Submittal Transmittal

Project: Pike Addition Lift Station near Maple & 151st St.

City of Wichita Project Number: 468-2019-005340

Contractor Project Number: 20059

Submittal Number: 3-05

Subcontractor/Supplier: Enviro-Line

Description: Control Panel, J-Box, Transducer

Date Submitted: May 26, 2020

Stamp Area

BAUGHMAN

315 ELLIS | WICHITA, KS 67211
[P] 316-262-7271
[BaughmanCo.com]

☒ REVIEWED ONLY BY: TPV
☐ REVIEWED AS NOTED
☐ REJECTED DATE: 5-1-2020

Enviro-Line co., inc.
409 SIXTH STREET P.O. BOX 308 OSAWATOMIE, KS 66064

SUBMITTALS

PROJECT
Pike Addition Lift Station
Wichita, KS

CONTRACTOR
McCullough Excavation, Inc.
Wichita, KS

ENGINEER
Baughman
Wichita, KS

EQUIPMENT MANUFACTURER
Primex Controls – Ashland, OH

SUPPLIER
Enviro-Line Company, INC
409 Sixth Street
Osawatomie, KS 66064
Phone: 913.755.2161

May 26, 2020

PRIMEX™

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Control Panel Submittal Documentation	
Project	Pike Addition Pump Station (Wichita, Kansas)
Proposal #	20200916
Customer	Enviro-Line Company
PO No.	16906
Date	May 21, 2020
Submitted by	Rick Lamp

Comments/Stamp Area

☒ 220 Ohio Street
Ashland, OH 44805
Toll Free: 800-363-5842
Phone: 419-281-5767
Fax: 419-289-2535

☐ 14190 63rd Way North
Clearwater, FL 33760-3616
Toll Free: 800-349-1905
Phone: 727-531-7141
Fax: 727-531-7151

☐ 22650 County Highway 6
Detroit Lakes, MN 56501
Toll Free: 888-342-5753
Phone: 218-847-1317
Fax: 218-847-4617

☐ 400 Techne Center Drive
Suite 104
Milford, OH 45150
Phone: 513-831-9959
Fax: 513-831-3549

Notes:

1.) The control enclosure is constructed of stainless steel (powder coated white) and consists of four compartments:
Zone 1 – Service Entrance compartment (Section is Type 4X rated).
Zone 2 – MCC compartment (Section is Type 4X rated).
Zone 3 – Controls compartment (Section is Type 4X rated).
Zone 4 – Vented conduit compartment (Section is Type-1 rated).

2.) Complete control panel will be UL698A listed and labeled. Panel will carry an 5KAIC short circuit current rating.

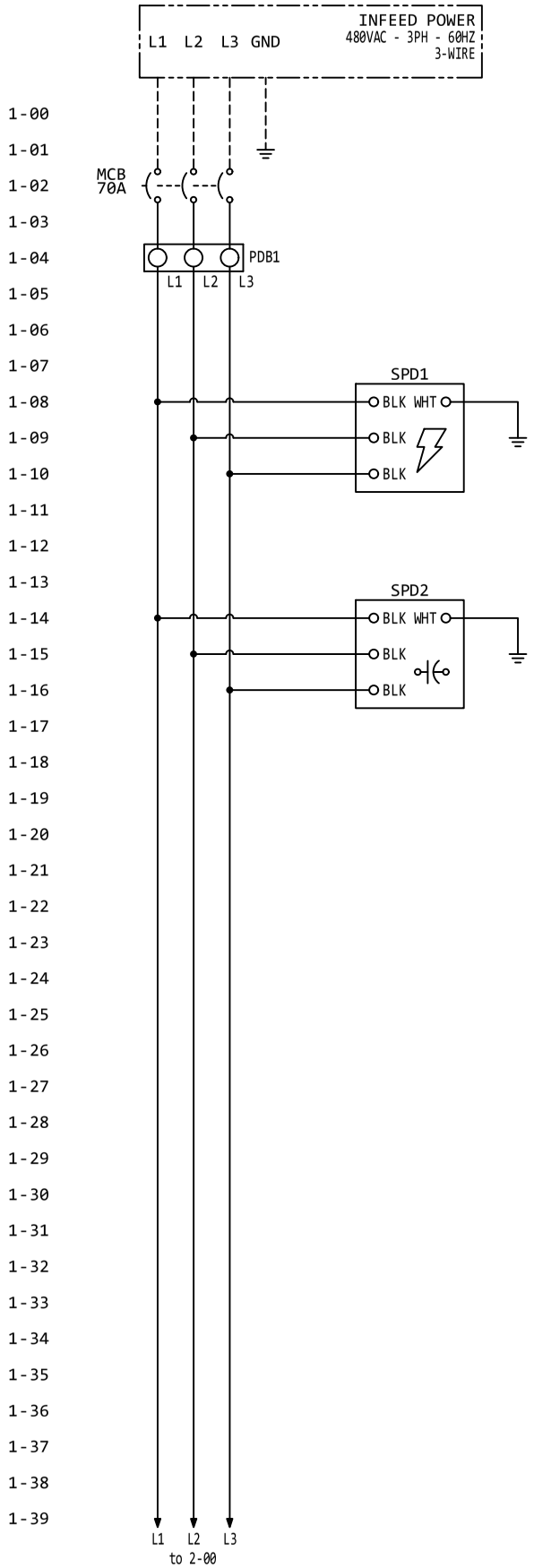
3.) The alarm beacon light and audible alarm will be shipped loose for field installation to exterior of fiberglass housing,

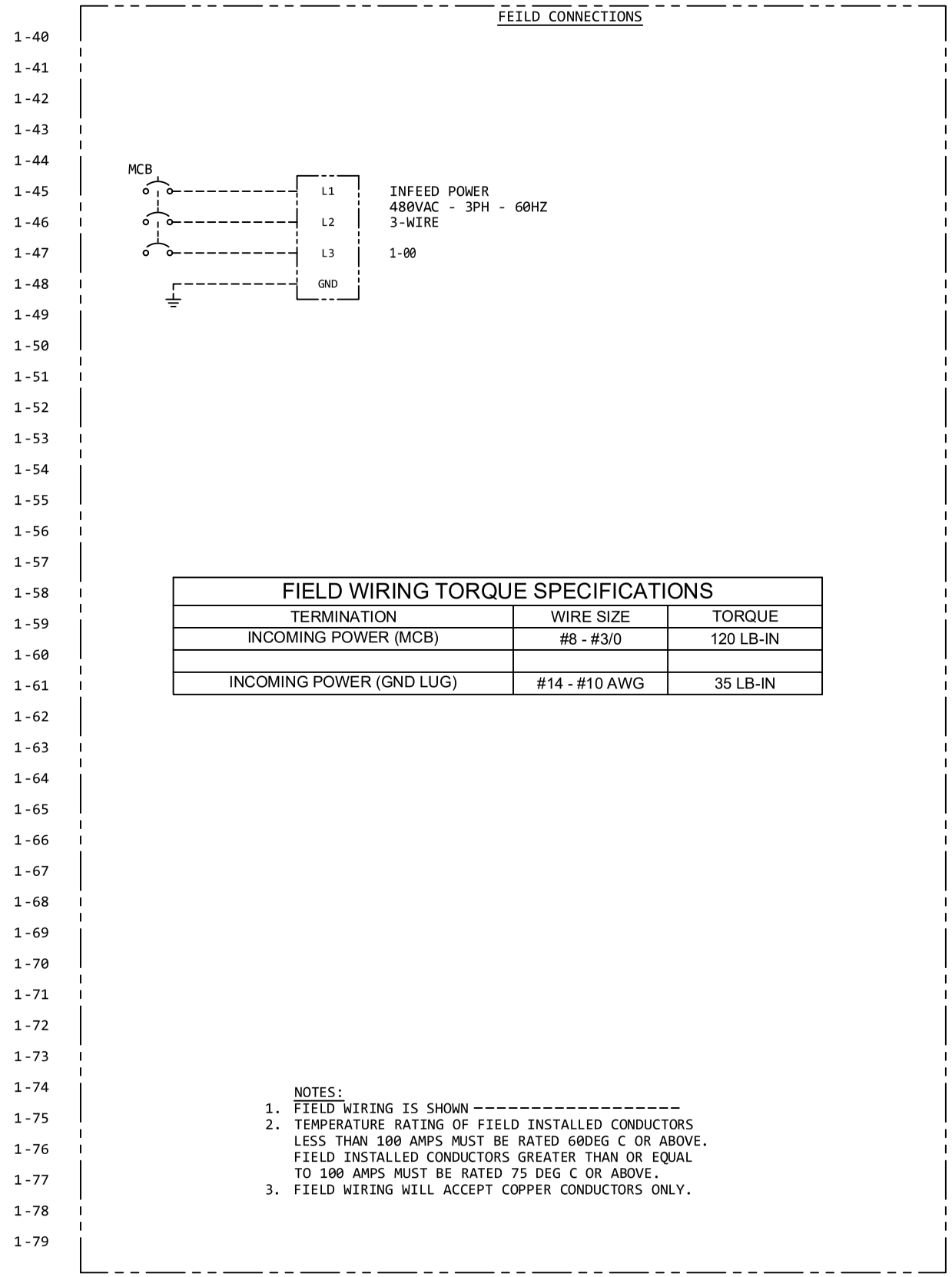
4.) One 4-port float switch manifold, five float switches and one submersible level transmitter will be supplied loose with control panel.

5.) A wet well junction box assembly will be supplied with control panel.

6.) Signed approval and/or stamp of the submittal cover sheet will be required before panel can be released for production. Any changes must be noted on cover sheet.

SERVICE COMPARTMENT





FIELD WIRING TORQUE SPECIFICATIONS		
TERMINATION	WIRE SIZE	TORQUE
INCOMING POWER (MCB)	#8 - #3/0	120 LB-IN
INCOMING POWER (GND LUG)	#14 - #10 AWG	35 LB-IN

SHEET NUMBER
1 OF 11

NO.	REVISION HISTORY	DATE	BY
A	SUBMITTAL	5/21/20	RJL

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ENVIRO-LINE COMPANY
PROJECT:
PIKE ADDITION P.S. - WICHITA, KS
DUPLEX PUMP CONTROL PANEL

DRAWN BY RJL
DATE 5/21/20

PANEL REQUIREMENTS

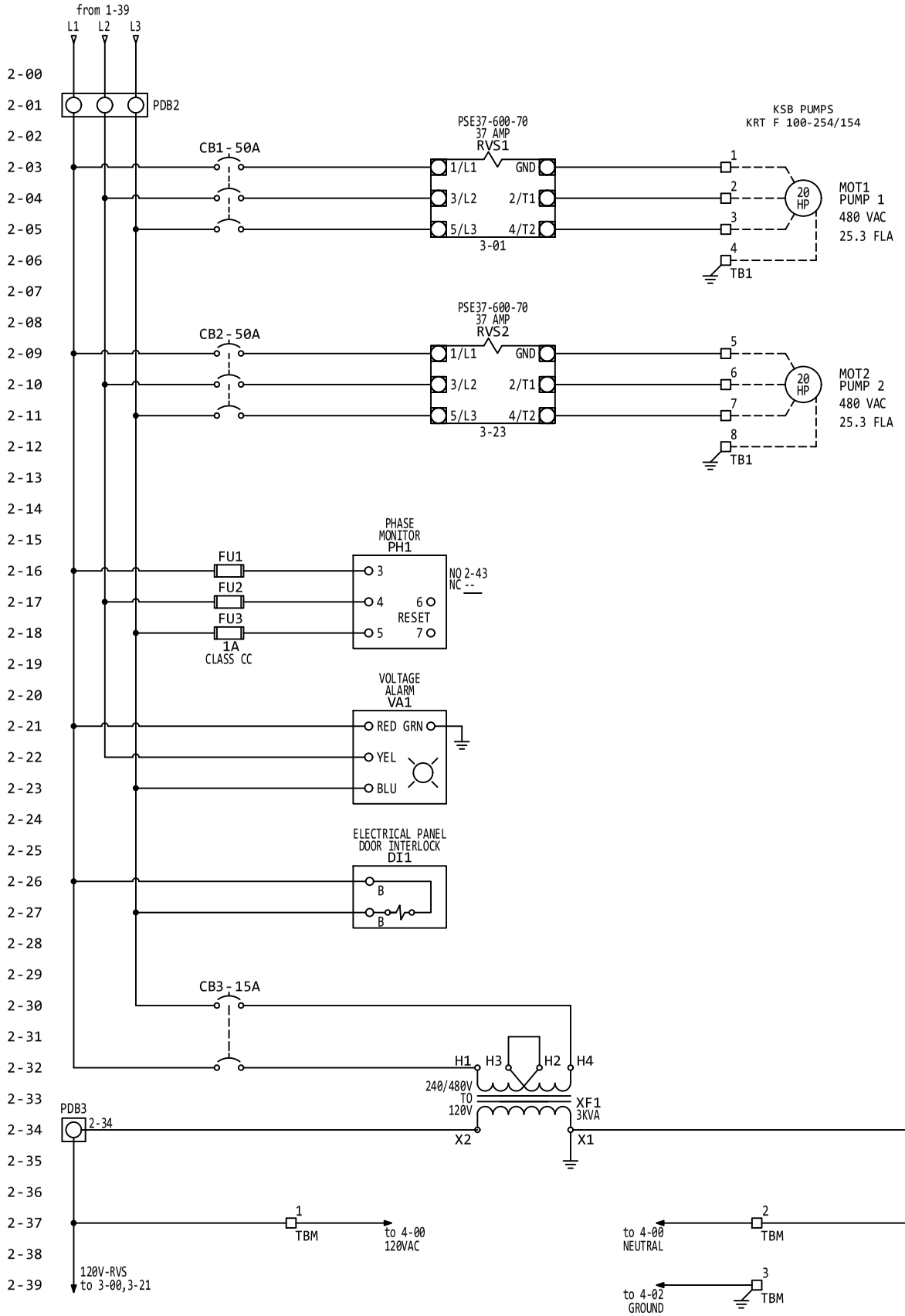
SYM.	
VOLTAGE	480 VAC
PHASE	3 PHASE 3 WIRE
FREQUENCY	60 Hz
SCCR	5 kA RMS SYM
TOTAL FLA	56.9 FLA
TYPE	4X

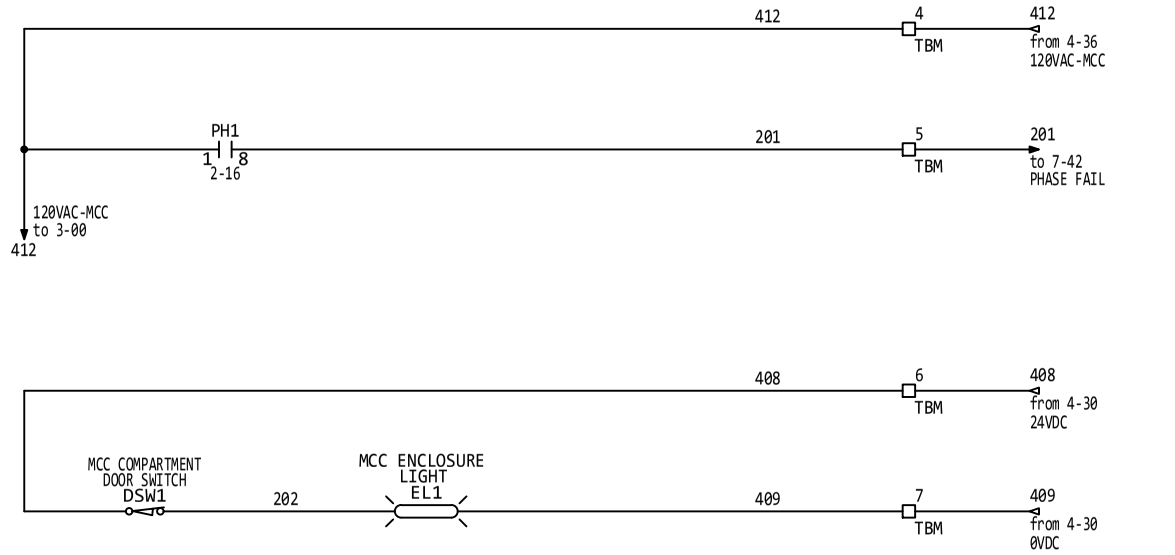
LARGEST MOTOR POWER REQUIREMENTS

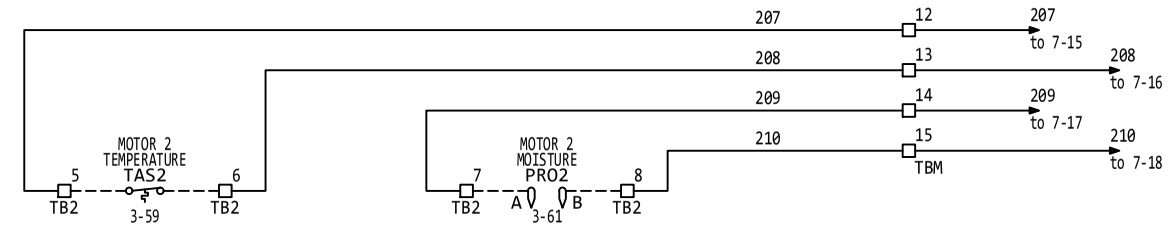
HP	20 HP
FLA	25.3 FLA @ 480VAC

PROJECT NUMBER
4005978A

MOTOR CONTROL COMPARTMENT







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ENVIRO-LINE COMPANY
PROJECT:
PIKE ADDITION P.S. - WICHITA, KS
DUPLEX PUMP CONTROL PANEL

DRAWN BY RJL
DATE 5/21/20

PANEL REQUIREMENTS	
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FREQUENCY	60 Hz
SCCR	5 kA RMS SYM
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TYPE	4X

LARGEST MOTOR POWER REQUIREMENTS	
HP	20 HP
FLA	25.3 FLA @ 480VAC

PROJECT NUMBER
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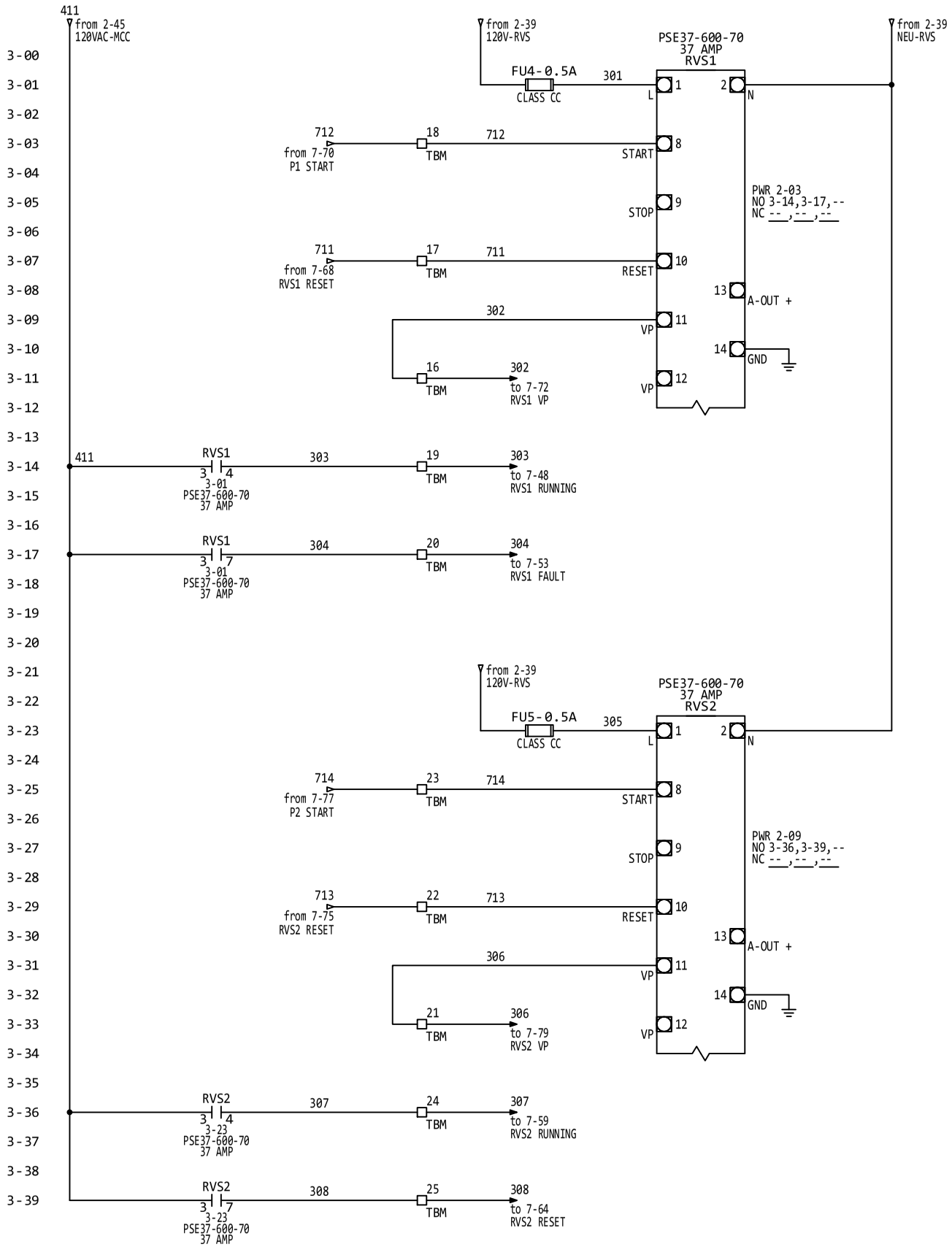
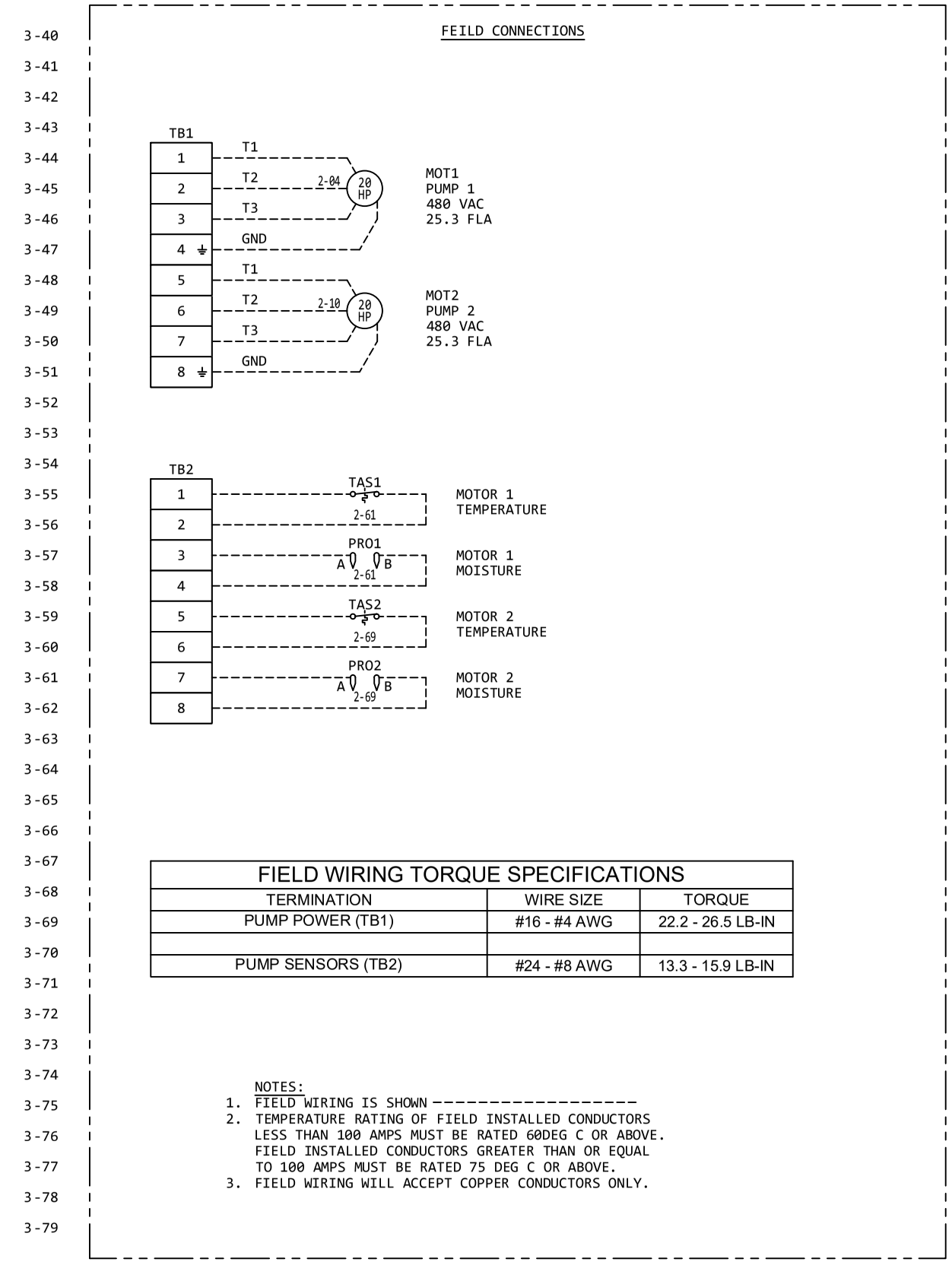
MOTOR CONTROL COMPARTMENT





FIELD WIRING TORQUE SPECIFICATIONS		
TERMINATION	WIRE SIZE	TORQUE
PUMP POWER (TB1)	#16 - #4 AWG	22.2 - 26.5 LB-IN
PUMP SENSORS (TB2)	#24 - #8 AWG	13.3 - 15.9 LB-IN

NOTES:
1. FIELD WIRING IS SHOWN ----------
2. TEMPERATURE RATING OF FIELD INSTALLED CONDUCTORS LESS THAN 100 AMPS MUST BE RATED 60DEG C OR ABOVE. FIELD INSTALLED CONDUCTORS GREATER THAN OR EQUAL TO 100 AMPS MUST BE RATED 75 DEG C OR ABOVE.
3. FIELD WIRING WILL ACCEPT COPPER CONDUCTORS ONLY.

SHEET NUMBER
3 OF 11

NO.	REVISION HISTORY	DATE	BY
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ENVIRO-LINE COMPANY
PROJECT:
PIKE ADDITION P.S. - WICHITA, KS
DUPLEX PUMP CONTROL PANEL

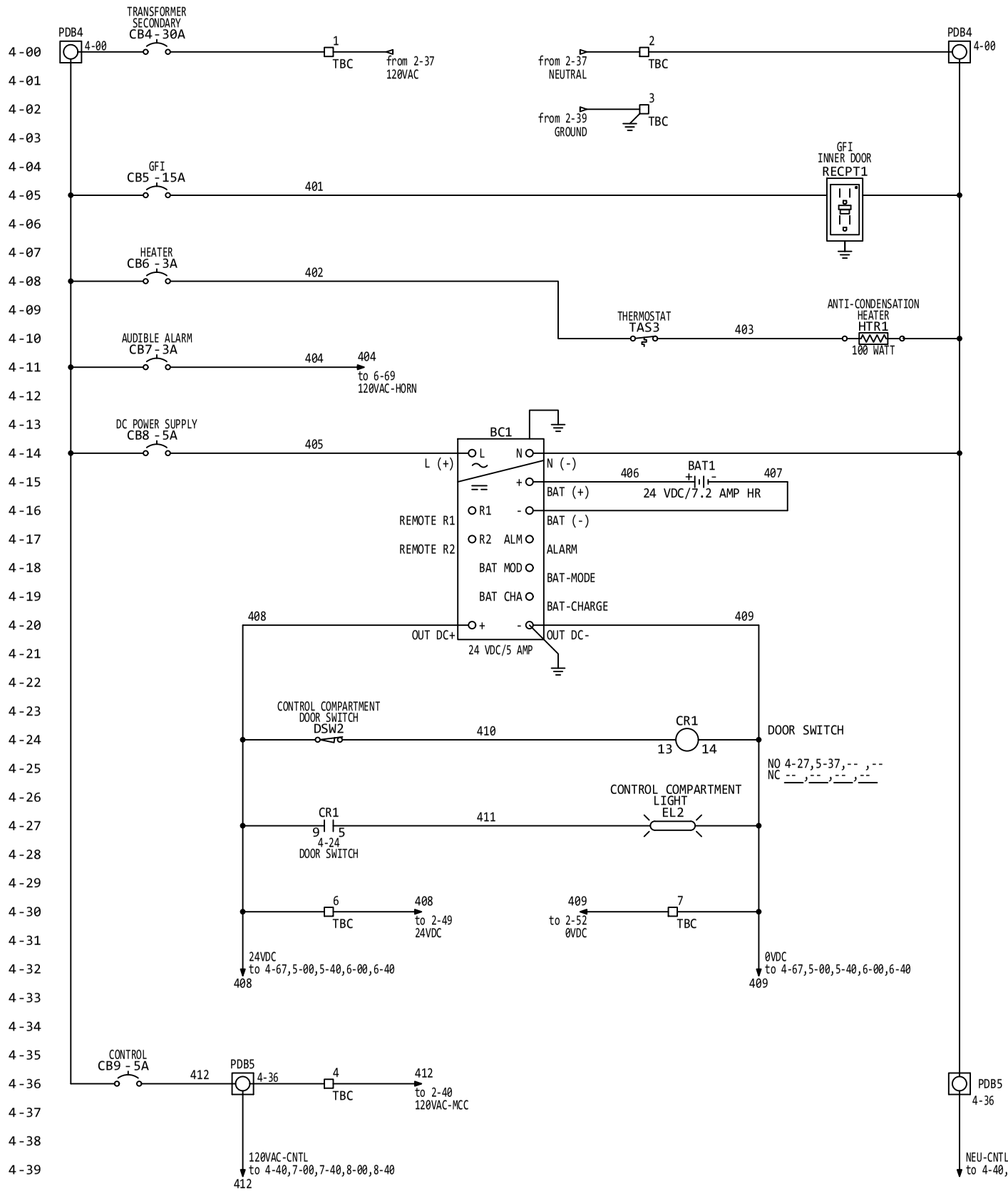
DRAWN BY RJL
DATE 5/21/20

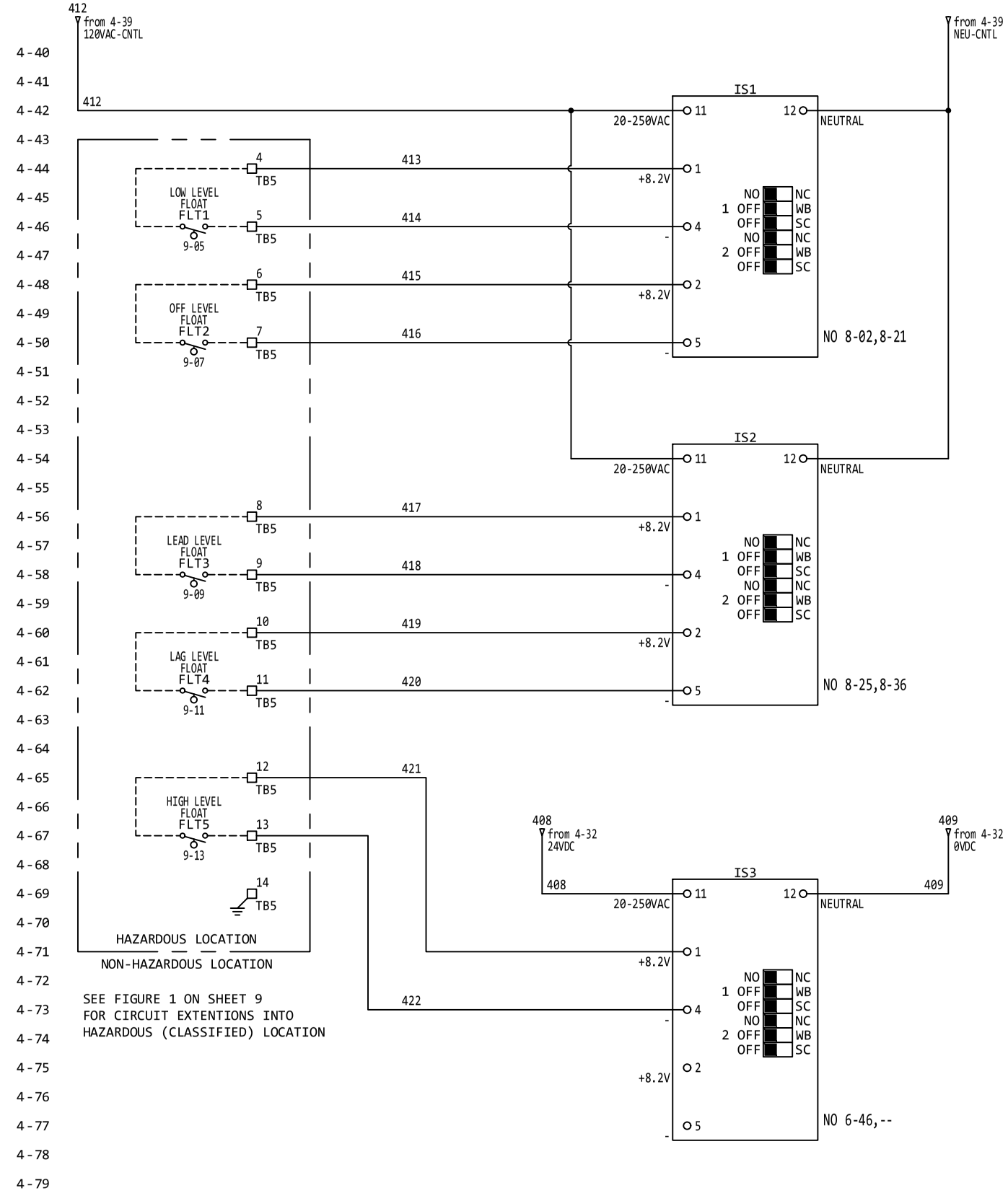
PANEL REQUIREMENTS	
SYM.	
VOLTAGE	480 VAC
PHASE	3 PHASE 3 WIRE
FREQUENCY	60 Hz
SCCR	5 kA RMS SYM
TOTAL FLA	56.9 FLA
TYPE	4X

LARGEST MOTOR POWER REQUIREMENTS	
HP	20 HP
FLA	25.3 FLA @ 480VAC

PROJECT NUMBER
4005978A

CONTROL COMPARTMENT





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ENVIRO-LINE COMPANY
PROJECT:
PIKE ADDITION P.S. - WICHITA, KS
DUPLEX PUMP CONTROL PANEL

DRAWN BY: RJL
DATE: 5/21/20

PANEL REQUIREMENTS

SYM.	
VOLTAGE	480 VAC
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PROJECT NUMBER
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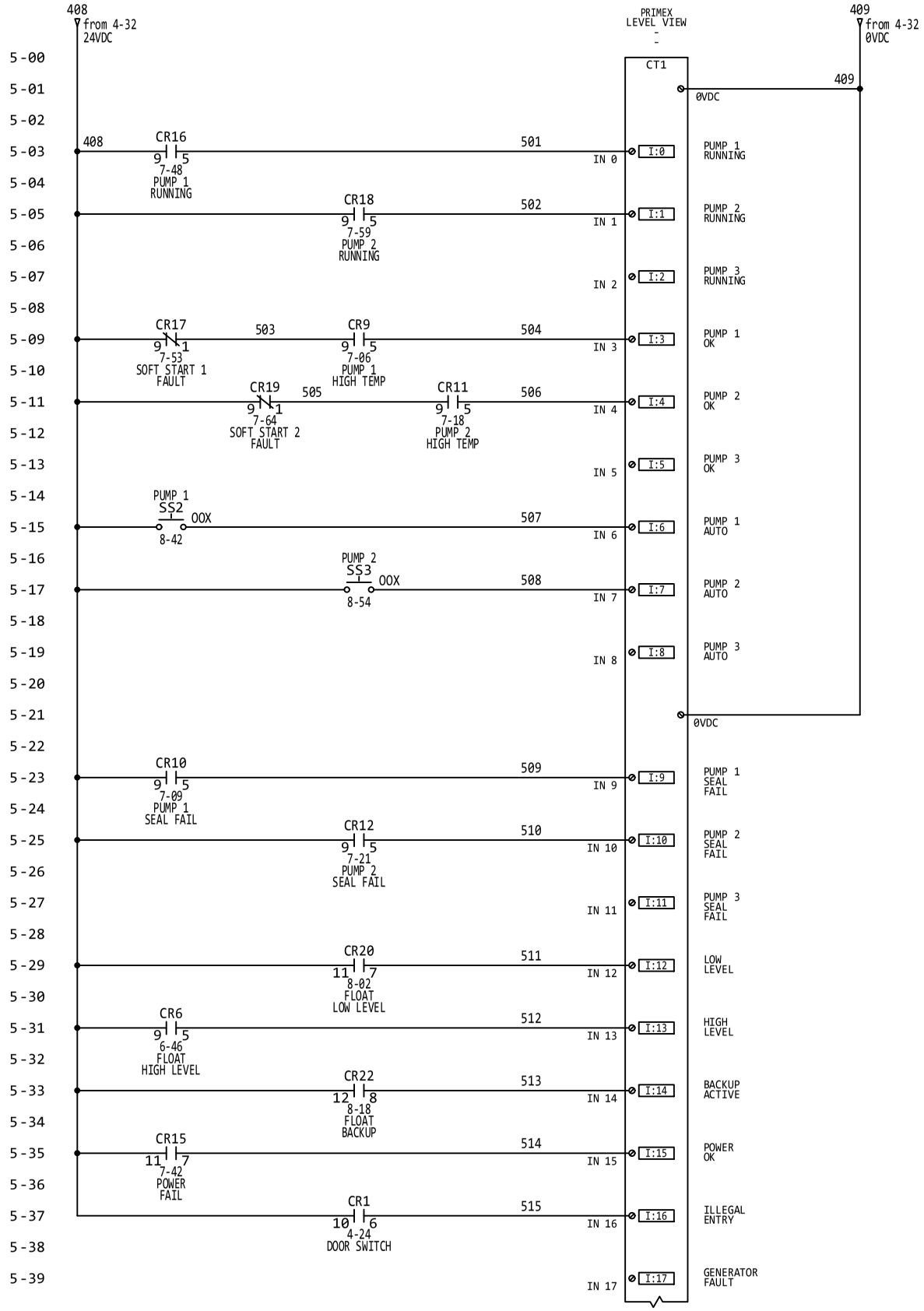

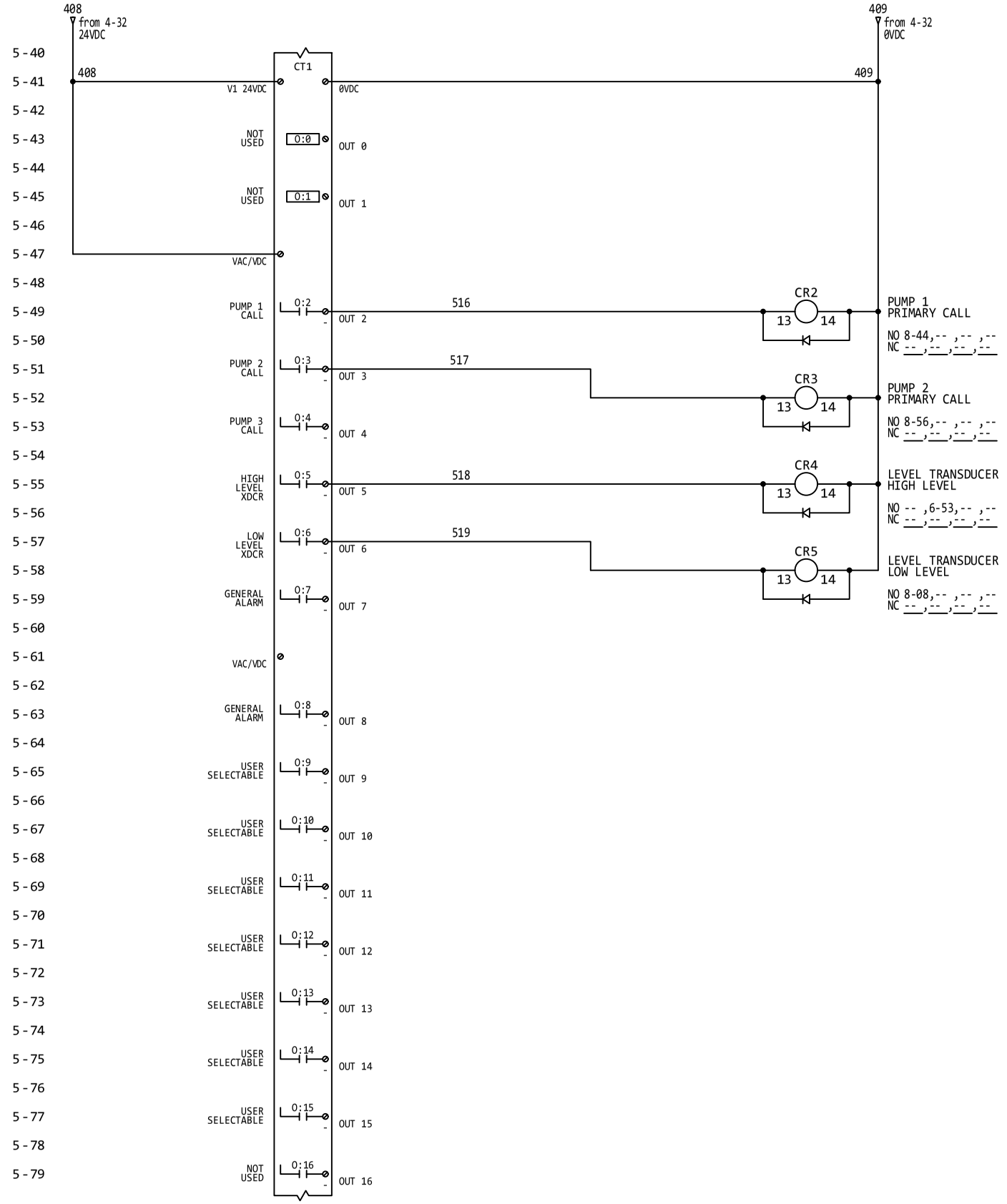

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ENVIRO-LINE COMPANY
PROJECT:
PIKE ADDITION P.S. - WICHITA, KS
DUPLEX PUMP CONTROL PANEL

DRAWN BY RJL
DATE 5/21/20

PANEL REQUIREMENTS

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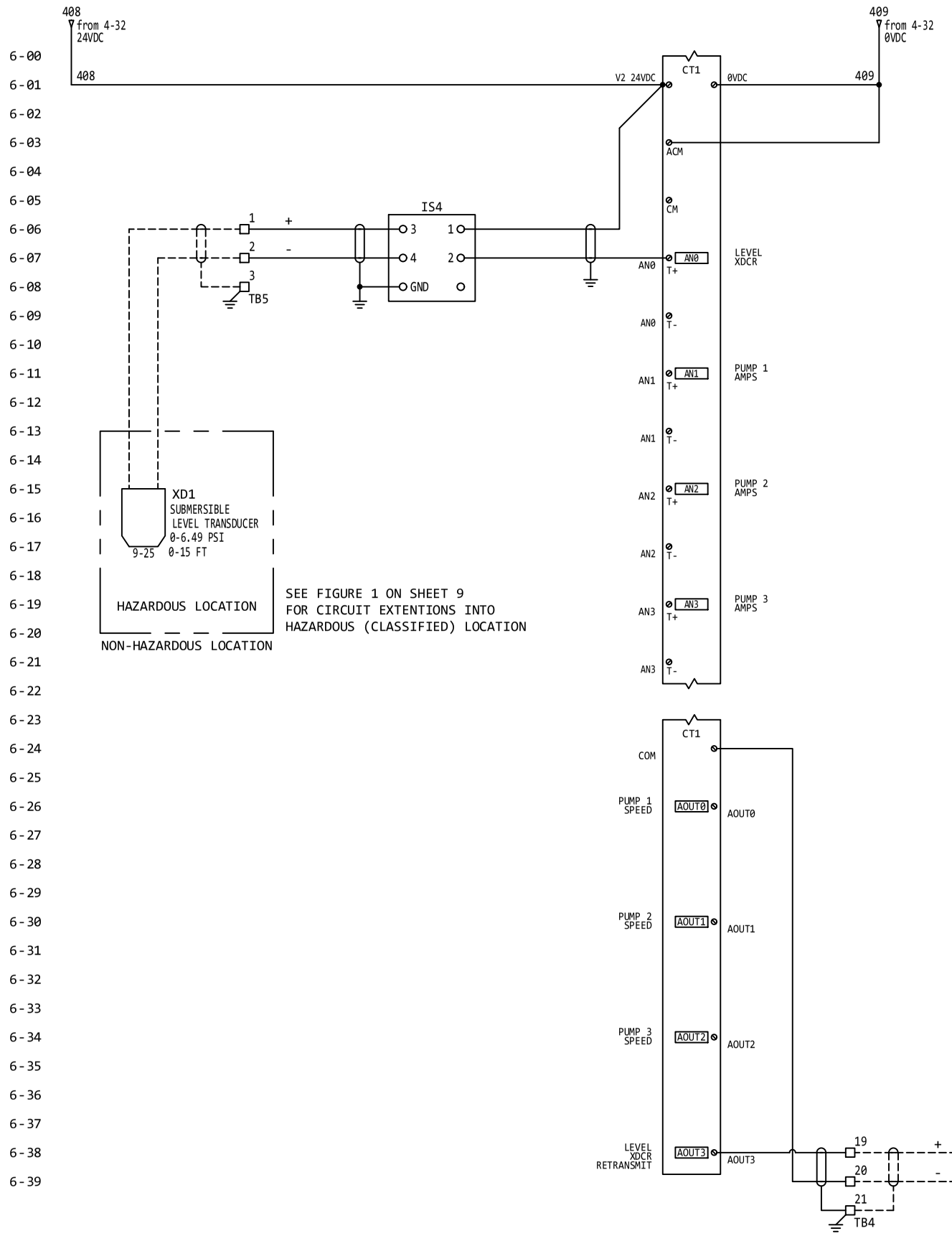

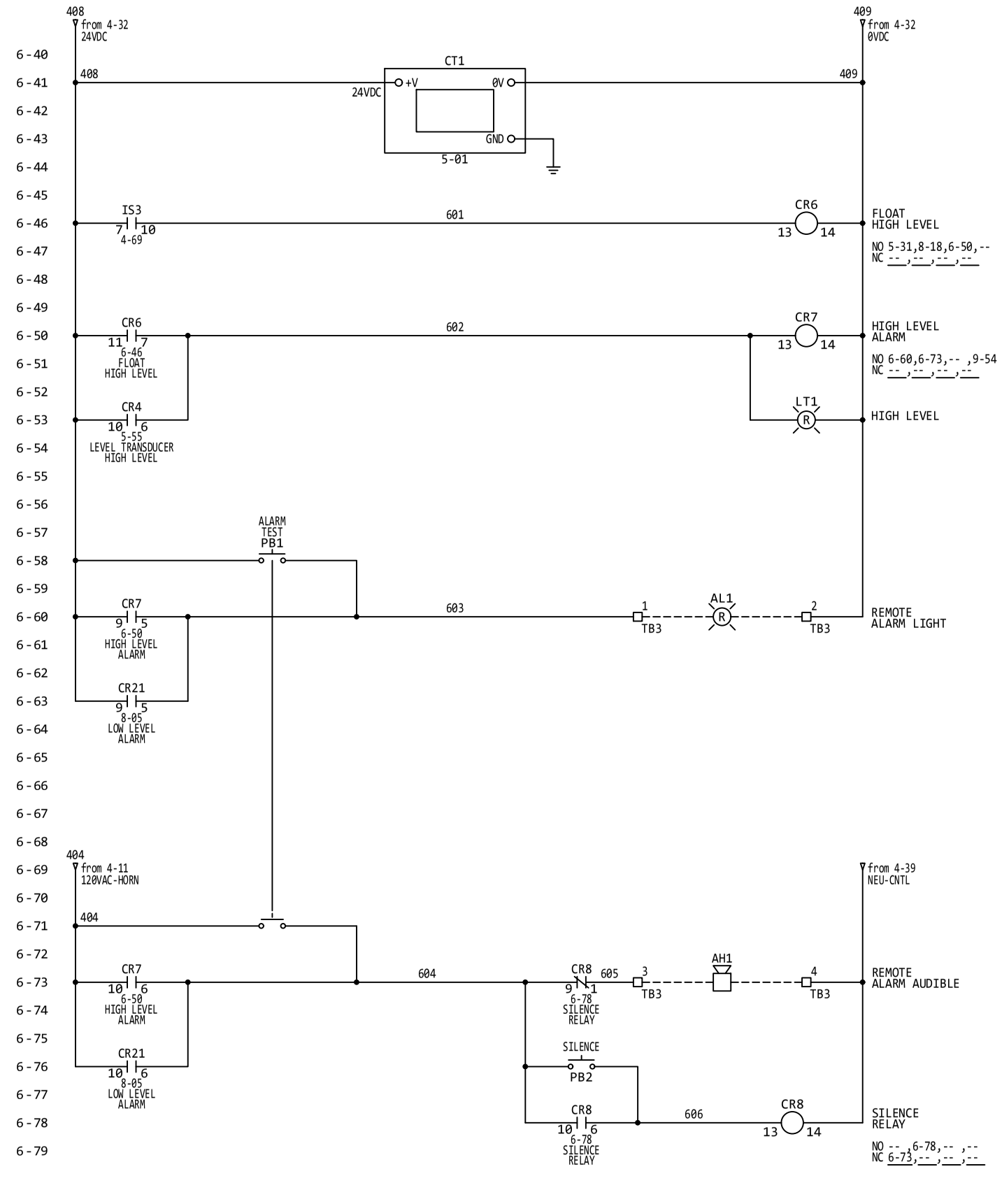

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PROJECT:
PIKE ADDITION P.S. - WICHITA, KS
DUPLEX PUMP CONTROL PANEL

DRAWN BY RJL
DATE 5/21/20

PANEL REQUIREMENTS	
SYM.	
VOLTAGE	480 VAC
PHASE	3 PHASE 3 WIRE
FREQUENCY	60 Hz
SCCR	5 kA RMS SYM
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TYPE	4X

LARGEST MOTOR POWER REQUIREMENTS	
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PROJECT NUMBER
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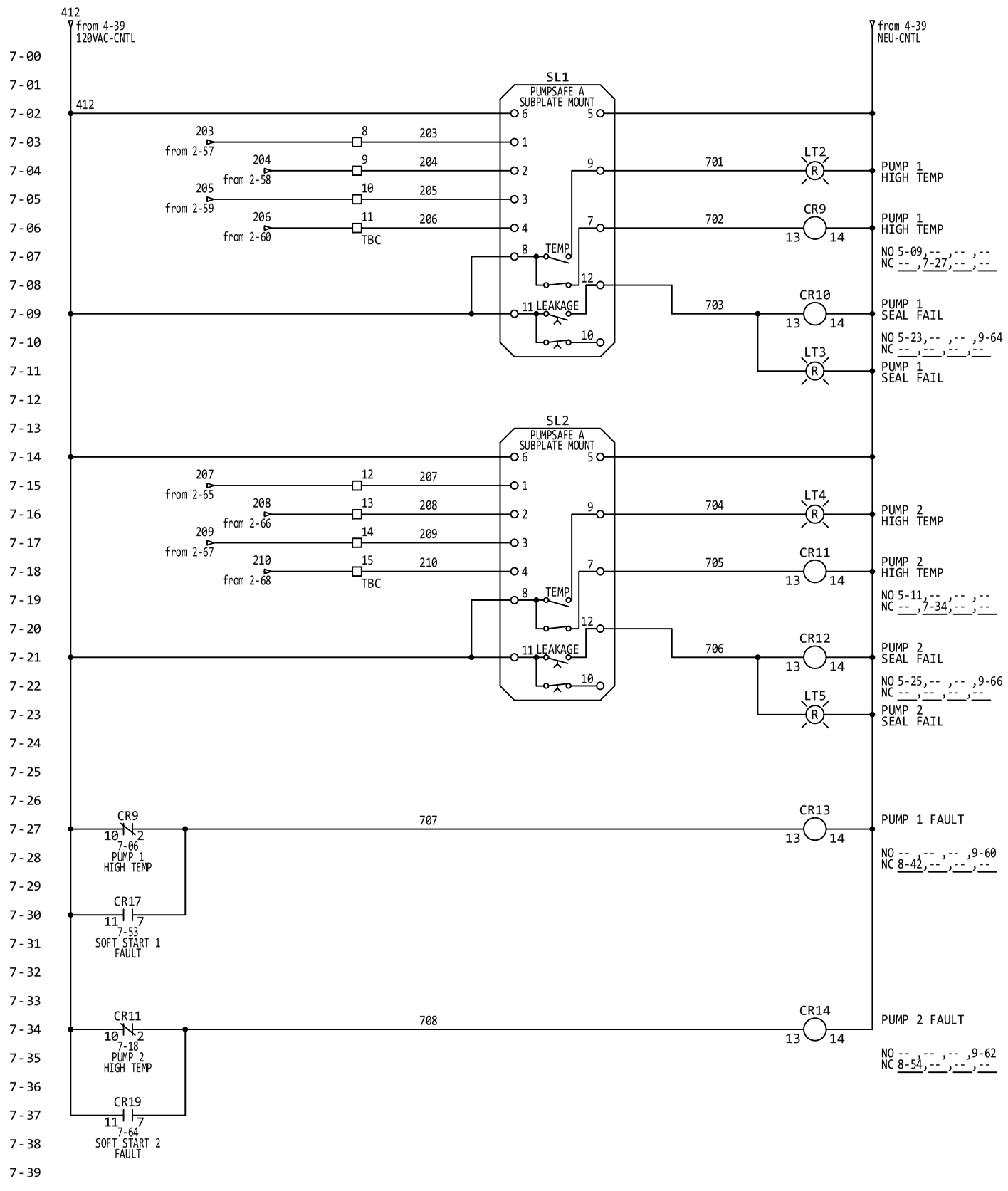

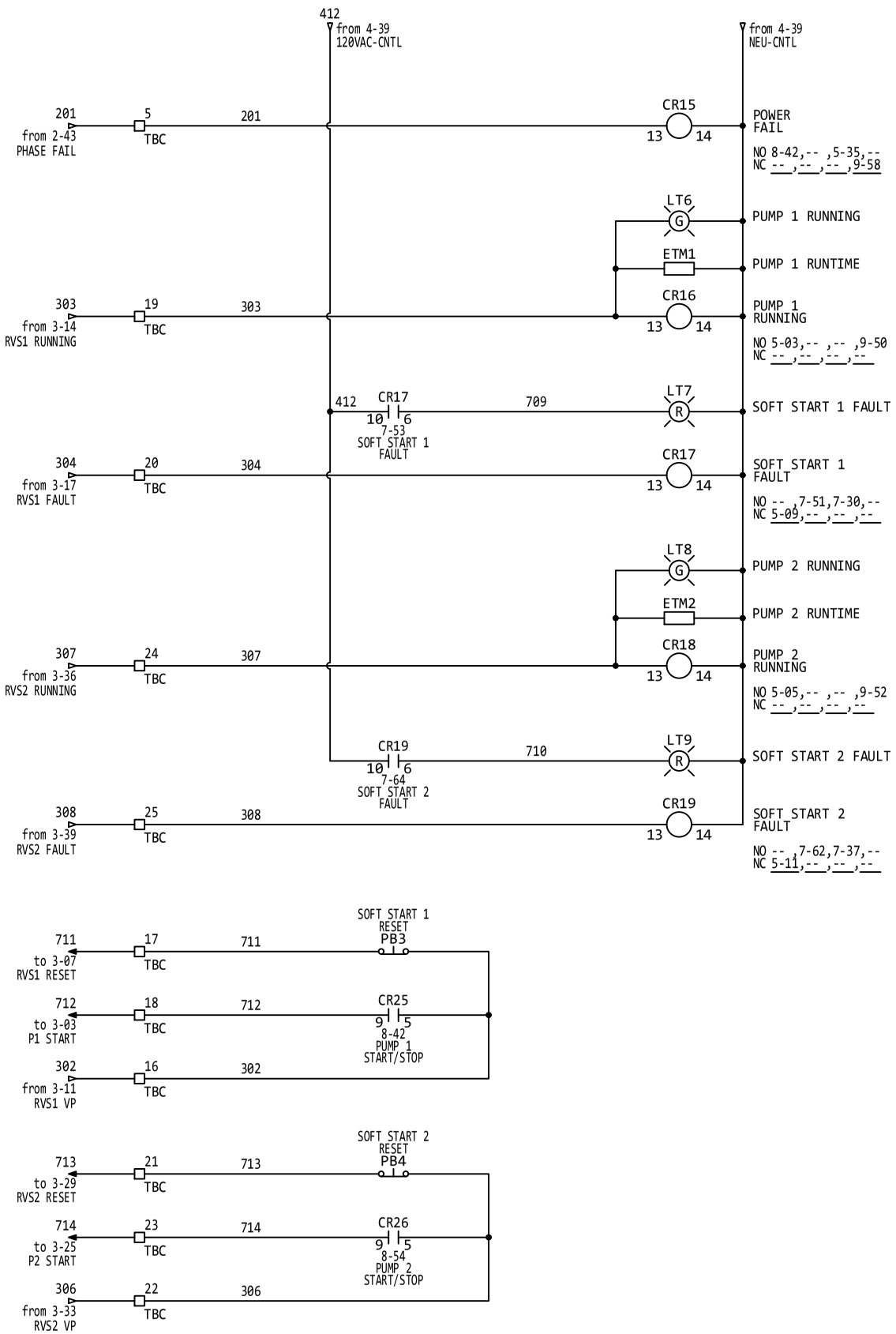

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PROJECT:
PIKE ADDITION P.S. - WICHITA, KS
DUPLEX PUMP CONTROL PANEL

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PANEL REQUIREMENTS	
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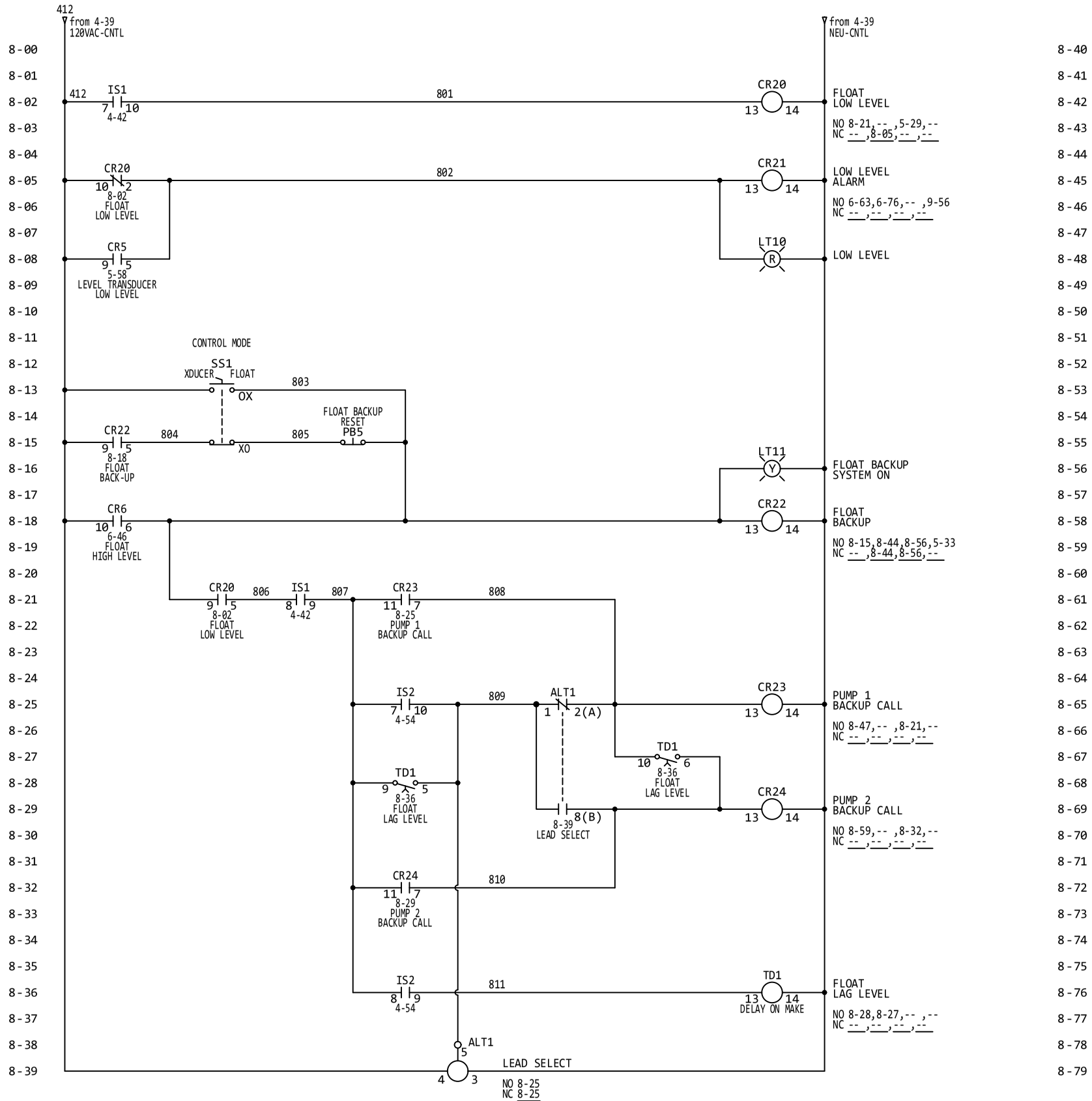

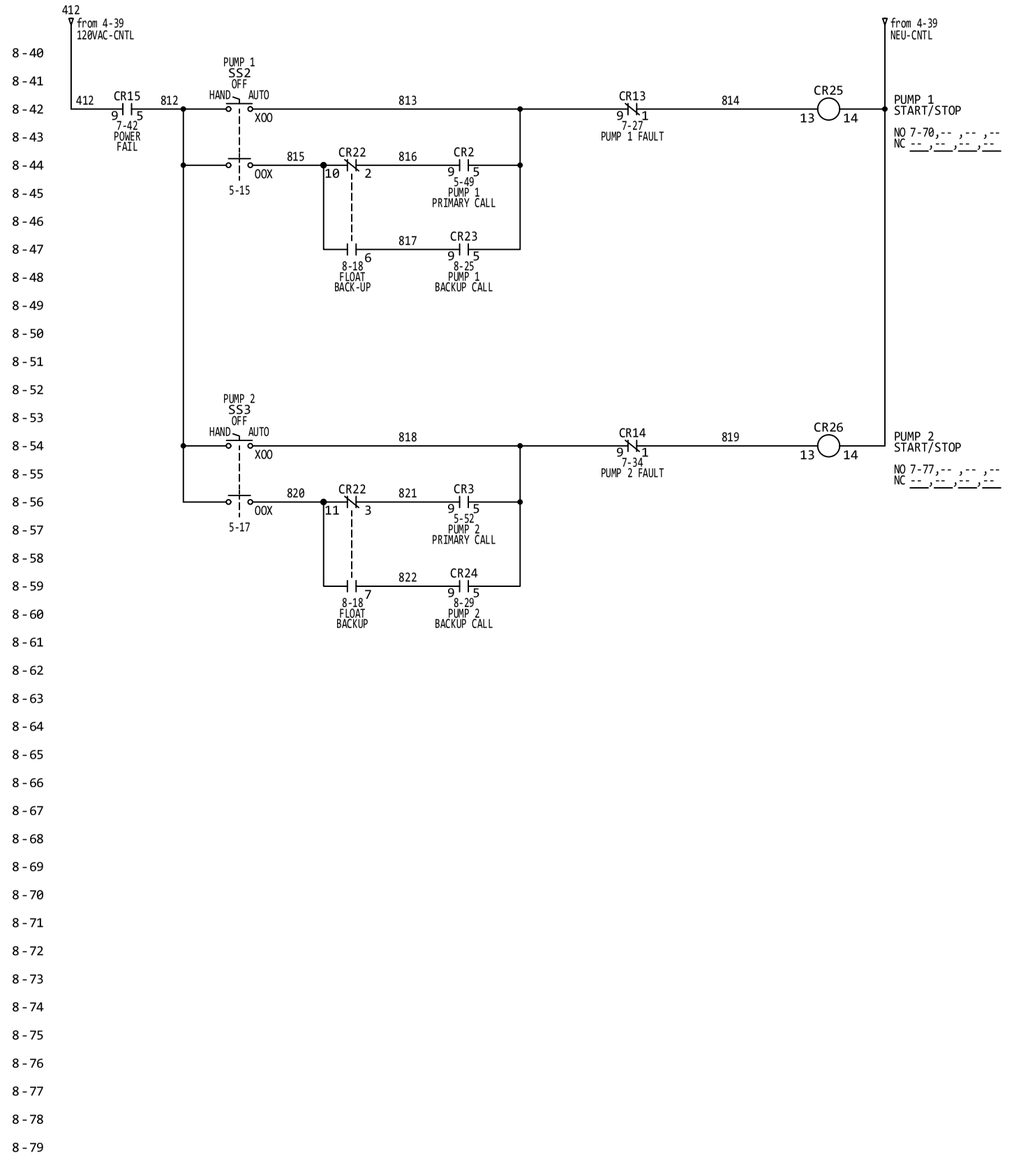

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8 OF 11

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PROJECT:
PIKE ADDITION P.S. - WICHITA, KS
DUPLEX PUMP CONTROL PANEL

DRAWN BY RJL
DATE 5/21/20

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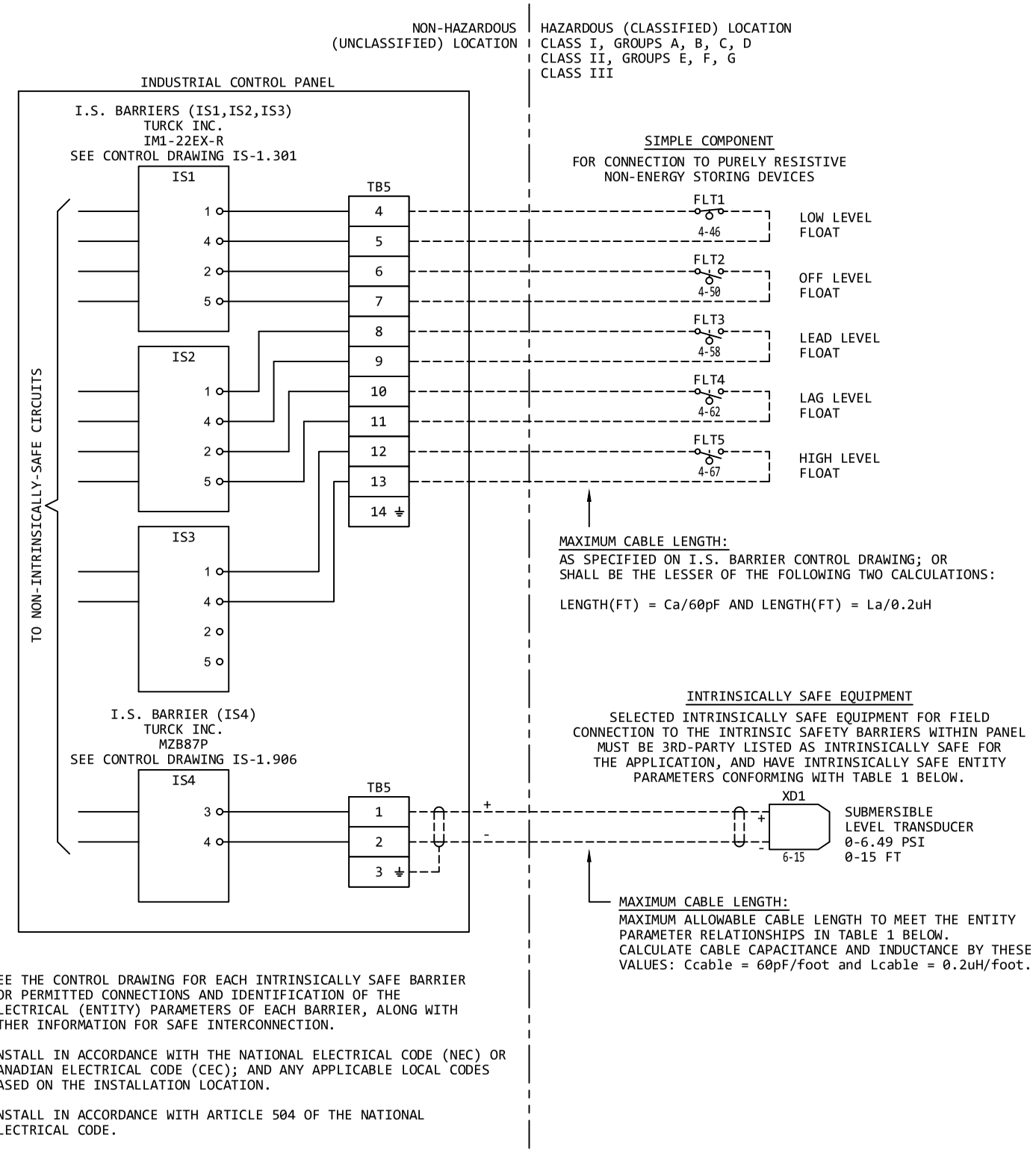
LARGEST MOTOR POWER REQUIREMENTS	
HP	20 HP
FLA	25.3 FLA @ 480VAC

PROJECT NUMBER
4005978A

CONTROL COMPARTMENT

FIGURE 1
PANEL CONTROL DRAWING



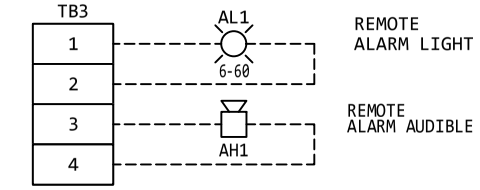
SEE THE CONTROL DRAWING FOR EACH INTRINSICALLY SAFE BARRIER FOR PERMITTED CONNECTIONS AND IDENTIFICATION OF THE ELECTRICAL (ENTITY) PARAMETERS OF EACH BARRIER, ALONG WITH OTHER INFORMATION FOR SAFE INTERCONNECTION.

INSTALL IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE (NEC) OR CANADIAN ELECTRICAL CODE (CEC); AND ANY APPLICABLE LOCAL CODES BASED ON THE INSTALLATION LOCATION.

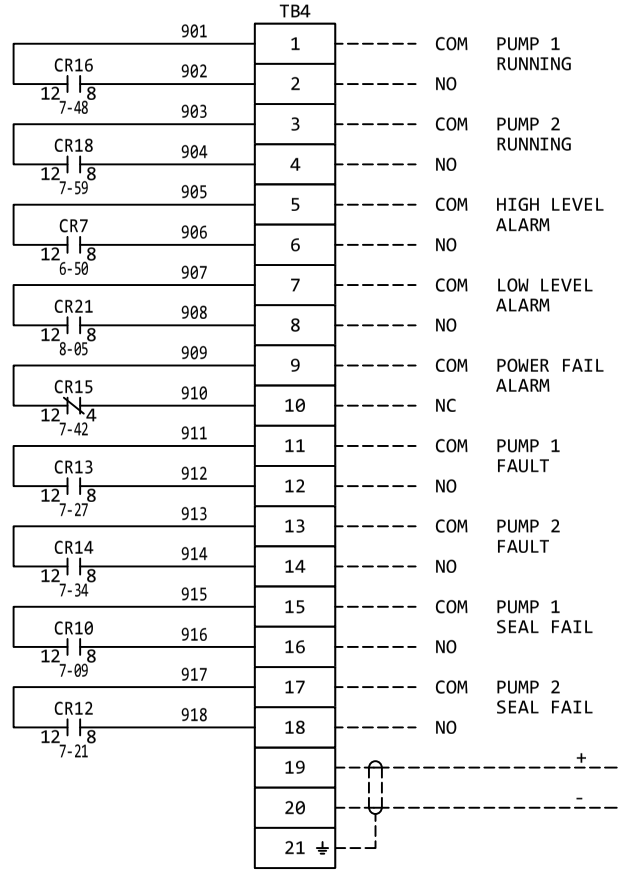
INSTALL IN ACCORDANCE WITH ARTICLE 504 OF THE NATIONAL ELECTRICAL CODE.

TABLE 1

UL LISTED I.S. BARRIER ENTITY PARAMETERS	REQUIRED RELATIONSHIP BETWEEN ENTITY PARAMETERS	3RD-PARTY LISTED I.S. EQUIPMENT ENTITY PARAMETERS
Voc or Vt (or Uo)	≤	Vmax (or Ui)
Isc or It (or Io)	≤	Imax (or Ii)
Po	≤	Pmax (or Pi)
Ca (or Co)	≥	Ci + Ccable
La (or Lo)	≥	Li + Lcable



AUXILIARY DRY CONTACTS
RATING: 6AMP @ 250VAC



FIELD WIRING TORQUE SPECIFICATIONS		
TERMINATION	WIRE SIZE	TORQUE
ALARM (TB3)	#24 - #8 AWG	13.3 - 15.9 LB-IN
SCADA / RTU (TB4)	#24 - #8 AWG	13.3 - 15.9 LB-IN
LEVEL SENSORS (TB5)	#24 - #8 AWG	13.3 - 15.9 LB-IN

NOTES:
1. FIELD WIRING IS SHOWN - - - - - - - - - - - - - - - - - -
2. TEMPERATURE RATING OF FIELD INSTALLED CONDUCTORS LESS THAN 100 AMPS MUST BE RATED 60DEG C OR ABOVE. FIELD INSTALLED CONDUCTORS GREATER THAN OR EQUAL TO 100 AMPS MUST BE RATED 75 DEG C OR ABOVE.
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SHEET NUMBER
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ENVIRO-LINE COMPANY
PROJECT:
PIKE ADDITION P.S. - WICHITA, KS
DUPLEX PUMP CONTROL PANEL

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LARGEST MOTOR POWER REQUIREMENTS	
HP	20 HP
FLA	25.3 FLA @ 480VAC

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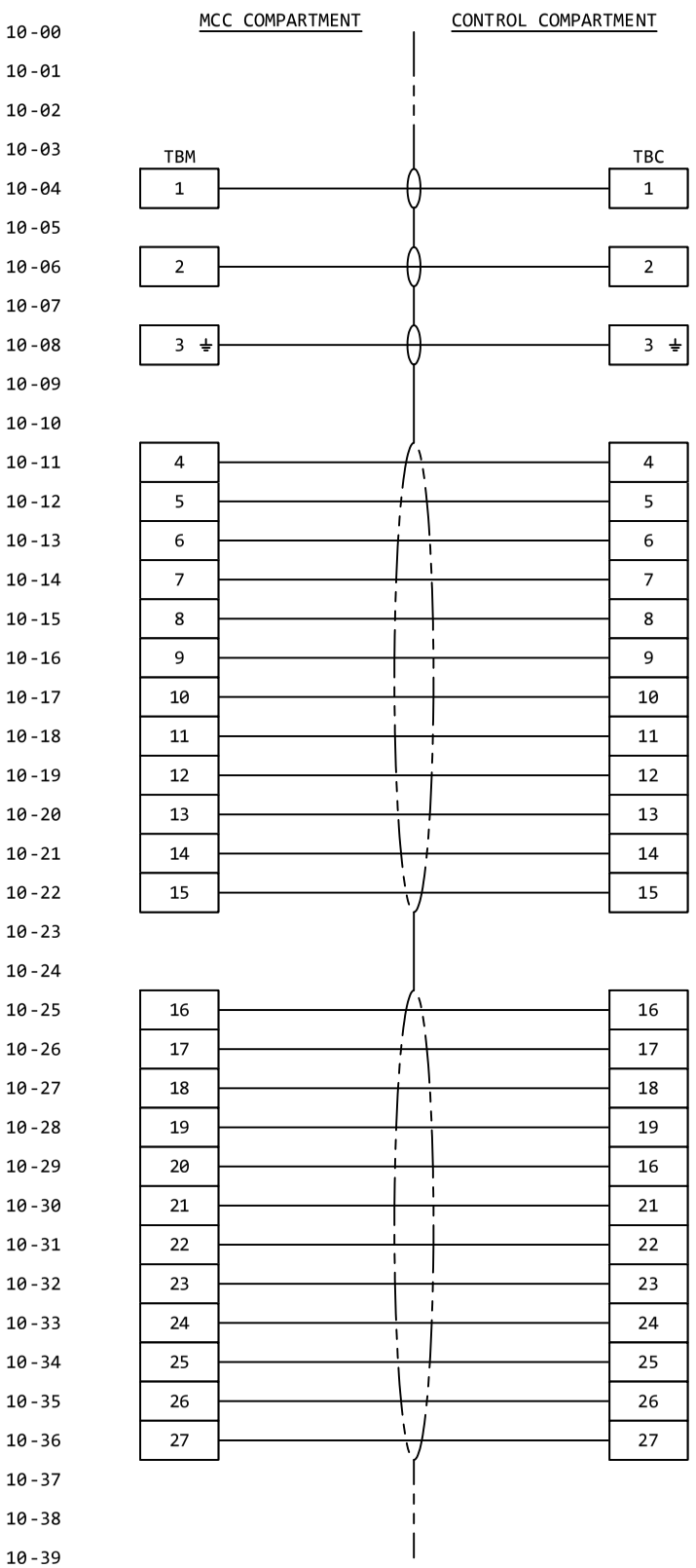
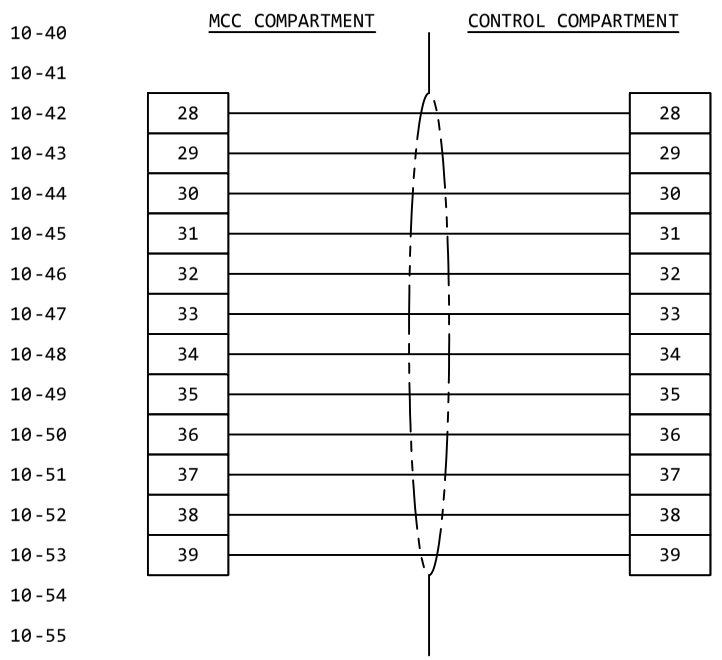
COMPARTMENT INTERCONNECTIONS





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ENVIRO-LINE COMPANY
PROJECT:
PIKE ADDITION P.S. - WICHITA, KS
DUPLEX PUMP CONTROL PANEL

DRAWN BY: RJL
DATE: 5/21/20

PANEL REQUIREMENTS	
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LARGEST MOTOR POWER REQUIREMENTS	
HP	20 HP
FLA	25.3 FLA @ 480VAC

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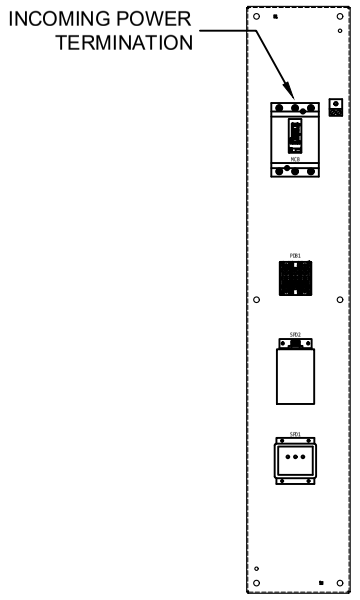
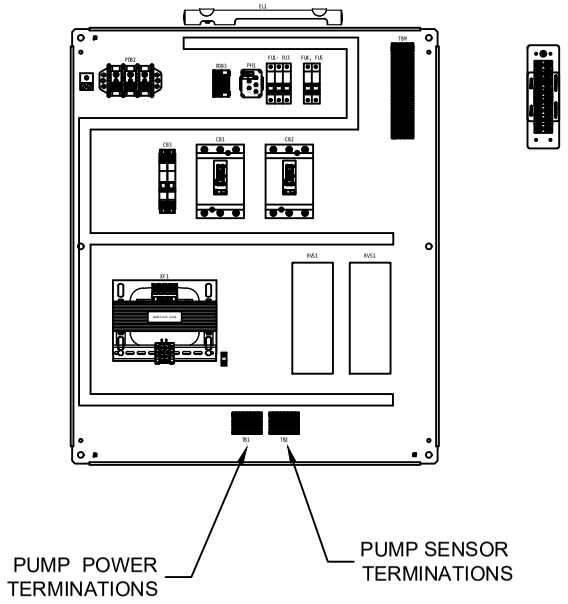
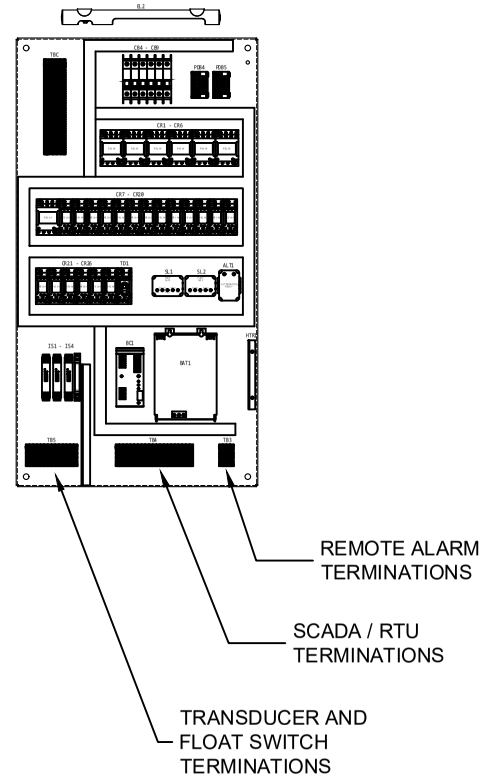
SERVICE BACK PANEL

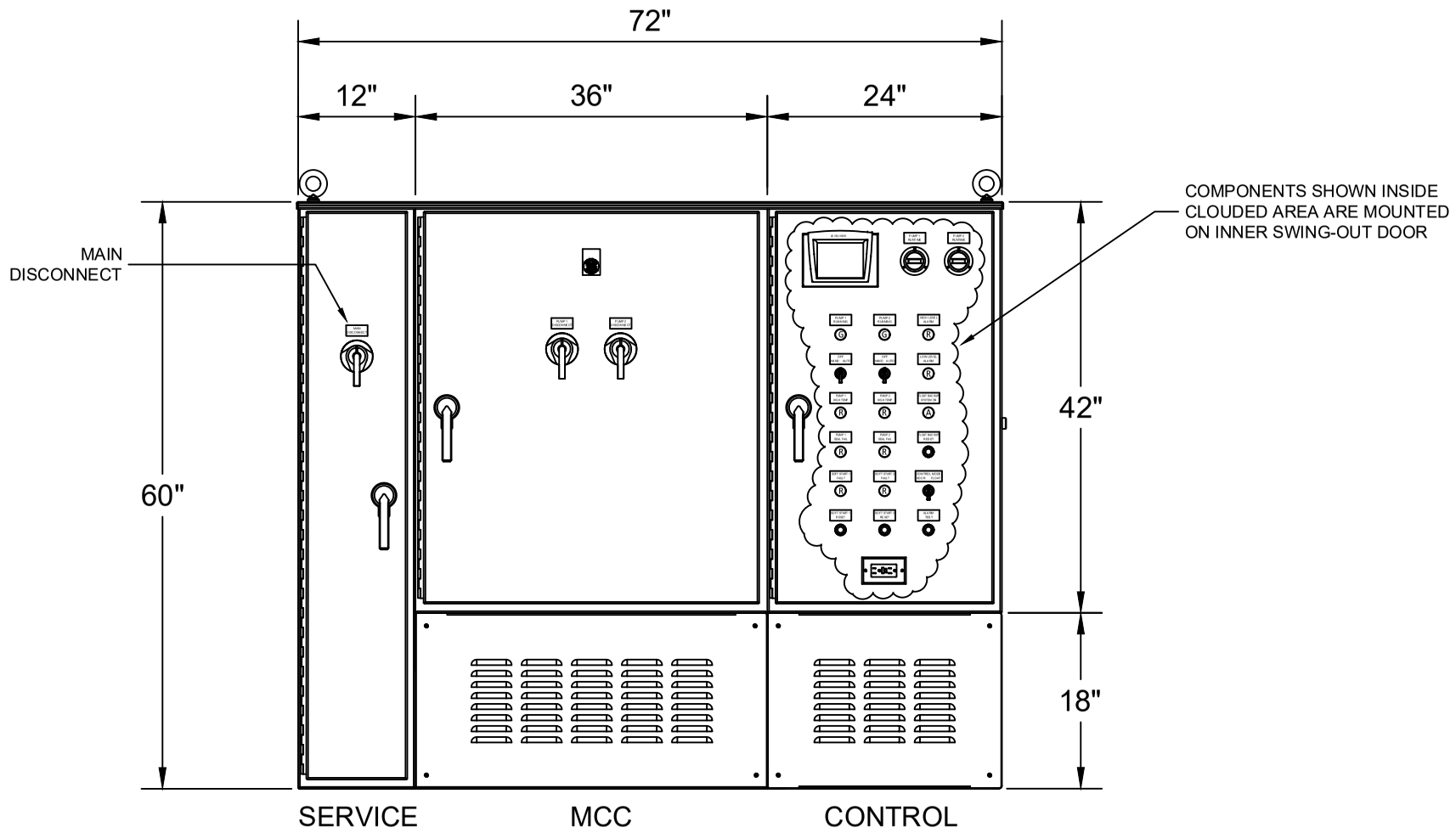


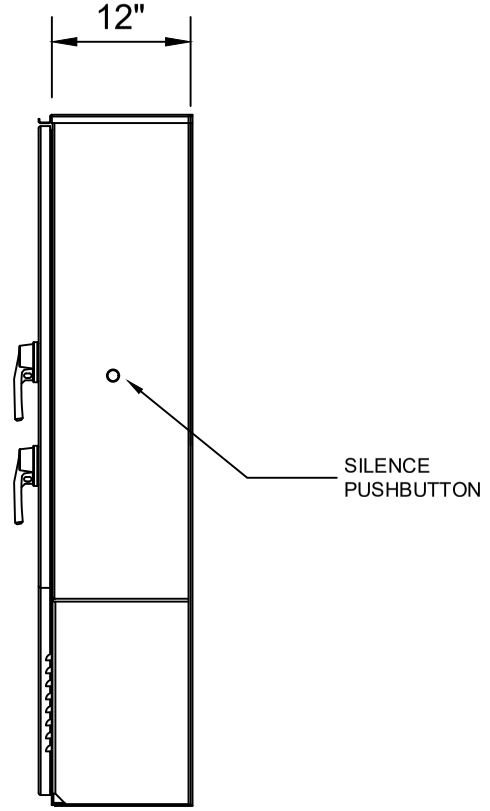
MCC BACK PANEL



CONTROL BACK PANEL







SHEET NUMBER
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PROJECT:
PIKE ADDITION P.S. - WICHITA, KS
DUPLEX PUMP CONTROL PANEL

DRAWN BY RJL
DATE 5/21/20

PANEL REQUIREMENTS	
SYM.	
VOLTAGE	480 VAC
PHASE	3 PHASE 3 WIRE
FREQUENCY	60 Hz
SCCR	5 kA RMS SYM
TOTAL FLA	56.9 FLA
TYPE	4X

LARGEST MOTOR POWER REQUIREMENTS	
HP	20 HP
FLA	25.3 FLA @ 480VAC

PROJECT NUMBER
4005978A

Submittal Bill of Material

Data accurate as of 5/21/2020

Part Number	Revision	Description
4005978A	A	20200916,RJL,PIKE ADDITION-WICHITA,KS

Where Used:	Qty	Manufacturer Part Number	Manufacturer	Description	CWI P/N
ENCLOSURE	1	E1451	HOFFMAN	ENC,ARC ARMOR,AA607212,SS,SGL SD,BS MT	1040959
INNRDR, ISBARR	1,058	54288958	Ryerson	ALMN, .125x48x96 PVC B/S 3003-H15	1027169
INNER DOOR PARTS	2			INNER DOOR KNOB SUB-ASSY	1029398
MISC PARTS	1	EZ00000001616	ROXTEC	CORDGRIP,16 SPACE,ROXTEC	1043057
DI1	1	AEK460	HOFFMAN	ENCL, INTERLOCK ELEC, 460V HOFF	1030200
VA1	1	UPA100	MARSH BELLOFRAM CORPORATION	LGT, LED, VOLTAGE WARNING	1030206
VA1	1	UPA-WP-100	MARSH BELLOFRAM CORPORATION	LBL, VOLTAGE WARNING	1030208
PDB1	1	1423570	MARATHON	BLOCK,DIST,3 POS 175A 600V 2/0:4	1024708
PDB1	1	CC1423	MARATHON	BLOCK,DIST,COVER 3 POS 175A	6001727
PDB2	1	1403401	MARATHON	BLOCK,DIST,3 POS 175A 600V 2/0:6	1034987
PDB2	1	CC1403	MARATHON	PWR,BLK,SHROUD MARATHON	1033814
PDB3, PDB4, PDB5	3	1412400	MARATHON	BLOCK,DIST,2 POS	6000531
PDB3, PDB4, PDB5	3	CC1412	MARATHON	BLOCK,DIST,COVER 2 POS 115A	1047503
TB1	6	3044199	PHOENIX CONTACT	TERM,BLK,85AMP,16-4AWG,SCREW,GRY,PHX	1039828
TB1	2	3044212	PHOENIX CONTACT	TERM,BLK,GRD,85AMP,16-4AWG,SCREW,GRN/YI	1039829
TB2, TB3, TB4, TB5, TBC, TBM	48	3044131	PHOENIX CONTACT	TERM,BLK,50AMP,24-8AWG,SCREW,GRY,PHX	1038973
TB4, TB5, TBC, TBM	5	3044157	PHOENIX CONTACT	TERM,BLK,GRD,50AMP,24-8AWG,SCREW,GRN/YI	1039246
TBC, TBM	73	3044076	PHOENIX CONTACT	TERM,BLK,20AMP,26-12AWG,SCREW,GRY,PHX	1036501
INCOMING GROUND	1	AU0	ILSCO	LUG, GROUND	1026029
TRANSFORMER GROUND	1	TA2	ILSCO	GROUND LUG, ILSCO	1028348
SPD1	1	SDSA3650	Schneider Electric	ARREST,LGTNG,3PH SQD	6000368
SPD1	1	BC-LAB-1	Earnest Products, Inc	BKT,FOR SQ D SDSA SURGE ARRESTOR	1040333
SPD2	1	CA603R	DELTA	ARREST,SURGE CAP,3PH 600V DELTA	6000800

Submittal Bill of Material

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Part Number	Revision	Description
4005978A	A	20200916,RJL,PIKE ADDITION-WICHITA,KS

Where Used:	Qty	Manufacturer Part Number	Manufacturer	Description	CWI P/N
SPD2	1	QOSAMK	Schneider Electric	BKT, LIGHTNING ARRESTOR, INNER MT	1031734
PH1	1	PMPU	Macromatic Industrial Controls	PHASE,MONIT,208-480V,3P,MACROMATIC	1030949
PH1	1	70169D	Macromatic Industrial Controls	SKT,RELAY,8 PIN MACROMATIC	1034017
MCB	1	HDL36070	Schneider Electric	BKR,3P,HDL 600V 70A SQD	1025674
MCB, CB1, CB2	3	9421LJ7	Schneider Electric	DISC,250A,MECH.,SQD	1027486
MCB, CB1, CB2	3	9421LS13	Schneider Electric	DISC,SHAFT LONG	1027492
MCB, CB1, CB2	3	9421LC46	Schneider Electric	HANDLE,CHROME,6 INCH,SQD	1027482
CB1, CB2	2	HDL36050	Schneider Electric	BKR,3P,HDL 600V 50A SQD	1024862
CB3	1	M9F42215	Schneider Electric	BKR, 2P, MINI 480V 15A SQD UL489	1030869
CB4	1	M9F42130	Schneider Electric	BKR,1P,MINI 120V 30A C-CURVE SQD	1030941
CB5	1	M9F42115	Schneider Electric	BKR,1P,MINI 120V 15A C-CURVE SQD	1030942
CB6, CB7	2	M9F42103	Schneider Electric	BKR,1P,MINI 120V 3A C-CURVE SQD	1030216
CB8, CB9	2	M9F42105	Schneider Electric	BKR,1P,MINI 120V 5A C-CURVE SQD	1032140
RVS1, RVS2	2	PSE37-600-70	ABB	SFT START,37A,208-600VAC,4-20MA OUT	1048479
FU1, FU2, FU3	3	FNQ-R-1	EATON BUSSMANN	FUSE,CLASS CC,1A	1012214
FU1-FU3	1	CHCC3DIU	EATON BUSSMANN	FUSE BLOCK,CLASS CC,THREE POLE WITH IND	1058885
FU4, FU5	2	FNQ-R-1/2	EATON BUSSMANN	FUSE 1/2 AMP TIME DELAY BUSS	1040863
FU4, FU5	2	CHCC1DIU	EATON BUSSMANN	FUSE BLOCK,CLASS CC,SINGLE POLE WITH IND	1058883
XF1	1	9070T3000D1	Schneider Electric	XFMR,3KVA,480/230:120 SQD	6000376
RECPT1	1	7599I	LEVITON	RECEPT,15A GFCI	1027353
TAS3	1	INGRAM: HTS	INGRAM PRODUCTS	THRMST,ADJ,30-140F NC INGRAM	1035575
HTR1	1	040050C1-A001F	WATLOW	HEATER,100W,4IN W X 5IN L,24IN LEADS	1048399
HTR1	1	394000-512	B&N SHEET METAL	BRKT,SHELF,UNIVERSAL,5.5IN X 4IN,(394000-512	1048627
EL1, EL2	2	LEDD1S35	HOFFMAN	LED,BAR,20-60VDC,13.82" HOFFMAN	1043576
DSW1, DSW2	2	CHZ8411K7	EATON CORPORATION	EXTERNAL PUSH BUTTON NC	1027811
BC1	1	2866611	PHOENIX CONTACT	TRIO-DC-UPS/1AC/24DC/5,2866611, PHOENIX CC	1045617
BAT1	1	2320319	PHOENIX CONTACT	UPS BATTERY, 7.2AH	1052321

Submittal Bill of Material

Data accurate as of **5/21/2020**

Part Number	Revision	Description
4005978A	**A**	**20200916,RJL,PIKE ADDITION-WICHITA,KS**

Where Used:	Qty	Manufacturer Part Number	Manufacturer	Description	CWI P/N
CT1	1	1043997	CSI	CNTRLR,LEVEL VIEW,PRIX ASSY	1043997
IS1, IS2, IS3	3	IM1-22EX-R	TURCK	ISR BARRIER,120V,2 CHAN TURCK	1038070
IS4	1	MZB87P	TURCK	ZENER BARRIER, 1CH, 4-20MA, K1075, MZB87P,	1047680
ALT1	1	ARP120A6R	Macromatic Industrial Controls	RELAY,ALTNTNG,DUPLEX 120V W/SW MAC	1041775
ALT1	1	SR2P-06	IDEC	SKT,CIRCULAR,8 PIN	1003062
SL1, SL2	2	12466-PUMPSAFE A	KSB	CSP-RELAY,MOIST SENSOR/THERMAL	1051460
CR1 - CR7	7	RPM42BD	Schneider Electric	RELAY,24VDC 4P IND TEST RPM TELE	1024318
CR1 - CR7	7	RPZF4	Schneider Electric	SKT,RELAY,4P RAIL MT RPM TELE	1024326
CR2, CR3, CR4, CR5	4	RUW240BD	Schneider Electric	ARREST,DIODE RPM 3P/4P RELAY TELE	1024313
CR8 - CR26	19	RXM4AB2F7	Schneider Electric	RELAY,PLG MT 4PDT 120V IND TST RXM	1030214
TD1	1	REXL4TMF7	Schneider Electric	TMR, DOM, 120V 4PDT 0.1S-100H REXL	1031780
CR8 - CR26, TD1	20	RXZE2M114M	Schneider Electric	RELAY BASE TESYS	1028815
ETM1, ETM2	2	T50B2	ENM COMPANY	METER, ETM, 120V FLUSH MT RO	1033953
SS1	1	XB4BJ21	Schneider Electric	SW,ROT,22MM LEV ON/OFF TEL	1024712
SS1	1	ZBE102	Schneider Electric	SW, CONTACT BLOCK, 22MM 1NC TEL	1022358
SS2, SS3	2	XB4BJ33	Schneider Electric	SW,ROT,22MM LEV HOA TEL	1017226
PB1, PB2	2	XB4BA21	Schneider Electric	PUSHBUTTON 22MM N.O.	1027100
PB2	1	ZBA147	Schneider Electric	LBL,SILENCE, 22MM PUSHBUTTON	1028513
PB3, PB4, PB5	3	XB4BA42	Schneider Electric	SW, PUSH, 22M, 1NC, 600V RND	1028462
PB1, SS2, SS3	3	ZBE101	Schneider Electric	SW, CONTACT BLOCK, 22MM, 1NO TEL	1022054
LT1	1	XB4BVB4	Schneider Electric	LGT,PIL LED,22MM 24V RD TEL	6002047
LT2, LT3, LT4, LT5, LT7, LT9, LT10	7	XB4BVG4	Schneider Electric	LGT,PIL LED,22MM 120V RD TEL	1024711
LT6, LT8	2	XB4BVG3	Schneider Electric	LGT,LED,GREEN,22mm,120V	1017411
LT11	1	XB4BVG5	Schneider Electric	LGT,PIL LED,22MM 120V AMB TEL	6001985
AL1	1	141ST-024R	FEDERAL SIGNAL	LGT,BEACON,24VDC STROBE RED	6002415
AH1	1	350-120-30	FEDERAL SIGNAL	HORN,FLUSH,MT,120V,FEDERAL	1030028
AH1	1	WB	FEDERAL SIGNAL	BACK,BOX WEATHERPROOF,FEDERAL	1030648

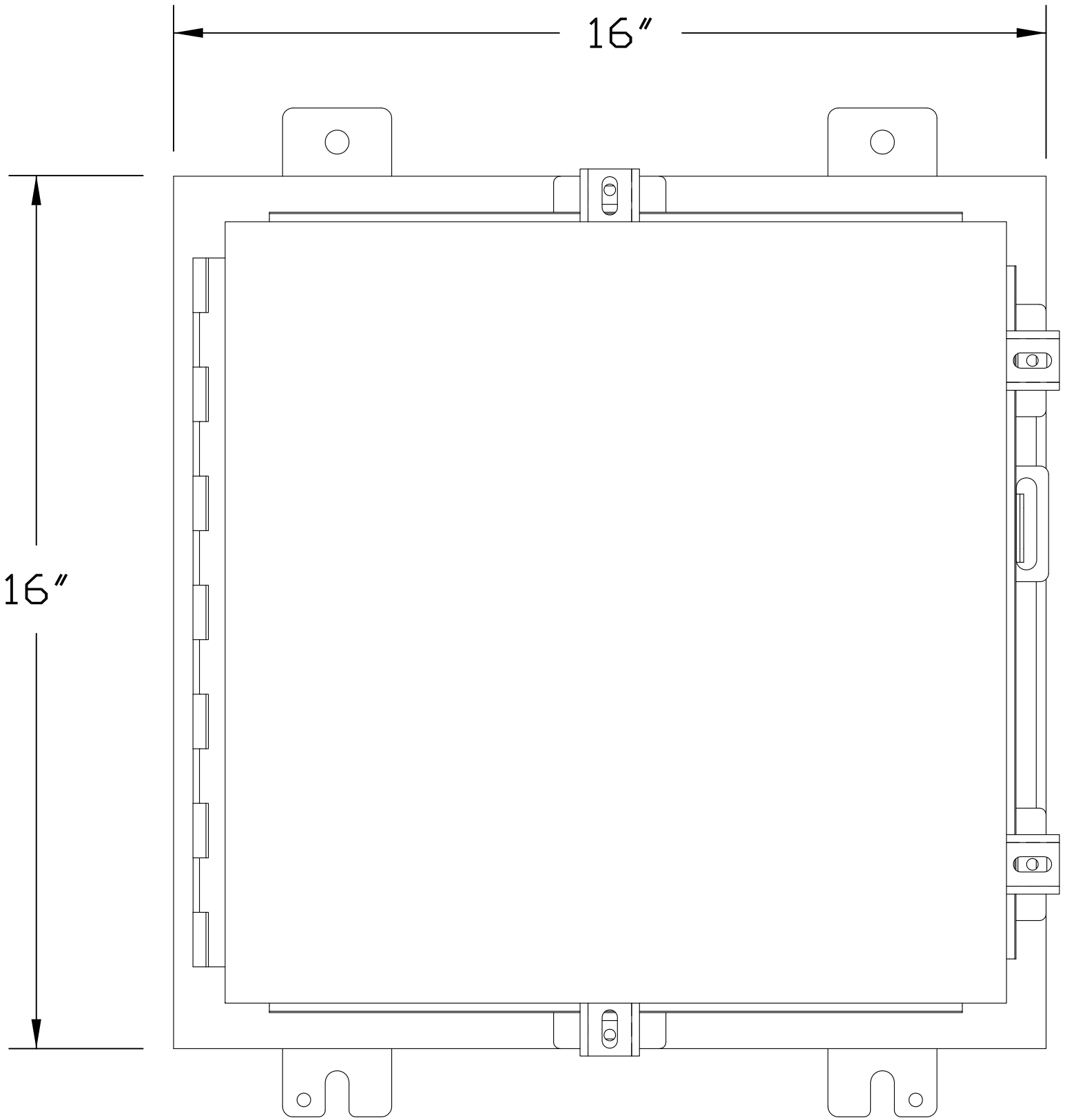
Submittal Bill of Material

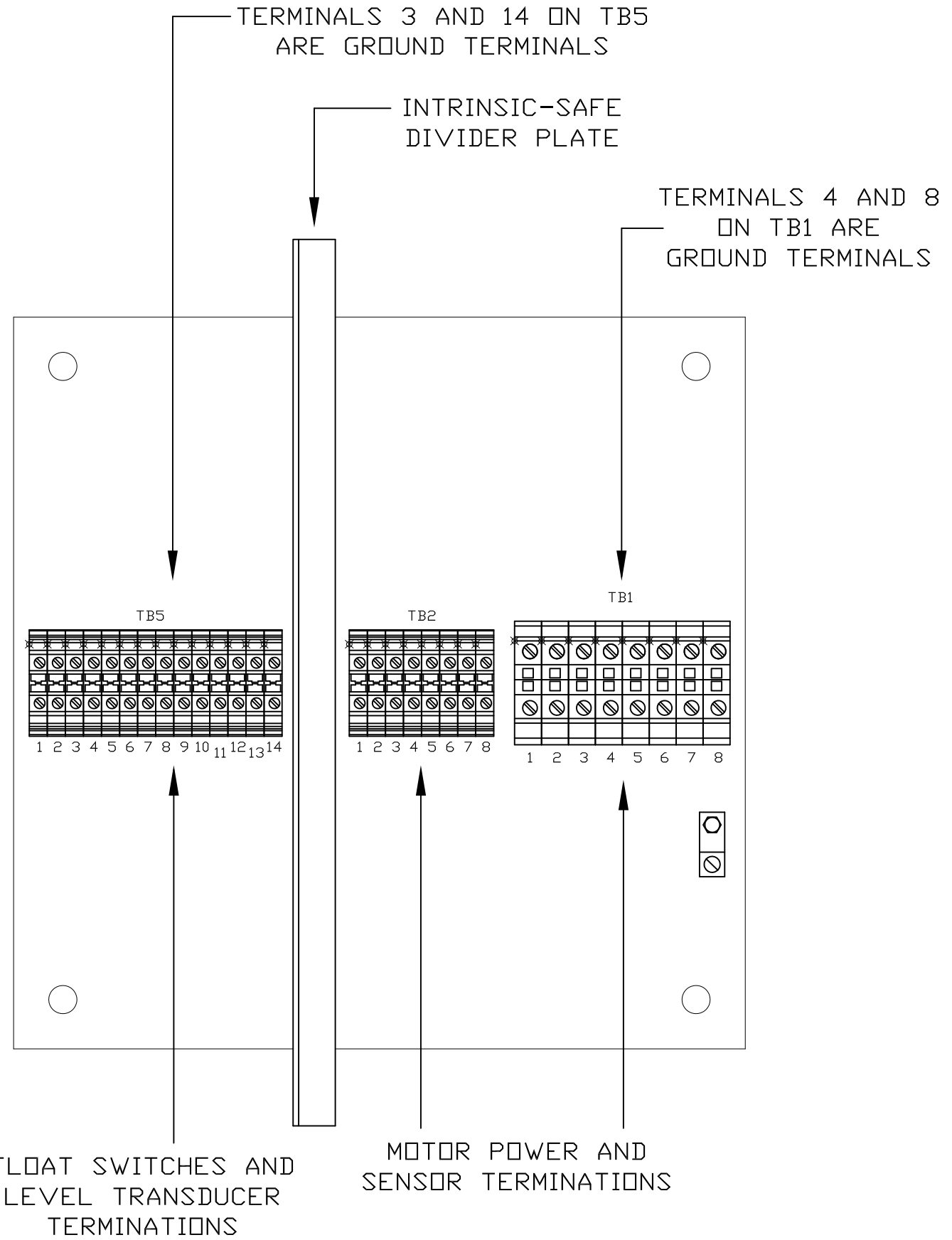
Data accurate as of **5/21/2020**

Part Number	Revision	Description
4005978A	**A**	**20200916,RJL,PIKE ADDITION-WICHITA,KS**

Where Used:	Qty	Manufacturer Part Number	Manufacturer	Description	CWI P/N
MISC PARTS	1	07020B	HALEX	NIPPLE,CHASE,2”,ZINC	1057981
MISC PARTS	1	NERPB600	NEER	CONDUIT BUSHING 2" PLASTIC	1031083
PRIMEX LBL	1	1038256	METALLICS INC.	LBL, PRIX, NAMEPLATE, SM, POLY, 6.0X1.75	1038256
ARC ARMOR LABELS	1	1033548	CSI	LBL, RH, INTERLOCK WRNG, ECOSMART	1033548
ARC ARMOR LABELS	1	1030163	METALLICS INC.	LBL, ARC ARMOR	1030163
ARC ARMOR LABELS	1	PVS0305W2102Y	PANDUIT	LBL, ARC FLASH	1030154
WARNING LABEL	3			LBL,RH,WRNG 4X2	1005699
WARNING LABEL (CONTROL SECTION)	1			LBL, RH, IS EXPLOSION WARNING	1024481
UL STICKER	1		UNDERWRITERS LABORATORIES	LBL,USL/ULC,698A	1028503
UL STICKER	1		METALLICS INC.	LBL,UL698,E151538-A,ASHLAND	1028758
SAME SCHEMATIC CHECK	1	PRODUCT SCHEMATIC	CSI	LIT, SCHEM, MATCHES PANEL #	1028516
XD1	1	1023.00107.051316.63	Keller America	LEV,RAT,4-20mA,0-15'WC,100'CABLECSI	1037448
FLT1	1	1046376	SJE RHOMBUS	MUNI 75FT BAG PRIX	1046376
FLT2 - FLT5	1			KWIKSWITCH 4P, 100FT W/ SS BKT	1053975
FLT2 - FLT5	4			MUNI 50FT N.O. BAG KWIKSWITCH	1053956

TYPE 4X STAINLESS STEEL ENCLOSURE (6" DEEP)





SHEET NUMBER
1 OF 1

NO.	REVISION HISTORY	DATE	BY

PRIMEX
primexcontrols.com
220 Ohio Street - Ashland, Oh 43805
419-281-5767

ENVIRO-LINE COMPANY
PROJECT:
PIKE ADDITION P.S - WICHITA, KS
WET WELL JUNCTION BOX ASSEMBLY

DRAWN BY RJL
DATE 5/21/20

PANEL REQUIREMENTS	
SYM.	
VOLTAGE	480 VAC
PHASE	3 PHASE 3-WIRE
FREQUENCY	60 Hz
SCCR	5 kA RMS SYM
TOTAL FLA	50.6 FLA
TYPE	4X

LARGEST MOTOR POWER REQUIREMENTS	
HP	20 HP
FLA	25.3 FLA @ 480VAC

PROJECT NUMBER
4005978B

Submittal Bill of Material

Data accurate as of **5/21/2020**

Part Number	Revision	Description
4005978B	**A**	**20200916,RJL,PIKE ADDITION - JUNCTION BOX**

Where Used:	Qty	Manufacturer Part Number	Manufacturer	Description	CWI P/N
	1	A16H1606SSLP	HOFFMAN	ENCL,N4X,SS 16X16X6 HOFF	6001565
	1	A16P16	HOFFMAN	PLATE,BACK,16X16 3R 4X 12 HOF	6000716
ISBARR	100	54288958	Ryerson	ALMN, .125x48x96 PVC B/S 3003-H15	1027169
TB1	6	3044199	PHOENIX CONTACT	TERM,BLK,85AMP,16-4AWG,SCREW,GRY,PHX	1039828
TB1	2	3044212	PHOENIX CONTACT	TERM,BLK,GRD,85AMP,16-4AWG,SCREW,GRN/YI	1039829
TB2, TB5	20	3044131	PHOENIX CONTACT	TERM,BLK,50AMP,24-8AWG,SCREW,GRY,PHX	1038973
TB5	2	3044157	PHOENIX CONTACT	TERM,BLK,GRD,50AMP,24-8AWG,SCREW,GRN/YI	1039246
	1	TA2	ILSCO	GROUND LUG, ILSCO	1028348
	1	1038256	METALLICS INC.	LBL, PRIX, NAMEPLATE, SM, POLY, 6.0X1.75	1038256
	1			LBL,RH,WRNG 4X2	1005699

PRIMEX
WWW.PRIMEXCONTROLS.COM

Arc Armor® Enclosure

Specifications

- 14-gauge Type 304 stainless steel bodies
- 16-gauge Type 304 stainless steel doors
- Individual seams continuously welded and ground smooth
- Compartments sealed via paintable sealant for environmental protection
- Louvered floor stand in 14-gauge Type 304 stainless steel
- Reinforced lifting eyes
- Type 4-rated gasket
- 90-degree external formed flange on top of body opening
- Epoxy Coated Zinc POWERGLIDE Handle and 3-point latching
- Door removed by pulling stainless steel continuous hinge pin
- Data pocket is high-impact thermoplastic
- Collar studs provided for mounting optional panels
- Stainless steel Door Stops on doors over 12” wide.

Finish

Enclosures have white polyester powder paint finish inside and out.

Ratings

UL 508A Listed; Type 3R, 4, 4X, 12; File No.E61997
cUL Listed per CSA C22.2 No 94; Type 3R, 4, 4X, 12; File No. E61997

NEMA/EEMAC Type 3R, 4, 4X, 12, 13
Meets NEMA Type 3RX requirements

Patent

US D646,239 S

Ashland, OH
Toll Free: 800-363-5842

Clearwater, FL
Toll Free: 800-349-1905

Detroit Lakes, MN
Toll Free: 888-342-5753

Milford, OH
Phone: 513-831-9959

Plymouth, MN
Phone: 763-559-0568

Vacaville, CA
Phone: 707-449-0341

844-4PRIMEX (477-4639)

Arc Armor® Enclosure

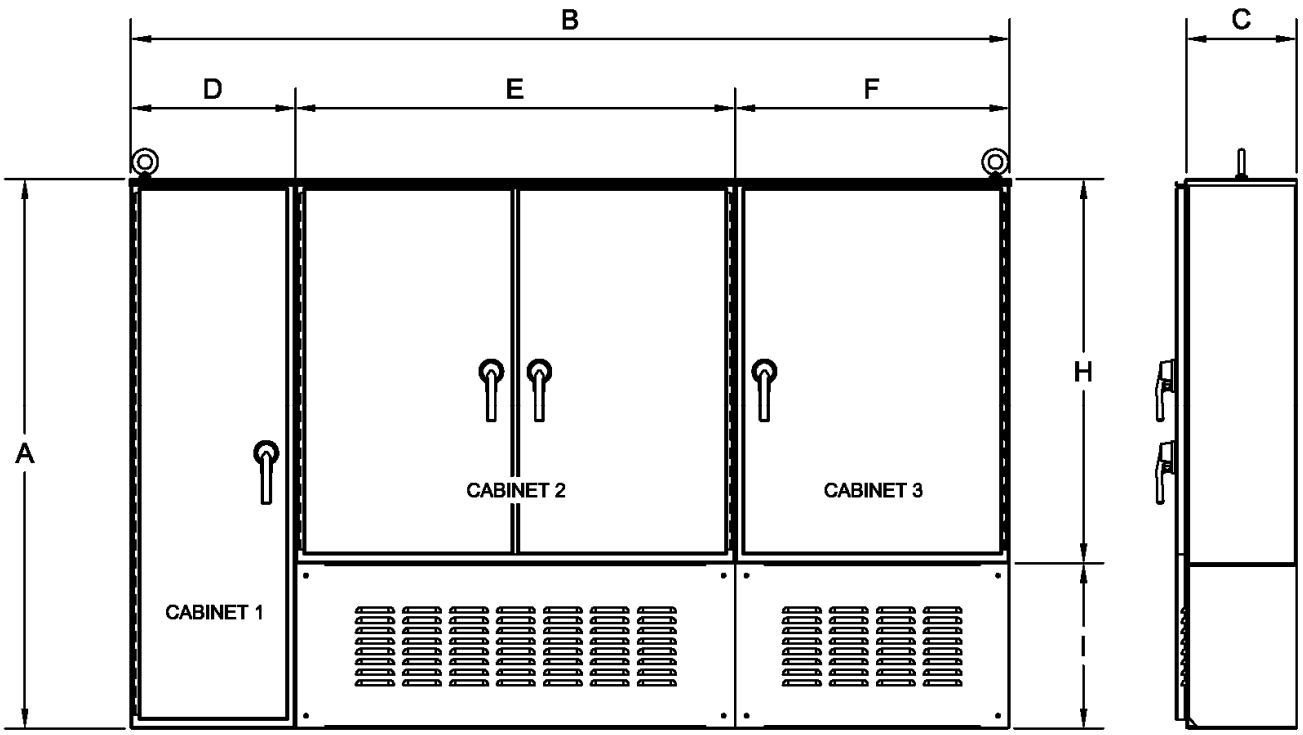
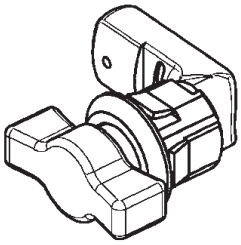


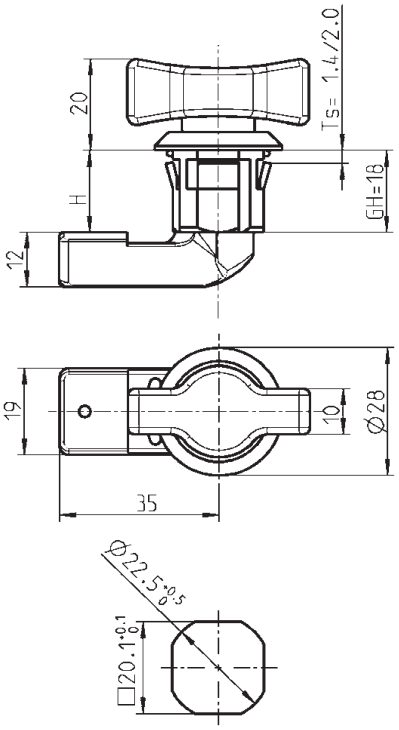
FIGURE 4

Base Mount (single sided)

Model	Part #	Figure	Dimensions (inches)									Notes
			A	B	C	D	E	F	G	H	I	
AA607212	1040959	4	60	72	12	12	36	24	-	42	18	Cabinet 2 has a single door.
AA609612	1040960	4	60	96	12	18	48	30	-	42	18	Cabinet 2 has a dual door.
AA6612018	1040961	4	66	120	18	24	60	36	-	48	18	Cabinet 2 has a dual door.
AA7814418	1040962	4	78	144	18	36	72	36	-	60	18	Cabinet 2 has a dual door.

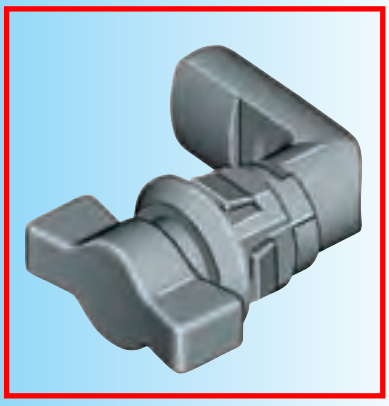
Clip-in fixing





Cut out

Housing polyamide GF black with nut or spring fixing AISI 301		Housing polyamide black with O-ring	
*nut fixing	Spring fixing	Ts	clip-in
1000-U675	1000-U709	1,4**	1000-U695
		2,0	1000-U696
Insert polyamide black, wave washer and self cutting screw m.s. zinc plated			
Square 7		1000-U666	
Square 8		1000-U676	
Triangular 8		1000-U667	
Double bit 3		1000-U677	
Double bit 5		1000-U678	
Slot 2 x 4		1000-U679	
Eastern Europe Ø 13		1000-U680	
Wing knob (IP 50), IP 65 upon request		1000-U711	
Cam on choice			
H		**m.s. zinc plate, t=4**	**polyamide black**
18		1000-5046	1000-386-18
20		1000-5161	1000-386-20
22		1000-5119	1000-386-22
24		-	1000-386-24
28		1000-5164	1000-386-28
30		-	1000-386-30
IP 65 (see housing) with:			
Flat seal (nut fixing only)		1000-23	
O-ring		1000-24	

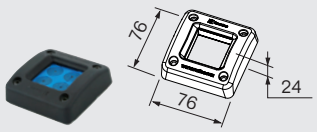


Note:
Quarter turn assembling 1B-105

Further parts see page
– Insert with wing knob 1B-720
– Handle (only nut fixing) 1C-320
– Dust cap (only nut fixing) 1C-320
– Key 12B-120

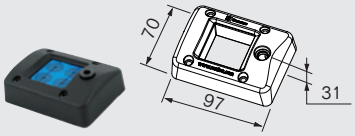
Roxtec EzEntry™

Roxtec EzEntry™ 4 mini/4



For cable/pipe range	0+3.5-16.5 mm / 0+0.138-0.650 in
Number of cables/pipes	4
Weight	0.100 kg / 0.220 lb
Article No.	EZ00000000440
Ratings	UL/NEMA and IP 55

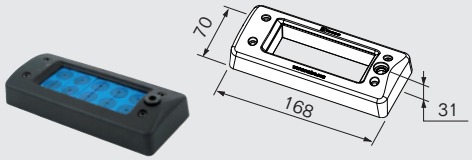
Roxtec EzEntry™ 4/4



For cable/pipe range	0+3.5-16.5 mm / 0+0.138-0.650 in
Number of cables/pipes	4
Weight	0.130 kg / 0.287 lb
Article No.	EZ00000000044
Ratings	UL/NEMA and IP 66/67

Roxtec EzEntry™ 10/10

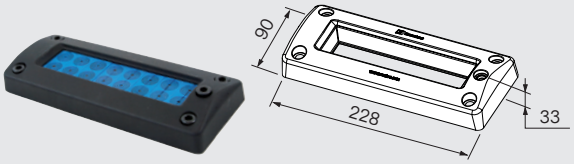
Fits standard multipin connector knock-out.



For cable/pipe range	0+3.5-16.5 mm / 0+0.138-0.650 in
Number of cables/pipes	10
Weight	0.300 kg / 0.650 lb
Article No.	EZ00000001010
Ratings	UL/NEMA and IP 66/67

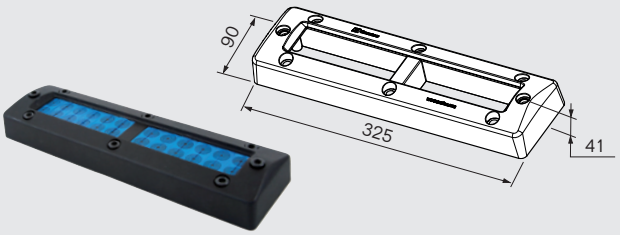
Roxtec EzEntry™ 16/16

Fits FL 21 knock-out.



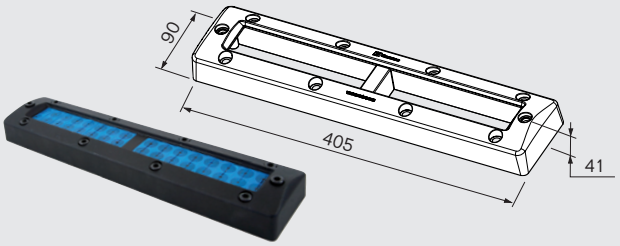
For cable/pipe range	0+3.5-16.5 mm / 0+0.138-0.650 in
Number of cables/pipes	16
Weight	0.387 kg / 0.860 lb
Article No.	EZ00000001616
Ratings	UL/NEMA and IP 66/67

Roxtec EzEntry™ 24/24



For cable/pipe range	0+3.5-16.5 mm / 0+0.138-0.650 in
Number of cables/pipes	24
Weight	0.805 kg / 1.774 lb
Article No.	EZ00000002424
Ratings	UL/NEMA and IP 66/67

Roxtec EzEntry™ 32/32



For cable/pipe range	0+3.5-16.5 mm / 0+0.138-0.650 in
Number of cables/pipes	32
Weight	1.030 kg / 2.270 lb
Article No.	EZ00000003232
Ratings	UL/NEMA and IP 66/67

The kit includes:
- Screws
- Hex key
- Lubricant (Assembly Gel for Roxtec EzEntry™ 4 mini)

Frame material:
Composite (PA 6.6 25% GF)

For more information, such as holecuts and assembly instruction, please visit:

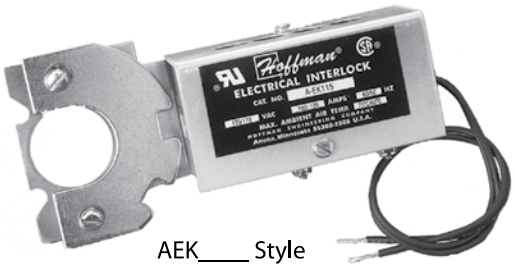
www.roxtec.com/ezentry

Roxtec International AB
Box 540, 371 23 Karlskrona, SWEDEN
PHONE +46 455 36 67 00, FAX +46 455 820 12
EMAIL info@roxtec.com, www.roxtec.com

SHE2008000701 ver_1.0/GB/0821/kasve

Electrical Interlocks

Electrical Interlocks



AEK____ Style

AEK____NDH Style

Industry Standards

UL 508A Component Recognized; File No. E61997

CSA Certified; File No. 42186

Application

Provide positive internal safety lockout on electrical enclosures while the equipment is energized. Catalog numbers AEK115, AEK230 and AEK460 are used with standard Hoffman door latching mechanisms. When energized, these interlocks prevent the door handle from being turned to open the door. Fit either clockwise or counterclockwise handles in the following enclosures:

1. All two-door Type 4 and 12 enclosures
2. All Type 4X with 3-point latch enclosures
3. Free-standing Type 12 enclosures
4. All one-door Type 12 enclosures with latch kits installed

The interlocks will fit the following enclosures, but modifications are required. Consult the factory for more information.

1. Two-door Type 12 enclosures for flange-mounted disconnects
2. Heavy duty free-standing Type 12 enclosures for flange-mounted disconnects
3. Modular Type 12 enclosures for flange-mounted disconnects
4. Multi-door Type 12 enclosures

The interlocks will also fit most Hoffman custom enclosures with door latching mechanisms similar to the mechanisms used on the preceding enclosures. Electrical interlocks will not fit CONCEPT® enclosures or Bulletin A25 and A26 enclosures. Interlocks are not designed to be used in place of the standard door or cover latch.

Catalog numbers AEK115NDH, AEK230NDH and AEK460NDH are designed to be used on some Hoffman enclosures and boxes which have exterior latching only. When energized, these interlocks will prevent the enclosure door from being opened. They fit on the door or cover of the following enclosures and maintain UL Type 4, 4X and 12 when properly installed per Hoffman instructions:

1. One-door Type 4 and 4X enclosures
2. Two-door Type 4 and 4X enclosures
3. One-door Type 12 enclosures
4. Larger sizes of CH, CHS, CHNF, CHNFSS and CHAL junction boxes
5. Type 1 and large Type 1 enclosures

The interlocks also fit in most Hoffman custom enclosures and boxes which have doors or covers hinged similar to doors or covers on the preceding enclosures.

Installation

AEK115, AEK230 and AEK460 mount on the inside of the enclosure door using the same screws which hold the door handle in place. The strike plate attaches to the existing latch assembly.

Specifications

- Rugged steel construction and plated finish
- Solenoids are rated for continuous duty and will stand up under heavy industrial use
- Packaged complete with a solenoid assembly, strike plate or bracket and instructions for field installation
- Handles and latch mechanisms are not included.

Bulletin: A80

Standard Product **A-EK___ Style**

Catalog Number	Volts @ 50/60 Hz	Normal/Inrush Amps @ 60Hz	Normal/Inrush Amps @ 50Hz
AEK115	110/120	.100/.63	.120/.69
AEK230	220/240	.050/.32	.060/.35
AEK460	440/480	.025/.16	.030/.18

Standard Product **AEK___NDH Style**

Catalog Number	Volts @ 50/60Hz	Normal/Inrush Amps @ 60Hz	Normal/Inrush Amps @ 50Hz
AEK115NDH	110/120	.100/.63	.120/.69
AEK230NDH	220/240	.050/.32	.060/.35
AEK460NDH	440/480	.025/.16	.030/.18

The UPA-100 Power Alert **reduces the risk of electrical arc flash** by pre-verifying the electrical isolation from outside of a control panel. Hardwired to the circuit breaker or main disconnect, the UPA flashes whenever voltage is present. Engineered with **redundant circuitry,** the Power Alert is powered by the same voltage that it indicates.

c UL us LISTED

NEMA 4X

Universal Power Alert

OPERATION

The eight detector UPA-100 visually alerts to the presence of dangerous AC or DC (Stored Energy) potentials occurring between any combination of the four monitored input lines (L1, L2, L3, GND). Two LED indicators are assigned to each input line and are designated "+" and "-". For each input line carrying an AC potential (bi-polar), both the "+" and "-" LEDs will be active. A DC or Stored Energy potential will illuminate the "+" LED for the positive line and the "-" LED for the negative line.

OSHA 1910.147 THE CONTROL OF HAZARDOUS ENERGY (LOCKOUT/TAGOUT)

Following the application of lockout or tagout devices to energy isolating devices, all potentially hazardous stored or residual energy shall be relieved, disconnected, restrained, and otherwise rendered safe. (d)(5)(ii)

If there is a possibility of reaccumulation of stored energy to a hazardous level, verification of isolation shall be continued until the servicing or maintenance is completed, or until the possibility of such accumulation no longer exists. (d)(6)

"Verification of Isolation." Prior to starting work on machines or equipment that have been locked out or tagged out, the authorized employee shall verify that isolation and de-energization of the machine or equipment have been accomplished.

SPECIFICATIONS

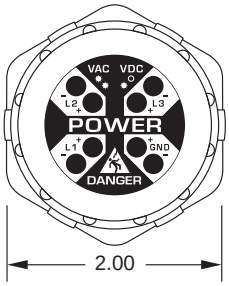
OPERATIONAL RANGE	AC Single or 3-Phase	40 to 750 VAC, 50/60/400 Hz, (LINE-TO-LINE or LINE-TO-GND)
	DC or Stored Energy	30 to 1000 VDC, (LINE-TO-LINE or LINE-TO-GND)
MAXIMUM RATED VOLTAGE	750 VAC/1000 VDC (LINE-TO-LINE or LINE-TO-GND)	
DETECTION THRESHOLDS	29 VAC 3-Phase, 40 VAC SINGLE-Phase, 27 VDC (TYP Cutoff)	
POWER CONSUMPTION	1.2 Watts @ 750 VAC (Approximately)	
TEMPERATURE RATING	Operate	-4° to 131°F (-20° to +55°C)
	Storage	-40° to 185°F (-40° to +85°C)
ENCLOSURE	NEMA 4X 105°C PVC, Totally Encapsulated for Environment Protection	
TERMINATIONS	(4) 8ft, 18 AWG 1000V, UL-1452	
WEIGHT	9 oz.	

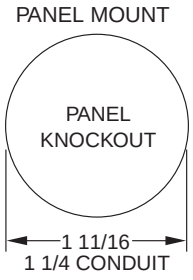
- Detects Single or 3-Phase AC & DC Voltage or Stored Energy
- *Redundant* Circuitry
- Verification of Zero Energy in a Panel
- Fits 1-1/4" Conduit Knock-Out

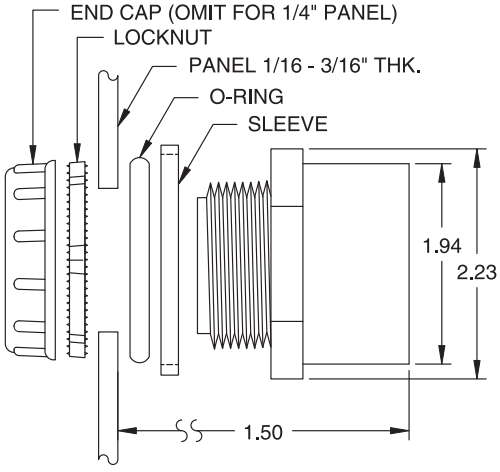
ORDERING INFORMATION

MODEL NUMBER	DESCRIPTION
UPA-100	Universal Power Alert

DIMENSIONS (INCHES)







INSTALLATION: INSIDE PANEL SURFACE MUST BE UNIFORM. TIGHTEN LOCKNUT UNTIL SLEEVE BOTTOMS-OUT.

INDICATOR FLASH RATES (L1, L2, L3, GND)							
3- Phase Line-To-Line (VAC)	<29	30	120	240	480	600	750
Flashes/Sec (Typical)	0	1.3	4.2	5.8	7.3	8.0	8.8
DC or Stored Energy (VDC)	<27	30	48	110	300	600	1000
Flashes/Sec (Typical)	0	1.6	2.5	4.5	6.9	8.8	9.1

GND DETECTOR THRESHOLDS (LEAKAGE ANY PHASE-TO-GROUND)					
3- Phase Line-To-Line (VAC)	30	120	240	480	750
L1, L2, or L3 To Ground Continuity (OHMS)	2M	2M	3M	5M	7M
Detector Included Fault Current (µA)	7	26	38	60	67

DETECTOR INCLUDED FAULT CURRENT (PHASE-TO-GROUND SHORT)					
3- Phase Line-To-Line (VAC)	30	120	240	480	750
0 OHM Phase-To-Ground Current (µA)	28	108	219	455	730

Power Blocks - Splicer/Distribution

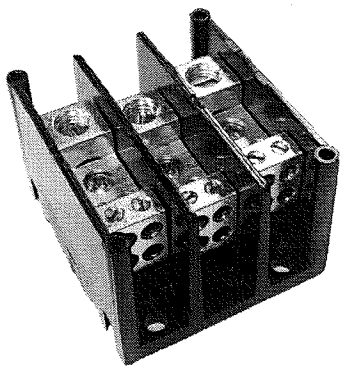
Electrical
- 60 - 2280 amps
- 600 volts AC/DC (UL)
- Flexible stranded wire compliant
- Multiple wire rating - refer to data sheets for details
- Listed products provide feeder circuit terminal spacing

Mechanical
- Base, black thermoplastic or phenolic (see chart)
- Insulator temp-ratings
  - Thermoplastic: 125°C (257°F) - UL RTI
  - Phenolic: 150°C (302°F) - UL RTI
- Flammability, UL 94 V-0
- Mounting: panel mountable, 132 series is also DIN mountable

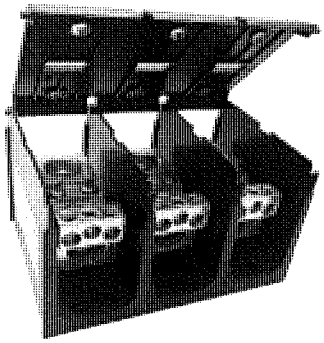
Standards
- See chart for product specific approvals listed
- UL listed - or - UL recognized
  - Listed file no. QPQS.E309401 (UL 1953)
  - Recognized file no. XCFR2.E62806 (UL 1059)
- CSA certified file no. LR19766 (CSA C22-2 No. 158)
- CE (Component IEC 60947-7-1)
- RoHS compliant (All)

Accessories (consult customer service)
- Covers - see page 24 for series cover specifications
- Marking strips - available with custom printing
- Printing - consult factory for custom requests

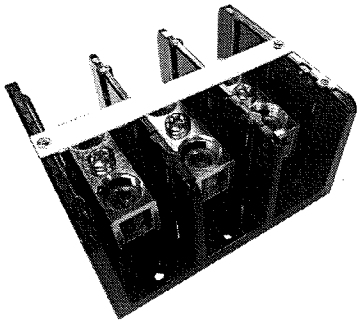
See on-line data sheets for:
- Dimensional drawings
- Detailed SCCR information
- Termination and mounting specifications



1413400



1333587CH
(shown with cover)



1433124
(shown with marking strip)

Ordering Code:

SERIES	POLES	IDENTIFIER	COVER OPTION
XXX	X	XXX	XX
		Random 3-digit Identifier	Blank = No Cover CH = Hinge Cover Attached

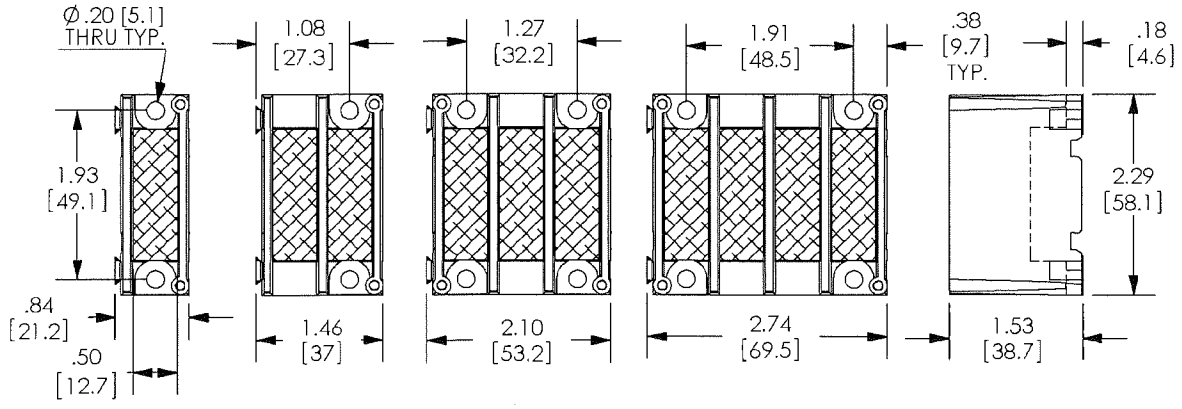
Series	Poles Available	Dimensions	Cover Type Available
141	1/2/3/4	Pg 21	Flat
140	2/3	Pg 22	Flat
132	0/1/2/3	Pg 21	Hinge
142	1/2/3	Pg 21	Flat
143		Pg 22	Flat
133		Pg 22	Hinge
144		Pg 23	Flat
145		Pg 23	Flat
135		Pg 23	Hinge

Power Blocks - Splicer/Distribution

Amps	Catalog #	Poles (X)	MATERIAL		LINE SIDE		LOAD SIDE		Agency Compliance
			Insulator	Conn.	Wire Range AWG/kcmil	Connector Openings/ Pole	Wire Range AWG/kcmil	Connector Openings/Pole	
60	141x403	1/2/3/4	Plastic	AL	#2 - #14	1	#10 - #18	2	UL Recognized CSA Certified CE Compliant
115	141x300	1/2/3/4	Plastic	AL	#2 - #14	1	#2 - #14	1	UL Recognized CSA Certified CE Compliant
115	142x552	1/2/3	Phenolic	AL	#2 - #14	1	#2 - #14	1	UL Recognized CSA Certified CE Compliant
115	141x400	1/2/3/4	Plastic	AL	#2 - #14	1	#10 - #18	4	UL Recognized CSA Certified CE Compliant
150	142x121	1/2/3	Phenolic	CU	1/0-#14		1/0-#14		UL Recognized CSA Certified CE Compliant
175	132x572	0/1/2/3	Plastic	AL	2/0 - #14	1	2/0 - #14	1	UL Recognized CSA Certified CE Compliant
175	142x572	1/2/3	Phenolic	AL	2/0 - #14	1	2/0 - #14	1	UL Recognized CSA Certified CE Compliant
175	132x972	1/2/3	Plastic	CU	2/0 - #14	1	2/0 - #14	1	UL Recognized CSA Certified CE Compliant
175	132x570	0/1/2/3	Plastic	AL	2/0 - #14	1	#4 - #14	4	UL Recognized CSA Certified CE Compliant
175	142x570	1/2/3	Phenolic	AL	2/0 - #14	1	#4 - #14	4	UL Recognized CSA Certified CE Compliant
175	132x580	0/1/2/3	Plastic	AL	2/0 - #14	1	#4 - #14	6	UL Recognized CSA Certified CE Compliant
175	140x402	2/3	Phenolic	AL	2/0 - #14	1	#4 - #14	4	UL Recognized CSA Certified CE Compliant
175	140x401	2/3	Phenolic	AL	2/0 - #14	1	#4 - #14	6	UL Recognized CSA Certified CE Compliant
175	132x970	0/1/2/3	Plastic	CU	2/0 - #14	1	#4 - #14	4	UL Recognized CSA Certified CE Compliant
175	142x970	1/2/3	Phenolic	CU	2/0 - #14	1	#4 - #14	4	UL Recognized CSA Certified CE Compliant
255	143x124	1/2/3	Phenolic	CU	250 kcmil - #6	1	250 kcmil - #6	1	UL Recognized CSA Certified CE Compliant
255	143x123	1/2/3	Phenolic	AL	250 kcmil - #6	1	250 kcmil - #6	1	UL Recognized CSA Certified CE Compliant

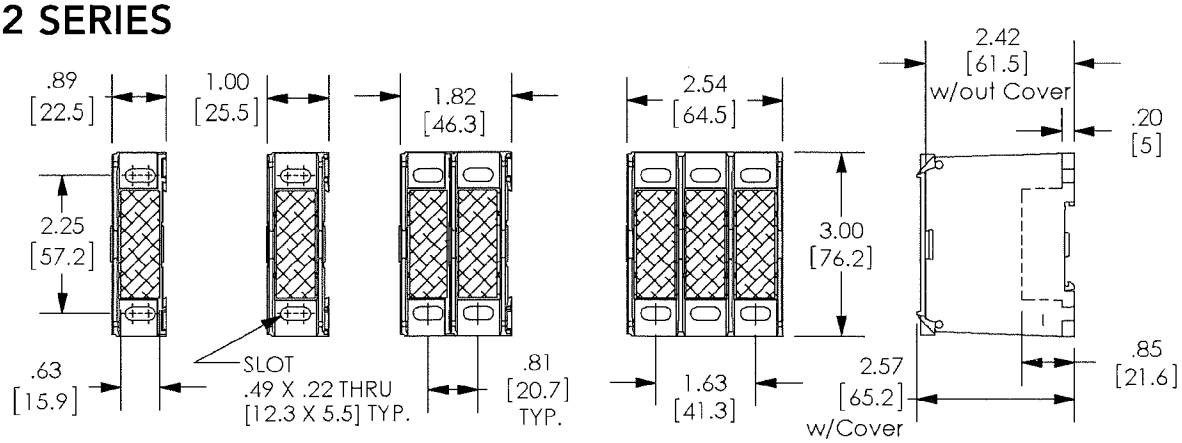
Power Terminal Block Dimensions

141 SERIES



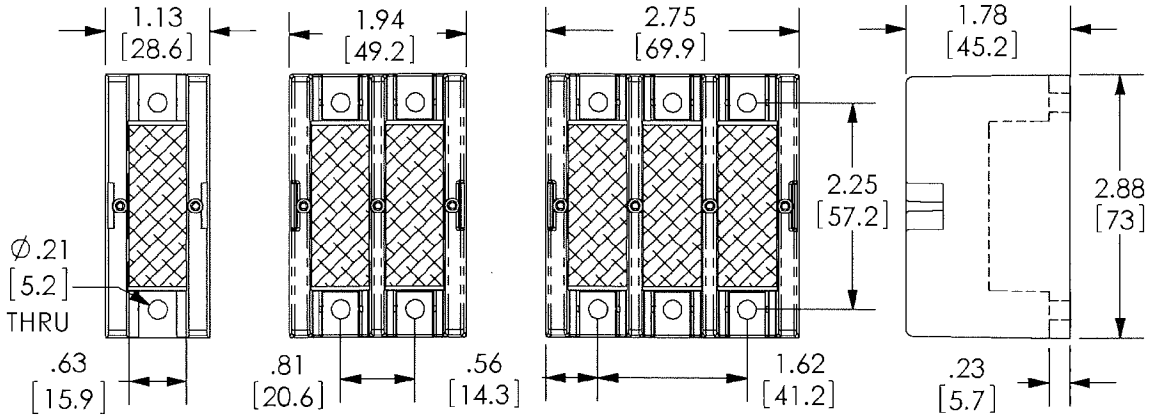
1 Pole | 2 Pole | 3 Pole | 4 Pole

132 SERIES



Adder | 1 Pole | 2 Pole | 3 Pole

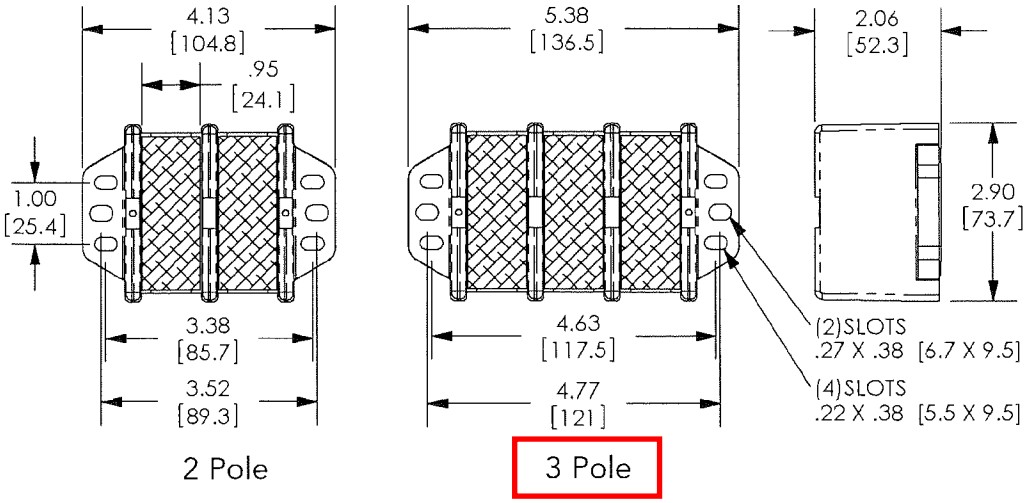
142 SERIES



1 Pole | 2 Pole | 3 Pole

Power Terminal Block Dimensions

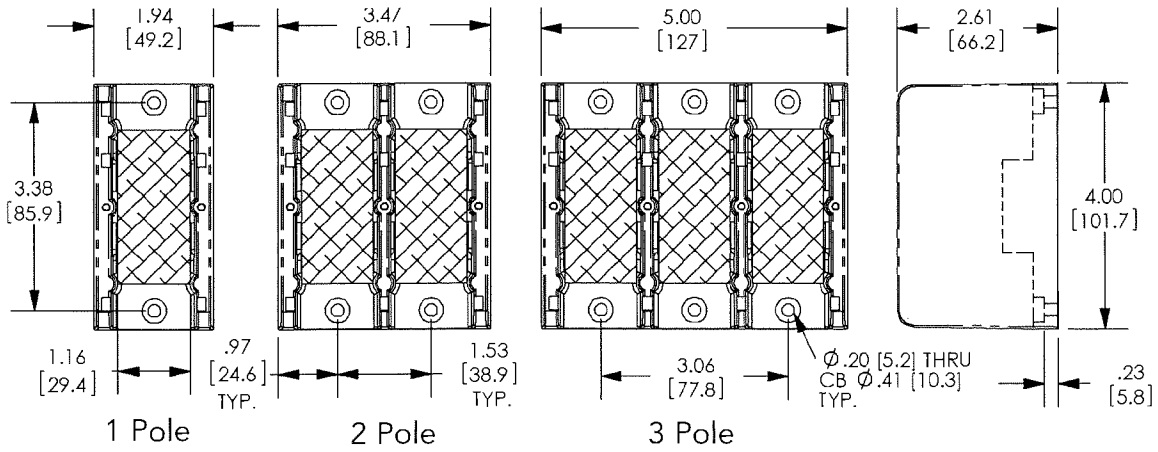
140 SERIES



2 Pole

3 Pole

143 SERIES

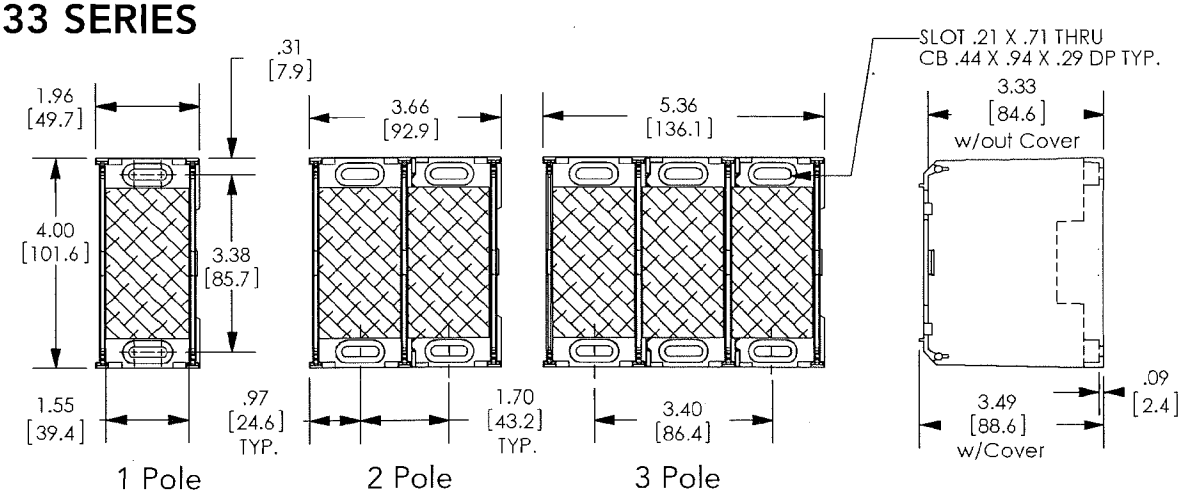


1 Pole

2 Pole

3 Pole

133 SERIES



1 Pole

2 Pole

3 Pole

Power Block Covers

Specifications:

140/141/142/143/144/145 Series (Figures 1 & 2)
- Material UL recognized, QMFZ2, 125°C, .06 clear protective plastic
- Thread cutting screws furnished per cover
- RoHS compliant

132/133 Series (Figure 3)
- Snap on, hinge cover, black thermoplastic
- UL recognized, QMFZ2, 125°C
- RoHS compliant

135 Series (Figure 4)
- Snap on, hinge cover, black thermoplastic
- UL recognized, QMFZ2, 125°C
- RoHS compliant

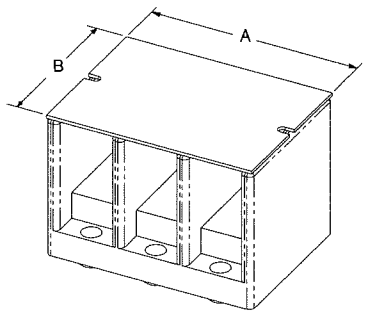


FIGURE 1

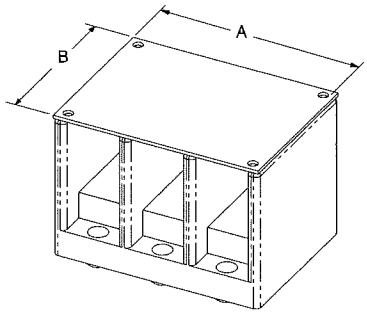


FIGURE 2

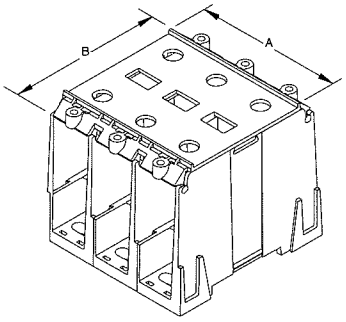


FIGURE 3
(Hinge Cover)

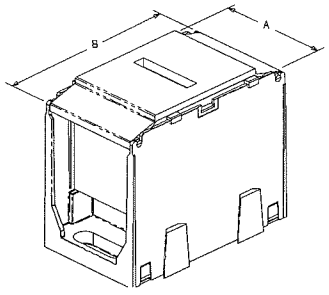


FIGURE 4
(Hinge Cover)

Dimensions (inches):

Catalog #	A	B	Figure #
CC1402	2.75	2.50	1
CC1403	4.00		
CC1411	0.77	2.40	2
CC1412	1.42		
CC1413	2.05		
CC1414	2.68		
CC1421	1.06	2.75	1
CC1422	1.87		
CC1423	2.68		
CC1431	1.76	3.38	1
CC1432	3.31		
CC1433	4.84		
CC1411	2.12	4.00	1
CC1442	4.00		
CC1443	5.87		
CC1451	2.87	4.5	1
CC1452	5.56		
CC1453	8.28		
CH1321	0.88	2.87	3
CH1322	1.69		
CH1323	2.50		
CH1331	1.93	3.89	3
CH1332	3.61		
CH1333	5.30		
CH1351 (one pole only)	3.35	5.65	4

Feed-through terminal block - UT 16 - 3044199

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Feed-through terminal block, Connection method: Screw connection, Cross section: 1.5 mm² - 25 mm², AWG: 16 - 4, Width: 12.2 mm, Height: 54.4 mm, Color: gray, Mounting type: NS 35/7,5, NS 35/15

Product Features

- The reducing bridges can be used to connect terminal blocks with different connection technologies, e.g., UT 35 screw terminal block with Push-in technology 2,5 Push-in terminal blocks, to form power blocks
- Easy and time-saving potential supply and distribution of large currents and cross sections up to 35 mm² with reducing bridges
- The flexible options for reducing bridging in the CLIPLINE complete system can be found in "Accessories for the CLIPLINE complete modular terminal block system"
- Tested for railway applications
-

Key commercial data

Packing unit	1 pc
Minimum order quantity	50 pc
Weight per Piece (excluding packing)	30.0 GRM
Custom tariff number	85369010
Country of origin	Turkey

Technical data

General

Number of levels	1
Number of connections	2
Color	gray
Insulating material	PA
Inflammability class according to UL 94	V0
Area of application	Railway industry

Ground modular terminal block - UT 16-PE - 3044212

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Ground modular terminal block, Connection method: Screw connection, Cross section: 1.5 mm² - 25 mm², AWG: 16 - 4, Width: 12.2 mm, Height: 54.4 mm, Color: green-yellow, Mounting type: NS 35/7,5, NS 35/15

Product Features

- Tested for railway applications
-

Key commercial data

Packing unit	1 pc
Weight per Piece (excluding packing)	46.85 GRM
Custom tariff number	85369010
Country of origin	Turkey

Technical data

General

Number of levels	1
Number of connections	2
Color	green-yellow
Insulating material	PA
Inflammability class according to UL 94	V0
Area of application	Railway industry
	Mechanical engineering
	Plant engineering
	Process industry
Maximum load current	101 A (with 25 mm² conductor cross section)
Rated surge voltage	8 kV

Extract from the online catalog

UT 6

Order No.: 3044131

http://eshop.phoenixcontact.de/phoenix/treeViewClick.do?UID=3044131

Universal terminal block with screw connection, cross section: 0.2 - 6 mm², AWG: 24 - 8, width: 8.2 mm, color: Gray

Product notes

WEEE/RoHS-compliant since: 10/26/2006

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	
EAN	4017918960438
Pack	50 Pcs.
Customs tariff	85369010
Weight/Piece	0.01503 KG
Catalog page information	Page 27 (CL-2007)

Technical data

General

Number of levels	1
Number of connections	2
Color	gray

Ground modular terminal block - UT 6-PE - 3044157

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Ground modular terminal block, Connection method: Screw connection, Cross section: 0.2 mm² - 10 mm², AWG: 24 - 8, Width: 8.2 mm, Color: green-yellow, Mounting type: NS 35/7,5, NS 35/15

Product Features

- The large wiring space enables the connection of solid and stranded conductors without ferrules, even above the nominal cross section
- Tested for railway applications
- As well as saving space, the compact design enables user-friendly wiring in a small amount of space
- Optimum screwdriver guidance through closed screw shafts
- The multi-conductor connection offers maximum flexibility and wiring density
- The cable entry funnel enables the use of conductors with ferrules and plastic collars within the nominal cross section

Key commercial data

Packing unit	1 pc
Weight per Piece (excluding packing)	22.74 GRM
Custom tariff number	85369010
Country of origin	Germany

Technical data

General

Number of levels	1
Number of connections	2
Color	green-yellow
Insulating material	PA
Inflammability class according to UL 94	V0
Area of application	Railway industry
	Mechanical engineering

Feed-through terminal block - UT 2,5 - 3044076

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Feed-through terminal block, Connection method: Screw connection, Cross section: 0.14 mm² - 4 mm², AWG: 26 - 12, Width: 5.2 mm, Color: gray, Mounting type: NS 35/7,5, NS 35/15

Product Features

- The large wiring space enables the connection of solid and stranded conductors without ferrules, even above the nominal cross section
- As well as saving space, the compact design enables user-friendly wiring in a small amount of space
- Optimum screwdriver guidance through closed screw shafts
- The multi-conductor connection offers maximum flexibility and wiring density
- Tested for railway applications
- The cable entry funnel enables the use of conductors with ferrules and plastic collars within the nominal cross section

Key commercial data

Packing unit	1 pc
Minimum order quantity	50 pc
Weight per Piece (excluding packing)	8.0 GRM
Custom tariff number	85369010
Country of origin	Germany

Technical data

General

Number of levels	1
Number of connections	2
Nominal cross section	2.5 mm²
Color	gray
Insulating material	PA
Inflammability class according to UL 94	V0

AU 2 CONDUCTOR AL/CU

- Manufactured from high strength 6061-T6 aluminum alloy.
- Electro-Tin plated.
- UL 486B 90° C Listed and is CSA certified for 600 Volts.
- Suitable for use with either copper or aluminum conductors.
- Chamfered wire entry provides ease of installation.
- UL File E6207

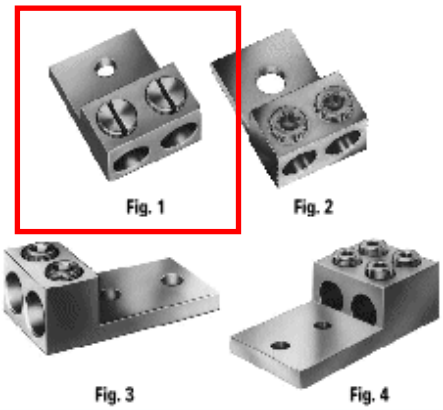


Fig. 1

Fig. 2

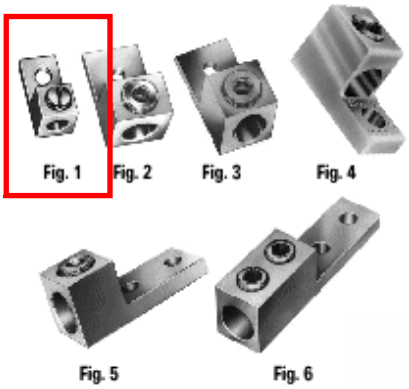
Fig. 3

Fig. 4

Catalog No.	Fig. No.	Wire Range AL/CU	Bolt Size	Length	Width	Hex Size	N.A.E.D. No.
AU-0	1	1/0-14 STR.	1/4	1-15/32	1-1/8	S	78366900066
AU-2/0	1	2/0-14 STR.	1/4	1-15/32	1-1/4	3/16	78366900074
AU-250	2	250 MCM-6 STR.	3/8	2-9/16	1-21/32	5/16	78366900330
AU-350	2	350 MCM-6 STR.	1/2	2-7/8	1-57/64	5/16	78366900381
AU-350-2N	3	350 MCM-6 STR.	1/2 (2)	4-5/16	2	5/16	78366900574
AU-600	2	600 MCM-2 STR.	1/2	3-3/16	2-13/32	1/2	78366900568
AU-600-2NS	3	600 MCM-2 STR.	1/2 (2)	4-11/16	2-13/32	1/2	78366900576
AU-600-2N	4	600 MCM-2 STR.	1/2 (2)	5-1/2	2-13/32	1/2	78366900577
AU-800	2	800 MCM-300 MCM	5/8	3-3/8	3-3/16	1/2	78366900680
AU-800-2NS	3	800 MCM-300 MCM	1/2 (2)	4-3/4	3-3/16	1/2	78366900700
AU-800-2N	4	800 MCM-300 MCM	1/2 (2)	6-3/16	3	1/2	78366900702
AU-1000	2	1000 MCM-500 MCM	5/8	3-3/8	3-3/16	9/16	78366900699
AU-1000-2NS	3	1000 MCM-500 MCM	1/2 (2)	4-3/4	3-3/16	9/16	78366900794
AU-1000-2N	4	1000 MCM-500 MCM	1/2 (2)	6-3/16	3-3/16	9/16	78366900796

TA 1 CONDUCTOR AL/CU

- Manufactured from high strength 6061-T6 aluminum alloy.
- Electro-Tin plated.
- UL 486B 90° C Listed and is CSA certified for 600 Volts.
- Suitable for use with either copper or aluminum conductors
- Chamfered wire entry provides ease of installation.
- UL File E6207



* Catalog Numbers link to CAD files (if available)

Catalog No.	Fig. No.	Wire Range	Bolt Size	Length	Width	Hex Size	N.A.E.D. No.
TA-6-S	1	4-14 STR.	1/4	1-1/16	1/2	S	78366988838
TA-2	1	2-14 STR.	1/4	1-5/32	1/2	S	78366988774
TA-0	1	1/0-14 STR.	1/4	1-15/32	5/8	S	78366988715
TA-2/0	2	2/0-14 STR.	1/4	1-15/32	5/8	3/16	78366917749
TA-250	2	250 MCM-6 STR.	5/16	2	1	5/16	78366988942
TA-300	2	300 MCM-6 STR.	1/4	2	55/64	5/16	78366918741
TA-350	2	350 MCM-6 STR.	3/8	2-1/4	1-1/8	3/8	78366988993
TA-500	2	500 MCM-4 STR.	3/8	2-13/16	1-1/2	1/2	78366989101
TA-500-S	3	ONE 600 MCM-4 STR. or TWO EQUAL 250 MCM-1/0 STR.	3/8	2-13/16	1-5-16	1/2	78366989144
TA-600	2	600 MCM-2 STR.	3/8	3-3/16	1-1/2	1/2	78366989216
TA-800	2	800 MCM-300 MCM	5/8	3-3/8	1-3/4	1/2	78366989320
TA-800-S	4	800 MCM-3/0 STR. CU, 800 MCM-250 MCM STR. AL	5/8	3-1/4	1-5/16	1/2	78366989312
TA-1000	2	1000 MCM-350 MCM	5/8	3-3/8	1-3/4	9/16	78366989558
TA-1000-S	4	1000 MCM-500 MCM	5/8	3-1/4	1-7/16	9/16	78366989566
TA-350-2NS	5	350 MCM-6 STR.	1/2	4-5/16	1-1/8	3/8	78366989222
TA-600-2NS	5	600 MCM-2 STR.	1/2	4-11/16	1-1/2	1/2	78366989217
TA-800-2NS	5	800 MCM-300 MCM	1/2	4-3/4	1-3/4	1/2	78366989218
TA-1000-2NS	5	1000 MCM-500 MCM	1/2	4-3/4	1-3/4	9/16	78366989219
TA-350-2N	6	350 MCM-6 STR.	1/2	5-1/2	1-1/4	(2)3/8	78366989223
TA-600-2N	6	600 MCM-2 STR.	1/2	5-1/2	1-3/8	(2)3/8	78366989225
TA-800-2N	6	800 MCM-300 MCM	1/2	6-3/16	1-3/4	(2)1/2	78366989340
TA-1000-2N	6	1000 MCM-500 MCM	1/2	6-3/16	1-5/8	(2)1/2	78366989486

OEM Kit

OEM/Assembler Kits

Surgelogic™ OEM/assembler kits allow manufacturers to add industry-leading surge suppression directly to customized equipment. Manufacturers benefit from shorter wire lengths that optimize the clamping voltage of the SPD. Products come with a backplane-mounted SPD, mounting hardware and diagnostic display with 36-inch cables. Audible alarm, silence switch, remote monitoring contacts, and surge counter are standard. Available as UL 1449 Type 2 (or 1 with optional suffix in catalog number).

US and Canadian UL® Recognized to UL 1449 3rd Edition and UL 1283 5th Edition. Complies with requirements of NEC® Article 285 and CSA 22.2 No. 8-M1986 as appropriate. Complies with UL 96A 12th Edition Master Label requirements for Lightning Protection Systems.

Table 6.9: OEM/Assembler Kits

	Service Voltage	Peak Surge Current Rating per Phase (kA)	Cat. No. ▲	$ Price
	120/240 V, 1-phase, 3-wire + ground	120	TVS1IMA12O( )	4137.00
		160	TVS1IMA16O( )	4547.00
		240	TVS1IMA24O( )	6753.00
	208Y/120 V, 3-phase, 4-wire + ground ■♦ Wye	120	TVS2IMA12O( )	4331.00
		160	TVS2IMA16O( )	4760.00
		240	TVS2IMA24O( )	7082.00
	240/120 V, 3-phase, 4-wire + ground High-leg Delta	120	TVS3IMA12O( )	4331.00
		160	TVS3IMA16O( )	4760.00
		240	TVS3IMA24O( )	7082.00
New!	240 V, 3-phase, 3-wire + ground ■★ Delta	120	TVS6IMA12O( )	4331.00
		160	TVS6IMA16O( )	4760.00
		240	TVS6IMA24O( )	7082.00
	480Y/277 V, 3-phase, 4-wire + ground ■★ Wye	120	TVS4IMA12O( )	4526.00
		160	TVS4IMA16O( )	4976.00
		240	TVS4IMA24O( )	7413.00
New!	480Y/277 V, 3-phase, 3-wire + ground ■★ High-Resistance Ground	120	TVS4HIMA12O( )	4526.00
		160	TVS4HIMA16O( )	4976.00
		240	TVS4HIMA24O( )	7413.00
New!	480 V, 3-phase, 3-wire + ground Delta	120	TVS5IMA12O( )	4526.00
		160	TVS5IMA16O( )	4976.00
		240	TVS5IMA24O( )	7413.00
	600Y/347 V, 3-phase, 4-wire + ground ■ Wye	120	TVS8IMA12O( )	4751.00
		160	TVS8IMA16O( )	5199.00
		240	TVS8IMA24O( )	7760.00
New!	600Y/347 V, 3-phase, 3-wire + ground ■ High Resistance Ground	120	TVS8HIMA12O( )	4751.00
		160	TVS8HIMA16O( )	5199.00
		180	TVS8HIMA18O( )	7760.00
New!	600 V, 3-phase, 3-wire + ground Delta	120	TVS9IMA12O( )	4751.00
		160	TVS9IMA16O( )	5199.00
		180	TVS9IMA18O( )	7760.00

( ) For a Type 1 SPD, add a "1" suffix to the catalog number.
▲ Note the last character of the catalog number is the letter "O", not a zero.
■ Can be used on 4-wire or 3-wire grounded neutral system.
♦ 208Y/120 series also applies to the following voltage 220Y/127.
★ 480Y/277 series applies to the following voltages 380Y/220, 400Y/230, and 415Y/240.

Nipple-Mounted Surge Protective Devices

SDSA3650

SDSA3650D

SDSA3650 Surge Protective Devices

SDSA3650 SPDs are designed and listed for indoor or outdoor installation and surge suppression for three-phase grounded electrical services up to 600 Vac, including delta services (SDSA3650D). The SDSA3650 series is used extensively in service entrance panels to provide an efficient and economical means of surge suppression.

US and Canadian UL® Listed as a Type 1 SPD to UL 1449 3rd Edition. Complies with requirements of NEC® Article 285, CSA 233.1-87, and CSA C22.2 No. 8-M1986 as appropriate.

- LEDs indicate operational status
- Short circuit current rating 200 kA
- Suitable for indoor and outdoor applications (NEMA Type 4X rated)
- Convenient back-nipple mounting

Table 6.10: SDSA3650 Surge Protective Devices

	Description	Peak Surge Current Rating per Phase (kA)	Cat. No.	$ Price
	600 Vac Maximum, 3-phase, 4-wire▼	40	SDSA3650 △	248.00
New!	600 Vac Maximum, 3-phase, 3-wire Delta	40	SDSA3650D △	248.00

▼ Do not use on ungrounded systems. Systems must be solidly grounded.
△ See Table 6.13 for QOSAMK mounting kit for installation in QO™ load centers.

DELTA SURGE CAPACITORS™

Delta Surge Capacitors™ Help Prevent Surge Damage to Electrical and Electronic Equipment. Surge Capacitors control surges which are too light or fast for a Lightning Arrestor, Surge Arrestor, or Surge Suppressor to function.

4F34
UL LISTED
CA 302R

Leads:
18" #12
2 black
1 white

Weatherproof Enclosure
DIMENSIONS:
4-1/2" High 2-1/4" Diameter

Rated voltage - 250V single phase, three wire. Voltage to neutral - 125V. An internal automatic discharge circuit is provided.
This unit is designed for light duty service such as single phase commercial and residential service entrance panels.
Installation: Connect the black wires below the fuses or breaker. Connect the white wire to the ground and/or neutral bus.

4F34
UL LISTED
CA 603R

Leads:
18" #12
3 black
1 white

Weatherproof Enclosure
DIMENSIONS:
4-1/2" High 2-1/4" Diameter

Rated voltage - 600V, three phase, four wire. An internal automatic discharge circuit is provided.
This unit is designed for regular duty service such as commercial three phase service entrance panels.
Installation: Connect the black wires below the fuses or breaker. Connect the white wire to the ground and/or neutral bus.

4F34
UL LISTED
CA 603

Leads:
36" #12
3 black
1 white

Weatherproof Enclosure
DIMENSIONS:
5-3/4" High 3-1/2" Diameter

Rated voltage - 650V, three phase, four wire. An internal automatic discharge circuit is provided.
This unit is designed for heavy duty service such as motor installations.
Installation: Connect the black wires below the fuses or breaker. Connect the white wire to the ground and/or neutral bus.

Available with separate ground add part No. "G".

Surge capacitors function differently from surge arrestors. They begin to conduct at a voltage above normal line voltage after a specific time delay. Capacitors conduct current at normal line voltage continually, therefore there is no time delay or voltage change before capacitors begin to conduct. A surge arrestor or suppressor might act in as little as five nanoseconds. A surge capacitor reacts continually, therefore the response time is zero. An arrestor or suppressor might react to as little as a ten percent increase in voltage. A capacitor will react to **any** increase in voltage. Surge capacitors can handle fast low energy surges that can get by an MOV, a surge arrestor, or a surge suppressor. Delta surge arrestors/suppressors can handle high current surges that are too large for an MOV, a surge arrestor, or a surge suppressor. Use of both the Delta surge arrestor/suppressor and the Delta surge capacitor will provide more complete protection. While it is not possible to achieve 100% protection, Delta units will greatly reduce problems due to lightning, power surges, and voltage spikes.

DELTA LIGHTNING ARRESTORS,™ INC.
P. O. BOX 750
BIG SPRING, TEXAS 79721

THREE-PHASE MONITOR RELAYS

PHASE LOSS, PHASE REVERSAL, PHASE UNBALANCE, UNDERVOLTAGE AND OVERVOLTAGE

PMP SERIES PLUG-IN

NEW!

- Protects against phase loss, phase reversal, phase unbalance, undervoltage, overvoltage & rapid cycling
- Universal voltage range of 190-500V on PMPU—greater range that covers more global applications
- True RMS voltage measurement ensures accurate sensing across more applications
- Retains fault indication and continues monitoring all voltages even with a lost phase
- Ultimate three-phase protection with a variety of user-selectable and adjustable settings
- Full fault indication on top of unit for easy troubleshooting
- Manual reset option works with external switch to reset the relay from outside the enclosure
- Compact plug-in case utilizing industry-standard 8 pin octal socket
- 10A SPDT output contacts
- c UL us CE c UL us

(with appropriate socket)

MACROMATIC

800-238-7474

www.macromatic.com

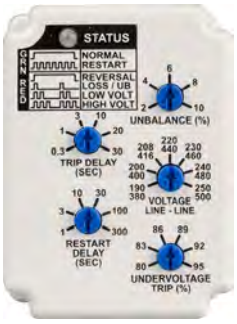
sales@macromatic.com

PMP Series Three-Phase Monitor Relays continuously monitor all voltages of a three-phase system. They are used to protect motors and equipment from expensive damage due to phase loss, phase reversal, phase unbalance, undervoltage and overvoltage faults as well as rapid cycling. These products detect single phasing and unbalanced voltages regardless of regenerative voltages.

The PMP Series incorporate a microprocessor-based design capable of advanced signal processing including *True RMS voltage measurement*. Innovative analog-to-digital sensing circuitry allows for true full-wave monitoring of all three phases, delivering the highest level of protection possible.

True RMS voltage measurement ensures accurate sensing in most generator and other applications with non-sinusoidal wave forms, eliminating nuisance tripping. Full wave monitoring provides a more accurate method to measure the voltages, regardless of load type or wave shape, resulting in improved protection across more applications.

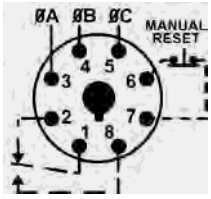
Unlike similar three-phase monitor relays, the PMP Series will *continue to function even with a lost phase*. They are the only line-powered units in their class to retain fault indication and continuous monitoring of all voltages during a phase loss, increasing the ease of troubleshooting and the level of protection.



The *PMPU is a true universal voltage product* that works on any three-phase line-line voltage of 190-500V. The Voltage Line-Line knob on the PMPU has two ranges: a 190-250V low voltage scale and a 380-500V high voltage scale. The unit auto senses the three-phase line-line voltage when applied and automatically selects the appropriate range. The PMP120 and PMP575 have a single adjustable range (see table below).

Operation:
When the proper three-phase line voltage is applied to the unit and the phase sequence (rotation) is correct, the relay is energized after the Restart Delay is completed. Any one of five fault conditions will de-energize the relay after a delay. As standard, re-energization is automatic upon correction of the fault condition. Manual reset is available if an external momentary N.C. switch is connected to pins 6 and 7. A bi-color status LED indicates normal condition and also provides specific fault indication to simplify troubleshooting.

PMP Series

PROTECTS AGAINST	LINE-LINE VOLTAGE▲ 50/60 Hz	CATALOG NUMBER	WIRING/SOCKET
Phase Loss, Phase Reversal, Phase Unbalance, Undervoltage & Overvoltage	102-138V	PMP120	8 Pin Octal **70169-D**
	190-500V	PMPU ●	
	460-600V	PMP575 ●	**DIAGRAM 104**

▲ Phase-to-Phase (Line-to-Line).
● Requires a 600V-rated socket when used on system voltages above 300V.

Application Data & Dimensions–Page 11
Sockets & Accessories–Pages 80 & 81

THREE-PHASE MONITOR RELAYS

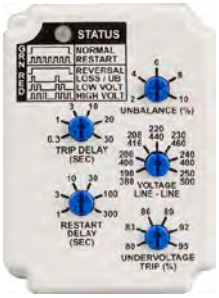
PMP SERIES PLUG-IN

APPLICATION DATA & DIMENSIONS

APPLICATION DATA

Three-Phase Line-Line Voltage:

Catalog No.	Range (50/60Hz ±5%)	MIN VOLTAGE	MAX VOLTAGE
PMPU	190-500V AC (see below)	156V AC	550V AC
PMP120	102-138V AC	77V AC	152V AC
PMP575	460-600V AC	345V AC	660V AC



The Voltage Line-Line knob on the PMPU has two ranges (left): a 190-250V low voltage scale and a 380-500V high voltage scale. The unit auto senses the three-phase line-line voltage when applied and automatically selects the appropriate range.

The PMP120 has a single adjustable range of 102-138V and the PMP575 has a single adjustable range of 460-600V.

Power Consumption: Less than 40VA.

Phase Loss:

Unit trips on loss of any Phase A, B or C, regardless of any regenerative voltages.

Phase Reversal (Out-of-Sequence):

Unit trips if sequence (rotation) of the three phases is anything other than A-B-C. It will not work on C-B-A.

Undervoltage:

Adjustable from 80-95% of the line voltage setting. Unit trips when the average of all three lines is less than the adjusted set point for a period longer than the adjustable trip delay. It will reset at +3% of the Undervoltage trip setting.

Overvoltage:

Fixed at 110% of the line voltage setting. Unit trips when the average of all three lines is greater than the fixed set point for a period longer than the adjustable trip delay. It will reset at 107% of the line voltage setting.

Phase Unbalance:

Adjustable from 2 - 10% unbalance. Unit trips when any one of the three lines deviates from the average of all three lines by more than the adjusted set point for a period longer than the adjustable trip delay.

Response Times:

Restart: 1 - 300 seconds adjustable
Drop-out Due to Fault:
- Phase Loss and Reversal: 100ms fixed
- Undervoltage and Overvoltage: 0.3 - 30 seconds adjustable
- Unbalance:
  - Normal: 0.3 - 30 seconds adjustable
  - Severe (Twice Knob Setting): 0.3-2 seconds

Output Contacts: 10 A @ 277V AC / 7A @ 30V DC; 1HP @ 250V AC, 1/2HP @ 125V AC, C300 Pilot Duty

Life: Mechanical: 10,000,000 operations; Full Load: 100,000 operations

Temperature: Operating: -28º to 65ºC (-18º to 149ºF)
Storage: -40º to 85ºC (-40º to 185ºF)

Mounting: Uses an 8 pin octal socket. Requires a 600V-rated socket when used on system voltages greater than 300V such as Macromatic Catalog Number 70169-D (see Page 80).

Status LED:

	LED STATUS	STATUS
GREEN	⎍	NORMAL/ RELAY ON
GREEN	⎍⎍⎍⎍⎍	RESTART DELAY
RED	⎍	REVERSAL
RED	⎍⎍	LOSS/ UNBALANCE
RED	⎍⎍⎍	UNDERVOLTAGE
RED	⎍⎍⎍⎍	OVERVOLTAGE

Reset:

As standard, the PMP Series relays are in the Automatic Reset mode. However, they can be set in the Manual Reset mode by connecting an external N.C. switch across terminals 6 and 7. Upon application of line voltage, the PMP Series will go into Manual Reset mode if it recognizes a closure across terminals 6 and 7. After a fault clears, the relay will not reset until the N.C. switch is opened.

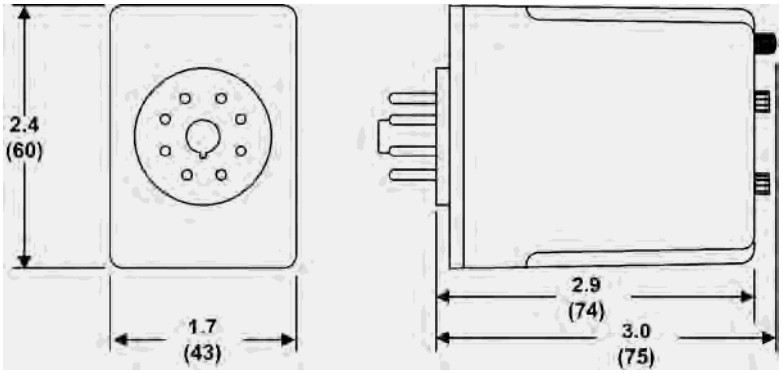
Approvals:

c UL us
File #E109466

c UL us LISTED IND. CONT. EQUIP. 5OU7
w/ appropriate socket
File #E109466

CE
Low Voltage & EMC Directives
EN60947-1, EN60947-5-1

DIMENSIONS



All Dimensions in Inches (Millimeters)

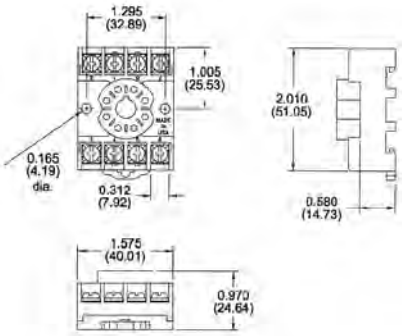
SOCKETS & ACCESSORIES

8 Pin Octal Socket--
Surface or DIN Rail-Mounted

10A @ 600V *
1 or 2 #12-22 AWG Wire
Recommended Tightening Torque
of 6-7 in-lbs. (12 in-lbs maximum)
Pressure Wire Clamp Terminations

File #E169693 File #LR701114

Catalog Number 70169-D

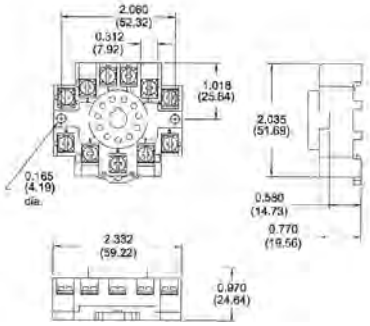


11 Pin Octal Socket--
Surface or DIN Rail-Mounted

10A @ 300V
1 or 2 #12-22 AWG Wire
Recommended Tightening Torque
of 6-7 in-lbs. (12 in-lbs maximum)
Pressure Wire Clamp Terminations

File #E169693 File #LR701114

Catalog Number 70170-D

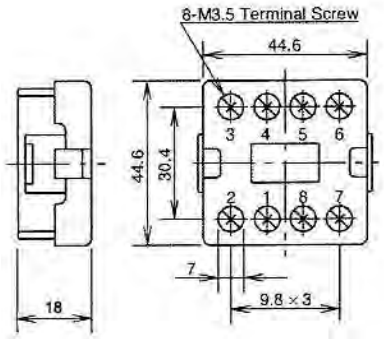


8 Pin Octal Socket--
Back-Mounted

10A @ 300V
Pressure Wire Clamp Terminations

File #E62437

Catalog Number SR6P-M08G

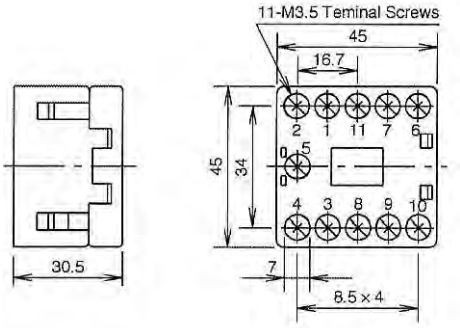


11 Pin Octal Socket--
Back-Mounted

10A @ 300V
Pressure Wire Clamp Terminations

File #E62437

Catalog Number SR6P-M11G



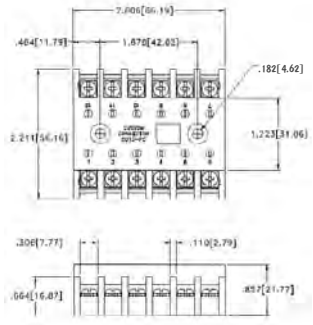
12 Pin Socket--
Surface-Mounted

10A @ 600V
#12-20 AWG Wire
Pressure Wire Clamp Terminations

File #E60008 File #LR29513

NOTE: if a 12 Pin Socket is required for DIN-rail mounting, please contact Macromatic.

Catalog Number SD12-PC



* Plug-in Three-Phase Monitor Relays require a 600V-rated socket when used on system voltages greater than 300V.

New!

HD and HG 2P

H-frame

J-frame

Table 7.37: H-frame 150 A and J-frame 250 A Thermal-magnetic Circuit Breakers (600 Vac, 250 Vdc) With Factory Sealed Trip Unit Suitable for Reverse Connection▲

Current Rating @ 40°C	Fixed AC Magnetic Trip		Cat. No.■♦	Interrupting Rating (2nd Letter of Catalog Number)								Terminal Wire Range
				D		G		J		L		
				$ Price								
	Hold	Trip		80% Rated	100% Rated	80% Rated	100% Rated	80% Rated	100% Rated	80% Rated	100% Rated	
H-frame, 150A 2P, 600 Vac 50/60 Hz, 250 Vdc												
15 A	350 A	750 A	H( )L26015(C)	580.00	696.00	846.00	1015.00	1039.00	1247.00	1576.00	1891.00	AL150HD 14–3/0 AWG Al or Cu
20 A	350 A	750 A	H( )L26020(C)	580.00	696.00	846.00	1015.00	1039.00	1247.00	1576.00	1891.00	
25 A	350 A	750 A	H( )L26025(C)	580.00	696.00	846.00	1015.00	1039.00	1247.00	1576.00	1891.00	
30 A	350 A	750 A	H( )L26030(C)	580.00	696.00	846.00	1015.00	1039.00	1247.00	1576.00	1891.00	
35 A	400 A	850 A	H( )L26035(C)	580.00	696.00	846.00	1015.00	1039.00	1247.00	1576.00	1891.00	
40 A	400 A	850 A	H( )L26040(C)	580.00	696.00	846.00	1015.00	1039.00	1247.00	1576.00	1891.00	
45 A	400 A	850 A	H( )L26045(C)	580.00	696.00	846.00	1015.00	1039.00	1247.00	1576.00	1891.00	
50 A	400 A	850 A	H( )L26050(C)	580.00	696.00	846.00	1015.00	1039.00	1247.00	1576.00	1891.00	
60 A	800 A	1450 A	H( )L26060(C)	580.00	696.00	846.00	1015.00	1039.00	1247.00	1576.00	1891.00	
70 A	800 A	1450 A	H( )L26070(C)	708.00	849.00	998.00	1198.00	1147.00	1377.00	1742.00	2091.00	
80 A	800 A	1450 A	H( )L26080(C)	708.00	849.00	998.00	1198.00	1147.00	1377.00	1742.00	2091.00	
90 A	800 A	1450 A	H( )L26090(C)	708.00	849.00	998.00	1198.00	1147.00	1377.00	1742.00	2091.00	
100 A	900 A	1700 A	H( )L26100(C)	708.00	849.00	998.00	1198.00	1147.00	1377.00	1742.00	2091.00	
110 A	900 A	1700 A	H( )L26110(C)	1381.00	1657.00	2039.00	2447.00	2966.00	3559.00	3689.00	4427.00	
125 A	900 A	1700 A	H( )L26125(C)	1381.00	1657.00	2039.00	2447.00	2966.00	3559.00	3689.00	4427.00	
150 A	900 A	1700 A	H( )L26150(C)	1381.00	1657.00	2039.00	2447.00	2966.00	3559.00	3689.00	4427.00	
H-frame 150A 3P, 600 Vac 50/60 Hz, 250 Vdc												
15 A	350 A	750 A	H( )L36015(C)	725.00	870.00	995.00	1194.00	1299.00	1559.00	1899.00	2279.00	AL150HD 14–3/0 AWG Al or Cu
20 A	350 A	750 A	H( )L36020(C)	725.00	870.00	995.00	1194.00	1299.00	1559.00	1899.00	2279.00	
25 A	350 A	750 A	H( )L36025(C)	725.00	870.00	995.00	1194.00	1299.00	1559.00	1899.00	2279.00	
30 A	350 A	750 A	H( )L36030(C)	725.00	870.00	995.00	1194.00	1299.00	1559.00	1899.00	2279.00	
35 A	400 A	850 A	H( )L36035(C)	725.00	870.00	995.00	1194.00	1299.00	1559.00	1899.00	2279.00	
40 A	400 A	850 A	H( )L36040(C)	725.00	870.00	995.00	1194.00	1299.00	1559.00	1899.00	2279.00	
45 A	400 A	850 A	H( )L36045(C)	725.00	870.00	995.00	1194.00	1299.00	1559.00	1899.00	2279.00	
50 A	400 A	850 A	H( )L36050(C)	725.00	870.00	995.00	1194.00	1299.00	1559.00	1899.00	2279.00	
60 A	800 A	1450 A	H( )L36060(C)	725.00	870.00	995.00	1194.00	1299.00	1559.00	1899.00	2279.00	
70 A	800 A	1450 A	H( )L36070(C)	885.00	1061.00	1134.00	1361.00	1399.00	1679.00	2099.00	2519.00	
80 A	800 A	1450 A	H( )L36080(C)	885.00	1061.00	1134.00	1361.00	1399.00	1679.00	2099.00	2519.00	
90 A	800 A	1450 A	H( )L36090(C)	885.00	1061.00	1134.00	1361.00	1399.00	1679.00	2099.00	2519.00	
100 A	900 A	1700 A	H( )L36100(C)	885.00	1061.00	1134.00	1361.00	1399.00	1679.00	2099.00	2519.00	
110 A	900 A	1700 A	H( )L36110(C)	1733.00	2080.00	2399.00	2879.00	3449.00	4139.00	4499.00	5399.00	
125 A	900 A	1700 A	H( )L36125(C)	1733.00	2080.00	2399.00	2879.00	3449.00	4139.00	4499.00	5399.00	
150 A	900 A	1700 A	H( )L36150(C)	1733.00	2080.00	2399.00	2879.00	3449.00	4139.00	4499.00	5399.00	

Current Rating @ 40°C	Adjustable AC Magnetic Trip		Cat. No.■♦	Interrupting Rating (2nd Letter of Catalog Number)								Terminal Wire Range
				D		G		J		L		
				$ Price								
	Low	High		80% Rated	100% Rated	80% Rated	100% Rated	80% Rated	100% Rated	80% Rated	100% Rated	
J-frame 250A 2P, 600 Vac 50/60 Hz, 250 Vdc												
150 A	750 A	1500 A	J( )L26150(C)	1450.00	1740.00	2141.00	2569.00	3114.00	3737.00	3874.00	4648.00	AL175JD 4–4/0 AWG Al or Cu
175 A	875 A	1750 A	J( )L26175(C)	1450.00	1740.00	2141.00	2569.00	3114.00	3737.00	3874.00	4648.00	
200 A	1000 A	2000 A	J( )L26200(C)	1450.00	1740.00	2141.00	2569.00	3114.00	3737.00	3874.00	4648.00	AL250JD 3/0 AWG–350 kcmil Al or Cu
225 A	1125 A	2250 A	J( )L26225(C)	1450.00	1740.00	2141.00	2569.00	3114.00	3737.00	3874.00	4648.00	
250 A	1250 A	2500 A	J( )L26250(C)	1992.00	2390.00	2834.00	3401.00	4150.00	4979.00	4796.00	5755.00	
J-frame 250A 3P, 600 Vac 50/60 Hz, 250 Vdc												
150 A	750 A	1500 A	J( )L36150(C)	1820.00	2184.00	2519.00	3023.00	3621.00	4346.00	4724.00	5669.00	AL175JD 4–4/0 AWG Al or Cu
175 A	875 A	1750 A	J( )L36175(C)	1820.00	2184.00	2519.00	3023.00	3621.00	4346.00	4724.00	5669.00	
200 A	1000 A	2000 A	J( )L36200(C)	1820.00	2184.00	2519.00	3023.00	3621.00	4346.00	4724.00	5669.00	AL250JD 3/0 AWG–350 kcmil Al or Cu
225 A	1125 A	2250 A	J( )L36225(C)	1820.00	2184.00	2519.00	3023.00	3621.00	4346.00	4724.00	5669.00	
250 A	1250 A	2500 A	J( )L36250(C)	2499.00	2999.00	3334.00	4001.00	4825.00	5790.00	5995.00	7194.00	

▲ See page 7-23 for circuit breakers with field interchangeable trip units.
■ To complete catalog number, replace the blank with the appropriate rating (D, G, J, L).
♦ For 100% rated circuit breakers add a "C" in the 9th character place (for example, HDL26015**C** or JDL26150**C**).

Table 7.38: H- and J-frame Termination Options

Termination Letter
A - I-Line (See Section 9)
F = No Lugs (includes terminal nut kit on both ends)★
L = Lugs both ends
M = Lugs ON end Terminal Nut Kit OFF end
P = Lugs OFF end Terminal Nut Kit ON end
N = Plug-in ▼
D = Drawout ▼
S = Rear Connected ▼

For factory-installed termination, place termination letter in the third block of the circuit breaker catalog number.

H G L 3 6 1 0 0
└Termination Letter

Plug-in

Drawout

Rear Connected

★ Add TS suffix for circuit breaker without terminal nut kit.
▼ For N and D pricing, add termination pricing on page 7-41 to price. For S pricing, add termination pricing on page 7-37 to price.

Table 7.39: H- and J-frame Interrupting Ratings

Voltage	Interrupting Rating			
	D	G	J	L
240 Vac	25 kA	65 kA	100 kA	125 kA
480 Vac	18 kA	35 kA	65 kA	100 kA
600 Vac	14 kA	18 kA	25 kA	50 kA

9421 Type L Circuit Breaker Mechanism

Type L Circuit Breaker Mechanisms

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

Table 8.55: Complete Kits

Complete Kit Does Not Include Circuit Breaker Use With			Includes: Operating Mechanism Standard 6 in. Handle Standard Shaft Kit		Includes: Operating Mechanism Standard 6 in. Handle Long Shaft Kit		Includes: Operating Mechanism Short 3 in. Handle Long Shaft Kit	
Circuit Breaker or Interrupter Type	No. of Poles	Frame Size (A)	Type	Mounting Depth [1] Min. – Max.	Type	Mounting Depth [1] Min. – Max.	Type	Mounting Depth [1] Min. – Max.
NSF, PowerPact™ H and J	2–3	250	LJ1	5-1/2–10-3/4	LJ4	5-1/2–21-3/8	LJ3	5-1/2–21-3/8
PowerPact D and L	2–3	600	LD1	7-1/4–12-1/16	LD4	7-1/4–22-5/8	3 in. handles are not recommended for use with these circuit breakers.	
PowerPact M and P [2]	3	1200	L-W1 [4]	9.00–12.50	LW4 [5]	9.00–23.50		

Table 8.56: Component Parts

Use With			3 in. Handle Assem-blies Type 1, 3R, 12	Standard Handle Assem-blies Type 1, 3R, 12	Operating Mechan-ism Includes Lockout	Standard Shaft (Support Bracket Not Required)		Long Shaft (Support Bracket Included)	
Circuit Breaker or Interrupter Type	No. of Poles	Frame Size (A)	Type	Type	Type	Mounting Depth [1] Min. – Max.	Type	Mounting Depth [1] Min. – Max.	Type
NSF, PowerPact H & J	2–3	250	LH3 [6]	LH6 [6]	LJ7	5-1/2–10-1/4	LS8	5-1/2–21-3/8	LS13
PowerPact D & L	2–3	600	[7]	LH6 [6]	LD7	7-1/4–12-1/16	LS8	7-1/4–22-5/8	LS13
PowerPact M & P [2]	3	1200	[7]	LHP8 [6]	LW7	7-3/16–11-5/8	LS8	7-3/16–22-1/4	LS10

3 in. Handle Assembly

Standard Handle Assembly

Table 8.57: NEMA Type 4 and 4X Handle Assemblies

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

Table 8.58: Auxiliary and Alarm Switches for PowerPact™ Circuit Breakers [8]

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

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

[1] Mounting depth measured in inches from circuit breaker mounting surface (control panel) to outside of enclosure door.
[2] These circuit breaker operating mechanisms must use the 9421LHP** or LCP** handles only.
[3] Type LW1 and LW4 include an 8 in. handle (9421LHP8) rather than a 6 in. handle.
[4] Type LW1 and LW4 include an 8 in. handle (9421LHP8) rather than a 6 in. handle.
[5] Type LW1 and LW4 include an 8 in. handle (9421LHP8) rather than a 6 in. handle.
[6] For a red handle and yellow bezel, add suffix RY to catalog number, e.g., 9421LH6RY.
[7] 3 in. handles are not recommended for use with these circuit breakers.
[8] Discount Schedule: DE2.

UL489 / CSA C22.2 No 5 / IEC/EN 60947-2 / GB14048-2
Miniature Circuit Breakers

Multi 9 C60BP and C60BPR Miniature Circuit Breakers

C60BP and C60BPR are multi-standard miniature circuit breakers and branch circuit protection as defined by UL489. They combine the following functions:

- circuit protection against short-circuit curves
- circuit protection against overload currents
- tripping and fault indication by the addition of auxiliary accessories

Number of 18 mm (0.71 in.) Poles	Rating (A) 25°C/77°F	Breaking Capacity (kA rms)							
		AIR UL 489 / CSA C22.2 No 5				Icu IEC 60947-2			
	Voltage (Ue)	277 Vac	240 Vac	120 Vac	60 Vdc	440 Vac	415 Vac	240 Vac	60 Vdc
1P	0.5 to 35	10	14	14	10	—	3	10	20
	40 to 63	—	10	10	10	—	3	10	20
	Voltage (Ue)	480Y/277 Vac		240 Vac	125 Vdc	440 Vac	415 Vac	240 Vac	125 Vdc
2P	1 to 25	10		14	10	6	10	20	—
	30 to 35	10		14	—	6	10	20	—
3P	1 to 35	10		14	—	6	10	20	—
2P/3P	40 to 63	—		10	—	6	10	20	—


C60BP 1P


C60BP 2P


C60BP 3P


C60BPR 1P


C60BPR 2P


C60BPR 3P

Table 7.37: C60BP and C60BPRCatalog Numbers

Type Rating (In)	UL489 and CSA Voltages	1P Curve Z	1P Curve C	1P Curve D (= K)	2P Curve C	2P Curve D (= K)	3P Curve C	3P Curve D (= K)
C60BP (Tunnel Terminal Connection)								
0.5	480Y/277 V and 240 V	M9F44170	M9F42170	M9F43170	—	—	—	—
1		M9F44101	M9F42101	M9F43101	M9F42201	M9F43201	M9F42301	M9F43301
2		M9F44102	M9F42102	M9F43102	M9F42202	M9F43202	M9F42302	M9F43302
3		M9F44103	M9F42103	M9F43103	M9F42203	M9F43203	M9F42303	M9F43303
4		M9F44104	M9F42104	M9F43104	M9F42204	M9F43204	M9F42304	M9F43304
5		M9F44105	M9F42105	M9F43105	M9F42205	M9F43205	M9F42305	M9F43305
6		M9F44106	M9F42106	M9F43106	M9F42206	M9F43206	M9F42306	M9F43306
8		M9F44108	M9F42108	M9F43108	M9F42208	M9F43208	M9F42308	M9F43308
10		M9F44110	M9F42110	M9F43110	M9F42210	M9F43210	M9F42310	M9F43310
15		M9F44115	M9F42115	M9F43115	M9F42215	M9F43215	M9F42315	M9F43315
20		M9F44120	M9F42120	M9F43120	M9F42220	M9F43220	M9F42320	M9F43320
25		M9F44125	M9F42125	M9F43125	M9F42225	M9F43225	M9F42325	M9F43325
30		M9F44130	M9F42130	M9F43130	M9F42230	M9F43230	M9F42330	M9F43330
35		M9F44135	M9F42135	M9F43135	M9F42235	M9F43235	M9F42335	M9F43335
40	240 V only	M9F44140	M9F42140	M9F43140	M9F42240	M9F43240	M9F42340	M9F43340
45		M9F44145	M9F42145	M9F43145	M9F42245	M9F43245	M9F43245	M9F43345
50		M9F44150	M9F42150	M9F43150	M9F42250	M9F43250	M9F42350	M9F43350
63		M9F44163	M9F42163	M9F43163	M9F42263	M9F43263	M9F42363	M9F43363
C60BPR (Ring Tongue Terminal Connection)								
1	480Y/277 V and 240 V		M9F54101	M9F52101	M9F53101	M9F52201	M9F53201	M9F52301	M9F53301
2			M9F54102	M9F52102	M9F53102	M9F52202	M9F53202	M9F52302	M9F53302
4			M9F54104	M9F52104	M9F53104	M9F52204	M9F53204	M9F52304	M9F53304
6			M9F54106	M9F52106	M9F53106	M9F52206	M9F53206	M9F52306	M9F53306
8			M9F54108	M9F52108	M9F53108	M9F52208	M9F53208	M9F52308	M9F53308
10			M9F54110	M9F52110	M9F53110	M9F52210	M9F53210	M9F52310	M9F53310
15			M9F54115	M9F52115	M9F53115	M9F52215	M9F53215	M9F52315	M9F53315
20			M9F54120	M9F52120	M9F53120	M9F52220	M9F53220	M9F52320	M9F53320
25			M9F54125	M9F52125	M9F53125	M9F52225	M9F53225	M9F52325	M9F53325
30			M9F54130	M9F52130	M9F53130	M9F52230	M9F53230	M9F52330	M9F53330
35			M9F54135	M9F52135	M9F53135	M9F52235	M9F53235	M9F52335	M9F53335
40	240 V only		M9F54140	M9F52140	M9F53140	M9F52240	M9F53240	M9F52340	M9F53340
45			M9F54145	M9F52145	M9F53145	M9F52245	M9F53245	M9F52345	M9F53345
50			M9F54150	M9F52150	M9F53150	M9F52250	M9F53250	M9F52350	M9F53350
63			M9F54163	M9F52163	M9F53163	M9F52263	M9F53263	M9F52363	M9F53363

PSE - The efficient range
Introduction

Feature list
- Rated operational current: 18...370 A
- Operational voltage: 208...600 V AC
- Wide rated control supply voltage: 100...250 V AC, 50/60 Hz
- Voltage ramp and torque control for both start and stop
- Two-phase controlled
- Current limit
- Kick-start
- Built-in bypass for energy saving and easy installation
- Illuminated display that uses symbols to become language neutral
- External keypad rated IP66 (Type 1, 4X,12) as an option
- Fieldbus communication with fieldbus plug adapter and the fieldbus plug
- Analog output for display of motor current
- Electronic overload protection
- Underload protection
- Locked rotor protection

SECURE MOTOR
Reliability

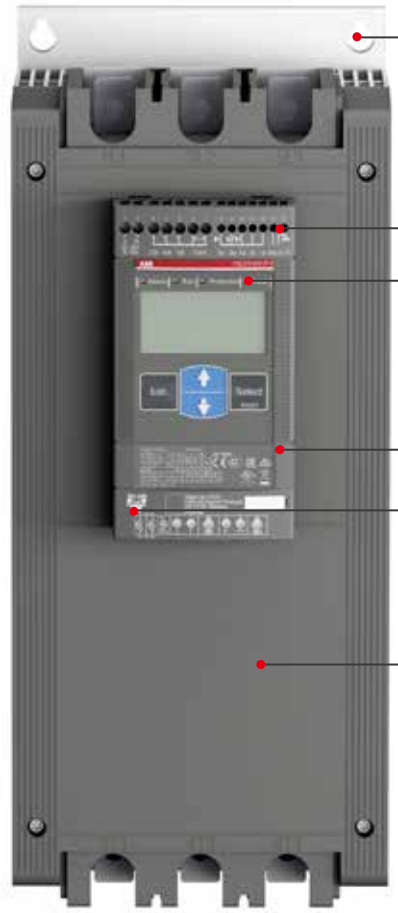
Basic motor protection and current limit
The PSE includes the most important protections for handling different load situations that can happen to pumps e.g. overload and underload. The current limit gives you more control of the motor during start and allows you to start your motor in weaker networks.

IMPROVE INSTALLATION
Efficiency

Saving time and money with built-in bypass and compact design
On the PSE, the bypass is built in and verified by ABB, saving you time during installation and space in your panel. The keypad is language neutral and illuminated for easy set-up and operation in field. The compact design makes installation fast and easy.

INCREASE APPLICATION
Productivity

Torque control for elimination of water hammering in pumps
Torque control is the most efficient way to stop a full speed pump. The PSE has a special torque stop ramp that is designed together with a pump manufacturer to eliminate water hammering in an optimal way.



Screw mounting
PSE is fast easy to install by using screw mounting.

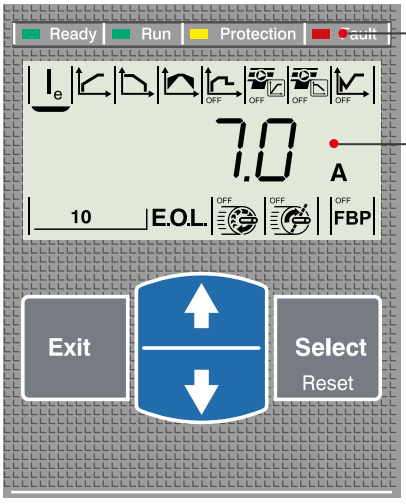
Digital input for start, stop and reset
PSE is controlled through digital inputs using the internal 24 V DC source. This allows easy control with e.g. push buttons or relays.

Output signal relays for run, top of ramp and event
Three output signal relays for indicating that the motor is running, that the softstarter is in top of ramp and if any event has happened. The relays can be used e.g. with pilot lights or to control a line contactor.

NEW Modbus- RTU
Built-in Modbus- RTU fieldbus communication for monitoring and control. Support for all major communication protocols.

Coated PCB
Coated circuit boards protecting from dust, moist and corrosive atmosphere

Torque control
The torque control function the absolutely best possible stop of pumps without water hammering and pressure surges.



LED indicators

- Green ready LED
  Flashing - Control supply
  Steady - Main power available
- Green run LED
  Flashing - Ramping up/down
  Steady - TOR
- Yellow protection LED
- Red fault LED

Illuminated and language-neutral display with icons
The display on PSE uses icons for fast and easy set-up of parameters. Each icon indicates a different parameter to set and makes navigation and setting of parameters easy.

PSE - The efficient range

Coordination examples

PSE18 ... PSE105

PSE142 ... PSE170

NEW PSE210 ... PSE370

Normal start In-line connected

Softstarter	PSE18	PSE25	PSE30	PSE37	PSE45	PSE60	PSE72	PSE85	PSE105
(400 V) kW	7.5	11	15	18.5	22	30	37	45	55
IEC, max. A	18	25	30	37	45	60	72	85	106
(440-480 V) hp	10	15	20	25	30	40	50	60	75
UL, max. FLA	18	25	28	34	42	60	68	80	104
Using MCCB only, type 1 coordination will be achieved [1]	**MCCB (400 V, 40 ºC)**								
MCCB (35 kA)	T2N160	T2N160	T2N160	T2N160	T2N160	T2N160	T2N160	T2N160	T3N250
MCCB (50 kA)	T2S160	T2S160	T2S160	T2S160	T2S160	T2S160	T2S160	T2S160	T3S250
To achieve type 2 coordination, semi-conductor fuses must be used [1]	**Fuse protection (85 kA), Semiconductor fuses, Bussmann**								
	170M1563	170M1564	170M1566	170M1567	170M1568	170M1569	170M1571	170M1572	170M3819
Suitable switch fuse for recommended semi-conductor fuses [1]	**Switch fuse**								
	OS32GD	OS32GD	OS32GD	OS63GD	OS63GD	OS63GD	OS125GD	OS125GD	OS250D
The line contactor is not required for the softstarter itself but often used to open if OL trips [1]	**Line contactor**								
	AF26	AF26	AF30	AF38	AF52	AF65	AF80	AF96	AF116

Softstarter	PSE142	PSE170	PSE210	PSE250	PSE300	PSE370
(400 V) kW	75	90	110	132	160	200
IEC, max. A	143	171	210	250	300	370
(440-480 V) hp	100	125	150	200	250	300
UL, max. FLA	130	169	192	248	302	361
Using MCCB only, type 1 coordination will be achieved [1]	**MCCB (400 V, 40 ºC)**					
MCCB (35 kA)	T3N250	T3N250	T4N320	T5N400	T5N400	T5N630
MCCB (50 kA)	T3S250	T3S250	T4S320	T5S400	T5S400	T5S630
To achieve type 2 coordination, semi-conductor fuses must be used [1]	**Fuse protection (85kA), Semiconductor fuses, Bussmann**					
	170M5809	170M5810	170M5812	170M5813	170M6812	170M6813
Suitable switch fuse for recommended semi-conductor fuses [1]	**Switch fuse**					
	OS400D	OS400D	OS400D	OS400D	OS630D	OS630D
The line contactor is not required for the softstarter itself but often used to open if OL trips [1]	**Line contactor**					
	AF146	AF190	AF265	AF265	AF305	AF370

[1] These are an example of coordination. For more examples see: applications.it.abb.com/SOC

PSE - The efficient range

Ordering details

PSE18 ... PSE105

PSE142 ... PSE170

NEW PSE210 ... PSE370

Normal starts, class 10, in-line Rated operational voltage U_e, 208-600 V, Rated control supply voltage U_s, 100-250 V AC, 50/60 Hz

IEC Rated operational power				UL/CSA Rated operational power							
230 V	400 V	500 V	current	200/208 V	220/240 V	440/480 V	550/600 V	current			
P_e	P_e	P_e	I_e	P_e	P_e	P_e	P_e	FLA	Type	Order code	Weight
kW	kW	kW	A	hp	hp	hp	hp	A			kg lb
4	7.5	11	18	5	5	10	15	18	PSE18-600-70	1SFA897101R7000	2.40 5.29
5.5	11	15	25	7.5	7.5	15	20	25	PSE25-600-70	1SFA897102R7000	2.40 5.29
7.5	15	18.5	30	7.5	10	20	25	28	PSE30-600-70	1SFA897103R7000	2.40 5.29
9	18.5	22	37	10	10	25	30	34	PSE37-600-70	1SFA897104R7000	2.40 5.29
11	22	30	45	10	15	30	40	42	PSE45-600-70	1SFA897105R7000	2.40 5.29
15	30	37	60	20	20	40	50	60	PSE60-600-70	1SFA897106R7000	2.40 5.29
18.5	37	45	72	20	25	50	60	68	PSE72-600-70	1SFA897107R7000	2.50 5.51
22	45	55	85	25	30	60	75	80	PSE85-600-70	1SFA897108R7000	2.50 5.51
30	55	75	106	30	40	75	100	104	PSE105-600-70	1SFA897109R7000	2.50 5.51
40	75	90	143	40	50	100	125	130	PSE142-600-70	1SFA897110R7000	4.20 9.26
45	90	110	171	60	60	125	150	169	PSE170-600-70	1SFA897111R7000	4.20 9.26
59	110	132	210	60	75	150	200	192	PSE210-600-70-1	1SFA897112R7001	8.45 18.63
75	132	160	250	75	100	200	250	248	PSE250-600-70-1	1SFA897113R7001	10.55 23.26
90	160	200	300	100	100	250	300	302	PSE300-600-70-1	1SFA897114R7001	10.55 23.26
110	200	250	370	125	150	300	350	361	PSE370-600-70-1	1SFA897115R7001	10.55 23.26

Heavy-duty starts, class 30, in-line Rated operational voltage U_e, 208...600 V, Rated control supply voltage U_s, 100...250 V AC, 50/60 Hz

IEC Rated operational power				UL/CSA Rated operational power							
230 V	400 V	500 V	current	200/208 V	220/240 V	440/480 V	550/600 V	current			
P_e	P_e	P_e	I_e	P_e	P_e	P_e	P_e	FLA	Type	Order code	Weight
kW	kW	kW	A	hp	hp	hp	hp	A			kg lb
3	5.5	7.5	12	3	3	7.5	10	11	PSE18-600-70	1SFA897101R7000	2.40 5.29
4	7.5	11	18	5	5	10	15	18	PSE25-600-70	1SFA897102R7000	2.40 5.29
5.5	11	15	25	7.5	7.5	15	20	25	PSE30-600-70	1SFA897103R7000	2.40 5.29
7.5	15	18.5	30	7.5	10	20	25	28	PSE37-600-70	1SFA897104R7000	2.40 5.29
9	18.5	22	37	10	10	25	30	34	PSE45-600-70	1SFA897105R7000	2.40 5.29
11	22	30	45	10	15	30	40	42	PSE60-600-70	1SFA897106R7000	2.40 5.29
15	30	37	60	20	20	40	50	60	PSE72-600-70	1SFA897107R7000	2.50 5.51
18.5	37	45	72	20	25	50	60	68	PSE85-600-70	1SFA897108R7000	2.50 5.51
22	45	55	85	25	30	60	75	80	PSE105-600-70	1SFA897109R7000	2.50 5.51
30	55	75	106	30	40	75	100	104	PSE142-600-70	1SFA897110R7000	4.20 9.26
40	75	90	143	40	50	100	125	130	PSE170-600-70	1SFA897111R7000	4.20 9.26
45	90	110	171	60	60	125	150	169	PSE210-600-70-1	1SFA897112R7001	8.45 18.63
59	110	132	210	60	75	150	200	192	PSE250-600-70-1	1SFA897113R7001	10.55 23.26
75	132	160	250	75	100	200	250	248	PSE300-600-70-1	1SFA897114R7001	10.55 23.26
90	160	200	300	100	100	250	300	302	PSE370-600-70-1	1SFA897115R7001	10.55 23.26

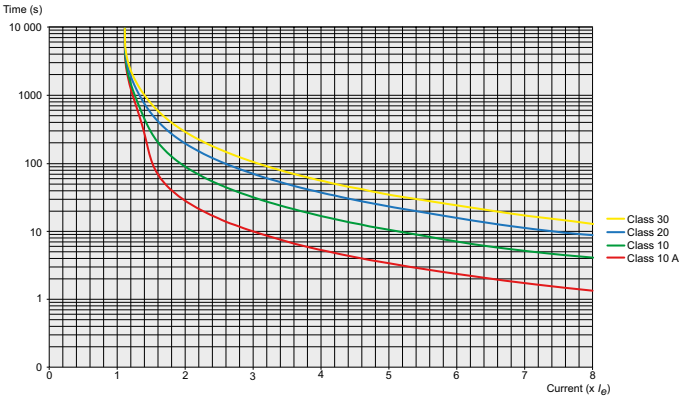
PSE - The efficient range

Technical data

Technical data	PSE18 ... PSE370
Rated insulation voltage U_i	600 V
Rated operational voltage U_e	208...600 V +10%/-15%
Rated control supply voltage U_s	100...250 V +10%/-15%, 50/60 Hz ±10 %
Rated control circuit voltage U_c	Internal 24 V DC
Starting capacity at I_e	4 x I_e for 10 sec.
Number of starts per hour	10 [1]
Maximum Altitude	4000 m (13123 ft) [3]
Overload capability	
Overload class	10
Ambient temperature	
During operation	-25...+60 °C (-13...+140 F) [2]
During storage	-40...+70 °C (-40...+158 F)
Degree of protection	
Main circuit	IP00
Supply and control circuit	IP20
Main circuit	
Built-in bypass	Yes
Cooling system	fan cooled (thermostat controlled)
HMI for settings	
Display	4 7-segments and icons. Illuminated
Keypad	2 selection keys and 2 navigation keys
Main settings	
Setting current	Size dependent
Ramp time during start	1...30 sec
Ramp time during stop	0...30 sec
Initial/end voltage	30...70%
Current limit	1.5...7 x I_e
Torque control for start	Yes / No
Torque control for stop	Yes / No
Kick start	Off, 30...100%
Signal relays	
Number of signal relays	3
K2	Run signal
K3	TOR (bypass) signal
K1	Event signal
Rated operational voltage U_e	100-250 V AC/24 V DC [4]
Rated thermal current I_{th}	3 A
Rated operational current I_e at AC-15 (U_e = 250 V)	1.5 A

Technical data	PSE18 ... PSE370
Analog output	
Output signal reference	4...20 mA
Type of output signal	I Amp
Scaling	Fixed at 1.2 x I_e
Control circuit	
Number of inputs	3 (start, stop, reset of faults)
Signal indication LED	
On / Ready	Green flashing / steady
Run / TOR	Green flashing / steady
Protection	Yellow
Fault	Red
Protections	
Electronic overload	Yes (Class 10A, 10, 20, 30)
Locked rotor protection	Yes
Underload protection	Yes
Fieldbus connection	
ABB Fieldbus plug	Yes (option)
NEW Built-in modbus	Yes
External keypad	
Display	LCD type
Ambient temperature	
During operation	-25...+60 ºC (-13...+140 F)
During storage	-40...+70 ºC (-40...+158 F)
Degree of protection	IP66

[1] Valid for 50% on time and 50% off time. If other data is required, contact your local ABB office.
[2] Above 40 ºC (104 F) up to max. 60 ºC (140 F) reduce the rated current with 0.6% per ºC (0,33% per F).
[3] When used at high altitudes, above 1000 meters (3281 ft) up to 4000 meters (13123 ft), de-rate the rated current using the following formula. [% of Ie = 100 - $\frac{x - 1000}{150}$] x = actual altitude of the softstarter in meters.
[4] A common voltage needs to be used for all 3 signal relays.

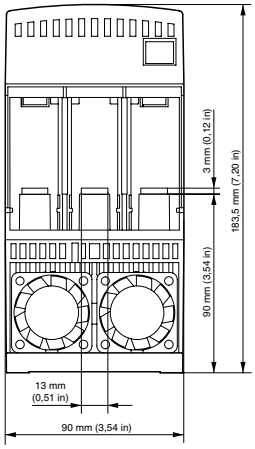


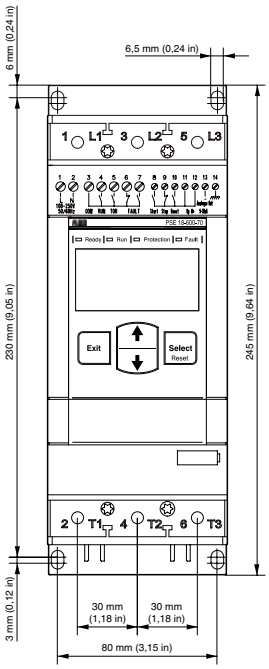
Tripping curves for the integrated electronic overload protection
PSE has an integrated electronic overload protection that can be set to four different tripping classes. Below you find a curve for each tripping class in cold state.

PSE - The efficient range

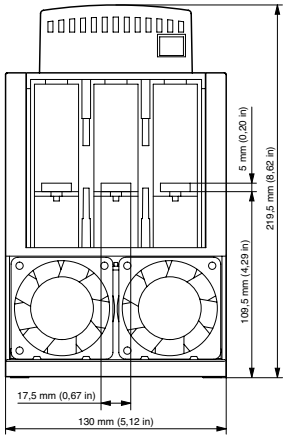
Dimensions

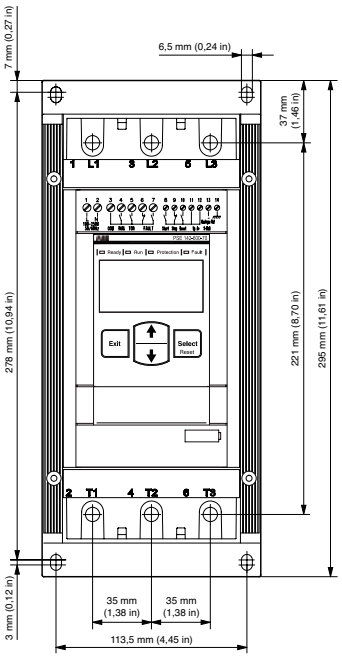
PSE18... 105



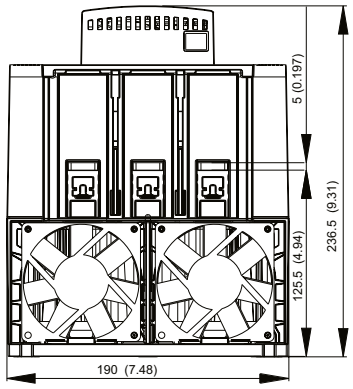


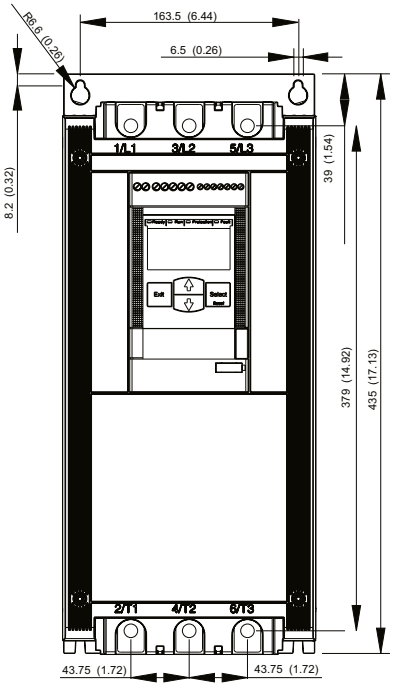
PSE142... 170



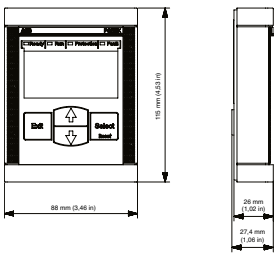


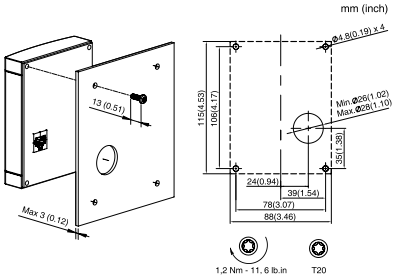
PSE210... 370





External keypad (PSEEK





LIMITRON™ Class CC

FNQ-R — 600Vac, ¼-30A, Time-Delay Fuses

Description: Advanced protection Class CC current-limiting, time-delay fuses.

Catalog Symbol: FNQ-R-(amp)

Ratings:

Volts — 600Vac
— 300Vdc (15 & 20A)
Amps — ¼-30A
IR — 200kA Vac RMS Sym.
— 20kA Vdc (15 & 20A)

Agency Information:

CE, UL Listed, Std. 248-4, Class CC, Guide JDDZ, File E4273

CSA Certified, Class CC CSA, Class 1422-01, File 53787–HRC-MISC

RoHS Compliant*

* FNQ-R-¼ not RoHS complaint.

Catalog Numbers (amps)

FNQ-R-¼	FNQ-R-1 3/10	FNQ-R-3 3/10	FNQ-R-8
FNQ-R-3/10	FNQ-R-1 4/10	FNQ-R-3½	FNQ-R-9
FNQ-R-4/10	FNQ-R-1½	FNQ-R-4	FNQ-R-10
FNQ-R-½	FNQ-R-1 6/10	FNQ-R-4½	FNQ-R-12
FNQ-R-6/10	FNQ-R-1 7/10	FNQ-R-5	FNQ-R-15
FNQ-R-¾	FNQ-R-2	FNQ-R-5 8/10	FNQ-R-17½
FNQ-R-8/10	FNQ-R-2¼	FNQ-R-6	FNQ-R-20
FNQ-R-1	FNQ-R-2½	FNQ-R-6¼	FNQ-R-25
FNQ-R-1⅛	FNQ-R-2 8/10	FNQ-R-7	FNQ-R-30
FNQ-R-1¼	FNQ-R-3	FNQ-R-7½	

Carton Quantity:

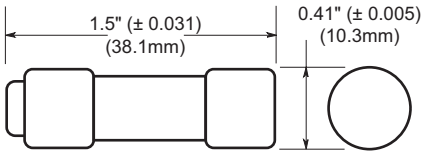
Amp Rating	Carton Qty.
¼-30	10

Maximum Acceptable Rating of Overcurrent Device†	
Rated Primary Current (Amps)	Maximum Rating of Overcurrent Protective Device Expressed As a Percent of Transformer Primary Current Rating
< 2A	500††
2A to 9A	167
> 9A	125

† UL 508A Table 42.1.

†† 300% for other than motor control applications.

Dimensions - in



Features:

- Provides 10X better current limitation to help prevent equipment damage caused by short-circuit events.
- 200kA interrupting rating complies with NEC® Section 110.9 for today's large capacity systems.
- Fast-acting fuse helps prevent equipment damage caused by short-circuit events.
- Rejection type fuse fits both standard and rejection-style holders.
- The Class CC FNQ-R Limitron fuse meets the needs of control circuit transformer protection.
- FNQ-R fuses can be sized according to NEC® and UL requirements and still allow the high inrush currents, with significantly more time-delay than the UL minimum value of 12 seconds at 200% for Class CC fuses.
- Ideal for critical industrial or commercial applications that have specific current limitation requirements.

Applications:

- Branch Circuits
- Line Protection
- Small Control Transformers
- Industrial Control

Recommended Fuse Blocks and Holders

Fuse Amps	1-Pole	2-Pole	3-Pole
	Open Blocks		
0-30	BC6031_	BC6032_	BC6033_
	DIN-Rail Holders		
0-30	CHCC1D_	CHCC2D_	CHCC3D_
	—	—	OPM-NG-_
	—	—	OPM-1038_
	—	—	OPM-1038_SW
	Panel Mount Holders		
0-30	HPS	—	—
	HPF	—	—
	In-Line Holders		
0-30	—	HEY	—
	HEZ	—	—

For additional information on Class CC fuse blocks and holders, see Data Sheets:

- Open Blocks # 1105 (BC Series)
- DIN-Rail Holders # 3185 (CHCC), # 1109 (OPM), # 1102 (OPM-1038), 1103 (OPM-1038_SW),
- Panel Mount Holders # 2113 (HPS), # 2114 (HPF)
- In-Line Holders # 2126 (HEY), # 2130 (HEZ)

CH Modular, IP20 finger-safe DIN-Rail holders for Class CC, supplemental and PV fuses

RoHS 2011/65/EU

Catalog symbol:

- CHCC_ (Class CC)
- CHM_ (UL® supplemental/IEC 10x38)
- CHPV_ (13/32 x 1-1/2 and 10x38 photovoltaic)

Description:

Eaton's Bussmann™ series CH DIN-Rail fuse holders are for UL Class CC and supplemental fuses, and IEC 10x38 fuses. They are available with and without indication in 1-, 2- and 3-pole IP20 finger-safe versions. A variety of accessories extends their application flexibility and they may be ganged together to meet specific application requirements.

For other Bussmann series CH fuse holders, please see the following data sheets.

Fuse class	Fuse size	Data sheet No.
Class J	30 and 60 A	2144
IEC	8 x 32 mm	720147
	14 x 51 mm	10080
	22 x 58 mm	10015

Specifications:

Ratings

- Volts
  - 600 V (or less) UL
  - 690 V (or less) IEC
  - 1000 Vdc (or less) photovoltaic (PV)
- Amps
  - 30 A UL
  - 32 A IEC
- Short-Circuit Current Rating (SCCR)
  - 33 kA photovoltaic
  - 200 kA RMS Sym. (CHCC, CHM*)

* CHM SCCR is fuse interrupting rating dependent.

Agency information

- Class CC version: UL Listed File E14853, Guide IZLT, Recognized IZLT2
- PV version: UL Listed to E348242 and Guide IZMR (CHPV)
- CSA® File 47235, CHPV and CHM - Class 6225-30, CHCC - Class 6225-01
- IEC 60269-2 (CHM, CHPV)
- CCC
- RoHS compliant

Mounting

- 35 mm DIN-Rail

Wire range (see conductor table on page 3 for details)

- 75°C and 90°C Cu
- #18 to #4 (0.8 mm^2 to 21.1 mm^2)
  - Solid
  - Stranded
  - Fine stranded

Terminals

- Single or dual conductors
- Comb busbar
- Terminal screws
  - Standard phil-slot
  - Optional hex head (order by adding "-H" suffix to the catalog number, e.g., CHM1DU-H)

Flammability

- UL 94V0, self-extinguishing

Powering Business Worldwide

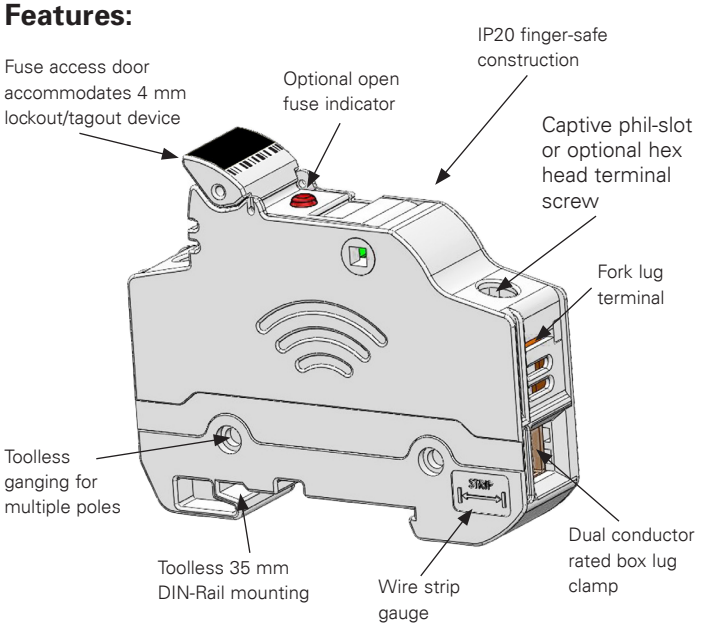
Storage and operating temperature

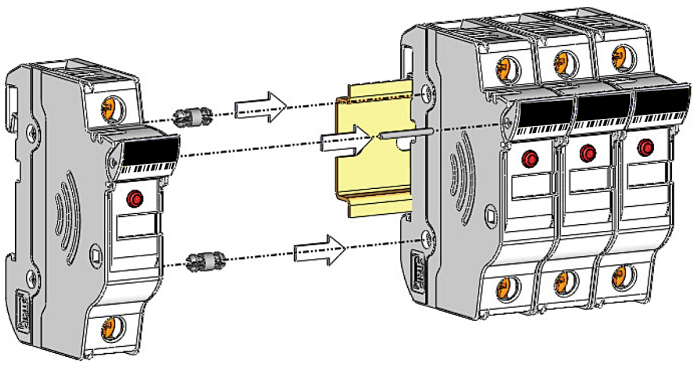
- -4°F (-20°C) to 194°F (90°C) indicating
- -4°F (-20°C) to 248°F (120°C) non-indicating

Features and benefits:

- High SCCR rated, UL Listed Class CC holder with optional open fuse indication for 600 Vac/dc and 48 V dc (see catalog number table for details)
- Enhanced safety with IP20 finger-safe construction
- UL Recognized midget and IEC 10x38 holders with factory assembled neutral pole option
- Agency ratings up to 1000 Vdc for use with PV fuses
- Available remote PLC fuse indication module
- Wiring flexibility with terminals rated for use with 75°C or 90°C solid, stranded and fine stranded wire, and spade terminals and comb busbars. (Use any higher temperature insulations at the 90°C ampacity.)
- Complete range of UL Listed and high SCCR rated one- and three-phase finger-safe comb busbars and power feed lugs
- Optional hex head terminal screw makes it easier to achieve necessary torque values

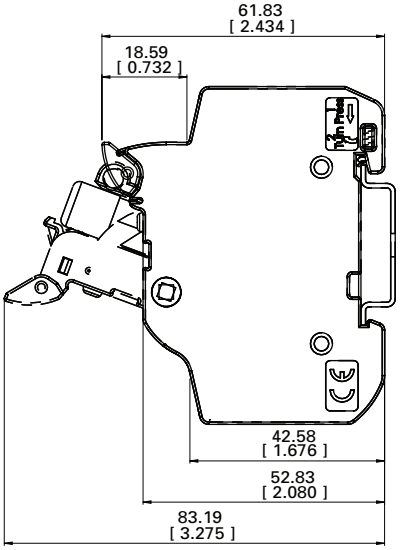
Features:

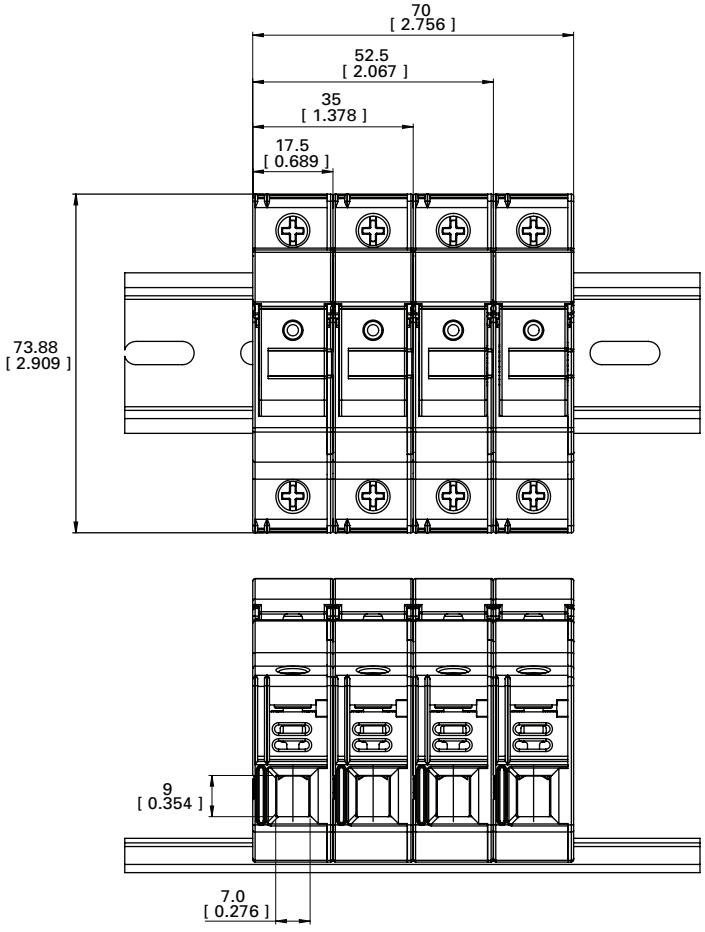




Gang multiple poles to meet application requirements using kit catalog number JV-L (gangs up to four poles).

Dimensions - mm (in):





UL midget and IEC 10x38 CHM holder catalog numbers

Catalog number†		Volts and amps		Agency marks	Poles	SCCR	Recommended Bussmann series fuses
With indication*	Without indication	UL	IEC				
CHM1DIU	CHM1DU	600 V/30 A	690 V/32 A	UR, CSA, IEC 60269-2, CCC	1	200 kA** RMS Sym.††	BAF, BAN, FNM, FNQ, FWA, FWC, KLM, KTK, AGU, C10G_, C10M_
CHM2DIU	CHM2DU				2		
CHM3DIU	CHM3DU				3		
CHM4DIU	CHM4DU				4		
CHM1DNIU	CHM1DNU			IEC 60269-2	1 + neutral		
CHM3DNIU	CHM3DNU				3 + neutral		
CHM1DI-48U	—	48 Vdc/30 A	48 Vdc/32 A	UR, CSA, IEC 60269-2, CCC	1		
—	CHM1DNXU	—	690V/32 A	IEC 60269-2		N/A	N/A
CHM1DCIU	CHM1DCU	600 Vac, 1000 Vdc, 30 A	690 V, 32 A	UR, CSA, IEC 60269-2	1	200 kA** RMS Sym., 33 kA DC††	600/690V BAF, BAN, FNM, FNQ, FWA, FWC, KLM, KTK, AGU, C10G_, C10M_, 1000Vdc PV-(amp)A10F, PV10M-(amp)
CHM2DCIU	CHM2DCU				2		
CHM3DCIU	CHM3DCU				3		
CHM4DCIU	CHM4DCU				4		

† Available with optional hex head terminal screws. To order, add "-H" suffix to the desired catalog number.
†† SCCR is limited to the interrupting rating of the installed fuse or 200 kA, which ever is less.
* All models require 90 V minimum for illumination, except CHM1DI-48U that requires 15 V minimum.
** SCCR is limited to the interrupting rating of the installed fuse or 200 kA, which ever is less.

UL Class CC CHCC holder catalog numbers

Catalog number†		Volts / amps	Agency marks	Poles	SCCR	Recommended Bussmann series fuses
With indication*	Without indication					
CHCC1DIU	CHCC1DU	600 V/30 A	UL, CSA, CCC	1	200 kA RMS Sym.	LP-CC, FNQ-R, KTK-R
~~CHCC2DIU~~	CHCC2DU			2		
CHCC3DIU	CHCC3DU			3		
~~CHCC1DI-48U~~	—	48 Vdc/30 A		1	33 kA DC	

† Available with optional hex head terminal screws. To order, add "-H" suffix to the desired catalog number.
* All models require 90 V minimum for illumination, except CHCC1DI-48U that requires 15 V minimum.

UL and IEC photovoltaic CHPV holder catalog numbers

Catalog number†		Volts / amps	Agency marks	Poles	SCCR	Recommended Bussmann series fuses
With indication	Without indication					
CHPV1IU	CHPV1U	1000 Vdc/30 A	UL, CSA, , UL 4248-18, IEC 60269-1, CCC	1	33 kA DC	PV-(amp)A10F, PV10M-(amp)
CHPV2IU	CHPV2U			2		

† Available with optional hex head terminal screws. To order, add "-H" suffix to the desired catalog number.
* All models require 90 V minimum for illumination.

Conductor information

AWG wire range	Wire type	Wire rating	Terminal torque N•m (lb-in)*
4-12	Solid/Stranded/compact/Class K	75°C or 90°C Cu	3.4 (30)
14-18	Solid/Stranded/Class K		2.3 (20)
(2) 10-12	Stranded		3.4 (30)
(2) 14	Solid/Stranded		
(2) 16-18			2.8 (25)
Fork terminals	N/A		3.4 (30)
Comb busbar			

* Use a phil-slot bit designed for high torque, or specify hex head terminal screw option.

The Type T units are designed for the global market and are the best choice when size and cost are of concern. This is our most popular and complete offering of industrial control transformers, and includes the following features:

- 50/60 Hz rated
  Customer installed accessories (finger-safe covers, fuse blocks, fuse clips)
- Type T transformers are designed with the various temperature classes:
  50–150 VA with a 55° C temperature rise, 105° C insulation
  200–350 VA with a 80° C temperature rise, 130° C insulation
  500–5000 VA with a 115° C temperature rise, 180° C insulation

Square D manufactures a wide variety of voltage combinations for control transformers. The voltage combinations are expressed as "Voltage Codes" and these codes are embedded within the catalog number of the transformer. Standard codes are listed, if the voltage combination you require is not listed, call your Square D Distributor for assistance.

Key to Price Column Headings

Voltage Code
Primary Voltages
Secondary Voltages
Key for Dimensions & Accessory

Type T

UL/CSA/ NOM VA	CE VA	Type	D1 240 x 480 120 I	D31 240 x 480 120/240 I	D5 600 120 I	D37 600 120/240 I	D24 120 120 I	D55 120 x 240 120/240 I	D3 208 120 I	D4 277 120 I	D51 208/277 120 I	D60 277 120/240 I
25	25	T25	$ 34.70	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
50	50	T50	36.50	$ 59.00	$ 42.40	$147.00	$147.00	$147.00	$ 42.40	$ 42.40	$147.00	$147.00
75	75	T75	43.30	62.00	51.00	153.00	153.00	153.00	51.00	51.00	153.00	153.00
100	100	T100	48.50	65.00	57.00	154.00	154.00	154.00	57.00	57.00	154.00	154.00
150	150	T150	52.00	86.00	72.00	164.00	164.00	164.00	72.00	72.00	164.00	164.00
200	200	T200	64.00	111.00	92.00	224.00	224.00	224.00	92.00	92.00	224.00	224.00
250	160	T250	75.00	117.00	114.00	225.00	225.00	225.00	114.00	114.00	225.00	225.00
300	200	T300	83.00	137.00	117.00	227.00	227.00	227.00	117.00	117.00	227.00	227.00
350	250	T350	88.00	143.00	136.00	228.00	228.00	228.00	136.00	136.00	228.00	228.00
500	300	T500	110.00	160.00	148.00	235.00	235.00	235.00	148.00	148.00	235.00	235.00
750	500	T750	152.00	223.00	209.00	264.00	264.00	264.00	209.00	209.00	264.00	264.00
1000	630	T1000	184.00	263.00	263.00	280.00	280.00	280.00	263.00	263.00	280.00	280.00
1500	1000	T1500	263.00	385.00	368.00	404.00	404.00	404.00	368.00	368.00	404.00	404.00
2000	1500	T2000	320.00	427.00	427.00	438.00	438.00	438.00	427.00	427.00	438.00	438.00
3000	2000	T3000	444.00	701.00	602.00	749.00	749.00	749.00	602.00	602.00	749.00	749.00
5000	3000	T5000	746.00	948.00	948.00	948.00	948.00	948.00	948.00	948.00	948.00	948.00

Type T

UL/CSA/ NOM VA	CE VA	Type	D2 240 x 480 24 I	D59 240 x 480 12/24 I	D13 120 12/24 I	D23 120/240 24 I	D54 120/240 12/24 I	D14 208 24 I	D25 277 24 I	D36 600 12/24 I
50	50	T50	$ 42.40	$147.00	$ 42.40	$ 42.40	$147.00	$ 42.40	$147.00	$147.00
75	75	T75	51.00	153.00	51.00	51.00	153.00	51.00	153.00	153.00
100	100	T100	57.00	154.00	57.00	57.00	154.00	57.00	154.00	154.00
150	150	T150	72.00	164.00	72.00	72.00	164.00	72.00	164.00	164.00
200	200	T200	92.00	224.00	92.00	92.00	224.00	92.00	224.00	224.00
250	160	T250	114.00	225.00	114.00	114.00	225.00	114.00	225.00	225.00
300	200	T300	117.00	227.00	117.00	117.00	227.00	117.00	227.00	227.00
350	250	T350	136.00	228.00	136.00	136.00	228.00	136.00	228.00	228.00
500	300	T500	148.00	235.00	148.00	148.00	235.00	148.00	235.00	235.00
750	500	T750▲	209.00	264.00	209.00	209.00	264.00	209.00	264.00	264.00
1000	630	T1000▲	263.00	280.00	263.00	263.00	280.00	263.00	280.00	280.00

Type T

UL/CSA/NOM VA	CE VA	Type	D15 240 x 480 24/120 I	D12 480 240 I	D22 480 277 I	D62 600 240 I
50	50	T50	$ 42.40	$ 42.40	$147.00	$147.00
75	75	T75	51.00	153.00	153.00	153.00
100	100	T100	65.00	57.00	154.00	154.00
150	150	T150	72.00	72.00	164.00	164.00
200	200	T200	92.00	92.00	224.00	224.00
250	160	T250	117.00	114.00	225.00	225.00
300	200	T300	137.00	117.00	227.00	227.00
350	250	T350	143.00	136.00	228.00	228.00
500	300	T500	160.00	148.00	235.00	235.00
750	500	T750	223.00	209.00	264.00	264.00
1000	630	T1000	263.00	263.00	280.00	280.00
1500	1000	T1500	385.00	368.00	404.00	404.00
2000	1500	T2000	427.00	427.00	438.00	438.00
3000	2000	T3000	701.00	602.00	749.00	749.00
5000	3000	T5000	948.00	948.00	948.00	948.00

Listing	File	Type
UL	E61239	T25–T1000
CSA	LR37055, Guide 184-N-90, C22.2	T25–T1000
cULus	E61239	T1500–T5000
EN (CE)	947923, EN-61558-1 (TUV ref: 00941-RAG/sg E9371495E01)	T25–T200
	9579078, EN-61558-1 (TUV ref: 00941-RAG/sg E9471921.02E01)	T250–T1000
	9579078, EN-61558-1 (TUV ref: 00941-RAG/sg E9471921.02E01)	T1500–T5000

▲ See Control Transformer Catalog: 9070CT9901 for dimensions different than Digest.

As part of the Type T designs are MultiTap units having a variety of primary voltages on just one transformer. Our Universal Control Transformer will provide 120 V, or near 120, power from all common primary voltages: 208 to 600 V, and is listed as voltage code D50.

Key to Price Column Headings

Voltage Code
Primary Voltages
Secondary Voltages
Key for Dimensions & Accessory

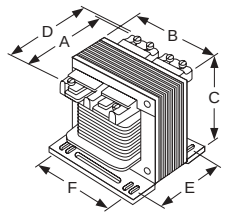


Figure 1

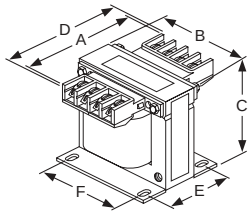


Figure 2

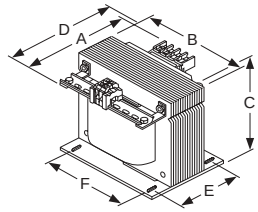


Figure 3

Type T MultiTap™

UL/ CSA/ NOM VA	CE VA	Type	D18 208/277/380 95/115 II	D20 208/230/460 115 II	D95 208/240/480 120 II	D32 230/460/575 95/115 II	D33 380/400/415 115/230 I	D50 240/416/480/600 99/120/130 IV	D19 208/240/277/380/480 24 III	D52 380/400/415 12/24 I
50	50	T50	$ 59.	$ 59.	$162.	$ 59.	$ 59.	$ 99.	$ 59.	$162.
75	75	T75	62.	62.	164.	62.	62.	107.	62.	164.
100	100	T100	65.	65.	174.	65.	65.	110.	65.	174.
150	150	T150	86.	86.	243.	86.	86.	115.	86.	243.
200	200	T200	111.	111.	242.	111.	111.	131.	111.	242.
250	160	T250	117.	117.	245.	117.	117.	143.	117.	245.
300	200	T300	137.	137.	256.	137.	137.	156.	137.	256.
350	250	T350	143.	143.	297.	143.	143.	161.	143.	297.
500	300	T500	160.	160.	300.	160.	160.	206.	160.	300.
750	500	T750	223.	223.	331.	223.	223.	239.	223.▲	331.▲
1000	630	T1000	263.	263.	423.	263.	263.	313.	263.▲	423.▲

▲ See Control Transformer Catalog: 9070CT9901 for Dimensions different than Digest.

Type Dimension Key				A		B		C		D♦		E		F		Slots		Fig.	Weight (lbs)
I	II	III	IV	IN	mm	IN	mm	IN	mm	IN	mm	IN	mm	IN	mm	IN	mm		
T25 T50	T25	. . .	. . .	3.09	78.5	3.00	76.2	2.58	65.5	3.84	97.5	2.00	50.8	2.50	63.5	.20x.38	5.1x9.7	1	2.5
. . .	. . .	T25	. . .	4.00	101.6	3.43	87.1	2.64	67.0	4.80	121.9	2.00	50.8	2.50	63.5	.20x.48	5.1x12.2	2	3.5
. . .	. . .	T50	T50	4.19	106.4	3.43	87.1	2.89	73.4	4.99	126.7	2.38	60.5	2.81	71.4	.20x.48	5.1x12.2	2	4.0
T75 T100	T50	. . .	. . .	3.34	84.8	3.38	85.8	2.89	73.4	4.09	103.9	2.38	60.5	2.81	71.4	.20x.48	5.1x12.2	1	3.8
T150 T200	T75 T100 T150	. . .	. . .	3.59	91.2	3.75	95.3	3.20	81.3	4.34	110.2	2.88	73.2	3.13	79.5	.20x.38	5.1x9.7	1	5.5
. . .	. . .	T75 T100	T75	4.88	124.0	3.75	95.3	3.20	81.3	5.68	144.2	2.88	73.2	3.13	79.5	.20x.38	5.1x9.7	2	7.2
T250	. . .	T150	T100	5.25	133.4	3.75	95.3	3.25	82.6	6.05	153.6	2.88	73.2	3.13	79.5	.20x.38	5.1x9.7	2	7.1
T300	T200	T200	T150	4.70	119.4	4.50	114.3	3.80	96.5	5.50	139.7	2.56	65.0	3.75	95.3	.20x.38	5.1x9.7	2	8.5
T350	T250 T300	T250	T200 T250	5.09	129.3	4.50	114.3	3.80	96.5	5.89	149.6	3.00	76.2	3.75	95.3	.20x.38	5.1x9.7	2	10.5
T500	T350	T350 T300	T300	5.46	138.7	4.50	114.3	3.80	96.5	6.26	159.0	3.56	90.4	3.75	95.3	.28x.56	7.1x14.2	2	11.9
T750	T500	T500	T350 T500	5.66	143.8	5.25	133.4	4.43	112.5	6.46	164.0	3.43	87.1	4.38	111.3	.28x.56	7.1x14.2	2	11.0
T1000	T750	T750	T750	6.04	153.4	5.25	133.4	4.43	112.5	6.84	173.7	4.31	109.5	4.38	111.3	.28x.56	7.1x14.2	2	20.6
T1500	T1000	T1000	T1000	5.81	147.6	7.06	179.3	6.16	156.5	6.61	167.9	4.13	104.9	5.81	147.6	.28x.56	7.1x14.2	2	34.0
T2000	T1500	T1500	T1500	7.04	178.8	7.06	179.3	6.16	156.5	7.84	199.1	4.56	115.8	5.81	147.6	.28x.56	7.1x14.2	2	47.0
T3000	T2000	T2000	T2000	6.86	174.2	9.00	228.6	8.46	214.9	7.26	184.4	4.63	117.6	7.63	193.8	.44x.69	11.2x17.5	3	60.0
T5000	T3000	T3000	T3000	8.73	221.7	9.00	228.6	8.46	214.9	9.13	231.9	6.56	166.6	7.63	193.8	.44x.69	11.2x17.5	3	89.0

♦ Dimension with FINGERSAFE® Covers

SmartlockPro® Commercial Spec Grade – Back and Side Wired GFCI with Professional Grade Lockout*

Specifications and Features

- Patented bridge contact provides individual sets of contacts for GFCI receptacle face and downstream receptacles; no power to receptacle face if improperly wired (line-load reversal)
- Patented lockout feature for added safety prevents RESET if GFCI is not operating properly
- TEST and RESET button colors match device face (Red and Black button color models available)
- Advanced electronics design provides superior resistance to electrical surges and over-voltages
- Impact-resistant thermoplastic cover and body
- Expanded wiring options with eight back-wire holes (two for each line and load connection) plus ground with an internal clamp
- Silver alloy contacts
- Compatible with all Decora® devices and wallplates; available in select Decora colors
- Packed with coordinating wallplate
- Backed by a Limited Two-Year Warranty

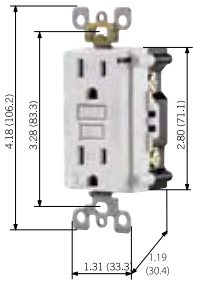
NAFTA Compliant

- Ideal for projects subject to the provisions of the Buy American Act

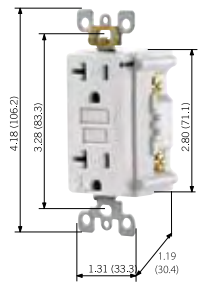
SMARTLOCKPRO COMMERCIAL SPEC GRADE

Back and Side Wired GFCI with Professional Grade Lockout* UL CSA

Description	Color	Cat. No.	Cat. No.
NEMA		 5-15R	 5-20R
Rating		**15A–125V @ Receptacle 20A-125V Feed-Through**	**20A–125V @ Receptacle 20A-125V Feed-Through**
Tamper Resistant GFCI with LED Indicator Light (with self-grounding clips)	White	T7599-W	T7899-W
	Ivory	T7599-I	T7899-I
	Almond	T7599-A	T7899-A
	Light Almond	T7599-T	T7899-T
	Grey	T7599-GY	T7899-GY
	Black	T7599-E	T7899-E
	Brown	T7599	T7899
	Red	T7599-R	T7899-R
GFCI with LED Indicator Light	White	7599-W	7899-W
	Ivory	7599-I	7899-I
	Almond	7599-A	7899-A
	Light Almond	7599-T	7899-T
	Grey	—	7899-GY
	Black	—	7899-E
	Brown	7599	7899
	Red	—	7899-R
GFCI with LED Indicator Light (with self-grounding clips)	White	7599-SGW	7899-SGW
	Ivory	7599-SGI	7899-SGI
	Almond	7599-SGA	7899-SGA
	Light Almond	7599-SGT	7899-SGT
GFCI with LED Indicator Light, with 6" wire leads (Black and Red Buttons)	White	7599-LW	7899-LW
	Ivory	7599-LI	7899-LI



T7599-W



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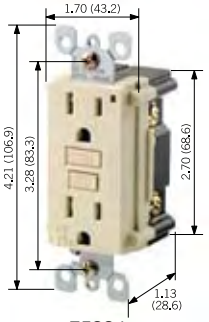


7599-I

*This product is covered by U.S. Patents Nos. 6,040,967; 6,246,558; 6,282,070; 6,381,112; 6,437,953; 6,864,766, as well as other U.S. and foreign patents pending.

Continued On Next Page ›

Thermostat

Part No. CTS, HTS

The Ingram CTS and HTS thermostats are designed to regulate and monitor air temperature. Use the HTS (heating thermostat) for panels designed with heaters. It closes as temperature drops. Use the CTS (cooling thermostat) for panels designed with fans, ventilators or air conditioner. It closes as temperature rises.

Using the Ingram CTS and HTS is an easy and low cost way to maintaining operating temperatures in enclosures.

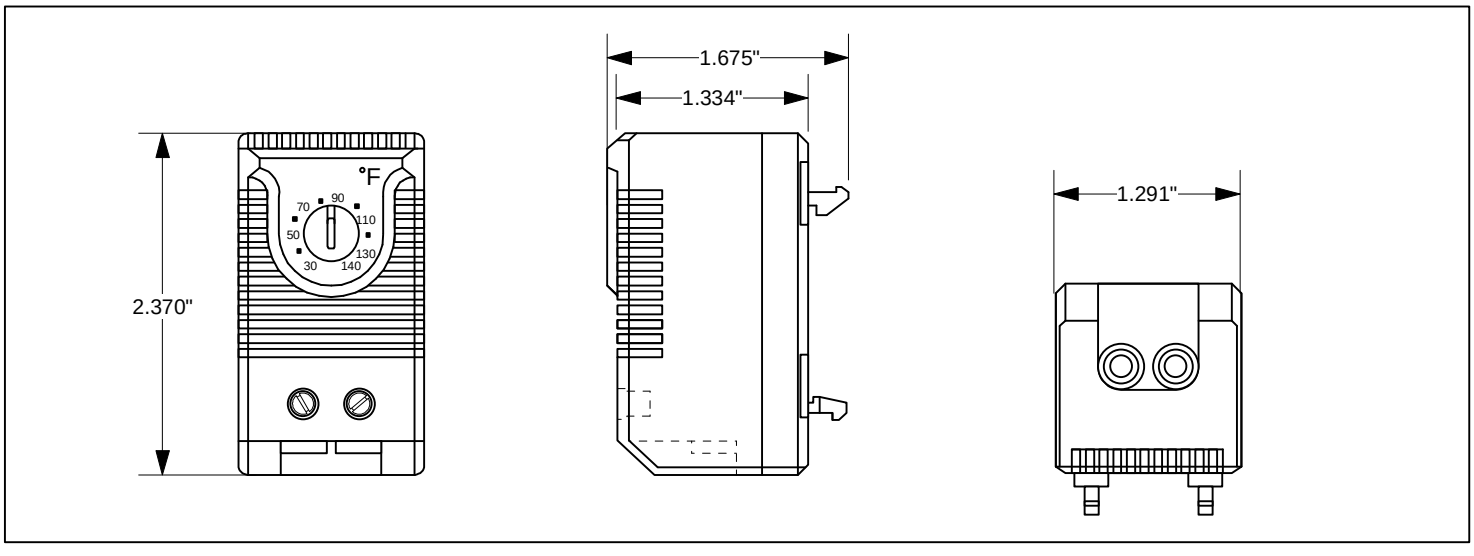
Features

- Small Size
- Easy 35mm din rail mounting
- Wide setting range
- Model CTS (cooling thermostat)
- Model HTS (heating thermostat)
- Heating thermostat closes as temperature decreases
- Cooling thermostat closes as temperature increase

Technical Specifications

- Sensor Type: Bimetal
- Mount: Din Rail
- Switching Capacity: 250 VAC 10A resistive
  120 VAC 15A resistive
- Set Range: 0°C (32°F) to 60°C (140°F)
- Connections: 2-pole terminal for AWG 14 max
- Housing: GE Lexan
- Weight: 40g
- Protection Type: Touch Safe
- Approvals: US UL Recognized
  Canadian UL Recognized

c UL us
E258620

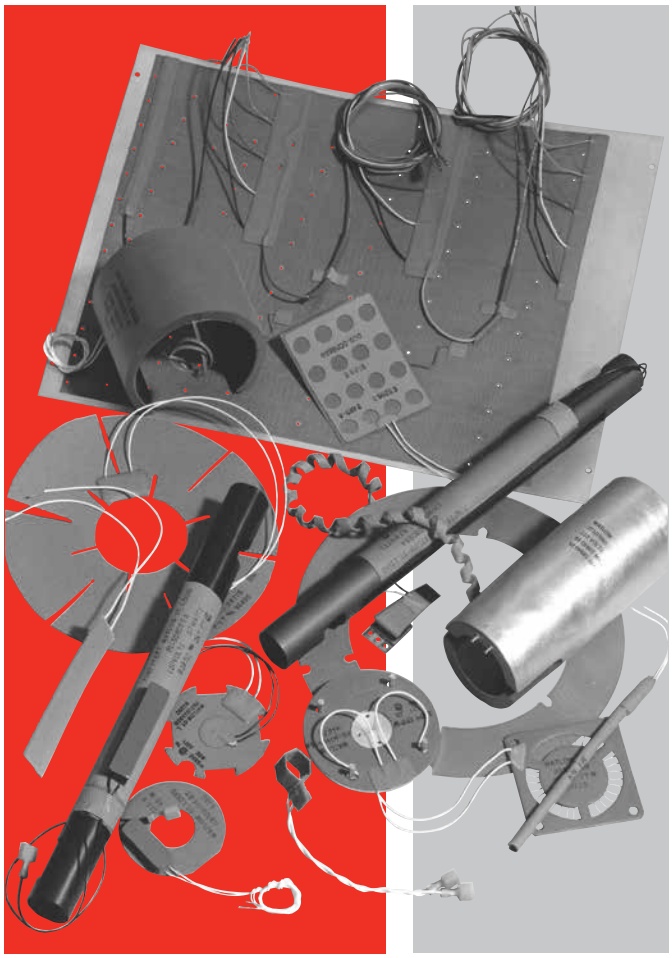


8725 Youngerman Court, Ste 206, Jacksonville, FL 32244 ■ 888-875-2221 ph (904)733-2230 fax ■ Website:www.ingramproducts.com ■ e-mail: info@ingramproducts.com

Silicone Rubber Heaters

Rugged, yet thin, lightweight and flexible—use of Watlow® silicone rubber heaters is limited only by the imagination. Heat can be put exactly where it is needed to improve heat transfer, speed warm ups and decrease wattage requirements in an application process.

Fiberglass-reinforced silicone rubber provides dimensional stability without sacrificing flexibility. Because very little material separates the element from the part, heat transfer is rapid and efficient. Heaters are constructed with a wire-wound element or with an etched foil element. Its thin construction allows it to fit into applications where space is limited.



Performance Capabilities

- Operating temperatures up to 500°F (260°C)
- Watt densities up to 80 W/in^2 (12.5 W/cm^2), dependent upon application temperature
- Wire-wound element thickness — 0.055 in. (1.4 mm)
- Etched foil element — 0.022 in. (0.56 mm)
- UR®, cUR®, VDE and CE recognitions are available on many designs up to 428°F (220°C)

Features and Benefits

Designed to the exact shape and size needed

- Conforms to component and/or equipment

More than 80 designs available immediately from stock

- Reduces downtime

Constructed with wire-wound or etched foil elements

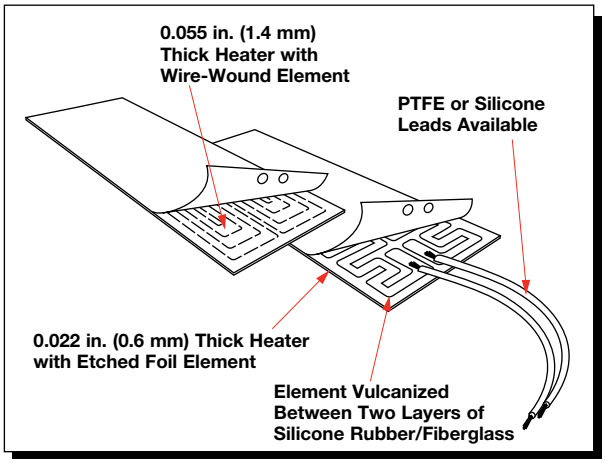
- Enables a thin, lightweight heater
- Provides the desired flexibility for many dynamic applications
- Delivers low mass and easily repeatable distributed watt densities

Moisture and chemical-resistant silicone rubber material

- Provides longer heater life

Vulcanizing adhesives or fasteners

- Allows heaters to be easily bonded to parts



Typical Applications

- Semiconductor processing equipment
- Freeze protection and condensation prevention for many types of instrumentation and equipment
- Medical equipment such as blood analyzers and test tube heaters
- Computer peripherals such as laser printers
- Curing of plastic laminates
- Photo processing equipment

Silicone Rubber Heaters

Wire-Wound Elements — RAPID SHIP Offering (Continued)

Width in.	Width (mm)	Length in.	Length (mm)	Watts	120VAC Part Number	120/240VAC Part Number
4	(102)	4	(102)	80	**040040C1**	
		5	(127)	100	**040050C1**	
		5	(127)	25/100		**040050C2**
		10	(254)	200	**040100C1**	
		10	(254)	50/200		**040100C2**
		15	(381)	300	**040150C1**	
		15	(381)	75/300		**040150C2**
		20	(508)	400	**040200C1**	
		20	(508)	100/400		**040200C2**
		25	(635)	500	**040250C1**	
		30	(762)	600	**040300C1**	
		35	(889)	700	**040350C1**	
		40	(1016)	800	**040400C1**	
5	(127)	5	(127)	125	**050050C1**	
		5	(127)	31.25/125		**050050C2**
		10	(254)	250	**050100C1**	
		10	(254)	62.50/250		**050100C2**
		15	(381)	375	**050150C1**	
		15	(381)	9.38/375		**050150C2**
		20	(508)	500	**050200C1**	
		20	(508)	125/500		**050200C2**
		25	(635)	625	**050250C1**	
		30	(762)	750	**050300C1**	
		35	(889)	875	**050350C1**	
		40	(1016)	1000	**050400C1**	
6	(152)	5	(127)	150	**060050C1**	
		5	(127)	37.50/150		**060050C2**
		10	(254)	300	**060100C1**	
		10	(254)	75/300		**060100C2**
		15	(381)	450	**060150C1**	
		15	(381)	112.50/450		**060150C2**
		20	(508)	600	**060200C1**	
		20	(508)	150/600		**060200C2**
		25	(635)	750	**060250C1**	
		30	(762)	900	**060300C1**	
		35	(889)	1050	**060350C1**	
		40	(1016)	1200	**060400C1**	

RAPID SHIP

- **RS** - Next day shipment up to 10 pieces for orders with part number configuration -0001B.

*** Due to their high resistance, these heaters are not recommended for curved or flexing applications.**

Notes:

- Thickness 0.055 in. (1.4 mm)
- Heaters have lead length of 12 in. (305 mm) UL® 1180 PTFE
- UL® component recognition
- Silicone rubber wire-wound elements rated at 5 W/in^2 (0.78 W/cm^2)

Silicone Rubber Heaters

Wire-Wound Elements — RAPID SHIP Offering Coding Configured Options

To order, complete the part number with the information below:

Wire Wound

0_____-____

Modification Options
0 = None
A = PSAS bottom
B = PSAS top
E = With plate, heater on side opposite flange
F = With plate, heater on flange side
G = Flaps + grommets
H = Flaps + boot hooks
J = Flaps + latch fasteners
K = PSAS and low loss
L = Low loss
M = Low loss + flaps + grommets
N = Low loss + flaps + boot hooks
P = Low loss + flaps + latch fasteners
R = 1/16 in. sponge
S = 1/8 in. sponge
T = 1/4 in. sponge
U = 3/8 in. sponge
V = 1/2 in. sponge
W = PSAS + 1/16 in. sponge
Y = PSAS + 1/8 in. sponge
1 = PSAS + 1/4 in. sponge
2 = PSAS + 3/8 in. sponge
3 = PSAS + 1/2 in. sponge

Sensors

Type	LOC	WIR
0 = None		
L = T10	STD	STD
M = T10	STD	ALT
N = T10	ALT	STD
P = T10	ALT	ALT
R = T207	STD	STD
S = T207	STD	ALT
T = T207	ALT	STD
U = T207	ALT	ALT
V = T207E	On heater	STD
W = T207E	Remote	STD
4 = JSTD	STD	STD
6 = JALT	STD	STD
7 = KSTD	STD	STD

- For thermostats, standard location is as shown in catalog; standard wiring is integral or in series with the heater, alternate location is rotated parallel with heater width, alternate wiring is separate leads for pilot control.
- For thermocouples, Type J standard is PFA insulation, Type J alternate is fiberglass insulation, Type K standard is fiberglass insulation.

T10 Set °F*
0 = None
A = 125
B = 150
E = 175
F = 200
G = 225
H = 250
J = 275
K = 300

T207 Set °F*
0 = None
1 = 40/55
2 = 60/75
3 = 95/110
4 = 145/160

T/C Length
0 = None
A = 8 in.
B = 12 in.
E = 18 in.
F = 24 in.
G = 30 in.
H = 36 in.
J = 40 in.
K = 4 ft
L = 5 ft
M = 6 ft
N = 7 ft
P = 8 ft
R = 9 ft
S = 10 ft
T = 12 ft
U = 15 ft
V = 18 ft
W = 20 ft
Y = 22 ft
1 = 25 ft
2 = 30 ft

* For all thermostats the heater must be a 2 in. (51 mm) min. width and 5 in. (127 mm) min. length.

Lead Insulation
0 = None
1 = 1180 UL® R/C
2 = 1180 C-UL® R/C
3 = 3133 22 Ga.
6 = 1199 CSA
7 = HPN
8 = 6 ft HPN set
9 = Type E PTFE
A = 1180VDE*
B = 1199VDE*
C = Silicone leads w/waterproof cap
E = SJO cord
F = 6 ft SJO set

* 1180VDE denotes a C-UL® heater plus a VDE stamp.

Lead Length*
A = 8 in.
B = 12 in.
E = 18 in.
F = 24 in.
G = 30 in.
H = 36 in.
J = 40 in.
K = 4 ft
L = 5 ft
M = 6 ft
N = 7 ft
P = 8 ft
R = 9 ft
S = 10 ft
T = 12 ft
U = 15 ft
V = 18 ft
W = 20 ft
Y = 22 ft
1 = 25 ft
2 = 30 ft

* Customer specified length must be noted in inches when ordering.

PANELITE™ ENCLOSURE LIGHTS OVERVIEW

INDUSTRY STANDARDS

PANELITE LED and Fluorescent Enclosure Lights

UL 508A Component Recognized; File No. E61997 cUL Component Recognized per CSA C22.2 No 14; File No. E61997

CSA File No. 42186
Maintains UL/CSA Type 4, 4X and 12 enclosure rating when properly installed in a Hoffman enclosure.

230 VAC Fluorescent Enclosure Light

UL 508A Component Recognized; File No. E234324 cUL Component Recognized per CSA C22.2 No 14; File No. E61997

CE

LED Light

UL 508A Component Recognized; File No. E234324 cUL Component Recognized per CSA C22.2 No 14; File No. E234324

CE
Ingress protection : IP 20
Maintains enclosure type rating up to 4X when installed per instructions

APPLICATION

Versatile, slim-profile LED and fluorescent lights provide mounting flexibility and are easy to install in any enclosure. Terminal blocks allow for easy wiring. Accessories include ganging cables, power cords and door switches, all provided with plug-and-play connectors for easy connection to the terminal blocks with an innovative terminal connection system. LED version provides superior lighting performance with minimal power consumption.

FEATURES

- Slim profile allows light to be tucked up out of the way for easy panel installation
- Versatile mounting allows the light to be positioned horizontally or vertically; two-way mounting provides for ideal orientation
- Includes mounting hardware for the following enclosure installations: PROLINE™ Frame, Enclosure Top, Panel Mount and Unistrut
- On/off switch incorporated in light; optional remote door switch accessory available to activate light when enclosure door is opened (230 VAC Fluorescent Enclosure Light has switch or door-activated sensor)

PANELITE Only:

- Mounting tabs provide easy access point for attachment hardware; light does not need to be disassembled for installation
- Up to five lights can be daisy-chained together
- Plug-and-play terminal connection system:
  - Pre-wired connection sockets on both ends of light allow use of Hoffman cable accessories
  - Optional terminal blocks snap into the connection sockets allowing customers to use own wiring methods; two terminal blocks provided with each light kit
  - Power supply can be wired manually with Hoffman PANELITE Power Cable with Leads or with Hoffman optional PANELITE Power Cord
  - Ganging cables are available in 2-, 4- and 6-ft. lengths to easily join up to five lights together using one power supply
  - Remote door switch for easy door activation eliminates need to mount light in the exact location required to activate the light

LED Light Only:

- Mechanical screw- or magnetic mount (non-slip rubberized)
- Protection Class II (double insulated)
- Operating temperature -22 F to 140 F (-30 C to 60 C)
- On / Off or motion-sensor activation
- LED lights with 900 LM illumination; 120° angle of illumination
- Low, 5-watt power requirement
- Light-weight, all-composite construction
- Input and output connectors included with light (16 AWG)

SPECIFICATIONS

PANELITE:

- Extruded aluminum center support
- Black composite end caps
- Black composite mounting tabs
- Each light fixture includes two mounting tabs, two pre-wired connection sockets, two optional terminal blocks that snap into the connection sockets and enclosure attachment hardware (bulb not included with fluorescent light)

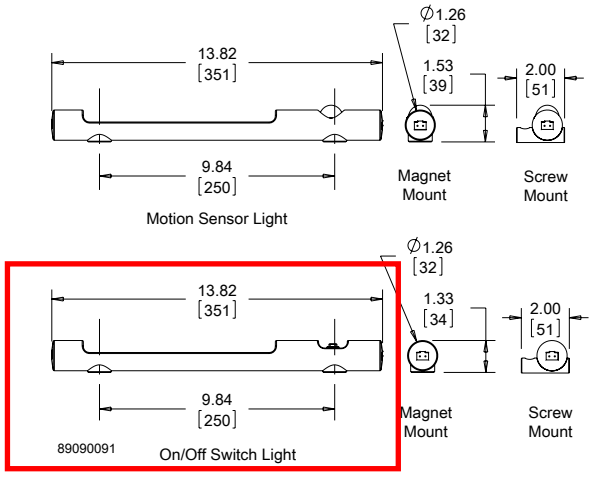
230 VAC Fluorescent Enclosure Light:

- Light gray composite construction – UL 94V-0 material
- Hardware kit provides fasteners to mount to PROLINE, NEMA (4, 4X, 12, and 13), CONCEPT™ , FUSION™ and other cabinets
- Easy-access terminal block that accommodates up to 16 AWG wires
- Fluorescent light bulb included (2G7 Base)

LED Light:

- LED (Light Emitting Diode) low-power light kit
- Screw mounting using included hardware kit (maintains enclosure rating up to UL Type 4X)
- No user-serviceable parts
- Life expectancy of 60,000 hours at 68 F (20 C) under specifications
- Operating temperature: -22 to +140 F (-30 to +60 C) under specifications
- 5-watt power consumption
- Transparent, composite construction

LED LIGHT KIT



LED light kits provide interior enclosure lighting. These light kits are ideal for remote and darkened enclosure applications. The light can be mechanically fastened with included hardware to maintain enclosure UL listing (up to Type 4X), or can be magnetically attached to flat steel surfaces. The lights have auto-sensing circuitry (AC voltage 90 VAC to 260 VAC and DC voltage 20 VDC to 60 VDC). LED lights are light-weight and in a small form factor while providing 900 LM of 6500K light. Power consumption for all models is 5 watts.

BULLETIN: A80LT

Catalog Number	AxBxC in./mm	Weight (oz)	Weight (gm)	Mounting Style	Power Source	Activation	Voltage
LEDA1M35	1.34 x 1.26 x 13.82 34 x 32 x 351	4.8	135	Magnetic	AC	On/off switch	90 VAC-260 VAC
LEDA2M35	1.54 x 1.26 x 13.82 39 x 32 x 351	5.0	140	Magnetic	AC	IR Motion Sensor	90 VAC-260 VAC
LEDA1S35	1.42 x 2.05 x 13.82 36 x 52 x 351	4.8	135	Screw	AC	On/off switch	90 VAC-260 VAC
LEDA2S35	1.63 x 2.05 x 13.82 41 x 52 x 351	5.0	140	Screw	AC	IR Motion Sensor	90 VAC-260 VAC
LEDD1M35	1.34 x 1.26 x 13.82 34 x 32 x 351	4.8	135	Magnetic	DC	On/off switch	20 VDC-60 VDC
LEDD2M35	1.54 x 1.26 x 13.82 39 x 32 x 351	5.0	140	Magnetic	DC	IR Motion Sensor	20 VDC-60 VDC
LEDD1S35	1.42 x 2.05 x 13.82 36 x 52 x 351	4.8	135	Screw	DC	On/off switch	20 VDC-60 VDC
LEDD2S35	1.63 x 2.05 x 13.82 41 x 52 x 351	5.0	140	Screw	DC	IR Motion Sensor	20 VDC-60 VDC

LED LIGHT INPUT CONNECTOR/CABLE ASSEMBLY

The input connector/cable assembly is used to provide supply power to the LED light. Pre-assembled connector/cable assembly with 78.7-in. (2000 mm) long cable whip. Cables are constructed of 16 AWG copper wire.

BULLETIN: A80LT

Catalog Number	A in./mm	Power Source	Use with
LEDA20C	78.74 2000	AC	AC LED Lights
LEDD20C	78.74 2000	DC	DC LED Lights

LED LIGHT EXTENSION CONNECTOR/CABLE ASSEMBLY

The extension connector/cable assembly is used to connect adjacent LED lights (daisy chain). Up to 10 LED lights can be ganged or connected in series. Pre-assembled connector/cable assembly with 39.4-in. (1000 mm) long cable between input and output connectors. Cables are constructed of 16 AWG copper wire.

BULLETIN: A80LT

Catalog Number	A in./mm	Power Source	Use with
LEDA10E	39.37 1000	AC	AC LED Lights
LEDD10E	39.37 1000	DC	DC LED Lights

General Purpose Pushbutton Switches — AC Rated

These general purpose ac rated pushbutton switches offer a wide variety of configurations, button styles and termination types. The 7835 and 7836 light duty series are ac only pushbutton switches. They feature Slow-make/Slow-break butt type contacts with a light operating pressure that is particularly suited to instrumentation applications.

SPECIFICATIONS

Ratings:

See selection table.

Circuits:

1PST, 1PDT, 2PDT.

Momentary action.

Contact Material:

3-6A Rated

Movable — Silver plated copper.

Stationary — Silver plated copper.

10-15A Rated

Movable — Silver plated copper with fine or coin silver contact face button.

Stationary — Copper with fine or coin silver contact face button.

Terminal Types:

Screw Terminals — Brass. Furnished unassembled.

8448 Series
#6-32 x 3/16″ binding head screws **(Cat. No. 811-2)**.

8410/8411 Series
#5-40 x 3/16″
(Cat. No. 811-7206).

8406/8440 Series
#5-40 x 5/32″ screws
(Cat. No. 11-26).

Solder Lug — Brass silver plated.

AC RATED PUSHBUTTON SWITCHES SELECTION TABLE (**BOLD** FACE TYPE INDICATES ITEMS NORMALLY IN DISTRIBUTOR STOCK)

Type	Rating	Poles and Throw	Contacts	CIRCUIT NUMBER SEE PAGE 4.28	BUTTON Construction	BUTTON Color	BUTTON Button Extension Dimension "B" mm	BUTTON Button Extension Dimension "B" inches	Typical Maximum Operating Force	Mounting or Bushing Length Dimension "A" mm	Mounting or Bushing Length Dimension "A" inches	CATALOG NUMBER Solder Lugs	CATALOG NUMBER Screw Terminals	CATALOG NUMBER Spade Terminals (.250″)	CATALOG NUMBER Wire Leads ❺
NON-ILLUMINATED												**NON-ILLUMINATED**			
Flush Mounted Light Duty Momentary Contact	3/4A, 125V ac/dc 1/4A, 250V ac/dc	1 P.S.T. 1 P.S.T.	NC NC	A A	Nylon Nylon	Black Black	11.50 11.89	.453″ .468″	0.7 lbs.❷ 0.7 lbs.❷	— —	Flush Flush	— —	8410K1 8406K1	— —	— —
Snap-In Mounted Light Duty Momentary Contact	3/4A, 125V ac/dc 1/4A, 250V ac/dc	1 P.S.T. 1 P.S.T.	NC NO	A A	Nylon Nylon	White White	9.53 9.53	.375″ .375″	— —	— —	Snap-In Snap-In	— —	— —	8423K1 ❶ 8424K1 ❶	— —
One Hole Mounted Light Duty Momentary Contact	3/4A, 125V ac/dc 1/4A, 250V ac/dc	1 P.S.T. 1 P.S.T.	NC NO	A	Nylon Nylon	Black Red	6.35 6.35	.250″ .250″	1.5 lbs. ❷ 1.5 lbs. ❸	6.35 6.35	.250″ .250″	8411K5 —	— —	— 8411K13 ❶	— —
		1 P.S.T. 1 P.S.T.	NC NO	A	Nylon Nylon	Black Black	10.31 9.53	.406″ .375″	1.5 lbs. ❷ 1.5 lbs. ❸	11.89 11.89	.468″ .468″	~~8411K8~~ —	8411K7 8411K12	8411K10 8411K11 ❶	— —
	3A, 125V ac	1 P.S.T. 1 P.S.T.	NC NO	A	Nylon Nylon	Black Black	6.35 10.31	.250″ .406″	1.5 lbs. 1.5 lbs.	6.35 11.89	.250″ .468″	— —	— —	8418K1 ❶ 8418K12 ❶	— —
	5A, 12V dc ❶❹ 3A, 125V ac	1 P.S.T.	NO	A	Metal	—	7.52	.296″	2.5 lbs.	11.89	.468″	8440K2	8440K3	—	—
	3A, 125V ac 1A, 250V ac 1/10 Hp, 125V ac	1 P.S.T.	NC	A	Metal Nylon (Snap-On) Nylon (Snap-On)	— Black Red	7.92 — —	.312″ — —	— — —	14.27 14.27 14.27	.562″ .562″ .562″	**7835K11A** 7835K11C 7835K11D	— — —	— — —	7835K12A — —
		1 P.S.T.	NO	A	Metal Nylon (Snap-On) Nylon (Snap-On)	— Black Red	7.92 — —	.312″ — —	— — —	14.27 14.27 14.27	.562″ .562″ .562″	**7836K11A** **7836K11C** **7836K11D**	7836K13A — —	— — —	7836K12A — —
One Hole Mounted Medium Duty Momentary Contact	15A, 125V ac 10A, 250V ac 1/3 Hp, 125-250V ac	1 P.S.T.	NO	A	Metal	— —	13.49 6.35	.531″ .250″	0.9 lbs.	17.45 8.71	.687″ .343″	— —	8444K3 8444K4	8444K2 —	— —
	15A, 125V ac, NO 10A, 125V ac, NC 10A, 250V ac, NO 5A, 250V ac, NC 1/2 Hp, 250V ac 1/4 Hp, 125V ac	1 P.D.T.	NO,NC	B	Metal Bakelite	— Black	13.49 13.49	.531″ .531″	2.0 lbs.	17.45 17.45	.687″ .687″	— —	8434K2 8435K2	8434K1 8435K1	— —
	15A, 125V ac 10A, 250V ac	2 P.S.T.	NO	C	Metal	—	6.35	.250″	—	8.71	.343″	—	8448K2 ❹	8448K1 ❹	—

❶ Combination spade and solder lug terminal.
❷ To change operating pressure, refer to your local Eaton Sales Representative.
❸ Operating pressure cannot be changed.
❹ UL and CSA listings not applicable.
❺ Standard length is 152.40mm (6″), stripped 15.88mm (.625″).

Uninterruptible power supply - TRIO-UPS/1AC/24DC/ 5 - 2866611

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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

Key Commercial Data

Packing unit	1 pc
Weight per Piece (excluding packing)	1120.0 g
Custom tariff number	85371091
Country of origin	China

Technical data

Dimensions

Width	60 mm
Height	130 mm
Depth	118 mm

Ambient conditions

Degree of protection	IP20
Ambient temperature (operation)	-25 °C ... 70 °C (> 55° C derating : 2.5%/K)
Ambient temperature (storage/transport)	-40 °C ... 80 °C
Max. permissible relative humidity (operation)	95 % (at 25 °C, non-condensing)
Noise immunity	EN 61000-6-2:2005

Input data

Nominal input voltage range	100 V AC ... 240 V AC
AC input voltage range	85 V AC ... 264 V AC (Derating < 90 V AC: 2.5%V)
Input voltage range DC	100 V DC ... 350 V DC (UL508: 100 ... 250 V)
Buffer time	adjustable: 0.5 min; 1 min; 2 min; 3 min; 5 min; 10 min; 15 min; 20 min; PC-Mode

Uninterruptible power supply - TRIO-UPS/1AC/24DC/ 5 - 2866611

Technical data

Input data

Current consumption	1.1 A (230 V AC, maximum)
	1.8 A (120 V AC, maximum)
Inrush current limiting/I²t	< 1.3 A^2s
Power failure bypass	see diagram
Typical response time	150 ms (230 V AC)
	200 ms (120 V AC)
Power factor (cos phi)	approx. 0.5
Protective circuit	Transient surge protection Varistor
Input fuse, integrated	6.3 A (slow-blow, internal)

Output data

Nominal output voltage	24 V DC
Setting range of the output voltage (U_{Set})	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)
Nominal output current (I_N)	5 A (-25°C ... 55°C)
Derating	55 °C ... 70 °C (2.5%/K)
Output current limit	max. 6 A (Mains operation)
Control deviation	< 1 % (change in load, static 10 % ... 90 %)
Efficiency	> 88 % (230 V AC, network operation)
	> 86 % (120 V AC, network operation)
	> 86 % (Battery operation)
Residual ripple	< 10 mV_{PP}
Peak switching voltages nominal load	< 25 mV_{PP}
Connection in parallel	Yes, 2
Surge protection against internal surge voltages	Yes, < 35 V DC
Feedback resistance	35 V DC

General

IQ technology	No
Net weight	1.1 kg
Memory medium	External, battery 1.3 Ah / 3.4 Ah / 7.2 Ah / 12 Ah
Operating mode	
Insulation voltage input/output	4 kV (type test)
	2 kV (Routine test)
Protection class	I
	> 596000 h (40°C)
Mounting position	horizontal DIN rail NS 35, EN 60715
Assembly instructions	Can be aligned: Horizontally 0 mm, vertically 50 mm

Energy storage - UPS-BAT/VRLA/24DC/7.2AH - 2320319

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Energy storage device, lead AGM, VRLA technology, 24 V DC, 7.2 Ah, tool-free battery replacement, automatic detection, and communication with QUINT UPS-IQ

Product Description

For continuous monitoring and intelligent management, there is constant communication with the QUINT UPS. Thanks to automatic detection of the energy storage, and tool-free switching during operation, quick installation is possible. The QUINT UPS with IQ technology energy storage leaves the warehouse fully charged.

Your advantages

- Maximum buffer times
- Lead AGM (Absorbent Glass Mat) technology

Key Commercial Data

Packing unit	1 pc
GTIN	4 046356 553353
GTIN	4046356553353
Weight per Piece (excluding packing)	6,340.000 g
Custom tariff number	85072080
Country of origin	China

Technical data

Dimensions

Width	135 mm
Height	202 mm
Depth	110 mm

Ambient conditions

Energy storage - UPS-BAT/VRLA/24DC/7.2AH - 2320319

Technical data

Ambient conditions

Degree of protection	IP20
Ambient temperature (operation)	0 °C ... 40 °C
Ambient temperature (storage/transport)	-15 °C ... 40 °C
Max. permissible relative humidity (operation)	≤ 95 %
Degree of pollution	2

Input data

Nominal input voltage	24 V DC
Buffer period	10 min. (20 A)
	3 min. (40 A)

Output data

Nominal output voltage	24 V DC
Output current I_{max}	50 A
Connection in parallel	5
Connection in series	No
Output fuse	2x 25 A

General

IQ technology	Yes
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.
Net weight	5.9 kg
Memory medium	Lead rechargeable battery module
Protection class	III
Degree of protection	IP20
Mounting position	horizontal DIN rail NS 35, EN 60715

Standards and Regulations

Connection in acc. with standard	CUL
Standard - Electrical safety	EN 60950-1/VDE 0805 (SELV)
Standard – Electronic equipment for use in electrical power installations and their assembly into electrical power installations	EN 50178/VDE 0160 (PELV)
Shipbuilding approval	DNV GL (EMC A), ABS
UL approvals	UL/C-UL listed UL 508
	UL/C-UL Recognized UL 60950-1
	UL ANSI/ISA-12.12.01 Class I, Division 2, Groups A, B, C, D (Hazardous Location)
VdS approval	G 193046

Energy storage - UPS-BAT/VRLA/24DC/7.2AH - 2320319

Technical data

Standards and Regulations

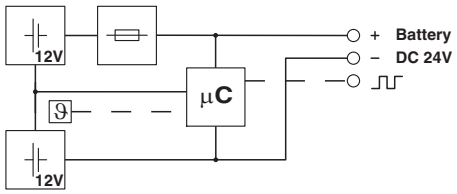
Shock	18 ms, 30g, in each space direction (according to IEC 60068-2-27)
Vibration (operation)	< 15 Hz, amplitude ±2,5 mm, 15 Hz ... 150 Hz, according to IEC 60068-2-6
	15 Hz ... 150 Hz, 2.3g, 90 min.

Environmental Product Compliance

REACh SVHC	Lead 7439-92-1
China RoHS	Environmentally Friendly Use Period = 3
	For details about hazardous substances go to tab “Downloads”, Category “Manufacturer's declaration”

Drawings

Block diagram



Classifications

eCl@ss

eCl@ss 4.0	27040603
eCl@ss 4.1	27040603
eCl@ss 5.0	27040603
eCl@ss 5.1	27040600
eCl@ss 6.0	27040600
eCl@ss 7.0	27050403
eCl@ss 8.0	27050403
eCl@ss 9.0	27050403

ETIM

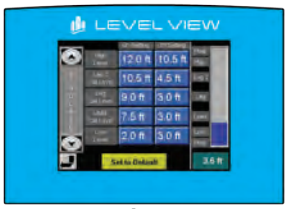
ETIM 2.0	EC000382
ETIM 3.0	EC000382
ETIM 4.0	EC000357
ETIM 5.0	EC000357
ETIM 6.0	EC000357

LEVEL VIEW™

DUPLEX/TRIPLEX PUMP CONTROLLER

OVERVIEW

The Level View™ is a versatile controller that controls two or three pumps. The pumps can be constant or variable speed and pump-up (water) and pump-down (wastewater) control modes are supported. The sunlight readable color touch-screen HMI has the ability to provide on/off level and speed control, pump alternation, flow monitoring, data logging, alarm logging and historical trending. It comes equipped with an SD memory card for data storage and download. Connectivity options provide flexibility for SCADA/BAC automation and a plug and play Pump Watch™ interface.



Level Setup

VFD Setup

FEATURES

- Continuous level monitoring
- Flow monitoring (without a flow meter)
- Pump current monitoring
- Duplex or triplex pump operation
- Alarm data logging
- Pump HOA switch monitoring
- Real time clock
- Level bar graph
- Level simulation
- Pump up or pump down applications
- Pump speed control (with VFDs)

SPECIFICATIONS

Pump Control and Monitoring:

- Automatic alternation
- Pump over temperature and seal fail monitoring
- Pump dry run protection
- Run time (hour meter)
- Cycle counter

System:

- 6 inch color touch screen
- LED backlit, sunlight readable
- Intuitive menu navigation
- Simple setup and operation
- Password protection
- Data logging on SD memory card

Electrical:

- Requires external 24 VDC power supply
- Input voltage range 20.4 - 28.8 VDC
- Optional battery backup

Communication:

- Ethernet port (optional)
- Pump Watch™ gateway (plug and play)
- Modbus RTU

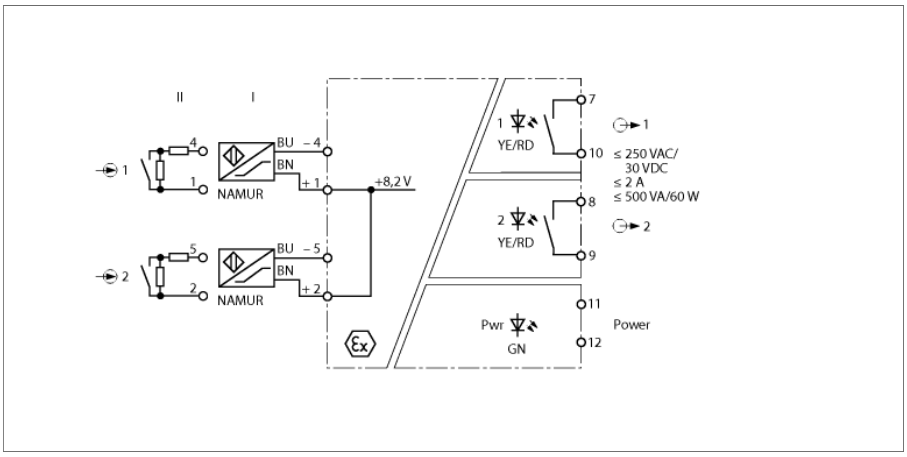
PRIMEX
MUNICIPAL AND INDUSTRIAL WATER CONTROL SOLUTIONS
844-4PRIMEX (477-4639)
WWW.PRIMEXCONTROLS.COM

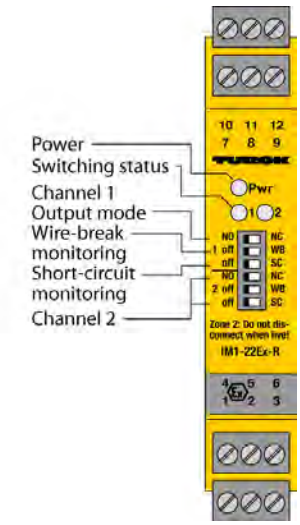
Ashland, OH	800-363-5842
Clearwater, FL	800-349-1905
Detroit Lakes, MN	888-342-5753
Milford, OH	513-831-9959

interface modul

Isolating switching amplifier 2-channel

IM1-22EX-R/24VDC





The 2-channel IM1-22EX-R/24VDC isolating switching amplifier is equipped with intrinsically safe input circuits.

Sensors according to EN 60947-5-6 (NAMUR) or potential-free contact transmitters can be connected to the device.

The output circuits feature 2 relays, each with 1 NO contact.

Via six switches on the front, you can set the operating behaviour for each channel separately (work or quiescent current behavior, i.e. NO/NC) as well as switch wire-break (WB) and short-circuit monitoring (SC) on and off.

When using mechanical contacts, wire-break and short-circuit monitoring must be switched off or the contacts must be wired to resistors (II) (see circuit diagram).

The Pwr LED lights green to indicate operational readiness. The 2-color LEDs 1 and 2 below light yellow to indicate the switching status of the corresponding output. In the event of an input circuit error, the 2-color LED of the assigned faulty input turns red, with the input circuit monitoring being switched on. Thereupon the belonging output relay is de-energized.

- **ATEX, $_{c}$FM$_{us}$, TR CU**
- **Adjustable output mode (NO/NC)**
- **Input circuits monitored for wire-break/ short-circuit (ON/OFF switchable)**
- **Complete galvanic isolation**

Edition • 2016-11-04T16:52:06+01:00

Hans Turck GmbH & Co.KG ● D-45472 Mülheim an der Ruhr ● Witzlebenstraße 7 ● Tel. 0208 4952-0 ● Fax 0208 4952-264 ● more@turck.com ● www.turck.com

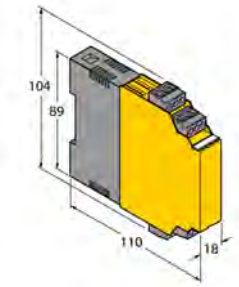
interface modul

Isolating switching amplifier
2-channel
IM1-22EX-R/24VDC

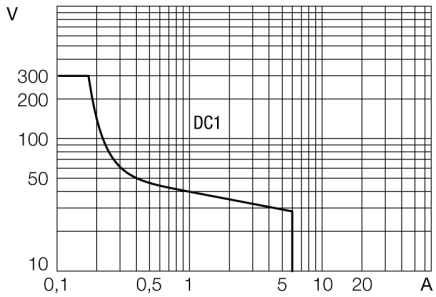
TURCK Industrial Automation

Type designation	IM1-22EX-R/24VDC
Ident no.	7541210
Nominal voltage	24 VDC
Operating voltage range	10…30 VDC
Power loss, typ.	≤ 0.99 W
NAMUR input	
NAMUR	EN 60947-5-6
Input circuit monitoring	on/off switchable
No-load voltage	8 VDC
Short-circuit current	8 mA
Input resistance	1 kΩ
Cable resistance	≤ 50 Ω
Switch-on threshold	1.75 mA
Switch-off threshold	1.55 mA
Wire breakage threshold	≤ 0.06 mA
Short-circuit threshold	≥ 6.4 mA
Output circuits (digital)	2 x relays (NO)
Output switching voltage relay	≤ 30 VDC / ≤ 250 VAC
Switching current per output	≤ 2 A
Switching capacity per output	≤ 500 VA/60 W
Switching frequency	≤ 10 Hz
Contact quality	AgNi, 3µ Au
Important note	For Ex-applications the values specified in the corresponding Ex certificates (ATEX, IECEx, UL, etc.) apply.
Ex approval acc. to conformity certificate	PTB 00 ATEX 2033
Application area	II (1) G, II (1) D
ignition protection category	[Ex ia Ga] IIC; [Ex ia Da] IIIC
Max. values:	Terminal connection: 1…6
State/ Fault	2 x yellow / red
Mechanical Data	
Protection class	IP20
Flammability class acc. to UL 94	V-0
Ambient temperature	-25 …+60 °C -25 ... +60 °C für FM
Storage temperature	-40…+80 °C
Relative humidity	≤ 95 %
Dimensions	104 x 18 x 110 mm
Weight	142 g
Mounting instructions	DIN rail (NS35) or panel
Housing material	Polycarbonate/ABS
Electrical connection	4 x 3-pin removable terminal blocks, reverse polarity protected, screw connection
Terminal cross-section	1 x 2.5 mm² / 2 x 1.5 mm²
Tightening torque	0.5 Nm

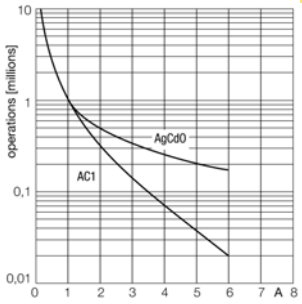
Dimensions



Output relay – Load curve



Output relay – Electrical lifetime



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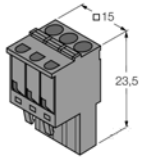
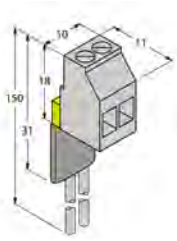
Isolating switching amplifier
2-channel
IM1-22EX-R/24VDC

Accessories

Type code	Ident no.	Description	
IM-CC-3X2BU/2BK	6900475	Cage clamp terminals for IM modules (Ex-devices with 18 mm overall width); includes: 2 pcs. 3-pin blue terminals and 2 pcs. 3-pin black terminals.	
WM1	0912101	The resistor module WM1 meets the requirements for line monitoring between a mechanical contact and a TURCK signal processor. The input circuit of the signal processor is designed for sensors acc. to EN60947-5-6 (NAMUR) and equipped with a wire-break and short-circuit monitoring function.	

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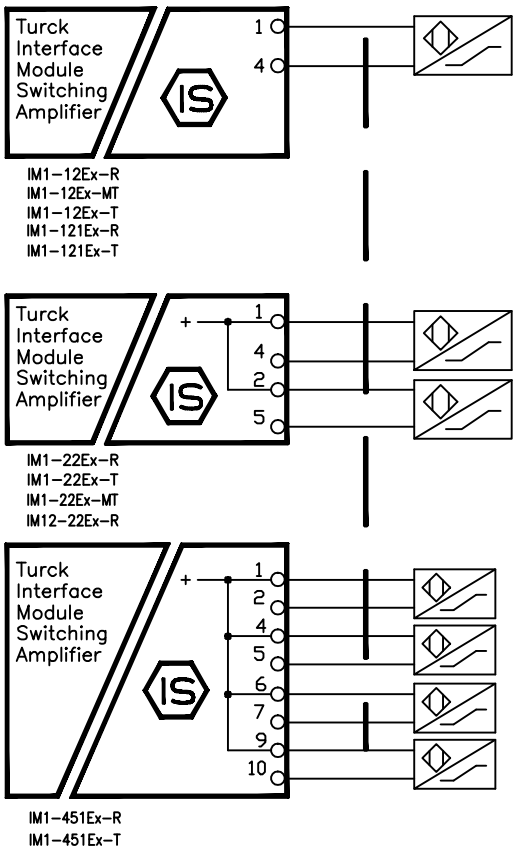
Discrete Input Devices with Intrinsically Safe Field Circuits

NON–HAZARDOUS LOCATION

HAZARDOUS (CLASSIFIED) LOCATION
Class I, Div. 1, Group A, B, C or D;
Class II, Div. 1, Group E, F or G;
Class III, Div. 1; or
Class I, Zone 0, Group IIC, IIB or IIA



Entity Parameters: Class I, Division 1; Class II, Division 1; Class III, Division 1
Class I, Zone 0, 1, or 2
Circuit Characteristic: Linear

Model ⚠1	Terminals	V_{oc}/U_o (V)	I_{sc}/I_o (mA)	P_o (mW)	C_a/C_o (uF)		L_a/L_o (mH)	
					AB/IIC	CDEFG/IIB,IIA	AB/IIC	CDEFG/IIB,IIA
IM1–12Ex–R, IM1–12Ex–MT, IM1–12Ex–T, IM1–121Ex–R, IM1–121Ex–T	1–4	9.6	11	26	1.1	5.2	1	2
IM1–22Ex–R,	1–4, 2–5				0.83	3.8	5	10
IM1–22Ex–T, IM1–22Ex–MT, IM12–22Ex–R					0.74	3.4	10	20
IM1–451Ex–R	1–2, 4–5, 6–7, 9–10	11.3	13	36	0.84	4	1	2
					0.62	2.8	5	10
IM1–451Ex–T					0.55	2.5	10	20

P_o of the barrier is calculated using the formula $P_o = (V_{oc} * I_{sc})/4$

LISTED

Associated Apparatus, Nonhazardous Locations, providing intrinsically safe circuits for use in hazardous locations Cl I, Div 1, Grps A, B, C, D; Cl II, Div 1, Grps E, F, G; Cl III, Div 1; Cl I, Zone 0, [AEx ia] IIC when installed per Turck control drawing IS–1.301. $-25°C \leq T_a \leq +60°C$

Notes:

1. The symbol  designates third party approved with correct entity parameters meeting the relations shown in Table 1, or simple apparatus.
2. Multiple circuits extending from the same piece of Associated Apparatus equipment must be installed in separate cables or in one cable having suitable insulation. Refer to Instrument Society of America Recommended Practice ISA RP12.6 for installing intrinsically safe equipment.
3. A simple apparatus is defined as an electrical component or combination of components of simple construction with well–defined electrical parameters that does not generate more than 1.5V, 100mA, and 25mW, or a passive component that does not dissipate more than 1.3W and is compatable with the intrinsic safety of the circuit in which it is used.
4. Capacitance and inductance of the field wiring from the intrinsically safe equipment to the barrier should be calculated and should be included in the system calculations as shown in Table 1. Cable capacitance (Cc) plus intrinsically safe equipment capacitance (Ci) must be less than the marked capacitance (Ca) shown on any barrier used. The same applies for inductance (Lc, Li and La, respectively). Where the cable capacitance and inductance per foot are not known, the following values shall be used: Cc = 60 pF/ft, Lc = 0.2 uH/ft.

Table 1

I.S. Equipment		Barrier
V_{max}	$\geq$	V_{oc} (or V_t)
I_{max}	$\geq$	I_{sc} (or I_t)
$C_i + C_c$	$\leq$	C_a
$L_i + L_c$	$\leq$	L_a
U_i	$\geq$	U_o
I_i	$\geq$	I_o
$C_i + C_{cable}$	$\leq$	C_o
$L_i + L_{cable}$	$\leq$	L_o
P_i	$\geq$	P_o

5. Barriers must be installed in accordance with barrier manufacturer's control drawing and Article 504 of the National Electrical Code, ANSI/NFPA 70, for installation in the United States.
6. Control equipment must not use or generate more than 250V rms or dc with respect to earth.
7. WARNING: To prevent ignition of flammable or combustible atmospheres, disconnect power before servicing.
8. WARNING: Substitution of components may impair intrinsic safety.

Rev	Description	Drft	Date
C	Standard update evaluation	BVL	11/2/12
B	Remove Obsolete Models	BVL	5/25/10
A	Release	BVL	6/6/07

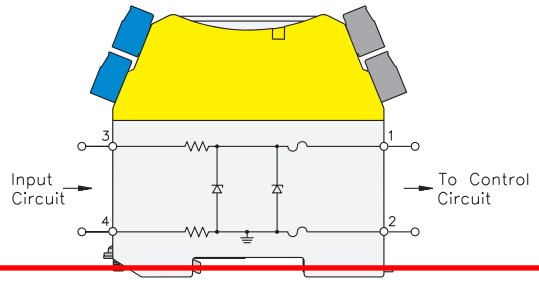
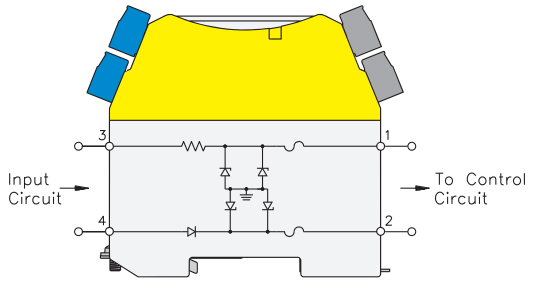
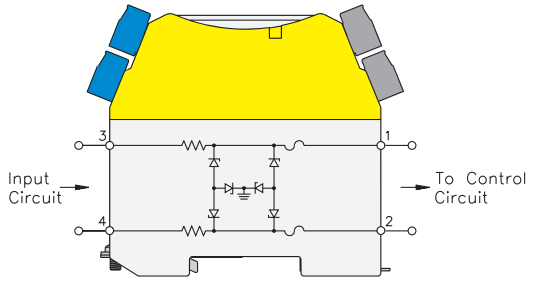
Drawing No.: IS–1.301

TURCK
3000 Campus Drive
Plymouth, MN 55441
Phone: (763) 553-7300

Title: Control Drawing for UL Listed IM1–...Ex–. and IM12–..Ex–. Isolator Barriers with I/S (Entity) Field Circuits

Scale: NONE

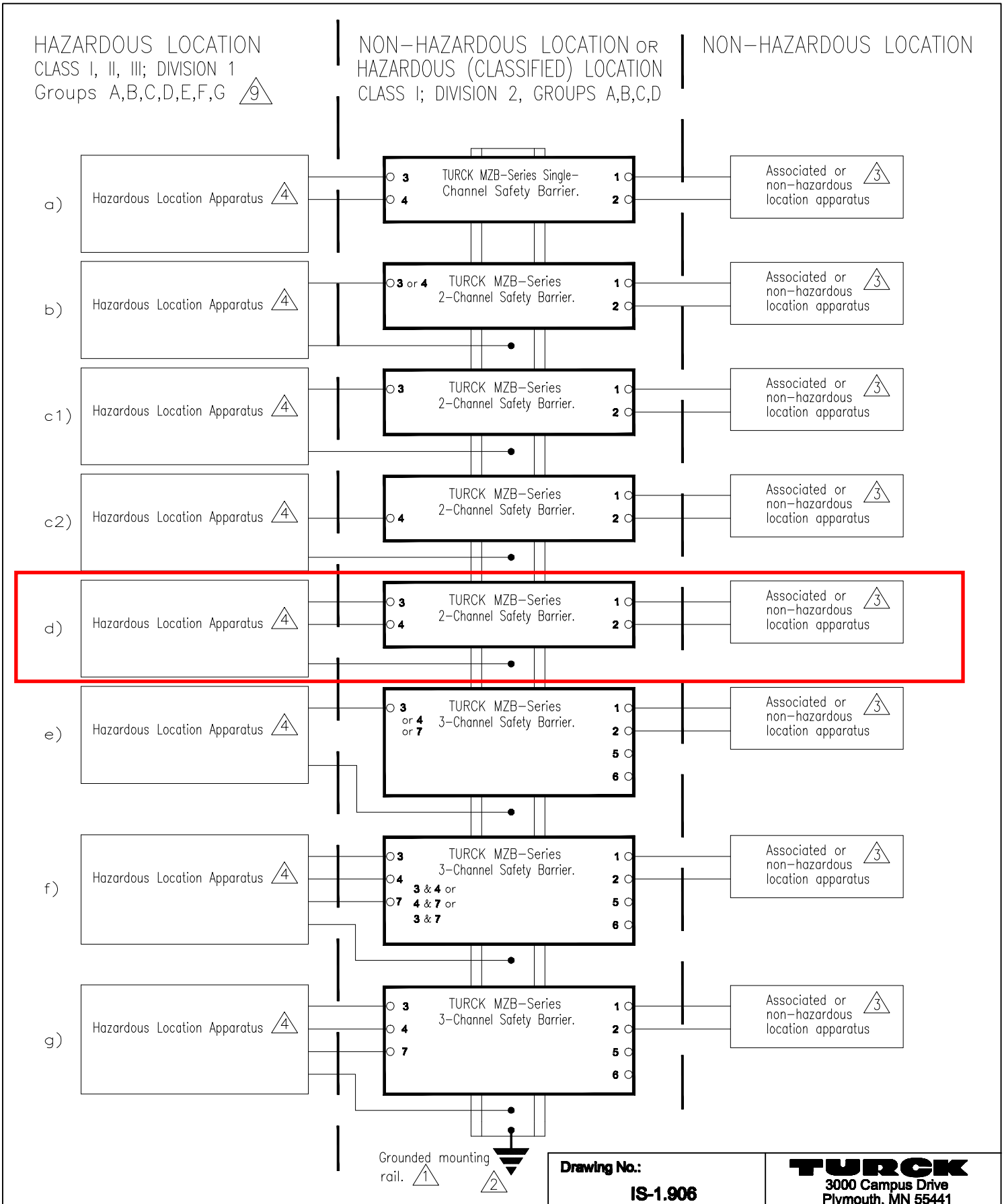
Sheet 1 of 1

Drawing #1	
	These are Single Channel, Grounded (-) return, devices. These devices are available in several options dependent on the voltage and current requirements of the field circuit .
Drawing #2	
	These are 2 channel diode return devices designed for use with 2-wire analog transmitters or common grounded analog output circuits. The diode return leg provides a path for the return current in one direction only. The 2 channels provide a floating circuit that is free from ground.
Drawing #3	
	These are 2 channel, double dual polarity devices. These devices are available with options that are dependent on the voltage and current requirements of the field circuit. These devices are designed to be used for AC +/- voltage sources and can be used with 2 independent field circuits. These circuits are also know as STAR connected circuits.

Single Channel							
Part Number	ID Number	Channel	Max. End-To-End Resistance (Ω)	V_{WKG} @10µA (V)	V_{MAX} (V)	Fuse Rating (mA)	Drawing #
MZB10P	K1053	1	75	6.0	7.0	50	1
MZB15P	K1054	1	119	12.0	13.1	100	1
MZB15PX	K1055	1	64	12.6	13.7	100	1
MZB28P	K1056	1	333	25.9	26.5	50	1
MZB28PX	K1057	1	252	24.9	25.9	100	1
MZB29PX	K1058	1	184	24.9	25.9	100	1

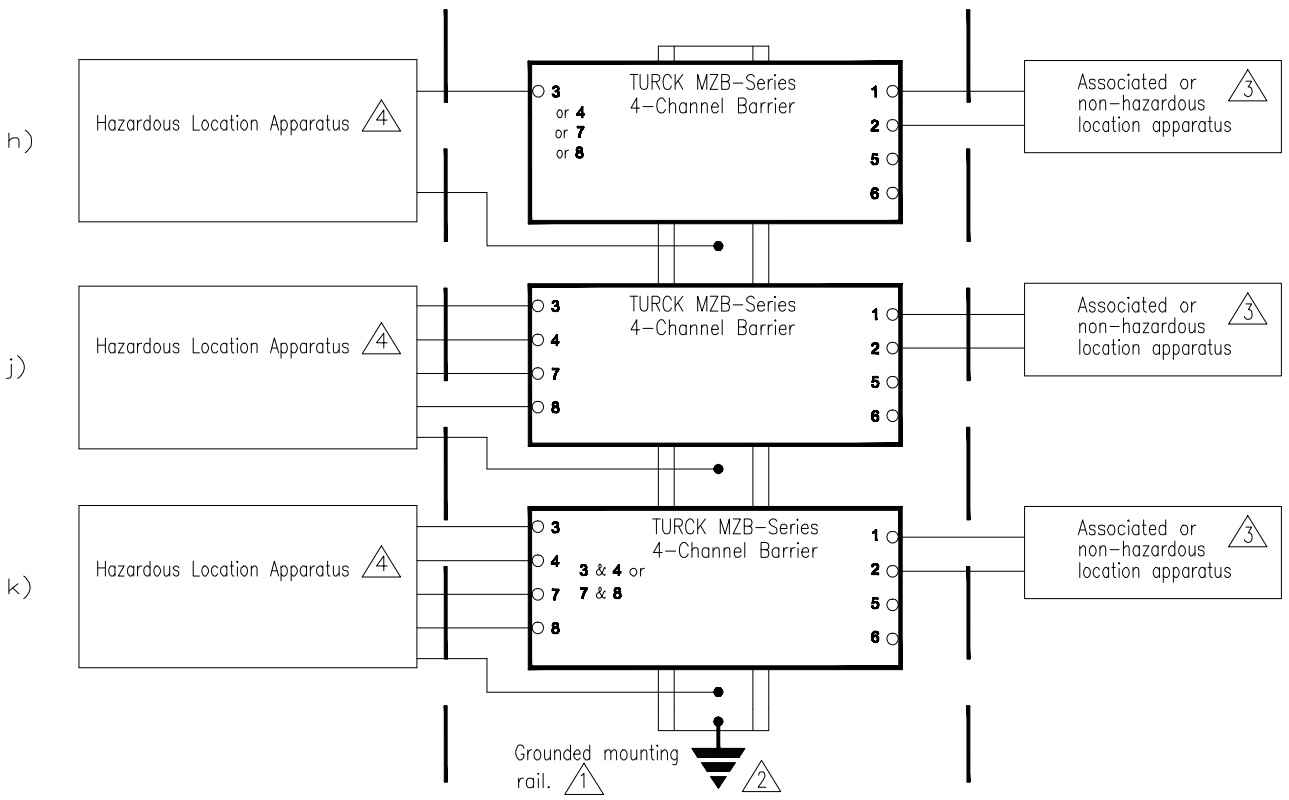
2 Channel							
Part Number	ID Number	Channel	Max end-to-end Resistance	V (working) @ 10µA	V (max)	Fuse Rating (mA)	Drawing #
MZB87P	K1075	1	300	26.6	27.2	50	2
		2	0.9 V + 26 Ω	26.6	27.2	50	
MZB87PX	K1076	1	253	26.4	27.2	80	2
		2	0.9 V + 21 Ω	26.4	27.2	80	

2 Channel							
Part Number	ID Number	Channel	Max. End-To-End Resistance (Ω)	V_{WKG} @10µA (V)	V_{MAX} (V)	Fuse Rating (mA)	Drawing #
MZB60A	K1066	1	75	6.0	6.7	50	3
		2	75	6.0	6.7	50	
MZB65A	K1070	1	124	12.0	12.5	50	3
		2	124	12.0	12.5	50	



Drawing No.: IS-1.906	TURCK 3000 Campus Drive Plymouth, MN 55441 Phone: (763) 553-7300
Title: Control Drawing for UL Listed MZB Series Barriers	
Scale: NONE	Sheet 1 of 6

Rev	Description	Drft	Date
A	Release	BVL	7/17/08



CONFIGURATIONS

a) Single channel barrier to one device with ground return.
b) Dual channel barrier, each channel to separate devices with separate ground returns.
c1) Dual channel barrier, first channel (power channel on diode return barriers) to separate device with separate ground return.
c2) Dual channel barrier, second channel (power channel on diode return barriers) to separate device with separate ground return.
d) Dual channel barrier, both channels to the same device with or without ground return.
e) Three channel barrier, each channel to separate devices with separate ground returns.
f) Three channel barrier, two channels to same device with or without ground return and one channel to separate device with separate ground return.
g) Three channel barrier, three channels to same device with or without ground return.
h) 1st, 2nd, 3rd, or 4th channel of a four channel barrier, each channel to separate devices with separate ground returns.
j) Four channel barrier, all channels to same device with or without ground return.
k) Four channel barrier, channels 1 and 2 or channels 3 and 4 to same device with or without ground return.

Notes:

1. Turck MZB Series shunt diode barriers must be secured to a DIN 'T' section (35x27x7.5mm) mounting rail. Rails constructed of aluminum or aluminum-based alloys must not be used. The mounting rail must be provided with at least one grounding terminal (two are recommended) which should be situated at each end of the rail. These terminals are to be used for the intrinsic safety grounding and must be capable of accommodating conductors up to 12 AWG (4mm in cross-section).
2. The intrinsic safety grounding system must be such that when installed the ground loop impedance (including the mounting rail) does not exceed 1.0 ohm.
3. The nonhazardous (safe) location or Division 2/Zone 2 equipment must not generate or use voltages (U_m) in excess of 250V rms or dc with respect to earth.

Notes (continued):

4. The hazardous location equipment may be UL Listed devices suitable for the locations in which it is to be installed and whith correct Entity parameters or Simple Apparatus.

   If the simple apparatus consists only of switches, then the entity parameter table on subsequent sheets of this drawing applies without any temperature limitation.

   If the simple apparatus consists of thermocouples (TC), light emitting diodes (LEDs) or resistance temperture devices (RTDs), with or without switches, then the maximum output power (P_o) from the barrier connected to simple apparatus must not exceed the following:

Maximum barrier output power (Po)	Maximum ambient Temperature (Ta) where simple apparatus is located
1.3 Watts	40°C

5. Barriers must be installed in suitable equipment that complies with the enclosure, mounting, spacing and segregation requirements of the ultimate application.

6. MZB Series shunt diode safety barriers are associated apparatus, and when mounted in an appropriate enclosure may be installed in the following locations:

   i Nonhazardous locations
   ii Class I, Division 2, Groups A, B, C or D; T4 temperature Code

   When installed in a Listed, dust–ignitionproof enclosure, the barriers may also be installed in the following locations:

   iii Class II, Division 2, Groups F or G hazardous locations, T4 temperature code
   iv Class III, Division 2, hazardous locations, T4 temperature code

7. Barriers must be installed in accordance with the barrier manufacturer's control drawing and Article 504 of the National Electrical Code (ANSI/NFPA 70) for installation in the United States.

8. Entity parameters for barriers listed in the parameters table must be used to determine the suitability of the barrier for connection to hazardous location apparatus. The following must be observed:

   V_{oc} or $V_t (U_o) \leq V_{max} (U_i)$

   I_{sc} or $I_t (I_o) \leq I_{max} (I_i)$

   $P_o \leq P_i$

   $C_a (C_o) \geq C_{cable} + C_i$

   $L_a (L_o) \geq L_{cable} + L_i$ or $L_a/R_a(L_o/R_o) \geq L_{cable}/R_{cable}$ and $L_a/R_a(L_o/R_o) \geq L_i/R_i$

9. Certain barriers are not permitted as associated apparatus for Div 1, Groups A, B or Zones 0,1 Group IIC. Refer to entries with asterisks in the following table.

10. When fitted in a nonhazardous locaton, the barriers may be used at the same maximum ambient temperature as when installed in Division 2.

WARNING

The following precautions must be taken when MZB Series shunt diode barriers are installed in in Division 2 hazardous locations:

i Barriers must not be fitted to or removed from the DIN rail unless power is off or the location is known to be free of flammable vapors.

ii Plug in terminals on nonhazardous side of the barriers as well as the bus power terminal jumper of barriers fitted with the bus power feature, must not be inserted or removed unless power is off or the location is known to be free of flammable vapors.

Barrier Model Terminals	Configuration	V_{oc} or U_o (V)	I_{sc} or I_o (mA)	R_o (Ohms)	P_o (W)	C_a or C_o (uF) AB/CE/DFG)	L_a or L_o (mH) AB/CE/DFG)	L_a/R_a or L_o/R_o (uH/Ohms) AB/CE/DFG)
MZB61A 3 – 4	d	18	200	45	0.45	0.31/1.78/7.6	0.91/2.72/7.2	62/258/522
MZB61AX 3–gnd or 4–gnd	b	9	26	351	0.58	4.9/40/500	54/208/419	613/2382/2778
MZB61AX 3 – 4	d	18	52	175	0.115	0.31/1.78/7.6	13.5/52.6/105.2	236/870/1747
MZB64A 3–gnd or 4–gnd	b	12	12	1000	0.036	1.41/9/36	240/932/1000	1000/1000/1000
MZB64A 3 – 4	d	24	24	500	0.072	0.125/0.93/3.35	61/226/452	360/1398/1500
MZB65A 3–gnd or 4–gnd	b	15	150	100	0.56	0.58/3.55/14.0	1.45/7.16/14.3	66/263/544
MZB65A 3 – 4	d	15	300	50	1.12	0.58/3.55/14.0	0.32/0.95/2.54	31.6/126.4/252.8
MZB66A 3–gnd or 4–gnd	b	12	80	150	0.24	1.41/9/36	5.6/22.4/44.9	149/556/1174
MZB66A 3 – 4	d	24	160	75	0.48	0.125/0.93/3.35	1.41/4.4/11	58/234/481
MZB66AX 3–gnd or 4–gnd	b	12	157	76.4	0.471	1.41/9/36	1.47/4.4/11	78/313/644
MZB66AX 3 – 4	d	24	314	38.2	0.942	0.125/0.93/3.35	0.34/1.02/2.71	29/87/231
MZB67P 3–gnd or 4–gnd	b	15	150	100	0.56	0.58/3.55/14	1.45/7.22/14	66/263/544
MZB67P 3 – 4	d	15	300	50	1.125	0.58/3.55/14	0.32/095/2.54	22/108/216
MZB79P 3–gnd or 4–gnd	b	28	93	300	0.65	0.083/0.65/2.15	4.2/12.6/33.6	56/210/444
MZB79P 3 – 4	d	28.5	188	150	1.3	*/0.627/2.05	*/4.1/7.9	*/108/212
MZB87P 3 – gnd	c1	28	93	300	0.65	0.083/0.65/2.15	4.2/12.6/33.6	56/210/444
MZB87P 4 – gnd	c2	28	0	diode	–	0.083/0.65/2.15	–	–
MZB87P 3 – 4	d	29.6	94	300	0.698	0.07/0.578/1.88	3.99/12.6/31.9	50/203/407
MZB87PX 3 – gnd	c1	28	119	234.6	0.835	0.083/0.65/2.15	2.5/7.53/20	44/168/354
MZB87PX 4 – gnd	c2	28	0	diode	–	0.083/0.65/2.15	–	–
MZB87PX 3 – 4	d	30.7	122	252	0.934	0.061/0.524/1.7	2.4/7.53/19.2	38.1/152/304.5
MZB89P 3–gnd or 7–gnd	h	28	46.5	600	0.33	0.083/0.65/2.15	16/63/133	106/393/781

* Not permitted for Groups A/B

SPDT & DPDT DUPLEXOR

ARP Series

- Control duplex loads
- Can be used with one or two Control Switches
- Control voltages of 12, 24, 120 & 240V AC
- Compact plug-in design utilizing industry-standard 8 or 11 pin octal socket
- 10A SPDT or DPDT Output Configuration
- Optional low profile selector switch to lock in one sequence
- 2 LEDs indicate load to energize next

c UL us

with appropriate socket

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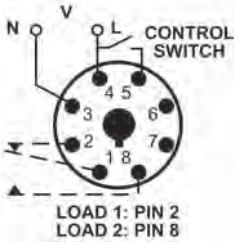
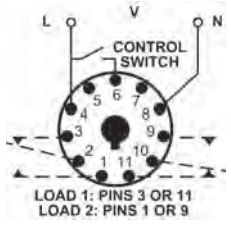
Alternating Relays are used in special applications where the optimization of load usage is required by equalizing the run time of two loads. This alternating action is initiated by a control switch, such as a float switch, manual switch, timing relay, pressure switch, or other isolated contact. Each time the initiating switch is opened, the output relay contacts will change state, thus alternating the two loads. Two LEDs indicate which load is the next to energize.

The Alternating Relays listed on this page can be used with one or two control switches and are available in either SPDT or DPDT output configurations. For products with DPDT Cross-Wired output configurations to be used with one, two or three control switches, DPDT Cross-Wired Duplexor.

Each version is available with an optional three position selector switch. This allows the unit to alternate the two loads as normal, or lock the relay to one load or the other. By locking the Alternating Relay to one load, the other load can be removed for service without rewiring the first load for continuous operation. The selector switch has a low profile to prevent any accidental changes in status.

OUTPUT CONTACTS	CONTROL VOLTAGE	PRODUCT NUMBER	WIRING/SOCKET
SPDT w/o Selector Switch	12V AC 24V AC 120V AC 240V AC	ARP012A6 ARP024A6 ARP120A6 ARP240A6	8 Pin Octal **70169-D**  **DIAGRAM 17**
SPDT w/ Selector Switch	12V AC ~~24V AC~~ 120V AC ~~240V AC~~	ARP012A6R ~~ARP024A6R~~ ARP120A6R ~~ARP240A6R~~	
DPDT w/o Selector Switch	12V AC 24V AC 120V AC 240V AC	ARP012A2 ARP024A2 ARP120A2 ARP240A2	11 Pin Octal **70170-D**  **DIAGRAM 18**
DPDT w/ Selector Switch	12V AC 24V AC 120V AC 240V AC	ARP012A2R ARP024A2R ARP120A2R ARP240A2R	

Sockets & Accessories available

SPDT & DPDT DUPLEXOR

ARP Series

Application Data

Voltage Tolerances: +10%/-15% of control voltage at 50/60Hz.

Load (Burden): Less than 3VA

Output Contacts:
10A @ 240V AC/30V DC,
1/2HP @ 120/240V AC (N.O.), 1/3HP @ 120/240VAC (N.C.)

Life:
Mechanical: 10,000,000 operations
Full Load: 100,000 operations

Temperature: Operating: -28° to 65°C (-18° to 149°F)
Storage: -40° to 85°C (-40° to 185°F)

Transient Protection: 10,000 volts for 20 microseconds

Indicator LEDs: 2 LEDs marked LOAD A and LOAD B

Optional Selector Switch Settings:
LOAD 1
ALTERNATE
LOAD 2

Approvals:

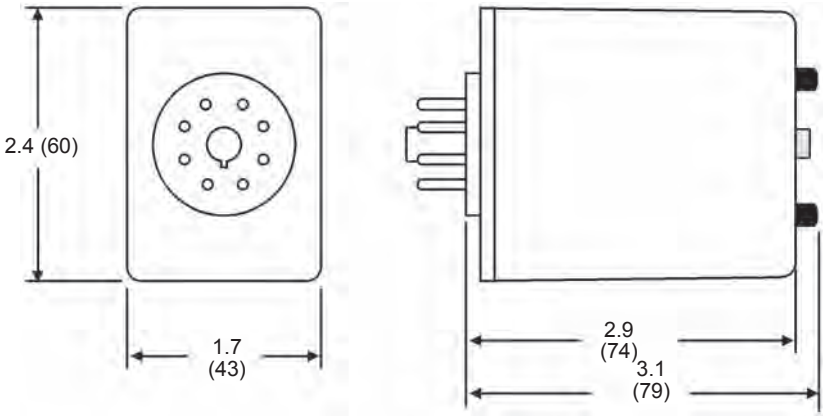
File #E109466

File #LR45565

Low Voltage &
EMC Directives
EN60947-1, EN60947-5-1

File #E109466
with
appropriate
socket

Dimensions



All Dimensions in
Inches (Millimeters)

Typical Installations

In the initial off state (Figure A), the Control Switch is open, the Alternating Relay is in the LOAD 1 position, and both loads (M1 & M2) are off. The red LED marked “LOAD 1” is ON. When the Control Switch closes, it energizes Load M1. As long as the Control Switch remains closed, Load M1 remains energized. When the Control Switch opens, Load M1 is turned off and the Alternating Relay toggles to the LOAD 2 position. The red LED marked “LOAD 2” glows. When the Control Switch closes again, it energizes Load M2. When the Control Switch opens, Load M2 is turned off, the Alternating Relay toggles back to the LOAD 1 position, and the process can be repeated again. On relays with DPDT contacts, two pilot lights can be used for remote indication of LOAD 1 or LOAD 2 status.

To eliminate any bounce condition of the Control Switch, the addition of a second switch (OFF) along with two auxiliary contacts is recommended as shown in Figure B.

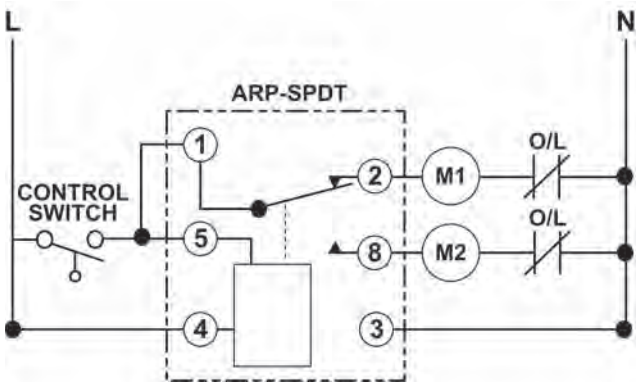


Figure A

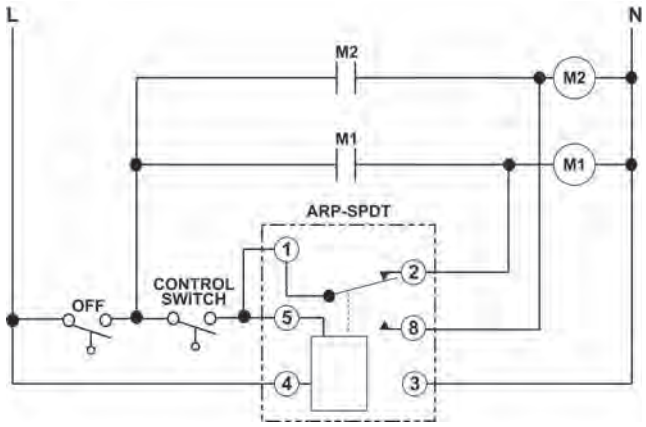
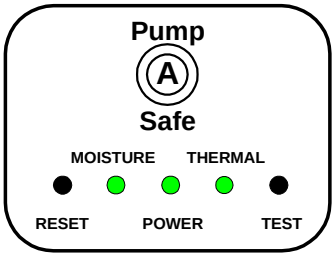


Figure B

PumpSafe™

Monitoring Modules for KSB Submersible Pumps



Monitoring Module
O/A Size 3.75"H x 2.62"W x 2.25"D

Module Types
(by sensor types and pump leads)

A – Bi-Metal (21 & 22) *or* Thermistor (10 & 11) & Moisture Probe (9 & Pump Ground)

B – Bi-Metal (21 & 22) *or* Thermistor (10 & 11) & Float Switch (3 & 4)

D – Bearing RTD (15 & 16) & Float Switch (3 & 4)

Overview: KSB submersible pump motors have varying combinations of over-temperature and moisture intrusion protection. The alternatives employed by the KSB factory are motor specific. The alternatives include bi-metal or thermistors for winding thermal protection, an RTD for bearing temperature monitoring and either conductivity probe, a float switch or on some motors both sensor types. The appropriate module(s) should be specified accordingly.

PumpSafe™ Module 'A': Monitors both thermal winding sensor (bi-metal or thermistor) and the conductivity probe to detect moisture intrusion. This sensor combination is typical for low horsepower motors. Each type module monitors one thermal and one moisture function input (see above listing). Each module type likewise has one set of form C output contacts per alarm function to provide remote pump monitoring or to directly control the pump's operation.

Installation: The PumpSafe™ Module can be installed locally or in a MCC on the supplied 12 pin socket. Modules can be combined in a single Nema 4X local control panel for monitoring multiple pump installations.

Operation: Integrally the module indicates using bi-colored LEDs, one each for each fault type; **GREEN** being OK, **ORANGE** (Channel A) or **RED** (Channel B) a failure "ALARM" condition. In addition a power ON LED and a "TEST" and a "RESET" button are provided. A self correcting fault, either moisture or thermal, causes the respective LED to change from a steady (alarm) to a flashing signal. This LED continues to flash until locally cleared, providing the plant operator annunciation of a potential intermittent fault condition.

Module Specifications:
Power supply: 24-240VAC/1/60 or 50 cycle
Thermal circuit: <25 mA @ 12VDC
Moisture Sensor Circuit: < 2uA @ 5 Volts VDC
Output Contact Rating: 5A @ 120 Volts AC
Power Consumption: 2.8 Watts Maximum

Pin Configuration & Function:
1 & 2 Motor Thermal Circuit – Input
3 & 4 Motor Moisture Circuit – Input
5 & 6 24-240 Volts AC – Input
7/8/9 Thermal NC/COM/NO Output Contacts
10/11/12 Moisture NC/COM/NO Output Contacts

Note: Relays are electrically held in their "Normal" states.

www.PumpSafe.com – Presently under construction

4415 Sarellen Road, Richmond, VA 23231
www.ksbusa.com
804-222-1818

Rev. 4 1/23/2009

TECHNICAL SPECIFICATIONS

PumpSafe™ MOTOR SENSOR MONITORING RELAY
The pump supplier shall furnish all relays required for monitoring all pump and motor sensors. The relays shall be installed by others in the motor control panel and properly wired in accordance with pump manufacturer's instructions. Relays shall mount in standard 12-pin socket bases (provided) and shall operate on available control voltage of 24-240 VAC. If relays require an input voltage that is not available in the motor control panel an adequate transformer (with fused input) shall be provided by the pump supplier. Relays shall have a power consumption of no more than 2.8 watt, and shall be UL approved. Relays shall be modular in design, with each relay monitoring no more than two motor sensor functions.

Each relay module shall include a dual color (red/green) LED to indicate the status of each monitored sensor. Green will indicate "status OK"; red will indicate a failure or alarm condition. A self-corrected fault will allow the relay output contacts to reset, and cause the LED to change from a steady alarm indication to a flashing signal. The LED shall continue to flash until locally cleared, providing the operator an indication of a potential intermittent fault. Each relay shall also include a power-on LED and both "test" and "reset" pushbuttons.

An independent fail-safe (switch on power loss) form-C output contact shall be included for each monitored sensor to provide a normally-open / normally-closed dry contact to initiate a remote alarm device or shut down the motor. Contacts shall be rated for 5 amps at 120 volt.

Zelio® Plug-In Relays

Zelio RPM plug-in relays and sockets provide a comprehensive selection of relays responding to the most demanding standards at 15 A. Some of the features include:

- Spring return test button for testing the contacts (standard)
- Green LED indication of relay status (depending on version)
- Mechanical indication of relay status (standard)
- Plug-in protection module to protect against electrical spikes

RPM22F7

Table 23.12: Power relays without LED (sold in lots of 10)

	Number and type of contacts - Thermal current (Ith)							
	1 C/O - 15 A Res.		2 C/O - 15 A Res.		3 C/O - 15 A Res.		4 C/O - 15 A Res.	
Coil Voltage	Catalog Number	$ Price ea.	Catalog Number	$ Price ea.	Catalog Number	$ Price ea.	Catalog Number	$ Price ea.
12 Vdc	RPM11JD	5.40	RPM21JD	7.10	RPM31JD	9.60	RPM41JD	11.90
24 Vdc	RPM11BD	5.40	RPM21BD	7.10	RPM31BD	9.60	RPM41BD	11.90
48 Vdc	RPM11ED	5.40	RPM21ED	7.10	RPM31ED	9.60	RPM41ED	11.90
110 Vdc	RPM11FD	5.40	RPM21FD	7.10	RPM31FD	9.60	RPM41FD	11.90
24 Vac	RPM11B7	5.40	RPM21B7	7.10	RPM31B7	9.60	RPM41B7	11.90
48 Vac	RPM11E7	5.40	RPM21E7	7.10	RPM31E7	9.60	RPM41E7	11.90
120 Vac	RPM11F7	5.40	RPM21F7	7.10	RPM31F7	9.60	RPM41F7	11.90
230 Vac	RPM11P7	5.40	RPM21P7	7.10	RPM31P7	9.60	RPM41P7	11.90

RPM32F7

Table 23.13: Power relays with LED (sold in lots of 10)

	Number and type of contacts - Thermal current (Ith)							
	1 C/O - 15 A Res.		2 C/O - 15 A Res.		3 C/O - 15 A Res.		4 C/O - 15 A Res.	
Coil Voltage	Catalog Number	$ Price ea.	Catalog Number	$ Price ea.	Catalog Number	$ Price ea.	Catalog Number	$ Price ea.
12 Vdc	RPM12JD	6.30	RPM22JD	8.10	RPM32JD	10.70	RPM42JD	12.90
24 Vdc	RPM12BD	6.30	RPM22BD	8.10	RPM32BD	10.70	RPM42BD	12.90
48 Vdc	RPM12ED	6.30	RPM22ED	8.10	RPM32ED	10.70	RPM42ED	12.90
110 Vdc	RPM12FD	6.30	RPM22FD	8.10	RPM32FD	10.70	RPM42FD	12.90
24 Vac	RPM12B7	6.30	RPM22B7	8.10	RPM32B7	10.70	RPM42B7	12.90
48 Vac	RPM12E7	6.30	RPM22E7	8.10	RPM32E7	10.70	RPM42E7	12.90
120 Vac	RPM12F7	6.30	RPM22F7	8.10	RPM32F7	10.70	RPM42F7	12.90
230 Vac	RPM12P7	6.30	RPM22P7	8.10	RPM32P7	10.70	RPM42P7	12.90

Table 23.14: Power relays with LED without Push Button (sold in lots of 10)

	Number and type of contacts - Thermal current (Ith)							
	1 C/O - 15 A Res.		2 C/O - 15 A Res.		3 C/O - 15 A Res.		4 C/O - 15 A Res.	
Coil Voltage	Catalog Number	$ Price ea.	Catalog Number	$ Price ea.	Catalog Number	$ Price ea.	Catalog Number	$ Price ea.
12 Vdc	RPM13JD	5.90	RPM23JD	7.50	RPM33JD	9.90	RPM43JD	12.00
24 Vdc	RPM13BD	5.90	RPM23BD	7.50	RPM33BD	9.90	RPM43BD	12.00
48 Vdc	RPM13ED	5.90	RPM23ED	7.50	RPM33ED	9.90	RPM43ED	12.00
110 Vdc	RPM13FD	5.90	RPM23FD	7.50	RPM33FD	9.90	RPM43FD	12.00
125 Vdc	—	—	—	—	—	—	—	—
24 Vac	RPM13B7	5.90	RPM23B7	7.50	RPM33B7	9.90	RPM43B7	12.00
48 Vac	RPM13E7	5.90	RPM23E7	7.50	RPM33E7	9.90	RPM43E7	12.00
120 Vac	RPM13F7	5.90	RPM23F7	7.50	RPM33F7	9.90	RPM43F7	12.00
230 Vac	RPM13P7	5.90	RPM23P7	7.50	RPM33P7	9.90	RPM43P7	12.00

RPZF2 + relay RPM22F7

Approvals for relays:

c UL us LISTED File CCN ▲ E164862 NLDX, NLDX7 — c RU us File CCN E164862 NLDX2, NLDX8 — CSA File 230765 Class 3211 07 — CE IEC 61810-1 — RoHS Compliant

▲ When used with the appropriate socket

Table 23.15: Sockets (sold in lots of 10)

Contact terminal arrangement	Connection	Relay type	Catalog Number	$ Price ea.
Mixed	Screw clamp terminals	RPM1〰	RPZF1	5.10
		RPM2〰	RPZF2	6.50
		RPM3〰	RPZF3	7.50
		RPM4〰	RPZF4	8.70

Approvals for Sockets:

c RU us File CCN E172326 SWIV2, SWIV8 — CSA File 230765 Class 3211 07 — CE IEC 61810-1 — RoHS Compliant

RXM041BN7

Table 23.16: Protection modules

Description	Voltage	For use with	Sold in lots of	Catalog Number	$ Price ea.
Diode	6–250 Vdc	RPZF1 RPZF2	20	RXM040W	**2.30**
		RPZF3 RPZF4	10	RUW240BD	**2.60**
RC circuit	24–60 Vac	RPZF1 RPZF2	20	RXM041BN7	**2.30**
	110–240 Vac	RPZF1 RPZF2	20	RXM041FU7	**2.60**
		RPZF3 RPZF4	10	RUW241P7	**2.60**
Varistor	6–24 Vac/Vdc	RPZF1 RPZF2	20	RXM021RB	**2.30**
	24–60 Vac/Vdc	RPZF1 RPZF2	20	RXM021BN	**2.30**
	110–240 Vac/Vdc	RPZF1 RPZF2	20	RXM021FP	**2.30**
	24 Vac/Vdc	RPZF3 RPZF4	10	RUW242B7	**3.20**
	240 Vac/Vdc	RPZF3 RPZF4	10	RUW242P7	**3.20**

RPZ1DA

Table 23.17: Timer module▲ (sold in lots of 1)

Description	Voltage	Socket Type	Catalog Number	$ Price
On-delay timer, interval timer, repeat cycle timer/starting on-delay, repeat cycle timer/starting off-delay, off-delay timer, one-shot timer, timing on de-energization, on-delay timer	24–240 Vac/Vdc	RPZF3 RPZF4	RUW101MW	**56.00**

▲ See timer module description (selection of functions and time delays) in catalog **8501CT0601**.

Table 23.18: Accessories (sold in lots of 10)

Description	For use with	Catalog Number	$ Price ea.
Metal hold-down clip (for single-pole relays)	RPZF1	RPZR235	**0.60**
Mounting adapters for DIN rail■	RPM1~~	RPZ1DA	**0.80**
	RPM2~~	RXZE2DA	**0.80**
	RPM3~~	RPZ3DA	**0.80**
	RPM4~~	RPZ4DA	**0.80**
Mounting adapters for mounting directly to a panel	RPM1~~	RPZ1FA	**0.60**
	RPM2~~	RXZE2FA	**0.60**
	RPM3~~	RPZ3FA	**0.60**
	RPM4~~	RPZ4FA	**0.60**
Clip-in markers (sheet of 108 markers)	All relays	RXZL520	**0.05**

■ Test button becomes inaccessible

RPZ3FA

Zelio® Plug-In Relays

Zelio RXM plug-in relays and sockets provide a comprehensive selection of relays responding to the most demanding standards ranging from 3A to 12A. Some of the features include:

- Spring return test button for testing the contacts (standard)
- Green LED indication of relay status (depending on version)
- Mechanical indication of relay status (standard)
- Plug-in protection module to protect against electrical spikes
- Plug-in jumper bars for coil terminals to avoid time-consuming wiring

RXM2AB1F7

Table 23.1: Miniature relays without LED (sold in lots of 10)

	Number and type of contacts - Thermal current (Ith)					
	2 C/O -12 A Res.		3 C/O - 10 A Res.		4 C/O - 8 A Res.	
Coil Voltage	**Catalog Number**	**$ Price ea.**	**Catalog Number**	**$ Price ea.**	**Catalog Number**	**$ Price ea.**
12 Vdc	RXM2AB1JD	**6.30**	RXM3AB1JD	**6.80**	RXM4AB1JD	**7.10**
24 Vdc	RXM2AB1BD	**6.30**	RXM3AB1BD	**6.80**	RXM4AB1BD	**7.10**
48 Vdc	RXM2AB1ED	**6.30**	RXM3AB1ED	**6.80**	RXM4AB1ED	**7.10**
110 Vdc	RXM2AB1FD	**6.30**	RXM3AB1FD	**6.80**	RXM4AB1FD	**7.10**
220 Vdc	—	—	—	—	RXM4AB1MD	**7.10**
24 Vac	RXM2AB1B7	**6.30**	RXM3AB1B7	**6.80**	RXM4AB1B7	**7.10**
48 Vac	RXM2AB1E7	**6.30**	RXM3AB1E7	**6.80**	RXM4AB1E7	**7.10**
120 Vac	RXM2AB1F7	**6.30**	RXM3AB1F7	**6.80**	RXM4AB1F7	**7.10**
230 Vac	RXM2AB1P7	**6.30**	RXM3AB1P7	**6.80**	RXM4AB1P7	**7.10**
240 Vac	—	—	—	—	RXM4AB1U7	**7.10**

Table 23.2: Miniature relays with LED (sold in lots of 10)

	Number and type of contacts - Thermal current (Ith)					
	2 C/O -12 A Res.		3 C/O - 10 A Res.		4 C/O - 8 A Res.	
Coil Voltage	**Catalog Number**	**$ Price ea.**	**Catalog Number**	**$ Price ea.**	**Catalog Number**	**$ Price ea.**
12 Vdc	RXM2AB2JD	**7.40**	RXM3AB2JD	**7.80**	RXM4AB2JD	**8.10**
24 Vdc	RXM2AB2BD	**7.40**	RXM3AB2BD	**7.80**	RXM4AB2BD	**8.10**
48 Vdc	RXM2AB2ED	**7.40**	RXM3AB2ED	**7.80**	RXM4AB2ED	**8.10**
110 Vdc	RXM2AB2FD	**7.40**	RXM3AB2FD	**7.80**	RXM4AB2FD	**8.10**
125 Vdc	—	—	—	—	RXM4AB2GD	**8.10**
24 Vac	RXM2AB2B7	**7.40**	RXM3AB2B7	**7.80**	RXM4AB2B7	**8.10**
48 Vac	RXM2AB2E7	**7.40**	RXM3AB2E7	**7.80**	RXM4AB2E7	**8.10**
120 Vac	RXM2AB2F7	**7.40**	RXM3AB2F7	**7.80**	RXM4AB2F7	**8.10**
230 Vac	RXM2AB2P7	**7.40**	RXM3AB2P7	**7.80**	RXM4AB2P7	**8.10**

Table 23.3: Miniature relays with LED without Push Button (sold in lots of 10)

	Number and type of contacts - Thermal current (Ith)					
	2 C/O -12 A Res.		3 C/O - 10 A Res.		4 C/O - 8 A Res.	
Coil Voltage	**Catalog Number**	**$ Price ea.**	**Catalog Number**	**$ Price ea.**	**Catalog Number**	**$ Price ea.**
12 Vdc	RXM2AB3JD	**6.80**	—	—	RXM4AB3JD	**7.50**
24 Vdc	RXM2AB3BD	**6.80**	—	—	RXM4AB3BD	**7.50**
48 Vdc	RXM2AB3ED	**6.80**	—	—	RXM4AB3ED	**7.50**
110 Vdc	RXM2AB3FD	**6.80**	—	—	RXM4AB3FD	**7.50**
125 Vdc	—	—	—	—	RXM4AB3GD	**7.50**
24 Vac	RXM2AB3B7	**6.80**	—	—	RXM4AB3B7	**7.50**
48 Vac	RXM2AB3E7	**6.80**	—	—	RXM4AB3E7	**7.50**
120 Vac	RXM2AB3F7	**6.80**	—	—	RXM4AB3F7	**7.50**
230 Vac	RXM2AB3P7	**6.80**	—	—	RXM4AB3P7	**7.50**

RXM4GB2F7

Table 23.4: Miniature relays with low level contacts, without LED (sold in lots of 10)

Number and type of contacts - Thermal current (Ith)		
4 C/O -3 A Res.		
Coil Voltage	**Catalog Number**	**$ Price ea.**
12 Vdc	RXM4GB1JD	**7.10**
24 Vdc	RXM4GB1BD	**7.10**
48 Vdc	RXM4GB1ED	**7.10**
110 Vdc	RXM4GB1FD	**7.10**
24 Vac	RXM4GB1B7	**7.10**
48 Vac	RXM4GB1E7	**7.10**
120 Vac	RXM4GB1F7	**7.10**
230 Vac	RXM4GB1P7	**7.10**

Table 23.5: Miniature relays with low level contacts, with LED (sold in lots of 10)

Number and type of contacts - Thermal current (Ith)		
4 C/O -3 A Res.		
Coil Voltage	**Catalog Number**	**$ Price ea.**
12 Vdc	RXM4GB2JD	**8.10**
24 Vdc	RXM4GB2BD	**8.10**
48 Vdc	RXM4GB2ED	**8.10**
110 Vdc	RXM4GB2FD	**8.10**
24 Vac	RXM4GB2B7	**8.10**
48 Vac	RXM4GB2E7	**8.10**
120 Vac	RXM4GB2F7	**8.10**
230 Vac	RXM4GB2P7	**8.10**
240 Vac	RXM4GB2U7	**8.10**

Table 23.6: Miniature relays with low level contacts, with LED without Push Button (sold in lots of 10)

Number and type of contacts - Thermal current (Ith)		
4 C/O -3 A Res.		
Coil Voltage	**Catalog Number**	**$ Price ea.**
12 Vdc	RXM4GB3JD	**7.50**
24 Vdc	RXM4GB3BD	**7.50**
48 Vdc	RXM4GB3ED	**7.50**
110 Vdc	RXM4GB3FD	**7.50**
125 Vdc	—	—
24 Vac	RXM4GB3B7	**7.50**
48 Vac	RXM4GB3E7	**7.50**
120 Vac	RXM4GB3F7	**7.50**
230 Vac	RXM4GB3P7	**7.50**

Approvals for Relays:

c UL us LISTED File CCN ▲ E164862 NLDX, NLDX7

c TÜV us File CCN E164862 NLDX2, NLDX8

CSA® File 230765 Class 3211 07

CE IEC 61810-1 RoHS Compliant

▲ When used with the appropriate socket.

For sockets and accessories, see page 23-3

Zelio ® IEC Style—17.9 mm wide

Table 23.119: RE11 Modular Timers—17.9 mm wide (Multi-range timers offering 7 selectable ranges)

RE11RLMU

Functions	Supply Voltages	Rated Current	Catalog Number	$ Price
Output 1 C/O contact				
On delay	24 Vdc, 24–240 Vac	8A	RE11RAMU	**51.00**
Interval	24 Vdc, 24–240 Vac	8A	RE11RHMU	**51.00**
Asymmetrical repeat cycle	24 Vdc, 24–240 Vac	8A	RE11RLMU	**63.00**
Asymmetrical repeat cycle	12 Vac/Vdc	8A	RE11RLJU	**89.00**
One shot	24 Vdc, 24–240 Vac	8A	RE11RBMU	**62.00**
Off delay with control start	24 Vdc, 24–240 Vac	8A	RE11RCMU	**62.00**
Multi-function ▲	24 Vdc, 24–240 Vac	8A	RE11RMMU	**74.00**
Multi-function ▲	12–240 Vac/Vdc	8A	RE11RMMW	**89.00**
Multi-function ▲	12–240 Vac/Vdc	8A	RE11RMMWS	**89.00**
Multi-function ▲	12 Vac/Vdc	8A	RE11RMJU	**89.00**
Multi-function ■	24 Vdc, 24–240 Vac	8A	RE11RMEMU	**89.00**
Multi-function ▲	24 Vdc, 24–240 Vac	8A	RE11RMXMU	**89.00**

▲ Timing ranges: 0.1–1 s, 1–10 s, 0.1–10 min, 1–10 min, 0.1–1 hr, 1–10 hr, 10–100 hr
■ Timing ranges: 0.1–1 s, 1–10 s, 0.1–10 min, 1–10 min, 0.1–1 hr, 1–10 hr

Conforming to standards			IEC 61812-1, EN 50081-1/2, EN 50082-1/2, LV directives (73/23/EEC + 93/68/EEC (CE marking) + EMC directive (89/336/EEC + IEC 60669-2-3)
Approvals			cULus File: E173076 CNN: NRNT File: E173076 CNN: NRNT7 CSA File: 217698 Class 3211 07 CE GL except RE11 RMX MU and RE11 RME MU
Ambient air temperature around the device	Storage	°F (°C)	–22 to +140 (–30 to +60)
	Operation	°F (°C)	–4 to +140 (–20 to +60)

Table 23.120: RE11 Modular Timers—17.9 mm wide (Multi-function, dual function or single function)

RE11LHBM

Functions	Supply Voltages	Rated Current	Catalog Number	$ Price
Solid state output				
On delay	24–240 Vac/Vdc	0.7A	RE11LAMW	**54.00**
Interval	24–240 Vac	0.7A	RE11LHBM	**51.00**
Off delay with control contact	24–240 Vac	0.7A	RE11LCBM	**62.00**
Asymmetrical repeat cycle	24–240 Vac	0.7A	RE11LLBM	**89.00**
Multi-function	24–240 Vac	0.7A	RE11LMBM	**74.00**

Timing ranges: 0.1–1 s, 1–10 s, 0.1–10 min, 1–10 min, 0.1–1 hr, 1–10 hr, 10–100 hr

Conforming to standards			IEC 61812-1, EN 50081-1/2, EN 50082-1/2, LV directives (73/23/EEC + 93/68/EEC (CE marking) + EMC directive (89/336/EEC + IEC 60669-2-3)
Approvals			cULus File: E173076 CNN: NRNT File: E173076 CNN: NRNT7 CSA File: 217698 Class: 3211 07 CE
Ambient air temperature around the device	Storage	°F (°C)	–22 to 140 (–30 to +60)
	Operation	°F (°C)	–4 to 140 (–20 to +60)

Table 23.121: RE48 Panel Mount Timers (For required socket, refer to the catalog section)

RE48A TM12MW

Functions	Supply Voltages	Rated Current	Catalog Number	$ Price
Single function: on delay, two relay outputs	24–240 Vac/Vdc	2 x 5 A	RE48ATM12MW	**87.00**
Repeat cycle: two relay outputs	24–240 Vac/Vdc	2 x 5 A	RE48ACV12MW	**104.00**
Multi-function: on delay, one shot, off delay, repeat cycle	24–240 Vac/Vdc	2 x 5 A	RE48AML12MW	**102.00**
Multi-function: on delay and interval, two relay outputs, of which one selectable and instantaneous	24–240 Vac/Vdc	2 x 5A	RE48AMH13MW	**102.00**

Conforming to standards			IEC 61812-1, EN 50081-1/2, EM 50082-1/2, LV directives (73/23/EEC + 93/68/EEC (CE marking) + ENC directive (89/336/EEC + IEC 60669-2-3)
Approvals			cURus File: E173076 CNN: NRNT2 File: E173076 CNN: NRNT8 CSA File: 217698 Class: 3211 07 CE, C-Tick, GL RoHS compliant as of date code 0625
Ambient air temperature around the device	Storage	°F (°C)	–40 to 158 (–40 to +70)
	Operation	°F (°C)	–4 to 122 (–20 to +50)

Table 23.122: REXL Miniature Plug-in Timers (For required socket, refer to the catalog section)

		4 pole			2 pole		
Function	**Supply Voltages**	**Rated Current**	**Catalog Number**	**$ Price**	**Rated Current**	**Catalog Number**	**$ Price**
Single function (On-Delay)	12 Vdc	3A	REXL4TMJD	**66.00**	5A	REXL2TMJD	**63.00**
	24 Vdc ♦	3A	REXL4TMBD	**66.00**	5A	REXL2TMBD	**63.00**
	24 Vac 50/60 Hz ♦	3A	REXL4TMB7	**66.00**	5A	REXL2TMB7	**63.00**
	120 Vac 50/60 Hz	3A	REXL4TMF7	**66.00**	5A	REXL2TMF7	**63.00**
	230 Vac 50/60 Hz	3A	REXL4TMP7	**66.00**	5A	REXL2TMP7	**63.00**
Timing Ranges	0.1–1 s, 1–10 s, 0.1–1 min, 1–10 min, 0.1–1 hr, 1–10 hr, 10–100 hr						

For 48 Vac supply, additional resistor 390 ohm 4 W / 24 V
▲ For 48 Vac supply, additional resistor 560 ohm 2 W / 24 V

Approvals: cULus File CCN E173076 NRNT2; File CCN E173076 NRNT8; CSA File Class 217698 321107; CE; IEC 61812-1; RoHS Compliant as of date code 0625

RXZE2M114M with Relay RXM4AB2P7TQ

Table 23.7: Miniature relays (sold in lots of 100)

Coil Voltage	Number and type of contacts - Thermal current (Ith)			
	2 C/O - 12 A Res.		4 C/O - 8 A Res.	
	Catalog Number	$ Price ea.	Catalog Number	$ Price ea.
Without LED				
12 Vdc	—	—	RXM4AB1JDTQ	**7.10**
24 Vdc	RXM2AB1BDTQ	**6.30**	RXM4AB1BDTQ	**7.10**
48 Vdc	—	—	RXM4AB1EDTQ	**7.10**
110 Vdc	—	—	RXM4AB1FDTQ	**7.10**
220 Vdc	—	—	RXM4AB1MDTQ	**7.10**
24 Vac	RXM2AB1B7TQ	**6.30**	RXM4AB1B7TQ	**7.10**
48 Vac	—	—	RXM4AB1E7TQ	**7.10**
120 Vac	RXM2AB1F7TQ	**6.30**	RXM4AB1F7TQ	**7.10**
230 Vac	RXM2AB1P7TQ	**6.30**	RXM4AB1P7TQ	**7.10**
With LED				
24 Vdc	—	—	RXM4AB2BDTQ	**8.10**
24 Vac	RXM2AB2B7TQ	**7.40**	RXM4AB2B7TQ	**8.10**
230 Vac	RXM2AB2P7TQ	**7.40**	RXM4AB2P7TQ	**8.10**

Table 23.8: Miniature relays with LED without Push Button (sold in lots of 100)

Coil Voltage	Number and type of contacts - Thermal current (Ith)			
	2 C/O - 12 A Res.		4 C/O - 8 A Res.	
	Catalog Number	$ Price ea.	Catalog Number	$ Price ea.
24 Vdc	RXM2AB3BDTQ	**6.80**	RXM4AB3BDTQ	**7.50**
24 Vac	RXM2AB3B7TQ	**6.80**	RXM4AB3B7TQ	**7.50**
230 Vac	RXM2AB3P7TQ	**6.80**	RXM4AB3P7TQ	**7.50**

RXZE2S114M with relay RXM4AB2F7TQ

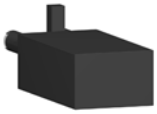
Table 23.9: Sockets (sold in lots of 10)

Contact terminal arrangement	Connection	Relay type	Catalog Number	$ Price ea.
Mixed	Screw clamp terminals	RXM2•••••▲ RXM4•••••▲	RXZE2M114■	**5.90**
	Box lug connector	RXM2••••• RXM4•••••	RXZE2M114M■	**5.90**
Separate	Box lug connector	RXM2•••••	RXZE2S108M♦	**5.90**
		RXM3•••••	RXZE2S111M■	**5.90**
		RXM4•••••	RXZE2S114M■	**5.90**

▲ When mounting relay RXM2••••• on socket RXZE2M••••, the thermal current must not exceed 10 A.
■ Thermal current Ith: 10 A
♦ Thermal current Ith: 12 A

Table 23.10: Protection modules (sold in lots of 20)

Description	Voltage	For use with	Catalog Number	$ Price ea.
Diode	6–250 Vdc	All sockets	RXM040W	**2.30**
RC circuit	24–60 Vac	All sockets	RXM041BN7	**2.30**
	110–240 Vac	All sockets	RXM041FU7	**2.30**
Varistor	6–24 Vac/Vdc	All sockets	RXM021RB	**2.30**
	24–60 Vac/Vdc	All sockets	RXM021BN	**2.30**
	110–240 Vac/Vdc	All sockets	RXM021FP	**2.30**



RXM041BN7

Table 23.11: Accessories (sold in lots of 10)

Description	For use with	Catalog Number	$ Price ea.
Metal hold-down clip	All sockets	RXZ400	**.57**
Plastic hold-down clip	All sockets	RXZR335	**.57**
Bus jumper, 2-pole (Ith: 5 A)	All sockets with separate contacts	RXZS2	**.84**
Mounting adapter for DIN rail	All relays	RXZE2DA	**.84**
Mounting adapter for mounting directly to a panel	All relays	RXZE2FA	**.57**
Clip-in markers	All relays (sheet of 108 markers)	RXZL520	**.05**
	All sockets except RXZE2M114	RXZL420	**.05**

RXZ400

Approvals for Sockets:

c UL us File CCN E172326 SWIV2, SWIV8 — CSA File 230765 Class 3211 07 — CE IEC 61810-1 — RoHS Compliant

Counting Instruments

Technical Data 211

Electronic Hour Meter, AC Hour Meter

T50 Series

T50A2, T50B2

ENM's Series T50 electronic AC hour meter is a low cost reliable hour meter incorporating the latest state-of-the-art in electronics. 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

- Low Power Consumption
- Solid State Electronic Drive Circuit
- Quartz-Crystal for Accurate Timing
- Non-reset
- UL/cUL Recognized, CE & RoHS Compliant
- High Impact, Tamperproof Plastic Case
- IP65
- Indicates Operating Time in Hours and Tenths
- No Battery Back-Up Required
- Quiet operation
- MADE IN THE U.S.A.

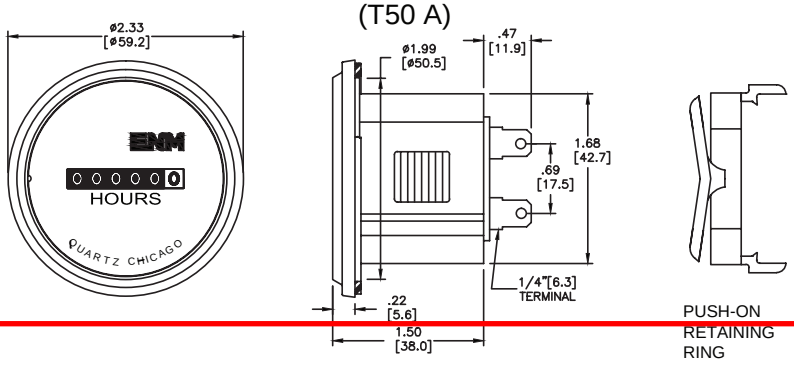
Specifications

Time Scale:	6-digits 99,999.9 Hours Automatic recycle to zero
Figures:	Hours - White on black Tenths - Red on white Height - 0.140"
Operation Voltage:	230, 115, 48, 24 VAC ±10% 50/60 Hz Other voltage available
Power Consumption:	Less than 0.4 Watts
Accuracy:	Better than ±0.02% over entire range
Temperature:	-40°F to +185°F (-40°C to +85°C)
Vibration Resistance:	Withstands 10-80 Hz at 20g's max. (SAE J1378)
Shock:	55g at 9-13 ms (SAE J1378)
Humidity:	95% (SAE J1378)
Terminations:	1/4" male blade terminals
Configuration:	Round SAE Bezel with new push-on retaining ring Round 3-Hole Bezel

Counting Instruments

ENM Company
5617 Northwest Highway, Chicago, IL 60646-6135
(773) 775-8400 • Fax: (773) 775-5968
Toll Free (888) 372-0465 • e-mail: customerservice@enmco.com
web site: www.enmco.com

(T50 A)



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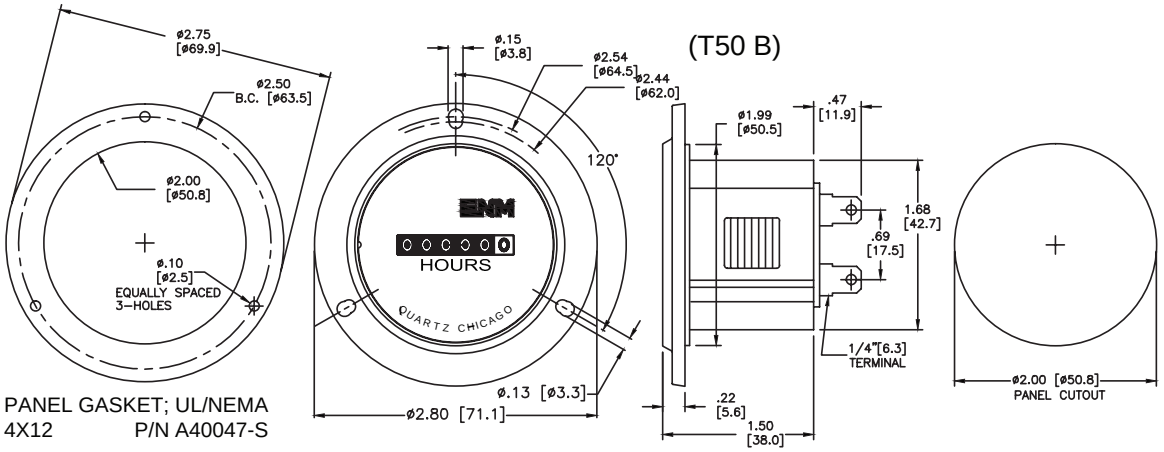
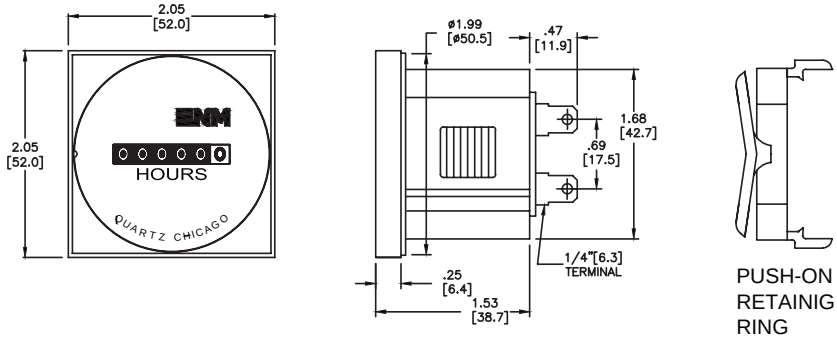


PANEL GASKET; UL/NEMA 4X12 P/N A40047-S

PANEL GASKET, UL/NEMA 4X12 WITH MTG HARDWARE; P/N B20017

(T50 E)



LIMITED WARRANTY

ENM Company resettable electromechanical counters are warranted to the consumer to be free from defects in material and workmanship for a period of 3 years. All ENM products which fall 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 products. Datasheet information subject to change.

Counting Instruments

ENM Company
5617 Northwest Highway, Chicago, IL 60646-6135
(773) 775-8400 • Fax: (773) 775-5968 • Toll Free (888) 372-0465
e-mail: customerservice@enmco.com
ISO 9001:2000 **web site: www.enmco.com**

Table 19.52: Non-Illuminated Emergency Stop Mushroom Head Push Buttons, Ø 40 mm (Red) (screw clamp terminal connections)


XB4BT845


XB4BS9445


XB4BS542

Shape of Head	Type of Push	Type of Contact N.O.	Type of Contact N.C.	Catalog Number	(Components)	$ Price
	Trigger action push-pull▲	1	1	XB4BT845	(ZB4BZ105 + ZB4BT84)	**92.00**
	Trigger action turn-to-release▲	1	1	XB4BS8445	(ZB4BZ105 + ZB4BS844)	**150.00**
	Trigger action Key release ▲ (No. 455)	1	1	XB4BS9445	(ZB4BZ105 + ZB4BS944)	**150.00**
	Push-pull	—	1	XB4BT42	(ZB4BZ102 + ZB4BT4)	**62.00**
	Turn-to-release	—	1	XB4BS542	(ZB4BZ102 + ZB4BS54)	**100.00**
	Key release (No. 455)	—	1	XB4BS142	(ZB4BZ102 + ZB4BS14)	**134.00**

▲ Trigger action mushroom heads are tamper proof in that a change of contact state is not possible by teasing or floating the operator.

Table 19.53: Non-Illuminated Selector Switches and Key Switches (screw clamp terminal connections)■


XB4BD33


XB4BJ33


XB4BG33

Shape of Head	Type of Operator	Type of Contact N.O.	Type of Contact N.C.	Number and Type of Positions		Catalog Number	(Components)	$ Price
	Standard lever, black	1	—	2-maintained		XB4BD21	(ZB4BZ101 + ZB4BD2)	**46.00**
		1	1	2-maintained		XB4BD25	(ZB4BZ105 + ZB4BD2)	**62.00**
		2	—	3-maintained		XB4BD33	(ZB4BZ103 + ZB4BD3)	**62.00**
				3-momentary to center		XB4BD53	(ZB4BZ103 + ZB4BD5)	**68.00**
	Extended lever, black	1	—	2-maintained		XB4BJ21	(ZB4BZ101 + ZB4BJ2)	**46.00**
		2	—	3-maintained		XB4BJ33	(ZB4BZ103 + ZB4BJ3)	**62.00**
				3-momentary to center		XB4BJ53	(ZB4BZ103 + ZB4BJ5)	**68.00**
	Key (No. 455)	1	—	2-maintained		XB4BG21	(ZB4BZ101 + ZB4BG2)	**112.00**
						XB4BG41	(ZB4BZ101 + ZB4BG4)	**112.00**
				2-momentary to left		XB4BG61	(ZB4BZ101 + ZB4BG6)	**112.00**
		2	—	3-maintained		XB4BG03	(ZB4BZ103 + ZB4BG0)	**128.00**
						XB4BG33	(ZB4BZ103 + ZB4BG3)	**128.00**

Note: The symbol ⚷ indicates key withdrawal position(s).

■ See page 19-22 for contact configurations.

Legends . . . . . pages 19-29 to 19-31

When ordering, please specify:

- Quantity
- Catalog Number

ZB4BZ009

ZBE101

ZBE203

ZBVB•

Table 19.84: Body/Mounting Collar

For use with	Catalog Number	$ Price
Electrical block (contact or light module)	ZB4BZ009	**5.40**

Table 19.85: Add-On Contact Block (with screw clamp terminal connections) ★▼

Description	Type of Contact		Catalog Number	$ Price
	N.O.	N.C.		
Standard single contact blocks▲■	1	—	ZBE101	**16.40**
	—	1	ZBE102	**16.40**
Standard double contact blocks▲■	2	—	ZBE203	**33.20**
	—	2	ZBE204	**33.20**
	1	1	ZBE205	**33.20**
Special contact blocks (for low power switching and dust protected) ♦	1	—	ZBE1016	**32.80**
	—	1	ZBE1026	**32.80**

▲ For Quick-Connect version add "3" to the end of the catalog number Example: ZBE1013 (Quick-Connect size 1 x 0.250" or 2 x 0.110").
■ For Ring Tongue compatible blocks add "9" to the end of the catalog number (Example: ZBE1029).
♦ Cannot stack additional contact blocks onto these blocks.

Table 19.86: Light Modules (with screw clamp terminal connections) ★▼

Description	Supply Voltage	Color of Light Source	Catalog Number	$ Price
Protected LED	12 Vac/dc	White	ZBVJ1	**52.00**
		Green	ZBVJ3	
		Red	ZBVJ4	
		Yellow	ZBVJ5	
		Blue	ZBVJ6	
	24 Vac/dc	White	ZBVB1	**52.00**
		Green	ZBVB3	
		Red	ZBVB4	
		Yellow	ZBVB5	
		Blue	ZBVB6	
	110–120 Vac	White	ZBVG1	**52.00**
		Green	ZBVG3	
		Red	ZBVG4	
		Yellow	ZBVG5	
		Blue	ZBVG6	
New!	24–120 Vac/dc	White	ZBVBG1	**52.00**
		Green	ZBVBG3	
		Red	ZBVBG4	
		Yellow	ZBVBG5	
		Blue	ZBVBG6	
	230–240 Vac	White	ZBVM1	**52.00**
		Green	ZBVM3	
		Red	ZBVM4	
		Yellow	ZBVM5	
		Blue	ZBVM6	
Direct supply for BA9s 2.4 W max. bulb Not included △	≤ 250 Vac/dc	—	ZBV6	**33.20**

★ Electrical components with connection by printed circuit board pins are available. Refer to Catalog **9001CT0001** for more details.
▼ Electrical components with connection by plug-in connector are available. Refer to Catalog **9001CT0001** for more details.
△ See page 19-32 for bulb information.

When ordering, please specify:

- Quantity
- Catalog Number


XB4BA31


XB4BA4322


XB4BP51


XB4BL42


XB4BC21


XB4BL845

Non-Illuminated Push Buttons, Momentary (screw clamp terminal connections)

Shape of Head	Type of Push	Type of Contact N.O.	Type of Contact N.C.	Marking	Color of Cap	Catalog Number (Components)	Price
	Flush	1	. . .	. . .	Black	XB4BA21 (ZB4BZ101 + ZB4BA2)	**$17.50**
					Green	XB4BA31 (ZB4BZ101 + ZB4BA3)	
					Yellow	XB4BA51 (ZB4BZ101 + ZB4BA5)	
					Blue	XB4BA61 (ZB4BZ101 + ZB4BA6)	
		. . .	1	. . .	Red	XB4BA42 (ZB4BZ102 + ZB4BA4)	**17.50**
		1	1	. . .	Black	XB4BA25 (ZB4BZ105 + ZB4BA2)	**25.60**
					Green	XB4BA35 (ZB4BZ105 + ZB4BA3)	
					Red	XB4BA45 (ZB4BZ105 + ZB4BA4)	
					Yellow	XB4BA55 (ZB4BZ105 + ZB4BA5)	
					Blue	XB4BA65 (ZB4BZ105 + ZB4BA6)	
	Flush	1	. . .	"I" (white)	Green	XB4BA3311 (ZB4BZ101 + ZB4BA331)	**20.30**
	Flush	. . .	1	"O" (white)	Red	XB4BA4322 (ZB4BZ102 + ZB4BA432)	**20.30**
	Flush with clear silicone boot (color of pusher unobscured)	1	. . .	. . .	Black	XB4BP21 (ZB4BZ101 + ZB4BP2)	**23.90**
					Green	XB4BP31 (ZB4BZ101 + ZB4BP3)	
					Yellow	XB4BP51 (ZB4BZ101 + ZB4BP5)	
					Blue	XB4BP61 (ZB4BZ101 + ZB4BP6)	
		. . .	1	. . .	Red	XB4BP42 (ZB4BZ102 + ZB4BP4)	**23.90**
	Extended	. . .	1	. . .	Red	XB4BL42 (ZB4BZ102 + ZB4BL4)	**17.50**
		1	1	. . .	Red	XB4BL45 (ZB4BZ105 + ZB4BL4)	**25.60**
	Mushroom head Ø 40 mm	1	. . .	. . .	Black	XB4BC21 (ZB4BZ101 + ZB4BC2)	**25.70**

Two Button Push Buttons, Momentary (screw clamp terminal connections)

Shape of Head	Type of Push	Type of Contact N.O.	Type of Contact N.C.	Degree of Protection	Catalog Number (Components)	Price
	One flush green push (marked "I") One extended red push (marked "O")	1	1	IP40	XB4BL845 (ZB4BZ105 + ZB4BL8434)	**$31.50**

For additional information, reference Catalog #9001CT0001.

XB4BVB5

Pilot Lights with PROTECTED LED® (screw clamp terminal connections)

Shape of Head	Supply Voltage	Color	Catalog Number (Components)	Price
Protected LED	24 Vac/dc	White	XB4BVB1 (ZB4BVB1 + ZB4BV013)	$32.40
		Green	XB4BVB3 (ZB4BVB3 + ZB4BV033)	
		Red	XB4BVB4 (ZB4BVB4 + ZB4BV043)	
		Yellow	XB4BVB5 (ZB4BVB5 + ZB4BV053)	
		Blue	XB4BVB6 (ZB4BVB6 + ZB4BV063)	
	110–120 Vac	White	XB4BVG1 (ZB4BVG1 + ZB4BV013)	32.40
		Green	XB4BVG3 (ZB4BVG3 + ZB4BV033)	
		Red	XB4BVG4 (ZB4BVG4 + ZB4BV043)	
		Yellow	XB4BVG5 (ZB4BVG5 + ZB4BV053)	
		Blue	XB4BVG6 (ZB4BVG6 + ZB4BV063)	

XB4BV64

Pilot Lights for BA9s Bulb (screw clamp terminal connections)

Shape of Head	Supply Voltage	Color	Catalog Number (Components)	Price
Direct supply, for BA9s (incandescent, LED, neon) V ≤ 250 V, 2.4 W bulb (bulb not included)				
	≤ 250 Vac/dc	White	XB4BV61 (ZB4BV6 + ZB4BV01)	$23.10
		Green	XB4BV63 (ZB4BV6 + ZB4BV03)	
		Red	XB4BV64 (ZB4BV6 + ZB4BV04)	
		Yellow	XB4BV65 (ZB4BV6 + ZB4BV05)	
Transformer type with 1.2 VA, 6 V secondary. BA9s incandescent bulb included				
	110–120 Vac 50/60 Hz	White	XB4BV31 (ZB4BV3 + ZB4BV01)	53.00
		Green	XB4BV33 (ZB4BV3 + ZB4BV03)	
		Red	XB4BV34 (ZB4BV3 + ZB4BV04)	
		Yellow	XB4BV35 (ZB4BV3 + ZB4BV05)	

XB4BV33

XB4BW33B5

Illuminated Push Buttons, Momentary (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 (Components)	Price
Flush							
Protected LED		1	1	24 Vac/dc	White	XB4BW31B5 (ZB4BW0B15 + ZB4BW313)	$54.00
					Green	XB4BW33B5 (ZB4BW0B35 + ZB4BW333)	
					Red	XB4BW34B5 (ZB4BW0B45 + ZB4BW343)	
					Yellow	XB4BW35B5 (ZB4BW0B55 + ZB4BW353)	
					Blue	XB4BW36B5 (ZB4BW0B65 + ZB4BW363)	
				110–120 Vac	White	XB4BW31G5 (ZB4BW0G15 + ZB4BW313)	54.00
					Green	XB4BW33G5 (ZB4BW0G35 + ZB4BW333)	
					Red	XB4BW34G5 (ZB4BW0G45 + ZB4BW343)	
					Yellow	XB4BW35G5 (ZB4BW0G55 + ZB4BW353)	
					Blue	XB4BW36G5 (ZB4BW0G65 + ZB4BW363)	

XB4BW3465

	Direct supply for BA9s 2.4 W max. bulb not included	1	1	≤ 250 Vac/dc	White	XB4BW3165 (ZB4BW065 + ZB4BV31)	44.90
					Green	XB4BW3365 (ZB4BW065 + ZB4BW33)	
					Red	XB4BW3465 (ZB4BW065 + ZB4BW34)	
					Yellow	XB4BW3565 (ZB4BW065 + ZB4BW35)	

XB4BW3545

	Transformer type 1.2 VA, 6 V secondary. BA9s incandescent bulb included	1	1	110–120 Vac 50/60 Hz	White	XB4BW3135 (ZB4BW035 + ZB4BV31)	74.00
					Green	XB4BW3335 (ZB4BW035 + ZB4BW33)	
					Red	XB4BW3435 (ZB4BW035 + ZB4BW34)	
					Yellow	XB4BW3535 (ZB4BW035 + ZB4BW35)	
				230–240 Vac 50/60 Hz	White	XB4BW3145 (ZB4BW045 + ZB4BV31)	74.00
					Green	XB4BW3345 (ZB4BW045 + ZB4BW33)	
					Red	XB4BW3445 (ZB4BW045 + ZB4BW34)	
					Yellow	XB4BW3545 (ZB4BW045 + ZB4BW35)	
Extended							
Protected LED		1	1	24 Vac/dc	White	XB4BW11B5 (ZB4BW0B15 + ZB4BW113)	51.40
					Green	XB4BW13B5 (ZB4BW0B35 + ZB4BW133)	
					Red	XB4BW14B5 (ZB4BW0B45 + ZB4BW143)	
					Yellow	XB4BW15B5 (ZB4BW0B55 + ZB4BW153)	
					Blue	XB4BW16B5 (ZB4BW0B65 + ZB4BW163)	
				110–120 Vac	White	XB4BW11G5 (ZB4BW0G15 + ZB4BW113)	51.40
					Green	XB4BW13G5 (ZB4BW0G35 + ZB4BW133)	
					Red	XB4BW14G5 (ZB4BW0G45 + ZB4BW143)	
					Yellow	XB4BW15G5 (ZB4BW0G55 + ZB4BW153)	
					Blue	XB4BW16G5 (ZB4BW0G65 + ZB4BW163)	

For additional information, reference Catalog #9001CT0001.

FEDERAL SIGNAL CORPORATION

Electraflash® Strobe Warning Light

Model 141ST

DESIGNED FOR INDUSTRIAL OR VEHICULAR USE

- Available in 12VDC, 24VDC, 120VAC and 240VAC
- Four dome colors
- 4,000 hour strobe tube
- Surface mount or integrated 1/2 - inch pipe mount
- Indoor/outdoor use
- Type 3R enclosure
- UL Listed and CSA Certified

Federal Signal's Electraflash® 141ST is an economical strobe light designed for a variety of industrial uses. This compact warning light is less than six inches tall and six inches in diameter. Models are available in four fresnel dome colors, including amber, blue, green and red. All models are UL Listed for indoor/outdoor use and the 120VAC models are CSA Certified.

The Model 141ST is available in 12VDC, 24VDC, 120VAC and 240VAC and includes a removable strobe mechanism. The 12VDC and 24VDC units have three holes for flat surface mounting. The 120VAC and 240VAC versions come ready to mount on a 1/2-inch pipe. Optional wall mounting brackets (Model LWMB2) or corner mounting brackets (Model LCMB2) are available for the 120VAC and 240VAC units.

Federal Signal's Electraflash strobe lights are designed for both indoor and outdoor industrial environments. The unit's convenient size and intense light output make it ideal for use on maintenance vehicles, fork lifts, and other material handling equipment. The economical Model 141ST effectively alerts of hazardous conditions or dangerous areas.

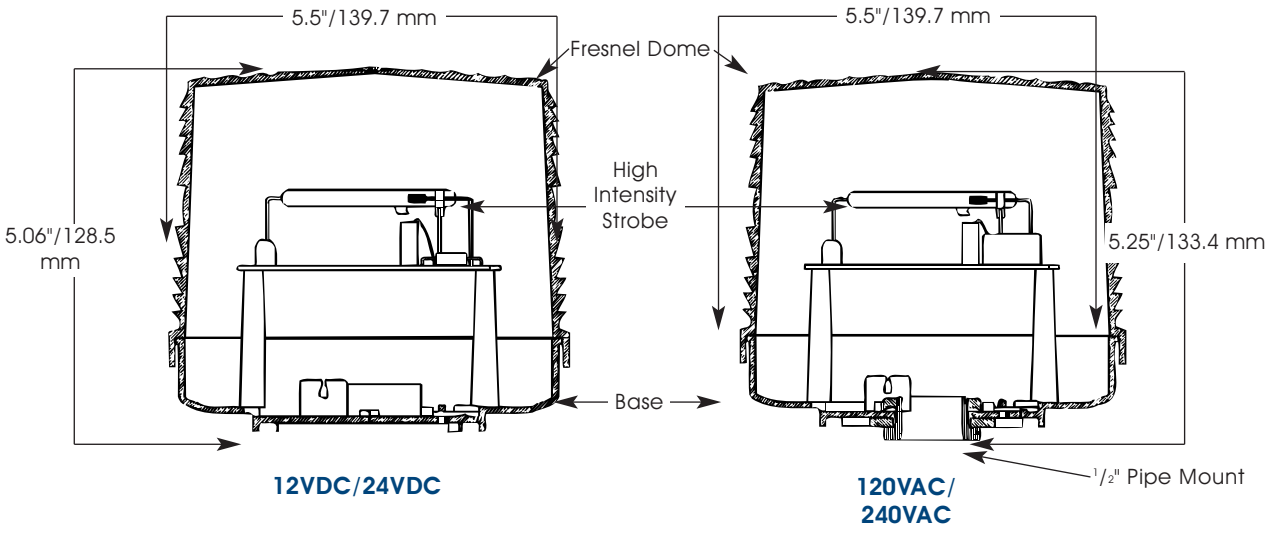
Federal Signal's Electraflash strobe warning light is an affordable visual signal which is ideally suited for light duty applications.

Model	Voltage	Operating Current	Flash Rate/ Minute	Candela Peak[1]	Mount
141ST	12VDC	0.18 amps	80	100,000	Surface
141ST	24VDC	0.08 amps	80	100,000	Surface
141ST	120VAC 50/60HZ	0.06 amps	80	100,000	1/2" Pipe
141ST	240VAC 50/60HZ	0.03 amps	80	100,000	1/2" Pipe

[1] Peak candela is the maximum light intensity generated by a flashing light during its light pulse

5 yr FEDERAL SIGNAL WARRANTY

ELECTRAFLASH® STROBE LIGHT (141ST)



SPECIFICATIONS

Lamp Life*:	4,000 hours	4,000 hours
Lamp Style:	Strobe	Strobe
Operating Temperature:	-31°F to 150°F	-35°C to 66°C
Net Weight:		
DC Models	0.8 lbs.	0.4 kg
AC Models	0.9 lbs.	0.4 kg
Shipping Weight:		
DC Models	1.3 lbs.	0.5 kg
AC Models	1.4 lbs.	0.5 kg
Height:		
DC Models	5.06"	128.5 mm
AC Models	5.25"	133.4 mm
Diameter:		
DC Models	5.5"	139.7 mm
AC Models	5.5"	139.7 mm

* Optimal hours under ideal conditions.

HOW TO ORDER

- Specify model, voltage and color
- Specify options (120VAC and 240VAC only):
  Corner Bracket (LCMB2)
  Wall Bracket (LWMB2)
- Please refer to Model Number Index 141ST beginning on page 375

REPLACEMENT PARTS

Description	***Part Number***	***Description***	***Part Number***
Dome, Amber	K8263079A	PC Assembly, 24VDC	K2001201B-01
Dome, Blue	K8263079A-01	PC Assembly, 120VAC	K2001195D
Dome, Green	K8263079A-03	PC Assembly, 240VAC	K2001195D-01
Dome, Red	K8263079A-02	Strobe Tube	K149128A
PC Assembly, 12VDC	K2001201B	Pipe Mount Kit	K8263093A

Vibratone® Horns

Models 350 and 450

The Models 350 and 450 Vibratone Horns produce a very loud horn tone by the electro-mechanical vibration of a diaphragm. Capable of reproducing coded blasts or sustained tones through the use of a number of control devices from a push button to a PLC. Federal Signal's Vibratone horn is excellent for general alarm, start and dismissal, coded paging, and process control signaling in areas of high ambient noise levels.

The Vibratone Model 350 is available in AC voltages; 12VAC, 24VAC, 120VAC and 240VAC. The Model 350 produces 100dBa @ 10', except the 12VAC model, which produces 94dBa @ 10'.

The Model 450 is available in DC voltages; 12VDC, 24VDC, 125VDC and 250VDC. The Model 450 produces 99dBa @ 10'.

Vibratone mounting options provide for surface, flush or semi-flush mounting on walls, panels, in cabinets, on 4-inch square outlet boxes, or in concrete and deep wall constructions.

Installed on the front of a Vibratone Horn, the optional Model PR Projector or Model PR2 Double Projector direct sound output straight ahead or to the sides, optimizing sound output for long, narrow rooms or corridors.

Vibratone horns are UL and cUL Listed, CSA Certified and FM Approved. They are designed and approved for use in Type 4X applications when installed with the Panel Mount Gasket Kit or Weatherproof Backbox (Model WB). They are approved for Type 4X and Type 12 applications when installed with the Surface Mount Trim Ring (Model TR, illustrated on page 124).

Each Vibratone horn is enclosed in a zinc die-cast housing and sealed with grey powder-coat paint. The Model 350 features a stainless steel diaphragm. The Model 450 utilizes an aluminum diaphragm and heavy duty contacts. The rugged construction of the Vibratone horns resists vandalism and the effects of harsh industrial environments.

Compact size, loud output and heavy-duty construction make the VibraTone horns ideal for industrial and institutional signaling applications.

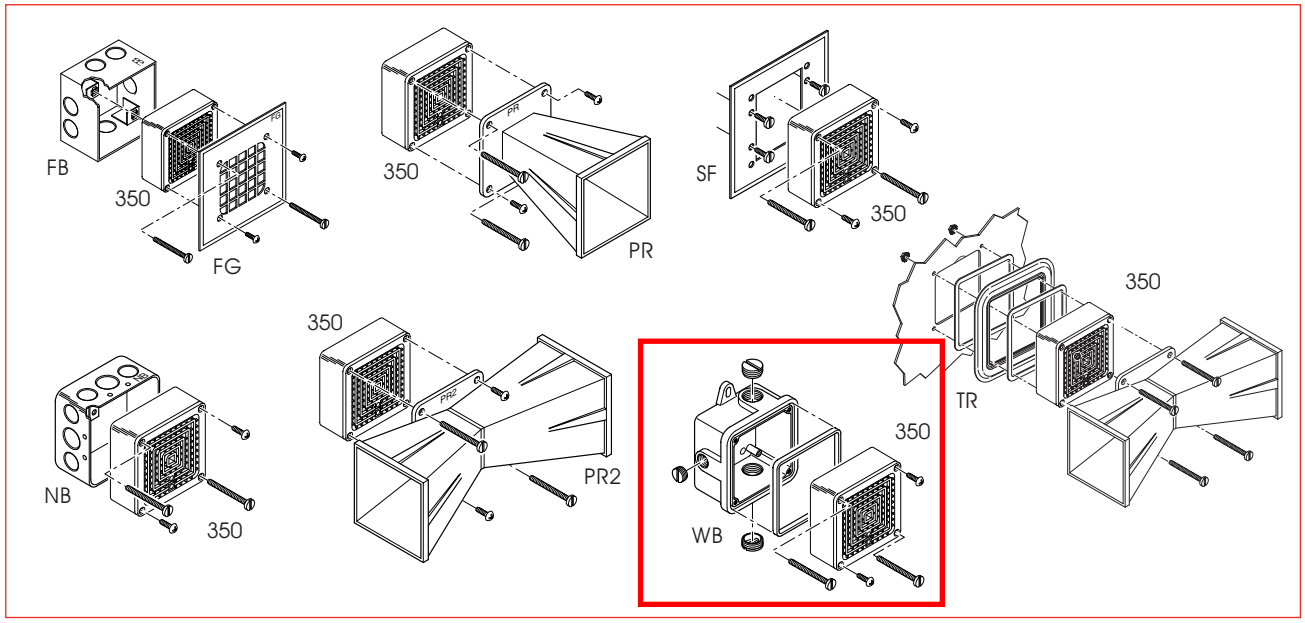
DESIGNED FOR ROUTINE SIGNALING

- Range of up to 200 feet
- Coded or sustained tones
- Model 350 – 12, 24, 120 and 240VAC; Model 450 – 12, 24, 125 and 250VDC
- Model 350 produces 100dBa at 10'
- Model 450 produces 99dBa at 10'
- Type 4X when installed with Panel Mount Gasket Kit or Weatherproof Backbox (Model WB); Type 4X and Type 12 when installed with Surface Mount Trim Ring (Model TR)
- UL and cUL Listed, CSA Certified and FM Approved

Model	Voltage	Operating Current	Decibels @ 10'	1m
350	12VAC 50/60Hz	0.90 amps	94	104
350	24VAC 50/60Hz	0.90 amps	100	110
350	120VAC 50/60Hz	0.18 amps	100	110
350	240VAC 50/60Hz	0.09 amps	100	110
450	12VDC	0.50 amps	99	109
450	24VDC	0.25 amps	99	109
450	125VDC	0.05 amps	99	109
450	250VDC	0.03 amps	99	109

5 yr FEDERAL SIGNAL WARRANTY

VIBRATONE® HORNS (350/450)



OPTIONS

FB	Wall box for flush mounting the Vibratone® horn in stud, 4" block, or other shallow wall construction; 4 3/8" square box; 2 7/8" deep; shipping weight 2 lbs. (0.91 kg)
FBL	Same as FB, but 3 13/16" deep for 6" x 8" concrete block, cinder block or other deep wall construction; shipping wt. 3 lbs. (1.36 kg)
FG	Flush grille which attaches to the basic unit and serves as the cover of the plastered-in FB flush box; 6" H x 6" W x 1/8" D; shipping wt. 1 lb. (0.45 kg)
K8435666A	Optional Panel Mounting Gasket Kit includes a gasket and hardware for surface or flush mounting the horn for NEMA Type 4 applications.
NB	4" square box with 1/2" & 3/4" knockouts for interior mountings; 1 1/2" deep; shipping weight 1 lb. (0.45 kg)
PR	Projector which concentrates sound into a basic area when attached to the basic model 350/450 units; 4" H x 4" W x 6" D; shipping weight 1 lb. (0.45 kg)
PR2	Double projector directs sounds to both sides when attached to the basic model 350/450 units; ideal for use in hallways; 4" H x 11 1/2" W x 4" D; shipping weight 2 lbs. (0,91 kg)
SF	Stamped surface plate used for installations on plastered-in 4" outlet switch boxes for semi-flush mountings; 6"H x 6" W x 1/2" D; shipping weight 1 lb. (0.45 kg)
TR	Gasketed trim ring allowing surface mount installations of 350/450 units while maintaining Type12 and Type4X rating of enclosure.
WB	Cast aluminum neoprene-gasketed weatherproof housing for outside use, complete with mounting lugs; tapped for 1/2", 3/4" conduit; 4 3/8" square box; 2" deep mounting lugs on 4 1/2" centers; shipping weight 1 lb. (0.45 kg)

HOW TO ORDER

- Specify model and voltage
- Specify options from list
- Please refer to Model Number Index 350/450 beginning on page 377

REPLACEMENT PARTS

Description	***Part Number***
Panel Mount Gasket Kit	K8435666A
Coil (120VAC only)	KFC1516C
Volume Control Kit	K8435663B
Gasket for WB	K8435696A

SPECIFICATIONS

Operating Temperature:	-65°F to 150°F	-54°C to 66°C
Net Weight:	1.4 lbs.	0.6 kg
Shipping Weight:	1.5 lbs.	0.7 kg
Height:	4.0"	102.0 mm
Width:	4.0"	102.0 mm
Depth:	2.5"	64.0 mm

LevelRat

NON-FOULING SUBMERSIBLE LEVEL TRANSMITTER

Specifically designed for extended service in sewage lift station environments, the LevelRat by Keller America features a wide sensing diaphragm yet small overall size. Unlike similar, competing models which feature a fragile Teflon®-coated rubber diaphragm, the LevelRat incorporates a monolithic diaphragm which combines the non-stick quality of Teflon with superior toughness and abrasion resistance.

Perfectly suited for pump control applications, the LevelRat is compatible with any standard 2-wire, 4...20 mA current loop or 3-wire voltage systems.

Keller America's guaranteed lightning protection makes this transmitter ideal for installation in areas prone to chronic damage due to transients caused by lightning.

For more information on the LevelRat, or any other Keller product, please contact Keller America, or view the entire Keller catalog at http://www.kelleramerica.com/datasheets.html.

FEATURES

4...20mA models include guaranteed lightning protection at no additional cost.

16-bit internal digital error correction for cost-effective low Total Error Band $(TEB)_3$.

316L SS housing construction.

Non-fouling diaphragm for superior resistance to puncture.

2-year warranty covers defects in materials and workmanship.

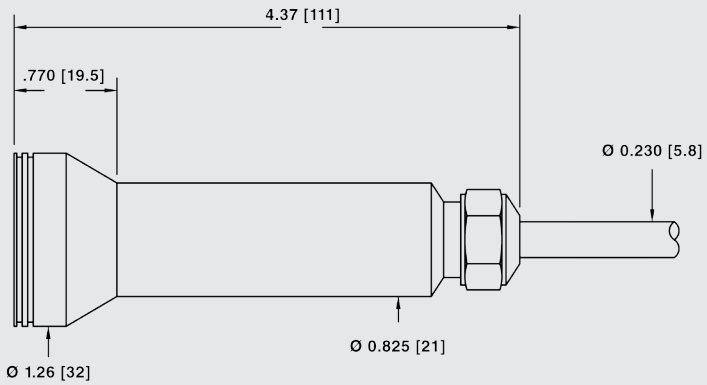
User-rangeable analog output ensures compatibility as requirements change.

RS485 modified-MODBUS compatible inteface allows up to 128 transmitters on a single bus.

Standard dual (analog & RS485) outputs simplify interface to controls, data collection, and telemetry systems.

Built in the U.S.A. ARRA Section 1605 Compliant.

Standard 3-day lead time.



Output	White	Black	Red
2-wire (mA)	OUT / GND	+Vcc	N/A
3-wire (VDC)	GND	+VCC	+OUT
Braided shield wire connected to transmitter housing			

SPECIFICATIONS ARE SUBJECT TO CHANGE WITHOUT NOTICE

07/16

KELLER AMERICA INC

351 BELL KING ROAD · NEWPORT NEWS, VA 23606 · TOLL FREE 877-253-5537 · PHONE (757) 596-6680 · FAX (757) 596-6659

EMAIL SALES@KELLERAMERICA.COM · WEBSITE WWW.KELLERAMERICA.COM

LevelRat

NON-FOULING SUBMERSIBLE LEVEL TRANSMITTER

Pressure Ranges[1,2]

Relative	Infinite between 0...5 thru 0...100 ft W.C

1. The LevelRat can be provided with custom calibration at no extra cost. For fluids other than water, the specific gravity must be given at the time the order is placed.

2. Intermediate ranges are realized by deranging the analog output from the next highest basic range: 1, 3, and 10 bar (relative). Level range may be specified in units of lb/in2(psi), inches WC or feet WC. Keller America uses the International Standard conversion of 2.3067 feet WC/psi.

Accuracy[3]

Static	Standard ±0.2% FS
Total Error Band	Standard ±0.5% FS

3. Static accuracy includes the combined effects of non-linearity, hysteresis, and non-repeatability at room temperature (25°C). Total Error Band (TEB) includes the combined effects of non-linearity, hysteresis, and non-repeatability as well as thermal dependencies, over the compensated temperature range, expressed as a percentage of the basic range (BR).

The calculation for maximum TEB on intermediate ranges (IR) is: $TEB_{IR} = (BR/IR) \times TEB_{BR}$

Output[4]

Current	4...20mA + RS485
Voltage	0...5, 0...10VDC + RS485
Resolution	0.002%[5]

4. Other voltage output options available on request.

5. Resolution applies to digital output only. Analog resolution is continuous and limited by the process meter and not the instrument.

Certifications

CE	EN50081-1, EN50082-2

Electrical[6]

Supply (4-20mA)	11...28 VDC
Supply (0-5VDC)	8...28 VDC
Supply (0-10VDC)	13...28 VDC
Load Resistance (mA)	<(Supply-11V)/0.022A
Load Resistance (VDC)	>4k ohm

6. Nominal values may be higher depending upon cable length. Internal lightning protection increases the minimum-required supply voltage from 8VDC to 11VDC, due to internal resistance of the surge protectors. In addition, cable resistance (~70Ω / 1000ft) adds to the supply requirement. In order to insure proper system operation, calculate the minimum required supply voltage (at the source) as follows:

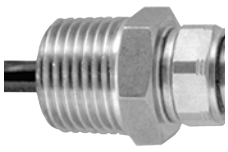
For two-part (internal+external) system (recommended):
MINIMUM SUPPLY VOLTAGE = 11.6 + 0.022 (CABLE LENGTH x 0.07) VDC

For internal only protector (standard with 4-20mA output):
MINIMUM SUPPLY VOLTAGE = 11 + 0.022 (CABLE LENGTH x 0.07) VDC

Environmental

Protection Rating	IP68
Operating Temp.	-10...60° C
Compensated Temp.	0...50° C
Wetted Materials	316 L Stainless Steel
	PEEK
	Polyamide
	Fluorocarbon
Cable Options	Polyethylene for general purpose
	Hytrel for hydrocarbon
	Tefzel for chemical interaction

Optional Accesories


1/2" NPT Conduit Fitting


Drying Tube Assembly


Bellows Assembly


Cable Hanger


Termination Enclosure


Pressure Test Adapter


Stabilizing Weight


Interface Converter

Process Meter


Signal Line Surge Protector

K E L L E R A M E R I C A I N C

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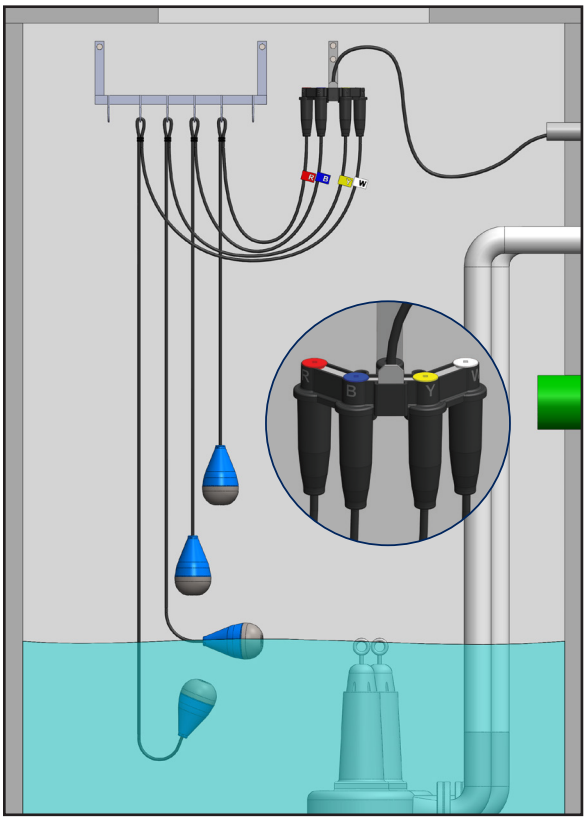
KWIKSWITCH™

REVOLUTIONARY FLOAT CONNECTION SYSTEM

OVERVIEW

The KwikSwitch™ quick release float switch connection system is designed to be installed directly in a wet well. The 4-port manifold easily connects 1-4 KwikSwitch™ float switches for level control applications. The KwikSwitch™ system improves reliability, and significantly reduces installation and float switch replacement time.



APPLICATIONS

- Sewage and effluent lift stations
- Stormwater pump stations
- Low voltage control
- Intrinsically safe applications

FEATURES

- (4) Quick release float switch connections
- Rated for temporary submersion, 6 ft. (1.8m) for 72 hours
- Dual seal design for improved protection against water ingress and corrosive gases typically found in sewage lift stations
- Single manifold multiconductor direct burial rated cable
- Color coded wiring pairs in cable correspond to colored caps on the manifold for easy identification (red-blue-yellow-white)
- Sealing plugs for unused ports
- Manifold provided with stainless steel mounting bracket
- KwikSwitch™ mechanically-activated float switch
- US Pat. 9,559,455 and 9,583,867. Foreign Patents Pending
- CSA Certified
- 2-year limited warranty

PRIMEX
WATER SYSTEM INTEGRATOR AND CONTROLS PROVIDER
844-4PRIMEX (477-4639)
WWW.PRIMEXCONTROLS.COM

KWIKSWITCH™

REVOLUTIONARY FLOAT CONNECTION SYSTEM

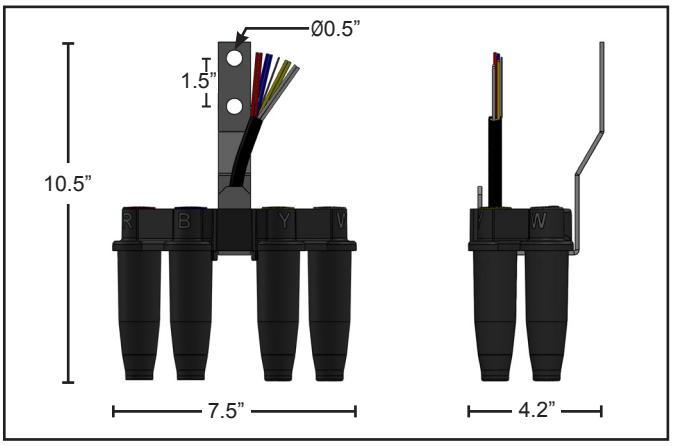
SPECIFICATIONS

Manifold:

- Housing:
  - Material: ABS plastic, black
  - Retaining slot for mounting bracket
  - 1.0” (2.54 cm) diameter caps: red-blue-yellow-white
- Cable:
  - 18 gauge, 8 conductors with ground shield
  - Color coded wiring pairs; red-blue-yellow-white
  - Direct burial PVC TPE TC-ER TFFN (UL) 600V
  - Outside dimension: 0.390” (9.91mm)
- Rating:
  - 1.0 Amp per connection port, 125 VAC
  - Operating temperature: 0°-122°F (-17°-50°C)
  - Storage temperature: -40°-140°F (-40°-60°C)
- Mounting Bracket:
  - Material: 304 stainless steel
  - Flat bar stock: 1.0” x 0.125” (25.4mm x 3.2mm)

Float Switches:

- Connectors:
  - Quick release, dual seal
  - Black rubber boot for N.O. contact switch
  - Gray rubber boot for N.C. contact switch
- Cable: 18 gauge; 3 conductor SJOW
- Float:
  - Mechanically-activated; 10° above/10° below horizontal, internally weighted
  - Dimensions: 4.03” diameter x 6.62” (10.2 cm x 16.8 cm)
  - Material: Polypropylene
  - Weight: 1.9 lbs. (0.862 kg)
- Rating:
  - Maximum temperature: 140°F (60°C)
  - Min./Max. electrical load: 1mA, 4 VDC; 1 Amp, 125 VAC



ORDERING

PART NUMBER	DESCRIPTION
1053973	KwikSwitch™ 4-port Manifold w/ 25ft. cable
1053974	KwikSwitch™ 4-port Manifold w/ 50ft. cable
1053975	KwikSwitch™ 4-port Manifold w/ 100ft. cable
1053954	KwikSwitch™ Float, N.O. w/ 25ft. cable
1053955	KwikSwitch™ Float, N.C. w/ 25ft. cable
1053956	KwikSwitch™ Float, N.O. w/ 50ft. cable
1053957	KwikSwitch™ Float, N.C. w/ 50ft. cable
1054136	Sealing Plug*

**One sealing plug must be ordered for each unused port. Do not install manifold with open ports.*

PRIMEX®
WATER SYSTEM INTEGRATOR AND CONTROLS PROVIDER

844-4PRIMEX (477-4639)
WWW.PRIMEXCONTROLS.COM

MUNI™ FLOAT

MUNICIPAL FLOAT SWITCH

OVERVIEW

Mechanically-activated, narrow-angle, internally weighted municipal float switch designed by the global manufacturing leader. The MUNI™ float is ideal for level control in municipal sewage pumping stations. The internal switching mechanism contains unique gold cross-point contacts, providing precision and reliable control signals up to 1 Amp.

APPLICATIONS

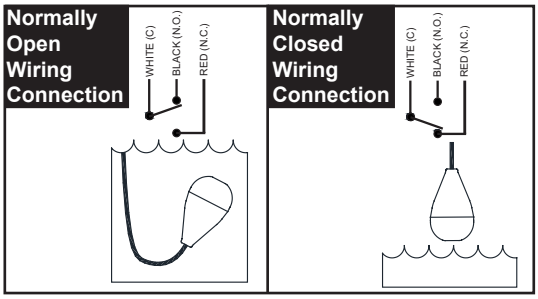
- Sewage lift stations
- Storm water lift stations
- Non-potable water
- Pump up/Pump down
- Programmable Logic Controllers (PLC)
- Intrinsically Safe

FEATURES

- Internally weighted
- 3 wire cable - SPDT (Single Pole, Double Throw) can be wired as normally open or normally closed
  - Wire color: Common (white), N.O. (black), N.C. (red)
- Large twin wall tear drop shape design offers increased buoyancy
- Two color housing allows for easy identification of float position
- Unique gold cross-point contacts provide precision and reliable control signals up to 1 Amp
- Excellent solution for applications with high grease content
- CSA Certified
- 2 year Limited Warranty

SPECIFICATIONS

- **Cable:** 18 AWG, 3 conductor, SJOW
- **Float Dimensions:** 4.03” diameter x 6.62” long (10.2 cm x 16.8 cm)
- **Maximum Temperature Rating:** 140°F (60°C)
- **Maximum Electrical Load:** 1 Amp, 125 VAC
- **Minimum Electrical Load:** 1mA, 4 VDC
- **Float Material:** Polypropylene
- **Weight of Float:** 1.9 pounds
- **Activation angle** is 10 degrees above and 10 degrees below horizontal



Part Number	Description
1046374	MUNI FLOAT-25FT CABLE
1046375	MUNI FLOAT-50FT CABLE
1046376	MUNI FLOAT-75FT CABLE
1046377	MUNI FLOAT-100FT CABLE

Mounting Kits Available

PRIMEX
WATER SYSTEM INTEGRATOR AND CONTROLS PROVIDER

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WWW.PRIMEXCONTROLS.COM

Ashland, OH	800-363-5842
Clearwater, FL	800-349-1905
Detroit Lakes, MN	888-342-5753
Milford, OH	513-831-9959
Plymouth, MN	763-559-0568
Vacaville, CA	707-449-0341

Stainless Steel Type 4X Enclosures

Application

Provides unmatched protection for housing electrical components in highly corrosive environments. This enclosure is used in indoor and outdoor settings that are frequently wet or have constant exposure to water, other liquids, or contaminants.

A wide variety of Type 316L stainless steel enclosures are available for applications requiring the additional protection of Type 316L material.

Construction

- 14 gauge Type 304 or Type 316L stainless steel bodies and doors
- Seams continuously welded and ground smooth; no holes or knockouts
- Seamless foam-in-place gasket assures watertight and dusttight seal
- Rolled lip around three sides of door and all sides of enclosure opening excludes liquids and contaminants
- Stainless steel door clamp assembly assures watertight seal
- Hasp and staple for padlocking
- Door removed by pulling stainless steel continuous hinge pin
- Data pocket is high-impact thermoplastic
- Collar studs provided for mounting optional panels
- Exterior hardware on Type 316L stainless steel enclosures matches enclosure material
- Bonding provision on Door. Grounding stud on body.

Finish

Enclosures are unpainted. Door, sides, top, and bottom have smooth #4 brushed finish. Optional mild steel panels are painted white. Optional conductive and stainless steel panels are available.

Industry Standards

UL 508A, File No. E61997: Type 3R, 4, 4X, and 12
NEMA/EEMAC Type 3, 3R, 4, 4X, 12, and 13
JIC standard EGP-1-1967
CSA File No. 42186: Type 4, 4X, and 12
IEC 60529, IP66

Meets Type 3RX requirements

Accessories

Electrical Interlocks
Fast Operating Clamp Assembly
Lighting Packages
Panel Support Kit
Panels
Rack Mounting Angle Kit
Swing-Out Panel Kit
Terminal Block Kit Assembly
Thermal Accessories
Window Kit

Modification Services Program

You can customize this product to your unique requirements by specifying from these options:

- Enclosure height, width, depth
- Holes and cutouts in body, doors, subpanels
- Tapped holes in subpanels
- Fasteners, mounting channel in enclosure and subpanel
- Mounting (adds and deletes)
- Doors
- Subpanels
- Thermal management (louvers, fans, filters)
- Windows
- Standard accessories
- Drip shield

To order, contact your local Hoffman sales representative.

NOTE: For information about modifications outside the scope of the Modification Services program, contact your Hoffman sales representative.

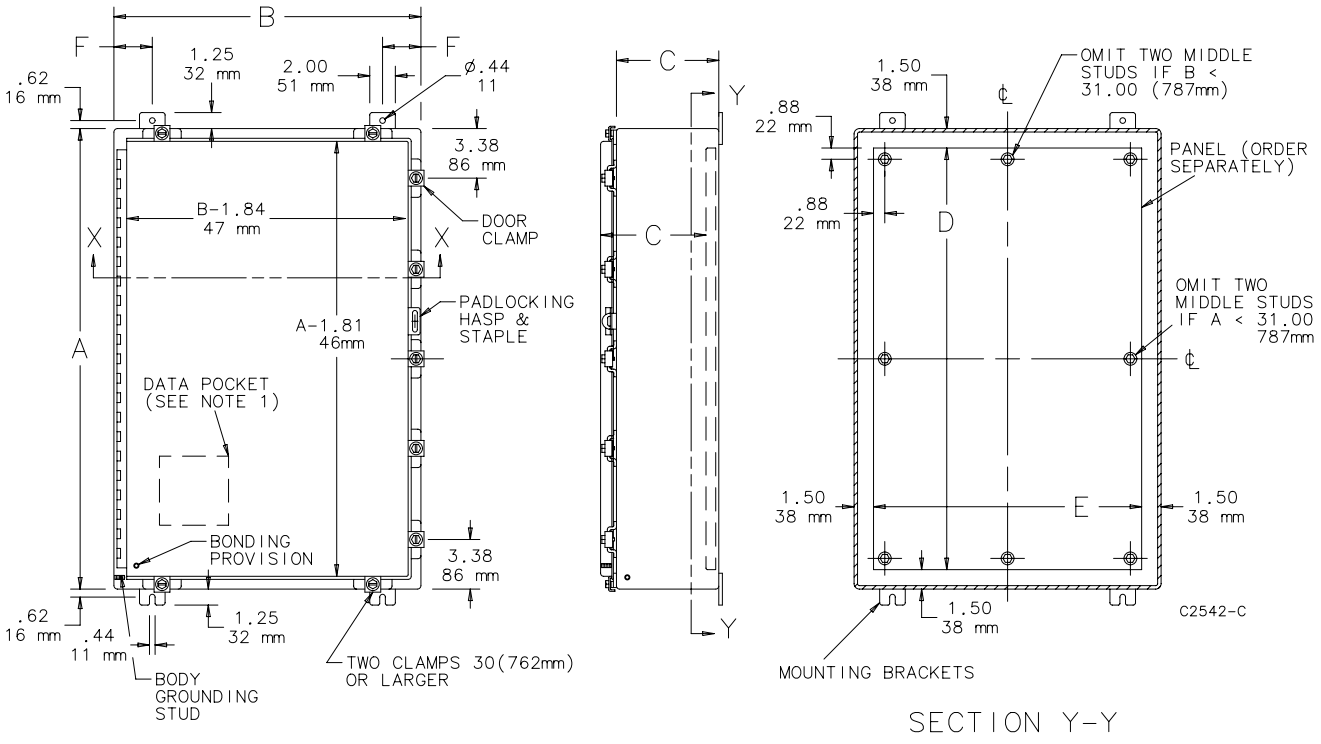
PH 763 422 2211 • F x 763 422 2600 • www.hoffmanonline.com

Stainless Steel Type 4X Enclosures

Standard Sizes Stainless Steel Type 4X Enclosures

Catalog Number	A x B x C in. (mm)	Stainless Steel Type	Steel Panel Catalog Number	Conductive Steel Panel Catalog Number	Stainless Steel Panel Catalog Number	Panel Size D x E (in.)	Panel Size D x E (mm)	F (in)	F (mm)	Clamps Qty.	Data Pocket
WET WELL JUNCTION BOX											
[illegible]	[illegible] 152)	304	A16P12	A16P12G	A16P12SS6	13.00 x 9.00	330 x 229	1.25	32	4	Small
[illegible]	[illegible] 152)	316L	A16P12	A16P12G	A16P12SS6	13.00 x 9.00	330 x 229	1.25	32	4	Small
A16H1606SSLP	16.00 x 16.00 x 6.00 (406 x 406 x 152)	304	A16P16	A16P16G	A16P16SS6	13.00 x 13.00	330 x 330	3.00	76	4	Small
[illegible]	[illegible] 152)	316L	A16P16	A16P16G	A16P16SS6	13.00 x 13.00	330 x 330	3.00	76	4	Small
A16H2006SSLP	16.00 x 20.00 x 6.00 (406 x 508 x 152)	304	A20P16	A20P16G	A20P16SS6	17.00 x 13.00	432 x 330	3.00	76	4	Small
A16H2006SS6LP	16.00 x 20.00 x 6.00 (406 x 508 x 152)	316L	A20P16	A20P16G	A20P16SS6	17.00 x 13.00	432 x 330	3.00	76	4	Small
A20H1606SSLP	20.00 x 16.00 x 6.00 (508 x 406 x 152)	304	A20P16	A20P16G	A20P16SS6	17.00 x 13.00	432 x 330	3.00	76	4	Small
A20H1606SS6LP	20.00 x 16.00 x 6.00 (508 x 406 x 152)	316L	A20P16	A20P16G	A20P16SS6	17.00 x 13.00	432 x 330	3.00	76	4	Small
A20H2006SSLP	20.00 x 20.00 x 6.00 (508 x 508 x 152)	304	A20P20	A20P20G	A20P20SS6	17.00 x 17.00	432 x 432	3.00	76	4	Small
A20H2006SS6LP	20.00 x 20.00 x 6.00 (508 x 508 x 152)	316L	A20P20	A20P20G	A20P20SS6	17.00 x 17.00	432 x 432	3.00	76	4	Small
A24H2006SSLP	24.00 x 20.00 x 6.00 (610 x 508 x 152)	304	A24P20	A24P20G	A24P20SS6	21.00 x 17.00	533 x 432	3.00	76	5	Small
A24H2006SS6LP	24.00 x 20.00 x 6.00 (610 x 508 x 152)	316L	A24P20	A24P20G	A24P20SS6	21.00 x 17.00	533 x 432	3.00	76	5	Small
A24H2406SSLP	24.00 x 24.00 x 6.00 (610 x 610 x 152)	304	A24P24	A24P24G	A24P24SS6	21.00 x 21.00	533 x 533	3.00	76	5	Small
A24H2406SS6LP	24.00 x 24.00 x 6.00 (610 x 610 x 152)	316L	A24P24	A24P24G	A24P24SS6	21.00 x 21.00	533 x 533	3.00	76	5	Small
A16H1208SSLP	16.00 x 12.00 x 8.00 (406 x 305 x 203)	304	A16P12	A16P12G	A16P12SS6	13.00 x 9.00	330 x 229	1.25	32	4	Small
A16H1208SS6LP	16.00 x 12.00 x 8.00 (406 x 305 x 203)	316L	A16P12	A16P12G	A16P12SS6	13.00 x 9.00	330 x 229	1.25	32	4	Small
A20H1608SSLP	20.00 x 16.00 x 8.00 (508 x 406 x 203)	304	A20P16	A20P16G	A20P16SS6	17.00 x 13.00	432 x 330	3.00	76	4	Small
A20H1608SS6LP	20.00 x 16.00 x 8.00 (508 x 406 x 203)	316L	A20P16	A20P16G	A20P16SS6	17.00 x 13.00	432 x 330	3.00	76	4	Small
A20H2008SSLP	20.00 x 20.00 x 8.00 (508 x 508 x 203)	304	A20P20	A20P20G	A20P20SS6	17.00 x 17.00	432 x 432	3.00	76	4	Small
A20H2008SS6LP	20.00 x 20.00 x 8.00 (508 x 508 x 203)	316L	A20P20	A20P20G	A20P20SS6	17.00 x 17.00	432 x 432	3.00	76	4	Small
A20H2408SSLP	20.00 x 24.00 x 8.00 (508 x 610 x 203)	304	A24P20	A24P20G	A24P20SS6	21.00 x 17.00	533 x 432	3.00	76	5	Small
A20H2408SS6LP	20.00 x 24.00 x 8.00 (508 x 610 x 203)	316L	A24P20	A24P20G	A24P20SS6	21.00 x 17.00	533 x 432	3.00	76	5	Small
A24H1608SSLP	24.00 x 16.00 x 8.00 (610 x 406 x 203)	304	A24P16	A24P16G	A24P16SS6	21.00 x 13.00	533 x 330	3.00	76	4	Small
A24H1608SS6LP	24.00 x 16.00 x 8.00 (610 x 406 x 203)	316L	A24P16	A24P16G	A24P16SS6	21.00 x 13.00	533 x 330	3.00	76	4	Small
A24H2008SSLP	24.00 x 20.00 x 8.00 (610 x 508 x 203)	304	A24P20	A24P20G	A24P20SS6	21.00 x 17.00	533 x 432	3.00	76	5	Small
A24H2008SS6LP	24.00 x 20.00 x 8.00 (610 x 508 x 203)	316L	A24P20	A24P20G	A24P20SS6	21.00 x 17.00	533 x 432	3.00	76	5	Small
A24H2408SSLP	24.00 x 24.00 x 8.00 (610 x 610 x 203)	304	A24P24	A24P24G	A24P24SS6	21.00 x 21.00	533 x 533	3.00	76	5	Small
A24H2408SS6LP	24.00 x 24.00 x 8.00 (610 x 610 x 203)	316L	A24P24	A24P24G	A24P24SS6	21.00 x 21.00	533 x 533	3.00	76	5	Small
A24H3008SSLP	24.00 x 30.00 x 8.00 (610 x 762 x 203)	304	A30P24	A30P24G	A30P24SS6	27.00 x 21.00	686 x 533	3.00	76	7	Large
A24H3008SS6LP	24.00 x 30.00 x 8.00 (610 x 762 x 203)	316L	A30P24	A30P24G	A30P24SS6	27.00 x 21.00	686 x 533	3.00	76	7	Large
A30H2008SSLP	30.00 x 20.00 x 8.00 (762 x 508 x 203)	304	A30P20	A30P20G	A30P20SS6	27.00 x 17.00	686 x 432	3.00	76	5	Small
A30H2008SS6LP	30.00 x 20.00 x 8.00 (762 x 508 x 203)	316L	A30P20	A30P20G	A30P20SS6	27.00 x 17.00	686 x 432	3.00	76	5	Small
A30H2408SSLP	30.00 x 24.00 x 8.00 (762 x 610 x 203)	304	A30P24	A30P24G	A30P24SS6	27.00 x 21.00	686 x 533	3.00	76	5	Large
A30H2408SS6LP	30.00 x 24.00 x 8.00 (762 x 610 x 203)	316L	A30P24	A30P24G	A30P24SS6	27.00 x 21.00	686 x 533	3.00	76	5	Large
A30H3008SSLP	30.00 x 30.00 x 8.00 (762 x 762 x 203)	304	A30P30	A30P30G	A30P30SS6	27.00 x 27.00	686 x 686	3.00	76	7	Large
A30H3008SS6LP	30.00 x 30.00 x 8.00 (762 x 762 x 203)	316L	A30P30	A30P30G	A30P30SS6	27.00 x 27.00	686 x 686	3.00	76	7	Large
A36H2408SSLP	36.00 x 24.00 x 8.00 (914 x 610 x 203)	304	A36P24	A36P24G	A36P24SS6	33.00 x 21.00	838 x 533	3.00	76	5	Large
A36H2408SS6LP	36.00 x 24.00 x 8.00 (914 x 610 x 203)	316L	A36P24	A36P24G	A36P24SS6	33.00 x 21.00	838 x 533	3.00	76	5	Large
A36H3008SSLP	36.00 x 30.00 x 8.00 (914 x 762 x 203)	304	A36P30	A36P30G	A36P30SS6	33.00 x 27.00	838 x 686	3.00	76	7	Large
A36H3008SS6LP	36.00 x 30.00 x 8.00 (914 x 762 x 203)	316L	A36P30	A36P30G	A36P30SS6	33.00 x 27.00	838 x 686	3.00	76	7	Large
A42H3608SSLP	42.00 x 36.00 x 8.00 (1067 x 914 x 203)	304	A42P36	A42P36G	A42P36SS6	39.00 x 33.00	991 x 838	3.00	76	8	Large
A42H3608SS6LP	42.00 x 36.00 x 8.00 (1067 x 914 x 203)	316L	A42P36	A42P36G	A42P36SS6	39.00 x 33.00	991 x 838	3.00	76	8	Large
A48H3608SSLP	48.00 x 36.00 x 8.00 (1219 x 914 x 203)	304	A48P36	A48P36G	A48P36SS6	45.00 x 33.00	1143 x 838	3.00	76	8	Large
A48H3608SS6LP	48.00 x 36.00 x 8.00 (1219 x 914 x 203)	316L	A48P36	A48P36G	A48P36SS6	45.00 x 33.00	1143 x 838	3.00	76	8	Large
A20H1610SSLP	20.00 x 16.00 x 10.00 (508 x 406 x 254)	304	A20P16	A20P16G	A20P16SS6	17.00 x 13.00	432 x 330	3.00	76	4	Small
A20H1610SS6LP	20.00 x 16.00 x 10.00 (508 x 406 x 254)	316L	A20P16	A20P16G	A20P16SS6	17.00 x 13.00	432 x 330	3.00	76	4	Small
A24H2010SSLP	24.00 x 20.00 x 10.00 (610 x 508 x 254)	304	A24P20	A24P20G	A24P20SS6	21.00 x 17.00	533 x 432	3.00	76	5	Small
A24H2010SS6LP	24.00 x 20.00 x 10.00 (610 x 508 x 254)	316L	A24P20	A24P20G	A24P20SS6	21.00 x 17.00	533 x 432	3.00	76	5	Small
A30H2410SSLP	30.00 x 24.00 x 10.00 (762 x 610 x 254)	304	A30P24	A30P24G	A30P24SS6	27.00 x 21.00	686 x 533	3.00	76	5	Large
A30H2410SS6LP	30.00 x 24.00 x 10.00 (762 x 610 x 254)	316L	A30P24	A30P24G	A30P24SS6	27.00 x 21.00	686 x 533	3.00	76	5	Large
A36H2410SSLP	36.00 x 24.00 x 10.00 (914 x 610 x 254)	304	A36P24	A36P24G	A36P24SS6	33.00 x 21.00	838 x 533	3.00	76	5	Large
A36H2410SS6LP	36.00 x 24.00 x 10.00 (914 x 610 x 254)	316L	A36P24	A36P24G	A36P24SS6	33.00 x 21.00	838 x 533	3.00	76	5	Large
A36H3010SSLP	36.00 x 30.00 x 10.00 (914 x 762 x 254)	304	A36P30	A36P30G	A36P30SS6	33.00 x 27.00	838 x 686	3.00	76	7	Large
A36H3010SS6LP	36.00 x 30.00 x 10.00 (914 x 762 x 254)	316L	A36P30	A36P30G	A36P30SS6	33.00 x 27.00	838 x 686	3.00	76	7	Large
A42H3010SSLP	42.00 x 30.00 x 10.00 (1067 x 762 x 254)	304	A42P30	A42P30G	A42P30SS6	39.00 x 27.00	991 x 686	3.00	76	8	Large
A42H3010SS6LP	42.00 x 30.00 x 10.00 (1067 x 762 x 254)	316L	A42P30	A42P30G	A42P30SS6	39.00 x 27.00	991 x 686	3.00	76	8	Large
A48H3610SSLP	48.00 x 36.00 x 10.00 (1219 x 914 x 254)	304	A48P36	A48P36G	A48P36SS6	45.00 x 33.00	1143 x 838	3.00	76	8	Large
A48H3610SS6LP	48.00 x 36.00 x 10.00 (1219 x 914 x 254)	316L	A48P36	A48P36G	A48P36SS6	45.00 x 33.00	1143 x 838	3.00	76	8	Large
A24H2412SSLP	24.00 x 24.00 x 12.00 (610 x 610 x 305)	304	A24P24	A24P24G	A24P24SS6	21.00 x 21.00	533 x 533	3.00	76	5	Small
A24H2412SS6LP	24.00 x 24.00 x 12.00 (610 x 610 x 305)	316L	A24P24	A24P24G	A24P24SS6	21.00 x 21.00	533 x 533	3.00	76	5	Small

Stainless Steel Type 4X Enclosures



NOTES: 1. Removable data pocket included (see table for size). Large data pocket 12.00 x 12.00 (305mm x 305mm); small data pocket 6.00 x 6.00 (152mm x 152mm).
2. Maximum spacing between door clamps is 15.00 (382mm).