Fox Tango Internatioanal

FT-101 Relays

National AE3271, AE3171 ,

OMRON MH6P & Matsushita AE317160 Relays

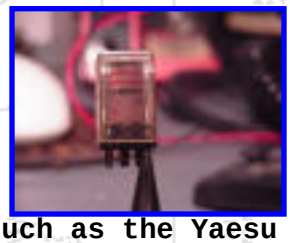
You might be asking yourself just how much can be written about a couple of relays? A LOT! While RL2 antenna change over relay is still readily available, RL1 on the other hand is not and it is the HEART beat for switching voltage inside your FT-101. This relay has become the source of much discussion in the Fox Tango Yahoo forum and a source of grief for many an owner of an FT-101 as they have become very difficult to find. If you are willing to pay the price from Yaesu (Vertex Stnd.) in Anaheim California a replacement can be obtained from them directly. The Yaesu part number for this relay is (P/N M1090028) it's current price is $75 dollars from Yaesu of Anaheim! So a search continues for an economical replacement for RL1 in the USA.

RL1 (Left) the HEART of the FT-101 switching and RL2 (right) Antenna Transfer Relay

More then likely if you can't read the name on the side of your relay it is made by NATIONAL.
It is written in Katakana which is a Japanese writing system for words that are not truly Japanese (Ex:マクドナルド MAKUDONARUDO- McDonald's) In this case it says NATIONAL as can be seen in the close up of RL1-micro photo by Fox Tango member Steven Peterson(KG6JEV/4)

The main relay used in the FT-101 series transceiver is a 6 pole, double pole,

double throw relay. The early relays had the National name in Katakana and the number AE3171 or AE3271



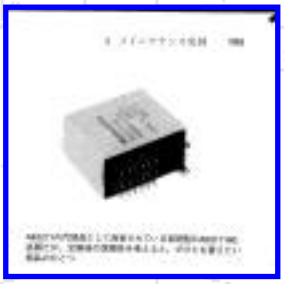
Some of Yaesu's other transceivers such as the Yaesu FT-620B came out with the identical style relay made by OMRON (Type MH6P) again 6 pole double pole double throw relay. The OMRON MH6P is also no longer available from OMRON, so save the dime on the phone call, I've tried.

FT-101 Antenna transfer relay Omron Type MX2P (Left) Modified RL-2 (Right)

RL2 on the other hand is still economical and available.

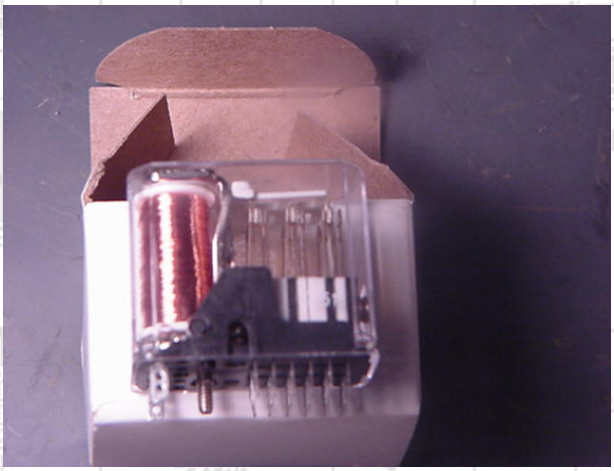
(Old Yaesu Part # MX2P) Current Yaesu Part # M1190124.

Omron Replacement Part # MY2-DC12S Yaesu part costs approximately $6.50 USD and the Omron is $6.64 USD



While in Japan last November(2003)I bought a book written in Japanese called the New FT-101 maintenance guide. Even if you can not read any Japanese at all you know pictures are still worth a 1000 words. One KEY piece of information I learned from this book is that RL1 is still available, getting it in the United States remains a problem. MATSUSHITA makes a current version of this relay. The number is AE317160 as listed on page 165 of this guide. Making several attempts to find this relay made by Matsushita and I believe they have now merged with Panasonic, so this has also complicated ordering. Yaesu's original National AE3271, AE3171, OMRON's MH6P and the Matsushita's AE317160 are all (12 volt 6P DPDT) identical relays. (NOTE: The Matsushita part number is current as of 2004) the problem right now appears to be finding a source to get them in the United States at a reasonable price.

Is there a replacement for RL-1?



The subject of an RL-1 replacement keeps popping up on the Yahoo forum. A possible replacement relay for RL1 is the Magnecraft W67RCSX-12, so I took a chance and ordered one. The Magnecraft Relay looks and fits perfectly in place of the original AE3271 and it is so close it's amazing. Except there was one problem. The relay wiper contacts are 180 deg out of phase with the original Yaesu relay. In other words what I found is although the relay looked the same on paper at first glance. When I put the ohm meter on the center wiper of the Magnecraft relay ohms out on the opposite side of the relay where I expect it to when compared to the original AE-3271 (FT-101 RL-1.)

Can we make it work? When we look a the Magnecraft relay diagram as drawn in the MOUSER catalog we have a true representation from the bottom of the relay terminal arrangement. With slight modification to your transceiver, you would have to move all the outside wiring on RL-1 relay socket outer contacts from one side to the other side, much as if you were rotating tires on your automobile from left side to right side. The center wiper contacts can be left as they are. If you down load the OMRON MH6 series catalog I have provided, you will find on page 8 the contact terminal arrangement of the MH6P, which is the same as all previous listed Yaesu relays National AE3271, AE3171, OMRON MH6P and Matsushita AE317160 relays. The Omron catalog says the contact arrangement is a bottom view, but it's really a Top view of the relay looking down. Then compare this to the Magnecraft W67RCSX-12 from the mouser catalog page 1104 (Cat# 620 Jan 2005.) The Magnecraft relay is truly a bottom terminal arrangement with the contacts facing toward you on the bench. You can ohm the contacts and they are exactly as the Mouser catalog shows, yet it is so similar to that of the Yaesu relay it hurts! If your into pain and want to try the Magnecraft relay, the part number is a Magnecraft W67RCSX-12 (12vdc) it cost me $17.18 for this lesson. The relay shows up on page 1104 of the mouser catalog or you can research yourself on line at http://www.mouser.com Mouser Part# 528-6710-12, Mfr's Part# W67RCSX-12 Magnecraft & Struthers-Dunn, Description: 6PDT industrial 12v relay

Attached please find the OMRON MH Series Catalog and Magnecraft information for the W67RCSX-12 Magnecraft available from Mouser.com

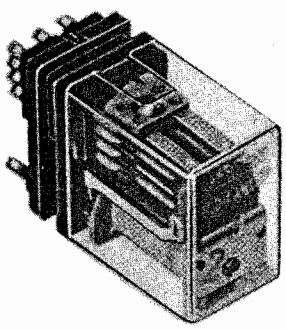
Carol L. Maher **W4CLM Fox Tango International**

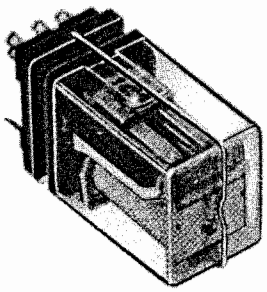
Emailto: Foxtango@foxtango.org

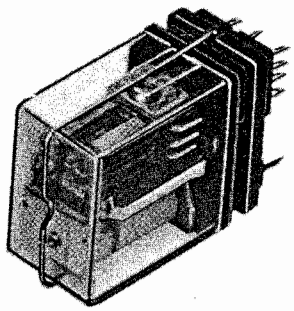
OMRON

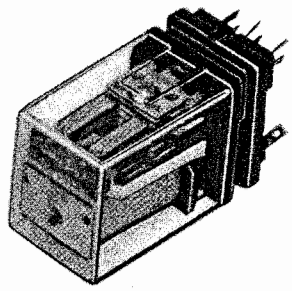
Subminiature Cradle Relay Type MH

- COMPACT
- LONG LIFE
- RELIABLE SIGNAL TRANSMISSION
- WIDE VARIETY OF MODELS









SUBMINIATURE CRADLE RELAY

BREAK—1 to 5 AMPS
CARRYS—1 to 5 AMPS
INRUSH—4 to 6 AMPS

TYPE MH

SPDT
DPDT
4PDT
6PDT

FEATURES

Light and very compact style

Transparent dust cover—assures reliability and readily visible operation

Exceptional response time—operate and release times of less than 15 msec

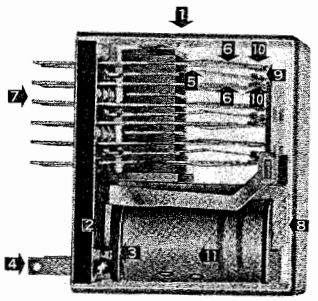
Long life and high reliability—more than 50,000,000 operations

High shock and vibration characteristics

Low power consumption—about 1.3 VA for AC, and 200 mW for DC

UL- and CSA-approved models also available

Special characteristics available on request



CONSTRUCTION

1. Case
2. Armature
3. Iron core
4. Coil terminal
5. Movable contactor
6. Fixed contactor
7. Terminal
8. Core frame
9. Movable contact
10. Fixed contact
11. Coil

AVAILABLE TYPES

Type	Contacts	Ratings	Poles	Coil Specifications *Table No.	Options	Mounting		
						Plug-In	PCB Staggered	PCB Inline
Standard	Single	2 A	2	1		MH202P	MH202P-O	MH202P-01
					Stud	MH202PG	MH202PG-O	MH202PG-01
			4	1		MH402P	MH402P-O	MH402P-01
					Stud	MH402PG	MH402PG-O	MH402PG-01
			6	1		MH602P	MH602P-O	MH602P-01
					Stud	MH602PG	MH602PG-O	MH602PG-01
		5 A	2	1		MH205P	MH205P-O	MH205P-01
					Stud	MH205PG	MH205PG-O	MH205PG-01
			4	1		MH405P	MH405P-O	MH405P-01
					Stud	MH405PG	MH405PG-O	MH405PG-01
			6	1		MH605P	MH605P-O	MH605P-01
					Stud	MH605PG	MH605PG-O	MH605PG-01
	Bifurcated Single	2 A	2	1		MH202ZP	MH202ZP-O	MH202ZP-01
					Stud	MH202ZPG	MH202ZPG-O	MH202ZPG-01
			4	1		MH402ZP	MH402ZP-O	MH402ZP-01
					Stud	MH402ZPG	MH402ZPG-O	MH402ZPG-01
			6	1		MH602ZP	MH602ZP-O	MH602ZP-01
					Stud	MH602ZPG	MH602ZPG-O	MH602ZPG-01
Sensitive	Single	1 A	2	2		MH2P	MH2P-O	MH2P-01
					Stud	MH2PG	MH2PG-O	MH2PG-01
			4	2		MH4P	MH4P-O	MH4P-01
					Stud	MH4PG	MH4PG-O	MH4PG-01
			6	2		MH6P	MH6P-O	MH6P-01
					Stud	MH6PG	MH6PG-O	MH6PG-01
Hermetically Sealed	Single	2 A	2	1		MH202HP		
					Stud	MH202HPG		
	Single	5 A	2	1		MH205HP		
					Stud	MH205HPG		
Latching	Single	1 A	1	3		MH1KP	MH1KP-O	
					Stud	MH1KPG	MH1KPG-O	

*See tables page 3.

COIL SPECIFICATIONS

TABLE 1 STANDARD TYPES

Nominal voltage	Nominal resistance (Ω) ± 10%		
	DPDT	4PDT	6PDT
6 VDC	52	52	25
12 VDC	185	185	90
24 VDC	700	700	430
48 VDC	2,500	2,500	1,550
110 VDC	15,000	15,000	9,000

TABLE 2 SENSITIVE TYPES

Nominal voltage	Nominal resistance		
	DPDT	4PDT	6PDT
6 VDC	145	80	28
12 VDC	690	270	110
24 VDC	2,400	1,100	430
48 VDC	9,000	5,800	1,700
6 VAC	9.2	NOT AVAILABLE WITH AC ADJUSTMENT	
12 VAC	39		
24 VAC	190		
50 VAC	650		
120 VAC	3,400		

TABLE 3 LATCHING TYPES

Nominal voltage	Coil resistance (Ω) (set/reset)
6 VDC	60/60
12 VDC	240/240
24 VDC	960/960

NOTES:
1. Maximum coil power not to exceed 1.5 W (DC) and 4 VA (AC).
2. Maximum must-operate voltage is 80% of nominal voltage.
3. Coil resistance tolerance ± 10% at 25°C ambient temperature.

CHARACTERISTICS

Power consumption: AC: about 1.3 VA (2-pole type only)
DC: about 250 mW to 1.4 W (standard type)
200 mW to 1.25 W (sensitive type)

Contact resistance: 50 mΩ max. (initial)

Dielectric strength: 700 VAC (50/60 Hz) for 1 minute between open contacts; 1000 VAC (50/60 Hz) for 1 minute between isolated parts

Insulation resistance: 1000 MΩ min. measured with megohm meter at 500 VDC

Operating frequency: 1800 operations/hour

Operate time: 15 msec max.

Release time: 8 msec max.

Vibration: 0 to 6 g; 55 Hz

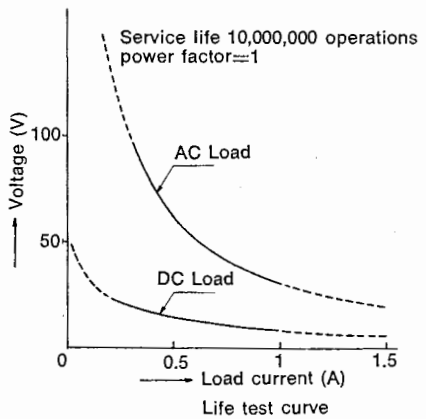
Shock: 25 g's

Temperature range: —55°C to +70°C

SERVICE LIFE

Electrically: 10,000,000 operations min. under max. permissible load

Mechanically: 50,000,000 operations min.



Life test curve

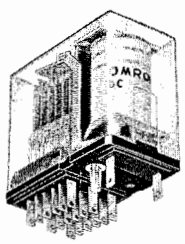
ORDERING INFORMATION

MH □ □ □ □ —UA— □
(I) (II) (III) (IV) (V)

Identifier	Symbol	Definition
I. Number of poles	1	SPDT (available on latch type only)
	2	DPDT
	4	4PDT
	6	6PDT
II. Contact type	none	Ag-Au Sensitive (available only on latch type, and AC or DC types with no special features)
	02	Ag-Au Standard (not available on latch type)
	05	AgCdO-Au Power (note available with bifurcated contacts or latch type)
III. Special features	none	No special features
	Z	Bifurcated twin single-button contacts
	K	Latch type (available only on 1-pole with plug-in or staggered PCB terminals)
	H	Hermetic seal (available on 2-pole with plug-in terminals and ground stud)
IV. Mounting options	P	Plug-in, without stud
	P-0	Printed circuit with staggered pins, without stud
	P-01	Printed circuit with inline pins, without stud
	PG	Plug-in, with stud
	PG-0	Printed circuit with staggered pins, with stud
	PG-01	Printed circuit with inline pins, with stud
V. Nominal voltage adjustment	AC (volts)	6, 12, 24, 50, 120 VAC (2-pole only)
	DC (volts)	6, 12, 24, 48, 110 VDC

GROUNDING STUD TYPE

The relay base has a #3-48 screw that is connected to the core and frame. The relay can be grounded by clamping the screw directly to the panel. Relays with a grounding stud are identified by the letter G; for example, MH6PG-UA- and MH2PG-O.



SUBMINIATURE CRADLE RELAY

BREAK—2 to 5 AMPS
CARRYS—2 to 5 AMPS
INRUSH—5 to 6 AMPS

TYPE MH

DPDT
4PDT
6PDT

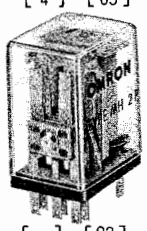
CONTACT RATINGS

Contact type		Voltage	Current (A)			
			Switching current		Inrush (A)	Carry (A)
			Power factor =1	Power factor =0.4		
02	Ag-Au	115 VAC 28 VDC	2	1	5	2
05	Ag-CdO	115 VAC 28 VDC	5	1.5 2	6	5

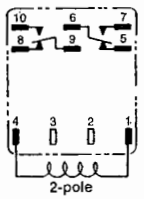
MODEL NUMBER | **COIL (Ω)** | **CONTACT FORM** BOTTOM VIEW | **DIMENSIONED DRAWINGS** IN INCHES | **METRIC CONVERSION**

PLUG-IN, STANDARD CONTACT TYPE

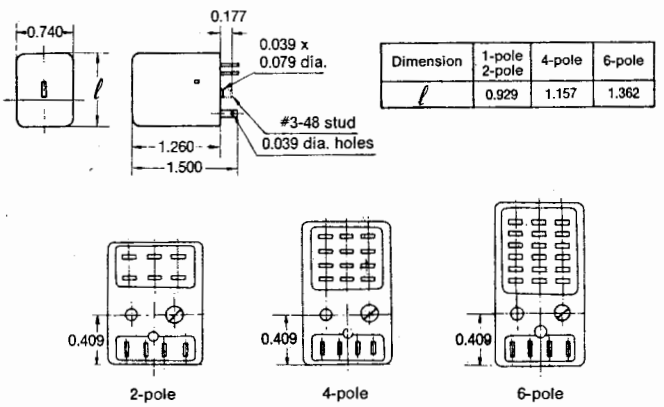
MH [2 or 4] [02 or 05] [P or PG] -UA-DC6 — 52
-DC12 — 185
-DC24 — 700
-DC48 — 2,500
-DC110 — 15,000



MH [6] [02 or 05] [P or PG] -UA-DC6 — 25
-DC12 — 90
-DC24 — 430
-DC48 — 1,550
-DC110 — 9,000



2-pole



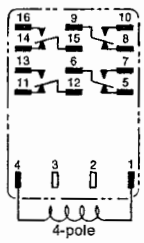
Dimension	1-pole 2-pole	4-pole	6-pole
ℓ	0.929	1.157	1.362

2-pole 4-pole 6-pole

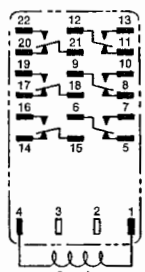
STAGGERED PCB, STANDARD CONTACT TYPE

MH [2 or 4] [02 or 05] [P-O or PG-O] -UA-DC6 — 52
-DC12 — 185
-DC24 — 700
-DC48 — 2,500
-DC110 — 15,000

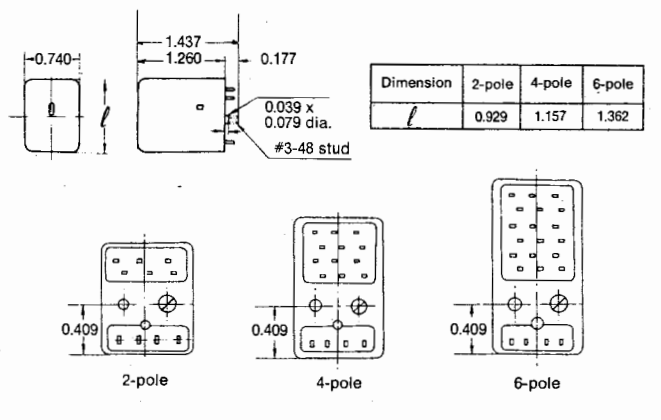
MH [6] [02 or 05] [P-O or PG-O] -UA-DC6 — 25
-DC12 — 90
-DC24 — 430
-DC48 — 1,550
-DC110 — 9,000



4-pole



6-pole



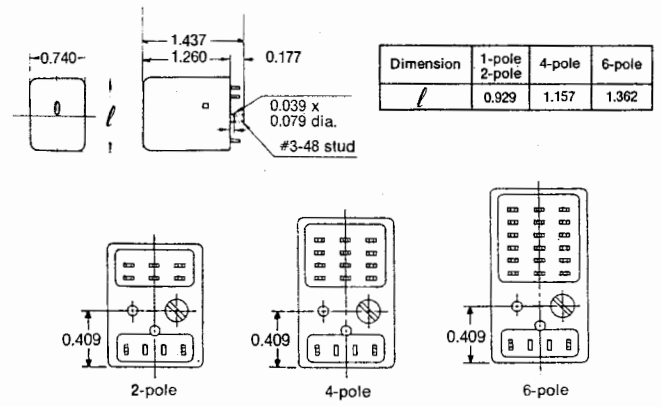
Dimension	2-pole	4-pole	6-pole
ℓ	0.929	1.157	1.362

2-pole 4-pole 6-pole

INLINE PCB, STANDARD CONTACT TYPE

MH [2 or 4] [02 or 05] [P-01 or PG-01] -UA-DC6 — 52
-DC12 — 185
-DC24 — 700
-DC48 — 2,500
-DC110 — 15,500

MH [6] [02 or 05] [P-01 or PG-01] -UA-DC6 — 25
-DC12 — 90
-DC24 — 430
-DC48 — 1,550
-DC110 — 9,000



Dimension	1-pole 2-pole	4-pole	6-pole
ℓ	0.929	1.157	1.362

2-pole 4-pole 6-pole

IN.	MM
0.039	1
0.079	2
0.177	4.5
0.409	10.4
0.740	18.8
0.929	23.6
1.157	29.4
1.260	32
1.362	34.6
1.437	36.5
1.500	38.1

SUBMINIATURE CRADLE RELAY

BREAK—1 to 5 AMPS
CARRYS—1 to 5 AMPS
INRUSH—4 to 6 AMPS

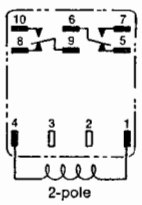
TYPE MH

DPDT
4PDT
6PDT

PLUG-IN, HERMETICALLY SEALED, STANDARD CONTACT TYPE

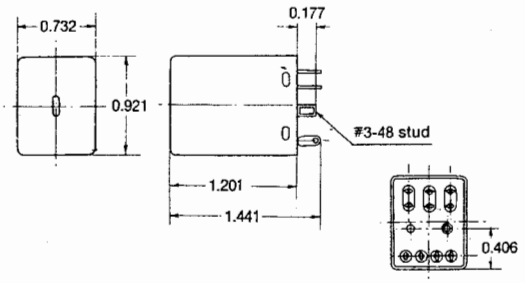
MODEL NUMBER	COIL (Ω)
MH [2] [02 or 05] [HP or HPG] -UA-DC6	52
-DC12	185
-DC24	700
-DC48	2,500
-DC110	15,000

CONTACT FORM (BOTTOM VIEW)



2-pole

DIMENSIONED DRAWINGS (IN INCHES)



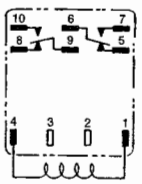
CONTACT RATINGS

Contact type	Voltage	Current (A)			
		Switching Current			
		Power factor =1	Power factor =0.4	Inrush	Carry
AgAu	115 VAC	1	0.5	4	1
	28 VDC	1	0.5		

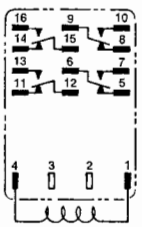
PLUG-IN, SENSITIVE TYPE

MODEL NUMBER	COIL (Ω)
MH [2] [P or PG] -UA-AC6	9.2
-AC12	39
-AC24	190
-AC50	650
-AC120	3,400
-DC6	145
-DC12	690
-DC24	2,400
-DC48	9,000
MH [4] [P or PG] -UA-DC6	80
-DC12	270
-DC24	1,100
-DC48	5,800
MH [6] [P or PG] -UA-DC6	28
-DC12	110
-DC24	430
-DC48	1,700

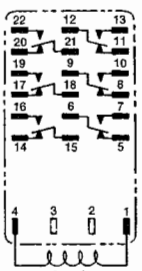
CONTACT FORM (BOTTOM VIEW)



2-pole

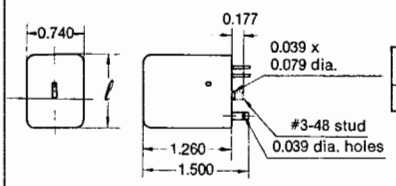


4-pole



6-pole

DIMENSIONED DRAWINGS (IN INCHES)



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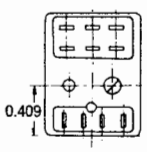
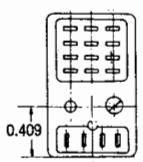
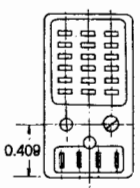


2-pole



4-pole



6-pole

METRIC CONVERSION

IN.	MM
0.039	1
0.079	2
0.177	4.5
0.406	10.3
0.409	10.4
0.732	18.6
0.740	18.8
0.921	23.4
0.929	23.6
0.157	29.4
1.201	30.5
1.260	32
1.362	34.6
1.437	36.5
1.441	36.6

SUBMINIATURE CRADLE RELAY

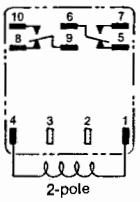
BREAK—1 AMP
CARRYS—1 AMP
INRUSH—4 AMPS

TYPE MH

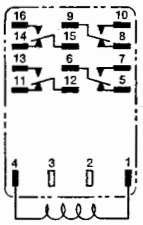
DPDT
4PDT
6PDT

STAGGERED PCB, SENSITIVE TYPE

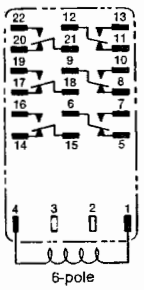
MODEL NUMBER	COIL (Ω)
MH [2] [P-0 or PG-0] -UA-AC6	9.2
-AC12	39
-AC24	190
-AC50	650
-AC120	3,400
-DC6	145
-DC12	690
-DC24	2,400
-DC48	9,000
MH [4] [P-0 or PG-0] -UA-DC6	80
-DC12	270
-DC24	1,100
-DC48	5,800
MH [6] [P-0 or PG-0] -UA-DC6	28
-DC12	110
-DC24	430
-DC48	1,700



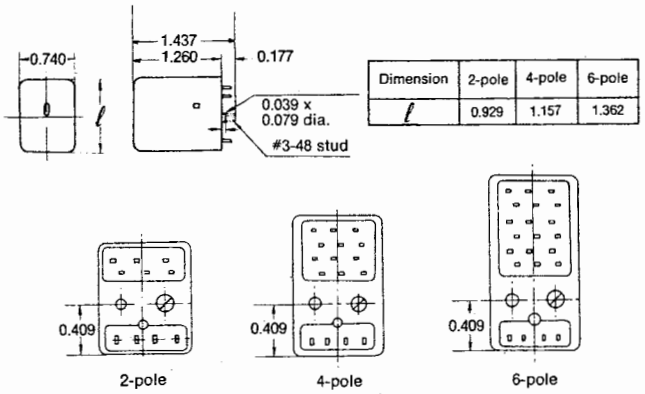
2-pole



4-pole



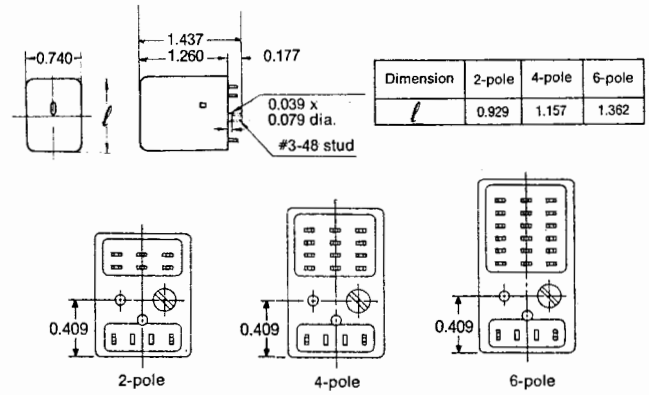
6-pole



Dimension	2-pole	4-pole	6-pole
ℓ	0.929	1.157	1.362

INLINE PCB, SENSITIVE TYPE

MODEL NUMBER	COIL (Ω)
MH [2] [P-01 or PG-01] -UA-AC6	9.2
-AC12	39
-AC24	190
-AC50	650
-AC120	3,400
-DC6	145
-DC12	690
-DC24	2,400
-DC48	9,000
MH [4] [P-01 or PG-01] -UA-DC6	80
-DC12	270
-DC24	1,100
-DC48	5,800
MH [6] [P-01 or PG-01] -UA-DC6	28
-DC12	110
-DC24	430
-DC48	1,700



Dimension	2-pole	4-pole	6-pole
ℓ	0.929	1.157	1.362

METRIC CONVERSION

IN.	MM
0.039	1
0.079	2
0.177	4.5
0.409	10.4
0.740	18.8
0.929	23.6
1.157	29.4
1.260	32
1.362	34.6
1.437	36.5
1.500	38.1

SUBMINIATURE CRADLE RELAY

BREAK—2 AMPS
CARRYS—2 AMPS
INRUSH—5 AMPS

TYPE MH

DPDT
4PDT
6PDT

CONTACT RATING

Contact type		Voltage	Current (A)			
			Switching Current		Inrush (A)	Carry (A)
			Power factor =1	Power factor =0.4		
02	AgAu	115 VAC 28 VDC	1 2	0.5 0.5	4 4	2 2

MODEL NUMBER	COIL (Ω)	CONTACT FORM BOTTOM VIEW	DIMENSIONED DRAWINGS IN INCHES
PLUG-IN, BIFURCATED STANDARD CONTACT TYPE poles amps stud MH [2 or 4] [02] [ZP or ZPG] -UA-DC6 -DC12 -DC24 -DC48 -DC110	52 185 700 2,500 15,000	2-pole 4-pole 6-pole	0.740, 0.177, 0.039 x 0.079 dia., 1.260, 1.500, #3-48 stud, 0.039 dia. holes Dimension: ℓ — 1-pole 2-pole: 0.929; 4-pole: 1.157; 6-pole: 1.362 0.409 2-pole 4-pole 6-pole
MH [6] [02] [ZP or ZPG] -UA-DC6 -DC12 -DC24 -DC48 -DC110	25 90 430 1,550 9,000		
STAGGERED PCB, BIFURCATED STANDARD CONTACT TYPE poles amps stud MH [2 or 4] [02] [ZP-0 or ZPG-0] -UA-DC6 -DC12 -DC24 -DC48 -DC110	52 185 700 2,500 15,000	2-pole 4-pole 6-pole	0.740, 1.437, 1.260, 0.177, 0.039 x 0.079 dia., #3-48 stud Dimension: ℓ — 2-pole: 0.929; 4-pole: 1.157; 6-pole: 1.362 0.409 2-pole 4-pole 6-pole
MH [6] [02] [ZP-0 or ZPG-0] -UA-DC6 -DC12 -DC24 -DC48 -DC110	25 90 430 1,550 9,000		
INLINE PCB, BIFURCATED STANDARD CONTACT TYPE poles amps stud MH [2 or 4] [02] [ZP-01 or ZPG-01] -UA-DC6 -DC12 -DC24 -DC48 -DC110	52 185 700 2,500 15,000	2-pole 4-pole 6-pole	0.740, 1.437, 1.260, 0.177, 0.039 x 0.079 dia., #3-48 stud Dimension: ℓ — 2-pole: 0.929; 4-pole: 1.157; 6-pole: 1.362 0.409 2-pole 4-pole 6-pole
MH [6] [02] [ZP-01 or ZPG-01] -UA-DC6 -DC12 -DC24 -DC48 -DC110	25 90 430 1,550 9,000		

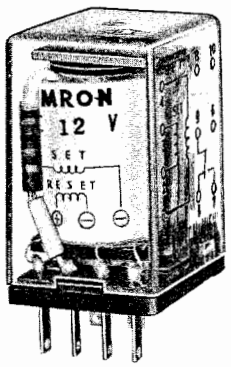
METRIC CONVERSION

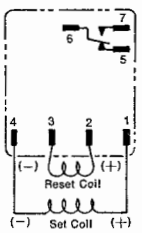
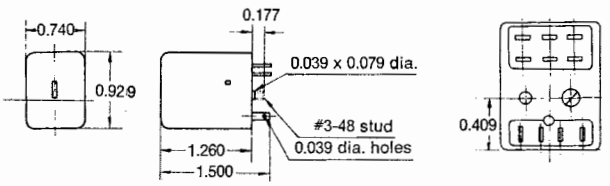
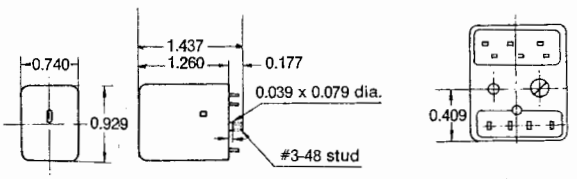
IN.	MM
0.039	1
0.079	2
0.177	4.5
0.409	10.4
0.740	18.8
0.929	23.6
1.157	29.4
1.260	32
1.362	34.6
1.437	36.5
1.500	38.1

LATCHING TYPE

The outward appearance is the same as that of Type MH2P, except two coils are employed, one for set and one for reset. The latching relay, once energized, maintains that condition, resuming its original condition only when the reset coil is energized.

This type has as long a life as the standard Type MH, because no mechanical lock is applied; it is, in fact, more stable than the standard type. The latching relay is currently available in a single-pole type only. For additional types, see the catalog for MKK.



MODEL NUMBER	COIL (Ω)	CONTACT FORM BOTTOM VIEW	DIMENSIONED DRAWINGS IN INCHES
PLUG-IN, LATCHING TYPE MH [poles: 1] [stud: KP or KPG] -UA-DC6 -DC12 -DC24	60/60 240/240 960/960		
STAGGERED PCB, LATCHING TYPE MH [poles: 1] [stud: KP-0 or KPG-0] -UA-DC6 -DC12 -DC24	60/60 240/240 960/960		

METRIC CONVERSION	
IN.	MM
0.039	1
0.079	2
0.177	4.5
0.409	10.4
0.740	18.8
0.929	23.6
1.157	29.4
1.260	32
1.362	34.6
1.437	36.5
1.500	38.1

AVAILABLE TYPES

SOCKETS

Number of Poles	Standard	
	Solder terminal	PC terminal
1	PM07	PM07-0-SM
2	PM08	PM08-0-SM
4	PM14	PM14-0-SM
6	PM20	PM20-0-SM

METRIC CONVERSION

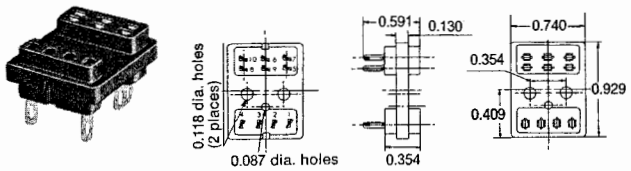
IN.	MM
0.087	2.2
0.118	3
0.130	3.3
0.335	8.5
0.354	9
0.409	10.4
0.531	13.5
0.591	15
0.740	18.8
0.929	23.6
1.157	29.4
1.362	34.6

SOLDER TERMINAL TYPE

For 1- and 2-pole relays

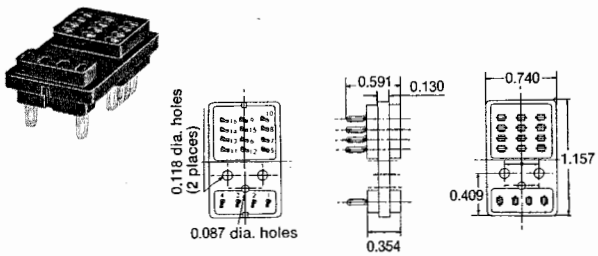
PM07

PM08



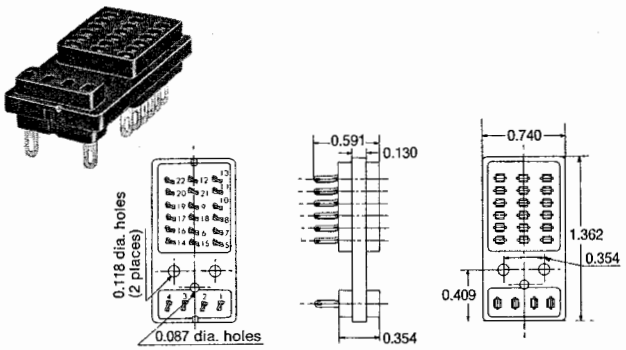
For 4-pole relays

PM14



For 6-pole relays

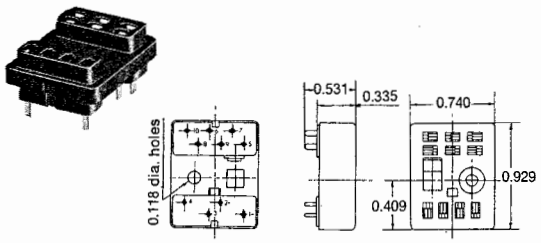
PM20



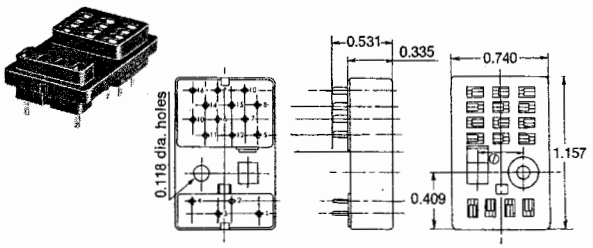
PRINTED CIRCUIT TYPE

PM07-0-SM

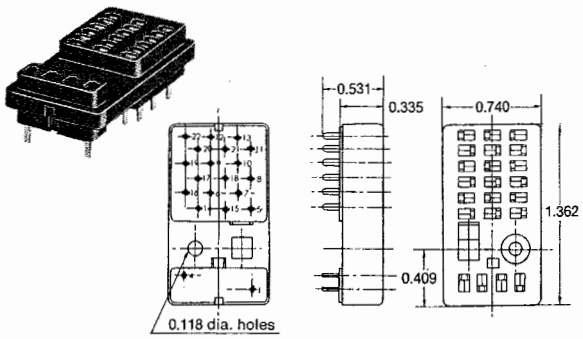
PM08-0-SM



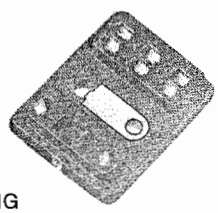
PM14-0-SM



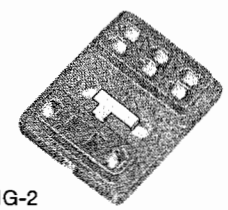
PM20-0-SM



METAL GROUND STRAP

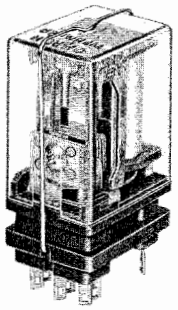


PMG



PMG-2

HOLD-DOWN CLIPS

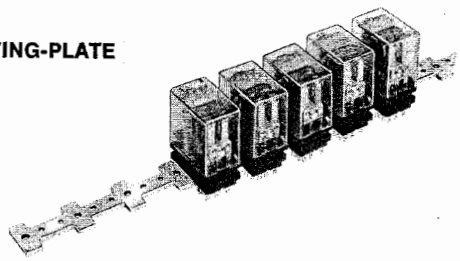


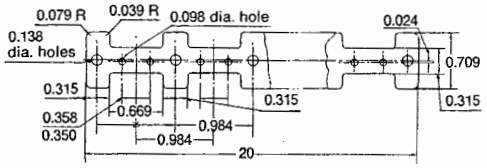
AVAILABLE TYPES

1-Pole	PMC
2-Pole	PMC
4-Pole	PMC-1
6-Pole	PMC-2
Hermetically Sealed	PMC-3

SOCKET MOUNTING-PLATE

PMP



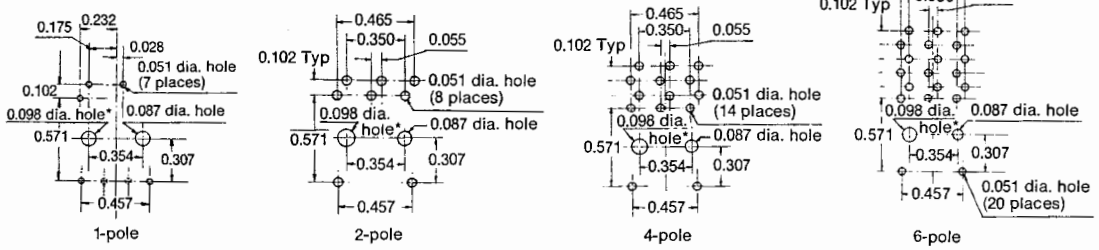


METRIC CONVERSIONS

IN.	MM
0.004	0.1
0.024	0.6
0.028	0.7
0.039	1.0
0.051	1.3
0.055	1.4
0.079	2
0.087	2.2
0.098	2.5
0.102	2.6
0.138	3.5
0.175	4.45
0.202	5.15
0.232	5.9
0.307	7.8
0.315	8
0.350	8.9
0.354	9
0.358	9.1
0.404	10.3
0.452	11.5
0.457	11.6
0.465	11.8
0.571	14.5
0.669	17
0.709	18
0.984	25
20.000	508

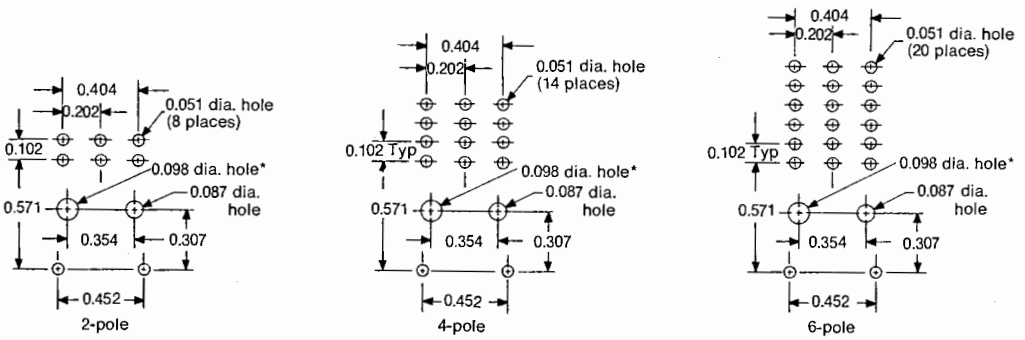
MOUNTING-HOLE DIMENSIONS
IN INCHES

DIRECT PC-BOARD MOUNTING (STAGGERED PINS)



*Where the grounding strap is not used, the 0.098 dia. hole is not required.

DIRECT PC-BOARD MOUNTING (INLINE PINS)

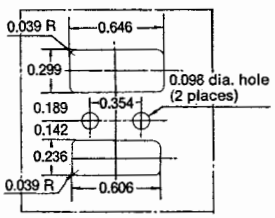


*Where the grounding strap is not used, the 0.098 dia. hole is not required.

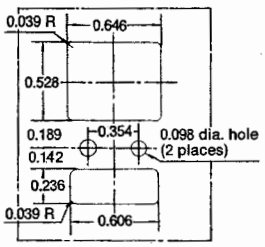
INSTALLATION

MOUNTING HOLE DIMENSIONS
IN INCHES

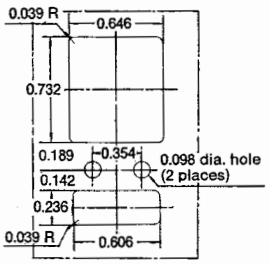
DIRECT PLUG-IN MOUNTED RELAYS AND SOLDER TERMINAL TYPE SOCKETS



2-pole



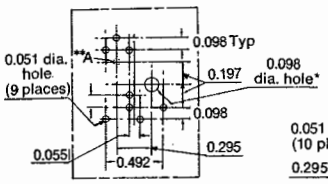
4-pole



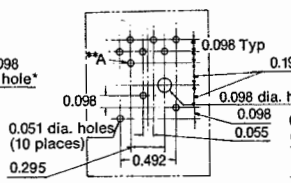
6-pole

*Where the grounding stud is not used, the 0.098 dia. hole is not required.

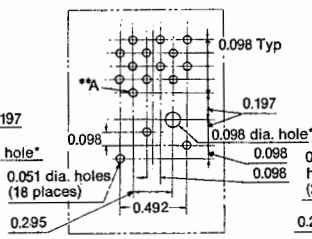
PC—TERMINAL SOCKET TYPE



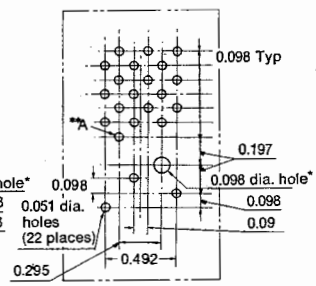
1-pole



2-pole



4-pole



6-pole

*Where the grounding stud is not used, the 0.098 dia. hole is not required.

**Hole A is needed only when using PMG-2.

METRIC CONVERSIONS

IN.	MM
0.039	1
0.051	1.3
0.098	2.5
0.142	3.6
0.189	4.8
0.197	5
0.236	6
0.295	7.5
0.299	7.6
0.354	9
0.492	12.5
0.528	13.4
0.606	15.4
0.646	16.4
0.732	18.6

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SALES AND SERVICE
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R-MH-675
PRINTED IN USA

MAGNECRAFT STRUTHERS-DUNN General Purpose Relays

CLASS 78 GENERAL PURPOSE RELAYS

Specifications:

- Contact material: 3 amps bifurcated - silver gold plated
- 3 amps - silver gold flashed
- 5, 10 & 15 Amps - silver cadmium oxide, gold flashed
- Coil power: 0.9 - 1.1 watts DC., 1.0 - 1.2 VA (60Hz) AC. @ 25°C
- Class B insulation
- Dielectric strength: 1500Vrms

UL Recognized
File No. E52197

For quantities of 100 and up, call for quote.

MOUSER STOCK NO.	Magnecraft® Part No.	Fig.	Contact		Coil		Price Each			
			Form	Rating	Volts	Ohms	1	10	25	50
Solder/Plug-in Mount										
528-7880-97	W78RCSX-97	A1	SPDT	15A	12 VDC	160	5.32	4.92	4.66	4.39
528-7880-6	W78RCSX-6	A2	DPDT	10A	6 VDC	40	5.50	5.09	4.81	4.54
528-7880-7	W78RCSX-7	A2	DPDT	10A	12 VDC	160	3.96	3.66	3.47	3.27
528-7880-8	W78RCSX-8	A2	DPDT	10A	24 VDC	650	3.96	3.66	3.47	3.27
528-7810-1	W78CSX-1	A3	4PDT	3A	6 VDC	40	5.50	5.09	4.81	4.54
528-7810-2	W78CSX-2	A3	4PDT	3A	12 VDC	160	3.96	3.66	3.47	3.27
528-7810-3	W78CSX-3	A3	4PDT	3A	24 VDC	650	3.96	3.66	3.47	3.27
528-7895-13	W78KCSX-13	A3	4PDT	5A	24 VDC	650	5.50	5.09	4.81	4.54
528-7870-9	W78ARCSX-9	A2	DPDT	10A	24 VAC	180	4.26	3.94	3.73	3.51
528-7870-11	W78ARCSX-11	A2	DPDT	10A	120 VAC	4430	4.26	3.94	3.73	3.51
528-7870-12	W78ARCSX-12	A2	DPDT	10A	240 VAC	15,700	7.22	6.68	6.32	5.96
528-7840-3	W78ACSX-3	A3	4PDT	3A	24 VAC	180	5.94	5.49	5.20	4.90
528-7840-5	W78ACSX-5	A3	4PDT	3A	120 VAC	4430	5.94	5.49	5.20	4.90
528-7840-6	W78ACSX-6	A3	4PDT	3A	240 VAC	15,700	7.22	6.68	6.32	5.96
Solder/Plug-in Mount, Bifurcated										
528-7815-2	W78ATCSX-2	A3	4PDT	3A	12 VAC	46	6.78	6.27	5.93	5.59
528-7815-5	W78ATCSX-5	A3	4PDT	3A	120 VAC	4430	6.78	6.27	5.93	5.59
528-7815-6	W78ATCSX-6	A3	4PDT	3A	240 VAC	15,700	7.96	7.36	6.97	6.57
Solder/Plug-in Mount, with Indicator Lamp										
528-7850-10	W78RNCSX-10	A1	SPDT	15A	24 VDC	650	6.90	6.38	6.04	5.69
528-7885-8	W78ARNCSX-8	A1	SPDT	15A	24 VAC	180	6.94	6.42	6.07	5.73
528-7885-9	W78ARNCSX-9	A1	SPDT	15A	120 VAC	4430	6.94	6.42	6.07	5.73
Enclosed, Printed Circuit Mount										
528-7830-79	W78RPCX-79	A1	SPDT	15A	12 VDC	160	5.32	4.92	4.66	4.39
528-7830-1	W78RPCX-1	A2	DPDT	10A	6 VDC	40	5.50	5.09	4.81	4.54
528-7830-2	W78RPCX-2	A2	DPDT	10A	12 VDC	160	5.50	5.09	4.81	4.54
528-7830-3	W78RPCX-3	A2	DPDT	10A	24 VDC	650	5.50	5.09	4.81	4.54
528-7820-2	W78PCX-2	A3	4PDT	3A	12 VDC	160	3.96	3.66	3.47	3.27
528-7820-3	W78PCX-3	A3	4PDT	3A	24 VDC	650	5.50	5.09	4.81	4.54
528-7850-5	W78ARPCX-5	A2	DPDT	10A	120 VAC	4430	5.94	5.49	5.20	4.90
528-7835-6	W78ARPCX-6	A2	DPDT	10A	240 VAC	15,700	7.22	6.68	6.32	5.96
528-7825-3	W78APCX-3	A3	4PDT	3A	24 VAC	180	5.52	5.11	4.83	4.55
528-7825-5	W78APCX-5	A3	4PDT	3A	120 VAC	4430	5.52	5.11	4.83	4.55
Sockets and Hold Down Clip for Class 78 Relays										
528-3781	70-378-1	----	14 Pin Solder terminals, 4 Pole				.76	.70	.67	.63
528-3791	70-379-1	----	14 Pin PC terminals, 4 Pole				1.06	.98	.93	.87
528-401	70-401-1	----	8 Pin Solder terminals, 2 Pole				1.06	.98	.93	.87
528-402	70-402-1	----	8 Pin PC terminals, 2 Pole				1.06	.98	.93	.87
528-459	70-459-1	----	8 Pin DIN/Panel mnt. w/screw terminals				4.60	4.26	4.03	3.80
528-461	70-461-1	----	14 Pin DIN/Panel mnt. w/screw terminals				3.30	3.05	2.89	2.72
528-16-1197	16-1197	----	Hold down clip				.46	.43	.40	.38

CLASS 67 MINIATURE ENCLOSED INDUSTRIAL RELAYS

Specifications:

- Contact resistance: 50 megohms max
- Coil power: 0.5 -1.5 watts DC, 1.5 VA - 2 VA (60 Hz) AC @ 25°C
- Contac material: silver gold overlay
- Dielectric strength: 1500Vrms

UL Recognized
File No. E52197

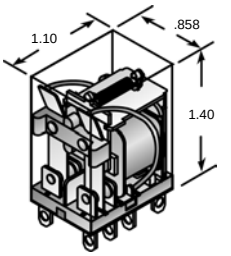
168986

For quantities of 100 and up, call for quote.

MOUSER STOCK NO.	Magnecraft® Part No.	Fig.	Contact		Coil		Price Each			
			Form	Rating	Volts	Ohms	1	10	25	50
Solder/Plug-in Mount										
528-6710-1	W67RCSX-1	B4	DPDT	5A	5 VDC	52	10.34	9.56	9.05	8.53
528-6710-2	W67RCSX-2	B4	DPDT	5A	12 VDC	185	10.34	9.56	9.05	8.53
528-6710-3	W67RCSX-3	B4	DPDT	5A	24 VDC	700	12.20	11.29	10.68	10.07
528-6710-6	W67RCSX-6	B5	4PDT	5A	5 VDC	52	13.24	12.25	11.59	10.92
528-6710-7	W67RCSX-7	B5	4PDT	5A	12 VDC	185	14.48	13.39	12.67	11.95
528-6710-8	W67RCSX-8	B5	4PDT	5A	24 VDC	700	14.48	13.39	12.67	11.95
528-6710-12	W67RCSX-12	B6	6PDT	5A	12 VDC	90	17.18	15.89	15.03	14.17
528-6710-13	W67RCSX-13	B6	6PDT	5A	24 VDC	430	18.60	17.21	16.28	15.35
528-6710-17	W67RCSX-17	B7	8PDT	5A	12 VDC	72	56.62	52.37	49.54	46.71
528-6710-18	W67RCSX-18	B7	8PDT	5A	24 VDC	350	47.14	43.60	41.25	38.89
Sockets for Class 67 RELAYS										
528-303	70-303-1	----	Solder terminals, DPDT, Chassis mount				2.14	1.98	1.87	1.77
528-304	70-304-1	----	PC terminals, DPDT, Chassis mount				2.14	1.98	1.87	1.77
528-305	70-305-1	----	Solder terminals, 4PDT, Chassis mount				2.48	2.29	2.17	2.05
528-306	70-306-1	----	PC terminals, 4PDT, Chassis mount				2.48	2.29	2.17	2.05
528-307	70-307-1	----	Solder terminals, 6PDT, Chassis mount				2.30	2.13	2.01	1.90
528-308	70-308-1	----	PC terminals, 6PDT, Chassis mount				2.30	2.13	2.01	1.90
528-309	70-309-1	----	Solder terminals, 8PDT, Chassis mount				2.48	2.29	2.17	2.05
528-310	70-310-1	----	PC terminals, 8PDT, Chassis mount				2.48	2.29	2.17	2.05

DIMENSIONS (IN)

A



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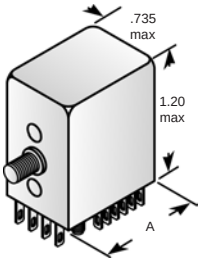
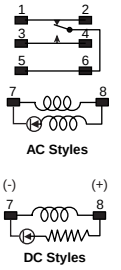


Form	A Dim.
DPDT	0.978
4PDT	1.156
6PDT	1.374
8PDT	1.592

TERMINAL ARRANGEMENT

1



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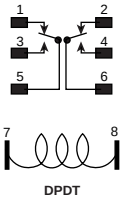

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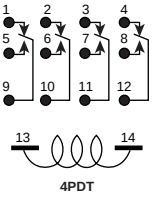

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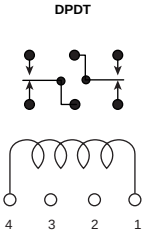

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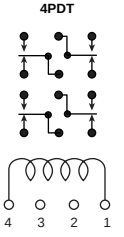

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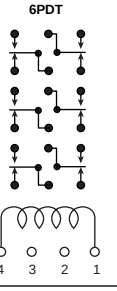

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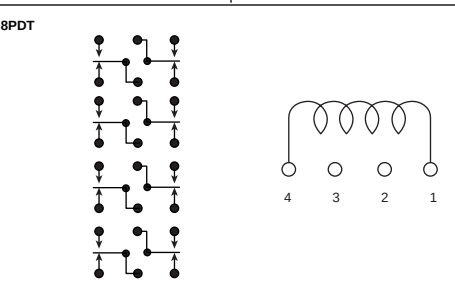

Catalog #620, Nov - Jan 2005
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MINIATURE ENCLOSED INDUSTRIAL RELAY

DPDT THRU 8PDT, 3 & 5 AMPS

c UL us
UL Recognized
File No. E52197

168986

UL CONTACT LOAD RATINGS TABLE

POLES	CURRENT OR HORSE POWER	LOAD VOLTAGE	LOAD VOLTAGE FREQUENCY	TYPE OF LOAD	MINIMUM LOAD
1 POLE THRU 8 POLES	5 AMP	120 VAC	50/60 Hz	RESISTIVE	
	5 AMP	28 VDC	DC	RESISTIVE	50 mA, 6 VDC
	3 AMP	120 VAC	50/60 Hz	RESISTIVE	
	3 AMP	28 VDC	DC	RESISTIVE	10 mA, 6 VDC

Standard **Class 67** miniature industrial relays are designed for applications requiring DPDT to 8PDT contacts where space and weight are of prime importance. Shatter resistant, see-thru plastic covers are utilized to protect against dust, tampering and electrical shock. The 67T models have Bifurcated Contacts and are designed for low level switching applications.

GENERAL SPECIFICATIONS

COIL

Pull-in Voltage :	80% of nominal voltage or less
Dropout Voltage:	DC-10% min. Of nominal voltage or more
Max. Voltage :	110%
Resistance:	±10% measured @ 25˚C
Coil Power:	0.5 to 1.5 watts DC, 1.5 VA to 2 VA (60 Hz) AC @ 25˚C.
Max. Coil Dissipation:	2.2 watts @ 25˚C.
Duty:	Continuous

CONTACTS

Contact Material:	Silver gold overlay
Coil Resistance:	50 megohms max.
Contact Rating:	See "**UL** CONTACT LOAD RATING TABLE"

CAPACITANCE

Between Contacts:	2 pf, typ.
Contacts to Coil:	2 pf, typ.
Contacts to Frame:	30 pf, typ.

TIMING

Operate Time:	DPDT=12 mS, 4PDT=14 mS, 6PDT=16 mS, 8PDT=18 mS
Release Time:	8 mS

DIELECTRIC STRENGTH

Contacts to Coil:	1500 V rms
Coil to Frame:	1000 V rms
Across Open Contacts:	500 V rms
Contacts to Frame:	1500 V rms
Insulation Resistance:	1000 megohms @ 500 VDC

TEMPERATURE

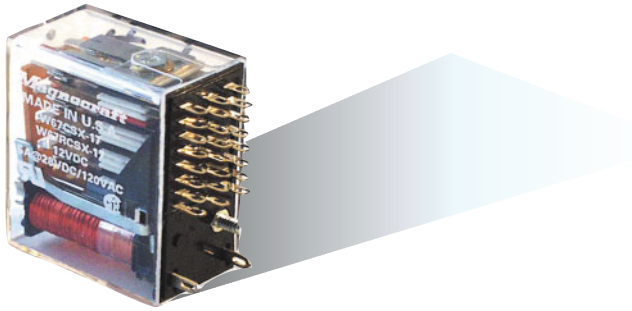
Operating:	-55˚C to +70˚C
Storage:	-55˚C to +105˚C

LIFE EXPECTANCY

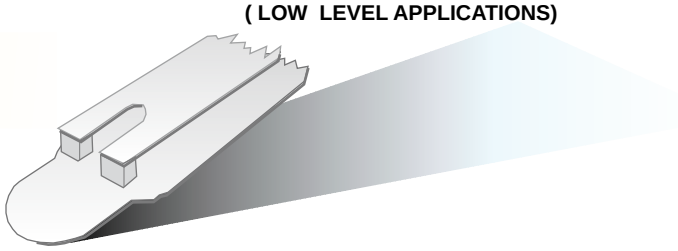
Electrical:	200,000 operations @ rated resistive load
Mechanical:	1,000,000 operations @ no load

MISCELLANEOUS

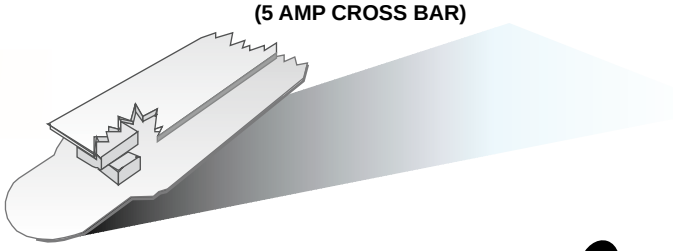
Operating Position:	Any
Insulation Material	Molded plastic
Enclosure:	Polycarbonate dust cover
Weight:	22 to 40 grams approx.



BIFURCATED CONTACTS
(LOW LEVEL APPLICATIONS)



STANDARD CONTACTS
(5 AMP CROSS BAR)



Mating Sockets
70-303-1, 70-305-1,70-307-1,
70-309-1: SOLDER
70-304-1, 70-306-1, 70-308-1,
70-310-1: PRINTED CIRCUIT
See section 8, page 25, 26

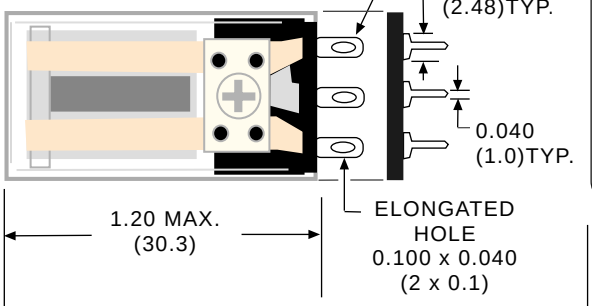
PHONE: (843) 393-5778 FAX: (843) 393-4123 EMAIL: info@magnecraft.com

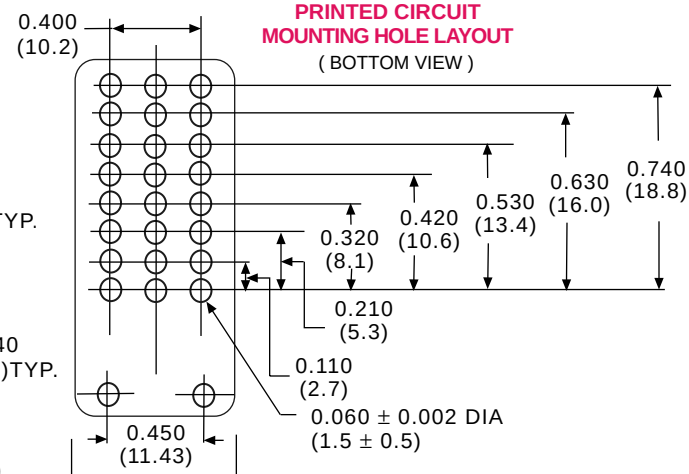
MINIATURE ENCLOSED INDUSTRIAL RELAY

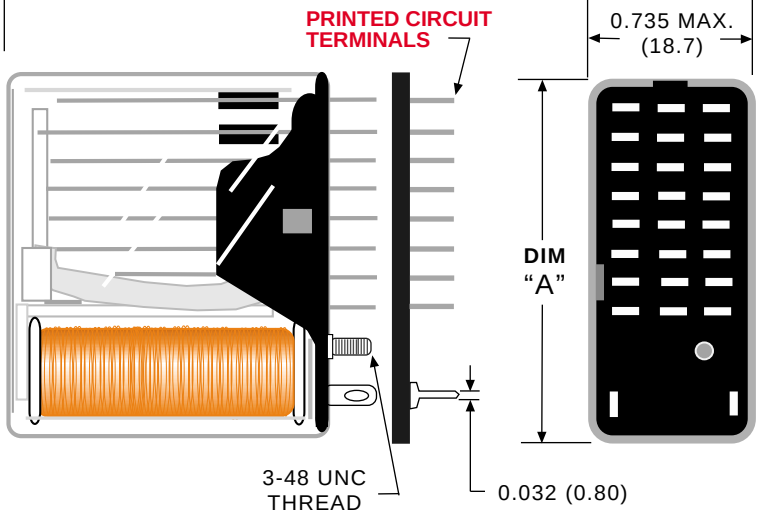
DPDT THRU 8PDT, 3 & 5 AMPS

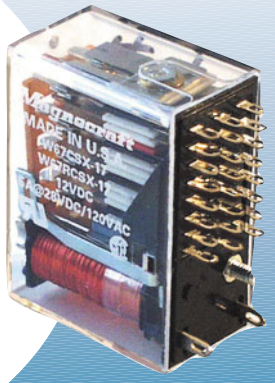
OUTLINE DIMENSIONS

DIMENSIONS SHOWN IN INCHES & (MILLIMETERS).



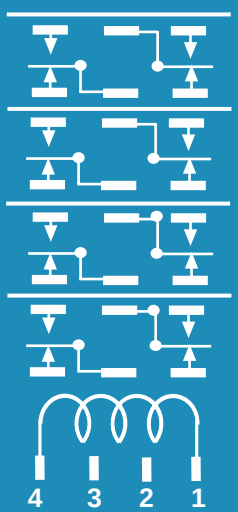






WIRING DIAGRAM

(VIEWED FROM PIN END)



DIMENSIONS

CONTACT CONFIGURATION	"A" DIM
8PDT	1.592 (40.4)
6PDT	1.374 (34.9)
4PDT	1.156 (29.4)
DPDT	0.978 (24.8)

STANDARD PART NUMBERS	CONTACT CONFIGURATION	COIL MEASURED @ 25°C NOMINAL INPUT VOLTAGE OR	NOMINAL RESISTANCE (OHMS)
DC OPERATED COIL - SOLDER/PLUG-IN, 5 AMP			
W67RCSX-1	DPDT	5 VDC	52 Ω
W67RCSX-2	DPDT	12 VDC	185 Ω
W67RCSX-3	DPDT	24 VDC	700 Ω
W67RCSX-4	DPDT	48 VDC	2,500 Ω
W67RCSX-5	DPDT	110 VDC	15,000 Ω
W67RCSX-6	4PDT	5 VDC	52 Ω
W67RCSX-7	4PDT	12 VDC	185 Ω
W67RCSX-8	4PDT	24 VDC	700 Ω
W67RCSX-9	4PDT	48 VDC	2,500 Ω
W67RCSX-10	4PDT	110 VDC	15,000 Ω
W67RCSX-12	6PDT	12 VDC	90 Ω
W67RCSX-13	6PDT	24 VDC	430 Ω
* W67RCSX-17	8PDT	12 VDC	72 Ω
* W67RCSX-18	8PDT	24 VDC	350 Ω
DC OPERATED COIL-BIFURCATED CONTACTS, 3 AMP			
W67TRCSX-2	DPDT	12 VDC	185 Ω
W67TRCSX-3	DPDT	24 VDC	700 Ω
W67TRCSX-7	4PDT	12 VDC	185 Ω
W67TRCSX-8	4PDT	24 VDC	700 Ω
W67TRCSX-12	6PDT	12 VDC	90 Ω
W67TRCSX-13	6PDT	24 VDC	430 Ω
* W67TRCSX-17	8PDT	12 VDC	72 Ω
* W67TRCSX-18	8PDT	24 VDC	350 Ω
DC OPERATED PRINTED CIRCUIT, 5 AMP			
W67RPCX-2	DPDT	12 VDC	185 Ω
W67RPCX-3	DPDT	24 VDC	700 Ω
W67RPCX-7	4PDT	12 VDC	185 Ω
W67RPCX-8	4PDT	24 VDC	700 Ω
W67RPCX-12	6PDT	12 VDC	90 Ω
W67RPCX-13	6PDT	24 VDC	430 Ω
AC OPERATED COIL - SOLDER/PLUG-IN, 5 AMP			
W67ARCSX-5	DPDT	120 VAC,50/60Hz	9000 Ω
W67ARCSX-10	4PDT	120 VAC,50/60Hz	8000 Ω
W67ARCSX-15	6PDT	120 VAC,50/60Hz	8000 Ω
DC OPERATED COIL ULTRA SENSITIVE -SOLDER/PLUG-IN, 3 AMP			
W67SCSX-1	DPDT	9.4 MADC	1,000 Ω
W67SCSX-2	DPDT	6.4 MADC	2,500 Ω
W67SCSX-3	DPDT	4.5 MADC	5,000 Ω
W67SCSX-6	4PDT	13.7 MADC	1,000 Ω
W67SCSX-7	4PDT	9.1 MADC	2,500 Ω
W67SCSX-8	4PDT	6.5 MADC	5,000 Ω

RETROFITS POTTER & BRUMFIELD R10.
SEE END OF SECTION 1 FOR CROSS REFERENCE

* Not UL or CSA approved