



October 1990

**DCD**

Direct Current Display  
**USER'S MANUAL**

No. 601-708-00 A

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**48<sup>HR.</sup>**  
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## Introduction

Moore Industries' Direct Current Display (DCD) is a compact, panel-mount meter that measures dc voltage or current and digitally displays a representative value that is proportional to the input.

This manual contains descriptive, installation, and maintenance information for the DCD.

## Description

The DCD is a highly reliable instrument designed to measure voltages in the range of 1-5 volts dc, or current in the range of 4-20 mA. It then displays a representative value for the voltage or current readings in percent (0-100.0 display).

The DCD is packaged in a sturdy, light-weight plastic housing that mounts directly on an instrument panel in a user-provided cutout. Mounting hardware is provided with each unit.

The DCD is equipped with a 3.5-digit display and is powered by an external 110- or 220-Vac power source.

The DCD is factory-configured to user specifications. The model number of each unit identifies the configuration of the unit as it was originally shipped from the factory.

Table 1 contains the equipment specifications for the DCD.

**Serial Number.** A complete history is kept on every product Moore Industries sells and services. This information is keyed to the unit's serial number. Whenever service information is required on a particular product, it is necessary to provide the factory with the serial number of the unit. The serial number for the DCD is located on a label affixed to the top of the housing.

**Model Number.** Moore Industries' model numbers identify the type of instrument, functional characteristics, operating parameters, and the housing type of the unit. If all documentation for a unit is missing, the model number can be used to obtain configuration information about the DCD. The model number for the DCD is located on the same label as the serial number, which is affixed to the top of the unit.

The example below identifies the significance of each field in the DCD model number.

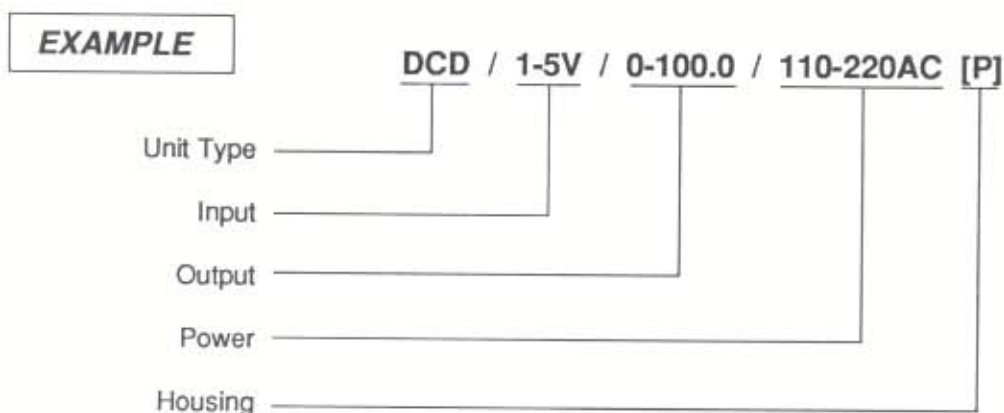


Table 1. DCD Equipment Specifications

Characteristic	Specification
Input	4-20 mA 1-5 Vdc
Display Range	0-100.0
Power Requirements	110/220 Vac ( $\pm 10\%$ ), 60/50 Hz
Accuracy	0.1% of reading, $\pm 1$ count
Noise Rejection	<b>Normal Mode Rejection Ratio (NMRR):</b> <40 dB @ 50/60 Hz, $\pm 0.1$ Hz <b>Common Mode Rejection Ratio (CMRR):</b> 130 dB with 250 $\Omega$ unbalance, typical
Isolation	Positive (+) or negative (-) analog input terminals to AC or ACC terminals, 1500 Vdc or Vac (peak)
Overload Protection	<b>Voltage Input:</b> Across input terminals, up to 300 Vac (rms) for 1 minute <b>Current Input:</b> Across input terminals, up to 50 mA ac or dc for 1 minute
Input Impedance	<b>Voltage:</b> 1 M $\Omega$ <b>Current:</b> <120 $\Omega$
Display	3.5-digit; each digit is seven-segment red/orange LED, 14.2 mm (0.56 in.) high
Environmental Ratings	<b>Operating:</b> 0 to 50 °C (32 to 122 °F) <b>Humidity:</b> $\leq 85\%$ relative humidity (non-condensing)
Weight	454 grams (1 lb.)
<b>NOTE:</b> Refer to the Installation Section for physical dimensions.	

## Installation

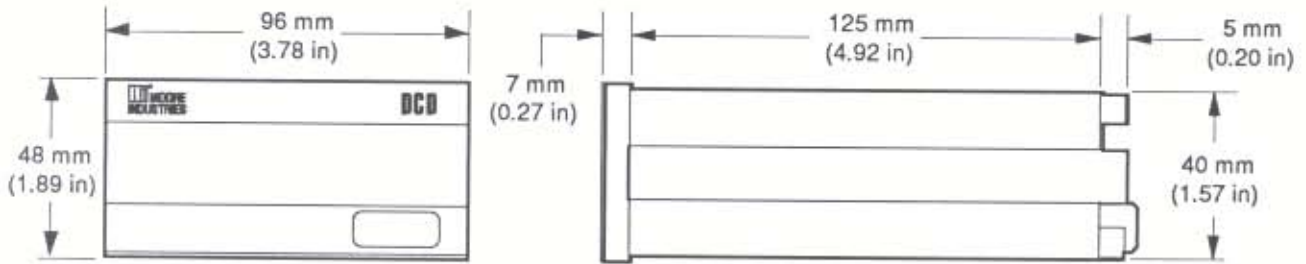
All DCD's are factory-configured to user specifications and calibrated for optimum performance before they leave the factory. There are no field adjustments to be made or calibration procedures to complete. The DCD is ready for use upon receipt.

Installing the DCD consists of physically mounting the unit and completing the electrical connections. Each of these tasks are described in the following subsections.

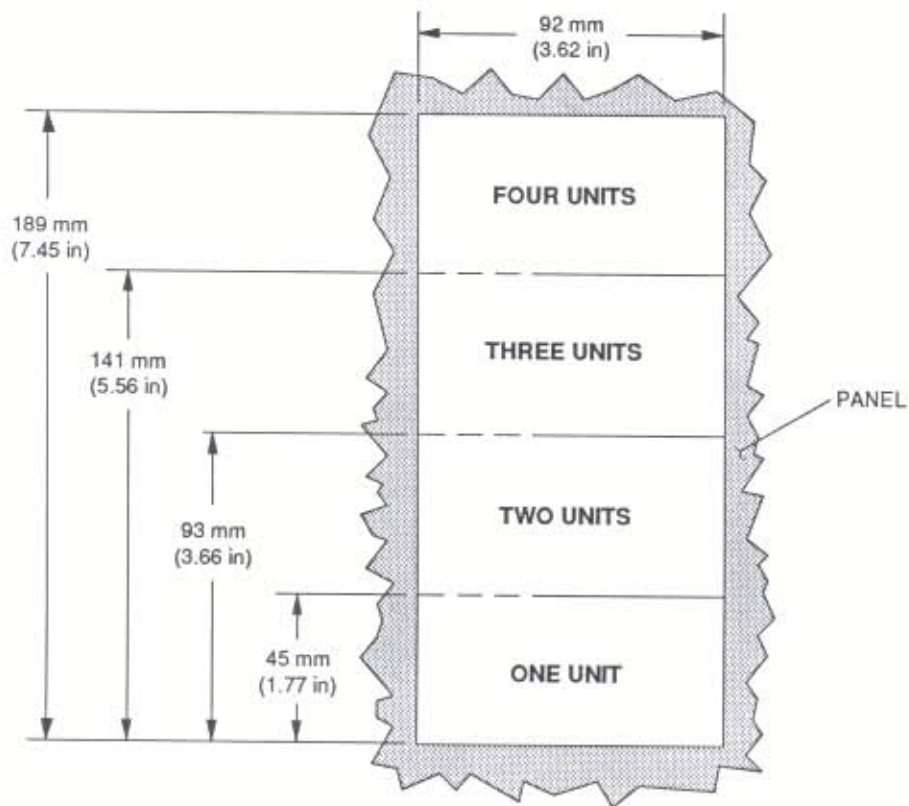
## Mounting the DCD

The DCD is designed for mounting in a flat panel cutout. Figure 1 shows the outline dimensions of the DCD. Figure 2 contains the cutout dimensions required to mount one, two, three, or four panel-mount meters in cutouts of varying heights. Mounting hardware is supplied with each unit.

The cutouts shown in figure 2 afford the user a couple of mounting options. If only one meter is to be mounted, the single cutout dimensions should be used. However, if stacking meters in a vertical arrangement is desirable, then a double, triple, or



*Figure 5. DCD Outline Dimensions*



*Figure 2. Panel Cutout Dimensions*



# DCD

larger cutout is required. Regardless of how many DCD's are mounted in a single panel cutout, the maximum panel thickness should not exceed 5 mm (0.2 inch).

When DCD's are stacked in a vertical cutout, the front panel of each meter will rest slightly on the meter beneath it. Removal of the front lens may be more difficult with the front panels in such close proximity.

After selecting and making the appropriate cutout, perform the following steps to physically mount the DCD.

1. Using a small Phillips-head screwdriver, remove mounting bracket from unit by removing two screws at rear of unit securing bracket to housing.
2. From front of mounting panel, slide unit through cutout until flange around front panel is against edge of cutout. (Ensure unit is right-side-up.)
3. Reposition mounting bracket on rear of meter and secure with two Phillips-head screws.

### **CAUTION**

*Over-tightening bracket screws or mounting the meter in a panel that is too thick may cause the housing to distort or crack.*

4. If meters are being stacked vertically, repeat steps 1 through 3 for each meter. Place first meter at lowest point of cutout.

## Electrical Connections

The DCD electrical connections are made to an 8-location terminal strip at the rear of the unit. Figure 3 shows the connections required for the DCD to operate properly.

Terminal lugs may be used to complete the electrical connections, but are not supplied nor are they required.

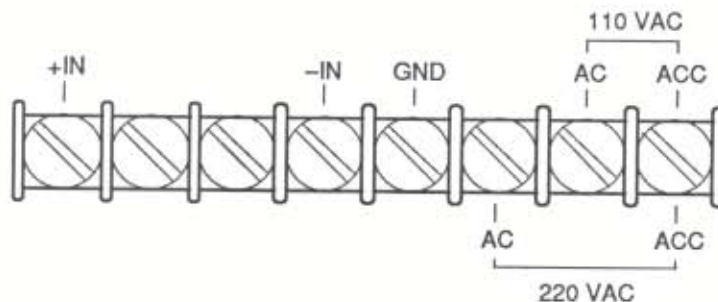
Ensure that ac power is removed from the unit while electrical connections are being made. Input signal connections to the DCD should be completed before supplying ac power.

## Maintenance

Field maintenance for the DCD is limited to keeping the electrical terminals clean and secure. Each unit should be visually inspected at least once every six months to ensure the terminals are free of dirt and oxidation, and the electrical wires are in good condition.

For reliable operation, frayed wires should be replaced as soon as possible with appropriate electrical wire and lugs (if used).

Each terminal should be checked to ensure that the connections have not become loose over time. When inspecting the terminals, always remove ac power before touching the terminal strip.



**Figure 3.** DCD Rear Terminal Electrical Connections

## NOTES

# 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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