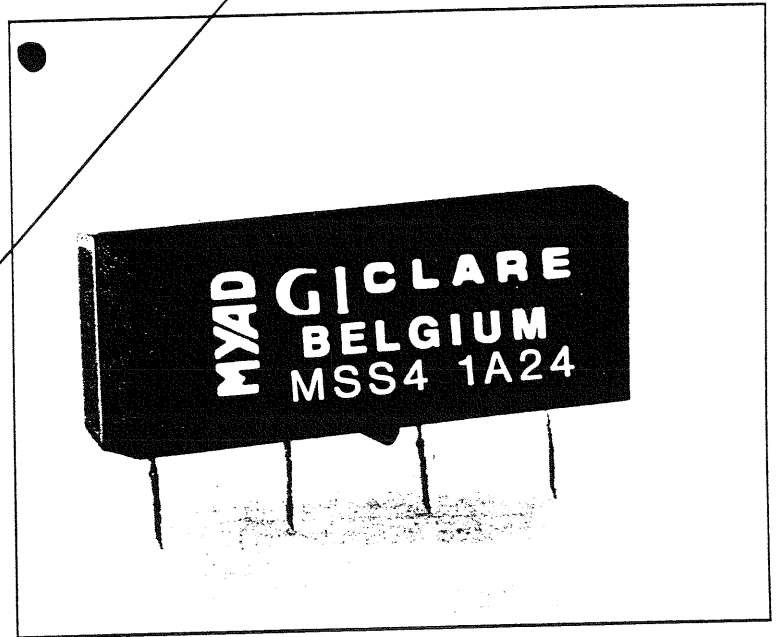


Clare MSS-4

Subminiature Single-In-Line
"All-Position" Wetted Reed Relays

NEW...



Features

- All-position mounting wetted reed contacts.
- Long life wetted reed contacts.
- Epoxy-molded for automatic wave soldering and board cleaning.
- Single-in-line-package.
- 1 Form A (SPST) contact arrangement.
- Nominal input power as low as 180 mW.
- Operate times less than 2 milliseconds.
- Bounce-free operation.
- Switching speed of 100 Hz.
- High density board mounting.
- Stable contact resistance (± 5 milliohms from original value) throughout life.
- Up to 30 VA switching, 350 V.
- High isolation between all points (1000 Vac rms)
- Diode option
- Automatic insertion capability.

**GENERAL
INSTRUMENT**

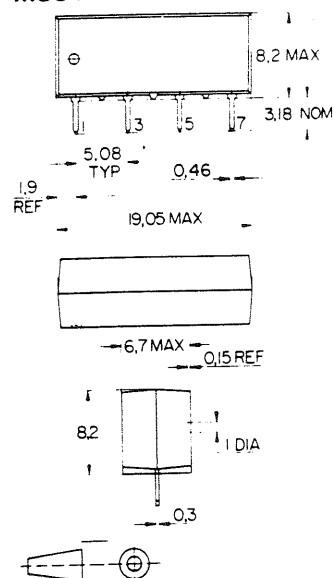
Specifications

Engineering Data	
Contact Form	1 Form A (SPST)
Contact Rating :	
Maximum Switching Power	30 VA
Maximum Switching Voltage	350 Vdc or 350 V peak ac
Maximum Switching Current	0,75 Adc or 0.75 A peak ac
Maximum Carrying Current	2,0 Adc or 2,0 A peak ac
Contact Resistance, Initial	100 m Ω max. (stable within ± 5 m Ω from original value over life)
Contact Material	Platinum-Nickel alloy (mercury-wetted) to Nickel-Iron alloy (mercury-wetted)
Life Expectancy (without contact protection) :	
10 Vdc, 10 mA	200 $\times 10^6$ operations min.
48 Vdc, 100 mA	50 $\times 10^6$ operations min.
Maximum Operating Frequency	100 Hz
Timing : (at nominal coil voltage up to 10 hz, 50 % duty cycle with diode suppression)	
Operate Time	1,2 ms typical, 1,75 ms max.
Release Time, Diode Suppressed	1,0 ms typical, 1,50 ms max.
Bounce Time	None
Dielectric Standoff:	
Between All Mutually Insulated Points	1000 Vac rms min.
Insulation Resistance:	
Across Open Contacts	100 Mohms min.
Between Contact and Coil	10.000 Mohms min.
Capacitance:	
Across Open Contacts	1,3 pF typical, 2,0 pF max.
Open Contact to Coil	3,0 pF typical, 4,0 pF max.
Closed Contact to Coil	5,5 pF typical, 8,0 pF max.
Environmental:	
Temperature	
Total Internal Relay (storage)	-40°C to +105°C
Operating	-38,8°C to +75°C
Shock Resistance, Non-operating	30g, 11 \pm 1 ms, 1/2 sine wave
Vibration Resistance, Non-operating	10g, 10 to 500 Hz
Mounting Position	All-position mounting
Unit Weight (approximate)	2,3 g

All characteristics at 25°C.

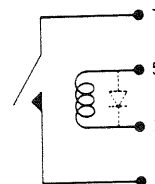
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Mechanical Dimensions MSS4

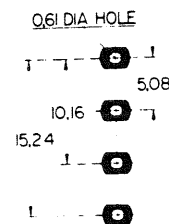


All dimensions are measured in millimeters

Wiring Diagrams

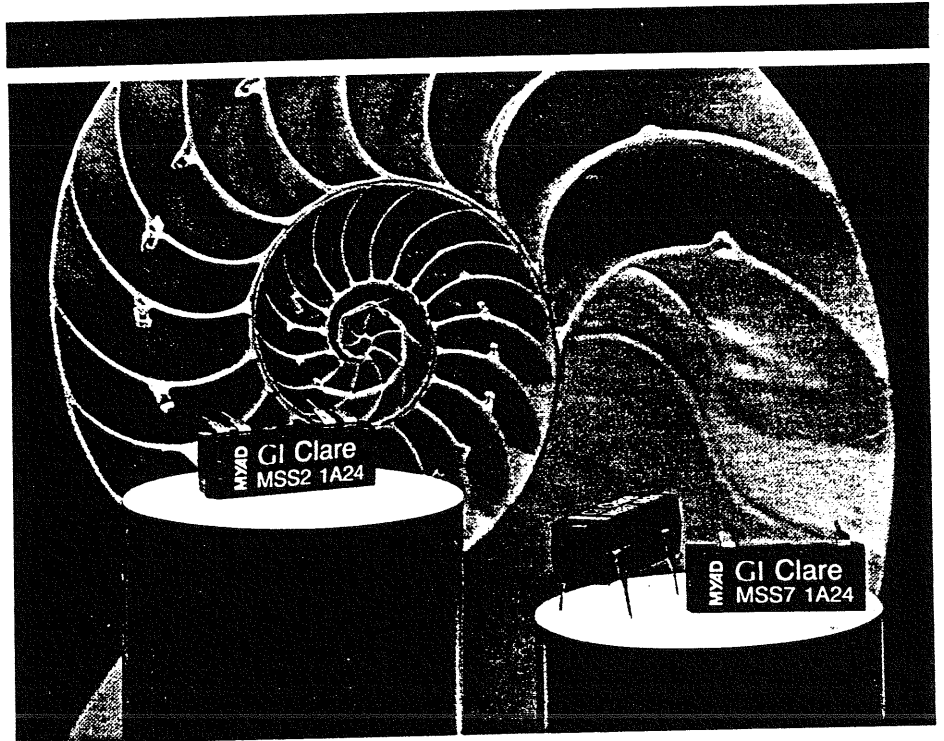


PCB Layout (Bottom View)



Clare MSS-2, MSS-7

Molded Dual-In-Line Series "All-Position" Wetted Reed Relays



Features

- All-position mounting wetted reed contacts.
- Long life wetted reed contacts.
- Epoxy-molded, dual-in-line for automatic board processing.
- 1 Form A (SPST) contact arrangement.
- Nominal input power as low as 180mW.
- Operate times less than 2 milliseconds.
- Bounce-free operation.
- Switching speed of 100 Hz.
- High density board mounting.
- Stable contact resistance (± 5 milliohms from original value) throughout life.
- Up to 30 VA switching, 350 V.
- High isolation between all points. (1000 Vac rms)
- Diode option.
- 4 pin version for 1500 Vac rms isolation input to output available.
- Automatic insertion capability.

**GENERAL
INSTRUMENT**

Clare MSS-2, MSS-7 Miniature "All-Position" Wetted Reed Relays

Introduction

The Clare MSS-2 dual-in-line wetted reed relay provides the designer with the superior switching characteristics of the MYAD switch in an epoxy-molded, dual-in-line package. The contact configuration within this package is a 1 Form A. There are three standard input voltages available: 5, 12, and 24 volts. Input power as low as 150mW addresses the need for minimum power supply requirements.

Options available in the MSS-2 package include an internal diode across the coil and a 4 pin DIP version (MSS-7) for high isolation (1500 Vac rms) input to output. Isolation across open contacts is 1000 Vac rms.

The MSS-2 and MSS-7 packages adapt to either automatic insertion equipment techniques for direct PCB mounting on 0.30 x 0.10 inch (7.62 x 2.54 mm) grid patterns or mounting in standard 14 pin DIP sockets. Both parts are delivered in plastic shipping tubes for ease of handling.

Design Characteristics

The Clare MYAD switch introduces a major breakthrough in wetted reed switching technology. It features all-position mounting of wetted reed contacts in a miniature, Form A (SPST) contact configuration.

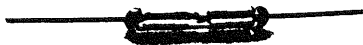
The MYAD switch is rated at 200 million operations at low level loads (10 Vdc, 10 mA). For higher level loads, the MYAD is rated up to 30 VA.

The unique, patented MYAD design offers the best of both wetted and dry reed technologies. The MYAD switch incorporates the capillary action and the effects of the historic mercury pool reservoir techniques. A hydrogen protective

gas, typical of quality wetted reed devices, yields a true mercury-to-mercury contact interface. A symmetric reed design, typical of dry reed technology, yields high sensitivity, low input power and switching speeds that are faster than any competitive wetted reed design.

MYAD All-Position Mounting

Until now, a major disadvantage of the wetted reed relay has been that it must be mounted in an upright position. The MYAD captures the advantages of the wetted reed in relay packages that can now be mounted in any plane.



This unique switch design offers a contact rating 10 times greater than competitive all-position wetted reed relays.

Applications

General—The MSS-2 and MSS-7 relays provide the designer with many key features that are important in applications such as those listed below. For example, MSS-2 and MSS-7 are available in industry standard, epoxy-molded DIP packages for automatic board processing. These packages offer a miniature, cost-effective solution where fast operate times and bounce-free operation are important considerations. The MSS-7, 4 pin DIP is available for higher isolation input to output (1500 Vac). Both the MSS-2 and MSS-7 offer the enhanced performance of wetted reed contacts with the portability of all-position mounting in a package that requires minimum operate power.

For the Telecommunication and Datacommunication

Fields—MSS-2 and MSS-7 relays are often used in dial pulse, off-hook, and ancillary equipment. Of particular value is the MYAD's ability to switch both low level loads and higher or varying loads without degrading the contacts or contact life. Equally important are its immunity to line transient input, FCC 68 compatibility within specific applications, and extended life at ringer loads.

For Automatic Test

Equipment—MSS-2 and MSS-7 offer contact stability over a wide range of switching loads. Also, their operation is enhanced by low leakage and high isolation. MSS-2 and MSS-7 are ideal for interface applications.

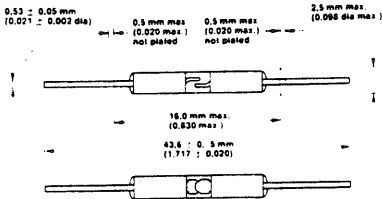
For Process Controls—The design of MSS-2 and MSS-7 relays is ideal for applications where high isolation and extremely stable and reliable contact resistance is required over a variety of switching loads.

For Security Systems—MSS-2 and MSS-7 are truly cost-effective answers in security applications. These rugged epoxy-molded packages allow freedom from the effects of environmental influences.

Performance Characteristics

Wetted Reed Contacts

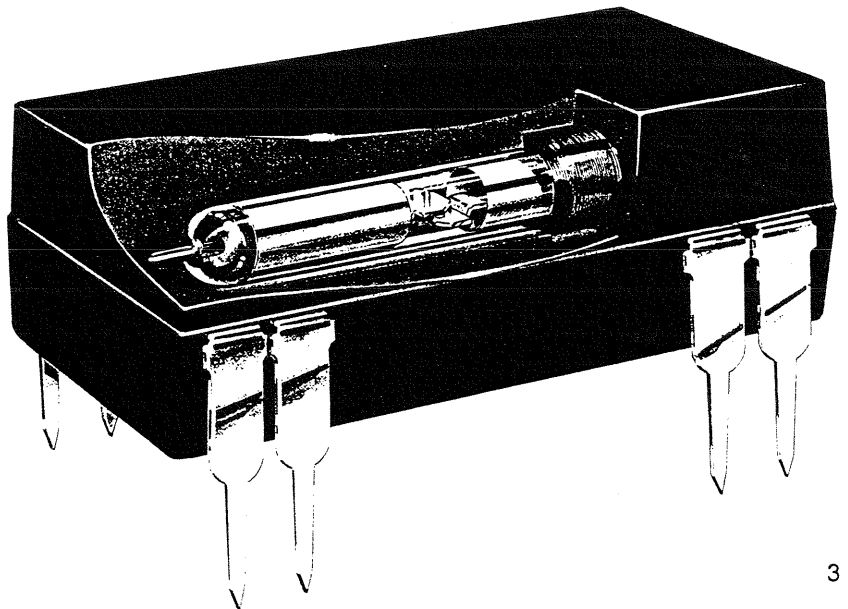
Wetted reed contacts provide a cushioning effect on closure, ensuring bounce-free operation. By eliminating the bounce that typically occurs on contact closure, the electrical continuity provided by the mercury film assures reliable switching and extends the life of the relay. The wetted contacts and the pressurized gas atmosphere within the switch combine to eliminate heat as the prime cause of contact erosion.



The MYAD switch, developed by the Clare Division, is oriented toward enhancing reliability, performance, and quality, as indicated in the accompanying checklist.

MYAD Performance Check List

Evaluation Criteria	MYAD Design Benefits			
	Symmetric Wetted Reeds	Capillary Grooves	Reservoir Cup	Pressurized Protective Gas
Mercury-to-Mercury Contacts		X	X	
All-Position Mounting			X	
Operate Speed	X			
Operate Bounce	X	X	X	
Frequency Response	X			
Dynamic Contact Resistance	X	X	X	X
Static Contact Resistance	X	X	X	X
Low Level Life		X	X	X
High Level Life		X	X	X
Isolation Voltage	X			X
Insulation Resistance				X
Manufacturing Cost	X			X
Size	X			X
Quality				
Wetting Action		X		X
Uniformity	X	X	X	X
Seal Integrity	X			X



Specifications

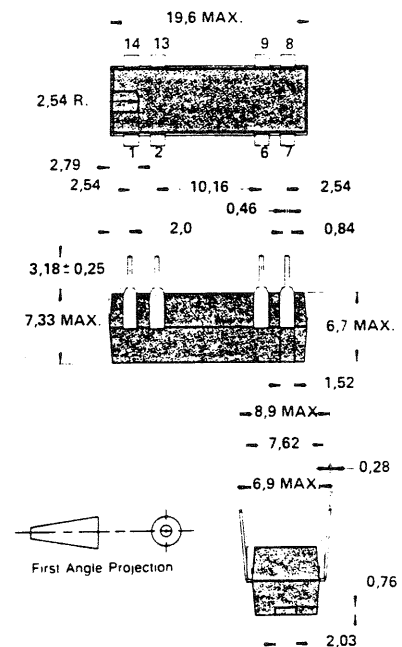
Engineering Data

Contact Form	1 Form A (SPST)
Contact Rating:	
Maximum Switching Power	30 VA
Maximum Switching Voltage	350 Vdc or 350 V peak ac
Maximum Switching Current	0,75 Adc or 0,75 A peak ac
Maximum Carrying Current	2,0 Adc or 2,0 A peak ac
Contact Resistance, Initial	100 mΩ max. (stable within ± 5 mΩ from original value over life)
Contact Material	Platinum-Nickel alloy (mercury-wetted) to Nickel-Iron alloy (mercury-wetted)
Life Expectancy: (with proper contact protection)	
10 Vdc, 10 mA	200 × 10 ⁶ operations min.
48 Vdc, 100 mA	50 × 10 ⁶ operations min.
Maximum Operating Frequency	100 Hz
Timing: (at nominal coil voltage up to 10 Hz, 50% duty cycle with diode suppression)	
Operate Time	1,2 ms typical, 1,75 ms max.
Release Time, Diode Suppressed	1,0 ms typical, 1,50 ms max.
Bounce Time	None
Dielectric Standoff:	
Across Open Contacts	1000 Vac rms min.
Between Contact and Coil	700 Vac rms min. (MSS-7 = 1500 Vac rms min.)
Insulation Resistance:	
Across Open Contacts	100 Mohms min.
Between Contact and Coil	10,000 Mohms min.
Capacitance:	
Across Open Contacts	1,75 pF typical, 2,0 pF max.
Open Contact to Coil	3,6 pF typical, 4,0 pF max.
Closed Contact to Coil	7,0 pF typical, 8,0 pF max.
Environmental:	
Temperature	
Total Internal Relay (Storage)	-40°C to +105°C
Operating	-38,8°C to +75°C
Shock Resistance, Non-Operating	30g, 11 ± 1 ms, ½ sine wave
Vibration Resistance, Non-Operating	10g, 10 to 500 Hz
Mounting Position	All-position mounting
Unit Weight (approximate)	2,3g

All characteristics at 25°C.

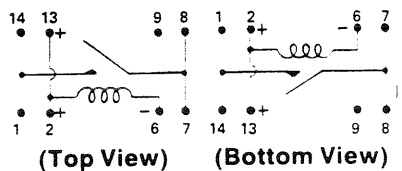
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Mechanical Dimensions and Schematics MSS-2

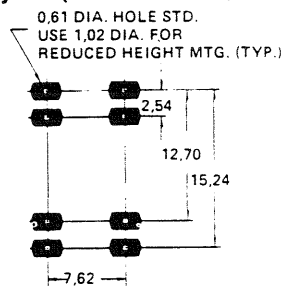


All Dimensions are measured in millimeters (inches).

Wiring Diagrams 1 Form A

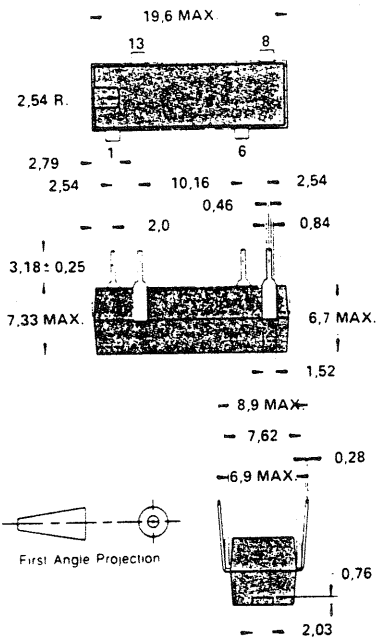


PCB Layout (Bottom View)



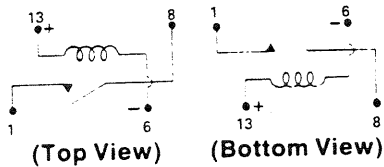
How To Order

Mechanical Dimensions and Schematics MSS-7

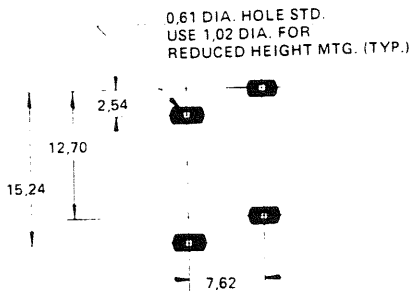


All Dimensions are measured in millimeters (inches).

Wiring Diagrams 1 Form A



PCB Layout (Bottom View)



Specify the part number as indicated below. MSS-2 and MSS-7 relays are readily available from local Clare Distributors. Consult your local Clare Sales Office for technical assistance.

MSS 2	1A	05	B
Relay Name	Contact Form	Nominal Voltage	Options
MSS 2 = Molded, Dual-In-Line Relay—8 Pin	1A = 1 Form A	05 = 5 Vdc 12 = 12 Vdc 24 = 24 Vdc	B = Diode MSS 2 Diode Pins 2 13 & 6. Cathode Pin 2.
MSS 7 = Molded, Dual-In-Line Relay—4 Pin			MSS 7 Diode Pins 6 & 13, Cathode Pin 13

Part Number	Contact Form	Nominal Input Voltage (Vdc)	Coil Resistance (Ohms) $\pm 10\%$	Nominal Input Power (mW)	Must Operate Voltage (Vdc)	Must Release Voltage (Vdc)	Maximum Voltage (Vdc)
MSS2 1A05* 1 Form A	5	140	178	3,75	0,5	11	
MSS2 1A12*	12	500	288	9,00	1,0	21	
MSS2 1A24*	24	2150	268	18,00	2,0	43	
MSS7 1A05 1 Form A	5	140	178	3,75	0,5	11	
MSS7 1A12	12	500	288	9,00	1,0	21	
MSS7 1A24	24	2150	268	18,00	2,0	43	

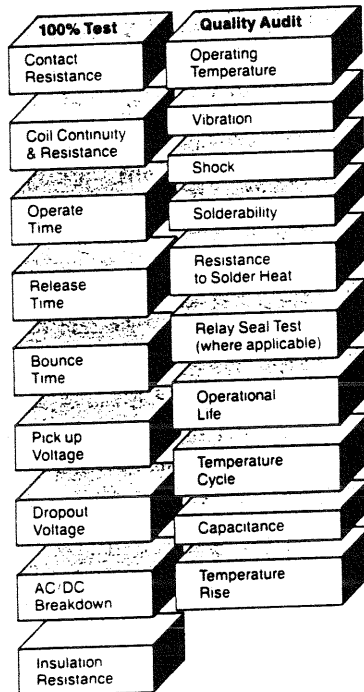
* Stock Items
All characteristics at 25°C

1. **Compatibility:** The MSS-2 MSS-7 are compatible with any standard 14 pin IC socket.
2. **Pins:** The coil and switch terminals are 0,018 x 0,011 inch (0,46 x 0,28 mm). For normal PCB mounting, 0,024 inch (0,6mm) diameter holes are recommended.
3. **Terminals:** All terminals are tin-lead plated.
4. **Soldering and Cleaning Operations:** Should be conducted as quickly as possible. Solder bath should not exceed 260°C.
5. **Molded Package:** Epoxy-molded body and epoxy heat-cured markings are impervious to all standard PCB cleaning agents.
6. **Rugged, Transfer-Molded-Plastic Case:** Provides terminal position stability and protection from extraneous mechanical or environmental forces in any application where these forces could compromise solder junctions between the coil or switch and terminals, or result in switch breakage.
7. **Clinching:** The inserted MSS-2 / MSS-7 can be clinched without damage to the structure.
8. **Maximum Life:** For best results, the specified contact ratings must not be exceeded.
9. **Contact Protection:** Wetted reed contacts can withstand changing currents better than any other relay type. However, contact loads that can cause severe arcing may result in contact erosion and shorten the relay's life. The designer must therefore provide contact protection to ensure the life expectancy of the relay by limiting the rate of change of voltage across the contacts when they are opened and also the current through them when they are closed. If you have any specific questions regarding contact protection, please see Clare Contact Protection Manual.
10. **Plastic Shipping Tube Packaging:** Ensures ease of handling and compatibility with automatic insertion equipment.

Clare Division enjoys a worldwide reputation for leadership in the relay industry... a reputation that is based on our long-term dedication to the quality of an entire product line.

And, for over 48 years, we have introduced switching solutions to answer customer needs with no sacrifice in our quality standards.

Clare Quality Testing



Value Added

Our years of experience in solving switching application needs is your assurance that we will help you select the right relay for your application. Ongoing Clare R&D teams work on new relay designs based on the needs and requirements specified by users throughout the world.

Our technical service and product engineering staffs are available to assist you in the selection of stock or custom products for your applications.

Pioneering Technology

Continuous attention to quality and function have enabled us to develop major breakthroughs in switching technology. The MYAD switch has been designed to overcome two main disadvantages of conventional wetted reed relays — size and position-sensitivity. The miniature, symmetric construction of the switch guarantees the same operational characteristics when mounted in any position. The assembly of the MYAD switch incorporates many advanced technological processes. The glass envelope is drawn to exact tolerances and the contacts are sealed in a pressurized chamber. Laser welding and automated sealing are employed to achieve greater uniformity between the switches.

Our automated production techniques are tightly controlled to ensure a consistent, high uniformity of product quality at every stage of the manufacturing process. 100% electrical testing is conducted at the manufacturing locations. Stringent QA auditing programs are followed to ensure that the integrity of the product is maintained.

It is this combination of supplying you with the component, the service, and the technical expertise that makes Clare the worldwide leader in quality relay products.

**Clare Division ...
We Help You Compete**

Other Clare Relay Products

The table on the following page will help you to select a specific wetted reed, dry reed, and/or electromechanical contact relay for your application. Our product engineering staff is always ready to give you detailed information on the standard products shown or to assist you in selecting a special relay for any unique application.

Relay Product Selection Guide

PRODUCT GROUP	PRODUCT NAME	CONTACT FORM	CONTACT RATING			TIMING (SPEED)			FULL LOAD	FOOTPRINT
			MAX. POWER	MAX. VOLTAGE	SWITCHED CURRENT MAX.	TYP OPERATE TIME (ms)	TYP RELEASE TIME (ms)	TYP BOUNCE TIME (ms)		
Wetted Reed Relays	MSS2	1A	30 VA	350 VDC	0.75 A	1.2	1.0	0.0	10 ⁶	DIP, 0.3x0.10
	MSS6	2A	30 VA	350 VDC	0.75 A	1.2	1.2	0.0	10 ⁶	DIP, 0.3x0.10
	MSS7	1A	30 VA	350 VDC	0.75 A	1.2	1.0	0.0	10 ⁶	4 PIN-DIP 0.3x0.10
	MMRB	1A TO 6A	30 VA	350 VDC	0.75 A	1.6	1.4	0.0	10 ⁶	1x0.1 OR 1x0.15
	CUP (6)	1A TO 5A, 1B	30 VA	350 VDC	0.75 A	1.6	1.4	0.0	10 ⁶	STAGGERED
	HRM	1A	50 VA	350 VDC	0.75 A	1.5	1.5	0.0	10 ⁶	0.8x0.15
	HRB	1A TO 6A	50 VA	350 VDC	0.75 A	2.0	2.0	0.0	10 ⁶	1x0.1 OR 1x0.15
	BS1	1A TO 5A, 1B	50 VA	350 VDC	0.75 A	2.0	2.0	0.0	10 ⁶	1.3x0.10
	CUP (5)	1A TO 3A, 5A, 1B	30 VA	350 VDC	0.75 A	1.3	1.4	0.0	10 ⁶	STAGGERED
	MHC	1C, 2C	50 VA	350 VDC	1.00 A	2.0	2.0	0.0	10 ⁶	1x0.10
	HGJM	1C, 2C	100 VA	500 VDC	2.00 A	1.1	1.1	0.0	20x10 ⁶	1.4x0.10
	HGWM	1C, 2C	100 VA	500 VDC	2.00 A	1.1	1.1	0.0	20x10 ⁶	1.2x0.10
	HGRM	1C, 2C, 1D, 2D	100 VA	500 VDC	2.00 A	2.0	2.4	0.0	10 ⁶	1.4x0.10
	GARA	1C, 2C	30 VA	350 VDC	0.75 A	2.0	2.4	0.0	10 ⁶	1.4x0.10
	HGZM	2C	30 VA	150 VDC	1.00 A	2.5	1.7		10 ⁶	DIP, 0.3x0.10
	Dry Reed Relays	PRMA	1A, 2A, 1B	10 VA	100 VDC	0.50 A	0.25	0.2	0.2	5x10 ⁶
PRMA		1C	3 VA	28 VDC	0.25 A	1.5	1.5	1.0	5x10 ⁶	DIP, 0.3x0.10
PRME		1A	10 VA	100 VDC	0.50 A	0.25	0.2	0.2	5x10 ⁶	DIP, 0.3x0.10
DSS3		1A	5 VA	100 VDC	0.50 A	0.5	0.2	0.3	5x10 ⁶	0.7x0.10
DSS4		1A	10 VA	100 VDC	0.50 A	0.25	0.2	0.2	5x10 ⁶	SIP, 0.2x0.10
DSS7		1A	10 VA	100 VDC	0.50 A	0.25	0.2	0.2	5x10 ⁶	4 PIN-DIP 0.3x0.10
MRB		1A TO 6A, 1B, 2B, 1AB, 2AB 1A LATCH 2A LATCH	10 VA	200 VDC	0.75 A	0.8	0.1	0.3	10 ⁶	1x0.1 OR 1x0.15
CUP (1)		1A TO 5A 1B, 2B, 1A1B, 2A2B, 1A LATCH	10 VA	200 VDC	0.75 A	0.45	0.4	0.3	10 ⁶	STAGGERED
CUPV		1A, 2A, 1B, 1A1B, 2A2B	10 VA	200 VDC	0.75 A	0.45	0.4	0.3	10 ⁶	STAGGERED
MRBS		1A	5 VA	75 VDC	0.15 A	1.5	1.0	0.5	10 ⁶	1x0.10
MRBT		2A, 3A	10 VA	100 VDC	0.50 A	1.0	0.5	0.3	10 ⁶	1x0.10
951		1A TO 5A, 1B	10 VA	150 VDC	0.75 A	0.2	0.3	0.2	5x10 ⁶	1x0.10
Electro-Mechanical Relays	LM	2C & 2C LATCH	30 VA	125 Vdc	2.00 A	3.5	2.0	2.5	5x10 ⁶	DIP
	LX	2C	30 VA	100 Vdc	1.00 A	4.0	2.5	3.0	2x10 ⁶	0.10 IN LINE
	LA	4C	30 VA	100 Vdc	1.00 A	15.0	3.0	10.0	10 ⁶	0.10 IN LINE
	LB	6C	30 VA	100 Vdc	1.00 A	15.0	3.0	10.0	10 ⁶	0.10 IN LINE
	LC	12A 6A6C, 6B6C, 6A6D, 6B6D, 6A4C2D	30 VA	100 Vdc	1.00 A	15.0	3.0	10.0	10 ⁶	0.10 IN LINE

Clare Sales Offices Worldwide

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