ConLAB

CSM-1

ANALOG MULTIPLEXER

OPERATION INSTRUCTIONS

CONTENTS:

1. *GENERAL DESCRIPTION*

The CSM-1 is a multiplexer for 16 analog 4-20mA current loop inputs.
The multiplexer is controlled by 4 address and one Enable lines, generated by the PLC's discrete output module, and outputs the selected channel in 4-20mA form.

Two terminals, marked "I" and "V", are designated for each input. Look at para.#6 for connection information.
Each input is protected by a channel fuse rated to 63mA.
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Note:	**Never connect a voltage source to the multiplexer inputs. Its internal low dynamic impedance will cause immediate fuse blowing**

The "V" terminals is individually limited to 40mA output, so that a short-circuit will not blow the channel fuse or the main fuse.

2. *MOUNTING INSTRUCTIONS*

Place the unit on the upper part of the standard DIN rail with the fastening tab facing down. Loosen the tab slightly, using a suitable flat screwdriver, and attach the unit to the rail. After releasing the tab, make sure that the unit is fastened securely in place.

3. *FUSE REPLACEMENT*

In order to replace a blown fuse, the unit has to be disassembled, as follows:

a) Take off both terminal strips by removing the four screws at the edges.

Note: This does not require disconnecting the cables connected to the strips.

b) Remove the front panel using a suitable flat screwdriver. Press down gently on the plastic spring-loaded tabs located in the slots on either side of the unit.
c) Disconnect the flat connectors from the front panel, printed circuit.
d) Replace the blown fuse.

Warning:	Never install a channel fuse rated more than 100mA, and main fuse rated more than 800mA.

4. *ASSEMBLING THE UNIT*

The CSM-1 unit includes three printed circuit cards designated as P.N 7016, P.N 7017 and P.N 7030 printed circuit board. The printed circuit cards should occupy the slots in the enclosure as shown in fig. 1.

Connect the short flat cable from J3 at 7016 to J1 at 7030 and the longer from J1 at 7017 to J2 at 7030.

Connect the flat cables between the printed circuit cards and the front panel. The front panel must be inserted into the grooves on both sides of the case while pressing down until a distinct "click" is heard. Assembly is completed by laying the terminal strips in place.

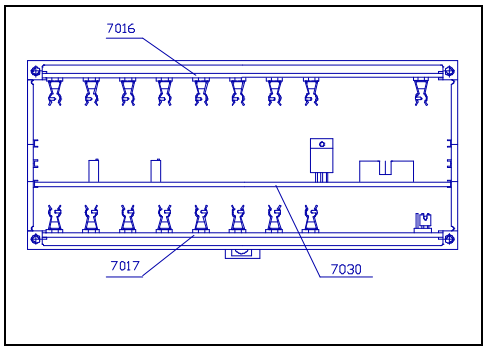


Fig. 1

Note: the terminal strips are polarized.

5. *SUPPLY VOLTAGE*

The CSM-1 is supplied by a regulated power supply at a range of 15 to 40Vdc. This voltage is used to feed the connected transmitters via the multiplexer's "V" terminals.

The CSM-1 unit adds around 250Ω to the current loop.

5.1 *Minimum Supply Voltage*

The minimum supply voltage required to operate the multiplexer and the transmitters fed by it can be calculated using the following equation:

$$V_{min} = V_t + 0.02*(R_s+250)$$

Where:

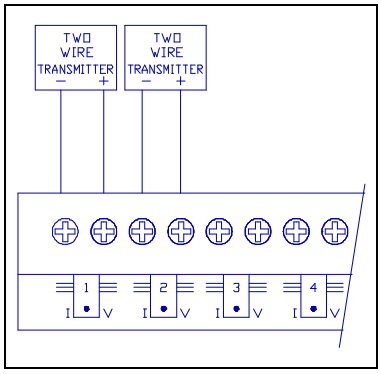
Vmin - the minimum required voltage
Vt - The connected transmitter's minimum voltage (at load=0)
Rs - Total loop load including load and leads' resistance

Example:

The minimum operational voltage of a given transmitter is 12V.
The total loop load is 250Ω.

Solving the above voltage:
Vmin= 22Vdc

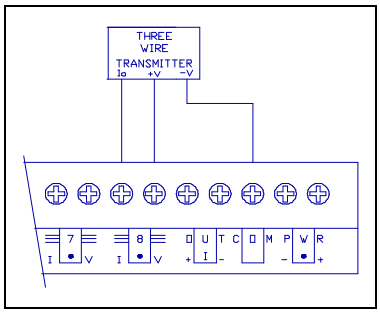
6. *CONNECTION OF TRANSMITTERS TO THE MULTIPLEXER*



6.1 *Two-Wire Transmitter*

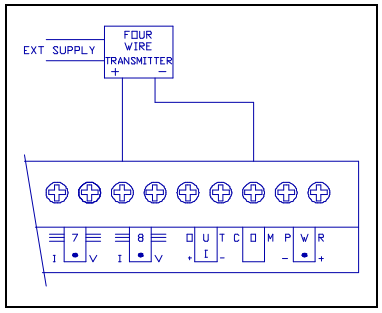
A Two-Wire transmitter is connected so that its positive terminal is connected to the "V" terminal, and its negative terminal is connected to the "I" terminal.

6.2 *Three-Wire Transmitter*



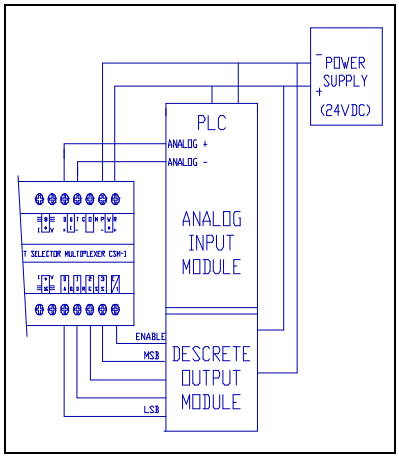
A Three-Wire transmitter is connected so that its positive terminal "+V" is connected to the multiplexer "V" terminal, its negative terminal "-V" is connected to the multiplexer's "COM" terminal and the current output terminal "Io" is connected to the CSM-1 "I" terminal.

6.3 *Four-Wire Transmitter*



A Four-Wire transmitter is connected so that its positive terminal is connected to the "I" terminal, and its negative terminal is connected to the "COM" terminal.

7. *CONTROL*



The CSM-1 unit is controlled via four address lines and one E/T (Enable/Test) line. The control terminals (Address and Enable), were designed to receive control signals from TTL levels up to 60V so that almost any PLC's DC output module can be used.

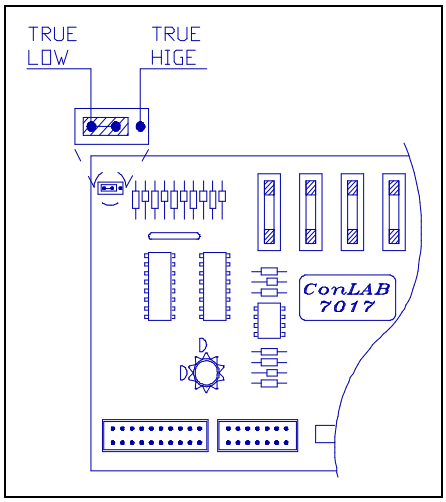
7.1 *Enable/Test*

The unit is enabled when "E/T" is in logical "0" (low) state. In a disabled state, the CSM-1 outputs no current and reflects an "Hi-Z" state.
The disabled state (T) is used to check the functioning of all the current inputs. This is performed by injecting current pulses simultaneously to the 16 channels. These current pulses cause the functioning channels to flash. This is a quick and useful indication to locate a blown fuse.

7.2 *Address*

The required channel is selected by four address lines.
The operating voltage levels are:

"0" state - $0V < V_{address} < 0.5V$
"1" state - $3.5V < V_{address} < 40V$



7.3 *Address Polarity*

Internal 3 pins and a jumper over two of them, located on printed circuit 7017-accessible behind the Enable terminal, control the address polarity. The unit is supplied with the jumper determine "true low" control logic, i.e. "0000" selects channel #16, and "1111" selects channel #1.
Moving the jumper to the second alternative, reverses the logic.

Note: If the address control lines voltages are generated from different power supply, then its negative terminal should be connected to the CSM-1's "COM" terminal.

7.4 *Control Tables*

7.4.1 *"True Low" Setting*

ADDRESS BUS A3 A2 A1 A0	E/T	OUTPUT CHANNEL
0 0 0 0	0	16
0 0 0 1	0	15
0 0 1 0	0	14
0 0 1 1	0	13
0 1 0 0	0	12
0 1 0 1	0	11
0 1 1 0	0	10
0 1 1 1	0	9
x x x x	1	TEST MODE

ADDRESS BUS A3 A2 A1 A0	E/T	OUTPUT CHANNEL
1 0 0 0	0	8
1 0 0 1	0	7
1 0 1 0	0	6
1 0 1 1	0	5
1 1 0 0	0	4
1 1 0 1	0	3
1 1 1 0	0	2
1 1 1 1	0	1
x x x x	1	TEST MODE

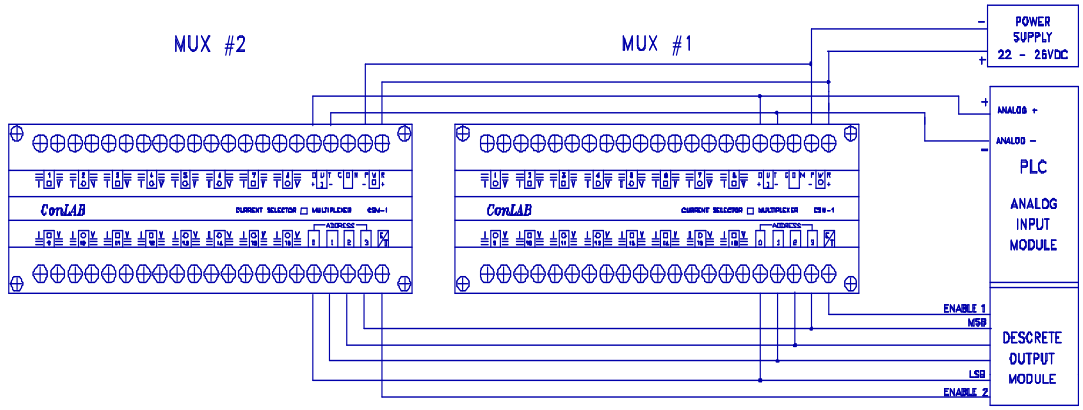
7.4.2 *"True High" Setting*

ADDRESS BUS A3 A2 A1 A0	E/T	OUTPUT CHANNEL
0 0 0 0	0	1
0 0 0 1	0	2
0 0 1 0	0	3
0 0 1 1	0	4
0 1 0 0	0	5
0 1 0 1	0	6
0 1 1 0	0	7
0 1 1 1	0	8
x x x x	1	TEST MODE

ADDRESS BUS A3 A2 A1 A0	E/T	OUTPUT CHANNEL
1 0 0 0	0	9
1 0 0 1	0	10
1 0 1 0	0	11
1 0 1 1	0	12
1 1 0 0	0	13
1 1 0 1	0	14
1 1 1 0	0	15
1 1 1 1	0	16
x x x x	1	TEST MODE

8. *MULTI-DROP CONFIGURATION*

In the disabled state (E=1), the multiplexer outputs no current and exhibits a "Hi Z" state which means that no current is output or absorbed. This mode allows to connect several CSM-1 units to one PLC's analog input, by tying their output terminals together, connecting address lines in parallel, and applying individual Enable lines to select the desired multiplexer by disabling all but one.



9. *SPECIFICATIONS*

INPUTS

Analog Inputs (Reverse Polarity Protected)	16, 0/4-20mA Current loop
Max Input Current	30mA
CONTROL INPUTS	4 Address inputs, 1 E/T Enable/Test input
Logic Levels	Low: 0< "0" <5V High: 3 < "1" < 40V
Logic Polarity	Selectable - True High/True Low
OUTPUT	Single 4-20mA, Current Loop
Switching Time	< 10µSec (into a resistive load)
Accuracy (Refer to Current Input)	±0.01% maximum @ all temperature range
"V" TERMINALS VOLTAGE OUTPUT (@ 20mA):	Vsupply-2.5V
Active Current Limiters	16
Limitation Current	40±1mA
Automatic Temperature Shut-down	Above 80°C
INDICATORS	1 Yellow LED, Power-On indicator 16 Red LED, 4-20mA input activity indicator
SUPPLY	
Supply Voltage	15 - 40 Vdc (regulated)
Supply Current Consumption	15mA in operation mode, 120mA in Test mode (transmitters not included)
FUSES	
Main Fuse	630mA, Fast Blow
Channel Fuse	63mA, Fast Blow
TEMPERATURE	
Operating	0-70°C
Storage	-25 to +85°C
HUMIDITY	5 to 95% Relative, non condensed
HOUSING	Plastic Polycarbonate
Box	According to IP50 DIN 40050
Terminals	According to IP20 DIN 40050
WEIGHT	0.75 Kg

Data subject to change without notification