Cod. MW6046

Signal Transducer Box

User Manual

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1 Introduction

Signal Transducer Box (code DEA420, herein called *STB*) is an electronic device produced by LSI LASTEM that allows the easy and fast connection of environmental sensors obtaining electrical standard signals with scale 0/4 ÷ 20 mA. The device can be interfaced to different types of sensors; depending of the STB model these inputs are available:

Model	***Voltage inputs 0…30 mV (pyranometer or solarimeter)***	***Voltage inputs for O2 cell***	***Voltage inputs 0…1000 mV***	***Pt100 temperature inputs (ambient or contact)***	***Thermocouple T temperature inputs (contact)***	***Frequency inputs (anemometer)***	***Internal temperature (*) (thermocouple compensation)***
DEA420.1	1	0	0	2	0	1	0
DEA420.2	1	0	0	1	1	1	1
DEA420.3	0	1	0	2	0	1	0
DEA420.4	1	0	2	0	0	1	0

(*) Not input: this measure is internally sampled.

The *sampling rate* (reading cycle of the input signals) has been set at 1 second. The instrument uses the *instantaneous* data, sampled within a programmable period (*processing rate*) and fixed in advance in order to supply a set of statistical processing; both instantaneous data and statistical processing can be transferred to the output signals.

STB is housed inside a small, proof container that can be easily installed.

1.1 Notes about this manual

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2 Product installation

2.1 General safety rules

Please read the following general safety rules in order to avoid injuries to people and prevent damages to the product or to possible other products connected with it. In order to avoid any damages, use this product exclusively according to the instructions herein contained.

The installation and maintenance procedures must be carried-out only by authorized and skilled service personnel.

Install the instrument in a clean, dry and safe place. Humidity, dust and extreme temperatures can deteriorate or damage the instrument. In such environments we recommend the installation inside suitable containers.

Power the instrument in a suitable manner. Pay attention and observe the power supplies like indicated for the model in your possession.

Carry-out all connections in a suitable manner. Pay strict attention to the connection diagrams supplied with the instrument.

Do not use the product in case of suspected malfunctions. In case of suspected malfunction, do not power the instrument and contact authorized technical support immediately.

Do not set working the product in presence of water or condensing humidity.

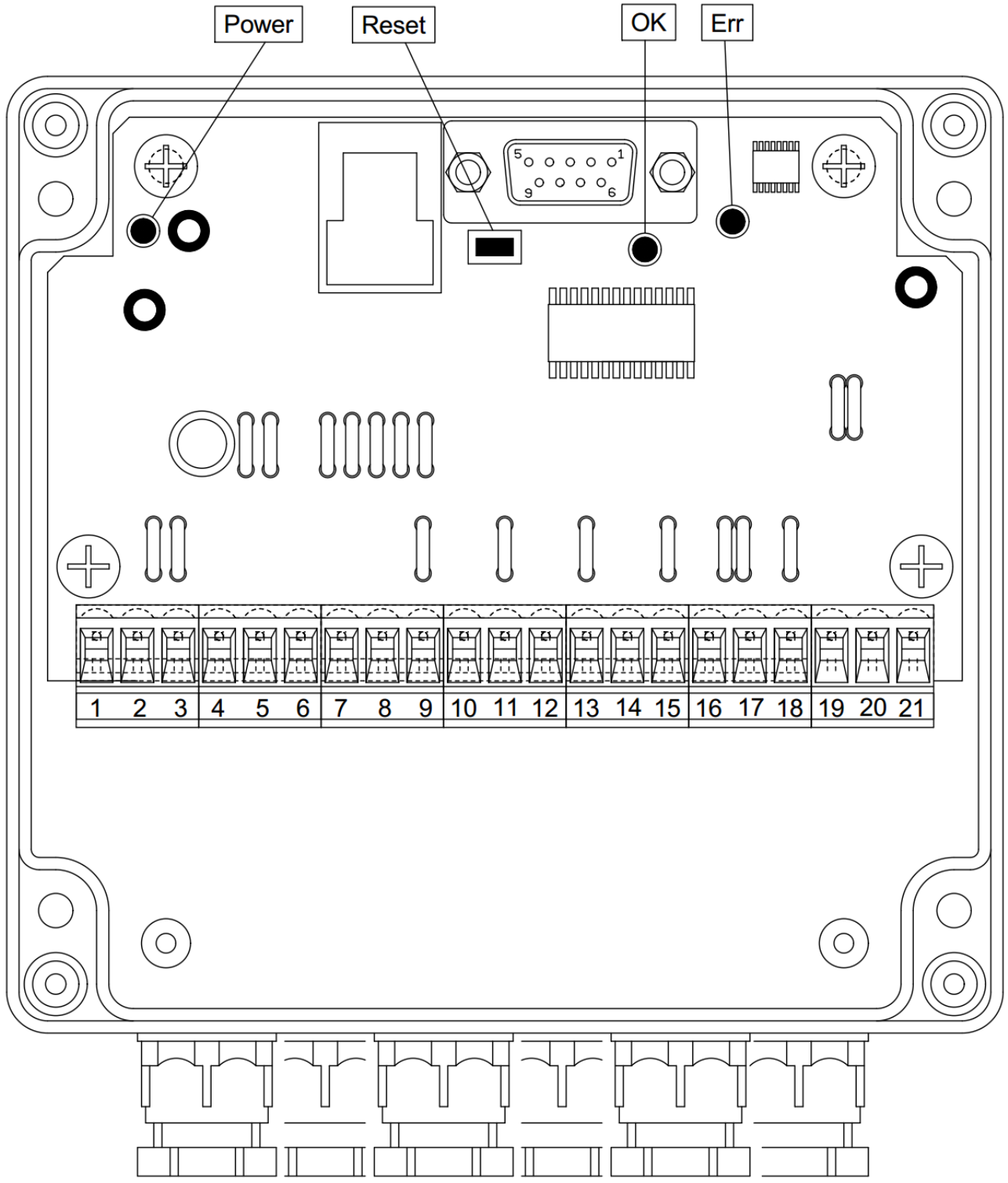
Do not set working the product in an explosive atmosphere.

Before you carry-out any operation on electrical connections, power supply system, sensors and communication apparatus:

- Disconnect the power supply
- Discharge the accumulated electrostatic discharges touching an earthed conductor or apparatus

2.2 Internal components layout

Picture 1 shows the components layout inside the box.



Picture 1

2.3 Mechanical fastening

The installation of the apparatus can be carried-out on the wall by means of 4 plugs, *Fischer* type, and 6 mm screws, using the holes placed on the back panel.

STB is a precision measurement apparatus, but it is subject to thermal creep (even though minimum); for this reason we recommend to place the apparatus in a shady area and safe from atmospheric agents (even if it is not expressly necessary).

2.4 Electrical connection

Power the instrument according to the technical specifications. Particularly you will get the correct operation using the suitable earthing of the power lines and communication lines.

Under the cover of the box you can find the diagram that shows the electrical wiring of the power in line, sensors and output signals; it is summed up through the following table:

Model: DEA420.1		
Clamp	***Name***	***Meaning***
1	Power In +	STB Power, positive
2	Power In -	STB Power, negative
3	Gnd	Earthing
4	Out Sig. 1 +	Analog output 1, positive
5	Out Sig. 2 +	Analog output 2, positive
6	Out Sig. Common -	Analog outputs, common negative
7	Out Sig. 3 +	Analog output 3, positive
8	Out Sig. 4 +	Analog output 4, positive
9	Out Sig. Common -	Analog outputs, common negative
10	Temp. 1 - 1	Temperature sensor input Pt100 1, wire 1
11	Temp. 1 - 2	Temperature sensor input Pt100 1, wire 2
12	Temp. 1 - 3	Temperature sensor input Pt100 1, wire 3 common to wire 2 (*)
13	Temp. 2 - 1	Temperature sensor input Pt100 2, wire 1
14	Temp. 2 - 2	Temperature sensor input Pt100 2, wire 2
15	Temp. 2 - 3	Temperature sensor input Pt100 2, wire 3 common to wire 2 (*)
16	Dig. +Out	Digital input, anemometer photodiode power feed
17	Dig. +In	Digital input, anemometer phototransistor power/A contact
18	Dig. Common	Digital input, common/B contact
19	Gnd	Earthing
20	Rad. / Voltage In +	Radiometer input / voltage 0…30 mV, positive
21	Rad. / Voltage In -	Radiometer input / voltage 0…30 mV, negative

Model: DEA420.2		
Clamp	***Name***	***Meaning***
1	Power In +	STB Power, positive
2	Power In -	STB Power, negative
3	Gnd	Earthing
4	Out Sig. 1 +	Analog output 1, positive
5	Out Sig. 2 +	Analog output 2, positive
6	Out Sig. Common -	Analog outputs, common negative
7	Out Sig. 3 +	Analog output 3, positive
8	Out Sig. 4 +	Analog output 4, positive
9	Out Sig. Common -	Analog outputs, common negative
10	Temp. Tc T +	Temperature sensor input thermocouple T, positive
11	N.C.	Not connected
12	Temp. Tc T -	Temperature sensor input thermocouple T, negative
13	Temp. Pt100 - 1	Temperature sensor input Pt100, wire 1
14	Temp. Pt100 - 2	Temperature sensor input Pt100, wire 2
15	Temp. Pt100 - 3	Temperature sensor input Pt100, wire 3 common to wire 2 (*)
16	Dig. +Out	Digital input, anemometer photodiode power feed
17	Dig. +In	Digital input, anemometer phototransistor power/A contact
18	Dig. Common	Digital input, common/B contact
19	Gnd	Earthing
20	Rad. / Voltage In +	Radiometer input / voltage 0…30 mV, positive
21	Rad. / Voltage In -	Radiometer input / voltage 0…30 mV, negative

Model: DEA420.3		
Clamp	***Name***	***Meaning***
1	Power In +	STB Power, positive
2	Power In -	STB Power, negative
3	Gnd	Earthing
4	Out Sig. 1 +	Analog output 1, positive
5	Out Sig. 2 +	Analog output 2, positive
6	Out Sig. Common -	Analog outputs, common negative
7	Out Sig. 3 +	Analog output 3, positive
8	Out Sig. 4 +	Analog output 4, positive
9	Out Sig. Common -	Analog outputs, common negative
10	Temp. 1 - 1	Temperature sensor input Pt100 1, wire 1
11	Temp. 1 - 2	Temperature sensor input Pt100 1, wire 2
12	Temp. 1 - 3	Temperature sensor input Pt100 1, wire 3 common to wire 2 (*)
13	Temp. 2 - 1	Temperature sensor input Pt100 2, wire 1
14	Temp. 2 - 2	Temperature sensor input Pt100 2, wire 2
15	Temp. 2 - 3	Temperature sensor input Pt100 2, wire 3 common to wire 2 (*)
16	Dig. +Out	Digital input, anemometer photodiode power feed
17	Dig. +In	Digital input, anemometer phototransistor power/A contact
18	Dig. Common	Digital input, common/B contact
19	Gnd	Earthing
20	O_2 / Voltage In +	O_2 cell input / voltage -1.5…3.5 mV, positive
21	O_2 / Voltage In -	O_2 cell input / voltage -1.5…3.5 mV, negative

Model: DEA420.4		
Clamp	***Name***	***Meaning***
1	Power In +	STB Power, positive
2	Power In -	STB Power, negative
3	Gnd	Earthing
4	Out Sig. 1 +	Analog output 1, positive
5	Out Sig. 2 +	Analog output 2, positive
6	Out Sig. Common -	Analog outputs, common negative
7	Out Sig. 3 +	Analog output 3, positive
8	Out Sig. 4 +	Analog output 4, positive
9	Out Sig. Common -	Analog outputs, common negative
10	Voltage 1 In +	Voltage input 0…1000 mV, positive
11	N.C.	Not connected
12	Voltage 1 In -	Voltage input 0…1000 mV, negative
13	Voltage 2 In +	Voltage input 0…1000 mV, positive
14	N.C.	Not connected
15	Voltage 2 In -	Voltage input 0…1000 mV, negative
16	Dig. +Out	Digital input, anemometer photodiode power feed
17	Dig. +In	Digital input, anemometer phototransistor power/A contact
18	Dig. Common	Digital input, common/B contact
19	Gnd	Earthing
20	Rad. / Voltage 3 In +	Radiometer input / voltage 0…30 mV, positive
21	Rad. / Voltage 3 In -	Radiometer input / voltage 0…30 mV, negative

(*) Wire 3 is used for line compensation; it is connected to the Pt100 sensor in the same point where wire 2 is connected too. Avoid to connect a shortcut bridge between wire 2 and 3 on the STB terminal board: in this way the line resistance compensation does not work properly and consequently the temperature reading is altered by the line resistance. It is also not correct, in case of use of a 4-wire Pt100 sensor, short-circuit the wires 3 and 4; in this case leave disconnected the wire 4. Please use as a reference the connection diagram under the STB box cover.

At first perform the connection of the sensors and signal outputs running the cables inside the holes of cable-guides; the unused cable-guides must be closed, using, for example, one piece of cable. Tighten the cable-guides appropriately in order to avoid the seepage of dust, humidity or animals inside the container.

At the end connect the power supply cables. The lighting of the green led on the STB card confirms the presence of electrical current (see §5.2).

In principle we recommend to divide the power supply lines from the measurement lines used for the connection of the sensors with STB, in order to reduce the possible electromagnetic disturbances to a minimum; so avoid the use of the same raceways for these different types of wiring.

2.4.1 Serial line

The connection to the serial communication line is carried-out through female 9 pin connector available inside the instrument. Connect STB to PC using a standard DTE/DCE cable (not inverting). STB uses Rx/Tx signals only, so the 9 pin D-Sub connector cabling can be reduced to only use poles 2, 3 and 5.

The serial line usage is limited only to the configuration and diagnostic operations, so the connection can be done only temporarily, so it is not required to use the cable holes for that.

3 System programming and management

STB is equipped with several functions that can be programmed easily through a terminal emulation program (for example *Windows HyperTerminal* or any other commercial or free program that can be downloaded from Internet).

The programming of the apparatus takes place by connecting the PC serial line (through USB/RS232 adapter or native) to the serial line of STB. The terminal program has to be programmed as follow:

- Bit rate: default 9600 bps;
- Terminal Mode: ANSI;
- Echo: disabled.

STB supplies the access to its functions through an easy menu interface. You can access to the main menu pressing ESC until the terminal program will show the following instructions:

```
Main Menu:
 1: About this device...
 2: Communication parameters
 3: Sampling
 4: Data Tx
 5: Output signals
 6: Save configuration
 7: Restart system
 8: Statistics
```

The main menu is made up of several items. You can access to the different functions pressing, on terminal, the numeric keypad corresponding to the desired item. The next function may be a new menu or the request to change the selected parameter; in this case it is shown the current value of parameter and the system waits for the input of a new value; press *Enter* to confirm the new inputted value, or press *Esc* to return to previous menu without changing the selected parameter; the *Esc* key also performs the move to previous menu.

Note: when you need to express decimal values use the dot as decimal separator for numbers input.

3.1 Functions available from menu

The programming menu of STB offers following functions:

- *About this device…*: to display the registry data of the instrument: mark, serial number and version of the program.
- *Communication parameters*: it allows to program some parameters useful for communication between STB and the external apparatus (PC, PLC, etc.), particularly:
    - *Bit rate* and *Stop bits*: it allows to modify the serial communication speed and stop bit number, as required by the external host.
    - *Network address*: the network address of the instrument. It is especially necessary for CISS protocol, in order to find (in univocal way) the instrument respect to the others connected on the same communication line.

- *Sampling*: it includes the parameters that adjust the sampling and the processing of detected signals from the inputs, particularly:
    - *Radiometer sensitivity*: (only for DEA420.1/2 models); corresponds to the sensitivity of the sensor, expressed in µV/W/m^2 or mV/W/m^2; this value is shown in the calibration certificate of the sensor.
    - *O2 cell sensitivity*: (only for DEA420.3 model); corresponds to the sensitivity of the O_2 cell, expressed in mV/%; this value must be calibrated for the specific used sensor (see §3.2).
    - *O2 cell auto calibrate*: (only for DEA420.3 model); enter in the calibration procedure for the O_2 cell (see §3.2).
    - *Anemometer parameters*: it allows to program the linearization factors relative to the anemometer connected to frequency input. STB supplies the right parameters for the management of LSI LASTEM mod. DNA202 and DNA30x anemometer families; possible other anemometers can be linearized introducing up to 3 factors of the polynomial function that represents the response curve of the sensor. For example, if there is an anemometer with linear response of 10 Hz/m/s frequency, the polynomial will have to be programmed with following values: *X0*: 0.0; *X1*: 0.2; *X3*: 0.0. If instead we have available a table that supplies the values of non-linear response curve, it is recommended the use of a spreadsheet and the calculation of tendency line of Y-X scatter diagram that represents the data of the table; displaying the polynomial equation (up to third degree) of tendency line, we can obtain the X_n values to be inputted in STB. Otherwise, in order to obtain the direct value of the frequency, set: *X0*: 0.0; *X1*: 1.0; *X3*: 0.0.
    - *Elaboration rate*: it is the processing time used for the supplying of statistical data (mean, minimum, maximum, totalization values); statistical values can be used to update the signal outputs according to the time expressed by this parameter.
- *Data Tx*: this menu allows the execution of a fast diagnostic check of the sampled data and processed by STB; directly from the terminal emulation program, it is possible evaluate the right signals acquired by the instrument:
    - *Tx rate*: it shows the transmission rate of data to terminal.
    - *Start Tx*: it starts the transmission according to the specified rate; they are proposed the measures sampled by means of STB (the display sequence is from measure 1 to measure 5), updating the display automatically; press *Esc* to stop the transmission of data to terminal. The measurement display order follows the instrument model type:
        - *DEA420.1*: Temperature 1, Temperature 2, Anemometer, Pyranometer.
        - *DEA420.2*: Internal temperature, Tc T Temperature, Pt100 Temperature, Anemometer, Pyranometer.
        - *DEA420.3*: Temperature 1, Temperature 2, Anemometer, O_2 cell.
        - *DEA420.4*: Voltage 1, Voltage 2, Anemometer, Pyranometer/ Voltage 3.
- *Output signals*: this menu allows the programming of the parameters that produce the signal outputs update; the sub-menu offers the followings commands:
    - *Output channel x*: choose one output from the available channels (x = 1 ÷ 4), from which its parameters can be accessed:
        - *Config*: it allows to set the parameters:
            - *Measure*: selected measure to be coupled to the electric output previously choosen; choose one from the measures list available from the inputs of STB.

- *Value scale start*: it is the start scale value of the probe sampled from the instrument input, which corresponds the start scale of the signal present on the STB output; i.e. if 4 ÷ 20 mA output signal is to be equivalent to a sampled temperature using a scale from 10 to 30 °C, this parameter must be set to *10*.
- *Value scale end*: it is the end scale value of the probe sampled from the instrument input, which corresponds the end scale of the signal present on the STB output.
- *Live zero*: set *true* to request STB to use an output signal current starting from 4 mA in correspondence of the start scale of the measured probe; if set to *false* the output signal starts from 0 mA.
- *Elab. item*: it is the statistical elaboration item used to calculate the value of the output signal; factory default set this value to the instantaneous measure value (updated every second); anyway it is possible to modify this parameter to obtain a different electric signal, i.e. to the average of a measure; in this way the output signal update time is equivalent to the parameter *Sampling – Elaboration rate*. It is also allowed to use more than one signal outputs coupled with the same measure but with its different statistical values (i.e. the minimum value of *Temperature 1* to the output 1 and its maximum value to the output 2).

▪ *Test:* it allows to perform tests on the output channel by manually setting the following values:

- *Specific % value:* it sets the output to the specified value.
- *Start scale:* it sets the output to zero scale value (0%).
- *Middle scale:* it sets the output to half scale value (50%).
- *End scale:* it sets the output to full scale value (100%).

o *Show outputs configuration*: this useful function takes a fast look to the entire signal outputs configuration, printing a table of all parameters of interest.

- *Save configuration*: after request to confirm the operation, it runs the final storage of all changes to parameters previous modified; please note that STB changes its operation immediately from the first variation of each parameter (excepted the serial bit rates, that need the instrument re-start necessarily), in order to allow the immediate evaluation of the executed modification; re-starting the instrument without the execution of final storage of the parameters, it is produced the operation of STB corresponding to the situation preceding the modification of parameters.
- *Restart system*: after request to confirm the operation, it runs the restart of the system; warning: this operation cancels the variation of any parameters that have been modified but not definitively stored.
- *Statistics*: this menu allows the display of some statistic data relative to the operation of the instrument, particularly:
  - *Show*: it shows the time from last start or re-start of the instrument, the time from last reset of statistical data, the statistical counts relevant to the communications executed on two serial communication lines (number of received and transferred byte, number of total received messages, wrong messages and transferred messages). For further information about these data read §5.1.
  - *Reset*: it resets the statistical counts.

3.2 O_2 measurement calibration

The O_2 cell requires a regular calibration because is prone to drift. For this reason it is suggested to perform it every 6 months. The model DEA420.3 provides a specific function that simplifies the calibration. The calibration is performed using the following procedure:

1) Place the sensor outdoors and wait few minutes for let it acclimatize. The O_2 reference value in open air is 20.95 % vol.
2) Activate the function *Sampling – O2 cell auto-calibrate*, using a Terminal application, and then confirm the choice.
3) Start the sensor sampling using the *Start sampling* command; check the measurements shown by the instrument: they should indicate roughly the reference value.
4) When the measurements become stable, use the *Stop Tx, use last value* command, pressing 2 when receiving data; this will set the last sample displayed as the reference value.
5) The O_2 reference value in open air is already preset to 20.95; to change it use the *Ref. Values* command.
6) Use the *Calculate* command to enable the calculation of the calibration factor (span); then check the value using the *Test* command.
7) Save the new calibration using *Save configuration* from the main menu.

3.3 Minimal configuration

In order to let STB to operate correctly, you usually have at least to set as follow:

- *Sampling*: set the parameters of this menu according to the typical data of the used sensors (radiometer sensitivity, anemometer type).
- *Output signals*: set the output parameters against the requirements of the connected devices; factory default set each output to the widest measure input scale (see §4) and it requires the using of its instantaneous value. Parameters of unused outputs can be left to default values. Default configuration output is:

Model: DEA420.1

Output	*Measure*	*Elab. item*
1	External temperature Pt100 1	Instantaneous value
2	External temperature Pt100 2	Instantaneous value
3	Frequency / Anemometer	Instantaneous value
4	Pyranometer/ Voltage	Instantaneous value

Model: DEA420.2		
Output	***Measure***	***Elab. item***
1	Thermocouple T	Instantaneous value
2	External temperature Pt100	Instantaneous value
3	Frequency / Anemometer	Instantaneous value
4	Pyranometer/ Voltage	Instantaneous value

Model: DEA420.3		
Output	***Measure***	***Elab. item***
1	External temperature Pt100 1	Instantaneous value
2	External temperature Pt100 2	Instantaneous value
3	Frequency / Anemometer	Instantaneous value
4	O_2 cell / Voltage	Instantaneous value

Model: DEA420.4		
Output	***Measure***	***Elab. item***
1	Voltage 1	Instantaneous value
2	Voltage 2	Instantaneous value
3	Frequency / Anemometer	Instantaneous value
4	Pyranometer / Voltage 3	Instantaneous value

After modification of the parameters remember to store them definitively through *Save configuration* command and re-start the system in order to make them active (reset button, switch off/switch on or *Restart system* command). It is possible to check if the instrument works in the right way using the *Data Tx* function, available on the configuration menu.

3.4 Restart of the instrument

STB can be restarted through menu (see §3.1) or acting on reset key placed under the connector of serial line 2. In both cases, the changes to configuration, made through menu and not saved, will be cancelled completely.

4 Specifications

- **Sensors Inputs**
  - Sensors sampling rate: all inputs sampled at 1 Hz
  - Input for *low range* voltage signals
    - Scale: -1.5 ÷ 30 mV
    - Resolution: < 8 µV
    - Impedance: 1.6 * 10^{10} Ω
    - Accuracy: < ±20 µV
    - Thermal drift: 1 W/m^2 (radiation units) / 10 °C
  - Input for *high range* voltage signals
    - Scale: 0 ÷ 1000 mV
    - Resolution: < 0.300 mV
    - Accuracy: < ±0.7 mV
  - Input for T thermocouple
    - Scale: -20 ÷ 100 °C
    - Resolution: ≈ 0.04 °C
    - Impedance: 1.6 * 10^{10} Ω
    - Accuracy: < ±0.3 °C (+ cold joint compensation: ±0.2 °C)
    - Thermal drift: 0.1 °C / 10 °C
  - Input for O_2 sensor
    - Scale: -1.5 ÷ 30 mV, 0 ÷ 25 %
    - Resolution: < 8 µV
    - Accuracy: < ±20 µV
  - Input for Pt100 thermal resistance
    - Scale: -20 ÷ 100 °C
    - Resolution: ≈ 0.04 °C
    - Accuracy: < ±0.2 °C
    - Thermal drift: 0.05 °C / 10 °C
    - Compensation of the line resistance: error 0.06 °C / Ω
  - Input for frequency signals
    - Scale: 0 ÷ 10 kHz
    - Level of input signal: 0 ÷ 3 V, supported 0 ÷ 5 V
    - Signal for power of anemometer photodiode: 3.3 V; 6 mA
    - Signal for power of anemometer phototransistor: 3.3 V; 0.7 mA
    - Resolution: 1 Hz
    - Accuracy: ±0.5 % measured value
    - Linearization/scale adaptation: through polynomial function of third degree (default values for LSI LASTEM anemometers, or programmable for different types of sensors)
- **Electric outputs**
  - Available outputs: 4
  - Output signal: current with 0 ÷ 20 or 4 ÷ 20 mA scale, selectable channel by channel
  - Maximum output load: 500 Ω @ V. power 24 V; 300 Ω @ V. power 12 V

  - Resolution: < 6 µA
  - Accuracy: ±15 µA
- **Processing of the measures**
  - All processed measures with common rate programmable from 1 to 3600 s
  - Application on all measurements of calculations of mean, minimum, maximum and total
- **Communication line**
  - Type: RS232
  - Connector: 9 poles Sub-D female, DCE, using only Tx/Rx/Gnd signals
  - Serial parameters: no parity, 8 data bit, 1 or 2 stop bit programmable, bit rate programmable from 1200 to 115200 bps
  - Configuration protocol of the apparatus through terminal program
- **Power**
  - Input voltage: 9 ÷ 30 Vdc
  - Protection on polarity inversion
  - Power consumption: < 0.4 W
- **Electrical protections**
  - Against electrostatic discharge, on all sensors inputs, on power line
  - Maximum power dissipation: 600 W (10/1000 µs)
- **Environmental limits**
  - Operative temperature: -20 ÷ 60 °C
  - Temperature of warehousing/transport: -40 ÷ 85 °C
- **Mechanics**
  - Box sizes: 120 x 120 x 56 mm
  - Fastening holes: nr. 4, 90 x 90, size Ø4 mm
  - Box material: ABS
  - Environmental protection: IP55
  - Weight: ≈320 g

5 Diagnostic

5.1 Statistical information

STB collects some statistics data that can be useful for diagnostics of possible operation problems. The statistics data can be obtained through menu for programming and management of the system (see §3.1) and through the proper menu entry.

The activation of display of statistics data produces the following result:

```
Power on time: 0000 00:01:00
Statistical info since: 0000 00:01:00

Com Rx bytes    Tx bytes    Rx msg      Rx err msg Tx msg
1   0           1           0           0          0
```

Here below you can read the meaning of displayed information:

- *Power on time*: power-up time of the apparatus or from last reset [dddd hh:mm:ss].
- *Statistical info since*: time from last reset of statistics [dddd hh:mm:ss].
- *Com*: number of serial port of the device.
- *Rx bytes*: number of bytes received from serial port.
- *Tx bytes*: number of bytes transferred from serial port.
- *Rx msg*: total number of messages received from serial port (TTY/CISS protocol).
- *Rx err msg*: number of wrong messages received from serial port.
- *Tx msg*: number of messages transferred from serial port.

5.2 Diagnostic LEDs

Through the lighting of led mounted on electronic card, the instrument shows the following information:

- Green led (Power): it lights to signal the presence of power supply;
- Yellow led (Ok) / Red led (Err): they light to signal the operating status of the instrument as specified in the following table:

Flashing type	***Meaning***
Yellow led: single fast flashing with pause of three seconds	Standard operation, no errors
Yellow led: single flashing lasting one second with pause of three seconds	Found not-critical problem that does not compromise the operation of the instrument
Red led: triple flashing lasting 1/3 of a second and then pause of three seconds	Found critical problem, STB must be checked

Possible errors pointed out by STB are shown by means of a proper message displayed in the menu of statistics that is proposed during the access to the functions of the instrument through terminal (see §3.1);

the access in the statistic menu produces the reset of the error signaling (also through led), till next error detection. For further information about the errors managed by the instrument look it up in §5.3.

5.3 Trouble shooting

The table below shows the causes of some problems detected by the system and the pertinent remedies that it can be adopted. In case of errors detection by the system, it is recommend to check the statistical data too (see §5.1) in order to have a complete picture of the situation.

Error	***Cause***	***Remedy***
The red or yellow led shows an error condition	STB has detected an error during its operation	Use the terminal, connected to serial line 2 of STB and display the statistical data; according to the reported code make reference to other instructions of this table
The statistical reports the error 1 or an error message has been reported during the final storage of the modifications of configuration parameters	It has been found a storage error of configuration parameters after their modification	The memory (store) of the instrument has an heavy malfunction that probably cannot be recovered; enter again the storage command; in case of persistence of the error contact LSI LASTEM after-sale service. In this situation the calibration parameters of STB can have been compromised; be sure that the measurements carried out by the apparatus are correct (indicatively); for example using reference signals instead of sensors, before you consider the problems like solved
The statistical reports the error 2	The instrument has restarted and the configuration memory is damaged	Try to restart the instrument checking if the signalling of non-valid configuration persists; in case of persistence of the error contact LSI LASTEM after-sale service
The statistical reports an error higher than 2	It is a non-serious error caused by the survey of a condition of internal invalid operation	Try to restart the instrument; if, within some hours of operation in standard operating conditions (sensors acquisition and signal-generating correct), you'll find again the problem check the power supply and the signals generated by the sensors; check the grounding quality

6 Maintenance

STB is a precision measurement apparatus. In order to maintain the specified measurement precision over the time, LSI LASTEM recommends to check and re-calibrate the instrument every two years.

7 Disposal

STB is a device with high electronic content. In accordance with the standards of environmental protection and collection, LSI LASTEM recommends to handle this product as waste of electrical and electronic equipment (RAEE). For this reason, at the end of its life, the instrument must be kept apart from other wastes.

LSI LASTEM is liable for the compliance of the production, sales and disposal lines of STB, safeguarding the rights of the consumer. Unauthorized disposal of this product will be punished by the law.

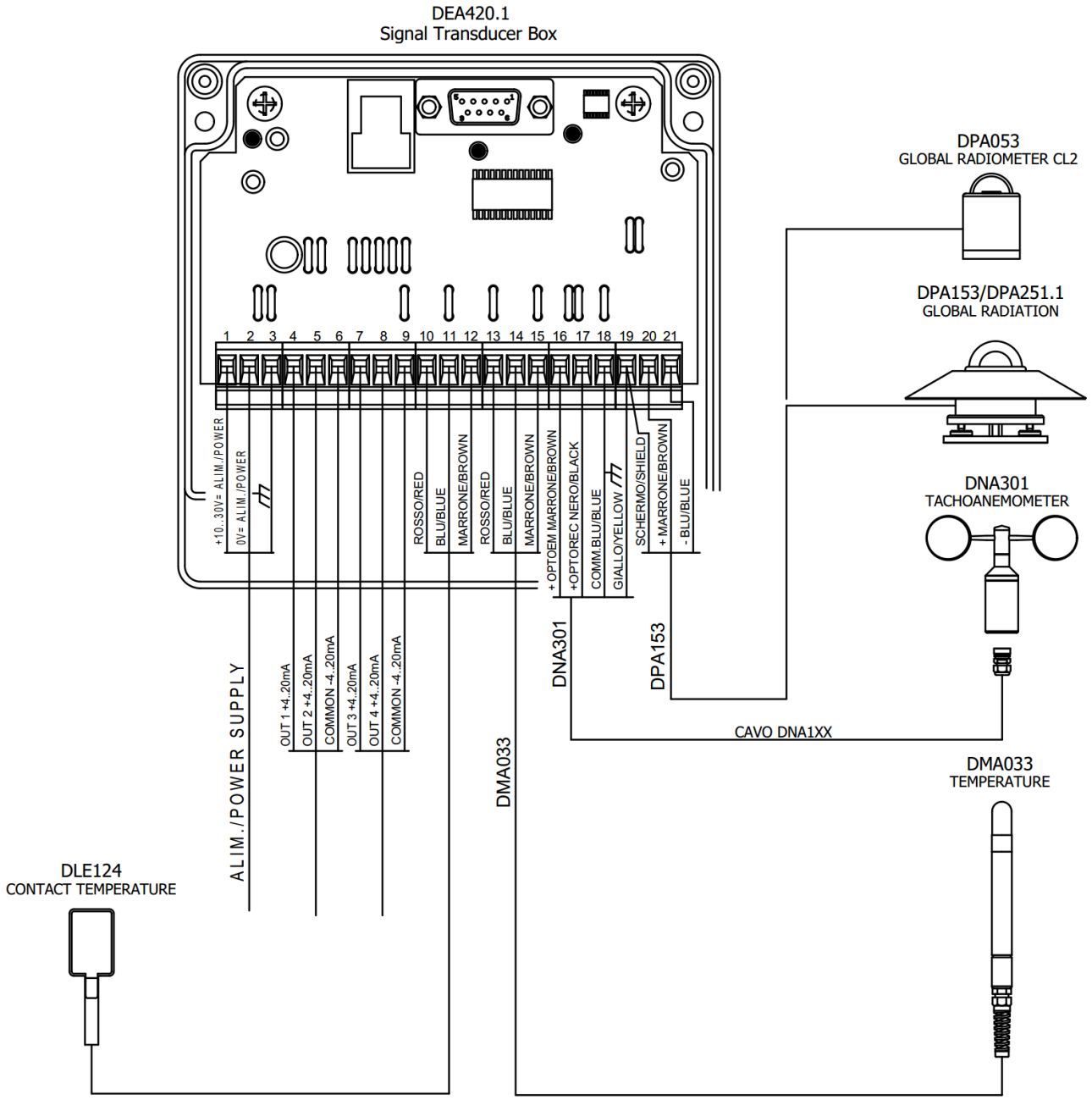
8 How to contact LSI LASTEM

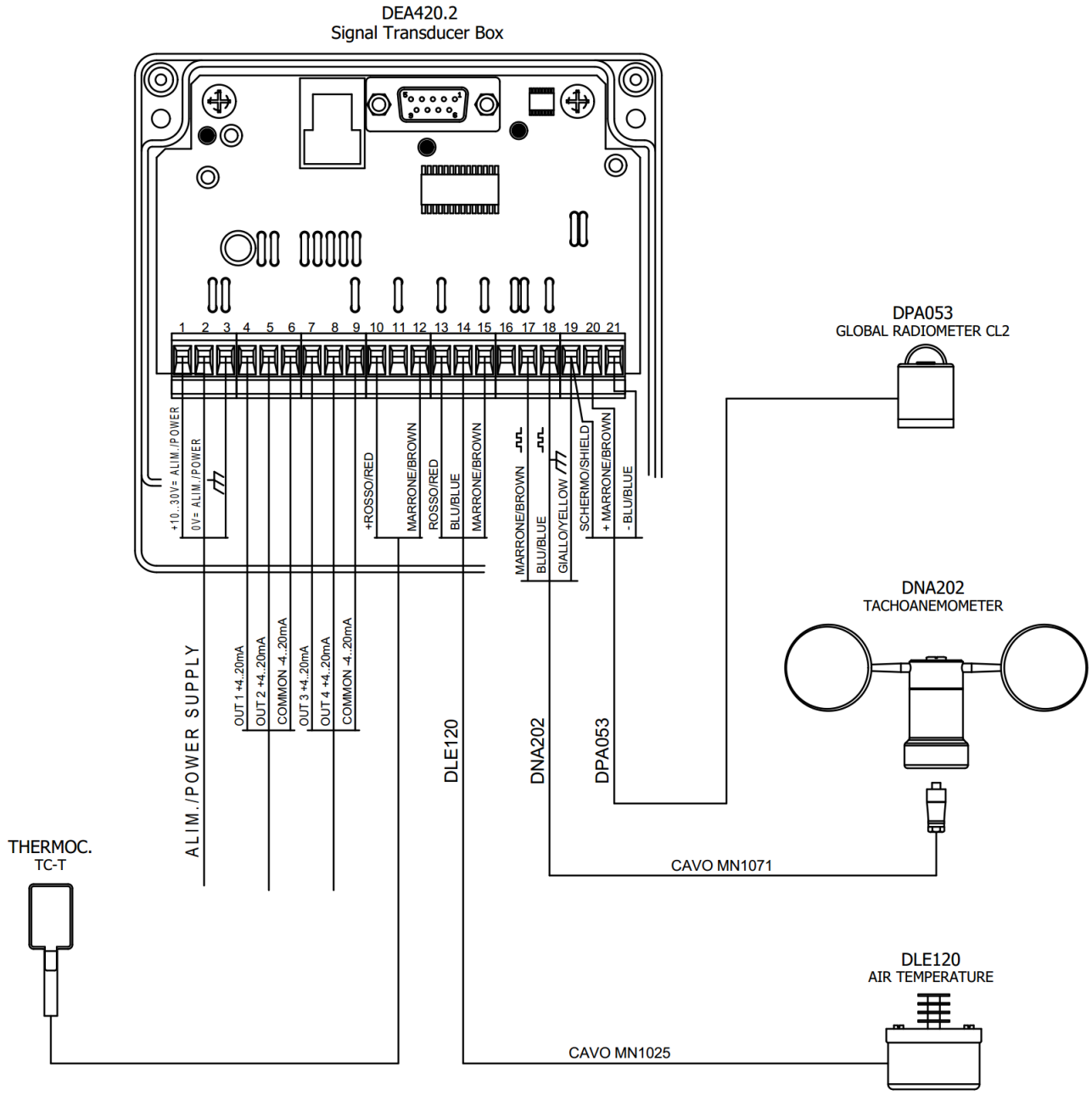
In case of problem contact the technical support of LSI LASTEM sending an e-mail to support@lsi-lastem.it, or compiling the technical support request module at www.lsi-lastem.it.

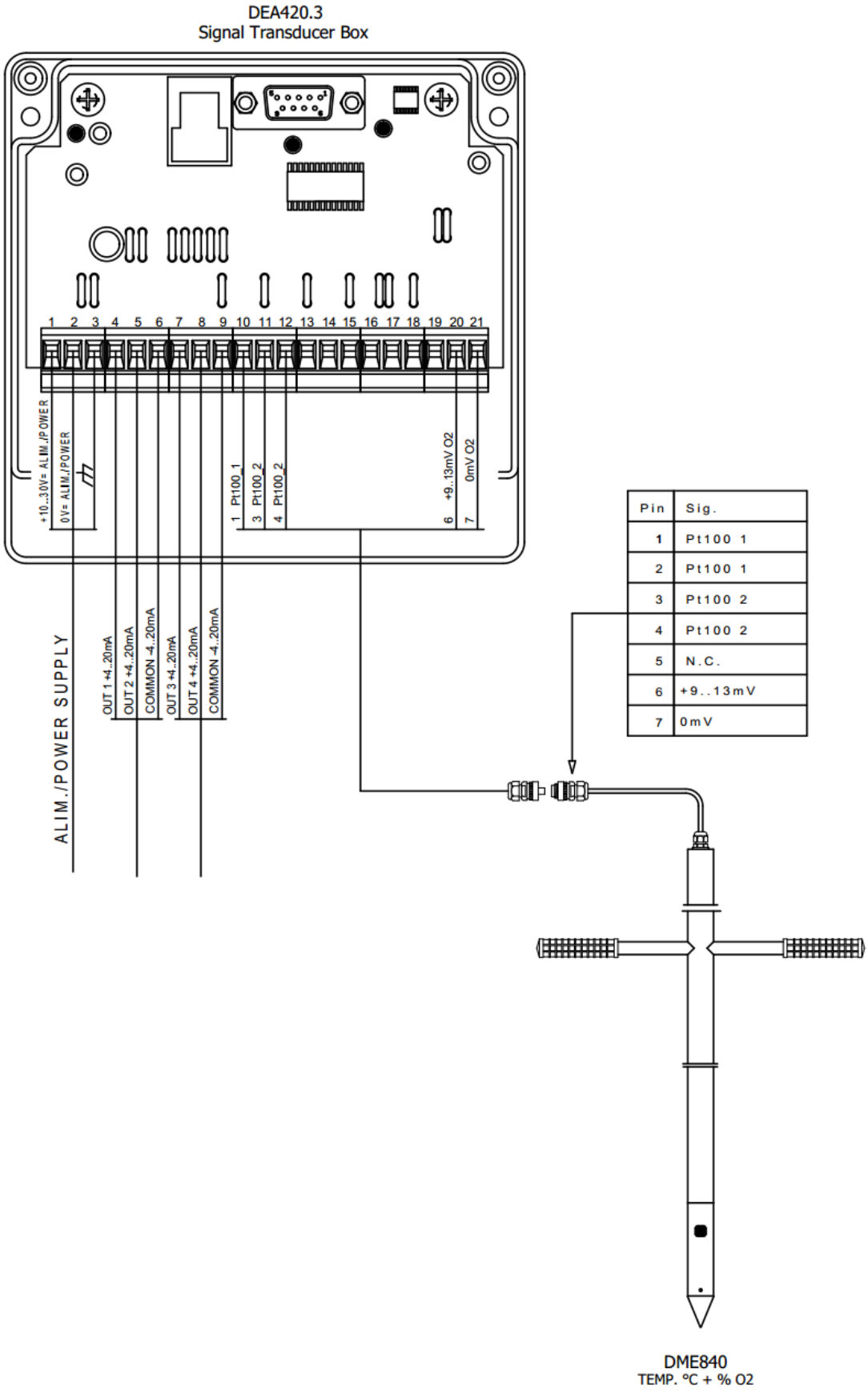
For further information make reference to addresses and numbers below:

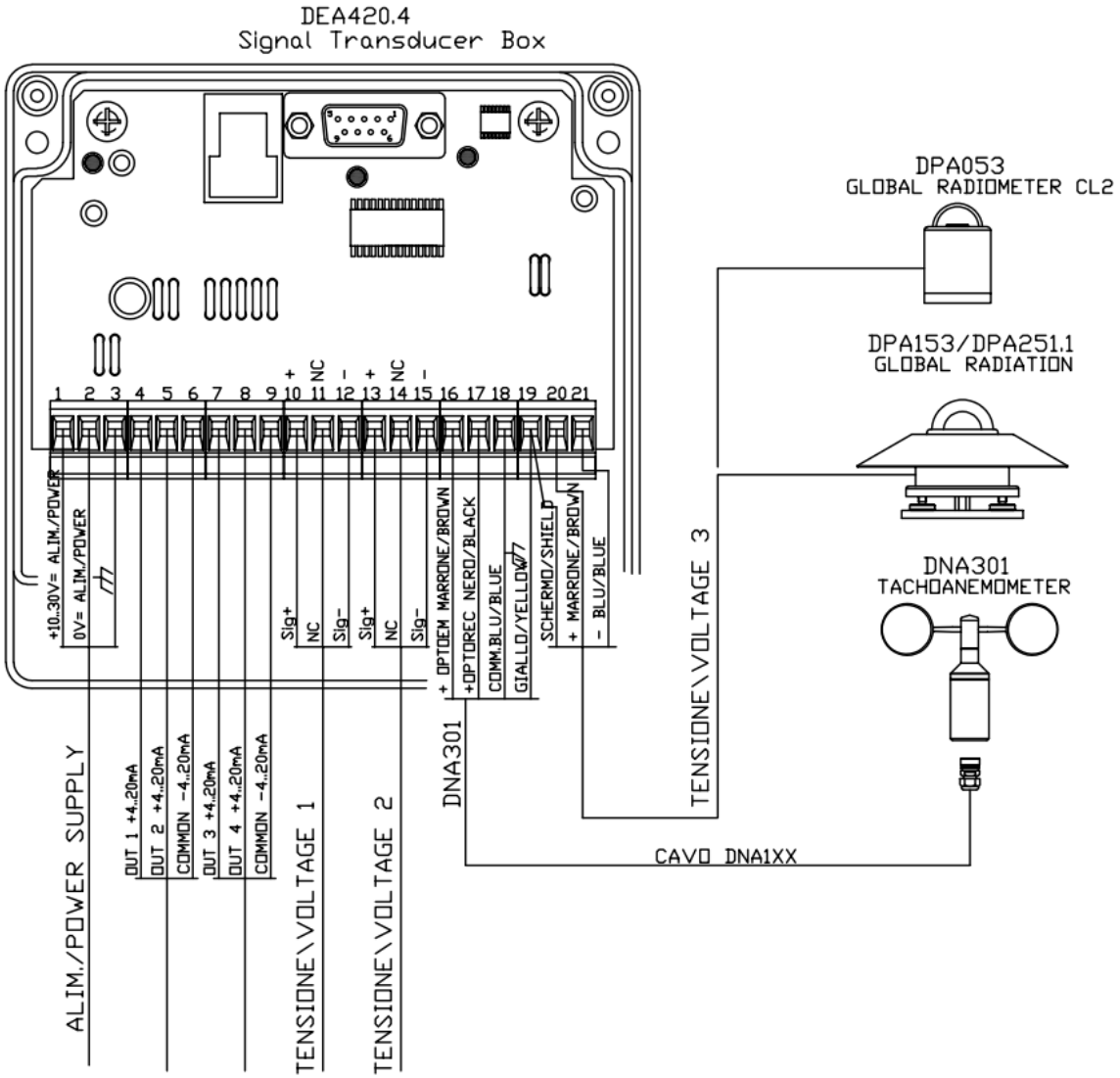
- Phone number: +39 02 95.414.1 (exchange)
- Address: via ex S.P. 161 – Dosso n. 9 - 20090 Settala Premenugo, Milano
- Web site: www.lsi-lastem.it
- Commercial service: info@lsi-lastem.it
- After-sales service: support@lsi-lastem.it, riparazioni@lsi-lastem.it

9 Connection drawings




DEA420.2
Signal Transducer Box
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21
+10..30V= ALIM./POWER
0V= ALIM./POWER
+ROSSO/RED
MARRONE/BROWN
ROSSO/RED
BLU/BLUE
MARRONE/BROWN
MARRONE/BROWN
BLU/BLUE
GIALLO/YELLOW
SCHERMO/SHIELD
+ MARRONE/BROWN
- BLU/BLUE
ALIM./POWER SUPPLY
OUT 1 +4..20mA
OUT 2 +4..20mA
COMMON -4..20mA
OUT 3 +4..20mA
OUT 4 +4..20mA
COMMON -4..20mA
DLE120
DNA202
DPA053
DPA053
GLOBAL RADIOMETER CL2
DNA202
TACHOANEMOMETER
CAVO MN1071
THERMOC.
TC-T
DLE120
AIR TEMPERATURE
CAVO MN1025


DEA420.3
Signal Transducer Box
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21
+10..30V= ALIM./POWER
0V= ALIM./POWER
1 Pt100_1
3 Pt100_2
4 Pt100_2
6 +9..13mV O2
7 0mV O2
ALIM./POWER SUPPLY
OUT 1 +4..20mA
OUT 2 +4..20mA
COMMON -4..20mA
OUT 3 +4..20mA
OUT 4 +4..20mA
COMMON -4..20mA
Pin Sig.
1 Pt100 1
2 Pt100 1
3 Pt100 2
4 Pt100 2
5 N.C.
6 +9..13mV
7 0mV
DME840
TEMP. °C + % O2


DEA420.4
Signal Transducer Box
DPA053
GLOBAL RADIOMETER CL2
DPA153/DPA251.1
GLOBAL RADIATION
DNA301
TACHOANEMOMETER
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21
+ NC - + NC -
+10..30V= ALIM./POWER
0V= ALIM./POWER
Sig+
NC
Sig-
Sig+
NC
Sig-
+ OPTOEM MARRONE/BROWN
+OPTOREC NERO/BLACK
COMM.BLU/BLUE
GIALLO/YELLOW
SCHERMO/SHIELD
+ MARRONE/BROWN
- BLU/BLUE
TENSIONE\VOLTAGE 3
DNA301
CAVO DNA1XX
ALIM./POWER SUPPLY
OUT 1 +4..20mA
OUT 2 +4..20mA
COMMON -4..20mA
OUT 3 +4..20mA
OUT 4 +4..20mA
COMMON -4..20mA
TENSIONE\VOLTAGE 1
TENSIONE\VOLTAGE 2

10 CE conformity declaration

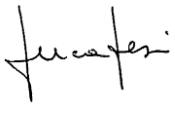
Product description: Signal Transducer Box

Models: DEA420.1, DEA420.2, DEA420.3, DEA420.4

Issuer: LSI LASTEM Srl

LSI Lastem Srl declare under sole responsibility the above products are made under European directives 2004/108/EC and, specifically to the electromagnetic conformity, with the relevant provision of the following harmonized standards:

- EN 61000-4-2 (1995) + A1 (1998) + A2 (2001): Electromagnetic compatibility (EMC) – Part 4-2: Testing and measurement techniques – Electrostatic discharge immunity test.
- EN 61000-4-3 (2002): Electromagnetic compatibility (EMC) – Part 4-3: Testing and measurement techniques – Radiated, radio-frequency, electromagnetic field immunity test.
- EN 61000-4-4 (2004): Electromagnetic compatibility (EMC) – Part 4-4: Testing and measurement techniques – Electrical fast transient/burst immunity test.
- EN 61000-4-5 (1995) + A1 (2001): Electromagnetic compatibility (EMC) – Part 4-5: Testing and measurement techniques – Surge immunity test.
- EN 61000-4-6 (2003): Electromagnetic compatibility (EMC) – Part 4-6: Testing and measurement techniques – Immunity to conducted disturbances, induced by radio-frequency fields.
- EN 61000-4-8 (1993) + A1 (2001): Electromagnetic compatibility (EMC) – Part 4-8: Testing and measurement techniques – Power frequency magnetic field immunity test.
- EN 61000-4-11 (2004): Electromagnetic compatibility (EMC) – Part 4-11: Testing and measurement techniques – Voltage dips, short interruptions and voltage variations immunity tests.



Settala, 29 October 2013 Luca Lesi