FLYGT
a xylem brand

Xylem Water Solutions USA, Inc.
Flygt Products

Section 4

Electrical

ZELLER
Automation, Control & Energy
A Division of Kaman

1000 University Avenue
Suite 800
Rochester, NY 14607
Phone: 585 254 8640
Fax: 585-254-4805

PROJECT O&M Manual
Rev A

Project: Town of Bethlehem
New Scotland Road Pump Station
Duplex Pump Control Panel

Customer: Flygt, A Xylem Brand
600 Mile Crossing Blvd, Suite 3
Rochester, NY 14624

WORK ORDER NUMBER	140935	
	DATE	INIT'L
RELEASED FOR APPROVAL	01-27-15	RN
APPROVED AS SUBMITTED		
APPROVED AS NOTED		
CORRECT AND RE-SUBMIT		
COMMENTS: **Please return one (1) approved or marked-up copy for release to manufacture or correction.**		

Project: Town of Bethlehem
New Scotland Road Pump Station
Duplex Pump Control Panel

Customer: Flygt, A Xylem Brand
600 Mile Crossing Blvd, Suite 3
Rochester, NY 14624

TABLE OF CONTENTS

Section 1
Service Contacts

ZELLER
Automation, Control & Energy
A KAMAN COMPANY
1000 University Avenue
Rochester, NY 14607
Phone: 585-254-8840
Fax: 585-254-4805

Project # 140975

Reference: Town of Bethlehem
New Scotland Road Pump Station
Duplex Pump Control Panel

Service Contact Information:

Zeller Corporation
1000 University Avenue
Rochester, NY 14607

Service Department Manager:

Darlene Toole
585-719-2931

Main Office:
585-254-8840
800-295-8696

Section 2
Warranty

ZELLER
Automation, Control & Energy
A Division of Kaman

1000 University Avenue
Suite 800
Rochester, NY 14607
Phone: 585-254-8540
Fax: 585-254-4805

Town of Bethlehem

New Scotland Road Pump Station

Duplex Pump Control Panel

Project # 140935

Xylem PO# 547145

This letter is to confirm that KIT Zeller will warranty the equipment we supplied covered under our scope of work for 18 months from the date of commissioning. The warranty period commenced on 12-08-14 when the system was commissioned, said commissioning was witnessed and approved by the customer. This warranty period will (with the exception of human negligence or acts of extreme nature such as lightning, floods or high winds) provide for the repair of any and all defects of workmanship, as well as repair or replacement of any defective or failed components.

Please feel free to contact KIT Zeller with any questions or comments regarding this letter.

Regards,

Robert Newby

Robert Newby
Design Engineering
KIT - Zeller
1000 University Avenue
Suite 800
Rochester, NY 14607

Section 3
Bill of Material

ZELLERCORPORATION
THE RIGHT SOLUTION FOR YOU

Town of Bethlehem
New Scotland Road Pump Station

BOM Number:	140935-SCOT-BOM	**Revision:**	A
Approval Date:	July 31, 2014	**Approval ER/ECN:**	ECN-140935-0001
Prepared By:	Ryan Youngers		

Item	Device ID	Item Description	Manufacturer	Manufacturer Part No.	New Scotland Road Pump Station
		Zeller			
1	ENCLOSURE	72x60x18 Double Door Enclosure, ANSI-61 gray powder coating inside and out	Saginaw Enclosures	SCE-72EL6018LPPL	1
2	ENCLOSURE	Mounting Panel	Saginaw Enclosures	SCE-72P60	1
3	AH-833	Horn, 120VAC, Weatherproof Back Box	Federal Signal	350WB-120	1
4	BAT-253	MINI-BAT/24DC/1.3AH	Phoenix Contact	2866417	1
5	CB-201	Circuit Breaker, 1 Pole, 15 Amp, 120 vac, 10 KAIC, Curve-C, DIN Rail Mount	Square D	60112	1
6	CB-208, 210, 218, 220, 251	Miniature Circuit Breaker 120V 3 Amps	Square D	60104	5
7	CB-214, 216	Miniature Circuit Breaker 120V 1 Amp	Square D	60101	2
8	CON-520, 521, 523, 525, 570, 571, 573, 575	IEC Reversing Contactor, 3 Pole, 50 a, 600 vac, 120 Vac Coil, 50/60 Hz, with Everlink, DIN Mount	Square D	LC2D50AG7	4
9	CR-222-684	Relay, 4PDT, 6 Amp, Rectangular, Plug-In, 14 Pin, 120VAC Lighted Coil	Square D	RXM4AB2F7	24
10	CR-510-834	Relay Socket-14 Pole-300vac-10 Amp-Blade Base-For RXM relays-DIN Rail Mount-Separate Terminals	Square D	RXZE2S114M	33
11	CR-804, 807	Relay, 4PDT, 6 Amp, Rectangular, Plug-In, 14 Pin, 24 Vdc Lighted Coil	Square D	RXM4AB2BD	2
12	CT-663, 666	TRANSFORMER-TRANSDUCER, FLYGT 0-50A/4-20MA DC	FlYGT	40-402203	2
13	ETM-508, 558	Hour Meter, 6 Digit including tenths, 120 Vac, Non-Resettable, electromechanical	ENM Company	T50B2	2
14	FAN-210	Filter Fan 424CFM, 115V, 50/60HZ	Rittal Corporation	3244110	1
15	FAN-210	Exhaust Filter for Filter Fan 3243xx/3244xxx	Rittal Corporation	3243200	1
16	FU-131	Fuse, Cartridge, 20 Amp, 600 Vac, 200 KAIC, Time Delay, Class "CC", 13/32 x 1-1/2"	Mersen	ATQR20	2
17	FU-131	Fuseholder, 2 Pole, 30 amp, 600 Vac, 200 KAIC, Class "CC"	Mersen	USCC2	1
18	FU-222	UK-6.3-HESILA-250, Fuse Terminal Block, Indicating, 1 Pole, 16 Amp, 250 Vac, 1/4"x1-1/4"	Phoenix Contact	3004249	1
19	FU-222-266	Fuse, 1 Amp, 125 Vac, Time Delay, Glass, 1/4" x 1-1/4"	Ferraz Shawmut	GDL1	6
20	FU-256	Fuse, 6 Amp, 125 Vac, Time Delay, Glass, 1/4" x 1-1/4"	Ferraz Shawmut	GDL6	1
21	FU-256-266	UK-6.3-HESILED-24, Fuse Terminal Block, Indicating, 1 Pole, 16 Amp, 24 Vdc, 1/4"x1-1/4"	Phoenix Contact	3004265	6
22	GND-105	Equipment Ground Bar Assembly, 9 Position, 100 Amp	Square D	PK9GTA	1
23	GND-105	Equip Grd Assembly 240V + 600V 100-200	Square D	PKOGTA2	1
24	HTR-208	HEATER, 120VAC, 75W	Rittal Corporation	3105350	1
25	IS-656	Intrinsically Safe Barrier for Level Transmitter	Phoenix Contact	2865793	1
26	IS-656, 802	Polystyrene Multibox, 7.2"x7.1"x6.5", With clear cover.	Vynckier	MB070765PSCT	1
27	IS-802	MACX MCR-EX-SL-2NAM-R-UP Intrinsically Safe Barrier, 2 Digital, 24-230 Vac/dc	Phoenix Contact	2865984	1
28	LF-101, 115	HARMONIC FILTER, 480 VAC, 44 AMPS	MTE Corporation	MAPP0044D002	2
29	LT-205	24" Enclosure Light, 18 Watt Fluorescent, 110 vac, 60Hz, Less T8 Bulb	Hammond Manufacturing	FLK24T8	1

30	LT-212	Pilot Light LED 120 VAC 22mm XB5, White. Complete Device + Options	Square D	XB5AVG1	1
31	LT-811, 817	PUSHBUTTON, ILLUMINATED LED 120VAC, GREEN	Square D	XB5AW33G5	2
32	LT-812, 814, 815, 818, 820, 821	PUSHBUTTON, ILLUMINATED LED 120VAC, YELLOW	Square D	XB5AW35G5	6
33	PB-826	Push Button, 22mm Black, 1 N/O, NEMA 4X	Square D	XB5AA21	1
34	PC-601	CONTROLLER, APP 721	FIYGT	40-501562	1
35	PC-702	I/O MODULE RIO-R02 2 ANALOG OUTPUTS	FIYGT	40-402004	1
36	RECP-201	Alarm Strobe, NEMA-4X, Red, 120 Vac, 0.10 Amp, Surface Mount, 65-95 FPM	Federal Signal	LP3S-120R	2
37	SP-110, 113	Surge Suppressiong Device, 480, 3 Phase	Ferraz Shawmut	ST4803PDGM	2
38	SP-656	TT-2-PE-M-24DC, Surge Protection, 1 Pair floating, 24VDC, with Integral Disconnect Knife Switches	Phoenix Contact	2920641	1
39	SP-804, 807	Surge Suppressor, 24VDC, 1 Dig	Phoenix Contact	2920638	2
40	SP-807	TTD2PE-MBK, Surge Protection Module End Cover for 2920641 suppressor	Phoenix Contact	2920654	1
41	SPLIT-706	MINI MCR-SL-UI-2I-NC MCR signal duplicator for electrical isolation and doubling of analog signals	Phoenix Contact	2864176	1
42	SR-526, 576	Mini-Cas Ii/Fus Modules	ITT Flygt (Xylem)	14-407129	2
43	SR-526, 576	Finger Safe Terminal Cover. Use with P3GA-11 Socket	Omron Electronic Components	Y92A-48G	2
44	SR-526, 576	Omron Relay Base	Omron Industrial Automation	P3GA-11	2
45	SS-501, 504, 517, 551	Auxiliary Contact Block, 1NO	Square D	ZBE101	4
46	SS-501, 551, 519, 569	Selector Switch, 3 Maintained Pos., 2 NO contacts, Std. Knob	Square D	XB5AD33	4
47	SS-504, 517	Selector Switch, 22mm, 2 Position, 1 N/O	Square D	XB5AD21	2
48	SS-517	Push Button Box, 1 hole, 22mm, Steel	Rittal Corporation	8017664	1
49	SST-107, 120	soft start 208-600vac 110vcntrl,63amp	Square D	ATS22D62S6U	2
50	TAS-208	Thermostat 32-140F Norm Closed, for Heating Applications, 15Amp, 120V/10A, 250V	Hammond Manufacturing	SKT011409NC	1
51	TAS-210	Thermostat 32-140F Norm Open, for Cooling Applications, 15Amp, 120V/10A, 250V	Hammond Manufacturing	SKT011419NO	1
52	TD-514-579	Time Delay Relay, 4PDT, 3 Amp, 120 Vac Coil, LED Light, 0.1-1s to 10-100h	Square D	REXL4TMF7	6
53	TD-806	Time Delay Relay, 4PDT, 3 Amp, 24 Vdc Coil, LED Light, 0.1-1s to 10-100h	Square D	REXL4TMBD	1
54	TERMINALS	ATP-UT, Partition Plate for UT Terminal block	Phoenix Contact	3047167	9
55	TERMINALS	UT 2.5 Universal Terminal Block, 20 Amp, 600 volt, AWG: 26 - 12,	Phoenix Contact	3044076	95
56	TERMINALS	UT 2.5-PE Universal Ground Terminal Block, 20 Amp, 600 volt, AWG: 26 - 12	Phoenix Contact	3044092	6
57	TERMINALS	UT-35-PE, Single Deck Ground Terminal, 125 Amp, 500 Volt	Phoenix Contact	3044241	2
58	TERMINALS	FBS 4-5 Plug-in bridge for UT2.5 Terminals in the center, 4-pos., color: Red	Phoenix Contact	3030187	1
59	TERMINALS	FBS 3-5 Plug-in bridge for UT2.5 Terminals in the center, 3-pos., color: Red	Phoenix Contact	3030174	1
60	TERMINALS	FBS 5-5 Plug-in bridge for UT2.5 Terminals in the center, 5-pos., color: Red	Phoenix Contact	3030190	2
61	TERMINALS	E/NS 35 N End bracket, width: 9.5 mm, color: gray	Phoenix Contact	0800886	26
62	UPS-251	TRIO-UPS/1AC/24DC/ 5	Phoenix Contact	2866611	1
63	VFD-101, 113	Variable Frequency Drive, 40 HP, 3 Phase, 480 vac, 60 Hz	Square D	ATV61HD30N4	2
64	VFD-101, 113	Remote Mounting Kit For LCD Keypad:ATV61/71	Square D	VW3A1102	2
65	VFD-101, 113	RJ45-RJ45 Cable For Remote LCD Keypad 3 Meter	Square D	VW3A1104R30	2
66	VR-320, 370	Potentiometer Operator with Mounting Collar, 22mm, for 1/4" Shaft 1.73 to 1.97 Inches, Black	Square D	ZB4BD922	2
67	VR-320, 370	10K,2W, 2" Shaft Pot	Honeywell Sensing and Control	380C110K	2
68	Floor Stock	Floor Stock	Zeller	ZC-ROCHESTER-FLOORSTOCKBOMREVA	

Section 4
Cutsheets

SAGINAW CONTROL & ENGINEERING

Your Enclosure Source ®

Saginaw Control & Engineering
95 Midland Road
Saginaw, MI 48638-5770
Phone: (800)234-6871
Fax: (989)799-4524
http://www.saginawcontrol.com

Part Information - SCE-72EL7218LPPL

SCE-72EL7218LPPL

Application -
Designed to house electrical and electronic controls, instrumentation and components in indoor & outdoor locations. For outdoor applications a drip shield is recommended. For installation information, consult our Installation Manual at www.saginawcontrol.com.

Construction -
- 0.125 In. carbon Steel
- Seams continuously welded and ground smooth.
- Flange trough collar around all sides of door opening.
- Removable centerpost.
- Heavy duty lifting eyes anchored into reinforced top.
- Body stiffeners.
- Concealed hinges.
- Black key locking padlocking handles.
- 3-point latching mechanism.
- Removable print pocket on main door.
- 12in. removable floor stands.
- Panel Supports.
- Provisions for mechanical interlock
- Oil & water resistant gasket.
- Ground stud on door and body.

Options -
Provisions for mechanical interlock. See Accessory section to order.

Finish -
ANSI-61 gray powder coating inside and out. Optional panels are powder coated white.

Industry Standards - (IS4)
NEMA Type 3R, 4, 12 and Type 13
UL Listed Type 3R, 4 and 12
CSA Type 3R, 4 and 12
IEC 60529 IP 66

Notes -
Special Instructions apply for IS3, IS4 and IS6 to maintain the environmental rating of Type 3R for these parts. Instructions are located on the enclosure door. Drip shield is required on IS3, drip shield is recommended on IS4 and IS6. Drain holes are required on all.

Product Specifications -
Part Number: SCE-72EL7218LPPL
Description: 2DR EL LPPL Enclosure
Height: 72.00"
Width: 72.00"
Depth: 18.00"
Price Code: E2
[redacted]
Catalog Page: 100
Est. Ship Weight: 763.00 lbs

Download CAD Package
Add to Bill of Material

Similar Part Numbers -
SCE-60EL6012LPPL - 2DR EL LPPL Enclosure
SCE-60EL6018LPPL - 2DR EL LPPL Enclosure
SCE-72EL6018LPPL - 2DR EL LPPL Enclosure
SCE-72EL6012LPPL - 2DR EL LPPL Enclosure
SCE-72EL7224LPPL - 2DR EL LPPL Enclosure
SCE-72EL7212LPPL - 2DR EL LPPL Enclosure

Saginaw Control and Engineering
95 Midland Road
Saginaw, MI 48638-5770
(800)234-6871
Fax: (989)799-4524
SCE@SaginawControl.com

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Fax: (989)799-4524
http://www.saginawcontrol.com

Part Information - SCE-72P72

SCE-72P72

Options -
Sub-plates can be special ordered in Stainless Steel or Galvanized material. Please consult a factory representative for assistance.

Finish -
Powder Coated White inside and out.

Industry Standards - (N/A)
N/A

Product Specifications -
Part Number: SCE-72P72
Description: Subpanel, Bent
Height: 68.00"
Width: 68.00"
Depth: 0.88"
Price Code: P3
[redacted]
Catalog Page: 281
Est. Ship Weight: 181.00 lbs
Edge Flanges: Four
Configuration: C

Download CAD Package
Add to Bill of Material

Similar Part Numbers -
SCE-60P60 - Subpanel, Bent
SCE-64P64 - Subpanel, Bent
SCE-64P76 - Subpanel, Bent
SCE-72P60 - Subpanel, Bent
SCE-76P76 - Subpanel, Bent
SCE-82P76 - Subpanel, Bent

Installation Information -
Sub-Plate Layout & Grounding for 3/8-16

Saginaw Control and Engineering
95 Midland Road
Saginaw, MI 48638-5770
(800)234-6871
Fax: (989)799-4524
SCE@SaginawControl.com

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95 Midland Road
Saginaw, MI 48638-5770
Phone: (800)234-6871
Fax: (989)799-4524
http://www.saginawcontrol.com

Part Information - SCE-72EL6018LPPL

SCE-72EL6018LPPL

Application -
Designed to house electrical and electronic controls, instrumentation and components in indoor & outdoor locations. For outdoor applications a drip shield is recommended.

Construction -
- 0.104" carbon steel.
- Seams continuously welded and ground smooth.
- Flange trough collar around all sides of door opening.
- Removable centerpost.
- Heavy duty lifting eyes anchored into reinforced top.
- Body stiffeners.
- Concealed hinges.
- Black key locking padlocking handles.
- 3-point latching mechanism.
- Removable print pocket on main door.
- 12" removable floor stands.
- Panel Supports.
- Provisions for mechanical interlock.
- Oil & water resistant gasket.
- Ground stud on door and body.

Options -
Provisions for mechanical interlock. See Accessory section to order.

Finish -
ANSI-61 gray powder coating inside and out. Optional sub-panels are powder coated white.

Industry Standards - (IS4)
NEMA Type 3R, 4, 12 and Type 13
UL Listed Type 3R, 4 and 12
CSA Type 3R, 4 and 12
IEC 60529 IP 66

Notes -
Special Instructions apply for IS3, IS4 and IS6 to maintain the environmental rating of Type 3R for these parts. Instructions are located on the enclosure door. Drip shield is required on IS3, drip shield is recommended on IS4 and IS6. Drain holes are required on all.

Product Specifications -
Part Number:
SCE-72EL6018LPPL
Description: 2DR EL LPPL Enclosure
Height: 72.00"
Width: 60.00"
Depth: 18.00"
Price Code: E2
List Price: $2,478.80
Catalog Page: 104
Est. Ship Weight: 670.00 lbs

Download CAD Package
Add to Bill of Material

Optional Accessories -
SCE-104941 - Interlock, Mechanical for Left Door as Main
SCE-105604 - Interlock, Mechanical for Right Door as Main
SCE-13ELJEXPP - Pocket, Exterior Print
SCE-19ELJEXPP - Pocket, Exterior Print
SCE-72P60 - Subpanel, Bent
SCE-BV4XKIT - Kit, Breather Vent
SCE-DF72EL60 - Panel, Dead Front (Enviroline Floor Mount)
SCE-DS60N4 - Shield, Drip
SCE-DV4XKIT - Kit, Drain Vent
SCE-FS1212 - Shelf, Folding
SCE-FS1818 - Shelf, Folding
SCE-FS2424 - Shelf, Folding
SCE-LF18 - Fixture, LED Light
SCE-LF18NO - Fixture, LED Light w/o Outlet

Similar Part Numbers -
SCE-60EL4812LPPL - 2DR EL LPPL Enclosure
SCE-60EL4818LPPL - 2DR EL LPPL Enclosure
SCE-60EL6012LPPL - 2DR EL LPPL Enclosure
SCE-60EL6018LPPL - 2DR EL LPPL Enclosure
SCE-72EL6012LPPL - 2DR EL LPPL Enclosure
SCE-72EL7212LPPL - 2DR EL LPPL Enclosure
SCE-72EL7218LPPL - 2DR EL LPPL Enclosure
SCE-72EL7224LPPL - 2DR EL LPPL Enclosure

Installation Information -
LED Light Fixture
Mechanical Interlock
Folding Shelf Hole Pattern
Drip Shield Kit Assembly
Drain/Vents
Dead Front 2 Door W/Center Post Installation Instructions

Saginaw Control and Engineering
95 Midland Road
Saginaw, MI 48638-5770
(800)234-6871

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Phone: (800)234-6871
Fax: (989)799-4524
http://www.saginawcontrol.com

Part Information - SCE-72P60

SCE-72P60

Options -
Sub-plates can be special ordered in Stainless Steel or Galvanized material. Please consult a factory representative for assistance.

Finish -
Powder Coated White inside and out.

Industry Standards - (N/A)
N/A

Product Specifications -
Part Number: SCE-72P60
Description: Subpanel, Bent
Height: 68.00"
Width: 56.00"
Depth: 0.88"
Price Code: P3
[redacted]
Catalog Page: 281
Est. Ship Weight: 149.00 lbs
Edge Flanges: Four
Configuration: C

Download CAD Package
Add to Bill of Material

Similar Part Numbers -
SCE-60P48 - Subpanel, Bent
SCE-60P60 - Subpanel, Bent
SCE-64P52 - Subpanel, Bent
SCE-64P64 - Subpanel, Bent
SCE-72P72 - Subpanel, Bent

Installation Information -
Sub-Plate Layout & Grounding for 3/8-16

Saginaw Control and Engineering
95 Midland Road
Saginaw, MI 48638-5770
(800)234-6871
Fax: (989)799-4524
SCE@SaginawControl.com

FEDERAL SIGNAL CORPORATION

Vibratone® Horns

Model 350WB

DESIGNED FOR ROUTINE SIGNALING USES

- Available in 120VAC and 240VAC
- Effective range 200 feet
- Coded or sustained tones
- Wall mount
- Produces 100dBa @ 10' (110dBa @ 1m)
- Type 4X, IP65 enclosure
- UL and cUL Listed, CSA Certified and FM Approved

The Model 350WB (AC current) Vibratone® horn produces sound by the electro-mechanical vibration of a stainless steel diaphragm. The horn mechanism with diaphragm is attached to the grille. Indoor or outdoor use is made possible by the water- and dust-tight backbox.

The 350WB is available in 120 or 240VAC for 50/60Hz. The sound output level is 100dBa nominal at ten feet (110dBa @ 1m).

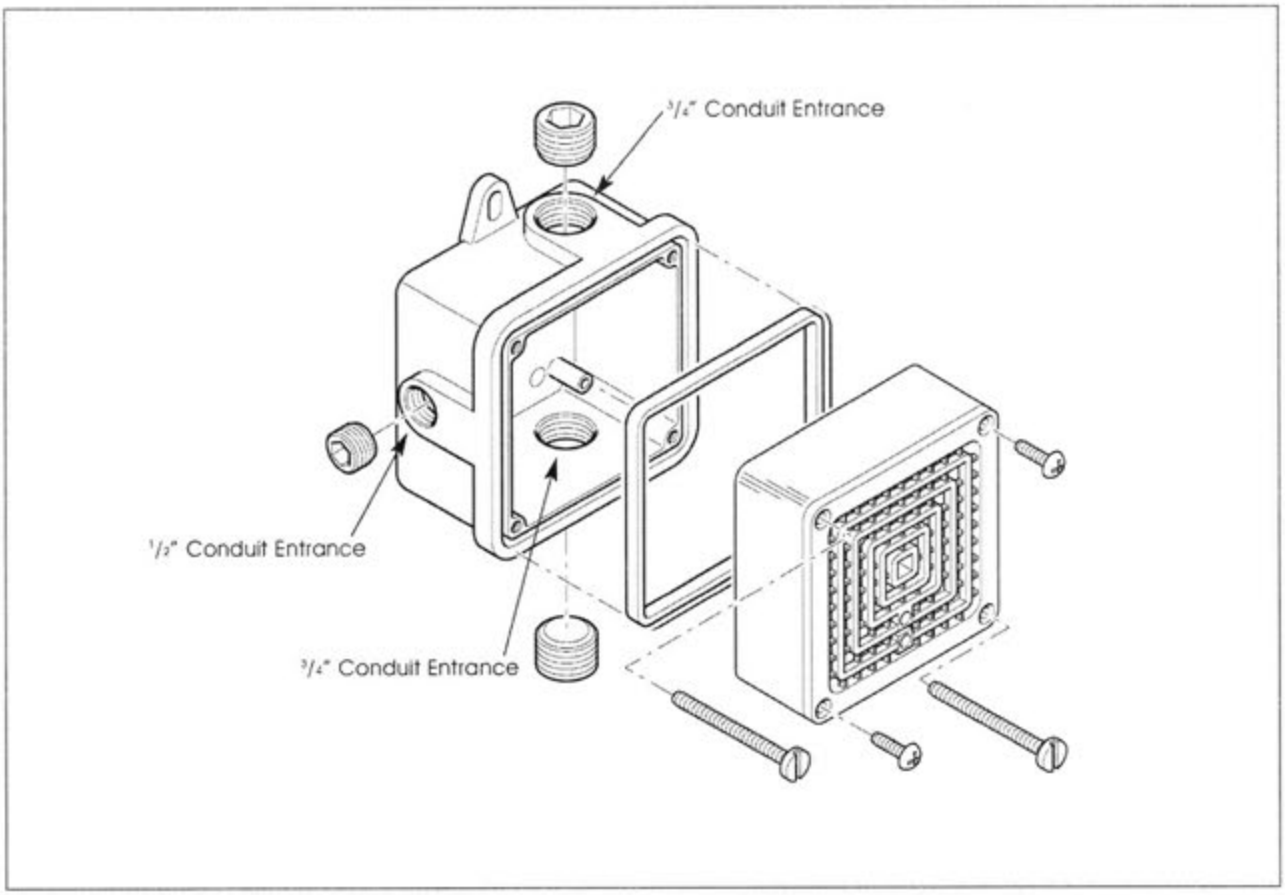
Model 350WB features a die-cast aluminum rear housing sealed with a gray enamel finish. The rugged outer housing resists vandalism without reducing sound output. Model 350WB is fused and utilizes a terminal block connection. The horn and backbox combination is UL and cUL Listed, CSA Certified and FM Approved.

Capable of reproducing coded blasts or sustained tones, Federal Signal's Vibratone horns are excellent for general alarm, start/dismissal, coded paging and process control signaling in areas where their sound output exceeds ambient noise levels. Compact size and various installation options make them ideal for institutional use.

Model	Voltage	Operating Current	Decibels @ 10'	Decibels @ 1m
350WB	120VAC 50/60Hz	0.18 amps	100	110
350WB	240VAC 50/60Hz	0.09 amps	100	110

5 yr FEDERAL SIGNAL WARRANTY

VIBRATONE® HORN (350WB)



SPECIFICATIONS

Operating Temperature:	-65°F to 150°F	-54°C to 66°C
Net Weight:	2.7 lbs.	1.2 kg
Shipping Weight:	2.8 lbs.	1.2 kg
Height:	5.3"	115.0 mm
Width:	5.3"	152.0 mm
Depth:	3.66"	92.9 mm

HOW TO ORDER

- Specify model and voltage
- Please refer to Model Number Index 350WB beginning on page 377

REPLACEMENT PARTS

Description	***Part Number***
Coil (120VAC only)	KFC1516C
Volume Control Kit	K8435663B

PHOENIX CONTACT

Extract from the online catalog

MINI-BAT/24DC/1.3AH

Order No.: 2866417

http://eshop.phoenixcontact.de/phoenix/treeViewClick.do?UID=2866417

Rechargeable battery module, lead AGM, VRLA technology, 24 V DC, 1.3 Ah.

http://
www.download.phoenixcontact.com
Please note that the data given here has been taken from the online catalog. For comprehensive information and data, please refer to the user documentation. The General Terms and Conditions of Use apply to Internet downloads.

Commercial data	
GTIN (EAN)	4 046356 152112
sales group	H061
Pack	1 pcs.
Customs tariff	85072080
Catalog page information	Page 623 (IF-2011)

Technical data

Input data

Nominal input voltage	24 V DC

Output data

Nominal output voltage	24 V DC
Output current	max. 15 A
Connection in series	No
Output fuse	15 A

General data

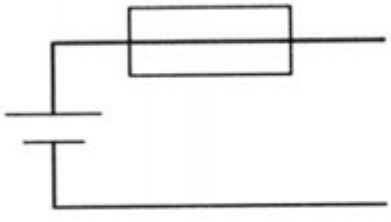
IQ technology	No
Disposal	Used batteries must not be thrown away with household waste, they should instead be disposed of in accordance with applicable national regulations. They can also be returned to Phoenix Contact or the manufacturer.
Width	52 mm
Height	130 mm
Depth	110 mm
Net weight	1.7 kg
Degree of protection	IP20
Protection class	III
Ambient temperature (operation)	0 °C ... 40 °C
Ambient temperature (storage/transport)	0 °C ... 40 °C

Certificates / Approvals

Certifications applied for:	UL-EX LIS

Diagrams/Drawings

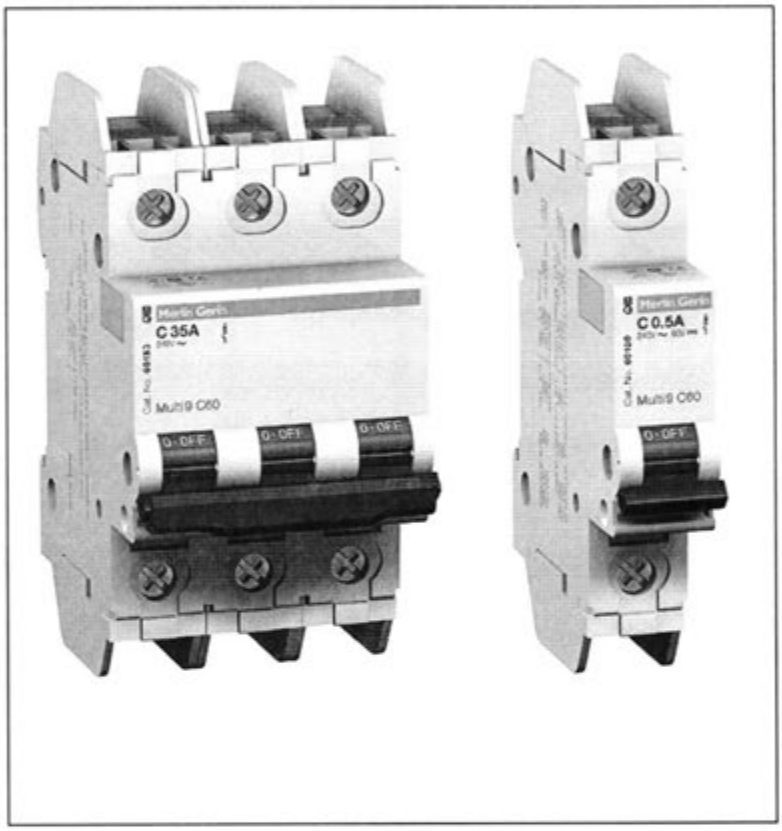
Block diagram



Multi 9™ System Catalog

Class 860

Catalog
0860CT0201R2/08
2008



CONTENTS

Merlin Gerin
SQUARE D

Schneider Electric
Building a New Electric World

CONTENTS

Conformance to Standards

Overview

Multi-9 circuit protection products conform to the standards most needed by OEMs—UL 489, UL 1077, CSA C22.2 No. 5, CSA C22.2 No. 235, and IEC 60947-2.

Different applications call for circuit protection devices that meet different standards. The Multi 9 family allows OEMs to use a single family of products in their equipment, whether it is destined for the United States, Canada or an international market outside of North America. A variety of Multi 9 devices are tested per Underwriters Laboratories (UL) and Canadian Standards Association (CSA) Standards as required by the National Electrical Code® (NEC®) in the United States and the Canadian Electrical Code (CEC) in Canada. They are also tested per the standards of the International Electrotechnical Commission® (IEC®) and may therefore be used in International Markets where these products meet the requirements.

In this catalog, the products are grouped by the standards they are designed to meet, including:

- UL 489—Defines rigorous testing requirements for circuit breakers in the United States
- CSA C22.2 No. 5—Defines rigorous testing requirements for circuit breakers in Canada
- CSA C22.2 No. 235—Defines requirements for supplementary protectors
- UL 489A—Limited applications (dc circuits in communications equipment)
- UL 1077—Defines supplementary protectors for use within electrical equipment protected by branch circuit breakers
- IEC 60947-2—International standards for circuit breakers to be used in industrial applications

UL 489 Standard–Branch Circuit Protection

An OEM product as a whole must be appropriately protected from overcurrent conditions, either by connection in the field to a protected branch circuit (in accordance with NEC) or by inclusion of branch circuit protection within the product itself. In the United States, these branch circuit protection devices must comply with the UL 489 Standard for Molded-Case Circuit Breakers. (see UL 489 No. 1 in Figure 3, which is a drawing of a hypothetical piece of OEM equipment requiring multiple protection devices.)

Applications Requiring UL 489 Listed Circuit Breakers

In some instances, the protective devices being installed in equipment must comply with UL 489. These include the following situations:

1. If a circuit such as a convenience receptacle could leave the equipment, that circuit must be protected by a UL 489 branch circuit protection device (see UL 489 No. 2).
2. If a circuit such as to an external motor could leave the equipment, that circuit must be protected by a UL 489 branch circuit protection device (see UL 489 No. 3).
3. Motors within the equipment should also be protected by a UL 489 device (see UL 489 No. 4).
4. All equipment which requires HACR (Heating, Air Conditioning, and Refrigeration) rating must be protected by a UL 489 branch circuit protection device (see UL 489 No. 5).

NOTE: The motor control circuit may be protected by a UL 1077 device. *It must also have over current protection even though there is a UL 1077 device downstream.*

In general, a UL 489 circuit breaker could also be used in any application for which a UL 1077 device is allowed, since the UL 489 devices meet or exceed the requirements of UL 1077 devices. The converse of this is not true, since UL 1077 devices cannot meet the more stringent UL 489 Standard.

UL 1077 Standard—Supplementary Protection within the Product

Within the OEM product itself, additional (supplementary) protection for sensitive or critical internal circuitry may be provided by one or more supplementary circuit protectors. A supplementary protector is an overcurrent protection device which is specifically designed for OEM applications and which complies with UL 1077 Standard for Supplementary Protectors for Use in Electrical Equipment.

Section 2—UL and CSA Rated Protection Devices

The Multi 9 system includes several families of miniature circuit protection devices that have the UL ratings required in the United States and some other countries. The products are summarized below and are described in detail on the following pages. They include the following families:

- UL Listed C60 240 V Circuit Breakers (UL 489 and CSA C22.2 No. 5)
- UL Listed C60 480 V Circuit Breakers (UL 489 and CSA C22.2 No. 5)
- UL Listed C60 Circuit Breakers for use in Communication Equipment (UL 489A)
- UL Recognized C60 Supplementary Protectors (UL 1077 and CSA C22.2 No. 235)

NOTE: Protection devices with only IEC ratings are described in Section 3, while accessories for both the UL and IEC devices are described in Section 5.

Table 2: Specifications for UL 489 and 489A Listed C60 Circuit Breakers

Ratings per UL Standards			UL 489 C60 (240 Vac)			UL 489 C60 (480Y/277 Vac)			UL 489A C60 (60 Vdc)
Number of Poles			1P	2P	3P	1P	2P	3P	1P
Rated Current at 77°F (25°C)			0.5–35 A	0.5–35 A	0.5–35 A	0.5–20 A	1–20 A	1–20 A	0.5–63 A
Interrupting Ratings as per UL 489	AC 50/60 Hz	120 V	10 kA	—	—	10 kA	—	—	—
		240 V	10 kA	10 kA	10 kA	10 kA	10 kA	10 kA	—
		277 V	—	—	—	10 kA	10 kA	10 kA	—
		480Y/277 V	—	—	—	10 kA	10 kA	10 kA	—
	DC	60 V	10 kA	10 kA	—	—	—	—	10 kA
		125 V	—	10 kA	—	—	—	—	—
Ultimate Breaking Capacity (I_{cu}) as per IEC 60947-2	AC 50/60 Hz	240 V	10 kA	20 kA	20 kA	10 kA	10 kA	10 kA	—
		415 V	10 kA	10 kA	10 kA	10 kA	10 kA	10 kA	—
		440 V	—	6 kA	6 kA	—	6 kA	6 kA	—
Service Breaking Capacity (I_{cs}) (%I_{cu})			75%	75%	75%	75%	75%	75%	75%
Magnetic Setting (Times Ampere Rating)	B curve		—			—			—
	C curve		7 to 10			7 to 10			7 to 14
	D curve		10 to 14			10 to 14			—
Dimensions (in./mm)	Width		0.71/18	1.42/36	2.13/54	0.71/18	1.42/36	2.13/54	0.71/18
	Height	box/box	4.21/107	4.21/107	4.21/107	5.56/141	5.56/141	5.56/141	3.19/81
		ring/ring[1]	4.86/123.4	4.86/123.4	4.86/123.4	5.56/141	5.56/141	5.56/141	—
		box/ring	4.54/115	4.54/115	4.54/115	—	—	—	—
	Depth		3.00/76	3.00/76	3.00/76	3.00/76	3.00/76	3.00/76	3.00/76
Weight (oz./g) max.		box/box	4.4/136	8.7/271	13.1/407	5.3 (166)	10.6/332	15.9 (498)	3.85/110
		ring/ring	5.2/161	10.3/321	15.5/482	5.3 (166)	10.6/332	15.9 (498)	—
		box/ring	4.8/148	9.5/297	14.3/445	—	—	—	—

[1] Fingersafe 240 V C60 circuit breaker ring terminal dimensions are same as the 480V C60 circuit breaker

Catalog Numbers

Table 5: Catalog Numbers for C Curve, UL 489 Listed 240 Vac C60 Miniature Circuit Breakers (Box Lug and Ring Tongue Terminal Combinations)

Rating	1P			2P			3P		
	Box/Box	Ring/Ring[1]	Box/Ring	Box/Box	Ring/Ring[1]	Box/Ring	Box/Box	Ring/Ring[1]	Box/Ring
0.5 A	60100	60200	60300	60134	60234	60334	—	—	—
1 A	60101	60201	60301	60135	60235	60335	60168	60268	60368
1.5 A	60102	60202	60302	60136	60236	60336	60169	60269	60369
2 A	60103	60203	60303	60137	60237	60337	60170	60270	60370
3 A	60104	60204	60304	60138	60238	60338	60171	60271	60371
4 A	60105	60205	60305	60139	60239	60339	60172	60272	60372
5 A	60106	60206	60306	60140	60240	60340	60173	60273	60373
6 A	60107	60207	60307	60141	60241	60341	60174	60274	60374
7 A	60108	60208	60308	60142	60242	60342	60175	60275	60375
8 A	60109	60209	60309	60143	60243	60343	60176	60276	60376
10 A	60110	60210	60310	60144	60244	60344	60177	60277	60377
13 A	60111	60211	60311	60145	60245	60345	60178	60278	60378
15 A	60112	60212	60312	60146	60246	60346	60179	60279	60379
20 A	60113	60213	60313	60147	60247	60347	60180	60280	60380
25 A	60114	60214	60314	60148	60248	60348	60181	60281	60381
30 A	60115	60215	60315	60149	60249	60349	60182	60282	60382
35 A	60116	60216	60316	60150	60250	60350	60183	60283	60383

[1] IP-20 Fingersafe ring tongue terminals may be ordered with an F suffix (example: 60210F)

Table 6: Catalog Numbers for D Curve, UL 489 Listed 240 Vac C60 Miniature Circuit Breakers (Line/Load as Box Lug or Ring Tongue Terminals)

Rating	1P			2P			3P		
	Box/Box	Ring/Ring[1]	Box/Ring	Box/Box	Ring/Ring[1]	Box/Ring	Box/Box	Ring/Ring[1]	Box/Ring
0.5 A	60117	60217	60317	60151	60251	60351	—	—	—
1 A	60118	60218	60318	60152	60252	60352	60184	60284	60384
1.5 A	60119	60219	60319	60153	60253	60353	60185	60285	60385
2 A	60120	60220	60320	60154	60254	60354	60186	60286	60386
3 A	60121	60221	60321	60155	60255	60355	60187	60287	60387
4 A	60122	60222	60322	60156	60256	60356	60188	60288	60388
5 A	60123	60223	60323	60157	60257	60357	60189	60289	60389
6 A	60124	60224	60324	60158	60258	60358	60190	60290	60390
7 A	60125	60225	60325	60159	60259	60359	60191	60291	60391
8 A	60126	60226	60326	60160	60260	60360	60192	60292	60392
10 A	60127	60227	60327	60161	60261	60361	60193	60293	60393
13 A	60128	60228	60328	60162	60262	60362	60194	60294	60394
15 A	60129	60229	60329	60163	60263	60363	60195	60295	60395
20 A	60130	60230	60330	60164	60264	60364	60196	60296	60396
25 A	60131	60231	60331	60165	60265	60365	60197	60297	60397
30 A	60132	60232	60332	60166	60266	60366	60198	60298	60398
35 A	60133	60233	60333	60167	60267	60367	60199	60299	60399

[1] IP-20 Fingersafe ring tongue terminals may be ordered with an F suffix (example: 60210F)

NOTE: UL 489 Listed Multi 9 circuit breakers are calibrated at 25°C (77°F). Please refer to the rating tables (page 80) for applications at temperatures greater than 25°C (77°F).

NOTE: The NEC requires that the continuous load applied to the circuit breaker shall not exceed 80% of the circuit breaker ampere rating.

Section 7—Dimensions

UL 489 Listed C60 Circuit Breakers

Figure 25: UL 489 Listed C60 240 Vac Circuit Breaker with Box Lug Terminals

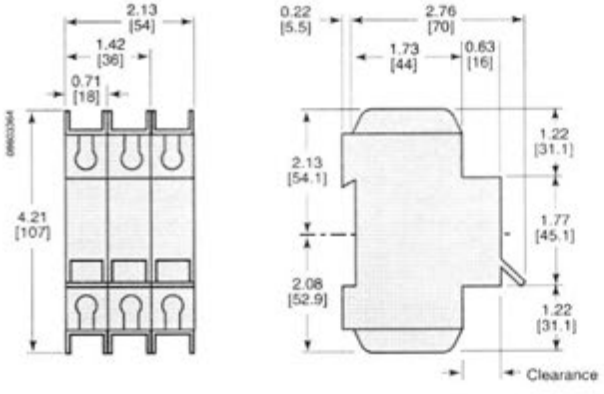


Figure 26: UL 489 Listed C60 240 Vac Circuit Breaker with Ring Tongue Terminals

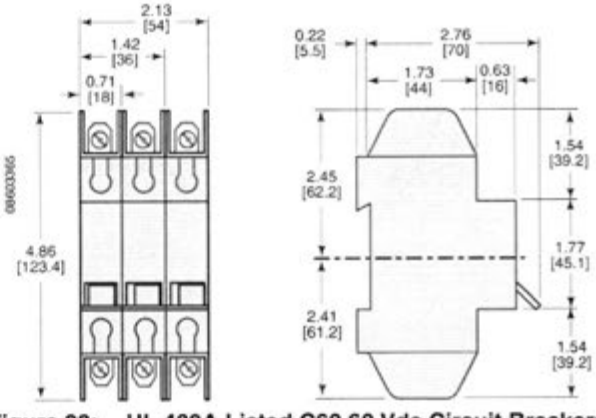


Figure 27: UL 489 C60 480 Vac and 240 Vac Circuit Breaker with Fingersafe Shields

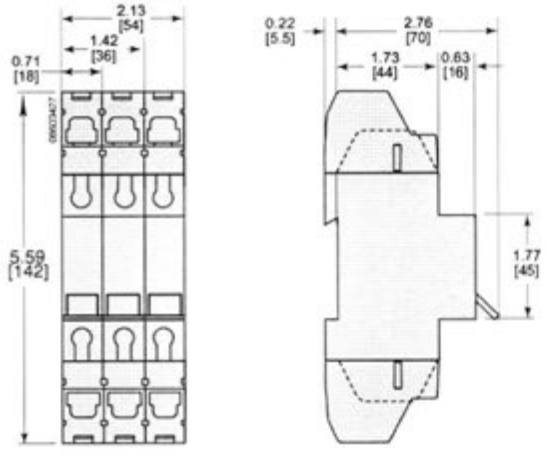
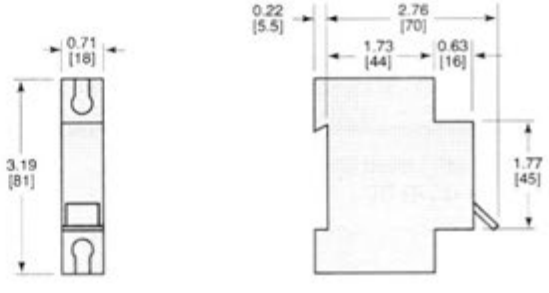


Figure 28: UL 489A Listed C60 60 Vdc Circuit Breakers for DC Telecommunications Applications



Section 9—Time/Current Curves

UL 489 and UL 489A Listed C60 Miniature Circuit Breakers

Figure 69: UL 489 Listed C60N—C Curve (0.5–35 A) AC & DC

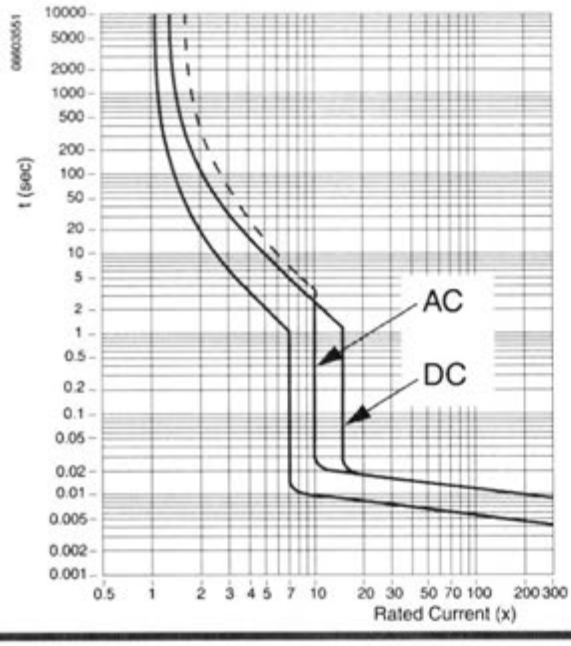


Figure 70: UL 489 Listed C60N—D Curve (0.5–35 A) AC

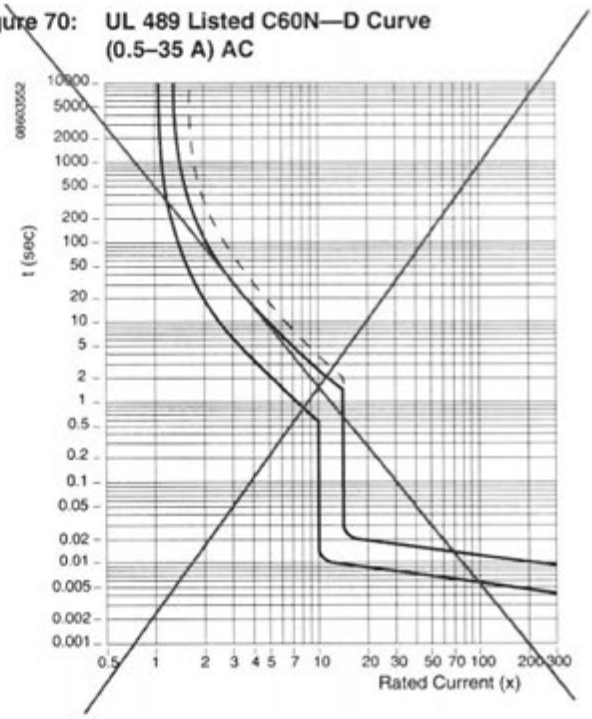
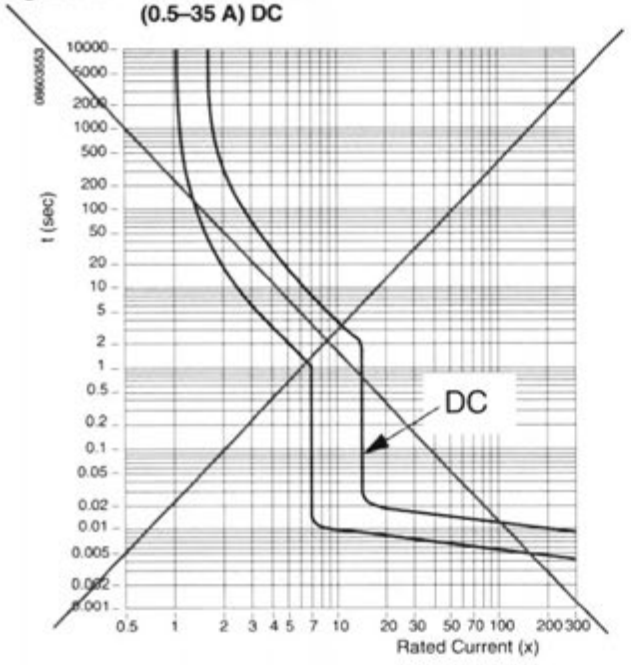


Figure 71: UL 489 Listed C60N—C Curve (0.5–35 A) DC



Section 10—Let-Through Curves

UL Listed C60 Miniature Circuit Breakers and UL Recognized C60 Supplementary Protectors

Figure 83: UL 489/489A Listed and UL 1077 Recognized C60 1P (240 Vac) Max Let-Through Peak Current

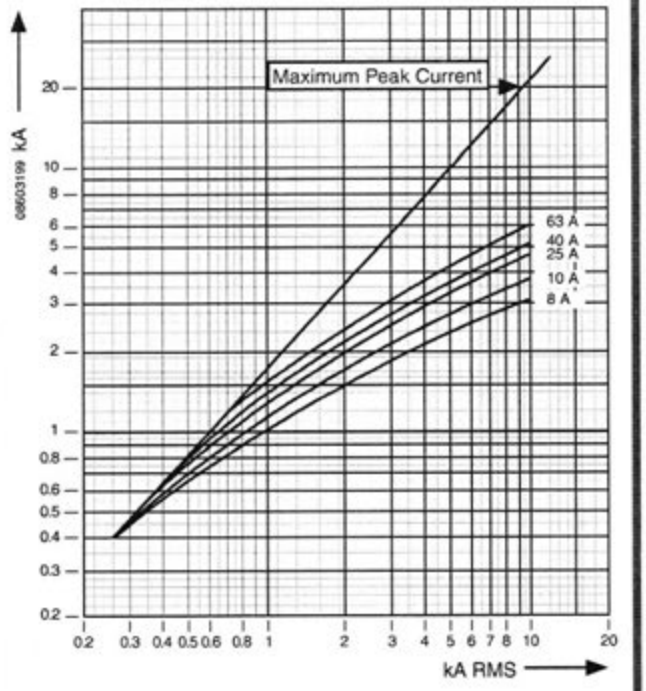
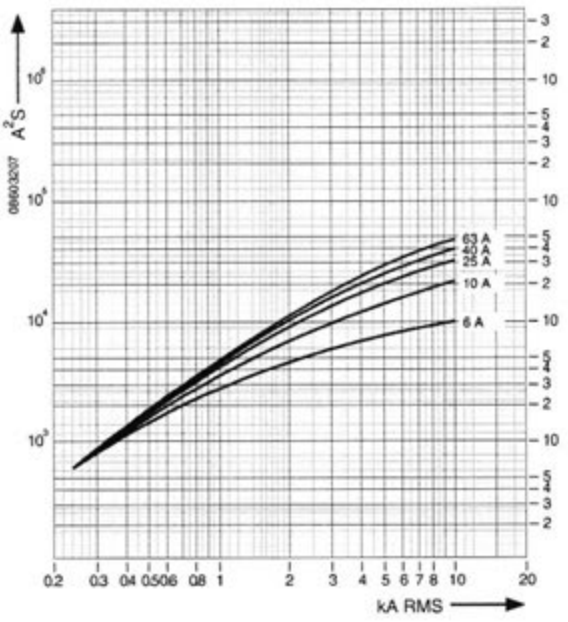


Figure 84: UL 489/489A Listed and UL 1077 Recognized C60 1P (240 Vac) Max Let-Through I^2t Current



The tables below show the kilowatt ratings (for international applications) and horsepower ratings (for North American applications) of contactors for motor control.

The contactors are pre-assembled, horizontally-mounted, and have pre-wired power connections. Order accessories separately. For information on auxiliary contact blocks and modules, see pages 106 to 107.

AC and DC Control Circuit — 3-pole Reversing Contactors with Touch-safe Terminals for Power Cabling (AC-3 category)

Maximum horsepower ratings						Maximum Inductive Current in AC-3 Category 600 V	Standard power ratings of 3-phase motors 50/60 Hz in category AC-3							Rated Operating Current in AC-3 up to 440 V	Instantaneous Auxiliary Contacts		Catalog Number ♦ ▼	Weight lb (kg)
1-phase 50/60 Hz		3-phase 50/60 Hz					220 V 230 V	380 V 400 V	415 V	440 V	500 V	660 V 690 V	1000 V					
115/ 120 V	230/ 240 V	200/ 208 V	220/ 240 V	460/ 480 V	575 V 600 V										N.O.	N.C.		
HP	HP	HP	HP	HP	HP	A	kW	kW	kW	kW	kW	kW	kW	A				
0.5	1	2	2	5	7.5	9	2.2	4	4	4	5.5	5.5	–	9	1	1	LC2D09•• ▲ ●	1.55 (0.700)
1	2	3	3	7.5	10	12	3	5.5	5.5	5.5	7.5	7.5	–	12	1	1	LC2D12•• ▲ ●	1.55 (0.700)
1	3	5	5	10	15	18	4	7.5	9	9	10	10	–	18	1	1	LC2D18•• ▲ ●	1.670 (0.75)
2	3	7.5	7.5	15	20	25	5.5	11	11	11	15	15	–	25	1	1	LC2D25•• ▲ ●	2.44 (1.100)
2	5	10	10	20	30	32	7.5	15	15	15	18.5	18.5	–	32	1	1	LC2D32•• ▲ ●	2.67 (1.200)
Not for North American applications						38	9	18.5	18.5	18.5	18.5	18.5	–	38	1	1	LC2D38•• ▲ ● ◗	2.67 (1.200)
3	5	10	10	30	30	40	11	18.5	22	22	22	30	–	40	1	1	LC2D40•• ▲	5.33 (2.400)
3	7.5	15	15	40	40	50	15	22	25	30	30	33	–	50	1	1	LC2D50•• ▲	5.33 (2.400)
5	10	20	20	50	50	65	18.5	30	37	37	37	37	–	65	1	1	LC2D65•• ▲	5.33 (2.400)
7.5	15	25	30	60	60	80	22	37	45	45	55	45	–	80	1	1	LC2D80•• ▲	7.11 (3.200)
Not for North American applications						95	25	45	45	45	55	45	–	95	1	1	LC2D95•• ▲ ◗	7.11 (3.200)
–	–	30	40	75	100	115	30	55	59	59	75	80	75	115	1	1	LC2D115 ■	14.44 (6.500)
–	–	40	50	100	125	150	40	75	80	80	90	100	90	150	1	1	LC2D150 ■	14.44 (6.500)

♦ For **LC2D09** to **LC2D38**: clip-on mounting on 35 mm DIN rail **AM1DP** or screw mounting.
For **LC2D40** to **LC2D95**: clip-on mounting on 35 mm DIN rail **AM1DE** or 75 mm DIN rail **AM1DL** or screw mounting.
For **LC2D115** and **LC2D150**: clip-on mounting on 2 x 35 mm DIN rails **AM1DP** or screw mounting.

▲ Includes mechanical interlock without electrical contacts. Installer to complete wiring for electrically interlocking contactor operating coils by utilizing a N.C. auxiliary contact integrated in the contactor or optional **LADN** or **LAD8N** type auxiliary contact block.

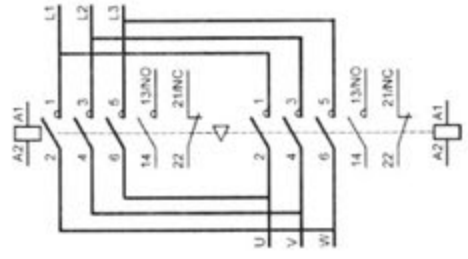
■ Included with electrical contacts integrated in mechanical interlock (type **LA9D••02**).

▼ Use voltage codes on page 115 "Voltage Code Table" to complete catalog number.

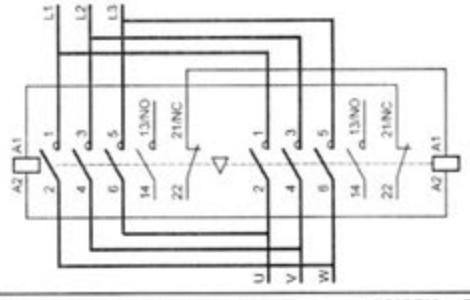
● For reversing contactors with electrical interlocking pre-wired at the factory, add suffix **V** to the catalog number reflected above. Example: **LC2D09••** becomes **LC2D09••V**.

◗ Devices are UL Listed at the same HP ratings as 32 and 80 amp devices, respectively.

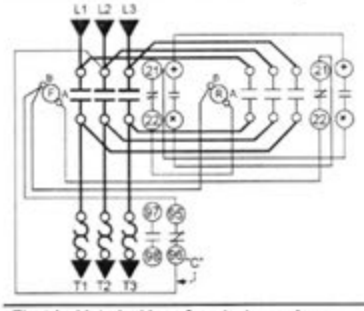
Reversing contactors for motor control, horizontally mounted LC2D09 to D150



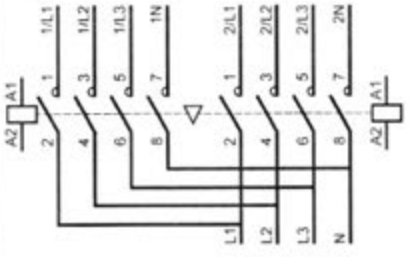
Reversing contactors for motor control with integral electrical interlocking (LAD9R1V)



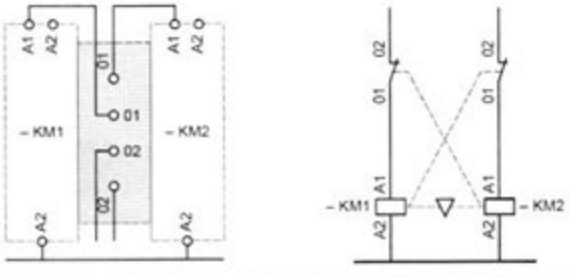
Reversing contactor with overload relay



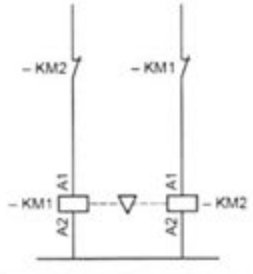
Changeover contactor pairs, horizontally mounted LC2DT20 to DT60



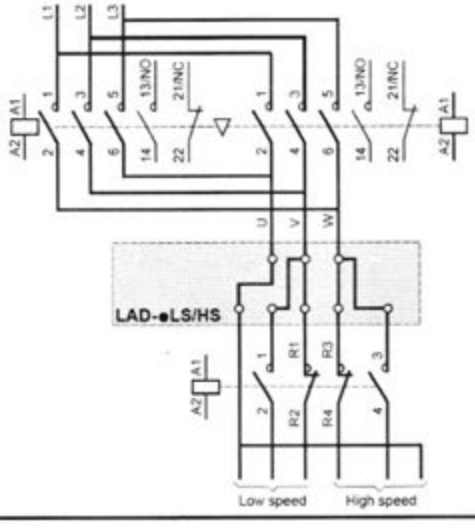
Electrical interlocking of contactors using:
mechanical interlock with integral electrical contacts LA9D•••02



Mechanical interlock without integral electrical contacts LA9D•••78, LAD9R1



Low speed - High speed cabling kit



TeSys™ D-Line Contactors and Starters
Selection of Contactors for Motor Control

The tables below show the kilowatt ratings (for international applications) and horsepower ratings (for North American applications) of contactors for motor control.

AC and DC Control Circuit — 3-pole Contactors with Touch-safe Terminals for Power Cabling (AC-3 category)

Maximum horsepower ratings						Maximum Inductive Current in AC-3 Category 600 V	Standard power ratings of 3-phase motors 50/60 Hz in category AC-3							Rated Operating Current in AC-3 up to 440 V	Instantaneous Auxiliary Contacts		Catalog Number ▼♦	Weight lb (kg)
1-phase 50/60 Hz		3-phase 50/60 Hz																
115/ 120 V	230/ 240 V	200/ 208 V	220/ 240 V	460/ 480 V	575 V 600 V		220 V 230 V	380 V 400 V	415 V	440 V	500 V	660 V 690 V	1000 V		N.O.	N.C.		
HP	HP	HP	HP	HP	HP	A	kW	kW	kW	kW	kW	kW	kW	A	N.O.	N.C.		
0.5	1	2	2	5	7.5	9	2.2	4	4	4	5.5	5.5	–	9	1	1	LC1D09••	0.71 (0.320)
1	2	3	3	7.5	10	12	3	5.5	5.5	5.5	7.5	7.5	–	12	1	1	LC1D12••	0.72 (0.325)
1	3	5	5	10	15	18	4	7.5	9	9	10	10	–	18	1	1	LC1D18••	0.73 (0.330)
2	3	7.5	7.5	15	20	25	5.5	11	11	11	15	15	–	25	1	1	LC1D25••	0.82 (0.370)
2	5	10	10	20	30	32	7.5	15	15	15	18.5	18.5	–	32	1	1	LC1D32••	0.83 (0.375)
Not for North American applications ■						38	9	18.5	18.5	18.5	18.5	18.5	–	38	1	1	LC1D38••	0.84 (0.380)
3	5	10	10	30	30	40	11	18.5	22	22	22	30	22	40	1	1	LC1D40••	3.11 (1.400)
3	7.5	15	15	40	40	50	15	22	25	30	30	33	30	50	1	1	LC1D50••	3.11 (1.400)
5	10	20	20	50	50	65	18.5	30	37	37	37	37	37	65	1	1	LC1D65••	3.11 (1.400)
7.5	15	25	30	60	60	80	22	37	45	45	55	45	45	80	1	1	LC1D80••	3.53 (1.590)
–	–	30	40	75	100	115	30	55	59	59	75	60	75	115	1	1	LC1D115••	5.38 (2.420)

♦ For **LC1D09** to **LC1D38**: clip-on mounting on 35 mm DIN rail **AM1DP** or screw mounting.
For **LC1D40** to **LC1D95**: clip-on mounting on 35 mm DIN rail **AM1DE** or 75 mm DIN rail **AM1DL** or screw mounting.
For **LC1D115** and **LC1D150**: clip-on mounting on 2 x 35 mm DIN rails **AM1DP** or screw mounting.

▼ Use voltage codes on page 115 "Voltage Code Table" to complete catalog number.

■ Devices are UL Listed at the same HP ratings as 32 and 80 amp devices, respectively.

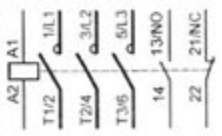
LC1D09••

LC1D65••

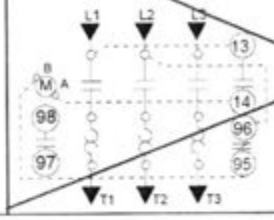
LC1D150••

3-Pole Contactors

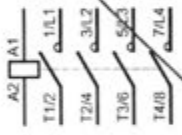
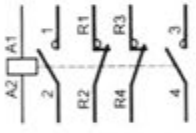
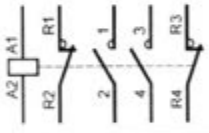
LC1D09 to D150



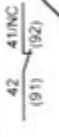
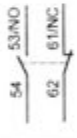
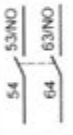
AC Magnetic 3-Pole Contactor with Overload Relay

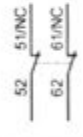
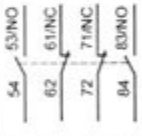
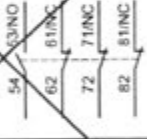


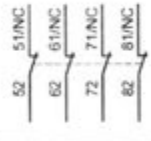
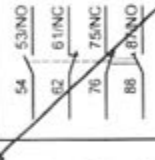
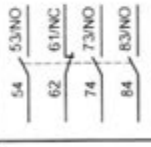
4-Pole Contactors

LC1 and LP1 D12004 to D80004 LC1D115004	LC1 and LP1 D12008 to D25008	LC1 and LP1 D40008 to D80008
		

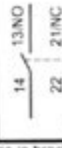
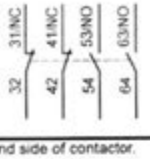
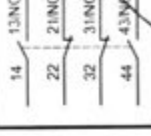
Front Mounting Add-on Contact Blocks
Instantaneous Auxiliary Contacts

One N.O. LADN10 (1)	One N.C. LADN01 (1)	One N.O. + 1 N.C. LADN11	Two N.O. LADN20
			

Two N.C. LADN02	Two N.O. + two N.C. LADN22	One N.O. + three N.C. LADN13	Four N.O. LADN40
			

Four N.C. LADN04	Two N.O. + two N.C. including one N.O. + one N.C. make before break LADC22	Three N.O. + one N.C. LADN31
		

Front Mounting Add-on Contact Blocks
Instantaneous Auxiliary Contacts Conforming to Standard EN 50012

One N.O. + one N.C. LADN11G	One N.O. + one N.C. LADN11P	Two N.O. + two N.C. LADN22G	Two N.O. + two N.C. LADN22P
			

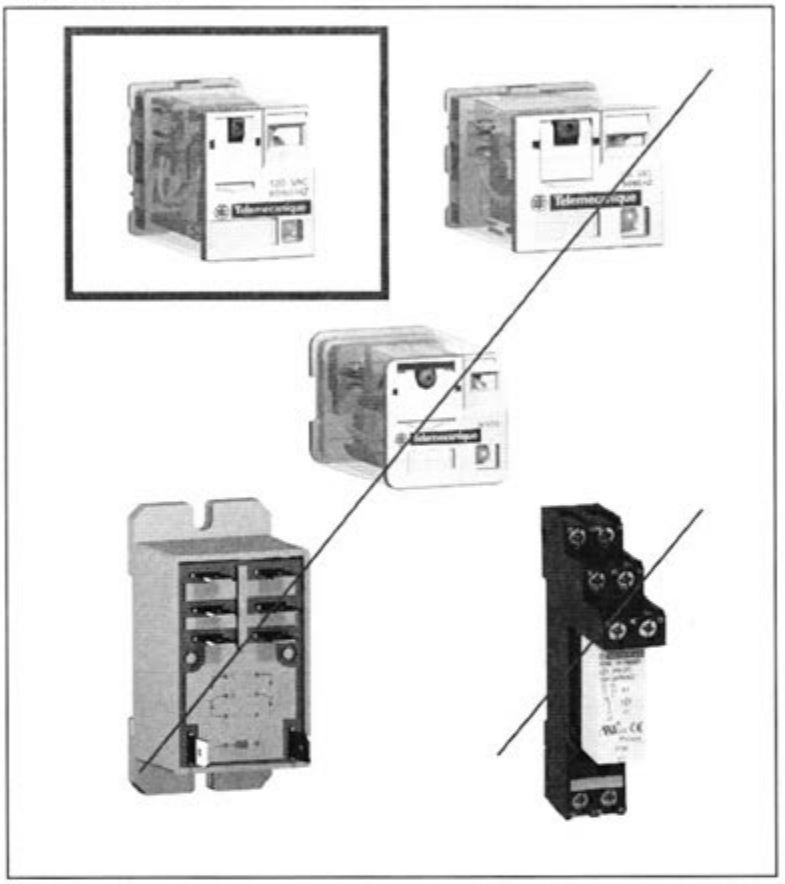
(1) Items in brackets are for blocks mounted on right-hand side of contactor.

Zelio® Plug-In Relays
RXM, RPM, RUM, RPF, RSB

Class 8501

Catalog
8501CT0601R1/08

08



CONTENTS

a brand of Schneider Electric

Telemecanique


RXM●AB2F7

RXM Miniature Relays (page 4)

2 pole relays; 12 A, 1/2 hp (IEC rating = 12 A)
3 pole relays; 10 A, 1/3 hp (IEC rating = 10 A)
4 pole relays; 8 A, 1/3 hp (IEC rating = 6 A)
4 pole relays; 3 A (low level), 1/16 hp (IEC rating = 3 A)

- Mechanical "relay status" indicator on all relays
- Pilot light option available
- Manual operator optional for all relays
- Built-in marking area


RPM32F7

RPM Miniature Power Relays (page 13)

1 pole relays; 15 A, 1/2 hp (IEC rating = 15 A)
2 pole relays; 15 A, 1/2 hp (IEC rating = 15 A)
3 pole relays; 15 A, 1/2 hp (IEC rating = 15 A)
4 pole relays; 15 A, 1/2 hp (IEC rating = 15 A)

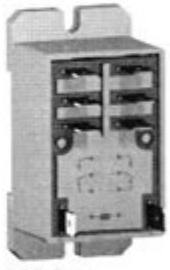
- Mechanical "relay status" indicator on all relays
- Pilot light option available
- Manual operator optional for all relays
- Built-in marking area


RUM●●AB2B7

RUM Universal Relays (page 21)

2 pole relays; 8-pin, tube type; 16 A, 1/3 hp (IEC rating = 10 A)
3 pole relays; 11-pin, tube type; 16 A, 1/3 hp (IEC rating = 10 A)
2 pole relays; 8 blade type; 16 A, 1/3 hp (IEC rating = 10 A)
3 pole relays; 11 blade type; 16 A, 1/3 hp (IEC rating = 10 A)

- Mechanical "relay status" indicator on all relays
- Pilot light option available
- Manual operator optional for all relays
- Built-in marking area


RPF2B●●

RPF Power Relays (page 30)

Two Form C contacts; 30 A
Two Normally Open contacts; 30 A

- DIN track mountable
- Can be mounted directly to a panel

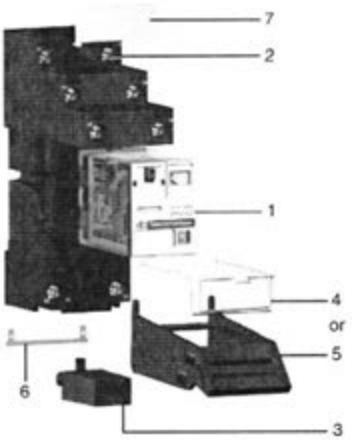

RSB1A160BD
+ RSZE1S48M

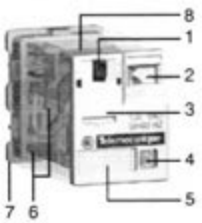
RSB Interface Relays (page 33)

Two Form C contacts; 8 A
One Form C contact; 12 A
One Form C contact; 16 A

General Technical Information (page 38)

Relay contact types
Utilization categories
Protection categories
Protection modules





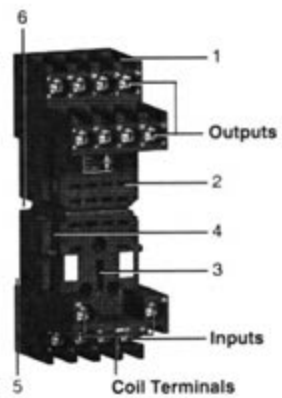
Product Description

The RXM miniature relay range consists of:

1. 12 A relays with DPDT contacts, 10 A relays with 3PDT contacts, 6 A relays with 4PDT contacts, and 3 A "low level" relays with 4PDT contacts. All of these relays have the same dimensions.
2. Sockets with mixed or separate contact terminals.
3. Protection modules (diode, RC circuit or varistor). All these modules are common to all sockets.
4. A metal hold-down clip for all sockets.
5. A plastic hold-down clip for all sockets.
6. A 2-pole bus jumper that can be used on sockets with separate contact terminals to simplify wiring when creating a jumper between the coil terminals.
7. Clip-in markers for all the sockets except RXZ E2M114.

Relay Description

1. Spring return push button for testing the contacts (green: DC, red: AC).
2. Mechanical "relay status" indicator.
3. Optional removable lock-down door and push button, enabling forced maintaining of the contacts for test or maintenance purposes. During operation, this lock-down door must always be in the closed position.
4. Bipolar LED (depending on version) indicating the relay status.
5. Removable marker for relay identification.
6. Four notches for DIN rail mounting adapter or panel mounting adapter.
7. Eight, eleven, or fourteen pins.
8. Area by which the product can be easily gripped.
9. Mounting adapter enabling direct mounting of the relay on a panel.
10. Mounting adapter enabling direct mounting of the relay on a DIN rail.

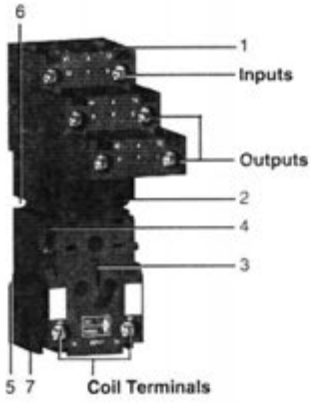


Socket Description

Sockets with Mixed Contact Terminals

1. Connection by screw clamp terminals or box lug connector.
2. Fourteen female contacts for the relay pins.
3. Location for protection modules.
4. Locking components for plastic and metal hold-down clips.
5. Locating slot for mounting on DIN rail.
6. Two or four mounting holes for panel mounting.

NOTE: The inputs are mixed with the relay coil terminals, with the outputs being located on the opposite side of the socket.



Sockets with Separate Contact Terminals

1. Box lug connector.
2. Eight, eleven, or fourteen female contacts for the relay pins.
3. Location for protection modules.
4. Locking components for plastic and metal hold-down clips.
5. Locating slot for mounting on DIN rail.
6. Two mounting holes for panel mounting.
7. Location for bus jumpers (see mounting on sockets on page 11).

NOTE: The inputs and outputs are separated from the relay coil terminals.

General characteristics

Conforming to standards		IEC/EN 61810-1 (iss. 2), UL 508, CSA C22-2 n° 14
Product certifications		cULus File E164862 CCN NLDX, NLDX7; cURus File E164862 CCN NLDX2, NLDX8; CSA pending; CE; RoHS compliant
Ambient air temperature around the device	Storage	-40–185 °F (-40–85 °C)
	Operation	-40–131 °F (-40–55 °C)
Vibration resistance	Conforming to IEC/EN 60068-2-6	> 6 gn (10–50 Hz)
Degree of protection	Conforming to IEC/EN 60529	IP 40
Shock resistance conforming to IEC/EN 60068-2-27	Opening	10 gn
	Closing	5 gn
Protection category (see page 38)		RT I
Mounting position		Any

Insulation characteristics

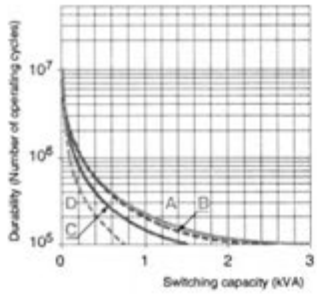
Rated insulation voltage (Ui)		250 V (IEC), 300 V (UL, CSA)
Rated impulse withstand voltage (Uimp)		3.6 kV (1.2/50 µs)
Dielectric strength (rms voltage)	Between coil and contact	2,500 Vac
	Between poles	2,500 Vac
	Between contacts	1,500 Vac

Contact characteristics

Relay type			**RXM2AB●●●**	**RXM3AB●●●**	**RXM4AB●●●**	**RXM4GB●●●**
Number and type of contacts (see page 12)			DPDT	3PDT	4PDT	4PDT
Contact materials			AgNi			AgAu–Bifurcated
Conventional thermal current (Ith)	For ambient temperature ≤ 131 °F (55 °C)		12 A	10 A	6 A	3 A
Rated operational current	Conforming to IEC in utilization category AC-1	N.O.	12 A	10 A	6 A	2 A
		N.C.	6 A	5 A	3 A	1 A
	Conforming to UL Resistive @277 Vac, hp @120 Vac		12 A, 1/2 hp	10 A, 1/3 hp	8 A, 1/3 hp	3 A, 1/16 hp
Maximum operating rate In operating cycles/hour	No load		18,000			
	Under load		1,200			
Switching voltage	Maximum		250 Vac/Vdc			
Switching capacity	Minimum		10 mA on 17 V			2 mA on 5 V
	Maximum		3,000 VA	2,500 VA	1,500 VA	750 VA
Utilization coefficient			20%			
Mechanical durability in millions of operating cycles			10			
Electrical durability in millions of operating cycles	Resistive load		0.1			

Electrical durability of contacts

Resistive load AC



A=RXM2AB●●● B=RXM3AB●●● C=RXM4AB●●● D=RXM4GB●●●

Coil characteristics

Average consumption		AC	1.2 VA							
		DC	0.9 W							
Drop-out voltage threshold		AC	⩾ 0.15 Uc							
		DC	⩾ 0.1 Uc							
Operating time (response time)	Between coil energization and making of the N.O. contact	AC	20 ms							
		DC	20 ms							
	Between coil de-energization and making of the N.C. contact	AC	20 ms							
		DC	20 ms							
Coil voltage Uc			**12 V**	**24 V**	**48 V**	**110 V**	**120 V**	**125 V**	**220 V**	**230 V**	**240 V**
Relay coil voltage codes			**JD**	**BD**	**ED**	**FD**	**—**	**GD**	**MD**	**—**	**—**
DC	Average resistance at 68 °F (20 °C) ± 10%		160 Ω	650 Ω	2,600 Ω	11,000 Ω	—	11,000 Ω	14,000 Ω	—	—
	Operating voltage limits	Min.	9.6 V	19.2 V	38.4 V	88 V	—	100 V	176 V	—	—
		Max.	13.2 V	26.4 V	52.8 V	121 V	—	138 V	242 V	—	—
Relay coil voltage codes			**—**	**B7**	**E7**	**—**	**F7**	**—**	**M7**	**P7**	**U7**
AC	Average resistance at 68 °F (20 °C) ± 15%		—	180 Ω	770 Ω	—	4,430 Ω	—	15,000 Ω	15,000 Ω	15,500 Ω
	Operating voltage limits	Min.	—	19.2 V	38.4 V	—	96 V	—	176 V	184 V	192 V
		Max.	—	26.4 V	52.8 V	—	132 V	—	242 V	253 V	264 V

Socket characteristics

Socket type		**RXZE2S108M**	**RXZE2S111M**	**RXZE2S114M**	**RXZE2M114**	**RXZE2M114M**
Relay types used		**RXM2●●●●●**	**RXM3●●●●●**	**RXM4●●●●●**	**RXM2●●●●●**[1] **RXM4●●●●●**	**RXM2●●●●●**[1] **RXM4●●●●●**
Product certifications		cURus File E172326 CCN SWIV2, SWIV8; CSA (pending); CE; RoHS compliant				
Conventional thermal current (Ith)		12 A	10 A			
Degree of protection	Conforming to IEC/EN 60529	IP 20				
Connection	Solid wire without cable end	1 conductor: AWG 20–12 (0.5–2.5 mm^2) 2 conductors: AWG 20–14 (0.5–1.5 mm^2)				
	Flexible wire with cable end	1 conductor: AWG 24–14 (0.2–2.5 mm^2) 2 conductors: AWG 24–16 (0.2–1.5 mm^2)				
	Flexible wire without cable end	1 conductor: AWG 24–14 (0.2–2.5 mm^2) 2 conductors: AWG 24–16 (0.2–1.5 mm^2)				
Maximum tightening torque		5.3 lbf-in (0.6 N●m) (M3 screw)				
Contact terminal arrangement		Separate			Mixed	
Bus jumper Ith: 5 A		Yes			No	

[1] When mounting relay RXM2●●●●● on socket RXZE2M●●●●, the thermal current must not exceed 10 A.


RXM●AB2F7

Miniature relays with lockable test button, without LED (sold in lots of 10)

	Number and type of contacts - Thermal current (Ith)								
	DPDT - 12 A			3PDT - 10 A			4PDT - 6 A		
Coil Voltage	Catalog Number	Weight		Catalog Number	Weight		Catalog Number	Weight	
		lb.	kg		lb.	kg		lb.	kg
12 Vdc	RXM2AB1JD	0.082	0.037	RXM3AB1JD	0.084	0.038	RXM4AB1JD	0.080	0.036
24 Vdc	RXM2AB1BD	0.082	0.037	RXM3AB1BD	0.084	0.038	RXM4AB1BD	0.080	0.036
48 Vdc	RXM2AB1ED	0.082	0.037	RXM3AB1ED	0.084	0.038	RXM4AB1ED	0.080	0.036
110 Vdc	RXM2AB1FD	0.082	0.037	RXM3AB1FD	0.084	0.038	RXM4AB1FD	0.080	0.036
220 Vdc	—	—	—	—	—	—	RXM4AB1MD	0.080	0.036
24 Vac	RXM2AB1B7	0.082	0.037	RXM3AB1B7	0.084	0.038	RXM4AB1B7	0.080	0.036
48 Vac	RXM2AB1E7	0.082	0.037	RXM3AB1E7	0.084	0.038	RXM4AB1E7	0.080	0.036
120 Vac	RXM2AB1F7	0.082	0.037	RXM3AB1F7	0.084	0.038	RXM4AB1F7	0.080	0.036
230 Vac	RXM2AB1P7	0.082	0.037	RXM3AB1P7	0.084	0.038	RXM4AB1P7	0.080	0.036
240 Vac	—	—	—	—	—	—	RXM4AB1U7	0.080	0.036
Miniature relays with lockable test button, with LED (sold in lots of 10)									
12 Vdc	RXM2AB2JD	0.082	0.037	RXM3AB2JD	0.084	0.038	RXM4AB2JD	0.080	0.036
24 Vdc	RXM2AB2BD	0.082	0.037	RXM3AB2BD	0.084	0.038	RXM4AB2BD	0.080	0.036
48 Vdc	RXM2AB2ED	0.082	0.037	RXM3AB2ED	0.084	0.038	RXM4AB2ED	0.080	0.036
110 Vdc	RXM2AB2FD	0.082	0.037	RXM3AB2FD	0.084	0.038	RXM4AB2FD	0.080	0.036
125 Vdc	—	—	—	—	—	—	RXM4AB2GD	0.080	0.036
24 Vac	RXM2AB2B7	0.082	0.037	RXM3AB2B7	0.084	0.038	RXM4AB2B7	0.080	0.036
48 Vac	RXM2AB2E7	0.082	0.037	RXM3AB2E7	0.084	0.038	RXM4AB2E7	0.080	0.036
120 Vac	RXM2AB2F7	0.082	0.037	RXM3AB2F7	0.084	0.038	RXM4AB2F7	0.080	0.036
230 Vac	RXM2AB2P7	0.082	0.037	RXM3AB2P7	0.084	0.038	RXM4AB2P7	0.080	0.036


RXM4GB2F7

Miniature relays with low level contacts, without LED (sold in lots of 10)

Number and type of contacts - Thermal current (Ith)			
4PDT - 3 A			
Coil Voltage	Catalog Number	Weight	
		lb.	kg
12 Vdc	RXM4GB1JD	0.080	0.036
24 Vdc	RXM4GB1BD	0.080	0.036
48 Vdc	RXM4GB1ED	0.080	0.036
110 Vdc	RXM4GB1FD	0.080	0.036
24 Vac	RXM4GB1B7	0.080	0.036
48 Vac	RXM4GB1E7	0.080	0.036
120 Vac	RXM4GB1F7	0.080	0.036
230 Vac	RXM4GB1P7	0.080	0.036

Miniature relays with low level contacts, with LED (sold in lots of 10)

Number and type of contacts - Thermal current (Ith)			
4PDT - 3 A			
Coil Voltage	Catalog Number	Weight	
		lb.	kg
12 Vdc	RXM4GB2JD	0.080	0.036
24 Vdc	RXM4GB2BD	0.080	0.036
48 Vdc	RXM4GB2ED	0.080	0.036
110 Vdc	RXM4GB2FD	0.080	0.036
24 Vac	RXM4GB2B7	0.080	0.036
48 Vac	RXM4GB2E7	0.080	0.036
120 Vac	RXM4GB2F7	0.080	0.036
230 Vac	RXM4GB2P7	0.080	0.036
240 Vac	RXM4GB2U7	0.080	0.036


RXM●AB3F7

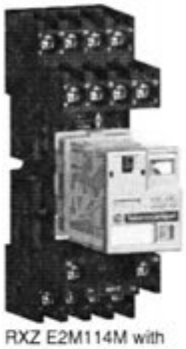
Miniature relays without lockable test button, with LED

	Number and Type of Contacts—Thermal Current (Ith)						
	DPDT - 12 A				4PDT - 6 A		
Coil Voltage	Catalog No.	Weight			Catalog No.	Weight	
		lb.	kg			lb.	kg
Sold in lots of 10							
12 Vdc	**RXM2AB3JD**	0.082	0.037		**RXM4AB3JD**	0.080	0.036
24 Vdc	**RXM2AB3BD**	0.082	0.037		**RXM4AB3BD**	0.080	0.036
48 Vdc	**RXM2AB3ED**	0.082	0.037		**RXM4AB3ED**	0.080	0.036
110 Vdc	**RXM2AB3FD**	0.082	0.037		**RXM4AB3FD**	0.080	0.036
125 Vdc	—	—	—		**RXM4AB3GD**	0.080	0.036
24 Vac	**RXM2AB3B7**	0.082	0.037		**RXM4AB3B7**	0.080	0.036
48 Vac	**RXM2AB3E7**	0.082	0.037		**RXM4AB3E7**	0.080	0.036
120 Vac	**RXM2AB3F7**	0.082	0.037		**RXM4AB3F7**	0.080	0.036
230 Vac	**RXM2AB3P7**	0.082	0.037		**RXM4AB3P7**	0.080	0.036
Sold in lots of 100							
24 Vdc	**RXM2AB3BDTQ**	0.082	0.037		**RXM4AB3BDTQ**	0.080	0.036
24 Vac	**RXM2AB3B7TQ**	0.082	0.037		**RXM4AB3B7TQ**	0.080	0.036
230 Vac	**RXM2AB3P7TQ**	0.082	0.037		**RXM4AB3P7TQ**	0.080	0.036

Miniature relays with low level contacts, without lockable test button, with LED

	4PDT (low level) - 3 A		
Coil Voltage	Catalog No.	Weight	
		lb.	kg
Sold in lots of 10			
12 Vdc	**RXM4GB3JD**	0.080	0.036
24 Vdc	**RXM4GB3BD**	0.080	0.036
48 Vdc	**RXM4GB3ED**	0.080	0.036
110 Vdc	**RXM4GB3FD**	0.080	0.036
125 Vdc	—	—	—
24 Vac	**RXM4GB3B7**	0.080	0.036
48 Vac	**RXM4GB3E7**	0.080	0.036
120 Vac	**RXM4GB3F7**	0.080	0.036
230 Vac	**RXM4GB3P7**	0.080	0.036

See page 9 for sockets and accessories.



RXZ E2M114M with relay RXM4AB2P7TQ

Miniature relays with lockable test button, without LED (sold in lots of 100)

Coil Voltage	Number and type of contacts - Thermal current (Ith) DPDT - 12 A Catalog Number	Weight lb.	Weight kg	4PDT - 6 A Catalog Number	Weight lb.	Weight kg
12 Vdc	—	—	—	**RXM4AB1JDTQ**	0.080	0.036
24 Vdc	**RXM2AB1BDTQ**	0.082	0.037	**RXM4AB1BDTQ**	0.080	0.036
48 Vdc	—	—	—	**RXM4AB1EDTQ**	0.080	0.036
110 Vdc	—	—	—	**RXM4AB1FDTQ**	0.080	0.036
220 Vdc	—	—	—	**RXM4AB1MDTQ**	0.080	0.036
24 Vac	**RXM2AB1B7TQ**	0.082	0.037	**RXM4AB1B7TQ**	0.080	0.036
48 Vac	—	—	—	**RXM4AB1E7TQ**	0.080	0.036
120 Vac	**RXM2AB1F7TQ**	0.082	0.037	**RXM4AB1F7TQ**	0.080	0.036
230 Vac	**RXM2AB1P7TQ**	0.082	0.037	**RXM4AB1P7TQ**	0.080	0.036
Miniature relays with LED (sold in lots of 100)						
24 Vdc	—	—	—	**RXM4AB2BDTQ**	0.080	0.036
24 Vac	**RXM2AB2B7TQ**	0.082	0.037	**RXM4AB2B7TQ**	0.080	0.036
230 Vac	**RXM2AB2P7TQ**	0.082	0.037	**RXM4AB2P7TQ**	0.080	0.036

RXZ E2S114M with relay RXM4AB2F7TQ

Sockets (sold in lots of 10)

Contact terminal arrangement	Connection	Relay type	Catalog Number	Weight lb.	Weight kg
Mixed	Screw clamp terminals	RXM2●●●● [1] RXM4●●●●	**RXZE2M114** [2]	0.11	0.048
	Box lug connector	RXM2●●●● [1] RXM4●●●●	**RXZE2M114M** [2]	0.12	0.056
Separate	Box lug connector	RXM2●●●●	**RXZE2S108M** [3]	0.13	0.058
		RXM3●●●●	**RXZE2S111M** [2]	0.15	0.066
		RXM4●●●●	**RXZE2S114M** [2]	0.15	0.070

[1] When mounting relay RXM2●●●●● on socket RXZE2M●●●●, the thermal current must not exceed 10 A.
[2] Thermal current Ith: 10 A
[3] Thermal current Ith: 12 A

RXM 041●●7

Protection modules (sold in lots of 20)

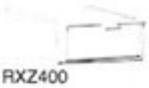
Description	Voltage	For use with	Catalog Number	Weight oz.	Weight g
Diode	6–250 Vdc	All sockets	**RXM040W**	0.11	3.0
RC circuit	24–60 Vac	All sockets	**RXM041BN7**	0.35	10.0
	110–240 Vac	All sockets	**RXM041FU7**	0.35	10.0
Varistor	6–24 Vac/Vdc	All sockets	**RXM021RB**	1.06	30.0
	24–60 Vac/Vdc	All sockets	**RXM021BN**	1.06	30.0
	110–240 Vac/Vdc	All sockets	**RXM021FP**	1.06	30.0

REXL4●●

Timing relays

Description	For use with	Catalog Number	Weight lb.	Weight kg
2 timed DPDT contacts (function A—On-delay)	Sockets RXZ E●●●●●	**REXL2●●** [4]	0.09	0.042
4 timed 4PDT contacts (function A—On-delay)		**REXL4●●** [4]	0.09	0.042

[4] Please refer to the *Zelio® Time - Timers* catalog (9050CT0001R2/05).



RXZ400

Accessories (sold in lots of 10)

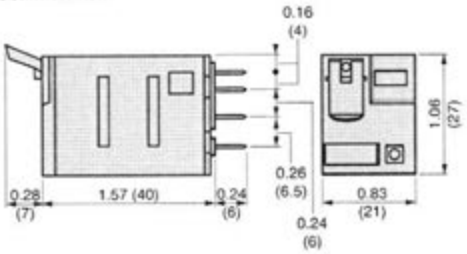
Description	For use with	Catalog Number	Weight oz.	Weight g
Metal hold-down clip	All sockets	**RXZ400**	0.04	1.0
Plastic hold-down clip	All sockets	**RXZR335**	0.18	5.0
Bus jumper, 2-pole (Ith: 5 A)	All sockets with separate contacts	**RXZS2**	0.18	5.0
Mounting adapter for DIN rail [5]	All relays	**RXZE2DA**	0.14	4.0
Mounting adapter for mounting directly to a panel	All relays	**RXZE2FA**	0.07	2.0
Clip-in markers	All relays (sheet of 108 markers)	**RXZL520**	2.82	80.0
	All sockets except RXZE2M114	**RXZL420**	0.04	1.0

[5] Test button becomes inaccessible.

Relays

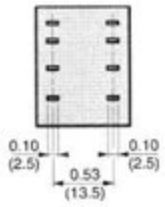
RXM●●●●●●

Common view

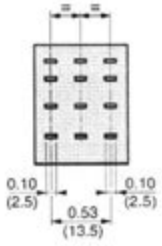


RXM2

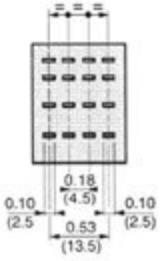
Pin side view



RXM3



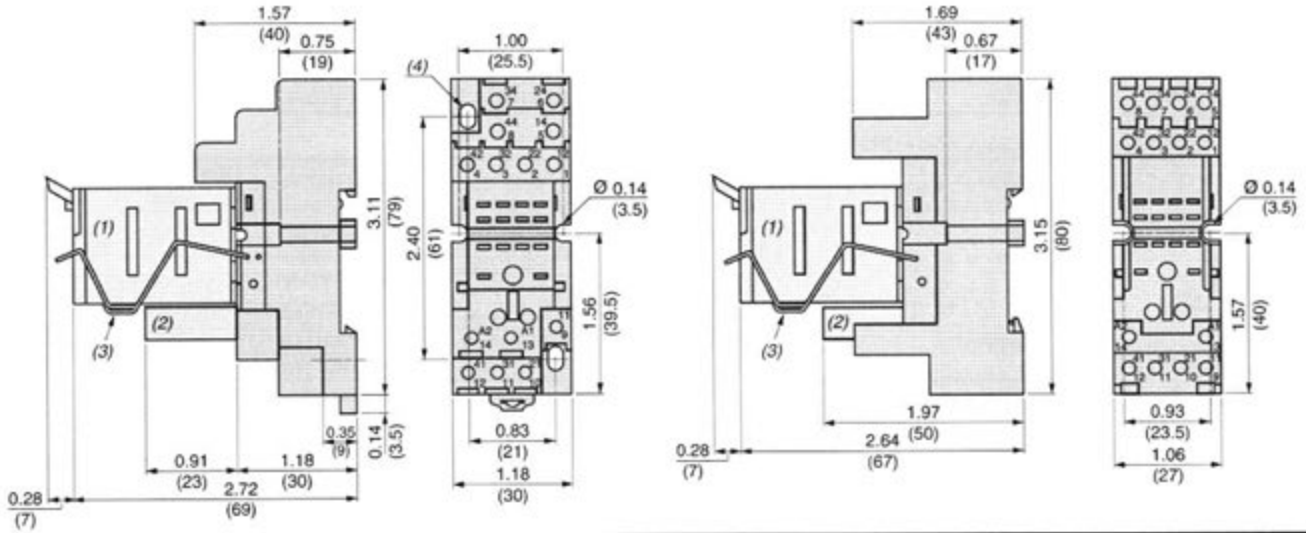
RXM4



Sockets

RXZE2M114

RXZE2M114M



RXZE2S●●●●

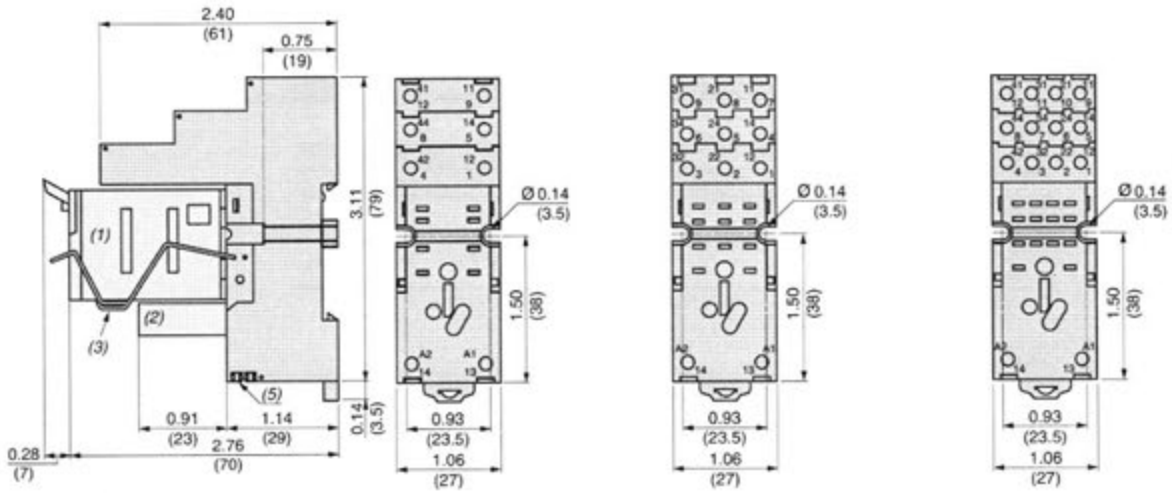
RXZE2S108M

RXZE2S111M

RXZE2S114M

Common side view

Pin side view



(1) Relays

(2) Add-on protection module

(3) Hold-down clip

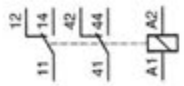
(4) 2 elongated holes Ø 0.14 x 0.26 (3.5 x 6.5)

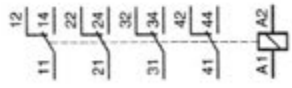
(5) 2 bus jumpers

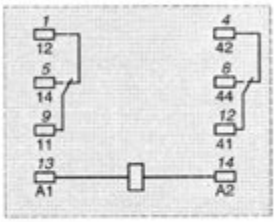
Dimensions = Inches / (mm)

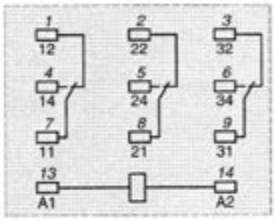
Miniature relays

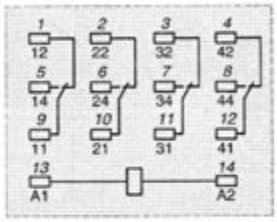
RXM2●●●●●	RXM3●●●●●	RXM4●●●●●











Numbers shown in *italics* correspond to NEMA marking. Viewed from pin end.

FLYGT
a xylem brand

Issued: 4/12 Supersedes: 4/07

AC Current Transducer

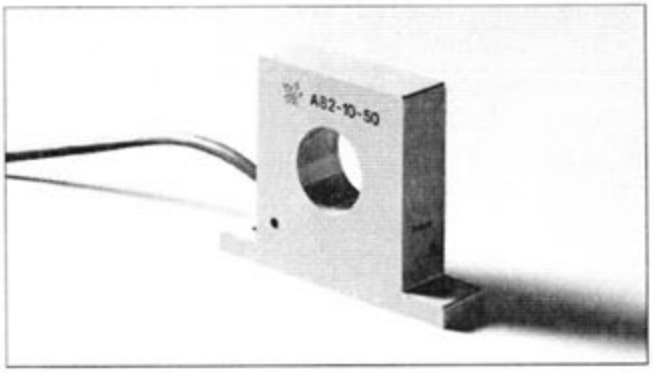
AC Current Transformer Types A 82-10, A 82-20

Typical Application

Use (1) one appropriately sized Flygt current transducer for each to be controlled by an FMC or APP series pump controller.

Description

AC current metering transformer for 50, 100 or 500A AC. Output current from the transformer is 4-20mA DC in accordance with IEC 381. Can be used with relay EID, EII or S183 or directly connected to a Flygt RTU. Power supply ON is indicated by a green LED on the side of the housing.



Flygt Part #	Description
40-402203	TRANSFORMER 0-50A/4 - 20MA DC
40-402205	TRANSFORMER 0-100A/4 - 20MA DC
40-402206	TRANSFORMER 0-500A/4 - 20MA DC

Input Specifications

	40-402203	40-402205	40-402206
Current range	0 - 50 AAC	0 - 100 AAC	0 - 500 AAC
Max. current (continuously)	60 AAC	120 AAC	600 AAC
Max. overload current (t = 30 s)	300 AAC	700 AAC	3000 AAC
Rated insulation voltage			
Input - output	1000 VAC rms	1000 VAC rms	1000 VAC rms
Overvoltage category (IEC 60664)	IV	IV	IV
Pollution degree (IEC 60664)	3	3	3
Dielectric strength			
Dielectric voltage	6 kVAC rms	6 kVAC rms	6 kVAC rms
Rated impulse withstand volt.	12 kV (1.2/50 μs)	12 kV (1.2/50 μs)	12 kV (1.2/50 μs)

FLYGT
a xylem brand

Issued: 4/12 Supersedes: 4/07

AC Current Transducer

AC Current Transformer Types A 82-10, A 82-20

Output Specifications

Output current	4 - 20 mADC
Power supply(loop voltage)	10 - 40 VDC
Tolerance of output current	
@ 50 Hz A 82-10	±2% ±0.08 mA
Temperature variation	±400 ppm/ºC
Frequency range	40 Hz -1 kHz
Frequency variation	10 ppm/Hz
Maximum output current	35 mADC

General Specifications

EMC	Electromagnetic Compatibility
Immunity	Acc. to EN50082-1 (toleranceof output current: ±2%) Acc. to EN50082-2 (toleranceof output current: ±5%)
Emission	Acc. to EN50081-1
Environment	
Degree of protection	IP 20
Pollution degree	3
Operating temperature	-20° to 50°C (-4° to +122°F)
Reaction time	t< 100 ms worst case reaction time may be up to 5 x t
Power ON delay	< 1 s
Connection cable	2 m, 2 x 0.25 mm²
Rated insulation voltage (cable)	250 VAC_{rms}
Indication for	
Power supply ON	LED, green
Weight	270 g
Material/color	ABS, light grey

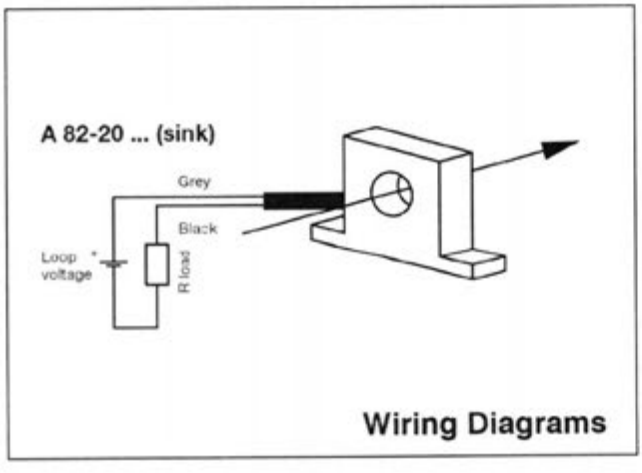
Mode of Operation

These devices are current metering transformers with standard sink output 4 - 20 mA. This makes it very useful as an AC current interface to a Flygt controller with mADC input.

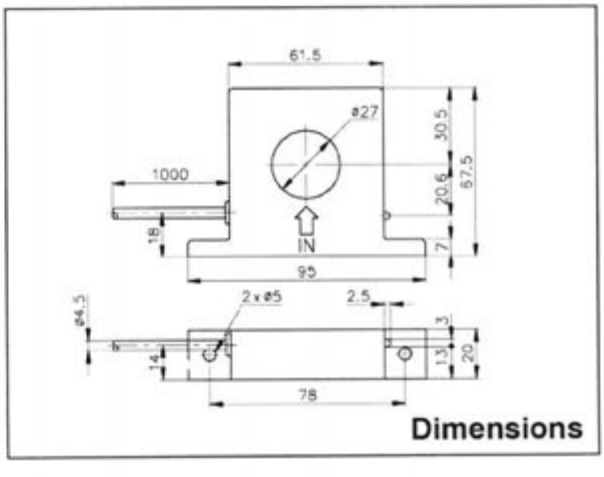
Used with relay EID, EIL or S183 one or more set points can monitor the current and signal alarm. S 183 also provides the DC voltage supply for the device.

The metered conductor is drawn through the central hole of the current metering transformer. It is possible to meter currents below the nominal range by drawing the conductor through the hole several times. If the conductor is drawn through the central hole Mode of Operation e.g. 5 times, the transformer will register 50 A when the current in the conductor is 10 A. The current metering transformer has zero as well as gain (span) adjustment, both factory-set.

Note: Do not change the set values.



Wiring Diagrams

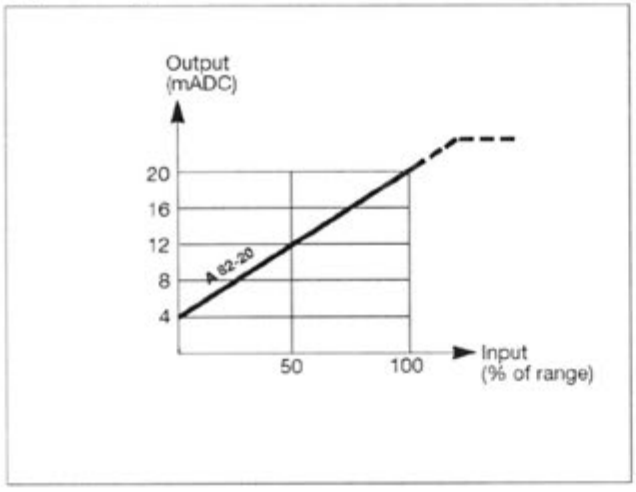


Dimensions

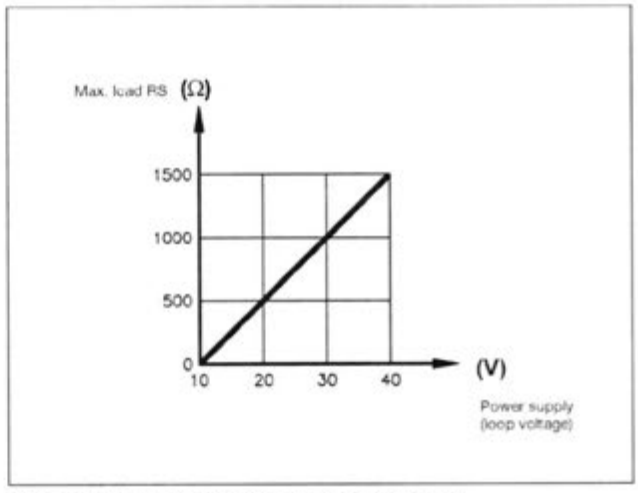
AC Current Transducer

AC Current Transformer Types A 82-10, A 82-20

Input/Output Curve



Resistance/Voltage Curve



Max. load resistance versus loop voltage
Max. load RS, Power supply (loop voltage)

Electronic Hour Meter Technical Data

AC Hour Meter, Series T50 211

Series T50

ENM's Series T50 electronic AC hour meter is a low cost reliable hour meter incorporating the latest state-of-the-art in electonics. It's quartz-crystal time base insures accurate long term time-keeping.

A reliable electromechanical wheel-type indicator is used to store accumulated hours.

This compact tamperproof meter is sealed against the environment to provide years of service.

The T50 elapsed time indicator was designed for use on test and recording equipment, for providing maintenance control, for establishing warranty programs, for measuring machine utilization and production time, or for any application where time-in-use is to be determined.

FEATURES:

- Solid State Electronic Circuit
- Quartz-Crystal for Accurate Timing
- Absolutely Will Not Lose Count
- High Impact, Tamperproof Plastic Case
- Sealed Against Moisture and Dirt
- UL and CSA Recognized
- Indicates Operating Time in Hours and Tenths
- Frequency Insensitive Design
- With Optional Gasket,complies to NEMA 4Xand 12
- **MADE IN THE USA**

SPECIFICATIONS:

Time Scale:	6-digits 99,999.9 Hours Automatic recycle to zero
Figures:	Hours — White on black Tenths — Red on White Height — 0.140"
Operating Voltage:	230,115,24V AC+10% Other Voltage available
Frequency:	50 or 60 Hz
Power Consumption:	Less than 0.4 Watts
Accuracy:	Better than ±0.02% over entire range
Temperature:	From -30° C to 65°
Vibration Resistance:	Withstands 10 to 75 hz at 1 to 8 g's
Termination:	1/4" male blade terminals
Configuration:	Round 3-hole Bezel Round SAE Bezel with new push-on retaining ring

E-MAIL
ENM Co. @ AOL.COM
Toll Free (888) 372-0465

ENM Company
5617 Northwest Highway
Chicago, IL 60646-6135
(773) 775-8400 Fax: (773) 775-5968

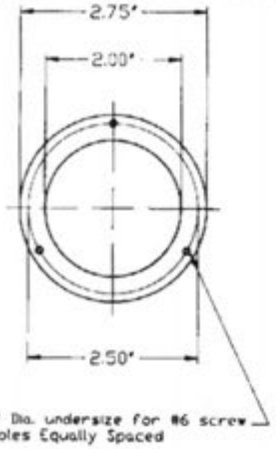
Series T50 AC

Dimensional Data

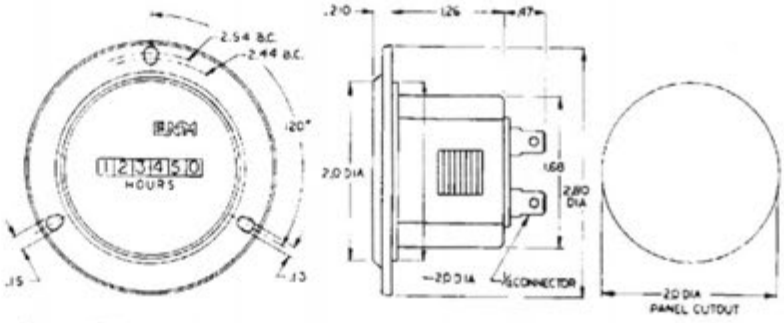
Panel Gasket
UL/NEMA 4X,12

Description	Part No.
NEMA Gasket	A40047-S

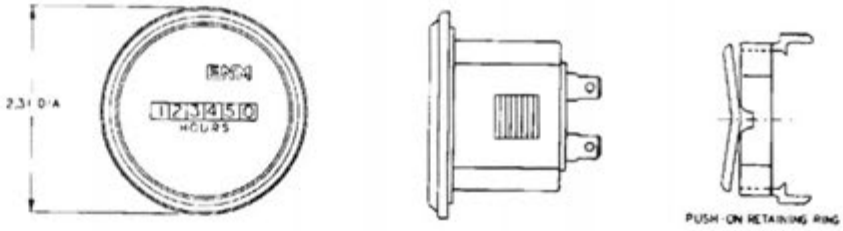
NEMA Gasket
w/ Mounting Hardware B20017



Round 3-Hole Bezel

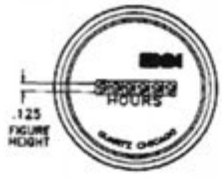


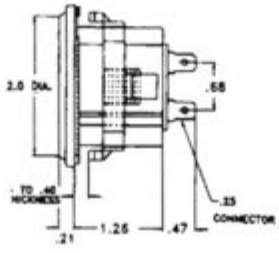
Round SAE Bezel



Power: Less than 0.4 Watts

Voltage	Part No.
230 AC	T50A1
115 AC	T50A2
24 AC	T50A4

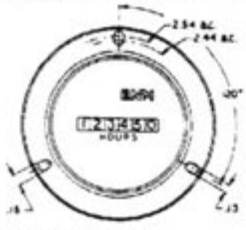


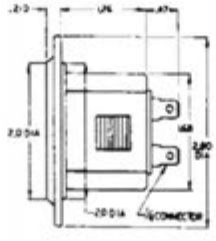


Technical Data Sheet #211

Power: Less than 0.4 Watts

Voltage	Part No.
115 AC	T50B2





Technical Data Sheet #211

Limited Warranty/Hour Meters

ENM Company hour meters are warranted to the consumer to be free from defects in material and workmanship for a period of 10,000 operating hours or for a period of 3 years, whichever first occurs.

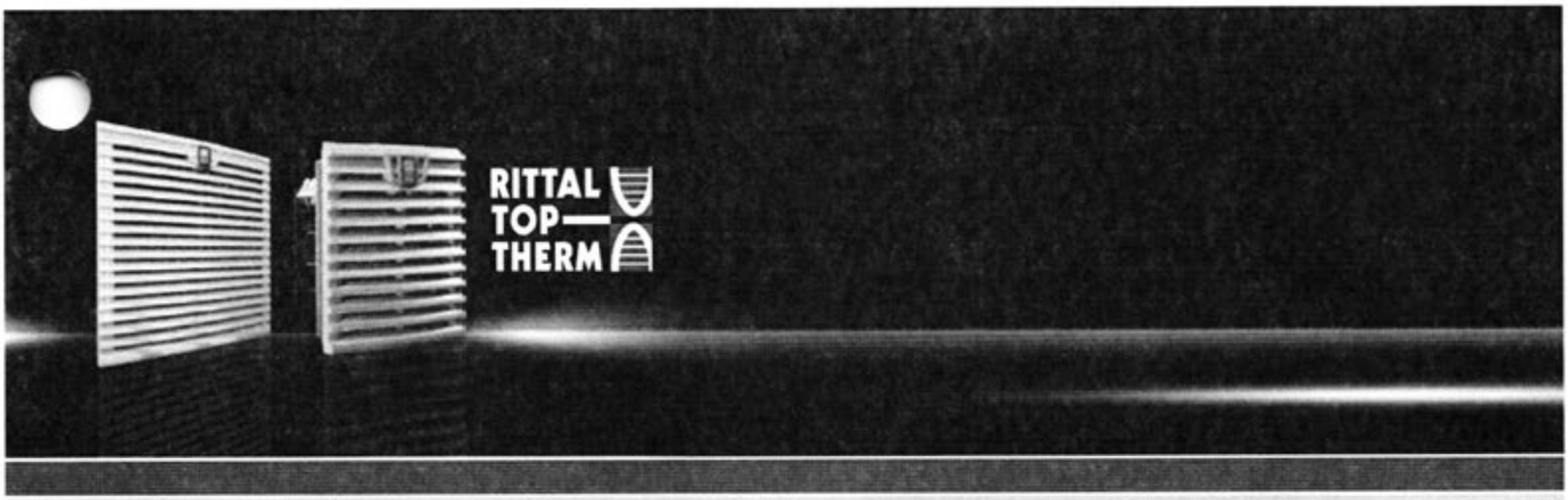
All ENM products which fail within the warranty period due to defects in material or workmanship will be repaired or replaced, at ENM's option, without charge to the consumer when returned with proof of purchase to any authorized ENM dealer in the United States, transportation charges prepaid, provided there is no evidence of improper installation, tampering, or other abuse.

All implied warranties, including any implied warranty of merchantability or fitness for a particular purpose, shall be limited in duration to the express warranty period specified above.

ENM disclaims any liability for consequential damages due to breach of any written or implied warranty on its hour meters.

ENM Company
5617 Northwest Highway
Chicago, IL 60646-6135
(773) 775-8400 Fax: (773) 775-5968

Filter Fan

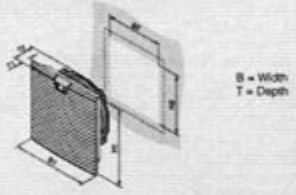


Configuration:
Filter fan unit ready for installation, including filter mats, self adhesive mounting template and instructions.

Protection Ratings:
NEMA 12/IP 54 standard
IP 55 with additional fine filter mat
NEMA 3R/4/4X/IP 56 with hose-proof hood

Property Rights:
German Registered Design
No. M 93 04 846

Certifications:
CE - 3527009
UL/cUL - E76083



Air Displacement: 12 - 39 cfm (20 - 66 m³/h)

Part No. (Filter Fan and Filter Unit)		**3237.100**	**3237.110**	**3237.124**	**3238.100**	**3238.110**	**3238.124**
Part No. (Filter Fan and Filter Unit - EMC)		**3237.600**	–	–	**3238.600**	–	–
Rated operating voltage V, Hz		230, 50/60	115, 50/60	24 (DC)	230, 50/60	115, 50/60	24 (DC)
Dimensions inches (mm)	B1/H1	5 x 5 (116.5 x 116.5)			6 x 6 (148.5 x 148.5)		
	B2/H2	4 x 4 (92 x 92)			5 x 5 (124 x 124)		
	T1	1 (16)			1 (16)		
Max. installation depth mm	T2	2 (43)			2 (58.5)		
Air throughput, unimpeded air flow		12/15 cfm (20/25 m³/h)		12 cfm (20 m³/h)	32/39 cfm (55/66 m³/h)		32 cfm (55 m³/h)
Air throughput with outlet filter including standard filter mat cfm		1 x 3237.200: 9/11 cfm (15/18 m³/h)			1 x 3238.200: 25/29 cfm (43/50 m³/h) 2 x 3238.200: 27/33 cfm (46/56 m³/h)		
Fan motor		Self-starting shaded pole motor		DC motor	Self-starting shaded pole motor		DC motor
Rated current		0.065 A/0.052 A	0.12 A/0.1 A	0.125 A	0.12 A/0.11 A	0.24 A/0.22 A	0.23 A
Power consumption		11 W/9 W		3 W	19 W/18 W		5.5 W
Pre-fuse		2 A					
Noise level		38/43 dB (A)		38 dB (A)	46/49 dB (A)		46 dB (A)
Operating temperature range F° (C°)		5 to 131° F (–15 to +55° C)					
Storage temperature range F °(C°)		-22 to 158° F (–30 to +70° C)					
Color		RAL 7035					
Part No. outlet filter		3237.200			3238.200		
Part No. outlet filter – EMC		3237.060			3238.060		
Accessories	PU						
Filter mats	5	3321.700			3322.700		
Filter mats – EMC	5	3237.066			3238.066		
Fine filter mats	5	–			3238.055		
Hose-proof hood - 304 stainless steel	1	3237.080[1]			3238.080[2]		
Hose-proof hood - RAL 7035	1	3237.085[1]			3238.085[2]		
Blanking cover	1	3237.020			3238.020		
Thermostat	1	3110.000					
Digital temperature display	1	3114.200					
Hygrostat	1	3118.000					
Speed control	1	3120.200					

Special voltages and colors available on request. We reserve the right to make technical modifications. [1] UL type 3R [2] UL type 4X [3] UL type 3R/4

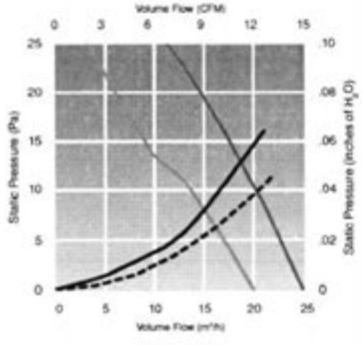
Air Displacement: 62 - 71 cfm (105 - 120 m³/h)

Part No. (Filter Fan and Filter Unit)		**3239.100**	**3239.110**	**3239.124**
Part No. (Filter Fan and Filter Unit - EMC)		**3239.600**	–	–
Rated operating voltage V, Hz		230, 50/60	115, 50/60	24 (DC)
Dimensions inches (mm)	B1/H1	8 x 8 (204 x 204)		
	B2/H2	7 x 7 (177 x 177)		
	T1	1 (24)		
Max. installation depth inches (mm)	T2	3.5 (90)		
Air throughput, unimpeded air flow		62/71 cfm (105/120 m³/h)		62 cfm (105 m³/h)
Air throughput with outlet filter including standard filter mat		1 x 3239.200: 51/59 cfm (87/100 m³/h) 2 x 3239.200: 55/64 cfm (93/108 m³/h) 1 x 3240.200: 58/65 cfm (98/111 m³/h)		
Diagonal fan		Self-starting shaded pole motor		DC motor
Rated current		0.12 A/0.11 A	0.24 A/0.22 A	0.23 A
Power consumption		19 W/18 W		5.5 W
Pre-fuse		2 A		
Noise level		46/49 dB (A)		46 dB (A)
Operating temperature range F° (C°)		-5 to 131° F (-15 to +55° C)		
Storage temperature range F° (C°)		-22 to 158° F (-30 to +70° C)		
Color		RAL 7035		
Part No. outlet filter		3239.200		

Accessories	PU	
Filter mats	5	3171.100
Filter mats – EMC	5	3239.066
Fine filter mats	5	3181.100
Hose-proof hood - 304 stainless steel	1	3239.080[1]
Hose-proof hood - RAL 7035	1	3239.085[2]
Blanking cover	1	3239.020
Thermostat	1	3110.000
Digital temperature display	1	3114.200
Hygrostat	1	3118.000
Speed control	1	3120.200

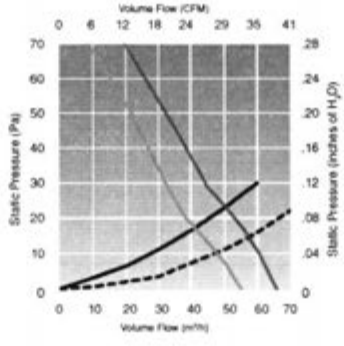
Special voltages and colors available on request. We reserve the right to make technical modifications. [1] UL type 4X [2] UL type 3R/4

Performance chart 3237.xxx



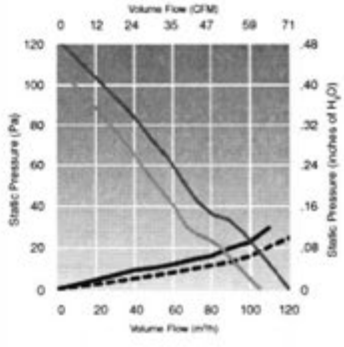
Performance Curve 1 x 3237.200
Performance Curve 2 x 3237.200
3237.xxx 50 Hz
3237.xxx 60 Hz

Performance chart 3238.xxx



Performance Curve 1 x 3238.200
Performance Curve 2 x 3238.200
3238.xxx 50 Hz
3238.xxx 60 Hz

Performance chart 3239.xxx



Performance Curve 1 x 3239.200
Performance Curve 2 x 3239.200
3239.xxx 50 Hz
3239.xxx 60 Hz

Filter Fan

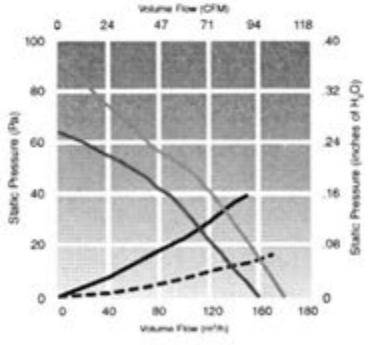
Air Displacement: 106 - 147 cfm (180 - 250 m³/h)

Part No. (Filter Fan and Filter Unit)		**3240.100**	**3240.110**	**3240.124**	**3241.100**	**3241.110**	**3241.124**
Part No. (Filter Fan and Filter Unit - EMC)		**3240.600**	–	–	**3241.600**	–	–
Rated operating voltage V, Hz		230, 50/60	115, 50/60	24 (DC)	230, 50/60	115, 50/60	24 (DC)
Dimensions inches (mm)	B1/H1	10 x 10 (255 x 255)					
	B2/H2	9 x 9 (224 x 224)					
	T1	.98 (25)					
Max. installation depth inches (mm)	T2	4.21 (107)					
Air throughput, unimpeded air flow		106/94 cfm (180/160 m³/h)		106 cfm (180 m³/h)	135/147 cfm (230/250 m³/h)		135 cfm (230 m³/h)
Air throughput with outlet filter including standard filter mat		1 x 3240.200: 81/71 cfm (138/121 m³/h) 2 x 3240.200: 97/82 cfm (165/140 m³/h) 1 x 3243.200: 97/82 cfm (165/140 m³/h)			1 x 3240.200: 108/120 cfm (183/205 m³/h) 2 x 3240.200: 119/135 cfm (203/230 m³/h) 1 x 3243.200: 119/135 cfm (203/230 m³/h)		
Diagonal fan		Self-starting shaded pole motor		DC motor	Self-starting shaded pole motor		DC motor
Rated current		0.21 A/0.19 A	0.42 A/0.38 A	0.43 A	0.26 A/0.24 A	0.52 A/0.48 A	0.78 A
Power consumption		35 W/34 W		11 W	40 W/42 W		19 W
Pre-fuse		2 A	4 A	2 A	4 A		2 A
Noise level		51/46 dB (A)		51 dB (A)	54/56 dB (A)		54 dB (A)
Operating temperature range F° (C°)		-22 to 131° F (–30 to +55° C)					
Storage temperature range F° (C°)		-22 to 158° F (–30 to +70° C)					
Color		RAL 7035					
Part No. outlet filter		3240.200					

Accessories	PU	
Filter mats	5	3172.100
Filter mats – EMC	5	3240.066
Fine filter mats	5	3182.100
Hose-proof hood - 304 stainless steel	1	3240.080[1]
Hose-proof hood - RAL 7035	1	3240.085[2]
Blanking cover	1	3240.020
Thermostat	1	3110.000
Digital temperature display	1	3114.200
Hygrostat	1	3118.000
Speed control	1	3120.200

Special voltages and colors available on request. We reserve the right to make technical modifications. [1] UL type 4X [2] UL type 3R/4

Performance chart 3240.xxx



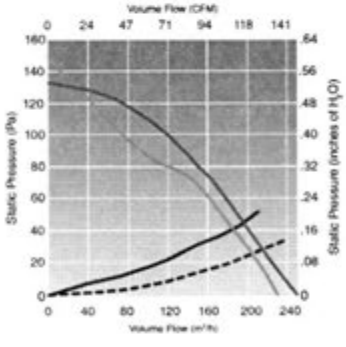
Performance Curve 1 x 3240.200

Performance Curve 2 x 3240.200

3240.xxx 50 Hz

3240.xxx 60 Hz

Performance chart 3241.xxx



Performance Curve 1 x 3241.200

Performance Curve 2 x 3241.200

3241.xxx 50 Hz

3241.xxx 60 Hz

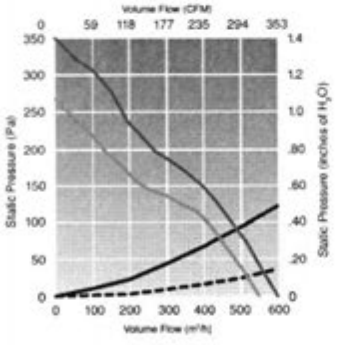
Air Displacement: 323 - 453 cfm (550 - 770 m³/h)

Part No. (Filter Fan and Filter Unit)		**3243.100**	**3243.110**	**3244.100**	**3244.110**	**3244.140**
Part No. (Filter Fan and Filter Unit - EMC)		**3243.600**	–	**3244.600**	–	–
Rated operating voltage V, Hz		230, 50/60	115, 50/60	230, 50/60	115, 50/60	400/460, 3~, 50/60
Dimensions inches (mm)	B1/H1	13 x 13 (323 x 323)				
	B2/H2	12 x 12 (292 x 292)				
	T1	1 (25)				
Max. installation depth inches (mm)	T2	4½ (118.5)		5 (130.5)		
Air throughput, unimpeded air flow		323/353 cfm (550/600 m³/h)		412/424 cfm (700/770 m³/h)		
Air throughput with outlet filter including standard filter mat		1 x 3243.200: 259/289 cfm (440/490 m³/h) 2 x S243.200: 300/330 cfm (510/560 m³/h)		1 x 3243.200: 320/359 cfm (544/610 m³/h) 2 x 3243.200: 371/406 cfm (630/690 m³/h)		
Diagonal fan		1~ capacitor motor				Rotary current motor
Rated current		0.37 A/0.39 A	0.78 A/0.80 A	0.43 A/0.6 A	0.9 A/1.25 A	0.17 A/0.21 A
Power consumption		70 W/87 W	75 W/90 W	95 W/135 W	100 W/145 W	93 W/140 W
Pre-fuse		4 A	6 A	4 A	6 A	Motor circuit-breaker
Noise level		59/61 dB (A)		65/66 dB (A)		
Operating temperature range		-22 to 131° F (-30 to +55° C)				
Storage temperature range		-22 to 158° F (-30 to +70° C)				
Color		RAL 7035				
Part No. outlet filter		3243.200				
Part No. outlet filter – EMC		3243.060	–	3243.060	–	–

Accessories	PU	
Filter mats	5	3173.100
Filter mats – EMC	5	3243.066
Fine filter mats	5	3183.100
Hose-proof hood - 304 stainless steel	1	3243.080[1]
Hose-proof hood - RAL 7035	1	3243.085[2]
Blanking cover	1	3243.020
Thermostat	1	3110.000
Digital temperature display	1	3114.200
Hygrostat	1	3118.000
Speed control	1	3120.200

Special voltages and colors available on request. We reserve the right to make technical modifications. [1] UL type 4X [2] UL type 3R/4

Performance chart 3243.xxx



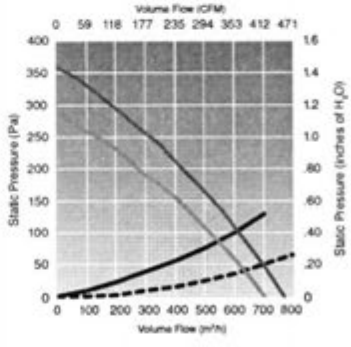
Performance Curve 1 x 3243.200

Performance Curve 2 x 3243.200

3243.xxx 50 Hz

3243.xxx 60 Hz

Performance chart 3244.xxx



Performance Curve 1 x 3244.200

Performance Curve 2 x 3244.200

3244.xxx 50 Hz

3244.xxx 60 Hz

Ferraz Shawmut

USCC & USM

ULTRASAFE™ FUSEHOLDERS

ULTRASAFE MODULAR FUSE HOLDERS

Ferraz Shawmut UltraSafe ™Modular Fuse Holders introduce a new level of safety for Class CC (USCC) and Midget 1-1/2" x 13/32" (USM) AC and DC-rated fuses up to 30 amperes. UltraSafe holders qualify as "finger safe" under IEC and DIN standards to an IP20 grade of protection, including fuse changing (with the flick of a finger). UltraSafe holders are available in 1, 2, 3 or 4 poles, with or without visual blown-fuse indicators in each pole. Multi-pole units can also be field assembled by ordering pin-tie handles. UltraSafe holders save up to 15% mounting space and any combination can be snapped onto 35mm DIN-rail for extra savings in panel building time. UltraSafe holders with Class CC fuses chosen for Type "2" No Damage protection give one of the safest protection packages in the industry. UltraSafe body material is tough and durable polyamide, with exceptional insulating properties.

Highlights

- IP20 Finger-Safe (touch safe)
- Optional Visual Blown Fuse Indicator Lights
- DIN-rail Mounting
- Compact Footprint
- Quick, Tool-free, Easy Fuse Change Outs

Applications

- All circuits up to 600 volts for motors, control circuits, transformers, etc...
- DC circuits up to 1000VDC including photovoltaic applications
- Non-load disconnect

Ratings

- **USM** (10x38mm, Midget Fuses)
  800VAC / 1000VDC, 30A (non-indicating versions)
  600VAC / 600VDC, 30A (indicating versions)
  Short Circuit Current Rating: 100kA
  Special indicators available for 24VDC, 120VAC and 1000VDC
- **USCC** (Class CC Fuses)
  600VAC / 600VDC, 30A
  Short Circuit Current Rating: 200kA
  Special indicators available for 24VDC, 120VAC and 300VAC

Recommended Fuse Usage

- **USM** use with:
  ATQ, ATM*, A6Y-2B, A25Z-2, TRM, OTM, A13X-2, A60Q-2, DCT*
- **USCC** use with:
  ATDR, ATMR*, ATQR

*** Recommended for DC Applications**

Approvals

All UltraSafe fuse holders meet the requirements of UL4248 (formally UL512)
CSA Certified C22.2, Class 6225, File 32169
IEC Compliant 60269-1

- **USM** (Midget, 10x38mm, 1-1/2" x 13/ 32")
  UL Recognized Component, Guide IZLT2, File E52283
  CSA Certified 750VAC, 30A
  IEC Compliant 690VAC, 32A
- **USCC** (UL Class CC)
  UL Listed, Guide IZLT, File E52283
  CSA Certified, 600V, 30A

Ferraz Shawmut

USCC & USM

ULTRASAFE™ FUSEHOLDERS

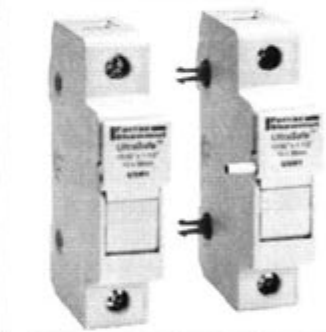
Catalog Number W/O Indicator	Catalog Number W/ Indicator	Description	Fuse Type	Voltage Rating		Ampere Rating	No. of Poles	Certifications
				AC	DC			
USCC1	USCC1I	1-Pole Class CC UltraSafe Fuse Holder	Class CC	600V	600V	30A	1	UL Listed CSA
USCC2	USCC2I	2-Pole Class CC UltraSafe Fuse Holder					2	
USCC3	USCC3I	3-Pole Class CC UltraSafe Fuse Holder					3	
USCC4	USCC4I	4-Pole Class CC UltraSafe Fuse Holder					4	
USCC3N	USCC3IN	3-Pole + N Class CC UltraSafe Fuse Holder					4	
Special Indicator Versions	USCC1I-AC120	USCC1I with 120VAC indicator		120	-		1	
	USCC1I-AC300	USCC1I with 300VAC indicator		300	-		1	
	USCC1I-DC24	USCC1I with 24VDC indicator		-	24		1	
USM1	USM1I	1-Pole Midget UltraSafe Fuse Holder	Midget (10 x 38mm) (1-1/2" x 13/32")	800V*	1000V*	30A	1	UL Recognized CSA IEC Certified
USM2	USM2I	2-Pole Midget UltraSafe Fuse Holder					2	
USM3	USM3I	3-Pole Midget UltraSafe Fuse Holder					3	
USM4	USM4I	4-Pole Midget UltraSafe Fuse Holder					4	
USM3N	USM3IN	3-Pole + N Midget UltraSafe Fuse Holder					4	
Special Indicator Versions	USM1I-AC120	USM1I with 120VAC indicator		120	-		1	
	USM1I-DC24	USM1I with 24VDC indicator		-	24		1	
	USM1I-DC1000	USM1I with 1000VDC indicator		-	1000		1	

* Catalog Numbers with Indicators are rated 600VAC / 600VDC unless otherwise noted.

Accessories Catalog Number	Description
USN	1-Pole with Integral Neutral Link
USPTH	Pin-Tie Accessory for 12-Poles

USPTH Pin-Tie Accessory

USM1 with USPTH Pin-Ties

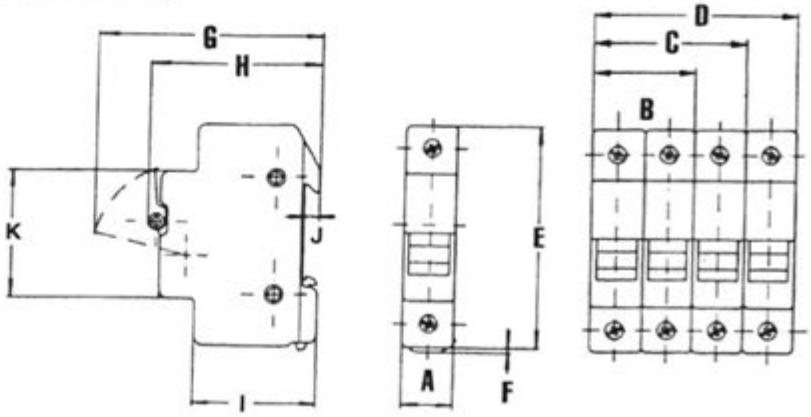


Additional Specifications

Terminal screws: Phillips/slot head
Suggested screw torque: 14.75 in-lbs.
Connector type: Pressure plate
Wire range: #6 to #14 (solid/stranded Cu)
Load-break disconnect: No

Dimensions

DIMENSION	mm	In
A	17.5	0.69
B	35.0	1.38
C	52.5	2.07
D	70.0	2.76
E	78.0	3.07
F	2.5	0.10
G	78.0	3.07
H	59.0	2.32
I	42.5	1.67
J	5.0	0.20
K	45.0	1.77



ATQR Time-delay/Class CC

Take control of fault currents headed for your control transformer

ATQR small-dimension fuses feature time-delay characteristics ideally suited for the high inrush currents of control transformers, solenoids, and similar inductive loads. Mersen's ATQR fuses provide superior protection for the branch circuits of electrical distribution systems.

Features/Benefits:

- Time-delay for control transformer inrush loads without nuisance opening
- Highly current-limiting for low peak let-thru current
- Rejection-style design prevents replacement errors (when used with recommended fuse blocks)
- High visibility orange label ensures instant brand recognition, and simplifies replacement
- Metal-embossed date and catalog number for traceability and lasting identification
- Fiberglass body provides dimensional stability in harsh industrial settings
- High-grade silica filler ensures fast arc quenching and high current limitation

Ratings:

Volts : 600VAC
: 300VDC
Amps : 1/10 to 30A
IR : 200kA I.R. AC
: 100kA I.R. DC

Highlights:

- Time-delay
- Best choice for small transformer protection
- Current-limiting

Applications:

- Control transformers
- Solenoids
- Inductive loads
- Lighting, heating & general-purpose loads

Note: See motor fuse applications tables on page P7

Approvals:

- UL listed to standard 248-4 File E2137
- DC listed to UL standard 248
- CSA certified to standard C22.2 No. 248.4

ATQR Time-delay/Class CC

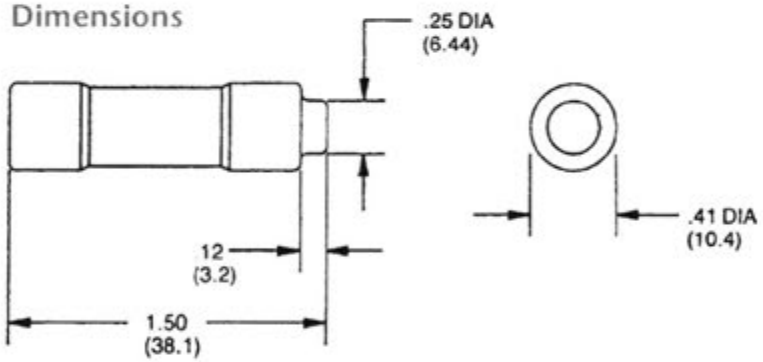
Catalog Numbers (amps)

ATQR1/10	ATQR8/10	ATQR2-8/10	ATQR7-1/2
ATQR1/8	ATQR1	ATQR3	ATQR8
ATQR3/16	ATQR1-1/8	ATQR3-2/10	ATQR9
ATQR2/10	ATQR1-1/4	ATQR3-1/2	ATQR10
ATQR1/4	ATQR1-4/10	ATQR4	ATQR12
ATQR3/10	ATQR1-1/2	ATQR4-1/2	ATQR15
ATQR4/10	ATQR1-6/10	ATQR5	ATQR17-1/2
ATQR1/2	ATQR1-8/10	ATQR5-6/10	ATQR20
ATQR6/10	ATQR2	ATQR6	ATQR25
ATQR3/4	ATQR2-1/4	ATQR6-1/4	ATQR30
	ATQR2-1/2	ATQR7	

Recommended Fuse Blocks for Class CC Fuses

Number of Poles	Catalog Numbers			
	UltraSafe™ Indicating Fuse Holder	Screw Connector w/ Double Quick Connects	Pressure Plate Connector w/ Double Quick Connects	Copper Box Connector
ADDER		30310R	30320R	30350R
1	USCC1I	30311R	30321R	30351R
2	USCC2I	30312R	30322R	30352R
3	USCC3I	30313R	30323R	30353R
3	USFMCCI			

Dimensions



Electronic/Glass Fuses

GSA/GSA-V

- Ceramic body
- Time-delay
- 1/4" x 1-1/4"
- 1-1/2" Axial leads optional

1/16A through 8A, 250VAC, UL Listed - 10,12,15A, 250V UL Recognized
1/16A through 8A, 250VAC, CSA Certified - 10, 12, 15A, 250V CSA Recognized 20A, 250VAC, 25 & 30A, 125VAC

Standard Fuse Ampere Ratings

Catalog Number	Axial Lead Cat. No	Ampere Rating	Volts	I.R.
GSA1/16	GSA-V1/16	1/16A	250V	1
GSA1/10	GSA-V1/10	1/10A	250V	1
GSA1/8	GSA-V1/8	1/8A	250V	1
GSA15/100	GSA-V15/100	15/100A	250V	1
GSA175/1000	GSA-V175/1000	175/1000A	250V	1
GSA3/16	GSA-V3/16	3/16A	250V	1
GSA2/10	GSA-V2/10	2/10A	250V	1
GSA1/4	GSA-V1/4	1/4A	250V	1
GSA3/10	GSA-V3/10	3/10A	250V	1
GSA3/8	GSA-V3/8	3/8A	250V	1
GSA4/10	GSA-V4/10	4/10A	250V	1
GSA1/2	GSA-V1/2	1/2A	250V	1
GSA6/10	GSA-V6/10	6/10A	250V	1
GSA7/10	GSA-V7/10	7/10A	250V	1
GSA3/4	GSA-V3/4	3/4A	250V	1
GSA8/10	GSA-V8/10	8/10A	250V	1
GSA1	GSA-V1	1A	250V	1
GSA1-1/4	GSA-V1-1/4	1-1/4A	250V	2
GSA1-1/2	GSA-V1-1/2	1-1/2A	250V	2
GSA1-6/10	GSA-V1-6/10	1-6/10A	250V	2
GSA2	GSA-V2	2A	250V	2
GSA2-1/4	GSA-V2-1/4	2-1/4A	250V	2
GSA2-1/2	GSA-V2-1/2	2-1/2A	250V	2
GSA2-8/10	GSA-V2-8/10	2-8/10A	250V	2
GSA3	GSA-V3	3A	250V	2
GSA3-2/10	GSA-V3-2/10	3-2/10A	250V	2
GSA3-1/2	GSA-V3-1/2	3-1/2A	250V	2
GSA4	GSA-V4	4A	250V	3
GSA5	GSA-V5	5A	250V	3
GSA6	GSA-V6	6A	250V	3
GSA6-1/4	GSA-V6-1/4	6-1/4A	250V	3
GSA7	GSA-V7	7A	250V	3
GSA8	GSA-V8	8A	250V	3
GSA10	GSA-V10	10A	250V	4
GSA12	GSA-V12	12A	250V	4
GSA15	GSA-V15	15A	250V	4
GSA20	GSA-V20	20A	250V	5
GSA25	GSA-V25	25A	125V	6
GSA30	GSA-V30	30A	125V	6

1. *250VAC @ 35A I.R./125VAC @ 10kA I.R.*
2. *250VAC @ 100A I.R./125VAC @ 10kA I.R.*
3. *250VAC @ 200A I.R./125VAC @ 10kA I.R.*
4. *250VAC @ 750A I.R./125VAC @ 10kA I.R.*
5. *250VAC @ 400A I.R./125VAC @ 10KA I.R.*
6. *125VAC @ 400A I.R.*

GDL/GDL-V

- Glass body
- Time-delay
- 1/4" x 1-1/4"
- 1-1/2" Axial leads optional

1/16A through 8A, 250VAC, UL Listed and CSA Certified
10A through 15A, 125VAC, UL Listed and CSA Certified
20A through 30A, 32VAC, UL Listed to U.S. and Canadian safety standards

Standard Fuse Ampere Ratings

Catalog Number	Axial Lead Cat. No	Ampere Rating	Volts	I.R.
GDL1/16	GDL-V1/16	1/16A	250V	1
GDL1/10	GDL-V1/10	1/10A	250V	1
GDL1/8	GDL-V1/8	1/8A	250V	1
GDL15/100	GDL-V15/100	15/100A	250V	1
GDL175/1000	GDL-V175/1000	175/1000A	250V	1
GDL3/16	GDL-V3/16	3/16A	250V	1
GDL2/10	GDL-V2/10	2/10A	250V	1
GDL1/4	GDL-V1/4	1/4A	250V	1
GDL3/10	GDL-V3/10	3/10A	250V	1
GDL3/8	GDL-V3/8	3/8A	250V	1
GDL4/10	GDL-V4/10	4/10A	250V	1
GDL1/2	GDL-V1/2	1/2A	250V	1
GDL6/10	GDL-V6/10	6/10A	250V	1
GDL7/10	GDL-V7/10	7/10A	250V	1
GDL3/4	GDL-V3/4	3/4A	250V	1
GDL8/10	GDL-V8/10	8/10A	250V	1
GDL1	GDL-V1	1A	250V	1
GDL1-1/4	GDL-V1-1/4	1-1/4A	250V	2
GDL1-1/2	GDL-V1-1/2	1-1/2A	250V	2
GDL1-6/10	GDL-V1-6/10	1-6/10A	250V	2
GDL1-8/10	GDL-V1-8/10	1-8/10A	250V	2
GDL2	GDL-V2	2A	250V	2
GDL2-1/4	GDL-V2-1/4	2-1/4A	250V	2
GDL2-1/2	GDL-V2-1/2	2-1/2A	250V	2
GDL2-8/10	GDL-V2-8/10	2-8/10A	250V	2
GDL3	GDL-V3	3A	250V	2
GDL3-2/10	GDL-V3-2/10	3-2/10A	250V	2
GDL4	GDL-V4	4A	250V	3
GDL5	GDL-V5	5A	250V	3
GDL6	GDL-V6	6A	250V	3
GDL6-1/4	GDL-V6-1/4	6-1/4A	250V	3
GDL7	GDL-V7	7A	250V	3
GDL8	GDL-V8	8A	250V	3
GDL10	GDL-V10	10A	125V	4
GDL12	GDL-V12	12A	125V	4
GDL15	GDL-V15	15A	125V	4
GDL20	GDL-V20	20A	32V	5
GDL25	GDL-V25	25A	32V	5
GDL30	GDL-V30	30A	32V	5

1. *250VAC @ 35A I.R./125VAC @ 10kA I.R.*
2. *250VAC @ 100A I.R./125VAC @ 10kA I.R.*
3. *250VAC @ 200A I.R./125VAC @ 10kA I.R.*
4. *125VAC @ 10kA I.R.*
5. *32VAC @ 300A I.R.*

Fuse modular terminal block - UK 5-HESILED 24 - 3004126

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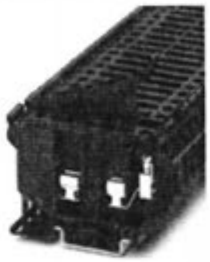

The illustration shows version UK 5-HESI

Fuse terminal block for cartridge fuse insert, cross section: 0.2 - 4 mm², AWG: 26 - 10, width: 8.2 mm, color: black

Why buy this product

- Versions with LED
- Large-surface labeling
- Safety lever locked in end position

Key commercial data

Packing unit	1
Minimum order quantity	1200
Catalog page	Page 438 (CL1-2011)
GTIN	4 017918 090647
Custom tariff number	85369085
Country of origin	CHINA

Technical data

General

Number of levels	1
Number of connections	2
Color	black
Insulating material	PA
Inflammability class according to UL 94	V2

Dimensions

Width	8.2 mm
Length	72.5 mm
Height NS 35/7,5	56.5 mm
Height NS 35/15	64 mm
Height NS 32	61.5 mm

Fuse modular terminal block - UK 5-HESILED 24 - 3004126

Technical data

Technical data

Fuse	G / 5 x 20 / 5 x 25 / 5 x 30
Fuse type	Glass
Rated surge voltage	6 kV
Pollution degree	3
Surge voltage category	III
Insulating material group	I
Connection in acc. with standard	IEC 60947-7-3
Nominal current I_N	6.3 A
Nominal voltage U_N	500 V (As a fuse terminal block)
LED voltage range	12 V AC/DC ... 30 V AC/DC
LED current range	3.5 mA ... 8.1 mA
Open side panel	nein
Number of positions	1

Connection data

Conductor cross section solid min.	0.2 mm²
Conductor cross section solid max.	4 mm²
Conductor cross section stranded min.	0.2 mm²
Conductor cross section stranded max.	4 mm²
Conductor cross section AWG/kcmil min.	24
Conductor cross section AWG/kcmil max	12
Conductor cross section stranded, with ferrule without plastic sleeve min.	0.25 mm²
Conductor cross section stranded, with ferrule without plastic sleeve max.	4 mm²
Conductor cross section stranded, with ferrule with plastic sleeve min.	0.25 mm²
Conductor cross section stranded, with ferrule with plastic sleeve max.	4 mm²
2 conductors with same cross section, solid min.	0.2 mm²
2 conductors with same cross section, solid max.	1.5 mm²
2 conductors with same cross section, stranded min.	0.2 mm²
2 conductors with same cross section, stranded max.	1.5 mm²
2 conductors with same cross section, stranded, ferrules without plastic sleeve, min.	0.25 mm²
2 conductors with same cross section, stranded, ferrules without plastic sleeve, max.	1.5 mm²
2 conductors with same cross section, stranded, TWIN ferrules with plastic sleeve, min.	0.5 mm²
2 conductors with same cross section, stranded, TWIN ferrules with plastic sleeve, max.	1.5 mm²
Cross section with insertion bridge, solid max.	4 mm²
Cross section with insertion bridge, stranded max.	4 mm²
Connection method	Screw connection
Stripping length	8 mm
Internal cylindrical gage	A4

Fuse modular terminal block - UK 5-HESILED 24 - 3004126

Technical data

Connection data

Screw thread	M3
Tightening torque, min	0.5 Nm
Tightening torque max	0.8 Nm

Classifications

ETIM

ETIM 2.0	EC000897
ETIM 3.0	EC000899
ETIM 4.0	EC000899
ETIM 5.0	EC000899

UNSPSC

UNSPSC 11	39121410
UNSPSC 12.01	39121410
UNSPSC 13.2	39121410
UNSPSC 6.01	30211811
UNSPSC 7.0901	39121410

eCl@ss

eCl@ss 4.0	27141116
eCl@ss 4.1	27141116
eCl@ss 5.0	27141116
eCl@ss 5.1	27141116
eCl@ss 6.0	27141116
eCl@ss 7.0	27141116

Approvals

Approvals

Approvals

CSA / UL Recognized / GOST / LR / GL / cUL Recognized / GOST / cULus Recognized

Ex Approvals

Approvals submitted

Approval details

Fuse modular terminal block - UK 5-HESILED 24 - 3004126

Approvals

CSA

		B	C
mm²/AWG/kcmil	28-1	28-10	28-10
Nominal current IN	6.3 A	6.3 A	6.3 A
Nominal voltage UN	600 V	600 V	600 V

UL Recognized

	C
mm²/AWG/kcmil	26-10
Nominal current IN	12 A
Nominal voltage UN	600 V

GOST

LR

GL

cUL Recognized

	C
mm²/AWG/kcmil	26-10
Nominal current IN	12 A
Nominal voltage UN	600 V

GOST

cULus Recognized

Drawings

Fuse modular terminal block - UK 6,3-HESILED 24 - 3004265

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Fuse terminal block for cartridge fuse insert, cross section: 0.5 - 16 mm², AWG: 26 - 8, width: 10.2 mm, color: black

Product Features

- Versions with LED
- Large-surface labeling
- Safety lever locked in end position

Key commercial data

Packing unit	1 pc
GTIN	4 017918 090753
Weight per Piece (excluding packing)	35.42 GRM
Custom tariff number	85369085
Country of origin	Turkey

Technical data

General

Number of levels	1
Number of connections	2
Color	black
Insulating material	PA
Inflammability class according to UL 94	V2
Fuse	G / 6,3 x 32
Fuse type	Glass
Rated surge voltage	6 kV
Pollution degree	3

Fuse modular terminal block - UK 6,3-HESILED 24 - 3004265

Technical data

General

Surge voltage category	III
Insulating material group	I
Connection in acc. with standard	IEC 60947-7-3
Nominal current I_N	10 A
Nominal voltage U_N	500 V (As a fuse terminal block)
Open side panel	nein

Dimensions

Width	10.2 mm
Length	79 mm
Height NS 35/7,5	60.5 mm
Height NS 35/15	68 mm
Height NS 32	65 mm

Connection data

Conductor cross section solid min.	0.5 mm²
Conductor cross section solid max.	16 mm²
Conductor cross section stranded min.	0.5 mm²
Conductor cross section stranded max.	16 mm²
Conductor cross section AWG/kcmil min.	20
Conductor cross section AWG/kcmil max	6
Conductor cross section stranded, with ferrule without plastic sleeve min.	0.5 mm²
Conductor cross section stranded, with ferrule without plastic sleeve max.	10 mm²
Conductor cross section stranded, with ferrule with plastic sleeve min.	0.5 mm²
Conductor cross section stranded, with ferrule with plastic sleeve max.	10 mm²
2 conductors with same cross section, solid min.	0.5 mm²
2 conductors with same cross section, solid max.	4 mm²
2 conductors with same cross section, stranded min.	0.5 mm²
2 conductors with same cross section, stranded max.	4 mm²
2 conductors with same cross section, stranded, ferrules without plastic sleeve, min.	0.5 mm²
2 conductors with same cross section, stranded, ferrules without plastic sleeve, max.	4 mm²
2 conductors with same cross section, stranded, TWIN ferrules with plastic sleeve, min.	0.5 mm²
2 conductors with same cross section, stranded, TWIN ferrules with plastic sleeve, max.	6 mm²
Cross section with insertion bridge, solid max.	10 mm²
Cross section with insertion bridge, stranded max.	10 mm²
Connection method	Screw connection

Fuse modular terminal block - UK 6,3-HESILED 24 - 3004265

Technical data

Connection data

Stripping length	12 mm
Internal cylindrical gage	B 6
Screw thread	M4
Tightening torque, min	1.2 Nm
Tightening torque max	1.5 Nm

Classifications

eCl@ss

eCl@ss 4.0	27141116
eCl@ss 4.1	27141116
eCl@ss 5.0	27141116
eCl@ss 5.1	27141116
eCl@ss 6.0	27141116
eCl@ss 7.0	27141116
eCl@ss 8.0	27141116

ETIM

ETIM 2.0	EC000897
ETIM 3.0	EC000899
ETIM 4.0	EC000899
ETIM 5.0	EC000899

UNSPSC

UNSPSC 6.01	30211811
UNSPSC 7.0901	39121410
UNSPSC 11	39121410
UNSPSC 12.01	39121410
UNSPSC 13.2	39121410

Approvals

Approvals

Approvals

CSA / UL Recognized / GOST / LR / GL / GOST

Fuse modular terminal block - UK 6,3-HESILED 24 - 3004265

Approvals

Ex Approvals

Approvals submitted

Approval details

CSA

mm²/AWG/kcmil	26-8
Nominal current IN	25 A
Nominal voltage UN	600 V

UL Recognized

mm²/AWG/kcmil	26-8
Nominal current IN	10 A
Nominal voltage UN	600 V

GOST

LR

GL

GOST

Accessories

Accessories

Product Data Sheet

PK9GTA

LOAD CENTER EQUIPMENT GROUND BAR ASSY

SQUARE D

by Schneider Electric

List Price $13.40 USD

Availability **Stock Item: This item is normally stocked in our distribution facility.**

Technical Characteristics

Application	Load Centers
Marketing Trade Name	QO and Homeline
Circuit Breaker Type	PK
Height	12.57 Inches
Width	8.88 Inches

Shipping and Ordering

Category	00102 - Load Centers, Accessories, Type QO
Discount Schedule	DE3A
GTIN	00785901026396
Package Quantity	10
Weight	0.11 lbs.
Availability Code	Stock Item: This item is normally stocked in our distribution facility.
Returnability	Y
Country of Origin	US

As standards, specifications, and designs change from time to time, please ask for confirmation of the information given in this document.

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Schneider Electric

Product Data Sheet

PKOGTA2

EQUIP GRD ASSY 240V + 600V 100-200

SQUARE D

by Schneider Electric

List Price $55.00 USD

Availability **Stock Item: This item is normally stocked in our distribution facility.**

Technical Characteristics

For Use With	Safety Switch
Wire Size	(2) #2/0 AWG(Al/Cu)

Shipping and Ordering

Category	00058 - Safety Switch, Accessories, Miscellaneous
Discount Schedule	DE1
GTIN	00785901432678
Package Quantity	1
Weight	0.14 lbs.
Availability Code	Stock Item: This item is normally stocked in our distribution facility.
Returnability	Y
Country of Origin	US

As standards, specifications, and designs change from time to time, please ask for confirmation of the information given in this document.

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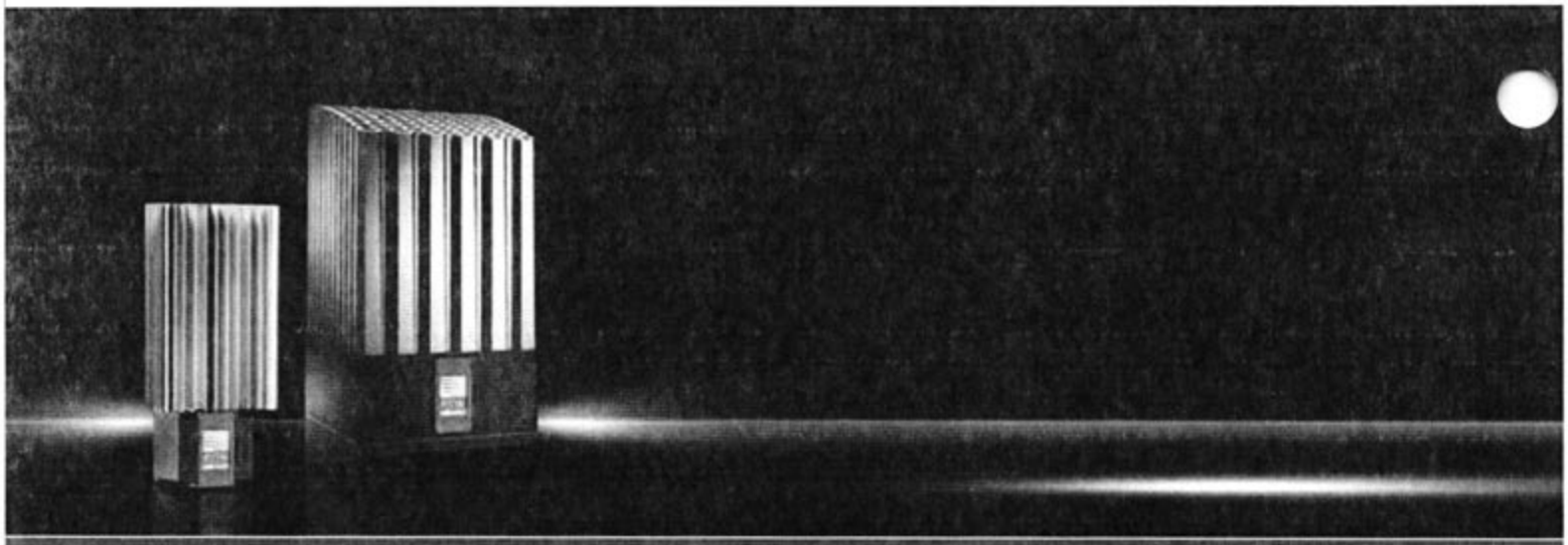
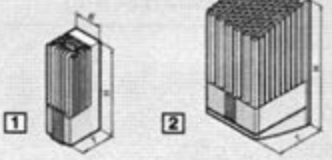
Schneider Electric



Climate control accessories Page 471 Software & services Page 511

Configuration:
- PTC heater
- Quick-connection terminal
- Assembly parts

Note:
- For precise temperature control inside the enclosure, we recommend the enclosure internal thermostat 3110.000 or the digital thermostat 3114.200 with display (see accessories).
- In order to prevent condensation on assemblies, hygrostat 3118.000 (see accessories) is recommended to regulate heating.
- In larger enclosures, even heat distribution is best achieved by installing several low-output heaters.
- The installation of heaters is generally advisable, in order to prevent condensation.



1 Without fan, continuous thermal output 10 – 150 W

Part No.		3105.310	3105.320	3105.330	3105.340	3105.350	3105.360	3105.370	
Dimensions inches (mm)	W (B)	5 (120)	5 (120)	6 (155)	6 (155)	9 (230)	6 (165)	7 (180)	
	H	2 (45)	2 (45)	3 (64)	3 (64)	3 (64)	4 (90)	4 (90)	
	D (T)	2 (46)	2 (46)	2 (56)	2 (56)	2 (56)	3 (75)	3 (75)	
Rated operating voltage V, Hz		110 – 240 V, 50/60 Hz							
Continuous thermal output at T_u = 50° F (10° C) BTU (W)		**27 – 34 (8 – 10)**	**61 – 68 (18 – 20)**	**78 – 102 (23 – 30)**	**167 – 171 (49 – 50)**	**215 – 256 (63 – 75)**	**293 – 341 (86 – 100)**	**444 – 512 (130 – 150)**	
Pre-fuse T		2 A		4A					

Accessories	PU		Page
Encl. internal thermostat	1	3110.000	476
Hygrostat	1	3118.000	476
Digital temp. display/thermostat	1	3114.200	475

Special voltages available on request. We reserve the right to make technical modifications.

2 With fan, continuous thermal output 250 – 800 W

Part No.		3105.410	3105.380	3105.420	3105.390	3105.430	3105.400	
Dimensions inches (mm)	W (B)	8 (200)						
	H	4 (103)						
	D (T)	4 (103)						
Rated operating voltage V, Hz		110 V, 50/60 Hz	230 V, 50/60 Hz	110 V, 50/60 Hz	230 V, 50/60 Hz	110 V, 50/60 Hz	230 V, 50/60 Hz	
Continuous thermal output at T_u = 50°F (10°C) BTU (W)		**853 (250)[1]**		**1365 (400)[1]**		**2730 (800)[1]**		
Pre-fuse T		4 A		6 A		10 A	6 A	

Accessories	PU		Page
Encl. internal thermostat	1	3110.000	476
Hygrostat	1	3118.000	476
Digital temp. display/thermostat	1	3114.200	475

[1] Thermal output with fan.
Special voltages available on request. We reserve the right to make technical modifications.

PHOENIX CONTACT

Extract from the online catalog

MACX MCR-EX-SL-RPSSI-I-UP

Order No.: 2865793

http://eshop.phoenixcontact.de/phoenix/treeViewClick.do?UID=2865793

Ex-i repeater power supply and input isolating amplifier, HART Sends fed or active 0/4-20 mA signals from the Ex area to a load (active or passive) to the safe area. Electrical 3-way isolation; SIL 2, wide range power supply.

SIL 2

Product notes

WEEE/RoHS-compliant since: 11/06/2008

http://www.download.phoenixcontact.com
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Commercial data

EAN	4046356324694
Pack	1 pcs.
Customs tariff	85437090
Weight/Piece	0.1502 KG
Catalog page information	Page 433 (IF-2009)

Technical data

Measuring input

Current input signal	0 mA ... 20 mA
	4 mA ... 20 mA
Transmitter supply voltage	> 16 V (at 20 mA)

Measurement output

Signal output	Current output
Voltage output signal	0 V ... 5 V (internal resistance, 250 Ω, 0.1%)
	1 V ... 5 V (internal resistance, 250 Ω, 0.1%)
Current output signal	0 mA ... 20 mA (active)
	4 mA ... 20 mA (active)
	0 mA ... 20 mA (passive, ext.Source voltage 14...26 V)
	4 mA ... 20 mA (passive, ext.Source voltage 14...26 V)
Load/output load current output	< 600 Ω (I output)

Power supply

Range of supply voltages	24 V AC/DC ... 230 V AC/DC (-20%/+10%, 50/60 Hz)
Max. current consumption	< 80 mA (for 24 V DC)
Power consumption	< 1.6 W

Connection data

Conductor cross section solid min.	0.2 mm²
Conductor cross section solid max.	2.5 mm²
Conductor cross section stranded min.	0.2 mm²
Conductor cross section stranded max.	2.5 mm²
Conductor cross section AWG/kcmil min.	24
Conductor cross section AWG/kcmil max	14
Stripping length	8 mm
Screw thread	M3
Type of connection	Screw connection
Tightening torque, min	0.5 Nm
Tightening torque max	0.6 Nm

General data

No. of channels	1
Transmission error, max.	< 0.1 % (of end value)
Transmission error, typical	< 0.05 % (of end value)
Maximum temperature coefficient	< 0.01 %/K
Ambient temperature (operation)	-20 °C ... 60 °C (Any mounting position)
Ambient temperature (storage/transport)	-40 °C ... 80 °C
Permissible humidity (operation)	10 % ... 95 % (no condensation)
Step response (10-90%)	< 600 µs (For jump 4 mA ... 20 mA)

Status display	Green LED (supply voltage)
Width	17.5 mm
Height	99 mm
Depth	114.5 mm
Inflammability class acc. to UL 94	V0
Housing material	polyamide (PA 6.6)
Color	green
Conformity	CE-compliant, additionally EN 61326
ATEX	II (1) GD [Ex ia] IIC
	Ex II 3 (1GD) G Ex nA [ia] IIC T4
IECEx	[Ex ia] IIC; Ex nA[ia] IIC T4
UL, USA / Canada	UL applied for
Functional safety (SIL)	SIL 2 according to EN 61508

Data communication (bypass)

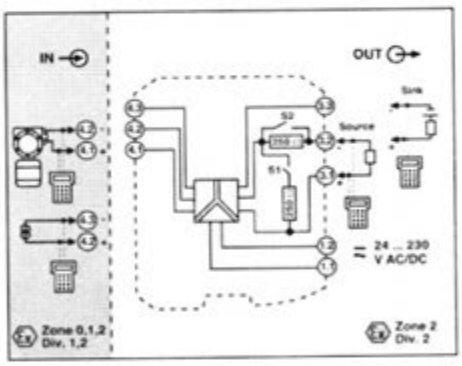
HART function	Yes
Protocols supported	HART

Certificates / Approvals

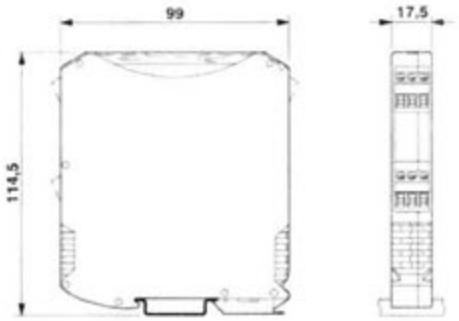
Certification Ex:	IECEx

Diagrams/Drawings

Block diagram

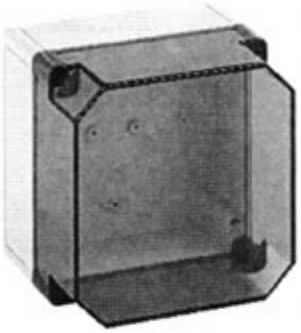


Dimensioned drawing



Vynckier Enclosure Systems, Inc.
271 McCarty Drive Houston, Texas 77029
Telephone: (713) 374-7850 Fax: (800) 444-1261
Web site: www.EnclosuresOnline.com

Item # MB070765PSCT MULTIBOX 182 x 180 x 165 POLYSTYRENE W/ CLEAR COVER



MULTIBOX 182 x 180 x 165 POLYSTYRENE W/ CLEAR COVER

PSCT

Features

The Multibox Series range in size from from 2.5" x 2.5" to 14" x 10" with varying depths, 27 sizes and a variety of configurations.
The Multibox "PSCT" enclosures include a transparent cover and 4 non-metallic cover screws.
The bases are made of light gray (similar to RAL7035) Polystyrene and the covers are made of transparent Polycarbonte.
Cover screw holes in corners are outside of the gasketed area.
Continuous gaskets made of polyurethane foam guarantee optimal integrity.
The enclosure can be readily worked with conventional tools such as drills, mills, saws, punches, etc...
Multibox enclosures are maintenance free and corrosion resistant.

Applications

The Multibox series enclosures are designed for use as electrical junction boxes or instrumentation enclosures in highly corrosive environments including oil refineries, chemical processing plants, waste water treatment facilities, marine installations, electroplating plants, agricultural environments and food or animal processing plants.
Multibox enclosures are also suitable as instrument housings in both indoor and outdoor applications.
Transparent cover enclosures provide easy visual inspection of interior components.

Standards

IP66 according to EN 60529 / DIN VDE 0470-11
IK08 Impact resistance according to DIN EN 50102 / VDE 0470 part 100

Approvals

UL
ATEX

SPECIFICATIONS

Availability	Special Modified - 14 to 28 days
Multibox Outside Height (inch)	7.08
Multibox Outside Height (mm)	180
Multibox Outside Width (inch)	7.08
Multibox Outside Width (mm)	180
Multibox Outside Depth (inch)	6.49
Multibox Outside Depth (mm)	165
Ingress Protection	IP66
...pact Resistance	IK07

Isolation amplifier - MACX MCR-EX-SL-2NAM-R-UP - 2865984

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2-channel Ex-i NAMUR isolation amplifier with wide-range power supply for proximity sensors and switches. Every channel has a relay with PDT contact as a signal output. Line fault detection (LFD), 3-way isolation, SIL 2.

Product Features

- Up to SIL 2 according to EN 61508
- Installation in zone 2, protection type "n" (EN 60079-15) permitted
- Line fault detection (LFD), can be activated/deactivated, error indicated by red flashing LED with de-excitation of output relay
- Relay signal output (PDT)
- 3-way electrical isolation
- LED indicators for supply voltage, switching state, and malfunction according to NAMUR NE 44
- Direction of operation can be selected (operating or closed circuit current behavior)
- Wide-range power supply of 19.2 ... 253 V AC/DC
- 2-channel
- Input for NAMUR proximity sensors (EN 60947-5-6), floating contacts or contacts with resistance circuit, [Ex ia] IIC

Key commercial data

Packing unit	1 pc
Weight per Piece (excluding packing)	180.0 GRM
Custom tariff number	85437090
Country of origin	Germany

Technical data

Note

Utilization restriction	EMC: class A product, see manufacturer's declaration in the download area

Dimensions

Isolation amplifier - MACX MCR-EX-SL-2NAM-R-UP - 2865984

Technical data

Dimensions

Width	17.5 mm
Height	99 mm
Depth	114.5 mm

Ambient conditions

Ambient temperature (operation)	-20 °C ... 60 °C
Ambient temperature (storage/transport)	-40 °C ... 80 °C
Maximum altitude	≤ 2000 m
Permissible humidity (operation)	10 % ... 95 % (non-condensing)
Noise immunity	EN 61000-6-2
Degree of protection	IP20

Input data

Non-load voltage	~ 8 V DC
Switching points (attenuated)	< 1.2 mA (blocking)
Switching points (unattenuated)	> 2.1 mA (conductive)

Output data

Switching output	Relay output
Contact type	1 PDT per channel
Contact material	$AgSnO_2$, hard gold-plated
Maximum switching voltage	250 V AC (2 A, 60 Hz)
	120 V DC (0.2 A)
	30 V DC (2 A)
Maximum switching capacity	500 VA
Mechanical service life	10^7 cycles

Power supply

Supply voltage range	24 V ... 230 V AC/DC (-20% ... +10%, 50 ... 60 Hz)
Max. current consumption	< 80 mA
Power consumption	≤ 1.3 W

Connection data

Conductor cross section solid min.	0.2 mm²
Conductor cross section solid max.	2.5 mm²
Conductor cross section stranded min.	0.2 mm²
Conductor cross section stranded max.	2.5 mm²
Conductor cross section AWG/kcmil min.	24
Conductor cross section AWG/kcmil max	14
Stripping length	7 mm

Isolation amplifier - MACX MCR-EX-SL-2NAM-R-UP - 2865984

Technical data

Connection data

Connection method	Screw connection
Tightening torque, min	0.5 Nm
Tightening torque max	0.6 Nm

General

No. of channels	2
Step response (10-90%)	typ. 6 ms (N/O contact: OFF/ON)
	typ. 6 ms (N/O contact: ON/OFF)
	typ. 4 ms (N/C contact: ON/OFF)
	typ. 10 ms (N/C contact: OFF/ON)
Status display	Green LED (supply voltage, PWR)
	LED yellow (switching state)
	Red LED (line errors)
Inflammability class according to UL 94	V0
Pollution degree	2
Surge voltage category	III
Housing material	PA 66-FR
Color	green
Designation	Input/output
Electrical isolation	375 V (Peak value in accordance with EN 60079-11)
Designation	Input/power supply
Electrical isolation	375 V (Peak value in accordance with EN 60079-11)
	300 V_{rms} (Rated insulation voltage (surge voltage category II; pollution degree 2, safe isolation as per EN 61010-1))
	2.5 kV AC (50 Hz, 1 min., test voltage)
Designation	Output 1/output 2/input, power supply
Electrical isolation	300 V_{rms} (Rated insulation voltage (surge voltage category III; pollution degree 2, safe isolation as per EN 61010-1))
	2.5 kV (50 Hz, 1 min., test voltage)
Conformance	CE-compliant, additionally EN 61326
ATEX	# II (1) G [Ex ia Ga] IIC
	# II (1) D [Ex ia Da] IIIC
	# II 3(1) G Ex nA nC [ia Ga] IIC T4 Gc X
IECEx	[Ex ia Ga] IIC
	[Ex ia Da] IIIC
	Ex nA nC [ia Ga] IIC T4 Gc
UL, USA / Canada	Class I Div 2; IS for Class I, II, III Div 1

Safety data

Isolation amplifier - MACX MCR-EX-SL-2NAM-R-UP - 2865984

Technical data

Safety data

Max. output voltage U_o	9.6 V
Max. output current I_o	10.3 mA
Max. output power P_o	25 mW
Group	IIC
Max. external inductivity L_o	100 mH
Max. external capacity C_o	0.5 µF
Group	IIC
Max. external inductivity L_o	10 mH
Max. external capacity C_o	0.75 µF
Group	IIC
Max. external inductivity L_o	1 mH
Max. external capacity C_o	1.2 µF
Group	IIB
Max. external inductivity L_o	100 mH
Max. external capacity C_o	2.7 µF
Group	IIB
Max. external inductivity L_o	10 mH
Max. external capacity C_o	3.9 µF
Group	IIB
Max. external inductivity L_o	1 mH
Max. external capacity C_o	6.3 µF
Safety-related maximum voltage U_m	253 V AC/DC (Supply terminals)

EMC data

Designation	Electromagnetic RF field
Standards/regulations	EN 61000-4-3
Evaluation criterion	A
Designation	Fast transients (burst)
Standards/regulations	EN 61000-4-4
Evaluation criterion	A
Designation	Conducted interferences
Standards/regulations	EN 61000-4-6
Evaluation criterion	A

Isolation amplifier - MACX MCR-EX-SL-2NAM-R-UP - 2865984

Classifications

eCl@ss

eCl@ss 4.0	27210121
eCl@ss 4.1	27210121
eCl@ss 5.0	27210121
eCl@ss 5.1	27210121
eCl@ss 6.0	27210121
eCl@ss 7.0	27210121
eCl@ss 8.0	27210121

ETIM

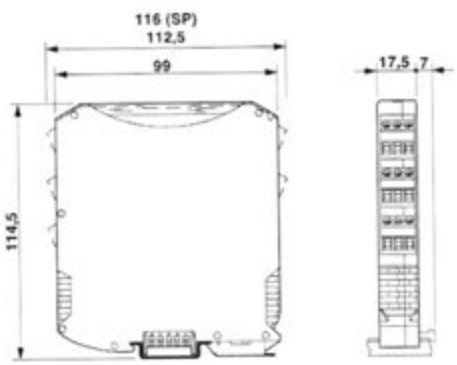
ETIM 2.0	EC001430
ETIM 3.0	EC001599
ETIM 4.0	EC001485
ETIM 5.0	EC001485

UNSPSC

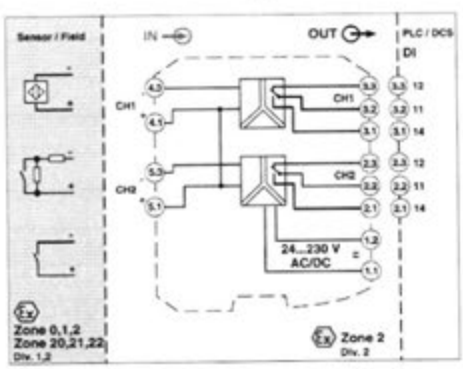
UNSPSC 6.01	30211506
UNSPSC 7.0901	39121008
UNSPSC 11	39121008
UNSPSC 12.01	39121008
UNSPSC 13.2	39121008

Drawings

Dimensioned drawing

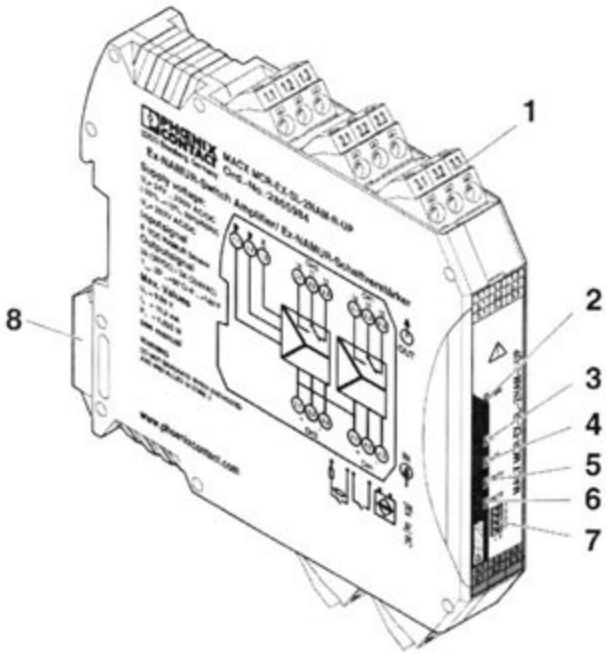


Block diagram



Isolation amplifier - MACX MCR-EX-SL-2NAM-R-UP - 2865984

Schematic diagram

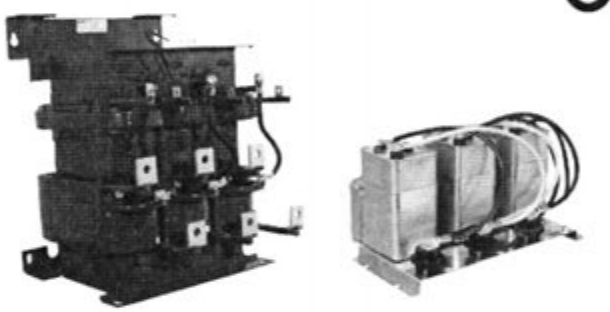


MTE
AN SL INDUSTRIES COMPANY

Matrix® AP

400V – 690V
TECHNICAL REFERENCE MANUAL

FORM: MAP-TRM-E
REL. February 2014
REV. 16



WARNING	**High Voltage! Only a qualified electrician can carry out the electrical installation of this filter.**

Quick Reference		
1	Selection Guide	Pages 7 – 33
2	Installation Guide	Pages 34 – 47
3	Startup/Troubleshooting	Pages 48 – 52
4	Reference Drawings	Pages 53 – 72

TABLE OF CONTENT

List of Figures

List of Tables

1. WARNINGS

Warnings and Cautions

There are two types of warnings in this manual:

- WARNING describes situations that can lead to serious faults, physical injuries, or even death.
- Caution describes situations that can lead to malfunction or possible equipment damage.

 WARNING	WARNING describes situations that can lead to serious faults, physical injuries, or even death.
 Caution	Caution describes situations that can lead to malfunction or possible equipment damage.

The following symbols are used in this manual.

- High Voltage Warning: warns of situations that dangerously high voltage is involved. Failure to use proper precautions may lead to serious injury or even death.
- General Warning: warns of situations that can result in serious injury or death if proper precautions are not used.
- General Caution: identifies situations that could lead to malfunction or possible equipment damage.

 WARNING	High Voltage Warning: warns of situations that dangerously high voltage is involved. Failure to use proper precautions may lead to serious injury or even death.
 WARNING	General Warning: warns of situations that can result in serious injury or death if proper precautions are not used.
 Caution	General Caution: identifies situations that could lead to malfunction or possible equipment damage.

General Safety Instructions

 WARNING	**High Voltage! Only a qualified electrician can carry out the electrical installation of this filter.**
 WARNING	High voltage is used in the operation of this filter. Use extreme caution to avoid contact with high voltage when operating, installing or repairing this filter. **Injury or death may result if safety precautions are not observed.**
 WARNING	The opening of the branch circuit protective device may be an indication that a fault current has been interrupted. To reduce the risk of fire or electrical shock, current-carrying parts and other components of the filter should be examined and replaced if damaged.
 WARNING	An upstream disconnect/protection device must be used as required by the National Electrical Code (NEC) or governing authority.
 WARNING	Even if the upstream disconnect/protection device is open, the drive down stream of the filter may feed back high voltage to the filter. The drive safety instructions must be followed. **Injury or death may result if safety precautions are not observed.**
 WARNING	The filter must be grounded with a grounding conductor connected to all grounding terminals. Open panel filters must have reactor grounded through a 2"x2" area cleaned of paint and varnish on lower mounting bracket.
 WARNING	Only spare parts obtained from MTE Corporation or an authorized MTE distributor can be used.
 WARNING	After removing power, allow at least five minutes to elapse and verify that the capacitors have discharged to a safe level before contacting internal components. Connect a DC voltmeter across the capacitor terminals and ensure that the voltage is at a safe level.
 Caution	Loose or improperly secured connections may damage or degrade filter performance. Visually inspect and secure all electrical connections before power is applied to the filter.
 Caution	The user of this filter must assure that the input voltage and frequency is correct for the filter rating and that the voltage applied falls within the rated operating tolerance envelop specified for the filter. For sever power line applications where the power feed is likely to experience surges and transients that exceed the input voltage rating, it is recommended that a TVSS (Transient Voltage Surge Suppression) or SPD (Surge Protection Device) be deployed ahead of the filter to reduce the possibility of exceeding the filter rated voltage. Consult with TVSS or SPD manufacturer to determine the correct protection requirements for your power line conditions.

2. INTRODUCTION

The purpose of the manual is to properly specify, size, and install the Matrix AP.

For most current information, please refer to website
http://www.mtecorp.com/products/matrix-ap-harmonic-filters/

Receipt & Repair Statement

Upon Receipt of this Filter:

The Matrix AP Harmonic Filter has been subjected to demanding factory tests before shipment. Carefully inspect the shipping container for damage that may have occurred in transit. Then unpack the filter and carefully inspect for any signs of damage. Save the shipping container for future transport of the filter.

In the event of damage, please contact and file a claim with the freight carrier involved immediately.

If the equipment is not going to be put into service upon receipt, cover and store the filter in a clean, dry location. After storage, ensure that the equipment is dry and that no condensation or dirt has accumulated on the internal components of the filter before applying power.

Repair/Exchange Procedure

MTE Corporation requires a Return Material Authorization Number and form before we can accept any filters that qualify for return or repair. If problems or questions arise during installation, setup, or operation of the filter, please contact MTE for assistance at:

Toll Free: 1-800-455-4MTE (1-800-455-4683)

International Tel: 262-253-8200

Fax: 262-253-8222

3. HOW TO SELECT

Selection Guide

The MTE Corporation Matrix AP Harmonic Filter is designed for harmonic mitigation of 6-pulse inverter drives supplying variable torque loads in a wide variety of applications. The suitability of this filter for a specific application must therefore be determined by the customer. In no event will MTE Corporation assume responsibility or liability for any direct or consequential damages resulting from the use or application of this filter, nor will MTE Corporation assume patent liability with respect to the use of information, circuits or equipment described in this instruction manual. The Matrix AP Harmonic Filter uses a patent pending Adaptive Passive Harmonic Mitigating Reactor (AP HMR) technology to limit full load current distortion to less than 5% THID and 8% at 30% load.

Matrix AP Harmonic Filters are available in Open Panel, NEMA 1/2, and 3R mechanical configurations.

For inverters feeding isolation transformers select a filter with a current rating equal to or greater than that of the transformer primary current.

Please verify information below for proper selection:

- ☐ **Line Voltage and Frequency**: Input voltage from 400V – 690V at standard frequency. See Table 4-1 (p28) for specification.
- ☐ **Current Rating**: 400V 6-1200 Amp, 480V 6-1200 Amp, 600V 6-786 Amp, 690V 52-636 Amp.
- ☐ **Voltage Distortion**: See Figure 5-5 (p33) for voltage distortion derating curve.
- ☐ **Contactor Option**: See Figure 6-4 (p41) for contactor option 002, Figure 6-5 (p42) for contactor option 009, Figure 6-6 (p43) for contactor option 012, Figure 6-7 (p44) for contactor option 013.
- ☐ **Temperature:** See Table 4-1: Performance Specifications (p28) for specification, and Figure 5-4 (p32) for temperature derating.
- ☐ **Altitude**: 3,300 feet above sea level without derating. See Figure 5-3 (p32) for derating curve.
- ☐ **Enclosure Type**: Open Panel, NEMA 1/2 & NEMA 3R, see Enclosures (p29) for enclosure descriptions.

Part Number Configuration

MAP X ____ X ___

Matrix AP

Enclosure Type

P = Panel Mount (No Enclosure)
G = General Purpose (NEMA 1/2)
W = Weather (NEMA 3R)

Current Rating

0006 is 6 Amps
0083 is 83 Amps
1200 is 1200 Amps

Voltage Frequency Code

C 380 – 415 Volts 50 Hz
D 480 Volts 60 Hz
E 600 Volts 60 Hz
F 690 Volts 50 Hz

Contactor Options

002 - Contactor for capacitor disconnect
009 - Contactor with adjustable pick up and drop out
012 - Contactor with control transformer
013 - Filter bypass and capacitor contactor with control transformer

Additional Options

Option - 400
Standard NEMA 3R enclosure with optional rodent/serpent screen
Option 400 provides intake exhaust air screens with (¼ X ¼) mesh

Matrix AP 400 Volts, 50Hz
Part Number Selection Tables
Open Panel

Table 3-1: Matrix AP 400V Open Panel

Filter Amps Rating	Part Number	App. Wt. (lbs.)	HMR Size (in.) (H x W x D)	HMR Ref. Fig.	Cap-panel P/N	3-Phase Capacitor (in.) (H x D) Capacitor Panel (in.) (H x W x D)	Capacitor Ref. Fig.
6	**MAPP0006C**	16	8.7 x 8 x 5.5	A-1 (p54)	CAP-350TP	7.5 x 2.9	A-12 (p65)
8	**MAPP0008C**	17	8.7 x 8 x 5.5	A-1 (p54)	CAP-351TP	7.5 x 2.9	A-12 (p65)
11	**MAPP0011C**	26	9.9 x 9 x 4.8	A-1 (p54)	CAP-352TP	7.5 x 2.9	A-12 (p65)
14	**MAPP0014C**	30	9.8 x 9 x 5.25	A-1 (p54)	CAP-353TP	7.5 x 3.9	A-12 (p65)
21	**MAPP0021C**	47	11.7 x 10.5 x 6.6	A-1 (p54)	CAP-342TP	7.5 x 3.9	A-12 (p65)
27	**MAPP0027C**	52	11.7 x 10.5 x 7	A-1 (p54)	CAP-354TP	7.5 x 4.6	A-12 (p65)
34	**MAPP0034C**	62	11.7 x 10.5 x 7.6	A-1 (p54)	CAP-355TP	9.1 x 4.6	A-12 (p65)
44	**MAPP0044C**	74	11.7 x 10.5 x 8	A-1 (p54)	CAP-356TP	9.1 x 4.6	A-12 (p65)
52	**MAPP0052C**	94	14 x 12 x 9	A-3 (p56)	CAP-357TP	10.6 x 4.6	A-12 (p65)
66	**MAPP0066C**	107	14 x 12 x 9	A-3 (p56)	CAP-358TP	10.6 x 4.6	A-12 (p65)
83	**MAPP0083C**	135	14 x 12 x 10.9	A-3 (p56)	CAP-359TP	10.6 x 4.6	A-12 (p65)
103	**MAPP0103C**	145	14 x 12 x 10.82	A-3 (p56)	CAP-360TP	10.6 x 4.6	A-12 (p65)
128	**MAPP0128C**	165	20 x 15.25 x 10.7	A-5 (p58)	594	6.9 x 16.3 x 7.6	A-13 (p66)
165	**MAPP0165C**	223	20 X15.25 x 11.75	A-5 (p58)	544	7.9 x 16.3 x 7.6	A-13 (p66)
208	**MAPP0208C**	237	20 x 15.25 x 11.85	A-5 (p58)	543	8.9 x 16.3 X7.6	A-13 (p66)
240	**MAPP0240C**	327	20 x 15.25 x 12.75	A-5 (p58)	595	7.9 x 16.3 x 7.6	A-13 (p66)
320	**MAPP0320C**	390	20 x 15.25 x 14.8	A-5 (p58)	596	10.7 x 16.3 x 7.6	A-13 (p66)
403	**MAPP0403C**	433	23.25 x 15.25 x13.86	A-7 (p60)	597	11.5 x 16.3 x 7.6	A-13 (p66)
482	**MAPP0482C**	483	23.25 x 15.25 x14.77	A-7 (p60)	595	7.9 x 16.3 x 7.6	A-13 (p66)
					595	7.9 x 16.3 x 7.6	A-13 (p66)
636	**MAPP0636C**	736	26 x 24 x 16.5	A-11 (p64)	596	10.7 x 16.3 x 7.6	A-13 (p66)
					596	10.7 x 16.3 x 7.6	A-13 (p66)
786	**MAPP0786C**	911	26 x 24 x 17.8	A-11 (p64)	597	11.5 x 16.3 x 7.6	A-13 (p66)
					597	11.5 x 16.3 x 7.6	A-13 (p66)
850	**MAPP0850C**	983	26 x 24 x 20.3	A-11 (p64)	596	10.7 x 16.3 x 7.6	A-13 (p66)
					596	10.7 x 16.3 x 7.6	A-13 (p66)
					595	7.9 x 16.3 x 7.6	A-13 (p66)
1000	**MAPP1000C**	1137	26 x 24 x 21.7	A-11 (p64)	598	10.7 x 16.3 x 7.6	A-13 (p66)
					598	10.7 x 16.3 x 7.6	A-13 (p66)
					598	10.7 x 16.3 x 7.6	A-13 (p66)
1200	**MAPP1200C**	1297	26 x 24 x 22.2	A-11 (p64)	597	11.5 x 16.3 x 7.6	A-13 (p66)
					597	11.5 x 16.3 x 7.6	A-13 (p66)
					597	11.5 x 16.3 x 7.6	A-13 (p66)

Basic Schematic Diagram

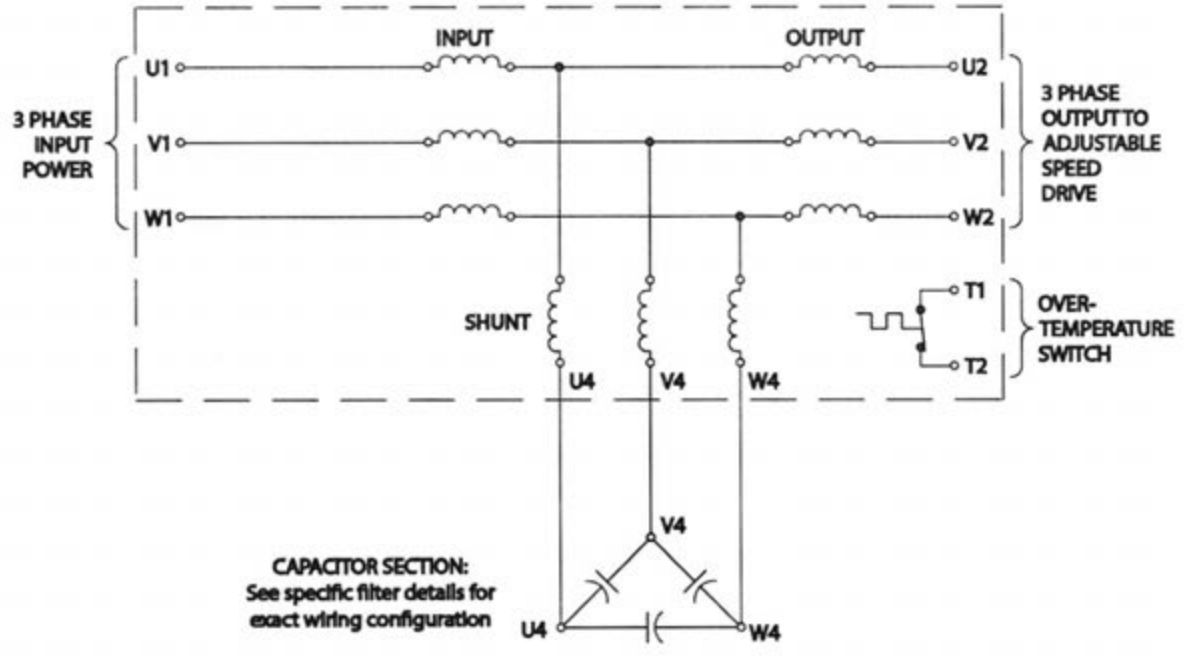


Figure 6-1: Basic Schematic Diagram

Note: Drawing depicts delta configuration for capacitors, 690V filters are connected in a WYE configuration.

Open Panel Unit Interconnection Diagram

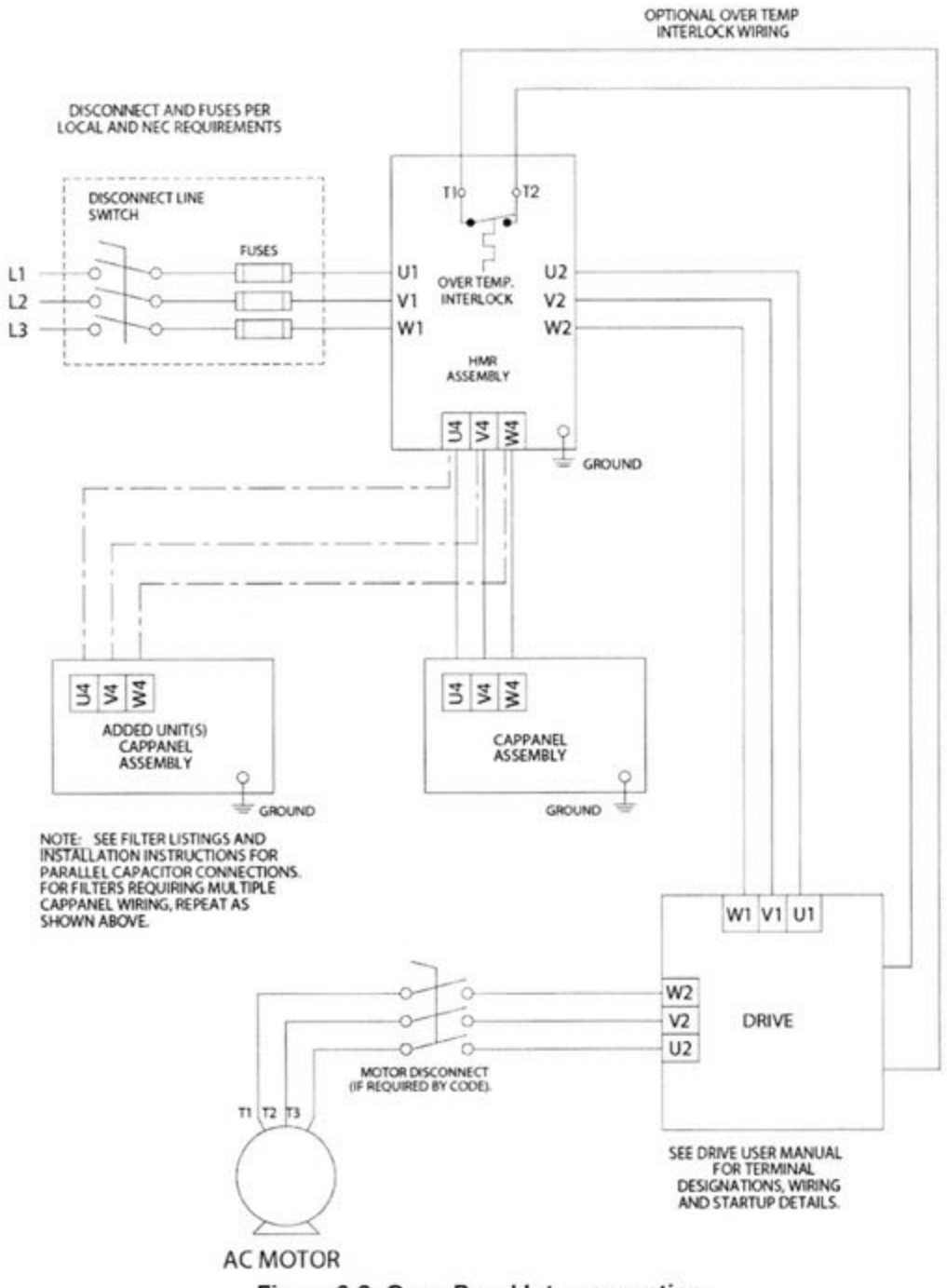


Figure 6-2: Open Panel Interconnection

Enclosed Unit Interconnection Diagram

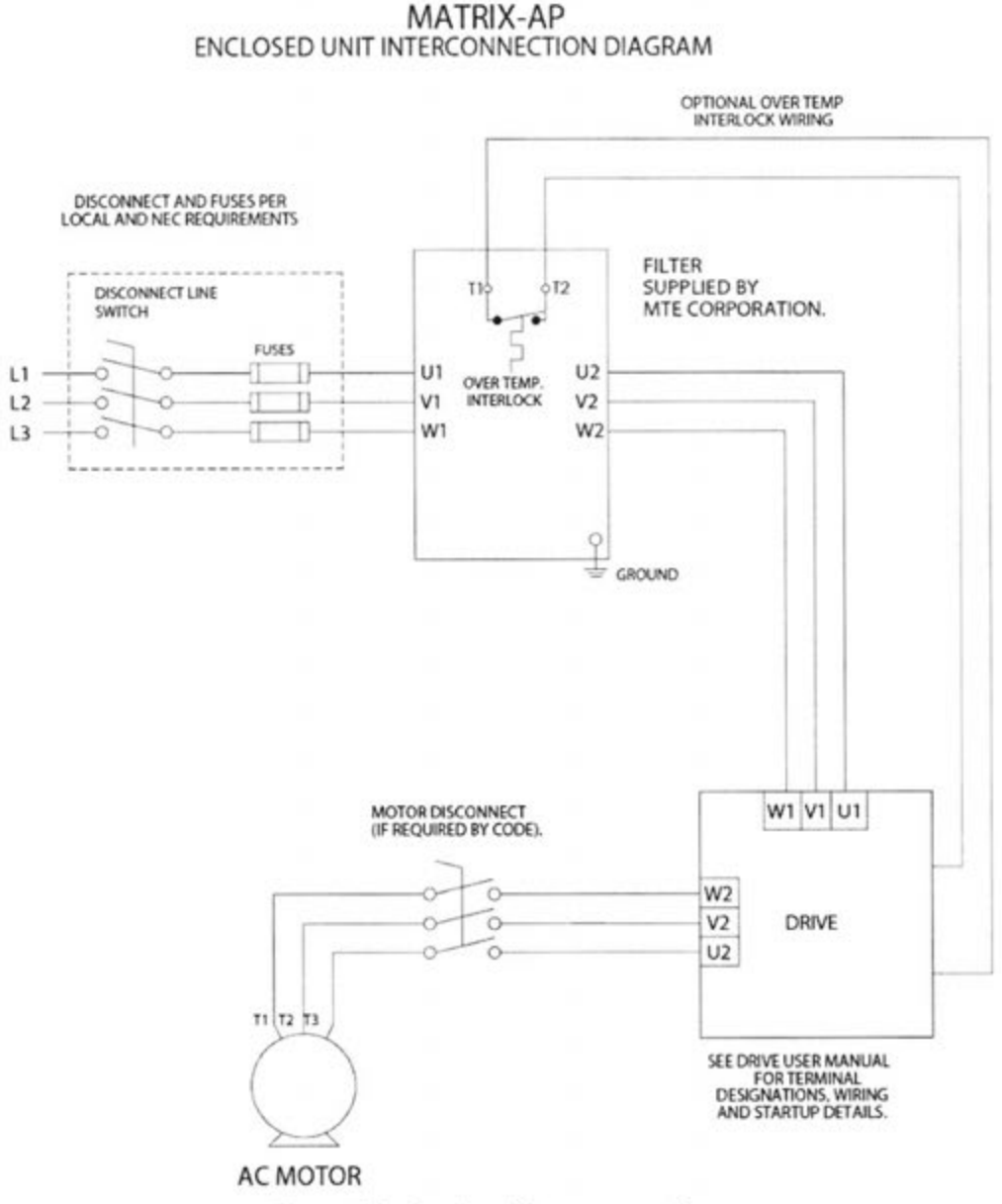


Figure 6-3: Enclosed Interconnection

Contactor Options

Option – 002

Capacitor Contactor

This option provides a contactor to disconnect the filter capacitor bank when the drive is not running. The contactor is supplied with NO/NC auxiliary contacts. The contactor coil and auxiliary contacts are wired to a customer terminal block. See page 53 for contactor coil switching characteristics. This option is provided pre-wired complete for enclosed filters and as loose parts for open panel filters.

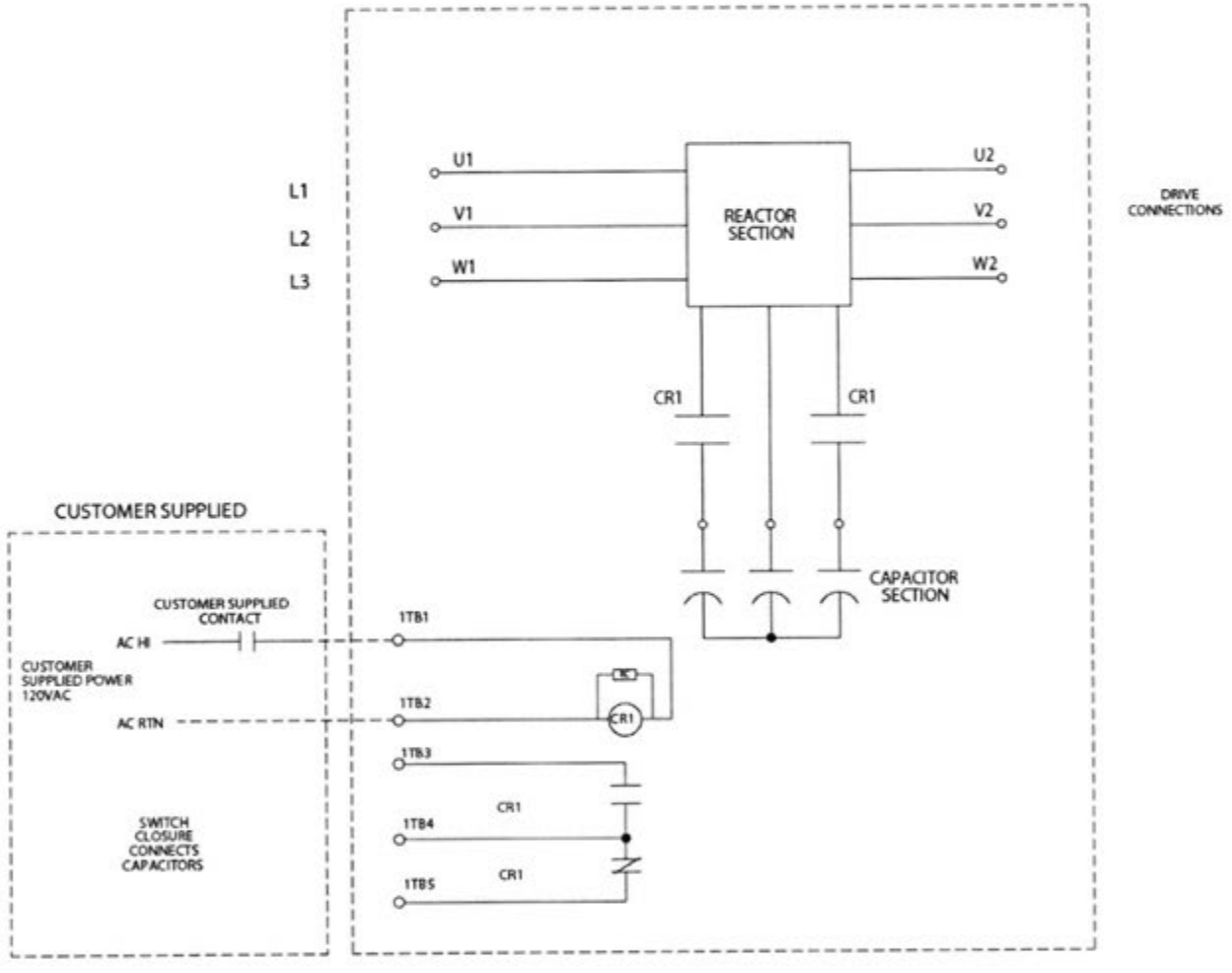
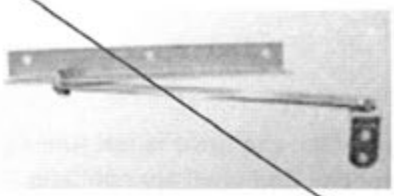


Figure 6-4: Contactor Options – 002

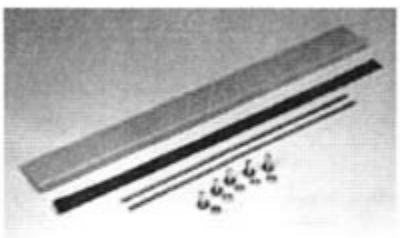
The above contactor option diagram is provided to help understand the circuit function and does not reflect actual circuit wiring.



Door Stop Kit

- Provides for door opening in fixed position as required.
- Prevents door swing that can occur in field maintenance situations.
- This door stop kit maintains NEMA 4x, 4, 3R and 12 ratings when installed correctly using the hardware and directions provided.

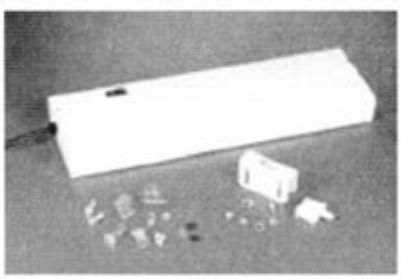
Part No.	DSTOPK



Drip Shield Kit

- Designed for use on Hammond NEMA 12 1418, and 1422 enclosures to protect door and hardware from falling dust and water.
- Cannot be used on NEMA 4 (mild steel or aluminum) or 4X due to interference with the top clamps on those units.
- Installs quickly and easily in the field with common tools.
- Each kit includes a drip shield, stainless steel bolts, plated nuts, neoprene gasket for drip shield and a stainless steel hinge pin (2 half length pins are supplied when required).
- Finished in gray.

Part No.	Fits Enclosure Width (Inches)
1481S12K	12
1481S16K	16
1481S20K	20
1481S24K	24
1481S30K	30
1481S36K	36
1481S42K	42
1481S48K	48
1481S60K	60
1481S72K	72



Remote door switch and magnet mount not included - must be ordered separately.

Light Kit & Accessories

- Light kits are offered in 18", 24" and 48" widths.
- CSA and UL component recognized.
- Features a manually operated switch, 115V convenience outlet, durable plastic lens, and 6 foot power cord (without plug).
- Can mount into light mounting channel, bolt through enclosure or by using magnet strip (available separately - see chart below.)
- Magnet mount can be used with mild steel enclosures only.
- Remote door switch available separately for automatic activation. Can be wired normally open or closed. 115/230 V AC
- 1¾" high x 4½" deep.
- Finished in white.
- Use standard 18", 24" or 48" T8 fluorescent bulb (not included)

Part No.	Description
FLK18T8[1]	18" Fluorescent Light Kit
FLK24T8[1]	24" Fluorescent Light Kit
FLK48T8[1]	48" Fluorescent Light Kit
FLK18MM	Magnet mount for 18" and 24" kit
FLK48MM	Magnet mount for 48" light kit
FLKDS	Remote Door Switch

[1] T8 fluorescent bulb not included

Push Buttons and Operator Interface

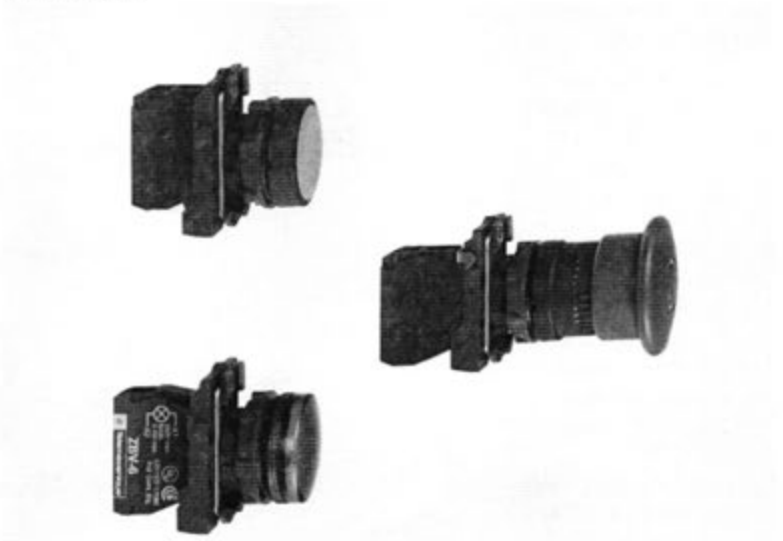
Specifier's Guide

XB5 22 mm Double Insulated

Catalog

2005

File 9001



CONTENTS

a brand of Schneider Electric

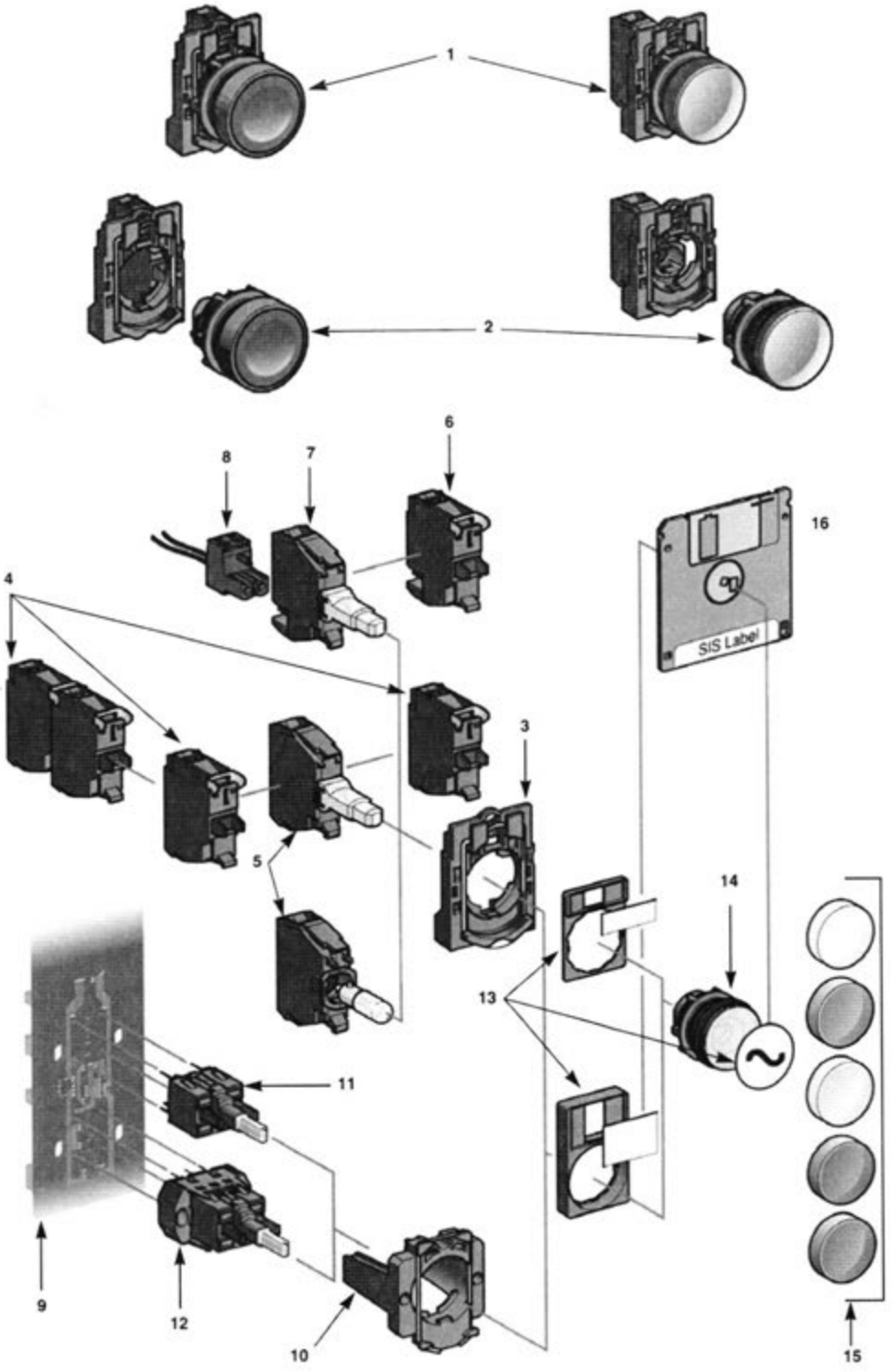
Telemecanique

Components for User Assembly ZB5-B:

1 - Electrical Bodies (pre-assembled)
2 - Operator Heads (pre-assembled)

Component Parts and Accessories ZB:

3 - Mounting Collar – Standard (ZB5AZ009)
4 - Contact Blocks – Screw Clamp Terminal (ZBE10•, ZBE20•)
5 - Light Modules – Screw Clamp Terminal (ZBV•) for Protected LED and Ba9 Base Lamps
6 - Contact Blocks – Plug-in Connector (ZBE10•)
7 - Light Modules – Plug-in Connector (ZBV•) for Protected LED only
8 - 2 Pin Connector and Cables for Plug-in Connection Electrical Components (APE1•)
9 - Printed Circuit Board (PCB) Application (Typical)
10 - Mounting Collar – PCB Application (ZB5BZ009 + ZB4BZ079)
11 - Contact Blocks – PCB Application (ZBE70•, ZBE70•6)
12 - Light Modules – PCB Application (ZBV•7) for Protected LED only
13 - Legend Plates and Holders (ZBY•, ZBZ•)
14 - Operator Head – Round or Square (Illuminated or Non-Illuminated)
15 - Lenses for Pilot Lights (ZBV•) or Lenses for Illuminated Push Buttons (ZBW•)



Environment

Protective treatment standard version			"TH"
Ambient air temperature around the device	Storage		-40 to +158 °F (- 40 to +70 °C)
	Operation		-13 to +158 °F (- 25 to +70 °C) unless otherwise stated
Electric shock protection	Conforming to IEC 60536		Class II
Degree of protection	Conforming to IEC 60529		IP 65, unless otherwise stated IP 68, for booted push button heads
	Conforming to UL 50 and CSA C22.2 No. 94		Type 1, 2, 3, 4, 4X, 12, and 13, unless otherwise stated
Resistance to high pressure cleaner			1,015 psi (70 x 10^5 Pa-70 bars); distance: 3.94 in (0.1 m) Temperature: 131 °F (55 °C)
Mechanical shock protection	Conforming to EN 50102		Non illuminated heads: IK 03
			Illuminated heads: IK 05
Conforming to standards	CE Marked		IEC 60947-1, IEC/EN 60947-5-1, IEC 60947-5-4, EN 60947-1, JIS C 4520, UL 508, CSA C22.2 No. 14
Product certifications	UL Listed, CSA Certified File E164353 CCN NKCR — File LR 44087 Class 3211 03 — File E164353 CCN NKCR 2		Standard single contacts with screw clamp terminals: A600; Q600 Double contacts with screw clamp terminals: A600; Q600 Contacts with "Quick-Connects": A300; Q300 Light modules with screw clamp terminals JOYSTICK XD4-PA: A600; R300
	UL Recognized, CSA Certified		Standard single contacts for plug-in connector: A300; R300 Standard single contact for printed circuit board: B300; R300
	BV, RINA, LROS, DNV, GL (pending)		Standard single contacts and double contacts with screw clamp terminals
Terminal identification	Conforming to EN 50005 and EN 50013		

Characteristics of Operators and Contact Blocks

Mechanical Characteristics

Contact operation	N/C or N/O		Slow break
Positive operation	Conforming to IEC/EN 60947-5-1 Appendix K		All functions incorporating a N/C contact are positive opening operation
Operating travel (to change electrical state)	Push button		Changing N/C state: 0.06 in (1.5 mm) Changing N/O state: 0.11 in (2.6 mm) Total travel: 0.17 in (4.3 mm)
Operating force	Push button		Changing N/C state: 0.79 lbf (3.5 N) Changing N/O state: 0.85 lbf (3.8 N)
	Additional contact (extra to change state)		Single N/C contact: 0.45 lbf (2 N) Single N/O contact: 0.52 lbf (2.3 N)
			Double contact N/C: 0.76 lbf (3.4 N) Double contact N/O: 1.12 lbf (5 N) Double contact N/C + N/O: 1.03 lbf (4.6 N)
	Emergency stop with N/C + N/O Maintained mushroom head operators Momentary mushroom head operators		Standard push-pull: 10.12 lbf (45 N) Trigger action push-pull: 11.24 lbf (50 N)
			Standard turn to release and key release: 8.99 lbf (40 N) Trigger action turn to release and key release: 9.89 lbf (44 N)
Operating torque (to change electrical state)	Selector switches		N/O contact: 1.24 lb-in (0.14 N•m)
	Additional contact (extra)		N/O contact: 0.44 lb-in (0.05 N•m)
Mechanical durability (in operating cycles)	Push button	Momentary	5 million
		Double-headed	1 million
		Push-push to release	500,000
	Selector switches	Non-illuminated	3 million
		Illuminated	1 million
	Toggle switches		500,000
	Emergency stop push button		300,000
	Joystick		1 million
	Standard blocks		5 million
	Low power switching power blocks		500,000
Vibration resistance	Conforming to IEC 60068-2-6		Frequency (2 to 500 Hz): 5 gn
Shock resistance	Conforming to IEC 60068-2-27		All functions except mushroom head push buttons– Half sine wave acceleration 11 ms: 50 gn Half sine wave acceleration 18 ms: 30 gn
			Mushroom head push buttons– Half sine wave acceleration 11 ms: 10 gn

General Characteristics

Electrical Characteristics

Cabling capacity	Conforming to IEC 60947-1	Screw and captive clamp terminals Min: 1 x 24 AWG (0.22 mm^2) without cable end 1 x 22 AWG (0.34 mm^2) for linking Max:2 x 16 AWG (1.5 mm^2) with cable end 2 x 14 AWG without cable end Cross headed screw (Pozidrive type 1) slotted for flat 4 and 5.5 mm screwdriver Typical torque: 0.8 N•m (8.55 lb-in) Maximum torque: 1.2 N•m (10.7 lb-in)
Contact material	Silver alloy (Ag/Ni)	Standard single and double blocks with screw clamp terminals Blocks for plug-in connector Standard blocks for printed circuit board connection
	Gold flashed (Ag/Ni/Au)	Low power switching contact blocks with screw clamp terminals Low power switching contact blocks for printed circuit board connection
Short-circuit protection	Conforming to IEC/EN 60947-5-1	Standard blocks with screw clamp terminals: 10 A (gG cartridge fuse conforming to IEC 60269-1) Blocks for plug-in connector: 4 A (gG fuse cartridge conforming to IEC 60269-1) Standard blocks for printed circuit board connection: 4 A (gG cartridge fuse conforming to IEC 60269-1)
Rated insulation voltage	Conforming to IEC 60947-1	Standard blocks (single or double) with screw clamp terminals: Ui = 600 V, degree of pollution 3 Blocks for plug-in connector: Ui = 250 V, degree of pollution 3 Standard blocks for printed circuit board connection: Ui = 250 V, degree of pollution 3
Rated impulse withstand voltage	Conforming to IEC 60947-1	Standard block (single or double) with screw clamp terminals: Uimp = 6 kV Blocks for plug-in connector: Uimp = 4 kV Standard blocks for printed circuit board connection: Uimp = 4 kV
Rated operational characteristics Conforming to IEC/EN 60947-5-1	AC supply: Utilization category AC-15	Standard blocks (single or double) with screw clamp terminals: A600: Ue = 600 Vac and Ie = 1.2 A or Ue = 240 Vac and Ie = 3 A or Ue = 120 Vac and Ie = 6 A Continuous thermal current = 10 A Blocks for plug-in connector: A300: Ue = 120 Vac and Ie = 6 A or Ue = 240 Vac and Ie = 3 A Standard blocks for printed circuit board connection: B300: Ue = 120 Vac and Ie = 3 A or Ue = 240 Vac and Ie = 1.5 A
	DC supply: Utilization category DC-13	Standard single or double blocks with screw clamp terminals: Q600: Ue = 600 Vdc and Ie = 0.1 A or Ue = 250 Vdc and Ie = 0.27 A or Ue = 125 Vdc and Ie = 0.55 A Continuous thermal current = 2.5 A Joystick XD4-PA: R300: Ue = 125 Vdc and Ie = 0.22 A or Ue = 250 Vdc and Ie = 0.1 A Blocks for plug-in connector: R300: Ue = 125 Vdc and Ie = 0.22 A or Ue = 250 Vdc and Ie = 0.1 A Standard blocks for printed circuit board connection: R300: Ue = 125 Vdc and Ie = 0.22 A or Ue = 250 Vdc and Ie = 0.1 A
Rated operational characteristics	AC supply: Resistive load	Low power switching contact blocks with screw clamp terminals or for printed circuit board connection: Max:24 Vac Max:0.1 A
Electrical durability Conforming to IEC/EN 60947-5-1 Appendix C Operating rate 3600 operating cycles/hour. Load factor: 0.5	AC supply for 1 million operating cycles, utilization category AC-15	Standard blocks for screw clamp terminals:

24 Vac	120 Vac	230 Vac
4 A	3 A	2 A

Standard double blocks with screw clamp terminal or plug-in connector:

24 Vac	120 Vac	230 Vac
3 A	1.5 A	1 A

DC supply for 1 million operating cycles, utilization category DC-13

Standard single blocks for screw clamp terminals:

24 Vdc	110 Vdc
0.5 A	0.2 A

Standard double blocks with screw clamp terminal or plug-in connector:

24 Vdc	110 Vdc
0.4 A	0.15 A

Electrical reliability	Failure rate Conforming to IEC 60947-5-4	
	- In clean environment	Standard blocks: - at 17 V and 5 mA, $\lambda < 10^{-8}$ - at 5 V and 1 mA, $\lambda < 10^{-6}$ Low power switching contact blocks: - at 5 V and 1 mA, $\lambda < 10^{-8}$
	- In dusty environment	Low power switching contact blocks only: at 5 V and 1 mA, $\lambda < 10^{-6}$

Characteristics of Light Modules

Mechanical Characteristics		
Vibration resistance	Conforming to IEC 60068-2-6	Frequency (12 to 500 Hz): 5 gn
Shock resistance	Conforming to IEC 60068-2-27	Half sine wave acceleration 11 ms: 50 gn Half sine wave acceleration 18 ms: 30 gn
Electrical Characteristics		
Cabling capacity	Conforming to IEC 60947-1	Screw and captive clamp terminals Min: 1 x 24 AWG (0.22 mm^2) without cable end 1 x 22 AWG (0.34 mm^2) for linking Max: 2 x 16 AWG (1.5 mm^2) with cable end
Rated insulation voltage	Conforming to IEC 60947-1	Direct supply pilot light modules (BA 9s bulbs): Ui = 250 V, degree of pollution 3 Pilot light modules with protected LED: Ui = 250 V, degree of pollution 3 Pilot light modules with transformer: Ui = 600 V, degree of pollution 3
Rated impulse withstand voltage	Conforming to IEC 60947-1	Direct supply pilot light modules (BA 9s bulbs): Uimp = 4 kV Pilot light modules with protected LED: Uimp = 4 kV Pilot light modules with transformer: Uimp = 6 kV

Specific Characteristics of Protected LED Light Modules Only

Voltage limits	Nominal voltage	24 V: 19.2 to 30 Vdc; 21.6 to 24.6 Vac 120 V: 102 to 132 Vac 240 V: 195 to 264 Vac
Current consumption	Applicable to all colors	24 Vac/Vdc supply blocks: 18 mA 120 Vac supply blocks: 14 mA 240 Vac supply blocks: 14 mA
Service life	At nominal voltage and at an ambient temperature of 77 °C (25 °C)	100,000 hours
Surge withstand	Conforming to IEC 61000-4-5	2/1 kV
Resistance to fast transients	Conforming to IEC 61000-4-4	2 kV
Resistance to electromagnetic fields	Conforming to IEC 61000-4-3	10 V/m
Resistance to electrostatic discharges	Conforming to IEC 61000-4-2	8/6 kV
Electromagnetic emission	Conforming to EN 55011	Class B

Specific Characteristics of Hour Counters and Annunciators

Voltage limits	Hour counter and annunciator	± 10% of nominal voltage
Current consumption	Hour counter	XB5DSB: 7 to 15 mA XB5DSG: 8 mA XB5DSM: 8 mA
	Annunciator	5 mA

XB5AVB1

XB5AV63

XB5AV34

XB5AW31B5

XB5AW3465

XB5AW3335

Pilot Lights with Protected LED (screw clamp terminal connections)

Shape of Head	Supply Voltage	Color	Catalog Number
Protected LED	24 Vac/Vdc	White	**XB5AVB1** (ZB5AVB1 + ZB5AV013)
		Green	**XB5AVB3** (ZB5AVB3 + ZB5AV033)
		Red	**XB5AVB4** (ZB5AVB4 + ZB5AV043)
		Yellow	**XB5AVB5** (ZB5AVB5 + ZB5AV053)
		Blue	**XB5AVB6** (ZB5AVB6 + ZB5AV063)
	110-120 Vac	White	**XB5AVG1** (ZB5AVG1 + ZB5AV013)
		Green	**XB5AVG3** (ZB5AVG3 + ZB5AV033)
		Red	**XB5AVG4** (ZB5AVG4 + ZB5AV043)
		Yellow	**XB5AVG5** (ZB5AVG5 + ZB5AV053)
		Blue	**XB5AVG6** (ZB5AVG6 + ZB5AV063)

Pilot lights for BA 9s Bulb (screw clamp terminal connections)

Shape of Head	Supply Voltage	Color	Catalog Number
Direct supply, for BA 9s (incandescent, LED, neon) U ≤ 250 V, 2.4 W bulb (bulb not included)			
	≤ 250 Vac/Vdc	White	**XB5AV61** (ZB5AV6 + ZB5AV01)
		Green	**XB5AV63** (ZB5AV6 + ZB5AV03)
		Red	**XB5AV64** (ZB5AV6 + ZB5AV04)
		Yellow	**XB5AV65** (ZB5AV6 + ZB5AV05)
Transformer type with 1.2 VA, 6 V secondary. BA 9s incandescent bulb included			
	110-120 Vac 50/60 Hz	White	**XB5AV31** (ZB5AV3 + ZB5AV01)
		Green	**XB5AV33** (ZB5AV3 + ZB5AV03)
		Red	**XB5AV34** (ZB5AV3 + ZB5AV04)
		Yellow	**XB5AV35** (ZB5AV3 + ZB5AV05)

Illuminated Push Buttons, Momentary, Flush (screw clamp terminal connections)

Shape of Head	Description	Type of Contact N/O	Type of Contact N/C	Supply Voltage	Color of Push	Catalog Number
Protected LED	**Protected LED**	1	1	24 Vac/Vdc	White	**XB5AW31B5** (ZB5AW0B15 + ZB5AW313)
					Green	**XB5AW33B5** (ZB5AW0B35 + ZB5AW333)
					Red	**XB5AW34B5** (ZB5AW0B45 + ZB5AW343)
					Yellow	**XB5AW35B5** (ZB5AW0B55 + ZB5AW353)
					Blue	**XB5AW36B5** (ZB5AW0B65 + ZB5AW363)
				110-120 Vac	White	**XB5AW31G5** (ZB5AW0G15 + ZB5AW313)
					Green	**XB5AW33G5** (ZB5AW0G35 + ZB5AW333)
					Red	**XB5AW34G5** (ZB5AW0G45 + ZB5AW343)
					Yellow	**XB5AW35G5** (ZB5AW0G55 + ZB5AW353)
					Blue	**XB5AW36G5** (ZB5AW0G65 + ZB5AW363)
	Direct supply for BA 9s 2.4 W max. bulb Not included	1	1	≤ 250 Vac/Vdc	White	**XB5AW3165** (ZB5AW065 + ZB5AW31)
					Green	**XB5AW3365** (ZB5AW065 + ZB5AW33)
					Red	**XB5AW3465** (ZB5AW065 + ZB5AW34)
					Yellow	**XB5AW3565** (ZB5AW065 + ZB5AW35)
	Transformer type 1.2 VA, 6 V secondary. BA 9s incandescent bulb included	1	1	110-120 Vac 50/60 Hz	White	**XB5AW3135** (ZB5AW035 + ZB5AW31)
					Green	**XB5AW3335** (ZB5AW035 + ZB5AW33)
					Red	**XB5AW3435** (ZB5AW035 + ZB5AW34)
					Yellow	**XB5AW3535** (ZB5AW035 + ZB5AW35)
				230-240 Vac 50/60 Hz	White	**XB5AW3145** (ZB5AW045 + ZB5AW31)
					Green	**XB5AW3345** (ZB5AW045 + ZB5AW33)
					Red	**XB5AW3445** (ZB5AW045 + ZB5AW34)
					Yellow	**XB5AW3545** (ZB5AW045 + ZB5AW35)

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Water & Wastewater

The complete solution to empower your next move

Flygt APP 700 water transport automation controller

Engineered for life

Empower your future, one step at a time

Flygt APP 700 is easily adapted to your growing needs and changing field conditions. From Day 1 you get a complete solution to ensure a reliable plant.

The software design is as flexible as the built-in connections and communication modules. You can, for example, start with a single pump controller and successively upgrade to more controllers or—ultimately, for a safe and reliable overview of the entire plant—an advanced SCADA system such as Flygt AquaView.

Flygt APP 700, the clear choice in water transport automation.

Flygt APP 700 offers pre-programmed key functions based on a wealth of water & wastewater experience.

Everything you need to know

Flygt APP 700 is an entire range of advanced all-in-one water transport automation controllers. Both the hardware and the software are specially designed for your water transport applications.

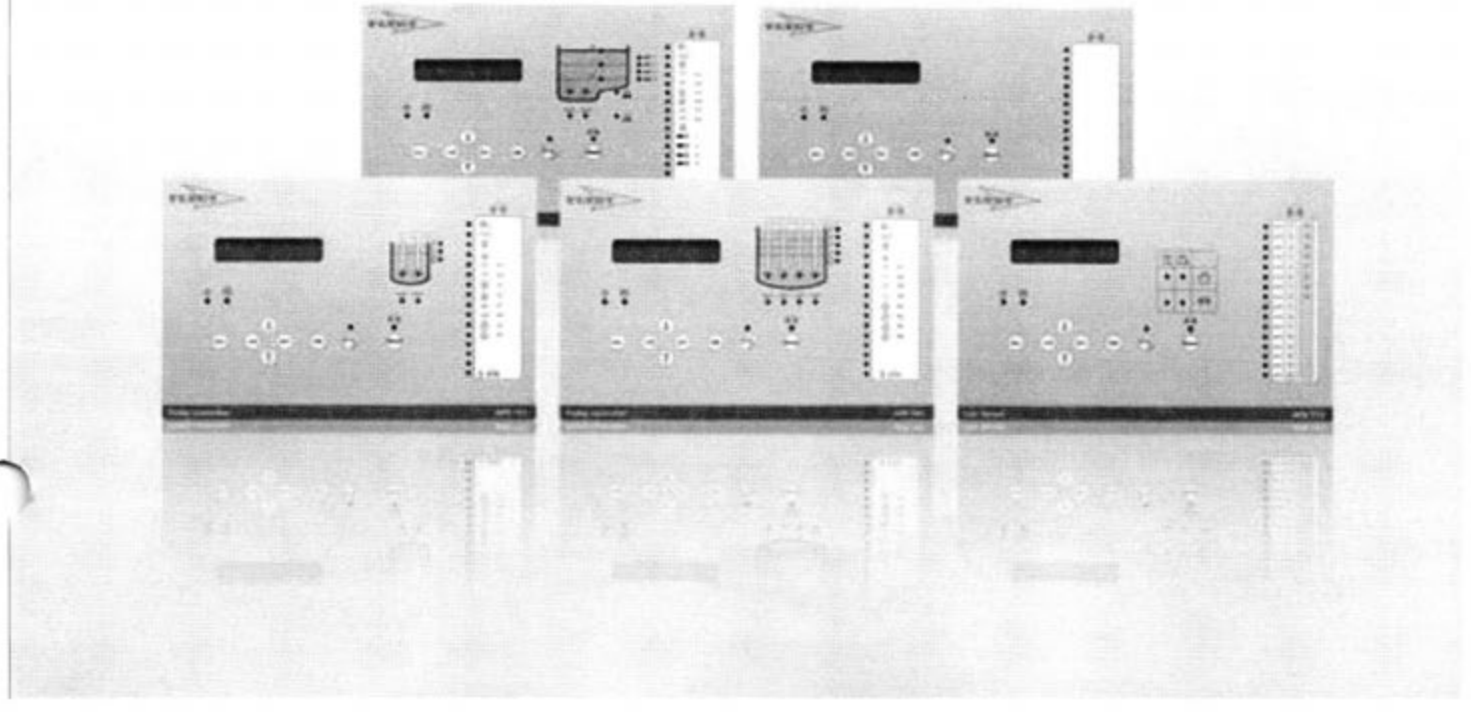
In pump station applications the water flows and levels are monitored with great accuracy, along with pump capacity, running times, energy costs and other key data. All functions are pre-engineered based on decades of worldwide experience.

To facilitate automation of water transport in other parts of the plants, such as treatment and retention, the same flexible controllers can be uniquely programmed.

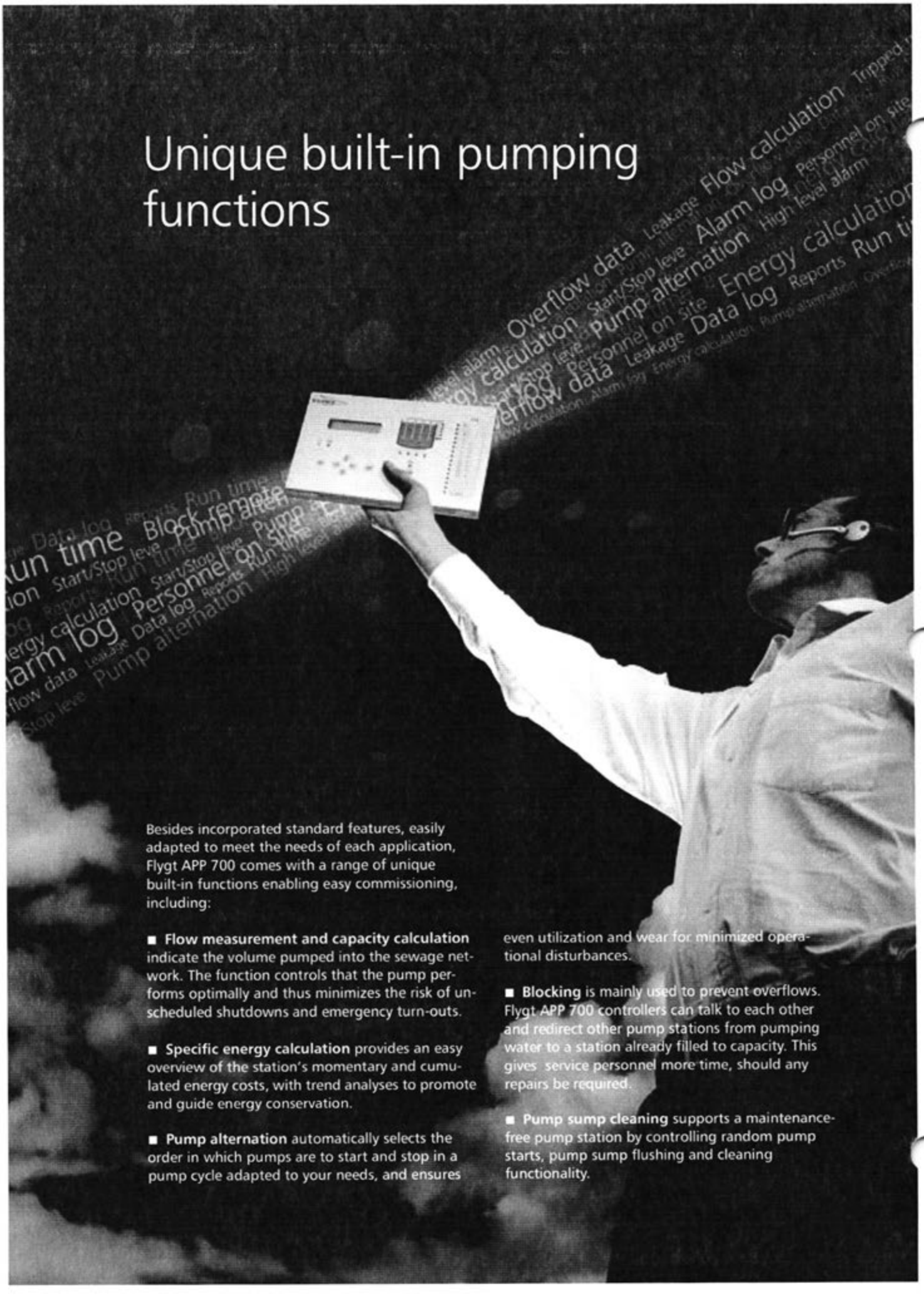
Flygt APP 700 controllers are very easy to use. Settings can be changed quickly and easily by simply adjusting the values on the display on the controller. An integrated web server enables low-cost plant overview. The units can be managed remotely via alternative communication and alarm management solutions.

Any deviations from optimal performance are immediately brought to your attention via active alarms, and systematically analyzed in periodical reports with trend indications. Recorded, time-stamped alarm data are stored for later retrieval as required.

Regardless of applications, you will always know exactly what is going on, what needs to be done and, if necessary, what has happened in the past.



Unique built-in pumping functions



Besides incorporated standard features, easily adapted to meet the needs of each application, Flygt APP 700 comes with a range of unique built-in functions enabling easy commissioning, including:

■ **Flow measurement and capacity calculation** indicate the volume pumped into the sewage network. The function controls that the pump performs optimally and thus minimizes the risk of unscheduled shutdowns and emergency turn-outs.

■ **Specific energy calculation** provides an easy overview of the station's momentary and cumulated energy costs, with trend analyses to promote and guide energy conservation.

■ **Pump alternation** automatically selects the order in which pumps are to start and stop in a pump cycle adapted to your needs, and ensures even utilization and wear for minimized operational disturbances.

■ **Blocking** is mainly used to prevent overflows. Flygt APP 700 controllers can talk to each other and redirect other pump stations from pumping water to a station already filled to capacity. This gives service personnel more time, should any repairs be required.

■ **Pump sump cleaning** supports a maintenance-free pump station by controlling random pump starts, pump sump flushing and cleaning functionality.

Access from anywhere

Flygt APP 700 can be easily managed, including active alarms, via your local area network and/or remotely via alternative forms of communication.

To further enhance the functionality and benefits of Flygt APP 700, a web server is integrated into the unit enabling low-cost connection to wide area networks via the Internet – with or without a SCADA system.

ITT

APP 700 01eng 02.09 686 Trosa Tryckeri AB 68538

What can ITT Water & Wastewater do for you?

Integrated solutions for fluid handling are offered by ITT Water & Wastewater as a world leader in transport and treatment of wastewater. We provide a complete range of water, wastewater and drainage pumps, equipment for monitoring and control, units for primary and secondary biological treatment, products for filtration and disinfection, and related services. ITT Water & Wastewater, headquartered in Sweden, operates in some 140 countries across the world, with own plants in Europe, China and North and South America. The company is wholly owned by the ITT Corporation of White Plains, New York, supplier of advanced technology products and services.

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Fax +46-8-475 69 00

Mini–CAS 120

PART NO. 14-407129

Features:

- Plug in replacement for existing MiniCAS / FUS unit
- 120 VAC, 24 VAC, or 24 VDC powered
- Durable plastic enclosure with flange for mounting on door of pump control enclosure
- Highly visible red LEDs for indication of Leakage and Temperature alarms
- Green LED for indication power is applied
- Temperature alarm reset mode select switch, for selection of Manual or Auto reset modes
- Temperature alarm reset push-button on front of unit
- Input power transient protected
- Sensor input circuit transient protected
- Sensor input circuit short circuit protected
- Noise Filter on Sensor Input
- Sensor circuit supply voltage regulated to 12 VDC
- Detailed connection diagram on side of unit

ITT Industries
Engineered for life

ITT FLYGT CORPORATION
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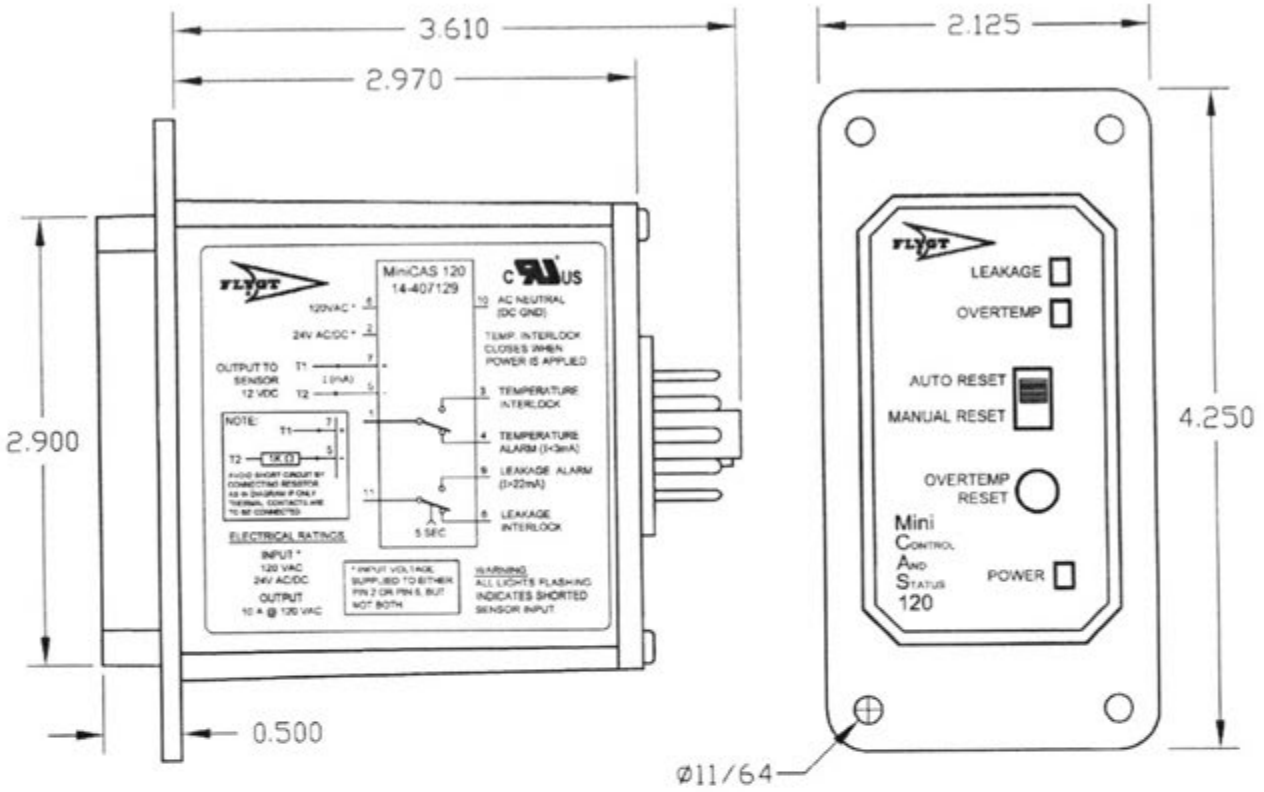
Trunbull, Connecticut 06611
Phone (203) 380-4700
FAX (203) 380-4705

Mini–CAS 120

PART NO. 14-407129



Specifications:

- Input Power: 120 VAC ±10%, 7.0 VA max
  24 VAC ±10%, 3.5 VA max
  24 VDC ±10%, 125 mA max
- Input Power Transient Protection: Metal Oxide Varistor
- Sensor Input Transient Protection: Metal Oxide Varistor
- Relay Contact Rating: 10A @ 250 VAC
- Relay Contact Material: Silver Cadmium Oxide (AgCdO)
- Ambient Operating Temperature: –20°C to +65°C (–4°F to +149°F)
- Agency Approvals: UL 508, CAN/CSA (Pending)
- Alarm Indicators: Super Bright Red LED
- Power On Indicator: Green LED
- Enclosure: Blue Lexan (141R) or Noryl (PX9406)
- Faceplate Overlay: Silver Lexan with Black Text
- Side Label: Silver Lexan with Black Text
- Sensor Circuit Supply Voltage: Regulated 12 VDC ±10%,
- Weight 11.75 oz (334 grams)
- Temperature Alarm Trip Point: Sensor Current ≤3 mA ±5%
- Leak Alarm Trip Point: Sensor Current ≥22 mA ±5%

FLYGT
a xylem brand

Issued: 1/09 Supersedes:

SIOX Input & Output System

Data

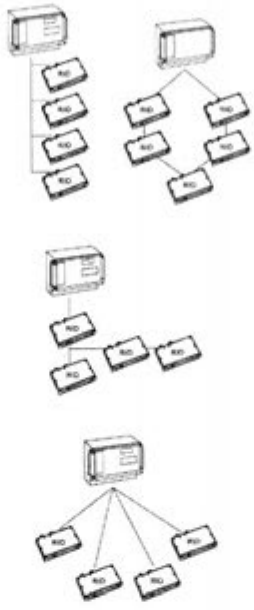
Product

SIOX input and output system is a flexible system based on the Flygt APP700 monitoring and control unit.
To increase the number of inputs and outputs, external RIO modules are connected. The APP700 unit will communicate with the RIO modules via a SIOX bus.

There are RIO modules with different configurations of analogue and digital inputs and outputs to meet your application demands.
The APP700 family of pump controllers can monitor and control up to 400 inputs / outputs when external RIO modules are connected.

The SIOX field bus works in all topologies; point-to-point, bus, tree, star or ring. This flexibility minimises the total cabling and cost for expansion or alteration of the system. The SIOX bus works at a distance of up to 250 m when using high quality shielded cable

Bus topologies



Denomination

40 402000	RIO-S48 8 Analog Inputs, 2 Analog Outputs
40 402004	RIO-R02 2 Analog Outputs
40 402003	RIO-S45 14 Digital Inputs, 7 Digital Outputs
40 402022	APP700-SIOX Interface Card (Required on all SIOX Installations, one per APP700 Unit)

Environment

EMC emission standard	EN 50081-1
EMC immunity standard	EN 50082-2

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a xylem brand

Issued: 1/09 Supersedes:

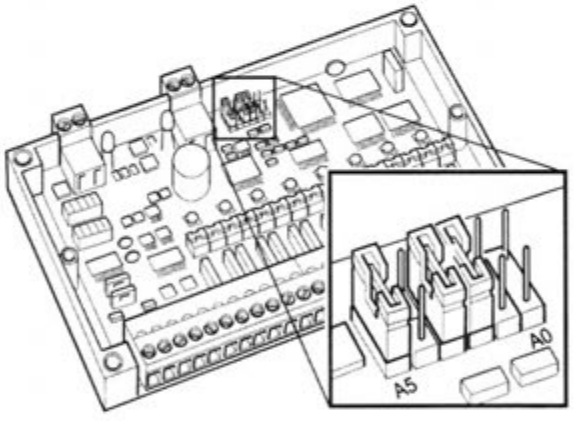
SIOX Input & Output System

SIOX bus

Electrical proporties	
Bus voltage	24 V
Bus current, max.	100 mA
Communication	
Bus type	SIOX bus
Communication	two wire
Communication speed	19.200 bps
Bus cable	Alpha 6072C
Max. bus length per segment	250 m

Requirements
SIOX driver

Address set-up
Every RIO module on the bus must have a unique address. The address of the RIO module is set-up with six address jumpers placed inside each module. A removed address jumper contributes to the address with its specific value.



Example. Address = 19 (010011 binary)

SIOX driver

A SIOX driver card (TCX 1601) makes it possible for an Flygt APP700 unit to master RIO modules via a SIOX bus. The SIOX driver generates the bus signals that may be used for communication with the RIO modules.

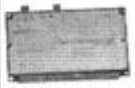
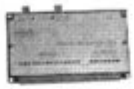
Technical data

Bus power supply	
Output voltage, typ.	24 V
Short-circuit current, typ.	100 mA
Communication	
Communication speed	19.200 bps
Dimensions	
Weight	0.050 kg
Mounting	Inside the APP700 I/O Board
Environment	
Operational tem perature	0 - +50°C
Storage temperature	-10 - +65°C
Humidity (non-condensing)	90 % RH
EMC emission standard	EN 50081-1
EMC immunity standard	EN 50082-2

FLYGT
a xylem brand

Issued: 1/09 Supersedes:

SIOX Input & Output System

Technical data	 RIO-R02	 RIO-S48	 RIO-S45
Digital inputs Logic 0 Logic 1 at U_{supp} = 24 V Internal resistance Input current at 24 V, typ			14 0-3,5 V > = 4 V 7 mA
Digital outputs Type: Transistor sourcing Max load Leakage current Short-circuit protection			7 • 500 mA 500 uA 500-1300 mA
Analogue inputs Resolution, bits Range: Internal resistance Inaccuracy at 25 °C: Differential, CM		8 12 0/4 - 20 mA 100 Ω 1% + - 80V	
Analogue outputs Resolution, bits Range: Inaccuracy at 25 °C: Max. resistance load	2 10 0/4 - 20 mA 1% Usupp-x/ 20 kΩ	2 12 0/4 - 20 mA 1% 500 Ω	
Communication Bus communication: SIOX Communication Unpolarised two-wire Communication Two wire Communication speed: 19.200 bps Isolation between I/O and SIOX bus Max bus segment length	• • • opto	• • • opto	• • • opto
Power supply Supply voltage: 24 V DC (12-35 V) Max current consumption (no load) Internal fuse:	• 30 mA 500 mA fast	• 100 mA No	• 100 mA 3.15 mA fast

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Issued: 1/09 Supersedes:

SIOX Input & Output System

	RIO-R02	RIO-S48	RIO-S45
Environment			
Operational temperature	-20-+55 °C	0-+55°C	0-+55 °C
Storage temperature:	40-+ 85°C	40-+ 85°C	40-+ 85°C
Humidity (non-condensing), rel. 95%	•	•	•
Enclosure	IP65	IP20	IP20
Cabinet			
Size (l x w x h), mm	94x94x58	140x82x36	140x82x36
Weight, total	0,20 kg	0,23kg	0,23 kg
Mounting	Wall	35 mm, DIN-rail	35 mm, DIN-rail
Cable entries	4 holes		
User interface			
Input indications: LED			14
Output indications: LED			7
Bus indication: LED	•	•	•
Answer indication : LED	•	•	•

[1] Communication, input, unpolarised two-wire

[2] Communication, output, two wire

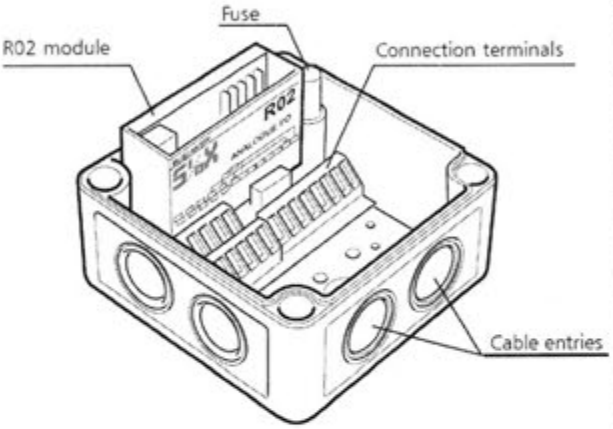
FLYGT
a xylem brand

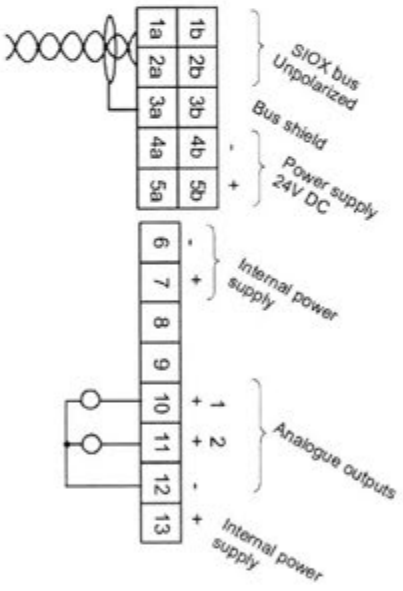
Issued: 1/09 Supersedes:

SIOX Input & Output System

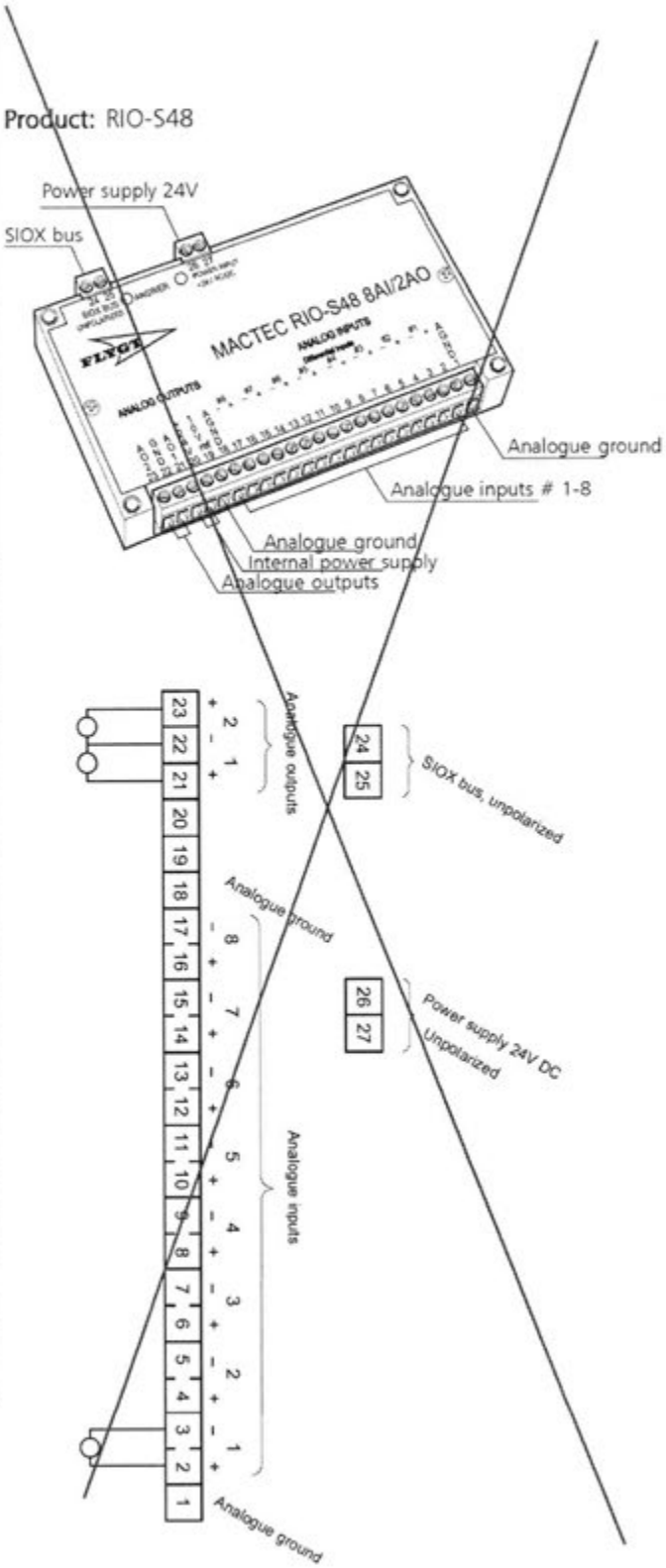
Connection drawings

Product: RIO-R02

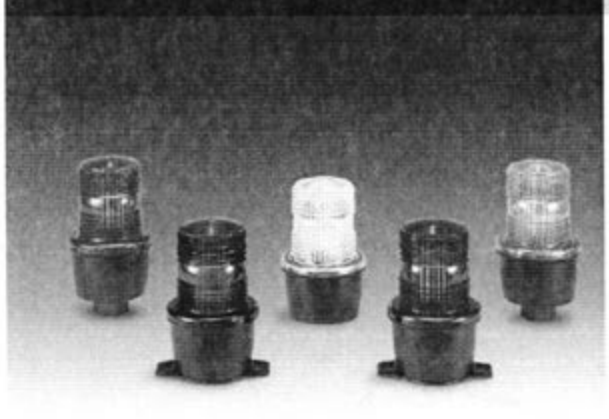




Product: RIO-S48



FEDERAL SIGNAL CORPORATION



StreamLine® Low Profile Strobe Light

Models LP3P, LP3S, LP3T

PERFECT SIZE MEETS SUPERIOR PERFORMANCE

- Available in 12-48VDC, 120VAC and 240VAC
- Surface mount, T-mount, or integrated ½ - inch pipe mount
- Five dome colors
- Screw-on lens
- Low profile — Model LP3S is only 5" high
- Type 4X, IP66 enclosure
- PLC and triac compatible
- Optional dome guard
- UL and cUL Listed, CSA Certified and CE Approved*

* CE Approval for P, S models only.

Federal Signal introduces the Model LP3 low profile strobe light. This Type 4X strobe is available in five colors: amber, blue, clear, green and red. An optional dome wire guard is available for the LP3S and LP3T.

The LP3 is offered in three mounting configurations. LP3P features an integrated ½-inch NPT pipe mount. LP3S features a three-hole surface mount — ideal for control panels and other flat or flush surfaces. The "T-mount" LP3T has a popular 2-hole design for wall or flush mounting.

Both the LP3S and LP3T include a surface gasket to complete the Type 4X installation. An optional dome guard is available for use with the LP3S and LP3T. All LP3 units feature a threaded screw-on lens that provides tool-free wiring and strobe tube replacement. The strobe tube is rated for 7,000 hours.

The LP3 comes in three voltage variations: 12-48VDC, 120VAC and 240VAC. The state-of-the-art strobe mechanism produces 2.2 joules of energy, while drawing relatively low level amperage.

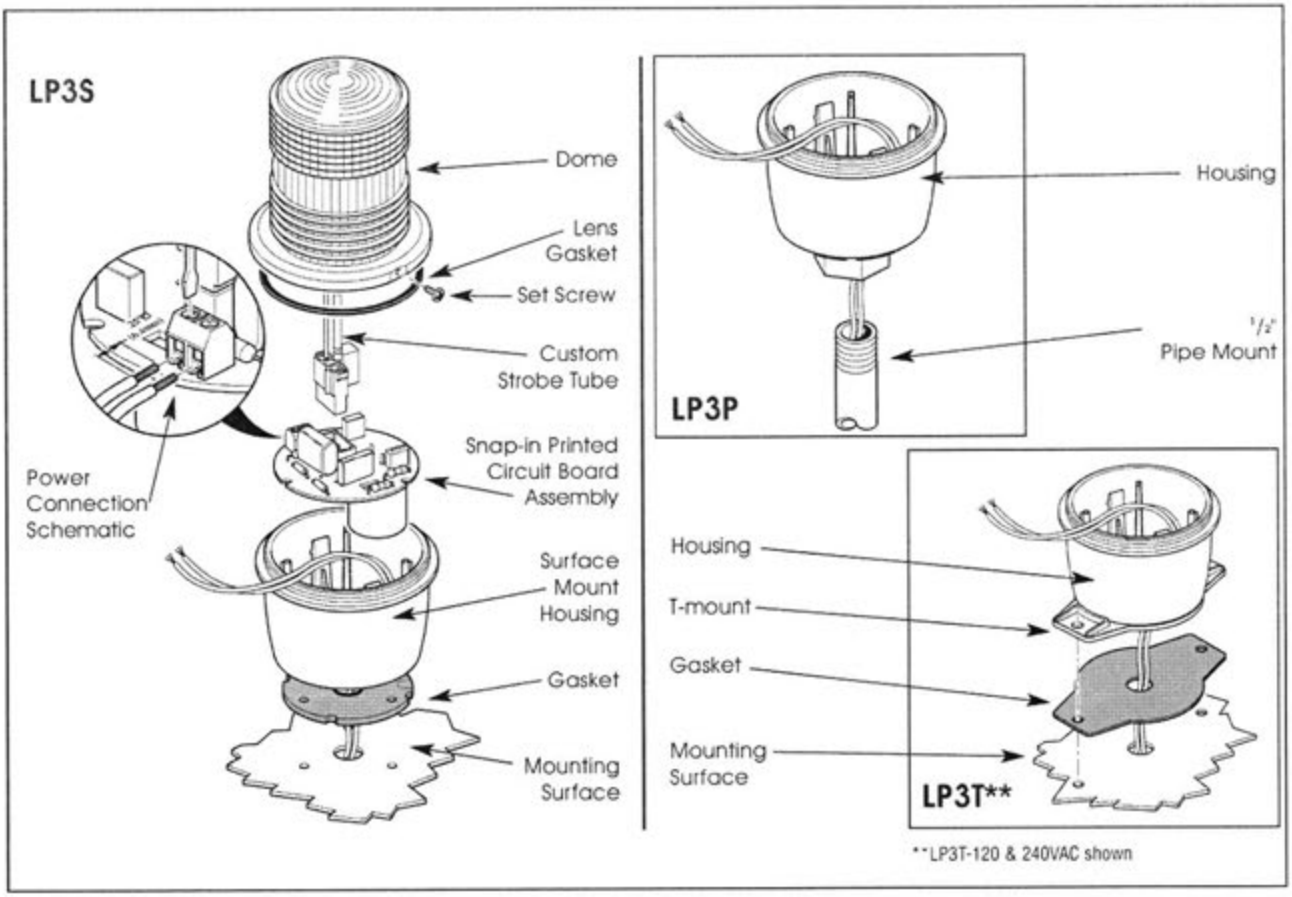
StreamLine® strobes feature high-quality, long-life strobe lamps which are designed to reduce tungsten build-up for longer lamp maintenance cycles. Careful consideration is given to the relationship between lamp shape and lens design for maximum light output. StreamLine products make use of surface mount technology, which provides a more powerful light in a much smaller package. The dry-electrolyte capacitor used in StreamLine products runs cooler than those used in many competitive strobes, resulting in a more reliable product that won't fail due to overheating.

Model	Voltage	Operating Current	Flash Rate/ Minute	Joule Output	Candela Peak[1]	Candela ECP[2]
LP3	12-48VDC	0.44-0.10 amps	65-95	2.2	175,000	51.5
LP3	120VAC	0.10 amps	65-95	2.2	175,000	51.5
LP3	240VAC	0.07 amps	65-95	2.2	175,000	51.5

5 yr FEDERAL SIGNAL WARRANTY

[1] Peak candela is the maximum light intensity generated by a flashing light during its light pulse
[2] ECP (Effective Candela) is the intensity that would appear to an observer if the light were burning steadily

STREAMLINE® LOW PROFILE STROBE LIGHT (LP3S/LP3P/LP3T)



SPECIFICATIONS

Lamp Life:*	7,000 hours	7,000 hours
Lamp Style:	Strobe	Strobe
Operating Temperature:	-31°F to 150°F	-35°C to 66°C
Net Weight:	7.3 oz.	206.96 g
Shipping Weight:	8.5 oz.	240.98 g
Diameter:	3.125"	7.94 cm
Height (from bottom):		
LP3P	5.7"	14.48 cm
LP3S	5.0"	12.7 cm
LP3T	5.1"	12.95 cm

*Optimal hours under ideal conditions.

HOW TO ORDER

- Specify model, voltage and color
- Specify options
  Wire/Dome guard for LP3S, LP3T (LP3G)
- Please refer to Model Number Index LP3 (P,S,T) beginning on page 374

REPLACEMENT PARTS

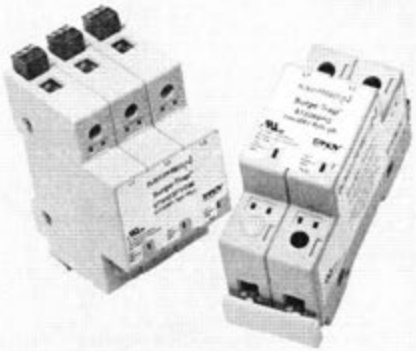
Description	***Part Number***	***Description***	***Part Number***
Dome, Amber	K8589063A	PC Assembly, 12-48VDC	K2001316B
Dome, Blue	K8589063A-01	PC Assembly, 120VAC	K2001317A
Dome, Clear	K8589063A-02	PC Assembly, 240VAC	K2001317A-01
Dome, Green	K8589063A-03	Gasket, Lens	K8589013A
Dome, Red	K8589063A-04	Gasket, LP3S	K8589011A
Strobe Tube	K149130A	Gasket, LP3T	K8589012A

2645 Federal Signal Dr., University Park, IL 60466 Tel: 708.534.4756 Fax: 708.534.4852 www.federalsignal-indust.com

Surge-Trap® Modular SPD

DIN-rail Style SPD

Surge-Trap® Modular Surge Protective Device (SPD) is a no-fuse, fail-safe surge suppressor featuring Mersen's patented TPMOV® technology inside. The modular SPD is UL 1449 Third Edition approved. It is DIN-rail mountable featuring a fail-safe self-protected design, visual indicator and a small footprint. A remote indicator option provides status to critical control circuitry. The Surge-Trap Modular SPD has a high short circuit rating and a thermally protected MOV, which eliminates the need for additional overcurrent protection devices.



Features/Benefits

- Easy installation or retrofit
- DIN-rail mountable
- Fail-safe, self-protected design
- Remote indicator (optional)
- Visual indicator
- IP20 finger-safe design
- Small footprint
- No additional overcurrent protection devices required

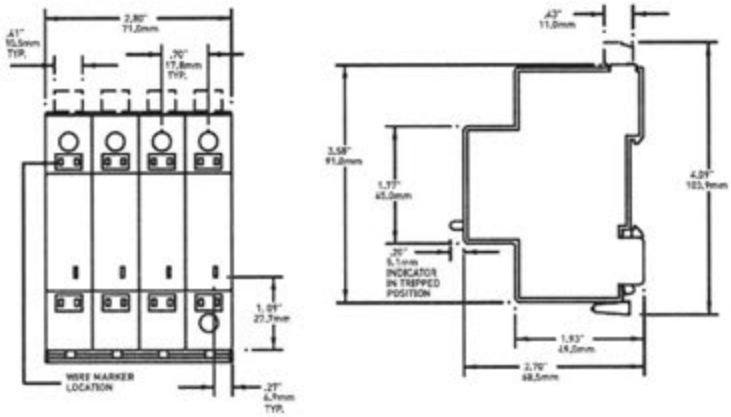
Applications:

- AC/DC distribution
- Power supplies
- Industrial automation
- Telecommunications
- Motor controls and starter systems
- Programmable logic controller (PLC) applications
- Power transfer equipment
- HVAC applications
- AC drives
- UPS systems
- Security systems
- IT/Data centers
- Medical equipment

Ratings:

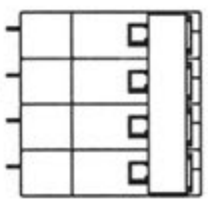
Volts : 120V to 600V
: 600V to 1000V (PV only)
SCCR : 200kA
Operating & storage temp
: -25°C to +60°C
Wiring range:
: #6 to #14AWG
Nominal discharge current
: 20kA

Dimensions



Poles	A in	A mm
1 Pole	0.70	17.8
2 Pole	1.39	35.5
3 Pole	2.10	53.3
4 Pole	2.80	71.0

*** Wire Size: 6-14 AWG*
*** Torque: 15 lbs-in*
*** Use 35mm DIN-rail*



Approvals:

- UL 1449 Third Edition Approved, File E210793
- Type 4 UL Recognized Component (Tested to UL Type 2 SPD)
- IEC 61643-1
- RoHS Compliant
- ANSI/IEEE C62.41
- CE

MERSEN

Surge-Trap® Modular SPD

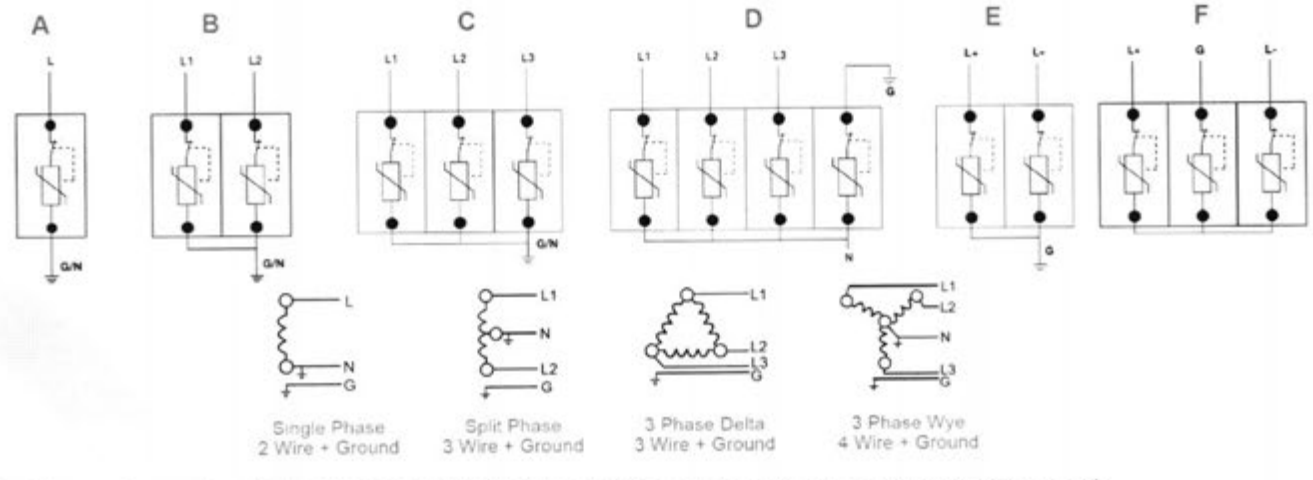
Product Type	Voltage	System Type	Mode	Auxiliary Microswitch
ST	**480**	**3PY**	**G**	**M**
ST- Modular	120	1P - Single Phase	Blank - Includes N-G Mode	Blank - No Microswitch
	120/208	SP - Split Phase	G - Does Not Provide N-G Mode	M - Microswitch Included
	120/240	3PD - 3 Phase Delta		
	240			
	277	3PY - 3 Phase Wye		
	347	PV - Photovoltaic		
	480			
	240/480			
	277/480			
	347/600			
	600			
	1000	Indicates PV only		

Catalog Numbers

Catalog No.	Nominal Voltage (VAC)	MCOV L-G	No. of Poles	System Type	Nominal Discharge Current ** (In, kA)	Max. Discharge Current (Imax, 8/20µs, kA)	SCCR (kA)	Freq (Hz)	Voltage Protection Rating (VPR)				No. of Wires	Circuit Connection Wiring Diagrams
									L-N	L-G	N-G	L-L		
ST1201PG(M)	120	180	1	1P	20	50	200	50/60	500	-	-	-	2	A
ST2301PG(M)	240	270	1	1P	20	50	200	50/60	800	-	-	-	2	A
ST2771PG(M)	277	320	1	1P	20	50	200	50/60	900	-	-	-	2	A
ST2083PY(M)	120/208	360	4	3PY	20	50	200	50/60	500	900	500	900	5	D
ST2083PYG(M)	120/208	180	3	3PY	20	50	200	50/60	500	-		900	4	C
ST240SPG(M)	120/240	180	2	SP	20	50	200	50/60	500	-		900	3	B
ST480SPG(M)	240/480	270	2	SP	20	50	200	50/60	800	-	-	1500	3	B
ST2403PDG(M)	240D	270	3	3PD	20	50	200	50/60	-	800	-	1500	4	C
ST4803PY(M)	277/480	500	4	3PY	20	50	200	50/60	1000	1500	500	1800	5	D
ST4803PYG(M)	277/480	320	3	3PY	20	50	200	50/60	900	-	-	1500	4	C
ST4803PDG(M)	480D	550	3	3D	20	50	200	50/60	-	1500	-	3000	4	C
ST6003PY(M)	347/600	690	4	3PY	20	50	200	50/60	1500	2500	800	2500	5	D
ST6003PYG(M)	347/600	420	3	3PY	20	50	200	50/60	1200	-	-	2000	4	C

Catalog No. PV	Nominal Operating DC Voltage (V)	Ucpv*	Nominal Discharge Current (In,8/20, kA)	Imax Discharge Current (Imax, 8/20µs, kA)	Voltage Protection Level (Up @ In, kV)	Iscwpv** (kA)	L/R	Replacement Plug Part No	No. of Poles	Wiring Diagrams
ST600PV(M)	600	720	10	40	<2.4	10	<= 1mS	-	2	E
ST1000PV(M)	1000	1200	10	40	<4.0	10	<= 1mS	-	3	F

** Ucpv: Maximum continuous operating DC voltage. **Values based upon SPD type 2 testing*

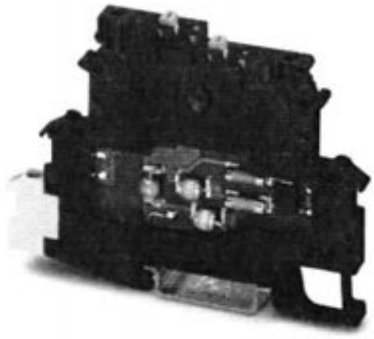


PHOENIX CONTACT

Extract from the online catalog

TT-2-PE-M-24DC

Order No.: 2920641



http://eshop.phoenixcontact.de/phoenix/treeViewClick.do?UID=2920641

Modular terminal block with two-stage surge protection for one operated floating double conductor, disconnect knife on both signal paths, separate ground connection, nominal voltage: 24 V DC.

Product notes

WEEE/RoHS-compliant since: 09/28/2006

http://www.download.phoenixcontact.com
Please note that the data given here has been taken from the online catalog. For comprehensive information and data, please refer to the user documentation. The General Terms and Conditions of Use apply to Internet downloads.

Commercial data

GTIN (EAN)	4046356160193
sales group	J304
Pack	14 pcs.
Customs tariff	85363010
Weight/Piece	0.033042 KG
Catalog page information	Page 100 (TT-2009)

Technical data

General

Housing material	PA 6.6
Inflammability class acc. to UL 94	V2
Color	black
Total surge current (8/20) µs	10 kA

Total surge current (10/350) µs	1 kA
Ambient temperature (operation)	-40 °C ... 80 °C
Mounting type	DIN rail 35 mm
Design	Double-level terminal block with PE foot – separate PE connection
Number of positions	2
Degree of protection	IP20
Direction of action	Line-Line & Line-Earth Ground
Width	6.20 mm
Height	66.45 mm
Length	92.00 mm

Protective circuit

IEC category	C1
	C2
	C3
	D1
Nominal voltage U_N	24 V DC
	17 V AC
Max. operating voltage U_{max}	30 V DC
	21 V AC
Arrester rated voltage U_C	30 V DC
	21 V AC
Arrester rated voltage U_C (Core-Core)	30 V DC
	21 V AC
Nominal current I_N	300 mA (40°C)
Operating effective current I_C at U_C	≤ 5 µA
Discharge current to PE at U_C	≤ 2 µA
Nominal discharge surge current In (8/20) µs (Core-Core)	5 kA
Nominal discharge surge current I_n (8/20) µs (Core-Earth)	5 kA
Total surge current (8/20) µs	10 kA
Max. discharge surge current Imax (8/20) µs maximum (Core-Core)	5 kA
Max. discharge surge current Imax (8/20) µs maximum (Core-Earth)	5 kA (per path)

Nominal pulse current Ian (10/1000) µs (Core-Core)	30 A
Nominal pulse current Ian (10/1000) µs (Core-Earth)	100 A (per path)
Lightning test current (10/350) µs, peak value I_{imp}	500 A (per path)
Output voltage limitation at 1 kV/µs (Core-Core) spike	≤ 45 V
Output voltage limitation at 1 kV/µs (Core-Earth) spike	≤ 650 V
Output voltage limitation at 1 kV/µs (Core-Core) static	≤ 45 V
Output voltage limitation at 1 kV/µs (Core-Earth) static	≤ 650 V
Residual voltage at I_n (conductor-conductor)	≤ 45 V
Residual voltage with Ian (10/1000)µs (conductor-conductor)	≤ 50 V
Protection level U_p (Core-Core)	≤ 55 V (C2 (10 kV/5 kA))
	≤ 53 V (C1 (500 V/250 A))
Response time tA (Core-Core)	≤ 1 ns
Response time tA (Core-Earth)	≤ 100 ns
Input attenuation aE, sym.	0.6 dB (≤ 500 kHz / 50 Ω)
	0.2 dB (≤ 200 kHz / 150 Ω)
Cut-off frequency fg (3 dB), sym. in 50 Ohm system	Typ. 6 MHz
Cut-off frequency fg (3 dB), sym. in 150 Ohm system	Typ. 2 MHz
Capacity (Core-Core)	Typ. 2.5 nF
Resistance in series	3.3 Ω 20 %
	3.3 Ω
Max. required back-up fuse	315 mA (e.g. T in acc. with IEC 127-2/III)
Surge carrying capacity in acc. with IEC 61643-21 (Core-Core)	C2 (10 kV/5 kA)
Surge carrying capacity in acc. with IEC 61643-21 (Core-Earth)	C2 (10 kV/5 kA)
	D1 (500 A)
Alternating current carrying capacity in acc. with IEC 61643-21 (Core-Earth)	5 A - 1 s

Connection data

Type of connection	Screw connection

Connection type IN	Screw terminal blocks
Connection type OUT	Screw terminal blocks
Screw thread	M3
Tightening torque	0.8 Nm
Stripping length	8 mm
Conductor cross section stranded min.	0.2 mm²
Conductor cross section stranded max.	2.5 mm²
Conductor cross section solid min.	0.2 mm²
Conductor cross section solid max.	2.5 mm²
Conductor cross section AWG/kcmil min.	24
Conductor cross section AWG/kcmil max	14

Connection, protective circuit

Standards/regulations	IEC 61643-21

Certificates / Approvals

Certification	GOST

Accessories

Item	Designation	Description
General		
2920654	TT-D-2-PE-M-BK	End cover for TERMITRAB TT-2-PE-M-... and TT-2/2-M-...
Marking		
1051993	B-STIFT	Marker pen, for manual labeling of unprinted Zack strips, smear-proof and waterproof, line thickness 0.5 mm
1051016	ZB 6,LGS:FORTL.ZAHLEN	Zack strip, 10-section, printed horizontally: with the numbers, 1-10, 11-20 etc. up to 991-1000, color: white
1051430	ZB 6,LGS:U-N	Zack strip, printed horizontally: 10-section, U, V, W, N, GND, U, V, W, N, GND, color: white
1050499	ZB 6:SO/CMS	Zack strip, 10-section, divisible, special printing, marking according to customer requirements
1051003	ZB 6:UNBEDRUCKT	Zack strip, unprinted, strips with 10 labels for individual labeling with M-PEN or CMS system, for terminal block width: 6.2 mm, color: white

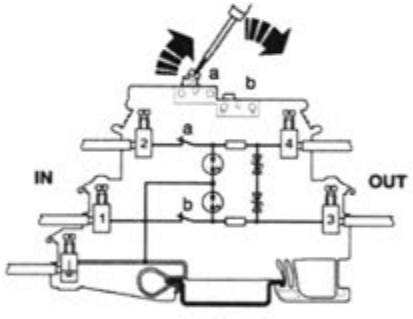
0808749	ZBF 6,LGS:FORTL.ZAHLEN	Zack strip, flat, printed horizontally: 10-section, with the numbers, 1-10, 11-20 etc. up to 991-1000, color: White
0808736	ZBF 6/WH-100:UNBEDRUCKT	Zack strip, flat, unprinted: 10-section, for individual labeling with M-PEN or ZBF-T, large batch, sufficient for labeling 1000 terminal blocks, color: white
0808710	ZBF 6:UNBEDRUCKT	Zack strip, flat, unprinted: 10-section, for individual labeling with M-PEN or ZBF-T, sufficient for 100 terminal blocks, color: white

Additional products

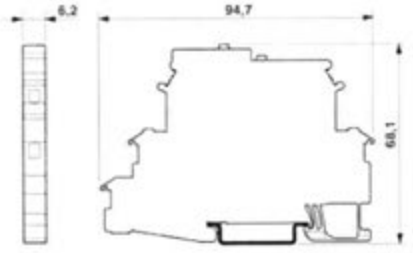
Item	Designation	Description
Assembly		
2839295	SSA 3-6	shield fast connections for conductor diameter 3 - 6 mm. Potential connection cable: 200 mm, black
2839512	SSA 5-10	Shield fast connection for conductor diameters 5 - 10 mm. Potential connection cable: 200 mm, black
General		
2920654	TT-D-2-PE-M-BK	End cover for TERMITRAB TT-2-PE-M-... and TT-2/2-M-...

Diagrams/Drawings

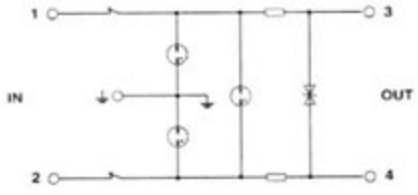
Connection diagram



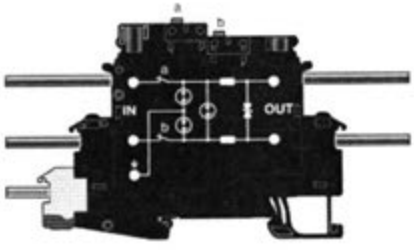
Dimensioned drawing



Circuit diagram



Schematic diagram

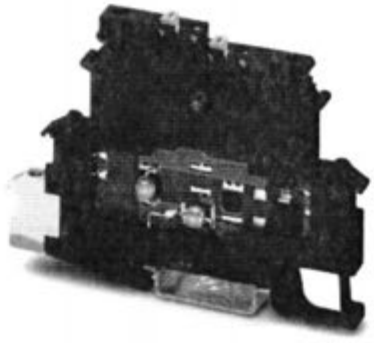


PHOENIX CONTACT

Extract from the online catalog

TT-2-PE/S1-M-24DC

Order No.: 2920638



http://eshop.phoenixcontact.de/phoenix/treeViewClick.do?UID=2920638

Double-level modular terminal block with two-stage surge protection for one two-wire impedance-sensitive signal circuit, disconnect knife on both signal paths, separate ground connection, nominal voltage: 24 V DC.

Product notes

WEEE/RoHS-compliant since: 09/28/2006

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Commercial data

GTIN (EAN)	4046356160186
sales group	J304
Pack	14 pcs.
Customs tariff	85363010
Weight/Piece	0.032293 KG
Catalog page information	Page 101 (TT-2009)

Technical data

General

Housing material	PA 6.6
Inflammability class acc. to UL 94	V2
Color	black

Total surge current (8/20) µs	10 kA
Total surge current (10/350) µs	1 kA
Ambient temperature (operation)	-40 °C ... 80 °C
Mounting type	DIN rail 35 mm
Design	Double-level terminal block with PE foot – separate PE connection
Number of positions	2
Degree of protection	IP20
Direction of action	Line-Line & Line-Earth Ground
Width	6.20 mm
Height	66.45 mm
Length	92.00 mm

Protective circuit

IEC category	C1
	C2
	C3
	D1
Nominal voltage U_N	24 V DC
	17 V AC
Max. operating voltage U_{max}	30 V DC
	21 V AC
Arrester rated voltage U_C	30 V DC
	21 V AC
Arrester rated voltage U_C (Core-Core)	30 V DC
	21 V AC
Nominal current I_N	10 A (40°C)
Operating effective current I_C at U_C	≤ 5 µA
Discharge current to PE at U_C	≤ 2 µA
Nominal discharge surge current In (8/20) µs (Core-Core)	300 A
Nominal discharge surge current I_n (8/20) µs (Core-Earth)	5 kA
Total surge current (8/20) µs	10 kA
Max. discharge surge current Imax (8/20) µs maximum (Core-Core)	300 A
Max. discharge surge current Imax (8/20) µs maximum (Core-Earth)	5 kA (per path)

Nominal pulse current Ian (10/1000) µs (Core-Core)	60 A
Nominal pulse current Ian (10/1000) µs (Core-Earth)	100 A (per path)
Lightning test current (10/350) µs, peak value I_{imp}	500 A (per path)
Output voltage limitation at 1 kV/µs (Core-Core) spike	≤ 45 V
Output voltage limitation at 1 kV/µs (Core-Earth) spike	≤ 650 V
Output voltage limitation at 1 kV/µs (Core-Core) static	≤ 45 V
Output voltage limitation at 1 kV/µs (Core-Earth) static	≤ 650 V
Residual voltage at I_n (conductor-conductor)	≤ 55 V
Residual voltage with Ian (10/1000)µs (conductor-conductor)	≤ 50 V
Protection level U_p (Core-Core)	≤ 50 V (C1 (500 V/250 A))
Response time tA (Core-Core)	≤ 1 ns
Response time tA (Core-Earth)	≤ 100 ns
Input attenuation aE, sym.	0.1 dB (≤ 1 MHz / 50 Ω)
	0.1 dB (≤ 400 kHz / 150 Ω)
Cut-off frequency fg (3 dB), sym. in 50 Ohm system	Typ. 7 MHz
Cut-off frequency fg (3 dB), sym. in 150 Ohm system	Typ. 2 MHz
Capacity (Core-Core)	Typ. 2.5 nF
Resistance in series	< 5 mΩ
Max. required back-up fuse	10 A (gL/gG/C)
Surge carrying capacity in acc. with IEC 61643-21 (Core-Core)	C1 (500 V / 250 A)
	C3 (25 A)
Surge carrying capacity in acc. with IEC 61643-21 (Core-Earth)	C2 (10 kV/5 kA)
	D1 (500 A)
Alternating current carrying capacity in acc. with IEC 61643-21 (Core-Earth)	5 A - 1 s

Connection data

Type of connection	Screw connection
Connection type IN	Screw terminal blocks

Connection type OUT	Screw terminal blocks
Screw thread	M3
Tightening torque	0.8 Nm
Stripping length	8 mm
Conductor cross section stranded min.	0.2 mm²
Conductor cross section stranded max.	2.5 mm²
Conductor cross section solid min.	0.2 mm²
Conductor cross section solid max.	2.5 mm²
Conductor cross section AWG/kcmil min.	24
Conductor cross section AWG/kcmil max	14

Connection, protective circuit

Standards/regulations	IEC 61643-21

Certificates / Approvals

Certification	GOST

Accessories

Item	Designation	Description
General		
2920654	TT-D-2-PE-M-BK	End cover for TERMITRAB TT-2-PE-M-... and TT-2/2-M-...
Marking		
1051993	B-STIFT	Marker pen, for manual labeling of unprinted Zack strips, smear-proof and waterproof, line thickness 0.5 mm
1051016	ZB 6,LGS:FORTL.ZAHLEN	Zack strip, 10-section, printed horizontally: with the numbers, 1-10, 11-20 etc. up to 991-1000, color: white
1051430	ZB 6,LGS:U-N	Zack strip, printed horizontally: 10-section, U, V, W, N, GND, U, V, W, N, GND, color: white
1050499	ZB 6:SO/CMS	Zack strip, 10-section, divisible, special printing, marking according to customer requirements
1051003	ZB 6:UNBEDRUCKT	Zack strip, unprinted, strips with 10 labels for individual labeling with M-PEN or CMS system, for terminal block width: 6.2 mm, color: white

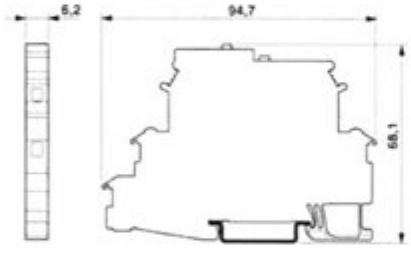
0808749	ZBF 6,LGS:FORTL.ZAHLEN	Zack strip, flat, printed horizontally: 10-section, with the numbers, 1-10, 11-20 etc. up to 991-1000, color: White
0808736	ZBF 6/WH-100:UNBEDRUCKT	Zack strip, flat, unprinted: 10-section, for individual labeling with M-PEN or ZBF-T, large batch, sufficient for labeling 1000 terminal blocks, color: white
0808710	ZBF 6:UNBEDRUCKT	Zack strip, flat, unprinted: 10-section, for individual labeling with M-PEN or ZBF-T, sufficient for 100 terminal blocks, color: white

Additional products

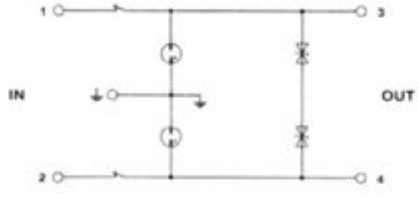
Item	Designation	Description
Assembly		
2839295	SSA 3-6	shield fast connections for conductor diameter 3 - 6 mm. Potential connection cable: 200 mm, black
2839512	SSA 5-10	Shield fast connection for conductor diameters 5 - 10 mm. Potential connection cable: 200 mm, black
General		
2920654	TT-D-2-PE-M-BK	End cover for TERMITRAB TT-2-PE-M-... and TT-2/2-M-...

Diagrams/Drawings

Dimensioned drawing



Circuit diagram



Signal duplicator - MINI MCR-SL-UI-2I-NC - 2864176

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4-way signal duplicator for electrical isolation and duplication of analog signals with screw connection, standard configuration

Product description

The 6.2 mm wide configurable 4-way isolating amplifier MINI MCR-SL-UI-2I-... is used for electrical isolation, conversion, amplification and filtering of standard signals.
On the input side, the analog standard signals 0...20 mA, 4...20 mA, 0...10 V or 1...5V can be selected, on the output side there are two current outputs that can be set independently of one another with a 0...20 mA-, or 4...20mA signal, electrically isolated (4-way isolation).
The DIP switches, which can be accessed on the side of the housing, can be used to configure the input and output signal ranges.
Power (19.2 V DC to 30 V DC) can be supplied through connection terminal blocks on the modules or in conjunction with the DIN rail connector.

Product Features

- Power supply possible via the foot element (T-connector)
- Highly-compact isolating amplifier for electrical isolation, conversion, amplification, filtering, and duplication of standard analog signals
- Up to 8 signal combinations can be configured using DIP switches
- 4-way isolation
- Duplication of a standard analog signal on two current outputs

Key commercial data

Packing unit	1 1
Weight per Piece (excluding packing)	100.0 GRM
Custom tariff number	85437090
Country of origin	Germany

Technical data

Note:

Utilization restriction	EMC: class A product, see manufacturer's declaration in the download area

Signal duplicator - MINI MCR-SL-UI-2I-NC - 2864176

Technical data

Dimensions

Width	6.2 mm
Height	93.1 mm
Depth	102.5 mm

Ambient conditions

Ambient temperature (operation)	-20 °C ... 60 °C
Ambient temperature (storage/transport)	-40 °C ... 85 °C
Degree of protection	IP20

Input data

Configurable/programmable	Yes, unconfigured
Voltage input signal	0 V ... 10 V (please indicate if different setting when ordering)
	1 V ... 5 V
Current input signal	0 mA ... 20 mA
	4 mA ... 20 mA
Max. input voltage	30 V
Max. input current	50 mA
Input resistance of voltage input	approx. 100 kΩ
Input resistance current input	approx. 50 Ω

Output data

Configurable/programmable	Yes, unconfigured
Current output signal	2x 0 mA ... 20 mA
	2x 4 mA ... 20 mA
Max. output current	approx. 22 mA
Load/output load current output	≤ 250 Ω (at 20 mA)

Power supply

Nominal supply voltage	24 V DC
Supply voltage range	19.2 V DC ... 30 V DC (The T connector (ME 6,2 TBUS-2 1,5/5-ST-3,81 GN, Order No. 2869728) can be used to bridge the supply voltage. It can be snapped onto a 35 mm DIN rail according to EN 60715))
Max. current consumption	< 30 mA (at 24 V DC incl. load)
Power consumption	< 600 mW

Connection data

Connection method	Screw connection
Conductor cross section solid min.	0.2 mm²
Conductor cross section solid max.	2.5 mm²
Conductor cross section stranded min.	0.2 mm²
Conductor cross section stranded max.	2.5 mm²

Signal duplicator - MINI MCR-SL-UI-2I-NC - 2864176

Technical data

Connection data

Conductor cross section AWG/kcmil min.	26
Conductor cross section AWG/kcmil max	12
Stripping length	12 mm
Screw thread	M3

General

No. of channels	2
Maximum transmission error	≤ 0.2 % (of final value)
Transmission error, typical	< 0.1 %
Maximum temperature coefficient	< 0.01 %/K
Temperature coefficient, typical	< 0.004 %/K
Limit frequency (3 dB)	approx. 35 Hz
Protective circuit	Transient protection
Electrical isolation	Basic insulation according to EN 61010
Surge voltage category	II
Pollution degree	2
Rated insulation voltage	50 V AC/DC
Test voltage, input/output/supply	1.5 kV (50 Hz, 1 min.)
Electromagnetic compatibility	Conformance with EMC Directive 2004/108/EC
Noise emission	EN 61000-6-4
Noise immunity	EN 61000-6-2 When being exposed to interference, there may be minimal deviations.
Color	green
Housing material	PBT
Mounting position	Any
Assembly instructions	The T connector can be used to bridge the supply voltage. It can be snapped onto a 35 mm DIN rail according to EN 60715.
Conformance	CE-compliant
ATEX	# II 3 G Ex nA IIC T4 Gc X
UL, USA / Canada	UL 508 Recognized
	Class I, Div. 2, Groups A, B, C, D T5
GL	GL EMC 2 D

EMC data

Name	Electromagnetic RF field
Standards/regulations	EN 61000-4-3
Typical deviation from the measuring range final value	5 %
Name	Fast transients (burst)
Standards/regulations	EN 61000-4-4

Signal duplicator - MINI MCR-SL-UI-2I-NC - 2864176

Technical data

EMC data

Typical deviation from the measuring range final value	5 %
Name	Conducted interferences
Standards/regulations	EN 61000-4-6
Typical deviation from the measuring range final value	5 %

Classifications

eCl@ss

eCl@ss 4.0	27210120
eCl@ss 4.1	27210120
eCl@ss 5.0	27210120
eCl@ss 5.1	27210120
eCl@ss 6.0	27210120
eCl@ss 7.0	27210120
eCl@ss 8.0	27210120

ETIM

ETIM 2.0	EC001485
ETIM 3.0	EC001485
ETIM 4.0	EC001485
ETIM 5.0	EC001485

UNSPSC

UNSPSC 6.01	30211506
UNSPSC 7.0901	39121008
UNSPSC 11	39121008
UNSPSC 12.01	39121008
UNSPSC 13.2	39121008

Approvals

Approvals

Approvals

UL Recognized / cUL Recognized / GL / cULus Recognized

Signal duplicator - MINI MCR-SL-UI-2I-NC - 2864176

Approvals

Ex Approvals

UL Listed / cUL Listed / ATEX / cULus Listed

Approvals submitted

Approval details

UL Recognized

cUL Recognized

GL

cULus Recognized

Accessories

Accessories

DIN rail connector

Electronic housing - ME 6,2 TBUS-2 1,5/5-ST-3,81 GN - 2869728

DIN rail connector for DIN rail mounting. Universal for T-BUS housing. Gold-plated contacts, 5-pos.

Marking material

User assembly of other units using body + head assemblies see pages 38005-7 to 38005-9

Control and signalling units Ø 22

Harmony® style 4
Pushbuttons and switches with chromium plated metal bezel

Complete units, XB4 B

XB4 BT845

XB4 BS9445

XB4 BS542

Emergency stop mushroom head pushbuttons, Ø 40 (red) (screw clamp terminal connections)

Shape of head	Type of push	Type of contact N/O	Type of contact N/C	Reference	Weight kg
	Trigger action Push-pull	1	1	**XB4 BT845** (ZB4 BZ105 + ZB4 BT84)	0.136
	Trigger action Turn to release	1	1	**XB4 BS8445** (ZB4 BZ105 + ZB4 BS844)	0.130
		–	2	**XB4 BS8444** (ZB4 BZ104 + ZB4 BS844)	0.130
		1	2	**XB4 BS84441** (ZB4 BZ141 + ZB4 BS844)	0.140
	Trigger action Key release (Key n° 455)	1	1	**XB4 BS9445** (ZB4 BZ105 + ZB4 BS944)	0.170
	Push-pull	–	1	**XB4 BT42** (ZB4 BZ102 + ZB4 BT4)	0.125
	Turn to release	–	1	**XB4 BS542** (ZB4 BZ102 + ZB4 BS54)	0.118
	Key release (key n° 455)	–	1	**XB4 BS142** (ZB4 BZ102 + ZB4 BS14)	0.133

XB4 BD33

XB4 BJ33

XB4 BG33

Selector switches and key switches (screw clamp terminal connections)

Shape of head	Type of operator	Type of contact N/O	Type of contact N/C	Number and type of positions (1)		Reference	Weight kg
	Standard handle, black	1	–	2 - stay put		**XB4 BD21** (ZB4 BZ101 + ZB4 BD2)	0.095
		1	1	2 - stay puts		**XB4 BD25** (ZB4 BZ105 + ZB4 BD2)	0.105
		2	–	3 - stay put		**XB4 BD33** (ZB4 BZ103 + ZB4 BD3)	0.105
				3 - spring return to centre		**XB4 BD53** (ZB4 BZ103 + ZB4 BD5)	0.105
	Long handle, black	1	–	2 - stay put		**XB4 BJ21** (ZB4 BZ101 + ZB4 BJ2)	0.096
		2	–	3 - stay put		**XB4 BJ33** (ZB4 BZ103 + ZB4 BJ3)	0.105
				3 - spring return to centre		**XB4 BJ53** (ZB4 BZ103 + ZB4 BJ5)	0.105
	Key (n° 455)	1	–	2 - stay put		**XB4 BG21** (ZB4 BZ101 + ZB4 BG2)	0.117
						XB4 BG41 (ZB4 BZ101 + ZB4 BG4)	0.117
				2 - spring return to left		**XB4 BG61** (ZB4 BZ101 + ZB4 BG6)	0.117
		2	–	3 - stay put		**XB4 BG03** (ZB4 BZ103 + ZB4 BG0)	0.127
						XB4 BG33 (ZB4 BZ103 + ZB4 BG3)	0.127

(1) The symbol ⚷ indicates key withdrawal position(s).

General pages 38002-2 to 38002-5 | Characteristics pages 38001-2 to 38001-5 | Dimensions pages 38020-2 to 38020-3

Control and signalling units Ø 22

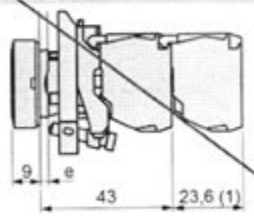
Harmony® style 4

Pushbuttons, switches and pilot lights with chromium plated metal bezel

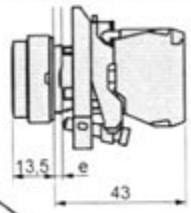
Complete units, XB4 B : contact functions

Pushbuttons, spring return

XB4 BA●●

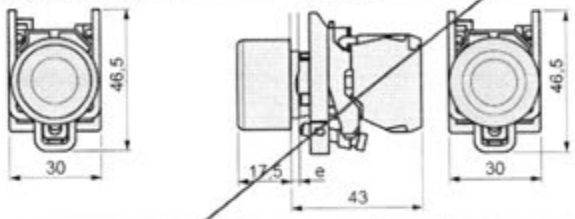


XB4 BL●●



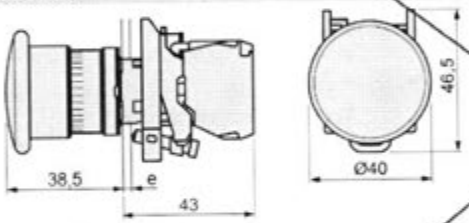
Common face view

XB4 BP●●



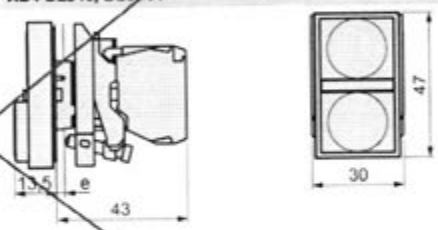
Mushroom head pushbuttons, spring return

XB4 BC21



Double-headed pushbuttons, spring return

XB4 BL●45, BL●4C5

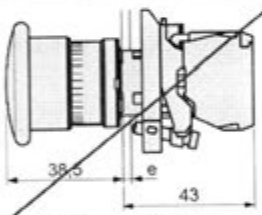


e: panel thickness: 1 to 6 mm

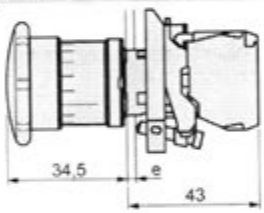
(1) Additional row of contacts or double contact.

Emergency stop mushroom head pushbuttons

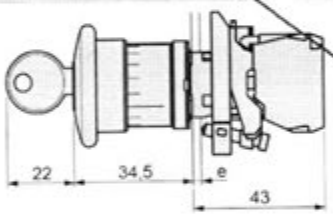
XB4 BT42, BT845



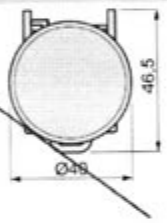
XB4 BS542, BS8441, BS8444, BS8445



XB4 BS142, BS9445



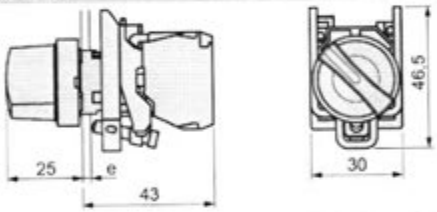
Common face view



Selector switches

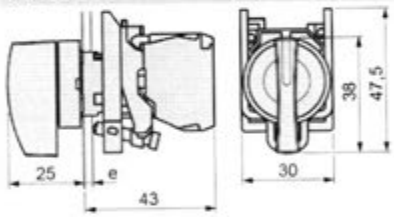
Standard handle operator

XB4 BD



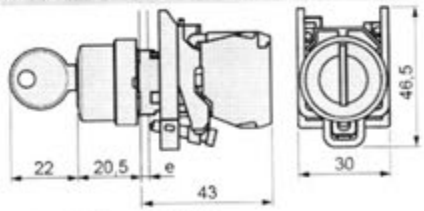
Long handle operator

XB4 BJ



Key switches

XB4 BG

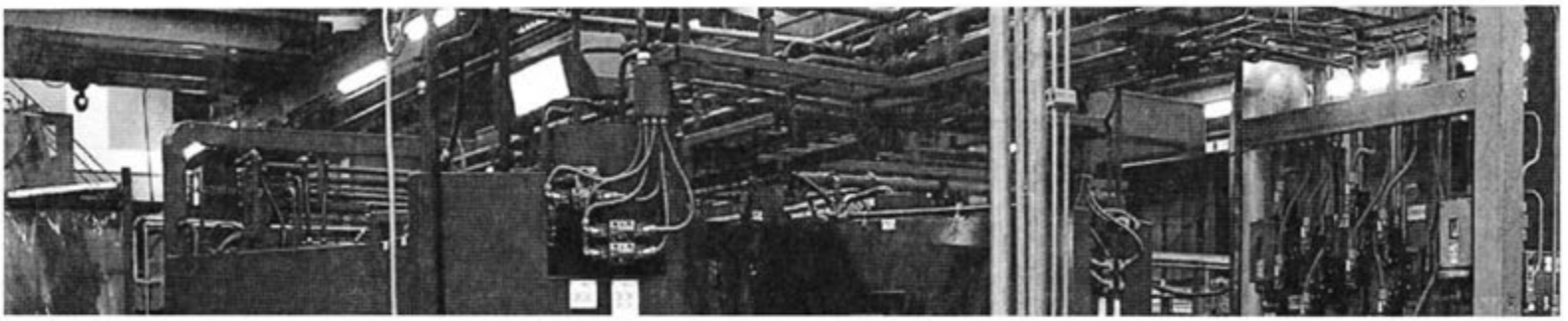


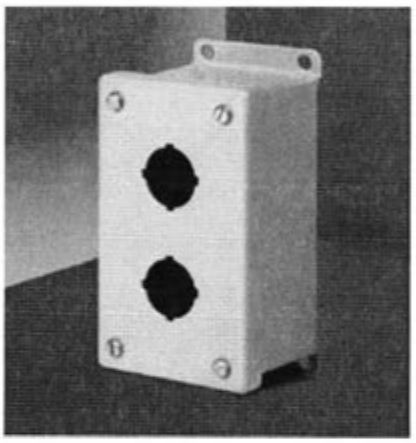
Heads for toggle switches

ZB4 BD●8

e: panel thickness: 1 to 6 mm

Carbon Steel Pushbutton Enclosures





Standard Pushbutton Enclosures

Rittal's rugged line of Pushbutton enclosures are used to house pushbuttons, selector switches, pilot lights and other devices for indoor use. Designed with continuously welded, smoothly finished seams, these enclosures protect the contents from dirt, dust, and sprays of water, oil or coolant to help insure trouble-free operation.

Designed For Versatility

The standard holes in these boxes accept all brands of 30.5 mm or 22.5 mm, 4-way, oil-tight pushbuttons, switches and pilot lights. Several of these enclosures can be mounted onto a Rittal column and base for use as an operator station. Additionally, external mounting brackets and captive, plated cover screws make installation quick and easy.

Technical Specifications

- Enclosures and covers are made from 14-gauge carbon steel for strength and durability
- Interior and exterior finish is a polyester-urethane powder coat over phosphatized surface, color is RAL 7035 (light gray)
- UL TYPE 4, 12 & 13 protection rated
- UL file number: E118617
- UL & CUL listed
- Enclosure conforms to all ratings

Carbon Steel – Standard

Hole Size 30.5 mm

Description	Part No.
1 Hole, 30.5, CS	PB01305S1C
2 Hole, 30.5, CS	PB02305S1C
3 Hole, 30.5, CS	PB03305S1C
4 Hole, 30.5, CS	PB04305S1C
4 Hole, 30.5, CS	PB04305S2C
5 Hole, 30.5, CS	PB05305S1C
6 Hole, 30.5, CS	PB06305S2C
6 Hole, 30.5, CS	PB06305S1C
8 Hole, 30.5, CS	PB08305S1C
9 Hole, 30.5, CS	PB09305S3C
10 Hole, 30.5, CS	PB10305S1C
12 Hole, 30.5, CS	PB12305S3C
16 Hole, 30.5, CS	PB16305S4C

Carbon Steel – Slim

Hole Size 30.5 mm

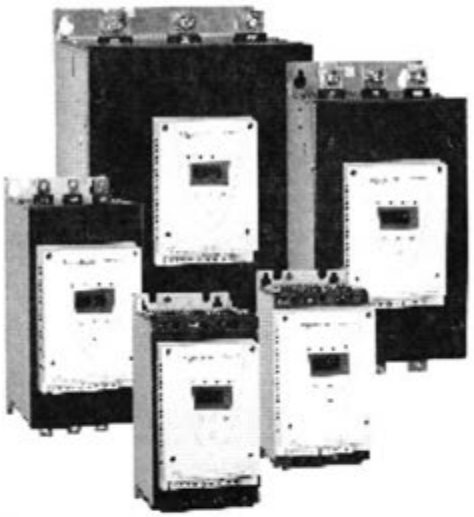
Description	Part No.
1 Hole, 30.5, CS	PB01305L1C
2 Hole, 30.5, CS	PB02305L1C
3 Hole, 30.5, CS	PB03305L1C
4 Hole, 30.5, CS	PB04305L1C
5 Hole, 30.5, CS	PB05305L1C
6 Hole, 30.5, CS	PB06305L1C

Carbon Steel – Miniature

Hole Size 22.5 mm

1 Hole, 22.5, CS	PB01225M1C
2 Hole, 22.5, CS	PB02225M1C
3 Hole, 22.5, CS	PB03225M1C
4 Hole, 22.5, CS	PB04225M1C
6 Hole, 22.5, CS	PB06225M2C

Altistart 22
soft start - soft stop units



The Altistart 22 soft start - soft stop unit offer

Presentation

The Altistart 22 soft start - soft stop unit supports the controlled starting and stopping, via voltage and torque, of three-phase squirrel cage asynchronous motors for power ratings between 4 and 400 kW.

It comes ready to use for standard applications with class 10 motor protection.

The Altistart 22 soft start - soft stop unit has been designed to satisfy the performance requirements of applications where ruggedness, the safety of personnel and equipment, and easy commissioning are at a premium.

The bypass function (based on a bypass contactor) has been made easier to use by integrating it into the starter. This approach suits applications where it may be necessary to bypass the starter at the end of the starting process in order, for example, to limit the starter's heat dissipation.

The Altistart 22 soft start - soft stop unit contains an integrated display terminal which allows the user to change both the programming and the adjustment or monitoring parameters in order to adapt and customize the application in line with customer needs.

The unit also features thermal protection for motors as well as a monitoring facility for machines and, thanks to the SoMove setup software, enables the installation to be commissioned immediately.

Applications

The integrated functions of the Altistart 22 soft start - soft stop unit are compatible with the more common types of application found in the construction, infrastructure or industrial sectors:

- Centrifugal pumps, piston pumps
- Fans
- Screw compressors, etc.
- Material handling (conveyors, etc.)
- Specialist machines (agitators, mixers, centrifugal machines)

The Altistart 22 soft start - soft stop unit represents a truly cost-effective solution, as it supports:

- A reduction in installation costs by optimizing product sizes, integrating the bypass function and reducing wiring time
- A reduction in the stress associated with electrical distribution by reducing the current peaks and line voltage drops caused by motors starting up
- A reduction in running costs for machines by reducing mechanical stress

Controlling the three phases of the motor windings ensures that performance remains satisfactory, whatever the situation (with or without a load, all voltage and power ranges, etc.).

Conformity to standards

Type		Performance
Conducted and radiated emissions	Conforming to IEC 60947-4-2	Class A
Vibration resistance	Conforming to IEC 60068-2-6	1.5 mm from 2 to 13 Hz, 1 gn from 13 to 200 Hz
Shock resistance	Conforming to IEC 60068-2-27	15 gn for 11 ms
Maximum ambient pollution	Conforming to IEC 60664-1	Step 2
Relative humidity	Conforming to IEC 60068-2-3	95% non-condensing, no dripping water
Degree of protection	For ATS 22D17...C11	IP 20 (IP 00 if no connections)
	For ATS 22C14...C59	IP 00

The Altistart 22 soft start - soft stop unit conforms to the RoHS Directive.

References: page 12
Combinations: page 16

Altistart 22
soft start - soft stop units

Functions

The main functions integrated in the drive are as follows:

Adjustment functions

- Adjustment of the Altistart 22 soft start - soft stop unit's current in line with the motor's nominal current
- Limiting current
- Selection of the type of stop (freewheel or deceleration)

Drive performance functions

- Management of the three supply phases
- Option of connecting the starter in the motor delta connection in series with each winding. This supports the use of a soft start - soft stop unit with a lower rating (only applies to the ATS 22●●●Q range)
- Management of the ramp and torque supplied to the motor throughout the acceleration and deceleration period (significantly less jerk)
- Variety of control profiles to suit different applications
- Integrated and automated management of the bypass function at the end of the starting process (based on a bypass contactor), whilst preserving electronic protection features

Protection functions for the motor and machine

- Integration of configurable motor thermal protection
- Thermal protection for the Altistart 22 soft start - soft stop unit
- Integrated processing of the PTC thermal probe with electrical isolation (optimum management of motor protection)
- Monitoring of the duration and number of starts (better installation safety)
- Management of stopping time before restart
- Automatic restart
- Protection against underloads and overcurrents in transient or steady state
- Automatic adjustment to the line frequency
- Detection of phase sequence
- Detection of phase loss
- Detection of imbalances between phases and of leakage currents (for the ATS 22●●●S6 and S6U ranges)

Functions to ease integration into control systems

- 3 programmable logic inputs
- 2 programmable N/C / N/O relay outputs
- Pluggable connectors for I/O
- Second set of parameters for motor operation
- Modbus serial link via RJ45 connector
- Display of soft start - soft stop unit and machine states
- Display of I/O currents and states
- Error log, diagnostics for soft start - soft stop unit
- Return to factory settings
- 4 LEDs on the front face (Ready, Communication, Run and Trip)

References:
page 12

Combinations:
page 16

Altistart 22
soft start - soft stop units

Commissioning the ATS 22 soft start - soft stop unit with SoMove lite setup software

The offer

The Altistart 22 soft start - soft stop unit offer comprises 2 voltage ranges for motor power ratings from 4 to 400 kW:

- Three-phase power supply voltage from 230 V to 440 V, 50/60 Hz **(ATS 22●●●Q)**
- Three-phase power supply voltage from 208 V to 600 V, 50/60 Hz **(ATS 22●●●S6** and **ATS 22●●●S6U)**

Options

The Altistart 22 soft start - soft stop unit range also offers a number of options:

- A remote terminal unit can be installed on the front face of a floor-standing enclosure with IP 54/NEMA 12 or IP 65 protection (depending on the model). It offers the same functions as an integrated display terminal.
- Additional fans to support a greater number of starts
- SoMove lite setup software
- Protection shrouds for terminals to ensure compliance with IP 20 degree of protection

Selection criteria

The Altistart 22 soft start - soft stop unit has been designed for standard control system applications.

In addition to the chosen application, the choice of starter will depend on the following main criteria:

- The power and nominal current on the motor rating plate
- The load factor for the application

The starting capacity also needs to be considered when selecting an Altistart 22 soft start - soft stop unit:

Starting capacity

The standard starting capacity for a class 10 motor is:

- 3.5 In for 40 seconds from cold with S1 motor duty
- 3.5 In for 20 seconds with S4 motor duty, based on a load factor of 95%

Note:
S1 motor duty is based on a start followed by operation at constant load, making it possible to achieve thermal equilibrium.
S4 motor duty is based on a cycle consisting of a start, operation at constant load and an idle period.

Number of starts per hour

Assuming the starting capacity remains the same, the number of starts per hour can be increased by adding a fan.
The ATS 22D17Q...C17Q, ATS 22D17S6...C17S6 and ATS 22D17S6U...C17S6U soft start - soft stop units can be fitted with an additional fan. Page 15 has details of this option.

Possible number of starts per hour based on a capacity of 3.5 In for 20 seconds (S4 motor duty) after adding a fan:

Soft start - soft stop units	Number of starts per hour	
	Without fan	With additional fan
ATS 22D17●...D47●	6	10
ATS 22D62●...D88●	6	10
ATS 22C11●...C17●	4	10

Note:
The ATS 22C21Q...C59Q, ATS 22C21S6...C59S6 and ATS 22C21S6U...C59S6U soft start - soft stop units come with a fan as standard.
The standard number of starts per hour for S4 motor duty is 4. Anything more would require the next lowest rating.

References: page 12
Combinations: page 16

Schneider Electric

Altistart 22
soft start - soft stop units

Example of pumping application using the Altistart 22 soft start - soft stop unit

Standard application areas

Examples of functions performed by the Altistart 22 soft start - soft stop unit depending on the application chosen

Type of machine	Functions performed by the Altistart 22
Centrifugal pump	Controlled slowing-down and stopping (fewer hammer blows) Protection against underload or reversal of phase rotation direction
Piston pump	Control of pump priming and the pump's direction of rotation
Fan	Detection of overloads and underloads (motor/fan transmission broken) Braking torque on stopping
Turbine	Thermal monitoring of motor via electrically isolated PTC probe
Refrigeration compressor	Control of starting characteristics Management of automatic restart
Screw compressor	Protection against reversal of phase rotation direction Contact for automatic emptying on stopping
Centrifugal compressor	Protection against reversal of phase rotation direction Contact for automatic emptying on stopping
Conveyor	Monitoring of overloads for incident detection or underloads for break detection
Conveyor belt	Second set of motor parameters depending on the load transported
Lifting screw	Monitoring of overloads for hard spot detection or underloads for break detection
Agitator	Displaying the current indicates the density of the material.
Mixer	Displaying the current indicates the density of the material. Boost on start-up
Refiner	Torque control on starting and stopping

Dedicated applications

The ATS 22 soft start - soft stop unit can be used for applications outside the standard characteristics, but this could involve derating to at least the next lowest level.

Examples of applications outside the standard characteristics:

- Greater number of starts
- Motor thermal protection higher than class 10
- Excess current required at time of start
- Certain ambient temperatures:

For ambient temperatures between +40°C and +60°C, derate the nominal current of the Altistart by 2.2% for each additional degree.

- Certain altitudes:

For altitudes between 1000 and 2000 metres, derate the nominal current of the Altistart by 2% for each additional 100 metres.

- Etc.

References: page 12
Combinations page 16

Altistart 22
soft start - soft stop units
Three-phase power supply voltage 230...440 V

ATS 22D17Q

Connection to the motor's power supply line

Motor power given in kW in accordance with standard IEC/EN 60947-4-2. 220 V control power supply

Motor			230...440 V - 50/60 Hz soft start - soft stop unit					
Power indicated on rating plate			Nominal current (In) *(1)*	Factory setting for current (IcL) *(1) (2)*	Dissipated power at nominal current *(4)*	Dimensions (W x D x H)	Reference	Weight
230 V	400 V	440 V						
kW	kW	kW	A	A	W	mm		kg
4	7.5	7.5	14.8	17	39	130 x 169 x 265	ATS 22D17Q	7.000
7.5	15	15	28.5	32	44	130 x 169 x 265	ATS 22D32Q	7.000
11	22	22	42	47	48	130 x 169 x 265	ATS 22D47Q	7.000
15	30	30	57	62	59	145 x 207 x 295	ATS 22D62Q	12.000
18.5	37	37	69	75	63	145 x 207 x 295	ATS 22D75Q	12.000
22	45	45	81	88	66	145 x 207 x 295	ATS 22D88Q	12.000
30	55	55	100	110	73	150 x 229 x 356	ATS 22C11Q	18.000
37	75	75	131	140	82	150 x 229 x 356	ATS 22C14Q	18.000
45	90	90	162	170	91	150 x 229 x 356	ATS 22C17Q	18.000
55	110	110	195	210	117	206 x 299 x 425	ATS 22C21Q	33.000
75	132	132	233	250	129	206 x 299 x 425	ATS 22C25Q	33.000
90	160	160	285	320	150	206 x 299 x 425	ATS 22C32Q	33.000
110	220	220	388	410	177	206 x 299 x 425	ATS 22C41Q	33.000
132	250	250	437	480	218	304 x 340 x 455	ATS 22C48Q	50.000
160	315	355	560	590	251	304 x 340 x 455	ATS 22C59Q	50.000

ATS 22D62Q

Connection to the motor's delta connection

Motor power given in kW in accordance with the standard IEC/EN 60947-4-2. 220 V control power supply

Motor			230...440 V - 50/60 Hz soft start - soft stop unit					
Power indicated on rating plate			Nominal current (In) *(1)*	Factory setting for current (IcL) *(1) (3)*	Dissipated power at nominal current *(4)*	Dimensions (W x D x H)	Reference	Weight
230 V	400 V	440 V						
kW	kW	kW	A	A	W	mm		kg
5.5	11	15	25	17	39	130 x 169 x 265	ATS 22D17Q	7.000
11	22	22	48	32	44	130 x 169 x 265	ATS 22D32Q	7.000
18.5	45	45	70	47	48	130 x 169 x 265	ATS 22D47Q	7.000
22	55	55	93	62	59	145 x 207 x 295	ATS 22D62Q	12.000
30	55	75	112	75	63	145 x 207 x 295	ATS 22D75Q	12.000
37	75	75	132	88	66	145 x 207 x 295	ATS 22D88Q	12.000
45	90	90	165	110	73	150 x 229 x 356	ATS 22C11Q	18.000
55	110	110	210	140	82	150 x 229 x 356	ATS 22C14Q	18.000
75	132	132	255	170	91	150 x 229 x 356	ATS 22C17Q	18.000
90	160	160	315	210	117	206 x 299 x 425	ATS 22C21Q	33.000
110	220	220	375	250	129	206 x 299 x 425	ATS 22C25Q	33.000
132	250	250	480	320	150	206 x 299 x 425	ATS 22C32Q	33.000
160	315	355	615	410	177	206 x 299 x 425	ATS 22C41Q	33.000
220	355	400	720	480	218	304 x 340 x 455	ATS 22C48Q	50.000
250	400	500	885	590	251	304 x 340 x 455	ATS 22C59Q	50.000

ATS 22C11Q

(1) In refers to the maximum continuous current for class 10. IcL refers to the starter rating.
(2) The factory setting for the current equates to the nominal current of a standard 4-pole, 400 V, class 10 motor (standard application). It should be adjusted in line with the current indicated on the motor rating plate.
(3) The factory setting for the current should be adjusted in line with the current indicated on the motor rating plate.
(4) Includes the power dissipated by the fan

Presentation: page 8
Combinations page 16

Schneider Electric

Altistart 22
soft start - soft stop units
Three-phase power supply voltage 208...600 V

ATS 22C21S6

Connection to the motor's power supply line

Motor power given in kW in accordance with standard IEC/EN 60947-4-2. 220 V control power supply

Motor				230...600 V - 50/60 Hz soft start - soft stop unit					
Power indicated on rating plate				Nominal current (In) (1)	Factory setting for current (IcL) (1) (2)	Dissipated power at nominal current (3)	Dimensions (W x D x H)	Reference	Weight
230 V	400 V	440 V	500 V						
kW	kW	kW	kW	A	A	W	mm		kg
4	7.5	7.5	9	14	17	39	130 x 169 x 265	ATS 22D17S6	7.000
7.5	15	15	18.5	27	32	44	130 x 169 x 265	ATS 22D32S6	7.000
11	22	22	30	40	47	48	130 x 169 x 265	ATS 22D47S6	7.000
15	30	30	37	52	62	59	145 x 207 x 295	ATS 22D62S6	12.000
18.5	37	37	45	65	75	63	145 x 207 x 295	ATS 22D75S6	12.000
22	45	45	55	77	88	66	145 x 207 x 295	ATS 22D88S6	12.000
30	55	55	75	96	110	73	150 x 229 x 356	ATS 22C11S6	18.000
37	75	75	90	124	140	82	150 x 229 x 356	ATS 22C14S6	18.000
45	90	90	110	156	170	91	150 x 229 x 356	ATS 22C17S6	18.000
55	110	110	132	180	210	117	206 x 299 x 425	ATS 22C21S6	33.000
75	132	132	160	240	250	129	206 x 299 x 425	ATS 22C25S6	33.000
90	160	160	220	302	320	150	206 x 299 x 425	ATS 22C32S6	33.000
110	220	220	250	361	410	177	206 x 299 x 425	ATS 22C41S6	33.000
132	250	250	315	414	480	218	304 x 340 x 455	ATS 22C48S6	50.000
160	315	355	400	477	590	251	304 x 340 x 455	ATS 22C59S6	50.000

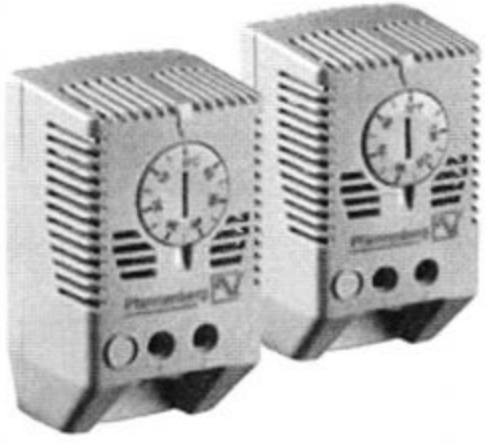
ATS 22C48S6U

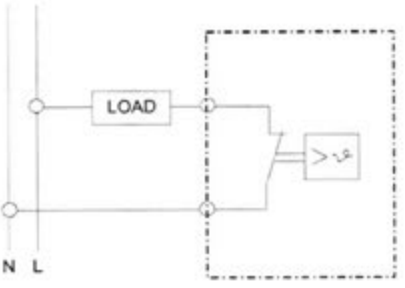
Motor power given in *HP*. 110 V control power supply

Motor				208...600 V - 50/60 Hz soft start - soft stop unit					
Power indicated on rating plate				Nominal current (In) (1)	Factory setting for current (IcL) (1) (2)	Dissipated power at nominal current (3)	Dimensions (W x D x H)	Reference	Weight
208 V	230 V	460 V	575 V						
HP	*HP*	*HP*	*HP*	A	A	W	mm		kg
3	*5*	*10*	*15*	14	17	39	130 x 169 x 265	ATS 22D17S6U	7.000
7.5	*10*	*20*	*25*	27	32	44	130 x 169 x 265	ATS 22D32S6U	7.000
–	*15*	*30*	*40*	40	47	48	130 x 169 x 265	ATS 22D47S6U	7.000
15	*20*	*40*	*50*	52	62	59	145 x 207 x 295	ATS 22D62S6U	12.000
20	*25*	*50*	*60*	65	75	63	145 x 207 x 295	ATS 22D75S6U	12.000
25	*30*	*60*	*75*	77	88	66	145 x 207 x 295	ATS 22D88S6U	12.000
30	*40*	*75*	*100*	96	110	73	150 x 229 x 356	ATS 22C11S6U	18.000
40	*50*	*100*	*125*	124	140	82	150 x 229 x 356	ATS 22C14S6U	18.000
50	*60*	*125*	*150*	156	170	91	150 x 229 x 356	ATS 22C17S6U	18.000
60	*75*	*150*	*200*	180	210	117	206 x 299 x 425	ATS 22C21S6U	33.000
75	*100*	*200*	*250*	240	250	129	206 x 299 x 425	ATS 22C25S6U	33.000
100	*125*	*250*	*300*	302	320	150	206 x 299 x 425	ATS 22C32S6U	33.000
125	*150*	*300*	*350*	361	410	177	206 x 299 x 425	ATS 22C41S6U	33.000
150	–	*350*	*400*	414	480	218	304 x 340 x 455	ATS 22C48S6U	50.000
–	*200*	*400*	*500*	477	590	251	304 x 340 x 455	ATS 22C59S6U	50.000

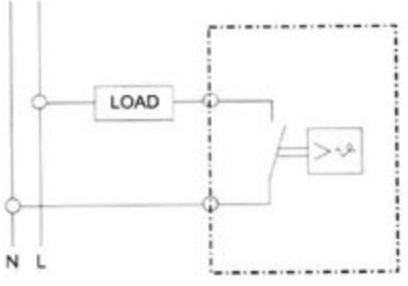
(1) In refers to the maximum continuous current for class 10. IcL refers to the starter rating.
(2) The factory setting for the current should be adjusted in line with the current indicated on the motor rating plate.
(3) Includes the power dissipated by the fan

Presentation: page 8
Combinations: page 16





NC - Normally Closed (Red)
Used in conjunction with heaters. Contact opens when rising temperatures reach the set point temperature shutting heater off.



NO - Normally Open (Blue)
Used in conjunction with fans. Contact closes when rising temperatures reach the set point temperature turning fan on.

Thermostat

- Designed to provide air temperature control and monitoring in cabinets.
- Thermostat NC (Normally Closed) for the control of heaters and heater fans.
- Thermostat NO (Normally Open) for the control of cooling units, or for switching signal transmitters in case of overheating.
- Available in Fahrenheit or Celsius.

Sensor Element:	Thermostatic bi-metal
Switching difference (hysteresis):	±4°F (±3°K)
Adjustment Range:	30-140°F
Connection:	2 pole terminal for AWG 14 (2.5mm²)
Mounting:	Easily installed by clip mounting on 35 mm or 38 mm DIN rails (included)
Housing:	Flame retardant plastic UL94VO
Color:	Gray (SB)
Protection:	IP20
Approval:	UL Recognized Component , cUL Recognized Component, CE, CSA Listed

Part No.	Scale	Contact Type	Dimensions Height x Width x Depth	Switching Capacity	Ship Wt. lbs
SKT011409NC	°F	Normally Closed	2.4 x 1.6 x 1.4	15 A (1) AC 120 V, 10 A (1) AC 250 V	1
SKT011409NC-C	°C	Normally Closed	2.4 x 1.3 x 1.4	15 A (1) AC 120 V, 10 A (1) AC 250 V	1
SKT011419NO	°F	Normally Open	2.4 x 1.6 x 1.4	15 A (1) AC 120 V, 10 A (1) AC 250 V	1
SKT011419NO-C	°C	Normally Open	2.4 x 1.3 x 1.4	15 A (1) AC 120 V, 10 A (1) AC 250 V	1

Technical references and DXF downloads available at www.hammfg.com

All dimensions in inches unless specified otherwise

Canada: 519 822 2960 or 905 456 3770 USA: 716 630 7030

Zelio® Time - Timers
RE

Catalog
April
05

Class 9050

CONTENTS

a brand of Schneider Electric

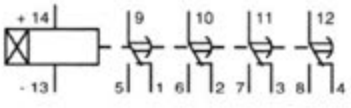
Telemecanique

	Timing Functions	Timing Range	Page Number
RE88865 Industrial Timers			
 0.88" (22.5 mm) wide 8A relay output DIN track mount	On-Delay On Delay with memory Off Delay True Off Delay On & Off Delay One shot Interval Interval with memory Symmetrical Repeat Cycle - start of OFF period Symmetrical Repeat Cycle - start of ON period Asymmetrical Repeat Cycle Pulse output Star-Delta Starting	0.1 seconds to 100 hours	50 - 59
RE88867 Plug-in Timers			
 Plug-In Timers 8A relay output Socket mount	On-Delay On-Delay with memory Off-Delay On & Off Delay One Shot Interval Interval with memory Pulse output Symmetrical Repeat Cycle - start of OFF period Symmetrical Repeat Cycle - start of ON period Asymmetrical Repeat Cycle	0.1 seconds to 100 hours	60 - 67
RE48 Panel Mount Timers			
 Plug-In Timers 5A relay output Panel or Socket mount	On-Delay Off-Delay Interval One Shot Symmetrical Repeat Cycle - start of OFF period Symmetrical Repeat Cycle - start of ON period Asymmetrical Repeat Cycle On-Delay On-Delay	0.1 seconds to 100 hours	68 - 75
REXL Miniature Plug-in Timers			
 Miniature Plug-In Timers 5A relay output Socket mount	On-Delay	0.1 seconds to 100 hours	76 - 77

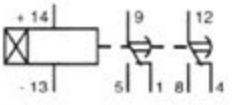
Timing characteristics			
Repeat accuracy (with constant parameters)			± 0.5 %
Full scale setting accuracy	Conforming to IEC/EN 61812-1		10 % at 77 °F (25 °C)
Temperature drift			0.05 %/ °C
Maximum reset time by de-energization	During time delay period	ms	50
	After time delay period	ms	250
Immunity to microbreaks		ms	≤ 5
Voltage drift			± 0.2 % / V
Output characteristics			
Output type	Relay		2 and 4 cadmium-free C/O contacts
Rated current		A	3 (Vac for REXL4TM●●) and 5 (Vac for REXL2TM●●)
Rated insulation voltage		V	250 Vac
Maximum breaking capacity (resistive)		A	4 x 5
Maximum permissible current		A	10 < 0.01 s
Minimum breaking current		mA	100
Electrical life at I max 250 Vac resistive ▲			10^5 operating cycles
Mechanical life ▲			10^7 operations
Dielectric strength	To IEC/EN 61812-1 and 60601-1		2 kV at 1 mA for 1 min at 50 Hz
General characteristics			
Conforming to standards			IEC/EN 61812-1, 60601-1, 60601-2, EN 50081-2, 61000-6-2, LV (73/23/EEC + 93/68/EEC) + EMC (89/336/EEC) directives
Product certifications			UR File: E173076 CNN: NRNT2 File: E173076 CNN: NRNT8 CSA File: 217698 Guide: 3211 07 CE
State indication by LED	Output in operation		Red LED
	Power on		Yellow LED
Permissible voltage variation	12 Vdc		± 10 %
	24 Vdc		± 10 %
	24 Vac		± 15 %
	120 Vac		± 15 %
	230 Vac		± 15 %
Frequency		Hz	50/60 ± 1
Maximum power consumption	12 Vdc	W	1.5
	24 Vdc	W	1.2
	24 Vac	VA	1.7
	120 Vac	VA	2.6
	230 Vac	VA	3
Temperature limits	Operation	°C	- 4 to 140 (- 20 to + 60)
	Storage	°C	- 40 to 158 (- 40 to + 70)
Insulation voltage	To standard VDE 0010 IEC 255 Group C	V	250 Vac/dc
Degree of protection	Conforming to IEC 60529		IP 50
Overvoltage protection		joules	2
Mounting	Base-mounted		On socket
Vibration resistance	Conforming to IEC 60068-2-6, 10 to 55 Hz		a = 0.013" (0.35 mm)
Relative humidity	Conforming to IEC 60068-2-3 without condensation		95 % max
Immunity to electromagnetic interference (EMC) (application class 2 conforming to EN 61812-1/A11)			
Electrostatic discharge	Conforming to IEC/EN 61000-4-2		Level 3 (Air 8 kV contact, 6 kV)
Electromagnetic fields	Conforming to IEC/EN 61000-4-3		Level 3 (10 V/m)
Fast transients	Conforming to IEC/EN 61000-4-4		Level 3 (2 kV)
Shock waves	Conforming to IEC/EN 61000-4-5		Level 3 (2 kV)
Radio frequencies in common mode	Conforming to IEC/EN 61000-4-6		Level 3 (10 V rms from 0.15 MHz to 80 MHz)
Voltage dips and breaks	Conforming to IEC/EN 61000-4-11		30 %/10 ms, 60 %/100 ms and 1 s, > 95 %/5 s
Radiated and conducted emissions	Conforming to EN 55022 (EN 55011 group 1)		Class B
Creepage distance and clearance	Conforming to IEC 60664-1	kV	4, in category 3

Internal Wiring

Timer with 4 C/O contacts



Timer with 2 C/O contacts



▲The expressed life above is based on average usage and normal operating conditions. Actual operating life will vary with conditions. The above statements are not intended to, nor shall they create any expressed or implied warranties as to product operation or life. For information on the listed warranty offered on this product, refer to the Square D terms and conditions of sale found in the Square D Digest.

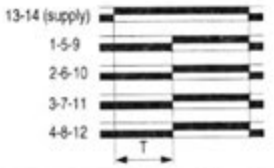
Relay output, 2 and 4 C/O contacts

- Miniature plug-in
- Function A: on-delay
- 7 timing ranges: 0.1 s to 100 h
- Excellent immunity to interference
- Power on and relay energized indication by 2 LEDs

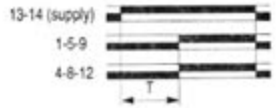
Function diagrams

Function A (On-Delay)

4 timed C/O contacts



2 timed C/O contacts



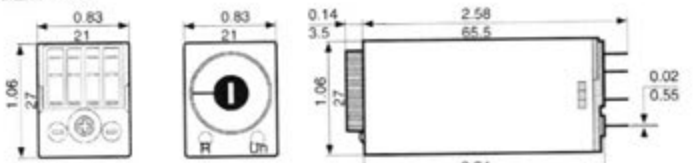
Catalog Number

Functions		Single function A (On-Delay)	
Timing ranges	7 switchable ranges	0.1 s to 1 s - 1 s to 10 s - 0.1 min to 1 min - 1 min to 10 min - 0.1 h to 1 h - 1 h to 10 h - 10 h to 100 h	
Relay output		4 timed C/O contacts	2 timed C/O contacts
Rated current		3 A - Vac	5 A - Vac
Voltages	12 Vdc	**REXL4TMJD**	**REXL2TMJD**
	24 Vdc *(1)*	**REXL4TMBD**	**REXL2TMBD**
	24 Vac 50/60 Hz *(1)*	**REXL4TMB7**	**REXL2TMB7**
	120 Vac 50/60 Hz	**REXL4TMF7**	**REXL2TMF7**
	230 Vac 50/60 Hz	**REXL4TMP7**	**REXL2TMP7**
Weight lb. (kg)		0.11 (0.050)	0.11 (0.050)
Socket		**8501NR45**	**8501NR45**
Weight lb. (kg)		0.09 (0.042)	0.09 (0.042)

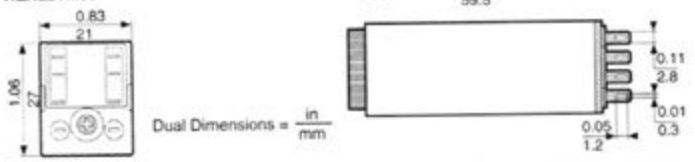
(1) For 48 Vac supply, additional resistor 560 Ω 2 W / 24 V
For c 48 V dc supply, additional resistor 390 Ω 4 W / 24 V.

Approximate Dimensions

REXL4TM••



REXL2TM••

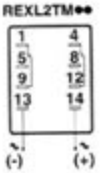


Dual Dimensions = $\frac{\text{in}}{\text{mm}}$

Terminal Location

REXL4TM••

REXL2TM••



Altivar® 61 Drives Electrical Specifications

Input Voltage	200 -15% to 240 +10%, 380 -15% to 480 +10%
Displacement Power Factor	98% through speed range
Input Frequency	50 Hz -5% to 60 Hz +5%
Drive Input Section	Six pulse bridge rectifier
Drive Output Section	Three Phase, IGBT Inverter with Pulse Width Modulated (PWM) output Maximum voltage equal to input voltage
Galvanic Isolation	Galvanic isolation between power and control (inputs, outputs and power supplies)
Frequency Range of Power Converter	0.5 to 500 Hz
Torque/overtorque	110% of nominal motor torque for 60 s, minimum
Current (transient)	110% of controller rated current for 60 s, minimum
Switching Frequency	Selectable from 1 to 16 kHz, 12 kHz nominal rating for 1-60 hp @ 200/240 V , 1-100 hp @ 380/480 V. Selectable: 2.5 to 8 kHz, 2.5 kHz nominal rating for 75-125 hp @ 200/240 V125-900 hp @ 380/480 V .
Speed Reference Inputs	AI: 0 to +10 V, Impedance = 30 kOhms Used for Speed potentiometer , 1-10 kOhms AI2: Factory setting = 4 to 20mA, software configurable for current, (0-20mA, X-Y) or voltage
Analog Reference Resolution	0.1 for 100 Hz (11 bits)
I/O Sampling Time	2 ms +/- 0.5 ms on analog inputs & outputs, & logic inputs, 7 ms +/- 0.5 ms on relay outputs
Power Removal/Run Permissive Input	24Vdc input, for use to prohibit unitended equipment operation
Efficiency	98% at full load typical
Acceleration and Deceleration Ramps	0.1 to 999.9 seconds (definition in 0.1 s increments)
Skip Frequencies	Three configurable skip frequency/jump frequency bands
Motor Control Profiles	Energy economizer (flux optimization) motor algorithm to maximize energy savings. (Automatically optimizes voltage based on load.) or select from 2 point or 5 point volts/hertz profile or SLFV (sensorless flux vector)
Speed Range	1 to 100, open loop
Motor Protection	Class 10 electronic overload protection or PTC probe
Graphic Display Terminal	Simply Start menu, PID set-up menu, network set-up menu, Logic I/O & Analog I/O mapping and status, Monitoring and self diagnostics with fault messages and status such as; Power on time, elapsed time, motor run time, line voltage, motor current, ready to run, running, motor speed
Compliance	RoHS and WEEE (Waste Electrical & Electronic Equipment compliant
Codes and Standards	UL, CSA, NOM 117, DNV, CE, C-Tick, GOST, UL 1995 Plenum rated, SEMI-F47 certified for voltage dip ride-through

Altivar® 61 Drives Environmental Specifications

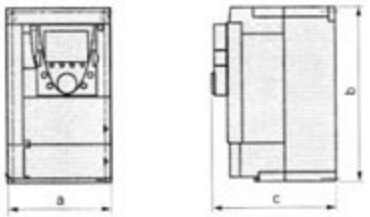
Temperature	Operation:+14 to + 122° F (-10 to +50° C) Storage:-13 to +158° F (-25 to +70° C)
Humidity	95% with no condensation or dripping water, conforming to IEC 600068-2-3.
Altitude	3,300 ft. (1,000 m) without derating; 3,300- 9850 ft (1,000-3,000 m) derate output current by 1% for each additional 330 ft. (100 m). 6560 ft (2000m) maximum for corner grounded distribution system.
Enclosure Rating	*1-60 hp @ 200/240 V, 1-100 hp @ 380/480 V:* IP 41 on top IP21 on all other surfaces, Type 1 with optional conduit kit. *75-125 hp @ 200/240 V, 125-500 hp @ 380/480 V:* IP 41 on top, IP30 sides & front IP00 on bottom, Type 1 w/ optional conduit kit. 600 -900 hp @ 380/480 V. IP 41 on top, IP30 sides and front, IP00 on bottom
Pollution Degree	*1-20 hp @ 200/240 V, 1-25 hp @ 380/480 V:* Pollution degree 2 per IEC/EN 61800-5-1, Option S337 provides protection per IEC 60721-3-3 Class 3C2 *25-60 hp @ 200/240 V, 30-100 hp @ 380/480V:* Pollution degree 3 per IEC/EN 61800-5-1, Option S337 provides protection per IEC 60721-3-3 Class 3C2 *60-125hp @ 200/240 V, 125-900 hp @ 380/480V:* Pollution degree 3 per IEC/EN 61800-5-1 and protection per IEC 60721-3-3 Class 3C2
Vibration Resistance	1-60hp @ 200/240V 1-100 hp @ 380/480 V Conforming to IEC/EN 60068-2-6 1.5mm peak to peak from 3 to 13 Hz, 1gn from 13 to 200 Hz. 75-125 hp @ 200/240V, 125-900 hp @ 380/480V: Conforming to IEC/EN 60068-2-6 1.5mm peak to peak from 3 to 10 Hz, 0.6gn from 10 to 200 Hz.
Shock Resistance	1-60 hp @ 200/240 V, 1-100 hp @ 380/480 V: 15gn for 11ms conforming to IEC/EN 600068-2-27 75-125 hp @ 200/240 V, 125-500 hp @ 380/480 V: 7gn for 11ms conforming to IEC/EN 600068-2-27 600-900 hp @ 380/480 V. 4gn for 11ms conforming to IEC/EN 600068-2-27

Altivar® 61 Drives Dimensions and Weights

With LCD Graphic Display Terminal

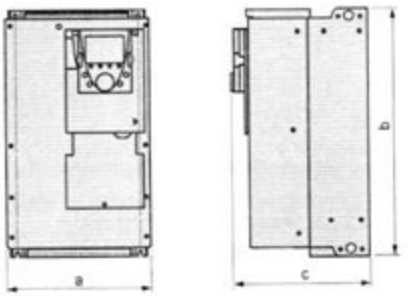
Frame Size	a Width		b Height		c Depth		Weight		b Height with Type 1 Kit	
	mm	In.	mm	In.	mm	In.	kg.	lbs.	mm	In.
1	130	5.12	230	9.06	175	6.89	3	6.61	357	14.05
2	155	6.10	260	10.24	187	7.36	4	8.82	387	15.23
3	175	6.89	295	11.61	187	7.36	5.5	12.13	422	16.61
4	210	8.27	295	11.61	213	8.39	7	15.43	396	15.61
5	230	9.06	400	15.75	213	8.39	9	19.84	502	19.75

For a drive without a graphic display terminal, the depth is reduced by 26mm (1.02 in)
For a drive with one option card installed, the depth is increases 23mm (0.91 in)
For a drive with two option cards installed, the depth is increases 46mm (1.81 in)



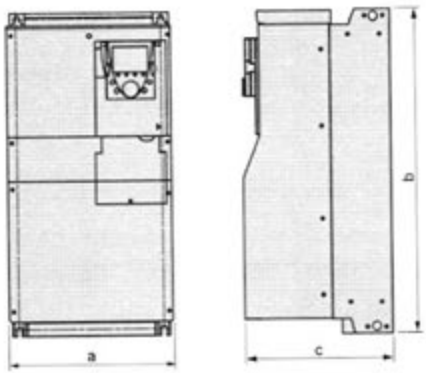
Frame Size	a Width		b Height		c Depth		Weight		b Height with Type 1 Kit	
	mm	In.	mm	In.	mm	In.	kg.	lbs.	mm	In.
6	240	9.45	420	16.54	236	9.29	30	66.14	547	21.54
7	240	9.45	550	21.65	266	10.47	37	81.57	677	26.65
8	320	12.60	550	21.65	266	10.47	37	81.87	753	29.65
9	320	12.60	630	24.80	290	11.42	45	99.21	833	32.80

For a drive without a graphic display terminal, the depth is reduced by 26mm (1.02 in)
For a drive with one option card installed, the depth is increases 23mm (0.91 in)
For a drive with two option cards installed, the depth is increases 46mm (1.81 in)



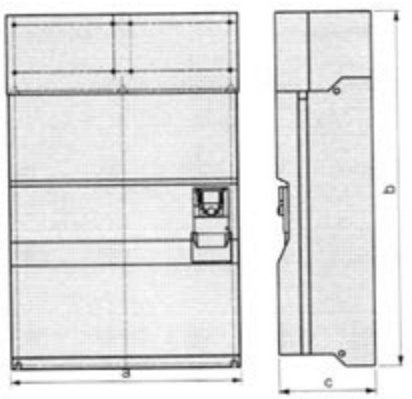
Frame Size	a Width		b Height		c Depth		Weight		b Height with Type 1 Kit	
	mm	In.	mm	In.	mm	In.	kg.	lbs.	mm	In.
10	320	12.60	920	36.22	377	14.84	74	163	985	38.77
11	360	14.17	1022	40.24	377	14.84	80	176	1188	46.79
12	340	13.39	1190	46.85	377	14.84	110	242	1471	57.90
13	440	17.32	1190	46.85	377	14.84	140	309	1407	55.40
14	595	23.43	1190	46.85	377	14.84	215	474	1458	57.40

For a drive with one option card installed, the depth remains the same
For a drive with two option cards installed, the depth is increases 15mm (0.59 in)



Frame Size	a Width		b Height		c Depth		Weight	
	mm	In.	mm	In.	mm	In.	kg.	lbs.
15	890	35.04	1390	54.72	377	14.84	225	496
16	1120	44.09	1390	54.72	377	14.84	300	661

For a drive with one option card installed, the depth remains the same
For a drive with two option cards installed, the depth is increases 15mm (0.59 in)



Altivar® 61 Drives Selection guide

Supply voltage: 3-phase 200...240V

Motor kW	HP	Amps	Drive References (LCD keypad included)	Frame size
0.75	1	4.8	ATV61H075M3[1]	1
1.5	2	8	ATV61HU15M3[1]	1
2.2	3	11	ATV61HU22M3[1]	2
3	–	13.7	ATV61HU30M3[1]	2
4	5	17.6	ATV61HU40M3[2]	2
5.5	7.5	27.5	ATV61HU55M3[2]	3
7.5	10	33	ATV61HU75M3[2]	4
11	15	54	ATV61HD11M3X[3]	5
15	20	66	ATV61HD15M3X[3]	5
18.5	25	75	ATV61HD18M3X[3]	6
22	30	88	ATV61HD22M3X[3]	6
30	40	120	ATV61HD30M3X[3]	8
37	50	144	ATV61HD37M3X[3]	8
45	60	176	ATV61HD45M3X[3]	8
55	75	221	ATV61HD55M3X[3][4]	10
75	100	285	ATV61HD75M3X[3][4]	10
90	125	359	ATV61HD90M3X[3][4]	11

For 20 HP and smaller, add the letter "Z" to the end of the reference for an Altivar 61 to receive the drive with an LED keypad in place of the LCD keypad.

(1) For single-phase 0.75 to 7.5 kW range, select the next rating up (example: 2.2 kW - reference = ATV61HU30M3).

(2) For single-phase operation, select the next rating up and add a line choke.

(3) Without EMC filter.

(4) With integrated DC bus inductance.

Supply voltage: 3-phase 380...480V

Motor kW	HP	Amps	Drive References (LCD keypad included)	Frame size
0.75	1	2.3	ATV61H075N4[4]	1
1.5	2	4.1	ATV61HU15N4[4]	1
2.2	3	5.8	ATV61HU22N4[4]	1
3	–	7.8	ATV61HU30N4[4]	2
4	5	10.5	ATV61HU40N4[4]	2
5.5	7.5	14.3	ATV61HU55N4[4]	3
7.5	10	17.6	ATV61HU75N4[4]	3
11	15	27.7	ATV61HD11N4[4]	4
15	20	33	ATV61HD15N4[4]	5
18.5	25	41	ATV61HD18N4	5
22	30	48	ATV61HD22N4	6
30	40	66	ATV61HD30N4	7
37	50	79	ATV61HD37N4	7
45	60	94	ATV61HD45N4	9
55	75	116	ATV61HD55N4	9
75	100	160	ATV61HD75N4	9
90	125	179	ATV61HD90N4[5]	10
110	150	215	ATV61HC11N4[5]	10
132	200	259	ATV61HC13N4[5]	11
160	250	314	ATV61HC16N4[5]	12
220	350	427	ATV61HC22N4[5]	13
250	400	481	ATV61HC25N4[5]	14
315	500	616	ATV61HC31N4[5]	14
400	600	759	ATV61HC40N4[5]	15
500	700	941	ATV61HC50N4[5]	15
630	900	1188	ATV61HC63N4[5]	16

(4) For 100 HP and smaller, add the letter "Z" to the end of the reference for an Altivar 61 to receive the drive with an LED keypad in place of the LCD keypad.

(5) With integrated DC bus inductance.

Inputs/outputs on board

Analog input #1: +/- 10Vdc bipolar input, 1 bits + 1 sign resolution, 2ms +/- .5ms sample time

Analog input #2: software selectable for 1-10Vdc or x-y mA x-y selectable from 0-20mA, 11 bits resolution, 2ms +/- .5ms sample time

Analog output #1: software selectable for 1-10Vdc or x-y mA x-y selectable from 0-20mA, 10 bits resolution, 2ms +/- .5ms sample time

Relay output #1: one NO (normally open) one NC (normally closed)

Relay output #2: one NO (normally open)

6 logic inputs: 24Vdc, 2ms +/- .5ms sample time. Multiple function assignment possible. Positive logic (source) or Negative logic (sink) choice LI6 offers PTC probe assignment

Power Removal input: 1 input for interlocking function (run permissive)

RJ45 port: Modbus or CANopen (selectable)

PowerSuite software workshop

PowerSuite CD-ROM for PC _____ VW3 A 8104

Connection kit for PC _____ VW3 A 8106

Adaptor for wireless link Modbus-Bluetooth® _____ VW3 A 8114

Input/output cards

Logic inputs/outputs

1 voltage output, 24V
1 voltage output, -10V
1 logic output, relay
4 programmable logic inputs
2 assignable logic outputs with open collector
1 input for 6 PTC probes max. _____ VW3 A 3201

Extended inputs/outputs

Same as logic inputs/outputs card +
2 analog inputs
2 analog outputs
1 pulse input _____ VW3 A 3202

Communication cards

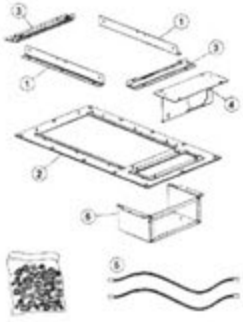
Modbus Plus _____ VW3 A 3302
Uni-Telway _____ VW3 A 3303
InterBus _____ VW3 A 3304
Profibus DP _____ VW3 A 3307
DeviceNet _____ VW3 A 3309
Ethernet _____ VW3 A 3310
Fipio _____ VW3 A 3311
LonWorks _____ VW3 A 3312
METASYS N2 _____ VW3 A 3313
APOGEE FLN _____ VW3 A 3314
BACnet _____ VW3 A 3315

Controller Inside programmable card

_____ VW3 A 3501

Pump application card _____ VW3 A 3503

Altivar® 61 Drives Accessories Selection guide



Heatsink Mounting Kit VW3A9506

Control Fan Kit

Installation of kit enables the drive to operate in higher ambient temperature. Fan mounts on top of drive and is powered from the drive.

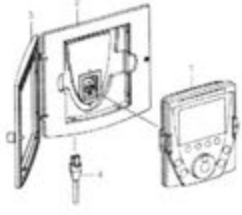
For Drives	Catalog Number
ATV 61H037M3...HU55M3 ATV 61H075N4...HU75N4	VW3 A9 401
ATV 61HU75M3...HD15M3 ATV 61HD11N4...HD18N4	VW3 A9 402
ATV 61HD18M3X...HD22M3X ATV 61HD22N4	VW3 A9 404
ATV 61HD30N4...HD37N4	VW3 A9 405
ATV 61HD30M3X...HD45M3X	VW3 A9 406
ATV 61HD45N4...HD75N4	VW3 A9 407

ATV61HU40N4 with VW3A9202 Conduit Kit

Type 1 Conduit Kit

Kit includes: a metal box, with conduit knockouts. Kit provides conduit landing when wall mounting the drive.

For Drives	Catalog Number
ATV 61H037M3...HU15M3 ATV 61H075N4...HU22N4	VW3 A9 201
ATV 61HU22M3...HU40M3 ATV 61HU30N4, HU40N4	VW3 A9 202
ATV 61HU55M3 ATV 61HU55N4, HU75N4	VW3 A9 203
ATV 61HU75M3 ATV 61HD11N4	VW3 A9 204
ATV 61HD11M3X, HD15M3X ATV 61HD15N4, HD18N4	VW3 A9 205
ATV 61HD18M3X, HD22M3X ATV 61HD22N4	VW3 A9 206
ATV 61HD30N4, HD37N4	VW3 A9 207
ATV 61HD30M3X...HD45M3X	VW3 A9 217
ATV 61HD45N4...HD75N4	VW3 A9 208
ATV 61HD55M3X, HD75M3X ATV 61HD90N4, HC11N4	VW3 A9 209
ATV 61HD90M3X ATV 61HC13N4	VW3 A9 210
ATV 61HC16N4	VW3 A9 211
ATV 61HC22N4	VW3 A9 212
ATV 61HC25N4...HC31N4 Without braking unit With braking unit VW347101	VW3 A9 213 VW3 A9 214



LCD Keypad Mounting Kit

Kit for Mounting Heatsink thru Back of Enclosure

Kit used to mount the heatsink of the drive outside of an enclosure. Kit includes: a metal frame, seals, mounting hardware, bracket to mount fan kit so fan can be accessed from the front of the drive.

For Drives	Catalog Number
ATV 61H037M3...HU15M3 ATV 61H075N4...HU22N4	VW3 A9 501
ATV 61HU22M3...HU40M3 ATV 61HU30N4, HU40N4	VW3 A9 502
ATV 61HU55M3 ATV 61HU55N4, HU75N4	VW3 A9 503
ATV 61HU75M3 ATV 61HD11N4	VW3 A9 504
ATV 61HD11M3X, HD15M3X ATV 61HD15N4, HD18N4	VW3 A9 505
ATV 61HD18M3X, HD22M3X ATV 61HD22N4	VW3 A9 506
ATV 61HD30N4, HD37N4	VW3 A9 507
ATV 61HD30M3X...HD45M3X	VW3 A9 508
ATV 61HD45N4...HD75N4	VW3 A9 509
ATV 61HD55M3X, HD75M3X ATV 61HD90N4, HC11N4	VW3 A9 510
ATV 61HD75M3X ATV 61HC11N4	VW3 A9 511
ATV 61HC16N4	VW3 A9 512
ATV 61HC16N4	VW3 A9 513
ATV 61HC25N4...HC31N4 Without braking unit With braking unit VW3A7101	VW3 A9 514 VW3 A9 515

LCD Keypad Mounting Kit

Use the remote mounting kit to mount the LCD keypad in an enclosure door.

Add the clear plastic door to improve to an IP65 rating and view the LCD screen.

Refer to diagram for item number		Catalog Number
1	LCD graphic keypad: IP54 rating	VW3A 1101
2	Remote mounting kit: includes bezel and mounting hardware	VW3A 1102
3	Door for use with remote mount kit for IP65 rating	VW3A 1103
4	Cable for remote mounting LCD graphic keypad RJ45 connector on each end	
	1 meter	VW3A1104 R10
	3 meters	VW3A1104 R30
	5 meters	VW3A1104 R50
	10 meters	VW3A1104 R100
	RJ 45 female female adaptor to connect LCD keypad and cable. Not required if using VW3A1102	VW3A1105

ZB4BD912

Potentiometer Operator (with Mounting Collar)

Shape of Head	Description	Application	Catalog Number	Price
	For potentiometer with shaft length 1.73 to 1.97 in (44 to 50 mm) (potentiometer not included)	For shaft Ø 0.25 in (6.35 mm)	ZB4BD922	$ 89.00

Joystick Controllers (54 mm, Extended Operating Shaft) ▲

Description	Contact Operation	Action	Catalog Number	Price
2 direction	1 step 1 N.O. contact per direction	Maintained	XD4PA12	$121.00
		Momentary	XD4PA22	
4 direction	1 step 1 N.O. contact per direction	Maintained	XD4PA14	153.00
		Momentary	XD4PA24	

▲ It is not permissible to use standard contact blocks ZBE10• (single) or ZBE20• (double).

XD4PA12

Legends for Joystick Controllers

Description	For use with		Catalog Number	Price
Legends 30 x 48 mm for engraving	2 direction	Black one side Red reverse	ZBG2201	$ 1.60
		White one side Yellow reverse	ZBG2401	
Legends 48 x 48 mm for engraving	4 direction	Black one side Red reverse	ZBG4201	
		White one side Yellow reverse	ZBG4401	

Two Position Toggle Switch

Shape of Head	Color	Type of Positions	Catalog Number	Price
	Black	Maintained	ZB4BD28	$ 22.50
	Black	Momentary	ZB4BD48	

ZB4BD28

Reset Operators, Flush, Adjustable Shaft

Shape of Head	Travel	Actuation Distance	Color	Catalog Number	Price
	0.39 in (10 mm)	0.24–0.63 in (6–16 mm)	Black	XB4BA821	$ 13.20
			Red	XB4BA841	
			Blue	XB4BA861	
		0.63–1.02 in (16–26 mm)	Black	XB4BA822	13.20
			Red	XB4BA842	
			Blue	XB4BA862	
	0.55 in (14 mm)	1.18–5.12 in (30–130 mm)	Black	XB4BA921	15.80
			Red	XB4BA941	
			Blue	XB4BA961	
		5.12–10.12 in (130–257 mm)	Black	XB4BA922	19.80
			Red	XB4BA942	
			Blue	XB4BA962	

XB4BA8•1

For additional information, reference Catalog #9001CT0001.

PHOENIX CONTACT

Extract from the online catalog

TRIO-UPS/1AC/24DC/ 5

Order No.: 2866611

http://eshop.phoenixcontact.de/phoenix/treeViewClick.do?UID=2866611

Uninterruptible power supply with integrated power supply unit, 5A, in combination with MINI-BAT/24/DC/1.3 AH, QUINT-BAT/24DC 3,4AH, 7,2AH or 12 AH

Product notes

WEEE/RoHS-compliant since: 09/03/2007

http://www.download.phoenixcontact.com
Please note that the data given here has been taken from the online catalog. For comprehensive information and data, please refer to the user documentation. The General Terms and Conditions of Use apply to Internet downloads.

Commercial data

GTIN (EAN)	4 046356 311809
sales group	H061
Pack	1 pcs.
Customs tariff	85044082
Catalog page information	Page 621 (IF-2011)

Technical data

Input data

Nominal input voltage	100 V AC ... 240 V AC
AC input voltage range	85 V AC ... 264 V AC (Derating < 90 V AC: 2.5%V)
DC input voltage range	100 V DC ... 350 V DC (UL508: 100 ... 250 V)
AC frequency range	45 Hz ... 65 Hz

DC frequency range	0 Hz
Current consumption	Approx. 0.95 A
	1.1 A (230 V AC)
	Approx. 1.7 A
	1.8 A (120 V AC)
Inrush surge current	< 44 A (< 1.3 A^2s)
Power failure bypass	(refer to the diagram)
Buffer period	20 min (5 A)
Input fuse	6.3 A (slow-blow, internal)
Permissible backup fuse	B6
	B10
	B16
Power factor (cos phi)	Approx. 0.5
Type of protection	Transient surge protection
Protective circuit/component	Varistor

Output data

Nominal output voltage	24 V DC
Setting range of the output voltage	22.5 V DC ... 29.5 V DC (Network operation; in the buffer mode, dependent on the battery voltage of 27.9 V DC ... 19.2 V DC)
Output current	5 A (-25 °C to +55 °C)
Derating	55 °C ... 70 °C (2.5%/K)
Connection in parallel	Yes, 2
Connection in series	No
Control deviation	< 1 % (change in load, static 10% ... 90%)
Residual ripple	< 10 mV_{PP}
Peak switching voltages nominal load	< 25 mV_{PP}

General data

Width	60 mm
Height	130 mm
Depth	118 mm
Net weight	1.1 kg
Memory medium	External, battery 1.3 Ah / 3.4 Ah / 7.2 Ah / 12 Ah
Efficiency	> 88 % (230 V AC, network operation)
	> 86 % (120 V AC, network operation)
	> 86 % (Battery operation)

Insulation voltage input/output	2 kV (routine test)
	4 kV (type test)
Degree of protection	IP20
Protection class	I
MTBF (IEC 61709, SN 29500)	> 500000 h
Ambient temperature (operation)	-25 °C ... 70 °C (> 55° C derating)
Ambient temperature (storage/transport)	-40 °C ... 80 °C
Max. permissible relative humidity (operation)	95 % (at 25 °C, no condensation)
Mounting position	horizontal DIN rail NS 35, EN 60715
Assembly instructions	Can be aligned: Horizontal 0 cm, vertical 5 cm
Electromagnetic compatibility	Conformance with EMC Directive 2004/108/EC
Noise emission	EN 50081-2
Noise immunity	EN 61000-6-2:2005
Low Voltage Directive	Conformance with LV directive 2006/95/EC
Standard – Electrical equipment of machines	EN 60204
Standard - Safety of transformers	EN 61558-2-17
Standard - Electrical safety	EN 60950-1/VDE 0805 (SELV)
Shipbuilding approval	Germanischer Lloyd (EMC 1)
Standard – Electronic equipment for use in electrical power installations and their assembly into electrical power installations	EN 50178/VDE 0160 (PELV)
Standard – Safety extra-low voltage	EN 60950-1 (SELV)
	EN 60204 (PELV)
Standard - Safe isolation	DIN VDE 0100-410
	DIN VDE 0106-1010
Standard – Protection against electric shock	DIN 57100-410
Standard – Protection against shock currents, basic requirements for protective separation in electrical equipment	DIN VDE 0106-101
Standard – Limitation of mains harmonic currents	EN 61000-3-2
UL approvals	UL/C-UL listed UL 508
	UL/C-UL Recognized UL 60950

Connection data, input

Connection method	Screw connection
Conductor cross section solid min.	0.2 mm²
Conductor cross section solid max.	2.5 mm²

Conductor cross section stranded min.	0.2 mm²
Conductor cross section stranded max.	2.5 mm²
Conductor cross section AWG/kcmil min.	24
Conductor cross section AWG/kcmil max	12
Screw thread	M3

Connection data, output

Connection method	Screw connection
Conductor cross section solid min.	0.2 mm²
Conductor cross section solid max.	2.5 mm²
Conductor cross section stranded min.	0.2 mm²
Conductor cross section stranded max.	2.5 mm²
Conductor cross section AWG/kcmil min.	24
Conductor cross section AWG/kcmil max	12
Stripping length	8 mm

Signaling

Output name	Alarm
Output description	Relay output
Output voltage	+ 24 V
Status display	Green LED
Note on status display	Mains voltage OK: Green LED, static at
Conductor cross section solid min.	0.2 mm²
Conductor cross section solid max.	2.5 mm²
Conductor cross section stranded min.	0.2 mm²
Conductor cross section stranded max.	2.5 mm²
Conductor cross section AWG/kcmil min.	24
Conductor cross section AWG/kcmil max	12
Tightening torque, min	0.5 Nm
Tightening torque max	0.6 Nm
Screw thread	M3
Output name	Alarm
Output description	Relay output
Maximum switching voltage	≤ 24 V
Output voltage	24 V
Continuous load current	≤ 200 mA

Status display	Alarm
Note on status display	Red LED, static at
Output name	Battery charge
Output description	Relay output
Maximum switching voltage	≤ 24 V
Output voltage	24 V
Continuous load current	≤ 200 mA
Status display	Battery (battery charge) is being charged
Note on status display	Yellow LED, flashing
Output name	Battery mode
Output description	Relay output
Type of signaling	LED, active relay output
Maximum switching voltage	≤ 24 V
Output voltage	24 V
Continuous load current	≤ 200 mA
Status display	Battery operation (Battery Mode)
Note on status display	LED yellow, static at

Charging process

Charge characteristic curve	I/U characteristic curve
Battery presence check/time interval	60 s
Charge current	0.2 A ... 1.5 A (Default 1.0 A)
End-of-charge voltage	25 V DC ... 30 V DC (Default 27.6 V DC)
Temperature compensation	0 mV/K ... 200 mV/K (42 mV/K by default)
Quality check of battery	4 h ... 200 h (Default 12 h)
Deep discharge protection	18 V DC ... 21 V DC (Default 19.2 V DC)
Alarm signaling threshold	18 V DC ... 30 V DC (Default 20.4 V DC)

Certificates / Approvals

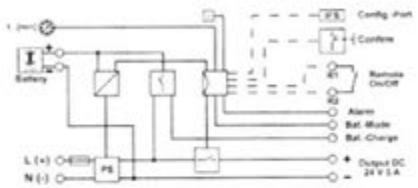
Certification	CUL, CUL Listed, GL, UL, UL Listed

Accessories

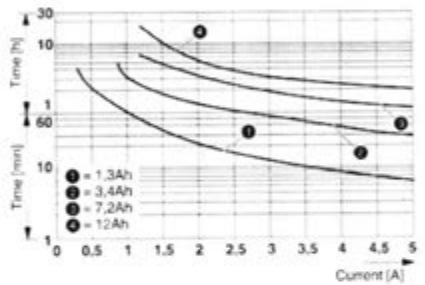
Item	Designation	Description
Cable/conductor		
2811271	IFS-USB-PROG-ADAPTER	Programming adapter with USB interface, for programming with the IFS-CONF, MACX-MCR-CONF and UPS-CONF software
Fuse		
0913676	SI FORM C 15 A DIN 72581	Flat-type plug-in fuse, type C, color code: light blue, nominal current: 15 A
0913757	SI FORM C 25 A DIN 72581	Flat-type plug-in fuse, type C, color code: white, nominal current: 25 A
General		
2986122	IFS-CONFSTICK	Multi-functional memory block for the INTERFACE systemf for easy storage and backup of the configuration.
2866417	MINI-BAT/24DC/1.3AH	Rechargeable battery module, lead AGM, VRLA technology, 24 V DC, 1.3 Ah.
2866349	QUINT-BAT/24DC/ 3.4AH	Rechargeable battery module, lead AGM, VRLA technology, 24 V DC, 3.4 Ah. Connection via male cable lug, 14 mm.
2866352	QUINT-BAT/24DC/ 7.2AH	Rechargeable battery module, lead AGM, VRLA technology, 24 V DC, 7.2 Ah. Connection via male cable lug, 14 mm.
2866365	QUINT-BAT/24DC/12AH	Rechargeable battery module, lead AGM, VRLA technology, 24 V DC, 12 Ah. Connection via male cable lug, 14 mm.
2938206	QUINT-PS-ADAPTERS7/2	Assembly adapter for QUINT POWER 10A on S7-300 rail
2320296	UPS-BAT/VRLA/24DC/ 1.3AH	Rechargeable battery module, lead AGM, VRLA technology, 24 V DC, 1.3 Ah, tool-free battery replacement, automatic detection and communication with QUINT UPS-IQ
2320306	UPS-BAT/VRLA/24DC/ 3.4AH	Rechargeable battery module, lead AGM, VRLA technology, 24 V DC, 3.4 Ah, tool-free battery replacement, automatic detection and communication with QUINT UPS-IQ
2320319	UPS-BAT/VRLA/24DC/ 7.2AH	Rechargeable battery module, lead AGM, VRLA technology, 24 V DC, 7.2 Ah, tool-free battery replacement, automatic detection and communication with QUINT UPS-IQ
2320322	UPS-BAT/VRLA/24DC/12AH	Rechargeable battery module, lead AGM, VRLA technology, 24 V DC, 12 Ah, tool-free battery replacement, automatic detection and communication with QUINT UPS-IQ
2853983	UTA 107	Universal DIN rail adapter, for screwing on switchgear
2938235	UWA 182/52	Universal wall adapter

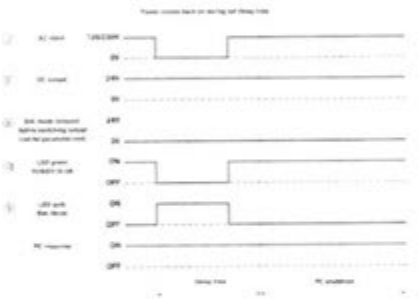
Diagrams/Drawings

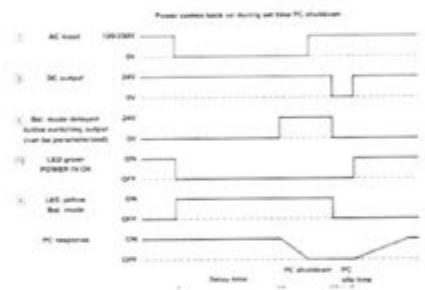
Block diagram



Diagram







Address

PHOENIX CONTACT Inc., USA
586 Fulling Mill Road
Middletown, PA 17057,USA
Phone (800) 888-7388
Fax (717) 944-1625
http://www.phoenixcon.com

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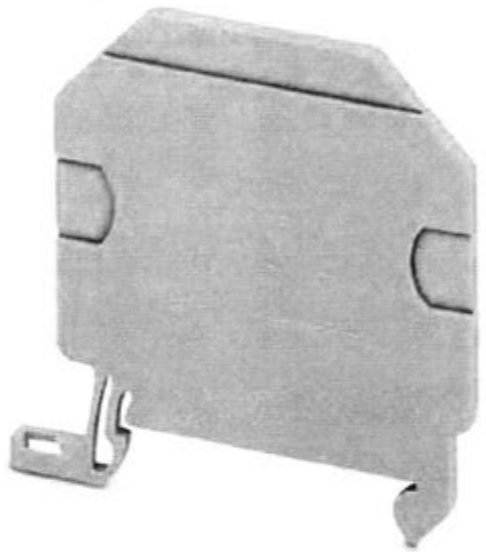

Partition plate, for visual and electrical separation of terminal groups, width: 2 mm, color: gray

Order No.	3047167
Ord designation	ATP-UT
EAN	4017918962159
Pack	50 Pcs.
Customs tariff	85472000
Weight/Piece	0.004895 KG
Catalog page information	Page 26 (CL-2007)

Product notes

WEEE/RoHS-compliant since: 01/01/2003

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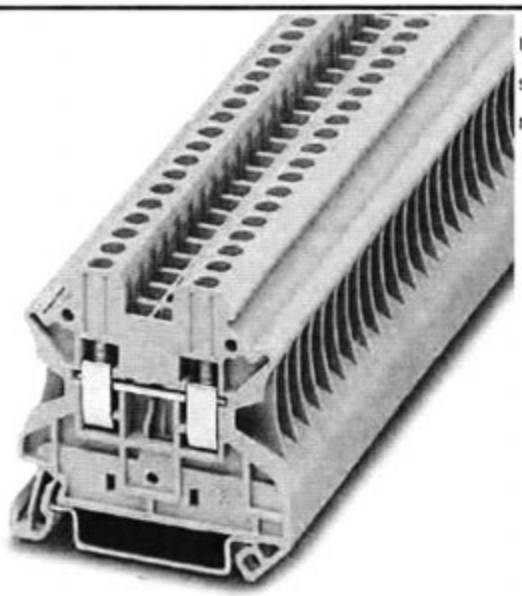

Universal terminal block with screw connection, cross section: 0.14 - 2.5 mm², AWG: 26 - 12, width: 5.2 mm, color: gray

Order No.	3044076
Ord designation	UT 2,5
EAN	4017918960377
Pack	50 Pcs.
Customs tariff	85369010
Weight/Piece	0,008397 KG
Catalog page information	Page 12 (NTK-2005)

Product notes

WEEE/RoHS-compliant since: 01/01/2003

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▸Technical data

General	
Number of levels	1
Number of connections	2
Color	gray
Insulating material	PA
Inflammability class acc. to UL 94	V0
Dimensions	
Width	5.2 mm
Length	46.9 mm
Height NS 35/7,5	47.5 mm
Height NS 35/15	55 mm
Technical data	
Maximum load current	32 A (with 4 mm^2 conductor cross section)
Rated surge voltage	8 kV
Contamination class	3
Surge voltage category	III
Insulating material group	I
Connection in acc. with standard	IEC / EN
Nominal current I_N	24 A
Nominal voltage U_N	1000 V
Open side panel	ja
Connection data	
Conductor cross section solid min.	0.14 mm^2
Conductor cross section solid max.	4 mm^2
Conductor cross section stranded min.	0.14 mm^2
Conductor cross section stranded max.	2.5 mm^2
Conductor cross section AWG/kcmil min.	26
Conductor cross section AWG/kcmil max	12
Conductor cross section stranded, with ferrule without plastic sleeve min.	0.25 mm^2
Conductor cross section stranded, with ferrule without plastic sleeve max.	2.5 mm^2
Conductor cross section stranded, with ferrule with plastic sleeve min.	0.25 mm^2
Conductor cross section stranded, with ferrule with plastic sleeve max.	2.5 mm^2
2 conductors with same cross section, solid min.	0.14 mm^2
2 conductors with same cross section, solid max.	1.5 mm^2
2 conductors with same cross section, stranded min.	0.14 mm^2
2 conductors with same cross section, stranded max.	1.5 mm^2
2 conductors with same cross section, stranded, TWIN ferrules with plastic sleeve, min.	0.5 mm^2
2 conductors with same cross section, stranded, TWIN ferrules with plastic sleeve, max.	1.5 mm^2

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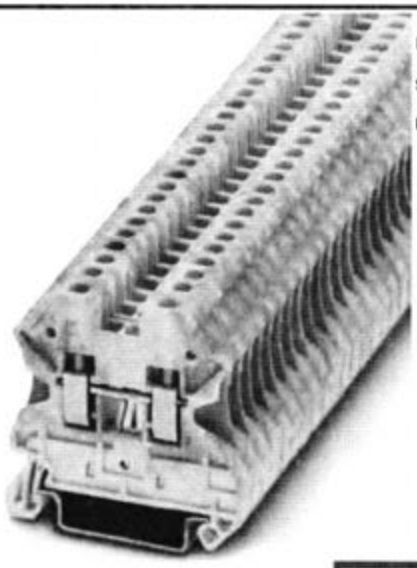
▸Extract from the online catalog



Universal terminal block with screw connection, cross section: 0.14 - 2.5 mm², AWG: 26 - 12, width: 5.2 mm, color: green-yellow

Order No.	3044092
Ord designation	UT 2,5-PE
EAN	4017918960360
Pack	50 Pcs.
Customs tariff	85369010
Weight/Piece	0.012156 KG
Catalog page information	Page 32 (CL-2007)

▸Product notes

WEEE/RoHS-compliant since: 01/01/2003

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General

Number of levels	1
Number of connections	2
Color	green-yellow
Insulating material	PA
Inflammability class acc. to UL 94	V0

Dimensions

Width	5.2 mm
Length	47.7 mm
Height NS 35/7,5	47.5 mm
Height NS 35/15	55 mm

Technical data

Rated surge voltage	8 kV
Contamination class	3
Surge voltage category	III
Insulating material group	I
Connection in acc. with standard	IEC 60947-7-2
Open side panel	ja

Connection data

Conductor cross section solid min.	0.14 mm^2
Conductor cross section solid max.	4 mm^2
Conductor cross section stranded min.	0.14 mm^2
Conductor cross section stranded max.	4 mm^2
Conductor cross section AWG/kcmil min.	26
Conductor cross section AWG/kcmil max	12
Conductor cross section stranded, with ferrule without plastic sleeve min.	0.25 mm^2
Conductor cross section stranded, with ferrule without plastic sleeve max.	2.5 mm^2
Conductor cross section stranded, with ferrule with plastic sleeve min.	0.25 mm^2
Conductor cross section stranded, with ferrule with plastic sleeve max.	2.5 mm^2
2 conductors with same cross section, solid min.	0.14 mm^2
2 conductors with same cross section, solid max.	1.5 mm^2
2 conductors with same cross section, stranded min.	0.14 mm^2
2 conductors with same cross section, stranded max.	1.5 mm^2
2 conductors with same cross section, stranded, TWIN ferrules with plastic sleeve, min.	0.5 mm^2
2 conductors with same cross section, stranded, TWIN ferrules with plastic sleeve, max.	1.5 mm^2
2 conductors with same cross section, stranded, ferrules without plastic sleeve, min.	0.25 mm^2
2 conductors with same cross section, stranded, ferrules without plastic sleeve, max.	1.5 mm^2
Type of connection	Screw connection
Stripping length	9 mm
Internal cylindrical gage	A3

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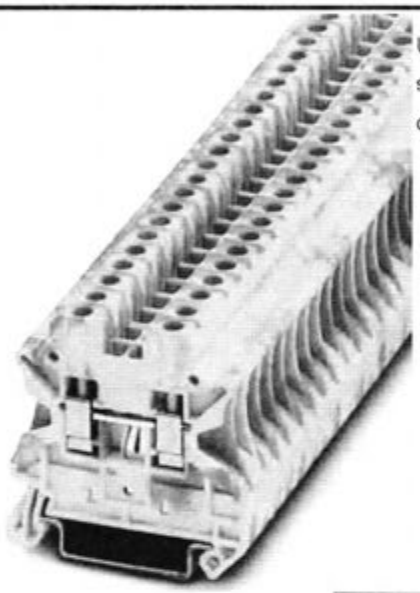
Extract from the online catalog



Universal terminal block with screw connection, cross section: 0.14 - 4 mm², AWG: 26 - 10, width: 6.2 mm, color: Green-yellow

Order No.	3044128
Ord designation	UT 4-PE
EAN	4017918960407
Pack	50 Pcs.
Customs tariff	85369010
Weight/Piece	0,01325 KG
Catalog page information	Page 13 (NTK-2005)

Product notes

WEEE/RoHS-compliant since: 01/01/2003

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General

Number of levels	1
Number of connections	2
Color	green-yellow
Insulating material	PA
Inflammability class acc. to UL 94	V0

Dimensions

Width	6.2 mm
Length	46.9 mm
Height NS 35/7,5	47.5 mm
Height NS 35/15	55 mm

Technical data

Rated surge voltage	8 kV
Contamination class	3
Surge voltage category	III
Insulating material group	I
Connection in acc. with standard	IEC / EN
Open side panel	ja

Connection data

Conductor cross section solid min.	0.14 mm^2
Conductor cross section solid max.	6 mm^2
Conductor cross section stranded min.	0.14 mm^2
Conductor cross section stranded max.	4 mm^2
Conductor cross section AWG/kcmil min.	26
Conductor cross section AWG/kcmil max	10
Conductor cross section stranded, with ferrule without plastic sleeve min.	0.25 mm^2
Conductor cross section stranded, with ferrule without plastic sleeve max.	4 mm^2
Conductor cross section stranded, with ferrule with plastic sleeve min.	0.25 mm^2
Conductor cross section stranded, with ferrule with plastic sleeve max.	4 mm^2
2 conductors with same cross section, solid min.	0.14 mm^2
2 conductors with same cross section, solid max.	1.5 mm^2
2 conductors with same cross section, stranded min.	0.14 mm^2
2 conductors with same cross section, stranded max.	1.5 mm^2
2 conductors with same cross section, stranded, TWIN ferrules with plastic sleeve, min.	0.5 mm^2
2 conductors with same cross section, stranded, TWIN ferrules with plastic sleeve, max.	2.5 mm^2
2 conductors with same cross section, stranded, ferrules without plastic sleeve, min.	0.25 mm^2
2 conductors with same cross section, stranded, ferrules without plastic sleeve, max.	1.5 mm^2
Type of connection	Screw connection
Stripping length	9 mm
Internal cylindrical gage	A4