



IRM/ORM

Input Relay Module
Output Relay Module

USER'S MANUAL

No. 280-737-00 A

May 1991

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IRM/ORM

Introduction

Moore Industries' Input Relay and Output Relay Modules, the IRM and ORM, are externally powered relays used with the Cable Concentrator System® (CCS). Each provides intermediate relay output for contact closure-configured channels of CCS® modules.

This manual consists of a brief description of both the IRM and the ORM, a list of their specifications, a simple bench check procedure, the installation instructions, operation and maintenance notes, and troubleshooting information.

Notes and Cautions, where they appear in text or illustrations, are used to call attention to practices that may result in inconvenience to the user (Notes) or damage to the unit (Cautions).

Consult your Sales Representative or Moore Industries for more information on the CCS and other accessories.

Description

Both the IRM and ORM are DIN-style units, compatible with both G-rail (DIN EN50035) and Hat-rail (DIN EN50022) mounting hardware. They are designed to be installed alongside the modules of the CCS, providing relay output when the appropriate input conditions are present.

The IRM. The unit receives input from a relatively high voltage device, and uses a 5 amp, double pole/double throw (DPDT, 2 form C), mechanical relay to furnish a contact closure signal output.

This output can be used with, for example, CCS Input Module (IMM) channels, providing signal isolation, and allowing contact closure-configured channels of the IMM to monitor signals of up to 220 Vac (not possible with the IMM alone).

The ORM. This unit is available with either the 5 amp, DPDT, mechanical relay; or a single pole/single throw (SPST, 1 form A), solid-state relay. It receives contact closure input from the CCS Output Module (OMM), and provides relay output capable of switching up to 5 A @ 250 Vac or 5 A @ 30 Vdc.

Table 1 consists of the performance and functional specifications of the IRM. Table 2 lists the specifications of the ORM.

A red, light-emitting diode (LED) on the front panel of both types of relay module is activated when power is supplied to the unit. If the input voltage is at or above the specified pick-up level, this LED may be used to indicate relay operation in the unit.

NOTE

The LED on both the IRM and the ORM will be activated at voltages lower than those termed "pick-up" in the specifications listing. Do not use the LED as an indicator of relay operation unless the voltage in your application is consistently at or above this pick-up level.

Serial Number. A complete history of every product Moore Industries sells and services is kept at the factory, filed according to unit serial number.

If service information is required for a Moore Industries' product, provide the factory with the serial number of the unit, and our skilled technicians will be happy to help you.

The serial number of each IRM and ORM is printed on an adhesive label, and affixed to the back panel of the unit.

IRM/ORM

Table 1. IRM Specifications

Characteristic	Specifications																				
Input	Factory-configured. 12 Vdc 24 Vdc 110 Vac 220 Vac																				
Output	Miniature Power Mechanical Relay, Double Pole/Double Throw (DPDT), 2 Form C. Rated for 5 amps at 250 Vac, 5 amps at 30 Vdc, or 1250 VA, resistive.																				
Power	Unit is not "powered". Input energizes relay.																				
Performance	Pickup Voltage: 70% of rated input voltage for 12 and 24 Vdc units. 80% of rated input voltage for 110 and 220 Vac units. Dropout Voltage: 15% of rated input voltage for 12 and 24 Vdc units. 30% of rated input voltage for 110 and 220 Vac units. Maximum Applied Voltage: 110% of rated input voltage for all units. Summary: <table border="1" style="margin-left: 20px;"> <thead> <tr> <th>Unit Type</th> <th>Pickup Minimum</th> <th>Dropout Maximum</th> <th>Applied Voltage Maximum</th> </tr> </thead> <tbody> <tr> <td>12 Vdc</td> <td>8.4 Vdc</td> <td>1.8 Vdc</td> <td>13.2 Vdc</td> </tr> <tr> <td>24 Vdc</td> <td>16.8 Vdc</td> <td>3.6 Vdc</td> <td>26.4 Vdc</td> </tr> <tr> <td>110 Vac</td> <td>88 Vac</td> <td>33 Vac</td> <td>121 Vac</td> </tr> <tr> <td>220 Vac</td> <td>176 Vac</td> <td>66 Vac</td> <td>242 Vac</td> </tr> </tbody> </table>	Unit Type	Pickup Minimum	Dropout Maximum	Applied Voltage Maximum	12 Vdc	8.4 Vdc	1.8 Vdc	13.2 Vdc	24 Vdc	16.8 Vdc	3.6 Vdc	26.4 Vdc	110 Vac	88 Vac	33 Vac	121 Vac	220 Vac	176 Vac	66 Vac	242 Vac
Unit Type	Pickup Minimum	Dropout Maximum	Applied Voltage Maximum																		
12 Vdc	8.4 Vdc	1.8 Vdc	13.2 Vdc																		
24 Vdc	16.8 Vdc	3.6 Vdc	26.4 Vdc																		
110 Vac	88 Vac	33 Vac	121 Vac																		
220 Vac	176 Vac	66 Vac	242 Vac																		
Isolation	1500 Vrms, input-to-output.																				
Environmental Ratings	Ambient Operating Temperature: 0 to 70 °C (32 to 158 °F). Ambient Storage Temperature: -40 to 70 °C (-40 to 158 °F). Ambient Operating/Storage Humidity: 45 to 80%, non-condensing.																				
Weight	Approximately 240 grams (8 ounces).																				
NOTE: Refer to Installation Section for unit dimensions.																					

Model Number. Moore Industries' model numbers identify type of instrument, functional characteristics, operating parameters, any options ordered, and the housing type used.

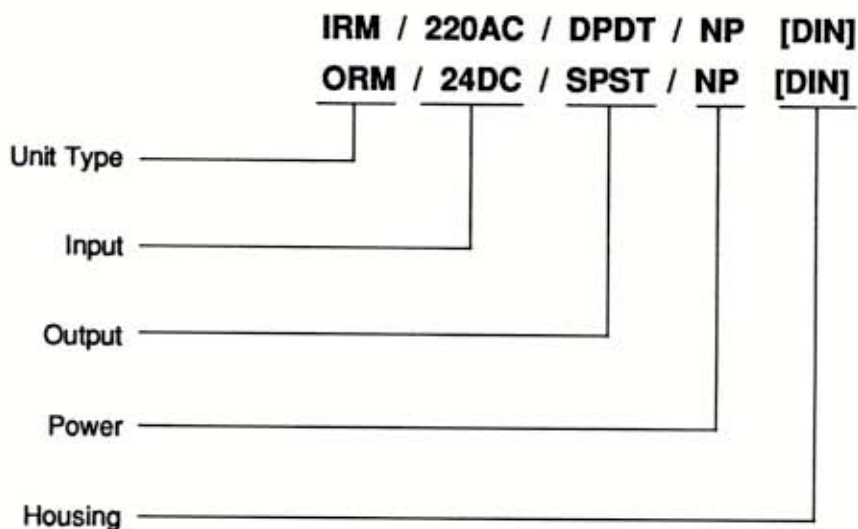
If all documentation for a unit is missing, the model number can be used to obtain configuration information about the IRM or ORM.

The model number for these units is located on the same label as the serial number.

The examples depict typical model numbers, and are provided as an aid in deciphering the various fields.

Table 2. ORM Specifications

Characteristic	Specifications
Input	24 Vdc.
Output	Miniature Power Mechanical Relay, Double Pole/Double Throw (DPDT), 2 Form C. Rated for 5 amps at 30 Vdc or 250 Vac, resistive. or Solid-state Relay, Single Pole/Single Throw (SPST), 1 Form A. Rated for 5 amps @ 12 to 250 Vac.
Power	Unit is not "powered". Input energizes relay.
Performance	Pickup Voltage: 16.8 Vdc Dropout Voltage: 3.6 Vdc Maximum Applied Voltage: 26.4 Vdc Nominal Operating Current: 22 mA
Isolation	1500 Vrms, input-to-output.
Environmental Ratings	Ambient Operating Temperature: 0 to 70 °C (32 to 158 °F). Ambient Storage Temperature: -40 to 70 °C (-40 to 158 °F). Ambient Operating/Storage Humidity: 45 to 80%, non-condensing.
Weight	Approximately 240 grams (8 ounces).
NOTE: Refer to Installation Section for unit dimensions.	

EXAMPLE

IRM/ORM

Bench Check

Each IRM and ORM is manufactured, checked, and tested according to Moore Industries' strict quality control guidelines. It is recommended, however, that a simple bench check of each unit's relay operation be performed prior to its being incorporated into your application.

It is further recommended that the procedures in this section be performed at a technician's bench or in a similar laboratory environment. Make sure to take precautions against electrostatic discharge, and to effect the correct polarity connections in your setup where appropriate.

Bench Check Equipment

To perform the check of either the IRM or the ORM, the equipment listed in table 3 will be needed. This equipment is not supplied by Moore Industries.

Bench Check Setup

The procedure for checking the operation of the relay in your IRM or ORM depends upon how your unit was configured by the factory.

If yours is a DPDT unit, it is recommended that both the normally open and the normally closed contacts be checked. SPST ORM's will require checking only the single pair of contacts.

Figure 1 shows how to connect a DPDT-equipped IRM or ORM for calibration, and to check for normally open operation. Figure 2 shows the same type IRM/ORM, connected for a normally closed check. Figure 3 shows the connection of ORM's configured with solid-state relays.

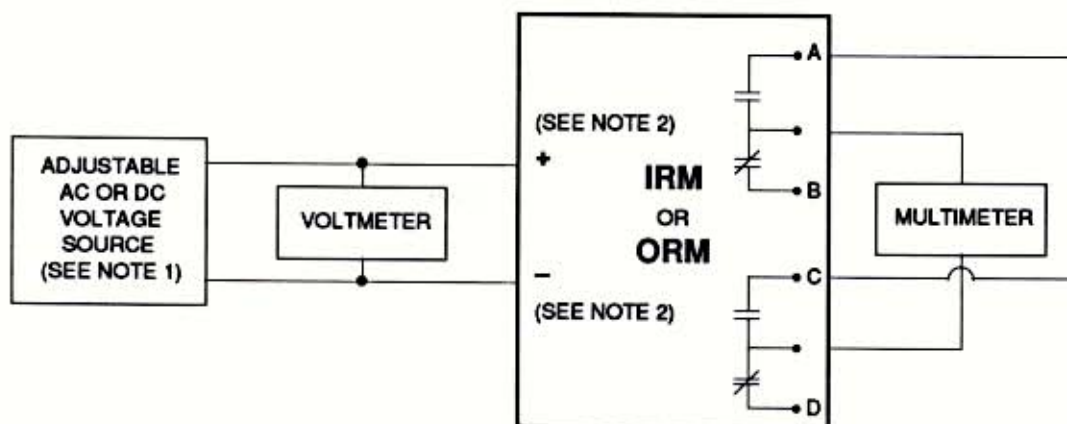
To check the operation of an IRM or ORM with DPDT relay, use the equipment described in table 3, and connect the module as shown figure 1. To check ORM's with SPST relays, connect the module as shown in figure 3.

CAUTION

Do not activate voltage sources until all connections are complete. Always begin this procedure with all voltage sources set to 0 volts.

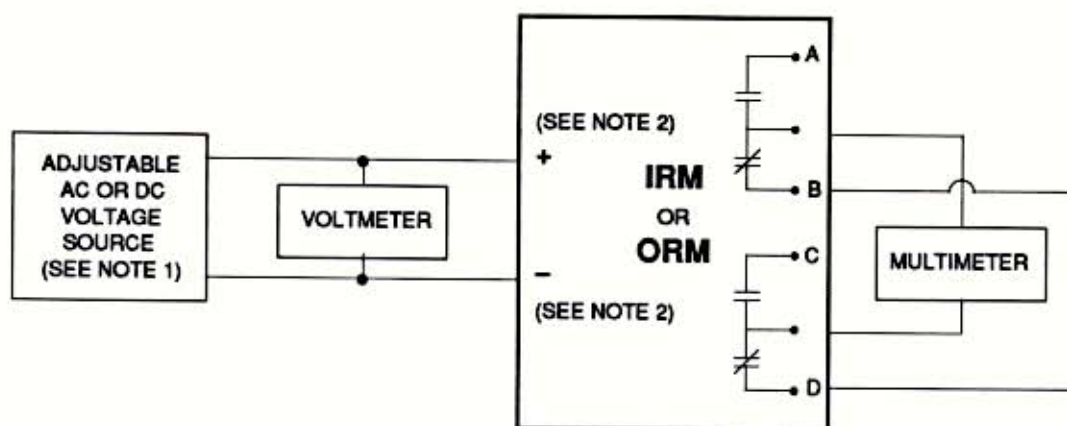
Table 3. IRM/ORM Bench Check Equipment

Equipment	Specifications
Voltage Sources	Calibrated, adjustable, and capable of providing voltages as follows: For 12V IRM's: 0 to 12 Vdc. For 24V IRM's: 0 to 24 Vdc. For 110V IRM's: 0 to 110 Vac. For 220V IRM's: 0 to 220 Vac. For ORM's with mechanical relays: 0 to 24 Vdc. For ORM's with solid-state relays: Source A - 0 to 24 Vdc Source B - Relay-compatible; 100 mA @ 15 Vac.
Voltmeter	Calibrated Fluke model 8800A digital multimeter or equivalent voltmeter capable of measurements in the range of your Voltage Source.
Multimeter	Calibrated Fluke model 8800A digital multimeter or any equivalent unit capable of indicating the contact closure of the IRM/ORM relay.
Resistor	1 k Ω , 0.5 watt, minimum (for use in checking ORM's with SPST relays only).



- NOTES:** 1. Refer to specifications and table 3 to determine type and range of voltage sources.
2. Polarity appropriate for dc setups only.

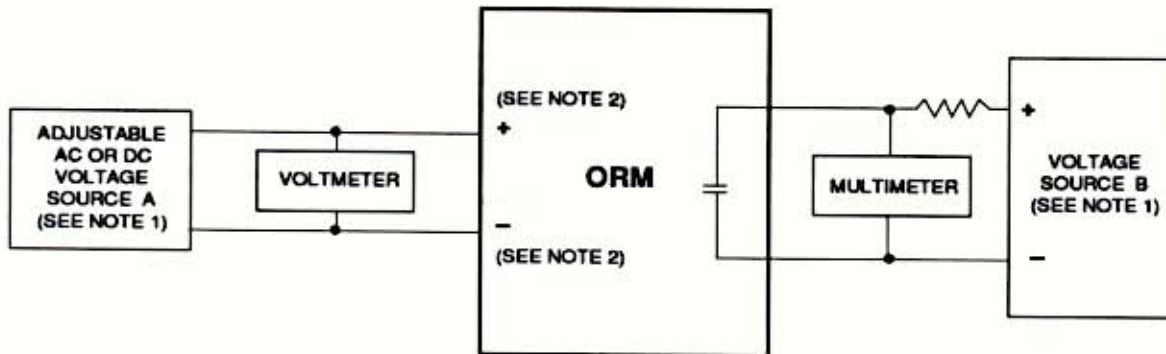
Figure 1. Setup for DPDT IRM's and ORM's, Normally Open Check



- NOTES:** 1. Refer to specifications and table 3 to determine type and range of voltage sources.
2. Polarity appropriate for dc setups only.

Figure 2. Setup for DPDT IRM's and ORM's, Normally Closed Check

IRM/ORM



NOTES: 1. Refer to specifications and table 3 to determine type and range of voltage sources.
2. Polarity appropriate for dc setups only.

Figure 3. Setup for Checking SPST (Solid-state) ORM's

Bench Check Procedures

Make sure that the calibration setup has been completed, and that the equipment is connected as shown in figure 1 (unless unit being checked is SPST-equipped ORM). Then:

1. Apply voltage to setup, adjusting until voltmeter reaches pickup level specified for your unit; 8.4 Vdc ± 0.1 V, for 12 Vdc units; 16.8 Vdc ± 0.1 Vdc, for 24 Vdc units; 88 Vac ± 1 Vac, for 110 Vac units; and 176 Vac ± 1 Vac, for 220 Vac units.
2. Verify that front panel LED is lit, indicating relay is on.
3. Set multimeter to measure resistance, and verify that it indicates closed relay contacts; negligible resistance.
4. Decrease level of voltage source to dropout point; 1.8 Vdc, 3.6 Vdc, 33 Vac, or 66 Vac, as appropriate for your unit.
5. Note that indication on multimeter switches to infinite resistance; open relay contacts.
6. Turn off voltage source, and reconfigure calibration setup as shown in figure 2.

7. Repeat steps 1 and 2 of this procedure.
8. Verify that multimeter indicates open relay contacts; infinite resistance.
9. Adjust voltage source until voltmeter reaches appropriate dropout level for your unit (see step 4 of this procedure).
10. Verify that multimeter indicates closed relay contacts; negligible resistance.

SPST-Equipped ORM's. To perform the calibration for ORM units with solid state relays, make sure that the calibration setup has been completed as shown in Figure 3, then:

1. Apply voltage to setup from source B. Set multimeter to measure voltage drop across ORM terminals, and verify that meter reading is 15 volts; relay contacts open.
2. Turn on voltage source A, and adjust to 16.8 Vdc, ± 0.1 Vdc, as indicated on voltmeter.
3. Verify that front panel LED is lit, indicating relay is on.

4. Check multimeter for a reading of less than 2.0 Vac drop, indicating contact closure.
5. Turn voltage source A off. Relay contacts open, and multimeter indicates maximum voltage drop, 15 Vac.
6. Verify that front panel LED turns off, indicating no voltage to the unit.

Installation

Installation of the IRM and ORM is a two phase process. First, the unit(s) must be physically mounted, and then the electrical connections must be made.

Mounting

The DIN-style housing used in the IRM and ORM snaps onto either a 32 mm G-rail or a 35 mm Hat-rail. These rails must be at zero potential (ac ground) for reliable operation.

Modules should be mounted in an area free from excessive dust, moisture, and corrosive elements. If a protective enclosure is used, ensure that adequate cooling is provided.

Figure 4 shows the outline dimensions of the IRM and ORM housing for use in mounting the units.

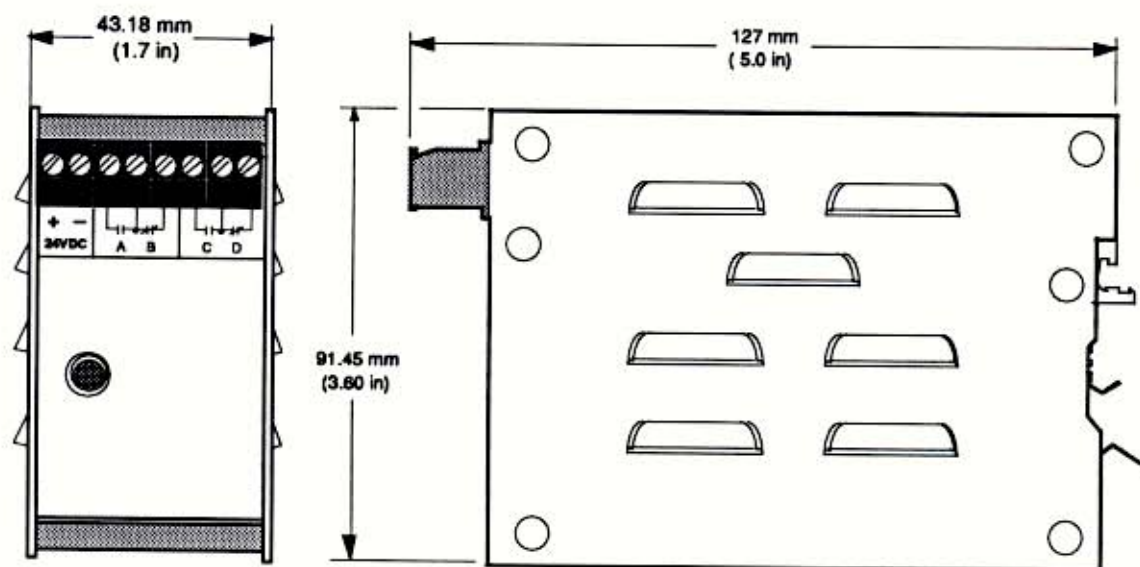


Figure 4. IRM/ORM Outline Dimensions

IRM/ORM

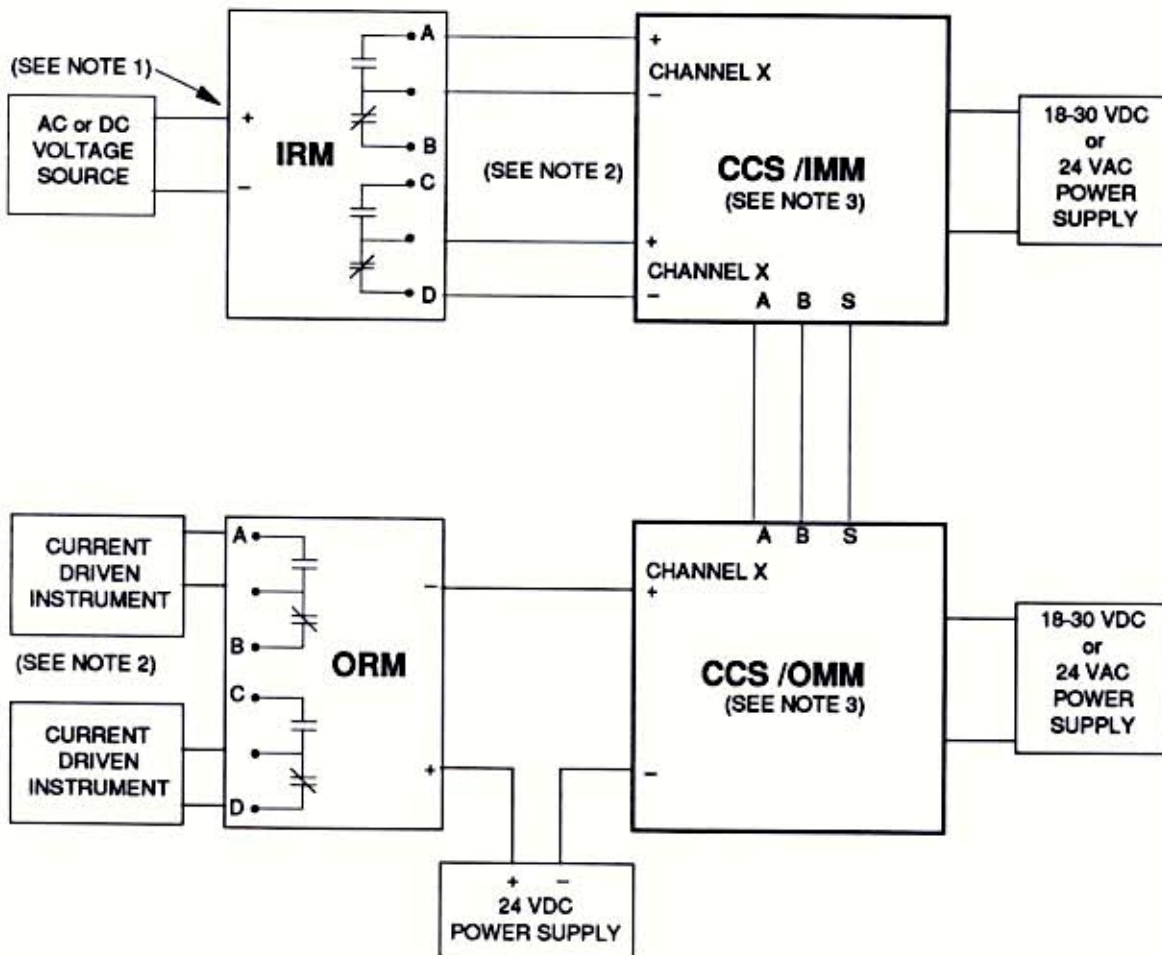
Electrical Connections

All wiring connections are made with removable terminal plugs, which are "shaped" to prevent insertion in the wrong orientation. The terminal plugs accept wire sizes 14 to 30 AWG.

To secure wiring connections to the terminal plugs, a slotted screwdriver with a head of approximately 3.17 mm (0.125 inch) is required.

Loosen the terminal screws, and strip approximately 0.25 inch of insulation from the end of each wire. With the terminal plugs seated in the modules, insert each wire end into the appropriately labeled plug opening (on the top of the terminal plugs). Then tighten the terminal screw.

Figure 5 shows a typical hookup diagram for the IRM and ORM.



- NOTES:**
1. Labeling applies to dc- configured units only.
 2. Use \overline{r} terminals for applications requiring normally open contacts.
Use r terminals for applications requiring normally closed contacts
 3. IMM must be connected to its paired OMM in your CCS.
Consult CCS User's Manual for information regarding condition of slave IMM's.

Figure 5. Typical IRM/ORM Installation Hookup

NOTE

If using the IRM and ORM with the CCS, the CCS Module channels must be configured for discrete, contact closure operation.

If using the IRM or ORM with the CCS, it is recommended that users become familiar with the installation and operating principles of the CCS first, before incorporating the ORM or the IRM in the application.

Operation

Once installed and connected properly, both the IRM and the ORM operate unattended indefinitely. The LED may be used to indicate that the unit is receiving input. When installed in an application that takes advantage of the units' rated pickup voltage, the LED will indicate that the relay is on.

Maintenance

The IRM and ORM require nothing more than a periodic check of the condition and tightness of their connecting terminals to operate smoothly.

Check the modules once every six months for signs of terminal corrosion, or loosening of the terminal plugs and screws.

Troubleshooting

If the IRM or ORM fail to operate or begin to operate erratically, check these items first:

- Are all terminals clean and secure?
- Is the wiring polarity of the installation correct?
- Are the voltage level or levels in the application within the rated ranges for the IRM/ORM being used?
- Is the CCS module to which the IRM/ORM is connected working properly?
- Is the CCS module channel configured for contact closure?

If unable to isolate the source of the IRM/ORM malfunction, remove the unit from service. Repeat the bench check, described earlier in this manual, to confirm whether the relay is malfunctioning.

If problems persist, make note of the unit's model and serial number, and contact Moore Industries' Customer Service Department. Instructions for returning Moore Industries products can be found on the back cover of this manual.

RETURN PROCEDURES

To return equipment to Moore Industries for repair, follow these four steps:

1. Call Moore Industries and request a Returned Material Authorization (RMA) number.

Warranty Repair –

If you are unsure if your unit is still under warranty, we can use the unit's serial number to verify the warranty status for you over the phone. Be sure to include the RMA number on all documentation.

Non-Warranty Repair –

If your unit is out of warranty, be prepared to give us a Purchase Order number when you call. In most cases, we will be able to quote you the repair costs at that time. The repair price you are quoted will be a "Not To Exceed" price, which means that the actual repair costs may be less than the quote. Be sure to include the RMA number on all documentation.

2. Provide us with the following documentation:
 - a) A note listing the symptoms that indicate the unit needs repair
 - b) Complete shipping information for return of the equipment after repair
 - c) The name and phone number of the person to contact if questions arise at the factory
3. Use sufficient packing material and carefully pack the equipment in a sturdy shipping container.
4. Ship the equipment to the Moore Industries location nearest you.

The returned equipment will be inspected and tested at the factory. A Moore Industries representative will contact the person designated on your documentation if more information is needed. The repaired equipment, or its replacement, will be returned to you in accordance with the shipping instructions furnished in your documentation.

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RETURN POLICY

For a period of thirty-six (36) months from the date of shipment, and under normal conditions of use and service, Moore Industries ("The Company") will at its option replace, repair or refund the purchase price for any of its manufactured products found, upon return to the Company (transportation charges prepaid and otherwise in accordance with the return procedures established by The Company), to be defective in material or workmanship. This policy extends to the original Buyer only and not to Buyer's customers or the users of Buyer's products, unless Buyer is an engineering contractor in which case the policy shall extend to Buyer's immediate customer only. This policy shall not apply if the product has been subject to alteration, misuse, accident, neglect or improper application, installation, or operation. THE COMPANY SHALL IN NO EVENT BE LIABLE FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES.



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