



## iM<sup>2</sup> Sensor Lab™

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### Applications

The intuitive Molten Metal (iM<sup>2</sup>) 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

# Heraeus

Heraeus

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Heatnumber

702,9 °C

-200,0 mV

4,3 ppm

,1869 %

o calc %

Measurement status

Electro-Nite Login



## Electro-Nite



### 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 *iM*<sup>2</sup> 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 *iM*<sup>2</sup> Sensor Lab™ by a VGA cable. Additionally, multiple HMIs can be connected to the *iM*<sup>2</sup> Sensor Lab™ by Ethernet. An HMI offers full control over the *iM*<sup>2</sup> 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 *iM*<sup>2</sup> 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 autolance

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 safety and measurement reliability, while reducing overall costs. The *iM<sup>2</sup>* 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

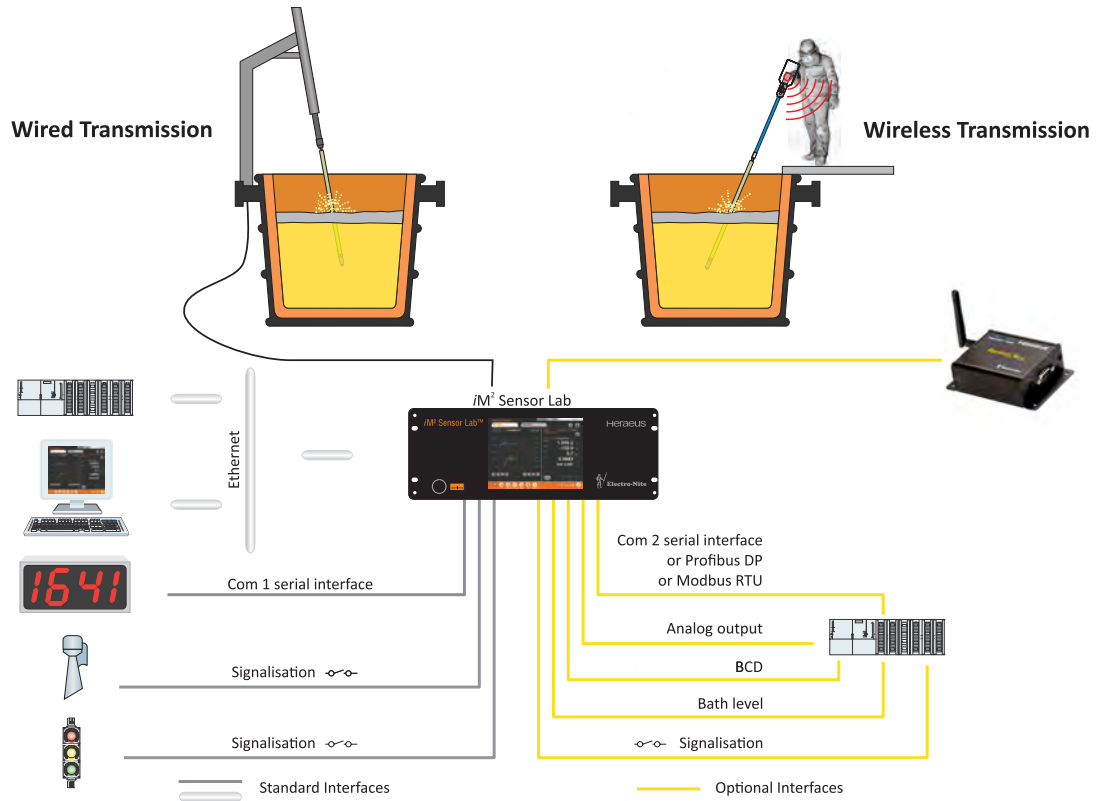


Battery and charging station

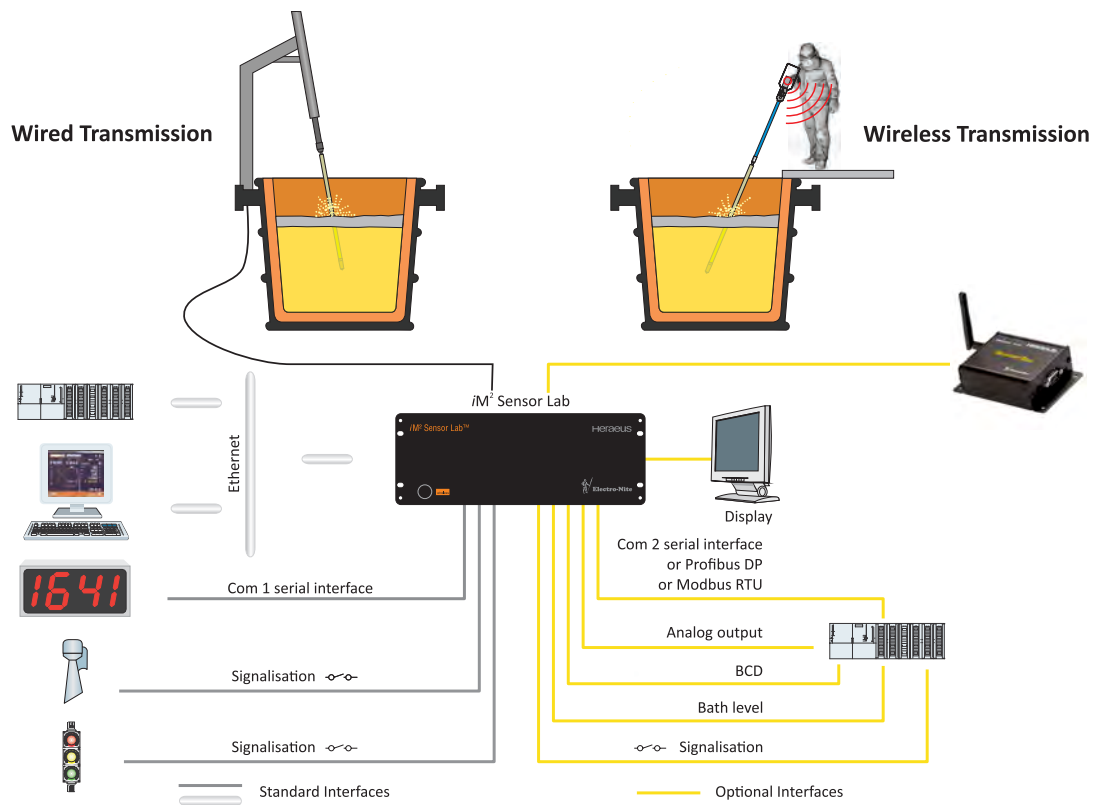




The following shows the *iM*<sup>2</sup> Sensor Lab™ with a built-in touch screen:



The following shows the *iM*<sup>2</sup> Sensor Lab™ with separate external screens:



Wireless measurements can also be taken using an autolance.

## Technical Data

<b>iM<sup>2</sup> Sensor Lab™:</b>		
<b>Applications</b>	Bath temperature, oxygen, carbon measurement	Bath level determination
<b>Additional calculation function</b>	Aluminium and FeO determination in steel slag	
<b>Measurement input</b>	Two individual measurement channels both for temperature and EMF	Each measurement channel with automatic probe recognition
<b>Temperature measurement</b>	T/c types S, R, and B	°C/°F, resolution 0.1°C/0.18°F
<b>EMF measurement</b>	+/- 1000mV	Resolution 0.1mV
<b>Sample rate</b>	Maximum 250/sec	
<b>Accuracy</b>	+/- 0.5°C (0.9°F) for thermocouples, 0.2mV for EMF signals	
<b>Display</b>	8.4-inch TFT colour display Resolution 800x600	For measurement results and menu display
<b>Operation</b>	Touch screen (on instrument or on HMI)	Menu controlled
<b>Result storage</b>	3000 measurements	
<b>Data interfaces</b>	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
<b>Heat number entry</b>	Eight digits, input using touch screen	External input as additional using serial interface or Ethernet
<b>Optional relay signal outputs</b>	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
<b>Solid state signal outputs</b>	Ready, measurement, complete, horn for both measuring stations	2 x 4 solid state relays, 100 – 240V, 47 – 63Hz, 100VA per output channel
<b>Housing, dimensions and weight</b>	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
<b>Connections</b>	All instrument inputs and outputs with plugs	
<b>Operating range</b>	Power supply, ambient temperature	100 – 240V AC, 47 – 63Hz, 160VA, 0°C (32°F) to 50°C (122°F)
<b>Storage range</b>	Ambient temperature, relative humidity	-20°C (-4°F) to 75°C (167°F), max. 90% RH non-condensing
<b>Bath level determination</b>	By evaluation of the measurement curve slope or Delta-Dist L@ function	Bath level contact output potential-free contact max. 48V DC, 24VA
<b>Profibus-DP</b>	Industrial field bus	Freely programmable data telegrams
<b>Ethernet-IP</b>	Industrial Ethernet field bus	Standard protocol
<b>Profinet</b>	Industrial Ethernet field bus	Freely programmable data telegrams
<b>Modbus</b>	Field bus	Freely programmable data telegrams
<b>Optional BCD output, with four outputs with valid pulses (maximum seven outputs possible)</b>	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
<b>Optional analog output with 2/4 data outputs</b>	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



**iM<sup>2</sup> 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:**

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

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



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