AAM2080 Manual

Digital measuring converter for ion-sensitive measurements

CE

KROHNE

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1.1 General information

For your protection, please read and pay attention to all safety information prior to start-up of your converter PAM2080.
Retain these instructions and all other information for future reference.
Utilisation other than that described here compromises the safety of persons and the entire measuring equipment and is therefore impermissible.
The manufacturer will assume no liability for damage arising from improper or non-compliant utilisation of the products.

DANGER!

Improper handling can lead to electric shock. “Hazardous voltages” representing a risk of electric shock for humans may be present on non-insulated parts in the product’s casing. Therefore cut off the device’s power supply prior to opening the connection cavity cover.

Assembly, electrical connection, start-up, operation and maintenance of the measuring equipment may only be effected by trained personnel who must be authorised by the system operator for the activities indicated. The trained personnel must have read and understood these operating instructions and must follow the directions in these operating instructions.

Check that all connections are correct prior to starting up the measuring point as a whole. Make sure that electrical cables and hose connections are not damaged.

Do not commission damaged products and protect these products from unintentional start-up. Label the damaged product as defective.
If faults cannot be eliminated, you must remove the products from operation and protect them from unintentional start-up. Repairs that are not described in these operating instructions must only be carried out directly with the manufacturer or via the service department of KROHNE.

1.2 Display conventions

The following symbols are used to help you navigate this document more easily:

WARNING! DANGER!

These warning signs must be observed without fail. Even only partial disreagarding such warnings can result in serious health damage, damage to the device itself or to parts of the oprator´s plant.

CAUTION!

These warning signs must be observed without fail. Even only partial disreagarding such warnings can lead to improper functioning of the device.

NOTE!

This symbol designates important information for the handling of the device.

LEGAL NOTICE!

This symbol designates information on statutory directives and standards.

HANDLING!

This symbol designates all instructions for actions to be carried out by the operator in the specified sequence.

CONSEQUENCE!

This symbol designates all important consequences of the previous actions..

1.3 Installation

CAUTION!

First assemble the device at the definitive place of use. Using suitable screws, fix the device to a weather-protected wall or weather cover, e.g. a pedestal.

Effect all electrical connections before switching on the device, otherwise damage is possible.

Water, moisture and dust

Converter PAM2080 is designed according to protection class IP 54 and correspondingly protected against penetration of water, moisture and dust. Nevertheless, avoid extreme conditions.

Heat

Do not install converter PAM2080 close to heat sources, such as heaters, radiators, conduits containing hot mediums. Avoid direct sunlight.

Power supply

Converter PAM2080 is equipped with a multi-range switching power supply and must only be operated live within the indicated range (see Technical Data).

Mains connection

To ensure safe and impeccable operation converter PAM2080 must be securely connected to a mains connection box by means of a mains cable.

Accessories

To ensure safe operation we recommend utilisation of our accessories.

1.4 Handling and Use

Cleaning

Where necessary, clean converter PAM2080 using a damp cloth and mild cleaning products. Use no abrasive cleaning or scouring products (front film is sensitive to scratches). Never use solvents or cleaning sprays containing solvents.

Decomissioning

Decommission the device if you notice damage to the casing, if you notice moisture in the device (e.g. fogged display) or if the converter does not function as prescribed.

Transportation / return

It is recommended to transport the device in its original packaging across large distances or when returning the device.
In the event of repair please send the device – cleaned – to the KROHNE sales office covering your area. As far as possible, use the original packaging when doing so.

Please enclose the completed hazardous goods sheet (copy penultimate page of these operating instructions) with the packaging and additionally with the dispatch documents.

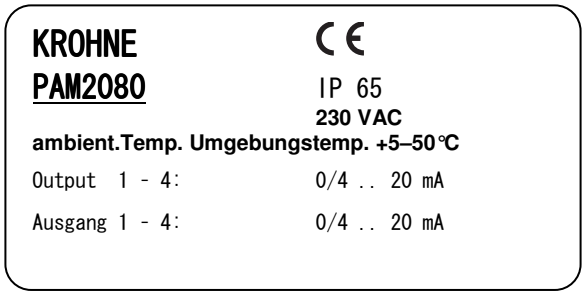
Play your part in environmental protection

Converter PAM2080 also contains electronic parts that contain precious metals in small quantities. These raw materials are fully recyclable. Please deposit electrical devices intended for disposal at appropriate collection points (electrical scrap).

Unauthorised interventions in the device render the guarantee ineffective.

1.5 Identification

Type plate



CERTIFICATE AND APPROVALS

Declaration of compliance:

The product fulfils the statutory requirements of the harmonised European standards. KROHNE confirms compliance with the standards by attaching the CE symbol.

2.1 Product

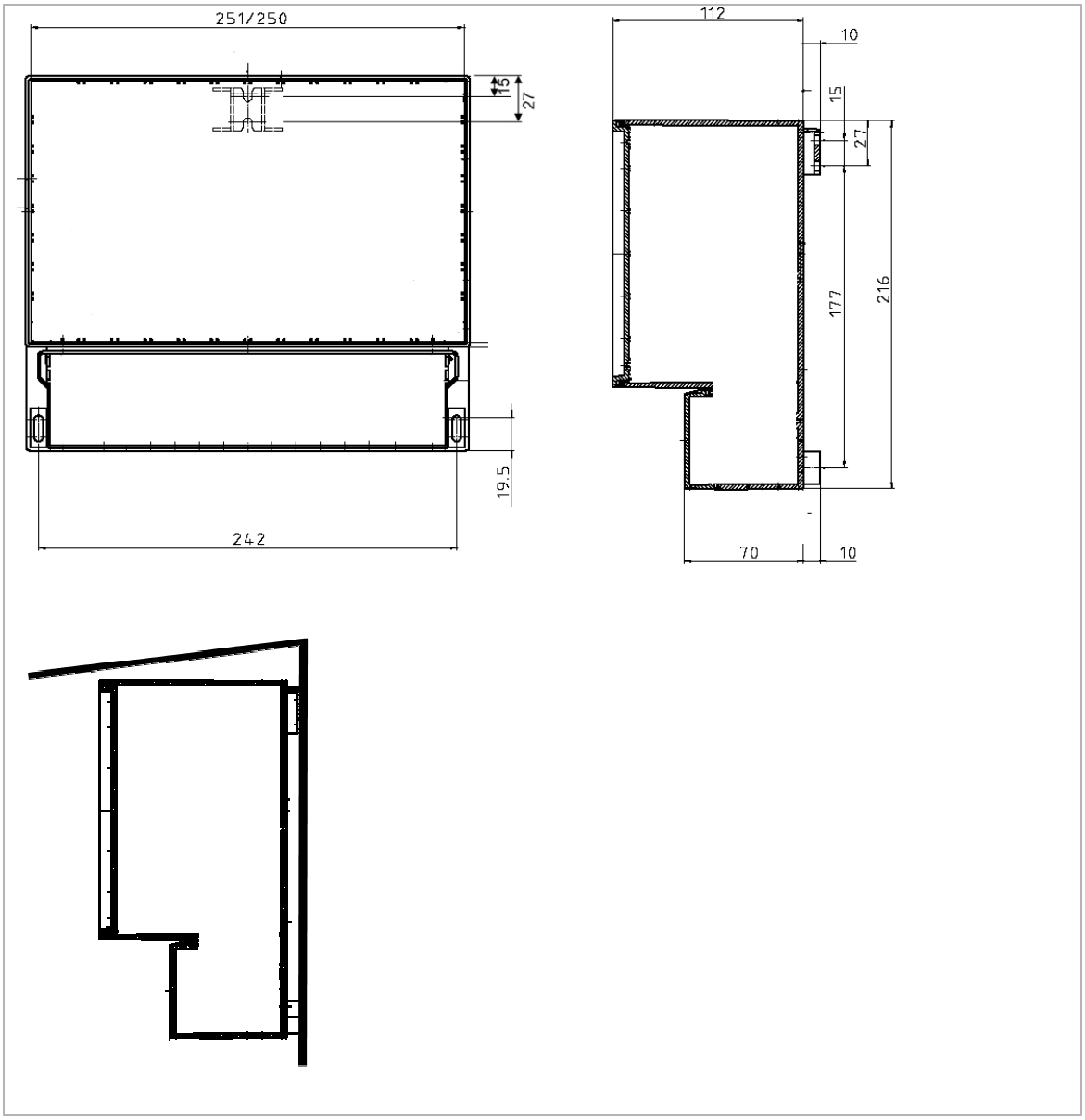
- Digital converter for analysing and displaying measured parameters of KROHNE sensors.
- Uninterrupted, secure data communication between MiniCVal components by means of IC bus technology
- 8 freely parameterisable channels for easy allocation of up to 8 sensors.
- 4 analogue outputs 0/4 .. 20 mA for free allocation of channels.
- 5 configurable relays, freely adjustable for thresholds (min./max.) or as fault sensors. Collective notification for several channels or individually.
- Full-graphic liquid crystal display (background illuminated) with clear-to-view, large display of individual parameters.
- Additionally, the most important information at a glance: calibration status, sensor condition, clean function.
- Data logger function with adjustable graphical hydrograph display, for improved on-site trend detection and operating status diagnosis.
- The following parameters are pre-configured factory-side and directly retrievable via the menu:
  - Semi-conductor
  - pH value (pH)
  - Redox (mV)
  - Ammoniac (NH3)
  - Ammonium (NH4 / NH4-N))
  - Nitrate (NO3 / NO3-N)
  - Nitrite (NO2 / NO2-N)
  - Water hardness (°GH Ca/Mg)
  - Sulfite (SO22-)
  - Sulfide (S2-)
  - Cyanide (CN-)
  - Chloride (Cl-)
  - Fluoride (F-)
  - Bromide (Br-)
  - Sodium (Na+)
  - Potassium (K+)
  - Oxygen (O2 dissolved)
  - Chlorine (Cl2 dissolved)
  - o-Phosphate (PO43-)
  - Lithium (Li+)
  - Refraction
  - Lead (Pb2+)

Further parameters on request.
New parameters and new firmware can be imported into converter PAM2080 at any time via software update. (Information on this from KROHNE service department or at www.krohne.de).

3.1 Mounting to wall or weather cover

Using appropriate screws, (d=6 mm), fix converter PAM2080 to straight surfaces (wall) or to a weather cover (for example weather cover ZAB-04, order no. 5.520.004 with pre-drilled holes).

You gain access to the lower fixing eyes by opening the terminal connection cavity (all dimensions indicated in mm).



3.2 Electrical connection

WARNING!

Electrical connection may only be carried out by authorised trained personnel.

Ensure that there is no voltage present in the mains cable before connection work commences.

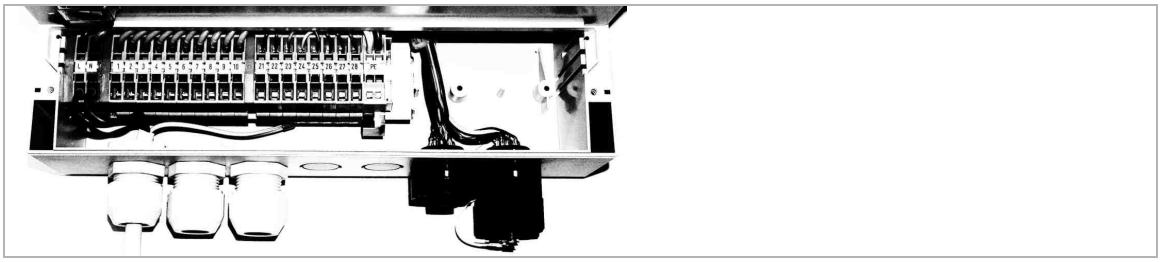
Prior to connection, make sure that the mains voltage matches the voltage indicated on the type plate!

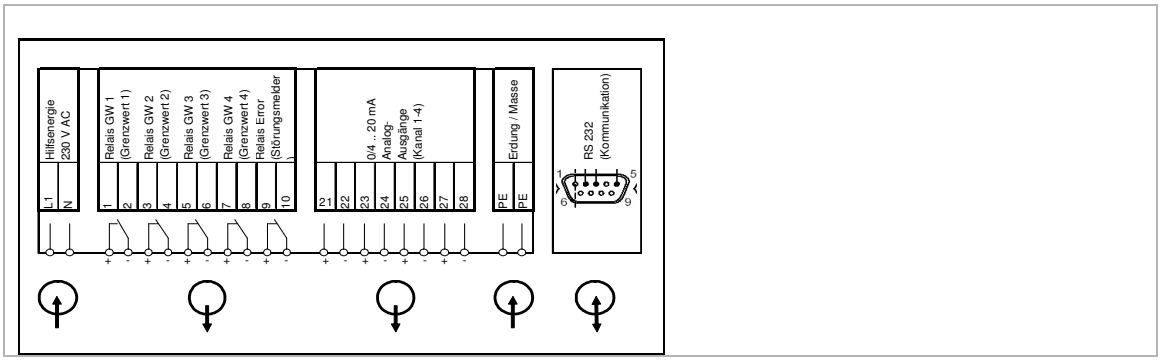
A clearly identified cut-off device must be installed close to the measuring system.

Fuse the measuring converter customer-side with 1.3 A.

Do not lay signal lines together with high-voltage lines in shared cable channels.

Switch on the measuring converter only with the sensors attached at all times.





Terminal occupancy

Terminal	Function		
L	~ Auxiliary power 230 V AC		
N	~ Auxiliary power 230 V AC		
1	K1 Relay 1	max. 230 V AC, 2A	
2			
3	K2 Relay 2	max. 230 V AC, 2A	
4			
5	K3 Relay 3	max. 230 V AC, 2A	
6			
7	K4 Relay 4	max. 230 V AC, 2A	
8			
9	K5 Relay 5	max. 230 V AC, 2A	
10			
21	+	Analogue output 1	0/4 .. 20 mA
22	-		
23	+	Analogue output 2	0/4 .. 20 mA
24	-		
25	+	Analogue output 3	0/4 .. 20 mA
26	-		
27	+	Analogue output 4	0/4 .. 20 mA
28	-		
PE	Protective conductor (earth/ground)		
PE	Protective conductor (earth/ground)		

4.1 Front of the converter

1 "On/Off" switch.

2 Graphical LCD display with background illumination.

3 Menu function button.
Call up menu functions, quit menu functions and cancel entries.
Page down individual pages in the menu.

4 Enter function button.
Switch between various displays (retrieval of single channels, hydrographs, etc.), confirm (acknowledge) entries.

5 Hold function button.
"Maintenance" system setting. The current analogue output signals are frozen (Hold).
Raise values in entry mode.

6 Measure function button.
"Measure" system setting and release of analogue output signals. Lower values in entry mode.

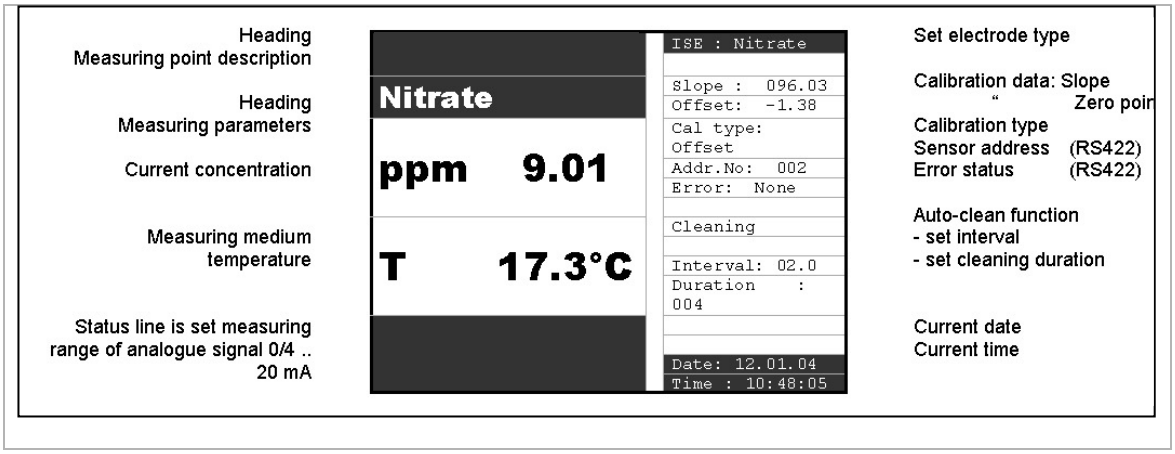
7 Cal function button.
Calls up calibration routines.

8 Clean function button.
Triggers manual cleaning.

9 Screw connections for power supply, signal lines.

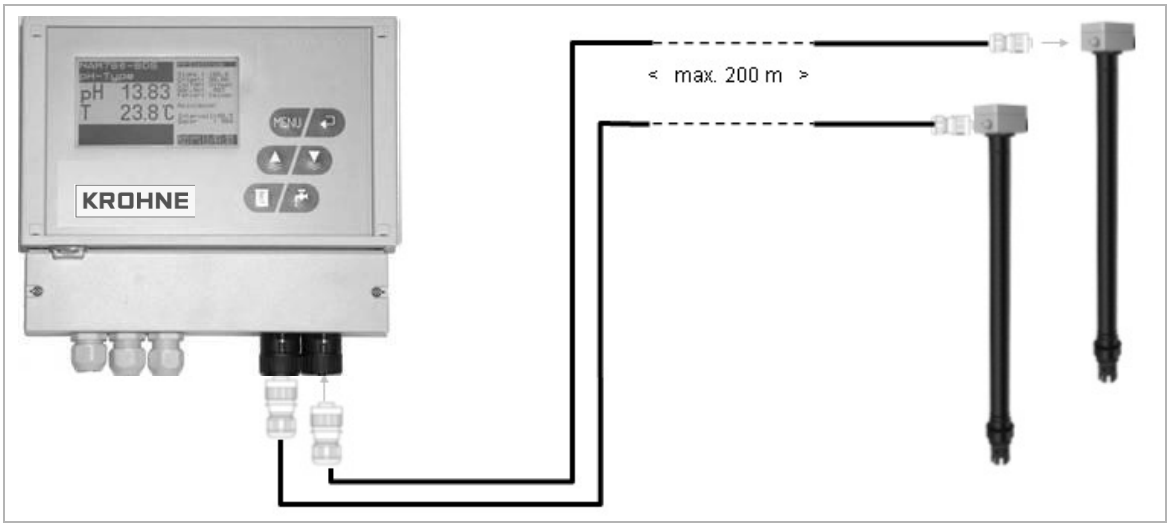
10 Ports for two sensor data lines.

4.2 Measuring channel display



4.3 Plug Connections (Probes)

As standard, two ports (F10) are included on converter PAM2080 for the direct connection of two measuring probes, for example immersion probe AS75-S4 (see illustration on the right).



Connection to a PAM2080 converter

max. 2 probes →directly to the converter

each additional probe →via bus distribution boxes

(max. 8 probes on one PAM2080 converter = 8 channels)

Bus connection boxes and extensions for data cables are available as Accessories from KROHNE.

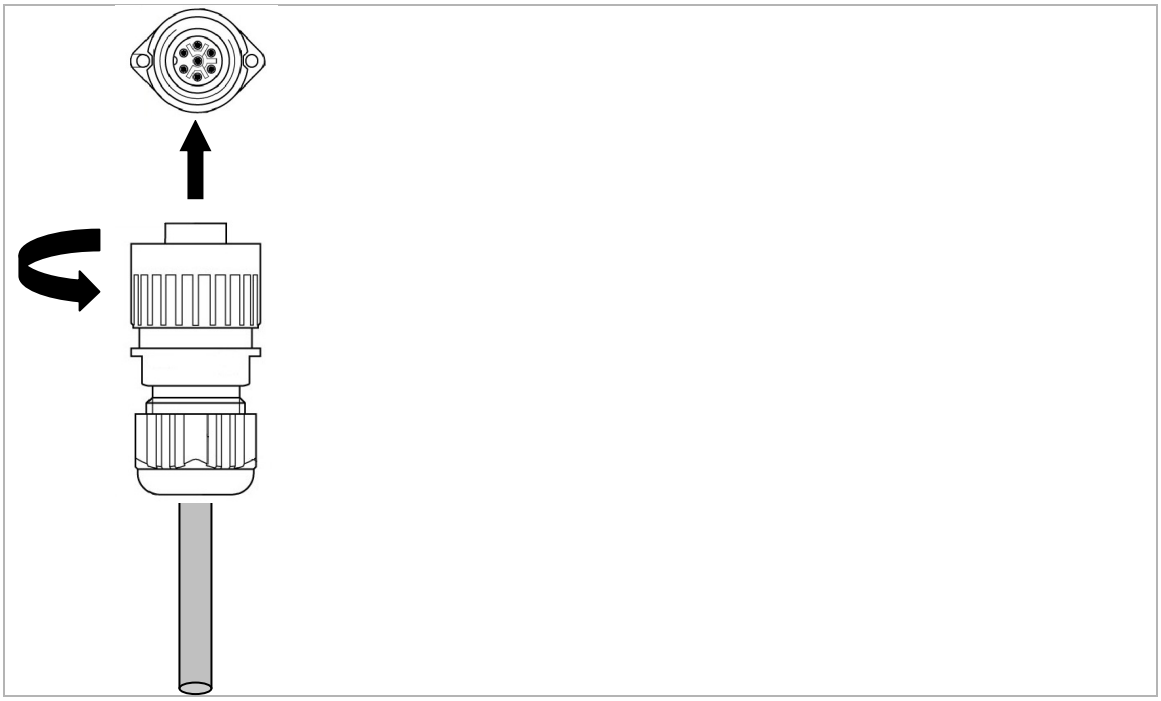
INFORMATION!

The converter recognises all connected probes automatically. You can attach and pin-align the probes at any port you choose, in any sequence you choose, even during operation. Data transmission between measuring probes and converter takes place via an internal bus system.

The system's plugs and ports are coded for reverse polarity protection.

- Connect the corresponding data cable plugs with the ports on the immersion holder and converter PAM2080 / bus distribution box.

- Always secure the connections by tightening the plug retaining ring.



5.1 Important information

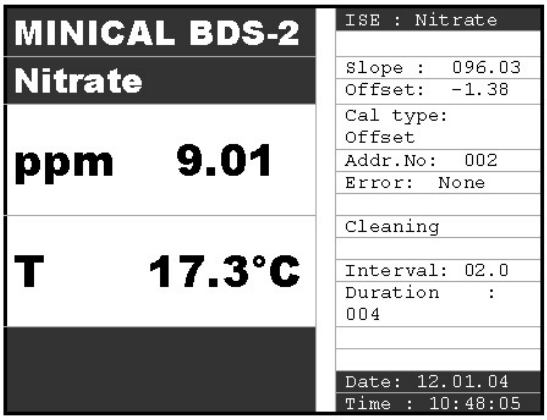
DANGER!

Carry out the following checks after electrical connection.

- Are device or cables externally undamaged?
- Does the supply voltage match the indications on the type plate?
- Are electrical / resistance inputs attached and shielded?
- Are the mounted cables free of strain?
- Is the cable type guide perfectly separated? Always guide power supply and signal lines separately across the entire the cable route.
- Cable guide free of loops and crossovers?
- Are all screw terminals tightened?
- Are all cable entry points mounted, tightened and sealed?
- Are the sensor data cables securely connected to the converter?
- Is there a cut-off device present?
- Is the converter made safe with the correct fuse?

5.2 Switch On / Off

Switch on converter PAM2080 at the On / Off switch.



The converter runs a self-test for approx. 20 sec. The converter identifies all sensors connected to the system in the process.

The auto-clean function launches in addition.

The display is inactive during the self-test.

After the self-test, the first channel with its parameters is automatically shown in the display.

NOTE!

The scroll function is active during initial start-up (factory settings). In the process, if several probes are attached, the converter switches automatically to the next measuring channel every 6 seconds, and so on.

5.3 Change measuring channel display

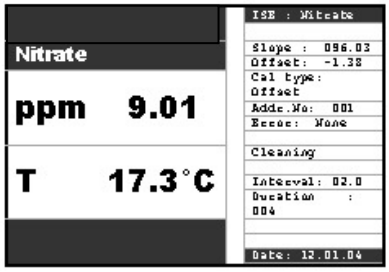
<Enter> function button

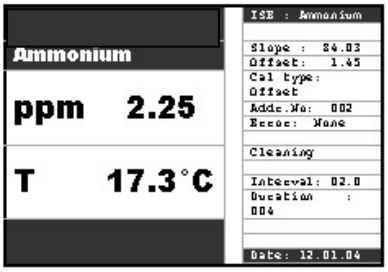
By pressing Enter you call up attached measuring channels in sequence manually.

The scroll function continues to be active.

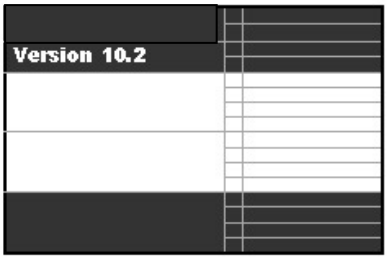
The scroll function (alternating channel display) automatically begins again after approx. 60 sec. inactivity.

You jump to the next measuring channel by pressing Enter again.



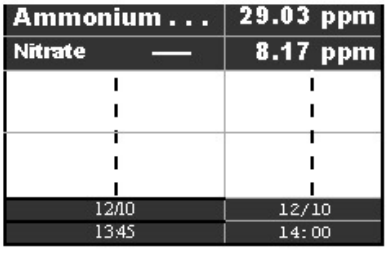


After the final measuring channel you arrive at the info screen with the software version displayed



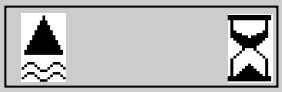
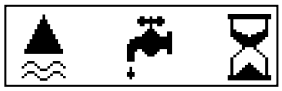
You call up by first measuring channel again by pressing **Enter** again, and so on.

If **data logger** functions are activated, more pages with **hydrographs** of various channels are call up after the info screen .



5.4 Control button functions

Some of the control buttons have multiple functions,
depending on which area of the operating menu you are currently in .

Button	Functions in *measuring mode*	Functions in *parameter mode*
	Retrieval of parameter menus in the respective measuring channel or data logger area.	Back to measuring mode. Cancel entries.
	Page down individual channels - Channel 1 - Channel 2 - Channel 3 ..... etc. - Trendline 1 - Trendline 2	Acknowledge entries and jump to the next point / menu address.
	Set system status to “Maintenance”. Display:  *(Signal outputs on Hold.* *Automatic rinse function is off.)*	Jump up one address in the menu field. Increase values on entry.
	Set system status to “Measurement”. *(Signal outputs are released. Automatic rinse function is active.)*	Jump down one address in the menu field. Reduce value on entry.
	Calibration functions are launched. Display:  (*Signal outputs are frozen according to the set Hold time.)*	
	Trigger rinse function manually. Display:  (*Signal outputs are frozen according to the set Hold time.)*	

5.5 Menu settings

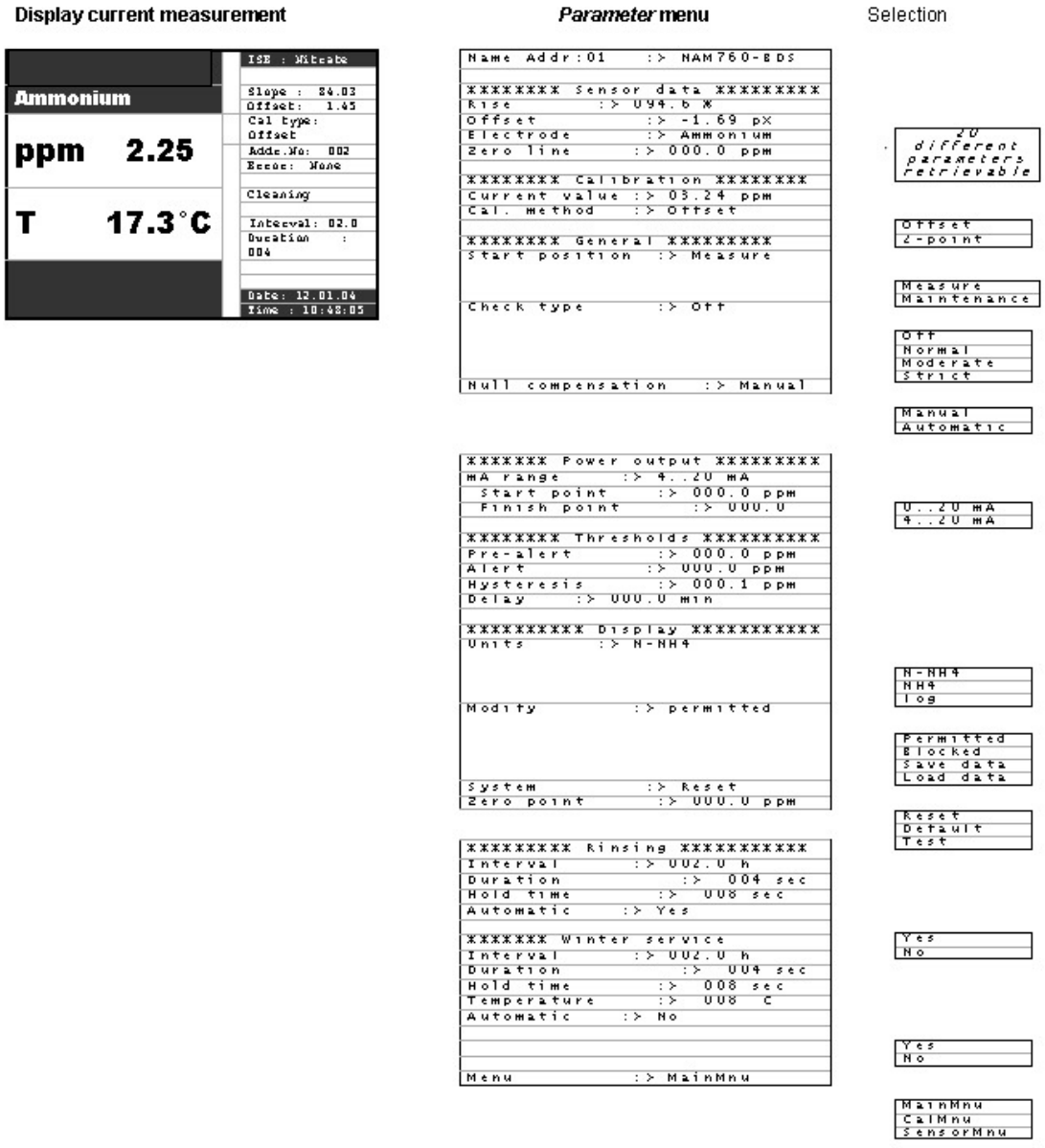
Converter PAM2080 has various menu and control levels for General Settings, measuring channels and trend display functions. Most parameters are pre-set factory-side, in order to start up the measuring point quickly and easily.

For a number of settings you enter alphanumerical values directly.

For other settings you can choose from various functions.

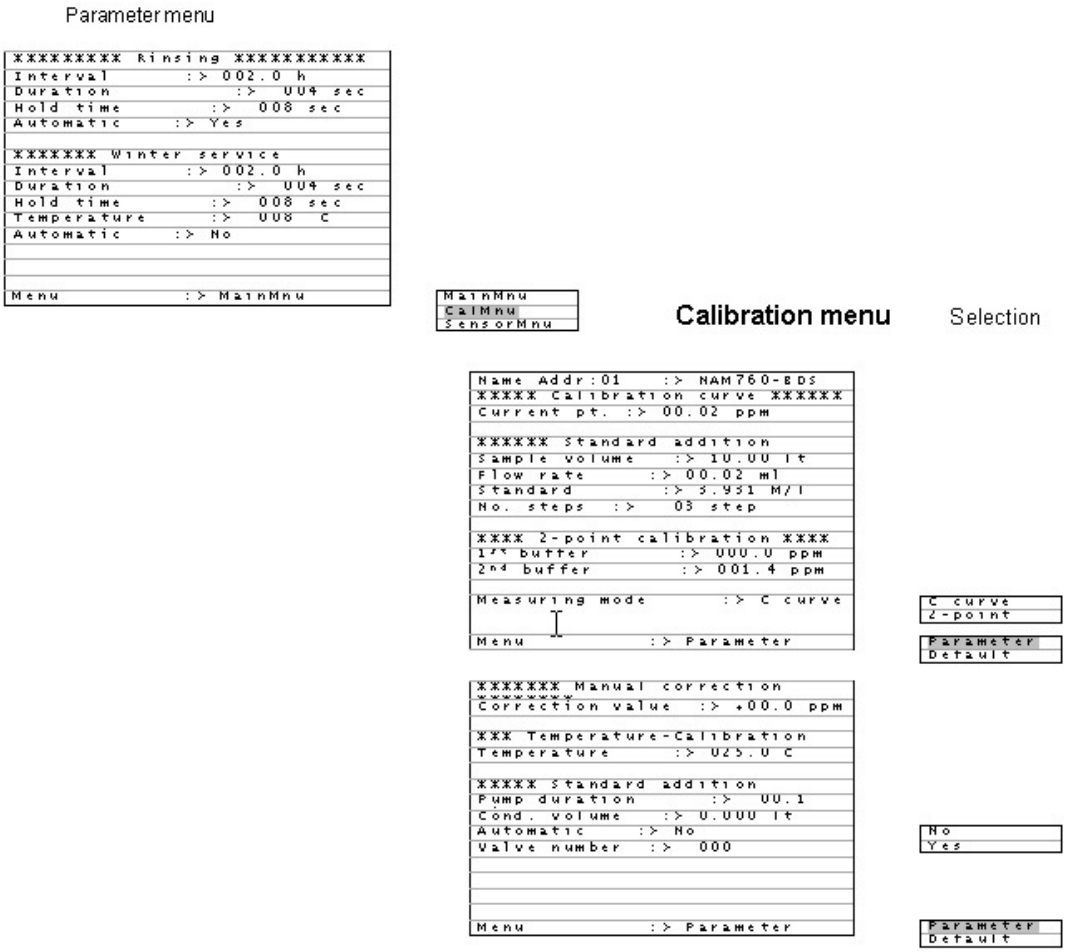
The necessary settings are explained in the following sections.

5.5.1 Parameter-menu



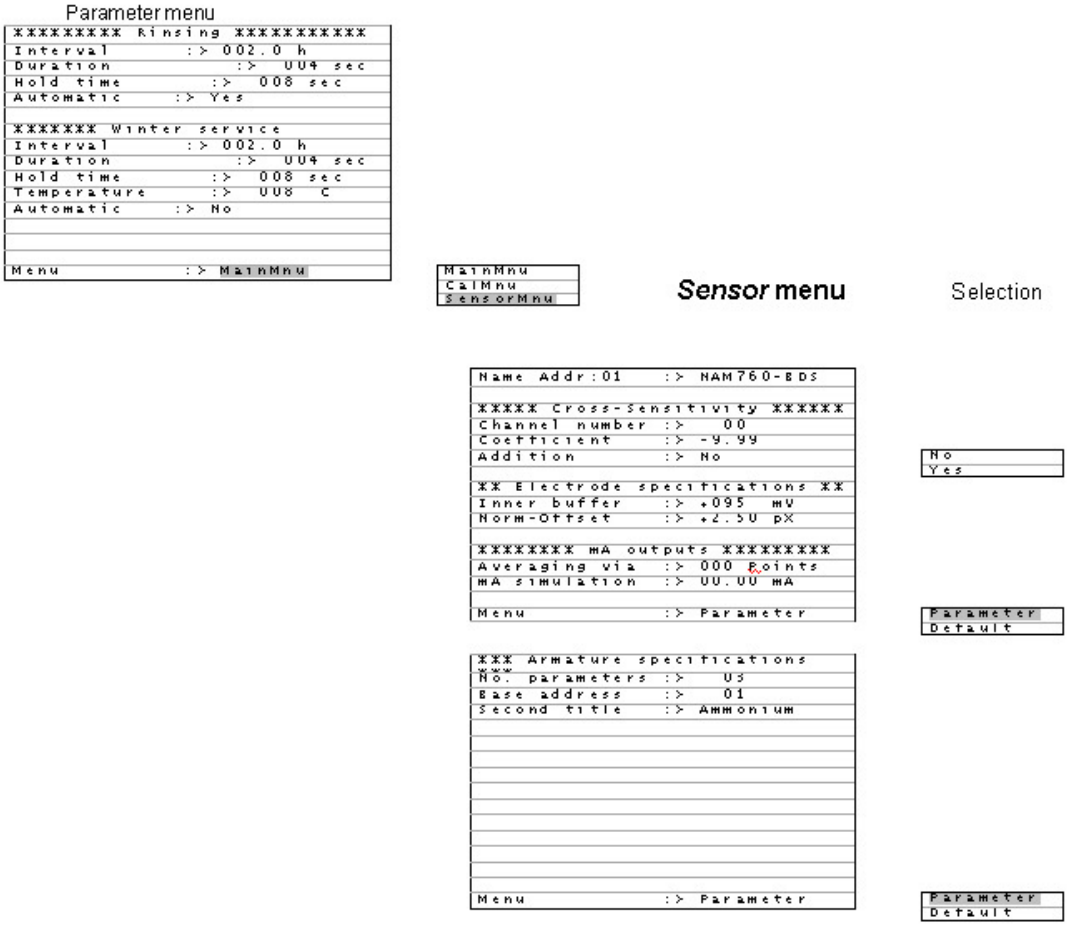
5.5.2 Branching of Parameter menu into further sub-menus

Calibration menu



Parameter: Return to the measuring parameter main menu.
Default: Re-start with *factory settings*. User settings are deleted.

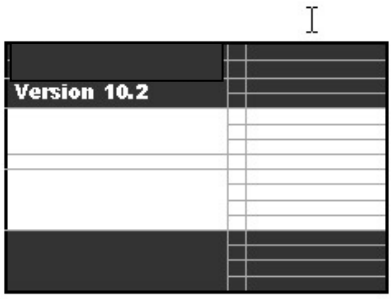
Sensor data



Parameter: Return to the measuring parameter main menu.
Default: Re-start with *factory settings*. User settings are deleted.

5.5.3 General Menu

Software version display



***General* menu**

```
***** General Data *******
Scroll time      :> 00.0 min
Modifications :> permitted

Parameter        :> Normal

****** Relay outputs *******
Inverted         :> 00000

****** Switching contacts
Relay No.1       :> 00 Pre-alert
Relay No.1       :> UU Alert
Relay No.1       :> 00 Fault

Relay No.2       :> 00 Pre-alert
Relay No.2       :> UU Alert
Relay No.2       :> 00 Fault
```

```
Relay No.3       :> 00 Pre-alert
Relay No.3       :> 00 Alert
Relay No.3       :> UU Fault

Relay No.4       :> UU Pre-alert
Relay No.4       :> 00 Alert
Relay No.4       :> UU Fault

Relay No.5       :> UU Pre-alert
Relay No.5       :> 00 Alert
Relay No.5       :> UU Fault


******* Date and time *******
Date             :>  U1.U1.U4
Time             :>  UU:UU
```

```
*** Hydrographs / data loggers
***
Status curve     :>  No
Number of windows :>  U3
Resolution       :> 00.50 min
Time range       :> U24.U  h

* Calibration of mA output *
Channel number   :>  U1
Simulation       :> 00.00  mA
Current value :> 1U.UU  mA

****** Fixed allocations
Parameter        :> 00:00:00:00
mA outputs       :> UU:UU:UU:UU
Baud rate RS232  :> 09600 baud
```

Selection

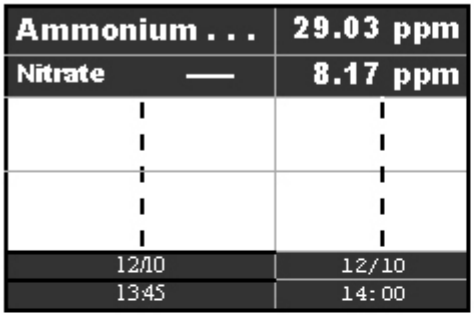
```
Permitted
Blocked
Save data
Load data
```

```
Normal
Hold
Default
Reset
```

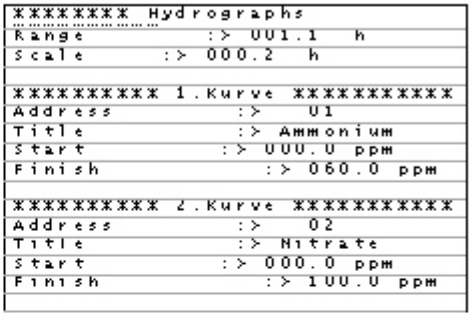
```
No
Yes
```

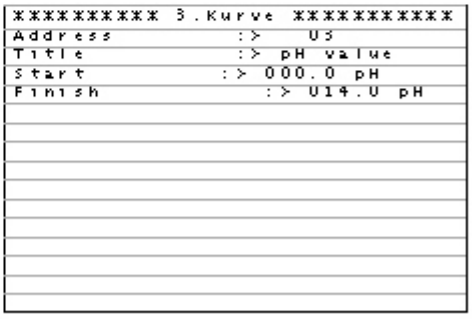
5.5.4 Data logger menu

Hydrograph display



***General* menu** Selection





5.6 Key lock

Converter PAM2080 is equipped with an
automatic key lock in order to prevent unintentional changes to menu settings.

Undo key lock

Hold down Menu button.

Then also press Enter for a few seconds.

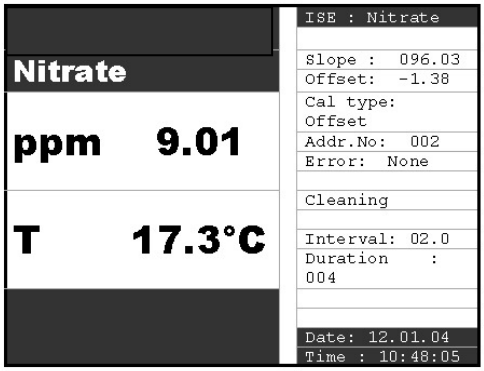
- A flashing cursor in the first entry row indicates that the key lock has been lifted and changes are possible.
- The keys are automatically locked again after 3 minutes of inactivity.
  The lock must be lifted again prior to new changes or entries.
  You can undo the key lock as described above at the menu level on every screen.

5.7 The most important settings for a quick start

You can quickly adapt the measuring system to your needs if you pay attention to the small number of settings described below. All further changes and configurations can be carried out at any time during ongoing operation.
The measuring system is pre-configured factory-side in accordance with the order data.

Electrode type

Check whether the set electrode type matches the electrode installed in the immersion holder in the respective measuring channel (= Addr.No.). Pay attention to electrode identification and plug no. (= Addr.No.). The electrode type (measuring parameter) is displayed top right in the called-up measuring channel.



Change the electrode type where necessary under "Menu – Sensor data – Electrode".

Measuring range = mA-output

Set the mA range that you need for the respective sensor:
"Menu – Power output – mARange / Start point / Finish point"

Example: Ammonium (NH4-N)

0 .. 20 mA ----- 0 .. 50 mg/l NH4-N

Displaying units

You can select the parameter units.

for pH:	pH	or	mV	
for Redox		mV	or	Volt
for ISE	connectn. or		Atom	
		(NH_4	NH_4-N)	

"Display – Units"

Auto clean function

If necessary, set the rinse function for immersion holders here. Our recommendation:

Rinse medium **Air**

Interval: 0,5 hr.
Rinse duration: 4 sec.
Hold time: 30 sec..
Automatic: yes

Rinse medium **water**

Interval: 2,0 hr.
Rinse duration: 20 sec.
Hold time: 30 sec.
Automatic: yes

"Rinse – Interval / Duration / Hold time / Automatic"

CAUTION!

If you use water as the rinse medium, it is essential that you activate the winter service in addition (against risk of frost)!

6.1 Preparation for sensor calibration

To ensure that the measuring system can supply you with correct online data, the installed sensors must be pre-calibrated.

It is essential that you pay attention to the following information:

- Remove all potential protective caps, if present, from the sensors.
- In the case of ion-sensitive probes (ISE), check that there are no air bubbles adhering to the inner side of the membrane. For procedure for removing air bubbles.
- Leave the immersion holder with the sensors in the measuring medium for at least one hour before you commence with a calibration. The sensors need this time in order to get used to the medium matrix.

We recommend undertaking the following types of calibration:

2-point calibration when:

- Starting up for the first time.
- Changing/regenerating electrodes.
- Changing the measuring point (≈ change of matrix).

Offset calibration:

- Regularly during permanent operation depending on electrode drift.

6.2 2-Point-Calibration

2-point calibration takes place with two separate measuring solutions (standards) with known concentrations.

pH- Redox electrodes:
To calibrate pH / Redox electrodes use ready-made standard buffer solutions that can also be procured via the chemical / laboratory market.

Ion-sensitive probes (ISE):
To calibrate ion-sensitive probes do not use ready-made standard solutions from the laboratory market. These are of no use for calibration, since as a synthetic measuring solution they never correspond to the water matrix in which the online measurement is subsequently used. In practice, the resulting calibration data are only utilisable to a limited extent and may sometimes lead to considerable deviations in measurement.

Produce your own calibration standards. This is not difficult, but the mistakes described above can be avoided by doing so. Production of a customised standard solution is described below.
If possible, calibration solutions should be used that are within the prescribed measuring range for online measuring. The use of concentrations at approx. 10-20% and approx. 80-90% of the expected measuring range has proved effective (see example).

Example:

0 .. 50 mg/ NO3-N	measuring range set on PAM2080 (= mA output)
ca. 5 mg/l NO3-N	= 1st standard solution (10% measuring range)
ca. 45 mg/l NO3-N	= 2nd standard solution (90% measuring range)

Produce calibration standards with “your” specific water matrix.
For this you use the actual measuring water in which the online measurement is to function later.

6.2.1 Producing calibration standards (ISE)

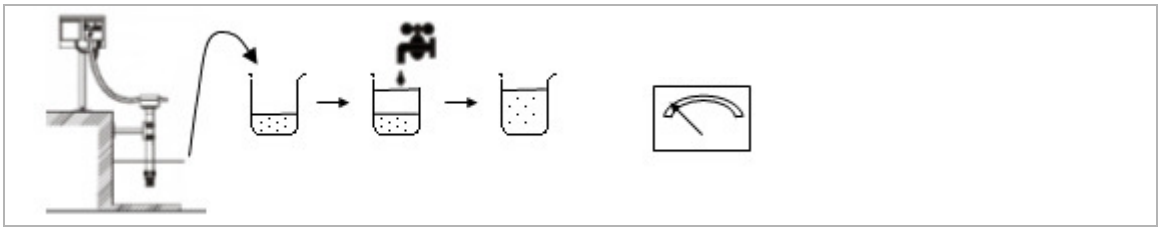
1st standard (lower concentration) sample volume approx. 800 ml:

- Fill a clean vessel (1-ltr. beaker) with approx. 400 ml measuring water.

  Dilute with drinking/processing water to approx. 800 ml calibration solution.

- For sewage works: optimum dilution water is drained water from final sedimentation.

- Determine the precise concentration of the 1st standard solution in the laboratory, please note measurement.



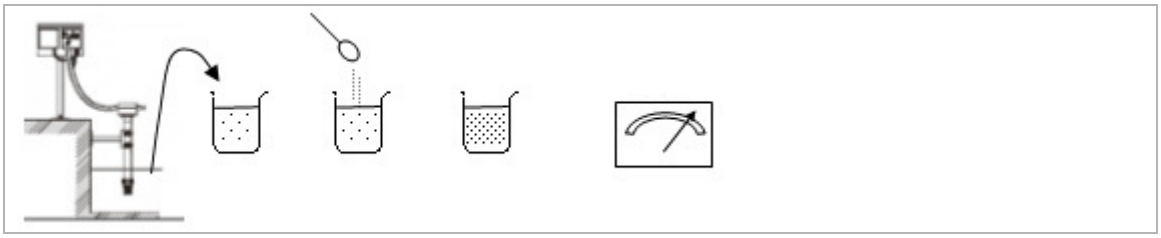
2nd standard (upper concentration) sample volume approx. 800 ml:

- Fill a clean vessel (1-ltr. beaker) with approx. 800 ml measuring water.

  Using a suitable standard salt increase the concentration in the sample.

- Determine the precise concentration of the 2nd standard solution in the laboratory, please note measurement.

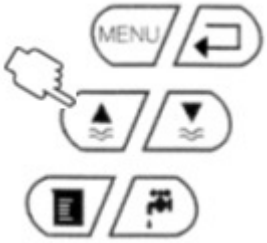
- Where necessary, the mix ratios should be adapted to the optimum measuring range by means of trials. You can obtain information on suitable standard salts from KROHNE.



6.2.2 Carrying out 2-Point-Calibration

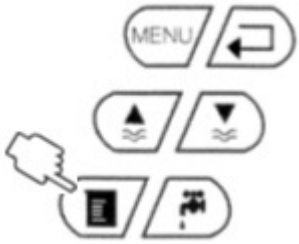
- Select the measuring channel that you wish to calibrate.
- Set the calibration type to 2-point calibration ("Calibration – Cal.method – 2-Point").
- Now enter the determined concentrations (laboratory values) of the calibration solutions / pH buffer for 1st buffer and 2nd buffer in the Cal menu ("Menu – Cal.menu – 2-Point-Calibration – 1st buffer / 2nd buffer").
- Terminate the entry and return from the Cal menu via the parameter menu back to the measurement display ("Menu – Cal.menu – Menu – Parameter")
- Now place the immersion holder with the probe to be calibrated in the 1st calibration standard. First clean the probe thoroughly using clean water.
- The probe/immersion holder should be moved/swung in the calibration solution if possible.

- Now press the Hold button on the converter.
  Converter goes into system setting “Maintenance”.



- Display symbol “Maintenance”.

Now press the Cal button on the converter



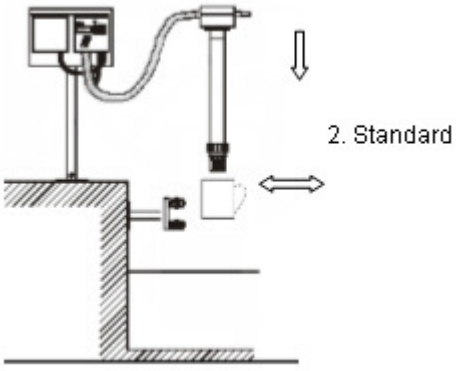
Calibration is launched.

"Hold", "Electrode active", "Buffer", "Run time" symbols displayed.

Calibration to the 1st standard lasts approx. 2 minutes. The symbols "Hold" and "Run time" are displayed after that.

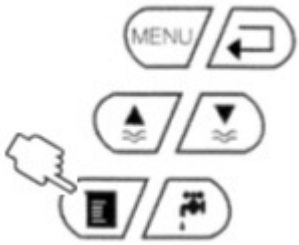
System waits for the 2nd standard.

Now place the immersion holder in the 2nd calibration standard.



First rinse the probe thoroughly again using clean water.

The probe/immersion holder should be moved/swung in the calibration solution again if possible.



Now press the Cal button on the converter again in order to continue calibration.

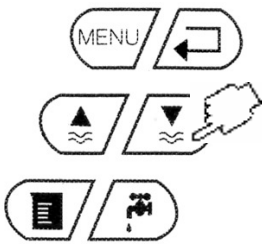
"Hold", "Electrode active", "Buffer", "Run time" symbols displayed.

Again, calibration to the 2nd standard lasts approx. 2 minutes. The "Hold", "Electrode", and "Run time" symbols are then displayed.

The converter now calculates the calibration curve
The "Hold" symbol is then displayed.

2-point calibration is thereby completed.

To complete, press the "Measure" button in order to delete the hold function. By doing so you release the analogue output again.



Pay attention to the specific calibration data for this probe

- Slope
- Offset

6.3 Offset Calibration

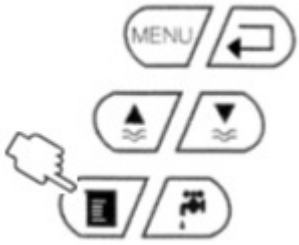
Offset calibration is used to compensate for the electrode drift that sets in due to the interaction of the probes with the measuring medium.

This drift is dependent upon the substances contained in the water and is therefore different for every measuring point. With time, you will establish how often you need to carry out an offset in each case.

Offset calibration is very easy to carry out. The probe generally remains in the measuring medium in the process.

Carrying Out Offset Calibration

- Select the measuring channel that you wish to calibrate.
- Set the calibration type to offset calibration ("Calibration – Cal.method – Offset). Ensure that measurement is active (must not remain on “Hold”).
- Now press the Cal button once.



  - Displays of “Hold”, “Electrode active”, “Buffer”, “Run time” indicate that the offset routine is running.

  - The symbols “Hold”, “Buffer” and “Run time” are displayed after approx. 20 sec.

- Now press the Cal button once more in order to save the determined measurement internally.
  - You now have 2 hours.

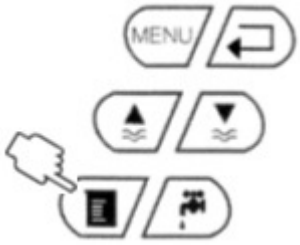
The current measurement is saved by the converter as “Redox voltage” for the next 2 hours. Offset calibration must be completed within this period, otherwise the entire process will be cancelled. The converter will then continue to work with the former calibration data.

Now take a medium sample close to the probe. Determine the concentration of the sample (laboratory).

The converter continues to work as normal in the meantime.

Enter the determined laboratory value of the sample in the measuring converter as “current value” ("Calibration – current value").

Then press the Cal button on the converter again in order to continue / complete the calibration.



The symbols “Hold”, “Electrode active”, “Buffer”, “Run time” are displayed.

The “laboratory value” is adopted and a curve adaptation is recalculated by the converter using the saved internal “Redox value”.

The symbols “Hold”, “Electrode” and “Run time” are displayed.

The symbols disappear after a few seconds and measurement is in the active measuring mode with new offset of the concentration curve.

NOTE ON PH / REDOX MEASUREMENT

You can carry out offset calibration with total ease with both ISE probes and pH / Redox probes.

Proceed as described above. Measure the pH value of the measuring medium using a comparison pH measurement (manual pH meter) and enter the pH value under Buffer 1.

6.4 General settings

Enter the menu-button to make the general settings.

General Data

Designation	Settings	Description
Scroll time	00.0 – 99.9 min	Automatic display-switching between measuring channels. 00.0 min = no scroll function
Modifications	permitted blocked save data load data	Permitted: Entries and modifications are possible. Blocked: Entries and modifications are not possible. save data: Saves the current general settings in EEPROM. load data: Loads and uses the last saved settings
Parameters	Normal Hold Reset Default	Normal Standard setting. Relay contacts are active as long as thresholds are exceeded. Hold Relay contacts are active, but are held even if thresholds are no longer exceeded. Reset using the Measure button. Reset The converter carries out a new system start. All set data are retained Default The converter carries out a new system start. All data set by the user are reset to factory settings.

Relay-Output

Designation	Settings	Description
Inverted	00000 - 11111	The switching contacts for the respective relay can be set as follows 0 = close actively (idle current, relay open as normal) 1 = open actively (operating current, relay closed as normal) Relay allocation: 0 0 0 0 0 Relay 1 Relay2 Relay 3 Relay 4 Relay 5
Switching contacts Relay No. 1	00 – 16	Pre-alert 00 = not active 01 = active on measuring channel 1 02 = active on measuring channel 2 03 = active on measuring channel 3 and so on Alert Setting possibilities as with pre-alert Fault Setting possibilities as with pre-alert
Switching contacts Relay No. 2	00 – 16	Pre-alert 00 = not active 01 = active on measuring channel 1 02 = active on measuring channel 2 03 = active on measuring 3 and so on Alert Setting possibilities as with pre-alert Fault Setting possibilities as with pre-alert

Switching contact Relay No. 3	00 – 16	Pre-alert	00 = not active 01 = active on measuring channel 1 02 = active on measuring channel 2 03 = active on measuring channel 3 and so on
		Alert	Setting possibilities as with pre-alert
		Fault	Setting possibilities as with pre-alert
Switching contact Relay No. 4	00 – 16	Pre-alert	00 = not active 01 = active on measuring channel 1 02 = active on measuring channel 2 03 = active on measuring channel 3 and so on
		Alert	Setting possibilities as with pre-alert
		Fault	Setting possibilities as with pre-alert
Switching contact Relay No. 5	00 – 16	Pre-alert	00 = not active 01 = active on measuring channel 1 02 = active on measuring channel 2 03 = active on measuring channel 3 and so on
		Alert	Setting possibilities as with pre-alert
		Fault	Setting possibilities as with pre-alert

The relays can be freely programmed individually or in combinations. In the process only one alert status can be allocated to each relay (lower alert threshold or upper alert threshold or technical fault). Incorrect or duplicated allocations can lead to measuring converter malfunction.

Date and time

Designation	Settings	Description
Date	01.01.04 – 31.12.99	Date entry / modification if required
Time	00:00 – 23:59	Time entry / modification if required. Automatic adjustment from standard time (GMT (+1)) to summer time (GMT+1 (+2)) does not take place.

6.5 Hydrograph Menu

Hydrographs and data loggers

Designation	Settings	Description
Status curve	Yes No	Yes The measurement is shown additionally as a trend curve in the field beneath the temperature display in the normal display screen of a measuring channel. The display range corresponds to the set range of the mA power output. No Depiction of the hydrograph in the measuring channel display screen is switched off.
Number windows	00 – 03	Indicates the number of hydrograph windows (data logger function). A maximum of 3 windows can be activated.
Resolution	00.02 – 99.00 min.	Time interval during which the measurements are depicted in the status curve in updated form.
Time range	00.1 – 99.9 h	Adjustable time for the visible time window of the status curve. Recommendation: 24.0 h

Calibration of analogue outputs

Designation	Settings	Description
Channel number	01 – 08	Selection of the channel in which the analogue output is to be tested / calibrated.
Simulation	00 – 20 mA	Entry of a power value which is then present at the corresponding terminals of the respective channel. Ideal for simple testing of signal lines from the converter to analogue value recorders.
Power value	00 – 20 mA	Entry of the power value actually arriving at the end of the signal line when a simulated current value has been preset. The converter automatically corrects the analogue output based on the entry. This way you can easily compensate for signal deviations/losses of current in signal lines.

Fixed allocations of analogue outputs

Designation	Settings	Description
Parameters	00:00:00:00	Allocation of 4 of the maximum 8 possible measuring channels (01 – 08) to the 4 analogue outputs. Attention, no channel may be indicated multiple times.
mA outputs	00:00:00:00	Free allocation of analogue outputs 01-04 to the measuring channel defined above
Baud rate RS232	02400 04800 09600 19200 38400	Factory setting 09600 baud. Setting for data transmission between converter and PC. If possible, do not change the baud rate on the converter. If necessary, change the baud rate on your PC to the same baud rate as the converter.
Baud rate RS422	02400 04800 09600 19200 38400	Factory setting 19200 baud. Setting for data transmission between converter and probe. Do not change the baud rate, otherwise communication between converter and probe may be disrupted. In the case of doubt speak to the KROHNE service department beforehand.

6.6 Channel-specific settings

This menu is the same for every measuring channel.

You must undertake specific parameter changes for every measuring channel separately.

Measuring point name

Designation	Settings	Description
Addr: 01	NAM760-BDS	1. Title The name of the measuring point or another designation can be entered here. The following ASCII symbols are available to you.

	!	„	#	$	%	&	´	(	)	*	+	,	-	.
/	0	1	2	3	4	5	6	7	8	9	:	;	<	=
>	?	A	B	C	D	E	F	G	H	I	J	K	L	M
N	O	P	Q	R	S	T	U	V	W	X	Y	Z	a	b
c	d	e	f	g	h	i	j	k	l	m	n	o	p	q
r	s	t	u	v	w	x	y	z						

Sensor data - setting of sensor type

Designation	Settings	Description
Slope	xxx.x % 0.00 – 100 %	Displays the dynamic sensor slope. The value changes depending on the calibration data and sensor duration of operation. Manual correction of the value is generally not necessary. Please ask for details at the KROHNE service department covering your area.
Offset	+- x.xx pX - 9.99 - + 9.99 pX	Displays the dynamic sensor zero point. The value changes depending on the calibration and sensor duration of operation. Manual correction of the value is generally not necessary. Please ask for details at the KROHNE service department covering your area.
Electrode	Gas sensor pH-Type Ammoniac Ammonium Nitrate Potassium Calcium Sulfite Cyanide Chloride Fluoride Sodium Bromide Nitrite Redox Oxygen Chlorine Phosphate Lithium Refraction Lead Sulfide Sulfide-H Sulfide-H2	Sensor type that is recognised by the converter. The new sensor type must be selected here if the sensor is changed on the respective measuring channel. Depending on sensor type the corresponding factory setting is retrieved with the specific sensor data. Further sensor types on request.
Zero line	000.0 ppm	Lower sensor-specific sensitivity threshold. This value is a component of the factory calibration. Modifications only after consultation with KROHNE-System service department.

Sensor calibration

Designation	Settings	Description
Current value	00.00 ppm	Displays the last current calibration value. Entry of the offset value for offset calibration here. See also offset calibration
Cal. method	Offset 2-point StdAdd. C-curve	Opportunity to select calibration routines. See calibration menu for further details. Offset 1-point adaptation of an available calibration curve in order to compensate for drift deviations. 2-point Calibration method via 2 standard solutions. Std.Add. Calibration routine via a standard addition (optional). C-curve Calibration by creating a concentration curve (optional).

General settings for sensor

Designation	Settings	Description
Start position	Measurement Maintenance	Indicates in which mode the converter is to switch following start-up / Power on. Measurement The converter switches to measuring mode. The analogue outputs are active. Maintenance The converter remains in maintenance mode, the analogue outputs are switched to Hold. Manual release by pressing the Measurement button on the converter is necessary.
Check type	Off Normal Moderate Strict	Indicates under which criteria the functionality of the electrodes is to be monitored. Off Electrode monitoring only during calibration. Normal Constant checking using standard tolerances. Moderate Constant checking using tight tolerances. Strict Constant checking using minimum tolerances. Recommend setting in standard applications: "Off".
Zero balance	Manual Automatic	Manual Null balance occurs during the next calibration in each case. Specifically for large measuring ranges. This setting is used in the normal case. Automatic For use when measuring is undertaken consistently in the lower measuring range. Null balance then occurs internally. Increases precision in the lower measuring range.

Setting analogue outputs

Designation	Settings	Description
mA range	0 .. 20 mA 4 .. 20 mA	Set the type of analogue signals here
Start point	000.0 ppm	Enter the start concentration for 0 or 4 mA
Finish point	000.0 ppm	Enter the finish concentration for 20 mA

Setting threshholds (relay control)

Designation	Settings	Description
Pre-alert	000.0 ppm	The pre-alert is triggered if values are exceeded. Set relays are activated.
Alert	000.0 ppm	The alert is triggered if values are exceeded. Set relays are activated
Hysteresis	000.0 ppm	Adjustable switching threshold
Delay	000.0 min	Adjustable time by which an alert trigger can be delayed.

Settings for the display

Designation	Settings	Description
Units	lin log mV pH %	The selection possibilities depend on the respective parameter. The reference magnitude between molecule or element can also be chosen during ISE measurement.
Modify	permitted blocked save data load data	permitted Entries and modifications are possible for this channel. blocked Entries and modifications are not possible save data Saves the current measuring channel settings. load data loads and uses the last saved channel settings.
System	Reset Default Test	Reset The converter is restarted with the currently used parameters Default The converter is restarted with the factory settings. Existing customised settings are lost. Test The converter switches to a test mode. Use this setting only in consultation with KROHNE service.
Zero point	000.0 ppm	Measurements beneath this adjustable value are displayed with this value.

Settings for auto-clean function

Designation	Settings	Description
Interval	000.0 h	Entry at which time intervals the auto-clean function is to be activated. Recommendation: 000.5 h for compressed air, 002.0 h for water
Duration	000 sec	Rinse duration in seconds Recommendation: 005 sec. for compressed air, 020 sec. for water
Hold time	000 sec	Waiting period after rinsing after which measurement can be engaged again. The analogue outputs are frozen during the hold time. Recommendation: 030 sec.
Automatic	Yes No	Yes The auto-clean function is active No The auto-clean function is not active.

Settings for auto-clean function winter service (necessary when rinsing with water)

Designation	Settings	Description
Interval	000.0 h	Entry at which time intervals the auto-clean function is to be activated. Recommendation: 000.2 h
Duration	000 sec	Rinse duration in seconds Recommendation: 002 sec.
Hold time	000 sec	Waiting period after rinsing after which measurement can be engaged again. The analogue outputs are frozen during the hold time.
Temperature	008 °C	Limit temperature for winter service program.
Automatic	Yes No	Yes The auto-clean function is active No The auto-clean function is not active.

Switch to other menu levels

Designation	Settings	Description
Menu	MainMnu	MainMnu Return to the main menu
	CalMnu	CalMnu Call up the calibration menu
	SensorMnu	SensorMnu Call up the specific sensor menu

6.7 Calibration submenu

You set the specific parameters for the calibration routines in this menu.

You get to the calibration submenu via the measuring channel menu.

Entering current value for offset calibration

Designation	Settings	Description
Current pt	00.00 ppm	Entry of the laboratory value for offset calibration

Settings for standard addition (optional)

Designation	Settings	Description
Sample volume	10.00 lt	Pre-set volume in which calibration is carried out following standard addition.
Flow	000.02 ml	Inflow rate of the standard calibration solution
Standard	0.000 M/l	Concentration of the standard in Mol/l
No. steps	03 step	Enter number of steps with which the standard addition is to be implemented.

2-point calibration: Entering the concentrations of the standard solutions

Designation	Settings	Description
1st buffer	000.0 ppm	Entry of the concentration of the first calibration standard (low concentration)
2nd buffer	000.0 ppm	Entry of the concentration of the second calibration standard (higher concentration)

Compensation of constant disturbances (manual correction of cross-sensitivities)

Designation	Settings	Description
Correction value	+- 00.0 ppm	Here you can manually undertake compensations if disturbing ions disturb the measurement by a constant amount. Set a fixed correction value that is added to the measurement (+) or deducted from the measurement (-). After entering the correction value you must carry out an offset calibration using the medium's current measurement (measurement prior to entry of the correction value).

Calibrating the temperature sensor

Designation	Settings	Description
Temperature	025.0 °C	If the temperature sensor does not display the correct temperature, the temperature can be calibrated here. Implementation: enter the current temperature and then press Enter. Switch briefly into display mode. Switch back to the menu and enter the same temperature once again. Press Enter. The calibration temperature is saved.

Settings for calibration with standard addition (optional) only on Analyser DISCO-2

Designation	Settings	Description
Pump duration	00.1 min	Pump duration of a metering pump
Cond. volume	0.000 lt	Volume of conditioning medium which is to be set
Automatic	No Yes	No Manual activation of the standard addition Yes Automatic activation of the standard addition
Valve number	000	Sets which valve is to be controlled during standard addition

Back to measuring mode

Designation	Settings	Description
Menu	Parameters Default	Parameters Return to the measuring channel menu Default Restart with factory settings The parameters used up to now are deleted.

6.8 Sensor date submenu

In the sensor data submenu you have the opportunity to activate sensor-specific functions. You can offset various sensors with one another and thus actively reduce cross-sensitivities from unknown ions.

You get to the sensor data submenu via the measuring channel menu.

Settings for disturbing ion compensation

Designation	Settings	Description
Channel number	00	Set the other channel that is to be used for compensation here.
Coefficient	-9.99 - +9.99	Offsetting factor by which the cross-sensitivity in respect of counter-ions is to be compensated. Please ask KROHNE for the specific values.
Addition	Yes No	Yes Activation of compensation No Deactivation of compensation

Electrode specification (factory setting)

Designation	Settings	Description
Inner buffer	+- 000 mV	Sensor-specific features. Loaded on retrieval of the sensor. Please do not change the factory setting.
Norm-Offset	+- 0.00 pX	Sensor-specific features. Loaded on retrieval of the sensor. Please do not change the factory setting.

Damping the analogue output

Designation	Settings	Description
Averaging above	000 –100 points	Option for averaging analogue output.
mA simulation	00.00 – 20.00 mA	This value is issued at the analogue output after a power value is entered.
Designation	Settings	Description
Disp. parameters	00	Number of parameters that are attached to the converter.
Base address	01 – 08	The address that is allocated to the parameter. The address can be changed if necessary. Pay attention that no sensor has the same base address. Otherwise the converter cannot communicate with the sensors without problems.
Second title		If required, enter an additional title for the parameter here.

6.9 Data logger settings

If one or more data logger windows were activated in the general cross-channel settings, you have the opportunity to configure the hydrograph screens.
You can depict up to 3 measuring channels simultaneously per screen.

Use Enter to call up the respective hydrograph screen.

Use Menu to call up the data logger settings:

Designation	Settings	Description
Hydrograph		
Range	000.1 – 999.9 h	Establishes the range to be depicted
Scale	000.1 – 999.9 h	Establishes the scale with time and date display
1st curve		
Address	01 – 08	Selection of the channel that is to be displayed in this screen.
Title		Indicate a title for the channel here
Start	000.0 ppm	Measuring range start that is to be depicted
Finish	000.0 ppm	Measuring range finish that is to be depicted
2nd curve		
Address	01 – 08	Selection of the channel that is to be displayed in this screen.
Title		Indicate a title for the channel here
Start	000.0 ppm	Measuring range start that is to be depicted
Finish	000.0 ppm	Measuring range finish that is to be depicted
3rd curve		
Address	01 – 08	Selection of the channel which is to be displayed in this screen.
Title		Indicate a title for the channel here
Start	000.0 ppm	Measuring range start that is to be depicted
Finish	000.0 ppm	Measuring range finish that is to be depicted

KROHNE as vendor, warrants to the original purchaser of this instrument that it will be free of defects in material and workmanship, in normal use and service, for a period of one year from date of delivery to the original purchaser. KROHNE's, obligation under this warranty is limited to replacing, at its factory, the instrument or any part thereof. Parts, which by their nature are normally required to be replaced periodically, consistent with normal maintenance, specifically reagent, desiccant, sensors, electrodes and fuses are excluded. Also exclud¬ed are accessories and supply type items.

Original purchaser is responsible for return of the instruments, or parts thereof, to KROHNE. This includes all freight charges incurred in shipping to and from KROHNE sales organization.

KROHNE is not responsible for damage to the instrument, or parts thereof, resulting from misuse, environmental corrosion, negligence or accident, or defects resulting from repairs, alterations or installation made by any person or company not authorized by KROHNE.

KROHNE assumes no liability for consequential damage of any kind, and the original purchaser, by placement of any order for the instrument, or parts thereof, shall be deemed liable for any and all damages incurred by the use or misuse of the instruments, or parts thereof, by the purchaser, its employees, or others, following receipt thereof.

Carefully inspect this product for shipping damage, if damaged, immediately notify the shipping company and arrange an on-site inspection. KROHNE cannot be responsible for damage in shipment and cannot assist with claims without an on-site inspection of the damage.

This warranty is given expressly and in lieu of all other warran¬ties, expressed or implied. Purchaser agrees that there is no warranty on merchantability and that there are no other warranties, ex¬pressed or implied. No agent is authorized to assume for KROHNE any liability except as set forth above.

Please include the following return template with your instrument.

Device Return Template:

This device has been carefully manufactured and tested. If installed and operated in accordance with these operating instructions, it will rarely present any problems. Should you nevertheless need to return a device for inspection or repair, please pay strict attention to the following points:

Due to statutory regulations on environmental protection and safeguarding the health and safety of our personnel, KROHNE may only handle, test and repair returned devices that have been in contact with products without risk to personnel and environment.

This means that KROHNE can only service this device if it is accompanied by the following certificate confirming that the device is safe to handle.

If the device has been operated with toxic, caustic, flammable or water-endangering products, you are kindly requested:

- to check and ensure, if necessary by rinsing or neutralizing, that all cavities are free from such dangerous substances,
- to enclose a certificate with the device confirming that is safe to handle and stating the product used.

We cannot service this device unless accompanied by such a form.

S P E C I M E N certificate

Company:…….

Address:……

Department:……

Name:……

Tel. No.:……..

Fax No.:…….....

Email:……...

The enclosed device

Type:……

KROHNE Order No. or Series No.:……..

has been operated with the following liquid:…….

Because this liquid is
☐ water-hazardous ☐ toxic ☐ caustic.. ☐ flammable

we have
☐ checked that all cavities in the device are free from such substances
☐ flushed out and neutralized all cavities in the device

We confirm that there is no risk to humans or environment through any residual liquid contained in this device.