red lion

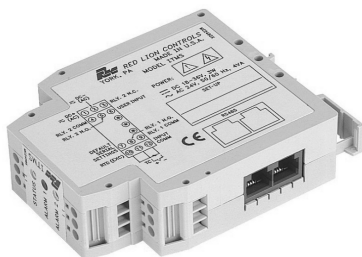## SILGE ELECTRONICA S.A.

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MODEL ITMS - INTELLIGENT TEMPERATURE TO MODBUS CONDITIONER W/ ALARMS

- *TEMPERATURE TO MODBUS CONVERSION*
- *ACCEPTS THERMOCOUPLE, RTD, mV OR RESISTANCE SIGNALS*
- *PROCESSOR BASED SCALING*
- *PC CONFIGURATION SOFTWARE*
- *DUAL SETPOINT RELAY ALARMS*
- *FOUR WAY SIGNAL ISOLATION*

GENERAL DESCRIPTION

The ITMS4037 Intelligent Temperature to MODBUS™ Conditioner with Alarms accepts a wide range of temperature sensors (thermocouple and RTD elements), and converts the signal into a register format that can be read using either ASCII or RTU MODBUS protocol.

The ITMS allows a choice of either Fahrenheit or Celsius readout with 0.1 or 1 degree of resolution. An offset value can be programmed to scale the input signal to meet most process requirements. Additionally, two setpoint values can be entered for dual relay process monitoring alarms.

The ITMS is programmed with Windows™ based SFIMS software. The software allows configuration, calibration, and storage of ITMS program files. Additionally, all setup parameters can be interrogated and modified through MODBUS register and coil commands.
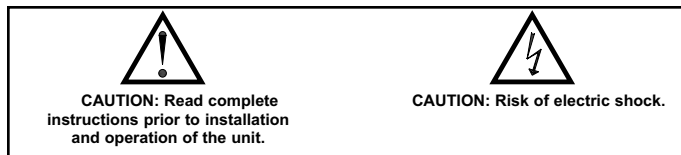
The RS485 port allows the ITMS to be multidropped, with Baud rates up to 38400. The CBPRO007 programming cable converts the RS232 port of a PC to RS485, and is terminated with an RJ-11 connector. The bidirectional capability of the CBPRO007 allows it to be used as a permanent interface cable as well as a programming cable.

The ITMS's two relay alarms can be configured independently for absolute high or low acting with balanced or unbalanced hysteresis. Alarm 2 can also be configured for deviation and band alarms. In these modes, Setpoint 2 tracks Setpoint 1. Adjustable alarm trip delays can be used for delaying output response. The alarms can be programmed for Automatic or Latching. Latched alarms can be reset with a serial command or a user input. A standby feature suppresses the alarm during power-up until the temperature stabilizes outside the alarm region. Standby eliminates power-up tripping for low acting alarms. A user input can be used to set and reset non-latching alarms. The output relays can also be manually controlled with register commands.

The module's high density packaging and DIN rail mounting saves time and panel space. The module is equipped with a universal mounting foot for attachment to standard DIN rails, including top hat (T) profile or G profile rail.

SAFETY SUMMARY

All safety related regulations, local codes and instructions that appear in the manual or on equipment must be observed to ensure personal safety and to prevent damage to either the instrument or equipment connected to it. If equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

CAUTION: Read complete instructions prior to installation and operation of the unit.

CAUTION: Risk of electric shock.

ORDERING INFORMATION

MODEL	DESCRIPTION	PART NUMBER
ITMS	Temperature to MODBUS Conditioner w/Alarms	ITMS4037
SFIMS	PC Configuration Software for Windows	SFIMS
CBPRO	Programming Interface Cable	CBPRO007
CBJ	Cable RJ11 to Unterminated 7 foot length	CBJ11A07
	Cable RJ11 to RJ11 6 inch jumper	CBJ11BD5
	RJ Connector to Terminal Adapter	DRRJ11T6

SPECIFICATIONS

1. **POWER**: 18-36 VDC, 3.0 W max. or 24 VAC, ±10%, 50/60 Hz, 4 VA max.
2. **INPUT**:
   Sample Rate: 67 msec. (15 Hz)
   Failed Sensor Response: Open or shorted (RTD only) sensor coils indication, error code returned in Process Value
   Common Mode Rejection: 50/60 Hz, 110 dB min.
   Overvoltage: 30 VDC
   Response Time: 150 msec. max.
3. **THERMOCOUPLE INPUTS**:
   Types: T, E, J, K, R, S, B, N, C, linear mV
   Input Impedance: 20 MΩ
   Lead Resistance Effect: 0.22 µV/Ω
   Resolution: 1° or 0.1° for all types

TC TYPE	DISPLAY RANGE	WIRE COLOR	
		ANSI	BS 1843
T	-200 to +400°C -328 to +752°F	(+) blue (-) red	(+) white (-) blue
E	-200 to +750°C -328 to +1382°F	(+) violet (-) red	(+) brown (-) blue
J	-200 to +760°C -328 to +1400°F	(+) white (-) red	(+) yellow (-) blue
K	-200 to +1372°C -328 to +2502°F	(+) yellow (-) red	(+) brown (-) blue
R	0 to +1768°C +32 to +3214°F	No Standard	(+) white (-) blue
S	0 to +1768°C +32 to +3214°F	No Standard	(+) white (-) blue
B	+200 to +1820°C +392 to +3308°F	No Standard	No Standard
N	-200 to +1300°C -328 to +2372°F	(+) orange (-) red	(+) orange (-) blue
C W5/W26	0 to +2315°C +32 to +4199°F	No Standard	No Standard
mV	-10 mV to 65 mV	NA	NA

DIMENSIONS "In inches (mm)"

3.12 (79.2)

1.08 (27.5)

4.20 REF (106.7)

STATUS
ALARM 1
ALARM 2
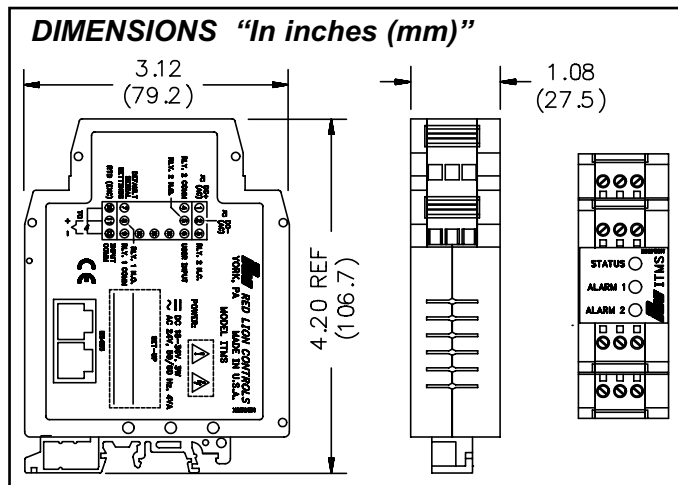
4. **RTD INPUTS**:
   Type: 2 or 3 wire
   Excitation: 150 µA
   Lead Resistance: 10 Ω max.
   Resolution: 1° or 0.1° for all types

RTD TYPE	INPUT TYPE	RANGE
385	100 Ω platinum, Alpha=.00385	-200 to +800°C -328 to +1472°F
392	100 Ω platinum, Alpha=.003919	-200 to +800°C -328 to +1472°F
672	120 Ω nickel, Alpha=.00672	-80 to +260°C -112 to +500°F
Ohms	Linear Resistance	0 to 440 Ω

5. **INDICATION ACCURACY**: ±(0.3% of span, +1°C), includes NIST conformity, cold junction effect, A/D conversion errors, tempco and linearization conformity at 23°C after 20 minute warm-up.
   Span Drift (max) : 0.01% /°C

6. **USER INPUT**: Internally pulled up to +5 VDC. $V_{IL} = 0.78$ V max., $V_{IH} = 1.8$ V min. $I_{OFF} = 9$ µA max. 30 V max. over voltage continuously.

7. **ISOLATION LEVEL**: 1.5 KV @ 50/60 Hz, 1 minute (150 V working) between input, RS485 and power supply. 2300 Vrms, 1 minute (300 V working) to relay contacts.

8. **SERIAL COMMUNICATIONS**:
   Type: RS485; RTU and ASCII MODBUS modes
   Baud: 300, 600, 1200, 2400, 4800, 9600, 19200, and 38400
   Format: 7/8 bit, odd, even and no parity
   Transmit Delay: Programmable. (See Transmit Delay explanation in Step 6)
   Transmit Enable (TXEN): (primarily for 20 mA loop converter) open collector $V_{OH} = 10$ VDC max. $V_{OL} = 0.5$ VDC @ 5 mA max. current limit

9. **A/D CONVERTER**: 16 bit resolution

10. **RELAY OUTPUTS**:
    Type: 1 Form A N.O. contacts, 1 Form C DPDT
    Rating: 5A @ 30 VDC or 250 VAC max. (resistive)
       1/10 HP @ 120 VAC (inductive)
    Response Time: 155 msec. max. to close including step response, 153 msec. max. to open.
    Output On Delay Time: Programmable from 0 to 32000 sec ±0.01% - 1 sec. max.

11. **MEMORY**: Nonvolatile E^{2}PROM retains all programmable parameters.

12. **ENVIRONMENTAL CONDITIONS**:
    Operating Temperature Range: -20 to +65 °C
    Storage Temperature Range: -40 to +85 °C
    Operating and Storage Humidity: 85% max. relative humidity (non-condensing) from -20 to +65 °C
    Altitude: Up to 2000 meters

13. **CERTIFICATIONS AND COMPLIANCE**:
    ELECTROMAGNETIC COMPATIBILITY

    Immunity to EN 50082-2

Electrostatic discharge	EN 61000-4-2	Level 2; 4 KV contact Level 3; 8 KV air[1]
Electromagnetic RF fields	EN 61000-4-3	Level3; 10 V/M 80 MHz - 1 GHz
Fast transients (burst)	EN 61000-4-4	Level 4; 2 KV I/O Level 3; 2 KV power
RF conducted interference	EN 61000-4-6	Level 3; 10 V/rms 150 KHz - 80 MHz
Simulation of cordless telephone	ENV 50204	Level 3; 10 V/m 900 MHz ± 5 MHz 200 Hz, 50% duty cycle

    Emissions to EN 55011

 | | | |
    |---|---|---|
    | RF interference | EN 55011 | Enclosure class A
Power mains class A |

    Notes:
    1. This device was designed for installation in an enclosure. To avoid electrostatic discharge to the unit in environments with static levels above 6 KV, precautions should be taken when the device is mounted outside an enclosure. When working in an enclosure (ex. making connections, etc.), typical anti-static precautions should be observed before touching the module.
    Refer to the EMC Installation Guidelines section of this bulletin for additional information.

14. **CONSTRUCTION**: Case body is green high impact plastic. Installation Category II, Pollution Degree 2.

15. **CONNECTIONS**: Wire clamping screw terminals.

16. **MOUNTING**: Universal mounting foot for attachment to standard DIN style mounting rails, including top hat (T) profile rail according to EN50022 - 35 x 7.5 and -35 x 15, and G profile rail according to EN50035 - G32.

17. **WEIGHT**: 4.5 oz. (127.57 g)

BLOCK DIAGRAM
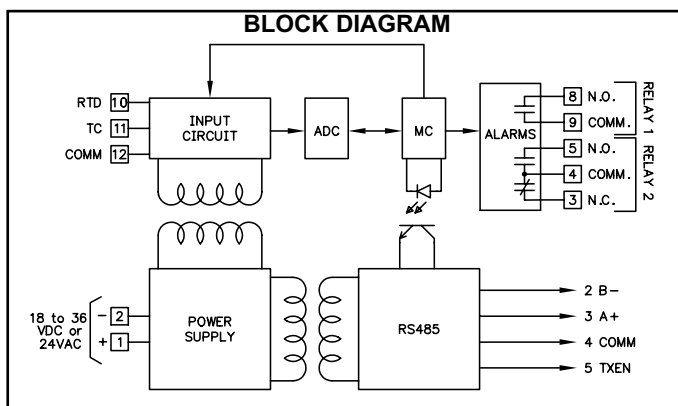
MODULE ISOLATION

The ITMS features "4-way" signal isolation. The 4-way isolation is a combination of optical, transformer and relay barriers, providing common mode voltage (CMV) isolation to 1.5 KV for 1 minute between input, RS485, and power supply. Isolation between relay contacts and all other inputs is 2300 Vrms for 1 minute.

LED FUNCTIONALITY

CONDITION	GREEN LED	2 RED LEDS
Power Applied	On	———
Communication Received	Flashing	———
Respective Alarm	On	On
Checksum error	Flashing	Flashing
Calibration	Off	On

EMC INSTALLATION GUIDELINES

Although this module is designed with a high degree of immunity to Electro-Magnetic Interference (EMI), proper installation and wiring methods must be followed to ensure compatibility in each application. The type of the electrical noise, source or coupling method into the unit may be different for various installations. Cable length, routing, and shield termination are very important and can mean the difference between a successful or troublesome installation.

Listed below are some EMC guidelines for successful installation in an industrial environment.

1. Use shielded (screened) cables for all Signal and Control inputs. The shield (screen) pigtail connection should be made as short as possible. The connection point for the shield depends somewhat upon the application. Listed below are the recommended methods of connecting the shield, in order of their effectiveness.
   a. Connect the shield only at the rail where the unit is mounted to earth ground (protective earth).
   b. Connect the shield to earth ground at both ends of the cable, usually when the noise source frequency is above 1 MHz.
   c. Connect the shield to common of the unit and leave the other end of the shield unconnected and insulated from earth ground.
2. Never run Signal or Control cables in the same conduit or raceway with AC power lines, conductors feeding motors, solenoids, SCR controls, and heaters, etc. The cables should be run in metal conduit that is properly grounded. This is especially useful in applications where cable runs are long and portable two-way radios are used in close proximity or if the installation is near a commercial radio transmitter.
3. Signal or Control cables within an enclosure should be routed as far away as possible from contactors, control relays, transformers, and other noisy components.
4. In extremely high EMI environments, the use of external EMI suppression devices, such as ferrite suppression cores, is effective. Install them on Signal and Control cables as close to the unit as possible. Loop the cable through the core several times or use multiple cores on each cable for additional protection. Install line filters on the power input cable to the unit to suppress power line interference. Install them near the power entry point of the enclosure. The following EMI suppression devices (or equivalent) are recommended:
   Ferrite Suppression Cores for signal and control cables:
       Fair-Rite # 0443167251 (RLC # FCOR0000)
       TDK # ZCAT3035-1330A
       Steward # 28B209-0A0
       Line Filters for input power cables:
       Schaffner # FN610-1/07 (RLC # LFIL0000)
       Schaffner # FN670-1.8/07
       Corcom # 1 VR3
   Note: Reference manufacturer's instructions when installing a line filter.
5. Long cable runs are more susceptible to EMI pickup than short cable runs. Therefore, keep cable runs as short as possible.