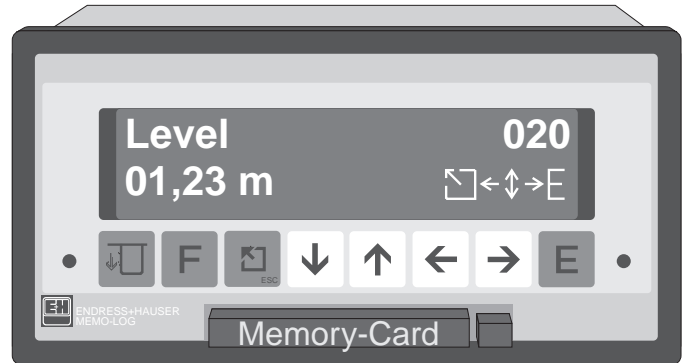
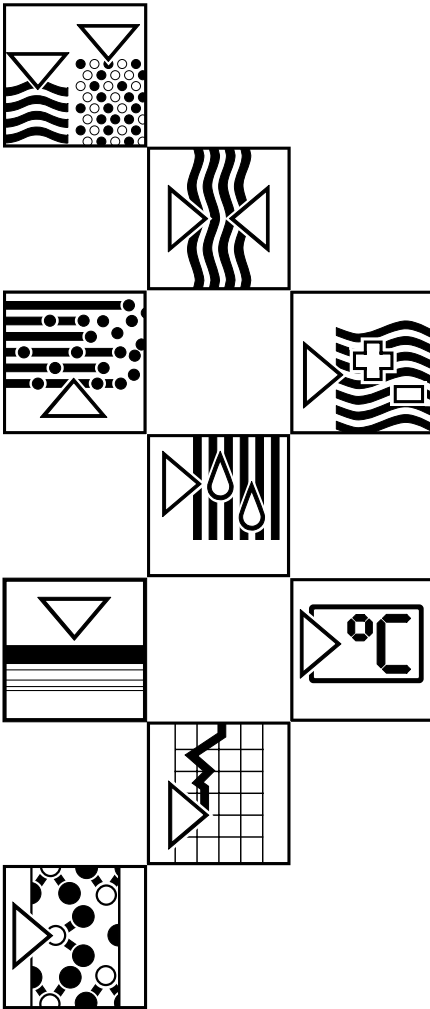


memo-log S

Data manager

Programme CMA 201 A
7 digital inputs/1 impulse output

Installation and operating instructions



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

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

- 2 keys for the front door
- 1 SRAM card, 1 3 1/2" diskette containing the readout software.

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

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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 !

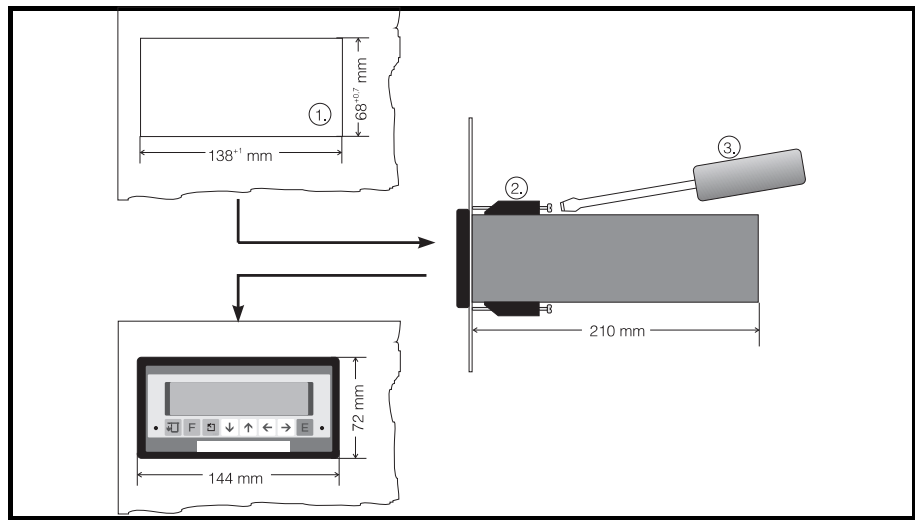


3 Installation

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,
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.

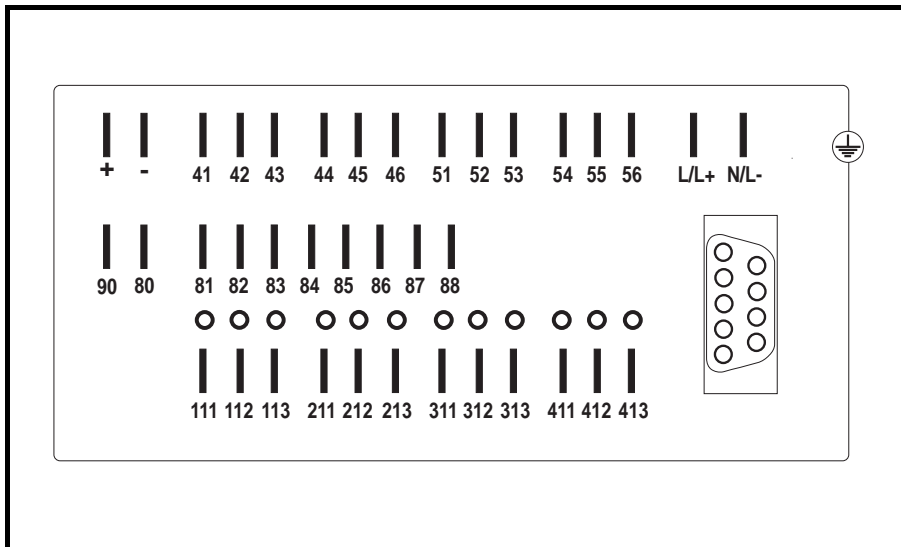
Make sure that the panel has sufficient ventilation so that the ambient operating temperature of the unit is not exceeded.

3.2 Environmental conditions

Please take note of the conditions set in the technical data, chapter 18, 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 digital in/outputs

81 (+)	Digital input 1	Channel A
82 (+)	Digital input 1	Channel A
83 (+)	Digital input 2	Channel B
84 (+)	Digital input 3	Channel C
85 (+)	Digital input 4	Channel D
86 (+)	Digital input 5	Channel E
87 (+)	Digital input 6	Channel F
88 (+)	Digital input 7	Channel G
90 +	Impulse output supply	

Analogue channels

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	0 V, 0/4 mA	-
213	2		Sense	10 V	
311	3	+	A	20 mA	+
312	3	-	B	0 V, 0/4 mA	-
313	3		Sense	10 V	
411	4	+	A	20 mA	+
412	4	-	B	0 V, 0/4 mA	-
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	-



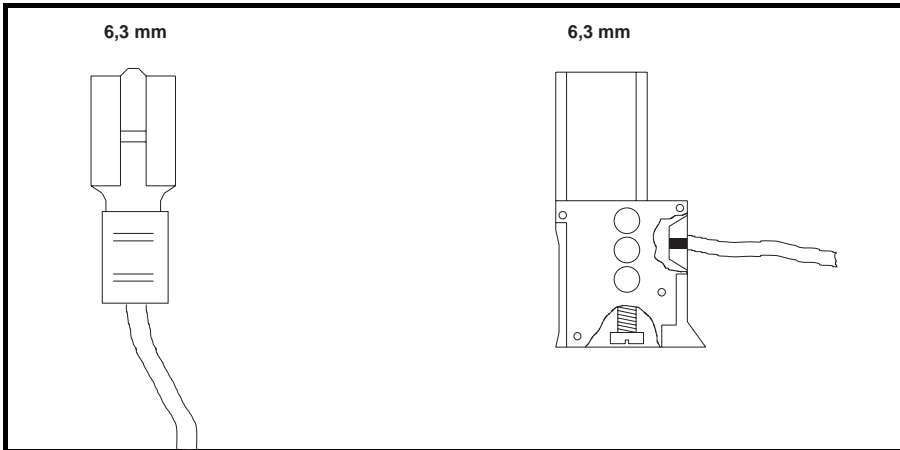
Attention:
Free pins must not be connected!

4 Connecting mains power supply

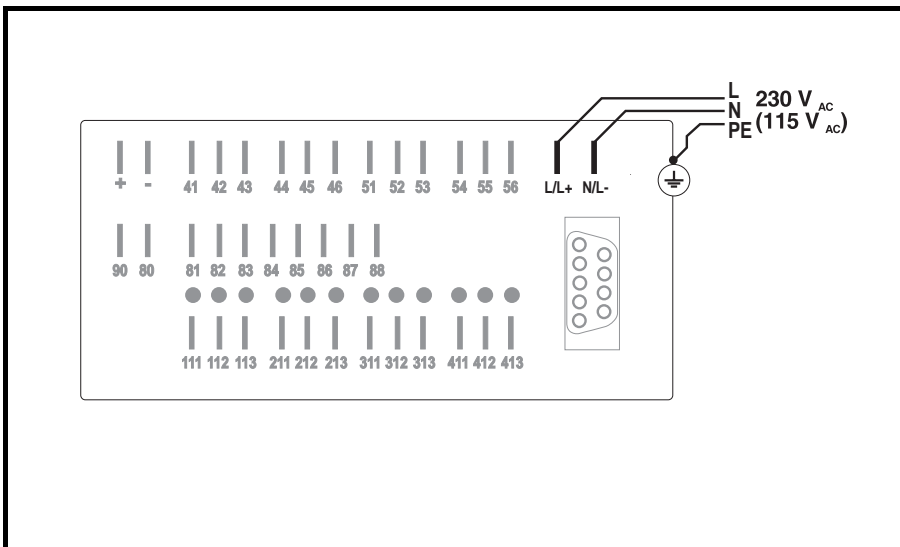
The following connectors are needed:

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

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



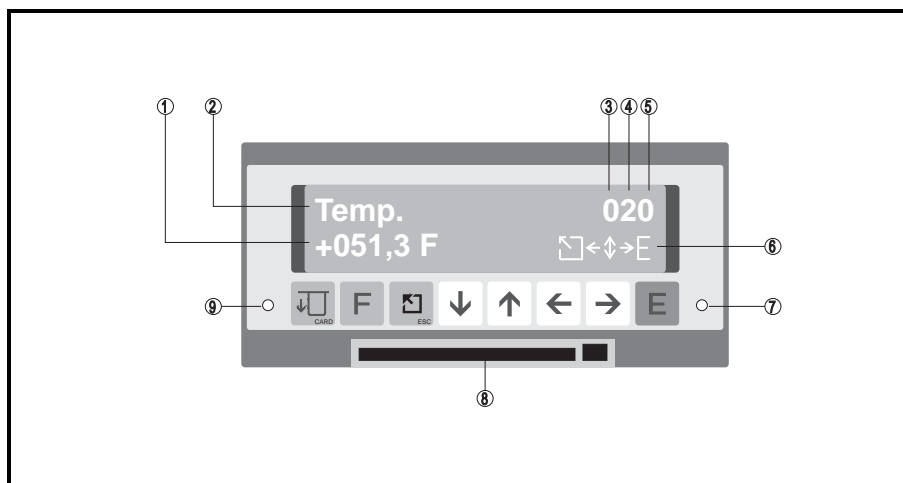
Spade connectors /
Screw terminals



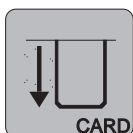
Connection example for
230 VAC / 115 VAC

4 Operation and display

Front view



4.1 Push buttons



Memory push button

- Operate before removing card.
- Displays memory status.



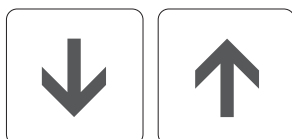
Function push button

- Operates function selected in basic settings level.



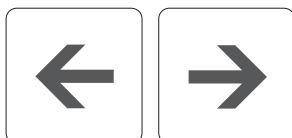
Home push button

- 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).

4.2 Displays

- (1) Measured value (in display level) or changable 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)/(9) 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.

5 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.

5.1 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 Analogue channels:	Setting up analogue in/outputs
3 Q/H curves:	Presetable linearisation tables (option)
4 Digital channels:	Setting up digital inputs
5 Modem:	Setting up modem parameters
8 Interface:	Interface parameters

9 Service: Unit information and maintenance

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

5.2 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 setting up level from the main menu using push buttons ↓ and ↑.
- Operate the ENTER push button once more when the setting up level has been selected.

5.3 Selecting a setting up address within a level



The fast way:

Using push buttons ←↑↓→ select the required setting up address.



The safe way:

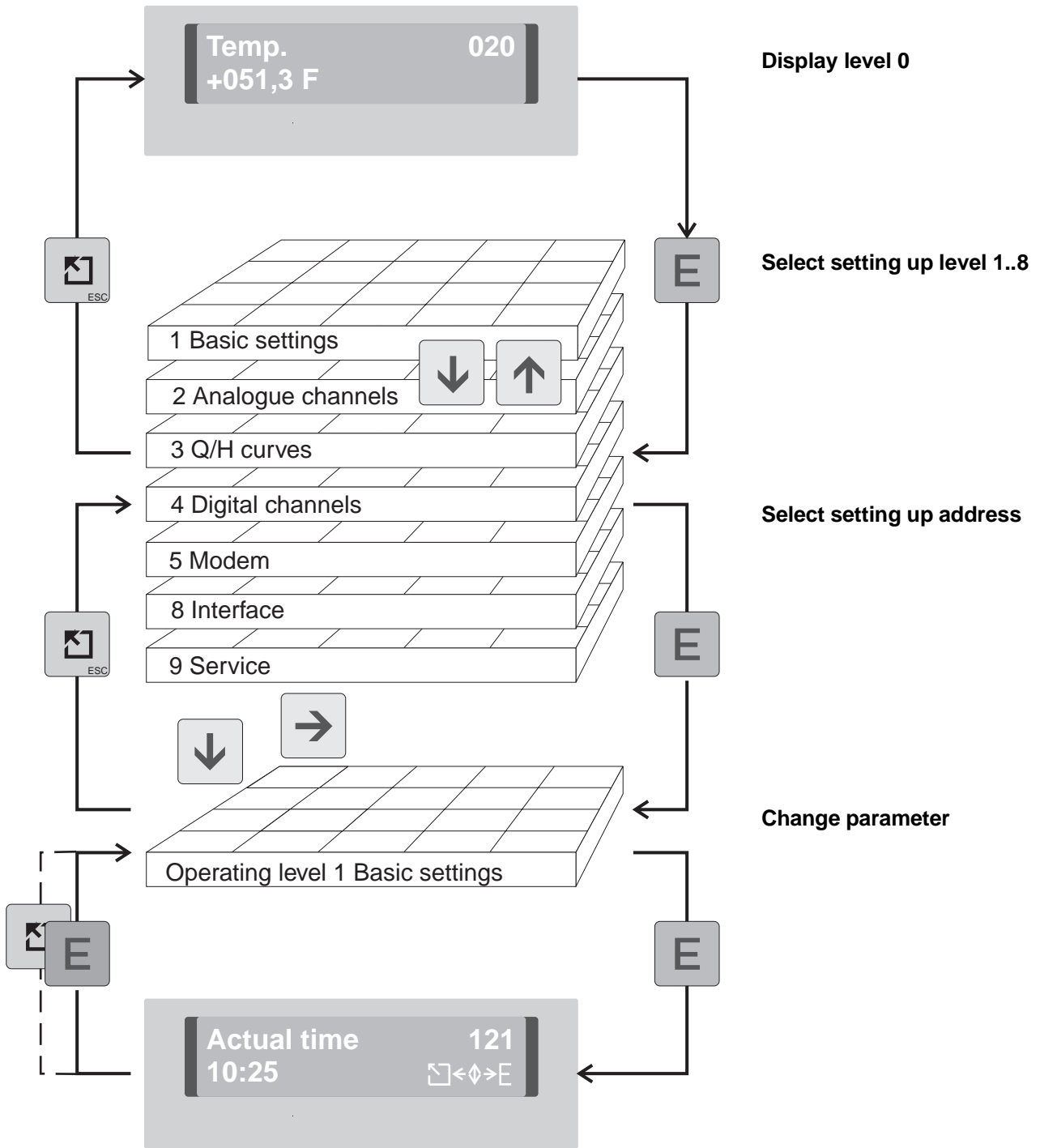
Use only the → push button. Operating this automatically leads through all the setting up addresses within the selected setting up level.

5.4 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.

5.5 Schematic diagram of the setting up sequence



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.

6 Display level

6.1 Display level (operating level 0)

The display level addresses show the following values for all active channels:

- Instantaneous values (digital, and/or as bar graph)
- Memory status
- Quantities
- Condition

Examples:

010 Instantaneous value channel 1 digital display

040 Instantaneous value channel 4 digital display

011 Trend bar graph for channel 1

041 Trend bar graph for channel 4

012 Instantaneous value channel 1 digital / Trend bar graph for channel 1

042 Instantaneous value channel 4 digital / Trend bar graph for channel 4

0C0 Instantaneous value for channels 1 to 4 are scrolled

0C1 Trend bar graphs for channels 1 to 4 are scrolled

0C2 Instantaneous values and trend bar graphs are scrolled

0D0 Instantaneous values of 4 channels in engineering units

0D1 Instantaneous values of 4 channels in % of zoom value

0D9 Display of memory card storage capacity status

Digital display

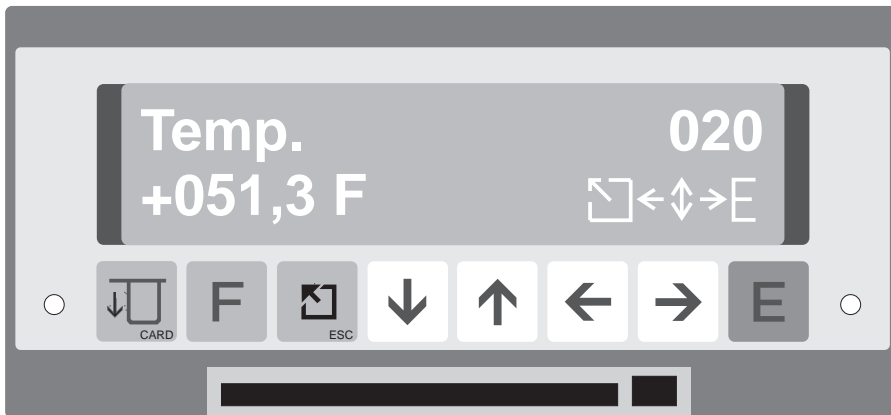


Instantaneous value
Trend bargraph
Instantaneous/
Trend bargraph
Event quantity
Daily quantity
Monthly quantity
Yearly quantity
Limit condition

Display level

Analogue input 1	010 Channel 1 1234,5 units	011 Channel 1	012 Channel 1 1234,5 units/ Event quantity +12345678,9 units	013 Channel 1 Daily quantity +12345678,9 units	014 Channel 1 Monthly quantity +12345678,9 units	015 Channel 1 Yearly quantity +12345678,9 units	016 Channel 1 Condition/limit	017 Channel 1 Condition/limit		
Analogue input 2	020 Channel 2 1234,5 units	021 Channel 2	022 Channel 2 1234,5 units/ Event quantity +12345678,9 units	023 Channel 2 Daily quantity +12345678,9 units	024 Channel 2 Monthly quantity +12345678,9 units	025 Channel 2 Yearly quantity +12345678,9 units	026 Channel 2 Condition/limit	027 Channel 2 Condition/limit		
Analogue input 3	030 Channel 3 1234,5 units	031 Channel 3	032 Channel 3 1234,5 units/ Event quantity +12345678,9 units	033 Channel 3 Daily quantity +12345678,9 units	034 Channel 3 Monthly quantity +12345678,9 units	035 Channel 3 Yearly quantity +12345678,9 units	036 Channel 3 Condition/limit	037 Channel 3 Condition/limit		
Analogue input 4	040 Channel 4 1234,5 units	041 Channel 4	042 Channel 4 1234,5 units/ Event quantity +12345678,9 units	043 Channel 4 Daily quantity +12345678,9 units	044 Channel 4 Monthly quantity +12345678,9 units	045 Channel 4 Yearly quantity +12345678,9 units	046 Channel 4 Condition/limit	047 Channel 4 Condition/limit		
Digital channel A			052 Digital channel A Event quantity +12345678,9 units	053 Digital channel A Daily quantity +12345678,9 units	054 Digital channel A Monthly quantity +12345678,9 units	055 Digital channel A Yearly quantity +12345678,9 units	056 Digital channel A Condition/limit			
Digital channel B			062 Digital channel B Event quantity +12345678,9 units	063 Digital channel B Daily quantity +12345678,9 units	064 Digital channel B Monthly quantity +12345678,9 units	065 Digital channel B Yearly quantity +12345678,9 units	066 Digital channel B Condition/limit			
Digital channel C			072 Digital channel C Event quantity +12345678,9 units	073 Digital channel C Daily quantity +12345678,9 units	074 Digital channel C Monthly quantity +12345678,9 units	075 Digital channel C Yearly quantity +12345678,9 units	076 Digital channel C Condition/limit			
Digital channel D			082 Digital channel D Event quantity +12345678,9 units	083 Digital channel D Daily quantity +12345678,9 units	084 Digital channel D Monthly quantity +12345678,9 units	085 Digital channel D Yearly quantity +12345678,9 units	086 Digital channel D Condition/limit			
Digital channel E			092 Digital channel E Event quantity +12345678,9 units	093 Digital channel E Daily quantity +12345678,9 units	094 Digital channel E Monthly quantity +12345678,9 units	095 Digital channel E Yearly quantity +12345678,9 units	096 Digital channel E Condition/limit			
Digital channel F			0A2 Digital channel F Event quantity +12345678,9 units	0A3 Digital channel F Daily quantity +12345678,9 units	0A4 Digital channel F Monthly quantity +12345678,9 units	0A5 Digital channel F Yearly quantity +12345678,9 units	0A6 Digital channel F Condition/limit			
Digital channel G			0B2 Digital channel G Event quantity +12345678,9 units	0B3 Digital channel G Daily quantity +12345678,9 units	0B4 Digital channel G Monthly quantity +12345678,9 units	0B5 Digital channel G Yearly quantity +12345678,9 units	0B6 Digital channel G Condition/limit	0B7 Optionen CPU number option code	0B8 Software version	0B9 Software Options
Scrolled channels	0C0 Scrolled Channel 1...4 +/-123,4 units	0C1 Scrolled channel 1...4	0C2 Scroll channel 1...4 +/-123,4 units							
Special display	0D0 Four way disp. channel 1...4 +/-123,4	0D1 Four way disp. channel 1...4 +/-123,4 %								0D9 Status memory-card

Digital display

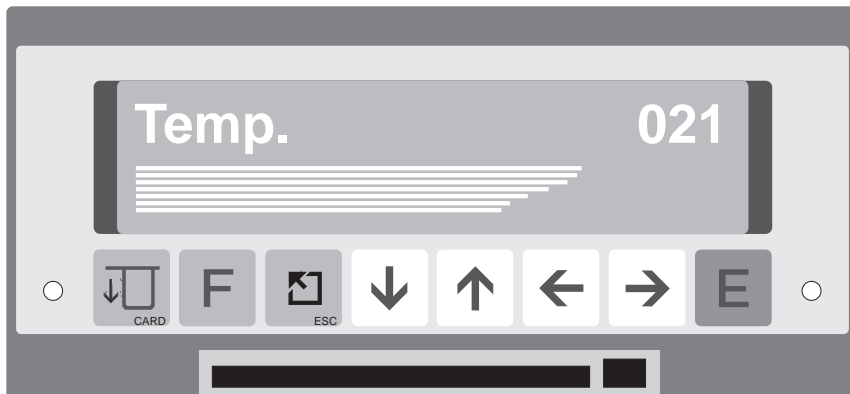


Example:
Digital display of measurement point "Temp." in Fahrenheit, channel 2

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

7 Basic settings (operating level 1)

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

Overview of level 1

110	111	112	113	114	115	116			
Unit identifier	Function key mode	Memory card off/on	Delete card yes/no	Fault relay	Telephone memory warning	Bargraph trend sequence			
120	121	122	123	124					
Actual date	Actual time	Mode changeover NT/ST	Change NT/ST	Change ST/NT					
130	131								
Measured value display free/block	Bargraph sequence in seconds								
140	141	142				146			
Daily analysis	Monthly analysis	Yearly analysis				Intermediate analysis			

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 Monthly report	"F-Taste" has no function Displays memory (card) status Printout of last monthly report
112	Activate memory card	On Off	Memory switched on 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
115	Telepone memory warning	Telephone No. (00) Telephone No. (01 ... 10)	There is no automatic telephone warning (Modem) Automatic warning using the selected telephone number when a capacity of 90% is reached
116	Bar graph sequence Trend bar graph	000s - 999 s	Preset time cycle in seconds between 2 bar graph lines. Trend bar graph is switched off when 000s is set
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 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
130	Quantity impulse	No Channel 1 Channel 2 Channel 3 Channel 4	Recording quantities for impulse output Only when address 2X2 is set to quantity recording

Addr	Description	Selection	Function/description
131	Impulse factor	xxxx l/Imp xxxx m ³ /Imp	xxxx Litre analogue signal of the input channel 1 ... 4 selected in address 130 equals 1 impulse at the impulse output eg. analogue input signal of 15 l/sec. Settings of 0005 l/Imp equals 3 Impulse/sec at the impulse output xxxx Cubic metre analogue signal of the input channel 1 ... 4 selected in address 130 equals 1 impulse at the impulse output
140	Daily analysis	Off 00:00 On 00:00	Daily analysis stored/printed out at the preset time
141	Monthly analysis	Off On	Monthly analysis stored/printed out on the first of each month at the time preset in address 140
142	Yearly analysis	Off On	Yearly analysis stored/printed out on the 01.01 of the year at the time preset in address 140
146	Intermediate analysis	Off 1 min • 12 h	No intermediate analysis Cycle for the intermediate analysis of the digital quantity channels

8 Analogue channels (operating level 2)

In this level analogue channel parameters are set.

Overview level 2

210 Channel 1 Channel identifier	211 Channel 1 Input signal	212 Channel 1 Quantity recording	213 Channel 1 Engineering units	214 Channel 1 Decimal point position	215 Channel 1 Scale upper/low	216 Channel 1 Filter 123,4 sec	217 Channel 1 Meas. cycle standard+ alarm	218 Channel 1 Limit alarm yes/no	219 Channel 1 Set point +/-123,4 Units.	21A Channel 1 Limit reaction relay + phone	21B Channel 1 Identifier on/off	21C Channel 1 Graphic	21D Channel 1 Trend value	21E Channel 1 Trend relay
220 Channel 2 Channel identifier	221 Channel 2 Input signal	222 Channel 2 Quantity recording	223 Channel 2 Engineering units	224 Channel 2 Decimal point position	225 Channel 2 Scale upper/low	226 Channel 2 Filter 123,4 sec	227 Channel 2 Meas. cycle standard+ alarm	228 Channel 2 Limit alarm yes/no	229 Channel 2 Set point +/-123,4 Units.	22A Channel 2 Limit reaction relay + phone	22B Channel 2 Identifier on/off	22C Channel 2 Graphic	22D Channel 2 Trend value	22E Channel 2 Trend relay
230 Channel 3 Channel identifier	231 Channel 3 Input signal	232 Channel 3 Quantity recording	233 Channel 3 Engineering units	234 Channel 3 Decimal point position	235 Channel 3 Scale upper/low	236 Channel 3 Filter 123,4 sec	237 Channel 3 Meas. cycle standard+ alarm	238 Channel 3 Limit alarm yes/no Ja/Nein	239 Channel 3 Set point +/-123,4 Units.	23A Channel 3 Limit reaction relay + phone	23B Channel 3 Identifier on/off	23C Channel 3 Graphic	23D Channel 3 Trend value	23E Channel 3 Trend relay
240 Channel 4 Channel identifier	241 Channel 4 Input signal	242 Channel 4 Quantity recording	243 Channel 4 Engineering units	244 Channel 4 Decimal point	245 Channel 4 Scale upper/low	246 Channel 4 Filter 123,4 sec	247 Channel 4 Meas. cycle standard+ alarm	248 Channel 4 Limit alarm yes/no	249 Channel 4 Set point +/-123,4 Units.	24A Channel 4 Limit reaction relay + phone	24B Channel 4 Identifier on/off	24C Channel 4 Graphic	24D Channel 4 Trend value	24E Channel 4 Trend relay
250 Analogue output 2	251 Analogue output 2 signal select.													
260 Analogue output 3	261 Analogue output 3 signal select													
270 Analogue output 4	271 Analogue output 4 signal select													

The Memo-Log has 4 analogue channels that can, (dependent on your order), operate as an input or output. Channel 1 is always an input.

8.1. Analogue inputs

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.

**Input signal,
measurement range**

All current and voltage signals can be individually set 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 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
Typ L:	-200,0..+900,0 °C	Typ U:	-200,0..+600,0 °C
Typ N:	- 0270..+ 1300 °C	Typ B:	0000..+ 1820 °C
Typ S:	0000..+ 1800 °C	Typ R:	-0050..+ 1800 °C
Typ K:	- 0200..+ 1372 °C	Typ J:	-0210..+ 1200 °C
Typ T:	-270,0..+400,0 °C		

Square root extraction**Linear/squared signal**

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

Cold junction compensation**Thermocouple cold junction compensation**

Temperature measurement using thermocouples requires the measurement of a reference temperature. The unit offers a choice of six external or one internal reference temperature. The internal is measured at the unit terminals.

At each analogue input three values can be simultaneously measured and recorded:

- Sequences (eg. level curves)
- Beginning, end length and frequency of events
- Quantities either by integration or by presettable Q/H curve calculation

8.1.1 Recording sequences**Storage on memory card**

The instantaneous analogue values are stored on a memory card in presettable time cycles. Once transferred to a PC they can then be displayed either graphically or digitally. There are two different time cycles presettable; the first is a standard (usually slow) , and the second a short time cycle active on an alarm condition. This then gives a higher resolution to the stored values..

Settings for alarm dependent storage

Limit alarm	(addr. 2x8)	:	YES
Limit value	(addr. 2x9)	:	eg.02,00 Ltr/s
Standard cycle	(addr. 2x7)	:	eg. 1 Std oder AUS
Alarm cycle	(addr. 2x7)	:	eg. 5 Min

The analogue signal can also be continuously, independent of limit infringement, stored.

Setting continuous storage

Limit alarm	(addr. 2x8)	:	NO
Standard cycle	(addr. 2x7)	:	eg. 15 Min
Alarm cycle	(addr. 2x7)	:	OFF

Sequence printout using a Uni-Bit printer

Sequence printouts on the printer connected to the Memo-Log S are always done dependent on events. If the preset limit of an analogue input is exceeded then all channels where the graphics are set to YES are printed out. The printout is made once the limit values of all analogue channels is undercut again. A condition for the printout is that the limit infringement is more than 5 minutes.

Limit alarm (addr. 2x8) : YES
 Limit value (addr. 2x9) : eg. 02,00 Ltr/s
 Graphic (addr. 2xC) : YES

Setting up printout on a Uni-Bit printer

8.1.2 Recording events

For each analogue channel limit infringements (events) can be stored on memory card, and/or printed out by the Uni-Bit printer.

Limit alarm (addr. 2x8) : YES
 Limit value (addr. 2x9) : eg. 02,00 Ltr/s
 Ident. on/off (addr. 2xB) : eg. ON OFF

Setting up limit infringement recording

- Time of limit infringement (event starting point)
- Time of limit return (event finishing point)
- Length of limit infringement
- Analogue signal peak value during limit infringement
- Quantity flow during limit infringement
 (if quantity recording is active see chapter 8.1.3)

The following is stored and/or printed:

Additionally the number and length of time of limit infringements per day, month and year can be recorded. Storage or printout of these values is done in accordance with the settings for daily, monthly and yearly analysis (setting up level 1, Base settings, addresses 140, 141 and 142).

Limit monitoring operates with a return hysteresis of 1%. The preset limit should therefore always be larger than 1% of the measurement range (scale).



8.1.3 Recording quantities

Each analogue input can record quantities. Here the instantaneous analogue value is integrated over preset periods of time, thus calculating the quantity. The quantity engineering units (eg. l/s) are set in address 2x2 and the sensor range (scale) in address 2x5.

If the sensor used delivers an already linear flow signal (eg. 4 ... 20 mA equals 0 ... 80 l/s) the quantity is directly integrated from this linear signal. If the ratio between analogue signal and quantity is not linear then the quantity measurement is done using a presettable Q/H curve (see chap. 9 Q/H curves).

Recording quantities from applications using more than one input size and special calculations (eg. incomplete overflow on storm tanks) is available on request.

Storage and/or printout of daily, monthly and yearly quantities is done in accordance with the settings in addresses 140, 141 and 142 setting up level 1 (Base settings,). Storage and/or printout of quantities over the time of an event is done when a preset limit is exceeded (Event end, see chap. 8.1.2).

8.1.4 Alarm on limit infringement

Each analogue input has the possibility to retransmit a limit infringement by switching a relay and/or by calling a preset telephone number via modem(see chap. 10 Relays and chap. 13 Modem). Relays (1..4) and telephone number (01..10) are selected in address 2xA.

Setting up alarm on limit infringement

Limit alarm	(addr. 2x8)	:	YES
Limit value	(addr. 2x9)	:	eg. 02,00 Ltr/s
Limit action	(addr. 2xA)	:	eg. Relais:2 Tel:07

Relay: 0	→	No relay alarm
Tel:00	→	No modem alarm

Please note that the selected relay must not be used for other functions such as remote control (see chap. 10).



Limit monitoring operates with a return hysteresis of 1%. The preset limit should therefore always be larger than 1% of the measurement range (scale).

8.1.5 Trend output

A change in the analogue signal per channel can be transmitted via relays (see chap. 10 Relays). This means that pumps or penstocks etc. can be controlled.

Specific control functions are possible on request.

8.1.6 Filter

Each analogue input signal can be filtered so that fast transient changes are not recorded. The filter is a low pass filter. The time constant is set in address 2x6.

Analogue inputs (x = 1..4)

Addr.	Description	Selection	Function/description
2x0	Channel identifier	15 characters, letters, numbers and signs	Measurement point or channel identifier (only 10 characters shown in the display)
2x1	Standard input Universal input	0..20 mA, 4..20 mA 0..1 V, 0..10 V Standard, squared 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	

Addr.	Description	Selection	Function/description
2x2	Quantity recording	No l/s l/min l/h cbm/s cbm/m cbm/h	No quantity recording on this channel Quantity recording in litre/sec Quantity recording in litre/min. Quantity recording in litre/h. Quantity recording in cbm/sec. Quantity recording in cbm/min. Quantity recording in cbm/h. Quantity recording only possible using standard input signals! (0/4..20 mA/0..1/10V)
2x3	Engineering units	5 characters, letters, numbers and signs	eg. °C, cm, Engineering units only possible if addr. 2x2 is set to NO!
2x4	Decimal point (fixed on Pt100 and thermocouples)	XXXX XXX,X XX,XX X,XXX ,XXXX	None One Two Three Four
2x5	Scale (fixed on Pt100 and thermocouples)		Sensor signal range
2x6	Filter	$\tau = 000,0s - 999,9s$	Against high frequency interference on input signals
2x7	Standard/ Alarm cycle	Off Off 1 min 1 min 12 h 12 h	Standard and alarm time intervals for instantaneous value storage onto memory card. No storage Storage intervals of 1,2,3,5,6,10,12,15,30 min 1,2,3,4,6,8,12 h
2x8	Limit alarm	No Yes	No action taken on limit infringements Limit infringements initiate the preset action (addr. 2xA)

Addr.	Meaning	Selection	Function/description
2x9	Limit value	xxxx engineering units	Preset limit value eg.: 0150 l/s
2xA	Limit action	Relay: 0 Tel: 00 Relay: 1 Tel: 01 Relay: 4 Tel: 10	No action taken on limit infringement Limit infringement action to preset relay 1..4 and/or telephone number 01...10 (addr. 520...529)
2xB	Description on/off	xxxxxx/xxxxxx	Text description for On/Off sequences eg.: on/off close/open
2xC	Graphic	Yes/No	Graphic printout of the sequence on the Uni-Bit printer
2xD	Trend value	xxxx	Signal change/minute value for initiating a trend relay
2xE	Trend relay	Rise: 0 Rise: 1 . . . Rise: 4 Fall: 0 Fall: 1 . . . Fall: 4	No relay for rising signal Relays 1..4 for rising signal No Relay for falling signal Relays 1..4 for falling signal

8.2. Analogue outputs

Analogue channels 2 ... 4 can be fitted as output channels (always note on order code).

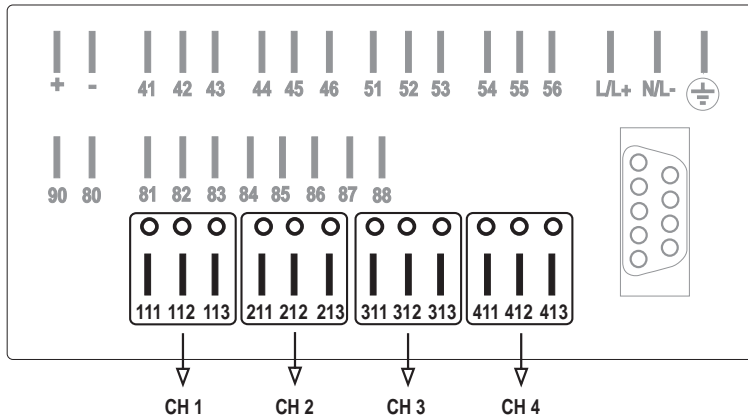
An output can be used to retransmit an analogue input (eg. linearised via the Q/H curve function) or for remote control of penstocks or valves using the serial interface/modem. The use of the output is set in addr. 2y0 and the output signal in addr. 2y1.

Output channels (y = 5..7)

Addr.	Meaning	Selection	Function/description
2y0	Output	Remote control	Presettable using PC software
		Channel 1	Output switched to instantaneous value of channel 1
		Channel 2	Output switched to instantaneous value of channel 2
		Channel 3	Output switched to instantaneous value of channel 3
		Channel 4	Output switched to instantaneous value of channel 4
2y1	Output signal	0..20 mA 4..20 mA 0..10 V	Signal is retransmitted using the preset range

8.3 Connections

Channels 1 to 4
Rear panel view



CH 1 = Channel 1, CH 2 = Channel 2 etc.

Connections

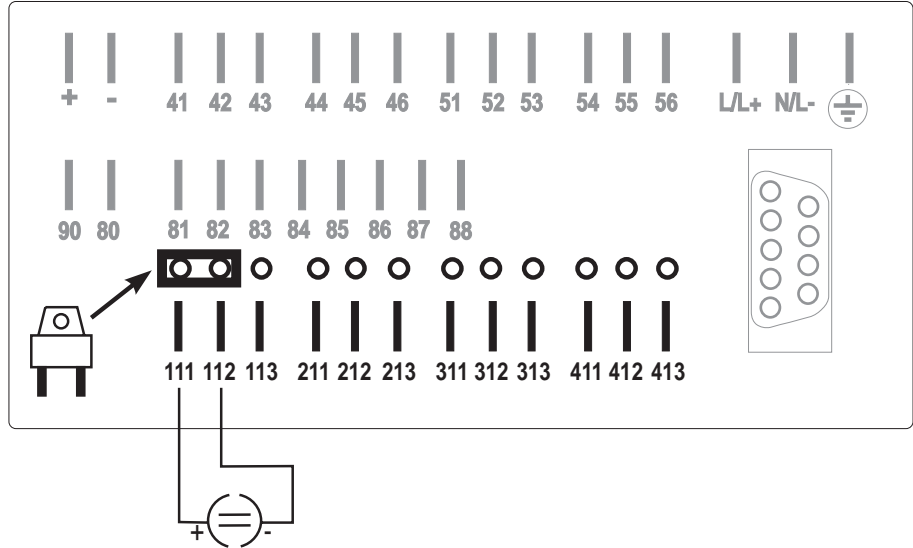
Terminal	Channel	Current, Voltage, Thermocouples	Resistive thermometer	Analogue output	Power supply output
111 112 113	Chan. 1 Chan. 1 Chan. 1	+ - not used	Pt100 A Pt100 B Sense		+ 24 V ⊥ not used
211 212 213	Chan. 2 Chan. 2 Chan. 2	+ - not used	Pt100 A Pt100 B Sense	+ 0/4..20 mA - 0/4..20 mA, ⊥ + 0..10 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.

8.3.1 Analogue signal connections

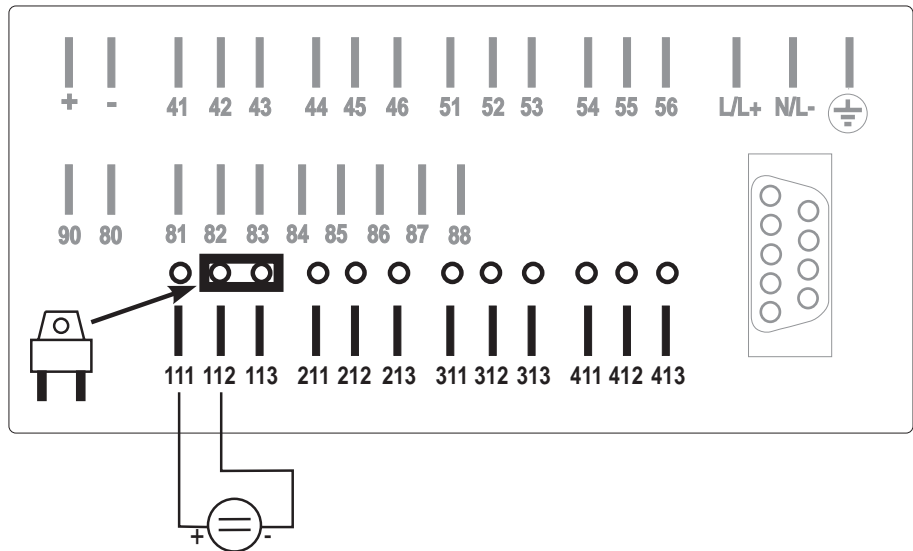
Current signals

Connection example of a current measurement system on channel 1



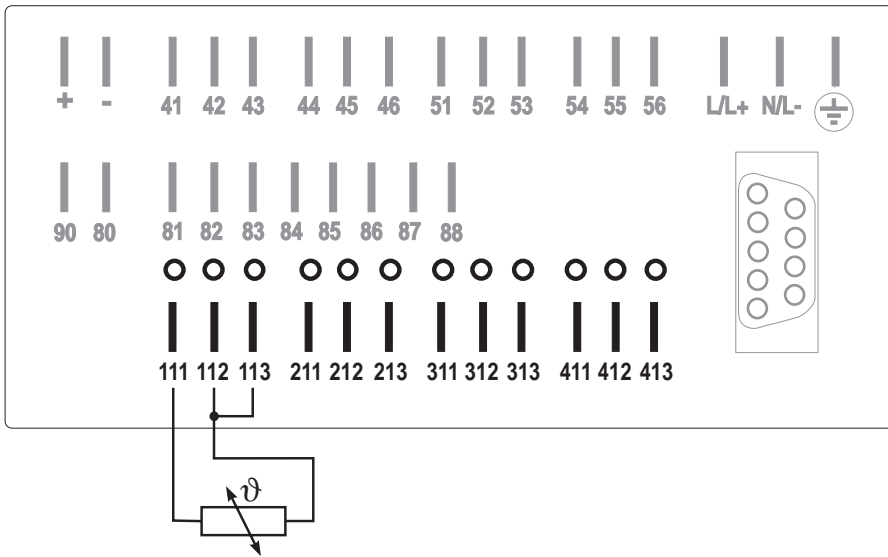
Voltage signals and Thermocouples

Connection example of a voltage or thermocouple measurement system on channel 1



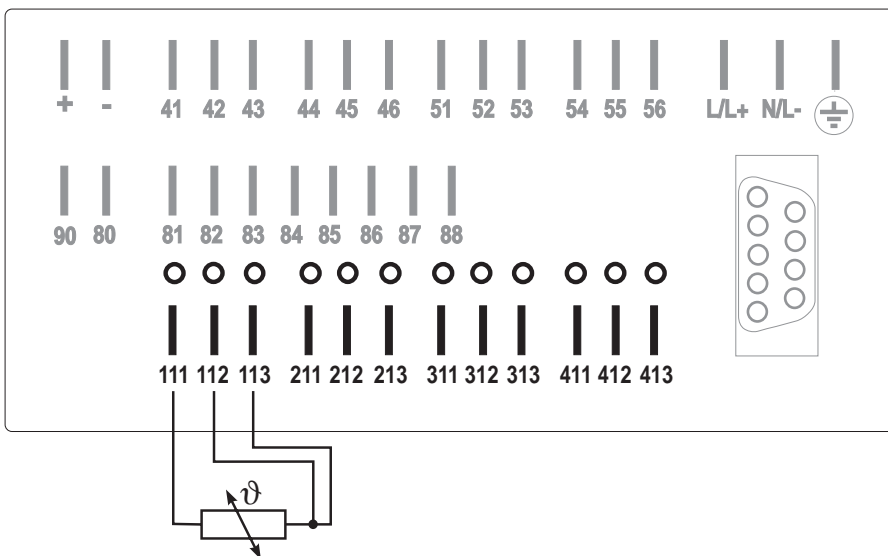
Resistive thermometer (Pt100)

2-wire system:



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

3-wire system:



Connection example of a 3-wire RTD (Pt100) measurement system on channel 1

8.3.2 Connection using loop power supply

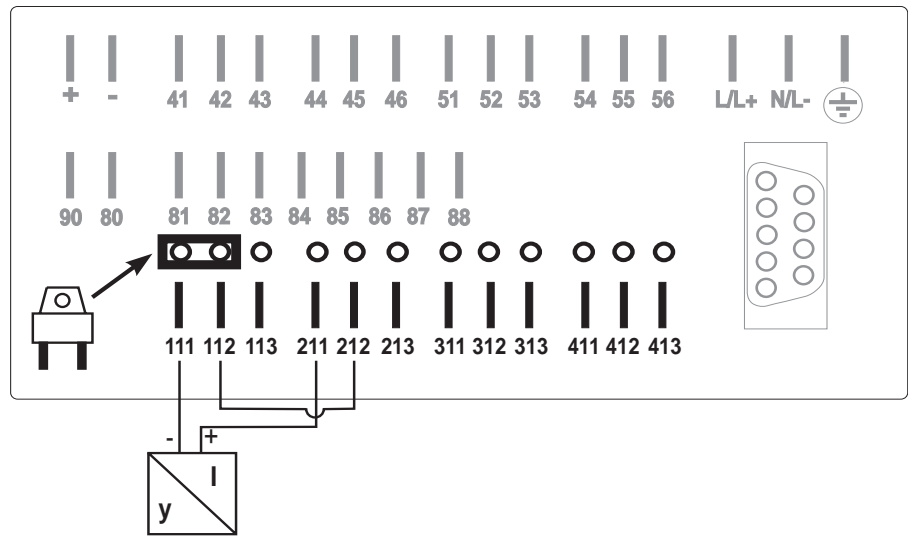
It is possible to power up to 3 transmitters (eg. Pt100 head transmitters) from the unit. Each power supply output PCB requires one of the input plug-in positions 2 ... 4.

Power supply technical data:

- Output voltage 24 VDC, $\pm 10\%$, 24 mA short circuit protected
- Open circuit voltage 30 VDC

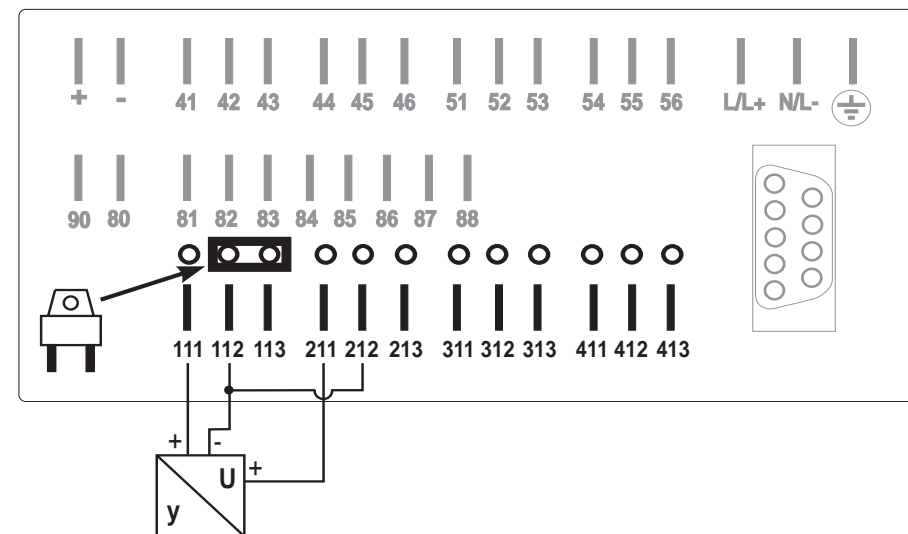
2-wire loop power (measuring current signal):

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

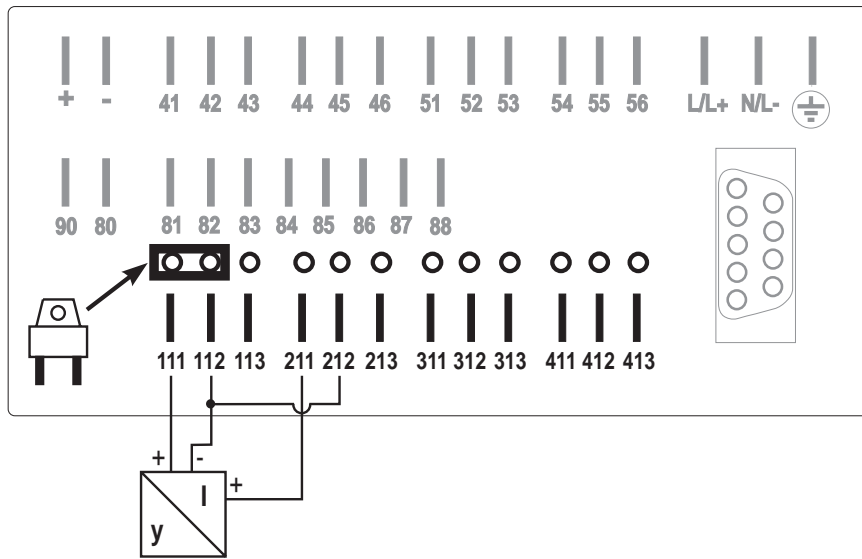


3-wire loop power (measuring voltage signal):

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

Hint:

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



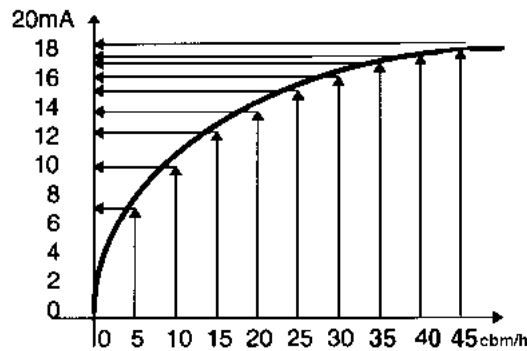
9. Setting the Q/H curves (Option) (operating level 3)

Using the Q/H curve:

The Q/H curves offer the possibility to linearise various input signals. There are 33 presettable signal set points available that can be allocated to either current or voltage input signals. The first and last points are always the scale lower and upper points from addr. 2x5. Quantity recording must be active (addr. 2x2).

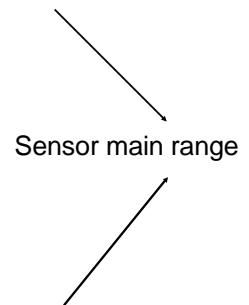
Example:

Linearisation curve of an external sensor. The linearisation is to be done using channel 2.



Settings:

Input signal (addr. 221):	0 - 20 mA
Quantity recording (addr.222):	cbm/h
Number of set points (addr.330):	10
Lower scale (addr.225):	0 mA = 0 cbm/h
Q/H2 (addr.331):	7 mA = 5 cbm/h
Q/H3 (addr.332):	10 mA = 10 cbm/h
Q/H4 (addr.333):	12 mA = 15 cbm/h
Q/H5 (addr.334):	13,8 mA = 20 cbm/h
Q/H6 (addr.335):	15 mA = 25 cbm/h
Q/H7 (addr.336):	16 mA = 30 cbm/h
Q/H8 (addr.337):	16,7 mA = 35 cbm/h
Q/H9 (addr.338):	17,2 mA = 40 cbm/h
Upper scale (addr.225):	20 mA = 45 cbm/h



Attention:



Q/H curves are an option and must be ordered using the correct order code. It is possible to retro-fit the Q/H curve without opening the unit.

Overview, level 3

310 Channel 1 Q/H1st set point	311 Channel 1 Set point input No. 2	312 Channel 1 Set point input No. 3	313 Channel 1 Set point input No. 4	314 Channel 1 Set point input No. 5	315 Channel 1 Set point input No. 6	316 Channel 1 Set point input No. 7	317 Channel 1 Set point input No.8	318 Channel 1 Set point input No. 9	319 Channel 1 Set point input No. 10	31A Channel 1 Set point input No. 11	31B Channel 1 Set point input No. 12	31C Channel 1 Set point input No. 13	31D Channel 1 Set point input No. 14	31E Channel 1 Set point input No. 15	31F Channel 1 Set point input No. 16
320 Channel 1 Set point input No. 17	321 Channel 1 Set point input No. 18	322 Channel 1 Set point input No. 19	323 Channel 1 Set point input No. 20	324 Channel 1 Set point input No. 21	325 Channel 1 Set point input No. 22	326 Channel 1 Set point input No. 23	327 Channel 1 Set point input No. 24	328 Channel 1 Set point input No. 25	329 Channel 1 Set point input No. 26	32A Channel 1 Set point input No. 27	32B Channel 1 Set point input No. 28	32C Channel 1 Set point input No. 29	32D Channel 1 Set point input No. 30	32E Channel 1 Set point input No. 31	32F Channel 1 Set point input No. 32
330 Channel 2 Q/H1- set point	331 Channel 2 Set point input No. 2	332 Channel 2 Set point input No. 3	333 Channel 2 Set point input No. 4	334 Channel 2 Set point input No. 5	335 Channel 2 Set point input No. 6	336 Channel 2 Set point input No. 7	337 Channel 2 Set point input No.8	338 Channel 2 Set point input No. 9	339 Channel 2 Set point input No. 10	33A Channel 2 Set point input No. 11	33B Channel 2 Set point input No. 12	33C Channel 2 Set point input No. 13	33D Channel 2 Set point input No. 14	33E Channel 2 Set point input No. 15	33F Channel 2 Set point input No. 16
340 Channel 2 Set point input No. 17	341 Channel 2 Set point input No. 18	342 Channel 2 Set point input No. 19	343 Channel 2 Set point input No. 20	344 Channel 2 Set point input No. 21	345 Channel 2 Set point input No. 22	346 Channel 2 Set point input No. 23	347 Channel 2 Set point input No. 24	348 Channel 2 Set point input No. 25	349 Channel 2 Set point input No. 26	34A Channel 2 Set point input No. 27	34B Channel 2 Set point input No. 28	34C Channel 2 Set point input No. 29	34D Channel 2 Set point input No. 30	34E Channel 2 Set point input No. 31	34F Channel 2 Set point input No. 32
350 Channel 3 Q/H1- set point	351 Channel 3 Set point input No. 2	352 Channel 3 Set point input No. 3	353 Channel 3 Set point input No. 4	354 Channel 3 Set point input No. 5	355 Channel 3 Set point input No. 6	356 Channel 3 Set point input No. 7	357 Channel 3 Set point input No.8	358 Channel 3 Set point input No. 9	359 Channel 3 Set point input No. 10	35A Channel 3 Set point input No. 11	35B Channel 3 Set point input No. 12	35C Channel 3 Set point input No. 13	35D Channel 3 Set point input No. 14	35E Channel 3 Set point input No. 15	35F Channel 3 Set point input No. 16
360 Channel 3 Set point input No. 17	361 Channel 3 Set point input No. 18	362 Channel 3 Set point input No. 19	363 Channel 3 Set point input No. 20	364 Channel 3 Set point input No. 21	365 Channel 3 Set point input No. 22	366 Channel 3 Set point input No. 23	367 Channel 3 Set point input No. 24	368 Channel 3 Set point input No. 25	369 Channel 3 Set point input No. 26	36A Channel 3 Set point input No. 27	36B Channel 3 Set point input No. 28	36C Channel 3 Set point input No. 29	36D Channel 3 Set point input No. 30	36E Channel 3 Set point input No. 31	36F Channel 3 Set point input No. 32
370 Channel 4 Q/H1- set point	371 Channel 4 Set point input No. 2	372 Channel 4 Set point input No. 3	373 Channel 4 Set point input No. 4	374 Channel 4 Set point input No. 5	375 Channel 4 Set point input No. 6	376 Channel 4 Set point input No. 7	377 Channel 4 Set point input No.8	378 Channel 4 Set point input No. 9	379 Channel 4 Set point input No. 10	37A Channel 4 Set point input No. 11	37B Channel 4 Set point input No. 12	37C Channel 4 Set point input No. 13	37D Channel 4 Set point input No. 14	37E Channel 4 Set point input No. 15	37F Channel 4 Set point input No. 16
380 Channel 4 Set point input No. 17	381 Channel 4 Set point input No. 18	382 Channel 4 Set point input No. 19	383 Channel 4 Set point input No. 20	384 Channel 4 Set point input No. 21	385 Channel 4 Set point input No. 22	386 Channel 4 Set point input No. 23	387 Channel 4 Set point input No. 24	388 Channel 4 Set point input No. 25	389 Channel 4 Set point input No. 26	38A Channel 4 Set point input No. 27	38B Channel 4 Set point input No. 28	38C Channel 4 Set point input No. 29	38D Channel 4 Set point input No. 30	38E Channel 4 Set point input No. 31	38F Channel 4 Set point input No. 32

Addr.	Meaning	Selection	Function/description
310 330 350 370	Number of set points	XX Preset: 02	Number of set points for linearisation of the measured signal (only intermediate values are to be set, this means that on number = 02 no set points need to be entered). The first and last set points are always the lower and upper scale values from addr. 2x5.
311 . . . 38F	Set points	mA = Engineering units or V = Engineering units	Input value allocation of flow values eg.: mA = l/s or V = l/s

10. Relay output

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

Use of the relays:

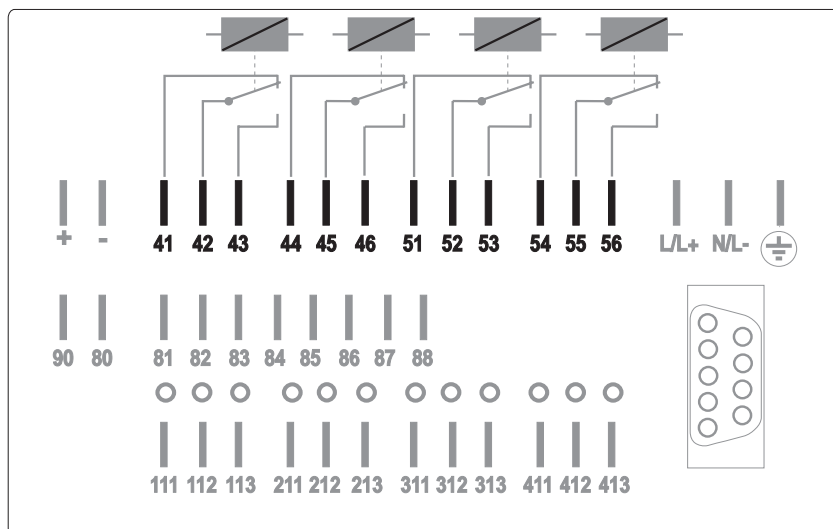
The four built-in relays can be used for the following:

- Monitoring limit values

The preset limit values can be allocated to each relay (the allocated relay is switched for the length of the limit infringement see chap. 8.1.4).

- Unit fault and/or memory-card status (on memory 90% full) can be set to relay 1 (setting up in addr. 114).
- Trend output
A trend value (addr. 2xD) can be set on each analogue input channel. If the input signal changes more than the preset value for over one minute then the relay set as a trend relay (addr. 2xE) switches. The output relays can be set as relays 1 ... 4 on rising trend and/or relays 1 ... 4 on falling trend.
- Change to serial interface modem - Unit-Bit (Endress+Hauser data printer)
The contact on relay 4 is used as a changeover contact for front end data output to the Uni-Bit and simultaneous use of the serial interface for PC or modem. The serial interface use is set in addr. 811.
- Remote control
Using the ReadexR PC software package relay 1 ... 4 can be remote controlled. The only condition is that relay 4 has not been allocated for any other function.

Rear panel view (relays in limit infringement condition or on power off) connections



Connections

Terminal	Contact	Relay	Function	Connection from:
41	Normally closed	1	Off	Analogue channel 1..4
42	Common		Limit value	
43	Normally open		Fault conditions	
44	Normally closed	2	Off	Analogue channel 1..4
45	Common		Limit value	
46	Normally open			
51	Normally closed	3	Off	Analogue channel 1..4
52	Common		Limit value	
53	Normally open			
54	Normally closed	4	Off	Analogue channel 1..4
55	Common		Limit value	
56	Normally open		UNI-BIT data printer	

All relays that are not set to fault condition, limit value, trend output or Uni-Bit printer/modem can be remotely controlled from a PC using the ReadexR software package.

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 V to another relay. When doing this please check the relevant safety regulations concerning a mix of low and high voltage wiring.



11. Quantity impulse output

Using the quantity impulse output

The Memo-Log S has a digital output (terminal 88) that can be used as a quantity impulse output.

The analogue input signal from channel 1, 2, 3 or 4 (add. 2x2 in quantity recording level) is retransmitted in the form of quantity proportional impulses.

The maximum output frequency is 12,5 Hz.

Example:

The quantity recorded on channel 2 is to be retransmitted as impulses on terminal 88, where one impulse equals 100 litres.

Settings:

Quantity impulses (addr. 130):	Channel 2
Impulse factor (addr. 131):	0100 l/Imp
Quantity recording (addr. 222):	l/s, l/min or l/h

Terminals:

Terminal 88 :	+ Impulse output
Terminal 80 :	Common (Ground impulse output)

Connection:

The +ve. supply for the impulse output comes from terminal 90, ground is terminal 80. If the impulse output is to be powered from the Memo-Log S internal auxiliary voltage then terminal 90 must be connected to the +ve terminal and terminal 80 to the -ve terminal.

12. Digital channels (operating level 4)

410	411	412	413	414	415	416	417	418	419
Digital channel A Channel identifier	Digital channel A recording	Digital channel A Event identifier	Digital channel A Eng. units	Digital channel A Decimal point	Digital channel A Impulse factor	Digital channel A Totaliser setting	Digital channel A Quantity allocation	Digital channel A Limit	Digital channel A Limit action
420	421	422	423	424	425	426	427	428	429
Digital channel B Channel identifier	Digital channel B recording	Digital channel B Event identifier	Digital channel B Eng. units	Digital channel B Decimal point	Digital channel B Impulse factor	Digital channel B Totaliser setting	Digital channel B Quantity allocation	Digital channel B Limit	Digital channel B Limit action
430	431	432	433	434	435	436	437	438	439
Digital channel C Channel identifier	Digital channel C recording	Digital channel C Event identifier	Digital channel C Eng. units	Digital channel C Decimal point	Digital channel C Impulse factor	Digital channel C Totaliser setting	Digital channel C Quantity allocation	Digital channel C Limit	Digital channel C Limit action
440	441	442	443	444	445	446	447	448	449
Digital channel D Channel identifier	Digital channel D recording	Digital channel D Event identifier	Digital channel D Eng. units	Digital channel D Decimal point	Digital channel D Impulse factor	Digital channel D Totaliser setting	Digital channel D Quantity allocation	Digital channel D Limit	Digital channel D Limit action
450	451	452	453	454	455	456	457	458	459
Digital channel E Channel identifier	Digital channel E recording	Digital channel E Event identifier	Digital channel E Eng. units	Digital channel E Decimal point	Digital channel E Impulse factor	Digital channel E Totaliser setting	Digital channel E Quantity allocation	Digital channel E Limit	Digital channel E Limit action
460	461	462	463	464	465	466	467	468	469
Digital channel F Channel identifier	Digital channel F recording	Digital channel F Event identifier	Digital channel F Eng. units	Digital channel F Decimal point	Digital channel F Impulse factor	Digital channel F Totaliser setting	Digital channel F Quantity allocation	Digital channel F Limit	Digital channel F Limit action
470	471	472	473	474	475	476	477	478	479
Digital channel G Channel identifier	Digital channel G recording	Digital channel G Event identifier	Digital channel G Eng. units	Digital channel G Decimal point	Digital channel G Impulse factor	Digital channel G Totaliser setting	Digital channel G Quantity allocation	Digital channel G Limit	Digital channel G Limit action

Using the digital channels

The Memo-Log has 7 digital inputs (A..G) that can be used for either quantity or event recording.

12.1. Quantity recording

The incoming impulses are multiplied by the preset (addr. 4x5) factor and then placed into various counters. The end factor must be set up as -/imp (addr. 4x5), recording must be set to quantity recording (addr. 4x1).

If the flow is constant (eg. pumps with a constant feed rate) the quantity can be recorded using an external signal (On = -3V..+5V, Off = +12V..+30V). The factor (addr. 4x5) is set as flow per second (on active signal at the digital input). In this way the quantity is added up over various time cycles. The end factor must be set up as -/s (addr. 4x5), recording must be set to quantity recording (addr. 4x1).

Storage on memory card and/or printout on the Uni-Bit printer of daily, monthly and yearly quantities is done in accordance with the settings in addresses 140,141,142 in operation level 1 (basic settings).

Additionally quantities over certain time spans (eg. hourly) can also be stored on memory card. The time span is set in address 146. Allocation of the quantity channel is to be set to NO in address 4x7.

Quantity recording using impulses

Quantity recording using on/off signal

Quantity storage / printout

If the quantity is to be recorded when a particular event or events are active, then the digital channel addr. 4x7 must be allocated to a channel on which events are recorded. This can be an analogue channel with active limits (see chap. 8.1.2) or an event channel (see chap. 12.2). If the selected channel is an analogue channel then the quantity measurement on this channel must be switched off (addr. 2x2).

Please note that only one digital channel can be allocated to each analogue input or event channel.

Storage and/or printout of the quantity over the period of an active event is done once the event on the relative channel has ended.

Alarm on limit infringement

A limit infringement on a digital quantity channel during an event can be retransmitted by a relay and/or a modem (see chap. 10 and 13). Relay (1..4) and telephone number (01..10) are selected in addr. 2xA.

Setting for limit infringement alarm:

Allocation	(addr.4x7)	:	eg.Channel 1
Limit value	(addr.4x8)	:	eg.00003000,00 cbm
Limit action	(addr.4x9)	:	eg.Relay: 3 Tel: 05

Relay: 0	→	No alarm transmitted by relay
Tel: 00	→	No alarm transmitted by modem

Please ensure that the relay selected is not used for other purposes such as remote control (see chap. 10).

12.2. Recording events

In order to record events, faults or operation times the recording status of the digital channel (addr. 4x1) must be set to event channel. The channel status word (eg. on/off) can be set in addr. 4x2.

Input signal:	-3V...+5V	→	No event (eg. Pump off)
	+12V..+30V	→	Event (eg. Pump on)

Event storage / printout

The following can be stored on memory card and/or printed out on the Uni-Bit printer:

- Event beginning
- Event end
- Time of event

Additionally the number of events as well as the length of active time per event channel can be recorded per day, month and year. Storage and/or printout of these values are dependent on the settings for daily, monthly and yearly analysis (operation level 1, basic settings, addr. 140, 141 und 142).

Overview of digital channel

Addr.	Meaning	Selection	Function / description
4y0	Identifier	15 characters, letters, numbers and signs	Channel identifier (only 10 characters are displayed at the Memo-Log)
4y1	Recording	Inactive: Event channel Quantity recording	No recording of the digital channel Recording of events, faults, operation times Recording quantities via impulses or external static signal
4y2	Description	on/off	Text description for on/off sequences (only for event channels)
4y3	Eng.	5 characters letters, numbers and signs	eg. Litre, cbm (only for quantity recording)
4y4	Decimal point	 XXXX XXX,X XX,XX X,XXX ,XXXX	Decimal point selection (important in connection with impulse factors, only for quantity measurement): None One Two Three Four
4y5	Factor	XXXX Eng. /s XXXX Eng. / impulse	Quantity per second Quantity per impulse (only for quantity measurement)
4y6	Preset yearly counter		Synchronising the yearly counter with an existing mechanical counter (only for quantity recording)
4y7	Quantity recording	No Channel 1 Channel 2 Channel 3 Channel 4 Channel A Channel B Channel C Channel D Channel E Channel F Channel G	Quantity recording allocation to the respective channels (only for quantity recording)
4y8	Limit event counter	xxxxxx,xxxx	Set the event limit value (only for quantity recording)
4y9	Limit Action Event	Relay: 0, Tel.: 00 Relay 1, Tel.: 01 Relay 2 Relay 3 Relay 4, Tel.: 10	No action taken on limit infringement Limit action on selected relay 1..4 and/or telephone numbers 01..10 (addr. 520-529) (only for quantity recording)

12.3 Control of digital inputs

Control to DIN 19240

Logic 0 equals: -3V ... +5V

Logic 1 equals: +12V ... +30V

Potential related to auxiliary voltage "-" terminal.

- max. impulse frequency 25 Hz
- Input current approx. 2-3 mA
- min. impulse length 20 ms
- max. bounce time 5 ms

12.4 Terminal connections:

+ +24V auxiliary voltage

- Ground auxiliary voltage

80 Common Digit in/outputs

81 Digital input A

82 Digital input B

83 Digital input C

84 Digital input D

85 Digital input E

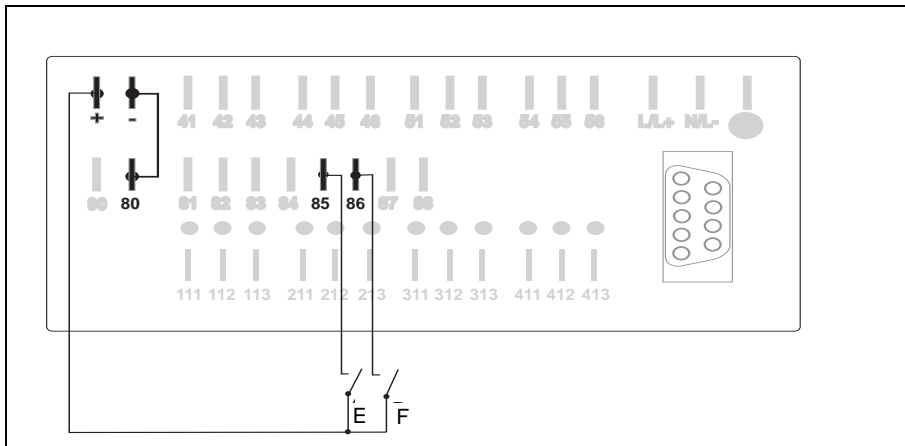
86 Digital input F

87 Digital input G

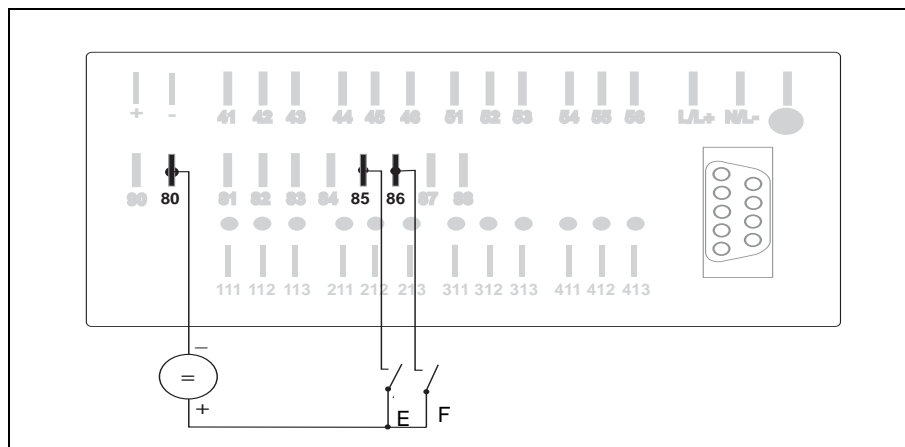
88 Impulse output

90 + supply to impulse output

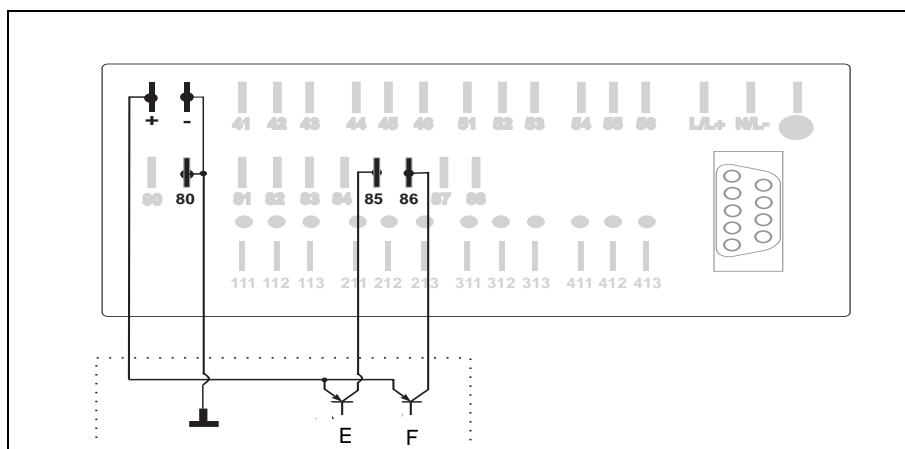
12.5 Connection examples digital inputs E and F



Connection when using the internal auxiliary voltage



Connection when using an external voltage source



Connection when using open collector outputs

13.Modem function (operating level 5)

In order to remotely transmit data using a telephone network the Memo-Log can be connected to any modem so long as it operates using the AT command lines. In order to utilize the 9600 Baud maximum transmission speed a modem operating with at least this Baud rate should be selected.

How to connect the Modem to the Memo-Log serial interface can be found in chapter 14.

13.1. Setting up the modem at the Memo-Log

On initial installation special basic settings must be done on the modem. For this an initialisation command is transmitted to the modem. This can be done directly from the Memo-Log.

- Connect the modem to the Memo-Log (chapter 14)
- Set the interface parameters at the Memo-Log (chapter 14)
- Set the initialisation command in address 510

For individual commands please see the operating instructions for the modem. Make sure that the modem is set to automatic answer (eg. S0 = 1). The last command should always be the command to store the command in the modem (eg. *W). This is so that the data is stored if there should be a power failure. The command preset in address 510 is the initialisation command for an ELSA 2460 and 14400 and can normally also be used for modems operating with the expanded AT command lines.

- Start the initialisation in address 514

Once the initialisation has been done successfully the modem display returns to its original condition. If initialisation was not successfully completed an error message will appear in the display.

Possible reasons for an unsuccessful initialisation:

- Wrong settings in address 811 (see chapter 14)
- Transmission format set up (addresses 813..815) is not used by the modem
- Wrong connection between Memo-Log and modem
- One or more commands used during the initialisation phase were not recognised by the modem (see modem operating instructions)

13.2 Alarms using modem

On limit infringement on either an analogue or digital quantity channel one of ten presettable telephone numbers can be automatically dialed (see chapters 8.1.4 and 12.1). This means that a beeper can be activated or a limit infringement can be displayed by ReadexR on a PC. In addition to this should the memory card be > 90% full then again one of ten telephone numbers can be dialed (address 115) and data transmission can be automatically started by ReadexR (see chapter 15

- Modem selection (addr. 511) eg. ATDT

These settings are dependent on the type of modem and telephone system (frequency or impulse dial, wait for dial tone, ground key) and must be taken from the modem operating instructions.

- Wait for connection (addr. 512): eg. 30 sec

This setting indicates how long the call should attempt to connect the modem or telephone.

- Attempt/pause (addr. 513): eg. 05/0120 s

These settings indicate how many dial attempts are to be made for connection to a modem or telephone as well as the time between each attempt.

- Telephone number (addr. 520..529) eg. 08361308475

In address 515 the settings for a test call can be made.

In order to protect the telephone network from overload the German telecommunication authority sets a recall block time between each dial attempt. If this is the case in your country please take this into account when setting up address 513 (see modem operating instructions).



Setting for alarms using modem

Modem settings

Addr.	Meaning	Selection	Function/description
510	Modem: initialisation	xxxxxxxxxxxxxxx	Initialisation command for the connected modem 15 characters standard ASCII character set
511	Modem: dial	xxxxxxxxxxxxxxx	Dial command 15 characters standard ASCII character set
512	Modem: wait for connection	10 ... 60 s	Wait time in seconds, before dial attempt is automatically cancelled
513	Modem: attempt/pause	00 .. 99x 0000 .. 9999 s	Number of dial attempts Pause time in seconds between two dial attempts
514	Modem: initialisation transmission		The modem initialisation set in addr. 510 is transmitted to the connected modem
515	Modem: test dial	Telephone no.: (01) (10)	A test dial is made with the selected telephone no.: (xx)
520	Telephone No.: (01)	xxxxxxxxxxxxxxx Preset: 0	Input of a max. 15 digit number
521	Telephone No.: (02)	xxxxxxxxxxxxxxx Preset: 0	Input of a max. 15 digit number
522	Telephone No.: (03)	xxxxxxxxxxxxxxx Preset: 0	Input of a max. 15 digit number
523	Telephone No.: (04)	xxxxxxxxxxxxxxx Preset: 0	Input of a max. 15 digit number
524	Telephone No.: (05)	xxxxxxxxxxxxxxx Preset: 0	Input of a max. 15 digit number
525	Telephone No.: (06)	xxxxxxxxxxxxxxx Preset: 0	Input of a max. 15 digit number
526	Telephone No.: (07)	xxxxxxxxxxxxxxx Preset: 0	Input of a max. 15 digit number
527	Telephone No.: (08)	xxxxxxxxxxxxxxx Preset: 0	Input of a max. 15 digit number
528	Telephone No.: (09)	xxxxxxxxxxxxxxx Preset: 0	Input of a max. 15 digit number
529	Telephone No.: (10)	xxxxxxxxxxxxxxx Preset: 0	Input of a max. 15 digit number

14 Serial interface (operating level 8)

14.1 Uses for the serial interface

A modem (or PC) and/or a Uni-Bit protocol printer can be connected to the Memo-Log serial interface. The use of the interface must be set up in address 811. Relay 4 is used as a changeover contact for simultaneous connection to a modem (or PC) and the printer. This means that this contact cannot be used for any other purpose (eg. alarm contact). Address 812 in each Memo-Log can be used to set an individual unit address (measurement point number) so that up to 99 Memo-Log units can be managed using the ReadexR PC software.

When connecting the memo-log s to a modem or PC the data transmission mode is set in addresses 813 to 815.

Data transmission to a Uni-Bit is always done using a fixed transmission format. It is not necessary to set this format at the Memo-Log. The DIP switches on the top of the Uni-Bit must be set in accordance with Chapter 14.5.

Here the parameters for data transmission are set.

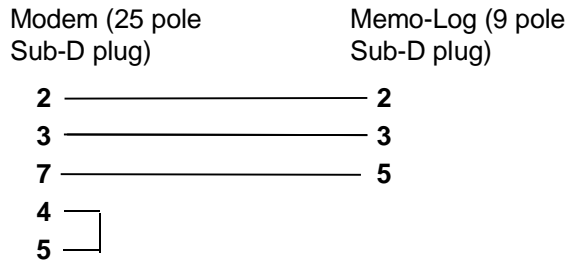
810	811	812	813	814	815	816
Interface type	Use of interface	Unit address	Baudrate	Parity	Stop bits	Data bits

Overview of interface parameters

Addr.	Meaning	Selection	Function/description
810	Display of interface board type installed		
811	Use of interface	Modem/PC Printer Modem/PC +printer	Interface connection to modem or PC Interface connection to Uni-Bit printer Interface connection to modem or PC and Uni-Bit printer
812	Set up measurement point number	01..99	Each unit requires its own individual measurement point number
813	Set up Baudrate	2400, 4800, 9600	Only for PC/modem
814	Set up parity	even, odd, mark, space	Only for PC/modem
815	Set up stopbits	1, 2	Only for PC/modem
816	Data bits	7	Cannot be changed

14.2 Connection of modem (RS 232) to a Memo-Log:

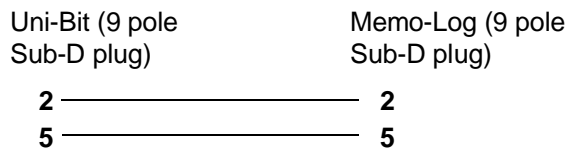
Cable PIN connections:



Set address 811 to modem/PC!

14.3 Connection of Uni-Bit (RS 232) to Memo-Log (RS 232):

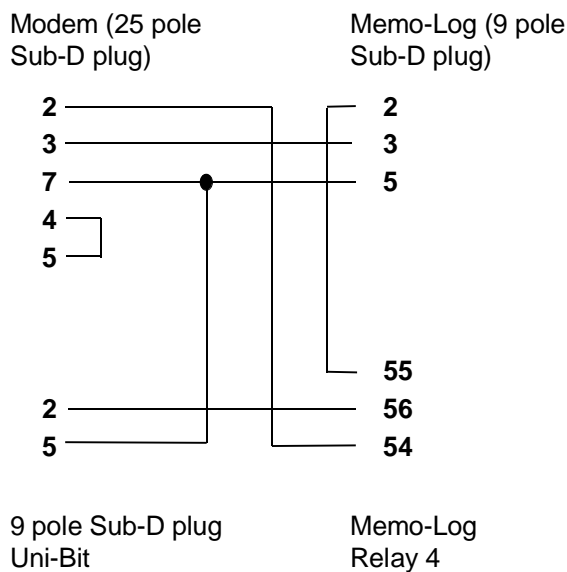
Cable PIN connection:



Set address 811 to printer.

14.4 Connection of modem (RS 232) and Uni-Bit (RS 232) to Memo-Log (RS232):

Cable PIN connection:



Set address 811 to modem/PC + printer!

14.5 Settings on the Uni-Bit printer

When connecting a Uni-Bit printer to the Memo-Log S set the switches on the top of the Uni-Bit as follows:

SW 1:	1 : off	SW 2:	1 : on	SW 3:	1 : off
	2 : off		2 : on		2 : off
	3 : off		3 : off		3 : off
	4 : off		4 : off		4 : on
	5 : off		5 : off		5 : off
	6 : on		6 : off		6 : off

14.6 Connections

(Sub-D socket to DIN 41 652, 9 pole plug)

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 (+)	

Connections

Attention:

Spare pins (-) must not be connected!

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!



15. Readex R PC software

15.1 General information

ReadexR has many features that turn your PC into a powerful tool for data evaluation, (remote) data transmission and data maintenance.

with Readex R you can:

- Set up units
- Display actual measured values
- Read out stored values (even by modem) and save these on hard disk
- Display, on screen, the values saved on hard disk and print these out.
- Remote control the Memo-Log outputs from the computer
- Receive Memo-Log fault messages via modem
- Convert measured data in tabular format (for further analysis with eg. EXCEL)

Basic knowledge required for installation and operation

Basic knowledge of:

- PC operation
- DOS 5.0 or higher operating system

A condition is a completely installed computer system (incl. operating system on hard disk C), as well as knowledge of how to use key board, drives, disks, serial interface/memory card drive and printer. For help on installing and operating your system see the individual manufacturers handbooks for the unit combination used (eg. memory card drive).

System requirements

IBM AT 80386/486/Pentium or compatible computer, minimal RAM 4 MByte
 1 Disk drive 31/3 inch with 1.44 Mb
 1 Hard drive defined as drive C with at least 20 MB of free space. If there is no direct connection (serial interface/ modem)to the Memo-Log: A directly installed or connected PCMCIA memory card drive.
 EGA / VGA graphic card with screen
 Microsoft compatible mouse with driver software
 Matrix printer / laser printer / Ink jet printer (IBM/HP/EPSON)
 LPT1 (parallel interface) for printer and/or memory card drive, COM 1,2 (serial interface) for Memo-Log S or modem connection for data transmission and/or remote monitor.

Mouse operation

Readex R can be mouse operated. In general the rule is that the left mouse pad equals the ENTER key and the right pad the ESC key.

15.2 Readex R installation

Before you can use ReadexR you must run the installation programme INSTALL.EXE. It is not possible to run ReadexR directly from the installation disk. INSTALL.EXE starts the installation of the programme onto your computer system.

1. Switch your computer on, and wait until the operating system has started.
2. Place the ReadexR installation disk into drive **A**.
3. Change to drive A (Input: **A: [ENTER]**)
4. Start the installation programme INSTALL.EXE
(Input: **INSTALL [ENTER]**)
5. Enter the required drive on which ReadexR is to be installed
(normally drive C:).

The installation will now run automatically.

15.3 ReadexR programme start

ReadexR is started from either DOS or from Windows using a DOS window.

Input in DOS operating level: ReadexR GB (for English text) **Operate enter key**

After a few seconds the ReadexR opening screen appears.

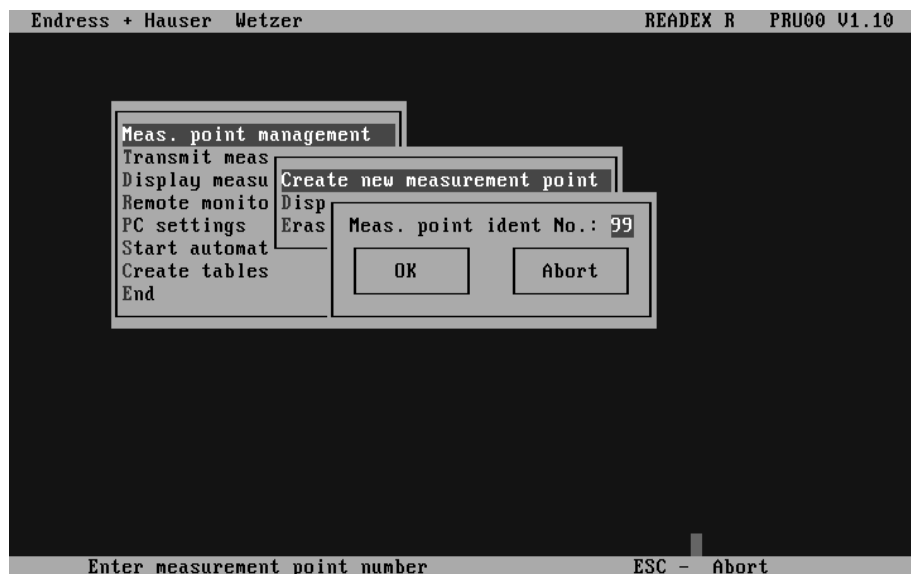


15.4 Measurement point management

Create new measurement point

In order to create a new measurement point a measurement point number must be entered. A measurement point is always equal to a Memo-Log S data manager.

The measurement point number is always the Memo-Log S unit address (address 812). Address and number must always be the same.



Here settings can be displayed or changed for an already existing measurement point.

Display/change settings

An already existing measurement point can be deleted.

Delete measurement point

Stored data for this measurement point is then lost.

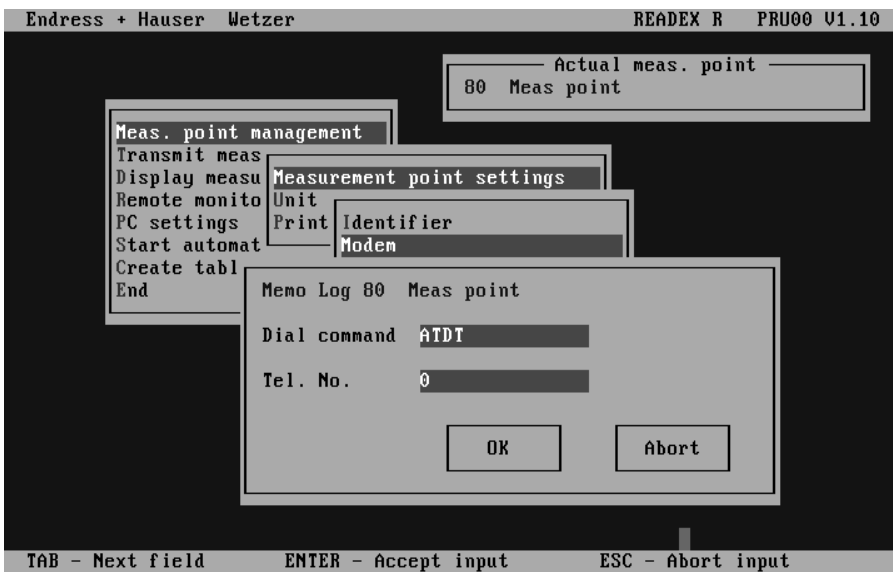


Measurement point identifier

Input of the measurement point identification name (max. 30 characters), e.g. "Storm overflow example"

Measurement point settings

Modem



If a modem is used for data transmission then the selection command and telephone number of the measurement point is set here.

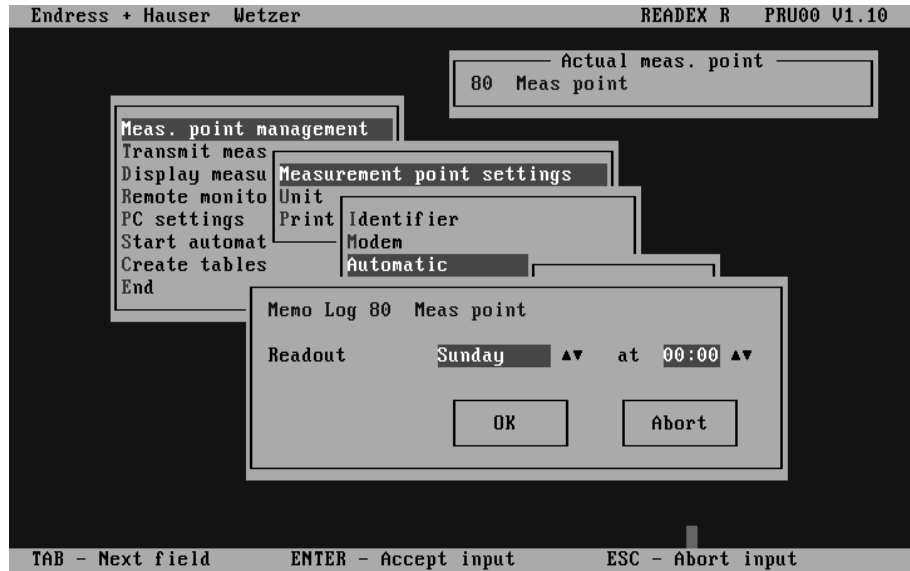
Modems must be initialised before the first installation. The modem connected to the computer system (preset to: Type ELSA) can be initialised from the menu point "Settings- Initialise modem". The modem connected to the Memo-Log S can be initialised directly from the Memo-Log S addresses 510 and 514.



Measurement point settings

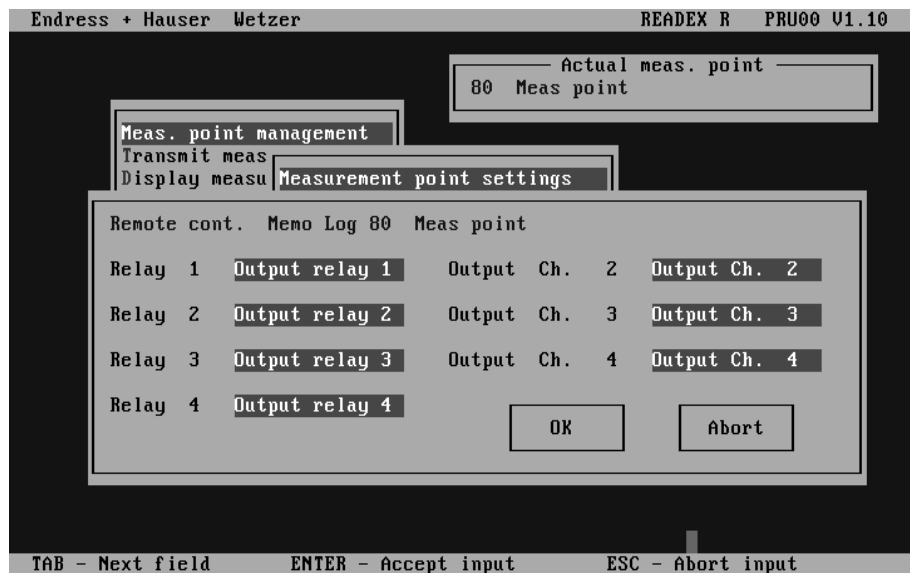
Automatic

ReadexR can operate in an automatic mode. Here connection is automatically made, at a preset time, to the selected Memo-Log S and data transmission started.



Memo-Log S remote control

If remote control of the Memo-Log S outputs (analogue, relays is to be done via the PC then the identification of these outputs are set here. These identifiers then appear on the screen when operating under remote control.



Memo-Log S Basic settings

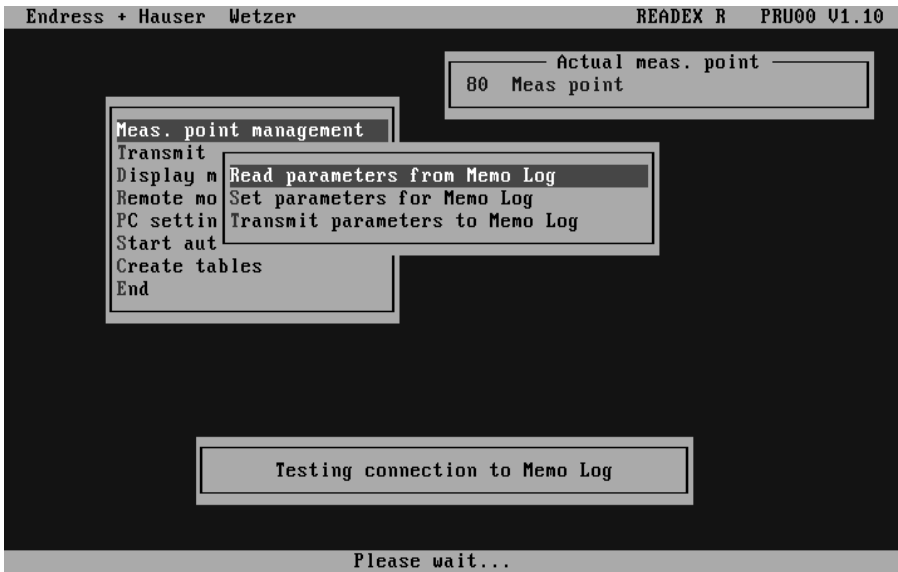
Here all settings for the Memo-Log S is done. The settings are then stored on the PC and can be transmitted to the Memo-Log S using the serial interface/modem.



Parameters in operating level 8 (interface) cannot be set from the PC. The reason for this is that a change in settings would initiate a break in serial transmission.

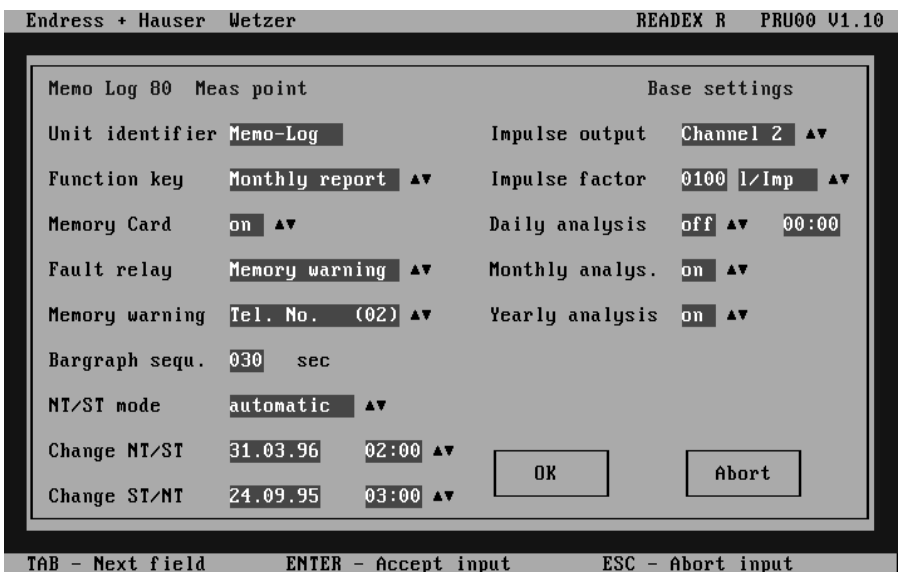
Reading the preset parameters from a Memo-Log S. The Memo-Log S must be connected to the PC using the serial interface/modem. The settings are then stored on the computer hard drive.

Reading settings from the Memo-Log S



Here all unit settings, such as analogue inputs, analogue outputs, relays, limits, Q/H curves, digital input channels and basic settings are made.

Setting up the parameters for the Memo-Log S



The parameters set in the PC are transmitted to the Memo-Log S connected via the serial interface/modem.

Transmission of parameters to the Memo-Log S

The Memo-Log S date and time is automatically taken from the PC clock.



In order to have written proof all Memo-Log S settings can be transmitted to a printer.

Print out settings

15.5 Read out measured values

The Memo-Log S offers various forms of measured value transmission. In addition to transmitting the measured values using either the serial interface or modem, data can also be read directly from the memory card.

Serial interface / modem

Once a measurement point is selected connection between the PC and Memo-Log S is automatically initiated. This is done either using the serial interface or, if preset, the modem.



Memory card

Measured value transmission to a computer system using either an integrated or connected PCMCIA drive. When using a memory card drive, also PCMCIA drive, the correct drive character must be selected in the menu line "Settings - memory card drive". Normally this is the next letter after the last hard drive letter.

The memory card is automatically deleted after a fault free transmission !



Before you read measured values from a new Memo-Log S:

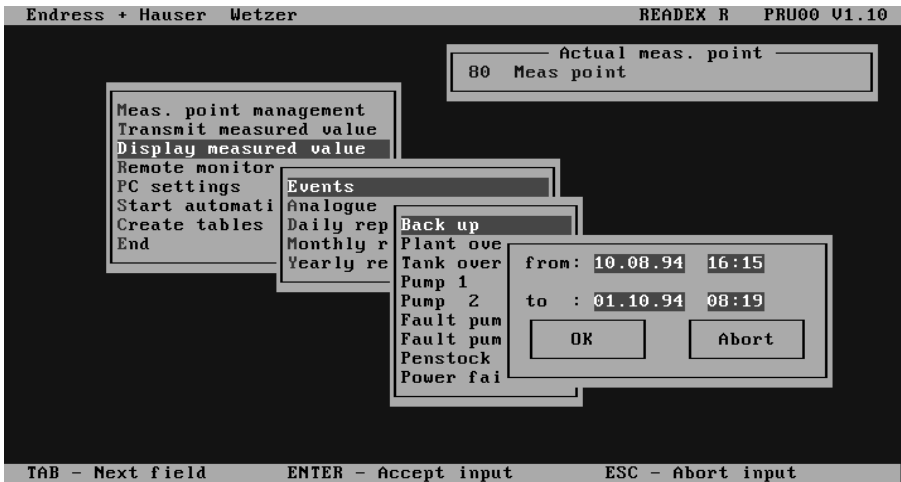


- First set up the Memo-Log S (note the correct date and time)
- Now delete memory card in the Memo-Log S (Basic settings, addr. 113, see chap. 15.10)

In doing this you avoid transmitting data to ReadexT with incorrect unit settings.

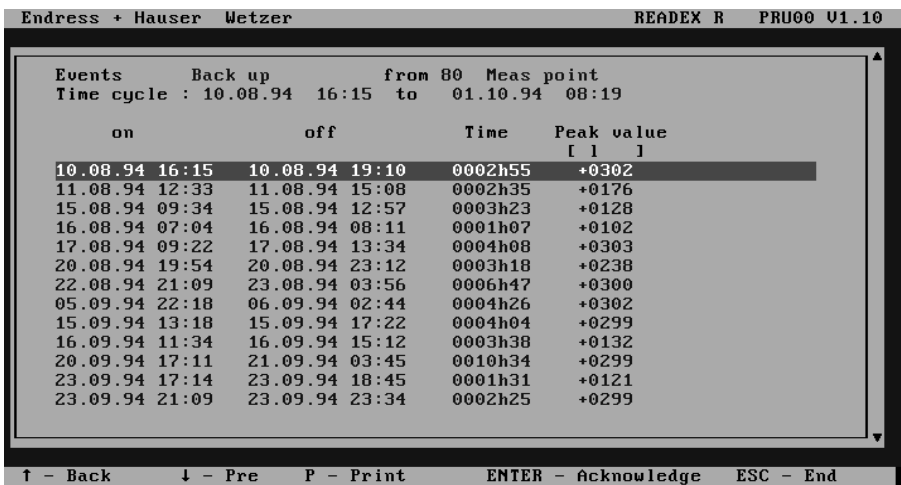
15.6 Displaying measured values

The following describes the various ways measured data can be displayed.

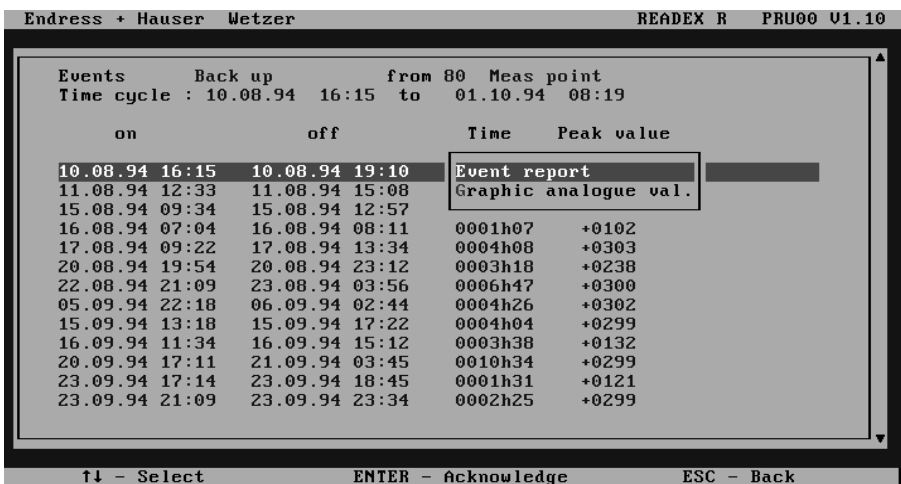


Events

- Select the measurement point
- Select "Events"
- Select event channel or "Power failure"
- Preset display time span



All events of the selected event channel in the preset time span are listed and can be transmitted to a printer for hard copy. The highlighted event can be selected by operating the ENTER key or clicking the mouse.



Here a selection is made between creating an event report or displaying the analogue values during the time of the event.

The contents of an event report are a listing of all the events and power failures on the Memo-Log S during the time of the preselected event.

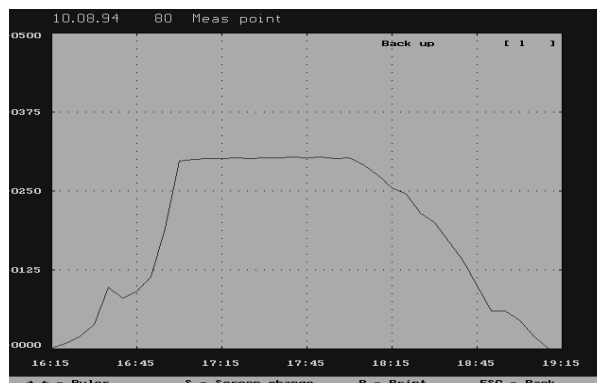
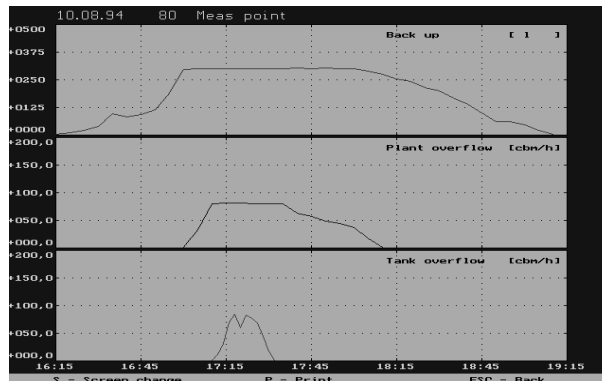
Endress + Hauser		Wetzer		READEX R		PRU00 U1.10	
Event report	Back up	Meas point					
on	: 10.08.94 16:15	off	: 10.08.94 19:10				
Time	: 0002h55						
Peak value	: +0302	1					
Plant overflow		Time	Max.[cbm/h]	Quant[cbm]			
10.08.94 17:00	10.08.94 18:10	0001h10	+080,8	000000103,7			
Tank overflow		Time	Max.[cbm/h]	Quant[cbm]			
10.08.94 17:10	10.08.94 17:32	0000h22	+084,4	000000042,1			
Pump 1		Time					
10.08.94 17:09	10.08.94 17:43	0000h34					
10.08.94 17:55	10.08.94 18:16	0000h21					
Pump 2		Time					
10.08.94 18:22	10.08.94 18:33	0000h11					

Analogue values

Analogue values can be displayed either as a graph or in tabular form.

Graphic display of analogue values

All active analogue channels of the selected measurement point are displayed for the preselected time span. A channel is active if the standard and/or alarm memory cycle of the channel is OFF.



Key C - Change screen (switches to single channel display with ruler)

Key P - Printout of the graphic display

The mouse is inactive during graphic display.

Tabular display of analogue values

All analogue values in the preselected time span are listed. The measured values can be scrolled and printed out.

Analogue values

```

Endress + Hauser  Wetzer  READEX R  PRU00 V1.10
-----
Analog value from 80 Meas point
Time cycle : 10.08.94 16:15 to 10.08.94 19:10

      Back up      Plant overflow  Tank overflow
16:15 +0000 1
16:20 +0008 1
16:25 +0019 1
16:30 +0038 1
16:35 +0096 1
16:40 +0079 1
16:45 +0090 1
16:50 +0113 1
16:55 +0190 1
17:00 +0296 1      +000,0 cbm/h
17:05 +0299 1      +032,4 cbm/h
17:10 +0301 1      +080,4 cbm/h      +000,0 cbm/h
17:12                                +010,9 cbm/h
17:14                                +030,8 cbm/h

↑ - Back      ↓ - Pre      P - Print      ESC - End
    
```

The cyclically (eg. hourly, minutely) stored quantities can be, as with analogue values, displayed graphically or in tabular report form. This function is only available as from ReadexR version V 1.1.

Intermediate analysis

The daily values stored in the Memo-Log S are listed. Entered is the date of the required daily report and the reports can be scrolled and printed out.

Daily report

```

Endress + Hauser  Wetzer  READEX R  PRU00 V1.10
-----
Day report from : 29.10.94 00:00
Meas point      : 80 Meas point

      Number  Time      Quant
Back up        0001  0002h57
Plant overflow  0001  0001h43  000003341,2 cbm
Tank overflow  0001  0000h43  000000341,2 cbm
Pump 1         0005  0004h49
Pump 2         0000  0000h00
Fault pump 1   0003  0001h40
Fault pump 2   0002  0002h43
Penstock valve 0004  0005h12
Inflow 1              0080112433 Ltr.
Inflow 2              0003343612 Ltr.

↑ - Back      ↓ - Pre      P - Print      ESC - End
    
```

The monthly values stored in the Memo-Log S are displayed. Enter the date of the required monthly report and the reports can be scrolled and printed out.

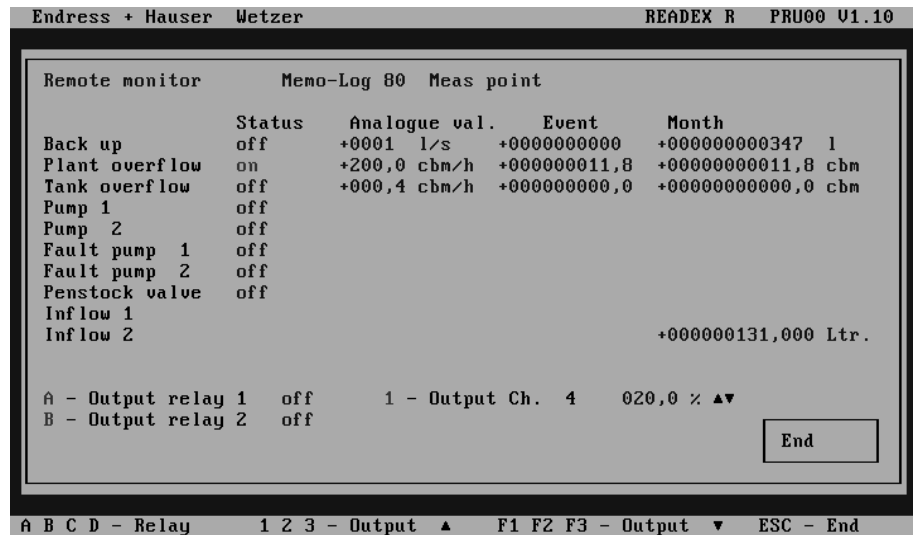
Monthly report

The yearly values stored in the Memo-Log S are displayed. Enter the date of the required yearly report and the reports can be scrolled and printed out.

Yearly report

15.7 Remote monitor

Actual measured values, conditions and quantities can be directly read from a Memo-Log S that is connected to a computer either directly by serial interface or modem. Relays or analogue outputs that are switched to remote control can be switched or changed.



Operation is either by mouse operation or key board.

Keys A,B,C,D: Switch relays

Keys 1,2,3: Increases the signal at the relative analogue output. Function keys F1, F2, F3: decreases the signal at the relative analogue output.

15.8 Settings

Here the basic settings for printer control, serial interface, modem initialisation and memory card drive are made.

Printer

Settings for the printer connected to the PC, as well as the printer resolution (DPI) in horizontal and vertical print direction. By increasing the DPI value the printout is enlarged, decreasing the value makes the printout smaller.

Serial interface

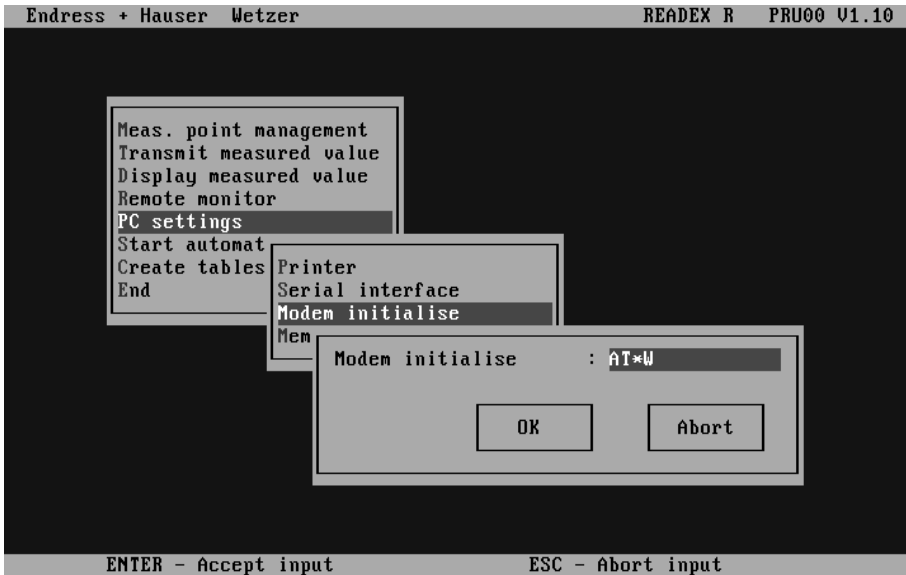
Here the serial interface at the PC is set. The Baudrate, parity and number of stop bits must be identical to those set at the Memo-Log S.



Initialising the modem connected to the PC. The commands for initialisation are dependent on the type of the modem and telephone system (for details see the modem instruction manuals).

Modem initialisation

The last command must store the settings in the modem transient memory (here *M). This means that the parameters are safe during a power failure.



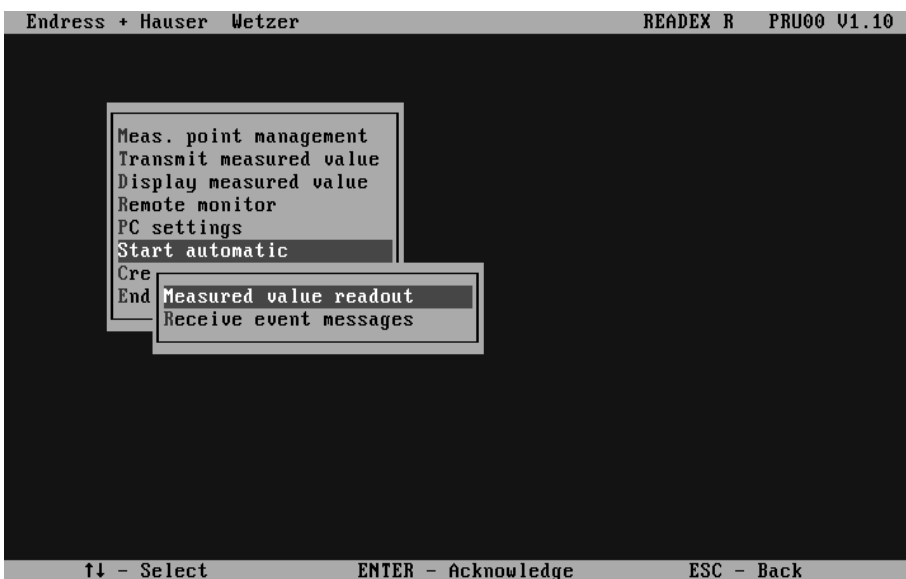
Read the measured values using a PCMCIA card drive (internal or external). Here you set the required drive letter.

Memory card drive

15.9 Start automatic

Transmission (readout) of measured values is started at a presettable time (Measured value maintenance - Measurement point settings - Automatic).

Read measured values



Receive messages

Alarm messages, that are transmitted from a Memo-Log S connected to a PC modem, can be displayed on screen and printed out on a printer connected to the PC system.

An automatic data transfer (read out of measured values), if preset in the Memo-Log S, is initiated if the memory-card is 90% full.



Message receipt is only possible on modem operation.

15.10 Create tables

The stored measured values of a preselectable measurement point are converted into an ASCII file so that the data can be used in other table calculation or spread sheet programmes (eg. EXCEL or Lotus). The input is always the time of the measured values as well as the name and characters for column limits of the ASCII file.

15.11 Setting up a Memo-Log S with ReadexR

Setting up a new Memo-Log S using the ReadexR software is done as follows:

- Connect the Memo-Log S to the PC

Use a normal interface cable (9 pole, plug/socket, one to one connection). If the PC is fitted with a 25 pin serial interface socket an additional adapter (9 pole socket/25 pole plug) must be used.
- Plug memory card into Memo-Log S

If the display indicates "Format memory card?", acknowledge using the E key (run formatting sequence, see chap. 16).
- Set up interface parameters at the Memo-Log in operating level 8
- Set up interface parameter in ReadexR SERIAL INTERFACE SETTINGS
- Create a new measurement point in ReadexR MEASUREMENT POINT MAINTENANCE

The measurement point number must be the same as the unit address set in the Memo-Log S address 812.

- Transmit the Memo-Log S factory settings to the PC using MEASUREMENT POINT MAINTENANCE - UNIT SETTINGS - READ PARAMETERS FROM MEMO-LOG

This stores the Memo-Log S configuration (eg. number and type of analogue channels, if the Q/H curve option is available) on the PC by means of the ReadexR software.

- Set up Memo-Log S parameter in ReadexR MEASUREMENT POINT MAINTENANCE - UNIT SETTINGS - SET UP MEMO-LOG PARAMETERS
- Transmit the settings to the Memo-Log S using MEASUREMENT POINT MAINTENANCE - UNIT SETTINGS - TRANSMIT PARAMETERS TO MEMO-LOG

Date and time of the PC-clock is automatically accepted.

- Delete the card in the Memo-Log S. Use operating level 1 (basic settings, address 113)

The measured values stored (using works settings) are deleted.

Deleting the memory card without reading out the measured values (eg. on initial installation) can, for security reasons, only be done at the Memo-Log S (addr. 113).

The card is automatically deleted when reading the measured values from the memory card, once the data is stored at the PC. Manual delete at the unit or in ReadexR is therefore no longer required.



16 Option: memory card

16.1 General information

Dependent on the memo-log version the measured data is saved onto the file MEMORY.DAT of a memory-card (PCM CIA Standard). Measured data transmission to a PC is done either directly by connecting the PC to the Memo-Log S and using the serial interface or by using an integrated or externally connected PCMCIA card drive. The memory card is placed into the drive and handled like a disk. The drive identifier (eg. D: or E:) is dependent on the configuration of the PC.

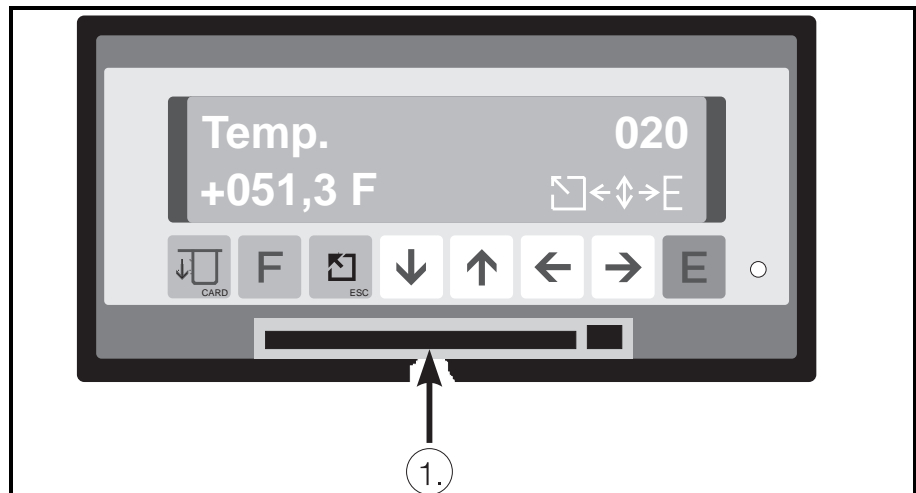
The memory capacity of a memory card is indicated, as on a disk, in K (kilobyte = 1024 Byte) or M (Megabyte = 1048576 Byte). There are different memory time capacities available. These are dependent on the time cycle for analogue value storage and the frequency of events.

Required memory capacity for saving:

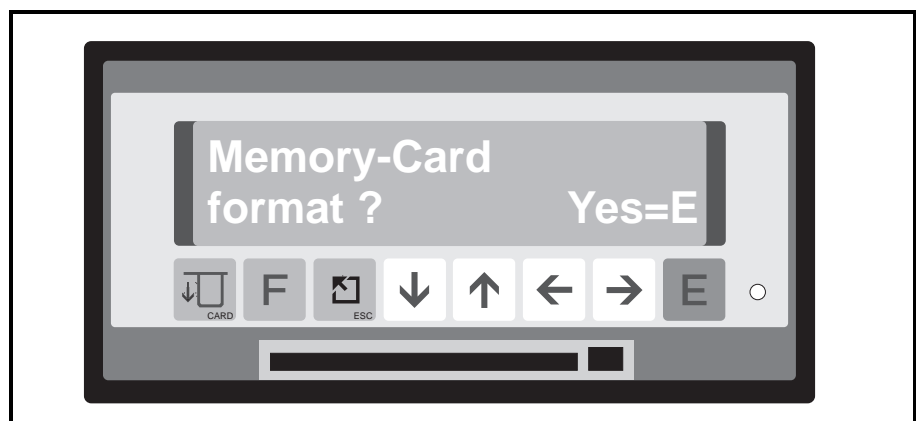
- Event (beginning, end and time):	25 Byte
- Event (beginning, end, time, peak value, quantity):	39 Byte
- Analogue instantaneous value (for recording):	13 Byte
- Daily analysis:	max. 200 Byte
- Monthly analysis:	max. 200 Byte
- Yearly analysis:	max. 200 Byte

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.

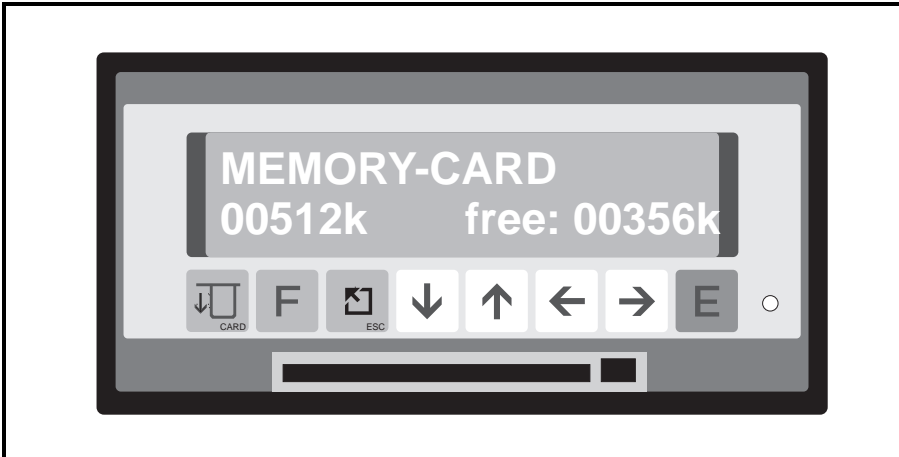
16.2 setting up memory card



An unformatted or wrongly formatted 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 can only be formatted from the Memo-Log and not the PC.



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. If "Empty" is displayed the battery must be replaced.

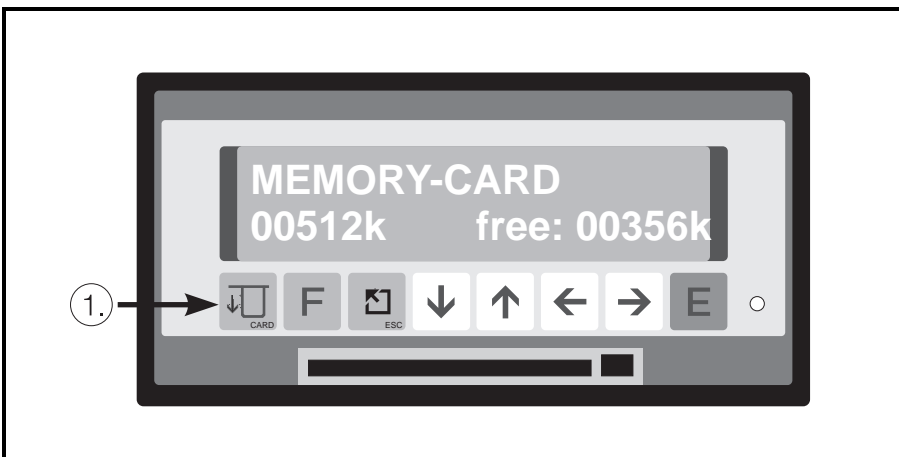
00512k free: 00356k

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.

16.3 Testing memory card status during operation

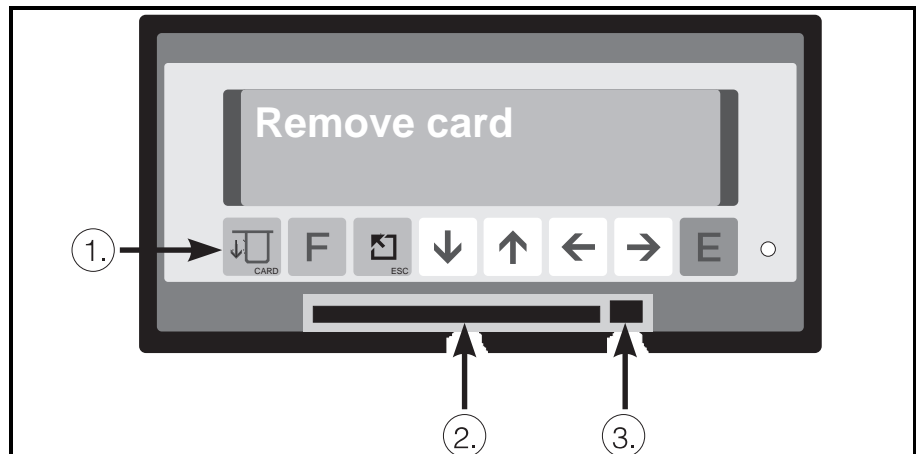


Status test during operation

- 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)

16.4 Removing memory card

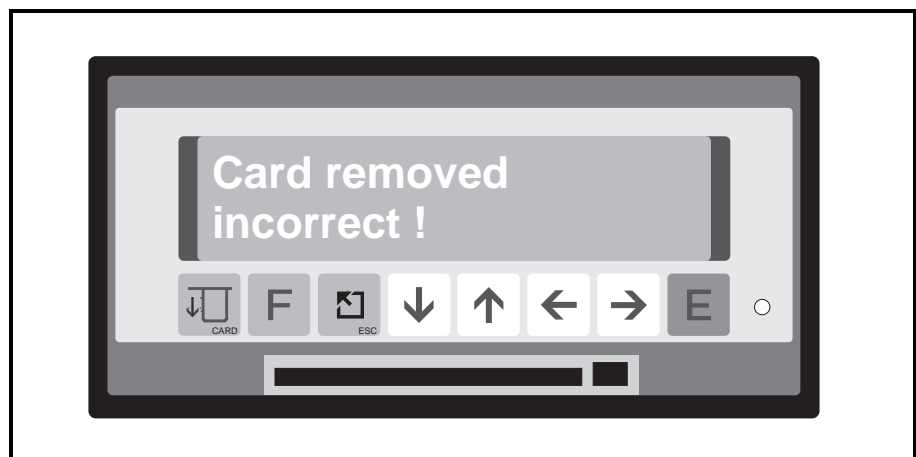
Remove card



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). The display indicates not only the calculated capacity but also the remaining capacity in % until overflow.

Hint:

ERROR !



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

16.5 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.

17 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" !

17.1 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: "I²C 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

17.2 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 chapter: Analogue 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 15.4.2)

Message: Green LED flashes

Cause: Operating parameters being set up
Timer has deactivated unit

Solution: Return to display level
Check timer

Message: Red LED continuously lit

Cause: Unit fault
Memory card is full or not there

Solution: Check fault and either repair or let the unit be repaired by service
Exchange full memory card for an empty one

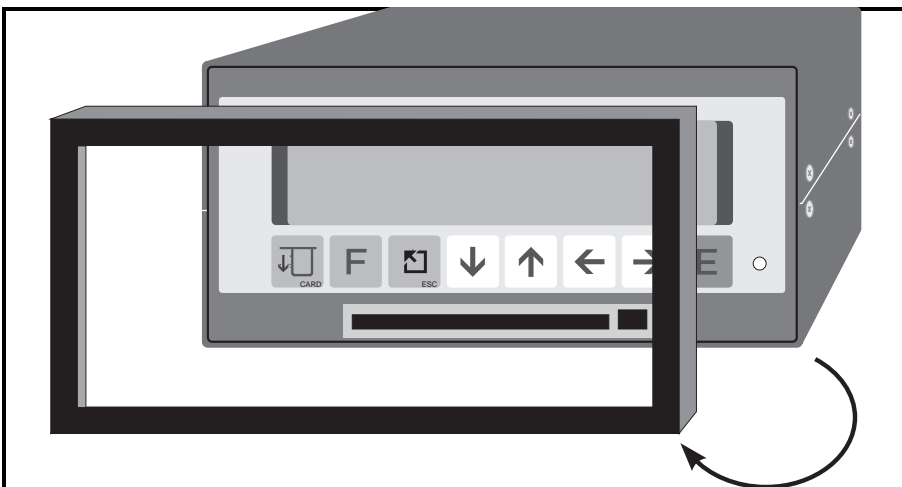
Message: Red LED flashes

Cause: Memory card is up to 90 % full

Solution: Prepare to change card

17.3 Replacing unit fuse

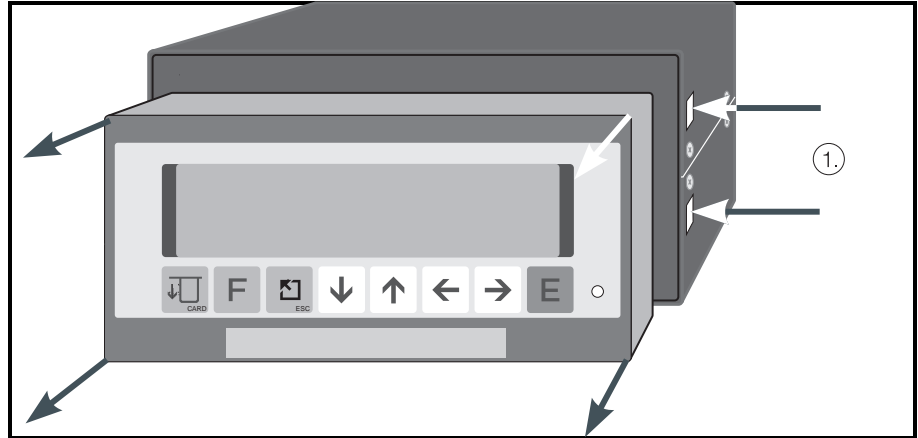
The unit fuse is positioned on the power supply board. Remove power from the unit and disconnect all cables. Remove unit from the panel.



Remove the front bezel

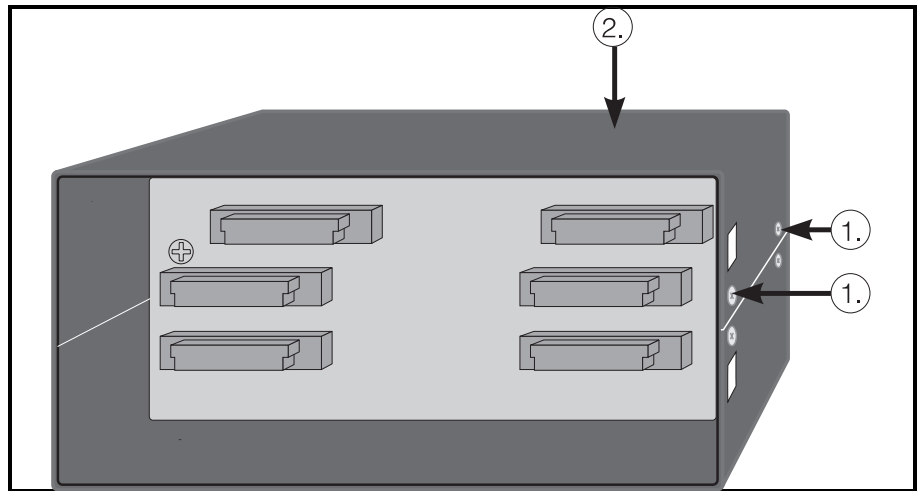
Remove front bezel.

Remove display from the housing



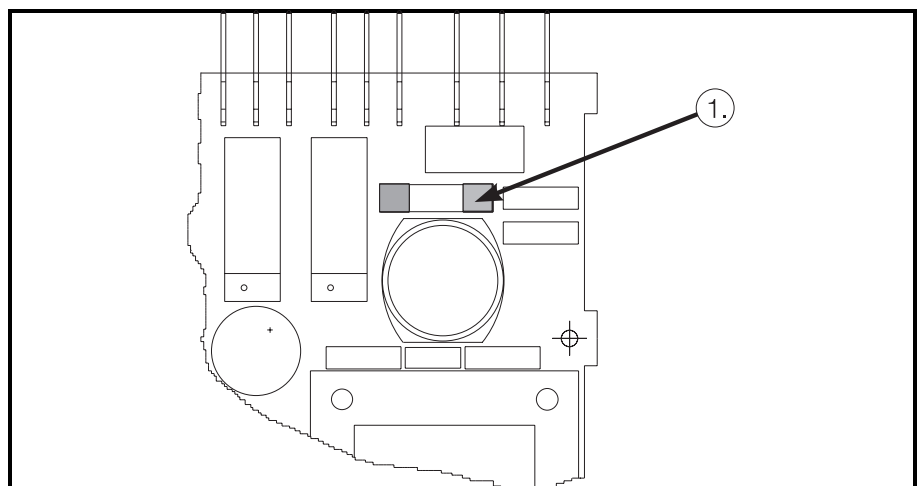
Using a screwdriver lightly push the straps (1) inwards. These can be found on both the left and right hand side of the unit. Now remove the display.

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 are not permitted. Before returning the unit into operation make sure that all earth connections are made!

17.4 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

17.4.1 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

17.4.2 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	- With "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

18 Technical data

Measurement component

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
	Type L -200 .. +900 °C Type K -200 .. +1372 °C Type U -200 .. +600 °C Type J -210 .. +1200 °C Type B 200 .. +1820 °C Type T -270 .. +400 °C Type S 0 .. +1800 °C Type N -270 .. +1300 °C Type 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 negligible

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 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	Recording traces, events, running times, messages and quantities,
Serial interface	RS232 C, option: RS422/485
Limit monitor	All channels 1 x per second; 1 limit/analogue/digital channel
Display	2 x 20 digit fluorescent display for digital measured value display and/or trend bar graph Operating languages: German, English, French, Italian

**Function/
interface/
display**

Power supply	230 V AC - 115 V AC - 24 V AC (50/60 Hz)
Electrical safety	to VDE 0411/IEC 348
Primary fuse	315 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)

Power supply

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

**Housing/
connection**

Digital inputs	7 digital inputs, max. 25 Hz selectable as event or quantity channel. 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
Impulse output	Impulse output max. 12.5 Hz,
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

**Further
in/outputs****Technical alterations reserved !**

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