

MIND

— **MIND**  
READOUT

READOUT UNITS  
AND DATALOGGERS





## MIND READOUT

Mind is the new portable and compact multichannel readout unit able to read all Sisgeo instruments, both analogue and digital. It is compact, rugged, with IP65 protection class and it is supplied with a specially designed carrying bag.

The BLE (Bluetooth Low Energy) wireless technology permits a fast and safe communication with Mind App, with a very low batteries' consumption.

Mind is fully managed by Mind App which is compatible with Android operating system and sooner with iOS. Thanks to its App, Mind is a fast and light system for a quick and handy interface with the instruments, furthermore the data storage and sharing is made simpler and immediate.

Mind App is also useful to read and utilize the QRcode placed on every analog Sisgeo instrument, having the identification, calibration and reading information always available.

### MAIN ADVANTAGES

- Long battery life: minimum 8 hours continuously
- Supplied with Calibration Report issued following high level metrologic procedures
- High accuracy and resolution
- Simultaneous display of electrical and engineering measures
- Real time charts
- Quick read for immediate readings without configuration
- Multiplexers reading
- One-touch reading of digital gauge arrays
- Biaxial analogue sensors reading with simultaneous temperature displaying
- Geolocation and search engine for sites and sensors
- Display the plot of vibrating wire sensor signal's spectrum with peak value



Meet the essential requirements of RED Directive 2014/53/EU,  
Certified for extended environmental conditions: altitude up to 3000m

## MIND APP

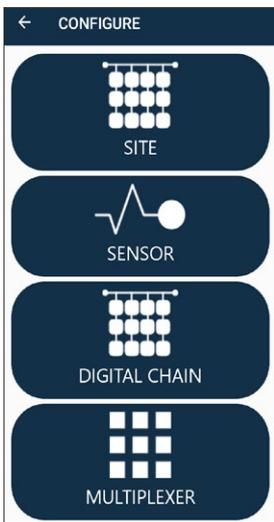
Thanks to its app, Mind is light system for a quick and handy interface with the instruments. The data storage and sharing is made simpler and immediate. Mind APP is also useful to read the QRcode placed on every analog Sisgeo instrument, having the identification, calibration and reading information always available.

Minimum Device Specifications  
(device not supplied by SISGEO)

Bluetooth Low Energy BLE 4.2  
APPLE iOS 14 or higher  
Android OS 9 (suggested Android OS 10 or higher)



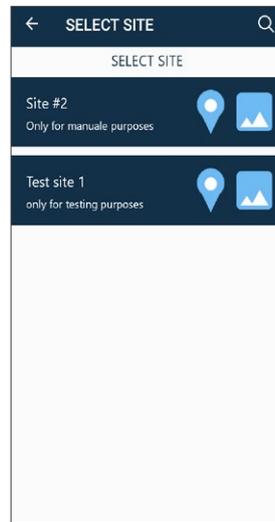
## APP OVERVIEW



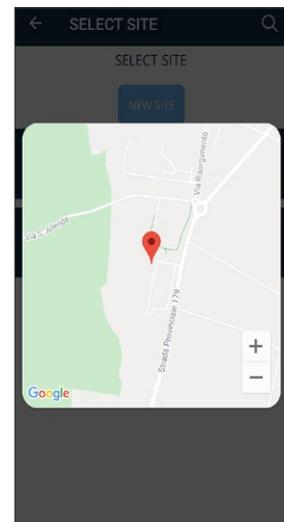
Instruments configuration main page



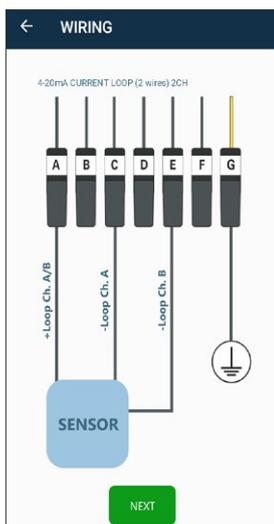
QR code scanner for automatic configuration of analog sensors



List of site with selectable icons to have info of geographical positioning and related picture.



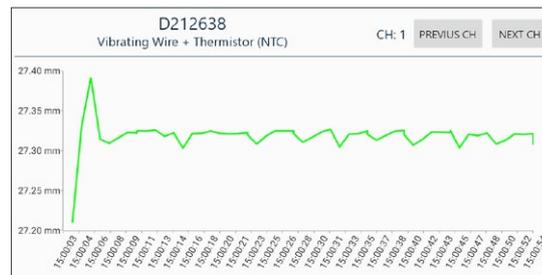
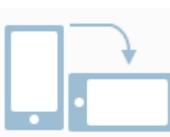
Site/sensor localization from Google Map®



Guided clips wiring connection



Instrument reading page with both biaxial 4-20mA current loop channels reading. The temperature measure is displayed scrolling down.



Graph of connected sensor's readings. It is generated just turning the mobile device in horizontal position.

## MIND READOUT PHYSICAL FEATURES

|                         |  |
|-------------------------|--|
| Material /Weight        | Aluminum / 1 Kg  |
| IP class <sup>(1)</sup> | IP65   |
| Overall dimensions      | 205x128x45 mm  |
| Operating temperature   | -30 to +70 °C (battery -20 to +60°C)                                       |
| Storage temperature     | -40 to +85°C (battery: -20 to +30°C max 1 year, -20 to +45°C max 3 months) |
| Relative humidity       | Operating: 15 - 93% RH<br>Storage: 10 - 75% RH                             |

<sup>(1)</sup> IP65 protection class is granted with closed connectors (i.e. with their own cap or with the cable connected) and with the on/off button not pressed.



## SISGEO COMPATIBLE INSTRUMENTS

|  |                                      |  |
|--|--------------------------------------|--|
| Uniaxial 4-20mA current loop<br>2-wire gauges              | Ratiometric<br>6-wire gauges         | Vibrating wire gauges                                    |
| Biaxial 4-20 mA current loop<br>2-wire gauges              | RTD PT-100<br>temperature gauges     | Vibrating wire + NTC Thermistor<br>gauges                |
| Biaxial 4-20 mA current loop<br>2-wire gauges + Thermistor | NTC Thermistor<br>temperature gauges | Digital gauges or arrays with<br>RS-485 Modbus RTU array |

## OTHER COMPATIBLE SENSORS

|  |   |   |
|--|---|---|
| Uniaxial and biaxial<br>4-20mA transmitter (3-wire)              | Ratiometric 4-wire gauge<br>(6-wire connection) | Uniaxial and biaxial<br>voltage gauges            |
| Uniaxial and biaxial 4-20mA<br>transmitter (3-wire) + Thermistor | Resistive strain gauge<br>1/2 bridge            | Uniaxial and biaxial<br>potentiometers            |
| Uniaxial and biaxial 4-20mA<br>transmitter (4-wire) + Thermistor | Resistive strain gauge<br>1/4 bridge            | Uniaxial and biaxial<br>servo-inclinometer gauges |

# TECHNICAL SPECIFICATIONS<sup>(1)</sup>

## A - ANALOG INPUTS

|                                    |   |
|------------------------------------|---|
| Number of channels                 | 3   |
| Analog-to-Digital Conversion (ADC) | Resolution: 24bit, sampling rate: 2.5 Hz per channel with 50/60 Hz mains frequency rejection, Modulation method sigma-delta |
| Input impedance                    | >10 k $\Omega$  |

### A.1 - MEASUREMENT TYPES

#### A.1.1 - 4-20mA current loop (2 wires)

|                               |  |
|-------------------------------|--|
| Range   Resolution   Accuracy | 0-24 mA   1 $\mu$ A at range 20 mA   2.4 $\mu$ A (max error at 2 Hz sample rate) |
| Internal shunt resistor       | 100 $\Omega$   |
| Power supply                  | 24V DC, 12V DC, external (selectable by the software, up to 100 mA)              |
| Temperature drift             | < 10 ppm / $^{\circ}$ C, range -30 $^{\circ}$ C to +70 $^{\circ}$                |

#### A.1.2 - Wheatstone full bridge (6 wires, with sensing)

|                               |   |
|-------------------------------|---|
| Range   resolution   accuracy | $\pm$ 62.5mV/V   0.001 mV/V   0.005mV/V (range $\pm$ 15 mV/V) and 0.05 mV/V (range $\pm$ 62.5 mV/V) |
| Power supply (up to 80 mA)    | 5 Vdc, external   |
| Max and min bridge resistance | Max 10 k $\Omega$ - min 200 $\Omega$  |
| Temperature drift             | < 10 ppm / $^{\circ}$ C, range -30 $^{\circ}$ C to +70 $^{\circ}$ C                                 |

#### A.1.3 - Platinum RTD (Pt100)

|                               |  |
|-------------------------------|--|
| Range   resolution   accuracy | -150 $^{\circ}$ C to +150 $^{\circ}$ C   0.1 $^{\circ}$ C   0.3 $^{\circ}$ C |
| Power supply                  | 1 mA   |
| Temperature drift             | < 10 ppm / $^{\circ}$ C, range -30 $^{\circ}$ C to +70 $^{\circ}$ C          |

#### A.1.4 - Thermistor (NTC 3 k $\Omega$ @ 25 $^{\circ}$ C)

|                               |  |
|-------------------------------|--|
| Range   resolution   accuracy | -50 $^{\circ}$ C to +150 $^{\circ}$ C   0.1 $^{\circ}$ C   0.2 $^{\circ}$ C (max error at 2 Hz sample rate)  |
| Power supply                  | 2-100 $\mu$ A  |
| Temperature drift             | < 10 ppm / $^{\circ}$ C from 0 to 150 $^{\circ}$ C   < 20 ppm / $^{\circ}$ C from 0 to -30 $^{\circ}$ C   < 100 ppm/ $^{\circ}$ C from -30 $^{\circ}$ C to -50 $^{\circ}$ C; |

#### A.1.5 - Vibrating Wire sensors

|                             |   |
|-----------------------------|---|
| Range   accuracy            | 300 to 6000 Hz   0.01% FS   |
| Excitation sine wave signal | Up to 10 Vpp (selectable by the software)   |
| Resolution                  | 0.01Hz at range 300÷1000Hz<br>0.02Hz at range 1000÷3000Hz<br>0.1Hz at range 3000÷6000Hz |
| Temperature drift           | <10ppm/ $^{\circ}$ C (-30 $^{\circ}$ C to +70 $^{\circ}$ C)                             |

(1) The information and data in the "Technical specifications" table refer to tests performed with a calibrated control unit in an environment with controlled temperature and humidity, and using signal generators with cables shorter than 5 m.

## B - DIGITAL RS485 INPUTS

|                               |  |
|-------------------------------|--|
| Max number of gauge per array | according to the consumption of each type of sensor and if configured in Always-on mode or in Timed mode |
| Interface and Protocol        | RS485, MODBUS RTU  |
| Power supply (up to 500 mA)   | 24 V DC  |

## C - COMMUNICATION WITH DEVICE

|                                |  |
|--------------------------------|--|
| BLE (Bluetooth Low Energy) 5.2 | band: 2.4 GHz ISM Band (2402-2480 MHz) - power: 4dBm Max |
| Led                            | Different colors for local notifications                 |

## D - ON-BOARD DIAGNOSTIC SENSORS

|                                      |  |
|--------------------------------------|--|
| <b>D.1 - INTERNAL TEMPERATURE</b>    | Range: -40°C to +125°C   Resolution: 0.1°C   Accuracy: ±1°C (-10°C to +85°C) |
| <b>D.2 - INTERNAL HUMIDITY</b>       | Range: 0 to 100%RH   Resolution: 0.1% RH   Accuracy: ±5% (0 to 95%RH)        |
| <b>D.3 - BATTERY VOLTAGE MONITOR</b> | Range: 0 to 18V   Resolution: 0.1 V   Accuracy: ±5% FS                       |

## E - BATTERIES

|                                      |  |
|--------------------------------------|--|
| Battery type - Voltage and capacity  | Li-Ion rechargeable batteries - 7.4V - 2.6Ah       |
| Operating time with Li-Ion batteries | min. 8h (constant use, 24 Vdc @ 20 mA x 2 @ 25 °C) |
| Charging temperature range           | 0°C to +45°C                                       |

## F - BATTERY CHARGER

|                                |  |
|--------------------------------|--|
| Input voltage                  | 50-60 Hz 90-264 Vac                                      |
| IP Class and temperature range | IP41 (for internal use only), Operating: -25°C to +40 °C |
| Max output power               | 10 W   |

## G - OTHER COMPATIBLE SENSORS<sup>(2)</sup>

|  |  |
|--|--|
| <b>G.1 - 4-20mA transmitters (3-4 wires)</b> |  |
| Range   Resolution   Accuracy                | 0-24 mA   1 µA at range 20 mA   2.4 µA (max error at 2 Hz sample rate) |

|  |  |
|--|--|
| <b>G.2 - Voltage 4 wires, differential</b> |  |
| Range   Resolution   Accuracy              | ±12V   1 mV at range ±12 V   4 mV at range ±12 V |

|                                  |   |
|----------------------------------|---|
| <b>G.3 - Servo inclinometers</b> |   |
| Range   resolution   accuracy    | ±5V   1 mV at range ±10 V   2 mV at range ±10 V |

|   |   |
|---|---|
| <b>G.4 - 1/2 Wheats. bridge (5 wires, with sensing)</b> |   |
| Range   resolution   accuracy                           | ±62.5 mV/V   0.005 mV/V   0.05 mV/V (max error at 2 Hz sample rate) |

|  |                                     |
|--|-------------------------------------|
| <b>G.5 - 1/4 Wheats. bridge (3 wires, w/o sensing)</b> |                                     |
| Range   resolution   accuracy                          | ±62.5 mV/V   0.005 mV/V   0.05 mV/V |

|                               |  |
|-------------------------------|--|
| <b>G.6 - Potentiometers</b>   |  |
| Range   resolution   accuracy | 5V   1 mV at range ±5 V   1 mV at range ±5 V (max error at 2 Hz sample rate) |

(2) full and complete technical specifications available on request

## ACCESSORIES AND SPARE PARTS

### JUMPER CABLE OECAV08V2J0

Jumper cable for MIND connection to an instrument supplied with military connector.



### SWITCH BOX JUMPER CABLE OECAV08V2S0

Jumper cable for MIND connection to a switch terminal box.



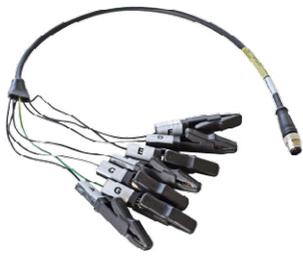
### MUX BOX-MIND JUMPER CABLE OECAVMINDMU

Jumper cable for direct connection from MIND to multiplexer boxes. NOTE: only new MUX BOX with M12 connector can be read with MIND. Old MUX-BOX with MIL connector which could be read with New Leonardo cannot be read with MIND.



### 6-CLIPS SENSOR CABLE (SPARE) OECAV8P6A00

Jumper cable with 6 alligator clips for instrument reading on signal cable wires.



### MIND CARRYING BAG (SPARE) OMIND1BAG00

Specially designed carrying bag for MIND readout. It includes shoulder belt.



### BATTERY CHARGER (SPARE) OECABMIND00

Charger for Li-Ion batteries. Input voltage 90-264 Vac, 50-60 Hz IP rate IP41 Max output power 10 W



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