

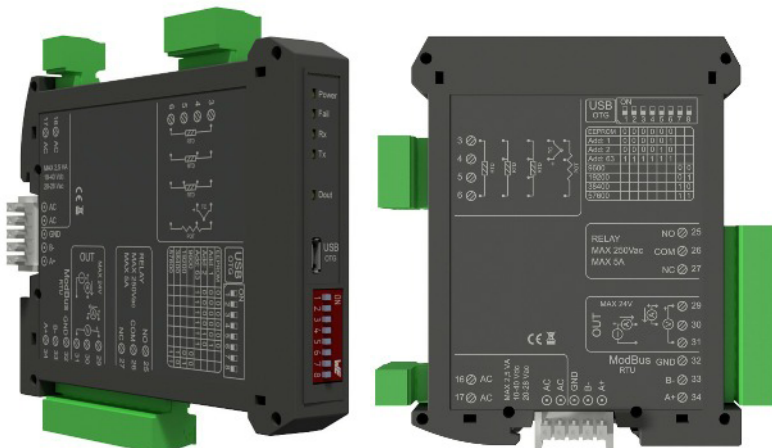
UNIVERSAL TEMPERATURE CONVERTER

4 way isolated - RS485 MODBUS- Datalogger



Advanced **UNIVERSAL TEMPERATURE CONVERTER**, **USB configurable**, DIN rail mounting, 4-way galvanically isolated, universal power supply AC/DC, **Programmable alarm contact**, **RS485 Modbus**.

DATALOGGING via USB with pen drive stick memory and download storage data on excel importable files. **RTC Real Time Clock** integrated. **RTD, TC and POTENTIOMETER CONVERTER**.



INPUT

TEMPERATURE:

RTD: Pt100, Pt500, Pt1000, Ni100. 2, 3 or 4 wire measure, automatic detection of cable interruption.

TC Types: J, K, R, S, T, B, E, N; automatic detection of cable interruption.

POTENTIOMETER: from 1000 Ohm to 10 KOhm.

RESISTANCE: resistance measurement 400ohm or 4000 ohm to 2, 3, 4 wires.

OUTPUT

CURRENT: 0...20mA programmable, max load resistance 600 ohm.

VOLTAGE: 0...10V programmable, min load resistance 2 kohm.

CONTACT ALARM: 5A 230Vac SPDT relay fully programmable by FACILE QA-TEMP.

RS485 MODBUS: Bus connection on the base of module by adapter (option) or on terminals. Dip-switch for setting address and baudrate.

POWER SUPPLY 10..40 Vdc, 20-28 Vac, 50-60 Hz

RETRANSMISSION OUTPUT On isolated analog output,

Voltage and Current (impressed) programmable; Active or Passive supply output 13 Vdc 30mA max

ABSORPTION Maximum 2 VA

PROTECTION INDEX IP20

ACCURACY 0,1% F.S.

RESOLUTION 16 bit

REJECTION 50-60 Hz

THERMAL STABILITY AT 25°C <100ppm

WORKING TEMPERATURE -15...+65°C

STORAGE TEMPERATURE -40°C... +85°C

ISOLATION Input, analog and digital output, serial output RS485 and USB port, Power supply, are 4-way galvanically isolated at 1,5kV

HUMIDITY 10...90% non condensing

ALTITUDE Up to 2000 m s.l.m.

MOUNTING DIN rail mounting with removable terminals, RS485 bus and Supply connection ready on the base of module (connector not included, on request).

CONNECTIONS Removable terminals 5,08mm

CE STANDARDS

EN61000-6-4/2006 + A1 2011;

EN64000-6-2/2005; EN61010-1/2010

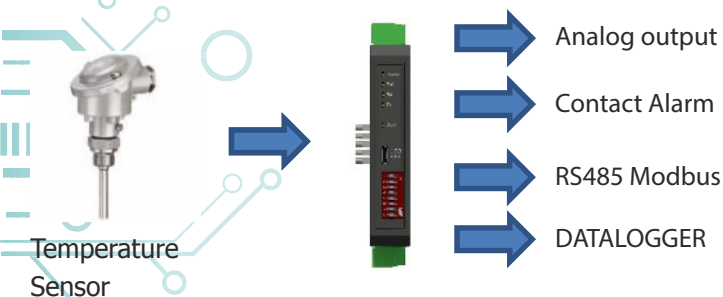
DIMENSIONS 17,5 x 100 x 112 mm (terminals excluded)

DATA LOGGER

Non-volatile memory. Log on USB OnTheGo port by Pen Drive stick memory. The software F7D? A ŽEA Ž ů ge (free of charge) allow you to configure Log, all conversion parameters, set contact alarm, set Modbus address. RTC Real Time Clock integrated

CONFIGURATION

By free software F7D? A ŽEA Ž ů ge to configure all of the conversion parameters like span, zero, alarm contact and log via USB port or via RS485. Dip-switch for setting modbus address and baudrate



4-WAY GALVANIC ISOLATION





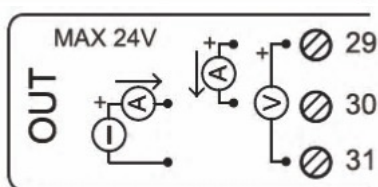
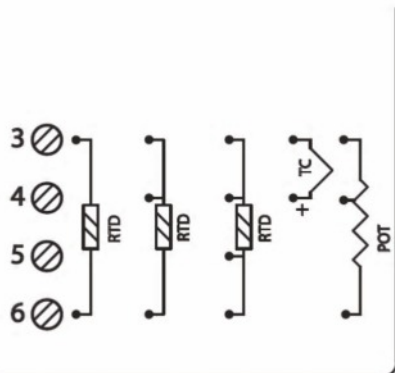
INSTRUCTION MANUAL




DESCRIPTION:




The F7D? AŽEAŽbge is Sn Gniversal Temperature Converter, 4-ways isolated, with one Snaalog [nput /temperature, potentiometer, resistance) and three different outputs. The module has a programmable analog output (voltage or current), one digital output (5A SPDT relay) and one serial RS485 slave output. Thanks to the presence of the RS485 serial port, the device can perform advanced functions such as I / O Module with Modbus RTU protocol. The F7D? A behaves as a slave device by placing n°1 RTD/ TC input , n°1 AO, n°1 DO.

ELECTRICAL CONNECTIONS:

16  AC
17  AC
MAX 2,5 VA
10-40 Vdc
20-28 Vac



RELAY
MAX 250Vac
MAX 5A
NO  25
COM  26
NC  27

ModBus RTU
GND  32
B-  33
A+  34



POWER SUPPLY:

10...40 Vdc or 20...28 Vac - Connectors 16 and 17, or by T-BUS connector (optional tool) on the base of the module (see the picture placed on the bottom of this page).

ANALOG INPUT TEMPERATURE SENSORS CONNECTION:

Depending on the type of sensor or signal available, make the connection as shown. For example, to connect a 3-wire RTD sensor requires a connection to terminals 3, 4 and 6. The Thermocouple, whatever it is, it requires the connection between terminals 3 and 4.

To connect a potentiometer use terminals 3, 4 and 6.

To make resistance measurements at 2, 3 and 4 wires to follow the wiring diagram for the RTD.

ANALOG OUTPUT:

For the voltage analog output, connect terminals 31 and 29 (positive).

For the ACTIVE current analog output, connect terminals 29 (positive) and 30.

For the PASSIVE current analog output, connect terminals 30 (positive) and 31.

Analog output supply: 13 Vdc, max 30mA.

DIGITAL OUTPUT:

SPDT Relay Output. Connect the terminals 25 Normally Open and 27 Normally Closed. The default setting is Normally Open (NO).

SERIAL OUTPUT RS485 Modbus RTU:

Available on terminals 32 GND, 33 (B-), 34 (A+), or by using T-BUS connector to be mounted on the base of the module. To configure the device use the software F7D? AŽEAŽbge or by direct connection via RS485 using the Modbus register map shown in this manual.

T-BUS CONNECTION (T-BUS connector required):

It is possible to mount the accessory T-BUS to carry both power and serial communication. The number of modules supported by the function of the power supply bus is used (check the absorption of the modules).

DATA LOGGING

The F7D? AŽEA 7bge provides, on a local memory type PEN DRIVE USB (USB KEY) connected to the module via the microUSB, a series of information concerning the operation of the module, alarm status, type of input, the output type, the reading of the measured data, the measure of the output value from the module.

For each row correspond to a precise time reference. The module is equipped with an RTC Real Time Clock powered by a backup battery that lets you record data with YEAR / MONTH / DAY / HOUR - MIN - SEC.

EXAMPLE OF LOG FILE: for 400ohm 2-wire RESISTOR input, one sample per minute, 0-10V output.

Serial Number	Data (yyyy-mm-dd) & Time	Status ID	Analog Input	Analog Output	Input type	Output type
12345678	2014/03/12-14-23-25	0	99.96	2499	3	0
12345678	2014/03/12-14-24-25	0	99.92	2498	3	0
12345678	2014/03/12-14-25-25	0	99.96	2499	3	0
12345678	2014/03/12-14-26-25	0	100	2500	3	0

The first number listed is the **SERIAL NUMBER** of the module, which allows it to be uniquely identified.

The second column give you information about: **DATE** (YEAR / MONTH / DAY / HOUR - MIN - SEC).

It is then reported the **STATUS ID** (Registry STATE) in binary mode to 16 bit. The binary number corresponds to the Modbus register 40005 that represents the state of the machine (Status: bit 1 = fail global, bit 2 = alarm, bit 3 = OVER RANGE, bit 4 = UNDER RANGE, bit 5 = din status, bit 6 = dout status, bit 7 = fail hw, bit 8 = fail log, bit 9 = fail RTC, bit 10 = fail EEPROM, bit 11 = fail sensor).

The fourth column we find the information from **ANALOG INPUT**: temperature, potentiometer or resistor.

ANALOG OUTPUT: the value uA or in mV output of the module. This value follows the setting made via FACILE.

INPUT TYPE: referred to the Modbus Register 101 that indicate the type of the Input sensor (Analog Input type : 2=Potentiometer, 3=Resistor400-2W, 4=Resistor400-3W, 5=Resistor400-4W, 6=Resistor4000-2W, 7=Resistor4000-3W, 8=Resistor4000-4W, 9=NI100-2W, 10=NI100-3W, 11=NI100-4W, 12=PT100-2W, 13=PT100-3W, 14=PT100-4W, 15=PT500-2W, 16=PT500-3W, 17=PT500-4W, 18=PT1000-2W, 19=PT1000-3W, 20=PT1000-4W, 21=TC J, 22=TC K, 23=TC R, 24=TC S, 25=TC T, 26=TC B, 27=TC E, 28=TC N).

OUTPUT TYPE: referred to the **Modbus Register 106** that indicate the output configuration (Output Analog mode: bit 0=Voltage/Current, bit 1-2=analog input,frequency, period, totalizer, bit 3 = fail UNDER RANGE, bit 4 = fail OVER RANGE, bit 5 = fail hardware, bit 6 = fail log, bit 7 = fail RTC, bit 8 = fail EEPROM, bit 9 = fail alarm, bit 10-11 = 1 threshold high/1 threshold low/2 thresholds external/2 thresholds internal , bit 12 = Manual mode).

AVAILABLE the MACRO for charge the .csv file logged directly on a Excel file

HOW TO IMPORT LOG DATA FROM EXCEL VERSION BEFORE 2003:

It's possible to import the data stored on the USB Memory Stick at any time (even if the log is not finished). Once you open the file with Excel (or Open Office), you will have to act on the functionality of the program for wrapping the data as described above. To do this, you can perform the following steps: Select the first column, go to the option data, click on TEXT COLUMN, then choose the option that provides for the separation of the data by tabs or commas, the next step endorse the option POINT and COMMA. Following the procedure as soon as you get the data displayed in columns.

MODBUS REGISTER MAP

REMARKS:

- Modbus connections: A+ and B-;
- Modbus Register reference: with reference to the logical address, for ex. 40010, corresponds to physical address n°9 as per Modbus RTU standard;
- Modbus functions supported: 3 (Read multiple registers), 6 (Write single), 16 (Write multiple);
- Any changes made by dip-switch required to switch off the power supply.

Register Name	Comment	Register Type	R/W	Default Value	Range	Modbus Address
Machine ID	Machine ID	UNIT16	R	10		40001
Firmware ID	Firmware ID	UNIT16	R	0		40002
ID	Serial Number	UNIT16	R		0...65535	40003 (MSW) 40004 (LSW)
Status	Status Register: bit 0 = fail global, bit 1 = alarm, bit 2 = over range, bit 3 = under range, bit 4 = din status, bit 5 =dout status, bit 6 = fail hw, bit 7 =fail log, bit 8 =fail rtc, bit 9 =fail eeprom, bit 10 =fail sensor	UNIT16	R			40005
Input Value	Input Value Normalized	UNIT16	R		-32768...32767	40006
Totalizer	Totalizer	UNIT32 (MSW)	R/W		0...4294967295	40007 40008
Output Value	Output Value (mV or uA)	UNIT16	R/W		0...65535	40009
Input Value	Input Value	Float (MSW)	R			40010 40011
	NOT USED					40012 40013
	NOT USED					40014 40015
Cold Junction Temp	Cold Junction Temperature	Float (MSW)	R			40016 40017
TC read	TC uV readed	Float (MSW)	R			40018 40019
Digital Output	Digital Output: bit 0= disabled/enabled	UNIT16	R/W			40020
Dip-switch status	DIPSW status : bit 0-7 =dip switch status, pos 1=bit 8,..., pos 8=bit 1	UNIT16	R			40021
Third wire resistance	Third wire Resistance Ohm	FLOAT (MSW)	R/W			40022 40023
Analog input type	Analog Input type : 2=Potentiometer, 3=Resistor400-2W, 4=Resistor400-3W, 5=Resistor400-4W, 6=Resistor4000-2W, 7=Resistor4000-3W, 8=Resistor4000-4W, 9=NI100-2W, 10=NI100-3W, 11=NI100-4W, 12=PT100-2W, 13=PT100-3W, 14=PT100-4W, 15=PT500-2W, 16=PT500-3W, 17=PT500-4W, 18=PT1000-2W, 19=PT1000-3W, 20=PT1000-4W, 21=TC J, 22=TC K, 23=TC R, 24=TC S, 25=TC T, 26=TC B, 27=TC E, 28=TC N	UNIT16	R/W	2	2...28	40101
	NOT USED					40102
Temperature mode	Temperature mode : bit 0-1 = unit measure °C/°F, bit 7-15 analog filter value	UNIT16	R/W	1	MSB: 1...32	40103
	NOT USED					40104
	NOT USED					40105
Output Analog mode	Output Analog mode : bit 0 =Voltage/Current, bit 1-2 =analog input, frequency, period,totalizer, bit 3 = fail ur, bit 4 = fail or, bit 5 = fail hw, bit 6 = fail log, bit 7 = fail rtc, bit 8 = fail eeprom, bit 9 = fail alarm, bit 10-11 = 1threshold greater/1threshold less/2thresholds external/2thresholds inside, bit 12 =Manual mode	UNIT16	R/W	0		40106

MODBUS REGISTER MAP

Register Name	Comment	Register Type	R/W	Default Value	Range	Modbus Address
Output Analog Input Begin scale	Output Analog Input Begin Scale	FLOAT (MSW)	R/W	0.0		40107
						40108
Output Analog Input End scale	Output Analog Input End Scale	FLOAT (MSW)	R/W	10000.0		40109
						40110
Output Analog Begin scale	Output Analog Begin Scale	UNIT16	R/W	0	0...65535	40111
Output Analog End scale	Output Analog End Scale	UNIT16	R/W	10000	0...65535	40112
Digital Output	Digital Output : bit 0 =default value, bit 1 =fail ur, bit 2 = fail or, bit 3 = fail hw, bit 4 = fail log, bit 5 = fail rtc, bit 6 = fail eeprom, bit 7	UNIT16	R/W	0		40113
Alarm Low Trip value	Alarm Low trip value	FLOAT (MSW)	R/W	0.0		40114
						40115
Alarm High Trip value	Alarm High trip value	FLOAT (MSW)	R/W	0.0		40116
						40117
Alarm Hysteresis value	Alarm Hysteresys value	FLOAT (MSW)	R/W	0.0		40118
						40119
Modbus Address	Modbus address +parity +stopbits : MSB Modbus address, bit 0-1 =parity none/odd/even, bit 2 =stop bits 1/2	UNIT16	R/W	256		40120
Modbus Baudrate	Modbus Baudrate : value 0=1200, 1=2400, 2=4800, 3=9600, 4=19200, 5=38400, 6=57600, 7=115200	UNIT16	R/W	3	0...7	40121
Log mode	Log mode : bit 0=disabled/enabled	UNIT16	R/W	0		40122
Log sample time	Log sample time (sec)	UNIT16	R/W	1	1...65535	40123
Log name	Log name 15 letters max	UNIT16	R/W	0		40124
Log name	Log name 15 letters max	UNIT16	R/W	0		40125
Log name	Log name 15 letters max	UNIT16	R/W	0		40126
Log name	Log name 15 letters max	UNIT16	R/W	0		40127
Log name	Log name 15 letters max	UNIT16	R/W	0		40128
Log name	Log name 15 letters max	UNIT16	R/W	0		40129
Log name	Log name 15 letters max	UNIT16	R/W	0		40130
Log name	Log name 15 letters max	UNIT16	R/W	0		40131
RTC Year	RTC Year	UNIT16	R/W		2000...2099	41001
RTC Month	RTC Month	UNIT16	R/W		1...12	41002
RTC Day	RTC Day	UNIT16	R/W		1...31	41003
RTC Hour	RTC Hour	UNIT16	R/W		1...23	41004
RTC Minute	RTC Minute	UNIT16	R/W		0...59	41005
RTC Second	RTC Second	UNIT16	R/W		0...59	41006
Command	Command : value 1=Reset, 2=Save Cfg to EEPROM, 3=Set Factory CFG,	UNIT16	R/W			42001
Command 1	Command parameter 1	UNIT16	R/W			42002
Command 2	Command parameter 2	UNIT16	R/W			42003

Upgrade FIRMWARE:

The F7D? AŽEA ž?ge is designed to upgrade the firmware via the USB port using a standard pen drive where the file will be placed. The firmware will allow you to implement the functionality of the card and correct any anomalies that may occur. In order to upgrade the firmware simply, remove power from the module, insert the pen drive with the file, restore power, at this point the card will automatically discharge the file and update the firmware without altering the configuration loaded during programming. During the update phase the LED light will be intermittent FAIL.



To mount the card on DIN rail, we recommend to place the top of the form on the edge of the bar omega, then pushing the bottom until it clicks. The module is equipped with a slider fastening that will be pushed forward in order to ensure the perfect fastening of the module on the bar.

It is possible to configure the module via RS485 through the register map contained on this manual.

