





# NUOVA Hi-G ITALIA

## Ultraminiature Relays

**Nuova Hi-G Italia** has more than 30 years experience in manufacturing high quality hermetically sealed relays to meet military and aerospace specifications and applications.

**Nuova Hi-G Italia**, with a range of relays up to 15 amps switching has one of the largest range of Mil and CECC qualified relays products in the world.

Nuova Hi-G Italia offers a completely interfaced and fully integrated organisation with a total capability for manufacturing and design, with fully equipped and up to date test and reliability laboratories, calibration facilities, purchasing, sales, distribution, administration etc... all harmonised in a Quality System that is approved and qualified to ISO 9000 and AQAP.

Production facilities are designed for maximum cleanliness. This includes a dust control room where relays are assembled under laminar flow benches and a white room (class 1000) where operations such as cleaning, testing and sealing are performed.

Nuova Hi-G Italia high reliability relays have been used for space applications and qualified in accordance with ESA / SCC (European Space Agency) specifications, the first manufacturer in Italy for electronic components to gain such approval.

Nuova Hi-G Italia hermetically sealed relays offers the following benefits

- SPDT, DPDT and 4PDT configurations
- Exceptional tolerance to shock and vibration
- Leak-free sealing and extended life expectancy
- Sensitive from 25 to 500 milliwatts
- Wide selection of coil resistance's, terminations and mounting, including SMD

The catalogue is divided into the following main product groups

- Military, Aerospace and CECC types
- Commercial and Industrial types
- Radio frequency types
- Customized Timers

**Warranty:** We guarantee our products for 12 months from delivery, providing material as supplied to the specifications listed on this catalogue, has not been modified, either electrically or mechanically. Modification of materials will void warranty and /or return policies.

Specifications noted herein are subjected to change without notice.



# GENERAL INFORMATION

## APPROVALS



CECC (CENELEC Electronic Components Committee) - All relays supplied with this registered Mark, have been subject to rigid inspection for quality conformance and a comprehensive schedule of test and acceptance requirements, under the surveillance of the independent inspectorate: ISTITUTO ITALIANO DEL MARCHIO DI QUALITA'



All relays supplied as compliance with Military Specification reference, have been subject to rigid inspection for quality conformance and a comprehensive schedule of test and acceptance requirements, in accordance to National military standard (NK-2C) and specification (i.e. Mil-PRF-39016), under the surveillance of the Italian MINISTRY of DEFENCE, D.G. TELEDIFE (previously TELECOMDIFE)

## MAIN PRODUCT SELECTION

The catalogue is divided into three main product groups: Qualified or compliant **Military** Types and qualified **CECC** Types, **Commercial** Types, **RF** Types.

The Relay Selector Chart on next page will enable you to easily choose the relay that is the best suited to meet your particular requirements.

### MILITARY and CECC QUALIFIED RELAYS

Nuova HI-G Italia offers a complete selection of CECC and Military relays qualified to or compliant with the latest specification, providing excellent reliability. Our relays are used world-wide in military and aerospace systems, civil aviation, satellites, including navigation control systems, engine management and control equipment. Where individual requirements demand design and testing that is not available within the military and CECC specifications listed here, Nuova HI-G Italia has the capability to modify existing devices to meet those needs.

### COMMERCIAL and INDUSTRIAL RELAYS

Nuova HI-G Italia offers a wide variety of commercial, industrial and special design relays, to meet the needs of customers whose applications require the advantages of qualified relay type, but who are unable to find a device within the military and CECC specifications. These devices operate reliably under extreme environmental conditions and are designed to survive where other competitive relays may not.

### RADIO FREQUENCY RELAYS

Although all Nuova HI-G Italia relays can be used to switch radio frequency loads, the RF types provides the user with switching poles terminated with coaxial cable. Two-pole devices are available with either one or both sets of poles cabled. When only one set of poles is cabled on a two-pole relay, the other set is available for use with pin or hook termination.

### CUSTOM RELAYS

Nuova HI-G Italia has the capability to provide custom design relays upon customer requirements. These relays includes a multitude of mounting (Brackets, Insulator Pads, Spreaders and Stand-offs), terminations, electrical parameters, with selective testing at our own laboratories.

**Note:**  
All relays can be shipped with certificate of conformance and test data record for individual relay or batches of relays, upon customer requirement.



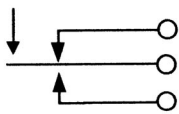
# GENERAL INFORMATION SELECTOR CHART

Series	Series Types	Enclosure	Contacts		Nominal Coil Voltage or Current	Operating Power at P.I. (mW)	Applicable Specification Approvals							
			Arrangement	Rating			MILITARY		CECC					
							Mil-PRF-39016/	Mil-PRF-28776/	16101-	16207-				
MA	MA	TO-5	DPDT	1A / 28 Vdc	5...30,0 Vdc	130	9							
	MA-D				5...26,5 Vdc		15							
	MA-DD						20							
	MA-T							1						
MA2		TO-5	DPDT	1A / 28 Vdc	5...30,0 Vdc	130			003					
MCA		TO-5	DPDT	2A / 28 Vdc	5...26,5 Vdc	150								
MS	MS	TO-5	DPDT	1A / 28 Vdc	5...48,0 Vdc	60	11							
	MS-D						16							
	MS-DD						21							
	MS-T							3						
MS2		TO-5	DPDT	1A / 28 Vdc	5...48,0 Vdc	60			004					
1MA	1MA	TO-5	SPDT	1A / 28 Vdc	5...26,5 Vdc	100	7							
	1MA-D						23							
	1MA-DD						24							
	1MA-T							5						
1MA1		TO-5	SPDT	1A / 28 Vdc	5...26,5 Vdc	100			005					
1MS	1MS	TO-5	SPDT	1A / 28 Vdc	5...40,0 Vdc	50	10							
	1MS-D						25							
	1MS-DD						40							
	1MS-T						50		4					
1MS1		TO-5	SPDT	1A / 28 Vdc	5...40,0 Vdc	50			006					
	MGA	CUBIC .100GRID	DPDT	1A / 28 Vdc	5...26,5 Vdc	130	17							
	MGA-D						18							
MGA-DD	150													
MGAE	MGAE	CUBIC .100GRID	DPDT	1A / 28 Vdc	5...28,0 Vdc	130				801				
	MGAE-D													
	MGAE-DD						150							
MGA2	MGA2/D2	CUBIC	DPDT	1A / 28 Vdc	5...28,0 Vdc	140			007					
MGS	MGS	CUBIC .100GRID	DPDT	1A / 28 Vdc	5...48,0 Vdc	60	41							
	MGS-D						42							
	MGS-DD						43							
MGSE	MGSE	CUBIC .100GRID	DPDT	1A / 28 Vdc	5...48,0 Vdc	60				802				
	MGSE-D													
	MGSE-DD													
MGS2	MGS2/D2	CUBIC	DPDT	1A / 28 Vdc	5...48,0 Vdc	60			008					
12K		1/2 CC	DPDT	2A / 28 Vdc	5...26,5 Vdc	250	6							
2K		1/2 CC	DPDT	2A / 28 Vdc	5...48,0 Vdc	250								
2K6600		1/2 CC	DPDT	2A / 28 Vdc	5...48,0 Vdc	250			007.014.021					
							MILITARY Compliance							
							Mil-R-39016/	Mil-R-5757/						
2K7940		1/2 CC	DPDT	2A / 28 Vdc	6...26,5 Vdc	250	22							
KA	2KA	1/2 CC	DPDT	2A / 28 Vdc	5...48,0 Vdc	100								
HA	2HA	1/2 CC	DPDT	5A / 28 Vdc	5...48,0 Vdc	300								
B	2B	CC	DPDT	2A / 28 Vdc	6...76,0 Vdc	250								
	2BR				26,5...115 Vac		370							
2B6660		CC	DPDT	3A / 28 Vdc	6...76,0 Vdc	250			008					
2B7506		CC	DPDT	2A / 28 Vdc	6...26,5 Vdc	250			10					
	BS						CC	DPDT	2A / 28 Vdc	6...26,5 Vdc	100			
	2BSA											CC	SPDT	2A / 28 Vdc
1BSK	CC	DPDT	2A / 28 Vdc	3,2...70,6mA	40									
2BSK						CC	DPDT	2A / 28 Vdc	4,0...89,2mA	40				
BN	1BN	CC	SPDT	5A / 28 Vdc	6...76,0 Vdc						280			
	2BN					CC	DPDT	2A / 28 Vdc	4,0...90,0mA	40				
2BC7201		CC	DPDT	2A / 28 Vdc	4,0...90,0mA						40		13	
BCN	1BCN	CC	SPDT	5A / 28 Vdc	6...40,0 Vdc	80								
	2BCN						CC	DPDT	2A / 28 Vdc	6...115 Vdc	400			
4B		CC	4PDT	2A / 28 Vdc	6...115 Vdc	400								
T	2T	CC	DPDT	10A / 28 Vdc	6...115 Vdc	500								
	2TR				115 Vac									
TN	2TN	CC	DPDT	15A / 28 Vdc	6...115 Vdc	500								
	2TNR				115 Vac									
2T7188		CC	DPDT	10A / 28 Vdc	6...120 Vdc	500			23					
RFK	RFK	1/2 CC	SPDT	2A / 28 Vdc	6...26,5 Vdc	250								
	2REFK						CC	DPDT	2A / 28 Vdc	6...76,5 Vdc	250			
RFB	RFB	CC	SPDT	2A / 28 Vdc	6...76,5 Vdc	250								
	2RFB						CC	DPDT	2A / 28 Vdc	4,0...89,2 mA	40			
RFBC	RFBC	CC	SPDT	2A / 28 Vdc	4,0...89,2 mA	40								
	2RFBC						CC	DPDT	1A / 28 Vdc	5,0...30,0 Vdc	260			
4MA		CC	4PDT	1A / 28 Vdc	5,0...30,0 Vdc	260								
4MS		CC	4PDT	1A / 28 Vdc	5,0...48,0 Vdc	120								



# GENERAL INFORMATION

## RELAY TERMINOLOGY and SYMBOLS

<b>Armature</b>	The moving magnetic member of an electromagnetic relay structure
<b>Capacitance</b>	The maximum allowable capacitive coupling between two specified test points
<b>Coil Voltage (maximum)</b>	The maximum coil voltage which can be applied to the coil over the temperature range, without damaging the coil.
<b>Contact (Form C)</b>	Break before Make, or Transfer
	
<b>Contact Bounce</b>	Intermittent and undesired opening of closed contacts or closing of open contacts, of a relay.
<b>Contact Bounce Time</b>	For a contact which is closing (opening) its circuit, the time interval between the instant when the contact circuit first closes (opens) and the instant when the circuit is finally closed (opened).
<b>Carry Current</b>	The amount of current which can safely flow through closed contacts, when the contacts are opened and closed with no load applied.
<b>Cycle</b>	One opening and one closure of a contact set
<b>DPDT</b>	Double Pole Double Throw relay
<b>Drop-out Value</b>	A monostable relay drops out when it changes from an energized to an unenergized condition.
<b>Isolation</b>	The value of insulation resistance, dielectric strength and capacitance measured between the input and outputs. The leakage of an RF signal between mutually isolated points.
<b>Low level Load</b>	Load level which will have minimal effect on contact life and performance.
<b>Nominal Coil Voltage</b>	The coil voltage at which the relay is intended to operate.
<b>Operate Time</b>	The interval of time between the application of the operate value and the first closing (or opening) of the contact circuit.
<b>Pick-up (Pull-in) Value</b>	As the current or voltage on an unoperated relay is increased, the minimum value at which all contacts will change state.
<b>Release Time</b>	The interval of time between the application of the release value and the first opening (or closing) of the contact circuit.
<b>SPDT</b>	Single Pole Double Throw relay.
<b>Crosstalk</b>	The electrical coupling between a closed contact circuit and other open or closed contacts on the same relay or switch, expressed in decibel down from the signal level.
<b>Contact Stabilisation time</b>	The interval of time, following operate or release time, to reach and maintain the static contact resistance value of the relay. It is the sum of the contact bounce time and the time for dynamic contact resistance to stabilise to the static contact resistance
<b>VSWR</b>	Voltage Standing Wave Ratio. A measurement of the reflected RF signal.



# GENERAL INFORMATION

## RELATIONSHIP OF RELAY PERFORMANCE TO DEFINITIONS

**Maximum coil voltage  
or current**

**Nominal coil voltage  
or current**

(relay must operate)

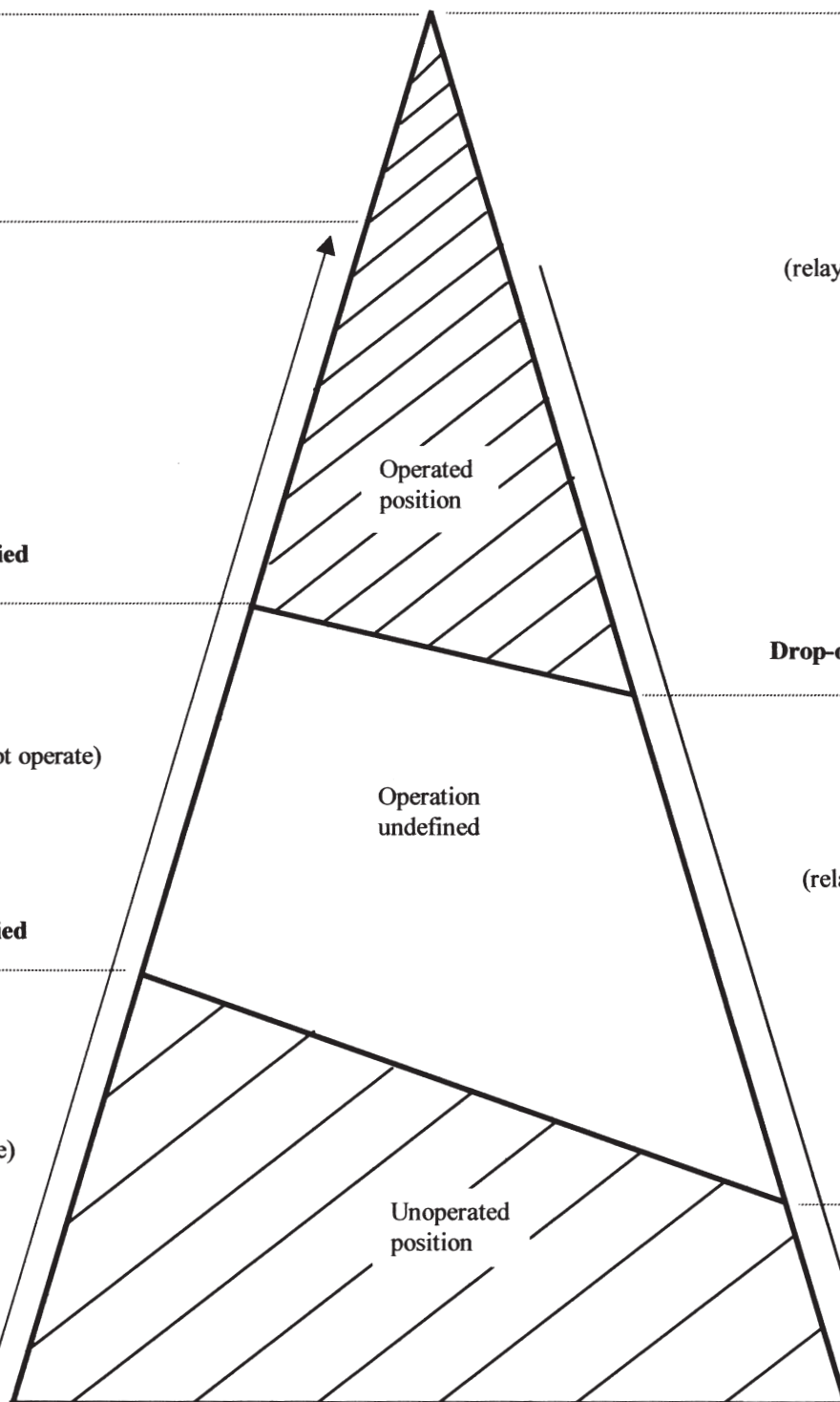
**Pick-up, max. specified**

(relay may or may not operate)

**Pick-up, min. specified**

(relay must not operate)

Increasing coil voltage  
or current



(relay must remain operated)

**Drop-out, max. specified (hold)**

(relay may or may not Drop out)

**Drop-out, min. specified**

(relay must drop-out)

Decreasing coil voltage  
or current



# CROSS REFERENCE

## NUOVA Hi-G vs Military Part Numbers

Nuova Hi-G Italia has qualified its products in accordance with MIL-PRF-39016 and MIL-PRF-28776 specifications, under the supervision of the Italian Ministry of Defence "TELEDIFE"; furthermore manufactures some of its products in total compliance to MIL-R-5757 and MIL-R-39016 specifications. The part following is a cross reference calling for the suggested equivalence between the Military Designation, the Nuova Hi-G Italia part number and, where available the CECC specification. For the part number of CECC qualified relays, please use the CECC reference specification number or contact your sales area representative. Examples:

MILITARY DESIGNATION	N-HiG Part. No.
M39016/17-025L	IMGAP-5A
M39016/17-025M	IMGAP-5B

MILITARY DESIGNATION	N-HiG PART. No	CECC DESIGNATION	MILITARY DESIGNATION	N-HiG PART. No	CECC DESIGNATION
<b>M28776/1</b>			<b>M28776/4 (cont'd)</b>		
28776/1 -013 L or M	IMAWT - 5 A or B		28776/4 -025 L or M	I1MSPT - 5 A or B	
28776/1 -014 L or M	IMAWT - 6 A or B		28776/4 -026 L or M	I1MSPT - 6 A or B	
28776/1 -015 L or M	IMAWT - 9 A or B		28776/4 -027 L or M	I1MSPT - 9 A or B	
28776/1 -016 L or M	IMAWT - 12 A or B		28776/4 -028 L or M	I1MSPT -12 A or B	
28776/1 -017 L or M	IMAWT - 18 A or B		28776/4 -029 L or M	I1MSPT -18 A or B	
28776/1 -018 L or M	IMAWT - 26 A or B		28776/4 -030 L or M	I1MSPT -26 A or B	
28776/1 -019 L or M	IMAPT - 5 A or B		28776/4 -031 L or M	I1MSPT -32 A or B	
28776/1 -020 L or M	IMAPT - 6 A or B		28776/4 -032 L or M	I1MSPT -40 A or B	
28776/1 -021 L or M	IMAPT - 9 A or B		28776/4 -033 L or M	I1MSCT - 5 A or B	
28776/1 -022 L or M	IMAPT - 12 A or B		28776/4 -034 L or M	I1MSCT - 6 A or B	
28776/1 -023 L or M	IMAPT - 18 A or B		28776/4 -035 L or M	I1MSCT - 9 A or B	
28776/1 -024 L or M	IMAPT - 26 A or B		28776/4 -036 L or M	I1MSCT -12 A or B	
28776/1 -025 L or M	IMACT - 5 A or B		28776/4 -037 L or M	I1MSCT -18 A or B	
28776/1 -026 L or M	IMACT - 6 A or B		28776/4 -038 L or M	I1MSCT -26 A or B	
28776/1 -027 L or M	IMACT - 9 A or B		28776/4 -039 L or M	I1MSCT -32 A or B	
28776/1 -028 L or M	IMACT - 12 A or B		28776/4 -040 L or M	I1MSCT -40 A or B	
28776/1 -029 L or M	IMACT - 18 A or B		28776/4 -041 L or M	I1MSCT - 5 AS or BS	
28776/1 -030 L or M	IMACT - 26 A or B		28776/4 -042 L or M	I1MSCT - 6 AS or BS	
28776/1 -031 L or M	IMACT - 5 AS or BS		28776/4 -043 L or M	I1MSCT - 9 AS or BS	
28776/1 -032 L or M	IMACT - 6 AS or BS		28776/4 -044 L or M	I1MSCT -12 AS or BS	
28776/1 -033 L or M	IMACT - 9 AS or BS		28776/4 -045 L or M	I1MSCT -18 AS or BS	
28776/1 -034 L or M	IMACT - 12 AS or BS		28776/4 -046 L or M	I1MSCT -26 AS or BS	
28776/1 -035 L or M	IMACT - 18 AS or BS		28776/4 -047 L or M	I1MSCT -32 AS or BS	
28776/1 -036 L or M	IMACT - 26 AS or BS		28776/4 -048 L or M	I1MSCT -40 AS or BS	
<b>M28776/3</b>			<b>M28776/5</b>		
28776/3 -017 L or M	IMSWT - 5 A or B		28776/5 -013 L or M	I1 MAWT - 5 A or B	
28776/3 -018 L or M	IMSWT - 6 A or B		28776/5 -014 L or M	I1 MAWT - 6 A or B	
28776/3 -019 L or M	IMSWT - 9 A or B		28776/5 -015 L or M	I1 MAWT - 9 A or B	
28776/3 -020 L or M	IMSWT -12 A or B		28776/5 -016 L or M	I1 MAWT - 12 A or B	
28776/3 -021 L or M	IMSWT -18 A or B		28776/5 -017 L or M	I1 MAWT - 18 A or B	
28776/3 -022 L or M	IMSWT -26 A or B		28776/5 -018 L or M	I1 MAWT - 26 A or B	
28776/3 -023 L or M	IMSWT -36 A or B		28776/5 -019 L or M	I1 MAPT - 5 A or B	
28776/3 -024 L or M	IMSWT -48 A or B		28776/5 -020 L or M	I1 MAPT - 6 A or B	
28776/3 -025 L or M	IMSPT - 5 A or B		28776/5 -021 L or M	I1 MAPT - 9 A or B	
28776/3 -026 L or M	IMSPT - 6 A or B		28776/5 -022 L or M	I1 MAPT - 12 A or B	
28776/3 -027 L or M	IMSPT - 9 A or B		28776/5 -023 L or M	I1 MAPT - 18 A or B	
28776/3 -028 L or M	IMSPT -12 A or B		28776/5 -024 L or M	I1 MAPT - 26 A or B	
28776/3 -029 L or M	IMSPT -18 A or B		28776/5 -025 L or M	I1 MACT - 5 A or B	
28776/3 -030 L or M	IMSPT -26 A or B		28776/5 -026 L or M	I1 MACT - 6 A or B	
28776/3 -031 L or M	IMSPT -36 A or B		28776/5 -027 L or M	I1 MACT - 9 A or B	
28776/3 -032 L or M	IMSPT -48 A or B		28776/5 -028 L or M	I1 MACT - 12 A or B	
28776/3 -033 L or M	IMSCT - 5 A or B		28776/5 -029 L or M	I1 MACT - 18 A or B	
28776/3 -034 L or M	IMSCT - 6 A or B		28776/5 -030 L or M	I1 MACT - 26 A or B	
28776/3 -035 L or M	IMSCT - 9 A or B		28776/5 -031 L or M	I1 MACT - 5 AS or BS	
28776/3 -036 L or M	IMSCT -12 A or B		28776/5 -032 L or M	I1 MACT - 6 AS or BS	
28776/3 -037 L or M	IMSCT -18 A or B		28776/5 -033 L or M	I1 MACT - 9 AS or BS	
28776/3 -038 L or M	IMSCT -26 A or B		28776/5 -034 L or M	I1 MACT - 12 AS or BS	
28776/3 -039 L or M	IMSCT -36 A or B		28776/5 -035 L or M	I1 MACT - 18 AS or BS	
28776/3 -040 L or M	IMSCT -48 A or B		28776/5 -036 L or M	I1 MACT - 26 AS or BS	
28776/3 -041 L or M	IMSCT - 5 AS or BS		<b>M39016/6</b>		
28776/3 -042 L or M	IMSCT - 6 AS or BS		39016/6 -104 L or M	I2K - 104 A or B	16101-007-18-06-01
28776/3 -043 L or M	IMSCT - 9 AS or BS		39016/6 -105 L or M	I2K -105 A or B	16101-007-18-06-02
28776/3 -044 L or M	IMSCT -12 AS or BS		39016/6 -106 L or M	I2K -106 A or B	16101-007-18-06-05
28776/3 -045 L or M	IMSCT -18 AS or BS		39016/6 -107 L or M	I2K -107 A or B	16101-007-18-15-01
28776/3 -046 L or M	IMSCT -26 AS or BS		39016/6 -108 L or M	I2K -108 A or B	16101-007-18-15-05
28776/3 -047 L or M	IMSCT -36 AS or BS		39016/6 -109 L or M	I2K -109 A or B	16101-007-18-01-02
28776/3 -048 L or M	IMSCT -48 AS or BS		39016/6 -110 L or M	I2K -110 A or B	16101-007-18-01-05
<b>M28776/4</b>			39016/6 -111 L or M	I2K -111 A or B	16101-007-12-06-01
28776/4 -017 L or M	I1MSWT - 5 A or B		39016/6 -112 L or M	I2K -112 A or B	16101-007-12-06-02
28776/4 -018 L or M	I1MSWT - 5 A or B		39016/6 -113 L or M	I2K -113 A or B	16101-007-12-06-05
28776/4 -019 L or M	I1MSWT - 9 A or B		39016/6 -114 L or M	I2K -114 A or B	16101-007-12-15-01
28776/4 -020 L or M	I1MSWT -12 A or B		39016/6 -115 L or M	I2K -115 A or B	16101-007-12-15-05
28776/4 -021 L or M	I1MSWT -18 A or B		39016/6 -116 L or M	I2K -116 A or B	16101-007-12-01-02
28776/4 -022 L or M	I1MSWT -26 A or B		39016/6 -117 L or M	I2K -117 A or B	16101-007-12-01-05
28776/4 -023 L or M	I1MSWT -32 A or B		39016/6 -118 L or M	I2K -118 A or B	16101-007-03-06-01
28776/4 -024 L or M	I1MSWT -40 A or B		39016/6 -119 L or M	I2K -119 A or B	16101-007-03-06-02
					16101-014-17-06-01
					16101-014-17-06-02
					N / A
					N / A
					N / A
					16101-014-17-01-02
					N / A
					N / A
					16101-014-11-06-01
					16101-014-11-06-02
					N / A
					N / A
					N / A
					16101-014-11-01-02
					N / A
					16101-014-02-06-01
					16101-014-02-06-02

MILITARY DESIGNATION			N-HiG PART. No		CECC DESIGNATION		MILITARY DESIGNATION			N-HiG PART. No		CECC DESIGNATION					
M39016/6			(cont'd)		16101-007		16101-014		M39016/6			(cont'd)		16101-007		16101-014	
39016/6 -120	L or M	I2K -120 A or B	16101-007-03-06-05	N/A	39016/6 -252	L or M	I2K -252 A or B	N/A	N/A	N/A	N/A	N/A	N/A				
39016/6 -121	L or M	I2K -121 A or B	16101-007-03-15-01	N/A	<b>M39016/9</b>			<b>16101-003</b>									
39016/6 -122	L or M	I2K -122 A or B	16101-007-03-15-05	N/A	39016/9 -013	L or M	IMAW - 5 A or B	16101-003-01-01									
39016/6 -123	L or M	I2K -123 A or B	16101-007-03-01-02	16101-014-02-01-02	39016/9 -014	L or M	IMAW - 6 A or B	16101-003-02-01									
39016/6 -124	L or M	I2K -124 A or B	16101-007-03-01-05	N/A	39016/9 -015	L or M	IMAW - 9 A or B	16101-003-03-01									
39016/6 -125	L or M	I2K -125 A or B	16101-007-18-15-02	N/A	39016/9 -016	L or M	IMAW - 12 A or B	16101-003-04-01									
39016/6 -126	L or M	I2K -126 A or B	16101-007-12-15-02	N/A	39016/9 -017	L or M	IMAW - 18 A or B	16101-003-05-01									
39016/6 -127	L or M	I2K -127 A or B	16101-007-03-15-02	N/A	39016/9 -018	L or M	IMAW - 26 A or B	16101-003-06-01									
39016/6 -128	L or M	I2K -128 A or B	N/A	N/A	39016/9 -019	L or M	IMAP - 5 A or B	16101-003-01-02									
39016/6 -129	L or M	I2K -129 A or B	16101-007-18-01-01	16101-014-17-01-01	39016/9 -020	L or M	IMAP - 6 A or B	16101-003-02-02									
39016/6 -130	L or M	I2K -130 A or B	16101-007-12-01-01	16101-014-11-01-01	39016/9 -021	L or M	IMAP - 9 A or B	16101-003-03-02									
39016/6 -131	L or M	I2K -131 A or B	16101-007-03-01-01	16101-014-02-01-01	39016/9 -022	L or M	IMAP - 12 A or B	16101-003-04-02									
39016/6 -132	L or M	I2K -132 A or B	16101-007-01-06-01	16101-014-01-06-01	39016/9 -023	L or M	IMAP - 18 A or B	16101-003-05-02									
39016/6 -133	L or M	I2K -133 A or B	16101-007-01-06-02	16101-014-01-06-02	39016/9 -024	L or M	IMAP - 26 A or B	16101-003-06-02									
39016/6 -134	L or M	I2K -134 A or B	16101-007-01-06-05	N/A	39016/9 -051	L or M	IMAW - 30 A or B	16101-003-08-01									
39016/6 -135	L or M	I2K -135 A or B	16101-007-01-15-01	N/A	39016/9 -052	L or M	IMAP - 30 A or B	16101-003-08-02									
39016/6 -136	L or M	I2K -136 A or B	16101-007-01-15-02	N/A	39016/9 -057	L or M	IMAC - 5 A or B	16101-003-01-03									
39016/6 -137	L or M	I2K -137 A or B	16101-007-01-15-05	N/A	39016/9 -058	L or M	IMAC - 6 A or B	16101-003-02-03									
39016/6 -138	L or M	I2K -138 A or B	16101-007-01-01-01	16101-014-01-01-01	39016/9 -059	L or M	IMAC - 9 A or B	16101-003-03-03									
39016/6 -139	L or M	I2K -139 A or B	16101-007-01-01-02	16101-014-01-01-02	39016/9 -060	L or M	IMAC - 12 A or B	16101-003-04-03									
39016/6 -140	L or M	I2K -140 A or B	16101-007-01-01-05	N/A	39016/9 -061	L or M	IMAC - 18 A or B	16101-003-05-03									
39016/6 -141	L or M	I2K -141 A or B	N/A	N/A	39016/9 -062	L or M	IMAC - 26 A or B	16101-003-06-03									
39016/6 -142	L or M	I2K -142 A or B	N/A	N/A	39016/9 -063	L or M	IMAC - 30 A or B	16101-003-08-03									
39016/6 -143	L or M	I2K -143 A or B	N/A	N/A	39016/9 -071	L or M	IMAC - 5 AS or BS	16101-003-01-09									
39016/6 -144	L or M	I2K -144 A or B	N/A	N/A	39016/9 -072	L or M	IMAC - 6 AS or BS	16101-003-02-09									
39016/6 -145	L or M	I2K -145 A or B	N/A	N/A	39016/9 -073	L or M	IMAC - 9 AS or BS	16101-003-03-09									
39016/6 -146	L or M	I2K -146 A or B	N/A	N/A	39016/9 -074	L or M	IMAC - 12 AS or BS	16101-003-04-09									
39016/6 -147	L or M	I2K -147 A or B	N/A	N/A	39016/9 -075	L or M	IMAC - 18 AS or BS	16101-003-05-09									
39016/6 -148	L or M	I2K -148 A or B	N/A	N/A	39016/9 -076	L or M	IMAC - 26 AS or BS	16101-003-06-09									
39016/6 -149	L or M	I2K -149 A or B	N/A	N/A	39016/9 -077	L or M	IMAC - 30 AS or BS	16101-003-08-09									
39016/6 -150	L or M	I2K -150 A or B	N/A	N/A	39016/9 -085	L or M	IMACG - 5 A or B	N/A									
39016/6 -151	L or M	I2K -151 A or B	N/A	N/A	39016/9 -086	L or M	IMACG - 6 A or B	N/A									
39016/6 -152	L or M	I2K -152 A or B	N/A	N/A	39016/9 -087	L or M	IMACG - 9 A or B	N/A									
39016/6 -204	L or M	I2K -204 A or B	16101-007-18-06-01	16101-014-17-06-01	39016/9 -088	L or M	IMACG - 12 A or B	N/A									
39016/6 -205	L or M	I2K -205 A or B	16101-007-18-06-02	16101-014-17-06-02	39016/9 -089	L or M	IMACG - 18 A or B	N/A									
39016/6 -206	L or M	I2K -206 A or B	16101-007-18-06-05	N/A	39016/9 -090	L or M	IMACG - 26 A or B	N/A									
39016/6 -207	L or M	I2K -207 A or B	16101-007-18-15-01	N/A	39016/9 -091	L or M	IMACG - 30 A or B	N/A									
39016/6 -208	L or M	I2K -208 A or B	16101-007-18-15-05	N/A	39016/9 -099	L or M	IMACG - 5 AS or BS	N/A									
39016/6 -209	L or M	I2K -209 A or B	16101-007-18-01-02	16101-014-17-01-02	39016/9 -100	L or M	IMACG - 6 AS or BS	N/A									
39016/6 -210	L or M	I2K -210 A or B	16101-007-18-01-05	N/A	39016/9 -101	L or M	IMACG - 9 AS or BS	N/A									
39016/6 -211	L or M	I2K -211 A or B	16101-007-12-06-01	16101-014-11-06-01	39016/9 -102	L or M	IMACG - 12 AS or BS	N/A									
39016/6 -212	L or M	I2K -212 A or B	16101-007-12-06-02	16101-014-11-06-02	39016/9 -103	L or M	IMACG - 18 AS or BS	N/A									
39016/6 -213	L or M	I2K -213 A or B	16101-007-12-06-05	N/A	39016/9 -104	L or M	IMACG - 26 AS or BS	N/A									
39016/6 -214	L or M	I2K -214 A or B	16101-007-12-15-01	N/A	39016/9 -105	L or M	IMACG - 30 AS or BS	N/A									
39016/6 -215	L or M	I2K -215 A or B	16101-007-12-15-05	N/A	39016/9 -106	L or M	IMAC - 5 AS2 or BS2	16101-003-01-06									
39016/6 -216	L or M	I2K -216 A or B	16101-007-12-01-02	16101-014-11-01-02	39016/9 -107	L or M	IMAC - 6 AS2 or BS2	16101-003-02-06									
39016/6 -217	L or M	I2K -217 A or B	16101-007-12-01-05	N/A	39016/9 -108	L or M	IMAC - 9 AS2 or BS2	16101-003-03-06									
39016/6 -218	L or M	I2K -218 A or B	16101-007-03-06-01	16101-014-02-06-01	39016/9 -109	L or M	IMAC - 12 AS2 or BS2	16101-003-04-06									
39016/6 -219	L or M	I2K -219 A or B	16101-007-03-06-02	16101-014-02-06-02	39016/9 -110	L or M	IMAC - 18 AS2 or BS2	16101-003-05-06									
39016/6 -220	L or M	I2K -220 A or B	16101-007-03-06-05	N/A	39016/9 -111	L or M	IMAC - 26 AS2 or BS2	16101-003-06-06									
39016/6 -221	L or M	I2K -221 A or B	16101-007-03-15-01	N/A	39016/9 -112	L or M	IMAC - 30 AS2 or BS2	16101-003-08-06									
39016/6 -222	L or M	I2K -222 A or B	16101-007-03-15-05	N/A	<b>M39016/7</b>			<b>16101-005</b>									
39016/6 -223	L or M	I2K -223 A or B	16101-007-03-01-02	16101-014-02-01-02	39016/7 -013	L or M	I1MAW - 5 A or B	16101-005-01-01									
39016/6 -224	L or M	I2K -224 A or B	16101-007-03-01-05	N/A	39016/7 -014	L or M	I1MAP - 5 A or B	16101-005-01-02									
39016/6 -225	L or M	I2K -225 A or B	16101-007-18-15-02	N/A	39016/7 -015	L or M	I1MAW - 6 A or B	16101-005-02-01									
39016/6 -226	L or M	I2K -226 A or B	16101-007-12-15-02	N/A	39016/7 -016	L or M	I1MAP - 6 A or B	16101-005-02-02									
39016/6 -227	L or M	I2K -227 A or B	16101-007-03-15-02	N/A	39016/7 -017	L or M	I1MAW - 9 A or B	16101-005-03-01									
39016/6 -228	L or M	I2K -228 A or B	N/A	N/A	39016/7 -018	L or M	I1MAP - 9 A or B	16101-005-03-02									
39016/6 -229	L or M	I2K -229 A or B	16101-007-18-01-01	16101-014-17-01-01	39016/7 -019	L or M	I1MAW - 12 A or B	16101-005-04-01									
39016/6 -230	L or M	I2K -230 A or B	16101-007-12-01-01	16101-014-11-01-01	39016/7 -020	L or M	I1MAP - 12 A or B	16101-005-04-02									
39016/6 -231	L or M	I2K -231 A or B	16101-007-03-01-01	16101-014-02-01-01	39016/7 -021	L or M	I1MAW - 18 A or B	16101-005-05-01									
39016/6 -232	L or M	I2K -232 A or B	16101-007-01-06-01	16101-014-01-06-01	39016/7 -022	L or M	I1MAP - 18 A or B	16101-005-05-02									
39016/6 -233	L or M	I2K -233 A or B	16101-007-01-06-02	16101-014-01-06-02	39016/7 -023	L or M	I1MAW - 26 A or B	16101-005-06-01									
39016/6 -234	L or M	I2K -234 A or B	16101-007-01-06-05	N/A	39016/7 -024	L or M	I1MAP - 26 A or B	16101-005-06-02									
39016/6 -235	L or M	I2K -235 A or B	16101-007-01-15-01	N/A	39016/7 -025	L or M	I1MAC - 5 A or B	16101-005-01-03									
39016/6 -236	L or M	I2K -236 A or B	16101-007-01-15-02	N/A	39016/7 -026	L or M	I1MAC - 6 A or B	16101-005-02-03									
39016/6 -237	L or M	I2K -237 A or B	16101-007-01-15-05	N/A	39016/7 -027	L or M	I1MAC - 9 A or B	16101-005-03-03									
39016/6 -238	L or M	I2K -238 A or B	16101-007-01-01-01	16101-014-01-01-01	39016/7 -028	L or M	I1MAC - 12 A or B	16101-005-04-03									
39016/6 -239	L or M	I2K -239 A or B	16101-007-01-01-02	16101-014-01-01-02	39016/7 -029	L or M	I1MAC - 18 A or B	16101-005-05-03									
39016/6 -240	L or M	I2K -240 A or B	16101-007-01-01-05	N/A	39016/7 -030	L or M	I1MAC - 26 A or B	16101-005-06-03									
39016/6 -241	L or M	I2K -241 A or B	N/A	N/A	39016/7 -031	L or M	I1MAC - 5 AS or BS	N/A									
39016/6 -242	L or M	I2K -242 A or B	N/A	N/A	39016/7 -032	L or M	I1MAC - 6 AS or BS	N/A									
39016/6 -243	L or M	I2K -243 A or B	N/A	N/A	39016/7 -033	L or M	I1MAC - 9 AS or BS	N/A									
39016/6 -244	L or M	I2K -244 A or B	N/A	N/A	39016/7 -034	L or M	I1MAC - 12 AS or BS	N/A									
39016/6 -245	L or M	I2K -245 A or B	N/A	N/A	39016/7 -035	L or M	I1MAC - 18 AS or BS	N/A									
39016/6 -246	L or M	I2K -246 A or B	N/A	N/A	39016/7 -036	L or M											



MILITARY DESIGNATION	N-HiG PART. No	CECC DESIGNATION	MILITARY DESIGNATION	N-HiG PART. No	CECC DESIGNATION
<b>M39016/10</b>	<b>(cont'd)</b>	<b>16101-006</b>	<b>M39016/15</b>	<b>(cont'd)</b>	
39016/10 -021 L or M	I1MSW -12 A or B	16101-006-04-01	39016/15 -078 L or M	IMACD - 9 A or B	
39016/10 -022 L or M	I1MSP - 12 A or B	16101-006-04-02	39016/15 -079 L or M	IMACD - 12 A or B	
39016/10 -023 L or M	I1MSW -26 A or B	16101-006-06-01	39016/15 -080 L or M	IMACD - 18 A or B	
39016/10 -024 L or M	I1MSP - 26 A or B	16101-006-06-02	39016/15 -081 L or M	IMACD - 26 A or B	
39016/10 -025 L or M	I1MSW - 32 A or B	16101-006-07-01	39016/15 -082 L or M	IMACD - 5 A or B	
39016/10 -026 L or M	I1MSP - 32 A or B	16101-006-07-02	39016/15 -089 L or M	IMACD - 6 A or B	
39016/10 -027 L or M	I1MSW - 40 A or B	16101-006-08-01	39016/15 -090 L or M	IMACD - 9 A or B	
39016/10 -028 L or M	I1MSP - 40 A or B	16101-006-08-02	39016/15 -091 L or M	IMACD - 12 A or B	
39016/10 -029 L or M	I1MSW - 9 A or B	16101-006-03-01	39016/15 -092 L or M	IMACD - 18 A or B	
39016/10 -030 L or M	I1MSP - 9 A or B	16101-006-03-02	39016/15 -093 L or M	IMACD - 26 A or B	
39016/10 -031 L or M	I1MSW - 18 A or B	16101-006-05-01	39016/15 -094 L or M	IMACD - 5 A or B	
39016/10 -032 L or M	I1MSP - 18 A or B	16101-006-05-02	39016/15 -101 L or M	IMACD - 6 AS or BS	
39016/10 -033 L or M	I1MSC - 5 A or B	16101-006-01-03	39016/15 -102 L or M	IMACD - 9 AS or BS	
39016/10 -034 L or M	I1MSC - 6 A or B	16101-006-02-03	39016/15 -103 L or M	IMACD - 12 AS or BS	
39016/10 -035 L or M	I1MSC - 12 A or B	16101-006-04-03	39016/15 -104 L or M	IMACD - 18 AS or BS	
39016/10 -036 L or M	I1MSC - 26 A or B	16101-006-06-03	39016/15 -105 L or M	IMACD - 26 AS or BS	
39016/10 -037 L or M	I1MSC - 32 A or B	16101-006-07-03	39016/15 -106 L or M	IMACD - 5 AS or BS	
39016/10 -038 L or M	I1MSC - 40 A or B	16101-006-08-03	39016/15 -113 L or M	IMACD - 6 AS or BS	
39016/10 -039 L or M	I1MSC - 9 A or B	16101-006-03-03	39016/15 -114 L or M	IMACD - 9 AS or BS	
39016/10 -040 L or M	I1MSC - 18 A or B	16101-006-05-03	39016/15 -115 L or M	IMACD - 12 AS or BS	
39016/10 -041 L or M	I1MSC - 5 AS or BS	N / A	39016/15 -116 L or M	IMACD - 18 AS or BS	
39016/10 -042 L or M	I1MSC - 6 AS or BS	N / A	39016/15 -117 L or M	IMACD - 26 AS or BS	
39016/10 -043 L or M	I1MSC - 12 AS or BS	N / A	39016/15 -118 L or M	IMACD - 5 AS or BS	
39016/10 -044 L or M	I1MSC - 26 AS or BS	N / A	39016/15 -125 L or M	IMACD - 6 AS2 or BS2	
39016/10 -045 L or M	I1MSC - 32 AS or BS	N / A	39016/15 -126 L or M	IMACD - 9 AS2 or BS2	
39016/10 -046 L or M	I1MSC - 40 AS or BS	N / A	39016/15 -127 L or M	IMACD - 12 AS2 or BS2	
39016/10 -047 L or M	I1MSC - 9 AS or BS	N / A	39016/15 -128 L or M	IMACD - 18 AS2 or BS2	
39016/10 -048 L or M	I1MSC - 18 AS or BS	N / A	39016/15 -129 L or M	IMACD - 26 AS2 or BS2	
39016/15 -130 L or M	IMACD - 5 AS2 or BS2				
<b>M39016/11</b>		<b>16101-004</b>	<b>M39016/16</b>		
39016/11 -017 L or M	IMSW - 5 A or B	16101-004-01-01	39016/16 -017 L or M	IMSWD - 5 A or B	
39016/11 -018 L or M	IMSP - 5 A or B	16101-004-01-02	39016/16 -018 L or M	IMSWD - 6 A or B	
39016/11 -019 L or M	IMSW - 6 A or B	16101-004-02-01	39016/16 -019 L or M	IMSWD - 12 A or B	
39016/11 -020 L or M	IMSP - 6 A or B	16101-004-02-02	39016/16 -020 L or M	IMSWD - 26 A or B	
39016/11 -021 L or M	IMSW -12 A or B	16101-004-04-01	39016/16 -021 L or M	IMSWD - 36 A or B	
39016/11 -022 L or M	IMSP - 12 A or B	16101-004-04-02	39016/16 -022 L or M	IMSWD - 48 A or B	
39016/11 -023 L or M	IMSW -26 A or B	16101-004-06-01	39016/16 -023 L or M	IMSWD - 9 A or B	
39016/11 -024 L or M	IMSP - 26 A or B	16101-004-06-02	39016/16 -024 L or M	IMSWD - 18 A or B	
39016/11 -025 L or M	IMSW - 36 A or B	16101-004-07-01	39016/16 -025 L or M	IMSPD - 5 A or B	
39016/11 -026 L or M	IMSP - 36 A or B	16101-004-07-02	39016/16 -026 L or M	IMSPD - 6 A or B	
39016/11 -027 L or M	IMSW - 48 A or B	16101-004-08-01	39016/16 -027 L or M	IMSPD - 12 A or B	
39016/11 -028 L or M	IMSP - 48 A or B	16101-004-08-02	39016/16 -028 L or M	IMSPD - 26 A or B	
39016/11 -029 L or M	IMSW - 9 A or B	16101-004-03-01	39016/16 -029 L or M	IMSPD - 36 A or B	
39016/11 -030 L or M	IMSP - 9 A or B	16101-004-03-02	39016/16 -030 L or M	IMSPD - 48 A or B	
39016/11 -031 L or M	IMSW - 18 A or B	16101-004-05-01	39016/16 -031 L or M	IMSPD - 9 A or B	
39016/11 -032 L or M	IMSP - 18 A or B	16101-004-05-02	39016/16 -032 L or M	IMSPD - 18 A or B	
39016/11 -033 L or M	IMSC - 5 A or B	16101-004-01-03	39016/16 -033 L or M	IMSPD - 18 A or B	
39016/11 -034 L or M	IMSC - 6 A or B	16101-004-02-03	39016/16 -034 L or M	IMSCD - 5 A or B	
39016/11 -035 L or M	IMSC - 12 A or B	16101-004-04-03	39016/16 -034 L or M	IMSCD - 6 A or B	
39016/11 -036 L or M	IMSC - 26 A or B	16101-004-06-03	39016/16 -035 L or M	IMSCD - 12 A or B	
39016/11 -037 L or M	IMSC - 36 A or B	16101-004-07-03	39016/16 -036 L or M	IMSCD - 26 A or B	
39016/11 -038 L or M	IMSC - 48 A or B	16101-004-08-03	39016/16 -037 L or M	IMSCD - 36 A or B	
39016/11 -039 L or M	IMSC - 9 A or B	16101-004-03-03	39016/16 -038 L or M	IMSCD - 48 A or B	
39016/11 -040 L or M	IMSC - 18 A or B	16101-004-05-03	39016/16 -039 L or M	IMSCD - 9 A or B	
39016/11 -041 L or M	IMSC - 5 AS or BS	16101-004-01-09	39016/16 -040 L or M	IMSCD - 18 A or B	
39016/11 -042 L or M	IMSC - 6 AS or BS	16101-004-02-09	39016/16 -041 L or M	IMSCD - 5 AS or BS	
39016/11 -043 L or M	IMSC - 12 AS or BS	16101-004-04-09	39016/16 -042 L or M	IMSCD - 6 AS or BS	
39016/11 -044 L or M	IMSC - 26 AS or BS	16101-004-06-09	39016/16 -043 L or M	IMSCD - 12 AS or BS	
39016/11 -045 L or M	IMSC - 36 AS or BS	16101-004-07-09	39016/16 -044 L or M	IMSCD - 26 AS or BS	
39016/11 -046 L or M	IMSC - 48 AS or BS	16101-004-08-09	39016/16 -045 L or M	IMSCD - 36 AS or BS	
39016/11 -047 L or M	IMSC - 9 AS or BS	16101-004-03-09	39016/16 -046 L or M	IMSCD - 48 AS or BS	
39016/11 -048 L or M	IMSC - 18 AS or BS	16101-004-05-09	39016/16 -047 L or M	IMSCD - 9 AS or BS	
39016/16 -048 L or M	IMSCD - 18 AS or BS				
<b>M39016/15</b>			<b>M39016/17</b>	<b>16207-801</b>	<b>16207-007</b>
39016/15 -029 L or M	IMAWD - 6 A or B		39016/17 -025 L or M	IMGAP - 5 A or B	16207-801-ABA 0Y-E3orE5 16207-007-YA-20-0
39016/15 -030 L or M	IMAWD - 9 A or B		39016/17 -026 L or M	IMGAP - 6 A or B	16207-801-BBA 0Y-E3orE5 16207-007-YB-20-0
39016/15 -031 L or M	IMAWD -12 A or B		39016/17 -027 L or M	IMGAP - 9 A or B	16207-801-CBA 0Y-E3orE5 16207-007-YC-20-0
39016/15 -032 L or M	IMAWD -18 A or B		39016/17 -028 L or M	IMGAP -12 A or B	16207-801-DBA 0Y-E3orE5 16207-007-YD-20-0
39016/15 -033 L or M	IMAWD -26 A or B		39016/17 -029 L or M	IMGAP -18 A or B	16207-801-EBA 0Y-E3orE5 16207-007-YE-20-0
39016/15 -034 L or M	IMAWD - 5 A or B		39016/17 -030 L or M	IMGAP -26 A or B	16207-801-GBA 0Y-E3orE5 16207-007-YG-20-0
39016/15 -035 L or M	IMAPD - 6 A or B		39016/17 -031 L or M	IMGAC - 5 A or B	16207-801-AOA 0Y-E3orE5 16207-007-YA-40-0
39016/15 -036 L or M	IMAPD - 9 A or B		39016/17 -032 L or M	IMGAC - 6 A or B	16207-801-BOA 0Y-E3orE5 16207-007-YB-40-0
39016/15 -037 L or M	IMAPD - 12 A or B		39016/17 -033 L or M	IMGAC - 9 A or B	16207-801-COA 0Y-E3orE5 16207-007-YC-40-0
39016/15 -038 L or M	IMAPD - 18 A or B		39016/17 -034 L or M	IMGAC -12 A or B	16207-801-DOA 0Y-E3orE5 16207-007-YD-40-0
39016/15 -039 L or M	IMAPD - 26 A or B		39016/17 -035 L or M	IMGAC -18 A or B	16207-801-EOA 0Y-E3orE5 16207-007-YE-40-0
39016/15 -040 L or M	IMAPD - 5 A or B		39016/17 -036 L or M	IMGAC -26 A or B	16207-801-GOA 0Y-E3orE5 16207-007-YG-40-0
39016/15 -065 L or M	IMAWDG - 6 A or B		39016/17 -037 L or M	IMGAC - 5 AW or BW	16207-801-AOP 0Y-E3orE5 16207-007-YA-4P-0
39016/15 -066 L or M	IMAWDG - 9 A or B		39016/17 -038 L or M	IMGAC - 6 AW or BW	16207-801-BOP 0Y-E3orE5 16207-007-YB-4P-0
39016/15 -067 L or M	IMAWDG - 12 A or B		39016/17 -039 L or M	IMGAC - 9 AW or BW	16207-801-COP 0Y-E3orE5 16207-007-YC-4P-0
39016/15 -068 L or M	IMAWDG - 18 A or B		39016/17 -040 L or M	IMGAC -12 AW or BW	16207-801-DOP 0Y-E3orE5 16207-007-YD-4P-0
39016/15 -069 L or M	IMAWDG - 26 A or B		39016/17 -041 L or M	IMGAC -18 AW or BW	16207-801-EOP 0Y-E3orE5 16207-007-YE-4P-0
39016/15 -070 L or M	IMAWDG - 5 A or B		39016/17 -042 L or M	IMGAC -26 AW or BW	16207-801-GOP 0Y-E3orE5 16207-007-YG-4P-0
39016/15 -077 L or M	IMACD - 6 A or B				

MILITARY DESIGNATION	N-HiG PART. No	CECC DESIGNATION		MILITARY DESIGNATION	N-HiG PART. No	CECC DESIGNATION
<b>M39016/17</b>	<b>(cont'd)</b>	<b>16207-801</b>	<b>16207-007</b>	<b>M39016/20</b>	<b>(cont'd)</b>	
39016/17 -043 L or M	IMGACG - 5 A or B	16207-801-AOJ 0Y-E3orE5	16207-007-Y-A-4J-0	39016/20 -037 L or M	IMAPDD - 5 A or B	
39016/17 -044 L or M	IMGACG - 6 A or B	16207-801-BOJ 0Y-E3orE5	16207-007-Y-B-4J-0	39016/20 -038 L or M	IMAPDD - 6 A or B	
39016/17 -045 L or M	IMGACG - 9 A or B	16207-801-COJ 0Y-E3orE5	16207-007-Y-C-4J-0	39016/20 -039 L or M	IMAPDD - 9 A or B	
39016/17 -046 L or M	IMGACG -12 A or B	16207-801-DOJ 0Y-E3orE5	16207-007-Y-D-4J-0	39016/20 -040 L or M	IMAPDD - 12 A or B	
39016/17 -047 L or M	IMGACG -18 A or B	16207-801-EOJ 0Y-E3orE5	16207-007-Y-E-4J-0	39016/20 -041 L or M	IMAPDD - 18 A or B	
39016/17 -048 L or M	IMGACG -26 A or B	16207-801-GOJ 0Y-E3orE5	16207-007-Y-G-4J-0	39016/20 -042 L or M	IMAPDD - 26 A or B	
39016/17 -049 L or M	IMGACG - 5 AW or BW	16207-801-AOK 0Y-E3orE5	16207-007-Y-A-4K-0	39016/20 -049 L or M	IMACDD - 5 A or B	
39016/17 -050 L or M	IMGACG - 6 AW or BW	16207-801-BOK 0Y-E3orE5	16207-007-Y-B-4K-0	39016/20 -050 L or M	IMACDD - 6 A or B	
39016/17 -051 L or M	IMGACG - 9 AW or BW	16207-801-COK 0Y-E3orE5	16207-007-Y-C-4K-0	39016/20 -051 L or M	IMACDD - 9 A or B	
39016/17 -052 L or M	IMGACG -12 AW or BW	16207-801-DOK 0Y-E3orE5	16207-007-Y-D-4K-0	39016/20 -052 L or M	IMACDD - 12 A or B	
39016/17 -053 L or M	IMGACG -18 AW or BW	16207-801-EOK 0Y-E3orE5	16207-007-Y-E-4K-0	39016/20 -053 L or M	IMACDD - 18 A or B	
39016/17 -054 L or M	IMGACG -26 AW or BW	16207-801-GOK 0Y-E3orE5	16207-007-Y-G-4K-0	39016/20 -054 L or M	IMACDD - 26 A or B	
<b>M39016/18</b>		<b>16207-801</b>	<b>16207-007</b>	39016/20 -061 L or M	IMACDD - 5 AS or BS	
39016/18 -025 L or M	IMGAPD - 5 A or B	16207-801-ABA 1Y-E3orE5	16207-007-Y-A-2O-1	39016/20 -062 L or M	IMACDD - 6 AS or BS	
39016/18 -026 L or M	IMGAPD - 6 A or B	16207-801-BBA 1Y-E3orE5	16207-007-Y-B-2O-1	39016/20 -063 L or M	IMACDD - 9 AS or BS	
39016/18 -027 L or M	IMGAPD - 9 A or B	16207-801-CBA 1Y-E3orE5	16207-007-Y-C-2O-1	39016/20 -064 L or M	IMACDD - 12 AS or BS	
39016/18 -028 L or M	IMGAPD -12 A or B	16207-801-DBA 1Y-E3orE5	16207-007-Y-D-2O-1	39016/20 -065 L or M	IMACDD - 18 AS or BS	
39016/18 -029 L or M	IMGAPD -18 A or B	16207-801-EBA 1Y-E3orE5	16207-007-Y-E-2O-1	39016/20 -066 L or M	IMACDD - 26 AS or BS	
39016/18 -030 L or M	IMGAPD -26 A or B	16207-801-GBA 1Y-E3orE5	16207-007-Y-G-2O-1	39016/20 -073 L or M	IMACDD - 5 AS2 or BS2	
39016/18 -031 L or M	IMGACD - 5 A or B	16207-801-AOA 1Y-E3orE5	16207-007-Y-A-4O-1	39016/20 -074 L or M	IMACDD - 6 AS2 or BS2	
39016/18 -032 L or M	IMGACD - 6 A or B	16207-801-BOA 1Y-E3orE5	16207-007-Y-B-4O-1	39016/20 -075 L or M	IMACDD - 9 AS2 or BS2	
39016/18 -033 L or M	IMGACD - 9 A or B	16207-801-COA 1Y-E3orE5	16207-007-Y-C-4O-1	39016/20 -076 L or M	IMACDD - 12 AS2 or BS2	
39016/18 -034 L or M	IMGACD -12 A or B	16207-801-DOA 1Y-E3orE5	16207-007-Y-D-4O-1	39016/20 -077 L or M	IMACDD - 18 AS2 or BS2	
39016/18 -035 L or M	IMGACD -18 A or B	16207-801-EOA 1Y-E3orE5	16207-007-Y-E-4O-1	39016/20 -078 L or M	IMACDD - 26 AS2 or BS2	
39016/18 -036 L or M	IMGACD -26 A or B	16207-801-GOA 1Y-E3orE5	16207-007-Y-G-4O-1	39016/20 -079 L or M	IMACDDG - 5 A or B	
39016/18 -037 L or M	IMGACD - 5 AW or BW	16207-801-AOP 1Y-E3orE5	16207-007-Y-A-4P-1	39016/20 -080 L or M	IMACDDG - 6 A or B	
39016/18 -038 L or M	IMGACD - 6 AW or BW	16207-801-BOP 1Y-E3orE5	16207-007-Y-B-4P-1	39016/20 -081 L or M	IMACDDG - 9 A or B	
39016/18 -039 L or M	IMGACD - 9 AW or BW	16207-801-COP 1Y-E3orE5	16207-007-Y-C-4P-1	39016/20 -082 L or M	IMACDDG - 12 A or B	
39016/18 -040 L or M	IMGACD -12 AW or BW	16207-801-DOP 1Y-E3orE5	16207-007-Y-D-4P-1	39016/20 -083 L or M	IMACDDG - 18 A or B	
39016/18 -041 L or M	IMGACD -18 AW or BW	16207-801-EOP 1Y-E3orE5	16207-007-Y-E-4P-1	39016/20 -084 L or M	IMACDDG - 26 A or B	
39016/18 -042 L or M	IMGACD -26 AW or BW	16207-801-GOP 1Y-E3orE5	16207-007-Y-G-4P-1	39016/20 -091 L or M	IMACDDG - 5 AS or BS	
39016/18 -043 L or M	IMGACDG - 5 A or B	16207-801-AOJ 1Y-E3orE5	16207-007-Y-A-4J-1	39016/20 -092 L or M	IMACDDG - 6 AS or BS	
39016/18 -044 L or M	IMGACDG - 6 A or B	16207-801-BOJ 1Y-E3orE5	16207-007-Y-B-4J-1	39016/20 -093 L or M	IMACDDG - 9 AS or BS	
39016/18 -045 L or M	IMGACDG - 9 A or B	16207-801-COJ 1Y-E3orE5	16207-007-Y-C-4J-1	39016/20 -094 L or M	IMACDDG - 12 AS or BS	
39016/18 -046 L or M	IMGACDG -12 A or B	16207-801-DOJ 1Y-E3orE5	16207-007-Y-D-4J-1	39016/20 -095 L or M	IMACDDG - 18 AS or BS	
39016/18 -047 L or M	IMGACDG -18 A or B	16207-801-EOJ 1Y-E3orE5	16207-007-Y-E-4J-1	39016/20 -096 L or M	IMACDDG - 26 AS or BS	
39016/18 -048 L or M	IMGACDG -26 A or B	16207-801-GOJ 1Y-E3orE5	16207-007-Y-G-4J-1			
39016/18 -049 L or M	IMGACDG - 5 AW or BW	16207-801-AOK 1Y-E3orE5	16207-007-Y-A-4K-1	<b>M39016/21</b>		
39016/18 -050 L or M	IMGACDG - 6 AW or BW	16207-801-BOK 1Y-E3orE5	16207-007-Y-B-4K-1	39016/21 -007 L or M	IMSWDD - 5 A or B	
39016/18 -051 L or M	IMGACDG - 9 AW or BW	16207-801-COK 1Y-E3orE5	16207-007-Y-C-4K-1	39016/21 -008 L or M	IMSWDD - 6 A or B	
39016/18 -052 L or M	IMGACDG -12 AW or BW	16207-801-DOK 1Y-E3orE5	16207-007-Y-D-4K-1	39016/21 -009 L or M	IMSWDD - 9 A or B	
39016/18 -053 L or M	IMGACDG -18 AW or BW	16207-801-EOK 1Y-E3orE5	16207-007-Y-E-4K-1	39016/21 -010 L or M	IMSWDD - 12 A or B	
39016/18 -054 L or M	IMGACDG -26 AW or BW	16207-801-GOK 1Y-E3orE5	16207-007-Y-G-4K-1	39016/21 -011 L or M	IMSWDD - 18 A or B	
				39016/21 -012 L or M	IMSWDD - 26 A or B	
<b>M39016/19</b>		<b>16207-801</b>		39016/21 -019 L or M	IMSPDD - 5 A or B	
39016/19 -025 L or M	IMGAPDD - 5 A or B	16207-801-ABA 2Y-E3orE5		39016/21 -020 L or M	IMSPDD - 6 A or B	
39016/19 -026 L or M	IMGAPDD - 6 A or B	16207-801-BBA 2Y-E3orE5		39016/21 -021 L or M	IMSPDD - 9 A or B	
39016/19 -027 L or M	IMGAPDD - 9 A or B	16207-801-CBA 2Y-E3orE5		39016/21 -022 L or M	IMSPDD - 12 A or B	
39016/19 -028 L or M	IMGAPDD -12 A or B	16207-801-DBA 2Y-E3orE5		39016/21 -023 L or M	IMSPDD - 18 A or B	
39016/19 -029 L or M	IMGAPDD -18 A or B	16207-801-EBA 2Y-E3orE5		39016/21 -024 L or M	IMSPDD - 26 A or B	
39016/19 -030 L or M	IMGAPDD -26 A or B	16207-801-GBA 2Y-E3orE5		39016/21 -029 L or M	IMSWDD - 36 A or B	
39016/19 -031 L or M	IMGACDD - 5 A or B	16207-801-AOA 2Y-E3orE5		39016/21 -030 L or M	IMSWDD - 48 A or B	
39016/19 -032 L or M	IMGACDD - 6 A or B	16207-801-BOA 2Y-E3orE5		39016/21 -031 L or M	IMSPDD - 36 A or B	
39016/19 -033 L or M	IMGACDD - 9 A or B	16207-801-COA 2Y-E3orE5		39016/21 -032 L or M	IMSPDD - 48 A or B	
39016/19 -034 L or M	IMGACDD -12 A or B	16207-801-DOA 2Y-E3orE5		39016/21 -033 L or M	IMSCDD - 5 A or B	
39016/19 -035 L or M	IMGACDD -18 A or B	16207-801-EOA 2Y-E3orE5		39016/21 -034 L or M	IMSCDD - 6 A or B	
39016/19 -036 L or M	IMGACDD -26 A or B	16207-801-GOA 2Y-E3orE5		39016/21 -035 L or M	IMSCDD - 9 A or B	
39016/19 -037 L or M	IMGACDD - 5 AW or BW	16207-801-AOP 2Y-E3orE5		39016/21 -036 L or M	IMSCDD - 12 A or B	
39016/19 -038 L or M	IMGACDD - 6 AW or BW	16207-801-BOP 2Y-E3orE5		39016/21 -037 L or M	IMSCDD - 18 A or B	
39016/19 -039 L or M	IMGACDD - 9 AW or BW	16207-801-COP 2Y-E3orE5		39016/21 -038 L or M	IMSCDD - 26 A or B	
39016/19 -040 L or M	IMGACDD -12 AW or BW	16207-801-DOP 2Y-E3orE5		39016/21 -039 L or M	IMSCDD - 36 A or B	
39016/19 -041 L or M	IMGACDD -18 AW or BW	16207-801-EOP 2Y-E3orE5		39016/21 -040 L or M	IMSCDD - 48 A or B	
39016/19 -042 L or M	IMGACDD -26 AW or BW	16207-801-GOP 2Y-E3orE5		39016/21 -041 L or M	IMSCDD - 5 AS or BS	
39016/19 -043 L or M	IMGACDDG - 5 A or B	16207-801-AOJ 2Y-E3orE5		39016/21 -042 L or M	IMSCDD - 6 AS or BS	
39016/19 -044 L or M	IMGACDDG - 6 A or B	16207-801-BOJ 2Y-E3orE5		39016/21 -043 L or M	IMSCDD - 9 AS or BS	
39016/19 -045 L or M	IMGACDDG - 9 A or B	16207-801-COJ 2Y-E3orE5		39016/21 -044 L or M	IMSCDD - 12 AS or BS	
39016/19 -046 L or M	IMGACDDG -12 A or B	16207-801-DOJ 2Y-E3orE5		39016/21 -045 L or M	IMSCDD - 18 AS or BS	
39016/19 -047 L or M	IMGACDDG -18 A or B	16207-801-EOJ 2Y-E3orE5		39016/21 -046 L or M	IMSCDD - 26 AS or BS	
39016/19 -048 L or M	IMGACDDG -26 A or B	16207-801-GOJ 2Y-E3orE5		39016/21 -047 L or M	IMSCDD - 36 AS or BS	
39016/19 -049 L or M	IMGACDDG - 5 AW or BW	16207-801-AOK 2Y-E3orE5		39016/21 -048 L or M	IMSCDD - 48 AS or BS	
39016/19 -050 L or M	IMGACDDG - 6 AW or BW	16207-801-BOK 2Y-E3orE5				
39016/19 -051 L or M	IMGACDDG - 9 AW or BW	16207-801-COK 2Y-E3orE5		<b>M39016/23</b>		
39016/19 -052 L or M	IMGACDDG -12 AW or BW	16207-801-DOK 2Y-E3orE5		39016/23 -013 L or M	I1MAWD - 5 A or B	
39016/19 -053 L or M	IMGACDDG -18 AW or BW	16207-801-EOK 2Y-E3orE5		39016/23 -014 L or M	I1MAWD - 6 A or B	
39016/19 -054 L or M	IMGACDDG -26 AW or BW	16207-801-GOK 2Y-E3orE5		39016/23 -015 L or M	I1MAWD - 9 A or B	
				39016/23 -016 L or M	I1MAWD - 12 A or B	
<b>M39016/20</b>				39016/23 -017 L or M	I1MAWD - 18 A or B	
39016/20 -007 L or M	IMAWDD - 5 A or B			39016/23 -018 L or M	I1MAWD - 26 A or B	
39016/20 -008 L or M	IMAWDD - 6 A or B			39016/23 -019 L or M	I1MAPD - 5 A or B	
39016/20 -009 L or M	IMAWDD - 9 A or B			39016/23 -020 L or M	I1MAPD - 6 A or B	
39016/20 -010 L or M	IMAWDD - 12 A or B			39016/23 -021 L or M	I1MAPD - 9 A or B	
39016/20 -011 L or M	IMAWDD - 18 A or B			39016/23 -022 L or M	I1MAPD - 12 A or B	
39016/20 -012 L or M	IMAWDD - 26 A or B			39016/23 -023 L or M	I1MAPD - 18 A or B	

MILITARY DESIGNATION	N-HIG PART. No	CECC DESIGNATION	MILITARY DESIGNATION	N-HIG PART. No	CECC DESIGNATION	
<b>M39016/23</b>	<b>(cont'd)</b>		<b>M39016/41</b>	<b>(cont'd)</b>	<b>16207-802</b> <b>16207-008</b>	
39016/23 -024 L or M	I1MAPD - 26 A or B		39016/41 -042 L or M	IMGSP - 6 A or B	16207-802-BBA 0Y-E3orE5	16207-008-Y-B-20-0
39016/23 -025 L or M	I1MACD - 5 A or B		39016/41 -043 L or M	IMGSP -12 A or B	16207-802-DBA 0Y-E3orE5	16207-008-Y-D-20-0
39016/23 -026 L or M	I1MACD - 6 A or B		39016/41 -044 L or M	IMGSP -26 A or B	16207-802-GBA 0Y-E3orE5	16207-008-Y-G-20-0
39016/23 -027 L or M	I1MACD - 9 A or B		39016/41 -045 L or M	IMGSP -36 A or B	N / A	16207-008-Y-H-20-0
39016/23 -028 L or M	I1MACD - 12 A or B		39016/41 -046 L or M	IMGSP -48 A or B	N / A	16207-008-Y-K-20-0
39016/23 -029 L or M	I1MACD - 18 A or B		39016/41 -047 L or M	IMGSP - 9 A or B	16207-802-CBA 0Y-E3orE5	16207-008-Y-C-20-0
39016/23 -030 L or M	I1MACD - 26 A or B		39016/41 -048 L or M	IMGSP - 18 A or B	16207-802-EBA 0Y-E3orE5	16207-008-Y-E-20-0
39016/23 -031 L or M	I1MACD - 5 AS or BS		39016/41 -049 L or M	IMGSC - 5 AW or BW	16207-802-AOP 0Y-E3orE5	16207-008-Y-A-4P-0
39016/23 -032 L or M	I1MACD - 6 AS or BS		39016/41 -050 L or M	IMGSC - 6 AW or BW	16207-802-BOP 0Y-E3orE5	16207-008-Y-B-4P-0
39016/23 -033 L or M	I1MACD - 9 AS or BS		39016/41 -051 L or M	IMGSC -12 AW or BW	16207-802-DOP 0Y-E3orE5	16207-008-Y-D-4P-0
39016/23 -034 L or M	I1MACD - 12 AS or BS		39016/41 -052 L or M	IMGSC -26 AW or BW	16207-802-GOP 0Y-E3orE5	16207-008-Y-G-4P-0
39016/23 -035 L or M	I1MACD - 18 AS or BS		39016/41 -053 L or M	IMGSC -36 AW or BW	N / A	16207-008-Y-H-4P-0
39016/23 -036 L or M	I1MACD - 26 AS or BS		39016/41 -054 L or M	IMGSC -48 AW or BW	N / A	16207-008-Y-K-4P-0
<b>M39016/24</b>			39016/41 -055 L or M	IMGSC - 9 AW or BW	16207-802-COP 0Y-E3orE5	16207-008-Y-C-4P-0
39016/24 -013 L or M	I1MAWDD - 5 A or B		39016/41 -056 L or M	IMGSC - 18 AW or BW	16207-802-EOP 0Y-E3orE5	16207-008-Y-E-4P-0
39016/24 -014 L or M	I1MAWDD - 6 A or B		39016/41 -057 L or M	IMGSCG - 5 A or B	16207-802-AOJ 0Y-E3orE5	16207-008-Y-A-4J-0
39016/24 -015 L or M	I1MAWDD - 9 A or B		39016/41 -058 L or M	IMGSCG - 6 A or B	16207-802-BOJ 0Y-E3orE5	16207-008-Y-B-4J-0
39016/24 -016 L or M	I1MAWDD - 12 A or B		39016/41 -059 L or M	IMGSCG -12 A or B	16207-802-DOJ 0Y-E3orE5	16207-008-Y-D-4J-0
39016/24 -017 L or M	I1MAWDD - 18 A or B		39016/41 -060 L or M	IMGSCG -26 A or B	16207-802-GOJ 0Y-E3orE5	16207-008-Y-G-4J-0
39016/24 -018 L or M	I1MAWDD - 26 A or B		39016/41 -061 L or M	IMGSCG -36 A or B	N / A	16207-008-Y-H-4J-0
39016/24 -019 L or M	I1MAPDD - 5 A or B		39016/41 -062 L or M	IMGSCG -48 A or B	N / A	16207-008-Y-K-4J-0
39016/24 -020 L or M	I1MAPDD - 6 A or B		39016/41 -063 L or M	IMGSCG - 9 A or B	16207-802-COJ 0Y-E3orE5	16207-008-Y-C-4J-0
39016/24 -021 L or M	I1MAPDD - 9 A or B		39016/41 -064 L or M	IMGSCG - 18 A or B	16207-802-EOJ 0Y-E3orE5	16207-008-Y-E-4J-0
39016/24 -022 L or M	I1MAPDD - 12 A or B		39016/41 -065 L or M	IMGSCG - 5 AW or BW	16207-802-AOK 0Y-E3orE5	16207-008-Y-A-4K-0
39016/24 -023 L or M	I1MAPDD - 18 A or B		39016/41 -066 L or M	IMGSCG - 6 AW or BW	16207-802-BOK 0Y-E3orE5	16207-008-Y-B-4K-0
39016/24 -024 L or M	I1MAPDD - 26 A or B		39016/41 -067 L or M	IMGSCG -12 AW or BW	16207-802-DOK 0Y-E3orE5	16207-008-Y-D-4K-0
39016/24 -025 L or M	I1MACDD - 5 A or B		39016/41 -068 L or M	IMGSCG -26 AW or BW	16207-802-GOK 0Y-E3orE5	16207-008-Y-G-4K-0
39016/24 -026 L or M	I1MACDD - 6 A or B		39016/41 -069 L or M	IMGSCG -36 AW or BW	N / A	16207-008-Y-H-4K-0
39016/24 -027 L or M	I1MACDD - 9 A or B		39016/41 -070 L or M	IMGSCG -48 AW or BW	N / A	16207-008-Y-K-4K-0
39016/24 -028 L or M	I1MACDD - 12 A or B		39016/41 -071 L or M	IMGSCG - 9 AW or BW	16207-802-COK 0Y-E3orE5	16207-008-Y-C-4K-0
39016/24 -029 L or M	I1MACDD - 18 A or B		39016/41 -072 L or M	IMGSCG -18 AW or BW	16207-802-EOK 0Y-E3orE5	16207-008-Y-E-4K-0
39016/24 -030 L or M	I1MACDD - 26 A or B		<b>M39016/42</b>	<b>16207-802</b>	<b>16207-008</b>	
39016/24 -031 L or M	I1MACDD - 5 AS or BS		39016/42 -033 L or M	IMGSCD - 5 A or B	16207-802-AOA 1Y-E3orE5	16207-008-Y-A-4O-1
39016/24 -032 L or M	I1MACDD - 6 AS or BS		39016/42 -034 L or M	IMGSCD - 6 A or B	16207-802-BOA 1Y-E3orE5	16207-008-Y-B-4O-1
39016/24 -033 L or M	I1MACDD - 9 AS or BS		39016/42 -035 L or M	IMGSCD -12 A or B	16207-802-DOA 1Y-E3orE5	16207-008-Y-D-4O-1
39016/24 -034 L or M	I1MACDD - 12 AS or BS		39016/42 -036 L or M	IMGSCD -26 A or B	16207-802-GOA 1Y-E3orE5	16207-008-Y-G-4O-1
39016/24 -035 L or M	I1MACDD - 18 AS or BS		39016/42 -037 L or M	IMGSCD -36 A or B	N / A	16207-008-Y-H-4O-1
39016/24 -036 L or M	I1MACDD - 26 AS or BS		39016/42 -038 L or M	IMGSCD -48 A or B	N / A	16207-008-Y-K-4O-1
<b>M39016/25</b>			39016/42 -039 L or M	IMGSCD - 9 A or B	16207-802-COA 1Y-E3orE5	16207-008-Y-C-4O-1
39016/25 -017 L or M	I1MSWD - 5 A or B		39016/42 -040 L or M	IMGSCD - 18 A or B	16207-802-EOA 1Y-E3orE5	16207-008-Y-E-4O-1
39016/25 -018 L or M	I1MSWD - 6 A or B		39016/42 -041 L or M	IMGSPD - 5 A or B	16207-802-ABA 1Y-E3orE5	16207-008-Y-A-20-1
39016/25 -019 L or M	I1MSWD - 12 A or B		39016/42 -042 L or M	IMGSPD - 6 A or B	16207-802-BBA 1Y-E3orE5	16207-008-Y-B-20-1
39016/25 -020 L or M	I1MSWD - 26 A or B		39016/42 -043 L or M	IMGSPD -12 A or B	16207-802-DBA 1Y-E3orE5	16207-008-Y-D-20-1
39016/25 -021 L or M	I1MSWD - 32 A or B		39016/42 -044 L or M	IMGSPD -26 A or B	16207-802-GBA 1Y-E3orE5	16207-008-Y-G-20-1
39016/25 -022 L or M	I1MSWD - 40 A or B		39016/42 -045 L or M	IMGSPD -36 A or B	N / A	16207-008-Y-H-20-1
39016/25 -023 L or M	I1MSWD - 9 A or B		39016/42 -046 L or M	IMGSPD -48 A or B	N / A	16207-008-Y-K-20-1
39016/25 -024 L or M	I1MSWD - 18 A or B		39016/42 -047 L or M	IMGSPD - 9 A or B	16207-802-CBA 1Y-E3orE5	16207-008-Y-C-20-1
39016/25 -025 L or M	I1MSPD - 5 A or B		39016/42 -048 L or M	IMGSPD - 18 A or B	16207-802-EBA 1Y-E3orE5	16207-008-Y-E-20-1
39016/25 -026 L or M	I1MSPD - 6 A or B		39016/42 -049 L or M	IMGSCD - 5 AW or BW	16207-802-AOP 1Y-E3orE5	16207-008-Y-A-4P-1
39016/25 -027 L or M	I1MSPD - 12 A or B		39016/42 -050 L or M	IMGSCD - 6 AW or BW	16207-802-BOP 1Y-E3orE5	16207-008-Y-B-4P-1
39016/25 -028 L or M	I1MSPD - 26 A or B		39016/42 -051 L or M	IMGSCD -12 AW or BW	16207-802-DOP 1Y-E3orE5	16207-008-Y-D-4P-1
39016/25 -029 L or M	I1MSPD - 32 A or B		39016/42 -052 L or M	IMGSCD -26 AW or BW	16207-802-GOP 1Y-E3orE5	16207-008-Y-G-4P-1
39016/25 -030 L or M	I1MSPD - 40 A or B		39016/42 -053 L or M	IMGSCD -36 AW or BW	N / A	16207-008-Y-H-4P-1
39016/25 -031 L or M	I1MSPD - 9 A or B		39016/42 -054 L or M	IMGSCD -48 AW or BW	N / A	16207-008-Y-K-4P-1
39016/25 -032 L or M	I1MSPD - 18 A or B		39016/42 -055 L or M	IMGSCD -9 AW or BW	16207-802-COP 1Y-E3orE5	16207-008-Y-C-4P-1
39016/25 -033 L or M	I1MSCD - 5 A or B		39016/42 -056 L or M	IMGSCD -18 AW or BW	16207-802-EOP 1Y-E3orE5	16207-008-Y-E-4P-1
39016/25 -034 L or M	I1MSCD - 6 A or B		39016/42 -057 L or M	IMGSCDG - 5 A or B	16207-802-AOJ 1Y-E3orE5	16207-008-Y-A-4J-1
39016/25 -035 L or M	I1MSCD - 12 A or B		39016/42 -058 L or M	IMGSCDG - 6 A or B	16207-802-BOJ 1Y-E3orE5	16207-008-Y-B-4J-1
39016/25 -036 L or M	I1MSCD - 26 A or B		39016/42 -059 L or M	IMGSCDG - 12 A or B	16207-802-DOJ 1Y-E3orE5	16207-008-Y-D-4J-1
39016/25 -037 L or M	I1MSCD - 32 A or B		39016/42 -060 L or M	IMGSCDG - 26 A or B	16207-802-GOJ 1Y-E3orE5	16207-008-Y-G-4J-1
39016/25 -038 L or M	I1MSCD - 40 A or B		39016/42 -061 L or M	IMGSCDG - 36 A or B	N / A	16207-008-Y-H-4J-1
39016/25 -039 L or M	I1MSCD - 9 A or B		39016/42 -062 L or M	IMGSCDG - 48 A or B	N / A	16207-008-Y-K-4J-1
39016/25 -040 L or M	I1MSCD - 18 A or B		39016/42 -063 L or M	IMGSCDG - 9 A or B	16207-802-COJ 1Y-E3orE5	16207-008-Y-C-4J-1
39016/25 -041 L or M	I1MSCD - 5 AS or BS		39016/42 -064 L or M	IMGSCDG -18 A or B	16207-802-EOJ 1Y-E3orE5	16207-008-Y-E-4J-1
39016/25 -042 L or M	I1MSCD - 6 AS or BS		39016/42 -065 L or M	IMGSCDG - 5 AW or BW	16207-802-AOK 1Y-E3orE5	16207-008-Y-A-4K-1
39016/25 -043 L or M	I1MSCD - 12 AS or BS		39016/42 -066 L or M	IMGSCDG - 6 AW or BW	16207-802-BOK 1Y-E3orE5	16207-008-Y-B-4K-1
39016/25 -044 L or M	I1MSCD - 26 AS or BS		39016/42 -067 L or M	IMGSCDG -12 AW or BW	16207-802-DOK 1Y-E3orE5	16207-008-Y-D-4K-1
39016/25 -045 L or M	I1MSCD - 32 AS or BS		39016/42 -068 L or M	IMGSCDG -26 AW or BW	16207-802-GOK 1Y-E3orE5	16207-008-Y-G-4K-1
39016/25 -046 L or M	I1MSCD - 40 AS or BS		39016/42 -069 L or M	IMGSCDG -36 AW or BW	N / A	16207-008-Y-H-4K-1
39016/25 -047 L or M	I1MSCD - 9 AS or BS		39016/42 -070 L or M	IMGSCDG -48 AW or BW	N / A	16207-008-Y-K-4K-1
39016/25 -048 L or M	I1MSCD - 18 AS or BS		39016/42 -071 L or M	IMGSCDG - 9 AW or BW	16207-802-COK 1Y-E3orE5	16207-008-Y-C-4K-1
<b>M39016/41</b>		<b>16207-802</b> <b>16207-008</b>	39016/42 -072 L or M	IMGSCDG -18 AW or BW	16207-802-EOK 1Y-E3orE5	16207-008-Y-E-4K-1
39016/41 -033 L or M	IMGSC - 5 A or B	16207-802-AOA 0Y-E3orE5	<b>M39016/26</b>			
39016/41 -034 L or M	IMGSC - 6 A or B	16207-802-BOA 0Y-E3orE5	39016/26 -017 L or M	I1MSWDD - 5 A or B		
39016/41 -035 L or M	IMGSC -12 A or B	16207-802-DOA 0Y-E3orE5	39016/26 -018 L or M	I1MSWDD - 6 A or B		
39016/41 -036 L or M	IMGSC -26 A or B	16207-802-GOA 0Y-E3orE5	39016/26 -019 L or M	I1MSWDD - 12 A or B		
39016/41 -037 L or M	IMGSC -36 A or B	16207-008-Y-H-4O-0	39016/26 -020 L or M	I1MSWDD - 26 A or B		
39016/41 -038 L or M	IMGSC -48 A or B	N / A	39016/26 -021 L or M	I1MSWDD - 32 A or B		
39016/41 -039 L or M	IMGSC - 9 A or B	16207-802-COA 0Y-E3orE5	39016/26 -022 L or M	I1MSWDD - 40 A or B		
39016/41 -040 L or M	IMGSC - 18 A or B	16207-802-EOA 0Y-E3orE5	39016/26 -023 L or M	I1MSWDD - 9 A or B		
39016/41 -041 L or M	IMGSP - 5 A or B	16207-802-ABA 0Y-E3orE5	39016/26 -024 L or M	I1MSWDD - 18 A or B		

MILITARY DESIGNATION	N-HiG PART. No	CECC DESIGNATION	MILITARY DESIGNATION	N-HiG PART. No	CECC DESIGNATION
<b>M39016/26</b>	<b>(cont'd)</b>		<b>MIL-R-5757/10</b>	<b>(cont'd)</b>	
39016/26 -025 L or M	I1MSPDD - 5 A or B		5757/10 -035	2B-7506 -035	
39016/26 -026 L or M	I1MSPDD - 6 A or B		5757/10 -036	2B-7506 -036	
39016/26 -027 L or M	I1MSPDD - 12 A or B		5757/10 -037	2B-7506 -037	
39016/26 -028 L or M	I1MSPDD - 26 A or B		5757/10 -038	2B-7506 -038	
39016/26 -029 L or M	I1MSPDD - 32 A or B		5757/10 -039	2B-7506 -039	
39016/26 -030 L or M	I1MSPDD - 40 A or B		5757/10 -040	2B-7506 -040	
39016/26 -031 L or M	I1MSPDD - 9 A or B		5757/10 -043	2B-7506 -043	
39016/26 -032 L or M	I1MSPDD - 18 A or B		5757/10 -044	2B-7506 -044	
39016/26 -033 L or M	I1MSCDD - 5 A or B		5757/10 -052	2B-7506 -052	
39016/26 -034 L or M	I1MSCDD - 6 A or B		5757/10 -053	2B-7506 -053	
39016/26 -035 L or M	I1MSCDD - 12 A or B		5757/10 -054	2B-7506 -054	
39016/26 -036 L or M	I1MSCDD - 26 A or B		5757/10 -059	2B-7506 -059	
39016/26 -037 L or M	I1MSCDD - 32 A or B		5757/10 -060	2B-7506 -060	
39016/26 -038 L or M	I1MSCDD - 40 A or B		5757/10 -067	2B-7506 -067	
39016/26 -039 L or M	I1MSCDD - 9 A or B				
39016/26 -040 L or M	I1MSCDD - 18 A or B		<b>MIL-R-5757/13</b>		
39016/26 -041 L or M	I1MSCDD - 5 AS or BS		5757/13 -083	2BC-7201 -083	
39016/26 -042 L or M	I1MSCDD - 6 AS or BS		5757/13 -084	2BC-7201 -084	
39016/26 -043 L or M	I1MSCDD - 12 AS or BS		5757/13 -085	2BC-7201 -085	
39016/26 -044 L or M	I1MSCDD - 26 AS or BS		5757/13 -086	2BC-7201 -086	
39016/26 -045 L or M	I1MSCDD - 32 AS or BS		5757/13 -087	2BC-7201 -087	
39016/26 -046 L or M	I1MSCDD - 40 AS or BS		5757/13 -088	2BC-7201 -088	
39016/26 -047 L or M	I1MSCDD - 9 AS or BS		5757/13 -089	2BC-7201 -089	
39016/26 -048 L or M	I1MSCDD - 18 AS or BS		5757/13 -090	2BC-7201 -090	
<b>M39016/43</b>	<b>16207-802</b>		5757/13 -091	2BC-7201 -091	
39016/43 -033 L or M	IMGSCDD - 5 A or B	16207-802-AOA 2Y-E3orE5	5757/13 -092	2BC-7201 -092	
39016/43 -034 L or M	IMGSCDD - 6 A or B	16207-802-BOA 2Y-E3orE5	5757/13 -093	2BC-7201 -093	
39016/43 -035 L or M	IMGSCDD - 9 A or B	16207-802-COA 2Y-E3orE5	5757/13 -094	2BC-7201 -094	
39016/43 -036 L or M	IMGSCDD -12 A or B	16207-802-DOA 2Y-E3orE5	5757/13 -095	2BC-7201 -095	
39016/43 -037 L or M	IMGSCDD -18 A or B	16207-802-EOA 2Y-E3orE5	5757/13 -096	2BC-7201 -096	
39016/43 -038 L or M	IMGSCDD -26 A or B	16207-802-GOA 2Y-E3orE5	5757/13 -097	2BC-7201 -097	
39016/43 -041 L or M	IMGSPDD - 5 A or B	16207-802-ABA 2Y-E3orE5	5757/13 -098	2BC-7201 -098	
39016/43 -042 L or M	IMGSPDD - 6 A or B	16207-802-BBA 2Y-E3orE5	5757/13 -099	2BC-7201 -099	
39016/43 -043 L or M	IMGSPDD - 9 A or B	16207-802-CBA 2Y-E3orE5	5757/13 -100	2BC-7201 -100	
39016/43 -044 L or M	IMGSPDD -12 A or B	16207-802-DBA 2Y-E3orE5	5757/13 -101	2BC-7201 -101	
39016/43 -045 L or M	IMGSPDD -18 A or B	16207-802-EBA 2Y-E3orE5	5757/13 -102	2BC-7201 -102	
39016/43 -046 L or M	IMGSPDD -26 A or B	16207-802-GBA 2Y-E3orE5	5757/13 -103	2BC-7201 -103	
39016/43 -049 L or M	IMGSCDD -5AW or BW	16207-802-AOP 2Y-E3orE5	5757/13 -104	2BC-7201 -104	
39016/43 -050 L or M	IMGSCDD -6 AW or BW	16207-802-BOP 2Y-E3orE5	5757/13 -105	2BC-7201 -105	
39016/43 -051 L or M	IMGSCDD -9 AW or BW	16207-802-COP 2Y-E3orE5	5757/13 -106	2BC-7201 -106	
39016/43 -052 L or M	IMGSCDD -12AW or BW	16207-802-DOP 2Y-E3orE5	5757/13 -107	2BC-7201 -107	
39016/43 -053 L or M	IMGSCDD -18AW or BW	16207-802-EOP 2Y-E3orE5	5757/13 -108	2BC-7201 -108	
39016/43 -054 L or M	IMGSCDD -26AW or BW	16207-802-GOP 2Y-E3orE5	5757/13 -109	2BC-7201 -109	
39016/43 -057 L or M	IMGSCDDG - 5 A or B	16207-802-AOJ 2Y-E3orE5	5757/13 -110	2BC-7201 -110	
39016/43 -058 L or M	IMGSCDDG - 6 A or B	16207-802-BOJ 2Y-E3orE5	5757/13 -111	2BC-7201 -111	
39016/43 -059 L or M	IMGSCDDG - 9 A or B	16207-802-COJ 2Y-E3orE5	5757/13 -112	2BC-7201 -112	
39016/43 -060 L or M	IMGSCDDG -12 A or B	16207-802-DOJ 2Y-E3orE5	5757/13 -113	2BC-7201 -113	
39016/43 -061 L or M	IMGSCDDG -18 A or B	16207-802-EOJ 2Y-E3orE5	5757/13 -114	2BC-7201 -114	
39016/43 -062 L or M	IMGSCDDG -26 A or B	16207-802-GOJ 2Y-E3orE5	5757/13 -115	2BC-7201 -115	
39016/43 -065 L or M	IMGSCDDG -5AW or BW	16207-802-AOK 2Y-E3orE5	5757/13 -116	2BC-7201 -116	
39016/43 -066 L or M	IMGSCDDG -6 AW or BW	16207-802-BOK 2Y-E3orE5	5757/13 -117	2BC-7201 -117	
39016/43 -067 L or M	IMGSCDDG -9 AW or BW	16207-802-COK 2Y-E3orE5	5757/13 -118	2BC-7201 -118	
39016/43 -068 L or M	IMGSCDDG -12 AW or BW	16207-802-DOK 2Y-E3orE5	5757/13 -119	2BC-7201 -119	
39016/43 -069 L or M	IMGSCDDG -18 AW or BW	16207-802-EOK 2Y-E3orE5	5757/13 -120	2BC-7201 -120	
39016/43 -070 L or M	IMGSCDDG -26 AW or BW	16207-802-GOK 2Y-E3orE5	5757/13 -121	2BC-7201 -121	
<b>MIL-R-39016/22</b>			5757/13 -122	2BC-7201 -122	
39016/22 -004 L or M	2K-7940 -004 A or B		5757/13 -123	2BC-7201 -123	
39016/22 -005 L or M	2K-7940 -005 A or B		5757/13 -124	2BC-7201 -124	
39016/22 -006 L or M	2K-7940 -006 A or B		5757/13 -125	2BC-7201 -125	
39016/22 -007 L or M	2K-7940 -007 A or B		5757/13 -126	2BC-7201 -126	
39016/22 -008 L or M	2K-7940 -008 A or B		5757/13 -127	2BC-7201 -127	
39016/22 -009 L or M	2K-7940 -009 A or B		5757/13 -128	2BC-7201 -128	
39016/22 -010 L or M	2K-7940 -010 A or B		5757/13 -129	2BC-7201 -129	
39016/22 -011 L or M	2K-7940 -011 A or B		5757/13 -130	2BC-7201 -130	
39016/22 -012 L or M	2K-7940 -012 A or B		5757/13 -131	2BC-7201 -131	
39016/22 -013 L or M	2K-7940 -013 A or B		5757/13 -132	2BC-7201 -132	
39016/22 -014 L or M	2K-7940 -014 A or B		5757/13 -133	2BC-7201 -133	
39016/22 -015 L or M	2K-7940 -015 A or B		5757/13 -134	2BC-7201 -134	
39016/22 -016 L or M	2K-7940 -016 A or B		5757/13 -135	2BC-7201 -135	
39016/22 -017 L or M	2K-7940 -017 A or B		5757/13 -136	2BC-7201 -136	
39016/22 -018 L or M	2K-7940 -018 A or B		5757/13 -137	2BC-7201 -137	
39016/22 -019 L or M	2K-7940 -019 A or B		5757/13 -138	2BC-7201 -138	
39016/22 -020 L or M	2K-7940 -020 A or B		5757/13 -139	2BC-7201 -139	
39016/22 -021 L or M	2K-7940 -021 A or B		5757/13 -140	2BC-7201 -140	
39016/22 -022 L or M	2K-7940 -022 A or B		5757/13 -141	2BC-7201 -141	
39016/22 -023 L or M	2K-7940 -023 A or B		5757/13 -142	2BC-7201 -142	
39016/22 -024 L or M	2K-7940 -024 A or B		5757/13 -143	2BC-7201 -143	
<b>MIL-R-5757/10</b>			<b>MIL-R-5757/ 23</b>		
5757/10 -015	2B-7506 -015		5757/23 -001	2T-7188 -001	
5757/10 -016	2B-7506 -016		5757/23 -002	2T-7188 -002	
5757/10 -022	2B-7506 -022		5757/23 -003	2T-7188 -003	
			5757/23 -004	2T-7188 -004	





# TO-5 CASE RELAY DPDT

Series  
MA

- Basic • Suppression • Suppression/Steering • Transistor Driven

## Product Description

A series of ultra miniature hermetically sealed relays constructed in a transistor style case, providing superior performance and established reliability characteristics. Available in a variety of sensitivities, contact configurations and hybrid improvements to provide a most versatile element to the circuit designer.

The following construction features ensure the highest reliability in extreme environments:

- All welded relay construction
- Cleaning and sealing techniques ensures maximum internal cleanliness
- Low level to 1 amp. switching
- 2 form C, DPDT contacts, special metal alloy with gold plating
- Frame design and force / mass ratio provides exceptional shock and vibration immunity

Low Intercontact capacitance and contact circuit losses, provides also a reliable switching functions in demanding RF applications, combined with small size and low coil power dissipation (see figure 1).

## Series Types (note 2)

- **MA\*** Basic Relay, 2 form C, DPDT
- **MA\*D** Basic Relay combined with an internal diode for coil transient suppression
- **MA\*DD** Basic Relay incorporates two internal diodes for coil transient suppression and polarity reversal protection
- **MA\*T** Basic Relay incorporating an internal transistor driver and diode for coil transient suppression

## Environmental and Physical Specifications

Temperature (Ambient)	-65°C to +125°C
Shock	75 g's, 6 msec.
Vibration (sinusoidal)	30 g's, 10 to 3000 Hz
Vibration (random)	0,4 g <sup>2</sup> s / Hz, 50 to 2000 Hz
Acceleration	50 g's
Sealing	All welded, Hermetic
Weight	0,09 oz. (2,55 grams) max.



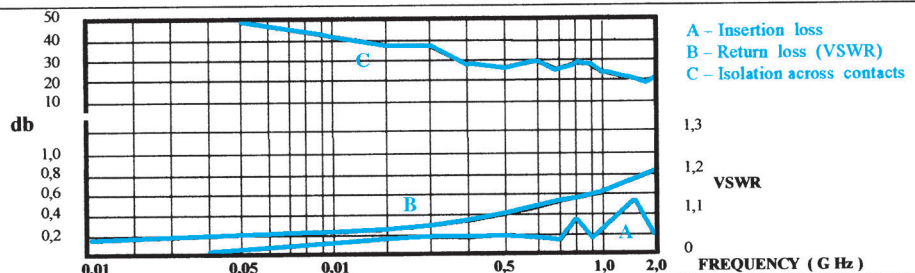
## Electrical Characteristics (over the Temperature range, unless otherwise noted)

Coil Data	See Typical Characteristics chart		
Contact Rating	Type Load	Contact Load	Cycles min.
(Note: All ratings with grounded case)	Low Level	10 to 50 $\mu$ A / 10 to 50 mV	1.000.000
	Resistive	1 Amp / 28 Vdc	100.000
		250 mA / 115 Vac, 60 and 400 Hz (Case not grounded)	100.000
		100 mA / 115 Vac, 60 and 400 Hz	100.000
	Resistive overload	2 Amp / 28 V dc	100
	Inductive	200 mA / 28 Vdc (320 mH)	100.000
	Lamp	100 mA / 28 Vdc	100.000
Contact Resistance	0,1 ohm max. initial, 0,2 ohm max. after life		
Operate Time	2,0 msec. max.		
Release Time	1,5 msec. max. Series: MA*	4,0 msec. max. Series: MA*D, MA*DD	7,5 msec. max. Series MA*T
Contact Bounce	1,5 msec. max.		
Contact stabilisation Time	2,0 msec. max.		
Dielectric Strength	500 Vrms min., 60 Hz, all points at sea level	125 Vrms min. 60 Hz, all points at 70.000 ft.	
Insulation Resistance	10.000 megohms min. all points at 500 Vdc		
Intercontact Capacitance	0,7pF typical		
Sensitivity	130 milliwatts at pick-up, 450 milliwatts at nominal rated coil voltage, at 25 °C		
Diode P.I.V.	100 Vdc min. Series : MA*D, MA*DD, MA*T		
Negative Coil Transient	1,0 Vdc max. Series : MA*D, MA*DD, MA*T		
Transistor Characteristics at 25 °C (Series MA*T)	Emitter-Base Voltage (Vebo)		6,0 Vdc min.
	Collector-Base Breakdown Voltage (Vcbo) (Ic = 100 $\mu$ A)		80 Vdc min.
	Base Turn-Off Voltage		0,3 Vdc min.

Figure 1 - Radio Frequency Curves

Note:

Radio frequency curves are typical characteristics based on factory knowledge. Tests to ensure compliance on RF performance, are not performed.





# TO-5 CASE RELAY DPDT

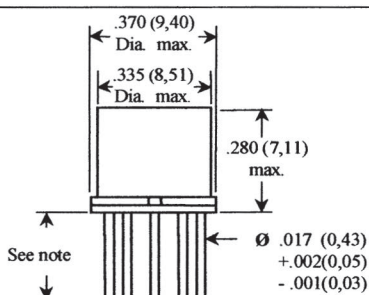
Series  
MA

• Basic • Suppression • Suppression/Steering • Transistor Driven

## Typical Characteristics (over the Temperature range, unless otherwise noted)

Description	Measur.	Series Types		Coil Voltage Code						
				5	6	9	12	18	26	30 (MA only)
Coil Voltage	Vdc	MA*, MA*D, MA*DD, MA*T	Nom.	5,0	6,0	9,0	12,0	18,0	26,5	30,0
			Max.	5,8	8,0	12,0	16,0	24,0	32,0	36,0
Coil Resistance at 25°C	ohms	MA*, MA*D, MA*T	±10%	50	98	220	390	880	1560	2500
			MA*DD	39	78	-	-	-	-	-
Coil Current at 25 °C	mAcd	MA*DD	Min.	93,2	58,3	33,0	25,6	17,5	14,8	-
			Max.	128,2	78,3	42,9	32,8	22,1	18,5	-
		MA*T	Min.	82,2	52,9	35,3	26,6	17,9	14,7	-
			Max.	112,1	69,9	47,4	35,8	24,0	19,8	-
Pick-up Voltage	Vdc	MA*, MA*D, MA*T	Max.	3,5	4,5	6,8	9,0	13,5	18,0	22,0
			MA*DD	Max.	4,0	5,0	7,8	10,0	14,5	19,0
Drop-Out Voltage	Vdc	MA*, MA*D, MA*T	Min.	0,14	0,18	0,35	0,41	0,59	0,89	1,0
			Max.	2,3	3,2	4,9	6,5	10,0	13,0	16,0
		MA*DD	Min.	0,6	0,7	0,8	0,9	1,1	1,4	-
			Max.	2,8	3,4	5,3	6,5	10,0	13,0	-
Base Current to Turn-on	mAcd	MA*T ( limit for base / emitter current to 15 mA max.)	Max.	3,00	2,04	1,36	1,03	0,68	0,50	-

## Outline Dimensions

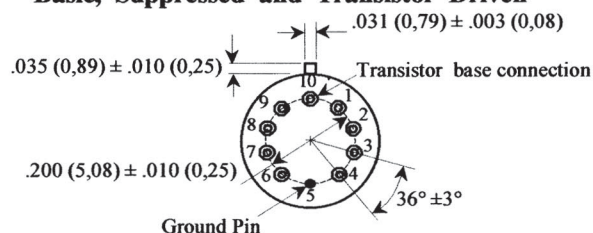


### Note :

- Dimensions are shown in inches (millimetres)
- Terminal Variants: - (C) Standard Wire Terminal = .500 (12,7) min.
- (W) Long Wire Terminal = 1.500 (38,1) min.
- (P) Pin Terminal = .187 ± .01 (4,75 ± 0,25)

## Terminal Locations

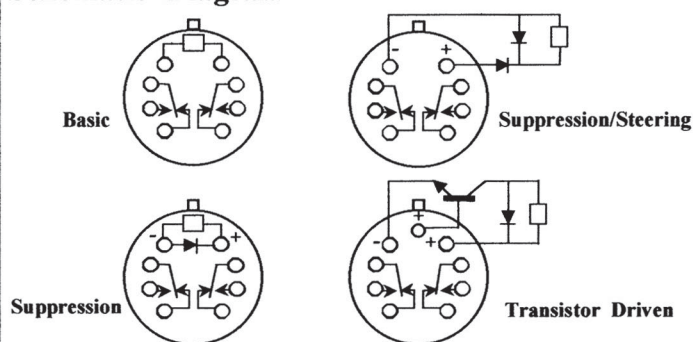
### Basic, Suppressed and Transistor Driven



### Note :

- dimensions are shown in inches (millimetres)
- Viewed from terminals, numbers are for reference only
- Ground pin is optional

## Schematic Diagram

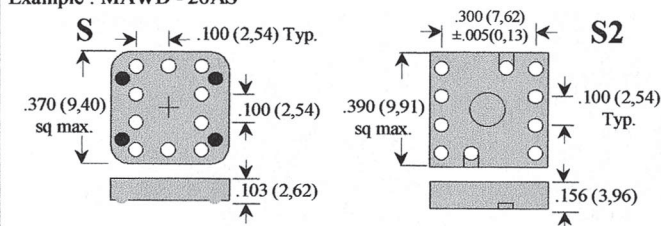


Note : Schematics are viewed from terminals

## Spreader Pads

Relays can be supplied with a spreader pad epoxied to the relay header, to prevent the possible shorting of printed circuit board land lines and to facilitate circuit board cleaning. To order relay with pad add. " S " to part Number.

Example : MAWD - 26AS



Note : - Dimensions are in inches (millimetres)

- Pad type S2 is not used on military qualified MA\*T series

### Note:

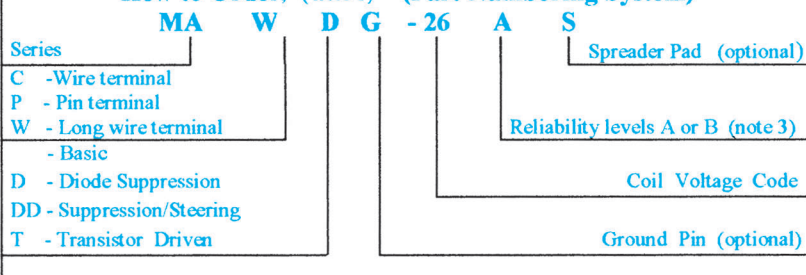
1 For qualified relays add. " I " and the applicable suffix for Failure Rate designation.  
Example: I MAWD - 26A

2 " \* " Indicates Terminal Variants: C, P or W

3 Failure Rate ( Reliability Level )

Military Suffix	NHIG Suffix	F R %/10.000 cycles
L	A	3,0
M	B	1,0

## How to Order, (note 1) (Part Numbering System)





# TO-5 CASE RELAY DPDT

Series  
MA2

## Product Description

A series of ultra miniature hermetically sealed relays constructed in a transistor style case, providing superior performance and established reliability characteristics. Available in a variety of sensitivities, contact configurations and hybrid improvements to provide a most versatile element to the circuit designer.

The following construction features ensure the highest reliability in extreme environments :

- All welded relay construction
- Cleaning and sealing techniques ensures maximum internal cleanliness
- Low level to 1 amp. switching
- 2 form C, DPDT contacts, special metal alloy with gold plating
- Frame design and force / mass ratio provides exceptional shock and vibration immunity

Low Intercontact capacitance and contact circuit losses, provides also a reliable switching functions in demanding RF applications, combined with small size and low coil power dissipation (see figure 1).

## Series Type

- MA2 2 form C, DPDT

## Environmental and Physical Specifications

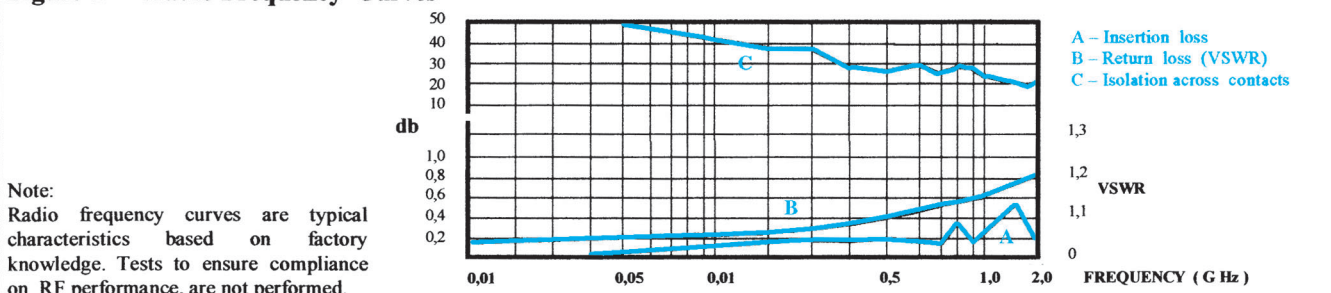
Temperature (Ambient)	-65°C to +125°C
Shock	75 g's, 6 msec., half sine wave
Vibration (sinusoidal)	30 g's, 10 to 2000 Hz, 1.5 amplitude peak
Bump	40 g's, 6 msec.,
Sealing	All welded, Hermetic
Weight	0,09 oz. (2,55 grams) max.
Finish	Bright tin lead plated terminations and case



## Electrical Characteristics (over the Temperature range, unless otherwise noted)

Coil Data	See Typical Characteristics chart		
Contact Rating  (Note : All ratings with grounded case)	Type Load	Contact Load	Cycles min.
	Low Level	10 mA / 30 mV	1.000.000
	Resistive	1 Amp / 28 Vdc,	100.000
	Resistive Overload	2 Amp / 28 Vdc	100
	Inductive	0,1 Amp / 28 Vdc (320 mH)	100.000
Contact Resistance	0,1 ohm max. initial, 0,2 ohm max after life		
Operate Time	2,5 msec. max. at 25°C		
Release Time	2,0 msec. max. at 25°C		
Contact Bounce	2,0 msec. max. at 25°C		
Dielectric Strength	500 Vrms min., 60 Hz, all points, at sea level		
Insulation Resistance	10.000 megohms min. all points at 500 Vdc		
Intercontact Capacitance	0,7 pF typical		
Sensitivity	130 milliwatts at pick-up, 500 milliwatts at nominal rated coil voltage at 25 °C		

Figure 1 - Radio Frequency Curves







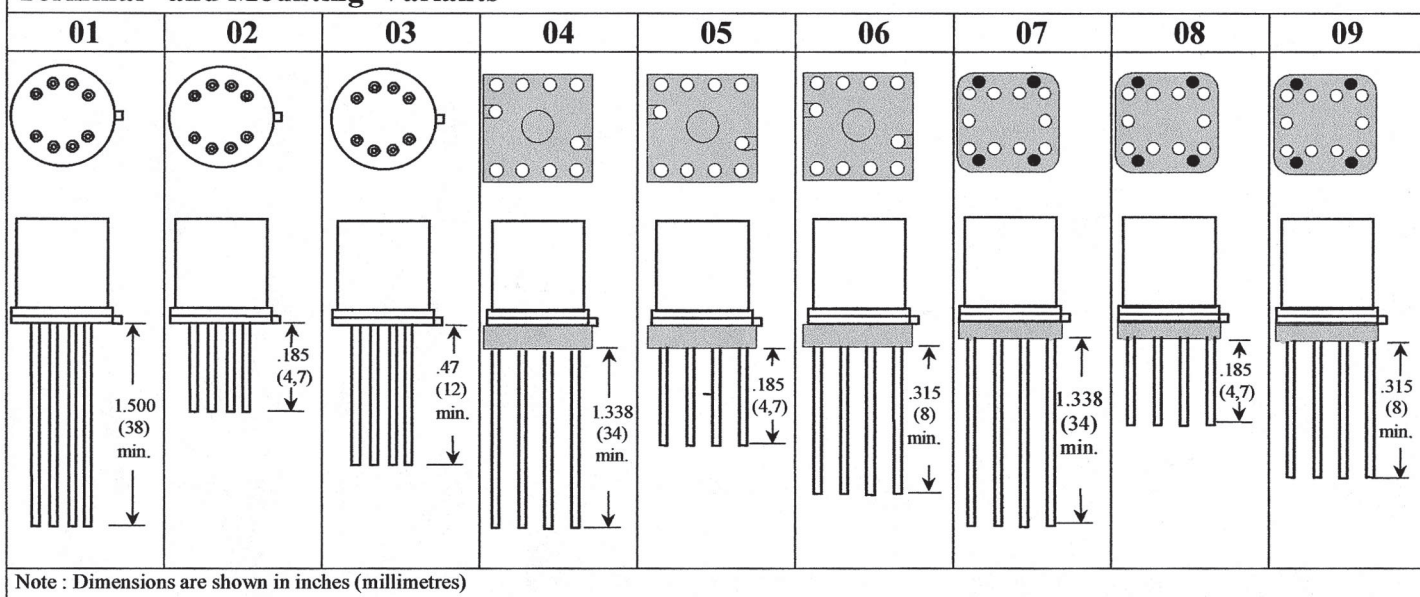
# TO-5 CASE RELAY DPDT

Series  
MA2

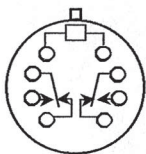
## Typical Characteristics

Coil Variant Code	Coil Voltage V dc		Coil resistance ohms ± 10% at 25 °C	Operated Voltage V dc Max. at		Release Voltage V dc			
	Rated	Max.		25 °C	125 °C	Non-release at		Must-release at	
						25 °C	125 °C	25 °C	- 65 °C
01	5,0	5,8	50	2,7	3,5	1,4	2,3	0,22	0,14
02	6,0	8,0	98	3,5	4,5	2,0	3,2	0,28	0,18
03	9,0	12,0	220	5,3	6,8	3,0	4,9	0,54	0,35
04	12,0	16,0	390	7,0	9,0	4,0	6,5	0,63	0,41
05	18,0	24,0	880	10,5	13,5	6,0	10,0	0,91	0,59
06	26,5	32,0	1560	14,2	18,0	8,0	13,0	1,37	0,89
07	28,0	29,0	1560	15,0	21,0	7,0	8,0	1,2	1,0
08	30,0	36,0	2500	17,7	22,0	10,0	16,0	1,5	1,0

## Terminal and Mounting Variants

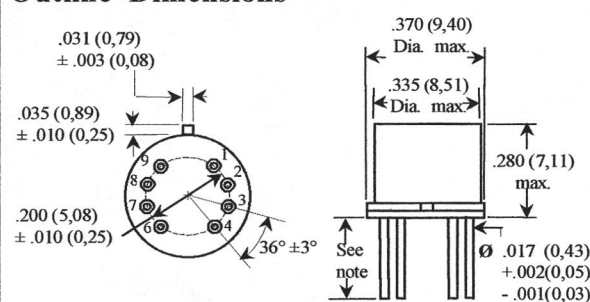


## Schematic Diagram

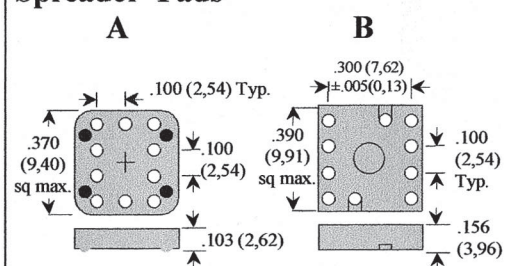


Note :  
- Schematics are viewed from terminals.

## Outline Dimensions



## Spreader Pads



## How to Order

CECC 16101 -003 -06 -02

CECC Specification No.

Type Code (CECC registration No.)

Terminal and Mounting Variant

Coil Variant Code



# TO-5 CASE RELAY SENSITIVE DPDT

Series  
MS

• Basic • Suppression • Suppression/Steering • Transistor Driven

## Product Description

A series of ultra miniature hermetically sealed relays constructed in a transistor style case, providing superior performance and established reliability characteristics. Available in a variety of sensitivities, contact configurations and hybrid versions to provide a most versatile element to the circuit designer.

The following construction features ensure the highest reliability in extreme environments :

- All welded relay construction
- Cleaning and sealing techniques ensures maximum internal cleanliness
- Low level to 1 amp. switching
- 2 form C, DPDT contacts, special metal alloy with gold plating
- Frame design and force / mass ratio provides exceptional shock and vibration immunity

Low Intercontact capacitance and contact circuit losses, provides also a reliable switching functions in demanding RF applications, combined with small size and low coil power dissipation (see figure 1).

## Series Types (note 2)

- **MS\*** Basic Relay, 2 form C, DPDT
- **MS\*D** Basic Relay combined with an internal diode for coil transient suppression
- **MS\*DD** Basic Relay incorporates two internal diodes for coil transient suppression and polarity reversal protection
- **MS\*T** Basic Relay incorporating an internal transistor driver and diode for coil transient suppression

## Environmental and Physical Specifications

Temperature (Ambient)	-65°C to + 125°C
Shock	75 g's, 6 msec.
Vibration (sinusoidal)	30 g's, 10 to 3000 Hz
Vibration (random)	0,4 g <sup>2</sup> 's / Hz, 50 to 2000 Hz
Acceleration	50 g's
Sealing	All welded, Hermetic
Weight	0,15 oz. (4,25 grams) max.

MIL-PRF-39016/11, 16 & 21  
MIL-PRF-28776/3



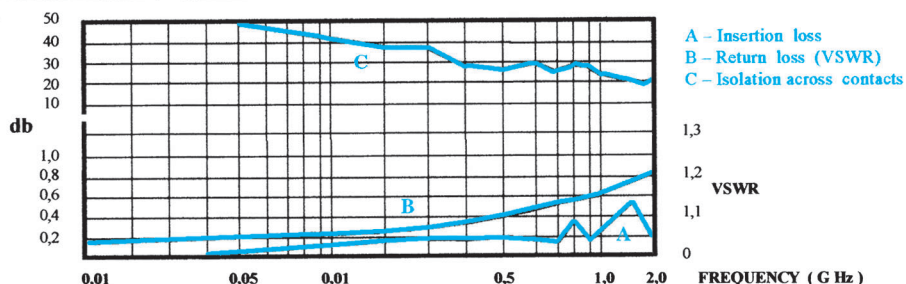
## Electrical Characteristics ( over the Temperature range, unless otherwise noted)

Coil Data	See Typical Characteristics chart		
Contact Rating	Type Load	Contact Load	Cycles min.
(Note : All ratings with grounded case)	Low Level	10 to 50 $\mu$ A / 10 to 50 mV	1.000.000
	Resistive	1 Amp / 28 Vdc	100.000
		250 mA / 115 Vac, 60 and 400 Hz (Case not grounded)	100.000
		100 mA / 115 Vac, 60 and 400 Hz	100.000
	Resistive overload	2A / 28 Vdc	100
	Inductive	200 mA / 28 Vdc (320 mH)	100.000
Lamp	100 mA / 28 Vdc	100.000	
Contact Resistance	0,1 ohm max. initial, 0,2 ohm max after life		
Operate Time	4,0 msec. max.		
Release Time	2,0 msec. max. Series: MS*	7,5 msec. max. Series: MS*D, MS*DD, MS*T	
Contact Bounce	1,5 msec. max.		
Contact stabilisation Time	2,0 msec. max.		
Dielectric Strength	500 Vrms min., 60 Hz, all points at sea level	125 Vrms min., 60 Hz, all points at 70.000 ft.	
Insulation Resistance	10.000 megohms min. all points at 500 Vdc		
Intercontact Capacitance	0,7 pF typical		
Sensitivity	60 milliwatts at pick-up, 250 milliwatts at nominal rated coil voltage, at 25 °C		
Diode P.I.V.	100 Vdc min. Series : MS*D, MS*DD, MS*T		
Negative Coil Transient	1,0 Vdc max. Series : MS*D, MS*DD, MS*T		
Transistor Characteristics at 25 °C (Series MS*T)	Emitter-Base Voltage (Vebo)		6,0 Vdc min.
	Collector-Base Breakdown Voltage (Vcbo) (Ic= 100 $\mu$ A)		80 Vdc min.
	Base Turn-Off Voltage		0,3 Vdc min.

Figure 1 - Radio Frequency Curves

Note:

Radio frequency curves are typical characteristics based on factory knowledge. Tests to ensure compliance on RF Performance, are not performed.





# TO-5 CASE RELAY SENSITIVE DPDT

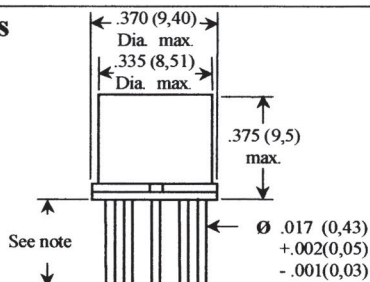
Series  
MS

• Basic • Suppression • Suppression/Steering • Transistor Driven

## Typical Characteristics (over the Temperature range, unless otherwise noted)

Description	Measur.	Series Types		Coil Voltage Code							
				5	6	9	12	18	26	36	48
Coil Voltage	Vdc	MS*, MS*D, MS*DD, MS*T	Nom.	5,0	6,0	9,0	12,0	18,0	26,5	36,0	48,0
			Max.	7,5	10,0	15,0	20,0	30,0	40,0	57,0	75,0
Coil Resistance at 25 °C	ohms	MS*, MS*D, MS*T	±10%	100	200	400	850	1600	3300	6500	11000
				MS*DD	64	125					
Coil Current at 25 °C	mA	MS*DD	Min.	56,8	36,3	18,1	11,7	9,6	7,0	4,9	3,9
			Max.	78,1	48,9	23,6	15,0	12,2	8,8	6,1	4,8
		MS*T	Min.	43,5	26,4	19,7	12,2	9,7	6,9	4,8	3,7
			Max.	59,3	35,4	25,8	16,7	13,1	9,5	6,4	5,1
Pick-up Voltage	Vdc	MS*, MS*D	Max.	3,5	4,5	6,8	9,0	13,5	18,0	27,0	36,0
		MS*DD	Max.	3,7	4,8	8,0	11,0	14,5	19,0	27,2	34,8
		MS*T	Max.	3,6		7,8				27,0	36,0
Drop-Out Voltage	Vdc	MS*, MS*D, MS*T	Min.	0,14	0,18	0,35	0,41	0,59	0,89	1,25	1,60
			Max.	2,5	3,2	4,9	6,5	10,0	13,0	19,0	26,0
		MS*DD	Min.	0,7	0,8	0,9	1,0	1,1	1,3	1,7	2,0
			Max.	2,6	3,0	4,5	5,8	9,0	13,0	19,0	26,0
Base Current to Turn-on	mA	MS*T (limit for base / emitter current to 15 mA max.)	Max.	1,50	1,00	0,75	0,47	0,38	0,24	0,17	0,13

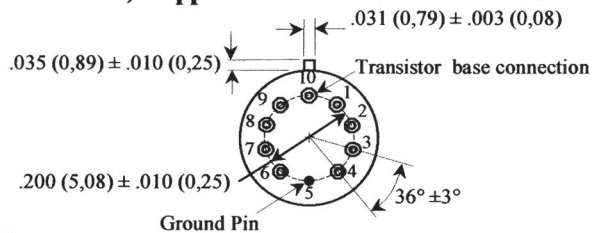
### Outline Dimensions



- Note :
- Dimensions are shown in inches (millimetres)
  - Terminal Variants: - (C) Standard Wire Terminal = .500 (12,7) min.
  - (W) Long Wire Terminal = 1.500 (38,1) min.
  - (P) Pin Terminal = .187 ± .01 (4,75 ± 0,25)

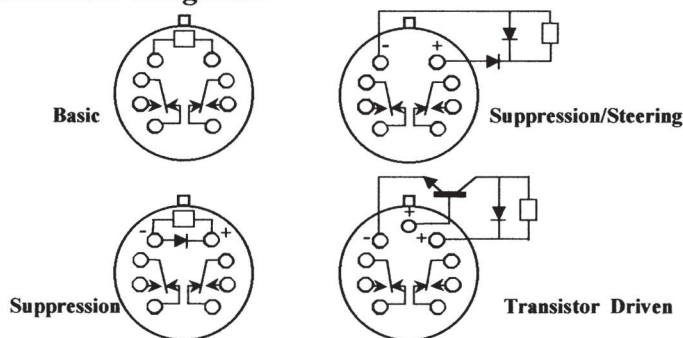
### Terminal Locations

#### Basic, Suppressed and Transistor Driven



- Note:
- dimensions are shown in inches (millimetres)
  - Viewed from terminals, numbers are for reference only
  - Ground Pin is optional

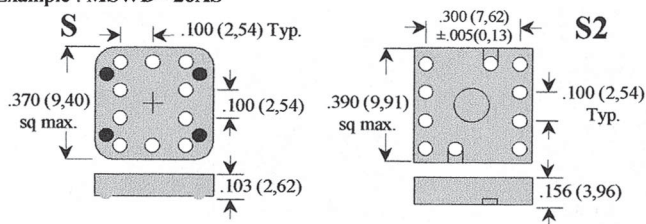
### Schematic Diagrams



Note : Schematics are viewed from terminals

### Spreader Pads

Relays can be supplied with a spreader pad epoxied to the relay header, to prevent the possible shorting of printed circuit board land lines and to facilitate circuit board cleaning. To order relay with pad add. " S " to part Number. Example : MSWD - 26AS



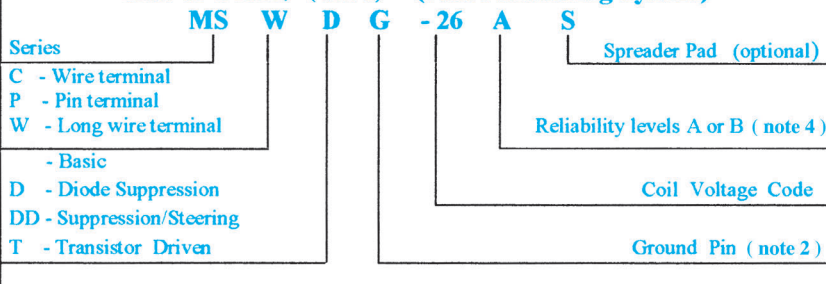
- Note : - Dimensions are in inches (millimetres)
- Pad type S2 is not used on military qualified MS\*T series

### Note:

- For qualified relays add. " I " and the applicable suffix for Failure Rate designation. Example: I MSWD - 26A
- Relay with Ground Pin is optional and is not applicable to military qualified relay series.
- " \* " Indicates Terminal Variants: C, P or W
- Failure Rate ( Reliability Level )

Military Suffix	NHIG Suffix	F R %/10.000 cycles
L	A	3,0
M	B	1,0

### How to Order, (note 1) (Part Numbering System)





# TO-5 CASE RELAY SENSITIVE DPDT

Series  
MS2

## Product Description

A series of ultra miniature hermetically sealed relays constructed in a transistor style case, providing superior performance and established reliability characteristics. Available in a variety of sensitivities, contact configurations and hybrid versions to provide a most versatile element to the circuit designer.

The following construction features ensure the high reliability in extreme environments:

- All welded relay construction
- Cleaning and sealing techniques ensures maximum internal cleanliness
- Low level to 1 amp. switching
- 2 form C, DPDT contacts, special metal alloy with gold plating
- Frame design and force / mass ratio provides exceptional shock and vibration immunity

Low Intercontact capacitance and contact circuit losses, provides also a reliable switching functions in demanding RF applications, combined with small size and low coil power dissipation (see figure 1).

## Series Type

- MS2 2 form C, DPDT

## Environmental and Physical Specifications

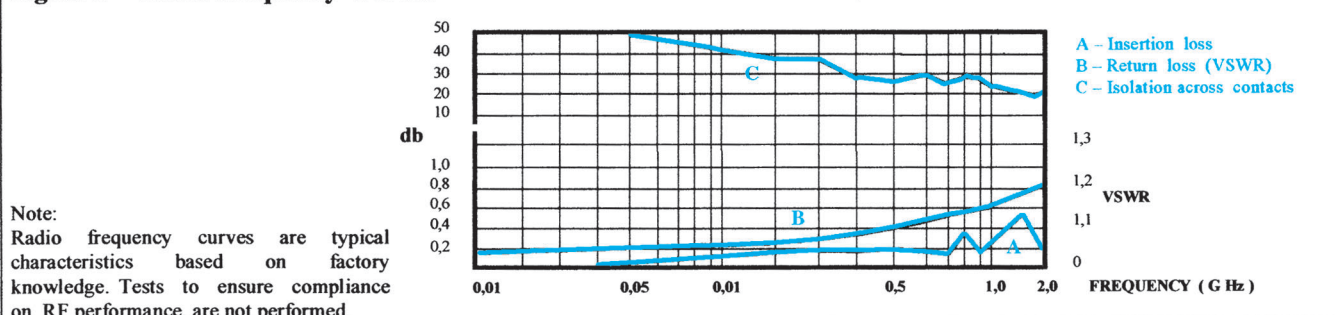
Temperature (Ambient)	-65°C to +125°C
Shock	75 g's, 6 msec., half sine wave
Vibration (sinusoidal)	30 g's, 10 to 2000 Hz, 1,5 amplitude peak
Bump	40 g's, 6 msec.,
Sealing	All welded, Hermetic
Weight	0,15 oz. (4,25 grams) max.
Finish	Bright tin lead plated terminations and case



## Electrical Characteristics (over the Temperature range, unless otherwise noted)

Coil Data	See Typical Characteristics chart		
Contact Rating  (Note : All ratings with grounded case)	Type Load	Contact Load	Cycles min.
	Low Level	10 mA / 30 mV	1.000.000
	Resistive	1 Amp / 28 Vdc,	100.000
	Resistive Overload	2 Amp / 28 Vdc	100
	Inductive	0,1 Amp / 28 Vdc (320 mH)	100.000
Contact Resistance	0,1 ohm max. initial, 0,2 ohm max after life		
Operate Time	4,5 msec. max.		
Release Time	2,5 msec. max.		
Contact Bounce	2,0 msec. max.		
Dielectric Strength	500 Vrms min., 60 Hz, all points at sea level		
Insulation Resistance	10.000 megohms min. all points at 500 Vdc		
Intercontact Capacitance	0.7 pF typical		
Sensitivity	60 milliwatts at pick-up, 250 milliwatts, at nominal rated coil voltage, at 25 °C		

Figure 1 - Radio Frequency Curves





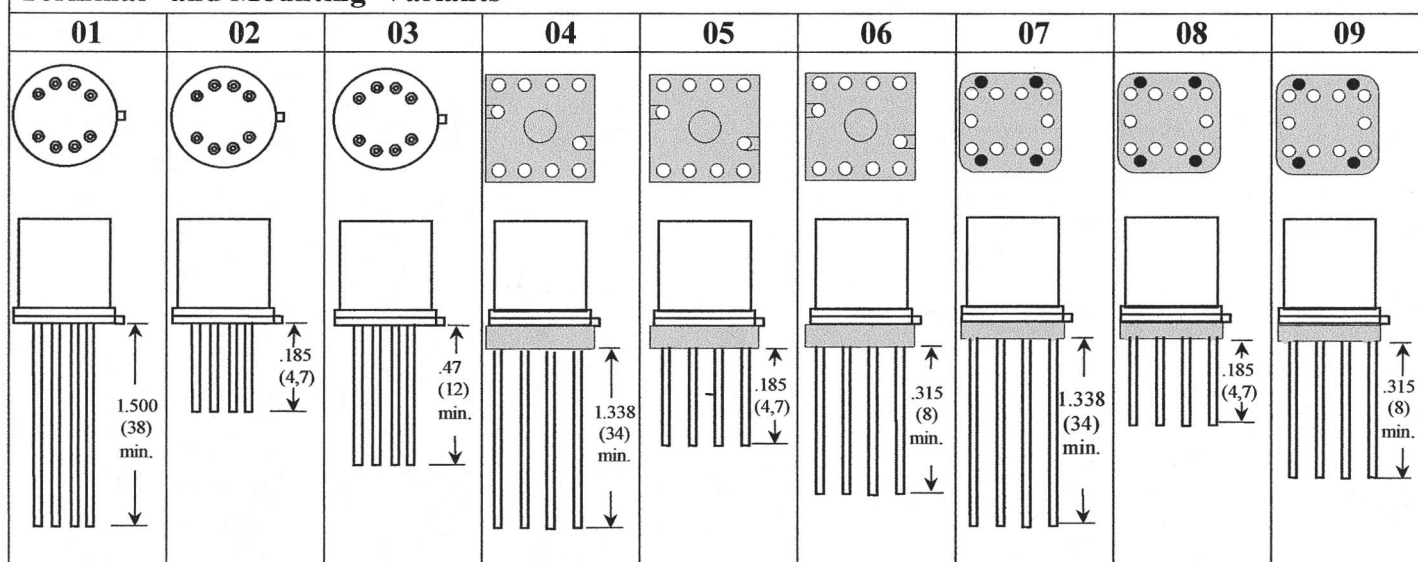
# TO-5 CASE RELAY SENSITIVE DPDT

Series  
MS2

## Typical Characteristics

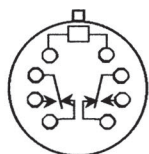
Coil Variant Code	Coil Voltage V dc		Coil Resistance ohms ± 10% at 25 °C	Operated Voltage V dc max. at		Release Voltage V dc			
	Rated	Max.		25 °C	125 °C	Non-release at		Must-release at	
						25 °C	125 °C	25 °C	- 65 °C
01	5,0	7,5	100	2,6	3,5	1,4	2,5	0,23	0,12
02	6,0	10,0	200	3,4	4,5	2,0	3,2	0,28	0,18
03	9,0	15,0	400	4,85	6,8	3,0	4,9	0,55	0,35
04	12,0	20,0	850	7,0	9,0	4,0	6,5	0,64	0,41
05	18,0	30,0	1600	9,8	13,5	6,0	10,0	0,92	0,59
06	26,5	40,0	3300	14,0	18,0	8,0	13,0	1,40	0,89
07	36,0	57,0	6500	20,0	27,0	10,0	19,0	1,80	1,25
08	48,0	75,0	11000	25,8	36,0	13,0	26,0	2,4	1,60

## Terminal and Mounting Variants



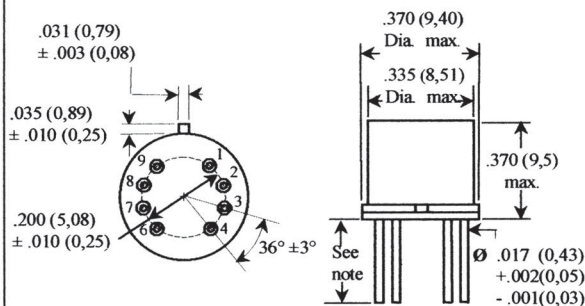
Note : Dimensions are shown in inches (millimetres)

## Schematic Diagram



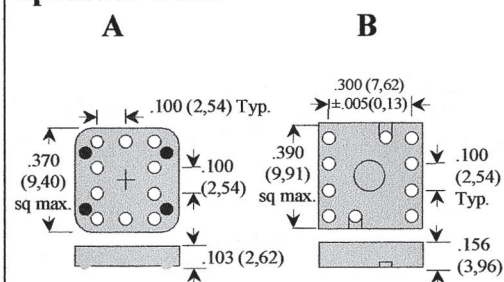
Note:  
-Schematics are viewed from terminals

## Outline Dimensions



Note :  
- Dimensions are shown in inches (millimetres)  
- For terminations see Terminal and Mounting Variants

## Spreader Pads



Note :  
- Spreader Pad type A: material 30% glass filled nylon  
- Spreader Pad type B: material Diallyl Phthalate  
- Dimensions are shown in inches (millimetres)

## How to Order

CECC 16101 -004 -06 -02

CECC Specification No.

Terminal and Mounting Variant

Type Code (CECC registration No.)

Coil Variant Code



# TO-5 CASE RELAY SPDT

Series  
1MA

• Basic • Suppression • Suppression/Steering • Transistor Driven

## Product Description

A series of ultra miniature hermetically sealed relays constructed in a transistor style case, providing superior performance and established reliability characteristics. Available in a variety of sensitivities, contact configurations and hybrid versions to provide a most versatile element to the circuit designer.

The following construction features ensure the highest reliability in extreme environments:

- All welded relay construction
- Cleaning and sealing techniques ensures maximum internal cleanliness
- Low level to 1 amp. switching
- 1 form C, SPDT contacts, special metal alloy with gold plating
- Frame design and force / mass ratio provides exceptional shock and vibration immunity

Low Intercontact capacitance and contact circuit losses, provides also a reliable switching functions in demanding RF applications, combined with small size and low coil power dissipation (see figure 1).

## Series Types (note 2)

- **1MA\*** Basic Relay, 1 form C, SPDT
- **1MA\*D** Basic Relay combined with an internal diode for coil transient suppression
- **1MA\*DD** Basic Relay incorporates two internal diodes for coil transient suppression and polarity reversal protection
- **1MA\*T** Basic Relay incorporating an internal transistor driver and diode for coil transient suppression



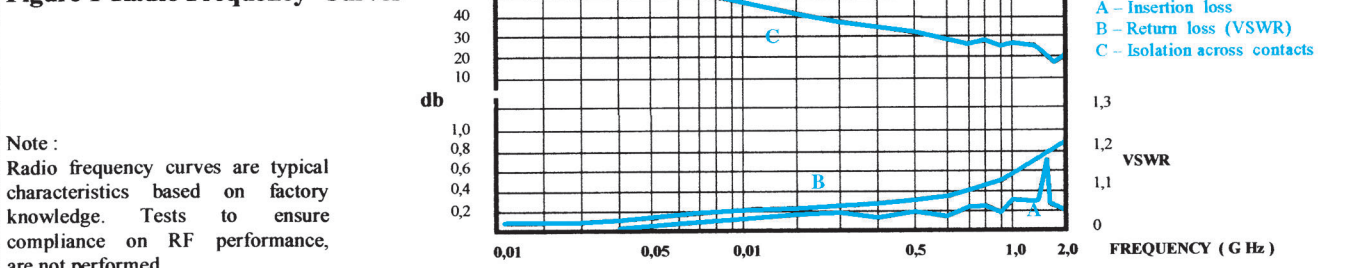
## Environmental and Physical Specifications

Temperature (Ambient)	-65°C to +125°C
Shock	75 g's, 6 msec.
Vibration (sinusoidal)	30 g's, 10 to 3000 Hz
Vibration (random)	0,4 g <sup>2</sup> s / Hz, 50 to 2000 Hz
Acceleration	50 g's
Sealing	All welded, Hermetic
Weight	0,08 oz. (2,27 grams) max.

## Electrical Characteristics (over the Temperature range. Unless otherwise noted)

Coil Data	See Typical Characteristics chart		
Contact Rating	Type Load	Contact Load	Cycles min.
(Note: All ratings with grounded case)	Low Level Resistive	10 to 50 $\mu$ A / 10 to 50 mV	1.000.000
		1 Amp / 28 Vdc	100.000
		250 mA / 115Vac, 60 and 400 Hz (Case not grounded)	100.000
	Resistive overload	100 mA / 115 Vac, 60 and 400 Hz	100.000
		2A / 28 Vdc	100
		Inductive	200 mA / 28 Vdc (320 mH)
Lamp	100 mA / 28 Vdc	100.000	
Contact Resistance	0,1 ohm max. initial, 0,2 ohm max. after life		
Operate Time	2,0 msec. max.		
Release Time	2,0 msec. max. Series: 1MA*	4,0 msec. max. Series: 1MA*D, 1MA*DD, 1MA*T	
Contact Bounce	1,5 msec. max.		
Contact stabilisation Time	2,0 msec. max.		
Dielectric Strength	500 Vrms min., 60 Hz, all points at sea level	125 Vrms min., 60 Hz, all points at 70.000 ft.	
Insulation Resistance	10.000 megohms min. all points at 500 Vdc		
Intercontact Capacitance	0,7 pF typical		
Sensitivity	100 milliwatts at pick-up, 400 milliwatts at nominal rated coil voltage, at 25 °C		
Diode P.I.V.	100 Vdc min. Series : 1MA*D, 1MA*DD, 1MA*T		
Negative Coil Transient	1,0 Vdc max. Series : 1MA*D, 1MA*DD, 1MA*T		
Transistor Characteristics at 25 °C (Series 1MA*T)	Emitter-Base Voltage (Vebo)		6,0 Vdc min.
	Collector-Base Breakdown Voltage (Vcbo) (Ic = 100 $\mu$ A)		80 Vdc min.
	Base Turn-Off Voltage		0,3 Vdc min.

Figure 1-Radio Frequency Curves





# TO-5 CASE RELAY SPDT

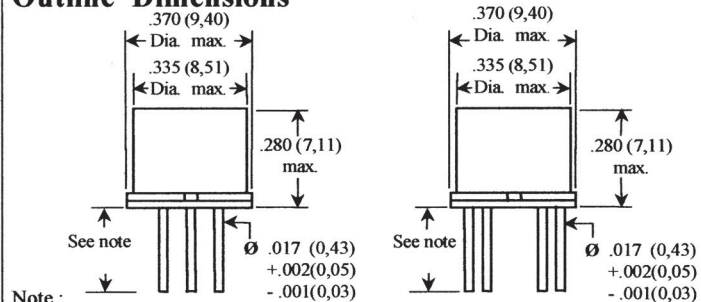
Series  
1MA

• Basic • Suppression • Suppression/Steering • Transistor Driven

## Typical Characteristics (over the Temperature range. Unless otherwise noted)

Description	Measur.	Series Types		Coil Voltage Code					
				5	6	9	12	18	26
Coil Voltage	Vdc	1MA*, 1MA*D, 1MA*DD, 1MA*T	Nom.	5,0	6,0	9,0	12,0	18,0	26,5
		1MA*, 1MA*D, 1MA*DD, 1MA*T	Max.	6,0	8,0	12,0	16,0	24,0	32,0
Coil Resistance at 25°C	ohms	1MA*, 1MA*D, 1MA*T	±10 %	63	125	280	500	1130	2000
		1MA*DD		50	98				
Coil Current at 25°C	mAcd	1MA*DD	Min.	72,7	46,3	25,9	20,0	13,6	11,5
			Max.	100	62,4	33,7	25,6	17,2	14,4
		1MA*T	Min.	66,6	42,0	28,0	20,9	13,8	11,5
			Max.	89,6	55,5	38,3	28,1	18,8	15,5
Pick-up Voltage	Vdc	1MA*, 1MA*D,	Max.	3,7	4,5	6,8	9,0	13,5	18,0
		1MA*DD	Max.	4,5	5,5				
		1MA*T	Max.	3,9	5,2				
Drop-Out Voltage	Vdc	1MA*, 1MA*D, 1MA*DD, 1MA*T	Min.	0,15	0,18	0,35	0,40	0,58	0,89
			Max.	2,4	2,8	4,2	5,6	8,4	10,4
Base Current to Turn-on	mAcd	1MA*T (limit for base / emitter current to 15 mA max.)	Max.	2,38	1,60	1,07	0,80	0,53	0,40

## Outline Dimensions



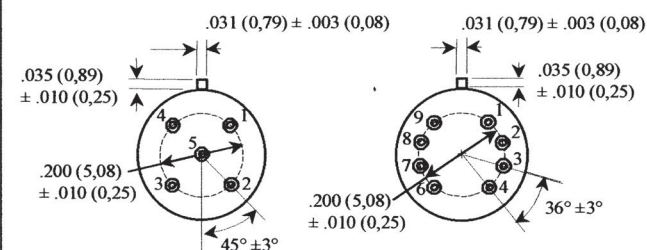
Note:

- Dimensions are shown in inches (millimetres)
- Terminal Variants: - (C) Standard Wire Terminal = .500 (12,7) min, - (W) Long Wire Terminal = 1,500 (38,1) min, - (P) Pin Terminal = .187 ± .010 (4,75 ± 0,25)

## Terminal Locations

Basic and Suppressed

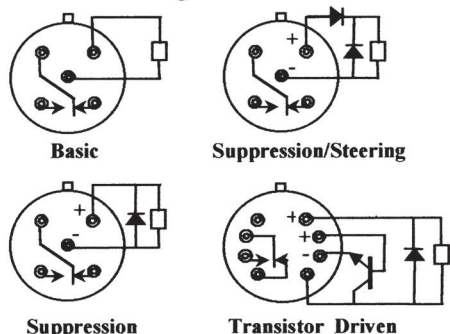
Transistor Driven



Note:

- Dimensions are shown in inches (millimetres)
- Viewed from terminals, numbers are for reference only

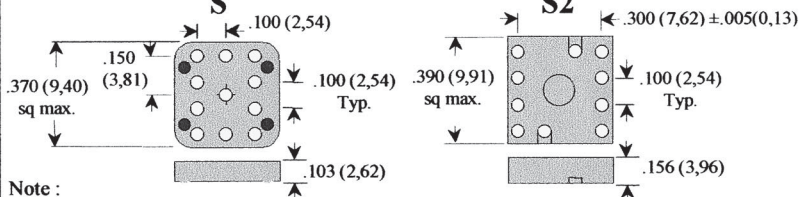
## Schematic Diagrams



Note: Schematics are viewed from terminals

## Spreader Pads

Relays can be supplied with a spreader pad epoxied to the relay header, to prevent the possible shorting of printed circuit board land lines and to facilitate circuit board cleaning. To order relay with pad add, "S" to part Number. Example: 1MAWD - 26AS



Note:

- Dimensions are in inches (millimetres)
- Pad Type S2 is not used on military qualified relays. It is used only on series: 1MA\*T
- Pad Type S is used on series: 1MA\*, 1MA\*D, 1MA\*DD, 1MA\*T

## Note:

1 For qualified relays add, "I" and the applicable suffix for Failure Rate designation.  
Example: I 1MAWD - 26A

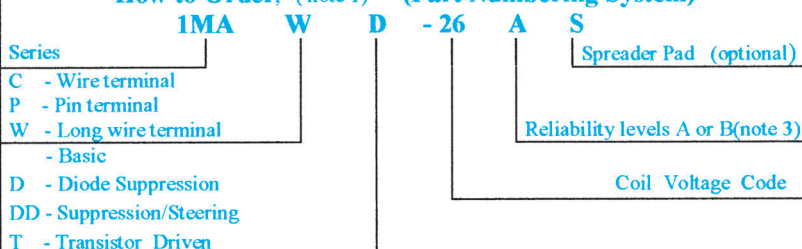
2 "\*" Indicates Terminal Variants: C, P or W

3 Failure Rate (Reliability Level)

Military Suffix	NHIG Suffix	FR %/10.000 cycles
L	A	3,0
M	B	1,0

## How to Order, (note 1)

## (Part Numbering System)



Reliability levels A or B (note 3)

Coil Voltage Code



# TO-5 CASE RELAY SPDT

Series  
1MA1

## Product Description

A series of ultra miniature hermetically sealed relays constructed in a transistor style case, providing superior performance and established reliability characteristics. Available in a variety of sensitivities, contact configurations and hybrid improvements to provide a most versatile element to the circuit designer.

The following construction features ensure the highest reliability in extreme environments:

- All welded relay construction
- Cleaning and sealing techniques ensures maximum internal cleanliness
- Low level to 1 amp. switching
- 1 form C, SPDT contacts, special metal alloy with gold plating
- Frame design and force / mass ratio provides exceptional shock and vibration immunity

Low Intercontact capacitance and contact circuit losses, provides also a reliable switching functions in demanding RF applications, combined with small size and low coil power dissipation (see figure 1).

## Series Type

- 1MA1 1form C, SPDT

## Environmental and Physical Specifications

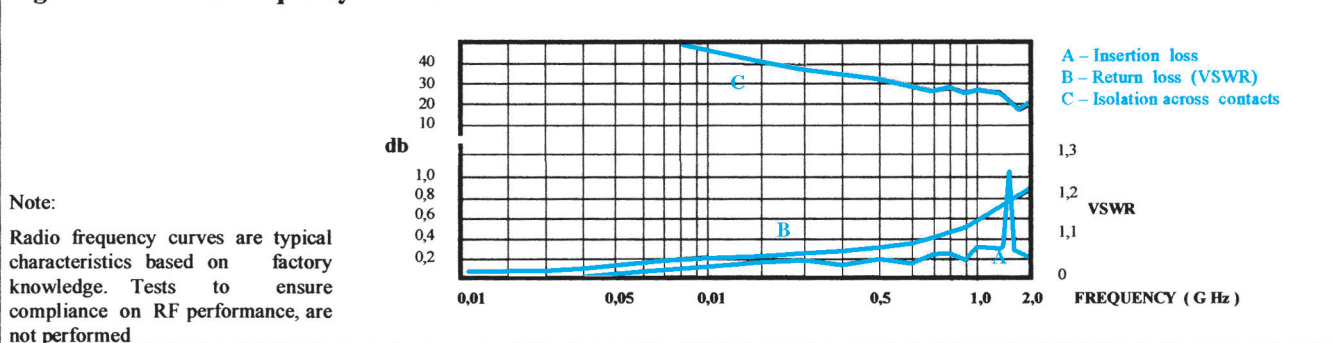
Temperature (Ambient)	-65°C to + 125°C
Shock	75 g's, 6 msec., half sine wave
Vibration (sinusoidal)	30 g's, 10 to 2000 Hz, 1,5 amplitude peak
Bump	40 g's, 6 msec.,
Sealing	All welded, Hermetic
Weight	0,08 oz. (2,27 grams) max.
Finish	Bright tin lead plated terminations and case



## Electrical Characteristics (over the Temperature range, unless otherwise noted)

Coil Data	See Typical Characteristics chart		
Contact Rating  (Note : All ratings with grounded case)	Type Load	Contact Load	Cycles min.
	Low Level	10 mA / 30 mV	1.000.000
	Resistive	1 Amp / 28 Vdc,	100.000
	Resistive Overload	2 Amp / 28 Vdc	100
	Inductive	0,1 Amp / 28 Vdc (320 mH)	100.000
Contact Resistance	0,1 ohm max. initial, 0,2 ohm max after life		
Operate Time	2,5 msec. max. at 25°C		
Release Time	2,0 msec. max. at 25°C		
Contact Bounce	2,0 msec. max. at 25°C		
Dielectric Strength	500 Vrms min. , 60 Hz, all points at sea level		
Insulation Resistance	10.000 megohms min. all points at 500 Vdc		
Intercontact Capacitance	0.7 pF typical		
Sensitivity	100 milliwatts at pick-up, 400 milliwatts at nominal rated coil voltage at 25 °C		

Figure 1 - Radio Frequency Curves







# TO-5 CASE RELAY SPDT

Series  
1MA1

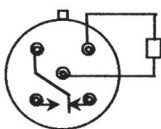
## Typical Characteristics

Coil Variant Code	Coil Voltage V dc		Coil Resistance ohms ± 10% at 25 °C	Operated Voltage V dc Max. at		Release Voltage V dc			
	Rated	Max.		25 °C	125 °C	Non-release at		Must-release at	
						25 °C	125 °C	25 °C	- 65 °C
01	5,0	6,0	63	2,8	3,7	1,7	2,4	0,23	0,15
02	6,0	8,0	125	3,5	4,5	2,0	2,8	0,28	0,18
03	9,0	12,0	280	5,3	6,8	3,0	4,2	0,54	0,35
04	12,0	16,0	500	7,0	9,0	4,0	5,6	0,63	0,40
05	18,0	24,0	1130	10,5	13,5	6,0	8,4	0,91	0,58
06	26,5	32,0	2000	14,2	18,0	8,0	10,4	1,37	0,89

## Terminal Variants

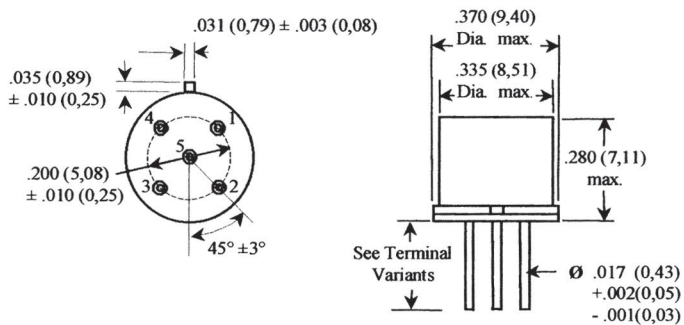
01	02	03
<p>Note : - Dimensions are shown in inches (millimetres)</p>		

## Schematic Diagram



Note : - Schematics are viewed from terminals

## Outline Dimensions



Note : -Dimensions are shown in inches (millimetres)

## How to Order

CECC 16101 - 005 - 06 - 02

CECC Specification No.

Terminal Variant

Type Code (CECC registration No.)

Coil Variant Code



# TO-5 CASE RELAY SENSITIVE SPDT

Series  
1MS

• Basic • Suppression • Suppression/Steering • Transistor Driven

## Product Description

A series of ultra miniature hermetically sealed relays constructed in a transistor style case, providing superior performance and established reliability characteristics. Available in a variety of sensitivities, contact configurations and hybrid improvements to provide a most versatile element to the circuit designer.

The following construction features ensure the highest reliability in extreme environments:

- All welded relay construction
- Cleaning and sealing techniques ensures maximum internal cleanliness
- Low level to 1 amp. switching
- 1 form C, SPDT contacts, special metal alloy with gold plating
- Frame design and force / mass ratio provides exceptional shock and vibration immunity

Low Intercontact capacitance and contact circuit losses, provides also a reliable switching functions in demanding RF applications, combined with small size and low coil power dissipation (see figure 1).

## Series Types (note 2)

- **1MS\*** Basic Relay, 1 form C, SPDT
- **1MS\*D** Basic Relay combined with an internal diode for coil transient suppression
- **1MS\*DD** Basic Relay incorporates two internal diodes for coil transient suppression and polarity reversal protection
- **1MS\*T** Basic Relay incorporating an internal transistor driver and diode for coil transient suppression



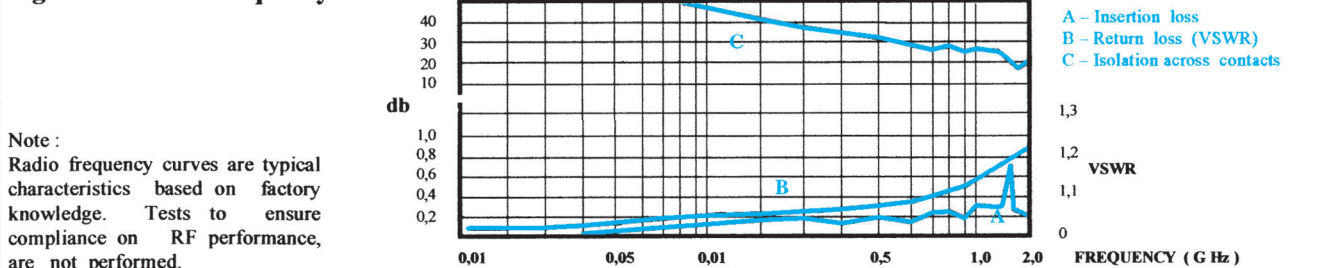
## Environmental and Physical Specifications

Temperature (Ambient)	-65°C to +125°C
Shock	75 g's, 6 msec.
Vibration (sinusoidal)	30 g's, 10 to 3000 Hz
Vibration (random)	0,4 g <sup>2</sup> /s / Hz, 50 to 2000 Hz
Acceleration	50 g's
Sealing	All welded, Hermetic
Weight	0,10 oz. (2,84 grams) max.

## Electrical Characteristics (over the Temperature range, unless otherwise noted)

Coil Data	See Typical Characteristics chart		
Contact Rating	Type Load	Contact Load	Cycles min.
(Note : All ratings with grounded case)	Low Level	10 to 50 $\mu$ A / 10 to 50 mV	1.000.000
	Resistive	1 Amp / 28 Vdc 250 mA / 115Vac, 60 and 400 Hz (Case not grounded)	100.000
		100 mA / 115 Vac, 60 and 400 Hz	100.000
	Resistive overload	2A / 28 Vdc	100
	Inductive	200 mA / 28 Vdc (320 mH)	100.000
	Lamp	100 mA / 28 Vdc	100.000
Contact Resistance	0,1 ohm max. initial, 0,2 ohm max after life		
Operate Time	4,0 msec. max. Series : 1MS*, 1MS*D, 1MS*DD		3,5 msec. max. Series 1MS*T
Release Time	2,5 msec. max. Series: 1MS*		7,5 msec. max. Series: 1MS*D, 1MS*DD, 1MS*T
Contact Bounce	1,5 msec. max.		
Contact stabilisation Time	2,0 msec max		
Dielectric Strength	500 Vrms min., 60 Hz, all points at sea level		125 Vrms min., 60 Hz, all points at 70.000 ft.
Insulation Resistance	10.000 megohms min. all points at 500 Vdc		
Intercontact Capacitance	0,7 pF typical		
Sensitivity	40 milliwatts at pick-up, 200 milliwatts at nominal rated coil voltage, at 25 °C		
Diode P.I.V.	100 Vdc min. Series : 1MS*D, 1MS*DD, 1MS*T		
Negative Coil Transient	1,0 Vdc max. Series : 1MS*D, 1MS*DD, 1MS*T		
Transistor Characteristics at 25 °C (Series 1MS*T)	Emitter-Base Voltage (Vebo)		6,0 Vdc min.
	Collector-Base Breakdown Voltage (Vcbo) (Ic = 100 $\mu$ A)		80 Vdc min
	Base Turn-Off Voltage		0,3 Vdc min.

Figure 1 - Radio Frequency Curves





# TO-5 CASE RELAY SENSITIVE SPDT

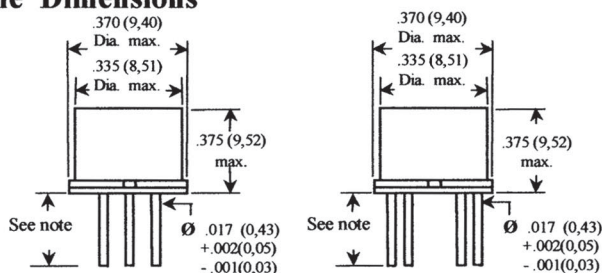
Series  
1MS

• Basic • Suppression • Suppression/Steering • Transistor Driven

## Typical Characteristics (over the Temperature range, unless otherwise noted)

Description	Measur.	Series Types		Coil Voltage Code							
				5	6	9	12	18	26	32	40
Coil Voltage	Vdc	1MS*,1MS*D, 1MS*DD,1MS*T	Nom.	5,0	6,0	9,0	12,0	18,0	26,5	32,0	40,0
		1MS*,1MS*D,1MS*DD, 1MS*T	Max.	8,0	11,0	16,0	22,0	33,0	45,0	57,0	75,0
Coil Resistance at 25°C	ohms	1MS*, 1MS*D, 1MS*T	±10%	125	255	630	1025	2300	4000	6500	11000
		1MS*DD		100	200						
Coil Current at 25°C	mAdc	1MS*DD	Min.	36,3	22,7	11,5	9,7	6,7	5,7	4,3	3,2
			Max.	50,0	30,6	15,0	12,5	8,5	7,2	5,4	4,0
		1MS*T	Min.	34,7	21,2	11,8	10,1	6,7	5,7	4,2	3,1
			Max.	47,8	27,7	16,8	13,6	9,1	7,7	5,8	4,3
Pick-up Voltage	Vdc	1MS*, 1MS*D	Max.	3,7	4,5	6,8	9,0	13,5	18,0	24,0	30,0
		1MS*DD	Max.	4,5	5,5	7,8	10,0	14,5	19,0	21,0	27,0
		1MS*T	Max.	3,6	4,8				24,0	30,0	
Drop-Out Voltage	Vdc	1MS*, 1MS*D, 1MS*T	Min.	0,15	0,18	0,35	0,41	0,58	0,89	1,0	1,3
			Max.	2,0	2,8	4,2	5,6	8,4	10,4	15,0	18,7
		1MS*DD	Min.	0,15	0,18	0,35	0,40	0,58	0,89	0,95	1,28
			Max.	2,4	2,8	4,2	5,6	8,4	10,4	12,6	15,7
Base Current to Turn-on	mAdc	1MS*T (limit for base / emitter current to 15 mA max.)	Max.	1,2	0,78	0,48	0,39	0,26	0,20	0,16	0,13

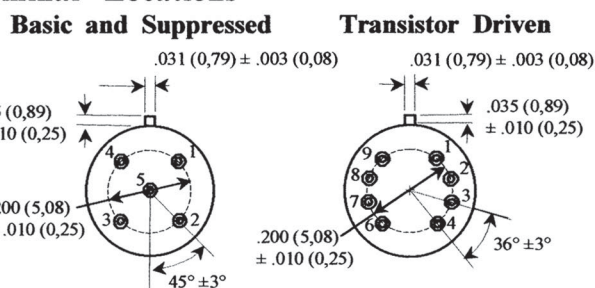
### Outline Dimensions



Note:

- Dimensions are shown in inches (millimetres)
- Terminal Variants: - (C) Standard Wire Terminal = .500 (12,7) min.
- (W) Long Wire Terminal = 1.500 (38,1) min.
- (P) Pin Terminal = .187 ± .010 (4,75 ± 0,25)

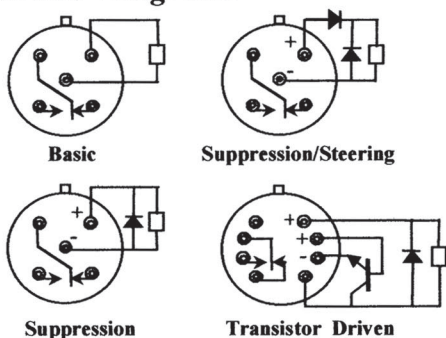
### Terminal Locations



Note:

- Dimensions are shown in inches (millimetres)
- Viewed from terminals, numbers are for reference only

### Schematic Diagrams



Note: Schematics are viewed from terminals

### Note:

1 For qualified relays add, "I" and the applicable suffix for Failure Rate designation.  
Example: I IMSWD - 26A

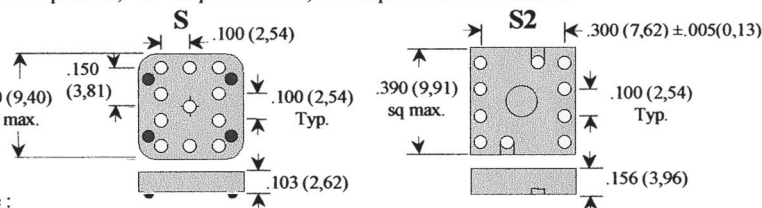
2 "\*" Indicates Terminal Variants: C, P or W

3 Failure Rate (Reliability Level)

Military Suffix	NHIG Suffix	F R %/10.000 cycles
L	A	3,0
M	B	1,0

### Spreader Pads

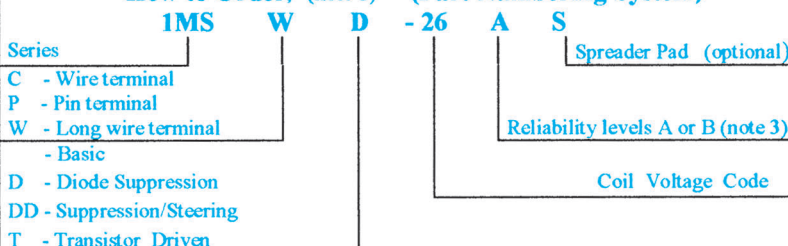
Relays can be supplied with a spreader pad epoxied to the relay header, to prevent the possible shorting of printed circuit board land lines and to facilitate circuit board cleaning. To order relay with pad add, "S" to part Number. Example: 1MSWD - 26AS



Note:

- Dimensions are in inches (millimetres)
- Pad Type S2 is not used on military qualified relays. It is used only on series 1MS\*T
- Pad Type S is used on series: 1MS\*, 1MS\*D, 1MS\*DD, 1MS\*T

### How to Order, (note 1) (Part Numbering System)





# TO-5 CASE RELAY SENSITIVE SPDT

Series  
1MS1

## Product Description

A series of ultra miniature hermetically sealed relays constructed in a transistor style case, providing superior performance and established reliability patterns. Available in a variety of sensitivities, contact configurations and hybrid versions to provide a most versatile element to the circuit designer.

The following construction features ensure the highest reliability in extreme environments:

- All welded relay construction
- Cleaning and sealing techniques ensures maximum internal cleanliness
- Low level to 1 amp. switching
- 1 form C, SPDT contacts, special metal alloy with gold plating
- Frame design and force / mass ratio provides exceptional shock and vibration immunity

Low Intercontact capacitance and contact circuit losses, provides also reliable switching functions in demanding RF applications, combined with small size and low coil power dissipation (see figure 1).

## Series Type

- 1MS1 1 form C, SPDT

## Environmental and Physical Specifications

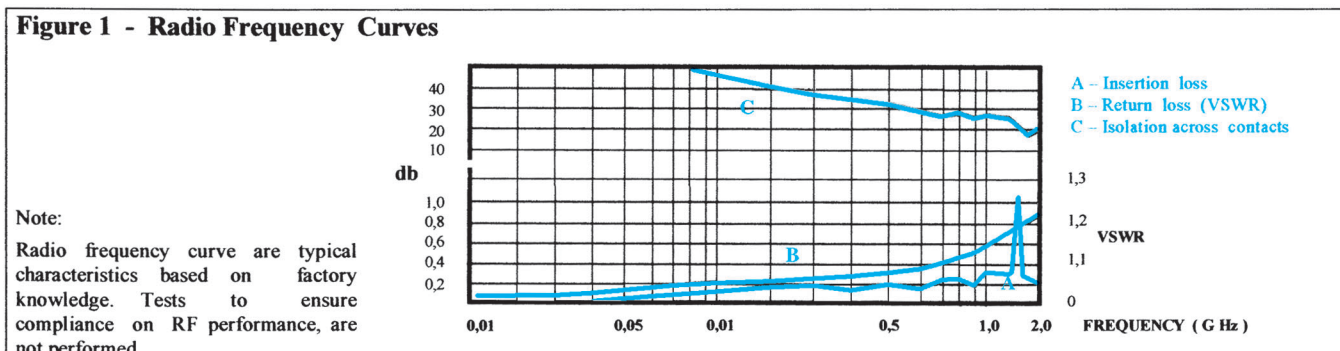
Temperature (Ambient)	-65°C to +125°C
Shock	75 g's, 6 msec., half sine wave
Vibration (sinusoidal)	30 g's, 10 to 2000 Hz, 1,5 amplitude peak
Bump	40 g's, 6 msec.,
Sealing	All welded, Hermetic
Weight	0,1 oz. (2,84 grams) max.
Finish	Bright tin lead plated terminals and case



## Electrical Characteristics (over the temperature range, unless otherwise noted)

Coil Data	See Typical Characteristics chart		
Contact Rating  (Note : All ratings with grounded case)	Type Load	Contact Load	Cycles min.
	Low Level	10 mA / 30 mV	1.000.000
	Resistive	1 Amp / 28 Vdc,	100.000
	Resistive Overload	2 Amp / 28 Vdc	100
	Inductive	0,1 Amp / 28 Vdc (320 mH)	100.000
Contact Resistance	0,1 ohm max. initial, 0,2 ohm max. after life		
Operate Time	4,5 msec. max. at 25°C		
Release Time	3,0 msec. max. at 25°C		
Contact Bounce	2,0 msec. max. at 25°C		
Dielectric Strength	500 Vrms min. , 60 Hz, all points at sea level		
Insulation Resistance	10.000 megohms min. all points at 500 Vdc		
Intercontact Capacitance	0.7 pF typical		
Sensitivity	50 milliwatts at pick-up, 200 milliwatts at nominal rated coil voltage, at 25 °C		

Figure 1 - Radio Frequency Curves





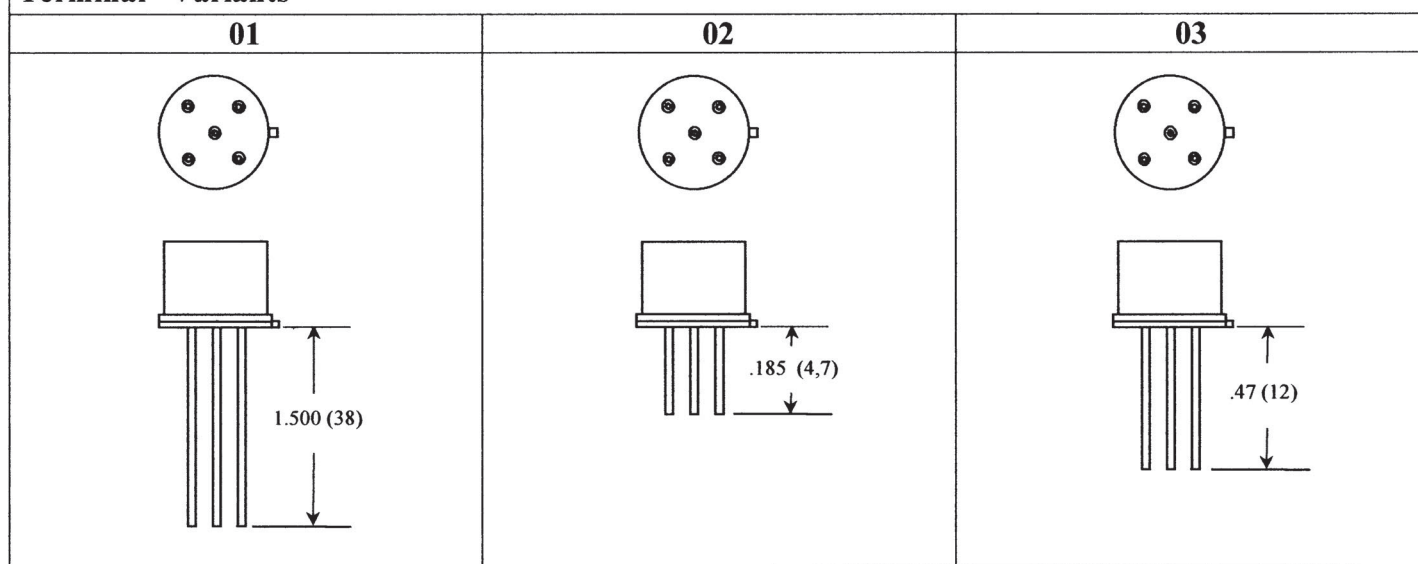
# SENSITIVE TO-5 CASE RELAY SPDT

Series  
1MS1

## Typical Characteristics

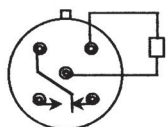
Coil Variant Code	Coil Voltage V dc		Coil Resistance ohms ± 10% at 25 °C	Operated Voltage V dc Max. at		Release Voltage V dc			
	Rated	Max.		25 °C	125 °C	Non-release at		Must-release at	
						25 °C	125 °C	25 °C	-65 °C
01	5,0	8,0	125	2,8	3,7	1,4	2,4	0,23	0,15
02	6,0	11,0	255	3,5	4,5	2,0	2,8	0,28	0,18
03	9,0	16,0	630	5,3	6,8	3,0	4,2	0,54	0,35
04	12,0	22,0	1025	7,0	9,0	4,0	5,6	0,63	0,40
05	18,0	33,0	2300	10,5	13,5	6,0	8,4	0,91	0,58
06	26,5	45,0	4000	14,2	18,0	8,0	10,4	1,37	0,89
07	32,0	57,0	6500	18,7	24,0	10,6	15,0	1,59	1,0
08	40,0	75,0	11000	23,3	30,0	13,3	18,7	2,0	1,3

## Terminal Variants



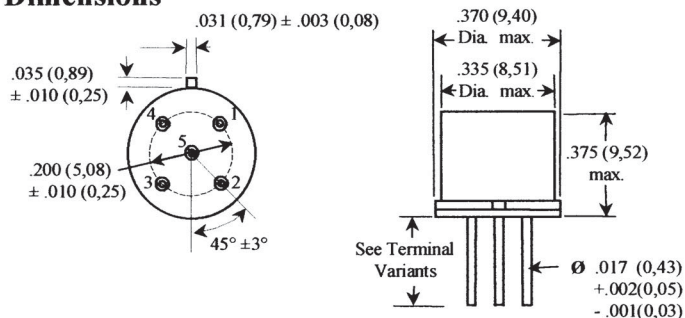
Note : - Dimensions are shown in inches (millimetres)

## Schematic Diagram



Note : - Schematics are viewed from terminals

## Outline Dimensions



Note : - Dimensions are shown in inches (millimetres)

## How to Order

CECC 16101 -006 -06 -02

CECC Specification No.

Terminal Variant

Type Code (CECC registration No.)

Coil Variant Code



# •100 GRID TERMINAL RELAY DPDT

Series  
MGA

• Basic • Suppression • Suppression/Steering

## Product Description

A series of ultra miniature hermetically sealed relays with .100 inch grid spaced terminations. These relays are similar to MA series TO-5 relays construction.

The following construction features ensure the highest reliability in extreme environments:

- All welded relay construction
- Cleaning and sealing techniques ensures maximum internal cleanliness
- Low level to 1 amp. switching
- 2 form C, DPDT contacts, special metal alloy with gold plating
- SMD terminal style available
- Frame design and force / mass ratio provides exceptional immunity to shock and vibration

Low Intercontact capacitance and contact circuit losses, provides also a reliable switching function in demanding RF applications, combined with small size and low coil power dissipation (see figure 1).

## Series Types (note 2)

- MGA\* Basic Relay, 2 form C, DPDT
- MGA\*D Basic Relay combined with an internal diode for coil transient suppression
- MGA\*DD Basic Relay incorporates two internal diodes for coil transient suppression and polarity reversal protection

## Environmental and Physical Specifications

Temperature (Ambient)	-65°C to +125°C
Shock	75 g's, 6 msec.
Vibration (sinusoidal)	30 g's, 10 to 3000 Hz
Vibration (random)	0,4g <sup>2</sup> /s/Hz, 50 to 2000 Hz
Acceleration	50 g's
Sealing	All welded, Hermetic
Weight	0.09 oz. (2.55 grams) max.

MIL-PRF-39016/17, 18 & 19

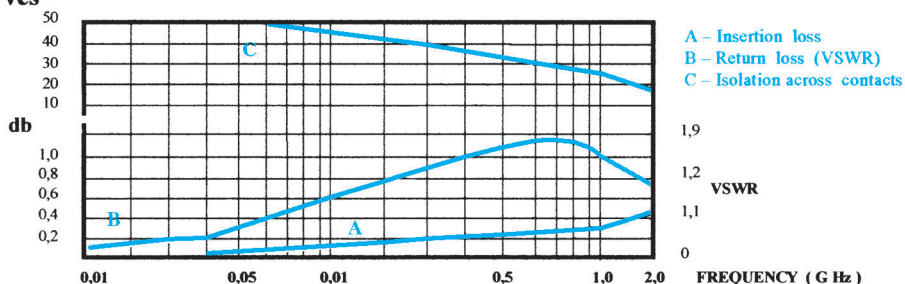


## Electrical Characteristics (over the Temperature range, unless otherwise noted)

Coil Data	See Typical Characteristics table		
Contact Rating  (Note: All ratings with grounded case)	Type Load	Contact Load	Cycles min.
	Low Level Resistive	10 to 50 $\mu$ A / 10 to 50 mV	
Resistive overload	1 Amp / 28 V dc		100.000
	250 mA / 115 Vac, 60 and 400 Hz (case not grounded)		100.000
	100 mA / 115 Vac, 60 and 400 Hz		100.000
	2 Amp / 28 V dc		100
Inductive	200 mA / 28 V dc (320 mH)		100.000
Lamp	100 mA / 28 Vdc		100.000
Contact Resistance	0,1 ohm max. initial, 0,2 ohm max after life		
Operate Time	2,0 msec. max.		
Release Time	1,5 msec. max. Series: MGA*	4,0 msec. max. Series: MGA*D, MGA*DD	
Contact Bounce	1,5 msec. max.		
Contact stabilisation Time	2,5 msec max		
Dielectric Strength	500 Vrms min., 60 Hz, all points at sea level	125 Vrms min., 60 Hz, all points at 70.000 ft.	
Insulation Resistance	10.000 megohms min. all points at 500 Vdc		
Intercontact Capacitance	0,4 pF typical		
Sensitivity	130 milliwatts at pick-up, 500 milliwatts at nominal rated coil voltage at 25 °C		
Diode P.I.V.	100 Vdc min. Series : MGA*D, MGA*DD		
Negative Coil Transient	1,0 Vdc max. Series: MGA*D, MGA*DD		

Figure 1 - Radio Frequency Curves

Note:  
Radio frequency curves are typical characteristics based on factory knowledge. Tests to ensure compliance on RF performance, are not performed.





# •100 GRID TERMINAL RELAY DPDT

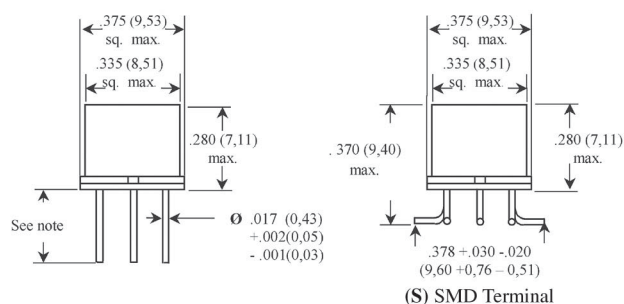
Series  
MGA

• Basic • Suppression • Suppression/Steering

## Typical Characteristics (over the Temperature range, unless otherwise noted)

Coil Voltage Code	Series Types	Coil Voltage V dc		Coil Resistance ohms at 25 °C ±10 %	Coil Current mA, at 25°C		Pick-up Voltage V dc Max.	Drop-out Voltage V dc	
		Rated	Max.		Min.	Max.		Max.	Min.
5	MGA*, MGA*D	5,0	5,8	50	-	-	3,5	2,3	0,14
	MGA*DD			39	93,2	128,2		4,0	2,8
6	MGA*, MGA*D	6,0	8,0	98	-	-	4,5	3,2	0,18
	MGA*DD			78	58,3	78,3		5,0	3,4
9	MGA*, MGA*D	9,0	12,0	220	-	-	6,8	4,9	0,35
	MGA*DD			33,0	42,9	42,9		7,8	5,3
12	MGA*, MGA*D	12,0	16,0	390	-	-	9,0	6,5	0,41
	MGA*DD			25,6	32,8	32,8		10,0	0,9
18	MGA*, MGA*D	18,0	24,0	880	-	-	13,5	10,0	0,59
	MGA*DD			17,5	22,1	22,1		14,5	1,1
26	MGA*, MGA*D	26,5	32,0	1560	-	-	18,0	13,0	0,89
	MGA*DD			14,8	18,5	18,5		19,0	1,4

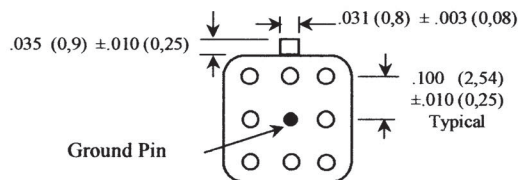
## Outline Dimensions



Note:

- Dimensions are shown in inches (millimetres)
- Terminal Variants: - (C) Wire Terminal = .500 (12,7) min.
- (P) Pin Terminal = .187 ± .01 (4,75 ± 0,25)

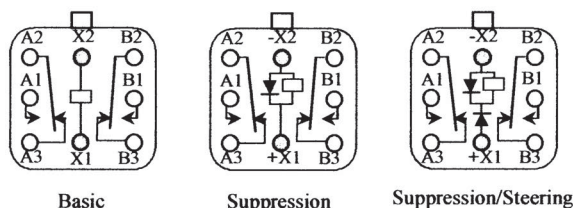
## Terminal Locations



Note :

- Viewed from terminals
- Ground pin is optional
- Dimensions are shown in inches (millimetres)

## Schematic Diagrams

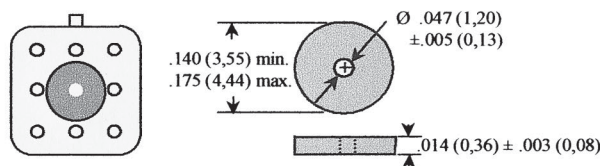


Note:

Schematics are viewed from terminals, numbers are for references only

## Mounting Pad

Relays can be supplied with a mounting pad epoxied to the relay header, to prevent the possible shorting of printed circuit board land lines and to facilitate circuit board cleaning. To order relay with pad add. W to part Number. Example : MGACD-26 W



Note : Dimensions are in inches (millimetres)

Note:

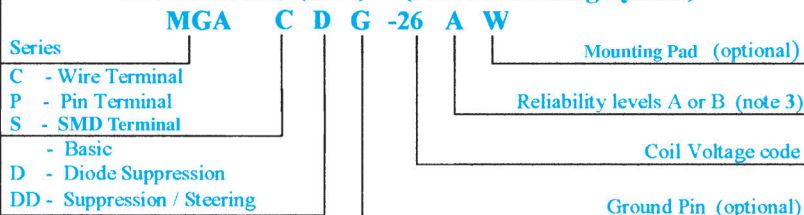
1 For qualified relays add. " I " and the applicable suffix for Failure Rate designation.  
Example: IMGACD - 26A

2 " \* " Indicates Terminal Variants: C, P or S

3 Failure Rate ( Reliability Level )

Military Suffix	NHIG Suffix	F R %/10.000 cycles
L	A	3,0
M	B	1,0

## How to Order. (note 1) (Part Numbering System)





# .100 GRID TERMINAL RELAY DPDT

Series  
MGA2

• Basic • Suppression

## Product Description

A series of ultra miniature hermetically sealed relays with .100 inch grid spaced terminations. These relays are similar to MA series TO-5 relays construction.

The following construction features ensure the highest reliability in extreme environments:

- All welded relay construction
- Cleaning and sealing techniques ensures maximum internal cleanliness
- Low level to 1 amp. switching
- 2 form C, DPDT contacts, special metal alloy with gold plating
- Frame design and force / mass ratio provides exceptional immunity to shock and vibration

Low Intercontact capacitance and contact circuit losses, provides also a reliable switching function in demanding RF applications, combined with small size and low coil power dissipation (see figure 1).

## Series Types

- MGA2 Basic Relay, 2 form C, DPDT
- MGAD2 Basic relay combined with an internal diode for coil suppression

## Environmental and Physical Specifications

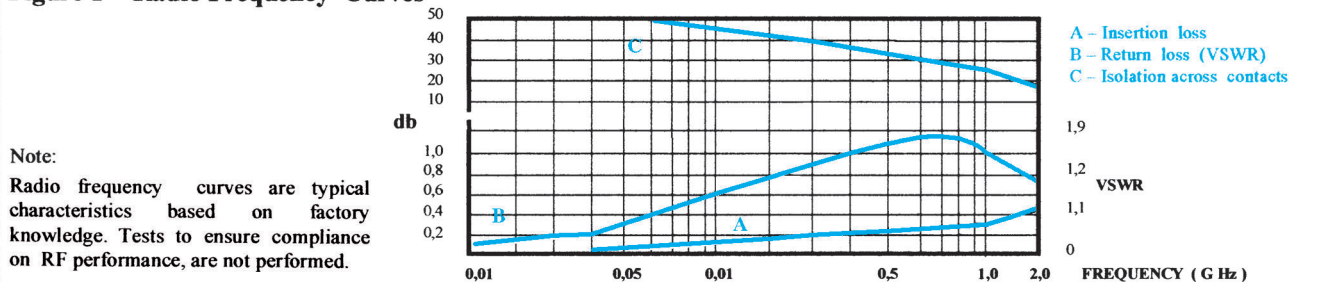
Temperature (Ambient)	-65°C to +125°C
Shock	100 g's, 6 msec., half sine wave
Vibration (sinusoidal)	30 g's, 10 to 3000 Hz, 2,5 peak amplitude
Vibration (random)	0,2 g <sup>2</sup> /s/Hz, 20 to 2000 Hz
Bump	40 g's, 6 msec., half sine wave
Sealing	All welded, Hermetic
Weight	0,09 oz. (2,55 grams) max.
Finish	Bright tin lead plated terminations and case



## Electrical Characteristics (over the Temperature range, unless otherwise noted)

Coil Data	See Typical Characteristics chart		
Contact Rating  (Note : All ratings with grounded case)	Type Load	Contact Load	Cycles min.
	Low Level	30 μ A / 10 to 30 mV	1.000.000
	Resistive	1 Amp / 28 Vdc	100.000
	Inductive	0,2 Amp / 28Vdc (320 mH)	100.000
	Lamp	0,1 Amp / 28 Vdc	100.000
	Intermediate	0,1 Amp / 28 Vdc	50.000
	Resistive overload	2 Amp / 28 Vdc	100
	Inductive overload	0,4 Amp / 28Vdc (320 mH)	100
Contact Resistance	0,1 ohm max. initial, 0,2 ohm max after life		
Operate Time	2,0 msec. max.		
Release Time	1,5 msec. max. series MGA2	4,0 msec. max. series MGAD2	
Contact Bounce	1,5 msec. max.		
Contact stabilisation Time	2,5 msec. max.		
Dielectric Strength	500 Vrms min, 60 Hz, all points at sea level	250 Vrms min., 60 Hz, all points at 26,000 mt.	
Insulation Resistance	10.000 megohms min. all points at 500 Vdc		
Intercontact Capacitance	0,4 pF typical		
Sensitivity	140 milliwatts at pick-up, 500 milliwatts at nominal rated coil voltage, max. at 25 °C		
Diode P.I.V.	100 Vdc min. Series MGAD2		
Negative Coil Transient	1,0 Vdc max. Series MGAD2		

Figure 1 - Radio Frequency Curves







# •100 GRID TERMINAL RELAY DPDT

Series  
MGA2

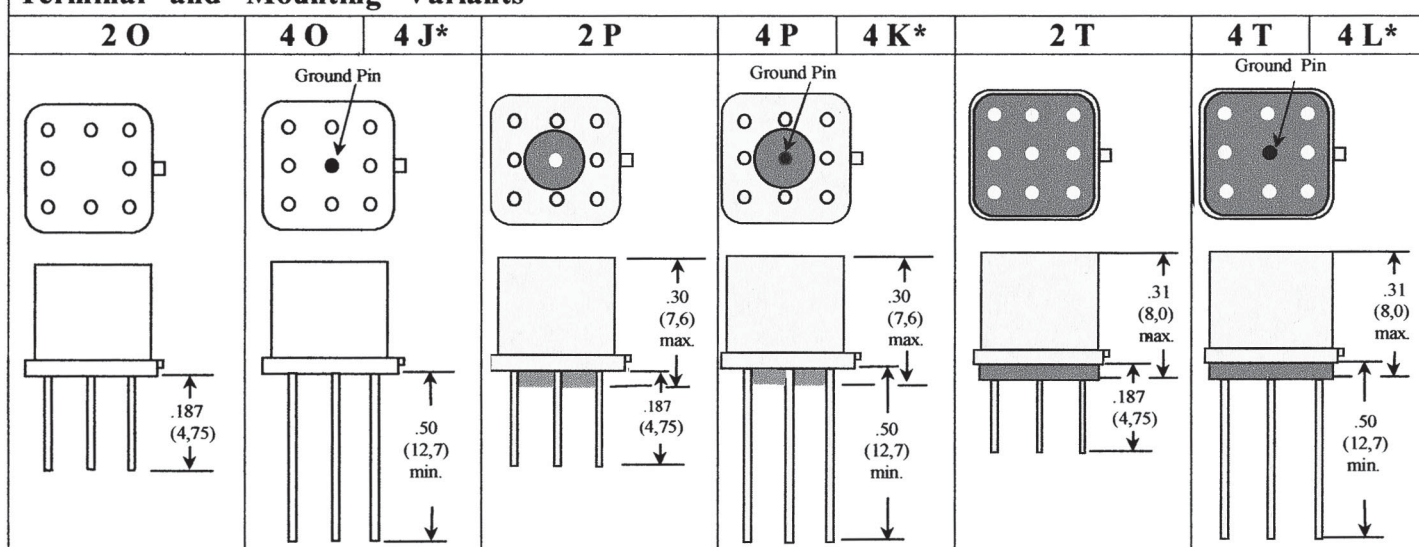
• Basic • Suppression

## Typical Characteristics

Identification letter of the Coil	Coil Voltage V dc		Coil resistance ohms ± 10% at 23 °C	Must Operated Voltage Vdc		Release Voltage V dc				Coil Transient Suppression Code No. *
	Rated	Max.		23 °C	125 °C	Max.		Min.		
						23 °C	125 °C	23 °C	-65 °C	
A	5.0	5.8	50	2.7	3.5	1.4	2.3	0.22	0.14	1
B	6.0	8.0	98	3.5	4.5	2.0	3.2	0.28	0.18	1
C	9.0	12.0	220	5.3	6.8	3.0	4.9	0.54	0.35	1
D	12.0	16.0	390	7.0	9.0	4.0	6.5	0.63	0.41	1
E	18.0	24.0	880	10.5	13.5	6.0	10.0	0.91	0.59	1
G	28.0	29.0	1560	14.2	18.0	8.0	13.0	1.37	0.89	1

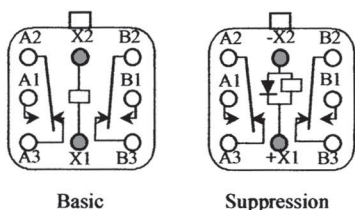
Note : -\* Without the Coil Transient Suppression diode, the Code Number is 0

## Terminal and Mounting Variants



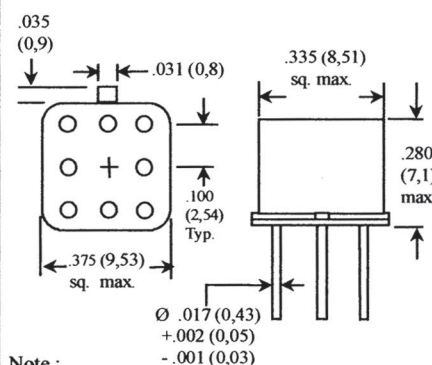
Note : - Dimensions are shown in inches (millimetres) \* - Relay with ground Pin

## Schematic Diagrams



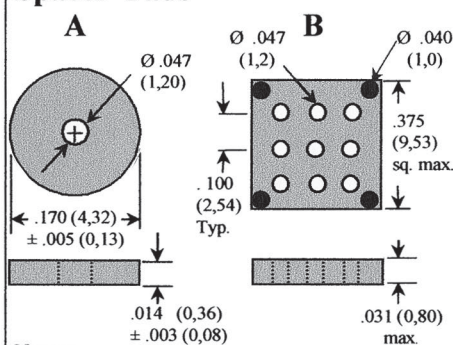
Note :  
- Schematics are viewed from terminals  
- Diagram references are not marked on the relay

## Outline Dimensions



Note :  
Dimensions are shown in inches (millimetres)

## Spacer Pads



Notes :  
- Spacer Pad type A : material Polyester  
- Spacer Pad type B : Diallyl Phthalate  
- Dimensions are shown in inches (millimetres)

## How to Order

CECC Specification No.	CECC 16207	-007	Y	A	2	P	1	
Type Code (CECC registration No.)								Coil transient suppression
Assessment Level								Mounting Variant
Coil Variant Code (Identification letter, see table)								Terminal Variant



# •100 GRID TERMINAL RELAY SENSITIVE DPDT

Series  
MGS

- Basic
- Suppression
- Suppression/Steering

## Product Description

A series of ultra miniature hermetically sealed relays with .100 inch grid spacer terminations. These relays are similar to MS series TO-5 relays construction.

The following construction features ensure the highest reliability in extreme environments:

- All welded relay construction
  - Cleaning and sealing techniques ensures maximum internal cleanliness
  - Low level to 1 amp. switching
  - SMD terminal style available
  - 2 form C, DPDT contacts, special metal alloy with gold plating
  - Frame design and force / mass ratio provides exceptional shock and vibration immunity
- Low Intercontact capacitance and contact circuit losses, provides also a reliable switching functions in demanding RF applications, combined with small size and low coil power dissipation (see figure 1).

## Series Types (note 2)

- **MGS\*** Basic Relay, 2 form C, DPDT
- **MGS\*D** Basic Relay combined with an internal diode for coil transient suppression
- **MGS\*DD** Basic Relay incorporates two internal diodes for coil transient suppression and polarity reversal protection

## Environmental and Physical Specifications

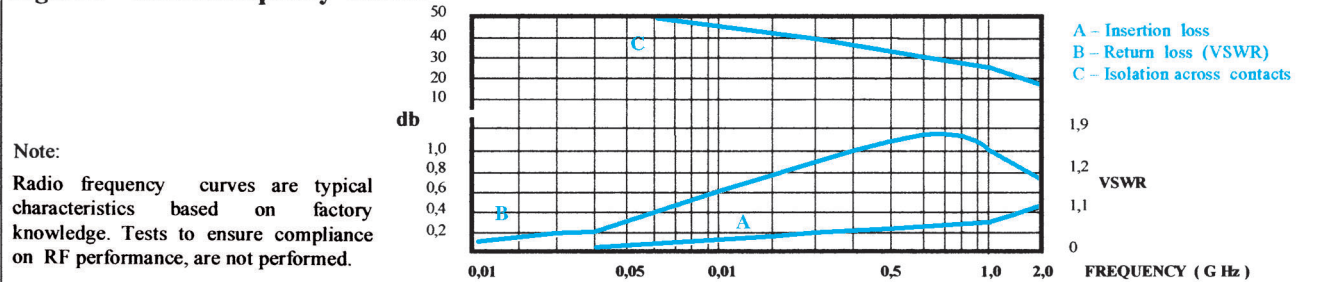
Temperature (Ambient)	-65°C to +125°C
Shock	75 g's, 6 msec.
Vibration (sinusoidal)	30 g's, 10 to 3000 Hz
Vibration (random)	0'4 g <sup>2</sup> s / Hz, 50 to 2000 Hz
Acceleration	50 g's
Sealing	All welded, Hermetic
Weight	0.15 oz. (4.3 grams) max.



## Electrical Characteristics (over the Temperature range, unless otherwise noted)

<b>Coil Data</b>	See Typical Characteristics chart		
<b>Contact Rating</b>  (Note: All ratings with grounded case)	<b>Type Load</b>	<b>Contact Load</b>	<b>Cycles min.</b>
	Low Level Resistive	10 to 50 $\mu$ A / 10 to 50 mV 1 Amp / 28 V dc 250 mA / 115 Vac, 60 and 400 Hz (Case not grounded) 100 mA / 115 Vac, 60 and 400 Hz	1.000.000 100.000 100.000 100.000
	Resistive overload	2A / 28 V dc	100
	Inductive	200 mA / 28 V dc (320 mH)	100.000
	Lamp	100 mA / 28 Vdc	100.000
	<b>Contact Resistance</b>	0,1 ohm max, initial, 0,2 ohm max after life	
<b>Operate Time</b>	4,0 msec, max,		
<b>Release Time</b>	2,5 msec, max, Series: MGS*	7,5 msec, max, Series: MGS*D, MGS*DD	
<b>Contact Bounce</b>	1,5 msec, max,		
<b>Contact stabilisation Time</b>	2,5 msec max		
<b>Dielectric Strength</b>	500 Vrms min., 60 Hz all points at sea level	125 Vrms min., 60 Hz all points at 70.000 ft.	
<b>Insulation Resistance</b>	10.000 megohms min. all points at 500 Vdc		
<b>Intercontact Capacitance</b>	0,4 pF typical		
<b>Sensitivity</b>	60 milliwatts at pick-up, 250 milliwatts at nominal rated coil voltage, at 25°C		
<b>Diode P.I.V.</b>	100 Vdc min. Series : MGS*D, MGS*DD		
<b>Negative Coil Transient</b>	1,0 Vdc max. Series : MGS*D, MGS*DD		

Figure 1 - Radio Frequency Curves





# •100 GRID TERMINAL RELAY SENSITIVE DPDT

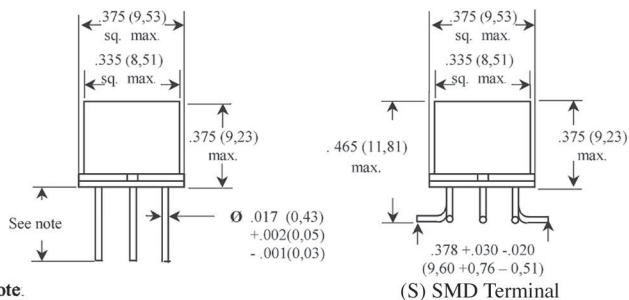
Series  
MGS

• Basic • Suppression • Suppression/Steering

## Typical Characteristics (over the Temperature range, unless otherwise noted)

Coil Voltage Code	Series Types	Coil Voltage V dc		Coil Resistance ohms at 25 °C ±10 %	Coil Current mA, at 25°C		Pick-up Voltage V dc Max.	Drop-out Voltage V dc	
		Rated	Max.		Min.	Max.		Max.	Min.
5	MGS*, MGS*D	5,0	7,5	100	-	-	3,5	2,5	0,12
	MGS*DD				56,8	78,1			
6	MGS*, MGS*D	6,0	10,0	200	-	-	4,5	3,2	0,18
	MGS*DD				36,3	48,9			
9	MGS*, MGS*D	9,0	15,0	400	-	-	6,8	4,9	0,35
	MGS*DD				18,1	23,6			
12	MGS*, MGS*D	12,0	20,0	800	-	-	9,0	6,5	0,41
	MGS*DD				12,5	16,0			
18	MGS*, MGS*D	18,0	30,0	1600	-	-	13,5	10,0	0,59
	MGS*DD				9,6	12,2			
26	MGS*, MGS*D	26,5	40,0	3200	-	-	18,0	13,0	0,89
	MGS*DD				7,2	9,0			
36	MGS*, MGS*D	36,0	57,0	6500	-	-	27,0	19,0	1,25
	MGS*DD				4,9	6,1			
48	MGS*, MGS*D	48,0	75,0	11000	-	-	36,0	26,0	1,6
	MGS*DD				3,9	4,8			

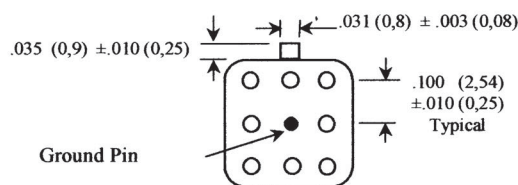
### Outline Dimensions



#### Note:

- Dimensions are shown in inches (millimetres)
- Terminal Variants: - (C) Wire Terminal = .500 (12,7) min.
- (P) Pin Terminal = .187 ± .01 (4,75 ± 0,25)

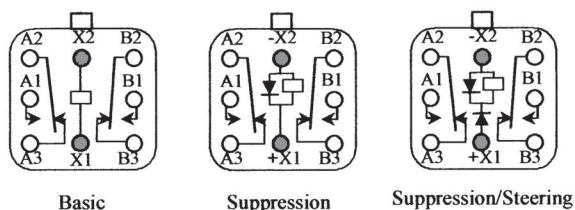
### Terminal Locations



#### Note :

- Viewed from terminals
- Ground pin is optional
- Dimensions are shown in inches (millimetres)

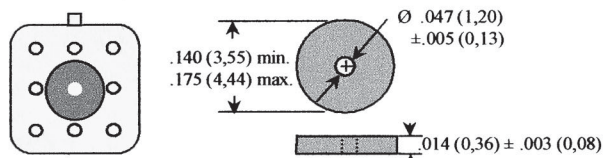
### Schematic Diagrams



Note : Schematics are viewed from terminals, numbers are for reference only

### Mounting Pad

Relays can be supplied with a mounting pad epoxied to the relay header, to prevent the possible shorting of printed circuit board land lines and to facilitate circuit board cleaning. To order relay with pad add **W** to part Number. Example : **MGSCD-26AW**



Note : Dimensions are in inches (millimetres)

#### Note:

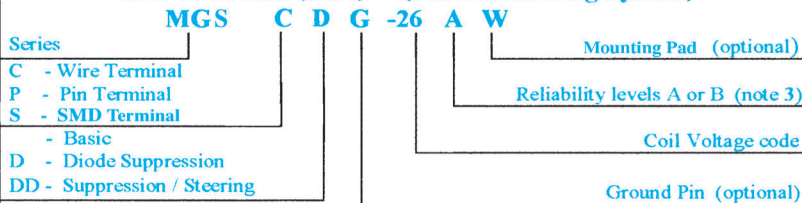
1 For qualified relays add. " I " and the applicable suffix for Failure Rate designation.  
Example: **IMGSCD - 26A**

2 " \* " Indicates Terminal Variants: C, P or S

3 Failure Rate ( Reliability Level )

Military Suffix	NHIG Suffix	F R %/10.000 cycles
L	A	3,0
M	B	1,0

### How to Order. (note 1) (Part Numbering System)





# •100 GRID TERMINAL RELAY SENSITIVE DPDT

Series  
MGS2

• Basic • Suppression

## Product Description

A series of ultra miniature hermetically sealed relays with .100 inch grid spaced terminations. These relays are similar to MS series TO-5 relays construction.

The following construction features ensure the highest reliability in extreme environments:

- All welded relay construction
  - Cleaning and sealing techniques ensures maximum internal cleanliness
  - Low level to 1 amp. switching
  - 2 form C, DPDT contacts, special metal alloy with gold plating
  - Frame design and force / mass ratio provides exceptional immunity to shock and vibration
- Low Intercontact capacitance and contact circuit losses, provides also a reliable switching function in demanding RF applications, combined with small size and low coil power dissipation (see figure 1).

## Series Types

- **MGS2** Basic Relay, 2 form C, DPDT
- **MGSD2** Basic relay combined with an internal diode for coil transient suppression

## Environmental and Physical Specifications

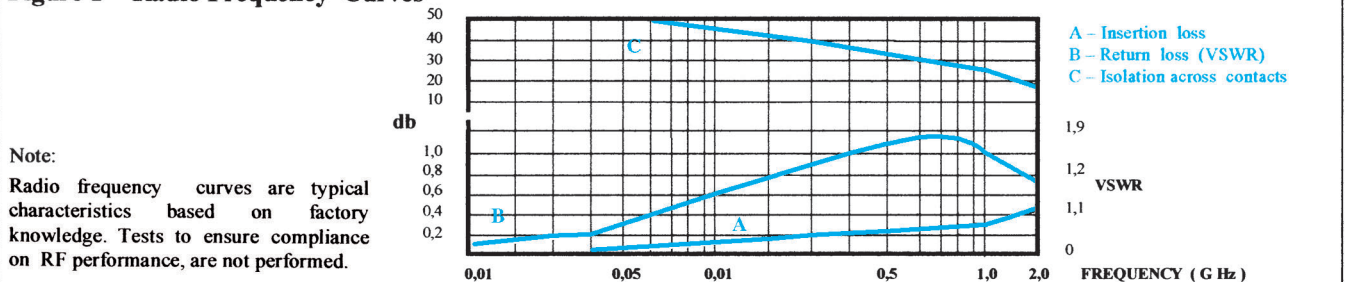
Temperature (Ambient)	-65°C to + 125°C
Shock	100 g's, 6 msec., half sine wave
Vibration (sinusoidal)	30 g's, 10 to 3000 Hz, 2,5 peak amplitude
Vibration (random)	0,2 g <sup>2</sup> s / Hz, 20 to 2000 Hz
Bump	40 g's, 6 msec., half sine wave
Sealing	All welded, Hermetic
Weight	0,15 oz. (4,3 grams) max.
Finish	Bright tin lead plated terminations and case



## Electrical Characteristics (over the Temperature range, unless otherwise noted)

Coil Data	See Typical Characteristics chart		
Contact Rating  (Note : All ratings with grounded case)	<b>Type Load</b>	<b>Contact Load</b>	<b>Cycles min.</b>
	Low Level	30 $\mu$ A / 10 to 30 mV	1.000.000
	Resistive	1 Amp / 28 Vdc	100.000
	Inductive	0,2 Amp / 28Vdc (320 mH)	100.000
	Lamp	0,1 Amp / 28 Vdc	100.000
	Intermediate current	0,1 Amp / 28 Vdc	50.000
	Resistive overload	2 Amp / 28 Vdc	100
Inductive overload	0,4 Amp / 28Vdc (320 mH)	100	
Contact Resistance	0,1 ohm max. initial, 0,2 ohm max after life		
Operate Time	4,0 msec. max.		
Release Time	2,5 msec. max. series MGS2	7,5 msec. max. series MGSD2	
Contact Bounce	1,5 msec. max.		
Contact stabilisation Time	2,5 msec. max.		
Dielectric Strength	500 Vrms, min. 60 Hz, all points at sea level	250 Vrms min.,60 Hz, all points at 26.000 mt.	
Insulation Resistance	10.000 megohms min. all points at 500 Vdc		
Intercontact Capacitance	0,4 pF typical		
Sensitivity	60 milliwatts at pick-up, 250 milliwatts max. at nominal rated coil voltage, at 25 °C		
Diode P.I.V.	100 Vdc min. Series MGSD2		
Negative Coil Transient	1,0 Vdc max. Series MGSD2		

Figure 1 - Radio Frequency Curves





# •100 GRID TERMINAL RELAY SENSITIVE DPDT

Series  
MGS2

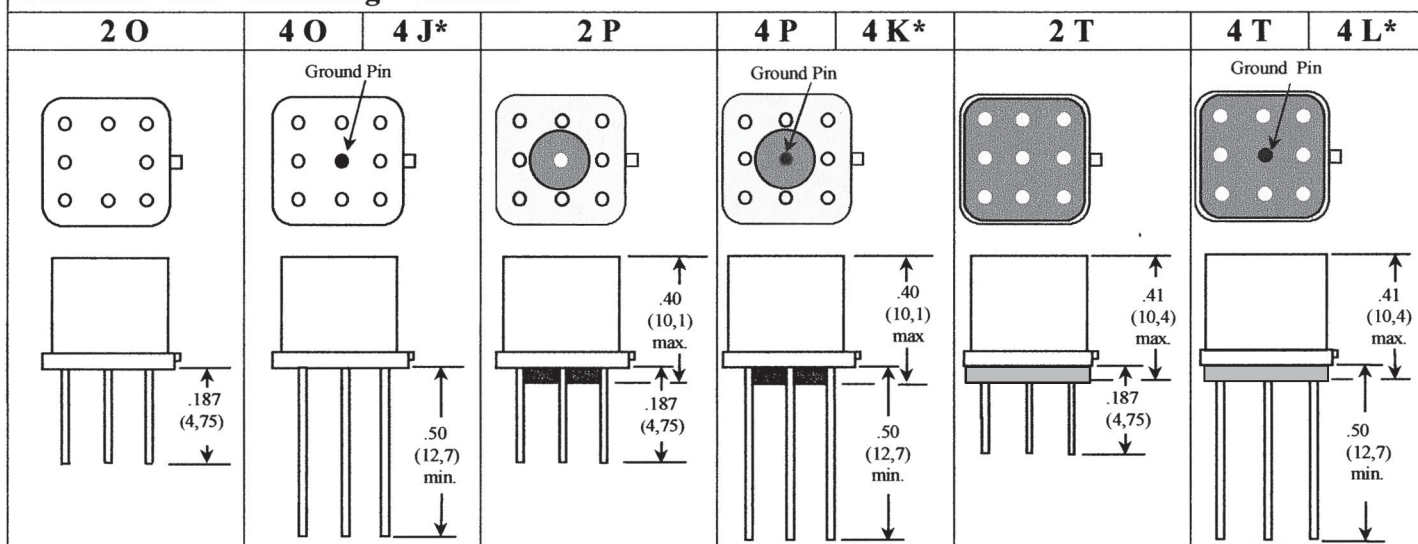
• Basic • Suppression

## Typical Characteristics

Identification letter of the Coil	Coil Voltage V dc		Coil resistance ohms ± 10% at 23 °C	Must Operated Voltage Vdc		Release Voltage V dc				Coil Transient Suppression Code No. *
	Rated	Max.		23 ° C		Max.		Min.		
				23 ° C	125 ° C	23 ° C	125 ° C	23 ° C	-65 ° C	
A	5,0	7,5	100	2,6	3,5	1,4	2,5	0,23	0,12	1
B	6,0	10,0	200	3,4	4,5	2,0	3,2	0,28	0,18	1
C	9,0	15,0	400	4,85	6,8	3,0	4,9	0,55	0,35	1
D	12,0	20,0	800	7,0	9,0	4,0	6,5	0,64	0,41	1
E	18,0	30,0	1600	9,8	13,5	6,0	10,0	0,92	0,59	1
G	28,0	40,0	3200	14,0	18,0	8,0	13,0	1,4	0,89	1
H	36,0	57,0	6500	20,0	27,0	10,0	19,0	1,8	1,25	1
K	48,0	75,0	11000	25,8	36,0	13,0	26,0	2,4	1,60	1

Note: -\* Without the Coil Transient Suppression diode, the Code Number is 0

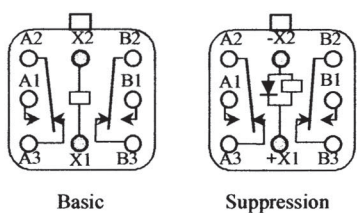
## Terminal and Mounting Variants



Notes :- Dimensions are shown in inches (millimetres)

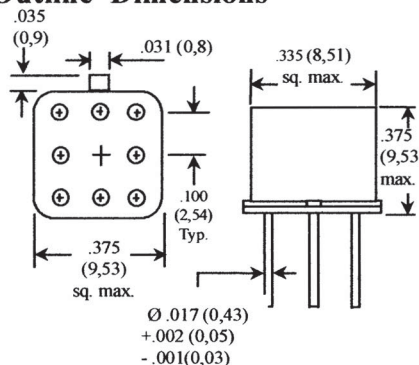
\* - Relay with Ground Pin

## Schematic Diagrams



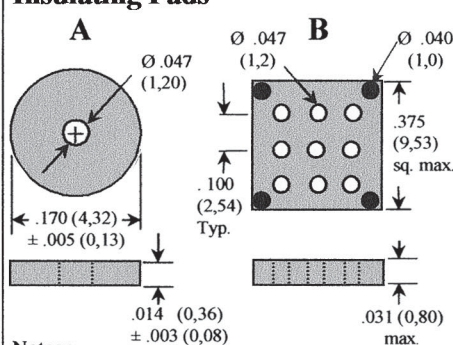
Notes :  
- Schematics are viewed from terminals  
- Diagram references are not marked on the relay

## Outline Dimensions



Note :  
Dimensions are shown in inches (millimetres)

## Insulating Pads



Notes :  
- Insulating Pad type A : material Polyester  
- Insulating Pad type B : material Diallyl Phthalate  
- Dimensions are shown in inches (millimetres)

## How to Order

CECC 16207 - 008 Y A 2 P 1

CECC Specification No.

Type Code (CECC registration No.)

Assessment Level

Coil Variant Code ( Identification letter, see table)

Coil transient suppression

Mounting Variant

Terminal Variant



# TO-5 CASE RELAY DPDT, HIGH CURRENT

Series  
MCA

## Product Description

A series of ultra miniature hermetically sealed relays constructed in a transistor style case, providing superior performance and established reliability characteristics. Designed for high density PCB mounting is available in a variety of sensitivities. Contact configurations and material improvements to provide a most versatile element to the circuit designer especially for resistive load rated at 2 amperes.

The following construction features ensure the highest reliability in extreme environments :

- All welded relay construction
- Cleaning and sealing techniques ensures maximum internal cleanliness
- 500 mA to 2 Amp. switching
- 2 form C, DPDT contacts, special metal alloy with gold plating
- Frame design and force / mass ratio provides exceptional shock and vibration immunity

## Series Type

- MCA 2 form C, DPDT

## Environmental and Physical Specifications

Temperature (Ambient)	-65°C to + 125°C
Shock	75 g's, 6 msec., half sine wave
Vibration (sinusoidal)	30 g's, 10 to 2000 Hz, 1.5 amplitude peak
Sealing	All welded, Hermetic
Weight	0,09 oz. (2,55 grams) max.
Finish	Bright tin lead plated terminations and case



## Electrical Characteristics (over the Temperature range, unless otherwise noted)

Coil Data	See Typical Characteristics chart		
Contact Rating  (Note : All ratings with grounded case)	Type Load	Contact Load	Cycles min.
	Resistive	500 mA to 2 Amp / 28 Vdc (note 1)	100.000
		500 mA / 115 Vac, 60 and 400 HZ (case not grounded)	50.000
Resistive Overload	2,5 A / 28 Vdc	100	
Inductive	280 mA / 28 Vdc (320 mH)	50.000	
Contact Resistance	0,2 ohm max. initial, 0,35 ohm max after life		
Operate Time	3,5 msec. max. at 25°C		
Release Time	2,5 msec. max. at 25°C		
Contact Bounce	2,0 msec. max. at 25°C		
Dielectric Strength	500 Vrms min., 60 Hz, all points, at sea level		
Insulation Resistance	10.000 megohms min. all points at 500 Vdc		
Sensitivity	150 milliwatts at pick-up, 500 milliwatts at nominal rated coil voltage at 25 °C		



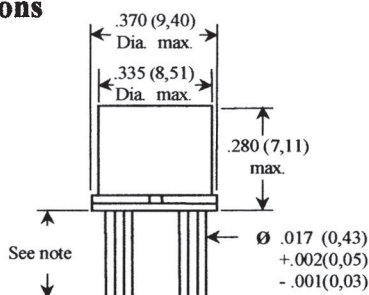
# TO-5 CASE RELAY DPDT, HIGH CURRENT

Series  
MCA

## Typical Characteristics

Coil Voltage Code	Coil Voltage V dc		Coil resistance ohm ± 10% at 25 °C	Operated Voltage V dc Max. at		Release Voltage V dc			
	Rated	Max.		25 °C	125 °C	Non-release at		Must-release at	
						25 °C	125 °C	25 °C	- 65 °C
5	5,0	5,8	50	3,0	4,2	1,5	2,5	0,20	0,14
6	6,0	8,0	98	3,8	4,8	2,3	3,5	0,28	0,18
9	9,0	12,0	220	5,5	7,0	3,2	5,1	0,54	0,35
12	12,0	16,0	390	8,0	10,0	4,2	6,8	0,65	0,43
18	18,0	24,0	880	11,0	14,0	6,4	10,4	0,91	0,59
26	26,5	32,0	1560	14,5	18,2	8,2	13,3	1,4	0,9

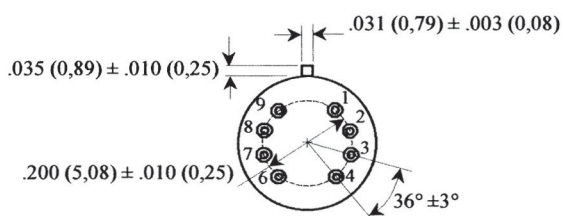
## Outline Dimensions



Note :

- Dimensions are shown in inches (millimetres)
- Terminal Variants: - (C) Standard Wire Terminal = .500 (12,7) min.
- (W) Long Wire Terminal = 1.500 (38,1) min.
- (P) Pin Terminal = .187 ± .01 (4,75 ± 0,25)

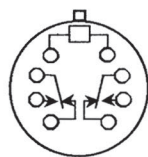
## Terminal Locations



Note:

- Dimensions are shown in inches (millimetres)
- Viewed from terminals, numbers are for reference only

## Schematic Diagram

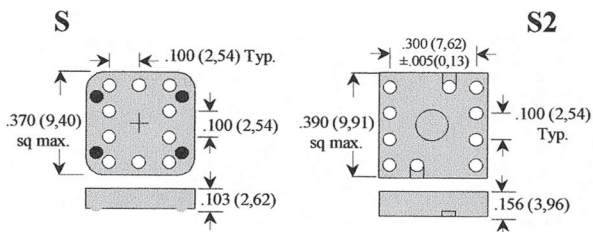


Note :

- Schematics are viewed from terminals.

## Spreader Pads

Relays can be supplied with a spreader pad epoxied to the relay header, to prevent the possible shorting of printed circuit board land lines and to facilitate circuit board cleaning. To order relay with pad add. " S " to part number. Example: MCAW-26S

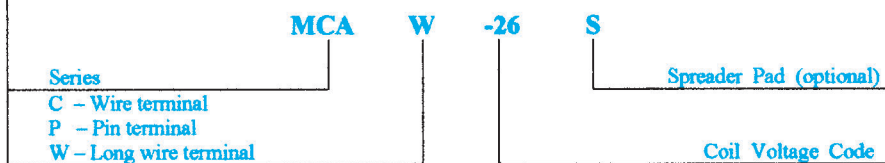


Note : - Dimensions are in inches (millimetres)

Note:

1 Not suitable for use below 500 mA resistive

## How to Order (Part Numbering System)





# .100 GRID TERMINAL RELAY DPDT

Series  
MGAE

• Basic • Suppression • Suppression/Steering

## Product Description

A series of ultra miniature hermetically sealed relays with .100 inch grid spaced terminations. These relays are similar to MA series TO-5 relays construction and are provided for the operation in military and/or commercial equipment and/or installations with increased mechanical and environmental requirements. The following construction methods ensure the highest reliability in extreme environments:

- All welded relay construction
- Cleaning and sealing techniques ensures maximum internal cleanliness
- Low level to 1 amp. switching
- 2 form C, DPDT contacts, special metal alloy with gold plating
- Frame design and force / mass ratio provides exceptional immunity to shock and vibration

Low Intercontact capacitance and contact circuit losses, provides also a reliable switching function in demanding RF applications, combined with small size and low coil power dissipation (see figure 1).

## Series Types

- MGAE Basic Relay, 2 form C, DPDT
- MGAED Basic relay combined with an internal diode for coil suppression
- MGAEDD Basic Relay incorporates two internal diodes for coil transient suppression and polarity reversal protection

## Environmental and Physical Specifications

Temperature (Ambient)	-65°C to +125°C
Shock	75 g's, 6 msec., half sine wave
Vibration (sinusoidal)	30 g's, 10 to 3000 Hz, 2,0 peak amplitude
Vibration (random)	0,2 g <sup>2</sup> /s/Hz, 20 to 2000 Hz
Bump	40 g's, 6 msec., half sine wave
Sealing	All welded, Hermetic
Weight	2,55 grams (0,09 oz.) max.
Finish	Case: bright tin lead plated Terminations: bright tin lead and gold plated

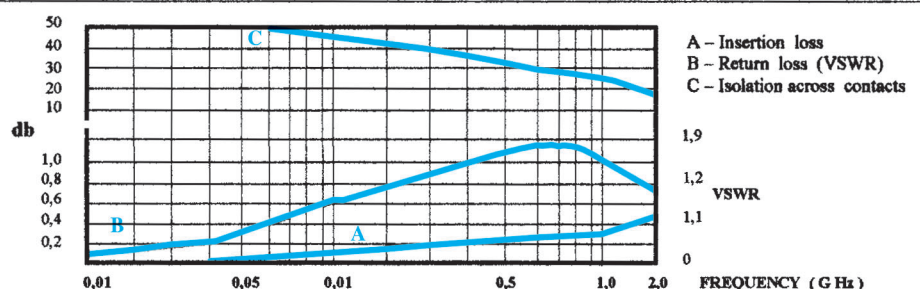


## Electrical Characteristics (over the Temperature range, unless otherwise noted)

Coil Data	See Typical Characteristics chart		
Contact Rating  (Note : All ratings with grounded case)	Type Load	Contact Load	Cycles min.
	Low Level	30 mV / 10 mA max	1.000.000
	Resistive	1 Amp / 28 Vdc	100.000
	Inductive	0,2 Amp / 28Vdc (320 mH)	100.000
	Lamp	0,1 Amp / 28 Vdc	100.000
	Intermediate	0,1 Amp / 28 Vdc	50.000
	Resistive overload	2 Amp / 28 Vdc	100
	Inductive overload	0,4 Amp / 28Vdc (320 mH)	100
Contact Resistance	0,1 ohm max. initial, 0,2 ohm max after life		
Operate Time	2,0 msec. max.		
Release Time	1,5 msec. max. series MGAE	4,0 msec. max. series MGAED, MGAEDD	
Contact Bounce	1,5 msec. max.		
Contact stabilisation Time	2,5 msec. max.		
Dielectric Strength	500 Vrms min. 50-60 Hz, all points at sea level	250 Vrms min. 50-60 Hz, all points at 25.000 mt.	
Insulation Resistance	10.000 megohms min. all points at 500 Vdc		
Intercontact Capacitance	0,4 pF typical		
Sensitivity	140 milliwatts at pick-up, 500 milliwatts at nominal rated coil voltage, max. at 25 °C		
Diode P.I.V.	100 Vdc min. Series MGAED, MGAEDD		
Negative Coil Transient	1,0 Vdc max. Series MGAED, MGAEDD		

Figure 1 - Radio Frequency Curves

Note:  
Radio frequency curves are typical characteristics based on factory knowledge. Tests to ensure compliance on RF performance, are not performed.







# .100 GRID TERMINAL RELAY DPDT

Series  
**MGAE**

• Basic • Suppression • Suppression/Steering

## Typical Characteristics

Identification letter of the Coil	Coil Voltage V dc		Coil resistance ohm ± 10% at 23 °C	Must Operated Voltage Vdc		Release Voltage V dc				Special Attributes Code No. (*)
	Rated	Max.		23 °C	125 °C	Max.		Min.		
						23 °C	125 °C	23 °C	-65 °C	
A	5,0	5,8	50	2,7	3,5	1,4	2,3	0,22	0,14	0 or 1
B	6,0	8,0	98	3,5	4,5	2,0	3,2	0,28	0,18	0 or 1
C	9,0	12,0	220	5,3	6,8	3,0	4,9	0,54	0,35	0 or 1
D	12,0	16,0	390	7,0	9,0	4,0	6,5	0,63	0,41	0 or 1
E	18,0	24,0	880	10,5	13,5	6,0	10,0	0,91	0,59	0 or 1
G	28,0	32,0	1560	14,2	18,0	8,0	13,0	1,37	0,89	0 or 1
A	5,0	5,8	39	3,2	4,0	2,3	2,8	0,6	0,6	2
B	6,0	8,0	78	4,0	5,0	2,8	3,4	0,7	0,7	2
C	9,0	12,0	220	6,3	7,8	4,2	5,3	0,9	0,8	2
D	12,0	16,0	390	8,0	10,0	5,2	6,5	1,1	0,9	2
E	18,0	24,0	880	11,5	14,5	7,3	10,0	1,4	1,1	2
G	28,0	32,0	1560	15,2	19,0	9,5	13,0	1,8	1,4	2

Note : \*Without transient suppression, code "0", with transient suppression, code "1", with transient suppression and reverse polarity protection, code "2"

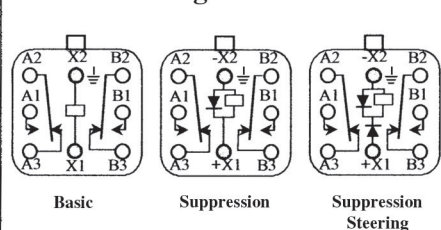
## Terminal (T) and Mounting (M) Variants

T	M	T	M	T	M	T	M	T	M	T	M	T	M	T	M		
B	A	Without ground pin		B	P	Without ground pin		B	T	Without ground pin				O	T		
		D	A			D	P			O	A	O	P			O	P
		E	A			E	P			P	A	P	P			P	T
C	A	With ground pin		C	P	With ground pin		C	T	With ground pin				O	L		
		D	J			D	K			O	J	O	K			O	L
		E	J			E	K			P	J	P	K			P	L

Note : - Dimensions are shown in inches (millimetres)

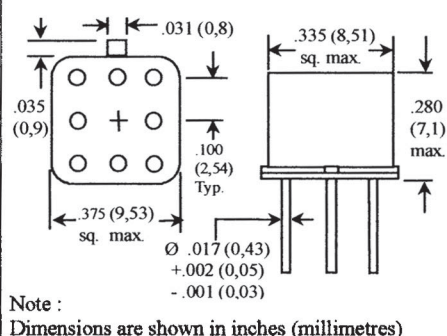
CODE	TERMINAL	CODE	MOUNTING VARIANT
B	Pins, tinned	J	Ground pin
C	Pins, gold plated	K	Ground pin with mounting pad round 0,36 mm
D	Leads 19,05 mm, tinned	L	Ground pin with pad grid 2,54 mm, H = 0,8 mm
E	Leads 19,05 mm, gold plated	A	Without mounting hardware accessories
O	Leads 12,7 mm, tinned	P	Mounting pad round, H = 0,36 mm
P	Leads 12,7 mm, gold plated	T	Pad grid 2,54 mm, H = 0,8 mm

## Schematic Diagrams

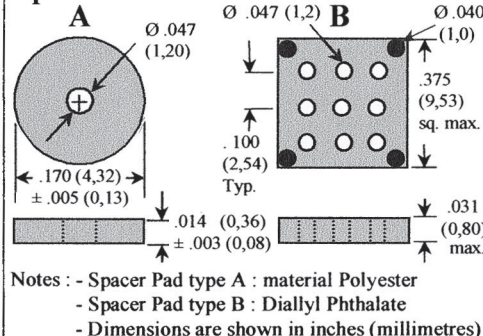


Note :  
- Schematics are viewed from terminals  
- Diagram references are not marked on the relay

## Outline Dimensions



## Spacer Pads



Code	Failures per 1 million cycles
E3	3
E5	1
E6	0,1
E7	0,01

**How to Order**  
**CECC 16207- 801 A B C 1 Y E5**

CECC number	Failure rate level (Identification code)
Type Code (CECC registration No)	Assessment level
Coil Voltage (Identification letter)	Special attributes (Identification No. code)
Terminals (Identification letter)	Mounting (Identification letter)



# .100 GRID TERMINAL RELAY SENSITIVE DPDT

Series  
MGSE

- Basic • Suppression • Suppression/Steering

## Product Description

A series of ultra miniature hermetically sealed relays with .100 inch grid spaced terminations. These relays are similar to MS series TO-5 relays construction and are provided for the operation in military and/or commercial equipment and/or installations with increased mechanical and environmental requirements. The following construction methods ensure the highest reliability in extreme environments:

- All welded relay construction
- Cleaning and sealing techniques ensures maximum internal cleanliness
- Low level to 1 amp. switching
- 2 form C, DPDT contacts, special metal alloy with gold plating
- Frame design and force / mass ratio provides exceptional immunity to shock and vibration

Low intercontact capacitance and contact circuit losses, provides also a reliable switching function in demanding RF applications, combined with small size and low coil power dissipation (see figure 1).

## Series Types

- MGSE Basic Relay, 2 form C, DPDT
- MGSED Basic relay combined with an internal diode for coil suppression
- MGSEDD Basic Relay incorporates two internal diodes for coil transient suppression and polarity reversal protection

## Environmental and Physical Specifications

Temperature (Ambient)	-65°C to + 125°C
Shock	75 g's, 6 msec., half sine wave
Vibration (sinusoidal)	30 g's, 10 to 3000 Hz, 2,0 peak amplitude
Vibration (random)	0,2 g <sup>2</sup> /s/Hz, 20 to 2000 Hz
Bump	40 g's, 6 msec., half sine wave
Sealing	All welded, Hermetic
Weight	4,33 grams (0,15 oz.) max.
Finish	Case: bright tin lead plated Terminations: bright tin lead and gold plated



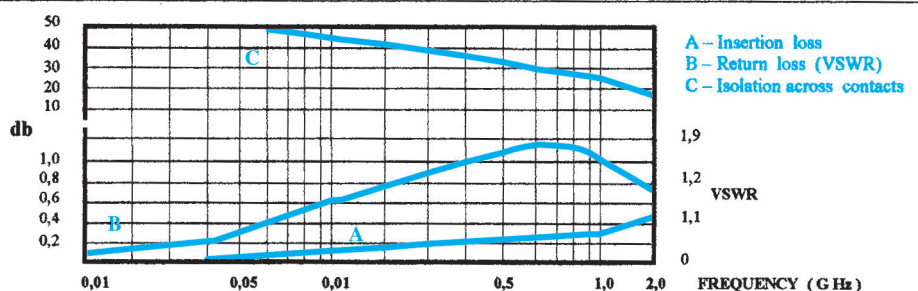
## Electrical Characteristics (over the Temperature range, unless otherwise noted)

Coil Data	See Typical Characteristics chart		
Contact Rating  (Note : All ratings with grounded case)	Type Load	Contact Load	Cycles min.
	Low Level	30 mV / 10 mA max	1.000.000
	Resistive	1 Amp / 28 Vdc	100.000
	Inductive	0,2 Amp / 28Vdc (320 mH)	100.000
	Lamp	0,1 Amp / 28 Vdc	100.000
	Intermediate	0,1 Amp / 28 Vdc	50.000
	Resistive overload	2 Amp / 28 Vdc	100
	Inductive overload	0,4 Amp / 28Vdc (320 mH)	100
Contact Resistance	0,1 ohm max. initial, 0,2 ohm max after life		
Operate Time	4,0 msec. max.		
Release Time	2,5 msec. max. series MGSE	7,5 msec. max. series MGSED, MGSEDD	
Contact Bounce	1,5 msec. max.		
Contact stabilisation Time	2,5 msec. max.		
Dielectric Strength	500 Vrms min. 50-60 Hz, all points at sea level	250 Vrms min. 50-60 Hz, all points at 25.000 mt.	
Insulation Resistance	10.000 megohms min. all points at 500 Vdc		
Intercontact Capacitance	0,4 pF typical		
Sensitivity	60 milliwatts at pick-up, 250 milliwatts at nominal rated coil voltage, max. at 25 °C		
Diode P.I.V.	100 Vdc min. Series MGSED, MGSEDD		
Negative Coil Transient	1,0 Vdc max. Series MGSED, MGSEDD		

Figure 1 - Radio Frequency Curves

Note:

Radio frequency curves are typical characteristics based on factory knowledge. Tests to ensure compliance on RF performance, are not performed.





# .100 GRID TERMINAL RELAY SENSITIVE DPDT

Series  
MGSE

• Basic • Suppression • Suppression/Steering

## Typical Characteristics

Identification letter of the Coil	Coil Voltage V dc		Coil resistance ohm ± 10% at 23 °C	Must Operated Voltage Vdc		Release Voltage V dc				Special Attributes Code No. (*)
	Rated	Max.		23 °C	125 °C	Max.		Min.		
						23 °C	125 °C	23 °C	-65 °C	
A	5,0	7,5	100	2,7	3,5	1,4	2,5	0,22	0,12	0 or 1
B	6,0	10	200	3,5	4,5	2,0	3,2	0,28	0,18	0 or 1
C	9,0	15	400	5,0	6,8	3,0	4,9	0,54	0,35	0 or 1
D	12,0	20	800	7,0	9,0	4,0	6,5	0,63	0,41	0 or 1
E	18,0	30	1600	10,0	13,5	6,0	10,0	0,91	0,59	0 or 1
G	28,0	40	3200	14,2	18,0	8,0	13,0	1,4	0,89	0 or 1
A	5,0	7	64	3,0	4,0	2,3	2,8	0,8	0,6	2
B	6,0	10	125	4,0	5,0	2,5	3,0	0,9	0,7	2
C	9,0	15	400	6,1	8,0	4,0	4,5	1,0	0,8	2
D	12,0	20	800	8,0	11,0	5,0	5,8	1,3	1,0	2
E	18,0	30	1600	11,5	14,5	7,0	9,0	1,4	1,1	2
G	28,0	40	3200	15,2	19,0	10,5	13,0	1,8	1,4	2

Note : \*Without transient suppression, code "0", with transient suppression, code "1", with transient suppression and reverse polarity protection, code "2"

## Terminal (T) and Mounting (M) Variants

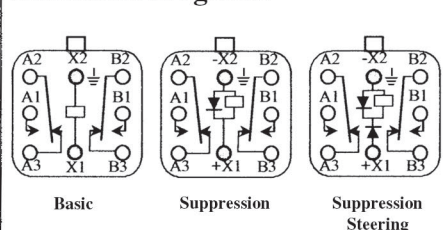
T	M	T	M	T	M	T	M	T	M	T	M	T	M	T	M
B	A	Without ground pin		B	P	Without ground pin		B	T	Without ground pin					
		D	A			D	P			O	A	O	P	O	T
		E	A			E	P			P	A	P	P	P	T
C	A	With ground pin		C	P	With ground pin		C	T	With ground pin					
		D	J			D	K			O	J	O	K	O	L
		E	J			E	K			P	J	P	K	P	L

Note : - Dimensions are shown in inches (millimetres)

CODE	TERMINAL
B	Pins, tinned
C	Pins, gold plated
D	Leads 19,05 mm, tinned
E	Leads 19,05 mm, gold plated
O	Leads 12,7 mm, tinned
P	Leads 12,7 mm, gold plated

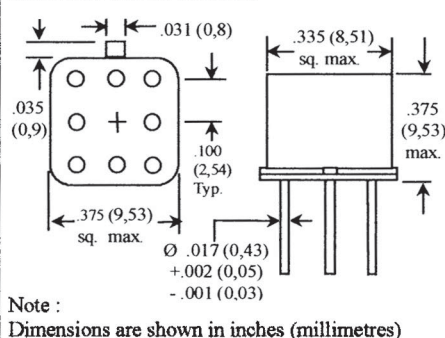
CODE	MOUNTING VARIANT
J	Ground pin
K	Ground pin with mounting pad round 0,36 mm
L	Ground pin with pad grid 2,54 mm, H = 0,8 mm
A	Without mounting hardware accessories
P	Mounting pad round, H = 0,36 mm
T	Pad grid 2,54 mm, H = 0,8 mm

## Schematic Diagrams



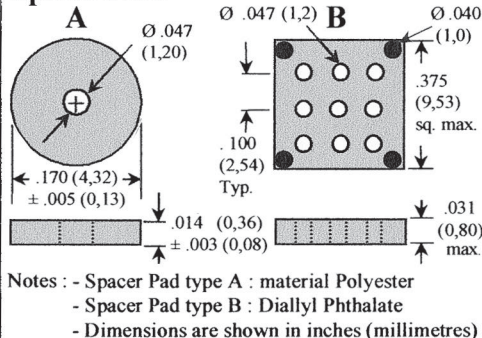
Note :  
- Schematics are viewed from terminals  
- Diagram references are not marked on the relay

## Outline Dimensions



Note :  
Dimensions are shown in inches (millimetres)

## Spacer Pads



Notes : - Spacer Pad type A : material Polyester  
- Spacer Pad type B : Diallyl Phthalate  
- Dimensions are shown in inches (millimetres)

## Failure rate level

Code	Failures per 1 million cycles
E3	3
E5	1
E6	0,1
E7	0,01

## How to Order

CECC 16207- 802 A B C 1 Y E5

CECC number

Type Code (CECC registration No.)

Coil Voltage (Identification letter)

Terminals (Identification letter)

Failure rate level (Identification code)

Assessment level

Special attributes (Identification No. code)

Mounting (Identification letter)



# HALF SIZE CRYSTAL CAN RELAY 2 AMPERE DPDT

Series  
I2K

## Product Description

A complete series of half crystal can hermetically sealed relays manufactured and qualified to the referenced Military specification.

The leading relay design in military and commercial application is represented in Nuova Hi-G Italia I 2K series relay. The products advanced design provides superior performance in the environmental and operational requirements of today's sophisticated equipment.

Volume production coupled with continuing qualification programs, ensure product consistency and the highest degree of reliability.

The following construction features ensure the highest reliability in extreme environments:

- All welded relay construction
- Cleaning and sealing techniques ensures maximum internal cleanliness
- Low level to 2 amp. switching
- 2 form C, DPDT contacts, special metal alloy with gold plating
- Frame, armature designs and force / mass ratio provides exceptional immunity to shock and vibration.

## Series Type

- I 2K 2 form C, DPDT

## Environmental and Physical Specifications

Temperature (Ambient)	-65°C to +125°C
Shock	100 g's, 6 msec.
Vibration (sinusoidal)	30 g's, 10 to 3000 Hz
Vibration (random)	0,4g <sup>2</sup> / Hz, 50 to 2000 Hz
Acceleration	50 g's
Sealing	All welded, Hermetic
Weight	0,46 oz. (13,0 grams) max.



## Electrical Characteristics (over the Temperature range, unless otherwise noted)

Coil Data	See Typical Characteristics chart			
Contact Rating	Contact load	Type 1	Type 2	Cycles min.
(Note : All ratings with grounded case)	Low Level	10 to 50 $\mu$ A / 10 to 50 mV	10 to 50 $\mu$ A / 10 to 50 mV	1.000.000
	Resistive	2 Amp / 28 Vdc	2 Amp / 28 Vdc	100.000
		0,3 Amp/115Vac, 60 and 400Hz	0,1 Amp/115Vac, 60 and 400Hz	100.000
	Overload	4A / 28 Vdc	4A / 28 Vdc	100
	Inductive	0,75 Amp / 28 Vdc (200 mH)	0,50 Amp / 28 Vdc (200 mH)	100.000
Lamp	0,16 Amp / 28 Vdc	0,16 Amp / 28 Vdc	100.000	
Contact Resistance	0,05 ohm max. initial, 0,1 ohm max. after life high level, 0,15 ohm max. after low level			
Operate Time	4,0 msec. max.			
Release Time	4,0 msec. max.			
Contact Bounce	2,0 msec. max.			
Contact stabilisation Time	2,0 msec max			
Dielectric Strength	1000 Vrms min., 60 Hz, all points, 500 Vrms min. between open contacts and coil to case, at sea level		350 Vrms min., 60 Hz, all points at 70.000 ft.	
	Insulation Resistance			
Insulation Resistance	10.000 megohms min. all points at 500 Vdc			
Intercontact Capacitance	2,5 pF Between contact			
Sensitivity	250 milliwatts at pick-up, 500 milliwatts typical at nominal rated coil voltage, at 25°C			



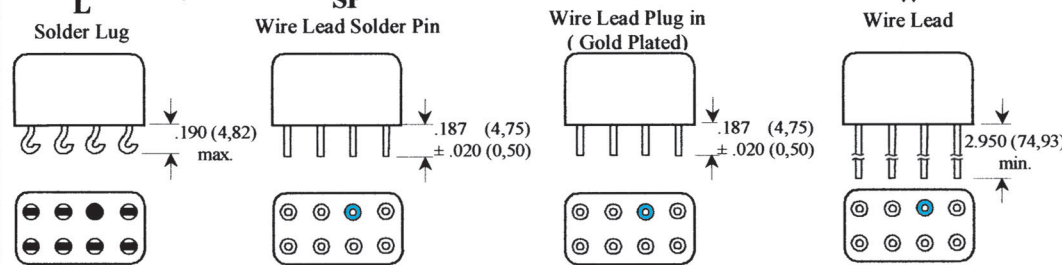
# HALF SIZE CRYSTAL CAN RELAY 2 AMPERE DPDT

Series  
**I2K**

## Typical Characteristics (over the Temperature range, unless otherwise noted)

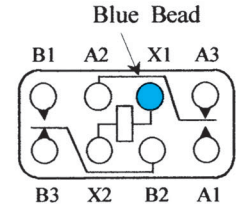
Terminal Codes				Mounting Styles	Load Rating	Coil Voltage (Vdc)		DC Coil Resistance ohms ±10% at 25°C	Pick-up (Vdc) Max	Drop-out (Vdc)	
Wire Lead (PI)	Solder Lug (L)	Wire Lead (SP)	Wire Lead (W)			Max.	Nom.			Max.	Min.
141	104 107 128	105 125	106 108	B C D	Type 1	32,0	26,5	700	18,0	14,0	1,00
142	129 149	109	110	None E							
241	204 207 228	205 225	206 208	B C D	Type 2	15,0	12,0	160	9,0	5,8	0,50
242	229 249	209	210	None E							
143	111 114 130 150	112 126 116	113 115 117	B C None E	Type 1	7,5	6,0	40	4,5	2,9	0,25
144	211 214 230 250	212 226 216	213 215 217	B C None E							
145	118 121 131 151	119 127 123	120 122 124	B C None E	Type 1	6,0	5,0	27	3,8	2,4	0,21
146	218 221 231 251	219 227 223	220 222 224	B C None E							
147	132 135 138 152	133 136 139	134 137 140	B C None E	Type 1	6,0	5,0	27	3,8	2,4	0,21
148	232 235 238 252	233 236 239	234 237 240	B C None E							
247	232 235 238 252	233 236 239	234 237 240	B C None E	Type 2	6,0	5,0	27	3,8	2,4	0,21
248											

### Terminal Styles



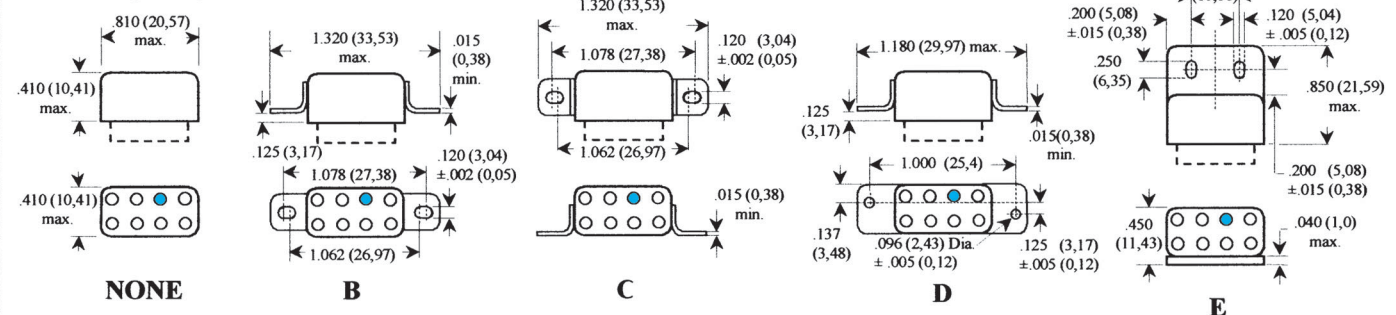
Note : - Dimensions are shown in inches (millimetres).  
- Terminal spacing is .200 (5,08). Terminal diameter is .030 (0,76) +.003 (0,07) - .002 (0,05)

### Schematic Diagram



Note : - Schematic is viewed from terminals

### Mounting Styles



Note: Dimensions are shown in inches (millimetres)

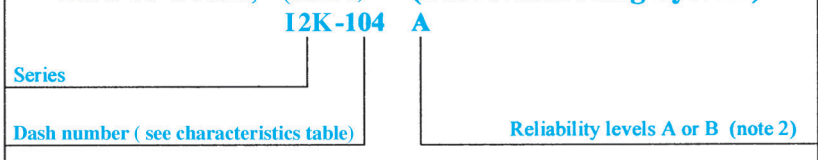
### Note:

1 Add the applicable suffix for Failure Rate designation:  
Example: **I2K - 104A**

2 Failure Rate (Reliability Level)

Military Suffix	N-HiG Suffix	FR % / 10.000 Cycles
L	A	3,0
M	B	1,0

### How to Order, (note 1) (Part Numbering System)





# HALF SIZE CRYSTAL CAN RELAY 2 AMPERE DPDT

Series  
2K

## Product Description

The leading relay design in military and commercial application is represented in Nuova Hi-G Italia 2K series relay. The products advanced design provides superior performance in the environmental and operational requirements of today's sophisticated equipment.

Volume production coupled ensure product consistency and the highest degree of the reliability.

The following construction features ensure the highest reliability in extreme environments:

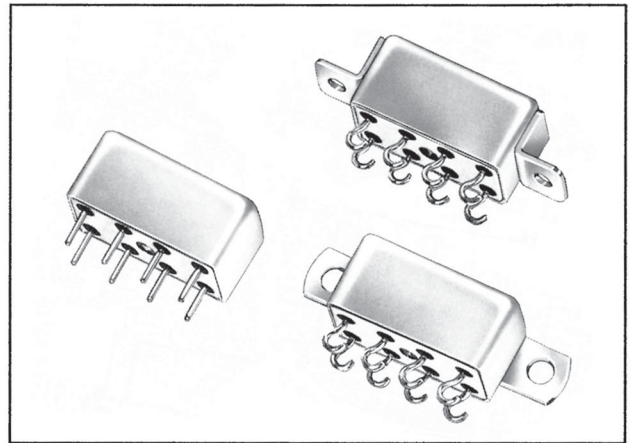
- All welded relay construction
- Cleaning and sealing techniques assures maximum internal cleanliness
- Low level to 2 amp. switching
- 2 form C, DPDT contacts, special metal alloy with gold plating
- Frame, armature designs and force / mass ratio provides exceptional immunity to shock and vibration.

## Series Type

- 2K 2 form C, DPDT

## Environmental and Physical Specifications

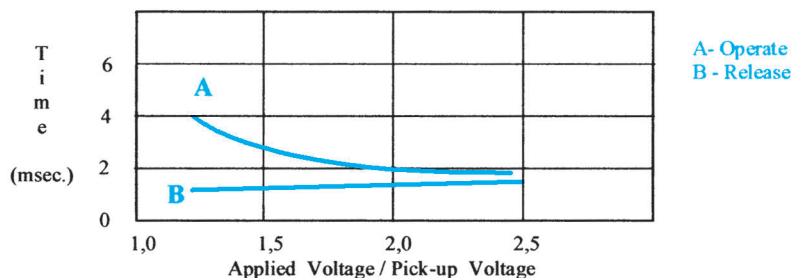
Temperature (Ambient)	-65°C to +125°C
Shock	100 g's, 6 msec.
Vibration (sinusoidal)	20 g's, 10 to 2000 Hz
Acceleration	50 g's
Sealing	All welded, Hermetic
Weight	0,35 oz. (10,0 grams) max.



## Electrical Characteristics (over the Temperature range, unless otherwise noted)

Coil Data	See Typical Characteristics chart			
Contact Rating  (Note : All ratings with grounded case)	Type load	Low Level	10 mA / 30 mV	1.000.000
		Resistive	2 Amp / 28 Vdc	100.000
	1 Amp / 115 Vac, 400 Hz		100.000	
	0,3 Amp / 115 Vac, 60 Hz		100.000	
	Overload		4A / 28 Vdc	100
	Inductive	0.75 Amp / 28 Vdc (200 mH)	100.000	
Contact Resistance		0,05 ohm max. initial		
Operate Time	4,0 msec. max. at 25 °C			
Release Time	2,0 msec. max. at 25 °C			
Contact Bounce	3,0 msec. max. at 25 °C			
Dielectric Strength	1000 Vrms min., 60 Hz, all points, 500 Vrms min. between open contacts and coil to case, at sea level			
Insulation Resistance	1000 megohms min. all points at 500 Vdc			
Intercontact Capacitance	2,5 pF Between contact			
Sensitivity	250 milliwatts at pick-up, 660 milliwatts typical at nominal rated coil voltage, at 25 °C			

Figure 1 - Operate & Release Time curves vs. Applied Voltage



Note:  
Typical characteristics are based on factory knowledge. Tests to ensure compliance, are not performed



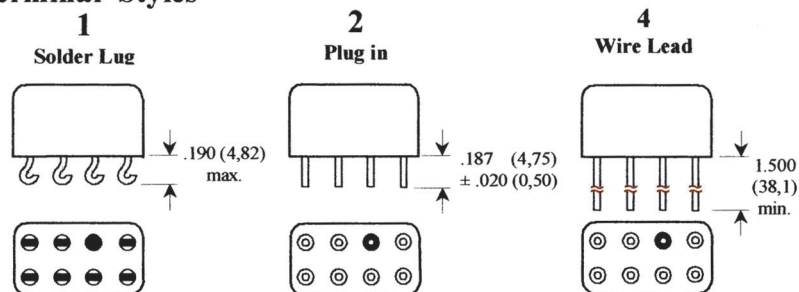
# HALF SIZE CRYSTAL CAN RELAY 2 AMPERE DPDT

Series  
**2K**

## Typical Characteristics (over the Temperature range, unless otherwise noted)

Voltage Code	Coil Voltage Vdc		Coil Resistance ohms ± 10% at 25 °C	Pick-up Vdc Max. at 25 °C	Drop-out Vdc Min. at 25 °C
	Nominal	Max.			
105	5,0	6,0	39	3,7	0,3
106	6,0	7,2	40	3,3	0,35
112	12,0	14,2	160	6,5	0,75
124	24,0	29,0	870	17,5	1,4
126	26,5	32,0	700	13,5	1,5
136	36,0	43,0	1960	26,0	2,2
148	48,0	57,0	3480	35,0	2,9

### Terminal Styles

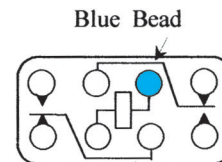


Note :

- Dimensions are shown in inches (millimetres)

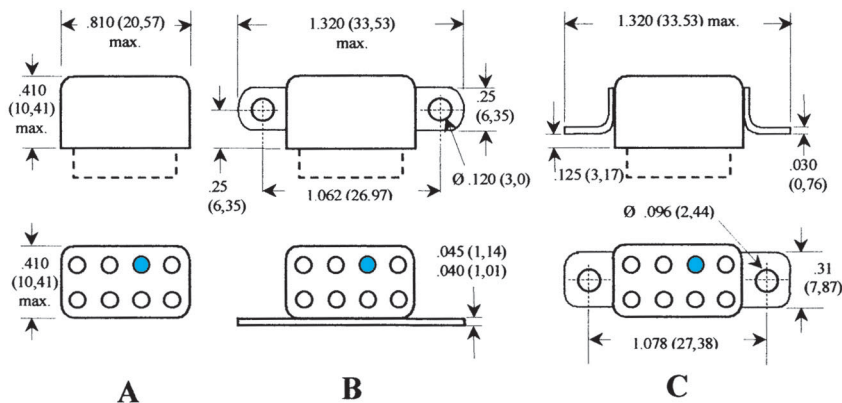
- Terminal spacing is .200 (5,08). Terminal diameter is .030 (0,76) + .003 (0,07) - .002 (0,05)

### Schematic Diagram



Note : - Schematic are viewed from terminals

### Mounting Styles

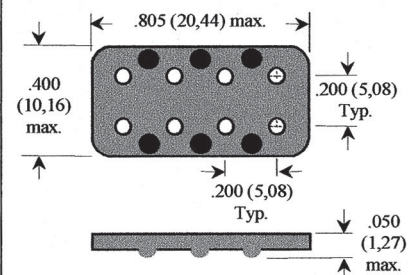


Note :

- Dimensions are shown in inches (millimetres)

### Insulating Pads

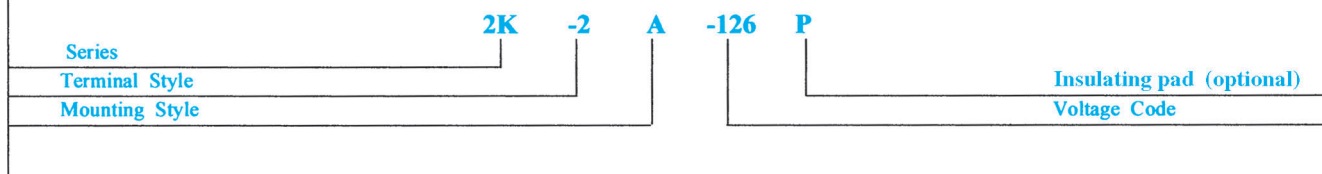
Relays can be supplied with an insulating pad epoxied to the relay header, to prevent the possible shorting of printed circuit board land lines and to facilitate circuit board cleaning. To order relay with pad add. **P** to part Number. Example : **2K-2A-126 P**



Note:

-Dimensions are shown in inches (millimetres)

### How to Order (Part Numbering System)





# HALF SIZE CRYSTAL CAN RELAY 2 AMPERE DPDT

Series  
2K-6600

## Product Description

A complete series of half crystal can hermetically sealed relays manufactured and qualified to the referenced CECC specifications. The leading relay design in military and commercial application is represented in Nuova Hi-G Italia 2K-6600 series relay. The product advanced design provides superior performance in the environmental and operational requirements of today's sophisticated equipment. Volume production coupled with continuing qualification programs, ensure product consistency and the highest degree of reliability.

The following construction features ensure the highest reliability in extreme environments:

- All welded relay construction
- Cleaning and sealing techniques ensures maximum internal cleanliness
- Low level to 2 amp. switching
- 2 form C, DPDT contacts, special metal alloy with gold plating
- Frame, armature designs and force / mass ratio provides exceptional immunity to shock and vibration.

## Series Type

- 2K-6600 2 form C, DPDT

Contact Category		
Code	Light duty contact	Types
01	0,01 mA, 5 V dc max.	007, 014, 021
02	0.01 mA, 0,01 V dc max.	021

## Environmental and Physical Specifications

Temperature (Ambient)	-65°C to +125°C
Shock	50 g's, 11 msec., half sine wave
Vibration (sinusoidal)	20 g's, 10 to 2000 Hz, 1,5 amplitude peak
Bump	40 g's, 6 msec.,
Sealing	All welded, Hermetic
Weight	0,46 oz. (13 grams) max.
Finish	FRENCH Bright tin lead plated terminals and case



NOTE: -007 ITALIAN FACTORY SPEC.  
-014 GERMAN / FRENCH FACTORY SPEC.  
-021 UK FACTORY SPEC.

Apart from the range and a few environmental tests, all specs. are identical. Nuova HiG Italia is the only Company qualified to each/all country specs.

## Electrical Characteristics (over the Temperature range, unless otherwise noted)

Coil Data	See Typical Characteristics chart		
Contact Rating	Type Load	Contact Load	Cycles min.
(Note : All ratings with grounded case)	Low Level	10 mA / 30 mV max.	1.000.000
	Resistive	2 Amp / 28 Vdc,	100.000
	Overload	4 Amp / 28 Vdc	100
	Inductive	0,75 Amp / 28 Vdc (200 mH)	100.000
Contact Resistance	0,05 ohm max. initial, 0,2 ohm max after life		
Operate Time	4,0 msec. max. at 25°C		
Release Time	4,0 msec. max. at 25°C		
Contact Bounce	2,5 msec. max. at 25°C		
Dielectric Strength	500 Vrms min., 60 Hz, all points at sea level		
Insulation Resistance	1000 megohms min. all points at 500 Vdc		
Intercontact Capacitance	2.5 pF typical		
Sensitivity	250 milliwatts max. ,at pick-up, 1 watt max., at nominal rated coil voltage at 25 °C		





# HALF SIZE CRYSTAL CAN RELAY 2 AMPERE DPDT

Series  
**2K-6600**

## Typical Characteristics

CECC Spec.	Coil Variant Code	Coil Voltage V dc		Coil resistance ohms ± 10% at 25 ° C	Operated Voltage V dc Max. at		Release Voltage V dc			
		Rated	Max		25 ° C	125 ° C	Non-release at		Must-release at	
							25 ° C	125 ° C	25 ° C	-65 ° C
007	01	5,0	6,0	27	2,7	3,8	1,65	2,4	0,29	0,21
	02	6,0	7,0	37	-	5,0	-	2,5	-	0,40
	03		7,5	40	3,2	4,5	2,0	2,9	0,35	0,25
	04		7,2	40	3,6	-	-	-	0,30	-
	05		7,2	42	3,6	-	-	-	0,30	-
	06		7,0	47,5 (±15%)	-	50	-	2,5	-	0,40
	07		7,2	60	3,6	-	-	-	0,30	-
	08	12,0	14,0	120	7,2	-	3,6	-	1,2	-
	09		14,4	150	6,5	-	-	-	0,75	-
	10		14,4	150	7,2	-	-	-	0,60	-
	11		14,0	150	-	10,0	-	5,0	-	0,8
	12		15,0	160	6,4	9,0	4,0	5,8	0,70	0,50
	13		14,0	190 (±15%)	-	10,0	-	5,0	-	0,8
	14	26,5	14,4	210	7,2	-	-	-	0,6	-
	15		14,4	320	7,2	-	-	-	0,6	-
	16		32,0	675	13,5	-	-	-	1,5	-
	17		30,0	700	-	22,0	-	12,0	-	1,5
	18		32,0	700	13,5	18,0	8,0	14,0	1,5	1,0
	19		30,0	935 (±15%)	-	22,0	-	12,0	-	1,5
	20	28,0	29,0	700	-	21,0	-	8,0	-	1,0
	21		29,0	935 (±15%)	-	21,0	-	8,0	-	1,0
	22		62,0	2500	25,0	-	-	-	2,5	-
	23	48,0	57,6	2500	28,8	-	-	-	2,4	-
	24		55,0	2600 (±15%)	-	40,0	-	20,0	-	2,5
	25		57,6	2800	28,8	-	-	-	2,4	-
	26		57,6	3500	28,8	-	-	-	2,4	-
	27		32,0	675	14,4	-	-	-	1,2	-
	28		24,0	32,0	830	14,4	-	-	-	1,2
	29	32,0		1250	14,4	-	-	-	1,2	-
	30	32,0		700	14,4	-	-	-	1,2	-
	31	5,0	-	40	3,0	-	-	-	0,25	-
	32	20,0	24,0	700	12,0	-	-	-	1,0	-
	33	6,0	7,2	40	3,3	-	-	-	0,35	-
014	01	5,0	6,0	27	2,7	3,8	1,65	2,4	0,29	0,21
	02	6,0	7,5	37	3,2	4,5	2,0	2,9	0,35	0,25
	06		7,5	47,5	3,5	4,5	2,0	2,9	0,35	0,25
	11	12,0	15	150	6,4	9,0	4,0	5,8	0,7	0,5
	13		15	190	7,0	9,0	4,0	5,8	0,7	0,5
	17	26,5	32	700	13,5	18,0	8,0	12,0	1,5	1,0
	19		32	935	14,5	19,0	8,0	12,0	1,5	1,0
	20	28,0	32	700	13,5	18,0	8,0	12,0	1,5	1,0
	21		32	935	14,5	19,0	8,0	12,0	1,5	1,0
24	48,0	55	2600	28,0	36,0	16,0	23,0	2,8	2,0	
021	01	6,0	7,2	40	3,6	-	-	-	0,3	-
	02		7,2	42	3,6	-	-	-	0,3	-
	03		7,2	60	3,6	-	-	-	0,3	-
	04	12,0	14,4	150	7,2	-	-	-	0,6	-
	05		14,4	210	7,2	-	-	-	0,6	-
	06		14,4	320	7,2	-	-	-	0,6	-
	07		32,0	675	14,4	-	-	-	1,2	-
	08	24,0	32,0	830	14,4	-	-	-	1,2	-
	09		32,0	1250	14,4	-	-	-	1,2	-
	10		57,6	2500	28,8	-	-	-	2,4	-
	11	48,0	57,6	2800	28,8	-	-	-	2,4	-
	12		57,6	3500	28,8	-	-	-	2,4	-
	13	5,0	6,0	40	3,0	-	-	-	0,25	-
	14	24,0	32,0	700	14,4	-	-	-	1,2	-
	15	20,0	24,0	700	10,6	-	-	-	1,0	-



# HALF SIZE CRYSTAL CAN RELAY 2 AMPERE DPDT

Series  
**2K-6600**

Mounting Variants (007)	
01	
02	
03	
04	
05	
06	
07	
08	
09	

Mounting Variants (007)	
10	
11	
12	
13	
14	
15	
16	
17	
<p><b>Note :</b></p> <ul style="list-style-type: none"> <li>- Can dimensions shown in ref. 01, apply to all variants</li> <li>- Dimensions are in inches (millimetres), tolerance <math>\pm 0,25</math> unless otherwise stated</li> </ul>	



# HALF SIZE CRYSTAL CAN RELAY 2 AMPERE DPDT

Series  
**2K-6600**

Mounting Variants (014)	
01	<p>Terminal Variants</p>
02	
03	
04	
05	
06	

Mounting Variants (014)	
07	
09	
14	
15	
16	
17	

Mounting Variants (021)	
01	<p>Terminal Variants</p>
02	
03	

Mounting Variants (021)	
04	
05	
<p>Note:</p> <ul style="list-style-type: none"> <li>- Can dimensions shown in ref. 01, apply to all variants</li> <li>- Dimensions are in inches (millimetres), tolerance <math>\pm 0,25</math> unless otherwise stated</li> </ul>	



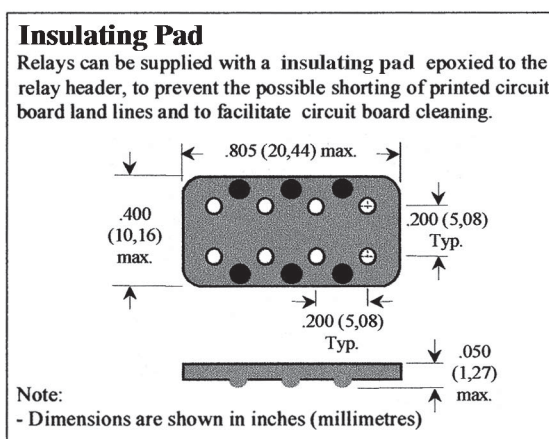
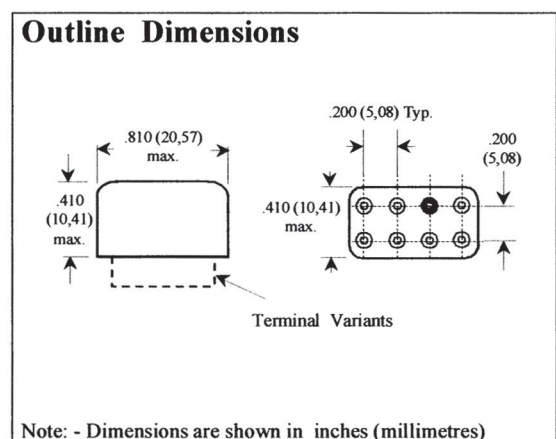
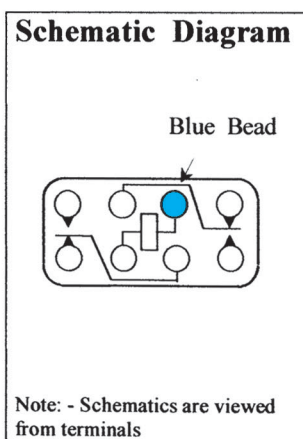
# HALF SIZE CRYSTAL CAN RELAY 2 AMPERE DPDT

Series  
**2K-6600**

Terminal Variants (007)				
01	02	03	04	05
<p>.190 (4,82) max.</p>	<p>.187 (4,75) ± .020 (0,50)</p>	<p>.133 (3,4) .114 (2,9)</p>	<p>1.500 (38,1) min.</p>	<p>3.0 (76) min.</p>
<p>Note :</p> <ul style="list-style-type: none"> <li>- Dimensions are shown in inches (millimetres)</li> <li>- Terminal spacing is .200 (5,08). Terminal diameter is .030 (0,76) +.003 (0,07) - .002 (0,05)</li> </ul>				

Terminal Variants (014)		
01	02	03
<p>.190 (4,82) max.</p>	<p>.187 (4,75) ± .020 (0,50)</p>	<p>.133 (3,4) .114 (2,9)</p>
<p>Note :</p> <ul style="list-style-type: none"> <li>- Dimensions are shown in inches (millimetres)</li> <li>- Terminal spacing is .200 (5,08). Terminal diameter is .030 (0,76) +.003 (0,07) - .002 (0,05)</li> </ul>		

Terminal Variants (021)		
11	12	13
<p>.190 (4,82) max.</p>	<p>.187 (4,75) ± .020 (0,50)</p>	<p>.133 (3,4) .114 (2,9)</p>
<p>Note :</p> <ul style="list-style-type: none"> <li>- Dimensions are shown in inches (millimetres)</li> <li>- Terminal spacing is .200 (5,08). Terminal diameter is .030 (0,76) +.003 (0,07) - .002 (0,05)</li> </ul>		



### How to Order

CECC Specification No.	<b>CECC 16101</b>	<b>-007</b>	<b>-01</b>	<b>-15</b>	<b>-01</b>	<b>-02</b>	<b>-P</b>
Type Code (CECC registration No.)							
Contact Code (applicable only for 021)							Insulating Pad (optional, only for 007 & 014)
Coil Variant Code							Terminal Variant
							Mounting Variant



**DESIGNED TO SURVIVE**





# HALF SIZE CRYSTAL CAN RELAY

## 2 AMPERE DPDT

coil transient Suppressed

Series  
2K-7940

### Product Description

A complete series of half crystal can hermetically sealed relays manufactured in compliance to the referenced Military specification.

The leading relay design in military and commercial application is represented in Nuova Hi-G Italia 2K-7940 series relay. The product advanced design provides superior performance in the environmental and operational requirements of today's sophisticated equipment.

This series type provide a coil transient suppression by a second coil in short-circuit.

The following construction features ensures the highest reliability in extreme environments:

- All welded relay construction
- Cleaning and sealing techniques ensures maximum internal cleanliness
- low level to 2 amp. switching
- 2 form C, DPDT contacts, special metal alloy with gold plating
- Frame, armature designs and force / mass ratio provides exceptional shock and vibration immunity

### Series Type

- 2K-7490 2form C, DPDT

### Environmental and Physical Specifications

Temperature (Ambient)	-65°C to + 125°C
Shock	100 g's, 6 msec.
Vibration (sinusoidal)	30 g's, 10 to 3000 Hz
Vibration (random)	0,4g <sup>2</sup> / Hz, 50 to 2000 Hz
Acceleration	50g's
Sealing	All welded, Hermetic
Weight	0,46 oz. (13,0 grams) max.



### Electrical Characteristics (over the Temperature range, unless otherwise noted)

<b>Coil Data</b>	See Typical Charateristics chart		
<b>Contact Rating</b>  (Note: All ratings with grounded case)	<b>Type load</b>	<b>Contact load</b>	<b>Cycles min.</b>
	Low level	10 to 50 $\mu$ A/10 to 50 mV dc or peak ac	1.000.000
	Resistive	2 Amp / 28 Vdc	100.000
		0,1 Amp / 115 Vac, 60 and 400 HZ	100.000
	Overload	4 Amp / 28 Vdc	100
Inductive	0,50 Amp / 28 Vdc (200 mH)	100.000	
Lamp	0,16 Amp / 28 Vdc	100.000	
<b>Contact Resistance</b>	0,05 ohm max. initial, 0,1 ohm max. after life high level, 0,15 ohm max. after low level		
<b>Operate Time</b>	5,0 msec. max.		
<b>Release Time</b>	5,0 msec. max.		
<b>Contact Bounce</b>	2,0 msec. max.		
<b>Contact stabilisation time</b>	2,5 msec. max.		
<b>Dielectrict Strength</b>	1000 Vrms min., 60 Hz, all point, 500 Vrms min. between open contacts and coil to case, at sea level	350 Vrms min., 60 Hz, all points at 70.000 ft.	
<b>Insulation Resistance</b>	10000 megohms min. all points at 500 Vdc		
<b>Intercontact Capacitance</b>	2,5 pF Between contact		
<b>Sensitivity</b>	1,0 watt max. at nominal rated coil voltage, at 25°C		



# HALF SIZE CRYSTAL CAN RELAY

## 2 AMPERE DPDT

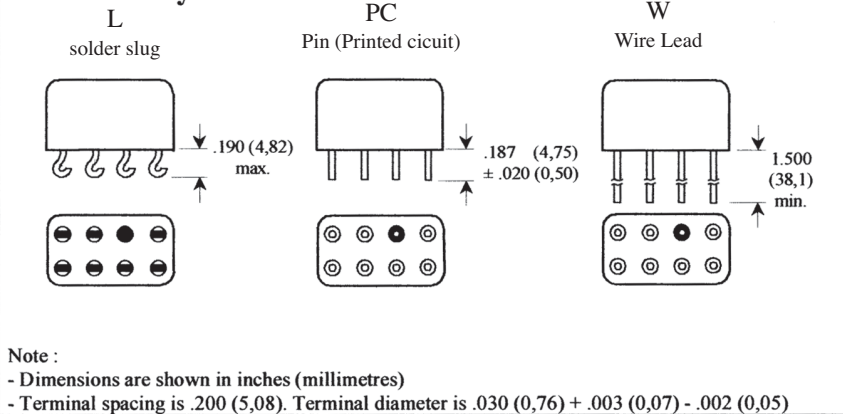
coil transient Suppressed

Series  
**2K-7940**

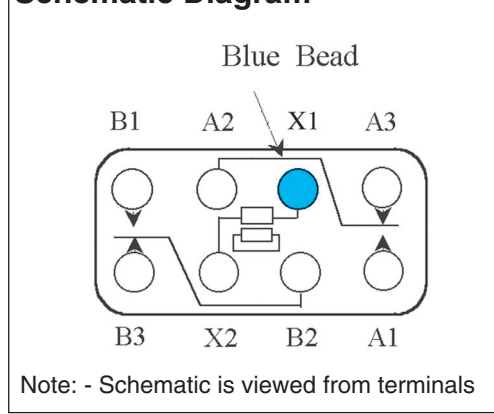
Typical Characteristics (over temperature range, unless otherwise noted)

Terminal Codes			Mounting Styles	Coil Voltage (Vdc)		DC coil Resistance ±10% at 25°C	Pick-up (Vdc) Max	Drop-out (Vdc)		Max. Coil Transient Voltage
Solder Lug (L)	Pin (PC)	Wire Lead (W)		Max.	Nom.			Max.	Min.	
004 007	005 008 009 010	006 008 010	B C None	32,0	26,5	700	20,0	14,0	1,00	48,0
011 014	012 015 016 017	013 015 017	B C None	15,0	12,0	160	9,6	5,8	0,50	24,0
018 021	019 022 023 024	020 022 024	B C None	7,5	6,0	40	4,8	2,9	0,25	12,0

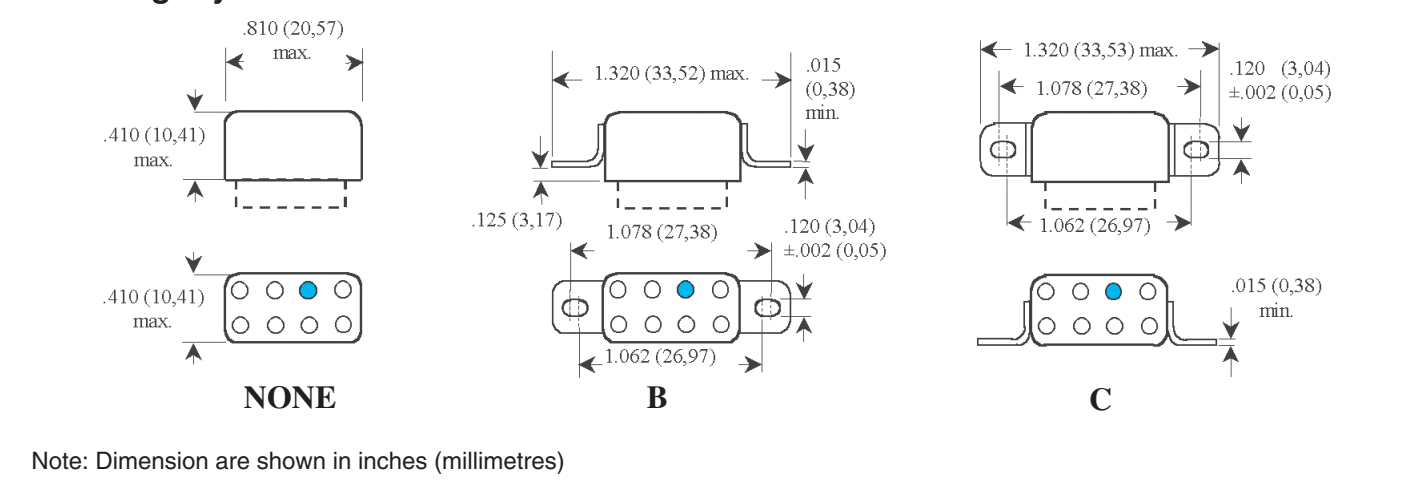
### Terminal Styles



### Schematic Diagram



### Mounting Styles



**Note:**  
1 Add the applicable suffix for failure Rate designation :  
Example: **2K - 7940 - 004A**

NB. Not listed on USA QPL

2 Failure Rate (Reliability Level)

Military Suffix	N-HiG Suffix	FR % / 10.000 Cycles
L	A	3,0
M	B	1,0

**How to Order (note 1) (Part Numbering System)**

**2K-7940 -004 A**

Series: \_\_\_\_\_  
Dash number (see characteristics table): \_\_\_\_\_  
Reliability levels A or B (note2): \_\_\_\_\_

Note: Relays compliant to MIL-R-39016/22 are designated 2K-7940 and Applicable dash numbers coincide with N Hi-G Italia dash numbers



# HALF SIZE CRYSTAL CAN RELAY 2 AMPERE SENSITIVE

Series  
KA

## Product Description

Innovation and versatility of design has allowed Nuova Hi-G Italia to achieve this improved sensitivity of our basic military qualified product. The product reflects an improved magnetic circuit powering our standard contact structure to levels of 2 amperes. The internal structures reflect and conform to the latest military specifications and are supported by a continuing qualification program. Product performance, reliability and sensitivity are reflected in this unique device and provide the design engineer with a tool for improved circuit design.

The following construction features ensure the highest reliability in extreme environments:

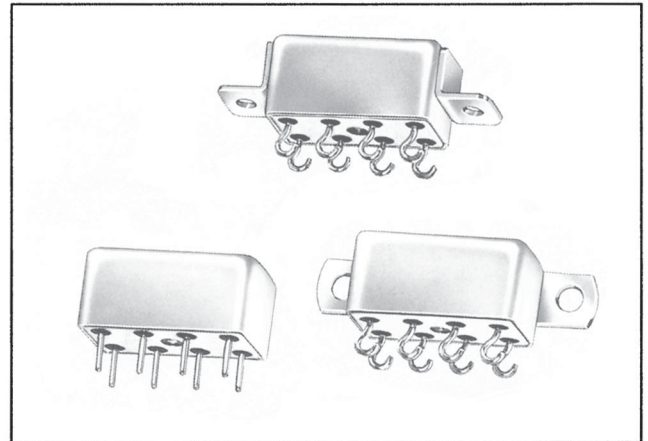
- All welded relay construction
- Cleaning and sealing techniques ensures maximum internal cleanliness
- Low level to 2 amp. switching
- 2 form C, DPDT contacts, special metal alloy with gold plating
- Frame, armature designs and force / mass ratio provides exceptional immunity to shock and vibration.

## Series Type

- 2KA 2 form C, DPDT

## Environmental and Physical Specifications

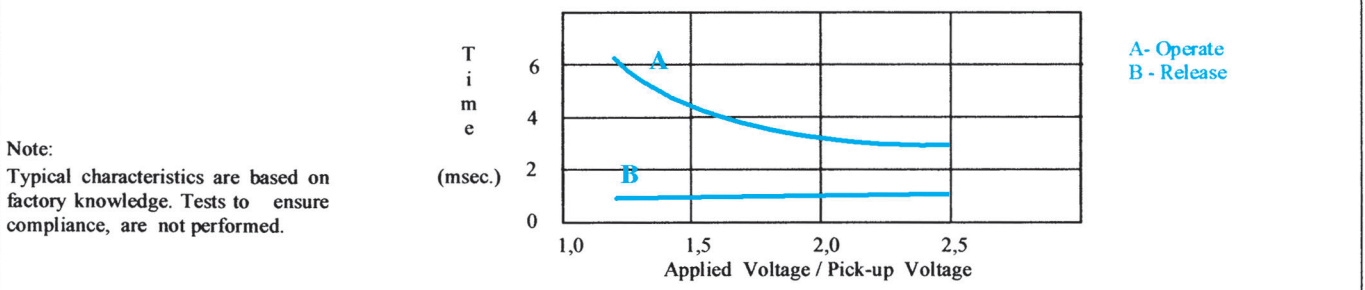
Temperature (Ambient)	-65°C to +125°C
Shock	100 g's, 6 msec.
Vibration (sinusoidal)	20 g's, 10 to 2000 Hz
Acceleration	30 g's
Sealing	All welded, Hermetic
Weight	0,35 oz. (10,0 grams) max.



## Electrical Characteristics (over the Temperature range, unless otherwise noted)

Coil Data	See Typical Characteristics chart		
Contact Rating  (Note : All ratings with grounded case)	Type load	Contact Load	Cycles min.
	Low Level	10 mA / 30 mV	1.000.000
	Resistive	2 Amp / 28 Vdc	100.000
		1 Amp / 115 Vac, 400 Hz	100.000
		0.3 Amp / 115 Vac, 60 Hz	100.000
	Resistive overload	4A / 28 Vdc	100
Inductive	0.75 Amp / 28 Vdc (200 mH)	100.000	
Contact Resistance	0,05 ohm max. initial		
Operate Time	5,0 msec. max. at 25 °C		
Release Time	3,0 msec. max. at 25 °C		
Contact Bounce	3,0 msec. max. at 25 °C		
Dielectric Strength	1000 Vrms min., 60 Hz, all points, 500 Vrms min., between open contacts and coil to case, at sea level		
Insulation Resistance	1000 megohms min. all points at 500 Vdc		
Intercontact Capacitance	2.5 pF Between contact		
Sensitivity	100 milliwatts at pick-up, 280 milliwatts at nominal rated coil voltage, at 25 °C		

Figure 1 - Operate & Release Time Curves, vs. Applied Voltage







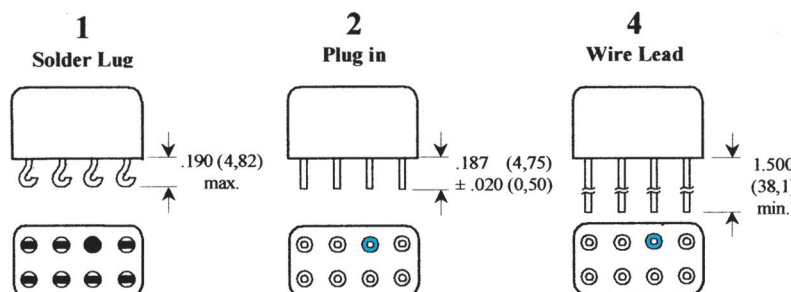
# HALF SIZE CRYSTAL CAN RELAY 2 AMPERE SENSITIVE

Series  
**KA**

## Typical Characteristics (over the Temperature range, unless otherwise noted)

Voltage Code	Coil Voltage		Coil Resistance ohms ±10% at 25 °C	Pick-up Vdc Max. at 25 °C	Drop-out Vdc Min. at 25 °C
	Nominal	Max.			
105	5,0	6	90	3,7	0,25
106	6,0	7,2	130	3,6	0,3
112	12,0	14	520	7,3	0,7
124	24	29	2070	17,5	1,4
126	26,5	32	2070	14,4	1,4
136	36	43	4550	26,0	2,2
148	48	57	8300	29,0	2,8

### Terminal Styles

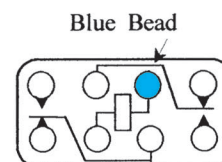


Note :

- Dimensions are shown in inches (millimetres)

- Terminal spacing is .200 (5,08). Terminal diameter is .030 (0,76) + .003 (0,07) - .002 (0,05)

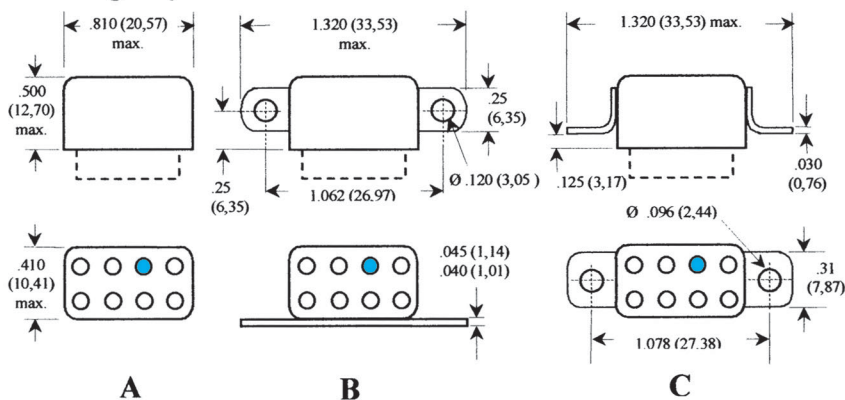
### Schematic Diagram



Note :

Schematic is viewed from terminals

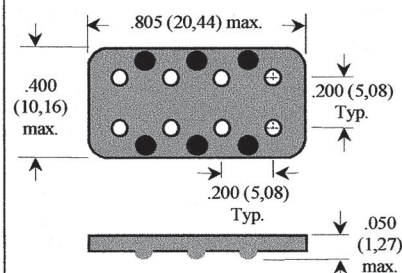
### Mounting Styles



Note : Dimensions are shown in inches (millimetres)

### Insulating Pad

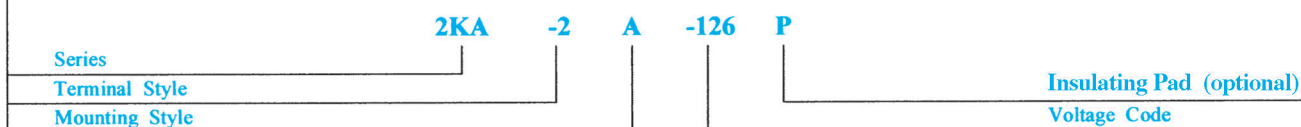
Relays can be supplied with an insulating pad epoxied to the relay header, to prevent the possible shorting of printed circuit board land lines and to facilitate circuit board cleaning. To order relay with pad add **P** to part Number. Example : **2KA-2A-126 P**



Note:

Dimensions are shown in inches (millimetres)

### How to Order (Part Numbering System)





# HALF SIZE CRYSTAL CAN RELAY 5 AMPERE DPDT

Series  
HA

## Product Description

A proven variation of our standard half size crystal can relay incorporates improved current carrying paths to provide 5 ampere switching.

The design is supported by our standard qualified military relays and their continued testing programs, together with the latest metallurgical innovations in contact materials and current carrying members. Reliability, product consistency and low cost are maintained through our volume production techniques.

The following construction features ensure the highest reliability in extreme environments:

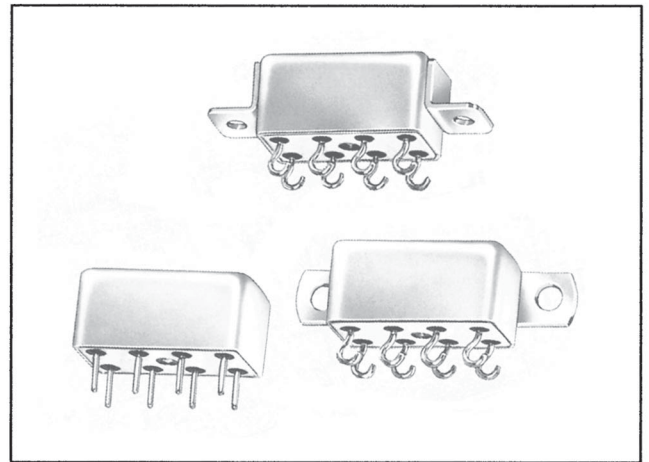
- All welded relay construction
- Cleaning and sealing techniques ensures maximum internal cleanliness
- 5 Amp. switching
- 2 form C, DPDT contacts, special metal alloy with gold plating
- Frame, armature designs and force / mass ratio provides exceptional immunity to shock and vibration.

## Series Type

- 2HA 2 form C, DPDT

## Environmental and Physical Specifications

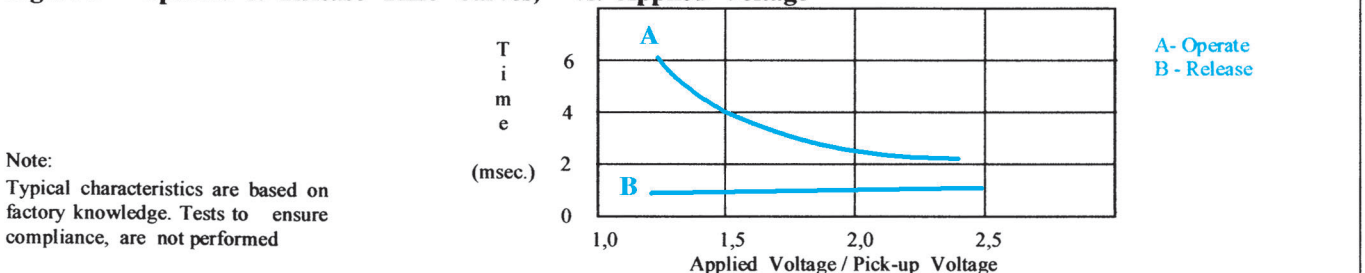
Temperature (Ambient)	-65°C to +125°C
Shock	100 g's, 6 msec.
Vibration (sinusoidal)	20 g's, 10 to 2000 Hz
Acceleration	30 g's
Sealing	All welded, Hermetic
Weight	0,35 oz. (10,0 grams) max.



## Electrical Characteristics (over the Temperature range, unless otherwise noted)

Coil Data	See Typical Characteristics chart		
Contact Rating	Type load	Contact Load	Cycles min.
(Note : All ratings with grounded case)	Resistive	5 Amp / 28 Vdc	100.000
		1 Amp / 115 Vac, 400 Hz	100.000
		0.3 Amp / 115 Vac, 60 Hz	100.000
	Inductive	10A / 28 Vdc	100
		0.75 Amp / 28 Vdc (200 mH)	100.000
Overload			
Contact Resistance	0,05 ohm max. initial		
Operate Time	4,0 msec. max. at 25 °C		
Release Time	3,0 msec. max. at 25 °C		
Contact Bounce	3,0 msec. max. at 25 °C		
Dielectric Strength	1000 Vrms min., 60 Hz, all points, 500 Vrms min. between open contacts and coil to case, at sea level		
Insulation Resistance	1000 megohms min. all points at 500 Vdc		
Intercontact Capacitance	2.5 pF Between contact		
Sensitivity	300 milliwatts at pick-up, 1,4 milliwatts at nominal rated coil voltage, at 25 °C		

Figure 1 - Operate & Release Time curves, vs. Applied Voltage





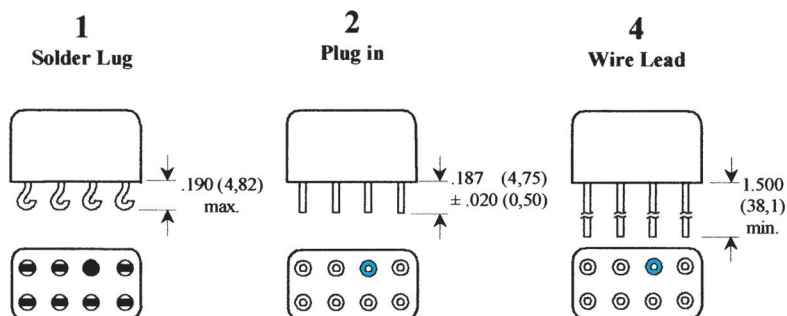
# HALF SIZE CRYSTAL CAN RELAY 5 AMPERE DPDT

Series  
HA

## Typical Characteristics (over the Temperature range, unless otherwise noted)

Voltage Code	Coil Voltage Vdc		Coil Resistance ohms ± 10% at 25 °C	Pick-up Vdc Max. at 25 °C	Drop-out Vdc Min. at 25 °C
	Nominal	Max.			
105	5	6	18	3,6	0,25
106	6,0	7,2	40	3,5	0,3
112	12,0	14	150	7,0	0,7
124	24	29	400	17,0	1,4
126	26,5	32	600	13,5	1,5
136	36	43	900	26,0	2,2
148	48	57	1600	34,0	2,8

### Terminal Styles

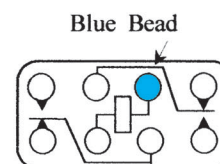


Note :

- Dimensions are shown in inches (millimetres)

- Terminal spacing is .200 (5,08). Terminal diameter is .030 (0,76) + .003 (0,07) - .002 (0,05)

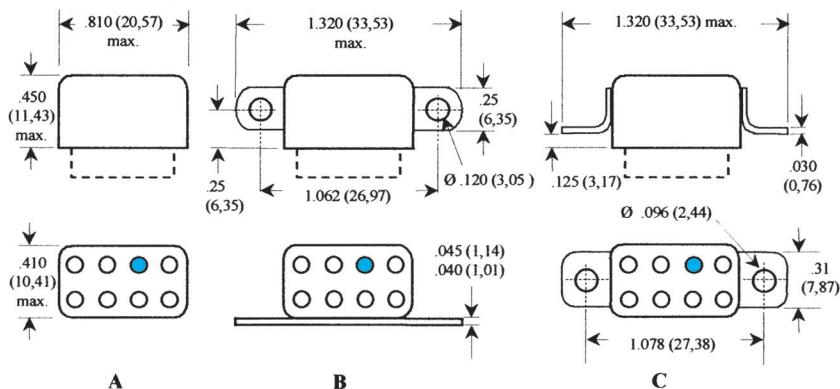
### Schematic Diagram



Note :

Schematic is viewed from terminals

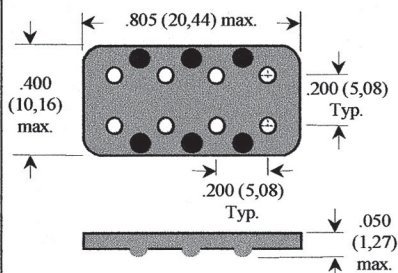
### Mounting Styles



Note : Dimensions are shown in inches (millimetres)

### Insulating Pad

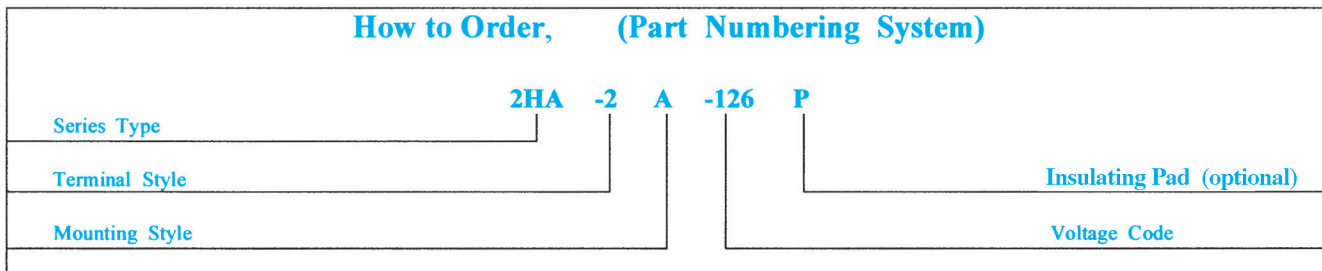
Relays can be supplied with an insulating pad epoxied to the relay header, to prevent the possible shorting of printed circuit board land lines and to facilitate circuit board cleaning. To order relay with pad add. P to part Number. Example : 2HA-2A-126 P



Note :

Dimensions are shown in inches (millimetres)

### How to Order, (Part Numbering System)





# FULL SIZE CRYSTAL CAN RELAY 2 AMPERE DC or AC COIL

Series  
B

## Product Description

This standard size crystal can relay series, offers switching capability of low level signals up 2 amperes under the most extreme environmental conditions.

The following construction features ensure the highest reliability in extreme environments:

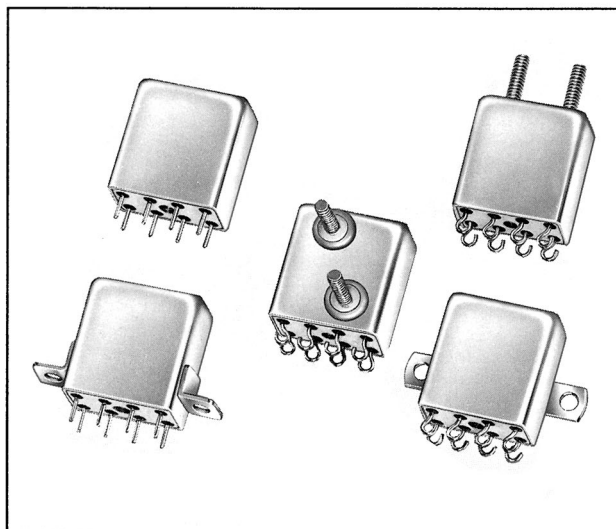
- All welded relay construction
- Cleaning and sealing techniques ensures maximum internal cleanliness
- Low level to 2 amp. switching
- 2 form C, DPDT contacts, special metal alloy with gold plating
- DC and AC coil

## Series Types

- **2B** Basic Relay, 2 form C, DPDT
- **2BR** Basic Relay with an internal bridge diode, for AC operation

## Environmental and Physical Specifications

Temperature (Ambient)	-65°C to +125°C
Shock	100 g's, 6 msec.
Vibration (sinusoidal)	20 g's, 10 to 2000 Hz
Acceleration	50 g's
Sealing	All welded, Hermetic
Weight	1 oz. (28,35 grams) max.



## Electrical Characteristics (over the Temperature range, unless otherwise noted)

<b>Coil Data</b>	See Typical Characteristics chart			
<b>Contact Rating</b>  (Note : All ratings with grounded case)	<b>Type load</b>	<b>Contact Load</b>		<b>Cycles min.</b>
		Low Level	10 mA / 30 mV	
	Resistive	Normal	2 Amp / 28 Vdc	100.000
			1 Amp / 115 Vac, 400 Hz	100.000
		Overload	0,3 Amp / 115 Vac, 60 Hz	100.000
			Inductive	4 A / 28 Vdc
		1 Amp / 28 Vdc (200 mH)	100.000	
<b>Contact Resistance</b>	0,05 ohm max. initial			
<b>Operate Time</b>	6,0 msec. max. at 25 °C, Series B	7,0 msec. max. at 25 °C, Series BR		
<b>Release Time</b>	3,0 msec. max. at 25 °C, Series B	10,0 msec. max. at 25 °C, Series BR		
<b>Contact Bounce</b>	3,0 msec. max. at 25 °C, Series B and BR			
<b>Dielectric Strength</b>	1000 Vrms min., 60 Hz, all points, 500 Vrms min. between open contacts and coil to case, at sea level			
<b>Insulation Resistance</b>	1000 megohms min. all points at 500 Vdc			
<b>Intercontact Capacitance</b>	2,5 pF Between contact			
<b>Sensitivity</b>	250 milliwatts at pick-up, 1,6 watts at nominal rated coil voltage, at 25 °C			



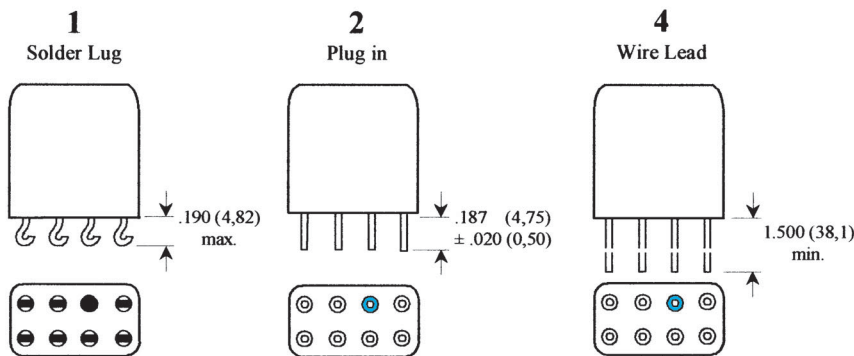
# FULL SIZE CRYSTAL CAN RELAY 2 AMPERE DC or AC COIL

Series  
B

## Typical Characteristics (over the Temperature range, unless otherwise noted)

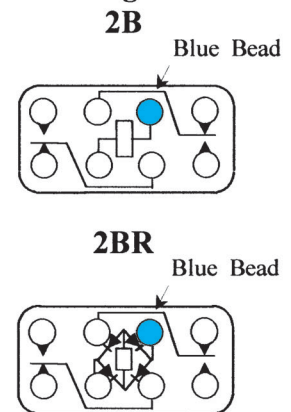
Series Types	Voltage Code	Coil Voltage		Coil Resistance ohms ± 10% at 25 °C	Pick-up Vdc Max. at 25 C	Drop-out Vdc Min. at 25 °C
		Nominal	Max.			
<b>2B</b>	106	6	7,2	40	3,1	0,5
	112	12	14,4	160	6,3	0,75
	126	26,5	32	675	13,0	1,5
	148	48	58	2500	25,0	2,5
	176	76	90	5000	35,0	3,0
<b>2BR</b>	126	26,5	32	600	15,0	2,0
	148	48	58	2000	28,0	3,0
	176	76	90	3500	44,0	4,0
	Note: AC operation, 60 to 400 Hz	215	115	125	10000	66,0

### Terminal Styles



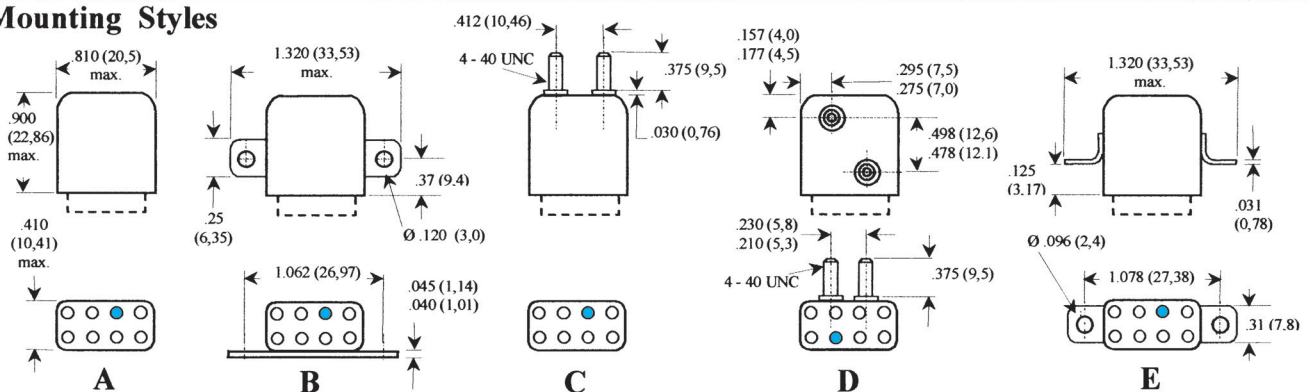
Note :  
- Dimensions are shown in inches (millimetres)  
- Terminal spacing is .200 (5,08). Terminal diameter is .030 (0,76) + .003 (0,07) - .002 (0,05)

### Schematic Diagrams



Note: - Schematics are viewed from terminals

### Mounting Styles



Note : - Dimensions are shown in inches (millimetres)

### How to Order (Part Numbering System)





# FULL SIZE CRYSTAL CAN RELAY 3 AMPERE DPDT

Series  
2B-6660

## Product Description

This standard size crystal can hermetically sealed relay series, offers switching capability of low level signals up 3 amperes under the most extreme environmental conditions, manufactured and qualified to the referenced CECC specifications.

The following construction features ensure the highest reliability in extreme environments:

- All welded relay construction
- Cleaning and sealing techniques ensures maximum internal cleanliness
- Low level to 3 amp. switching
- 2 form C, DPDT contacts, special metal alloy with gold plating

## Series Type

- 2B-6660 2 form C, DPDT

## Environmental and Physical Specifications

Temperature (Ambient)	-65°C to +125°C
Shock	50 g's, 11 msec., half sine wave
Vibration (sinusoidal)	20 g's, 10 to 2000 Hz, 1,5 amplitude peak
Bump	40 g's, 6 msec.,
Sealing	All welded, Hermetic
Weight	0,7 oz. (28,5 grams) max.
Finish	Bright tin lead plated terminals and case



## Electrical Characteristics (over the Temperature range, unless otherwise noted)

Coil Data	See Typical Characteristics chart		
	Type Load	Contact Load	Cycles min.
Contact Rating  (Note : All ratings with grounded case)	Low Level	10 mA / 30 mV max.	1.000.000
	Resistive	3 Amp / 28 Vdc,	100.000
	Inductive	6 Amp / 28 Vdc 0,75 Amp / 28 Vdc (200 mH)	100 100.000
Overload			
Contact Resistance	0,05 ohm max. initial, 0,2 ohm max after life		
Operate Time	6,5 msec. max. at 25°C		
Release Time	3,0 msec. max. at 25°C		
Contact Bounce	3,0 msec. max. at 25°C		
Dielectric Strength	1000 Vrms min., 60 Hz, all points at sea level		
Insulation Resistance	1000 megohms min. all points at 500 Vdc		
Intercontact Capacitance	2.5 pF typical		
Sensitivity	250 milliwatts at pick-up, 1,2 watts max. at nominal rated coil voltage, at 25 °C		



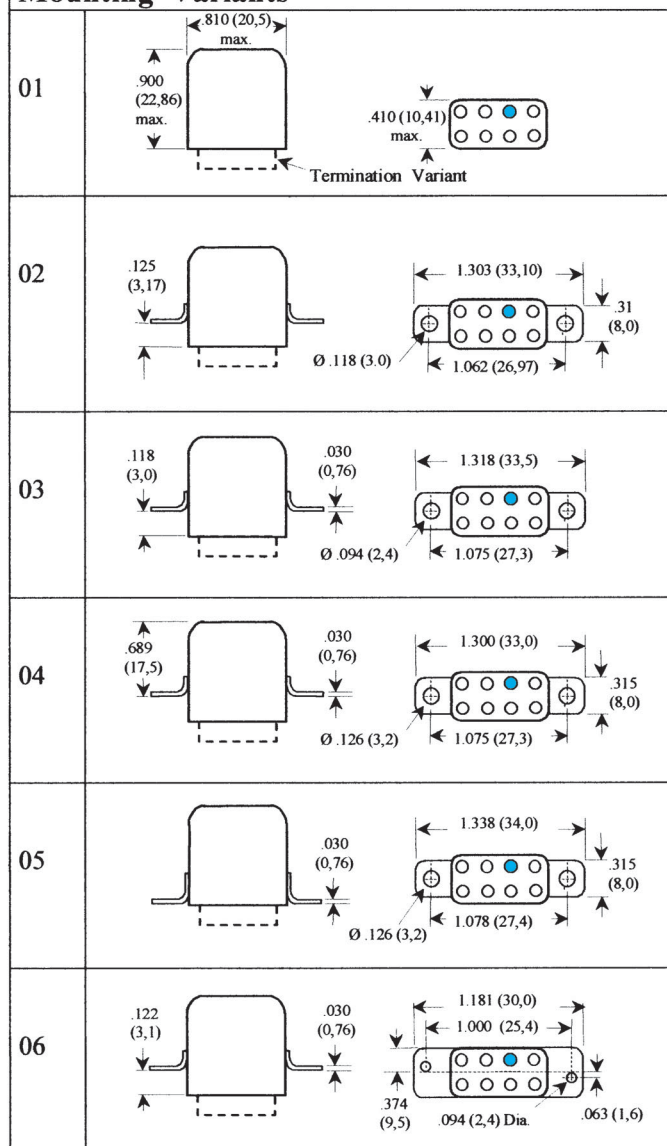
# FULL SIZE CRYSTAL CAN RELAY 3 AMPERE DPDT

Series  
2B-6660

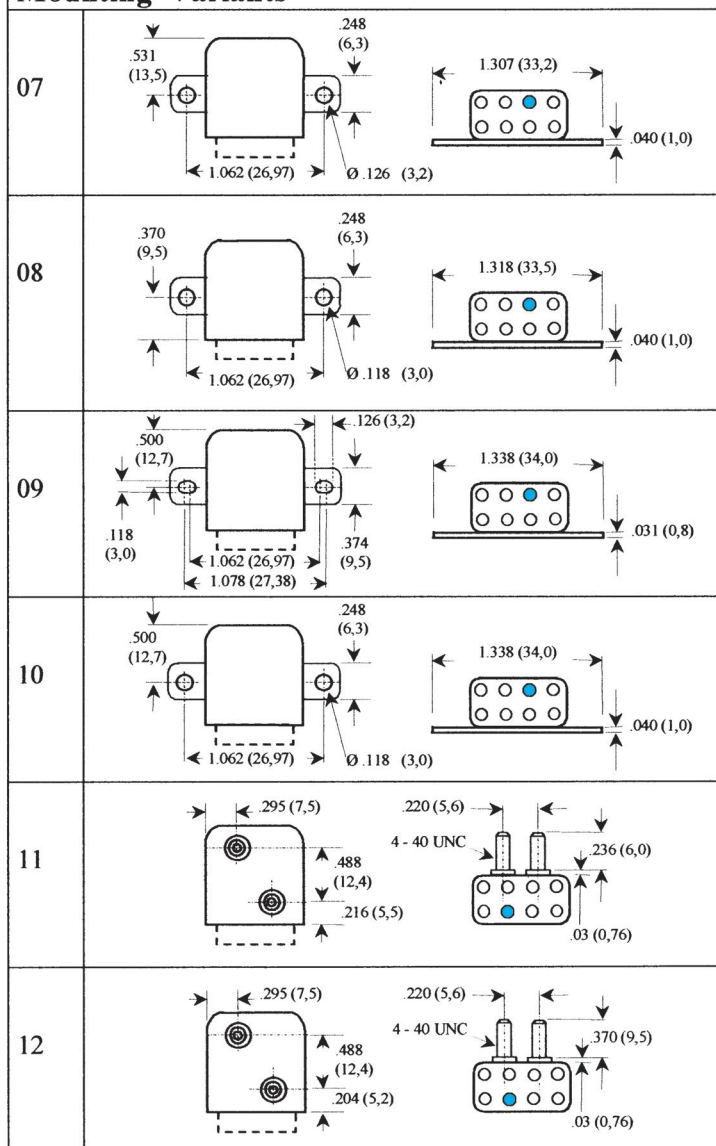
## Typical Characteristics

Coil Variant Code	Coil Voltage V dc		Coil Resistance ohms ± 10% at 25 °C	Operate Voltage V dc Max. at		Release Voltage V dc			
	Rated	Max.		25 °C	125 °C	Non-release at		Must-release at	
						25 °C	125 °C	25 °C	-65 °C
01	6,0	7,0	30	-	5,0	-	2,5	-	0,4
02		7,2	35	3,6	-	-	-	0,30	-
03		7,2	40	3,1	-	-	-	0,50	-
04		7,3	44	-	4,2	-	-	-	0,14
05	12,0	14,0	145	-	10,0	-	5,0	-	0,8
06		14,4	160	6,3	-	-	-	0,75	-
07		14,7	194	-	8,9	-	-	-	0,32
08		14,4	200	7,2	-	-	-	0,60	-
09	24,0	32,0	675	14,4	-	-	-	1,2	-
10	26,5	32,0	675	-	18,0	-	14,0	-	1,5
11		32,0	675	13,0	-	-	-	1,5	-
12		30,0	700	-	22,0	-	12,0	-	1,5
13	48,0	55,0	2300	-	40,0	-	20,0	-	2,9
14		57,6	2450	28,3	-	-	-	2,4	-
15		58,0	2500	25,0	-	-	-	2,5	-
16	76,0	90,0	5000	35,0	-	-	-	3,0	-

## Mounting Variants



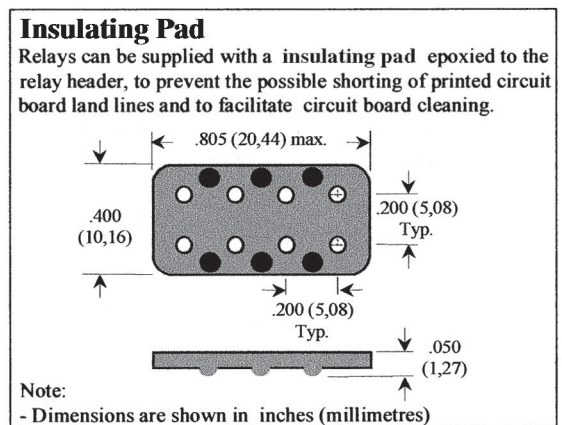
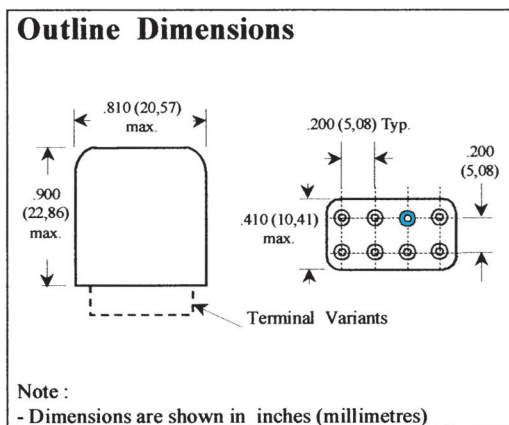
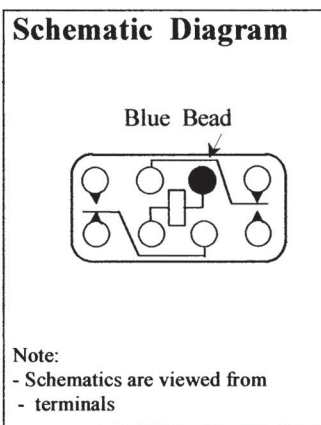
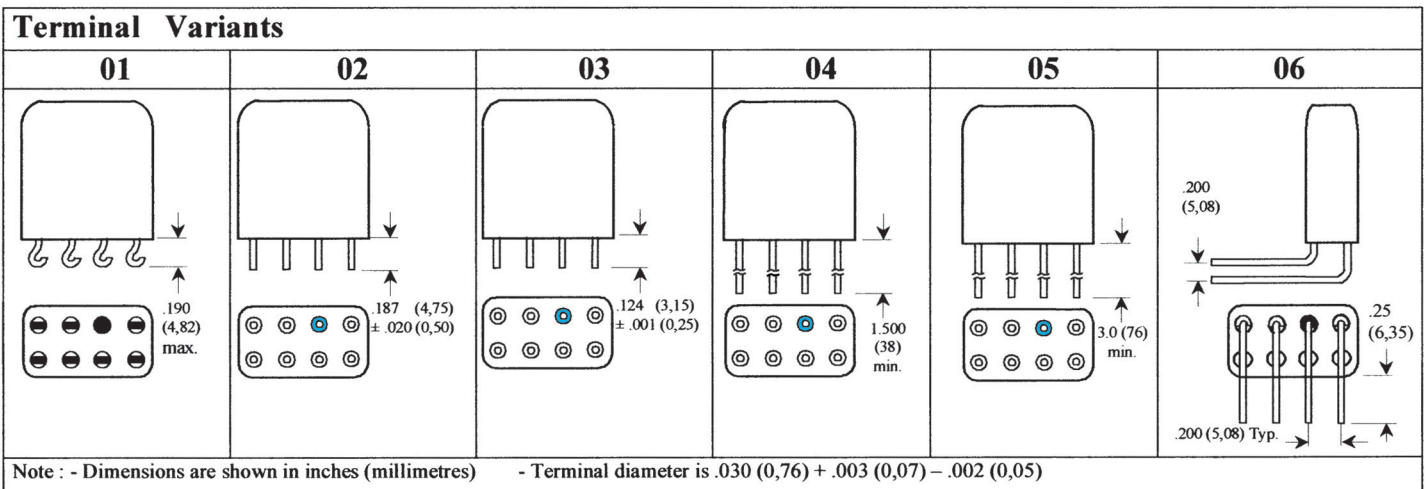
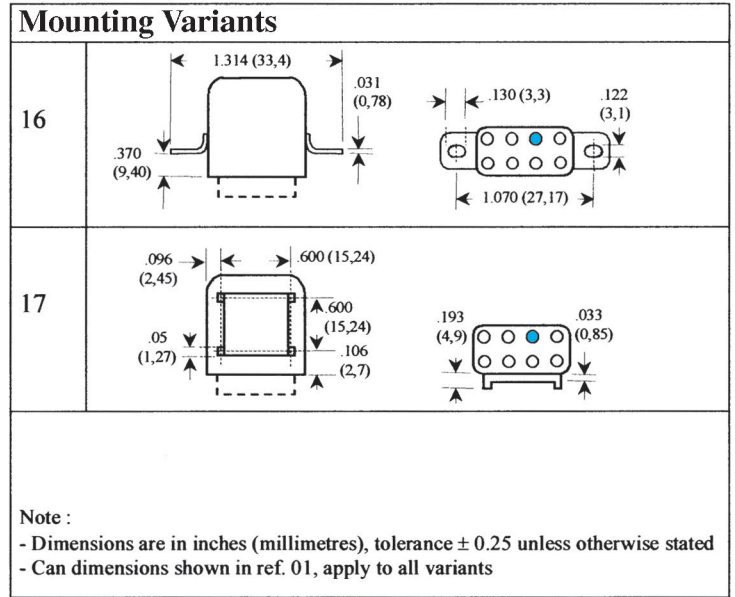
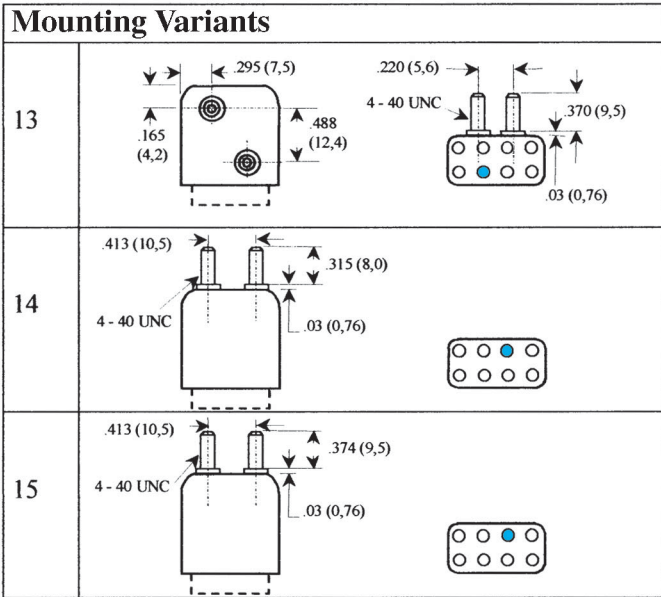
## Mounting Variants





# FULL SIZE CRYSTAL CAN RELAY 3 AMPERE DPDT

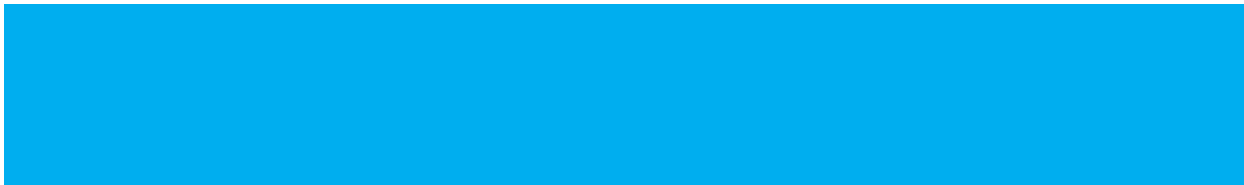
Series  
**2B-6660**



### How to Order

CECC Specification No.	CECC 16101	- 008	- 16	- 09	- 01	- P
Type Code (CECC registration No.)						
Coil Variant Code						
						Insulating Pad (optional)
						Terminal Variant
						Mounting Variant





**DESIGNED TO SURVIVE**





# FULL SIZE CRYSTAL CAN RELAY 2 AMPERE DPDT

Series  
**2B -7506**

## Product Description

A complete series of full crystal can hermetically sealed relays manufactured in compliance to the referenced Military specification.

The leading relay design in military and commercial application is represented in Nuova Hi-G Italia 2B-7506 series relay. The product advanced design provides superior performance in the environmental and operational requirements of today's sophisticated equipment.

The following construction features ensures the highest reliability in extreme environments:

- All welded relay construction
- Cleaning and sealing techniques ensures maximum internal cleanliness
- Low level to 2 amp. switching
- 2 form C, DPDT contacts, special metal alloy with gold plating
- Frame, armature designs and force / mass ratio provides exceptional shock and vibration immunity

## Series Type

- **2B-7506** 2 form C, DPDT

## Environmental and Physical Specifications

Temperature (Ambient)	-65°C to + 125°C
Shock	100 g's, 6 m sec.
Vibration (sinusoidal)	20 g's, 10 to 2000 Hz
Acceleration	50 g's
Sealing	All welded, Hermetic
Weight	0,8 oz. (22,68 grams) max.



## Electrical Characteristics (over the Temperature range, unless otherwise noted)

<b>Coil Data</b>	See Typical Characteristics chart				
<b>Contact Rating</b>  (Note: All ratings with grounded case)	<b>Type load</b>	<b>Contact load</b>		<b>Cycles min.</b>	
		<b>High Level</b>	<b>Low Level</b>		
	<b>Resistive</b>	2 Amp / 28 Vdc 0,3 Amp/115Vac, 60 and 400 HZ	10 to 50 µA / 10 to 50 mV		100.000 100.000
	<b>Overload</b>	4 Amp / 28 Vdc	NA		100
	<b>Inductive</b>	1,0 Amp / 28 Vdc (200 mH)	NA		100.000
	<b>Lamp</b>	0,1 Amp / 28 Vdc	NA	100.000	
<b>Contact Resistance</b>	0,05 ohm max. initial; 0,1 ohm max. after life high level; 0,15 ohm max. after low level				
<b>Operate Time</b>	6,0 msec. max.				
<b>Release Time</b>	6,0 msec. max.				
<b>Contact Bounce</b>	High level 1,0 msec. max. ; low level 2,0 msec. max.				
<b>Dielectric strength</b>	1000 vrms min., 60 Hz, all points, 500 Vrms min., Between open contacts and coil to case, at sea level		350 Vrms min., 60 Hz, all points at 70.000 ft.		
<b>Insulation Resistance</b>	1000 megohms min. all points at 500 Vdc				
<b>Intercontact Capacitance</b>	2,5 pF between contact				
<b>Sensitivity</b>	1,0 watt max. at nominal rated coil voltage, at 25°C				

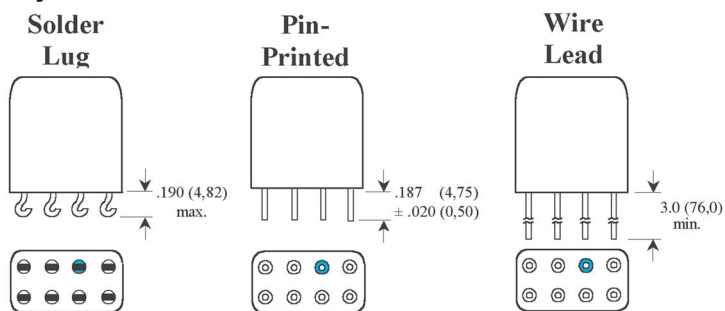


# FULL SIZE CRYSTAL CAN RELAY 2 AMPERE DPDT

Series  
**2B -7506**

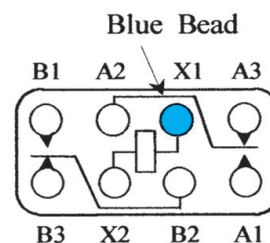
Mounting Styles							Terminal Styles	Coil Resistance ohms ± 10 % at 25°C	OPERATE PARAMETERS				
LOW LEVEL CONTACTS		HIGH LEVEL CONTACTS			None				Coil Voltage Vdc		P.I. Vdc	D.O. Vdc	
Stud	B	Side	Stud	A			B		Max.	Nom.	Max.	Max.	Min.
						-052	Solder Lug	675	32,0	26,5	18,0	14,0	1,5
						-053	Wire Lead	675	32,0	26,5	18,0	14,0	1,5
						-054	Pin	675	32,0	26,5	18,0	14,0	1,5
-015		-035	-037	-039	-043		Solder Lug	675	32,0	26,5	18,0	14,0	1,5
-016		-036	-038				Wire Lead	675	32,0	26,5	18,0	14,0	1,5
	-022			-040	-044		Pin	675	32,0	26,5	18,0	14,0	1,5
				-067		-060	Pin	194	14,7	12,0	8,9	6,0	0,32
						-059	Pin	44	7,3	6,0	4,2	3,0	0,14

## Terminal Styles



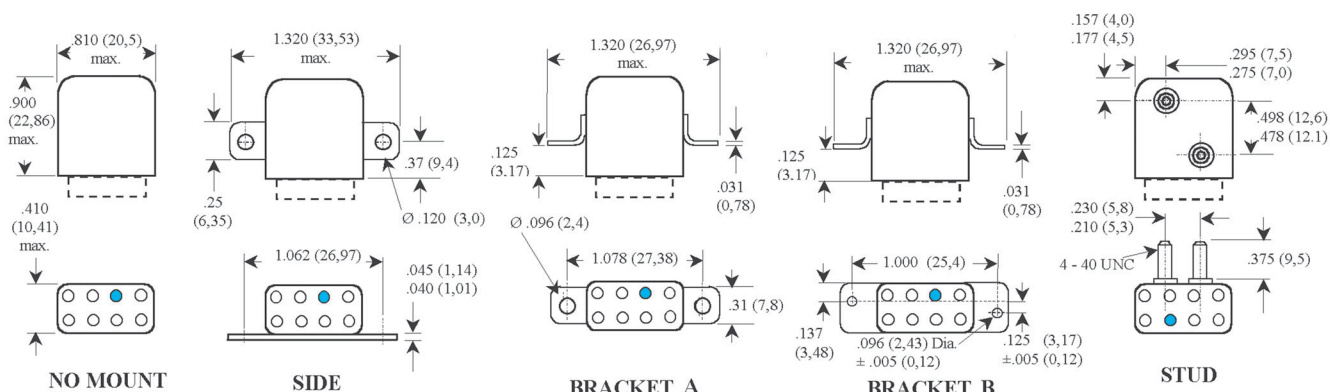
Note:  
- Dimension are shown in inches (millimetres)  
- Terminal spacing is .200 (5,08). Terminal diameter is .030 (0,76) + .003 (0,07) - .002 (0,05)

## Schematic Diagram



Note: - Schematic is viewed from terminals

## Mounting Styles



Note: - Dimension are shown inches (millimeters)

## How to Order

## (Part Numbering System)

2B-7506

-015

P

Series

Dash number (see characteristics table)

Insulating pad (optional) See half crystal series

Note: Relays compliant to MIL-R-5757/10 are designated 2B-7506 and Applicable dash numbers coincide with N Hi-G Italia dash numbers



# FULL SIZE CRYSTAL CAN RELAY SENSITIVE 25,40 and 100 MILLIWATT

Series  
BS

## Product Description

This ultra sensitive full size crystal can relay series, offers switching capability of low level signals up 2 amperes under the most extreme environmental conditions. It's low coil sensitivity and high contact current carrying capacity makes these relays ideal for a variety of applications. In a unique design, motor efficiency and the proven contact structure of qualified relays, offer sensitivities from 25 milliwatts with low level switching to 2 amperes. Low profile, proven designs and wide selection of coil values provide the designer with a consistent high quality product for today's and tomorrow design. These series replace the previous BA, BC and BK series.

The following construction features ensure the highest reliability in extreme environments:

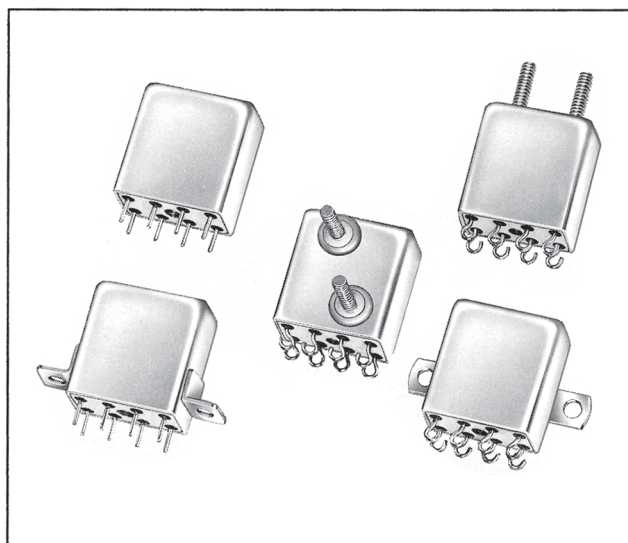
- All welded relay construction
- Cleaning and sealing techniques ensures maximum internal cleanliness
- Low level to 2 amp. switching
- 1 or 2 form C, SPDT or DPDT contacts, special metal alloy with gold plating

## Series Types

- 2BSA 2 form C, DPDT, 100 milliwatts sensitivity
- 1BSK 1 form C, SPDT, 25 milliwatts sensitivity
- 2BSK 2 form C, DPDT, 40 milliwatts sensitivity

## Environmental and Physical Specifications

Temperature (Ambient)	-65°C to +125°C
Shock	100 g's, 6 msec.
Vibration (sinusoidal)	20 g's, 10 to 2000 Hz
Acceleration	30 g's
Sealing	All welded, Hermetic
Weight	1 oz. (28,35 grams) max.



## Electrical Characteristics (over the Temperature range, unless otherwise noted)

Coil Data	See Typical Characteristics chart		
Contact Rating  (Note: All ratings with grounded case)	Type load		Cycles min.
	Low Level Resistive	10 mA / 30 mV	1.000.000
		2 Amp / 28 Vdc	100.000
		1 Amp / 115 Vac, 400 Hz	100.000
		0.3 Amp / 115 Vac, 60 Hz	100.000
	Overload Inductive	4A / 28 Vdc	100
0.75 Amp / 28 Vdc (200 mH)		100.000	
Contact Resistance	0,05 ohm max. initial		
Operate Time	6,5 msec. max. at 25°C, series BSA	8.0 msec. max. at 25°C, series BSK	
Release Time	4,0 msec. max. at 25°C, series BSA	4.0 msec. max. at 25°C, series BSK	
Contact Bounce	3,0 msec. max. at 25°C, series BSA	4.0 msec. max. at 25°C, series BSK	
Dielectric Strength	1000 Vrms min., 60 Hz, all points, 500 Vrms min., between open contacts and coil to case, at sea level		
Insulation Resistance	1000 megohms min. all points at 500 Vdc		
Intercontact Capacitance	2.5 pF Between contacts		
Sensitivity	Series BSK: 25 milliwatts SPDT, 40 milliwatts DPDT at pick-up at 25°C Series BSA 100 milliwatts at pick-up, at 25°C		

## Typical Characteristics (over the Temperature range, unless otherwise noted)

Voltage Code	Coil Voltage Vdc		Coil Resistance ohms ± 10% at 25 °C	Pick-up Vdc Max. at 25 °C	Drop-out Vdc Min. at 25 °C
	Nominal	Max.			
106	6,0	7,2	120	3,5	0,5
112	12,0	14,4	480	7,0	1,0
126	26,5	32,0	2250	15,0	2,0



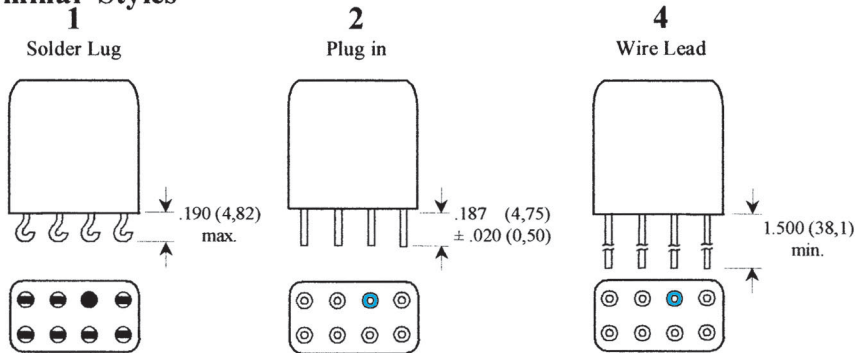
# FULL SIZE CRYSTAL CAN RELAY SENSITIVE 25,40 and 100 MILLIWATT

Series  
BS

## Typical Characteristics (over the Temperature range, unless otherwise noted)

Voltage Code	Series Type 2BSK - DPDT - 40 mW					Series Type 1BSK - SPDT - 25 mW			
	Coil Res. ohms at 25 °C ± 10 %	Nominal Coil Voltage Vdc	Nominal Coil Current mA	Pick-up mA Max, at 25°C	Drop-out mA Min, at 25°C	Nominal Coil Voltage Vdc	Nominal Coil Current mA	Pick-up mA Max, at 25°C	Drop-out mA Min, at 25°C
101	20	1,8	89,2	44,6	4,5	1,4	70,6	35,3	3,5
102	30	2,2	73,0	36,5	3,7	1,8	57,6	28,8	2,9
103	50	2,8	56,6	28,3	2,8	2,2	44,6	22,3	2,3
104	75	3,5	46,2	23,1	2,3	2,8	36,6	18,3	1,8
105	100	4,0	40,0	20,0	2,0	3,2	31,6	15,8	1,6
106	200	5,7	28,4	14,2	1,4	4,5	22,4	11,2	1,2
107	300	7,0	23,0	11,5	1,2	5,5	18,2	9,1	0,90
109	500	9,0	17,8	8,9	0,90	7,1	14,2	7,1	0,70
112	875	12,0	13,5	6,8	0,70	9,4	10,7	5,4	0,54
113	1000	12,6	12,6	6,3	0,64	10,0	10,0	5,0	0,50
118	2000	18,0	8,9	4,5	0,50	14,2	7,1	3,6	0,36
120	2500	20,0	8,0	4,0	0,40	15,8	6,3	3,2	0,32
128	5000	28,0	5,6	2,8	0,30	22,5	4,5	2,3	0,23
135	7000	32,0	4,8	2,4	0,24	28,0	3,8	1,9	0,18
140	10000	40,0	4,0	2,0	0,20	32,0	3,2	1,6	0,16

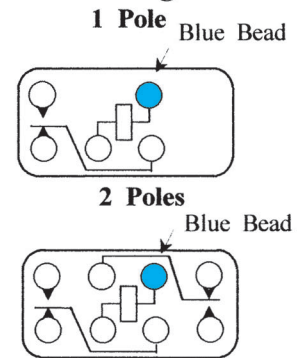
### Terminal Styles



Note :

- Dimensions are shown in inches (millimetres)
- Terminal spacing is .200 (5,08). Terminal diameter is .030 (0,76) + .003 (0,07) - .002 (0,05)

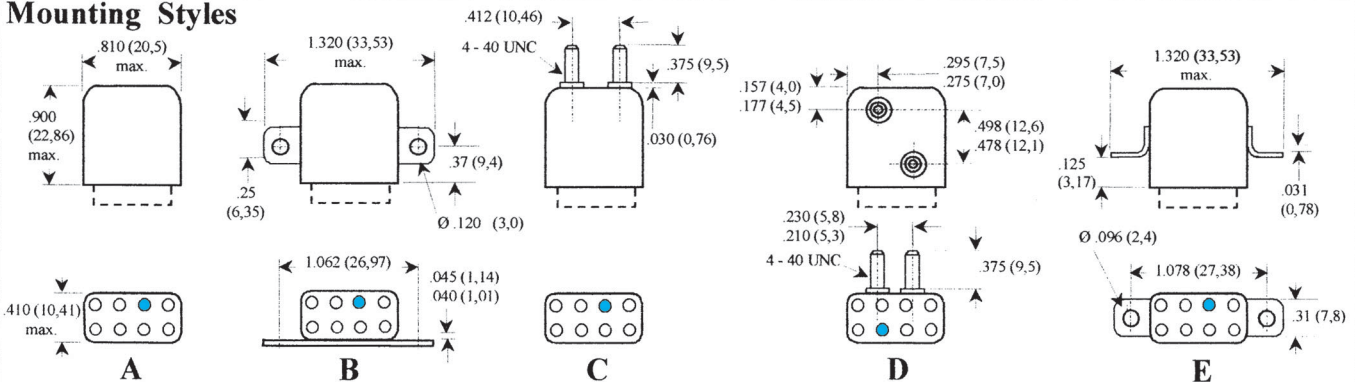
### Schematic Diagrams



Note:

Schematics are viewed from terminals

### Mounting Styles



Note : -Dimensions are shown in inches (millimetres)

### How to Order (Part Numbering System)

Series Type	2BSK	-1	C	-120	P	Insulating pad (optional) see half crystal series
Terminal Style						Voltage code
						Mounting Style



# FULL SIZE CRYSTAL CAN RELAY 5 AMPERE

Series  
BN

## Product Description

An innovation in design with emphasis on material technology developments have allowed NHI-GI to manufacture this high sensitivity 5 amperes crystal can relay. The selection of contacts and all current carrying parts, have resulted in this highly reliable, sensitive, fully hermetically sealed relay.

This relay meets all the switching and environmental conditions of demanding military environments.

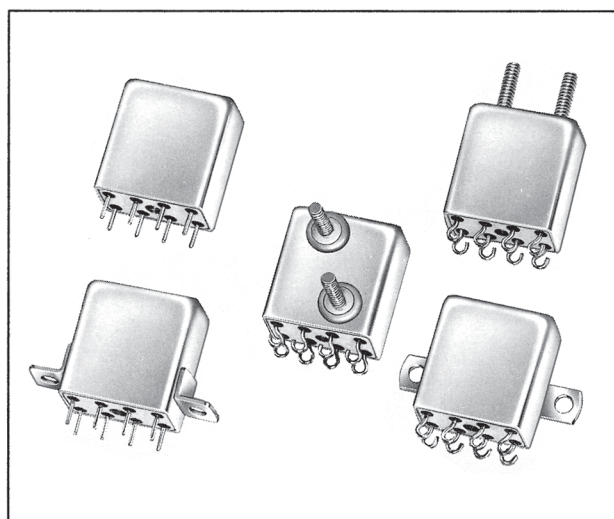
- All welded relay construction
- Cleaning and sealing techniques ensures maximum internal cleanliness
- 5 amp. switching
- Contacts, special metal alloy with gold plating

## Series Types

- 1BN 1 form C, SPDT
- 2BN 2 form C, DPDT

## Environmental and Physical Specifications

Temperature (Ambient)	-65°C to +125°C
Shock	100 g's, 6 msec
Vibration (sinusoidal)	20 g's, 10 to 2000 Hz
Acceleration	30 g's
Sealing	All welded, Hermetic
Weight	1 oz. (28.35 grams) max.



## Electrical Characteristics (over the Temperature range, unless otherwise noted)

Coil Data	See Typical Characteristics chart			
Contact Rating  (Note : All ratings with grounded case)	Type Load	Contact Load		
		Cycles min.		
	Resistive	5Amp / 28 Vdc		100.000
		3 Amp/ 115 Vac, 400 Hz		100.000
		2 Amp/ 115 Vac, 60 Hz		100.000
Inductive overload	10 Amp / 28 Vdc		100	
	1 Amp/ 28 Vdc (200 mH)		100.000	
Contact Resistance	0,02 ohm max. initial			
Operate Time	6,0 msec. max. at 25°C			
Release Time	3,0 msec. max. at 25°C			
Contact Bounce	2,0 msec. max. at 25°C			
Dielectric Strength	1000 Vrms min, 60 Hz, between contact to case, 500 Vrms min. , 60 Hz, between contacts and coil to case, at sea level			
Insulation Resistance	1000 megohms min. all points at 500 Vdc			
Intercontact Capacitance	2.5 pF typical			
Sensitivity	280 milliwatts at pick-up, 1,3 watts max. at nominal rated coil voltage, at 25 °C			



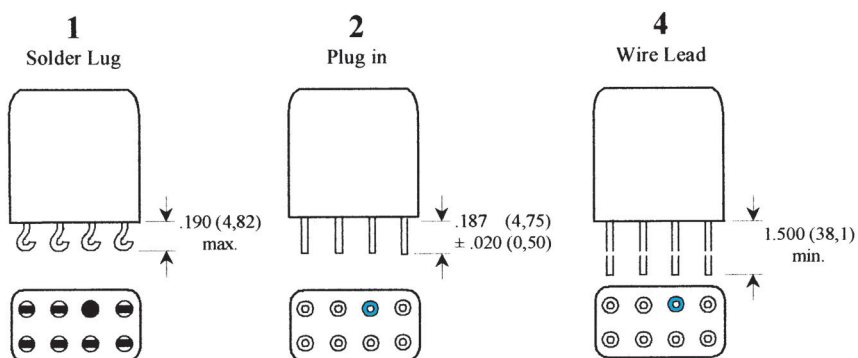
# FULL SIZE CRYSTAL CAN RELAY 5 AMPERE

Series  
BN

## Typical Characteristics (over the temperature range, unless otherwise noted)

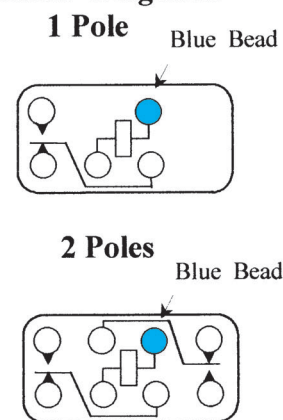
Coil Voltage Code	Coil Voltage V dc		Coil Resistance ohms ± 10% at 25 °C	Pick-up Vdc Max. at 25°C	Drop-out Vdc Min. at 25°C
	Rated	Max.			
106	6	7,2	35	3,1	0,5
112	12	14,4	140	6,3	0,75
126	26,5	32	600	13,0	1,5
148	48	58	2200	25,0	2,5
176	76	90	4400	35,0	3,0

### Terminal Styles



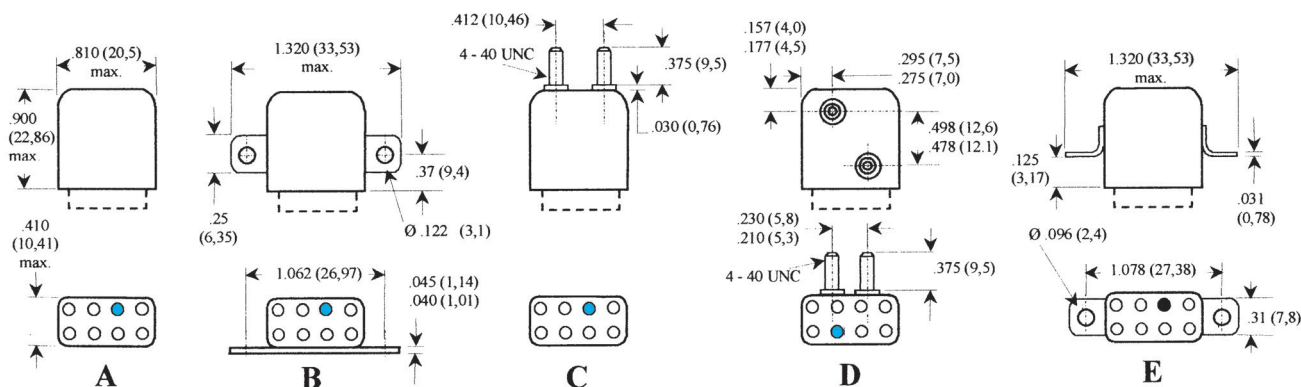
Note :  
- Dimensions are shown in inches (millimetres)  
- Terminal spacing is .200 (5,08). Terminal diameter is  $.030$  (0,76) +  $.003$  (0,07) -  $.002$  (0,05)

### Schematic Diagrams



Note :  
- Schematic is viewed from terminals

### Mounting Styles



Note : - Dimensions are shown in inches (millimetres)

### How to Order (Part Numbering System)

Series Type: **2BN** - 1 **C** - 126 **P** Insulating pad (optional) see half crystal series  
 Terminal Style: \_\_\_\_\_ Coil Voltage Code: \_\_\_\_\_  
 \_\_\_\_\_ Mounting Style: \_\_\_\_\_



# FULL SIZE CRYSTAL CAN RELAY 2 AMPERE SENSITIVE

Series  
**2BC-7201**

## Product Description

A complete series of full crystal can hermetically sealed relays manufactured in compliance to the referenced Military specification.

The leading relay design in military and commercial application is represented in Nuova Hi-G Italia 2BC-7201 series relay. The product advanced design provides superior performance in the environmental and operational requirements of today's sophisticated equipment.

The following construction features ensures the highest reliability in extreme environments:

- All welded relay construction
- Cleaning and sealing techniques ensures maximum internal cleanliness
- Low level to 2 amp. switching
- 2 form C, DPDT contacts, special metal alloy with gold plating
- Frame, armature designs and force / mass ratio provides exceptional shock and vibration immunity

## Series Type

- **2BC-7201** 2 form C, DPDT

## Environmental and Physical Specifications

Temperature (Ambient)	-65°C to + 125°C
Shock	100 g's, 6 msec.
Vibration (sinusoidal)	15 g's, 10 to 2000 Hz
Acceleration	30 g's
Sealing	All welded, Hermetic
Weight	1 oz. (28,35 grams)max.



## Electrical Characteristics (over the Temperature range, unless otherwise noted)

Coil Data	See Typical Characteristics chart		
Contact Rating	Type load	Contact load	Cycles min.
(Note: All ratings with grounded case)	Low Level	10 to 50 $\mu$ A / 10 to 50 mV	100.000
	Resistive	2 Amp / 28 Vdc	100.000
		0,3 Amp/115Vac, 60 and 400Hz	100.000
	Inductive	0,75 Amp / 28 Vdc (200 mH)	100.000
	Lamp	0,1 Amp / 28 Vdc	100.000
<b>Contact Resistance</b>	0,05 ohm max. initial 0,1 ohm max. after life high level 0,15 ohm max. after low level		
<b>Operate Time</b>	15,0 msec. max.		
<b>Release Time</b>	10,0 msec. max.		
<b>Contact Bounce</b>	2,0 msec. max.		
<b>Dielectric strength</b>	1000 vrms min., 60 Hz, all points, 500 Vrms min., Bet ween open contacts and coil to case, at sea level	350 Vrms min., 60 Hz, all points at 70.000 ft.	
<b>Insulation Resistance</b>	1000 megohms min. all points at 500 Vdc		
<b>Intercontact Capacitance</b>	2,5 pF between contact		
<b>Sensitivity</b>	1,0 watt max. at nominal rated coil voltage, at 25°C		



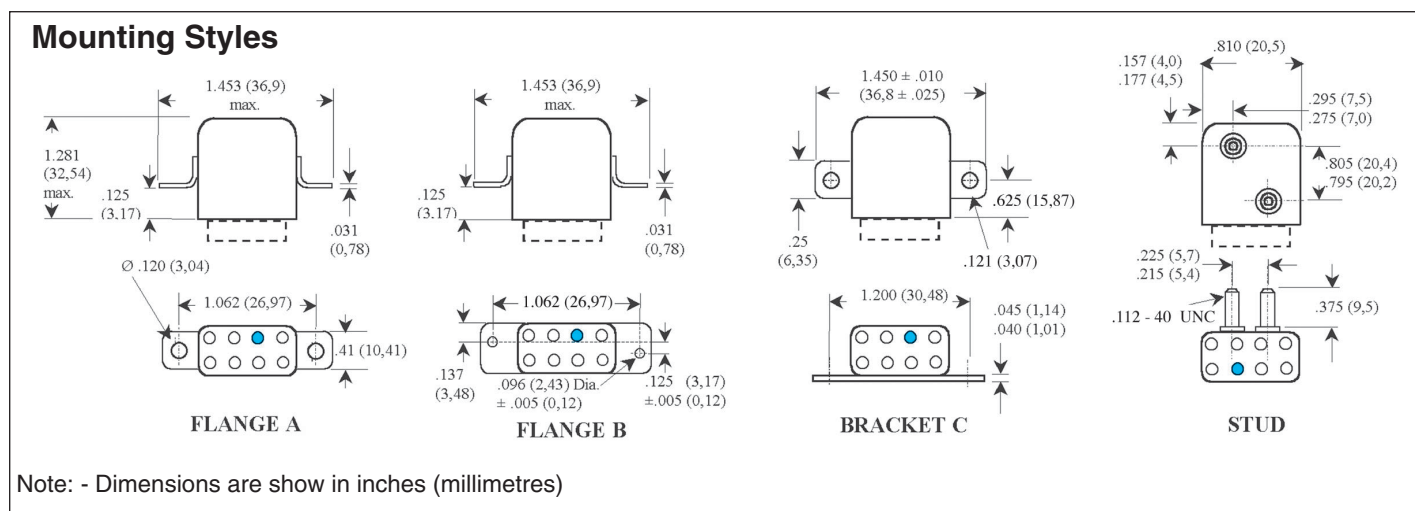
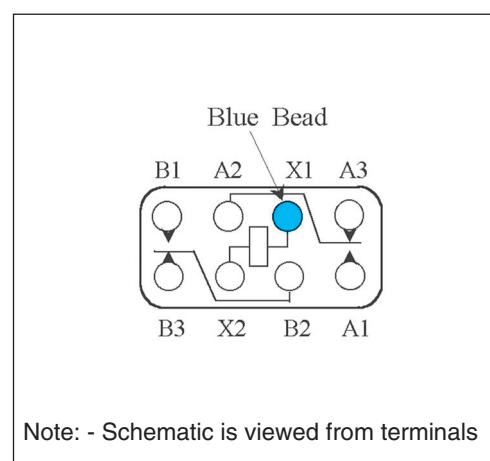
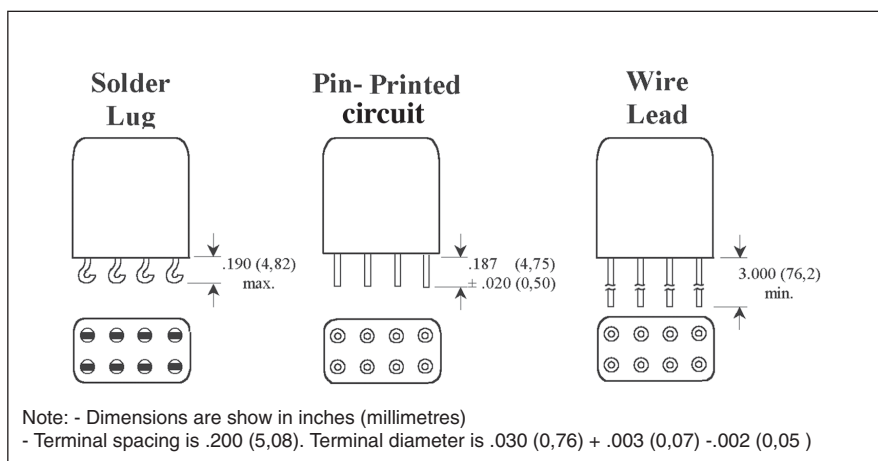


# FULL SIZE CRYSTAL CAN RELAY 2 AMPERE SENSITIVE

Series  
**2BC-7201**

## Typical Characteristics

TERMINAL MOUNTING	Lug	Lug	Lug	Lug	PC	Wire	Coil Resistance ohms ±10% at 25°C	OPERATE PARAMETERS			
	Flange A	Flange B	Bracket C	Stud	Flange A	Stud		Coil Current mAdc Nom.	Pull-in mAdc Max.	Drop-out mAdc	
									Max.	Min.	
	-083	-104	-134	-114	-093	-124	20	90,0	45,0	22,5	4,5
	-084	-105	-135	-115	-094	-125	100	40,0	20,0	10,0	2,0
					-095		200	28,4	14,2	10,0	1,4
	-085	-106	-136	-116	-096	-126	500	18,0	9,0	4,5	0,9
	-086	-107	-137	-117	-097	-127	1000	13,0	6,5	3,1	0,65
	-087	-108	-138	-118	-098	-128	1500	11,0	5,2	2,6	0,52
	-088	-109	-139	-119	-099	-129	2000	9,0	4,5	2,2	0,50
	-089	-110	-140	-120	-100	-130	2500	8,0	4,0	2,0	0,40
	-090	-111	-141	-121	-101	-131	5000	6,0	2,8	1,4	0,30
	-091	-112	-142	-122	-102	-132	8000	5,0	2,3	1,1	0,23
	-092	-113	-143	-123	-103	-133	10000	4,0	2,0	1,0	0,20



### How to Order (Part Numbering System)

**Series**: 2BC-7201

**Dash number (see characteristics table)**: -041

**Insulating pad (optional) See half crystal series**: P

Note: Relays compliant to MIL-R-5757/13 are designated 2BC-7201 and applicable dash numbers coincide with N Hi-G Italia dash numbers



# FULL SIZE CRYSTAL CAN RELAY 5 AMPERE SENSITIVE

Series  
BCN

## Product Description

An innovation in design with emphasis on material technology developments have allowed NH-GI to manufacture this high sensitivity 5 amperes crystal can relay. The selection of contacts and all current carrying parts, have resulted in this highly reliable, sensitive, fully hermetically sealed relay. This relay meets all the switching and environmental conditions of demanding military environments.

- All welded relay construction
- Cleaning and sealing techniques ensures maximum internal cleanliness
- 5 amp. switching
- Contacts, special metal alloy with gold plating

## Series Types

- 1BCN 1 form C, SPDT
- 2BCN 2 form C, DPDT

## Environmental and Physical Specifications

Temperature (Ambient)	-65°C to +125°C
Shock	100 g's, 6 msec
Vibration (sinusoidal)	20 g's, 10 to 2000 Hz
Acceleration	50 g's
Sealing	All welded, Hermetic
Weight	1 oz. (28.35 grams) max.



## Electrical Characteristics (over the Temperature range, unless otherwise noted)

Coil Data	See Typical Characteristics chart		
Contact Rating  (Note : All ratings with grounded case)	Type Load	Resistive	Cycles min.
		Resistive overload	100
	Contact Load	5Amp / 28 Vdc	100.000
		3 Amp/ 115 Vac, 400 Hz	100.000
		2 Amp/ 115 Vac, 60 Hz	100.000
Inductive	10 Amp / 28 Vdc 1 Amp/ 28 Vdc (200 mH)	100 100.000	
Contact Resistance	0,02 ohm max. initial		
Operate Time	15,0 msec. max. at 25°C		
Release Time	4,0 msec. max. at 25°C		
Contact Bounce	2,0 msec. max. at 25°C		
Dielectric Strength	1000 Vrms min., 60 Hz, between contact to case, 500 Vrms min. , 60 Hz between contacts and coil to case, at sea level		
Insulation Resistance	1000 megohms min. all points at 500 Vdc		
Intercontact Capacitance	2,5 pF typical		
Sensitivity	80 milliwatts at pick-up, 320 milliwatts max. at nominal rated coil voltage at 25 °C		



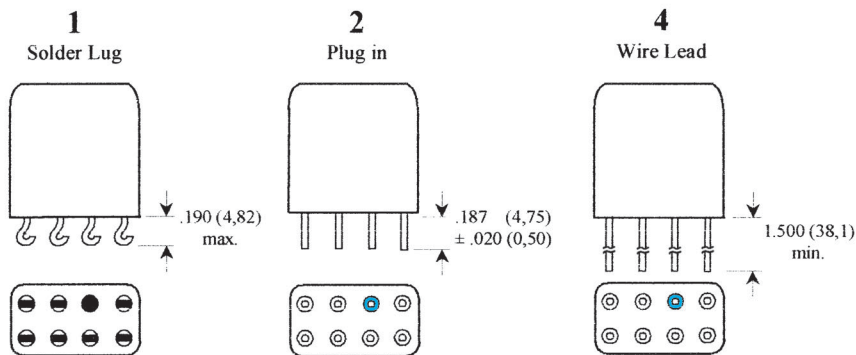
# FULL SIZE CRYSTAL CAN RELAY 5 AMPERE SENSITIVE

Series  
BCN

## Typical Characteristics (over the temperature range, unless otherwise noted)

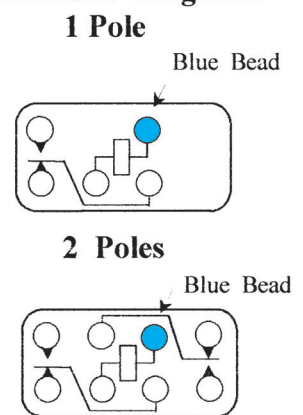
Coil Voltage Code	Coil Voltage Vdc Nominal	Coil Current mA Nominal	Coil Resistance ohms ± 10% at 25 °C	Pick-up mA Max. at 25°C	Drop-out mA Min. at 25 °C
106	6,0	54,5	110	27,3	3,0
112	12,0	26,7	450	13,4	1,4
128	28,0	11,2	2500	5,6	0,6
140	40,0	8,0	5000	4,0	0,4

## Terminal Styles



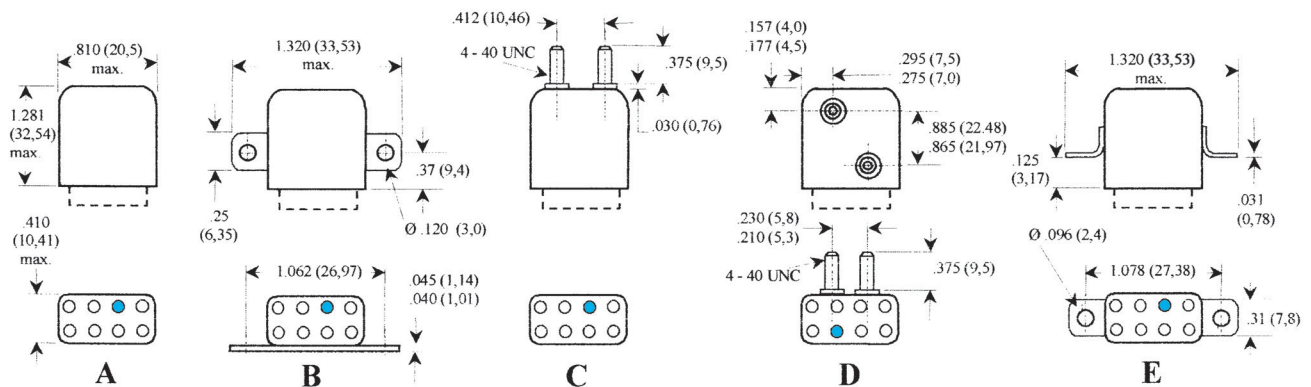
Note :  
- Dimensions are shown in inches (millimetres)  
- Terminal spacing is .200 (5,08). Terminal diameter is .030 (0,76) + .003 (0,07) - .002 (0,05)

## Schematic Diagrams



Note :  
- Schematic is viewed from terminals

## Mounting Styles



Note: - Dimensions are shown in inches (millimetres)

## How to Order (Part Numbering System)

Series Type	2BCN - 1	C - 128	P	Insulating Pad (optional) See half crystal series
Terminal Style				Coil Voltage Code
				Mounting Style



# FOUR POLE CRYSTAL CAN RELAY 2 AMPERE

Series  
4B

## Product Description

A four pole relay design, compatible with the popular 0.2 grid pin spacing. The design employs a common actuator system to each of the four double pole, double throw contacts, and provides reliable simultaneous operation of each pole. Powered by a wide latitude of coil resistance providing sensitivity of 100 milliwatts per contacts. Switching capabilities from low level to 2 amperes. Environmental stability to the extreme temperatures.

The following construction features ensure the highest reliability in extreme environments:

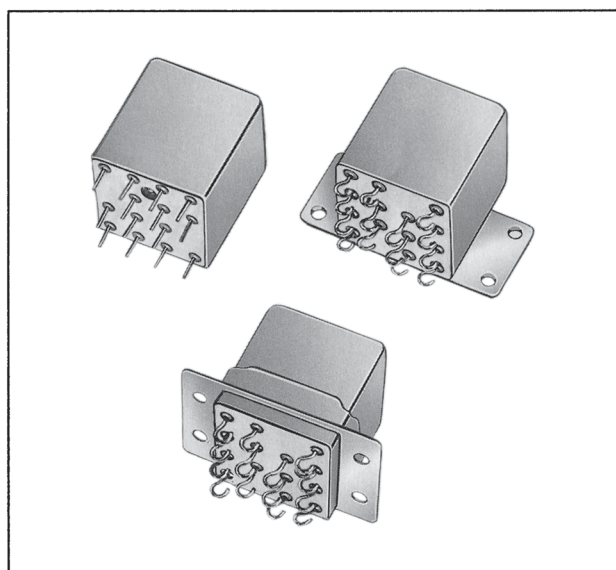
- All welded relay construction
- Cleaning and sealing techniques ensures maximum internal cleanliness
- Low level to 2 amp. switching
- 4 form C, 4PDT contacts, special metal alloy with gold plating

## Series Type

- 4B 4 form C, 4PDT

## Environmental and Physical Specifications

Temperature (Ambient)	-65°C to +125°C
Shock	100 g's, 6 msec.
Vibration (sinusoidal)	20 g's, 10 to 2000 Hz
Acceleration	30 g's
Sealing	All welded, Hermetic
Weight	1 oz. (28,35 grams) max.



## Electrical Characteristics (over the Temperature range, unless otherwise noted)

Coil Data	See Typical Characteristics chart			
Contact Rating  (Note : All ratings with grounded case)	Type load	Low Level	10 mA / 30 mV	1.000.000
		Resistive	2 Amp / 28 Vdc	100.000
	overload		1 Amp / 115 Vac, 400 Hz	100.000
			0.3 Amp / 115 Vac, 60 Hz	100.000
			4A / 28 Vdc	100
			0.75 Amp / 28 Vdc (200 mH)	100.000
Contact Resistance	0,05 ohm max. initial			
Operate Time	6,0 msec. max. at 25°C			
Release Time	4,0 msec. max. at 25°C			
Contact Bounce	3,0 msec. max. at 25 °C			
Dielectric Strength	1000 Vrms min. , 60 Hz, all points, 500 Vrms min. between open contacts and coil to case, at sea level			
Insulation Resistance	1000 megohms min. all points at 500 Vdc			
Intercontact Capacitance	2,5 pF Between contact			
Sensitivity	400 milliwatts at pick-up, 1,2 watts at nominal rated coil voltage at 25 °C			



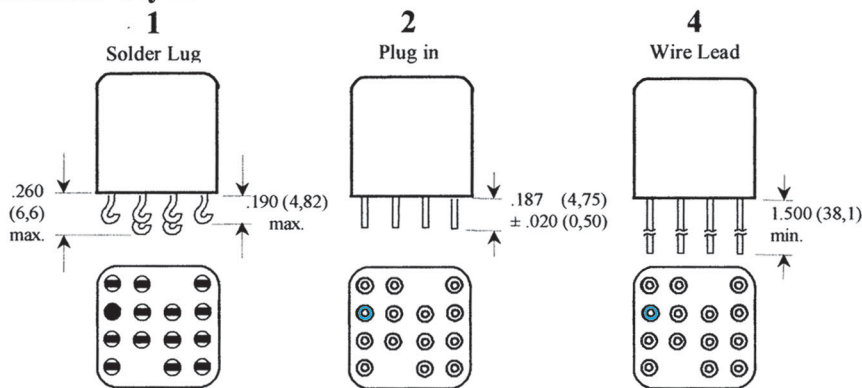
# FOUR POLE CRYSTAL CAN RELAY 2 AMPERE

Series  
4B

## Typical Characteristics (over the Temperature range, unless otherwise noted)

Voltage Code	Coil Voltage		Coil Resistance ohms ± 10% at 25 °C	Pick-up Vdc Max. at 25 °C	Drop-out Vdc Min. at 25 °C
	Nominal	Max.			
106	6,0	7,2	30	3,5	0,5
112	12,0	14,4	125	7,0	1,0
126	26,5	32,0	570	15,0	2,0
148	48,0	58,00	2000	28,0	3,0
176	76,0	90,0	4500	44,0	4,0
215	115	125	9500	66,0	5,0

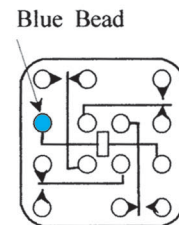
### Terminal Styles



Note :

- Dimensions are shown in inches (millimetres)
- Terminal spacing is .200 (5,08). Terminal diameter is .030 (0,76) + .003 (0,07) - .002 (0,05)

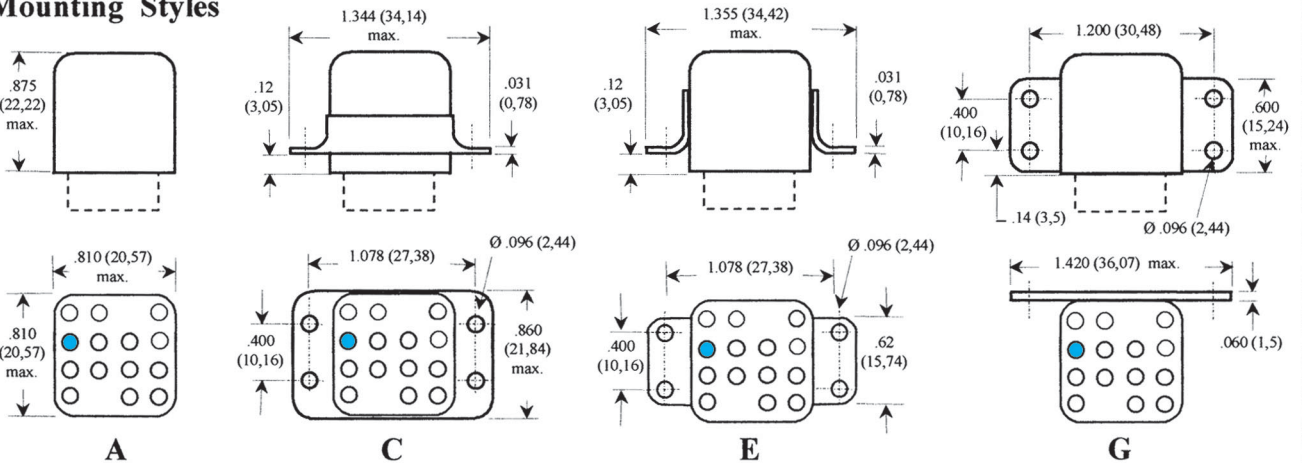
### Schematic Diagram



Note :

Schematics are viewed from terminals

### Mounting Styles

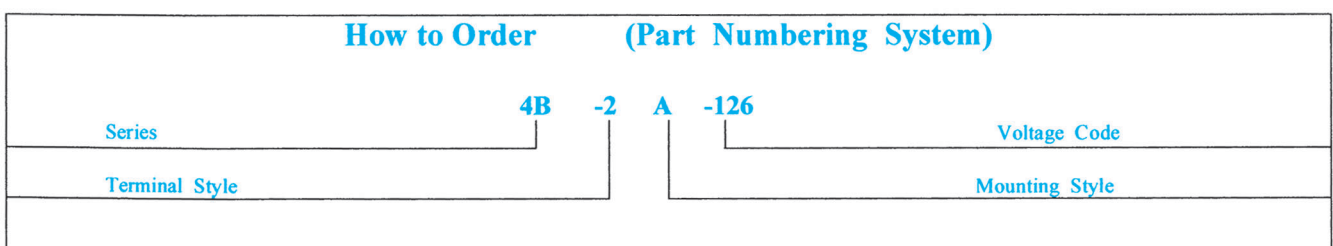


Note :

- Dimensions are shown in inches (millimetres)

### How to Order

### (Part Numbering System)





# CRYSTAL CAN RELAY 10 AMPERE DC or AC COIL

Series  
T

## Product Description

The economical approach to high current switching in a relay design for commercial and military applications. Through unique design innovations, this device incorporates an optimised magnetic structure and massive contact switching paths in less than 0.65 cubic inches. With proven switching characteristics of 10 amperes in excess of 100.000 operations under all environments, it performs in a wide variety of switching applications.

The following construction features ensure the highest reliability in extreme environments:

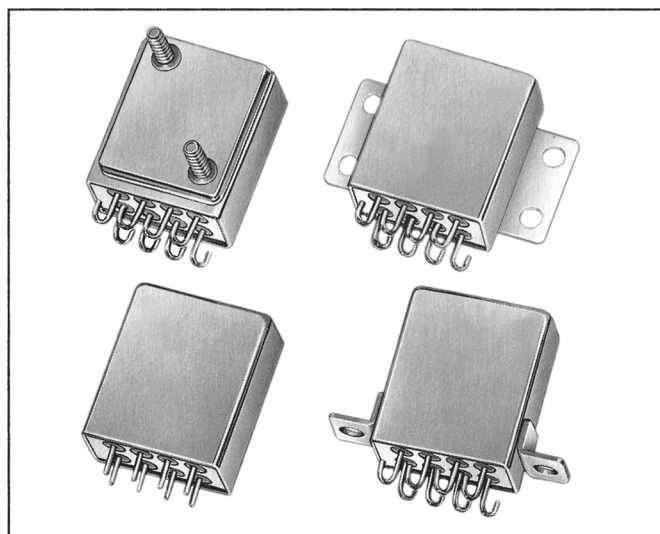
- All welded relay construction
- Cleaning and sealing techniques ensures maximum internal cleanliness
- 10 Amp. switching
- 2 form C, DPDT contacts, special metal alloy with gold plating

## Series Types

- 2T Basic Relay, 2 form C, DPDT
- 2TR Basic Relay combined with internal bridge diode, for AC operation

## Environmental and Physical Specifications

Temperature (Ambient)	-65°C to + 125°C
Shock	100 g's, 6 msec.
Vibration (sinusoidal)	20 g's, 10 to 2000 Hz
Acceleration	30 g's
Sealing	All welded, Hermetic
Weight	2 oz. (56,7 grams) max.



## Electrical Characteristics (over the Temperature range, unless otherwise noted)

Coil Data	See Typical Characteristics chart			
Contact Rating  (Note : All ratings with grounded case)	Type load	Contact Load		Cycles min.
		Resistive	10 Amp / 28 Vdc	100.000
	Inductive	5 Amp / 115 Vac, 400 Hz	100.000	
		3 Amp / 115 Vac, 60 Hz	100.000	
		6 Amp / 28 Vdc (200 mH)	50.000	
Contact Resistance	0,01 ohm max. initial			
Operate Time	13,0 msec. max. at 25°C			
Release Time	13,0 msec. max. at 25°C / 16,0 msec. max. AC Series			
Contact Bounce	5,0 msec. max. at 25 °C, normally closed contacts		5,0 msec. max. at 25 °C, normally open contacts	
Dielectric Strength	1000 Vrms min., 60 Hz, all points, 500 Vrms min., between open contacts and coil to case, at sea level			
Insulation Resistance	1000 megohms min. all points at 500 Vdc			
Sensitivity	500 milliwatts at pick-up, 1,7 watts typical at nominal rated coil voltage			



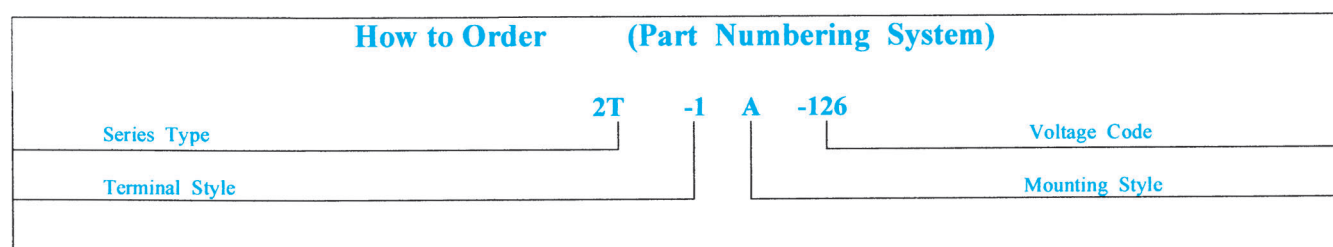
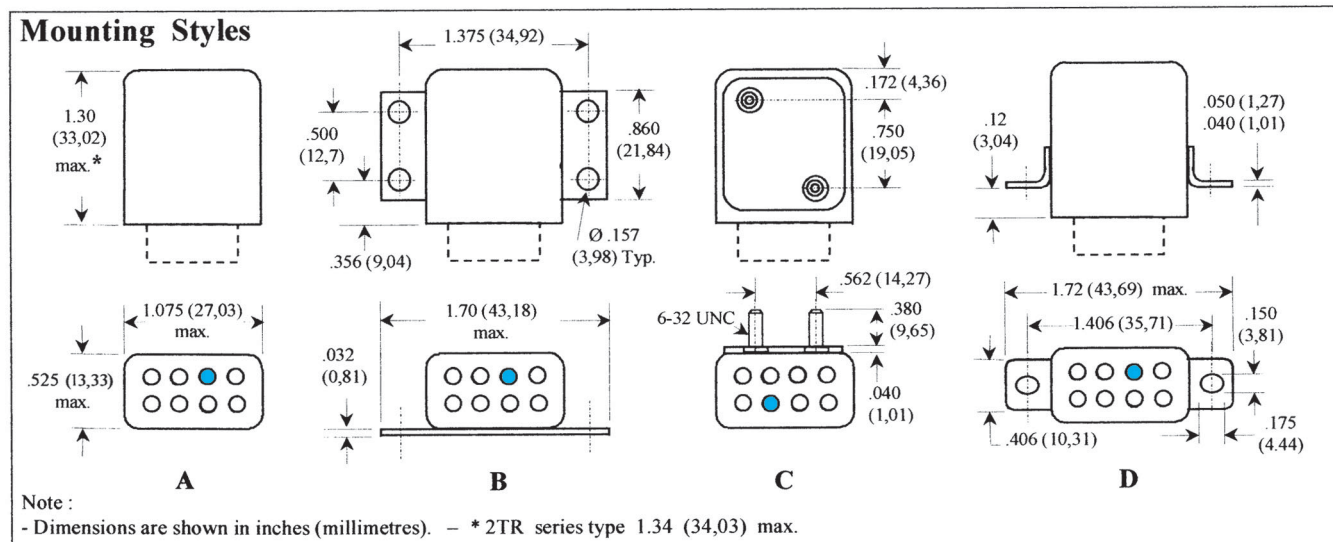
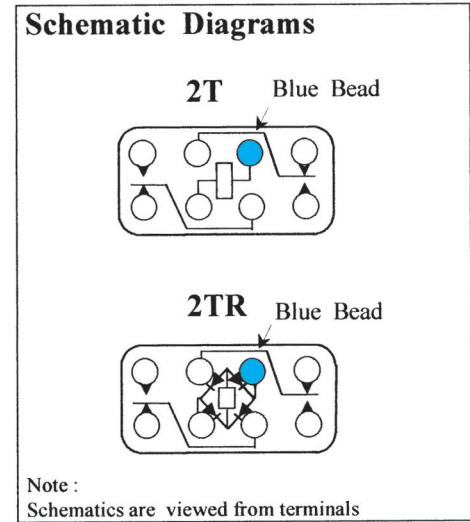
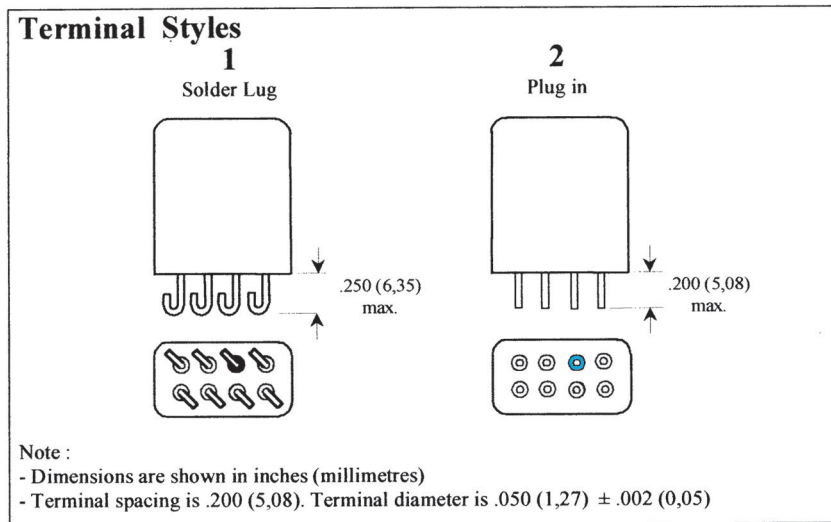
# CRYSTAL CAN RELAY 10 AMPERE DC or AC COIL

Series  
T

## Typical Characteristics (over the Temperature range, unless otherwise noted)

Series Types	Voltage Code	Coil Voltage Vdc		Coil Resistance ohms ± 10% at 25 °C	Pick-up Vdc Max. at 25 °C	Drop-out Vdc Min. at 25 °C
		Nominal	Max.			
2T	106	6	7,2	22	3,3	0,5
	112	12	14,4	90	6,7	1,0
	126	26,5	32	330	13,0	2,0
	215	115	125	7500	63,0	5,0
2TR	215	115	125	7500	66,0	7,0

Note:  
AC operation 60 to 400 Hz





# CRYSTAL CAN RELAY 15 AMPERE DC or AC COIL

Series  
TN

## Product Description

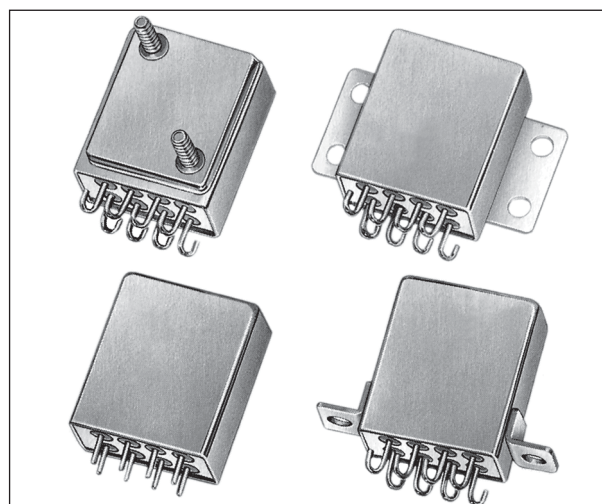
The economical approach to high current switching in a relay design for commercial and military applications. Through unique design innovations, this device incorporates an optimised magnetic structure and massive contact switching paths in less than 0.65 cubic inches. With proven switching characteristics of 15 amperes in excess of 100,000 operations under all environments, it performs in a wide variety of switching applications.

The following construction features ensure the highest reliability in extreme environments:

- All welded relay construction
- Cleaning and sealing techniques ensures maximum internal cleanliness
- 15 Amp. switching
- 2 form C, DPDT contacts, special metal alloy with gold plating

## Series Types

- **2TN** Basic Relay, 2 form C, DPDT
- **2TNR** Basic Relay combined with internal bridge diode, for AC operation



## Environmental and Physical Specifications

Temperature (Ambient)	-65°C to +125°C
Shock	100 g's, 6 msec.
Vibration (sinusoidal)	20 g's, 10 to 2000 Hz
Acceleration	30 g's
Sealing	All welded, Hermetic
Weight	2 oz. (56,7 grams) max.

## Electrical Characteristics (over the Temperature range, unless otherwise noted)

Coil Data	See Typical Characteristics chart		
Contact Rating  (Note: All ratings with grounded case)	Type load	Contact load	Cycles min.
	Resistive	15 Amp / 28 Vdc	100.000
		6 Amp / 115 Vac, 400 Hz	100.000
		4 Amp / 115 Vac 60 Hz	100.000
Inductive	6,5 Amp / 28 Vdc (200 mH)	50.000	
Contact Resistance	0,01 ohm max. initial		
Operate Time	13,0 msec. max. at 25°C		
Release Time	13,0 msec. max. at 25°C / 16,0 msec. max. AC Series		
Contact Bounce	5,0 msec. max. at 25°C, normally closed contacts	5,0 msec. max at 25°C, normally open contacts	
Dielectric strength	1000 vrms min., 60 Hz, all points, 500 Vrms min., between open contacts and coil to case, at sea level		
Insulation Resistance	1000 megohms min. all points at 500 Vdc		
Sensitivity	500 milliwatts at pick-up, 1,7 watts typical at nominal rated coil voltage		



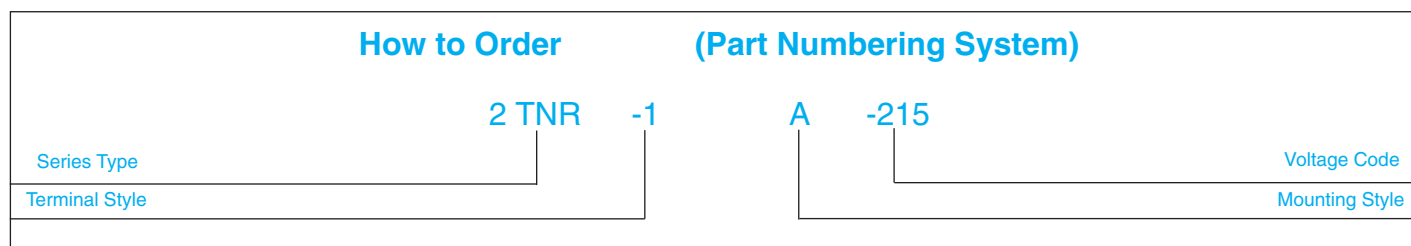
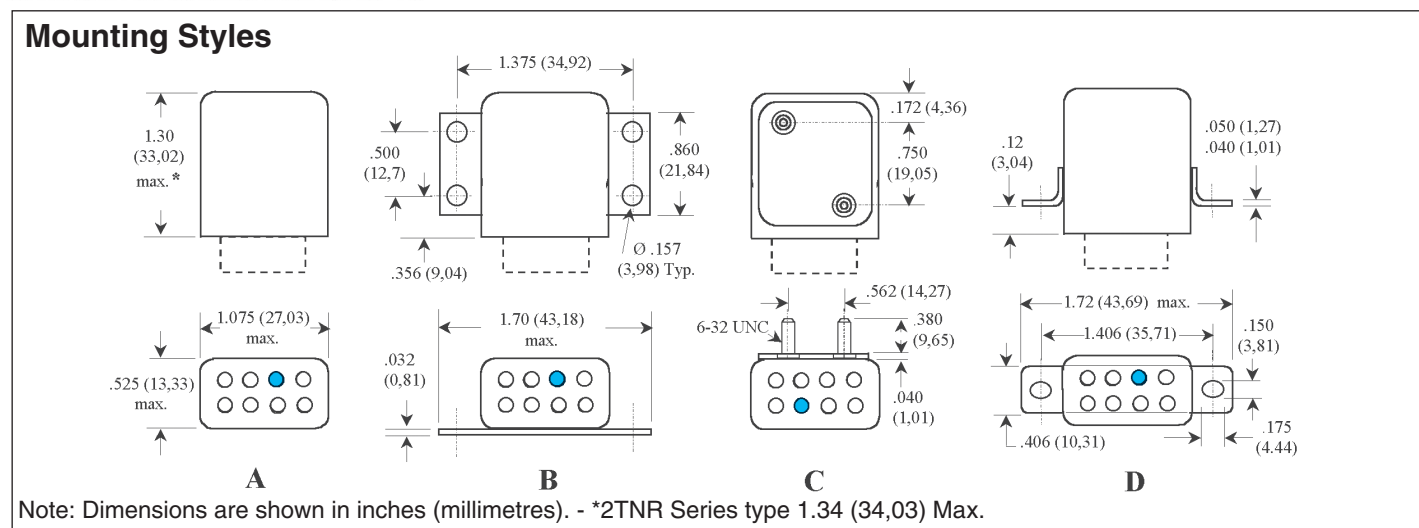
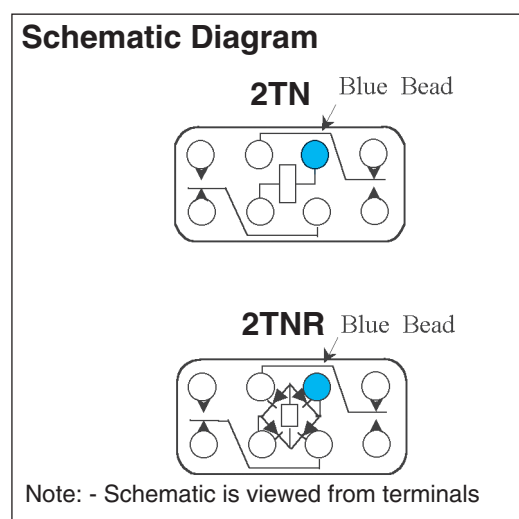
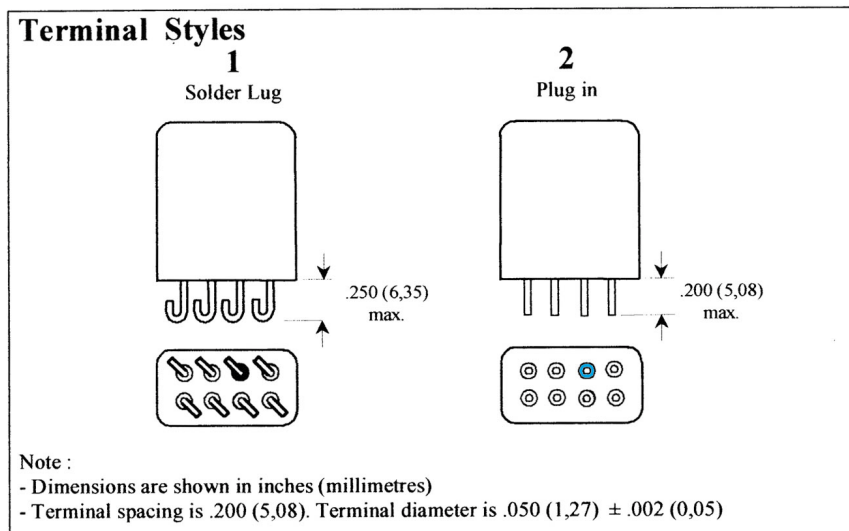


# CRYSTAL CAN RELAY 15 AMPERE DC or AC COIL

Series  
TN

Series Type	Voltage code	Coil Voltage Vdc		DC coil Resistance ±10% at 25°C	Pick-up Vdc Max. at 25°C	Drop-out Vdc Min. at 25°C
		Nominal	Max.			
2TN	106	6	7,2	22	3,3	0,5
	112	12	14,4	90	6,7	1,0
	126	26,5	32	330	13,0	2,0
	215	115	125	7500	63,0	5,0
2TNR	215	115	125	7500	66,0	7,0

Note:  
AC operation 60 to 400 Hz





# CRYSTAL CAN RELAY 10 AMPERE DC COIL

Series  
**2T-7188**

## Product Description

The economical approach to high current switching in a relay design for commercial and military applications. Through unique design innovations, this device incorporates an optimised magnetic structure and massive contact switching paths in less than 0.65 cubic inches. With proven switching characteristics of 10 amperes in excess of 100,000 operations under all environments, it performs in a wide variety of switching applications.

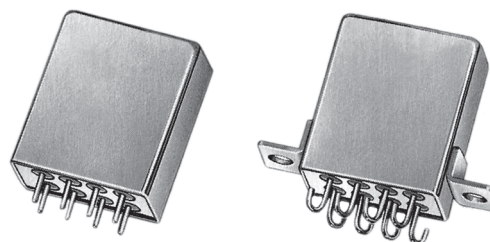
The following construction features ensure the highest reliability in extreme environments:

- All welded relay construction
- Cleaning and sealing techniques ensures maximum internal cleanliness
- 10 Amp. switching
- 2 form C, DPDT contacts, special metal alloy with gold plating

## Series Type

- **2T-7188** 2 form C, DPDT

**COMPLIANT TO  
MIL-R-5757/23**



## Environmental and Physical Specifications

Temperature (Ambient)	-65°C to + 125°C
Shock	100 g's, 6 msec.
Vibration (sinusoidal)	20 g's, 10 to 2000 Hz
Acceleration	17 g's
Sealing	All welded, Hermetic
Weight	2 oz. (56,7 grams) max.

## Electrical Characteristics (over the Temperature range, unless otherwise noted)

<b>Coil Data</b>	See Typical Characteristics chart		
<b>Contact Rating</b>  (Note: All ratings with grounded case)	<b>Type load</b>	<b>Contact load</b>	<b>Cycles min.</b>
	Resistive	10 Amp / 28 Vd	50.000
		5 Amp / 115 Vac, 400 Hz	50.000
		3 Amp / 115 Vac, 60 Hz	50.000
	Inductive Lamp Motor	6 Amp / 28 Vdc (200 mH)	50.000
1 Amp / 28 Vdc 3 Amp / 28 Vdc		50.000 50.000	
<b>Contact Resistance</b>	0,01 ohm max. initial		
<b>Operate Time</b>	15,0 msec. max. at 25°C		
<b>Release Time</b>	15,0 msec. max. at 25°C		
<b>Contact Bounce</b>	5,0 msec. max. at 25°C, normally closed contacts	5,0 msec. max at 25°C, normally open contacts	
<b>Dielectric strength</b>	1000 Vrms min., 60 Hz, all points, 500 Vrms min. between coil and case, at sea level		
<b>Insulation Resistance</b>	1000 megohms min. all points at 500 Vdc		
<b>Sensitivity</b>	1,9 watts typical at nominal rated coil voltage		



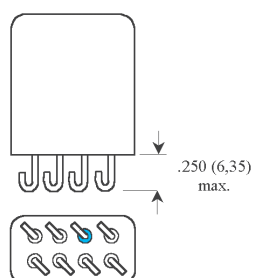
# CRYSTAL CAN RELAY 10 AMPERE DC COIL

**Series  
2T-7188**

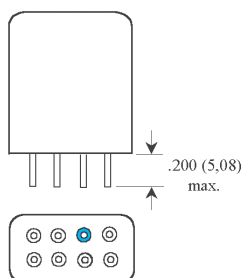
Mounting & Terminal styles						Coil Voltage VDC		Coil Resistance ohms $\pm 10\%$ at 25°C	Pick-up Vdc		Drop-out Vdc	
Raised Lug	Flush Lug	Raised Pin	Flush Pin	Plain Pin	Laydown Lug	Max.	Nom.		Max.	Min.	Max.	
-001	-002	-003	-004	-005	-031	32,0	26,5	300	18,0	1,5	7,0	
-006	-007	-008	-009	-010	-032	16,0	12,0	75	9,0	0,5	5,0	
-011	-012	-013	-014	-015	-033	9,0	6,0	19	4,5	0,25	2,0	
-016	-017	-018	-019	-020	-034	52,0	48,0	1200	36,0	2,0	20,0	
-026	-027	-028	-029	-030	-036	122,0	120,0	7500	90,0	5,0	50,0	
-037	-038	-039	-040	-041	-042	24,0	18,0	170	13,5	0,75	7,5	

## Terminal Styles

### LUG



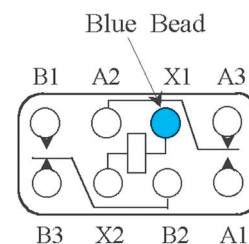
### PIN



Note:

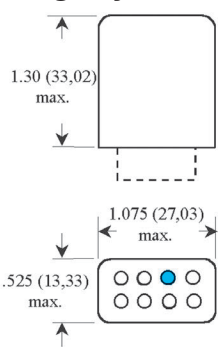
- Dimension are show in inches (millimetres)
- Terminal spacing is .200 (5,08). Terminal diameter is .050 (1,27)  $\pm$  .002 (0,05)

## Schematic Diagram

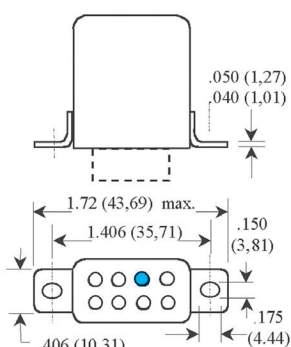


Note: - Schematic is viewed from terminals

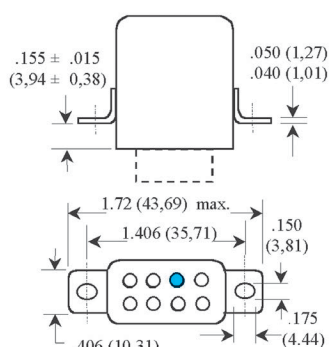
## Mounting Styles



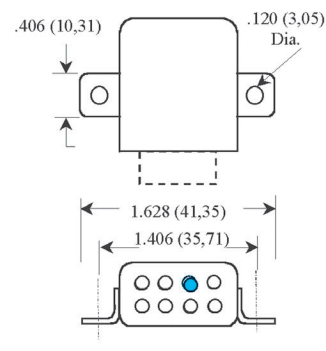
### PLAIN



### FLUSH



### RAISED



### LAYDOWN

Note: Dimensions are shown in inches (millimetres).

## How to Order

## (Part Numbering System)

2T-7188 -001

Series Type

Dash number (see characteristics table)

Note: Relays compliant to MIL-R-5757/23 are designated 2T-7188 and applicable dash numbers coincide with N Hi-G Italia dash numbers



# HALF SIZE CRYSTAL CAN RADIO FREQUENCY RELAY 75 Watt

Series  
RFK

## Product Description

This series of coaxial terminated hermetically sealed relays have been designed to provide reliable switching functions in the most demanding radio frequency applications. The use of 2K relays in the basic construction, has been coupled with a unique and improved termination network to insure faultless performance under severe environmental conditions.

The design concepts employed in each of this series have been time tested through thousands of hours testing and millions of field operations to provide the highest degree of reliability.

The following construction features ensure the highest reliability in extreme environments:

- All welded relay construction
- Cleaning and sealing techniques ensures maximum internal cleanliness
- Low level to 2 amp. auxiliary switching
- 1 or 2 form C RF contacts, special metal alloy with gold plating
- Frame, armature designs and force / mass ratio provides exceptional shock and vibration immunity
- Coax interconnections
- 200 watt RF carry capability
- 75 watt RF switching capability
- Terminated with 6 inches length RG 196A u Teflon cable

## Series Types

- RFK 1 form C, SPDT
- 2RFK 2 form C, DPDT

## Environmental and Physical Specifications

Temperature (Ambient)	-65°C to +85°C
Shock	100 g's, 6 msec.
Vibration (sinusoidal)	20 g's, 10 to 2000 Hz
Acceleration	30 g's
Sealing	All welded, Hermetic



## Electrical Characteristics (over the Temperature range, unless otherwise noted)

Coil Data	See Typical Characteristics chart		
Contact Rating	Type load	Contact Load	Cycles min.
	Resistive	2 Amp / 28 Vdc (aux) 75 Watts RF Switching , 200 Watts carry (cold switching)	100.000 100.000
Contact Resistance	0,05 ohm max. initial aux. contact		
Operate Time	4,0 msec. max. at 25 °C		
Release Time	2,0 msec. max. at 25 °C		
Dielectric Strength	500 Vrms, 60 Hz, all mutually insulated points, at sea level		
Insulation Resistance	1000 megohms min. all points at 500 Vdc		
Sensitivity	250 milliwatts at pick-up, at 25 °C		

## Radio frequency Characteristics

Frequency range	0 to 500 MHz (derated characteristics to 1000 MHz)	
	Typical at 100 MHz	Typical at 500 MHz
Voltage Standing Wave Ratio (VSWR)	< 1.1 : 1	< 1.2 : 1
Insertion Loss	0.16 dB	0.5 dB
Crosstalk	50 dB	40 dB
Power Switching	75 Watts	50 Watts
Power Handling	200 Watts max.	
Characteristic Impedance	50 or 75 ohms (other impedances available on special order)	



# HALF SIZE CRYSTAL CAN RADIO FREQUENCY RELAY 75 Watt

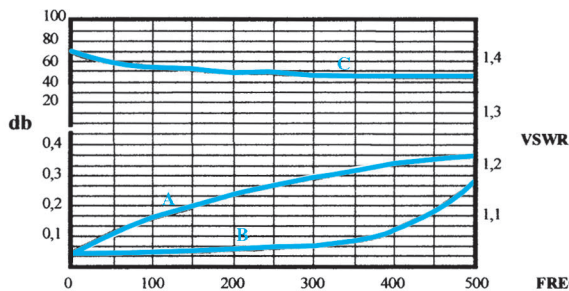
Series  
RFK

**Figure 1 - Radio Frequency curves**

Note:

Typical characteristics are based on factory knowledge. Tests to ensure compliance, are not performed

Values shown are in a 50 ohm impedance coaxial system

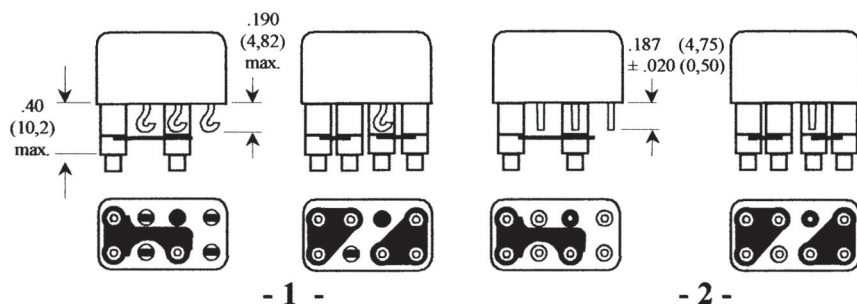


A - Insertion loss  
B - Return loss (VSWR)  
C - Isolation across contacts (Crosstalk)

## Typical Characteristics (over the Temperature range, unless otherwise noted)

Voltage Code	Coil Voltage Vdc		Coil Resistance ohms ± 10% at 25 °C	Pick-up Vdc Max. at 25 °C	Drop-out Vdc Min. at 25 °C
	Nominal	Max.			
106	6,0	7,2	40	3,3	0,3
112	12,0	14,2	150	6,5	0,7
126	26,5	32,0	675	13,5	1,5

## Terminal Styles

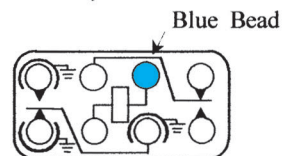


Note :

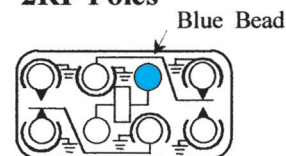
- Dimensions are shown in inches (millimetres)  
- Terminal spacing is .200 (5,08), all headers. Aux. Terminal diameter is .030 (0,76) all headers

## Schematic Diagrams

1 Pole RF, 1 Pole aux.

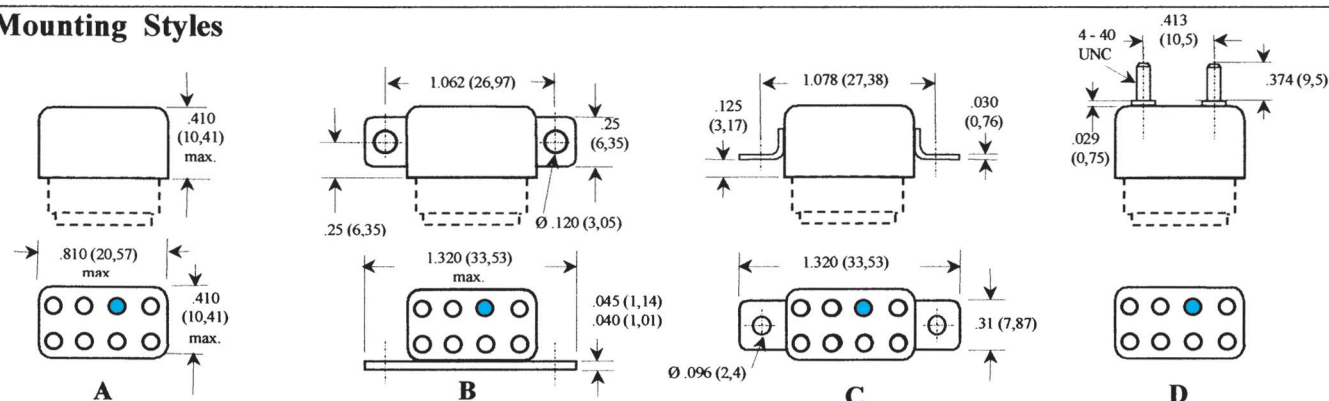


2RF Poles



Note : Schematics are viewed from terminals

## Mounting Styles



Note : - Dimensions are shown in inches (millimetres)

Note :

Contact factory for other cable types and lengths

## How to Order (Part Numbering System)

Series Type **RFK** Terminal Style **-2** Voltage Code **A** Mounting Style **-126**



# CRYSTAL CAN RADIO FREQUENCY RELAY 75 Watt

Series  
RFB

## Product Description

This series of coaxial terminated hermetically sealed relays have been designed to provide reliable switching functions in the most demanding radio frequency applications. The use of 2B relays in the basic construction, has been coupled with a unique and improved termination network to insure faultless performance under severe environmental conditions.

The design concepts employed in each of these series has been time tested through thousands of hours testing and millions of field operations to provide the highest degree of reliability.

The following construction features ensure the highest reliability in extreme environments:

- All welded relay construction
- Cleaning and sealing techniques ensures maximum internal cleanliness
- Low level to 2 amp. auxiliary switching
- 1 or 2 form C RF contacts, special metal alloy with gold plating
- Frame, armature designs and force / mass ratio provides exceptional immunity to shock and vibration.
- Coax interconnections
- 200 watt RF carry capability
- 75 watt RF switching capability
- Terminated with 6 inches length RG 196A/ u Teflon cable

## Series Types

- RFB Basic Relay 1 form C, SPDT
- 2RFB Basic Relay 2 form C, DPDT

## Environmental and Physical Specifications

Temperature (Ambient)	-65°C to +85°C
Shock	100 g's, 6 msec.
Vibration (sinusoidal)	20 g's, 10 to 2000 Hz
Acceleration	30 g's
Sealing	All welded, Hermetic



## Electrical Characteristics (over the Temperature range, unless otherwise noted)

Coil Data	See Typical Characteristics chart		
Contact Rating	Type load	Contact Load	Cycles min.
	Resistive	2 Amp / 28 Vdc (aux) 75 Watts RF Switching , 200 Watts carry (cold switching)	100.000 100.000
Contact Resistance	0,05 ohm max. initial aux. contact		
Operate Time	6,0 msec. max. at 25 °C		
Release Time	3,0 msec. max. at 25 °C		
Dielectric Strength	500 Vrms min., 60 Hz, all mutually insulated, at sea level		
Insulation Resistance	1000 megohms min. all points at 500 Vdc		
Sensitivity	250 milliwatts at pick-up, at 25 °C		

## Radio frequency Characteristics

Frequency range	0 to 500 MHz (derated characteristics to 1000 MHz)	
	Typical at 100 MHz	Typical at 500 MHz
Voltage Standing Wave Ratio (VSWR)	< 1.1 : 1	< 1.2 : 1
Insertion Loss	0.16 dB	0.5 dB
Crosstalk	50 dB	40 dB
Power Switching	75 Watts	50 Watts
Power Handling	200 Watts max.	
Characteristic Impedance	50 or 75 ohms (other impedances available on special order)	



# CRYSTAL CAN RADIO FREQUENCY RELAY 75 Watt

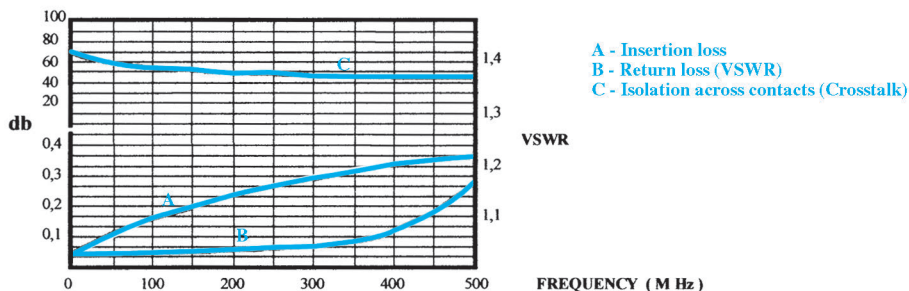
Series  
RFB

Figure 1 - Radio Frequency curves

Notes:

Typical characteristics are based on factory knowledge. Tests to ensure compliance, are not performed

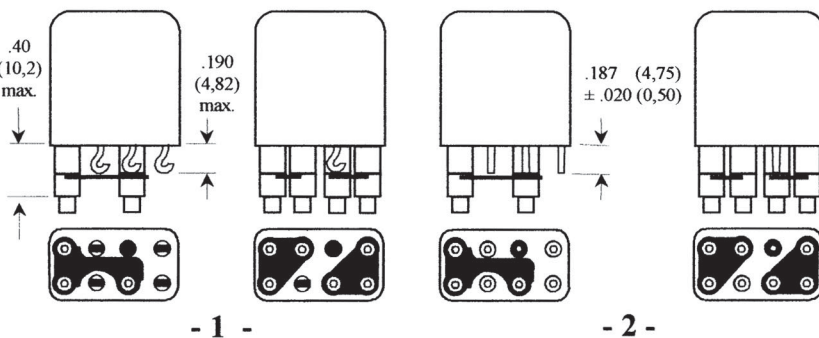
Values shown are in a 50 ohm impedance coaxial system



## Typical Characteristics (over the Temperature range, unless otherwise noted)

Voltage Code	Coil Voltage Vdc Nominal	Coil Voltage Vdc Max.	Coil Resistance ohms ± 10% at 25 °C	Pick-up Vdc Max. at 25 °C	Drop-out Vdc Min. at 25 °C
106	6,0	7,2	40	3,1	0,5
112	12,0	14,2	160	6,3	0,7
126	26,5	32,0	675	13,0	1,5
148	48,0	58,0	2500	25,0	2,5
176	76,0	90,0	5000	35,0	3,0

## Terminal Styles

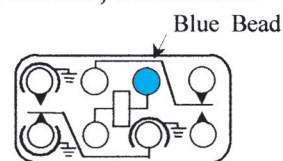


Note :

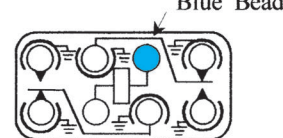
- Dimensions are shown in inches (millimetres)
- Terminal spacing is .200 (5,08). Aux. Terminal diameter is .030 (0,76) all headers

## Schematic Diagrams

### 1 Pole RF, 1 Pole aux



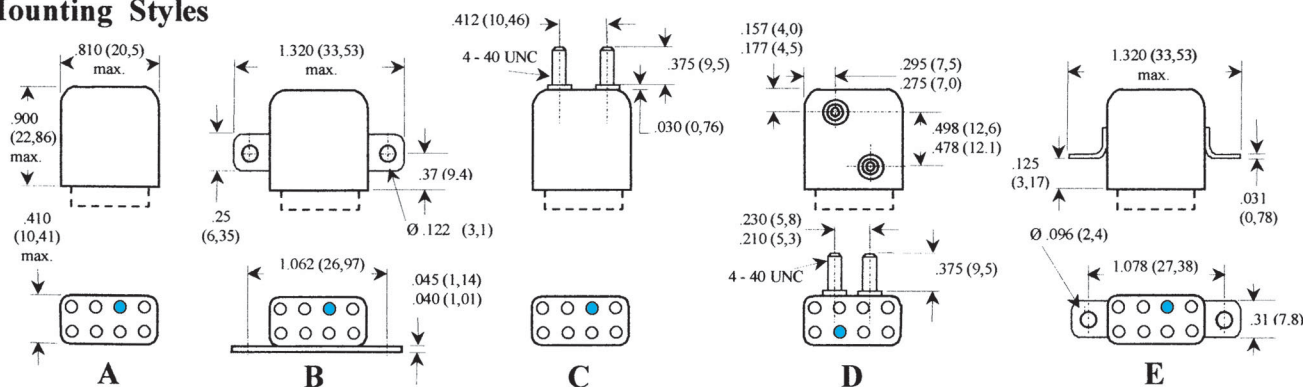
### 2RF Poles



Note:

- Schematics are viewed from terminals

## Mounting Styles



Note : Dimensions are shown in inches (millimetres)

Note :

Contact factory for other cable types and lengths

## How to Order (Part Numbering System)

Series Type: RFB -2 A -126  
Terminal Style: Voltage Code: Mounting Style



# CRYSTAL CAN RADIO FREQUENCY RELAY 75 Watt, 40 Milliwatt SENSITIVE

Series  
RFBC

## Product Description

This series of coaxial terminated hermetically sealed relays have been designed to provide reliable switching functions in the most demanding radio frequency applications. The use of 2BC relays in the basic construction, has been coupled with a unique and improved termination network to insure faultless performance under severe environmental conditions.

The design concepts employed in each of this series have been time tested through thousands of hours testing and millions of field operations to provide the highest degree of reliability.

The following construction features ensure the highest reliability in extreme environments:

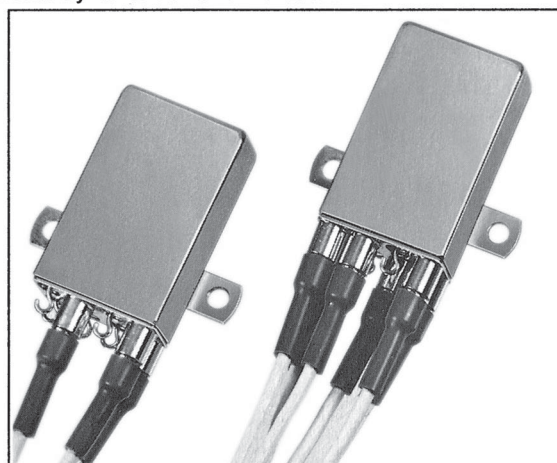
- All welded relay construction
- Cleaning and sealing techniques ensures maximum internal cleanliness
- Low level to 2 amp. auxiliary switching
- 1 or 2 form C RF contact, special metal alloy with gold plating
- Frame, armature designs and force / mass ratio provides exceptional immunity to shock and vibration.
- Coax interconnections
- Terminated with 6 inches length RG 196A/ u Teflon cable
- 200 watt RF carry capability
- 75 watt RF switching capability

## Series Types

- RFBC 1 form C, SPDT
- 2RFBC 2 form C, DPDT

## Environmental and Physical Specifications

Temperature (Ambient)	-65°C to +85°C
Shock	100 g's, 6 msec.
Vibration (sinusoidal)	15 g's, 10 to 2000 Hz
Acceleration	30 g's
Sealing	All welded, Hermetic



## Electrical Characteristics (over the Temperature range, unless otherwise noted)

Coil Data	See Typical Characteristics chart		
Contact Rating	Type load	Contact Load	Cycles min.
	Resistive	2 Amp / 28 Vdc (aux) 75 Watts RF Switching , 200 Watts carry (cold switching)	100.000 100.000
Contact Resistance	0,05 ohm max. initial aux. contact		
Operate Time	15,0 msec. max. at 25 °C		
Release Time	3,0 msec. max. at 25 °C		
Dielectric Strength	500 Vrms min., 60 Hz, all mutually insulated, at sea level		
Insulation Resistance	1000 megohms min. all points at 500 Vdc		
Sensitivity	40 milliwatts at pick-up, at 25 °C		

## Radio frequency Characteristics

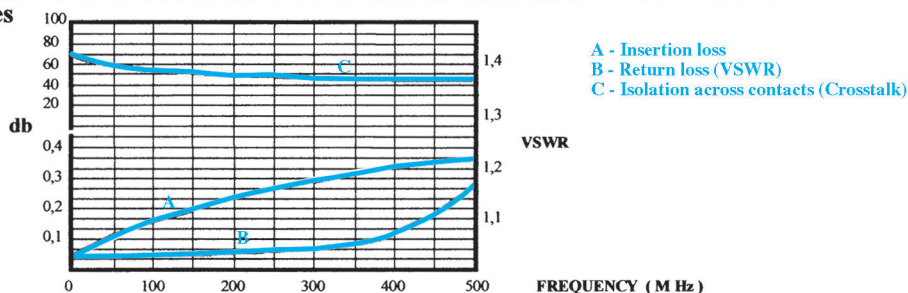
Frequency range	0 to 500 MHz (derated characteristics to 1000 MHz)	
	Typical at 100 MHz	Typical at 500 MHz
Voltage Standing Wave Ratio (VSWR)	< 1.1 : 1	< 1.2 : 1
Insertion Loss	0.16 dB	0.5 dB
Crosstalk	50 dB	40 dB
Power Switching	75 Watts	50 Watts
Power Handling	200 Watts max.	
Characteristic Impedance	50 or 75 ohms (other impedances available on special order)	

**Figure 1 - Radio Frequency curves**

Note:

Typical characteristics are based on factory knowledge. Tests to ensure compliance, are not performed

Values shown are in a 50 ohm impedance coaxial system







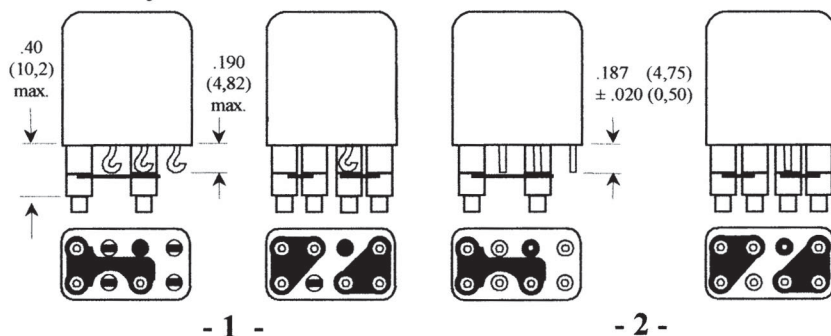
# CRYSTAL CAN RADIO FREQUENCY RELAY 75 Watt, 40 Milliwatt SENSITIVE

**Series  
RFBC**

### Typical Characteristics (over the Temperature range, unless otherwise noted)

Voltage Code	Coil Resistance ohms ± 10% at 25 °C	Nominal rated Coil		Pick-up mA Max. at 25 °C	Drop-out mA Min. at 25 °C
		Voltage (Vdc)	Current (mA)		
101	20	1,8	89,2	44,6	4,5
102	30	2,2	73,0	36,5	3,7
103	50	2,8	56,6	28,3	2,8
104	75	3,5	46,2	23,1	2,3
105	100	4,0	40,0	20,0	2,0
106	200	5,7	28,4	14,2	1,4
107	300	7,0	23,0	11,5	1,2
109	500	9,0	17,8	8,9	0,9
112	875	12,0	13,5	6,8	0,7
113	1000	12,6	12,6	6,5	0,6
118	2000	18,0	8,9	4,5	0,5
120	2500	20,0	8,0	4,0	0,4
128	5000	28,0	5,6	2,8	0,3
135	8000	36,0	4,5	2,3	0,2
140	10000	40,0	4,0	2,0	0,2

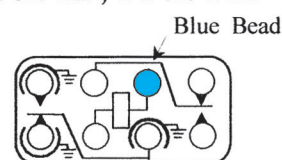
### Terminal Styles



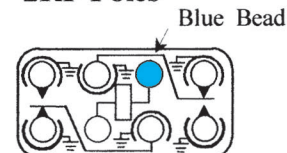
Note :  
 - Dimensions are shown in inches (millimetres)  
 - Terminal spacing is .200 (5,08). Aux. Terminal diameter is .030 (0,76) all headers

### Schematic Diagrams

#### 1 Pole RF, 1 Pole aux

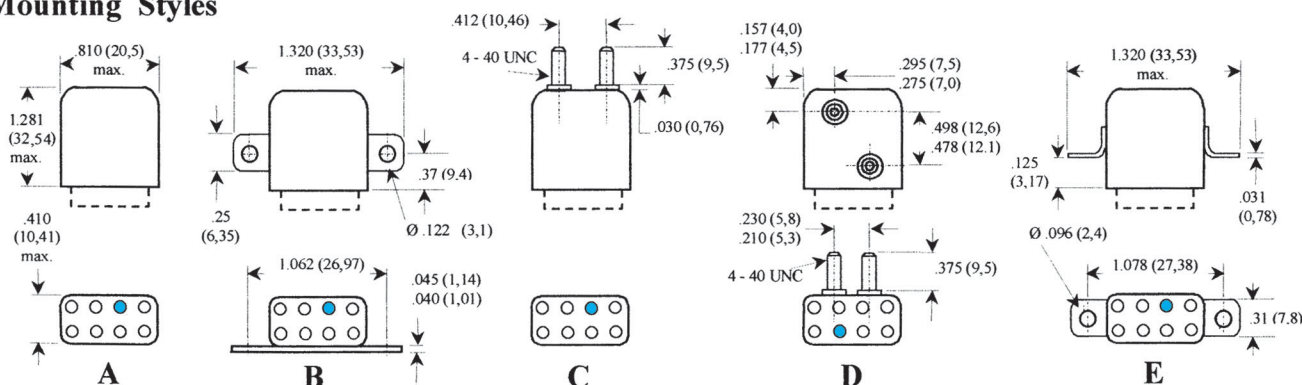


#### 2RF Poles



Note : Schematics are viewed from terminals

### Mounting Styles



Note : Dimensions are shown in inches (millimetres)

### Note

Contact factory for other cable types and lengths

### How to Order (Part Numbering System)





# CRYSTAL CAN RELAY ASSY

## 1 AMPERE 4PDT DC COIL

Series  
4MA

### Product Description

A relay assembly incorporating two MIL TO-5 relays in standard size crystal can relay that offers switching capability of low level signals up 1 ampere under the most extreme environmental conditions.

The following construction features ensure the highest reliability in extreme environments:

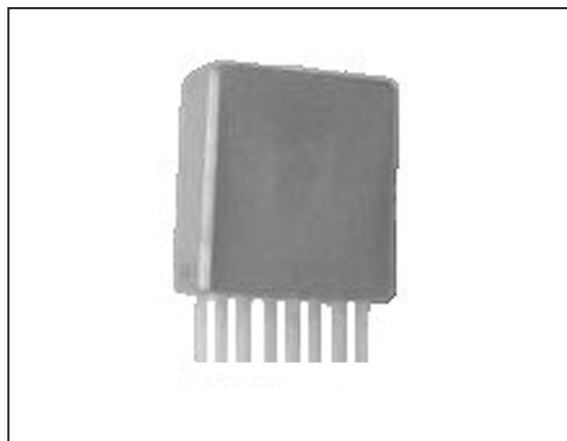
- Cleaning and sealing techniques ensures maximum internal cleanliness
- Low level to 1 amp. switching
- 4 form C, 4PDT contacts, special metal alloy with gold plating
- DC not polarised coil

### Series Type

- 4MA 4 form C, 4PDT

### Environmental and Physical Specifications

Temperature (Ambient)	-65°C to + 125°C
Shock	50 g's, 11 msec.
Vibration (sinusoidal)	15 g's, 10 to 2000 Hz
Acceleration	50 g's
Sealing	Hermetic, internally welded
Weight	1.2 oz. ( 34 grams)



### Electrical Characteristics (over the Temperature range, unless otherwise noted)

<b>Coil Data</b>	See Typical Characteristics chart		
<b>Contact Rating</b>	<b>Type load</b>	<b>Contact load</b>	<b>Cycles min.</b>
(Note: All ratings with grounded case)	Low Level	10 mA / 30 mV	1.000.000
	Resistive	1 Amp / 28 Vdc	100.000
	Overload	2 A / 28 Vdc	100
	Inductive	0.35 Amp / 28 Vdc (200 mH)	100.000
<b>Contact Resistance</b>	0,1 ohm max. initial		
<b>Operate Time</b>	4,0 ms. max. at 25 °C		
<b>Release Time</b>	2,0 ms. max. at 25 °C		
<b>Contact Bounce</b>	2,0 ms. max. at 25 °C		
<b>Contact Simultaneously</b>	Within 1 ms. above min. pick-up voltage		
<b>Dielectric strength</b>	500 Vrms min., 50 Hz, all points		
<b>Insulation Resistance</b>	500 Mohms min. all points at 500 Vdc		

### Typical Characteristics

Series Type	Voltage Code	Coil Voltage		Coil Resistance ± 10% at 25 °C	Pick-up Max. Vdc Overtemp. range	Drop-out Min. Vdc Overtemp. range
		Nominal	Max.			
4MA	105	5.0	7.5	25	3.5	0.14
	106	6.0	10.0	49	4.5	0.18
	109	9.0	15.0	110	6.8	0.35
	112	12.0	20.0	195	9.0	0.41
	118	18.0	30.0	440	13.5	0.59
	126	26.5	40.0	780	18.0	0.89
	130	30.0	36.0	1250	22.0	1.00

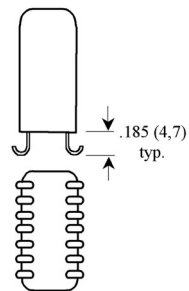


# CRYSTAL CAN RELAY ASSY 1 AMPERE 4PDT DC COIL

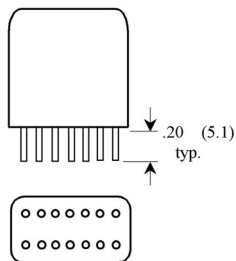
Series  
4MA

## Terminal Styles

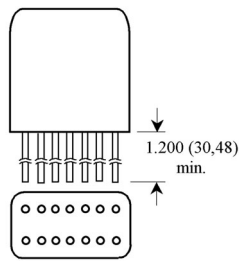
**1**  
Solder Lug



**2**  
Plug in

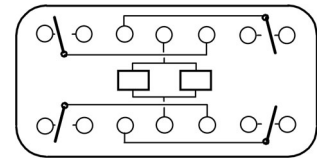


**3**  
Wire Lead



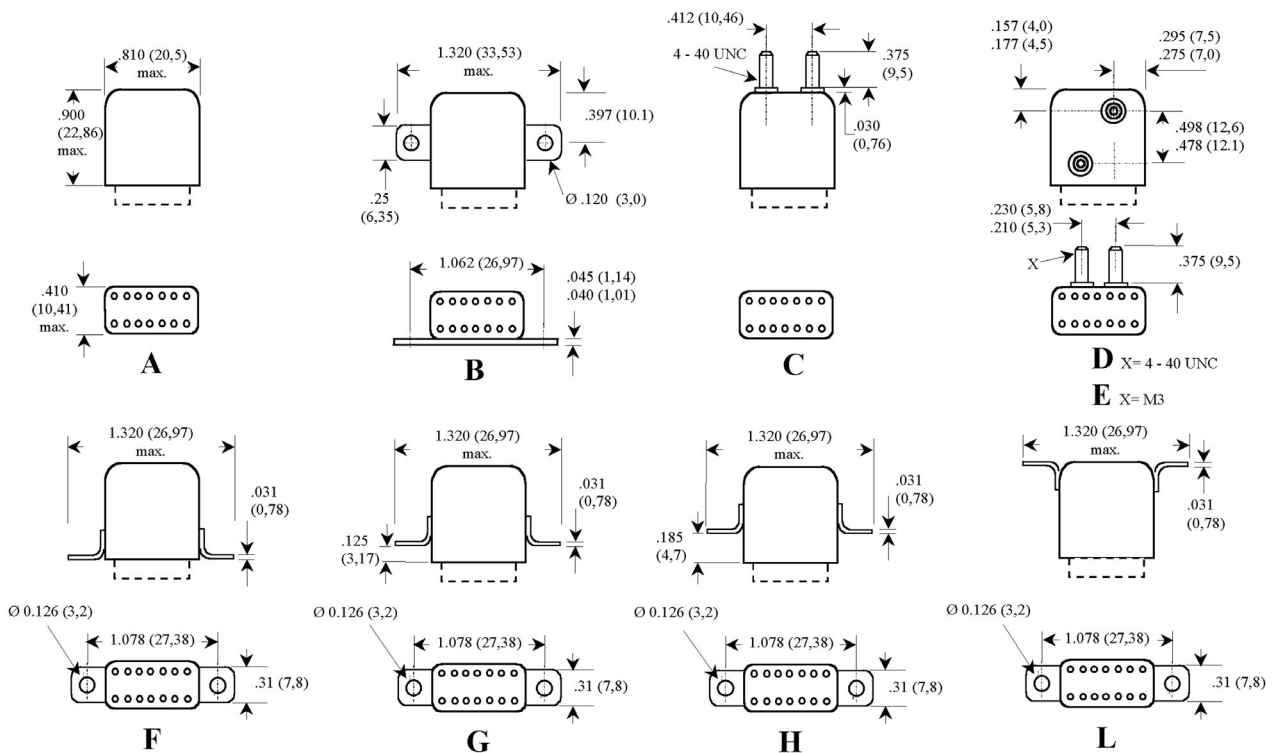
Note :  
- Dimensions are shown in inches (millimetres in brackets)  
- Terminal spacing 0.100 (2,54). Terminal diameter typ. 0.030 (0,76)

## Schematic Diagram



Note: - Schematic is viewed from terminals

## Mounting Styles



Note : - Dimensions are shown in inches (millimetres in brackets)

## How to Order (Part Numbering System)





# CRYSTAL CAN RELAY ASSY

## 1 AMPERE 4PDT DC COIL SENSITIVE

Series  
4MS

### Product Description

A relay assembly incorporating two sensitive MIL TO-5 relays in standard size crystal can relay that offers switching capability of low level signals up 1 ampere under the most extreme environmental conditions.

The following construction features ensure the highest reliability in extreme environments:

- Cleaning and sealing techniques ensures maximum internal cleanliness
- Low level to 1 amp. switching
- 4 form C, 4PDT contacts, special metal alloy with gold plating
- DC not polarised coil

### Series Type

- 4MS 4 form C, 4PDT



### Environmental and Physical Specifications

Temperature (Ambient)	-65°C to + 125°C
Shock	50 g's, 11 msec.
Vibration (sinusoidal)	15 g's, 10 to 2000 Hz
Acceleration	50 g's
Sealing	Hermetic, internally welded
Weight	1.2 oz. ( 34 grams)

### Electrical Characteristics (over the Temperature range, unless otherwise noted)

<b>Coil Data</b>	See Typical Characteristics chart		
<b>Contact Rating</b>  (Note: All ratings with grounded case)	<b>Type load</b>	<b>Contact load</b>	<b>Cycles min.</b>
	Low Level	10 mA / 30 mV	1.000.000
	Resistive	1 Amp / 28 Vdc	100.000
	Overload	2 A / 28 Vdc	100
	Inductive	0.35 Amp / 28 Vdc (200 mH)	100.000
<b>Contact Resistance</b>	0,1 ohm max. initial		
<b>Operate Time</b>	4,0 ms. max. at 25 °C		
<b>Release Time</b>	2,0 ms. max. at 25 °C		
<b>Contact Bounce</b>	2,0 ms. max. at 25 °C		
<b>Contact Simultaneously</b>	Within 1 ms. above min. pick-up voltage		
<b>Dielectric strength</b>	500 Vrms min., 50 Hz, all points		
<b>Insulation Resistance</b>	500 Mohms min. all points at 500 Vdc		

### Typical Characteristics

Series Type	Voltage Code	Coil Voltage		Coil Resistance ± 10% at 25 °C	Pick-up Max. Vdc Over temp. range	Drop-out Min. Vdc Over temp. range
		Nominal	Max.			
4MS	105	5.0	7.5	50	3.5	0.14
	106	6.0	10.0	100	4.5	0.18
	109	9.0	15.0	200	6.8	0.35
	112	12.0	20.0	400	9.0	0.41
	118	18.0	30.0	800	13.5	0.59
	126	26.5	40.0	1600	18.0	0.89
	136	36.0	57.0	3250	27.0	1.25
	148	48.0	75.0	5500	36.0	1.60



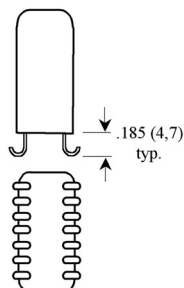
# CRYSTAL CAN RELAY ASSY

## 1 AMPERE 4PDT DC COIL SENSITIVE

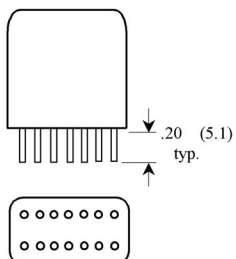
Series  
4MS

### Terminal Styles

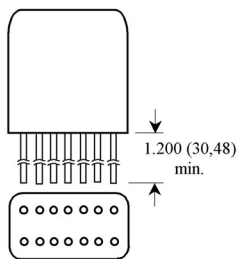
**1**  
Solder Lug



**2**  
Plug in



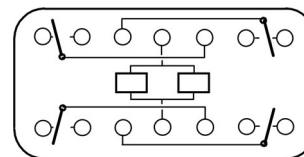
**3**  
Wire Lead



Note :

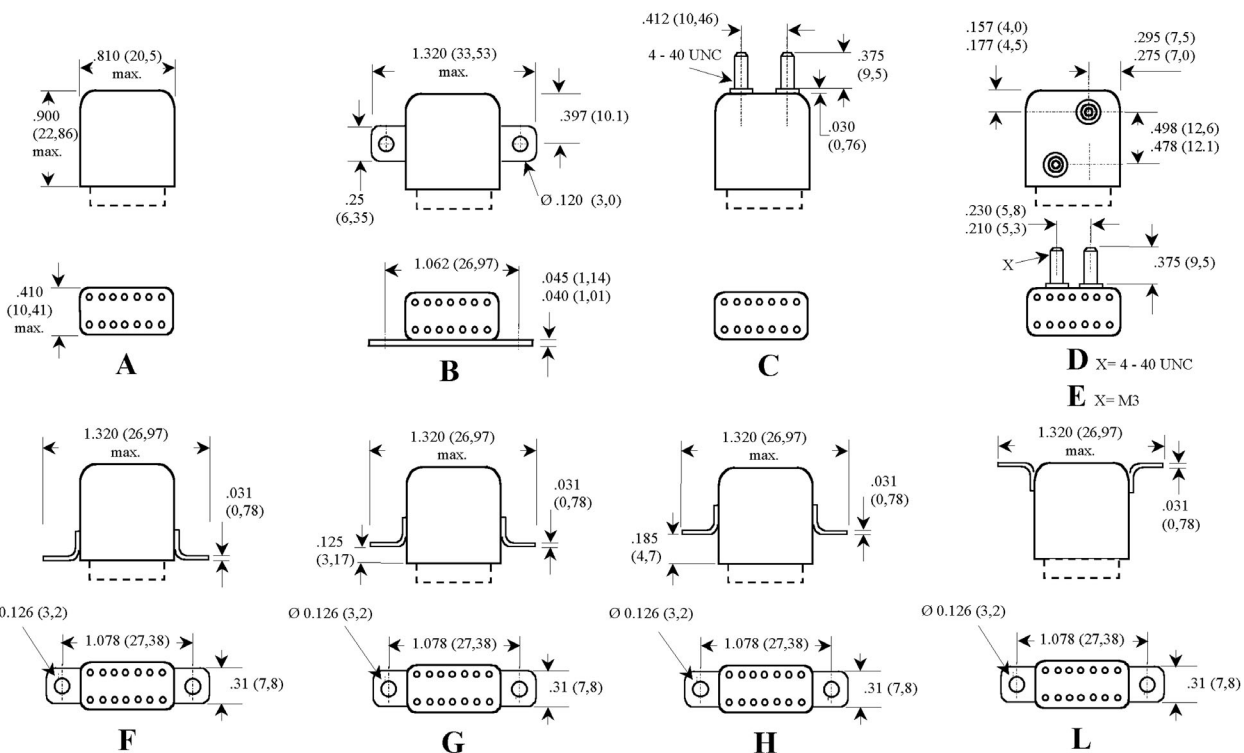
- Dimensions are shown in inches (millimetres in brackets)
- Terminal spacing 0.100 (2,54). Terminal diameter typ. 0.030 (0,76)

### Schematic Diagram



Note: - Schematic is viewed from terminals

### Mounting Styles



Note : - Dimensions are shown in inches (millimetres in brackets)

### How to Order (Part Numbering System)





## MAIN AREA SALES OFFICE



**NUOVA HI-G ITALIA**  
SS Appia Km. 56,420

Phone +39 06 9699666

Fax +39 06 9698688

E-mail [Info@nhig.it](mailto:Info@nhig.it)

