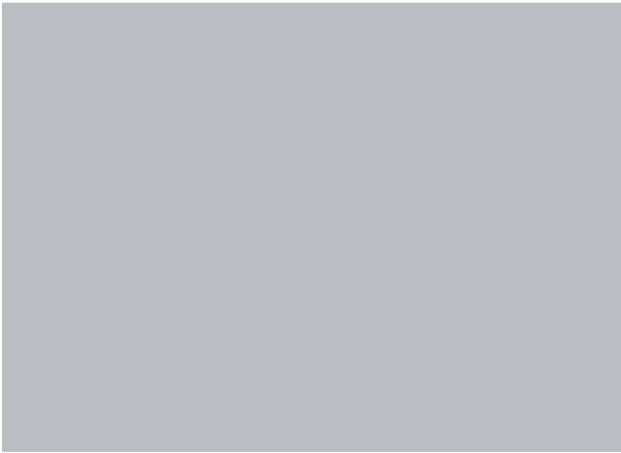


# SECTION 3



## POWER RELAYS AND CONTACTORS

15 TO 300 AMPERES



199

PM

A275

MDR

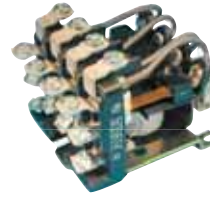
B101

**PRODUCT**



**199**

MANUFACTURED UNDER  
ISO 9002 QS 9000



**PM**



**A275**

L X W X H (INCHES)

2.43-3.12 x 2.50 x 2.53

2.72 x 2.66 x 3.40

3.62 x 2.985 x 2.75

**FEATURES**

- ◆ PANEL MOUNT, OPEN STYLE RELAY
- ◆ MULTI-CONTACT CONFIGURATIONS WITH RATINGS UP TO 50 AMPS
- ◆ OPTIONAL MAGNETIC BLOWOUT FOR DC SWITCHING
- ◆ OPTIONAL AUXILIARY SWITCHES AVAILABLE

- ◆ PANEL MOUNT, OPEN STYLE RELAY
- ◆ 4-POLE, DOUBLE-THROW, UP TO 35 AMPS RATING
- ◆ OPTIONAL PLASTIC DUST COVER OR METAL ENCLOSURE

- ◆ 2 COIL, COMPACT MOTOR REVERSING CONTACTOR
- ◆ 3 -POLE OPERATION, UP TO 3 HP RATING
- ◆ MECHANICAL INTERLOCK
- ◆ OPTIONAL AUXILIARY SWITCHES AVAILABLE
- ◆ DIN MOUNT ADAPTER AVAILABLE

COIL @ 25°C	UNITS	199	PM	A275
Standard Coil Voltage				
AC:	50/60 Hz	24, 120, 240	6 to 240	24, 120
DC:		12, 24, 110	6 to 125	24
Coil Power AC (60 Hz):	VA	10	14	14
Coil Power DC:	W	2	4.4	4.6
Insulation System Per UL Standard 1446:		Class B (130 °C)	Class B (130 °C)	Class B (130 °C)

CONTACTS		199	PM	A275
Contact Configuration:		<b>VARIOUS</b>	<b>4PDT</b>	<b>DUAL 3PST-NO-DM</b>
Contact Material:		Silver alloy, gold flashed	Silver alloy	Silver alloy, gold flashed
Contact Resistance (Initial):	m ohms	50	50	50
Contact Rating AC Amperes(AC1):	A	See General specifications sheet	35	15 / 10 / 5
Contact Rating AC Voltage:	V	See General specifications sheet	277	120 / 240 / 600
Contact Rating DC Amperes(DC1):	A	See General specifications sheet	20	15 / 5
Contact Rating DC Voltage:	V	See General specifications sheet	28	30 / 125

TIMING		199	PM	A275
Operate Time:	ms	40	40	50
Release Time:	ms	30	30	30

DIELECTRIC STRENGTH @ 25°C		199	PM	A275
Coil to Contacts:	V rms	2200	2000	2500
Insulation Resistance:	megohms minimum @ VDC	1000 @ 500	1000 @ 500	1000 @ 500

TEMPERATURE		199	PM	A275
Operating, AC Lower:	°C	-40	-40	-40
Operating, AC Upper:	°C	+50	+45	+50
Operating, DC Lower:	°C	-40	-40	-40
Operating, DC Upper:	°C	+60	+55	+70
Storage, Lower:	°C	-55	-55	-55
Storage, Upper:	°C	+100	+100	+100

LIFE EXPECTANCY		199	PM	A275
Electrical @ Rated Load (AC1):	operations	100,000	100,000	100,000
Mechanical @ no Load:	operations	1,000,000	10,000,000	2,000,000

MISCELLANEOUS		199	PM	A275
Weight:	grams	227 to 312	397	455

**AGENCY APPROVALS**



# POWER RELAYS & CONTACTORS



SEE PAGE 13

2.84 x 2.80 x 2.90

- ✦ HERMETICALLY SEALED MERCURY DISPLACEMENT CONTACTOR
- ✦ RATINGS UP TO 100 AMPS
- ✦ CONSISTENT CONTACT RESISTANCE, QUIET OPERATION
- ✦ DIN MOUNT ADAPTER AVAILABLE
- ✦ FREE TUBE RECYCLE PROGRAM (CONTACT FACTORY FOR DETAILS)

- ✦ HEAVY DUTY DC SOLENOID OPERATED CONTACTOR
- ✦ SINGLE-POLE NO OR NC, 100 AMPS RATING
- ✦ OPTIONAL SILVER TIN-OXIDE CONTACTS AVAILABLE
- ✦ COMBINATION PANEL AND DIN MOUNT

120, 240  
24

Not Applicable  
12, 24, 48

7 to 26.4  
3.1 to 9.1

Not Applicable  
10

Class B (130 °C)

Class B (130 °C)

**VARIOUS**

**SPST-NO-DM, SPST-NC-DB**

Mercury

Silver alloy

2

50

See General specifications sheet

100

See General specifications sheet

240

See General specifications sheet

100

See General specifications sheet

28

50

60

80 to 100

30

2650

1500

1000 @ 500

1000 @ 500

-40

Not Applicable

+60

Not Applicable

-40

-40

+60

+65

-55

-55

+100

+100

100,000

100,000

5,000,000

5,000,000

370 to 1078

370



LISTED  
367G  
UL Listed  
File No. E52197



LISTED  
367G  
UL Listed  
File No. E52197

UL US  
UL Recognized  
File No. E43641



LISTED 367G  
IND. CONT. EQ.



COMPLIES WITH REQUIREMENTS OF

\* IEC STANDARDS 947-4-1 AND 947-5-1 LOW VOLTAGE DIRECTIVE

\* IEC = INTERNATIONAL ELECTROTECHNICAL COMMISSION

\* CE TESTING AND EVALUATION PERFORMED BY THE UNDERWRITERS LABORATORIES AS A THIRD PARTY PARTICIPANT

## FEATURES

40 AMP POWER RELAY

RATINGS TO 50 AMPS WITH WIRE PRESSURE CONNECTOR

METAL ENCLOSURE AVAILABLE

OPTIONAL 10 AMP SPDT AUXILIARY SWITCH

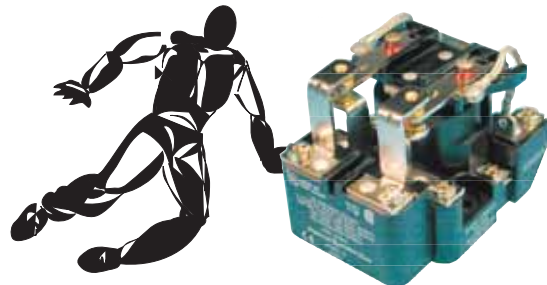
MANUFACTURED  
UNDER  
ISO 9002  
& QS 9000

## GENERAL SPECIFICATIONS (@ 25°C)

	UNITS	
<b>COIL</b>		
Pull-in Voltage AC (50/60 Hz):≤	% of nominal	85
Pull-in Voltage DC:≤	% of nominal	80
Dropout Voltage AC (50/60 Hz):≥	% of nominal	10
Dropout Voltage DC:≥	% of nominal	10
Maximum Voltage:	% of nominal	110
Resistance Tolerance:	% ±	10
Coil Power AC (50/60 Hz):	VA	10
Coil Power DC:	W	2
Insulation System		
Per UL Standard 1446:		Class B (130 °C)
Duty:		Continuous
<b>CONTACTS</b>		
Material:		Silver alloy, gold flashed
Minimum Recommended Load:	amps	1 @ 5 VDC or 5 W
<b>TIMING</b>		
Operate Time @ Nominal voltage:	ms	40
Release Time @ Nominal voltage:	ms	30
<b>DIELECTRIC STRENGTH</b>		
Coil to Contacts:	V rms	2200
Across Open Contacts:	V rms	1500
Pole to Pole:	V rms	1500
Contacts to Frame:	V rms	Not Applicable
Insulation Resistance:	megohms minimum@VDC	1000 @ 500
<b>TEMPERATURE</b>		
Operating, AC Lower:	°C	-40
Operating, AC Upper:	°C	+50
Operating, DC Lower:	°C	-40
Operating, DC Upper:	°C	+60
Storage, Lower:	°C	-55
Storage, Upper:	°C	+100
<b>LIFE EXPECTANCY</b>		
Electrical @ Rated Load (AC1):	operations	100,000
Mechanical @ no Load :	operations	1,000,000
<b>MISCELLANEOUS</b>		
Operating Position:		Any
Coil Terminals:		#6-32 combination head screws
Contact Terminals:		#8-32 combination head screws
Weight:	grams	227 to 312

## CONTACT LOAD RATINGS TABLE

	SINGLE MAKE/BREAK CONTACTS	DOUBLE MAKE/BREAK CONTACTS
UP TO 300 VAC 50/60HZ	40 A, RESISTIVE (AC1)	40 A, RESISTIVE (AC1)
480 VAC 50/60HZ	5 A, RESISTIVE (AC1)	12 A, RESISTIVE (AC1)
600 VAC 50/60HZ	5 A, RESISTIVE (AC1)	10 A, RESISTIVE (AC1)
28 VDC	40 A, RESISTIVE (DC1)	40 A, RESISTIVE (DC1)
MOTOR LOAD, 120 - 600 VAC 50/60HZ	1 1/2 HP	2 HP
TUNGSTEN, 120 VAC 50/60HZ	15 A	15 A
120 - 600 VAC 50/60HZ	960 VA	1152 VA
NEMA PILOT DUTY 50/60HZ	A 600	A 600
SHORT CIRCUIT	5000 A	5000 A
<b>DOUBLE- POLE WITH BOTH SIDES SWITCHING THE LOAD</b>		
200 - 600 VAC 50/60HZ	2 HP	
200 - 600 VAC 50/60HZ	1152 VA	
<b>ADDITIONAL DC RATING WITH MAGNETIC BLOWOUT</b>		
110 VDC	10 A	20 A
144 VDC		15 A
220 VDC	4 A	8 A
325 VDC	2 A	4 A
500 VDC		2 A
<b>AUXILIARY SWITCH</b>		
UP TO 240 VAC 50/60HZ	10 A (AC1)	10 A (AC1)
MOTOR LOAD, 120- 240 VAC 50/60HZ	1/4 HP	1/4 HP
PILOT DUTY, 120- 240 VAC 50/60HZ	278 VA	278 VA
125 VDC	0.4 A (DC1)	0.4 A (DC1)
250 VDC	0.2 A (DC1)	0.2 A (DC1)
TUNGSTEN, 120 VAC 50/60 HZ	3 A	3 A
<b>WITH WIRE PRESSURE CONNECTORS</b>		
UP TO 300 VAC 50/60 HZ		50 A, RESISTIVE (AC1)
28 VDC		50 A, RESISTIVE (DC1)



# 199 OPEN STYLE POWER RELAYS

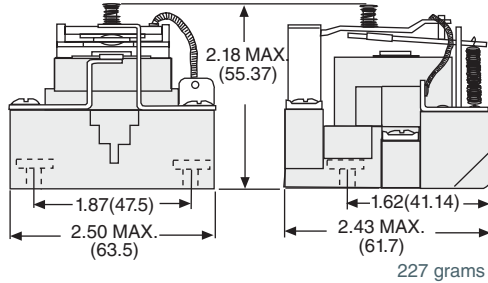


**UP TO 50 AMPS**

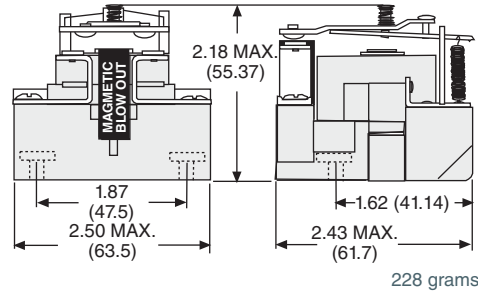
**OUTLINE DIMENSIONS**

DIMENSIONS SHOWN IN INCHES & (MILLIMETERS).

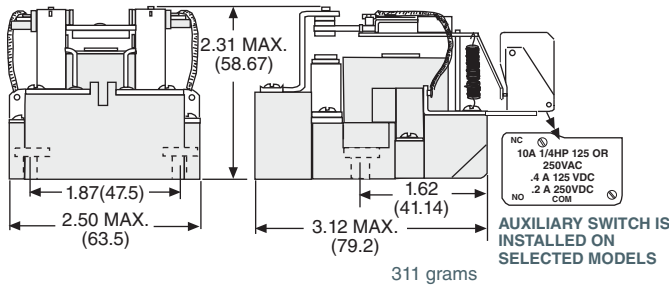
**199 SPDT**  
40 AMP, 1-1/2 Hp



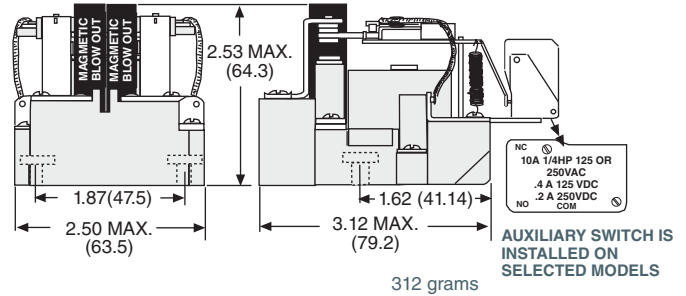
**199DB SPST-NO-DM**  
WITH MAGNETIC BLOWOUT FOR DC  
ARC QUENCHING 20 AMP, 110 VDC



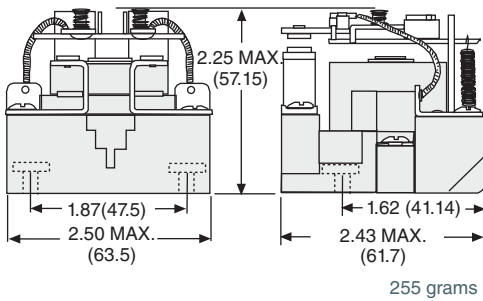
**199 DPDT**  
40 AMP, 1-1/2 Hp PER POLE  
2 Hp - 2 POLE SWITCHING



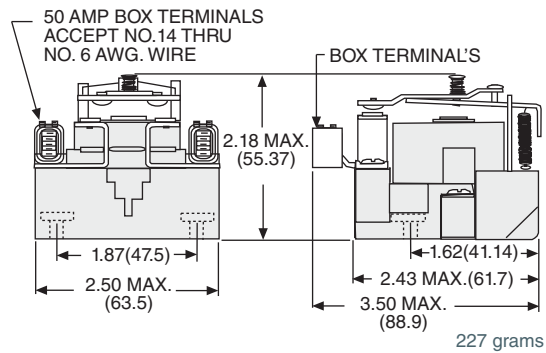
**199B DPDT**  
WITH MAGNETIC BLOWOUT FOR DC  
ARC QUENCHING 10 AMP, 110 VDC PER POLE



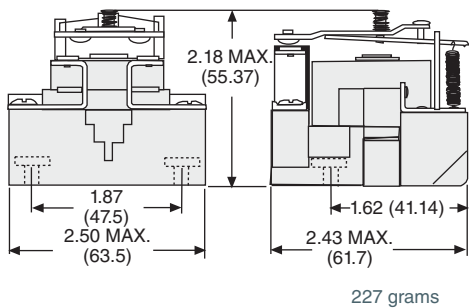
**199 DPST-NO**  
40 AMP, 1-1/2 Hp PER POLE  
2 Hp - 2 POLE SWITCHING



**199DE SPST-NO-DM**  
WITH BOX TERMINALS.  
50 AMP, 2 Hp



**199 SPST-NO-DM**  
40 AMP, 2 Hp





# 199 OPEN STYLE POWER RELAYS

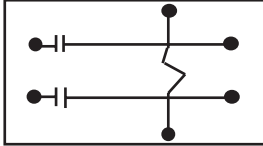


## UP TO 50 AMPS

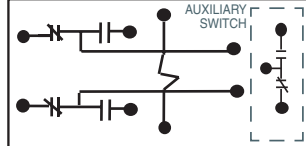
WIRING DIAGRAM  
(VIEWED FROM TOP)



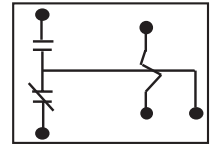
**199 DPST-NO**  
40 AMP, 1-1/2 Hp PER POLE  
2 Hp - 2 POLE SWITCHING



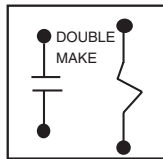
**199 DPDT**  
40 AMP, 1-1/2 Hp PER POLE, 2 Hp-2 POLE SWITCHING



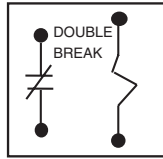
**199 SPDT**  
40 AMP, 1-1/2 Hp



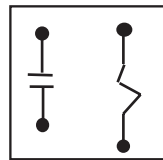
**199DB SPST-NO-DM**  
WITH MAGNETIC BLOWOUT FOR DC ARC  
QUENCHING 20 AMP, 110 VDC



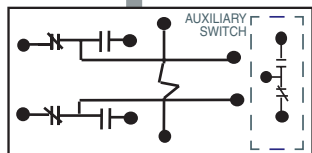
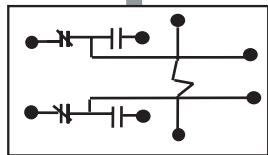
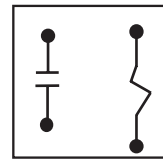
**199 SPST-NC-DB**  
40 AMP, 2 Hp



**199 SPST-NO-DM**  
40 AMP, 2 Hp



**199DE SPST-NO-DM**  
WITH BOX TERMINALS.  
50 AMP, 2 Hp



**199B DPDT**  
WITH MAGNETIC BLOWOUT FOR  
DC ARC QUENCHING

\* REFERENCE DOUBLE MAKE/  
BREAK CONTACT RATINGS

STANDARD PART NUMBERS	CONTACT CONFIGURATION	COIL MEASURED @ 25 °C	
		NOMINAL INPUT VOLTAGE	NOMINAL RESISTANCE (OHMS)
<b>AC OPERATED</b>			
W199AX-4	SPDT	120 VAC 50/60 Hz	290 Ω
W199AX-13	DPDT	24 VAC 50/60 Hz	12 Ω
W199AX-14	DPDT	120 VAC 50/60 Hz	290 Ω
W199AX-15	DPDT	240 VAC 50/60 Hz	1200 Ω
W199AX-8	DPST-NO	24 VAC 50/60 Hz	12 Ω
W199AX-9	DPST-NO	120 VAC 50/60 Hz	290 Ω
W199AX-10	DPST-NO	240 VAC 50/60 Hz	1200 Ω
W199ADX-4	*SPST-NO-DM	120 VAC 50/60 Hz	290 Ω
W199ADX-5	*SPST-NO-DM	240 VAC 50/60 Hz	1200 Ω
W199ADBX-4	*SPST-NO-DM (magnetic blowout)	120 VAC 50/60 Hz	290 Ω
W199ABX-14	DPDT (magnetic blowout)	120 VAC 50/60 Hz	290 Ω
<b>AC OPERATED WITH SPDT AUXILIARY</b>			
W199ABMX-7	DPDT (magnetic blowout)	120 VAC 50/60 Hz	290 Ω
W199AMX-64	DPDT	120 VAC 50/60 Hz	290 Ω
<b>AC OPERATED WITH BOX TERMINALS</b>			
W199ADEX-4	*SPST-NO-DM	120 VAC 50/60 Hz	290 Ω
<b>DC OPERATED</b>			
W199X-2	SPDT	12 VDC	70 Ω
W199X-3	SPDT	24 VDC	290 Ω
W199X-11	DPDT	6 VDC	18 Ω
W199X-12	DPDT	12 VDC	70 Ω
W199X-13	DPDT	24 VDC	290 Ω
W199X-14	DPDT	110 VDC	6000 Ω
W199X-7	DPST-NO	12 VDC	70 Ω
W199X-8	DPST-NO	24 VDC	290 Ω
W199DYX-2	*SPST-NC-DB	12 VDC	70 Ω
W199DX-2	*SPST-NO-DM	12 VDC	70 Ω
W199DX-3	*SPST-NO-DM	24 VDC	290 Ω
W199DBX-3	*SPST-NO-DM (magnetic blowout)	24 VDC	290 Ω
W199DBX-6	*SPST-NO-DM (magnetic blowout)	48 VDC	1200 Ω
W199BX-13	DPDT (magnetic blowout)	24 VDC	290 Ω
W199BX-14	DPDT (magnetic blowout)	110 VDC	6000 Ω
<b>DC OPERATED WITH SPDT AUXILIARY</b>			
W199BMX-13	DPDT (magnetic blowout)	24 VDC	290 Ω
W199MX-51	DPDT	24 VDC	290 Ω
<b>DC OPERATED WITH BOX TERMINALS</b>			
W199DEX-3	*SPST-NO-DM	24 VDC	290 Ω



## UP TO 35 AMPS AC, UP TO 20 AMPS DC



### FEATURES

- 4PDT POWER RELAY
- RATINGS TO 35 AMPS
- 8-32 SCREW OR 0.250 QC TERMINATIONS
- PLASTIC AND METAL COVERS AVAILABLE



**OPTIONAL QUICK CONNECT TERMINAL**



**OPTIONAL PLASTIC DUST COVER**

### CONTACT LOAD RATINGS TABLE

UP TO 277 VAC 50/60 Hz	35 A, RESISTIVE (AC1)
28 VDC	20 A, RESISTIVE (DC1)
MOTOR LOAD, 240 VAC 50/60 Hz	1 1/2 HP
MOTOR LOAD, 480 VAC 50/60 Hz	2 HP
TUNGSTEN, 240 VAC 50/60 Hz	10 A

### COIL CHARACTERISTICS @ 25 °C

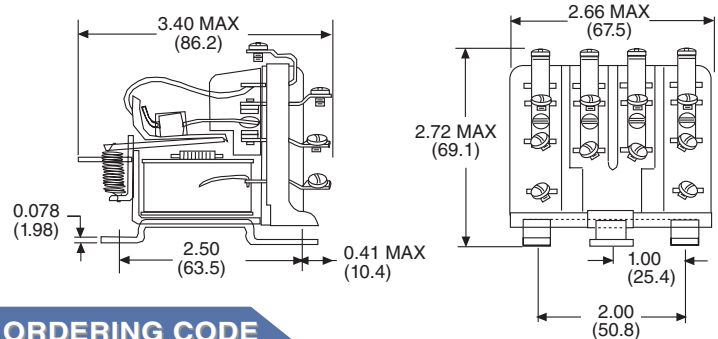
DC COILS		AC COILS	
NOMINAL INPUT VOLTAGE	DC RESISTANCE IN OHMS ±10%	NOMINAL INPUT VOLTAGE	DC RESISTANCE IN OHMS ±10%
6	8.2		
12	33	12 VAC 50/60 Hz	1.4
24	132	24 VAC 50/60 Hz	5.0
48	526	120 VAC 50/60 Hz	120
110	2760	240 VAC 50/60 Hz	587
125	3570		

## GENERAL SPECIFICATIONS (@ 25°C)

	UNITS	
<b>COIL</b>		
Pull-in Voltage AC (50/60 Hz):	≤ % of nominal	85
Pull-in Voltage DC:	≤ % of nominal	80
Dropout Voltage AC (50/60 Hz):	≥ % of nominal	10
Dropout Voltage DC:	≥ % of nominal	10
Maximum Voltage:	% of nominal	110
Resistance Tolerance:	% ±	10
Coil Power AC (50/60 Hz):	VA	14
Coil Power DC:	W	4.4
Insulation System		
Per UL Standard 1446:		Class B (130 °C)
Duty:		Continuous
<b>CONTACTS</b>		
Material:		Silver alloy
Minimum Recommended Load:	amps	1 @ 5 VDC or 5 W
<b>TIMING</b>		
Operate Time @ Nominal voltage:	ms	40
Release Time @ Nominal voltage:	ms	30
<b>DIELECTRIC STRENGTH</b>		
Coil to Contacts:	V rms	2000
Across Open Contacts:	V rms	1500
Pole to Pole:	V rms	1500
Contacts to Frame:	V rms	2000
Insulation Resistance:	megohms minimum@VDC	1000 @ 500
<b>TEMPERATURE</b>		
Operating, AC Lower:	°C	-40
Operating, AC Upper:	°C	+50
Operating, DC Lower:	°C	-40
Operating, DC Upper:	°C	+55
Storage, Lower:	°C	-55
Storage, Upper:	°C	+100
<b>LIFE EXPECTANCY</b>		
Electrical @ Rated Load (AC1):	operations	100,000
Mechanical @ no Load :	operations	10,000,000
<b>MISCELLANEOUS</b>		
Operating Position:		Any
Terminals PM::		#8-32 combination head screws
Terminals PMT:		0.250 quick connect terminals
Weight:	grams	397

### OUTLINE DIMENSIONS

DIMENSIONS SHOWN IN INCHES & (MILLIMETERS).



### ORDERING CODE

**PM** **-17** **A** **Y** **-120**

**CLASS:** \_\_\_\_\_

**TYPE:** \_\_\_\_\_

LEAVE BLANK = OPEN RELAY WITH SCREW TERMINAL  
 T = OPEN RELAY WITH 0.250" (6.35 mm) QUICK CONNECT TERMINALS.  
 C = PLASTIC DUST COVER

**CONTACT ARRANGEMENT:** \_\_\_\_\_

17 = 4 FORM C (4PDT)

**COIL INPUT:** \_\_\_\_\_

A = AC, D = DC

**CONTACT MATERIAL:** \_\_\_\_\_

Y = SILVER ALLOY

**COIL VOLTAGE:** \_\_\_\_\_

UP TO 240 ADD "A" FOR AC COILS  
 UP TO 125 ADD "D" FOR DC COILS

# 199 & PM ENCLOSURES

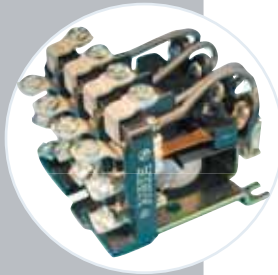
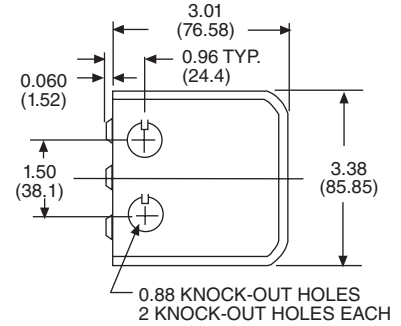
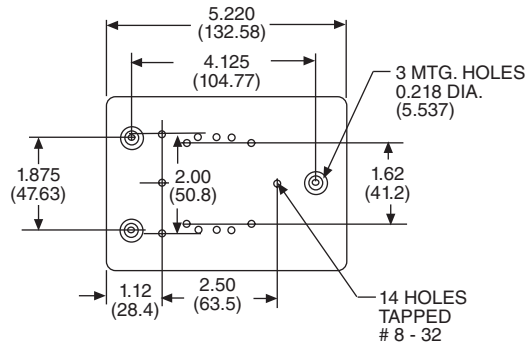


## OUTLINE DIMENSIONS

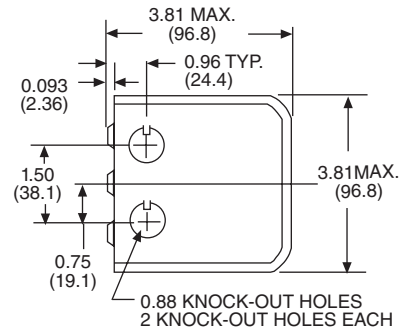
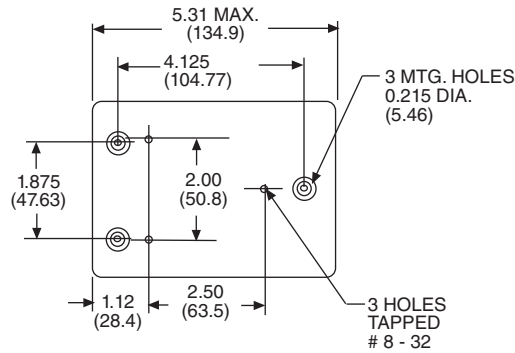
DIMENSIONS SHOWN IN INCHES & (MILLIMETERS).



199



PM



**35D203**  
MAY BE ORDERED  
AND SHIPPED  
SEPARATELY



**50-1289-1**  
MAY BE ORDERED  
AND SHIPPED  
SEPARATELY



**35D227**  
MAY BE ORDERED  
AND SHIPPED  
SEPARATELY

**COVER & RELAY MOUNTING  
SCREWS INCLUDED**

STANDARD PART NUMBERS	DESCRIPTION
<b>199 METAL ENCLOSURE</b>	
50-1289-1	UNIVERSAL MOUNT METAL ENCLOSURE
<b>PM ENCLOSURE</b>	
35D203	PLASTIC SNAP-ON DUST COVER
35D227	METAL ENCLOSURE



## FEATURES



<b>MECHANICALLY INTERLOCKED</b>
<b>UP TO 3 POLE SWITCHING</b>
<b>INDEPENDENT FORWARD / REVERSE COILS</b>
<b>5 AMP AUXILIARY SWITCH AVAILABLE</b>

## CONTACT LOAD RATINGS TABLE

LOAD VOLTAGE	PHASE	MOTOR LOAD	RESISTIVE LOAD
120 VAC	1-2-3	1 HP	15 AMPS (AC1)
240 VAC	1	1.5 HP	10 AMPS (AC1)
240 VAC	2-3	3 HP	10 AMPS (AC1)
480/600 VAC	2-3	3 HP	5 AMPS (AC1)
30 VDC	-	-	15 AMPS (DC1)
125 VDC	-	-	5 AMPS (DC1)

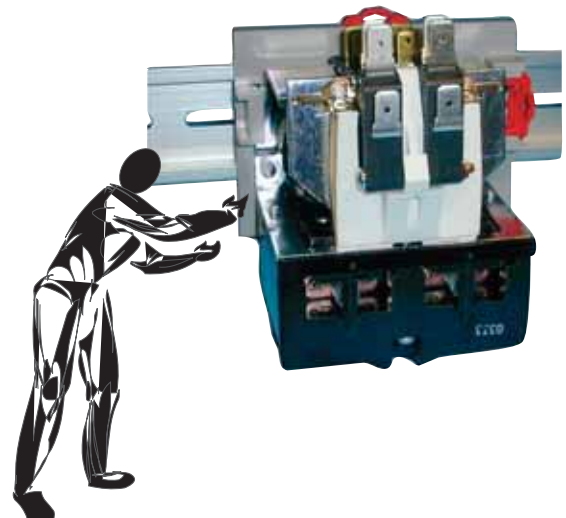
NOTE: AC CONTACTS RATED WITH ALL CONTACTS IN USE, NOT RATED PER POLE.

## GENERAL SPECIFICATIONS (@ 25°C)

	UNITS	
<b>COIL</b>		
Pull-in Voltage AC (50/60 Hz): $\leq$	% of nominal	85
Pull-in Voltage DC: $\leq$	% of nominal	80
Dropout Voltage AC (50/60 Hz): $\geq$	% of nominal	10
Dropout Voltage DC: $\geq$	% of nominal	10
Maximum Voltage:	% of nominal	110
Resistance Tolerance:	% $\pm$	10
Coil Power AC (50/60 Hz):	VA	14
Coil Power DC:	W	4.6
Insulation System		
Per UL Standard 1446:		Class B (130 °C)
Duty:		Continuous
<b>CONTACTS</b>		
Material:		Silver alloy, gold flashed
Minimum Recommended Load:	amps	1 @ 5 VDC or 5 W
<b>TIMING</b>		
Operate Time @ Nominal voltage:	ms	50
Release Time @ Nominal voltage:	ms	30
<b>DIELECTRIC STRENGTH</b>		
Coil to Contacts:	V rms	2500
Across Open Contacts:	V rms	1500
Pole to Pole:	V rms	1500
Contacts to Frame:	V rms	2500
Insulation Resistance:	megohms	1000 @ 500
	minimum@VDC	
<b>TEMPERATURE</b>		
Operating, AC Lower:	°C	-40
Operating, AC Upper:	°C	+50
Operating, DC Lower:	°C	-40
Operating, DC Upper:	°C	+70
Storage, Lower:	°C	-55
Storage, Upper:	°C	+100
<b>LIFE EXPECTANCY</b>		
Electrical @ Rated Load (AC1):	operations	100,000
Mechanical @ no Load :	operations	2,000,000
<b>MISCELLANEOUS</b>		
Operating Position:		Any
Coil Terminals:		0.25 Inch
		quick connect, male
Contact Terminals:		0.25 Inch
		quick connect, male
Weight:		455

**THE SERIES A275 IS A COMPACT, 2-COIL, MECHANICALLY INTERLOCKED MOTOR REVERSING CONTACTOR. APPLICATIONS INCLUDE:**

**INDUSTRIAL DOOR OPERATORS, ELECTRIC HOISTS AND ELECTRONIC WHEEL BALANCING. THE A275 HAS 1/4" QUICK CONNECT TERMINALS ON THE COILS, CONTACTS AND AUXILIARY SWITCHES. THE MECHANICAL INTERLOCK WILL NOT JAM, EVEN IF BOTH COILS ARE SIMULTANEOUSLY ENERGIZED.**

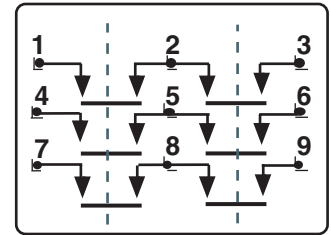
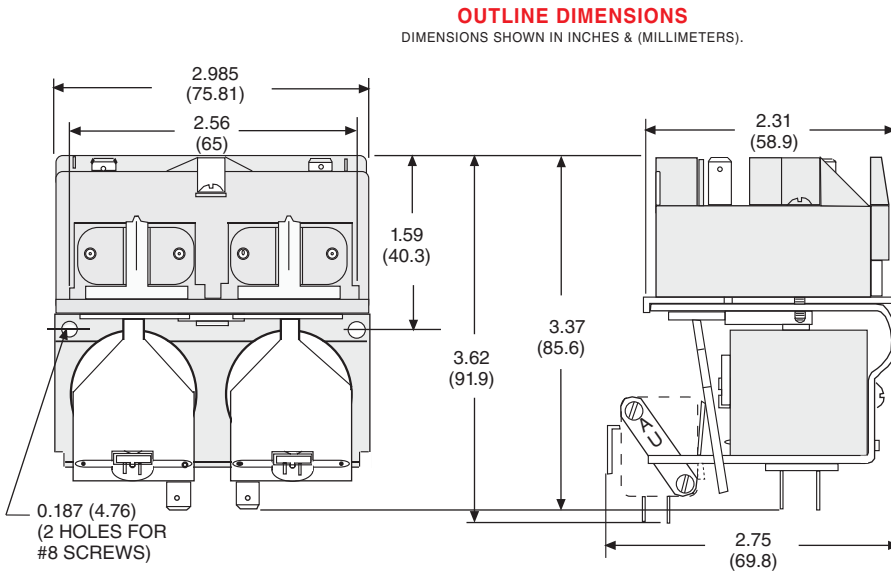


# A275 MOTOR REVERSING CONTACTOR



## UP TO 3 HP, 15 AMPS

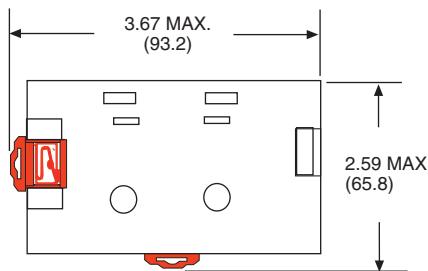
### WIRING DIAGRAM



MECHANICAL INTERLOCK

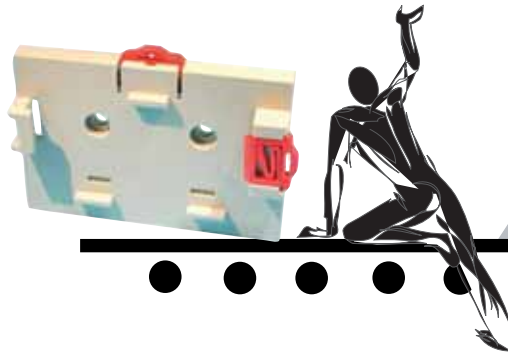
AUXILIARY CONTACT SNAP SWITCHES

COILS



### OPTIONAL DIN ADAPTER 16-275DIN-1

ORDERED AND SHIPPED SEPARATELY



### ORDERING CODE

**A275** **KXX** **90** **-24A**

**CLASS:** 3 POLE CONTACTOR

**CONTACT ARRANGEMENTS:** KXX (3PDM-NO., PER COIL)

**OPTIONS:**  
LEAVE BLANK - STANDARD CONTACTOR  
2 AUX. CONTACTS, EACH SPDT (1 PER COIL) 0.250 QUICK CONNECT TERMINALS - **CODE 90**  
4 AUX. CONTACTS, EACH SPDT (2 PER COIL) 0.250 QUICK CCONNECT TERMINALS - **CODE 91**  
RECTIFIED COIL - **CODE V2**

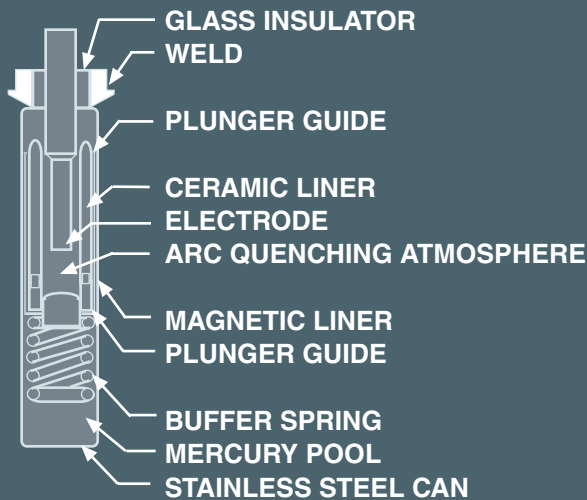
**COIL VOLTAGE:**  
24 & 120 ADD "A" FOR AC COILS  
24 ADD "D" FOR DC COILS

STANDARD PART NUMBERS	COIL MEASURED @ 25 °C	
	NOMINAL INPUT VOLTAGE	NOMINAL RESISTANCE (OHMS)
<b>AC OPERATED</b>		
A275KXX-24A	24 / 24 VAC 50/60 Hz	4.8 Ω
A275KXX-120A	120 / 120 VAC 50/60 Hz	125 Ω
A275KXX90-24A	24 / 24 VAC 50/60 Hz	4.8 Ω
A275KXX90-120A	120 / 120 VAC 50/60 Hz	125 Ω
A275KXX91-24A	24 / 24 VAC 50/60 Hz	4.8 Ω
A275KXX91-120A	120 / 120 VAC 50/60 Hz	125 Ω
<b>DC OPERATED</b>		
A275KXX-24D	24 / 24 VDC	125 Ω
A275KXX90-24D	24 / 24 VDC	125 Ω
A275KXX91-24D	24 / 24 VDC	125 Ω

OTHER COIL VOLTAGES ARE AVAILABLE ON SPECIAL ORDER. CONTACT FACTORY FOR DETAILS

## APPLICATION DATA

### 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

Mercury Displacement Relays provide a perpetually self-renewing contact to assure maximum contact life and minimum contact resistance. Conventional contactors are destroyed by pitting and welding under high load conditions. MDR's have a single moving part that floats free on a pool of mercury. There are no hinges, pivots, pins or mechanical linkage to wear out or break. The result is a life expectancy which exceeds other types of contactors handling the same loads and duty cycle.

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 - Audible noise normally associated with conventional 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.

### RECOMMENDED FUSE PROTECTION

MDR's are capable of accepting high inrush currents however, short circuit currents can damage the contactor. Fast acting fuses should be used in-line with the contactor load to protect against short circuit fault current. UL class J and class RK-1 fuses are recommended.





LISTED 367G  
File E52197

## FEATURES

- SILENT OPERATION
- HIGH DC VOLTAGE RATINGS
- OPTIONAL DIN MOUNT ADAPTERS
- STABLE CONTACT RESISTANCE

## CONTACT LOAD RATINGS TABLE

	VOLTAGE	RESISTIVE AMPS (AC1) (DC1)	TUNGSTEN AMPS		HP		MOTOR AMPS	
			NO	NC	1Ø	3Ø	1Ø	3Ø
M35	120 VAC	35*	35*	35*	3*	5*	34	30
	240 VAC	35*	17	17	5*	7.5*	28	19
	480 VAC	35*	9	9	5*	10*	14	14
	600 VAC	35*	7	7	5*	10*	11.2	11
	24 VDC	35*	35*	35*	1/2		27	
	48 VDC	35*	35*	35*	1/2		13.5	
	125 VDC	16*	16*	16*	1/2		5.2	
	250 VDC	12*	12*	12*	1/2		2.6	
ML35	120 VAC	35*	35*	35*				
	240 VAC	35*	17	17				
	480 VAC	35*	9	9				
	600 VAC	35*	7	7				
M60	120 VAC	60*	60*	45*	3*	5*	34	30
	240 VAC	60*	30	22.5	5*	10*	28	28
	480 VAC	60*	15	11.2	7.5*	15*	21	21
	600 VAC	50	12	9	7.5*	15*	16	17
	24 VDC	60*	50*	50*	3/4		39	
	48 VDC	60*	50*	50*	3/4		19.5	
	125 VDC	40*	40*	40*	3/4		7.4	
	250 VDC	20*	20*	20*	3/4		3.7	
ML60	120 VAC	60*	60*	45*				
	240 VAC	60*	30	22.5				
	480 VAC	60*	15	11.2				
	600 VAC	50	12	9				
M100	120 VAC	100*	100*					
	240 VAC	100*	60*					
	480 VAC	100*	30*					
	600 VAC	80	24					
	24 VDC	100*	100*					
	48 VDC	100*	100*					
125 VDC	80*	80*						
250 VDC	40*	40*						

## GENERAL SPECIFICATIONS (@ 25°C)

	UNITS	
<b>COIL</b>		
Pull-in Voltage AC (50/60 Hz): ≤	% of nominal	80
Pull-in Voltage DC: ≤	% of nominal	80
Dropout Voltage AC (50/60 Hz): ≥	% of nominal	78
Dropout Voltage DC: ≥	% of nominal	65
Maximum Voltage:	% of nominal	110
Resistance Tolerance:	% ±	10
Coil Power AC (50/60 Hz):	VA	7 to 26.4
Coil Power DC:	W	3.1 to 9.1
Insulation System		
Per UL Standard 1446:		Class B (130 °C)
Duty:		Continuous
<b>CONTACTS</b>		
Material:		Mercury
Minimum Recommended Load:	amps	1 @ 5 VDC or 5 W
<b>TIMING</b>		
Operate Time @ Nominal voltage:	ms	50
Release Time @ Nominal voltage:	ms	80 to 100
<b>DIELECTRIC STRENGTH</b>		
Coil to Contacts:	V rms	2650
Across Open Contacts:	V rms	2650
Pole to Pole:	V rms	2650
Contacts to Frame:	V rms	2650
Insulation Resistance:	megohms	1000 @ 500
	minimum@VDC	
<b>TEMPERATURE</b>		
Operating, AC Lower:	°C	-40
Operating, AC Upper:	°C	+60
Operating, DC Lower:	°C	-40
Operating, DC Upper:	°C	+60
Storage, Lower:	°C	-55
Storage, Upper:	°C	+100
<b>LIFE EXPECTANCY</b>		
Electrical @ Rated Load (AC1):	operations	100,000
Mechanical @ no Load :	operations	5,000,000
<b>MISCELLANEOUS</b>		
Operating Position:		Vertical ±10%
Load Terminals:		M35: AWG 6-14 wire pressure connectors M60: AWG 2-12 wire pressure connectors M100: AWG 1-8 wire pressure connectors
Coil Terminals:		#6-32 pan head screws
Weight:	grams	370 to 1078

\* UL and CSA Listed



### HERMETICALLY SEALED STAINLESS STEEL TUBES

Every contactor tube is hermetically sealed for maximum life. The MDR provides protection to the user from arcing and other hazards of switching heavy loads with exposed contacts.

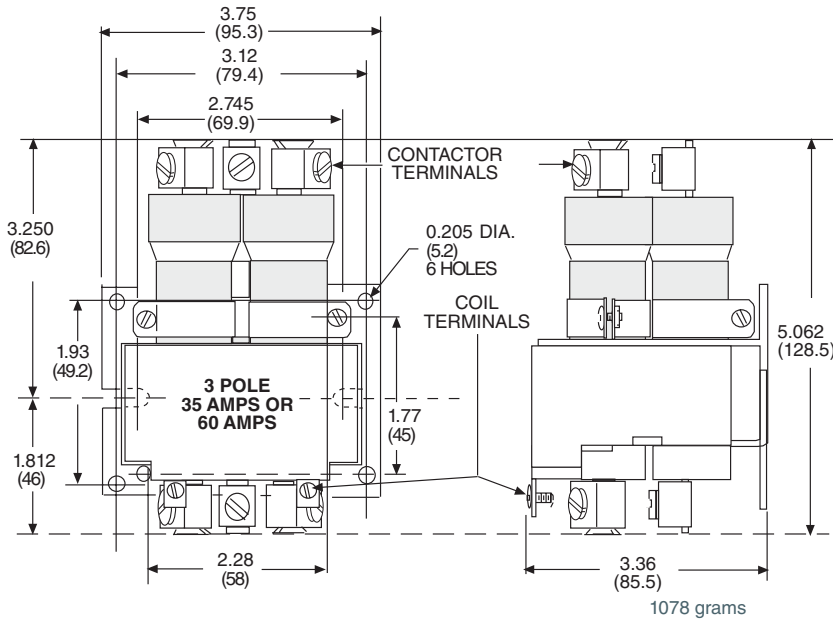
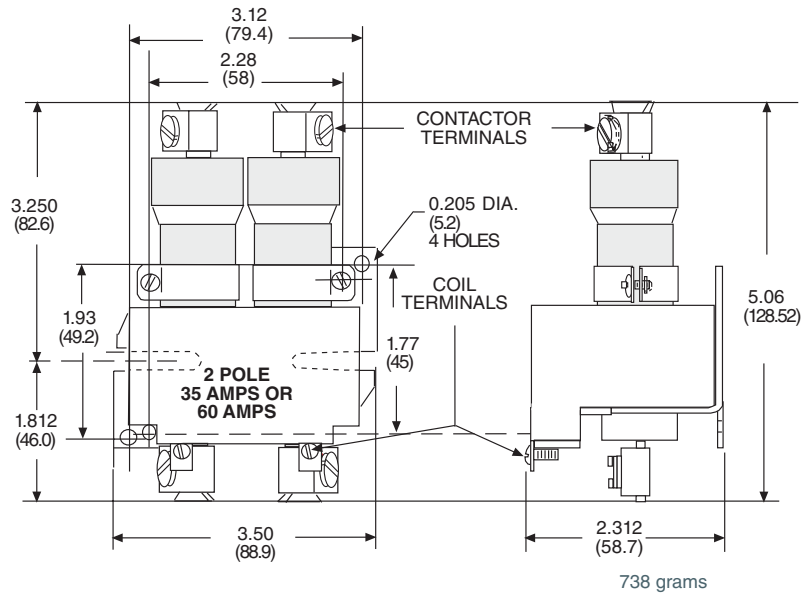
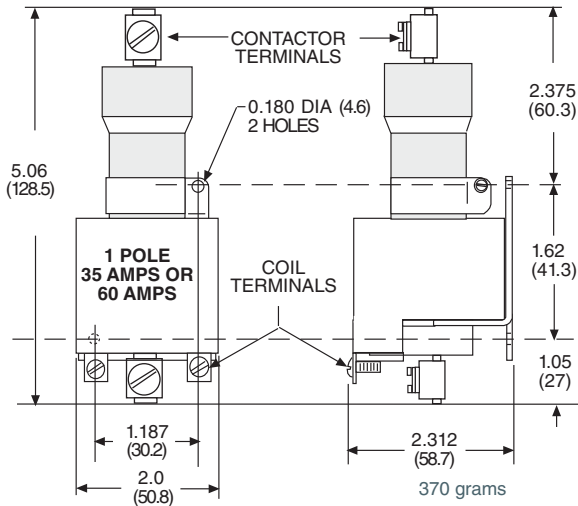
# MDR MERCURY DISPLACEMENT RELAYS



**1, 2 & 3 POLES 35, 60 AMPS**  
**1 POLE 100 AMPS**

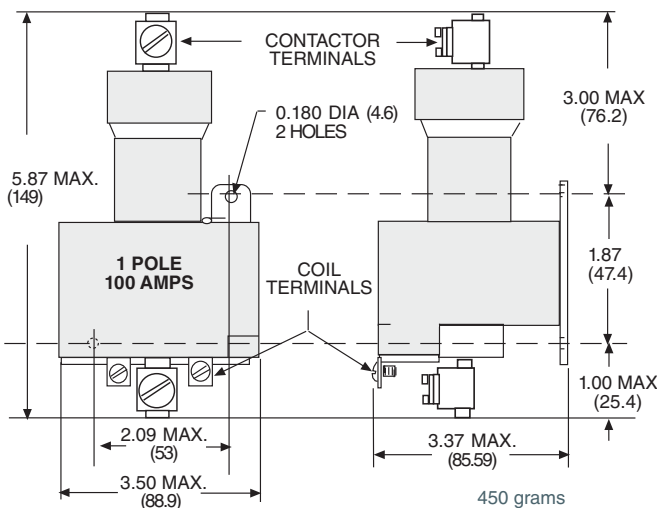
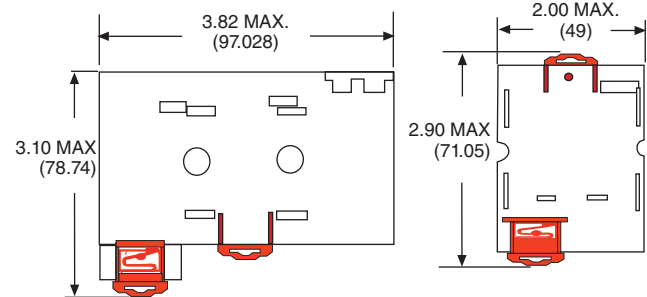
## OUTLINE DIMENSIONS

DIMENSIONS SHOWN IN INCHES & (MILLIMETERS).



### NOTE:

THE OUTLINES FOR THE N.C. VERSIONS ARE NOT SHOWN. THE TUBE IS POSITIONED APPROXIMATELY 0.43 INCHES (11mm) LOWER IN THE COIL. THE OVERALL HEIGHT IS THE SAME AS THE N.O. VERSION.



**OPTIONAL 2 OR 3 POLE  
DIN ADAPTER  
16-MDRDIN-2 / 3**

**OPTIONAL 1 POLE  
DIN ADAPTER  
16-MDRDIN-1**

ORDERED AND SHIPPED SEPARATELY





# MDR MERCURY DISPLACEMENT RELAYS



CLASS WM35, WM60 & WM100 SWITCH RESISTIVE, TUNGSTEN, AND MOTOR LOADS. HIGH INRUSH CAPACITY. RECOMMENDED FOR DC LOADS. CLASS WML35 & WML60 RECOMMENDED FOR LONGER LIFE WHEN SWITCHING AC RESISTIVE AND TUNGSTEN LOADS.

**1, 2 & 3 POLES**  
**35, 60 AMPS**  
**1 POLE 100 AMPS**



**1 POLE**  
35 OR 60 AMPS



**2 POLES**  
35 OR 60 AMPS



**3 POLES**  
35 OR 60 AMPS



**1 POLE**  
100 AMPS



STANDARD PART NUMBERS	COIL MEASURED @ 25 °C	
	NOMINAL INPUT VOLTAGE	NOMINAL RESISTANCE (OHMS)
<b>1 POLE NORMALLY OPEN, 35 AMP</b>		
WM35A-120A	120 VAC 50/60Hz	700 Ω
WM35A-240A	220/240 VAC 50/60Hz	2,800 Ω
WM35A-24D	24 VDC	186 Ω
<b>2 POLE NORMALLY OPEN, 35 AMP</b>		
WM35AA-120A	120 VAC 50/60Hz	218 Ω
WM35AA-240A	220/240 VAC 50/60Hz	1,200 Ω
WM35AA-24D	24 VDC	98 Ω
<b>3 POLE NORMALLY OPEN, 35 AMP</b>		
WM35AAA-120A	120 VAC 50/60Hz	111 Ω
WM35AAA-240A	220/240 VAC 50/60Hz	430 Ω
WM35AAA-24D	24 VDC	63 Ω
<b>1 POLE NORMALLY CLOSED, 35 AMP</b>		
WM35B-120A	120 VAC 50/60Hz	460 Ω
<b>ML SERIES 1 POLE NORMALLY OPEN, 35 AMP</b>		
WML35A-120A	120 VAC 50/60Hz	700 Ω
WML35A-240A	220/240 VAC 50/60Hz	2,800 Ω
<b>ML SERIES 2 POLE NORMALLY OPEN, 35 AMP</b>		
WML35AA-120A	120 VAC 50/60Hz	218 Ω
WML35AA-240A	220/240 VAC 50/60Hz	1,200 Ω
<b>ML SERIES 3 POLE NORMALLY OPEN, 35 AMP</b>		
WML35AAA-120A	120 VAC 50/60Hz	111 Ω
WML35AAA-240A	220/240 VAC 50/60Hz	430 Ω
<b>1 POLE NORMALLY OPEN, 60 AMP</b>		
WM60A-120A	120 VAC 50/60Hz	700 Ω
WM60A-240A	220/240 VAC 50/60Hz	2,800 Ω
WM60A-24D	24 VDC	186 Ω
<b>2 POLE NORMALLY OPEN, 60 AMP</b>		
WM60AA-120A	120 VAC 50/60Hz	218 Ω
WM60AA-240A	220/240 VAC 50/60Hz	1,200 Ω
WM60AA-24D	24 VDC	98 Ω
<b>3 POLE NORMALLY OPEN, 60 AMP</b>		
WM60AAA-120A	120 VAC 50/60Hz	111 Ω
WM60AAA-240A	220/240 VAC 50/60Hz	430 Ω
WM60AAA-24D	24 VDC	63 Ω
<b>1 POLE NORMALLY CLOSED, 60 AMP</b>		
WM60B-120A	120 VAC 50/60Hz	460 Ω
<b>ML SERIES 1 POLE NORMALLY OPEN, 60 AMP</b>		
WML60A-120A	120 VAC 50/60Hz	700 Ω
WML60A-240A	220/240 VAC 50/60Hz	2,800 Ω
<b>ML SERIES 2 POLE NORMALLY OPEN, 60 AMP</b>		
WML60AA-120A	120 VAC 50/60Hz	218 Ω
WML60AA-240A	220/240 VAC 50/60Hz	1,200 Ω
<b>ML SERIES 3 POLE NORMALLY OPEN, 60 AMP</b>		
WML60AAA-120A	120 VAC 50/60Hz	111 Ω
WML60AAA-240A	220/240 VAC 50/60Hz	430 Ω
<b>1 POLE NORMALLY OPEN, 100 AMP</b>		
WM100A-120A	120 VAC 50/60Hz	73.5 Ω
WM100A-240A	220/240 VAC 50/60Hz	300 Ω
WM100A-24D	24 VDC	53 Ω

OTHER COIL VOLTAGES ARE AVAILABLE ON SPECIAL ORDER. CONTACT FACTORY FOR DETAILS

## FEATURES



FITS STANDARD 35 mm DIN RAIL

100 AMP SWITCHING CAPABILITY

DUST COVERED CONTACTS

SINGLE POLE SWITCHING



LISTED 367G  
IND. CONT. EQ.

## CONTACT LOAD RATINGS TABLE

UP TO 240 VAC 50/60 Hz

100 A, RESISTIVE (AC1)

28 VDC

100 A, RESISTIVE (DC1)

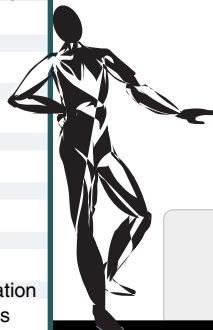
## GENERAL SPECIFICATIONS (@ 25°C)

	UNITS	
<b>COIL</b>		
Pull-in Voltage AC (50/60 Hz): $\leq$	% of nominal	Not Applicable
Pull-in Voltage DC: $\leq$	% of nominal	80
Dropout Voltage AC (50/60 Hz): $\geq$	% of nominal	Not Applicable
Dropout Voltage DC: $\geq$	% of nominal	10
Maximum Voltage:	% of nominal	110
Resistance Tolerance:	% $\pm$	10
Coil Power AC (50/60 Hz):	VA	Not Applicable
Coil Power DC:	W	10
Insulation System		
Per UL Standard 1446:		Class B (130 °C)
Duty:		Continuous
<b>CONTACTS</b>		
Material:		Silver alloy
Minimum Recommended Load:	amps	1 @ 5 VDC or 5 W
<b>TIMING</b>		
Operate Time @ Nominal voltage:	ms	60
Release Time @ Nominal voltage:	ms	30
<b>DIELECTRIC STRENGTH</b>		
Coil to Contacts:	V rms	1500
Across Open Contacts:	V rms	1500
Pole to Pole:	V rms	Not Applicable
Contacts to Frame:	V rms	1500
Insulation Resistance:	megohms minimum@VDC	1000 @ 500
<b>TEMPERATURE</b>		
Operating, AC Lower:	°C	Not Applicable
Operating, AC Upper:	°C	Not Applicable
Operating, DC Lower:	°C	-40
Operating, DC Upper:	°C	+60
Storage, Lower:	°C	-55
Storage, Upper:	°C	+100
<b>LIFE EXPECTANCY</b>		
Electrical @ Rated Load (AC1):	operations	100,000
Mechanical @ no Load :	operations	5,000,000
<b>MISCELLANEOUS</b>		
Operating Position:		Any
Coil Terminals:		#6-32 combination head screws
Contact Terminals:		AWG 2-12 wire pressure connectors
Weight:	grams	370

THE CLASS B101 IS A DC SOLENOID-ACTUATED, HEAVY DUTY CONTACTOR. EACH CONTACTOR HAS A SINGLE POLE, DOUBLE-MAKE OR DOUBLE-BREAK CONTACT. COMBINATION DIN-RAIL/PANEL MOUNTING IS STANDARD. CONTACTS ARE ENCLOSED IN A MOLDED PLASTIC COVER. THE POWERFUL MAGNETIC STRUCTURE CREATES A HIGH CONTACT PRESSURE WHICH RESULTS IN VERY RELIABLE, LOW RESISTANCE CONTACTS. THE B101 IS SUITABLE FOR POWER APPLICATIONS IN TELECOMMUNICATIONS, ELEVATOR AND RAIL MASS TRANSIT, AS WELL AS OTHER INDUSTRIES.



**DIN - RAIL OR  
PANEL MOUNT**

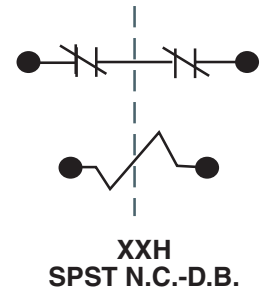
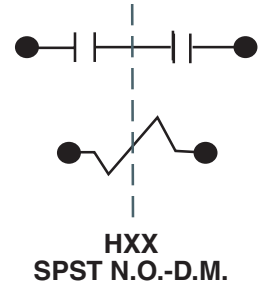


# B101 100 AMP CONTACTOR



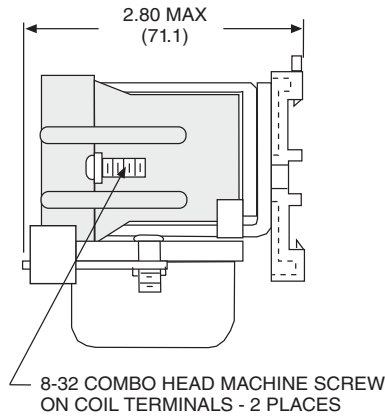
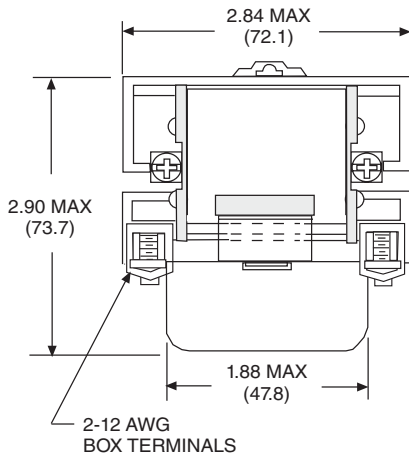
## SPST-N.O.-D.M. OR SPST-N.C.-D.B., 100 AMPS

### WIRING DIAGRAM



### OUTLINE DIMENSIONS

DIMENSIONS SHOWN IN INCHES & (MILLIMETERS).



FITS STANDARD  
35 MILLIMETER DIN RAIL



### ORDERING CODE

**B101** **HXX** **-24D**

**CLASS:**  
100 AMP, 1 POLE

**CONTACT ARRANGEMENTS:**  
HXX 1 POLE N.O.-D.M.  
XXH 1 POLE N.C.-D.B.

**COIL VOLTAGE:**  
12, 24 & 48 **ADD "D" FOR DC COILS**

**OPTIONS (CONSULT FACTORY)**  
AC COIL INPUT VOLTAGES  
NON STANDARD DC COIL VOLTAGES  
CADMIUM FREE CONTACTS  
0.250 QUICK CONNECT COIL TERMINALS

STANDARD PART NUMBERS	CONTACT CONFIGURATION	COIL MEASURED @ 25 °C	
		NOMINAL INPUT VOLTAGE	NOMINAL RESISTANCE (OHMS)
B101HXX-12D	SPST -NO	12 VDC	16.5 Ω
B101HXX-24D	SPST -NO	24 VDC	58.2 Ω
B101HXX-48D	SPST -NO	48 VDC	235 Ω
B101XXH-12D	SPST -NC	12 VDC	16.5 Ω
B101XXH-24D	SPST -NC	24 VDC	58.2 Ω
B101XXH-48D	SPST -NC	48 VDC	235 Ω

## CROSS REFERENCE GUIDE

MAGNECRAFT STRUTHERS-DUNN		POTTER & BRUMFIELD	OMRON	DELTROL	TYCO
W199AX-4	A425XAX-120A	PRD5AG0-120 / PRD5AY0-120	MGN1C-AC120	20239-83	9-1393127-9 / 1393128-5
W199X-2	A425XAX-12D	PRD5DG0-12 / PRD5DY0-12	MGN1C-DC12	20243-81	1-1393128-2 / 1-1393128-6
W199X-3	A425XAX-24D	PRD5DG0-24 / PRD5DY0-24	MGN1C-DC24	20243-82	1-1393128-3 / 1-1393128-7
W199AX-13	A425XBX-24A	PRD11AG0-24 / PRD11AY0-24	MGN2C-AC24	20241-82	1-1393127-1 / 2-1393127-9
W199AX-14	A425XBX-120A	PRD11AG0-120 / PRD11AY0-120	MGN2C-AC120	20241-83	1-1393127-9 / 2-1393127-6
W199AX-15	A425XBX-240A	PRD11AG0-240 / PRD11AY0-240	MGN2C-AC240	20241-84	1-1393127-2 / 3-1393127-0
W199AMX-64	A425XBX90-120A	PRDA11AGA-120 / PRDA11AYA-120		20246-83	
W199X-11	A425XBX-6D	PRD11DG0-6 / PRD11DY0-6	MGN2C-DC6		
W199X-12	A425XBX-12D	PRD11DG0-12 / PRD11DY0-12	MGN2C-DC12	20245-81	3-1393127-5 / 6-1393127-1
W199X-13	A425XBX-24D	PRD11DG0-24 / PRD11DY0-24	MGN2C-DC24	20245-82	3-1393127-8 / 6-1393127-2
W199X-14	A425XBX-110D	PRD11DG0-110 / PRD11DY0-110	MGN2C-DC110	20245-84	3-1393127-4 / 6-1393127-0
W199MX-51	A425XBX90-24D	PRDA11DGA-24 / PRDA11DYA-24		20247-82	
W199AX-8	A425BXX-24A	PRD7AG0-24 / PRD7AY0-24	MGN2A-AC24	20240-82	9-1393129-6 / 1393130-9
W199AX-9	A425BXX-120A	PRD7AG0-120 / PRD7AY0-120	MGN2A-AC120	20240-83	9-1393129-5 / 1393130-7
W199AX-10	A425BXX-240A	PRD7AG0-240 / PRD7AY0-240	MGN2A-AC240	20240-84	9-1393129-7 / 1-1393130-0
W199AMX-34		PRDA7AGA-120 / PRDA7AYA-120		20248-83	
W199X-7	A425BXX-12D	PRD7DG0-12 / PRD7DY0-12	MGN2A-DC12	20244-81	1-1393130-5 / 2-1393130-8
W199X-8	A425BXX-24D	PRD7DG0-24 / PRD7DY0-24	MGN2A-DC24	20244-82	1-1393130-6 / 2-1393130-9
W199MX-27		PRDA7DGA-24 / PRDA7DYA-24		20249-82	
W199ADX-4	A425HXX-120A	PRD3AG0-120 / PRD3AY0-120	MGN1X-AC120	20238-83	6-1393127-9 / 7-1393127-9
W199ADX-5	A425HXX-240A	PRD3AG0-240 / PRD3AY0-240	MGN1X-AC240	20238-84	7-1393127-1 / 8-1393127-1
W199DYX-2	A425XXH-12D	PRD4DG0-12 / PRD4DY0-12		20336-81	
W199DX-2	A425HXX-12D	PRD3DG0-12 / PRD3DY0-12	MGN1X-DC12	20242-81	8-1393127-3 / 9-1393127-5
W199DX-3	A425HXX-24D	PRD3DG0-24 / PRD3DY0-24	MGN1X-DC24	20242-82	8-1393127-4 / 9-1393127-6
W199ADBX-4	A425HXX69-120A	PRD3AJ0-120 / PRD3AH0-120			7-1393127-4 / 7-1393127-3
W199DBX-3	A425HXX69-24D	PRD3DJ0-24 / PRD3DH0-24			
W199DBX-6	A425HXX69-48D	PRD3DJ0-48 / PRD3DH0-48			
W199ABX-14	A425XBX69-120A	PRD11AJ0-120 / PRD11AH0-120	MGN2CM-AC120	20919-83	2-1393127-0 / 1-1393127-6
W199ABMX-7	A425XBX6990-120A	PRDA11AJA-120 / PRDA11AHA-120			
W199BX-13	A425XBX69-24D	PRD11DJ0-24 / PRD11DH0-24			
W199BX-14	A425XBX69-110D	PRD11DJ0-110 / PRD11DH0-110	MGN2CM-DC110	20918-84	4-1393127-6
W199BMX-13	A425XBX6990-24D	PRDA11DJA-24 / PRD11DHA-24			
W199ADEX-4		PRD3AP4-120			7-1393127-6
W199DEX-3		PRD3DP4-24			9-1393127-1
50-1289-1		35D013			5-1393158-2

MAGNECRAFT & STRUTHERS-DUNN	TYCO
PM-17AY-12	4-1393126-4
PM-17AY-24	4-1393126-7
PM-17AY-120	4-1393126-5
PM-17AY-240	4-1393126-8
PM-17DY-6	5-1393126-5
PM-17DY-12	5-1393126-0
PM-17DY-24	5-1393126-2
PM-17DY-48	5-1393126-4
PM-17DY-110	4-1393126-9
PM-17DY-125	5-1393126-1

THE CROSS REFERENCE IS INTENDED TO MATCH FOOT PRINT, INTERNAL WIRING, AND CONTACT LOAD RATINGS. CONSTRUCTION FEATURES AND GENERAL SPECIFICATIONS SHOULD BE COMPARED IF EXACT REPLACEMENT IS REQUIRED.

MAGNECRAFT & STRUTHERS-DUNN	DURAKOOL	MDI
WM35A-120A	BFL-7032	60NO-24D
WM35A-240A	BFL-7034	260NO-120A
WM35A-24D	BFL-7048	260NO-240A
WM35AA-120A	BFL2-7027	260NO-24D
WM35AA-240A	BFL2-7029	360NO-120A
WM35AA-24D	BFL2-7032	360NO-240A
WM35AAA-120A	BFL3-7024	360NO-24D
WM35AAA-240A	BFL3-7026	100NO-120A
WM35AAA-24D	BFL3-7038	100NO-220A
WM35B-120A		100NO-24D
WM60A-120A	BFC-717	35NO-120A
WM60A-240A	BFC-719	35NO-220A
WM60A-24D	BFC-722	35NO-24D
WM60AA-120A	BFC2-727	235NO-120A
WM60AA-240A	BFC2-729	235NO-240A
WM60AA-24D	BFC2-733	235NO-24D
WM60AAA-120A	BFC3-708	335NO-120A
WM60AAA-240A	BFC3-710	335NO-240A
WM60AAA-24D	BFC3-721	335NO-24D
WM100A-120A	CFC-718	35NC-120A
WM100A-240A	CFC-720	60NO-120A
WM100A-24D	CFC-723	60NO-220A

### U. S. A.

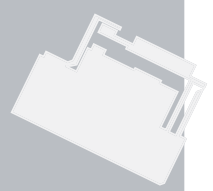
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