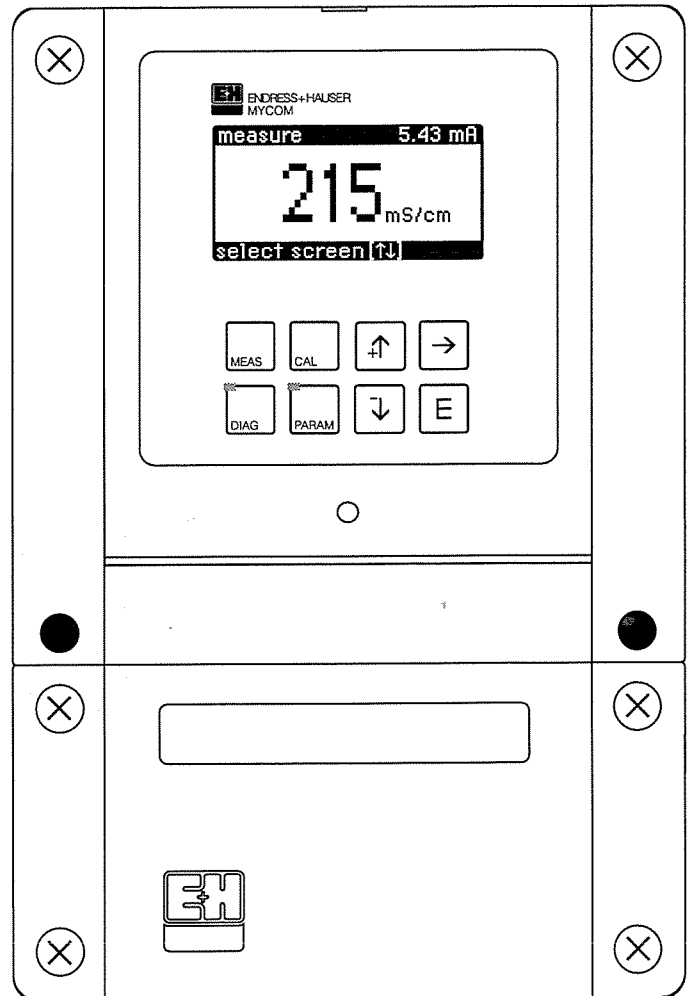
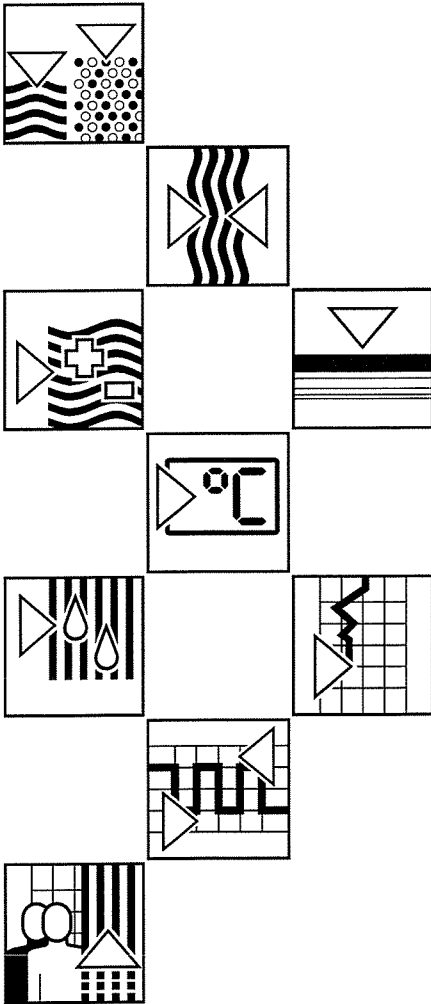


mycom CLM 152 Inductive Conductivity Transmitter

Operating Instructions



**You wish to familiarise yourself with the instrument.
All you need to know can be found in these chapters:**



General information



Safety



Description

**You wish to install and start up the instrument.
All the necessary steps are described in these chapters:**



Installation



First start-up

**You wish to operate or reconfigure the instrument.
The operating concept is explained in these chapters:**



Operation



Instrument configuration



Limit configuration



Calibration



Profibus interface

**When you encounter problems or when the instrument
requires maintenance, refer to these chapters for help:**



Diagnostics



Maintenance and service

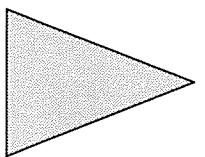
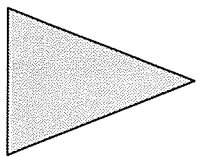
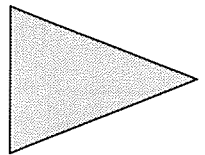
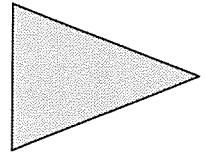


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1 General information

1.1 Symbols

**Warning:**

This symbol alerts to hazards. Failure to observe these warnings may result in injury or damage to equipment.

**Caution:**

This symbol alerts to possible malfunction due to operator error.

**Note:**

This symbol indicates important items of information.

1.2 Conformity statement

The conductivity transmitter Mycom CLM 152 has been developed and manufactured in accordance with current European standards and directives.

**Note:**

A conformity statement can be obtained from Endress+Hauser.

2 Safety

2.1 Intended application

The transmitter Mycom CLM 152 is a microprocessor-controlled measuring and control instrument used to determine and evaluate specific conductivity. Since it has been designed to permit extensive programming and the addition of optional

plug-in modules, it can be adapted to different process applications. If the version of the Mycom CLM 152 with explosion protection is chosen, it can be operated in explosive atmospheres as well.

2.2 General safety instructions



Warning:

Operating this instrument in any way other than as described in these instructions may compromise the safety and function of the measuring system.

Installation, start-up, operation

The Mycom CLM 152 instrument has been designed and manufactured for safe operation according to the state of the art in engineering and conforms to the relevant regulations and EC directives (see "Technical data"). However, if used improperly or other than for the intended purpose, it may be hazardous, e.g. due to improper connection.

Installation, electrical connection, start-up, operation and maintenance of the measuring

system must therefore be performed exclusively by trained specialist personnel properly authorised by the system operator for such work. The specialist personnel must be familiar with these operating instructions and must adhere to the instructions contained therein.

2.3 Safety functions

- **Access code:**
Unauthorised access to the calibration and configuration data of the transmitter is effectively prevented by numeric access codes.
- **Alarm functions:**
The failure contact is activated in case of system faults, temperature sensor failure and serious defects.
The alarm contact is fail-safe by design, i.e. the alarm is also signalled immediately in case of a power failure.
- **Data integrity:**
The current configuration is retained even after a power failure.
- **Electromagnetic compatibility:**
This instrument is protected against interference, such as pulse-shaped transients, high frequency and electrostatic discharges, in accordance with the current European standards.
This is, however, only the case for instruments connected as outlined in these installation and operating instructions.

3 Description

3.1 Application areas

The inductive Mycom CLM 152 transmitter is highly suitable for carrying out measuring and control assignments in the following areas:

- Foodstuffs industry
- Pharmaceutical industry
- Chemical process engineering
- Water treatment
- Drinking water

3.2 Operating principle

In inductive conductivity measurement, an excitation coil generates a continuous magnetic alternating field that induces an electric voltage in a liquid.

The ions present in the liquid enable a current flow which increases with increasing ion concentrations. The ion concentration serves as a measure of conductivity.

The current in the liquid generates a magnetic alternating field in the receiving coil.

The resulting current induced in the receiving coil is processed in the measuring instrument and output as a conductivity value.

The advantages of this measuring principle are accurate measurement in media with a tendency to sediment, no electrically conductive connection between measuring cell and liquid, and no polarisation since there are no electrodes.

3.3 Measuring functions

Concentration measurement

Data for NaOH, HNO₃, H₂SO₄ and H₃PO₄ are permanently stored in the instrument for this mode of operation. The user can enter the data of four other substances within the permissible value ranges, store them and activate them as concentration measuring ranges whenever required. See chapter 7.1.1, "Measurement type".

Difference measurement

Two inductive measuring cells are used at different points of a process, e.g. for heat exchanger monitoring (upstream and downstream from the exchanger) in media separation or mixture control.

The difference between the two measured values is used to control the process.

Measuring range switching

The instrument can store the following settings for a total of four measuring ranges:

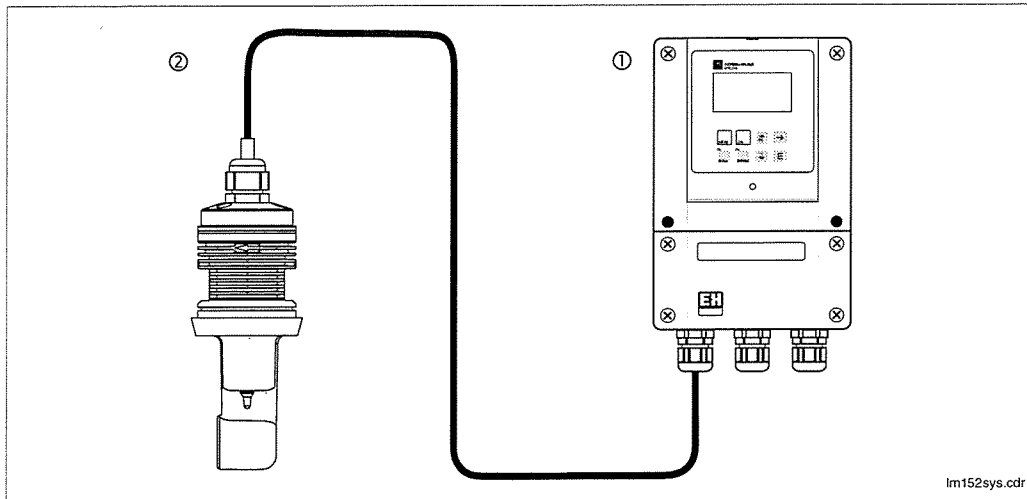
- Measured value assignment for current output (0/4 and 20 mA)
- Setpoint and hysteresis values for the limit contacts
- Temperature coefficients
- Alarm delay
- Type of temperature compensation

Switching is effected by configuring the internal trigger thresholds accordingly or by controlling the binary inputs (requires expansion module FCXI).

3.4 Measuring system

A typical measuring system consists of:

- an inductive conductivity measuring cell with an integrated temperature sensor Pt 100,
- an appropriate conductivity measuring cable, and
- the inductive Mycom CLM 152 transmitter.



Example of a complete measuring system
 ① Mycom CLM 152 inductive
 ② Conductivity measuring cell

3.5 Major features

- Illuminated graphics display, 128 x 64 dots
- Menu-guided plain-text operation
- Comprehensive, clearly structured programming options
- Configuration and calibration protected by access codes the user can choose by himself
- Modular design with plug-in modules, permitting configurations with two measuring inputs, current input with transmitter power supply, two active 0 / 4 ... 20 mA current outputs and up to five contact outputs.



Note:

Expansion of the instrument by adding new plug-in modules or replacement of individual modules must be carried out exclusively by the manufacturer or the Endress+Hauser service organisation (see back cover of these operating instructions).

3.6 Instrument variants

You can identify the instrument variant and the mains supply type by the order code on the nameplate of the instrument.

Conductivity and resistance transmitter CLM 152¹⁾

Field housing, protection type IP 65, for wall mounting

0/4 ... 20 mA signal outputs for cond. / MΩ and temperature, 2 output contacts

Configuration and certificate

A1A	1-circuit; base version
A1B	1-circuit; 3 relays / Chemoclean
A1C	1-circuit; hold input / remote MR switching
A1D	1-circuit; 3 relays / Chemoclean and hold input / remote MR switching
A1E	1-circuit; Profibus
A1F	1-circuit; 3 relays / Chemoclean, Profibus
A1G	1-circuit; mA / hold input / remote MR switching, Profibus
A1H	1-circuit; 3 relays / Chemoclean, hold input / remote MR switching, Profibus
A2A	2-circuit; base version
A2B	2-circuit; 3 relays / Chemoclean
A2C	2-circuit; mA / hold input / remote MR switching
A2D	2-circuit; 3 relays / Chemoclean and hold input / remote MR switching
A2E	2-circuit, Profibus
A2F	2-circuit; 3 relays / Chemoclean, Profibus
A2G	2-circuit; hold input / remote MR switching, Profibus
Z1A	1-circuit; EEx em (ia/ib) IIC T4
Z1B	1-circuit; 3 optocouplers / Chemoclean, EEx em (ia/ib) IIC T4
Z1C	1-circuit; mA / hold input / remote MR switching, EEx em (ia/ib) IIC T4
Z1D	1-circuit; 3 optocouplers / Chemoclean and mA / hold / remote MR switching, EEx em (ia/ib) IIC T4
Z2A	2-circuit; EEx em (ia/ib) IIC T4
Z2B	2-circuit; 3 optocouplers / Chemoclean, EEx em (ia/ib) IIC T4
Z2C	2-circuit; mA / hold input / remote MR switching, EEx em (ia/ib) IIC T4

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
4	48 V, 50 / 60 Hz
5	100 V, 50 / 60 Hz
8	24 V, DC

Language

A D,E,F,I, switchable

Measuring principle / equipment

10	Conductive
15	Inductive
20	Conductive, with moisture protection varnish
25	Inductive, with moisture protection varnish

Mounting

A	Without additional mounting kit
B	With post mounting kit

CLM 152-

--	--	--	--	--	--	--	--

← complete order code

¹⁾ Items in italics are not available for inductive measuring instruments

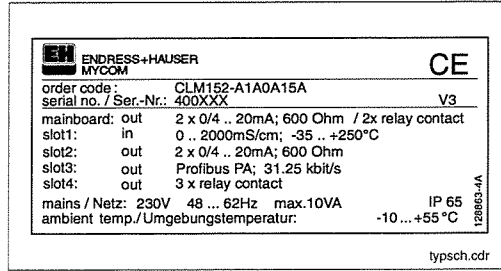


Fig. 3.3 Nameplate of Mycom CLM 152 inductive

3.7 Accessories

3.7.1 Supplied accessories

The following accessories are supplied:

- 2 Pg 13.5 cable glands
- Mounting kit for panel and post mounting (mounting version B only)
- 1 measuring point label with 2 nails

3.7.2 Calibration solutions

Precision calibration solutions for conductivity, accuracy ± 0.5 % at 25 °C, bottle with 500 ml.

Type	Conductivity at 25 °C ¹⁾	Order number
CLY 11-A	74.0 µS	50081902
CLY 11-B	149.6 µS	50081903
CLY 11-C	1.406 mS	50081904
CLY 11-D	12.64 mS	50081905
CLY 11-E	107.00 mS	50081906

¹⁾Values may vary due to manufacturing tolerances. The accuracy is given for the value specified on the bottle.

3.7.3 Junction box VBM

Installation of junction box VBM is required when the connecting cable of the CLS 52 sensor must be extended beyond the normal length by means of a special extension cable. Junction box VBM is supplied with 2 Pg 13.5 cable glands for cable entry and 10 high-resistance isolated screw terminals for connection of individual cores
 Material: painted aluminium; protection type: IP 65; order no.: 50063987

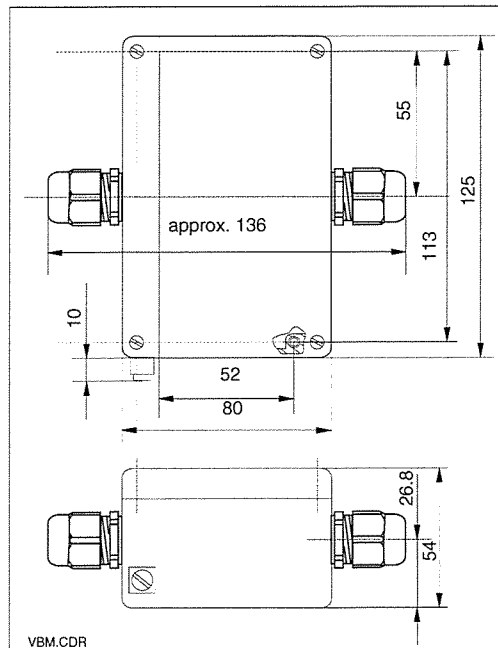


Fig. 3.2 Dimensions of junction box VBM

3.7.4 Sensor cable CLK 5

Special cable for extension of sensor cable up to a total length of 60 m; order no.: 50085473

4 Installation

4.1 Storage and transport

The packaging material used to store or transport the instrument must provide shock and moisture protection. Optimal protection is

provided by the original packaging materials. The ambient conditions also have to meet the requirements (see Technical data).

4.2 Unpacking

Verify that the contents are undamaged! Inform the post office or freight carrier as well as the supplier of any damage.

Keep the original packaging materials for future storage or shipping of the instrument.

Check that the delivery is complete and corresponds to your order and the shipping documents:

If you have any questions, please contact your supplier or the Endress+Hauser sales organisation in your area (see back cover of these operating instructions).

- Quantity delivered
- Instrument version according to nameplate (see chapter 3.6)
- Accessories (see chapter 3.7)
- Operating instructions
- Instrument identification card(s)

4.3 Mounting

Wall mounting (mounting versions A and B)

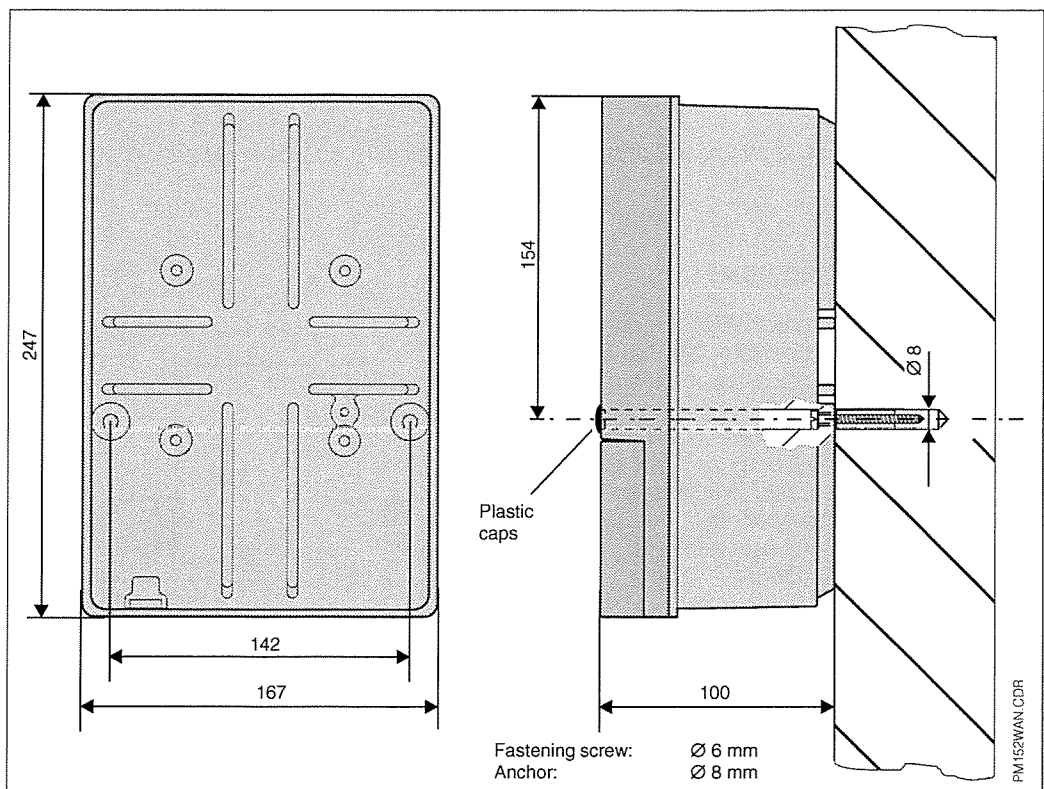


Fig. 4.1 Dimensions for wall mounting

Insert the screws in the mounting holes in the housing and secure the instrument as shown in fig. 4.1.

The holes are covered with plastic caps.

Post mounting and panel installation (mounting version B)

Install the parts of the mounting kit supplied with mounting version B on the back of the housing as shown in fig. 4.2:

Mounting cutout: $161^{+0.5} \times 241^{+0.5}$ mm

Installation depth: 134 mm

Pipe diameter: max. 70 mm



Caution:

Use weather protection cover CYY 101 for outdoor installation (see Mounting accessories below).

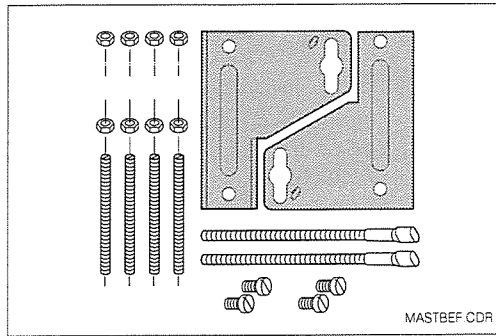


Fig. 4.2 Mounting kit for panel installation and post mounting (order no. 50061357)

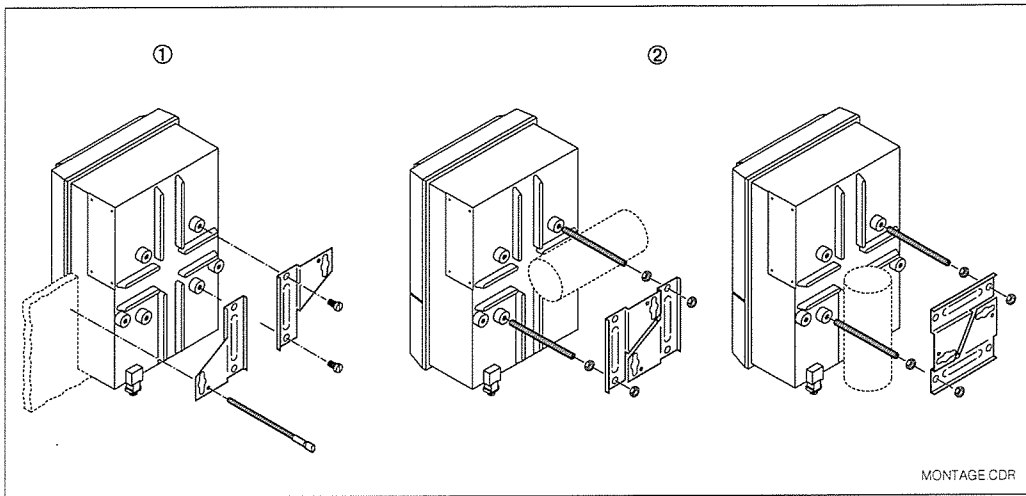


Fig. 4.3 Panel installation ① and post mounting ② of Mycom CLM 152 inductive

Mounting accessories

Weather protection cover CYY 101 for outdoor installation of the Mycom CLM 152. The weather protection cover post mounting kit (see fig. 4.5) is also needed for installation on vertical or horizontal pipes.

Material: special steel
Order no. CYY101-A

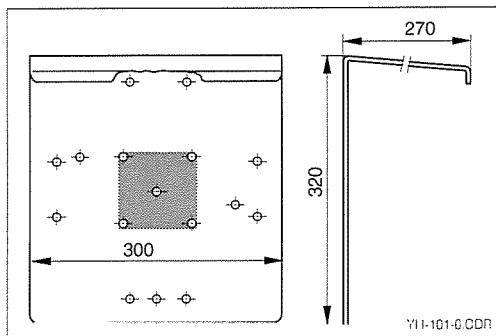


Fig. 4.4 Weather protection cover

Round post mounting kit for weather protection cover CYY 101
For installation on vertical or horizontal pipes with diameters of up to 70 mm.

Material: special steel
Order no. 50062121

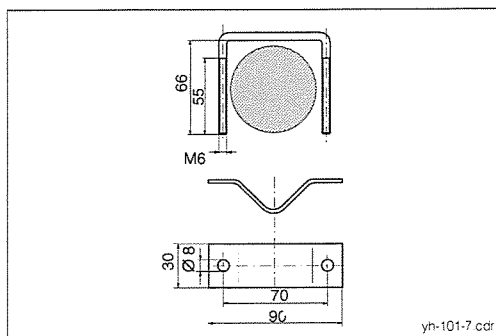


Fig. 4.5 Round post mounting kit for weather protection cover CYY 101

4.4 Electrical connection of Mycom CLM 152


Warning:

- Work under tension and connection to the mains may only be performed by properly trained personnel.
- A mains disconnecting device must be installed close to the instrument and identified as the mains disconnecting device for the Mycom CLM 152 inductive (see EN 61010-1).
- Do not start up the instrument until the PE conductor has been connected!
- Before connecting the instrument to the mains, make sure that the mains voltage matches the voltage rating on the nameplate!


Caution:

All lines conducting signals are to be shielded according to VDE 0165 and to be routed separately from other control lines.


Note:

- Immunity to interference can only be guaranteed if the screen ground line is kept as short as possible. Do not solder an extension onto the screen!
- If the instrument is installed on a post, grounding the post is recommended.

Instrument connections

- Undo the four screws in the bottom third of the front panel.
- Remove the connection compartment cover.
- A removable, folded connection diagram with information on the plug-in modules installed is located inside the cover.
- Replace the plugs in the holes on the bottom of the housing with the necessary number and type of Pg cable glands.
- Feed the cable through the Pg cable glands into the connection compartment.
- Connect the cables according to the connection diagrams on the following pages.
- Tighten the Pg cable glands securely to make sure that the connections are provided with the necessary strain relief.


Warning:

In the non-Ex area, the output contacts can also be connected to the instrument's auxiliary power supply.

To do this, the thin section provided in the separating wall on the connection compartment lid must be broken out with a pair of pliers.

Now a cable connection between the right and left parts of the connection compartment can be established by attaching the cable carefully and without forming a loop in the cable clip provided.

4.4.1 Connection of Mycom CLM 152 in non-Ex area

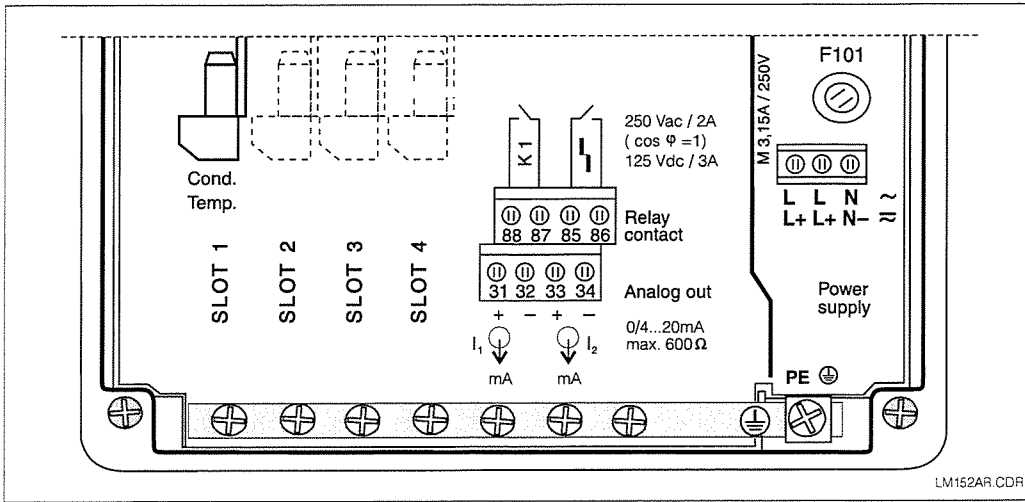


Fig. 4.6 Connection compartment of Mycom CLM 152 inductive non-Ex (basic configuration)

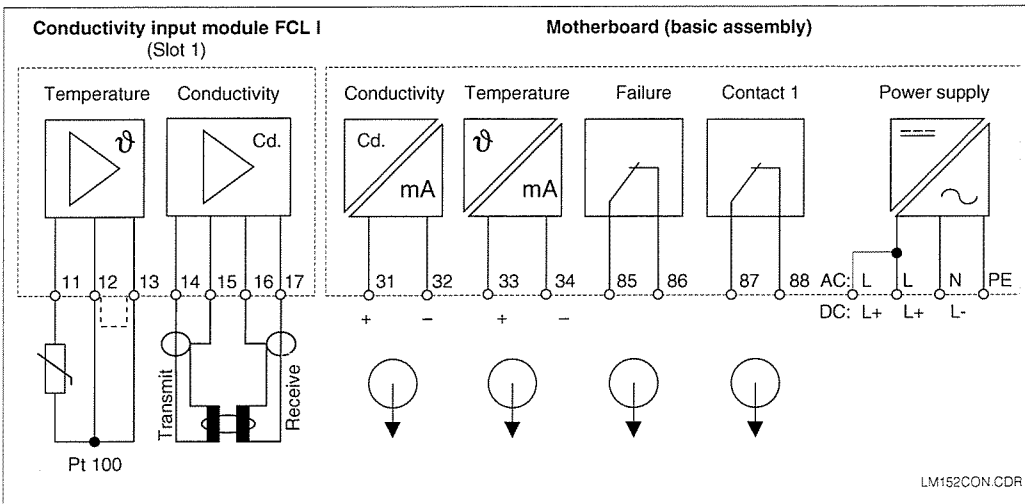


Fig. 4.7 Connection diagram of Mycom CLM 152 (basic configuration)

Module FCLI (slot 1, basic configuration):

- 11 Pt 100 sensor cable
- 12 Pt 100 sensor cable
- 13 Cable compensation
- 14 Inner conductor of transm. coil
- 15 Transm. coil screen
- 16 Rec. coil screen
- 17 Inner conductor of rec. coil

Terminal blocks (basic configuration):

- Power supply:
- L Voltage, AC phase or DC +
 - L Voltage, AC phase or DC +
 - N Voltage, AC neutral or DC -
 - PE Protective earth
 - 31 Current output (cond. signal) plus
 - 32 Current output (cond. signal) minus
 - 33 Current output (temp. signal) plus
 - 34 Current output (temp. signal) minus
 - 85 Failure contact
 - 86 Failure contact
 - 87 Contact 1
 - 88 Contact 1



Note:

- The contact position in case of power failure or fault can be set for "contact 1" and the "failure contact" via the system configuration.

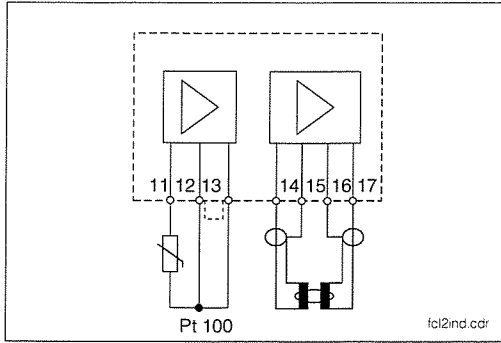


Note:

- All switching contacts are interference-suppressed with varistors. Any external loads connected may require additional interference suppression measures.

Expansion module FCLI:

For second conductivity input.



- 11 Pt 100 sensor cable
- 12 Pt 100 sensor cable
- 13 Cable compensation
- 14 Inner transm. coil conductor
- 15 Transm. coil screen
- 16 Rec. coil screen
- 17 Inner rec. coil conductor

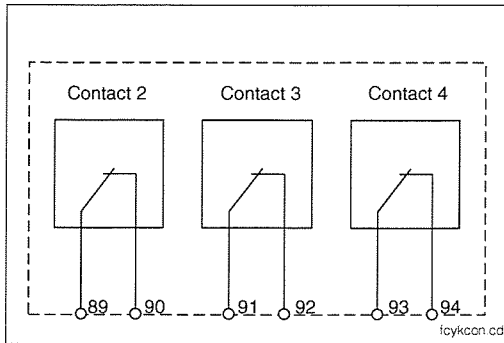
Measuring channel assignments:

- Cd1 / temperature 1 slot 2
- Cd2 / temperature 2 slot 1

Fig. 4.8 Connection of FCLI module

Expansion module FCYK:

With 3 relays for limit contactor or Chemoclean.

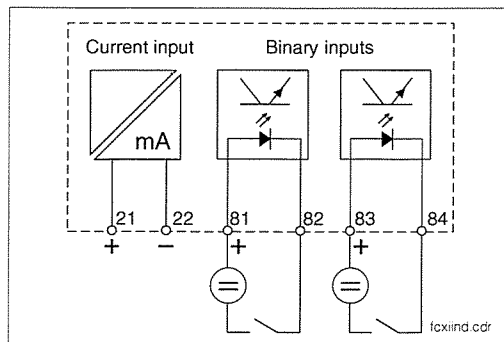


- 89 Contact 2
- 90 Contact 2
- 91 Contact 3
- 92 Contact 3
- 93 Contact 4
- 94 Contact 4

Fig. 4.9 Connection of non-Ex FCYK module

Expansion module FCXI:

With two binary input contacts for hold and remote measuring range switching and an auxiliary voltage (see chapter 7.1 for function).



- 21 Current input output plus
- 22 Current input input minus
- 81 Binary input 1
- 82 Binary input 1
- 83 Binary input 2
- 84 Binary input 2

Fig. 4.10 Connection of FCXI module

Connection for use of internal auxiliary voltage

When expansion module FCXI is used, the internal auxiliary voltage can be used for power supply purposes (see fig. 4.11).

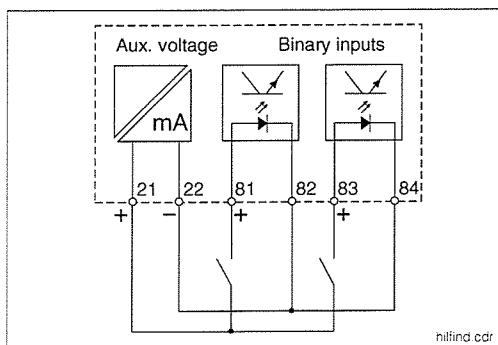


Fig. 4.11 Connection of FCXI module with internal aux. voltage

Technical data	
Contact inputs (terminals 81-84)	passive, external power supply required
Internal aux. voltage (terminals 21/22)	
Supply voltage	20 V with 30 mA
When using an external aux. voltage:	
Terminal voltage	max. 30 V, nominal 12 V
Current consumption	nominal \approx 2 mA
Isolation voltage	galvanic separation 276 V _{rms}

Expansion module FCYP

Digital interface Profibus PA:

- 98 PA -
- 99 PA +

See chapter 10 for further information.

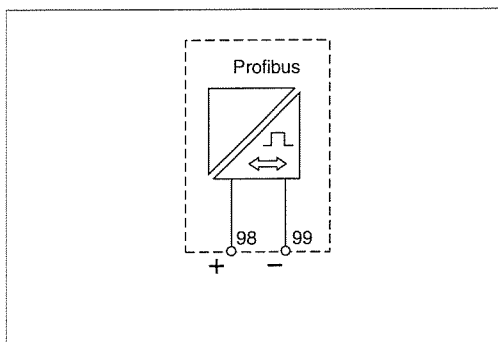


Fig. 4.12 Connection of FCYP module

4.5 Connection of conductivity measuring cells

Conductivity measuring cells are connected using special, shielded multi-core measuring cables (see table).
 If you need to extend the measuring cable, use junction box VS (see Connection accessories).



Caution:

It is vital to protect connectors and terminals against moisture to prevent inaccurate measuring results!

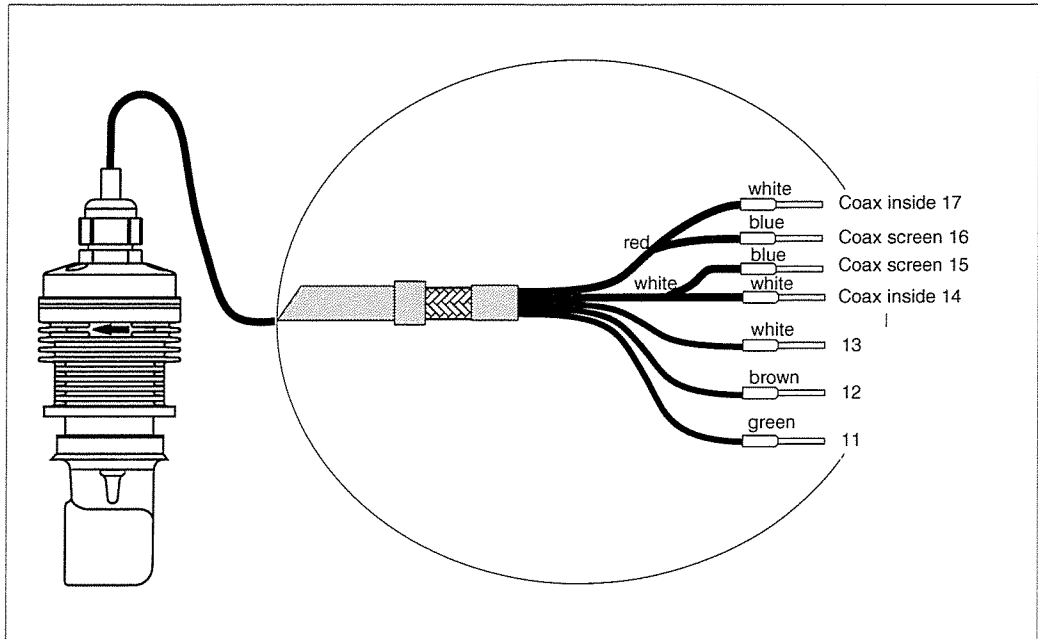


Fig. 4.13 Sensor CLS 52 with connecting cable

Structure and assembly of cable

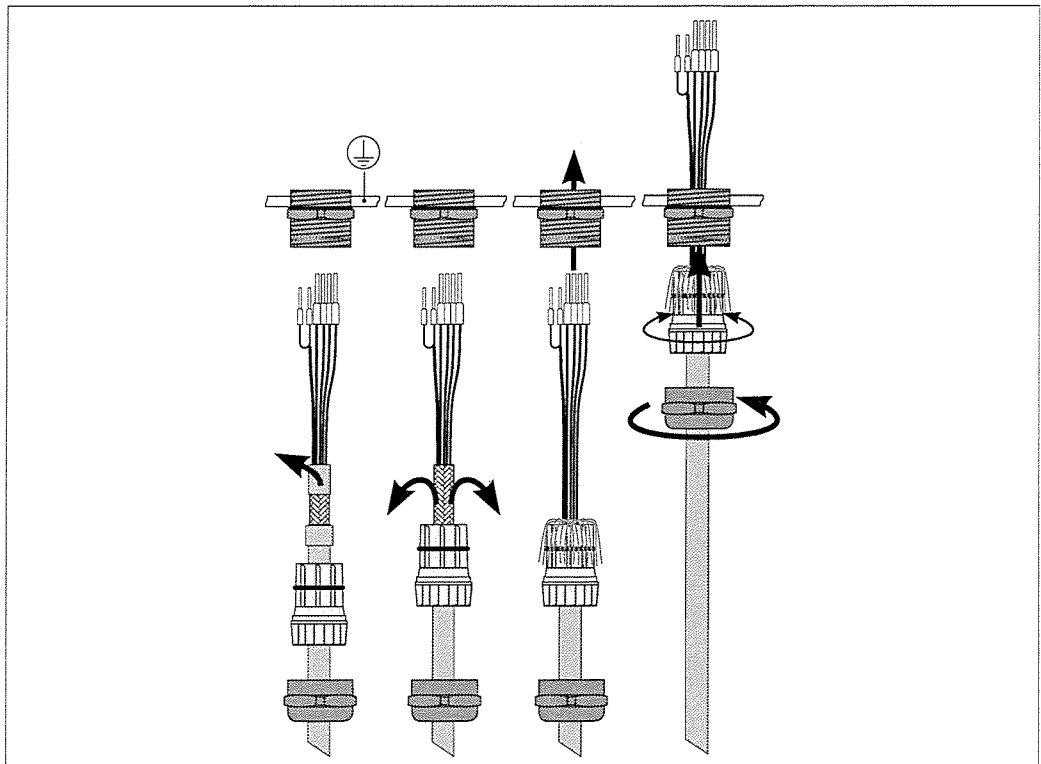
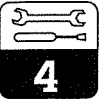


Fig. 4.14 Cable connection



4.6 Packaging and disposal

Packaging

The packaging material used to store or transport the instrument must provide shock and moisture protection. Optimal protection is provided by the original packaging materials.

Disposal

**Note:**

Electronic components to be disposed of are to be considered special waste. Observe local regulations for disposal.

5 First start-up

5.1 Measures before first power-up

Familiarise yourself with the operation of the transmitter before switching it on for the first time.



Caution:

Make sure all connections have been established correctly before power-up!

Make sure the measuring cell is located in the medium or in a calibration solution. If it is not, implausible readings are to be expected.



Warning:

Before power-up make sure that there is no risk of damage to the system the instrument is a part of; for example, due to valves or pumps that might operate in an uncontrolled manner, etc.

5.2 The „Set-up guide“ menu

When it is powered up for the first time, the instrument is in the „Set-up guide“ menu. All the setting data needed for operation are checked here. This automatically guarantees that all the selections required for operation are made.

First, the instrument prompts for the language to be used for text displays. The selections available are shown. Select the „English“ line – it appears in reverse video – and confirm your choice by pressing the „E“ („Enter“) key. Your selection is stored, and the next prompt is displayed.

Proceed in the same manner for all other prompts (cf. chapter 6, Operation).

- You can abort the set-up guide procedure by pressing the CAL, DIAG, MEAS or PARAM key.
- The set-up guide menu will come up every time the instrument is powered up until the procedure is completed all the way, acknowledging the last field with „end“.
- Thereafter, the start-up routine can be accessed via the menu structure following entry of the advanced (specialist) code.

Set-up guide / checklist

Prompt	See chapter	Possible choices	Factory settings	User settings
Language	7.1.5	Deutsch, English, Français, Italiano	English	
Contrast of LC display	7.1.5	Set as desired	"medium"	
Date	7.1.5	Entry of current date	Current date	
Time of day	7.1.5	Entry of current time of day	CET (no daylight savings time)	
Unit	7.1.1	Selection of available units: $\mu\text{S}/\text{cm}$, mS/cm or mS/m , S/m	$\mu\text{S}/\text{cm}$, mS/cm	
Measuring principle (only for difference measurement)	7.1.1	Difference measurement (1-circuit or difference)	Difference measurement	
Measurement type	7.1.1	Conductivity Concentration	Conductivity	
Measuring cell	7.1.1	CLS 52 or CLS 50 (this setting also selects the cell constant)	CLS 52	
Perform Air Set	11	Suppress Air Set Perform Air Set	Suppress Air Set	
Temperature unit	7.1.5	Celsius [°C], Fahrenheit [°F], Kelvin [K]	Celsius [°C]	
Temperature compensation	7.3	Manual (MTC) Automatic (ATC)	ATC	
Compensation temperature (MTC 1 only; MTC 2 for difference measurement only)	7.3	-35.0 ... 250.0 °C	25 °C	

Set-up guide / checklist
(continued)

Prompt	See chapter	Possible choices	Factory settings	User settings
Input contact (with FCXI card only)	7.1.4	2 x hold; 1 x hold + 1 x remote switching; 2 x remote switching	2x hold	
Relay function	7.1.4	Maintenance, limit (base version)	Maintenance	
		NAMUR ¹⁾ / limit; NAMUR ¹⁾ / MR switching; Maintenance / limit / MR switching	NAMUR ¹⁾ / limit	
NAMUR contacts ¹⁾	7.1.4	NC contact, NO contact	NO contact	
Failure relay	7.1.4	Fleeting contact, Steady contact	Steady contact	
Fault contact assignment	7.1.4	Maintenance contact, No contact	Maintenance contact	
Set-up guide		End, Resume	End	

¹⁾ According to recommendation by NAMUR (Normen-Ausschuß Meß- and Regeltechnik, i.e. measuring and control engineering standards committee)

6 Operation

6.1 Operating elements

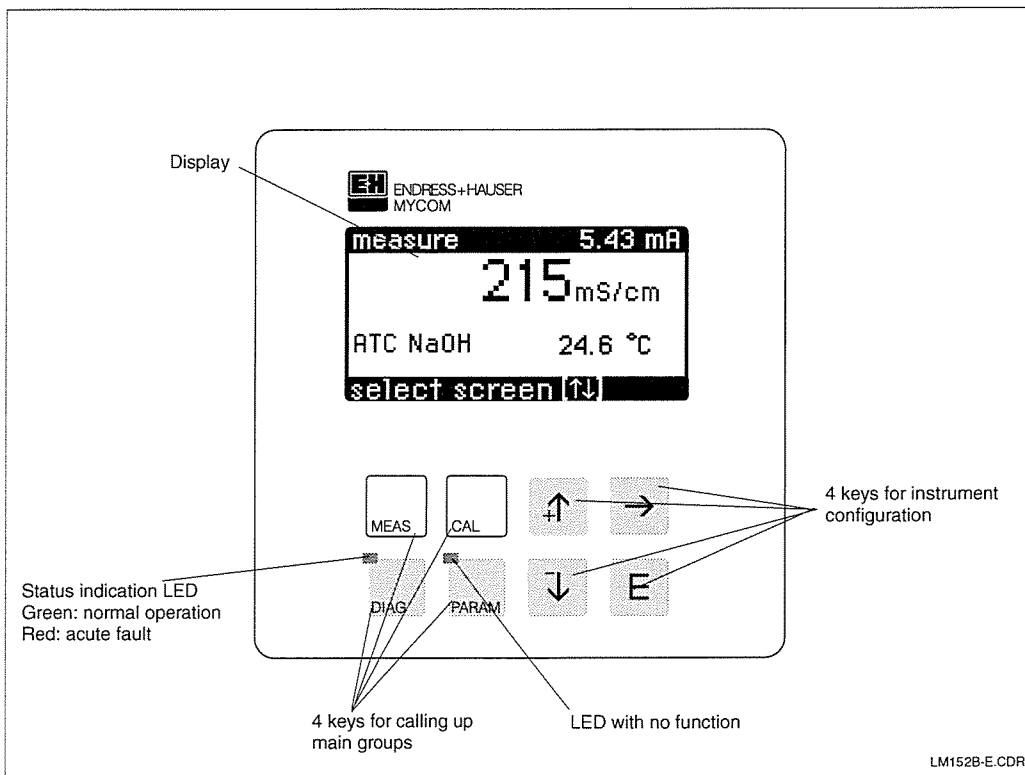


Fig. 6.1 Operating elements of Mycom CLM 152 inductive

6.2 Display

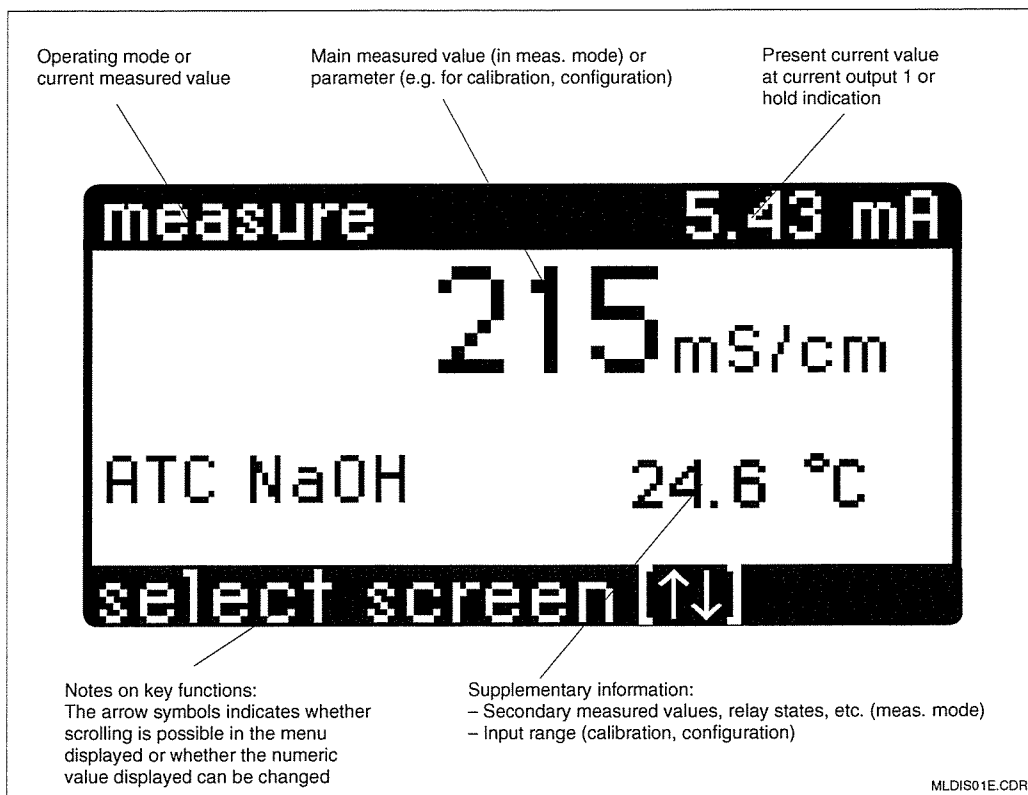


Fig. 6.2 Display of Mycom CLM 152 inductive

6.3 Key functions



Measurement

- Measured value display
- Return to measuring mode from any position



Calibration

- Activation of calibration mode
- Calibration menu display



Diagnostics

- Display of error and maintenance messages
- Display of information and statistics
- Access to service routine with simulation, internal data and instrument check



Parameter configuration

- Display of configuration menu (adaptation of instrument to other measurement and control tasks)
- Return to higher menu level



- Increases value shown in reverse video
- Moves inverted bar for menu line selection
- Returns to previous measured value display



- Decreases value shown in reverse video
- Moves inverted bar for menu line selection
- Advances to next measured value display



- Selection of digit to be edited (multi-digit numbers)



Enter

- Accepts a value or parameter setting during configuration
- Selects menu line shown in reverse video

6.4 Operating concept

The functions of the Mycom CLM 152 inductive are arranged in four main groups:

- Measurement
- Calibration
- Diagnostics
- Parameter configuration

These main groups are accessed by pressing the corresponding keys (see chapter 6.3).

Related functions within the main groups are combined in subgroups, some of which are divided up into further groups.

The subgroups are presented as menus and selected with the ↑ and ↓ keys (inverted line). Menus may contain more items than can be displayed on one page. This is indicated by small arrows in the left margin. Selections are confirmed by pressing the E key.



Note:

Refer to the last three pages of these operating instructions for an overview of the menu structure.

Options are selected and parameters are configured in the submenus by choosing a menu item (see above) or by editing a numeric value.

To do this, select the digit of the value to be edited with the → key and change the value with the ↑ and ↓ keys to obtain the desired value.

Repeat this procedure for all other digits of a value.

Confirm the new setting by pressing the E key. The limits of a parameter are shown on the penultimate line of the display. Values outside these limits are not accepted.

When a setting has been confirmed, the prompt for the next parameter is displayed.

When all parameters of a subgroup have been set or acknowledged, the submenu reappears. Press the "Param" key to go up a level in the menu structure.



Note:

It is possible to change to a different main group even when you are in the middle of a subgroup. Any setting not confirmed with the E key reverts to the previous setting.

If there is no input in a subgroup for more than 10 minutes, the instrument automatically returns to the measuring mode (exceptions: calibration, simulation and set-up guide).

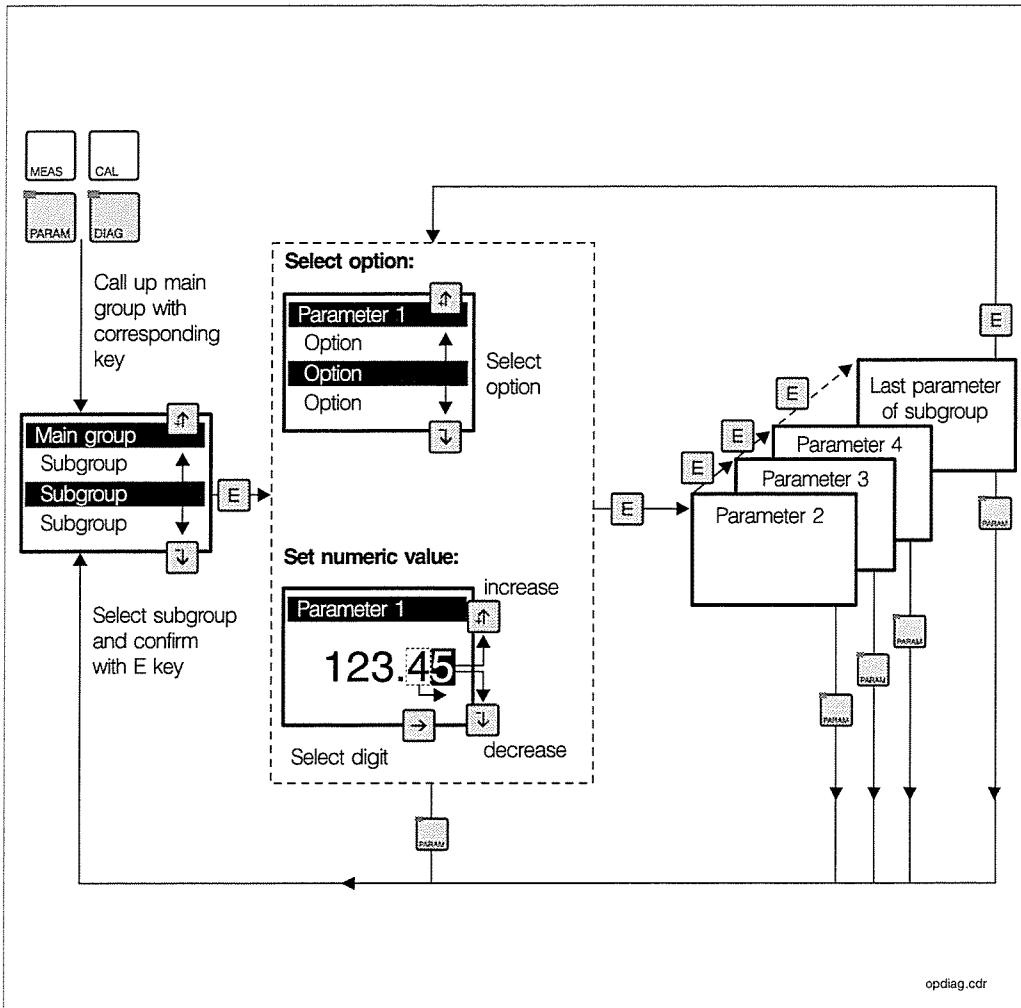


Fig. 6.3 Diagram of Mycom operating concept

Hold function

In order to avoid unintentional changes to the current outputs during configuration or calibration, the present current value at the current output can be „frozen“ with the „hold“ function or a fixed current value can be specified.

The limit relays are switched to the passive state while „hold“ is in effect (NO contacts are open, NC contacts are closed).

„Hold“ appears on the right-hand side of the top display line instead of the current output value; the current value of the main parameter continues to be displayed on the left.

Also see:

- Chapter 6.7, Short-cut menu: hold on / off
- Chapter 7.2, Current output menu, hold type: fixed current value / last measurement
- Chapter 7.4, Preset calibration data, hold during cal.: yes / no

6.5 Measured value displays

The ↑ and ↓ keys can be used to select different measured value display formats. These formats differ in the size of the display characters and the amount of supplementary information displayed.



Note:

Contact states are only indicated if one or two contacts are configured as limit contacts.

Conductivity measurement		
One-circuit	1st meas. value display	Main display: Conductivity value measured in mS/cm or μ S/cm (large characters for reading from a distance) Suppl. info: Measuring range (measuring range switching only)
	2nd meas. value display	Main display: Conductivity value measured in mS/cm or μ S/cm Suppl. info: Measuring range (remote meas. range switching only) Type of temperature compensation Substance measured Current compensation temperature
	3rd meas. value display	Main display: Conductivity value measured in mS/cm or μ S/cm Suppl. info: Same as 2nd measured value display plus contact states (limit contacter only)
Difference	1st meas. value display	Main display: Difference in conductivity measured (Δ CD) in mS/cm or μ S/cm (large characters) Suppl. info: Measuring range (measuring range switching only)
	2nd meas. value display	Main display: Difference in conductivity measured (Δ CD) in mS/cm or μ S/cm Suppl. info: Measuring range (measuring range switching only) Type of temperature compensation Substance measured Current compensation temperature
	3rd meas. value display	Main display: Difference in conductivity measured (Δ CD) in mS/cm or μ S/cm Suppl. info: Same as 2nd measured value display plus contact states (limit contacter only)
	4th meas. value display	Main display: Conductivity value, channel 1 (CD1) in mS/cm or μ S/cm Suppl. info: Same as 3rd measured value display
	5th meas. value display	Main display: Conductivity value, channel 2 (CD2) in mS/cm or μ S/cm Suppl. info: Same as 3rd measured value display
Concentration measurement		
One-circuit	1st meas. value display	Main display: Concentration value measured in % (large characters) Suppl. info: Measuring range (measuring range switching only) Substance name
	2nd meas. value display	Main display: Concentration value measured in % Suppl. info: Same as first measured value display plus type of temperature compensation, current compensation temperature
	3rd meas. value display	Main display: Concentration value measured in % Suppl. info: Same as 2nd measured value display plus contact states (limit contacter only)
	4th meas. value display	Main display: Concentration value measured in % Suppl. info: Same as first measured value display plus conductivity value measured
	5th meas. value display	Main display: Concentration value measured in % Suppl. info: Same as 3rd measured value display plus conductivity value measured

6.6 Locking of functions

The Mycom CLM 152 transmitter has two operating levels that are accessed by entering four-digit numeric access codes:

- Operator (maintenance)
- Advanced (specialist)



Note:

The instrument is supplied unlocked.

Menu items that are not available at the current operating level are not displayed. If there is no input in response to the code prompt or if the input is incorrect, then the field can only be exited with the Meas key.

Accessible without code entry:

- Measured value displays
- Error list
- Info list
- Logbook
- Calibration data history
- Air Set info

Accessible with operator code:

- Short-cut to relays
- Calibration parameters
- Temperatur measurement type
- Internal data (instrument number, SW no., FCLI SW no., module info)
- Language, date, time, tag no., contrast, operator code

Accessible with advanced code:

- All menus and functions

The access codes are set in the System set-up menu group (see chapter 7.1).

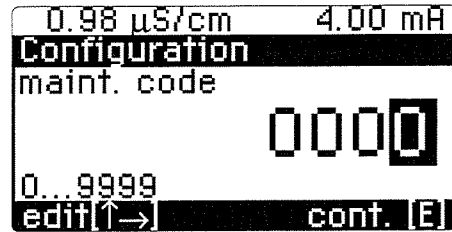


Fig. 6.4 Code prompt

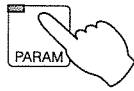


Caution:

If the codes are lost, unlocking is possible with the default code "7156". A new code can then be set in the Commissioning / System set-up menu.

All calibration functions are accessible at the operator (maintenance) and advanced (specialist) levels.

6.7 The „Short-cut to relays" menu



→ Short-cut to relays

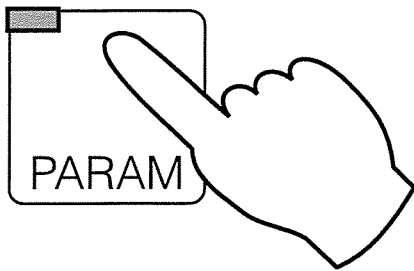
This menu gives you direct access to the main functions without having to go through the entire configuration menu. The short-cut menu includes the following functions:

- Hold on / off
- Manual contact operation
- Limit settings

Short-cut to relays menu		
Function	Selection	Factory setting
Hold	Hold on / hold off	Hold off
Limit contacter operating mode	Automatic / manual operation	Manual operation
	When „manual operation" is selected: Contact 1 off / on Contact 2 off / on ¹⁾ Current state is indicated	Contact 1 off Contact 2 off
Limit contacter setpoints	Entry of limit 1 Entry of limit 2 ¹⁾	50.00 mS / cm 950 mS / cm

¹⁾ If second contact is configured as a limit contacter.

7 Instrument configuration

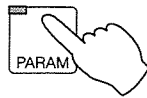


Note:

Refer to the last three pages of these operating instructions for an overview of the Mycom menu structure.

→ Set-up guide	• Guided run through major menus	☞ chapter 5.2
→ Short-cut to relays	• Hold on / off • Manual relay operation • Limit parameters	☞ chapter 6.7
→ Commissioning		
→ System set-up	• Operating mode, cell type, 2nd current output • Locking codes • Output relays • General	☞ chapter 7.1
→ Current outputs	• Parameters for current outputs • Hold with last value / fixed value	☞ chapter 7.2
→ Temperature	• Temperature compensation autom. / manual • Temperature measurement	☞ chapter 7.3
→ Calibration	• Calibration parameters	☞ chapter 7.4
→ Relay contacts	• All subgroups for limit configuration	☞ chapter 8

7.1 System configuration



- Commissioning
- System set-up
 - Measurement type ☞ 7.1.1
 - Meas. range switching ☞ 7.1.2
 - Code ☞ 7.1.3
 - Output relays ☞ 7.1.4
 - General settings ☞ 7.1.5

7.1.1 Measurement type

Function	Selection	Factory setting
Selection of unit	($\mu\text{S} / \text{cm}$), (mS / cm); (mS / m), (S / m)	($\mu\text{S} / \text{cm}$), (mS / cm)
Difference or one-circuit measurement (instruments with two channels only)	Difference measurement, one-circuit measurement	Difference measurement
Difference measurement (instruments with two channels only)		
Selection of measurement type	Conductivity, concentration	Conductivity
Setting according to measuring cell connected	CLS 50 CLS 52 Measuring cell selection determines cell constants	CLS 52
Configuration of input contacts (only with expansion module FCXI, remote meas. range switching see below)	2 x hold, 1 x hold / 1 x remote switching 2 x remote switching	2 x hold
Definition of measurement type for 2nd current output (instrument with 2nd cond. input only)	CD1, CD2, temperature 1, temperature 2	Temperature 1
One-circuit measurement		
Selection of measurement type	Conductivity, concentration	Conductivity
Setting according to measuring cell connected	CLS 50 CLS 52 Measuring cell selection determines cell constants	CLS 52
Configuration of input contacts (only with expansion module FCXI, remote meas. range switching see below)	2 x hold, 1 x hold / 1 x remote switching 2 x remote switching	2 x hold



Caution:

Changing the operating mode resets all data to the factory settings (defaults).

**Note:**

2-circuit instruments are permanently configured as difference measuring instruments. Current output 1 is always assigned to the difference value. Assignments for 2nd current output and channel-specific settings:

CD 1 / temperature 1	slot 2
CD 2 / temperature 2	slot 1

7.1.2 Measuring range switching

The Mycom CLM 152 inductive offers two alternatives for measuring range switching: Either external measuring range switching or automatic internal measuring range switching.

Measuring range switching affects:

- Current output
- Limit settings
- Temperature compensation type
- Substance selection (with concentration measurement)

Remote measuring range switching

Measuring range switching is effected by means of external contacts, e.g. of a PLC. Expansion module FCXI is required. Up to four measuring ranges can be selected.

Measuring range		MR 1	MR 2	MR 3	MR 4
Contact state (1 x remote switching)	83 / 84	open	closed	–	–
Contact state (2 x remote switching)	81 / 82	open	closed	open	closed
	83 / 84	open	open	closed	closed

Remote measuring range switching

(Only possible with expansion module FCXI; electrical connection see chapter 4.4.1)

Automatic measuring range switching

The Mycom automatically switches to the next measuring range.
The current measuring range is signalled to the downstream evaluation unit via contacts 3 and 4.
This function is automatically activated during programming of contacts 3 and 4 as the

“MR switching” function (see chapter 7.1.4). This operating menu is also used to set the switching points and their individual switching hystereses (LOW and HIGH values).

Example for automatic measuring range switching with four measuring ranges:

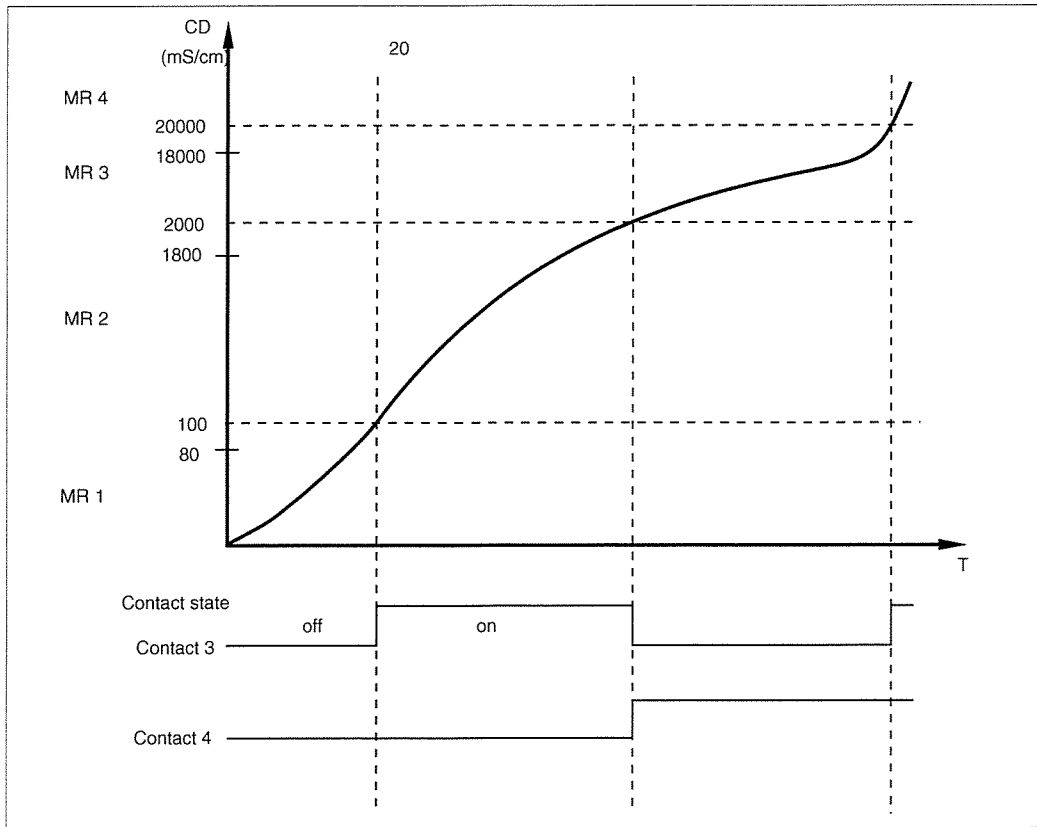


Fig. 7.1 Example for measuring range switching

Settings for above example:

	Trigger thresh. 1	Trigger thresh. 2	Trigger thresh. 3	Trigger thresh.4
LOW value	—	80 μ S/cm	1800 μ S/cm	18 μ S/cm
HIGH value	100 μ S/cm	2000 μ S/cm	20 μ S/cm	—

Also see page 30

7.1.3 Code

Function	Selection	Factory setting
Entry of desired operator (maintenance) code (0000 = no locking)	0000 ... 9999	0000
Entry of desired advanced (specialist) code (0000 = no locking)	0000 ... 9999	0000

7.1.4 Output relays



Caution:

- Make sure before start-up that the wiring matches the contact assignment selection.

- The contacts of the non-Ex version respond differently to a power failure (see table of contact assignments on next page)

Function	Selection	Factory setting
Base version (2 output contacts)		
Function of contact 1 ¹⁾	Maintenance Limit	Maintenance
Equipped with expansion module FCYK (5 output contacts)		
Function of contacts 1 ... 4 ¹⁾	NAMUR ²⁾ / limit NAMUR ²⁾ / MR switching Maintenance / limit / MRS	NAMUR / limit
NAMUR ²⁾ contact type	NC contact, NO contact	NO contact
Failure relay contact type	Steady contact Fleeting contact	Steady contact
Fault assignment (E055-E078), when "Maintenance" or "NAMUR / limit" has been selected	Assigned to maintenance contact, to no contact	Maintenance contact

¹⁾ siehe Tabelle „Kontaktzuordnung“ auf der folgenden Seite

²⁾ nach Empfehlung des Normen-Ausschuß Meß- und Regeltechnik (NAMUR)

Contact assignments for base version		
	Selection "maintenance"	Selection "limit"
Failure contact term. 85/86	Failure ¹⁾	Failure ¹⁾
Contact 1 term. 87/88	Maintenance required ²⁾	Limit contact ²⁾

Relay contact of non-Ex version in case of power failure:

¹⁾ active (NO contact closed, NC contact open)

²⁾ passive (NO contact open, NC contact closed)

Contact assignments with expansion module FCYK			
Selection	“NAMUR”, limit	“NAMUR” / MR switching	Maintenance / limit / MRS
Failure contact term. 85/86	Failure ¹⁾	Failure	Failure
Contact 1 term. 87/88	Maintenance required ²⁾	Maintenance required	Maintenance required
Contact 2 term. 89/90	Function check ²⁾	Function check	Limit contact 1
Contact 3 term. 91/92	Limit contact 1 ²⁾	MRS 1	MRS 1
Contact 4 term. 93/94	Limit contact 2 ²⁾	MRS 2	MRS 2

Also see page 28

Relay contact of non-Ex version in case of power failure:

- ¹⁾ active (NO contact closed, NC contact open)
- ²⁾ passive (NO contact open, NC contact closed)



Note:

The „**failure contact**” is activated by system errors and defects (error codes 1 ... 23) which would cause instrument failure.

Current outputs 1 and 2 output the defined error current (see chapter 7.2.1).

The failure contact is an obligatory part of all instrument configurations.

If configured, the „**maintenance required**” contact signals instrument or process faults that permit operation to continue but make a check of the measuring system necessary.

Error codes 30 ... 52 or 30 ... 78 will cause “maintenance required” to be signalled according to the configuration described in chapter 7.1.4.

The „**function check**” contact is activated in the hold state and when the instrument configuration is changed (e.g. during calibration).



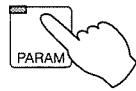
7.1.5 General settings

Function	Selection	Factory setting
Selection of language	Deutsch, English, Français, Italiano	English
Input damping ¹⁾ (size of the time window over which the measurement is averaged)	Filter length, 0 (= off) ... 30	0
Temperature unit	Celsius [°C] Fahrenheit [°F] Kelvin [K]	Celsius [°C]
Date setting	Day of week, day, month, year	
Time setting	Hours, minutes	
Tag number (up to 32 characters) (measuring point designation)	0 ... 9; A ... Z	
Display contrast (E+H logo)	Setting for optimal viewing	

¹⁾ Input damping:

A continuous input damping function in the form of an input filter (average formation) can be switched on to increase the resistance of the measurement to interference. The length of the filter must be adapted to the process empirically in such a way that short-term interference pulses are suppressed but that any actual changes in the measured value are registered.

7.2 Current output



→ Commissioning

→ Current output

→ Current output 1/2

☞ 7.2.1

→ Hold type (current output during hold) ☞ 7.2.2

7.2.1 Current output 1 / 2

Current output signal: characteristics and assignment

Function	Selection	Factory setting
Current monitoring (broken line activates failure contact, error message 15 / 16)	Inactive Active	Inactive
Error current (output in case of "failure" to current outputs 1 and 2)	Off (no error current) Min current ¹⁾ Max current ²⁾	Off
Current output 1		
Measuring current range	0 ... 20 mA or 4 ... 20 mA	0 ... 20 mA
Output damping	1.0 ... 20.0 mA/s	20.0 mA/s
Selection of output signal characteristic	Linear, bilinear	Linear
Entry of measuring range limits depending on characteristic selected	Refer to A) and B) and for possible settings and factory settings	
Selection of remote switching measuring range (remote switching activated, see Measurement type menu, chapter 7-7.1.1)	Measuring range 1 ... measuring range 4	Measuring range 1
Current output 2		
Measuring current range	0 ... 20 mA or 4 ... 20 mA	0 ... 20 mA
Output damping	1.0 ... 20.0 mA/s	20.0 mA/s
Lower measuring range limit ³⁾ (temperature value for 0/4 mA)	Temperature: -35.0 ... +250.0 °C ¹⁾	0.0 °C
Upper measuring range limit ³⁾ (temperature value for 20 mA)	Temperature: -35.0 ... +250.0 °C ⁴⁾	200.0 °C

¹⁾ 0.00 mA for 0 ... 20 mA measuring current range
2.40 mA for 4 ... 20 mA measuring current range

²⁾ 22.00 mA

³⁾ Only for one-circuit measurement or temperature assignment to 2nd current output. Options available for conductivity (two-circuit measurement only) are the same as for current output 1.

⁴⁾ Minimum distance between upper and lower limits is Δ 28.5 °C.

The current output signal characteristic can be individually adapted to the requirements of the downstream signal processing, display or registration equipment.

The assignment of the measured value to the current output signal depends on the internal measuring ranges of the instrument and the characteristic type chosen.

The following characteristics can be selected:

- A) linear
- B) bilinear

Only the linear characteristic is available for concentration measurement!

A) Linear current output signal characteristic

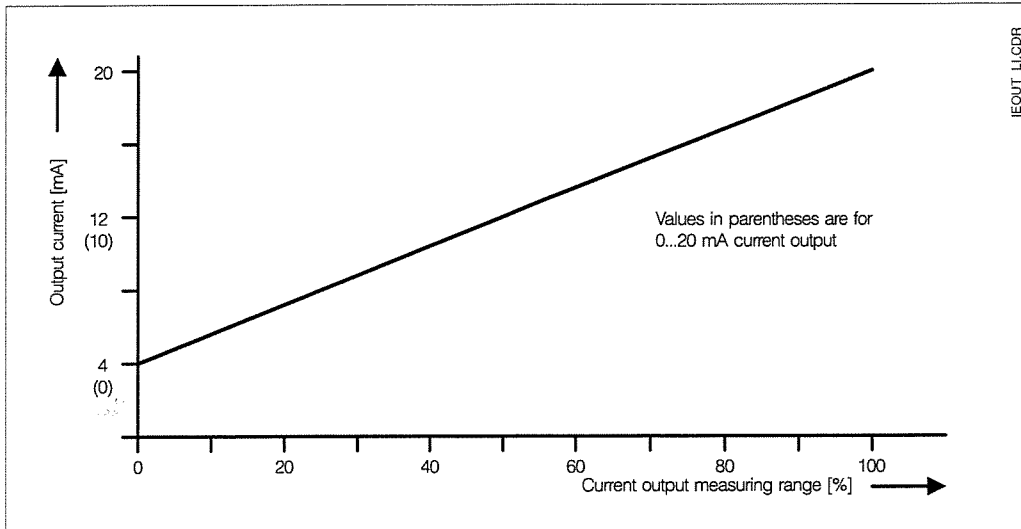


Fig. 7.2 Current output signal with linear characteristic

	Switching step 1 ¹⁾	Switching step 2 ¹⁾	Switching step 3 ¹⁾	Switching step 4 ¹⁾	Switching step 5 ¹⁾
Standard ²⁾	0.000 ... 200.0 μ S/cm	200.0 ... 2000 μ S/cm	2.000 ... 20.00 mS/cm	20.00 ... 200.0 mS/cm	200.0 ... 1000 mS/cm
Max. TD ²⁾	20 μ S/cm	200 μ S/cm	2.0 μ S/cm	20 mS/cm	100 mS/cm

- 1) The measuring range is automatically adapted to achieve maximum accuracy and resolution via the internal switching steps.
- 2) The current output spread TD (turn down) is determined by the 20 mA limit (rising characteristic) and by the 0/4 mA limit (falling characteristic).

Example: Measuring range assignment of a measuring cell with CLS 52, rising characteristic

- The measuring range is determined by the conductivity values defined for 0 or 4 mA and 20 mA.
- The difference between the 20 mA value and the 0/4 mA value must be greater than the current output spread TD of the switching step in which the 20 mA value is located.
- If a value of 300 $\mu\text{S}/\text{cm}$ is assigned to 20 mA, then the 0/4 mA value must be at least 200 $\mu\text{S}/\text{cm}$ lower (TD for switching step 2).
- Possibilities: 100 $\mu\text{S}/\text{cm}$... 300 $\mu\text{S}/\text{cm}$
or 0.0 $\mu\text{S}/\text{cm}$... 300 $\mu\text{S}/\text{cm}$
But not . . . 150 $\mu\text{S}/\text{cm}$... 300 $\mu\text{S}/\text{cm}$!

B) Bilinear current output signal characteristic

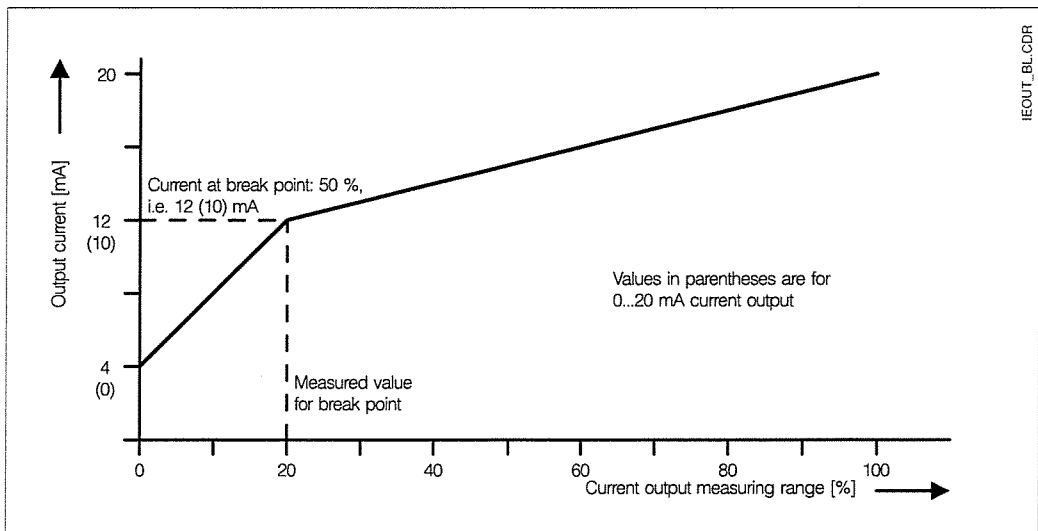


Fig. 7.3 Current output signal with bilinear characteristic

Entry range for 20 mA value	200.0 $\mu\text{S} / \text{cm}$... 1000 mS / cm
Entry range for break point	20.0 $\mu\text{S} / \text{cm}$... 100 mS / cm

The minimum current output spread TD is determined by the switching step in which the break point is located. It amounts to 10 % of the upper limit of the switching step (see table "linear").

The measured value for the break point must be less than (20 mA value – TD).

The 0/4 mA value is 0 S/cm in all cases.

7.2.2 Hold type (current output during hold)

Function	Selection	Factory setting
Selection of hold function type	Fixed current value Last measured value	Fixed current value
Entry of fixed current value (if fixed current value has been selected)	Current value during hold: 0 ... 22 mA	20.00 mA

**Note:**

When set to "last measured value", the corresponding value is stored in EEPROM. When the instrument is restarted with the hold condition active, this stored value is output.

7.3 Temperature compensation



- Commissioning
- Temperature
- Temperature compensation ☞ 7.3.1
- Temperature measurement ☞ 7.3.2

The temperature coefficient indicates the change in conductivity per degree of temperature change. It depends on the chemical composition of the solution and on its concentration (see fig. 7.4).

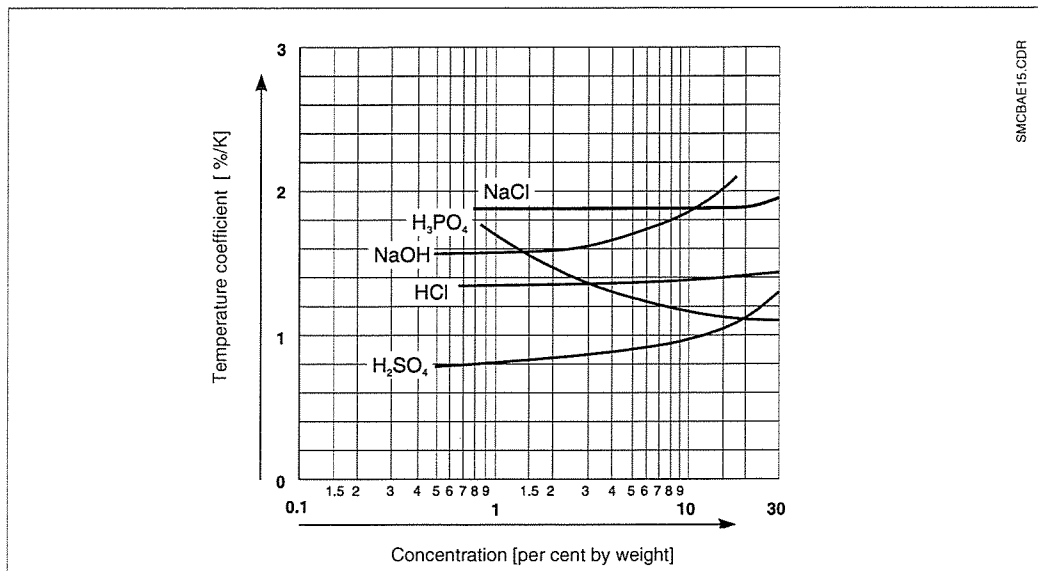


Fig. 7.4 Concentration dependence of temperature coefficient for different electrolyte solutions (reference temperature $T_{ref} = 25^\circ\text{C}$)

Salt solutions (NaCl) have a non-linear temperature coefficient. The NaCl characteristic (acc. to DIN IEC 746 for low concentrations) is stored in the instrument.

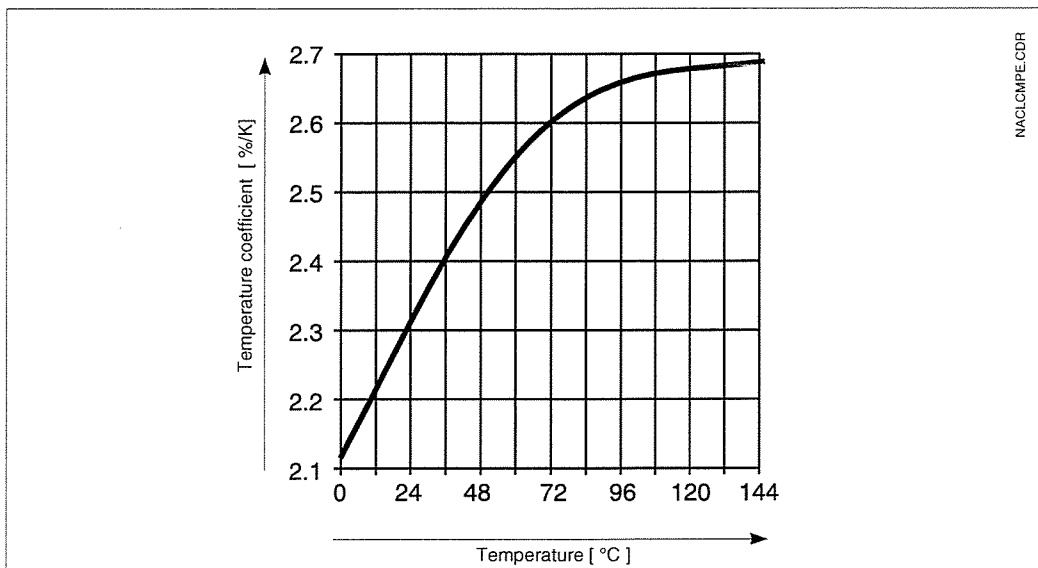


Fig. 7.5 Dependence of temperature coefficient on the temperature of NaCl solutions



7.3.1 Temperature compensation

Function	Selection	Factory setting
Measuring range selection with switching activated	Measuring ranges 1...4	Measuring range 1
Type of temperature compensation (for conductivity)	No comp., linear, NaCl according to DIN 746, Tc curve	Linear
For "linear" selection		
Entry of reference temperature	- 35.0 ... + 250.0 °C	25.0 °C
Entry of temperature coefficient	0.0 ... 10.0 % / K	2.1 %/K
For "NaCl to DIN 746" selection		
No further settings required		
For "Tc curve" selection		
Substance selection	NaOH, HNO ₃ , H ₃ PO ₄ , H ₂ SO ₄ , USER1 ... USER4 (user-definable) (no further settings required)	NaOH
Entry of substance name for selected user-definable substance (USER1 ... USER4)	0 ... 9 ; a ... Z (max. 5 digits)	USER1
Entry of number of reference points (value pairs) for Tc curve	2 ... 10	2
For each of the reference points a temperature coefficient is assigned to a temperature value	Temperature Temp. coefficient 000.0°C 00.0%/K ¹⁾	
The temperature values must have a minimum difference of +10° K between reference points. Incorrect value entries produce an error message. Subsequently the reference points must be defined anew.		

- 1) Select value with "↑↓" keys.
 Press "→" key to access the edit mode.
 Select desired digit with "→" key and edit with the "↑↓" keys.
 Confirm the edited value with the "E" key.
 Select another value with the "↑↓" keys
 or press the "E" key to accept all the changes you have made.

7.3.2 Temperature measurement

Temperature measurement requires either manual or automatic temperature compensation.

Manual temperature compensation (MTC):

Without temperature sensor.
The process temperature in the range of -35 °C to 250 °C is entered directly.

Procedure:

- Select "MTC" in the temperature measurement menu.
- Enter the known value of the process temperature in the "MTC temp" field.
- Two-circuit measurement: Repeat procedure for second measuring point.

Automatic temperature comp. (ATC):

In order to measure the temperature precisely, the temperature sensor of the measuring cell must be calibrated independent of the conductivity measurement. Calibration requires a precision temperature sensor for comparison measurement. The temperature of the measuring solution must be within the specified temperature measuring range from -35 °C to 250 °C . This calibration consists of a shift of the Pt 100 characteristic to the temperature value measured.

Procedure:

- Immerse the measuring cell and the precision temperature sensor (comparison measurement) in the measuring solution.
- Select "ATC" in the temperature measurement menu.
- Enter the temperature value of the comparison measurement in the "Offset temp." field.
- Two-circuit measurement: Repeat procedure for second measuring point.

Function	Selection	Factory setting
Type of temperature compensation	Manual (MTC) Automatic (ATC)	Automatic (ATC)
For "automatic (ATC)" selection		
Enter actual temperature for channel 1	$-35.0 \dots +250.0\text{ °C}$	
Display of temperature 1, offset 1	No selection	
Enter actual temperature for channel 2 (for difference measurement only)	$-35.0 \dots +250.0\text{ °C}$	
Display of temperature 2, offset 2 (for difference measurement only)	No selection	
For "manual (MTC)" selection		
Enter MTC temperature	$-35.0 \dots +250.0\text{ °C}$	25 °C



7.4 Calibration settings



→ Commissioning

→ Calibration

Function	Selection	Factory setting
Hold during calibration	Yes, no	Yes
Entry of temperature coefficient Tc of calibration solution	0.0 ... 10.0 % / K	2.1 %/K
Entry of temperature of calibration solution (MTC only)	-35.0 ... +250.0 °C	25 °C

8 Limit configuration

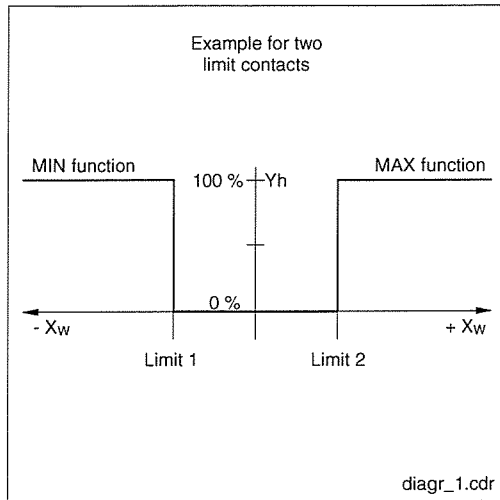


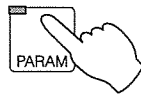
Fig. 8.1 Control characteristic of a limit contacter
 X_w = system deviation
 Y_h = manipulated variable output

Limit monitor

The contact in question is either continuously open or closed.

The nature and scope of the possible settings are determined by the equipment available in your instrument as well as by the settings made in the System set-up / Output relays menu. (See chapter 7.1.4, Output relays, relay assignments.)

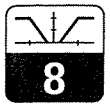
8.1 Instruments with two contacts



→ Commissioning

→ Relay contacts

Function	Selection	Factory setting
Group selection	Limit configuration Alarm configuration Operating mode	Limit configuration
For „limit configuration“ selection		
Switch output on / off	On, off	Off
Limit	0 μ S/cm ... 1000 mS/cm	50.00 mS/cm
Hysteresis	0.1 μ S/cm ... 100.0 mS/cm	10.00 mS/cm
Contact function	Min function Max function	Min function
Pickup delay	0 ... 7200 s	0 s
Dropout delay	0 ... 7200 s	0 s
Contact type	NC contact, NO contact	NO contact
For „alarm configuration“ selection		
Alarm threshold	0.1 μ S/cm ... 1000 mS/cm	50.00 mS/cm
Alarm delay	0 ... 6000 s	0 s
For „operating mode“ selection		
Switch operating mode	Auto limit contacter 1 Manual limit contacter 1	Manual limit contacter 1
Manual limit contacter (if „manual“ has been selected)	Off, on	Off



8.2 Instruments with five contacts

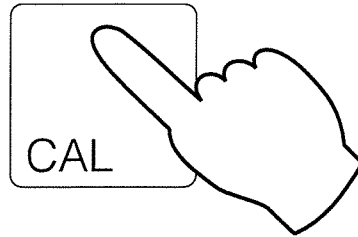


→ Commissioning

→ Relay contacts

Function	Selection	Default
Group selection	Limit configuration Alarm configuration Operating mode	Limit configuration
For „limit configuration“ selection		
Limit contacter selection	Limit contacter 1 Limit contacter 2	Limit contacter 1
Switch output on / off	Off, on	1: on 2: off
Limit	0 μ S/cm ... 1000 mS/cm	1: 50.00 mS/cm 2: 950.0 mS/cm
Hysteresis	0.1 μ S/cm ... 100.0 mS/cm	10 mS/cm
Contact function	Min function Max function	1: min function 2: max function
Pickup delay	0 ... 7200 s	0 s
Dropout delay	0 ... 7200 s	0 s
Contact type	NC contact, NO contact	NO contact
For „alarm configuration“ selection		
Alarm contact selection	Alarm 1 Alarm 2	Alarm 1
Alarm threshold	0.1 μ S/cm ... 1000 mS/cm	50.00 mS/cm
Alarm delay	0 ... 6000 s	0 s
For „operating mode“ selection		
Limit contacter selection	Limit contacter 1 Limit contacter 2	Limit contacter 1
Betriebsart umschalten	Auto GW-Geber 1 / 2 Hand GW-Geber 1 / 2	Hand
Grenzwertgeber Handbetrieb (Bei Auswahl „Hand“)	aus, ein	aus

9 Calibration



- Entry of code ⇨ 9.1
- Determination of cell constant ⇨ 9.2
- Entry of adaptation factor ⇨ 9.4.1
- Determination of adapt. factor ⇨ 9.4.2

9.1 Entry of code

Enter the required code to access the protected menu levels and confirm with the E key.

The menu levels can then be accessed (see chapter 7.1.3). All calibration functions can be selected with the operator or the advanced code.

9.2 Entry of cell constant

Function	Selection	Default
Measuring cell selection (not for one-circuit)	Measuring cell 1 Measuring cell 2	Measuring cell 1
Cell constant fine adjustment	5.500 1/cm ... 6.500 1/cm	6.000 1/cm

Selecting a measuring cell (CLS 50 or CLS 52) in the System set-up menu (see chapter 7.1) automatically results in the assignment of the corresponding cell constant value. However, this value can be edited by the user for fine adjustment.

9.3 Determination of cell constant

The conductivity of a calibration solution (with a known conductivity) is measured (see chapter 3.7.2). Then the display is adjusted to the conductivity of the calibration solution, and the instrument computes the cell constant.

Procedure:

- Select the measuring cell to be calibrated (two-circuit measurement only).
- Clean the measuring cell.
- Place the measuring cell and temperature sensor in the calibration solution.
- Start calibration with the "E" key.
⇒ The display shows the measured value of the calibration solution.

- Wait for the measured value to stabilise.
- Accept measured value with "E" key
⇒ setpoint adjustment.
- Adjust to the value of the calibration solution with the arrow keys.
Entry range:
Cd.: 0 ... 2000 mS/cm
- Confirm your entry with the "E" key.
⇒ The computed cell constant is displayed.
- Terminate or repeat calibration.

When "End cal." is chosen, the newly determined cell constant is stored, and the instrument switches to the measuring mode.



Note:

To carry out a highly accurate calibration, it is necessary to eliminate the temperature influence which is due to the temperature difference from the reference temperature, i.e. the calibration should be performed at the reference temperature. If this is not possible, the calibration temperature or Tc value of the calibration solution can be entered in the "Commissioning / Calibration" menu.



Note:

To assure accurate temperature registration, the temperature sensor should be checked and calibrated before each calibration of the conductivity measurement with the aid of the "Commissioning / Temperature" menu.

Function	Selection	Default
Measuring cell selection (not for one-circuit)	Measuring cell 1 Measuring cell 2	Measuring cell 1
	No selection	Clean meas. cell and place in calibration solution
Display of calibration solution		Meas. value ATC 2.1 %/K Temperature
Entry of calibration solution setpoint	0 µS/cm ... 1000 mS/cm	Current meas. value
Display of cell constant		x.xxx 1/cm
Calibration	End cal. Repeat cal. Cal. channel 2 (difference only)	End cal.

Continued on next page

Table (continued)		
Function	Selection	Default
For "End cal." selection		
Return to measuring mode		
For "Repeat cal." selection		
Calibration of measuring cell 1 Return to measuring cell selection (see above)		Measuring cell 1
For "Cal. channel 2" selection		
Calibration of measuring cell 2 Return to measuring cell selection (see above)		Measuring cell 2

9.4 Adaptation factor

When installed in narrow pipes, the sensor may be influenced by the pipe wall, resulting in inaccurate measurement. This effect may occur when the distance from the wall is less

than 15 mm. It can be compensated for by entering an adaptation factor (installation factor).

9.4.1 Entry of adaptation factor

Function	Selection	Default
Measuring cell selection (not for one-circuit)	Measuring cell 1 Measuring cell 2	Measuring cell 1
Entry of adaptation factor	0.001 ... 2.000	1.000

Note: The adaptation factor for the CLS 52 cell is 1 for pipes \geq DN65 (all measuring cell versions).
For pipe diameter DN 40, an adaptation factor of 0.990 is to be entered.



Note:

Measuring cell versions equipped with dairy pipe, clamp and internal thread fittings can only be installed in pipes with a diameter of at least DN 65.



9.4.2 Determination of adaptation factor

Function	Selection	Default
Measuring cell selection (not for one-circuit)	Measuring cell 1 Measuring cell 2	Measuring cell 1
Note		Leave measuring cell in process
Display of calibration solution		Meas. value ATC 2.1 %/K Temperature
Entry of calibration solution setpoint	0 μ ... 1000 mS/cm	Current measured value
Display of adaptation factor		x.xxx
Calibration	End cal. Repeat cal. Cal. channel 2 (two-circuit only)	End cal.
For "End cal." selection		
Return to measuring mode		
For "Repeat cal." selection		
Calibration of measuring cell 1 Return to measuring cell selection (see above)		Measuring cell 1
For "Cal. channel 2" selection (two-circuit only)		
Calibration of measuring cell 2 Return to measuring cell selection (see above)		Measuring cell 2

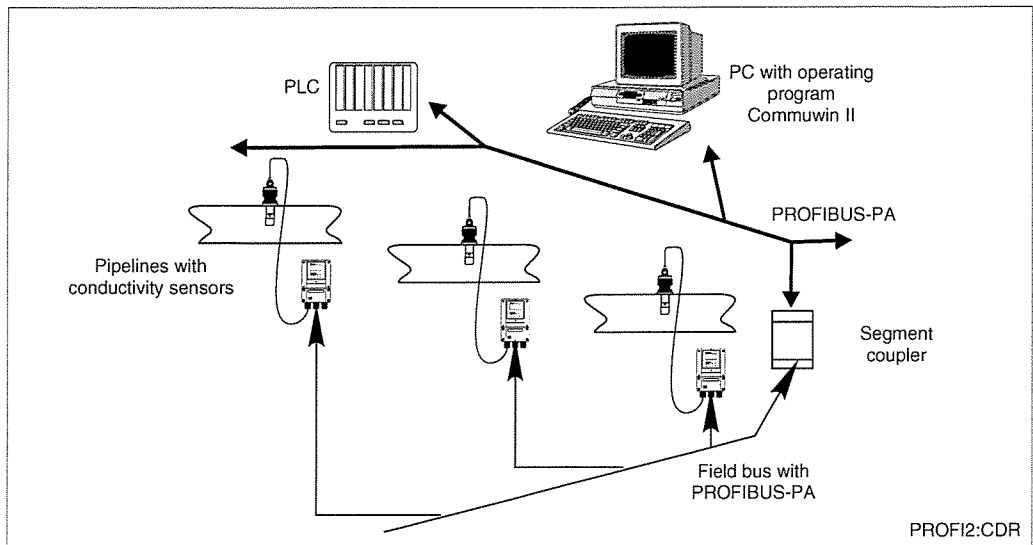
10 Profibus interface

10.1 FCYP module

In the simplest case, a complete measuring point consists of the Mycom CLM 152 with the FCYP module (see chapter 4, fig. 4.12), a bus coupler, a PLC or a PC with the operating program Commuwin II and a PROFIBUS-PA terminating resistor.

The maximum number of transmitters in one bus segment is determined by their current consumption, the power of the bus coupler and the required bus length (refer to TI 260F/00/en for details).

Normally, up to 32 Mycom CLM 152 units can be operated in one bus segment in the case of non-Ex applications.



Measuring system based on PROFIBUS-PA protocol with Mycom CLM 152

Fig. 10.1

10.2 Bus cable

Shielded, twisted-pair cable should preferably be used for new installations. The FISCO model (explosion protection) prescribes the following specifications:

- Loop impedance (DC): 15 ... 150 Ω /km
- Inductance per unit length: 0.4 ... 1 mH/km
- Capacitance p. unit length: 80 ... 200 nF/km

Please refer to TI 260F/00/en Project planning notes for Profibus-PA and the PROFIBUS-PA specification for information on setup and grounding of the network.

Cable connection

The bus line also carries the auxiliary energy for the plug-in Profibus card and is connected as follows:

- Thread the cable through the cable entry fitting (e.g., Beldon 3097A, Siemens 6xV 1830-5AH10 cable).
- Connect the bus cable to the terminals (see fig. 10.2).
Terminal 99 PA+
Terminal 98 PA-
(Polarity reversal does not affect operation.)
- Attach the screen to the internal ground terminal.
- Connect the external ground terminal to the potential matching line if required.



Caution:

Multiple grounding of the protective screen in explosion protection applications is only permissible in special cases.

10.3 Bus address

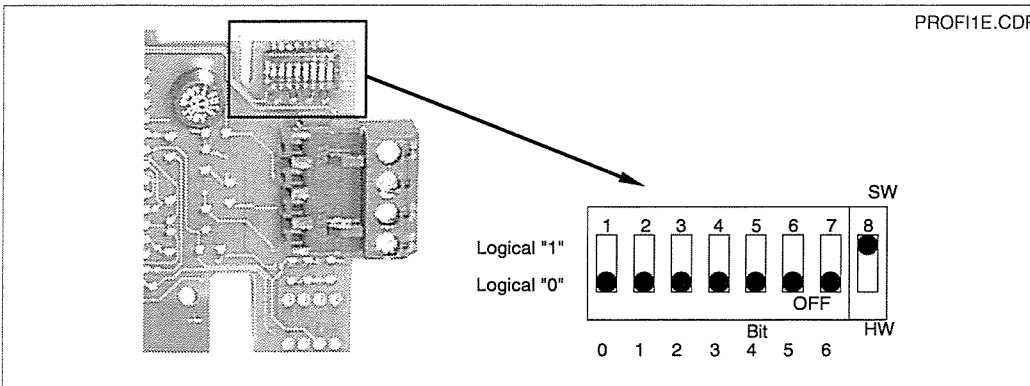
Each device is assigned a unique bus address:

- ⇒ Set address (1 ... 126) with switches 1-7
- ⇒ Switch 8 set to OFF:
- Address set with DIL switches 1-7 is valid.
- ⇒ Switch 8 set to ON:
- The address set in the field or via the interface is valid.

Setting of Profibus address (menu selection):

- Param
- Advanced
- Commissioning
- System set-up

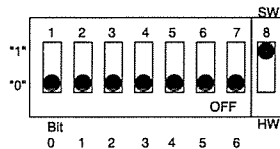
General ⇒ Profibus address (default 126)



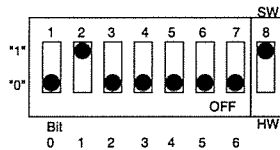
Section of Profibus card in Mycom showing address setting 126 (factory setting)

Addressing examples

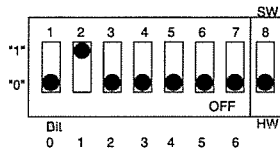
Factory setting:
Software addressing (SW)
(default: 126_d)



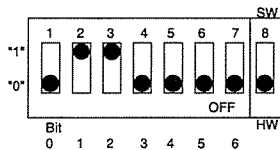
Software addressing
(default: 126_d)



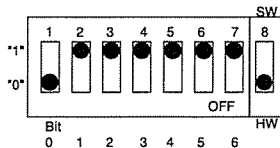
Hardware addressing (HW)
address: 2_d



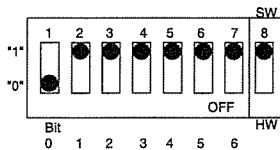
Hardware addressing
address: 6_d



Hardware addressing
address: 64_d



Hardware addressing
address: 126_d
(default after switching from HW to SW)



10.4 Device master file / type file

The device master data is required to use the Profibus. This data must be provided in the Siemens TYP file format. The data must be loaded into the communication partner (Siemens operating system COMET 200 or COM PROFIBUS) before the bus system is started up. The data is stored in the following locations:

- All *.200 files are stored in the type file directory, e.g. ***\TYPDAT5X
- All *.GSD files are stored in the device master file directory, e.g. ***\GSD

- All *.BMP files are stored in the bitmap directory, e.g. ***\BITMAPS

The meaning of the individual device parameters is described in the PROFIBUS-PA specification.

The device master files are provided on a diskette:

- Diskette with Profibus PA device files (order no. 943157-0000)

10.5 Remote-controlled operation with Commuwin II

PROFIBUS-PA devices can be operated via the Commuwin II operating program (starting with software version 1.5). Operation with Commuwin II is described in the BA 124F

operating instructions. Settings are made via the operating matrix (see fig. 10.3) or graphical user interface (see fig. 10.4).

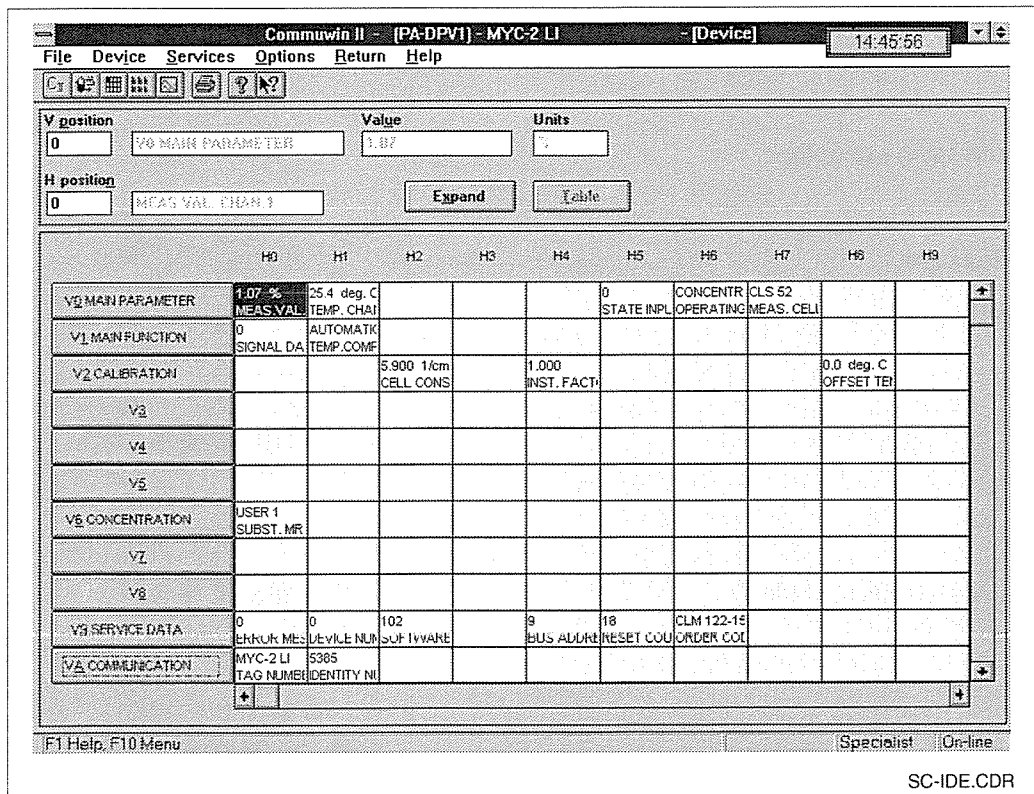


Fig. 10.3 Instrument data (commissioning) menu displayed in Commuwin II

Establishing the connection

Remote control requires installation of the PROFIBUS-PA server, and the PC must be equipped with a PROFIBUS-PA card:

- The connection to Commuwin II is established via the PROFIBUS-PA server.
- The device list contains all devices connected to the segments selected.
- The appropriate settings are made in the Commissioning menu.
- PROFIBUS-PA profile parameters can also be displayed and set via the graphical user interface.

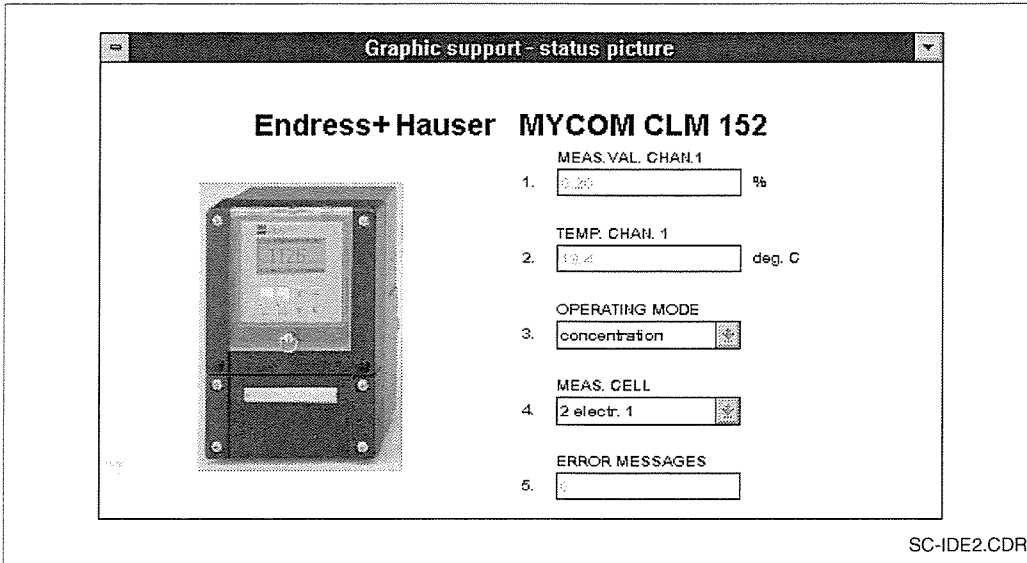


Fig. 10.4 Graphical operation of Commuwin II

10.6 System integration via PLC

The Mycom CLM 152 transmitter makes the measured values (OUT) available cyclically using the PROFIBUS-PA protocol. Other

PROFIBUS-PA parameters are made available using the acyclical service.

	Command	Type	Function
Module 1	OUT	Read	Current measured value of process variable in mS/cm or % and the corresponding status - Status = 80 Hex, devices OK - Status = 0C Hex, warning or alarm active. The information is transferred byte-by-byte in 5 bytes, with the last byte containing the status information.
Module 2	OUT	Read	Current measured value of process variable in mS/cm or % and the corresponding status - Status = 80 Hex, devices OK - Status = 0C Hex, warning or alarm active. The information is transferred byte-by-byte in 5 bytes, with the last byte containing the status information.

Two so-called modules are available for the data exchange with the PLC:

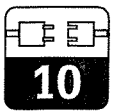
- Module 1: main measured value
- Module 2: temperature value measured

Data format OUT

Byte	Data	Data format
1	Measured value	IEEE 754 floating point number
2	Measured value	
3	Measured value	
4	Measured value	
5	Device status	80 _{Hex} = device OK 0C _{Hex} = error (alarm condition)

IEEE 754 floating point number

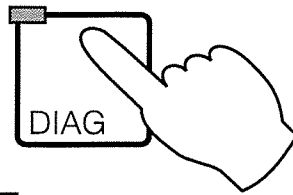
D15	D14	D13	D12	D11	D10	D9	D8	D7	D6	D5	D4	D3	D2	D1	D0
VZ	Exponent (E)								Fraction (F)						
	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0	2^{-1}	2^{-2}	2^{-3}	2^{-4}	2^{-5}	2^{-6}	2^{-7}
Fraction (F)															
2^{-8}	2^{-9}	2^{-10}	2^{-11}	2^{-12}	2^{-13}	2^{-14}	2^{-15}	2^{-16}	2^{-17}	2^{-18}	2^{-19}	2^{-20}	2^{-21}	2^{-22}	2^{-23}



10.7 Profibus PA parameters

Parameter	Matrix VH	Index (slot = 1)	Data type	Read	Write	Data length
Composite List Directory	-	1	Octet String	yes		24
DEVICE_ID	V99H0	25	Octet String	yes		16
Actual Error	90	42	Unsigned 16	yes		2
Device Bus Address	94	44	Integer 8	yes		1
Device and Software Number	93	48	Unsigned 16	yes		2
Main meas. value	00	108	Float	yes		4
Temp. value	01	109	Float	yes		4
Ext. binary input	05	110	Unsigned 8	yes		1
Operating mode	06	111	Unsigned 8	yes		1
Measuring cell	07	112	Unsigned 8	yes		1
Input damping	10	113	Unsigned 8	yes	yes	1
ATC/MTC setting	11	114	Unsigned 8	yes	yes	1
MTC temperature	13	115	Float	yes	yes	4
Cell constant	22	116	Float	yes		4
Adaptation factor	24	117	Float	yes	yes	4
Temp. offset	28	118	Float	yes		4
Subst. selection MR 1	60	119	Unsigned 8	yes	yes	1
Subst. selection MR 2	61	120	Unsigned 8	yes	yes	1
Subst. selection MR 3	62	121	Unsigned 8	yes	yes	1
Subst. selection MR 4	63	122	Unsigned 8	yes	yes	1
Device number	91	123	Unsigned 32	yes		4
Software version	92	124	Unsigned 16	yes		2
Reset counter	95	125	Unsigned 8	yes		1
SAP code	96	126	Octet String	yes		18
Meas. point description	A0	127	Octet String	yes	yes	32
ΓNO ident. number	A1	128	Unsigned 16	yes		2

11 Diagnostics



Messages 11.1
 Info list / logbook 11.2
 Air Set information 11.3
 Calibration history 11.4
 Service 11.5

11.1 Error messages

11.1.1 Error classification

Two error statuses are distinguished:

- active cause of error is acute
- inactive cause of error no longer exists

The LED in the DIAG key lights up red whenever there is an active error, and lights up green when there is no active error. Errors are divided up into four error classes by priority:

Priority	Error number	Effect
Failure	E001 ... E016	<ul style="list-style-type: none"> • Failure contact active • Error current at outputs 1 and 2 (as set, see chapter 7.2.1) • Limit contacter output contacts passive (NO contacts open, NC contacts closed) • DIAG LED red
Maintenance	E036 ... E052	<ul style="list-style-type: none"> • Maintenance contact active if configured in "System set-up / Output relays" menu • DIAG LED red
Process fault	E055 ... E078	<ul style="list-style-type: none"> • Maintenance contact active if configured and error has been assigned to maintenance • DIAG LED red
Warning	E080 ... E149	<ul style="list-style-type: none"> • DIAG LED red

11.1.2 Error list and error log

Error list:

The instrument administrates up to 30 active errors in a list. The error with the highest priority is at the top of the list. When the list is full and another error is to be added, the error with the lowest priority is deleted. Errors are displayed in plain text. The error number and the date and time the error

occurred are also displayed. You can scroll up and down in the list with the ↓ and ↑ keys. The entries in the error list cannot be edited or deleted by the user. If an error is no longer acute, the corresponding entry in the error list is automatically removed.

Error logbook

From the error list, you can access the error log by pressing the E key. The error log records every activation and deactivation of an error message in chronological order in a list with up to 50 entries. You can use the ↓ and ↑ keys to scroll through the list entry by entry. The entries in the error list cannot be edited or deleted by

the user. When the capacity of the list is exhausted, the oldest entry is deleted to make room for a new entry. Only the ten most recent entries in the error log are retained in the event of a power failure. Press the E key once more to return to the „Diagnostics“ menu.

11.1.3 Error table

Failure		
No.	Display	Action
E001	Internal communication error	Return instrument to your Endress+Hauser sales agency for repair or request service assistance
E002	Data error in EEPROM	
E003	Invalid configuration	Check modules in slots
E004	Configuration changed	Set new configuration with "set config" in "Service / Factory settings" menu
E005	Unknown card identifier	Check modules in slots
E006	Checksum error in EEPROM	Perform checksum correction in „Special functions“ menu
E007	Transmitter defective	Return instrument to your Endress+Hauser sales agency for repair or request service assistance
E010	Temperature sensor defective	Check temperature measurement and connections; if necessary, check instrument and measuring cable with temperature simulator
E011	Temperature sensor 2 defective	
E015	Current loop 1 open	Check connections, cables and devices connected if necessary
E016	Current loop 2 open	
Maintenance		
E036	Calibration range of meas. cell 1 exceeded	Recalibrate measuring cell; check measuring cell and connections; check instrument and measuring cable with conductivity simulator
E037	Below calibration range of meas. cell 1	
E038	Calibration range of meas. cell 2 exceeded	
E039	Below calibration range of meas. cell 2	
E040	TC table invalid	Correct temperature compensation table; check temperature measurement and connections; if necessary, check instrument and measuring cable with temperature simulator
E041	Substance table invalid	Correct substance table
E049	Adapation factor range for meas. cell 1 exceeded	
E050	Below adapation factor range for meas. cell 1	
E051	Adapation factor range for meas. cell 2 exceeded	
E052	Below adapation factor range for meas. cell 1	

Continued on next page

Disturbances		
No.	Display	Action
E055	Below display range of meas. value	Check measurement, control and connections; if necessary, check instrument and measuring cable with simulator
E056	Below display range of meas. value 2	
E057	Display range of meas. value exceeded	
E058	Display range of meas. value 2 exceeded	
E059	Below temperature range	
E060	Below temperature range 2	
E061	Temperature range exceeded	
E062	Temperature range 2 exceeded	
E063	Current limiting, 0/4 mA, output 1	Check configuration in „Current outputs“ menu; check measurement, control and connections; if necessary, check instrument and measuring cable with simulator
E064	Current limiting, 20 mA, output 1	
E065	Current limiting, 0/4 mA, output 2	
E066	Current limiting, 20 mA, output 2	
E067	Limit or setpoint 1 exceeded	Check configuration in „Relay contacts“ menu; check measurement, control and connections; if necessary, check instrument and measuring cable with simulator
E068	Limit or setpoint 2 exceeded	
E073	Below TC range	Check configuration in „Temperature“ menu; check temperature measurement and connections; if necessary, check instrument and measuring cable with temperature simulator
E074	Below TC range of channel 2	
E075	TC range exceeded	
E076	TC range of channel 2 exceeded	
E077	Temperature outside TC table range	Check temperature compensation table and correct if necessary, check temperature measurement and connections; if necessary, check instrument and measuring cable with temperature simulator
E078	Temperature 2 outside TC table range	

Continued on next page

Warnings		
No.	Display	Action
E080	Range for current output 1 too small	Increase range in „Current outputs“ menu
E081	Range for current output 2 too small	
E142	Break point outside range, current output 1	Correct configuration in „Current outputs“ menu
E143	Break point outside range, current output 2	
E144	Range of current output 1 for selected MR (= measuring range) too small	Increase range in „Current outputs“ menu
E145	Range of current output 2 for selected MR (= measuring range) too small	
E148	Break point outside range of current output 1 MRX (= current measuring range)	Correct configuration in „Current outputs“ menu
E149	Break point outside range of current output 2 MRX (= current measuring range)	

11.2 Info list / logbook

11.2.1 Info list

The „Info list“ menu item displays two information windows in succession. Window 1 displays when the instrument was last started

up, its name and the number of output contacts. Press the E key to go on to the logbook.

11.2.2 Logbook

Window 2, the „logbook“, contains a list of the last 30 operating events with the date and time of day. The most recent event is at the top of the list. When the list is full and a new entry is to be added, the oldest entry is removed. The following events are recorded:

- all configuration changes
- all simulation activities (unspecific)

Entries in the logbook can be neither changed nor deleted by the user.

11.3 Air Set information

The Air Set adjustment permits a zero calibration of a sensor connected. Channel 1 and channel 2 can be calibrated separately (in the case of difference measuring instruments).

To calibrate, the sensor is removed from the measuring solution and held up in the air without contacting the solution. The inductive

Mycom CLM 152 transmitter then waits for the measured value to stabilise and, when stable, stores it as the calibration value.

This Air Set value is subsequently used in the normal computation of the measured value. The Air Set value can only be reset using the “Service data default” function!

11.4 Calibration history

Through the „Diagnostics“ and „Calibration history“ menu items, the inductive Mycom CLM 152 transmitter provides access to automatically recorded logs permitting convenient evaluation of the measuring cell status.



Caution:

Changing the operating mode or resetting the instrument with “Default calibration data” will erase the entire calibration history!

11.4.1 Calibration history

The following information is recorded in the calibration history for the last five calibrations:

- Date and time
- Cell constant
- Measured value
- Temperature compensation
- Adaptation factor

You can scroll back and forth among the entries with the ↑ and ↓ keys. In the case of two-channel measurement, you can move on to the window with the calibration history of the second cell by pressing the E key.



Note:

Faulty calibrations are not included in the calibration history.

11.5 Service



- Service
 - Simulation 11.5.1
 - Internal data 11.5.2
 - Factory settings 11.5.3
 - Instrument check 11.5.4
 - Special functions 11.5.5

11.5.1 Simulation

Function	Selection
Setting of present current value for current output 1	0.00...22.00 mA
Setting of present current value for current output 2	0.00...22.00 mA
Setting of current relay statuses (the number of contacts shown depends on the modules installed and the configuration)	The contacts are selected with the ↑ and ↓ keys. The selected contact is opened / closed with the → key.
Measured value simulation, main measured value (conductivity, concentration)	Can be set to any value within configured measuring range. Current outputs and relay states change according to configuration.
Measured value simulation, temperature	-35.0 ... +250.0 °C Current outputs and relay states change according to configuration.



Note:

The displayed current output value or relay state immediately appears in the „Simulation“ menu . If the value in the window is changed, the




current output or relay state immediately changes accordingly. The simulation function is deactivated by leaving the window.

11.5.2 Internal data

Function	Selection
Display of instrument number	No selection
Display of software number	No selection
Display of software version of FCLI module (conductivity signal processor)	No selection
Display of hardware configuration in several consecutive windows: assembly (module), installation date, slot information	No selection
Order code	Alphanumeric entry, may include numbers from 0 ... 9 and characters from a ... Z
Reset counter	0 ... 255, display only

11.5.3 Factory settings

11.5.4 Instrument check

Function	Selection
Factory settings (instrument reset)	Abort (no reset) set config (acknowledge changed slot occupation), setting data only, calibration data only, all data, (service data, logbook, reset counter ⇒ accessible to authorised service personnel only)
set config	The hardware equipment is checked and a change in slot configuration is acknowledged when the E key is pressed.
Reset setting data only	When the E key is pressed, all setting data for the instrument configuration is reset to the factory settings.  Caution: All previous instrument configuration data is lost!
Reset calibration data only	When the E key is pressed, all calibration data is reset to the factory settings.  Caution: All previous calibration data is lost!
Reset all data	When the E key is pressed, the configuration and calibration data is reset to the factory settings.  Caution: All previous data for configuration and calibration is lost!



Caution:

If the calibration data is reset, the measuring system must be recalibrated.

Function	Description
Test type	Selection: keyboard, display, RAM, EPROM, EEPROM
Keyboard	Graphical representation of keyboard layout Press all keys in turn. If a key works properly, this is acknowledged in the corresponding display field. Press the E key to return to the test type selection menu.
Display	A chessboard pattern and its inverted image are shown alternatingly. Inspect the display to see if any dots are missing. Press the E key to return to the test type selection menu.
RAM	Self-test. The test result is displayed at the end of the test period. Press the E key to return to the test type selection menu.
EPROM	
EEPROM	

11.5.5 Special functions

Function	Description
Selection of special functions	Optimisation, checksum correction, reset
For "Optimisation" selection	
Determination of temperature coefficient	Determination of temperature coefficient Tc of a medium.
Request sample 1	Immerse the measuring cell and temperature sensor in a medium sample. The temperature of the sample should be as close as possible to the reference temperature used.
Measurement of conductivity and temperature	Press the E key when both values are stable.
Request sample 2	Heat the sample by at least 10 Kelvin. Immerse the measuring cell and temperature sensor in the sample.
Measurement of conductivity and temperature	Press the E key when both values are stable.
Display of temperature coefficient	Note result for further use.
Perform Air Set adjustment	

12 Maintenance and service

12.1 Cleaning

For cleaning of keys and housing we recommend surface-active, non-abrasive, neutral cleaning agents.

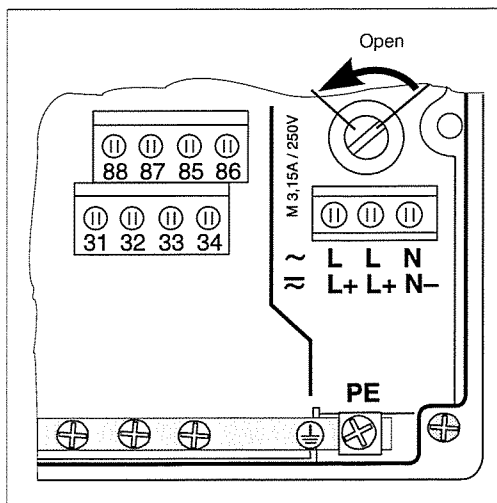


Note:

We do not guarantee resistance to concentrated acids or lyes, benzyl alcohol, methylene chloride and high-pressure steam.

12.2 Fuse replacement

Non-Ex version:



Turn fuse holder in the direction of the arrow with a screwdriver to open (see fig.12.1) and replace blown fuse with a new type M 3.15 A / 250 V fuse.

Fig. 12.1 Fuse holder of non-Ex version

12.3 Repairs

Repair work must be carried out directly by the manufacturer or by the Endress+Hauser Service Organization. See the back cover of these operating instructions for a list of the Endress+Hauser service representatives.

13 Appendix

13.1 Technical data

13.1.1 Technical data with CLS 52

Conductivity measurement	
Measuring ranges (uncompensated)	0 ... 6000 mS/cm
Display range (compensated)	0 ... 1000 mS/cm
Lower measuring range limit (uncompensated)	10 μ S/cm
Measurement deviation (acc. to DIN IEC 746, at 25 °C)	
Transmitter	± 0.5 % of meas. value ± 3 digits
Reproducibility	± 0.2 % of meas. value ± 3 digits
Response time (T ₉₀)	< 3 seconds across entire measuring range (1-circuit instrument)
	< 6 seconds across entire measuring range (2-circuit instrument)
Cable length	max. 60 m (with junction box and cable)
Current output characteristic	linear, bilinear
Concentration measurement	
NaOH	0 ... 15 %
HNO ₃	0 ... 20 %
H ₂ SO ₄	0 ... 20 %
H ₃ PO ₄	0 ... 12 %
User-programmable (1 ... 4)	0 ... 99.99 %
Temperature compensation	
Range for linear and user-programmable T _c values	-35 ... 250 °C
Range for	
NaOH	0 - 85.0 °C
HNO ₃	0 - 75.0 °C
H ₃ PO ₄	0 - 75.0 °C
H ₂ SO ₄	0 - 80.0 °C
Temperature measurement	
Temperature sensor	Pt 100 class A acc. to DIN IEC 751
Temperature response time	t ₉₀ ... < 15s
Measuring ranges (also in °F and K)	-35 ... +250 °C
Display resolution	0.1 °C
Measurement deviation (acc. to DIN IEC 746)	± 0.5 % of measuring range
Reproducibility	± 0.1 % of measuring range
Current output range	$\Delta 28.5$ °C ... $\Delta 285$ °C, adjustable
Technical data of sensor CLS 52	
Cell constant k (measurement deviation ± 0.5 %)	5.9 cm ⁻¹
Ambient temperature	-10 ... +70 °C
Storage temperature	-25 ... +80 °C
Humidity	5 ... 95 %, rel.
Protection type	IP 67
Measured value deviation	
(-5 °C ... +100 °C)	± 10 μ S/cm
(-5 °C ... +140 °C)	± 30 μ S/cm
Medium temperature	-5 °C ... +125 °C
Sterilisation	+140 °C (max. 30 min)
Pressure	max. 16 bar (20 °C)
Measuring cell material	PEEK
Peak-to-valley height	Ra ≤ 0.5 μ m
Thermal conductivity socket with Pt 100	
Material	V4A (1.4571)
Seal	O-ring, EPDM (FDA-approved)
Required pipe cross section (also see chapter 9-9.4.2 Adaptation factor)	
Dairy pipe fitting, clamp fitting G 1 1/2"	\geq DN 65
APV, Varivent connection	\geq DN 40

13.1.2 Technical data with CLS 50

Measuring cells not yet available at time of printing.

13.1.3 Profibus PA

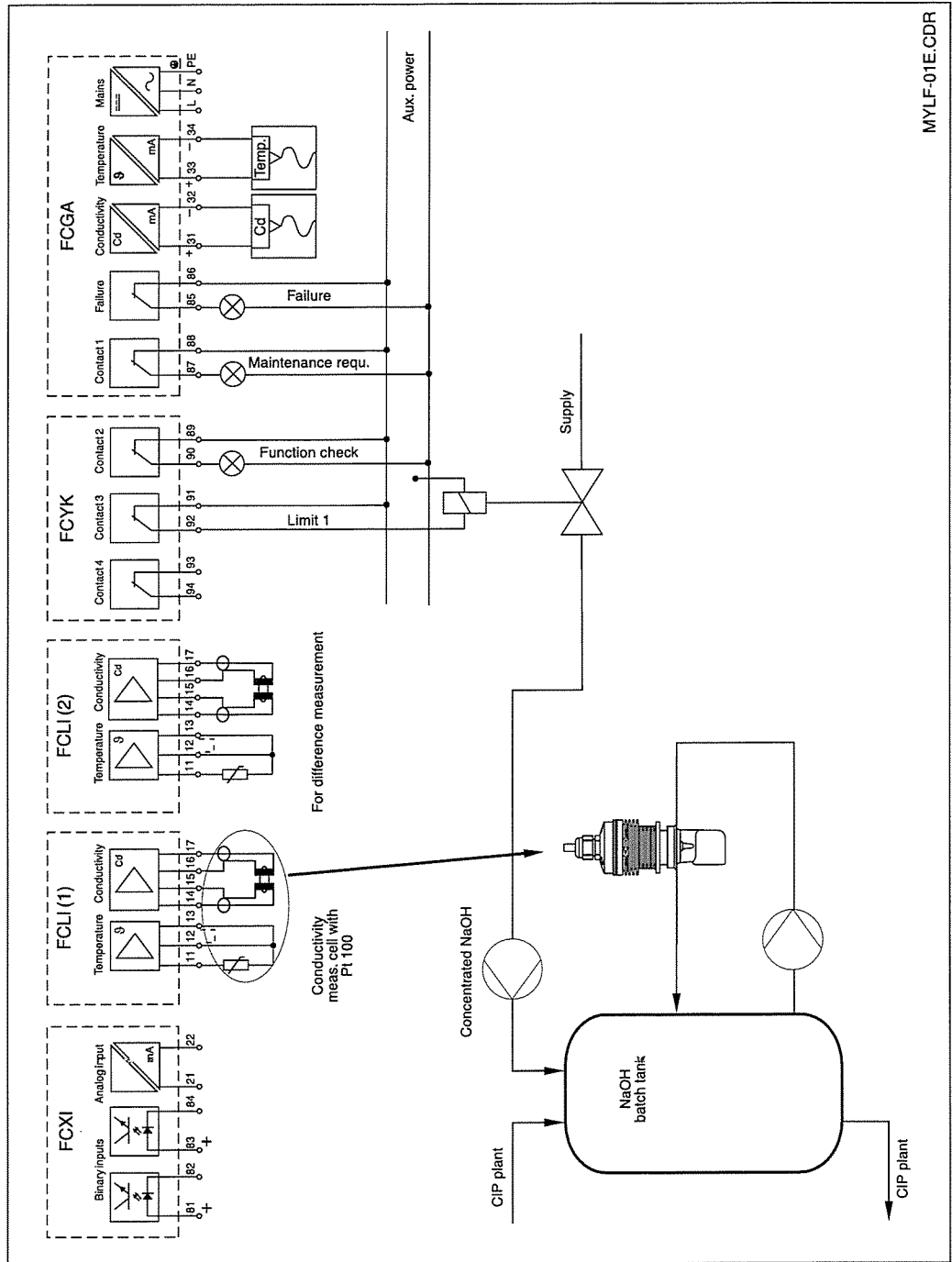
Output characteristics	
Output signal	digital communication signal, PROFIBUS-PA
PA function	slave
Response time	slave approx. 20 ms
	PLC approx. 600 ms for approx. 30 devices
Failure signal	PROFIBUS-PA: signal status bit is set, last valid measured value is held
Integration time	0 ... 99 s, default 0 s
Communication resistance	none, separate PROFIBUS-PA terminating resistor
Physical layer	IEC 1158-2
Integrated overvoltage protection	25 VAC / 250 A
Display and user interface	
Remote control	via PROFIBUS-PA with operating program Commuwin II
Communication interface	PROFIBUS-PA
Power supply	
Supply voltage	9 ... 32 VDC
Current consumption	10 mA ± 1 mA
Inrush current	according to table 4, IEC 1158-2

13.1.4 General technical data

Limit and alarm functions	
Function	limit contacter
Function type	MIN or MAX
Setpoint settings (in absolute values)	0 ... 100 % of DR
Hysteresis for switched contacts (in absolute values)	1 ... 10 % of DR
Pickup / dropout delay	0 ... 7200 s
Alarm threshold	0.5 ... 100 % of DR
Alarm delay	0 ... 6000 s
Electrical data and connections	
AC power supply	24 / 100 / 115 / 200 / 230 V +10 / -15 %
Frequency	47 ... 64 Hz
DC power supply	24 V, +20 / -15 %
Power consumption	max. 10 VA
Contact outputs (optional)	potential-free changeover contacts (Ex version: optocouplers) configurable as NO or NC contacts
Switching current	max. 3 A
Switching voltage	max. 250 VAC / 125 VDC
Switching power	max. 750 VA
Signal outputs	2 x 0 / 4 ... 20 mA, potential separated from other circuits but not from each other
Isolation voltage	276 V _{rms}
Current output	
Current range	0/4 ... 20 mA
Measurement deviation	0.2 % of upper range value
Load	max 600 Ω
Terminals, max. cable cross section	2.5 mm ²
General technical data	
Measured value display	illuminated LC display with dot matrix, 128 x 64 dots
Electromagnetic compatibility (EMC)	
Emitted interference	acc. to EN 50081-1, 01.92
Immunity to interference	acc. to EN 50082-2, 03.93
Nominal operating conditions	
Ambient temperature	-10 ... +55 °C
Relative humidity	10 ... 95%, non-condensing
Limit operating conditions	
Ambient temperature	-20 ... +60 °C
Storage and transport temperature	-25 ... +85 °C
Physical data	
Dimensions (HxWxD)	247 x 167 x 111 mm
Weight	max. 6 kg
Protection type	IP 65
Materials	
Housing	GD-AlSi 12 (Mg content < 0.05 %), plastic-coated
Front	polyester, UV-resistant

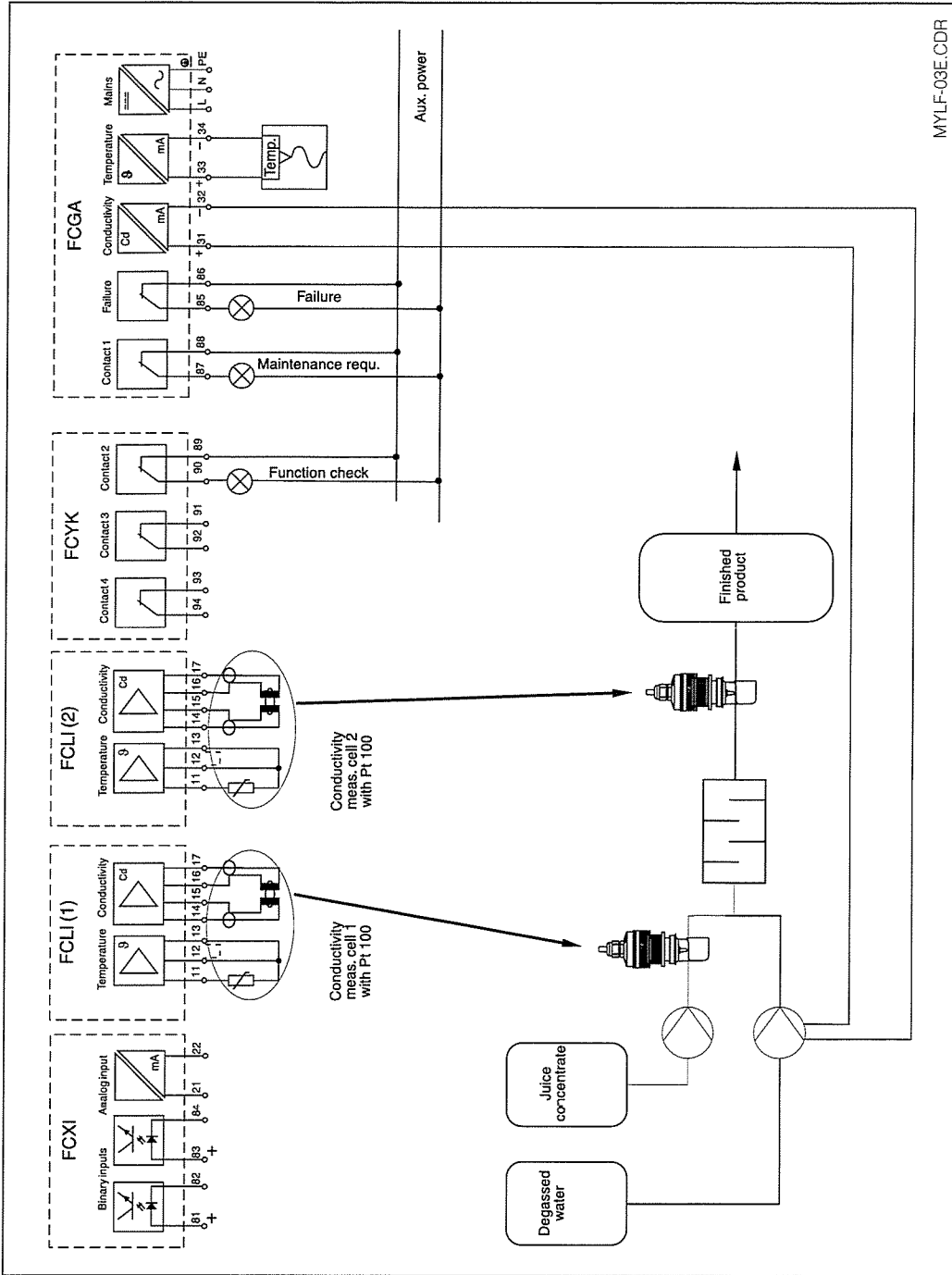
13.2 Connection examples

13.2.1 Lye-acid recycling with concentration measurement



MYLF-01E.CDR

13.2.2 Difference measurement for juice production

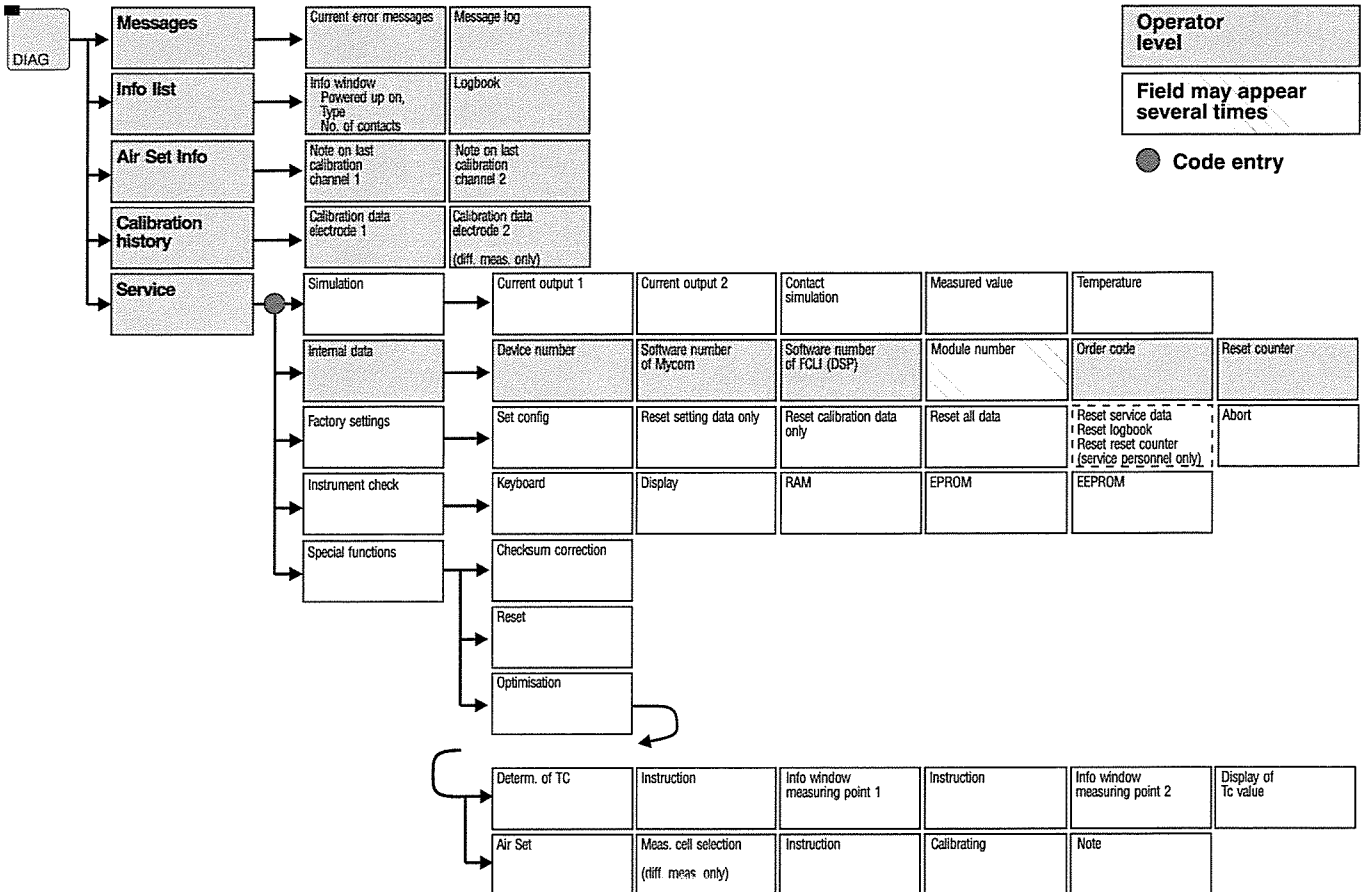
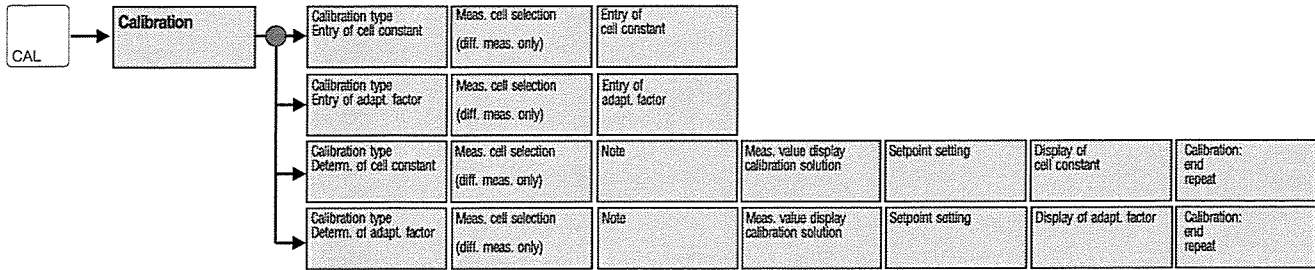
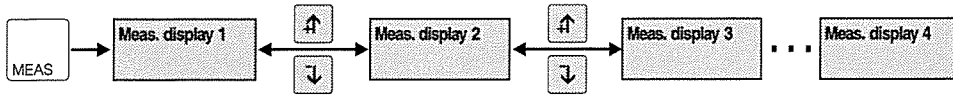


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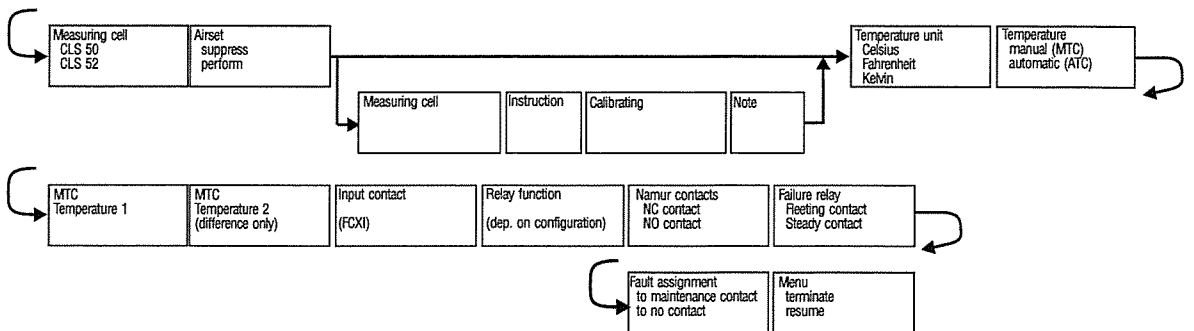
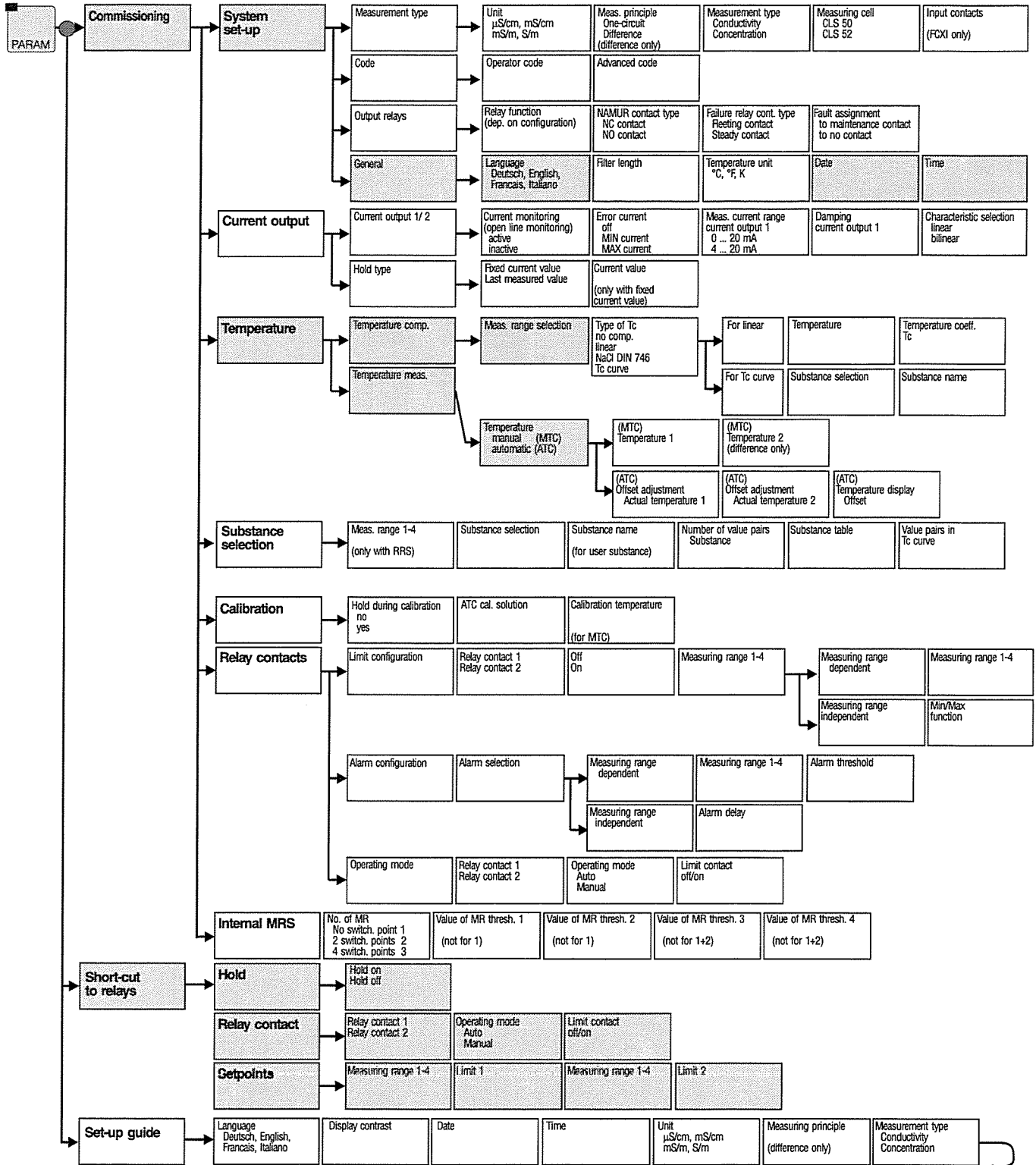
mycom CLM-152 inductive Menu Structure



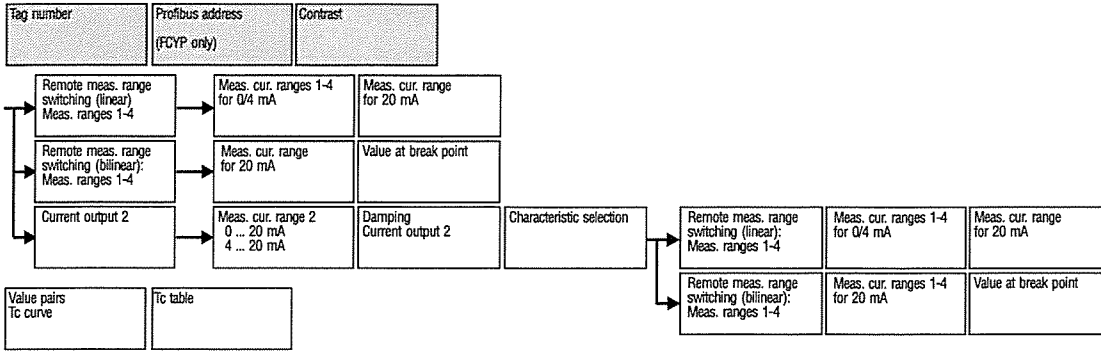
Operator level

Field may appear several times

● Code entry

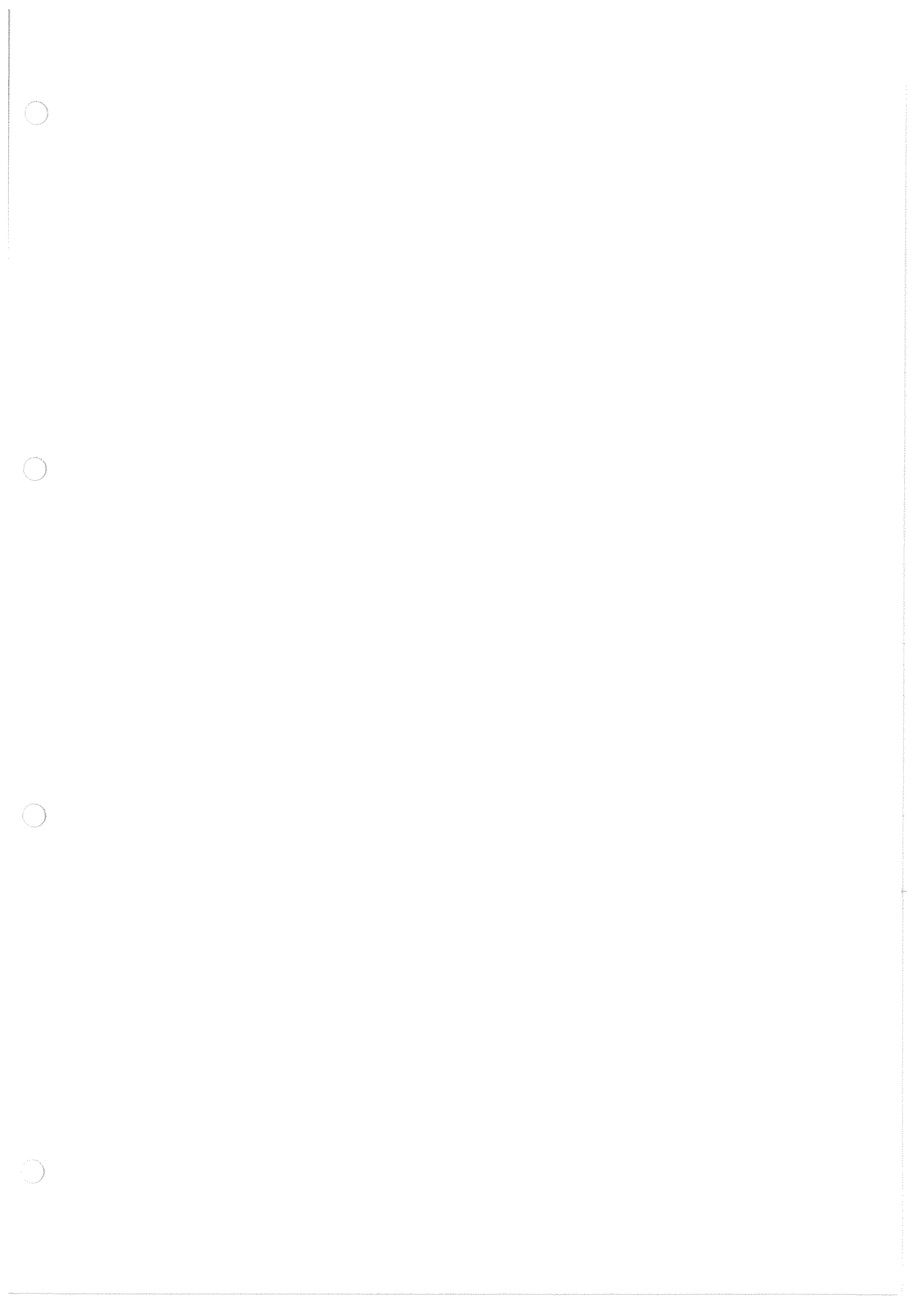


2nd current output
(difference only)



Tc table

Limit	Hysteresis	
Pickup delay	Dropout delay	NC contact NO contact







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