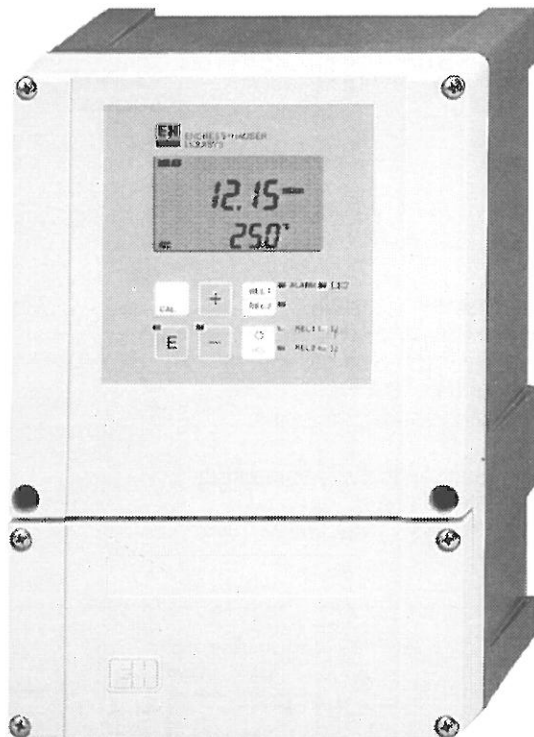


# Conductivity Measurement *liquisys CLM 252*

## Conductivity and Resistance Transmitter



### Areas of application

- Ultrapure water
- Water treatment
- Ion exchangers
- Reverse osmosis
- Cooling water desalination
- Waste water

### Benefits at a glance

- Safe operation
  - Overvoltage (lightning) protection acc. to EN 50142, EN 50082/2
  - Pt 100 failure monitoring
  - Alarm contact for error signalling
  - Two switched contacts usable for limit monitoring with long-term delay for cooling water applications
  - High degree of protection against electromagnetic interference
  - Galvanically separated 0/4 ... 20 mA signal output
- Simple handling
  - Logically arranged menu structure facilitates parameter configuration
  - Large, two-line display shows measured quantity and temperature at a glance
  - Calibration can be conveniently controlled via CAL key
- Universal use
  - Can be configured for conductivity or specific resistance measurement by means of internal adjustment
  - Rugged field housing, protection class IP 65
  - 2nd current output for temperature



## General information

### Maximum accuracy with ATC

Automatic temperature compensation is essential for conductivity measurement because conductivity strongly depends on temperature.

The indicated conductivity value is referred to a reference temperature using a coefficient specific to each solution.

In addition to linear compensation, this instrument comes with a special ultrapure water compensation function which also takes into account the dependence of the temperature coefficient on water purity.

In ultrapure water applications, the temperature coefficient varies between +5.29 %/K at 25 °C and +2.23 %/K at 100 °C.

### Continuous monitoring

A limit monitoring function permanently checks for limit violation.

The alarm contact is activated if a limit is exceeded for more than a predefined period of time (0 to 30 minutes). This relay also responds to failure of the Pt 100 temperature sensor. Of course, this contact is fail-safe by design.

### Maximum reliability

All measurements required to assure electromagnetic compatibility have been implemented in the Liquisys.

The instrument conforms to the requirements for the CE mark.

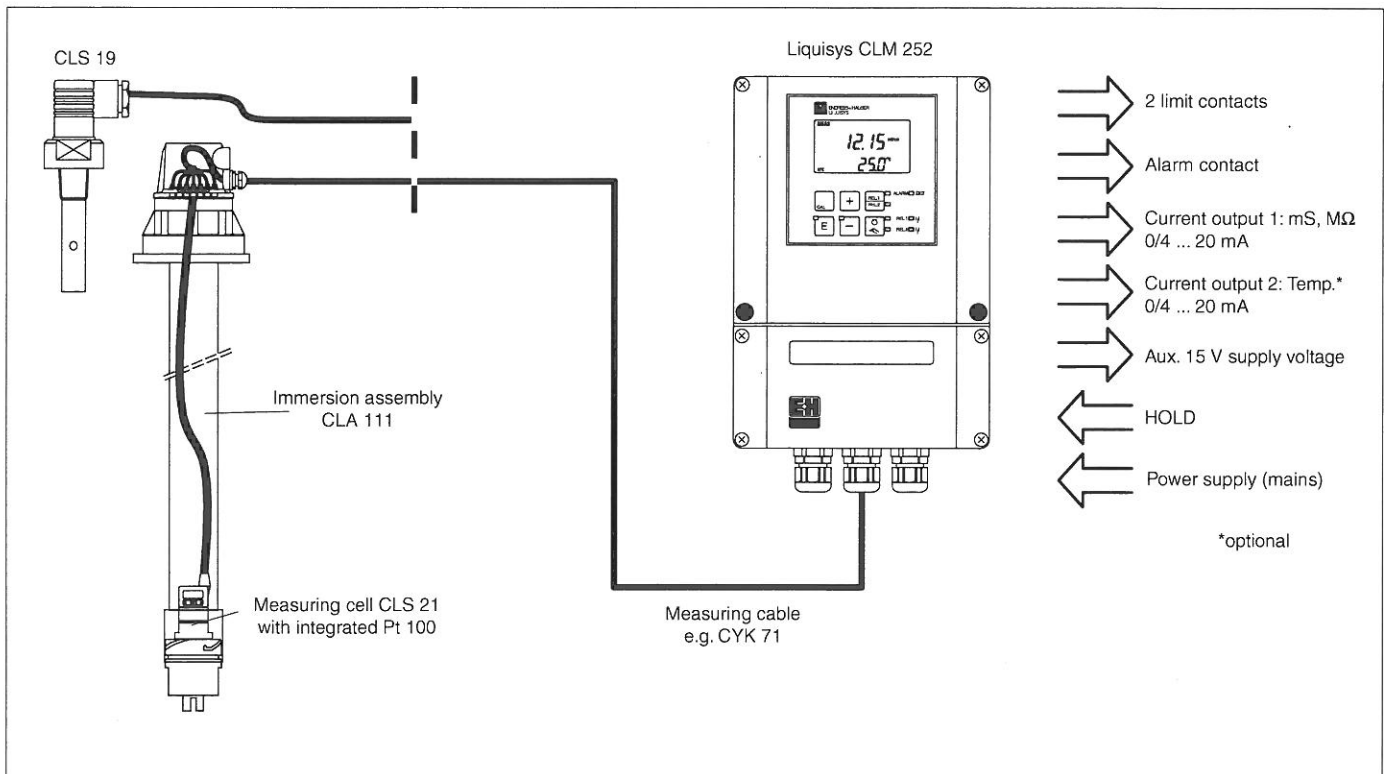
An additional safety margin is provided by galvanic separation of the current outputs.

## Measuring and control system

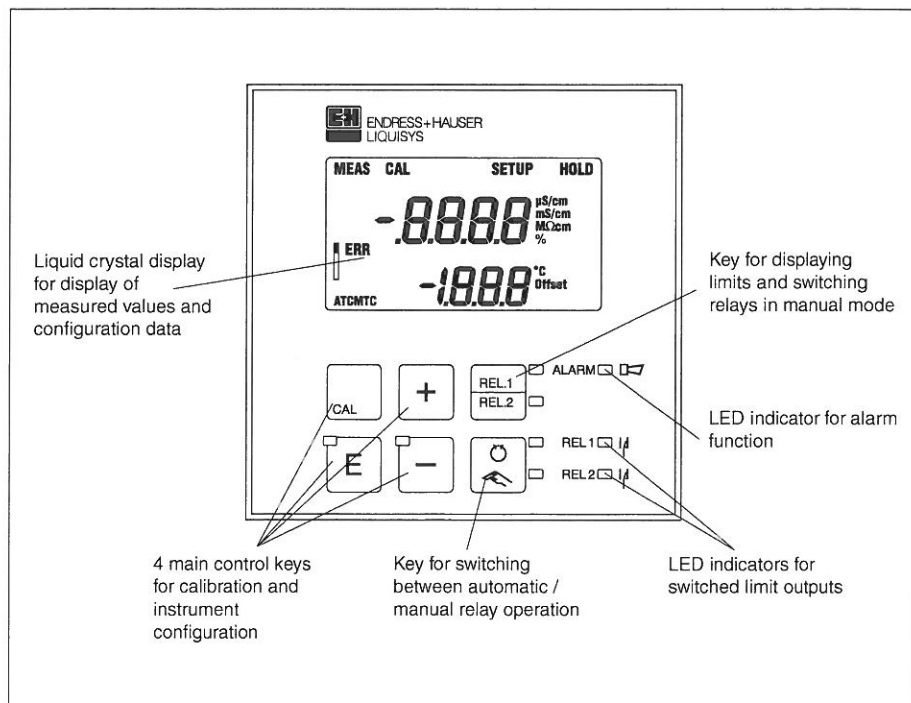
A measuring system generally comprises the following components:

- a conductivity measuring cell with or without integrated temperature sensor Pt 100, installed in a pipeline, tank or vat
- an appropriate conductivity measuring cable, e.g. CYK 71, and
- the Liquisys CLM 252 transmitter.

Example of measuring system showing system interfaces



# Operation



User interface:  
Display and keys



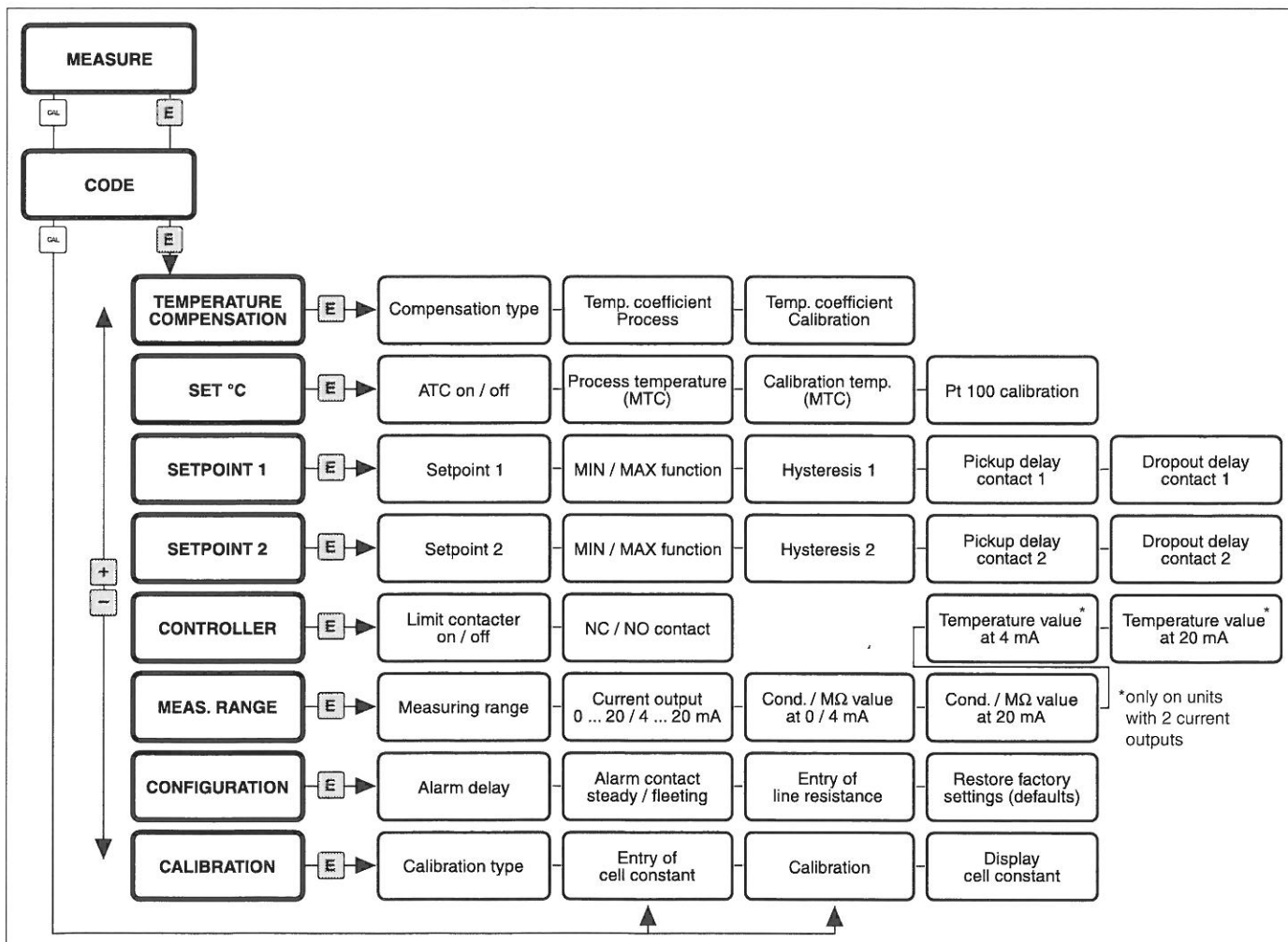
Liquisys CLM 252  
menu structure

## Everything at a glance

The display simultaneously shows the current measured value and the temperature – the essential process data. Brief informational texts in the configuration menu provide assistance with parameter configuration, quickly familiarising you with the operation of the instrument.

## Intelligent and simple

All instrument control functions are arranged in a logical menu structure. Following access code entry, the individual parameters can be easily selected and modified as needed. The calibration procedure, controlled with a single dedicated key, is simple and convenient.



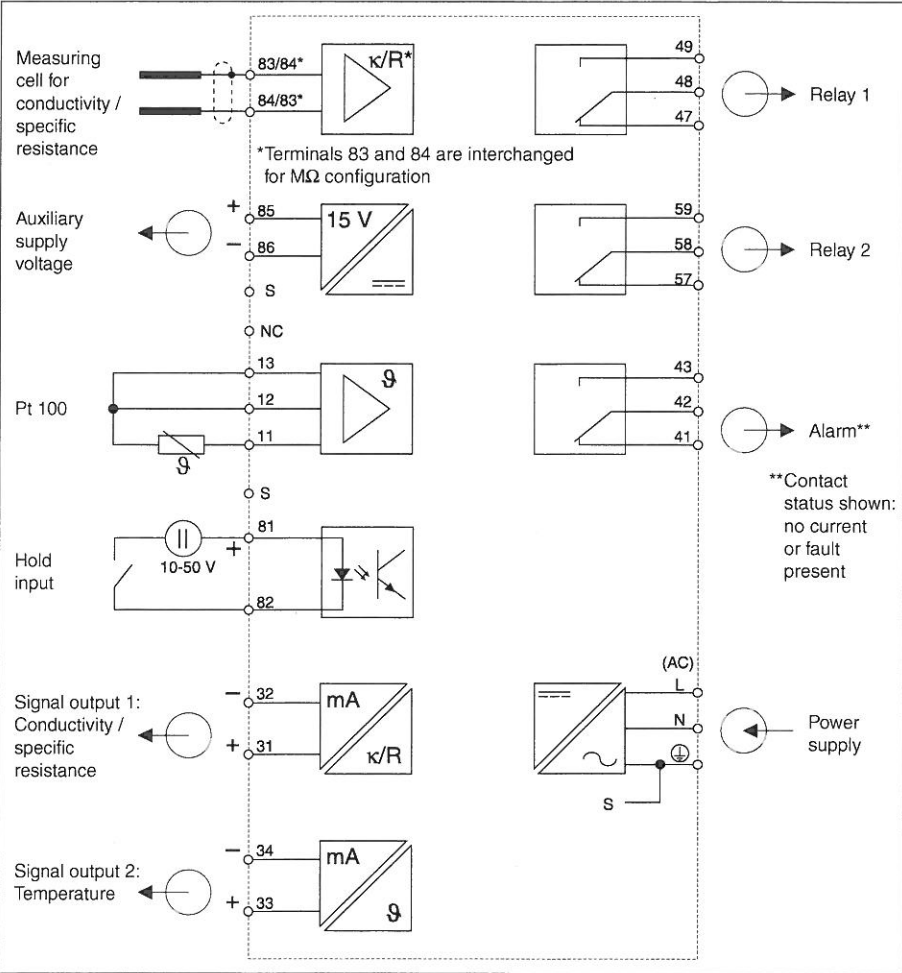
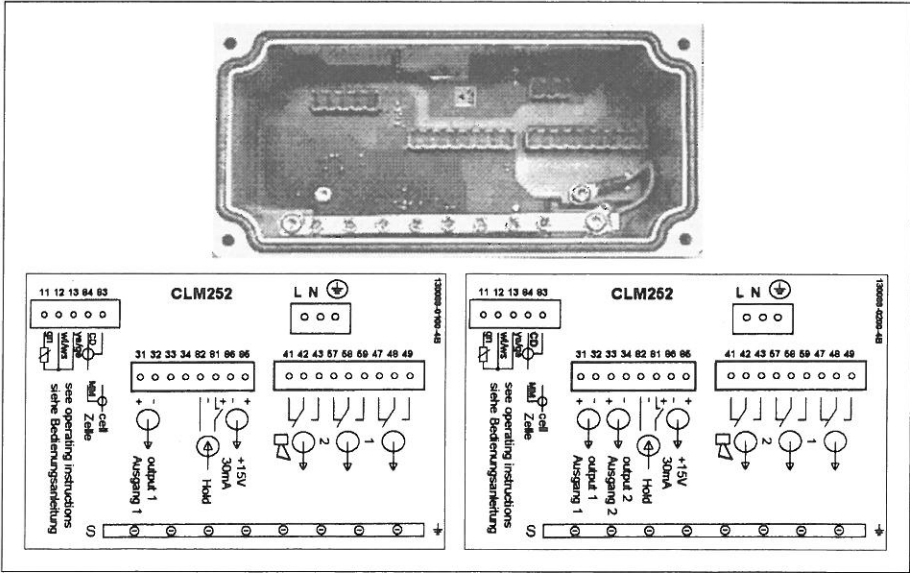
Electrical connection

Liquisys CLM 252  
Position and  
designation of  
connections in wiring  
compartment

Top:  
Wiring compartment  
(terminals removed)

Left:  
Instrument with 1 signal  
output

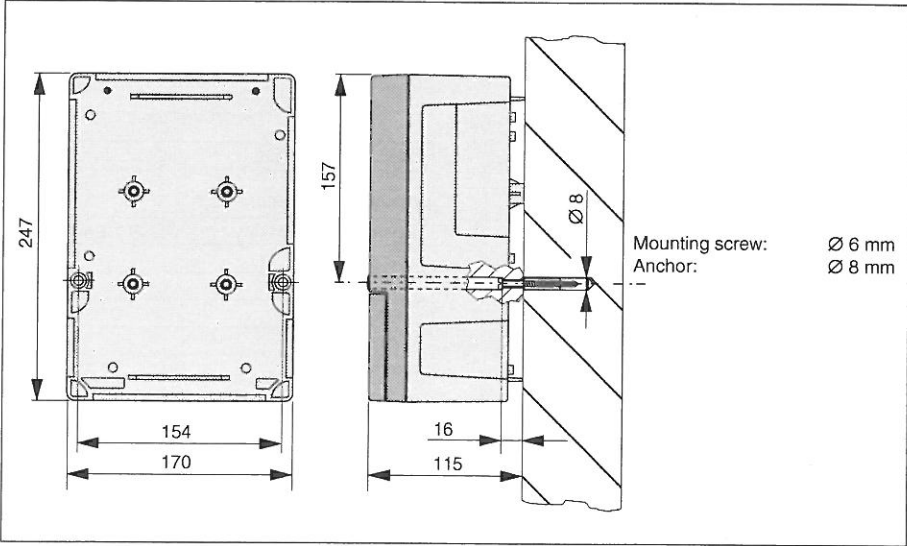
Right:  
Instrument with 2 signal  
outputs



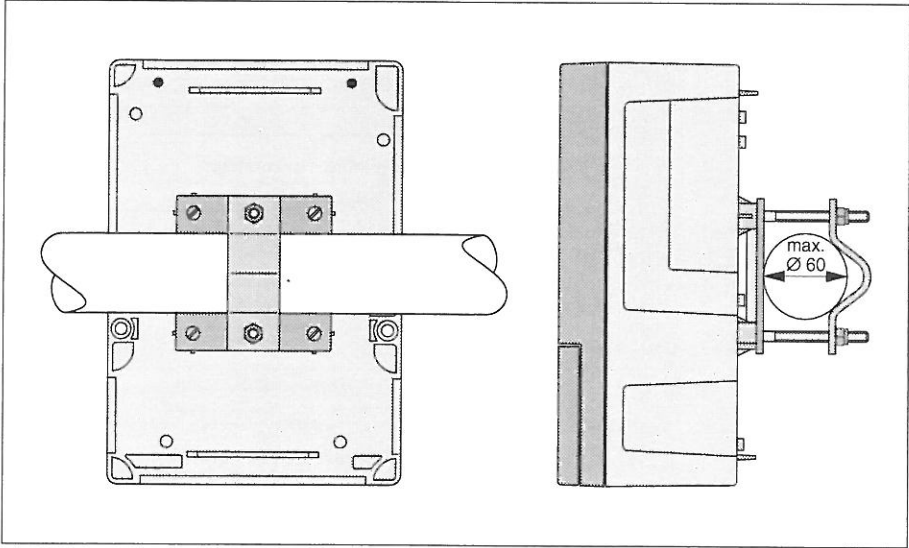
Connection diagram for  
Liquisys CLM 252

# Dimensions / mounting

Wall mounting of  
Liquisys CLM 252

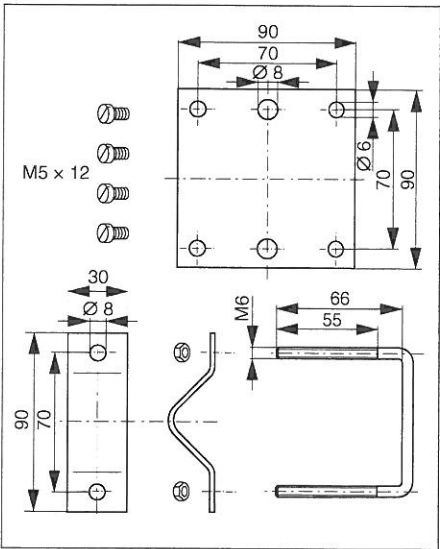
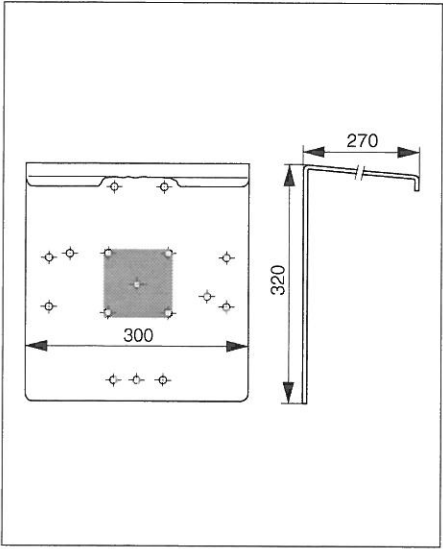


Post mounting of  
Liquisys CLM 252  
(can be installed on  
vertical or horizontal  
pipes with diameters of  
up to DN 60)



Left:  
Weather protection  
cover CYY 101

Right:  
Post mounting kit



# Technical data

## General specifications

Manufacturer	Endress+Hauser Conducta GmbH+Co.
Instrument designation	Liquisys CLM 252

## Input

Measured quantities	conductivity, resistance, temperature
---------------------	---------------------------------------

### Conductivity measurement

Display and measuring ranges (cell constant)	
Range 0	0.000 ... 2.000 $\mu\text{S/cm}$ ( $0.01 \text{ cm}^{-1}$ )
Range 1	0.00 ... 20.00 $\mu\text{S/cm}$ ( $0.01 \text{ cm}^{-1}$ )
Range 2	0.00 ... 20.00 $\mu\text{S/cm}$ ( $0.1 \text{ cm}^{-1}$ )
Range 3	0.0 ... 200.0 $\mu\text{S/cm}$ ( $0.1 \text{ cm}^{-1}$ )
Range 4	0.0 ... 200.0 $\mu\text{S/cm}$ ( $1.0 \text{ cm}^{-1}$ )
Range 5	0 ... 2000 $\mu\text{S/cm}$ ( $1.0 \text{ cm}^{-1}$ )
Range 6	0 ... 5000 $\mu\text{S/cm}$ ( $1.0 \text{ cm}^{-1}$ )
Range 7	0.00 ... 20.00 $\text{mS/cm}$ ( $1.0 \text{ cm}^{-1}$ )
Range 8	0.0 ... 200.0 $\text{mS/cm}$ ( $1.0 \text{ cm}^{-1}$ )
Range 9	0.0 ... 200.0 $\text{mS/cm}$ ( $10 \text{ cm}^{-1}$ )
Calibration range	80 ... 120 %
Line length	max. 100 m

### Resistance measurement

Display and measuring ranges (cell constant)	
Range 10	0.10 ... 20.00 $\text{M}\Omega\text{-cm}$ ( $0.01 \text{ cm}^{-1}$ )
Range 11	0.010 ... 2.000 $\text{M}\Omega\text{-cm}$ ( $0.1 \text{ cm}^{-1}$ )
Line length	max. 20 m

### Temperature measurement

Temperature sensor	Pt 100
Measuring range / ATC range	-9.9 ... +125 $^{\circ}\text{C}$

### Hold input

External voltage	10 ... 50 V
Current consumption	max. 10 mA

## Output

Isolation voltage, signal output	max. 350 $V_{\text{RMS}}$ / 500 V DC
Overvoltage (lightning) protection	acc. to EN 50142, EN 50082/2

### Conductivity signal output

Current range	0 / 4 ... 20 mA, galvanically separated
Load	max. 500 $\Omega$
Output range	adjustable, $\Delta 20 \dots \Delta 100$ % of URV

### Resistance signal output

Current range	0 / 4 ... 20 mA, galvanically separated
Load	max. 500 $\Omega$
Output range	adjustable, $\Delta 20 \dots \Delta 100$ % of URV

### Temperature signal output (optional)

Current range	0 / 4 ... 20 mA, galvanically separated
Load	max. 500 $\Omega$
Output range	adjustable, $\Delta 10 \dots \Delta 100$ % of URV

### Auxiliary voltage output

Output voltage	15 V $\pm$ 0.6 V
Output current	max. 30 mA

### Contact outputs (potential-free changeover contacts)

Switching current with ohmic load ( $\cos \varphi = 1$ )	max. 5 A
Switching current with inductive load ( $\cos \varphi = 0.4$ )	max. 3 A
Switching voltage	max. 250 V AC, 30 V DC
Switching power with ohmic load ( $\cos \varphi = 1$ )	max. 1250 VA AC, 150 W DC
Switching power with inductive load ( $\cos \varphi = 0.4$ )	max. 500 VA AC, 90 W DC

### Limit contactor

Switching hysteresis	0 ... 10 % of URV
Pickup / dropout delay	0 ... 2000 s

### Alarm

Alarm delay	0 ... 2000 s
Contact function (switchable)	steady contact / fleeting contact

## Technical data (continued)

### Accuracy

#### Conductivity measurement

Reference temperature	+25 °C
Resolution	0.001 µS/cm ... 0.1 mS/cm (depending on range)
Deviation of indication <sup>1</sup>	max. 0.5 % of URV
Reproducibility	max. 0.2 % of URV
Measurement deviation <sup>1</sup> , conductivity signal output	0.75 % of URV

#### Resistance measurement

Resolution (range 10 / 11)	0.01 MΩ·cm / 0.001 MΩ·cm
Deviation of indication <sup>1</sup>	max. 0.5 % of URV
Reproducibility	max. 0.2 % of URV
Measurement deviation <sup>1</sup> , resistance signal output	0.75 % of URV

#### Temperature measurement

Resolution	0.1 °C
Deviation of indication <sup>1</sup>	max. 1.0 % of MR
Measurement deviation <sup>1</sup> , temperature signal output	max. 1.25 % of URV

### Environmental

Ambient temperature (nominal operating conditions)	-10 ... +55 °C
Ambient temperature (limit operating conditions)	-20 ... +60 °C
Temperature for storage and transport	-25 ... +65 °C
Relative humidity (nominal operating conditions)	10 ... 95 %, non-condensing
Protection class of field housing	IP 65
Electromagnetic compatibility	emission acc. to EN 50081-1, 01.92 immunity acc. to EN 50082-2, 03.93

### Physical data / design

Dimensions of field housing (H x W x D)	247 x 170 x 115 mm
Weight	max. 1.8 kg
Terminals	plug-in printed board terminals, 3, 5, 8 and 9 poles
Conductor cross section	max. 2.5 mm <sup>2</sup>
Measured value display	liquid crystal display (LCD), two lines, 4 and 3½ digits, with status indicators

#### Materials

Front membrane	polyester, UV-resistant
Field housing	ABS PC Fr

### Power supply

AC supply voltage	24 / 100 / 115 / 200 / 230 V AC +10 / -15 %
Frequency	48 ... 62 Hz
DC supply voltage	24 V DC +20 / -15 %
Power consumption	max. 7.5 VA

<sup>1</sup>acc. to DIN IEC 746 part 1, for nom. operating conditions

## Accessories

Type	Features	Order number
Post mounting kit	Kit for mounting of CLM 252 on horizontal or vertical pipes (max. Ø 60 mm) Material: galvanised steel	50086842
Weather protection cover CYY 101	Weather protection cover for outdoor use, for mounting on CLM 252 Material: stainless steel	CYY 101-A

#### Assembly

Type	Features	Application
Dipsys CLA 111	Immersion assembly with DN 100 flange, bayonet lock design for quick sensor installation and removal, integration of Chemoclean measuring cell cleaning system is possible without modification	Open and closed tanks and channels

## Accessories (continued)

### Conductivity measuring cells (selection from E+H programme)

Type	Features	Areas of application
CLS 19	Cell constant: $k = 0.1$ or $k = 0.01$ Process connection: NPT $\frac{1}{2}$	Condensate monitoring, monitoring of reverse osmosis and ion exchanger systems
CLS 21	Cell constant: $k = 1$ Process connections: G 1", DN 25 and DN 40 dairy pipe fitting, 2" clamp	Service water, boiler feed water
CLS 30	Cell constant: $k = 10$ Process connections: G 1", DN 25 and DN 40 dairy pipe fitting	Service water, concentrate monitoring

### Cable

Type	Features	Order number
CYK 71	Special measuring cable for connection of conductivity measuring cells with and without Pt 100	50085333

## How to order

Conductivity and resistance transmitter Liquisys CLM 252				
<b>Version / measuring range</b> Field housing, 247 × 170 × 115 mm, protection class IP 65 CD Measurement of spec. conductivity, measuring range 0.000 $\mu\text{S}/\text{cm}$ ... 200.0 $\text{mS}/\text{cm}$ MM Measurement of spec. resistance, measuring range 0.010 ... 20.00 $\text{M}\Omega\text{-cm}$ YY Special version to customer specifications				
<b>Power supply</b> 0 230 V AC 1 115 V AC 2 200 V AC 3 24 V AC 5 100 V AC 8 24 V DC 9 Special version to customer specifications				
<b>Measurement output</b> 0 Conductivity / specific resistance 1 Conductivity / specific resistance and temperature 9 Special version to customer specifications				
<b>Additional features</b> 10 Base version 20 Moisture protection lacquering				
CLM 252-				
complete order code				

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