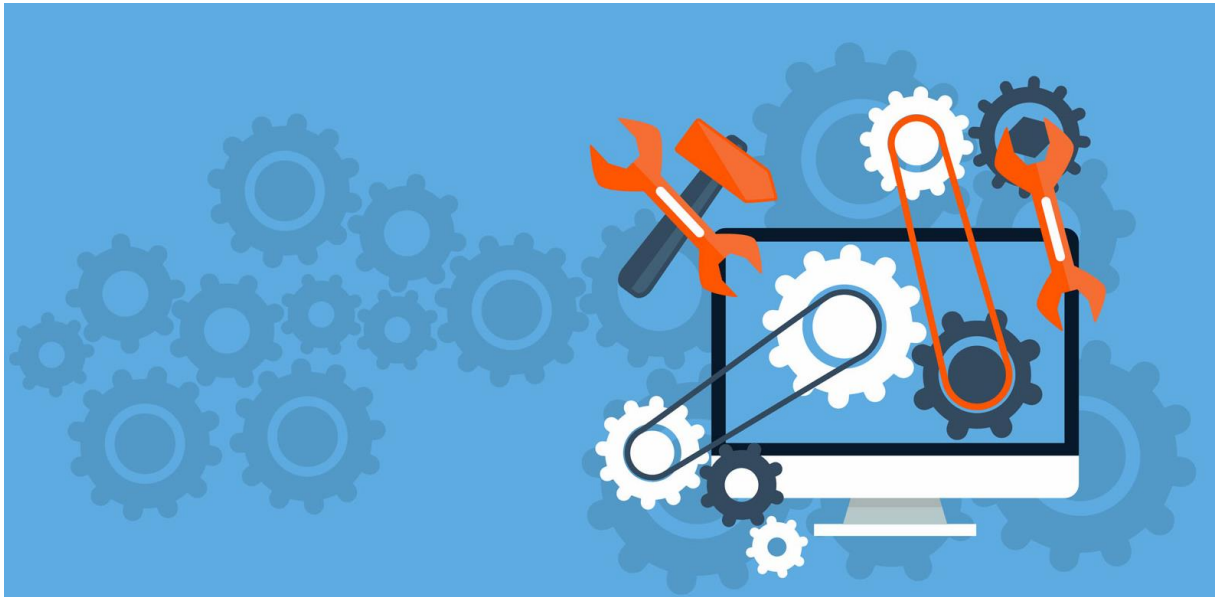


CALMS BASIC

AUDIT GUIDE



CALMS D.O.O. / CALMS USA / CALMS NORDIC AB

CAL-KIT includes:

- Device CAL-EDGE-8 with LTE 4G modem,
- Ethernet,
- Modbus RTU – RS485,
- Modbus TCP/IP,
- 8x analog inputs 4-20mA,
- Explorer case CA,
- 4x CT Rogowski coil for 4 compressors (500A / 20mA),
- 1x Pressure transmitter (SML-10),
- 5x AI extension cable (10m),
- 3x open end short cable (0,5m) with connector for 4-20mA
- Optional accessories also available.

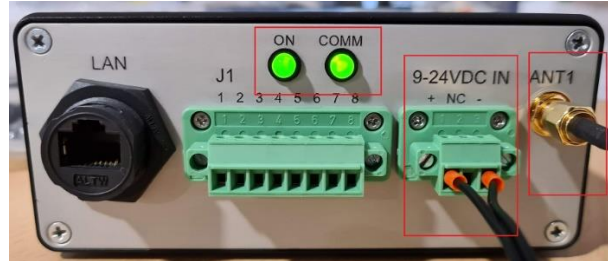


Recommended equipment:

- Personal safety gears (helmet, goggles, ear muffs, shoes, gloves...),
- Personal hand tool,
- Smart phone with assessment app and photo,
- Multi-meter and current clamp meter,
- Pipe diameter measuring tape.

1. CONNECT YOUR CAL-EDGE DEVICE

- 1.1. Connect the antenna to CAL-EDGE device.
- 1.2. Connect the device to power supply. When device is successfully connected two LED lights will turn on (ON&COMM).



LAN: LAN port is used to connect device to any other TCP/IP protocol capable device (MODBUS, ADS, OPC UA...). Port is also used to connect device on internet when communication through mobile network is not working. For connecting device to the internet through LAN port, a DHCP server must be installed in the network.

ANT1: Used for antenna connection with SMA connector. Mount antenna on the place with best signal reception possible!

DC IN: Power supply terminal. Device accepts voltage 9-24VDC. To properly connect power supply please check the electrical scheme.

LED ON: LED is green if device boots up properly. Green color should appear in approximately 10 seconds after device is power supplied.

LED COMM: LED becomes green when device gets connection to the internet. It may take a few minutes (depending on signal strength). Device is in normal condition when both LEDs are green.

J1: Terminal is used to connect RS485 fieldbus. To properly connect sensors to RS485 please check the electrical scheme. Be careful when wiring sensors to device. Improper connection may lead to device damage. Always make sure to screw plug to the header to avoid unintentional disconnection!

A1-A8: Connectors used for field sensors connection. When using open-end cable (CAB-SENSOR) double check the connection. Improper connection can damage the device. Power supply voltage also powers connected sensors. Choose input voltage (VDC IN) required by sensors: commonly it's 24VDC.

2. CONNECT SENSORS TO THE DEVICE

Device supports: analog 4-20mA sensors, MODBUS RTU and MODBUS TCP sensors.

Analog 4-20mA sensors

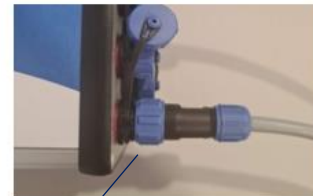
Step 1.

Connect cables on white dots.



Step 2.

Tighten the cable with nut.



We recommend that you connect the individual sensors as follows:

A1 Wet Pressure

A2 Dry Pressure

A3 Compressor Current C0.1

A4 Compressor Current C0.2

A5 Compressor Current C0.3

A6 Compressor Current C0.4

A7 Option Flow

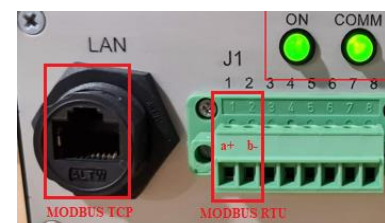
A8 Option Dew point



NOTE: If you do not have a specific sensor, leave the analog input empty.

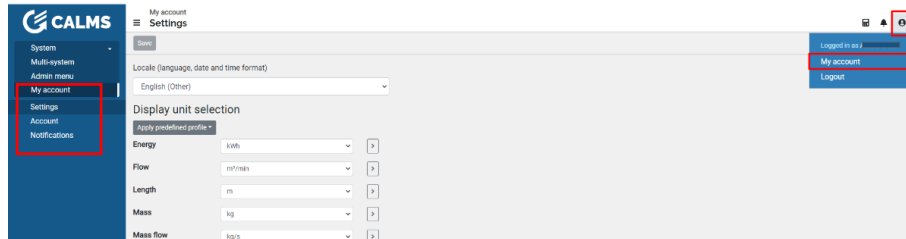
MODBUS RTU and MODBUS TCP IP sensor

To connect sensors to the device please check electrical scheme

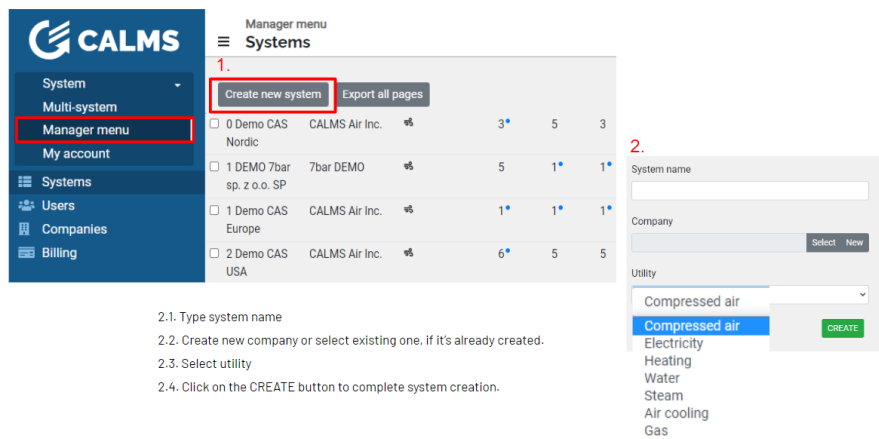


3. SETTING UP CALMS SYSTEM ON THE CALMS PLATFORM

1. Open CALMS <https://app.calms.com/> and login with your account.
2. Set up your account.

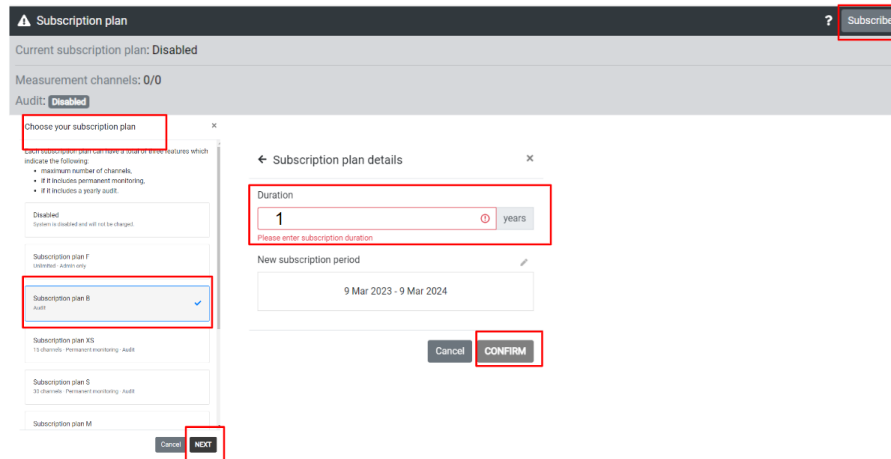


3. Create new system on the CALMS platform and start with setup.



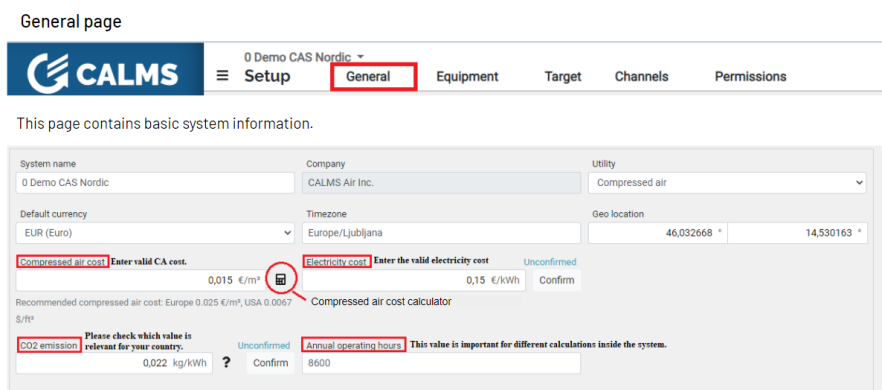
When you create a new system, you are immediately redirected to the setup page of the system you created. The other pages are locked until you choose a subscription plan.

- 3.1. Choose your subscription plan, enter subscription duration and confirm it.
- Subscription plan provides various options based on the number of measured channels that are stored in the system. For more information about subscription plan click on **?** button.



- 3.2. Fill in all data on the General page. Some information is crucial for the calculations. Use CALMS calculator to calculate compressed air cost.

General page




Blue dot means system data are not confirmed. Red dot means essential data is missing.

General

Equipment

4. Add the device you will use to audit the system.



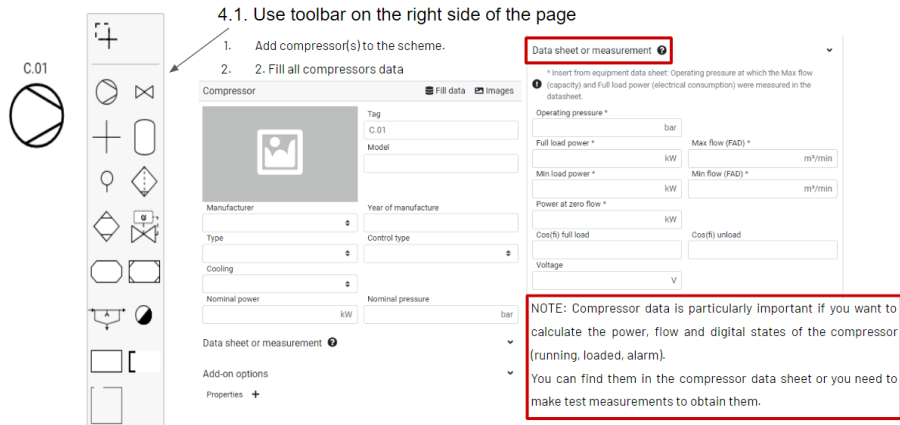
5. Draw P&ID scheme

- 5.1. Add compressors and air treatment equipment to the scheme and fill all compressors and equipments data.

4. EQUIPMENT PAGE - Draw P&ID scheme - add compressor and other equipment and sensors

4.1. Use toolbar on the right side of the page

1. Add compressor(s) to the scheme.
2. Fill all compressors data



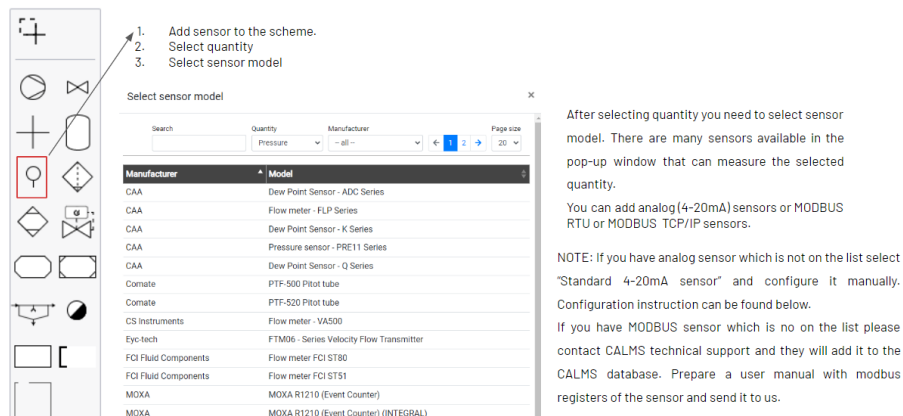
NOTE: Compressor data is particularly important if you want to calculate the power, flow and digital states of the compressor (running, loaded, alarm). You can find them in the compressor data sheet or you need to make test measurements to obtain them.

- 5.2. Add sensors to the scheme and configure it.

You can add analog (4-20mA) sensors, MODBUS RTU (RS485) and MODBUS TCP/IP sensors.

EQUIPMENT PAGE - Add sensors to the scheme

1. Add sensor to the scheme.
2. Select quantity
3. Select sensor model



After selecting quantity you need to select sensor model. There are many sensors available in the pop-up window that can measure the selected quantity.

You can add analog (4-20mA) sensors or MODBUS RTU or MODBUS TCP/IP sensors.

NOTE: If you have analog sensor which is not on the list select "Standard 4-20mA sensor" and configure it manually. Configuration instruction can be found below.

If you have MODBUS sensor which is not on the list please contact CALMS technical support and they will add it to the CALMS database. Prepare a user manual with modbus registers of the sensor and send it to us.

5.2.1. Configuration of analog sensor

Configuration of analog (4-20mA) sensor

Connection configuration (Standard 4-20mA sensor)

Edge device: Meritve HPE-101

Sensor is connected to device "Meritve HPE-101"

PI.01 Standard4-20mA

Use as: System pressure

Unit: bar

Input: A2

Output min: 0 bar

Output max: 16 bar

Range of the sensor

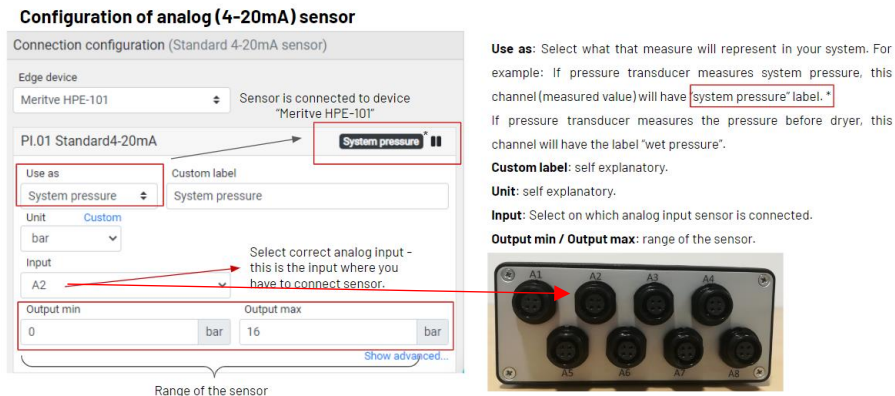
Use as: Select what that measure will represent in your system. For example: If pressure transducer measures system pressure, this channel (measured value) will have "system pressure" label.*

Custom label: self explanatory.

Unit: self explanatory.

Input: Select on which analog input sensor is connected.

Output min / Output max: range of the sensor.



5.2.2. Configuration of MODBUS RTU sensor

Configuration of MODBUS RTU (RS 485) sensor

Connection configuration (VPFlowScope M)

Edge device
Meritve HPE-101

Unit ID: 1
Comm port: Standard RS485 (default)
Baud rate: 38400 (default)
Data bits: 8 (default)
Stop bits: 1 (default)
Parity: none (default)

[Hide advanced](#)

Unit ID = modbus address
Comm port, baud rate, data bits, stop bits and parity are modbus communication parameters!

Modbus address and modbus communication parameters must be exactly the same as on the sensor. This information can be found in sensor's user manual or in the settings of the sensor.

5.2.3. Configuration of MODBUS TCP sensor

Configuration of MODBUS TCP/IP sensor

Connection configuration (VPFlowScope M)


Edge device
Meritve HPE-101

Unit ID: 1
Host:
Port:


Enter the host IP address and port.

6. Check device dashboard and make sure you are receiving signals from sensors.



To access the device dashboard, follow these steps:

Setup – General page – Device – click on  button. You will be automatically redirected to device dashboard.

Status tab – general device information: signal strength, communication, version, latest device logs.

Inputs tab – last values read from sensors. Activate »Live« mode by clicking on .

Settings tab – device's name, users of the device and system/s in which device is added.

Device	Serial number	+ Add device
CALMS Presentation device	3000000214	 

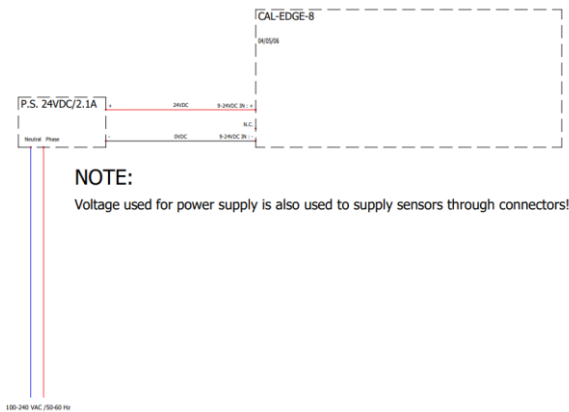
Device dashboard - Inputs

Live

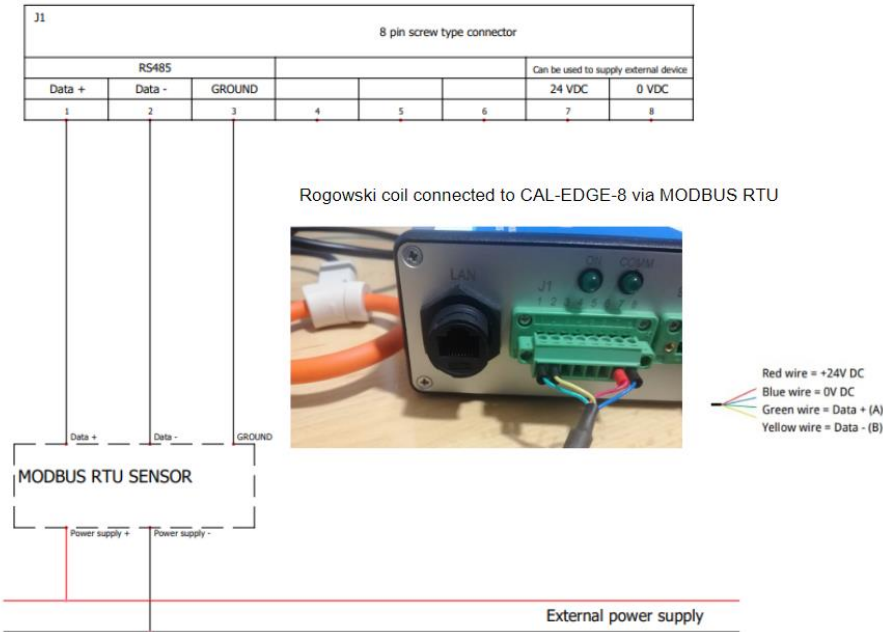
Sensor	Channel	Input	Last value
0 Demo CAS Nordic			
C.01 Compair160 - CH160	C.01 Loaded	StandardDigitalInput	0
C.01 Compair160 - CH160	C.01 Running	StandardDigitalInput	0
C.01 Compair160 - CH160	K.01 Alarm	StandardDigitalInput	0
C.02 IR R110 - R110-7-AC	C.02 Running	StandardDigitalInput	0
C.02 IR R110 - R110-7-AC	C.02 loaded	StandardDigitalInput	0
C.02 IR R110 - R110-7-AC	K.02 Alarm	StandardDigitalInput	0
C.03 Compair 132 - CM132	K.03 Alarm	StandardDigitalInput	0
C.04 Kaeser 132 - DSD 200 - 125 psig / 460V/3ph/60Hz	K.04 Alarm	StandardDigitalInput	0
FT.01 System Flow.01.01 - Standard 4-20mA sensor	System flow	Standard4-20mA	23.73 m³/min
J1.01 - Standard 4-20mA sensor	Power C.01	Standard4-20mA	0.58 kW
J1.02 - Standard 4-20mA sensor	C.02 Power	Standard4-20mA	1.42 kW
J1.03 - Standard 4-20mA sensor	C.03 Power	Standard4-20mA	128.09 kW
J1.04 - Standard 4-20mA sensor	C.04 Power	Standard4-20mA	0.69 kW
PT.01.01 - Standard 4-20mA sensor	Pressure System	Standard4-20mA	6.98 bar

4. ELECTRICAL SCHEMATICS

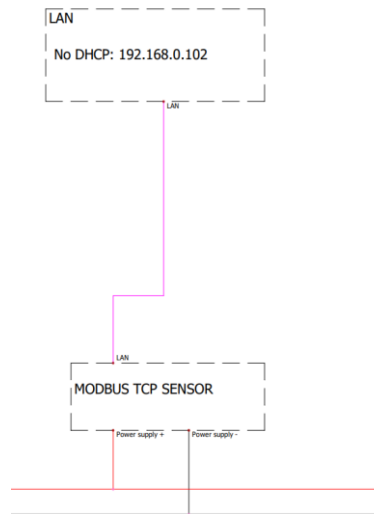
4.1. Power supply wiring scheme



4.2. RTU-485 wiring scheme



4.3. MODBUS TCP wiring scheme



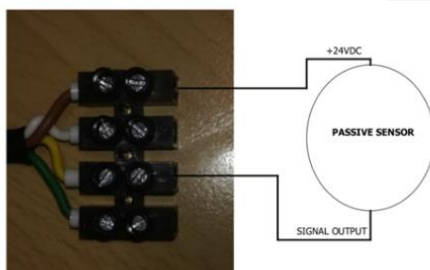
4.4. CONNECTING ACTIVE AND PASSIVE SENSORS USING OPEN-END CABLE

Open-end cable (CAB-SENSOR) is used to connect custom 4-20mA sensors to the CAL-EDGE-8 device. When using open-end cable to connect a custom sensor, double check the connection. Improper connection can damage the device.

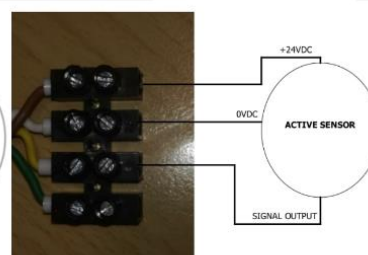
Passive (2-wire) sensors are powered through a current loop. Active sensors (3-wire or 4-wire) are powered separately. Please, check the table below before wiring.

Color coded wire on the open-end cable	Number coded wire on the open-end cable	Description
Brown	1	24VDC
White	2	0VDC
Yellow	3	4-20mA signal
Green	4	Not used

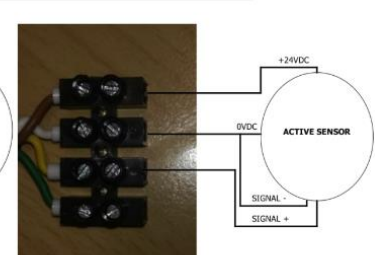
Wiring passive - 2 wire sensor



Wiring active - 3 wire sensor



Wiring active - 4 wire sensor



5. CAL-EDGE-8 device went offline - TROUBLESHOOTING

Please reference the below for troubleshooting when your device is offline:

1. Check if the device is powered on,
2. Check the Status LED – make sure that LED is rapidly flashing,
3. Try restarting the device, wait at least 10sec before the device go online and then observe status of the device.

If your device continues to drop offline, please contact support team for further assistance and inform us of the serial number of the device, which you can find on the back side of the device.

Contact: support@calms.com

