



**MERCURY & SOLID STATE CONTACTORS RELAYS, TILT & TIP OVER SWITCHES
FLOAT SWITCHES, GRINDER & NON-CLOG PUMPS, & TRANSDUCERS**

CATALOG Z

GENERAL INFORMATION

MDI Relays are all designed and built to meet the most exacting demands of the industry. They have won their high place in the electrical field by doing the tough and tricky jobs that ordinary equipment could at best do in an uncertain manner. They have proven their ability to stand up to the most adverse conditions of temperature, dust and moisture, in all types of applications. All the care required for the manufacture of high-grade instruments is used in the manufacture of the switches. All switch parts are specially cleaned, and contamination is avoided by use of tweezers, gloves, etc; when making assemblies. Contactors are hermetically sealed with high quality glass to metal seals. The stainless steel tube is totally encapsulated in high grade epoxy to prevent moisture damage and voltage breakdown through the protective coating. The coils are wound on compact nylon bobbins and molded on to the metal tube to provide minimum power loss. This allows for low coil power required to actuate the contactor. This also enables the units to handle high loads with minimum derating due to higher ambient temperatures. Internal gasses prevent excessive arcing between the mercury and the electrodes which enables the unit to function for millions of cycles with very low contact resistance, and minimum deterioration of the internal parts. Available in all standard coil voltages, in single, two, three and four pole arrangements. Other coil voltages available upon request.

We can cross-reference any competitors products. Over 125 years experience in the relay business.

FEATURES

1) ADVANTAGE OVER ELECTROMECHANICAL AND SOLID STATE RELAYS

- A) Superior Performance and Reliability
 - (a) Long Life
 - (b) Durable
- B) Compact Size
- C) Low, Predictable Contact Resistance
- D) Reduced RFI for Improved Interface Capability
- E) Handles a Variety of Loads
 - (a) Increases design flexibility
- F) Rapid On-Off Cycling Capability
 - (a) Mercury quickly dissipates contact heat
- G) Low Coil Power Requirements
- H) Minimal Derating Due to Higher Ambient Temperatures
- I) Quiet Action

2) DESIGN & CONSTRUCTION

- A) Contacts are within a hermetically sealed steel body
 - (a) Impervious to adverse condition
 - (b) No external arcing
- B) Arcing is in a gaseous atmosphere

- (a) Quenches the arc
- (b) Extends relay life
- C) Only one moving part (the plunger)
 - (a) No buttons to pit, weld or burn out
- D) One coil for each set of contacts
 - (a) Assures consistent switching
 - (b) Minimizes pull-in variation between contacts
- E) Epoxy encapsulated
 - (a) Moisture resistant
 - (b) High dielectric strength
 - (c) Permanently fixes contacts to coil; eliminating possible misalignment
 - (d) Helps dissipate heat and noise
 - (e) Rugged (impact resistant)

3) BENEFITS

- A) Reduction of Operational and Maintenance costs
- B) Increases Utilization and Productivity of equipment
 - (a) By reducing down-time
- C) Installation and service is a routine operation
 - (a) Simple to install
 - (b) No sophisticated equipment is required
 - (c) Easy to trouble-shoot

SELECTION FACTORS

In order to get the right relay for your job -- the relay that will give you the best performance -- it is essential that certain information, concerning the conditions under which the relay must perform, be carefully considered. We therefore recommend that answers to the following questions be forwarded to us with your inquiry or order.

1) APPLICATION

- a. What kind of job is relay to do?
- b. Is application special in any way?
- c. Will mounting be stationary?

2) TYPE OF LOAD

- a. What is the voltage in the load circuit?
- b. What is the Amperage in the load circuit?
- c. Is it A.C. or D.C.? If A.C., what is the frequency?
- d. What is the nature of the load?
 - Heater load?
 - Lamp load?

- Motor load?
- Current inrush and running current?
- Other types of inductive load?

3) CONTACT ARRANGEMENT

- a. Do you require a relay which has a normally open or normally closed contact?

4) DUTY

- a. How often is relay to be operated?
- b. How long is relay to be energized in each operation?

5) TIME DELAY CHARACTERISTICS

- a. What operating time do you want to achieve, maximum and minimum seconds?
- b. Is timing to be on closing or opening of the contacts?

6) COIL RATING

- a. What is your maximum and minimum coil operating voltage or current?
- b. Is coil to be operated from and A.C. or a D.C. circuit? If A.C., what frequency?

7) MOUNTING SPACE

- a. Are there any limitations on space for applying relay?

GLOSSARY OF TERMS & EXPRESSIONS

AMBIENT: The temperature of air or liquid surrounding any electrical part or device.

CONSTANT DUTY: If the contactor will remain "on" in normal use for indefinite periods of time, in excess of 100 hours.

CONTACTOR: 1.) A device for the purpose of repeatedly establishing or interrupting an electric power circuit; 2.) A heavy duty relay used to control electrical circuits. Relays rated at 15 to 30 AMPS and up are generally referred to as contactors.

CONTACT: 1.) One of the current-carrying parts of a relay, switch or connector that is engaged or disengaged to open or close the associated electrical circuits. 2.) To join two conductors or conducting objects in order to provide a complete path for current flow. 3.) The juncture point to provide the complete path.

CONTACTS: **Mercury to Metal:** The contacts of a standard mercury displacement relay or contactor. The upper contact is met and stationary. The lower contact is a pool of mercury that gets displaced by the plunger assembly, thereby coming in contact with the metal electrode during operation. (See page 4.)

Mercury to Mercury: The contacts of a standard mercury timer relay. This contact arrangement utilizes a cup, which has the electrode in it, and is filled with mercury. When the mercury at the bottom of the unit is displaced, it floods over the sides of the cup, completing the circuit. This provides a clean make and break with no chatter and little erosion. (See page 11.)

CONTINUITY: A continuous path for the flow of current in an electric circuit.

DERATE: To reduce the voltage, current, or power rating of a device to improve its reliability or to permit operation at high ambient temperatures.

DIELECTRIC: The insulating material between the metallic elements of an electronic component.

DROP-OUT: The current, voltage, or power value that will cause an energized relays contacts to return to their normal de-energized condition.

GAUSS: The centimeter-gram-second electromagnetic unit of magnetic induction. One gauss represents one maxwell per square centimeter.

HEAT RISE: In a mercury displacement relay; The heat developed from the coil and contacts as a unit.

HERMETIC SEAL: A mechanical or physical closure that is impervious to moisture or gas, including air.

HERTZ: Cycles per second.

INRUSH CURRENT: In a solenoid or coil, the steady-state current drawn from the line with the armature, or plunger, in its maximum open position.

LOAD, CONTACT: The electrical power encountered by a contact set in any particular application.

MAXWELL: The cgs electromagnetic unit of magnetic flux, equal to one gauss per square centimeter, or one magnetic line of force.

OPERATE TIME: In a mercury displacement relay; the amount of time that passes when power is applied to the coil, to when the contacts close in a normally open set of contacts, or when the contacts open in a normally closed set of contacts. Quick Operate is when the operate time is less than the stated release time. Slow operate is when the operate time is no longer than the stated release time.

PLUNGER: In a mercury displacement relay; The device used to displace mercury. The plunger is lighter than mercury so it

floats on the mercury. The plunger also contains a magnetic shell or sleeve, so it can be pulled down into the mercury with a magnetic field. The plunger does the same job in a mercury displacement relay as an armature in a mechanical relay.

POLE: 1.) Output terminals on a switch. 2.) A single set of contacts; (i.e., three sets of contacts equal three poles)

POWER FACTOR: Ratio of the actual power of an alternating or pulsating current to the apparent power.

PULL-IN: (Pick-up): The minimum current, voltage, power or other value which will trip a relay or cause it to operate.

RELAY: An electromechanical or electronic device in which continuity is established or interrupted in one circuit by a control circuit. Typically used to switch large currents by supplying relatively small currents to the control circuit. Also see Contactor.

RELEASE TIME: In a mercury displacement relay; The amount of time that passes when power is removed from the coil, until the contacts of a normally open unit reopen, or when contacts of a normally closed unit re-closes. Quick Release is when the release time is less than the stated operate time. Slow release is when the release time is longer than the stated operate time.

STEADY-STATE: A condition in which circuit values remain essentially constant, occurring after all initial transients or fluctuating conditions have settled down.

TRANSIENT (Transient Phenomena): Rapidly changing action occurring in a circuit during the interval between closing of a switch and settling to steady state conditions, or any other temporary actions occurring after some change in a circuit or its constants.

VOLT-AMPERE: A unit of apparent power in an AC circuit containing reactance. It is equal to the potential in volts multiplied by the current, in Amperes, without taking phase into consideration.

VOLTAGE SPIKES: An abrupt transient which comprises part of a pulse but exceeds its average amplitude considerably.

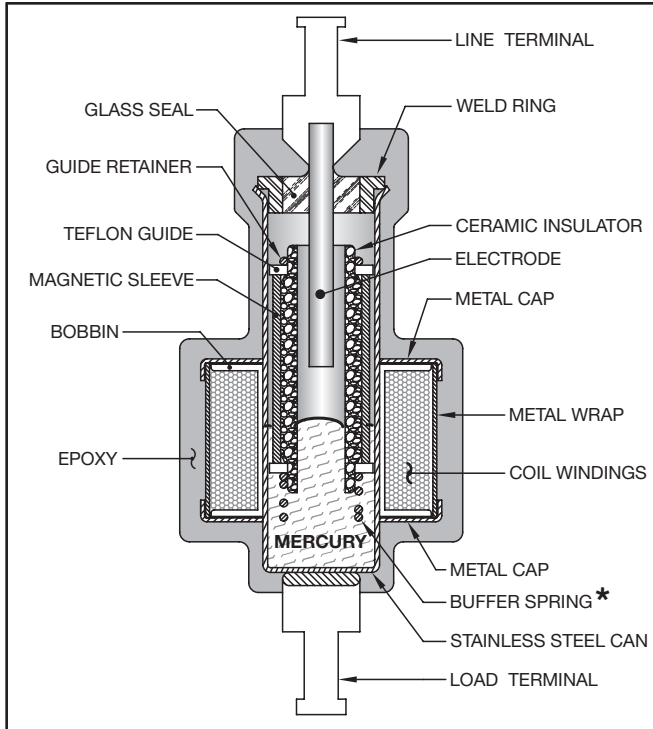
VOLTAGE WITHSTAND: The amount of electromotive force (volts) that can be applied to two points before a current will flow (leakage or breakdown.)

WATT: A unit of electrical power. One watt is expended when one Ampere of direct current flows through a resistance of one ohm. In an AC circuit, the true power in watts is effective Volt-Amperes multiplied by the circuit power factor. There are 746 watts in one horsepower.

ABBREVIATIONS

AC	Alternating Current	SSR	Solid State Relay
DC	Direct Current	Hg	Mercury
MDR	Mercury Displacement Relay	Hz	Hertz
DATS	Damper Arm Tilt Switch	NC	Normally Closed
SPST	Single Pole Single Throw	NO	Normally Open
DPST	Double Pole Single Throw	Q	Quick
TPST	Triple Pole Single Throw	S	Slow

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DESCRIPTION

MERCURY TO METAL CONTACTOR: The load terminals are isolated from each other by the glass in the hermetic seal. "The plunger assembly," which includes the ceramic insulator, the magnetic sleeve and related parts, floats on the mercury pool. When the coil is powered causing a magnetic field, the plunger assembly is pulled down into the mercury pool which is in turn displaced and moved up to make contact with the electrode, closing the circuit between the top and bottom load terminal which is connected to the stainless steel can.

TRAFFIC CONTROL (CONSTANT DUTY)

SP-1132- VOLTAGE- (A or D)

35 AMPS @ 600 VAC

SP-1130- VOLTAGE- (A or D)

60 AMPS @ 480 VAC

* A return spring replaces the buffer spring for this application

**We can cross-reference any competitors products.
Over 125 years experience in the relay business.**

HOW TO ORDER

EXAMPLE #1

NUMBER OF POLES: 2, 3, 4 or Blank if single pole (4 pole on 35 & 60-AMP only)

CONTACTS
NO - Normally Open
NC - Normally Closed

COIL VOLTAGE (Standard Voltages: 12, 24, 36, 48, 120, 220 (208-240), 277 & 480)
A - Alternating Current
D - Direct Current

SEE NOTE #1 (Below)

3 35 NO - 120 A T H N - 18

BRACKET See Page 12 for Optional Mounting Plates
A, B, N, NB, P or U on 35 & 60-AMP units
(Blank if Standard bracket is used)

H - Loads other than AC Resistive & Tungsten on Normally Open Units
(Blank if Normally Closed or AC Resistive & Tungsten loads)

T - Top Termination See Pages 8 for T-Top & Page 11 for Optional Terminations
TS - Top Screw Termination on 35-AMP Units
L-1 - Leaded Terminals on 35-AMP Normally Open Units
(Blank if Standard Termination)

A.C. RESISTIVE LOAD RATING: (30, 35, 60, or 100-AMP).

NOTE #1 Other designations are -1 thru -99. These are suffix numbers, and are reserved for units with dead special detail, construction and/or features. **-11 MOV** on coil (see page 29), **-13 MOV & Metal Strap**, **-17 DIN Rail Mount**, **-20 DIN Rail & Metal Strap** (see page 12), **-18 Metal Strap** (see page 7).
(See example #2).

EXAMPLE #2

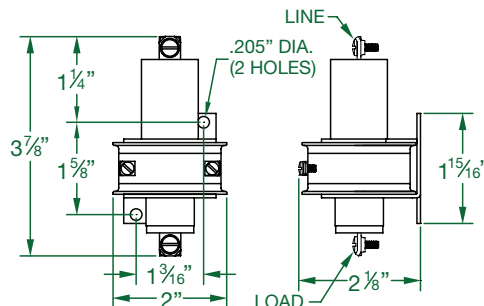
100NO-120AH-6A

The **-6A** stands for HIGH VOLTAGE contactor.

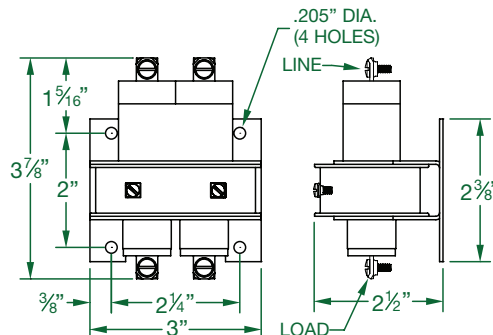
Used in ultraviolet curing ovens and other high voltage applications.
See page 9 for ratings.



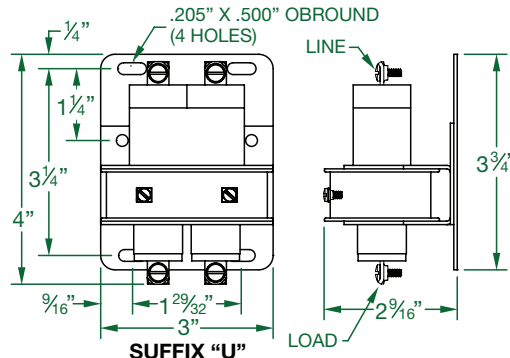
SINGLE POLE



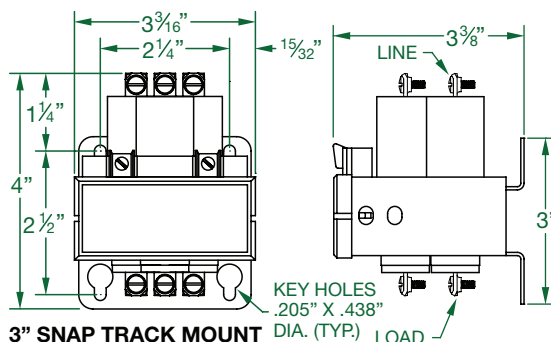
**TWO POLE
STANDARD MOUNT**



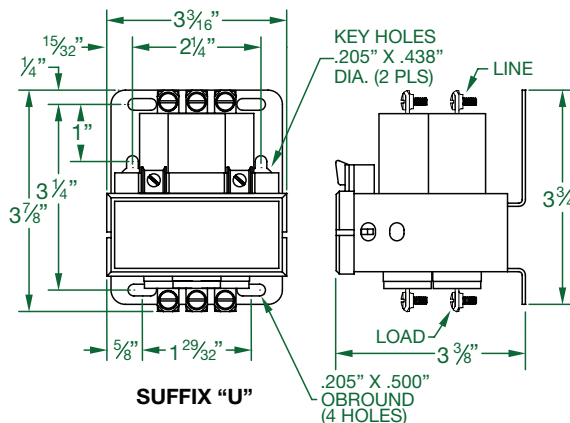
**TWO POLE
UNIVERSAL MOUNT**



**THREE POLE
STANDARD MOUNT**



**THREE POLE
UNIVERSAL MOUNT**



GENERAL INFORMATION

The 30-AMP model is designed to save space and simplify mounting methods. The standard mounting bracket on the three pole model allows the unit to be mounted in standard 3" snap track channel. If you do not use snap track mounting, the standard three pole bracket has key hole slots for easy mounting in any panel arrangement. The universal three pole mounting bracket has various mounting holes and key hole slots to meet a variety of mounting centers.

The 30-AMP series is a more compact line with a well proven switch which is the heart of mercury relays. It is the same switch design that is in our 35 and 60-AMP encapsulated MDR's, which have withstood the test of time and millions of cycles in many different applications.

TYPICAL SPECIFICATIONS

- ON NORMALLY OPEN UNITS:
OPERATE TIME: 50 milliseconds
RELEASE TIME: 80 milliseconds
- CONTACT RESISTANCE:
30-AMP=.003 ohm*
- DIELECTRIC WITHSTAND:
2500 VAC RMS
- LONGEVITY:
MILLIONS OF CYCLES
- TEMPERATURE RANGE:
-35°C TO 85°C
- COIL TERMINALS:
#6 BINDING HEAD SCREWS
- LOAD TERMINALS:
#8 BINDING HEAD SCREWS
- UL LISTING: FILE #E62767
- C.S.A.: FILE #LR41198
- TO ORDER SEE PAGE 4

*AFTER CYCLING UNDER LOAD.



FILE #E-62767



FILE #LR 41198



Made in the USA

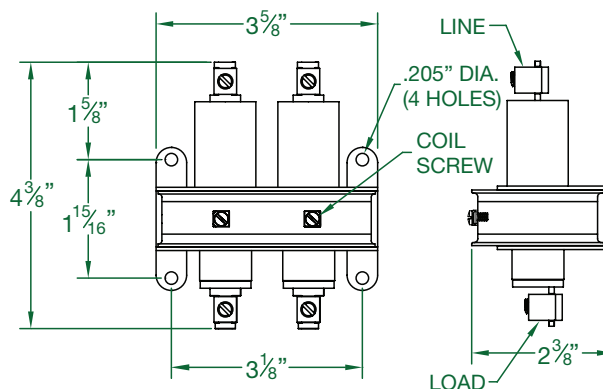
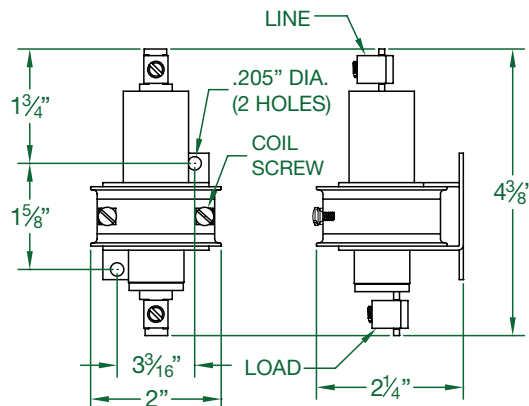
Catalog No.	Resistance	Current	V.A.	Watts
30NO-24D	180 Ω	133 mA	3.2	3.2
230NO-24D	131 Ω	188 mA	4.5	4.5
330NO-24D	73 Ω	329 mA	7.9	7.9
30NO-24A	28 Ω	316 mA	7.6	2.8
230NO-24A	12.5 Ω	610 mA	14.6	4.7
330NO-24A	7.6 Ω	815 mA	19.6	5.0
30NO-120A	725 Ω	65 mA	7.8	3.1
230NO-120A	317 Ω	118 mA	14.2	4.4
330NO-120A	210 Ω	163 mA	19.6	5.6
30NO-220A	3,150 Ω	27 mA	6.0	2.2
230NO-220A	1,300 Ω	56 mA	12.3	4.1
330NO-220A	728 Ω	86 mA	18.9	5.5



**SINGLE POLE
NORMALLY OPEN**



**TWO POLE
NORMALLY OPEN**



Made in the USA

The "L" version of the 35 and 60-AMP normally open contactors are designed and manufactured to the same high quality specifications as the standard 35 and 60-AMP models. The contactor switch is the same well proven design that has been manufactured since 1975. The mounting centers and physical size are identical to the standard single and two pole 35 and 60-AMP molded versions.

The new design provides a cleaner appearance, and is a more economical design. It is available in the single and two pole models only, with top and bottom load terminals or with lead wires. Noted are the typical specifications and UL and CSA file numbers.

TYPICAL SPECIFICATIONS

- **ON NORMALLY OPEN UNITS:**
OPERATE TIME: 50 milliseconds
RELEASE TIME: 80 milliseconds
- **CONTACT RESISTANCE:**
35-AMP = .003 ohm*
60-AMP = .002 ohm*
- **DIELECTRIC WITHSTAND:**
2500 VAC RMS
- **LONGEVITY:**
MILLIONS OF CYCLES
- **TEMPERATURE RANGE:**
-35°C TO 85°C
- **COIL TERMINALS:**
#6 BINDING HEAD SCREWS
- **LOAD TERMINALS:**
PRESSURE CONNECTORS FOR
A.W.G. #4-#14 ON 35-AMP AND
A.W.G. #2-#8 ON 60-AMP UNITS
- **UL LISTING:**
FILE #E62767 FOR L35 AND
L60-AMP N.O. UNITS 1-2 POLES
- **C.S.A.:**
FILE #LR41198 FOR L35 AND
L60-AMP N.O. UNITS 1-2 POLES



COIL DATA L35 AND L60 SERIES.

Catalog No.		Resistance	Current	V.A.	Watts
L35NO-24D	L60NO-24D	188 Ω	135 mA	3.3	3.3
L235NO-24D	L260NO-24D	92 Ω	260 mA	6.2	6.2
L35NO-24A	L60NO-24A	28 Ω	325 mA	7.8	3.0
L235NO-24A	L260NO-24A	10.3 Ω	660 mA	15.8	4.5
L35NO-120A	L60NO-120A	725 Ω	75 mA	9.0	4.0
L235NO-120A	L260NO-120A	350 Ω	115 mA	13.8	4.6
L35NO-220A	L60NO-220A	3,150 Ω	27 mA	5.9	2.2
L235NO-220A	L260NO-220A	1,000 Ω	69 mA	15.2	4.8

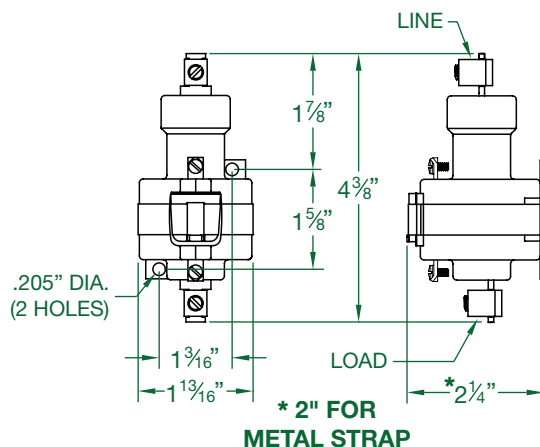
* AFTER CYCLING UNDER LOAD

35/60-AMP NORMALLY OPEN CONTACTORS

MDI



SINGLE POLE—NORMALLY OPEN



FILE #E-62767 FILE #LR 41198

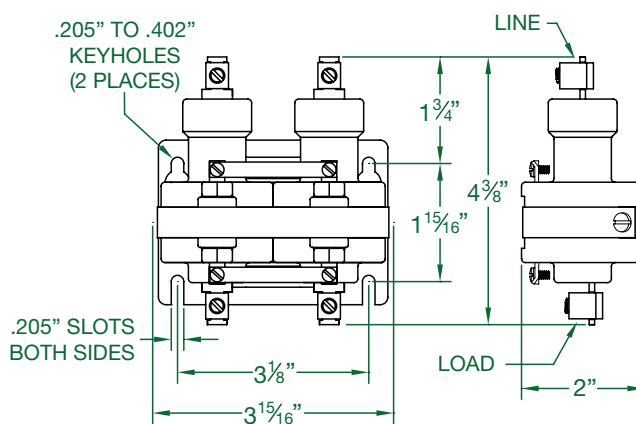
TYPICAL SPECIFICATIONS

- **NORMALLY OPEN UNITS:**
OPERATE TIME: 50 milliseconds
RELEASE TIME: 80 milliseconds
- **NORMALLY CLOSED UNITS:**
OPERATE TIME: 30 milliseconds
RELEASE TIME: 35 milliseconds
- **CONTACT RESISTANCE:**
35-AMP = .003 ohm*
60-AMP = .002 ohm*
- **TEMPERATURE RANGE:**
-35°C to 85°C
- **COIL TERMINALS:**
#6 WIRE BINDING SCREWS
- **LOAD TERMINALS:**
PRESSURE CONNECTORS
4 TO 14 AWG ON 35-AMP
2 TO 8 AWG ON 60-AMP
- **RATINGS:**
SEE PAGE 13 FOR COIL DATA
SEE PAGE 14 FOR RATINGS
- **UL LISTING: FILE #E-62767 FOR**
- **C.S.A.: FILE # LR 41198 FOR**
- **TO ORDER SEE PAGE 4**

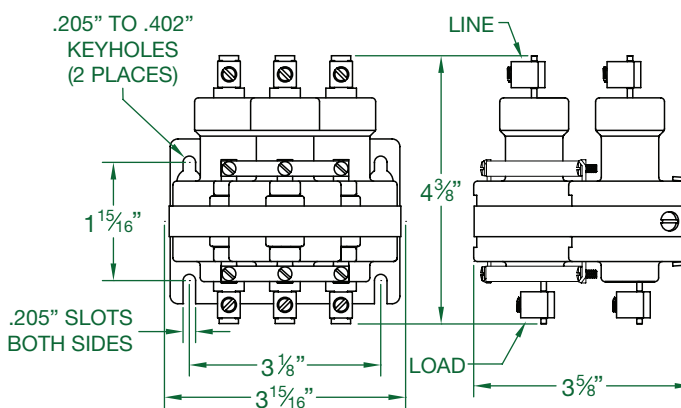
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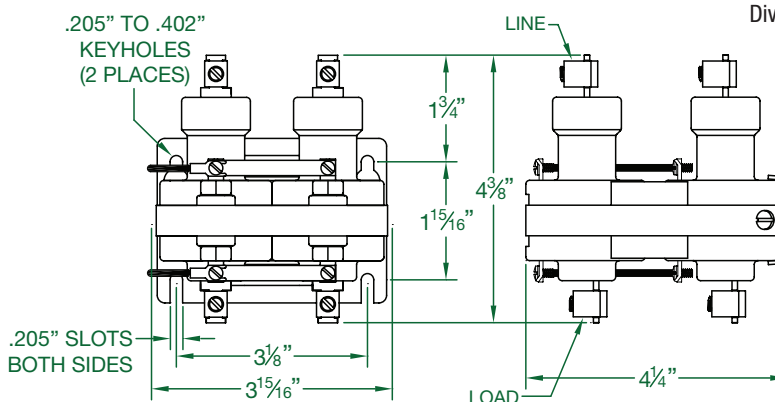
TWO POLE—NORMALLY OPEN



THREE POLE—NORMALLY OPEN



FOUR POLE—NORMALLY OPEN



Made in the USA

TRAFFIC CONTROL (CONSTANT DUTY)

SP-1132- VOLTAGE- (A or D)

35 AMPS @ 600 VAC

SP-1130- VOLTAGE- (A or D)

60 AMPS @ 480 VAC

A return spring replaces the buffer spring for this application

HAZARDOUS LOCATIONS SUFFIX "X"

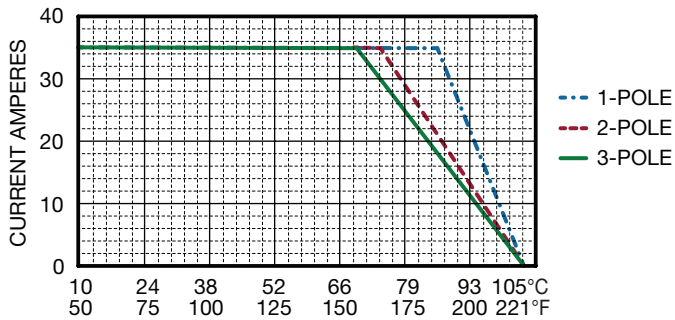
Available in 1, 2 & 3 Pole Units

Auxiliary devices for use in hazardous locations

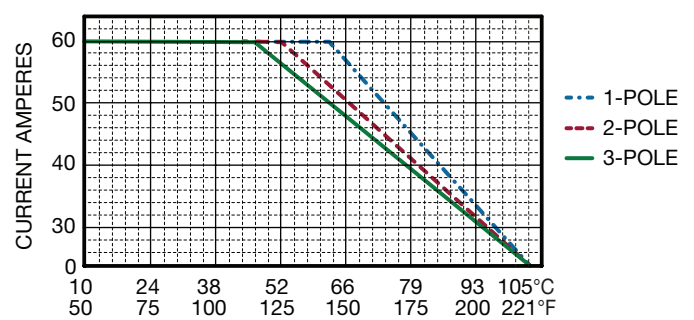
For CLASS 1, GROUPS A, B, C, & D – Division 2 only.

DERATING CHARTS

**35-AMP NORMALLY OPEN
LOAD DERATING DUE TO AMBIENT TEMPERATURE**



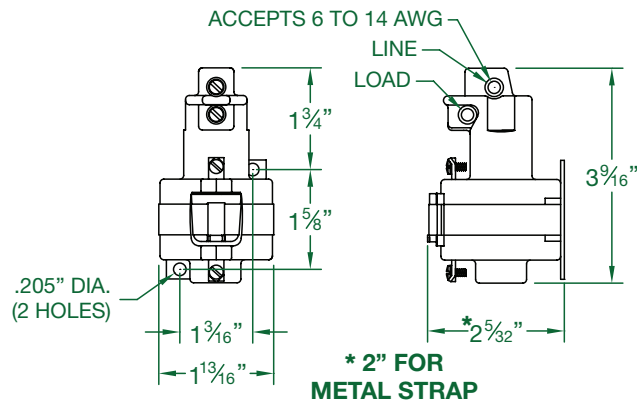
**60-AMP NORMALLY OPEN
LOAD DERATING DUE TO AMBIENT TEMPERATURE**



35-AMP T-TOP CONTACTORS



SINGLE POLE—NORMALLY OPEN



Made in the USA



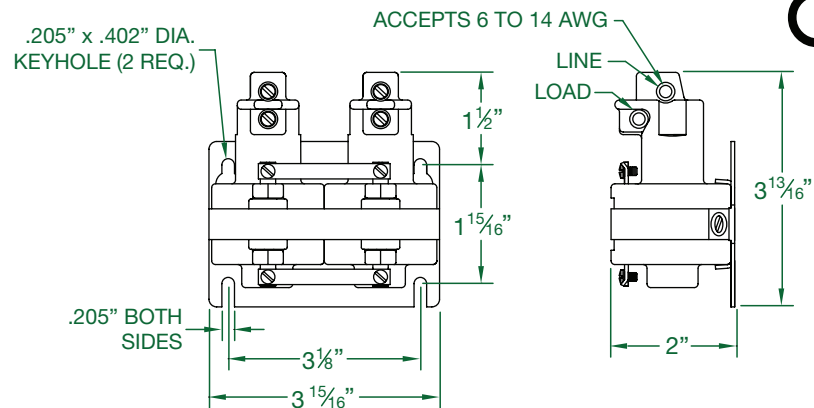
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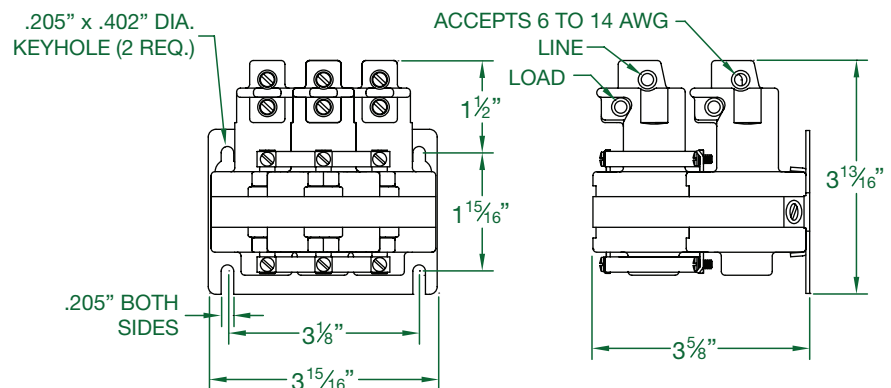
FILE #LR 41198



TWO POLE—NORMALLY OPEN



THREE POLE—NORMALLY OPEN



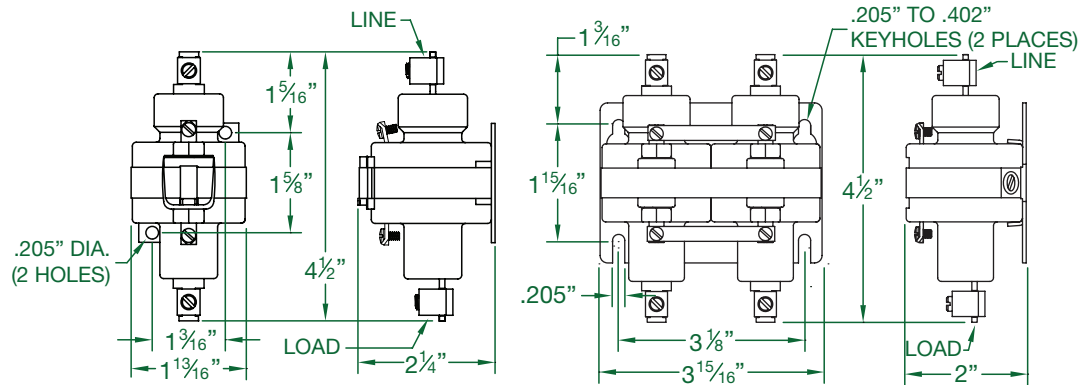
35/60-AMP NORMALLY CLOSED CONTACTORS

MDI

SIMILAR CONSTRUCTION AS THE NORMALLY OPEN UNITS BUT WITH THE COIL POSITIONED CLOSER TO THE TOP OF THE CONTACTOR.



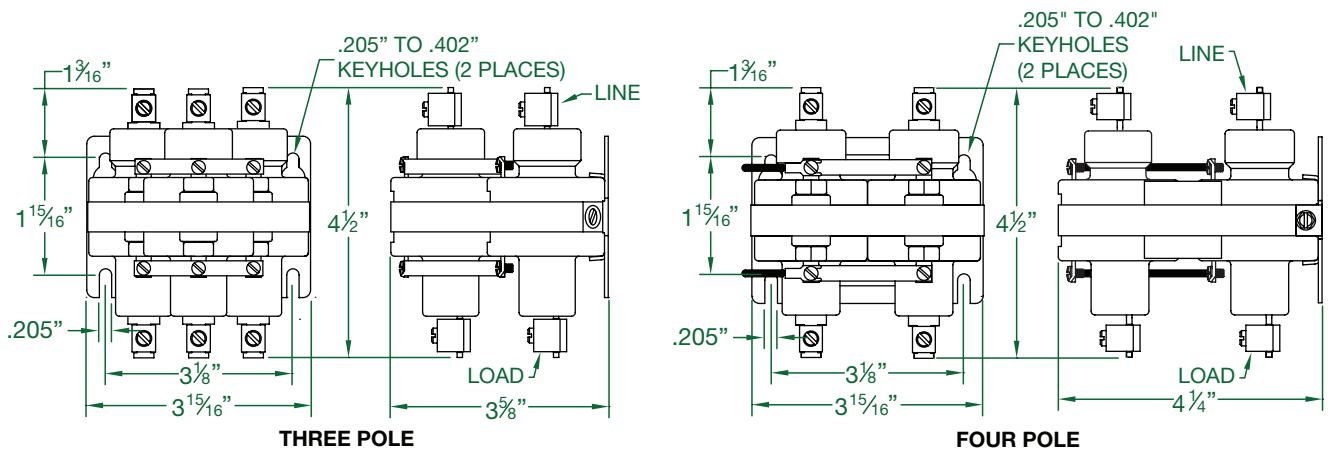
Made in the USA



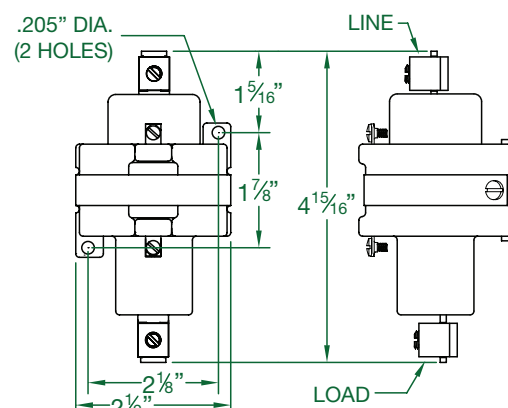
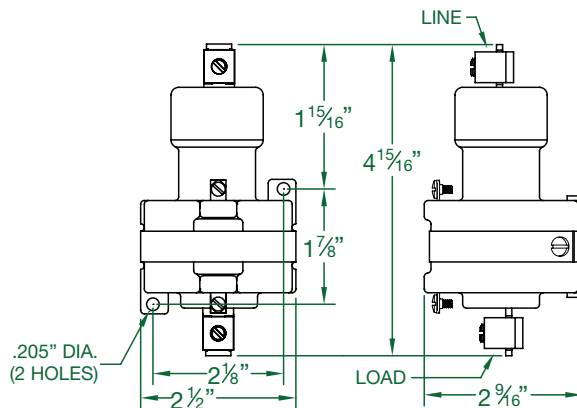
FILE #E-62767



FILE #LR 41198



HIGH VOLTAGE CONTACTORS



Coil Data

For UV Curing, and Various High Voltage applications. Available in Single Pole, Normally Open, and Normally Closed Units. The coils utilize 6-32 Wire Binding Screws, and the Contacts use Compression type terminals for #2 thru #8 A.W.G. wire.

• Also available in 2 & 3 pole

RATINGS: 10 AMPS @ 3500 VAC
15 AMPS @ 2500 VAC
AC INDUCTIVE Power Factor .7 or Greater

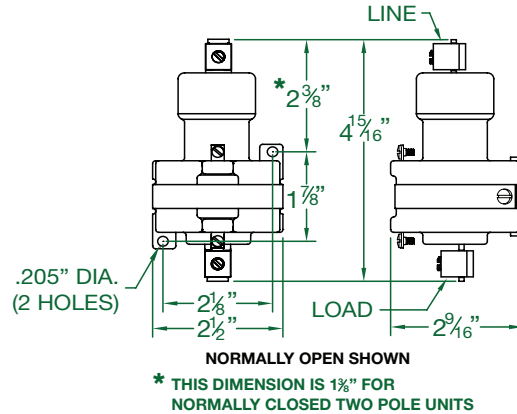
Catalog Number	Coil Voltage	Resistance	Current Draw	Wattage	V.A.
100NC-24D-6A	24 VDC	65 Ω	369 mA	8.9	8.9
100NC-120A-6A	120 VAC	380 Ω	125 mA	5.9	15.0
100NC-220A-6A	220 VAC	1,400 Ω	76 mA	8.1	16.7
100NO-12DH-6A	12 VDC	16 Ω	750 mA	9.0	9.0
100NO-24AH-6A	24 VAC	16 Ω	760 mA	9.2	18.2
100NO-24DH-6A	24 VDC	65 Ω	369 mA	8.9	8.9
100NO-120AH-6A	120 VAC	380 Ω	158 mA	9.5	19.0
100NO-220AH-6A	220 VAC	1,320 Ω	92 mA	11.2	20.2



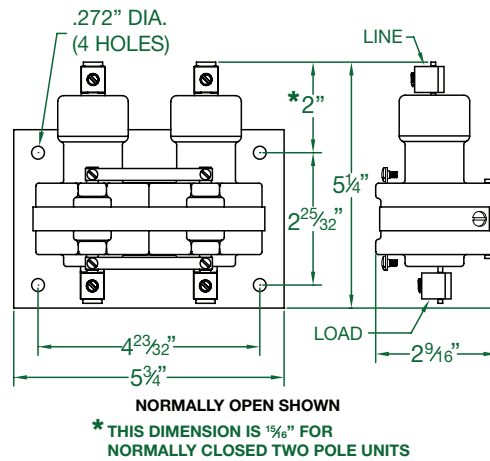
NORMALLY OPEN
UNIT



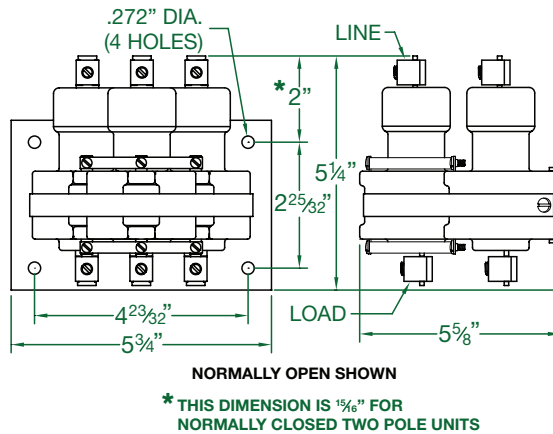
NORMALLY CLOSED
UNIT



TWO POLE—NORMALLY OPEN



THREE POLE—NORMALLY OPEN



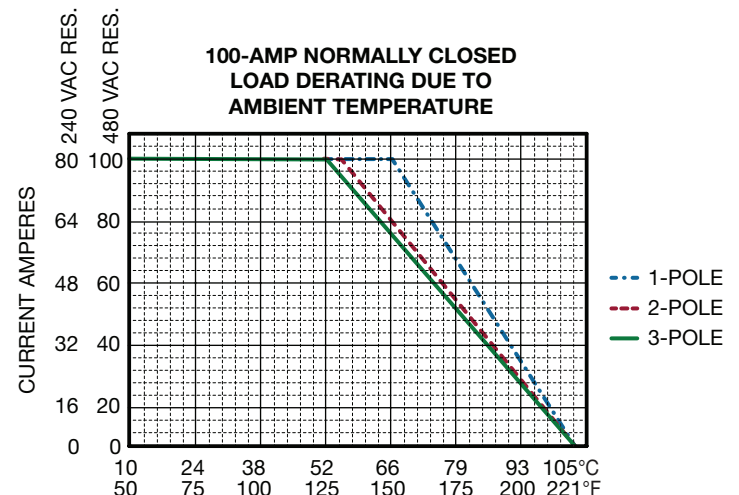
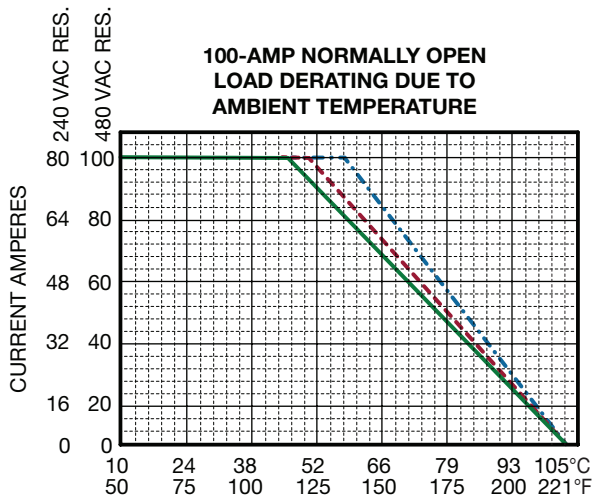
TYPICAL SPECIFICATIONS

- ON NORMALLY OPEN UNITS:
OPERATE TIME: 50 milliseconds
RELEASE TIME: 80 milliseconds
- ON NORMALLY CLOSED UNITS:
OPERATE TIME: 45 milliseconds
RELEASE TIME: 60 milliseconds
- CONTACT RESISTANCE:
.001 ohm*
- DIELECTRIC WITHSTAND:
2500 VAC RMS
- LONGEVITY:
MILLIONS OF CYCLES
- TEMPERATURE RANGE:
-35°C TO 85°C
- COIL TERMINALS:
#6 BINDING HEAD SCREWS
- LOAD TERMINALS:
PRESSURE CONNECTORS.
STANDARD ACCEPTS A.W.G.
#2 to #8.
FOR A.W.G. #1 to #8,
ADD SUFFIX -5 TO CATALOG
NUMBER (i.e. 100NO-120A-5)
- RATINGS:
Derate over 240 VAC Res.
See Page 13 for Coil Data.
See Page 14 for Ratings.
- TO ORDER SEE PAGE 4.

S100NO - SERIES

AVAILABLE IN 1, 2 & 3 POLES
RATINGS: 100 AMPS @ 480 VAC
SEE PAGE 14 FOR RATINGS

Made in the USA



MERCURY TO MERCURY CONTACTORS

HOW TO ORDER

A - Alternating Current

D - Direct Current

TIME DELAY IN SECONDS

DOO - 120 A P - 5

MOUNTING See page 12 for details

A - "A" BRACKET

U - UNIVERSAL BRACKET

P - PANEL MOUNT

(Blank if Standard Bracket is used)

COIL VOLTAGE

(Standard Voltages: 12, 24, 36, 48, 120, 220, 240, 277 & 480)

CONTACT ACTION

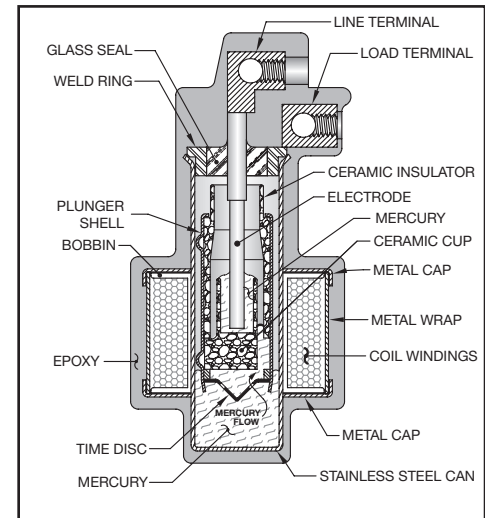
DOO: Delay on Operate, Normally Open

DORO: Delay on Operate and Release, Normally Open

DRO: Delay on Release, Normally Open

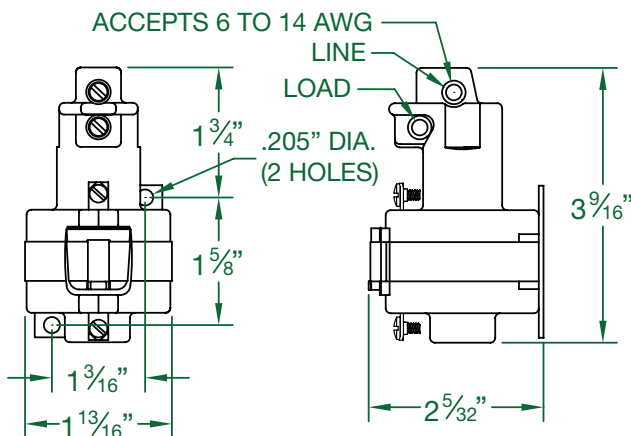
DORC: Delay on Operate and Release, Normally Closed

DRC: Delay on Release, Normally Closed

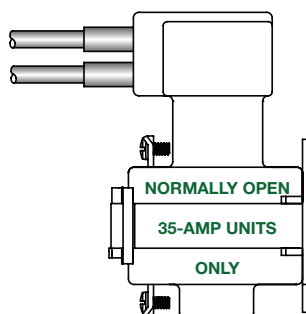


TIME DELAY RELAYS Are available with delays of up to 15 seconds on normally open units, and 4 seconds on normally closed units. The timing limitation depends on the contact action required. A time delay function is accomplished in this unit by sizing a hole in the time disc that will control the rate of the mercury flow. This controls the time it will take from the instant the coil is powered until the mercury pools make contact with each other, closing the circuit between the load terminals. Typical contact ratings 10 AMP @ 120 VAC. Pilot duty rating 720 VA. Common coil voltages are available. Standard load terminals are compression type. Coil terminals use #6 binding head screws.

Made in the USA

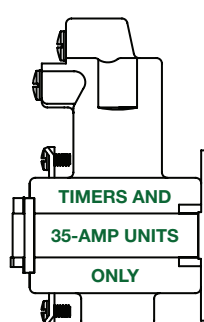


OPTIONAL TERMINATIONS



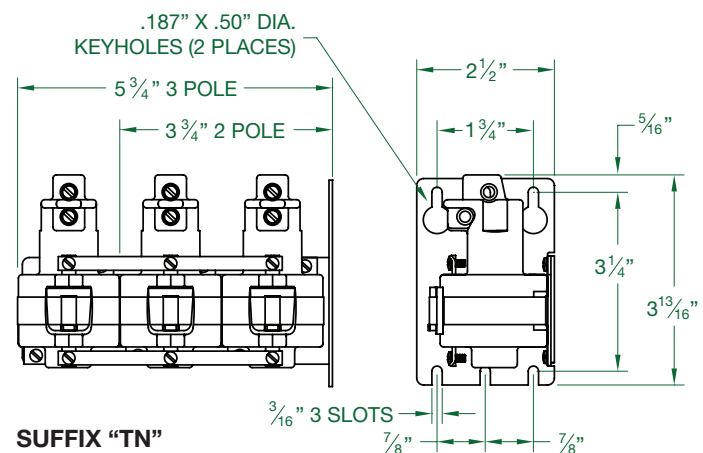
L-1 (Leaded)

Designated by the letters "L-1" in the catalog number suffix. For normally open 35-AMP units. Height 3-3/16" other dimensions same as standard (page 8).



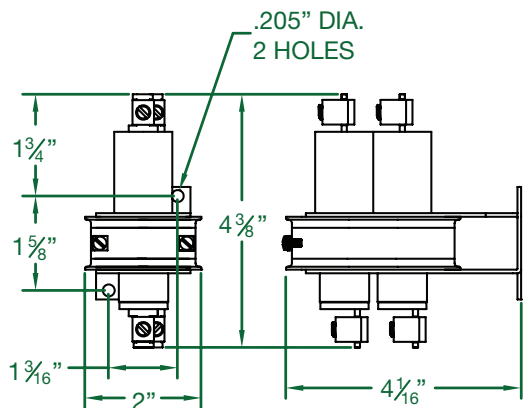
TS (Top Screws)

Designated by the letters "TS" in the catalog number suffix. For timers and 35-AMP units. (Dimensions same as T-Top see page 8).



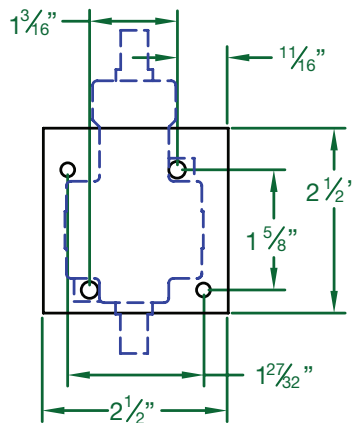
SUFFIX "TN"

Two or Three Pole 35-AMP Only. Load terminals on top for shorter overall height.



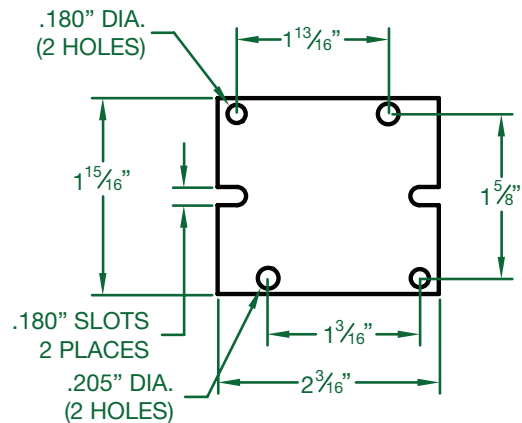
SP-1214-

2" wide, narrow mount two pole 30-AMP catalog number SP-1214 followed by the coil voltage, then "A" for AC & "D" for DC.
Example: SP-1214-120A



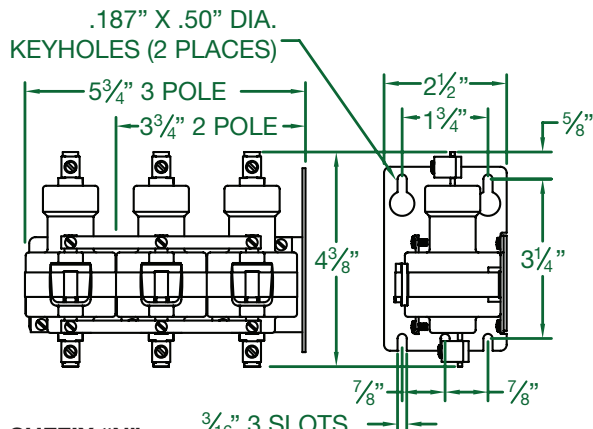
"P" PANEL MOUNT

For 35, 60-AMP or standard timer; with standard mounting bracket. The standard mounting bracket attaches to the panel with two 6-32 screws.
Material: 3/8" thick phenolic.



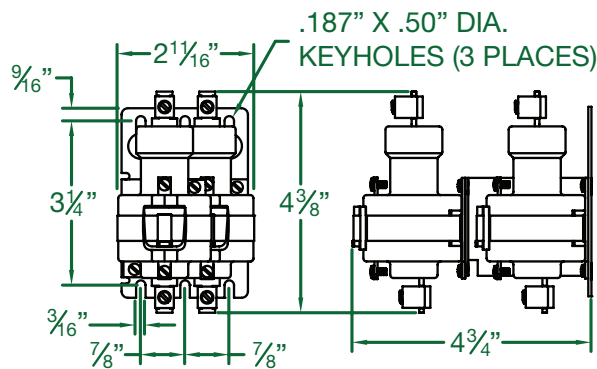
"U" UNIVERSAL BRACKET

For single pole, 35 and 60-AMP units, and for timers. This is the standard bracket for hybrid timers.
Material: 16-ga. plated steel.



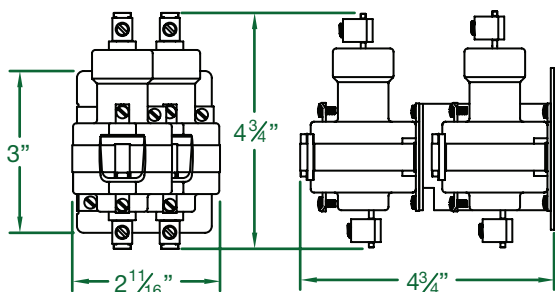
SUFFIX "N"

Narrow 2 or 3 pole 35 or 60-AMP units only



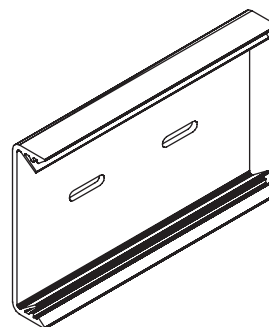
SUFFIX -19

Two pole 35 or 60-AMP narrow mounted, front facing, off set, for panel mounting.



SUFFIX -"NB"

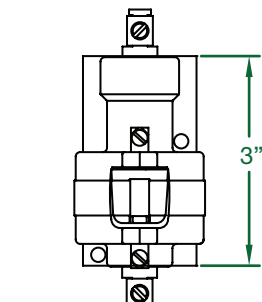
Two pole 35 or 60-AMP narrow mounted, front facing, off set, for snap track mounted



3" SNAP TRACK™ MOUNTING

Specify suffix "B" for SNAP TRACK mount on single, two and three pole 35 and 60-AMP series and single and two pole 30-AMP series. SNAP TRACK mount is standard on three pole 30-AMP without suffix.

SNAP TRACK Mounting Channel
Reed Devices Inc; a subsidiary of Augat, Inc.

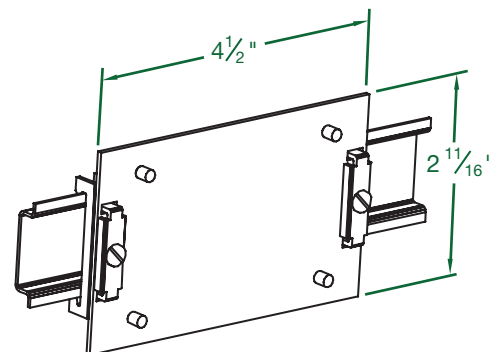


"B" BRACKET

For single pole 35 and 60-AMP units, and for timers. Mounts into standard 3" snap-track. Material is 16-ga. plated steel.



SUFFIX -17 & -20 Din rail mount 35 mm symmetrical for 35 and 60-AMP units.



COIL DATA PER POLE RATINGS ON STANDARD COILS



CATALOG NUMBER	VOLTAGE	RESISTANCE (D.C. OHMS)	CURRENT (MILLIAMPERES)	VOLT AMPERES (VA)	POWER (WATTS)
30 AMP SERIES (SEE PAGE 5)	SEE PAGE 5	SEE PAGE 5	SEE PAGE 5	SEE PAGE 5	SEE PAGE 5
35NO-24A	24 VAC	50 Ω	242 mA	5.8 VA	2.9 W
35NO-120A	120 VAC	1,250 Ω	53 mA	6.4 VA	3.5 W
35NO-208A	208 VAC	3,400 Ω	30 mA	6.2 VA	3.1 W
35NO-220A	220 VAC	4,800 Ω	28 mA	6.2 VA	3.8 W
35NO-277A	277 VAC	7,900 Ω	20 mA	5.5 VA	3.2 W
35NO-480A	480 VAC	20,000 Ω	12 mA	5.9 VA	3.0 W
35NO-6D	6 VDC	13 Ω	462 mA	2.8 VA	2.8 W
35NO-12D	12 VDC	36 Ω	333 mA	4.0 VA	4.0 W
35NO-24D	24 VDC	176 Ω	136 mA	3.3 VA	3.3 W
35NO-48D	48 VDC	636 Ω	75 mA	3.6 VA	3.6 W
35NO-125D	125 VDC	3,400 Ω	37 mA	4.6 VA	4.6 W
35NO-250D	250 VDC	14,800 Ω	17 mA	4.2 VA	4.2 W
35NC-24A	24 VAC	36 Ω	310 mA	7.4 VA	3.5 W
35NC-120A	120 VAC	960 Ω	65 mA	7.8 VA	3.6 W
35NC-220A	220 VAC	3,400 Ω	31 mA	6.8 VA	3.3 W
35NC-12D	12 VDC	36 Ω	333 mA	4.0 VA	4.0 W
35NC-24D	24 VDC	176 Ω	136 mA	3.3 VA	3.3 W
35NC-48D	48 VDC	560 Ω	86 mA	4.1 VA	4.1 W
35NC-125D	125 VDC	3,400 Ω	37 mA	4.6 VA	4.6 W
60NO-24A	24 VAC	50 Ω	259 mA	6.2 VA	3.4 W
60NO-120A	120 VAC	1,250 Ω	48 mA	5.8 VA	2.9 W
60NO-208A	208 VAC	3,400 Ω	30 mA	6.2 VA	3.1 W
60NO-220A	220 VAC	4,800 Ω	27 mA	5.9 VA	3.5 W
60NO-277A	277 VAC	7,900 Ω	19 mA	5.3 VA	2.9 W
60NO-480A	480 VAC	20,000 Ω	12 mA	5.8 VA	2.9 W
60NO-12D	12 VDC	36 Ω	333 mA	4.0 VA	4.0 W
60NO-24D	24 VDC	140 Ω	171 mA	4.1 VA	4.1 W
60NO-48D	48 VDC	636 Ω	75 mA	3.6 VA	3.6 W
60NO-125D	125 VDC	3,400 Ω	37 mA	4.6 VA	4.6 W
60NO-250D	250 VDC	14,800 Ω	17 mA	4.3 VA	4.3 W
60NC-24A	24 VAC	36 Ω	325 mA	7.8 VA	5.3 W
60NC-120A	120 VAC	960 Ω	69 mA	8.3 VA	4.1 W
60NC-220A	220 VAC	3,400 Ω	34 mA	7.5 VA	3.9 W
60NC-277A	277 VAC	7,900 Ω	26 mA	7.3 VA	5.5 W
60NC-12D	12 VDC	36 Ω	333 mA	4.0 VA	4.0 W
60NC-24D	24 VDC	140 Ω	171 mA	4.1 VA	4.1 W
60NC-48D	48 VDC	560 Ω	86 mA	4.1 VA	4.1 W
60NC-125D	125 VDC	3,400 Ω	37 mA	4.6 VA	4.6 W
100NO-24A	24 VAC	16 Ω	646 mA	15.5 VA	6.7 W
100NO-120A	120 VAC	380 Ω	137 mA	16.4 VA	7.1 W
100NO-220A	220 VAC	1,400 Ω	73 mA	16.1 VA	7.5 W
100NO-277A	277 VAC	2,400 Ω	55 mA	15.2 VA	7.3 W
100NO-480A	480 VAC	6,300 Ω	35 mA	16.8 VA	7.7 W
100NO-24D	24 VDC	65 Ω	369 mA	8.9 VA	8.9 W
100NO-48D	48 VDC	325 Ω	148 mA	7.1 VA	7.1 W
100NO-125D	125 VDC	2,400 Ω	52 mA	6.5 VA	6.5 W
100NC-24A	24 VAC	16 Ω	515 mA	12.4 VA	4.2 W
100NC-120A	120 VAC	380 Ω	110 mA	13.2 VA	4.6 W
100NC-208A	220 VAC	1,400 Ω	55 mA	11.4 VA	4.2 W
100NC-240A	240 VAC	1,685 Ω	49 mA	11.8 VA	4.0 W
100NC-480A	480 VAC	6,300 Ω	27 mA	13.0 VA	4.6 W
100NC-12D	12 VDC	28 Ω	433 mA	5.2 VA	5.2 W
100NC-24D	24 VDC	108 Ω	222 mA	5.3 VA	5.3 W
100NC-48D	48 VDC	380 Ω	126 mA	6.1 VA	6.1 W
100NC-125D	125 VDC	2,400 Ω	52 mA	6.5 VA	6.5 W

- NOTES: 1. Inrush current = 1.5 times the steady state current. (No inrush on DC coils).
2. Minimum operation voltage is 90% of nominal voltage.
3. All AC voltages are 50/60 Hz.
4. For other coils voltages contact the factory
5. Ratings shown are per pole. (Coils are in parallel).

MERCURY CONTACTORS RATINGS

MERCURY CONTACTORS RATINGS			RATINGS ARE IN AMPS UNLESS OTHERWISE SPECIFIED																							
			30 NO		35 NO		35 NO (H)		35 NC		60 NO		60 NO (H)		60 NC		100 NO		100 NO		100 NO (H)		100 NC		100 NO (H)	
A.C. RESISTIVE			240 V	30	35	35	35	60	60	60	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
			480 V	30	35	35	35	60	60	60	80	100	80	100	80	100	80	100	80	100	80	100	80	100	80	100
			600 V	30	35	-	-	48	-	-	70	80	70	80	70	80	70	80	70	80	70	80	70	80	70	80
A.C. INDUCTIVE P.F. .4 OR GREATER			120 V	-	-	25	25	-	30	30	-	-	100	100	100	100	100	100	100	100	100	100	100	100	100	
			240 V	-	-	15	15	-	20	20	-	-	100	100	100	100	100	100	100	100	100	100	100	100	100	
GENERAL PURPOSE P.F. .7 OR GREATER			240 V	-	-	35	35	-	60	60	-	-	100	100	100	100	100	100	100	100	100	100	100	100	100	
			480 V	-	-	-	-	-	60	60	-	-	100	100	100	100	100	100	100	100	100	100	100	100	100	
D.C. RESISTIVE HEATING			48 V	-	-	35	35	-	60	60	-	-	100	100	100	100	100	100	100	100	100	100	100	100	100	
			125 V	-	-	16	16	-	40	40	-	-	100	100	100	100	100	100	100	100	100	100	100	100	100	
			250 V	-	-	12	12	-	20	20	-	-	100	100	100	100	100	100	100	100	100	100	100	100	100	
TUNGSTEN LAMP			120 V	30	35	35	60	60	60	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	
MOTOR LOADS	SINGLE PHASE	120 V	-	1 H.P.	2 H.P.	-	3 H.P.	-	-	7.5 H.P.	-	-	15 H.P.	-	-	20 H.P.	-	-	25 H.P.	-	-	30 H.P.	-	-	35 H.P.	
		240 V	-	1 H.P.	3 H.P.	-	5 H.P.	-	-	10 H.P.	-	-	15 H.P.	-	-	20 H.P.	-	-	25 H.P.	-	-	30 H.P.	-	-		
	THREE PHASE	240 V	-	-	5 H.P.	-	7.5 H.P.	-	-	15 H.P.	-	-	20 H.P.	-	-	25 H.P.	-	-	30 H.P.	-	-	35 H.P.	-	-		
		480 V	-	-	7.5 H.P.	-	10 H.P.	-	-	15 H.P.	-	-	20 H.P.	-	-	25 H.P.	-	-	30 H.P.	-	-	35 H.P.	-	-		

KEY: 

SHADED AREA FOR UL LISTING AND/OR COMPONENT RECOGNITION.

- NOT RECOMMENDED FOR THIS TYPE OF LOAD.

SOLID STATE RELAY RATINGS

See Page 16 for HPR Series

See Page 15 for 3PSS60A75

		HPR48A25 HPR48D25	HPR48A50 HPR48D50	HPR48A75 HPR48D75	HPR48A100 HPR48D100	3PSS60A75
Rated operational current AC51 @ Ta=25°C AC53a @ Ta=25°C		25 AMPS rms 5 AMPS rms	50 AMPS rms 15 AMPS rms	75 AMPS rms 20 AMPS rms	100 AMPS rms 30 AMPS rms	75 AMPS rms 20 AMPS rms
Minimum operational current		150 mA rms	250 mA rms	400 mA rms	500 mA rms	400 mA rms
Rep. overload current t=1 s		< 55 A rms	< 125 A rms	< 150 A rms	< 200 A rms	< 150 A rms
I ² t (10ms)	Minimum	525 A ² s	1800 A ² s	6600 A ² s	18000 A ² s	6600 A ² s

See Page 18 for SSR Series

		SS20AE-1 SS20AU-1 SS20DE-1 SS20DU-1	SS30AE-1 SS30AU-1 SS30DE-1 SS30DU-1	SS40AE-1 SS40AU-1 SS40DE-1 SS40DU-1	SS60AE-1 SS60AU-1 SS60DE-1 SS60DU-1	SS90AE-1 SS90AU-1 SS90DE-1 SS90DU-1
Rated operational current AC51 @ Ta=25°C AC51 @ Ta=40°C AC53a @ Ta=25°C		20 AAC 20 AAC 5 AAC	30 AAC 30 AAC 8 AAC	47.4 AAC 40 AAC 13 AAC	70.4 AAC 60 AAC 14.8 AAC	85 AAC 85 AAC 18 AAC
Minimum operational current		150 mAAC	250 mAAC	400 mAAC	400 mAAC	400 mAAC
Rep. overload current		60 AAC	84 AAC	126 AAC	144 AAC	168 AAC
I ² t (10ms)	Minimum	525 A ² S	1800 A ² S	3200 A ² S	3200 A ² S	6600 A ² S

See Page 25 for 2 & 3 Pole

		2PSS60A25 2PSS60D25	2PSS60A40 2PSS60D40	2PSS60A75-24DF 2PSS60A75-120F 2PSS60D75-24DF 2PSS60D75-120F	3PSS60A20 3PSS60D20	3PSS60A25 3PSS60D25	3PSS60A30 3PSS60D30	3PSS60A40 3PSS60D40	3PSS60A65-24DF 3PSS60A65-120F 3PSS60D65-24DF 3PSS60D65-120F
Rated operational current AC51 @ Ta=25°C AC51 @ Ta=40°C AC53a @ Ta=25°C		32 AAC 27 AAC 11.5 AAC	50 AAC 40 AAC 16.5 AAC	85 AAC 75 AAC 28 AAC	25 AAC 20 AAC 10 AAC	32 AAC 28 AAC 11 AAC	37 AAC 30 AAC 14 AAC	42 AAC 42 AAC 17 AAC	71 AAC 66 AAC 25 AAC
Minimum operational current		250 mAAC	400 mAAC	500 mAAC	250 mAAC	250 mAAC	400 mAAC	400 mAAC	500 mAAC
Rep. overload current		61 AAC	107 AAC	154 AAC	61 AAC	84 AAC	107 AAC	107 AAC	154 AAC
I ² t (10ms)	Minimum	1800 A ² S	6600 A ² S	15000 A ² S	1800 A ² S	1800 A ² S	6600 A ² S	6600 A ² S	15000 A ² S

3PSS Series with Suffix S (Standard Din-rail) or R (Retro Fit)



3PSS60A75 S
3PSS60D75 S Standard Din-Rail
3PSS60A75 R
3PSS60D75 R Retro Fit

General Specifications

Operational voltage range	42-660 VAC 45 to 65 Hz
Blocking voltage	1600 V _p
Over voltage category III	Pollution degree 3
Operating temperature	-30° to 80°C (-22° to 158°F)
Storage temperature	-40° to 100°C (-40° to 212°F)
Input to output isolation voltage	≥ 4000 VAC rms
Output to case isolation voltage	≥ 4000 VAC rms
Heat Sink Fan requires	70 mA @ 24 VDC (Included) 55 mA @ 120 VAC (Optional)

Tested and Approved

3 Pole 50 AMPS @ 480 VAC @ -30°C to 50°C 3-Phase
 2 Pole 75 AMPS @ 480 VAC @ -30°C to 50°C 3-Phase *
 51°C to 80°C derates @ 10 AMPS per decade

*For 2 Pole usage, use L1 & L3

- 3-phase Solid State Relay
- Zero switching
- Rated operational current: 3 x 75 AMPS
- Rated operational voltage: 600 VAC
- Control voltage 3PSS60A75 24-50 VDC/24-275 VAC
3PSS60D75 4-32 VDC
- Line & Load accepts: **8-18 AWG**
- Integral snubber network
- Built-in varistor
- IP10 back-of-hand protection
- LED indication of control input
- Heat Sink and 24 VDC Fan Included
120 VAC Fan Optional

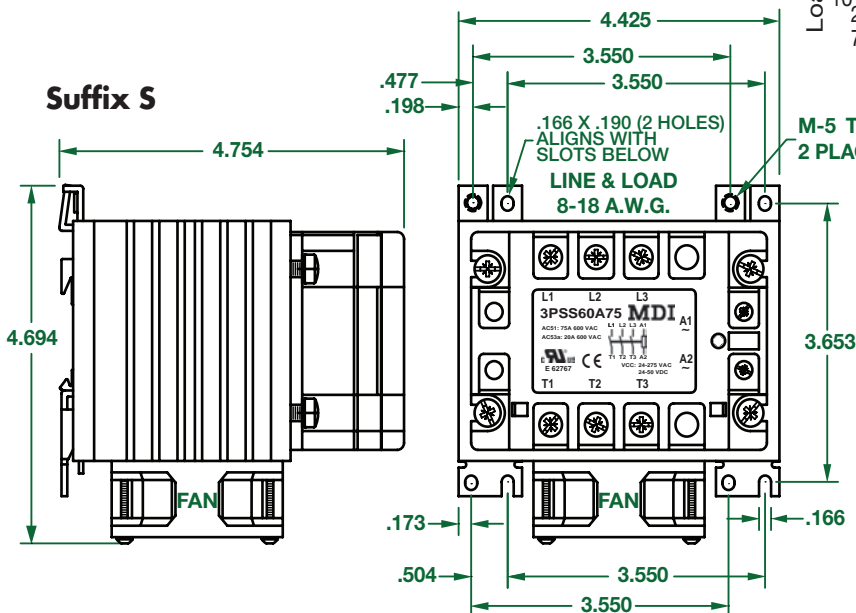
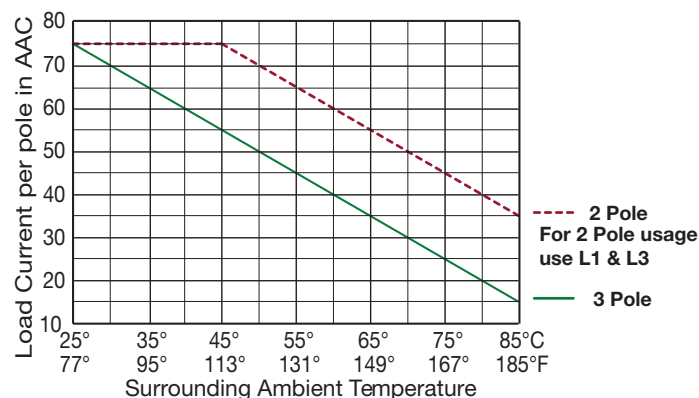


Product Description

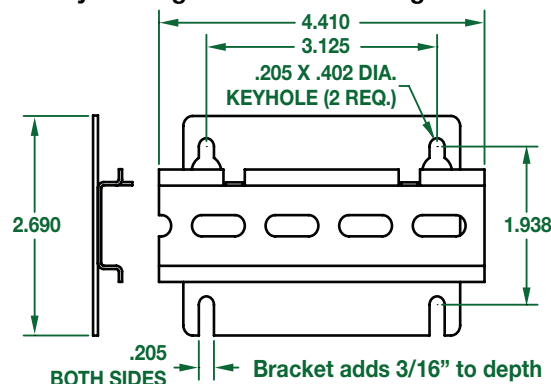
A Solid State Relay family designed to switch various loads such as heating elements, motors and transformers. The relay is capable of switching voltages up to 600 VAC rms. The built-in varistor is for heavy industrial applications. For higher reliability and load cycle capability three semiconductor power units are bonded directly to the substrate.

Input Specifications

All data specified at Ta=25°C	3PSS60A75	3PSS60D75
Control voltage range	24-275 VAC/24-50 VDC	4-32 VDC
Pick-up voltage	18 VAC/20 VDC	3.8 VDC
Drop-out voltage	9 VAC/DC	1.2 VDC
Input current	≤ 15 mA	≤ 23 mA
Response time pick-up (Power output = 50 Hz)	20 ms	10 ms
Response time drop-out (Power output = 50 Hz) e	30 ms	10 ms



Suffix R
 Includes Retro Fit Back Plate For direct replacement with standard 2 & 3 pole Mercury Relays. Using the same mounting holes.



HPR Series (Hockey Puck Relay)



- Zero switching
- Direct copper bonding (DCB) technology
- LED indication
- Built-in varistor 480 V
- Clip-on IP20 protection cover
- Self-lifting terminals
- Housing free of moulding mass
- Opto-isolation: > 4000 VAC rms
- Blocking voltage: 1200Vp
- Control Voltage: 4-32 VDC or 20-280 VAC/22-48 VDC
- Line & Load accepts: 8-18 AWG
- Operational ratings: Up to 75 AMPS rms
- Rated voltage: 480 VAC rms



Product Description

The industrial, 1-phase relay with anti parallel thyristor output is the most widely used industrial SSR due to its multiple application possibilities. The relay can be used for resistive, inductive and capacitive loads. The zero switching relay switches ON when the sinusoidal curve crosses zero and switches OFF when the current crosses zero.

The instant-on relay with DC control input can be used for phase control. The built in varistor secures transient protection for the heavy industrial applications, and the LED indicates the status of the control input. The clip on cover is securing touch protection to IP20. Protected output terminals can handle cables up to 16mm² (6 AWG).

General Specifications

Operational voltage range	42 to 530 VAC rms
Blocking voltage	≥ 1200 V _p
Zero voltage turn-on	≤ 10V
Operational frequency range	45 to 65Hz
Power factor	> 0.5 @ 480 VAC rms
Markings	cULus CE

Fusing

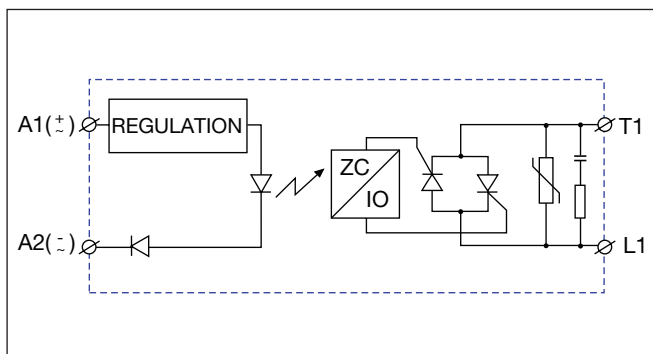
See Web: <https://www.mdious.com/solid-state/hpr/>

Call: (269) 663-8574 or (800) 634-4077

Thermal Specifications

	HPR...25	HPR...50	HPR...75	HPR...100
Operating temperature range		-20° to 70°C (36° to 126°F)		
Storage temperature range		-40° to 100°C (72° to 180°F)		
Junction temperature		≤ 125°C (225°F)		
R _{th} junction to case	≤ 0.80K/W	≤ 0.50K/W	≤ 0.35K/W	≤ 0.30K/W
R _{th} junction to ambient			≤ 20.0K/W	

Functional Diagram



Ordering Key

Solid State Relay	HPR48	A	25
Control voltage			
Rated operational current			

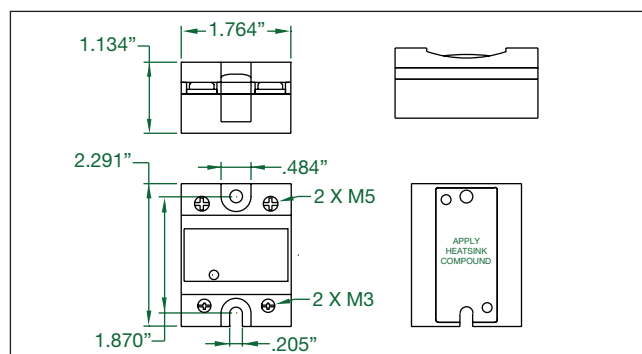
Type Selection

Control voltage	Rated operation current
A: 20-280 VAC/22-48 VDC	25: 25 AACrms
D: 4-32VDC	50: 50 AACrms
	75: 75 AACrms
	100: 100 AACrms

Input Specifications

	HPR..D..	HPR..A..
Control voltage range	4 - 32 VDC	20 - 280 VAC
Pick-up voltage @ Ta = 25°C	3.5 VDC	18 VAC/DC
Reverse voltage	32 VDC	-
Drop out voltage	1.2 VDC	6 VAC/DC
Input current @ max voltage	≤ 12 mA	≤ 20 mA
Response time pick-up	≤ 1/2 cycle	≤ 12 ms
Response time drop-out	≤ 1/2 cycle	≤ 40 ms

Dimensions



Heatsink Data

(load current versus ambient temperature)

HPR...25	Load current [A]		Thermal resistance [K/W]				Power dissipation [W]	
	25.0	2.70	2.34	1.98	1.61	1.25	0.89	28
	22.5	3.10	2.69	2.28	1.86	1.45	1.04	24
	20.0	3.61	3.13	2.65	2.18	1.70	1.23	21
	17.5	4.26	3.70	3.14	2.59	2.03	1.47	18
	15.0	5.14	4.47	3.80	3.14	2.47	1.80	15
	12.5	6.38	5.56	4.73	3.91	3.09	2.27	12
	10.0	8.25	7.19	6.14	5.08	4.02	2.97	9
	7.5	11.4	9.94	8.49	7.04	5.59	4.14	7
	5.0	17.7	15.4	13.2	11.0	8.74	6.51	4
	2.5	-	-	-	-	18.2	13.6	2
	20	30	40	50	60	70°C		
	68	86	104	122	140	158°F	T _A	Ambient temp.

HPR...50	Load current [A]		Thermal resistance [K/W]				Power dissipation [W]	
	50.0	1.03	0.86	0.70	0.53	0.37	0.20	61
	45.0	1.27	1.09	0.90	0.71	0.52	0.33	53
	40.0	1.54	1.32	1.10	0.89	0.67	0.45	46
	35.0	1.85	1.59	1.34	1.08	0.82	0.57	39
	30.0	2.26	1.95	1.65	1.34	1.03	0.72	33
	25.0	2.85	2.47	2.08	1.70	1.32	0.94	26
	20.0	3.73	3.24	2.75	2.26	1.77	1.27	20
	15.0	5.22	4.54	3.86	3.19	2.51	1.83	15
	10.0	8.21	7.16	6.11	5.05	4.00	2.95	10
	5.0	17.2	15.0	12.9	10.7	8.51	6.33	5
	20	30	40	50	60	70°C		
	68	86	104	122	140	158°F	T _A	Ambient temp.

HPR...75	Load current [A]		Thermal resistance [K/W]				Power dissipation [W]	
	75.0	0.91	0.78	0.65	0.52	0.39	0.26	77
	67.5	1.10	0.96	0.81	0.66	0.51	0.36	68
	60.0	1.34	1.17	1.00	0.83	0.66	0.49	59
	52.5	1.60	1.40	1.20	1.00	0.80	0.60	50
	45.0	1.93	1.68	1.44	1.20	0.96	0.72	42
	37.5	2.38	2.08	1.78	1.49	1.19	0.89	34
	30.0	3.06	2.68	2.30	1.91	1.53	1.15	26
	22.5	4.21	3.68	3.16	2.63	2.10	1.58	19
	15.0	6.51	5.70	4.88	4.07	3.26	2.44	12
	7.5	13.5	11.77	10.09	8.41	6.73	5.04	6
	20	30	40	50	60	70°C		
	68	86	104	122	140	158°F	T _A	Ambient temp.

HPR...100	Load current [A]		Thermal resistance [K/W]				Power dissipation [W]	
	100.0	0.54	0.45	0.36	0.27	0.18	0.09	111
	90.0	0.68	0.58	0.47	0.37	0.27	0.17	97
	80.0	0.86	0.74	0.62	0.50	0.38	0.26	84
	70.0	1.08	0.94	0.80	0.66	0.52	0.38	71
	60.0	1.37	1.20	1.03	0.85	0.68	0.51	59
	50.0	1.70	1.49	1.28	1.06	0.85	0.64	47
	40.0	2.21	1.93	1.66	1.38	1.10	0.83	36
	30.0	3.06	2.68	2.30	1.91	1.53	1.15	26
	20.0	4.78	4.18	3.59	2.99	2.39	1.79	17
	10.0	9.98	8.73	7.49	6.24	4.99	3.74	8
	20	30	40	50	60	70°C		
	68	86	104	122	140	158°F	T _A	Ambient temp.

Junction to ambient thermal resistance, R _{th j-a}	< 20.0	K/W
Junction to case thermal resistance, R _{th j-c}	< 0.35	K/W
Case to heatsink thermal resistance, R _{th c-s}	< 0.10	K/W
Maximum allowable case temperature	100 (212)	C (F)
Maximum allowable junction temperature	125 (257)	C (F)

Isolation

Rated isolation voltage	
Input to output	≥ 4000 VAC rms
Rated isolation voltage	
Output to case	≥ 4000 VAC rms

Heatsink Selection

Heatsink	Thermal Resistance	Power Dissipation
HS 45CD	2.70K/W	> 60W
HS 45BD	2.00K/W	> 60W
Consult MDI	>0.25K/W	N/A

SSR-1 Series



Product Description

This new range of solid state contactors presents an unique opportunity to maximize efficiency in panel space and is an evolution of solid state switches. The nominal current ratings are at 40°C. The smallest width is 17.5mm and is rated at 20 AAC. Power and control terminals allow for safe looping of cables. Voltage transient protection is standard across the output with a varistor.

Ordering Key

Rated operational current **SS 40 D U - 1**
 Control voltage _____
 Connection Configuration _____
 Current Version _____

Output Specifications

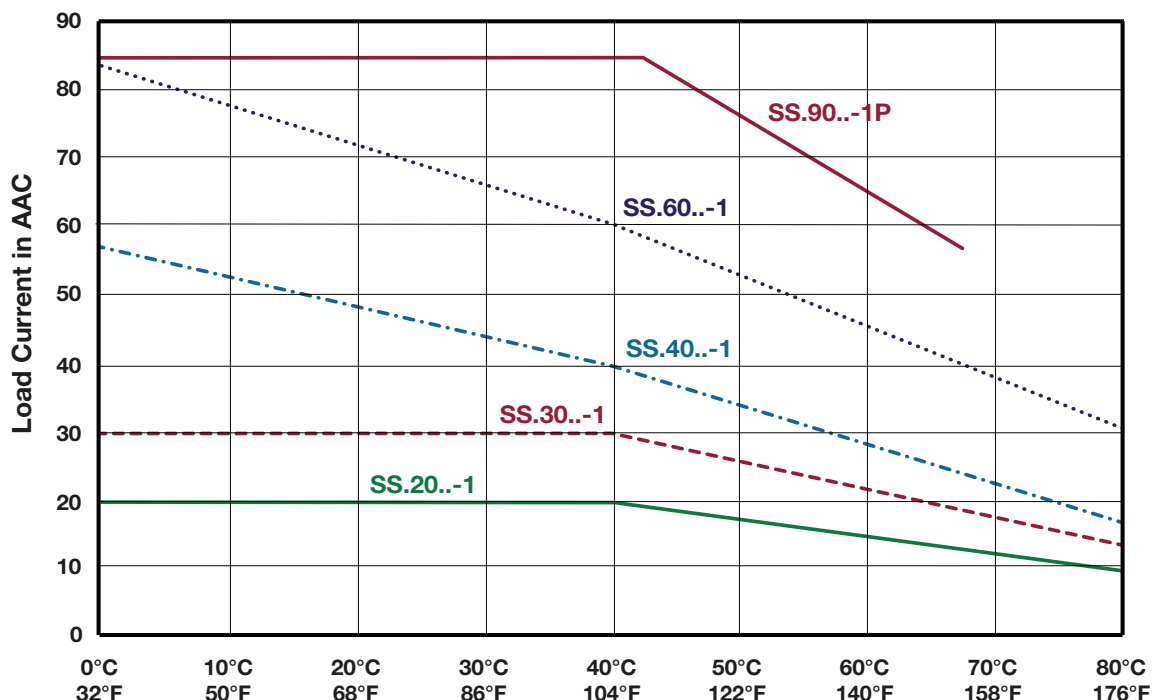
See Page 14

Output Specifications

See Web: <https://www.mdious.com/solid-state/ssr-series/>

E-mail: rbrewers@mdious.com or Call: (269) 663-8574 or (800) 634-4077

Current Derating (UL508)



SS.....-1P models max. operating temperature is + 70°C (158°F)

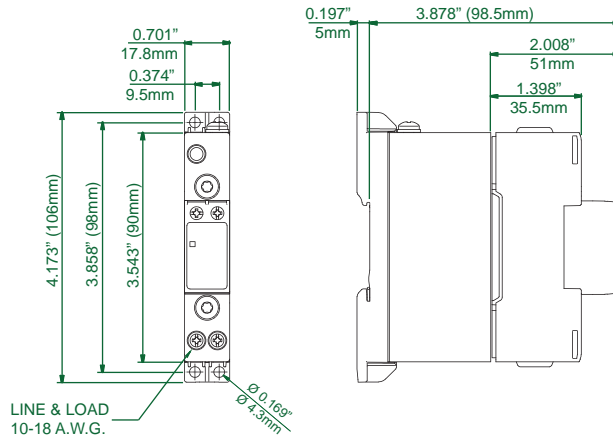
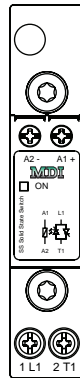
20, 30, 40, 60 & 85 AMP RELAYS WITH INTEGRATED HEATSINKS

- Product Width ranging from 17.5mm up to 70mm
 - Rated Operational voltage: 42 - 600 VAC
 - Rated Operational current: Up to 85AAC @ 40°C
 - Up to 6600A²s for I²t
 - Control voltages: 4-32 VDC (5-32 VDC on SS90D.-1)
20-275 VAC (24-190 VDC)
 - **Line & Load accepts:** 10-18 AWG (SS20 & SS30 units)
3-10 AWG (SS40, SS60, & SS90 units)
 - Short circuit current rating: 100kA
 - Latching Voltage ≤20V
 - Operational Frequency range 45-65 Hz
 - Power Factor > 0.5 @ Vrated
 - Blocking Voltage 1200Vp
 - Internal Varistor 625V
 - UL508 & cUL Listed (E 354129)
 - IP20 protection
 - Design according to EN/IE60947-4-2, EN/IEC60947-4-3,
EN/IEC62314, UL508, CSA 22-2 No. 14-10
 - Integrated voltage transient protection with varistor
 - Continuously ON Green LED when control input is applied
 - RoHS compliant
 - VDE approval
 - **U:** SSR Style
 - **E:** Contactor
 - Germanischer Lloyd approval¹
1. Germanischer Lloyd approval applicable only to models SS20A.-1, SS20D.-1, SS30A.-1 and SS30D.-1.

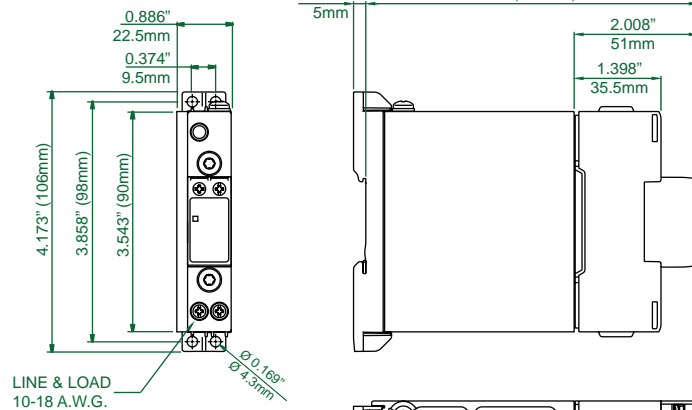
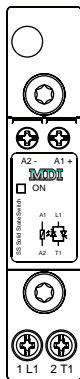


Terminal Layout and Dimensions "U" Connection

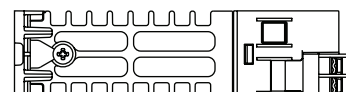
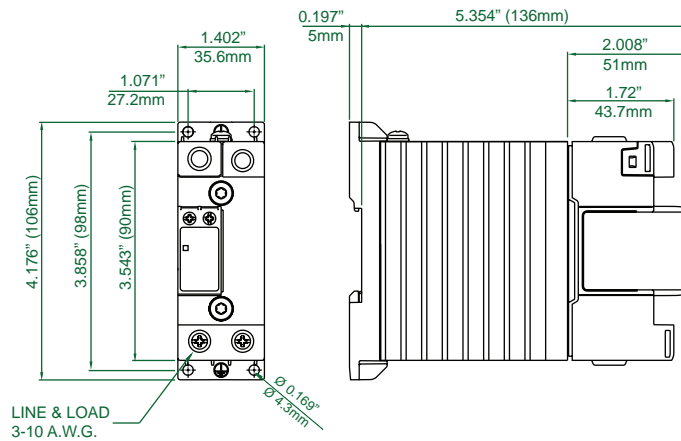
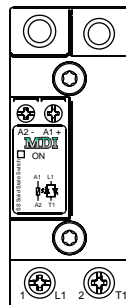
SS.20.U-1



SS.30.U-1



SS.40.U-1



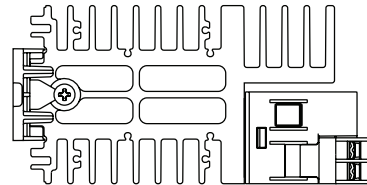
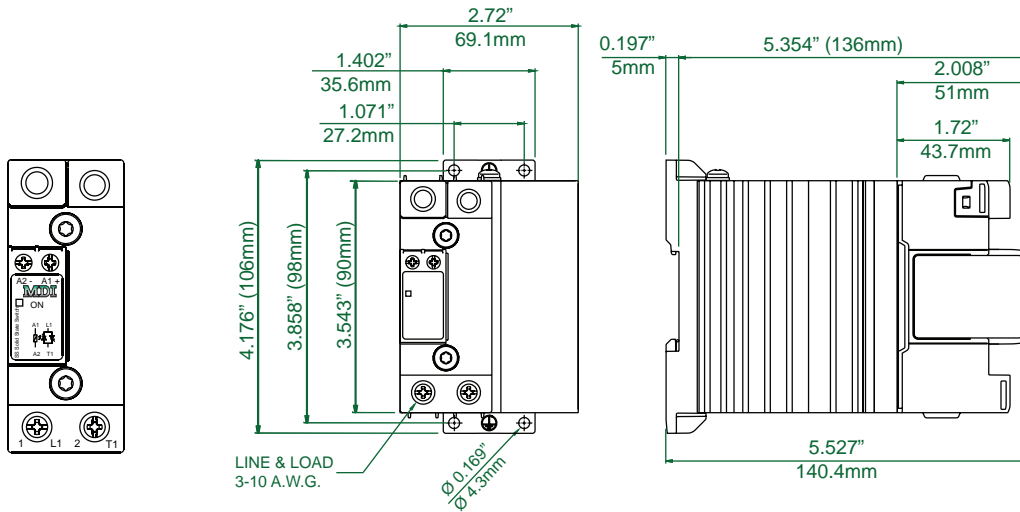
1/L1: Supply connection
2/T1: Load connection
A1 (+): Positive control signal
A2 (-): Control ground

* Housing width tolerance +0.02" (0.5 mm), -0 as per DIN43880

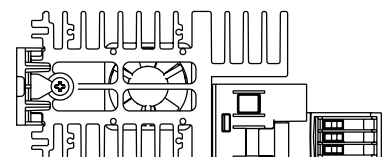
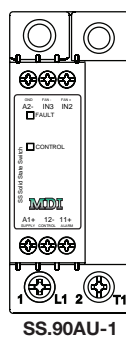
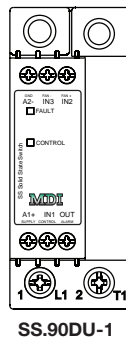
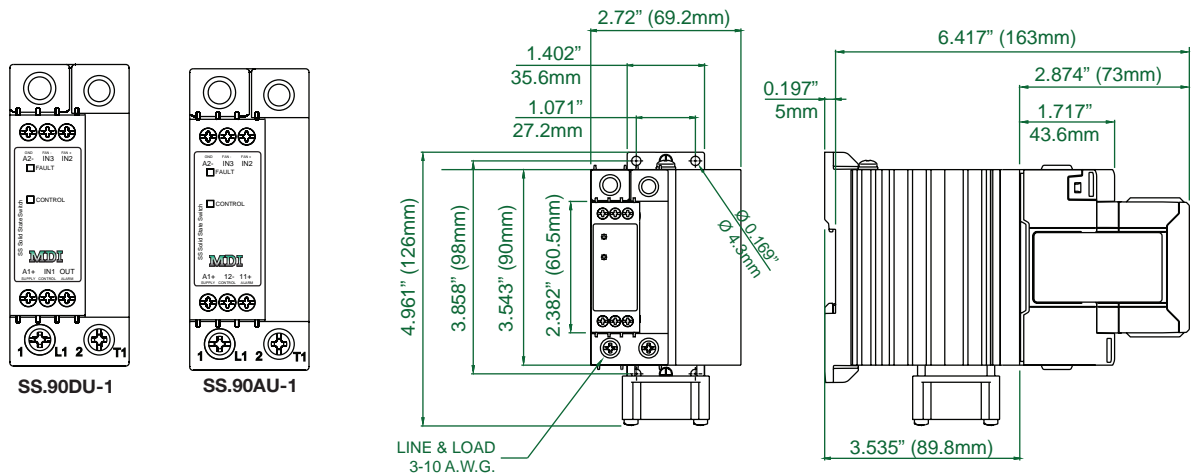
SSR-1 Series (Continued)

Terminal Layout and Dimensions "U" Connection

SS.60.U-1



SS.90.U-1P

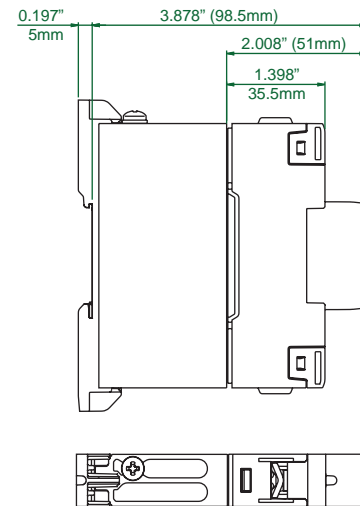
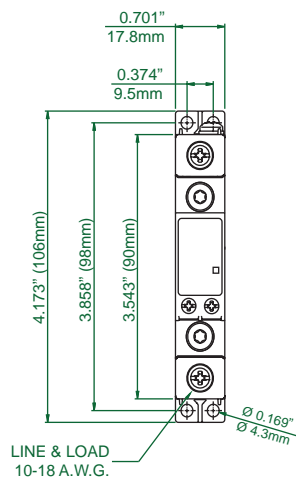
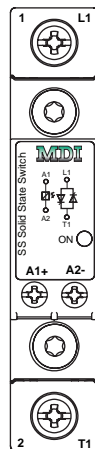


- 1/L1: Supply connection
- 2/T1: Load connection
- A1 (+): Positive control signal
(Positive supply in case of SS.90DU-1P)
- A2 (-): Control ground
- IN1: Control signal (only for SS.90DU-1P)
- IN2: Fan + supply (only for SS.90AU-1P)
- IN3: Fan - supply (only for SS.90AU-1P)
- 11 + : Alarm output (+)
- OUT, 12 - : Alarm output (-)

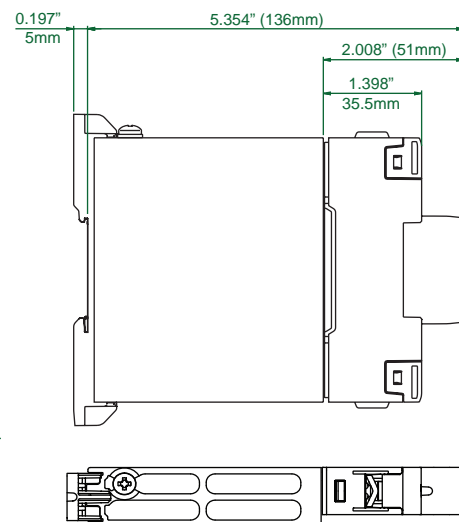
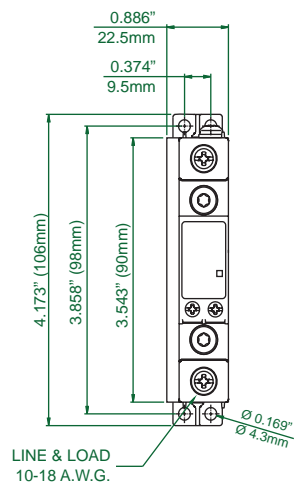
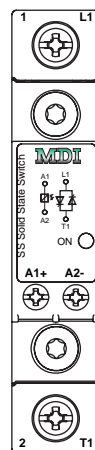
* Housing width tolerance +0.02" (0.5 mm), -0 as per DIN43880

Terminal Layout and Dimensions "E" Connection

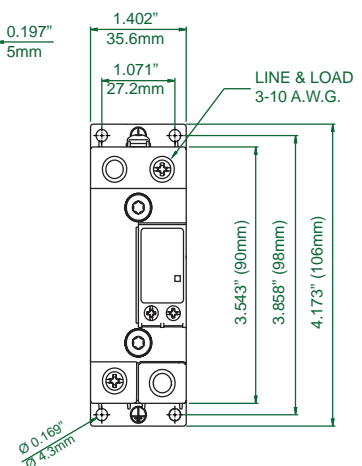
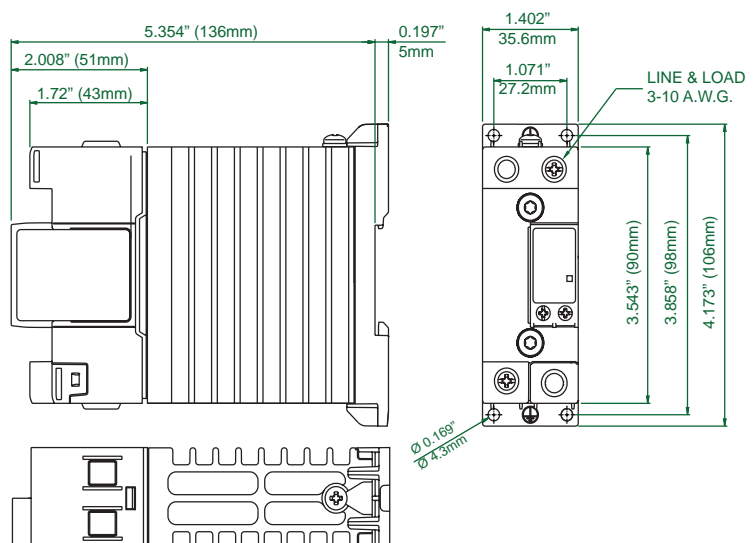
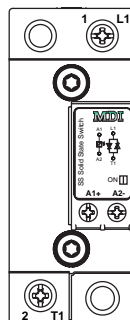
SS.20.E-1



SS.30.E-1



SS.40.E-1



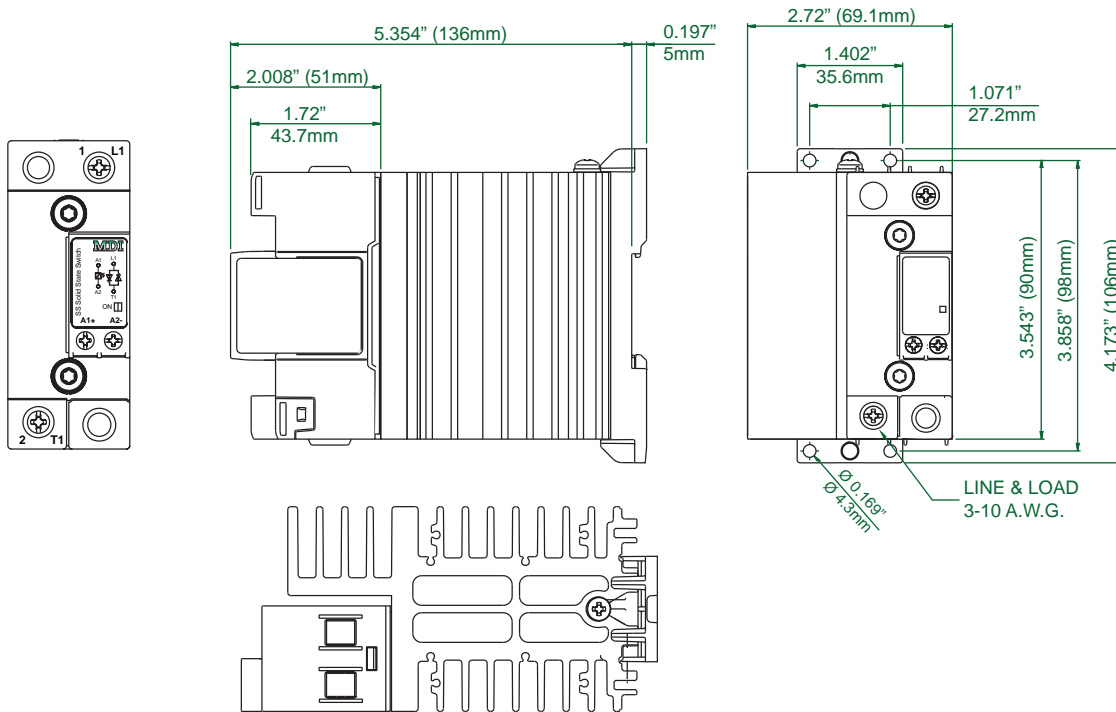
1/L1: Supply connection
 2/T1: Load connection
 A1 (+): Positive control signal
 A2 (-): Control ground

* Housing width tolerance +0.02" (0.5 mm), -0 as per DIN43880

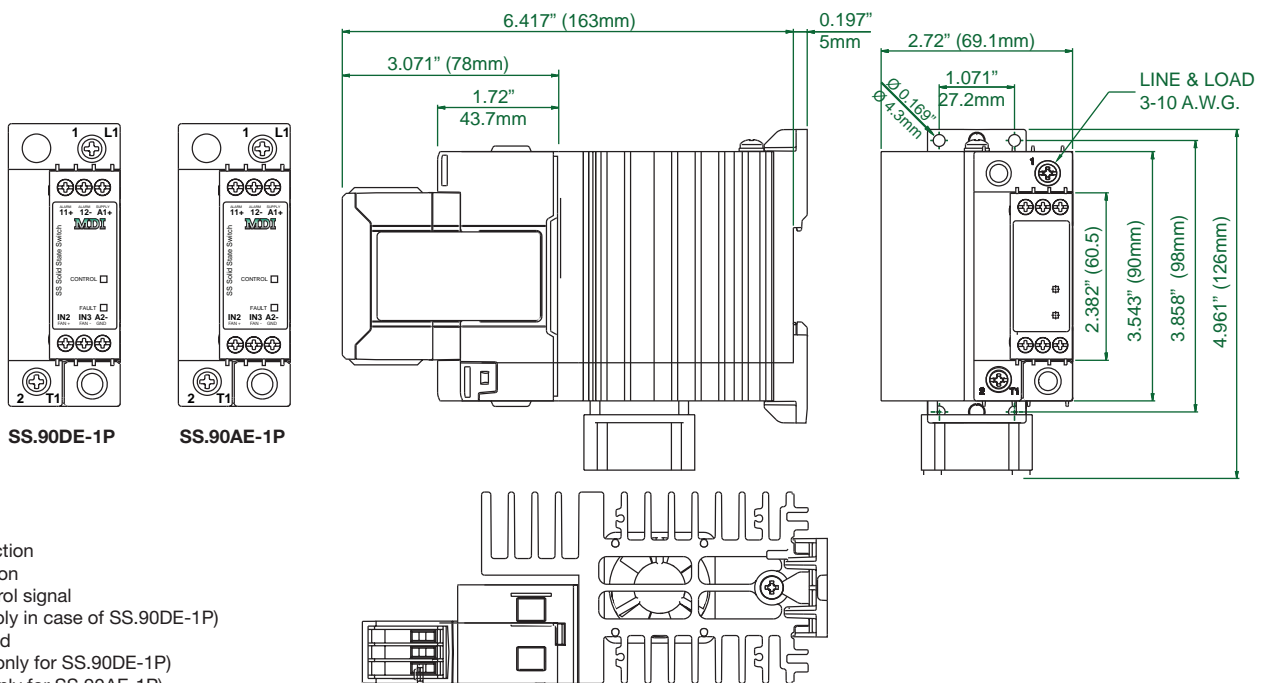
SSR-1 Series (Continued)

Terminal Layout and Dimensions "E" Connection

SS.60.E-1



SS.90.E-1P

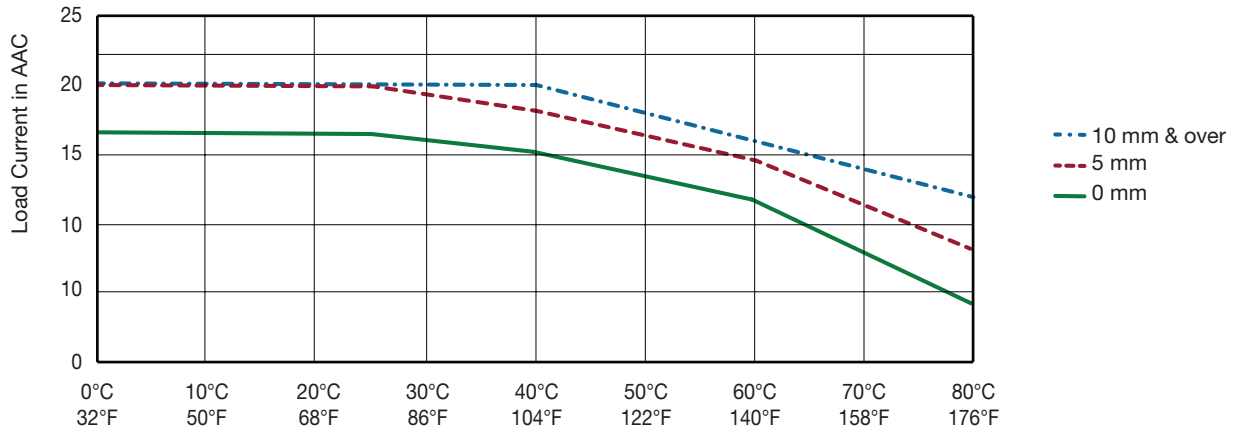


- 1/L1: Supply connection
 2/T1: Load connection
 A1 (+): Positive control signal
 (Positive supply in case of SS.90DE-1P)
 A2 (-): Control ground
 IN1: Control signal (only for SS.90DE-1P)
 IN2: Fan + supply (only for SS.90AE-1P)
 IN3: Fan - supply (only for SS.90AE-1P)
 11 + : Alarm output (+)
 OUT, 12 - : Alarm output (-)

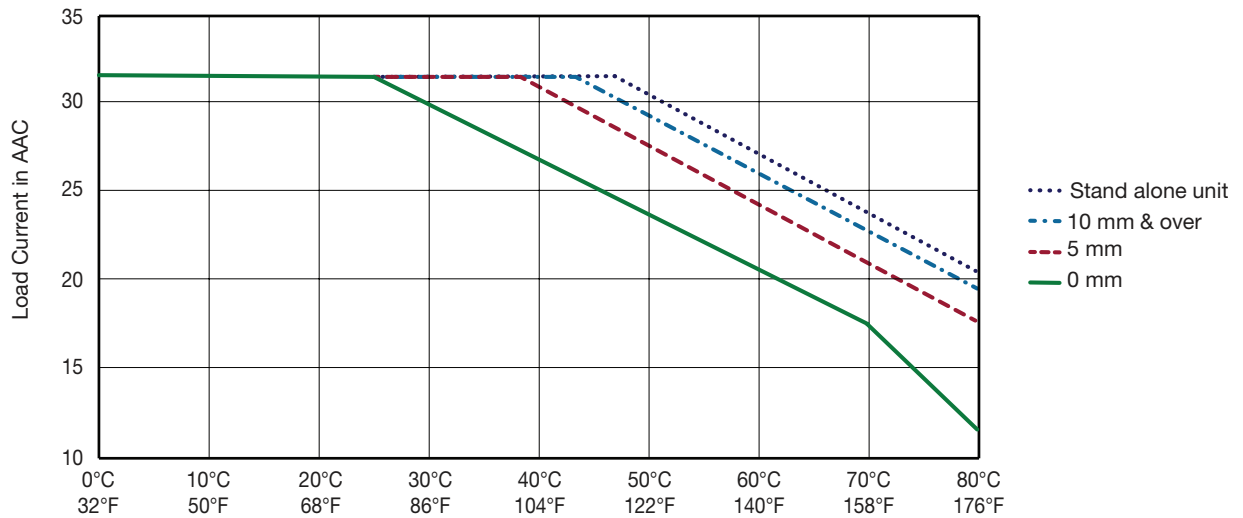
* Housing width tolerance +0.02" (0.5 mm), -0 as per DIN43880

Derating vs. Spacing Curves

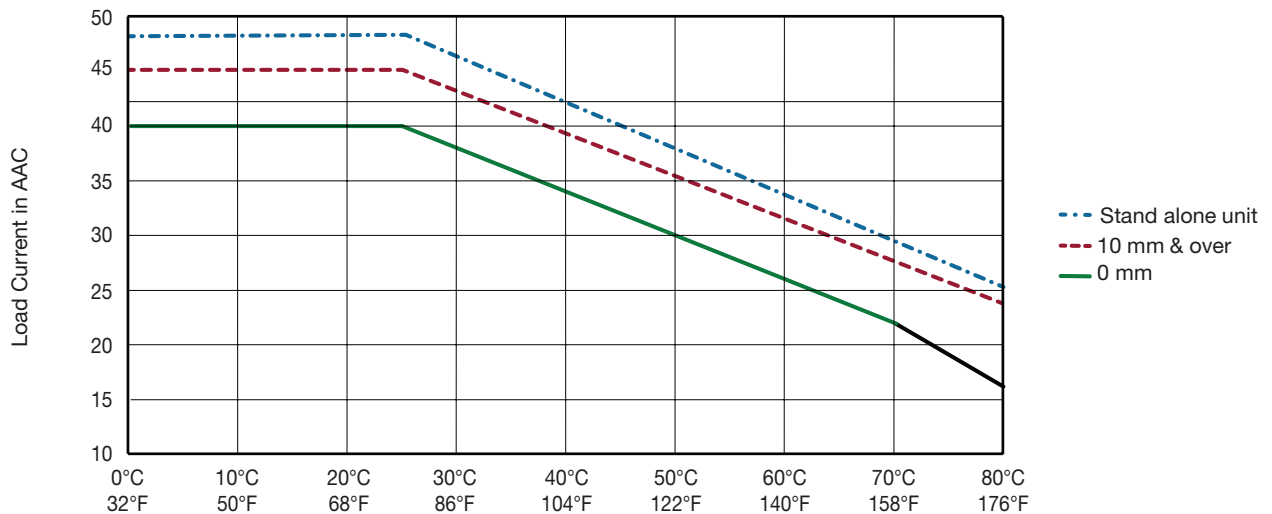
SS.20..1



SS.30...-1



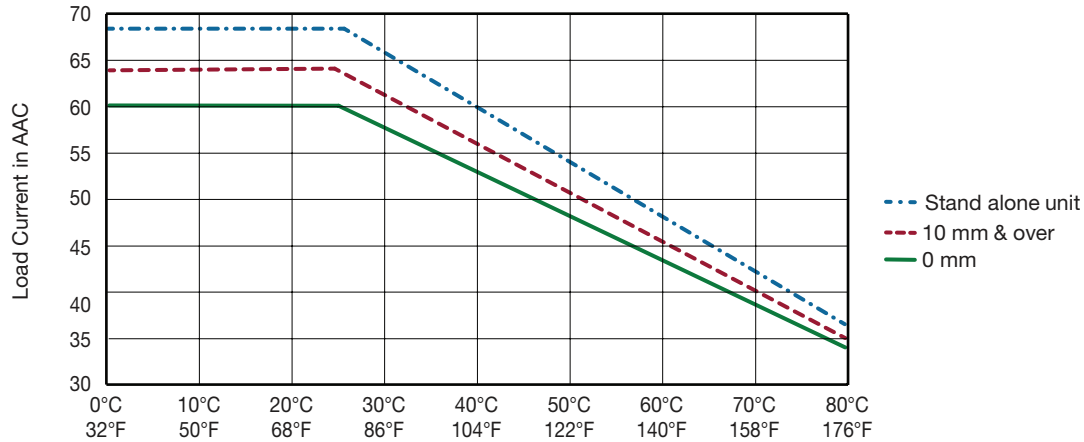
SS.40...-1



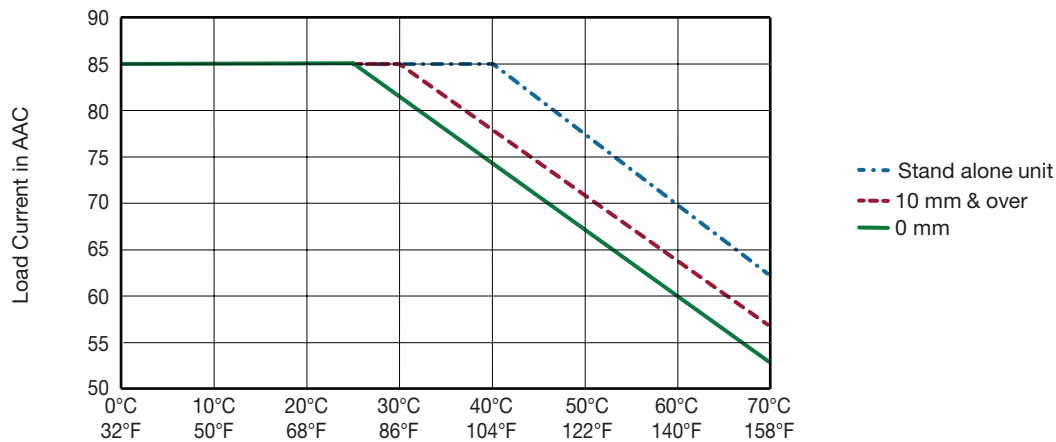
SSR-1 Series (Continued)

Derating vs. Spacing Curves (cont.)

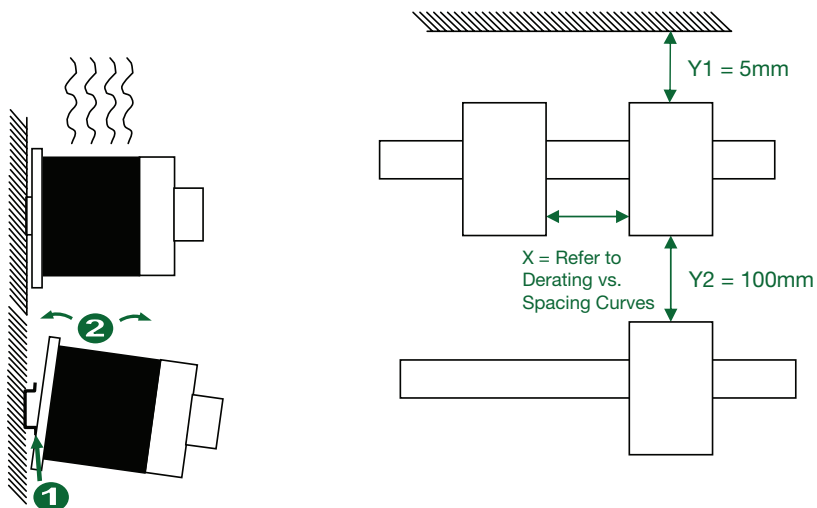
SS.60..1



SS.90..-1P



Installation Instructions



SSR with Integrated Heatsink



- 2-Pole & 3-Pole AC switching solid state contactors
- Product width from 2.13" (54 mm) to 2.84" (72 mm)
- Rated operational voltage: 42 to 600 VAC
- Rated operational current: up to 75 AAC
- Control voltages: 5-32 VDC or 20-275 VAC (24-190 VDC)
- **Line & Load accepts:** 10-14 AWG (20 & 25 units)
3-14 AWG (30, 40, 65 & 75 units)
- Up to 15,000 A's for I²t
- Latching Voltage ≤20 V
- Operational Frequency range 45-65 Hz
- Power Factor >0.5 @ rated voltage
- Blocking Voltage 1200 Vp
- Internal Varistor 625 V
- UL Listed, UL508, & cUL Listed (E 354129)
- Motor ratings up to 11 kW @ 400 VAC, 25 HP @ 600 VAC
- Controlled fan operation for versions with integrated fan
- 100 kA Short Circuit Current Rating according to UL 508
- DIN or panel mount
- RoHS compliant



Ordering Key 2P SS 60 A 65 - 24D F

Number of poles	2P
Solid state relay	SS
Rated operational voltage	60
Control voltage	A
Rated operational current	65
Fan voltage (24D or 120A)	24D
Integrated fan	F

Product Description

This product is intended to replace mechanical contactors especially when switching is frequent. The smallest product width in the 2 & 3 Pole range is 2.13" (54 mm) (3xDIN) and goes up to 2.84" (72 mm).

Switch ON occurs at the voltage zero cross and switch OFF occurs at the current zero cross. Apart from resistive and slightly inductive loads, the relays are certified for motor switching with associated motor ratings. Varistors are integrated for output overvoltage protection. A green LED gives indication of control voltage presence. Fan operation is controlled for the versions which have an integrated fan.

SSR with heatsink	Rated voltage (Ue) ⁴ , Blocking voltage	Control voltage ⁵ (Uc)	Rated current / pole @ 40°C ²	Fan Voltage	External supply (Us)	Features
2PSS: 2-Pole switching + 1-Pole direct, ZC ³	22: 42-242 VAC, 800 Vp	D: 5-32 VDC	2PSS 25: 25 AAC 40: 40 AAC 75: 75 AAC	24: 24 VDC	D: 24 VDC	F: Integrated fan with over temperature protection (OTP) & EMR alarm output
3PSS: 3-Pole switching, ZC	60: 42-660 VAC, 1200 Vp	A: 20-275 VAC, 24-190 VDC	3PSS 20: 20 AAC 25: 25 AAC 30: 30 AAC 40: 40 AAC 65: 65 AAC	120: 120 VAC	(blank): 90-250 VAC	M: Monitoring for Mains loss, Load loss, SSR short circuit, open circuit and over temperature with EMR alarm output and auxiliary output ¹ (suitable only for resistive loads)

2. Refer to Current Derating curves
3. ZC= Zero Cross Switching
4. Operating voltage for .PSS...-M starts from 90 VAC
5. AC control range for .PSS..A...-120. is limited to 20-275 VAC only

Output Specifications

Motor Ratings: HP (UL508)

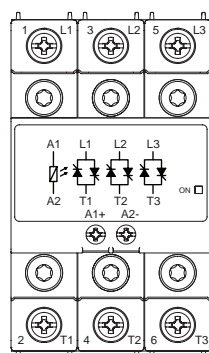
Filtering & Fusing

See page 14

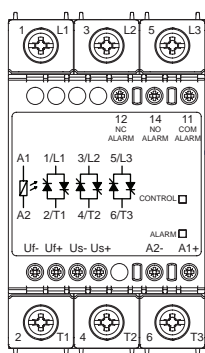
See Web: <https://www.mdious.com/solid-state/2-3-pole/>

E-mail: rbrewers@mdious.com or Call: (269) 663-8574 or (800) 634-4077

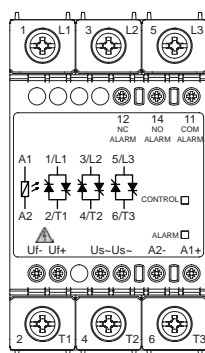
Terminal Layout



2PSS..25, 2PSS..40
3PSS..20-..., 3PSS..40, 3PSS..30



2PSS..75-24DF
3PSS..40-24DF, 3PSS..65-24DF



2PSS..75-120F
3PSS..40-120F, 3PSS..65-120F

Terminals labelling:

1/L1, 2/L2, 3/L3: Line connections

2/T1, 4/T2, 6/T3: Load connections

A1(+): Positive control

A2(-): Control ground

Us(+): External supply positive

Us(-): External supply ground

Us(~): AC external supply

Uf(+): Fan supply positive

(Pre-Connected)

Uf(-): Fan supply ground

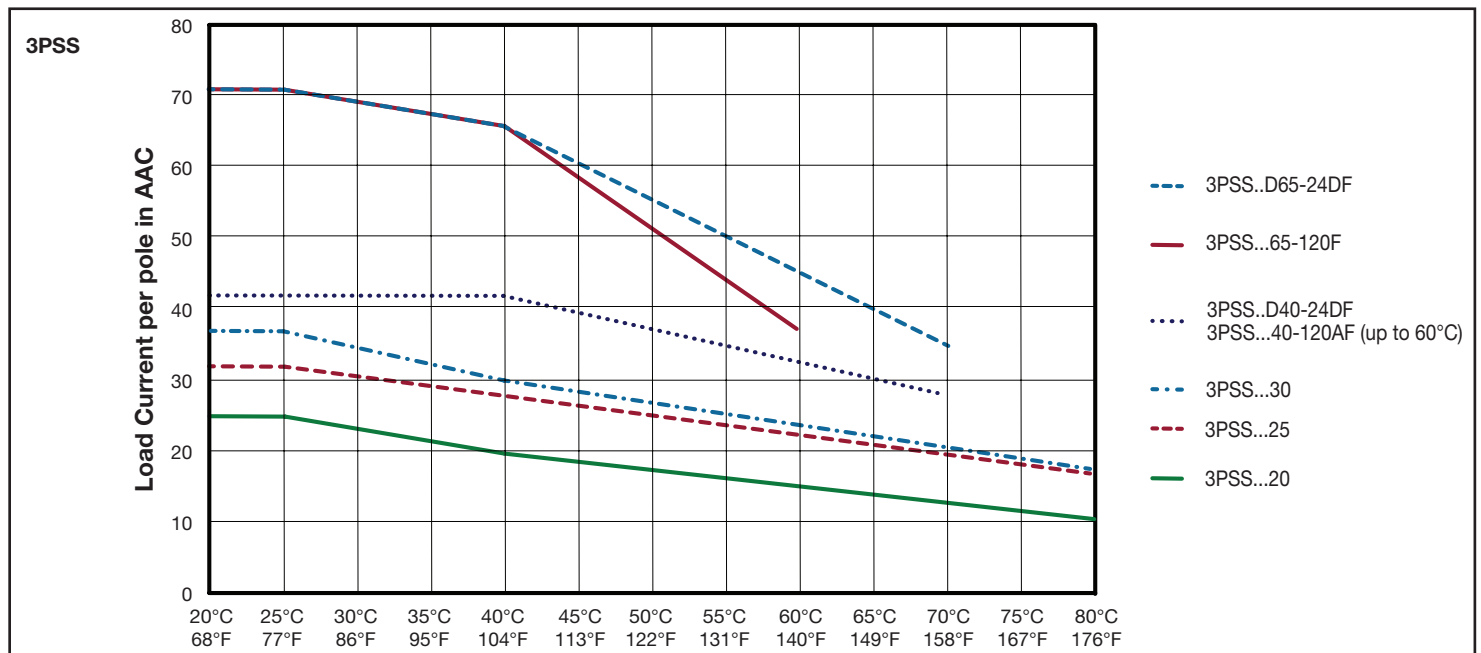
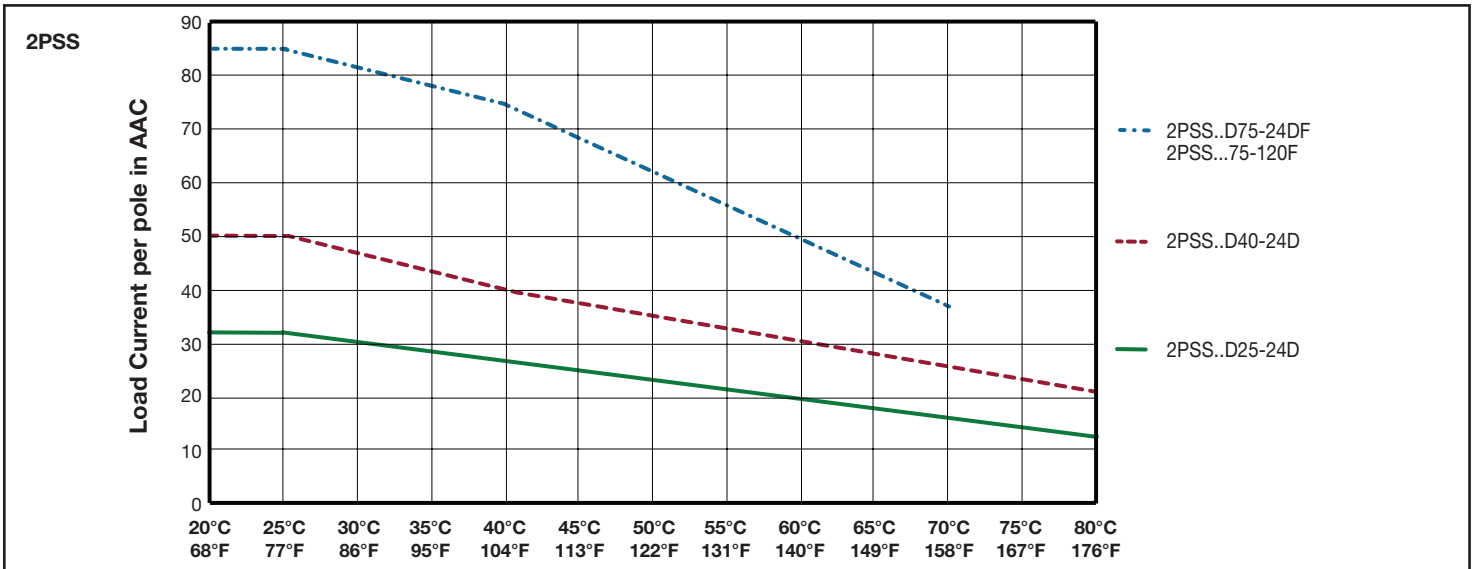
(Pre-Connected)



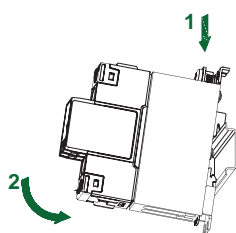
Connections to Uf+, Uf- are provided readily terminated by manufacturer. However, in case of needed user intervention on terminals Uf+, Uf- for the .PSS..A...-120AF models, the mains supply has to be turned off first to avoid risk of electrical shock.

2 & 3 Pole 3-Phase (Continued)

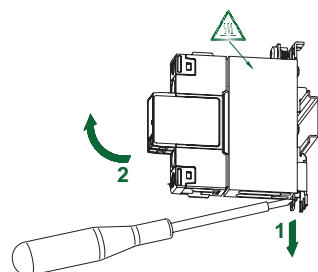
Derating vs. Spacing Curves



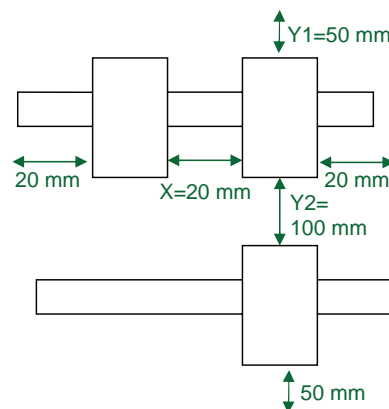
Installation Instructions



Mounting on DIN rail



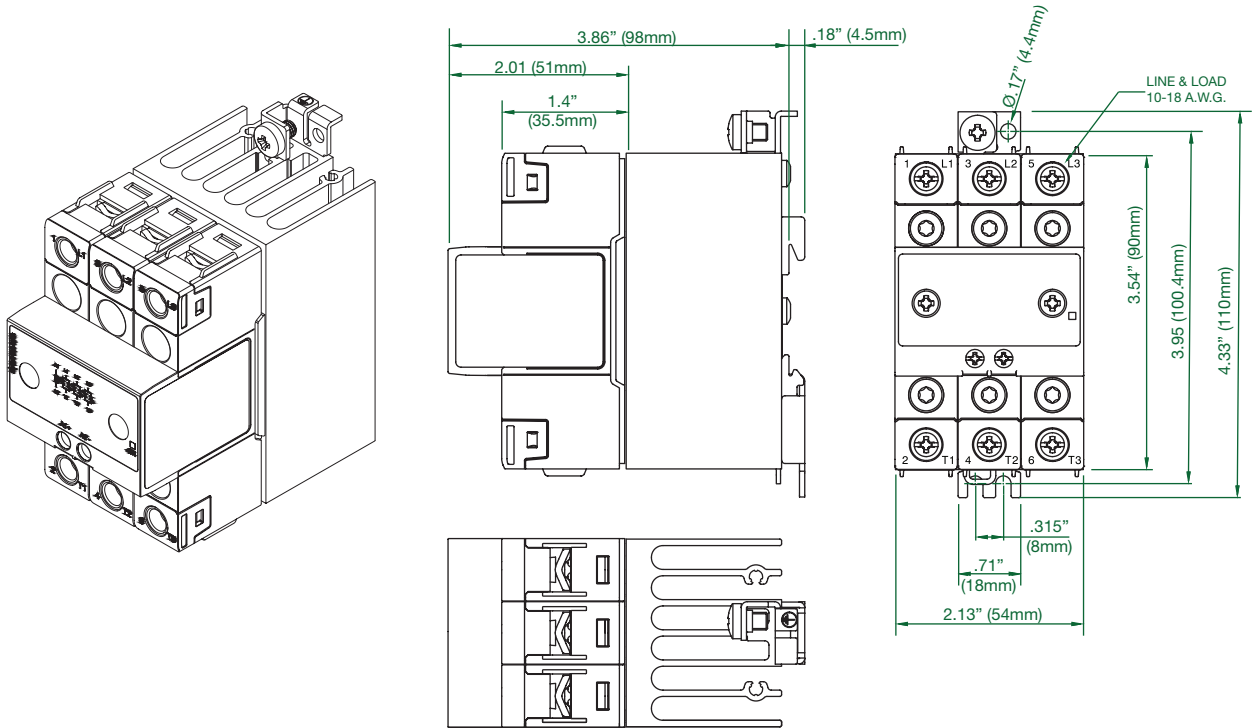
Dismounting from DIN rail



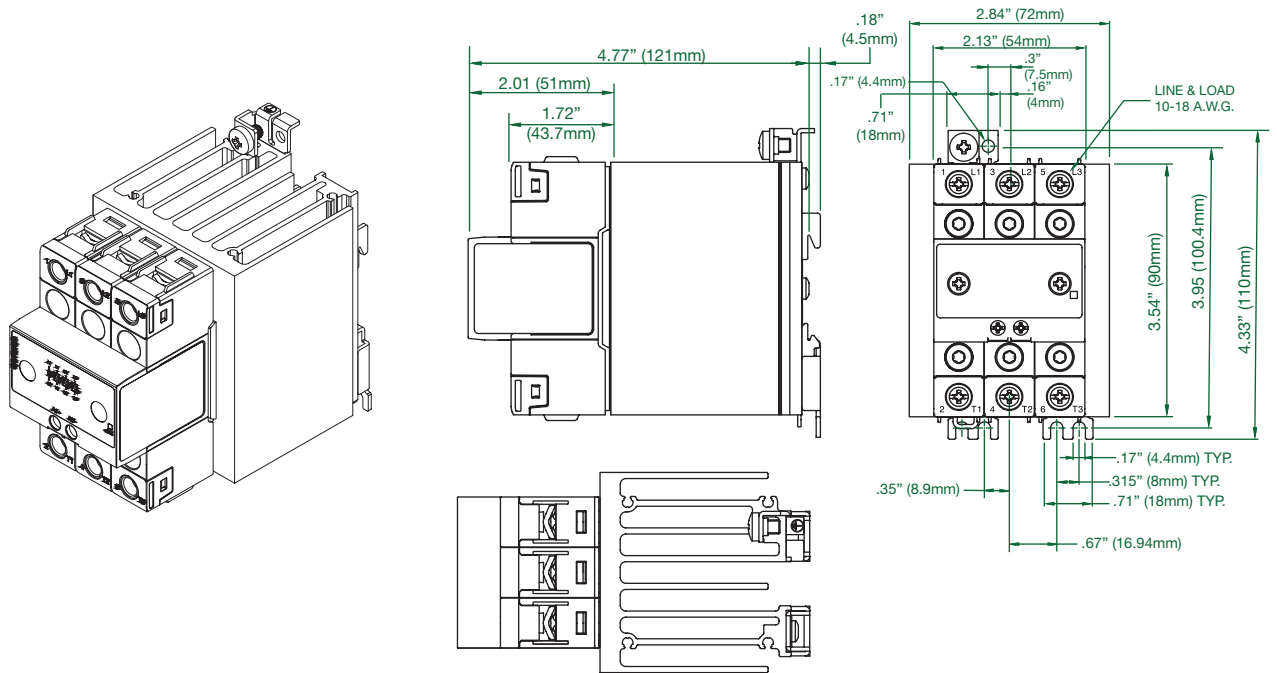
2 & 3 Pole 3-Phase (Continued)

Dimensions

2PSS...25
3PSS...20



3PSS...25

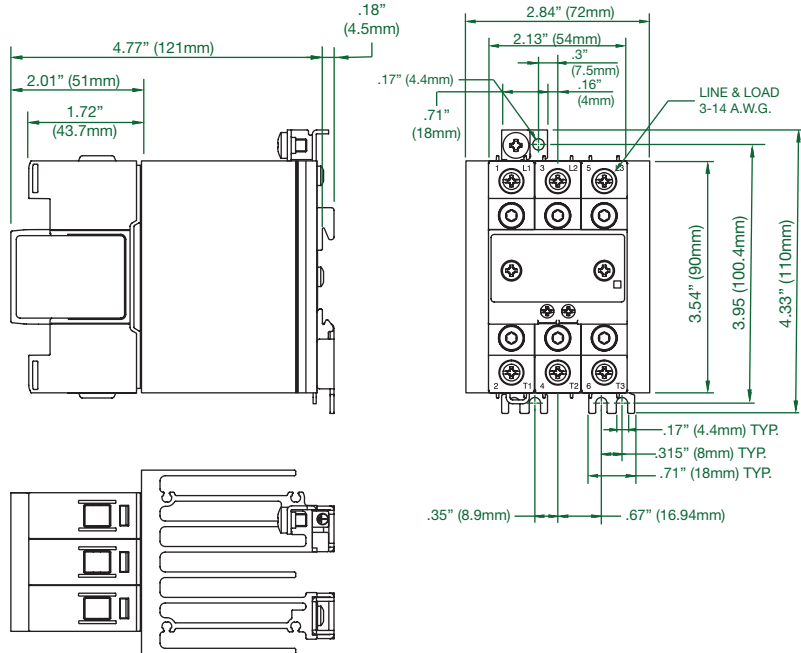
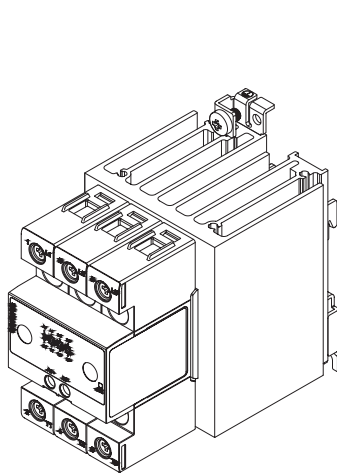


Dimensions in mm. Housing width tolerance +.02" (0.5 mm), -0 as per DIN43880.
All other tolerances ±.02" (0.5 mm)

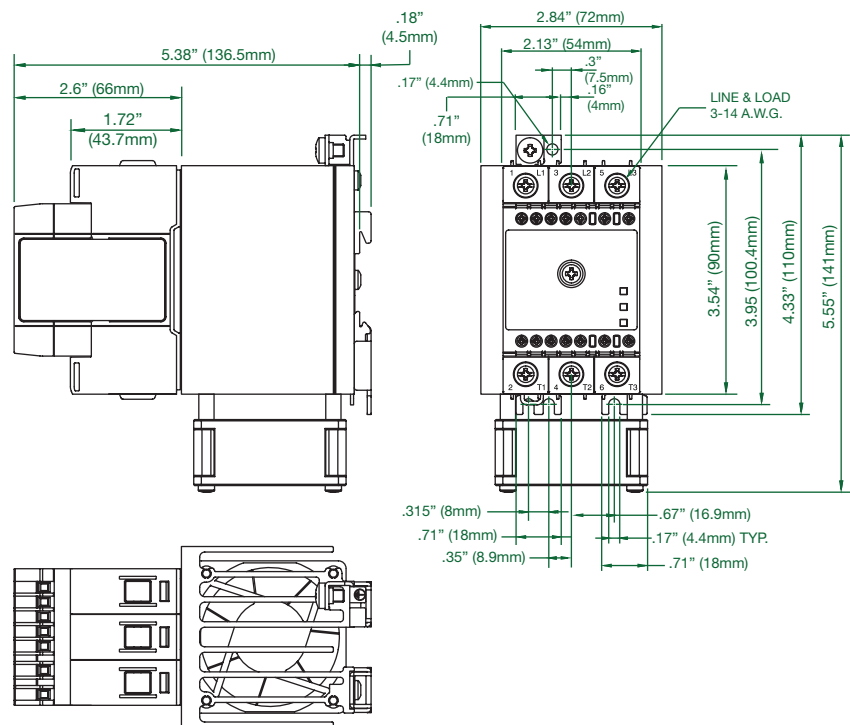
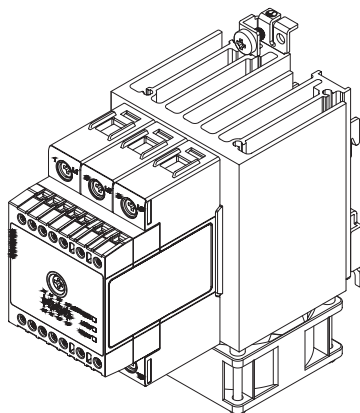
2 & 3 Pole 3-Phase (Continued)

Dimensions

2PSS...40
3PSS...30

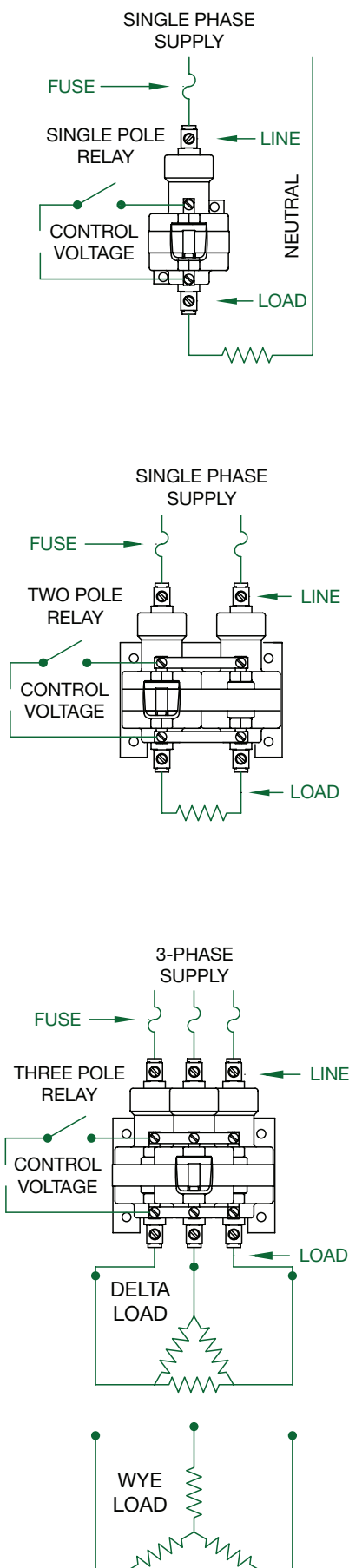


2PSS...75-...
3PSS...65-...



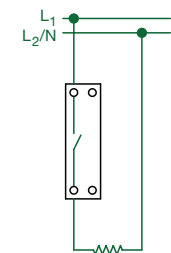
Dimensions in mm. Housing width tolerance $+0.02$ " (0.5 mm), -0 as per DIN43880.
All other tolerances ± 0.02 " (0.5 mm)

MERCURY CONTACTORS

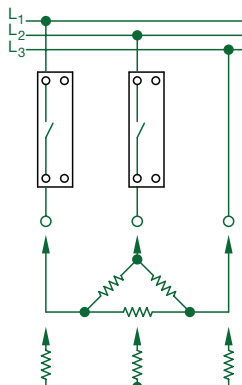


SOLID STATE RELAYS

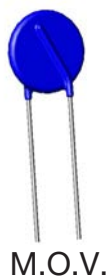
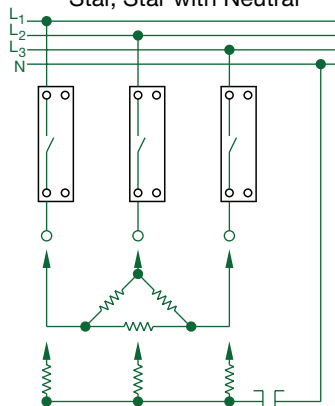
Single pole relay application
Line-Neutral, Line-Line



2 Single Pole Relays in
3-Phase application
Delta and Star Connection
(Economy Switch)



3 Single Pole Relays in
3-Phase Application Delta,
Star, Star with Neutral



Proper Fusing is Required

1. While MDI Mercury contactors handle high inrush, such as lamps, mercury contactors are susceptible to damage by short circuit currents, and should be fused to minimize short circuit fault currents. UL class RK-1 and class J fuses and semiconductor I²t fuses more effectively protect relays. These are low current-peak fuses designed to limit short circuit currents. Regardless, when there is a short circuit, relay operations should be closely monitored afterward because of the possibility of concealed damage that could cause the relays to behave inconsistently.
2. For sizing of relay see below
3. For data on standard coils see pages 5, 6, 11, & 13.
4. MDI RELAYS must mount vertically, ±10°.
5. Control line can be protected with metal oxide varistors (MOV). Use suffix -11.
6. Disconnect power before installing or servicing. Observe all electrical and safety codes and ordinances such as national electric code (NEC) and the occupational safety and health act (OSHA).

-RECOMMENDED-

Solid State Relays

Please see our
web page!

www.mdius.com

or call

(800) 634-4077

Mercury Relays

250 VOLT 600 VOLT

KTN-R KTS-R

JJN/A3T JJS

JKS/A4J

KTk-R

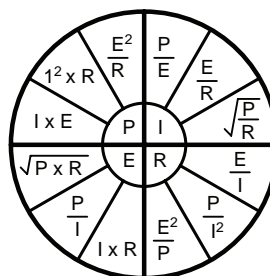
SIZING RELAY

To find AMPS per pole
3 Ø Balanced Heater loads

$$\text{AMPS per pole} = \frac{\text{KW} \times 1,000}{\text{VOLTS} \times 1.732}$$

Or multiply the kilowatts times
the appropriate factor

3 Ø AC	FACTORS
208 V	2.776
220 V	2.624
240 V	2.406
277 V	2.084
480 V	1.203
600 V	0.962



TORQUE SPECIFICATIONS

- For coils 8 in. Lb. max.
- For line and load terminals see ratings labels.

MOV CHART

FOR	SIEMENS	HARRIS	C.K.E.	M.D.I.
24 VOLTS	S14K30	V47ZA7	-	PM-567-5
120 VOLTS	S20K130	V150LA20B	Z150LA20B	PM-567-1
220 VOLTS	S20K275	V275LA40B	Z275LA40B	PM-567-2
277 VOLTS	S20K385	V320LA20B	Z320LA20B	PM-567-3

How To Order

SWITCH TYPE

TOS - Tip-Over Switch
TS - Tilt Switch
WATS - Wide Angle Tilt Switch

TOS - 12 C - L1
TS - 10 C - L1

AMP RATING

12 - 12 AMPS (TOS ONLY)
1 - 1 AMP
10 - 10 AMPS (TS ONLY)
20 - 20 AMPS

MOUNTING CLIPS

PART NO.	FOR
PM-348-36	TS-1, TS-1-L1
PM-348-44	TS-10, TS-10-L1
PM-348-50	TS-1C-L1
PM-348-62	TS-10C-L1, TS-20C-L1

UNINSULATION

C - Cased Unit
(blank) - UNINSULATED UNIT

TERMINATION

2 - 1/4" Quick Connects (TOS Non-Cased Only)
3 - Printed Circuit Mountable (TS-1 & WATS-1 Non-Cased Only)
6 - Standard Mounts (TS-1 & WATS-1 Non-Cased Only)
8 - 1/4" Quick Connects (TOS Cased Only)
L1 - 6" Leads
L2 - 12" Leads
L3 - 18" Leads
L4 - 24" Leads

(Continues in 6" Increments)

* For lead wire or lengths other than the above contact the factory

All leaded and cased tilt switches come with silicone rubber mercury switch lead wire, except TOS-12

Tilt Switches *Mercury & Mechanical (Non-Mercury)*

RATINGS:

TS-1 & WATS-1

1 AMP @ 120 VAC / 1 AMP @ 28 VDC

SP-1357 & SP-1358-L*

1 AMP @ 6-24 VDC

TS-10

10 AMP @ 120 VAC

TS-20

20 AMP @ 120 VAC

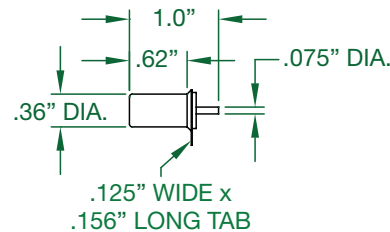
NATS-20 & WATS-20

13 AMP @ 120 VAC

6 AMP @ 240 VAC

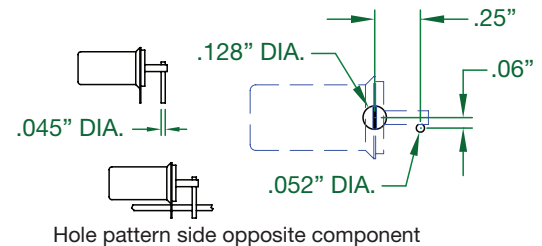
TS-1 & WATS-1

Tilt Switch 10°



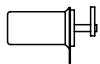
TS-1-3 & WATS-1-3

Printed circuit mountable Tilt Switch

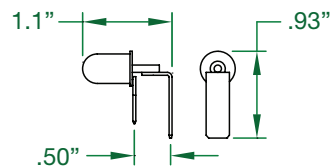


TS-1-6 & WATS-1-6

Standard

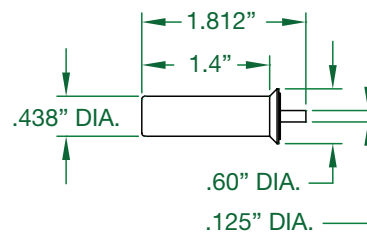


SP-1357 (Mechanical NON-Mercury) With 1/4" Quick Connects



TS-10 & TS-20

Tilt Switch 10°

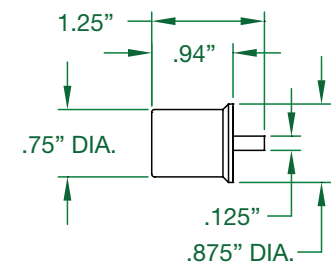


NATS-20

Narrow Angle Tilt Switch 30°

WATS-20

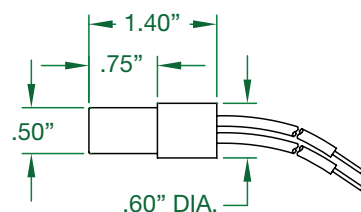
Wide Angle Tilt Switch 90°



TS-1C-L* (Mercury)

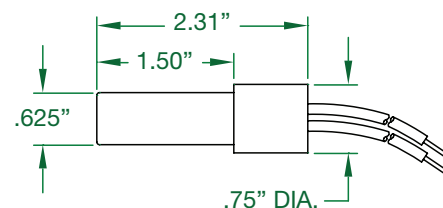
WATS-1C-L* (Mercury)

SP-1358-L* (Mechanical NON-Mercury)



TS-10C-L*

TS-20C-L*



Tip-Over Switches *Mercury & Mechanical (Non-Mercury)*

TOS-12

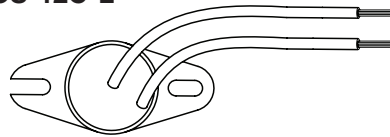
12 AMPS @ 120 VAC
25° Tip Over Angle

SP-1353

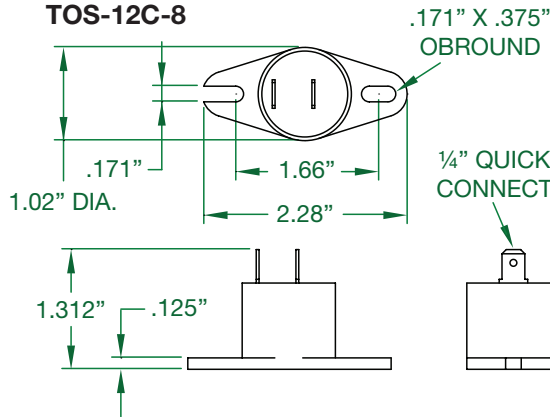
1 AMP @ 120 VAC
0.4 AMP @ 240 VAC
45° ±10° Tip Over Angle

SP-1353-L* Mechanical

TOS-12C-L*



TOS-12C-8



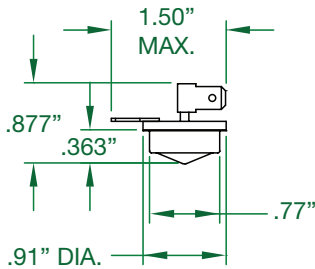
SP-1431

(Mechanical Non-Mercury)

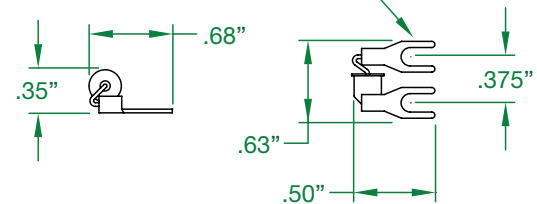
Ratings:

0.25 AMPS @ 60 V
3 VA Max.
40° Tip Over Angle
30-50° Tip Over Angle

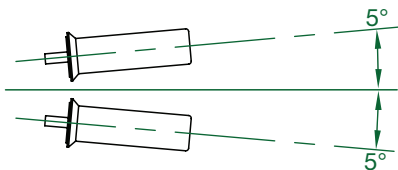
TOS-12-2



1/4" SPADE
TERMINAL

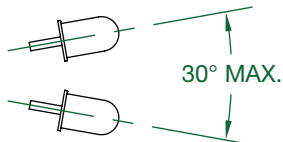


Switches *Operating Angles*



TS-1, TS-10, TS-20

Operating Angle
Recommended operating angle for good
switch open and closure conditions.

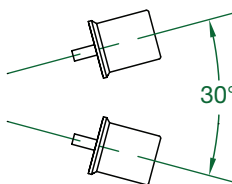


SP-1357 & SP-1358

Operating Angle

NATS-20

Operating Angle

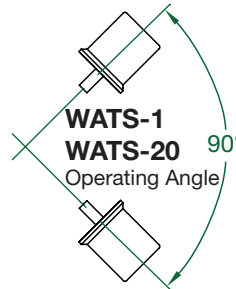


SWITCH CLOSING
ABOVE HORIZONTAL

WATS-1

WATS-20

Operating Angle



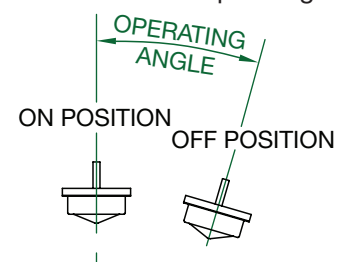
SWITCH CLOSING
BELOW HORIZONTAL

TOS-12 (Op. Angle is approx. 25° *)

SP-1353 (Op. Angle is 35°-55°)

SP-1431 (Op. Angle is 30°-50°)

Omni Directional Operating Angle

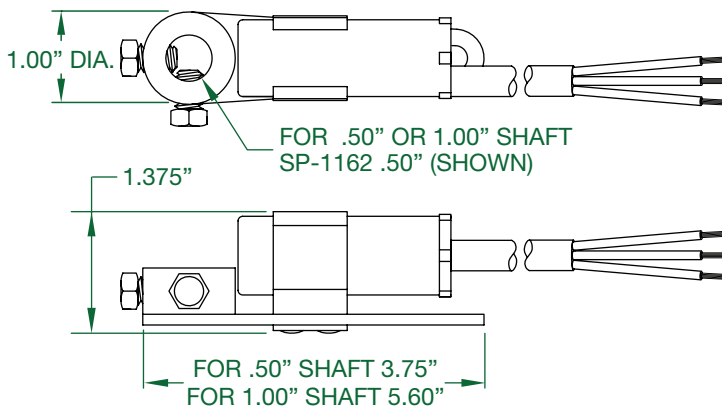


VERTICAL

* 15° & 45° Operating Angle Available

Contact the Factory 1-800-634-4077 or www.mdius.com

Damper Arm Tilt Switch



SP-1162-L*

SPDT - .50" SHAFT - 18 AWG Plenum wire

SP-1442-L*

SPDT - 1.00" SHAFT - 18 AWG Plenum wire

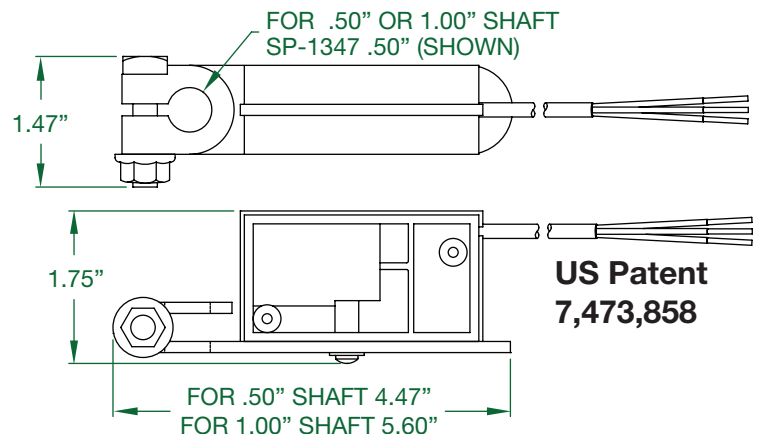
SP-1335-L*

SPDT - .50" SHAFT - 18 AWG SJOW Cord

RATINGS

1 AMPS @ 120 VAC / 1 AMP @ 28 VDC

Mechanical DATS (Non-Mercury)



**US Patent
7,473,858**

SP-1347-L*

SPDT - .50" SHAFT - 18 AWG Plenum wire

SP-1450-L*

SPDT - 1.00" SHAFT - 18 AWG Plenum wire

RATINGS

5 AMPS @ 120 VAC / 5 AMP @ 30 VDC

HOW TO ORDER

BASIC SWITCH SERIES

MERCURY

A - TS-1

1 AMP @ 120 VAC Pilot Duty 10°

B - WATS-1

1 AMP @ 120 VAC Pilot Duty 90°

C - TS-10

13 AMPS @ 120 VAC / 5 AMPS @ 240 VAC 10°

D - NATS-20

13 AMPS @ 120 VAC / 6 AMPS @ 240 VAC 30°

E - WATS-20

13 AMPS @ 120 VAC / 6 AMPS @ 240 VAC 90°

MECHANICAL

G - ½ H.P. 13/15 AMPS 90°

H - 1 and 2 H.P. 15 AMPS 90°

K - 10 AMPS Pilot Duty Narrow Angle Tetherless

L - 1 & 2 H.P. 25 AMPS 90°

N - 10 AMPS Pilot Duty Narrow Angle 35°

P - ½ H.P. Narrow Angle 25°

R - ½ H.P. Narrow Angle Tetherless

S - Small 5 AMPS 120/250 VAC 90°

X - Small 5 AMPS 120/250 VAC Narrow Angle 15°

FLOAT SIZE & STANDARD COLOR CODE

<u>NORMALLY OPEN</u>	<u>NORMALLY CLOSED</u>	<u>BASIC SWITCH SERIES</u>
S -SMALL MERCURY BLACK (ABS ONLY)	S -SMALL MERCURY BLACK (ABS ONLY)	A & B SERIES
M -MERCURY BLACK (HIPS ONLY)	B -MERCURY YELLOW (HIPS ONLY)	C, D, & E SERIES
F -SMALL MECHANICAL BLACK (ABS ONLY)	F -SMALL MECHANICAL BLACK (ABS ONLY)	S & X SERIES
DOUBLE THROW F -SMALL MECHANICAL BLACK (ABS ONLY)		
F -MECHANICAL BLACK (HIPS & ABS)	Y -MECHANICAL YELLOW W -MECHANICAL WHITE (ABS ONLY)	G, H, K, L, P & R SERIES
DOUBLE THROW G -MECHANICAL GREEN (ABS ONLY)		G, H, K, P & R SERIES
82°C/180°F R -MECHANICAL RED (ABS ONLY)	82°C/180°F B -MECHANICAL BLUE (ABS ONLY)	G, H, K, L, P & R SERIES
105°C/221°F T -MECHANICAL TEEL (POLYCARB/ABS ONLY)	105°C/221°F T -MECHANICAL TEEL (POLYCARB/ABS ONLY)	G, P & R SERIES

TERMINATION AND LABEL DESIGNATION

00 - Standard skive (See Fig 4)

Recognized: No Label

C1 - 120 VAC Series plug (See Fig 1)

Listed: Label on 6' min. cord

F1 - 120 VAC Series plug (See Fig 1)

Listed: Label on Float - 6' min. cord

R1 - 120 VAC Series plug (See Fig 1)

Recognized: No Label - 6' min. cord

C2 - 240 VAC Series plug (See Fig 2)

Listed: Label on 6' min. cord

F2 - 240 VAC Series plug (See Fig 2)

Listed: Label on Float - 6' min. cord

R2 - 240 VAC Series plug (See Fig 2)

Recognized: No Label - 6' min. cord

R3 - 3 Pin barrel plug (See Fig 3)

Recognized: No Label

F0 - Standard skive (See Fig 4)

Recognized: Label on Float

J G F 1 O W 10 00 W

FLOAT MATERIAL

- 1** - High Impact Polystyrene (HIPS) for 60°C/140°F
- 2** - Acrylonitrile Butadiene Styrene (ABS) for 82°C/180°F
- 3** - ABS/PolyCarbonate (PC/ABS) 105°C/221°F (Not UL or CSA approved)

CONTACTS

From 01 to 50 feet.
Lengths are in even foot increments.

CONTACTS

- O** - Normally Open
- C** - Normally Closed
- D** - Double Throw

OPTIONAL

- B** - Individually boxed
- W** - External weighted
- C** - Capillary Blocks
- T** - Cable Tie Tether
- TC** - Tether Clamp
- G** - Gold Contacts (G Series only)

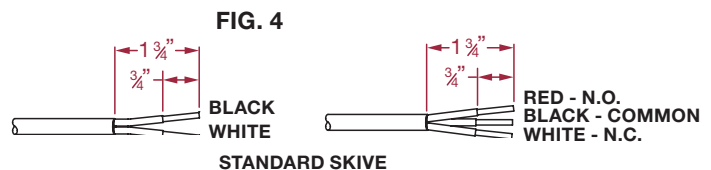
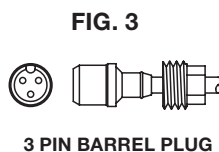
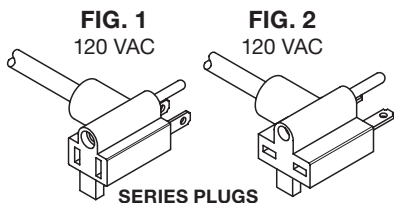
CORD TYPE AND MATERIAL

- Y** - 18 Gauge - Chlorinated Polyethylene CPE Jacketed (SJOW)
- W** - 16 Gauge - Chlorinated Polyethylene CPE Jacketed (SJOW)
- N** - 16 Gauge - Chlorinated Polyethylene Yellow CPE Jacketed (SJOOW)
- L** - 16 Gauge - Chlorinated Polyethylene Yellow CPE Jacketed (SOOW)
- X** - 16 Gauge - Polyvinyl Chloride PVC Jacketed (SJTOW)
- T** - 16 Gauge - Teflon TFE Jacketed (Not UL or CSA approved cord)
- U** - 14 Gauge - Chlorinated Polyethylene CPE Jacketed (SJOW)
- P** - 12 Gauge - Chlorinated Polyethylene CPE Jacketed (SJOW)

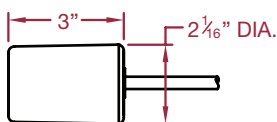
OPTIONAL PEAR FLOAT

Same MDI switch, larger pear shaped float
This option only comes in ABS plastic

GOLD CONTACTS MECHANICAL FLOAT SWITCHES INTRINSICALLY SAFE RATINGS: 160 µA TO 100 mA



Mercury Float Switches



A Series

10° Narrow Angle Operation
1 AMP @ 120 VAC

B Series

90° Wide Angle Operation
1 AMP @ 120 VAC



FILE #E-93774



FILE #E-93774



FILE #LR 41198

C Series

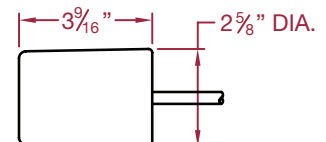
10° Narrow Angle Operation
13 AMPS @ 120 VAC
5 AMPS @ 240 VAC

D Series

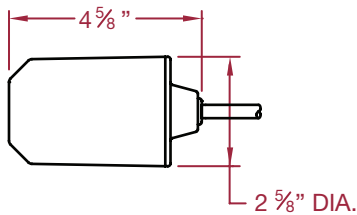
30° Narrow Angle Operation
13 AMPS @ 120 VAC
6 AMPS @ 240 VAC

E Series

90° Wide Angle Operation
13 AMPS @ 120 VAC
6 AMPS @ 240 VAC



Mechanical Float Switches (Mercury Free)



Heavy Duty Floats

H Series

90° Operating Angle
1 H.P. @ 120 VAC
2 H.P. @ 240 VAC
15 AMPS @ 120/240 VAC
96 AMPS overload

L Series

90° Operating Angle
1 H.P. @ 120 VAC
2 H.P. @ 240 VAC
25 AMPS @ 120/240 VAC

Standard Duty Floats

G Series

90° Operating Angle
1/2 H.P. @ 120/240 VAC
15 AMPS @ 120/240 VAC w/ 14 GA. cord
13 AMPS @ 120/240 VAC w/ 16 GA. cord
58.8 AMPS overload

P Series

25° Narrow Angle Operation
1/2 H.P. @ 120/240 VAC
15 AMPS @ 120/240 VAC w/ 14 GA. cord
13 AMPS @ 120/240 VAC w/ 16 GA. cord
58.8 AMPS overload

R Series

Tetherless with Internal Weight
Narrow Angle Operation
1/2 H.P. @ 120/240 VAC
15 AMPS @ 120/240 VAC w/ 14 GA. cord
13 AMPS @ 120/240 VAC w/ 16 GA. cord
58.8 AMPS overload

Pilot Duty Floats

K Series

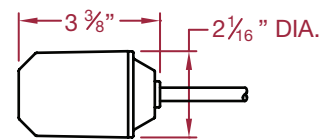
Tetherless with Internal Weight
Narrow Angle Operation
10 AMPS @ 120/240 VAC
1/4 H.P. @ 120/240 VAC
34.8 AMPS overload

N Series

35° Narrow Angle Operation
10 AMPS @ 120/240 VAC
1/4 H.P. @ 120/240 VAC
34.8 AMPS overload



FILE #LR 41198



Mini Floats

S Series

90° Operating Angle
5 AMPS @ 120/240 VAC
5 AMPS @ 30 VDC

X Series

15° Narrow Operating Angle
5 AMPS @ 120/240 VAC
5 AMPS @ 30 VDC

Gold Series Switch

Available in: **"G, N, & K" Series**
Add the suffix "G" for Gold Plated Contacts.

Example: GF2OW1000 G

Good for 160 μ A to 100 mA
Same standard angles.

Commonly used in intrinsically safe equipment.

SKF Series

This includes our standard K Series float switch (internally weighted), with a longer 3" ROJ and 1/2" skive.

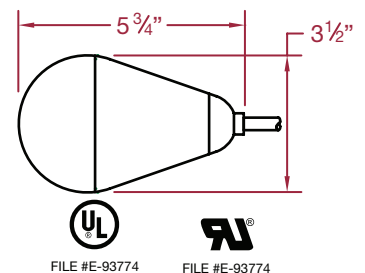
Features:

- SKF-5032-10 (10' Normally Open)
- SKF-5033-10 (10' Normally Closed)
- SKF-5034-10 (10' Double Throw)

"J" Package Option

"J" Package
Includes all series

Add the option
"J" Prefix
to any series



Installation Instructions

MDI Tether Clamp

This is a nice and simple way to mount your float switch to a pipe, either with a cable tie or pipe clamp. It can be used on 18-2 to 12-2 (18-3 to 14-3) cords.

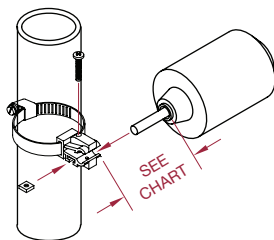
TC

(Includes the clamp, bolt and nut)

TC-1 (Includes the TC and 2 1/2" pipe clamp)

TC-2 (Includes the TC and 3 1/2" pipe clamp)

TC-10 (Includes the TC and 14" cable tie)



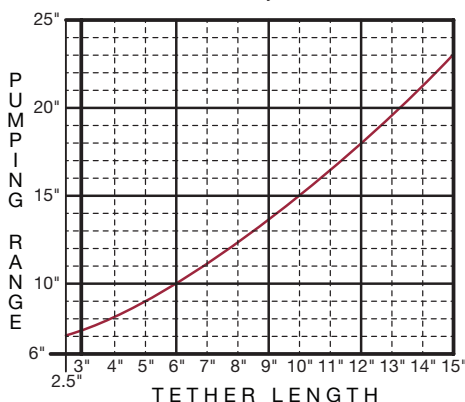
12-2	7 1/2 INCHES
14-3	5 INCHES
14-2, 16-3	4 INCHES
18-2, 18-3, 16-2	3 1/2 INCHES
WIRE GAUGE	MINIMUM LENGTH

Based on SJOW cord @ 65° F.

Flexibility of wire varies, test in actual application to verify

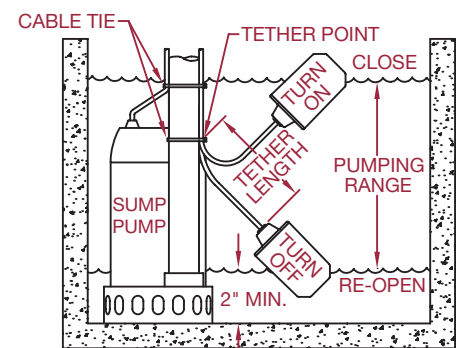
Tether Data

For CPE 16-2 SJOW jacketed cord

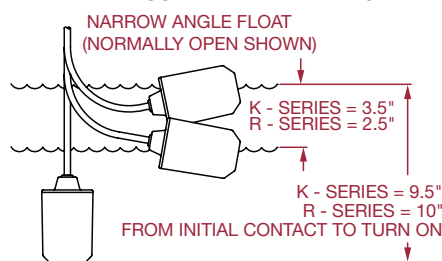


1. Attach cord, using a cable tie (tether clamp), to any convenient rigid surface as illustrated. This is known as the tether point. Do not tighten until both turn-on and turn-off levels are established.
2. To adjust greater distance between turn-on and turn-off, increase cord length between tether point or tether clamp and float. For less distance between turn-on and turn-off decrease cord.
3. Make sure the float is at least 2 inches above pump base, in the turn-off position, before tightening cable tie or tether clamp at the tether point.
4. Plug piggy-back switch cord (Series Plug) into GFCI outlet, then plug into piggy-back switch cord, and check for proper operation.

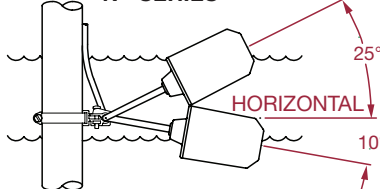
Typical Normally Open (Pump Down) Application



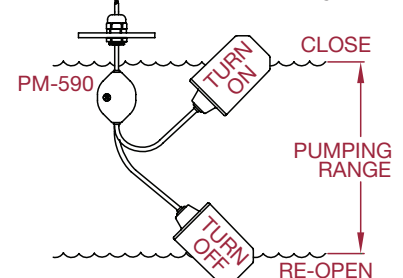
TETHERLESS INTERNALLY WEIGHTED



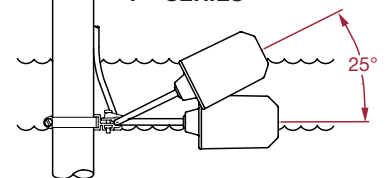
N - SERIES



EXTERNAL WEIGHT



P - SERIES

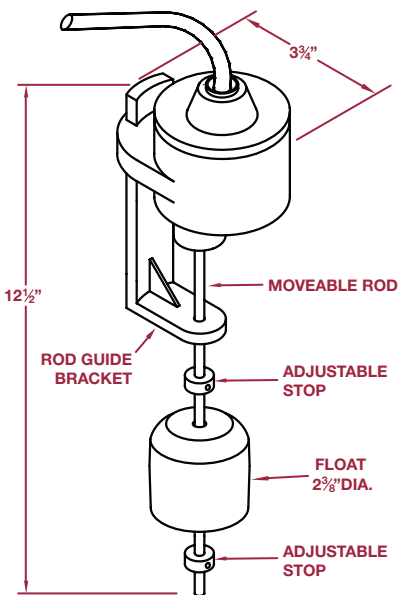




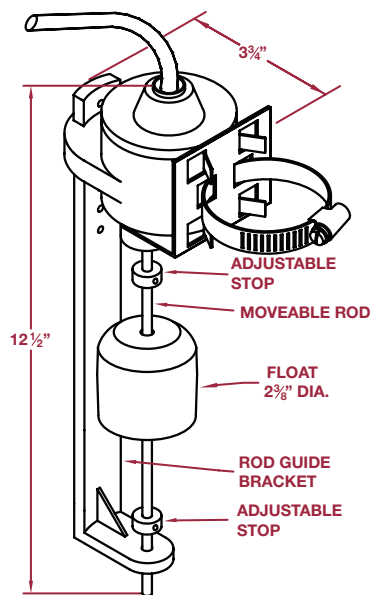
Upper Rod Guide
Plastic Bracket (-02)



Lower Rod Guide
Stainless Steel Bracket (-01)



Upper Rod Guide
No Bracket



Lower Rod Guide
Stainless Steel Pipe Clamp (-01)

RATINGS

(Standard Switch)

13 AMPS / 1/2 HP @ 120/240 V 50/60 Hz

(Optional Relay)

15 AMPS @ 120/240 VAC 50/60 Hz.

1 HP @ 120 VAC or 2 HP @ 240 VAC

PUMPING RANGE

Adjustable up to 6 inches (with standard 9" rod length)

MATERIALS

Enclosure and Guide are ABS Plastic

Float is black Polypropylene

MOUNTING

Standard mounting holes for #8 screws on 2.06 inch centers are located under housing.

OPTIONAL PIPE MOUNT

This bracket allows for mounting to standard size sump discharge piping. Comes in Stainless Steel or PVC Plastic.

HOW TO ORDER

VS **01** - **012** **03** **R9** **L** - **01**
A B C D E F

(Optional)

A - Contacts and Current

Blank - Standard switch

(This is CSA approved option)

O - Normally Open

C - Normally Closed

D - Double Throw

01 - Normally Open 1 HP @ 120 VAC Relay

C1 - Normally Closed 1 HP @ 120 VAC Relay

02 - Normally Open 2 HP @ 240 VAC Relay

C2 - Normally Closed 2 HP @ 240 VAC Relay

B - Length of cord in inches (012 - 720)

C - Termination

00 - 1 3/4" ROJ & 3/4" Strip or Skive (Standard)

R1 - Piggyback 120 VAC Component Recognized

C1 - Piggyback 120 VAC W/ Listed Cord Label

R2 - Piggyback 240 VAC Component Recognized

C2 - Piggyback 240 VAC W/ Listed Cord Label

R3 - 3-Pin Barrel Plug Component Recognized

C3 - 3-Pin Barrel Plug W/ Listed Cord Label

D - Rod Length

Rod length in inches (9" is standard)

Rods available up to 24"

E - Rod Guide

L - Lower rod guide

U - Upper rod guide

(Optional)

F - With or Without Bracket

01 - Pipe Clamp & Stainless Steel Bracket

02 - Pipe Clamp & Plastic Bracket



FILE #LR 41198



FILE #E-93774



FILE #E-93774

PRODUCT DESCRIPTION

The Twin Float pump switch consists of two floats, each float contains our standard "JH" series switch. The boot contains a heavy-duty latching relay, which enables the floats to function together. The relay eliminates pump chatter in turbulent conditions.

The unit is well suited for narrow and deep sump pump pits. On the N.O. (pump down) model, the pump is turned on when activated by the top float switch. The pump stays on until the bottom float switch turns it off, this allows a pumping range of about 12 - 60" with the standard 060 (60") cord length on the bottom float). This can be extended almost indefinitely with longer cords.

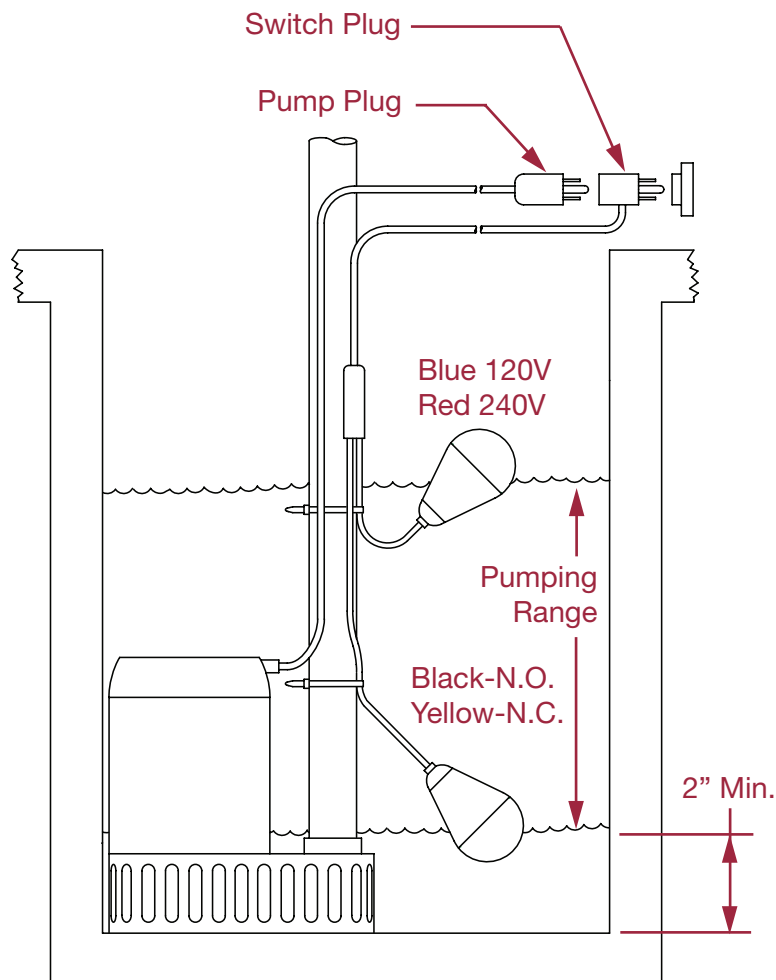


Ratings

15 AMPS @ 120 VAC
1 HP @ 120 VAC
OR
15 @ 240 VAC
2 HP @ 240 VAC

Standard colors

Top float color indicates voltage
Blue Float - 120 VAC
Red Float - 240 VAC
Bottom float color indicates action
Graphite - Pump Down (Normally Open)
Yellow - Pump Up (Normally Closed)



FILE #E-93774



FILE #E-93774

HOW TO ORDER

JTF D - 060 - U 15 R1
A B C D E

A - Switch Action

D - Pump Down (Normally Open)
U - Pump Up (Normally Closed)

B - Bottom Float Cord Length

12" Increments (Min. length 12")
060 is our standard 60" length

C - Cord Types (Currently 14 AWG only)

U - 14 AWG CPE jacketed SJOW cord

D - Power Cord Length in Feet

E - Power Cord (14 AWG PVC)

00 - Standard Skive
R1 - 120 VAC (15 AMP piggyback)
R2 - 240 VAC (15 AMP piggyback)

Perfect for Sewage, Sludge and Slurries

Features / Benefits

- Durable cage design with large diameter 316 SS diaphragm seal that is non-clogging and damage resistant to floating solids
- Incorporates lightning and surge protection utilizing dual arrestor technology, grounded to case, eliminating both power supply surges and lightning ground strike transients (surge protection is not guaranteed and is not covered by warranty) on PBLT2 models
- Maintenance free filter eliminates particulate or water droplets from entering and damaging the transducer
- UL approved intrinsically safe on PBLTX models for use in hazardous locations when used with proper barrier
- Excellent chemical compatibility for wide application use
- NPT connection allows the unit to be rigidly installed in a pipe/conduit, or the addition of a A-625 hanging loop for attaching a chain for pulling out of the installation

Applications

- Wastewater
- Sludge pits, clarifiers, digesters
- Alum tanks
- Chemical storage tanks
- Oil tanks
- Lime slurry
- Sumps
- Reservoirs

Description

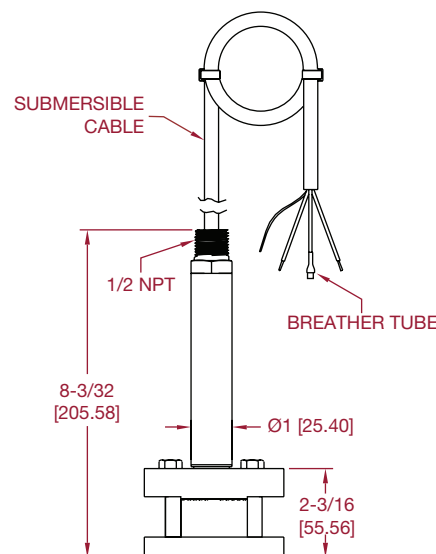
The SERIES PBLT2 & PBLTX Submersible Level Transmitters are manufactured for years of trouble free service in the harshest applications. This Series measures the height of liquid above the position in the tank referenced to atmospheric pressure. The transmitter consists of a piezo-resistive sensing element, encased in a 316 SS housing with cage and large diameter 316 SS diaphragm seal.



Specifications

Service	Compatible liquids.
Wetted Materials	316 SS, 316L SS, epoxy, cable: ETFE or polyurethane.
Accuracy	±0.25% FS (includes linearity, hysteresis, and repeatability)*.
Temperature Limit	PBLT2: 0 to 200°F (-18 to 93°C); PBLTX: 0 to 176°F (18 to 80°C).
Compensated Temperature Range	PBLT2: 0 to 180°F (-18 to 82°C); PBLTX: 0 to 176°F (18 to 80°C).
Thermal Effect	±0.02% FS/°F.
Pressure Limit	2X FS.
Power Requirement	PBLT2: 13 to 30 VDC, PBLTX: 10 to 28 VDC.
Output Signal	4 to 20 mA DC, two wire.
Response Time	50 ms.
Loop Resistance	900 Ω.
Electrical Connection	Wire pigtail.
Mounting Orientation	Suspended in tank below level being measured.
Electrical Protection	PBLT2: Lightning and surge protection, PBLTX: none.
Weight	4.3 lb (2.0 kg).
Agency Approvals	PBLT2: CE, PBLTX: CE, cULus intrinsically safe for Class I, Div. 1, Groups A, B, C, & D; Class II, Dev. 1, Groups E, F, & G; Class III, Div. 1. **
*Configured ranges below 5 psi (11.54 ft w.c.) (3.52 m w.c.) ±1% FS accuracy	
**Up to 196 ft (59.5 m) for ETFE cable; Up to 333 ft (101.5 m) for polyurethane cable	

Dimensions



How to Order

Use the **bold** characters from the chart below to construct a product code.

PBLT 2 - 5 - 40 - PU

SERIES

- 2** - Submersible level transmitter
- X** - Submersible level transmitter (intrinsically safe)

*RANGE psi (ft w.c.) [m w.c.]

- 5** - 5 (11.54) [3.52]
- 10** - 10 (23.09) [7.04]
- 15** - 15 (34.63) [10.56]
- 20** - 20 (46.18) [14.08]
- 3.5M** - 4.87 (11.48) [3.5]
- 5M** - 7.11 (16.40) [5]
- 10M** - 14.21 (32.81) [10]

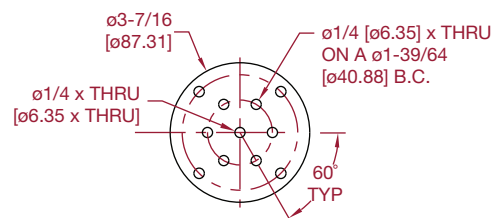
CABLE TYPE

- (blank)** - ETFE
- PU** - Polyurethane

**CABLE TYPE

- 40** - 40 (12.2)
- 60** - 60 (18.3)
- 5M** - 16.40 (5)
- 10M** - 32.81 (10)
- 18M** - 59.06 (18)

**Configure cable lengths available from 10 to 2000ft (3 to 610 m)



*Additional pressure ranges available (Consult Factory)

Perfect for Ground Waters and Wells

Description

The SBLT2 Submersible Level Transducer is manufactured for years of trouble free service. The transmitter consists of a piezo-resistive sensing element, encased in a 316 SS housing. Superior lightning and surge protection utilizing dual arrestor technology, grounded to case, eliminating both power supply surges and lightning ground strike transients (surge protection is not guaranteed and is not covered by warranty). Bullet nose design protects diaphragm from damage. Comes equipped with a 270-pound tensile strength, shielded, vented cable. Ventilation tube in the cable automatically compensates for changes in atmospheric pressure above the tank.

Applications

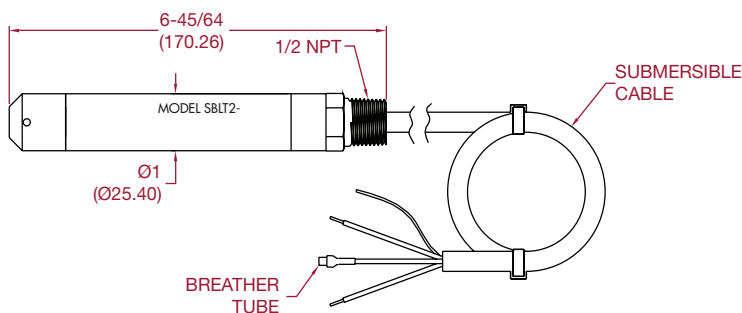
Well monitoring; Ground water monitoring; Environmental re-mediation; Surface water monitoring; Down hole; Water Tanks.

Electrical Installation

An external power supply delivering 13-30 VDC with minimum current capability of 40 mA DC (per transmitter) is required to power the control loop. See figure below for connection of the power supply, transmitter and receiver.



Dimensions



Specifications

Service: Compatible liquids

Wetted Materials: 316 SS, 316L SS, epoxy adhesive

Cable: Polyether Polyurethane or ETFE

Bullet Nose: PVC

Accuracy: ±0.25% of full scale

Temperature Limit: 0 to 150°F (-18 to 66°C)

Compensated Temperature Range: 0 to 140°F (-18 to 60°C)

Thermal Effect: Less than ±0.02%/°F

Pressure Limit: 2X full scale

Power Requirement: 13 to 30 VDC

Output Signal: 4 to 20 mA DC, 2-wire

Response Time: 50 ms

Max. Loop Resistance: 850 ohms at 30 VDC

Electrical Connections: Wire pigtail

Mounting Orientation: Suspended in tank below level being measured

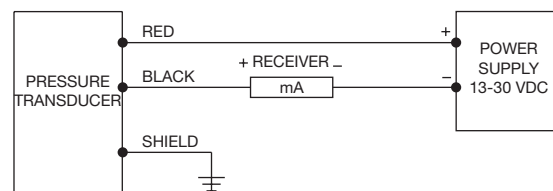
Weight: 2.2 lb. (1.0 kg)

Electrical Protection: Lightning and surge protection

WARNING:

A voltage potential between the ground wire of the unit and the ground of other equipment can lead to electrolytic corrosion. Always ensure the grounding system provides an equipotential between the transmitter and the earthing ground connection. Avoid using the power system protective ground since this will often have a significant potential difference to the transmitter ground. Also note that dissimilar metals in the ground system may cause electrolysis corrosion of the transmitter or other components in the ground system.

During installation, connect a voltmeter or ammeter between the shield ground wire and the grounding connection. If there is a measurable voltage or current electrolytic corrosion may be a serious possibility. If there is a potential difference then some isolation system will be required. Improper grounding may lead to damage or poor signal integrity.



Model	Range psi (ft w.c.) [m w.c.]	Cable Length ft (m)	Cable Type
SBLT2-5-40-ETFE	5 (11.54) [3.52]	40 (12.2)	ETFE
SBLT2-10-40-ETFE	10 (23.09) [7.04]	40 (12.2)	ETFE
SBLT2-15-60-ETFE	15 (34.63) [10.56]	60 (18.3)	ETFE
SBLT2-20-60-ETFE	20 (46.18) [14.08]	60 (18.3)	ETFE
SBLT2-5-40	5 (11.54) [3.52]	40 (12.2)	Polyurethane
SBLT2-10-40	10 (23.09) [7.04]	40 (12.2)	Polyurethane
SBLT2-15-60	15 (34.63) [10.56]	60 (18.3)	Polyurethane
SBLT2-20-60	20 (46.18) [14.08]	60 (18.3)	Polyurethane
SBLT2-3.5M-5M	4.97 (11.48) [3.5]	16.40 (5)	Polyurethane
SBLT2-5M-10M	14.21 (32.81) [10]	32.81 (10)	Polyurethane
SBLT2-10M-18M	25.58 (59.06) [18]	59.06 (18)	Polyurethane

The maximum receiver load resistance (RLmax) for the DC power supply voltage (Vsup) is expressed by the formula:

$$RL_{max} = \frac{V_{sup} - 13V}{0.02A}$$

Shielded cable is recommended for control loop wiring.

Intrinsically Safe Approval:

Change model number from SBLT2 to SBLTX

Custom ranges or Cable Lengths - Contact MDI

Indoor Tank Alarms

SP-3000 ALARM - BBLA INDOOR ALARM WITH **XF2OY1500** MECHANICAL FLOAT

SP-3100 ALARM - BBLA INDOOR ALARM WITH **AS2OY1500** MERCURY FLOAT



The BBLA alarm system is designed to monitor liquid levels in sump basins, holding tanks, lift stations tanks and many other non-potable water and wastewater applications. Comes individually boxed with Cable tie and Instruction sheet.

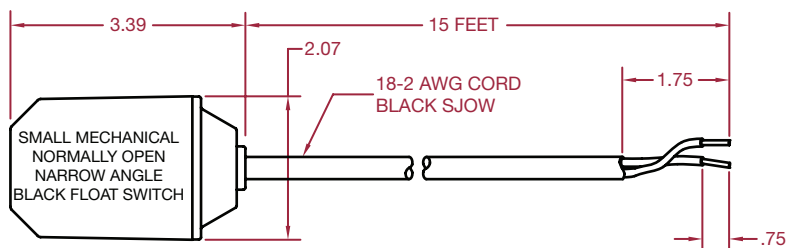
Auxiliary contacts with common, normally open and normally closed terminals are available behind a panel, on the lower right side, held in place by two #1 Phillips head screws. The barrier terminal screws are Phillips/Standard slot combo head type.

The BBLA is design to sound a piezo horn and illuminate a red light to notify of an alarm situation. There is a green line voltage power indicator light to show that the unit is functioning, as well as a silence switch to turn horn off while fixing the alarm (the red alarm light will remain on until the alarm conditions are remedied).

SPECIFICATIONS

• Dimensions	7" X 4" X 2 1/2"
• Enclosure	NEMA 1 thermoplastic (external mounting feet)
• Horn	85 dB
• Weight	1 1/3 pounds
• Voltage	Primary: 120 VAC, Secondary 12 VAC, 60 Hz (Alarm condition 2.5 Watts max)
• Power cord	6 feet 120 VAC (NEMA 5-15P)
• External block connection	Float connection. DO NOT APPLY POWER! Class Two Output, 12 VAC
• Auxiliary contacts	120 VAC, 5 AMPS max 60 Hz
• Battery Back Up	9 Volt

XF2OY1500

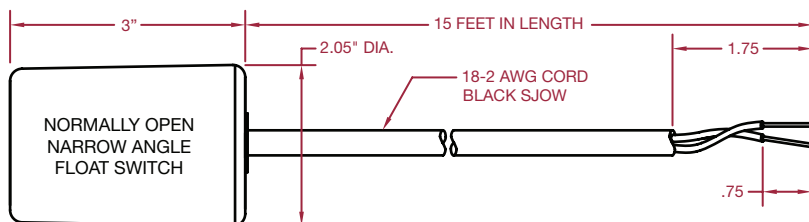


OPERATING ANGLE 15°: CONTACTS CLOSE @ 10° ABOVE HORIZONTAL
CONTACTS OPEN @ 5° BELOW HORIZONTAL

ELECTRICAL RATINGS: 5 AMP @ 120/240 VAC.
5 AMP @ 30 V.D.C.

FLOAT MATERIAL: A.B.S.

AS2OY1500



OPERATING ANGLE 10°: CONTACTS CLOSE @ 5° ABOVE HORIZONTAL
CONTACTS OPEN @ 5° BELOW HORIZONTAL

ELECTRICAL RATINGS: 1 AMP @ 120 VAC.

FLOAT MATERIAL: A.B.S.

SP-4000 ALARM - OTA OUTDOOR ALARM WITH NF2OW1500 MECHANICAL FLOAT

SP-4100 ALARM - OTA OUTDOOR ALARM WITH CG2OY1500 MERCURY FLOAT



The OTA alarm system is designed to monitor liquid levels in sump basins, holding tanks, lift stations tanks and many other non-potable water and wastewater applications. Comes individually boxed with Cable tie and Instruction sheet.

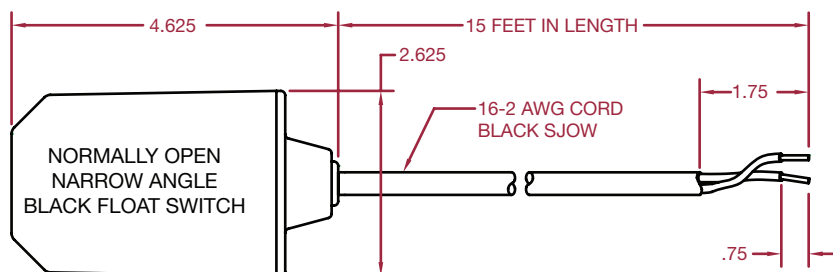
This alarm comes in a Type 4X nonmetallic enclosure with external mounting feet and a gasketed door for outdoor use. It has a large red illuminating beacon, front cover mounted piezo, with Test and Silence push button switches.

The OTA is design to sound an audible piezo horn and illuminate the red beacon light to notify of an alarm situation. There is a silence switch to turn the piezo horn off while fixing the alarm (the red alarm light will remain on until the alarm conditions are remedied).

SPECIFICATIONS

• Dimensions	.	.	.	8" X 4 1/2" X 4 1/4"
• Enclosure	.	.	.	Type 4X nonmetallic enclosure rated for indoor or outdoor use
• Piezo Horn	.	.	.	85 dB
• Weight	.	.	.	2 pounds
• Voltage	.	.	.	Primary: 120 VAC, Secondary 12 VAC, 60 Hz 6 Watts max.
• Power cord	.	.	.	6 feet 120 VAC (NEMA 5-15P)
• Float connection	.	.	.	External block connection

NF2OW1500

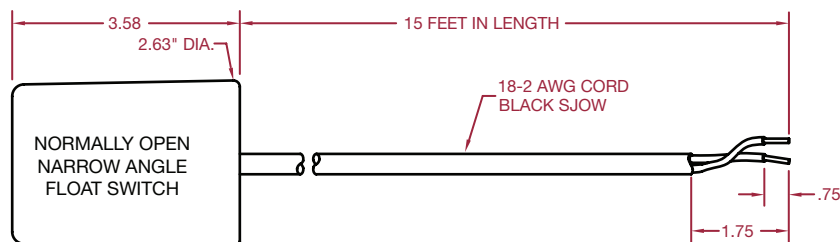


OPERATING ANGLE 15°: CONTACTS CLOSE @ 25° ABOVE HORIZONTAL
CONTACTS OPEN @ 10° BELOW HORIZONTAL

ELECTRICAL RATINGS: 1/4 H.P. 10 AMPS @ 120/240 VAC. 34.8 LRA

FLOAT MATERIAL: A.B.S.

CG2OY1500



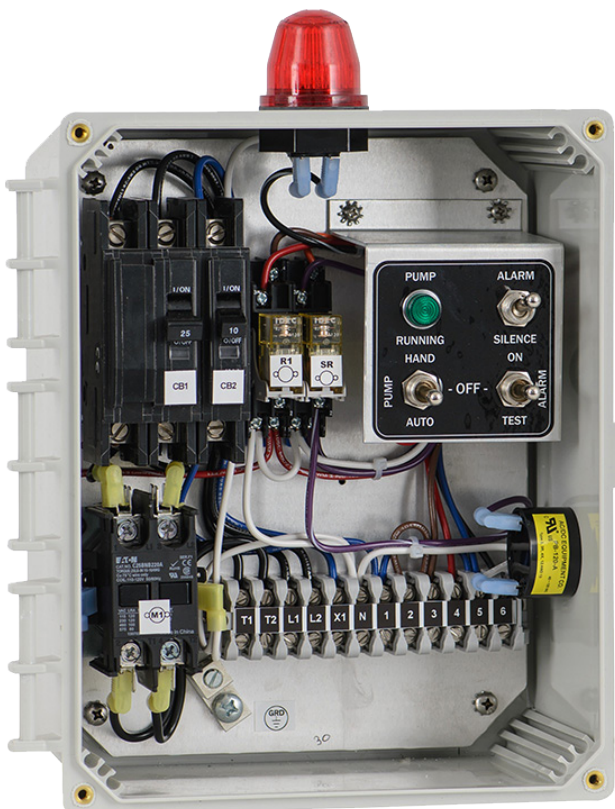
OPERATING ANGLE 10°: CONTACTS CLOSE @ 5° ABOVE HORIZONTAL
CONTACTS OPEN @ 5° BELOW HORIZONTAL

ELECTRICAL RATINGS: 10 AMP @ 120 VAC
5 AMP @ 240 VAC

FLOAT MATERIAL: A.B.S.

Features

- Flashing Red Alarm Light
- Amber Run Lights
- High Decibel Audible Alarm
- NEMA 4X Fiberglass Enclosure
- Stainless Piano Hinged Door
- Stainless Door Latches w/Padlock Hasp
- External Mounting Feet
- Alternating Relay/Override Circuit
- Non-Reversing Contactors
- “Hand/Off/Auto” Heavy Duty Toggles
- Alarm “On/Off/Test” Heavy Duty Toggle
- Field Wiring Terminal Strips
- Motor Circuit Breakers
- Control Circuit Breaker
- Individual 3 AMP Control/Alarm Circuit Fuses
- UL 508A Listing
- One Year Limited Warranty
- Custom Options Available



Applications Include

- Starting & Stopping Pump for:
- Sump & Sewage Basins
- Septic Tanks & Aeration Systems
- Cisterns & Atmospheric Storage Tanks
- Chemical Solution Tanks

Our Effluent and Sewage Pumps offer these features and benefits!

- High Efficient Motor With Upper & Lower Ball Bearings/ Runs Cooler & Last Longer
- Cast Iron Vortex Impeller/ Helps Prevent Clogging
- Inboard Seal-Rotating Components Of Seal Are In The Motor Housing, Lubricated By The Motor Oil/ Seal Will Last Longer If Pump Runs Dry, Hair And Debris Cannot Wrap Around Seal Components
- Secondary Exclusion Seal/ Keeps Debris From Entering Seal Cavity
- Sealed Entry-Replaceable Power Cord/Easy To Replace In The Field, Prevents Water From Entering The Motor Housing Through A Cut Power 20' Cord
- Every Pump Is Tested in Water/ Ensures That The Pump Meets Head & Flow Requirements

Effluent Pump: CPE5-12

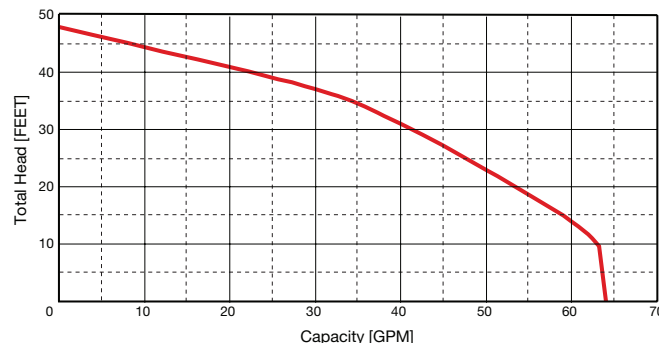
Dewatering, Elevator Pits, Septic Systems, Residential & Commercial Developments, STEP Systems



CPE5-12 H
Pump with 1 HP
Heavy Duty float switch

CPE5-12 V
Pump with 1 HP
Vertical float switch

- 1/2 HP @ 115 VAC 60 Hz Single Phase @ 8.5 AMPS
- 3450 RPM, 60 Hz NEMA L Includes Overload Protection
- 16 AWG 20 foot (UL/cUL) Cord
- Discharge 2" NPT. Vertical
- Solids Handling 3/4"
- Liquid Temperature 140 Degrees F. (Intermittent)
- Hardware 300 Series Stainless Steel
- Motor Housing Cast Iron
- Shaft Stainless Steel
- Bearing (Upper & Lower)
Single Row, Ball, Oil Lubricated
- Volute Cast Iron
- Seal Plate Cast Iron
- Impeller Cast Iron/Vortex
- Square Rings Buna-N
- Oil Filled, Class B
- Permanent Split Capacitor



Sewage Pump: CPW5-12

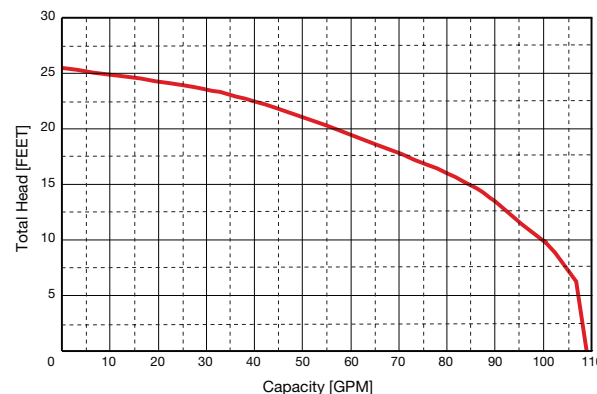
Submersible Non-Clog Sewage Pumps Are Designed for Typical Raw Sewage Application.



CPW5-12 H
Pump with 1 HP
Heavy Duty float switch

CPW5-12 V
Pump with 1 HP
Vertical float switch

- 1/2 HP @ 115 VAC 60 Hz Single Phase @ 11.5 AMPS
- 3450 RPM, 60 Hz NEMA L Includes Overload Protection
- 16 AWG 20 foot (UL/cUL) Cord
- Discharge 2" NPT. Vertical
- Solids Handling 2"
- Liquid Temperature 140 Degrees F. (Intermittent)
- Hardware 300 Series Stainless Steel
- Motor Housing Cast Iron
- Shaft Stainless Steel
- Bearing (Upper & Lower)
Single Row, Ball, Oil Lubricated
- Volute Cast Iron
- Seal Plate Cast Iron
- Impeller Cast Iron/Vortex
- Square Rings Buna-N
- Oil Filled, Class B
- Permanent Split Capacitor



Internal or External Start Components Single or 3 Phase



The vortex impeller design of the grinder pump provides non-overloading performance and prevents clogging.

The **CPG2-2(S)** pump produces capacities up to 44 gpm with heads up to 103 feet.

The **CPG2-2(H)** pump produces capacities up to 42 gpm with heads up to 133 feet.

The pump can easily handle waste from:

- Residential/Commercial Developments
- Wastewater Transfer
- Hospitals, Motels, Apartments
- Schools, Universities
- Churches
- Campgrounds
- Office Complexes

Some of the other pump features:

- Single or 3 Phase
 - 2 HP @ 230 V 1-Phase @ 15 AMPS
 - 2 HP @ 230 V 3-Phase @ 9 AMPS
 - 2 HP @ 460 V 3-Phase @ 4.5 AMPS
- 150 Degrees F. (Intermittent)
- 30' Cord
- Start component
 - Internal (no control panel required)
 - External (must use start kit or components in control panel)

How to Order

CPG 2 - 2 1 S I

SERIES

2HP Grinder

VOLTAGE

2 - 208/230 VAC

4 - 460 VAC (3-Phase)

PHASE

1 - Single Phase Motor

3 - 3 Phase Motor

HEAD

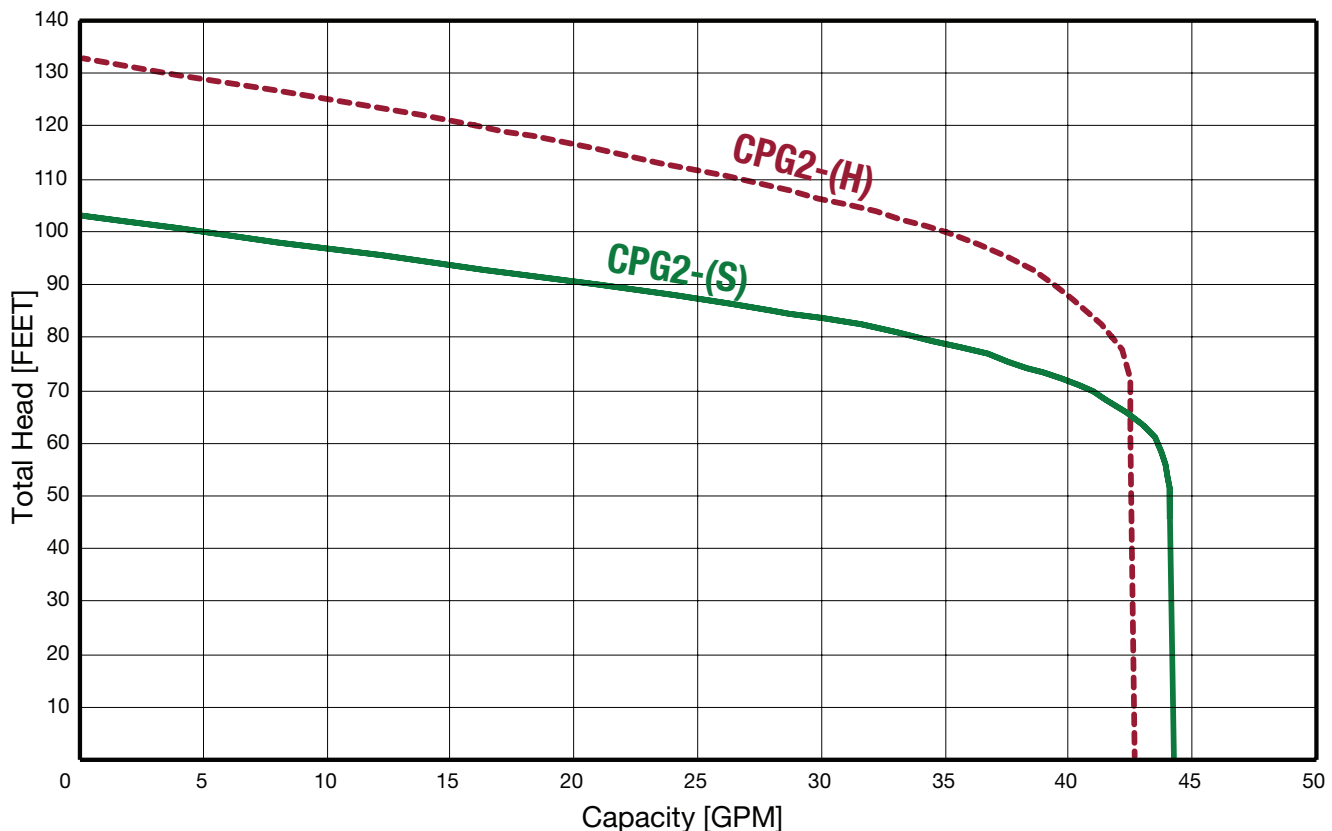
S - Standard Head (103 Feet)

H - High Head (133 Feet)

START COMPONENTS

I - Internal Start Components

E - External Start Components



Sealed Entrance-Replaceable Power Cord

Easy to replace, prevents water from entering the motor housing through a cut power cord. Warranty is not voided if plug is cut off.

Internal or External Start Kit

Internal Start / Run capacitor in the motor. External Start / Run capacitor design for capacitors in the control panel.

Pump Design

The centrifugal submersible grinder pump is capable of reducing all material found in normal residential and light industrial sewage containing small quantities of plastic, disposable diapers, sanitary napkins, rubber, food particles and other non-abrasive solids into a finely ground slurry. Heavy duty ASTM A48, Class 30 cast iron components.

Strong Motor

Non-overloading high torque for powerful and reliable pump operation. The rotor and stator assembly is of the standard frame design. The motor windings shall be of Class B insulation and operate in a sealed environment containing clean dielectric oil, making it capable of operating in a totally, partially or non-submerged condition for extended periods of time without damage due to the heat being generated.

2-Bearing Support

Pump shall utilize a 2-Bearing design operating in an oil bath atmosphere, consisting of an upper single row, an intermediate single row, ball bearing for thrust loads and a lower bronze sleeve bearing for radial loads to prevent shaft deflection. Long 50,000-hour B-10 bearing life.

Tandem Double Mechanical Seal Protection

Each shaft seal prevents leakage between the pump and motor. The upper seal is constructed of a carbon rotating face and ceramic stationary face, 300 series stainless steel hardware, and all elastomer parts to be Buna-N. The lower seal is silicon carbide rotating face and stationary face, 300 series stainless steel hardware, and all elastomer parts to be Viton.

Non-Overloading Hydraulic Design

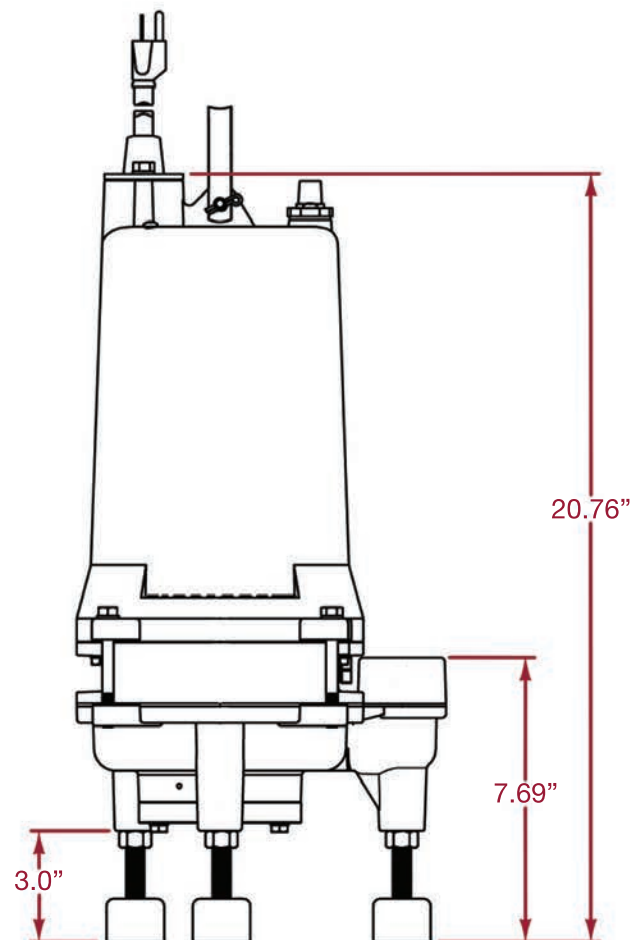
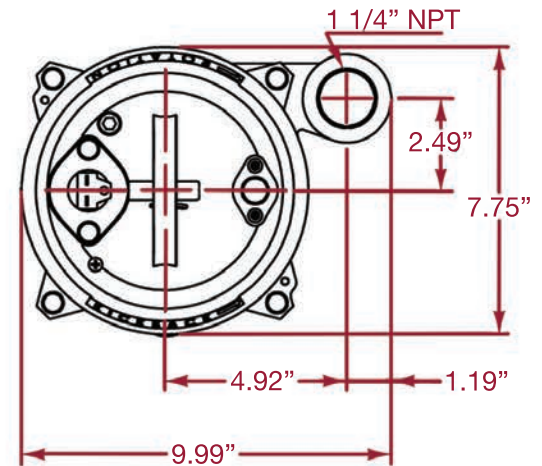
The recessed centrifugal impeller allows 100% performance curve operation from shut-off to maximum flow without damage to the pump or system. The recessed vortex impeller is out of the passageway of fluid flow, eliminating concerns of blockage or wear. The impeller shall be capable of being trimmed to meet specific performance characteristics.

Proven Grinder Assembly

The shredding ring and radial cutter shall be constructed of 440C stainless steel hardened to a minimum Rockwell C55 and shall be finish for a fine cutting edge. The grinding mechanism shall be constructed to eliminate clogging and jamming under starting and all normal conditions and capable of passing stringy type solids through the pump without roping or winding the material.

Accessories Included

Stainless steel lifting handle and anti-vibration rubber mounting feet are included with the pump.



Internal Start Components



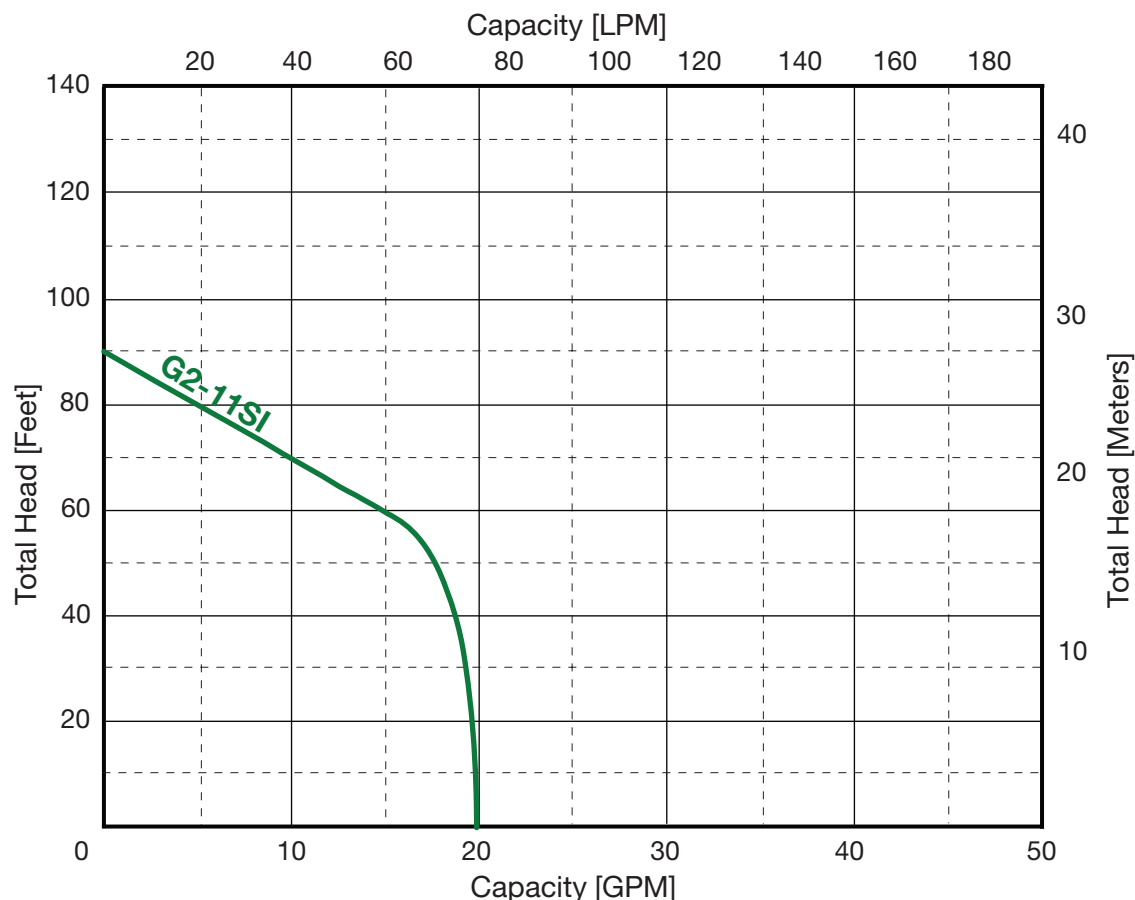
The MDI grinder pumps easily handle residential, light commercial or industrial sanitary waste, reducing it to fine slurry. The **G2-11SI Series** pump is designed for use in pressure sewer applications or any piping network.

The recessed vortex impeller design of the **G2-11SI Series** grinder pump provides trouble free, non-overloading operation over the entire performance curve. The **G2-11SI Series** pump produces capacities up to 43 gpm with heads up to 130 feet.

The modular design provides quick access to the internal start capacitor kit. Hardened stainless steel grinder assembly and many quality features.

Some of the other **G2-11SI Series** pump features:

- Strong, 2 HP, 115 V motor @ 16.9 AMPS
- **Internal start component** (no control box required)
- Potted cord cap assembly
- Dual silicon carbide shaft seals
- 3 Bearings
- Pressed in motor
- 27.5 x 8.25 x 10.75 with 1.25" NPT Removable Discharge Flange



1. Triple Sealed Cable Entrance

Stainless steel strain relief cord grip with compression grommet protects outer cord jacket. Epoxy filled inner cord cap with individually soldered wires provide anti-wicking moisture protection to the motor even if power cable is cut or damaged.

2. Internal Start Kit

Start / Run capacitor with relay securely positioned in dry compartment. Rubber compression grommet for wire leads to motor prevents oil from entering chamber. 4 bolts quickly removes cord cap for easy servicing.

3. Modular Pump Design

Commonality of parts across the pump product line minimizes the amount of parts required for servicing. Heavy duty ASTM A48, Class 30 cast iron components.

4. Strong Motor

High torque for powerful and reliable pump operation. Pressed stator securely holds motor and efficiently transfers heat. Class F insulation with overload protection in oil filled chamber for cool operation and long motor life.

5. 3-Bearing Support

Motor / Pump shaft securely held with upper and lower ball bearing plus addition sleeve bearing in lower seal chamber. Long 50,000 hour B-10 bearing life.

6. Double Mechanical Seal Protection

Dual silicon carbide mechanical shaft seals provide twice the moisture protection for the motor. Dual seals are housed in a secondary oil filled seal chamber. Tougher silicon carbide seals better handles sand, grit and abrasive materials.

7. Non-Overloading Hydraulic Design

The recessed centrifugal impeller allows 100% performance curve operation from shut-off to maximum flow without damage to the pump or system. The recessed vortex impeller is out of the passageway of fluid flow, eliminating concerns of blockage or wear.

8. Proven Grinder Assembly

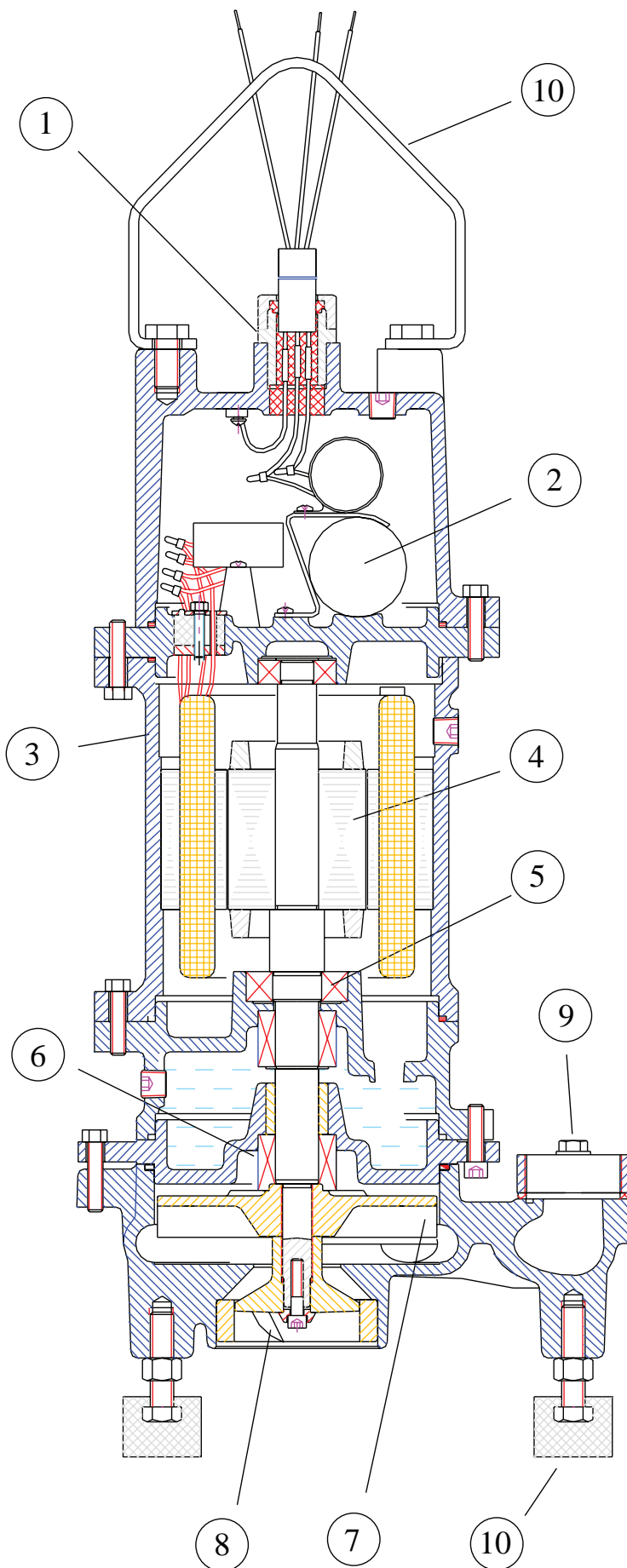
Hardened (Rockwell 56-60) stainless steel grinder assembly has 30+ years proven field experience. The reversible grinder ring and grinder impeller effectively reduces solids into a fine slurry, easily passable in a piping system without concerns of clogging. Highly efficient G2-11SI 7,400 cuts per second.

9. Easy Piping Connection

Removable 1-1/4" NPT connection flange for simple and easy connection to discharge piping.

10. Accessories Included

Stainless steel lifting handle and anti-vibration rubber mounting feet are included with the pump.



External Start Components



The MDI grinder pumps easily handle residential, light commercial or industrial sanitary waste, reducing it to fine slurry. The **G2-21** pump is designed for use in pressure sewer applications or any piping network.

The recessed vortex impeller design of this grinder pump provides trouble free, non-overloading operation over the entire performance curve. The **G2-21** grinder pump retrofits into many existing competitor pump installations. The **G2-21** pump operates with the same control panel and installation piping / rail system.

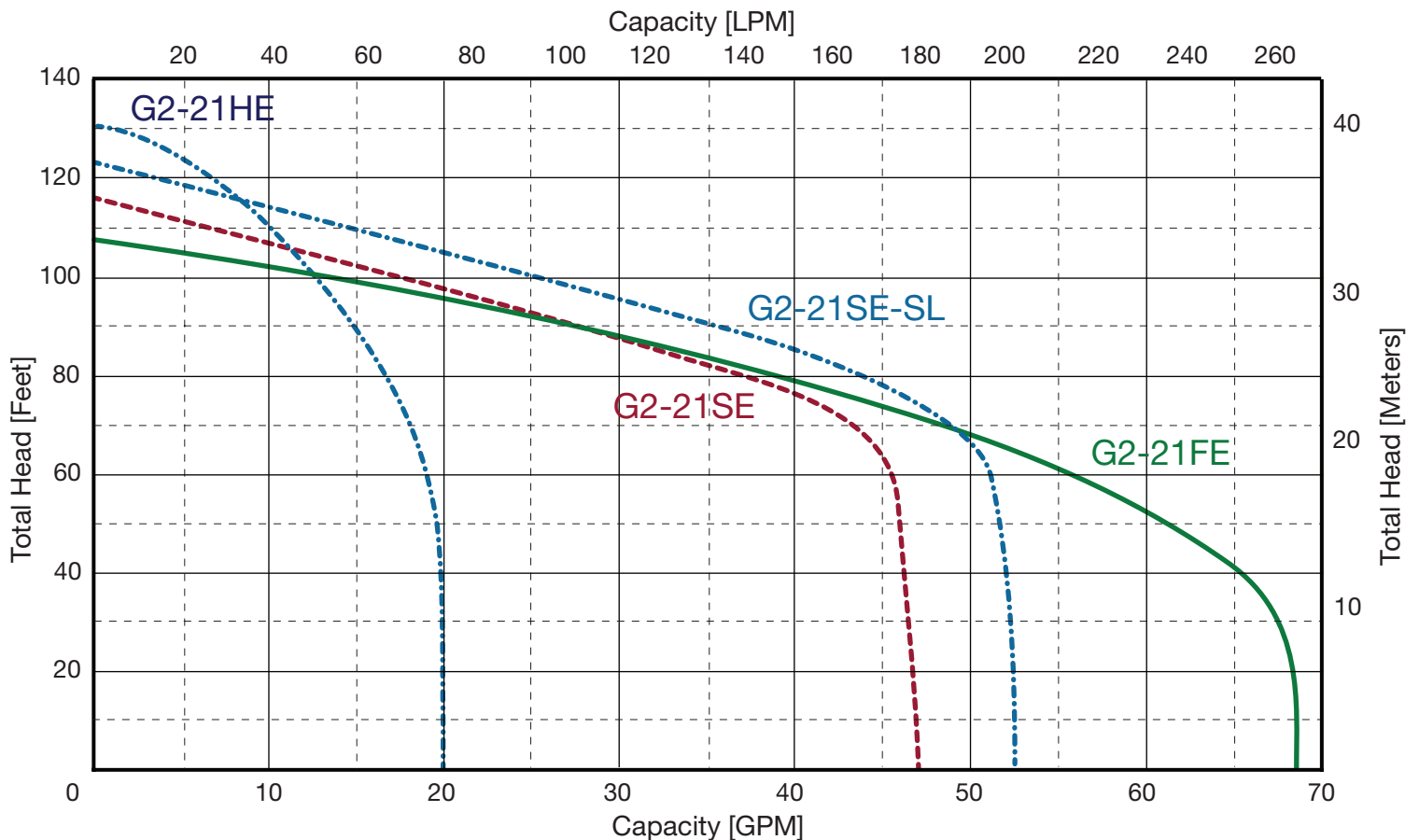
Some of the other **G2-21** series pump features:

- Interchangeable into competitor installations
- Dual mechanical seals (silicon carbide)
- Class H motor, internal overload protection
- 3 Bearing shaft support
- Internal moisture detection
- Strong, 2 HP motor 208 V @ 14 AMPS / 230 V @ 12.8 AMPS

STANDARD
"Radial" Cutter
G2-21.E



OPTIONAL
"Axial Slicer"
G2-21.E-SL



1. Triple Sealed Cable Entrance

Stainless steel strain relief cord grip with compression grommet protects outer cord jacket. Epoxy filled inner cord cap with individually soldered wires provide anti-wicking moisture protection to the motor even if power cable is cut or damaged.

2. Modular Pump Design

Commonality of parts across the pump product line minimizes the amount of parts required for servicing. Heavy duty ASTM A48, Class 30 cast iron components.

3. Strong Motor

High torque for powerful (208/230 V) and reliable pump operation. Pressed stator securely holds motor and efficiently transfers heat. Class F insulation with overload protection in oil filled chamber for cool operation and long motor life.

4. 3-Bearing Support

Motor / Pump shaft securely held with upper and lower ball bearing plus addition sleeve bearing in lower seal chamber. Long 50,000 hour B-10 bearing life.

5. Double Mechanical Seal Protection

Dual silicon carbide mechanical shaft seals provide twice the moisture protection for the motor. Dual seals are housed in a secondary oil filled seal chamber. Tougher silicon carbide seals better handles sand, grit and abrasive materials.

6. Moisture Detection

Seal leak probe signals alarm in control panel for scheduled maintenance.

7. Non-Overloading Hydraulic Design

The recessed centrifugal impeller allows 100% performance curve operation from shut-off to maximum flow without damage to the pump or system. The recessed vortex impeller is out of the passageway of fluid flow, eliminating concerns of blockage or wear.

8. Proven Grinder Assembly

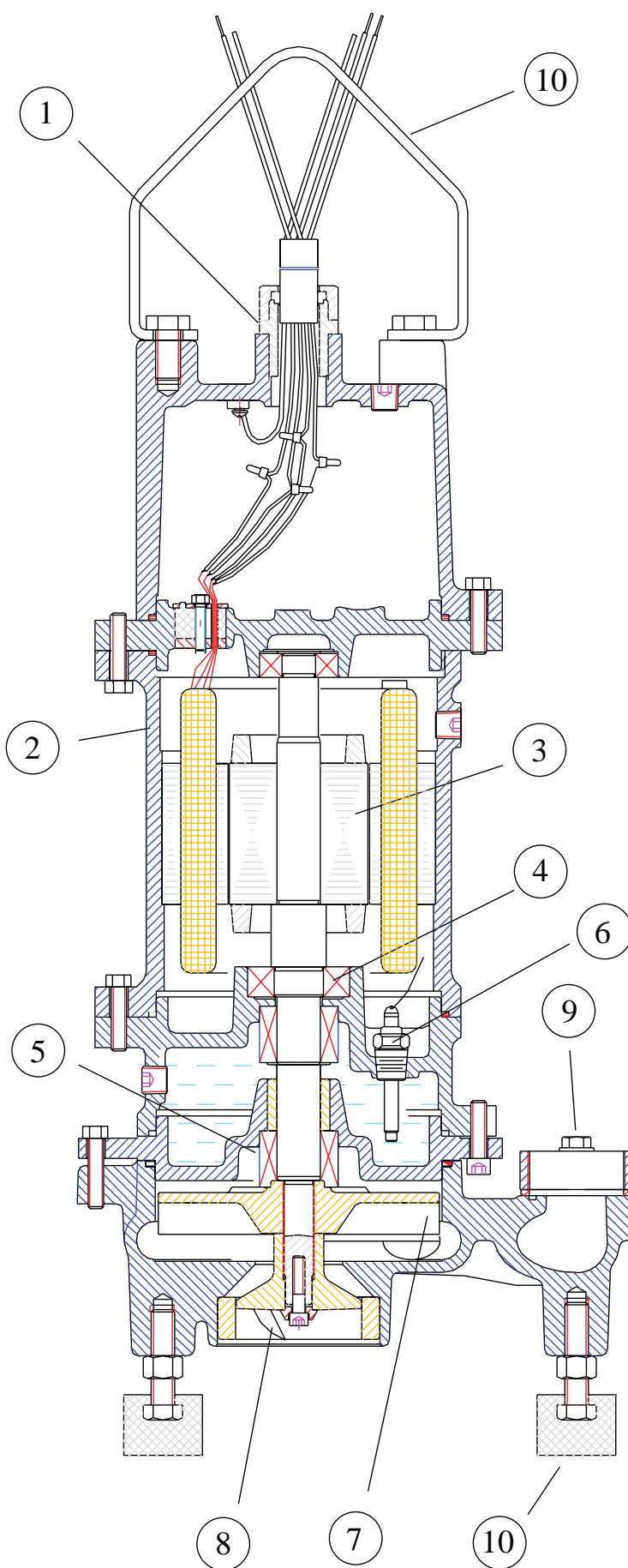
Hardened (Rockwell 56-60) stainless steel grinder assembly has 30+ years proven field experience. The reversible grinder ring and grinder impeller effectively reduces solids into a fine slurry, easily passable in a piping system without concerns of clogging. Highly efficient 16,600 (G2-21HE 7,400) cuts per second.

9. Easy Piping Connection

Removable 1-1/4" NPT connection flange for simple and easy connection to discharge piping.

10. Accessories Included

Stainless steel lifting handle and anti-vibration rubber mounting feet are included with the pump.



M4VN - 4" Discharge



2-Vane Enclosed Impeller

- Efficient Operation, Non-clogging
- Pump-Out Vanes Prevent Material Build-up
- Pressure Balance on Shaft Seal for Long Life
- Positive Pumping Action through Impeller

Strong Performance

- Ideal for Higher Flows, Lower Heads
- Operate to Shut-off Head without Damage
- Non-Overloading Performance Curve
- 3-Bearing Shaft Support

Long Service Life

- Dual Silicon Carbide Shaft Seals
- Low Motor Operation Temperatures
- Continuously Lubricated Ball Bearings

Low Maintenance

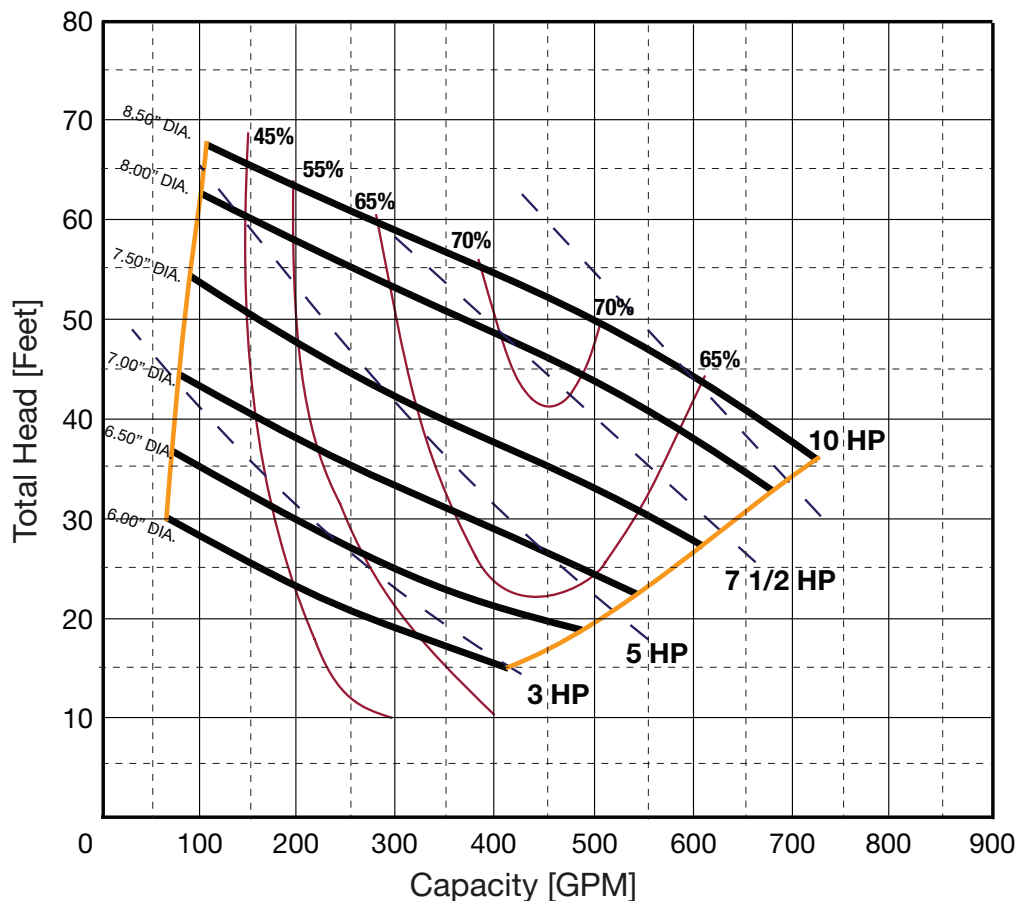
- Easily Replaceable Impeller Wear Ring Restores Original Pump Performance
- Unobstructed Impeller Passageway
- Grit-Resistant Silicon Carbide Shaft Seals
- Large, 3" diameter Solids-Handling
- High Service Factor Motor Handles Tough Electrical Operating Conditions

Capabilities

- Flows to 700 GPM
- Heads to 67 Feet
- 3 - 10 HP Range
- Voltage / Phase Options
 - 208 / 230 Volt 1-Phase
 - 208 / 230 / 460 Volt, 3-Phase
- ANSI Class 125 Horizontal Flange Discharge Connection
- Motor Speeds 1150 / 1750 RPM
- Solids-Handling 3"
- Recessed, Vortex Impeller
- Motor Service Factor 1.20

Features and Benefits

- Watertight Cable Entrance
- Strong Motor (U.S. Motor Manufacturer)
- Solid 3-Bearing Support Rated for 100,000 hour B-10 life.
- Severe Duty Dual Mechanical Seals
- Moisture Detection
- High Efficiency Hydraulic Design
- 4" Horizontal Standard Flange Connection
- High Performance Wear Ring
- Available in dry pit configuration



M4V Series

Long Service Life

- Easily Replaceable Impeller Wear Ring Restores
- Original Pump Performance
- Unobstructed Impeller Passageway
- Grit-Resistant Silicon Carbide Shaft Seals
- Large, 3" diameter Solids-Handling
- High Service Factor Motor Handles Tough Electrical Operating Conditions

Low Maintenance

- Easily replaceable impeller wear ring restores original pump performance
- Unobstructed impeller passageway
- Grit-resistant silicon carbide shaft seals
- Large, 3" diameter solids handling
- High service factor motor handles tough electrical operating conditions

Heavy Duty Pump Series

- Handles aggressive pumping applications
- Strong pumping capacities
- Centerline volute discharge
- Smooth, quiet operation

Strong Performance

- Ideal for higher flows
- Positive pumping action through impeller
- Pump-out vanes, prevent material build-up Non-overloading performance curve

Options Available

- Flows to 20,000 GPM
- Up to 350 HP
- Discharge to 24"
- Available in dry pit configuration

M4VB - 4" Discharge



Features and Benefits

- Watertight Cable Entrance
- Strong Motor (U.S. Motor Manufacturer)
- Solid 2-Bearing Support Rated for 100,000 hour B-10 life.
- Severe Duty Dual Mechanical Seals
- Moisture Detection
- High Efficiency Hydraulic Design
- 4" Horizontal Standard Flange Connection
- High Performance Wear Ring

Capabilities:

- Flows to 1850 GPM
- Heads to 165 Feet
- 3 - 60 HP Range
- Voltage Options
 - 208 / 230 / 460 / 575 Volt, 3-Phase
- 4" ANSI Class 125 Horizontal Flange
- Motor Speed 870 / 1150 / 1750 rpm
- Solids Handling 3 3/16"
- Balanced, Enclosed, 2-Vane Impeller
- Motor Service Factor 1.20

M4VP - 4" Discharge



Features and Benefits

- Watertight Cable Entrance
- Strong Motor (U.S. Motor Manufacturer)
- Solid 2-Bearing Support Rated for 100,000 hour B-10 life.
- Severe Duty Dual Mechanical Seals
- Moisture Detection
- High Efficiency Hydraulic Design
- 4" Horizontal Standard Flange Connection
- High Performance Wear Ring

Capabilities:

- Flows to 1150 GPM
- Heads to 110 Feet
- 3 - 20 HP Range
- Voltage Options
 - 208 / 230 Volt, 1-Phase
 - 208 / 230 / 460 / 575 Volt, 3-Phase
- 4" ANSI Class 125 Horizontal Flange
- Motor Speed 1150 / 1750 rpm
- Solids Handling 3"
- Balanced, Enclosed, 2-Vane Impeller
- Motor Service Factor 1.20



Recessed Impeller

- Handles Stringy and Fibrous Materials
- Passes Large Solids
- Pumps Heavier Solids Concentrations
- Ideal for Grit and Abrasive Solids
- Pumping via Vortex Action
- Solids Do Not Pass through Impeller
- Virtually Impossible to Clog

Strong Performance

- Ideal for Higher heads, Lower flows
- Operate to Shut-off Head without Damage
- Non-overloading Performance Curve

Long Service Life

- Dual Silicon Carbide Shaft Seals
- Low Motor Operation Temperatures
- Continuously Lubricated Bearings
- Premium 3-Bearing Construction
- Epoxy Potted Cord Entry

Low Maintenance

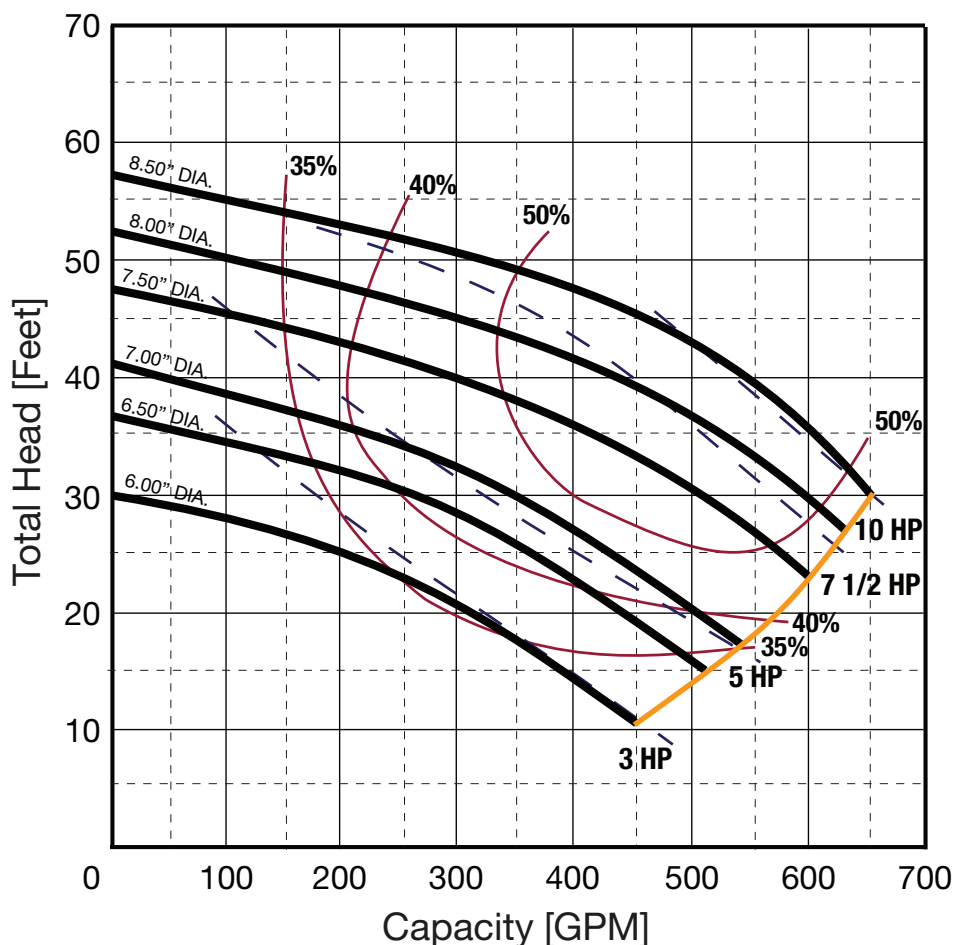
- No Wear Components
- Recessed Impeller out of Passageway
- Grit-Resistant Silicon Carbide Shaft Seals

Capabilities

- Flows to 650 GPM
- Heads to 57 Feet
- 3 - 10 HP Range
- Voltage / Phase Options
 - 208 / 230 Volt 1-Phase
 - 208 / 230 / 460 Volt, 3-Phase
- ANSI Class 125 Horizontal Flange Discharge Connection
- Motor Speeds 1150 / 1750 RPM
- Solids-Handling 3"
- Balanced, Enclosed, 2-Vane Impeller
- Motor Service Factor 1.20

Features and Benefits

- Watertight Cable Entrance
- Strong Motor (U.S. Motor Manufacturer)
- Solid 3-Bearing Support Rated for 100,000 hour B-10 life.
- Severe Duty Dual Mechanical Seals
- Moisture Detection
- High Efficiency Hydraulic Design
- 3" Solids Handling
- Standard Flange Connection
- Available in dry pit configuration



M4R Series

Recessed Impeller

- Handles Stringy and Fibrous Materials
- Passes Large Solids
- Pumps Heavier Solids Concentrations
- Ideal for Grit and Abrasive Solids
- Pumping via Vortex Action
- Solids Do Not Pass through Impeller
- Virtually Impossible to Clog

Long Service Life

- Dual Silicon Carbide Shaft Seals
- Low Motor Operation Temperatures
- Continuously Lubricated Bearings
- Premium 3-Bearing Construction
- Epoxy Potted Cord Entry

Low Maintenance

- No Wear Components
- Recessed Impeller out of Passageway
- Grit-Resistant Silicon Carbide Shaft Seals

Strong Performance

- Ideal for Higher heads, Lower flows
- Operate to Shut-off Head without Damage
- Non-overloading Performance Curve

Options Available

- Flows to 1,400 GPM
- Up to 60 HP
- Available in dry pit configuration

M4RH - 4" Discharge



Features and Benefits

- Watertight Cable Entrance
- Strong Motor
- 3-Bearing Support Rated for 100,000 hour B-10 life.
- Severe Duty Dual Mechanical Seals
- Moisture Detection
- Non-Overloading Hydraulic Design
- 3" Solids Handling
- Standard Flange Connection

Capabilities:

- Flows to 510 GPM
- Heads to 93 Feet
- 7.5 - 15 HP Range
- Voltage Options
 - 208 / 230 Volt, 1-Phase
 - 208 / 230 / 460 Volt, 3-Phase
- 4" ANSI Class 125 Horizontal Flange
- Motor Speed 3450 rpm
- Solids Handling 3"
- Recessed, Vortex Impeller
- Motor Service Factor 1.20

M4RP - 4" Discharge



Features and Benefits

- Watertight Cable Entrance
- Strong Motor (U.S. Motor Manufacturer)
- Solid Bearing Support Rated for 100,000 hour B-10 life.
- Severe Duty Dual Mechanical Seals
- Moisture Detection
- Non-Overloading Hydraulic Design
- 3" Solids Handling
- Standard Flange Connection

Capabilities:

- Flows to 800 GPM
- Heads to 125 Feet
- 3 - 20 HP Range
- Voltage Options
 - 208 / 230 Volt, 1-Phase
 - 208 / 230 / 460 / 575 Volt, 3-Phase
- 4" ANSI Class 125 Horizontal Flange
- Motor Speed 1150 / 1750 / 3450 rpm
- Solids Handling 3"
- Recessed, Vortex Impeller
- Motor Service Factor 1.20

COMPLETE TURNKEY PACKAGES

- Completely Assembled
- Quick & Simple Field Installation
- Saves Time & Money
- Fast Shipping Time
- Custom Built to Your Requirements



BASINS

- Diameters to 120"
- Lengths to 28'

SYSTEMS

- Simplex
- Duplex

PACKAGES

- Pumps
- Controls
- Junction Box
- Floats
- Rail System
- Piping



Turnkey Replacement Package

The **MDI** Advantages:

- Fully Assembled
- Fits into Existing System No Changes
 - Lower Into Place
 - Latch Arm Over Pipe
 - Plug Connector In
- Eliminates Existing Problems
- Heads to 183 feet
- Operates With Same Control Panel
- Better Pump Performance More Flow
- Reduces Service Maintenance Issues
- Saves Money, More Efficient!

Pump Specifications:

EOR-WTB

G2-21HI 2 HP Dual Seal Grinder Pump

The recessed vortex impeller design of the G2-21HI grinder pump provides trouble free, non-overloading operation over the entire performance curve. The G2-21HI pump produces capacities to 20 gpm with heads to 130 feet.

For more detail see page 44

EOR-WTB-F (High Flow)

CPG2-21HI 2 HP Dual Seal Grinder Pump

The vortex impeller design of the CPG2-21HI pump provides non-overloading performance and prevents clogging over the entire performance curve. The CPG2-21HI pump produces capacities to 42 gpm with heads to 133 feet.

For more detail see page 42

EOR-H (High Head)

MHGS2-21 2 HP Dual Seal Grinder Pump

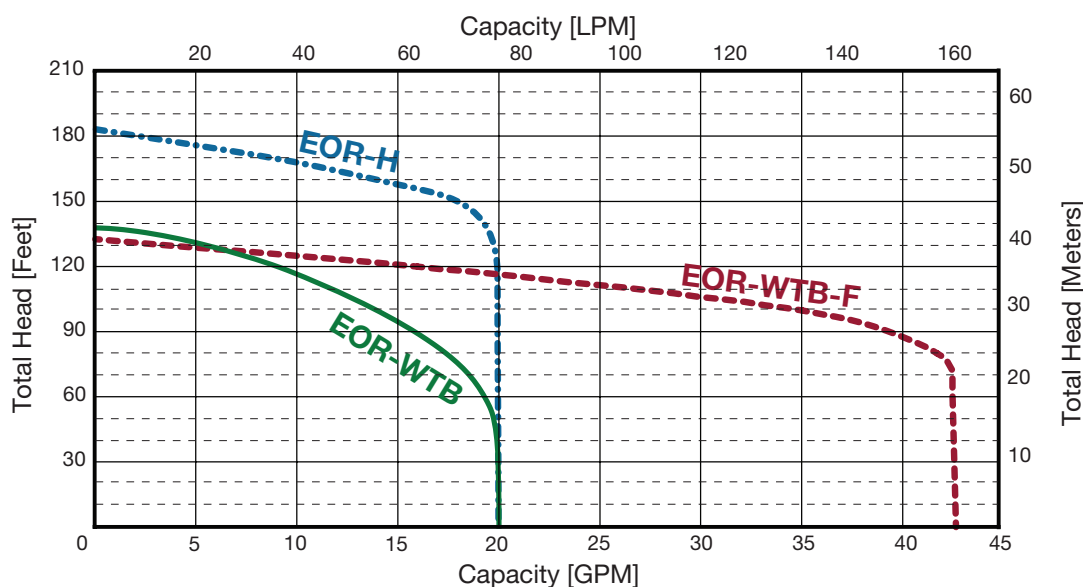
The semi-open centrifugal design of the MHGS2-21 grinder pump provides trouble free, non-overloading operation over the entire performance curve. The MHGS2-21 pump produces capacities to 20 gpm with heads to 183 feet.



EOR-WTB
Shown Here



EOR-WTB-F
Shown Here



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2 HP Grinder Pump Package

Turnkey Replacement Package Fully Assembled



The MDI advantages:

- Fits into Existing System - No Modifications
- Simple and Fast Installation - Just Lower Into Place
- Operates with same Control Panel
- Eliminates Existing Problems
- Superior Pump Performance - More Flow
- Reduces Service/Maintenance Issues
- Reliable Operation
- Saves up to 20% on energy costs

The Barnes Retrofit works with any of our 2 HP grinder pumps.
Just add BR to the beginning of the part number:
(Ex. BRG2-21HI)

For detailed specs please refer to any of the following:

115 Volt 2 HP Standard Head Internal Start G2-11SI (See Page 44)

208/230 Volt 2 HP Standard Head Internal Start G2-21SI (See Page 44)

208/230 Volt 2 HP High Head Internal Start G2-21HI (See Page 44)

208/230 Volt 2 HP Standard Head External Start G2-21SE (See Page 46)

208/230 Volt 2 HP High Head External Start G2-21HE (See Page 46)

5 HP Grinder Pump Package



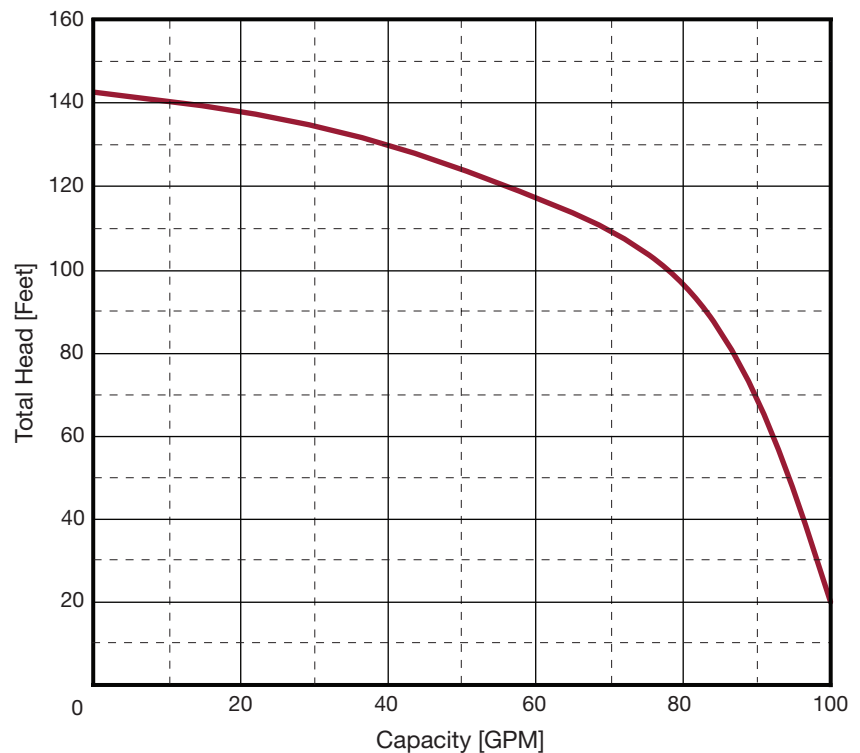
Turnkey Replacement Package
Fully Assembled
Simple Fast Installation
Just lower into place!

The MDI advantages:

- No Modifications - Fits into Existing System
- Eliminates Existing Problems
- Superior Pump Performance - More Flow
- Reduces Service/Maintenance Issues
- Saves Money!
- Operates with same Control Panel
- Reliable Operation

Pump Specifications: BRG5-21HE 5 HP Dual Seal Grinder High Flow Pump External Start Components - High Flow

The G5-21HE series pump features:
Strong Class F 5 HP motor, 208 / 230 Volt, 1-phase
3 support bearings (upper / lower ball, sleeve)
Dual mechanical seals (silicon carbide)
Internal moisture protection



The MDI BRG5-21HE series centrifugal grinder pumps easily handle residential, light commercial or industrial sanitary waste, reducing it to fine slurry. The BRG5-21HE pump is designed for use in pressure sewer applications or any piping network.

The recessed vortex impeller design of the BRG5-21HE grinder pump provides trouble free, non-overloading operation over the entire performance curve.

The modular design provides quick and easy serviceability. The hardened stainless steel grinder assembly provides many years of dependable operation.

FOR MDI'S MERCURY DISPLACEMENT CONTACTORS

LIGHTING

Auditorium Lighting
Beacons and Search Lights
Copy Equipment
Dimmer Controls
Display Signs
Emergency Lighting
Flood Lights
High Intensity Lamps
Hospital Lighting
Lighting Test Panels
Mercury Vapor Lamps
Parking Lots
Photography Lighting
Scoreboards
Sodium Vapor Lamps
Stage Lighting
Street Lighting
Surgical Lighting Control
Tower Lights
Traffic Signal
Tungsten Lamps

GENERAL APPLICATIONS

Air Conditioning
Alarm Systems
Automatic Door Closers
Battery Chargers
Blue Print Machines
Copiers
Computer Power Supplies
Corrosive Locations
Dusty, Oil Locations
Dry Cleaning Equipment
Energy Management Systems
Farm Incubators and Brooders
Low Voltage Switching
Marking and Engraving Equipment
Motor Starting
Soldering Systems
Surgical Equipment
Telephone Switching
Test Panels
Vapor De-greasers
X-Ray Machine Controls

ELECTRIC HEATERS

Baseboard Heaters
Blow Molding
Cabinet Heaters
Chemical Tank Heaters
Curing Furnaces
Drying Ovens
Duct Heaters
Film Packaging
Glass Furnaces
Heat Lamps
Heat Sealing Machines
Induction Heater
Industrial Ovens
Infrared Heaters
Ink Drying
Ink Heating
Injection Molding Machines
Kilns
Lab Ovens
Packaging Equipment
Plastic Extruders
Pool Heaters
Quartz Heaters

Radiant Heaters
Roof Top Heating
Shrink Tunnels
Unit Heaters
Vacuum Forming

FOOD INDUSTRY EQUIPMENT

(Heaters)
Baking Ovens
Coffee Urns
Deep Fryers
Dishwashers
Electric Grills
Electric Ranges
Pizza Ovens
Steam Generators

SPECIALTY APPLICATIONS

Capacitor Discharge Systems
Hazardous Locations
Mining Equipment
Phase Converters
Tower Control

We can cross-reference any competitors products. Over 125 years experience in the relay business.

WARRANTY

MDI Inc., warrants its products to be free from defects in material or workmanship (length varies depending on product), and will replace any units with such defects. Warranty is void if units are improperly applied. All repairs are to be done by MDI in their facility. The purchaser is responsible for pump removal and re-installation. MDI Inc. shall not be liable for any consequential, incidental, or contingent damages whatsoever. The foregoing Warranty is exclusive to MDI products and in lieu of all other express or implied Warranties, including but not limited to the implied Warranties of merchantability and fitness for a particular purpose.

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