DESCRIPTION

The Model 380C2 AC Voltage Converter Module accepts an AC voltage input signal and converts it to a proportional output current. Trim pots are provided for adjusting input range and zero (offset) level. A transformer isolates the input signal from the main converter circuitry, thus allowing the input to operate at common mode voltages of up to 100 Vdc. Two output current ranges are available, 4 to 20 mA or 10 to 50 mA, field selectable by means of jumper wire J1. A protective circuit limits the output current to 150% of the selected full-scale value, thus preventing possible damage to the connected instruments.

The AC Voltage Converter Module is designed to be plugged into a Model Series 380 Card Cage Enclosure equipped with a common power supply (see Service Instruction SD3801).

OUTPUT RANGE SELECTION

Before proceeding with the installation and calibration, determine which output range is required in your application. Status of Jumper J1, located on the solder side of the circuit board and shown in Figure 1, determines the output range. Set the jumper as needed.

<table>
<thead>
<tr>
<th>Output Range</th>
<th>Jumper J1</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 to 20 mA</td>
<td>OUT</td>
</tr>
<tr>
<td>10 to 50 mA</td>
<td>IN</td>
</tr>
</tbody>
</table>

SPECIFICATIONS

INPUT

Range (Adjustable) ....................... 0-150 Vac to 0-60 Vac
Zero (Adjustable) ....................... 0 to 90 Vac
CALIBRATED INPUT MUST NOT EXCEED 150 Vac
Frequency .............................. 50/60 Hz
Input Impedance ......................... 7500 Ohms
Input Burden ............................ 3.0 VA
Overload (Max. Input) .................. 180 Vac (continuous)

Input isolation......................... Input is transformer isolated from output and power circuits, allowing the input to operate at up to 100 Vdc above ground level.

OUTPUT (Current)

<table>
<thead>
<tr>
<th>Field Selectable Range</th>
<th>Permissible Load</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>AC Powered Enclosures</td>
</tr>
<tr>
<td>4 to 20 mA</td>
<td>0 to 900 Ohms</td>
</tr>
<tr>
<td>10 to 50 mA</td>
<td>0 to 360 Ohms</td>
</tr>
</tbody>
</table>

Load Effect ............................. Less than 0.1% within permissible load range.
Current Limiting ....................... Output will not exceed 150% of full scale when input is overdriven.
Accuracy ............................... For 0-50°C (32-122°F) ±0.33% test limit.
Response Time ......................... 150 mSec to reach 98% of output span.
INSTALLATION
The AC Voltage Converter Module must be installed in a Model Series 380 Card Cage Enclosure. It can be plugged into any of the slots in the enclosure. Refer to your drawing for the designated slot or assign a convenient slot for it.

WARNING
Remove all power from signal and power supply wires before making any connections or setting the safety keys in the card cage enclosure.

The safety keys in the card cage enclosure must be set before the module is plugged in. Service Instruction SD3801 identifies these safety keys and gives the procedure for setting them. The positions of the keys for the AC Voltage Converter Module are as follows:

   Left Key: H (Horizontal)
   Right Key: V (Vertical)

The input and output connections of the AC Voltage Converter Module are made to one of the terminal strips located at the front or the rear of the card cage (depending on card cage model). Each terminal strip is identified by a number that matches a corresponding slot number. Figure 2 identifies the input and output connections of the Module.

NOTE
All the plug-in modules in the card cage share the same SIGNAL COMMON due to the common power supply. Be careful when connecting various signal lines to avoid possible ground loops or shorts.

If it is necessary to convert the Module's output current to a voltage signal, select an appropriate conditioning resistor listed below and connect it across the output (terminals 4 and 5).

<table>
<thead>
<tr>
<th>Current Signal</th>
<th>Conditioning Resistor</th>
<th>MPC Co. Part No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 to 5 mA</td>
<td>1000 Ohms ±0.1%</td>
<td>15037-228</td>
</tr>
<tr>
<td>4 to 20 mA</td>
<td>250 Ohms ±0.1%</td>
<td>15037-229</td>
</tr>
<tr>
<td>10 to 50 mA</td>
<td>100 Ohms ±0.1%</td>
<td>15037-230</td>
</tr>
</tbody>
</table>

CALIBRATION
General
The AC Voltage Converter Module is normally shipped factory calibrated for a specific customer application. Such a module requires no additional adjustment and can be put immediately into service.

Modules ordered without a specific application request must be calibrated by the user.

To assure continued accuracy it is recommended to check the calibration after the first 30 days of operation and then at regular intervals dictated by the severity of the operating environment or whenever an inaccuracy is suspected.

REQUIRED EQUIPMENT
The following equipment is needed for calibration of the Module:

1. Model Series 380 Card Cage Enclosure with power supply.
2. Adjustable AC Voltage Source
   Range: 0 to 150 Volts @ 60 Hz
3. Digital Voltmeter
   Range: 0-150 Vac
   0-5 Vdc
4. Conditioning Resistor
   To convert output current to 1 to 5 Vdc:
   - 4 to 20 mA — 250 Ohms
   - 10 to 50 mA — 100 Ohms

The calibration equipment should provide an overall accuracy of ±0.1%.

CALIBRATION PROCEDURE
Use the following procedure to perform periodic calibration checks or to calibrate the Module for a new application. Figure 1 shows the location of the range jumper (J1) and the zero and span trimpots.

1. Obtain the required calibration equipment.
2. Find out the needed input and output range.
3. Check the status of output range jumper (J1). Set the output range as necessary (see OUTPUT RANGE SELECTION).

CAUTION
Turn power OFF to card cage and calibration equipment before withdrawing or inserting the module or making any connections.

4. Plug the Module into the card cage enclosure.
5. Connect the calibration equipment to the appropriate terminals on the card cage (see Figure 2).
6. Turn power ON to card cage and calibration equipment.
7. Set the AC Voltage Source to the MINIMUM value of the required input range. Use the digital voltmeter, set to AC VOLTS, to check this input signal.
8. Adjust the 20-turn ZERO trimpot (R3) to obtain a 1.000 Vdc output reading across the conditioning resistor. Use the digital voltmeter (DVM), set to DC VOLTS, to read the output.
9. Set the AC Voltage Source to the MAXIMUM value of the required input range (use DVM set to AC VOLTS).
10. Adjust the 20-turn SPAN trimpot (R6) to obtain a 5.000 Vdc output reading across the conditioning resistor (use DVM set to DC VOLTS).
11. Repeat steps 7 through 10 until both calibration end points are correct.

This completes the calibration procedure.
FIGURE 1 Physical Layout, AC Voltage Converter Module

FIGURE 2 Connection Diagram
MAINTENANCE

General

Required maintenance for this Module consists of periodic cleaning, visual inspection, and calibration checks. The severity of the environment in which the Module is located will determine the required frequency of maintenance.

CLEANING

The Module should be cleaned as often as operating conditions require. The accumulation of dust and dirt on components prevents efficient heat dissipation which can cause overheating and component breakdown. Blow off accumulated dust and dirt with dry, low velocity air. Any dust or dirt that remains should be removed with a soft brush or cloth dampened with a mild detergent and water solution. Cotton-tipped swabs are useful for cleaning in narrow spaces.

CAUTION

Avoid the use of chemical agents which may damage plastic components or protective coatings.

VISUAL INSPECTION

The Module should be inspected occasionally for defects such as loose or broken connections, damaged circuit board, and heat-damaged components.

The corrective action for most visible defects is obvious.

However, if a heat-damaged component is found, the cause of overheating must be corrected to prevent a recurrence of the damage.

CAUTION

Exceeding the specified ambient temperature limits can adversely affect performance and may cause damage.

TROUBLESHOOTING

If the Module does not operate properly when initially installed, check the terminal strip wiring. Most problems in new installations can be traced to wiring mistakes. Also, verify that the equipment associated with the input and output circuits is functioning and is properly calibrated. If the trouble is then traced to the Module, remove the Module and give it a full bench check. A complete schematic of the Module is given in Figure 3.

A Part No. 15378-27 Card Extender can be ordered. It extends the Module beyond the front edge of a card cage enclosure, providing easy access to both sides of the Module’s circuit board.

RECOMMENDED SPARES

There are no recommended spare parts for the AC Voltage Converter Module. One spare module is recommended for every 1 to 10 in service.

WARRANTY

The Company warrants all equipment manufactured by it and bearing its nameplate, and all repairs made by it, to be free from defects in material and workmanship under normal use and service. If any part of the equipment hereto described, and sold by the Company, proves to be defective in material or workmanship and if such part is within 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, to the Company’s factory. The Company assumes no liability for the consequences of its use or misuse by Purchaser, his employees or others. A defect or the meaning of this warranty on any part of said equipment shall not, when such part is capable of being renewed or replaced, operate to 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 title are hereby expressly negatived 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
39 E. Main Street
Springhouse, PA 19477

Equipment manufactured or sold by MOORE INSTRUMENT CO
MOORE INSTRUMENT LTD. INC.
244 West of Mississippi Dr. Hwy. 7
Brampton, Ontario, Canada

Equipment manufactured or sold by MOORE PRODUCTS CO (U.K.) LTD
MOORE PRODUCTS CO (U.K.) LTD
Crowe Road
Luton, Luton
Sricomest B32 8GJ
England

The warranty will be null and void if repair is attempted without prior authorization from the MOORE PRODUCTS CO Service Department.
FIGURE 3 Schematic, AC Voltage Converter Module