DESCRIPTION

The Model 38051 Signal Selector Module selects either the highest or the lowest of three 1 to 5 Volt input signals and converts it to a proportional output current. Selection of the highest or the lowest signal is accomplished by the appropriate positioning of a plug-in jumper. Two output current ranges, 4 to 20 mA and 10 to 50 mA, are available. Either range can be selected by means of jumper wire J1. Two 15 turn trimpots provide the necessary zero and span adjustments.

A 1 to 5 Vdc feedback signal, equal to the selected signal, is made available for use with SYNGRO 350 Control Stations.

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

Current input signals can be accommodated by placing precision conditioning resistors across the input terminals in the Card Cage Enclosure. This permits the removal of the Module without interrupting the input current loop.

SPECIFICATIONS

INPUT
Range: 1 to 5 Vdc
Impedance: 6 Megohms (min.)
Overload (Without Damage): ± 24 Volts

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.

FEEDBACK OUTPUT (Voltage)
Range: 1 to 5 Vdc
Permissible Load Resistance: 1 Megohm (minimum)

ADJUSTMENTS

Operating Mode:

<table>
<thead>
<tr>
<th>Jumper Selected:</th>
<th>Position</th>
</tr>
</thead>
<tbody>
<tr>
<td>Select Highest Signal</td>
<td>H</td>
</tr>
<tr>
<td>Select Lowest Signal</td>
<td>L</td>
</tr>
</tbody>
</table>

Output Range:

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

Output Zero: ±5% of full scale (15 turn trimpot, R21)
Output Span: ±5% of full scale (15 turn trimpot, R24)
RESPONSE TIME: 150 mSec. to reach 98% of output span

ACCURACY*

Input-Output Transfer: ±0.15% (maximum)
Signal Selection: ±0.15% (maximum)
OPERATING TEMP.: 32 to 122°F (0 to 50°C)
TEMP. EFFECT: ±0.008°F (Maximum) over the ambient temp. range

*Performance at 25°C ambient with output set to 4 to 20 mA range into a 500 ohm load.
INSTALLATION

The Signal Selector 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 customer drawing for the designated slot or assign a convenient slot for it.

The safety keys of the designated slot in the card cage must be set before the Module can be plugged in. Service Instruction SD3801 identifies these safety keys and gives the procedure for setting them. The positions of the keys for the Signal Selector Module are as follows:

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

The input and output connections are made to the terminal strips provided at the front or rear of the card cage enclosure (depending on model). Each terminal strip is identified by a number that matches a corresponding slot number. Service Instruction SD3801 provides complete physical and electrical descriptions of the available card cage enclosures. The Module's input and output connections, accessible at the individual screw terminals of a given terminal strip, are identified in Figure 1, Connection Diagram.

NOTE

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

If it is necessary to convert a current signal to a voltage signal, select an appropriate conditioning resistor listed below and connect it across the required input or output terminals.

<table>
<thead>
<tr>
<th>Current Signal</th>
<th>Conditioning Resistor (to obtain 1 to 5 Vdc)</th>
<th>MPCNo. Part No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 to 5 mA</td>
<td>1000 Ohms ± 0.1%</td>
<td>150027-228</td>
</tr>
<tr>
<td>4 to 20 mA</td>
<td>250 Ohms ± 0.1%</td>
<td>150027-229</td>
</tr>
<tr>
<td>10 to 50 mA</td>
<td>100 Ohms ± 0.1%</td>
<td>150027-230</td>
</tr>
</tbody>
</table>

CALIBRATION

GENERAL

The Signal Selector 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.

Use the following procedure to perform periodic calibration checks or to calibrate the Module for a new application. Figure 2 shows the location of all jumper wires and trimpots.

REQUIRED EQUIPMENT

Calibration of the Module will require the use of the following equipment.

1. Model Series 380 Card Cage Enclosure with power supply.
2. Adjustable Signal Source
   The following devices may serve as signal sources:
   a) Voltage Source (typically 0 to 5 Vdc).
   b) Current Source (typically 0 to 50 mAdc).
   c) Transmitter (adjustable over required range).

   Signals from these sources must be adjustable to an accuracy of ± 0.1% or better.

3. Digital Output Meter
   The following devices may serve as output meters:
   a) Digital Voltmeter
      Range: 0 to 5 Vdc
      Input Impedance: 1 Megohm (min.)
   b) Digital Milliammeter
      Range: 0 to 50 mA dc
      Insertion Resistance: 200 Ohms (max.)

   Both devices must have an overall accuracy of ± 0.1% or better.

4. Conditioning Resistor(s)
   Required quantity of appropriate value to convert current signals to voltage. See INSTALLATION section for available values.

PRELIMINARY ADJUSTMENTS

Refer to Figure 2 for the location of the two jumper wires used in the following procedures.

1. HIGH/Low Selection
   Determine whether the Module is to select the highest or the lowest of the input signals. Place the yellow jumper wire, located on the component side of the circuit board, to either the "H" (High) or "L" (Low) position.

2. OUTPUT RANGE Selection
   The output range of the Module is determined by the presence or absence of jumper wire J1 located on the solder side of the P.C. board. With jumper wire J1 intact, the output range is 10 to 50 mA; with it removed, the range is 4 to 20 mA.
   Perform the necessary range selection by cutting out or soldering in jumper wire J1. After making a range change, the Module must always be recalibrated.

PROCEDURE

Refer to Figure 1 for the connection of test equipment and to Figure 2 for the location of the zero and span trimpots.

1. Complete all steps listed in the PRELIMINARY ADJUSTMENTS section.
Terminal strips on Series 300 rack enclosures.

1. INPUT A (NOTE 1 & 2)
2. INPUT B
3. COMMON
4. OUTPUT
5. NC
6. P (NOTE 3)
7. INPUT C (NOTE 1 & 2)
8. COMMON
9. FEEDBACK OUTPUT, 1 TO 5 Vdc (NOTE 3)

NOTES:
1. 1 to 5 Vdc input signals are standard. For milliamperes inputs, refer to Service Instruction SD3891 for the required input conditioning resistors.
2. For two-input applications, connect a jumper between "+ INPUT B" and "+ INPUT C".
3. See SPECIFICATIONS for output load limits.

FIGURE 1 Connection Diagram

FIGURE 2 P.C. Board
2. Connect the adjustable signal source to all three inputs (terminals 1, 2, and 7) referenced to signal common (terminal 3).

3. Connect the digital output meter to output terminals 4 (+) and 5 (−).

4. Set the signal source to +1,000 Volts.

5. Adjust the ZERO trimpot (R21) to read the 0% point on the output meter. This reading is 4 mA for the 4 to 20 mA output range, 10 mA for the 10 to 50 mA range, or 1 Volt if a 1 to 5 Volt conditioning resistor is used.

6. Set the signal source to +5,000 Volts.

7. Adjust the SPAN trimpot (R24) to read the 100% point on the output meter. This reading is 20 mA for the 4 to 20 mA output range, 50 mA for the 10 to 50 mA range, or 5 Volts if a 1 to 5 Volt conditioning resistor is used.

8. Repeat steps 4 through 7 until the calibration end points are correct.

This completes the calibration procedure.

MAINTENANCE

GENERAL

Required maintenance for this Module should consist 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 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. 15375-27 Card Extender can be ordered. It extends the Module beyond the front edge of the card cage enclosure, providing easy access to both sides of the Module circuit board.

IMPORTANT

Warranty repair and replacement requires the Module to be returned to Moore Products Co., Spring House, Pa. 19477. The warranty is null and void if repair is attempted at any other location.

RECOMMENDED SPARES

There are no recommended spare parts for the Signal Selector Module.

One spare module is recommended for every 1 to 10 in service.
NOTES:
1. Resistors are ±10%, 1/2W unless otherwise specified.
2. The Feedback Output voltage is equal to the selected signal voltage. Loading resistance for Feedback Output must be greater than 1 Megohm.

FIGURE 3 Schematic