

### HERMETICALLY SEALED IN STEEL TUBES

Every contactor tube is hermetically sealed to provide maximum life, protection to the user from arcing and the hazards of switching heavy loads with exposed contacts.

### LIQUID MERCURY CONTACT

Liquid mercury means a new contact surface after every operation. Mercury is self-renewing, it cannot pit, weld, disintegrate or oxidize. The internal resistance of the contact surfaces typically measure only a few Milliohms and is ideal for switching large loads safely.

## SPECIFICATIONS (@ 25°C)

### COIL

Frequency of Operation:	60 per minute maximum
Pull-in voltage	80% of nominal voltage, Typ. AC & DC coils.
Dropout voltage	10% of nominal minimum

### CONTACTS

Material:	Mercury
Contact resistance:	.003 ohm typical

### TIMING

Operate (at nominal voltage)	50 Milliseconds typical
Dropout (at nominal voltage)	80 Milliseconds typical

### DIELECTRIC STRENGTH

All mutually insulated points to ground:	2650 V rms
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### TEMPERATURE

Operating:	- 35 °C to + 60 °C
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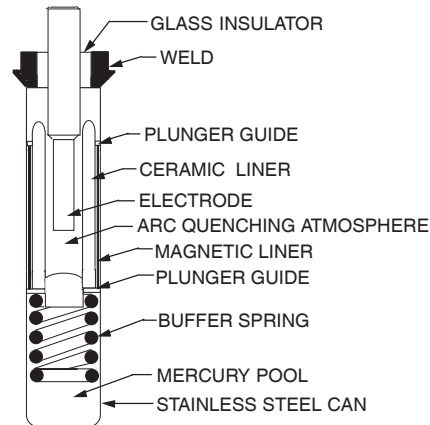
### LIFE

Mechanical: (No load)	5,000,000 Operations
Electrical (Rated load)	250,000 Operations

### MISCELLANEOUS

Insulation Material:	Class B - 130 °C & M35 pressure connectors for AWG 6-14 wire; M60 pressure connectors for AWG 2 - 12 wire
Mounting:	Vertical ±10 °
Options:	Combination of SPST-NO & SPST-NC contact configurations. available. Other coil voltages available .

## MERCURY DISPLACEMENT TUBE



## PRINCIPLE OF OPERATION

The sectional view shows our normally open style Mercury Displacement tube with the plunger assembly floating on the mercury pool.

When the coil power is off, the mercury level is below the electrode tip. No electrical path exists between the electrode and mercury pool.

When coil power is applied, the plunger is drawn down into the mercury by the pull of the magnetic field. This action raises the mercury level, so it covers the end of the electrode closing the circuit.

When coil power is turned off, the buoyant force of the mercury causes the plunger assembly to rise, dropping the mercury level, and breaking the circuit.

## APPLICATION DATA

**Mercury Displacement relays are ideal for adverse environments-**

- ....Where high inrushes are encountered
- ....Where hermetically sealed contact operation is required because of corrosive, dirty, or moist ambient conditions.
- ....Where use does not permit contact maintenance.
- ....Where reduced noise levels are required.
- ....where minimum weight and size are desired.

## DESIGN FEATURES

**Liquid Mercury Contact** provides a new contact surface with every actuation. Mercury is self-renewing and does not pit, weld, disintegrate or oxidize.

**Hermetic sealing** - provides internal and external protection from arcing.

**Inert Gas atmosphere** - contactor tube is evacuated, then pressurized with a combination of gases which extinguish arcing and contribute to long life. The pressurized gases provide for a high dielectric withstanding voltage between contact surfaces.

**Low Contact Resistance** - Large electrode and mercury volume creates low contact resistance and provides high inrush current capability.

**Quiet Operation** - Switch clacking normally associated with conventional hard contactors, is eliminated with mercury displacement tubes and the buffer spring assembly.

## APPLICATION OF "M" SERIES VS "ML" SERIES

The series "ML" is physically the same as the "M" series except for the type of gases used in the contactor tubes. The "ML" series was developed for use with resistive and tungsten loads on AC power ONLY. The "ML" series will give much greater life than the "M" series for these types of loads and is intended for high activation use, such as molding machines or ovens.

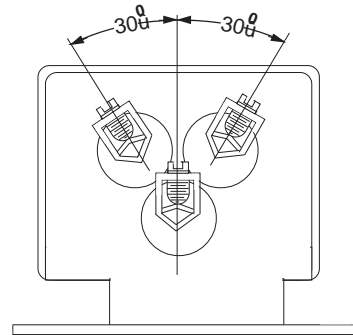
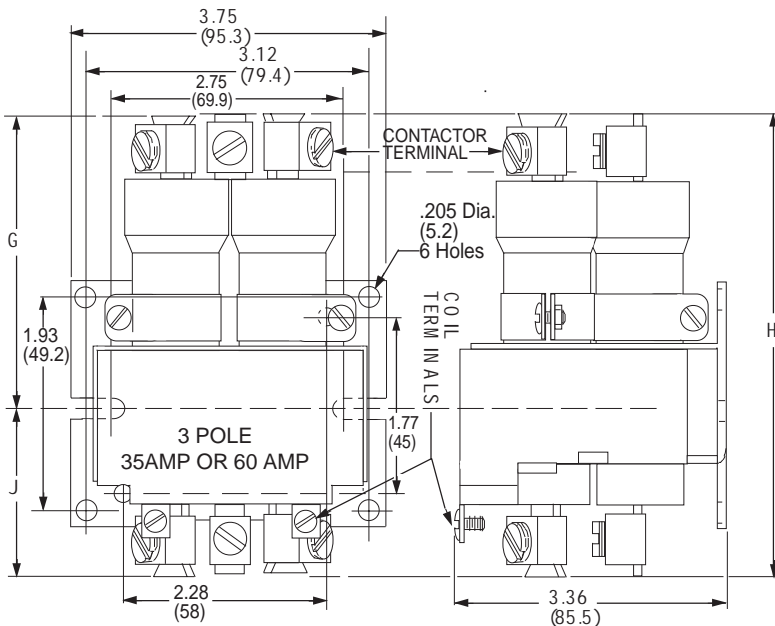
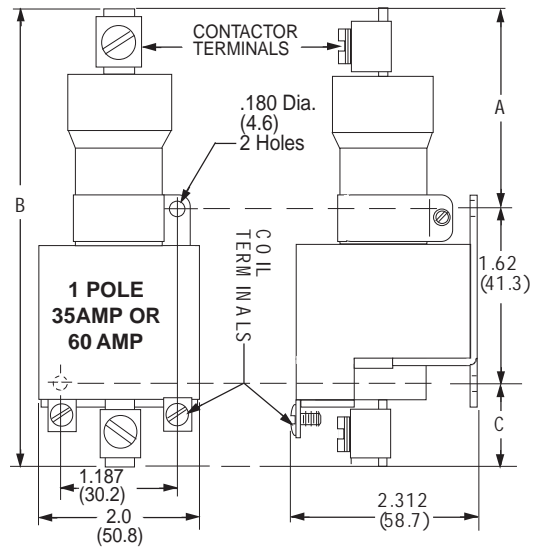
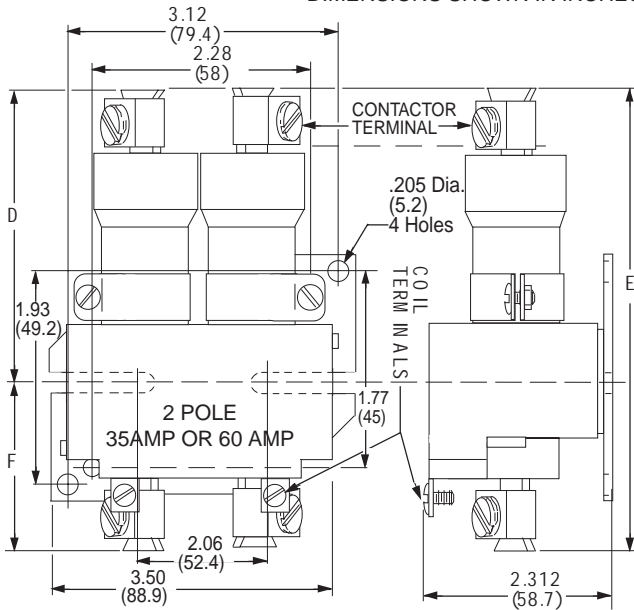
The "ML" series, however is not intended for use with motor loads on AC power, or for resistive, tungsten, or motor loads on DC power. The "M" series, which is our universal series is rated to be used on all types of loads resistive, tungsten, and motor for both AC and DC power

# M35 AND M60 DIMENSIONS

DIMENSION		M60A	M60B	M35A	M3 5B
1 POLE	A	2.375 Max. (60.3)	1.50Max. * (38.1)	2.312 Max. (58.7)	1.375 Max. (34.9)
	B	5.06 Max. (128.52)	5.062 Max. (128.52)	4.875 Max. (123.8)	4.875 Max. (123.8)
	C	1.06 Max. (27)	1.937 Max. (49.2)	0.937 Max. (23.8)	1.875 Max. (47.6)
2 POLE	D	3.250 Max. (82.6)	2.281Max. (57.9)	3.187 Max. (81.0)	2.218 Max. (56.3)
	E	5.062 Max. (128.52)	5.062 Max. (128.52)	4.875 Max. (123.8)	4.875 Max. (123.8)
	F	1.812 Max. (46.0)	2.781 Max. (70.6)	1.687 Max. (42.9)	2.656 Max. (57.4)
3 POLE	G	3.250 Max. (82.6)	2.281 Max. (57.9)	3.187 Max. (81.0)	2.218 Max. (56.3)
	H	5.062 Max. (128.52)	5.062 Max. (128.52)	4.875 Max. (123.8)	4.875 Max. (123.8)
	J	1.812 Max. (46)	2.781 Max. (70.6)	1.687Max. (42.9)	2.656 Max. (67.4)

\* SPST-NC outline is not shown. The SPST-NC tube is positioned lower on the coil so Dimension A is lower, but the overall height remains the same.

DIMENSIONS SHOWN IN INCHES AND (MILLIMETERS)



# 35 AND 60 AMP MERCURY DISPLACEMENT RELAYS

**MDR**  
SERIES



UL Listed  
File No. E52197



**M35 and M60 SERIES**  
SWITCHES RESISTIVE,  
TUNGSTEN, AND MOTOR LOADS  
STAINLESS STEEL TUBES  
HIGH INRUSH CAPACITY

CONTACTOR RATINGS FOR M35A - M35B

VOLTAGE	PHASE	HP		MOTOR AMPS		RESISTIVE AMPS	TUNGSTEN AMPS
		1 <sup>-</sup>	3 <sup>-</sup>	1 <sup>-</sup>	3 <sup>-</sup>		
120VAC	1 <sup>-</sup> 3 <sup>-</sup>	3*	5*	34	30	35*	35*
240VAC	1 <sup>-</sup> 3 <sup>-</sup>	5*	7.5*	28	19	35*	17
480VAC	1 <sup>-</sup> 3 <sup>-</sup>	5*	10*	14	14	35*	9
600VAC	1 <sup>-</sup> 3 <sup>-</sup>	5*	10*	11.2	11	25**	7
24VDC	DC	1/2		27		35*	35*
48VDC	DC	1/2		13.5		35*	35*
125VDC	DC	1/2		5.2		16*	16*
250VDC	DC	1/2		2.6		12*	12*

\* UL and CSA Listed \*\* CSA only

CONTACTOR RATINGS FOR M60A - M60B

VOLTAGE	PHASE	HP		MOTOR AMPS		RESISTIVE AMPS	TUNGSTEN	
		1 <sup>-</sup>	3 <sup>-</sup>	1 <sup>-</sup>	3 <sup>-</sup>		AMPS	AMPS
							"A" (N.O.)	"B" (N.C.)
120VAC	1 <sup>-</sup> 3 <sup>-</sup>	3*	5*	34	30	60*	60*	45*
240VAC	1 <sup>-</sup> 3 <sup>-</sup>	5*	10*	28	28	60*	30	22.5
480VAC	1 <sup>-</sup> 3 <sup>-</sup>	7.5*	15*	21	21	60*	15	11.2
600VAC	1 <sup>-</sup> 3 <sup>-</sup>	7.5*	15*	16	17	50**	12	9
24VDC	DC	3/4		39		60*	50*	50*
48VDC	DC	3/4		19.5		60*	50*	50*
125VDC	DC	3/4		7.4		40*	40*	40*
250VDC	DC	3/4		3.7		20*	20*	20*

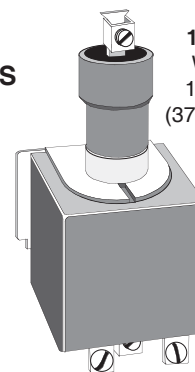
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SEE MDR GENERAL SPECIFICATIONS AND DIMENSIONS.

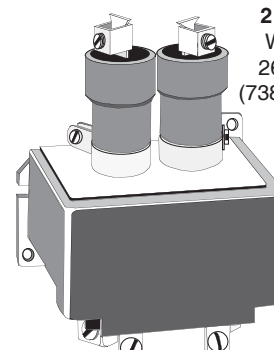
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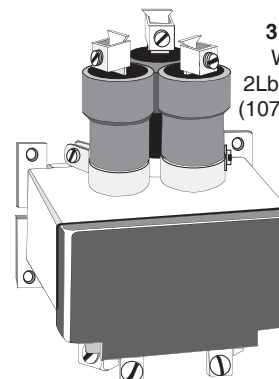
RECOMMENDED MOUNTING  
POSITION ± 10



**1 POLE**  
Weight  
13 Ozs.,  
(370 Grams)



**2 POLE**  
Weight  
26 Ozs.,  
(738 Grams)



**3 POLE**  
Weight  
2Lbs. 6 ozs.,  
(1078 Grams)

## STRUTHERS-DUNN

PART NUMBERS	COIL Measured @ 25°C			
	NOMINAL INPUT VOLTAGE	NOMINAL RESISTANCE (OHMS)	NOMINAL CURRENT (AMPS)	NOMINAL POWER
<b>1 POLE NORMALLY OPEN CONTACT</b>				
M35A-120A	120 VAC	700	.058	7VA
M35A-240A	240VAC, 60HZ 220VAC, 50HZ	2,800	.029	7VA
M35A-24D	24VDC	186	.120	3.5W
<b>2 POLE NORMALLY OPEN CONTACT</b>				
M35AA-120A	120 VAC	218	.135	16.5VA
M35AA-240A	240VAC, 60HZ 220VAC, 50HZ	1,200	.063	16.5VA
M35AA-24D	24VDC	98	.232	6W
<b>3 POLE NORMALLY OPEN CONTACT</b>				
M35AAA-120A	120 VAC	111	.220	28VA
M35AAA-240A	240VAC, 60HZ 220VAC, 50HZ	430	.117	28VA
M35AAA-24D	24VDC	64	.375	9W
<b>1 POLE NORMALLY CLOSED CONTACT</b>				
M35B-120A	120VAC	460	.115	13VA

## STRUTHERS-DUNN

PART NUMBERS	COIL Measured @ 25°C			
	NOMINAL INPUT VOLTAGE	NOMINAL RESISTANCE (OHMS)	NOMINAL CURRENT (AMPS)	NOMINAL POWER
<b>1 POLE NORMALLY OPEN CONTACT</b>				
M60A-120A	120 VAC	700	.058	7VA
M60A-240A	240VAC, 60HZ 220VAC, 50HZ	2,800	.029	7VA
M60A-24D	24VDC	186	.120	3.5W
<b>2 POLE NORMALLY OPEN CONTACT</b>				
M60AA-120A	120 VAC	218	.135	16.5VA
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M60AAA-240A	240VAC, 60HZ 220VAC, 50HZ	430	.117	28VA
M60AAA-24D	24VDC	64	.375	9W
<b>1 POLE NORMALLY CLOSED CONTACT</b>				
M60B-120A	120VAC	460	.115	13VA

PART NUMBER SHOWN ALSO AVAILABLE THRU STOCK DISTRIBUTION