Heraeus

*i*M² Sensor Lab™

Analyzer for liquid steel and
hot metal, featuring the innovative
QUBE wireless system

Electro-Nite

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hot metal, featuring the innovative
QUBE wireless system

Applications

The *i*ntuitive **M**olten **M**etal (*i*M^2) Sensor Lab™ is a versatile and precise measuring instrument with a wide range of uses, depending on the sensor attached.

- In hot metal: measuring temperature, determining sulfur and silicon

- In primary steel making: measuring temperature and oxygen, determining carbon

- In ladle metallurgy: measuring temperature, oxygen, and bath level, determining aluminium, FeO, and slag thickness

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eatnumber

702,9 °C

-200,0 mV

4,3 ppm

0,1869 %

o calc %

Measurement status

Electro-Nite   Login

Sensor Lab Features

- Easy-to-use controls with intuitive, menu-controlled navigation

- Wired operation with the option of wireless operation with the
  QUBE Wireless unit located on the end of the handlance or autolance

- One or two measurement places supported: either wired or wireless

- USB ports for uploading and downloading data using a memory stick

The *i*M² Sensor Lab™ comes in two versions - one with a built-in 8.4" colour
touch screen (external screen optional), the other without a screen (external
screen needed). An external screen can be connected to the *i*M² Sensor
Lab™ by a VGA cable. Additionally, multiple HMIs can be connected to the
*i*M² Sensor Lab™ by Ethernet. An HMI offers full control over the *i*M² Sensor
Lab™.

Each version

- displays measurement curves;

- carries out immersion lance insulation checks;

- has enough memory for 3000 measurements;

- has customized calculation formulas, which can be programmed
  by the operator;

- can display the history of measurement curves, and

- has programmable data transmission capability.

The *i*M² Sensor Lab™ also helps in determining the bath level in
steel casting and hot-metal ladles when using PLC travel-controlled
autolances, standard Heraeus Electro-Nite lance hardware, Positherm®
or Celox® sensors, or special Delta-Dist L® (DDL) sensors for
high-precision measurements.

Interfaces

Standard connections

- Two dual measurement inputs - thermocouple/EMF with DDL capability
- One Ethernet port
- Three USB ports - one on the front and two on the back
- One RS232/TTY serial Sub-D 25-pin male
- Eight AC relay/triac outputs - 230V(AC)/2A (active or passive lighting)
  Also, optional DC In/Out 16 channel (24V(DC)/0.5A PLC compatible)

Optional fieldbus connections

- Second RS 422/RS485 and RS232/TTY serial
- Profibus DP slave, Profinet IO device, Modbus RTU, Modbus TCP/IP,
  or Ethernet IP (using an extra real-time Ethernet connection)
- Digital outputs organized as BCD output (five digits + DP)
- Analog milliampere input (four channel)/output (four channel)

Wireless interface

A QUBE wireless unit can be attached to hand- or autolances to provide a wireless connection between the lance and the iM^2 Sensor Lab™ instrument. The QUBE wireless unit is located on the end of the lance. The unit removes the need for external compensation lance cabling, which results in improved usability, safety, and reliability. The battery-powered unit is small and rugged and is protected by a specially formed handle. The unit digitizes and transmits the temperature and EMF values to the iM^2 Sensor Lab™.

Safety benefits
- No cables lying on the shop floor (potential trip hazards)
- No maintenance on cabling in restricted and dangerous locations
- No lifting of heavy cables and cable spools

Cost benefits
- No cabling or connectors needed from the lance to instruments
- No installation and maintenance of conduit needed for cabling
- No diagnosing problems due to cabling

Measuring using the wireless unit

The measurement mode is activated when the handlance is picked up. The status of the wireless link is indicated. The individual sensor type attached to the handlance is automatically detected. The unit continues to measure for a predefined time after values have been detected, after which the unit goes into 'sleep' mode as long as no movement is detected.

The handlance with the wireless unit is portable, which means it can be used in more than one location. All the operator needs to do is select the new measurement location on the unit. There is no need to run any cables from the handlance to the iM^2 Sensor Lab™ in the pulpit.

Measuring using the QUBE unit on an autoloance

The QUBE is set to continuous operation and has no sleep mode.

The QUBE Wireless Suite

The QUBE wireless suite eliminates the need for expensive cabling between the measuring lance and the instrument in the control room. This results in improved safely and measurement reliability, while reducing overall costs. The iM^2 Sensor Lab™ can use any of the three different transmitters in the QUBE wireless suite:

- QUBE-T for temperature only measurements in the steel plant or foundry
- QUBE-O for temperature, oxygen, and carbon measurements in the steel plant.
- QUBE-L for temperature, oxygen, and carbon measurements as well as wireless bath level and DDL probe (slag thickness) measurements in the steel plant.

Each QUBE transmitter is rugged, light-weight, and has an IP65 sealed design. The built-in Location ID (channel) display has a push button to modify. Advanced electronics ensure reliable transfer of measurement data. Programmable motion sensor increases battery life.

QUBE Features

- Rugged aluminium enclosure with IP65 protection against dust and water
- Proprietary 2.4GHz internal antenna is protected against damage
- Long-life Lithium Ion rechargeable battery with built-in fuel gauge
- Reliable and fast battery charging station with feedback LEDs and self-cleaning blade contacts
- Designed for use with all Heraeus Electro-Nite immersion sensors
- Ergonomically designed handle with moulded, rubber grip
- Receiver box has built-in RS-232 and USB interfaces as well as long-range RS422 interface
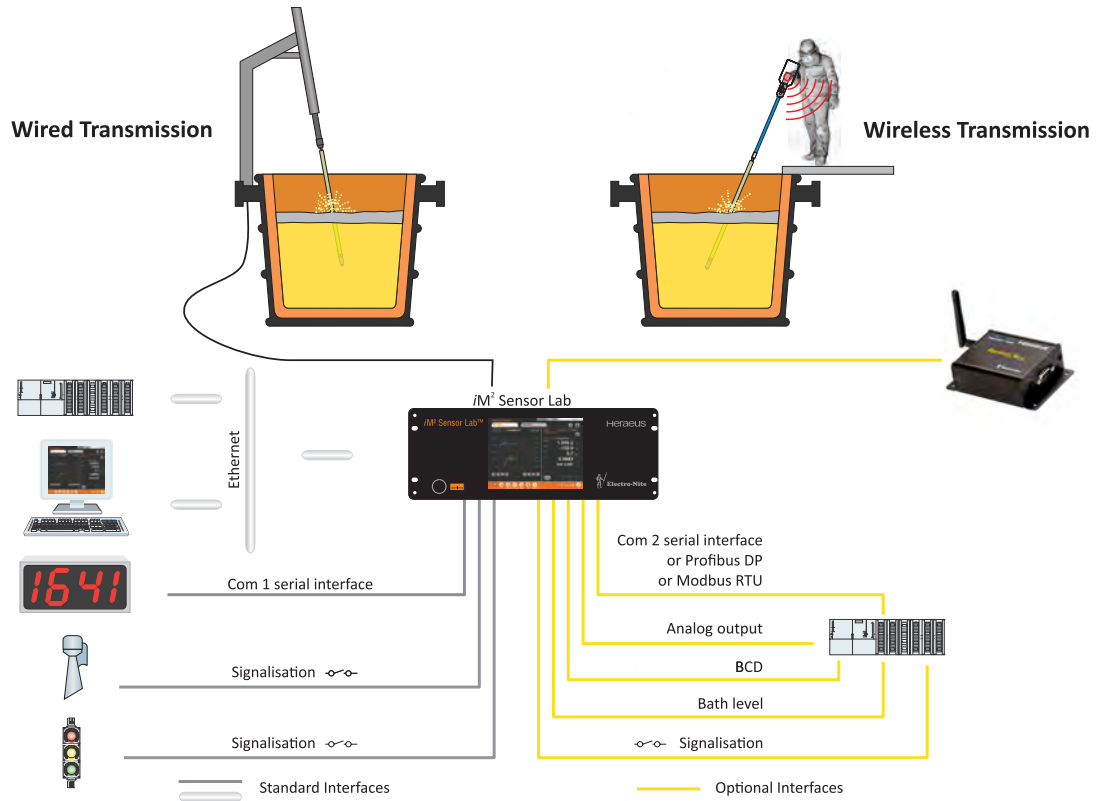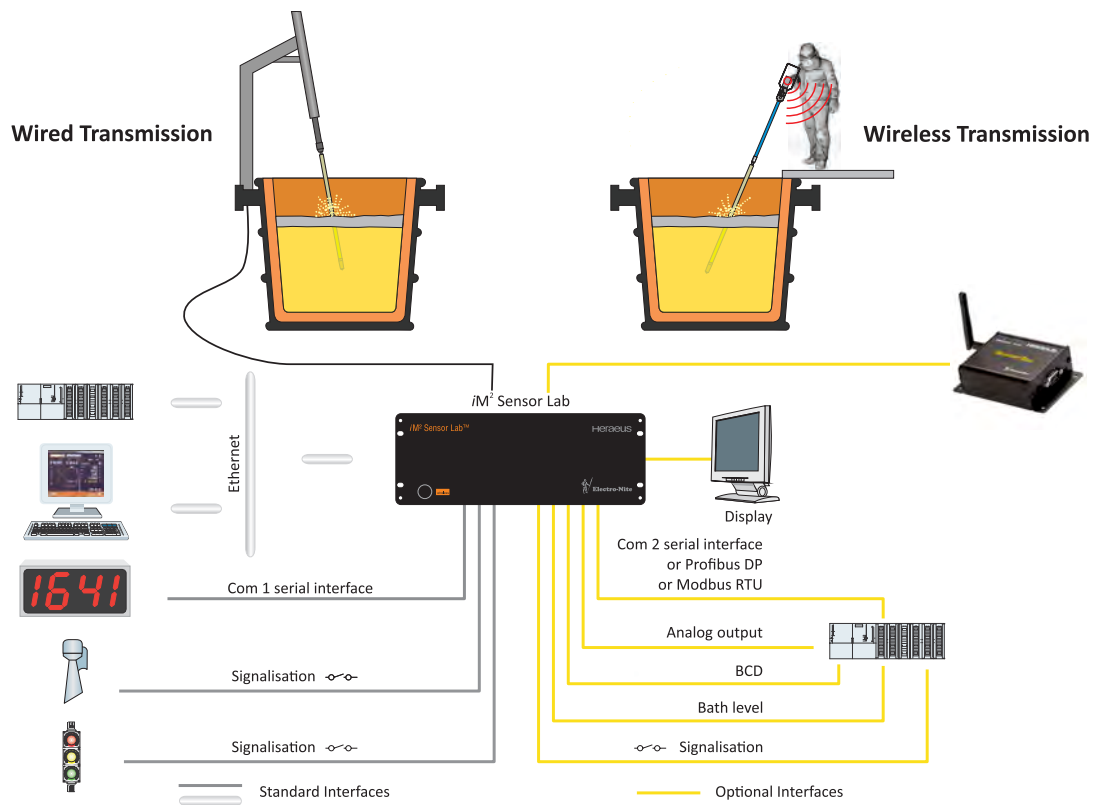
Receiver box

Battery and charging station

The following shows the *i*M² Sensor Lab™ with a **built-in touch screen:**

Wired Transmission

Wireless Transmission

Ethernet

*i*M² Sensor Lab

Com 1 serial interface

Com 2 serial interface
or Profibus DP
or Modbus RTU

Analog output

BCD

Bath level

Signalisation

Signalisation

Signalisation

Standard Interfaces

Optional Interfaces

The following shows the *i*M² Sensor Lab™ with **separate external screens:**

Wired Transmission

Wireless Transmission

Ethernet

*i*M² Sensor Lab

Display

Com 1 serial interface

Com 2 serial interface
or Profibus DP
or Modbus RTU

Analog output

BCD

Bath level

Signalisation

Signalisation

Signalisation

Standard Interfaces

Optional Interfaces

Wireless measurements can also be taken using an autolance.

Technical Data

*i*M² Sensor Lab™:		
Applications	Bath temperature, oxygen, carbon measurement	Bath level determination
Additional calculation function	Aluminium and FeO determination in steel slag	
Measurement input	Two individual measurement channels both for temperature and EMF	Each measurement channel with automatic probe recognition
Temperature measurement	T/c types S, R, and B	°C/°F, resolution 0.1°C/0.18°F
EMF measurement	+/- 1000mV	Resolution 0.1mV
Sample rate	Maximum 250/sec	
Accuracy	+/- 0.5°C (0.9°F) for thermocouples, 0.2mV for EMF signals	
Display	8.4-inch TFT colour display Resolution 800x600	For measurement results and menu display
Operation	Touch screen (on instrument or on HMI)	Menu controlled
Result storage	3000 measurements	
Data interfaces	Serial interface (additional serial interface optional) with TTY 20 mA/RS232 and serial connection for wireless (only connection to Receiver Box) LAN (Ethernet)	Serial interface with modem and programmable data transmission Ethernet interface with TCP/IP protocol and programmable data transmission
Heat number entry	Eight digits, input using touch screen	External input as additional using serial interface or Ethernet
Optional relay signal outputs	Ready, Measurement, Complete, Error Celox, End of data communication, Bath level, TXD Complete	2 x 8 relays, allocation programmable, max. 48V DC, max. 100mA, max. 24VA
Solid state signal outputs	Ready, measurement, complete, horn for both measuring stations	2 x 4 solid state relays, 100 – 240V, 47 – 63Hz, 100VA per output channel
Housing, dimensions and weight	Metal housing, height 4 HU for 19 inch rack mounting, panel or bench mounting Protection front IP54, protection housing IP51, weight approximately 13kg (28.6lb)	Dimensions: h = 178mm (7"), w = 482mm (18.9"), d = 365mm (14.4") built-in depth 450mm (17.7"), panel cut-out +1mm (0.039") h and w
Connections	All instrument inputs and outputs with plugs	
Operating range	Power supply, ambient temperature	100 – 240V AC, 47 – 63Hz, 160VA, 0°C (32°F) to 50°C (122°F)
Storage range	Ambient temperature, relative humidity	-20ºC (-4ºF) to 75ºC (167ºF), max. 90% RH non-condensing
Bath level determination	By evaluation of the measurement curve slope or Delta-Dist L® function	Bath level contact output potential-free contact max. 48V DC, 24VA
Profibus-DP	Industrial field bus	Freely programmable data telegrams
Ethernet-IP	Industrial Ethernet field bus	Standard protocol
Profinet	Industrial Ethernet field bus	Freely programmable data telegrams
Modbus	Field bus	Freely programmable data telegrams
Optional BCD output, with four outputs with valid pulses (maximum seven outputs possible)	Five digits with decimal point Four take over (valid pulses) for the first four data outputs	Data output programmable potential-free output using reed relays, active/on max. 48V DC, 24VA
Optional analog output with 2/4 data outputs	0/4 – 20mA = output range, galvanically separated, dynamic or memorized, output range programmable, load (burden) 0 to maximum 500Ω	Programmable data output Accuracy: 0.1% full scale

*i*M² Sensor Lab™ and QUBE:

Channel	Parameter	Positherm®	Celox®	Celox SLAC® (QuiK-Slag®)	Tap-Tip®	Econ-O-Carb®
0/2	Input type	T/c S, R, B	T/c S, R, B	Short circuit	T/c S, R, B	Open circuit
1/3	Input type	EMF	EMF	EMF + 50kΩ parallel	T/c S, R, B	T/c S, R, B

QUBE:

Measurement channels:	T = 1, O and L = 2
Measurement channel modes:	Thermocouple (S,R,B) EMF (-1V to +1V)
Accuracy:	Thermocouple: better than +/-0.5ºC (0.9ºF) at ambient between 0ºC (32ºF) and 50ºC (122ºF) (actual ºC or ºF values depend on thermocouple type) EMF: better than 0.2mV at ambient between 0ºC (32ºF) and 50ºC (122ºF)
LED indicators:	Power pack status and wireless link status
Power pack life:	Typically 1000 measurements or three days of continuous use
Radio range:	Over 100 line-of-sight meters depending on location
Operating range:	-20ºC (-4ºF) to 75ºC (167ºF)
Storage range:	-20ºC (-4ºF) to 75ºC (167ºF), max. 90% RH non-condensing
Protection:	IP65 (whether connected to the lance or not)
Size:	mm: length = 175, width = 66.7, height = 66.7 Inches: length = 6.9, width = 2.625, height = 2.625
Weight (without power pack)	930g (2.05lbs)

You can get further technical details from us. We can change illustrations and technical data without notice.

ISO 9001 CERTIFIED VINÇOTTE

ISO 14001 CERTIFIED VINÇOTTE

Certified Quality System
DIN EN ISO 9001:2000
DIN EN ISO 14001