DESCRIPTION
The Card Cage Enclosures are for the MODEL SERIES 380 plug-in function modules. There are four basic packages as listed under MODEL DESIGNATION and as shown by Figure 1. These are general purpose enclosures; auxiliary enclosures must be used to protect against unfavorable environments.

The Card Cage Enclosures accept any combination of the MODEL SERIES 380 function modules. The function modules can be arranged in any sequence; just choose one of the numbered slots for a module, wire to the corresponding terminal strip, and plug the module in. The capacity of the enclosures is either 4 or 10 function modules and depends upon the type of enclosure being used.

Each numbered slot within an enclosure has a pair of safety keys. These keys must be set according to the function module chosen for that slot. If a function module is inserted into the wrong slot, the safety keys prevent electrical contact for those modules with incompatible input/output wiring terminations.

Each Card Cage Enclosure includes a Power Supply Module. This module is located in the un-numbered slot at the right-hand side of the enclosure. There are two Power Supply Modules: P/N 15376–1FM for AC powered enclosures, and P/N 15376–2FM for DC powered enclosures.

The Card Cage Enclosure and its Power Supply Module provide regulated DC power (+24V and +15V) to all module locations within the enclosure. The regulating transistors (Q101 and Q102) for these DC supplies are contained in the enclosure and not the Power Supply Module. AC powered enclosures also contain the appropriate power transformer (T101). The Power Supply Module is an integral part of the Card Cage Enclosure and will not function unless installed in the enclosure.

Circuit protection consists of an enclosure fuse (F101) and a Power Supply Module fuse (F1). The Power Supply Module also includes a "crowbar" circuit for over-voltage protection and a "fold-back" circuit for over-current protection.

An LED on the front of the Power Supply Module indicates that power is being supplied to the function modules within the enclosure. Blown fuses or a loss of enclosure power will extinguish this light.

MODEL DESIGNATION

<table>
<thead>
<tr>
<th>Basic Series Designation</th>
<th>3803 C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Module Capacity and Type of Mount</td>
<td></td>
</tr>
<tr>
<td>1 – 10 modules, rack mount with rear terminal access</td>
<td></td>
</tr>
<tr>
<td>2 – 10 modules, wall mount with front terminal access</td>
<td></td>
</tr>
<tr>
<td>3 – 10 modules, rack mount with front terminal access</td>
<td></td>
</tr>
<tr>
<td>4 – 4 modules, wall mount with front terminal access</td>
<td></td>
</tr>
</tbody>
</table>

Power Requirements and Power Supply Module

A — 115VAC ±10% 50/60 Hz and 15376–1FM Power Supply Module
B — 24VAC ±10% 50/60 Hz and 15376–1FM Power Supply Module
C — 24VDC ±10% to +50% and 15376–2FM Power Supply Module
D — 230VAC ±10% 50/60 Hz and 15376–1FM Power Supply Module

GENERAL SPECIFICATIONS

Power Requirements: Supply Voltage is determined by the Card Cage Enclosure’s model number; refer to MODEL DESIGNATION.

Draws 50 Watts total with 10 function modules operating.

Output Voltage:
+24V dc ±2%
+15V dc ±1%

Output Capacity: 1.0 Amp. dc. Will furnish 24V dc and 15V dc to ten function modules; each module can draw a total of 100 mA dc if required.

Ambient Temp. Limits: 32°F (0°C) and 122°F (50°C)

Ambient Temp. Effect: ±0.1% for an ambient change from 32°F (0°C) to 122°F (5°C)

INSTALLATION

GENERAL
A hinged cover is provided at the front of the function
module compartment. To gain access to the compartment, loosen the two, captive screws along the top edge of the cover and swing the cover down.

A label for module tag numbers, slot-location and calibration data is attached to the inside of the hinged cover.

The slots for the function modules are numbered (see Fig. 2). There is a terminal strip for each module slot; these terminal strips are numbered to correspond to the slot numbers (see Fig. 3).

The module connectors within the enclosure are identical. This permits the choice of any slot for any one of the various function modules.

Choose a slot for each module or refer to your drawings for the designated slot. Be sure to mark the module location on the identification label attached to the inside of the module compartment cover.

**IMPORTANT**

It is recommended that the enclosure be mounted and wired, and its safety keys set before installing the function modules.

**MOUNTING**

Choose a location for the Card Cage Enclosure that is suitable for general purpose electronic equipment. Ambient temperature limits for the chosen location are 32°F and 122°F.

Mounting dimensions are given in Figure 1. Allow sufficient space around the enclosure to accommodate wire ways, etc., to provide access to the

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**FIGURE 1 Installation Dimensions**
terminal strips for calibration and troubleshooting, and to permit removal and installation of the plug-in modules.

SETTING THE SAFETY KEYS

Each function module slot has a pair of safety keys. These keys are located directly below each module connector in the enclosure. Each pair has a LEFT Key and a RIGHT Key. The keys have two positions: horizontal (H) and vertical (V). Figure 2 locates and identifies the keys, and shows the four horizontal and vertical combinations used.

WARNING

Ensure that all power (supply and signal) to the enclosure is off before setting the safety keys.

The positions for the safety keys are given in the INSTALLATION section of the Service Instructions for each function module. The instruction numbers correspond to the model numbers of the modules (e.g., a Model 380M Multiplier/Divider Module is covered by Service Instructions SD380M).

Use a small hex wrench or nail, etc. to rotate the safety keys to their required positions (see Fig. 2).

ELECTRICAL CONNECTIONS

All power, input and output terminations are made at the terminal strips in the Card Cage Enclosure. There is a terminal strip for each module slot; the terminal strips are numbered to correspond to the slot numbers (see Fig's. 2 and 3).

WARNING

Ensure that all power on all wires to be connected is off.

Modules for thermocouple inputs (i.e., Model Series 3807) have a barrier strip at the front of the module.

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**FIGURE 2 Safety Keys**

**FIGURE 3 Electrical Connections**
The T/C extension wire is routed to this barrier strip via one of the grommets in the bottom plate of the module compartment.

The following wire sizes are suggested:

- Signal Wiring — #18 AWG
- Power Wiring — #14 AWG

Use crimp-on wire terminals for #6 screws. Ring or locking fork terminals are recommended.

The input/output wiring terminals for each module are given by a CONNECTION DIAGRAM in the Service Instructions for that particular module.

Most of the modules require 1 to 5V dc inputs. Current input signals can be used by placing precision resistors across the input terminals. This permits removal of a module without interrupting the input current loop. The input resistors may not be required at the Card Cage Enclosure terminals if the enclosure is in a loop with other 1 to 5V dc receiving instruments. Refer to your loop diagrams and select the instrument on which to install the input resistors. The resistors must be 1/2W, metal film, ±0.1%.

<table>
<thead>
<tr>
<th>Current Range</th>
<th>Resistance</th>
<th>M.P.C. Part No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 to 5mA</td>
<td>1000 Ohms</td>
<td>15037–228</td>
</tr>
<tr>
<td>4 to 20mA</td>
<td>250 Ohms</td>
<td>15037–229</td>
</tr>
<tr>
<td>10 to 50mA</td>
<td>100 Ohms</td>
<td>15037–230</td>
</tr>
</tbody>
</table>

Figure 3 gives examples of input wiring for a module with two inputs. In the example, inputs of the same type and range, and inputs of different types or ranges are shown.

Most of the modules have 4 to 20 mA outputs. If such an output is being connected to other modules within the enclosure, or to other 1 to 5V dc receiving instruments, follow the preceding instructions on placement of input conditioning resistors. The resistors can also be placed across the output terminals.

Connect the AC or DC power and ground wires to the power terminal strip. Figures 3 and 4 locate and identify the terminal; connect the power lead to the AC or DC terminals; connect the NUTRAL power lead to the ACC or DC terminal. The GND terminal must be connected to a good earth ground.

**WARNING**

Incorrect wiring to the power terminal strip will defeat the fuse and create a safety hazard.

Reinstall the plastic shield over the power terminal strip to prevent accidental touching of the power terminals.

**INSTALLING THE MODULES**

Mounting and wiring should be complete and the safety keys should be set before installing the modules in their selected slots.

Position the module so that its pull-tab is at the top-front. Insert the module into the card guides of the designated slot and push the module in until it is fully engaged with the connector.

Be sure that the module slot location has been marked on the identification label attached to the inside of the module compartment cover. Secure the module compartment cover after module installation is complete.

**MAINTENANCE**

Except for annual cleaning, the Card Cage Enclosure and its Power Supply Module require no routine maintenance.

If the enclosure and its modules do not operate properly when initially installed, check the input/output wiring. Most problems on new installations can be traced to wiring mistakes. Also, verify that the equipment associated with the input/output circuits is functioning and is properly calibrated.

In the event of a suspected failure, check the light on the front of the Power Supply Module. This LED will be on when power is being supplied to the function modules. If it is out, check the enclosure fuse (see Fig. 3) and the Power Supply Module fuse (see Fig. 6).

A P/N 15376–27 Card Extender can be ordered. This extender provides test jacks for all of the card-edge connections on the modules. It also provides access to a module’s circuit board for detailed troubleshooting.

If a problem is traced to the enclosure’s power supply, use the card extender for functional testing of the Power Supply Module and its related components in the Card Cage Enclosure. Refer to Figures 5 and 6 for a schematic and a parts location drawing of the Power Supply Module. Otherwise, remove the Power Supply Module and perform static bench checks.

**NOTE**

The Power Supply Module is an integral part of the Card Cage Enclosure and will not function unless installed in the enclosure.

<table>
<thead>
<tr>
<th>Pin</th>
<th>P/N 15376–1FM AC Pwr. Supply Module</th>
<th>P/N 16376–2FM DC Pwr. Supply Module</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Common</td>
<td>Common</td>
</tr>
<tr>
<td>B</td>
<td>+15V dc Out/Q102 Emitter</td>
<td>+15V dc Out/Q102 Emitter</td>
</tr>
<tr>
<td>C</td>
<td>+24V dc Out</td>
<td>+24V dc Out</td>
</tr>
<tr>
<td>D</td>
<td>Q101 Emitter/+25V dc</td>
<td>Q101 Emitter/+24V dc</td>
</tr>
<tr>
<td>E</td>
<td>Q102 Base</td>
<td>Q102 Base</td>
</tr>
<tr>
<td>F</td>
<td>Q101 Base</td>
<td>Q101 Base</td>
</tr>
<tr>
<td>G</td>
<td>Q101 Collector</td>
<td>Q101 Collector</td>
</tr>
<tr>
<td>H</td>
<td>Q102 Collector</td>
<td>Q102 Collector</td>
</tr>
<tr>
<td>I</td>
<td>AC Center Tap</td>
<td>AC Center Tap</td>
</tr>
<tr>
<td>J</td>
<td>AC Center Tap</td>
<td>AC Center Tap</td>
</tr>
<tr>
<td>K</td>
<td>Not Used</td>
<td>Not Used</td>
</tr>
<tr>
<td>L</td>
<td>Common (DC Supply)</td>
<td>Common (DC Supply)</td>
</tr>
<tr>
<td>M</td>
<td>+32V dc</td>
<td>+32V dc</td>
</tr>
<tr>
<td>N</td>
<td>+32V dc</td>
<td>+32V dc</td>
</tr>
<tr>
<td>O</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>P</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Q</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>R</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>S</td>
<td>--</td>
<td>--</td>
</tr>
</tbody>
</table>

Regulating transistors Q101 and Q102 for the 24V dc and 15V dc supplies are mounted in the Card Cage Enclosure. Figures 7 locates these transistors and gives wiring and hardware details. When replacing either of these transistors, use insulating sleeves at least 3/4 inch long, dress the leads to expose a 1/2 inch of the wire, and solder the wires to the transistor leads. Now mica washers and insulating step washers must be used if the originals are damaged. Apply fresh thermal paste and fasten the transistor.
FIGURE 5 Schematic – Power Supply Module
FIGURE 6 Component Location - Power Supply Module
securely to the enclosure's side plate.

When troubleshooting the function modules, note that each of the module schematics uses letters for the pins of the card-edge connectors. Pin A is identified on the circuit board of each module. Figure 4 of these Card Cage Enclosure instructions relates the letters to the terminal numbers of the enclosure's strips.

Faulty function modules may be located by substituting a known good module, of the same type, in place of the suspected module.

Schematics and component location drawings for each module are in the Service Instructions for each particular module.

Recommended spares are:
1. Fuse — F1, 2 Amp, Type 3AG.  P/N 7447-103
2. Fuse — F101, Type 3AG
1.0 Amp  — 115V  P/N 7447-49
0.5 Amp  — 230V  P/N 7447-112
4.0 Amp  — 24V  P/N 7447-113
   P/N 15376-1FM for AC powered enclosures,
   P/N 15376-2FM for DC powered enclosures.
4. Function Modules — One for each ten of the same type. For critical applications, there should be one of each type regardless of the quantity in service.

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**WARRANTY**

The Company warrants all equipment manufactured by it and bearing its name plate, and all repairs made by it, to be free from defects in materials and workmanship under normal use and service, if any part of the equipment here described, and sold by the Company, proves to be defective in material or workmanship and if such part is returned twelve months from date of shipment from the Company's factory, returned to such factory, transportation charges prepaid, and if the same is found by the Company to be defective in material or workmanship, it will be replaced or repaired, free of charge. I.e., Company's factory. The Company assumes no liability for the consequences of its use or misuse by Purchaser, his employees or others. A defect in the meaning of the warranty in any part of such equipment shall not, when such part is capable of being removed, repaired or replaced, operate to void or render such equipment. This warranty is expressly in lieu of all other warranties, guarantees, obligations, or liabilities, expressed or implied by the Company or its representatives. All statutory or implied warranties other than this, are hereby expressly required and excluded.

Warranty repair or replacement requires the equipment to be returned to one of the following addresses:

Equipment manufactured or sold by MOORE PRODUCTS CO.
MOORE PRODUCTS CO.
Sunnyside Pkwy.
Spring House, PA. 19477

Equipment manufactured or sold by MOORE INSTRUMENT CO.
MOORE INSTRUMENTS LTD.
25th West of Main (Route 64)
Brantford, Ontario, Canada

The warranty will be null and void if repair is attempted without prior authorization by a member of the MOORE PRODUCTS CO. Service Department.

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**FIGURE 7** Parts Location — Enclosure