaker Accessories, page 7-50
- Motor Operators and Rotary Handles, page 7-51
- Locks, Installation Accessories, and Rear Connections, page 7-53
- Mechanical Lugs, page 7-53
- Compression Lugs and Power Distribution Connectors (PDC), page 7-56
- Terminal Nuts, Terminal Pads, Terminal Shields and Accessories, page 7-58
- Plug-In and Drawout Mountings, page 7-59
- MicroLogic™ Electronic Trip Units, page 7-60
- MicroLogic™ Trip Unit Accessories, page 7-63

[1] B-frame K interrupting rating is 100 kA at 240 Vac
 [2] P-frame K interrupting is 50 kA at 480 and 600 Vac.
 [3] P-frame L interrupting is 25 kA at 600 Vac.
 [4] For amperage of M-, P- or R-frame circuit breakers, add a zero to the three amperage digits; for example, 120 = 1200 A.



B-Frame Thermal-Magnetic Trip Unit



With EverLink Lug Technology

PowerPact B-Frame Molded Case Circuit Breakers (125 A)

PowerPact B-frame circuit breakers provides economical thermal-magnetic circuit protection in a compact size.

- Fixed 15-125 A thermal-magnetic protection up to 600Y/347 Vac and 250 Vdc
- 1- to 4-pole unit mount construction; 1- to 3-pole I-Line construction
- UL listed interrupting ratings from 18 kA to 65 kA at 480 Vac
- EverLink lugs, a cable connection method that helps maintain low resistance connections
- UL, CSA, NOM, IEC, CCC certified and CE marked for global acceptance

Table 7.48: PowerPact B-Frame 125 A Thermal-Magnetic Circuit Breakers (600Y/347 Vac) with EverLink Lugs

Current Rating @ 40° C	Interrupting Rating													
	D				G				J				K	
	1 Pole 347 Vac 125 Vdc	2 Pole 600Y/347 Vac 250 Vdc	3 Pole 600Y/347 Vac 250 Vdc	4 Pole 600Y/347 Vac 250 Vdc	1 Pole 347 Vac 125 Vdc	2 Pole 600Y/347 Vac 250 Vdc	3 Pole 600Y/347 Vac 250 Vdc	4 Pole 600Y/347 Vac 250 Vdc	1 Pole 347 Vac 125 Vdc	2 Pole 600Y/347 Vac 250 Vdc	3 Pole 600Y/347 Vac 250 Vdc	4 Pole 600Y/347 Vac 250 Vdc	1 Pole 347 Vac	2 Pole 600Y/347 Vac
15 A	BDL16015	BDL26015	BDL36015	BDL46015	BGL16015	BGL26015	BGL36015	BGL46015	BJL16015	BJL26015	BJL36015	BJL46015	BKL16015	BKL26015
20 A	BDL16020	BDL26020	BDL36020	BDL46020	BGL16020	BGL26020	BGL36020	BGL46020	BJL16020	BJL26020	BJL36020	BJL46020	BKL16020	BKL26020
25 A	BDL16025	BDL26025	BDL36025	BDL46025	BGL16025	BGL26025	BGL36025	BGL46025	BJL16025	BJL26025	BJL36025	BJL46025	BKL16025	BKL26025
30 A	BDL16030	BDL26030	BDL36030	BDL46030	BGL16030	BGL26030	BGL36030	BGL46030	BJL16030	BJL26030	BJL36030	BJL46030	BKL16030	BKL26030
35 A	BDL16035	BDL26035	BDL36035	BDL46035	BGL16035	BGL26035	BGL36035	BGL46035	BJL16035	BJL26035	BJL36035	BJL46035	---	---
40 A	BDL16040	BDL26040	BDL36040	BDL46040	BGL16040	BGL26040	BGL36040	BGL46040	BJL16040	BJL26040	BJL36040	BJL46040	---	---
45 A	BDL16045	BDL26045	BDL36045	BDL46045	BGL16045	BGL26045	BGL36045	BGL46045	BJL16045	BJL26045	BJL36045	BJL46045	---	---
50 A	BDL16050	BDL26050	BDL36050	BDL46050	BGL16050	BGL26050	BGL36050	BGL46050	BJL16050	BJL26050	BJL36050	BJL46050	---	---
60 A	BDL16060	BDL26060	BDL36060	BDL46060	BGL16060	BGL26060	BGL36060	BGL46060	BJL16060	BJL26060	BJL36060	BJL46060	---	---
70 A	BDL16070	BDL26070	BDL36070	BDL46070	BGL16070	BGL26070	BGL36070	BGL46070	BJL16070	BJL26070	BJL36070	BJL46070	---	---
80 A	BDL16080	BDL26080	BDL36080	BDL46080	BGL16080	BGL26080	BGL36080	BGL46080	BJL16080	BJL26080	BJL36080	BJL46080	---	---
90 A	BDL16090	BDL26090	BDL36090	BDL46090	BGL16090	BGL26090	BGL36090	BGL46090	BJL16090	BJL26090	BJL36090	BJL46090	---	---
100 A	BDL16100	BDL26100	BDL36100	BDL46100	BGL16100	BGL26100	BGL36100	BGL46100	BJL16100	BJL26100	BJL36100	BJL46100	---	---
110 A	BDL16110	BDL26110	BDL36110	BDL46110	BGL16110	BGL26110	BGL36110	BGL46110	BJL16110	BJL26110	BJL36110	BJL46110	---	---
125 A	BDL16125	BDL26125	BDL36125	BDL46125	BGL16125	BGL26125	BGL36125	BGL46125	BJL16125	BJL26125	BJL36125	BJL46125	---	---

Table 7.49: B-Frame Termination Options

Termination Letter	
A = I-Line (See Section 9, Panelboards)	B D L 3 6 1 0 0
F = No Lugs (includes terminal nut kit on both ends)	For factory-installed termination, place termination letter in the third block of the circuit breaker catalog number.
L = EverLink Lugs both ends	
M = Lugs ON end Terminal Nut Kit OFF end	
P = Lugs OFF end Terminal Nut Kit ON end	

Table 7.50: B-Frame Interrupting Ratings

Voltage	Interrupting Rating			
	D	G	J	K
240 Vac	25 kA	65 kA	100 kA	100 kA
480Y/277 Vac	18 kA	35 kA	65 kA	65 kA
480 Vac	18 kA	35 kA	65 kA	65 kA
600Y/347 Vac	14 kA	18 kA	25 kA	65 kA
125 Vdc	10 kA	20 kA	50 kA	---
250 Vdc	10 kA	20 kA	50 kA	---



Table 7.51: B-Frame Lug Options

Lug Option Suffix	
No Suffix = EverLink Lugs both ends	B D L 3 6 1 0 0 L U
LU = EverLink Lug with Control Wire Terminal ON end; EverLink Lug OFF end	For factory-installed lug option, place suffix after the amperage in the circuit breaker catalog number.
LV = EverLink Lug ON end; EverLink Lug with Control Wire Terminal OFF end	
LW = EverLink Lug with Control Wire Terminal both ends	
LC = Copper Mechanical Lugs both ends	
LH = Aluminum Mechanical Lugs both ends	

Table 7.52: PowerPact B-Frame 125 A Magnetic Trip Values

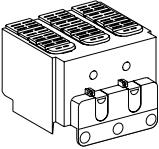
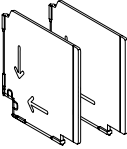
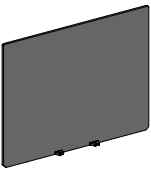
Current Rating @ 40° C	Fixed AC Magnetic Trip	
	Hold	Trip
15 A	400 A	600 A
20 A	400 A	600 A
25 A	480 A	720 A
30 A	480 A	720 A
35 A	480 A	720 A
40 A	480 A	720 A
45 A	480 A	720 A
50 A	480 A	720 A
60 A	640 A	960 A
70 A	800 A	1200 A
80 A	800 A	1200 A
90 A	1000 A	1500 A
100 A	1000 A	1500 A
110 A	1000 A	1500 A
125 A	1000 A	1500 A

Accessories see page 7-50
Optional Lugs see page 7-55
Dimensions see page 7-83

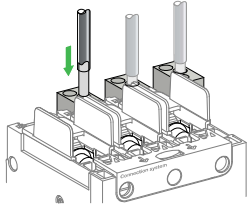
Accessory Description			Qty per kit	Catalog Number
Torque Limiting Breakaway Bits				
	9 N.m - Green	9±0.9 N•m 80±8 lb-in.	6	LV426990
			8	LV426991
	5 N.m - Yellow	5±0.5 N•m 44±4.4 lb-in.	6	LV426992
			8	LV426993

Insulation Accessories Catalog Numbers

Insulation Accessories

Long Terminal Shields				
	Used with terminal nut connectors, power distribution connectors, or mechanical lugs		Qty per kit	Catalog Number
	Long terminal shield	2 poles	1	LV426911
		3 poles	1	LV426912
		4 poles	1	LV426913
Interphase Barriers				
	Used with terminal nut connectors, power distribution connectors, or mechanical lugs		Qty per kit	Catalog Number
	Interphase barriers		6	LV426920
Rear Insulation Screen			Qty per kit	Catalog Number
	Rear insulation screen		2	LV426921
			2	LV426922
			2	LV426923

Power Distribution Connectors




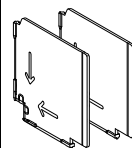
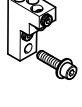
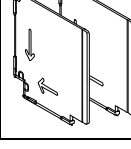
The power distribution connectors (PDCs) can be used for multiple load wire connections on one circuit breaker. Use in place of stand-alone power distribution blocks to save space and time. Field-installable kit includes tin-plated aluminum multi-conductor lug, interphase barriers, and required M6 x 24 mm mounting hardware.

The connectors are attached to circuit breaker terminals equipped with separately provided terminal nut connectors. Interphase barriers (required for installation) are supplied with power distribution connectors, but may be replaced by long terminal shields.

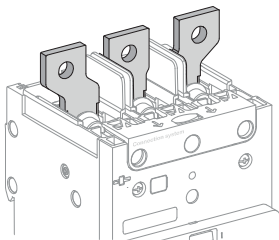
Power distribution connectors are available in three-wire or six-wire versions.

- For use on load end of circuit breaker only.
- For use in UL 508 Industrial Control applications.
- For use in UL 1995/CSA C22.2 No. 236 heating and cooling equipment.
- For copper wire only.

Power Distribution Connector Kits

Power Distribution Connector Kit		Kit Number	Qty per Kit	Wires per Terminal	Wire Range	Wire Binding Screw Torque
Power Distribution Connector	Phase Barriers					
		PDC6BD6	3	6	10–16 mm ² (8–6 AWG)	2.8 N•m (25 lb-in.)
				6	2.5–6 mm ² (14–10 AWG)	2.3 N•m. (20 lb-in.)
		PDC3BD2	3	3	35 mm ² (2 AWG)	4.5 N•m (40 lb-in.)
				3	2.5–35 mm ² (14–3 AWG)	4.0 N•m (35 lb-in.)

Spreaders



Spreaders can be used to increase the pitch of the circuit breaker from 27 mm (1.063 in.) to 35 mm (1.378 in.). They are delivered with interphase barriers and M8 screws, nuts and washers. The connectors are attached to device terminals equipped with separately provided terminal nut connectors.

Rear insulation screens may have to be used too, depending on the distance between the live uninsulated parts and the grounded metallic back pan.

Holes for customer connection use 8 mm (5/16 in.) hardware, provided.

Spreader Kits

Description	Used With	Qty per Kit	Catalog Number
B-Frame 3–pole Spreader	B-Frame terminal nut connector	1	LV426940
B-Frame 4–pole Spreader	B-Frame terminal nut connector	1	LV426941

NOTE: For a one pole circuit breaker, use the middle part of a 3–pole spreader. For a two pole circuit breaker, use the two middle parts of a 4–pole spreader.



9421 Type L
Circuit Breaker Operating Mechanism

Type L Circuit Breaker Mechanisms

Type L door-mounted, variable depth operating mechanisms feature heavy duty, all metal construction with trip indication. All mechanisms can be padlocked in the Off position when the enclosure door is open. Further, the handle assemblies can be locked Off with up to three padlocks, which also locks the enclosure when the door is closed. (The 3 in. handle accepts one padlock.) Complete kits are rated for NEMA 1, 3R, and 12 enclosures. They include a handle assembly, operating mechanism, and shaft assembly.

Table 8.88: Complete Kits

Complete Kit Does Not Include Circuit Breaker			Includes Operating Mechanism and Handle					
Use With			Standard 6 in. Handle		Short 3 in. Handle			
Circuit Breaker or Interrupter Type	No. of Poles	Frame Size (A)	Standard Shaft Kit		Long Shaft Kit			
			Cat. No.	Mounting Depth [1]	Cat. No.	Mounting Depth [1]	Cat. No.	Mounting Depth [1]
PowerPacT™ B	2-3	125	9421LB1	5.50-10.75	9421LB4	5.50-21.38	9421LB3	5.50-21.38
PowerPacT H and J	2-3	250	9421LJ1	5.50-10.75	9421LJ4	5.50-21.38	9421LJ3	5.50-21.38
PowerPacT D and L	2-3	600	9421LD1	7.25-12.06	9421LD4	7.25-22.63	3 in. handles are not recommended for use with these circuit breakers.	
	4	1200 (300 V)	9421LD14	7.25-12.06	—	—		
—			—	9421LD44	7.25-12.06	—		
PowerPacT M and P [2]	3	1200	9421LW1 [3]	9.00-12.50	9421LW4 [3]	9.00-23.50		

Table 8.89: Component Parts

Use With			3 in. Handle Assemblies NEMA 1, 3R, 12	Standard Handle Assemblies NEMA 1, 3R, 12	Operating Mechanism Includes Lockout	Standard Shaft (Support Bracket Not Required)		Long Shaft (Support Bracket Required)	
Circuit Breaker or Interrupter Type	No. of Poles	Frame Size (A)	Cat. No.	Cat. No.	Cat. No.	Mounting Depth [1]	Cat. No.	Mounting Depth [1]	Cat. No.
PowerPacT B	2-3	125	9421LH3 [4]	9421LH6 [4]	9421LB7	5.50-10.75	9421LS8	5.50-21.38	9421LS13
PowerPacT H and J	2-3	250	9421LH3 [4]	9421LH6 [4]	9421LJ7	5.50-10.25	9421LS8	5.50-21.38	9421LS13
PowerPacT D and L	2-3	600	[5]	9421LH6 [4]	9421LD7	7.25-12.06	9421LS8	7.25-22.63	9421LS13
	4	1200 (300 V)	—	9421LH6 [4]	—	7.25-12.06	9421LS8	—	—
				9421LH6 [4]	—	—	—	7.25-22.63	9421LS13
PowerPacT M and P [2]	3	1200	[5]	9421LHP8 [4]	9421LW7	7.19-11.63	9421LS8	7.19-22.25	9421LS10

Table 8.90: NEMA 4 and 4X Handle Assemblies

Use With			Standard Handle Assemblies		Special 3 in. Version	
Circuit Breaker or Interrupter Type	No. of Poles	Frame Size (A)	NEMA 1, 3R, 4, 12 (Painted)	NEMA 1, 3R, 4, 4X, 12 (Chrome Plated)	NEMA 1, 3R, 4, 12 (Painted)	NEMA 1, 3R, 4, 4X, 12 (Chrome Plated)
			Cat. No.	Cat. No.	Cat. No.	Cat. No.
PowerPacT B	2-3	125	9421LH46	9421LC46	9421LH43	9421LC43
PowerPacT H and J; NSF	2-3	250	9421LH46	9421LC46	9421LH43	9421LC43
PowerPacT D and L	2-3	600	9421LH46	9421LC46	3 in. handles are not recommended for use with these circuit breakers.	
PowerPacT M and P	3	1200	9421LHP48	9421LCP48		

Table 8.91: Auxiliary and Alarm Switches for PowerPac™ Circuit Breakers

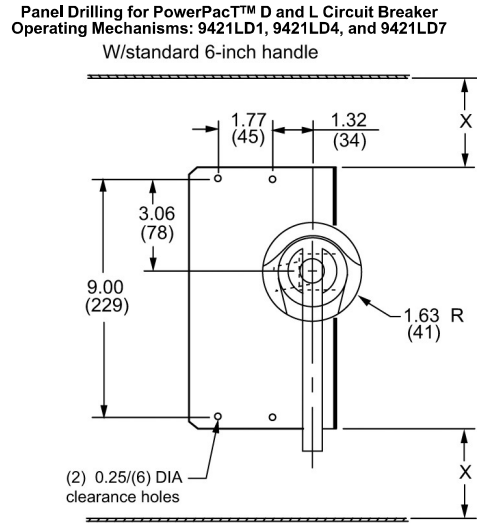
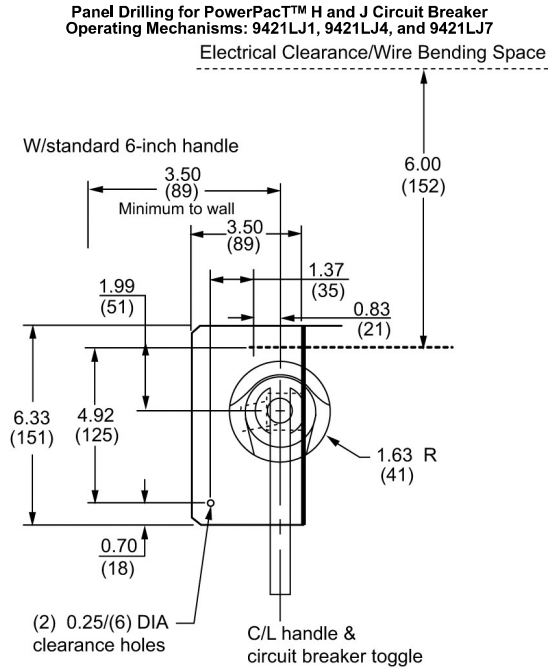
Description	B-Frame	H- and J-Frame	D- and L-Frame	D- and L-Frame
1 Auxiliary Switch 1a 1b	LV26950	S29450	S29450	S29450
2 Auxiliary Switch 2a 2b	—	2 x S29450	2 x S29450	2 x S29450
3 Auxiliary Switch 3a 3b	—	—	3 x S29450	3 x S29450

NOTE: The location of the accessory in the circuit breaker determines its function.



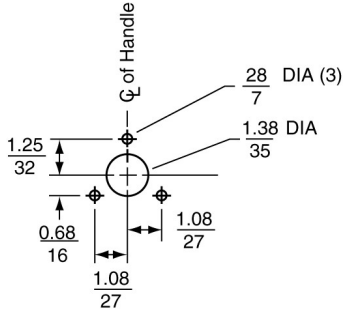
[1] Mounting depth measured in inches from circuit breaker mounting surface (control panel) to outside of enclosure door.
 [2] These circuit breaker operating mechanisms must use the 9421LHP** or LCP** handles only.
 [3] Type LW1 and LW4 include an 8 in. handle (9421LHP8) rather than a 6 in. handle.
 [4] For a red handle and yellow bezel, add suffix RY to catalog number, e.g., 9421LH6RY.
 [5] 3 in. handles are not recommended for use with these circuit breakers.

Dimensions for Type L Operating Mechanisms



X: Minimum to wall or barrier to insure adequate wire bending space to lug surface when the maximum wire size is used. Refer to NEC 430-10.

Panel Drilling for PowerPac™ M and P Circuit Breaker Operating Mechanisms: 9421LW1, 9421LW4, and 9421LW7



Door Drilling Dimensions

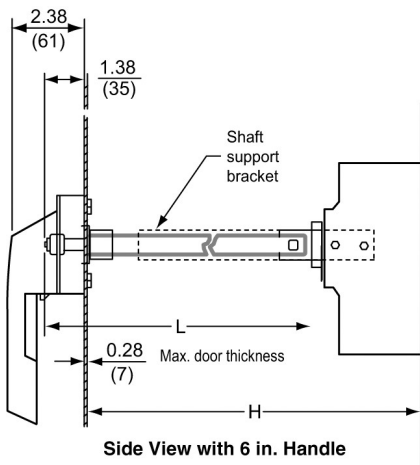
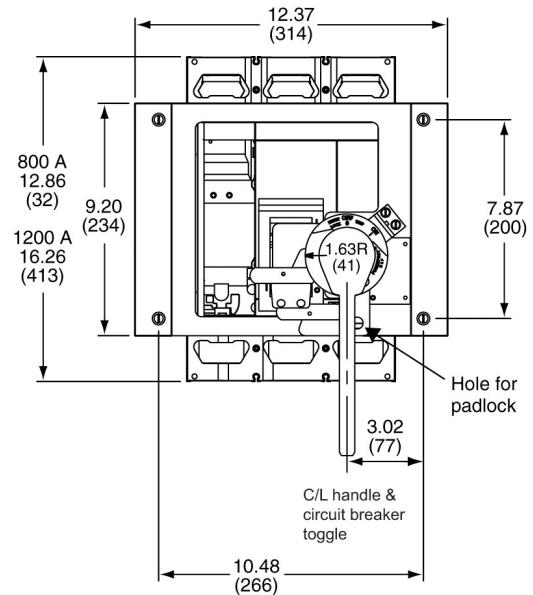
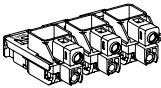
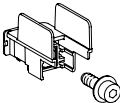


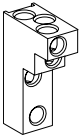
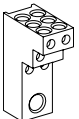



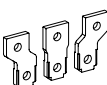


Table 8.92: Shaft Cutting Dimensions

Class	Type	Shaft Length Formula	H = Standard Shaft		H = Long Shaft	
			Min.	Max.	Min.	Max.
9421	LJ1, LJ4, LJ7	L = H - 3.00 (76)	5.5 (138)	10.75 (273)	5.5 (138)	21.63 (543)
9421	LD1, LD4, LD7	L = H - 4.25 (108)	7.25 (184)	12.06 (306)	7.25 (184)	22.63 (575)
9421	LW1, LW4, LW7	L = H - 4.89 (124)	7.19 (183)	11.63 (295)	7.19 (183)	22.25 (565)

Connection Accessories

Accessory Description			Qty per kit	Catalog Number
EverLink Lug Connectors				
	For 1 pole		1	LV426972
	For 2 poles with control wire terminal		1	LV426973
	For 3 poles with control wire terminal		1	LV426974
	For 4 poles with control wire terminal		1	LV426975
Terminal Nut Connection Kits				
	B-Frame terminal nut connector with metric screws	M6	2	LV426962
			3	LV426963
Mechanical Lug Connection Kits				
	Cu lugs for use with Cu wires	2.5–50 mm ² (#14–1/0 AWG)	2	LV426964
			3	LV426965
	Al lugs for use with Al or Cu wires	2.5–70 mm ² (#14–2/0 AWG)	2	LV426966
			3	LV426967
	Al lugs for 3 cables with 2 interphase barriers	2.5–35 mm ² (#14–#2 AWG)	3	PDC3BD2
	Al lugs for 6 cables with 2 interphase barriers	2.5–16 mm ² (#14–#6 AWG)	3	PDC6BD6
Copper Compression Lugs for Copper Cables				
	For cable 95 mm ² solid/stranded / 70 mm ² fine stranded ²³	3	LV426980	
		4	LV426981	
	For cable 1/0 AWG (Includes heat shrink sheaths)	2	LV426986	
		3	LV426987	
Aluminum Compression Lugs for Copper or Aluminum Cables				
	For cable 1/0 AWG (Includes heat shrink sheaths)	2	LV426988	
		3	LV426989	
Terminal Extensions				
	Spreaders from 27 to 35 mm pitch (Supplied with 2 or 3 interphase barriers.)	3 poles	1 set	LV426940
		4 poles	1 set	LV426941

23. Supplied with 2 or 3 interphase barriers.

Dead Front Fuse Holders

LPSC Series POWR-SAFE Fuse Holders

600 V



Description

The POWR-SAFE LPSC series dead front fuse holders feature touch-safe protection for personnel when installing and removing fuses. These fuse holders are intended to house Class CC fuses. They are available in 1-, 2-, 3-, and 4-pole configurations and are offered in indicating and non-indicating options. The LPSC series is DIN rail mountable and easily installed and removed with no additional fuse pullers or tools. They are UL Listed for branch circuit protection. The indicating fuse holders show blown fuse indication above 80 V.

Features & Benefits

FEATURES	BENEFITS
Meets dead front requirements	Maximum safety for personnel
35 mm DIN rail mountable	Easy installation in various settings
Compact design	Ultimate flexibility, space-saving
Easy removal	No fuse pullers or additional tools required
Ventilated design	Cooler operation

Applications

- For use with Class CC fuses

Dead Front Fuse Holders

LPSC Series POWR-SAFE Fuse Holders

Specifications

Voltage Rating	600 V ac/dc
Ampere Rating	30 A
Interrupting Rating	200 kA (Class CC)
Terminal Type	Pressure Plate
Suggested Torque	17.7 in-lbs
Wire Range	#8–#14 CU
Housing	Thermoplastic
Fuse Clip	Silver plated copper
Zinc Plated Steel	Zinc plated steel
Terminal Screws	Nickel plated steel
Operating Temperature	-50 °C to +125 °C
Flammability Rating	UL 94 V-0
Environmental	RoHS Compliant, Lead (Pb) Free

WIRE TYPE	
75 °C CU Only	8–14 Stranded UL Class B and Class C wire
	10–14 Solid wire

Certification & Compliance

UL	UL Listed (LPSC File: E14721)
CSA	CSA Certified (LPSC File: LR7316)
CE	EU Declaration of Conformity (LPSC_201113)
RoHS	RoHS Directive 2011/65/EU

Accessories

Class CC fuses
Multi-Pole Assembly Kit

Ordering Information

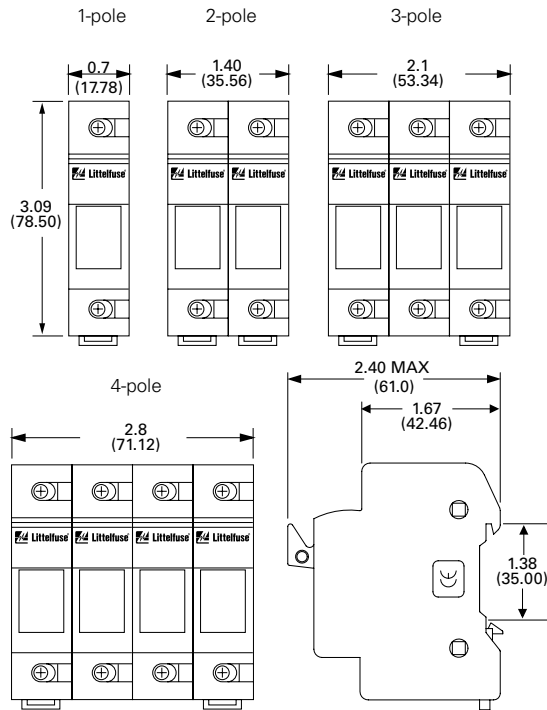
INDICATING		NON-INDICATING		FUSE TYPE	POLES
CATALOG NUMBER	ORDERING NUMBER	CATALOG NUMBER	ORDERING NUMBER		
LPSC001ID	LPSC0001ZXID	LPSC001	LPSC0001Z	Class CC	1
LPSC002ID	LPSC0002ZXID	LPSC002	LPSC0002Z	Class CC	2
LPSC003ID	LPSC0003ZXID	LPSC003	LPSC0003Z	Class CC	3
LPSC004ID	LPSC0004ZXID	LPSC004	LPSC0004Z	Class CC	4

Multi-Pole Assembly Kit Ordering No. CYHP0001Z-KIT
(Kit contains 20 connector pincers & 10 handle pins)

Dead Front Fuse Holders

LPSC Series POWR-SAFE Fuse Holders

Dimensions Inches (mm)



Disclaimer Notice – Information furnished is believed to be accurate and reliable. However, users should independently evaluate the suitability of and test each product selected for their own applications. Littelfuse products are not designed for, and may not be used in, all applications. Read complete Disclaimer Notice at www.littelfuse.com/product-disclaimer.

Class CC Fuses

KLDR Series

600 V ac • 300 V dc • Time-Delay • $\frac{1}{10}$ –30 A



Description

KLDR Series time-delay fuses are designed to protect control transformers, solenoids, and similar inductive components with high-magnetizing currents during the first half-cycle. These small-sized fuses provide excellent protection of motor branch circuits containing IEC or NEMA-rated motor controllers or contactors. The KLDR Series fuses closely match most control power transformer characteristics, which permits them to be sized in accordance with the latest revisions of UL 508 (Industrial Control) and UL 845 (Motor Control Centers).

Features & Benefits

FEATURES	BENEFITS
Current-limiting	Reduces damage caused by heating and magnetic effects of short-circuit currents
Short-circuit protection	Improves safety with faster response times to fault currents
Rejection capability	Prevents use of fuses with lower interrupting ratings or voltage when used with corresponding fuse holders
Time-delay	Allows for a temporary current surge for a short period of time without blowing

Applications

- Transformer and solenoid protection

Specifications

Voltage Rating	Ac: 600 V Dc: 300 V
Amperage Range	$\frac{1}{10}$ – 30 A
Interrupting Ratings	Ac: 200,000 A rms symmetrical Dc: 20,000 A self-certified
Material	Body: Melamine Caps: Nickel-plated Bronze
Fuse Weight	.019 lb (8.62g)
Applicable Standards	UL 248-4, Class CC
Environmental	RoHS Compliant
Country of Origin	Mexico

Class CC Fuses

KLDR Series

Certification & Compliance

UL	UL Listed (File: E81895)
CSA	CSA Certified (File: LR29862)
CE	EU_DOC-KLDR_P_210128
RoHS	RoHS 2 Directive 2011/65/EU; Directive (EU) 2015/863

Accessories

L60030C series fuse holder
 LPSC/LFPSC Touch-Safe series fuse holder
 LEC series inline fuse holder
 571/572 series panel mount fuse holder

Ordering Information

AMPERE RATING	CATALOG NUMBER	PRODUCT MARKING	PACK QUANTITY	ORDERING NUMBER	UPC
1/10	KLDR.100	KLDR 1/10 A	10	KLDR.100TXP	07945896877
			100	KLDR.100HXP	07945879278
1/8	KLDR.125	KLDR 1/8 A	10	KLDR.125TXP	07945896878
			100	KLDR.125HXP	07945879279
15/100	KLDR.150	KLDR 15/100 A	10	KLDR.150TXP	07945896879
			100	KLDR.150HXP	07945879280
3/16	KLDR.187	KLDR 3/16 A	10	KLDR.187TXP	07945896880
			100	KLDR.187HXP	07945879281
3/10	KLDR.200	KLDR 3/10 A	10	KLDR.200TXP	07945879239
			100	KLDR.200HXP	07945879282
1/4	KLDR.250	KLDR 1/4 A	10	KLDR.250TXP	07945879240
			100	KLDR.250HXP	07945879283
3/10	KLDR.300	KLDR 3/10 A	10	KLDR.300TXP	07945879241
			100	KLDR.300HXP	07945879284
4/10	KLDR.400	KLDR 4/10 A	10	KLDR.400TXP	07945879242
			100	KLDR.400HXP	07945879285
1/2	KLDR.500	KLDR 1/2 A	10	KLDR.500TXP	07945879243
			100	KLDR.500HXP	07945879286
5/10	KLDR.600	KLDR 5/10 A	10	KLDR.600TXP	07945879244
			100	KLDR.600HXP	07945879287
3/4	KLDR.750	KLDR 3/4 A	10	KLDR.750TXP	07945879245
			100	KLDR.750HXP	07945879288
8/10	KLDR.800	KLDR 8/10 A	10	KLDR.800TXP	07945879246
			100	KLDR.800HXP	07945879289
1	KLDR001	KLDR 1 A	10	KLDR001.TXP	07945879247
			100	KLDR001.HXP	07945879290
1 1/8	KLDR1.12	KLDR 1 1/8 A	10	KLDR1.12TXP	07945879248
			100	KLDR1.12HXP	07945879291
1 1/4	KLDR1.25	KLDR 1 1/4 A	10	KLDR1.25TXP	07945879249
			100	KLDR1.25HXP	07945879292
1 5/10	KLDR01.4	KLDR 1 5/10 A	10	KLDR01.4TXP	07945879250
			100	KLDR01.4HXP	07945879293

Class CC Fuses

KLDR Series

Ordering Information

AMPERE RATING	CATALOG NUMBER	PRODUCT MARKING	PACK QUANTITY	ORDERING NUMBER	UPC
1 ½	KLDR01.5	KLDR 1 ½A	10 100	KLDR01.5TXP KLDR01.5HXP	07945879251 07945879294
1 ⅝	KLDR01.6	KLDR 1 ⅝A	10 100	KLDR01.6TXP KLDR01.6HXP	07945879252 07945879295
1 ⅞	KLDR01.8	KLDR 1 ⅞A	10 100	KLDR01.8TXP KLDR01.8HXP	07945879253 07945879296
2	KLDR002	KLDR 2A	10 100	KLDR002.TXP KLDR002.HXP	07945879254 07945879297
2 ¼	KLDR2.25	KLDR 2 ¼A	10 100	KLDR2.25TXP KLDR2.25HXP	07945879255 07945879298
2 ½	KLDR02.5	KLDR 2 ½A	10 100	KLDR02.5TXP KLDR02.5HXP	07945879256 07945879299
2 ⅝	KLDR02.8	KLDR 2 ⅝A	10 100	KLDR02.8TXP KLDR02.8HXP	07945879257 07945879300
3	KLDR003	KLDR 3A	10 100	KLDR003.TXP KLDR003.HXP	07945879258 07945879301
3 ⅝	KLDR03.2	KLDR 3 ⅝A	10 100	KLDR03.2TXP KLDR03.2HXP	07945879259 07945879302
3 ½	KLDR03.5	KLDR 3 ½A	10 100	KLDR03.5TXP KLDR03.5HXP	07945879260 07945879303
4	KLDR004	KLDR 4A	10 100	KLDR004.TXP KLDR004.HXP	07945879261 07945879304
4 ½	KLDR04.5	KLDR 4 ½A	10 100	KLDR04.5TXP KLDR04.5HXP	07945879262 07945879305
5	KLDR005	KLDR 5A	10 100	KLDR005.TXP KLDR005.HXP	07945879263 07945879306
5 ⅝	KLDR05.6	KLDR 5 ⅝A	10 100	KLDR05.6TXP KLDR05.6HXP	07945879264 07945879307
6	KLDR006	KLDR 6A	10 100	KLDR006.TXP KLDR006.HXP	07945879265 07945879308
6 ¼	KLDR6.25	KLDR 6 ¼A	10 100	KLDR6.25TXP KLDR6.25HXP	07945879266 07945879309
7	KLDR007	KLDR 7A	10 100	KLDR007.TXP KLDR007.HXP	07945879267 07945879310
7 ½	KLDR07.5	KLDR 7 ½A	10 100	KLDR07.5TXP KLDR07.5HXP	07945879268 07945879311
8	KLDR008	KLDR 8A	10 100	KLDR008.TXP KLDR008.HXP	07945879269 07945879312
9	KLDR009	KLDR 9A	10 100	KLDR009.TXP KLDR009.HXP	07945879270 07945879313
10	KLDR010	KLDR 10A	10 100	KLDR010.TXP KLDR010.HXP	07945879271 07945879314
12	KLDR012	KLDR 12A	10 100	KLDR012.TXP KLDR012.HXP	07945879272 07945879315
15	KLDR015	KLDR 15A	10 100	KLDR015.TXP KLDR015.HXP	07945879273 07945879316
17 ½	KLDR17.5	KLDR 17 ½A	10 100	KLDR17.5TXP KLDR17.5HXP	07945879274 07945879317

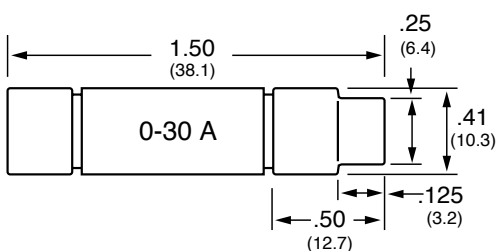
Class CC Fuses

KLDR Series

Ordering Information

AMPERE RATING	CATALOG NUMBER	PRODUCT MARKING	PACK QUANTITY	ORDERING NUMBER	UPC
20	KLDR020	KLDR 20A	10	KLDR020.TXP	07945879275
			100	KLDR020.HXP	07945879318
25	KLDR025	KLDR 25A	10	KLDR025.TXP	07945879276
			100	KLDR025.HXP	07945879319
30	KLDR030	KLDR 30A	10	KLDR030.TXP	07945879277
			100	KLDR030.HXP	07945879320

Dimensions Inches (mm)



Electrical Specification - Agency Requirements

AMPERAGE RATING	OPENING TIME		
	100 % OF AMP RATING PER UL	135 % OF AMP RATING PER UL	200 % OF AMP RATING PER UL
1/10-30	Temperature Stabilization	60 Minutes Max	12 Seconds Minimum

Electrical Specifications

CATALOG NUMBER	VOLTAGE RATING (V)		INTERRUPTING RATING (A)		MELT (PRE-ARC) I ² T (A ² S)	TOTAL CLEARING I ² T (A ² SEC) 200 KA	AGENCY APPROVALS	
	AC	DC	AC	DC			UL	CSA
KLDR.100	600	300	200,000	20,000	.0004	.0059	•	•
KLDR.125	600	300	200,000	20,000	.0007	.0055	•	•
KLDR.150	600	300	200,000	20,000	.0016	.0059	•	•
KLDR.187	600	300	200,000	20,000	.0040	.0267	•	•
KLDR.200	600	300	200,000	20,000	.0018	.0230	•	•
KLDR.250	600	300	200,000	20,000	.0138	.0967	•	•
KLDR.300	600	300	200,000	20,000	.0111	.1005	•	•
KLDR.400	600	300	200,000	20,000	.0579	.1420	•	•
KLDR.500	600	300	200,000	20,000	.0877	.3121	•	•
KLDR.600	600	300	200,000	20,000	.1404	.3742	•	•
KLDR.750	600	300	200,000	20,000	.2911	1.972	•	•
KLDR.800	600	300	200,000	20,000	.2416	2.064	•	•
KLDR001	600	300	200,000	20,000	.4494	5.883	•	•
KLDR1.12	600	300	200,000	20,000	.5049	5.149	•	•

Class CC Fuses

KLDR Series

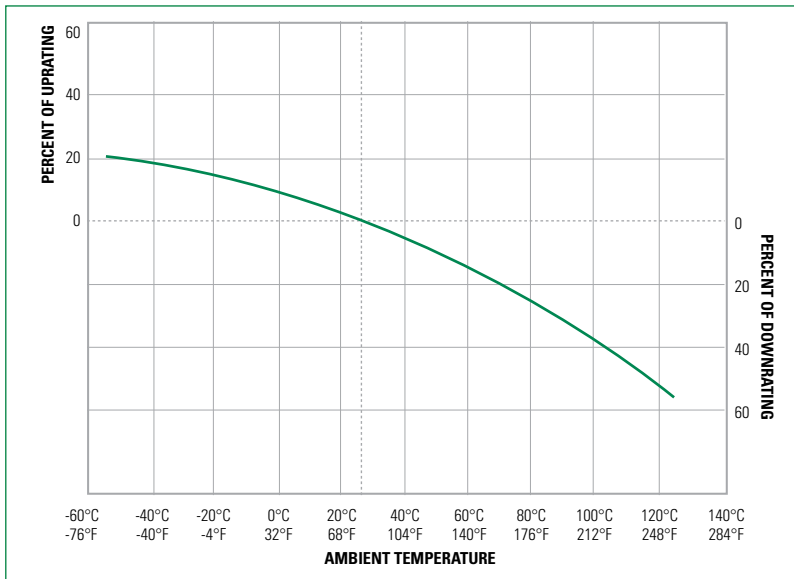
CATALOG NUMBER	VOLTAGE RATING (V)		INTERRUPTING RATING (A)		MELT (PRE-ARC) I ² T (A ² S)	TOTAL CLEARING I ² T (A ² SEC) 200 KA	AGENCY APPROVALS	
	AC	DC	AC	DC			UL	CSA
KLDR1.25	600	300	200,000	20,000	.4367	7.354	•	•
KLDR01.4	600	300	200,000	20,000	.8135	7.639	•	•
KLDR01.5	600	300	200,000	20,000	.9302	5.885	•	•
KLDR01.6	600	300	200,000	20,000	.7495	6.682	•	•
KLDR01.8	600	300	200,000	20,000	.9964	6.594	•	•
KLDR002	600	300	200,000	20,000	.8615	14.01	•	•
KLDR2.25	600	300	200,000	20,000	1.126	26.41	•	•
KLDR02.5	600	300	200,000	20,000	2.087	35.35	•	•
KLDR02.8	600	300	200,000	20,000	21.28	45.47	•	•
KLDR003	600	300	200,000	20,000	23.21	55.99	•	•
KLDR03.2	600	300	200,000	20,000	37.92	57.27	•	•
KLDR03.5	600	300	200,000	20,000	21.42	109.4	•	•
KLDR004	600	300	200,000	20,000	83.81	258.6	•	•
KLDR04.5	600	300	200,000	20,000	83.89	110.6	•	•
KLDR005	600	300	200,000	20,000	63.33	84.04	•	•
KLDR05.6	600	300	200,000	20,000	87.66	114.0	•	•
KLDR006	600	300	200,000	20,000	129.5	161.9	•	•
KLDR6.25	600	300	200,000	20,000	147.6	261.7	•	•
KLDR007.	600	300	200,000	20,000	202.4	513.4	•	•
KLDR07.5	600	300	200,000	20,000	321.8	813.0	•	•
KLDR008	600	300	200,000	20,000	111.2	1,145	•	•
KLDR009	600	300	200,000	20,000	73.40	1,334	•	•
KLDR010	600	300	200,000	20,000	132.0	934.8	•	•
KLDR012	600	300	200,000	20,000	154.7	1,723	•	•
KLDR015	600	300	200,000	20,000	200.5	2,248	•	•
KLDR17.5	600	300	200,000	20,000	87.50	722.8	•	•
KLDR020	600	300	200,000	20,000	123.8	1,363	•	•
KLDR025	600	300	200,000	20,000	226.0	1,710	•	•
KLDR030	600	300	200,000	20,000	299.6	1,990	•	•

Class CC Fuses

KLDR Series

Temperature Derating Curve

Ambient temperature: temperature of air immediately surrounding fuse



Current-Limiting Effects

SHORT CIRCUIT CURRENT*	APPARENT RMS SYMMETRICAL CURRENT FOR VARIOUS FUSE RATINGS								
	4 A	6 A	7.5 A	8 A	10 A	12 A	15 A	20 A	30 A
5,000	349	420	521	437	359	369	435	456	621
10,000	440	529	656	551	452	465	548	575	783
15,000	504	605	751	631	517	532	627	658	896
20,000	554	666	827	694	569	585	690	724	986
25,000	597	718	890	748	613	630	743	780	1063
30,000	634	763	946	795	651	670	790	829	1129
35,000	668	803	996	837	686	705	832	872	1189
40,000	698	840	1041	875	717	737	870	912	1243
50,000	752	904	1122	942	772	794	937	983	1339
60,000	799	961	1192	1001	821	844	995	1044	1423
80,000	880	1058	1312	1102	903	929	1096	1149	1566
100,000	948	1139	1413	1187	973	1001	1180	1238	1687
150,000	1085	1304	1618	1359	1114	1146	1351	1417	1931
200,000	1194	1436	1781	1496	1226	1261	1487	1560	2125

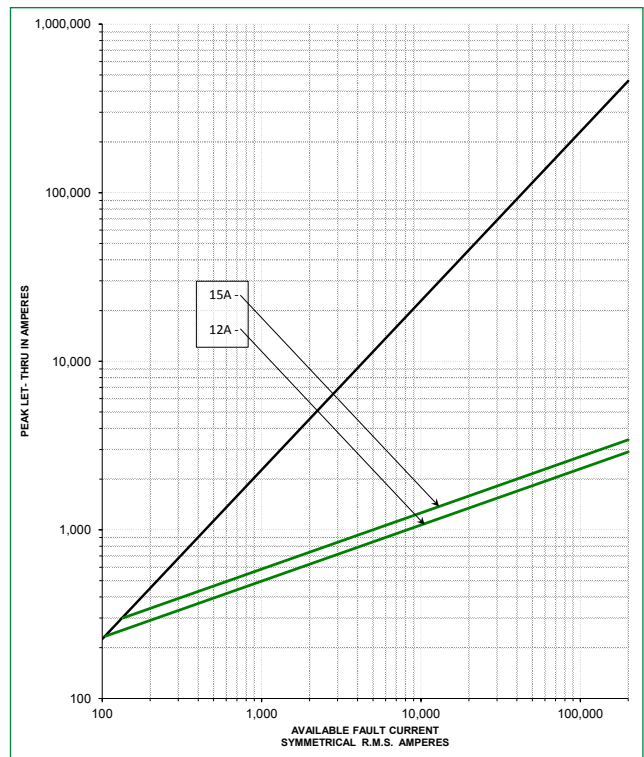
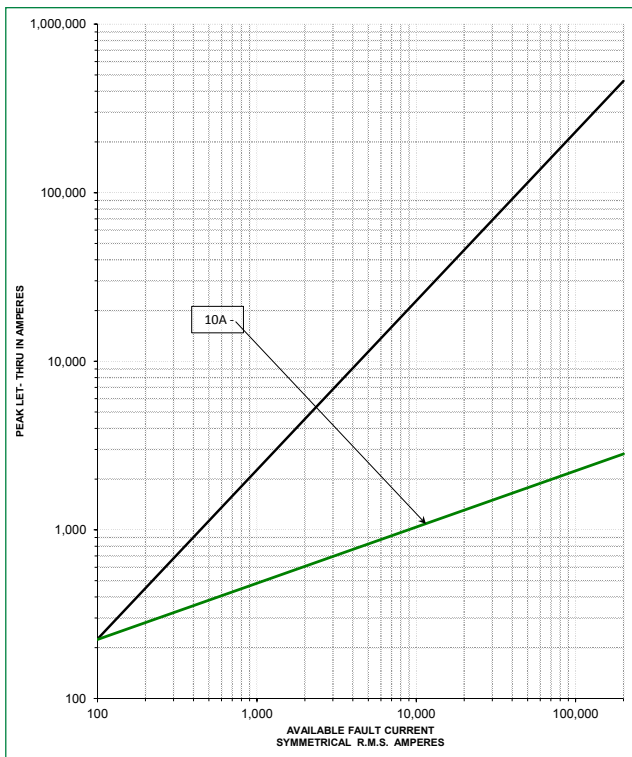
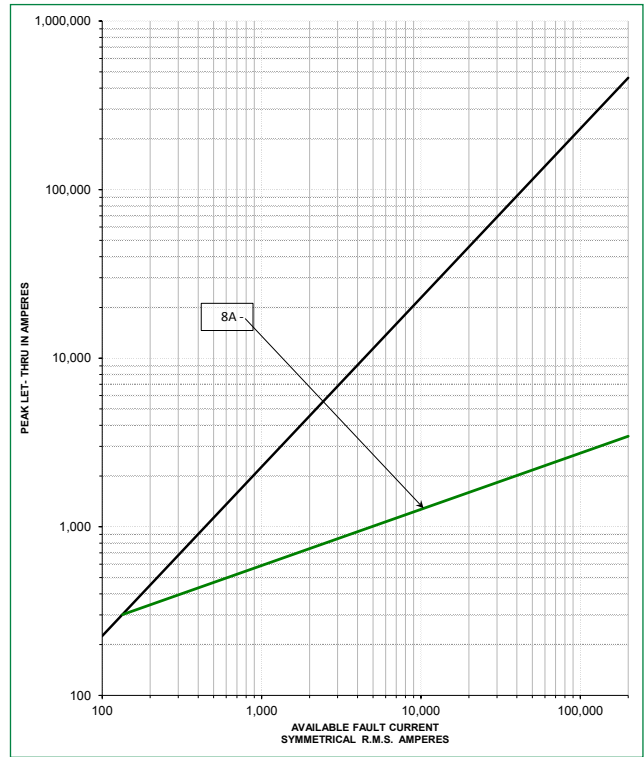
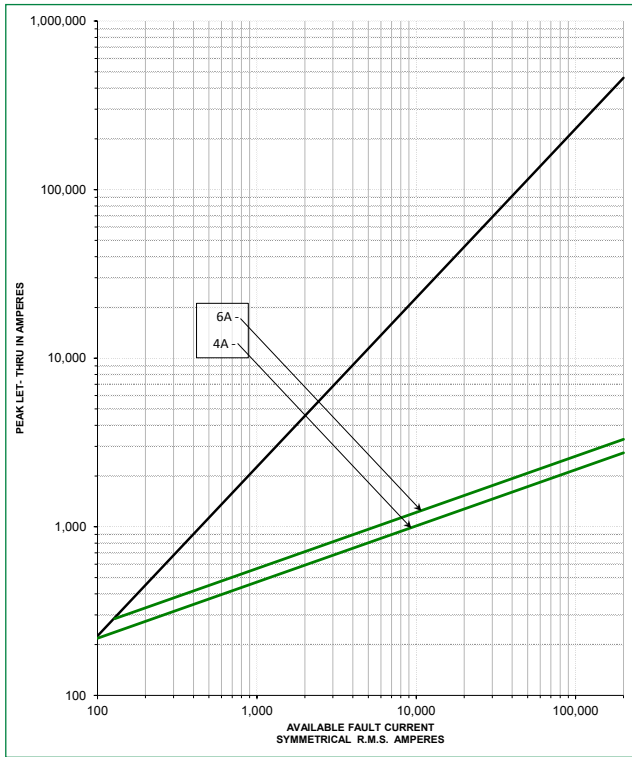
*Prospective RMS Symmetrical Amperes Short-Circuit Current

Note: Data Derived from Peak Let-Thru Curve

Class CC Fuses

KLDR Series

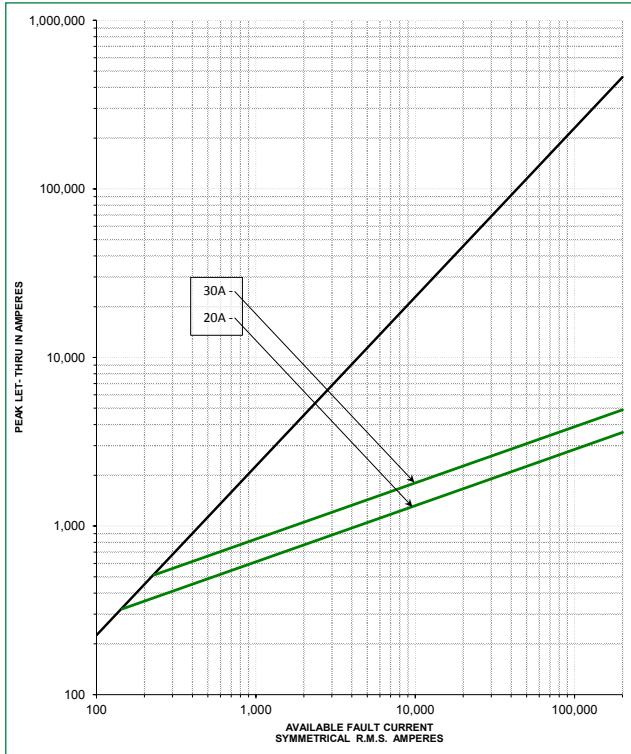
Peak Let-Thru Curves



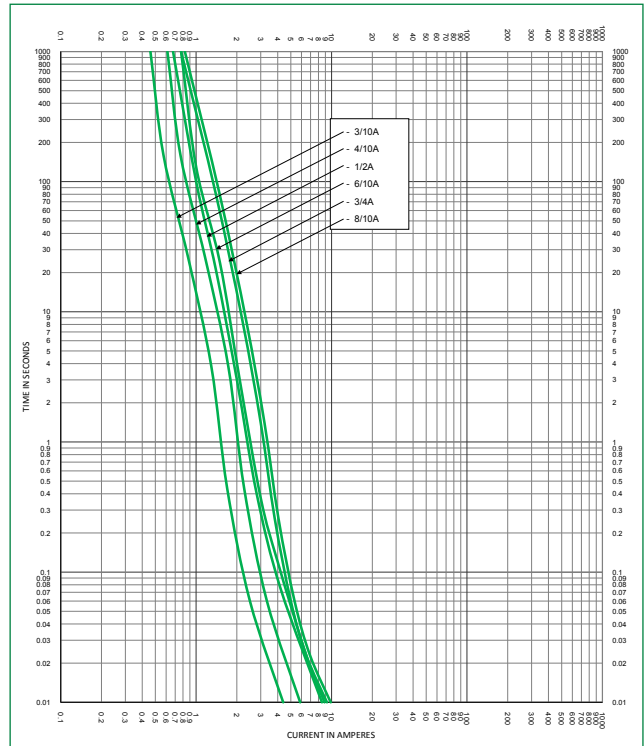
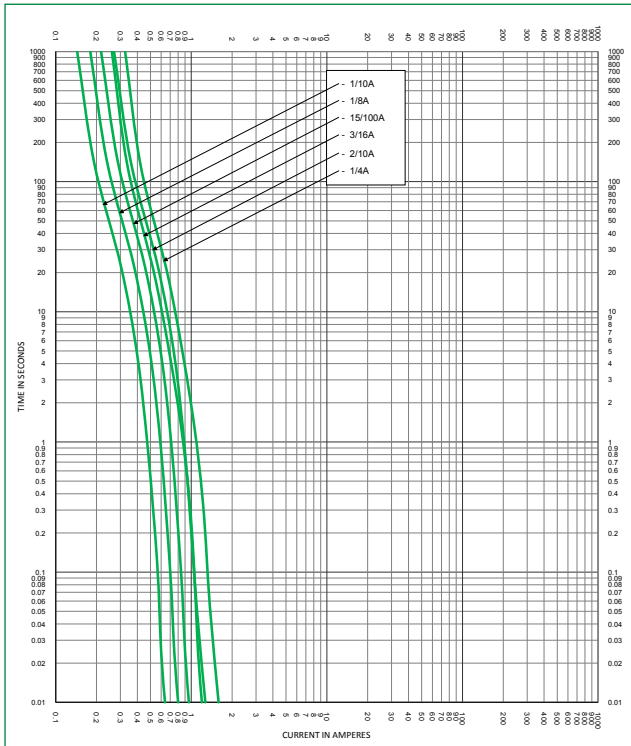
Class CC Fuses

KLDR Series

Peak Let-Thru Curves



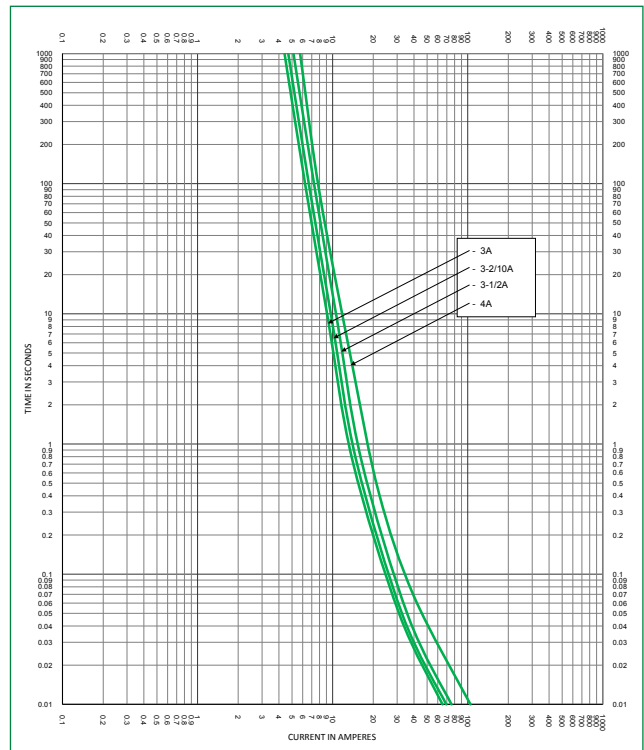
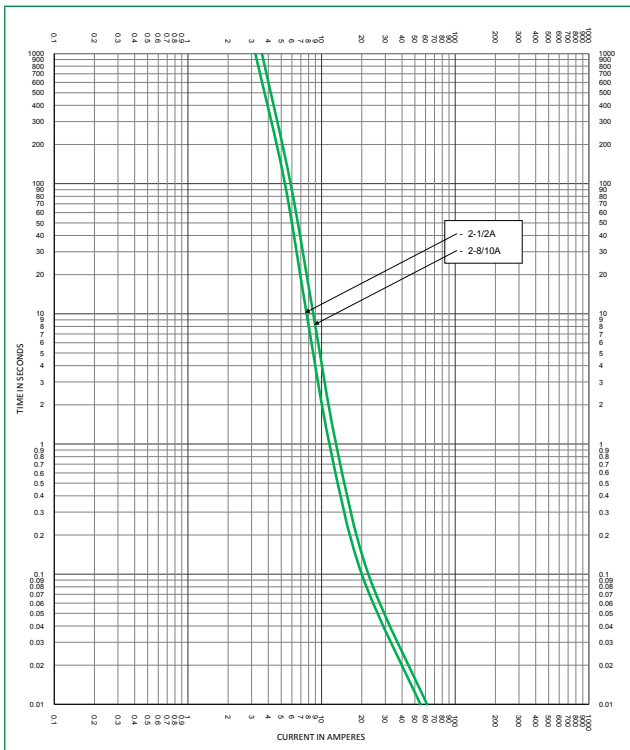
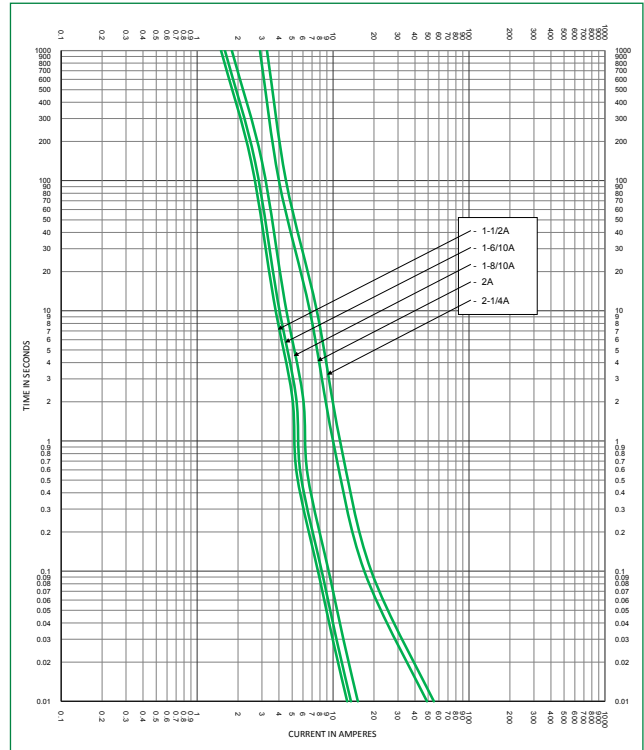
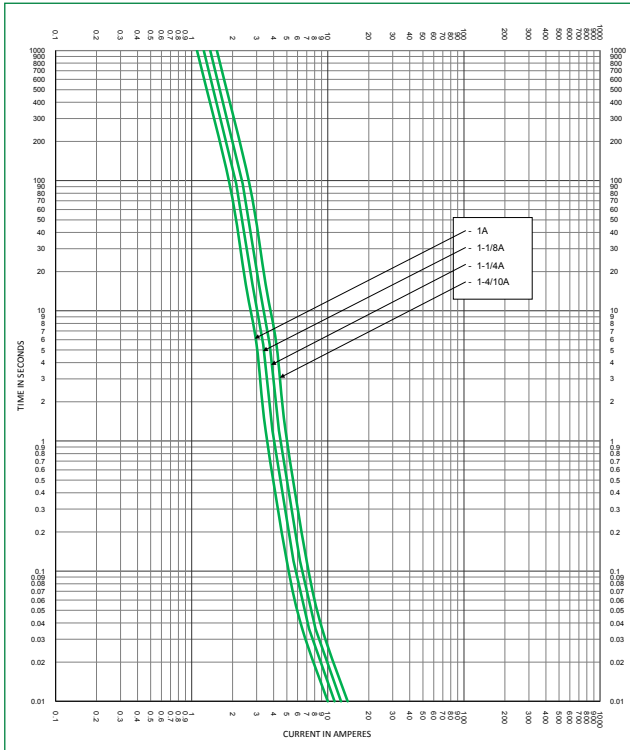
Time Current Curves



Class CC Fuses

KLDR Series

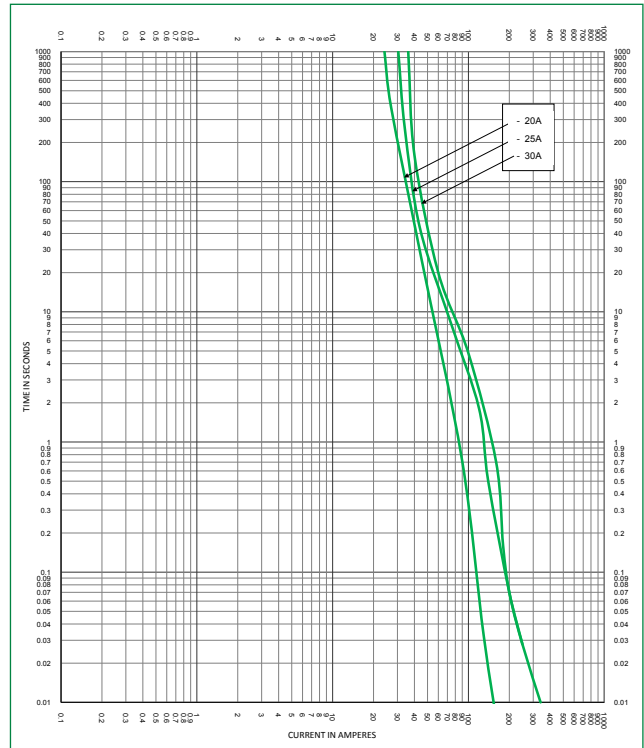
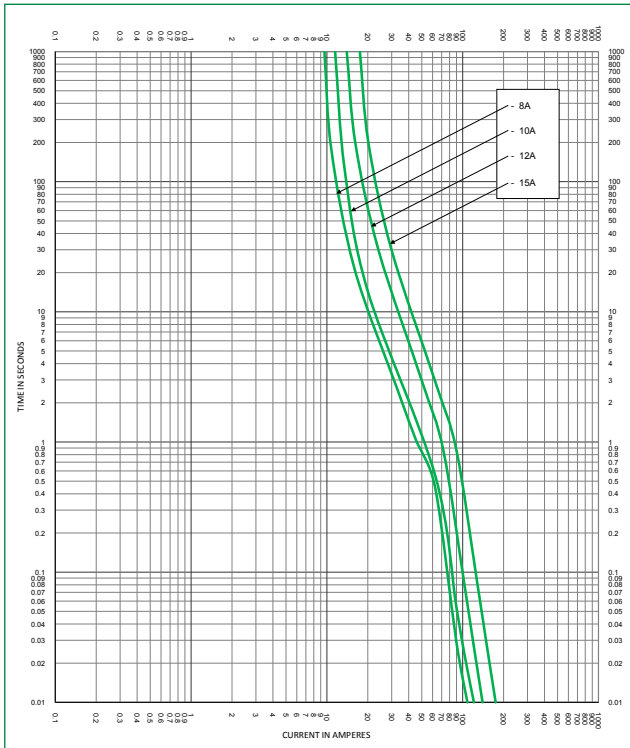
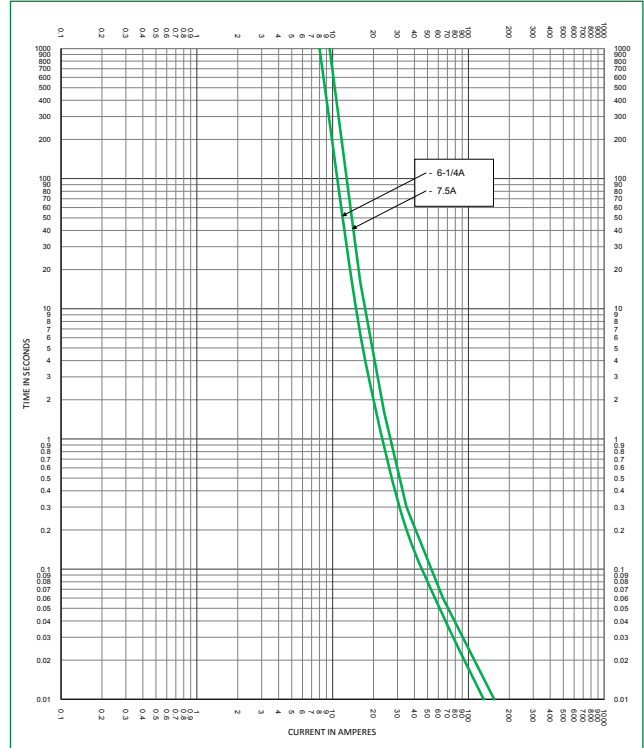
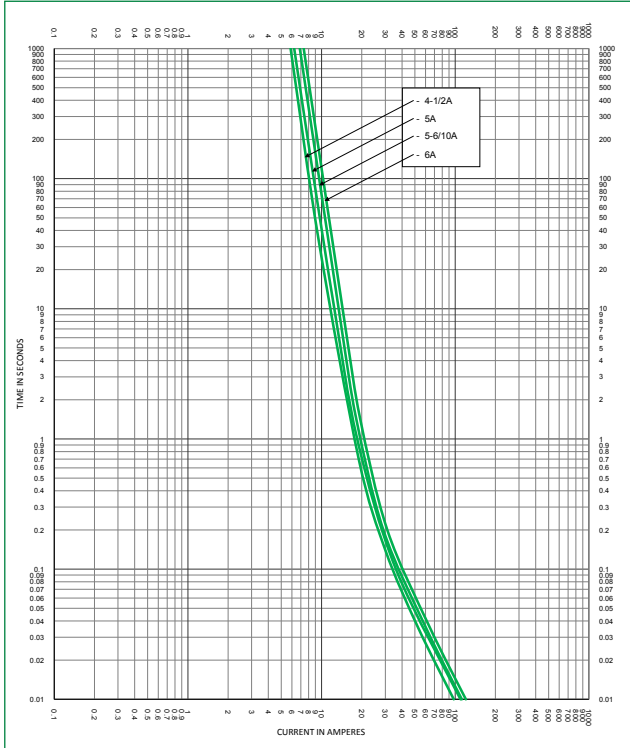
Time Current Curves



Class CC Fuses

KLDR Series

Time Current Curves



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- A. System Overview
- B1. Cable Ties
- B2. Cable Accessories
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UL LISTED Two-Hole, Single Barrel Lug

For Use with Stranded Aluminum or Copper Code Conductors

Type LAMB

- Made from high strength, extruded aluminum alloy to provide premium electrical and mechanical performance
- Tin-plated to inhibit corrosion
- Compact design saves space
- Wide wire range-taking capability minimizes inventory requirements
- Inspection window to visually assure full conductor insertion
- Plated steel or aluminum set screw provides high strength, durable electrical contact between conductor and connector
- LAMLB provided with dual set screws for premium clamping of conductor to connector for heavy duty applications
- UL Listed and CSA Certified for use up to 600 V and UL temperature rated 90°C
- Available with NEMA hole sizes and spacing

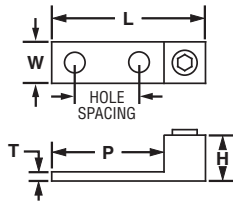


Figure 1

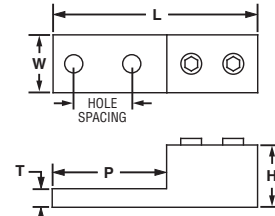


Figure 2

Part Number	Figure No.	Conductor Size Range	Stud Hole Size (In.)	Stud Hole Spacing (In.)	Hex Key Size (In.)	Figure Dimensions (In.)					Std. Pkg. Qty.
						L	W	H	T	P	
◆ LAMB350-12-6Y	1	#6 AWG – 350 kcmil	1/2	1.75	5/16	4.19	1.13	1.28	0.28	3.05	6
◆ LAMB600-12-3Y	1	#2 AWG – 600 kcmil	1/2	1.75	1/2	4.69	1.60	1.57	0.44	3.31	3
◆ LAMLB1000-12-3*	2	500 – 1000 kcmil	1/2	1.75	1/2	6.19	1.63	1.88	0.56	3.44	3

The use of Panduit oxide inhibiting joint compound (CMP-100) is recommended for pad to pad and conductor connections. See page D2.155.

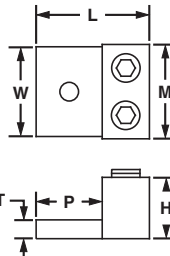
*UL Listed and CSA Certified.
uNEMA hole sizes and spacing.

UL LISTED One-Hole, Two-Barrel Lug

For Use with Stranded Aluminum or Copper Code Conductors

Type LAM2A

- Dual barrel provides termination of two conductors
- Made from high strength, extruded aluminum alloy to provide premium electrical and mechanical performance
- Tin-plated to inhibit corrosion
- Wide wire range-taking capability minimizes inventory requirements
- Inspection window to visually assure full conductor insertion
- Plated steel or aluminum set screw provides high strength, durable electrical contact between conductor and connector
- UL Listed and CSA Certified for use up to 600 V and UL temperature rated 90°C
- Available with NEMA hole sizes and spacing



Part Number	Conductor Size Range	Stud Hole Size (In.)	Hex Key Size (In.)	Figure Dimensions (In.)						Std. Pkg. Qty.
				L	W	H	T	P	M	
LAM2A10-14-6Y	#14 AWG – 1/0 AWG	1/4	**	1.47	1.13	0.78	0.19	0.85	1.13	6
LAM2A20-14-6Y	#14 AWG – 2/0 AWG	1/4	3/16	1.47	1.20	0.78	0.19	0.85	1.20	6
LAM2A250-35-6Y	#6 AWG – 250 kcmil	3/8	3/8	2.56	1.50	1.19	0.25	1.56	1.64	6
LAM2A350-12-6Y	#6 AWG – 350 kcmil	1/2	5/16	2.87	1.73	1.25	0.25	1.74	1.91	6
LAM2A600-12-6Y*	#2 AWG – 600 kcmil	1/2	3/8	3.19	2.00	1.56	0.44	1.81	2.38	6
LAM2A1000-58-6Y*	500 kcmil – 1000 kcmil	5/8	3/8	3.50	3.50	1.94	0.50	1.88	3.50	6

The use of Panduit oxide inhibiting joint compound (CMP-100) is recommended for pad to pad and conductor connections. See page D2.155.

*UL Listed and CSA Certified.

**Uses slotted head set screw.

New TWND Series – Full Size NEMA Pushbuttons



New! TWND Series: Heavy duty switches built to last

Key features:

- Variety of button sizes up to 2 9/16" (65mm)
- Rugged construction includes chrome plated zinc locking ring die cast zinc mounting thread
- LED illumination
- Transformer or full voltage
- Slow make, double break wiping contacts
- Modular construction for maximum flexibility
- Available assembled or as sub-components
- UL Type 4X, 13 and IP65 watertight/oiltight panel

The rugged series of TWND switches offers both variety and durability in an attractive design.

With button sizes up to 2 9/16" (65mm), chrome plated zinc locking rings, die cast zinc mounting threads, steel anti-rotation rings, and self cleaning contacts, the TWNDs are here to stay.

The TWND series also offers LED illumination in full voltage and transformer models.

Regardless of your switching needs, the NEW TWND series provides the kind of long lasting, industrial strength quality you've come to expect from IDEC.



Switches & Pilot Devices

Signaling Lights

Relays & Sockets

Timers

Contactors


Terminal Blocks

Circuit Breakers

Specifications

Conforming to Standards	EN60947-5-1, UL508, CSA C22-2 No.14
Approvals	CSA: pushbuttons and selector switches: A600 pilot lights and illuminated pushbuttons, direct supply pilot lights and illuminated pushbuttons with integral transformer (100/110, 115, 120, 200/220, 230, 240, 380, 400/440, 480V) UL: pushbuttons and selector switches: A600 pilot lights and illuminated pushbuttons, direct supply pilot lights and illuminated pushbuttons with integral transformer (100/110, 115, 120, 200/220, 230, 240, 380, 400/440, 480V) TÜV: pushbuttons and selector switches: A600 pilot lights and illuminated pushbuttons, direct supply pilot lights and illuminated pushbuttons with integral transformer (100/110, 115, 120, 200/220, 230, 240, 380, 400/440, 480V)
Operating Temperature	Operation: -25 to +50°C (illuminated versions) -25 ~ +70C non-illuminated Storage: -40 to +80°C (without freezing) C-> °C
Vibration Resistance	5 to 55Hz, 98m/sec ² (10g) conforming to IEC60068-2-6
Shock Resistance	980m/sec ² (100g) conforming to IEC60068-2-27
Electric Shock Protection	Class 2 conforming to IEC60664-1
Degree of Protection	IP65 (from front of the panel) (conforming to IEC60529) UL Type 1, 2, 3, 3R, 3S, 4, 4X, 5, 12, 13 (conforming to NEMA ICS6-110)
Mechanical Life	Momentary pushbuttons: 5,000,000 (1800 operations per hour) All other switches: 500,000
Pollution Degree (conforming to IEC60947-1)	3

Mechanical-Electrical Specifications

Rated Operational Characteristics	AC-15: A600					
Rated Insulation Voltage	600V					
Rated Impulse Withstanding Voltage øDielectric Strength	Between live and dead metal parts 2.5kV AC, 1 minute					
Rated Thermal Current	10 Amp					
Minimum Switching Capacity	5 mA at 3V AC/DC (applicable range may vary with operating conditions and load types)					
Contact Operation	Slow break NC or NO					
Operating Force	Flush and extended pushbuttons—with 1NO or 1NC contact: 6.2±2N (momentary), 9.0±1.5N Additional contacts—1NO or 1NC: +3.0N					
Recommended Terminal Torque	Unit	Wire	Number of Wires	Recommended Tightening Torque (Nm)	Terminal Screw	
	HW-U Contact Block	Crimping Terminal	2	1.0 to 1.3	M3.5	
			Solid Wire	ø0.5 to 1.6 mm (AWG14 to 22)		2
		Stranded Wire	ø1.7 to 2.0 mm (AWG12)	1		1.2 to 1.3
			0.3 to 2.0 mm ² (AWG14 to 22)	2		1.0 to 1.3
	Illuminated Unit (*1)	Crimping Terminal	2	1.0 to 1.3	M3.5	
			Solid Wire	ø0.5 to 1.6 mm (AWG14 to 22)		2
		Stranded Wire	0.3 to 2.0 mm (AWG14 to 22)	2		1.0 to 1.3
2.1 to 3.5 mm ² (AWG12)			1	1.2 to 1.3		
Applicable Wire Size	Pilot Light	Crimping Terminal		0.6 to 1.0 (M3.0)		
		Solid Wire	ø0.5 to 1.6 mm (AWG14 to 22)	2	1.0 to 1.3 (M3.5)	
		Stranded Wire	ø0.3 to 2.0 mm (AWG14 to 22)			
 1. * refers to the lamp terminals of the illuminated push buttons and selector switches.						
Contact Resistance	Initial contact resistance of 50mΩ or less					
Contact Gap	4mm (NO and NC) 2mm (NO-EM and NC-LB)					
LED Ratings	LEDs: 6V: 8mA, 12V: 11mA, 24V: 11mA, 120V: 8.8mA, 240V: 8.6mA					
Contact Material	Silver					

Contact Ratings

Contact Ratings by Utilization Category IEC 60947-5-1	AC-15 (A600)							
	DC-13 (P600)							
Contact Ratings by Utilization Category								
Operational Voltage		24V	48V	50V	110V	220V	440V	
Operation Current	AC 50/60 Hz	AC-12 Control of resistive loads & solid state loads	10A	—	10A	10A	6A	2A
		AC-15 Control of electromagnetic loads (> 72VA)	10A	—	7A	5A	3A	1A
	DC	DC-12 Control of resistive loads & solid state loads	10A	5A	—	2.2A	1.1A	—
		DC-13 Control of electromagnets	5A	2A	—	1.1A	0.6A	—

Switches & Pilot Devices

Signaling Lights

Relays & Sockets

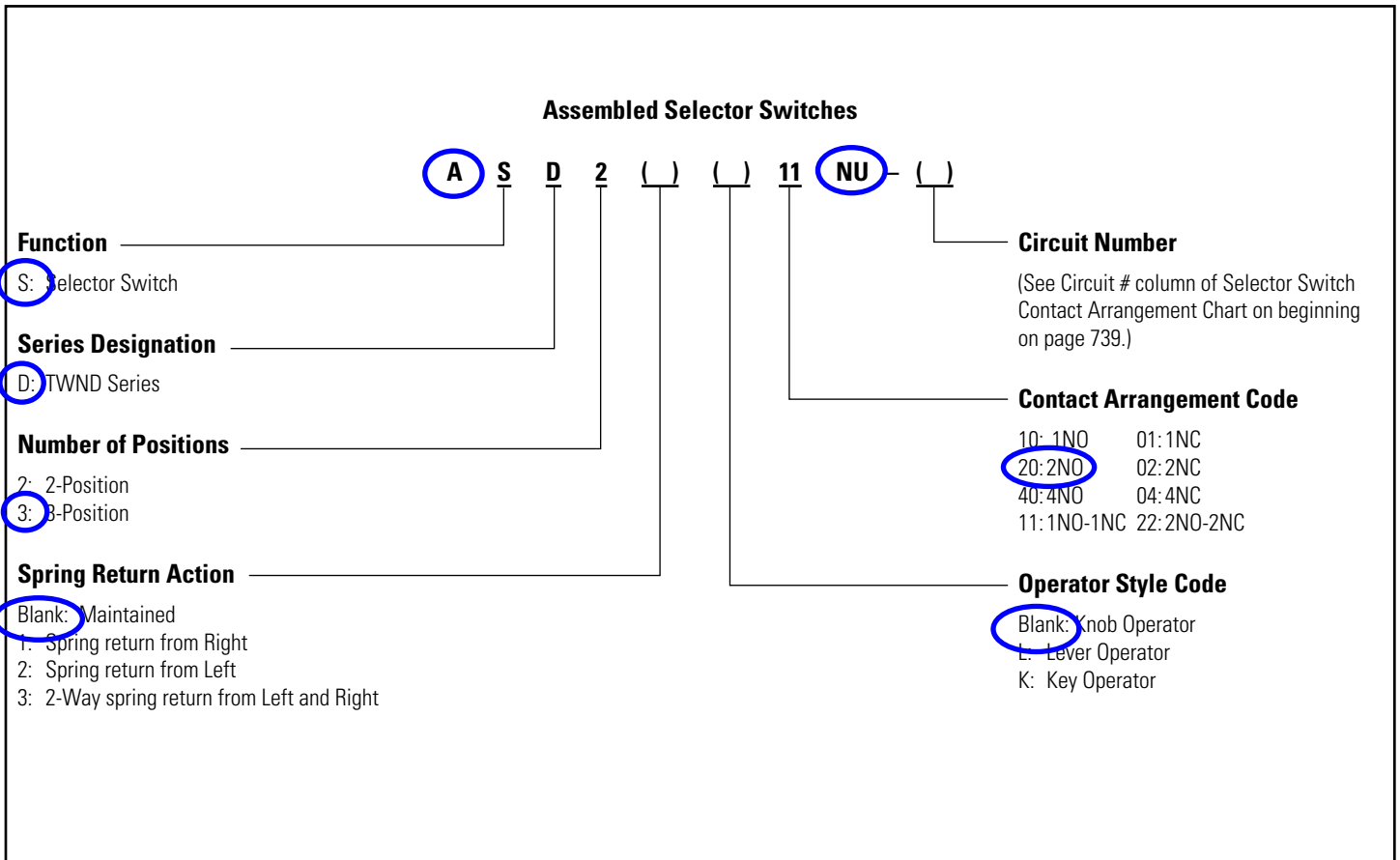
Timers

Contactors

Terminal Blocks

Circuit Breakers

Non-Illuminated Selector Switches (Assembled)



1. Use only when interpreting part numbers. Do not use for developing part numbers.
2. Custom key removal codes available. Please contact IDEC for details.

Non-Illuminated Selector Switches (Assembled)

Non-Illuminated 2-Position Selector Switches

Style					Part Number		
Contact	Mounting	Operator Position			Maintained	Spring Return from Right	Spring Return from Left
		L	R				
1NO	1 2	0 0	X 0	Knob Lever Key	ASD210NU ASD210NU ASD210NU	ASD2110NU ASD2110NU ASD2110NU	ASD2210NU ASD2210NU ASD2210NU
1NC	1 2	X 0	0 0	Knob Lever Key	ASD201NU ASD201NU ASD201NU	ASD2101NU ASD2101NU ASD2101NU	ASD2201NU ASD2201NU ASD2201NU
1NO 1NC	1 2	0 X	X 0	Knob Lever Key	ASD211NU ASD211NU ASD211NU	ASD2111NU ASD2111NU ASD2111NU	ASD2211NU ASD2211NU ASD2211NU
2NO	1 2	0 0	X X	Knob Lever Key	ASD220NU ASD220NU ASD220NU	ASD2120NU ASD2120NU ASD2120NU	ASD2220NU ASD2220NU ASD2220NU
2NC	1 2	X X	0 0	Knob Lever Key	ASD202NU ASD202NU ASD202NU	ASD2102NU ASD2102NU ASD2102NU	ASD2202NU ASD2202NU ASD2202NU
2NO 2NC	1 2 3 4	0 X 0 X	X 0 X 0	Knob Lever Key	ASD222NU ASD222NU ASD222NU	ASD2122NU ASD2122NU ASD2122NU	ASD2222NU ASD2222NU ASD2222NU
2NO 2NC	1 2 3 4	0 0 X X	X X 0 0	Knob Lever Key	ASD222NU-111 ASD222NU-111 ASD222NU-111	ASD2122NU-111 ASD2122NU-111 ASD2122NU-111	ASD2222NU-111 ASD2222NU-111 ASD2222NU-111

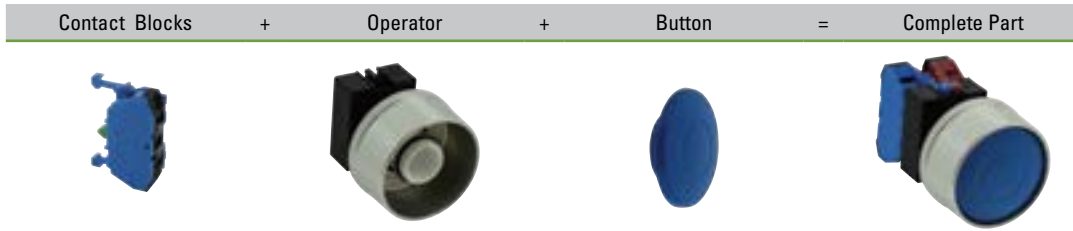


- The truth table indicates the operating position of contact block when the operator is switched to that position.
X = On (closed contacts) 0 = Off (open contacts)
X-X = Overlapping Contacts: Remain on (closed contacts) when switch is moved between these two positions.
- All knob and lever selector switches come in black. Other colors are available by ordering the knob or lever separately.
- Custom contact arrangements available, see page 739.

Non-Illuminated 3-Position Selector Switches

Style						Part Number			
Contact	Mounting	Operator Position				Maintained	Spring Return from Right	Spring Return from Left	Spring Return Two-Way
		L	C	R					
2NO	1 2	X 0	0 0	0 X	ASD320NU ASD320NU ASD320NU	ASD3120NU ASD3120NU ASD3120NU	ASD3220NU ASD3220NU ASD3220NU	ASD3320NU ASD3320NU ASD3320NU	
2NC	1 2	0 X	X X	X 0	ASD302NU ASD302NU ASD302NU	ASD3102NU ASD3102NU ASD3102NU	ASD3202NU ASD3202NU ASD3202NU	ASD3302NU ASD3302NU ASD3302NU	
2NO 2NC	1 2 3 4	X 0 0 X	0 0 X X	0 X X 0	ASD322NU ASD322NU ASD322NU	ASD3122NU ASD3122NU ASD3122NU	ASD3222NU ASD3222NU ASD3222NU	ASD3322NU ASD3322NU ASD3322NU	
2NO 2NC	1 2 3 4	X X 0 0	0 X X 0	X 0 0 X	ASD322NU-309 ASD322NU-309 ASD322NU-309	ASD3122NU-309 ASD3122NU-309 ASD3122NU-309	ASD3222NU-309 ASD3222NU-309 ASD3222NU-309	ASD3322NU-309 ASD3322NU-309 ASD3322NU-309	
2NO 2NC	1 2 3 4	0 0 0 0	X X X 0	0 X 0 X	ASD322NU-310 ASD322NU-310 ASD322NU-310	ASD3122NU-310 ASD3122NU-310 ASD3122NU-310	ASD3222NU-310 ASD3222NU-310 ASD3222NU-310	ASD3322NU-310 ASD3322NU-310 ASD3322NU-310	
4NO	1 2 3 4	X 0 X 0	0 0 0 0	0 X 0 X	ASD340NU ASD340NU ASD340NU	ASD3140NU ASD3140NU ASD3140NU	ASD3240NU ASD3240NU ASD3240NU	ASD3340NU ASD3340NU ASD3340NU	
4NC	1 2 3 4	0 X 0 X	X X X X	X 0 X 0	ASD304NU ASD304NU ASD304NU	ASD3104NU ASD3104NU ASD3104NU	ASD3204NU ASD3204NU ASD3204NU	ASD3304NU ASD3304NU ASD3304NU	

Non-Illuminated Pushbuttons (Sub-Assembled)



Operators

Style	Part Number	
	Momentary	Maintained
Round Flush/Extended 	ABW-100	AOW-100
Round with Full Shroud/Recessed 	ABFW-200	AOFW-200
Ø 40mm, Ø 29mm Mushroom Head 	ABW-300	AOW-300
Ø 40mm Mushroom Head with Full Shroud 	ABGW-400	AOGW-400
Square Flush/Extended 	ABQW-100	AQQW-100
Keylock Push On/Off 	—	AKW-200

Buttons

Style	Part Number
Round Flush 	ABW1B-①
Round Extended 	ABW2B-①
Ø 29mm Mushroom 	ABW3B-①
Ø 40mm Mushroom 	ABW4B-①
Square Flush 	ABQW1B-①
Square Extended 	ABQW2B-①



In place of ① specify the button color code from table

Contact Blocks

Style	Contacts	1NO	1NC
	Finger-Safe Spring-Up Terminal	HW-U10-F	HW-U01-F
		HW-U10R-F (early make)	HW-U01R-F (late break)
	Dummy Block	HW-DB	

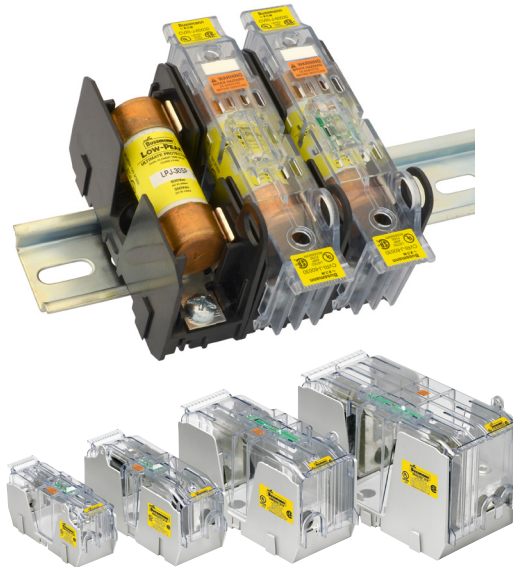


- Dummy blocks (no contacts) are used with an odd number of contact blocks.
- Use of early and late break contacts creates a make before break function

① Button Color Codes

Color	Code
Black	B
Green	G
Red	R
Blue	S
Yellow	Y
White	W

Class J modular ferrule and knifeblade fuse blocks



Knifeblade fuse blocks from 100 to 600 amps feature phase barriers between poles for additional safety with up to four mounting holes per pole increase installation flexibility. All knifeblade blocks meet UL creep and clearance requirements for Industrial Power Circuits (UL 508 and UL 845).

Additionally, the 200 to 600 amp blocks meet the higher UL creep and clearance requirements for Power Distribution Standards (UL 98, UL 67, UL 489, UL 891 and UL 869A)

All blocks have optional IP20 finger-safe high clarity, see-through covers for inspecting wire terminations or thermography measurements without removal. All covers enhance safety by featuring probe holes for easier, safer testing and a lockout/tagout capability. These covers also have optional open fuse indication to speed troubleshooting.

Easy circuit identification is available for 30 and 60 amp blocks and covers with universal marker labels.

Catalog symbol:

- JM60_

Description:

Bussmann® series Class J modular fuse blocks increase versatility, reduce labor and enhance safety for any panel or electrical system design. Available for the full Class J fuse amp range.

These fuse blocks feature a standard fuse clip reinforcing spring for enhanced electrical contact between the block and fuse. All blocks are available as single-pole versions that snap together for the required number of poles, or as factory configured 2-, and 3-pole versions to meet stocking requirements.

The modular design permits reducing inventory, assembly time and labor with tool-less assembly of multiple poles at point of use.

Ferrule fuse blocks up to 60 amps save panel space with the smallest width dimension on the market and feature DIN-Rail and panel mount versatility so that one product can be used for multiple applications with lower inventory cost.

Specifications:

Ratings

- Volts 600 V
- Amps up to 600 A
- Withstand 200 kA RMS Sym

Agency information

- Blocks:
 - UL® Listed E14853 — IZLT and IZLT7
 - CSA® Certified 47235-6225-01
 - CE
 - RoHS Compliant
 - REACH declaration available upon request
- Covers:
 - UL Listed E58836 - JDVS
 - CSA Certified 47235-6225-01 (30 and 60A)
 - RoHS Compliant
 - REACH declaration available upon request



Powering Business Worldwide

Poles

- 1-, 2-, 3-pole units factory assembled
- Single-pole units snap together to create desired number of poles

Flammability ratings

- Blocks: UL 94V0, self-extinguishing
- Covers: UL 94HB, self-extinguishing

Operating and storage temperature range

- Blocks -40°C to +120°C
- Covers;
 - Non-Indicating -40°C to +120°C
 - Indicating -20°C to +90°C*

* Indication requires minimum 90V and closed circuit to illuminate.

Materials

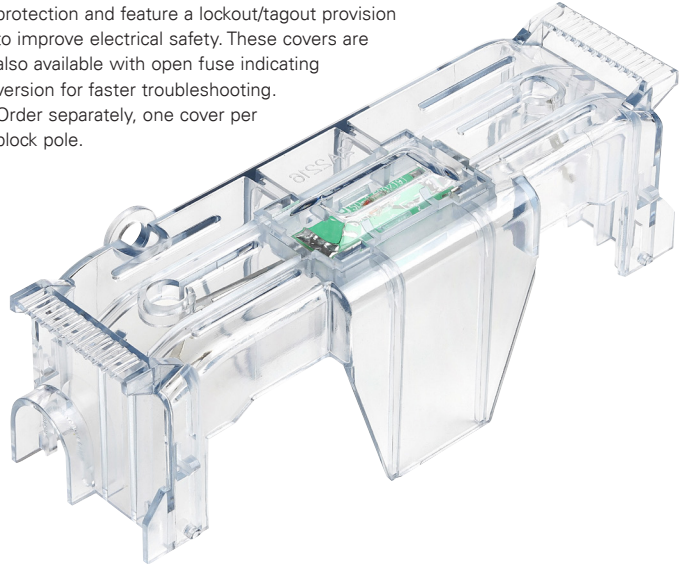
- Base: Thermoplastic
- Terminals:
 - Tin-plated copper brass (30 and 60A)
 - Tin-plated aluminum (box lug)
- Covers: Thermoplastic

Conductors

- See catalog numbers for details and torque specifications.

Class J modular ferrule and knifeblade fuse blocks

Optional see-through covers provide IP20 finger-safe protection and feature a lockout/tagout provision to improve electrical safety. These covers are also available with open fuse indicating version for faster troubleshooting. Order separately, one cover per block pole.



Standard dual lugs on 600A blocks and optional dual lugs on 400A blocks for easier wiring using two, smaller conductors.

Modular Class J ferrule and knifeblade fuse blocks



30 and 60 amp ferrule fuse blocks have DIN-rail and panel mounting capability, the modular designs allows blocks to snap together for the desired number of poles. They accept optional snap-on covers for IP20 finger-safe protection and feature a lockout/tagout to improve electrical safety.



On blocks rated from 100 to 600A, the optional covers can be completely removed for servicing or simply hinged open.



100 to 600 amp knifeblade fuse blocks are panel mount with multiple holes for installation flexibility and the modular design allows blocks to snap together for the desired number of poles. They accept optional snap-on covers for IP20 finger-safe protection and feature a lockout/tagout to improve electrical safety.

Table 1: 30 and 60 amp block catalog numbers

Fuse amp range	Poles	Terminal type				Optional covers*	
		Box lug/slot screw	Box lug/hex screw	#10-32 Phil-slot screw	Pressure plate	Indicating**	Non-indicating
up to 30	1	JM60030-1CR	JM60030-1CHR	JM60030-1SR	JM60030-1PR	CVRI-J-60030	CVR-J-60030
	2	JM60030-2CR	JM60030-2CHR	JM60030-2SR	JM60030-2PR		
	3	JM60030-3CR	JM60030-3CHR	JM60030-3SR	JM60030-3PR		
35 to 60	1	JM60060-1CR	JM60060-1CHR	—	—	CVRI-J-60060	CVR-J-60060
	2	JM60060-2CR	JM60060-2CHR				
	3	JM60060-3CR	JM60060-3CHR				

* Covers sold separately, one cover per pole.
 ** Open fuse indication requires 90 volts minimum and closed circuit to operate.

Table 2: 30 and 60 amp block terminals and conductors

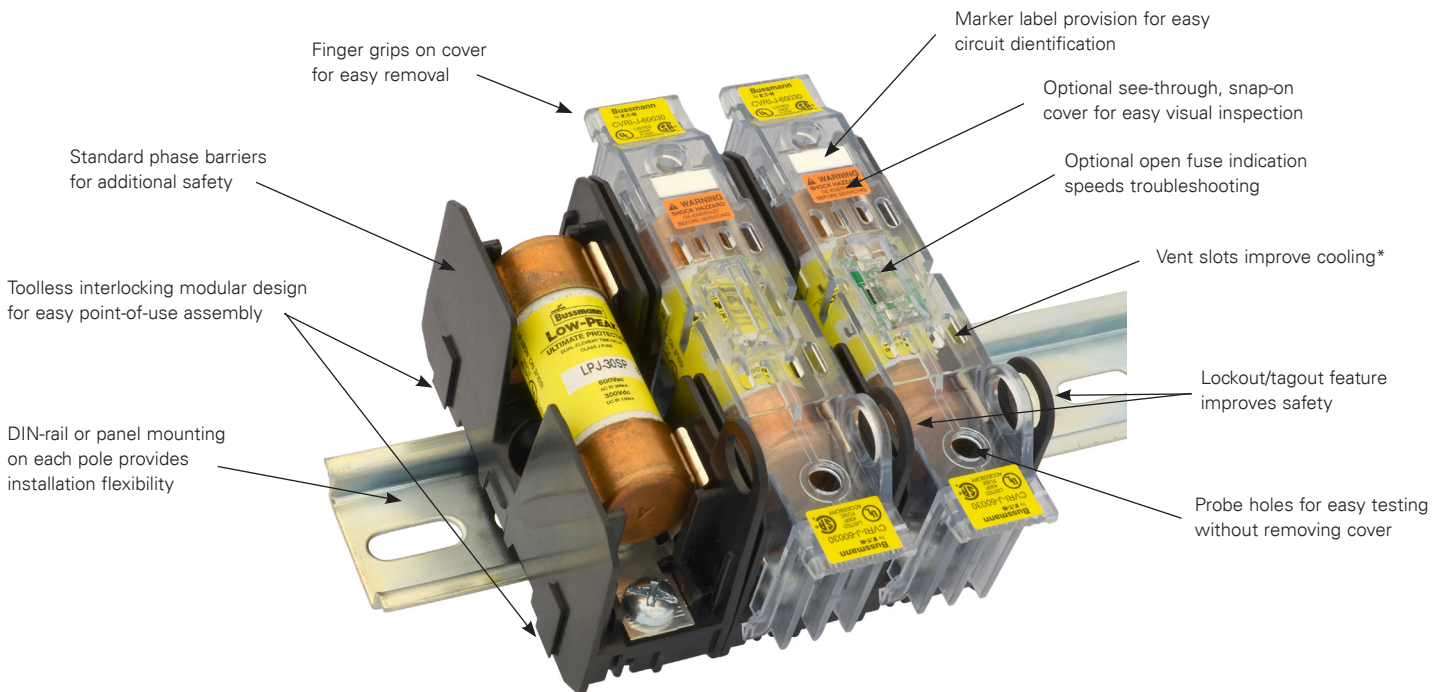
Terminal type	AWG type/range	AWG	Torque N·m (lb-in)
Box lug	75°C Cu 2-14, AL 2-8	2-3	5.6 (50)
		4-6	5.1 (45)
		8	4.5 (40)
		10-14	4.0 (35)
#10-32 Phil-slot screw	75/90°C Cu 10-18	10-18	2.3 (20)
Pressure plate			

Recommended Bussmann series fuses:

Description	Amps	Data sheet no.
Ultimate protection Low-Peak LPJ time-delay fuses	up to 60	1006
Advanced protection Limitron JKS fast-acting fuses	up to 60	1026
High speed DFJ drive fuse	up to 60	1048

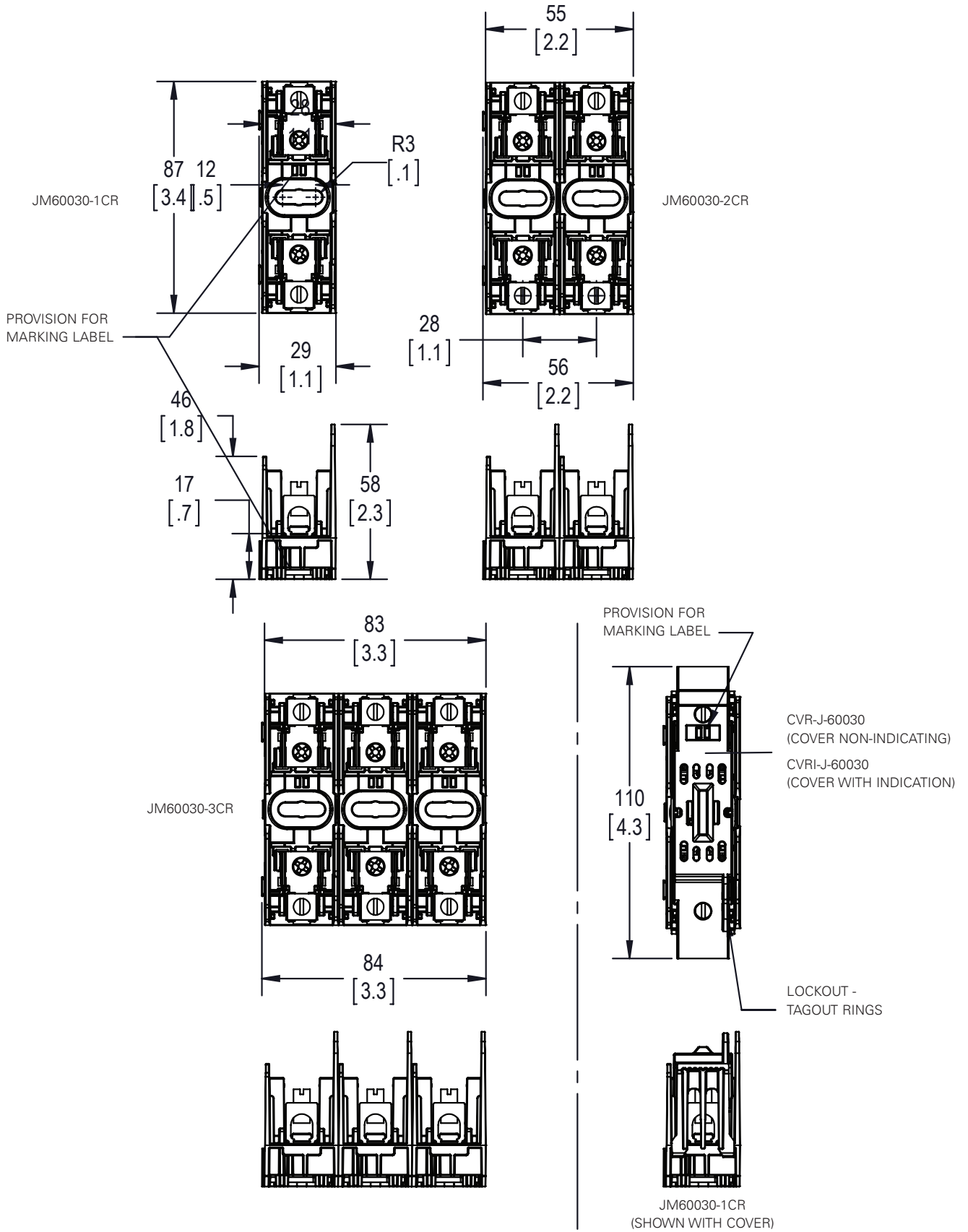
Recommended accessories for 30 and 60 amp blocks:

Description	Catalog no.
DIN-Rail end stops	BRKT-ND
	BRKT-NDSCREW2
Marker labels	TM26CB

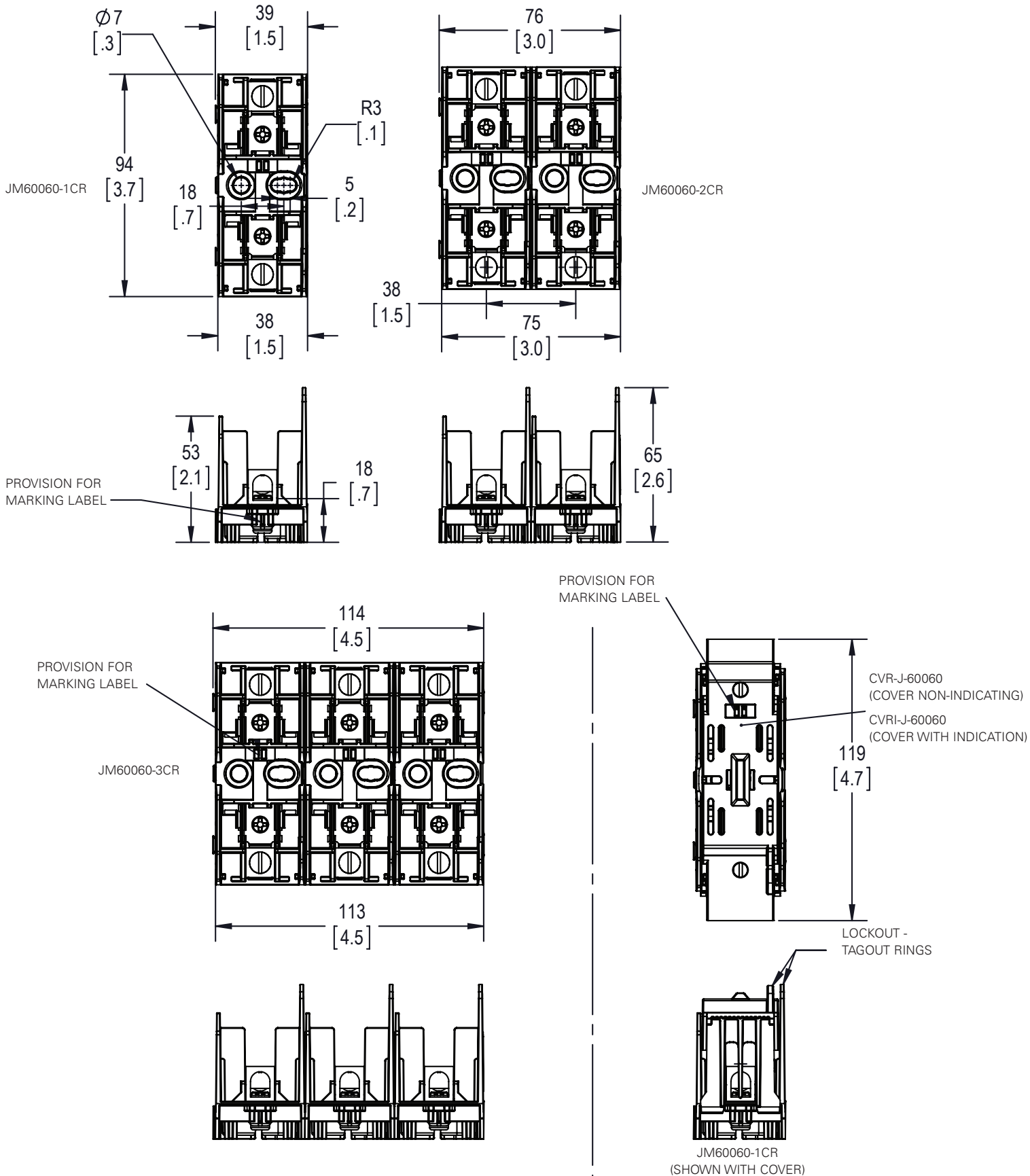


*No fuse derating necessary.

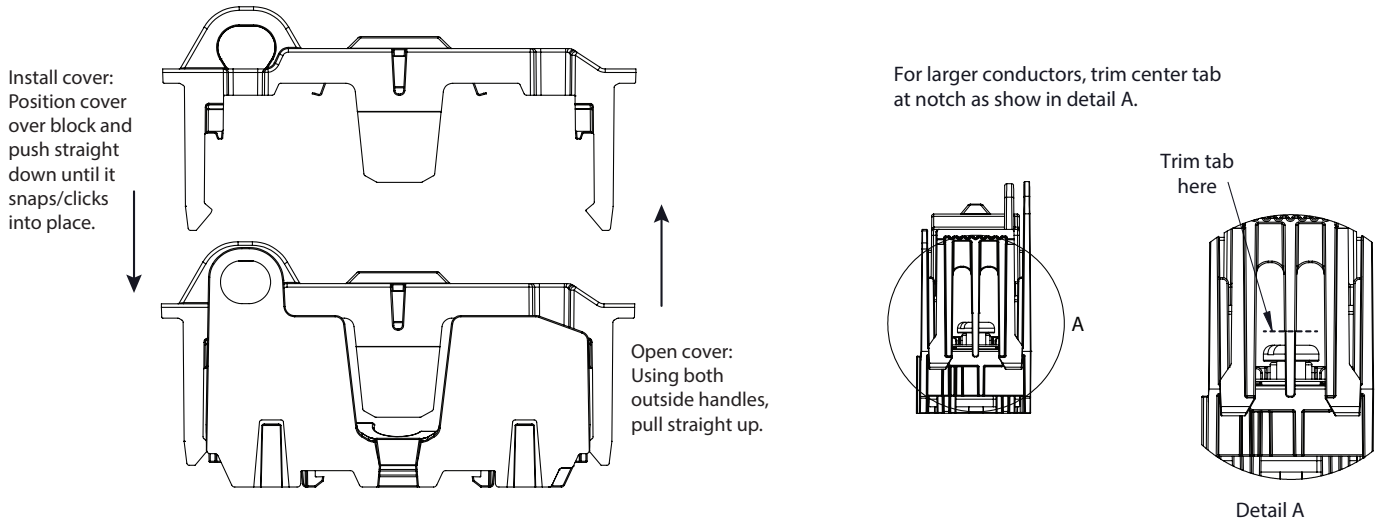
Dimensions; 30A Class J block - in (mm)



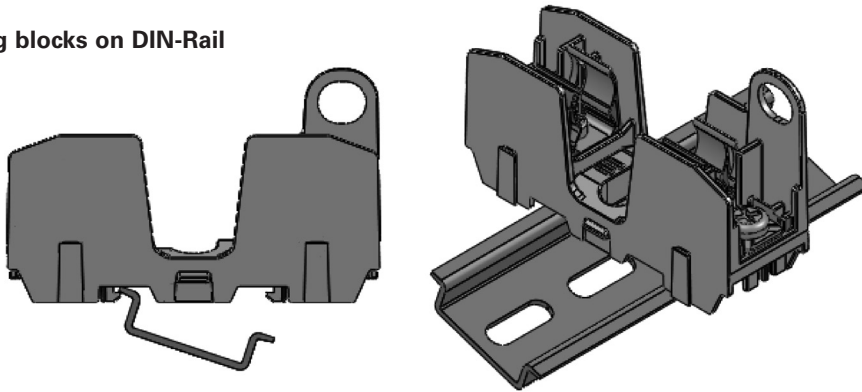
Dimensions; 60A Class J block - in (mm)



Installing /removing covers



Installing blocks on DIN-Rail



Place one edge of DIN-Rail in fuse block base, then rotate block down until it clicks into place.

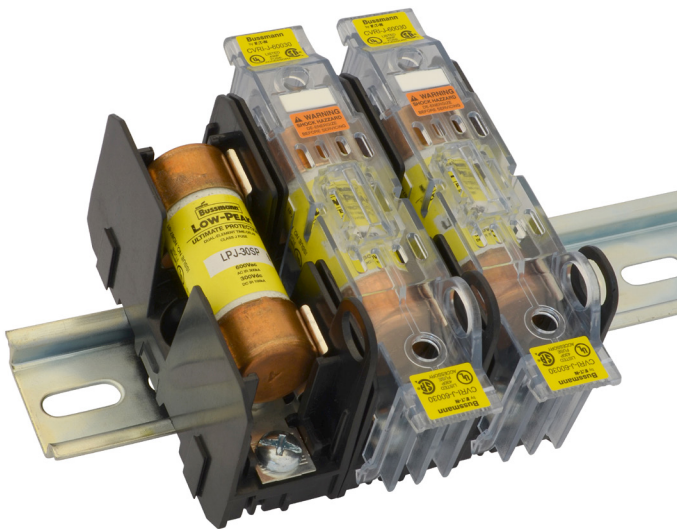


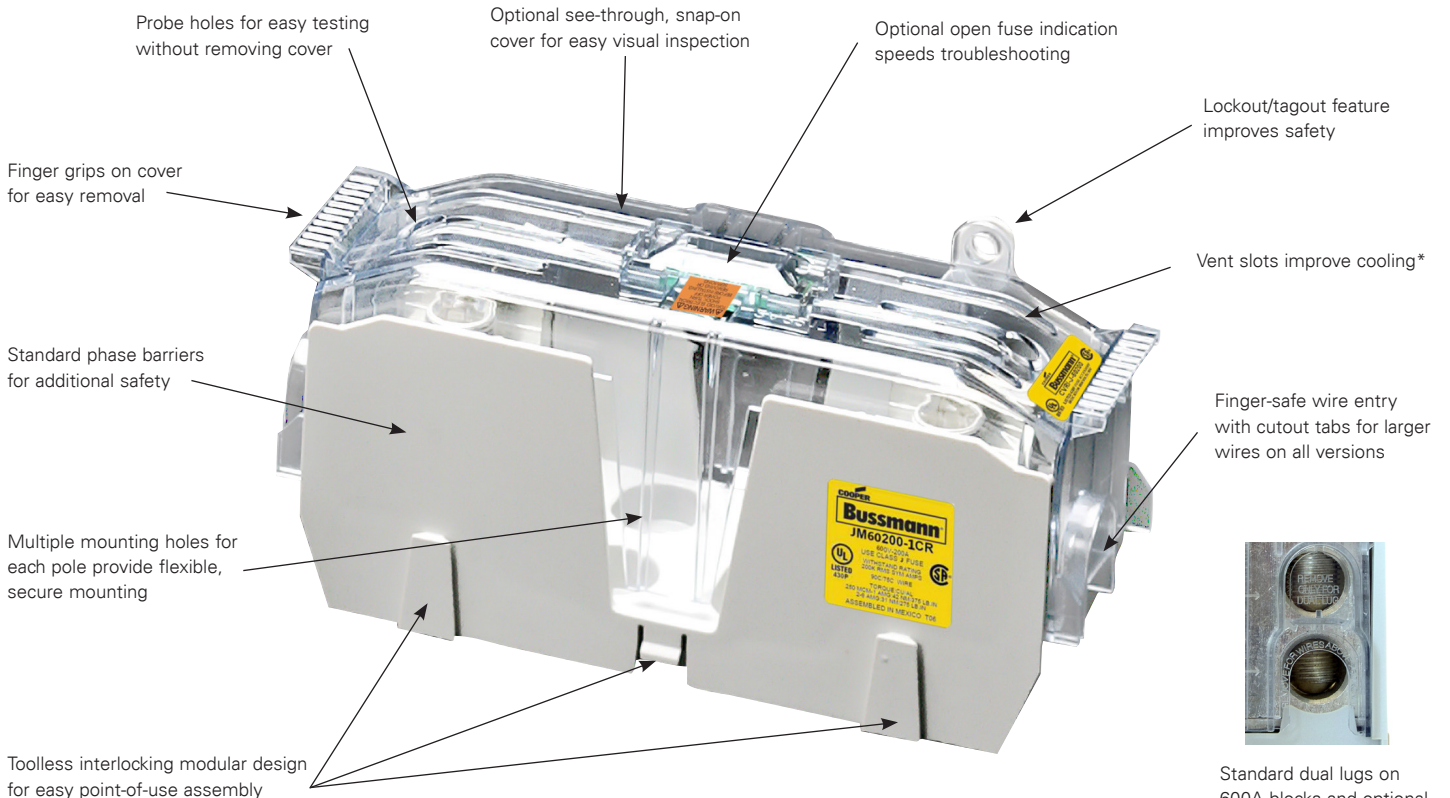
Table 6: Class J 100 to 600 amp knifeblade blocks and covers

Fuse amp range	Poles	Catalog nos.	Covers*		Conductors***		
			Non-indicating	Indicating**	Solid and stranded	Fine stranded	Torque N·m (lb·in)
70-100	1	JM60100-1CR			—	Cu 1-3 AWG	6.2 (55)
	2	JM60100-2CR	CVR-J-60100-M	CVR-J-60100-M	1/0-3 AWG; (2) Cu 4-6 AWG	Cu 4-6 AWG	5.6 (50)
					8 AWG; (2) Cu 10-14 AWG	—	4.5 (40)
3	JM60100-3CR			Cu 10-14 AWG; Al 10-12 AWG	—	4.0 (35)	
110-200	1	JM60200-1CR			250kcmil-1 AWG	Cu 3/0-1 AWG	42 (375)
	2	JM60200-2CR	CVR-J-60200-M	CVR-J-60200-M	2-6 AWG; (2) Cu 2-6 AWG	Cu 2-6 AWG	31 (275)
	3	JM60200-3CR					
225-400	1	JM60400-1CR			600kcmil		57 (500)
	2	JM60400-2CR			500kcmil-4 AWG	N/A	51 (450)
	3	JM60400-3CR	CVR-J-60400-M	CVR-J-60400-M	(2) Cu 3/0 - 4 AWG		57 (500)
					(2) Al 3/0 - 4 AWG		34 (300)
	1	JM60400-1MW22			250kcmil-1 AWG	Cu 3/0-1 AWG	42.37 (375)
	2	JM60400-2MW22					
3	JM60400-3MW22			2-6 AWG; (2) Cu 2-6 AWG	Cu 2-6 AWG	31.07 (275)	
450-600	1	JM60600-1CR					
	2	JM60600-2CR	CVR-J-60600	CVRI-J-60600	2 (2) 500kcmil-4 AWG	N/A	51 (450)
	3	JM60600-3CR					

* Covers sold separately.
 ** Open fuse indication requires 90 volts minimum and closed circuit to operate.
 *** Ratings for copper and aluminum conductors except where otherwise noted.

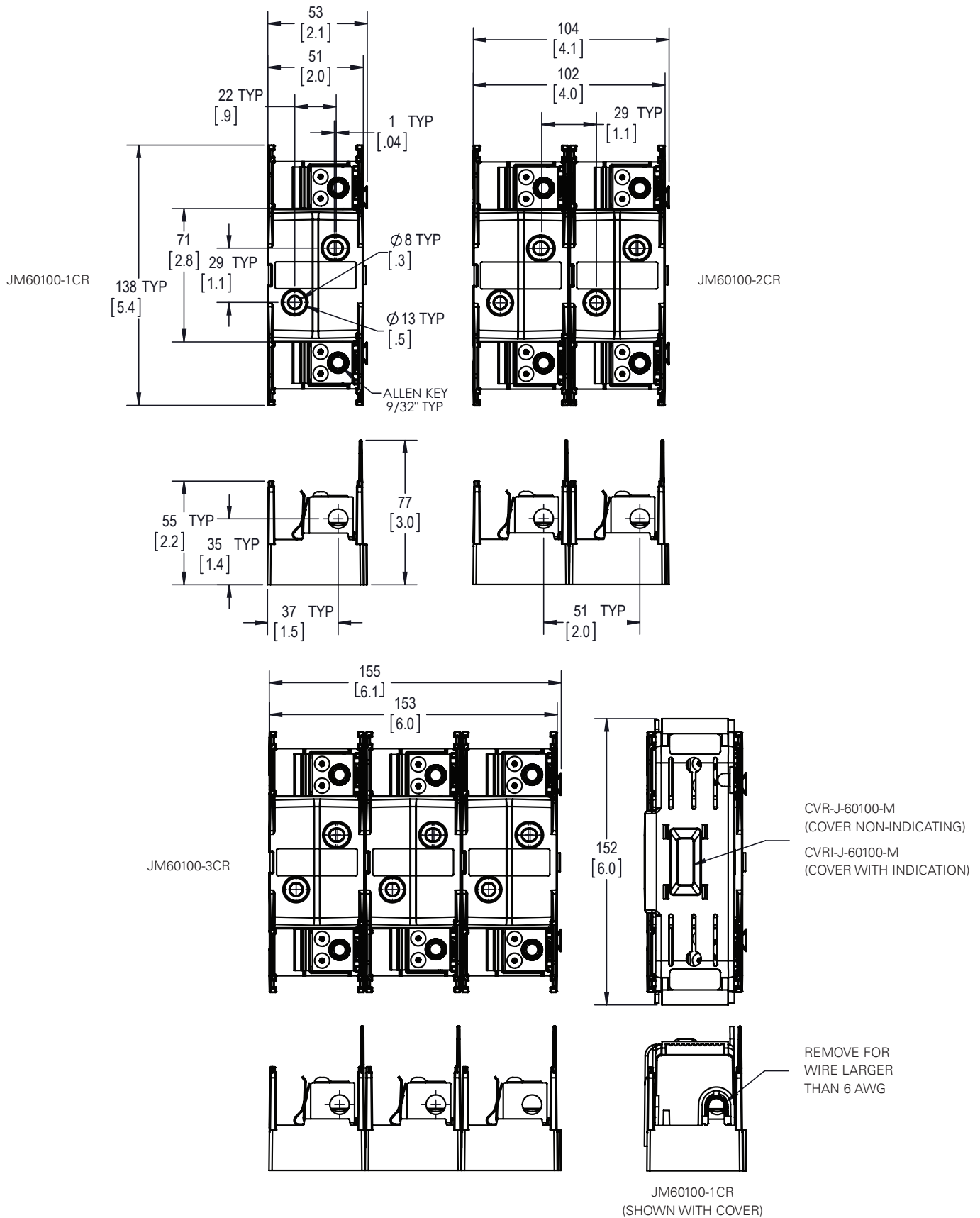
Recommended Bussmann series fuses

Description	Amps	Data sheet no.
Ultimate protection Low-Peak LPJ time-delay fuses	70 to 600	1007
Advanced protection Limitron JKS fast-acting fuses	70 to 600	1026
High speed DFJ drive fuse	70 to 600	1048

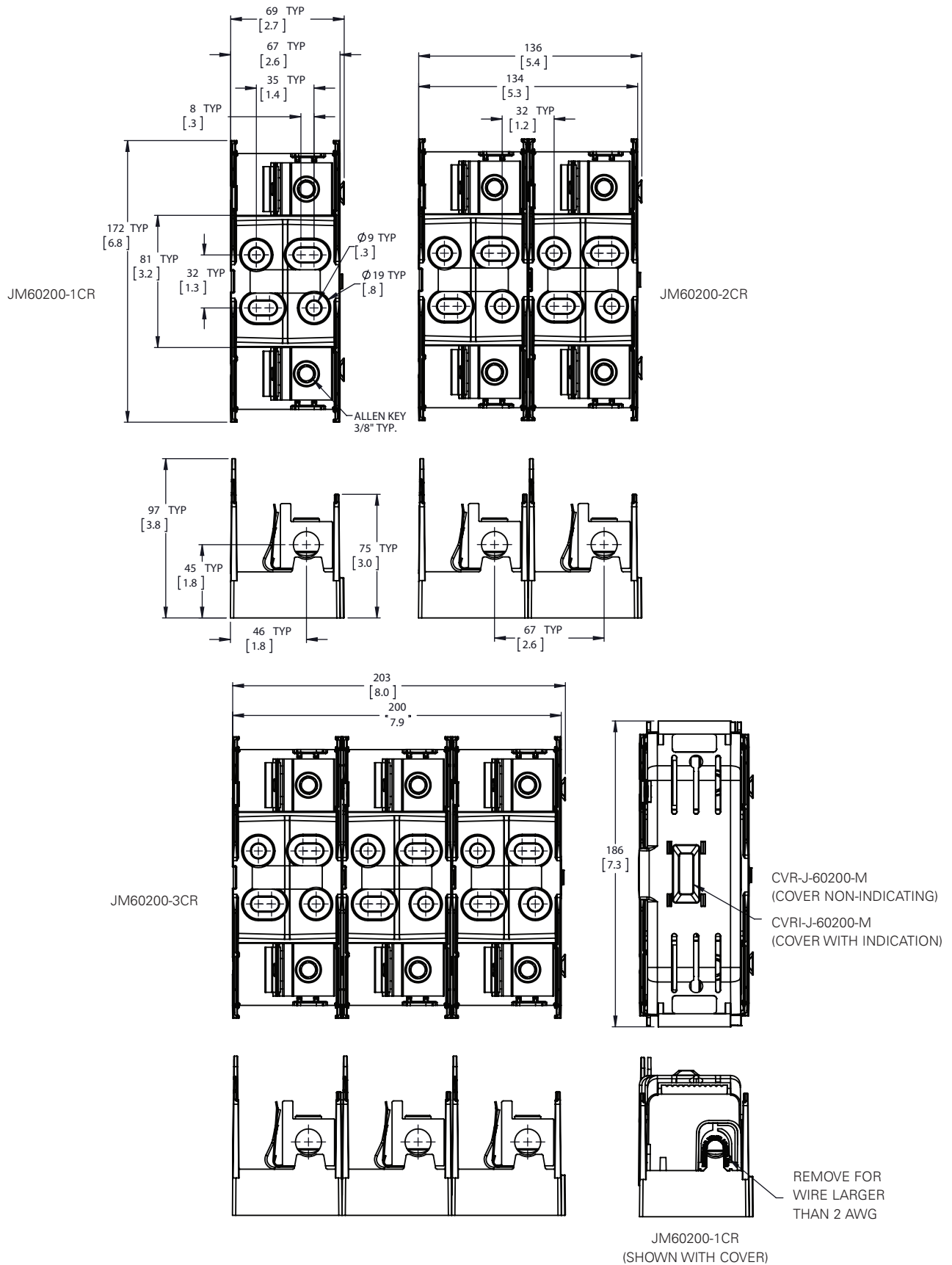


*No fuse derating necessary.

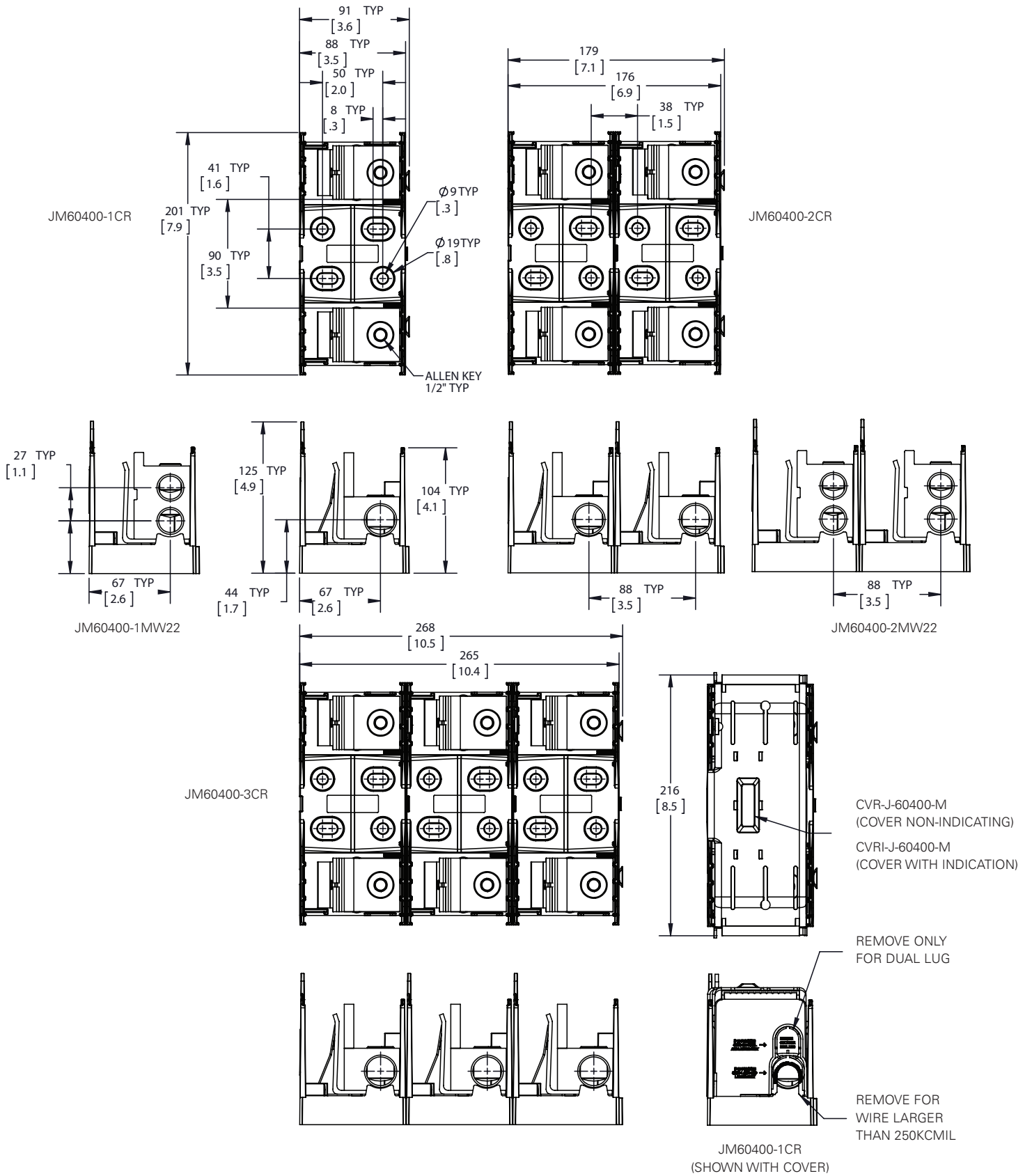
Dimensions; 100A Class J block - in (mm)



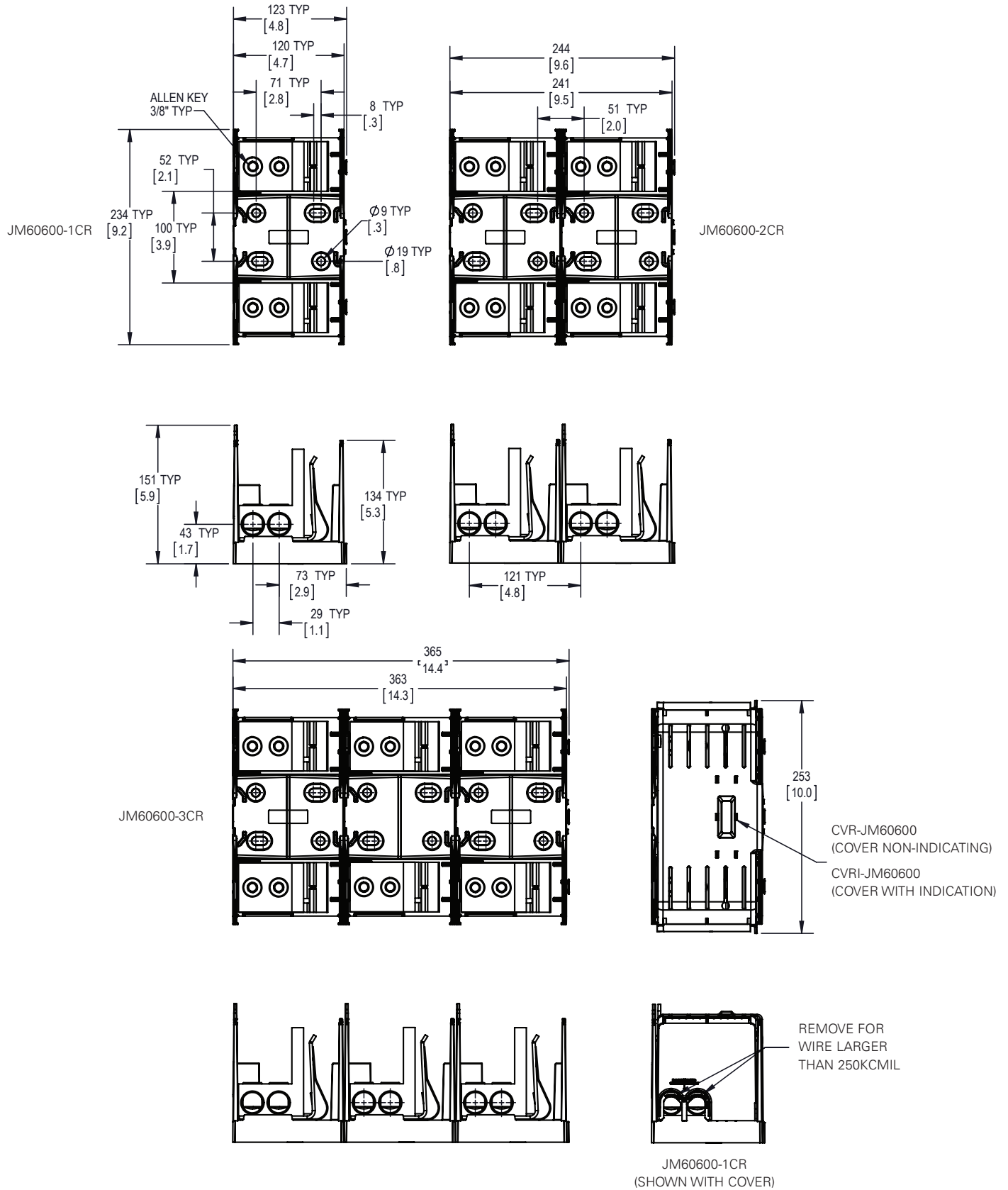
Dimensions; 200A Class J block - in (mm)



Dimensions; 400A Class J block - in (mm)



Dimensions; 600A Class J block - in (mm)



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CLASS J – JLS SERIES FUSES

Item 7

600 VAC • Fast-Acting • 1-600 A



Description

The UL Listed Class J JLS Series fuses provide space saving, fast-acting overload and short-circuit protection for vital industrial and power conversion applications. Littelfuse's JLS Series fuses offer best in class current limitation that prevents equipment damage from overcurrent faults.

Features and Benefits

- Superior performance in a space saving package
- Reliable interruption of all overcurrents with protection up to 200kA
- Extremely current limiting
- Fast-acting protection for surge-sensitive devices and components
- Reduces heating and magnetic effects due to overcurrents, extending equipment life
- Economical and readily available

Applications

- Power conversion device protection
- Variable speed drives
- Rectifiers
- Resistive loads
- Solid-state devices

Web Resources

Download TC curves, CAD drawings and other technical information: littelfuse.com/jls

Recommended Fuse Holders

LFJ60 Series
LFPSJ Series (1/10-60 A)

Specifications

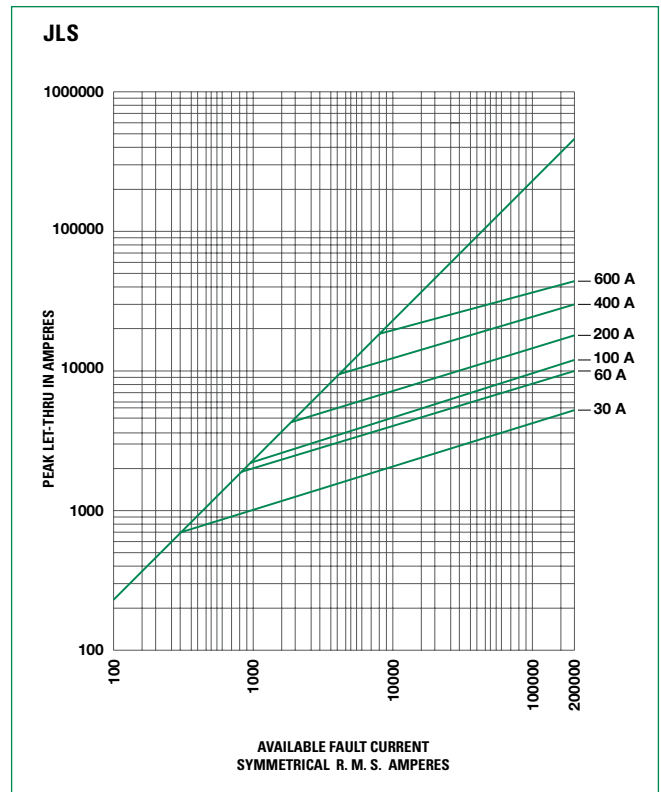
Voltage Ratings	600 VAC
Interrupting Ratings	200 kA rms symmetrical
Ampere Range	1-600 A
Approvals	Standard 248-8, Class J UL Listed (File: E81895) CSA Certified (File: LR29862) Federal Specification WF-1814 (QPL-W-F-1814)

Ordering Information

AMPERE RATINGS					
1	20	45	90	175	350
3	25	50	100	200	400
6	30	60	110	225	450
10	35	70	125	250	500
15	40	80	150	300	600

SERIES	AMPERAGE	CATALOG NUMBER	ORDERING NUMBER
JLS	110	JLS110	0JLS110.X

Peak Let-Through Curve



Dimensions

Please refer to the Class J dimensions on page 2

CLASS J – JLS SERIES FUSES

Dimensions Inches (mm)

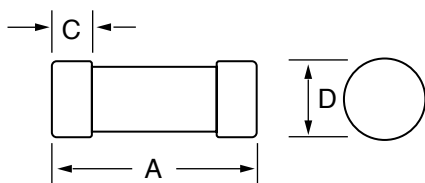


Fig. 1

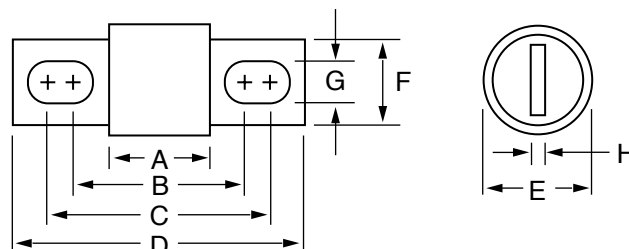


Fig. 2

Dimensions

AMPERES	REFER TO FIG. NO.	DIMENSIONS INCHES (mm)							
		A	B	C	D	E	F	G	H
1 – 30	1	2¼ (57.2)	—	½ (12.7)	13/16 (20.6)	—	—	—	—
35 – 60	1	2¾ (60.3)	—	5/8 (15.9)	1¼ (27.0)	—	—	—	—
70 – 100	2	2½ (66.7)	3 ¹¹ / ₃₂ (89.7)	3 ²³ / ₃₂ (94.5)	4 ⁵ / ₈ (117.5)	1 (25.4)	¾ (19.1)	9/32 (7.1)	1/8 (3.2)
110 – 200	2	3 (76.2)	4 ⁹ / ₃₂ (108.7)	4 ¹⁵ / ₃₂ (113.5)	5 ³ / ₄ (146.1)	1½ (38.1)	1 (28.6)	9/32 (7.1)	3/16 (4.8)
225 – 400	2	3 ³ / ₈ (85.7)	5 ¹ / ₈ (130.2)	5 ³ / ₈ (136.5)	7 ¹ / ₈ (181.0)	2 (50.8)	1 ⁵ / ₈ (41.3)	13/32 (10.3)	¼ (6.4)
450 – 600	2	3 ³ / ₄ (95.3)	5 ²⁷ / ₃₂ (148.4)	6 ⁵ / ₃₂ (156.4)	8 (203.2)	2½ (63.5)	2 (50.8)	1 ⁷ / ₃₂ (13.5)	3/8 (9.5)

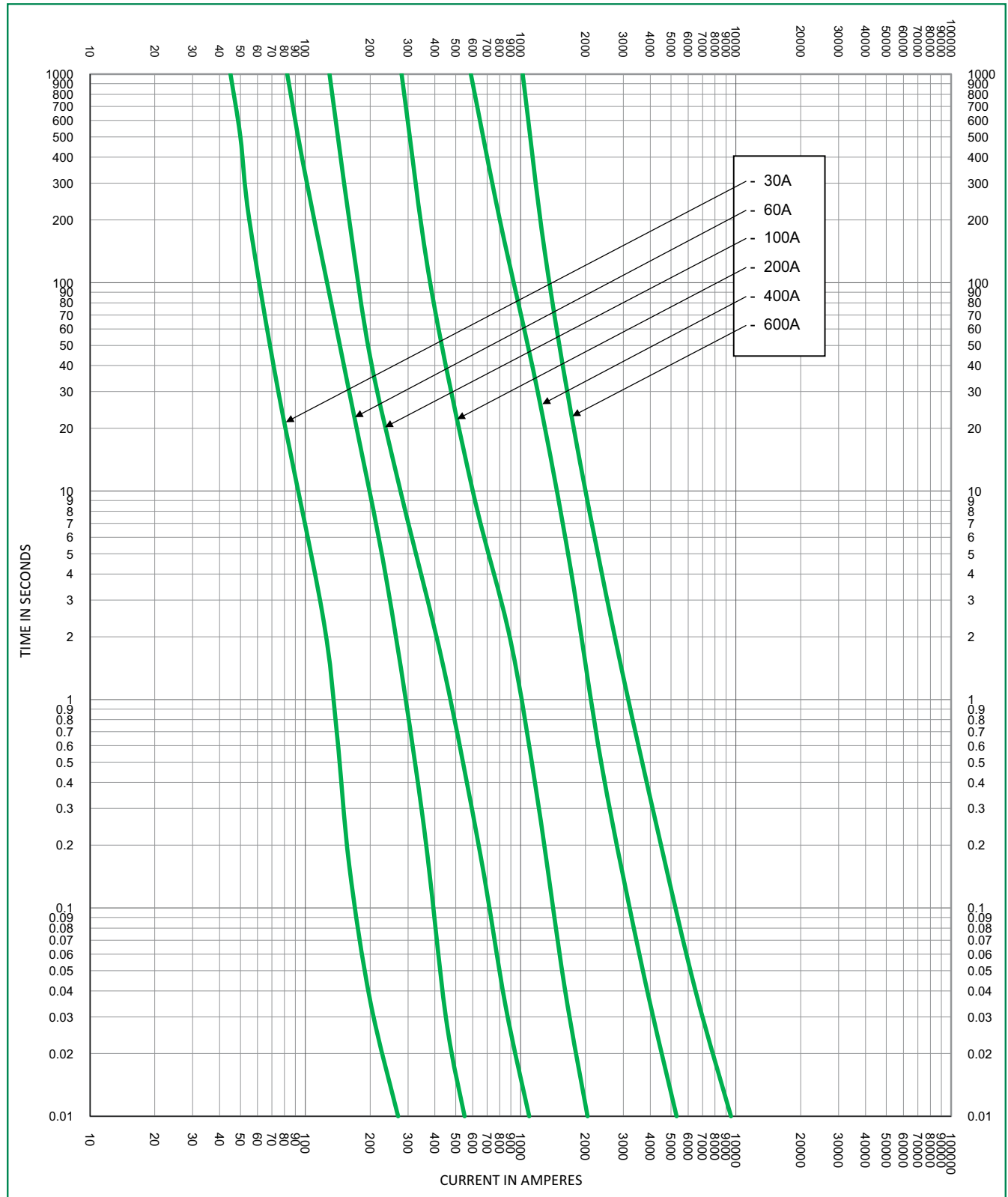
Current-Limiting Effects of JLS (600 V) Fuses

SHORT CIRCUIT CURRENT†	APPARENT RMS SYMMETRICAL CURRENT FOR VARIOUS FUSE RATINGS					
	30 A	60 A	100 A	200 A	400 A	600 A
5,000	750	1,450	1,650	2,600	4,450	5,000
10,000	925	1,800	2,050	3,200	5,450	8,700
15,000	1,050	2,025	2,350	3,600	6,200	9,650
20,000	1,150	2,225	2,570	3,950	6,700	10,400
25,000	1,225	2,375	2,750	4,200	7,200	11,000
30,000	1,300	2,500	2,900	4,400	7,500	11,750
35,000	1,350	2,600	3,050	4,650	7,900	12,250
40,000	1,425	2,725	3,200	4,850	8,200	12,500
50,000	1,525	2,900	3,450	5,200	8,750	13,500
60,000	1,600	3,100	3,650	5,500	9,250	14,000
80,000	1,775	3,375	4,000	6,000	10,000	15,000
100,000	1,900	3,600	4,250	6,400	10,800	16,000
150,000	2,125	4,050	4,900	7,300	12,150	18,000
200,000	2,350	4,450	5,300	8,000	13,150	19,250

†Prospective RMS Symmetrical Amperes Short-Circuit Current
Note: Data derived from Peak Let-Thru Curves

CLASS J – JLS SERIES FUSES

Time Current Curve



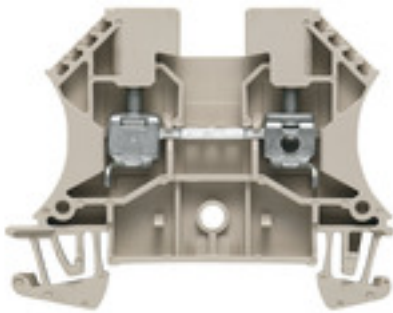
WDU 4**Weidmüller Interface GmbH & Co. KG**

Klingenbergstraße 26

D-32758 Detmold

Germany

www.weidmueller.com

Product image

To feed through power, signal, and data is the classical requirement in electrical engineering and panel building. The insulating material, the connection system and the design of the terminal blocks are the differentiating features. A feed-through terminal block is suitable for joining and/or connecting one or more conductors. They could have one or more connection levels that are on the same potential or insulated against one another.

General ordering data

Version	Feed-through terminal, Screw connection, 4 mm ² , 800 V, 32 A, dark beige
Order No.	1020100000
Type	WDU 4
GTIN (EAN)	4008190150617
Qty.	100 pc(s).

Creation date August 8, 2023 8:25:54 PM CEST

Catalogue status 04.08.2023 / We reserve the right to make technical changes.

WDU 4

Weidmüller Interface GmbH & Co. KG

Klingenbergstraße 26

D-32758 Detmold

Germany

www.weidmueller.com

Technical data

Dimensions and weights

Depth	46.5 mm	Depth (inches)	1.831 inch
Depth including DIN rail	47 mm	Height	60 mm
Height (inches)	2.362 inch	Width	6.1 mm
Width (inches)	0.24 inch	Net weight	9.57 g

Temperatures

Storage temperature		Operating temperature range	For operating temperature range see EC Design Test Certificate / IEC Ex-Certificate of Conformity
	-25 °C...55 °C		
Continuous operating temp., min.	-60 °C	Continuous operating temp., max.	130 °C

Material data

Material	Wemid	Colour	dark beige
UL 94 flammability rating	V-0		

Rating data IECEx/ATEX

Certificate No. (ATEX)	DEMKO14ATEX1338U	Certificate No. (IECEX)	IECEXULD14.0005U
Max. voltage (ATEX)	690 V	Current (ATEX)	32 A
Wire cross section max. (ATEX)	4 mm ²	Max. voltage (IECEX)	690 V
Current (IECEX)	32 A	Wire cross section max. (IECEX)	4 mm ²
Operating temperature range	For operating temperature range see EC Design Test Certificate / IEC Ex-Certificate of Conformity	Marking EN 60079-7	
Ex 2014/34/EU label	II 2 G D		Ex eb II C Gb

System specifications

Version	Screw connection, for plug-in cross-connector, for screwable cross-connection, One end without connector	End cover plate required	Yes
Number of potentials	1	Number of levels	1
Number of clamping points per level	2	Number of potentials per tier	1
Levels cross-connected internally	No	PE connection	No
Rail	TS 35	N-function	No
PE function	No	PEN function	No

2 clampable conductors (H05V/H07V) with equal cross-section (rated connection)

Cross-section for connected wire, solid, two clampable wires, max.	2.5 mm ²	Cross-section for connected wire, solid, two clampable wires, min.	0.5 mm ²
Wire connection cross section, finely stranded with wire-end ferrules DIN 46228/1, 2 clampable wires, max.	1.5 mm ²	Wire connection cross section, finely stranded with wire-end ferrules DIN 46228/1, 2 clampable wires, min.	0.5 mm ²
Wire connection cross section, finely stranded, two clampable wires, min.	0.5 mm ²	Wire cross-section, finely stranded, two clampable wires, max.	1.5 mm ²

Additional technical data

Explosion-tested version	Yes	Number of similar terminals	1
Open sides	right	Type of mounting	Snap-on

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WDU 4

Weidmüller Interface GmbH & Co. KG
 Klingenbergstraße 26
 D-32758 Detmold
 Germany

www.weidmueller.com

Technical data

CSA rating data

Certificate No. (CSA)	200039-1057876	Current size B (CSA)	35 A
Current size C (CSA)	35 A	Voltage size C (CSA)	600 V
Wire cross section max. (CSA)	10 AWG	Wire cross section min. (CSA)	26 AWG

Conductors for clamping (rated connection)

Blade size	0.6 x 3.5 mm			
Clampable conductor	Connection specification	Screw connection		
	Cross-section for conductor connection	Type	solid, H05(07) V-U	
		min.	0.5 mm ²	
		max.	6 mm ²	
		nominal	4 mm ²	
	wire end ferrule	Stripping length	min.	10 mm
			max.	10 mm
			nominal	10 mm
		Tightening torque	min.	0.5 Nm
			max.	1 Nm
	Recommended wire-end ferrule			
	Connection specification	Screw connection		
	Cross-section for conductor connection	Type	stranded, H07V-R	
		min.	1.5 mm ²	
		max.	6 mm ²	
		nominal	4 mm ²	
	wire end ferrule	Stripping length	min.	10 mm
			max.	10 mm
			nominal	10 mm
		Tightening torque	min.	0.5 Nm
			max.	1 Nm
	Recommended wire-end ferrule			
	Connection specification	Screw connection		
	Cross-section for conductor connection	Type	flexible, H05(07) V-K	
min.		0.5 mm ²		
max.		6 mm ²		
nominal		4 mm ²		
wire end ferrule	Stripping length	min.	10 mm	
		max.	10 mm	
		nominal	10 mm	
	Tightening torque	min.	0.5 Nm	
		max.	1 Nm	
Recommended wire-end ferrule				
Clamping range, max.	6 mm ²			
Clamping range, min.	0.13 mm ²			
Clamping screw	M 3			
Connection cross-section, stranded, max.	6 mm ²			
Connection cross-section, stranded, min.	1.5 mm ²			
Connection direction	on side			
Gauge to IEC 60947-1	A4			
Number of connections	2			
Stripping length	10 mm			
Tightening torque, max.	1 Nm			
Tightening torque, min.	0.5 Nm			

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Technical data

Torque level with DMS electric screwdriver	2
Twin wire-end ferrules, max.	2.5 mm ²
Twin wire-end ferrules, min.	0.5 mm ²
Type of connection	Screw connection
Wire connection cross section AWG, max.	AWG 10
Wire connection cross section AWG, min.	AWG 26
Wire connection cross section, finely stranded, max.	6 mm ²
Wire connection cross section, finely stranded, min.	0.5 mm ²
Wire connection cross-section, finely stranded with wire-end ferrules DIN 46228/1, max.	4 mm ²
Wire connection cross-section, finely stranded with wire-end ferrules DIN 46228/1, min.	0.5 mm ²
Wire connection cross-section, finely stranded with wire-end ferrules DIN 46228/4, max.	4 mm ²
Wire connection cross-section, finely stranded with wire-end ferrules DIN 46228/4, min.	0.5 mm ²
Wire connection cross-section, solid core, max.	6 mm ²
Wire connection cross-section, solid core, min.	0.5 mm ²

General

Rail	TS 35	Standards	IEC 60947-7-1
Wire connection cross section AWG, max.	AWG 10	Wire connection cross section AWG, min.	AWG 26

Rating data

Rated cross-section	4 mm ²	Rated voltage	800 V
Rated current	32 A	Current at maximum wires	41 A
Standards	IEC 60947-7-1	Volume resistance according to IEC 60947-7-x	1 mΩ
Rated impulse withstand voltage	8 kV	Power loss in accordance with IEC 60947-7-x	1.02 W
Pollution severity	3		

UL rating data

Certificate No. (UR)	E60693	Conductor size Factory wiring max. (UR)	10 AWG
Conductor size Factory wiring min. (UR)	26 AWG	Conductor size Field wiring max. (UR)	10 AWG
Conductor size Field wiring min. (UR)	22 AWG	Current size C (UR)	35 A
Voltage size C (UR)	600 V		

Classifications

ETIM 6.0	EC000897	ETIM 7.0	EC000897
ETIM 8.0	EC000897	ECLASS 9.0	27-14-11-20
ECLASS 9.1	27-14-11-20	ECLASS 10.0	27-14-11-20
ECLASS 11.0	27-14-11-20	ECLASS 12.0	27-14-11-20

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Data sheet

WDU 4

Weidmüller Interface GmbH & Co. KG
Klingenbergstraße 26
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Drawings



PSTX – The advanced range

Normal starts, class 10, in-line, ordering details



PSTX30 ... PSTX105



PSTX142 ... PSTX170



PSTX210 ... PSTX370



PSTX470 ... PSTX570



PSTX720 ... PSTX840



PSTX1050 ... PSTX1250

Description

Selection table for normal start. Typical applications:

- Bow thruster
- Centrifugal pump
- Compressor
- Conveyor belt (short)
- Elevator



For a more precise selection, use the online softstarter selection tool available by scanning the shown QR code or using the selection tool available on:

new.abb.com/low-voltage/products/softstarters

Rated operational voltage U_e , 208...600 V

Rated control supply voltage U_s , 100...250 V AC, 50/60 Hz

IEC		UL/CSA							Type	Order code	Weight (1 pce)	
Rated operational power		Rated operational power									kg	(lb)
400 V		500 V	690 V	current		current		FLA				
P_e	P_e	P_e	I_e	200 / 208 V	220 / 240 V	440 / 480 V	550 / 600 V		A			
kW	kW	kW	A	hp	hp	hp	hp					
15	18.5	-	30	7.5	10	20	25	28	PSTX30-600-70	1SFA898103R7000	6.10	(13.45)
18.5	22	-	37	10	10	25	30	34	PSTX37-600-70	1SFA898104R7000	6.10	(13.45)
22	25	-	45	10	15	30	40	42	PSTX45-600-70	1SFA898105R7000	6.10	(13.45)
30	37	-	60	20	20	40	50	60	PSTX60-600-70	1SFA898106R7000	6.10	(13.45)
37	45	-	72	20	25	50	60	68	PSTX72-600-70	1SFA898107R7000	6.10	(13.45)
45	55	-	85	25	30	60	75	80	PSTX85-600-70	1SFA898108R7000	6.10	(13.45)
55	75	-	106	30	40	75	100	104	PSTX105-600-70	1SFA898109R7000	6.10	(13.45)
75	90	-	143	40	50	100	125	130	PSTX142-600-70	1SFA898110R7000	9.60	(21.16)
90	110	-	171	50	60	125	150	169	PSTX170-600-70	1SFA898111R7000	9.60	(21.16)
110	132	-	210	60	75	150	200	192	PSTX210-600-70	1SFA898112R7000	12.70	(27.99)
132	160	-	250	75	100	200	250	248	PSTX250-600-70	1SFA898113R7000	12.70	(27.99)
160	200	-	300	100	100	250	300	302	PSTX300-600-70	1SFA898114R7000	12.70	(27.99)
200	257	-	370	125	150	300	350	361	PSTX370-600-70	1SFA898115R7000	12.70	(27.99)
250	315	-	470	150	200	400	500	480	PSTX470-600-70	1SFA898116R7000	25.00	(55.12)
315	400	-	570	200	200	500	600	590	PSTX570-600-70	1SFA898117R7000	25.00	(55.12)
400	500	-	720	250	300	600	700	720	PSTX720-600-70	1SFA898118R7000	46.20	(101.85)
450	600	-	840	300	350	700	800	840	PSTX840-600-70	1SFA898119R7000	46.20	(101.85)
560	730	-	1050	400	450	900	1000	1062	PSTX1050-600-70	1SFA898120R7000	64.20	(141.54)
710	880	-	1200	400	500	1000	1200	1250	PSTX1250-600-70	1SFA898121R7000	64.70	(142.64)

Rated operational voltage U_e , 208...690 V

Rated control supply voltage U_s , 100...250 V AC, 50/60 Hz

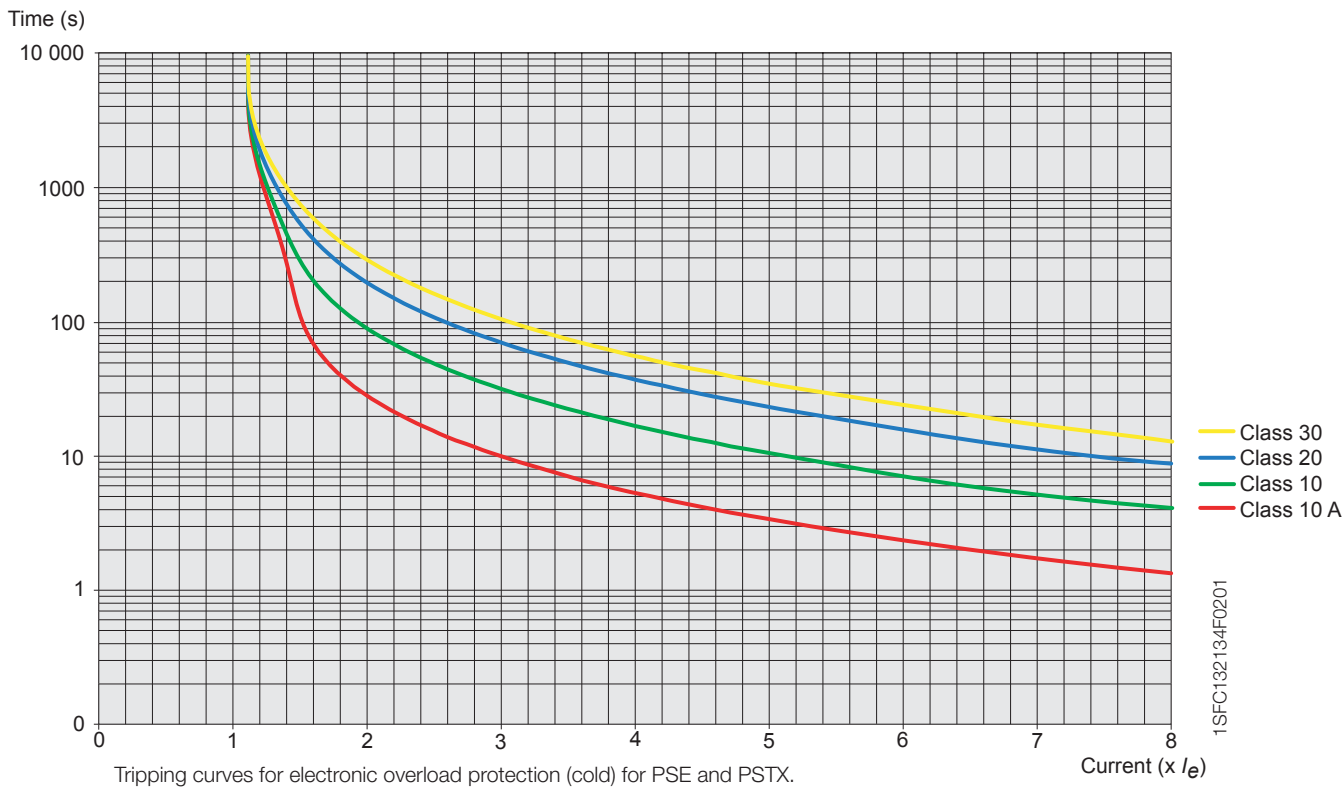
15	18.5	25	30	7.5	10	20	25	28	PSTX30-690-70	1SFA898203R7000	6.10	(13.45)
18.5	22	30	37	10	10	25	30	34	PSTX37-690-70	1SFA898204R7000	6.10	(13.45)
22	25	37	45	10	15	30	40	42	PSTX45-690-70	1SFA898205R7000	6.10	(13.45)
30	37	55	60	20	20	40	50	60	PSTX60-690-70	1SFA898206R7000	6.10	(13.45)
37	45	59	72	20	25	50	60	68	PSTX72-690-70	1SFA898207R7000	6.10	(13.45)
45	55	75	85	25	30	60	75	80	PSTX85-690-70	1SFA898208R7000	6.10	(13.45)
55	75	90	106	30	40	75	100	104	PSTX105-690-70	1SFA898209R7000	6.10	(13.45)
75	90	132	143	40	50	100	125	130	PSTX142-690-70	1SFA898210R7000	9.60	(21.16)
90	110	160	171	50	60	125	150	169	PSTX170-690-70	1SFA898211R7000	9.60	(21.16)
110	132	184	210	60	75	150	200	192	PSTX210-690-70	1SFA898212R7000	12.70	(27.99)
132	160	220	250	75	100	200	250	248	PSTX250-690-70	1SFA898213R7000	12.70	(27.99)
160	200	257	300	100	100	250	300	302	PSTX300-690-70	1SFA898214R7000	12.70	(27.99)
200	257	355	370	125	150	300	350	361	PSTX370-690-70	1SFA898215R7000	12.70	(27.99)
250	315	450	470	150	200	400	500	480	PSTX470-690-70	1SFA898216R7000	25.00	(55.12)
315	400	560	570	200	200	500	600	590	PSTX570-690-70	1SFA898217R7000	25.00	(55.12)
400	500	710	720	250	300	600	700	720	PSTX720-690-70	1SFA898218R7000	46.20	(101.85)
450	600	800	840	300	350	700	800	840	PSTX840-690-70	1SFA898219R7000	46.20	(101.85)
560	730	1000	1050	400	450	900	1000	1062	PSTX1050-690-70	1SFA898220R7000	64.20	(141.54)
710	880	1200	1250	400	500	1000	1200	1250	PSTX1250-690-70	1SFA898221R7000	64.70	(142.64)

PSTX – The advanced range

Technical data

Tripping curves for the integrated electronic overload protection

PSTX has an integrated electronic overload protection that can be set to four different tripping classes. Below you find a curve for each tripping class in cold state.



PSTX – The advanced range

Technical data

Softstarter type		PSTX30 ... PSTX1250
Rated insulation voltage U _i		690V
Rated operational voltage U _e		208...600 V, 208...690V +10% / -15%, 50/60Hz ±5%
Rated control supply voltage U _s		100...250 V +10% / -15%, 50/60Hz ±5%
Rated control circuit voltage U _c		Internal or external 24 V DC
Starting capacity at I _e		4 x I _e for 10 sec.
Number of starts per hour		10 for PSTX30 ... PSTX370 ¹⁾ 6 for PSTX470 ... PSTX1250 ¹⁾
Overload capability		Overload class 10
Ambient temperature		During operation -25...+60 °C, (-13...+140 F) ²⁾ During storage -40...+70 °C, (-40...+158 F)
Maximum altitude		4000 m (13123 ft) ³⁾
Degree of protection		Main circuit - Supply and control circuit IP20
Main circuit		Built-in bypass contactor Yes Cooling system - Fan cooled Yes (thermostat controlled)
HMI for settings (Human Machine Interface)		Display LCD type, graphical Languages Arabic, Chinese, Czech, Dutch, English, Finnish, French, German, Greek, Indonesian, Italian, Polish, Portuguese, Russian, Spanish, Swedish and Turkish Keypad 2 selection keys, 4 navigation keys, start key, stop key, info key and remote/local key
Signal relays		Number of programmable signal relays 3 (each relay can be programmed to None, Run, Top of ramp, Event group 0-6, Sequence 1-3 Run, Sequence 1-3 Top of ramp or Run reverse) K4 Default as Run signal K5 Default as Top of Ramp (Bypass) signal K6 Default as Event group 0 (Faults) Rated operational voltage, U _e 250 V AC/24 V DC Rated thermal current I _{th} 5 A Rated operational current I _e at AC-15 (U _e =250 V) 1.5 A
Analog output		Output signal reference 0...10 V, 0...10 mA, 0...20 mA, 4...20 mA Type of output signal Motor current (A), Main voltage (V), Active power (kW), Active power (HP), Reactive power (kVAr), Apparant power (kVAh), Active energy (kWh), Reactive energy (kVAh), cos phi, Motor temperature (%), Thyristor temperature (%), Motor voltage (%), Main frequency (Hz), PT100 temperature (centigrade), PTC resistance (Ohm)
Control circuit		Number of inputs 2 (start, stop) Number of additional programmable inputs 3 (each input can be programmed to: None, Reset, Enable, Slow speed forward (Jog), Slow speed reverse (Jog), Motor heating, Stand still brake, Start reverse, User defined protection, Emergency mode (active high), Emergency mode (active low), Fieldbus disable control, Start 1, Start 2, Start 3, Switch to remote control or Cancel brake)
Signalling indication LED		Ready Green Run Green Fault Red Protection Yellow
External keypad		Detachable keypad Yes Display LCD type, graphical Ambient temperature During operation -25...+60 °C, (-13...+140 F) During storage -40...+70 °C, (-40...+158 F) Degree of protection IP66 (Type 1, 4X, 12)
Start and stop functions		Soft start with voltage ramp Yes Soft stop with voltage ramp Yes Soft start with torque control Yes Soft stop with torque control Yes Kick start Yes Full voltage start Yes Sequence start Yes, 3 different sets of settings Current limit Yes Dual current limit Yes Current limit ramp Yes Torque limit Yes Pre-start function Yes (Motor heating or Stand still brake) Jog with slow speed, forward and reverse Yes (3 speed levels) Start reverse (external contactors) Yes Dynamic brake Yes
Field bus connection		Built-in Modbus RTU Yes Connection for Anybus Yes Connection for ABB FieldBusPlug Yes, with adapter

¹⁾ Valid for normal start (class 10) for 50% on time and 50% off time. If other data if required, contact your local ABB office.

²⁾ Above 40 °C (104 F) up to max. 60 °C (140 F) reduce the rated current with 0,8% per °C (0,44% per F).

³⁾ When used at high altitudes, above 1000 meters (3281 ft) up to 4000 meters (13123 ft), de-rate the rated current using the following formula.

[% of I_e = 100 - $\frac{x-1000}{1000}$] x = actual altitude of the softstarter in meter, [% of I_e = 100 - $\frac{x-3280}{3280}$] x = actual altitude of the softstarter in feet. For de-rating of voltage, contact your local ABB office.

PSTX – The advanced range

Technical data

Softstarter type	PSTX30 ... PSTX1250
Protections	Electronic overload protection, EOL Yes (Class 10A, 10, 20, 30)
	Dual overload (separate overload for start and run) Yes
	PTC connection Yes
	PT-100 connection Yes
	Locked rotor protection Yes
	Current underload protection Yes
	Current imbalance protection Yes
	Power factor underload protection Yes
	Under voltage protection Yes
	Over voltage protection Yes
	Voltage imbalance protection Yes
	Earth fault protection / ground fault protection Yes
	Phase reversal protection Yes
	24 V output protection Yes
	Frequency range protection Yes
	Bypass open protection Yes
	User defined protection Yes
	Too long current limit protection Yes
	HMI failure protection Yes
	Fieldbus failure protection Yes
	Extension IO failure protection Yes
	Max number of starts/hour Yes
	Too long start time protection Yes
Warnings	Current underload warning Yes
	Current imbalance warning Yes
	Voltage imbalance warning Yes
	Thyristor overload warning (SCR) Yes
	Electronic overload Time-to-trip Yes
	Short circuit warning (for Limp mode) Yes
	Over voltage warning Yes
	Under voltage warning Yes
	Power factor underload warning Yes
	Locked rotor warning Yes
	Faulty fan warning Yes
	THD(U) - Total Harmonic Distortion warning Yes
	Motor runtime limit warning Yes
	Phase loss warning (for stand by) Yes
	EOL warning Yes
External faults detection	Phase loss Yes
	High current Yes
	Low control supply voltage Yes
	Faulty usage (e.g. using limp mode inside-delta) Yes
	Faulty connection Yes
	Bad network quality Yes
Internal faults detection	Thyristor overload Yes
	Short circuit Yes
	Open circuit thyristor or gate Yes
	Heat sink over temperature Yes
	Shunt fault Yes
PTC input	Switch off resistance 2825 ohm ± 20%
	Switch on resistance 1200 ohm ± 20%
Other functions	Real time clock Yes
	Event log Yes
	Emergency mode Yes
	Automatic restart Yes
	Secure settings Yes
	Keypad password Yes
	Electronic overload Time-to-cool Yes
	Thyristor runtime measurement Yes
	Auto phase sequence detection Yes
	Electricity metering Yes
	Motor heating Yes
	Stand still brake Yes
	Voltage sags detection Yes
	Limp mode with two-phase motor control if one set of thyristors is shorted Yes

For all functions and features see installation and commissioning manual, 1SFC132081M0201 available on new.abb.com/low-voltage/products/softstarters.

PSTX – The advanced range

Technical data

Fuse ratings and power losses

For softstarter	Current range	Max power loss at rated I_e	Max fuse rating - main circuit ^{1) 2)}			Power requirements supply circuit Holding (VA) / Pull-in (VA)
			Bussmann fuses, DIN43 620 (Knife)			
Type	A	W	A	Type	Size	
PSTX30	9.0...30.0	0.8	100	170M1567	000	49/51
PSTX37	11.1...37.0	1.2	125	170M1568	000	49/51
PSTX45	13.5...45.0	1.8	160	170M1569	000	49/51
PSTX60	18.0...60.0	3.2	160	170M1569	000	49/51
PSTX72	21.6...72.0	4.7	250	170M1571	000	49/51
PSTX85	22.5...85.0	6.5	315	170M1572	000	49/51
PSTX105	31.8...106.0	10	400	170M3819	1*	49/51
PSTX142	42.9...143.0	18	500	170M5810	2	49/53
PSTX170	51.3...171.0	26	630	170M5812	2	49/53
PSTX210	63.0...210.0	48	630	170M5812	2	56/276
PSTX250	75.0...250.0	68	700	170M5813	2	56/276
PSTX300	90.0...300.0	97	800	170M6812	3	56/276
PSTX370	111.0...370.0	148	900	170M6813	3	56/276
PSTX470	141.0...470.0	99	900	170M6813	3	67/434
PSTX570	171.0...570.0	146	900	170M6814	3	67/434
PSTX720	216.0...720.0	78	1250	170M8554	3	61/929
PSTX840	252.0...840.0	106	1500	170M6018	3	61/929
PSTX1050 ³⁾	315.0...1050.0	165	1800	170M6020	3	68/929
PSTX1250 ^{3) 4)}	375.0...1250.0	234	2000	170M6021	3	68/929

¹⁾ For the supply circuit 6 A delayed, for MCB use C characteristics.

²⁾ For inside delta connection the fuses shall be placed inside the delta. Contact ABB for more information.

³⁾ 170M6019 with fuse rating 1600 A should be used for 690 V version.



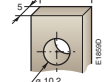
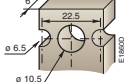
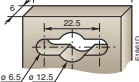
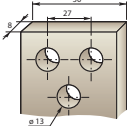








⁴⁾ For 690 V version, Bussmann fuses are only available for motors with rated current up to 1150 A.

PSTX Integrated bypass ratings

Softstarter	PSTX470	PSTX570	PSTX720	PSTX840	PSTX1050	PSTX1250
Integrated contactor	AF370			AF750		AF1250
AC-3 rating at 400 V (A)	370			750		-
IEC AC-3 Rated operational power at 400 V (kW)	200			400		-
UL/CSA 3-phase motor rating at 480 V (hp)	300			600		-

PSTX – The advanced range

Technical data

Main terminals			PSTX30 ... PSTX105	PSTX142 ... PSTX170	PSTX210 ... PSTX370	PSTX470 ... PSTX570	PSTX720 ... PSTX1050	PSTX1250
								
	Cu cable - flexible	1 x mm ²	10...70 mm ²	6...120 mm ²	16...240 mm ²	-	-	-
	Clamp type		Included	1SDA066917R1	1SDA055016R1	-	-	-
	Tightening torque		8 Nm	14 Nm	25 Nm	-	-	-
	Cu cable - flexible	2 x mm ²	6...35 mm ²	50...95 mm ²	70...185 mm ²	-	-	-
	Clamp type		Included	LZ185-2C/120 1SFN074709R1000	OZXB4 ¹⁾ 1SCA022194R0890	-	-	-
	Tightening torque		8 Nm	16 Nm	22 Nm	-	-	-
	Cu cable - Stranded	1 x mm ²	10...95 mm ²	6...150 mm ²	16...300 mm ²	-	-	-
	Clamp type		Included	1SDA066917R1	1SDA055016R1	-	-	-
	Tightening torque		8 Nm	14 Nm	25 Nm	-	-	-
	Cu cable - Stranded	2 x mm ²	6...35 mm ²	50...120 mm ²	70...185 mm ²	120...240 mm ²	-	-
	Clamp type		Included	LZ185 - 2C/120 1SFN074709R1000	OZXB4 ¹⁾ 1SCA022194R0890	1SDA013922R1	-	-
	Tightening torque		8 Nm	16 Nm	22 Nm	35 Nm	-	-
	Cu cable - Stranded	3 x mm ²	-	-	-	-	70...185 mm ²	-
	Clamp type		-	-	-	-	1SDA013956R1	-
	Tightening torque		-	-	-	-	45 Nm	-
	Al cable - Stranded	1 x mm ²	-	95...185 mm ²	185...240 mm ²	-	-	-
	Clamp type		-	1SDA0549881R1	1SDA055020R1	-	-	-
	Tightening torque		-	31 Nm	43 Nm	-	-	-
	Al cable - Stranded	2 x mm ²	-	-	-	120...240 mm ²	-	-
	Clamp type		-	-	-	1SDA023380R1	-	-
	Tightening torque		-	-	-	31 Nm	-	-
	Lugs	Width ≤	-	24 mm (0.945 in)	32 mm (1.260 in)	47 mm (1.850 in)	50 mm (1.969 in)	50 mm (1.969 in)
		Diameter ≥	-	8 mm (0.355 in)	10.2 mm (0.402 in)	10.5 mm (0.413 in)	12.5 mm (0.492 in)	13 mm (0.519 in)
		Tightening torque	-	18 Nm (160 in lb)	28 Nm (248 in lb)	35 Nm (310 in lb)	45 Nm (398 in lb)	45 Nm (398 in lb)
	Connection capacity acc to UL / CSA 1 x AWG / kcmil		6...2/0	6...300 kcmil	4...400 kcmil	-	-	-
	Clamp type		Included	ATK185	ATK300	-	-	-
	Tightening torque		71 in lb	300 in lb	375 in lb	-	-	-
	Connection capacity acc to UL / CSA 2 x AWG / kcmil		-	-	4...500 kcmil	2/0...500 kcmil	2/0...500 kcmil	-
	Clamp type		-	-	ATK300/2 ²⁾	ATK580/2	ATK580/2	-
	Tightening torque		-	-	375 in lb	375 in lb	375 in lb	-
	Connection capacity acc to UL / CSA 3 x AWG / kcmil		-	-	-	2/0...500 kcmil	2/0...500 kcmil	-
	Clamp type		-	-	-	ATK750/3	ATK750/3	-
	Tightening torque		-	-	-	375 in lb	375 in lb	-
Supply and control circuit								
	Cu cable - Stranded 1 x mm ²		0.75...2.5 mm ² (19...14 AWG)					
	Cu cable - Stranded 2 x mm ²		0.75...1.5 mm ² (19...16 AWG)					
	Tightening torque		0.5 Nm (4.4 in lb)					

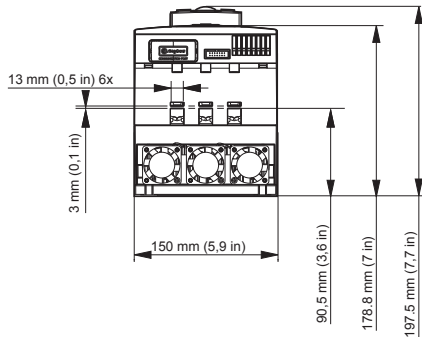
¹⁾ Terminal shrouds 1SFN125406R1000 must be used.

²⁾ Terminal shrouds 1SFN125406R1000 can be used.

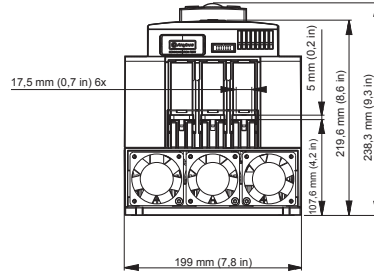
PSTX – The advanced range

Dimensions

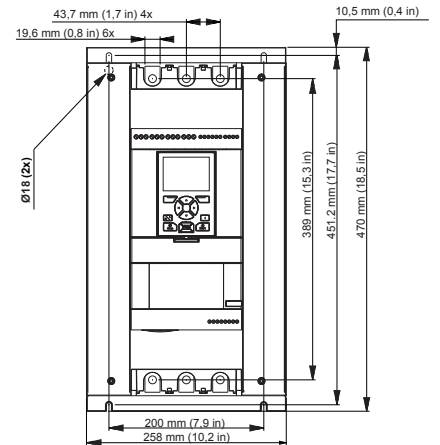
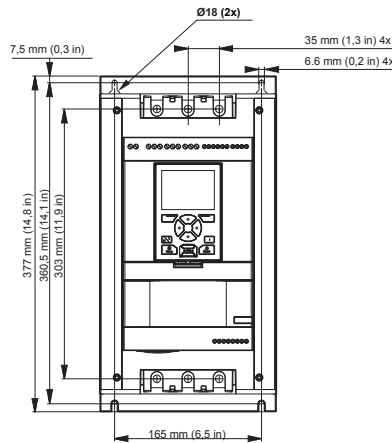
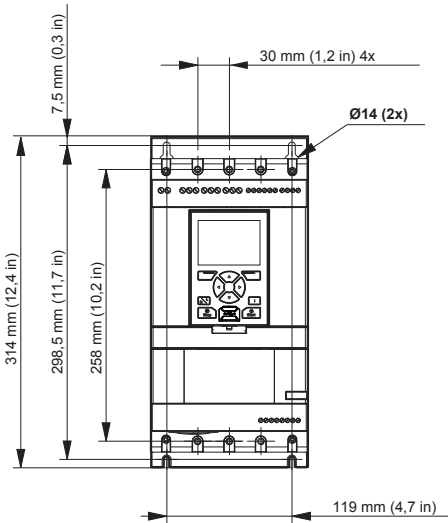
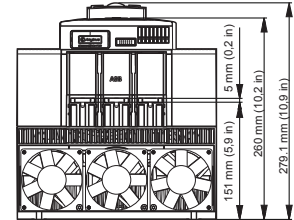
PSTX30 ... PSTX105



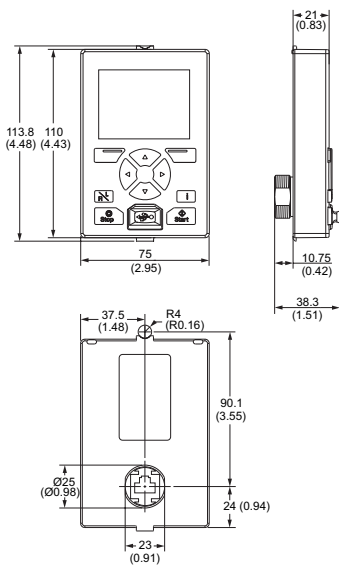
PSTX142 ... PSTX170



PSTX210 ... PSTX370



PSTX detachable keypad




Dimensions in mm (in)

PSTX – The advanced range

Circuit diagrams



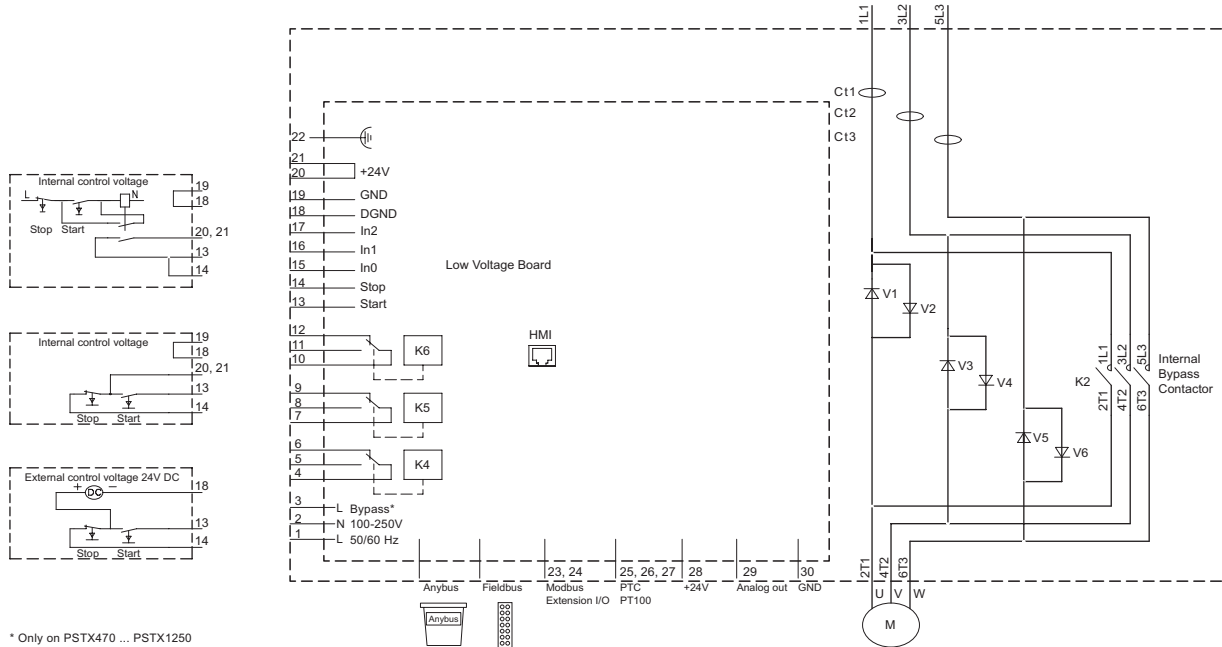
CAUTION

Terminal 22  is a function earth, it is not a protective earth. It shall be connected to the mounting plate.

PSTX30 ... PSTX1250

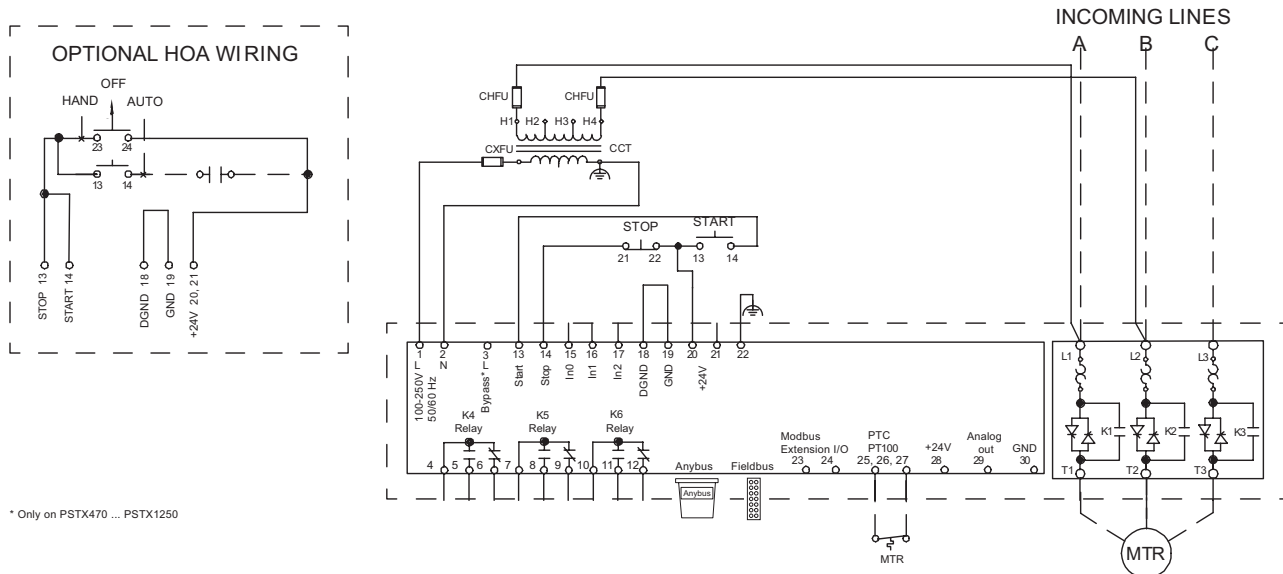
IEC circuit diagram

4



* Only on PSTX470 ... PSTX1250

UL circuit diagram



* Only on PSTX470 ... PSTX1250

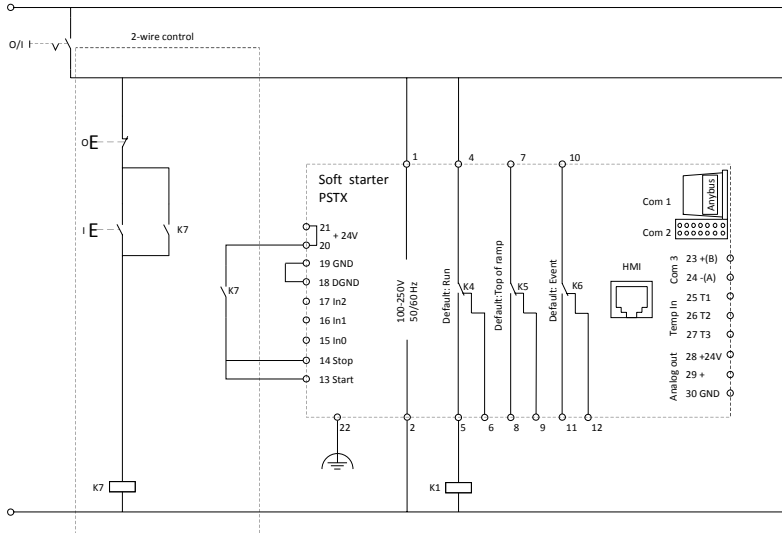
For more circuit diagrams see new.abb.com/low-voltage/products/softstarters

PSTX – The advanced range

Circuit diagrams

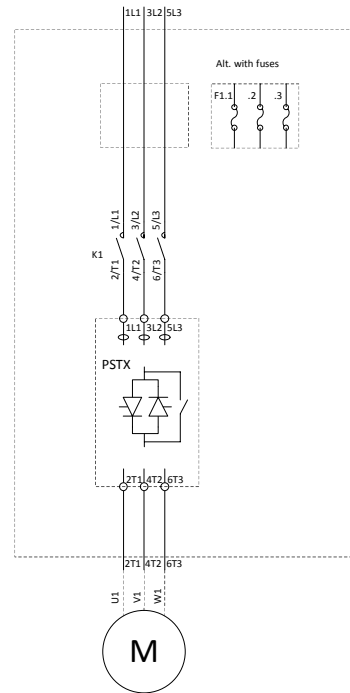
PSTX30 ... PSTX1250

In-line connected with line contactor and fuses

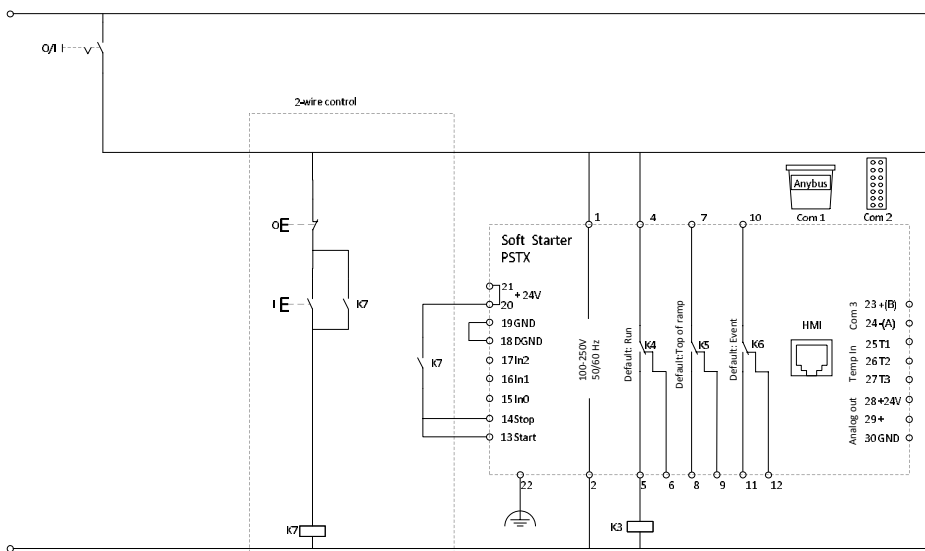


Coil consumption for main contactors.
Pull-in max 15A
Holding max 1.5A

If the pull-in or holding values are higher, the main contactors must be controlled via an auxiliary contactor.

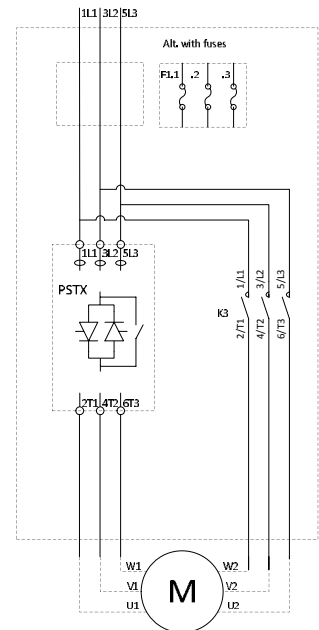


Inside-delta connected with contactor and fuses



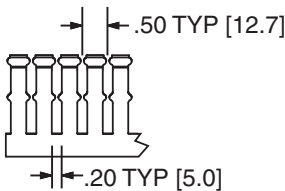
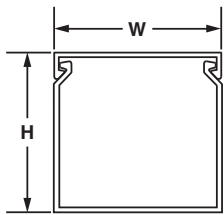
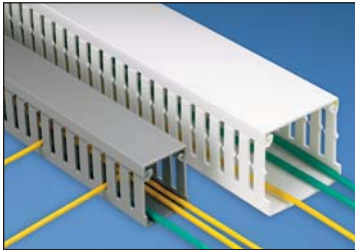
Coil consumption for Inside Delta contactor.
Pull-in max 15A
Holding max 1,5A

If the pull-in or holding values are Higher, the Inside Delta contactor must be controlled via an auxiliary contactor.

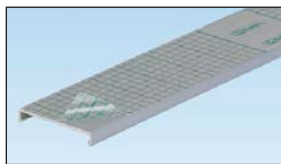


Panduit® Type F Narrow Slot Wiring Duct

- Narrow slot/finger design provides more slots to fit the spacing of high-density terminal blocks and other hardware
- Material: Lead-free PVC
- UL recognized continuous use temperature: 122°F (50°C)
- UL 94 flammability rating of V-0
- Conforms with NFPA 79-2007 section 13.3.1 requirement for flame retardant material
- Provided with mounting holes
- Base and cover length is 6 feet



Multiple slot restrictors present with 2" and greater duct wall height.



To order cover with protective film add "-F" to part number. 6" cover not available with film.



Base Part Number	Duct Size (W x H)*		Slot Width		Cover Part Number	Std. Pkg. Qty.	Base Ctn. Qty.	Cover Ctn. Qty.
	In.	mm	In.	mm				
F.5X.5LG6	0.69 x 0.60	17.5 x 15.2	0.20	5.0	C.5LG6	6	120	120
F.5X1LG6	0.69 x 1.06	17.5 x 26.9	0.20	5.0	C.5LG6	6	120	120
F.75X.75LG6	0.93 x 0.82	23.6 x 20.9	0.20	5.0	C.75LG6	6	120	120
F.75X1.5LG6	0.93 x 1.57	23.6 x 39.9	0.20	5.0	C.75LG6	6	120	120
F1X1LG6	1.26 x 1.13	32.0 x 28.7	0.20	5.0	C1LG6	6	120	120
F1X1.5LG6	1.26 x 1.62	32.0 x 41.1	0.20	5.0	C1LG6	6	120	120
F1X2LG6	1.26 x 2.12	32.0 x 53.8	0.20	5.0	C1LG6	6	120	120
F1X3LG6	1.26 x 3.12	32.0 x 79.2	0.20	5.0	C1LG6	6	120	120
F1X4LG6	1.26 x 4.10	32.0 x 104.1	0.20	5.0	C1LG6	6	60	120
F1.5X1LG6	1.75 x 1.12	44.5 x 28.4	0.20	5.0	C1.5LG6	6	120	120
F1.5X1.5LG6	1.75 x 1.62	44.5 x 41.1	0.20	5.0	C1.5LG6	6	120	120
F1.5X2LG6	1.75 x 2.12	44.5 x 53.8	0.20	5.0	C1.5LG6	6	120	120
F1.5X3LG6	1.75 x 3.12	44.5 x 79.2	0.20	5.0	C1.5LG6	6	120	120
F1.5X4LG6	1.75 x 4.10	44.5 x 104.1	0.20	5.0	C1.5LG6	6	60	120
F2X1LG6	2.25 x 1.12	57.2 x 28.4	0.20	5.0	C2LG6	6	120	120
F2X1.5LG6	2.25 x 1.62	57.2 x 41.1	0.20	5.0	C2LG6	6	120	120
F2X2LG6	2.25 x 2.12	57.2 x 53.8	0.20	5.0	C2LG6	6	120	120
F2X3LG6	2.25 x 3.12	57.2 x 79.2	0.20	5.0	C2LG6	6	60	120
F2X4LG6	2.25 x 4.10	57.2 x 104.1	0.20	5.0	C2LG6	6	60	120
F2X5LG6	2.25 x 5.10	57.2 x 129.5	0.20	5.0	C2LG6	6	60	120
F2.5X3LG6	2.75 x 3.12	69.9 x 79.2	0.20	5.0	C2.5LG6	6	120	120
F3X1LG6	3.25 x 1.12	82.6 x 28.4	0.20	5.0	C3LG6	6	120	120
F3X2LG6	3.25 x 2.12	82.6 x 53.8	0.20	5.0	C3LG6	6	120	120
F3X3LG6	3.25 x 3.12	82.6 x 79.2	0.20	5.0	C3LG6	6	60	120
F3X4LG6	3.25 x 4.10	82.6 x 104.1	0.20	5.0	C3LG6	6	60	120
F3X5LG6	3.25 x 5.10	82.6 x 129.5	0.20	5.0	C3LG6	6	60	120
F4X2LG6	4.25 x 2.12	108.0 x 53.8	0.20	5.0	C4LG6	6	60	120
F4X3LG6	4.25 x 3.12	108.0 x 79.2	0.20	5.0	C4LG6	6	60	120
F4X4LG6	4.25 x 4.10	108.0 x 104.1	0.20	5.0	C4LG6	6	60	120
F4X5LG6	4.25 x 5.10	108.0 x 129.5	0.20	5.0	C4LG6	6	60	120
F6X4LG6	6.25 x 4.15	158.8 x 105.4	0.20	5.0	C6LG6	6	60	120

Part number shown for LG (Light Gray). For other color availability see color selection guide, page C1.48. Base and cover sold separately.

*"H" dimension includes duct and cover.

A. System Overview

B1. Cable Ties

B2. Cable Accessories

B3. Stainless Steel Ties

C1. Wiring Duct

C2. Surface Raceway

C3. Abrasion Protection

C4. Cable Management

D1. Terminals

D2. Power Connectors

D3. Grounding Connectors

E1. Labeling Systems

E2. Labels

E3. Pre-Printed & Write-On Markers

E4. Permanent Identification

E5. Lockout/Tagout & Safety Solutions

F. Index

Product data sheet

Characteristics

PK7GTA

LOAD CENTER EQUIPMENT GROUND BAR ASSY

Product availability : Stock - Normally stocked in distribution facility



Price** : 11.70 USD



Main

Product line	QO
Product type	Load Center Grounding Bar Assembly

Complementary

Number of connectors	7
Wire size	AWG 14...AWG 4 copper AWG 12...AWG 4 aluminium
Provided equipment	2 screw
Bar length	2.87 in (73 mm)
Maximum length of segment	1.26 in (32 mm)
Device mounting	Direct mounting back of enclosure
Tightening torque	20 lbf.in (2.26 N.m) AWG 14...AWG 10) 20 lbf.in (2.26 N.m) AWG 12...AWG 10) 25 lbf.in (2.82 N.m) AWG 8) 35 lbf.in (3.95 N.m) AWG 6...AWG 4) 25 lbf.in (2.82 N.m) AWG 14...AWG 12) 25 lbf.in (2.82 N.m) AWG 12...AWG 10)

Ordering and shipping details

Category	00102 - QO LC ACCESSORIES
Discount Schedule	DE3A
GTIN	00785901026372
Package weight(Lbs)	0.1 lb(US) (0.05 kg)
Returnability	Yes
Country of origin	US

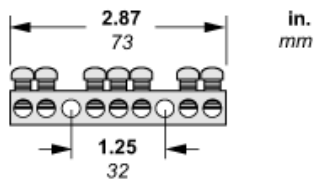
Offer Sustainability

California proposition 65	WARNING: This product can expose you to chemicals including: Lead and lead compounds which is known to the State of California to cause Carcinogen & Reproductive harm. For more information go to www.p65warnings.ca.gov
REACH Regulation	REACH Declaration
REACH free of SVHC	Yes
EU RoHS Directive	Pro-active compliance (Product out of EU RoHS legal scope) EU RoHS Declaration
Mercury free	Yes
RoHS exemption information	Yes
China RoHS Regulation	China RoHS declaration Product out of China RoHS scope. Substance declaration for your information.

Contractual warranty

Warranty	18 months
----------	-----------

Approximate Dimensions



New TWND Series – Full Size NEMA Pushbuttons

**New! TWND Series: Heavy duty switches built to last****Key features:**

- Variety of button sizes up to 2 9/16" (65mm)
- Rugged construction includes chrome plated zinc locking ring die cast zinc mounting thread
- 6 vibrant colors rendered by single long lasting white LED engine
- Transformer or full voltage
- Slow make, double break wiping contacts
- Modular construction for maximum flexibility
- Available assembled or as sub-components
- UL Type 4X, 13 and IP65 watertight/oiltight panel

The rugged series of TWND switches offers both variety and durability in an attractive design.

With button sizes up to 2 9/16" (65mm), chrome plated zinc locking rings, die cast zinc mounting threads, steel anti-rotation rings, and self cleaning contacts, the TWNDs are here to stay.

The TWND series also offers LED illumination in full voltage and transformer models.

Regardless of your switching needs, the NEW TWND series provides the kind of long lasting, industrial strength quality you've come to expect from IDEC.



Switches & Pilot Devices


Specifications

Conforming to Standards	EN60947-5-1, UL508, CSA C22-2 No.14
Approvals	CSA: pushbuttons and selector switches: A600 pilot lights and illuminated pushbuttons, direct supply pilot lights and illuminated pushbuttons with integral transformer (100/110, 115, 120, 200/220, 230, 240, 380, 400/440, 480V) UL: pushbuttons and selector switches: A600 pilot lights and illuminated pushbuttons, direct supply pilot lights and illuminated pushbuttons with integral transformer (100/110, 115, 120, 200/220, 230, 240, 380, 400/440, 480V) TÜV: pushbuttons and selector switches: A600 pilot lights and illuminated pushbuttons, direct supply pilot lights and illuminated pushbuttons with integral transformer (100/110, 115, 120, 200/220, 230, 240, 380, 400/440, 480V)
Operating Temperature	Operation: -25 to +50°C (illuminated versions) -25 ~ +70C non-illuminated Storage: -40 to +80°C (without freezing) C-> °C
Vibration Resistance	5 to 55Hz, 98m/sec ² (10g) conforming to IEC60068-2-6
Shock Resistance	980m/sec ² (100g) conforming to IEC60068-2-27
Electric Shock Protection	Class 2 conforming to IEC60664-1
Degree of Protection	IP65 (from front of the panel) (conforming to IEC60529) UL Type 1, 2, 3, 3R, 3S, 4, 4X, 5, 12, 13 (conforming to NEMA ICS6-110)
Mechanical Life	Momentary pushbuttons: 5,000,000 (1800 operations per hour) All other switches: 500,000
Pollution Degree (conforming to IEC60947-1)	3

Signaling Lights

Relays & Sockets

Mechanical-Electrical Specifications

Rated Operational Characteristics	AC-15: A600																																											
Rated Insulation Voltage	600V																																											
Rated Impulse Withstanding Voltage Dielectric Strength	Between live and dead metal parts 2.5kV AC, 1 minute																																											
Rated Thermal Current	10 Amp																																											
Minimum Switching Capacity	5 mA at 3V AC/DC (applicable range may vary with operating conditions and load types)																																											
Contact Operation	Slow break NC or NO																																											
Operating Force	Flush and extended pushbuttons—with 1NO or 1NC contact: 6.2±2N (momentary), 9.0±1.5N Additional contacts—1NO or 1NC: +3.0N																																											
Recommended Terminal Torque	<table border="1"> <thead> <tr> <th>Unit</th> <th>Wire</th> <th>Number of Wires</th> <th>Recommended Tightening Torque (Nm)</th> <th>Terminal Screw</th> </tr> </thead> <tbody> <tr> <td rowspan="6">HW-U Contact Block</td> <td colspan="2">Crimping Terminal</td> <td>2</td> <td>1.0 to 1.3</td> <td rowspan="6">M3.5</td> </tr> <tr> <td rowspan="2">Solid Wire</td> <td>ø0.5 to 1.6 mm (AWG14 to 22)</td> <td>2</td> <td>1.0 to 1.3</td> </tr> <tr> <td>ø1.7 to 2.0 mm (AWG12)</td> <td>1</td> <td>1.2 to 1.3</td> </tr> <tr> <td rowspan="2">Stranded Wire</td> <td>0.3 to 2.0 mm² (AWG14 to 22)</td> <td>2</td> <td>1.0 to 1.3</td> </tr> <tr> <td>2.1 to 3.5 mm² (AWG12)</td> <td>1</td> <td>1.2 to 1.3</td> </tr> <tr> <td rowspan="3">Illuminated Unit (*1)</td> <td colspan="2">Crimping Terminal</td> <td>2</td> <td>1.0 to 1.3</td> <td rowspan="3">M3.5</td> </tr> <tr> <td>Solid Wire</td> <td>ø0.5 to 1.6 mm (AWG14 to 22)</td> <td>2</td> <td>1.0 to 1.3</td> </tr> <tr> <td>Stranded Wire</td> <td>0.3 to 2.0 mm (AWG14 to 22)</td> <td>2</td> <td>1.0 to 1.3</td> </tr> </tbody> </table>					Unit	Wire	Number of Wires	Recommended Tightening Torque (Nm)	Terminal Screw	HW-U Contact Block	Crimping Terminal		2	1.0 to 1.3	M3.5	Solid Wire	ø0.5 to 1.6 mm (AWG14 to 22)	2	1.0 to 1.3	ø1.7 to 2.0 mm (AWG12)	1	1.2 to 1.3	Stranded Wire	0.3 to 2.0 mm ² (AWG14 to 22)	2	1.0 to 1.3	2.1 to 3.5 mm ² (AWG12)	1	1.2 to 1.3	Illuminated Unit (*1)	Crimping Terminal		2	1.0 to 1.3	M3.5	Solid Wire	ø0.5 to 1.6 mm (AWG14 to 22)	2	1.0 to 1.3	Stranded Wire	0.3 to 2.0 mm (AWG14 to 22)	2	1.0 to 1.3
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Applicable Wire Size	Pilot Light	Crimping Terminal		0.6 to 1.0 (M3.0)																																								
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		Stranded Wire	ø0.3 to 2.0 mm (AWG14 to 22)	1.0 to 1.3 (M3.5)																																								
 1. * refers to the lamp terminals of the illuminated push buttons and selector switches.																																												
Contact Resistance	Initial contact resistance of 50mΩ or less																																											
Contact Gap	4mm (NO and NC) 2mm (NO-EM and NC-LB)																																											
LED Ratings	LEDs: 6V: 8mA, 12V: 11mA, 24V: 11mA, 120V: 8.8mA, 240V: 8.6mA																																											
Contact Material	Silver																																											

Timers

Contactors

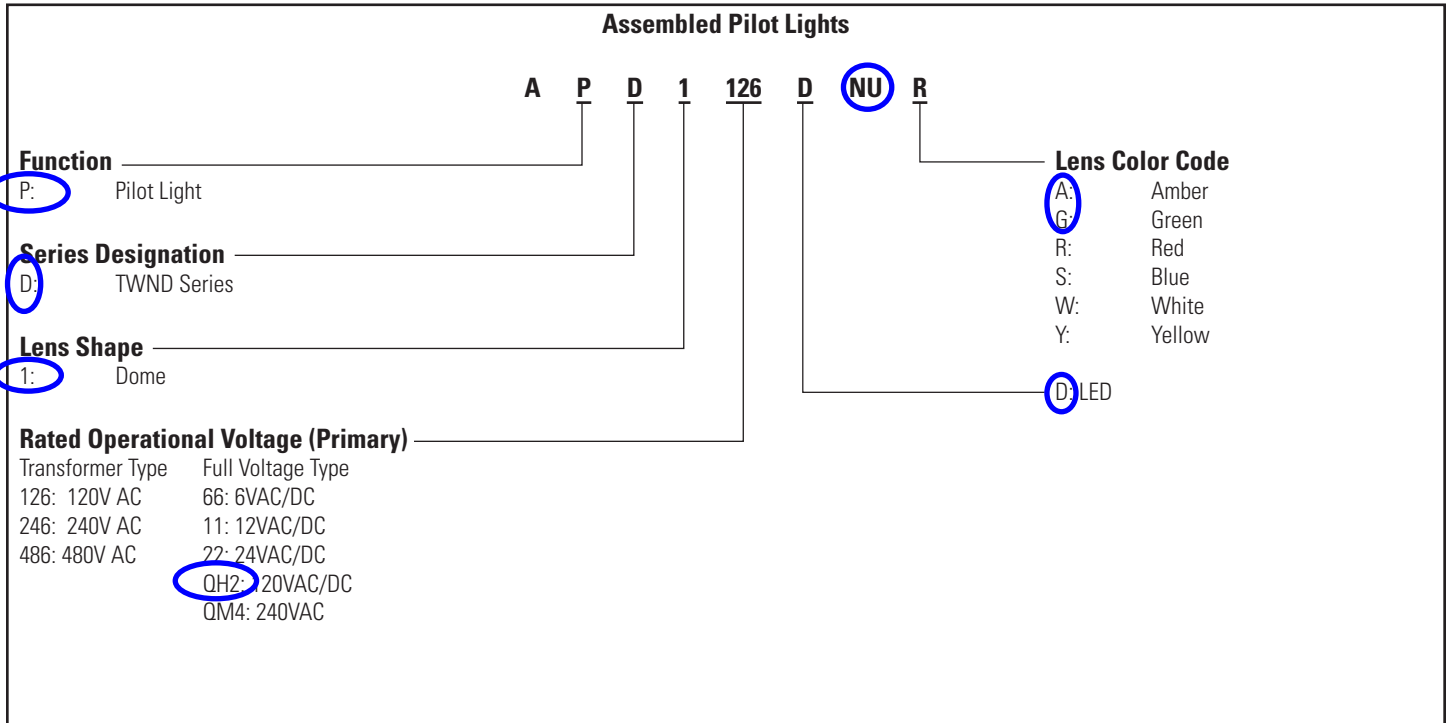
Terminal Blocks

Contact Ratings

Contact Ratings by Utilization Category IEC 60947-5-1		AC-15 (A600)						
		DC-13 (P600)						
Contact Ratings by Utilization Category								
Operational Voltage			24V	48V	50V	110V	220V	440V
Operation Current	AC 50/60 Hz	AC-12 Control of resistive loads & solid state loads	10A	—	10A	10A	6A	2A
		AC-15 Control of electromagnetic loads (> 72VA)	10A	—	7A	5A	3A	1A
	DC	DC-12 Control of resistive loads & solid state loads	10A	5A	—	2.2A	1.1A	—
		DC-13 Control of electromagnets	5A	2A	—	1.1A	0.6A	—

Circuit Breakers

Pilot Lights (Assembled)



Use only when interpreting part numbers. Do not use for developing part numbers.

LED Pilot Lights

Style	Operating Voltage	Part Number
		LED
Transformer Dome 	120V AC	APD1126DNU ^②
	240V AC	APD1246DNU ^②
	480V AC	APD1486DNU ^②
	—	APD1 ^③ DNU ^②
Full Voltage Dome 	—	APD1 ^③ DNU ^②

② Lens Color Codes

Color	Code
Amber	A
Green	G
Red	R
Blue	S
White	W
Yellow	Y

③ Full Voltage Codes

Voltage	Code
6V AC/DC	66
12V AC/DC	11
24V AC/DC	22
120V AC/DC	QH2
240V AC	QM4

- 1. In place of ②, specify the Lens/LED Color Code.
- 2. In place of ③, specify the Full Voltage Code (LED voltage).
- 3. Yellow pilot light comes with white LED.

Pilot Lights (Sub-Assembled)



* Not required for full voltage units.

One Each from Left Column	plus	One Selection from Right Column
---------------------------	------	---------------------------------

Operators

Style	Part Number
Transformer or FULL Voltage	APD09ST8

Full Voltage Clips

Primary Voltage (50/60Hz)	Part Number
	APD-F

Required for all full voltage models. Two pieces each. 2 clips required for full voltage pilot lights

Lenses

Style	Part Number
Dome Lens	APN106LN-Ⓢ-K

1. In place of Ⓢ, specify the Lens Color Code.

Transformers (only for Pilot Lights)

Style	Primary Voltage (50/60Hz)	Part Number
LED	120V AC	TWD-0126
	240V AC	TWD-0246
	480V AC	TWD-0486

6V secondary voltage (use 6V lamp).

LEDs

Style	Voltage	Part Number
LED	6V AC/DC	LSRD-6
	12V AC/DC	LSRD-1
	24V AC/DC	LSRD-2
	120V AC/DC	LSRD-H2
	240V AC	LSRD-M4

1. In place of Ⓢ, specify the lens color code.
2. The LED contains a current-limiting resistor and a protection diode.

Ⓢ Lens Color Codes

Color	Code
Amber	A
Green	G
Red	R
Blue	S
White	W
Yellow	Y




RR Series Power Relays


Key features:

- SPDT through 3PDT, 10A contacts
- Midget power type relays
- Available in pin and blade terminal styles.
- Options include an indicator, check button for test operations and side flange.
- DIN rail, surface and panel mount sockets are available for a wide a variety of mounting applications.



Part Number Selection

Contact	Model	Part Number		Coil Voltage Code (Standard Stock Items in Bold)
		Pin Terminal	Blade Terminal*	
	Standard	—	RR1BA-U <input type="checkbox"/>	AC6V, AC12V, AC24V, AC110V, AC120V , AC240V, DC6V, DC12V, DC24V , DC48V, DC110V
	With Indicator		RR1BA-UL <input type="checkbox"/>	
	With Check Button		RR1BA-UC <input type="checkbox"/>	
	With Indicator and Check Button		RR1BA-ULC <input type="checkbox"/>	
	Side Flange Model		RR1BA-US <input type="checkbox"/>	
	Standard	RR2P-U <input type="checkbox"/>	RR2BA-U <input type="checkbox"/>	
	With Indicator	RR2P-UL <input type="checkbox"/>	RR2BA-UL <input type="checkbox"/>	
	With Check Button	RR2P-UC <input type="checkbox"/>	RR2BA-UC <input type="checkbox"/>	
	With Indicator and Check Button	RR2P-ULC <input type="checkbox"/>	RR2BA-ULC <input type="checkbox"/>	
	Side Flange Model	—	RR2BA-US <input type="checkbox"/>	
	Standard	RR3PA-U <input type="checkbox"/>	RR3B-U <input type="checkbox"/>	
	With Indicator	RR3PA-UL <input type="checkbox"/>	RR3B-UL <input type="checkbox"/>	
	With Check Button	RR3PA-UC <input type="checkbox"/>	RR3B-UC <input type="checkbox"/>	
	With Indicator and Check Button	RR3PA-ULC <input type="checkbox"/>	RR3B-ULC <input type="checkbox"/>	
	Side Flange Model	—	RR3B-US <input type="checkbox"/>	

 *Blade type not TUV tested or CE marked.
Side flange model mounts directly to panel with no socket required.

Ordering Information

When ordering, specify the Part No. and coil voltage code:

(example) **RR3B-U** **AC120V**
Part No. Coil Voltage Code

Sockets

Relays	Standard DIN Rail Mount	Finger-safe DIN Rail Mount	Through Panel Mount
RR2P	SR2P-05 SR2P-06	SR2P-05C	SR2P-51
RR3PA	SR3P-05 SR3P-06	SR3P-05C	SR3P-51
RR1BA RR2BA RR3B	SR3B-05	—	SR3B-51



All DIN rail mount sockets shown here can be mounted using DIN rail BNDN1000.

Switches & Pilot Lights

Signaling Lights

Relays & Sockets

Timers

Contactors

Terminal Blocks

Circuit Breakers

Specifications

Contact Material	Silver		
Contact Resistance ¹	30 mΩ maximum		
Minimum Applicable Load	1V DC, 10 mA		
Operating Time ²	25 ms maximum		
Release Time ²	25 ms maximum		
Power Consumption (approx.)	AC: 3 VA (50 Hz), 2.5 VA (60 Hz) DC: 1.5W		
Insulation Resistance	100 MΩ minimum (500V DC megger)		
Dielectric Strength	Pin Terminal	Between live and dead parts:	1500V AC, 1 minute
		Between contact and coil:	1500V AC, 1 minute
		Between contacts of different poles:	1500V AC, 1 minute
		Between contacts of the same pole:	1000V AC, 1 minute
	Blade Terminal	Between live and dead parts:	2000V AC, 1 minute
		Between contact and coil:	2000V AC, 1 minute
		Between contacts of different poles:	2000V AC, 1 minute
		Between contacts of the same pole:	1000V AC, 1 minute
Operating Frequency	Electrical:	1800 operations/h maximum	
	Mechanical:	18,000 operations/h maximum	
Vibration Resistance	Damage limits:	10 to 55 Hz, amplitude 0.5 mm	
	Operating extremes:	10 to 55 Hz, amplitude 0.5 mm	
Shock Resistance	Damage limits:	1000 m/s ² (100g)	
	Operating extremes:	100 m/s ² (10G)	
Mechanical Life	10,000,000 operations		
Electrical Life	200,000 operations (220V AC, 5A)		
Operating Temperature ³	-25 to +40°C (no freezing)		
Operating Humidity	5 to 85% RH (no condensation)		
Weight (approx.) (Standard type)	RR2P: 90g, RR3PA: 96g, RR1BA/RR2BA/RR3B: 82g		




1. Measured using 5V DC, 1A voltage drop method
2. Measured at the rated voltage (at 20°C), excluding contact bouncing
3. For use under different temperature conditions, refer to Continuous Load Current vs. Operating Temperature Curve.

Coil Ratings

Rated Voltage (V)	Rated Current (mA) ±15% (at 20°C)		Coil Resistance (Ω) ±10% (at 20°C)	Operating Characteristics (values at 20°C)		
	50 Hz	60 Hz		Maximum Continuous Applied Voltage	Pickup Voltage	Dropout Voltage
AC (50/60 Hz)	6	490	420	110%	80% maximum	30% minimum
	12	245	210			
	24	121	105			
	110	27	23			
	120	24	20.5			
	240	12.1	10.5			
DC	6	240		110%	80% maximum	10% minimum
	12	120				
	24	60				
	48	30				
	110	13				


Contact Ratings

Maximum Contact Capacity					
Continuous Current	Allowable Contact Power		Rated Load		
	Resistive Load	Inductive Load	Voltage (V)	Res. Load	Ind. Load
			10A	1650VA AC 300W DC	1100VA AC 150W DC

 Note: Inductive load for the rated load — $\cos \phi = 0.3$, L/R = 7 ms

TÜV Ratings

Voltage	
240V AC	10A
30V DC	10A

 AC: $\cos \phi = 1.0$, DC: L/R = 0 ms

UL Ratings

Voltage	Resistive	General use	Horse Power Rating
240V AC	10A	7A	1/3 HP
120V AC	10A	7.5A	1/4 HP
30V DC	10A	7A	—

CSA Ratings

Voltage	Resistive	General use
240V AC	10A	7A
120V AC	10A	7.5A
100V DC	—	0.5A
30V DC	10A	7.5A

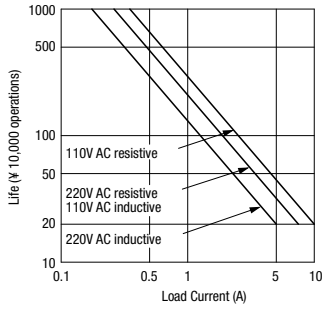
Socket Specifications

	Relays	Terminal	Electrical Rating	Wire Size	Torque
DIN Rail Sockets	SR2P-05	M3 screw with captive wire clamp	300V, 10A	Maximum 2 - #12 AWG	9 - 11.5in•lbs
	SR2P-05C	M3 screw with captive wire clamp, fingersafe	300V, 10A	Maximum 2 - #12 AWG	9 - 11.5in•lbs
	SR2P-06	M3 screw with captive wire clamp	300V, 10A	Maximum 2 - #12 AWG	9 - 11.5in•lbs
	SR3P-05	M3 screw with captive wire clamp	300V, 10A	Maximum 2 - #12 AWG	9 - 11.5in•lbs
	SR3P-05C	M3 screw with captive wire clamp, fingersafe	300V, 10A	Maximum 2 - #12 AWG	9 - 11.5in•lbs
	SR3P-06	M3 screw with captive wire clamp	300V, 10A	Maximum 2 - #12 AWG	9 - 11.5in•lbs
	SR3B-05	M3 screw with captive wire clamp	300V, 15A (10A)* (*CSA rating)	Maximum 2 - #12 AWG	9 - 11.5in•lbs
Through Panel Mount Sockets	SR2P-51	Solder	300V, 10A	—	—
	SR3P-51	Solder	300V, 10A	—	—
	SR3B-51	Solder	300V, 10A	—	—

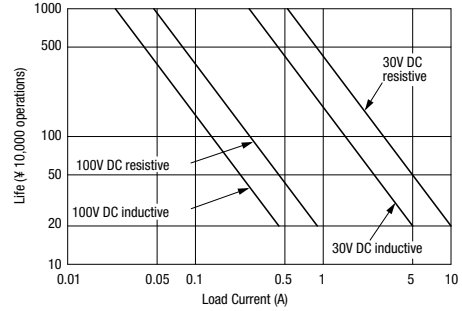
Characteristics (Reference Data)

Electrical Life Curves

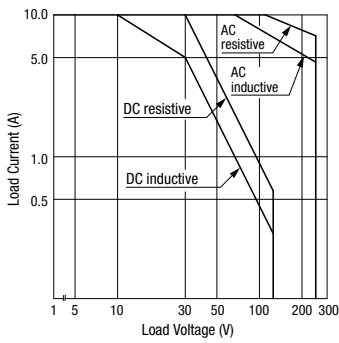
AC Load



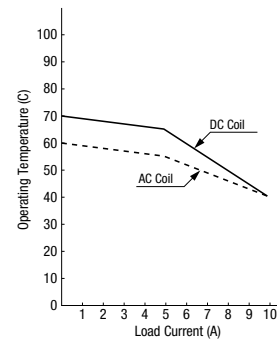
DC Load



Maximum Switching Capacity

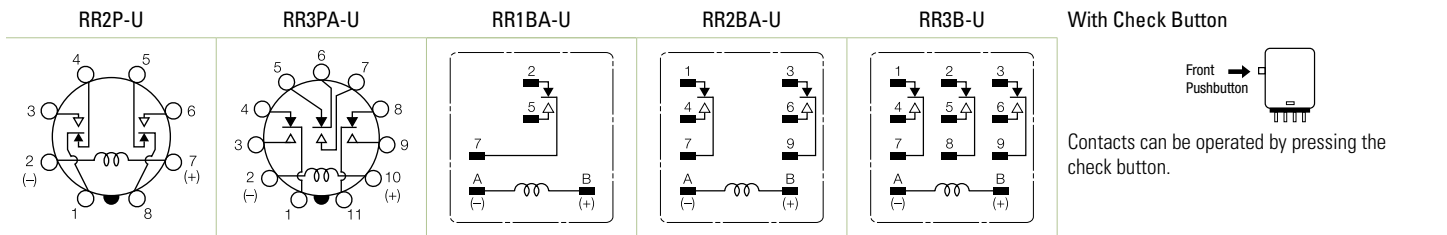


Continuous Load Current vs. Operating Temperature Curve (Standard Type, With Check Button, and Side Flange Type)

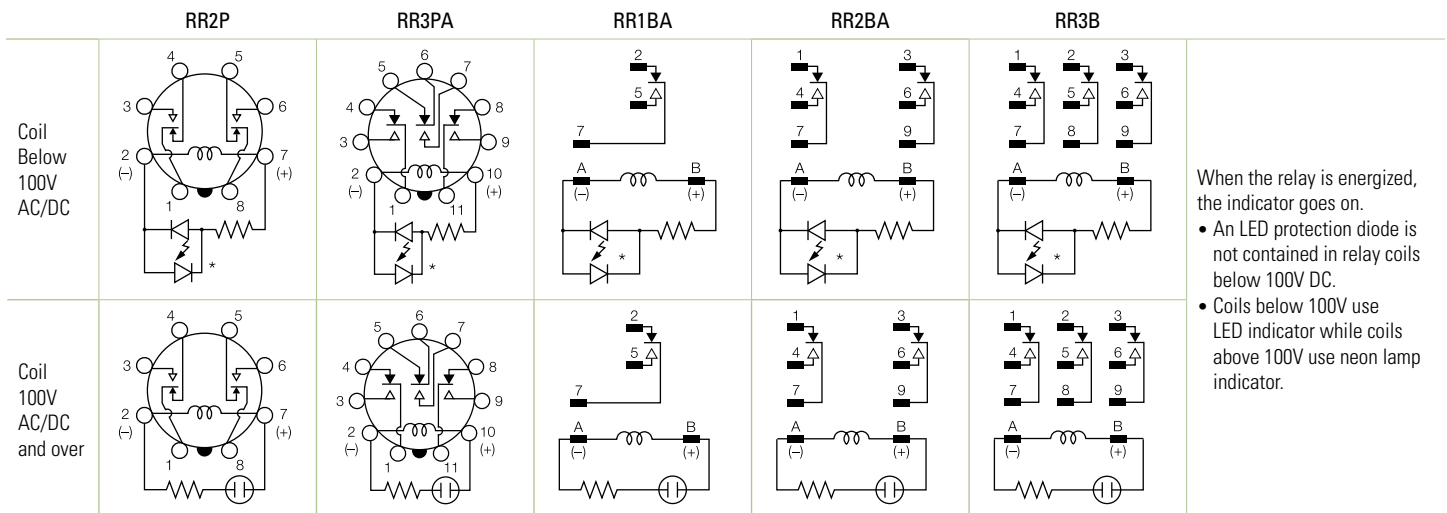


Internal Connection (View from Bottom)

Standard Type

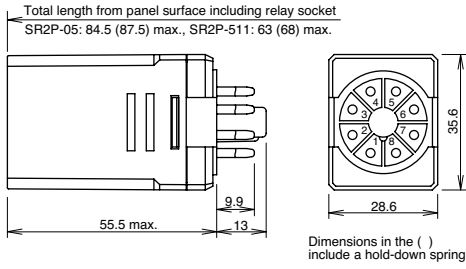


With Indicator (-UL type)

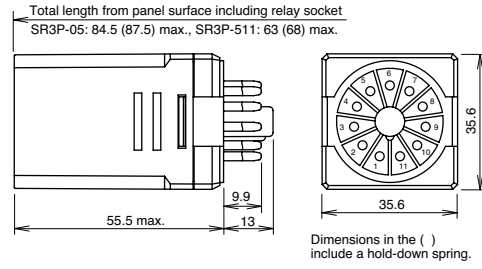


Dimensions (mm)

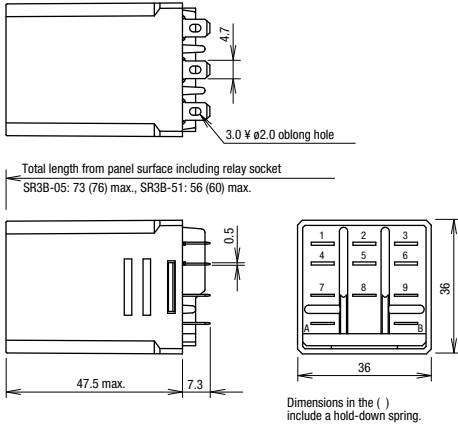
RR2P-U/RR2P-UL



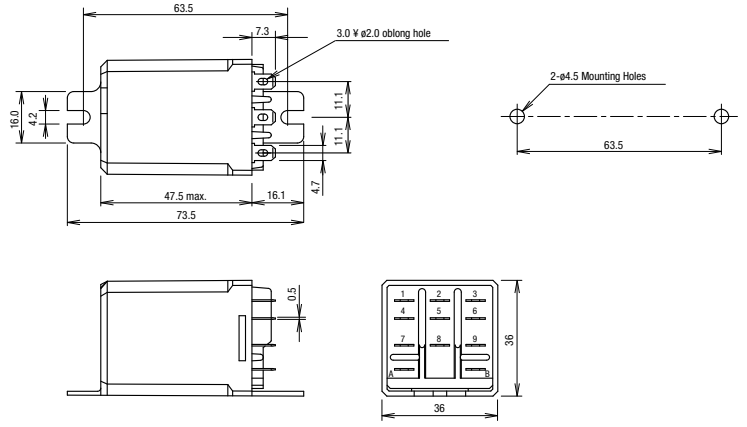
RR3PA-U/RR3PA-UL



RR1BA-U/RR2BA-UL/RR2BA-U
RR2BA-UL/RR3B-U/RR3B-UL

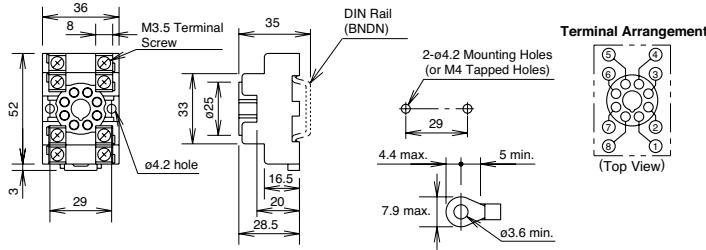


RR1BA-US/RR2BA-US/RR3B-US

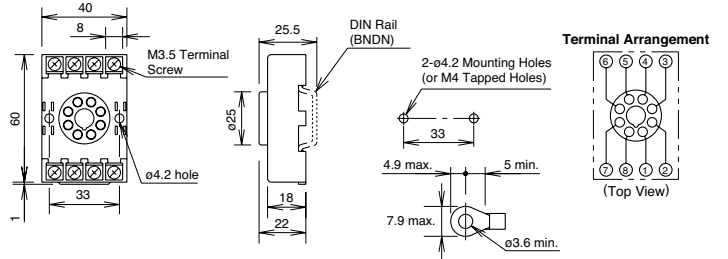


Standard DIN Rail Mount Sockets

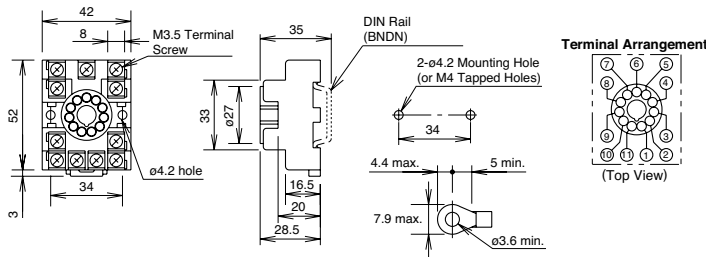
SR2P-05



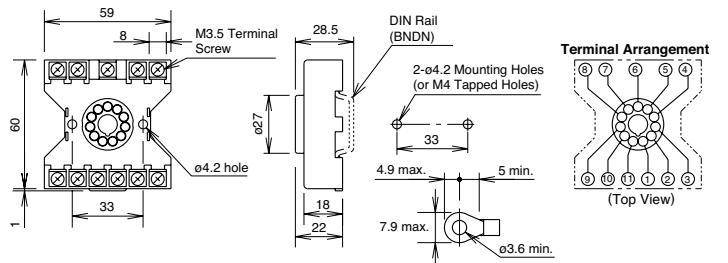
SR2P-06



SR3P-05



SR3P-06



Switches & Pilot Lights

Signaling Lights

Relays & Sockets

Timers

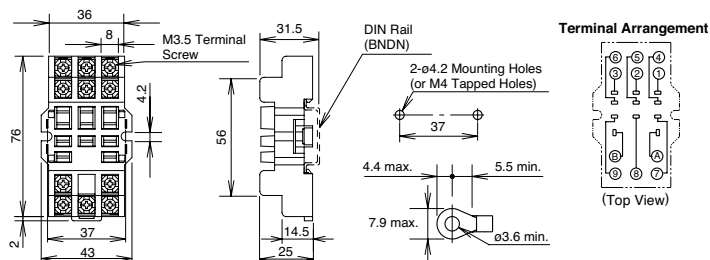
Contactors

Terminal Blocks

Circuit Breakers

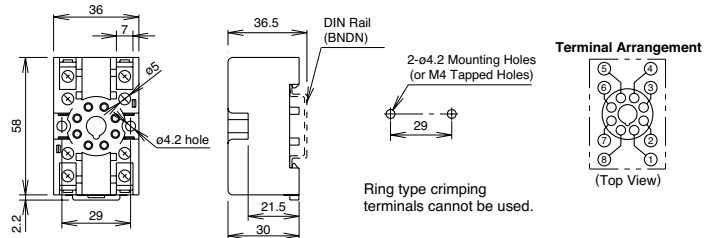
Standard DIN Rail Mount Sockets

SR3B-05

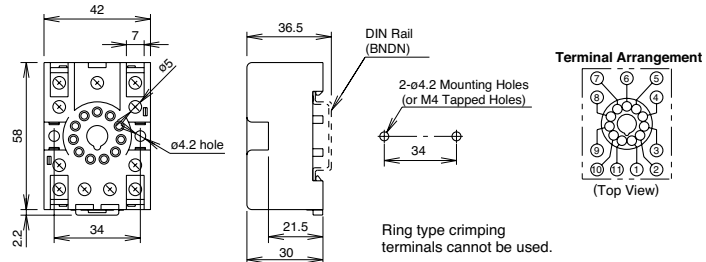


Finger-safe DIN Rail Mount Sockets

SR2P-05C

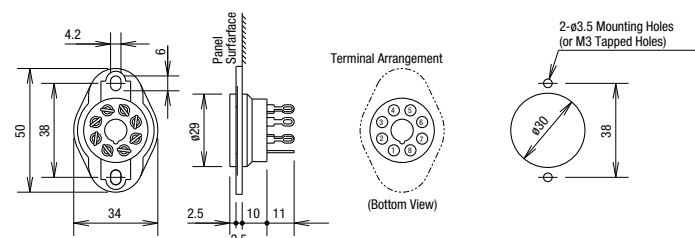


SR3P-05C

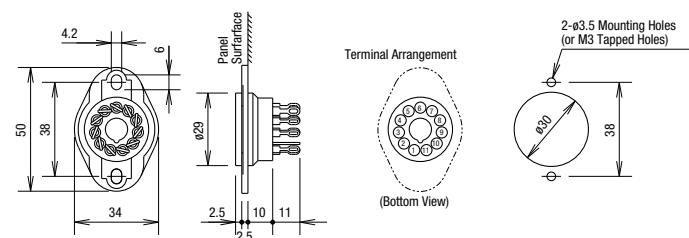


Through Panel Mount Socket

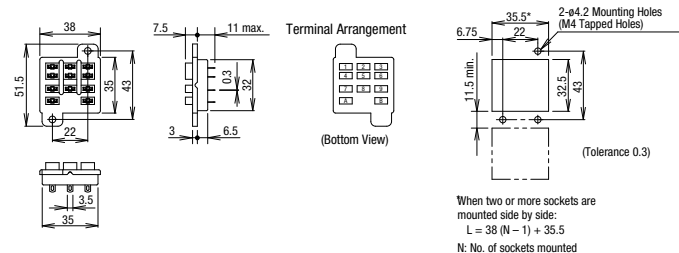
SR2P-51



SR3P-51



SR3B-51



Switches & Pilot Lights

Signaling Lights

Relays & Sockets

Timers

Contactors

Terminal Blocks

Circuit Breakers

New TWND Series – Full Size NEMA Pushbuttons



New! TWND Series: Heavy duty switches built to last

Key features:

- Variety of button sizes up to 2 9/16" (65mm)
- Rugged construction includes chrome plated zinc locking ring die cast zinc mounting thread
- LED illumination
- Transformer or full voltage
- Slow make, double break wiping contacts
- Modular construction for maximum flexibility
- Available assembled or as sub-components
- UL Type 4X, 13 and IP65 watertight/oiltight panel

The rugged series of TWND switches offers both variety and durability in an attractive design.

With button sizes up to 2 9/16" (65mm), chrome plated zinc locking rings, die cast zinc mounting threads, steel anti-rotation rings, and self cleaning contacts, the TWNDs are here to stay.

The TWND series also offers LED illumination in full voltage and transformer models.

Regardless of your switching needs, the NEW TWND series provides the kind of long lasting, industrial strength quality you've come to expect from IDEC.



UL Listed
File No. E68961



File No. LR21451



R 50363567



Certificate No.
2016010305902410

Switches & Pilot Devices

Signaling Lights

Relays & Sockets

Timers

Contactors


Terminal Blocks

Circuit Breakers

Specifications

Conforming to Standards	EN60947-5-1, UL508, CSA C22-2 No.14
Approvals	CSA: pushbuttons and selector switches: A600 pilot lights and illuminated pushbuttons, direct supply pilot lights and illuminated pushbuttons with integral transformer (100/110, 115, 120, 200/220, 230, 240, 380, 400/440, 480V) UL: pushbuttons and selector switches: A600 pilot lights and illuminated pushbuttons, direct supply pilot lights and illuminated pushbuttons with integral transformer (100/110, 115, 120, 200/220, 230, 240, 380, 400/440, 480V) TÜV: pushbuttons and selector switches: A600 pilot lights and illuminated pushbuttons, direct supply pilot lights and illuminated pushbuttons with integral transformer (100/110, 115, 120, 200/220, 230, 240, 380, 400/440, 480V)
Operating Temperature	Operation: -25 to +50°C (illuminated versions) -25 ~ +70C non-illuminated Storage: -40 to +80°C (without freezing) C-> °C
Vibration Resistance	5 to 55Hz, 98m/sec ² (10g) conforming to IEC60068-2-6
Shock Resistance	980m/sec ² (100g) conforming to IEC60068-2-27
Electric Shock Protection	Class 2 conforming to IEC60664-1
Degree of Protection	IP65 (from front of the panel) (conforming to IEC60529) UL Type 1, 2, 3, 3R, 3S, 4, 4X, 5, 12, 13 (conforming to NEMA ICS6-110)
Mechanical Life	Momentary pushbuttons: 5,000,000 (1800 operations per hour) All other switches: 500,000
Pollution Degree (conforming to IEC60947-1)	3

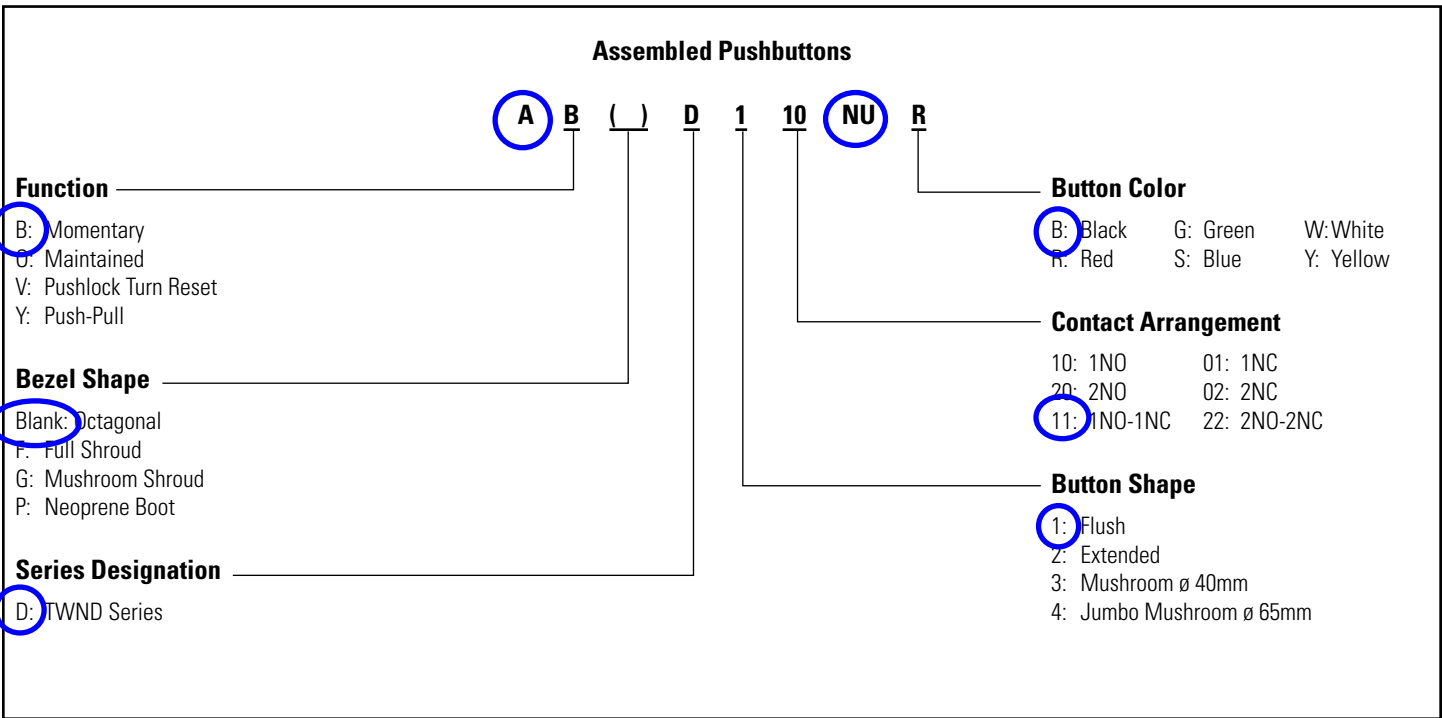
Mechanical-Electrical Specifications

Rated Operational Characteristics	AC-15: A600					
Rated Insulation Voltage	600V					
Rated Impulse Withstanding Voltage øDielectric Strength	Between live and dead metal parts 2.5kV AC, 1 minute					
Rated Thermal Current	10 Amp					
Minimum Switching Capacity	5 mA at 3V AC/DC (applicable range may vary with operating conditions and load types)					
Contact Operation	Slow break NC or NO					
Operating Force	Flush and extended pushbuttons—with 1NO or 1NC contact: 6.2±2N (momentary), 9.0±1.5N Additional contacts—1NO or 1NC: +3.0N					
Recommended Terminal Torque	Unit	Wire	Number of Wires	Recommended Tightening Torque (Nm)	Terminal Screw	
	HW-U Contact Block	Crimping Terminal	2	1.0 to 1.3	M3.5	
			Solid Wire	ø0.5 to 1.6 mm (AWG14 to 22)		2
		Stranded Wire	ø1.7 to 2.0 mm (AWG12)	1		1.2 to 1.3
			0.3 to 2.0 mm ² (AWG14 to 22)	2		1.0 to 1.3
	Illuminated Unit (*1)	Crimping Terminal	2	1.0 to 1.3	M3.5	
			Solid Wire	ø0.5 to 1.6 mm (AWG14 to 22)		2
		Stranded Wire	0.3 to 2.0 mm (AWG14 to 22)	2		1.0 to 1.3
2.1 to 3.5 mm ² (AWG12)			1	1.2 to 1.3		
Applicable Wire Size	Pilot Light	Crimping Terminal	2	0.6 to 1.0 (M3.0)		
		Solid Wire	ø0.5 to 1.6 mm (AWG14 to 22)	1.0 to 1.3 (M3.5)		
		Stranded Wire	ø0.3 to 2.0 mm (AWG14 to 22)	1.0 to 1.3 (M3.5)		
 1. * refers to the lamp terminals of the illuminated push buttons and selector switches.						
Contact Resistance	Initial contact resistance of 50mΩ or less					
Contact Gap	4mm (NO and NC) 2mm (NO-EM and NC-LB)					
LED Ratings	LEDs: 6V: 8mA, 12V: 11mA, 24V: 11mA, 120V: 8.8mA, 240V: 8.6mA					
Contact Material	Silver					

Contact Ratings

Contact Ratings by Utilization Category IEC 60947-5-1	AC-15 (A600)							
	DC-13 (P600)							
Contact Ratings by Utilization Category								
Operational Voltage		24V	48V	50V	110V	220V	440V	
Operation Current	AC 50/60 Hz	AC-12 Control of resistive loads & solid state loads	10A	—	10A	10A	6A	2A
		AC-15 Control of electromagnetic loads (> 72VA)	10A	—	7A	5A	3A	1A
	DC	DC-12 Control of resistive loads & solid state loads	10A	5A	—	2.2A	1.1A	—
		DC-13 Control of electromagnets	5A	2A	—	1.1A	0.6A	—

Non-Illuminated Pushbuttons (Assembled)



1. Use only when interpreting part numbers. Do not use for developing part numbers.
 2. Custom contact configurations available, contact IDEC for details.

Non-Illuminated Pushbuttons (Assembled)

Non-Illuminated Pushbuttons

Style	Contacts	Momentary	Maintained
Flush	1NO	ABD110NUⓄ	AOD110NUⓄ
	1NC	ABD101NUⓄ	AOD101NUⓄ
	1NO-1NC	ABD111NUⓄ	AOD111NUⓄ
	2NO	ABD120NUⓄ	AOD120NUⓄ
	2NC	ABD102NUⓄ	AOD102NUⓄ
Extended	1NO	ABD210NUⓄ	AOD210NUⓄ
	1NC	ABD201NUⓄ	AOD201NUⓄ
	1NO-1NC	ABD211NUⓄ	AOD211NUⓄ
	2NO	ABD220NUⓄ	AOD220NUⓄ
	2NC	ABD202NUⓄ	AOD202NUⓄ
Extended with Neoprene Boot*	1NO	ABPD210NUⓄ	AOPD210NUⓄ
	1NC	ABPD201NUⓄ	AOPD201NUⓄ
	1NO-1NC	ABPD211NUⓄ	AOPD211NUⓄ
	2NO	ABPD220NUⓄ	AOPD220NUⓄ
	2NC	ABPD202NUⓄ	AOPD202NUⓄ
Recessed	1NO	ABFD110NUⓄ	AOFD110NUⓄ
	1NC	ABFD101NUⓄ	AOFD101NUⓄ
	1NO-1NC	ABFD111NUⓄ	AOFD111NUⓄ
	2NO	ABFD120NUⓄ	AOFD120NUⓄ
	2NC	ABFD102NUⓄ	AOFD102NUⓄ
Extended with Full Shroud	1NO	ABFD210NUⓄ	AOFD210NUⓄ
	1NC	ABFD201NUⓄ	AOFD201NUⓄ
	1NO-1NC	ABFD211NUⓄ	AOFD211NUⓄ
	2NO	ABFD220NUⓄ	AOFD220NUⓄ
	2NC	ABFD202NUⓄ	AOFD202NUⓄ
ø 40mm Mushroom Head	1NO	ABD310NUⓄ	AOD310NUⓄ
	1NC	ABD301NUⓄ	AOD301NUⓄ
	1NO-1NC	ABD311NUⓄ	AOD311NUⓄ
	2NO	ABD320NUⓄ	AOD320NUⓄ
	2NC	ABD302NUⓄ	AOD302NUⓄ
ø 40mm Mushroom Head with Full Shroud	1NO	ABGD310NUⓄ	AOGD310NUⓄ
	1NC	ABGD301NUⓄ	AOGD301NUⓄ
	1NO-1NC	ABGD311NUⓄ	AOGD311NUⓄ
	2NO	ABGD320NUⓄ	AOGD320NUⓄ
	2NC	ABGD302NUⓄ	AOGD302NUⓄ
ø 65mm Jumbo Mushroom Head	1NO	ABD410NUⓄ	AOD410NUⓄ
	1NC	ABD401NUⓄ	AOD401NUⓄ
	1NO-1NC	ABD411NUⓄ	AOD411NUⓄ
	2NO	ABD420NUⓄ	AOD420NUⓄ
	2NC	ABD402NUⓄ	AOD402NUⓄ
ø 65mm Jumbo Mushroom Head with Shallow Shroud	1NO	ABGD410NUⓄ	AOGD410NUⓄ
	1NC	ABGD401NUⓄ	AOGD401NUⓄ
	1NO-1NC	ABGD411NUⓄ	AOGD411NUⓄ
	2NO	ABGD420NUⓄ	AOGD420NUⓄ
	2NC	ABGD402NUⓄ	AOGD402NUⓄ
ø 65mm Jumbo Mushroom Head With Deep Shroud	1NO	ABFD410NUⓄ	AOFD410NUⓄ
	1NC	ABFD401NUⓄ	AOFD401NUⓄ
	1NO-1NC	ABFD411NUⓄ	AOFD411NUⓄ
	2NO	ABFD420NUⓄ	AOFD420NUⓄ
	2NC	ABFD402NUⓄ	AOFD402NUⓄ

① Button Color Codes

Color	Code
Black	B
Green	G
Red	R
Blue	S
Yellow	Y
White	W



- 65mm Jumbo mushroom not available in white.
- Neoprene boot is not available in blue or white.



- In place of Ⓞ, specify the Button Color Code.
- For sub-assembly part numbers, see next page.
- *Neoprene boot available only in Black (B), Green (G), Red (R) and Yellow (Y).

POWR-GARD® Blocks & Holders

LPSM Series POWR-SAFE Fuse Holders

600 V



Description

The POWR-SAFE LPSM series dead front fuse holders feature touch-safe protection for personnel when installing and removing fuses. These fuse holders are intended to house Class CC and Midget-style fuses. They are available in 1-, 2-, 3-, and 4-pole configurations and are offered in indicating and non-indicating options. The LPSM series is DIN rail mountable and easily installed and removed with no additional fuse pullers or tools. The indicating fuse holders show blown fuse indication above 80 V.

Features & Benefits

FEATURES	BENEFITS
Meets dead front requirements	Maximum safety for personnel
35 mm DIN rail mountable	Easy installation in various settings
Compact design	Ultimate flexibility, space-saving
Easy removal	No fuse pullers or additional tools required
Ventilated design	Cooler operations

Applications

- For use with Class CC and Midget style (10 x 38 mm) fuses

POWR-GARD® Blocks & Holders

LPSM Series POWR-SAFE Fuse Holders

Specifications

Voltage Rating	600 V ac/dc
Ampere Rating	30 A
Interrupting Rating	200 kA (Class CC) 100 kA (Midget)
Terminal Type	Pressure Plate
Suggested Torque	17.7 in-lbs
Wire Range	#8-#14 CU
Housing	Thermoplastic
Fuse Clip	Silver plated copper
Zinc Plated Steel	Zinc plated steel
Terminal Screws	Nickel plated steel
Operating Temperature	-50 °C to +125 °C
Flammability Rating	UL 94 V-0
Applicable Standards	UL Recognized CSA Certified
Environmental	RoHS Compliant, Lead (Pb) Free

WIRE TYPE	
75 °C CU Only	8-14 Stranded UL Class B and Class C wire 10-14 Solid wire

Certification & Compliance

UL	UL Recognized (File: E14721)
CE	EU Declaration of Conformity (LPSM_201113)
CSA	CSA Certified (File: LR7316)

Accessories

Class CC fuses
Midget-style (10 x 38 mm) fuses

Ordering Information

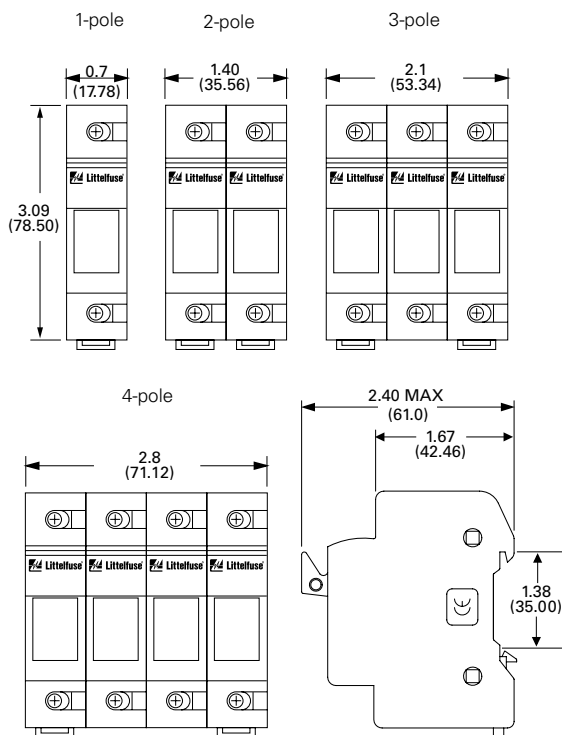
INDICATING		NON-INDICATING		FUSE TYPE	POLES
CATALOG NUMBER	ORDERING NUMBER	CATALOG NUMBER	ORDERING NUMBER		
LPSM001ID	LPSM0001ZXID	LPSM001	LPSM0001Z	Midget	1
LPSM002ID	LPSM0002ZXID	LPSM002	LPSM0002Z	Midget	2
LPSM003ID	LPSM0003ZXID	LPSM003	LPSM0003Z	Midget	3
LPSM004ID	LPSM0004ZXID	LPSM004	LPSM0004Z	Midget	4

Multi-Pole Assembly Kit Ordering No. CYHP0001Z-KIT
(Kit contains 20 connector pincers & 10 handle pins)

POWR-GARD® Blocks & Holders

LPSM Series POWR-SAFE Fuse Holders

Dimensions inches (mm)



Disclaimer Notice – Information furnished is believed to be accurate and reliable. However, users should independently evaluate the suitability of and test each product selected for their own applications. Littelfuse products are not designed for, and may not be used in, all applications. Read complete Disclaimer Notice at www.littelfuse.com/product-disclaimer.

Supplemental Fuses

FLM Series

Item 16

250 V ac • 10x38 (Midget) • Time-Delay • $\frac{1}{10}$ –30 A



Description

The FLM series 250 V fuses are designed to protect control circuit transformers, solenoids, and other circuits with high in-rush currents. They are also excellent for supplemental protection of small motors. The time-delay design can carry an overload several times the normal load for a short period of time without blowing. The FLM fuses are non-indicating and may be used with an indicating fuse block to identify a blown fuse.

Features & Benefits

FEATURES	BENEFITS
10x38 mm size	Common dimensions used in a variety of applications
Time-delay	Allows for temporary current surge for a short period of time without blowing
Paper body	Cost effective materials provide a lower cost alternative for supplemental circuit protection
POWR-GARD® technology	Ensures quality backup overcurrent protection

Applications

- Control circuit transformers
- Solenoids
- Circuits with high in-rush currents
- Small motors

Supplemental Fuses

FLM Series

Specifications

Voltage Rating	Ac: 250 V Dc: 125 V
Interrupting Ratings	Ac: 10,000 A Dc: 10,000 A Self Certified
Ampere Range	$\frac{1}{10}$ –30 A
Applicable Standards	UL 248-14
Environmental	REACH, RoHS
Material	Body: Paper Cap: Nickel plated bronze
Country of Origin	Mexico
Fuse Weight	.010 lbs (4.54g)

Certification & Compliance

UL	UL Listed (File: E10480)
CSA	CSA Certified (File: LR29862)
CE	EU_DOC-FLM_210323
QPL	MIL-F-15160/9
RoHS	RoHS 2 Directive 2011/65/EU; Directive (EU) 2015/863

Accessories

L60030M series fuse block
LEB/LEX series inline fuse holder
LPSM Touch-safe series fuse holder
571/572 series panel mount fuse holder

Ordering Information

AMPERE	CATALOG NUMBER	PRODUCT MARKING	PACK QUANTITY	ORDERING NUMBER	UPC
$\frac{1}{10}$	FLM.100	FLM $\frac{1}{10}$ A	10	OFLM.100T	07945814011
$\frac{15}{100}$	FLM.125	FLM $\frac{15}{100}$ A	10	OFLM.125T	07945814013
$\frac{3}{10}$	FLM.200	FLM $\frac{3}{10}$ A	10	OFLM.200T	07945814018
$\frac{1}{4}$	FLM.250	FLM $\frac{1}{4}$ A	10	OFLM.250T	07945814019
$\frac{3}{10}$	FLM.300	FLM $\frac{3}{10}$ A	10	OFLM.300T	07945800083
$\frac{3}{10}$	FLM.400	FLM $\frac{3}{10}$ A	10	OFLM.400T	07945814023
$\frac{1}{2}$	FLM.500	FLM $\frac{1}{2}$ A	10	OFLM.500T	07945814024
$\frac{3}{10}$	FLM.600	FLM $\frac{3}{10}$ A	10	OFLM.600T	07945800084
$\frac{3}{10}$	FLM.800	FLM $\frac{3}{10}$ A	10	OFLM.800T	07945800085
1	FLM001	FLM 1A	10	OFLM001.T	07945814031
1 $\frac{1}{8}$	FLM1.12	FLM 1- $\frac{1}{8}$ A	10	OFLM1.12T	07945814032
1 $\frac{1}{4}$	FLM1.25	FLM 1- $\frac{1}{4}$ A	10	OFLM1.25T	07945814034
1 $\frac{1}{10}$	FLM01.4	FLM 1- $\frac{1}{10}$ A	10	OFLM01.4T	07945814036
1 $\frac{1}{2}$	FLM01.5	FLM 1- $\frac{1}{2}$ A	10	OFLM01.5T	07945814037

Supplemental Fuses

FLM Series

Ordering Information

AMPERE	CATALOG NUMBER	PRODUCT MARKING	PACK QUANTITY	ORDERING NUMBER	UPC
1 $\frac{1}{10}$	FLM01.6	FLM 1- $\frac{1}{10}$ A	10	OFLM01.6T	07945814038
1 $\frac{1}{10}$	FLM01.8	FLM 1- $\frac{1}{10}$ A	10	OFLM01.8T	07945814040
2	FLM002	FLM 2A	10	OFLM002.T	07945814041
2 $\frac{1}{4}$	FLM2.25	FLM 2- $\frac{1}{4}$ A	10	OFLM2.25T	07945814042
2 $\frac{1}{2}$	FLM02.5	FLM 2- $\frac{1}{2}$ A	10	OFLM02.5T	07945814043
2 $\frac{3}{10}$	FLM02.8	FLM 2- $\frac{3}{10}$ A	10	OFLM02.8T	07945814046
3	FLM003	FLM 3A	10	OFLM003.T	07945814047
3 $\frac{1}{10}$	FLM03.2	FLM 3- $\frac{1}{10}$ A	10	OFLM03.2T	07945814049
3 $\frac{1}{2}$	FLM03.5	FLM 3- $\frac{1}{2}$ A	10	OFLM03.5T	07945814051
4	FLM004	FLM 4A	10	OFLM004.T	07945814053
4 $\frac{1}{2}$	FLM04.5	FLM 4- $\frac{1}{2}$ A	10	OFLM04.5T	07945814054
5	FLM005	FLM 5A	10	OFLM005.T	07945814055
5 $\frac{1}{10}$	FLM05.6	FLM 5- $\frac{1}{10}$ A	10	OFLM05.6T	07945814056
6	FLM006	FLM 6A	10	OFLM006.T	07945814058
6 $\frac{1}{4}$	FLM6.25	FLM 6- $\frac{1}{4}$ A	10	OFLM6.25T	07945814059
7	FLM007	FLM 7A	10	OFLM007.T	07945814061
8	FLM008	FLM 8A	10	OFLM008.T	07945814063
9	FLM009	FLM 9A	10	OFLM009.T	07945814064
10	FLM010	FLM 10A	10	OFLM010.T	07945814065
12	FLM012	FLM 12A	10	OFLM012.T	07945814066
15	FLM015	FLM 15A	10	OFLM015.T	07945814068
20	FLM020	FLM 20A	10	OFLM020.T	07945814071
25	FLM025	FLM 25A	10	OFLM025.T	07945814072
30	FLM030	FLM 30A	10	OFLM030.T	07945814073

Electrical Specification - Agency Requirements

AMPERAGE RATING	OPENING TIME (MINUTES)		
	100 % OF AMP RATING PER UL	135 % OF AMP RATING PER UL	200 % OF AMP RATING PER UL
$\frac{1}{10}$ –3	Temperature Stabilization	60 Minutes Max	5 Seconds Minimum
3 $\frac{1}{10}$ –30	Temperature Stabilization	60 Minutes Max	12 Seconds Minimum

Electrical Specifications

CATALOG NUMBER	VOLTAGE AC (V)	INTERRUPTING RATING (A)	NOMINAL COLD RESISTANCE (OHMS)	AGENCY APPROVALS			
				UL	CSA	QPL	CE
FLM.100	250	10,000	188.0	•	•	•	•
FLM.125	250	10,000	87.00	•	•	•	•
FLM.200	250	10,000	35.10	•	•	•	•
FLM.250	250	10,000	16.82	•	•	•	•
FLM.300	250	10,000	6.739	•	•	•	•
FLM.400	250	10,000	5.413	•	•	•	•

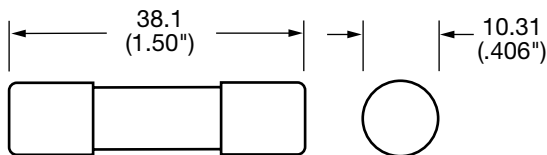
Supplemental Fuses

FLM Series

Electrical Specifications

CATALOG NUMBER	VOLTAGE AC (V)	INTERRUPTING RATING (A)	NOMINAL COLD RESISTANCE (OHMS)	AGENCY APPROVALS			
				UL	CSA	QPL	CE
FLM.500	250	10,000	3.790	•	•	•	•
FLM.600	250	10,000	2.050	•	•	•	•
FLM.800	250	10,000	1.024	•	•	•	•
FLM001	250	10,000	1.024	•	•	•	•
FLM1.12	250	10,000	.6231	•	•	•	•
FLM1.25	250	10,000	.6231	•	•	•	•
FLM01.4	250	10,000	.3950	•	•	•	•
FLM01.5	250	10,000	.3390	•	•	•	•
FLM01.6	250	10,000	.2860	•	•	•	•
FLM01.8	250	10,000	.2530	•	•	•	•
FLM002	250	10,000	.2191	•	•	•	•
FLM2.25	250	10,000	.1840	•	•	•	•
FLM02.5	250	10,000	.1620	•	•	•	•
FLM02.8	250	10,000	.1250	•	•	•	•
FLM003	250	10,000	.1020	•	•	•	•
FLM03.2	250	10,000	.0904	•	•	•	•
FLM03.5	250	10,000	.0735	•	•	•	•
FLM004	250	10,000	.0700	•	•	•	•
FLM04.5	250	10,000	.0561	•	•	•	•
FLM005	250	10,000	.0413	•	•	•	•
FLM05.6	250	10,000	.0326	•	•	•	•
FLM006	250	10,000	.0280	•	•	•	•
FLM6.25	250	10,000	.0277	•	•	•	•
FLM007	250	10,000	.0213	•	•	•	•
FLM008	250	10,000	.0124	•	•	•	•
FLM009	250	10,000	.0106	•	•	•	•
FLM010	250	10,000	.0090	•	•	•	•
FLM012	250	10,000	.0069	•	•	•	•
FLM015	250	10,000	.0053	•	•	•	•
FLM020	250	10,000	.0038	•	•	•	•
FLM025	250	10,000	.0027	•	•	•	•
FLM030	250	10,000	.0022	•	•	•	•

Dimensions Millimeters (inches)

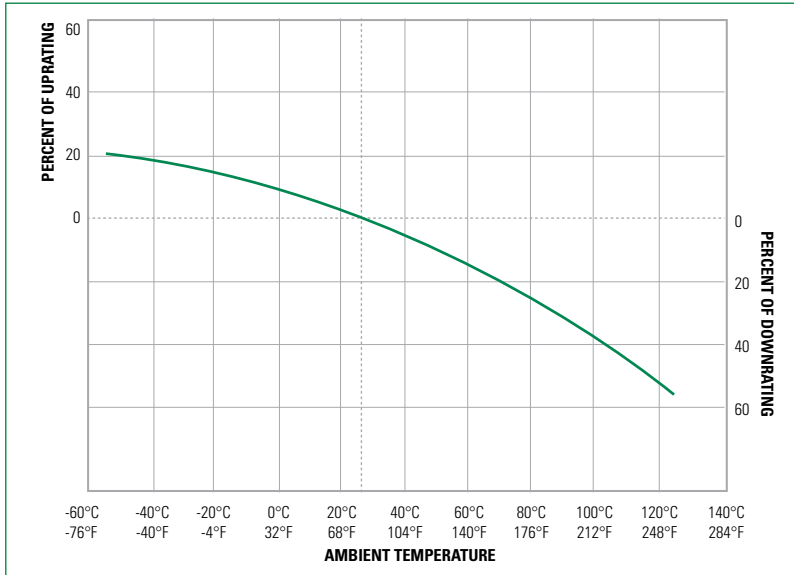


Supplemental Fuses

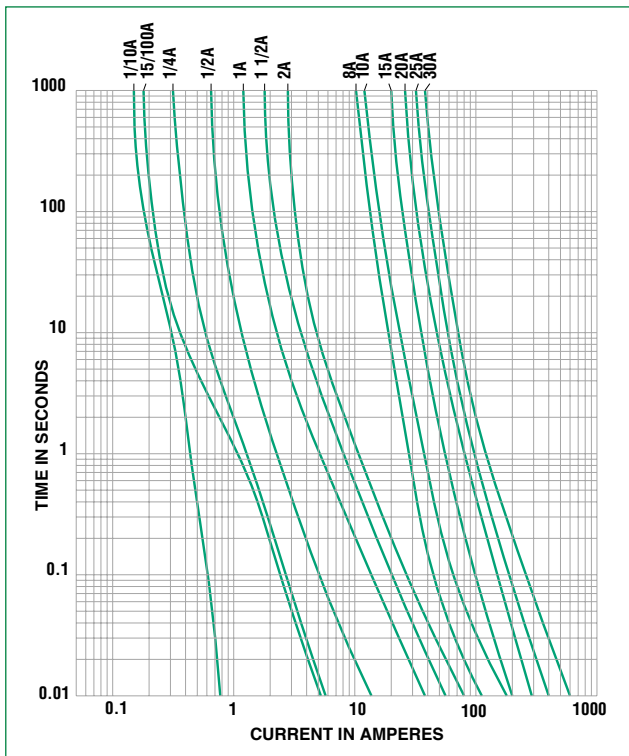
FLM Series

Temperature Derating Curve

Ambient temperature: temperature of air immediately surrounding fuse



Time Current Curves



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Item 8



should be 18, not 8

Item 18

 TECHNICAL CATALOG

Low voltage AC drives

ABB general purpose drives
ACS580, 1 to 350 hp



Technical data

Mains connection	
Voltage and power range	3-phase, U_N 380 to 480 V, +10%/-15% ACS580-01: 1 to 350 hp (0.75 to 250 kW)
Frequency	from 48 to 63 Hz
Power factor	$\cos\phi = 0.98$
Efficiency (at nominal power)	98%
Motor connection	
Voltage	0 to U_N , 3-phase
Frequency	0 to 500 Hz
Motor control	Scalar and vector control
Torque control	Torque step rise time: <10 ms with nominal torque Non-linearity: $\pm 5\%$ with nominal torque
Speed control	Static accuracy: 20% of motor nominal slip Dynamic accuracy: 1% seconds with 100% torque step
Product compliance	
CE Low Voltage Directive 2006/95/EC, EN 61800-5-1: 2007 Machinery Directive 2006/42/EC, EN 61800-5-2: 2007 EMC Directive 2004/108/EC, EN 61800-3: 2004 + A1: 2012 RoHS directive 2011/65/EU Quality assurance system ISO 9001 and Environmental system ISO 14001 Waste electrical and electronic equipment directive (WEEE) 2002/96/EC RoHS directive 2011/65/EU UL, EAC, RCM, UL, cUL	

EMC according to EN 61800-3: 2004 + A1: 2012	
Frames R1 to R9 with built-in C2 category filter as standard	
Environmental limits	
Ambient temperature	
Transport	-40 to +70 °C
Storage	-40 to +70 °C
Operation area	ACS580-01: -15 to +50 °C. No frost allowed R1 to R9 from +40 to +50 °C with derating
Cooling method	
Air-cooled	Dry clean air
Altitude	
0 to 1,000 m	Without derating
1,000 to 4,000 m	With derating of 1%/100 m
Relative humidity	5 to 95%, no condensation allowed
Degree of protection	ACS580-01: UL Type 1 (IP21) as standard. UL Type 12 (IP55) as option (frames R1 to R9)
Functional safety	Safe torque off (STO according EN 61800-5-2) IEC 61508 ed2: SIL 3. IEC 61511: SIL 3. IEC 62061: SIL CL 3. EN ISO 13849-1: PL e
Contamination levels	No conductive dust allowed
Storage	IEC 60721-3-1. Class 1C2 (chemical gases). Class 1S2 (solid particles)*
Operation	IEC 60721-3-3. Class 3C2 (chemical gases). Class 3S2 (solid particles)*
Transportation	IEC 60721-3-2. Class 2C2 (chemical gases). Class 2S2 (solid particles)*

*C = chemically active substances

S = mechanically active substances

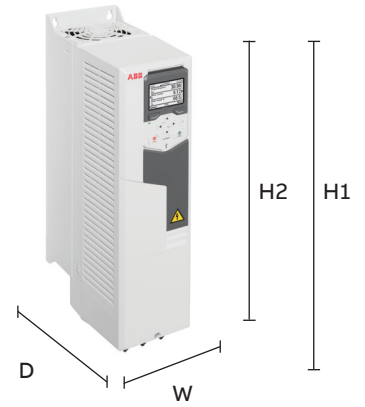
Dimensions

ACS580-01 UL Type 1 (IP21)

Frames	Height				Width		Depth		Weight	
	H1*		H2**		in	mm	in	mm	lb	kg
R1	14.7	373	13	331	4.9	125	8.8	223	10.6	4.8
R2	18.6	473	17	432	4.9	125	9	229	14.3	6.5
R3	19.3	490	---	---	8	203	9	229	26	11.8
R4	22.9	580	---	---	8	203	10.1	257	41.9	19
R5	28.8	732	23.5	596	8	203	11.6	295	62.4	28.3
R6	28.6	727	21.6	548	9.9	252	14.5	369	93.5	42.4
R7	34.6	880	23.6	600	11.2	284	14.6	370	119.1	54
R8	38	965	26.8	680	11.8	300	15.5	393	152.2	69
R9	37.6	955	26.8	680	15	380	16.5	418	213.9	97

* Front height of the drive with conduit box

** Front height of the drive without conduit box



ACS580-01 UL Type 12 (IP55) (option +B056)

Frames	Height*		Width		Depth		Weight	
	in	(mm)	in	mm	in	mm	lb	kg
R1	15.9	403	5.6	128	9.2	233	11.25	5.1
R2	19.8	503	5.1	128	9.4	239	14.8	6.7
R3	19.3	490	8.1	206	9.3	237	28.7	13
R4	25	636	8	203	10.4	265	44.1	20
R5	28.9	732	8	203	12.6	320	64	29
R6	28.6	726	9.9	252	15	380	94.9	43
R7	34.7	880	11.2	284	15	380	123.5	56
R8	38	965	11.8	300	17.8	452	169.8	77
R9	37.6	955	15	380	18.8	380	227.1	103

* Front height of the drive with conduit box



Ratings, types and voltages

Wall-mounted drives, ACS580-01

3-phase, $U_N = 440, 460, 480$ V

Type code	Frame Size	Max. output current	Light overload use		Heavy-duty use	
		I_{max} (A)	I_{Ld} (A)	P_{Ld} (hp)	I_{Hd} (A)	P_{Hd} (hp)
ACS580-01-02A1-4	R1	2.9	2.1	1	1.6	0.75
ACS580-01-03A0-4	R1	3.8	3	1.5	2.1	1
ACS580-01-03A5-4	R1	5.4	3.5	2	3	1.5
ACS580-01-04A8-4	R1	6.1	4.8	3	3.4	2
ACS580-01-06A0-4	R1	7.2	6	3	4	3
ACS580-01-07A6-4	R1	8.6	7.6	5	4.8	3
ACS580-01-012A-4	R1	11.4	12	7.5	7.6	5
ACS580-01-014A-4	R2	19.8	14	10	11	7.5
ACS580-01-023A-4	R2	25.2	23	15	14	10
ACS580-01-027A-4	R3	37.8	27	20	21	15
ACS580-01-034A-4	R3	48.6	34	25	27	20
ACS580-01-044A-4	R3	61.2	44	30	34	25
ACS580-01-052A-4	R4	76	52	40	40	30
ACS580-01-065A-4	R4	104	65	50	52	40
ACS580-01-077A-4 †	R4	122	77	60	65	50
ACS580-01-078A-4	R5	122	77	60	65	50
ACS580-01-096A-4	R5	148	96	75	77	60
ACS580-01-124A-4	R6	178	124	100	96	75
ACS580-01-156A-4	R7	247	156	125	124	100
ACS580-01-180A-4	R7	287	180	150	156	125
ACS580-01-240A-4	R8	350	240	200	180	150
ACS580-01-260A-4	R8	418	260	200	240*	150
ACS580-01-302A-4 †	R8	TBD	302	250	260	200
ACS580-01-361A-4	R9	542	361	300	302	250
ACS580-01-414A-4	R9	542	414	350	361**	300

† Coming soon

Nominal ratings

I_N Rated current available continuously without overloadability at 40 °C.

P_N Typical motor power in no-overload use.

Maximum output current

I_{max} Maximum output current. Available for 2 seconds at start, then as long as allowed by drive temperature.

Light-overload use

I_{Ld} Continuous current allowing 110% I_{Ld} for 1 minute every 10 minutes at 40 °C.

P_{Ld} Typical motor power in light-overload use.

Heavy-duty use

I_{Hd} Continuous current allowing 150% I_{Hd} for 1 minute every 10 minutes at 40 °C.
 * Continuous current allowing 130% I_{Hd} for 1 minute every 10 minutes at 40 °C.
 ** Continuous current allowing 125% I_{Hd} for 1 minute every 10 minutes at 40 °C.

P_{Hd} Typical motor power in heavy-duty use.

The ratings apply for the frames R1 to R9 up to +40 °C in enclosure class 21.

For derating at higher altitudes, temperatures, switching frequencies or enclosure classes, see the HW manuals, document codes: 3AXD50000018826 and 3AXD50000015497.

Control panel options

—
01 Assistant control panel is included as standard.

—
02 Optional Bluetooth panel. USB connection as standard.

—
03 By using the CDPI-01 panel adapter, the assistant control panel is able to manage up to 32 drives.

Assistant control panel

Set up the drive using the assistant control panel delivered as standard with all ACS580 drives. There is no need to know any drive parameters, as the control panel helps to set up the essential settings quickly and get the drive into action.

- Drive setup with the primary settings menu including embedded assistants
- Process monitoring with one glance at the control panel's editable home view showing you the status of the drive and process
- Drive maintenance with the help function providing context-sensitive guidance and troubleshooting instructions
- Drive diagnostics under the diagnostics menu informing the user of the root cause.

Bluetooth panel

The optional Bluetooth panel enables connection with the Drivetune mobile app. The app is available for free on the Google Play and the Apple App store.

Some of the Drivetune features are: commissioning, troubleshooting, monitoring and controlling the drive. Drivetune also has full parameter access.



Control panel options

Assistant control panel ACS-AP-S is included as standard in the delivery. ACS-AP-S (+J400) can be replaced by +J options below.

Option code	Description	Type designation
+J400	Assistant control panel (+J400 option automatically included)	ACS-AP-S
+J425	Industrial Assistant control panel*	ACS-AP-I
+J429	Control panel with Bluetooth interface*	ACS-AP-W
+J424	Blank control panel cover (no control panel delivered)	CDUM-01
3AXD5000004419	Panel bus adapter	CDPI-01
3AUA0000108878	Control panel mounting platform (flush mounted, requires also panel bus adapter on the drive)	DPMP-01
3AXD50000010763	Door mounting kit for the panel, surface mounted (for one drive, contains both DPMP-02 and CDPI-01)	DPMP-EXT

* Also compatible with ACS880 drives

Additional options

04 Cold configuration adapter CCA-01

05 Remote monitoring tool NETA-21

06 Drive composer PC tool

Safe configuration for unpowered drives

The CCA-01 cold configuration adapter provides a serial communication interface for unpowered ACS580 drives. With the adapter, safety isolation of both serial communication and control board power supply is possible. The power supply is taken from a PC USB port.

Remote monitoring access worldwide

The NETA-21 remote monitoring tool gives easy access to the drive via the Internet or local Ethernet network. NETA-21 comes with a built-in web server. Compatible with standard web browsers, it ensures easy access to a web-based user interface. Through the web interface, the user can configure drive parameters, and monitor drive log data, load levels, runtime, energy consumption, I/O data and bearing temperatures of the motor connected to the drive.

PC tools

The Drive composer PC tool offers fast and harmonized setup, commissioning and monitoring for all-compatible drives. The free version of the tool provides start-up and maintenance capabilities and gathers all drive information, such as parameter loggers, faults, backups and lists, into a support diagnostics file. Drive composer pro provides additional features such as custom parameter windows, graphical control diagrams of the drive's configuration, and improved monitoring and diagnostics.



Ordering code	Description	Type designation
3AXD50000019865	Cold configurator adapter, packed kit	CCA-01

Remote monitoring option

Ordering code	Description	Type designation
3AUA0000094517	2 x panel bus interface 2 x 32 = max. 64 drives 2 x Ethernet interface SD memory card USB port for WLAN/3G	NETA-21

Connectivity options

- 07 ACS580 is compatible with many fieldbus protocols
- 08 Input/output extension modules

Fieldbus adapter modules

The ACS580 general purpose drives are compatible with a wide range of fieldbus protocols. The drive comes with Modbus RTU fieldbus interface as standard. Fieldbus communication reduces wiring costs when compared to traditional hard-wired input/output connections.



Option code	Fieldbus protocol	Adapter
+K451	DeviceNet™	FDNA-01
+K454	PROFIBUS DP, DPV0/DPV1	FPBA-01
+K457	CANopen®	FCAN-01
+K458	Modbus RTU	FSCA-01
+K462	ControlNet	FCNA-01
+K469	EtherCAT®	FECA-01
+K470	POWERLINK	FEPL-02
+K473	EtherNet/IP™, Modbus TCP, PROFINET IO	FENA-11
+K475	Two port EtherNet/IP™, Modbus TCP, PROFINET IO	FENA-21

Input/output extension modules

Standard input and output can be extended by using optional analog and digital input/output extension modules. The modules are easily installed in the extension slots located on the drive.



I/O options

Option code	Description	Type designation
+L501	External 24 V AC and DC 2 x RO and 1 x DO	CMOD-01
+L523	External 24 V and isolated PTC interface	CMOD-02
+L512	115/230 V digital input 6 x DI and 2 x RO	CHDI-01
+L537	ATEX certified PTC interface and external 24V	CPTC-02

EMC – electromagnetic compatibility

Every ACS580 drive is equipped with a built-in filter to reduce high-frequency emissions. EMC product standard (EN 61800-3) category C2 is fulfilled in wall-mounted drives.

EMC standards

The EMC product standard (EN 61800-3) covers the specific EMC requirements stated for drives (tested with motor and motor cable) within the EU. EMC standards such as EN 55011 or

EN 61000-6-3/4 are applicable to industrial and domestic equipment and systems, including the components inside the drive. Drive units complying with the requirements of EN 61800-3 are compliant with comparable categories in EN 55011 and EN 61000-6-3/4 but not necessarily vice versa. EN 55011 and EN 61000-6-3/4 do not specify cable length or require a motor to be connected as a load. The emission limits are comparable to EMC standards according to the table below.

Domestic environments versus public low voltage networks

The first environment includes domestic premises. It also includes establishments directly connected without an intermediate transformer to a low voltage power supply network that supplies buildings used for domestic purposes. The second environment includes all establishments directly connected to public low voltage power supply networks.

Comparison of EMC standards				
EMC according to EN 61800-3 product standard	EN 61800-3 product standard	EN 55011. product family standard for industrial, scientific and medical (ISM) equipment	EN 61000-6-4, generic emission standard for industrial environments	EN 61000-6-3, generic emission standard for residential, commercial and light-industrial environment
1 st environment, unrestricted distribution	Category C1	Group 1. Class B	Not applicable	Applicable
1 st environment, restricted distribution	Category C2	Group 1. Class A	Applicable	Not applicable
2 nd environment, unrestricted distribution	Category C3	Group 2. Class A	Not applicable	Not applicable
2 nd environment, restricted distribution	Category C4	Not applicable	Not applicable	Not applicable

EMC compliance and maximum cable length of ACS580-01/07 units*					
Type	Voltage	Frame sizes	1 st environment, restricted distribution, C2, grounded network (TN)	2 nd environment, unrestricted distribution, C3, grounded network (TN)	2 nd environment, unrestricted distribution, C3, ungrounded network (IT)
ACS580-01	380 - 480 V	R1 - R5	Standard device, cable length 100 m	Standard device, cable length 100 m	-
ACS580-01	380 - 480 V	R6 - R9	Standard device, cable length 150 m	Standard device, cable length 150 m	-

* Motor cable operational functionality up to 300 m. See ACS580 hardware manuals 3AXD50000018826, 3AXD50000015497, 3AXD50000045815 and 3AXD50000032622 for frame specific information.

Cooling and fuses

Cooling

ACS580 drives are fitted with variable-speed cooling air fans. The cooling air must be free from corrosive materials and not exceed the maximum ambient temperature of 40°C for frames R1 to R9 (50°C with derating). The speed-controlled fans cool the drive only when needed, which reduces overall noise level and energy consumption.

Fuse connections

Standard fuses can be used with ABB general purpose drives. For input fuses, see the table below.

Wall-mounted drives, ACS580-01

Cooling air flow and recommended input protection fuses for 380 to 415 V units										
Type designation	Frame size	Cooling Air Flow 380 to 480V units					Recommended UL Input Protection fuses			
		Heat dissipation*		Air flow		Max. noise level**	I _N	Voltage rating	Bussmann type***	UL class
		W	BTU/Hr	m3/h	ft3/hr					
ACS580-01-02A1-4	R1	45	155	34	20	55	15	600	JJS-15	T
ACS580-01-03A0-4	R1	55	187	34	20	55	15	600	JJS-15	T
ACS580-01-03A5-4	R1	66	224	34	20	55	15	600	JJS-15	T
ACS580-01-04A8-4	R1	84	288	34	20	55	15	600	JJS-15	T
ACS580-01-06A0-4	R1	106	362	50	29	55	15	600	JJS-15	T
ACS580-01-07A6-4	R1	133	454	50	29	55	15	600	JJS-15	T
ACS580-01-012A-4	R1	174	593	50	29	55	15	600	JJS-15	T
ACS580-01-014A-4	R2	228	777	128	75	66	30	600	JJS-30	T
ACS580-01-023A-4	R2	322	1100	128	75	66	30	600	JJS-30	T
ACS580-01-027A-4	R3	430	1469	179	105	70	40	600	JJS-40	T
ACS580-01-034A-4	R3	525	1791	179	105	70	50	600	JJS-50	T
ACS580-01-044A-4	R3	619	2114	179	105	70	60	600	JJS-60	T
ACS580-01-052A-4	R4	835	2852	134	79	69	80	600	JJS-80	T
ACS580-01-065A-4	R4	1024	3497	134	79	69	90	600	JJS-90	T
ACS580-01-077A-4 [†]	R4	1240	4235	139	82	63	110	600	JJS-110	T
ACS580-01-078A-4	R5	1240	4235	139	82	63	110	600	JJS-110	T
ACS580-01-096A-4	R5	1510	5157	139	82	63	150	600	JJS-150	T
ACS580-01-124A-4	R6	1476	5041	435	256	67	200	600	JJS-200	T
ACS580-01-156A-4	R7	1976	6748	450	265	67	225	600	JJS-225	T
ACS580-01-180A-4	R7	2346	8012	450	265	67	300	600	JJS-300	T
ACS580-01-240A-4	R8	3336	11393	550	324	65	350	600	JJS-350	T
ACS580-01-260A-4	R8	3936	13422	550	324	65	400	600	JJS-400	T
ACS580-01-302A-4 [†]	R8	4836	16516	1150	677	68	500	600	JJS-500	T
ACS580-01-361A-4	R9	4836	16516	1150	677	68	500	600	JJS-500	T
ACS580-01-414A-4	R9	6036	20614	1150	677	68	600	600	JJS-600	T

[†] Coming soon

* Heat dissipation value is a reference for cabinet thermal design

** The maximum noise level is at full fan speed. When the drive is not operating at full load and at maximum ambient temperature the noise level is lower.

***ABB does not require Bussmann brand fuses. Fuses which meet the appropriate UL class type, current rating, and are rated at 600V, 200 kA may be used.

[ENM Counting Instruments](#) > [Electrical Counters](#) > [E6B Electrical Counter - Two-Hole Panel Mount](#) > [T14 DC Powered Hour Meter II.](#) > [T14 DC Powered Hour Meter I.](#) > [T18 AC Powered Hour Meter III.](#) > [T18 AC Powered Hour Meter II.](#) > [T32 AC/DC DIN Rail Mount Hour Meter](#) > [T40 Quartz DC Hour Meter](#) > [T40 3-Hole Quartz DC Hour Meter](#) > [T40 Square Mount Quartz DC Hour Meter II.](#) > [T41 Quartz DC Hour Meter II.](#) > [T41 Quartz DC Hour Meter I.](#) > [T50 Quartz AC Hour Meter I.](#) > [T50 Quartz AC Hour Meter II.](#) > Item # T50B212

Item # T50B212 with NEMA 4x12 Gasket

with NEMA 4x12 Gasket

ENM's series T50 AC hour meter in a large 3-hole flange. Includes NEMA 4X. 12 rated panel gasket for water and corrosion resistant panel mounting (see accessories). A quartz crystal time base insures accurate time keeping. This model is also frequency insensitive.

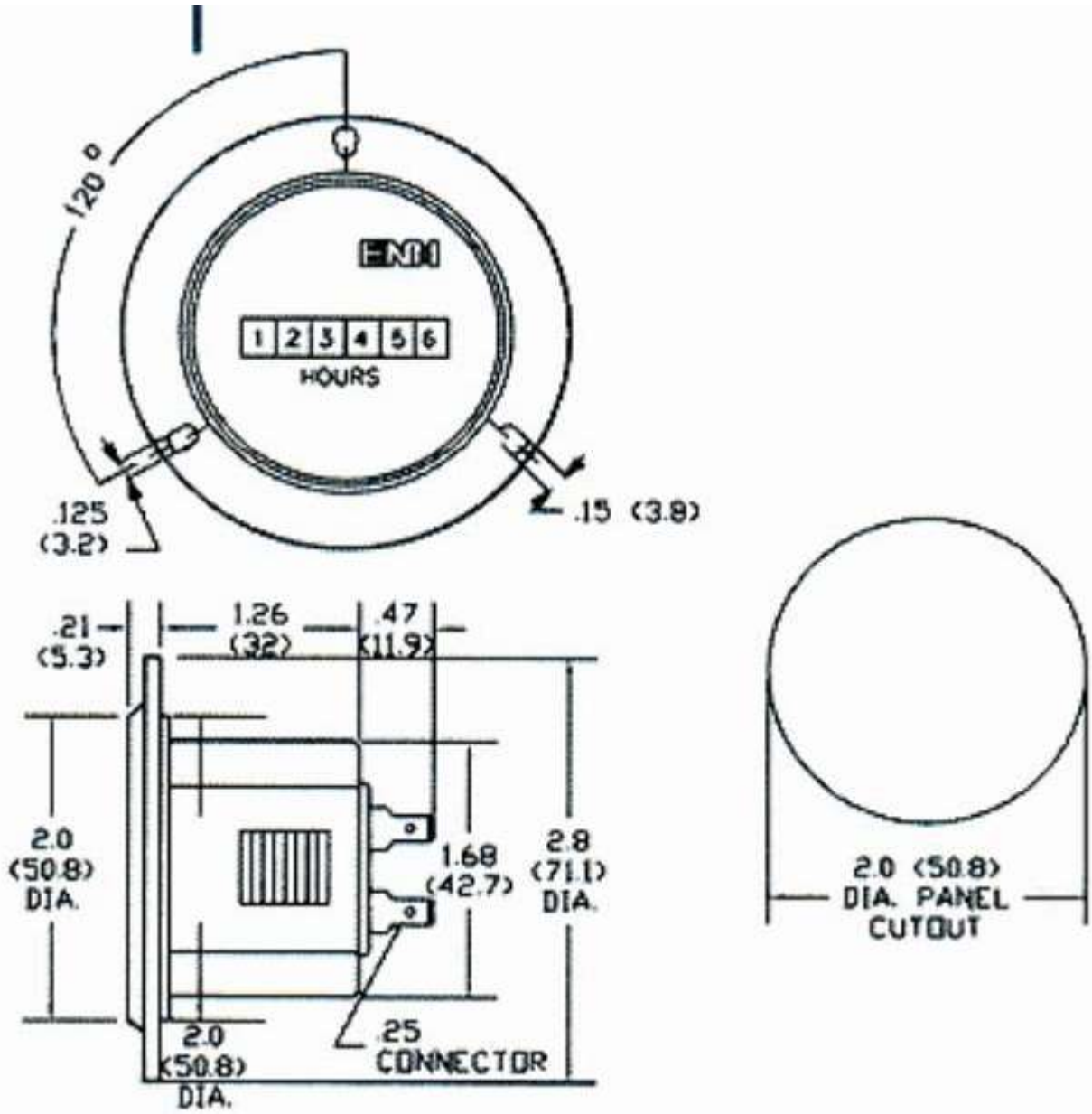


Specifications

Series	T50
Display	6-Digit
Voltage	115 V AC
Reset	None
Size	1.68W x 1.68H x 1.26D Inch
Face Dia - Flange	2.8 Inch
Face Dia - Cutout	2 Inch
Weight	2 oz.
Mounting Style	3-Hole Panel
Power	Less than 0.4 W

Item # T50B212, with NEMA 4x12 Gasket

Dimensional Drawing



PANEL

Panel Mounting is obtained by cutting a circular or rectangular cut-out in the desired panel and the instrument is inserted with the flange resting on the top of the panel. The instrument is held in place by compressing a plastic or steel spring clip from behind the panel. This type of mounting is very popular because it requires no additional fasteners. Models are also considered panel mounted when they are inserted into a panel cut-out and mounted from the front using a two or more hole flange and fastened with screws from the front of the panel (pictured to the right).



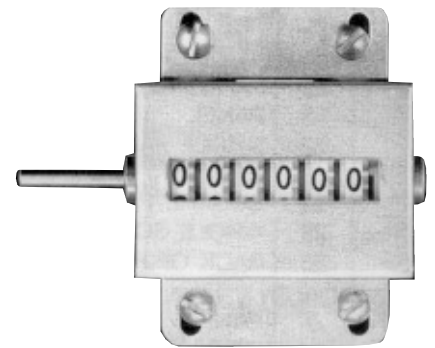
BACK OF PANEL

Back of panel mounting is usually achieved by cutting an opening in a thin panel large enough to read the display. Two or more holes are drilled in the panel and screws are inserted from the front to secure the instrument against the back of the panel wall.



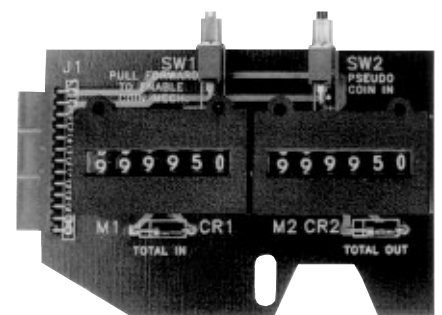
BASE

Base mounting is usually a free standing mount and connections are made with a two or more hole flange at the bottom of the unit. This is a standard mount for most mechanical counters and is sometimes used for hour meters when a panel is not available.



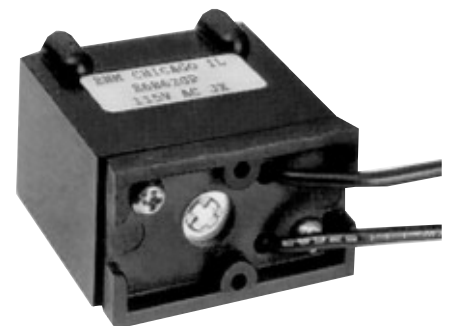
PCB

PC board mounting is common for using counters in add-on PCB modules to electronic machinery. This type of mounting eliminates the need for any wires and multiple counters can be assembled as one unit. The counters are attached by soldering the protruding pins into the PCB and two or more fasteners are also screwed into the bottom of the unit for additional support onto the PC board.



REAR

Rear mounting is similar to PCB mounting except there are no pins for soldering, only two or more holes on the bottom for threaded or self-tapping screws. This is an optional type of mounting used mainly when a suitable panel is not available.



AF40 ... AF96 3-pole contactors

18.5 to 30 kW

AC / DC operated with 1 N.O. + 1 N.C. auxiliary contacts



AF40-30-11



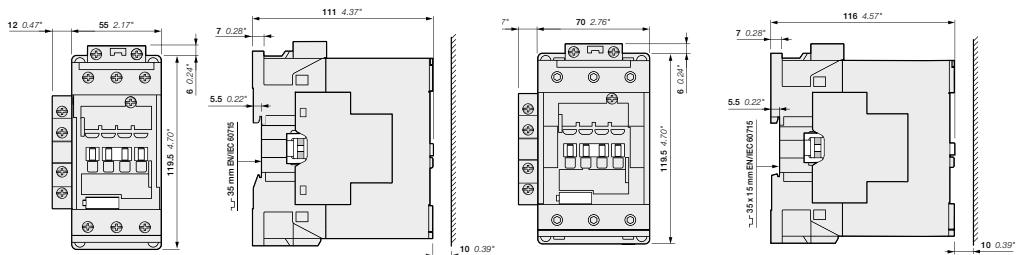
AF80-30-11

AF40 ... AF96 contactors are mainly used for controlling 3-phase motors and power circuits up to 1000 V AC and 220 V DC. These contactors are of the block type design with 3 main poles (1st stack):

- with 1 N.O. + 1 N.C. side mounted auxiliary contact block
- control circuit: AC or DC operated with electronic coil interface accepting a wide control voltage range (e.g. 100...250 V AC and DC), only 4 control voltage ranges covering 24...500 V 50/60 Hz and 20...500 V DC
 - can manage large control voltage variations
 - reduced panel energy consumption
 - very distinct closing and opening
 - can withstand short voltage dips and voltage sags (SEMI F47-0706 conditions of use on request).
- built-in surge suppression
- add-on auxiliary contact blocks for side mounting and a wide range of accessories.

IEC		UL / CSA		Rated control circuit voltage		Auxiliary contacts fitted	Type	Order code	Weight
Rated operational power	current $\theta \leq 40^\circ\text{C}$	3-phase motor rating	General use rating	Uc min. ... Uc max.					
400 V AC-3 kW	AC-1 A	hp	600 V AC A	V 50/60 Hz	V DC			kg	
185	70	30	60	24...60	20...60 (1)	1 1	AF40-30-11-11	1SBL347001R1111	1.010
				48...130	48...130	1 1	AF40-30-11-12	1SBL347001R1211	1.010
				100...250	100...250	1 1	AF40-30-11-13	1SBL347001R1311	0.990
				250...500	250...500	1 1	AF40-30-11-14	1SBL347001R1411	0.990
22	100	40	80	24...60	20...60 (1)	1 1	AF52-30-11-11	1SBL367001R1111	1.010
				48...130	48...130	1 1	AF52-30-11-12	1SBL367001R1211	1.010
				100...250	100...250	1 1	AF52-30-11-13	1SBL367001R1311	0.990
				250...500	250...500	1 1	AF52-30-11-14	1SBL367001R1411	0.990
30	105	50	90	24...60	20...60 (1)	1 1	AF65-30-11-11	1SBL387001R1111	1.010
				48...130	48...130	1 1	AF65-30-11-12	1SBL387001R1211	1.010
				100...250	100...250	1 1	AF65-30-11-13	1SBL387001R1311	0.990
				250...500	250...500	1 1	AF65-30-11-14	1SBL387001R1411	0.990
37	125	60	105	24...60	20...60 (1)	1 1	AF80-30-11-11	1SBL397001R1111	1.260
				48...130	48...130	1 1	AF80-30-11-12	1SBL397001R1211	1.260
				100...250	100...250	1 1	AF80-30-11-13	1SBL397001R1311	1.210
				250...500	250...500	1 1	AF80-30-11-14	1SBL397001R1411	1.210
45	130	60	115	24...60	20...60 (1)	1 1	AF96-30-11-11	1SBL407001R1111	1.260
				48...130	48...130	1 1	AF96-30-11-12	1SBL407001R1211	1.260
				100...250	100...250	1 1	AF96-30-11-13	1SBL407001R1311	1.210
				250...500	250...500	1 1	AF96-30-11-14	1SBL407001R1411	1.210

(1) For control by PLC-output, use RA4 interface relay.



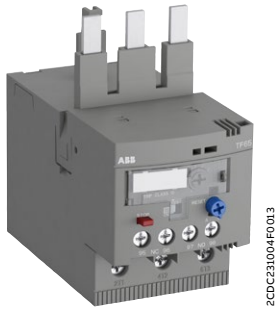
AF40, AF52, AF65-30-11...

AF80, AF96-30-11...

Main dimensions mm, inches

TF65 thermal overload relays – 22.0 to 67.0 A

Ordering details



TF65

2CDC231004F013



DB65

2CDC231003V0015



DB65 + TF65

2CDC231004V0015



KPR-101L

1SFC151224F0002



DRS-F

2CDC211002V0017

The TF65 thermal overload relays are economic electromechanical protection devices for the main circuit. They offer reliable protection for motors in the event of overload or phase failure. The devices have trip class 10.

The thermal overload relays are three pole relays with bimetal tripping elements. The motor current flows through the bimetal tripping elements and heats them directly and indirectly. In case of an overload (over current), the bimetal elements bent as a result of the heating. This leads to a release of the relay and a change of the contacts switching position (95-96 / 97-98).

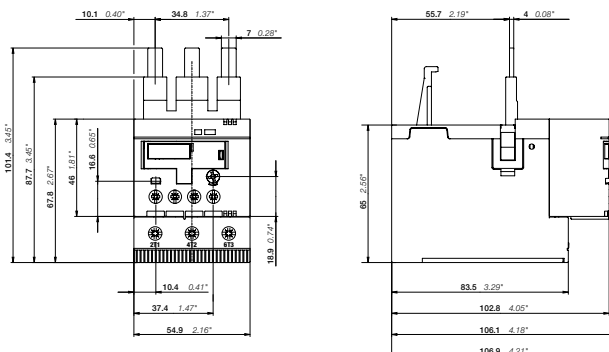
- Manual or automatic reset selectable
- Phase loss sensitive acc. to IEC/EN 60947-4-1
- TEST and STOP function – Trip indication on the front
- Temperature compensation
- Suitable for three- and single-phase applications
- With ATEX certification (1)

Setting range	Short-circuit protective device	Trip class	Type	Order code	Weight (1 pce) kg
A					
Suitable for AF40...AF65 contactors					
22.0 ... 28.0	80 A, gG Type Fuses	10	TF65-28	1SAZ811201R1001	0.456
25.0 ... 33.0	80 A, gG Type Fuses	10	TF65-33	1SAZ811201R1002	0.456
30.0 ... 40.0	100 A, gG Type Fuses	10	TF65-40	1SAZ811201R1003	0.456
36.0 ... 47.0	125 A, gG Type Fuses	10	TF65-47	1SAZ811201R1004	0.456
44.0 ... 53.0	125 A, gG Type Fuses	10	TF65-53	1SAZ811201R1005	0.456
50.0 ... 60.0	125 A, gG Type Fuses	10	TF65-60	1SAZ811201R1006	0.466
57.0 ... 67.0	160 A, gG Type Fuses	10	TF65-67	1SAZ811201R1007	0.466

Ordering details accessories

Description	Suitable for	Type	Order code	Weight (1 pce) kg
Single mounting kit	TF65	DB65	1SAZ801901R1001	0.132
Reset push button	E16, EF, TF, T16, TA200	KPR-101L	1SFA616162R1014	0.019
Remote reset coil 24-30 V AC / DC	TF42, TF65, TF96	DRS-F-01	1SAX101911R1001	0.077
Remote reset coil 48-60 V AC / DC		DRS-F-02	1SAX101911R1002	0.077
Remote reset coil 110-127 V AC / DC		DRS-F-03	1SAX101911R1003	0.077
Remote reset coil 220-240 V AC / DC		DRS-F-04	1SAX101911R1004	0.077
Remote stop coil 24-30 V DC		DRS-F-TF-01	1SAZ701904R1001	0.077
Remote stop coil 48-60 V DC		DRS-F-TF-02	1SAZ701904R1002	0.077
Remote stop coil 110-127 V DC		DRS-F-TF-03	1SAZ701904R1003	0.077
Remote stop coil 220-240 V DC		DRS-F-TF-04	1SAZ701904R1004	0.077

1) ATEX is valid for products, produced from week 26, 2015.



TF65

Main dimensions mm, inches

TF65 thermal overload relays – 22.0 to 67.0 A

Technical data

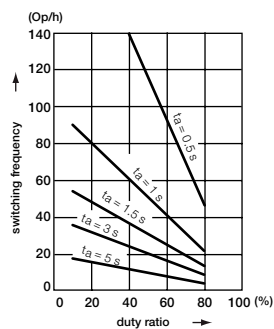
Main circuit – Utilization characteristics according to IEC/EN

Type	TF65
Standards	IEC/EN 60947-1, IEC/EN 60947-4-1, IEC/EN 60947-5-1
Rated operational voltage Ue	690 V AC
Rated frequency	50/60 Hz
Trip class	10
Number of poles	3
Duty time	100%
Operating frequency without early tripping	Up to 15 operations/h, see "Technical diagram – Intermittent periodic duty"
Rated impulse withstand voltage Uimp	8 kV
Rated insulation voltage Ui	690 V

Auxiliary circuit according to IEC/EN

Type	TF65
Rated operational voltage Ue	600 V
Conventional free air thermal current Ith	N.C., 95-96 6 A N.O., 97-98 4 A
Rated frequency	DC, 50/60 Hz
Number of poles	1 N.O. + 1 N.C.
Ie / Rated operational current AC-15 acc. to IEC/EN 60947-5-1 for utilization category	
110-120 V	N.C., 95-96 3.00 A N.O., 97-98 0.50 A
220-230-240 V	N.C., 95-96 3.00 A N.O., 97-98 0.50 A
440 V	N.C., 95-96 0.75 A N.O., 97-98 0.50 A
480-500 V	N.C., 95-96 0.75 A N.O., 97-98 0.50 A
Ie / Rated operational current DC-13 acc. to IEC/EN 60947-5-1 for utilization category	
24 V	N.C., 95-96 1.25 A N.O., 97-98 1.25 A
110-120-125 V	N.C., 95-96 0.55 A N.O., 97-98 0.55 A
250 V	N.C., 95-96 0.27 A N.O., 97-98 0.27 A
Minimum switching capacity	17 V / 3 mA
Short-circuit protective device	N.C., 95-96 6 A, gG Type Fuses N.O., 97-98 4 A, gG Type Fuses
Rated impulse withstand voltage Uimp	6 kV
Rated insulation voltage Ui	690 V

Technical diagram – Intermittent periodic duty



ta: Motor starting time

TF65 thermal overload relays – 22.0 to 67.0 A

Technical data

Main circuit – Utilization characteristics according to UL/CSA

Type	TF65
Standards	UL 60947-1, UL 60947-4-1
Maximum operational voltage	600 V AC
Trip rating	125% of FLA
Full load amps (FLA)	See table "Full load amps and short-circuit protective device"
Short-circuit rating RMS symmetrical	See table "Full load amps and short-circuit protective device"
Short-circuit protective device	See table "Full load amps and short-circuit protective device"

Auxiliary circuit according to UL/CSA

Type	TF65	
Contact rating	N.C., 95-96	B600, Q600
	N.O., 97-98	D300, Q600
Conventional thermal current	N.C., 95-96	6 A
	N.O., 97-98	4 A

Full load amps and short-circuit protective device

Type	Full load amps (FLA)	Short-circuit protective device			
		480 / 600 V AC		480 / 600 V AC	
		Short circuit rating RMS symmetrical	Fuse type	Short circuit rating RMS symmetrical	Fuse type
TF65-28	28 A	5 kA	100 A, K5 / RK5	100 kA	110 A, Class J
TF65-33	33 A	5 kA	100 A, K5 / RK5	100 kA	110 A, Class J
TF65-40	40 A	5 kA	100 A, K5 / RK5	100 kA	110 A, Class J
TF65-47	47 A	5 kA	125 A, K5 / RK5	100 kA	125 A, Class J
TF65-53	53 A	10 kA	125 A, K5 / RK5	100 kA	125 A, Class J
TF65-60	60 A	10 kA	150 A, K5 / RK5	100 kA	150 A, Class J
TF65-67	67 A	10 kA	150 A, K5 / RK5	100 kA	150 A, Class J

TF65 thermal overload relays – 22.0 to 67.0 A

Technical data





General technical data

Type	TF65	
Pollution degree	3	
Phase loss sensitive	Yes	
Ambient air temperature		
Operation (1)	Open - compensated	-40 ... +70 °C
	Open	-40 ... +70 °C
Storage	-50 ... +80 °C	
Ambient air temperature compensation	Acc. to IEC/EN 60947-4-1	
Maximum operating altitude permissible	2000 m	
Resistance to shock acc. to IEC 60068-2-27	25g / 11 ms	
Resistance to vibrations acc. to IEC 60068-2-6	5g / 3 ... 150 Hz	
Mounting position	Position 1 to 6	
Mounting	Mount on the contactor and tighten the screws of the main circuit terminals or with single mounting kit on DIN rail (35 mm)	
Degree of protection	Housing	IP20
	Main circuit terminals	IP10





(1) Valid for TF65 produced from week 11, 2016. Otherwise, -25 ... +60 °C range is valid.
Derating might be applicable for temperatures > 50°C. Data on request

Electrical connection

Main circuit

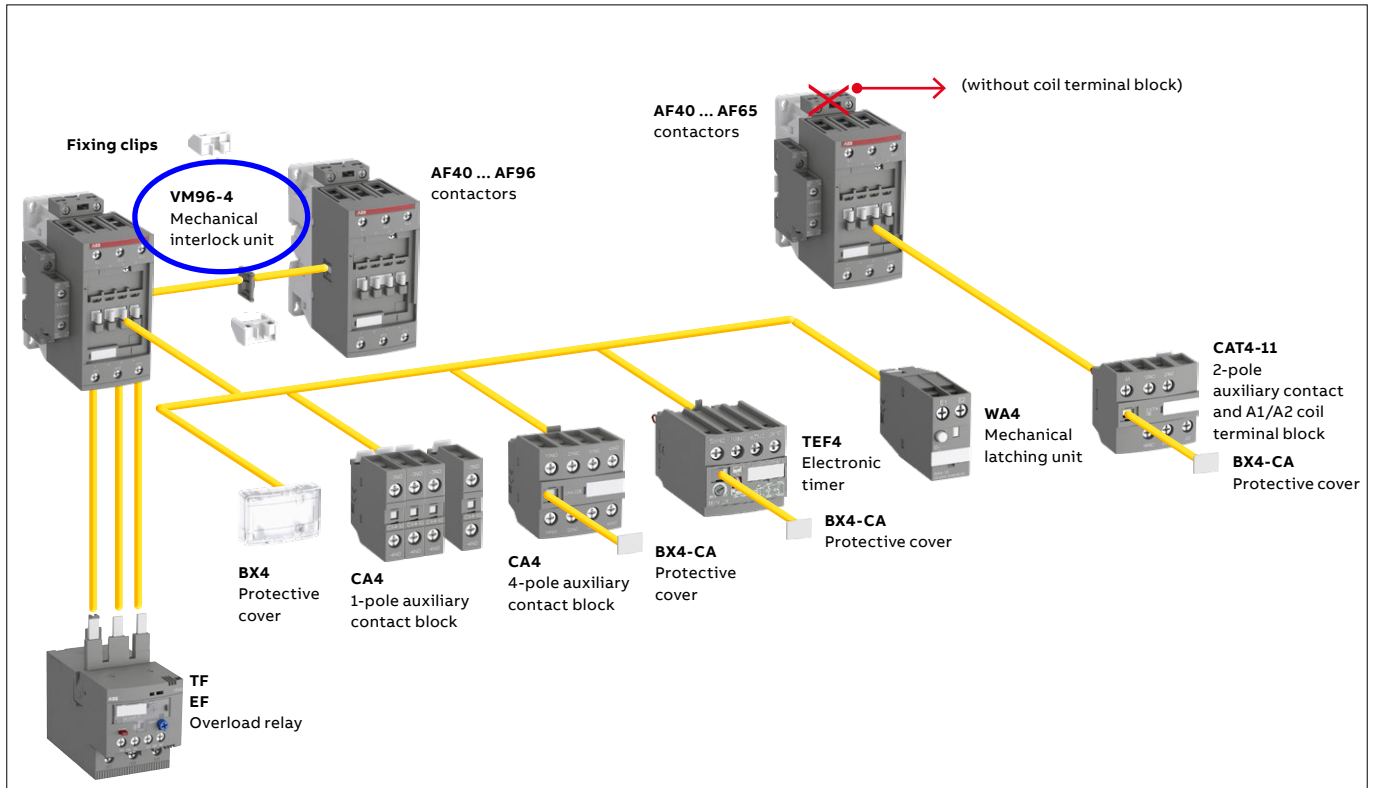
Type	TF65	
Connecting capacity		
 Rigid	1 x or 2 x	2.5 ... 16 mm ²
	1 x	2.5 ... 35 mm ²
 Flexible with ferrule	1 x or 2 x	2.5 ... 10 mm ²
	1 x	2.5 ... 35 mm ²
 Flexible with insulated ferrule	1 x or 2 x	2.5 ... 10 mm ²
	1 x	2.5 ... 35 mm ²
 Flexible	1 x or 2 x	2.5 ... 16 mm ²
	1 x	2.5 ... 35 mm ²
	Stranded acc. to UL/CSA	1 x AWG 12 ... 2
		2 x AWG 12 ... 6
	Flexible acc. to UL/CSA	1 x AWG 12 ... 2
		2 x AWG 12 ... 6
Stripping length	17 mm	
Tightening torque	4.0 - 4.5 Nm / 35 ... 40 lb.in	
Recommended screw driver	M6 (Pozi driv 2)	

Auxiliary circuit

Type	TF65	
Connecting capacity		
 Rigid	1 x or 2 x	0.75 ... 4 mm ²
 Flexible with ferrule	1 x or 2 x	0.75 ... 4 mm ²
 Flexible with insulated ferrule	1 x	0.75 ... 2.5 mm ²
	2 x	0.75 ... 1.5 mm ²
 Flexible	1 x or 2 x	0.75 ... 1 mm ² or 1 ... 2.5 mm ²
	Stranded acc. to UL/CSA	1 x or 2 x AWG 18 ... 12
	Flexible acc. to UL/CSA	1 x or 2 x AWG 18 ... 12
Stripping length	9 mm	
Tightening torque	1.1 ... 1.5 Nm / 9 ... 13 lb.in	
Recommended screw driver	M3 (Pozi driv 2)	

AF40 ... AF96 3-pole contactors with 1 N.O. + 1 N.C. auxiliary contacts

Contactors and main accessories



Main accessory fitting details - for ordering details, technical data and other accessories: see section accessories

Many configurations of accessories are possible depending on whether these are front-mounted or side-mounted.

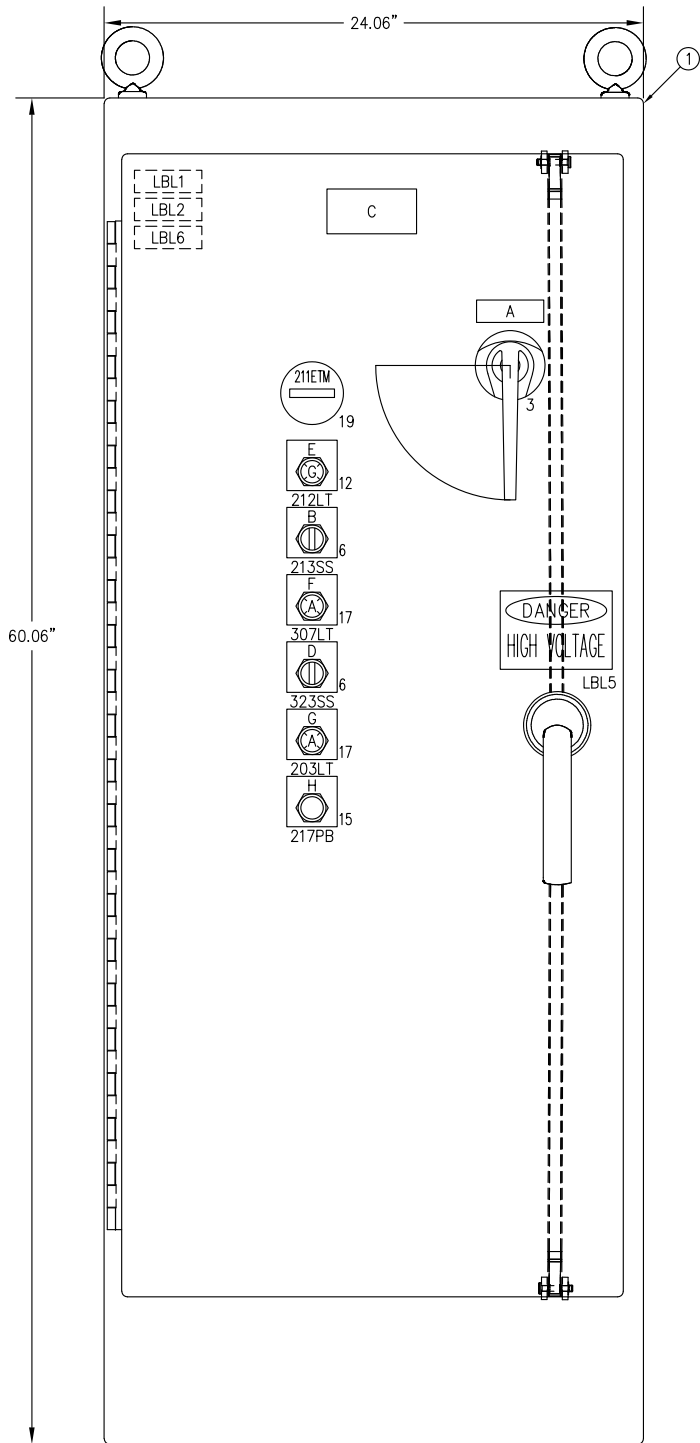
Contactor types	Main poles	Built-in auxiliary contacts	Front-mounted accessories			Electronic timer	Mechanical latching unit (1)	Side-mounted accessories	Auxiliary contact blocks	
			Auxiliary contact blocks						Mechanical interlock set (between 2 contactors)	2-pole CAL4-11
			1-pole CA4	2-pole CAT4-11	4-pole CA4				Left side	
AF40 ... AF65	3 0	1 1	4 max.	or 1	or 1	TEF4	WA4	VM96-4	-	-
			4 max.	or 1	or 1	or 1	or 1	-	+ -	1
AF80, AF96	3 0	1 1	4 max.	-	or 1	or 1	or 1	+ 1	-	-
			4 max.	-	or 1	or 1	or 1	-	+ -	1

(1) Use WA4 for AF09...AF65 and WA4-96 for AF80, AF96.
Accept 1-pole CA4 auxiliary contacts on each side of the mechanical latch.

Overload relays fitting details (2)

Contactor types	Thermal overload relays	Electronic overload relays
AF40 ... AF65	TF65 (22...67 A)	EF65 (20...70 A)
AF80, AF96	TF96 (40...96 A)	EF96 (36...100 A)

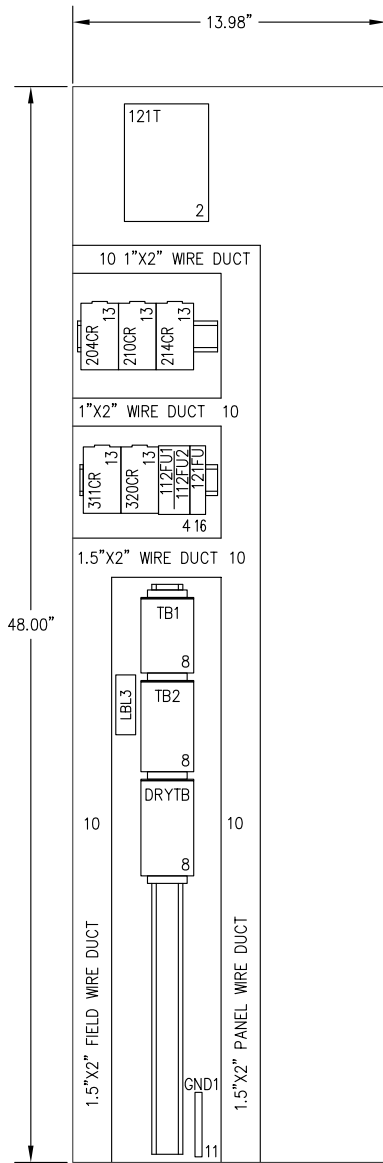
The addition of an overload relay on the contactor does not prevent fitting of many other accessories as shown above.
(2) Direct mounting - No kit required.



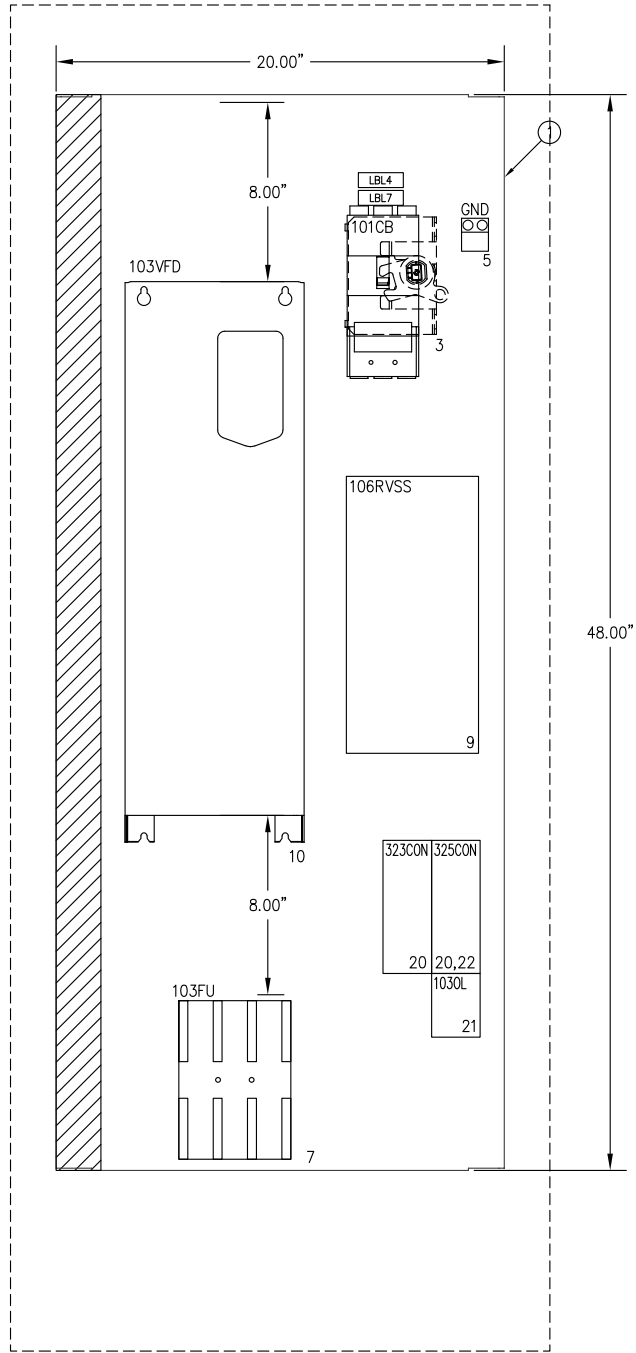
FRONT VIEW
(16" DEEP)

NO.	DATE	REVISION DESCRIPTION	BY
2	07/15/24	ENCLOSURE SIZE CHANGE	BOL
1	04/30/24	DESIGN	BOL

ITEM: BROOKFIELD 133RD PUMP STATION PUMP CONTROL PANEL BILL OF MATERIAL AND SCHEDULES			
DRAWN BY:	DATE:	DWG. NO.	
BOL	04/30/24	AE0174	1/9



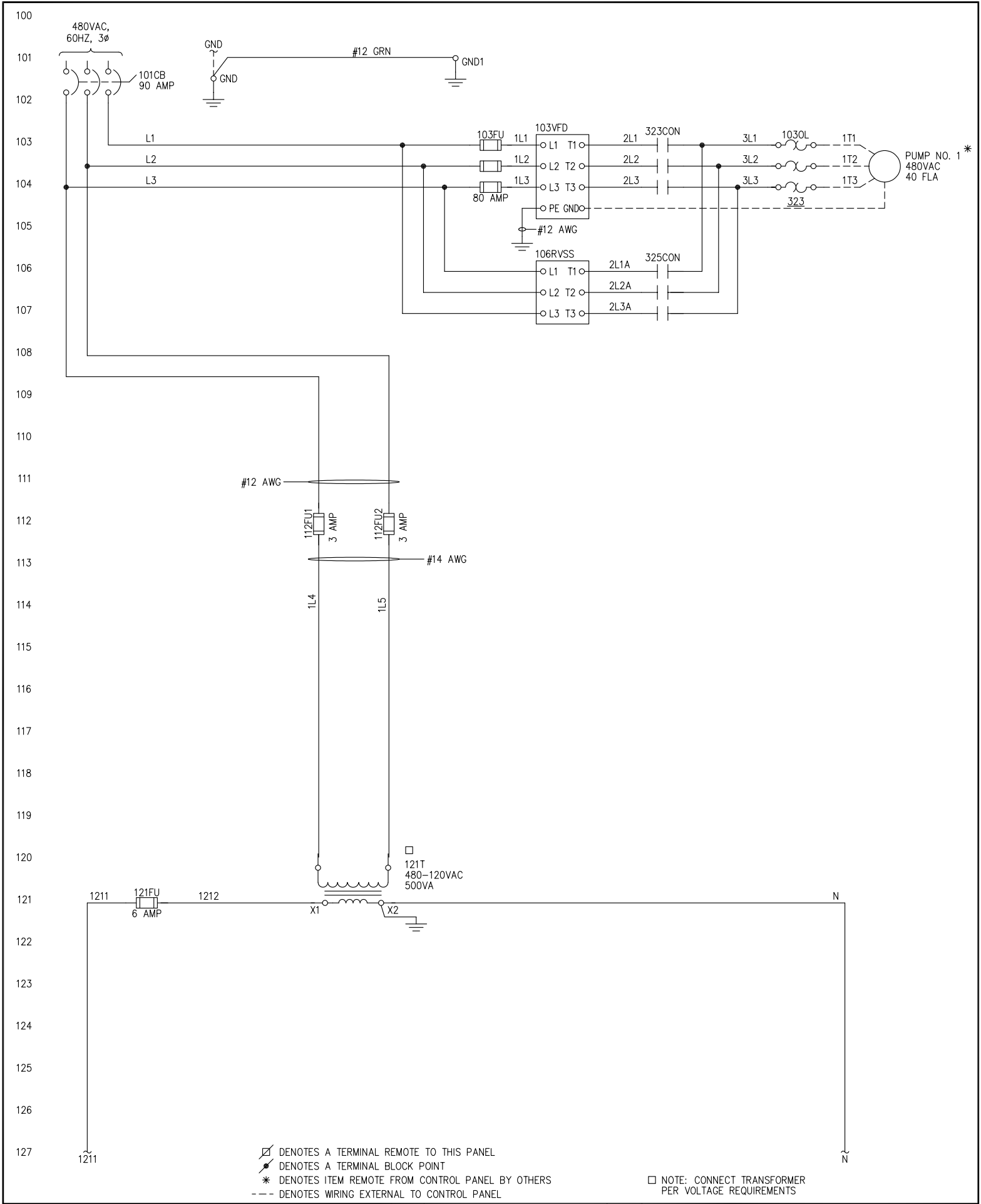
SIDE SUBPANEL LAYOUT



SUBPANEL LAYOUT

NO.	DATE	REVISION DESCRIPTION	BY
2	07/15/24	ENCLOSURE SIZE CHANGE	BOL
1	04/30/24	DESIGN	BOL

ITEM: BROOKFIELD 133RD PUMP STATION PUMP CONTROL PANEL SUBPANEL LAYOUT			
DRAWN BY: BOL	DATE: 04/30/24	DWG. NO. AE0174	2/9



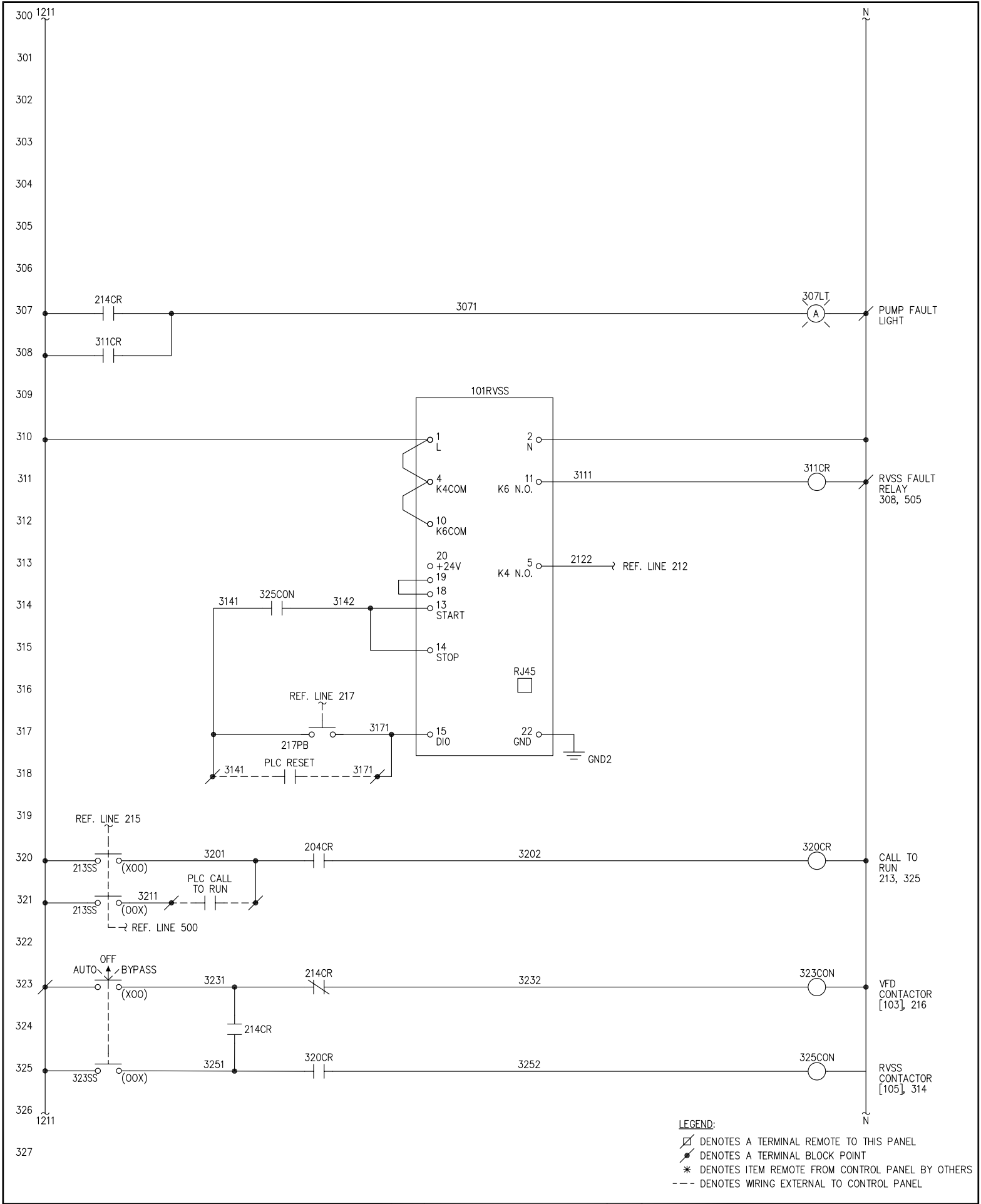
□ DENOTES A TERMINAL REMOTE TO THIS PANEL
 / DENOTES A TERMINAL BLOCK POINT
 * DENOTES ITEM REMOTE FROM CONTROL PANEL BY OTHERS
 --- DENOTES WIRING EXTERNAL TO CONTROL PANEL

□ NOTE: CONNECT TRANSFORMER PER VOLTAGE REQUIREMENTS



NO.	DATE	REVISION DESCRIPTION	BY
2	07/15/24	ENCLOSURE SIZE CHANGE	BOL
1	04/30/24	DESIGN	BOL

ITEM: BROOKFIELD 133RD PUMP STATION PUMP CONTROL PANEL ELECTRICAL SCHEMATIC DIAGRAM			
DRAWN BY: BOL	DATE: 04/30/24	DWG. NO. AE0174	4/9



NO.	DATE	REVISION DESCRIPTION	BY
2	07/15/24	ENCLOSURE SIZE CHANGE	BOL
1	04/30/24	DESIGN	BOL

ITEM: BROOKFIELD 133RD PUMP STATION PUMP CONTROL PANEL ELECTRICAL SCHEMATIC DIAGRAM			
DRAWN BY: BOL	DATE: 04/30/24	DWG. NO. AE0174	6/9

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LEGEND:

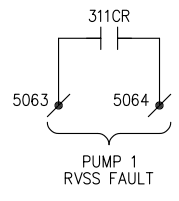
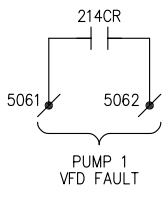
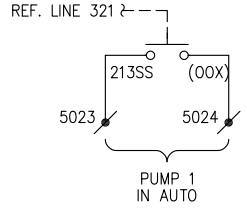
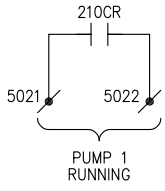
- ☑ DENOTES A TERMINAL REMOTE TO THIS PANEL
- ⚡ DENOTES A TERMINAL BLOCK POINT
- * DENOTES ITEM REMOTE FROM CONTROL PANEL BY OTHERS
- DENOTES WIRING EXTERNAL TO CONTROL PANEL



NO.	DATE	REVISION DESCRIPTION	BY
2	07/15/24	ENCLOSURE SIZE CHANGE	BOL
1	04/30/24	DESIGN	BOL

ITEM: BROOKFIELD 133RD PUMP STATION PUMP CONTROL PANEL ELECTRICAL SCHEMATIC DIAGRAM			
DRAWN BY: BOL	DATE: 04/30/24	DWG. NO. AE0174	7/9

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CONTACT RATING: 10A @ 240VAC & 30VDC (TYP.)
(ORANGE WIRE)

- LEGEND:**
- ☑ DENOTES A TERMINAL REMOTE TO THIS PANEL
 - ⚡ DENOTES A TERMINAL BLOCK POINT
 - * DENOTES ITEM REMOTE FROM CONTROL PANEL BY OTHERS
 - DENOTES WIRING EXTERNAL TO CONTROL PANEL



NO.	DATE	REVISION DESCRIPTION	BY
2	07/15/24	ENCLOSURE SIZE CHANGE	BOL
1	04/30/24	DESIGN	BOL

ITEM: BROOKFIELD 133RD PUMP STATION PUMP CONTROL PANEL ELECTRICAL SCHEMATIC DIAGRAM			
DRAWN BY:	DATE:	DWG. NO.	
BOL	04/30/24	AE0174	8/9



**Brookfield WPCA 133 Pump Station
VFD Submittal**

SIGN-OFF/APPROVAL

7/25/24

NAME:

Serdar Umur

TITLE:

Sales Engineer

PREPARED BY:

Isaiah Russell

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