Universal AC/DC Current / Voltage converter and analyzer

S1XMmM
Part No. 2800100
S1XMmHM
Part No. 2800110

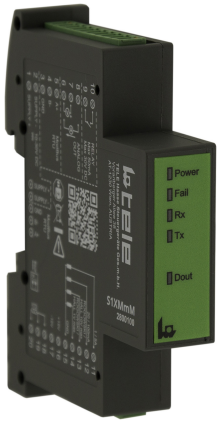
Current / Voltage sensors input:

- Rogowski probes
- Current / Voltage transformers
- Current / Voltage transducer
- Hall‘s effect sensor

Temperature input (PT100, NTC)

Output:

- RS485 Modbus RTU
- 1 NO output contact (alarm)
- Analog output (0 ... 10V / 0 ... 20mA)



Technical data

Function
Universal current / voltage converter and analyzer.

1. Mechanical Design
PBT plastic housing, IP rating IP20
DIN-rail mountable, ready to be mounted on T-BUS system
Mounting position: any
Dimensions: 17,5 x 70,8 x 55,26mm (without connectors)
17,5 x 93 x 68,3mm (with connectors)
Terminals: 2 removeable 10-pole connectors (3,5mm)
DIP-switch: 2 poles (Baudrate and Address) for connection with the configuration software

2. Indicators
Green LED Power: indication of supply voltage
Yellow LED Comm: indication of fault / error
Red LED‘s TX, RX: indication of communication via RS485
Green LED Dout: digital output active

2. Power supply
Supply voltage: 10...30V DC; terminals 1, 2 or via the T-BUS
Protected against reverse polarity and over-temperature
Consumption: < 2,5VA

3. Digital output
Kind of output: OptoMOS; terminals 9, 10
Max 50mA / 30V DC
The contact can be used as alarm contact (you can set the parameter associated with software).

4. Analog output
Voltage output: 0 ... 10V; terminals 6(-), 7(+)
Current output: 0 ... 20mA, terminals 8(I out), 6(I in)

5. RS485 Modbus RTU
Baudrate: 1200 ... 115200 Baud (Standard: 9600)
terminals 3 (GND), 4 (B-), 5(A+), or via T-BUS

6. Measuring circuit
Sampling rate: 6400Hz @ 50Hz
Current / Voltage sensors:
- Rogowski probes: output signal max 10V; terminals 13, 15 (GND)
output signal max 1V; terminals 14, 15 (GND)
- Current transformer: secondary 1A / 5A; terminals 11, 15 (GND)
- Current / Voltage transducer:
secondary +/-10V pk; terminals 13, 15 (GND)
secondary +/- 1 V pk; terminals 14, 15 (GND)
- Current transducer: secondary 20mA / 100mA AC/DC;
terminals 12, 15 (GND)
- Hall‘s effect sensor: power supply +/-15V DC; terminals 16(+), 17(-)
output signal max 10V; terminals 13, 15 (GND)
output signal max 1V; terminals 14, 15 (GND)

Temperature sensors:
- PT100 2 wires: terminals 18+19 bridged, 20
- PT100 3 wires: terminals 18, 19, 20
- NTC: 10kΩ/ 100kΩ or custom;
terminals 18+19 bridged, 20

7. Measurements:
Measurements for current and voltage
- RMS: Max, Min, average, Amperehours
- DC: Max, Min, average, Amperehours
- AC: Max, Min, average, Amperehours
- Crest factor
- Frequency
- Temperature (PT100 / NTC)
- Resistence of PT100 / NTC probe
- Peak*
- THD*
- Harmonics analysis up to 63th*
- Internal temperature measurement*

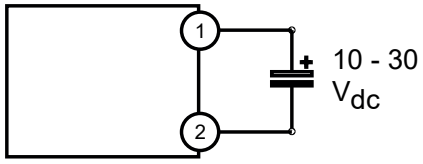
* Measurements available on version S1XMmHm only

8. Accuracy (@25°C / 50-60Hz)
1/5A channel:
Crest Factor: 4 (relative of 5A)
Range 50mA < I < 250mA: Maximum error 1%
Range 250mA < I 5 A: Maximum error 0,5%
Temperature coefficient: < 100 ppm/°C
Band Width: > 2kHz
Channel 20/100mA:
Crest Factor: 4 (@ 100mA)
Range 1mA < I < 5mA: Maximum error 1%
Range 5mA < I < 100mA: Maximum error 0,5%
Temperature coefficient: <100ppm/°C
Band Width: > 2kHz
Channel +/- 1Vpk:
Range 10mV< V < 50mV: Maximum error 1%
Range 50mV< V < 1V: Maximum error 0,5%
Temperature coefficient: <100ppm/°C
Band Width: > 2kHz
Channel +/- 10Vpk:
Range 100mV < V < 500mV: Maximum error 1%
Range 500mV < V < 10V: Maximum error 0,5%
Temperature coefficient: <100ppm/°C
Band Width: > 800Hz
Temperature channel:
PT100:
Range -200°C...600°C: Error +/- 1,2°C on the reading
Temperature coefficient: <100ppm/°C
NTC:
Range 200Ω... 20kΩ: Error +/- 1,2°C on the reading
Range 20kΩ... 300kΩ: Error +/- 1,6°C on the reading
Temperature coefficient: <100ppm/°C

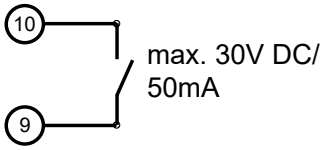
9. Ambient conditions
Ambient temperature: -10 to +60°C
Storage temperature: -40 to +85°C
Relative humidity: 10 to 90% (not condensing)
Altitude: up to 2000m above sea level

Connections

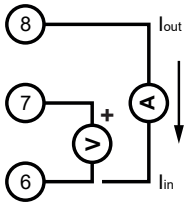
Power supply



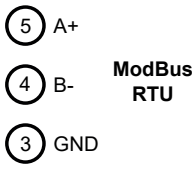
Digital output



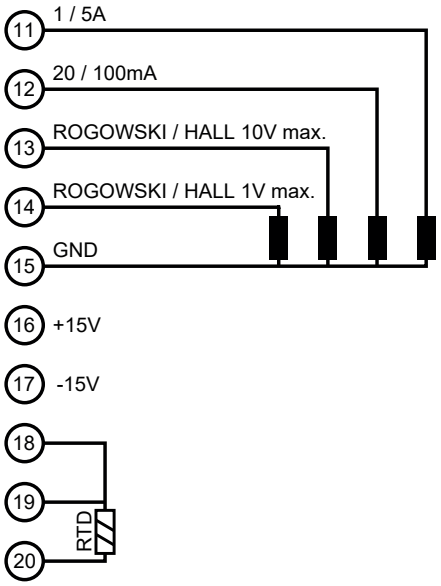
Analog output



Serial output RS485

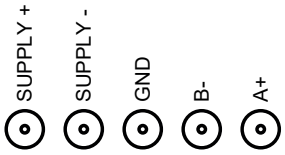


Current and transducer input



Sensor 1/5A: Between the terminals 11 and 15 (GND).
Sensor 20/100 mA: Between the terminals 12 and 15 (GND).
Sensor of ±10 V max: Between the terminals 13 and 15 (GND).
Sensor of ±1 V max: Between the terminals 14 and 15 (GND).
Sensor PT100 2 wires/ NTC: 18, 19 (connecting these two terminals to each other) and 20.
Sensor PT100 3 wires: Between the terminals 18, 19 and 20 (without make any kind of connection between terminals 18 and 19).
Power supply for Hall sensors:
The terminals 16 (positivo) and 17 give dual power supply to Hall sensor (external), at both +15 V and -15V (MAX 50 mA).

T-BUS connection



Configuration software

The free interface software is downloadable from our website www.tele-online.com/products/sensact
To communicate with the module you have to connect via USB port directly on your PC using the serial converter S-USB485; part No. 498513.
You can configure the module via RS485 using the register map downloadable at www.tele-online.com/products/sensact

LED description

Function	State	Note	
Power (green)	Steady on	Powered device	
Fail (yellow)	Blinking	Bootloader active: Can be executed through Modbus command, or because of program flash corruption.	
	Steady on	At least one of the following state is present:	
		Eeprom fail	Error on storing flash for settings, calibration or energies
		Input under or over range	Input under / over set input value
		RTD out of range	RTD outside temperature scale
		RTD 3 wire error	Third wire not connected (R > 20Ω)
Rx (red)	Blinking	The device is receiving data from RS485	
Tx (red)	Blinking	The device is sending data via RS485	
D_{out} (green)	Steady on	Digital output is closed	

Dip switch settings

DIP 1	DIP 2	
0	X	RS485 settings from Eeprom
1	0	Address 1, Baudrate 9600, no parity
1	1	Address 1, Baudrate 38400, no parity

CONFIGURATION REGISTER 40007

This 16 bit register sets the configuration of the device. Hereafter the details

Setting	Value	Detail
Ah saving	xxxx xxxx xxxx xxx0	Ah disabled
	xxxx xxxx xxxx xxx1	Ah enabled
Measurement Channel	xxxx xxxx xxxx x00x	Input 1A / 5A
	xxxx xxxx xxxx x01x	Input 20mA / 100mA
	xxxx xxxx xxxx x10x	Input 1V
	xxxx xxxx xxxx x11x	Input 10V
RTD measurement	xxxx xxxx xxxx 0xxx	2 wire RTD
	xxxx xxxx xxxx 1xxx	3 wire RTD
Output Type	xxxx xxxx xxx0 xxxx	Voltage 0-10V
	xxxx xxxx xxx1 xxxx	Current 0-20mA
Output measurement retransmitted	xxxx xxxx x00x xxxx	IRMS
	xxxx xxxx x01x xxxx	IAC
	xxxx xxxx x10x xxxx	IDC
	xxxx xxxx x11x xxxx	Temperature
FFT representation	xxxx xxxx 0xxx xxxx	Absolute
	xxxx xxxx 1xxx xxxx	Relative to the I1 value
THD calculation	xxxx xxx0 xxxx xxxx	Only AC components
	xxxx xxx1 xxxx xxxx	Including DC components
Temperature sensor	xxxx x00x xxxx xxxx	PT100
	xxxx x01x xxxx xxxx	NTC 10 kΩ
	xxxx x10x xxxx xxxx	NTC 100 kΩ
	xxxx x11x xxxx xxxx	NTC SteinhartHart
Measurement Format (Reg. 40148-40320)	xxx0 0xxx xxxx xxxx	Float (LSW First)
	xxx0 1xxx xxxx xxxx	Float (MSW First)
	xxx1 0xxx xxxx xxxx	Hundredth (Float * 100) (LSW First)
	xxx1 1xxx xxxx xxxx	Hundredth (Float * 100 SW) (MSW First)
Integrator condition	xx0x xxxx xxxx xxxx	Disabled
	xx1x xxxx xxxx xxxx	Enabled, for Rogowski input
Output switch initial condition	x0xx xxxx xxxx xxxx	Closed initial condition
	x1xx xxxx xxxx xxxx	Open initial condition
Measurement filtering	0xxx xxxx xxxx xxxx	Filter disabled
	1xxx xxxx xxxx xxxx	Filter enabled

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RELEASE 2018/03