L-4335

Sensor Monitoring Unit | SMU 1200

Operating and Maintenance Instructions

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Schroeder INDUSTRIES

L-4335 | Created 9.2014

Content

Safety information

The device was built according to the statutory provisions valid at the time of delivery and satisfies current safety requirements.

Any residual hazards are indicated by safety information and instructions and are described in the operating instructions.

Observe all safety and warning instructions attached to the unit. They must always be complete and legible.

Do not operate the unit unless all the safety devices are present.

Secure the hazardous areas which may arise between the unit and other equipment.

Maintain the unit inspection intervals prescribed by law.

Document the results in an inspection certificate and keep it until the next inspection.

Hazard symbols

These symbols are listed for all safety information and instructions in these operating instructions which indicate particular hazards to persons, property or the environment.

Observe these instructions and act with particular caution in such cases.

Pass all safety information and instructions on to other users.

General hazard

Danger due to electrical voltage / current

Signal words and their meaning in the safety information and instructions

DANGER

DANGER indicates a hazard with a high risk and which will lead to death or serious injury if not avoided.

WARNING

WARNING indicates a hazard with a medium risk and which can lead to death or serious injury if not avoided.

CAUTION

CAUTION indicates a danger with a low risk and which can lead to minor injury if not avoided.

NOTICE

NOTICE indicates a danger which will lead to damage to property if not avoided.

Structure of the safety information and instructions

All warning instructions in this manual are highlighted with pictograms and signal words. The pictogram and the signal word indicate the severity of the danger.

Warning instructions listed before an activity are laid out as follows:

HAZARD SYMBOL	**SIGNAL WORD** **Type and source of danger** Consequence of the danger ► Measures to avert danger

Observe regulatory information

Also observe the following regulatory information and guidelines:

- Legal and local regulations for accident prevention
- Legal and local regulations for environmental protection
- Country-specific regulations, organization-specific regulations

Proper/Designated Use

WARNING

Strong magnets on the SMU

Life-threatening danger for persons with cardiac pacemakers

► Maintain sufficient clearance between yourself and the magnets

NOTICE

Connection of the SMU to board networks

The SMU1200 will be destroyed

► Use the SMU only on board networks which have a central "Load Dump" fuse.
The Load Dump with a maximum of 30 V DC must be installed and effective.

NOTICE

Exceeding the maximum permissible line length

Erroneous or no communication

► Observe the maximum permissible line lengths

Only use the sensor for the application described in the following.

The SensorMonitoring Unit is for connecting two sensors for the continuous monitoring of fluids in hydraulic and lubrication systems.

By displaying, storing and forwarding measurement data for particle contamination in the ultra-fine or coarse particle range and for relative saturation of the fluid with water, it is possible to perform condition-based service and maintenance procedures.

Any other use shall be deemed to be improper and not in keeping with the product's designated use. SCHROEDER INDUSTRIES accepts no liability for any damage resulting from such use.

Proper or designated use of the product extends to the following:

- Connection with the suitable sensors provided
- Observing all the notes contained in these operating instructions

Improper Use or Use Deviating from Intended Use

DANGER

Hazard due to use of the unit other than that intended

Bodily injury and damage to property will result when operated improperly.

► Never operate the sensor in potentially explosive atmospheres.

► The sensor is only to be used with the permitted media.

Any use extending beyond or deviating therefrom shall not be considered intended use. Schroedr Industries llc will assume no liability for any damage resulting from such use. The user alone, shall assume any and all associated risk

Improper use may result in hazards and/or will damage the sensor. Examples of improper use:

- Operation in potentially explosive atmospheres.
- Operation with a non-approved sensor.
- Operation under non-approved operational conditions.
- Modifications to the sensor made by the user or purchaser.
- Improper connection of the voltage and sensor cables.
- Operation on board networks without central "Load Dump" fuse.

Qualifications of personnel / target group

Persons who work on the sensor must be aware of the associated hazards when using it.

Auxiliary and specialist personnel must have read and understood the operating instructions, in particular the safety information and instructions, and applicable regulations before beginning work.

The operating instructions and applicable regulations are to kept so they are accessible for operating and specialist personnel.

These operating instructions are intended for:

Auxiliary personnel: such persons have been instructed about the sensor and are aware of potential hazards due to improper use.

Specialist personnel: such persons with corresponding specialist training and several years work experience. They are able to assess and perform the work assigned to them, they are also able to recognize potential hazards.

Activity	Person	Knowledge
Transport / storage	Auxiliary personnel	• No specialist knowledge required
Electric installation, first commissioning, troubleshooting, Shutdown	Specialist personnel	• Safe handling/use of tools • Fitting and connection of electrical lines • Knowledge of network communication • Knowledge of using Windows PCs and of program installation • Product-specific knowledge
Operation, operations control	Specialist personnel	• Knowledge of using Windows PCs • Product-specific knowledge
Dismantling, disposal	Specialist personnel	• Proper and environmentally-friendly disposal of materials and substances • Knowledge about reuse

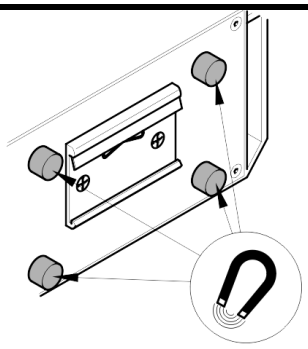
Storing the SMU

Make sure to store the SMU in a clean, dry place, in the original packing, if possible. Do not remove the packing until you are ready to install the unit.

Storage conditions

Storage temperature:	-40 °C … 80 °C / -40 °F … + 176 °F
Relative humidity:	maximum 95%, non-condensing

Transporting the SMU



WARNING

Strong magnetic field around the magnets

Life-threatening danger for persons with cardiac pacemakers

► Maintain sufficient clearance between yourself and the magnets

NOTICE

Strong magnetic field around the magnets

Magnetic strips and magnetizable objects can be damaged.

► Maintain sufficient clearance from magnetic strips on credit cards, watches, jewelry, etc.

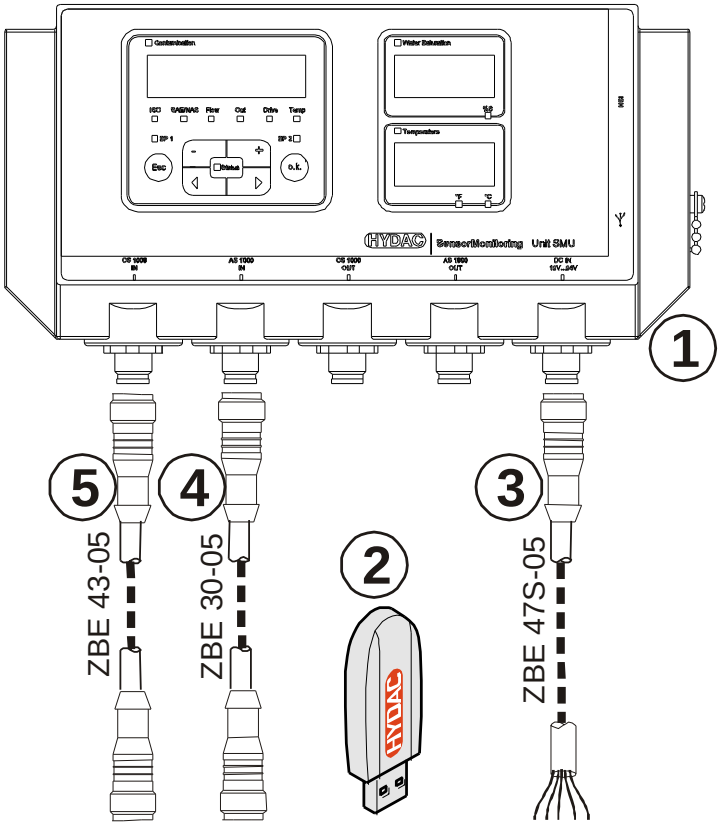
Transport the SMU by hand. During transport, avoid any localized pressure points, especially on the displays.

Checking the scope of delivery

The SMU comes packed and factory-assembled. Before commissioning the SMU, check the content of the package to make sure everything is present.

The following items are supplied:

Item	Qty.	Designation	
1	1	SensorMonitoring Unit SMU	
2	1	USB Memory stick	
3	1	Connection cable, 5-pin with open cable end, L = 5 m	ZBE 47S-05
4	1	Connection cable, 5-pin, plug/socket, L = 5 m	ZBE 30-05
5	1	Connection cable, 8-pin, plug/socket, L = 5 m	ZBE 43-05
-	1	Top hat rail (35 mm), L= 200 mm	
-	1	Operating Instructions (this document)	
-	1	CD - FluMoS light	



SMU Features

The SensorMonitoring Unit SMU is used for the presentation and memory storage of the measured values of Fluid Sensors.

The following fluid sensors can be connected directly, depending on the SMU model:

- ContaminationSensor TCM (sensor interface A)
- Metal ContaminationSensor TMS (sensor interface A)
- AquaSensor TWS-C (Sensor interface B)

The measured values for the connected sensors are shown on the display.

The values can be read off via USB memory stick for further processing and evaluation of data and thus simply transferred to Office applications, for example FluMoS or MS-Excel.

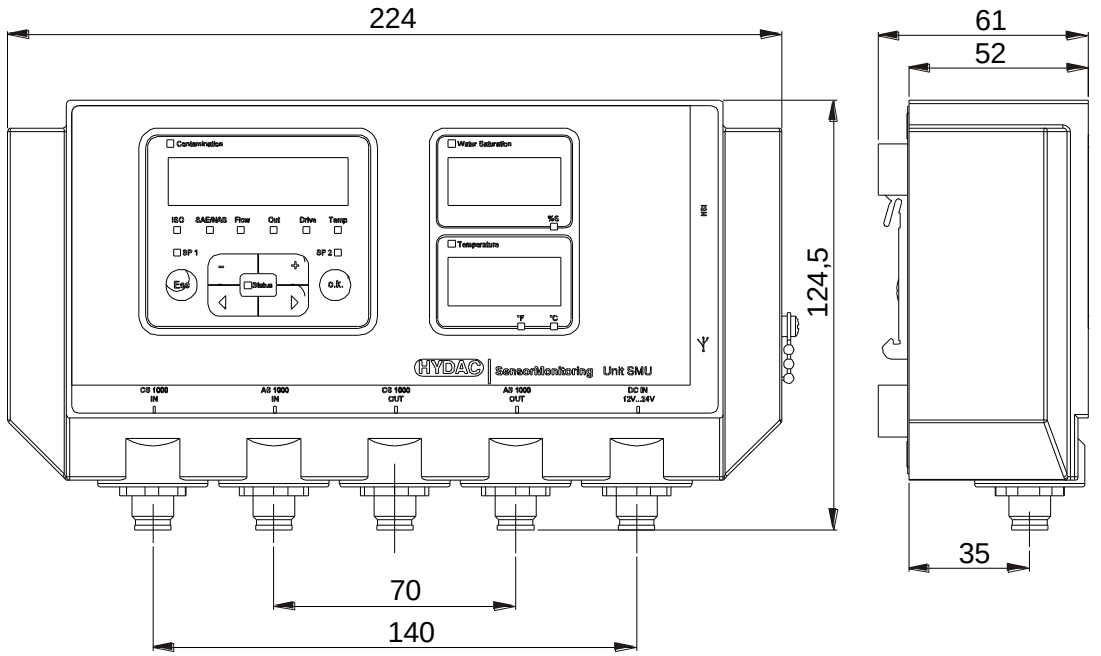
Uses for the SMU include:

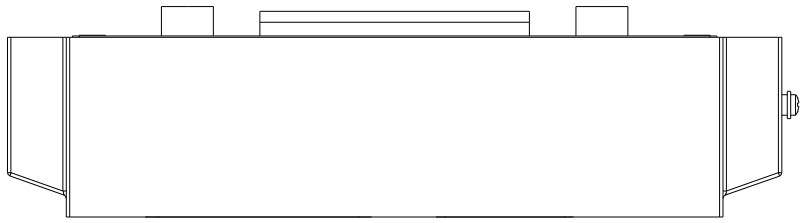
- Presentation and memory storage of the measured values of Fluid Sensors
- Parameterization of Fluid Sensors
- Test installation for testing Fluid Sensors
- Permanent installation of Fluid Sensors

Advantages offered by the SMU unit:

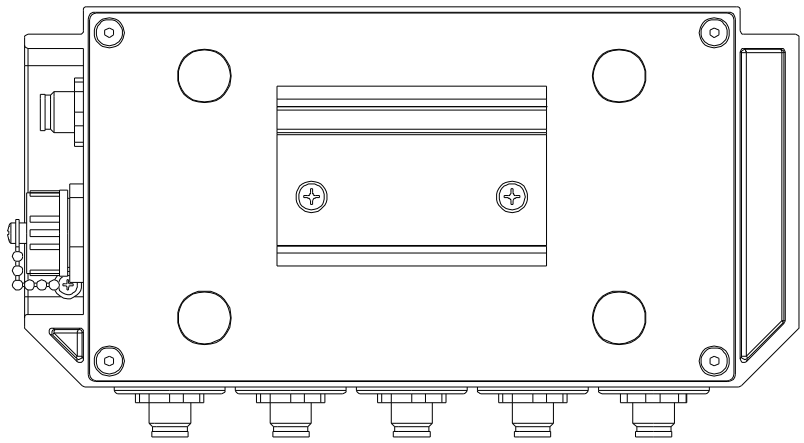
- Cost-effective, easy-to-install solution
- Simple processing and evaluation with FluMoS or MS Excel
- USB interface for transferring data onto a USB memory stick
- HSI interface for connecting HMG 3000 SERIES or CSI-F-10 or Ethernet interface for simple integration into an existing network via IP address
- Bluetooth interface for data transfer and/or for visualization, e.g. on a smartphone / PC via FluMoS
- Representation and/or parameterization of sensors without their own display (e.g. TWS-C)
- Interface for routing the analog and/or switching outputs of connected Fluid Sensors

Dimensions



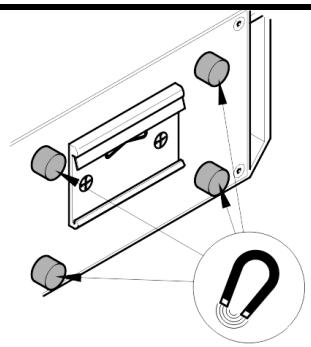


Rear view:



Fastening / Mounting the SMU

The SMU has the following two types of mounting as standard features



WARNING

Strong magnetic field around the magnets

Life-threatening danger for persons with cardiac pacemakers

► Maintain sufficient clearance between yourself and the magnets

CAUTION

Strong magnets for fastening

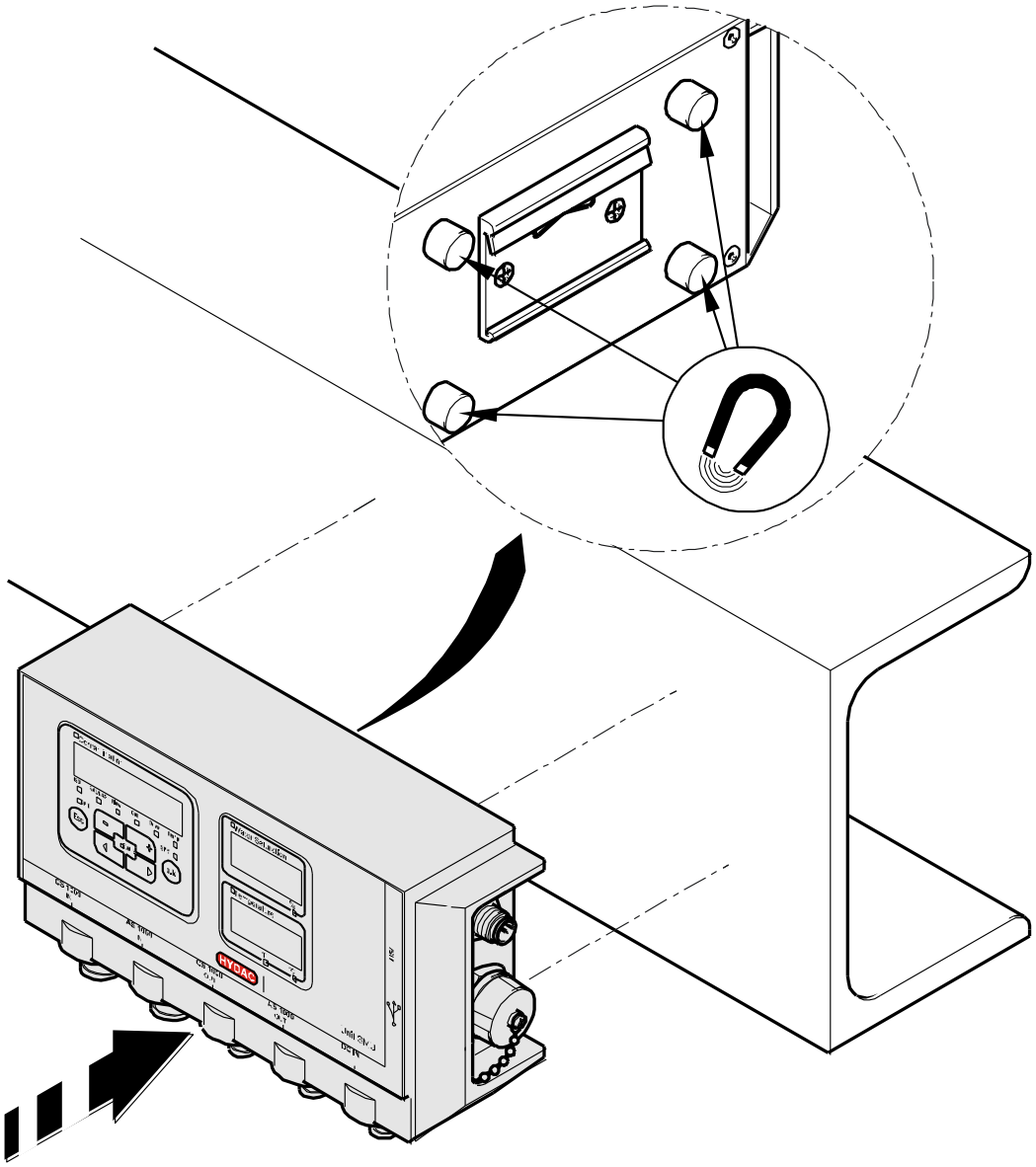
Danger of crushing

► Hold the SMU firmly on the edge for assembly.

Fastening the SMU temporarily to magnetizable surfaces

The four high-performance magnets on the rear side provide fastening to metallic surfaces. Use the top hat rail mounting technique for permanent fastening, see page 20

The SMU can be readily released from the metallic surface by tilting.

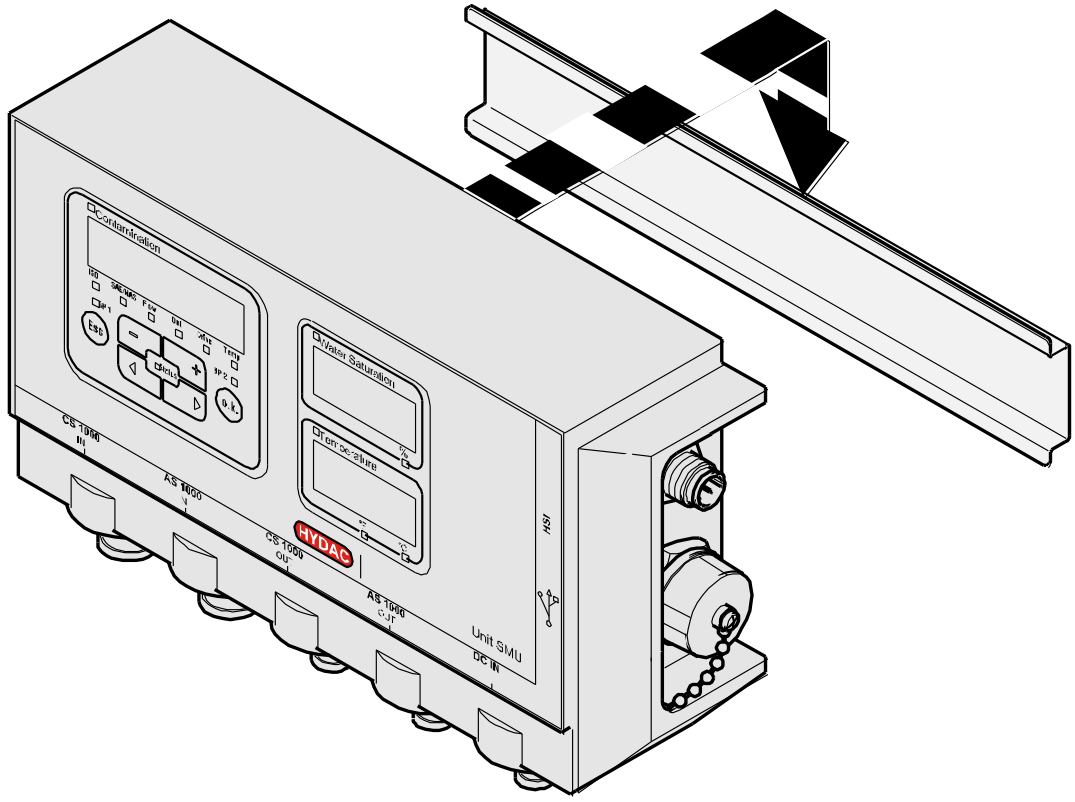


Permanent fastening of the SMU on the top hat rail

The SMU has a top hat rail receptacle on its rear side for the purpose of fastening it to 35 mm top hat rails in accordance with DIN EN 60715 TH35. To accomplish this, mount the top hat rail included in the scope of delivery to the desired position with 2 screws or use the top hat rail to be found in the control cabinet.

Hang the SMU in the top hat rail with the top hat rail receptacle at the top. Pull the SMU slightly downward and to the rear until the lower guide of the top hat rail receptacle encloses the top hat rail. Now let go of the SMU. Make sure that the SMU is seated firmly on the top hat rail.

Disassemble in reversed order of sequence.

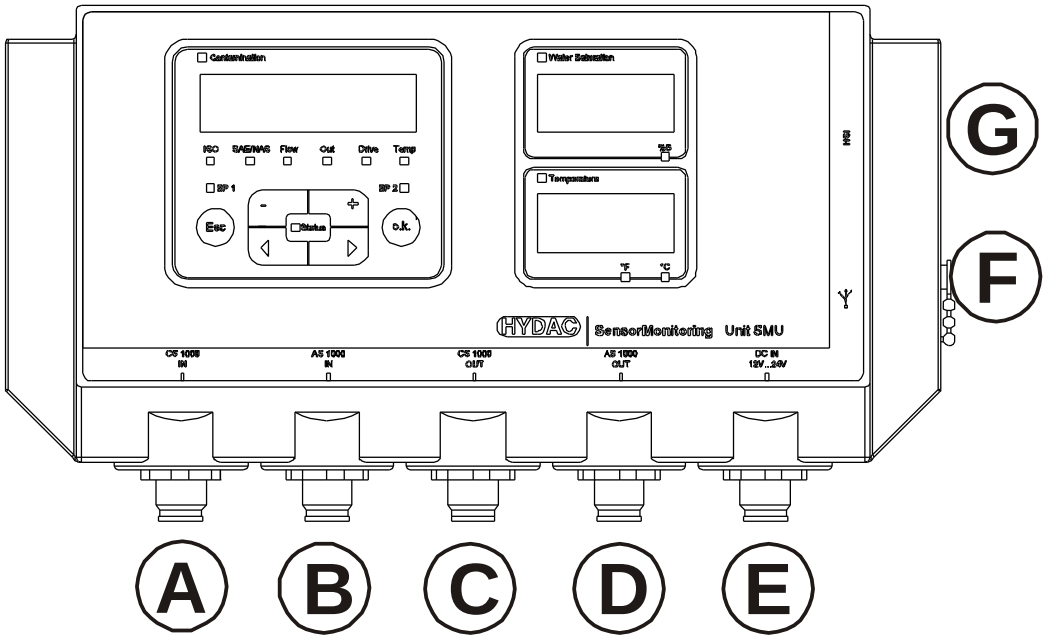


Connecting the SMU

Note the many different interfaces on the SMU before connecting. Described in detail in the following overview.

SMU interface overview

The SMU has sensor interfaces and interfaces as indicated below.



Connection	Description
A	Sensor Interface A
B	Sensor Interface B
C	Interface, additional signals from sensor interface A
D	Interface, additional signals from sensor interface B
E	Supply voltage / HSI interface connection
F	USB interface
G	HSI interface for SMU 1260 ... Ethernet interface for SMU 1270 ...

The sensor interfaces A/B are each prepared for one particular sensor.

The sensor for the sensor interface A / B can be found in the front foil lettering and/or on page 15.

Additional signals from the sensors to the sensor interface A/B are available at the interfaces C/D.

Sensor interface A - TCM IN / TMS IN

Connect the sensor TCM / TMS with this connection.

Sensor Interface B - TWS-C IN

Connect the sensor TWS-C with this connection.

Interface C - TCM OUT / TMS OUT

Here the output signals of a connected TCM or TMS can be tapped into for further utilization.

The bus signals such as RS485 and HSI are not transferred by the sensor.

The SMU has its own HSI interface (G).

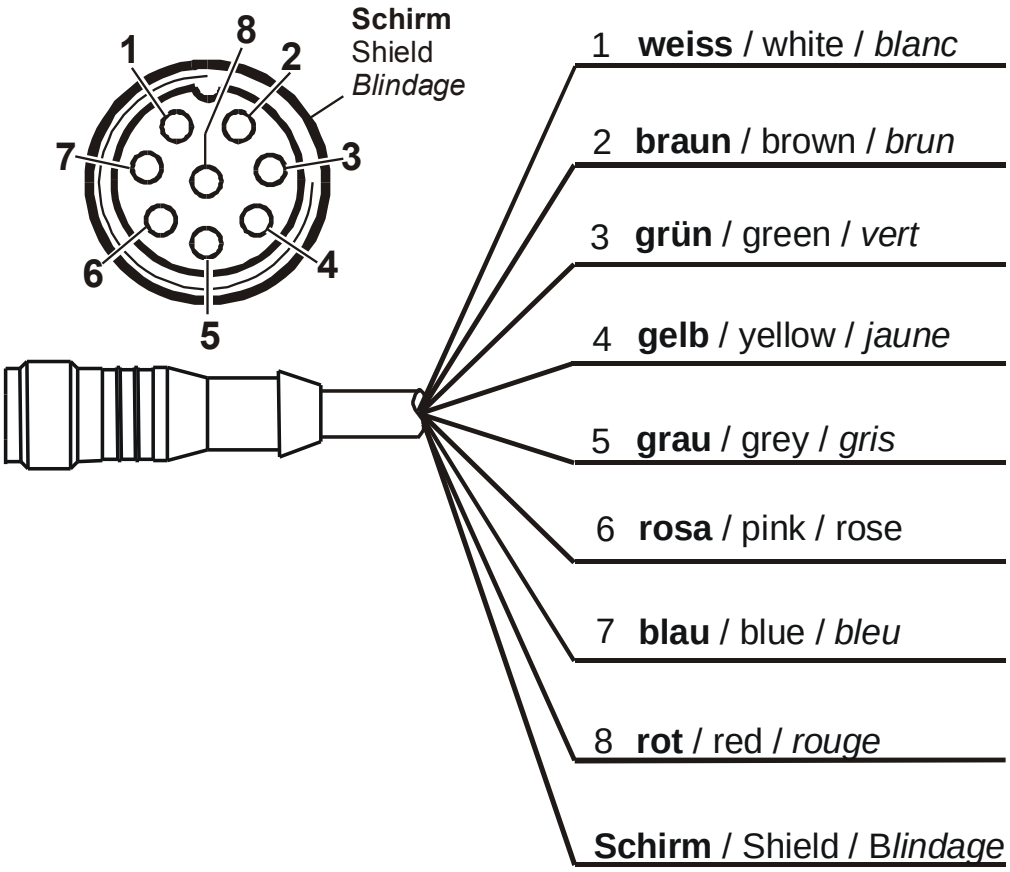
Our accessories list includes cables of different lengths with one connection plug and an open cable end.

The assignment of the connection cable is as follows:

Pin	Color code	TCM	TMS
2	brown	Analog signal +	Switching output 2
4	yellow	GND Analog signal / switching output	GND switching output
8	Red	Switching output (passive, n.c.)	Switching output 1

Please see the sensor documentation for more detailed information.

8-pin connection cable, open cable end:



The color coding of the connection cable is valid only for cables from the scope of delivery and for original replacement parts.

Interface D - TWS-C OUT

Here you can tap into the output signals of a connected TWS-C for further utilization.

The bus signals such as RS485 and HSI are not transferred by the sensor.

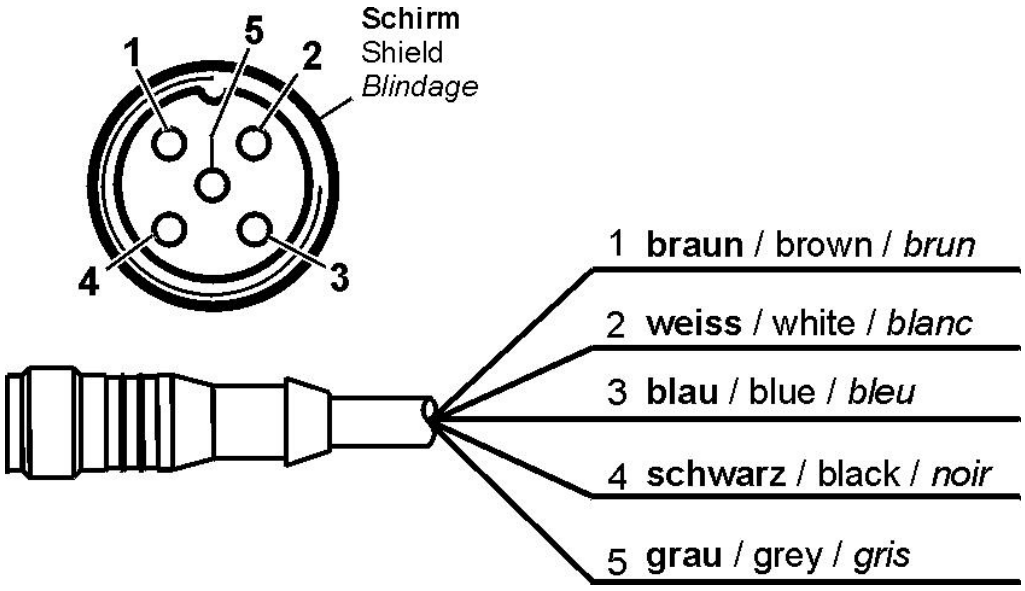
The SMU has its own HSI interface (G).

Our accessories list includes connection cables of different lengths with one connector and the following configuration:

Pin	Color code	Connection to TWS-C		
2	White	"Saturation" analog output	4 … 20 mA	0 … 100 %
3	blue	GND		
4	black	"Temperature" analog output	4 … 20 mA	-25 … 100°C

Please see the sensor documentation for more detailed information.

5-pin connection cable, open cable end:



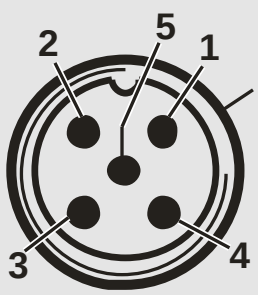
The color coding of the connection cable is valid only for cables from the scope of delivery and for original replacement parts.

Interface E - voltage supply

Connect the connection cable for supply voltage contained in the scope of delivery in accordance with the following table:

Pin	Color code	Designation
1	brown	Voltage 12 … 24 V DC
2	White	-
3	blue	GND
4	black	-
5	grey	HSI

The assignment of the interface is as follows:



Pin	Designation
1	Voltage 12 … 24 V DC
2	-
3	GND
4	-
5	HSI

An appropriate plug-in mains adaptor is included with Article No: 3399939.

Interface F - USB

You will find additional information in the chapter USB Interface on page 68.

Interface G

The G interface is designed as an HSI or Ethernet interface depending on the SMU version. Please refer to the following description.

HSI (Schroeder Industries Sensor Interface) – SMU 126x …

The following Schroeder devices can be connected to the HSI interface:

- HMG 3000 SERIES — Manual Measuring Unit
- CSI-F-10 — GSM module
- CSI-B-2 — Interface converter HSI -> RS232/USB for connection to the PC.

Cable placement is as follows:

Pin	Color code	Assignment
4	black	GND
5	grey	HSI

ETH (Ethernet) – SMU 127x …

With the Ethernet interface you can connect the SMU to a LAN (Local Area Network) via TCP/IP protocol and read data out with FluMoS ≥ V 1.50.

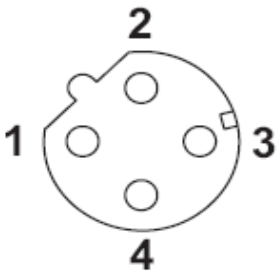
The factory setting with IP address and subnet mask as well as standard gateway can be found on page 49.

You can change this factory setting using the SMU keyboard.

The Ethernet connection is designed as a D-coded M12 Industrial Ethernet connection socket in accordance with IEC 61076-2-101.

Cable placement is as follows:

Pin	Color code	Assignment
1	yellow	TxD+
2	White	RxD+
3	Orange	TxD-
4	Blue	RxD-



Connecting the sensors

Before connection, check the model/type designation or sensor imprint of the SMU in connection with the sensors that you plan to use. The sensors are connected through the unit plugs on the underside of the SMU.

The analog outputs and/or the switching outputs of the sensors are looped through and are available for further use at the 8-pin or 5-pin outlet socket.

The HSI bus signals are supplied via the HSI interface G.

The SMU expects a digital HSI bus signal from all sensors.

NOTICE

Contact of individual wires leads to short circuits

Connected sensors are destroyed

► Insulate and secure any open cable ends not required against inadvertent reciprocal contact

NOTICE

Same HSI bus address of the sensors

SMU1200 functions incorrectly

► Take note of different HSI bus addresses

NOTICE

Incorrect Hardwareindex of TCM / TWS-C sensors

The SMU functions incorrectly

► Only use TCM with a Hardwareindex ≥ C.
(Type plate -> Serial No: xxx**C** xxxxxx or Date: xx/10 **C**)

► Only use TWS-C with a serial No: ≥ 607B001647 with Firmware ≥ V01.03

At the time of delivery, the following sensors have the factory setting:

Sensor	HSI bus address:
TCM	A
TMS	D
TWS-C	No address

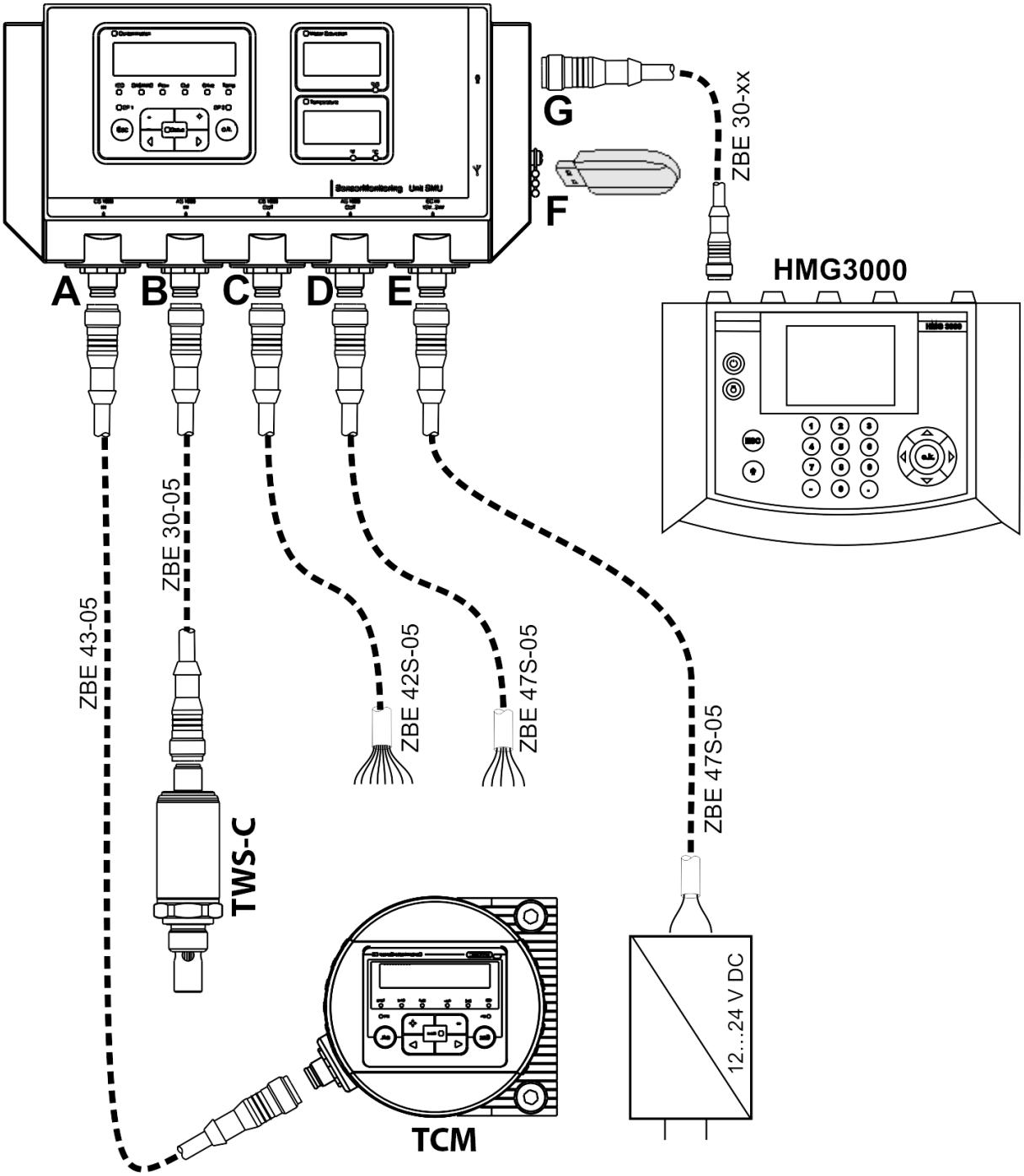
Set the TWS-C to a fixed HSI bus address. Carry out the setting of the HSI bus address in the PowerUp menu.
See page 56 for details.

Examples of connection

You will find SMU connection examples in the subsequent chapters.

SMU126x <-> TCM / TWS-C

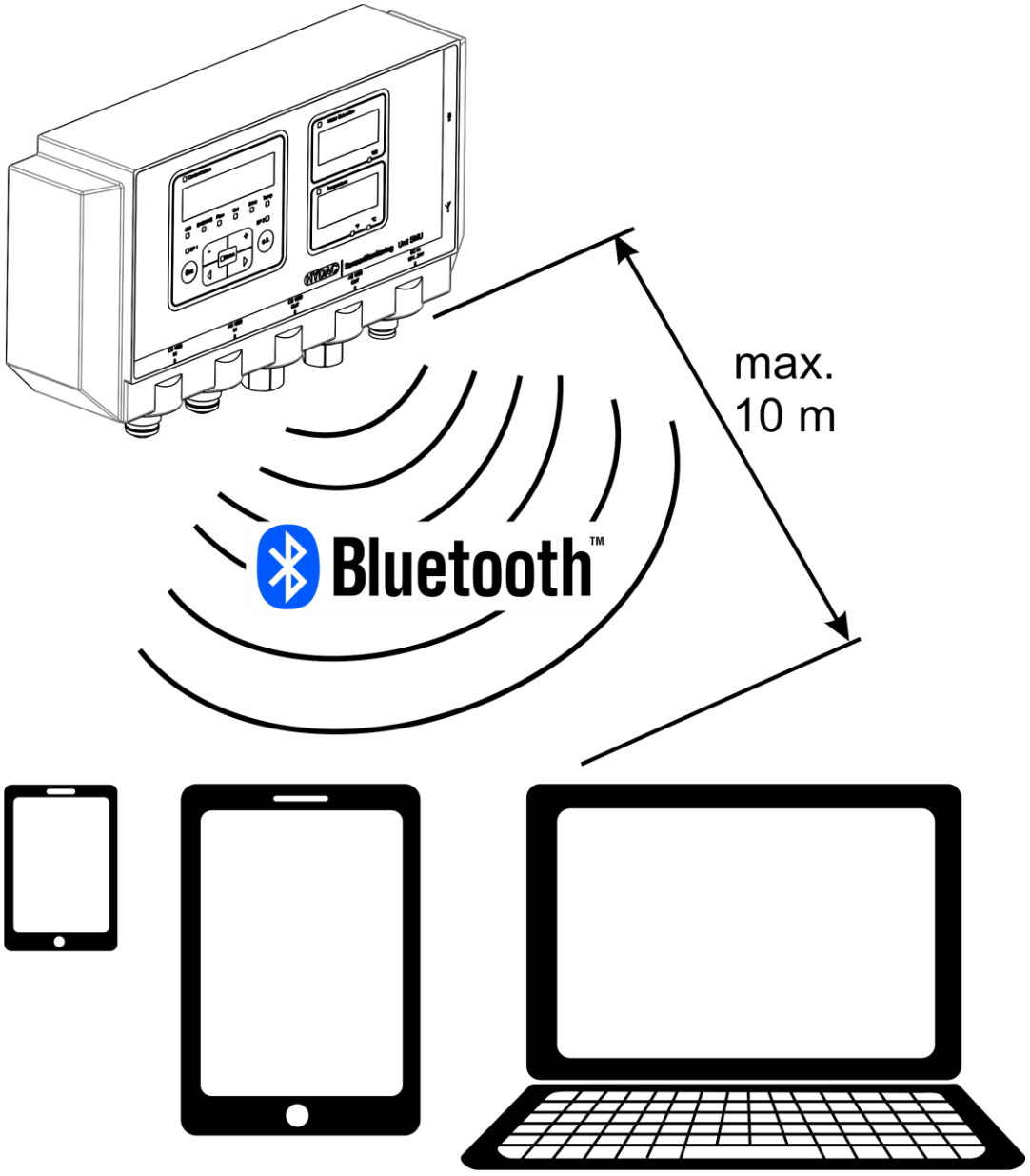
All of the cables required for connection are to be found in the scope of delivery of the SMU.



SMU12x1 <-> Bluetooth

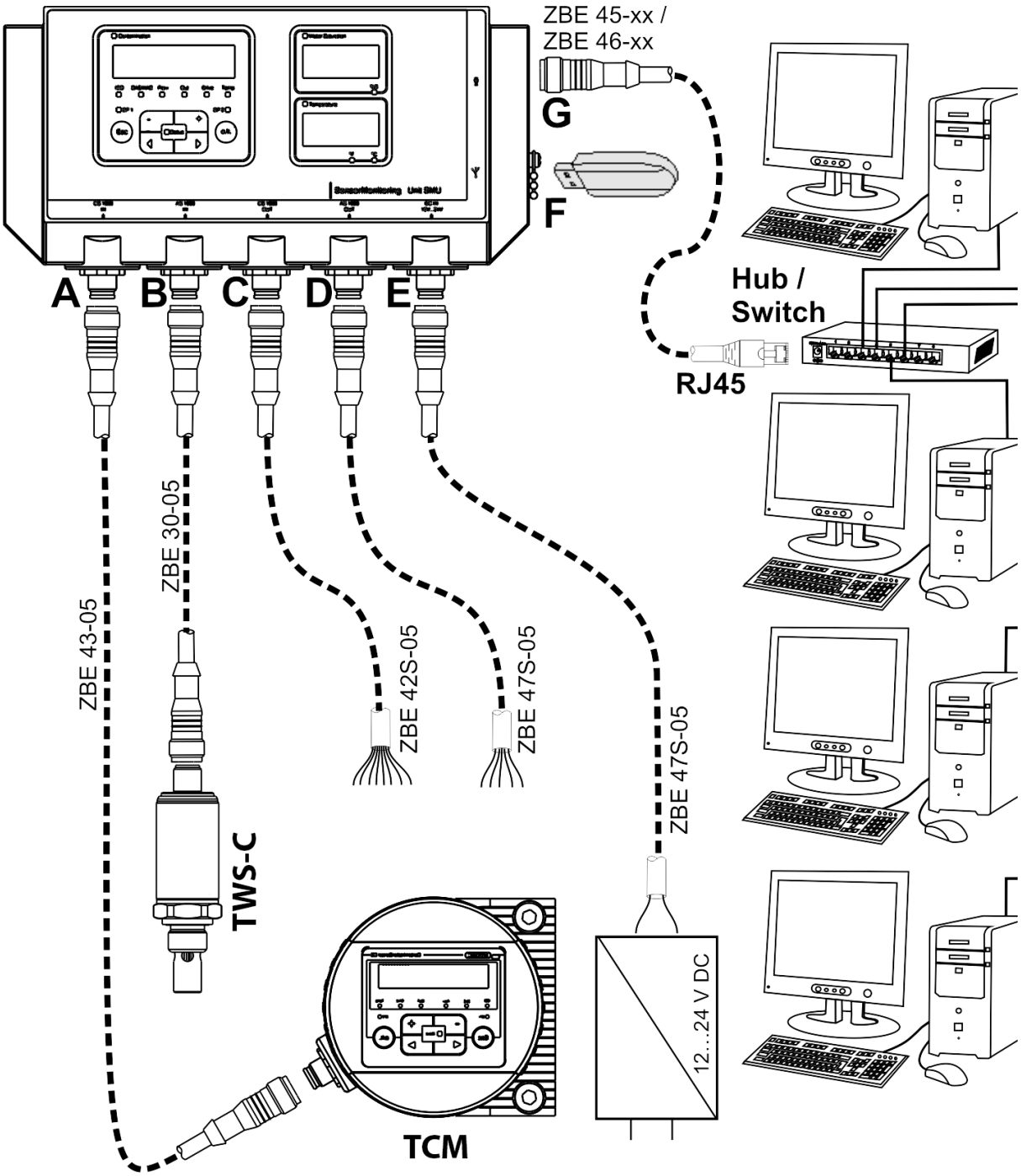
The following diagram is an application example of SMU12x1 sending the measurement data via Bluetooth to mobile end devices.

You can evaluate the measurement data on end devices with FLuMoS light, FLuMoS professional or FLuMoS mobile.



SMU127x <-> TCM / TWS-C -> LAN

The following diagram is a connection example of SMU127x with TCM and TWS-C in LAN (Local Area Network).



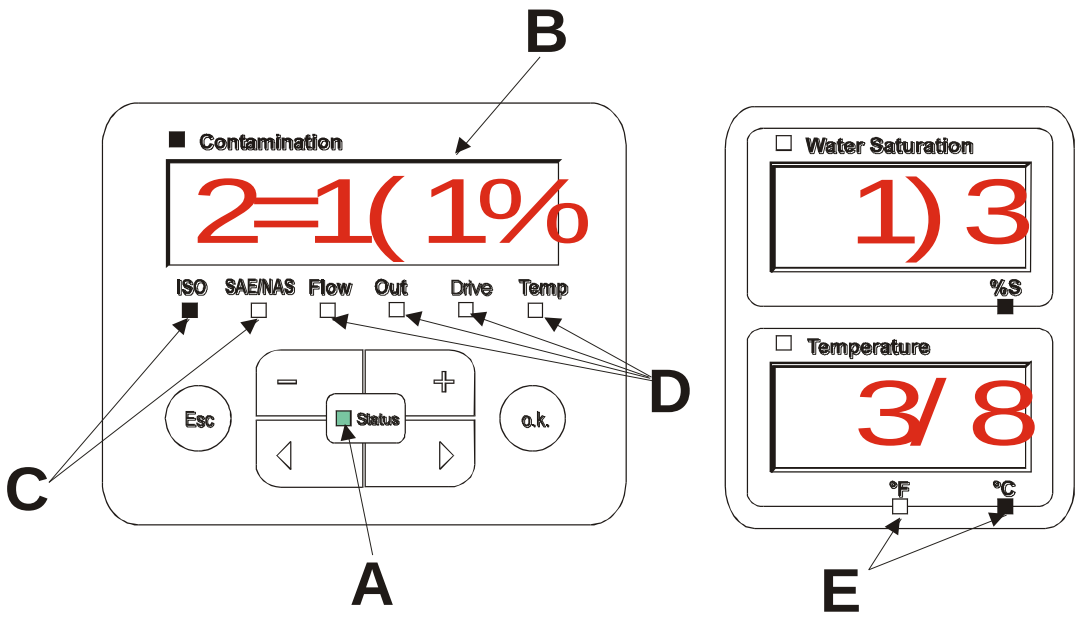
Operating the SMU

If the SMU is powered up, then it can be used and parameters can be set, even without any sensors being connected.

The saving of measurement data is accomplished after a minimum of one sensor has been connected.

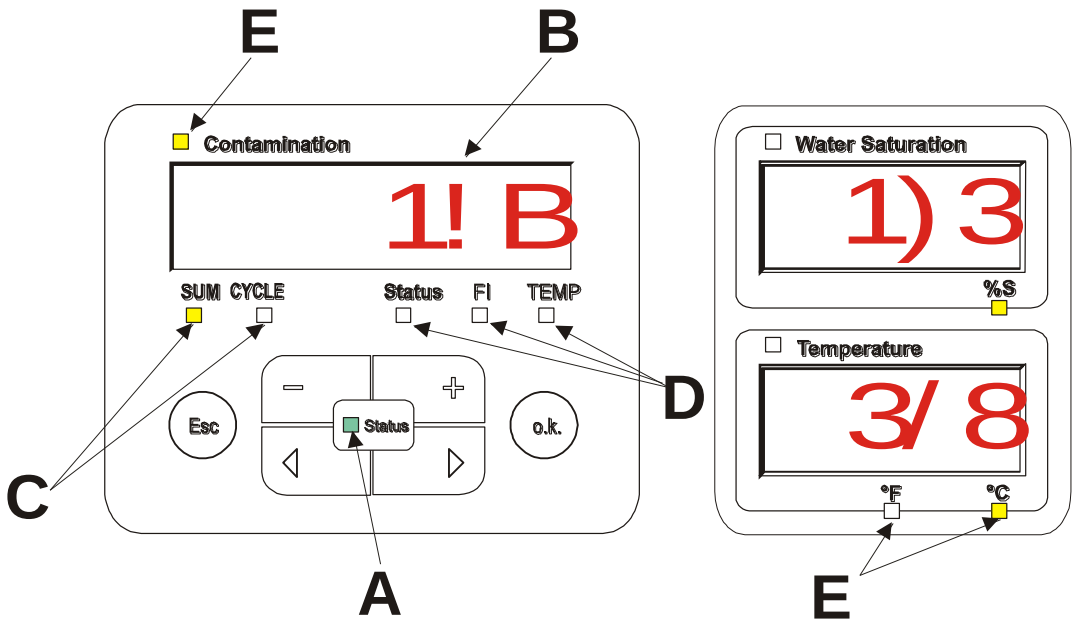
The individual controls and their operation are described in the following.

Display (TCM and TWS-C)



Item	LED	Designation
A	Status	Status display (see page 81 for details).
B	Display	Consists of a 6-digit display and shows the selected measured values.
C	Measured variable	This indicates which measurement is currently being shown in the display e.g. **ISO / SAE/NAS.**
D	Additional variable	Indicates which service variable is shown in the display e.g. **Flow / Drive.**
E	Unit	The units of the fluid temperature display can be set to °C or °F.

Display (TMS and TWS-C)



Item	LED	Designation
A	Status	Status display (see page 81 for details).
B	Display	Consists of a 6-digit display that shows the selected measured values.
C	Quantity	Display of the respective particle number **SUM** = Quantity since switch-on **CYCLE** = Quantity during current measurement period
D	Additional variable	Indicates the service variable in the display, i.e.: **Status / Fi / Temp**
E	Unit	The units of the fluid temperature display can be set to °C or °F.

Internal measurement data memory

All measurements are kept in internal memory, with a reference to the measurement point, until deliberately deleted by means of the DEL.MEM function.

To transfer the data, the target system (e.g. PC or USB stick) has to have at least 10 MB of capacity free.

The capacity of the internal memory is dependent on the measurement interval and the sensor combination.

SMU1200 up until 31.12.2009 – Hardwareindex A:

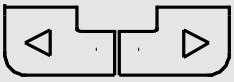
Measurement interval	TMS + TWS-C Days	TCM + TWS-C Days
10 Seconds	> 3	> 3
20 Seconds	> 6	> 7
60 Seconds	> 21	> 21
5 Minutes	> 105	> 107
60 Minutes	> 1265	> 1286

SMU1200 as of 01.01.2010 – Hardwareindex B:

Measurement interval	TMS + TWS-C Days	TCM + TWS-C Days
10 Seconds	> 6	> 6
20 Seconds	> 12	> 14
60 Seconds	> 42	> 42
5 Minutes	> 210	> 214
60 Minutes	> 2530	> 2572

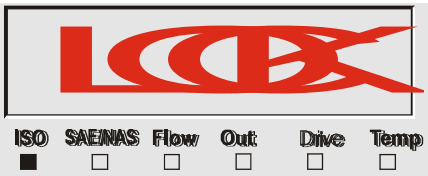
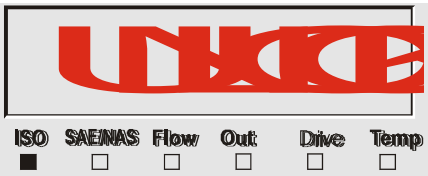
Keyboard elements

The keyboard consists of six buttons. These buttons are used to operate the SMU and to navigate through the menus (hierarchically structured).

Keyboard	Description
	- One level lower - Confirmation of changed value (lowest level) - confirm when changes are to be saved or cancelled (top level)
	- One level higher - No value change
	- Change values at the lowest levels (if you are at the lowest menu level, the display will flash)
	- Scroll through display - Scroll through menu - Select numbers

Activating/deactivating key lock

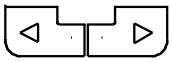
Lock the keyboard to prevent unwanted / accidental entries or operation. To activate or deactivate keypad locking, press both keys simultaneously.

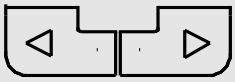
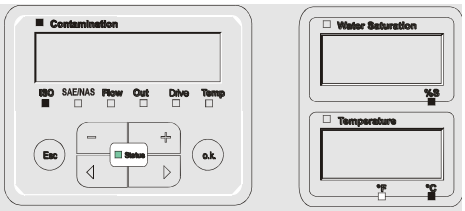
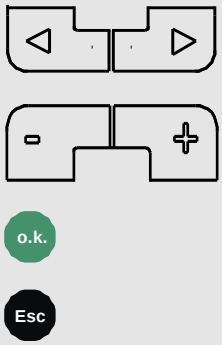
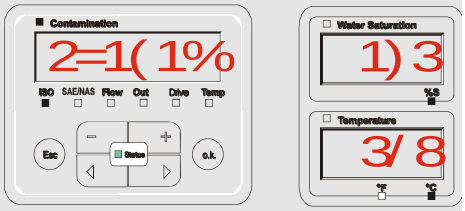
Keys	The following appears in the display (1 sec)	Description
		Key Lock is activated
		Key Lock is deactivated

The display switches to the preset display after 1 second.

Switching the display on and off

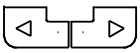
You can switch off the display. Only the status LED stays active on switched off displays.

To switch off the display, press the two  keys simultaneously. Switching back on is accomplished by pressing any key.

Keys	Display	Description
		Switches displays off
		Switches displays on

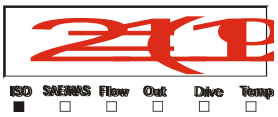
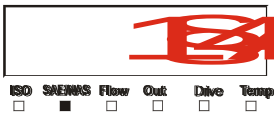
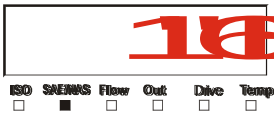
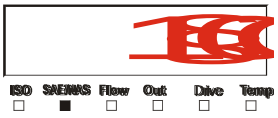
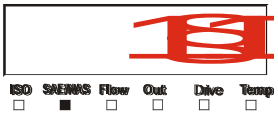
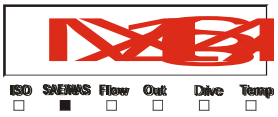
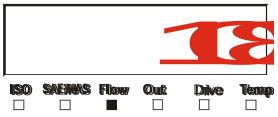
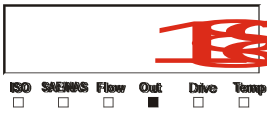
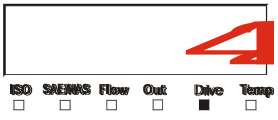
Scrolling through the displays

The various information is shown in the display, depending on the ContaminationSensor (TCM or TMS) that is connected and on the settings selected under SENS.A or SENS.B.

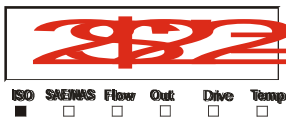
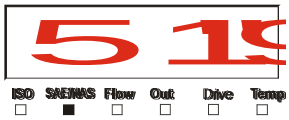
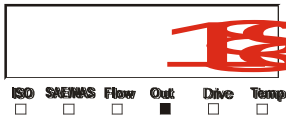
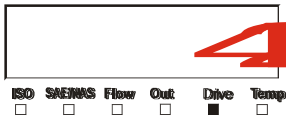
The displays can be called up by scrolling using the  keys.

TCM displays

Display ISO.SAE

Display	Description	
	3-digit ISO code	Measured variables
	SAE class A	
	SAE class B	
	SAE class C	
	SAE class D	
	SAE Max.	
	Flow rate in ml/min	Service variables
	Display of the current or voltage output at the analog output. (example: 13.8 mA)	
	LED current in %	
	Display of the temperature in the sensor . (example: = 29.5°C)	

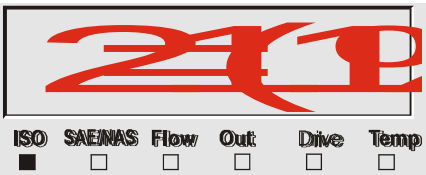
Display ISO.NAS

Display	Description	
	3-digit ISO code	Measured variables
	2-5 µm channel NAS	
	5-15 µm channel NAS	
	15-25 µm channel NAS	
	> 25 µm channel NAS	
	NAS Max.	
	Flow rate in ml/min	Service variables
	Display of the current or voltage output at the analog output. (example: 13.8 mA)	
	LED current in %	
	Display of the temperature in the sensor. (example: 29.5 °C)	

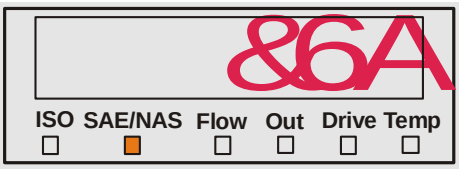
Measured variables TCM

The measurements provide you with information about the purity of the oil in the system concerned. The measurement variables are calibrated. They indicate a measured value with an accuracy of +/- 1/2 codes/class.

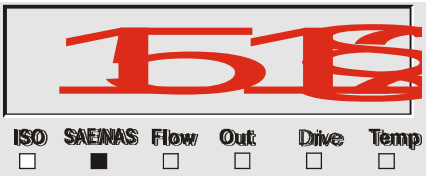
Measured variable "ISO"

Display	Description
	The measured value is updated depending on the set measuring time. Display of the 3-digit ISO code.

Measured variable "SAE"

Display	Description
	The measured value is updated depending on the set measuring time. Display of a channel in the SAE class.

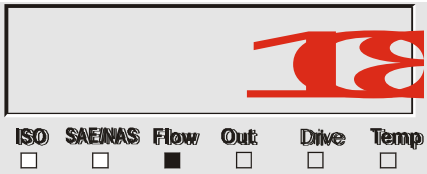
Measured variable "NAS"

Display	Description
	The measured value is updated depending on the set measuring time. Display of a channel in the NAS class.

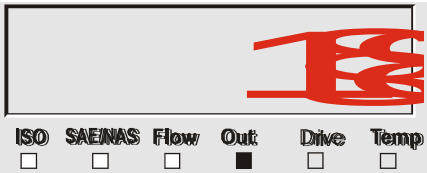
Service variables (only for TCM)

These values give you information about the current flow and the LED brightness within the TCM Sensor. The service variables are not calibrated.

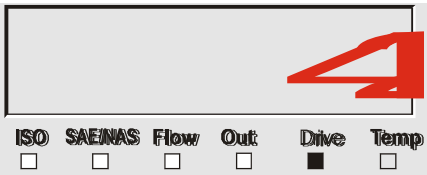
Service variable "Flow"

Display	Description
	Here, you can see the averaged flow through the ContaminationSensor unit (e.g. 108 ml/min)

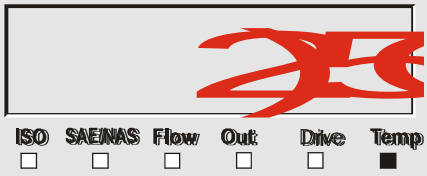
Service category "Out"

Display	Description
	Here you can see the value emitted as analog output signal (example: 13.8 mA)

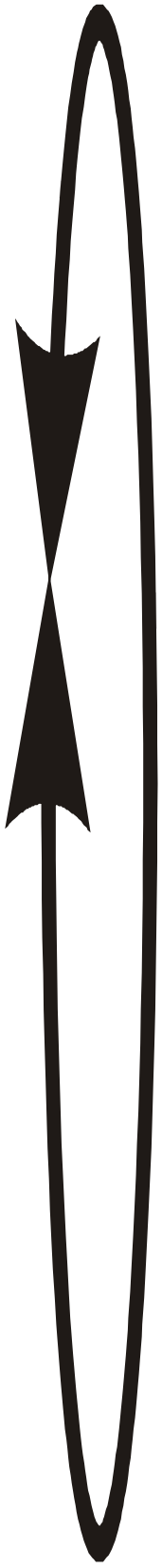
Service variable "Drive"

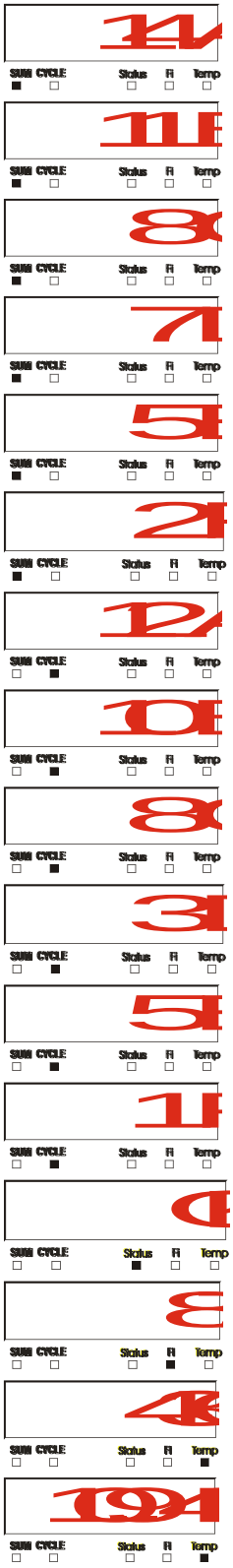
Display	Description
	Display of the current LED brightness (1-100%) in the ContaminationSensor (example: 42%).

Service category "Temp"

Display	Description
	Display of the media temperature indirectly measured in the ContaminationSensor. The display takes place dependent on setting in °C or °F (example: 29.5 °C) The measurement may deviate from the TWS-C measurement if a measurement point deviates or if measurements are taken indirectly.

TMS displays





Display	Description	
FE A	ferromagnetic particles Class A	Measured variables
FE B	ferromagnetic particles Class B	
FE C	ferromagnetic particles Class C	
NFE D	non-ferromagnetic particles Class D	
NFE E	non-ferromagnetic particles Class E	
NFE F	non-ferromagnetic particles Class F	
CYC A	ferromagnetic particles Class A	
CYC B	ferromagnetic particles Class B	
CYC C	ferromagnetic particles Class C	
CYC D	non-ferromagnetic particles Class D	
CYC E	non-ferromagnetic particles Class E	
CYC F	non-ferromagnetic particles Class F	
STATUS	Status byte (00 at status O.K.)	Service variables
FI	Field strength of the field coil	
TEMP C	Media temperature in °C	
TEMP F	Media temperature in °F	

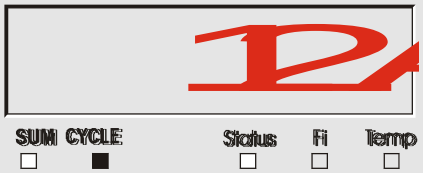
Measured variables TMS

The measurements provide you with information about the purity of the oil in the system concerned.

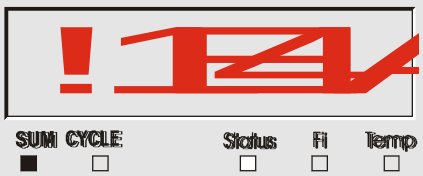
Measured variable "SUM"

Display	Description
	The measurement variable SUM represents the quantity of particles counted since the sensor was switched on.

Measured variable "CYCLE"

Display	Description
	The number of particles that were counted for each size within the current measuring time (parameter sTIME) is presented via the measured variable CYCLE.

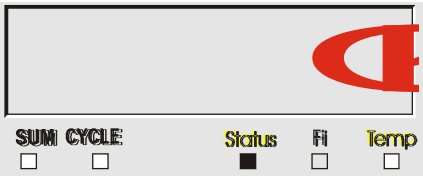
Representation of numbers over 9999

Display	Description
	If a particle quantity of over 9999 is achieved on one of the classes shown, the display switches to exponential representation. (Example: 1.1E4 = 11,000)

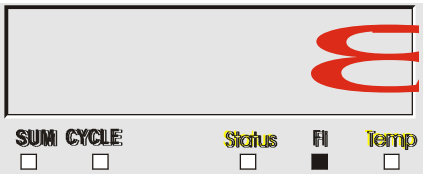
Service variables (only for TMS)

The service variables give you information on the current status and the field strength for the connected sensor particle definition. The service variables are not calibrated.

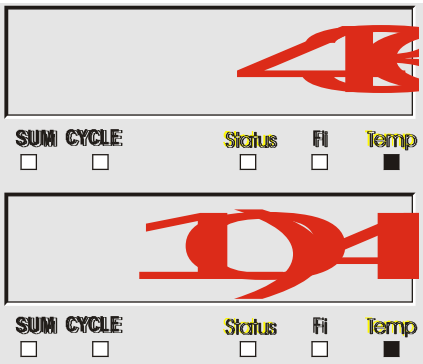
Service variable "Status"

Display	Description
	Status byte OK if no malfunction has occurred

Service variable "Fi"

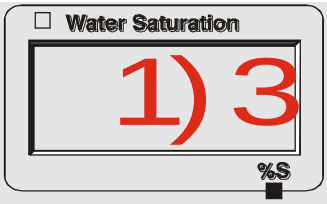
Display	Description
	Field strength of coil in %

Service category "Temp"

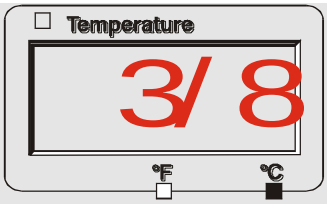
Display	Description
	The TMS determines the fluid temperature indirectly. Depending on the setting, the measurement is either shown in Celsius °C, or as Fahrenheit °F. The measurement may deviate from the AS display and measurement due to a deviating measurement point or if measurements are taken indirectly.

AquaSensor TWS-C measured variables

Measured variable "Water saturation"

Display	Description
	When using the AS, the measurement is shown on the display as the relative humidity of the operating fluid, expressed as percentage saturation.

Measured variable "Temperature"

Display	Description
	The TWS-C continuously measures the fluid temperature. Depending on the setting under TP.UNIT, the measurement is either shown in Celsius °C, or as Fahrenheit °F.

Configuring the SMU

The SMU has two operating levels with corresponding menus for configuration:

Menus	Description	For details see page
PowerUp Menu	The basic settings for the SMU	47
Measuring Menu	Settings for the recording and storing of the measurements and naming the measurement points.	59

PowerUp Menu

In the PowerUp menu, the basic settings for the operation of the SMU are made.

Selection	To do
Start the PowerUp menu	Press any button and hold it down while switching on the supply voltage
Exit the PowerUp menu without saving	Scroll to **CANCEL** and press o.k., or the option will be selected automatically after 30 seconds
Exit the PowerUp menu after saving.	Scroll to **SAVE** and press o.k.

PowerUp	Description	For details see page
DAtTIM	Set the system date/time	48
ADRESS	Set the bus and IP address of the SMU	49
REcMOD	Set the data recording	51
DElMEM	Delete the records	52
SENS A	Selection of the PowerUp menu of the sensor connected to sensor interface A (TCM or TMS)	53
SENS B	Selection of the PowerUp menu of the sensor connected to sensor interface B (TWS-C)	55
SEnADR	Set the sensor address automatically	56
DFAULT	Reset to factory defaults	57
CANCEL	Discard changes and exit	58
SAVE	Save changes and exit	58

Press the o.k. key to change to a sub-menu.

DAT.TIM – date / time

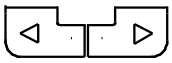
In this option you can set or alter the system date / time.

If the date has never been set, or if the battery is flat , the system date will be 2000-01-01 and the time will be 00:00.

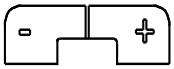
The date format is YY.MM.DD => year / year / month / month / day / day.

The time uses 24 hour format HH.MM => hour / hour / minute / minute.

Use the following buttons to set the date and time:



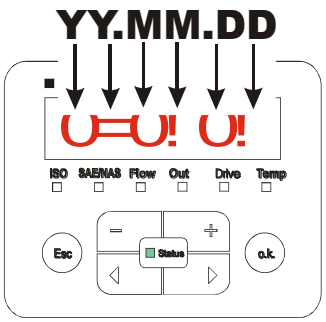
To change digit



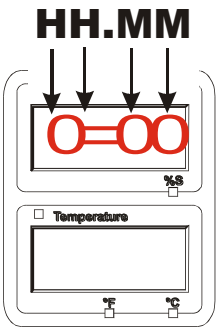
To change the value

To confirm the change

Cancel and back



YY -> Year
MM-> Month
DD -> Day



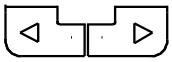
HH -> Hour
MM-> Minutes

ADRESS – Setting HSI bus address / TCP/IP address

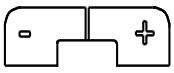
Under ADRESS set the HSI bus address and / or the IP address of the SMU.

There are 26 bus addresses from A - Z available for the HSI bus address. Please note that each address can occur only once on any bus.

Use the following buttons to set the address:



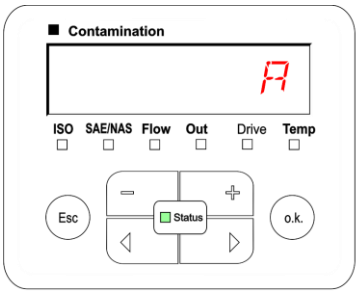
To change digit

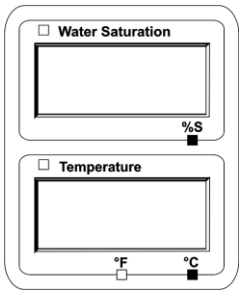


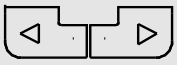
To change the value

To confirm the change

Cancel and back



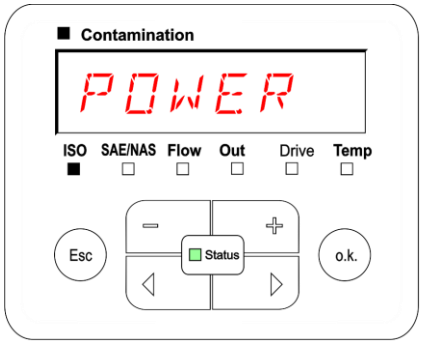


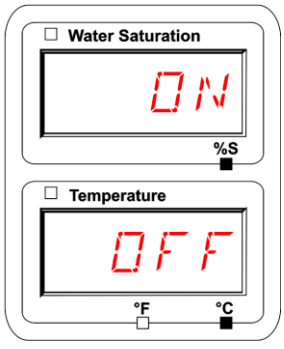
ADRESS		Description
	HSI	Setting HSI bus address
	IpADR	Setting up IP address
	IpMASK	Setting IP subnet mask
	IpGATE	Setting IP standard gateway

Press the 

to change to a sub-menu.

After you have changed the IP settings the SMU requires a restart. The following appears on the display:





Restart the SMU to adopt the changed settings. To do this, remove the power supply to the SMU for approx. 10 seconds.

The factory settings under ADRESS are:

HSI	**A**
IpADR	**192.168.0.30**
IpMSK	**255.255.255.0**
IpGW	**192.168.0.1**

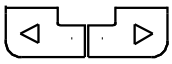
REC.MOD – Set data recording

Using the function REC.MOD, you can change the type of data recording. You can select between two variants.

RING: Data is saved continuously. If the memory is full, then the oldest data will be deleted in order to make it possible to continue to record. This setting is recommended for stationary operation at a measurement point. Then it will also be true that only one measurement point can be selected in the Measuring Menu.

FILL: The data is stored until the memory available has been used up. After this, no further data are recorded. The time period is dependent on the REC.TIM setting in the measurement menu. This type of storage is intended for when the SMU is used at different measurement points. The DEL.MEM function is available for deletion of the memory.

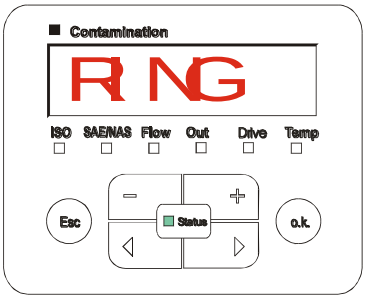
Use the following buttons to set the memory type:

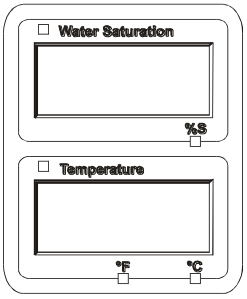


Change the settings

To confirm the change

Cancel and back





The factory setting of the memory type is: **RING**

Save the data to the USB memory stick before changing and deleting the memory.

If the memory is not deleted after changing the REC.MOD, then the SMU will display a NO.LOG.

If REC.MOD is already changed, then you will no longer be able to save the data. To save the data elsewhere, restore the original setting.

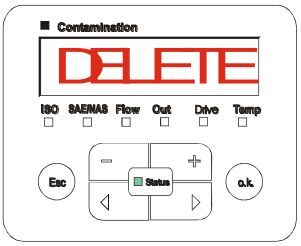
DEL.MEM – Delete Memory

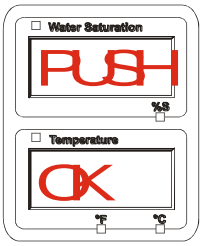
With DEL.MEM, you permanently delete all of the measurement records in the internal memory.

Before deletion, back up all of the measurement records on the USB memory stick.

Push the following buttons to:

- o.k. Confirm deletion
- Esc Cancel and back





Exit the PowerUp menu with **CANCEL** or **SAVE**.

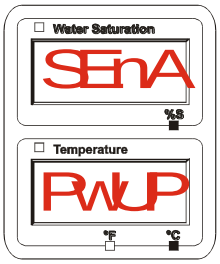
SENS A – Sensor A PowerUp menu

Under SENS A, you have the option of accessing the PowerUp menu with the sensor (TCM or TMS) connected to sensor interface A.

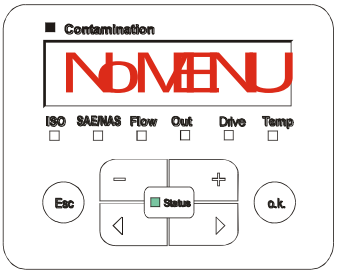
The respective menu items are dependent on the connected sensor.

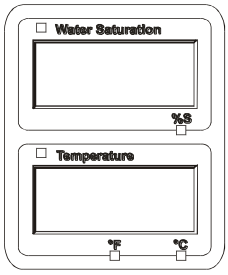
You can find a description of the menu items in the Operating and Maintenance Instructions for the sensor.

SEN A and PW.UP be shown in the right-hand display for as long as the PowerUp menu of sensor A is selected.



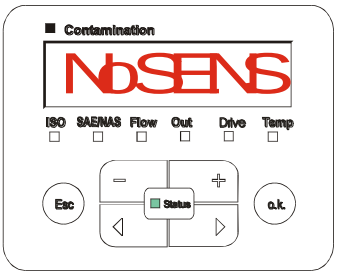
The message NO.MENU will appear if no PowerUp menu is available for the connected sensor. (Display for ~ 2 seconds).

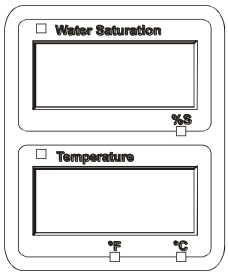




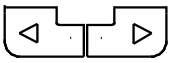
If no sensor is connected to the sensor interface A, then NO.SENS will be displayed.

This display will go out after 10 seconds provided that the SMU status (LED) is green.

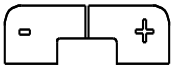




Use the following buttons to set the menu items:



To change the menu items

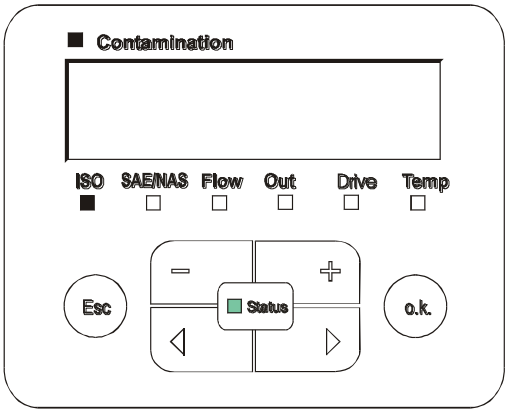


To change the value

To select the menu item

To confirm the change

Cancel and back



Factory setting:	Consult the operating and servicing instructions for the sensor that is connected.

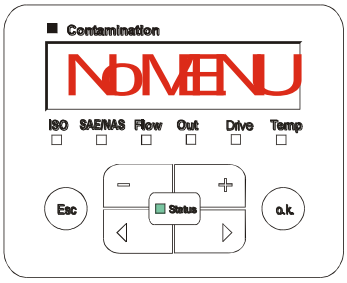
SENS B – Sensor B PowerUp menu

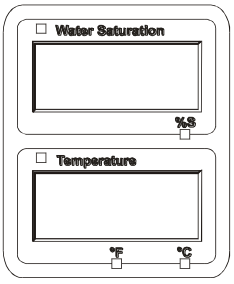
Under SENS B, you have the option of accessing the PowerUp menu with the sensor connected to sensor interface B.

You can find a description of the menu items in the Operating and Maintenance Instructions for the sensor.

The TWS-C has no PowerUp menu. This item is reserved for use with other sensors.

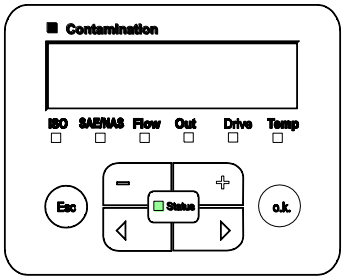
The message NO.MENU will appear if no PowerUp menu is available for the connected sensor. (Display for ~ 2 seconds).

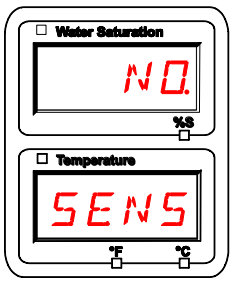




If no sensor is connected to the sensor interface B, then NO.SENS will be displayed.

This display will go out after 10 seconds provided that the SMU status (LED) is green.





Factory setting:	Consult the operating and servicing instructions for the sensor that is connected.

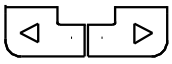
SEN.ADR – Set sensor address

Use this menu item to reset the sensor address of the connected sensors. This becomes necessary if an TWS-C or another sensor at the sensor interface B is used without a fixed address or with the same address as at sensor interface A.

To change the sensor address, proceed as follows:

Connect the TCM or TMS to sensor interface A and the TWS-C to sensor interface B.

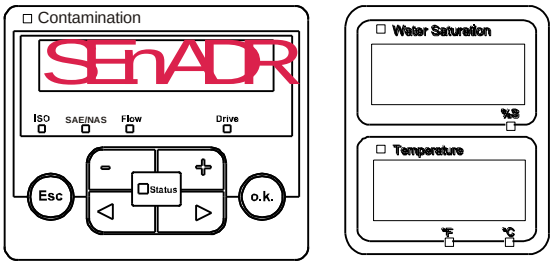
Call up the PowerUp menu.



Change to menu item

o.k. Request changes to the address settings

Esc Cancel and back

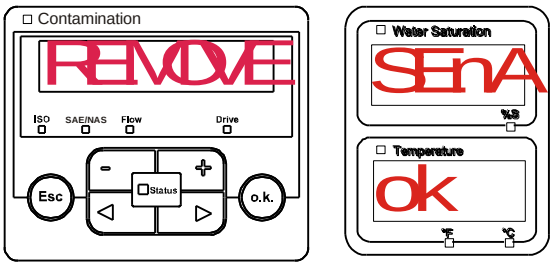


The SMU determines the address of the sensor connected to sensor interface A.

Remove the sensor from sensor interface A and confirm with OK.

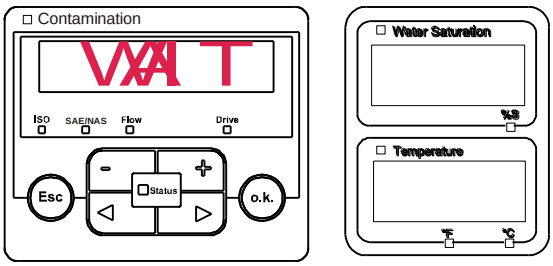
o.k. Confirm

Esc Cancel and back



The settings for the sensor at sensor interface B (TWS-C) will now be reset.

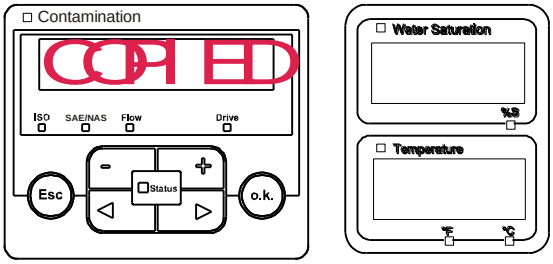
The message WAIT appears on the display.



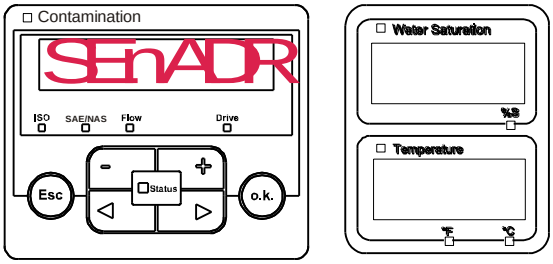
The bus address of the sensor at interface B is set automatically.

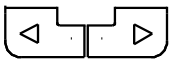
The TWS-C is set as bus address B. If this bus address has already been allocated, bus address C is selected for the TWS-C.

After completion, the message COPIED will appear for ~ 1 second.



Afterwards, you will find yourself back in the menu item SEN.ADR.





Change to menu item

o.k. Request changes to the address settings

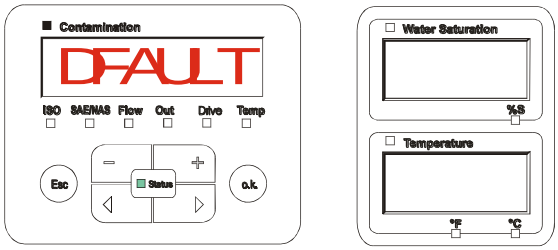
Esc Cancel and back

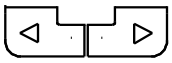
Reconnect the sensor with the sensor interface A and exit the PowerUp menu via CANCEL or SAVE and restart the SMU.

DFAULT – reset to factory settings

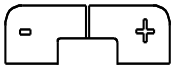
DEFAULT resets the SMU back to factory settings.

Use the following buttons:





Change to the next option in the menu



Has no function

o.k. To confirm the change

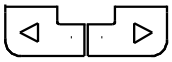
Esc Cancel and back

Factory setting	See table, page 86. The settings for the connected sensors remain unchanged.

CANCEL

CANCEL discards all changes and exits the PowerUp menu.

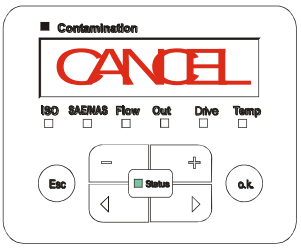
Use the following buttons:

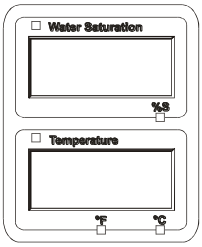


Change to the next option in the menu

o.k. Confirm

Esc Cancel and back

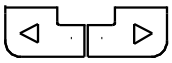




SAVE – store data

SAVE stores all of your changes and exits the PowerUp menu.

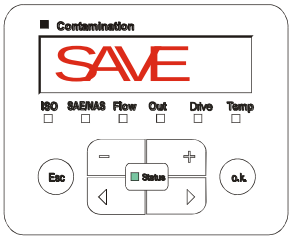
Use the following buttons:

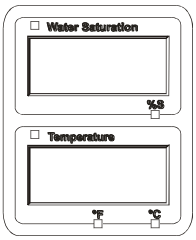


Change to the next option in the menu

o.k. Confirm

Esc Cancel and back





Measuring Menu

The measuring menu allows you to change settings during operation.

Selection	To do
Start the measuring menu	Press the o.k. button
Exit the measuring menu without saving	Scroll to **CANCEL** and press o.k. or wait 30 seconds. With no further action the SMU will automatically switch to display mode.
Save and exit the measuring menu	Scroll to **SAVE** and press o.k.

Measuring Menu:	Description	For details see page
RECORD	Record measurements	60
MEMORY	Show free memory	61
REcTIM	SMU recording interval	62
EdMPNT	Change name of measurement point	63
OIlCON	Set the parameters of the OilCondition sensor	64
TPUNIT	Change temperature units	64
SENS A	Select sensor A	65
SENS B	Select sensor B	66
CANCEL	Discard changes and exit	66
SAVE	Save changes and exit	67

RECORD – Record measurements

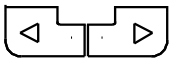
In the item RECORD, you define at which measurement point the next reports will be saved.

If the setting RING (factory setting) is selected in the PowerUp menu under REC.MOD, then only MPNT00 is available.

Only one measurement point designation is available to you in this operating mode.

The following applies for the setting selected under item REC.MOD = FILL:

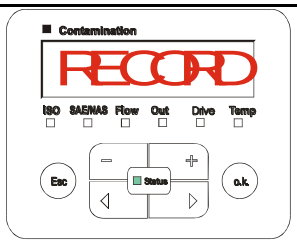
Use the following buttons:

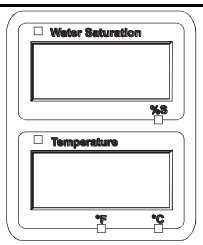


Change to the next option in the menu

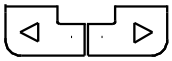
o.k. Confirm

Esc Cancel and back





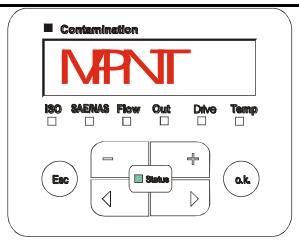
Use the following buttons:

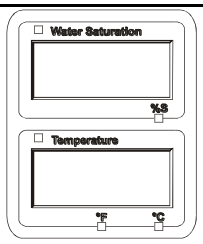


Change the selection

o.k. Confirm

Esc Cancel and back

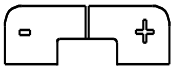




MNPT makes up to 20 freely definable measurement points available. On delivery, the measurement points are set to MNPT00 to MNPT19.

You can change these names at will, as described under ED.MNPT.

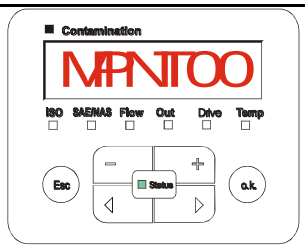
Use the following buttons:

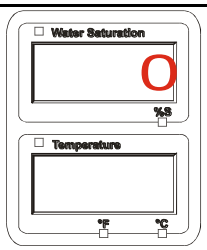


Change to the next measurement point

o.k. To confirm the change

Esc Cancel and back

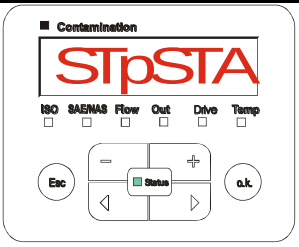


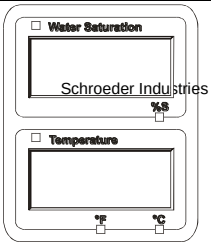


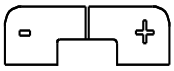
Select STP.STA to create a new file in the internal SMU memory under the new measurement point. Press o.k. and the display will jump to SAVE.

Confirm once more by pressing the o.k. key.

Use the following buttons:







Change the selection

o.k.

Confirm

Esc

Cancel and back

If the setting RING (factory setting) is selected in the PowerUp menu under the item RECORD, then the menu item STP.STA will not be available.

MEMORY – show free memory space

Under MEMORY, you check the current free internal memory capacity of the SMU in %.

This item is available only with the memory setting FILL in the menu item REC.MOD. In the RING setting, the menu item MEMORY does not appear for selection.

When adjusting the setting FILL under the menu item REC.MODE, it must be taken into account that no further measurement records will be saved when there is no more memory available.

For example: 97% free memory.

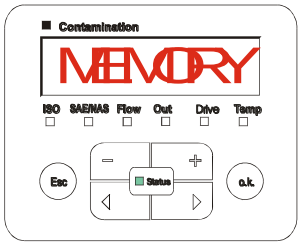
Use the following buttons:

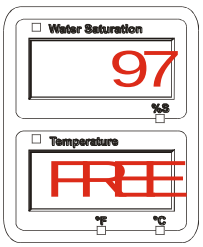
o.k.

To confirm the change

Esc

Cancel and back





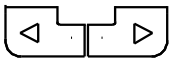
Save measurement records that you have already read out as described on page 68. Then delete those records in the internal memory with DEL.MEM as described on page 52.

REC.TIM – Set recording interval

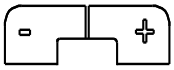
Under REC.TIM, set the time interval at which the current measured value of the connected sensors is stored in the SMU memory.

Select the duration in the range from 10 to 3600 seconds.

Use the following buttons to set the duration of the measurement.



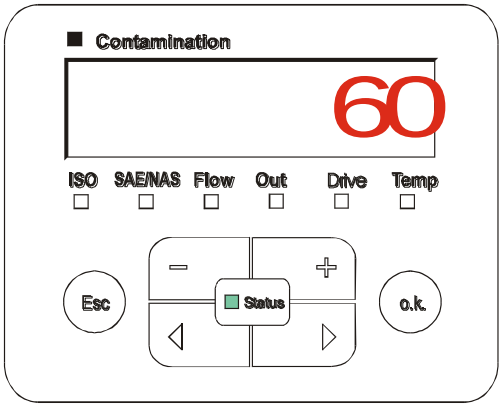
To change digit



To change the value

To confirm the change

Cancel and back



Factory setting:	60 seconds

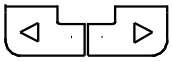
ED.MPNT – Change the name of measurement points

Under ED.MPNT you can modify the designation of the measurement point to meet your requirements.

You only have 6 characters available for the name. E.g., TEST01, DIGGER, CRANE, etc.

If the setting RING (factory setting) is selected in the PowerUp menu under the item REC.MOD, then only MPNT00 is available. No other measurement points can be selected in this operating mode.

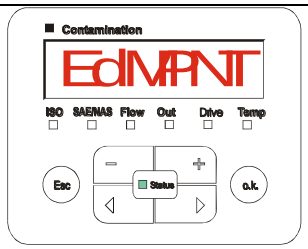
Use the following buttons:



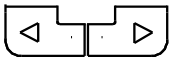
Change to the next option in the menu

o.k. To confirm the change

Esc Cancel and back



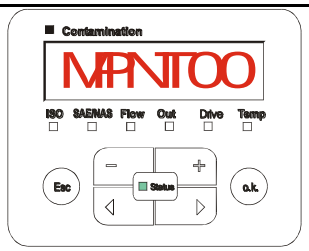
Use the following buttons:



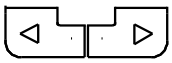
Change to the next measurement point

o.k. To confirm the change

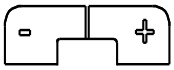
Esc Cancel and back



Use the following buttons:



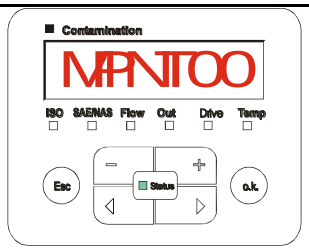
Select another character

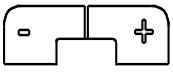


Change the current character

o.k. To confirm the change

Esc Cancel and back



The following characters will appear when the  button is pressed, wrapping around at the end.

ABCDEFGHIJKLMNOPQRSTUVWXYZ0123456789_

The empty space is located between 9 and A and can be adjusted only from the 6th position to the left. This offers you the option to enter measurement point names with less than 6 characters.

Setting OIL.CON – display screen for OilCondition sensors

Under the item OIL.CON you can select which measured value is displayed in the top right display.

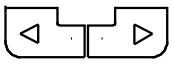
Only the water saturation level SAT.LEV can be selected for the TWS-C.

Factory setting: **SAT.LEV**

TP.UNIT – change the temperature units °C / °F

Under TP.UNIT you set the units for displaying the fluid temperature. Choose between the units Celsius °C and Fahrenheit °F.

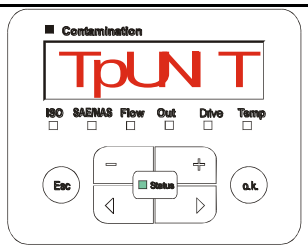
Use the following buttons:

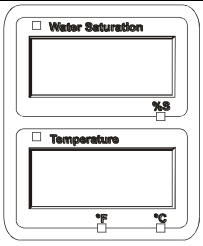


Change to the next option in the menu

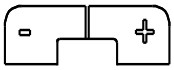
o.k. Confirm

Esc Cancel and back





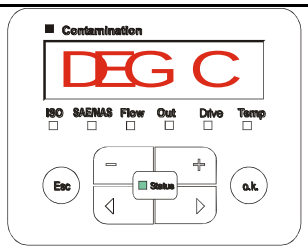
Use the following buttons:

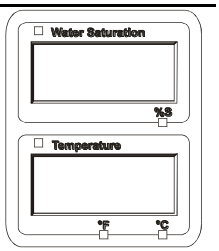


Change the selection

o.k. Confirm

Esc Cancel and back





Factory setting: **DEG C**

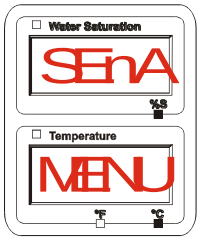
SENS A – Sensor A Measuring Menu

Under SENS A, you have the option of moving into the Measuring menu with the sensor (TCM or TMS) connected to sensor interface A.

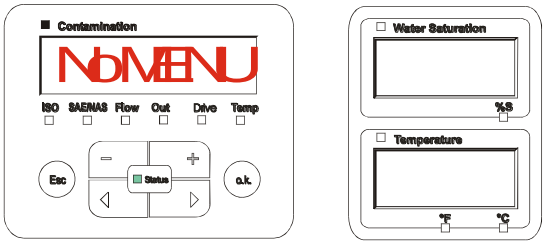
The respective menu items are dependent on the connected sensor.

You can find a description of the menu items in the operating instructions for the sensor.

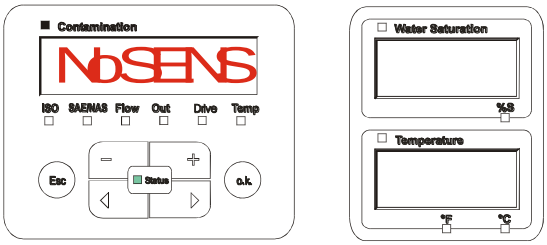
SEN A and MENU will be shown in the right-hand display for as long as the Measuring menu of Sensor A is selected.



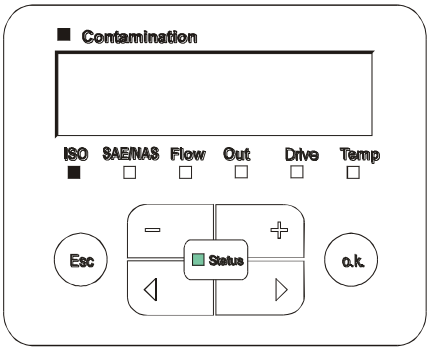
If no Measuring menu is available for the sensor that is connected, then the message NO.MENU display for will appear for ~ 2 seconds.

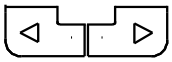


If no sensor is connected to the sensor interface A, then NO.SENS will be displayed.

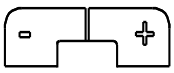


Use the following buttons to set the menu items:





To change the menu items



To change the value

To select the menu item

To confirm the change

Cancel and back

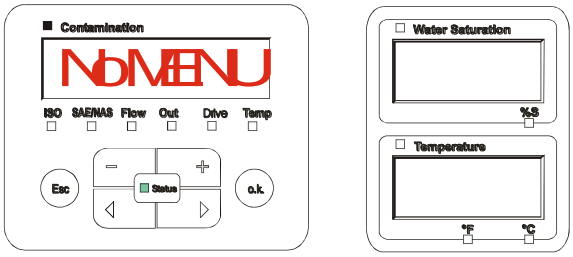
SENS B – Sensor B Measuring Menu

Under SENS B, you have the option of moving into the Measuring menu with the sensor connected to sensor interface B.

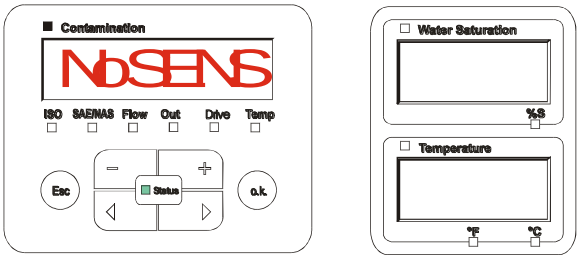
You can find a description of the menu items in the Operating and Maintenance Instructions for the sensor.

The TWS-C has no Measuring menu. This item is provided for use with other sensors.

If no Measuring menu is available for the sensor that is connected, then the message NO.MENU for will appear for ~ 2 seconds.



If no sensor is connected to the sensor interface B, then NO.SENS will be displayed.



CANCEL

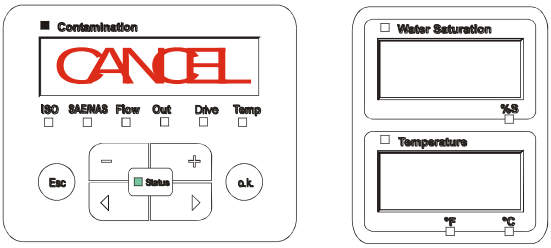
With CANCEL, you discard all changes and exit the Measuring menu.

Use the following buttons:

Change to the next option in the menu

o.k. Confirm

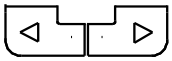
Esc Cancel and back



SAVE – save data

With SAVE, you save all changes and exit the Measuring menu.

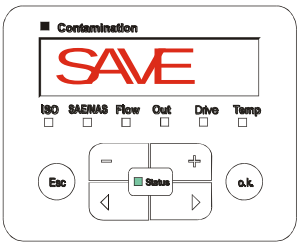
Use the following buttons:

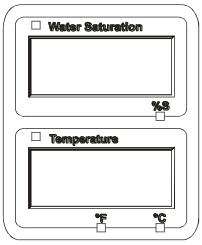


Change to the next option in the menu

o.k. Confirm

Esc Cancel and back





USB interface

Copying measurements onto a USB data stick

Compatibility with other USB memory sticks on the market cannot be guaranteed as the SMU communicates directly with the microprocessor. This means that communication errors can't be corrected in software, as on a PC with an operating system.

We recommend using the Schroeder USB memory stick included in delivery, which we successfully tested for many PC/operating system combinations.

On page 90. you will find an overview of additional tested USB sticks.

(diagram similar)

We accept no liability for the functionality and compatibility of the USB memory stick with your system. We do not offer support or replacements in this case.

Saved measurements can be backed up on the USB memory stick supplied with the unit. Note that all of the measurements stored in the SMU 1200 internal memory will be copied to the USB memory stick. After copying to the USB stick, the data still exists in the internal memory.

During the download, no measurement data are stored in the internal memory. After another download, the measuring data are missing for the duration of the download.

You have to explicitly delete the data in the internal memory of the SM 1200. See the DEL.MEM menu option on page 52.

Before using the USB stick for the first time, we recommend that you format it. To do that, insert it into a free USB port on your PC. Then change to the file manager (e.g. Explorer) and format the stick in FAT32 format. You will find details of this in the documentation of your operating system.

There must be at least 10 MB of free memory available on the USB memory stick.

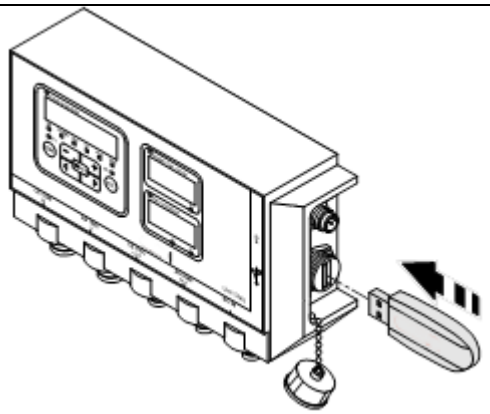
In order to be able to copy data to the USB memory stick, the REC.MOD must be set to the setting with which the data can also be recorded.

To save your measurements on the USB stick, proceed as follows:

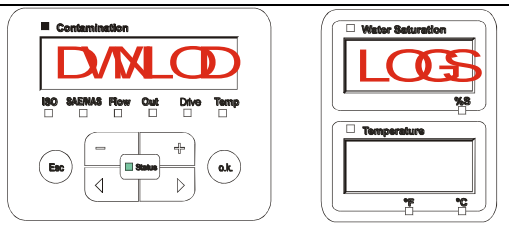
1. Open the protective cap to the USB interface by unscrewing in counterclockwise direction.

   Insert the USB memory stick into the socket. Note that the stick only fits one way around.

   It must be easy to insert the USB stick into the socket.

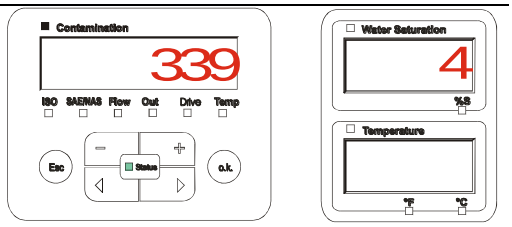


2. After inserting the USB memory stick, the SMU will detect it and immediately start copying the measurement data.



3. In the left-hand display, you can see the number of measurement records to be copied (e.g. 339)

   The top right display shows the number of records to be viewed (e.g. 4). Only a 1 appears if you are in the RING setting.

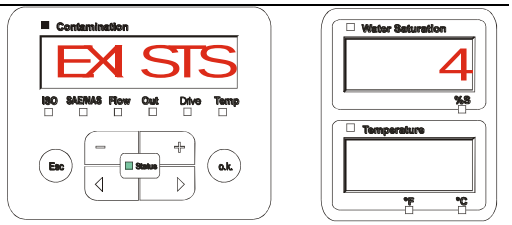


4a. **Memory setting FILL:**

   If the SMU detects existing records on the USB memory stick, the following message will appear on the display.

   Example: The SMU has found the record number 4 on the USB memory stick.

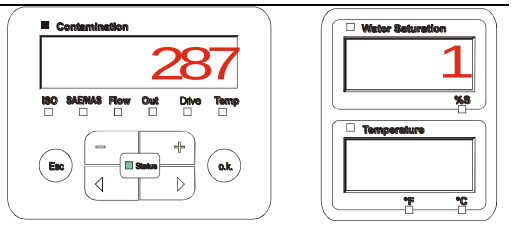
   This function is especially suited to the synchronization of the copied data with the SMU's internal memory. The existing records will be displayed.



4b. **Memory setting RING:**

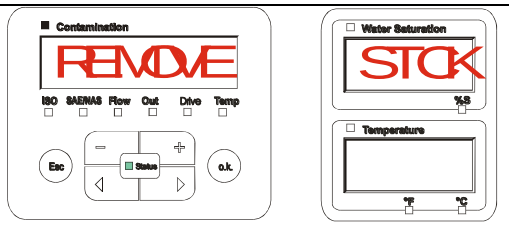
   If the SMU recognized the file with the same data and number from the same measured point on the USB memory stick, the file ending is incremented by 1.

   (Example: file 09_02_06.001



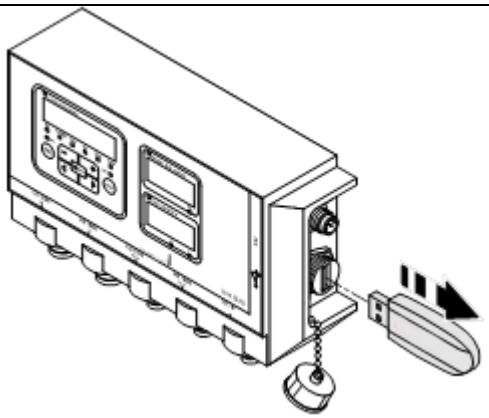
appears as the new file 09_02_06.002)

5. After successfully copying the records, the following message will appear on the display.



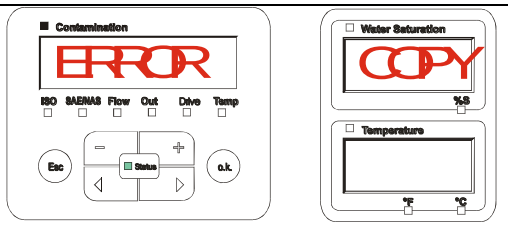
6. Now remove the USB memory stick from the socket by gently pulling on it.

   Close the cover to the USB interface by screwing the protective cap on in a clockwise direction.



Data transmission failed - "ERROR COPY"

If a fault occurs during the copy procedure, or if you remove the USB memory stick from the socket before the procedure is complete, the following message will be output on the display.



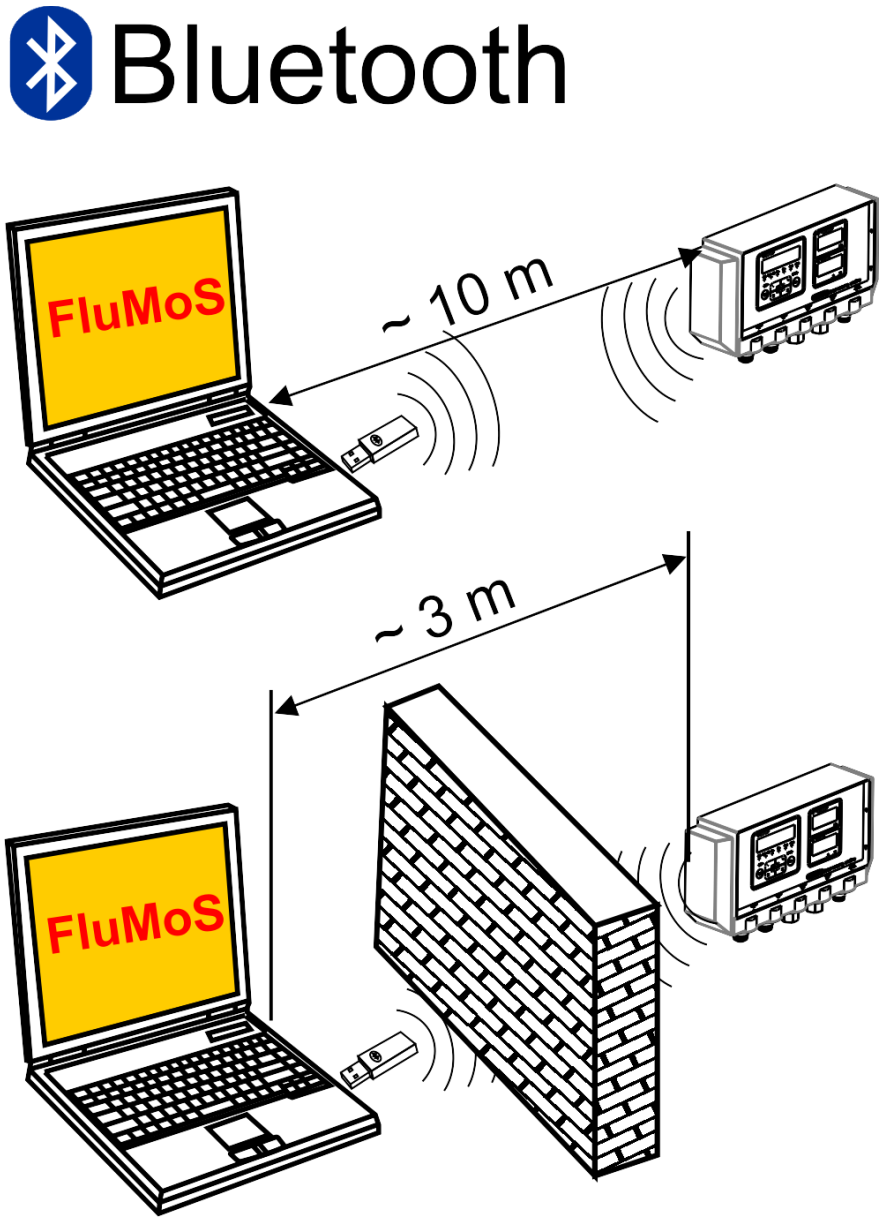
To remedy faults, proceed as follows:

Step		Description	
1.		Insert the USB memory stick in your PC and delete all data.	
2.		Put the USB memory stick back in the SMU USB interface. The download will start automatically.	
3.	->a.	If the error recurs	-> proceed to Step 4.
	->b.	If the error does not recur	-> proceed to Step 11.
4.		Insert the USB stick in your PC and reformat it.	
5.		Put the USB memory stick back in the SMU USB interface. The download will start automatically.	
6.	->a.	If the error recurs	-> proceed to Step 7.
	->b.	If the error does not recur	-> proceed to Step 11.
7.		Use another compatible USB memory stick (see page 90).	
8.		Put the USB memory stick back in the SMU USB interface. The download will start automatically.	
9.	->a.	If the error recurs	-> proceed to Step 10.
	->b.	If the error does not recur	-> proceed to Step 11.
10.		Contact the Schroeder Industries Service Department.	
11.		The download has been successfully completed	

Bluetooth interface

The SMU1200 Bluetooth interface is based on Bluetooth **version 1.2**, **class 3**. This means that:

- **Bluetooth Version 1.2**:
  is less sensitive to static disturbances (e.g. WLAN), the maximum data transfer rate is 732.2 kBit/s
- **Class 3**:
  a maximum performance of 1mW or 0 dBm, reaches a maximum of 10 m outdoors. This distance is strongly influenced by disturbances and obstacles in the vicinity of the SMU.



Installing the Bluetooth USB adaptor

If the PC already has a Bluetooth interface, use only this to establish a connection to the SMU.

Prior to the installation of new Bluetooth software, we strongly recommend deinstalling all existing Bluetooth drivers. The parallel use of different Bluetooth interfaces leads to diver conflicts.

If problems should arise, consult the Bluetooth USB adaptor handbook or consult the manufacturer of your PC hardware.

We recommend using the HAMA USB adaptor "Nano", which we successfully tested for many PC/operating system combinations.

(diagram similar)

We cannot guarantee the functionality and compatibility of the Bluetooth USB adaptor with your system. We do not offer support or replacements in this case.

Guarantee and liability for the USB adapter

Warranty and liability - for whatever legal reason - for the delivered item shall be excluded. This exclusion of liability does not apply in cases of intent and gross negligence. Moreover, it does not apply to defects which have been deceitfully concealed or in cases of culpable harm to life, physical injury and damage to health. We shall not be liable for loss not incurred by the supplied object itself, and he is not liable in particular for loss of profit or other financial loss incurred by the Customer.

Connecting the SMU via Bluetooth

The SMU1200 is registered in the Bluetooth vicinity as **SMUxxxx**.

If the connection to the SMU is established via Bluetooth, the measured values can be read out by FluMoS, for example. The HSI report is used to communicate with the SMU.

The data transfer through the Bluetooth connection depends on your PC hardware and installed software. There are a multitude of Bluetooth modules and software drivers on the market that do not completely fulfill the specifications of IEEEE 802.15.

The code for the security question is: 0000

Evaluating stored records

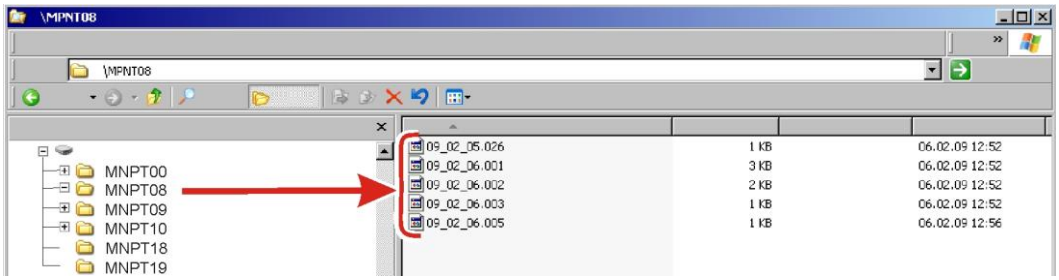
The measurement records read out of the SMU and stored on the USB memory stick are defined as follows:

Directories to store the records

Memory setting FILL

These saving process takes place according to measurement points if the setting FILL has been selected in the PowerUp menu under the setting REC.MOD. (see page 51)

If measurements are to be stored under a measurement point MNPT, the SMU will automatically produce a directory for this measurement point and will put the record there.

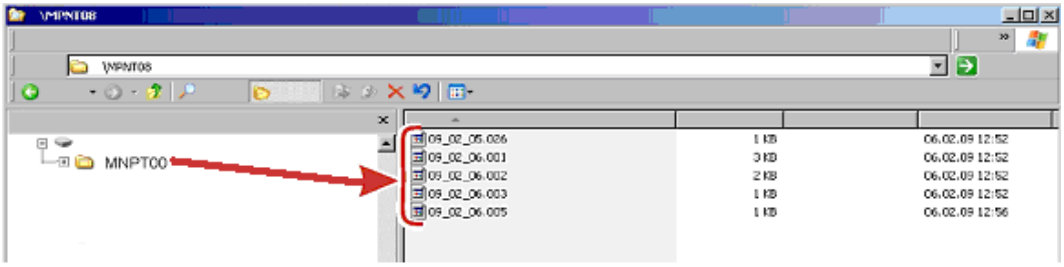


New measurement files are created in FILL mode, as soon as:

- The SMU is switched off and then switched back on.
- The USB memory stick is plugged into the USB port for data transfer.
- In the Measuring menu under RECORD, the menu item STP.STA for creation of a new measurement file is activated with the o.k. button.

Memory setting RING

This saving process takes place in the directory for the measurement point MNPT00 if the setting RING has been selected in the PowerUp menu under the REC.MOD setting. (for more information, see page 51).



If an data set already in existence is recognized by the SMU, the file ending is counted up by 1.

This is to ensure that the downloaded file is not inadvertently overwritten. The most recently downloaded file has the highest file ending.

The measurement file is continuously updated in RING mode.

Record file names

The file names of the measurement records consist of date YY → year, MM → month, DD → day, as well as an incremental number.

09 _ 02 _ 05 . 026

YY _ MM _ DD . incremental number

A new record is created in REC.MOD = FILL:

- on request by STA.STP
- after a restart
- after the data is downloaded to the USB stick

For each new record, the incremental number is increased by one.

Evaluating the file containing the measurements

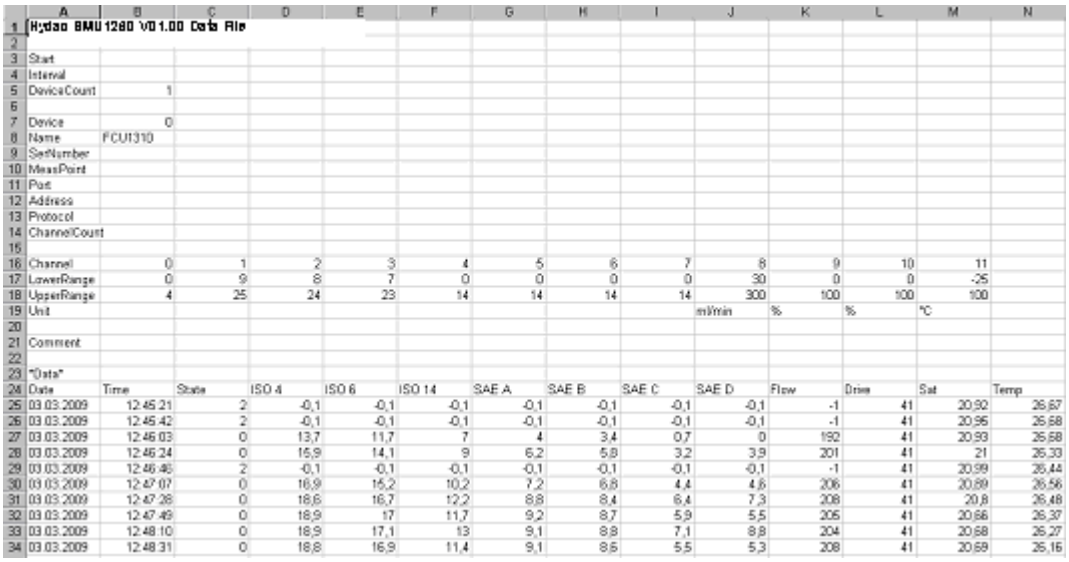
The file containing the measurements has a file extension, for example "026". If your PC does not recognize the file extension, you must tell your PC that, in future, you would like to open this file with MS Excel.

Open the file with MS excel by right-clicking on it and then selecting "Open". A window will open where you will be asked to choose which program should open the file.

In principle, you can do this for every extension of SMU record files from "000" to "999".

A measurement file consists of two parts:

Part	Content
1	General information about the data collected, sensors and equipment.
2	After the word ***Data,*** the actual measurement data is shown, line by line. The first line contains the column titles.



	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	Hydac SMU 1260 V01.00 Data File													
2														
3	Start													
4	Interval													
5	DeviceCount	1												
6														
7	Device	0												
8	Name	FCU1310												
9	SerNumber													
10	MeasPoint													
11	Port													
12	Address													
13	Protocol													
14	ChannelCount													
15														
16	Channel	0	1	2	3	4	5	6	7	8	9	10	11	
17	LowerRange	0	9	8	7	0	0	0	0	30	0	0	-25	
18	UpperRange	4	25	24	23	14	14	14	14	300	100	100	100	
19	Unit									ml/min	%	%	°C	
20														
21	Comment													
22														
23	"Data"													
24	Date	Time	State	ISO 4	ISO 6	ISO 14	SAE A	SAE B	SAE C	SAE D	Flow	Drive	Sat	Temp
25	03.03.2009	12:45:21	2	-0,1	-0,1	-0,1	-0,1	-0,1	-0,1	-0,1	-1	41	20,92	26,67
26	03.03.2009	12:45:42	2	-0,1	-0,1	-0,1	-0,1	-0,1	-0,1	-0,1	-1	41	20,95	26,68
27	03.03.2009	12:46:03	0	13,7	11,7	7	4	3,4	0,7	0	192	41	20,93	26,68
28	03.03.2009	12:46:24	0	15,9	14,1	9	6,2	5,8	3,2	3,9	201	41	21	26,33
29	03.03.2009	12:46:46	2	-0,1	-0,1	-0,1	-0,1	-0,1	-0,1	-0,1	-1	41	20,99	26,44
30	03.03.2009	12:47:07	0	16,9	15,2	10,2	7,2	6,8	4,4	4,6	206	41	20,89	26,56
31	03.03.2009	12:47:28	0	18,6	16,7	12,2	8,8	8,4	6,4	7,3	208	41	20,8	26,48
32	03.03.2009	12:47:49	0	18,9	17	11,7	9,2	8,7	5,9	5,5	205	41	20,66	26,37
33	03.03.2009	12:48:10	0	18,9	17,1	13	9,1	8,8	7,1	8,8	204	41	20,68	26,27
34	03.03.2009	12:48:31	0	18,8	16,9	11,4	9,1	8,6	5,5	5,3	208	41	20,69	26,16

Faults are shown as negative values, e.g. -0.1 or -1.

The status can take the following values:

Status	Description		
0	Ready for operation	=>	Sensor / equipment is working
2	Minor fault / warning	=>	Sensor / equipment continues to work. A warning that is automatically reset by the SMU.
3	Moderate fault	=>	Sensor / equipment status us "fault" Restart the SMU by switching it off and then on again.
4	Serious fault	=>	The sensor or equipment is faulty. Contact the Schroeder Service Department.

See page 81 for more information about the individual faults.

The values for the measuring results and the units are defined by the sensor settings.

The measurements are shown as dates

On opening the file, all decimal numbers will be shown as dates. To resolve this, proceed as follows:

1. Start Excel.

2. From the menu bar, select the "Open" command.

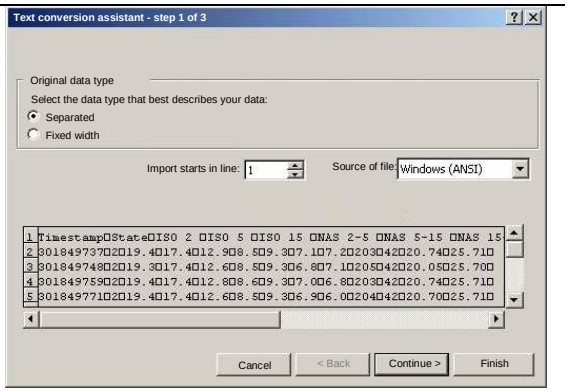
   Open the measurement file.

3. The

   Text conversion assistant - step 1 of 3.

   Check the settings.

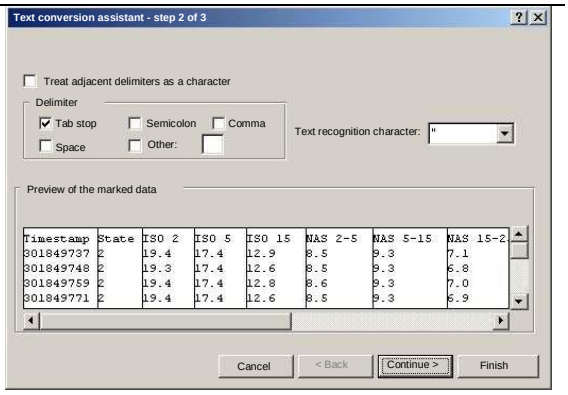
   Press the "Continue >" button to accept the settings.



4. Text conversion assistant step 2 of 3

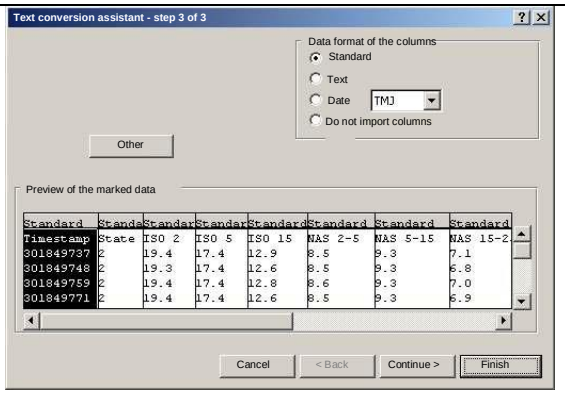
   Check the settings.

   Press the "Continue >" button to accept the settings.



5. Text conversion assistant - step 3 of 3.

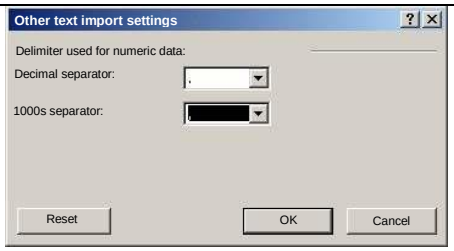
   Press the "Other" button.



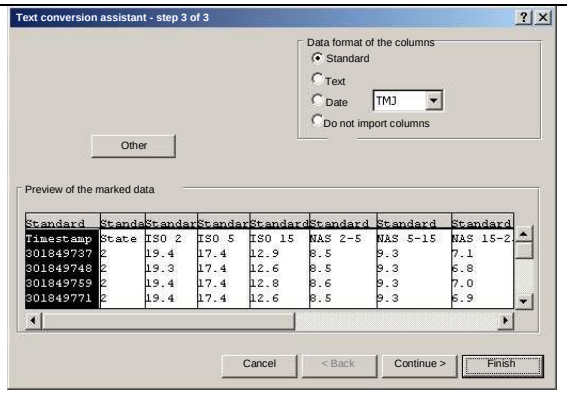
6. Change the following settings:

   Set the decimal separator to be a dot and the 1000s separator to be a comma.

   Confirm the changes with the OK button.



7. Click on the "Finish" button, to complete the import of the measurement data.



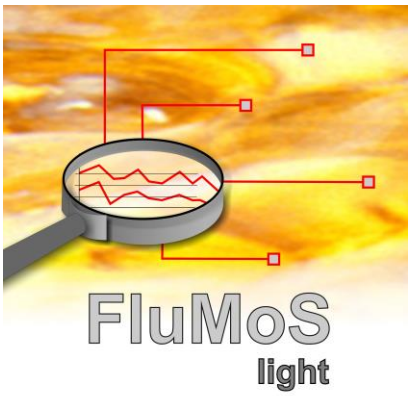
8. Decimal numbers are now displayed correctly.

Measurement value readouts with FluMoS

The Fluid Monitoring Software FluMoS is for reading and evaluating the measured values.

FluMoS light is available as freeware on the CD included in the delivery or as a download on the Schroeder homepage www.SchroederIndustries.com.

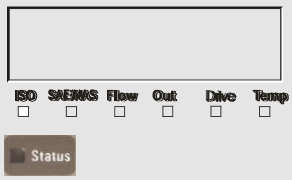
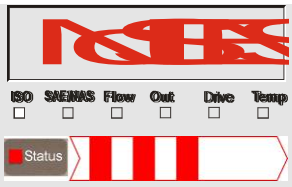
In addition, you will receive FlusMoS mobile for your mobile end device or FluMoS professional (subject to an additional fee) for comprehensive analysis of several sensors.

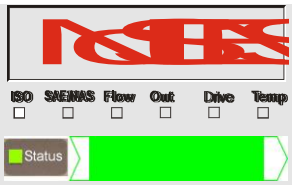
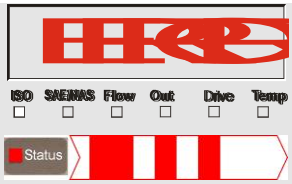
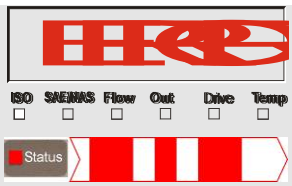
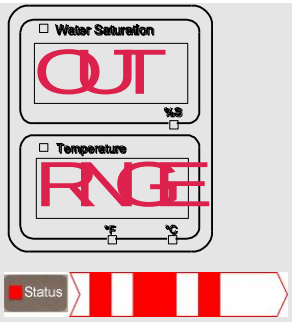


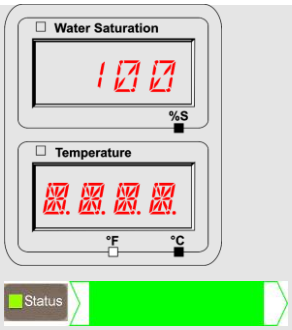
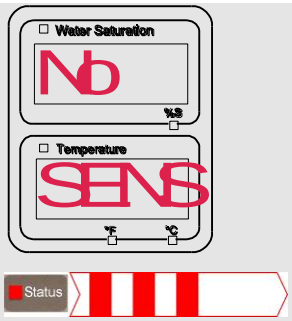
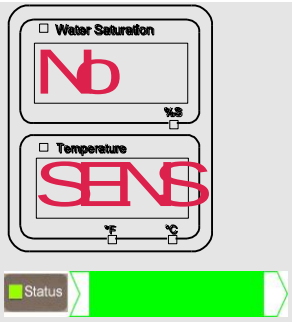
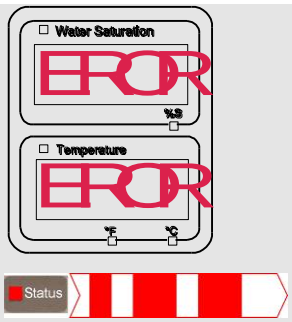
Status messages / error messages

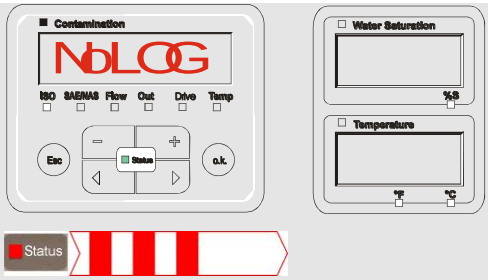
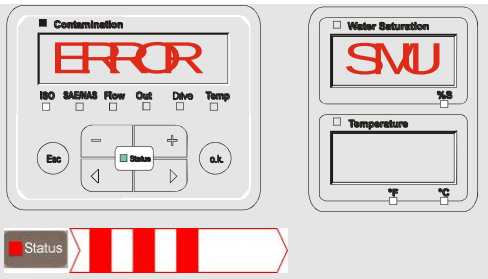
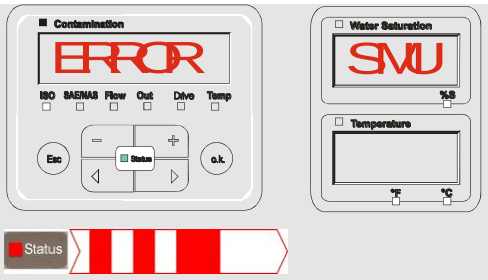
The SMU can take on the following status:

Status	Description		
0	Ready for operation	=>	Sensor / equipment is working
2	Minor fault / warning	=>	Sensor / equipment continues to work. A warning that is automatically reset by the SMU.
3	Moderate fault	=>	Sensor / equipment status us "fault" Restart the SMU by switching it off and then on again.
4	Serious fault	=>	The sensor or equipment is faulty. Contact the Schroeder Industries Service Department.

LED	Display flashing code	Status	To do	Status
-		SMU no digits displayed no function	Check the power supply to the SMU. Contact the Schroeder Industries Service Department.	-
Green		SMU ready for operation	You can make further measurements.	**0**
Red		A sensor is connected to sensor interface A. This is not recognized.	Check sensor interface A – is a TMS or a TCM connected? Check the connection cables between the sensor and the SMU. Check the sensor bus address. The bus address must be different to SENS B. See page 56. Switch the SMU off and on again.	**3**

			If the fault recurs, contact Schroeder Industries service department.	
Green		No sensor is connected. This display will go out after 10 seconds.	Connect a sensor to sensor interface A. Switch the SMU off and then on again.	**0**
Red		Sensor A is causing a moderate fault.	Switch the SMU off. If the error occurs again, check sensor A (use HMG 3000 series as an aid)	**3**
Red		Sensor A is causing a major fault.	Check sensor A (use HMG 3000 Series as an aid)	**4**
Red		TWS-C ≤ firmware V2.04: The sensor at sensor interface B is outside of the measurement range.	Wait for a few more measurement cycles.	**2**

Green		TWS-C ≥ firmware V2.10: The sensor at sensor interface B is outside of the measurement range or has a short circuit at the sensor.	Wait for a few more measurement cycles. Dewater the fluid in the saturated range. Check the sensor outside the fluid or with the calibration and adjustment set (part no. 3122629)	**2**
Red		A sensor is connected to sensor interface B. This is not recognized.	Check sensor interface B – is an TWS-C connected? Check the connection cables between the sensor and the SMU. Check the sensor bus address. The bus address must be different to SENS A. See page 56. If the fault recurs, contact Schroeder Industries service department.	3
Green		No sensor is connected. This display will go out after 10 seconds.	Connect a sensor to sensor interface B. Switch the SMU off and then on again.	0
Red		TWS-C ≥ firmware V2.10: The sensor at sensor interface B is causing a major error.	Switch the SMU off and on again. If the fault recurs, contact Schroeder Industries service department.	4

LED	Display flashing code	Status / To do	Status
Red		No log files are stored in the memory. Possible cause: Other or new sensors have been connected The parameters for REC.MOD have been changed To delete the memory in the PowerUp menu, see page 52. Back up the data in advance using the USB memory stick. When adjusting the REC.MOD, one must take into account the fact that this will need to be reset before saving.	3
Red		The SMU has a moderate fault. Switch the SMU off and then on again. If the fault recurs, contact Schroeder Industries service department.	3
Red		The SMU has a major fault. Contact Schroeder Industries.	4

Depending on the sensors connected, messages from these sensors will also be shown on the display.

Please find the descriptions of these messages in the Operating and Maintenance Instructions for the connected sensor.

Disposing of the SMU

Dispose of the packaging material in an environmentally friendly manner.

After dismantling the unit and separating the various materials, dispose of the unit in an environmentally friendly manner.

Factory default settings

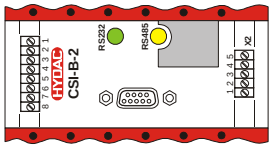
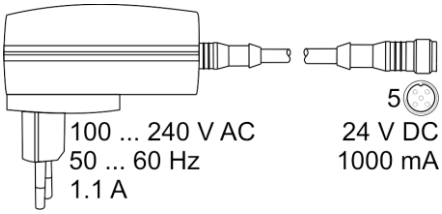
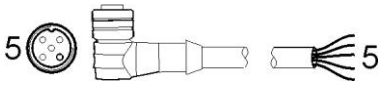
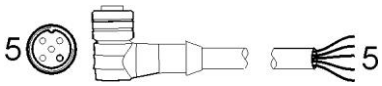
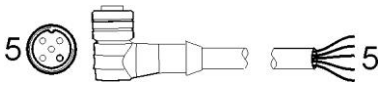
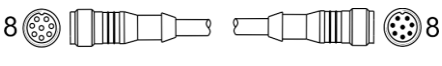
If the "DFAULT" function is used for a reset, the following settings will be changed to the value shown:

PowerUp menu	Value	For details see page
REcMOD	**RING**	51

Measuring Menu	Value	For details see page
REcTIM	**60**	62
EdMNPT	**MNPT00 - MNPT19**	63
OIlCON	**SAtLEV**	64
TpUNIT	**DEG C**	64

All other settings are not affected by the DFAULT reset. The settings for the IP address also remain unchanged after resetting.

Accessories

Part no.	Description:	Figure
6074886	Bluetooth USB adaptor	
3442973	USB Memory stick	
3409462	CSI-B-2 kit ConditionSensor interface	
3399939	Mains adapter PS5 with 5-pin socket plug, Length 1.8 m	
6079195	Protective cap / dust cap for unit plug M12.	
6019455	Connection cable, screened, with 5-pole connector socket plug, bent, open cable end, length 2 m (ZBE 08S-02)	
6019456	Connection cable, screened, with 5-pole connector socket plug, bent, open cable end, length 5 m (ZBE 08S-05)	
6023102	Connection cable, screened, with 5-pole connector socket plug, bent, open cable end, length 10 m (ZBE 08S-10)	
6040851	Connection cable with 5-way female connector <-> 5-way male connector Length 2 m (ZBE 30-02)	
6053924	Connection cable with 5-way female connector <-> 5-way male connector Length 3 m (ZBE 30-03)	
6040852	Connection cable with 5-way female connector <-> 5-way male connector Length 5 m (ZBE 30-05)	
3281240	Connection cable with 8-way female connector <-> 8-way male connector Length 2 m (ZBE 43-05)	

Part no.	Description:	Figure
3519768	Connection cable with 8-way female connector <-> 8-way male connector Length 3 m (ZBE 43-10)	
3346100	Connection cable with 4-pin socket plug <–> RJ45 plug - patch, Length 5 m (ZBE 45-05)	
3346101	Connection cable with 4-pin socket plug <–> RJ45 plug - patch, Length 10 m (ZBE 45-10)	
3346102	Connection cable with 4-pin socket plug <–> RJ45 plug - crossover, Length 5 m (ZBE 45-05)	
3346103	Connection cable with 4-pin socket plug <–> RJ45 plug - crossover, Length 10 m (ZBE 45-10)	

*) available on request

Technical data

General data	
Mounting position	arbitrary
Self-diagnosis	continuously with error indication on display
Display	LCD, 6/4/4 lines, 17 segments
Drop (IEC/EN 60068-2-31)	Fall height 50 mm
Ambient temperature range	0° … 55° C
Storage temperature range	-40° … 80° C
Relative humidity	Maximum 90%, non-condensing
Protection class	III (safety extra-low voltage)
IP class	IP67
Weight	~ 1 kg
Electrical data	
Voltage supply	12 … 24 V DC (± 10%)
Residual ripple	≤ 5 %
Power consumption	15 Watt, 1.25 A max.
Accuracy of the real-time clock	± 5 s/day / ± 0.5 h/year
Clock back-up	~ 20 years

Overview - Compatible USB sticks

In the following, you will find an overview of the USB memory sticks which we have tested with the SMU 1200 for compatibility, writing speed and stability in operation.

Manufacturer, name	Typ	European Article Number (EAN)	SMU 1200 compatible	Write speed	Stability
SCHROEDER INDUSTRIES (from the delivery)			✓	→	↑
…	…	…			
SanDisk 2GB Cruzer Micro	SDCZ4-2048-E11	619659023034	✓	↗	↑
Emtec Flash Drive USB 2.0 1GB	EKMMD1GC150B	3126170043658	✓	→	→
Hama Piko Business 1GB	00090845	4007249908452	✓	↗	↓
Silicon Power 2GB Ultima-II	SP002GBUF2M01V1S	4710700395035	✓	↑	↗
Platinum ultra high performance 2GB		4027927775046	✓	↗	→
CnMemory USB memory stick 2GB	85114_2GB	4040348851144	✓	↗	↗
Freecom Data Bar 1GB	29321 / 1GB	4021801293213	✓	→	→
Intenso USBDRIVE 1GB		4034303006397	✓	→	↓
PNY attaché premium 4GB	P-FD4GBA2M7-BX	3536401508618	✓	↗	↓
Sony Microvault Click 2GB	USM2GL	027242737105	✓	↗	→
Sony Microvault Click 2GB	USM2GLX	027242737204	✓	↑	→
Transcend JetFlash T5 2GB	TS2GJFT5T	0760557814030	✓	↑	↓
TDK Trans-IT 2GB	UFD-2GBUEBBL	4902030780036	✓	↑	↗
ExcelStor Gstor Mini 8GB	GSMS7008	6935758606102	✓	→	→
CnMemory Micro X 512MB			✓	↗	↗
Transcend JetFlash V30 8GB			✓	↗	↗
Kingston Traveler Mini Slim 2GB	DTMSB/2GB	740617131956	✗		
SanDisk 2GB Cruzer Micro	SDCZ6-2048-E11WT	619659025724	✗		
Emtec Flash Drive USB 2.0 1GB	EKMMD1GM200EM	3126170058126	✗		

Explanation:

✓	Compatible with SMU 1200	↑	Recommendable
✗	Not compatible with SMU 1200	↗	Good
		→	Ok
		↓	Bad