

·:: Sigicom



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Making challenging and complex measurements easy

Sigicom is a leading supplier of measurement technology, serving a large number of customers. Our solutions are being used in many key infrastructure projects in urban areas.

Since its humble origins almost four decades ago, Sigicom has grown to become one of the most trusted and sought after manufacturer of robust measurement equipment for remote monitoring of environmental disturbances. In the early 80's vibration monitors, seismographs and sound level monitors comprised the main thrust of our business. In more recent times we have expanded our products portfolio adding additional dynamic and static sensors. Thanks to the company philosophy of working close with and listening to our customers, never shying away from demanding or challenging requests; our products have improved and our company has acquired unique excellence in these areas.

Today Sigicom is an independent and privately owned company with focus on providing the most up to date and cost efficient equipment for remote monitoring of environmental disturbances from infrastructure projects. Development of autonomous robust measuring equipment and the accompanying software for presentation and reporting are areas to which we devote great attention, time and energy. Sigicom is actively involved in several standardization committees around the world, giving us the opportunity to provide our customers with the most competitive equipment on the market

Reliable in harsh environments

All our equipment is robust and reliable, built to endure the harshest environments, withstanding cold Nordic winter nights as well as the Australian summer's heat at high noon. Sigicom provides complete solutions for your measurements including hardware, software and web interaction for compilation and presentation of measurement data. Sigicoms INFRA system is modular, flexible and built to last; it is fully automated and

transmits data via an internet connection, allowing the measurement consultant to control numerous instruments simultaneously.

A flexible solution

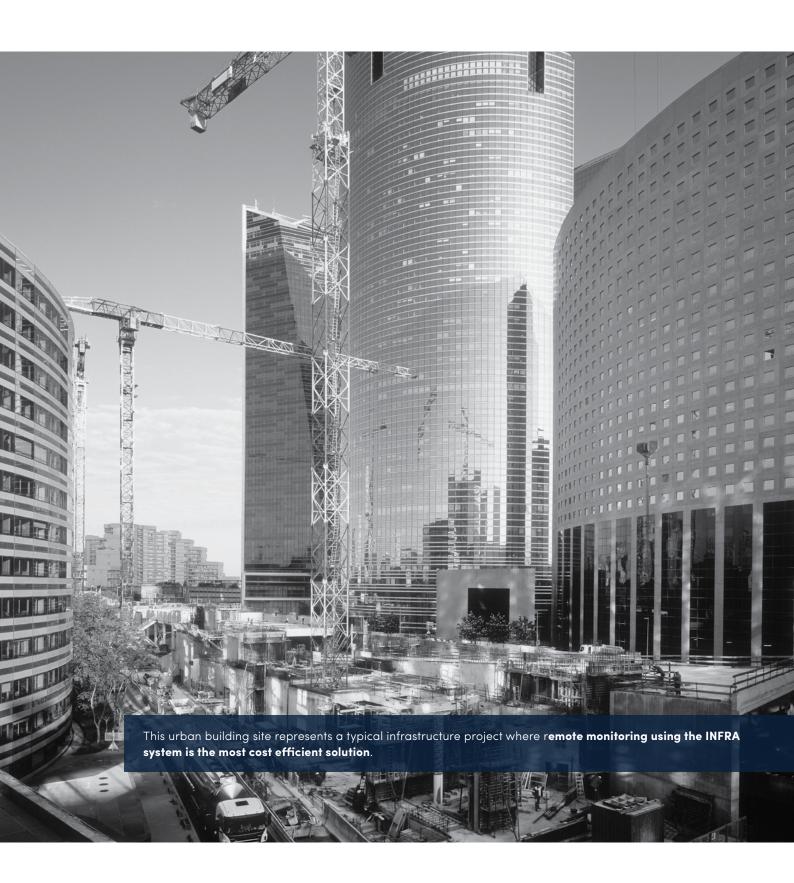
As a measurement consultant using Sigicom's Plug & Measure sensors you can easily connect various sensor types that you need for your project, for example a sound level meter, a geophone and an air blast sensor on the same bus cable to one of our data loggers. Toggling between various measurement standards is easy and possible since the digital signal processing is done in the sensor itself. Measurement standards and other parameters can be changed remotely from your computer in the comfort of your office without having to be at the job site.

You can easily view your measurement results in illustrative tables and charts using INFRA Net. Simultaneously stakeholders (construction manager), and you can receive automatic SMS and e-mail alarms when limits are exceeded, battery level is low, cable loss and more.

INFRA Academy & Our Services

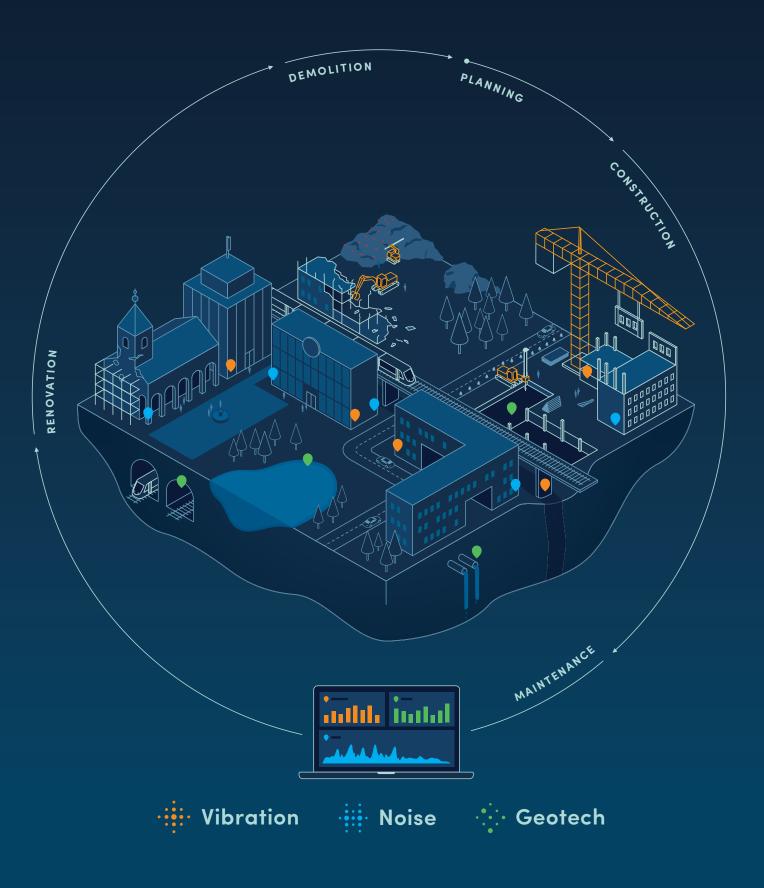
Sigicom provides "INFRA Academy", an education to our customers ensuring you the best possible start with your new INFRA system.

As a customer you can always contact us for support and advice. Our highly skilled engineers will guide and support you through unforeseen situations that can occur when measuring. We provide state of the art calibration and service of INFRA equipment to ensure measurement accuracy and instruments reliability.

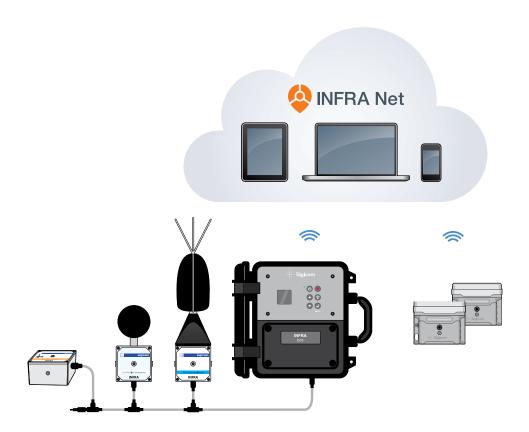


Building lifecycle

Keep track of the environmental impact with the INFRA system.



INFRA – A complete system for remote construction site monitoring



INFRA System

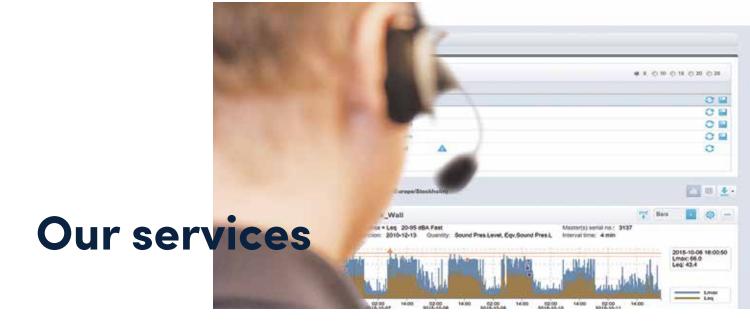
The cabled system is comprised of a data logger and digital sensors. A series of available sensors can be connected to a single data logger that stores and communicates data. For cablefree solutions, we offer wireless vibration monitoring equipment.

Automatic communication

Measurement data are transmitted at pre-set time intervals or when an event occurs. Data is automatically sent to INFRA Net over the Internet and an alarm is sent as an SMS to selected recipients. The system can be remotely controlled from INFRA Net.

Multistandard

The dynamic sensors have digital signal processing and measures according to national and international standards. Signal processing is done through our software which makes it easy to add new or updated standards.



Calibration

Calibration service is second nature to Sigicom as a supplier of quality measuring instruments. Therefore, we track the calibration schedule for all sensors that we have delivered and we can give the customer an automated reminder before re-calibration is required.

Customers also have the option of sending the instruments to our calibration laboratory for service.

Only the INFRA sensors needs to be calibrated.

Calibration

Telephone: +46 8 44 99 750 calibration@sigicom.com

Service & Repair

If the need for service arises, for example due to damage to an instrument, we can always be at help.

INFRA-sensors and data loggers can be sent to Sigicom for repair or other service. We have excellent troubleshooting routines. After repair, upgrade or service – and if required – we will automatically calibrate the instrument before it is returned to the customer.

Service & Repair

Telephone: +46 8 44 99 750 service@sigicom.com

Support

We consider an active and effective support department as part of our mission to provide the best functionality and reliability of the measurement systems we deliver.

Every support request we receive is registered in our case management system. All activities and status of each case entered in the system stay active until the case is resolved.

Our phone support is open weekdays (CET) 9–16 (closed for lunch 12–13).

Support

Telephone: +46 8 44 99 770 support@sigicom.com



Training

INFRA Academy Basic is a training program for the INFRA system. These not only provide the participants with training, but offer the chance to get to know Sigicom's calibration, service, development work and other information concerning the INFRA-system. There will also be time for questions and discussions.

Training goal

After the course, you will be able to install an INFRA measurement system, launch and remotely control the equipment. You will also be able to retrieve data and create your reports.

A continuous exchange between theory and practical exercises guarantees both knowledge of the system and the ability to use all the advantages of the system.

Participants

This course is for consultants who will be using the INFRA system.

Contents

Theory and practical exercises:

- General information on what you measure and which rules exist
- Information regarding standards
- General description of the INFRA system
- Presentation of INFRA Net, the online database and user interface
- Installation of a measuring system
- Practical exercises with the installation and start-up of the sensors and data logger
- Practical exercises with INFRA Net

Education

Telephone: +46 8 44 99 750 sales@sigicom.com

Keeping you up to date





Website

On our website you can always access the latest news and interesting articles regarding current events and new product launches. This information is available in English, Swedish, and now also in French.



Stories

Here we publish interesting, relevant and educational customer cases from challenging situations all around the world where our customers have benefited from using Sigicom's INFRA system.



News

News is a digital newsletter bringing you the latest news and information from Sigicom. Sign up on our web page and you will be among the first to know the latest.

LinkedIn in

Sigicom updates the information of our solutions, products and company on Linkedin. You even find the latest information regarding construction site monitoring. Please follow our LinkedIn page.

https://se.linkedin.com/company/sigicom-ab

Products



On the following pages, when this symbol appears it means that a separate datasheet is available. Please contact Sigicom to request datasheets and more information on specific products.



Internet based measurement database

2150 **INFRA** Net

Dashboard

General overview/diagnostics

Projects

Create and customize projects

Data reports

Advanced bar graphs view

Messages

Create and customize messages

Hardware

Remote control & check system status

Users

Manage customer access

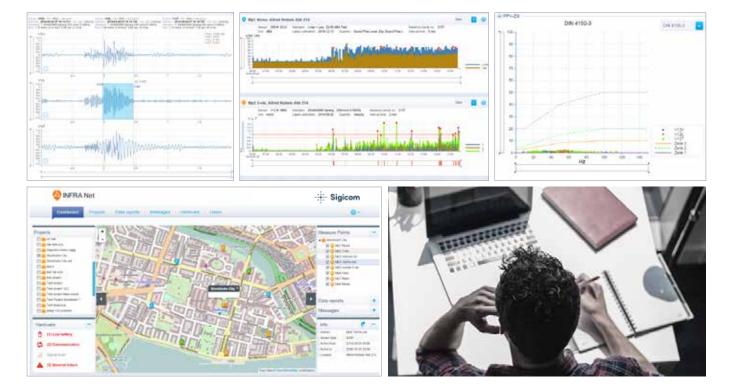
INFRA C20/C22 and INFRA Point

With INFRA Net you can view real time data and information from your INFRA systems online. It is easy to manage a large number of INFRA Systems with INFRA Net. By building, administrate and report your projects directly in INFRA Net you will save time and increase your productivity. Based on the projects and measurement points you can easily extract reports in PDF format that can be sent directly to your

customer. The web application contains a powerful analysis function allowing you to generate different types of charts and curves

from transient and interval data. INFRA Net's remote control enables you to change measurement settings, connection schedule and much more directly from your office or anywhere you have an Internet connection. Interactive presentation of data, smart and flexible alerts/alarms transmitted from INFRA Net via e-mail or SMS directly to you or other stakeholders.







- Present your data
- Easy to give your customer access to view projects and data
- · Dashboard with an overview of Projects, Measure points, Hardware, Data reports and Messages
- INFRA Live to present streamed measurement data
- INFRA Messages to send server data text messages and e-mails
- Reporting: Use the powerful project report function or report from single sensors
- Projects: From sensor to reports, create, change and view your projects
- Remote control: Change settings such as measurement standard, threshold, recording time, interval time, connection schedule and alarm beacon settings
- Service messages: Get alarms on low battery, GSM coverage, cable loss and other critical information
- Equipment: Provides an overview of the INFRA systems health
- Customers: Build your customer database and get the right information on your reports
- INFRA Net API allows programming access to measurement data through a REST API
- GPS position for INFRA C20/C22 and INFRA Point

NEW



Get in touch with your local sales representative, they will walk you through the new INFRA Net Beta.

Take a glimpse at the future of INFRA Net

We are constantly working to improve your INFRA experience. Behind this new approach lays your feedback and requirements that we wish to fulfil.

With INFRA Net Beta you can:

- Access your devices through the new INFRA Net Beta
- Use the new part of INFRA Net in a mobile-friendly view
- Mark and filter your devices as favourites
- Find devices, filter warnings and get locations through the map
- Get a summary of your "Monitoring On" days for your devices

This is the first glimpse to the new INFRA Net experience. We hope that you through this Beta version can see the future we are about to create

INFRA Net API



Allows INFRA Net customers access to measurement data – for their own presentation systems. The INFRA Net API allows programming access to measurement data through a REST API.

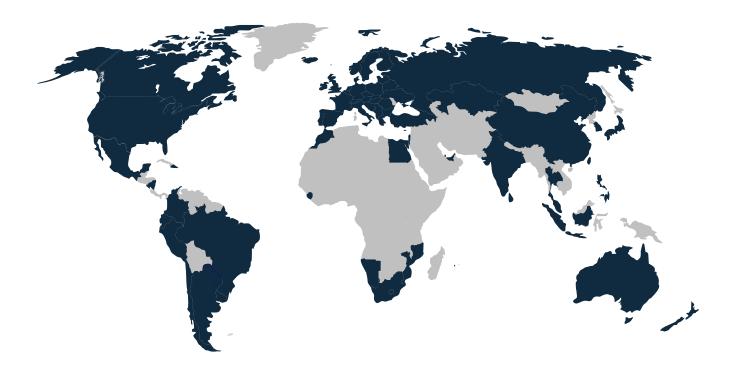
The API is aimed for customers who are interested in using data from INFRA Net for software development and implementation in their own presentation system and/or for customized analyzation of the data.

Advantages for INFRA Net API:

- Quick & easy access to measurement data for use in your own presentation system
- · Secure authorisation of access to your data
- Total system redundancy
 - Fire proof
 - Daily back-up
 - Measurement data redunancy
 - Power outage redundancy
 - Server redunancy
 - Network outage redundancy
- Low cost of data ownership
- Make data searches & update them
- JSON Output



INFRA Global Communication solution



Advantages:

- Analyze and monitoring
- Fixed cost and text messages
- Communication issues will be handled direct by Sigicom's support team
- Put your communication accounts on hold when no measurements are planned

INFRA SIM



All INFRA Systems can be delivered with a SIM card and the customers configuration for sending data to the INFRA Net web application.

This communication solution provides global roaming in more than 100 countries with more than 200 mobile operators.

Fixed cost per month that includes SMS from INFRA Net messages.

Support cases involving communication will be handled directly with Sigicom Support team instead of the local mobile operator. It will be possible to put your communication accounts on hold when no measurements are planned.

Contact Sigicom for a list of countries with coverage.

The wireless system









The **world's smallest** wireless vibration monitor

INFRA Compact is a complete automated vibration monitoring in a small package. Benefit from a cost-effective system with everything from sensor to communication and web application –

no cables required!

Vertical Wireless Vibration Monitor





Advantages:

- Excellent battery performance –
 Even in low temperatures
- Rechargeable batteries
- Multi button keypad
- Color display
- Remote firmware upgrade
- Built-in 4G modem
- GPS



5220

INFRAC20

The INFRA C20 is Sigicom's latest innovation. The brand-new hardware platform utilizes the latest technologies, such as modular communication, OLED color display and built in Gps. This will provide long service life in harsh conditions with unparalleled reliability.

The INFRA C20 with geophones and a data logger built into the same wireless unit. The monitor works with INFRA Net in the same way as the other INFRA sensors and data loggers. Extreme low power consumption gives the INFRA C20 up to **seven months** of measurement time, well ahead of all similar systems on the market.

1620 Li-ion Battery for INFRA C20/C22 2 batteries required (batteries not included)

1436 Additional SD Card

Measures:

- Vibration
- Vibration on sensitive electronic equipment in buildings
- Human Comfort



1620 Li-ion Battery B50

Datasheet available

Accessories - C20/C22



1682 Power Supply



1677 External Battery Cable1615 Adapter cable



1628 Battery Charger, Li-ion (B50/B100)



1257 External Antenna Connector **1250-1** External Antenna



1679 Solar Panel Solution1615 Adapter cable



1832 Protection Cover

Triaxial Wireless Vibration Monitor





Advantages:

- Excellent battery performance Even in low temperatures
- Rechargeable batteries
- Multi button keypad
- Color display
- Remote firmware upgrade
- Built-in 4G modem
- GPS



5222

INFRA C22

The INFRA C22 is Sigicom's latest innovation. The brand-new hardware platform utilizes the latest technologies, such as modular communication and OLED color display. This will provide long service life in harsh conditions with unparalleled reliability.

The INFRA C22 with geophones and a data logger built into the same wireless unit. The monitor works with INFRA Net in the same way as the other INFRA sensors and data loggers. Extreme low power consumption gives the INFRA C22 up to **four months** of measurement time, well ahead of all similar systems on the market.

1620 Li-ion Battery for INFRA C20/C22 2 batteries required (batteries not included)

1436 Additional SD Card



- Vibration
- Vibration on sensitive electronic equipment in buildings
- Human Comfort



1620 Li-ion Battery B50

Datasheet available

Accessories - C20/C22



1815-1 Leveling Plate



1888 Transport Case



1821 Mounting Plate



1895 Tool Kit with Case



1810-11 Ground Spike Conical



1870 Ex/ATEX Protection Box







Advantages:

- Up to 12 months of continuous monitoring on internal rechargeable **batteries**
- Built-in 4G modem
- OLED color display
- · Simultaneous bar graph and waveform monitoring
- Remote firmware upgrade
- Digital signal processing
- GPS

5000

INFRA Point

INFRA Point is a vibration monitor with a small, robust and traceable sensor, vertical or triaxial geophone.

The INFRA Point is built on a brand-new hardware platform utilizing the latest technologies, such as modular communication. This will give you unparalleled reliability as well as being future proof. INFRA Point has up to 12 months of continuous monitoring on internal rechargeable batteries (for the vertical geophone).

The monitor works with INFRA Net in the same way as the other INFRA sensors and data loggers.

1621 Li-ion Battery for INFRA Point, 2 batteries required (batteries not included)

1436 Additional SD Card

Measures:

- Vibration
- Human Comfort

Note! This product is only available in Sweden, Norway and Finland.

Datasheet available



Accessories - INFRA Point



1621 Li-ion Battery INFRA B100





1851 Wall Mount



1628 Battery Charger, Li-ion (B50/B100)



1891 Tool Kit with Case



1002, 1005, 1015 INFRA Point Cables (Available in different lengths)



Connect a vertical or triaxial sensor



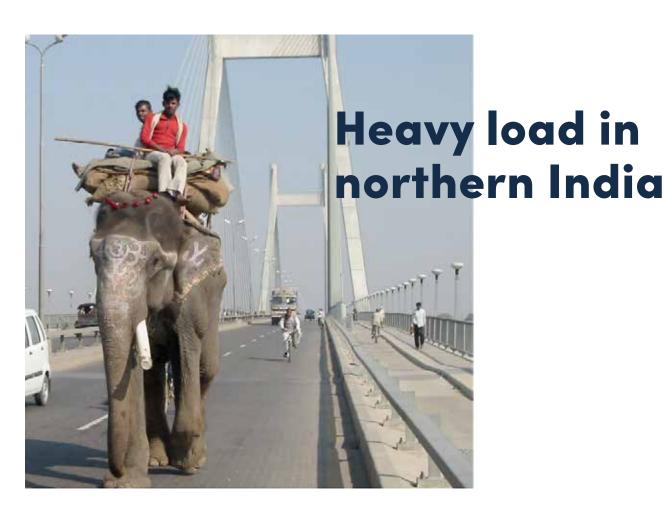
5110

INFRA Point Vertical geophone
The geophone is a small
lightweight vertical geophone
that can handle the majority of
measurement standards.



5112

INFRA Point Triaxial geophone
The geophone is a small
lightweight triaxial geophone
that can handle the majority
of measurement standards.



How COWI ensured reliable safety data

In 2012 the international consultancy company COWI was asked to propose a solution for a low-cost structural health monitoring system (SHMS) for the Naini Bridge. The elegant cable-stayed bridge connects the cities of Allahabad and Naini across the Yamuna River in the Uttar Pradah region.

Originally designed by COWI engineers, the bridge had already been in operation for eight years. Says Ken Grønne Andersen, monitoring specialist at COWI: "This bridge must endure extreme heat waves and heavy traffic loads. The National Highway Agency of India (NHAI) was very foreseeing to request a system that ensured its continued optimal performance. This initiative was well in tune with NHAI's strategy for operation, and especially maintenance of the bridge. Parameters to be monitored included longitudinal movements of the pylons and structural performance of critical bridge joints as well as traffic loads in order to assess the frequency and potential consequences of overload."

Unattended system

A vital part of the SHMS solution is a robust Sigicom system, comprising several outdoor contact extensometers connected to an INFRA Master data logger unit. This system, post-installed in 2012, was an upgraded version of the original installation that had been part of the original bridge design.

Operational challenges included frequent power outages in the region, but the system continued to perform without a single breakdown and without any loss of data until January 2018 when the external leadacid backup battery collapsed and was replaced. Once the battery was replaced, the Sigicom system continued to monitor without any problems.

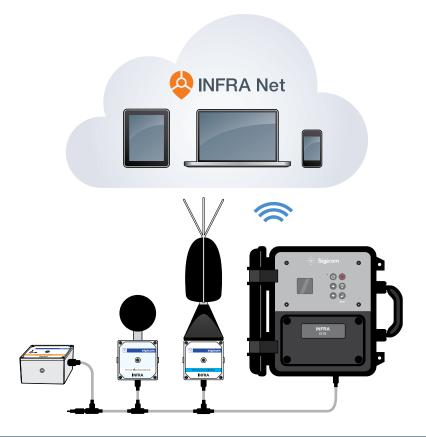
Anonymised data chart

Apart from the annual site inspections and planned maintenance, including cleaning of the sensors, the system itself was completely unattended.

The low-cost structural health monitoring system fulfilled its purpose by providing valuable data for NHAI, and thereby supporting operation and maintenance of the bridge.

"In more general terms we see a great need for, and value in, post-installed monitoring systems. Beyond system intelligence and cost-efficiency they need to be robust enough to be applied in remote locations without compromising the high-quality data output", says Ken Grønne Andersen.

The cabled system



Connect many different sensors to one data logger

The cabled INFRA System is comprised of a data logger and digital sensors. The data logger is built with internal battery, it stores and communicates data. A serie of available sensors can be connected to a single data logger.

Just plug and measure.



- Vibration
- Vibration on sensitive electronic equipment in buildings
- Sound level
- Dust
- Air blast
- Speed measurement

Connect many diffrent sensors to one data logger

5010 INFRA D10

INFRA D10 is a digital data logger with high capacity data storage and flexible communication capabilities. It has built-in 4G modem with 3G and 2G fallback.

All data is buffered on the memory card and is sent when the next cellular communication takes place.

If cellular communication is not possible, data is kept for later transfer.

SMS can be sent directly from the data logger to one or several recipients. Both SMS and e-mails can be sent from INFRA Net.

Project administration, data presentation, reports, analysis and graphs can easily be performed with INFRA Net software.

1621 Li-ion Battery for INFRA D10, 2 batteries required (batteries not included)



1621 Li-ion Battery B100

Accessories - D10



1682 Power Supply



1851 Wall Mount



1628 Battery Charger, Li-ion (B50/B100)



1677 External Battery Cable1615 Adapter cable



1679 Solar Panel Solution1615 Adapter cable



1100... INFRA Sensor Bus Cable (Available in different lengths, please see page 46.)



Measures:

- Vibration
- Vibration on sensitive electronic equipment in buildings
- Sound level
- Dust
- Air blast
- Speed measurement
- Crack displacement
- Ground water level
- Pore pressure
- Wind speed and direction
- Rain intensity
- Air temperature

Data logger with built-in communication

4030

INFRA Micro

INFRA Micro is a complete digital data logger with built-in GSM/GPRS modem or the option to connect an external modem. The INFRA Micro is equivalent to other INFRA data loggers and the external modem is controlled by automatic power switch. The data logger has one connection for the INFRA bus cable were sensors are connected. The front panel has four buttons (easy operation) and a LCD screen with 4 lines, each can display up to 20 characters.

INFRA Micro is powered by an external lead-acid battery housed within the enclosure and can be connected to an external power source e.g. solar panel, deep cycle marine battery. The data is stored on the internal CompactFlash card and automatically sent to INFRA Net.

The INFRA Micro contains no measurement electronics and needs no calibration.

A serie of available sensors can be connected to a single data logger.

(Lead-acid battery not included)

Accessories - Micro



1672 Battery Eliminator



1853 Bracket



1679 Solar Panel Solution1618 Adapter cable



1862-1 Pole/Wall Mount Kit



1891 Tool Kit with Case

Vertical Geophone V10

- INFRA V10 is a digital Geophone that can handle the majority of measurement standards including acceleration and comfort measurement
- Dimensions: 78 x 78 x 45 mm $(3.0 \times 3.0 \times 1.8 \text{ in})$ excl. pads and connector
- Weight approx. 500 gram (1.1 lbs)
- Maximum vibration level: 250 mm/s
- Frequency range: 1 500 Hz
- Protection class: IP67
- Designed for mounting on floor or wall. Equipped with mounting holes, both vertical and horizontal. Various mounting accessories are available.



Datasheet available



3112

Triaxial Geophone V12

- INFRA V12 is a digital Geophone that measures vibrations from blasting, piling, sheet piling, excavation, compaction and traffic according to standards
- Dimension: 102 x 78 x 75 mm $(4.0 \times 3.0 \times 2.9 \text{ in})$ excl. pads and connector
- Weight approx. 1200 gram (2.6 lbs)
- · Maximum vibration level: 250 mm/s
- Frequency range: 1 500 Hz
- Protection class: IP67
- Designed for mounting on floor, wall or on a comfort measuring plate. Equipped with mounting holes, both vertical and horizontal. Various mounting accessories are available.



Datasheet available



3112 - 1

Inverted Triaxial Geophone V12R

- INFRA V12R is a digital Geophone with the same specifications as the triaxial V12 – but designed for mounting in the ceiling or in tunnel roofs
- Dimension: 102 x 78 x 75 mm $(4.0 \times 3.0 \times 2.9 \text{ in})$ excl. pads and connector



3112-2

Triaxial Borehole Geophone V12B

• INFRA V12B is a cylindrical Triaxial borehole geophone. It is used together with an signal processing box that is directly connected to the INFRA bus cable. It has technical data similar to the Triaxial geophone V12. Cable length between sensor and electronics is up to 50 meters.

• Sensor diameter 50 mm (1.97 in)

3112-2 — Triaxial Borehole Geophone V12B

3112-3 — Cable for borehole geophone

Accessories: **1805** Tip for quick clay **1806** Tool for quick clay tip



Sound Level Meter S50 Class 1

- INFRA Sound Level Meter class 1. Measures sound levels outdoor, indoor and structure-born sound.
- The sound level meter measures the equivalent, or average, sound pressure level Leg. In addition, it measures the instantaneous, maximum and peak sound levels Lmax, at the same time. The interval time can be set from 1 second to 60 minutes.
- Measuring range 20-130 dB in four ranges, each with a dynamic range of 75 dB
- When triggered, a sound clip up to 10 sec. will be
- Weighting: dBA & dBC
- Time constant: fast, slow and peak
- Dimensions: 78 x 270 x 70 mm (3.0 x 10.6 x 2.9 in) excl. pads, connector & bird spikes
- Weight approx. 750 gram (1.7 lbs)
- · Designed for vertical mounting on a wall, pole or tripod Various mounting accessories are available







2851

Sound Level Meter S51 Class 1

-with infrasound capabilities

INFRA Sound Level Meter class 1. Measures sound levels outdoor, indoor and structure-born sound.

- The sound level meter measures the equivalent, or average, sound pressure level Leg. In addition, it measures the instantaneous, maximum and peak sound levels Lmax, at the same time. The interval time can be set from 1 second to 60 minutes.
- Measuring range 20-130 dB in four ranges, each with a dynamic range of 75 dB
- When triggered, a sound clip up to 10 sec. will be recorded
- Weighting: dBA, dBC and dBG
- Time constant: fast, slow and peak
- Dimensions: 78 x 270 x 70 mm (3.0 x 10.6 x 2.9 in) excl. pads, connector & bird spikes
- Weight approx. 750 gram (1.7 lbs)
- · Designed for vertical mounting on a wall, pole or tripod Various mounting accessories are available







Air Blast Microphone S10

- INFRA Air Blast Microphone S10 measures air blast pressure to valid national and international standards
- It measures both maximum values for each minute and also a complete air blast record
- Measures up to 2000 Pa with a resolution of 0.5 Pa
- Dimensions: 78 x 158 x 65 mm $(3.0 \times 6.2 \times 2.6 \text{ in})$ excl. pads and connector
- Weight approx. 500 gram (1.1 lbs)
- Designed for vertical mounting on a wall, pole or tripod. Various mounting accessories are available





Datasheet available



2811

Air Blast Microphone S11

- INFRA Air Blast Microphone S11 is used when air blast pressures higher than normal are expected, for example in tunnel systems.
- Measures up to 7000 Pa
- Dimensions: 78 x 158 x 65 mm $(3.0 \times 6.2 \times 2.6 \text{ in})$ excl. pads and connector
- Weight approx. 500 gram (1.1 lbs)
- · Designed for vertical mounting on a wall, pole or tripod Various mounting accessories are available







2911

Accelerometer

When measuring vibrations, a piezoelectric accelerometer is sometimes easier to mount on sensitive equipment. It is also smaller than a geophone and not sensitive to the orientation.





Micro Triaxial Accelerometer

- INFRA 2912 is an extremely small accelerometer, developed for vibration monitoring of sensitive equipment. It is much smaller and lighter than a geophone and insensitive to magnetic interference. Typical applications are sensitive items like sculptures, paintings in churches and old buildings.
- It is possible to measure acceleration or particle velocity
- It is connected to the INFRA bus cable via the supplied connection box
- Dimensions:14 x 21 x 14 mm (0.6 x 0.8 x 0.6 in)
- Weight approx. 7.5 gram (0.26 oz)
- Depending on the subject and environment, the sensor is mounted with adhesive tape, wax or removable glue
- Not suitable for outdoor use





Dust Monitor X20DM2

INFRA X20DM2 Dust Monitor is a high quality sensor that simultaneously measures the following parameters:

PM10 dust concentration PM2.5 dust concentration PM1.0 dust concentration **TSP** total Suspended Particles

Intended for continuous monitoring of dust particles from demolition, construction works and traffic. Connects directly to an INFRA data logger with the INFRA bus cable. An alarm and/or alert can be automatically sent out as either e-mail or text message from INFRA Net when the predefined threshold on PM10 is breached. Interval time and alarm levels are selected via INFRA Net and can be handled remotely.

- Measurement range: PM10 and TSP 0.01–6000 μg/m³ PM2.5 and PM1 $0.001-600 \,\mu g/m^3$
- 100-240VAC power supply
- Operating Temperature -5°C to +40°C
- Dimensions: 370 x 320 x 180 mm (14 x 12 x 6 in)
- Weight: 10 kg (22 lbs)
- To be mounted on a vertical pole or on a wall. Various mounting accessories are available.

Accessories: 2550-2 Flow-meter



Datasheet available



3300

Gas Monitor

Harmful concentrations of gases may occur during construction. To protect workers and to ensure compliance to regulations, e.g. the air quality directive, the INFRA system can monitor and document air quality.

The INFRA Gas monitor is a modular system for continuous monitoring of various gases. Each monitor can house up to six sensors which measures different types of gases from the selection below (additional gas monitoring sensors are available upon request). The monitor can be directly connected to Sigicom's INFRA monitoring system with ready-made solutions for data communication, and web presentation of measurement data.

Gases:

- CH₄ (Methane)
- CO (Carbon monoxide)
- CO2 (Carbon dioxide)
- NO (Nitric oxide)
- NO2 (Nitrogen dioxide)
- SO2 (Sulfur dioxide)
- O3 (Ozone)
- VOC (Volatile organic compounds)

Additional gas detection units are available on request.









Speed Radar X20SR

The INFRA X20SR Speed radar offers a convenient way to measure speed on moving objects. Together with other parts of the INFRA system, it allows for monitoring correlation between the speed of a passing object and resulting environmental parameters such as noise and vibration.

The technology behind the INFRA X20SR is a licence free 24 GHz doppler radar, combining low power consumption and high sensitivity. Depending on conditions, the detection range is about 50 meters for a moving person and 140 meters for a vehicle. Conditions that might deteriorate performance are heavy rain and snow.

The sensitivity of the INFRA X20SR is a lobe towards the front of the device. It is essential to compensate for the angle between the device and the velocity of the target, as described in the manual. For easy adjustment of the direction towards the target the INFRA X20SR is equipped with a ball joint.

Only available in Europe.







Weather Station 4 Channel

INFRA X20WXT Weather Station is a small, lightweight and high quality sensor that simultaneously measures the following parameters:

- wind speed
- · wind direction
- · rain intensity or relative humidity
- air temperature

Select between two available standards, one presenting the measured quantities in SI-units, and the other in US-units.

All settings, such as Interval time, is selected via INFRA Net and can be handled remotely.

- Low power consumption
- Dimensions: Ø115 x 240 mm (Ø4.5 x 9.5 in)
- Weight: 650 gram (1.4lbs)
- Protection class: IP66
- Bird spikes included, to reduce the risk that birds interfere the wind and rain measurement
- Robust, because it contains no moving parts which is also a great benefit when simultaneously measuring noise
- To be mounted on a vertical pole or a horizontal cross arm

Accessories: 3242-2 Heating Solution







3244

Weather Station 2 Channel

INFRA X20WMT Wind Station is a small, lightweight and high quality sensor that simultaneously measures the following parameters:

- wind speed
- wind direction

It has two standards, one presenting the measured quantities in SI-units, and the other in US-units.

All settings, such as Interval time, is selected via INFRA Net and can be handled remotely.

- Low power consumption
- Dimensions: Ø115 x 140 mm (Ø4.5 x 5.5 in)
- Weight: 510 gram (1.1 lbs)
- Protection class: IP66
- Bird spikes included, to reduce the risk that birds interfere the wind measurement
- Robust, because it contains no moving parts which is also a great benefit when simultaneously measuring noise
- To be mounted on a vertical pole or a horizontal cross arm

Accessories: 3242-2 Heating Solution









2252-1...

Extensometer Sensor (outdoor)

INFRA Extensometer is a displacement sensor that measures movement between two bolts. Distance is measured with a moving bar.

- High protection level (IP67) for outdoor applications
- Measuring range: 0-100, 0-200 or 0-750 mm with a resolution of 0.01 mm (400µin)
- Connects directly to the INFRA bus cable

Available in lengths of:

- 2252-1 100 mm (3.9 in)
- 2255-1 200 mm (7.9 in)
- 2275-0 750 mm (29.5 in)







3222

Extensometer Sensor (Indoor)

INFRA Extensometer is a small sensor that can be glued to a surface or mounted with adhesive tape. It measures displacement up 10 mm with a resolution of 0.001 mm.

- The sensor is intended for indoor use only
- It has been used for monitoring of cracks in churches and other very sensitive buildings
- Connects directly to the INFRA bus cable



3247

Barometer Sensor

The barometer is used to monitor atmospheric pressure.

- Measuring range 300–1100 mbar, resolution 0.1 mbar
- Connects directly to the INFRA bus cable







Air Humidity and Air **Temperature Sensor**

Measures air humidity and air temperature with high accuracy even in tough environments like outdoor on bridges with sometimes 100% relative humidity. It is well proven in Nordic climate.

- Measuring range 0-100% relative humidity, resolution 0.1%, -40 to +70 degrees Celsius with a resolution of 0.1 degree Celsius
- Connects directly to the INFRA bus cable



Datasheet available

2571

Temperature Sensor

A temperature sensor for accurate measurement of temperature in air, water or in the ground. The sensor is based on a Pt100 element in a completely water tight metal body (IP68).

- Measuring range -50 to +120 degrees Celsius with a resolution of 0.01 degree Celsius
- Connects directly to the INFRA bus cable





2655-2, 2655-3

Groundwater Level Sensor

Measures water level with a high quality pressure sensor and automatic compensation for atmospheric

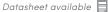
- Measuring range 0–1000 cm with a resolution of 0.5 cm
- · Connects directly to the INFRA bus cable
- Can be converted to pore pressure/ Piezometer sensor with adapter 2665 and weight 2666

Available with cable lengths of:

2655-2 - 20 meters (66 ft)

2655-3 - 30 meters (98 ft)







2665, 2666

Pore Pressure/Piezometer **Adapter & Weight**

Converts ground water level sensor 2655 to a pore pressure/Piezometer sensor.

- 2665 Pore Pressure Adapter
- 2666 Pore Pressure Weight



2668...

Pore Pressure/Piezometer Tips

System for measuring pore pressure in soil. The unique BAT-system is easy to install and use. Only the pore pressure/Piezometer tip and a standard tube is installed in the ground. There are no cables to handle during installation.

When the tip is installed a pressure sensor (2655-x with pore pressure/ Piezometer adapter and weight) is put into the metal tube. The sensor has a syringe in its lower end. When the sensor reaces the pore pressure/ Piezometer tip a rubber membrane is penetrated and the pore pressure is sensed. The sensor can be left for long term monitoring of the pore pressure.

- 2668 Pore Pressure Tip BATMKIII STD
- 2669 Pore Pressure Tip BATMKIII Hd
- 2671 Water Saturation Kit



AlarmBox X80

INFRA Alarm Box can be connected to an external warning flash light or siren and a battery.



3285

Alarm Beacon X85

INFRA Alarm Beacon is for example used to warn machine operators when piling, sheet piling or compacting. The alarm level can be set to a percentage of the trigger level (from 1 to 99%) — after each interval period the maximum value is compared to the alarm level and if the value is higher the alarm beacon flashes.

It can also be used for high levels when blasting. In this case the alarm level can be set between 100 and 1000% of the trigger level and the beacon flashes directly if the alarm level is exceeded.

The Alarm Beacon connects directly to the INFRA bus cable.

Charged with (art.no. 1673-1/1674-1)



Datasheet available 📕



3288

Wireless Alarm Beacon X88*

INFRA Alarm Beacon is for example used to warn machine operators when piling, sheet piling or compacting. The alarm level can be set to a percentage of the trigger level (from 1 to 99%) - after each interval period the maximum value is compared to the alarm level and if the value is higher the alarm beacon flashes.

It can also be used for high levels when blasting. In this case the alarm level can be set between 100 and 1000% of the trigger level and the beacon flashes directly if the alarm level is exceeded.

Charged with (art.no. 1673-1/1674-1)

*) Only for EU and Norway



Datasheet available





Battery Holder Kit Li-ion B100, INFRA Mini

A battery holder that you easily can use instead of the existing battery compartment in your INFRA Mini.

Two batteries (art.no. 1621–1) can be used simultaneous and it is possible to hot swap the batteries during monitoring.



1608-2

Li-ion Battery, INFRA C10/C12

- Internal Li-ion battery for INFRA C10/C12
- Weight approx: 100 gram (0.22 lbs)
- Capacity 21 Wh
- Needs a separate charger (art.no. 1675-1)



1610...

Lead-Acid Battery Cable

On all lead-acid batteries, this separate connection cable - with auto resetable thermo fuses on both poles - is needed.

- To be used in combination with the Battery charger for INFRA Master (art.no. 1673-1)
- To avoid unnecessary wear and tear on the battery terminals, we recommend to provide each battery with this cable and let it sit there permanently
- Available in size:

1610-0 - 4.75 mm (3/16")

1610-1 - 6.3 mm (1/4")

1610-2 - 6.6 mm (≈ 1/4") Cable Ring



1611

Lead-Acid Battery

- Lead Acid battery for Solar panel and INFRA Master
- Weight approx. 3,3 kg (7.3 lbs)
- Needs a connection cable (art.no. 1610-0) with auto resetable thermo fuses on both poles even when the battery is charged outside of the INFRA Master
- To avoid unnecessary wear and tear on the battery terminals, we recommend to provide each battery with the Connection cable (art.no.1610–0) and let it sit there permanently



Li-ion Battery B50

- Internal Li-ion battery for INFRA C20/C22
- Weight approx: 200 gram (0.44 llbs)
- Capacity 48.2 Wh
- Needs a separate charger (art.no. 1628)



1621

Li-ion Battery B100

- Li-ion battery for INFRA Mini/INFRA Point/INFRA D10
- Weight approx: 425 gram (0.94 lbs)
- Capacity 96.4Wh
- Needs a separate charger (art.no. 1628-0)
- For INFRA Mini fitted with the Battery Holder Li-ion (art.no. 1606-0)



1628

Battery Charger, Li-ion B50/B100

- · Charges two batteries at the same time
- Output 1.9A
- For indoor use only
- Intended for:

1620 Li-ion Battery B50

1621 Li-ion Battery B100



1672

Battery Eliminator, INFRA Micro

- Can be permanently connected during monitoring
- When the lead-acid battery is fully charged, the charger will automatically switch to maintenance charging



1673-1

Battery Charger, INFRA Master

- Can be permanently connected during monitoring
- When the INFRA Masters internal lead-acid battery is fully charged, the charger will automatically switch to maintenance charging
- Can also be used for charging a single battery. In that case, a separate connection cable (art.no. 1610–0) with auto resetable thermo fuses on both poles, is needed.



1674-1

Battery Eliminator, INFRA Mini/ Battery Charger, INFRA Alarm Beacon

Battery eliminator for INFRA Mini/X85/X88.

· Can be permanently connected during monitoring



1675...

Battery Charger, INFRA C10/C12

- Charges one separate battery at a time
- Output 1.3A
- Intended for indoor use only
- Intended for: Li-ion Battery, INFRA C10/C12 (art no. 1608-2)
- Power plug options:

1675-1 — Battery Charger EU

1675-2 — Battery Charger US

1675-3 — Battery Charger UK



1677

External Battery Cable

With this cable an external boat or car battery (12 volt) can be connected to the INFRA Master or INFRA C10/C12/C20/C22/D10 for extended monitoring time.

To connect INFRA C10/C12/C20/C22/D10 you need an adapter cable:
 1615 — Adapter cable

NOTE! When using an external battery, the internal lead-acid battery must always be disconnected.



Solar Panel Solution

A 10W or 25W solar panel will give a prolonged or continuously running system.

- One hour of full sunshine will give enough energy for up to 50 hours of monitoring
- Ilncludes a Built in battery (12V 9Ah) a charging regulator (peak efficiency >99%, self-consumption <0.12mA) and a power cable 10 meters (32.8 ft)
- The charging regulator prevents overcharging of the battery
- Available in size:

1679-0 — 280 x 335 x mm (11.0 x 13.2 in) 10W 1679-1 — 575 x 355 x mm (22.6 x 14.0 in) 25 W

 To connect INFRA Mini/Master you only need the included adapter. To connect INFRA C10/C12/C20/C22 or INFRA Micro you need an adapter cable:

1615-0 — Adapter cable (INFRA C10/C12/C20/C22/D10) 1618-0 — Adapter cable (INFRA Micro)

• Accessories: 1862-1, 1862-4 Pole Mount Kit

NOTE! When using an external battery, the internal lead-acid battery must always be disconnected.





1679 - 3

Solar Panel Door for INFRA Micro

A 10W Solar panel door for INFRA Micro Enclosure 30 will give a prolonged or continuously running monitoring system. One hour of full sunshine will typically give enough energy for up to 50 hours of monitoring.

Includes a charging regulator to prevent overcharging of the battery and a power cable.



1676

Power Supply, INFRA C10

Battery eliminator for INFRA C10

- Intended for permanent connection during monitoring
- Voltage 5VDC
- Intended for both in- and outdoor use



Power Supply, INFRA C12/C20/C22/Point/D10

Battery eliminator for INFRA C12/C20/C22/Point/D10

- Intended for permanent connection during monitoring
- Voltage 12VDC
- Intended for both in- and outdoor use



1102...

INFRA Point - shielded cable

INFRA shielded cable with stainless contacts for INFRA Point are available in lengths of:

- 1002 2 meters (6.6 ft)
- 1005 5 meters (16.4 ft)
- 1015 15 meters (49.2 ft)



1100....

INFRA Sensor Bus Cable

The INFRA Cable has moulded contacts that are waterproof (IP67) when connected according to instructions. The cable contains conductors for both data transfer and power supply for the sensors. The cable can be connected directly to any INFRA data logger and sensor.

- Total cable length in one system is max. 500 meters (1600 ft)
- Cabel diameter 7 mm (0.28 in)
- Please note that the drop cable length is max. 5 meters (16.4 ft)

Available in lengths of:

- 1100 0.3 meters (1 ft)
- 1101 1 meter (3.3 ft)
- 1102 2 meters (6.6 ft)
- 1105 5 meters (16.4 ft)
- 1115 15 meters (49.2 ft)
- 1140 40 meters (131 ft)
- 1175 75 meters (246 ft)



1230-2

T-coupling Shielded

The shielded T-coupling is used to connect one drop cable to the main cable. The connection is made in 90 degrees from the main cable.

• Please note that the drop cable length is max. 5 meters (16.4 ft)



1236-1

Termination Plug Shielded

Like all digital communication networks, the INFRA network needs to be terminated.

The INFRA Mini has one built-in termination point in the casing, but the INFRA Master requires a termination plug on the case (when using only one of the two available outgoing cable-connectors on the INFRA Master). If both of the connectors are used, then the Termination Plug is used at the end of each main cable.



1248

INFRA Cable tester

The INFRA Cable tester is used to verify functionality of INFRA Cables. The tester is a complement to the regular ocular control of the cables.

 You need a multimeter that can measure resistance and capacitance when using this tester



1472

Cable for Window Feed Through

A short flat cable for feed through when connecting through window frames/doorposts etc.



1892

Self Vulcanizing Tape

Used for insulating and protecting of cable joints.
Uninsulated joints should not be placed directly on the ground.



1710...

Sensor Bolts

For mounting of the different INFRA sensors, a M6 bolt is used (incl. nut and washer).

Available in lengths of:

- 1710 Short 80 mm (3 in) V10 wall/S50
- 1712 Long 100 mm (4 in) C10/C12
- 1714 Extra long 120 mm (5 in) V12 wall/floor
- 1717 Sensor bolt 150 mm (6 in) C20/C22



1720

Expansion Plug

- Expansion plug suitable for concrete, rocks, walls etc.
- Mounted in Ø8 mm (Ø0,3 in) predrilled holes
- M6 internal thread for sensor bolt
- Dimension: Ø8 x 30 mm (Ø0.3 x 1.1 in)



1740

Magnet Mount

Heavy duty magnet for mounting of Geophones, Air Blast Microphones, Sound Level Meters etc. Designed for mounting on for example steel columns.

- M6 internal thread for sensor bolt
- Dimensions: Ø89 x 28 mm (Ø3.5 x 1.1 in) incl. pads



1805, 1806

Tip and Tool for Quick Clay

Quick Clay adapter for INFRA Triaxial Borehole Geohone B12, to be used when monitoring in soft clay. Is needed to measure according to the NS8141–3:2014 standard.

1805 — Tip for quick clay

1806 — Tool for quick clay tip



Ground Spike Impact Protector

Protects the ground spike when using a hammer or a sledgehammer.



1810, 1811

Ground Spike Conical

For ground mounting of INFRA V10/V12, C10/C12 and C20/C22.

Ground Spike - 1810

- M6 internal thread for sensor bolts
- Length: 125 mm (4.9 in)

Extra long Ground Spike — 1811

- M6 internal thread for sensor bolts
- Length: 500 mm (20 in)



1812

Mounting Plate, INFRA V10

Can be fastened to a flat surface with double sided adhesive tape. Adapted for V10/V11 geophones.

 Dimensions: 78 x 43 x 12 mm (3.0 x 1.7 x 0.5 in)



1813

Mounting Plate, INFRA V12

Can be fastened to a flat surface with double sided adhesive tape. Especially adapted for V12 Triaxial Geophone. Can also be used for mounting geophones V10/ V11, S10 Microphone or S50 Sound Level Meter on a wall.

 Dimensions: 102 x 78 x 12 mm (4.0 x 3.0 x 0.5 in)



1815-1

Leveling Plate

Adjustable leveling plate. Intended for use with: INFRA V10/V12/C10/C12/C20/C22

- Intended for low frequency measurements only
- Can be fastened to a flat surface with the included bolt. For floor mounting only.
- Dimensions: 200 x 110 x 70 mm, incl. screws (7.9 x 4.3 x 2.8 in)



1817

Mounting Plate, INFRA C10/C12

Can be fastened to a flat surface with the included bolt. For floor mounting only.

• Dimensions: 175 x 90 x 12 mm (6.9 x 3.54 x 0.5 in)



1818

Mounting Plate, INFRA C20/C22

Can be fastened to a flat surface with double sided adhesive tape.

 Dimensions: 150 x 100 x 10 mm (5.9 x 3.4 x 0.4 in)



1820

Comfort Measuring Plate, INFRA V12/C12

Fulfills requirements for mounting and measuring of comfort levels with a V12 Geophone according to Swedish, Norwegian and German standards. Adjustable leveling plate. Also intended for use with INFRA C12.

- Dimensions: Ø150 x 35 mm (Ø 5.9 x 1.4 in) incl. screws
- Weight approx. 1500 gram (3.3 lbs)



Comfort Measuring Plate, INFRA V12/C12/C22

Fulfills requirements for mounting and measuring of comfort levels with a V12 Geophone according to Swedish, Norwegian and German standards. Adjustable leveling plate. Also intended for use with INFRA C12/C22.

- Dimensions: Ø 150 x 7 mm (Ø 5.9 x 0.3 in) incl. screws
- Weight approx. 650 gram (1.4 lbs)



1826

Mounting Wedge \$50

The mounting wedge is intended for use with Sound Level Meter S50 when mounted on a wall. By using the wedge the sensing microphone will come very close to the wall, which is a requirement in many cases.

- Incl. M6 bolt, length 31 mm (1.22 in) for wall mounting (fitting Sensor Bolt)
- Dimensions: 78 x 24 x 78 mm (3.0 x 0.95 x 3.0 in) incl. pads



1850

Wall Mount, INFRA Master

The lockable wall/floor mount for INFRA Master can be mounted with concealed bolts and thereafter the INFRA Master case can be mounted and padlocked.

The case will be kept in place even after opening the guard.

(Padlock not included)



185

Wall Mount, INFRA Mini/Point/D10

The lockable wall/floor mount for INFRA Mini/Point/D10 can be mounted with concealed bolts and thereafter the INFRA Mini/Point/D10 case can be mounted and padlocked. The case will be kept in place even after opening the guard.

(Padlock not included)



Bracket

The lockable bracket makes it possible to mount and padlock the INFRA Micro 4030 safely on the construction site.

(Padlock not included)



1862-1...

Pole/Wall Mount Kit

Components for pole and wall mounting of INFRA Micro 4030/INFRA Micro 4060/Dust Monitor and the Solar Panel Solution.

Available in size: 1862-1 — 2" Pole mount enclosure (4030)

1862-4 — 12" Pole mount enclosure (4030)

1864-1 — 2" Pole mount enclosure (4060) 1864-4 — 12" Pole mount enclosure (4060)

Contact Sigicom for more details and recommendations.



1891

Tool Kit with Case

- Comes in a practical bag, with additional space for bolts, expansion plugs, couplings and termination plugs
- Toolkit necessary for mounting of sensors and opening of battery compartment in INFRA Master/ Mini/Micro/D10 and C10/C12



1895

Tool Kit with Case for INFRA C20/C22

- Comes in a practical bag, with additional space for bolts, expansion plugs, couplings and termination plugs
- Toolkit necessary for mounting of sensors and opening of battery compartment in INFRA C20/C22



GSM/GPRS External Antenna

- Is equipped with a 3 meters (9.8 ft) connection cable
- To be used during poor GSM coverage, or when the INFRA Master/Mini is mounted in a shielded area
- When using the external GSM antenna with an INFRA Master, a rewiring in the INFRA Master has to be done
- To use with INFRA C10/C12 you need an external connector (art.nr. 1255)



1250-1

External Antenna

- Is equipped with a 3 meters (9.8 ft) connection cable
- To use with INFRA C20/C22 you need an external connector (art.nr. 1257)



1251

GSM/GPRS Directional Antenna

In cases when the GSM/GPRS signal is weak a directional antenna can help.



1255

External Antenna Connector, INFRA C10/C12

Connector for using an external antenna with INFRA C10/C12. To be used with GSM/GPRS External antenna (art.no. 1250–0).

(INFRA C12 and antenna not included)



External Antenna Connector, INFRA C20/C22

Connector for using an external antenna with INFRA C20/22. To be used with External antenna (art.no. 1250-1).

(INFRA C22 and antenna not included)



1259...

GSM-antenna Extension Cable

Shall only be used in exceptional cases when the original cable is too short.

Available in lengths of:

- 1259 5 meters (16 ft)
- 1260 10 meters (33 ft)
- 1261 30 meters (98 ft)



Protection Cover, INFRA C10/C12

For use with wall mounted INFRA C10/C12. Makes the unit less visual on a concrete wall.

Can be attached to the unit with an included letter screw.



1832

Protection Cover, INFRA C20/C22

For use with wall mounted INFRA C20/C22. Makes the unit less visual on a concrete wall

Can be attached to the unit with an included letter screw.



1884...

INFRA Transport Case

A transport case for INFRA instrument in diffrent sizes.

Contact Sigicom for different interior fittings.

Robust reusable containers made of Polyethylene (PE-HD) to meet the toughest requirements.

Depending on size and design the containers can satisfy the toughest packaging specifications such as ATA 300 Cat I, that implies a guaranteed service life of at least 100 transports. All system containers have a recurring grid that also makes it possible to stack containers with different item numbers.

This reduces the space required for storage and transport to a minimum.

Contact Sigicom for more details and sizes.



CompactFlash Reader with USB

- CompactFlash reader that can be connected to the USB port of the PC
- Available in different configurations



1471, 1473

RS 232 Cable

- For connecting a PC to INFRA data logger (Master/Mini/Micro)
- "Null modem" type
- Necessary for downloading new software to the INFRA data logger
- RS 232 to USB, for connection to PCs without traditional RS 232 serial ports

1471 — RS-232 Cable 1473 — SB-RS232 Adapter





1870

Ex/ATEX Protection Box for INFRA C22

Package includes an explosion proof enclosure designed for INFRA C22.

- Full functionality of C22 (for additional information see INFRA C22)
- International approval for use in an explosive environment
- European approval for use in an explosive environment ATEX zone 1/21
- Configured for wall mount or ground mount
- Suitable for use in e.g. refinaries and petrol processing plants.

(INFRA C22 - not included)



Datasheet available



3640

Sound Level Calibrator Class 1

Sound level calibrator that generates a sound signal with 94dB or 114 dB at 1000 Hz. Used for functional test of Sound Level Meter S50 before and after the measurement period.





Restoring a divided fairytale town with care

Denmark's third-largest city, was officially founded in the year 988 but its history goes even further back, another 3,000 years or so. The vibrant city centre is lending its uniquely quaint character from a number of historic buildings and the many friendly Danes cruising the streets on their bicycles. The fact that the famous storyteller H C Andersen was born and spent his childhood in this fairytale town seems absolutely right. Until recently, however, a major thoroughfare, effectively cutting the city centre in two, spoiled this idyllic environment. Therefore, the local government initiated a major city renovation project, recreating one cozy centre and leading the bulk of traffic into a new ring road. Another important part of the town centre renewal is the establishing of a new light rail line – one of Denmark's first.

Minimizing risk of vibration damages

In conjunction with the project, a partnership was formed between the City of Odense and the Realdania investment fund. To minimize the risk for vibration damages as well as disturbance to everyday life COWI, a leading international consultancy firm, was engaged as their consultant. Ken Grønne Andersen, a seasoned COWI engineer, is deeply engaged in the historic and environmental aspects of the project:

"One of our key contributions to this project is the continuous monitoring and immediate reporting of any vibrations that might otherwise damage the ancient buildings, like the 500-year-old priory, a preserved ruin from 1420 and the Saint Albani church. This is an undertaking that requires some rather special skills, because many of these buildings are very close to the

construction sites. At the same time, we are assigned to monitor and report any noise that exceeds the maximum levels set by the city management."

Integrated monitoring system

COWI was assigned to continuously monitor vibrations and noise at all critical points, earlier in the northern section, and now expanding into the southern parts. COWI uses a combination of all-digital vibration sensors, geophones and microphones integrated in one multifunctional INFRA Net system. Says Ken Grønne Andersen:

"Information from 21 simultaneous measuring points is continually fed into the system, and the construction teams are immediately alerted if they exceed the set limits. The configuration of the measurement equipment is flexible and adapts to the ongoing construction activities. The system uses the data to generate daily and more comprehensive monthly reports. This will continue throughout the reconstruction project, which means towards the end of 2017."

Based in Lyngby, COWI is a Danish company with more than 6,400 employees worldwide. This includes complete engineering teams and all specialists required to manage major city reconstruction projects. This includes, for example, highly qualified biologists, geologists, economists, surveyors, architects, anthropologists and sociologists.

The company is specializing in engineering, environmental and economic consulting. To date, the company has been involved in more than 50,000 projects in some 175 countries around the world.

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