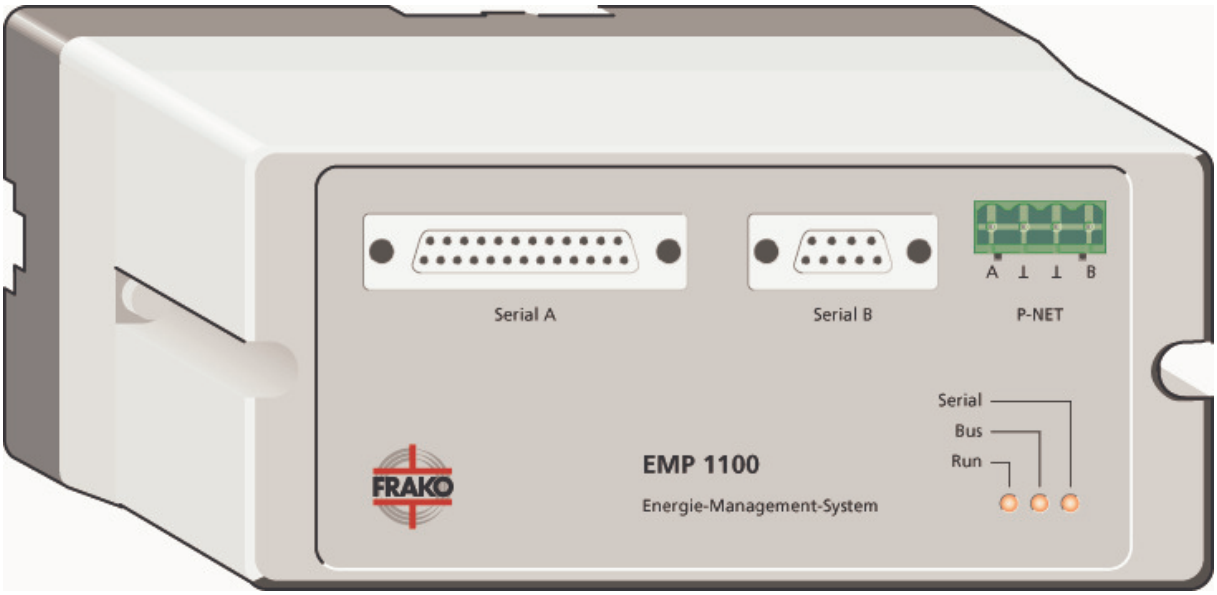
EMP 1100 Communications Processor

Operating Manual



Notes:

Safety instructions

!!! Important, read before commissioning !!!

- The user must ensure that all operators are familiar with this operating manual and follow it at all times.
- The operating manual must be read carefully before the instrument is mounted, installed and commissioned.
- All actions taken must follow the operating instructions.
- The installation and commissioning may only be carried out by appropriately qualified personnel with due regard for all rules and regulations that are in force.
- If the instrument is visibly damaged, it must not be installed, wired up or commissioned.
- If the instrument does not work after commissioning, it must again be isolated from the power supply.
- Any further laws, standards, directives, etc. that relate to this product must be complied with.

Contents

1. Quick start

- **Installation:**
  - Undo the two screws in the front cover and open the instrument.
  - Attach the DIN rail adapter to the instrument base and then mount it over a DIN top hat rail, or
  - screw the instrument base directly onto a suitable surface through the two knockouts provided.
  - The instrument is connected according to the wiring diagram: Figure 2, on page 8.

Important:
The instrument must be isolated from the power supply during installation and when carrying out any servicing work.

- **Commissioning:**
  - The instrument must be closed again after it is installed.
  - When the power supply to the instrument is switched on, the **Run** LED must begin to flash.

Note:
If the EMP 1100 does not respond in this way, the power supply to the instrument must be switched off and the installation checked.

  - The entire functioning of the instrument can be checked by means of a PC and the software SETEMP3.EXE supplied with the instrument (see Section 4, page 10)
  - Once all data blocks have been cleared (value of 0 in data word 0), the **Bus** LED must no longer be lit.
  - If a device connected to the bus is then registered, the **Bus** LED must light up at every update of the data block. If the **Bus** LED flashes rapidly, this indicates problems with the bus.

- **Basic settings:**

The basic settings of the EMP 1100 can be reviewed and changed by means of the SETEMP3.EXE software supplied with the instrument. The factory settings are as follows:

- Bus address:	2
- Maximum number of masters:	8
- Rapid polling every	4 seconds
- Slow polling every	15 seconds

2. Functions

The EMP 1100 acts as an interface between the FRAKO Starkstrombus® (bus for data interchange in energy systems developed by FRAKO) and the 3964R framework protocol with the RK512 interpreter. This communications system is supported by several PLC systems, but connections to computers with serial interfaces are also possible.
The 3964R protocol operates via an RS232 connection. A hardware handshake is not necessary.

The configuration process specifies to the EMP 1100 which devices are connected to the bus system and what their addresses are. Data from these devices are then read cyclically and saved in data blocks. The tables from page 24 onwards show which measurement data are assigned to which data words. Whenever desired, the contents of the data blocks can be accessed through the serial interfaces.

Data written by a PLC or a computer in the data blocks are forwarded by the EMP 1100 to the appropriate devices in the bus system.

The EMP 1100 is basically a passive component in the 3964R system. Data must be polled or transmitted by another unit connected to it. Active transmission of data is not possible.

2.1 Data blocks

The EMP contains 100 empty data blocks, but the first one of these that can be used is data block No. 4. There is no information saved in the data blocks in the instrument as delivered. In order to notify the EMP as to which data block is to receive data from which EM device, the data word 0 in the data block concerned must be programmed.

2.2 Power connection

The EMP 1100 must be connected to a 230 V AC supply in order to operate, the power cables being wired to terminals 1 and 2 on the instrument. Before switching on the power supply to the instrument, its cover must be replaced.

2.3 FRAKO Starkstrombus®

This connection is via a 4-pin Phoenix connector at the front of the instrument, its pin assignments being A, B and two earth connections. In addition, the A, B and earth connections can also be made at terminals 24, 25 and 23, respectively. From here the EMP must be connected to the other EM devices by means of a bus cable. The cable to use is a twisted pair of conductors with common shielding. These conductors are connected to terminals A and B and the shielding to the earth terminal. Terminal A must be connected to terminal A on the other EM devices; the same applying to terminal B and the earth terminal.

2.4 Serial interface A

The 25-pin connector for this interface is also located on the front panel of the instrument. This interface is used to operate the 3964R protocol described above.
To connect the instrument to a PLC or PC, the two connectors must be wired as follows:

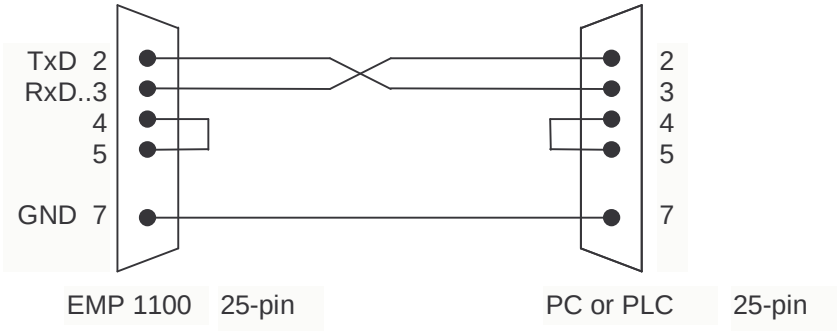


Figure 1: Interconnecting cable for serial interface A

The basic settings for the interface are as follows:

Baud rate	**: 9600**
Parity	**: even**
Stop bits	**: 1**
Hardware handshake	**: none**

The baud rate is saved in data block No. 3 and can be changed if required.

2.5 Serial interface B

This interface is effected by the 9-pin connector on the front panel of the instrument. Data blocks saved in the instrument can be accessed through this interface as well, but it is also possible to poll data directly via P-NET. The transmission rate is 19200 baud, the protocol being different to 3964R.

2.6 Annunciators

The EMP 1100 has three LED annunciators with the following functions:

Run: This LED flashes about once per second to indicate that the EMP 1100 is working correctly.

Bus: Indicates that the FRAKO Starkstrombus® is being used for accessing purposes. If the LED flashes rapidly, this indicates faults in the bus line.

Serial: Indicates that the serial interface A or B is being used for accessing purposes.

3. Installation

3.1 Mounting

The EMP 1100 communications processor is designed to be screwed to a suitable surface or mounted on a standard DIN 35 mm rail (top hat type). It can be mounted in any desired orientation, but if rail mounting is used, it must be ensured that the instrument is fitted securely.

Before mounting the instrument it is necessary to open it by slackening the two screws at the right- and left-hand sides of the cover.
If fixing screws are to be used, the two knockouts in the instrument base can first be opened up with a suitable tool.

For rail mounting, a 4 mm diameter hole must first be drilled in the middle of the instrument base at the position marked on its underside (see Figure 2).
The DIN rail adapter supplied with the instrument can now be fitted behind the base and its retaining screw tightened. The base is then mounted over the top hat rail.

3.2 Electrical connections

The instrument is connected according to the wiring diagram (Figure 2 below).

Important:
The instrument and all connected cables must be isolated from the power supply during installation and when carrying out any servicing work.

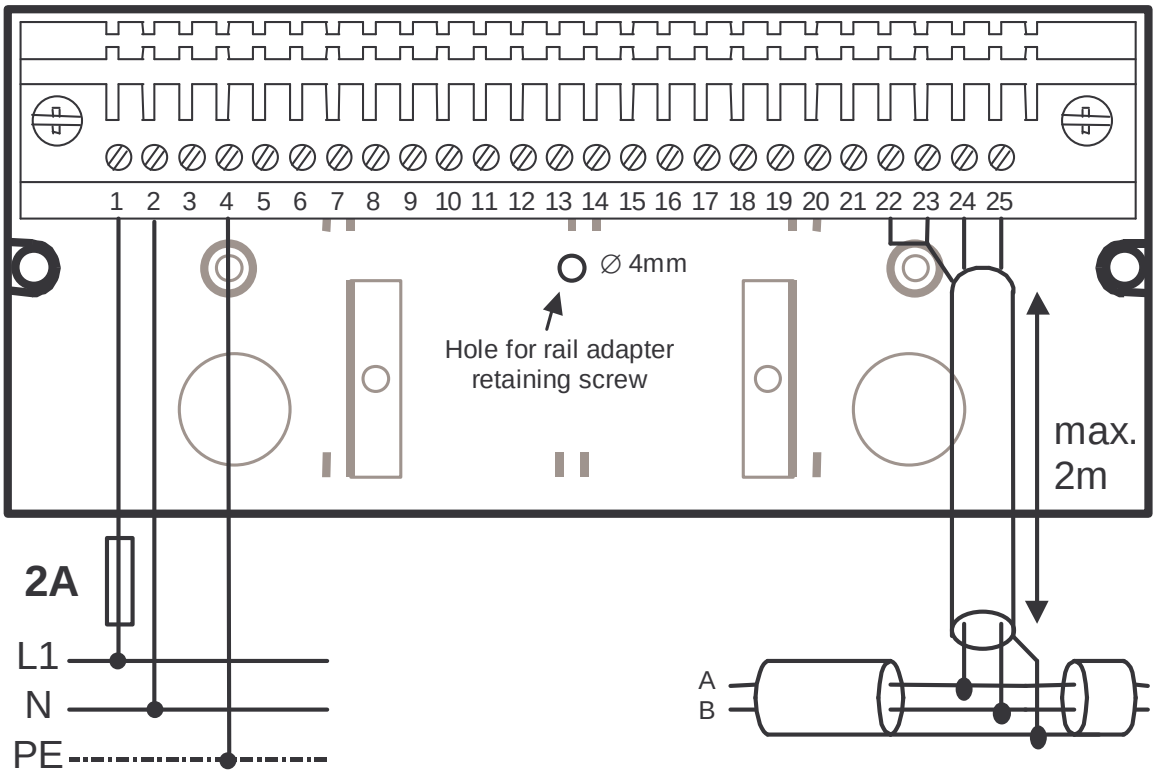


Figure 2: Wiring diagram

3.2.1 Power supply

The required power supply is 230 V AC, 50 / 60 Hz. This is connected to the **230V ~** terminals as shown in the wiring diagram (Figure 2 on page 8).

Important:
Install an external 2 A overcurrent protection device in the AC power line.

3.2.2 Connection to the FRAKO Starkstrombus®

The bus cable is connected to the terminals **Bus A, Bus B** and **Bus** ⊥ in the instrument base as shown in the wiring diagram (Figure 2 on page 8). Terminal 22 also provides a connection for **Bus** ⊥.
Alternatively, the FRAKO Starkstrombus® connection can also be by means of the connector at the front panel, which is arranged in parallel with the above terminals. Two of the connector pins are assigned to **Bus** ⊥ here as well.

3.2.3 Connection to serial interface A

The 25-pin connector for this interface is located at the front panel of the instrument. It supports the 3964R protocol with the RK512 interpreter.
To connect the instrument to a PLC or PC, the two connectors must be wired as follows:

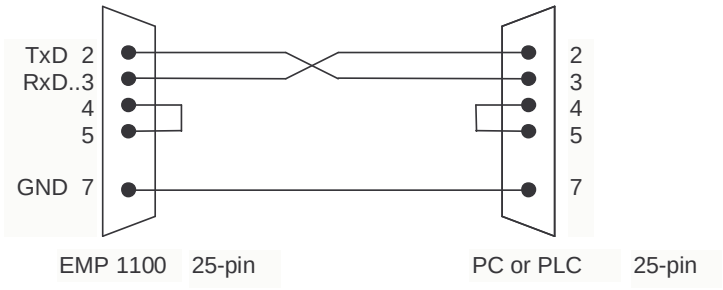


Figure 3: Interconnecting cable for serial interface A

The basic settings for the interface are as follows:

Baud rate	**: 9600**
Parity	**: even**
Stop bits	**: 1**
Hardware handshake	**: none**

3.2.4 Connection to serial interface B

This interface is effected by the 9-pin connector on the front panel of the instrument. Its protocol is described in Section 6.2. The transmission rate is a constant 19200 baud. This interface should be connected using the cable supplied with the instrument.

3.2.5 Further notes

Care:
No connections must be made to the unassigned terminals in the instrument base.

4. Commissioning

The commissioning procedure is used to verify that the EMP 1100 is functioning correctly. If required, the data blocks that are required can also be configured at this time.

4.1 Requirements prior to commissioning

Important:

Before commissioning the EMP 1100 it must be securely fixed to the instrument base.

After installation has been carried out as described in Section 3, and it has been ensured that the instrument is firmly secured to its base, the power supply can be switched on to the EMP 1100 and the instrument put into operation.

4.2 Functional check

When the power supply to the instrument is switched on, the **Run** LED must begin to flash (about once per second).

The status of the other LEDs is of no consequence.

Note:

If the EMP 1100 does not respond in this way, the power supply to the instrument must be switched off and the installation checked.

4.3 Checking the basic settings

The EMP 1100 is connected to a PC by means of serial interface B and the cable supplied with the instrument. Any one of the four ports COM1 to COM4 can be used.
After starting the **SETEMP3.EXE** software, the port to be used can be selected via the menu option **Setup/COM**.
The basic settings of the EMP 1100 can now be verified in the menu option **Setup/Basic settings**. The existing settings should be as follows:

- **Bus address: 2**
- **Number of masters: 8**
- **Slow polling: 15 s**
- **Rapid polling: 4 s**

If read errors occur when reading the basic settings, the serial connection between the EMP 1100 and the PC must be checked.

Important:

Each bus address may only be assigned once. With the more complex systems it is recommended to compile a table of bus addresses.

Important:

The set number of masters must be the same at all master instruments (EMP 1100, EMZ 110X).
In the FRAKO Starkstrombus® the default setting is 8.

If any instrument has a different setting, this should be corrected.
A setting of 60 seconds is recommended as the cycle time for slow polling.

4.4 Checking the data blocks

As already described, the EMP 1100 polls the devices connected to it in a set cycle and reads their data, which are then held in readiness for information requests in the form of data blocks. The device type and bus number must, however, first be registered in the EMP 1100 (configuration).
If the **Bus** LED occasionally lights up or flickers, it must be assumed that at least one data block is already configured.
Data blocks can be checked via the menu option **Setup/Set data block.** The type number 0 and the bus number 0 must be entered for all data blocks. Once this has been done, the **Bus** LED must no longer be lit. If it is, however, the data blocks must be checked again.

A device that is connected to the FRAKO Starkstrombus® and whose bus address is known should now be registered at any desired data block. To do this, the device type number (see Sections **Fehler! Verweisquelle konnte nicht gefunden werden.** and 11) and bus address must be entered via the menu option **Setup/Set data block** and sent.

The **Bus** LED should now flash at the rapid polling frequency. If it flickers or does not light up at all, the programming or the bus connection to the device concerned must be checked.

All the other devices required can now be registered in the same way. This configuration remains saved in the EMP 1100 even after a power failure.

If the data interchange does not take place via the data blocks (e.g. when using EM-GRAPH.EXE), all data blocks should be cleared again.

5. Function of the data blocks

As already mentioned, the differences between the two bus systems are firstly the hardware (RS485/RS232) and secondly the transmission rate (76800 baud / 9600 baud). The different memory structures of the two systems constitute a third problem. It is therefore not sufficient for the EMP to relay information requests and to return the results obtained. The instrument must autonomously poll data from the EM devices and organize these into data blocks. This means that data blocks containing data from the selected EM devices are set up in the EMP.

5.1 Data blocks

The EMP contains 100 empty data blocks. Data block No. 4 is the first of these that can be used. There is no information saved in the data blocks in the instrument as delivered. In order to specify to the EMP which data block is to receive data from which EM device, the data word 0 must be programmed in the data block concerned.

The more significant byte in the data word indicates from which device the data is to come, its value being the type number registered in the data block as described in Section 4.

The less significant byte in the data word indicates the P-NET bus number of the device.

Example:

The data for an EMA 1100 with the bus number 51 are to be stored in data block 10.

The value **0633h** must be written to the data word 0 in data block 10. (EMA 1100 type number == 06h ; bus number 51 = 33h)

Once the word has been filed in this form, the EMP automatically begins to retrieve data from the device concerned and store them in the data block. The contents of the data block are updated in a polling cycle.
Section 11 contains type tables giving the data structures within the data blocks for the various EM devices.

5.2 Operating principle of the data blocks

The individual readings from the EM devices are stored in the data blocks in three different classes.
Measurement readings and important data are read in quick cycles. These values are marked in the type tables with an “S“. The cycle time can be changed with the **SETEMP3.EXE** software in the menu option **Setup/Basic settings**, the default value in the basic settings being 4 seconds.
A second class of data is read much less frequently. In the type tables these values are marked with a “V“. The cycle time for these is 15 seconds in the basic settings, but this can also be changed with the setup software.
A third class of data is read only once when the data block is set up or when restarting the EMP. These data can also be renewed by means of a special read command to the data block.
The times for the polling cycles are stored in data block 3.

The status is stored in data word 1 of each data block, the status options being as follows:

Bit 0 == 1	All data words have been read at least once
Bit 1 == 1	The device specified in data word 0 cannot be accessed
Bit 2 == 1	Another error when accessing the device

If the word **0200h** is written to the address 1 (data word 1) of a data block, **all** fields in this data block are updated.

5.3 Data block No. 3

Data block 3 does not have the same function as the other data blocks. It is used to store the EMP 1100 basic settings data, which can be changed. They are distributed in the data block as follows:

Data word 2 : Cycle time for rapid polling in $^{1}/_{10}$ seconds (e.g. a value of 50 means that an update takes place every 5 seconds)

Data word 3 : Cycle time for slow polling in $^{1}/_{10}$ seconds

Data word 5: Baud rate for interface A (e.g. a value of 960 here means 9600 baud)

Data word 7: Version number (e.g. 201 => V 2.01)

Data word 8: P-Net number of the EMP 1100

Data word 9: Maximum number of masters in the P-Net

The basic settings in the instrument as delivered are as follows:

Data word:		2	3	4	5	6	7	8	9
Setting:		40	150		960		201	2	8

As a general rule, however, these settings should not be changed by directly accessing this data block. The setup software **SETEMP3.EXE** supplied with the instrument offers more convenient options for changing the basic settings.

6. Serial access

The EMP 1100 has three serial interfaces, two of which, interfaces A and B, operate via an RS232 connector.
The FRAKO Starkstrombus® (P-Net), on the other hand, uses an RS485 interface.
For the user, access to the EMP 1100 is only via the two serial interfaces A and B. The protocol on the FRAKO Starkstrombus® is generated by the EMP 1100 and is therefore not described any further here.

6.1 Access via 3964R / RK512 (serial interface A)

In order to access the EMP 1100 with the 3964R protocol, its serial interface A must be used.
Jumpers must be in place to short-circuit the handshake contacts (RTS, CTS) at the EMP 1100 and the PC or PLC, and the RxD and TxD data lines must be crossed over between the corresponding pins. A direct connection is made between the earth terminals (see Figure 1, page 7).

Note: The EMP 1100 can only accept one connection via RS232/V.24 (TTY is not possible).

The transmission parameters are: 8 bits, 1 stop bit, even parity, 9600 baud factory setting

6.1.1 3964R

The 3964R protocol actually only describes how a connection is established and released. At the beginning of the procedure it is ascertained whether a remote station is present that is ready to receive. At the end of the connection the remote station is notified of the connection release and a corresponding acknowledgement is expected. At the same time a check byte containing the longitudinal parity for all the data transmitted is exchanged.
This process has already been used for connections between mainframe computers and terminals.

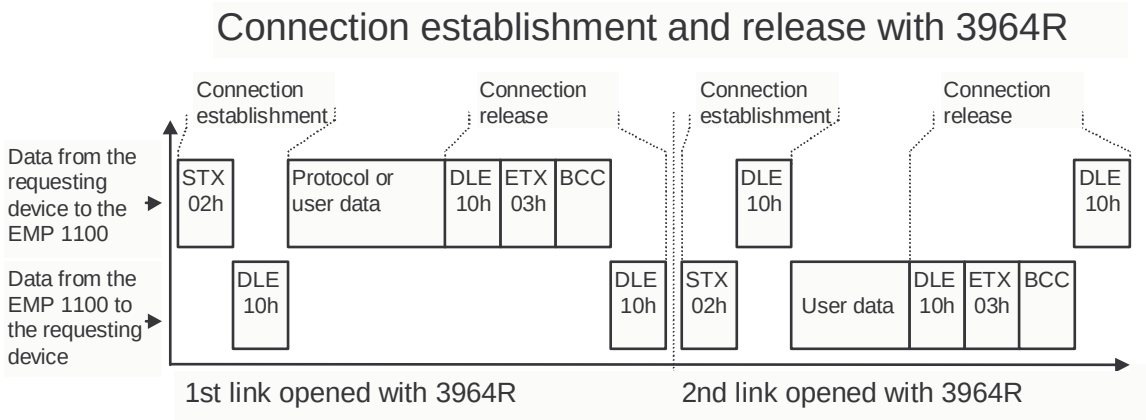


Figure 4: Connection establishment and release with 3964R

STX, DLE and ETX are control characters for the 3964R protocol. BCC is the longitudinal parity mentioned above. The data interchanged within this framework are not defined by the 3964R protocol.

6.1.2 RK512

In order to specify to the remote station what is to be done, the RK512 interpreter is incorporated in the 3964R connection. This is done with a block of at least 10 bytes giving the exact size of the data and where they are to be fetched from or written to.
Byte 3 indicates whether data are to be read or written, while byte 4 indicates the type of data. In the EMP 1100 there are only data of the data block type. Bytes 5 and 6 identify the data block and data word, respectively. These are followed by bytes 7 and 8, which give the number of words to be read or written. One data word comprises two bytes.
The two bytes at the beginning and end of the command telegram have no further significance with the EMP 1100 and must be adopted as given below.

Command telegram									
1	2	3	4	5	6	7	8	9	10
Telegram ID		Command		Target / Source		Number		CPU No. / KM *	
always 00h or FFh	always 00h	Send = 'A' or Fetch = 'E'	Data block = 'D'	Data block No.	Data word No.	high low Number of data words		for EMP access FFh	for EMP access FFh

If data are transmitted, the numerical values are sent immediately after the command telegram.
The response from the remote station is then as shown on the right. It is also incorporated within a 3964R framework. With a data request the results are transmitted immediately following the response telegram.

Response telegram			
1	2	3	4
Telegram ID			Error
	always 00h	always 00h	see Table A

* KM = coordination marker

Note: A maximum of 64 data words may be requested with a command telegram.

6.2 Interface B

The data blocks can also be accessed via interface B, but in addition access is possible via the FRAKO Starkstrombus®.
Interface B has its own protocol in order to transmit the data with as small an overhead as possible. The transmission rate is set at a constant 19200 baud, 8 bits with one stop bit and no parity being transmitted. A hardware handshake is used. The connecting cable is wired as follows:

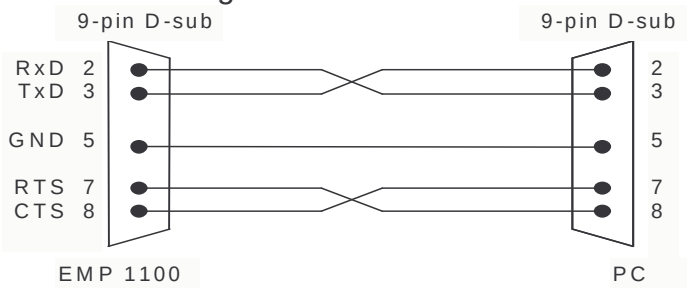


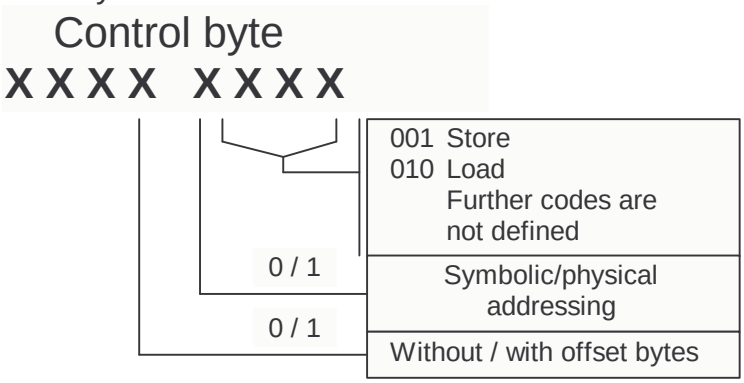
Figure 5: Connecting cable for serial interface B

6.2.1 Direct access via the FRAKO Starkstrombus®

A character string containing all the information for a request via the FRAKO Starkstrombus® is sent to the EMP 1100.

Byte :	0	1	2	3	4	5	6	7-(n-1)	n
	Number of bytes	P-Net number of remote station	Control	Address high	Address low	Offset high	Offset low	Number of bytes	Checksum
Example:	07h Without this byte and without checksum	33h P-Net address of a device	12h Load a value	00h Soft-wire number high	11h Soft-wire number Low	00h Offset value high	00h Offset value low	02h Fetch two bytes	A1h Adding all characters gives 00h

The character string begins by giving its length, not counting the length byte itself and the checksum. This is followed by the bus address of the desired device.
The control byte indicates whether it is a load or store command, and also whether the string contains offset bytes or not.
The control byte is coded as follows:



If a request is made without offset bytes, the EMP 1100 expects the number of bytes to be loaded or the data to be stored after the 'Address low' byte.
For requests to EM devices via the FRAKO Starkstrombus®, symbolic addressing must always be selected.
The amount of user data that can be transmitted must not exceed 56 bytes. Any attempt to do so results in the EMP 1100 responding with an error signal.
The checksum at the end of the transaction is included for reliable data interchange. Its value is selected so that the sum of all the bytes transmitted (including the checksum itself) amounts to a whole multiple of 256.

If the EMP 1100 has received the protocol correctly, the transaction is carried out and an acknowledgement or data sent back.

Byte :	0	1	2 - (n-1)	n
	Number of bytes	Error message	Data	Checksum
Example:	03h Without this byte and without checksum	00h See table A for coding	00h , 0Ah The required data	F3h Adding all characters gives 00h

With a storage command the shaded bytes are not sent. In such a case the acknowledgement protocol is only three bytes long.
Table 1 is a key to the error codes. An error code of 00h indicates fault-free transmission.

If, however, the same request is used with the bus address 00h or the bus address of the EMP, a data block in the EMP is accessed. The 'Softwire number' is then the data block and the 'offset' specifies the data word. The number must also be given in bytes and the result is an 'array of bytes'.

6.2.2 Accessing data blocks

As already described above, the protocol is also able to access data blocks. To do this, it is only necessary to set the bus number at 00h or use the EMP's own bus number. The address and the offset then indicate the data block number and the data word number. The number of bytes describes how many are to be transmitted. To read a data word, the number 2 must therefore be given. This means that when accessing data blocks, this number must always be even. The response from the EMP 1100 has already been described in Section 6.2.1. The results data start with the more significant byte of the lowest requested data word and end with the less significant byte of the last data word.

6.3 Error messages

The following table lists the error messages for all error numbers in the system.

Error No.	Description	Source
00h	No error	B
01h	P-Net slave cannot be accessed	B
02h	Faulty P-Net connection	B
31h	P-Net slave is busy at the moment	B
0Ah	A false data type was selected (only DB or DX are allowed)	A
0Ch	Error in the data length (the limits of the data block or the P-Net frame - max. 56 bytes - have been exceeded)	A + B
10h	Byte 1 of the RK512 interpreter was not 00h	A
14h	The required data block is not available	A + B
16h	The RK 512 command was neither read (A or O) nor write (E)	A
32h	Data block or data words are busy	A + B
34h	Stated number of bytes is not the same as the number of bytes received	A + B
36h	Data block is write- and read-protected	A + B
FEh - FFh	The protocol length or the length stated in the protocol is incorrect	B

Table 1: Error messages

As can be seen, all error messages for both interfaces are summarized together. Some error messages can only be received when accessing via interface B directly onto the FRAKO Starkstrombus®, and others only when interface A is operated with RK512. However, certain error messages can be initiated with both access modes.

It is possible that the transaction between the PC and the data blocks in the EMP takes place correctly, but the EMP has problems reading the data for the data block. An error of this type is noted in data word 1 of each activated data block.
Data word 1 is structured as follows:

bit 0 == 1	All data words have been read at least once
bit 1 == 1	The device specified in data word 0 cannot be addressed
bit 2 == 1	Other errors when addressing the device

If the word **0100h** is written to the address 1 (data word 1) of a data block, **all** fields of this data block are updated.

When errors occur in the bus access, this can also be seen at the LED indicating bus accessing in the front panel of the EMP 1100. If a faulty transmission occurs, the **Bus** LED flashes quickly for about 3 seconds. If the bus requests are successful, the LED lights up continuously until all data blocks have been read.

7. The setup software

The setup program **SETEMP3.EXE** is supplied with the EMP 1100 and is used for the preliminary configuration of the instrument. As already described in Section **Fehler! Verweisquelle konnte nicht gefunden werden.**, the device type and its bus number must be stored in data word 0 of a data block so that the EMP 1100 can fill the data block with numerical values. This can be done by means of a setup routine in the PLC or the PC connected to the system.
As the memory in the EMP 1100 is not volatile, it suffices to set the data blocks just once. Even after a power cut, the EMP 1100 continues to operate with the old parameters.

The configuration with the setup program takes place via the serial interface B, and the connecting cable must be wired as described in Section 6.2.

Important:

Only one item of software may be used for accessing purposes to or via the EMP 1100. Other programs must be closed.

7.1 Main menu

When the program is started, a menu bar with the following menus appears:

File	**Test**	**Setup**	**Exit**

The mouse is used to select one of the four options, **Exit** being clicked to leave the program at the end of a session.

7.2 Setup menu

This menu allows the user to specify how the EMP 1100 is to operate.

7.2.1 COM

Here the user can select the port through which the PC will communicate with the EMP 1100. The default setting is COM2. This setting, once selected, is retained even after the program is closed.

7.2.2 Basic settings

The EMP 1100, like every other device connected to the FRAKO Starkstrombus®, is assigned a bus number. This number must be less than or equal to the maximum number of masters. The bus number 0 is not permissible.

Important:

The maximum number of masters must be set at the same value for all master devices in the system.

This value can range from 2 to 31, the default setting being a maximum number of masters of 8. EMZ 1100 instruments also operate with this value.

The function of the two parameters for rapid and slow polling is described in detail in Section 5.2.

7.2.3 Set data block

The data blocks can be parameterized in this dialog box. This means that the user specifies which device is to appear in which data block.
The procedure for programming a data block is as follows:

- Select the desired data block.
- Enter the bus number of the appropriate device.
- Select the desired device with the desired data set via the **Device type** or **Type number** list boxes.
- Send the data to the EMP 1100 by clicking the **Send** button.

All data blocks can be selected in the **Data block** list box in order to check their setups.

The bus number 0 and the type number 0 indicate a data box that is not in use.

7.3 Test menu

All the data of a data block are displayed in this dialog box. The user can select whether the data are to be displayed in hex, integer or Word format, and the wording of the frame can also be selected by the user.

The display is updated in a 4-second cycle. This setting can be switched off.

Clicking any desired data word in the display of the data block causes the former to be displayed separately in the bottom right-hand corner of the dialog box. The type of display can be selected separately. With long or real values, the following data word is also read. Parameters can be sent to the EMP 1100 by entering a valid value in the output box. This entry must be confirmed by pressing the Enter key.

8. Addresses

The 3964R/RK512 protocol can also be installed on a PC. Two companies that offer suitable software for doing this are:

Berghof GmbH
Bereich Automatisierungstechnik
Harretstrasse 1
D-72800 Eningen
Germany
- C routines to implement the 3964R/RK512 protocol under DOS

ASP GmbH
Siemensstrasse 22
D-74722 Buchen / Odenwald
Germany
- DDE server for reading variables via 3964R/RK512

9. Start-up and troubleshooting instructions

Fault	Possible causes	Remedial action
After start-up the **Run** LED does not flash.	No power at instrument or wrong voltage.	Check power connection (see Figure 2, page 8).
The **Bus** LED does not come on despite the data block being configured.	Incorrect configuration	To register a device correctly, the bus number and type number must be entered.
The **Bus** LED flickers.	The configured device cannot be accessed via the bus.	The bus system must be checked out.
	The wrong type number has been selected for a bus number.	To register a device correctly, the bus number and type number must be entered.
	The specified bus number is not present in the bus system.	
The EMP 1100 cannot be accessed with the setup software.	The wrong serial interface has been used.	The setup software is operated via interface B.
	The wrong COM port has been selected in the setup software.	Select the correct port in the menu option **SETUP/COM.**
	The wrong cable has been used.	The cable supplied with the EMP 1100 should be used to connect it to the PC.

10. Technical data

Interfaces:

Serial A:	RS232 V.24
Protocol:	3964R / RK512
Transmission:	9600 baud (configurable), 8 bits, 1 stop bit, even parity
Serial B:	RS232 V.24
Protocol:	see Section 6.2
Transmission:	19200 baud, 8 bits, 1 stop bit, no parity

Connection to FRAKO Starkstrombus®:

Electrical connection:	as per EIA RS485
Transmission rate:	76.8 kbit/sec
Protocol:	FRAKO Starkstrombus®

Power supply:

Supply voltage:	230 V AC ± 10% external overcurrent protection mandatory
Frequency:	45 Hz to 65 Hz
Power draw:	approx. 5 VA
Protective measures:	to VDE 0411 protection class I (also EN 61 010 - 1)

Ingress protection:

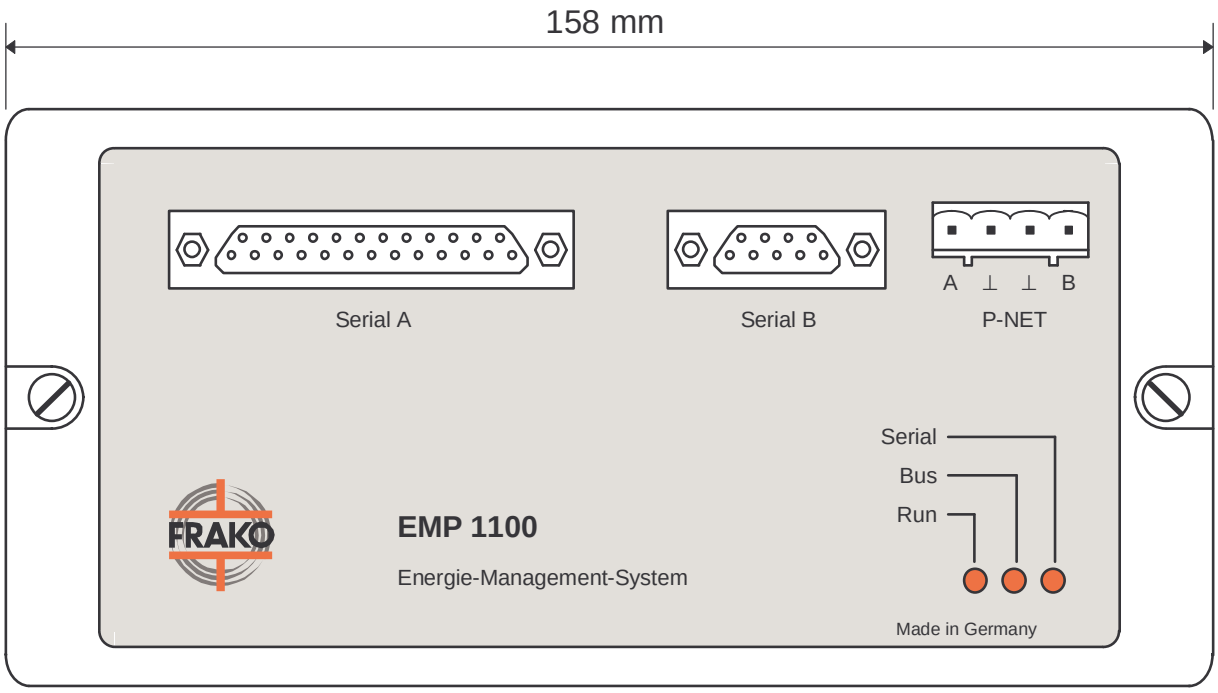
Enclosure:	IP 40

Mechanical design:

Enclosure material:	PC with 10% GF, V-0 flame retardant to UL-94 V-0
Dimensions:	158 x 75 x 120 mm (W x H x D) see Figure 6
Weight:	0.80 kg
Mounting:	on DIN standard 35 mm rail or surface mount
Orientation:	as desired
Electrical connections:	screw terminals
Max. conductor cross-section:	2.5 mm²

Operating conditions:

Ambient temperature:	0 ℃ to 50 ℃



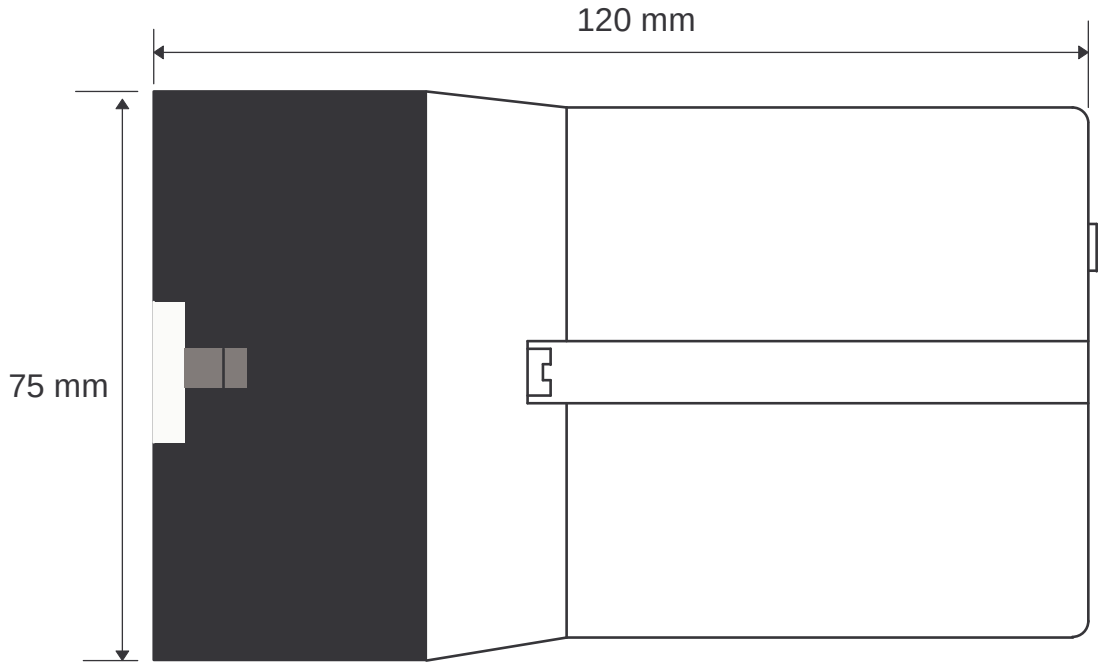


Figure 6: Dimensions

11. Type tables

Standard memory assignments for the EMR 1100

Type number : **01** EMR data area
(Mode: S= rapid polling; V= slow polling; A= read on command)

DW	Designation	M	Byte	Type	Factor	R/W	Reading	Value
0	Source		2	2Byte				
1	Flags		2	2Byte				
2	Power factor	S	2	Int	1000	R	-999...1000	cap0.999..ind 1.0
3	Alarm	S	2	Byte	-	R	Bit pattern	see 1)
4	Capacitive load	S	2	Byte	1	R	0..100	0%..100%
5	Reactive current	S	4	LongInt	100	R	e.g. 12000	120.A
7	Active Current	S	4	LongInt	100	R	e.g. -23500	235.A recovery Current
9	Total current	S	4	LongInt	100	R	e.g. 3100	31.A
11	U Phase/Phase	S	2	Int	1	R	0..32000	0V..32000V
12	Voltage (U) thd	S	2	Int	10	R	0..1000	0%..100%
13	H5	S	2	Int	10	R	0..1000	0%..100%
14	H7	S	2	Int	10	R	0..1000	0%..100%
15	H11	S	2	Int	10	R	0..1000	0%..100%
16	H13	S	2	Int	10	R	0..1000	0%..100%
17	Tariff	S	2	Byte	1	R	Bit pattern	see 2)
18	Switching state	S	2	Word	-	R	Bit pattern	Bit 0 == stage 1
19	Free stages	S	2	Word	-	R	Bit pattern	Bit 0 == stage 1
20	Calculated target PF	S	2	Int	1000	R	-999...1000	cap0.999..ind 1.0
21	Free		2					
22	Free		2					
23	Target PF 1	V	2	Byte	100	R/W	80..110	0.8ind.. 0.90cap
24	Parallel shift 1	V	2	Int	10	R/W	-20..+40	-2.0..+4.0
25	Limitation 1	V	2	Int	10	R/W	-20..+20	-2.0..+2.0
26	Switching delay time 1	V	2	Int	1	R/W	5..500	5..500 sec.
27	Target PF 2	V	2	Byte	100	R/W	80..110	0.8ind.. 0.90cap
28	Parallel shift 2	V	2	Int	10	R/W	-20..+40	-2.0..+4.0
29	Limitation 2	V	2	Int	10	R/W	-20..+20	-2.0..+2.0
30	Switching delay time 2	V	2	Int	1	R/W	5..500	5..500 sec.
31	Auto. c/k	V	2	Byte	-	R/W	0..1	Off..On
32	c/k	V	2	Byte	100	R/W	2..200	0.02..2.00
33	Switching sequ.	V	2	Byte	-	R/W	0..11	1:1:1:1 .. 1:2:4:8
34	Used stages	V	2	Byte	1	R/W	1..12	1..12
35	Auto. conn. ident.	V	2	Byte	-	R/W	0..1	Off..On
36	Connection mode	V	2	Byte	-	R/W	0..11	0°..330°
37	Discharge time	V	2	Byte	1	R/W	5..900	5..900sec.
38	Cyclic switching	V	2	Byte	-	R/W	0..1	Off..On
39	Fixed stages	V	2	Byte	1	R/W	0..3	0..3 Fixd stages
40	Current transformer	V	2	Int	1	R/W	1..7000	1..7000
41	Voltage transformer	V	2	Int	1	R/W	1..300	1..300
42	Harmonic over-current	V	2	Int	100	R/W	105..300	1.05..3.00
43	Free		2					

DW	Designation	M	Byte	Type	Factor	R/W	Reading	Value
44	Free		2	0				
45	Limit H5	V	2	Byte	10	R/W	10..250	1.0%..25.0%
46	Limit H7	V	2	Byte	10	R/W	10..250	1.0%..25.0%
47	Limit H11	V	2	Byte	10	R/W	10..250	1.0%..25.0%
48	Limit H13	V	2	Byte	10	R/W	10..250	1.0%..25.0%
49	Max. value H5	V	2	Byte	10	R	10..250	1.0%..25.0%
50	Max. value H7	V	2	Byte	10	R	10..250	1.0%..25.0%
51	Max. value H11	V	2	Byte	10	R	10..250	1.0%..25.0%
52	Max. value H13	V	2	Byte	10	R	10..250	1.0%..25.0%
53	Load stage 1	V	2	Int	10	R	0..32000	0..3200kVAr
54	Load stage 2	V	2	Int	10	R	0..32000	0..3200kVAr
55	Load stage 3	V	2	Int	10	R	0..32000	0..3200kVAr
56	Load stage 4	V	2	Int	10	R	0..32000	0..3200kVAr
57	Load stage 5	V	2	Int	10	R	0..32000	0..3200kVAr
58	Load stage 6	V	2	Int	10	R	0..32000	0..3200kVAr
59	Load stage 7	V	2	Int	10	R	0..32000	0..3200kVAr
60	Load stage 8	V	2	Int	10	R	0..32000	0..3200kVAr
61	Load stage 9	V	2	Int	10	R	0..32000	0..3200kVAr
62	Load stage 10	V	2	Int	10	R	0..32000	0..3200kVAr
63	Load stage 11	V	2	Int	10	R	0..32000	0..3200kVAr
64	Load stage 12	V	2	Int	10	R	0..32000	0..3200kVAr

1) The alarm display has the following bit string:

bit15 – bit8	bit7	bit6	bit5	bit4	bit3	bit2	bit1	bit0
allways ziro	I=0	U=0	cosφ	overcurr.	H13	H11	H7	H5

Bit 15 is the MSG Bit of the data word. Bit 0 is the LSG Bit.

2) Reading and setting the tariff:

A 1 or 2 in this position indicates the current tariff status. If, however, a 3 or 4 is written at this position, the external volt-free contact is overridden and the system controlled according to the new entry (3 ≡ tariff 1 ; 4 ≡ tariff 2). The external operation is reactivated by writing 1 or 2 again at this position.

Operating the EMP

Two bytes must be written in the coding address (DW 0).
The more significant byte indicates the device type (here 01h for EMR 1100), while the less significant byte constitutes the device's bus address.
Subsequently, the EMP collects the data in a polling cycle and continually updates the data block.

Memory assignments for the EMA 1100/1101

Type number : **06** EMA 1100/1101 data area
(Mode: S= rapid polling; V= slow polling; A= read on command)

DW	Designation	M	Byte	Type	Factor	R/W	Reading	Value
0	Source		2	2Byte				
1	Flags		2	2Byte				
2	Total active power	S	4	LongInt	1	R	-max .. +max	234500 = 234.5 kW
4	T. reactive power	S	4	LongInt	1	R	-max .. +max	7900 = ind 7.9 kVAr
6	T. apparent power	S	4	LongInt	1	R	0 .. max	e.g. 30000 = 30 kVA
8	Total power factor	S	2	Int	1000	R	-999 .. 1000	cap 0.999 .. ind 1.00
9	Ferquence	S	2	Int	100	R	4500 .. 6200	45Hz .. 62Hz
10	Asymmetry	S	2	Int	10	R	0 .. 1000	0 .. 100%
11	Voltage U1/2	S	4	LongInt	10	R	0.. max	e.g. 4000 = 400V
13	Voltage U2/3	S	4	LongInt	10	R	0.. max	e.g. 100000 = 10kV
15	Voltage U3/1	S	4	LongInt	10	R	0.. max	e.g. 5500 = 550V
17	Voltage rms U1	S	4	LongInt	10	R	0.. max	e.g. 2200 = 220V
19	Current rms I1	S	4	LongInt	1000	R	0.. max	e.g.4500 = 4.5A
21	Active power 1	S	4	LongInt	1	R	-max .. max	e.g. 253000 = 253kW
23	Reactive power 1	S	4	LongInt	1	R	-max .. +max	-12300 = cap 12.3kVAr
25	Apparent power 1	S	4	LongInt	1	R	0 .. max	e.g. 76600 = 76.6kVA
27	power factor 1	S	2	Int	1000	R	-999 .. 1000	cap 0.99 .. ind 1.00
28	Voltage rms U2	S	4	LongInt	10	R	0.. max	e.g. 2300 = 230V
30	Current rms I2	S	4	LongInt	1000	R	0.. max	e.g. 120000 = 120A
32	Active power 2	S	4	LongInt	1	R	-max .. max	e.g. 253000 = 253kW
34	Reactive power 2	S	4	LongInt	1	R	-max .. +max	12300 = ind 12.3kVAr
36	Apparent power 2	S	4	LongInt	1	R	0 .. max	e.g. 76600 = 76.6kVA
38	power factor 2	S	2	Int	1000	R	-999 .. 1000	cap 0.99 .. ind 1.00
39	Voltage rms U3	S	4	LongInt	10	R	0.. max	e.g. 2230 = 223V
41	Current rms I3	S	4	LongInt	1000	R	0.. max	e.g. 47000 = 47A
43	Active power 3	S	4	LongInt	1	R	-max .. max	e.g. 253000 = 253kW
45	Reactive power 3	S	4	LongInt	1	R	-max .. +max	-12300 = cap 12.3kVAr
47	Apparent power 3	S	4	LongInt	1	R	0 .. max	e.g. 76600 = 76.6kVA
49	power factor 3	S	2	Int	1000	R	-999 .. 1000	cap 0.99 .. ind 1.00
50	Voltage 1 50Hz	S	4	LongInt	10	R	0 .. max	e.g. 2300 = 230V
52	Voltage 1 thd	S	2	Int	10	R	0 .. 1000	0 .. 100%
53	H03 1	S	2	Int	10	R	0 .. 1000	0 .. 100%
54	H05 1	S	2	Int	10	R	0 .. 1000	0 .. 100%
55	H07 1	S	2	Int	10	R	0 .. 1000	0 .. 100%
56	H09 1	S	2	Int	10	R	0 .. 1000	0 .. 100%
57	H11 1	S	2	Int	10	R	0 .. 1000	0 .. 100%
58	H13 1	S	2	Int	10	R	0 .. 1000	0 .. 100%
59	H15 1	S	2	Int	10	R	0 .. 1000	0 .. 100%
60	H17 1	S	2	Int	10	R	0 .. 1000	0 .. 100%
61	H19 1	S	2	Int	10	R	0 .. 1000	0 .. 100%
62	Current 1 thd	S	2	Int	10	R	0 .. 1000	0 .. 100%

DW	Designation	M	Byte	Type	Factor	R/W	Reading	Value
63	Voltage 2 50Hz	S	4	LongInt	10	R	0 .. max	e.g. 2300 = 230V
65	Voltage 2 thd	S	2	Int	10	R	0 .. 1000	0 .. 100%
66	H03 2	S	2	Int	10	R	0 .. 1000	0 .. 100%
67	H05 2	S	2	Int	10	R	0 .. 1000	0 .. 100%
68	H07 2	S	2	Int	10	R	0 .. 1000	0 .. 100%
69	H09 2	S	2	Int	10	R	0 .. 1000	0 .. 100%
70	H11 2	S	2	Int	10	R	0 .. 1000	0 .. 100%
71	H13 2	S	2	Int	10	R	0 .. 1000	0 .. 100%
72	H15 2	S	2	Int	10	R	0 .. 1000	0 .. 100%
73	H17 2	S	2	Int	10	R	0 .. 1000	0 .. 100%
74	H19 2	S	2	Int	10	R	0 .. 1000	0 .. 100%
75	Current 2 thd	S	2	Int	10	R	0 .. 1000	0 .. 100%
76	Voltage 3 50Hz	S	4	LongInt	10	R	0 .. max	e.g. 2300 = 230V
78	Voltage 3 thd	S	2	Int	10	R	0 .. 1000	0 .. 100%
79	H03 3	S	2	Int	10	R	0 .. 1000	0 .. 100%
80	H05 3	S	2	Int	10	R	0 .. 1000	0 .. 100%
81	H07 3	S	2	Int	10	R	0 .. 1000	0 .. 100%
82	H09 3	S	2	Int	10	R	0 .. 1000	0 .. 100%
83	H11 3	S	2	Int	10	R	0 .. 1000	0 .. 100%
84	H13 3	S	2	Int	10	R	0 .. 1000	0 .. 100%
85	H15 3	S	2	Int	10	R	0 .. 1000	0 .. 100%
86	H17 3	S	2	Int	10	R	0 .. 1000	0 .. 100%
87	H19 3	S	2	Int	10	R	0 .. 1000	0 .. 100%
88	Current 3 thd	S	2	Int	10	R	0 .. 1000	0 .. 100%
89	Tariff state	S	2	Byte		R/W	1 .. 4	see table 3
90	Active energy T1	S	4	LongInt	1	R	0 .. max	e.g. 3125 = 3125 kWh
92	Reactive ener. T1	S	4	LongInt	1	R	0 .. max	1000 = ind 1000 kVArh
94	Active energy T2	S	4	LongInt	1	R	0 .. max	10123 = 10123 kWh
96	Reactive ener. T2	S	4	LongInt	1	R	0 .. max	7314 = ind 7314 kVArh
98	Temperature 1	S	2	Int	1	R	-20 .. 150	-20℃ .. 150℃
99	Temperature 2	S	2	Int	1	R	-20 .. 150	-20℃ .. 150℃
100	Alarm limit Umax	V	4	LongInt	10	R/W	0..300000	4200 = max 420 V
102	Alarm limit Umin	V	4	LongInt	10	R/W	0..300000	e.g. 3600 = 360 V min
104	Alarm limit Imax	V	4	LongInt	1000	R/W	1 .. 9999000	60000 = max 60 A
106	Alarm temp.1 max	V	2	Int	1	R/W	0 .. 200	0℃ .. 200℃
107	Alarm temp.1 min	V	2	Int	1	R/W	-30 .. +99	-30℃ .. +99℃
108	Alarm temp.2 max	V	2	Int	1	R/W	0 .. 200	0℃ .. 200℃
109	Alarm temp.2 min	V	2	Int	1	R/W	-30 .. +99	-30℃ .. +99℃
110	Alarm limit asymm.	V	2	Int	10	R/W	10 .. 990	1 .. 99%
111	Alarm limit PF min	V	2	Int	1000	R/W	0 .. 1000	ind 0.00 .. ind 1.00
112	Alarm limit U thd	V	2	Int	10	R/W	0 .. 1000	0 .. 100%
113	Alarm limit H03	V	2	Int	10	R/W	0 .. 1000	0 .. 100%
114	Alarm limit H05	V	2	Int	10	R/W	0 .. 1000	0 .. 100%
115	Alarm limit H07	V	2	Int	10	R/W	0 .. 1000	0 .. 100%
116	Alarm limit H11	V	2	Int	10	R/W	0 .. 1000	0 .. 100%
117	Alarm limit H13	V	2	Int	10	R/W	0 .. 1000	0 .. 100%
118	Alarm limit H17	V	2	Int	10	R/W	0 .. 1000	0 .. 100%

DW	Designation	M	Byte	Type	Factor	R/W	Reading	Value
120	Max. value U 1/2	V	4	LongInt	10	R	0 .. max	e.g. 2000 = 200V max
122	Max. value U 2/3	V	4	LongInt	10	R	0 .. max	e.g. 3300 = 330V max
124	Max. value U 3/1	V	4	LongInt	10	R	0 .. max	e.g. 200000 = 20 kV max
126	Min. value U 1/2	V	4	LongInt	10	R	0 .. max	e.g. 1700 =170V min
128	Min. value U 2/3	V	4	LongInt	10	R	0 .. max	e.g. 2900 =290V min
130	Min. value U 3/1	V	4	LongInt	10	R	0 .. max	e.g. 193000 = 19.3 kV min
132	Max. value Irms 1	V	4	LongInt	1000	R	0 .. max	e.g. 732000 = 732 A max
134	Max. value Irms 2	V	4	LongInt	1000	R	0 .. max	e.g. 33000 = 33 A max
136	Max. value Irms 3	V	4	LongInt	1000	R	0 .. max	e.g. 10000 = 100 A max
138	Max. value asym.	V	2	Int	10	R	0 .. 1000	0% .. 100%
139	Max. value PF	V	2	Int	1000	R	-999..1000	cap 0.99..ind 1.
140	Min. value PF	V	2	Int	1000	R	-999..1000	cap 0.99..ind 1.
141	Max. value U1 50Hz	V	4	LongInt	10	R	0 .. max	e.g. 2300 = 230V
143	Max. value U thd 1	V	2	Int	10	R	0 .. 1000	0 .. 100%
144	Max. value H03 1	V	2	Int	10	R	0 .. 1000	0 .. 100%
145	Max. value H05 1	V	2	Int	10	R	0 .. 1000	0 .. 100%
146	Max. value H07 1	V	2	Int	10	R	0 .. 1000	0 .. 100%
147	Max. value H09 1	V	2	Int	10	R	0 .. 1000	0 .. 100%
148	Max. value H11 1	V	2	Int	10	R	0 .. 1000	0 .. 100%
149	Max. value H13 1	V	2	Int	10	R	0 .. 1000	0 .. 100%
150	Max. value H15 1	V	2	Int	10	R	0 .. 1000	0 .. 100%
151	Max. value H17 1	V	2	Int	10	R	0 .. 1000	0 .. 100%
152	Max. value H19 1	V	2	Int	10	R	0 .. 1000	0 .. 100%
153	Max. value I thd 1	V	2	Int	10	R	0 .. 1000	0 .. 100%
154	Max. value U2 50Hz	V	4	LongInt	10	R	0 .. max	e.g. 2300 = 230V
156	Max. value U thd 2	V	2	Int	10	R	0 .. 1000	0 .. 100%
157	Max. value H03 2	V	2	Int	10	R	0 .. 1000	0 .. 100%
158	Max. value H05 2	V	2	Int	10	R	0 .. 1000	0 .. 100%
159	Max. value H07 2	V	2	Int	10	R	0 .. 1000	0 .. 100%
160	Max. value H09 2	V	2	Int	10	R	0 .. 1000	0 .. 100%
161	Max. value H11 2	V	2	Int	10	R	0 .. 1000	0 .. 100%
162	Max. value H13 2	V	2	Int	10	R	0 .. 1000	0 .. 100%
163	Max. value H15 2	V	2	Int	10	R	0 .. 1000	0 .. 100%
164	Max. value H17 2	V	2	Int	10	R	0 .. 1000	0 .. 100%
165	Max. value H19 2	V	2	Int	10	R	0 .. 1000	0 .. 100%
166	Max. value I thd 2	V	2	Int	10	R	0 .. 1000	0 .. 100%

DW	Designation	M	Byte	Type	Factor	R/W	Reading	Value
167	Max. value U3 50Hz	V	4	LongInt	10	R	0 .. max	e.g. 2300 = 230V
169	Max. value Uthd 3	V	2	Int	10	R	0 .. 1000	0 .. 100%
170	Max. value H03 3	V	2	Int	10	R	0 .. 1000	0 .. 100%
171	Max. value H05 3	V	2	Int	10	R	0 .. 1000	0 .. 100%
172	Max. value H07 3	V	2	Int	10	R	0 .. 1000	0 .. 100%
173	Max. value H09 3	V	2	Int	10	R	0 .. 1000	0 .. 100%
174	Max. value H11 3	V	2	Int	10	R	0 .. 1000	0 .. 100%
175	Max. value H13 3	V	2	Int	10	R	0 .. 1000	0 .. 100%
176	Max. value H15 3	V	2	Int	10	R	0 .. 1000	0 .. 100%
177	Max. value H17 3	V	2	Int	10	R	0 .. 1000	0 .. 100%
178	Max. value H19 3	V	2	Int	10	R	0 .. 1000	0 .. 100%
179	Max. value I thd 3	V	2	Int	10	R	0 .. 1000	0 .. 100%
180	Max. value T1	V	2	Int	1	R	-20 .. 150	-20℃ .. 150℃
181	Min. value T1	V	2	Int	1	R	-20 .. 150	-20℃ .. 150℃
182	Max. value T2	V	2	Int	1	R	-20 .. 150	-20℃ .. 150℃
183	Min. value T2	V	2	Int	1	R	-20 .. 150	-20℃ .. 150℃
184	Reset	V	2	Byte		R/W	1 .. 3	see table 2
185	Alarm array	V	44	Array of Byte[46]		R		see table 1
207	Alarm display	V	2	Word		R		Holds the item number of the alarm present in the display.

Table 1: The byte [0] is at zero.
The byte [1] gives the number of alarms present. The remaining bytes indicate an alarm with the value 1.

position	alarm value		position	alarm value		position	alarm value
2	$U_{P1/P2}$ max		16	H03 $_3$ max		30	H13 $_2$ max
3	$U_{P2/P3}$ max		17	H05 $_1$ max		31	H13 $_3$ max
4	$U_{P3/P1}$ max		18	H05 $_2$ max		32	Frei
5	I_{rms}1 max		19	H05 $_3$ max		33	Frei
6	I_{rms}2 max		20	H07 $_1$ max		34	Frei
7	I_{rms}3 max		21	H07 $_2$ max		35	H17 $_1$ max
8	$U_{P1/P2}$ min		22	H07 $_3$ max		36	H17 $_2$ max
9	$U_{P2/P3}$ min		23	free		37	H17 $_3$ max
10	$U_{P3/P1}$ min		24	free		38	asymmetry max
11	Uthd 1 max		25	free		39	power factor min
12	Uthd 2 max		26	H11 $_1$ max		40	temperature 1 max
13	Uthd 3 max		27	H11 $_2$ max		41	temperature 2 max
14	H03 $_1$ max		28	H11 $_3$ max		42	temperature 1 min
15	H03 $_2$ max		29	H13 $_1$ max		43	temperature 2 min

Table 2: The values 1 to 3 indicate which values are to be reset.
1 == Reset temperature; 2 == Reset maximum values; 3 == Reset meters

Table 3: The values 1 and 2 restore the tariff status applied externally.
By writing 3 or 4 another tariff status can be selected.
(3 == tariff 1 ; 4 == tariff 2)

Memory assignments for the EMR 1100 with standardized values

Type number : **07** EMR 1100 data area
(Mode: S= rapid polling; V= slow polling; A= read on command)

DW	Designation	M	Byte	Type	Factor	R/W	Reading	Value
0	Source		2	2Byte				
1	Flags		2	2Byte				
2	Power factor	S	2	Int	1000	R	-999...1000	cap0.999..ind 1.0
3	Alarm	S	2	Byte	-	R	Bit pattern	see 1)
4	Capacitive load	S	2	Byte	1	R	0..100	0%..100%
6	Reactive current	S	4	LongInt	100	R	e.g. 12000	120.A
8	Active Current	S	4	LongInt	100	R	e.g. -23500	235.A recovery Current
10	Total current	S	4	LongInt	100	R	e.g. 3100	31.A
11	U Phase/Phase	S	2	Int	1	R	0..32000	0V..32000V
12	Voltage (U) thd	S	2	Int	10	R	0..1000	0%..100%
13	H5	S	2	Int	10	R	0..1000	0%..100%
14	H7	S	2	Int	10	R	0..1000	0%..100%
15	H11	S	2	Int	10	R	0..1000	0%..100%
16	H13	S	2	Int	10	R	0..1000	0%..100%
17	Tariff	S	2	Byte	1	R	Bit pattern	see 2)
18	Switching state	S	2	Word	-	R	Bit pattern	Bit 0 == stage 1
19	Free stages	S	2	Word	-	R	Bit pattern	Bit 0 == stage 1
20	Calculated target PF	S	2	Int	1000	R	-999...1000	cap0.999..ind 1.0
23	Target PF 1	V	2	Byte	100	R/W	80..110	0.8ind.. 0.90cap
24	Parallel shift 1	V	2	Int	10	R/W	-20..+40	-2.0..+4.0
25	Limitation 1	V	2	Int	10	R/W	-20..+20	-2.0..+2.0
26	Switching delay time 1	V	2	Int	1	R/W	5..500	5..500 sec.
27	Target PF 2	V	2	Byte	100	R/W	80..110	0.8ind.. 0.90cap
28	Parallel shift 2	V	2	Int	10	R/W	-20..+40	-2.0..+4.0
29	Limitation 2	V	2	Int	10	R/W	-20..+20	-2.0..+2.0
30	Switching delay time 2	V	2	Int	1	R/W	5..500	5..500 sec.
31	Auto. c/k	V	2	Byte	-	R/W	0..1	Off..On
32	c/k	V	2	Byte	100	R/W	2..200	0.02..2.00
33	Switching sequ.	V	2	Byte	-	R/W	0..11	1:1:1:1 .. 1:2:4:8
34	Used stages	V	2	Byte	1	R/W	1..12	1..12
35	Auto. conn. ident.	V	2	Byte	-	R/W	0..1	Off..On
36	Connection mode	V	2	Byte	-	R/W	0..11	0°..330°
37	Discharge time	V	2	Byte	1	R/W	5..900	5..900sec.
38	Cyclic switching	V	2	Byte	-	R/W	0..1	Off..On
39	Fixed stages	V	2	Byte	1	R/W	0..3	0..3 Fixd stages
40	Current transformer	V	2	Int	1	R/W	1..7000	1..7000
41	Voltage transformer	V	2	Int	1	R/W	1..300	1..300
42	Harmonic over-current	V	2	Int	100	R/W	105..300	1.05..3.00
43	Frei		2					

DW	Designation	M	Byte	Type	Factor	R/W	Reading	Value
44	Free		2	0				
45	Limit H5	V	2	Byte	10	R/W	10..250	1.0%..25.0%
46	Limit H7	V	2	Byte	10	R/W	10..250	1.0%..25.0%
47	Limit H11	V	2	Byte	10	R/W	10..250	1.0%..25.0%
48	Limit H13	V	2	Byte	10	R/W	10..250	1.0%..25.0%
49	Max. value H5	V	2	Byte	10	R	10..250	1.0%..25.0%
50	Max. value H7	V	2	Byte	10	R	10..250	1.0%..25.0%
51	Max. value H11	V	2	Byte	10	R	10..250	1.0%..25.0%
52	Max. value H13	V	2	Byte	10	R	10..250	1.0%..25.0%
53	Load stage 1	V	2	Int	10	R	0..32000	0..3200kVAr
54	Load stage 2	V	2	Int	10	R	0..32000	0..3200kVAr
55	Load stage 3	V	2	Int	10	R	0..32000	0..3200kVAr
56	Load stage 4	V	2	Int	10	R	0..32000	0..3200kVAr
57	Load stage 5	V	2	Int	10	R	0..32000	0..3200kVAr
58	Load stage 6	V	2	Int	10	R	0..32000	0..3200kVAr
59	Load stage 7	V	2	Int	10	R	0..32000	0..3200kVAr
60	Load stage 8	V	2	Int	10	R	0..32000	0..3200kVAr
61	Load stage 9	V	2	Int	10	R	0..32000	0..3200kVAr
62	Load stage 10	V	2	Int	10	R	0..32000	0..3200kVAr
63	Load stage 11	V	2	Int	10	R	0..32000	0..3200kVAr
64	Load stage 12	V	2	Int	10	R	0..32000	0..3200kVAr

1) The alarm display has the following bit string:

bit15 – bit8	bit7	bit6	bit5	bit4	bit3	bit2	bit1	bit0
allways ziro	I=0	U=0	cosφ	overcurr.	H13	H11	H7	H5

Bit 15 is the MSG Bit of the data word. Bit 0 is the LSG Bit.

2) Reading and setting the tariff:

A 1 or 2 in this position indicates the current tariff status. If, however, a 3 or 4 is written at this position, the external volt-free contact is overridden and the system controlled according to the new entry (3 ≡ tariff 1 ; 4 ≡ tariff 2). The external operation is reactivated by writing 1 or 2 again at this position.

Memory assignments for the EMA1101 with standardized values

Type number : **08** EMA 1100/1101 data area
(Mode: S= rapid polling; V= slow polling; A= read on command)

DW	Designation	M	Byte	Type	Factor	R/W	Reading	Value
0	Source		2	2Byte		R/W		
1	Flags		2	2Byte		R/W		
2	Total active power	S	2	Int	0.001	R	-max .. +max	e.g. 234 = 234 kW
3	T. reactive power	S	2	Int	0.001	R	-max .. +max	e.g. 7 = ind 7 kVAr
4	T. apparent power	S	2	Int	0.001	R	0 .. max	e.g. 30 = 30 kVA
5	Total power factor	S	2	Int	1000	R	-999 .. 1000	cap 0.999 .. ind 1.00
6	Ferquence	S	2	Int	100	R	4500 .. 6200	45Hz .. 62Hz
7	Asymmetry	S	2	Int	10	R	0 .. 1000	0 .. 100%
8	Voltage U1/2	S	2	Int	1	R	0.. max	e.g. 400 = 400V
9	Voltage U2/3	S	2	Int	1	R	0.. max	e.g. 10000 = 10kV
10	Voltage U3/1	S	2	Int	1	R	0.. max	e.g. 550 = 550V
11	Voltage rms U1	S	2	Int	1	R	0.. max	e.g. 220 = 220V
12	Current rms I1	S	2	Int	1	R	0.. max	e.g. 45 = 45A
13	Active power 1	S	2	Int	0.001	R	-max .. max	e.g. 253 = 253kW
14	Reactive power 1	S	2	Int	0.001	R	-max .. +max	-12 = cap 12kVAr
15	Apparent power 1	S	2	Int	0.001	R	0 .. max	e.g. 76 = 76kVA
16	power factor 1	S	2	Int	1000	R	-999 .. 1000	cap 0.99 .. ind 1.00
17	Voltage rms U2	S	2	Int	1	R	0.. max	e.g. 230= 230V
18	Current rms I2	S	2	Int	1	R	0.. max	e.g. 120 = 120A
19	Active power 2	S	2	Int	0.001	R	-max .. max	e.g. 253 = 253kW
20	Reactive power 2	S	2	Int	0.001	R	-max .. +max	12 = ind 12kVAr
21	Apparent power 2	S	2	Int	0.001	R	0 .. max	e.g. 766 = 766kVA
22	power factor 2	S	2	Int	1000	R	-999 .. 1000	cap 0.99 .. ind 1.00
23	Voltage rms U3	S	2	Int	1	R	0.. max	e.g. 223 = 223V
24	Current rms I3	S	2	Int	1	R	0.. max	e.g. 47 = 47A
25	Active power 3	S	2	Int	0.001	R	-max .. max	e.g. 25 = 25kW
26	Reactive power 3	S	2	Int	0.001	R	-max .. +max	-123 = cap 123kVAr
27	Apparent power 3	S	2	Int	0.001	R	0 .. max	e.g. 66 = 66kVA
28	power factor 3	S	2	Int	1000	R	-999 .. 1000	cap 0.99 .. ind 1.00
29	Voltage 1 50Hz	S	2	Int	1	R	0 .. max	e.g. 232 = 232V
30	Voltage 1 thd	S	2	Int	10	R	0 .. 1000	0 .. 100%
31	H03 1	S	2	Int	10	R	0 .. 1000	0 .. 100%
32	H05 1	S	2	Int	10	R	0 .. 1000	0 .. 100%
33	H07 1	S	2	Int	10	R	0 .. 1000	0 .. 100%
34	H09 1	S	2	Int	10	R	0 .. 1000	0 .. 100%
35	H11 1	S	2	Int	10	R	0 .. 1000	0 .. 100%
36	H13 1	S	2	Int	10	R	0 .. 1000	0 .. 100%
37	H15 1	S	2	Int	10	R	0 .. 1000	0 .. 100%
38	H17 1	S	2	Int	10	R	0 .. 1000	0 .. 100%
39	H19 1	S	2	Int	10	R	0 .. 1000	0 .. 100%
40	Current 1 thd	S	2	Int	10	R	0 .. 1000	0 .. 100%

DW	Designation	M	Byte	Type	Factor	R/W	Reading	Value
41	Voltage 2 50Hz	S	2	Int	1	R	0 .. max	z.B. 220 = 220V
42	Voltage 2 thd	S	2	Int	10	R	0 .. 1000	0 .. 100%
43	H03 2	S	2	Int	10	R	0 .. 1000	0 .. 100%
44	H05 2	S	2	Int	10	R	0 .. 1000	0 .. 100%
45	H07 2	S	2	Int	10	R	0 .. 1000	0 .. 100%
46	H09 2	S	2	Int	10	R	0 .. 1000	0 .. 100%
47	H11 2	S	2	Int	10	R	0 .. 1000	0 .. 100%
48	H13 2	S	2	Int	10	R	0 .. 1000	0 .. 100%
49	H15 2	S	2	Int	10	R	0 .. 1000	0 .. 100%
50	H17 2	S	2	Int	10	R	0 .. 1000	0 .. 100%
51	H19 2	S	2	Int	10	R	0 .. 1000	0 .. 100%
52	Current 2 thd	S	2	Int	10	R	0 .. 1000	0 .. 100%
53	Voltage 3 50Hz	S	2	Int	1	R	0 .. max	z.B. 230 = 230V
54	Voltage 3 thd	S	2	Int	10	R	0 .. 1000	0 .. 100%
55	H03 3	S	2	Int	10	R	0 .. 1000	0 .. 100%
56	H05 3	S	2	Int	10	R	0 .. 1000	0 .. 100%
57	H07 3	S	2	Int	10	R	0 .. 1000	0 .. 100%
58	H09 3	S	2	Int	10	R	0 .. 1000	0 .. 100%
59	H11 3	S	2	Int	10	R	0 .. 1000	0 .. 100%
60	H13 3	S	2	Int	10	R	0 .. 1000	0 .. 100%
61	H15 3	S	2	Int	10	R	0 .. 1000	0 .. 100%
62	H17 3	S	2	Int	10	R	0 .. 1000	0 .. 100%
63	H19 3	S	2	Int	10	R	0 .. 1000	0 .. 100%
64	Current 3 thd	S	2	Int	10	R	0 .. 1000	0 .. 100%
65	Tariff state	S	2	Byte		R/W	1 .. 4	see table 3
66	Active energyT1	S	2	Int	0.01	R	0 .. max	e.g. 31 = 3100 kWh
67	Reactive ener. T1	S	2	Int	0.01	R	0 .. max	10 = ind 1000 kVArh
68	Active energy T2	S	2	Int	0.01	R	0 .. max	1401 = 1401 kWh
69	Reactive ener. T2	S	2	Int	0.01	R	0 .. max	71 = ind 7100 kVArh
70	Temperature 1	S	2	Int	1	R	-20 .. 150	-20℃ .. 150℃
71	Temperature 2	S	2	Int	1	R	-20 .. 150	-20℃ .. 150℃
72	Alarm limit Umax	V	2	Int	1	R/W	0..30000	420 = max 420 V
73	Alarm limit Umin	V	2	Int	1	R/W	0..30000	e.g. 360 = 360 V min
74	Alarm limit Imax	V	2	Int	1	R/W	1 .. 9999	60 = max 60 A
75	Alarm temp.1 max	V	2	Int	1	R/W	0 .. 200	0℃ .. 200℃
76	Alarm temp.1 min	V	2	Int	1	R/W	-30 .. +99	-30℃ .. +99℃
77	Alarm temp.2 max	V	2	Int	1	R/W	0 .. 200	0℃ .. 200℃
78	Alarm temp.2 min	V	2	Int	1	R/W	-30 .. +99	-30℃ .. +99℃
79	Alarm limit asymm.	V	2	Int	10	R/W	10 .. 990	1 .. 99%
80	Alarm limit PF min	V	2	Int	1000	R/W	0 .. 1000	ind 0.00 .. ind 1.00
81	Alarm limit U thd	V	2	Int	10	R/W	0 .. 1000	0 .. 100%
82	Alarm limit H03	V	2	Int	10	R/W	0 .. 1000	0 .. 100%
83	Alarm limit H05	V	2	Int	10	R/W	0 .. 1000	0 .. 100%
84	Alarm limit H07	V	2	Int	10	R/W	0 .. 1000	0 .. 100%
85	Alarm limit H11	V	2	Int	10	R/W	0 .. 1000	0 .. 100%
86	Alarm limit H13	V	2	Int	10	R/W	0 .. 1000	0 .. 100%
87	Alarm limit H17	V	2	Int	10	R/W	0 .. 1000	0 .. 100%

DW	Designation	M	Byte	Type	Factor	R/W	Reading	Value
88	Max. value U 1/2	V	2	Int	1	R	0 .. max	e.g. 200 = 200V max
89	Max. value U 2/3	V	2	Int	1	R	0 .. max	e.g. 330 = 330V max
90	Max. value U 3/1	V	2	Int	1	R	0 .. max	z.B. 20000 = 20 kV max
91	Min. value U 1/2	V	2	Int	1	R	0 .. max	e.g. 170 =170V min
92	Min. value U 2/3	V	2	Int	1	R	0 .. max	e.g. 290 =290V min
93	Min. value U 3/1	V	2	Int	1	R	0 .. max	e.g. 19300 =19.3 kV min
94	Max. value Irms 1	V	2	Int	1	R	e.g.	
95	Max. value Irms 2	V	2	Int	1	R	0 .. max	e.g. 33 = 33 A max
96	Max. value Irms 3	V	2	Int	1	R	0 .. max	e.g. 100 = 100 A max
97	Max. value asym.	V	2	Int	10	R	0 .. 1000	0% .. 100%
98	Max. value PF	V	2	Int	1000	R	-999..1000	cap 0.99..ind 1.
99	Min. value PF	V	2	Int	1000	R	-999..1000	cap 0.99..ind 1.
100	Max. value U1 50Hz	V	2	Int	1	R	0 .. max	e.g. 230 = 230V
101	Max. value U thd 1	V	2	Int	10	R	0 .. 1000	0 .. 100%
102	Max. value H03 1	V	2	Int	10	R	0 .. 1000	0 .. 100%
103	Max. value H05 1	V	2	Int	10	R	0 .. 1000	0 .. 100%
104	Max. value H07 1	V	2	Int	10	R	0 .. 1000	0 .. 100%
105	Max. value H09 1	V	2	Int	10	R	0 .. 1000	0 .. 100%
106	Max. value H11 1	V	2	Int	10	R	0 .. 1000	0 .. 100%
107	Max. value H13 1	V	2	Int	10	R	0 .. 1000	0 .. 100%
108	Max. value H15 1	V	2	Int	10	R	0 .. 1000	0 .. 100%
109	Max. value H17 1	V	2	Int	10	R	0 .. 1000	0 .. 100%
110	Max. value H19 1	V	2	Int	10	R	0 .. 1000	0 .. 100%
111	Max. value I thd 1	V	2	Int	10	R	0 .. 1000	0 .. 100%
112	Max. value U2 50Hz	V	2	Int	1	R	0 .. max	e.g. 230 = 230V
113	Max. value U thd 2	V	2	Int	10	R	0 .. 1000	0 .. 100%
114	Max. value H03 2	V	2	Int	10	R	0 .. 1000	0 .. 100%
115	Max. value H05 2	V	2	Int	10	R	0 .. 1000	0 .. 100%
116	Max. value H07 2	V	2	Int	10	R	0 .. 1000	0 .. 100%
117	Max. value H09 2	V	2	Int	10	R	0 .. 1000	0 .. 100%
118	Max. value H11 2	V	2	Int	10	R	0 .. 1000	0 .. 100%
119	Max. value H13 2	V	2	Int	10	R	0 .. 1000	0 .. 100%
120	Max. value H15 2	V	2	Int	10	R	0 .. 1000	0 .. 100%
121	Max. value H17 2	V	2	Int	10	R	0 .. 1000	0 .. 100%
122	Max. value H19 2	V	2	Int	10	R	0 .. 1000	0 .. 100%
123	Max. value I thd 2	V	2	Int	10	R	0 .. 1000	0 .. 100%

DW	Designation	M	Byte	Type	Factor	R/W	Reading	Value
124	Max. value U3 50Hz	V	2	Int	1	R	0 .. max	e.g. 230 = 230V
125	Max. value Uthd 3	V	2	Int	10	R	0 .. 1000	0 .. 100%
126	Max. value H03 3	V	2	Int	10	R	0 .. 1000	0 .. 100%
127	Max. value H05 3	V	2	Int	10	R	0 .. 1000	0 .. 100%
128	Max. value H07 3	V	2	Int	10	R	0 .. 1000	0 .. 100%
129	Max. value H09 3	V	2	Int	10	R	0 .. 1000	0 .. 100%
130	Max. value H11 3	V	2	Int	10	R	0 .. 1000	0 .. 100%
131	Max. value H13 3	V	2	Int	10	R	0 .. 1000	0 .. 100%
132	Max. value H15 3	V	2	Int	10	R	0 .. 1000	0 .. 100%
133	Max. value H17 3	V	2	Int	10	R	0 .. 1000	0 .. 100%
134	Max. value H19 3	V	2	Int	10	R	0 .. 1000	0 .. 100%
135	Max. value I thd 3	V	2	Int	10	R	0 .. 1000	0 .. 100%
136	Max. value T1	V	2	Int	1	R	-20 .. 150	-20℃ .. 150℃
137	Min. value T1	V	2	Int	1	R	-20 .. 150	-20℃ .. 150℃
138	Max. value T2	V	2	Int	1	R	-20 .. 150	-20℃ .. 150℃
139	Min. value T2	V	2	Int	1	R	-20 .. 150	-20℃ .. 150℃
140	Reset	V	2	Byte		R/W	1 .. 3	see table 2
141	Alarm array	V	44	Array of Byte[44]		R		see table 1
163	Alarm display	V	2	Word		R		Holds the item number of the alarm present in the display.

Table 1: The byte [0] is at zero.
The byte [1] gives the number of alarms present. The remaining bytes indicate an alarm with the value 1.

position	alarm value		position	alarm value		position	alarm value
2	$U_{P1/P2}$ max		16	H03 $_3$ max		30	H13 $_2$ max
3	$U_{P2/P3}$ max		17	H05 $_1$ max		31	H13 $_3$ max
4	$U_{P3/P1}$ max		18	H05 $_2$ max		32	Frei
5	I_{rms}1 max		19	H05 $_3$ max		33	Frei
6	I_{rms}2 max		20	H07 $_1$ max		34	Frei
7	I_{rms}3 max		21	H07 $_2$ max		35	H17 $_1$ max
8	$U_{P1/P2}$ min		22	H07 $_3$ max		36	H17 $_2$ max
9	$U_{P2/P3}$ min		23	free		37	H17 $_3$ max
10	$U_{P3/P1}$ min		24	free		38	asymmetry max
11	Uthd 1 max		25	free		39	power factor min
12	Uthd 2 max		26	H11 $_1$ max		40	temperature 1 max
13	Uthd 3 max		27	H11 $_2$ max		41	temperature 2 max
14	H03 $_1$ max		28	H11 $_3$ max		42	temperature 1 min
15	H03 $_2$ max		29	H13 $_1$ max		43	temperature 2 min

Table 2: The values 1 to 3 indicate which values are to be reset.
1 == Reset temperature; 2 == Reset maximum values; 3 == Reset meters

Table 3: The values 1 and 2 restore the tariff status applied externally.
By writing 3 or 4 another tariff status can be selected.
(3 == tariff 1 ; 4 == tariff 2)

Memory assignments for the EMF 1100/1101

Type number : **09** EMF 1100/1101 data area
(Mode: S= rapid polling; V= slow polling; A= read on command)

DW	Designation	M	Byte	Type	Factor	R/W	Reading	Value
0	Source		2	2Byte				
1	Flags		2	2Byte				
2	Switching states	S	2	Int	1	R	Bit pattern	
3	Reset all	A	2	Byte	1	W	FFh	FFh clear all counter
4	P1/P2 Channel	V	2	Byte	1	R/W	1 .. 12	Channel 1 .. 12
5	Time,Date	S	6	Array		R/W	sec,min,h, DD,MM,YY	In BCD-Code
8	P-NET-Base	V	2	Byte	1	R/W		
10	Calculated counter C1P1	S	4	Real	1	R		
12	Calculated counter C2P1	S	4	Real	1	R		
14	Calculated counter C3P1	S	4	Real	1	R		
16	Calculated counter C4P1	S	4	Real	1	R		
18	Calculated counter C5P1	S	4	Real	1	R		
20	Calculated counter C6P1	S	4	Real	1	R		
22	Calculated counter C7P1	S	4	Real	1	R		
24	Calculated counter C8P1	S	4	Real	1	R		
26	Calculated counter C9P1	S	4	Real	1	R		
28	Calculated count. C10P1	S	4	Real	1	R		
30	Calculated count. C11P1	S	4	Real	1	R		
32	Calculated count. C12P1	S	4	Real	1	R		
34	Calculated counter C1P2	S	4	Real	1	R		
36	Calculated counter C2P2	S	4	Real	1	R		
38	Calculated counter C3P2	S	4	Real	1	R		
40	Calculated counter C4P2	S	4	Real	1	R		
42	Calculated counter C5P2	S	4	Real	1	R		
44	Calculated counter C6P2	S	4	Real	1	R		
46	Calculated counter C7P2	S	4	Real	1	R		
48	Calculated counter C8P2	S	4	Real	1	R		
50	Calculated counter C9P2	S	4	Real	1	R		
52	Calculated count. C10P2	S	4	Real	1	R		
54	Calculated count. C11P2	S	4	Real	1	R		
56	Calculated count. C12P2	S	4	Real	1	R		
60	Addend C1 P1	V	4	Real	1	R/W		
62	Multiplicand C1 P1	V	4	Real	1	R/W		
64	Addend C1 P2	V	4	Real	1	R/W		
66	Multiplicand C1 P2	V	4	Real	1	R/W		
68	Edge C1	V	2	Byte	1	R/W	0 .. 1	rising / falling
69	Difference channel C1	V	2	Byte	1	R/W	1 .. 12	Channel 1 .. 12
70	Debounce time C1	V	2	Byte	0.01	R/W	1 .. 255	10 ms .. 2.55 sec
71	Reset C1	A	2	Byte		W	FFh	FFh clear counters
72	Calculate C1	A	2	Byte		W	FFh	Start calculation

DW	Designation	M	Byte	Type	Factor	R/W	Reading	Value
74	Addend C2 P1	V	4	Real	1	R/W		
76	Multiplicand C2 P1	V	4	Real	1	R/W		
78	Addend C2 P2	V	4	Real	1	R/W		
80	Multiplicand C2 P2	V	4	Real	1	R/W		
82	Edge C2	V	2	Byte	1	R/W	0 .. 1	rising / falling
83	Difference channel C2	V	2	Byte	1	R/W	1 .. 12	Channel 1 .. 12
84	Debounce time C2	V	2	Byte	0.01	R/W	1 .. 255	10 ms .. 2.55 sec
85	Reset C2	A	2	Byte		W	FFh	FFh clear counters
86	Calculate C2	A	2	Byte		W	FFh	Start calculation
88	Addend C3 P1	V	4	Real	1	R/W		
90	Multiplicand C3 P1	V	4	Real	1	R/W		
92	Addend C3 P2	V	4	Real	1	R/W		
94	Multiplicand C3 P2	V	4	Real	1	R/W		
96	Edge C3	V	2	Byte	1	R/W	0 .. 1	rising / falling
97	Difference channel C3	V	2	Byte	1	R/W	1 .. 12	Channel 1 .. 12
98	Debounce time C3	V	2	Byte	0.01	R/W	1 .. 255	10 ms .. 2.55 sec
99	Reset C3	A	2	Byte		W	FFh	FFh clear counters
100	Calculate C3	A	2	Byte		W	FFh	Start calculation
102	Addend C4 P1	V	4	Real	1	R/W		
104	Multiplicand C4 P1	V	4	Real	1	R/W		
106	Addend C4 P2	V	4	Real	1	R/W		
108	Multiplicand C4 P2	V	4	Real	1	R/W		
110	Edge C4	V	2	Byte	1	R/W	0 .. 1	rising / falling
111	Difference channel C4	V	2	Byte	1	R/W	1 .. 12	Channel 1 .. 12
112	Debounce time C4	V	2	Byte	0.01	R/W	1 .. 255	10 ms .. 2.55 sec
113	Reset C4	A	2	Byte		W	FFh	FFh clear counters
114	Calculate C4	A	2	Byte		W	FFh	Start calculation
116	Addend C5 P1	V	4	Real	1	R/W		
118	Multiplicand C5 P1	V	4	Real	1	R/W		
120	Addend C5 P2	V	4	Real	1	R/W		
122	Multiplicand C5 P2	V	4	Real	1	R/W		
124	Edge C5	V	2	Byte	1	R/W	0 .. 1	rising / falling
125	Difference channel C5	V	2	Byte	1	R/W	1 .. 12	Channel 1 .. 12
126	Debounce time C5	V	2	Byte	0.01	R/W	1 .. 255	10 ms .. 2.55 sec
127	Reset C5	A	2	Byte		W	FFh	FFh clear counters
128	Calculate C5	A	2	Byte		W	FFh	Start calculation
130	Addend C6 P1	V	4	Real	1	R/W		
132	Multiplicand C6 P1	V	4	Real	1	R/W		
134	Addend C6 P2	V	4	Real	1	R/W		
136	Multiplicand C6 P2	V	4	Real	1	R/W		
138	Edge C6	V	2	Byte	1	R/W	0 .. 1	rising / falling
139	Difference channel C6	V	2	Byte	1	R/W	1 .. 12	Channel 1 .. 12
140	Debounce time C6	V	2	Byte	0.01	R/W	1 .. 255	10 ms .. 2.55 sec
141	Reset C6	A	2	Byte		W	FFh	FFh clear counters
142	Calculate C6	A	2	Byte		W	FFh	Start calculation

DW	Designation	M	Byte	Type	Factor	R/W	Reading	Value
144	Addend C7 P1	V	4	Real	1	R/W		
146	Multiplicand C7 P1	V	4	Real	1	R/W		
148	Addend C7 P2	V	4	Real	1	R/W		
150	Multiplicand C7 P2	V	4	Real	1	R/W		
152	Edge C7	V	2	Byte	1	R/W	0 .. 1	rising / falling
153	Difference channel C7	V	2	Byte	1	R/W	1 .. 12	Channel 1 .. 12
154	Debounce time C7	V	2	Byte	0.01	R/W	1 .. 255	10 ms .. 2.55 sec
155	Reset C7	A	2	Byte		W	FFh	FFh clear counters
156	Calculate C7	A	2	Byte		W	FFh	Start calculation
158	Addend C8 P1	V	4	Real	1	R/W		
160	Multiplicand C8 P1	V	4	Real	1	R/W		
162	Addend C8 P2	V	4	Real	1	R/W		
164	Multiplicand C8 P2	V	4	Real	1	R/W		
166	Edge C8	V	2	Byte	1	R/W	0 .. 1	rising / falling
167	Difference channel C8	V	2	Byte	1	R/W	1 .. 12	Channel 1 .. 12
168	Debounce time C8	V	2	Byte	0.01	R/W	1 .. 255	10 ms .. 2.55 sec
169	Reset C8	A	2	Byte		W	FFh	FFh clear counters
170	Calculate C8	A	2	Byte		W	FFh	Start calculation
172	Addend C9 P1	V	4	Real	1	R/W		
174	Multiplicand C9 P1	V	4	Real	1	R/W		
176	Addend C9 P2	V	4	Real	1	R/W		
178	Multiplicand C9 P2	V	4	Real	1	R/W		
180	Edge C9	V	2	Byte	1	R/W	0 .. 1	rising / falling
181	Difference channel C9	V	2	Byte	1	R/W	1 .. 12	Channel 1 .. 12
182	Debounce time C9	V	2	Byte	0.01	R/W	1 .. 255	10 ms .. 2.55 sec
183	Reset C9	A	2	Byte		W	FFh	FFh clear counters
184	Calculate C9	A	2	Byte		W	FFh	Start calculation
186	Addend C1 P10	V	4	Real	1	R/W		
188	Multiplicand C10 P1	V	4	Real	1	R/W		
190	Addend C10 P2	V	4	Real	1	R/W		
192	Multiplicand C10 P2	V	4	Real	1	R/W		
194	Edge C10	V	2	Byte	1	R/W	0 .. 1	rising / falling
195	Difference chann. C10	V	2	Byte	1	R/W	1 .. 12	Channel 1 .. 12
196	Debounce time C10	V	2	Byte	0.01	R/W	1 .. 255	10 ms .. 2.55 sec
197	Reset C10	A	2	Byte		W	FFh	FFh clear counters
198	Calculate C10	A	2	Byte		W	FFh	Start calculation
200	Addend C11 P1	V	4	Real	1	R/W		
202	Multiplicand C11 P1	V	4	Real	1	R/W		
204	Addend C11 P2	V	4	Real	1	R/W		
206	Multiplicand C11 P2	V	4	Real	1	R/W		
208	Edge C11	V	2	Byte	1	R/W	0 .. 1	rising / falling
209	Difference chann. C11	V	2	Byte	1	R/W	1 .. 12	Channel 1 .. 12
210	Debounce time C11	V	2	Byte	0.01	R/W	1 .. 255	10 ms .. 2.55 sec
211	Reset C11	A	2	Byte		W	FFh	FFh clear counters
212	Calculate C11	A	2	Byte		W	FFh	Start calculation

DW	Designation	M	Byte	Type	Factor	R/W	Reading	Value
214	Addend C12 P1	V	4	Real	1	R/W		
216	Multiplicand C12 P1	V	4	Real	1	R/W		
218	Addend C12 P2	V	4	Real	1	R/W		
220	Multiplicand C12 P2	V	4	Real	1	R/W		
222	Edge C12	V	2	Byte	1	R/W	0 .. 1	rising / falling
223	Difference chann. C12	V	2	Byte	1	R/W	1 .. 12	Channel 1 .. 12
224	Debounce time C12	V	2	Byte	0.01	R/W	1 .. 255	10 ms .. 2.55 sec
225	Reset C12	A	2	Byte		W	FFh	FFh clear counters
226	Calculate C12	A	2	Byte		W	FFh	Start calculation

Bit pattern:

Data word 2: XXXX XXXX XXXX XXXX

|	| |	
|	| Channel 1	
|	Channel 2	
|		
Channel 12		

Switching states:

0 == Cannel open

1 == Channel closed

Memory assignments for the EMF 1100/1101 in the raw data area

Type number : **10** EMF 1100/1101 raw data area
(Mode: S= rapid polling; V= slow polling; A= read on command)

DW	Designation	M	Byte	Type	Factor	R/W	Reading	Value
0	Source		2	2Byte				
1	Flags		2	2Byte				
2	Switching states	S	2	Int	1	R	Bit pattern	
3	Reset all	A	2	Byte	1	W	FFh	FFh clear all counter
4	P1/P2 Channel	V	2	Byte	1	R/W	1 .. 12	Channel 1 .. 12
5	Time,Date	S	6	Array		R/W	sec,min,hour, DD,MM,YY	In BCD-Code
8	P-NET-Base	V	2	Byte	1	R/W		
10	Counter C1 P1	S	6	5By Int	1	R		
13	Counter C2 P1	S	6	5By Int	1	R		
16	Counter C3 P1	S	6	5By Int	1	R		
19	Counter C4 P1	S	6	5By Int	1	R		
22	Counter C5 P1	S	6	5By Int	1	R		
25	Counter C6 P1	S	6	5By Int	1	R		
28	Counter C7 P1	S	6	5By Int	1	R		
31	Counter C8 P1	S	6	5By Int	1	R		
34	Counter C9 P1	S	6	5By Int	1	R		
37	Counter C10 P1	S	6	5By Int	1	R		
40	Counter C11 P1	S	6	5By Int	1	R		
43	Counter C12 P1	S	6	5By Int	1	R		
50	Counter C1 P2	S	6	5By Int	1	R		
53	Counter C2 P2	S	6	5By Int	1	R		
56	Counter C3 P2	S	6	5By Int	1	R		
59	Counter C4 P2	S	6	5By Int	1	R		
62	Counter C5 P2	S	6	5By Int	1	R		
65	Counter C6 P2	S	6	5By Int	1	R		
68	Counter C7 P2	S	6	5By Int	1	R		
71	Counter C8 P2	S	6	5By Int	1	R		
74	Counter C9 P2	S	6	5By Int	1	R		
77	Counter C10 P2	S	6	5By Int	1	R		
80	Counter C11 P2	S	6	5By Int	1	R		
83	Counter C12 P1	S	6	5By Int	1	R		
90	Reset value C1 P1	S	6	5By Int	1	R		
93	Reset value C2 P1	S	6	5By Int	1	R		
96	Reset value C3 P1	S	6	5By Int	1	R		
99	Reset value C4 P1	S	6	5By Int	1	R		
102	Reset value C5 P1	S	6	5By Int	1	R		
105	Reset value C6 P1	S	6	5By Int	1	R		
108	Reset value C7 P1	S	6	5By Int	1	R		
111	Reset value C8 P1	S	6	5By Int	1	R		
114	Reset value C9 P1	S	6	5By Int	1	R		
117	Reset value C10 P1	S	6	5By Int	1	R		
120	Reset value C11 P1	S	6	5By Int	1	R		
123	Reset value C12 P1	S	6	5By Int	1	R		

DW	Designation	M	Byte	Type	Factor	R/W	Reading	Value
130	Reset value C1 P2	S	6	5By Int	1	R		
133	Reset value C2 P2	S	6	5By Int	1	R		
136	Reset value C3 P2	S	6	5By Int	1	R		
139	Reset value C4 P2	S	6	5By Int	1	R		
142	Reset value C5 P2	S	6	5By Int	1	R		
145	Reset value C6 P2	S	6	5By Int	1	R		
148	Reset value C7 P2	S	6	5By Int	1	R		
151	Reset value C8 P2	S	6	5By Int	1	R		
154	Reset value C9 P2	S	6	5By Int	1	R		
157	Reset value C10 P2	S	6	5By Int	1	R		
160	Reset value C11 P2	S	6	5By Int	1	R		
163	Reset value C12 P2	S	6	5By Int	1	R		
170	Edge C1	V	2	Byte	1	R/W	0 .. 1	rising / falling
171	Difference chan. C1	V	2	Byte	1	R/W	1 .. 12	Channel 1 .. 12
172	Debounce time C1	V	2	Byte	0.01	R/W	1 .. 255	10 ms .. 2.55 sec
173	Reset C1	A	2	Byte		W	FFh	FFh clear counters
175	Edge C2	V	2	Byte	1	R/W	0 .. 1	rising / falling
176	Difference chan. C2	V	2	Byte	1	R/W	1 .. 12	Channel 1 .. 12
177	Debounce time C2	V	2	Byte	0.01	R/W	1 .. 255	10 ms .. 2.55 sec
178	Reset C2	A	2	Byte		W	FFh	FFh clear counters
180	Edge C3	V	2	Byte	1	R/W	0 .. 1	rising / falling
181	Difference chan. C3	V	2	Byte	1	R/W	1 .. 12	Channel 1 .. 12
182	Debounce time C3	V	2	Byte	0.01	R/W	1 .. 255	10 ms .. 2.55 sec
183	Reset C3	A	2	Byte		W	FFh	FFh clear counters
185	Edge C4	V	2	Byte	1	R/W	0 .. 1	rising / falling
186	Difference chan. C4	V	2	Byte	1	R/W	1 .. 12	Channel 1 .. 12
187	Debounce time C4	V	2	Byte	0.01	R/W	1 .. 255	10 ms .. 2.55 sec
188	Reset C4	A	2	Byte		W	FFh	FFh clear counters
190	Edge C5	V	2	Byte	1	R/W	0 .. 1	rising / falling
191	Difference chan. C5	V	2	Byte	1	R/W	1 .. 12	Channel 1 .. 12
192	Debounce time C5	V	2	Byte	0.01	R/W	1 .. 255	10 ms .. 2.55 sec
193	Reset C5	A	2	Byte		W	FFh	FFh clear counters
195	Edge C6	V	2	Byte	1	R/W	0 .. 1	rising / falling
196	Difference chan. C6	V	2	Byte	1	R/W	1 .. 12	Channel 1 .. 12
197	Debounce time C6	V	2	Byte	0.01	R/W	1 .. 255	10 ms .. 2.55 sec
198	Reset C6	A	2	Byte		W	FFh	FFh clear counters
200	Edge C7	V	2	Byte	1	R/W	0 .. 1	rising / falling
201	Difference chan. C7	V	2	Byte	1	R/W	1 .. 12	Channel 1 .. 12
202	Debounce time C7	V	2	Byte	0.01	R/W	1 .. 255	10 ms .. 2.55 sec
203	Reset C7	A	2	Byte		W	FFh	FFh clear counters

DW	Designation	M	Byte	Type	Factor	R/W	Reading	Value
205	Edge C8	V	2	Byte	1	R/W	0 .. 1	rising / falling
206	Difference chan. C8	V	2	Byte	1	R/W	1 .. 12	Channel 1 .. 12
207	Debounce time C8	V	2	Byte	0.01	R/W	1 .. 255	10 ms .. 2.55 sec
208	Reset C8	A	2	Byte		W	FFh	FFh clear counters
210	Edge C9	V	2	Byte	1	R/W	0 .. 1	rising / falling
211	Difference chan. C9	V	2	Byte	1	R/W	1 .. 12	Channel 1 .. 12
212	Debounce time C9	V	2	Byte	0.01	R/W	1 .. 255	10 ms .. 2.55 sec
213	Reset C9	A	2	Byte		W	FFh	FFh clear counters
215	Edge C10	V	2	Byte	1	R/W	0 .. 1	rising / falling
216	Difference ch. C10	V	2	Byte	1	R/W	1 .. 12	Channel 1 .. 12
217	Debounce time C10	V	2	Byte	0.01	R/W	1 .. 255	10 ms .. 2.55 sec
218	Reset C10	A	2	Byte		W	FFh	FFh clear counters
220	Edge C11	V	2	Byte	1	R/W	0 .. 1	rising / falling
221	Difference ch. C11	V	2	Byte	1	R/W	1 .. 12	Channel 1 .. 12
222	Debounce time C11	V	2	Byte	0.01	R/W	1 .. 255	10 ms .. 2.55 sec
223	Reset C11	A	2	Byte		W	FFh	FFh clear counters
225	Edge C12	V	2	Byte	1	R/W	0 .. 1	rising / falling
226	Difference ch. C12	V	2	Byte	1	R/W	1 .. 12	Channel 1 .. 12
227	Debounce time C12	V	2	Byte	0.01	R/W	1 .. 255	10 ms .. 2.55 sec
228	Reset C12	A	2	Byte		W	FFh	FFh clear counters

Memory assignments for the EML 1101

Type number : **12** EML 1101 data area
Those variables with grey shading are not yet in use.
The various pulse inputs at the EML 1101 are designated as E1, E2 or E3. K1 indicates the switching channel and P1, P2, P3, and P4 indicate the profile.
(Mode: S= rapid polling; V= slow polling; A= read on command)

DW	Designation	M	Byte	Type	Factor	R/W	Reading	Value
0	Source		2	2Byte				
1	Flags		2	2Byte				
2	Remaining time	S	2	2Byte	1	R	0..65535	in Sekunden
3	Current total power	S	4	longint	10	R	0..999999999	10 = 1.0kW
5	accumlated power	S	4	longint	10	R	0..999999999	10 = 1.0kW
7	Power of the last period	S	4	longint	10	R	0..999999999	10 = 1.0kW
9	Current power factor	S	4	longint	1000	R	-1000..1000	999=0.999
11	Current target max. demand	S	4	longint	10	R	0..999999999	10 = 1.0kW
13	Current peak power	S	4	longint	10	R	0..999999999	10 = 1.0kW
15	Current profil	S	2	Word		R	0..3	
16	Current active power E1	S	4	longint	10	R	0..999999999	10 = 1.0kW
18	Current active power E2	S	4	longint	10	R	0..999999999	10 = 1.0kW
20	Current active/reactive power E2	S	4	longint	10	R	0..999999999	10 = 1.0kW
22	Correction power	S	4	longint	10	R	0..999999999	10 = 1.0kW
24	Power trend	S	4	longint	10	R	0..999999999	10 = 1.0kW
26	Alarmflag EML	S	2	2Byte	2	R	Bit pattern	see 1)
27	Alarmflag EMD	S	2	2Byte	1	R	Bit pattern	see 2)
28	EMD activation	V	2	2Byte		R/W	Bit pattern	Bit X=1 -> EMD activ see 3)
29	Virtual EMD activation	V	2	2Byte		R/W	Bit pattern	Bit X=1 -> EMD virtual see 3)
30	Switching state EML	S	2	2Byte	1	R	Bit pattern	siehe 4)
31	Switching state EMD 1	S	2	2Byte	1	R	Bit pattern	Bit x=1 Contact x=open
32	Switching state EMD 2	S	2	2Byte	1	R	Bit pattern	Bit x=1 Contact x=open
33	Switching state EMD 3	S	2	2Byte	1	R	Bit pattern	Bit x=1 Contact x=open
34	Switching state EMD 4	S	2	2Byte	1	R	Bit pattern	Bit x=1 Contact x=open
35	Switching state EMD 5	S	2	2Byte	1	R	Bit pattern	Bit x=1 Contact x=open
36	Switching state EMD 6	S	2	2Byte	1	R	Bit pattern	Bit x=1 Contact x=open
37	Switching state EMD 7	S	2	2Byte	1	R	Bit pattern	Bit x=1 Contact x=open
38	Switching state EMD 8	S	2	2Byte	1	R	Bit pattern	Bit x=1 Contact x=open
39	Switching state EMD 9	S	2	2Byte	1	R	Bit pattern	Bit x=1 Contact x=open
40	Switching state EMD10	S	2	2Byte	1	R	Bit pattern	Bit x=1 Contact x=open
41	Target max.demand P1	V	4	longint	1	R/W	0..999999999	10 = 1.0kW
43	Target max.demand P2	V	4	longint	1	R/W	0..999999999	10 = 1.0kW
45	Target max.demand P3	V	4	longint	1	R/W	0..999999999	10 = 1.0kW
47	Target max.demand P4	V	4	longint	1	R/W	0..999999999	10 = 1.0kW
49	Max. peak power P1	V	4	longint	1	R/W	0..999999999	10 = 1.0kW
51	Max. peak power P2	V	4	longint	1	R/W	0..999999999	10 = 1.0kW
53	Max. peak power P3	V	4	longint	1	R/W	0..999999999	10 = 1.0kW
55	Max. peak power P4	V	4	longint	1	R/W	0..999999999	10 = 1.0kW

DW	Designation	M	Byte	Type	Factor	R/W	Reading	Value
60	Number of used profils	V	2	Word	1	R/W	1..4	1 == one profil
61	Highest EMD-Address	V	2	Word	1	R/W	0..10	
62	Number of active energy inputs (pulse-inputs)	V	2	Word	1	R/W	0; 255	0 = one input 255 = two inputs
63	Kind of profil switching	V	2	Word	1	R/W	0..2	see 5)
64	Periode pulse edge	V	2	Word	1	R/W	0;255	0=closing 255=opening
65	maximal time between two time pulses	V	2	Word	1	R/W	0 .. 9999	in seconds
66	Grouping allowed	V	2	Word	1	R/W	0;255	0 = No 255 = Yes
67	dead time in use	V	2	Word	1	R/W		
68	Allowed inverse outputs	V	2	Word	1	R/W	0; 255	0 = Yes 255 = No
69	Change profil	V	2	Word	1	R/W	0,$10,$11, $12,$13	0=external switching $10-$13=profil1-4
70	Period time	V	2	Word	1	R/W	10 .. 60	in minutes
71	Pulse rate Pw E1	V	4	longint	1	R/W	0 .. 99999	Pulses per kWh
73	Current transformer E1	V	4	longint	1	R/W	0 .. 9999	Factor
75	Voltage transformer E1	V	4	longint	1	R/W	0 .. 9999	Factor
77	Averaging P active E1	V	2	Word	1	R/W	0 .. 9999	Pulses per value
78	Pulse rate Pw E2	V	4	longint	1	R/W	0 .. 99999	Pulses per kWh
80	Current transformer E2	V	4	longint	1	R/W	0 .. 9999	Factor
82	Voltage transformer E2	V	4	longint	1	R/W	0 .. 9999	Factor
84	Averaging P active E2	V	2	Word	1	R/W	0 .. 9999	Pulses per value
85	Pulse rate Pb E3	V	4	longint	1	R/W	0 .. 99999	Pulses per kWh
87	Current transformer E3	V	4	longint	1	R/W	0 .. 9999	Factor
89	Voltage transformer E3	V	4	longint	1	R/W	0 .. 9999	Factor
91	Averaging P reactive E3	V	2	Word	1	R/W	0 .. 9999	Pulses per value
92	Emergency mode activated XX%	V	2	Word	1	R/W	10 .. 80	in %
93	Control delay	V	2	Word	1	R/W	2 .. 60	in seconds
94	Control application point	V	2	Word	1	R/W	10 .. 75	in %
95	Power factor controll	V	2	Word	1	R/W	1 .. 100	90 = ind 0.90
96	daylight saving time changeover	V	2	Word	1	R/W	0; 255;	255=activ
97	Dimension	V	2	Word	1	R/W	0;$FFFF	0 = kW $FFFF = MW
100	Energy counter E1 for Profil 1 and 3	S	6	6Byte	0.1	R		10=1.0kWh
103	Energy counter E1 for Profil 2 and 4	S	6	6Byte	0.1	R		10=1.0kWh
106	Energy counter E2 for Profil 1 and 3	S	6	6Byte	0.1	R		10=1.0kWh
109	Energy counter E2 for Profil 2 and 4	S	6	6Byte	0.1	R		10=1.0kWh
112	Energy counter E3 for Profil 1 and 3	S	6	6Byte	0.1	R		10=1.0kWh
115	Energy counter E3 for Profil 2 and 4	S	6	6Byte	0.1	R		10=1.0kWh

DW	Designation	M	Byte	Type	Factor	R/W	Reading	Value
118	Reset all counter	A	2	word	1	W		$FFFF = Reset
119	Period synchronisation	A	2	word	1	W		$FFFF = Start a new period
120	C1P_ Channel name	A	28	String		R/W	1Word = 2Char	
139	C1P_ Load aktiv?	V	2	word	1	R/W		see 1)
140	C1P_ Output inverse?	V	2	word	1	R/W	0 oder 255	0 = No inverting 255 = Output inverse
141	C1P1 Priority	V	2	word	1	R/W	0..99	see 2)
142	C1P1 Group	V	2	word	1	R/W	0..99	see 3)
143	C1P1 min. turn-off time	V	2	word	1	R/W	0 .. 59999	in seconds
144	C1P1 max. turn-off time	V	2	word	1	R/W	0 .. 59999	in seconds
145	C1P1 min. turn-on time	V	2	word	1	R/W	0 .. 59999	in seconds
146	C1P1 dead time	A	2	word	1	R/W		in seconds
147	C1P1 Connected load	V	4	longint	1	R/W	0 .. 99999	10=1.0kW
149	C1P2 Priority	V	2	word	1	R/W	0..99	see 2)
150	C1P2 Group	V	2	word	1	R/W	0..99	see 3)
151	C1P2 min. turn-off time	V	2	word	1	R/W	0 .. 59999	in seconds
152	C1P2 max. turn-off time	V	2	word	1	R/W	0 .. 59999	in seconds
153	C1P2 min. turn-on time	V	2	word	1	R/W	0 .. 59999	in seconds
154	C1P2 dead time	A	2	word	1	R/W		in seconds
155	C1P2 Connected load	V	4	longint	1	R/W	0 .. 99999	10=1.0kW
157	C1P3 Priority	V	2	word	1	R/W	0..99	see 2)
158	C1P3 Group	V	2	word	1	R/W	0..99	see 3)
159	C1P3 min. turn-off time	V	2	word	1	R/W	0 .. 59999	in seconds
160	C1P3 max. turn-off time	V	2	word	1	R/W	0 .. 59999	in seconds
161	C1P3 min. turn-on time	V	2	word	1	R/W	0 .. 59999	in seconds
162	C1P3 dead time	A	2	word	1	R/W		in seconds
163	C1P3 Connected load	V	4	longint	1	R/W	0 .. 99999	10=1.0kW
165	C1P4 Priority	V	2	word	1	R/W	0..99	see 2)
166	C1P4 Group	V	2	word	1	R/W	0..99	see 3)
167	C1P4 min. turn-off time	V	2	word	1	R/W	0 .. 59999	in seconds
168	C1P4 max. turn-off time	V	2	word	1	R/W	0 .. 59999	in seconds
169	C1P4 min. turn-on time	V	2	word	1	R/W	0 .. 59999	in seconds
170	C1P4 dead time	A	2	word	1	R/W		in seconds
171	C1P4 Connected load	V	4	longint	1	R/W	0 .. 99999	10=1.0kW
175	Name of the EML	A	28	String		R/W	1Word = 2Char	

1) Bit 0: Emergency mode active
Bit 1: Target power exceeded
Bit 2: Peak-load power exceeded
Bit 3: cos phi limit exceeded
Bit 8: Clock pulse over 30 sec too late, cleared again with clock pulse
Bit 9: Watchdog defective
Bit 10: Active pulse missing (DW65)
Bit 11: P-Net defective
Bit 12: Clock defective
Bit 13: LC display defective

2) Bit 1 - Bit 10 : No access at EMD 1 - 10

3) Bit 0: EML
Bit 1 - Bit 10: EMD 1 - 10

4) Bit 0 - Bit 3: Relay 1 - 4 active
Bit 4: Emergency load-shedding relay energized
Bit 5: Operating fault relay energized
Bit 6: Relay 5 active

5) 0: Profile switch is immediately active, the cumulative power is <u>not</u> reset
1: Profile switch is immediately active, controlled synchronization is initiated
2: New profile begins with next measurement period

6) 0 = always off
1 = controlled
2 = always on

7) 0 = always ON
1-98 = controlled
99 = always OFF

8) 0 = Consumer not assigned to any group
1-99 = Consumer group

Memory assignments for the EML 1101

Type number: **13** EML 1101 setting parameters for switching channels on instrument

The data block described below contains the setting parameters for the channels K2, K3, K4, and K5 of the EML 1101. Those variables with grey shading are not yet in use. The profile is given with P1, P2, P3 and P4.

(Mode: S= rapid polling; V= slow polling; A= read on command)

DW	Designation	M	Byte	Type	Factor	R/W	Reading	Value
0	Source		2	2Byte				
1	Flags		2	2Byte				
2								
5	C2P_ Channel name	A	28	String		R/W	1Word = 2Char	
24	C2P_ Load aktiv?	V	2	word	1	R/W		see 1)
25	C2P_ Output inverse?	V	2	word	1	R/W	0 oder 255	0 = No inverting 255 = Output inverse
26	C2P1 Priority	V	2	word	1	R/W	0..99	see 2)
27	C2P1 Group	V	2	word	1	R/W	0..99	see 3)
28	C2P1 min. turn-off time	V	2	word	1	R/W	0 .. 59999	in seconds
29	C2P1 max. turn-off time	V	2	word	1	R/W	0 .. 59999	in seconds
30	C2P1 min. turn-on time	V	2	word	1	R/W	0 .. 59999	in seconds
31	C2P1 dead time	A	2	word	1	R/W		in seconds
32	C2P1 Connected load	V	4	longint	1	R/W	0 .. 99999	10=1.0kW
34	C2P2 Priority	V	2	word	1	R/W	0..99	see 2)
35	C2P2 Group	V	2	word	1	R/W	0..99	see 3)
36	C2P2 min. turn-off time	V	2	word	1	R/W	0 .. 59999	in seconds
37	C2P2 max. turn-off time	V	2	word	1	R/W	0 .. 59999	in seconds
38	C2P2 min. turn-on time	V	2	word	1	R/W	0 .. 59999	in seconds
39	C2P2 dead time	A	2	word	1	R/W		in seconds
40	C2P2 Connected load	V	4	longint	1	R/W	0 .. 99999	10=1.0kW
42	C2P3 Priority	V	2	word	1	R/W	0..99	see 2)
43	C2P3 Group	V	2	word	1	R/W	0..99	see 3)
44	C2P3 min. turn-off time	V	2	word	1	R/W	0 .. 59999	in seconds
45	C2P3 max. turn-off time	V	2	word	1	R/W	0 .. 59999	in seconds
46	C2P3 min. turn-on time	V	2	word	1	R/W	0 .. 59999	in seconds
47	C2P3 dead time	A	2	word	1	R/W		in seconds
48	C2P3 Connected load	V	4	longint	1	R/W	0 .. 99999	10=1.0kW
50	C2P4 Priority	V	2	word	1	R/W	0..99	see 2)
51	C2P4 Group	V	2	word	1	R/W	0..99	see 3)
52	C2P4 min. turn-off time	V	2	word	1	R/W	0 .. 59999	in seconds
53	C2P4 max. turn-off time	V	2	word	1	R/W	0 .. 59999	in seconds
54	C2P4 min. turn-on time	V	2	word	1	R/W	0 .. 59999	in seconds
55	C2P4 dead time	A	2	word	1	R/W		in seconds
56	C2P4 Connected load	V	4	longint	1	R/W	0 .. 99999	10=1.0kW

1) 0 = always off
1 = controlled
2 = always on

2) 0 = always ON
1-98 = controlled
99= always OFF

3) 0 = Consumer not assigned to any group
1-99 = Consumer group

DW	Designation	M	Byte	Type	Factor	R/W	Reading	Value
60	C3P_ Channel name	A	28	String		R/W	1Word = 2Char	
79	C3P_ Load aktiv?	V	2	word	1	R/W		see 1)
80	C3P_ Output inverse?	V	2	word	1	R/W	0 oder 255	0 = No inverting 255 = Output inverse
81	C3P1 Priority	V	2	word	1	R/W	0..99	see 2)
82	C3P1 Group	V	2	word	1	R/W	0..99	see 3)
83	C3P1 min. turn-off time	V	2	word	1	R/W	0 .. 59999	in seconds
84	C3P1 max. turn-off time	V	2	word	1	R/W	0 .. 59999	in seconds
85	C3P1 min. turn-on time	V	2	word	1	R/W	0 .. 59999	in seconds
86	C3P1 dead time	A	2	word	1	R/W		in seconds
87	C3P1 Connected load	V	4	longint	1	R/W	0 .. 99999	10=1.0kW
89	C3P2 Priority	V	2	word	1	R/W	0..99	see 2)
90	C3P2 Group	V	2	word	1	R/W	0..99	see 3)
91	C3P2 min. turn-off time	V	2	word	1	R/W	0 .. 59999	in seconds
92	C3P2 max. turn-off time	V	2	word	1	R/W	0 .. 59999	in seconds
93	C3P2 min. turn-on time	V	2	word	1	R/W	0 .. 59999	in seconds
94	C3P2 dead time	A	2	word	1	R/W		in seconds
95	C3P2 Connected load	V	4	longint	1	R/W	0 .. 99999	10=1.0kW
97	C3P3 Priority	V	2	word	1	R/W	0..99	see 2)
98	C3P3 Group	V	2	word	1	R/W	0..99	see 3)
99	C3P3 min. turn-off time	V	2	word	1	R/W	0 .. 59999	in seconds
100	C3P3 max. turn-off time	V	2	word	1	R/W	0 .. 59999	in seconds
101	C3P3 min. turn-on time	V	2	word	1	R/W	0 .. 59999	in seconds
102	C3P3 dead time	A	2	word	1	R/W		in seconds
103	C3P3 Connected load	V	4	longint	1	R/W	0 .. 99999	10=1.0kW
105	C3P4 Priority	V	2	word	1	R/W	0..99	see 2)
106	C3P4 Group	V	2	word	1	R/W	0..99	see 3)
107	C3P4 min. turn-off time	V	2	word	1	R/W	0 .. 59999	in seconds
108	C3P4 max. turn-off time	V	2	word	1	R/W	0 .. 59999	in seconds
109	C3P4 min. turn-on time	V	2	word	1	R/W	0 .. 59999	in seconds
110	C3P4 dead time	A	2	word	1	R/W		in seconds
111	C3P4 Connected load	V	4	longint	1	R/W	0 .. 99999	10=1.0kW
115	C4P_ Channel name	A	28	String		R/W	1Word = 2Char	
134	C4P_ Load aktiv?	V	2	word	1	R/W		see 1)
135	C4P_ Output inverse?	V	2	word	1	R/W	0 oder 255	0 = No inverting 255 = Output inverse
136	C4P1 Priority	V	2	word	1	R/W	0..99	see 2)
137	C4P1 Group	V	2	word	1	R/W	0..99	see 3)
138	C4P1 min. turn-off time	V	2	word	1	R/W	0 .. 59999	in seconds
139	C4P1 max. turn-off time	V	2	word	1	R/W	0 .. 59999	in seconds
140	C4P1 min. turn-on time	V	2	word	1	R/W	0 .. 59999	in seconds
141	C4P1 dead time	A	2	word	1	R/W		in seconds
142	C4P1 Connected load	V	4	longint	1	R/W	0 .. 99999	10=1.0kW
144	C4P2 Priority	V	2	word	1	R/W	0..99	see 2)
145	C4P2 Group	V	2	word	1	R/W	0..99	see 3)
146	C4P2 min. turn-off time	V	2	word	1	R/W	0 .. 59999	in seconds
147	C4P2 max. turn-off time	V	2	word	1	R/W	0 .. 59999	in seconds
148	C4P2 min. turn-on time	V	2	word	1	R/W	0 .. 59999	in seconds
149	C4P2 dead time	A	2	word	1	R/W		in seconds
150	C4P2 Connected load	V	4	longint	1	R/W	0 .. 99999	10=1.0kW

DW	Designation	M	Byte	Type	Factor	R/W	Reading	Value
152	C4P3 Priority	V	2	word	1	R/W	0..99	see 2)
153	C4P3 Group	V	2	word	1	R/W	0..99	see 3)
154	C4P3 min. turn-off time	V	2	word	1	R/W	0 .. 59999	in seconds
155	C4P3 max. turn-off time	V	2	word	1	R/W	0 .. 59999	in seconds
156	C4P3 min. turn-on time	V	2	word	1	R/W	0 .. 59999	in seconds
157	C4P3 dead time	A	2	word	1	R/W		in seconds
158	C4P3 Connected load	V	4	longint	1	R/W	0 .. 99999	10=1.0kW
160	C4P4 Priority	V	2	word	1	R/W	0..99	see 2)
161	C4P4 Group	V	2	word	1	R/W	0..99	see 3)
162	C4P4 min. turn-off time	V	2	word	1	R/W	0 .. 59999	in seconds
163	C4P4 max. turn-off time	V	2	word	1	R/W	0 .. 59999	in seconds
164	C4P4 min. turn-on time	V	2	word	1	R/W	0 .. 59999	in seconds
165	C4P4 dead time	A	2	word	1	R/W		in seconds
166	C4P4 Connected load	V	4	longint	1	R/W	0 .. 99999	10=1.0kW
170	C5P_ Channel name	A	28	String		R/W	1Word = 2Char	
189	C5P_ Load aktiv?	V	2	word	1	R/W		see 1)
190	C5P_ Output inverse?	V	2	word	1	R/W	0 oder 255	0 = No inverting 255 = Output inverse
191	C5P1 Priority	V	2	word	1	R/W	0..99	see 2)
192	C5P1 Group	V	2	word	1	R/W	0..99	see 3)
193	C5P1 min. turn-off time	V	2	word	1	R/W	0 .. 59999	in seconds
194	C5P1 max. turn-off time	V	2	word	1	R/W	0 .. 59999	in seconds
195	C5P1 min. turn-on time	V	2	word	1	R/W	0 .. 59999	in seconds
196	C5P1 dead time	A	2	word	1	R/W		in seconds
197	C5P1 Connected load	V	4	longint	1	R/W	0 .. 99999	10=1.0kW
199	C5P2 Priority	V	2	word	1	R/W	0..99	see 2)
200	C5P2 Group	V	2	word	1	R/W	0..99	see 3)
201	C5P2 min. turn-off time	V	2	word	1	R/W	0 .. 59999	in seconds
202	C5P2 max. turn-off time	V	2	word	1	R/W	0 .. 59999	in seconds
203	C5P2 min. turn-on time	V	2	word	1	R/W	0 .. 59999	in seconds
204	C5P2 dead time	A	2	word	1	R/W		in seconds
205	C5P2 Connected load	V	4	longint	1	R/W	0 .. 99999	10=1.0kW
207	C5P3 Priority	V	2	word	1	R/W	0..99	see 2)
208	C5P3 Group	V	2	word	1	R/W	0..99	see 3)
209	C5P3 min. turn-off time	V	2	word	1	R/W	0 .. 59999	in seconds
210	C5P3 max. turn-off time	V	2	word	1	R/W	0 .. 59999	in seconds
211	C5P3 min. turn-on time	V	2	word	1	R/W	0 .. 59999	in seconds
212	C5P3 dead time	A	2	word	1	R/W		in seconds
213	C5P3 Connected load	V	4	longint	1	R/W	0 .. 99999	10=1.0kW
215	C5P4 Priority	V	2	word	1	R/W	0..99	see 2)
216	C5P4 Group	V	2	word	1	R/W	0..99	see 3)
217	C5P4 min. turn-off time	V	2	word	1	R/W	0 .. 59999	in seconds
218	C5P4 max. turn-off time	V	2	word	1	R/W	0 .. 59999	in seconds
219	C5P4 min. turn-on time	V	2	word	1	R/W	0 .. 59999	in seconds
220	C5P4 dead time	A	2	word	1	R/W		in seconds
221	C5P4 Connected load	V	4	longint	1	R/W	0 .. 99999	10=1.0kW
230	Name of the EML	A	28	String		R/W	1Word = 2Char	

Memory assignments for the EML 1101

Type numbers: **14, 16, 18, 20, 22, 24, 26, 28, 30, 32** EML 1101 setting parameters for extension channels

The data block described below contains the setting parameters for the first four channels (K1, K2, K3, K4) of an EMD 1101. Those variables with grey shading are not yet in use. The profile is given with P1, P2, P3 and P4. The type number indicates which EMD is specified in the data block.

Type-number:	14	16	18	20	22	24	26	28	30	32
EMD number:	1	2	3	4	5	6	7	8	9	0

(Mode: S= rapid polling; V= slow polling; A= read on command)

DW	Designation	M	Byte	Type	Factor	R/W	Reading	Value
0	Source		2	2Byte				
1	Flags		2	2Byte				
2								
5	C1P_ Channel name	A	28	String		R/W	1Word = 2Char	
24	C1P_ Load aktiv?	V	2	word	1	R/W		see 1)
25	C1P_ Output inverse?	V	2	word	1	R/W	0 oder 255	0 = No inverting 255 = Output inverse
26	C1P1 Priority	V	2	word	1	R/W	0..99	see 2)
27	C1P1 Group	V	2	word	1	R/W	0..99	see 3)
28	C1P1 min. turn-off time	V	2	word	1	R/W	0 .. 59999	in seconds
29	C1P1 max. turn-off time	V	2	word	1	R/W	0 .. 59999	in seconds
30	C1P1 min. turn-on time	V	2	word	1	R/W	0 .. 59999	in seconds
31	C1P1 dead time	A	2	word	1	R/W		in seconds
32	C1P1 Connected load	V	4	longint	1	R/W	0 .. 99999	10=1.0kW
34	C1P2 Priority	V	2	word	1	R/W	0..99	see 2)
35	C1P2 Group	V	2	word	1	R/W	0..99	see 3)
36	C1P2 min. turn-off time	V	2	word	1	R/W	0 .. 59999	in seconds
37	C1P2 max. turn-off time	V	2	word	1	R/W	0 .. 59999	in seconds
38	C1P2 min. turn-on time	V	2	word	1	R/W	0 .. 59999	in seconds
39	C1P2 dead time	A	2	word	1	R/W		in seconds
40	C1P2 Connected load	V	4	longint	1	R/W	0 .. 99999	10=1.0kW
42	C1P3 Priority	V	2	word	1	R/W	0..99	see 2)
43	C1P3 Group	V	2	word	1	R/W	0..99	see 3)
44	C1P3 min. turn-off time	V	2	word	1	R/W	0 .. 59999	in seconds
45	C1P3 max. turn-off time	V	2	word	1	R/W	0 .. 59999	in seconds
46	C1P3 min. turn-on time	V	2	word	1	R/W	0 .. 59999	in seconds
47	C1P3 dead time	A	2	word	1	R/W		in seconds
48	C1P3 Connected load	V	4	longint	1	R/W	0 .. 99999	10=1.0kW
50	C1P4 Priority	V	2	word	1	R/W	0..99	see 2)
51	C1P4 Group	V	2	word	1	R/W	0..99	see 3)
52	C1P4 min. turn-off time	V	2	word	1	R/W	0 .. 59999	in seconds
53	C1P4 max. turn-off time	V	2	word	1	R/W	0 .. 59999	in seconds
54	C1P4 min. turn-on time	V	2	word	1	R/W	0 .. 59999	in seconds
55	C1P4 dead time	A	2	word	1	R/W		in seconds
56	C1P4 Connected load	V	4	longint	1	R/W	0 .. 99999	10=1.0kW

1) 0 = always off
1 = controlled
2 = always on

2) 0 = always ON
1-98 = controlled
99= always OFF

3) 0 = Consumer not assigned to any group
1-99 = Consumer group

DW	Designation	M	Byte	Type	Factor	R/W	Reading	Value
60	C2P_ Channel name	A	28	String		R/W	1Word = 2Char	
79	C2P_ Load aktiv?	V	2	word	1	R/W		see 1)
80	C2P_ Output inverse?	V	2	word	1	R/W	0 oder 255	0 = No inverting 255 = Output inverse
81	C2P1 Priority	V	2	word	1	R/W	0..99	see 2)
82	C2P1 Group	V	2	word	1	R/W	0..99	see 3)
83	C2P1 min. turn-off time	V	2	word	1	R/W	0 .. 59999	in seconds
84	C2P1 max. turn-off time	V	2	word	1	R/W	0 .. 59999	in seconds
85	C2P1 min. turn-on time	V	2	word	1	R/W	0 .. 59999	in seconds
86	C2P1 dead time	A	2	word	1	R/W		in seconds
87	C2P1 Connected load	V	4	longint	1	R/W	0 .. 99999	10=1.0kW
89	C2P2 Priority	V	2	word	1	R/W	0..99	see 2)
90	C2P2 Group	V	2	word	1	R/W	0..99	see 3)
91	C2P2 min. turn-off time	V	2	word	1	R/W	0 .. 59999	in seconds
92	C2P2 max. turn-off time	V	2	word	1	R/W	0 .. 59999	in seconds
93	C2P2 min. turn-on time	V	2	word	1	R/W	0 .. 59999	in seconds
94	C2P2 dead time	A	2	word	1	R/W		in seconds
95	C2P2 Connected load	V	4	longint	1	R/W	0 .. 99999	10=1.0kW
97	C2P3 Priority	V	2	word	1	R/W	0..99	see 2)
98	C2P3 Group	V	2	word	1	R/W	0..99	see 3)
99	C2P3 min. turn-off time	V	2	word	1	R/W	0 .. 59999	in seconds
100	C2P3 max. turn-off time	V	2	word	1	R/W	0 .. 59999	in seconds
101	C2P3 min. turn-on time	V	2	word	1	R/W	0 .. 59999	in seconds
102	C2P3 dead time	A	2	word	1	R/W		in seconds
103	C2P3 Connected load	V	4	longint	1	R/W	0 .. 99999	10=1.0kW
105	C2P4 Priority	V	2	word	1	R/W	0..99	see 2)
106	C2P4 Group	V	2	word	1	R/W	0..99	see 3)
107	C2P4 min. turn-off time	V	2	word	1	R/W	0 .. 59999	in seconds
108	C2P4 max. turn-off time	V	2	word	1	R/W	0 .. 59999	in seconds
109	C2P4 min. turn-on time	V	2	word	1	R/W	0 .. 59999	in seconds
110	C2P4 dead time	A	2	word	1	R/W		in seconds
111	C2P4 Connected load	V	4	longint	1	R/W	0 .. 99999	10=1.0kW
115	C3P_ Channel name	A	28	String		R/W	1Word = 2Char	
134	C3P_ Load aktiv?	V	2	word	1	R/W		see 1)
135	C3P_ Output inverse?	V	2	word	1	R/W	0 oder 255	0 = No inverting 255 = Output inverse
136	C3P1 Priority	V	2	word	1	R/W	0..99	see 2)
137	C3P1 Group	V	2	word	1	R/W	0..99	see 3)
138	C3P1 min. turn-off time	V	2	word	1	R/W	0 .. 59999	in seconds
139	C3P1 max. turn-off time	V	2	word	1	R/W	0 .. 59999	in seconds
140	C3P1 min. turn-on time	V	2	word	1	R/W	0 .. 59999	in seconds
141	C3P1 dead time	A	2	word	1	R/W		in seconds
142	C3P1 Connected load	V	4	longint	1	R/W	0 .. 99999	10=1.0kW
144	C3P2 Priority	V	2	word	1	R/W	0..99	see 2)
145	C3P2 Group	V	2	word	1	R/W	0..99	see 3)
146	C3P2 min. turn-off time	V	2	word	1	R/W	0 .. 59999	in seconds
147	C3P2 max. turn-off time	V	2	word	1	R/W	0 .. 59999	in seconds
148	C3P2 min. turn-on time	V	2	word	1	R/W	0 .. 59999	in seconds
149	C3P2 dead time	A	2	word	1	R/W		in seconds
150	C3P2 Connected load	V	4	longint	1	R/W	0 .. 99999	10=1.0kW

DW	Designation	M	Byte	Type	Factor	R/W	Reading	Value
152	C3P3 Priority	V	2	word	1	R/W	0..99	see 2)
153	C3P3 Group	V	2	word	1	R/W	0..99	see 3)
154	C3P3 min. turn-off time	V	2	word	1	R/W	0 .. 59999	in seconds
155	C3P3 max. turn-off time	V	2	word	1	R/W	0 .. 59999	in seconds
156	C3P3 min. turn-on time	V	2	word	1	R/W	0 .. 59999	in seconds
157	C3P3 dead time	A	2	word	1	R/W		in seconds
158	C3P3 Connected load	V	4	longint	1	R/W	0 .. 99999	10=1.0kW
160	C3P4 Priority	V	2	word	1	R/W	0..99	see 2)
161	C3P4 Group	V	2	word	1	R/W	0..99	see 3)
162	C3P4 min. turn-off time	V	2	word	1	R/W	0 .. 59999	in seconds
163	C3P4 max. turn-off time	V	2	word	1	R/W	0 .. 59999	in seconds
164	C3P4 min. turn-on time	V	2	word	1	R/W	0 .. 59999	in seconds
165	C3P4 dead time	A	2	word	1	R/W		in seconds
166	C3P4 Connected load	V	4	longint	1	R/W	0 .. 99999	10=1.0kW
170	C4P_ Channel name	A	28	String		R/W	1Word = 2Char	
189	C4P_ Load aktiv?	V	2	word	1	R/W		see 1)
190	C4P_ Output inverse?	V	2	word	1	R/W	0 oder 255	0 = No inverting 255 = Output inverse
191	C4P1 Priority	V	2	word	1	R/W	0..99	see 2)
192	C4P1 Group	V	2	word	1	R/W	0..99	see 3)
193	C4P1 min. turn-off time	V	2	word	1	R/W	0 .. 59999	in seconds
194	C4P1 max. turn-off time	V	2	word	1	R/W	0 .. 59999	in seconds
195	C4P1 min. turn-on time	V	2	word	1	R/W	0 .. 59999	in seconds
196	C4P1 dead time	A	2	word	1	R/W		in seconds
197	C4P1 Connected load	V	4	longint	1	R/W	0 .. 99999	10=1.0kW
199	C4P2 Priority	V	2	word	1	R/W	0..99	see 2)
200	C4P2 Group	V	2	word	1	R/W	0..99	see 3)
201	C4P2 min. turn-off time	V	2	word	1	R/W	0 .. 59999	in seconds
202	C4P2 max. turn-off time	V	2	word	1	R/W	0 .. 59999	in seconds
203	C4P2 min. turn-on time	V	2	word	1	R/W	0 .. 59999	in seconds
204	C4P2 dead time	A	2	word	1	R/W		in seconds
205	C4P2 Connected load	V	4	longint	1	R/W	0 .. 99999	10=1.0kW
207	C4P3 Priority	V	2	word	1	R/W	0..99	see 2)
208	C4P3 Group	V	2	word	1	R/W	0..99	see 3)
209	C4P3 min. turn-off time	V	2	word	1	R/W	0 .. 59999	in seconds
210	C4P3 max. turn-off time	V	2	word	1	R/W	0 .. 59999	in seconds
211	C4P3 min. turn-on time	V	2	word	1	R/W	0 .. 59999	in seconds
212	C4P3 dead time	A	2	word	1	R/W		in seconds
213	C4P3 Connected load	V	4	longint	1	R/W	0 .. 99999	10=1.0kW
215	C4P4 Priority	V	2	word	1	R/W	0..99	see 2)
216	C4P4 Group	V	2	word	1	R/W	0..99	see 3)
217	C4P4 min. turn-off time	V	2	word	1	R/W	0 .. 59999	in seconds
218	C4P4 max. turn-off time	V	2	word	1	R/W	0 .. 59999	in seconds
219	C4P4 min. turn-on time	V	2	word	1	R/W	0 .. 59999	in seconds
220	C4P4 dead time	A	2	word	1	R/W		in seconds
221	C4P4 Connected load	V	4	longint	1	R/W	0 .. 99999	10=1.0kW
230	Name of the EMD	A	28	String		R/W	1Word = 2Char	

Memory assignments for the EML 1101

Type numbers: **15, 17, 19, 21, 23, 25, 27, 29, 31, 33** EML 1101 setting parameters for extension channels

The data block described below contains the setting parameters for the first four channels (K1, K2, K3, K4) of an EMD 1101. Those variables with grey shading are not yet in use. The profile is given with P1, P2, P3 and P4. The type number indicates which EMD is specified in the data block.

Type-number:	15	17	19	21	23	25	27	29	31	33
EMD number:	1	2	3	4	5	6	7	8	9	0

(Mode: S= rapid polling; V= slow polling; A= read on command)

DW	Designation	M	Byte	Type	Factor	R/W	Reading	Value
0	Source		2	2Byte				
1	Flags		2	2Byte				
2								
5	C5P_ Channel name	A	28	String		R/W	1Word = 2Char	
24	C5P_ Load aktiv?	V	2	word	1	R/W		see 1)
25	C5P_ Output inverse?	V	2	word	1	R/W	0 oder 255	0 = No inverting 255 = Output inverse
26	C5P1 Priority	V	2	word	1	R/W	0..99	see 2)
27	C5P1 Group	V	2	word	1	R/W	0..99	see 3)
28	C5P1 min. turn-off time	V	2	word	1	R/W	0 .. 59999	in seconds
29	C5P1 max. turn-off time	V	2	word	1	R/W	0 .. 59999	in seconds
30	C5P1 min. turn-on time	V	2	word	1	R/W	0 .. 59999	in seconds
31	C5P1 dead time	A	2	word	1	R/W		in seconds
32	C5P1 Connected load	V	4	longint	1	R/W	0 .. 99999	10=1.0kW
34	C5P2 Priority	V	2	word	1	R/W	0..99	see 2)
35	C5P2 Group	V	2	word	1	R/W	0..99	see 3)
36	C5P2 min. turn-off time	V	2	word	1	R/W	0 .. 59999	in seconds
37	C5P2 max. turn-off time	V	2	word	1	R/W	0 .. 59999	in seconds
38	C5P2 min. turn-on time	V	2	word	1	R/W	0 .. 59999	in seconds
39	C5P2 dead time	A	2	word	1	R/W		in seconds
40	C5P2 Connected load	V	4	longint	1	R/W	0 .. 99999	10=1.0kW
42	C5P3 Priority	V	2	word	1	R/W	0..99	see 2)
43	C5P3 Group	V	2	word	1	R/W	0..99	see 3)
44	C5P3 min. turn-off time	V	2	word	1	R/W	0 .. 59999	in seconds
45	C5P3 max. turn-off time	V	2	word	1	R/W	0 .. 59999	in seconds
46	C5P3 min. turn-on time	V	2	word	1	R/W	0 .. 59999	in seconds
47	C5P3 dead time	A	2	word	1	R/W		in seconds
48	C5P3 Connected load	V	4	longint	1	R/W	0 .. 99999	10=1.0kW
50	C5P4 Priority	V	2	word	1	R/W	0..99	see 2)
51	C5P4 Group	V	2	word	1	R/W	0..99	see 3)
52	C5P4 min. turn-off time	V	2	word	1	R/W	0 .. 59999	in seconds
53	C5P4 max. turn-off time	V	2	word	1	R/W	0 .. 59999	in seconds
54	C5P4 min. turn-on time	V	2	word	1	R/W	0 .. 59999	in seconds
55	C5P4 dead time	A	2	word	1	R/W		in seconds
56	C5P4 Connected load	V	4	longint	1	R/W	0 .. 99999	10=1.0kW

1) 0 = always off
1 = controlled
2 = always on

2) 0 = always ON
1-98 = controlled
99= always OFF

3) 0 = Consumer not assigned to any group
1-99 = Consumer group

DW	Designation	M	Byte	Type	Factor	R/W	Reading	Value
60	C6P_ Channel name	A	28	String		R/W	1Word = 2Char	
79	C6P_ Load aktiv?	V	2	word	1	R/W		see 1)
80	C6P_ Output inverse?	V	2	word	1	R/W	0 oder 255	0 = No inverting 255 = Output inverse
81	C6P1 Priority	V	2	word	1	R/W	0..99	see 2)
82	C6P1 Group	V	2	word	1	R/W	0..99	see 3)
83	C6P1 min. turn-off time	V	2	word	1	R/W	0 .. 59999	in seconds
84	C6P1 max. turn-off time	V	2	word	1	R/W	0 .. 59999	in seconds
85	C6P1 min. turn-on time	V	2	word	1	R/W	0 .. 59999	in seconds
86	C6P1 dead time	A	2	word	1	R/W		in seconds
87	C6P1 Connected load	V	4	longint	1	R/W	0 .. 99999	10=1.0kW
89	C6P2 Priority	V	2	word	1	R/W	0..99	see 2)
90	C6P2 Group	V	2	word	1	R/W	0..99	see 3)
91	C6P2 min. turn-off time	V	2	word	1	R/W	0 .. 59999	in seconds
92	C6P2 max. turn-off time	V	2	word	1	R/W	0 .. 59999	in seconds
93	C6P2 min. turn-on time	V	2	word	1	R/W	0 .. 59999	in seconds
94	C6P2 dead time	A	2	word	1	R/W		in seconds
95	C6P2 Connected load	V	4	longint	1	R/W	0 .. 99999	10=1.0kW
97	C6P3 Priority	V	2	word	1	R/W	0..99	see 2)
98	C6P3 Group	V	2	word	1	R/W	0..99	see 3)
99	C6P3 min. turn-off time	V	2	word	1	R/W	0 .. 59999	in seconds
100	C6P3 max. turn-off time	V	2	word	1	R/W	0 .. 59999	in seconds
101	C6P3 min. turn-on time	V	2	word	1	R/W	0 .. 59999	in seconds
102	C6P3 dead time	A	2	word	1	R/W		in seconds
103	C6P3 Connected load	V	4	longint	1	R/W	0 .. 99999	10=1.0kW
105	C6P4 Priority	V	2	word	1	R/W	0..99	see 2)
106	C6P4 Group	V	2	word	1	R/W	0..99	see 3)
107	C6P4 min. turn-off time	V	2	word	1	R/W	0 .. 59999	in seconds
108	C6P4 max. turn-off time	V	2	word	1	R/W	0 .. 59999	in seconds
109	C6P4 min. turn-on time	V	2	word	1	R/W	0 .. 59999	in seconds
110	C6P4 dead time	A	2	word	1	R/W		in seconds
111	C6P4 Connected load	V	4	longint	1	R/W	0 .. 99999	10=1.0kW
115	C7P_ Channel name	A	28	String		R/W	1Word = 2Char	
134	C7P_ Load aktiv?	V	2	word	1	R/W		see 1)
135	C7P_ Output inverse?	V	2	word	1	R/W	0 oder 255	0 = No inverting 255 = Output inverse
136	C7P1 Priority	V	2	word	1	R/W	0..99	see 2)
137	C7P1 Group	V	2	word	1	R/W	0..99	see 3)
138	C7P1 min. turn-off time	V	2	word	1	R/W	0 .. 59999	in seconds
139	C7P1 max. turn-off time	V	2	word	1	R/W	0 .. 59999	in seconds
140	C7P1 min. turn-on time	V	2	word	1	R/W	0 .. 59999	in seconds
141	C7P1 dead time	A	2	word	1	R/W		in seconds
142	C7P1 Connected load	V	4	longint	1	R/W	0 .. 99999	10=1.0kW
144	C7P2 Priority	V	2	word	1	R/W	0..99	see 2)
145	C7P2 Group	V	2	word	1	R/W	0..99	see 3)
146	C7P2 min. turn-off time	V	2	word	1	R/W	0 .. 59999	in seconds
147	C7P2 max. turn-off time	V	2	word	1	R/W	0 .. 59999	in seconds
148	C7P2 min. turn-on time	V	2	word	1	R/W	0 .. 59999	in seconds
149	C7P2 dead time	A	2	word	1	R/W		in seconds
150	C7P2 Connected load	V	4	longint	1	R/W	0 .. 99999	10=1.0kW

DW	Designation	M	Byte	Type	Factor	R/W	Reading	Value
152	C7P3 Priority	V	2	word	1	R/W	0..99	see 2)
153	C7P3 Group	V	2	word	1	R/W	0..99	see 3)
154	C7P3 min. turn-off time	V	2	word	1	R/W	0 .. 59999	in seconds
155	C7P3 max. turn-off time	V	2	word	1	R/W	0 .. 59999	in seconds
156	C7P3 min. turn-on time	V	2	word	1	R/W	0 .. 59999	in seconds
157	C7P3 dead time	A	2	word	1	R/W		in seconds
158	C7P3 Connected load	V	4	longint	1	R/W	0 .. 99999	10=1.0kW
160	C7P4 Priority	V	2	word	1	R/W	0..99	see 2)
161	C7P4 Group	V	2	word	1	R/W	0..99	see 3)
162	C7P4 min. turn-off time	V	2	word	1	R/W	0 .. 59999	in seconds
163	C7P4 max. turn-off time	V	2	word	1	R/W	0 .. 59999	in seconds
164	C7P4 min. turn-on time	V	2	word	1	R/W	0 .. 59999	in seconds
165	C7P4 dead time	A	2	word	1	R/W		in seconds
166	C7P4 Connected load	V	4	longint	1	R/W	0 .. 99999	10=1.0kW
170	C8P_ Channel name	A	28	String		R/W	1Word = 2Char	
189	C8P_ Load aktiv?	V	2	word	1	R/W		see 1)
190	C8P_ Output inverse?	V	2	word	1	R/W	0 oder 255	0 = No inverting 255 = Output inverse
191	C8P1 Priority	V	2	word	1	R/W	0..99	see 2)
192	C8P1 Group	V	2	word	1	R/W	0..99	see 3)
193	C8P1 min. turn-off time	V	2	word	1	R/W	0 .. 59999	in seconds
194	C8P1 max. turn-off time	V	2	word	1	R/W	0 .. 59999	in seconds
195	C8P1 min. turn-on time	V	2	word	1	R/W	0 .. 59999	in seconds
196	C8P1 dead time	A	2	word	1	R/W		in seconds
197	C8P1 Connected load	V	4	longint	1	R/W	0 .. 99999	10=1.0kW
199	C8P2 Priority	V	2	word	1	R/W	0..99	see 2)
200	C8P2 Group	V	2	word	1	R/W	0..99	see 3)
201	C8P2 min. turn-off time	V	2	word	1	R/W	0 .. 59999	in seconds
202	C8P2 max. turn-off time	V	2	word	1	R/W	0 .. 59999	in seconds
203	C8P2 min. turn-on time	V	2	word	1	R/W	0 .. 59999	in seconds
204	C8P2 dead time	A	2	word	1	R/W		in seconds
205	C8P2 Connected load	V	4	longint	1	R/W	0 .. 99999	10=1.0kW
207	C8P3 Priority	V	2	word	1	R/W	0..99	see 2)
208	C8P3 Group	V	2	word	1	R/W	0..99	see 3)
209	C8P3 min. turn-off time	V	2	word	1	R/W	0 .. 59999	in seconds
210	C8P3 max. turn-off time	V	2	word	1	R/W	0 .. 59999	in seconds
211	C8P3 min. turn-on time	V	2	word	1	R/W	0 .. 59999	in seconds
212	C8P3 dead time	A	2	word	1	R/W		in seconds
213	C8P3 Connected load	V	4	longint	1	R/W	0 .. 99999	10=1.0kW
215	C8P4 Priority	V	2	word	1	R/W	0..99	see 2)
216	C8P4 Group	V	2	word	1	R/W	0..99	see 3)
217	C8P4 min. turn-off time	V	2	word	1	R/W	0 .. 59999	in seconds
218	C8P4 max. turn-off time	V	2	word	1	R/W	0 .. 59999	in seconds
219	C8P4 min. turn-on time	V	2	word	1	R/W	0 .. 59999	in seconds
220	C8P4 dead time	A	2	word	1	R/W		in seconds
221	C8P4 Connected load	V	4	longint	1	R/W	0 .. 99999	10=1.0kW
230	Name of the EMD	A	28	String		R/W	1Word = 2Char	

Memory assignments for the EMF 1102

Type number : **34** EMF 1102 data area for attended time (operating hours), power and alarms

(Mode: S= rapid polling; V= slow polling; A= read on command)

DW	Designation	M	Byte	Type	Factor	R/W	Reading	Value
0	Source		2	2Byte				
1	Flags		2	2Byte				
2	Switching states	S	2	Int	1	R	Bit pattern	bit0 == Channel 1 bit11 == Channel 12
4	Time	S	4	LongInt	1	R/W		seconds since 01.01.1980
10	C1 attended time ON	S	4	LongInt	1	R		in seconds
12	C1 attended time OFF	S	4	LongInt	1	R		in seconds
14	C1 Power	S	4	Real	1	R		as configured
16	C1 Power	S	4	LongInt	10	R		see 1)
18	C1 Switching state	S	2	Int	1	R	0..1	0 == open 1 == closed
20	C2 attended time ON	S	4	LongInt	1	R		in seconds
22	C2 attended time OFF	S	4	LongInt	1	R		in seconds
24	C2 Power	S	4	Real	1	R		as configured
26	C2 Power	S	4	LongInt	10	R		see 1)
28	C2 Switching state	S	2	Int	1	R	0..1	0 == open 1 == closed
30	C3 attended time ON	S	4	LongInt	1	R		in seconds
32	C3 attended time OFF	S	4	LongInt	1	R		in seconds
34	C3 Power	S	4	Real	1	R		as configured
36	C3 Power	S	4	LongInt	10	R		see 1)
38	C3 Switching state	S	2	Int	1	R	0..1	0 == open 1 == closed
40	C4 attended time ON	S	4	LongInt	1	R		in seconds
42	C4 attended time OFF	S	4	LongInt	1	R		in seconds
44	C4 Power	S	4	Real	1	R		as configured
46	C4 Power	S	4	LongInt	10	R		see 1)
48	C4 Switching state	S	2	Int	1	R	0..1	0 == open 1 == closed
50	C5 attended time ON	S	4	LongInt	1	R		in seconds
52	C5 attended time OFF	S	4	LongInt	1	R		in seconds
54	C5 Power	S	4	Real	1	R		as configured
56	C5 Power	S	4	LongInt	10	R		see 1)
58	C5 Switching state	S	2	Int	1	R	0..1	0 == open 1 == closed

DW	Designation	M	Byte	Type	Factor	R/W	Reading	Value
60	C6 attended time ON	S	4	LongInt	1	R		in seconds
62	C6 attended time OFF	S	4	LongInt	1	R		in seconds
64	C6 Power	S	4	Real	1	R		as configured
66	C6 Power	S	4	LongInt	10	R		see 1)
68	C6 Switching state	S	2	Int	1	R	0..1	0 == open 1 == closed
70	C7 attended time ON	S	4	LongInt	1	R		in seconds
72	C7 attended time OFF	S	4	LongInt	1	R		in seconds
74	C7 Power	S	4	Real	1	R		as configured
76	C7 Power	S	4	LongInt	10	R		see 1)
78	C7 Switching state	S	2	Int	1	R	0..1	0 == open 1 == closed
80	C8 attended time ON	S	4	LongInt	1	R		in seconds
82	C8 attended time OFF	S	4	LongInt	1	R		in seconds
84	C8 Power	S	4	Real	1	R		as configured
86	C8 Power	S	4	LongInt	10	R		see 1)
88	C8 Switching state	S	2	Int	1	R	0..1	0 == open 1 == closed
90	C9 attended time ON	S	4	LongInt	1	R		in seconds
92	C9 attended time OFF	S	4	LongInt	1	R		in seconds
94	C9 Power	S	4	Real	1	R		as configured
96	C9 Power	S	4	LongInt	10	R		see 1)
98	C9 Switching state	S	2	Int	1	R	0..1	0 == open 1 == closed
100	C10 attended time ON	S	4	LongInt	1	R		in seconds
102	C10 attended time OFF	S	4	LongInt	1	R		in seconds
104	C10 Power	S	4	Real	1	R		as configured
106	C10 Power	S	4	LongInt	10	R		see 1)
108	C10 Switching state	S	2	Int	1	R	0..1	0 == open 1 == closed
110	C11 attended time ON	S	4	LongInt	1	R		in seconds
112	C11 attended time OFF	S	4	LongInt	1	R		in seconds
114	C11 Power	S	4	Real	1	R		as configured
116	C11 Power	S	4	LongInt	10	R		see 1)
118	C11 Switching state	S	2	Int	1	R	0..1	0 == open 1 == closed
120	C12 attended time ON	S	4	LongInt	1	R		in seconds
122	C12 attended time OFF	S	4	LongInt	1	R		in seconds
124	C12 Power	S	4	Real	1	R		as configured
126	C12 Power	S	4	LongInt	10	R		see 1)
128	C12 Switching state	S	2	Int	1	R	0..1	0 == open 1 == closed

DW	Designation	M	Byte	Type	Factor	R/W	Reading	Value
130	Upper alarm limit 1 exceeded (abs.)	S	2	Int	1	R	bit pattern	bit0 == Channel 1 bit11 == Channel 12
131	Lower alarm limit 1 exceeded (abs.)	S	2	Int	1	R	bit pattern	bit0 == Channel 1 bit11 == Channel 12
132	Upper alarm limit 2 exceeded (abs.)	S	2	Int	1	R	bit pattern	bit0 == Channel 1 bit11 == Channel 12
133	Lower alarm limit 2 exceeded (abs.)	S	2	Int	1	R	bit pattern	bit0 == Channel 1 bit11 == Channel 12
135	Upper alarm limit 1 exceeded (diff.))	S	2	Int	1	R	bit pattern	bit0 == Channel 1 bit11 == Channel 12
136	Lower alarm limit 1 exceeded (diff.)	S	2	Int	1	R	bit pattern	bit0 == Channel 1 bit11 == Channel 12
137	Upper alarm limit 2 exceeded (diff.))	S	2	Int	1	R	bit pattern	bit0 == Channel 1 bit11 == Channel 12
138	Lower alarm limit 2 exceeded (diff.)	S	2	Int	1	R	bit pattern	bit0 == Channel 1 bit11 == Channel 12

1) The calculated power is output as a long integer to one decimal place. This means, for example, that a power of 32.4 kW is displayed as the long integer 324.

Memory assignments for the EMF 1102

Type number : **35** EMF 1102 data area for limits and alarms

(Mode: S= rapid polling; V= slow polling; A= read on command)

DW	Designation	M	Byte	Type	Factor	R/W	Reading	Value
0	Source		2	2Byte				
1	Fags		2	2Byte				
2	Switching states	S	2	Int	1	R	bit pattern	bit0 == Channel 1 bit11 == Channel 12
4	Time	S	4	LongInt	1	R/W		seconds since 01.01.1980
10	Upper alarm limit 1 (abs.) Channel 1	V	4	Real	1	R/W		
12	Lower alarm limit 1 (abs.) Channel 1	V	4	Real	1	R/W		
14	Upper alarm limit 2 (abs.) Channel 1	V	4	Real	1	R/W		
16	Lower alarm limit 2 (abs.) Channel 1	V	4	Real	1	R/W		
18	Upper alarm limit 1 (diff.) Channel 1	V	4	Real	1	R/W		
20	Lower alarm limit 1 (diff.) Channel 1	V	4	Real	1	R/W		
22	Upper alarm limit 2 (diff.) Channel 1	V	4	Real	1	R/W		
24	Lower alarm limit 2 (diff.) Channel 1	V	4	Real	1	R/W		
26	Upper alarm limit 1 (abs.) Channel 2	V	4	Real	1	R/W		
28	Lower alarm limit 1 (abs.) Channel 2	V	4	Real	1	R/W		
30	Upper alarm limit 2 (abs.) Channel 2	V	4	Real	1	R/W		
32	Lower alarm limit 2 (abs.) Channel 2	V	4	Real	1	R/W		
34	Upper alarm limit 1 (diff.) Channel 2	V	4	Real	1	R/W		
36	Lower alarm limit 1 (diff.) Channel 2	V	4	Real	1	R/W		
38	Upper alarm limit 2 (diff.) Channel 2	V	4	Real	1	R/W		
40	Lower alarm limit 2 (diff.) Channel 2	V	4	Real	1	R/W		
42	Upper alarm limit 1 (abs.) Channel 3	V	4	Real	1	R/W		
44	Lower alarm limit 1 (abs.) Channel 3	V	4	Real	1	R/W		
46	Upper alarm limit 2 (abs.) Channel 3	V	4	Real	1	R/W		
48	Lower alarm limit 2 (abs.) Channel 3	V	4	Real	1	R/W		

DW	Designation	M	Byte	Type	Factor	R/W	Reading	Value
50	Upper alarm limit 1 (diff.) Channel 3	V	4	Real	1	R/W		
52	Lower alarm limit 1 (diff.) Channel 3	V	4	Real	1	R/W		
54	Upper alarm limit 2 (diff.) Channel 3	V	4	Real	1	R/W		
56	Lower alarm limit 2 (diff.) Channel 3	V	4	Real	1	R/W		
58	Upper alarm limit 1 (abs.) Channel 4	V	4	Real	1	R/W		
60	Lower alarm limit 1 (abs.) Channel 4	V	4	Real	1	R/W		
62	Upper alarm limit 2 (abs.) Channel 4	V	4	Real	1	R/W		
64	Lower alarm limit 2 (abs.) Channel 4	V	4	Real	1	R/W		
66	Upper alarm limit 1 (diff.) Channel 4	V	4	Real	1	R/W		
68	Lower alarm limit 1 (diff.) Channel 4	V	4	Real	1	R/W		
70	Upper alarm limit 2 (diff.) Channel 4	V	4	Real	1	R/W		
72	Lower alarm limit 2 (diff.) Channel 4	V	4	Real	1	R/W		
74	Upper alarm limit 1 (abs.) Channel 5	V	4	Real	1	R/W		
76	Lower alarm limit 1 (abs.) Channel 5	V	4	Real	1	R/W		
78	Upper alarm limit 2 (abs.) Channel 5	V	4	Real	1	R/W		
80	Lower alarm limit 2 (abs.) Channel 5	V	4	Real	1	R/W		
82	Upper alarm limit 1 (diff.) Channel 5	V	4	Real	1	R/W		
84	Lower alarm limit 1 (diff.) Channel 5	V	4	Real	1	R/W		
86	Upper alarm limit 2 (diff.) Channel 5	V	4	Real	1	R/W		
88	Lower alarm limit 2 (diff.) Channel 5	V	4	Real	1	R/W		
90	Upper alarm limit 1 (abs.) Channel 6	V	4	Real	1	R/W		
92	Lower alarm limit 1 (abs.) Channel 6	V	4	Real	1	R/W		
94	Upper alarm limit 2 (abs.) Channel 6	V	4	Real	1	R/W		
96	Lower alarm limit 2 (abs.) Channel 6	V	4	Real	1	R/W		

DW	Designation	M	Byte	Type	Factor	R/W	Reading	Value
98	Upper alarm limit 1 (diff.) Channel 6	V	4	Real	1	R/W		
100	Lower alarm limit 1 (diff.) Channel 6	V	4	Real	1	R/W		
102	Upper alarm limit 2 (diff.) Channel 6	V	4	Real	1	R/W		
104	Lower alarm limit 2 (diff.) Channel 6	V	4	Real	1	R/W		
106	Upper alarm limit 1 (abs.) Channel 7	V	4	Real	1	R/W		
108	Lower alarm limit 1 (abs.) Channel 7	V	4	Real	1	R/W		
110	Upper alarm limit 2 (abs.) Channel 7	V	4	Real	1	R/W		
112	Lower alarm limit 2 (abs.) Channel 7	V	4	Real	1	R/W		
114	Upper alarm limit 1 (diff.) Channel 7	V	4	Real	1	R/W		
116	Lower alarm limit 1 (diff.) Channel 7	V	4	Real	1	R/W		
118	Upper alarm limit 2 (diff.) Channel 7	V	4	Real	1	R/W		
120	Lower alarm limit 2 (diff.) Channel 7	V	4	Real	1	R/W		
122	Upper alarm limit 1 (abs.) Channel 8	V	4	Real	1	R/W		
124	Lower alarm limit 1 (abs.) Channel 8	V	4	Real	1	R/W		
126	Upper alarm limit 2 (abs.) Channel 8	V	4	Real	1	R/W		
128	Lower alarm limit 2 (abs.) Channel 8	V	4	Real	1	R/W		
130	Upper alarm limit 1 (diff.) Channel 8	V	4	Real	1	R/W		
132	Lower alarm limit 1 (diff.) Channel 8	V	4	Real	1	R/W		
134	Upper alarm limit 2 (diff.) Channel 8	V	4	Real	1	R/W		
136	Lower alarm limit 2 (diff.) Channel 8	V	4	Real	1	R/W		
138	Upper alarm limit 1 (abs.) Channel 9	V	4	Real	1	R/W		
140	Lower alarm limit 1 (abs.) Channel 9	V	4	Real	1	R/W		
142	Upper alarm limit 2 (abs.) Channel 9	V	4	Real	1	R/W		
144	Lower alarm limit 2 (abs.) Channel 9	V	4	Real	1	R/W		

DW	Designation	M	Byte	Type	Factor	R/W	Reading	Value
146	Upper alarm limit 1 (diff.) Channel 9	V	4	Real	1	R/W		
148	Lower alarm limit 1 (diff.) Channel 9	V	4	Real	1	R/W		
150	Upper alarm limit 2 (diff.) Channel 9	V	4	Real	1	R/W		
152	Lower alarm limit 2 (diff.) Channel 9	V	4	Real	1	R/W		
154	Upper alarm limit 1 (abs.) Channel 10	V	4	Real	1	R/W		
156	Lower alarm limit 1 (abs.) Channel 10	V	4	Real	1	R/W		
158	Upper alarm limit 2 (abs.) Channel 10	V	4	Real	1	R/W		
160	Lower alarm limit 2 (abs.) Channel 10	V	4	Real	1	R/W		
162	Upper alarm limit 1 (diff.) Channel 10	V	4	Real	1	R/W		
164	Lower alarm limit 1 (diff.) Channel 10	V	4	Real	1	R/W		
166	Upper alarm limit 2 (diff.) Channel 10	V	4	Real	1	R/W		
168	Lower alarm limit 2 (diff.) Channel 10	V	4	Real	1	R/W		
170	Upper alarm limit 1 (abs.) Channel 11	V	4	Real	1	R/W		
172	Lower alarm limit 1 (abs.) Channel 11	V	4	Real	1	R/W		
174	Upper alarm limit 2 (abs.) Channel 11	V	4	Real	1	R/W		
176	Lower alarm limit 2 (abs.) Channel 11	V	4	Real	1	R/W		
178	Upper alarm limit 1 (diff.) Channel 11	V	4	Real	1	R/W		
180	Lower alarm limit 1 (diff.) Channel 11	V	4	Real	1	R/W		
182	Upper alarm limit 2 (diff.) Channel 11	V	4	Real	1	R/W		
184	Lower alarm limit 2 (diff.) Channel 11	V	4	Real	1	R/W		
186	Upper alarm limit 1 (abs.) Channel 12	V	4	Real	1	R/W		
188	Lower alarm limit 1 (abs.) Channel 12	V	4	Real	1	R/W		
190	Upper alarm limit 2 (abs.) Channel 12	V	4	Real	1	R/W		
192	Lower alarm limit 2 (abs.) Channel 12	V	4	Real	1	R/W		

DW	Designation	M	Byte	Type	Factor	R/W	Reading	Value
194	Upper alarm limit 1 (diff.) Channel 12	V	4	Real	1	R/W		
196	Lower alarm limit 1 (diff.) Channel 12	V	4	Real	1	R/W		
198	Upper alarm limit 2 (diff.) Channel 12	V	4	Real	1	R/W		
200	Lower alarm limit 2 (diff.) Channel 12	V	4	Real	1	R/W		
210	Upper alarm limit 1 exceeded (abs.)	S	2	Int	1	R	bit pattern	bit0 == Channel 1 bit11 == Channel 12
211	Lower alarm limit 1 exceeded (abs.)	S	2	Int	1	R	bit pattern	bit0 == Channel 1 bit11 == Channel 12
212	Upper alarm limit 2 exceeded (abs.)	S	2	Int	1	R	bit pattern	bit0 == Channel 1 bit11 == Channel 12
213	Lower alarm limit 2 exceeded (abs.)	S	2	Int	1	R	bit pattern	bit0 == Channel 1 bit11 == Channel 12
215	Upper alarm limit 1 exceeded (diff.))	S	2	Int	1	R	bit pattern	bit0 == Channel 1 bit11 == Channel 12
216	Lower alarm limit 1 exceeded (diff.)	S	2	Int	1	R	bit pattern	bit0 == Channel 1 bit11 == Channel 12
217	Upper alarm limit 2 exceeded (diff.))	S	2	Int	1	R	bit pattern	bit0 == Channel 1 bit11 == Channel 12
218	Lower alarm limit 2 exceeded (diff.)	S	2	Int	1	R	bit pattern	bit0 == Channel 1 bit11 == Channel 12

Memory assignments for the EMA 1100/1101

Type number : **36** EMA 1100/1101 data area with current in nutral
(Mode: S= rapid polling; V= slow polling; A= read on command)

DW	Designation	M	Byte	Type	Factor	R/W	Reading	Value
0	Source		2	2Byte				
1	Flags		2	2Byte				
2	Total active power	S	4	LongInt	1	R	-max .. +max	234500 = 234.5 kW
4	T. reactive power	S	4	LongInt	1	R	-max .. +max	7900 = ind 7.9 kVAr
6	T. apparent power	S	4	LongInt	1	R	0 .. max	e.g. 30000 = 30 kVA
8	Total power factor	S	2	Int	1000	R	-999 .. 1000	cap 0.999 .. ind 1.00
9	Ferquence	S	2	Int	100	R	4500 .. 6200	45Hz .. 62Hz
10	Asymmetry	S	2	Int	10	R	0 .. 1000	0 .. 100%
11	Voltage U1/2	S	4	LongInt	10	R	0.. max	e.g. 4000 = 400V
13	Voltage U2/3	S	4	LongInt	10	R	0.. max	e.g. 100000 = 10kV
15	Voltage U3/1	S	4	LongInt	10	R	0.. max	e.g. 5500 = 550V
17	Voltage rms U1	S	4	LongInt	10	R	0.. max	e.g. 2200 = 220V
19	Current rms I1	S	4	LongInt	1000	R	0.. max	e.g.4500 = 4.5A
21	Active power 1	S	4	LongInt	1	R	-max .. max	e.g. 253000 = 253kW
23	Reactive power 1	S	4	LongInt	1	R	-max .. +max	-12300 = cap 12.3kVAr
25	Apparent power 1	S	4	LongInt	1	R	0 .. max	e.g. 76600 = 76.6kVA
27	power factor 1	S	2	Int	1000	R	-999 .. 1000	cap 0.99 .. ind 1.00
28	Voltage rms U2	S	4	LongInt	10	R	0.. max	e.g. 2300 = 230V
30	Current rms I2	S	4	LongInt	1000	R	0.. max	e.g. 120000 = 120A
32	Active power 2	S	4	LongInt	1	R	-max .. max	e.g. 253000 = 253kW
34	Reactive power 2	S	4	LongInt	1	R	-max .. +max	12300 = ind 12.3kVAr
36	Apparent power 2	S	4	LongInt	1	R	0 .. max	e.g. 76600 = 76.6kVA
38	power factor 2	S	2	Int	1000	R	-999 .. 1000	cap 0.99 .. ind 1.00
39	Voltage rms U3	S	4	LongInt	10	R	0.. max	e.g. 2230 = 223V
41	Current rms I3	S	4	LongInt	1000	R	0.. max	e.g. 47000 = 47A
43	Active power 3	S	4	LongInt	1	R	-max .. max	e.g. 253000 = 253kW
45	Reactive power 3	S	4	LongInt	1	R	-max .. +max	-12300 = cap 12.3kVAr
47	Apparent power 3	S	4	LongInt	1	R	0 .. max	e.g. 76600 = 76.6kVA
49	power factor 3	S	2	Int	1000	R	-999 .. 1000	cap 0.99 .. ind 1.00
50	Voltage 1 50Hz	S	4	LongInt	10	R	0 .. max	e.g. 2300 = 230V
52	Voltage 1 thd	S	2	Int	10	R	0 .. 1000	0 .. 100%
53	H03 1	S	2	Int	10	R	0 .. 1000	0 .. 100%
54	H05 1	S	2	Int	10	R	0 .. 1000	0 .. 100%
55	H07 1	S	2	Int	10	R	0 .. 1000	0 .. 100%
56	H09 1	S	2	Int	10	R	0 .. 1000	0 .. 100%
57	H11 1	S	2	Int	10	R	0 .. 1000	0 .. 100%
58	H13 1	S	2	Int	10	R	0 .. 1000	0 .. 100%
59	H15 1	S	2	Int	10	R	0 .. 1000	0 .. 100%
60	H17 1	S	2	Int	10	R	0 .. 1000	0 .. 100%
61	H19 1	S	2	Int	10	R	0 .. 1000	0 .. 100%
62	Current 1 thd	S	2	Int	10	R	0 .. 1000	0 .. 100%

DW	Designation	M	Byte	Type	Factor	R/W	Reading	Value
63	Voltage 2 50Hz	S	4	LongInt	10	R	0 .. max	e.g. 2300 = 230V
65	Voltage 2 thd	S	2	Int	10	R	0 .. 1000	0 .. 100%
66	H03 2	S	2	Int	10	R	0 .. 1000	0 .. 100%
67	H05 2	S	2	Int	10	R	0 .. 1000	0 .. 100%
68	H07 2	S	2	Int	10	R	0 .. 1000	0 .. 100%
69	H09 2	S	2	Int	10	R	0 .. 1000	0 .. 100%
70	H11 2	S	2	Int	10	R	0 .. 1000	0 .. 100%
71	H13 2	S	2	Int	10	R	0 .. 1000	0 .. 100%
72	H15 2	S	2	Int	10	R	0 .. 1000	0 .. 100%
73	H17 2	S	2	Int	10	R	0 .. 1000	0 .. 100%
74	H19 2	S	2	Int	10	R	0 .. 1000	0 .. 100%
75	Current 2 thd	S	2	Int	10	R	0 .. 1000	0 .. 100%
76	Voltage 3 50Hz	S	4	LongInt	10	R	0 .. max	e.g. 2300 = 230V
78	Voltage 3 thd	S	2	Int	10	R	0 .. 1000	0 .. 100%
79	H03 3	S	2	Int	10	R	0 .. 1000	0 .. 100%
80	H05 3	S	2	Int	10	R	0 .. 1000	0 .. 100%
81	H07 3	S	2	Int	10	R	0 .. 1000	0 .. 100%
82	H09 3	S	2	Int	10	R	0 .. 1000	0 .. 100%
83	H11 3	S	2	Int	10	R	0 .. 1000	0 .. 100%
84	H13 3	S	2	Int	10	R	0 .. 1000	0 .. 100%
85	H15 3	S	2	Int	10	R	0 .. 1000	0 .. 100%
86	H17 3	S	2	Int	10	R	0 .. 1000	0 .. 100%
87	H19 3	S	2	Int	10	R	0 .. 1000	0 .. 100%
88	Current 3 thd	S	2	Int	10	R	0 .. 1000	0 .. 100%
89	Tariff state	S	2	Byte		R/W	1 .. 4	see table 3
90	Active energy T1	S	4	LongInt	1	R	0 .. max	e.g. 3125 = 3125 kWh
92	Reactive ener. T1	S	4	LongInt	1	R	0 .. max	1000 = ind 1000 kVArh
94	Active energy T2	S	4	LongInt	1	R	0 .. max	10123 = 10123 kWh
96	Reactive ener. T2	S	4	LongInt	1	R	0 .. max	7314 = ind 7314 kVArh
98	Temperature 1	S	2	Int	1	R	-20 .. 150	-20℃ .. 150℃
99	Temperature 2	S	2	Int	1	R	-20 .. 150	-20℃ .. 150℃
100	Alarm limit Umax	V	4	LongInt	10	R/W	0..300000	4200 = max 420 V
102	Alarm limit Umin	V	4	LongInt	10	R/W	0..300000	e.g. 3600 = 360 V min
104	Alarm limit Imax	V	4	LongInt	1000	R/W	1 .. 9999000	60000 = max 60 A
106	Alarm temp.1 max	V	2	Int	1	R/W	0 .. 200	0℃ .. 200℃
107	Alarm temp.1 min	V	2	Int	1	R/W	-30 .. +99	-30℃ .. +99℃
108	Alarm temp.2 max	V	2	Int	1	R/W	0 .. 200	0℃ .. 200℃
109	Alarm temp.2 min	V	2	Int	1	R/W	-30 .. +99	-30℃ .. +99℃
110	Alarm limit asymm.	V	2	Int	10	R/W	10 .. 990	1 .. 99%
111	Alarm limit PF min	V	2	Int	1000	R/W	0 .. 1000	ind 0.00 .. ind 1.00
112	Alarm limit U thd	V	2	Int	10	R/W	0 .. 1000	0 .. 100%
113	Alarm limit H03	V	2	Int	10	R/W	0 .. 1000	0 .. 100%
114	Alarm limit H05	V	2	Int	10	R/W	0 .. 1000	0 .. 100%
115	Alarm limit H07	V	2	Int	10	R/W	0 .. 1000	0 .. 100%
116	Alarm limit H11	V	2	Int	10	R/W	0 .. 1000	0 .. 100%
117	Alarm limit H13	V	2	Int	10	R/W	0 .. 1000	0 .. 100%
118	Alarm limit H17	V	2	Int	10	R/W	0 .. 1000	0 .. 100%

DW	Designation	M	Byte	Type	Factor	R/W	Reading	Value
120	Max. value U 1/2	V	4	LongInt	10	R	0 .. max	e.g. 2000 = 200V max
122	Max. value U 2/3	V	4	LongInt	10	R	0 .. max	e.g. 3300 = 330V max
124	Max. value U 3/1	V	4	LongInt	10	R	0 .. max	e.g. 200000 = 20 kV max
126	Min. value U 1/2	V	4	LongInt	10	R	0 .. max	e.g. 1700 =170V min
128	Min. value U 2/3	V	4	LongInt	10	R	0 .. max	e.g. 2900 =290V min
130	Min. value U 3/1	V	4	LongInt	10	R	0 .. max	e.g. 193000 = 19.3 kV min
132	Max. value Irms 1	V	4	LongInt	1000	R	0 .. max	e.g. 732000 = 732 A max
134	Max. value Irms 2	V	4	LongInt	1000	R	0 .. max	e.g. 33000 = 33 A max
136	Max. value Irms 3	V	4	LongInt	1000	R	0 .. max	e.g. 10000 = 100 A max
138	Max. value asym.	V	2	Int	10	R	0 .. 1000	0% .. 100%
139	Max. value PF	V	2	Int	1000	R	-999..1000	cap 0.99..ind 1.
140	Min. value PF	V	2	Int	1000	R	-999..1000	cap 0.99..ind 1.
141	Max. value U1 50Hz	V	4	LongInt	10	R	0 .. max	e.g. 2300 = 230V
143	Max. value U thd 1	V	2	Int	10	R	0 .. 1000	0 .. 100%
144	Max. value H03 1	V	2	Int	10	R	0 .. 1000	0 .. 100%
145	Max. value H05 1	V	2	Int	10	R	0 .. 1000	0 .. 100%
146	Max. value H07 1	V	2	Int	10	R	0 .. 1000	0 .. 100%
147	Max. value H09 1	V	2	Int	10	R	0 .. 1000	0 .. 100%
148	Max. value H11 1	V	2	Int	10	R	0 .. 1000	0 .. 100%
149	Max. value H13 1	V	2	Int	10	R	0 .. 1000	0 .. 100%
150	Max. value H15 1	V	2	Int	10	R	0 .. 1000	0 .. 100%
151	Max. value H17 1	V	2	Int	10	R	0 .. 1000	0 .. 100%
152	Max. value H19 1	V	2	Int	10	R	0 .. 1000	0 .. 100%
153	Max. value I thd 1	V	2	Int	10	R	0 .. 1000	0 .. 100%
154	Max. value U2 50Hz	V	4	LongInt	10	R	0 .. max	e.g. 2300 = 230V
156	Max. value U thd 2	V	2	Int	10	R	0 .. 1000	0 .. 100%
157	Max. value H03 2	V	2	Int	10	R	0 .. 1000	0 .. 100%
158	Max. value H05 2	V	2	Int	10	R	0 .. 1000	0 .. 100%
159	Max. value H07 2	V	2	Int	10	R	0 .. 1000	0 .. 100%
160	Max. value H09 2	V	2	Int	10	R	0 .. 1000	0 .. 100%
161	Max. value H11 2	V	2	Int	10	R	0 .. 1000	0 .. 100%
162	Max. value H13 2	V	2	Int	10	R	0 .. 1000	0 .. 100%
163	Max. value H15 2	V	2	Int	10	R	0 .. 1000	0 .. 100%
164	Max. value H17 2	V	2	Int	10	R	0 .. 1000	0 .. 100%
165	Max. value H19 2	V	2	Int	10	R	0 .. 1000	0 .. 100%
166	Max. value I thd 2	V	2	Int	10	R	0 .. 1000	0 .. 100%

DW	Bezeichnung	Art	Byte	Type	Faktor	R/W	Ablagebereich	Wertebereich
167	Max value U3 50Hz	V	4	LongInt	10	R	0 .. max	e.g. 2300 = 230V
169	Max. value Uthd 3	V	2	Int	10	R	0 .. 1000	0 .. 100%
170	Max. value H03 3	V	2	Int	10	R	0 .. 1000	0 .. 100%
171	Max. value H05 3	V	2	Int	10	R	0 .. 1000	0 .. 100%
172	Max. value H07 3	V	2	Int	10	R	0 .. 1000	0 .. 100%
173	Max. value H09 3	V	2	Int	10	R	0 .. 1000	0 .. 100%
174	Max. value H11 3	V	2	Int	10	R	0 .. 1000	0 .. 100%
175	Max. value H13 3	V	2	Int	10	R	0 .. 1000	0 .. 100%
176	Max. value H15 3	V	2	Int	10	R	0 .. 1000	0 .. 100%
177	Max. value H17 3	V	2	Int	10	R	0 .. 1000	0 .. 100%
178	Max. value H19 3	V	2	Int	10	R	0 .. 1000	0 .. 100%
179	Max. value I thd 3	V	2	Int	10	R	0 .. 1000	0 .. 100%
180	Max. value T1	V	2	Int	1	R	-20 .. 150	-20℃ .. 150℃
181	Min. value T1	V	2	Int	1	R	-20 .. 150	-20℃ .. 150℃
182	Max. value T2	V	2	Int	1	R	-20 .. 150	-20℃ .. 150℃
183	Min. value T2	V	2	Int	1	R	-20 .. 150	-20℃ .. 150℃
184	Reset	V	2	Byte		R/W	1 .. 3	see table 2
185	Alarm array	V	44	Array of Byte[46]		R		see table 1
208	Alarm display	V	2	Word		R		Holds the item number of the alarm present in the display.
210	Nutral current	S	4	LongInt	1000	R		see I rms
212	Nutral current	S	2	Integer	1	R		z.B. 125 == 125A

Table 1: The byte [0] is at zero. The byte [1] gives the number of alarms present.
The remaining bytes indicate an alarm with the value 1.

position	alarm value		position	alarm value		position	alarm value
2	$U_{P1/P2}$ max		17	H05 $_1$ max		32	Frei
3	$U_{P2/P3}$ max		18	H05 $_2$ max		33	Frei
4	$U_{P3/P1}$ max		19	H05 $_3$ max		34	Frei
5	I_{rms}1 max		20	H07 $_1$ max		35	H17 $_1$ max
6	I_{rms}2 max		21	H07 $_2$ max		36	H17 $_2$ max
7	I_{rms}3 max		22	H07 $_3$ max		37	H17 $_3$ max
8	$U_{P1/P2}$ min		23	free		38	asymmetry max
9	$U_{P2/P3}$ min		24	free		39	power factor min
10	$U_{P3/P1}$ min		25	free		40	temperature 1 max
11	Uthd 1 max		26	H11 $_1$ max		41	temperature 2 max
12	Uthd 2 max		27	H11 $_2$ max		42	temperature 1 min
13	Uthd 3 max		28	H11 $_3$ max		43	temperature 2 min
14	H03 $_1$ max		29	H13 $_1$ max		44	I nutral
15	H03 $_2$ max		30	H13 $_2$ max		45	free
16	H03 $_3$ max		31	H13 $_3$ max			

Table 2: The values 1 to 3 indicate which values are to be reset.
1 == Reset temperature; 2 == Reset maximum values; 3 == Reset meters

Table 3: The values 1 and 2 restore the tariff status applied externally.
By writing 3 or 4 another tariff status can be selected.(3 == tariff 1; 4 == tariff 2)

Memory assignments for the EMD 1101

Type number : **37** EMD 1101 read and write the switching states
(Mode: S= rapid polling; V= slow polling; A= read on command)

DW	Designation	M	Byte	Type	Factor	R/W	Reading	Value
0	Source		2	2Byte				
1	Flags		2	2Byte				
4	switching states	S	2	Int	1	R	Bit pattern	Bit0 == Channel1
6	Switching state C1	S	2	Int		R/W		see 1)
7	Switching state C2	S	2	Int		R/W		see 1)
8	Switching state C3	S	2	Int		R/W		see 1)
9	Switching state C4	S	2	Int		R/W		see 1)
10	Switching state C5	S	2	Int		R/W		see 1)
11	Switching state C6	S	2	Int		R/W		see 1)
12	Switching state C7	S	2	Int		R/W		see 1)
13	Switching state C8	S	2	Int		R/W		see 1)
15	Timeout channel 1	S	2	Int		R/W	seconds	see 2)
16	Timeout channel 2	S	2	Int		R/W	seconds	see 2)
17	Timeout channel 3	S	2	Int		R/W	seconds	see 2)
18	Timeout channel 4	S	2	Int		R/W	seconds	see 2)
19	Timeout channel 5	S	2	Int		R/W	seconds	see 2)
20	Timeout channel 6	S	2	Int		R/W	seconds	see 2)
21	Timeout channel 7	S	2	Int		R/W	seconds	see 2)
22	Timeout channel 8	S	2	Int		R/W	seconds	see 2)
24	Inverting C1	S	2	Int		R/W	0 .. 1	1 == inverse
25	Inverting C1	S	2	Int		R/W	0 .. 1	1 == inverse
26	Inverting C1	S	2	Int		R/W	0 .. 1	1 == inverse
27	Inverting C1	S	2	Int		R/W	0 .. 1	1 == inverse
28	Inverting C1	S	2	Int		R/W	0 .. 1	1 == inverse
29	Inverting C1	S	2	Int		R/W	0 .. 1	1 == inverse
30	Inverting C1	S	2	Int		R/W	0 .. 1	1 == inverse
31	Inverting C1	S	2	Int		R/W	0 .. 1	1 == inverse

1) The figures have the following significance:
0xA0 == Channel is switched off
0xA1 == Channel is switched on
0xF0 == Channel is in fault condition and switched off
0xF1 == Channel is in fault condition and switched on
Write the value 0x00 == Switch off channel
Write the value 0x01 == Switch on channel

2) The figures have the following significance:
0 == Fault condition is output
1 - 0xFFFE == Seconds until fault condition is output
(The timeout is reset by writing to the channel: see footnote 1)
0xFFFF == No timeout

EMP 1100 memory assignments for data block 3

DW	Designation	R/W	value
0	Source	R/W	
1	Flags	R/W	
2	Time for rapid polling in 0.1sec.	R/W	0-32767
3	Time for slow polling in 0.1sec.	R/W	0-32767
4			
5	Baud rate for serial A	R/W	
6	Reserved for paritiy	R/W	
7			
8	Master number	R/W	
9	Maximum number of masters	R/W	

Contents of data word 1 (coding) of any data block

- **Write in high byte:**
  - 01: Inhibit data block
  - 02: Read in data block again

- **Read from low byte:**
  - Bit 0=1: All data words have been read at least once
  - Bit 1=1: Error, device not addressable
  - Bit 2=1: Other error

Notes:

Power capacitors for low voltage

Power factor correction systems

Power factor correction systems with reactors

Modules for power factor correction systems

Active filters

Dynamic compensation of harmonics

Reactive power control relays

Maximum demand control systems

Mains monitoring instruments

Cost allocation

Energy management systems

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