

RTD1

Temperature Module

IECEX ITA 07.0017x



Description

The iMAC-RTD1 Temperature Module is an intrinsically safe field module for monitoring temperature using a RTD PT100 temperature transducer. The supported RTD temperature measurement range is from -20°C to 300°C. The PT100 is connected using a 3-wire configuration.

The iMAC-RTD1 Module publishes two 16 bit words onto the iMAC communication line. One 16 bit word for the PT100 temperature value and one 16 bit word for PT100 status and error bits.

The iMAC-RTD1 Module is powered from the iMAC L1 line. Each Module draws 7mA peak current from the iMAC controller.

There is a precision resistor used in the RTD1 Module to calculate the resistance of the PT100 sensor. The RTD1 Module uses a 10 bit Analog to Digital Converter and corrects the parabolic RTD response using a high order piecewise linear approximation method. The RTD1 Module corrects for the temperature effects on reference voltages.

Features

- 1x 16 bit PT100 temperature data word (Addressable 1..255)
- 1x 16 bit PT100 status word (Addressable 1..255)
- On line configuration from iMAC Controller
- Monitors 1x PT100 Temperature Sensor
- 3-wire PT100 termination
- Low cost installation
- LED Indication to aid fault finding
- Down line powered – over communication pair

Led Status Indication

- **Slow flash** if the module is communicating to the Controller over the L1 line with no alarms active.
- **Two flashes** when module is being roll called.
- **Three flashes** if there is an address clash.
- **Fast flash** the RTD1 Module has an active alarm.

Data Mapping

The RTD1 Module publishes Status Data and Temperature Data onto the iMAC communication line. The Status Data and error bits indicate the status of the PT100 transducer and help identify faults (not-connected, over-range, under-range, etc.)

Bit								Bit							
15								0							
X	X	X	X	X	X	X	X	X	X	HT	LT	TR	WF	OC	SC

RTD 16-Bit Status Word (A1..255)

SC – RTD Short Circuit	1=Fault	0=OKAY
OC – RTD Open Circuit	1=Fault	0=OKAY
WF – RTD sense Wire Fault	1=Fault	0=OKAY
TR –Temperature out of Range	1=Fault	0=OKAY
LT – Low Temperature alarm	1=Alarm	0=OKAY
HT – High Temperature alarm	1=Alarm	0=OKAY
X – not used		

RTD short circuit =>RTD sensor resistance is less than ~50 ohms.

RTD open circuit =>RTD sensor resistance is greater than ~250 ohms.

RTD sensor wire fault =>abnormal sensing signal.

The temperature data word is defined as follows:

Bit								Bit							
15								0							
T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T

RTD 16-Bit Temp Data Word (A1..255)

16 bit 2s Compliment representation of temperature in 1degree Celsius.

If there is any fault, temperature value is set to 999.

Programming Procedure

Select the Rollcall and Program page from the Controller menu.

- Press <F2> to rollcall each module. The modules are rollcalled in address order. Keep pressing <F2> until the correct module with the correct serial number is displayed.

- MAIN ROLLCALL PAGE
RTD1 Temp next>
Serial number: 1111
Address: 21, read>
- Press <F4> to read address parameters. Pressing <F4> will cause the Controller to read the programming parameters from the module and display the parameters on the "Programming Page"
- Edit the parameters by pressing the function key corresponding to parameter for editing. Use the arrow keys to edit the value. Save edits by re-pressing the corresponding function key. To cancel edits press the <ESC> key.
- Write the edited parameters to the module by pressing the function key corresponding to the "Write Parameters ?" message. Note the down arrow may have to be used to locate this message. This writes the parameter values into the module non-volatile memory.
- The Serial Number is the same in all Rollcalls because the same module (RTD1 module) is producing all rollcalls.

MAIN ROLLCALL PAGE
RTD1 Status next>
Serial number: 1111
Address: 20, read>

- Parameter 1:** Is the iMAC Address into which the temperature will be published. Selecting 0 will put the temperature variable offline.
- Parameter 2:** Temperature LOW set point for the alarm bit in the Status Word. Set point is a 16 bit, 2s compliment representation of temperature in Celsius.
- Parameter 3:** Not used
- Parameter 4:** Temperature HIGH set point for the alarm bit in the Status Word. Set point is a 16 bit, 2s compliment representation of temperature in Celsius.

Status Address

Parameter	Meaning	Range
Parameter 1	iMAC RTD1 Status Address	1..255d
Parameter 2	Not Used	N/A
Parameter 3	Not Used	N/A
Parameter 4	L1+ voltage (1/10V)	0..200d

Temperature Address

Parameter	Meaning	Range
Parameter 1	iMAC RTD1 Temp Address	1..255d
Parameter 2	Low Set point	
Parameter 3	Not Used	N/A
Parameter 4	High Set point	

Specifications

Power Supply:
 Powered from iMAC Communication Line.

Inputs:
 1 x PT100 Temperature Sensor (3-wire connection)
 -20°C to 300°C

Communication:
 iMAC 2/3 Wire Line.
 300 to 1000 baud

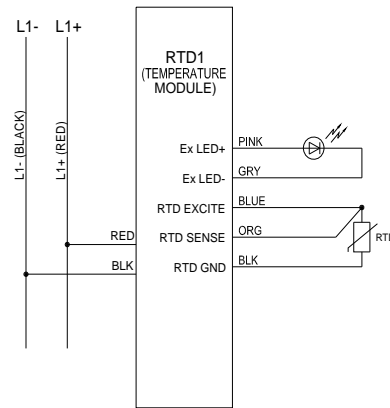
Operating Environment:
 0 to 50°C.

Overall Dimensions:
 70L x 31W x 24H mm

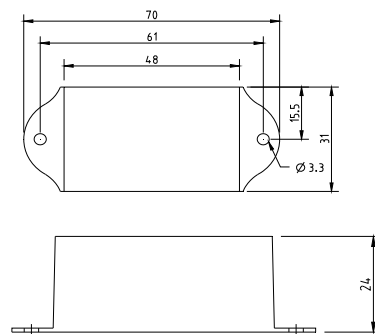
Equipment List

- 121890 iMAC-RTD1 Temperature Module Without LED
- 121889 iMAC-RTD1 Temperature Module With LED
- 141063 iMAC RTD1 I.S. cw LED IecEx SA

Connection Diagram



General Arrangement



Technical Support

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