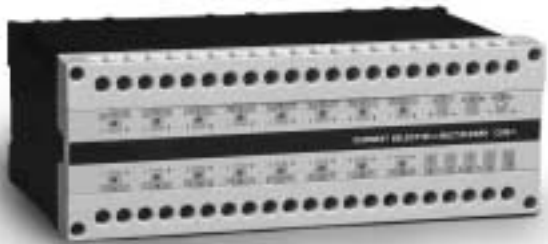




User's Guide



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**DRA-CSM-1
CURRENT MULTIPLEXER**



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1. GENERAL DESCRIPTION

The DRA-CSM-1 is a multiplexer for 16 analog 4-20mA current loops.

The transmitter/transducer currents are input via "I" terminals. Each input is protected by a 63mA fuse.

The current input is steered either to the output ("Io") terminal or to the negative (COM) terminal of the power supply (PWR). Fifteen channels are routed to the COM and only the selected one is routed to the output terminals, thus ensuring a continuous and uninterrupted current loop.

The multiplexer's channel selection is controlled by 4 address lines, generated by the PLC's discrete output module.

The unit provides 16, current limited (~40mA), voltage supply ("V") outputs. These outputs are derived from the mux's power supply input and are used to feed two-wire transmitters. The current limitation avoids fuse blowing in cases of short-circuit of the transmitters' leads.

WARNING: Never connect a voltage source as an input to the multiplexer. Its internal low dynamic impedance will cause immediate fuse blowing.

2. MOUNTING INSTRUCTIONS

The DRA-CSM-1 is designed for standard DIN rail mounting.

Place the unit on the upper part of the mounting 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. REPLACING FUSES

To replace a blown fuse, disassemble the unit 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 springloaded tabs located in the slots on either side of the unit.

- c. Disconnect the flat connectors from the front panel.
- d. Replace the blown fuse.

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

4. ASSEMBLY

The DRA-CSM-1 unit includes three printed circuit cards designated as P.N 7016, P.N 7017 and P.N 7030.

The printed circuit cards should occupy the slots in the enclosure according to fig1.

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.

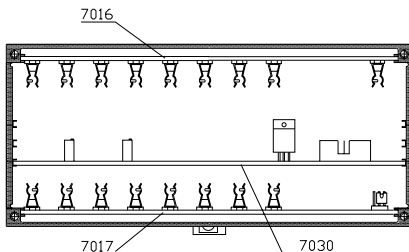


Figure 1.

Note: The terminal strips are polarized and must not be placed backwards.

5. POWER SUPPLY

The DRA-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 DRA-CSM-1 unit adds about 350Ω 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:

$$V_{min} = V_t + 0.02 * (R_s + 350)$$

Where:

V_{min} - The minimum required supply voltage

V_t - The minimum required voltage specified for the connected transmitter (at load=0)

R_s - Total loop load including leads' resistance and PLC's input impedance

Example:

The minimum operational voltage of a given transmitter is 12V.

The total loop load is 250 Ω .

Solving the above voltage:

$V_{min} = 24V_{dc}$

6. CONNECTING THE 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. (see fig 2.)

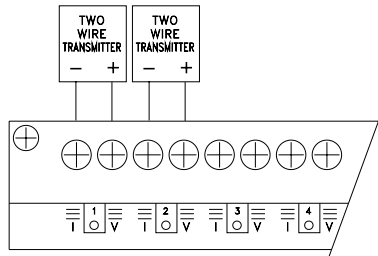


Figure 2.

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 DRA-CSM-1 "I" terminal. (see fig 3).

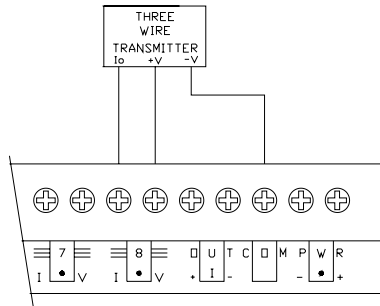


Figure 3.

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. (see fig 4).

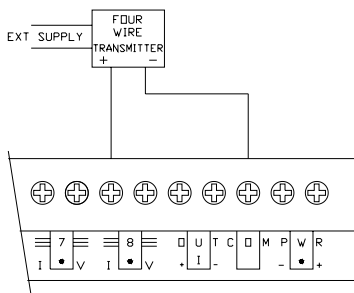


Figure 4.

7. CONTROL

The DRA-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. (see fig 5).

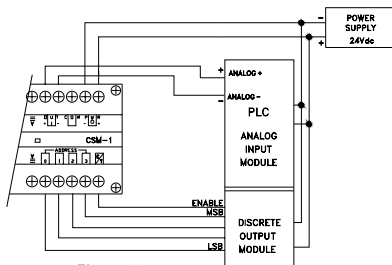


Figure 5.

7.1 ENABLE/TEST

The unit is enabled when "E/T" is in logical "0" (low) state. In a disabled state, the DRA-CSM-1 outputs no current and reflects a Hi-Z state.

The disabled state of the DRA-CSM-1 multiplexer is used to check the functioning of all the current inputs. This is performed by simultaneously injecting current pulses to all 16 channels which cause the functioning channels to flash. This is a quick and useful means to indicate a blown fuse.

7.2 ADDRESS

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

"0" state $0V < V_{address} < 0.4V$

"1" state $5V < V_{address} < 60V$

7.3 ADDRESS POLARITY (see fig 6)

Address polarity is controlled by three internal pins and a jumper over two of them, accessible behind the Enable terminal. The unit is supplied with the jumper set for "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.

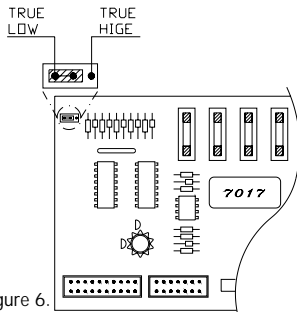


Figure 6.

Note: If the PLC and the DRA-CSM-1 are powered by separate power supplies, then the negative terminals should be connected.

7.4 CONTROL TABLES

7.4.1 "True Low" Setting

ADDRESS BUS				E/T	OUTPUT CHANNEL
A3	A2	A1	A0		
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				E/T	OUTPUT CHANNEL
A3	A2	A1	A0		
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				E/T	OUTPUT CHANNEL
A3	A2	A1	A0		
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				E/T	OUTPUT CHANNEL
A3	A2	A1	A0		
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 high Z state. This mode allows the connection of several DRA-CSM-1 units to one PLC's analog input, by tying their output terminals and the address lines in parallel, and applying individual Enable lines to select the desired multiplexer by disabling all but one. (see fig 7)

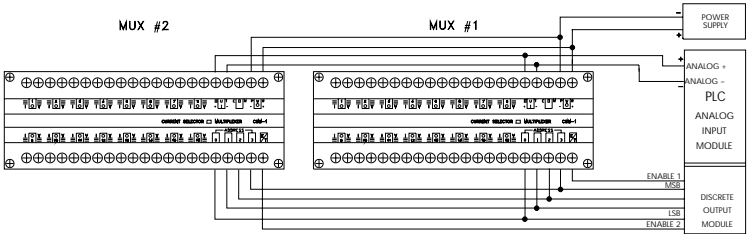


Figure 7

9. SPECIFICATIONS

INPUTS

ANALOG INPUTS

(Reverse Polarity Protected)

Max Input Current

16, 0/4-20mA Current loop

30mA

CONTROL INPUTS

Logic Levels

4 Address inputs

E/T Enable/Test input

Low: "0" < 0.4V

High: 5 < "1" < 60V

Logic Polarity

Selectable - True High/True Low

OUTPUTS

CURRENT OUTPUT

Switching time

Accuracy (Refer to Current Input)

4-20mA, Current Loop

10 μ Sec (into a resistive load)

0.01% maximum @ for the entire temperature range

"V" TERMINALS

"V" Voltage

Limitation Current

Automatic Temperature Shut-down

V supply - 2.5V

40 \pm 1mA

Above 80 °C

INDICATORS

1 Yellow LED, Power-On indicator

16 Red LEDs, current activity indicators

SUPPLY

Supply Voltage

Supply Current Consumption

15 - 40 Vdc (regulated)

15mA in operation mode,

120mA in Test mode

(transmitters not included)

FUSES

Main Fuse

Channel Fuse

630mA, Fast Blow (20x5 mm)

63mA, Fast Blow (20x5 mm)

TEMPERATURE

Operating

Storage

0 to 70 °C (32 to 158 °F)

-25 to +85 °C (-13 to 185 °F)

HUMIDITY

5 to 95% Relative humidity, non condensing

HOUSING

Box

Terminals

Plastic Polycarbonate

According to IP50 DIN 40050

According to IP20 DIN 40050

WEIGHT

0.75 Kg. (1.5 lb.)

DIMENSIONS

73Hx200Wx121mmD

(2.88"x7.88"x4.76")

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