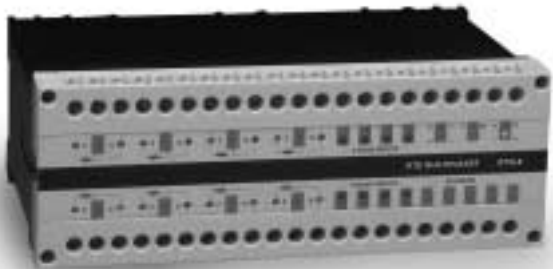




User's Guide



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DRA-RTM-8 ANALOG MULTIPLEXER



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1. GENERAL DESCRIPTION

The DRA-RTM-8 is a multiplexer for 16 analog inputs - eight of which, marked 1-8, are direct inputs for Pt-100 sensors, while the remaining (9-16), are for 4-20mA current loops.

The DRA-RTM-8 output format is a 4-20mA current loop, with a 28mA limitation.

Each Pt-100 input has its own signal conditioner, allowing each input to be calibrated separately. Each signal conditioner includes six DIP switches for coarse calibration and two potentiometers for fine tuning.

2. MOUNTING INSTRUCTIONS

The DRA-RTM-8 is designed for standard DIN rail mounting.

Place the unit on the upper part of the mounting rail with the fastening tab facing down. Using a suitable flat screwdriver loosen the tab slightly and attach the unit to the rail. Once the tab is loosened, ensure 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 which connects the front panel printed circuit.
- d. Replace the blown fuse.

WARNING: Never install a fuse rated more than 800mA

4. ASSEMBLY

The DRA-RTM-8 unit includes two printed circuit cards designated as P.N 7020 and P.N 7021. The two printed circuit cards should occupy the slots in the enclosure according to fig 1.

Insert the two printed cards into their slots. Connect the flat cable between them. Connect the front panel flat cables. The 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 on place.

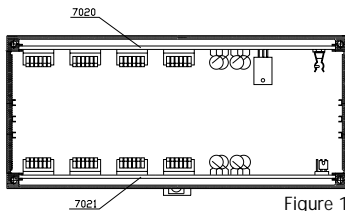


Figure 1.

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

5. CURRENT INPUTS

The eight 4-20mA current inputs are marked as channels 9-16. These inputs are for current only. The "COM" input is the return for all the current channels. It is possible to connect any current source, as long as a closed loop is maintained.

WARNING: Voltage sources should not be connected to the current inputs, as permanent damage might occur.

6. CONNECTING TRANSMITTERS TO THE MULTIPLEXER

6.1 TWO WIRE TRANSMITTER

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

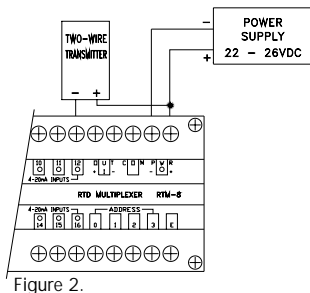


Figure 2.

6.2 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 3)

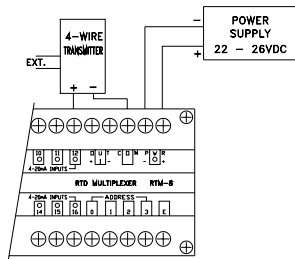


Figure 3.

7. CONNECTING Pt-100 TO THE MULTIPLEXER

The Pt-100 probe should be connected according to fig 4. The three wires connecting the probe should be identical. The distance of the probe can be up to 200 meters. A shielded cable is recommended. The shield should be grounded at one point. When possible, connect the ground at the multiplexer's end.

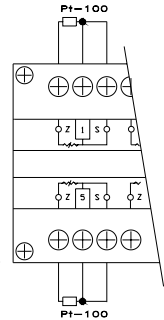


Figure 4.

8. CONNECTING THE DRA-RTM-8 TO A PLC

The multiplexer output should be connected to 4-20mA input of the PLC analog module (see fig 5).

The DRA-RTM-8 multiplexer generates the output current, therefore the PLC analog module should be configured for four wire transmitter connection.

WARNING: NEVER apply 24Vdc to the DRA-RTM-8's +I_o terminal as in two-wire connection, and make sure that the PLC's analog module is configured as a passive input.

9. CONTROL

The DRA-RTM-8 unit is controlled via four address lines and one E (Enable) 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)

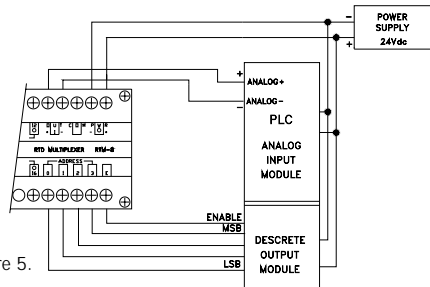


Figure 5.

9.1 ENABLE

The unit is enabled when a logical "1" ($5V < E < 60V$) is connected to the E Terminal. In a disabled state, the DRA-RTM-8 outputs no current and reflects a Hi-Z state. This feature allows the connection of several DRA-RTM-8 units by tying their outputs and control in parallel and addressing them by controlling the individual Enable terminals.

9.2 ADDRESS

The required channel is selected by four address lines.

The operating voltages are:

Logical "1" $5V < V_i < 60V$

Logical "0" $0V < V_i < 0.5V$

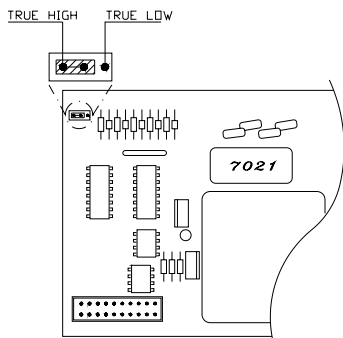


Figure 6.

9.3 ADDRESS POLARITY (see fig 6)

Address polarity is controlled by three internal pins and a jumper over two of them, located on PN 7021 printed circuit board, accessible behind the Enable terminal. The unit is supplied with the jumper set for "true high" control logic, i.e. "0000" selects channel #1, and "1111" selects channel #16.

Moving the jumper to the second alternative, reverses the logic.

Note: If the address control voltages are generated from different power supplies, then its negative terminal should be connected to the DRA-TM-8's "COM" terminal.

9.4 CONTROL TABLES

9.4.1 "TRUE LOW" SETTING

ADDRESS BUS				E	OUTPUT CHANNEL
A3	A2	A1	A0		
0	0	0	0	1	16
0	0	0	1	1	15
0	0	1	0	1	14
0	0	1	1	1	13
0	1	0	0	1	12
0	1	0	1	1	11
0	1	1	0	1	10
0	1	1	1	1	9
x	x	x	x	0	NO OUTPUT

ADDRESS BUS				E	OUTPUT CHANNEL
A3	A2	A1	A0		
1	0	0	0	1	8
1	0	0	1	1	7
1	0	1	0	1	6
1	0	1	1	1	5
1	1	0	0	1	4
1	1	0	1	1	3
1	1	1	0	1	2
1	1	1	1	1	1
x	x	x	x	0	NO OUTPUT

9.4.2 "TRUE HIGH" SETTING

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

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

Note: The unit includes three internal potentiometers. These potentiometers are carefully adjusted and sealed in the factory. It is not recommended to alter these calibration potentiometers.

10. CALIBRATION

To calibrate the DRA-RTM-8, the limits must be defined.

Tmin is the temperature at which the output current is 4mA.

Tmax is the temperature at which the output current is 20mA.

Tspan is the difference between Tmax and Tmin.

10.1 CALIBRATION PROCEDURE

- Remove the terminal strips to get access to the coarse calibration switches.
- Set the channels DIP switches to the desired calibration ranges according to the calibration tables.
- Re-install the terminals strips. The terminal strips are polarized and should be returned to their original position.
- Connect a Pt-100 calibrator* set for Tmin to the proper input terminals.
- Apply the proper channel selection code by connecting those which according the table should be "1" to the +PWR terminal.
- Start calibrating by adjusting the proper "Z" potentiometer to obtain an output current of 4.000mA.
- Set the calibrator for Tmax and adjust the "S" potentiometer to obtain an output current of 20.000mA.
- Repeat this procedure until satisfactory results are obtained.

i. Change the address to the next channel to be calibrated.

j. Repeat steps b to h

* The calibrator is set according to DIN 43760 Pt-100 table ($\alpha = 0.00385$)

10.2 CALIBRATION TABLES

Note: Logic state of "0" is when the DIP switch lever is down.

10.2.1 "ZERO" - COARSE CALIBRATION TABLES

	CHANNELS 1-4		
ZERO TEMP °C	SW6	SW5	SW4
-50.....10	1	1	1
8.....75	0	1	1
74...140	1	0	1
139...206	0	0	1
205...272	1	1	0
270...338	0	1	0
336...404	1	0	0
401...470	0	0	0

CHANNELS 5-8		
SW1	SW2	SW3
1	1	1
0	1	1
1	0	1
0	0	1
1	1	0
0	1	0
1	0	0
0	0	0

10.2.2 "SPAN" - COARSE CALIBRATION TABLES

	CHANNELS 1-4		
SPAN °C	SW1	SW2	SW3
50.....76	1	1	1
65...115	1	0	1
110...180	0	1	1
135...225	0	1	0
215...440	0	0	1
400...800	0	0	0

CHANNELS 5-8		
SW6	SW5	SW4
1	1	1
1	0	1
0	1	1
0	1	0
0	0	1
0	0	0

11. MULTIDROP CONFIGURATION

In the disabled state ($E=0$), the multiplexer outputs no current and exhibits a high Z state. This mode allows the connection of several DRA-RTM-8 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).

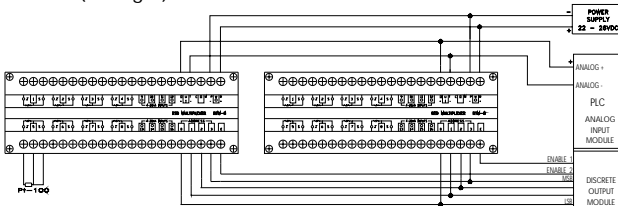


Figure 7.

12. SPECIFICATIONS

ANALOG INPUTS:	8, Pt-100 Channels $\alpha=0.00385$ 8, 0/4-20mA Channels
RTD INPUT:	
Zero adjustability:	50 to +200 °C
Span adjustability:	50 to 750 °C
Lead Compensation Error:	± 0.025 °C for 10 Ω lead resistance
Max Lead Resistance:	120 Ω two ways
Pt-100 linearization:	$\pm 0.1\%$ of span max.
CURRENT INPUT	
Max Input Current:	30 mA
Reverse Polarity Protection:	Yes
Output Accuracy (Refer to Current Input):	$\pm 0.1\%$ of span max.
CONTROL INPUTS:	4 Address 1 Enable input
Logic:	True High or True Low (User selectable)
Logic Levels:	Low: "0" < 0.5V High: 5 < "1" < 60V
OUTPUT:	4-20mA, Current Loop
SWITCHING TIME:	< 20 μ Sec (into a resistive load)
INDICATORS:	1 Yellow LED, Power-On indicator 8 Red LEDs, current activity indicators
SUPPLY VOLTAGE:	24 $\pm 10\%$ Vdc (regulated)
SUPPLY CURRENT CONSUMPTION:	120 mA ± 10 mA
FUSE:	150 mA, Fast Blow (5x20mm)
TEMPERATURE STABILITY:	$\pm 0.01\%$ of span/1 °C
OPERATING TEMPERATURE:	0 to 60 °C (32 to 140 °F)
STORAGE TEMPERATURE:	-25 to +85 °C (-13 to 185 °F)
HUMIDITY:	5 to 95% Relative humidity, non-condensing
HOUSING:	Plastic Polycarbonate
Box:	According to IP50 DIN 40050
Terminal:	According to IP20 DIN 40050
WEIGHT:	0.9 Kg. (2.0 lb.)
DIMENSIONS:	73Hx200Wx121mmD (2.88"x7.88"x4.76")

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