e-SENSE

You will return to the contents of P4 EARTH MONITORING by clicking the pictogram

Measurement and control equipment need to be increasingly often employable at a (large) distance. Setting up, reading out and if necessary taking measures from a location of your choice,
are possibilities that these days are part of the standard package of requirements.

With e-SENSE® measurement data using intelligent sensors, such as the e+® sensors or the Diver®, becomes more than just measuring.
Intelligent sensors independently measure data in the field and register these internally.
Connected to the e-SENSE field modem, your measurement data or alarms are transferred to a database, which is in your own PC (e-SENSE direct).

e-SENSE direct

e-SENSE direct is easy to install (plug & play), control and maintain. With e-SENSE direct the monitoring and communication is carried out from your own PC. You have insight into your entire installation and can change any of the settings. This enables an optimal functioning with regard to response speed, costs of data traffic and battery use.

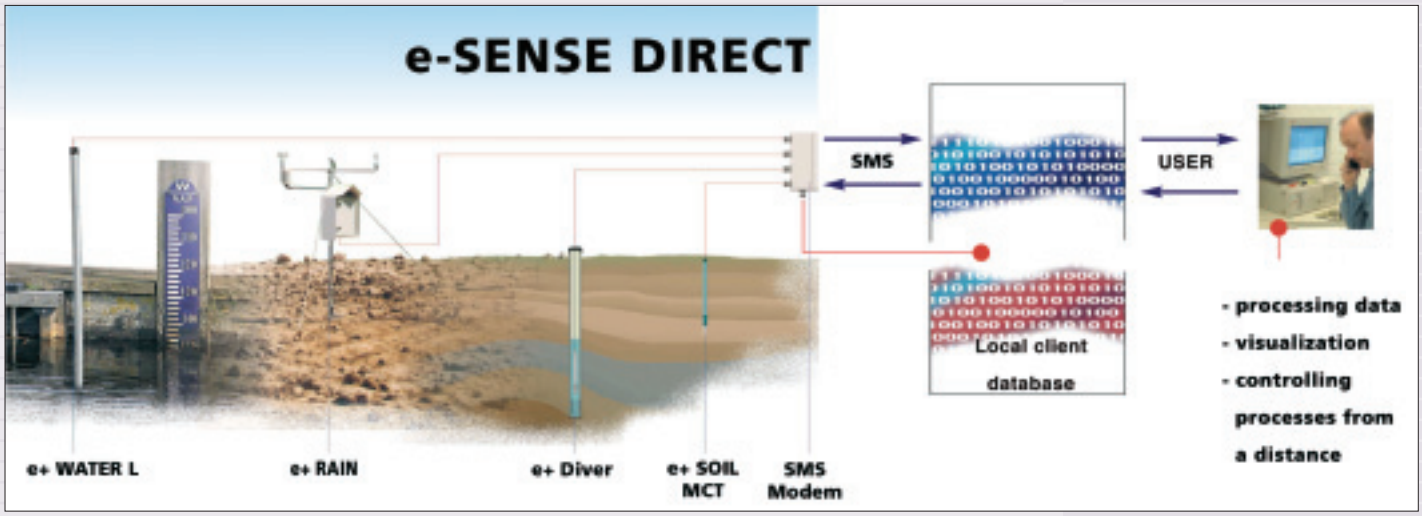
The measurement data can be imported into Logger Data Manager (LDM) e+ software, after which it is possible to process, have graphical displays and to produce reports. It is also possible to export the data to your own personal database.

Sending data via SMS

The decision was made to opt for a GSM/SMS network. The reason for this is that the GSM has almost complete global coverage.

Data communication using SMS is relatively inexpensive and it is anticipated that prices will come down further in the near future. It is in this respect that the system distinguishes itself from other systems commonly used.
Communication with these systems is carried out via GSM networks relying on interaction between the initiating and the receiving modem.

Programming and reading out the data from the e-SENSE database



e-SENSE

The e-SENSE system is generating an alarm.

Such interaction always requires the full availability of the connection and the receiving modem. There is also considerable expense attached to this solution both in terms of communication as well as equipment.

The right alternative is SMS, a service that virtually all GSM providers can deliver. SMS stands for Short Message Service.
The measurement data from the connected intelligent sensors are read and sent as SMS code messages to the database. Messages of that type need very little data traffic and for that reason are inexpensive.

Two-way communication

e-SENSE enables two-way communication to take place between the measuring unit in the field and the central computer system.
The data are transmitted from the sensor to the central database. The central computer system allows your sensors to be accessed from a distance as well. It is a simple matter therefore to alter the settings of the sensors in the field from your place of work. Increasing or lowering the measurement intervals is easy to do without having personally to go to the place where the measurements are being taken. It is also possible to download the files in LDM and ASCII format (using spread sheets).

e-SENSE system configuration

A complete e-SENSE direct measuring system consists of the following components:

- PC modem set (incl. e-SENSE software)
- Field modem, available in different types
- Housings to protect field modems
- e+ Sensors
- Cables to connect sensors to the modems
- Read out units and software for programming the sensors.

e-SENSE modem with 2 ports

e-SENSE

P4.32

PC Modem

11.51.20 PC modem set

To enable communication between your PC and the e-SENSE field modem you need the PC modem set for e-SENSE direct communication. The complete set consists of a modem power supply (100 - 240 Vac), antenna, communication cable and software.

Field modems

The field modems are supplied in four different types. The sets with the postfix SA have a standard power supply while the sets with the postfix SB are supplied with a long life power supply.

11.31.12.SA e-SENSE field modem set, 2 ports

11.31.18.SA e-SENSE field modem set, 8 ports

SMS modem for GSM data communication with max. 2 or 8 sensors (e+ sensors or Diver). With status display. Power supply 7.5 Vdc. Readout and configuration via database.

11.31.12.SB e-SENSE field modem set, long life, 2 ports

11.31.18.SB e-SENSE field modem set, long life, 8 ports

SMS modem for GSM data communication with max. 2 or 8 sensors (e+ sensors or Diver). With status display. Power supply 7.5 Vdc. Readout and configuration via database.

Installation in the field, plug and play

The e-SENSE field modem comes with a display which shows the status during installation. One of the functions performed by the e-SENSE modem is first of all to determine the best possible setting for GSM reception quality. The next step is to connect the sensors by means of waterproof connectors. The e-SENSE modem checks that the sensors that have been connected are working correctly. If desired the current measurement values of the sensors can be checked with the use of a laptop.

The status can be read on the display of the e-SENSE field modem.

e-SENSE PC modem

e-SENSE

The configuration of the measuring set-up is sent in coded SMS messages to the database. The database processes the messages and sends confirmation of communication back to the measuring set-up. The e-SENSE modem indicates that everything is functioning correctly and the user can close up the watertight, fraudproof field housing with an easy mind.

Advantages

The advantages are:

- Economical.
- Modem can be used in mobile units.
- Flexibility when setting up the measuring parameters.
- Long life.
- Various sensor models can be connected.
- Alarm function.
- The batteries have the capacity to supply power to a measuring unit for a whole year.

Housings

11.31.00 Underground housing

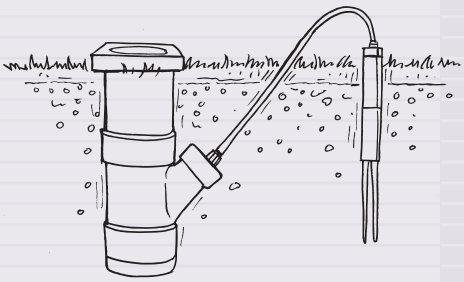
Underground housing to install the e-SENSE field modem and battery housing. Side inlet for cable. Water and vandalismproof lockable. Inclusive mounting bracket for SMS modem and battery housing. Dimensions 200 x 310 x 520 mm.

11.31.01 Above-ground housing

Above-ground housing to install the e-SENSE field modem and battery housing. Inclusive vandalism proof mounting material for monitoring well cover or pole from 50 to 270 mm diameter. Dimensions 120 x 255 x 250 mm.

Before the underground housing is installed a hole is dug.

The onderground housing is installed.



Underground housing

Above-ground housing connected to a monitoring well cover

e-SENSE

e+ Sensors

The e-SENSE modem is user-ready for connecting to the following intelligent sensors:

- e+SOIL MCT
- e+ RAIN
- e+ WATER L
- Diver and CTD Diver

They can be connected in any combination at all to the e-SENSE modem. Sensors to measure other parameters are under development.

e+ SOIL MCT sensors

The e+ SOIL MCT sensor/logger measures soil Moisture, Conductivity and Temperature and is available in various lengths to enable measurements from the surface to a depth of 1 m.

e+ SOIL MCT logger:

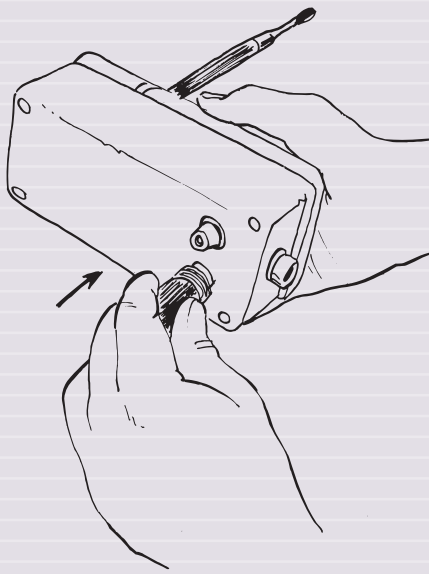
- Memory capacity: 3x20.000 measurements
- Measurement interval time: 10...60 sec; 1...60 minutes; 1...24 hour
- Datalogging method: Fixed interval time
- Clock accuracy: 1 sec. per day
- Alarm levels (adjustable): low and/or high alarm in the complete range of all measuring parameters
- Battery status indication: 0...100%

e+ SOIL MCT sensor:

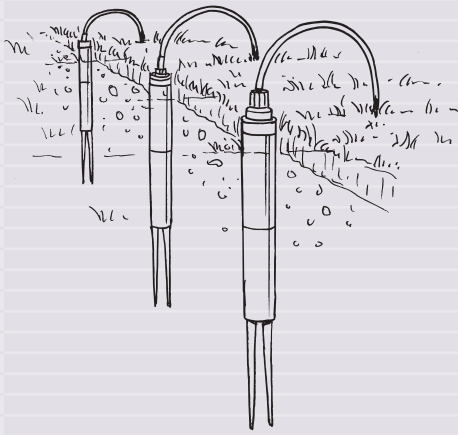
- Measuring frequency: 20 MHz
- Measurement volume (saturation): 1000 ml (500 ml 98% accuracy)
- Measuring range soil moisture: 0...100% volumetric
- Accuracy soil moisture: +/- 2.5% of the measured value (mineral soils, 0...50 °C)
- Resolution soil moisture: 0.01%
- Measuring range conductivity: 0...5 mS/cm
- Accuracy conductivity: +/- 5% of the measured value (0...50 °C, 0...2 mS/cm)
- Resolution conductivity: 0.01 mS/cm
- Measuring range temperature: 0...80 °C
- Accuracy temperature: +/- 0.5 °C
- Resolution temperature: 0.01 °C

e+ SOIL MCT sensor/logger

After installation the e+ SOIL MCT sensor/logger is connected to the modem.



Various lengths are installed to measure the soil moisture profile.



Eijkelkamp Agrisearch Equipment

www.eijkelkamp.com

e-SENSE

The e+ RAIN sensor/logger must be positioned horizontal and unobstructed.

e+ RAIN sensors

Two e+ RAIN sensors / loggers are available one with a synthetic and one with a metal rain gauge.
The e+ RAIN sensors measure the intensity of the rain over certain periods as well as totalled amounts (integrator function).

e+ RAIN logger:

- Number of channels: 2
- Memory capacity: 2 x 30.000 measurements
- Measurement interval time: 10...60 sec, 1...60 minutes, 1...24 hour
- Datalogging method: Fixed interval time
- Clock accuracy: 1 sec. per day
- Alarm levels (adjustable): low and/or high alarm in the complete range of all measuring parameters
- Battery status indication: 0...100%
- Precipitation intensity range: 0...100 mm per measurement interval
- Precipitation integrator range: 0...500 mm per measurement interval

e+ RAIN gauge, synthetic:

- Type: tipping bucket
- Accuracy: 1%
- Resolution: 0.2 mm
- Measuring surface: 507 cm^2
- Height: 340 mm
- Diameter: 254 mm
- Weight: ±1.15 kg

e+ RAIN gauge, metal:

- Type: tipping bucket
- Accuracy: 2%
- Resolution: 0.2 mm
- Measuring surface: 400 cm^2
- Height: 420 mm
- Diameter: 284 mm
- Weight: ± 8.4 kg

Optional:
For installation in the field an optional field support is available. The metal rain gauge can be optionally fitted with a heater which requires an external power source.

e+ RAIN sensor/logger with synthetic rain gauge (installed on field support)

e+ WATER L sensors for surface water

The e+ WATER L (Level) sensor is an intelligent and accurate sensor for the measurement and registration of the levels and temperatures of surface water. The level measurement values are automatically (internal) compensated for variations in air pressure and water density variations due to temperature fluctuations. The sensor is frost resistant and can be applied in all seasons without any problems.

The e+ WATER L is available in in various lengths (for water fluctuations up to 2 meter).

e+ WATER L logger:

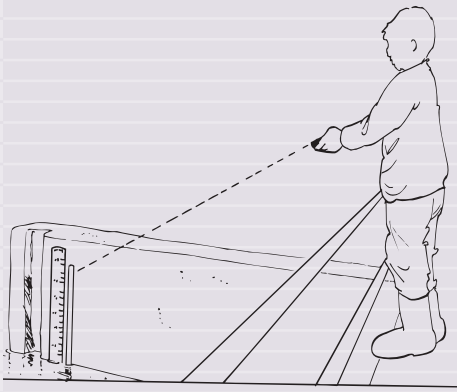
- Number of channels: 2
- Storage capacity: 2 x 30.000 measurements
- Measurement interval: 1...60 seconds, 1...60 minutes, 1...24 hours
- Clock accuracy: 1 sec. per day
- Alarm functions: low and/or high alarm in the complete range of all measuring parameters
- Battery status (indication): 0...100%

e+ WATER L sensor:

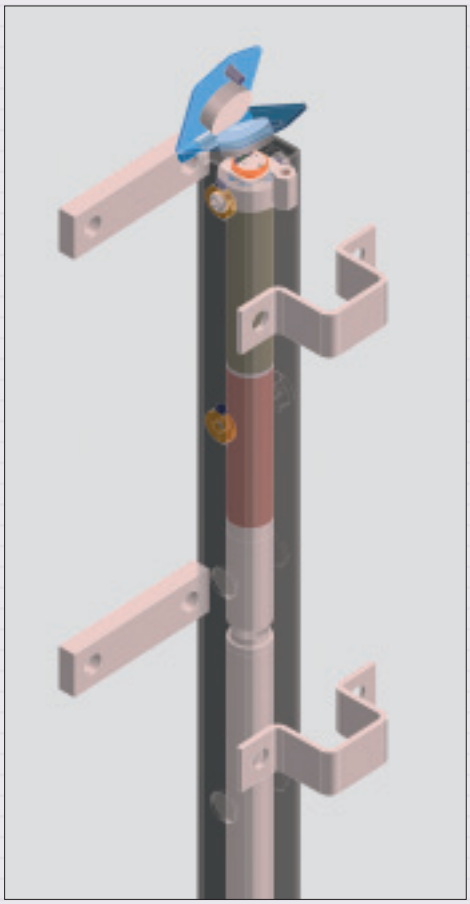
- Measuring range level: Depending on type from 0 - 50 till 0 - 200 cm water column
- Accuracy level: +/- 0.5 cm
- Resolution level: 0.1 cm
- Measuring range temperature: -20...+80 °C
- Accuracy temperature: +/- 0.5 °C
- Resolution temperature: 0.01 °C

The e+ WATER L sensors can be optionally provided with a robust and functional stainless steel mounting system, which is easy to combine with existing level indicator systems.

Reading out an e+ WATER L with the IrDa read-out unit.



e+ WATER L sensor/logger



e+ WATER L in protective housing

Eijkelkamp Agrisearch Equipment

www.eijkelkamp.com

e-SENSE

The divers can be programmed in the office before installation in the field.

Diver sensors for groundwater

All members of the Diver family can be used as an e+ sensor in the e-SENSE system.

The Diver is the smallest instrument in the world for automatic measurement and registration of groundwater levels and ground water tempe-ratures; the CTD-Diver also measures conductivity. This instrument fits in the palm of your hand and is remarkably light. With its length of only 90 mm (183 mm for the CTD-Diver) and a diameter of 22 mm (18 mm for the MicroDiver), the Diver can be used in virtually any monitoring well.

The pressure sensor, temperature sensor, the conductivity sensor, as well as the datalogger and battery are contained within a hermetically sealed stainless steel or ceramic housing. This ensures that the Diver is less sensitive to moisture or external electrical influences (Faraday cage). The Diver can be installed in the monitoring well simply suspended from a steel wire.

The Diver is available in various designs:

The **MiniDiver®**: stainless steel housing and ceramic pressure sensor, diameter 22 mm, length 90 mm, available in various measuring ranges, memory capacity 24.000 measurements.

The **MicroDiver®**: stainless steel housing, ceramic pressure sensor, diameter 18 mm, length 90 mm, available in various measuring ranges, memory capacity 48.000 measurements.

The **CeraDiver®**: ceramic housing and ceramic pressure sensor, diameter 22 mm, length 90 mm, available in various measuring ranges, memory capacity 48.000 measurements.

The **CTD-Diver**: ceramic housing, ceramic pressure sensor and platinum/ceramic conductivity sensor (measuring range 0 - 80 mS/cm), diameter 22 mm, length 183 mm, available in various measuring ranges, memory capacity 16.000 measurements.

The **Baro-Diver**: the function of the Baro-Diver is to register barometric pressure. Compensation for these atmospheric pressure variations is subsequently carried out simply and easily with the use of the Logger Data Manager (LDM) software program.

MiniDiver, MicroDiver, CeraDiver and CTD-Diver

Cables and read-out units

Communication cables

There are two different type of cables:

Communication cable to connect e+ sensors with the SMS-modem, varying in length from 1 till 200 metres, with IP 68 connector for waterproof connection with the SMS-modem.

Communication cable to connect Divers with the SMS-modem, varying in length from 1 till 200 metres, with IP 68 connector for waterproof connection with the SMS-modem.

Reading-out

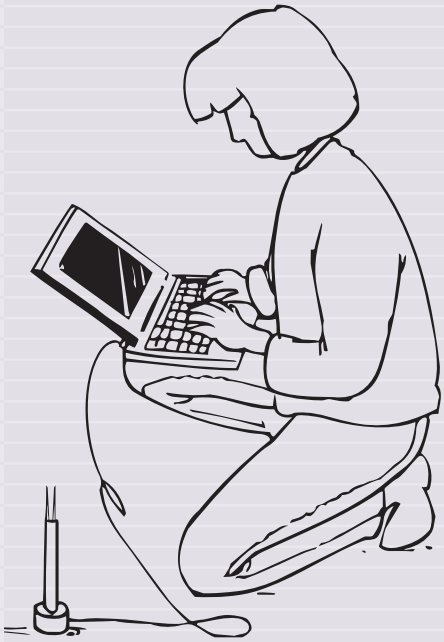
Reading-out and configuring the e+ sensors or Divers can be done in various ways:

- With an e-SENSE modem via e-SENSE direct software or LDM (Logger Data Manager) software).
- With a readout unit (IR), that is used when the e+ sensor or Diver can be brought into the immediate vicinity of a PC (laptop).

If the e+ sensors or Divers are used as stand-alone applications the following accessories can be used:

- A Diver Data Cable (DDC) (IR) available in various lengths till 200 m (only for Diver), for manual readings of the sensors.
- An IrDa readout unit. The IrDa readout unit is intended for reading out the measurement data of the e+ sensor or Diver with the help of a laptop computer. This can take place at a distance of 1 to 2 metres from the e+ sensor. For this the IrDa readout must be pointed towards the infrared LED's on the end of the e+ sensor.

An e+ SOIL MCT is read-out with the read-out unit.



IrDa read-out unit, DDC-cable read-out unit

PARTS LIST

Art.no.	Description	Qty. in set
e-SENSE direct (P4.32)		
	A complete e-SENSE (direct) system consists of the following components: **A) PC Modem set (incl. e-SENSE software)** **B) Field modem** **C) Housings to protect modem in the field** **D) e+ sensors** **E) Cables to connect sensors to field modem** **F) Read-out unit + software for programming sensors**	
	A) PC Modem set	
11.51.20	**PC modem set for e-SENSE direct communication. Complete set consisting of modem power supply (100 - 240 Vac), antenna and c ommunication cable. Incl. license costs and installation of SIM card (card to be supplied by customer).**	
**11.51.20.01	e-SENSE direct PC-modem for communication with SMS (field) modem 11.31.12 or 11.31.18, excl. SIM-card	1
**11.51.20.02	Power supply for e-SENSE PC modem 11.51.20.01 (100-240 Vac)	1
**11.51.20.03	Antenna for e-SENSE PC-modem 11.51.20.01	1
**11.51.20.04	Communication cable RS232 for e-SENSE PC-modem 11.51.20.01	1
**11.51.10	Software e-SENSE direct, basic licence costs	1
**11.31.11	Installation of a SIM card supplied by a customer in an e-SENSE SMS field-modem.	1
	The SIM card will be provided by the customer. The applicable pin and puk code, it's telephone and sma-c number need to be send separately by email to the sales department. The customer has to take care of a SIM card which meets the specs of roaming.	
	B) Field modems **Field modems are supplied in four different types:** **- standard model with either 2 or 8 ports** **- long life power supply model with either 2 or 8 ports**	
11.31.12.SA	**Field modem set for e-SENSE. Complete set consisting of SMS-modem (2 ports), battery housing and batteries. Incl. installation of SIM-card (card to be supplied by customer)**	
**11.31.12	SMS-modem, 2 ports, for GSM data communication with max. 2 sensors (e+ sensors or Divers). With status display. Power supply 7.5 Vdc. Read-out and configuration via (Internet) database.	1
**11.31.20	Battery housing to supply the SMS-modem. With cable with connector. Excl. batteries (5x1.5 V, alkaline, size D, MN 1300, R20P).	1
**11.31.21	Battery for battery housing. Type size D, MN1300, R20P, alkaline. Capacity 18 Ah (350 SMS messages).	5
**11.31.11	Installation of a SIM card supplied by a customer in an e-SENSE SMS field modem.	1
11.31.18.SA	**Field modem set for e-SENSE. Complete set consisting of SMS-modem (8 ports), battery housing and batteries. Incl. installation of SIM card (card must be supplied by customer).**	
**11.31.18	SMS-modem, 8 ports, for GSM data communication with max. 8 sensors (e+ sensors or Divers). With status display. Power supply 7.5 Vdc. Read-out and configuration via (Internet) database.	1
**11.31.20	Battery housing to supply the SMS-modem. With cable with connector. Excl. batteries (5x1.5 V, alkaline, size D, MN 1300, R20P).	1
**11.31.21	Battery for battery housing. Type size D, MN1300, R20P, alkaline. Capacity 18 Ah (350 SMS messages).	5
**11.31.11	Installation of a SIM card supplied by a customer in an e-SENSE SMS field modem.	1
11.31.12.SB	**Field modem set for e-SENSE. Complete set consisting of SMS-modem (2 ports), battery housing and batteries (long life). Incl. installation of SIMcard (card to be supplied by customer).**	
**11.31.12	SMS-modem, 2 ports, for GSM data communication with max. 2 sensors (e+ sensors or Divers). With status display. Power supply 7.5 Vdc. Read-out and configuration via (Internet) database.	1
**11.31.22	Battery housing, long life, to supply the SMS-modem. With cable with connector. Excl. batteries (Battery set, long life, art. no. 11.31.23)	1
**11.31.23	Battery set for battery housing 11.31.22. Set consisting of 4 D-cell and 2 penlites, type High Current Lithium (for approx. 650 SMS messages)	1
**11.31.11	Installation of a SIM card supplied by a customer in an e-SENSE SMS field modem.	1
11.31.18.SB	**Field modem set for e-**	

Art.no.	Description	Qty. in set
	SENSE.Complete set consisting of SMS-modem (8 ports), battery housing and batteries (long life). Incl. installation of SIM-card (card to be supplied by customer).	
**11.31.18	SMS-modem, 8 ports, for GSM data communication with max. 8 sensors (e+ sensors or Divers). With status display. Power supply 7.5 Vdc. Read-out and configuration via (Internet) database.	1
**11.31.22	Battery housing, long life, to supply the SMS-modem. With cable with connector. Excl. batteries (Battery set, long life, art. no. 11.31.23)	1
**11.31.23	Battery set for battery housing 11.31.22. Set consisting of 4 D-cell and 2 penlites, type High Current Lithium (for approx. 650 SMS messages)	1
**11.31.11	Installation of a SIM card supplied by a customer in an e-SENSE SMS field modem.	1
	Optional item for field modems:	
11.31.19	Service interface to connect a laptop with the SMS-modem to check and change the modem configuration in the field. A standard (Windows) communication program via the RS 232 port is used for this.	
	C) Housings to protect modem in the field (two options)	
11.31.00	**Housing, underground, to install the SMS-modem and battery housing. Side inlet for cable. Water- and vandalism proof lockable. Incl. mounting bracket for SMS-modem and battery housing. Dim. 200x310x520 mm (lxwxh).**	
11.31.01	**Housing, above-ground, to install the SMS-modem and battery housing. Incl. vandalism proof mounting material for monitoring well or pole with 50 to 270 mm Ø. Excl. installation tool. Dim. 120x255x250 mm (lxwxh).**	
	Optional items for housings:	
11.31.08	Tool for installation of vandalism proof above-ground housing.	
11.31.09	Rubber/bentonite sealing kit for waterproof sealing of cable inlets. Sufficient for 5 sealings of e-SENSE underground or aboveground housings.	
	D) e+ SENSORS The following e+ sensors are available (sensors for other parameters under development)	
	- e+ SOIL MCT	
	- e+ RAIN	
	- e+ WATER L	
	- DIVER	
	- CTD-DIVER	
	e+ SOIL MCT SENSORS (See also P1.62)	
11.41.11	e+ SOIL MCT set for surface measurements, consisting of e+ SOIL MCT sensor/logger (art. no. 11.41.11.01), 2 e+ SOIL MCT measuring pens (art. no. 11.41.11.02) and battery set (11.41.90.01).	
11.41.14	e+ SOIL MCT set for measuring depth of 25 cm, consisting of e+ SOIL MCT sensor/logger (art. no. 11.41.14.01), 2 e+ SOIL MCT measuring pens (11.41.11.02) and battery set (11.41.90.01).	
11.41.15	e+ SOIL MCT set for measuring depth 50 cm, consisting of e+ SOIL MCT sensor/logger (art. no. 11.41.15.01), 2 e+ SOIL MCT measuring pens (11.41.11.02) and battery set (11.41.90.01).	
11.41.16	e+ SOIL MCT set for measuring depth of 75 cm, consisting of e+ SOIL MCT sensor/logger (art.no. 11.41.16.01), 2 e+ SOIL MCT measuring pens (11.41.11.02) and battery set (11.41.90.01).	
11.41.17	e+ SOIL MCT set for measuring depth 100 cm, consisting of e+ SOIL MCT sensor/logger (art. no. 11.41.17.01), 2 e+ SOIL MCT measuring pens (11.41.11.02) and battery set (11.41.90.01).	
	Optional accessories/spares for e+ SOIL MCT sensors:	
11.41.91.08.C	Gouge auger, bottom part, for installation of e+ SOIL MCT sensors in the field, operational length 100 cm, Ø 23 mm, conical screwthread connection.	
01.10.11.C	Handle, short, 10 cm, with beating head, c.sc.	
11.41.11.02	Measuring pen, stainless steel, for e+ SOIL MCT sensor/logger, length approx. 67 mm	
11.41.90.01	Battery set for e+logger, consisting of Penlite battery (AA), 3.6 Volt, 2.3 Ah, Lithium Thionyl Chlorid. NOT rechargeable, axial design. Incl. O-rings and desiccant pack.	
	e+ RAIN SENSOR (see also P4.01)	
11.41.21	e+ RAIN set, consisting of an e+ RAIN logger (art. no. 11.41.21.01), an e+ RAIN sensor (art. no. 11.41.21.02) and battery set (art. no. 11.41.90.01). It is recommended to use the standard field support (11.41.92.01)	
11.41.22	e+ RAIN (metal) set consisting of	

PARTS LIST

Art.no.	Description	Qty. in set
	e+ RAIN logger (art. no. 11.41.21.01) , e+ RAIN sensor (metal) (art. no. 11.41.22.01) and battery set (art. no. 11.41.90.01). It is recommended to use the standard field support (11.41.92.02).	
	Optional accessories/spares for e+ RAIN sensors:	
11.41.92.01	Field support (stainless steel) for mounting of the 11.41.21 (e+ RAIN synthetic rain gauge with logger), incl. mounting material and vandalism proof bolts for mounting of the logger	
11.41.90.01	Battery set for e+logger, consisting of Penlite battery (AA), 3.6 Volt, 2.3 Ah, Lithium Thionyl Chlorid. NOT rechargeable, axial design. Incl. O-rings and desiccant pack.	
	e+ WATER L SENSOR (see also P2.20)	
11.41.53	e+ WATER L-50 set, consisting of e+ WATER L-50 sensor/logger (art. no. 11.41.53.01) and battery set (11.41.90.01). It is recommended to use the standard mounting system (11.41.95.00-11.41.95.03).	
	Note: this is not necessary when the e+ WATER L is installed in a monitoring well pipe.	
11.41.54	e+ WATER L-100 set, consisting of e+ WATER L-100 sensor/logger (art. no. 11.41.54.01) and battery set (art. no. 11.41.90.01). It is recommended to use the standard mounting system (11.41.95.00 - 11.41.95.03).	
	Note: this is not necessary when the e+ WATER L is installed in a monitoring well pipe.	
11.41.55	e+ WATER L-150 set, consisting of e+ WATER L-150 sensor/logger (art. no. 11.41.55.01) and battery set (art. no. 11.41.90.01). It is recommended to use the standard mounting system (11.41.95.00-11.41.95.03).	
	Note: This is not necessary when the e+ WATER L is installed in a monitoring well pipe.	
11.41.56	e+ WATER L-200 set, consisting of e+ WATER L-200 sensor/logger (art. no. 11.41.56.01) and battery set (art. no. 11.41.90.01) It is recommended to use the standard mounting system (11.41.95.00-11.41.95.03).	
	Note: this is not necessary when the e+ WATER L is installed in a monitoring well pipe.	

Art.no.	Description	Qty. in set
	Optional accessories/spares for e + WATER L sensors:	
11.41.95.00	Mounting system (stainless steel) for installation and protection of the 11.41.53.01 (e+ WATER L-50), incl. mounting material and vandalism proof bolts for installation of the logger.	
11.41.95.01	Mounting system (stainless steel) for installation and protection of the 11.41.54.01 (e+ WATER L-100), incl. mounting material and vandalism proof bolts for installation of the logger.	
11.41.95.02	Mounting system (stainless steel) for installation and protection of the 11.41.55.01 (e+ WATER L-150), incl. mounting material and vandalism proof bolts for installation of the logger.	
11.41.95.03	Mounting system (stainless steel for installation and protection of the 11.41.56.01 (e+ WATER L-200), incl. mounting material and vandalism proof bolts for installation of the logger.	
11.41.90.01	Battery set for e+ logger, consisting of Penlite battery (AA), 3.6 Volt, 2.3 Ah, Lithium Thionyl Chlorid. NOT rechargeable, axial design. Incl. O-rings and desiccant pack.	
	DIVER SENSORS (see also P2.20) Here we have three (3) different models having each their specific advantages and specifications: **- MiniDiver** **- MicroDiver** **- CeraDiver**	
11.11.01.02	Monitoring well datalogger type MiniDiver for measuring and recording groundwater levels/ temperatures. Range 10 m, -20 till +80°C. Memory 24000 measurements. Dim. 22x90 mm. Pressure sensor: ceramic Housing: stainless steel 316L. Accuracy 0.05%/10 m, + 0,1°C, temp. compens. 0/+40°C.	
11.11.01.04	Monitoring well datalogger type MiniDiver for measuring and recording groundwater levels/ temperatures. Range 20 m, -20 till +80°C. Memory 24000 measurements. Dim. 22x90 mm. Pressure sensor: ceramic Housing: stainless steel 316L. Accuracy 0.05%/20 m, + 0,1°C, temp. compens. 0/+40°C.	
11.11.01.06	Monitoring well datalogger type MiniDiver for measuring and recording groundwater levels/ temperatures. Range 50 m, -20 till +80°C. Memory 24000 measurements Pressure sensor: ceramic Housing: stainless steel 316L. Accuracy 0.05%/50 m, + 0.1°C, temp. compens. 0/+40°C.	
11.11.01.08	Monitoring well datalogger type MiniDiver for measuring and recording groundwater levels/	

Art.no.	Description	Qty. in set
	temperatures. Range 100 m, -20 till +80°C. Memory 24000 measurements. Dim. 22x90 mm. Pressure sensor: ceramic	
11.11.02.02	Monitoring well datalogger type MicroDiver for measuring and recording groundwater levels/ temperatures. Range 10 m, -20 till +80°C. Memory 48000 measurements. Dim. 18x90 mm. Pressure sensor: ceramic. Housing: stainless steel 316L. Accuracy 0.05%/10 m, +0,1°C, temp. compensated 0/+40°C.	
11.11.02.04	Monitoring well datalogger type MicroDiver for measuring and recording groundwater levels/ temperatures. Range 20 m, -20 till +80°C. Memory 48000 measurements. Dim. 18x90 mm. Pressure sensor: ceramic. Housing: stainless steel 316L. Accuracy 0.05%/20 m, + 0,1°C, temp. compensated 0/+40°C.	
11.11.02.06	Monitoring well datalogger type MicroDiver for measuring and recording groundwater levels/ temperatures. Range 50 m, -20 till +80°C. Memory 48000 measurements. Dim. 18x90 mm. Pressure sensor: ceramic Housing: stainless steel 316L. Accuracy 0.05%/50 m, + 0.1°C, temp. compensated 0/+40°C.	
11.11.02.08	Monitoring well datalogger type MicroDiver for measuring and recording groundwater levels /temperatures. Range 100 m, -20 till +80°C. Memory 48000 measurements. Dim. 18x90 mm. Pressure sensor: ceramic Housing: stainless steel 316L. Accuracy 0.05%/100 m, + 0,1°C, temp. compensated 0/+40°C	
11.11.03.02	Monitoring well datalogger type CeraDiver, for measuring and recording groundwater levels/ temperatures. Range 10 m, -20 till +80°C. Memory 48000 measurements. Dim. 22x90 mm. Pressure sensor/ housing: ceramic. Accuracy 0.05%/10 m, + 0,1°C, temp. compensated 0/+40°C.	
11.11.03.04	Monitoring well datalogger type CeraDiver, for measuring and recording groundwater levels/ temperatures. Range 20 m, -20 till +80°C. Memory 48000 measurements. Dim. 22x90 mm. Pressure sensor/ housing: ceramic. Acc. 0.05%/20 m, + 0,1°C, temp. compens. 0/+40°C.	
11.11.03.06	Monitoring well datalogger type CeraDiver, for measuring and recording groundwater levels/ temperatures. Range 50 m, -20 till +80°C. Memory 48000 measurements. Dim. 22x90 mm. Pressure sensor/ housing: ceramic. Accuracy 0.05%/50 m, + 0,1°C, temperature comp. 0/+40°C.	
11.11.03.08	Monitoring well datalogger type CeraDiver for measuring and recording groundwater levels/ temperatures. Range 100 m, -20 till +80°C. Memory 48000 measurements. Dim. 22x90 mm. Pressure sensor/ housing: ceramic. Accuracy 0,05%/100 m, + 0.1°C, temperature compensated 0/+40°C.	
	CTD-DIVER SENSORS (see also P2.71)	
11.11.58.01	CTD-DIVER for measuring and recording groundwater levels/ temperature/conductivity. Memory 16000 measurements. Conductivity 20 µS till 80 mS/cm. Temperature -10 till + 40°C. Depth 10 m. Accuracy EC 1% measurement value, temperature 0.1%, depth 0.1% FS. Housing ZnO_2. Warranty 3 years. The logger can be read out by means of a read-out unit, DDC-cable or through connection with a SMS-modem.	
11.11.58.02	CTD-DIVER for measuring and recording groundwater levels/ temperature/conductivity. Memory for 16000 measurements. Conductivity 20 µS till 80 mS/cm. Temperature -10 till +40°C. Depth 30 m. Accuracy EC 1% measurement value, temperature 0.1%, depth 0.1% FS. Housing ZnO_2. Warranty 3 years. The logger can be read out by means of a read-out unit, DDC-cable or through a connection with a SMS-modem.	
11.11.58.03	CTD-DIVER for measuring and recording groundwater levels/ temperature/conductivity. Memory for 16000 measurements. Conductivity 20 µS till 80 mS/cm. Temperature -10 till +40°C. Depth 100 m. Accuracy EC 1% measurement value, temperature 0.1%, depth 0.1% FS. Housing ZnO_2. Warranty 3 years. The logger can be read out by means of a read-out unit, DDC-cable or through connection with a SMS-modem.	
	Required accessories for Diver and CTD-Diver sensors	
11.11.55.01	Monitoring well datalogger type Baro-Diver, for measuring the atmosferic pressure in a measuring area, to compensate for barometric pressure only. Range 150 cmwc, -20 till +80°C. Accuracy 0.03%/150 cmwc. Dim. 22x90 mm.	
	Optional accessories for Diver and CTD-Diver sensors	
11.11.20	Cable, stainless steel, Ø 1 mm, length 50 m, to hang the DIVER on the monitoring well locks	
11.11.21	Stainless steel wire clamps for stainless steel cable Ø 1 mm. Set of 10 pcs.	
11.11.22	Vectran cable, Ø 1.6 mm, length 50 m.	

PARTS LIST

Art.no.	Description	Qty. in set
	For installation of Diver in corrosive water. Fastening on monitoring well lock.	
	E) Cables to connect sensors to field modems. These are two different types of cables (e + sensors and Diver/CTD-Diver) in various lengths up to 200 meter	
	Choose for e+ sensors:	
11.31.81.00	Communication cable to connect an e+ sensor with the SMS modem. Length 1 meter, with P 68 connector for waterproof connection with the SMS-modem.	
11.31.81.01	Communication cable to connect an e+ sensor with the SMSmodem. Length 5 meter, with IP 68 connector for waterproof connection with the SMS-modem.	
11.31.81.02	Communication cable to connect an e+ sensor with the SMSmodem. Length 10 meter, with IP 68 connector for waterproof connection with the SMS-modem.	
11.31.81.03	Communication cable to connect an e+ sensor with the SMSmodem. Length 15 meter, with IP 68 connector for waterproof connection with the SMS-modem.	
11.31.81.04	Communication cable to connect an e+ sensor with the SMSmodem. Length 30 meter, with IP 68 connector for waterproof connection with the SMS-modem.	
11.31.81.05	Communication cable to connect an e+ sensor with the SMSmodem. Length 60 meter, with IP 68 connector for waterproof connection with the SMS-modem.	
11.31.81.06	Communication cable to connect an e+ sensor with the SMSmodem. Length 80 meter, with IP 68 connector for waterproof connection with the SMS-modem.	
11.31.81.07	Communication cable to connect an e+ sensor with the SMSmodem. Length 100 meter, with IP 68 connector for waterproof connection with the SMS-modem.	
11.31.81.08	Communication cable to connect an e+ sensor with the SMSmodem. Length 200 meter, with IP 68 connector for waterproof connection with the SMS-modem.	
	Choose for DIVER and CTD-DIVER sensors	
11.31.82.00	Communication cable to connect Mini/Micro/Cera Divers with the e-SENSE SMS-modem, with IP68 connector for waterproof connection with the SMS-modem, length 1 m.	
11.31.82.01	Communication cable to connect Mini/Micro/Cera Divers with the e-SENSE SMS-modem, with IP68 connector for waterproof connection with the SMS-modem, length 5 m.	
11.31.82.02	Communication cable to connect Mini/Micro/Cera Divers with the e-SENSE SMS-modem, with IP68 connector for waterproof connection with the SMS-modem, length 10 m.	
11.31.82.03	Communication cable to connect Mini/Micro/Cera Divers with the e-SENSE SMS-modem, with IP68 connector for waterproof connection with the SMS-modem, length 15 m.	
11.31.82.04	Communication cable to connect Mini/Micro/Cera Divers with the e-SENSE SMS-modem, with IP68 connector for waterproof connection with the SMS-modem, length 30 m.	
11.31.82.05	Communication cable to connect Mini/Micro/Cera Divers with the e-SENSE SMS-modem, with IP68 connector for waterproof connection with the SMS-modem, length 60 m.	
11.31.82.06	Communication cable to connect Mini/Micro/Cera Divers with the e-SENSE SMS-modem, with IP68 connector for waterproof connection with the SMS-modem, length 80 m.	
11.31.82.07	Communication cable to connect Mini/Micro/Cera Divers with the e-SENSE SMS-modem, with IP68 connector for waterproof connection with the SMS-modem, length 100 m.	
11.31.82.08	Communication cable to connect Mini/Micro/Cera Divers with the e-SENSE SMS-modem, with IP68 connector for waterproof connection with the SMS-modem, length 200 m.	
	F) Readout unit for programming e+ sensors and Divers	
11.11.10.03	Reading unit for Diver, used to programme and read out the Diver, incl. cable with USB connection and driver software. Applicable for all Diver types and e+ sensors.	
	Also required:	
11.11.14	CD-ROM with Logger Data Manager (LDM) software (for Windows 2000 and XP)and USB driver software. Operating instructions included on CD-ROM for Diver, LDM and USB driver.	