

ELCOMPONENT

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MM8TC - THERMOCOUPLE INPUTS

DESCRIPTION

The MM8TC module is a 8 thermocouple input module. The module uses differential inputs to reduce effects of electrical noise and mains pickup. The thermocouple inputs are isolated from the logic. If inter channel isolation is required then the MM8TCISO should be used.

The thermocouple voltage is read by the module circuitry, linearised and converted to degrees Centigrade. No ranging is required as the module covers the full range as indicated in Section 3.10.2. The value that is read from the Modbus register is the actual temperature in degrees centigrade to 0.1°C resolution. ie: a value of 3451 corresponds to a temperature of 345.1°C.

The thermocouple type is setup by writing a value to the TC Type register (See Section 3.10.2). The value is obtained from the table below. For example to select type K thermocouples, the value "2" must be written to the TC Type register. All 8 thermocouple inputs adopt the same TC type.

The DIP switch 9 (See Section 3.10.4) is used to select upscale or downscale burnout. A value of 32768 is used to indicate upscale burnout and a value of -32767 is used to indicate downscale burnout.

The module has built in Cold Junction Compensation. Use must be made of the correct thermocouple extension wire to avoid reading errors.

The thermocouple module can also be configured for a 0 - 50mV input range. The TC Type register must be set to 9 for this option. The value in the register which is read back over the network is 0 - 50,000.

Note: As there is no inter-channel isolation, isolated thermocouples must be used in order to prevent ground loops and reading errors.



SPECIFICATIONS

Power Supply: Logic 10 - 26Vdc @ 80 mA

Inputs:

TC Type	Range	Accuracy
1 - J	-150 to 760 °C	0.2°C
2 - K	-200 to 1370 °C	0.3°C
3 - E	0 to 600 °C	0.1°C
4 - T	-200 to 400 °C	0.3°C
5 - N	0 to 1300 °C	0.3°C
6 - B	400 to 1820 °C	0.5°C
7 - S	-50 to 1767 °C	0.6°C
8 - R	-50 to 1767 °C	0.7°C

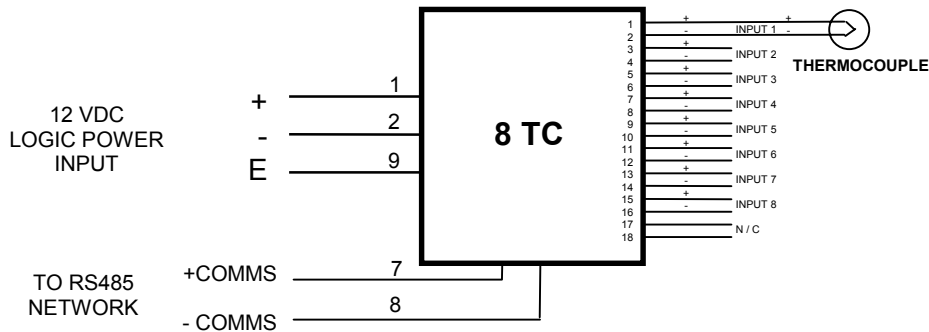
9 - mV	0 to 50mV	0.1%
10 - C	0 to 2315.5 °C	0.7°C
11 - D	0 to 2315.5 °C	0.7°C
12 - G	0 to 2315.5 °C	0.9°C

Resolution 0.1°C
 Drift 100ppm/°C Typ.
 Isolation 1000Vrms between field and logic

CJC error: ±0.5°C Typ.

Connector: 11 Pin Connector on rear of unit
 18 Way screw connector on front

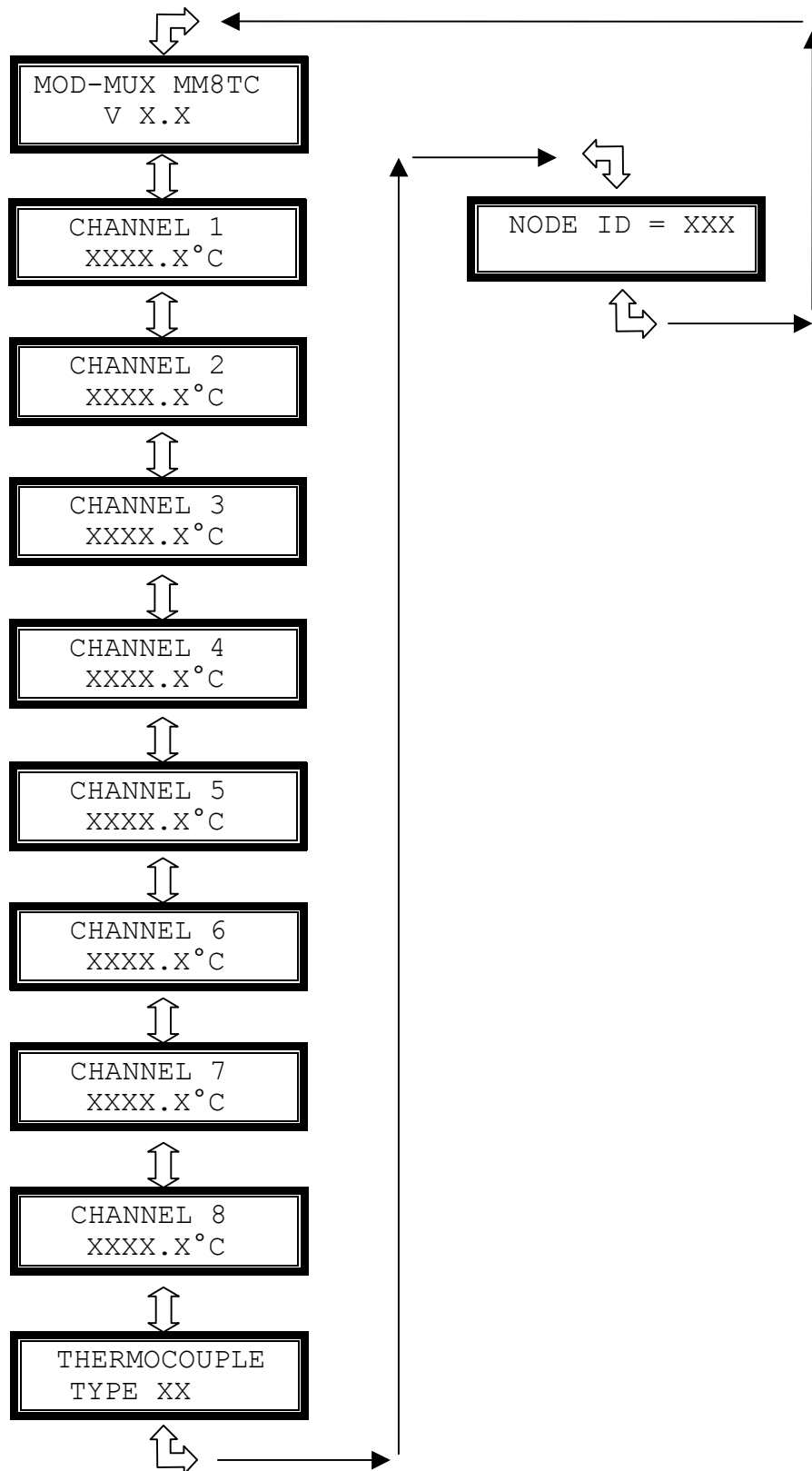
WIRING



SWITCH SETTINGS

<u>SWITCH</u>	<u>FUNCTION</u>	<u>DESCRIPTION</u>
1	NODE ID	Node ID's from 0 to 127 are set up using switches 1 to 7.
2	NODE ID	
3	NODE ID	
4	NODE ID	
5	NODE ID	
6	NODE ID	
7	NODE ID	
8	-	Not used.
9	BREAK	TC break. When switched off the TC value will loaded with -32767 when the TC is faulty. When switched on the TC value will be loaded with 32768.
10	BAUD RATE	Selects 9600 (off) or 19200 BAUD (on)

DIAGNOSTIC UNIT MENU FORMAT



DATA ADDRESSES

The data in the modules is stored in registers. These registers are accessed over the network using the MODBUS communication protocol.

The MODBUS mode used is the **RTU** mode with the following set-up:

BAUD RATE	LOW (9600) / HIGH (19200)
DATA BITS	8
PARITY	NONE
STOP BITS	1

There are 4 types of variables which can be accessed from the module. Each module has one or more of these data variables.

<u>Type</u>	<u>Start Address</u>	<u>Variable</u>
1	00001	Digital Outputs
2	10001	Digital Inputs
3	30001	Input registers (Analog)
4	40001	Output registers (Analog)

Note: Due to the limited buffer memory size in the modules, the Modbus message length must be limited to 8 consecutive read or write registers. If more registers are required then a new poll group must be added for the next 8 registers.

MM8TC - THERMOCOUPLE INPUTS

Modbus Address	Register Name	Low Limit	High Limit	Access	Comments
30001	S/W Version / Module Type	N/A	N/A	R	High Byte = Software Version Low Byte = 5
30002	TC Input 1	-xxx.x	yyy.y	R	Thermocouple Inputs. See table for range.
30003	TC Input 2	-xxx.x	yyy.y	R	Resolution in 0.1°C.
30004	TC Input 3	-xxx.x	yyy.y	R	"
30005	TC Input 4	-xxx.x	yyy.y	R	"
30006	TC Input 5	-xxx.x	yyy.y	R	"
30007	TC Input 6	-xxx.x	yyy.y	R	"
30008	TC Input 7	-xxx.x	yyy.y	R	"
30009	TC Input 8	-xxx.x	yyy.y	R	"
30010	CJC Temp.	-xxx.x	yyy.y	R	CJC Temperature in 0.1°C resolution.
40011	TC Type	1	13	R/W	See TC Tables.

SPECIFICATIONS

ENVIRONMENTAL

Operating Temperature	-5°C to +65°C
Storage Temperature	-20°C to +85°C
Humidity	Up to 95% non condensing.

EMC INSTALLATION INSTRUCTIONS

1. Screened twisted pair RS485 cable must be used with the screen grounded at one point only.
2. The RS485 cable must be terminated at both ends using a 120ohm resistor.
3. Use should be made of screened I/O, T/C, RTD cable with the screens grounded at one point as close to the MOD-MUX module as possible.

DIP SWITCH TABLE

The following table assists with the setting up of DIP switches for the required NODE ID.

NODE ID	DIP SWITCH SETTINGS						
	SW1	SW2	SW3	SW4	SW5	SW6	SW7
0	OFF	OFF	OFF	OFF	OFF	OFF	OFF
1	ON	OFF	OFF	OFF	OFF	OFF	OFF
2	OFF	ON	OFF	OFF	OFF	OFF	OFF
3	ON	ON	OFF	OFF	OFF	OFF	OFF
4	OFF	OFF	ON	OFF	OFF	OFF	OFF
5	ON	OFF	ON	OFF	OFF	OFF	OFF
6	OFF	ON	ON	OFF	OFF	OFF	OFF
7	ON	ON	ON	OFF	OFF	OFF	OFF
8	OFF	OFF	OFF	ON	OFF	OFF	OFF
9	ON	OFF	OFF	ON	OFF	OFF	OFF
10	OFF	ON	OFF	ON	OFF	OFF	OFF
11	ON	ON	OFF	ON	OFF	OFF	OFF
12	OFF	OFF	ON	ON	OFF	OFF	OFF
13	ON	OFF	ON	ON	OFF	OFF	OFF
14	OFF	ON	ON	ON	OFF	OFF	OFF
15	ON	ON	ON	ON	OFF	OFF	OFF
16	OFF	OFF	OFF	OFF	ON	OFF	OFF
17	ON	OFF	OFF	OFF	ON	OFF	OFF
18	OFF	ON	OFF	OFF	ON	OFF	OFF
19	ON	ON	OFF	OFF	ON	OFF	OFF
20	OFF	OFF	ON	OFF	ON	OFF	OFF
21	ON	OFF	ON	OFF	ON	OFF	OFF
22	OFF	ON	ON	OFF	ON	OFF	OFF
23	ON	ON	ON	OFF	ON	OFF	OFF
24	OFF	OFF	OFF	ON	ON	OFF	OFF
25	ON	OFF	OFF	ON	ON	OFF	OFF
26	OFF	ON	OFF	ON	ON	OFF	OFF
27	ON	ON	OFF	ON	ON	OFF	OFF
28	OFF	OFF	ON	ON	ON	OFF	OFF
29	ON	OFF	ON	ON	ON	OFF	OFF
30	OFF	ON	ON	ON	ON	OFF	OFF
31	ON	ON	ON	ON	ON	OFF	OFF
32	OFF	OFF	OFF	OFF	OFF	ON	OFF
33	ON	OFF	OFF	OFF	OFF	ON	OFF
34	OFF	ON	OFF	OFF	OFF	ON	OFF
35	ON	ON	OFF	OFF	OFF	ON	OFF
36	OFF	OFF	ON	OFF	OFF	ON	OFF
37	ON	OFF	ON	OFF	OFF	ON	OFF
38	OFF	ON	ON	OFF	OFF	ON	OFF
39	ON	ON	ON	OFF	OFF	ON	OFF
40	OFF	OFF	OFF	ON	OFF	ON	OFF
41	ON	OFF	OFF	ON	OFF	ON	OFF
42	OFF	ON	OFF	ON	OFF	ON	OFF
43	ON	ON	OFF	ON	OFF	ON	OFF
44	OFF	OFF	ON	ON	OFF	ON	OFF
45	ON	OFF	ON	ON	OFF	ON	OFF
46	OFF	ON	ON	ON	OFF	ON	OFF
47	ON	ON	ON	ON	OFF	ON	OFF
48	OFF	OFF	OFF	OFF	ON	ON	OFF
49	ON	OFF	OFF	OFF	ON	ON	OFF

NODE ID	DIP SWITCH SETTINGS						
	SW1	SW2	SW3	SW4	SW5	SW6	SW7
50	OFF	ON	OFF	OFF	ON	ON	OFF
51	ON	ON	OFF	OFF	ON	ON	OFF
52	OFF	OFF	ON	OFF	ON	ON	OFF
53	ON	OFF	ON	OFF	ON	ON	OFF
54	OFF	ON	ON	OFF	ON	ON	OFF
55	ON	ON	ON	OFF	ON	ON	OFF
56	OFF	OFF	OFF	ON	ON	ON	OFF
57	ON	OFF	OFF	ON	ON	ON	OFF
58	OFF	ON	OFF	ON	ON	ON	OFF
59	ON	ON	OFF	ON	ON	ON	OFF
60	OFF	OFF	ON	ON	ON	ON	OFF
61	ON	OFF	ON	ON	ON	ON	OFF
62	OFF	ON	ON	ON	ON	ON	OFF
63	ON	ON	ON	ON	ON	ON	OFF
64	OFF	OFF	OFF	OFF	OFF	OFF	ON
65	ON	OFF	OFF	OFF	OFF	OFF	ON
66	OFF	ON	OFF	OFF	OFF	OFF	ON
67	ON	ON	OFF	OFF	OFF	OFF	ON
68	OFF	OFF	ON	OFF	OFF	OFF	ON
69	ON	OFF	ON	OFF	OFF	OFF	ON
70	OFF	ON	ON	OFF	OFF	OFF	ON
71	ON	ON	ON	OFF	OFF	OFF	ON
72	OFF	OFF	OFF	ON	OFF	OFF	ON
73	ON	OFF	OFF	ON	OFF	OFF	ON
74	OFF	ON	OFF	ON	OFF	OFF	ON
75	ON	ON	OFF	ON	OFF	OFF	ON
76	OFF	OFF	ON	ON	OFF	OFF	ON
77	ON	OFF	ON	ON	OFF	OFF	ON
78	OFF	ON	ON	ON	OFF	OFF	ON
79	ON	ON	ON	ON	OFF	OFF	ON
80	OFF	OFF	OFF	OFF	ON	OFF	ON
81	ON	OFF	OFF	OFF	ON	OFF	ON
82	OFF	ON	OFF	OFF	ON	OFF	ON
83	ON	ON	OFF	OFF	ON	OFF	ON
84	OFF	OFF	ON	OFF	ON	OFF	ON
85	ON	OFF	ON	OFF	ON	OFF	ON
86	OFF	ON	ON	OFF	ON	OFF	ON
87	ON	ON	ON	OFF	ON	OFF	ON
88	OFF	OFF	OFF	ON	ON	OFF	ON
89	ON	OFF	OFF	ON	ON	OFF	ON
90	OFF	ON	OFF	ON	ON	OFF	ON
91	ON	ON	OFF	ON	ON	OFF	ON
92	OFF	OFF	ON	ON	ON	OFF	ON
93	ON	OFF	ON	ON	ON	OFF	ON
94	OFF	ON	ON	ON	ON	OFF	ON
95	ON	ON	ON	ON	ON	OFF	ON
96	OFF	OFF	OFF	OFF	OFF	ON	ON
97	ON	OFF	OFF	OFF	OFF	ON	ON
98	OFF	ON	OFF	OFF	OFF	ON	ON
99	ON	ON	OFF	OFF	OFF	ON	ON
100	OFF	OFF	ON	OFF	OFF	ON	ON
101	ON	OFF	ON	OFF	OFF	ON	ON
102	OFF	ON	ON	OFF	OFF	ON	ON
103	ON	ON	ON	OFF	OFF	ON	ON
104	OFF	OFF	OFF	ON	OFF	ON	ON

NODE ID	DIP SWITCH SETTINGS						
	SW1	SW2	SW3	SW4	SW5	SW6	SW7
105	ON	OFF	OFF	ON	OFF	ON	ON
106	OFF	ON	OFF	ON	OFF	ON	ON
107	ON	ON	OFF	ON	OFF	ON	ON
108	OFF	OFF	ON	ON	OFF	ON	ON
109	ON	OFF	ON	ON	OFF	ON	ON
110	OFF	ON	ON	ON	OFF	ON	ON
111	ON	ON	ON	ON	OFF	ON	ON
112	OFF	OFF	OFF	OFF	ON	ON	ON
113	ON	OFF	OFF	OFF	ON	ON	ON
114	OFF	ON	OFF	OFF	ON	ON	ON
115	ON	ON	OFF	OFF	ON	ON	ON
116	OFF	OFF	ON	OFF	ON	ON	ON
117	ON	OFF	ON	OFF	ON	ON	ON
118	OFF	ON	ON	OFF	ON	ON	ON
119	ON	ON	ON	OFF	ON	ON	ON
120	OFF	OFF	OFF	ON	ON	ON	ON
121	ON	OFF	OFF	ON	ON	ON	ON
122	OFF	ON	OFF	ON	ON	ON	ON
123	ON	ON	OFF	ON	ON	ON	ON
124	OFF	OFF	ON	ON	ON	ON	ON
125	ON	OFF	ON	ON	ON	ON	ON
126	OFF	ON	ON	ON	ON	ON	ON
127	ON	ON	ON	ON	ON	ON	ON

