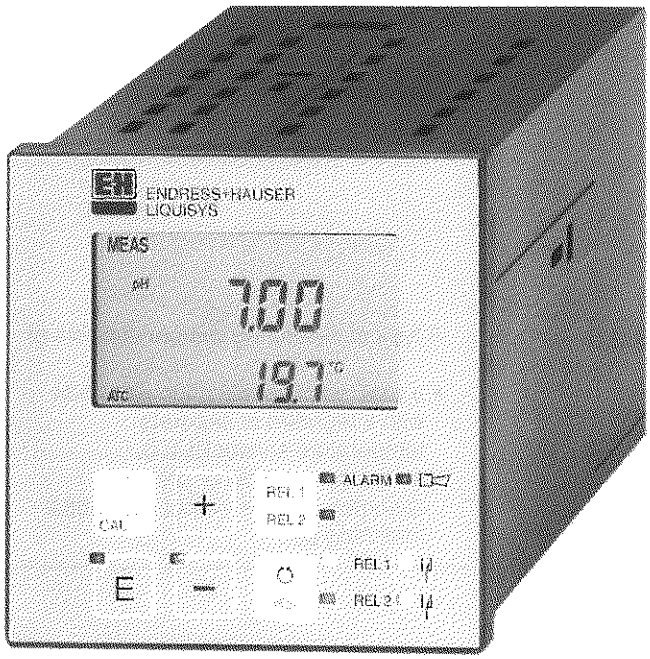
Technical
Information
TI 140C/07/en

pH / Redox Measurement
liquisys CPM 221

Measuring transmitter for pH and redox



Safe operation
- Two switching contacts as limit value switches or as an i/f proportional controller for metering valves and diaphragm pumps
- Alarm contact for error messages
- Galvanically isolated signal output 0/4 ... 20 mA
- High protection against electromagnetic interference
- Pt 100 failure monitoring

Universal use
- Switching between pH and redox operation from the menu
- Field-tested panel-mounted housing (96 x 96 mm); ingress protection IP 54 (front)
- Optional, rugged field housing; ingress protection IP 65

Easy operation
- User-friendly menu structure enables easy parameter setting.
- Large two line display: measuring value and temperature at a glance
- Calibration is controlled by a single CAL button

Areas of application
- Waste water treatment, neutralisation
- Galvanic-decontamination
- Water treatment and monitoring

Quality made by
Endress+Hauser

ISO 9001

Endress+Hauser

Nothing beats know-how

General information

Continuous monitoring
Overflow of the limit values is continuously monitored.
If a limit value exceeds a preset time period (0 to 30 minutes), the alarm contact is switched on.
This relay also activates if there is a fault in the Pt 100 temperature sensor.
This contact operates also as a fail-safe switch.

High measurement reliability
All measures have been taken to ensure electromagnetic compatibility for Liquisys.
All requirements for CE certificate are met.
The galvanic isolation of the current output provides additional safety.

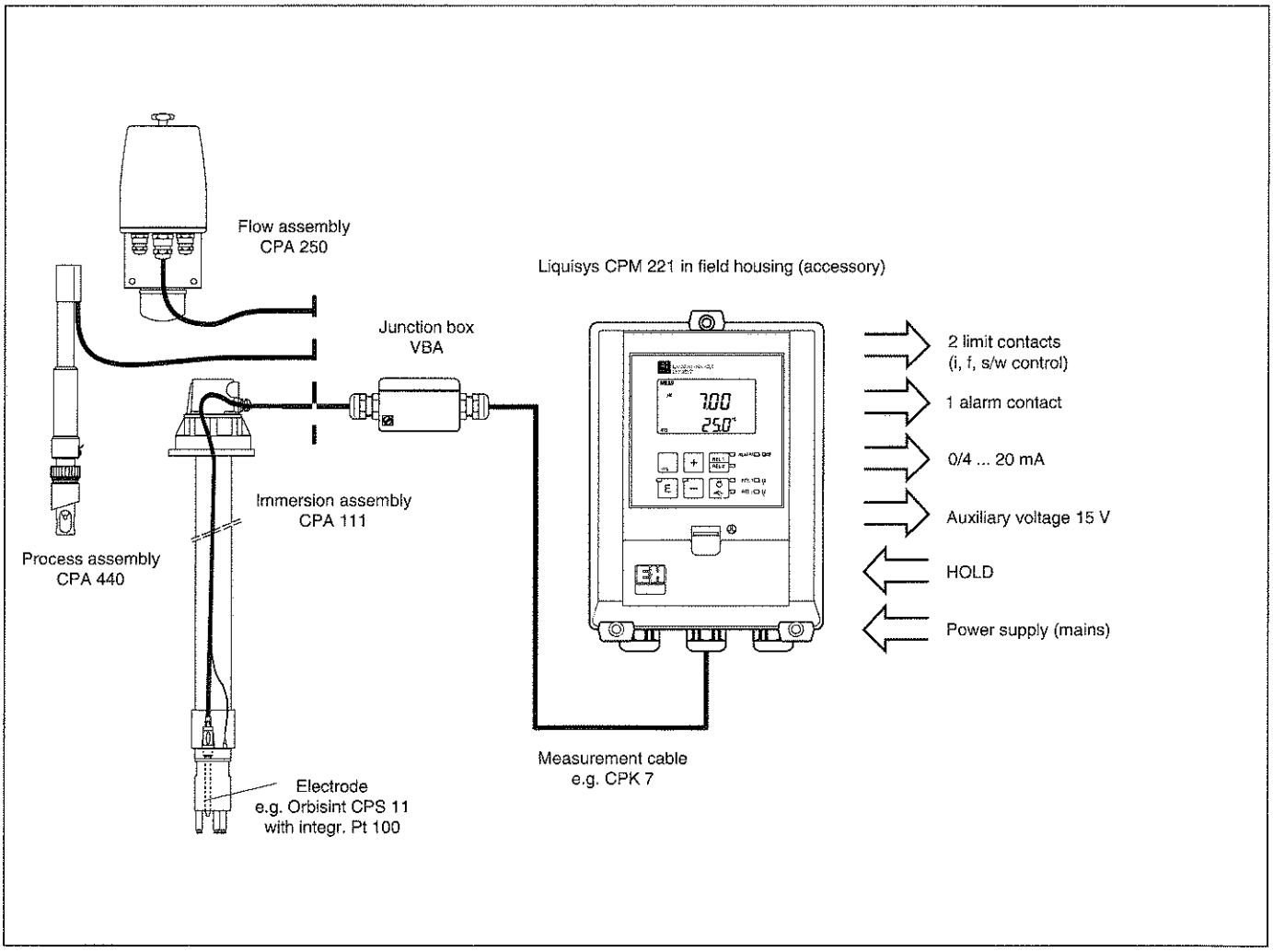
Intelligent manual operation
By switching over to manual operation, the relays can be set depending on the selected control function.
If for example a pulse frequency controller is selected the frequency for the chosen contact can be manually set by pressing "+" or "–" keys.
With that manual operation of a magnetic pump is possible without any difficulties.

Measurement and control system

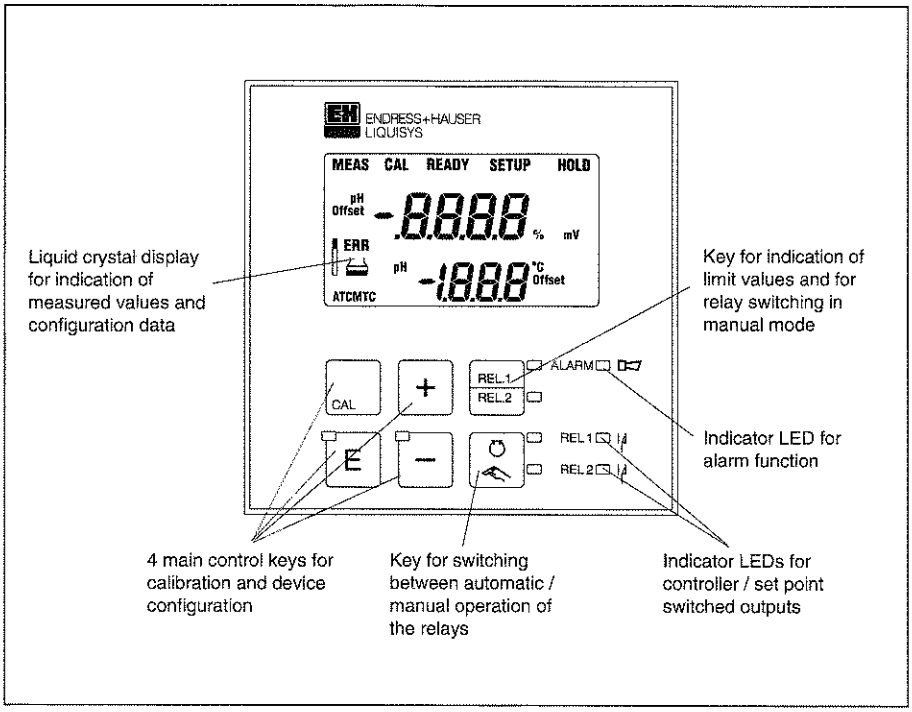
A typical measuring system consists of:

- a pH/Redox combination electrode with integrated or separate temperature sensor Pt 100,
- an immersion, flow or process assembly with or without a potential matching pin,
- an appropriate pH or Redox measurement cable and
- the Liquisys CPM 221 as a panel-mounted instrument or in the field housing accessory

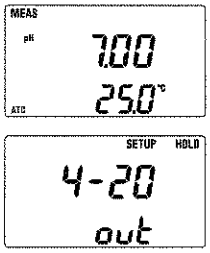
Example for possible measurement systems and system interfaces



Operation



Operating interface:
Display and keys



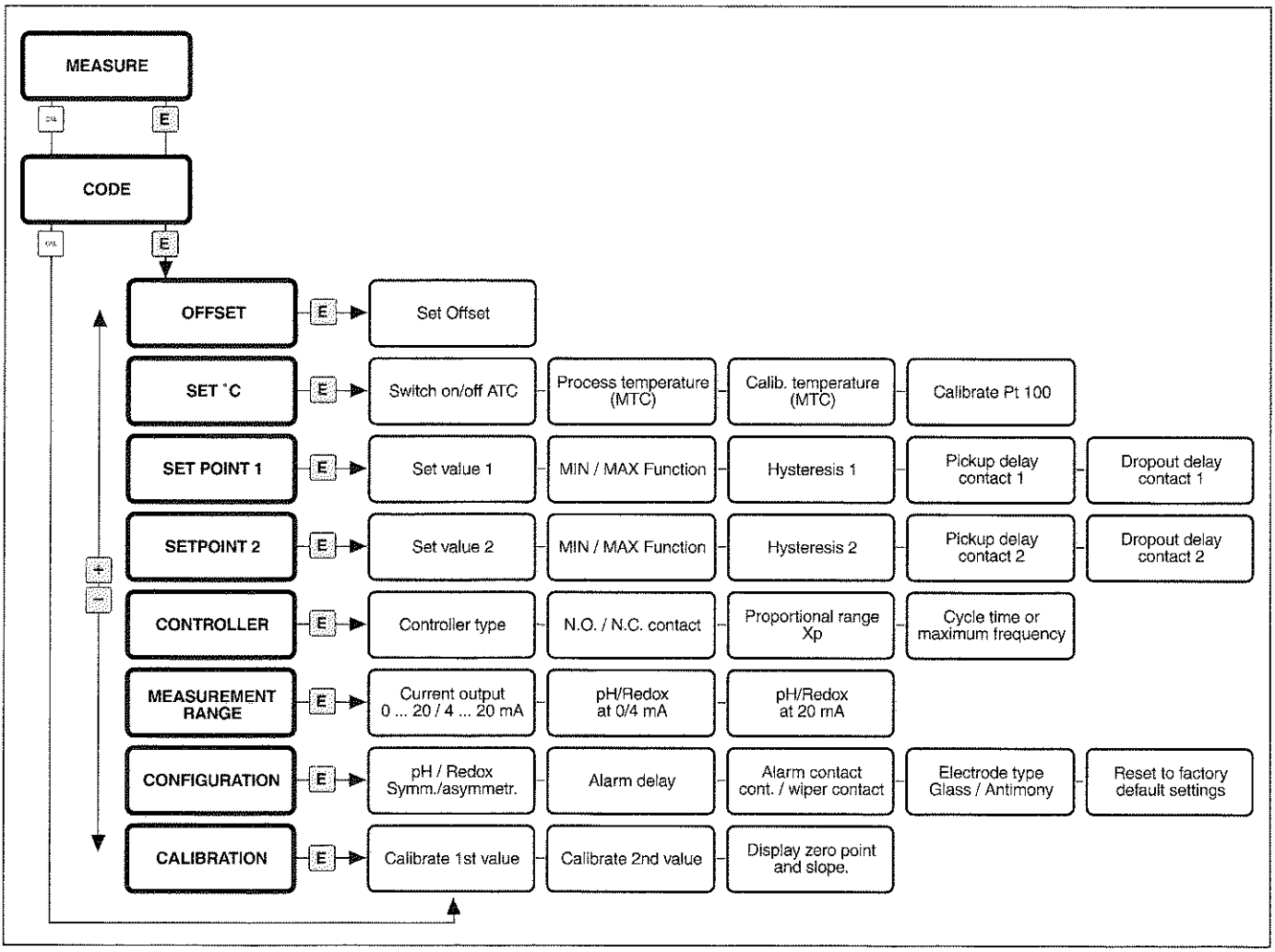
Menu structure
Liquisys CPM 221

Quick information

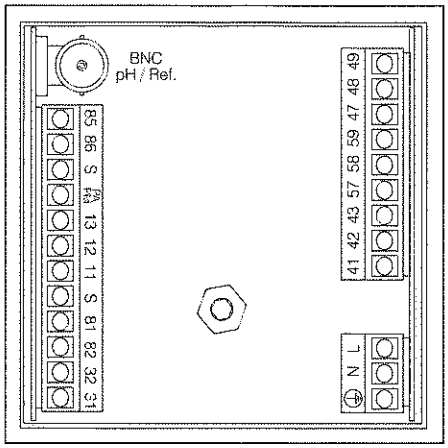
The display shows the current measured value and temperature at the same time. All important process data is available at a glance. Brief plain texts displayed in the configuration menu provides guidance in setting the instrument parameters, familiarising users with instrument operation.

Intelligent and simple

All operating functions of the instrument are clearly arranged in a menu structure. The individual parameters can be easily selected and modified after entering the access code. Calibration is controlled by a single button making it an easy and convenient routine.

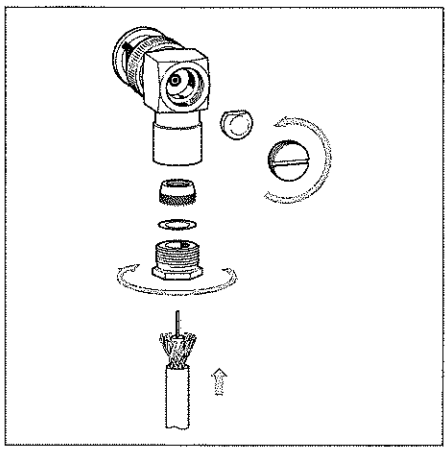


Electrical connection



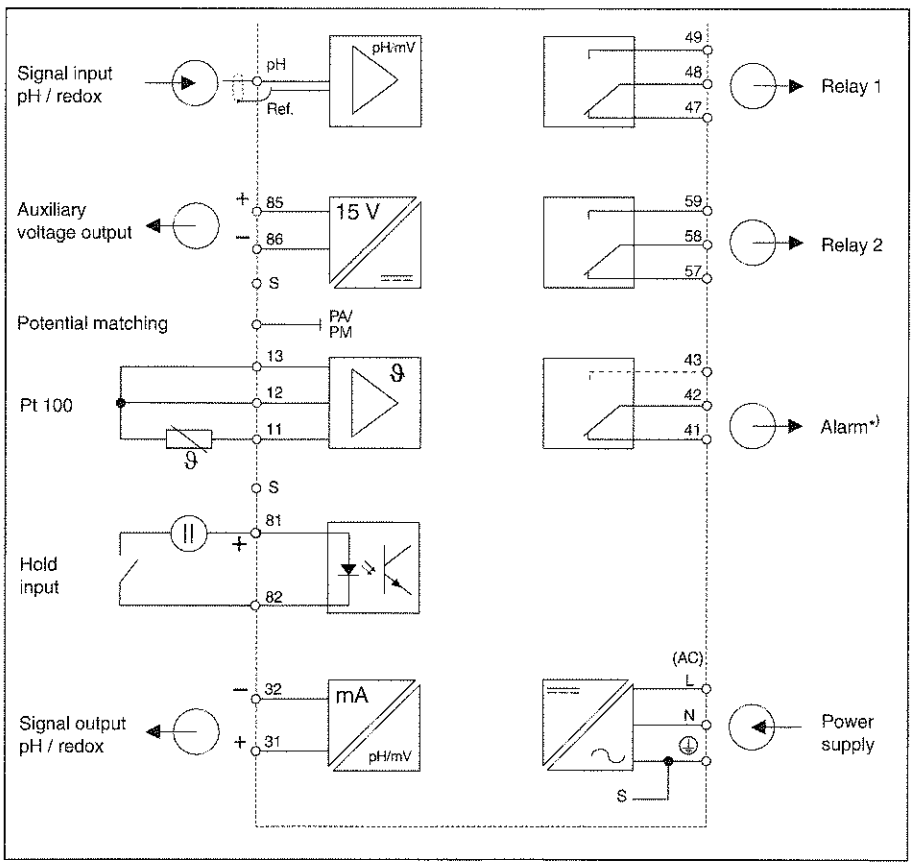
Liquisys CPM 221
Connections on the rear of the instrument.

Simple connection
Connecting the device is simple and convenient.
The supplied terminal blocks (3-, 9- and 12-pole) and the BNC plug are wired separately and then plugged into the already assembled device.



BNC plug with screw-in conductor connection

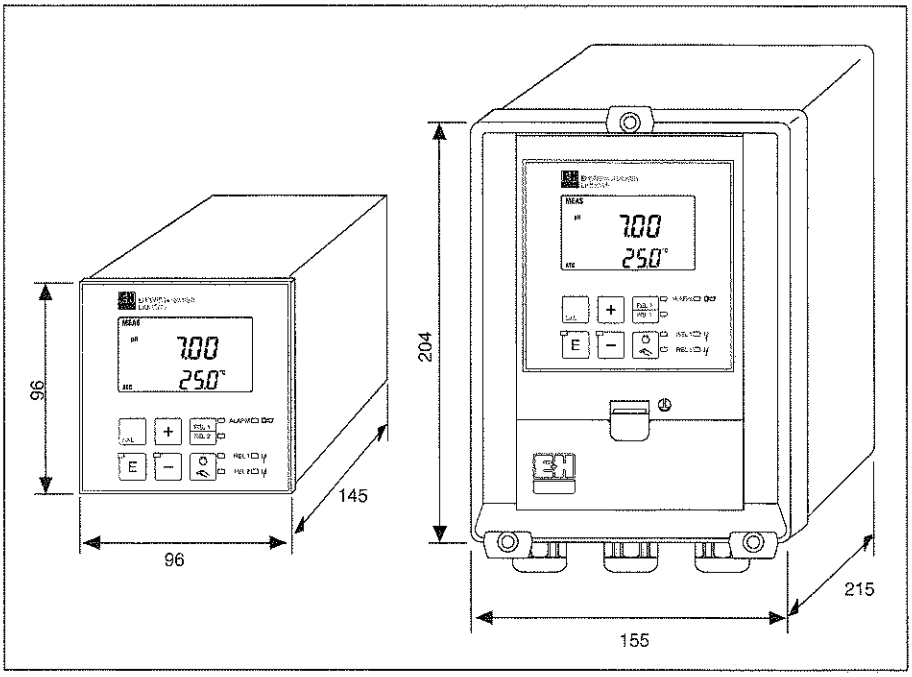
Soldering unnecessary
A new type of BNC plug is included in the scope of supply. When wiring the plug, the inner conductor of the cable is fixed using a screw (see figure). Soldering is no longer required .



Connection diagram
Liquisys CPM 221

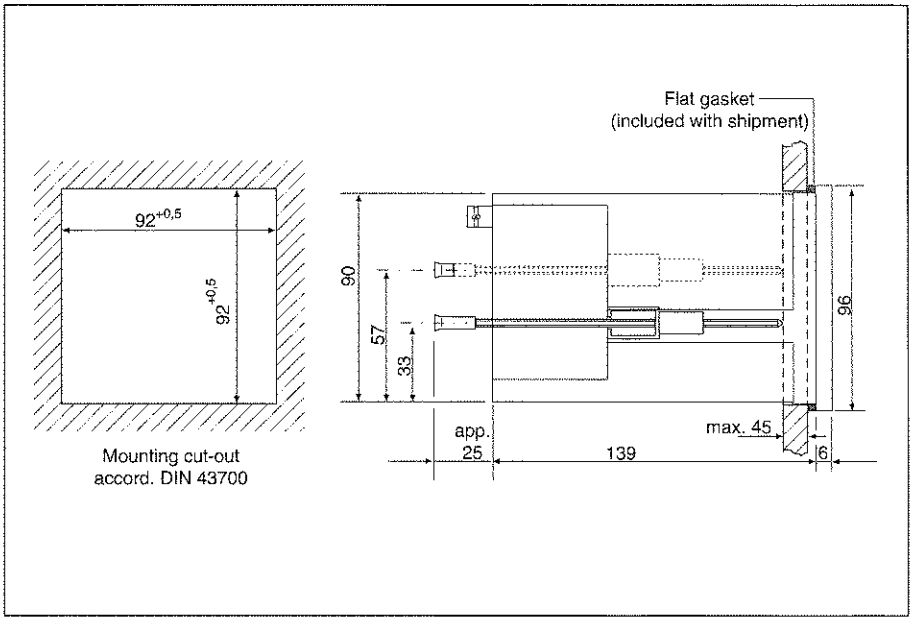
*) indicated contact positions are for currentless or error conditions

Dimensions

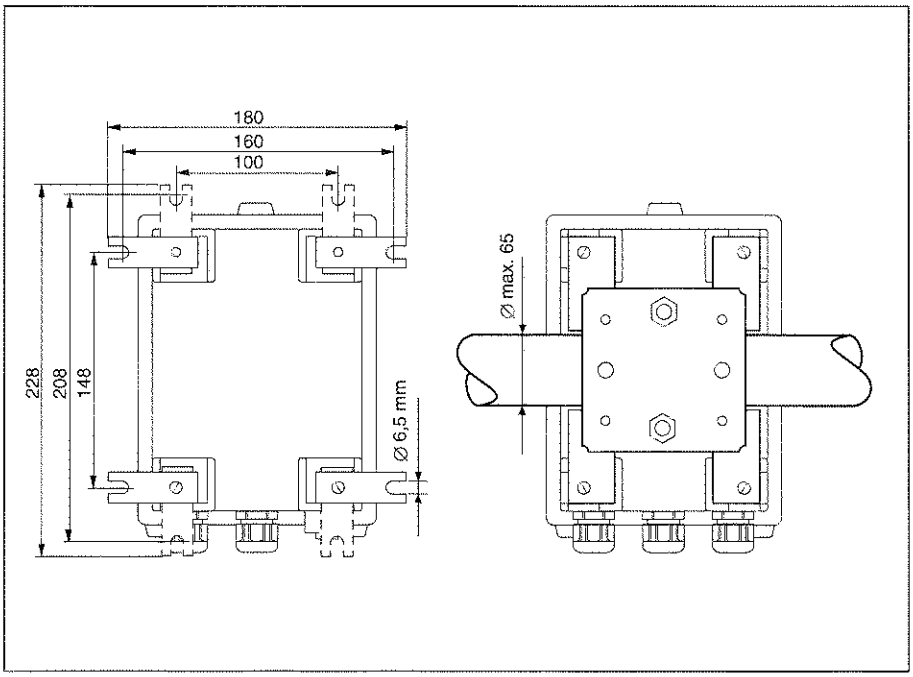


Dimensions
Liquisys CPM 221 in the panel-mounted housing (left) and built into the field housing (right)

Installation



Installing the control panel housing



Wall mounting (left) and post mounting (right) of the field housing (see accessories)

Technical data

pH measurement

Measuring range (MR)	pH 0 ... 14
Display range	–2 ... +16 pH with indication of MR over and underflow
Measured value resolution	pH 0.01
Measurement deviation[1], display	max. 0.5 % of MR
Reproducibility[1]	max. 0.2 % of MR
Reference temperature	+25 °C
pH offset range	±2 pH
Slope adjustment	
Glass	38.0 ... 65.0 mV/pH (nominal value 59.16 mV/pH)
Antimony	25.0 ... 65.0 mV/pH (nominal value 59.16 mV/pH)
pH signal input	
Input resistance at nominal operating conditions	$> 1 \times 10^{12}\ \Omega$
pH signal output	
Current range	0 / 4 ... 20 mA
Measurement deviation[1]	max. 0.75 % of MR
Load	max. 500 Ω
Transmission range	adjustable, min. Δ 1 pH

Redox measurement

Display and measuring range	–1000 ... +1000 mV / 0 ... 100 %
Measured value resolution	1 mV / 0.1 %
Measurement deviation[1], display	max. 0.5 % of MR
Reproducibility[1]	max. 0.2 % of MR
Redox offset range	±120 mV
Redox signal input	
Input resistance at nominal operating conditions	$> 1 \times 10^{12}\ \Omega$
Redox signal output	
Current range	0 / 4 ... 20 mA
Measurement deviation[1]	max. 0.75 % of MR
Load	max. 500 Ω
Transmission range	
absolute (mV)	adjustable, min. Δ 50 mV
relative (%)	fixed, 0 ... 100 %

Temperature measurement

Temperature sensor	Pt 100 (3-wire connection)
Measuring range / ATC range	–9.9 ... +125 °C
Measured value resolution	0.1 °C
Measurement deviation[1], display	max. 1.0 % of MR

Limit contactor, controller and alarm functions

Limit contactor	
Pickup / dropout delay	0 ... 2000 s
Controller	
Function (switchable)	pulse length / pulse frequency controller
Controller characteristics	proportional
Proportional range	0 ... 500 % of MR final value
Adjustable period with pulse length controller	0.5 ... 20 s
Adjustable frequency with pulse frequency controller	60 ... 120 $^1/_{min}$
Hysteresis	
pH / redox mV / redox %	0.1 ... 1 pH / 10 ... 100 mV / 1 ... 10 .0 %
Alarm	
Function (switchable)	continuous / pulsed contact
Alarm delay	0 ... 2000 s

Electrical data and connections

Voltage supply AC	24 / 100 / 115 / 200 / 230 V AC +10 / –15%
Frequency	48 ... 62 Hz
Current consumption	7.5 VA
Auxiliary voltage output	
Output voltage	15 V ±0.6 V
Output current	max. 10 mA
Contact outputs	potential-free change-over contacts
Switching current	
with ohmic load (cos φ = 1)	max. 5 A
with inductive load (cos φ = 0.4)	max. 3 A
Switching voltage	max. 250 V AC, 30 V DC
Switching power	
with ohmic load (cos φ = 1)	max. 1250 VA AC, 150 W DC
with inductive load (cos φ = 0.4)	max. 500 VA AC, 90 W DC

[1] according to DIN IEC 746 part 1, at nominal operating conditions

Technical data

Isolation voltage, signal output	max. 2500 Veff
pH / redox input	BNC plug
Connection terminals	plug-in terminal blocks 3-, 9-, and 12-pole
Conductor cross section	max. 2.5 mm^2
Mains fuse	fine wire fuse, medium 250 V / 1 A
General technical data	
Measured value display	LC Display, 2-line, 4- and $3^1/_2$-digits with status symbols
Electromagnetic compatibility	
Emission	acc. EN 50081-1
Immunity	acc. EN 50082-1
Nominal operating conditions	
Ambient temperature	0 ... +50 °C
Relative humidity	10 ... 95 %, non-condensing
Voltage supply AC	24 / 100 / 115 / 200 / 230 V AC +10 / –15%
Frequency	48 ... 62 Hz
Limit operating conditions	
Ambient temperature	-10 ... + 60 °C
Storage and transport temperature	-25 ... + 65 °C
Physical data	
Dimensions	
Built-in control panel housing (H x W x D)	96 x 96 x 145 mm
Installation depth	175 mm
Field housing (H x W x D)	204 x 155 x 215 mm
Weight	
Liquisys CPM 221 (control panel housing)	max. 0.7 kg
Liquisys CPM 221 with field housing	max. 2.3 kg
Ingress protection	
Liquisys CPM 221 (control panel housing)	IP 54 (Front), IP 30 (housing)
Field housing	IP 65
Materials	
Housing	polycarbonate
Front	polyester, UV-resistant
Field housing	polycarbonate

Subject to modifications.

Accessories

Field housing

Type	Description	Order number
Field housing	For installing the CPM/CLM 221, Dimensions (H x W x D): 204 x 155 x 215 mm Protection class IP65, wall and post mounting	50054413
Weather protection cover VH 3	For mounting on the field housing, Dimensions (L x W x D): 245 x 200 x 310 mm Material: plastic	50003254
Post mounting kit	Retrofit kit for mounting the field housing on horizontal or vertical pipes (Ø max. 65 mm) Material: steel, galvanised	50003244

Assemblies

Type	Description	Areas of application
Dipsys CPA 111	**Immersion assembly** with DN 100 DIN flange, bayonet mounting for fast installation and removal of the electrodes, integration of an electrode cleaning Chemoclean without modification	Open and closed vessels and tanks Flow channels
Probfit CPA 440	**Process assembly** for a pH/Redox electrode, can be used up to 6 bar	Pipelines Vessels and tanks
CPA 250-A	**Flow assembly** for up to 3 electrodes, sensors are kept wet during flow interruptions through a syphon-type construction	Pipelines

Accessories

Electrodes

Type	Description	Areas of application
Orbisint CPS 11/12/13	Universally applicable, easily cleaned, contamination rejecting PTFE diaphragm, compression-proof up to 6 bar, conductivity > 50 µs/cm	Process technology, general
		Industrial waste water
		Decontamination (Cyanogen, Chromium)
		Neutralisation
Ceratex CPS 31/32/33	Inexpensive electrode with ceramic diaphragm, long lifetimes	Drinking water
		Swimming pools
Ceraliquid CPS 41/42/43	Electrodes with ceramic diaphragms and KCl liquid electrolyte, compression-proof up to 8 bar through counter-pressure impingement	High-purity water
		Boiler feed water

Cable

Type	Description
CPK 1	Special measurement cable for connecting pH or Redox combination electrodes **without Pt 100**
CPK 7	Special measurement cable for connecting pH or Redox combination electrodes **with Pt 100**

How to order

pH and redox measuring transmitter

Type

221 Built-in control panel device, 96 x 96 x 145 mm, protection class IP 54 (front), Signal output 0/4 ... 20 mA, HOLD input, 2 control contacts, 1 alarm contact

Power supply

0 230 V, 50 / 60 Hz
1 115 V, 50 / 60 Hz
2 200 V, 50 / 60 Hz
3 24 V, 50 / 60 Hz
5 100 V, 50 / 60 Hz
9 Special version

Additional features

10 Base version
20 Moisture protection lacquering
99 Special version

CPM 221 - [ ][ ] ⇐ **complete order code**

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