

HG Series Mercury Displacement Relay

User's Manual



ISO 9001



Registered Company
Winona, Minnesota USA

Watlow Controls, 1241 Bundy Blvd., P.O. Box 5580, Winona, MN, USA 55987-5580, Phone: (507) 454-5300, Fax: (507) 452-4507

WMDR-XUMN-1097

June 1997

Supersedes: WMDR-XUMN Rev A00



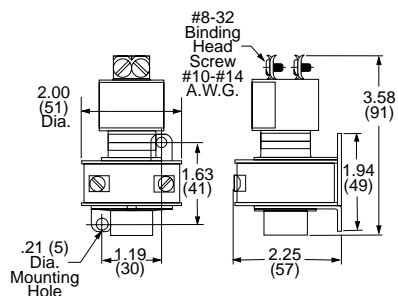
Made in the U.S.A.

Printed on Recycled Paper 10% Postconsumer Waste

Dimensions

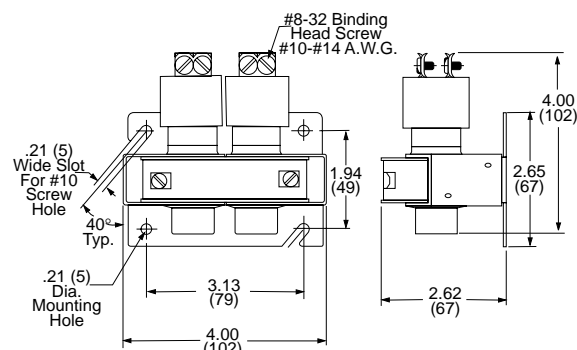
30 Amp Models HG30-XKDX-0000

1 Pole

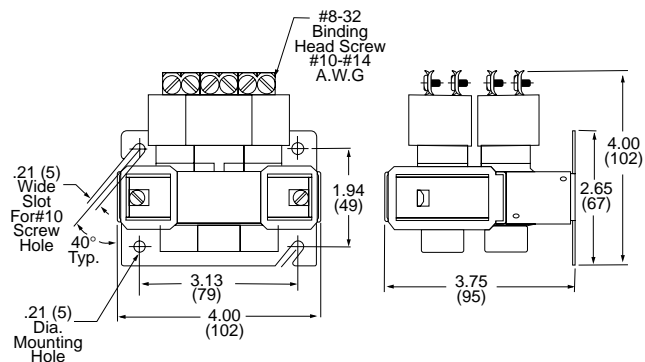


NOTE:
Watlow recom-
mends that ring ter-
minal lugs be used
with stranded wire
on all binding head
screw terminals.

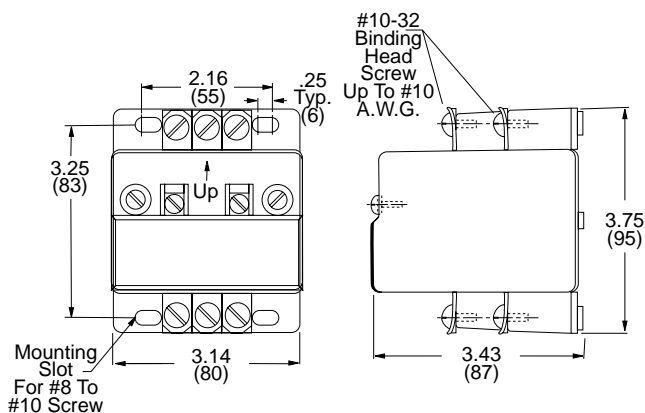
2 Pole



3 Pole



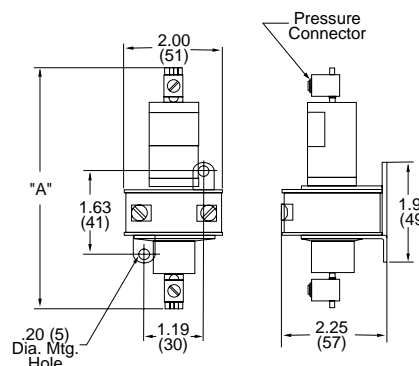
Definite Purpose Relay Foot Print HG30-XAAX-0000



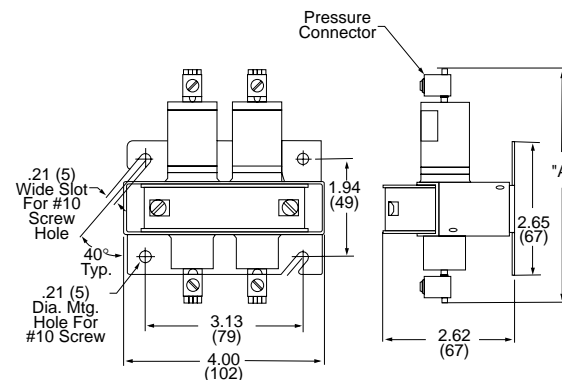
All 35, 50, and 60 Amp Models

	"A" Dimensions	Pressure Connectors
HG35-XLDX-0000	4.62 (117)	#4-14 A.W.G.
HG50-XMDX-0000	4.62 (117)	#4-14 A.W.G.
HG60-XPDX-0000	5.12 (130)	#1 - 8 A.W.G.

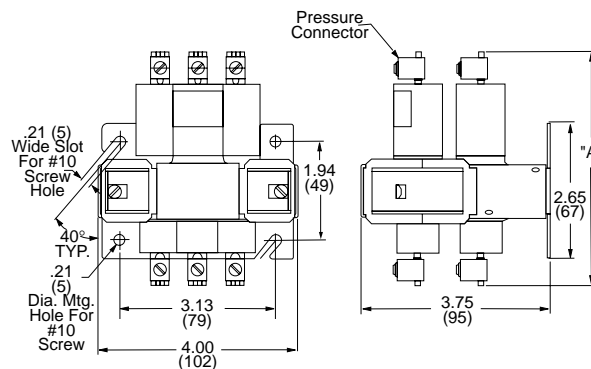
1 Pole



2 Pole



3 Pole



⚠ WARNING: Mercury displacement relay must be mounted vertically. Failure to do this will prevent the contacts from turning off, which will supply full voltage to the load. Failure to follow this guideline could result in damage to equipment, and personal injury or death.

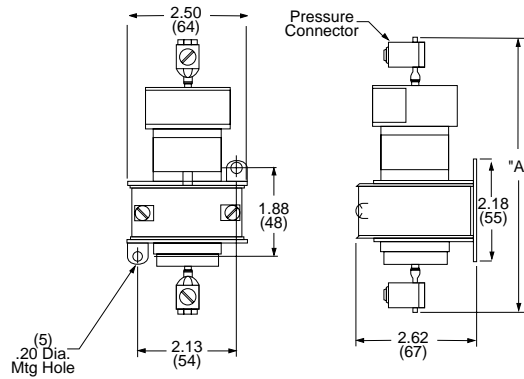
⚠ WARNING: Mercury displacement relay contacts will switch ac current only. Not for use with dc current. Failure to follow this guideline could result in damage to equipment, and personal injury or death.

Dimensions

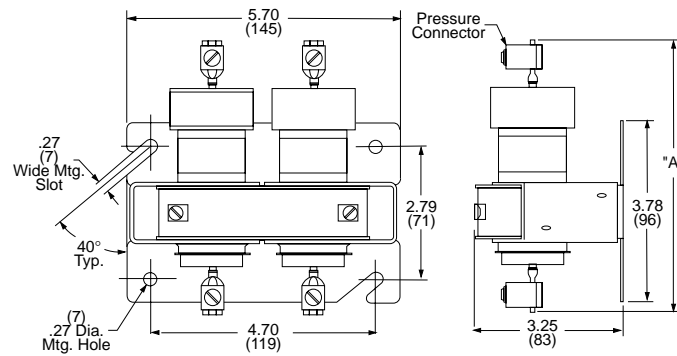
All 80, 100, and 150 Amp Models

	"A" Dimensions	Pressure Connectors:
HG80-XABX-0000	5.77 (147)	#1-8 A.W.G.
HG1M-XACX-0000	5.77 (147)	#1-8 A.W.G.
HG2M-XADX-0000	6.40 (163)	#1/0 - #2 A.W.G.

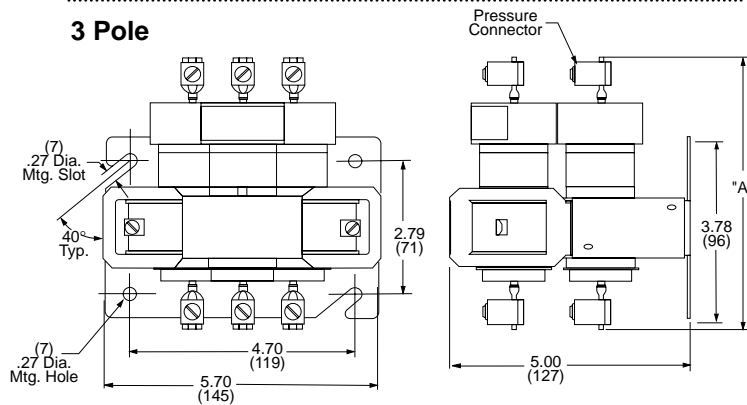
1 Pole



2 Pole



3 Pole

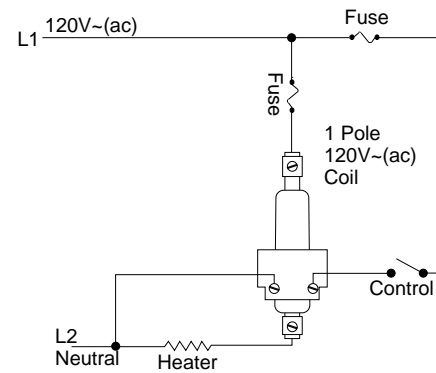


Wiring

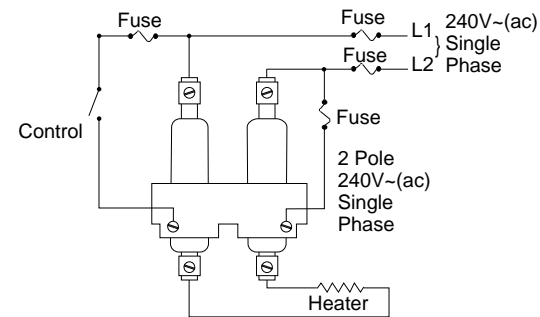
⚠ WARNING: Wiring must conform to National Electric Code (NEC) safety standards, as well as locally applicable codes. Failure to do so could result in personal injury or death. See page 6 for fusing recommendations.

⚠ Use copper conductors only.

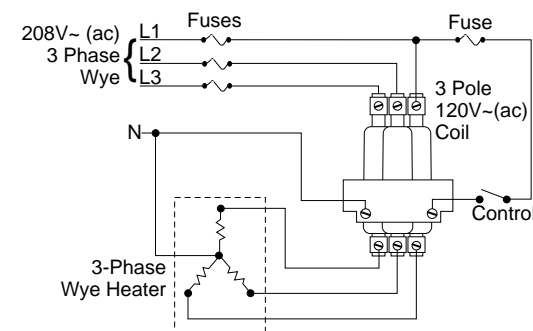
1 Pole Wiring Example



2 Pole Wiring Example



3 Pole Wiring Example



Field Coil Power Requirements

HG30-XAAX-0000

Voltage	1 Pole		2 Pole		3 Pole	
	Current	Power	Current	Power	Current	Power
24V~ (ac)	NA	NA	0.456A	10.9VA	0.510A	12.2VA
120V~ (ac)	NA	NA	0.121A	14.5VA	0.106A	12.7VA
208V~ (ac)	NA	NA	0.055A	11.4VA	0.055A	11.4VA
240V~ (ac)	NA	NA	0.063A	15.1VA	0.062A	14.9VA
24V= (dc)	NA	NA	0.240A	5.8W	0.250A	6.0W

HG30-XKDX-0000 HG35-XLDX-0000 HG50-XMDX-0000 HG60-XPDX-0000

Voltage	1 Pole		2 Pole		3 Pole	
	Current	Power	Current	Power	Current	Power
24V~ (ac)	0.235A	5.6VA	0.529A	12.7VA	1.270A	30.5VA
120V~ (ac)	0.057A	6.8VA	0.133A	16.0VA	0.224A	26.9VA
208V~ (ac)	0.030A	6.2VA	0.075A	15.6VA	0.111A	23.1VA
240V~ (ac)	0.035A	8.4VA	0.087A	20.9VA	0.128A	30.7VA
24V= (dc)	0.146A	3.5W	0.266A	6.4W	0.470A	11.3W

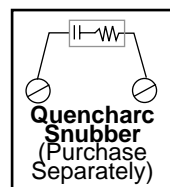
HG80-XABX-0000 HG1M-XACX-0000 HG2M-XADX-0000

Voltage	1 Pole		2 Pole		3 Pole	
	Current	Power	Current	Power	Current	Power
24V~ (ac)	0.930A	22.3VA	2.310A	55.4VA	5.060A	121.4VA
120V~ (ac)	0.195A	23.4VA	0.448A	53.8VA	0.968A	116.2VA
208V~ (ac)	0.097A	20.2VA	0.280A	58.2VA	0.482A	100.3VA
240V~ (ac)	0.112A	26.9VA	0.323A	77.5VA	0.563A	135.1VA
24V= (dc)	0.219A	5.2W	0.572A	13.7W	0.555A	13.3W

Temperature Control Output to MDR Coil Input

Please refer to the Field Coil Power Requirements when selecting the correct temperature control output.

Example: An HG35-1LD3-X000 requires 224mA to energize the coil and could be used with Watlow temperature control output options 'B' or 'K' (i.e. 988A-XXBB-XXXX or 988A-XXKK-XXXX) models. The best selection is the 'B' output option because it includes an RC snubber across the output. If you select the 'K' option, it is recommended that you also purchase a Quencharc® snubber separately (Watlow part number 0804-0147-0000). Place the snubber across the MDR coil terminals to protect the temperature control solid state output. When placing the snubber across the coil of a 2 and 3 pole relay, you may have to add some lead wire to the snubber. The MDR coil is an inductive load and the snubber will reduce the flyback voltage produced by the MDR coil when it de-energizes. See below.



Note: Watlow temperature control solid state outputs will not drive VDC coils directly. Refer to the coil current specifications above and any temperature control output specifications as required by the application.

Ordering Information

WMDR-XMNN-1099

	HG	-		-	00
Amperage					
30	=	30 Amp			
35	=	35 Amp			
50	=	50 Amp			
60	=	60 Amp			
80	=	80 Amp			
1M	=	100 Amp			
2M	=	150 Amp			
Coil Voltage					
1	=	120V~ (ac)			
4	=	24V~ (ac)			
6	=	24V= (dc)			
9	=	208/240V~ (ac)			
Option					
KD	=	30 Amp (Standard)			
LD	=	35 Amp			
MD	=	50 Amp			
PD	=	60 Amp			
AA	=	30 Amp (Definite Purpose Relay Footprint)			
AB	=	80 Amp			
AC	=	100 Amp			
AD	=	150 Amp			
Poles					
1	=	1 Pole (Not For Option "AA")			
2	=	2 Pole			
3	=	3 Pole			
Type					
00	=	Standard (Includes Definite Purpose Relay Footprint)			
XX	=	Custom			

Returns

1. Call Customer Service: 507-454-5300, or fax: 507-452-4507, for a Return Material Authorization (RMA) number before returning any item for repair.
2. Make sure the RMA number is on the outside of the carton, and on all paperwork returned. Ship on a freight prepaid basis.
3. A restocking charge of 20% of the net price applies for all returned stock controls and accessories in like new condition and within 120 days after shipment. Non-stock and modified stock items are not returnable.
4. If the unit is unrepairable, it will be returned to you with a letter of explanation. Repair costs will not exceed 50% of the original cost.

Recycle

To provide proper disposal, Watlow accepts used MDRs. Phone (507) 454-5300 for an Return Materials Authorization (RMA) number. Contact your Watlow representative for details.

Warranty

The Mercury Relay is warranted to be free of defects in material and workmanship for 18 months after delivery to the first purchaser for use, providing that the units have not been misapplied. Since Watlow has no control over their use, and sometimes misuse, we cannot guarantee against failure. Watlow's obligations hereunder, at Watlow's option, are limited to replacement, repair or refund of purchase price, and parts which upon examination prove to be defective within the warranty period specified. This warranty does not apply to damage resulting from transportation, alteration, misuse, abuse or improper fusing.

Specifications

WMDR-XSPN-1098

Model Number	HG30-XKDX	HG30-XAAX	HG35-XLDX	HG50-XMDX	HG60-XPDX	HG80-XABX	HG1M-XACX	HG2M-XADX
Contact Type	N.O.	N.O.	N.O.	N.O.	N.O.	N.O.	N.O.	N.O.
Maximum Load Current ac	30A	30A	35A	50A	60A	80A	100A	See Table Below
(typ) Contact Resistance	4mΩ	4mΩ	4mΩ	4mΩ	4mΩ	4mΩ	4mΩ	4mΩ
Load Wire Terminations	10-14AWG bhs	10-14AWG bhs	4-14AWG pc	4-14AWG pc	1-8AWG pc	1-8AWG pc	1-8AWG pc	1/0-2AWG pc
Coil Wire Terminations	#6-32bhs up to #12AWG	#6-32bhs up to #16AWG	#6-32bhs up to #12AWG	#6-32bhs up to #12AWG	#6-32bhs up to #12AWG	#6-32bhs up to #12AWG	#6-32bhs up to #12AWG	#6-32bhs up to #12AWG
Load Type	Resistive	Resistive	Resistive	Resistive	Resistive	Resistive	Resistive	Resistive
Maximum Load Voltage ac	480/600**	480/600**	600****	600****	480/600****	480***	480***	480/600
Load Frequency	50/60 Hz.	50/60 Hz.	50/60 Hz.	50/60 Hz.	50/60 Hz.	50/60 Hz.	50/60 Hz.	50/60 Hz.
Pull-in Time	70 mS	50 mS	70 mS	70 mS	70 mS	90 mS	90 mS	90 mS
Drop-out Time	90 mS	70 mS	90 mS	90 mS	90 mS	140 mS	140 mS	140 mS
Operating Ambient	-35 to 55°C	-35 to 55°C	-35 to 55°C	-35 to 55°C	-35 to 55°C	-35 to 55°C	-35 to 55°C	-35 to 55°C
Storage Temperature	-40 to 100°C	-40 to 100°C	-40 to 100°C	-40 to 100°C	-40 to 100°C	-40 to 100°C	-40 to 100°C	-40 to 100°C
Hg - Mass/Contact	1.82 oz.	0.84 oz.	1.75 oz.	1.75 oz.	1.75 oz.	8.93 oz.	8.93 oz.	9.46 oz.
Weight : 1 Pole	1.0 lbs.	1.0 lbs.	1.0 lbs.	1.0 lbs.	1.0 lbs.	2.0 lbs.	2.0 lbs.	2.5 lbs.
2 Pole	2.0 lbs.	2.0 lbs.	2.0 lbs.	2.0 lbs.	2.0 lbs.	3.5 lbs.	4.0 lbs.	4.5 lbs.
3 Pole	2.5 lbs.	2.0 lbs.	3.0 lbs.	3.0 lbs.	3.0 lbs.	4.5 lbs.	7.0 lbs.	7.0 lbs.

Agency Approvals

- UL, File #ULE177629
- CSA File #LR22416

HG2M-XADX Load Current Table

Volts	120	208	240	277	480	600
Amps	150	140	135	130	120	120

Note: The 150 Amp relay (HG2M-XADX) is not UL or CSA approved.

** UL listed to 480V~ (ac); CSA certified to 600V~ (ac)

*** UL listed to 480V~ (ac)

**** UL listed and CSA certified to 600V~ (ac)

Note: pc = pressure connector
bhs = binding head screw

Note: Watlow recommends that you do not exceed 30 cycles per minute.

Note: Watlow recommends that ring terminal lugs be used on all binding head screw terminals.

Note: When replacing Watlow MD style relays, consider the HG60 model if larger gauge or multiple wires are required. See the load termination specification above.

Fusing

To prevent the MDR from rupture in the event of a heater short circuit, you should always fuse the MDR load circuit. Watlow recommends a Bussmann type JJN or JJS (Class T) fuse or equivalent. Select a fuse size 1.25 times the connected load or the next size above, but do not exceed 1.6 times the MDR rating. To fuse the MDR field coil, you can use Bussmann fuse number MDL-2 for coils up to 240V~ (ac). For coils up to 480V~ (ac), use Bussmann fuse number JJS-1.

⚠ WARNING: Install high or low temperature control protection in systems where an overtemperature or undertemperature fault condition could present a fire hazard or other hazard. Failure to install temperature control protection where a potential hazard exists could result in damage to equipment and property, and personal injury or death.