



## E700 Meter

### Manual for Installation and Use

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**aim** ACTIVE INFORMATION MANAGEMENT

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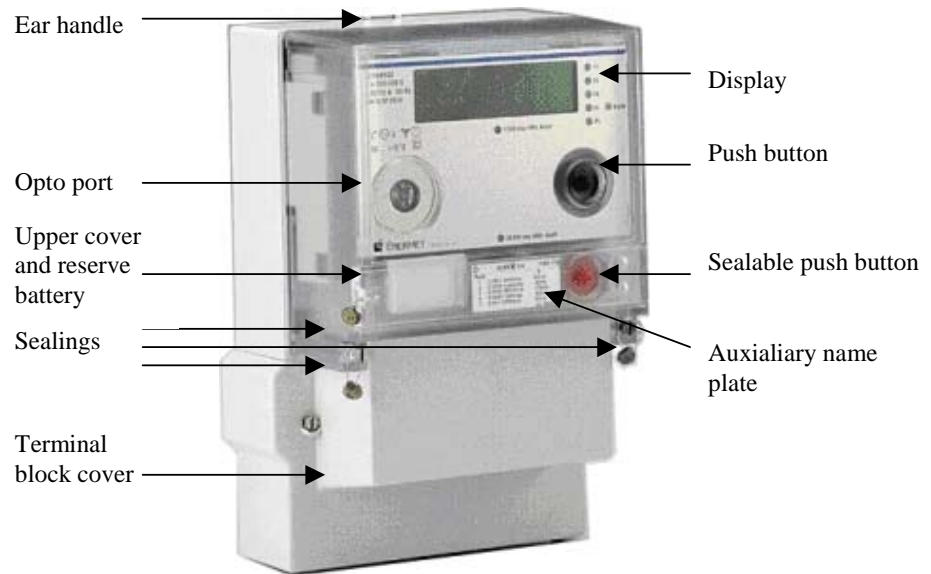
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# 1 METER TYPES

The type of the E700 meter is defined as follows:

E7	Product family
10	Class 1
05	Class 0.5
02	Class 0.2
D	Terminal configuration according to DIN standard
N	3 elements for 4 wire network (with or without neutral), - without N = two elements for 3 wire network
V	Meter with current transformer connection
J	Meter with current and voltage transformer connection
Q	1-directional active and 1 to 4 quadrant reactive
Z	2-directional active and 1 to 4 quadrant reactive
-w	V-type meter with voltage ratio
-d	Life-time cumulative register always on display
-s	SCTM protocol support
-h	No load profiling available

For example, meter of type E705 ANVZ meets the requirements of 0.5 measuring accuracy class (05). This meter corresponds to the Australian standard. It is a three-phase meter, which measures the consumption of electrical energy in a four-wire system (with or without neutral) (N). The measurement of the consumption place current must be directed through current transformers (V). The meter measures active energy two-directionally as well as reactive energy and apparent power from all four quadrants (Z).



**Figure 1. The E700 Meter**

## 2 OPTION MODULES AND RESERVE BATTERY

### 2.1 Option module types

The following option cards can be used with the E700:

- E7O1 (RS232 serial card)
- E7O2 (RS485 serial card)
- E7O3 (I/O-card)
- E7O4 (RS- and I/O-card), supported from meter version 2.0
- E7O5 (CS- and I/O-card), supported from meter version 2.0
- E7O6 (I/O- and modem card), supported from meter version 3.0
- E7O7 (modem card), supported from meter version 3.0 (requires E700UI v6.0)
- E7O8 (I/O card), supported from meter version 1.0 (requires E700UI v6.0)

The meter can use simultaneously a maximum of two option cards. The E7O4- and E7O5-cards are both serial- and I/O-cards. The E7O6 is a combined I/O and modem card. These three cards take both option card slots. Therefore, it is not possible to use another option card simultaneously with these cards.

**Note!**

**Option card E7O7 has to be placed in the rightward card slot (slot B). It is not functional in the other card slot.**

### 2.2 Changing the option modules

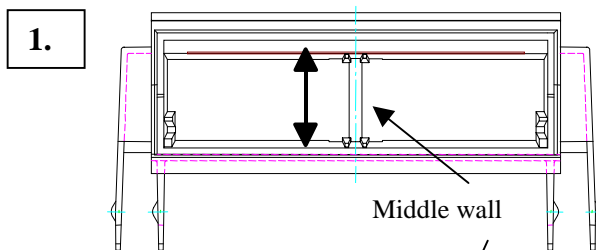
If requested, the option cards are installed to the meter by Enermet. If you want to add or change the option cards, do the following:

1. Switch off the voltage.
2. Remove the terminal block cover.

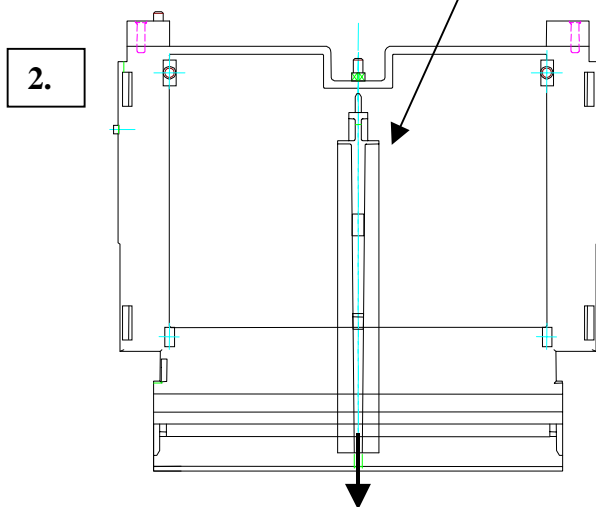
3. Add, remove, or change the option cards. If you change into a full width option module (E7O6), remove the separation wall between the two option module slots. See Figure 2. No special tools are needed. Make sure that the option card is properly placed in the meter.
4. Do the necessary wiring. The option card connections are presented inside the terminal block cover.
5. Attach the cover. Seal the device, if necessary.
6. Switch on the voltage.
7. Reconfigure the meter to the desired values using the configuration program.
8. Check that the meter has correct date and time. If necessary, update them using the push buttons or configuration program.

### Removing the separation wall

The option module slot seen from the front:



The option module slot seen from above:



#### 1. Expand the slot

To expand the option module slot: push the top and bottom up and down with your fingers. Push near the fixation protrusions.

You can use another removed middle wall as a tool.

#### 2. Pull out the separation wall.

**Figure 2. Removing the separation wall between the option module slots**

## 2.3 Reserve battery

A reserve battery for the real time clock can be attached to the meter. During a power failure, it keeps the real time clock running longer than the Super Capacitor, which is a basic accessory to the meter.

Attaching the reserve battery:

1. Switch off the voltage.
2. Remove the possible sealing from the left side of the upper cover. See Figure 1. When you lift the left side of the sliding cover for 5 mm and simultaneously slide it to the right, the cover opens. Attach the reserve battery to the terminal block located under the cover. Check that the cover is in its slide rails. Close the cover by sliding it from the right side to the left. Seal the cover, if necessary.
3. Switch on the voltage.

## 3 Installation Requirements

### 3.1 Installation site conditions

The installation site must meet the requirements of the meter's protection class (IP54) and the operating temperature range (-20 °C ... +70 °C). There must be no corrosive gases or dust on the installation site.

### 3.2 Installation place

The E700 can be installed on the meter frames corresponding to the DIN or ERMI specifications or directly to an unflammable wall. The place must not be so narrow or closed that the cooling of the meter is inhibited.

### 3.3 Voltage systems

#### 3.3.1 Electricity network

Check that the voltage marked to the meter nameplate is the same as the voltage used on site. Use the wires and cables designed for the used voltage and current.

#### 3.3.2 Outputs

There are two types of outputs. Check that the output corresponds to the used voltage.

##### 3.3.2.1 Pulse outputs (option card)

S0-connections are SELV-circuits (Safety Extra Low Voltage). The measuring voltage that the E700 feeds to the S0-connections is 18 - 27 VDC. Low-voltage wires can be used. Do not connect pulse outputs to ground.

When you connect the S0 outputs to other device's inputs, make sure that the inputs are filtered concerning high frequency interference.

##### 3.3.2.2 Semiconductor outputs (option card)

The relay outputs are high voltage connections: 230 V, 100 mA. Use the wires and cables designed for the used voltage and current



(max. 2,5 mm<sup>2</sup>, which is the maximum size of the connector).

**Note!**

**All relays must have the same supply voltage!**

### 3.3.3 Inputs

There are two types of inputs. Make sure that the input corresponds to the used voltage.

#### 3.3.3.1 Pulse and status inputs 18–27 VDC (option card)

S0-connections are SELV-circuits (Safety Extra Low Voltage). The measuring voltage that the E700 feeds to the S0-connections is 18 - 27 VDC. Low-voltage wires can be used.

#### 3.3.3.2 Pulse and status inputs 230 V (option card)

These inputs are high-voltage connections: 230 V, 100 mA. Use the wires and cables designed for the used voltage and current (max. 2,5 mm<sup>2</sup>, which is the maximum size of the connector).

**Note!**

**The 18 - 27 VDC is the maximum voltage for S0-inputs and outputs. Do not use higher voltage.**

**Note!**

**During the installation, keep the low-voltage wires away from the 230 V wires. If you do not use a pre-fabricated wire set, bundle the different types of wires into separate groups starting immediately from the terminal.**

**Note!**

**If an input device does not meet the SELV requirements (for example, a transistor output that is not opto-insulated), all circuits become immediately 230 V circuits. In such case, use the 230 V wires.**

## 3.4 Meter configuration

Use the E700UI software to configure the meter. Refer to the E700 Product Description and E700UI Manual for further information.

An E700 meter can also be configured at the Enermet factory. In such case, check the meter's date and time during the installation.

## 4 Installation Sequence

1. Make sure that the voltage is not on!
2. Make sure that the meter type is correct for the installation site (type V or J).
3. Remove the terminal block cover.
4. Make the required wiring. The connection diagram is located inside the terminal block cover. The connections for the option cards are also presented there.
5. Attach the cover. Seal the device, if necessary.
6. You can install an auxiliary name plate to the place reserved for it under the sliding cover. See Figure 1. The use of stick-on label is recommended. You can use the E700UI software to print the auxiliary name plates. For information on how to open the cover, refer to chapter 2.3 Reserve battery.
7. Switch on the voltage.
8. Check that the meter has the correct date and time. If necessary, update them using the push buttons or the E700UI software.

## 5 Setting date and time

To set the meter's date and time, you need both push buttons. To access the red button, remove the sliding cover. See chapter 2.3 Reserve battery.

The consequences of this manual time setting to the meter's registers are identical to those of the "Set time" command in the E700UI program. See E700 Meter Product Description.

1. First make a short press on the black button (the upper button, see Figure 1). All display characters appear on display.
2. Make a short press on the red button located under the black one. Date and time appear on the display.
3. Make another short press on the red button again. The day starts to blink.
4. If you want to change the day, make short presses on the black button until you get the desired day on the display. When the day is correct, proceed to step 5.
5. Accept the day by making a short press on the red button. The month field starts to blink. Change the month the same way as you changed the day (in step 4). Accept the change by making a short press on the red button. Proceed to the next field.
6. Repeat the above steps until the desired date and time are blinking on the display.
7. Accept the changes by making a short press on the red button. If you do not press the red button, the meter date and time will not change.

You can immediately re-update the meter's date and time by pressing the red button again.

## 6 Ending billing period

To end the meter's billing period, make a short press on the red push button. To access the red button, remove the sliding cover. See chapter 2.3 Reserve battery.

Billing period ending is indicated with “-----End” on the display.

It depends on the configuration, which tariff registers are ended. To prevent extra billing period endings there is also a configurable BP ending lock period (0 – 10080 minutes). Refer to E700UI Manual for Installation and Use.

### Note!

**When ending billing period using the red push button, meter's display must be in auto scrolling mode or manual scrolling mode, not in time setting mode.**

## 7 Maintenance

The reserve battery is the only component in the E700 that is maintained by the user. See Chapter 2.3 Reserve battery.

The operating time of the reserve battery is ten years.

### **Warning!**

**Do not open the case when the device is connected to the electricity network. Life hazard.**

## 8 Push buttons and display

### 8.1 Push buttons

The E700 has two push buttons. A black button is located in the bottom right corner of the nameplate and a red button is located under the sealable cover. See figure 1.

The black button is used to scroll the meter's display. The red button is used to end the meter's billing period (refer to chapter 6 Ending Billing Period). Both push buttons are needed in setting meter date and time (refer to chapter 3.5.1 Setting meter date and time using push buttons).

### 8.2 Display

The meter has an illuminated digital display. The data displayed depends on the meter's configuration, which is made using the E700UI configuration program.

The display is scrolled either automatically (Auto Scrolling) or you can scroll it manually (Manual Scrolling) using the black push button. Auto Scrolling is the normal state. In Auto Scrolling mode the meter automatically displays a selected scrolling sequence.

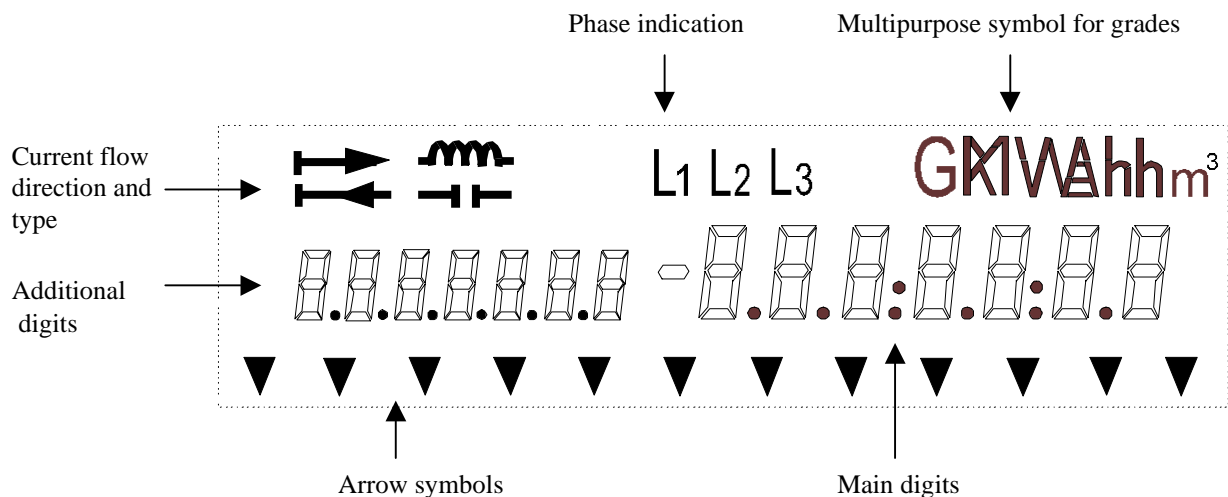


Figure 3. The display symbols of an E700 meter.

Some display messages are presented in the following tables:

**Table 1. Display messages**

Message		Meaning
E700 ID	EDIS ID	
UNIT ID	0.0.0	Unit ID
SER No	C.1.0	Serial number
C DATE	0.9.2	Current date
C CLO	0.9.1	Current time
CONF ID	0.2.0	Configuration ID
P DATE	C.2.1	Configuration date
IN STAT	C.51	Input status
OUT STA	C.52	Output status
RE STAT	C.59	Register status
ABC TARIFF	C.53 TARIFF	Tariff register menu
ABC LP	C.54 LP	Load profile menu
ABC BP	C.55 Bp	Billing Period counter menu
ABC U-I-P	C.56 U-I-P	Instantaneous values menu
ABC OTHER	C.57 OTHER	Miscellaneous menu
ERR 001	F.1	Error register 1: application
ERR 002	F.2	Error register 2: core
ERR 003	F.3	Error register 3: alarms
---END	---END	END tag

**Table 2. Display messages - instantaneous values**

Instantaneous values		
Message		Meaning
E700 ID	EDIS ID	
A1	21.24	Active power L1
A2	41.24	Active power L2
A3	61.24	Active power L3
A	1.24	Active power sum
R1	23.24	Reactive power L1
R2	43.24	Reactive power L2
R3	63.24	Reactive power L3
R	3.24	Reactive power sum
S1	29.24	Apparent power L1
S2	49.24	Apparent power L2
S3	69.24	Apparent power L3
S	9.24	Apparent power sum
U1	32.24	Line voltage L1
U2	52.24	Line voltage L2
U3	72.24	Line voltage L3
I1	31.24	Line current L1
I2	51.24	Line current L2
I3	71.24	Line current L3
PF1	33.24	Power factor L1
PF2	53.24	Power factor L2
PF3	73.24	Power factor L3

FRE	14.24	Frequency
AE	64.1.8	Life-time cum. AE+
AE-	64.2.8	Life-time cum. AE-
RE	64.3.8	Life-time cum. RE+
RE-	64.4.8	Life-time cum. RE-
SE	64.9.8	Life-time cum. SE

**Note!**

**In 2 element meters Line voltage 1 means mains voltage between phase L1 and L2 (U12), and Line voltage L3 means mains voltage between L3 and L2 (U32).**

**8.2.1 Scrolling the display using push buttons (Manual scrolling)**

Change from the Auto Scrolling to Manual Scrolling by making two short presses on the black push button. Scroll the display in Manual Scrolling using the black push button.

Each menu level ends with an END-tag. You can get to different menu levels using different press lengths:

Press length	Meaning
Short press < 2 sec	Scrolls on the menu level.
Medium press >2<5 sec.	Moves to submenu or previous menu level.
Long press > 5 sec.	Changes from Manual Scrolling to Auto Scrolling.

If you make a short press, the display scrolls the same menu level from the beginning. If you make a long press, the display changes to Auto Scrolling. See Figure 4. The length of the press is seen, since the display changes accordingly after two and five seconds during a constant press.

Each menu function can have a submenu. It is indicated by an arrow that points downwards. The arrow is located on the right-hand corner of the display.

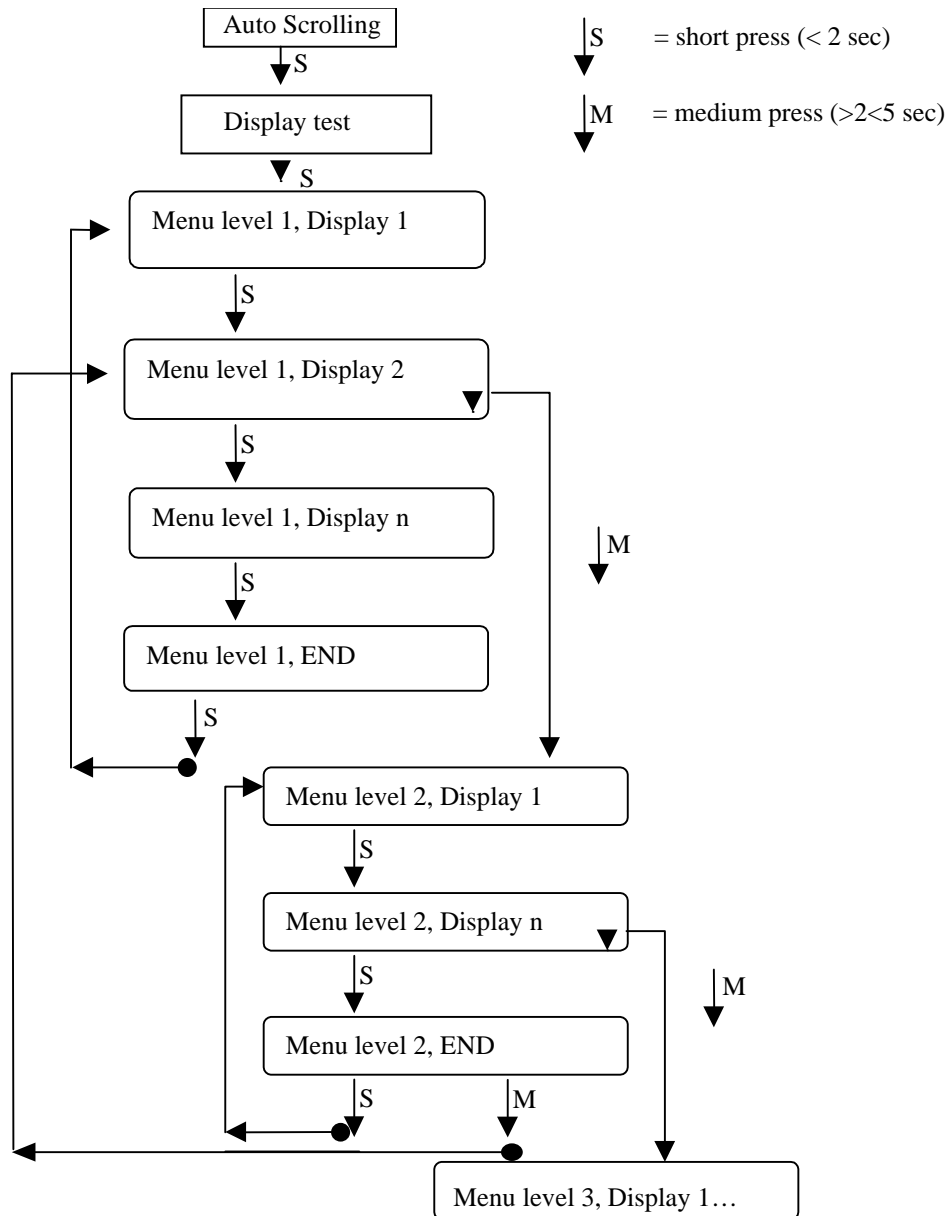
To get to the submenu or to the previous menu level when the END-tag is displayed

- make a medium press when the arrow is displayed.
- If you want to move two levels downwards, release the push button when the display changes for the first time. Then make another medium press.



**Note!**

**If the button is not used, the program goes back to the Auto Scrolling after the time period defined using the configuration program.**



**Figure 4. Manual scroll sequence.**

### 8.2.1.1 *An example of manual scrolling: browsing all load profile values*

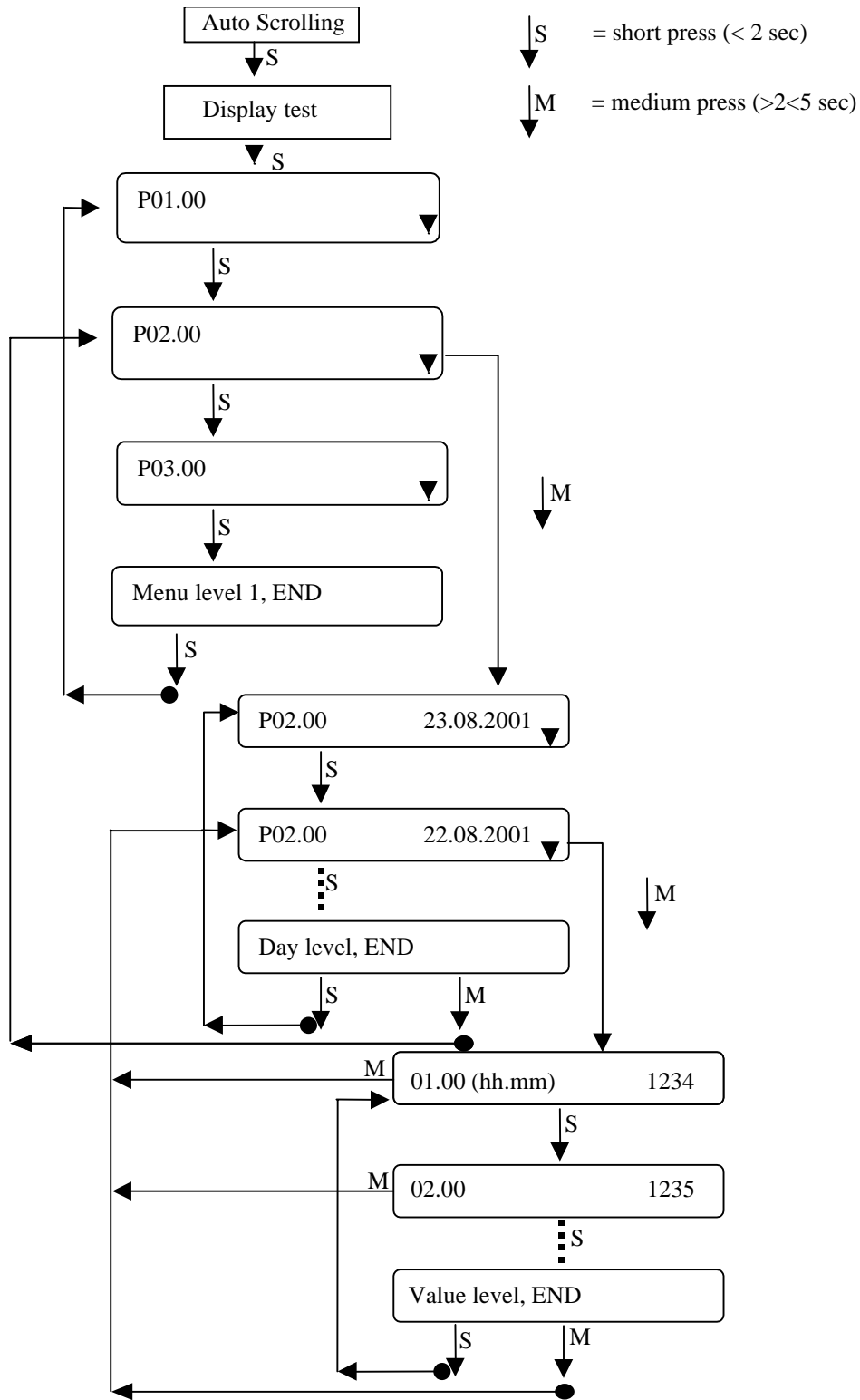
You can browse all load profile values on the display if the meter is version 5.00 or later and if you have ticked the **All load profile values** box in the User Interface (see E700 User Interface Manual, chapter *Edit display*). This feature allows you to find each individual load profile value that the meter has recorded.

First, change from Auto Scrolling to Manual Scrolling by making two short presses on the black push button (see Figure 5). Now, the first menu level is displayed. The first menu level shows the load profiles. You can move from one load profile to another by making short presses. When you find the load profile you want to examine more closely, make a medium press.

Now, the second menu level is displayed. The second menu level shows the days of the chosen load profile, starting from the most recent date. Make short presses until you come to the day you want to examine more closely, then make a medium press.

The third level shows you the values recorded on the chosen day, complete with time stamps (hh:mm) and starting from the first value recorded on that day. Make short presses until you find the value you are looking for.

On the third level you can make a medium press any time to return to the second level.



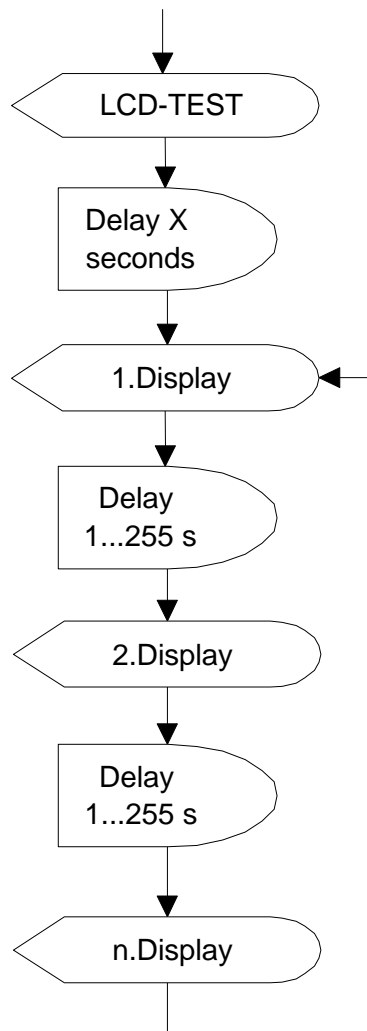
**Figure 5. An example of manual scrolling: how to browse load profile values**

### 8.2.2 Automatic display scrolling (Scrolling mode)

In Auto Scrolling mode the meter automatically displays a selected scrolling sequence. Maximum number of items displayed in the scrolling sequence is 256. Time between the scroll steps can be from 1 to 255 seconds. Use the E700UI software to define the items and scroll step length.

Switch to the manual mode by pressing the push button once. When the display is switched to manual mode the meter runs an LCD-test.

The meter will switch automatically back to scrolling mode after a configurable delay from the last press on the push button. The scrolling sequence is then started from the first display.



**Figure 6. Auto-scrolling sequence**

### 8.3 LED indicators

The E700 has eight LED indicators, which have the following purposes:

LED indicator	Purpose:
V-type: Configurable, the default is 5000 imp./kWh, kvarh  J-type: Configurable, the default is 10 000 imp./kWh, kvarh	Configurable Test-LED
V-type: 50 000 imp./kWh, kvarh  J-type: 100 000 imp./kWh, kvarh	Test-LED
P1 – P5	The purpose of LED indicators P1-P5 can be freely configured using the configuration program.
Alarm	LED indicates a meter failure. Refer to chapter 9 <i>Troubleshooting</i>

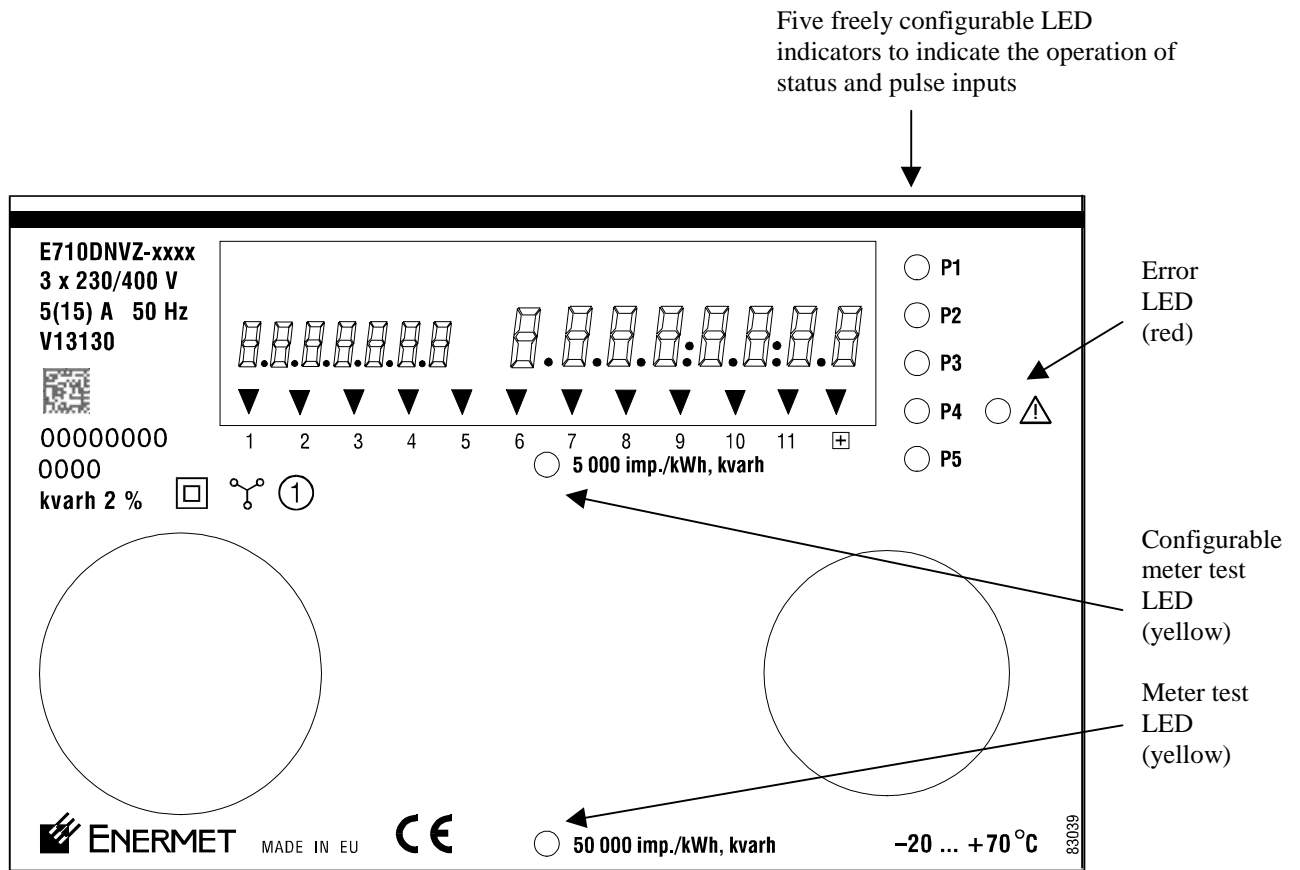


Figure 7. The LED indicators of an E700 meter

## 9 Troubleshooting

### 9.1 Alarm LED is on

If the Alarm-LED is on:

- Check the connections of the phase wires.
- Make sure that the device has not remained de-energised for longer than fourteen days after the programming (the clock is not on time). Update the unit's time using the push buttons, configuration program, or the AIM DGC system.

### 9.2 Phase indication symbol is blinking

Phase symbols L1, L2 and L3 indicate electricity network's line voltages. The symbols are turned on when the corresponding line voltages are existing. The phase symbols also indicate different error situations, which are presented in Table 3.

**Table 3. Error situations in phase indication**

Phase indication	Meaning	Action
One phase symbol is blinking	Line voltage is too high or too low	Check the operation of the electricity network and meter connections.
All phase symbols are blinking	Voltage imbalance	Check the operation of the electricity network and meter connections.
All phase symbols are blinking alternately; the blinking symbol changes at 2 seconds interval.	Wrong phase order	Check the operation of the electricity network and meter connections.

### 9.3 Alarm message on display

An alarm message begins with the text Err and number sequence 001, 002, or 003. The number sequence tells in which section the error is detected:

- Err 001: application error
- Err 002: meter core error

- Err 003: measurement alarm (control of electricity network)

After these, an eight digit hexadecimal number is displayed. This error code tells what error(s) the meter has detected.

When you read the error registers with the E700UI, it shows the error codes as decimal values. The tables below show both hexadecimal and decimal error codes.

**Note! If several errors are detected at the same time, the error code is the sum of individual error codes.** For example, the display can show *Err 003 00000003*.  $00000003 = 00000001 + 00000002$ , where 00000001 indicates that the phase L1 is missing and 00000002 indicates that L2 is missing from the meter.

The meter enters the detected changes and failures to its internal event log (for example, power failures). Use the E700UI to define the type and number of events entered and saved in the log, and to read the event log.

In other cases, contact Enermet and deliver the meter for maintenance.

Error messages and their meanings are presented in the following tables:

**Table 4. Error messages**

Err 001 Application error	Error message in UI	Error message on LCD	Meaning	Action
Bit number:	Decimal	Hex		
3	4	0004	Option module type is wrong	Re-configure the meter/change the right module/deliver meter to Enermet.
4	8	0008	Watchdog has caused a unit reset	Deliver meter to Enermet for maintenance.
6	32	0020	Error detected in real time, e.g. duration of a power break has exceeded the guaranteed battery backup time of the real time clock. In this situation the time information may be erroneous.	Update the unit's time./Deliver meter to Enermet for maintenance.
9	256	0100	Checksum error detected in code memory (EPROM)	Deliver meter to Enermet for maintenance.
11	1024	0400	Checksum error detected in non-volatile memory	Deliver meter to Enermet for maintenance.
13	4096	1000	Modem fault has been detected	Change the modem option module/Deliver meter to Enermet for maintenance
16	32768	8000	Pulse output overflow or underflow has occurred	Deliver meter to Enermet for maintenance



Err 002 Meter core error	Error message in UI	Error message on LCD	Meaning	Action
Bit number:	Decimal	Hex		
1	1	0001	Non-volatile memory (EEPROM) was initialised.	Deliver meter to Enermet for maintenance.
2	2	0002	Checksum error in non-volatile memory (EEPROM)	Deliver meter to Enermet for maintenance.
3	4	0004	Checksum error in volatile memory (RAM)	Deliver meter to Enermet for maintenance.
4	8	0008	Checksum error in code memory	Deliver meter to Enermet for maintenance.
5	16	0010	A/D-converter operation fault	Deliver meter to Enermet for maintenance.

Err 003 Measure- ment alarm	Error message in UI	Error message on LCD	Meaning	Action
Bit number:	Decimal	Hex		
1	1	0001	No line voltage (phase L1 missing)	Check the operation of the electricity network and meter connections.
2	2	0002	No line voltage (phase L2 missing)	
3	4	0004	No line voltage (phase L3 missing)	
4	8	0008	Low line voltage (phase L1)	Check the operation of the electricity network and meter connections.
5	16	0010	Low line voltage (phase L2)	
6	32	0020	Low line voltage (phase L3)	
7	64	0040	High line voltage (phase L1)	Check the operation of the electricity network and meter connections.
8	128	0080	High line voltage (phase L2)	
9	256	0100	High line voltage (phase L3)	Check the operation of the electricity network and meter connections.
10	512	0200	Wrong phase order	Check the operation of the electricity network and meter connections
11	1024	0400	Voltage imbalance	Check the operation of the electricity network and meter connections.
12	2048	0800	High line current (phase L1)	Check the operation of the electricity network and meter connections.
13	4096	1000	High line current (phase L2)	
14	8192	2000	High line current (phase L3)	

**Note!**

**In 2 element meters Line voltage 1 means mains voltage between phase L1 and L2 (U12), and Line voltage L3 means mains voltage between L3 and L2 (U32).**

# 10 TECHNICAL SPECIFICATIONS

**Table 5. Operating characteristics**

<b>Operating characteristics</b>	
<p><u>Metrological requirements</u></p> <ul style="list-style-type: none"> <li>• Class 0.2S and 0.5S according to EN60687, IEC 62052-11, IEC 62053-22</li> <li>• Class 1 according to EN61036, IEC 62053-21</li> </ul> <p><u>Measurement System</u></p> <ul style="list-style-type: none"> <li>• Digital</li> <li>• 3 element for 4 wire networks</li> <li>• 2 element for 3 wire network</li> </ul> <p><u>Voltage</u></p> <ul style="list-style-type: none"> <li>• <math>U_n = 3 \times 230/400 \text{ V}</math></li> <li>• <math>U_n = 3 \times 100: \sqrt{3}/100 \text{ V}</math></li> <li>• <math>U_n = 3 \times 110: \sqrt{3}/110 \text{ V}</math></li> <li>• <math>U_n = 3 \times 100 \text{ V}</math> (2 element meters)</li> <li>• <math>U_n = 3 \times 110 \text{ V}</math> (2 element meters)</li> <li>• Measuring range: 80 – 115 % of <math>U_n</math></li> </ul> <p><u>Current</u></p> <ul style="list-style-type: none"> <li>• <math>I_n = 1 \text{ A}</math></li> <li>• <math>I_n = 5 \text{ A}</math></li> <li>• <math>I_{\max} = 15 \text{ A}</math> (0.2s: 6 A)</li> <li>• Starting current: 0,01 x <math>I_n \text{ A}</math></li> </ul> <p><u>Frequency</u></p> <ul style="list-style-type: none"> <li>• 50 Hz</li> </ul> <p><u>Auxiliary Voltage</u></p> <ul style="list-style-type: none"> <li>• Internal 3-phase power supply</li> </ul> <p><u>Power Consumption</u></p> <p><u>Current circuit per phase</u></p> <ul style="list-style-type: none"> <li>• 0.05 VA (5A)</li> </ul> <p><u>Voltage circuit, three phase, 3x100: <math>\sqrt{3}/100\text{V}</math> meters</u></p> <ul style="list-style-type: none"> <li>• with E7O6: &lt; 5.0VA, 4.0W (typical)</li> <li>• without option modules: &lt; 4.0VA, 3.5W (typical)</li> </ul> <p><u>Voltage circuit, three phase, 3x230/400V meters</u></p> <ul style="list-style-type: none"> <li>• with E7O6: &lt; 8.5VA, 4.0W (typical)</li> <li>• without option modules: &lt; 7.5VA, 3.5W (typical)</li> </ul>	<p><u>Instantaneous measurement</u></p> <ul style="list-style-type: none"> <li>• Total active / reactive power</li> <li>• Phase active / reactive power</li> <li>• Phase voltage</li> <li>• Phase current</li> <li>• Phase power factor</li> <li>• Frequency</li> <li>• Life-time cumulative registers</li> </ul> <p><u>Time-Of-Use metering</u></p> <ul style="list-style-type: none"> <li>• 32x1 main TOU/MD registers</li> <li>• 32x15 background TOU/MD registers</li> <li>• MD Integration from 1 to 180 min</li> </ul> <p><u>Load profile data recording</u></p> <ul style="list-style-type: none"> <li>• Maximum 8 channel</li> <li>• Integration period 1... 180 minutes</li> <li>• Three (3) data integrity diagnostic bits</li> </ul> <p><u>Event log</u></p> <ul style="list-style-type: none"> <li>• Size 0 – 1024 events</li> <li>• Type, description and date and time</li> </ul> <p><u>Meter Test Constant of High Voltage CT/VT type meters</u></p> <ul style="list-style-type: none"> <li>• 100 000 imp/kWh (kvarh)</li> </ul> <p><u>Low Voltage CT connected meters</u></p> <ul style="list-style-type: none"> <li>• 50 000 imp/kWh (kvarh)</li> </ul> <p><u>Slow Meter Test Constant</u></p> <ul style="list-style-type: none"> <li>• Configurable</li> </ul> <p><u>Temperature Range</u></p> <ul style="list-style-type: none"> <li>• Operating -20 ... +70 °C</li> </ul> <p><u>Humidity</u></p> <ul style="list-style-type: none"> <li>• Annual 0 to 75 %</li> </ul>

<p><u>Energy measurements</u></p> <ul style="list-style-type: none"> <li>• +AE (I+IV) kWh</li> <li>• -AE (II+III) kWh</li> <li>• +RE (I+II) kvarh</li> <li>• -RE (III+IV) kvarh</li> <li>• +REi (I) kvarh / +SEi (I) kVAh</li> <li>• +REc (II) kvarh / +SEc (II) kVAh</li> <li>• -REi (III) kvarh / -SEi (III) kVAh</li> <li>• -REc (II) kvarh / -SEc (II) kVAh</li> </ul>	
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**Table 6. General characteristics**

<b>General characteristics</b>	
<p><u>RTC time keeping accuracy</u></p> <ul style="list-style-type: none"> <li>• Crystal, 0,5 s / 24 h</li> <li>• Network 50 Hz</li> </ul> <p><u>RTC reserve running time</u></p> <ul style="list-style-type: none"> <li>• Supercapacitor, 14 days</li> <li>• Lithium battery (option), 10 years</li> <li>• Reserve running accuracy 1,5 s / 36 h Supercap</li> </ul> <p><u>Communication</u></p> <ul style="list-style-type: none"> <li>• Optical port</li> <li>• Serial communication and internal modem, see Table 8</li> <li>• EN61107 / IEC 61107 compatible</li> <li>• SCTM™ compatible</li> </ul> <p><u>Password structure</u></p> <ul style="list-style-type: none"> <li>• Three level Software 1) read, 2) read and partial write and 3) read and write</li> </ul> <p><u>Display</u></p> <ul style="list-style-type: none"> <li>• Customised LCD</li> <li>• 1x8 large digits and 1x7 small digits</li> <li>• 20 symbols</li> </ul>	<p><u>Push buttons</u></p> <ul style="list-style-type: none"> <li>• 1 for scrolling the display</li> <li>• 1 for the ending of the billing period</li> </ul> <p><u>Name plates</u></p> <ul style="list-style-type: none"> <li>• Main name plate for general information</li> <li>• Auxiliary name plate for application specific information</li> </ul> <p><u>Self diagnostic</u></p> <ul style="list-style-type: none"> <li>• General alarm</li> <li>• Phase failure</li> <li>• Watchdog</li> <li>• Memory</li> </ul> <p><u>Housing</u></p> <ul style="list-style-type: none"> <li>• IP54 tested without suction</li> </ul> <p><u>Weight</u></p> <ul style="list-style-type: none"> <li>• 2,1 kg</li> </ul>

**Table 7. Absolute maximums**

<b>Absolute maximums</b>	
<p><u>Insulation</u></p> <ul style="list-style-type: none"> <li>• Resistance &gt; 1000 MΩ (500 VDC, 1 min)</li> </ul> <p><u>AC Voltage</u></p> <ul style="list-style-type: none"> <li>• Network connection 4 kV AC, 1 min</li> <li>• Low voltage lines 4 kV AC, 1 min</li> </ul>	<p><u>RF emission</u></p> <ul style="list-style-type: none"> <li>• EN 55014, EN 55022 class b</li> </ul> <p><u>Spring hammer test</u></p> <ul style="list-style-type: none"> <li>• IEC 60068-2-75, 0,2 J ± 0,02 J</li> </ul> <p><u>Shock test</u></p> <ul style="list-style-type: none"> <li>• IEC 60068-2-27, 300 m/s<sup>2</sup> (30 g)</li> </ul>

<p><u>Impulse voltage</u></p> <ul style="list-style-type: none"> <li>• Network connections 12 kV</li> <li>• Low voltage lines 6 kV</li> </ul> <p><u>Burst</u></p> <ul style="list-style-type: none"> <li>• IEC 61000-4-4 level 3, 2 kV with base current level 4, 4 kV with no load</li> </ul> <p><u>Static electricity</u></p> <ul style="list-style-type: none"> <li>• IEC 61000-4-2 level 4, 8 kV contact discharge, 15 kV air discharge</li> </ul> <p><u>RF interference</u></p> <ul style="list-style-type: none"> <li>• IEC 61000-4-3 level 3, 10 V/m</li> </ul>	<p><u>Vibration test</u></p> <ul style="list-style-type: none"> <li>• IEC 60068-2-6, 9.8 m/s<sup>2</sup> (1 g)</li> </ul> <p><u>Current</u></p> <ul style="list-style-type: none"> <li>• Continuous 15 A</li> <li>• Short duration 300 A, 1 second</li> </ul> <p><u>Storage temperature</u></p> <ul style="list-style-type: none"> <li>• -40 °C to +80 °C</li> </ul>
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**Table 8. The Option Module characteristics**

<b>Option Module E701</b>
<p><u>Communication</u></p> <ul style="list-style-type: none"> <li>• Serial port RS232</li> <li>• EN61107 and SCTM™ compatible</li> </ul>
<b>Option Module E702</b>
<p><u>Communication</u></p> <ul style="list-style-type: none"> <li>• Serial port RS485</li> <li>• EN61107 and SCTM™ compatible</li> </ul>
<b>Option Module E703</b>
<p><u>Outputs</u></p> <ul style="list-style-type: none"> <li>• Five (5) S0-outputs, according to DIN 43864</li> <li>• 18...27 V, 10 ... 27 mA</li> <li>• Maximum pulse frequency 17 Hz</li> </ul> <p><u>Inputs</u></p> <ul style="list-style-type: none"> <li>• Two (2) S0 inputs according to DIN 43864</li> <li>• Maximum pulse frequency 17 Hz</li> </ul>
<b>Option Module E704</b>
<b>Version E704.1</b>
<p><u>Outputs</u></p> <ul style="list-style-type: none"> <li>• Six (6) semiconductor relay outputs</li> <li>• Max 230 Vac/Vdc (all relays must have the same supply voltage!)</li> <li>• 120 mA</li> <li>• Maximum pulse frequency 17 Hz</li> </ul> <p><u>Inputs</u></p> <ul style="list-style-type: none"> <li>• One (1) S0 input in accordance with DIN 43864, maximum pulse frequency 17 Hz</li> <li>• Eight (8) high voltage inputs (230V)</li> </ul> <p><u>Communication</u></p> <ul style="list-style-type: none"> <li>• Serial port RS232 and RS485</li> <li>• EN61107 and SCTM™ compatible</li> </ul>
<b>Version E704.2</b>
<ul style="list-style-type: none"> <li>• Same as E704.1, except with 100/110 Vac lines</li> </ul>

<b>Option Module E705</b>
<b>Version E705.1</b>
<p><u>Outputs</u></p> <ul style="list-style-type: none"> <li>• Six (6) semiconductor relay outputs</li> <li>• Max 230 Vac/Vdc (all relays must have the same supply voltage!)</li> <li>• 120 mA</li> <li>• Maximum pulse frequency 17 Hz</li> </ul> <p><u>Inputs</u></p> <ul style="list-style-type: none"> <li>• Two (2) S0 inputs in accordance with DIN 43864, maximum pulse frequency 17 Hz</li> <li>• Eight (8) high voltage inputs (230V)</li> </ul> <p><u>Communication</u></p> <ul style="list-style-type: none"> <li>• Serial port CS</li> <li>• EN61107 and SCTM™ compatible</li> </ul>
<b>Version E705.2</b>
<ul style="list-style-type: none"> <li>• Same as E705.1, except with 100/110 Vac lines</li> </ul>

<b>Option Module E706</b>
<b>Version E706.1</b>
<p><u>Outputs</u></p> <ul style="list-style-type: none"> <li>• Six (6) semiconductor relay outputs</li> <li>• Maximum pulse frequency 17 Hz</li> <li>• Max 230 Vac/Vdc (all relays must have the same supply voltage!)</li> <li>• 120mA</li> </ul> <p><u>Inputs</u></p> <ul style="list-style-type: none"> <li>• Two (2) S0 inputs in accordance with DIN 43864, maximum pulse frequency 17 Hz</li> <li>• Eight (8) high voltage inputs (230V)</li> </ul> <p><u>Communication</u></p> <ul style="list-style-type: none"> <li>• PSTN modem</li> <li>• 2400 bits/s (V.22bis) and 300 bits/s (V.21)</li> <li>• Dial-up/Leased line</li> <li>• CTR21 compatible</li> <li>• EN61107 and SCTM™ compatible</li> </ul>
<b>Version E706.2</b>
<ul style="list-style-type: none"> <li>• Same as E706.1, except with 100/110 Vac lines</li> </ul>

<b>Option Module E707</b>
<p><u>Communication</u></p> <ul style="list-style-type: none"> <li>• PSTN modem</li> <li>• 2400 bits/s (V.22bis) and 300 bits/s (V.21)</li> <li>• Dial-up/Leased line</li> <li>• CTR21 compatible</li> <li>• EN61107 and SCTM™ compatible PSTN modem</li> </ul>

<b>Option Module E708</b>
<p><u>Outputs</u></p> <ul style="list-style-type: none"> <li>• Two (2) S0-outputs, according to DIN 43864</li> <li>• 18...27 V, 10 ... 27 mA</li> <li>• Maximum pulse frequency 17 Hz</li> </ul> <p><u>Inputs</u></p> <ul style="list-style-type: none"> <li>• Four (4) S0 inputs according to DIN 43864</li> <li>• Maximum pulse frequency 17 Hz</li> </ul>

# 11 Dimensions

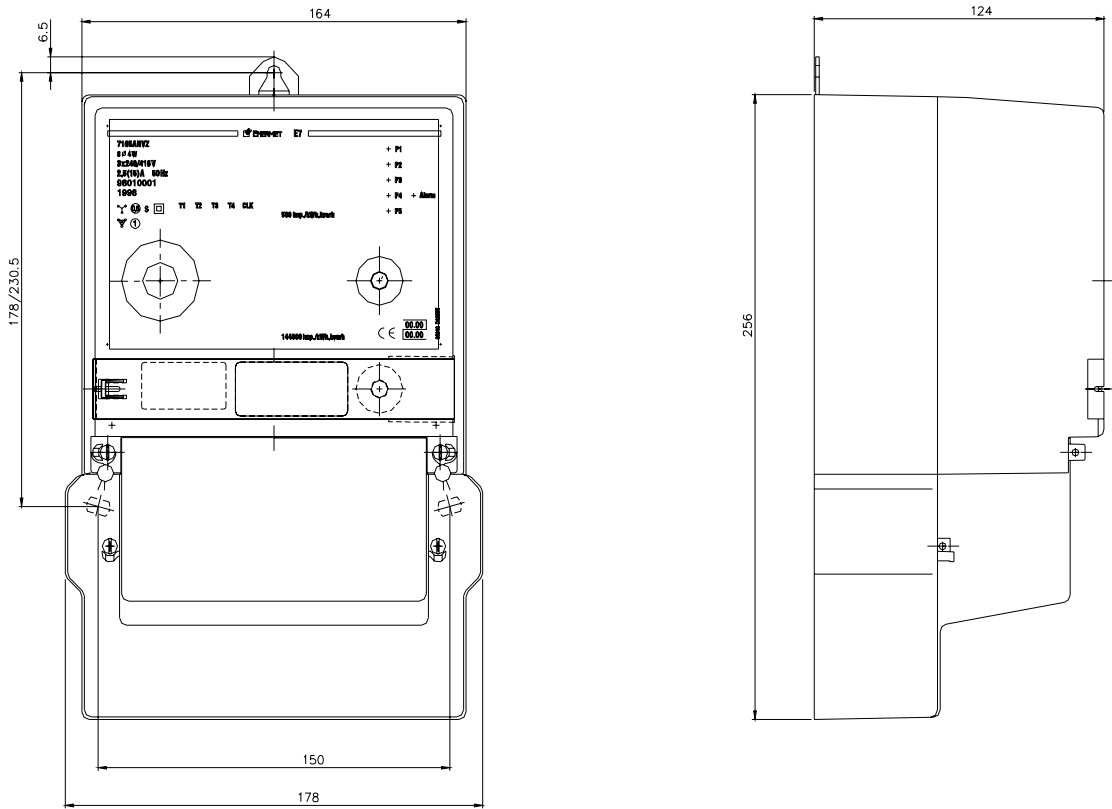


Figure 8. E700 dimensions

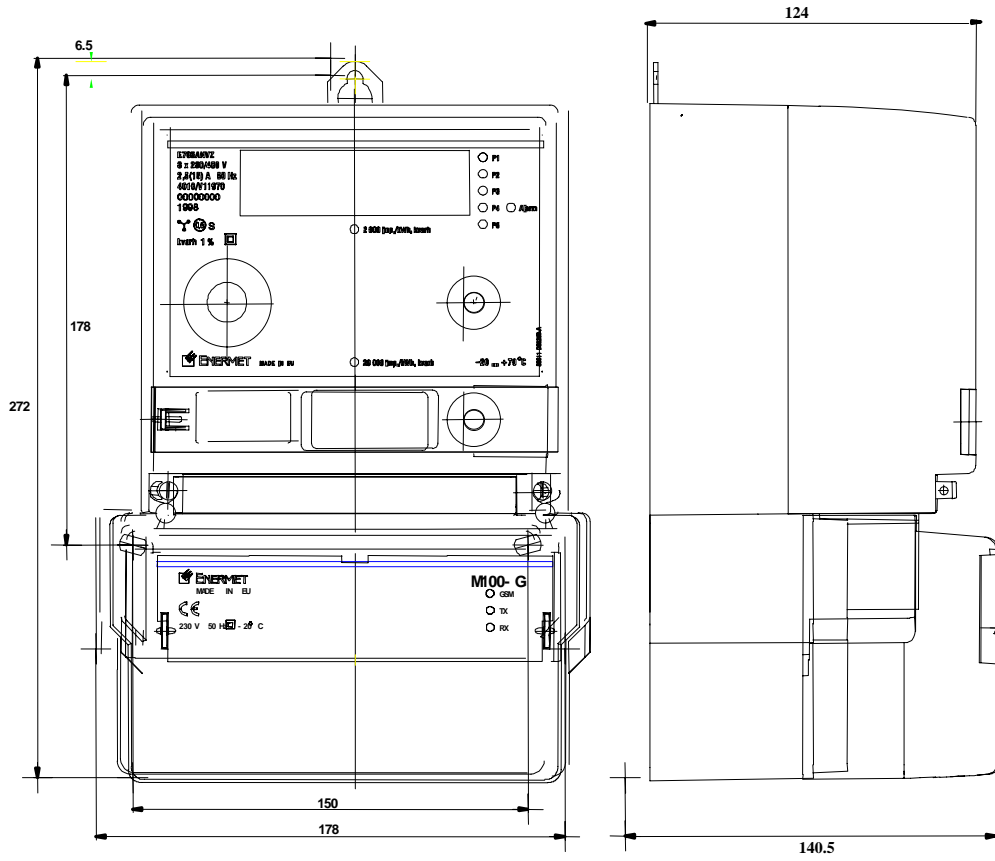


Figure 9. Installation dimensions with M100-G GSM modem.

# 12 Connections

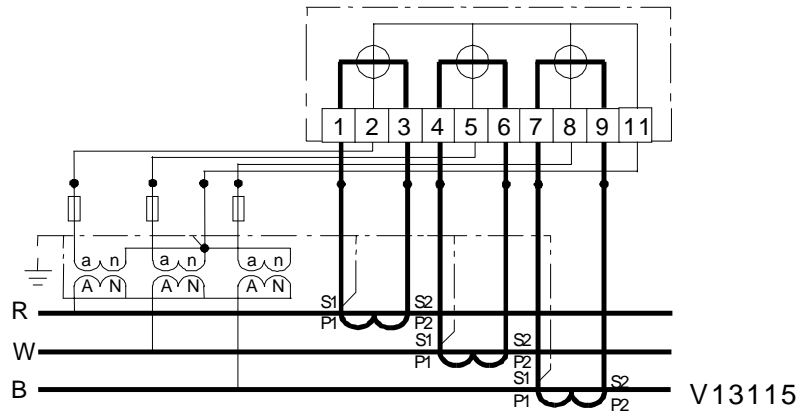


Figure 10. Connections for E700 type J

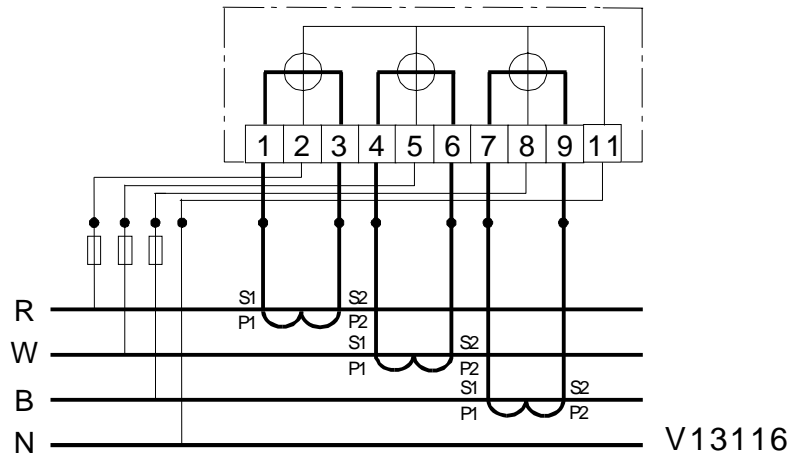


Figure 11. Connections for E700 type V

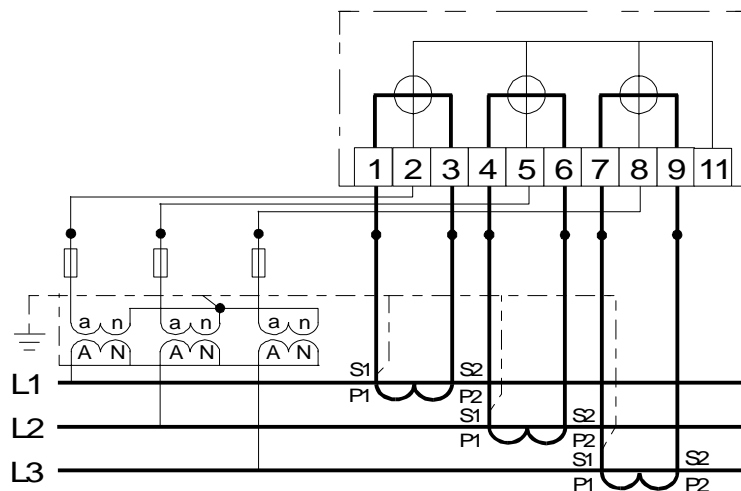
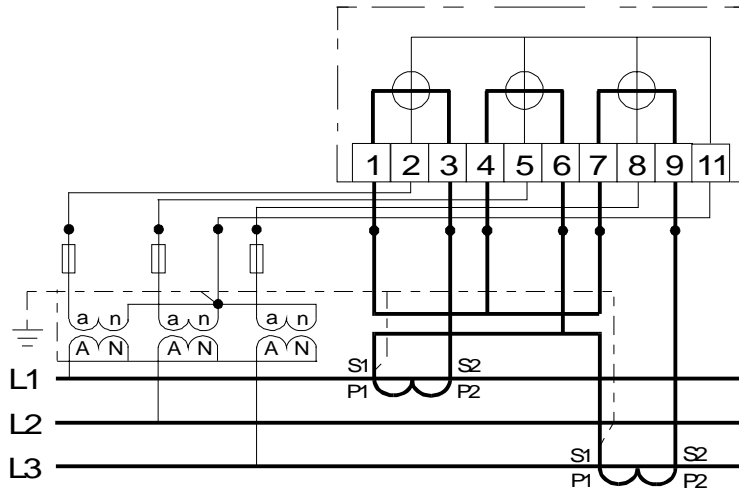
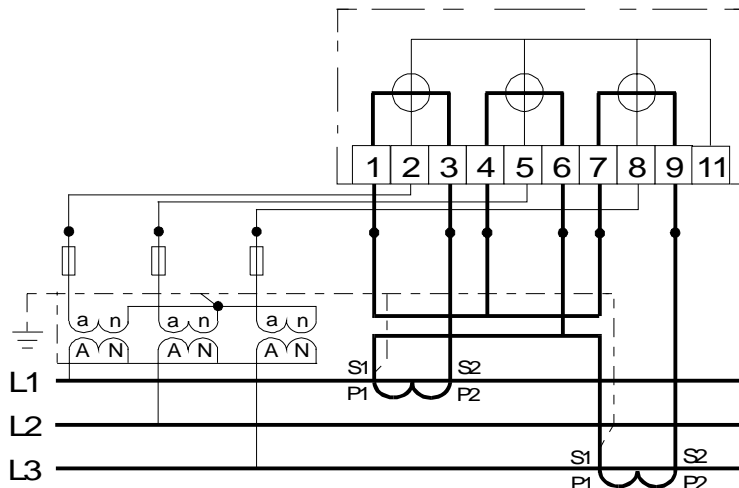


Figure 12. Connections for type J with 3 voltage transformers without neutral and 3 current transformers

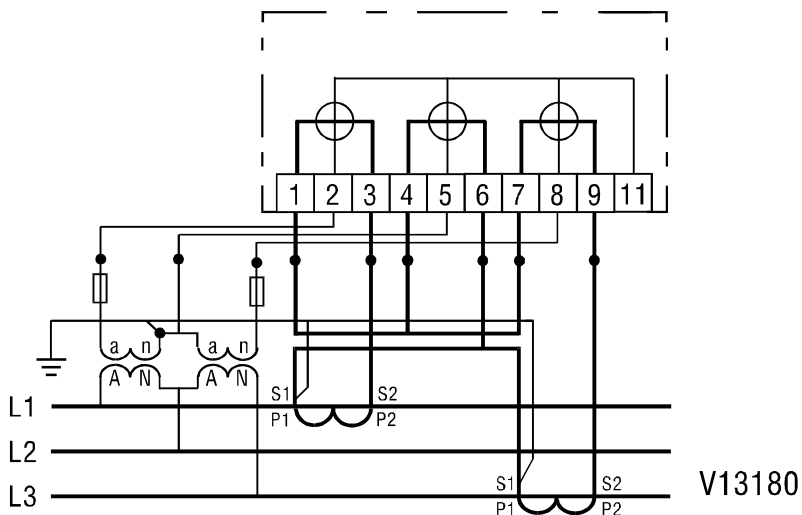




**Figure 13. Connections for type J with 3 voltage transformers with neutral and 2 current transformers**



**Figure 14. Connections for type J with 3 voltage transformers without neutral and 2 current transformers**



**Figure 15. Connections for type J with 2 voltage transformers without neutral and 2 current transformers**

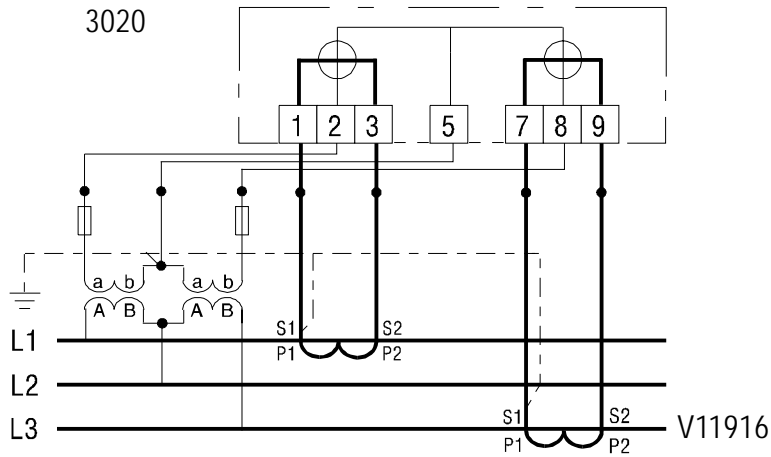


Figure 16. Connections for 2 element meters (DJQ and DJZ types)

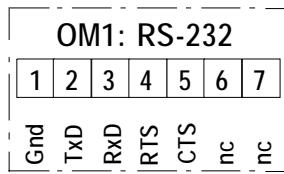


Figure 17. Connections for E7O1 option module.

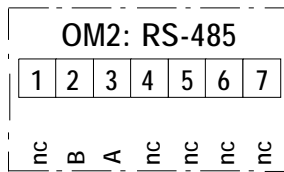


Figure 18. Connections for E7O2 option module.

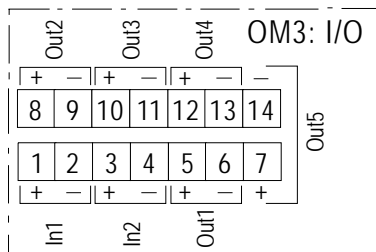


Figure 19. Connections for E7O3 option module.

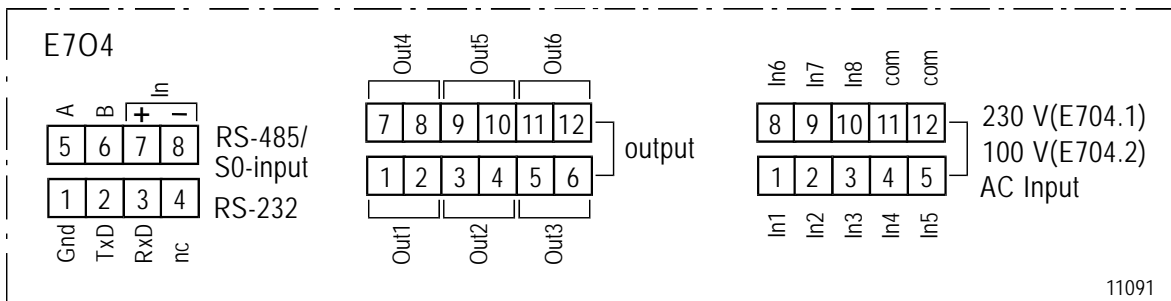


Figure 20. Connections for E7O4 option module.

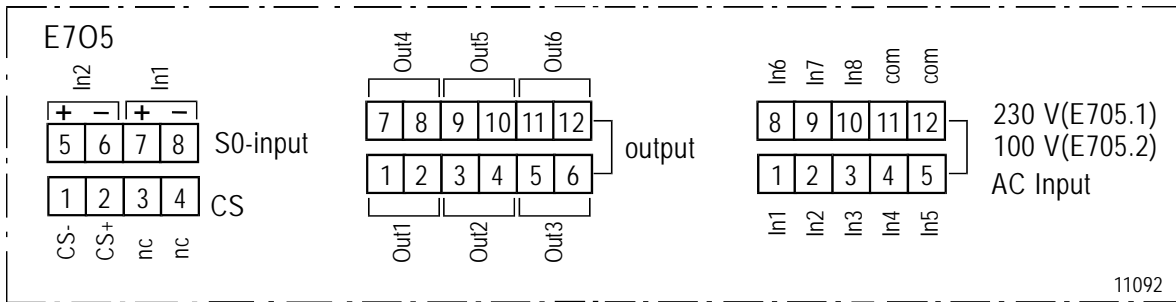


Figure 21. Connections for E705 option module.

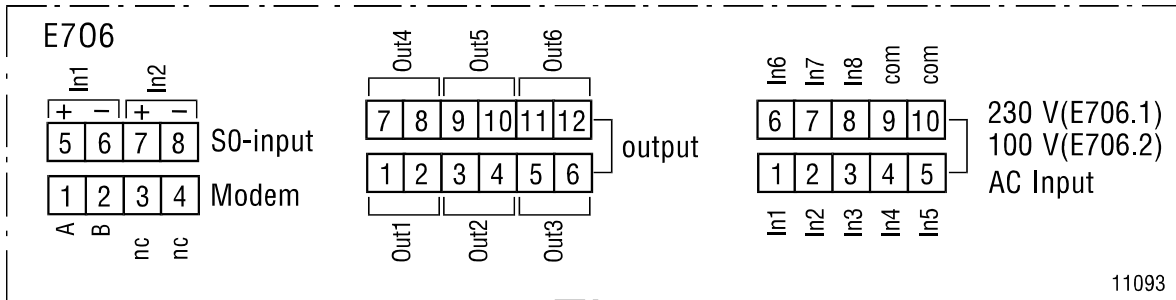


Figure 22. Connections for E706 option module

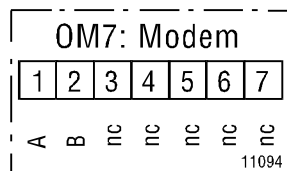


Figure 23. Connections for E707 option module

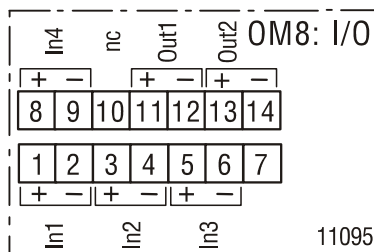


Figure 24. Connections for E708 option module

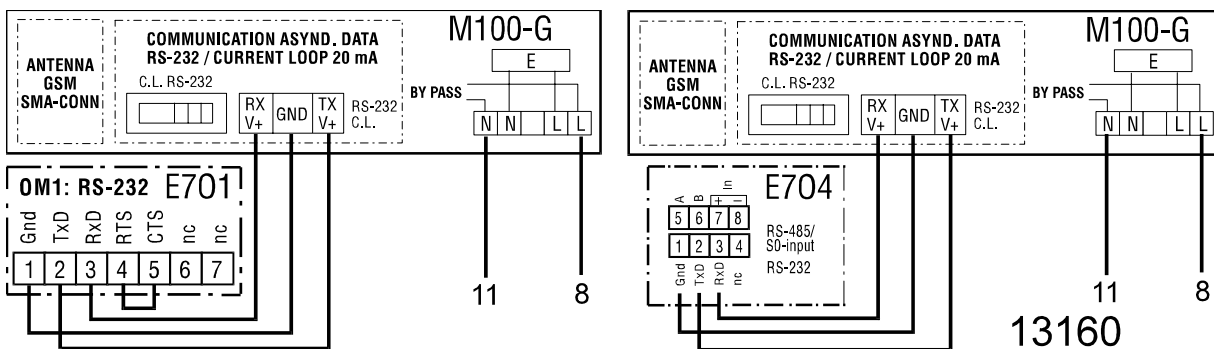


Figure 25. Connections with M100-G modem