ELECTREX the energy saving technology

Engineered and manufactured in Italy
Made in Italy
Pensato, progettato e prodotto in Italia

LOW ENERGY CONSUMPTION

Environmental Sensors

Multifunction Sensors

In addition to the energy vectors the Electrex monitoring and control solutions may include also environmental parameters. One way to integrate these parameters is by adding to the same monitoring system one or more sensors from the one provided by Electrex (and listed in this datasheet). The sensors may be connected in an Rs485 network (Deca Sensor RS485 or RS485 Node Box SI/CO_2); or via the wireless protocol E-Wi (based on the IEEE802.15.4 standard); or connected to the Ethernet / Wi-Fi via Electrex devices with built-in SI module (Net series and Libra panel with built-in SI module). Depending on the type of connection / sensor used it is possible to measure one or more parameters such as: ambient temperature, temperature on contact (e.g. PV panels, in-out boiler's water temperature), relative humidity, luminosity, pressure, differential pressure as well as count the impulses from energy, gas, water, etc. meters. The variety of sensors allow to set up applications for indoor/outdoor environmental parameters monitoring in the residential, commercial and industrial sectors. While in Energy Automation applications the sensors can be used for remote controlling, alarm and notification management and building automation.

Built-in and external sensors

Some of the devices are equipped with built-in, one or more, sensors (**Deca Sensor RS485, Deca Sensor E-Wi and RS485 Node Box 12Vdc CO₂**); while more frequently the sensors are external (**the Net series with built-in SI module**, **the Libra panel** and the **RS485 Node Box 12Vdc SI**). There are also devices that have both built-in and external sensors (the **TE Bus** versions of the **Deca Sensor RS485 and Deca Sensor E-Wi**).

Indoor and outdoor models

The multifunction sensors **Deca Sensor E-Wi and RS485** are suitable for indoor and outdoor (if appropriately protected).

'4DI TE Bus' models

The **Deca Sensor E-Wi 4DI TE BUS** multifunctional sensors versions are equipped with:
- 4 Digital Inputs (4DI) suitable for counting impulses coming from electrical energy, gas and water meters / counters
- 1 Input for an external temperature probe (TE) measuring for example the temperature on contact of a PV panel
- 1 BUS where can be connected up to 4 sensors. In the standard configuration: temperature, humidity, luminosity, atmospheric pressure, CO2 carbon dioxide (in this case can be connected only 1 sensor).
Other configurations on request (e.g. 4 sensors all for temperature).
Adding the option module RS485 5V and a power supplier of 5Vdc the **Deca Sensors E-Wi 4DI TE BUS** became **Deca Sensor RS485 4DI TE BUS**.

'2DI 2DO TE Bus' and '4DO TE Bus' versions

In addition to the versions with 4 digital input are available also versions with 2DI and 2DO or 4DO:
- 2 Digital Inputs (2DI) can be used for counting (see here below for RS485 versions), while the 2 (2DO) or the 4 (4DO) digital outputs can be used for alarm states rated at 27 Vdc 27 mA compliant with DIN 43864 (available also in the 7 Vdc 30 mA versions).


Example of sensors: Sensor Bus Black Box, Sensor Bus Plate T, Sensor Bus Black Box Connectors and Sensor Bus Black Deca.

RS485 '2DI 2DO TE Bus' & '4DI TE Bus' versions

Only for in the RS485 versions with 2 (2DI) or 4 (4DI) digital inputs, the inputs in addition to the counting task can be configured (hardware modification) as state indicators (e.g. ON/OFF status of machines, switches, etc.).

Monitoring network example including Deca Sensors
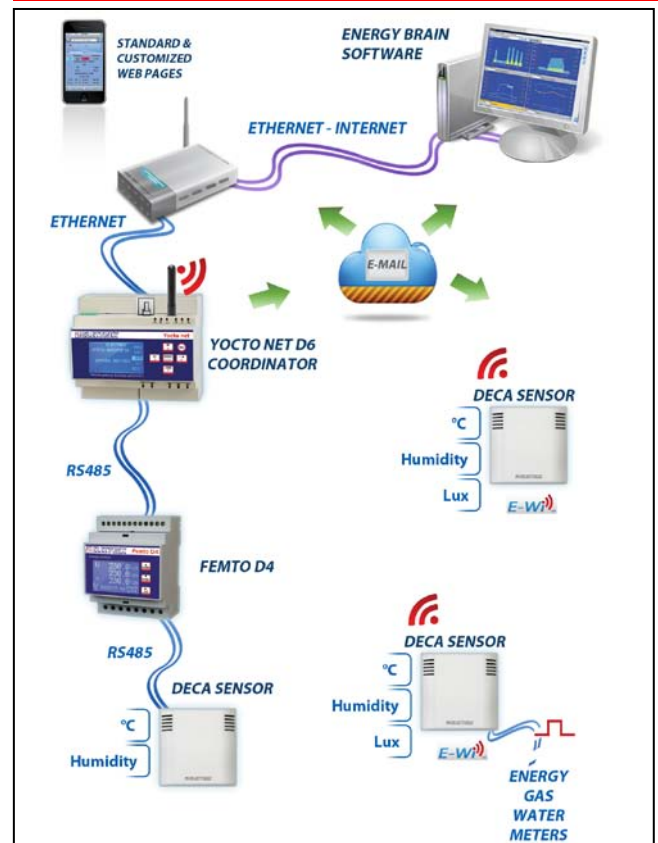
In the example above the Yocto net web coordinator D6 E-Wi is connected via RS485 to a Femto for the electrical measures and a Deca Sensor measuring temperature and humidity. While from the wireless Deca Sensor 1 E-Wi, it retrieves the data regarding temperature, humidity and luminosity of another environment. The Deca Sensor 2 E-Wi instead provides the same external data and the consumption of electrical energy, gas and water.

.

ELECTREX
the energy saving technology

Engineered and manufactured in Italy
Made in Italy
Pensato, progettato e prodotto in Italia

Environmental Sensors

Deca Sensor E-Wi and RS485* readings

Parameters	Type	Range
Temperature (T)	T inst	-20 … +80°C (wider ranger on request)
	T average	
	T min	
	T max	
Relative Humidity (H)	RH inst	0 … 100%
	RH average	
	RH min	
	RH max	
Luminosity (L) (programmable for internal or external use)	Lx inst	Indoor: 0 … 4.000 lux Outdoor: 0 … 65.000 lux
	Lx media	
	Lx min	
	Lx max	
External TE Temperature	T inst	-40 … +120°C
	T average	
	T min	
	T max	
	Or Analog Input	0 … 5Vcc
Atmospheric pressure (B)	B inst	800 … 1.100 mbar
	B average	
	B min	
	B max	
Counters (for 2 or 4 Digital Inputs) (RS485 version, with suitable hardware conf., also status indicator)	C	100 Hz
Alarm outputs (for 2 or 4 digital outputs)	Status ON-OFF	27Vdc – 27mA (DIN 43864) Available also in 7Vdc - 30mA version

* depending on the version.

Sensor Bus* readings

Parameters	Type	Range
Temperature (T)	T inst	-20 … +80°C (wider ranger on request)
	T average	
	T min	
	T max	
Relative Humidity (H)	RH inst	0 … 100%
	RH average	
	RH min	
	RH max	
Luminosity (L) (programmable for internal or external use)	Lx inst	Indoor: 0 … 4.000 lux Outdoor: 0 … 65.000 lux
	Lx media	
	Lx min	
	Lx max	
Atmospheric pressure (B)	B inst	800 … 1.100 mbar
	B average	
	B min	
	B max	
CO2 air concentration	CO_2 ist	0 … 2.000 ppm
	CO_2 average	
	CO_2 min	
	CO_2 max	
Node Box CO2 air concentration	CO_2 inst	400 … 2.000 ppm
	CO_2 average	
	CO_2 min	
	CO_2 max	
Differential Pressure (DP)	DP inst	-500 Pa …+500 Pa
	DP average	
	DP min	
	DP max	
Temperature (T)	T inst	-20 … +80°C
	T average	
	T min	
	T max	

Deca Sensor Alarms

The **Deca Sensor E-Wi and RS485** include a Modbus register regarding the state of the 4 programmable alarms. Each alarm is independent and bindable to one of the available parameters (e.g. instantaneous or average temp., instantaneous or average relative humidity, luminosity, external optional temp., etc.). The alarms can refer to the same parameter in order to have more thresholds. Each alarm can be set on the max or min value. It is also possible to set the hysteresis (in % on the threshold) and the delay of activation on each alarm (from 1 sec. to 8 hours). The battery alarm instead is automatic and it is activated when the remaining power is less than 30%.

Deca Sensor E-Wi and RS485 calibration

In the **Deca Sensor E-Wi and RS485**, it is also possible to define the offset, that is a value which can be added or subtracted from the measurement made, and the gain, that is a multiplicative constant. This will permit to apply compensations in order to, for example, correct the positioning of the sensor if installed in a different position from the original one.

Deca Sensor E-Wi and RS485 measurement setup

For each sensor it is possible to define if the measure should be disabled, if it should be instantaneous, an average or the median.

Deca Sensor E-Wi advanced settings

The **Deca Sensor E-Wi Battery**, in order to make the battery last longer, uses a communication method which alternates periods of "sleep" and periods "wake up" lasting the needed time to make the measures and transmit the data. The time between the two "wake up" periods is called 'rendez-vous' interval.

The 'rendez-vous' interval can be set between 30 seconds and 24 hours, e.g. 15 minutes and it is also possible to configure the samples number (how many times the Deca Sensor should wake up and measure without transmitting, between two rendez-vous). It is also possible to choose the communication channel among 16 available channels.

In E-Wi version, with external power supply, it is possible to choose between the "low power" mode and the "always ON" mode.

Deca Sensor with RS485 option while in the image beside the switching power supply 230Vac – 5Vdc.

Deca Sensor features

- E-Wi or RS485 versions. All the Deca Sensor E-Wi can be equipped with an RS485 port adding the Deca Sensor Option Module RS485 5V Cod. PFATV01-00, the power supply 5Vdc Cod. PFTP000-R2 and updating the firmware.

- 2 or 4DI (2 or 4 digital inputs): for pulse counting (or detection of ON – OFF status if version RS485).

- 2 or 4DO (2 or 4 digital outputs): for ON – OFF alarms. Rated at 27 Vdc 27 mA compliant with DIN 43864 (available also versions rated at 7 Vdc 30 mA).

- External TE for external sensors. Max. length of the cable: 5 mt.

- Bus for up to 4 sensors among: up to 4 x temperature, 1 x humidity, 1 x luminosity, 1 x atmospheric pressure. Different sensor combinations on request (e.g. 4 temperature sensors). Can be wired as in-out mode (as the one used for the RS485) or in a radial mode. Max. length for the Bus is 20 mt.

- E-Wi protocol based on the standard IEEE 802.15.4. Speed 250kbps and frequency 2.4GHz.

- Transceiver 'HI' transmitting up to 13,7dBm (further, up to 20 dBm only where permitted) [-102dBm in reception]. Range: Up to 800m in an open space.

- Auto-reset in case of temporary barrier that will prevent the communication.

- Alarms on 4 parameters and automatic alarm when battery is below 30%.

- Configuration and data retrieve through Energy Brain software. Needs an Modbus RS485 address.

- High accuracy and stability over time

- Accuracy: ±0,5 °C between +10 …+50°C
  ±1,5 °C on extremes
  ±2% relative humidity
  ± 0,1 lux

- Power supply: 5Vdc
  battery 3,6V *(for E-Wi Battery)*

- Terminals: Spring clamp max. 1,5 mm^2

- Easy to install

- Wall mounting

- Black or White polycarbonate external case

- Size (l x w x h): 80 x 80 x 25 mm

RS485 Node Box 12Vdc SI features

Integrates the SI module with the RS485 interface. Equipped with an RJ45 female port for connection of various sensors via UTP cable. For e.g., up to 8 parameters if connected 1 x Sensor Bus Box TH, 2 x Sensor Bus Box TH 0,2 and 2 x Sensor Bus Box T. For a total of 5 temperature and 3 relative humidity variables.

RS485 Node Box 12Vdc CO_2 features

Integrates the CO_2 sensor with the RS485 interface communicating at 9600 baud.

Other Sensors

- *Sensor External TE* temperature sensors (T) in various ext. cases. Only for Deca Sensor TE Bus, Libra and Net series with built-in 4NTC module.

- Temperature sensors (T) with a typical accuracy of ±0,5°C and various ext. cases. Addressable from 1 to 4. For the Deca Sensor TE Bus, Net series with built-in SI module, Libra and RS485 Node Box 12Vdc SI.

- Temperature sensors (T) with a typical accuracy of ±0,2°C and various ext. cases. Addressable from 1 to 4. For the Net series with built-in SI module, Libra and RS485 Node Box 12Vdc SI.

- Temperature and Relative Humidity sensors (TH) with a typical accuracy of ±0,2°C and ±1,8% and various ext. cases. Non addressable. For the Deca Sensor TE Bus, Net series with built-in SI module, Libra and RS485 Node Box 12Vdc SI.

- Temperature and Relative Humidity sensors (TH) with a typical accuracy of ±0,2°C and ±1,5% and various ext. cases. Addressable from 1 to 2. For the Net series with built-in SI module, Libra and RS485 Node Box 12Vdc SI.

- Luminosity sensors (L), for indoor (0-4.000Lux) or outdoor (0-65.000Lux) use. Non addressable. For the Deca Sensor TE Bus, Net series with built-in SI module, Libra and RS485 Node Box 12Vdc SI.

- Pressure sensors (B) from 800 to 1.100 mbar. Non addressable. For the Deca Sensor TE Bus, Net series with built-in SI module, Libra and RS485 Node Box 12Vdc SI.

- Ambiental CO_2 sensors from 0 to 2.000 ppm. Accuracy: ±50ppm. Non addressable. Requires a +5Vdc power supply. For the Deca Sensor TE Bus, Net series with built-in SI module, Libra and RS485 Node Box 12Vdc SI. Must be the only sensor connected (no other sensors the host device).

- Differential pressure sensors (DP) from -500Pa to +500Pa and Temperature from -20°C to +80°C; typical accuracy of ±1°C. Non addressable. For the Net series with built-in SI module, Libra and RS485 Node Box 12Vdc SI.

- Temperature and Luminosity sensors (TL). Non addressable. For the Deca Sensor TE Bus, Net series with built-in SI module, Libra and RS485 Node Box 12Vdc SI.

- Temperature, Relative Humidity and Luminosity sensors (THL). Non addressable. For the Deca Sensor TE Bus, Net series with built-in SI module, Libra and RS485 Node Box 12Vdc SI.

- Temperature, Relative Humidity, Luminosity and Pressure sensors (THLB). Non addressable. For the Deca Sensor TE Bus, Net series with built-in SI module, Libra and RS485 Node Box 12Vdc SI.

ELECTREX the energy saving technology

Engineered and manufactured in Italy
Made in Italy
Pensato, progettato e prodotto in Italia

Environmental Sensors

How to order

Type	Code

Temperature sensors (for the Deca Sensor TE Bus, Net series with built-in SI module, Libra and RS485 Node Box 12Vdc SI):

SENSOR BUS BLACK BOX T...PFATVTQ-B0
SENSOR BUS WHITE BOX T PFATVTQ-W0
SENSOR BUS BLACK DECA T PFADVTQ-B0
SENSOR BUS WHITE DECA T.......................................PFADVTQ-W0
SENSOR BUS CYLINDER T PFAT0TQ-00
SENSOR BUS PLATE T..PFAT1TQ-00

Temperature sensors (for the Deca Sensor TE Bus, Net series with built-in SI module, Libra and RS485 Node Box 12Vdc SI):

SENSOR BUS RJ BLACK BOX T 0,2...........................PFARVTQ-B01
SENSOR BUS RJ WHITE BOX T 0,2...........................PFARVTQ-W01
SENSOR BUS BLACK DECA T 0,2...............................PFADVTQ-B01
SENSOR BUS WHITE DECA T 0,2..............................PFADVTQ-W01

Temp. and Rel. Humidity sensors (for the Deca Sensor TE Bus, Net series with built-in SI module, Libra and RS485 Node Box 12Vdc SI):

SENSOR BUS BLACK BOX TH PFATVHQ-B0
SENSOR BUS WHITE BOX TH PFATVHQ-W0
SENSOR BUS BLACK DECA TH..................................... PFADVHQ-B0
SENSOR BUS WHITE DECA TH PFADVHQ-W0

Temp. and Rel. Humidity sensors (for the Deca Sensor TE Bus, Net series with built-in SI module, Libra and RS485 Node Box 12Vdc SI):

SENSOR BUS RJ BLACK BOX TH 0,2 .... PFARVHQ-B01
SENSOR BUS RJ WHITE BOX TH 0,2 .... PFARVHQ-W01
SENSOR BUS BLACK DECA TH 0,2 .... PFADVHQ-B01
SENSOR BUS WHITE DECA TH 0,2 .... PFADVHQ-W01

Luminosity sensors (for the Deca Sensor TE Bus, Net series with built-in SI module, Libra and RS485 Node Box 12Vdc SI):

SENSOR BUS BLACK BOX L.. PFATVMQ-B0
SENSOR BUS WHITE BOX L PFATVMQ-W0
SENSOR BUS CYLINDER L PFAT0MQ-00

Pressure sensors (for the Deca Sensor TE Bus, Net series with built-in SI module, Libra and RS485 Node Box 12Vdc SI):

SENSOR BUS BLACK BOX B...PFATVNQ-B0
SENSOR BUS WHITE BOX B...PFATVNQ-W0
SENSOR BUS RJ BLACK BOX B PFARVNQ-B0
SENSOR BUS RJ WHITE BOX B.................................. PFARVNQ-W0

CO$_2$ sensors (for the Deca Sensor TE Bus, Net series with built-in SI module, Libra and RS485 Node Box 12Vdc SI):

SENSOR BUS BLACK BOX CO2.....................................PFATVCQ-B0

NOTA: occorre alimentare il Sensor CO2 con alimentatore da 5Vdc.

Differential Pressure sensors (for the Net series with built-in SI module, Libra and RS485 Node Box 12Vdc SI):

SENSOR BUS RJ BLACK BOX DP...............................PFARVDP-B01
SENSOR BUS RJ WHITE BOX DP PFARVDP-W01

Temperature and Luminosity sensors (for Deca Sensor TE Bus, Net series with built-in SI module, Libra and RS485 Node Box 12Vdc SI):
SENSOR BUS BLACK BOX T L......................................PFATVOQ-B0

Temperature, Relative Humidity and Luminosity sensors (for the Deca Sensor TE Bus, Net series with built-in SI module, Libra and RS485 Node Box 12Vdc SI):
SENSOR BUS BLACK BOX T H L PFATVLQ-B0

Temperature, Relative Humidity, Luminosity and Pressure sensors (for the Deca Sensor TE Bus, Net series with built-in SI module, Libra and RS485 Node Box 12Vdc SI):
SENSOR BUS BLACK BOX T H L B PFATVRQ-B0
SENSOR BUS WHITE BOX T H L B PFATVRQ-W0
SENSOR BUS RJ BLACK BOX T H L B........................ PFARVRQ-B0

How to order

Type	Code

SENSOR BUS WHITE BOX T H L B CONNECTORS....PFARVRQ-W0

Temperature sensors (for the Deca Sensor TE Bus and Net series with built-in 4NTC module):
SENSOR EXTERNAL PLATE TE PFAT0TS-01
SENSOR EXTERNAL EYELET TE PFAT0TS-02
SENSOR EXTERNAL NAKED TE PFAT0TS-03
NOTE: to each Deca Sensor 4DI TE BUS can be connected a single Sensor External TE while for the Net series with built-in 4NTC module can be connected up to 4 Sensor External TE.

Temperature sensors (for the Net series with built-in 4NTC module):
SENSOR EXTERNAL PLA CUSTOM 01 ....PFAT0TC-01
NOTE: other customized versions of Sensor External on request.

RS485 Node versions:
RS485 NODE BLACK BOX 12VDC CO2 ……................PFAT0CO-B0
RS485 NODE BLACK BOX 12VDC SI ……...................PFAT001-T4

Deca Sensor RS485 and wireless E-W versions:
DECA SENSOR RS485 T 5V …….................................... PFATUT1-0C
DECA SENSOR RS485 T H 5V ……..............................PFATUH1-0C
DECA SENSOR RS485 T H L 5V …….............................. PFATUL1-0C
DECA SENSOR RS485 T 4DI TE BUS 5V.. ....PFATUT1-NC
DECA SENSOR RS485 T H 4DI TE BUS 5V.. ....PFATUH1-NC
DECA SENSOR RS485 T H L 4DI TE BUS 5V.. ....PFATUL1-NC
DECA SENSOR RS485 T H L 2DI 2DO TE BUS 5V.. .....PFATUL1-QC
DECA SENSOR RS485 T H L 4DO TE BUS 5V.. ....PFATUL1-PC

DECA SENSOR E-Wi HI T BATTERY………... ….....…..PFATUTH-0B
DECA SENSOR E-Wi HI T H BATTERY ……...............PFATUHH-0B
DECA SENSOR E-Wi HI T H L BATTERY …. PFATULH-0B
DECA SENSOR E-Wi HI T 4DI TE BUS BATTERY 5V.. PFATUTH-NB
DECA SENS. E-Wi HI T H 4DI TE BUS BATTERY 5V... PFATUHH-NB
DECA SENS. E-Wi HI T H L 4DI TE BUS BATTERY 5V. PFATULH-NB
DECA SENS. E-Wi HI T H L 2DI 2DO TE BUS BAT.5V. PFATULH-QB
DECA SENS. E-Wi HI T H L 2DI 2DO TE BUS BAT.5V. .PFATULH-PB

NOTE: other customized versions on request.
All the Deca Sensor E-Wi may be equipped with an RS485 port adding the option Cod. PFATV01-00 Deca Sensor Option Module RS485 5V.

Deca Sensor RS485 and wireless E-Wi accessories:
DECA SENSOR LED PULSE COUNTER PFAT0IS-01
SENSOR LED PULSE C. MOUNTING BRACKET.............PFAT000-01
DECA SENSOR OPTION MODULE RS485 5V PFATV01-00
DECA SENSOR LITHIUM BATTERY PFAT000-0B
SWITCHING POWER SUPPLY 5VDC 600mA.................PFTP000-R2
DECA SENSOR EXTERNAL ENCLOSURE PFAT0T0-01

ELECTREX the energy saving technology

Electrex is a brand of Akse srl
Via Aldo Moro, 39 - 42124 Reggio Emilia (RE) - Italy
Tel : +39 0522 924244 - Fax : +39 0522 924245
www.electrex.it - email: info@electrex.it

Subject to modification without prior notice. Data Sheet Environmental Sensors 2017 11 06-ENG

Distributor