SIEMENS

| Power and Energy Meter   N 162 | 7KT1 162 |
| Power and Energy Meter   N 165 | 7KT1 165 |

Product and Applications Description

The power meters N 162 / N 165 are DIN rail mounted devices according to DIN 43880 with a total height of 70mm.

They are applied for measurement of real and reactive energy in 3-phase networks (3/4 wire connection).

Application Programs

20 S1 PowerMeter 906601

For details see application program description document.

Installation Instructions

- The device may be used for permanent interior installations in dry locations, within distribution boards, or small casings.

⚠ WARNING

- The device may be placed into distribution boards (230/400 V) together with appropriate VDE-devices and must be mounted and commissioned by an authorised electrician.
- Disconnect and lock off power before installing or working on the device.
- Free DIN rail areas with sticked-in data rail must be covered with covers, order no. 5WG1 192-8AA01.
- The prevailing safety and installation rules must be heeded.
- The device must not be opened. A device suspected faulty should be returned to the local Siemens office.

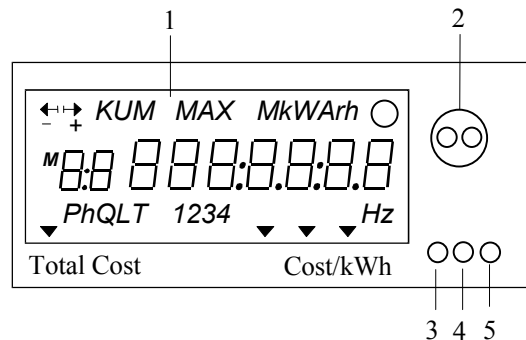## Technical Specification

Power supply
via bus line and from meter circuit

Display elements
1 red LED:
for monitoring bus voltage and displaying mode selected with learning button
- LED on: addressing mode
- LED off: normal mode

1) 7-digit display LCD size 8 x 4 mm
2) IR-read out interface to restart the readout-measuring head
3) Display push button
4) Led for IR-test readout
5) Sealing Set / Reset button

Readout data for consumption analysis
- Manual readout
  The above listed data can be read out and manually recorded directly on the power meter by pressing the (3) Set/Reset button and (5) Display button. The power meter calculates the energy costs if the price per kWh is entered. The possibility of entering the device number makes it easier to assign the device to the numbering system used and the assignment of costs to the various cost centers.
- Readout software for the IR measuring head
  The data of the table above are read into a PC using a magnetic IR measuring head and saved in an ASCII file acc. to IEC 61 107. This ASCII file is suitable to be processed into an Excel or Access file. The program can be run on Windows 95, 98 and Windows NT.

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Technical Product Information

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Power and Energy Meter N 165		**7KT1 165**

Readout data on the LCD display or via IR interface

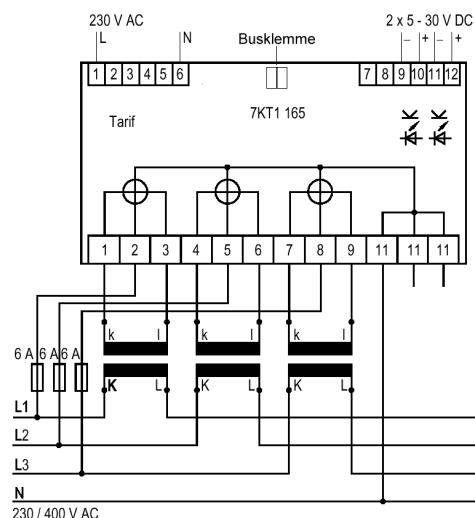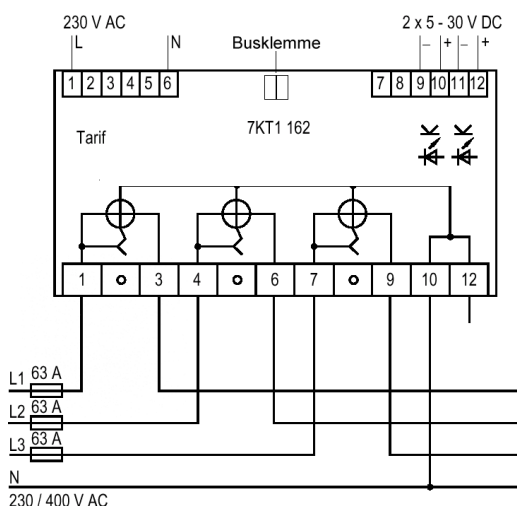|		
-Real energy	rate 1/2	kWh
-Price per kWh, adjustable	rate 1/2	cost/kWh
-Total costs	rate 1/2	total cost
-Reactive energy	rate 1/2	kvarh
-Current real power	total	kW
	phase L1/L2/L3	kW
-Current transformer (CT) factor		FA I
-Device ID, adjustable		No.

Data transmission *instabus EIB*

The following data transmission is possible with the
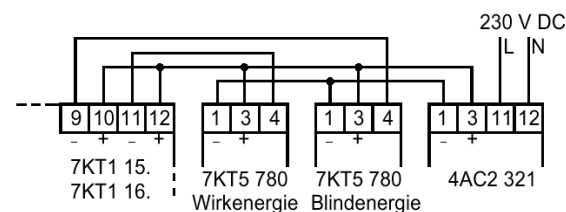7KT1 162 and 7KT1 165 meters:

-Real energy	Rate 1	Wh
-Real energy	Rate 2	Wh
-Device ID		
-Real power	Phase L1	W
-Real power	Phase L2	W
-Real power	Phase L3	W

Note for the connection of transformer meters:

Depending on the protection of the phases L1, L2, L3, a
short-circuit protected wiring for the voltage supply of the
terminals 2, 5 and 8 is required in case of a reduction of
the cross section. For cable and line protection a 6A fuse
is recommended.

Rate changing

If a voltage of 230 V AC is applied to the terminals 1 and 6,
rate 2 is selected for the external display of rate 1 and 2.

Circuit of the S0 interface

The short-circuit proof optocoupler is operated with 5-30
V DC. The current must be selected in the range of max.
20 mA. The pulse duration is 125 ms. The wiring dia-
gram shows the circuit with the 7KT5 780 or 7KT5 751
pulse counters and the 4AC2 321 power supply unit for
the external display of rate 1 and 2.

Connections

- Terminals
Mains terminals	+/- screw (Pozidriv)2
Impulse signal	+/- screw (Pozidriv)1
- Wire cross-sections
Mains terminals	solid wire (min.) mm² 1x1,5
	solid wire (max.) mm² 1x35
Impulse signal	solid wire (min.) mm² 1x2,5
stranded wire with core terminator (min.) mm² 1x0,75	
- Bus line
screwless Bus terminal	0,6 ... 0,8mm Ø solid wire

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Power and Energy Meter N 162	7KT1 162
Power and Energy Meter N 165	**7KT1 165**

Physical specifications

- dimensions: DIN-rail mounted device according to DIN 43880 width 6 SU (1SU = 18mm)
- weight: approx. 380g
- fire load: approx. 6000 kJ $\pm$ 10 %

Prüfnormen

Insulation, Power frequency test	IEC 60
Insulation, Impulse voltage test	IEC 60
Radiated RF electro-magnetic field.	
Immunity test	ENV 50140
Radio disturbance characteristics	CISPR 22, EN 55022
RF. Conducted disturbances	EN 61000-4-6, ENV 50141
Burst	IEC 1000-4-4, EN 61000-4-4
Elektrostatic discharge	IEC 1000-4-2, EN 61000-4-2

Snap hammer test	IEC 1036-5.2.1
Mechanical shock	IEC 1036-5.2.2
Vibration	IEC 1036-5.2.3
Resistance to heat / fire	IEC 1036-5.2.4
Protection against water	IEC 1036-5.2.5
Protection against dust	IEC 1036-5.2.5

Electrical safety

- overvoltage class (according to IEC 60664-1): III
- protection (according to EN 60529): IP 20
- fouling class (according to IEC 60664-1): 2
- device complies with: EN 50090-2-2, EN 60669-2-1 and IEC 60664-1

Electromagnetic compatibility

- complies with EN 50081-1, EN 50082-2 and EN 50090-2-2

Environmental specifications

- climatic conditions: EN 50090-2-2: 3K5
- ambient temperature operating: - 10 ... + 50 °C
- ambient temperature non-op.: - 40 ... + 70 °C
- relative humidity (non-condensing): 5 % bis 93 %

Certification

EIB certified
PTB certified

CE norm

complies with the EMC regulations (residential and functional buildings), and low voltage regulations

Mounting and Wiring

General

The meter can be installed in surface-mounted or flush-mounted distribution boards conforming to DIN 43880, an in any other location or enclosure with a DIN EN 50022-35 x 7,5mm rail.
The connection to the bus line is established via a bus connector block.

Montage des Installationseinbaugerätes
- Slide the device (B1) onto the DIN-rail (B2) and
- swivel back the device until the slide clicks into place audibly.

Demontage des Installationseinbaugerätes (Bild 1)
- Remove all connected wires,
- press down the slide (C3) with a screw-driver and
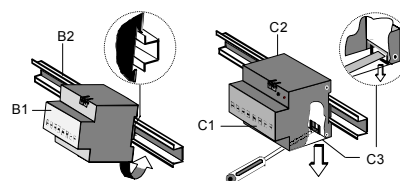- swivel the device (C1) from the DIN-rail (C2).

Figure 1: *Mounting and Dismounting a DIN rail device*

Slipping off bus connection blocks (Diagram 2)
- The bus connection block (E1) is situated on the top of the power meter (E2).
- The bus connection block (E1) consists of two components (E1.1 and E1.2) with four terminal contacts each. Take care not to damage the two test sockets (E1.3) by accidentally connecting them to the bus cable or with the screwdriver (e.g. when attempting to unplug the bus connection block).
- Carefully put the screwdriver to the wireinserting slit of the bus connection block's grey component and pull the bus connection block (E1) from the power meter (E2).

Slipping on bus connection blocks (Diagram 2)
- Slip the bus connection block onto the guide slot and
- press the bus connection block (E1) down to the stop.

Connecting bus cables (Diagram 2)
- The bus connection block (E1) can be used with single core conductors Ø 0,6 ... 0,8 mm.
- Remove approx. 5 mm of insulation from the conductor (E1.4) and plug it into the bus connection block (E1) (red = +, black = -).

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Disconnecting bus cables (Diagram 2)
- Unplug the bus connection block (E1) and remove the bus cable conductor (E1.4) while simultaneously wiggling it.
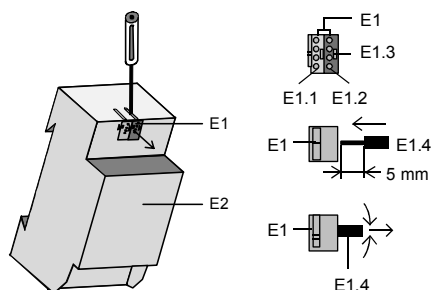
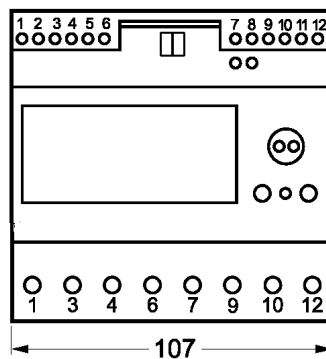Diagram 4: *Connecting and disconnecting bus wires*

Mounting, Connection and Operation
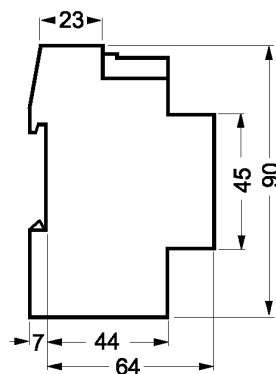
see Operation Instructions FISCE 4620.2L SIE

Dimension Diagram
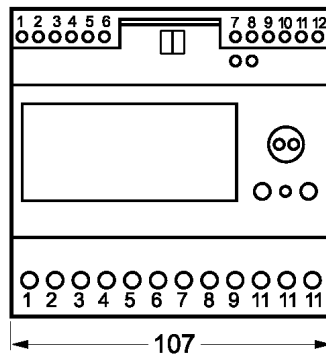
Dimensions in mm

7KT1 162

7KT1 165

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Power and Energy Meter N 162	7KT1 162
Power and Energy Meter N 165	7KT1 165

Energy Meter – Technical Data			7KT1 162	7KT1 165
Supply voltage Ue		V AC	3x230/400	
Supply current Ie	direct readout up	A AC	10(63)	–
	CT connected	A AC	–	5(6)
Supply frequency		Hz	50/60	
Display (LCD)	Tariff		Double	
	7-digit size H x W	Mm	8x4	
Readout Data		KWh	real energy	
		KVArh	reactive energy	
		kV	instant. real power	∑ phase / L1-L2-L3
		FAI	-	Current factor
		Device ID	Nr.	
Accuracy	According IEC 61036	Class	2	
Meter burden	rating power	W	0,8	
Starting current		MA	5	1
		Quantity	1	2
Impulse output According IEC 61393/DIN 43864	IR-Pulse LED	Imp./Wh	10	
	terminal outread	Imp./kWh	10	
Impulse command supply	voltage	V DC	5-30	
	current	MA	max. 20	
	resistance	kΩ	0,5 - 1,5	
Overvoltage category			III	
Degree of pollution			2	
Degree of protection	(terminal area)		IP 40 (IP 20)	

Energy Meter – Technical Data			7KT1 162	7KT1 165
Terminal connection - Main current supply - Cable stripped length - Impulse output, rate changing - Cable stripped length	± Pozidriv screw		2	1
		mm	10	
	Single-slot screw	mm	2,5	
		mm	6	
Terminal capacity - Main current supply - Impulse output, rate changing	rigid copper wire (min.)	mm²	1 x 1,5	1x10
	rigid copper wire (max.)	mm²	1 x 35	
	rigid copper wire (max.)	mm²	1 x 2,5	
	flexible cable with sleeve (min.)	mm²	1 x 0,75	
Ambient temperature	stocking	°C	– 40…+70	
	operating	°C	– 10…+50	

Operating Instructions
Reading data at the display

Fig.: 1   Test display
Fig.: 2.1 Current Real Energy T1 (kWh)
Fig.: 2.2 Cost per kWh T1 (Cost / kWh)
Fig.: 2.3 Total Cost T1 (Total Cost)
Fig.: 3.1 Current Real Energy T2 (kWh)
Fig.: 3.2 Cost per kWh T2 (Cost / kWh)
Fig.: 3.3 Total Cost T2 (Total Cost)
Fig 4.1 Current reactive energy T1 (kvarh)
Fig.: 5.1 Current reactive energy T2 (kvarh)
Fig 6.1 Momentary Real Power, Total L1,2,3 (kW)
Fig.: 6.2 Momentary Real Power L1 (kW)
Fig.: 6.3 Momentary Real Power L2 (kW)
Fig.: 6.4 Momentary Real Power L3 (kW)
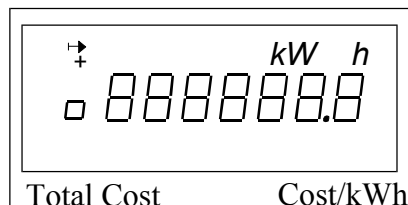Fig.: 7.1 Current transformer factor "FA I"
Fig.: 8.1 Device ID "nr"

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Fig. 1: Test display

This appears for about 4 sec. upon switch-on of meter
1) 7-digit display LCD size 8 x 4 mm
2) IR-read out interface to restart the readout-measuring head
3) Display push button
4) Led for IR-test readout
5) Sealing Set / Reset button
6) Current real and reactive power (supply)
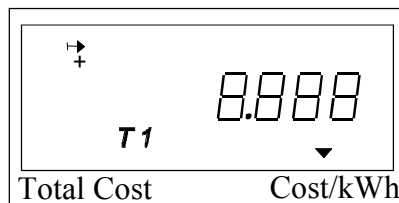7) Current real and reactive power (delivery)

Fig.: 2.1 Current real energy T1 (kWh)

Tariff 1 is real when the control input is free of voltage. The display shows this by a small "o".
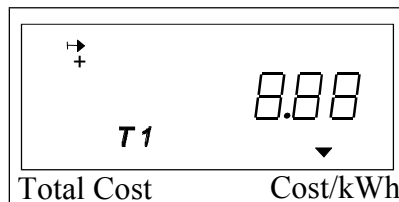000000.0 — 9999.9 kWh
Overflow: 999999.9 kWh

If the Set / Reset button is pressed for 3 sec, the Real Energy value and the Total cost T1 are reset zero. This can be prevented by sealing the Set / Reset button.

Fig. 2.2: Cost per kWh T1 (Cost / kWh)
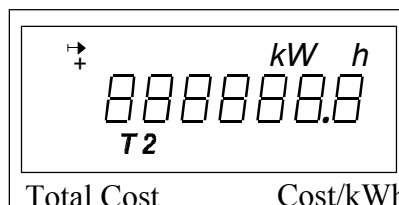**0.000 — 999.999 Cost / kWh**

If the Set / Reset button is pressed for 3 sec. you are in the entry mode (Cost/kWh) and the first position is intermitting. The Display button now enables you to adjust the first position. To advance a position press the Set / Reset button and adjust again the desired figure by means of the display button. This is the way to enter the desired cost per kWh. If you have reached the last position, please store the value by pressing the Set / Reset button.

Fig. 2.3: Total Cost T1 (Total Cost)

0.00 — 99999.99 Total Cost
Overflow: Stop at 99999.99 Total Cost

Fig.: 3.1 Current real energy T2 (kWh)

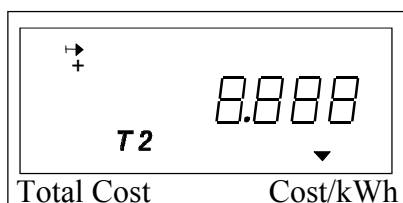Tariff 2 (T2) is real when the control input is free of voltage. This is shown on the display by a small "o".
000000.0 — 9999.9kWh
Overflow: 999999.9 — 000000.0 kWh

If the Set / Reset button is pressed for 3 sec, the Real Energy value and the Total cost T2 are reset zero. This can be prevented by sealing the Set / Reset button.

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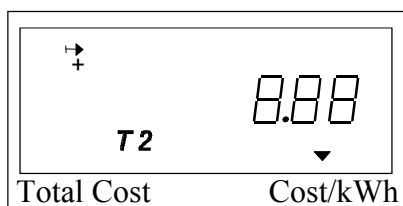| Power and Energy Meter N 162	7KT1 162
Power and Energy Meter N 165	7KT1 165

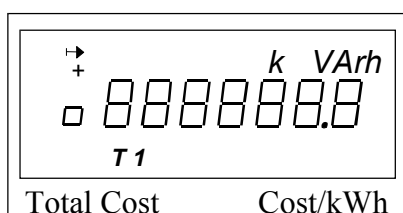### Fig. 3.2: Cost per kWh T2 (Cost / kWh) 0.000 — 999.999 Cost / kWh

Adjustment of cost per kWh as under Fig. 2.2.
0.000 — 999.999 Cost / kWh

Fig. 3.3: Total Cost T2 (Total Cost)

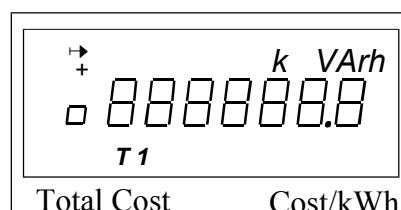0.000 — 999.999 Cost / kWh
Overflow: Stop at 99999.99 Total Cost

Fig. 4.1: Current reactive energy T1 (kVArh)

Tariff 1 is active when the control input is free of voltage.
This is shown on the display by a small "o".
000000.0 — 9999.9 kVArh
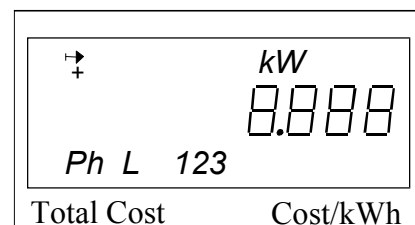Overflow: 999999.9 kVArh

If the Set / Reset key is pressed for 3 sec, the reactive energy value T2 is set on zero. This can be avoided by lead sealing the Set / Reset key.
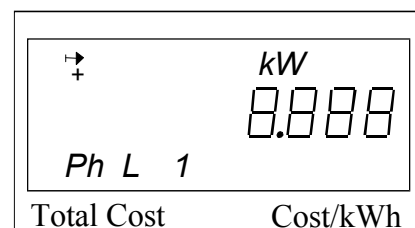
Fig.: 5.1 Current reactive energy T2 (kVArh)

Tariff 2 is active when the control input is connected to voltage. This is shown on the display by a small "o".
000000.0 – 999999.9kVArh.
Overflow: 999999.9 – 000000.0kVArh.
If the Set / Reset key is pressed for 3 seconds, the reactive energy value T2 is set on zero.
This can be avoided by lead sealing the Set / Reset key.

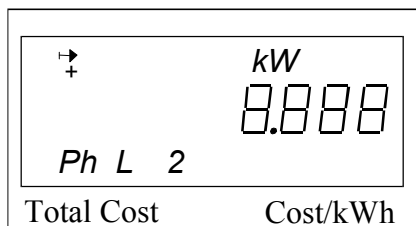### Fig : 6. 1 Momentary Real Power, Total L1,2,3 (kW)

If the Display is pressed for more than 3 sec. the display jumps to Fig. 6.2
0.000 - 1000.000 kW for transformer-connected m. 5(6)A
0.000 - 5.000 kW direct connection 10(63)A

Fig.: 6.2 Momentary Real Power L1 (kW)

0.000 - 350.000 kW for transformer-connected m. 5(6)A
0.000 - 17.000 kW direct connection 10(63)A

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Bild 6.3: Momentary Real Power L2 (kW)

```
 ↦
 +              kW
             8.888

 Ph  L   2
─────────────────────
Total Cost      Cost/kWh
```

0.000 - 350.000 kW for transformer-connected m. 5(6)A
0.000 - 17.000 kW direct connection 10(63)A
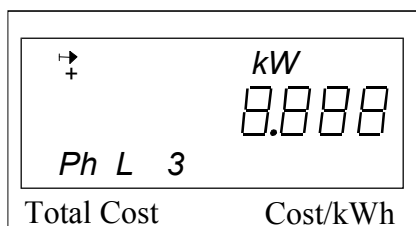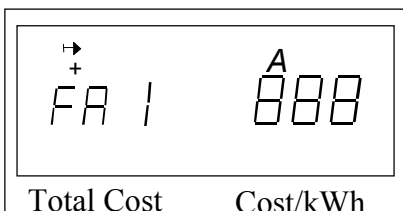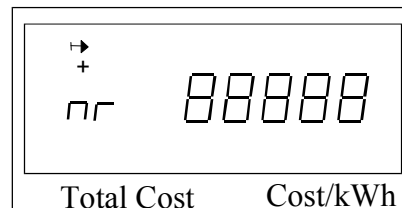
Fig.: 6.4 Momentary Real Power L3 (kW)

```
 ↦
 +              kW
             8.888

 Ph  L   3
─────────────────────
Total Cost      Cost/kWh
```

0.000 - 350.000 kW for transformer-connected m. 5(6)A
0.000 - 17.000 kW direct connection 10(63)A

**Fig. 7.1: Current transformer (CT) factor „FA I"
for current transformer connected meters 5(6)A**

```
 ↦
 +                  A
 FA I          888

─────────────────────
Total Cost      Cost/kWh
```

Example: current transformers 100/5A – current trans-
former factor "FA I" = 20

000 — 255

**Fig. 8.1: Device ID
00000 – FFFFF**

```
 ↦
 +
 nr         88888

─────────────────────
Total Cost      Cost/kWh
```

**Entry of Current Transformer Factor „FA I" and
of Device ID „nr".**

If the Set / Reset button is pressed for 3 seconds, you
are in the entry mode. The entry of the current trans-
former (CT) factor „FA I" recognises the figures 0 - 9.
The entry of the Device ID recognises the figures 0 – 9
and the characters A – F. If you are in the entry mode
the first position is intermitting. By means of the Display
button the first position can now be changed. To ad-
vance a position press the Set / Reset button and
change again by means of the Display button the de-
sired figure or character. This is the way of entering both
the current factor „FA I" and the device ID „nr". If you
have arrived at the last position, store the value/number
by renewed pressing of the Set / Reset button.

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