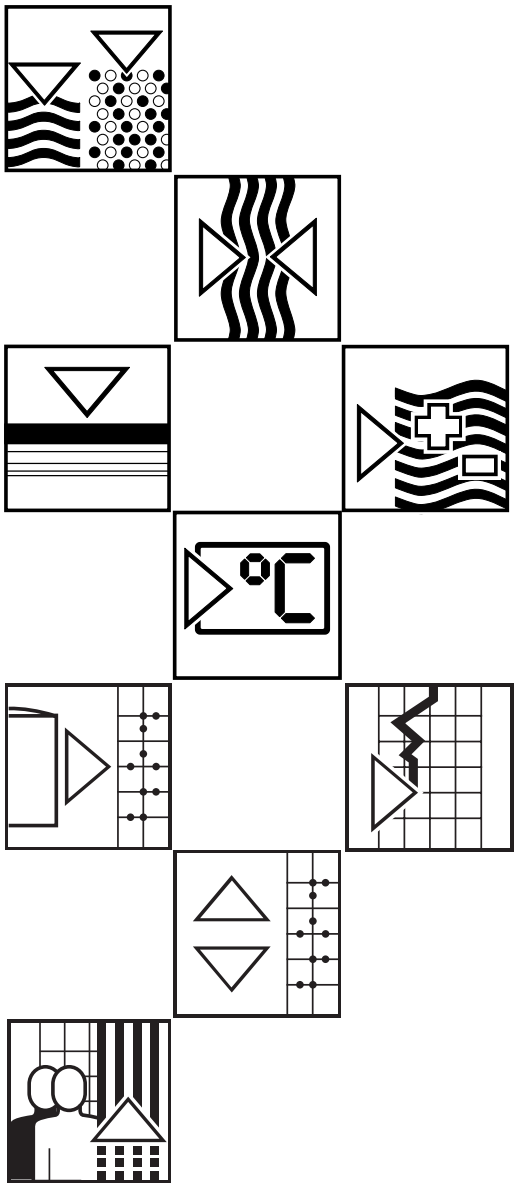
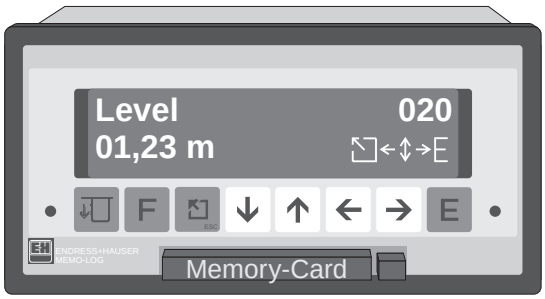
BA 040R/09/e/05.00
Mat.-Nr. 500 64168

Data-Manager

memo-log

Installation and operating instructions





Endress+Hauser
The Power of Know How

Transport damage

If any damage is discovered please inform both the shippers and your supplier immediately.

The right unit

Please check and compare all delivered items with those on the delivery note. It is very important that the unit numbers and order code on the unit legend plate correspond.

Complete delivery

The following items should be contained within the delivery:

- Delivery note
- 2 Jack screws (for panel mounting)
- These operating instructions
- PC operating software 'ReadWin'

Dependent on the version, the following items should also be included:

- 2 keys for the front door
- 1 SRAM card

If any of these items are missing please inform your supplier immediately !

Chapter **Page**

Chapter **Page**

1 Correct application

This series of units has been constructed for installation in wall mounted as well as free standing panels and fulfils all regulations.

Regulations for electronic measurement units (IEC 348/VDE 0411 and IEC 1010-1)

DIN VDE 0100 part 410 "Protection procedure, protection against dangerous component voltages", especially section 4.3.2 "Functional low voltage with safe separation".

DIN VDE 0106 Part 101 "Protection against dangerous component voltages, basic requirements for safe separation".

EN 55011 / DIN VBE 0875 part 11; Class A (spark arrest).

The units must only be operated when panel mounted.

2 Safety information

- **Installation and connection must only be done by qualified skilled personnel.**
- **Before installation compare the application power supply voltage with that on the unit legend plate.**
- **Install a power isolator close to the unit. The open contact spacing must not be less than 3 mm.**
- **Always connect the earth protection cable to the earth terminal before connecting any other cables.**
- **Do not operate from a transformer.**
- **Secure the power supply to the unit with a 10 A mains fuse.**

Please take note of the following characters:

Hint: Suggestions for better installation and setting up.

Attention: Ignoring this warning can lead to damage of the unit or delete memorised values.

Danger: Ignoring this warning can lead to personal injury !

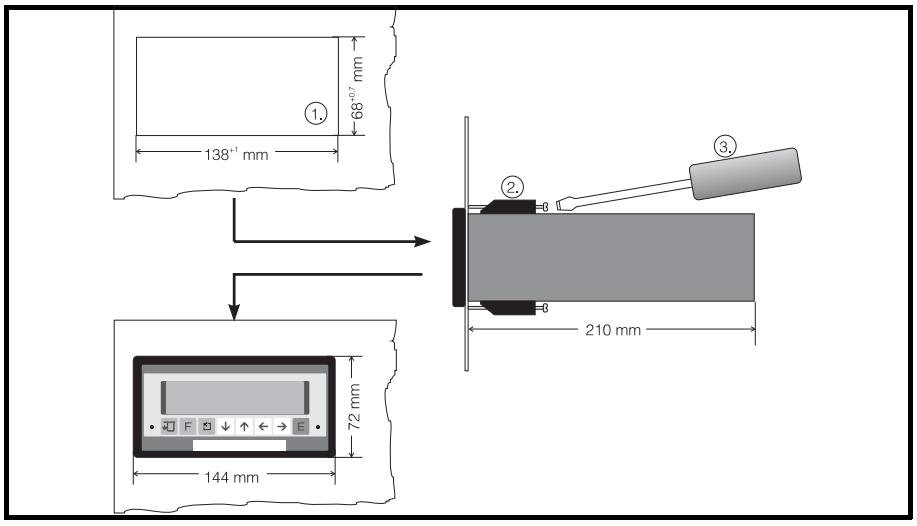
3 Installation

3.1 Panel mounting

1. Prepare the panel cutout: Size 138 $^{+1}$ mm x 68 $^{+0,7}$ mm (to DIN 43700).

2. Push the unit through the panel cutout (1)

Front and side elevation with panel cutout



3. Hold the unit horizontally and mount the jackscrews (2) into their cutouts (top / bottom).

4. Tighten the jackscrews onto the panel using a screwdriver (3) until the unit is held tightly. Make sure that even pressure is applied to both clamps.

Hint:

Further support is only required when installing in thin walled panels.

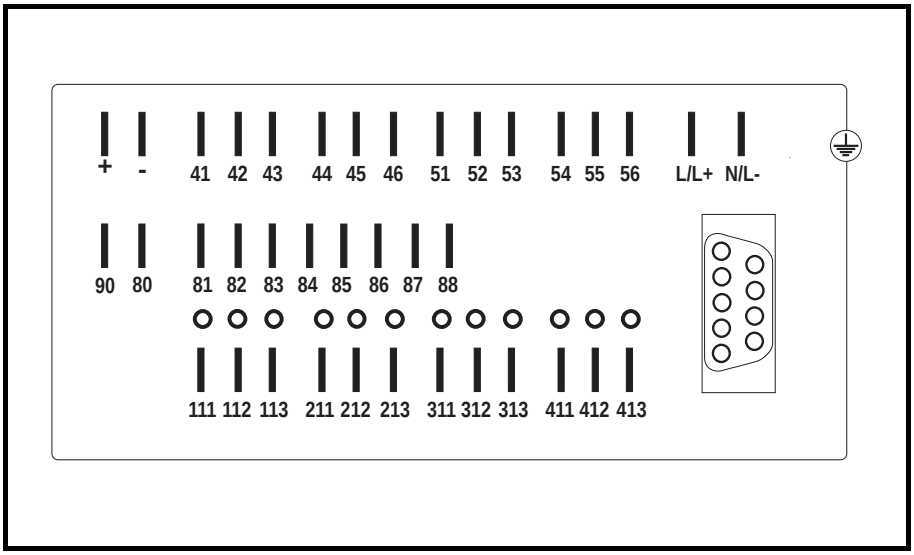
Make sure that the panel has sufficient ventilation so that the ambient operating temperature of the unit is not exceeded.

3.2 Environmental conditions

Please take note of the conditions set in the technical data, chapter 17, for:

- Interference protection
- Protection classification
- Climatic conditions

3.3 Terminal layout



Unit rear panel

L/L+ Main (live) **N/L-** Neutral ⏚ Potential earth

41 Normally closed (nc) Relay 1
42 Common (c) Relay 1
43 Normally open (no) Relay 1

44 Normally closed (nc) Relay 2
45 Common (c) Relay 2
46 Normally open (no) Relay 2

51 Normally closed (nc) Relay 3
52 Common (c) Relay 3
53 Normally open (no) Relay 3

54 Normally closed (nc) Relay 4
55 Common (c) Relay 4
56 Normally open (no) Relay 4

+ Auxiliary voltage +24V
- Auxiliary voltage ground

80 (-) Common control in/outputs

81 (+) Time counter 1
82 (+) Time counter 2
83 (+) Control input external measuring period
84 (+) Control input external blocking of signal analysis, batch
85 (+) Count input A (Impulse/quantity counter)
86 (+) Count input B (Impulse/quantity counter)
87 (+) Control input time synchronisation
88 (+) Control output time synchronisation
90 (+) Control output supply

Terminal	Channel	Standard/ TC	Pt100	Output	Power Supply
111	1	+	A	--	+
112	1	-	B	--	-
113	1		Sense	--	
211	2	+	A	20 mA	+
212	2	-	B	0V, 0/4mA	-
213	2		Sense	10 V	
311	3	+	A	20 mA	+
312	3	-	B	0V, 0/4mA	-
313	3		Sense	10 V	
411	4	+	A	20 mA	+
412	4	-	B	0V, 0/4mA	-
413	4		Sense	10 V	

SUB-D 9 pole socket for serial interface to DIN 41652:

Pin	RS485	RS422	RS232C
1	Screen	Screen	Screen
2	-	-	TXD
3	RXD/TXD-B	RXD-B	RXD
4	-	TXD-B	-
5	GND	GND	GND
6	-	-	-
7	-	GND	-
8	RXD/TXD-A	RXD-A	-
9	-	TXD-A	-

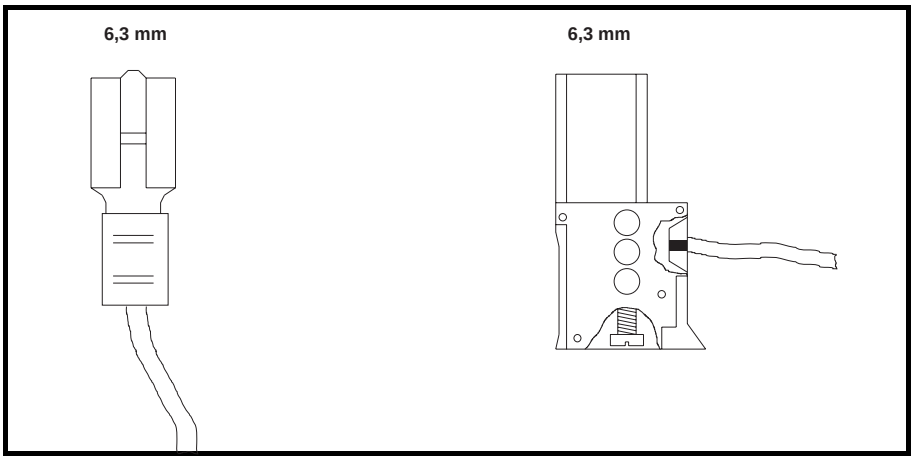
Attention:
Free pins must not be connected!

4 Connecting mains power supply

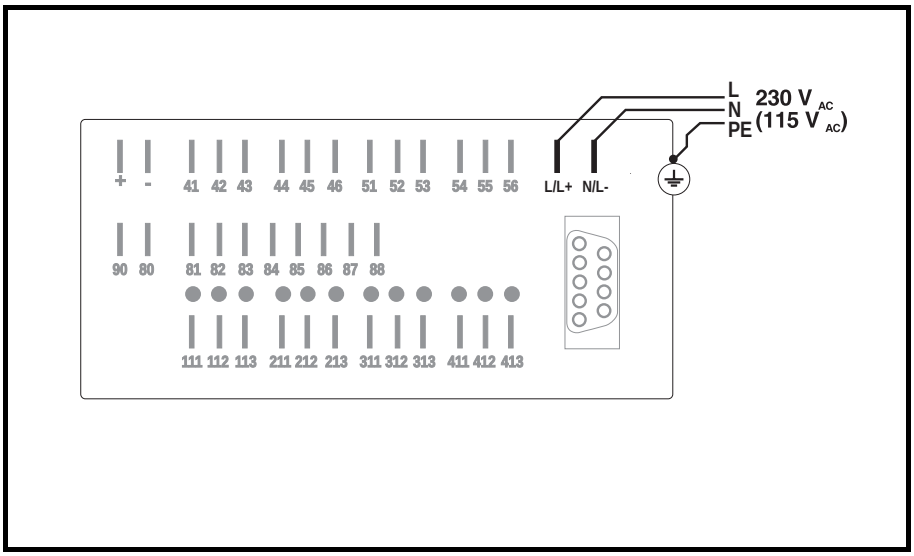
The following connectors are needed:

- Spade connector 6.3 mm x 0.8 mm (DIN 46 422)

On request plug-on screw terminal strips can be supplied.



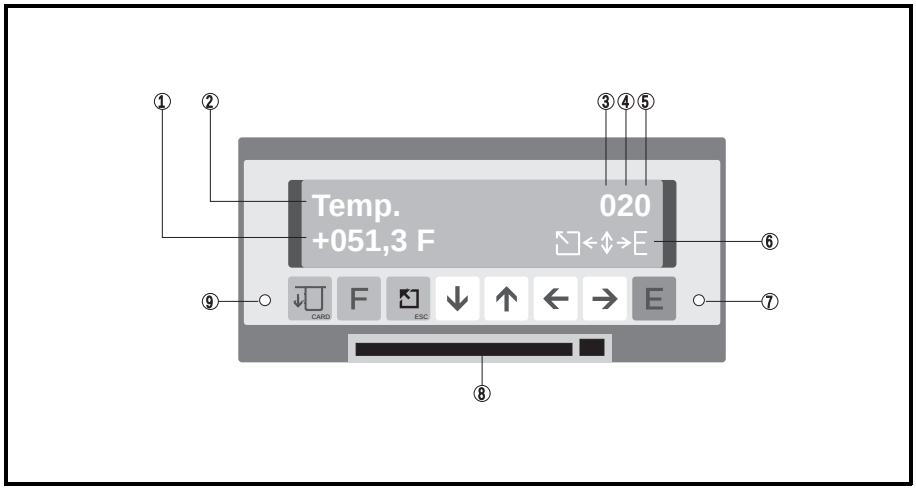
Spade terminals / screw terminals



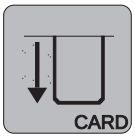
Connection example when using 230 VAC / 115 VAC

5 Operation and display

Front elevation



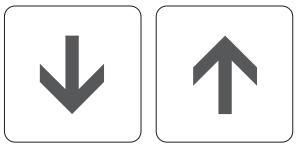
5.1 Push buttons



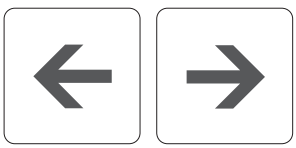
Memory push button
- Operate before removing card.
- Displays memory status.

Function push button
- Operates function selected in basic settings level.

Home push button
- Abort input in any operating position.
- Return to main menu (from all operating levels).
- Return to display level (from main menu/abort input).



Change push buttons
- Change operation level.
- Select character / parameter in an operating level.



Position push buttons
- Select column.
- Move cursor.

Enter push button
- Change from display level to main menu.
- Code entry in locked mode.
- Open entry in an operating address.
- Acknowledge input (accept).

5.2 Displays

1) Measured value (in display level) or changeable value in operation address.

2) Measurement point (in display level) or parameter description.

3) Actual operating level

4) Actual line in operating level

5) Actual column in operating level

6) Active push buttons

7) Operation modes (LEDs):

- red “off”	- green “on”:	Unit is operational
- red “off”	- green "flashes":	Input is open or recording is inactive due to timer.
- red "flashing"	- green “off”:	Memory available on memory card up to 90% full.
- red “on”	- green “off”:	Unit fault / memory card memory is full.

8) Memory card slot with remove push button.

6 Setting up sequence

Attention:
The unit does not record any changes on the analogue and mathematic channels during parameter setting up. This is the case until the unit returns to the (normal operation) display level. The complete recording function is interrupted until return to the display level when the measurement period times for signal analysis are changed.

6.1 The function levels

Operation (setting up) is divided into numbers:

0 Display level:	Measured value display
1 Basic settings:	General setting up, eg. time and date functions
2 Channel parameters:	Setting up real and calculated channels
3 Analogue limit set points:	Setting up set points and relays on analogue channels
4 Counter channels:	Setting up impulse counters
5 Counter limit set points:	Setting up set points and relays on counter channels
6 Signal analysis:	Memory intervals
8 Interface:	Interface parameters

Each setting up level consists of a varying number of presettable parameter addresses.

6.2 Selecting a setting up level:

A setting up level is selected as follows:
- Operate the ENTER push button.
- The main menu is displayed.
- Select the required level from the main menu using push buttons ↓ and ↑.
- Operate the ENTER push button again when the level has been selected.

6.3 Selecting a setting up address within a level

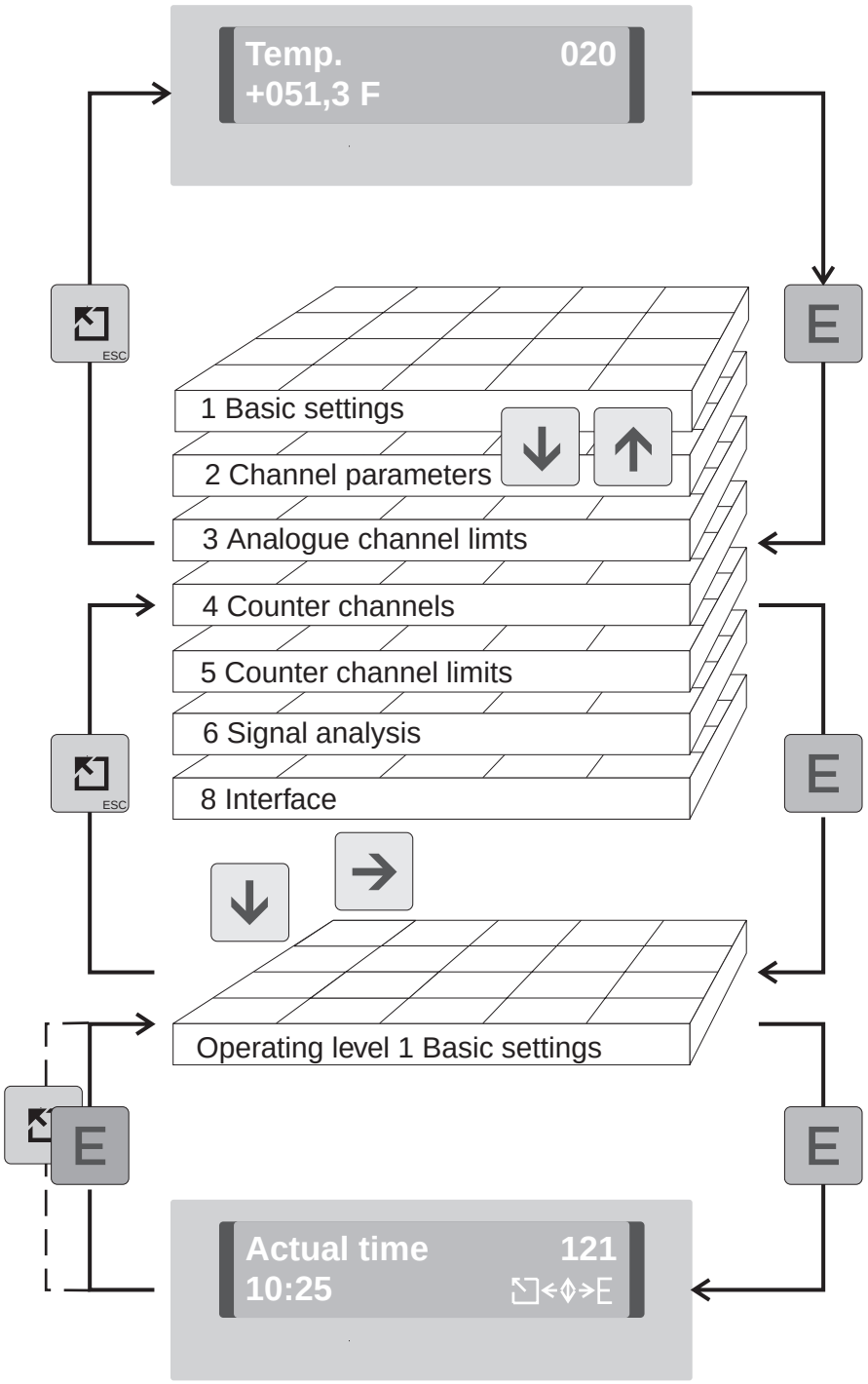
The fast way:
Using push buttons ←↑↓→ select the required setting up address.

The safe way:
Use only the → push button. Operating this automatically leads through all the setting up addresses within the selected setting up level.

6.4 Changing the value of a setting up address:

Once an address is selected the contents can be changed as follows:
- Operate the ENTER push button.
- Enter the unit code (6051) for setting up release.
- Using the ↑ ↓ or ← → push buttons set the value required.
- Acknowledge using the ENTER push button or abort entry by using the home/ESC push button.

6.5 Schematic diagram of the setting up sequence



Display level 0

Select setting up level 1..8

Select setting up address

Change parameter

Attention:

- All data is continuously stored in the EEPROM after 30 seconds from return to display level.
- If the unit is disconnected from the power source within these 30 seconds the data is only saved in a battery powered intermediate memory.
- Storage into the EEPROM is done after return of power.
- The unit automatically returns to the display level if not operated for 10 minutes.

7 Display level

7.1 Display level (operating level 0)

The display level addresses show the following values for all <u>active</u> channels:
- Instantaneous values (digital, and/or as bar graph)
- Statistic values (minimum, maximum and average values)
- Memory status

Examples:

010	Instantaneous value channel 1	digital display
040	Instantaneous value channel 4	digital display
070	Instantaneous value channel M7	digital display

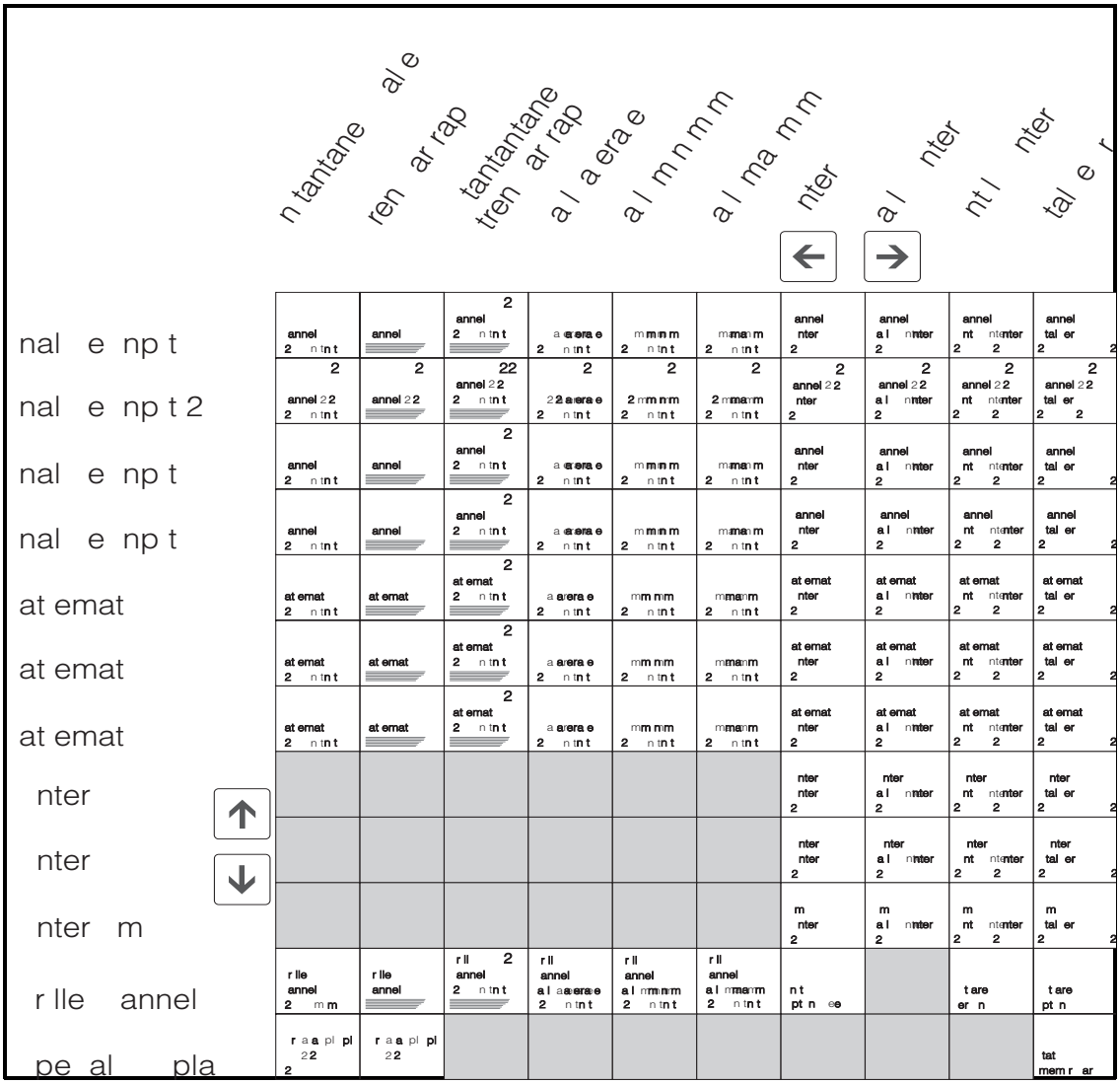
011	Trend bar graph for channel 1
041	Trend bar graph for channel 4
071	Trend bar graph for channel M7

012	Instantaneous value channel 1 digital / Trend bar graph for channel 1
042	Instantaneous value channel 4 digital / Trend bar graph for channel 4
072	Instantaneous value channel M7 digital/ Trend bar graph for channel M7

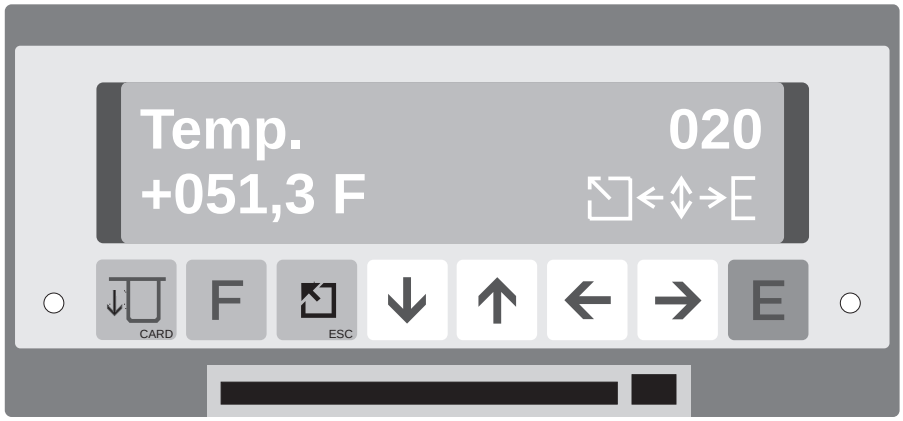
0B0	Instantaneous value for channels 1 to M7 are scrolled
0B1	Trend bar graphs for channels 1 to M7 are scrolled
0B2	Instantaneous values and trend bar graphs are scrolled

0C0	Instantaneous values of 4 channels in engineering units
0C1	Instantaneous values of 4 channels in % of zoomvalue
0C9	Display of memory card storage capacity status

Complete display level



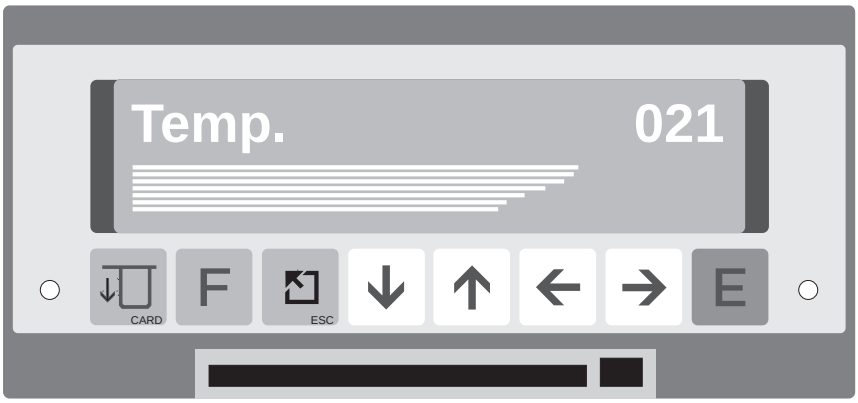
Digital display



Example:
Digital display of measurement point "Temp." in Fahrenheit, channel 2

Trend bar graph
This trend bar graph can be activated as an alternative to the normal bar graph display. Each bar graph line is filled individually with the measured value at the time it was active. This means that the signal sequence can be followed over a maximum of 100 minutes.

The upper bar graph line is always the most recent measured value.



Example:
Channel 2 with rising trend

8 Basic settings (operating level 1)

In this level all settings common to all channels are set up.

Overview of level 1

110 Unit identifier	111 Function key mode	112 Memory card off/on	113 Delete card yes/no	114 Fault relay					
120 Actual date	121 Actual time	122 Mode changeover NT/ST	123 Change NT/ST	124 Change ST/NT	125 Timer days	126 Timer hours			
130 Measured valuedisplay free/block	131 Bargraph sequence in seconds								

Setting up addresses

Addr.	Description	Selection	Function/description
110	Unit identifier	10 characters, letters, numbers and signs	Is stored on the memory card for data identification purposes or transmitted via serial interface
111	Function push button "F" mode	Not used Memory status	"F-Taste" has no function Displays memory (card) status
112	Activate memory card	Stack memory Ring memory Off	Memory switched on (stack memory) Memory switched on (ring memory FIFO) Memory switched off (display function only)
113	Delete card	Yes No	Deletes written cards Does not delete
114	Fault relay (relay 1) (can also be used as additional/alternative limit relay. See chap. 10)	Switched off Memory warning Fault and memory Fault	Relay 1 not active on faults Capacity of 90% reached Unit fault and capacity of 90% reached Relay 1 active on unit fault

Addr.	Description	Selection	Function/description
120	Date		Format: Day.month.year
121	Time		Format: Hours:minutes
122	Summer time changeover mode	Automatic Manual Off	To valid European agreement Preset times manually in addresses Pos. 123 and 124 Time change inactive
123	Changeover times normal to summer time		Format: Day.month.year Hours:minutes
124	Changeover times summer to normal time		Format: Day.month.year Hours:minutes
125	Timer: Weekdays		The unit measures and records normally on the preset days. At all other times the unit remains “dormant”
126	Timer: Hours		Start and stop times in which the unit measures and records normally. At all other times the unit remains “dormant”
130	Measured value display	Free Fixed to addr. xxx	Required display address can be selected using the arrow push buttons The preset display address xxx is permanently displayed
131	Bar graph sequence, trend bar graph	000s - 999s	Preset time cycle in seconds between 2 bar graph lines. Trend bargraph is switched off when 000s is set.

Explanation to setting up address 112:

Stack memory

When stack memory is selected all data is placed onto a “stack/pile”. If the card memory is 90% full this can be relayed externally via an alarm relay. Setting up can be found in address 114. No more data can be stored once the memory card is full.

Ring memory

The ring memory places all data into a “ring/circle”. If the card memory is full the oldest data is overwritten (first in, first out). This means that the most recent data is always available. Reaching 90% full can, as with the stack memory version, be externally transmitted via the fault relay.

9 Analogue and mathematic channels
9.1 Analogue and mathematic channels (operating level 2)

In this level analogue and mathematic channel parameters are set.

Overview level 2

210 Channel1 channel identifier	211 Channel1 input signal	212 Channel1 input sig. status	213 Channel1 engin. units	214 Channel1 decimal point	215 Channel1 Scale upper/low	216 Channel1 Zoom	217 Channel1 alarm cycle		219 Channel1 filter in seconds	21A Channel1 copy to channel ?
220 Channel2 channel identifier	221 Channel2 input signal	222 Channel2 input sig. status	223 Channel2 engin. units	224 Channel2 decimal point	225 Channel2 Scale upper/low	226 Channel2 Zoom	227 Channel2 alarm cycle		229 Channel2 filter in seconds	22A Channel2 copy to channel ?
230 Channel3 channel identifier	231 Channel3 input signal	232 Channel3 input sig. status	233 Channel3 engin. units	234 Channel3 decimal point	235 Channel3 Scale upper/low	236 Channel3 Zoom	237 Channel3 alarm cycle		239 Channel3 filter in seconds	23A Channel3 copy to channel ?
240 Channel4 channel identifier	241 Channel4 input signal	242 Channel4 input sig. status	243 Channel4 engin. units	244 Channel4 decimal point	245 Channel4 Scale upper/low	246 Channel4 Zoom	247 Channel4 alarm cycle		249 Channel4 filter in seconds	24A Channel4 copy to channel ?
250 M. chan 5 channel identifier	251 M. chan5 calculation formula	252 M. chan5 input sig. status	253 M. chan5 engin. units	254 M. chan5 decimal point	255 M. chan5 Scale upper/low	256 M. chan5 Zoom	257 M. chan5 alarm cycle			25A M. chan5 copy to channel ?
260 M. chan 6 channel identifier	261 M. chan6 calculation formula	262 M. chan6 input sig. status	263 M. chan6 engin. units	264 M. chan6 decimal point	265 M. chan6 Scale upper/low	266 M. chan6 Zoom	267 M. chan6 alarm cycle			26A M. chan6 copy to channel ?
270 M. chan 7 channel identifier	271 M. chan7 calculation formula	272 M. chan7 input sig. status	273 M. chan7 engin. units	274 M. chan7 decimal point	275 M. chan7 Scale upper/low	276 M. chan7 Zoom	277 M. chan7 alarm cycle			27A M. chan7 copy to channel ?
280 Output 1 output sig. status	281 Output 1 output sig. select									
290 Output 2 output sig. status	291 Output 2 output sig. select									
2A0 Output 3 output sig. status	2A1 Output 3 output sig. select									

Analogue inputs (x = 1..4):

Addr.	Description	Selection	Function/description
2x0	Channel identifier	10 characters, letters, numbers and signs	Measurement point or channel identifier
2x1	Standard input	0..20 mA, 4..20 mA 0..1 V, 0..10 V linear, squared	
	Universal input	0/4..20 mA Ni100 -60..+180°C Pt100 -100..+600°C Pt500 -100..+600°C Pt1000 -100..+600°C Type L -200..+900°C Type U -200..+600°C Type B 0..+1820°C Type S 0..+1800°C Type R -50..+1800°C Type K -200..+1372°C Type J -210..+1200°C Type T -270..+400°C Type N -270..+1300°C Cold junction compensation: internal, ext. 0 °C, ext. 20 °C, ext. 50 °C, ext. 60 °C, ext. 70 °C, ext. 80 °C 0..1/10 V ±10V ±5V ±2V ±1V ±0.2V ±0.1V ±50mV ±20mV	
	Standard output	0..20 mA, 4..20 mA 0..10 V	

Addr.	Description	**Selection**	**Function/description**
2x2	Operating mode	Off	Channel is not recorded
		On	Channel is recorded
		Without Statistic	Channel is recorded but statistic (signal analysis) is switched off
		Integration/s Integration/min Integration/h Integration/day	Additional integration with variable time base (option "Integration")
2x3	Engineering units	5 characters, letters, numbers signs	eg. °C, l/h, m, m^3/h
2x4	Decimal point (fixed on RTDs Pt100 and thermo couples)	XXXX XXX.X XX.XX X.XXX .XXXX	none one two three four
2x5	Scale (fixed on RTDs, Pt100 and thermocouples)		Sensor signal range (check zoom range)
2x6	Zoom (Signal magnifier)		Input range from...to...; (in engineering units)
2x7	Alarm memory	off	Alarm cycle off
		1s, 2s, 5s, 10s, 15s, 30s, 1min, 2min, 3min, 5min, 6min, 10min, 12min, 15min, 30min, 1h, 2h, 3h, 4h, 6h, 8h, 12h	Alarm cycle on (Measured value storage cycle)
2x9	Filter	τ = 000.0s - 999.9s	Filter against high frequency interference on input signal
2xA	Copy setting up values		Copy channel settings including limit settings to another channel. (Useful only on similar channels!)

Mathematic channels (x = 5..7):

Addr.	Description	**Selection**	**Function/description**
2x0	Channel identifier	10 characters letters, numbers and signs	Channel identifier
2x1	Formular mathematic channel	Channel X - Channel Y Channel X + Channel Y Σ Channel X to Chan. Y Channel X / Channel Y Channel X * Channel Y Channel X ___ Chan. Y	Subtraction Addition Sum Division Multiplication Average
2x2	Recording	Off On Without statistic	Channel is not recorded Channel is recorded Channel is recorded but not analysed or saved to memory
2x3	Engineering units	5 characters, letters, numbers and signs	eg. Watt, Liter, l/s
2x4	Decimal point (fixed on RTDs Pt100 and thermo couples)	XXXX XXX.X XX.XX X.XXX .XXXX	none one two three four
2x5	Scale		Sensor signal range (Check zoom range)
2x6	Zoom (Signal magnifier)		Input range from...to...; (in engineering units)
2x7	Alarm memory	off 1s, 2s, 5s, 10s, 15s, 30s, 1min, 2min, 3min, 5min, 6min, 10min, 12min, 15min, 30min, 1h, 2h, 3h, 4h, 6h, 8h, 12h	Alarm cycle off Alarm cycle on (Measured value storage cycle)
2xA	Copy setting up values		Copy channel settings including limit settings to another channel. (Useful only on similar channels!)

Hint:
Mathematic channels can be used in a calculation. The only condition is that the channel number used is smaller than the resultant channel number.

Example:
M-channel 5 = Channel 2 + Channel 3
M-channel 7 = M-channel 5 + Channel 4

Output channels (y = 8..A):

Addr.	Description	**Selection**	**Function/description**
2y0	Output	Inactive	Output switched off
		Channel 1	Output switched to zoom of channel 1
		Channel 2	Output switched to zoom of channel 2
		Channel 3	Output switched to zoom of channel 3
		Channel 4	Output switched to zoom of channel 4
		Channel 5M	Output switched to zoom of mathematic channel 5
		Channel 6M	Output switched to zoom of mathematic channel 6
		Channel 7M	Output switched to zoom of mathematic channel 7
2y1	Output signal	0..20 mA 4..20 mA 0..10 V	The range preset in zoom is set and transmitted using the selected output signal range

Important:
Mathematic channels differ from "normal" channels only in the source of the input signal. They are handled exactly the same as "normal channels" but are only calculated once per second.

9.2 General information on the analogue channels

Input signal, measurement range

Input signal and measurement range
Your unit automatically recognises the type of signal each channel can accept. This is dependent on the type of hardware defined in your order code. All current and voltage signals can be set individually to any measurement scale. An exact digital value of the range selected can be seen in the display.
Example:
A transmitter has an output signal of 0..20 mA. This signal is equal to a temperature range of +10 °C .. +70 °C. Set the unit up as follows:
Input signal: "0..20 mA" Scale: "+010.0..+070.0"
Engineering units: "°C" Decimal point: "XXX.X"

RTD and thermocouple measurement ranges

The scales and measurement ranges of RTD and thermocouple signals are preset. These are as follows:

Ni100:	-060,0..+180,0 °C	Pt100:	-100,0..+600,0 °C
Type L:	-200,0..+900,0 °C	Type U:	-200,0..+600,0 °C
Type N:	- 0270..+ 1300 °C	Type B:	0000..+ 1820 °C
Type S:	0000..+ 1800 °C	Type R:	-0050..+ 1800 °C
Type K:	- 0200..+ 1372 °C	Type J:	-0210..+ 1200 °C
Type T:	-270,0..+400,0 °C		

Zoom

Partial range display
If the application requirement is that only a part of the total input range is to be recorded the upper and lower points of the partial range can be preset. This is done using engineering units.
The zoom range is operative in the bar graphs, analogue signal output, limit reset hysteresis and display address 0C1.

Example:
Input signal: "0..20 mA" Scale: "+020.0 ..+070.0 °C"
Zoom: "+040.0..+050.0 °C"
In this example only the temperature range of +40 °C..+50 °C is shown on the bar graph display (and possibly transmitted by the analogue signal output).

Hint:
The zoom range remains unchanged if the main range is changed.

Square root extraction

Linear/squared signal
The choice of "linear" or "squared" signals is available when using standard current or voltage input signals. Most transmitters have linear outputs, however, there are some transmitters (eg. differential pressure) that transmit a squared signal. This transmitter can be directly connected to the unit where the root is then extracted.

Cold junction compensation

Thermocouple cold junction compensation
Temperature measurement using thermo couples requires the measurement of a reference temperature. The unit offers the choice of six external or one internal reference temperature. The internal is measured at the unit terminals.

Storing the measured values

The Memo-Log data manager has an alarm memory cycle function for each channel (4 analogue and 3 mathematic channels). Measured value memory in an alarm cycle only occurs when a limit set point is infringed and the limit allocation (address 3x1) is set to "Ch.alarm" (channel alarm) or "gl. alarm" (global alarm). Channel alarm: only the channel where a limit infringement occurs stores data in the alarm cycle. Global alarm: all channels save data in their own channel specified alarm cycle on any limit infringement. On a save cycle of 30 seconds or more the values are saved in the form of min., max. and average values including the time of the min. and max. values. On a measurement cycle of 15 seconds or smaller only the average value is saved. This avoids masses of unrequired data. The alarm memory cycle can be set for individual channels in addresses 2x7.
If no limit allocation is set to "Ch.alarm" or "gl.alarm" then the measured values are stored in the normal preset cycles (setting up address 613).

Integration

Using this option an analogue signal is additionally integrated. A further explanation: A data manager without integration is like an automobile with only a speedometer, therefore only recording the instantaneous values. A data manager with integration has not only got the speedometer but also the intermediate and total distance counters.
There are four counters available when using integration:

- 10 digit measurement period counter ("intermediate counter")
- 10 digit daily counter
- 12 digit monthly counter
- 12 digit totaliser

Time of memory storage and counter reset is set up in the "Signal analysis" level.

Integration time base

To do justice to all Types of inputs the unit can be set to integrate using one of four time bases:

- Integration / s
- Integration / min
- Integration / h
- Integration / day

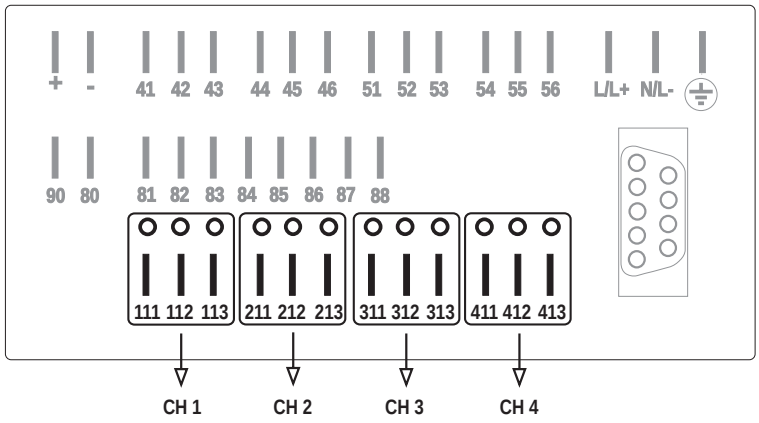
Example:
Quantity recording of short dosing sequences would be set to integrate using seconds as a time base (units/sec). An hourly time base however is usually enough for quantity recording in the inflow of a water treatment plant (m3/h).

Attention:
The shorter the time base the faster a counter overrun will occur.

Hint:
Limits cannot be set on integrated counter values.

9.3 Connections

Channels 1 to 4
Rear panel view



CH 1 = Channel 1, CH 2 = Channel 2 u.s.w.

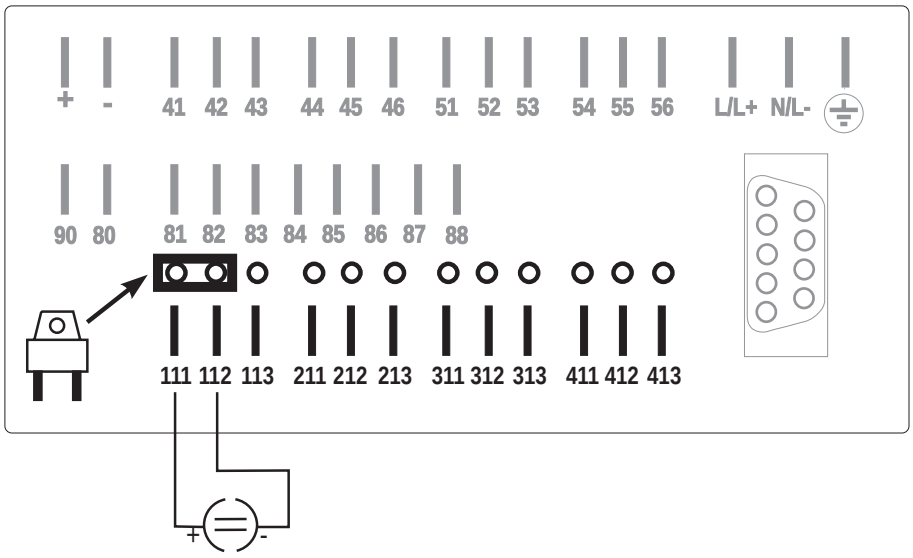
Connections

Terminal	**Channel**	**Current, voltage Thermo-couples**	**Resistive thermo-meter**	Analogue output	**Power supply output**
111 **112** **113**	Chan.1 Chan.1 Chan. 1	+ - not used	Pt100 A Pt100 B Sense		+ 24 V ⊥ not used
211 **212** **213**	Chan. 2 Chan. 2 Chan. 2	+ - not used	Pt100 A Pt100 B Sense	+ 0/4..20 mA - 0/4..20 mA, ⊥ + 0..10 V	+ 24 V ⊥ not used
311 **312** **313**	Chan. 3 Chan. 3 Chan. 3	+ - not used	Pt100 A Pt100 B Sense	+ 0/4..20 mA - 0/4..20 mA, ⊥ + 0..10 V	+ 24 V ⊥ not used
411 **412** **413**	Chan. 4 Chan. 4 Chan. 4	+ - not used	Pt100 A Pt100 B Sense	+ 0/4..20 mA - 0/4..20 mA,⊥ + 0..10 V	+ 24 V ⊥ not used

Single channel functions are dependent on the type of in/output PCB installed in the corresponding plug-in space in the unit.

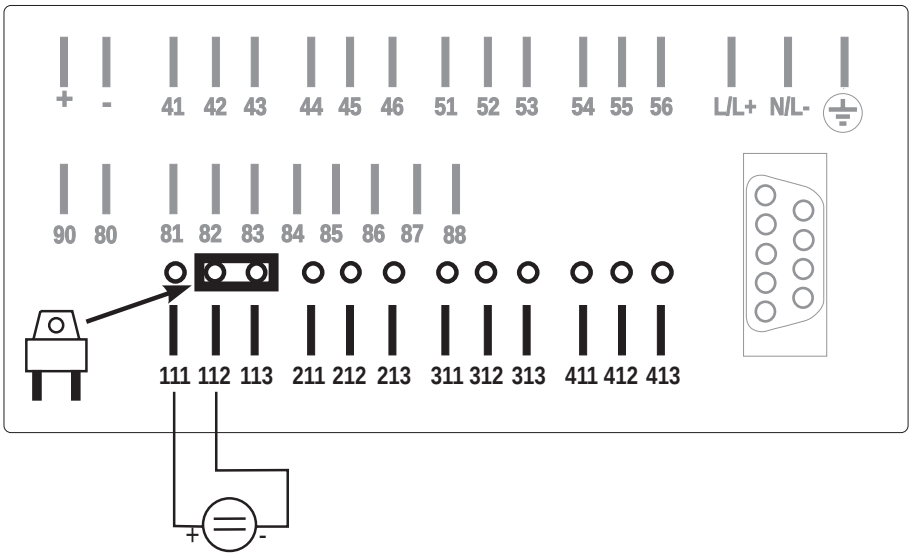
9.3.1 Analogue signal connections

Current signals



Connection example of a current measurement system on channel 1

Voltage signals and thermo couples

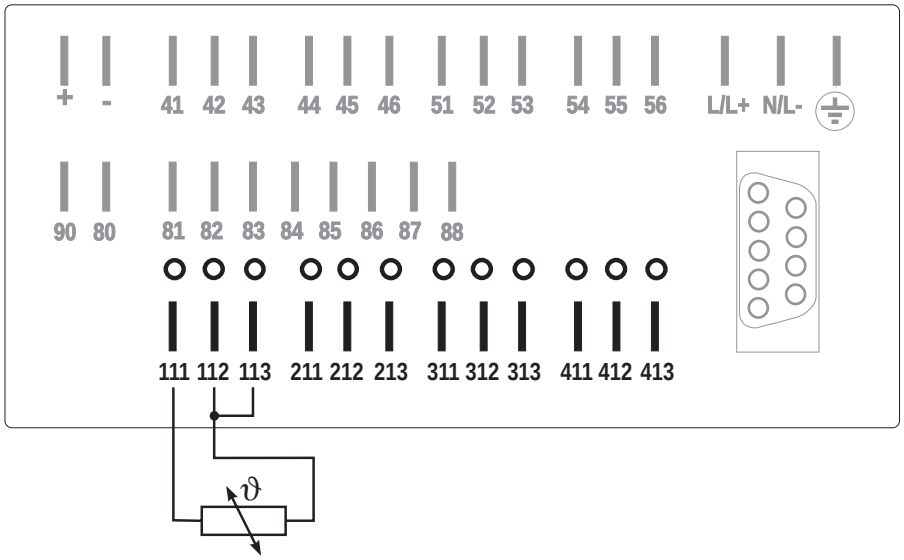


Connection example of a voltage or thermo couple measurement system on channel 1

Resistive thermometer (Pt100)

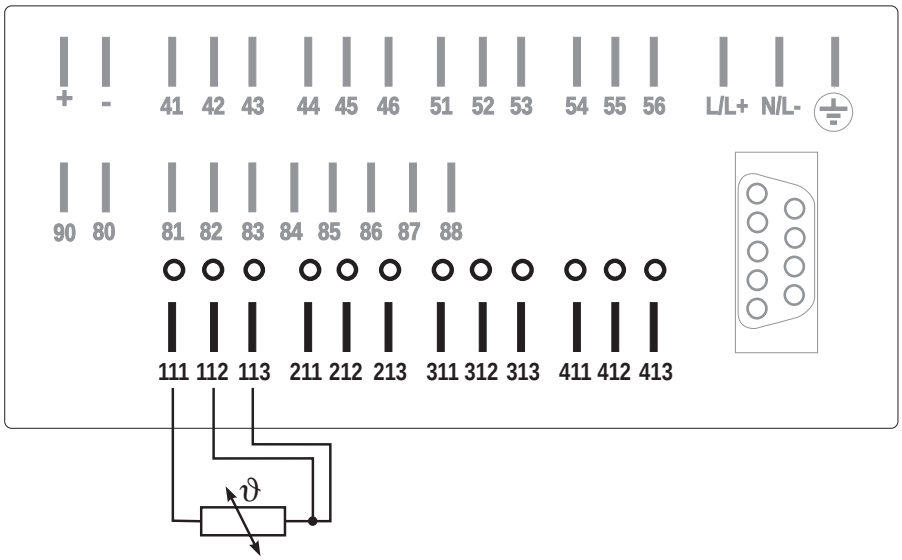
2 wire system:

Connection example of a 2 wire RTD (Pt100) measurement system on channel 1



3 wire system:

Connection example of a 2 wire RTD (Pt100) measurement system on channel 1

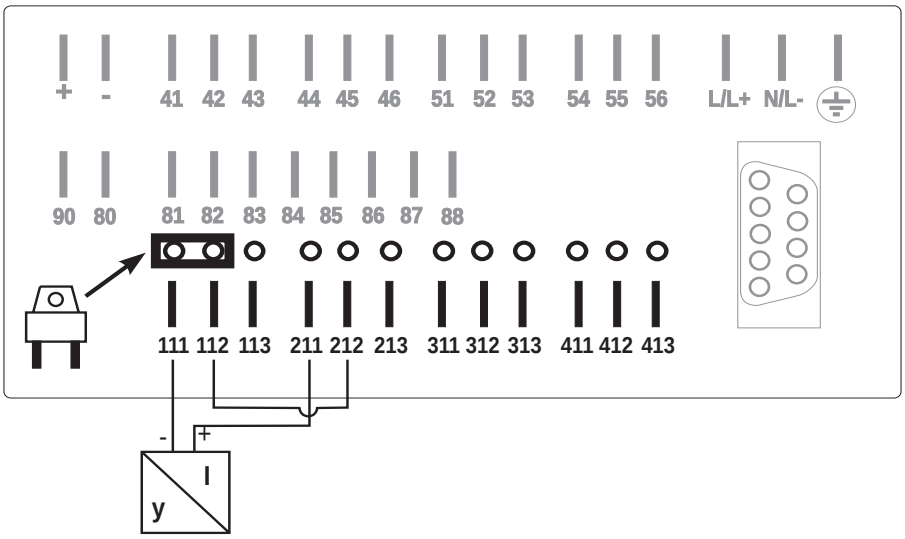


9.3.2 Connection using loop power supply

It is possible to power up to 3 transmitters (eg. Pt100 head transmitters) from the unit. Each power supply output PCB requires one of the input plug-in positions 2 ... 4.

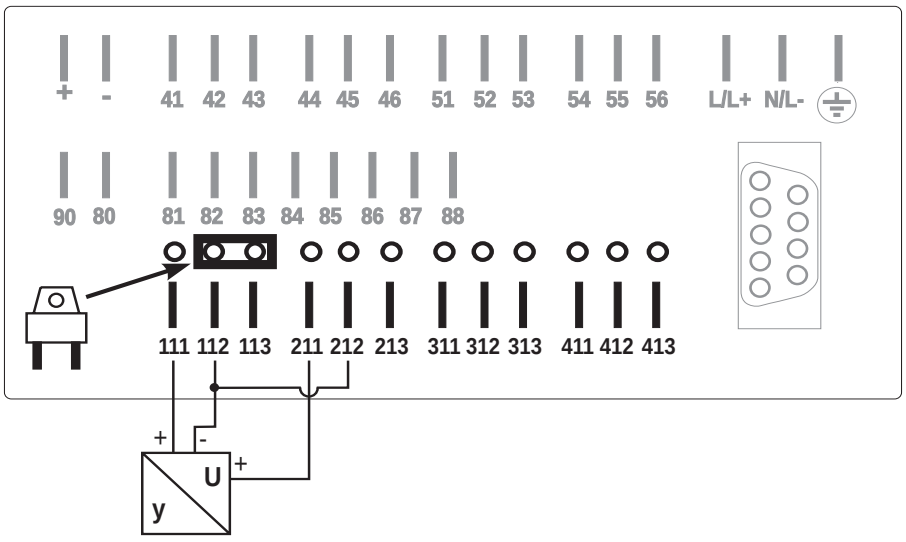
Power supply technical data:
- Output voltage 24 VDC, -/+ 10%, 24 mA short circuit protected
- Open circuit voltage 30 VDC

2-wire loop power (measuring current signal):



Connection example of a 2 wire loop powered system, current measurement on channel 1, loop power from channel 2

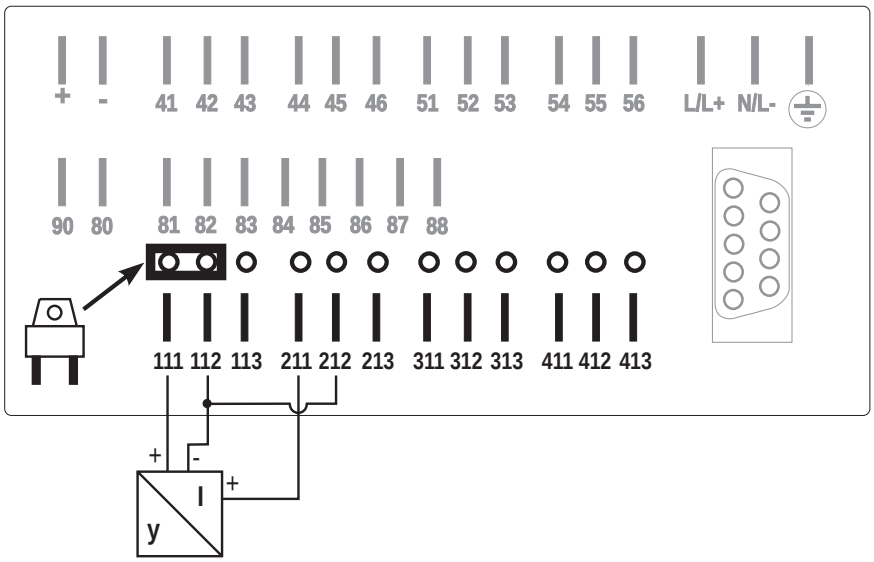
3-wire loop power (measuring voltage signal):



Connection example of a 3 wire loop powered system, voltage measurement on channel 1, loop power from channel 2

3 wire loop power (measuring current signal):

Connection example of a 3 wire loop powered system, current measurement on channel 1, loop power from channel 2



Hint:
In order to improve interference protection use screened cables (earthed at one end only).

9.4 Mathematic channels option

Using main menu level "Channel parameters" and addresses 2x0 - 2xA (x = channels 5..7), real analogue channels (channels 1..4) can be mathematically combined.

Possible calculations:
- Subtraction (Channel X - Channel Y)
- Addition (Channel X + Channel Y)
- Sum (Channel X to Channel Y)
- Division (Channel X : Channel Y)
- Multiplication (Channel X * Channel Y)
- Average (Channel X ⩵ Channel Y)

Important:
Mathematic channels are only different to real channels due to the type of input signal (mathematics). Otherwise they are handled the same as real channels.

Hint:
Mathematic channels can also be used in the calculation. The only condition is that the mathematic channel used in the calculation is smaller than the resultant channel.

Example:
M-Channel 5 = Channel 2 + Channel 3
M-Channel 7 = M-Channel 5 + Channel 4

10 Setting up limit values (operating level 3)

10.1 Limit values on analogue and mathematic channels

In this level analogue and mathematic channel limit values are set.

Overview level 3

310 Channel 1 Limit value 1 123,4	311 Channel 1 Limit value 1 Relay allocate	312 Channel 1 Limit value 2 123,4	313 Channel 1 Limit value 2 Relay allocate	314 Channel 1 Limit value 3 123,4	315 Channel 1 Limit value 3 Relay allocate	316 Channel 1 Limit value 4 123,4	3107 Channel 1 Limit value 4 Relay allocate	318 Channel 1 Limit value 5 123,4	3109 Channel 1 Limit value 5 Relay allocate
320 Channel 2 Limit value 1 123,4	321 Channel 2 Limit value 1 Relay allocate	322 Channel 2 Limit value 2 123,4	323 Channel 2 Limit value 2 Relay allocate	324 Channel 2 Limit value 3 123,4	325 Channel 2 Limit value 3 Relay allocate	326 Channel 2 Limit value 4 123,4	327 Channel 2 Limit value 4 Relay allocate	328 Channel 2 Limit value 4 123,4	329 Channel 2 Limit value 5 Relay allocate
330 Channel 3 Limit value 1 123,4	331 Channel 3 Limit value 1 Relay allocate	332 Channel 3 Limit value 2 123,4	333 Channel 3 Limit value 2 Relay allocate	334 Channel 3 Limit value 3 123,4	335 Channel 3 Limit value 3 Relay allocate	336 Channel 3 Limit value 4 123,4	337 Channel 3 Limit value 4 Relay allocate	338 Channel 3 Limit value 5 123,4	339 Channel 3 Limit value 5 Relay allocate
340 Channel 4 Limit value 1 123,4	341 Channel 4 Limit value 1 Relay allocate	342 Channel 4 Limit value 2 123,4	343 Channel 4 Limit value 2 Relay allocate	344 Channel 4 Limit value 3 123,4	345 Channel 4 Limit value 3 Relay allocate	346 Channel 4 Limit value 4 123,4	347 Channel 4 Limit value 4 Relay allocate	348 Channel 4 Limit value 5 123,4	349 Channel 4 Limit value 5 Relay allocate
350 M. Chan 5 Limit value 1 123,4	351 M. Chan 5 Limit value 1 Relay allocate	352 M. Chan 5 Limit value 2 123,4	353 M. Chan 5 Limit value 2 Relay allocate	354 M. Chan 5 Limit value 3 123,4	355 M. Chan 5 Limit value 3 Relay allocate	356 M. Chan 5 Limit value 4 123,4	357 M. Chan 5 Limit value 4 Relay allocate	358 M. Chan 5 Limit value 5 123,4	359 M. Chan 5 Limit value 5 Relay allocate
350 M. Chan 6 Limit value 1 123,4	361 M. Chan 6 Limit value 1 Relay allocate	362 M. Chan 6 Limit value 2 123,4	363 M. Chan 6 Limit value 2 Relay allocate	364 M. Chan 6 Limit value 3 123,4	365 M. Chan 6 Limit value 3 Relay allocate	366 M. Chan 6 Limit value 4 123,4	367 M. Chan 6 Limit value 4 Relay allocate	368 M. Chan 6 Limit value 5 123,4	369 M. Chan 6 Limit value 5 Relay allocate
370 M. Chan 7 Limit value 1 123,4	371 M. Chan 7 Limit value 1 Relay allocate	372 M. Chan 7 Limit value 2 123,4	373 M. Chan 7 Limit value 2 Relay allocate	374 M. Chan 7 Limit value 3 123,4	375 M. Chan 7 Limit value 3 Relay allocate	376 M. Chan 7 Limit value 4 123,4	377 M. Chan 7 Limit value 4 Relay allocate	378 M. Chan 7 Limit value 5 123,4	379 M. Chan 7 Limit value 5 Relay allocate

Addr.	Description	Selection	Function / description
3x0	Set limit value LV 1	Prefix 4 digit numbers (Engineering units and decimal point are accepted from the analogue or mathematic channel)	
3x1	Allocate LV 1	Type: Off Lower Upper Gradient Effect on: Relay 1 Relay 2 Relay 3 Relay 4 Chan. alarm Global alarm	 No monitoring Effect when signal drops and undercuts the limit set point Effect when signal rises and exceeds the limit set point Effect on speed of signal change (“slope”) Limit acts on Rel. 1 Limit acts on Rel. 2 Limit acts on Rel. 3 Limit acts on Rel. 4 Channel alarm On limit infringement the alarm memory cycle function for channel x becomes active Global alarm On limit infringement the alarm memory cycle function for all channels becomes active

Analogue channel limit values (x = 1..4)
Mathematic channel limit values (x = 5..7)

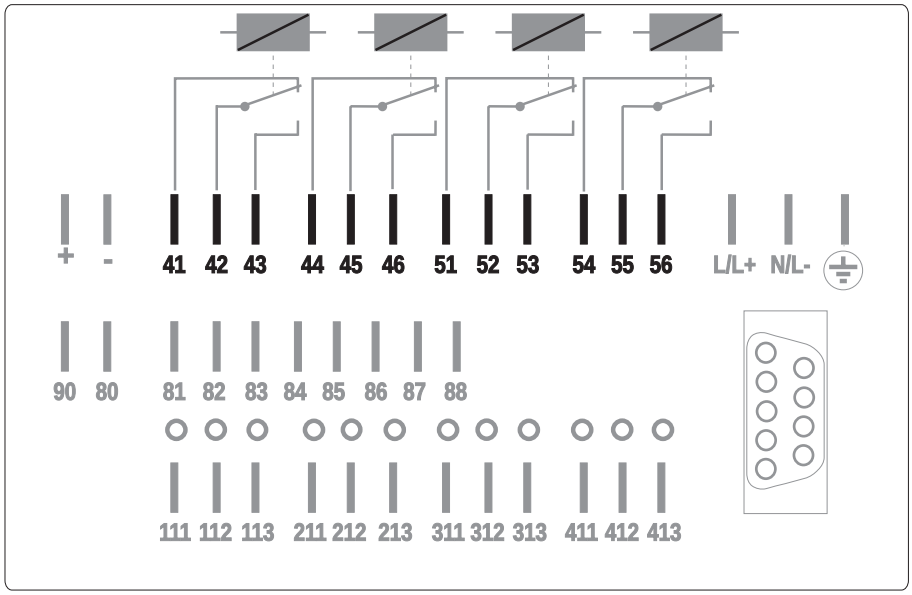
Addr.	Description	Selection	Function / description
3x2	Set limit value LV 2	see 3x0	
3x3	Allocate LV 2	see 3x1	see 3x1
3x4	Set limit value LV 3	siehe 3x0	
3x5	Allocate LV 3	see 3x1	see 3x1
3x6	Set limit LV 4	see 3x0	
3x7	Allocate LV 4	see 3x1	see 3x1
3x8	Set limit vlue LV 5	see 3x0	
3x9	Allocate LV 5	see 3x1	see 3x1

Five limits can be allocated to each analogue or mathematic channel. The effect is valid from the time the limit infringement is active.
The return hysteresis is 1% of the preset zoom value. A gradient limit infringement remains active for one minute after the signal returns to a normal value.

10.2 Relay output

The relays operate in maximum fail safe mode. In normal operation (no limit infringement) the relays are active. On power failure or limit infringement the relays de-energise.

10.3 Relay output terminal layout



Rear panel
(Relay in limit infringement or power failure)

Connections

Terminal	Contact	Relay	Function	Available for:
41 **42** **43**	Normally closed Common Normally open	1	Off Lower limit Upper limit Gradient	Analogue channel 1..4 Mathematic channel 5..7
44 **45** **46**	Normally closed Common Normally open	2	Off Lower limit Upper limit Gradient	Analogue channel 1..4 Mathematic channel 5..7
51 **52** **53**	Normally closed Common Normally open	3	Off Lower limit Upper limit Gradient	Analogue channel 1..4 Mathematic channel 5..7
54 **55** **56**	Normally closed Common Normally open	4	Off Lower limit Upper limit Gradient	Analogue channel 1..4 Mathematic channel 5..7

Attention: A voltage of up to 250 V (eg. live and switch output) can be connected to the relay changeover contacts. Combined connection of the line and neutral to the normally open and closed contacts is not permissible.

Hint: It is possible to connect a low voltage cable to one relay and a voltage of up to 250 VEFF to another relay. When doing this please check the safety regulations concerning a mix of low and high voltage wiring.

11 Option: 2 count inputs

11.1 Connection

Terminal	Channel
85	Count input A
86	Count input B

Count input control

Logic 0 equals	- 3 V...+ 5V
Logic 1 equals	+12V...+30V
max. impulse frequency:	25 Hz

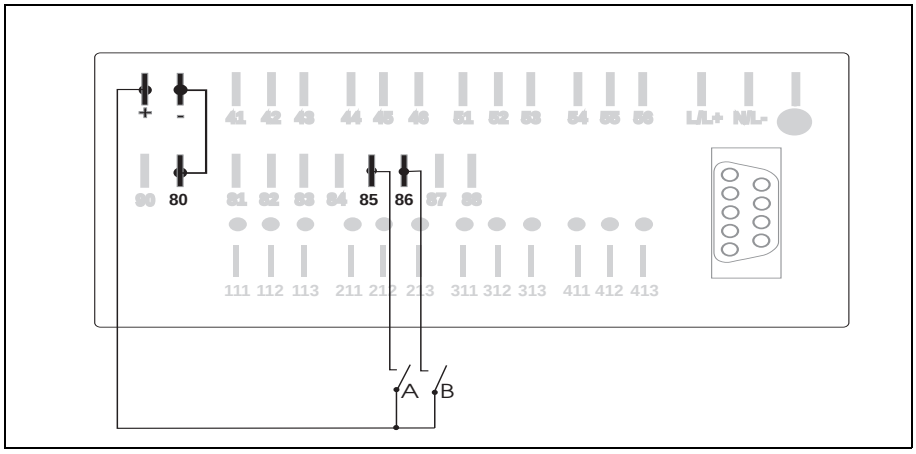
Potential always referenced to auxiliary voltage "-" terminal

Attention:

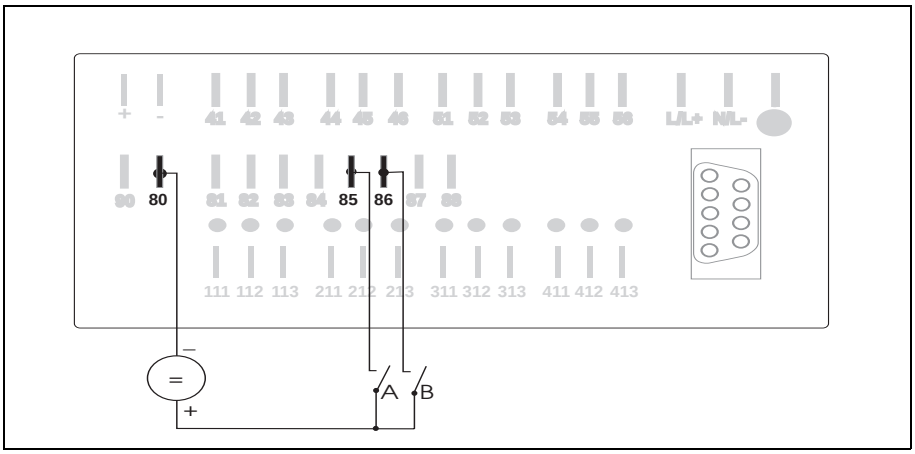
a) Potential free contacts (24 V DC auxiliary voltage from unit, max. load 100 mA)

b) External voltage source with:

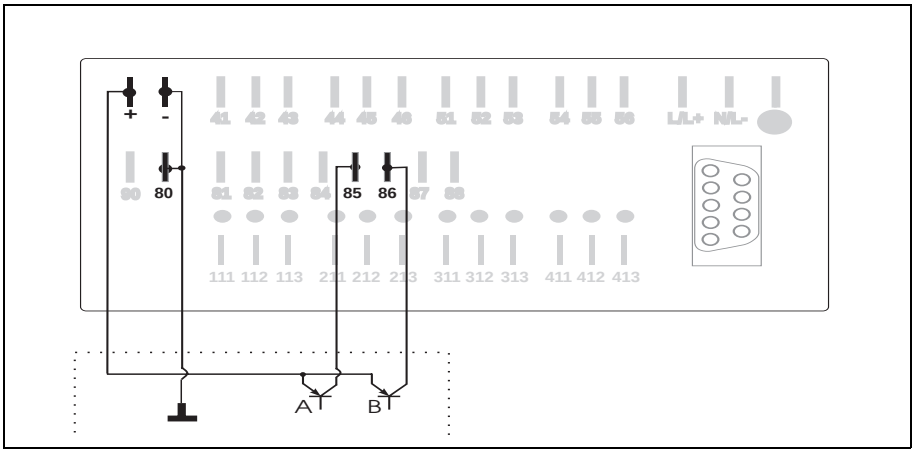
- max. impulse frequency 25 Hz
- positive voltage impulse max. 30 Volt
- Input current: approx. 2-3 mA
- minimum impulse length: 20 ms
- bounce time: max. 5 ms



Connection when using internal auxiliary voltage



Connection when using external auxiliary voltage



Connection when using open collector outputs

Storage of counter values

At the end of:

- an adjustable measuring period ("intermediate analysis")

- a day

- a month

- a year/total

or

- on request of an externally set time cycle

The unit memorises the counter values and resets the necessary counters to zero. The time of active memory is preset in the operating level “Signal analysis”.

11.2 Setting up impulse counters (operating level 4)
"Impulse counters"

Counter channel A

Counter channel B

410 Channel identifier	411 Mode	412 Engineering units	413 Decimal point	414 Impuse factor	415 Preset totaliser
420 Channel identifier	421 Mode	422 Engineering units	423 Decimal point	424 Impulse factor	425 Preset totaliser
	431 A +B Sum				

Addr.	Description	**Selection**	Function / description
4y0	Counter (Measurement point) identifier	10 characters, letters, numbers and signs	y = counter channel A,B and sum
4y1	Operating mode	off: on:	Impulses are not recorded and memorised Impulses are recorded and memorised. Counter channels A and B can be summed in address 431
4y2	Engineering units	5 characters letters, numbers and signs	
4y3	Decimal point	 XXXX XXX.X XX.XX X.XXX .XXXX	Number of digits after the decimal point (important in connection with the impuse factor): None One Two Three Four
4y4	Impulse factor		Value of each incoming impulse Example: 1 impulse equals 100 m^3. Here: +100.0/Imp. (4y3: XXX.X)
4y5	Preset totaliser		Synchronising the internal totaliser with an already existing external counter (eg. electromechanical counter)

11.3 Setting up counter limits

Up to four limits can be allocated to a count channel as well as the counter sum. The limit is equal to a counter value (comparable to a preset counter). The limits can be allocated to the built-in relays.

Matrix line counter channel limits

5y0	5y1	5y2	5y3	5y4	5y5	5y6•	5y7
...Limit interm counter...		...Limt daily counter...		...Limit monthly counter...		...Limit totaliser...	
Set up	Allocate	Set up	Allocate	Set up	Allocate	Set up	Allocate

y =1: Count input A
y = 2: Count input B
y = 3: Sum A + B

Addr.	Description	Selection	Function / description
5y0	Intermediate counter limit value		Set up counter limit value
5y1	Effect of intermediate counter limit	- Relays 1...4	
5y2	Daily counter limit value	as above	as above
5y3	Effect of daily counter limit	as above	as above
5y4	Monthly counter limit value		
5y5	Effect of monthly counter limit	as above	as above
5y6	Totaliser limit value	as above	as above
5y7	Effect of totaliser limit	as above	as above

Hint:

The limits are always set to not active before delivery ("9" on all points).

12 Setting up signal analysis (operating level 6)

In this level the periodic signal analysis time cycles are set. The following is memorised for each active channel after the preset time has expired:

- Instantaneous, minimum, maximum and average values of the allocated analogue channels and "mathematic channels". All with date and time

- On option "Integration":
Four counters per analogue channel. These are integrated from the input of the respective channel

- On option "2 count inputs":
Four counters per counter channel

610	611	612	613	614	615	616
...Signal analysis...						
Analogue	Integration	Counter	Interval/ start	Daily analysis	Monthly analysis	Yearly analysis

Level 6

Addr.	Description	Selection	Function / description
610	Analogue and mathematic channel analysis switch “ON” or “OFF”	On Off	Minimum, maximum, average and instantaneous values: Recorded and memorised No recording and memory
611	Analysis of integrated analogue channels	On Off	Record intermediate, daily, monthly and total counters No recording and memory
612	Counter channel analysis	On Off	Record intermediate, daily, monthly and total counters No recording and memory
613	Intermediate analysis (Record and memorise minimum, maximum, average and instantaneous values repeatedly during the day)	Off External 30 sec. / 1 min / 2 min 3 min / 5 min / 6 min 10 min / 12 min / 15 min. 30 min / 1 h / 2 h / 3 h 4 h / 6 h / 8 h / 12 h from hh:mm	No analysis Option: Intermediate analysis set by an external signal on terminal 83 Intermediate analysis cycle Analysis start time
614	Analysis daily	On Off hh:mm	Record and memorise daily minimum, maximum and average values No daily recording and memory Time for daily analysis and memory
615	Analysis monthly	On Off	As address 614 but for the month
616	Analysis yearly	On Off	As address 614 but for the year

Hint: The start times for the intermediate analysis (measurement period) and the daily or monthly analysis are independently presettable.
On option "external measurement period" a control signal (at least 30 seconds and a maximum of 1 month) on terminal 83 sets the time for the measurement period.

13 Serial interface (operating level 8)

13.1 Setting up parameters

Here the parameters for data transmission are set.

Overview level 8

810	811	812	813	814	815
Interface type	Interface address	Baudrate	Parity	Stopbits	Databits

Interface parameter

Addr.	Description	Selection	Function / description
810	Display of interface board type installed		
811	Set up unit address	00..99	When using more than one unit connected in series using RS 485 each unit requires an individual unit address
812	Set up Baudrate	300, 600, 1200, 1800, 2400, 4800, 9600, 14400	
813	Set up parity	even, odd, mark, space	
814	Set up stopbits	1, 2	
815	Data bits	7	

13.2 Pin layout (Sub-D connector to DIN 41 652, 9 pin socket)

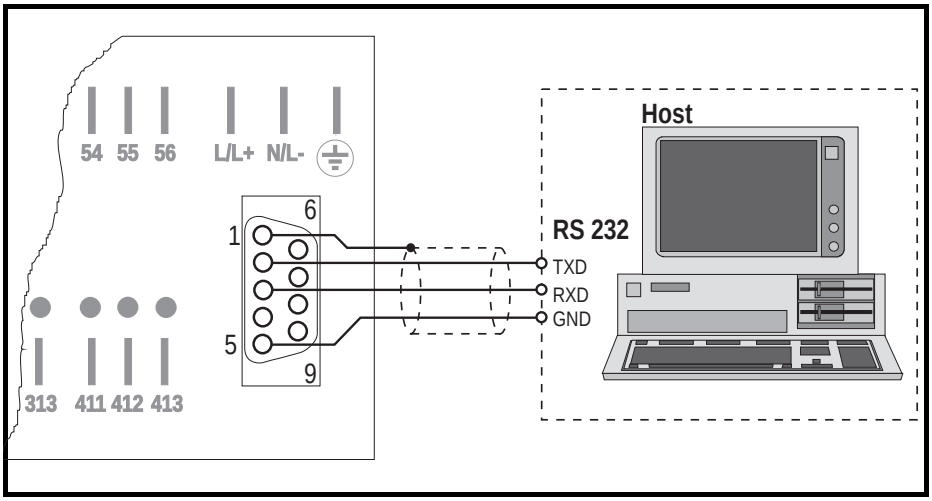
Pin layout

Pin	RS 232	RS 422	RS 485
1	Screen	Screen	Screen
2	TXD		
3	RXD	RXD (-)	RXD/TXD (-)
4		TXD (-)	
5	GND	GND	GND
6			
7		GND	
8		RXD (+)	RXD/TXD (+)
9		TXD (+)	

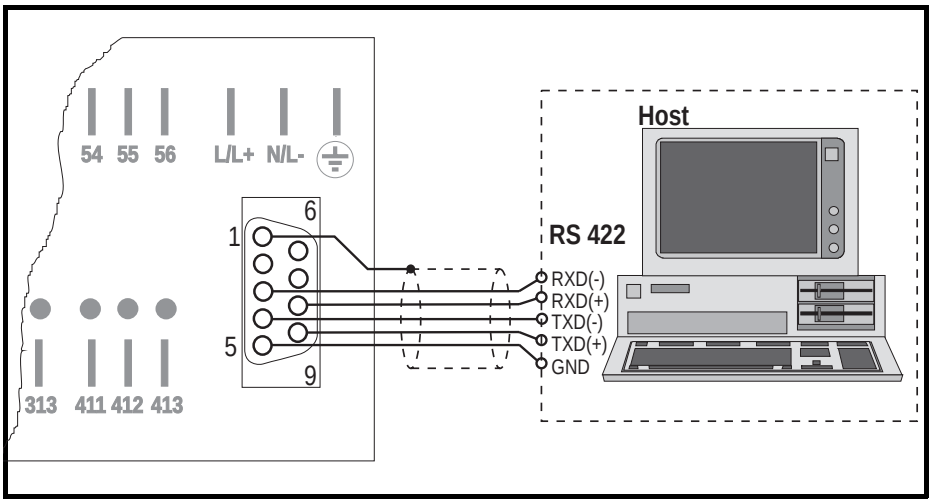
Attention:
Spare pins (-) must not be connected!

13.3 Interface types and their connection

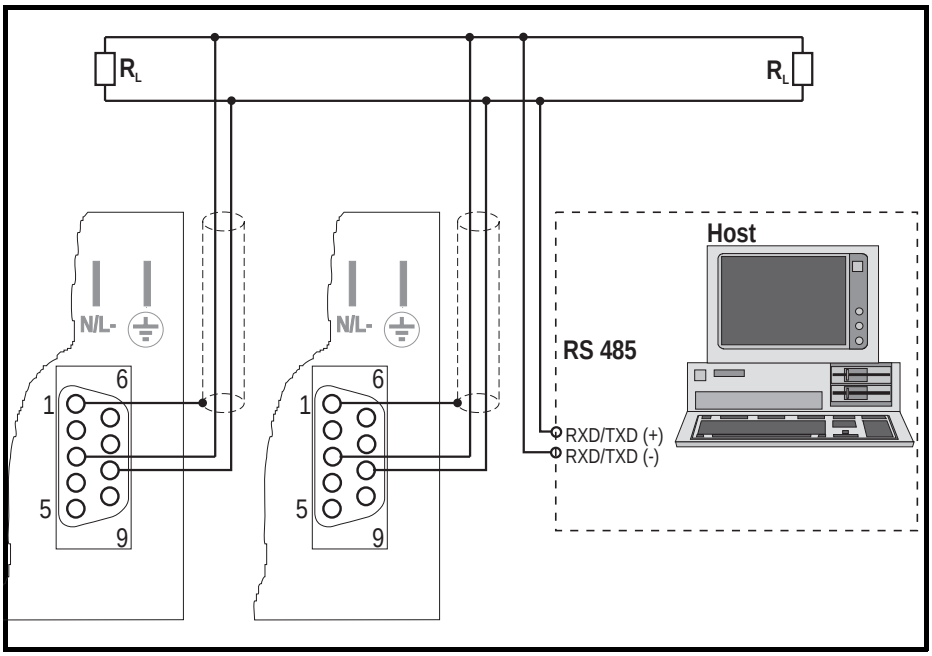
Using the serial interface the data manager can be directly connected to a personal computer using the same type of interface.



RS 232 interface



RS 422 interface



RS 485 interface
Bus system

13.4 Uses for the serial interface

Using the interface one or more data managers can be set up and the memorised data can be called up as an on-screen display or for further evaluation purposes.
As well as the standard RS 232 interface (normally available in every personal computer) which is meant for individual unit connection, it is possible to operate using an RS422 and RS485 interface for simple Bus systems. This means that a maximum of 32 units can be series connected.

Please note that when using a RS232 / RS485 converter that this must automatically switch between send and reveive. (e. g. W+T Typ 86000).

Danger:
The serial interface in your unit is defined as a measurement and control interface. Connection to the level of an office data handling system is not permitted !

13.5 Interface software

Delivered with the unit is the PC operating software ReadWin.

The following can be done using ReadWin:

- Set up units
- Display actual measured values in tabular form
- Read out memorised values (even using Modem) and store these on hard drive
- Display hard drive memorised values graphically or as a table
- Preformat data for further analysis using normal spread sheets.

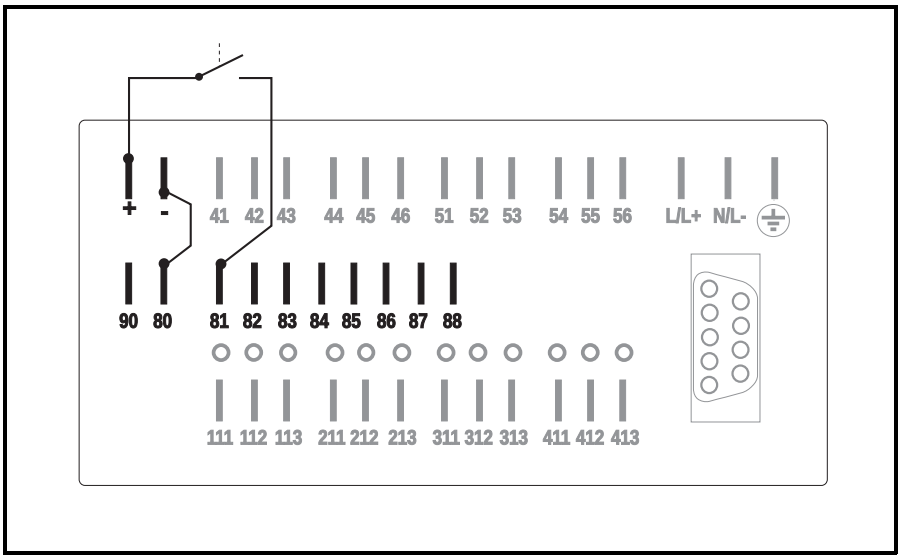
In addition to this files MEMORY.EXE and READOUT.EXE will be copied in the ReadWin file path. MEMORY.EXE can be used to calculate the amount of data that can be stored on memory cards (various sizes) with varying unit configurations.
READOUT.EXE is used for data readout when using customer specific programmes (eg. batch programmes).

14 Option control in/outputs

14.1 Terminal layout

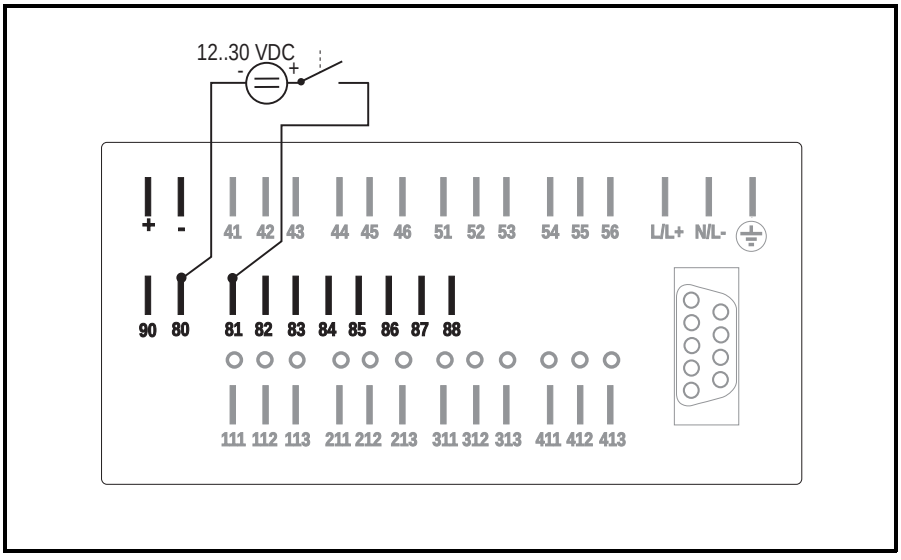
Terminal	Function
81	Time counter 1
82	Time counter 2
83	External intermediate analysis
84	External signal analysis inactive command
87	Time synchronisation (on remote synchronisation)
88	Output remote synchronisation
90	+ Supply for control output
+	Auxiliary voltage +
-	Auxiliary voltage GND

14.2 Connection examples



Connection when using internal auxiliary power source (Example: time counter 1)

Attention:
Do not forget link between terminals "-" and "80"!



Connection when using an external voltage source (Example: time counter 1)
Recommended when using long cable runs

14.3 Control in/output functions

Time counter

Time counters 1 and 2 (inputs)
These automatically record the switch-on state of the two inputs seen over the signal analysis time cycles. This then gives a simple possibility to monitor running times of, e.g. pumps, heaters, machines etc. in addition to the analogue measurement analysis. The cumulated times are stored on the memory card.

Measuring period (Intermediate analysis)

External measuring period eg. for calculation of batch min., max. and average values (input)
The control signal activates a measuring period. If a further signal is active within a second of the last measurement period ending, then continuous measurement period recording is guaranteed.

Analysis suppression

External suppression of the signal analysis (input)
Times where recording, memory and limit monitoring are not needed can be set using this input signal.
Typical applications are on process shutdown, service or maintenance times.

Time synchronisation

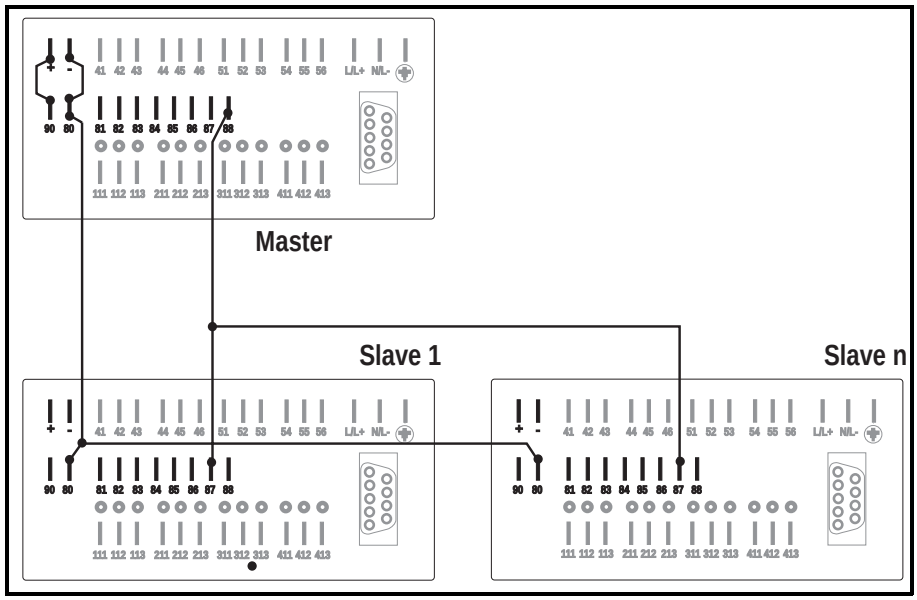
Time synchronisation (input)

A control impulse (min. 100 ms) from an external source synchronises the internal time. If the control impulse is active between hh:mm:00 ... 29s the seconds are set to zero, if the time is between hh:mm: 30 ... 59s the minute is increased by 1 and the seconds set to zero.. The control impulse can come from an external timer and/or from a neighbouring unit (master).

Remote synchronisation

Remote synchronisation (output)
A fleeting contact (length 375ms) is available every hour at the control output connection. Using this output a “master unit” can synchronise the time at one or more “slave units”.

Connecting the control output (Remote synchronisation)



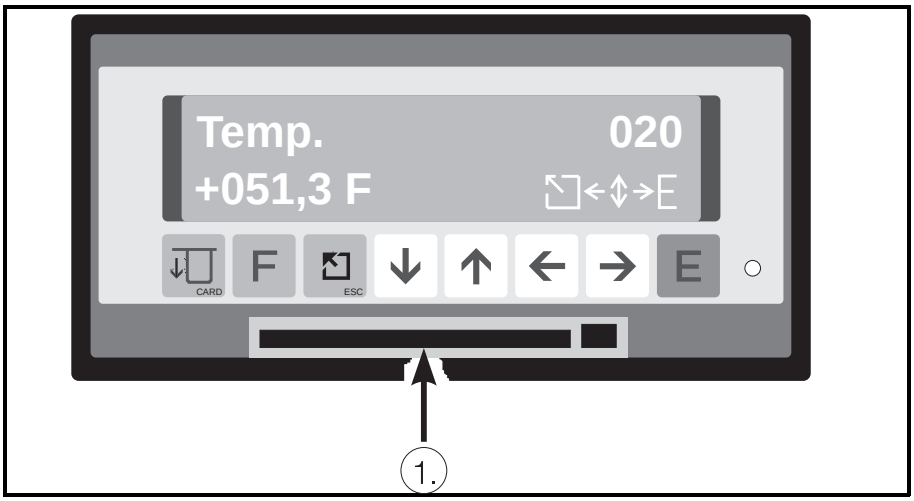
15 Option: memory card
15.1 General information

Dependent on the memo-log version each active analogue channel and mathematic channel statistic values as well as counter values are saved on memory. This is done using a memory card (PCMCIA standard).
Dependent on the intermediate, daily, monthly and yearly analysis periods or alarm memory cycle the following data is memorised:

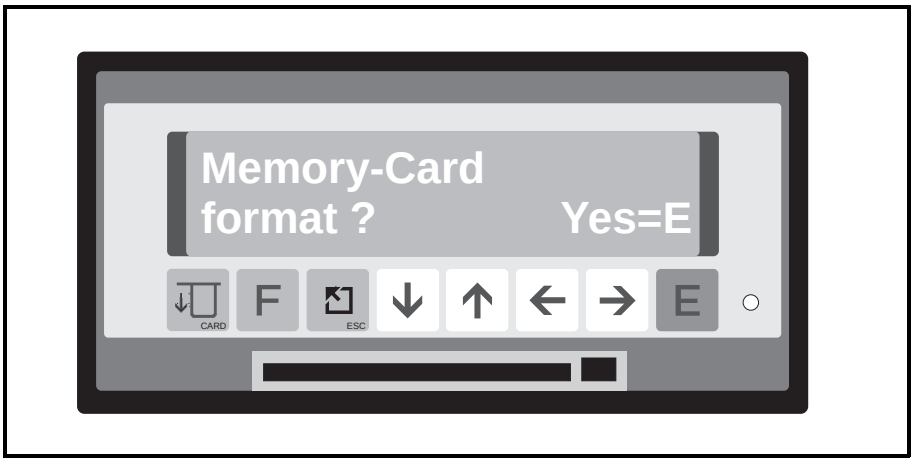
- Minimum value (if memory cycle is larger than 15 sec)
- Maximum value (if memory cycle is larger than 15 sec)
- Average value
- Time counter 1
- Time counter 2
- (Impulse) counter A
- (Impulse) counter B
- Sum counter A+B

The memory time of the card is dependent on various factors such as the initial card capacity, the preset intermediate analysis time cycle and alarm memory cycle. If the card is being changed there is an internal buffer of at least 3 minutes available. Avoid electrostatic discharges when handling the memory card !

15.2 setting up memory card



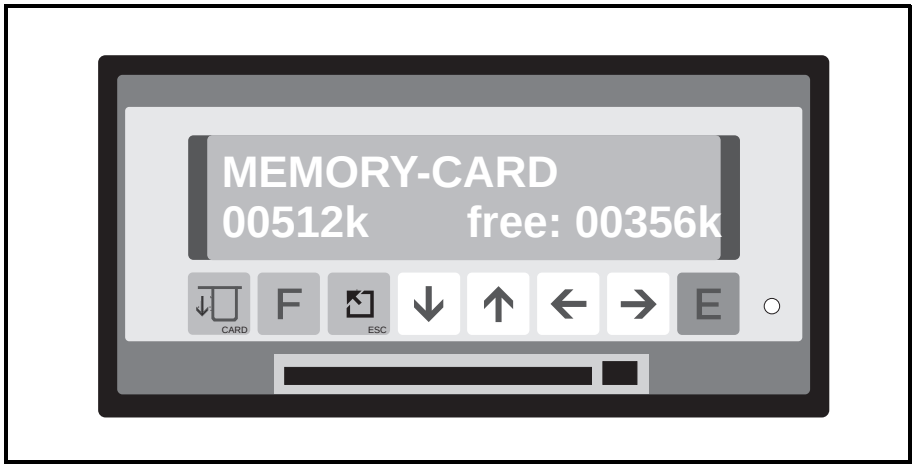
Place the memory card in the card holder ① , until you feel it click into position. The card is recognised by the unit when the card test indicated in the display is active.



An unformated or wrongly formated card is recognised and the question “Memory-Card format Yes=E” is asked. The format sequence is automatically started once the E push button is operated.

The memory card status is displayed once formatting has been completed:

Memory card status

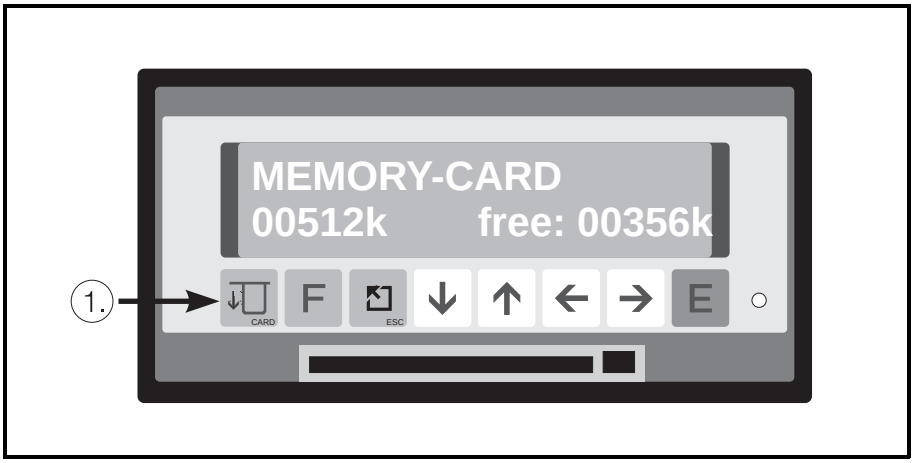


B: Full or B: Empty
The battery inside the memory card is measured and the result displayed. When “Empty” is displayed the battery must be replaced.

00512k free: 00356k
The memory card memory capacity is displayed in the lower left corner of the display and dependent on the type of card used, will show 00064k, 00512k or 01024k.
The amount of free memory is displayed in the lower right corner of the display.
These values are usually nearly equal on unused cards. It is possible to use already used cards up to the point of full capacity, however it is recommended if long term memory is required to delete old data and start with a blank card (See Basic settings addr. 113).

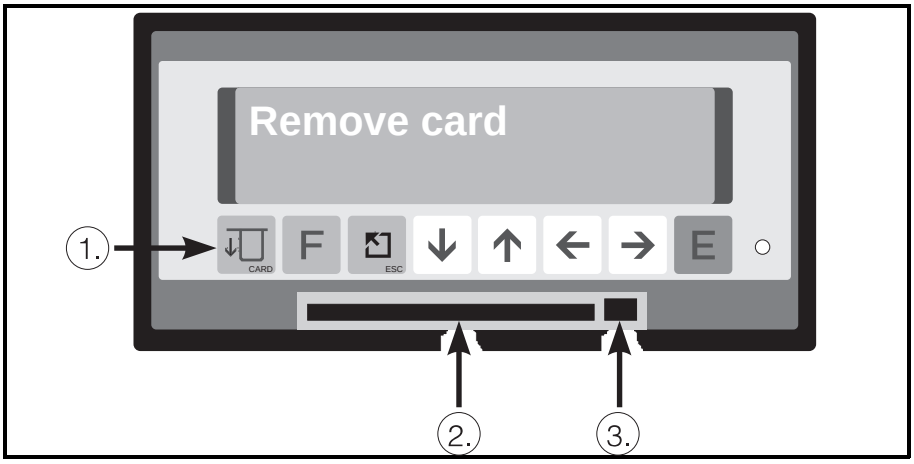
15.3 Testing memory card status during operation

Status test during operation



There are two ways to read off the memory card status using the display:
1. Operate the card push button ① twice (status will be fleetingly shown) or
2. Select display address 0C9 (status will be permanently displayed)

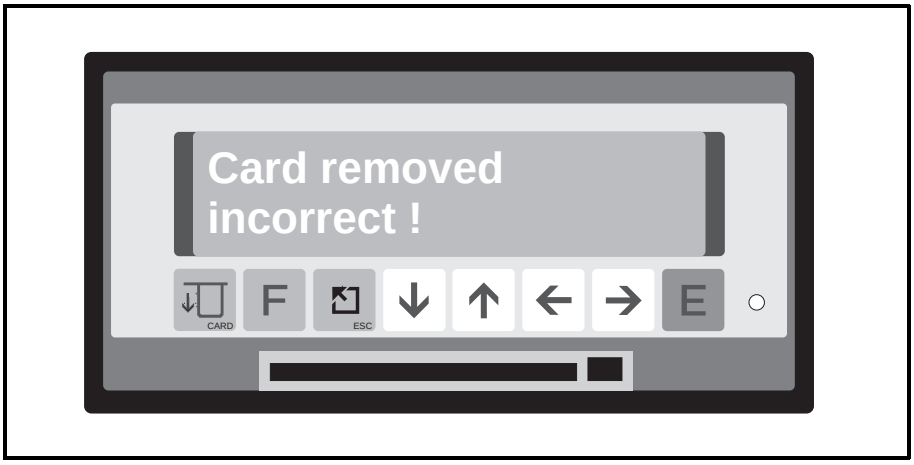
15.4 Removing memory card



Remove card
Be careful!

Operate push button ① once before removing the memory card. Only operate the mechanical card eject button ③ and remove the memory card from the slot ② when the display reads “Remove card”.
From this time the internal buffer takes over all storage functions for a minimum of 3 minutes. A new memory card must be inserted within this time otherwise the memory will overrun and data will be lost.
If required the buffer memory status can be displayed during the time the memory card is removed by operating the card push button ①.

Hint:



ERROR !

If the memory card has been removed incorrectly this is displayed.
Limited data loss can occur!

15.5 Data format

Data is stored in the file MEMORY.DAT on the memory card in a PCMCIA format (Version 4.1) as readable as DOS data.

Transfer of data to the computer is done with the assistance of the ReadexT software. This is done either using the serial interface or the either built-in or connected memory card drive. This drive must be able to be accessed by the computer as a normal diskdrive with its relative drive letter (eg. **D:** or **E:**).

15.6 Memory card capacity

The memory capacity is dependent on:

- Memory size of the memory card used
- Number of active analogue and mathematic channels
- Options used
- Signal analysis time cycles
- Alarm memory cycle of the analogue and mathematic channels

As a rule of thumb use the following tables to indicate typical values for min. or. max. memory capacity in hours. These values can change dependent on which options are used:

Memory card 64 kByte:

Measurement period 30 seconds (Alarm memory cycle off)

Channels	A	B	C	D
1	17	13	11	9
2	11	9	8	7
3	8	7	6	5
4	7	6	5	4
5	5	5	4	3
6	5	4	3	3
7	4	4	3	3

Memory capacity in hours:
A = Internal intermediate analysis, no time counter option, **B** = Time counter
C = External intermediate analysis, **D** = Time counter + intermediate analysis

Memory card 64 kByte:

Measurement period 1 hour (Alarm memory cycle off)

Channels	A	B	C	D
1	2046	1518	1348	1097
2	1366	1108	945	815
3	1025	872	727	648
4	819	720	592	538
5	684	613	499	460
6	586	533	431	402
7	513	472	379	357

Memory capacity in hours:
A = Internal intermediate analysis, no time counter option, **B** = Time counter
C = External intermediate analysis, **D** = Time counter + intermediate analysis

Memory card 256 kByte:

Measurement period 30 seconds (Alarm memory cycle off)

Channels	A	B	C	D
1	80	60	52	42
2	53	43	36	31
3	40	34	28	25
4	32	28	23	21
5	26	24	19	17
6	23	21	16	15
7	20	18	14	13

Memory capacity in hours:
A = Internal intermediate analysis, no time counter option, **B** = Time counter
C = External intermediate analysis, **D** = Time counter + intermediate analysis

Measurement period 1 hour (Alarm memory cycle off)

Channels	A	B	C	D
1	9316	6916	6138	4996
2	6217	5047	4305	3710
3	4665	3975	3315	2950
4	3733	3278	4695	2449
5	3112	2789	2270	2049
6	2668	2426	1962	1828
7	2334	2149	1727	1622

Memory capacity in hours:
A = Internal intermediate analysis, no time counter option, **B** = Time counter
C = External intermediate analysis, **D** = Time counter + intermediate analysis

Memory card 1024 kByte:

Measurement period 30 seconds (Alarm memory cycle off)

Channels	A	B	C	D
1	332	247	216	176
2	221	180	151	131
3	166	141	116	104
4	133	116	95	86
5	110	99	80	73
6	95	86	69	64
7	83	76	60	57

Memory capacity in hours:
A = Internal intermediate analysis, no time counter option, **B** = Time counter
C = External intermediate analysis, **D** = Time counter + intermediate analysis

Measurement period 1 hour (Alarm memory cycle off)

Channels	A	B	C	D
1	38398	28503	25300	20500
2	25625	20805	17743	15290
3	19228	16381	13662	12161
4	15387	13509	11108	10093
5	12826	11493	9358	8629
6	10994	10001	8085	7534
7	9621	8851	7117	6686

Memory capacity in hours:
A = Internal intermediate analysis, no time counter option, **B** = Time counter
C = External intermediate analysis, **D** = Time counter + intermediate analysis

15.7 Battery change

The battery built into the memory card must be changed when the display shows the status message “Empty”.

Please read the instructions supplied with each memory card to see how this is done.

16 Faults and solutions

Danger:

Only repair faults that can be completely analysed. If a fault analysis is not possible, contact your supplier. As long as the unit is connected to a mains power source live components may be accessible when removing covers or other components. This is not the case where components can be removed by hand. Certain terminals on the rear panel of the unit can also be live.

For your own safety it is not recommended that calibration, maintenance or repairs be done on an open unit when under power. If this cannot be avoided then these tasks must be carried out by skilled personnel who are aware of the inherent dangers.

It can be assumed the unit cannot be safely operated:
- if it is visibly damaged
- if it no longer operates (no LED and display OFF)
- if it has been in storage under adverse conditions (eg. condensation) for a long period of time
- if the unit has been transported in bad conditions
- after dampness has entered the unit (humidity too high)

Always take note of the chapter "Safety information" !

16.1 Faults that the unit recognises and displays

The unit indicates recognised faults as running messages in the display. Each fault message means that the unit no longer operates safely and the display, limit messages and measurement value storage could be influenced. If the problem cannot be localised and solved take the unit out of operation and either return it for repair or contact your supplier's service department.

The following fault messages are displayed:

Message: **"Last operating data change invalid due to power failure!!"**
Cause: Power failure whilst leaving operating level
Solution: Reset the changed addresses to the required value

Message: **"RAM error: Process values destroyed!!"**
Cause: Long storage times (accumulator empty), memorised data unusable
Solution: Accumulator will be automatically recharged when connected to power. If the message continues, have the unit checked out.

Message: **"EEPROM error: Preset done!!"**
Cause: The memorised settings were unusable. Factory settings have been loaded.
Solution: Switch unit off. Call service

Message: **"Real time error: New system time set 01.01.01 01:01!!"**
Cause: The clock IC delivered the wrong time
Solution: Reset the clock (date and time). If this fault reoccurs the unit must be checked.

Message: **"I^2C bus error!!"**
Cause: The processor system can no longer communicate with the peripheral IC
Solution: Switch unit off. Have it checked.

Message:	**"Cable open circuit channel X"**
Cause:	2 mA measured at 4..20 mA input
Solution:	Check transmitter, cables and connections
Message:	**Analogue board X type recognition is destroyed. Call service !!"**
Cause:	The EEPROM analogue board identifier is unplausible.
Solution:	Switch unit off. Call service
Message:	**"Calibration values of analogue board X are faulty, recalibrate!!"**
Cause:	Board faulty or uncalibrated analogue board being used
Solution:	Recalibrate
Message:	**"Expansion board 'Control input X' is missing!!"**
Cause:	The option is active but board is missing
Solution:	Plug in board
Message:	**"The serial interface type identifier is destroyed, call service!!"**
Cause:	Board faulty
Solution:	Switch unit off. Have it checked.
Fault:	**Display and LED do not light up**
Cause:	No power to the unit or the unit fuse has blown
Solution:	Check mains power supply, if required change internal unit fuse

16.2 Other faults and messages

Fault:	**Display value inaccurate**
Cause:	**Solution:**
Signal cable too long	Shorten cable to max. 2...3 m when using 2 wire systems, replace with 3 wire system
Link not used by current signals	Set link correctly (see chanpter: Anlogue inputs)
4..20 mA input signal but set up for 0..20 mA	Set the correct input signal in the operating level
Inductive interference on voltage signals	Install cables again Using screened cables. Change to a current signal.
Wrong cold junction compensation point when using thermocouples	Set the correct compensation value in the operating level. (see chapter "Analogue inputs")
General long term drift	Recalibrate unit (see 16.4.2)

Fault:	**Green LED flashes**
Cause:	**Solution:**
Operating parameters being set up	Return to display level
Timer has deactivated unit	Check timer

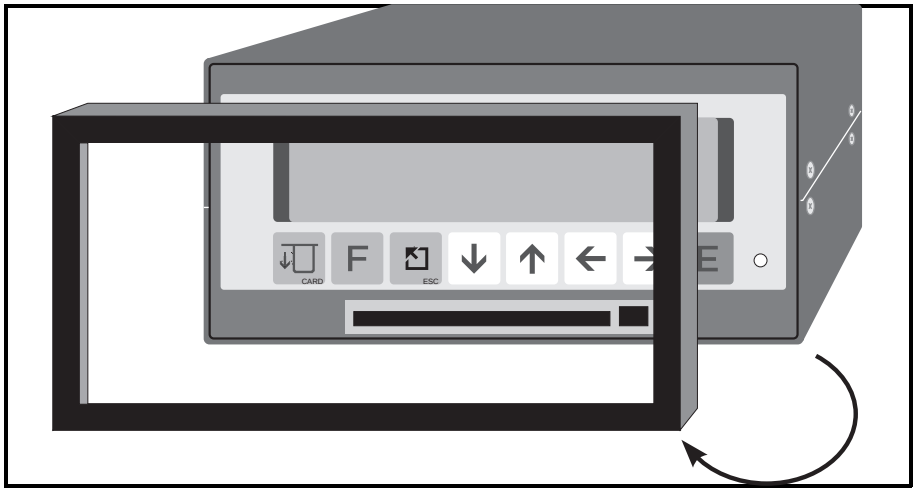
Fault:	**Red LED continuously lit**
Cause:	**Solution:**
Unit fault	Check fault and either repair or let the unit be repaired by service
Memory card is full or not there	Exchange full memory card for an empty one

Fault:	**Red LED flashes**
Cause:	**Solution:**
Memory card is up to 90 % full	Prepare to change card

16.3 Replacing unit fuse

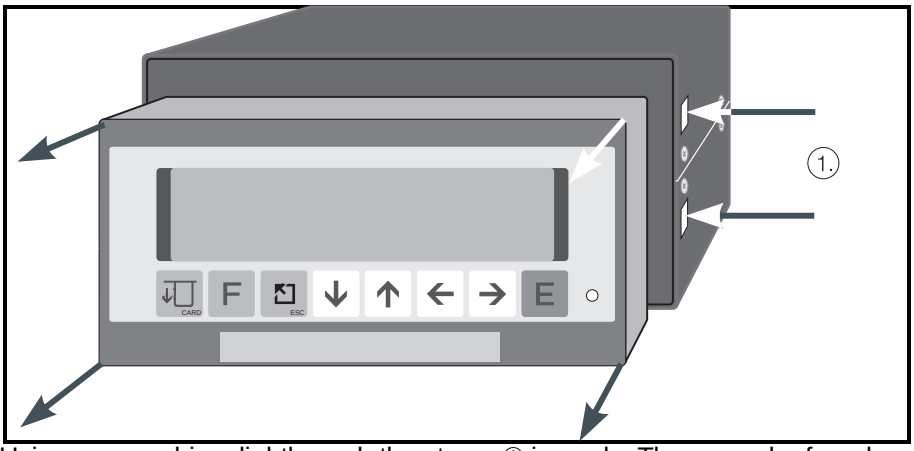
The unit fuse is positioned on the power supply board. Remove power from the unit and disconnect all cables. Remove unit from the panel.

Remove the front bezel



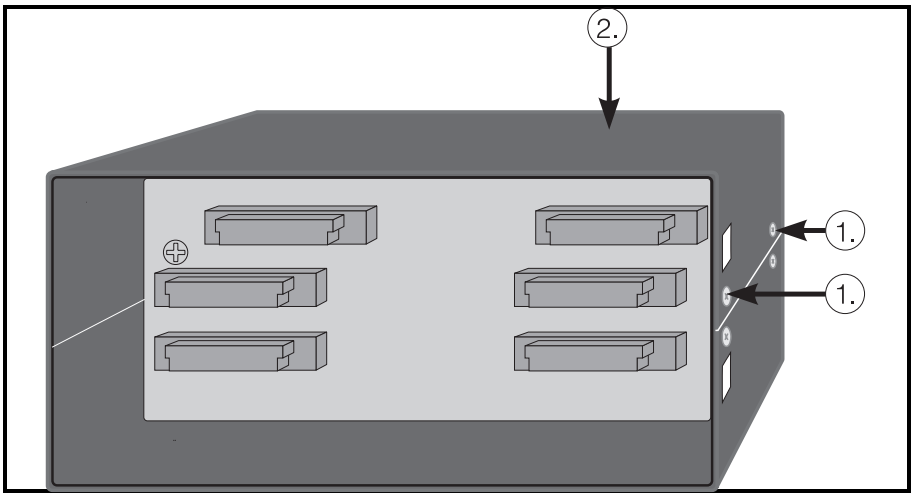
Remove front bezel.

Remove display from the housing



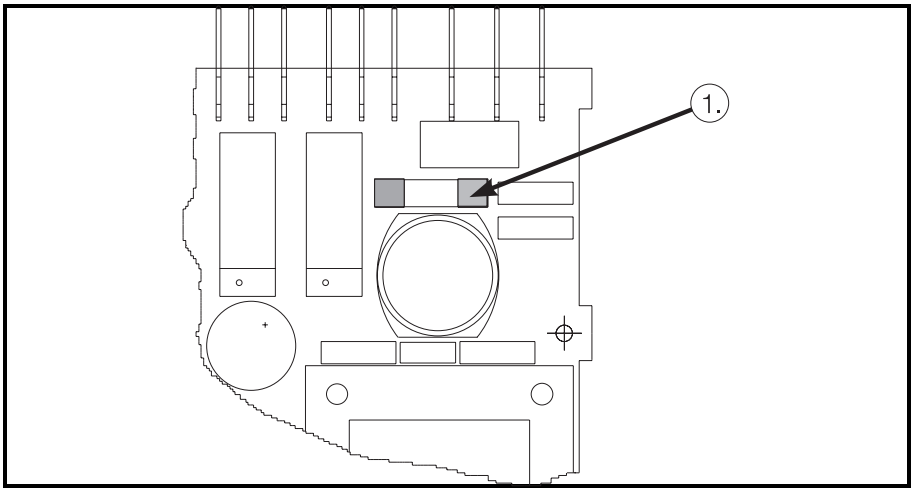
Using a screwdriver lightly push the straps ① inwards. These can be found on both the left and right hand side of the unit. Now remove the display.

Remove boards



Loosen the screws ① on both sides. Lift upper housing cover ② , lift the rear panel and printed circuit board and hinge to the side.

Exchange ① fuse



Danger: Make sure that only fuses of the type and current rating stated in the technical data sheets are used. The use of repaired or short circuited fuses or fuse holders is not permitted. Before returning the unit into operation make sure that all earth connections are made!

16.4 Service that you can do yourself

In the main menu (operating levels) under the service section various service information messages can be displayed, tests done and analogue channels can be calibrated.

All addresses can be secured against unauthorised tampering by means of an access code.

The following codes are available for the user:

Code:	**Access for**:
5051	In addition to the features opened by the code 6051 the following can be accessed: - Run display test
5050	In addition to the features opened by the code 5051 the following can be accessed: - Calibrate analogue channels - Release options

16.4.1 Run display test

Step	**To do**
1	- Select service level in main menu
2	- Operate "E push button
3	- Using “arrow right push button” select address 912
4	- Operate “E push button”
5	- Using "arrow push button" set code 5051
6	- Operate “E push button”
7	- Operate “E push button”
8	- Display test runs for approx. 5 seconds
9	- Operate “Home push button”. Return to main menu
10	- Operate “Home push button”. Return to display level

16.4.2 Digital calibration of analogue channels

Step	**To do**
1	- Select service in the main menu
2	- Operate “E push button”
3	- Using “arrow push buttons” select address 910
4	- Operate “E push button”
5	- Using "arrow push buttons" set code 5050
6	- Operate “E push button”
7	- Operate “E push button”
8	- Using “arrow down push button" select channel address 9X0
9	- Connect the requested seignal
10	- Operate “E push button”
11	- Using “arrow right push button" access further calibration points
12	- Operate “E push button”
13	- Connect the requested signal
14	- Operate “E push button”
15	- Using “arrow right push button" select address 9X5
16	- Operate “E push button”

Calibrate further channels or

17	- Operate “Home push button”. Return to main menu
18	- Operate “Home push button”. Return to display level

17 Technical data

Masurement unit

Measurement frequency / resolution	100 ms (all channels), 15 Bit
Measurement range: Standard input board	Voltage: 0 ... 1/10 V (overrange: max. 50 V) Current: 0/4 ... 20 mA via shunt (overrange: max. 100 mA) Cable open circuit monitor: ≤ 2 mA (range 4 ... 20 mA)
	Input impedance > = 1 MOhm on voltage / 50 Ohm on current (on rear panel PCB)
	Accuracy: Basic accuracy: < = 0.2 % FSD Long term drift: < = 0.2 % FSD Power up drift up to 4 h: < = 0.1 % FSD Temperature drift: < = 0.2 % / 10 K
Measurement range: Universal input PCB (option)	0/4 .. 20 mA via 50 Ω shunt Ni 100 -60 .. +180 °C Pt 500 -100 .. +600 °C Pt 100 -100 .. +600 °C Pt 1000 -100 .. +600 °C
	Typ L -200 .. +900 °C Typ K -200 .. +1372 °C Typ U -200 .. +600 °C Typ J -210 .. +1200 °C Typ B 200 .. +1820 °C Typ T -270 .. +400 °C Typ S 0 .. +1800 °C Typ N -270 .. +1300 °C Typ R -50 .. +1800 °C
	Cold junction compensation: internal, ext. 0 °C, ext. 20 °C, ext. 50 °C, ext. 60 °C, ext. 70 °C, ext. 80 °C
	0 .. 1 V ±2 V ±0,1 V 0 ... 10 V ±1 V ±50 mV ±10 V ±0,2 V ±20 mV ±5 V
	Basic accuracy: 0.2 % FSD Power up drift up to 4h: 0.2 % FSD Temperature drift: 0.2 % FSD/10 K Cable open circuit monitor: on thermocouples from approx. 50 kOhm
Damping	Time constant presettable: 0 .. 999.9 s, System basic damping negligeable

Influencing effects

Environment	To DIN 40040, 43782/Teil 2 Ambient temperature: 0 .. +50 °C Storage temperature: -20 .. +70 °C
EMC immunity	To NAMUR recommendation NE 21: Without functional interference due to: – Elect. fast transients (bursts): Level 4, IEC 801-4 VDE 0843/4 – Electrostatic discharge: Level 4, IEC 801-2 VDE 0843/2 – Electromagnetic fields: Level 3, IEC 801-3 VDE 0843/3 (Exception RTD or ranges < 1V: Level 2, max. allowable deviation on RTD ≤ 1.5 % v. MB., at ± 20 mV ≤ 0,6 % v. MB.)
Normal mode noise rejection (not on resistive measurment)	> 40 dB on input range/10 (50 Hz / 60 Hz ±0.5 Hz)
Common mode noise rejection	< = 0.1 % measurement span at 160 V (50 Hz/60 Hz ±0.5 Hz) (Standard input board)
Power failure	No functional reduction due to mains power loss up to 20 ms. Longer power losses: Unit automatically starts up
Potential difference	Channel to channel 100 V, no accessible dangerous voltage
RF immunity	To EN 55011: Class A

Function/ interface/ display

Function	Analytical data memory ("analogue signal analysis"): Analogue signal analysis into minimum
Serial interface	RS232 C, option: RS422/485
Limit monitor	All channels 1 x per second; 5 limits per analogue channel, 1 limit for each of the following: intermediate/daily/monthly/total impulse counters Per (impulse) counter, each limit presettable to one of the four integrated relays
Display	2 x 20 digit fluorescent display for digital measured value display and/or trend bar graph Operating languages: German

Power supply

Power supply	230 V AC - 115 V AC - 24 V AC (50/60 Hz
Electrical safety	to VDE 0411/IEC 348
Primary fuse	630 mA slow blow (230 V power supply) 630 mA slow blow (115 V power supply) 3,15 A slow blow (24 V AC/DC power supply)
Power consumption	max. 15 VA (with all options)

Housing/ connections

Housing	Stainless steel, for 144 x 72 mm panel mounting
colour	RAL 7016
Front door (option)	selectable with lock or latch
Protection class (front)	without door: IP 20 D to EN 60529 With door: IP 54 to IEC 529
Installation depth	210 mm
Connections	Spade terminals (DIN 46244), 6.3 x 0.8 mm or 2.8 x 0.8 mm

Further in/outputs

(Impulse) count input	2 count inputs, max. 25 Hz
Control inputs	2 time counters, external signal analysis release and block, Time synchronisation (in combination with output signal “remote synchronisation”) Control to DIN 19 240: Logic 0 equals 3 V ... +5 V, Logic 1 equals +12 V ... +30 V Input current: 2-3 mA Bounce time: max. 5 ms Signal length: min. 100 ms
Control output	1 control output for remote synchronisation of a number of units On hour change: Fleeting contact for 375 ms
Auxiliary voltage	Auxiliary voltage from unit: approx. 24 V DC, 100 mA
Analogue output	0/4 .. 20 mA, Load < 500 Ohm 0 .. 10 V, 2 mA Accuracy: 0.5 % FSD Power up drift 4h: 0.3 % FSD Temperature drift: 0.3 % FSD / 10 K
Relay outputs	4 Relays, each with 1 x changeover contact, 3 A, 250 VAC Insulation class A to VDE 0110
Power supply	Max. 3 power supplies: 24 V, +/- 10 %, 24 mA, short circuit protected; alternatives to analogue input channels

Technical alterations reserved !

17.1 How to order

Data manager MEMO-LOG

Power supply
D Multi supply 24 V AC/DC
F 115 VAC, 50/60 Hz
H 230 VAC, 50/60 Hz
Y Special version

Model
A 144x72 mm panel mounted, with bezel
B 144x72 mm panel mounted, door and latch
C 144x72 mm panel mounted, door and lock
Y Special version

Operating language
A German
B English
C French
S English, without operating instructions
Y Other versions

Signal calculation
1 Without signal calculation
2 MM = Mathematic module
3 INT = Integration
4 MM + INT
Y Special version

Count inputs / control inputs
A Without count and control inputs
B CI = two count inputs
C TMC = two time counters
D REM = external release/measurement block
E SYNC = remote time synchronisation
O CI + TMC
P CI + REM
Q CI + SYNC
R CI + TMC + REM
S CI + TMC + SYNC
T CI + TMC + REM + SYNC
I TMC + REM
J TMC + SYNC
K REM + SYNC
N TMC + REM + SYNC

Interface
1 RS 232 C
2 RS 422/485

Plug-in position 1
1 Standard analogue input 0/4...20 mA, 0...1/10 V
2 Multi voltage / thermo couple PCB
3 Pt 100/Ni 100 input
7 Universal input

Plug-in position 2/3/4
0 Not used
1 Standard analogue input 0/4...20 mA, 0...1/10 V
2 Multi voltage / thermo couple PCB
3 Pt 100/Ni 100 input
5 Linear analogue output 0/4...20 mA, 0...1/10 V
6 24 VDC, 25 mA power supply output
7 Universal input

Memory-Card
A None
B Memory card, 64 kByte
C Memory card, 256 kByte
D Memory card, 1024 kByte
Y Special version

Internal temperature compensation
0 Without internal temperature compensation
1 With internal temperature compensation

RD10- [ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ]

Europe

Austria
❑ Endress+Hauser Ges.m.b.H.
Wien
Tel. 01/ 8 80 56-0, Fax 01/ 8 80 56-35

Belarus
Belorgsintez
Minsk
Tel. (01 72) 26 31 66, Fax (01 72) 26 31 11

Belgium / Luxembourg
❑ Endress+Hauser S.A./N.V.
Brussels
Tel. (02) 2 48 06 00, Fax (02) 2 48 05 53

Bulgaria
INTERTECH-AUTOMATION
Sofia
Tel. (02) 66 48 69, Fax (02) 9 63 13 89

Croatia
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Zagreb
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Nicosia
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Weil am Rhein
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Greece
I & G Building Services Automation S.A.
Athens
Tel. (01) 9 24 15 00, Fax (01) 9 22 17 14

Hungary
Mile Ipari-Elektro
Budapest
Tel. (01) 2 61 55 35, Fax (01) 2 61 55 35

Iceland
BIL ehf
Reykjavik
Tel. (05) 61 96 16, Fax (05) 61 96 17

Ireland
Flomeaco Company Ltd.
Kildare
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Italy
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Cernusco s/N Milano
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Latvia
RINO
Riga
Tel. (07) 31 28 97, Fax (07) 31 28 94

Lithuania
Agava Ltd.
Kaunas
Tel. (07) 20 24 10, Fax (07) 20 74 14

Netherlands
❑ Endress+Hauser B.V.
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Raszyn
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Tecnisis - Tecnica de Sistemas Industriais
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