

# Configuration Program MA 400 Multi Function Power Meter



Exit Program



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## User Guide

- MA 400 Configuration Program
- MA 400 Interface Description



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## **1. General**

The serial interface is used to set parameters for the MA 400 Multi Function Indicator. The configuration data is gathered by the program and then transmitted to the unit, if desired. The program is designed to be used with PCs using the Windows® 9x/2000/XP operating systems.

You can set the parameter values listed below:

- Password for parameter level 1
- Password for parameter level 2
- Current transducer ratio
- Voltage transducer ratio
- $U_{\text{secondary}}$  ( in specific limit ranges);
- Selection and order of display menus
- Selection and order of data to be transmitted via the serial interface

Additionally, the measured data can be transmitted to a data terminal via the serial interface for further analysis. The Configuration Program provided includes a program for receiving measured values and displaying them on the display. A maximum of ten different variables can be transmitted.

Furthermore, you have the option of reading out configuration data from the Multi Function Indicators, modifying, and returning them to the indicators.

The configuration is able to be saved and the data to be printed as well. Of course you also have the option of directly configuring the MA 400 using the two keys except that the selection of the measured values to be transmitted cannot be made on the MA 400 unit. This is done through the Configuration Program only.

## **2. Installing the Program**

1. Insert the installation CD into your CR-ROM drive.
2. On Windows, the Installation Manager starts automatically. If it does not, run the Windows Explorer and click the letter of your CD-ROM drive. Double-click the "Setup.exe" file.
3. The Installation Program appears. Follow the instructions on the screen and click "Weiter" (Next), After all files have been copied to the hard disk, a program group is created. Now the installation is complete.
4. A re-start of the machine is not required. The program can be run through the Windows Start button at any time.

### 3. Program Description

#### 3.1. Procedure after Program Start



Figure 1 – Program Selection

After the Program has been started (Figure 1), the following functionality options are available:

#### Configuration:

- File - New  
a new configuration file is being created;
- File - Open  
an existing stored file can be opened
- File - Receive  
Configuration data is received from the MA 400; measured values can be received from the MA 400

#### Measured Values Output

Selection of the measured values to be received from the MA 400.

#### Receive

Configuration data is being received from the MA 400.  
Measured values can be received.

## 3.2. How to Create a New Configuration File

After selecting File - New, the password prompt window appears.

### 3.2.1 Password Prompt

In this window (refer to Figure 2), the passwords can be entered.

#### **Password 1 (first programming level):**

A two-digit numerical password can be entered here, ranging from 00 through 99. The password value "00" is not verified in the MA 400. Confirm your password entry by pressing the "Enter" key.

#### **Password 2 (second programming level):**

A two-digit numerical password is also entered here which, however, ranges from 01 through 99. As the no. 2 password is required for operating the MA 400, entering the value "00" is not allowed. Confirm your password entry by pressing the "Enter" key.

After clicking the "Confirm Password Entry" button you enter the "Menu Selection" window (refer to Figure 2).

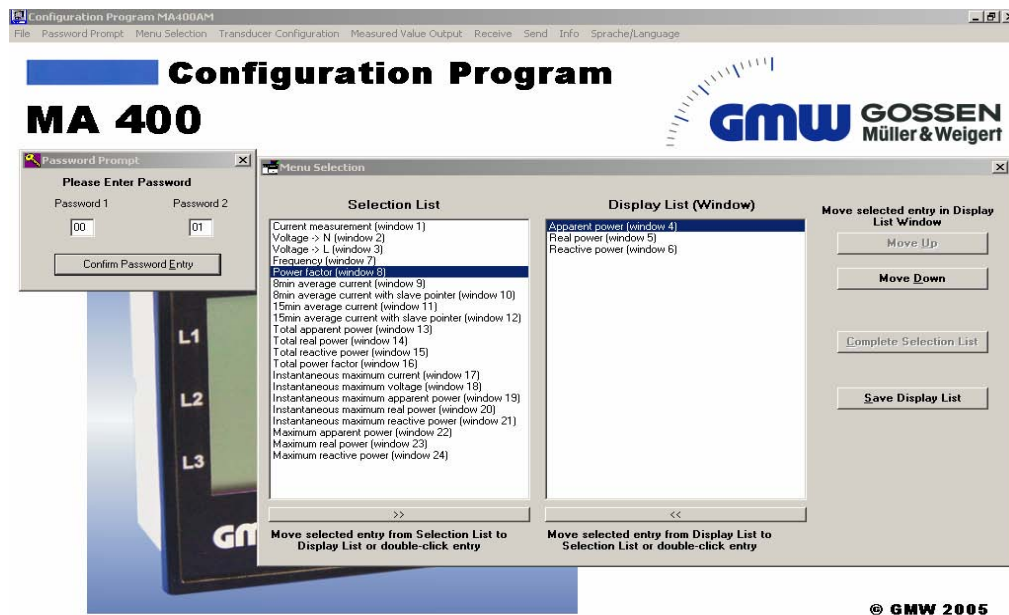


Figure 2 Password Prompt – Menu Selection

### 3.2.2. Menü Selection Window

From this window you can select the various menu windows that can be displayed in the unit. In addition, you can modify the order of the windows displayed. The list includes all menus available for selection. By double-clicking the menu or clicking the ">>" button you select the display menu desired. The menu selected will be shown in the Display List.

By clicking the "Move up" or "Move down" buttons you can modify the order of the windows.

By clicking the "<<" button you can remove a selected window from the Display List. The same is accomplished by double-clicking the respective window.

There are two approaches for selecting the windows. One option is to select a window and include it into the current Display List.

The other option is to include all windows into the Display List by clicking the "Complete Selection List" button. Then you remove those windows which you do not want to display. The "Save Display List" button finishes the selection and you get into the "Transducer Configuration" window.

### 3.2.3. Transducer Configuration Window

Here, the values for

$I_{\text{secondary}}$   
 $I_{\text{primary}}$   
 $U_{\text{secondary}}$   
 $U_{\text{primary}}$

are entered. The value ranges available can be obtained from the Memo Windows (refer to Figure 3).

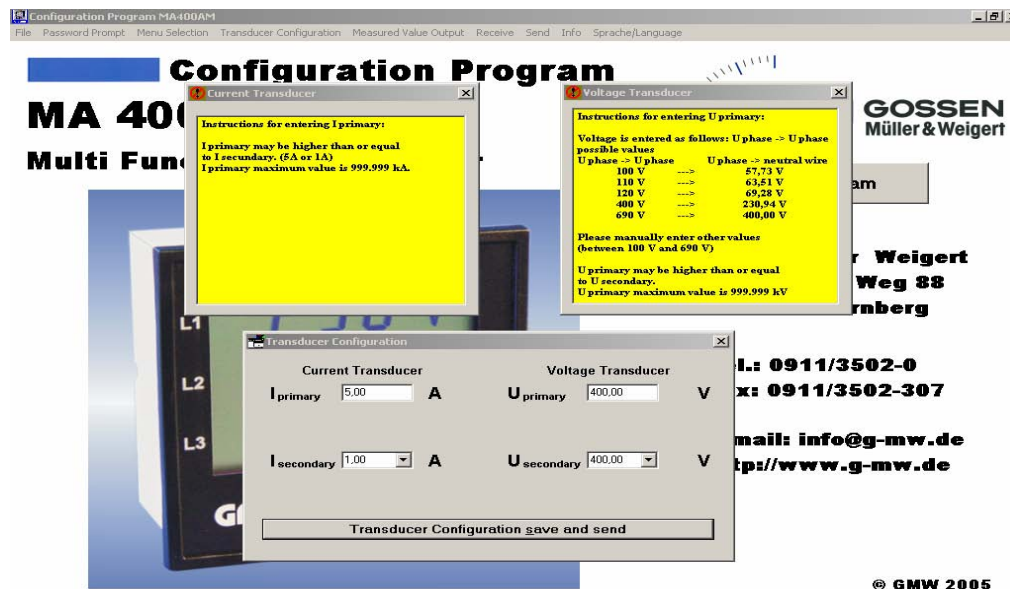
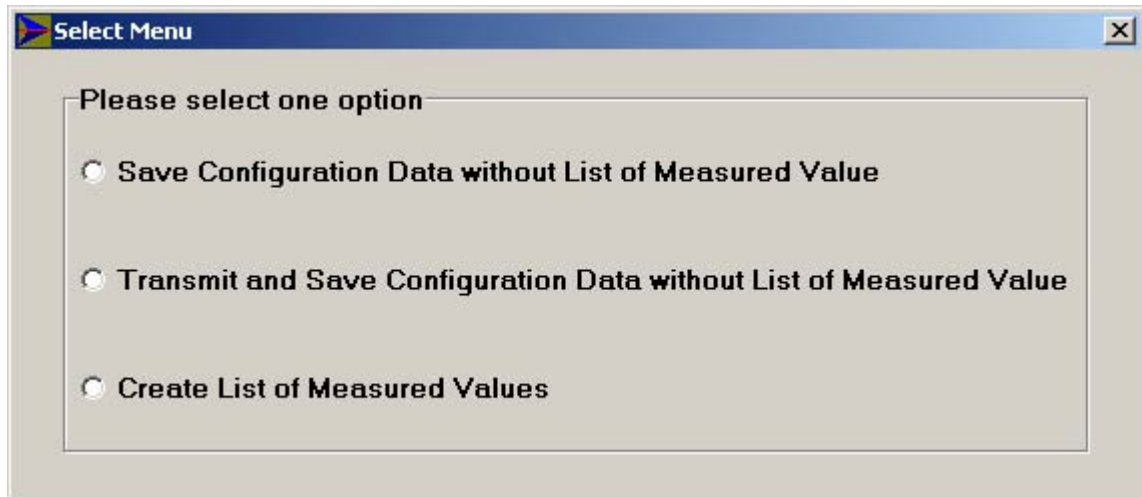


Figure 3 – Transducer Configuration

Please note that the  $U_{\text{secondary}}$  and  $I_{\text{secondary}}$  values must match the unit configuration delivered. The coincidence of the values is verified while the configuration values are being transmitted to the MA 400. Repeat your entries when the unit issues an error message indicating such a mismatch. Additionally, a transducer ratio of less than 1 cannot be entered. An error message is shown upon such an attempt.

### **3.2.4 Selection Menu**

After you have clicked the “Save and Transmit Transducer Configuration” button, the “Selection Menu” popup windows (Figure 4) appears presenting you with the following options:



*Figure 4: Select Menü*

### **3.2.5. Measured Value Output Window**

Use this window (refer to Figure 5) to select measured values or to modify the selection of values to be output by the MA 400.

The procedure of selecting the individual measured values intended to be transmitted by the MA 400 is the same as for selecting Display Menus described in Section 3.2.2.

A total of 10 different measured values can be transmitted from the MA 400. This limitation to 10 values has been established to keep the measuring interval of 1 second. The unit can be shipped with a configuration for transmitting more than 10 measured values upon request in which case, however, the measuring interval will not be kept.

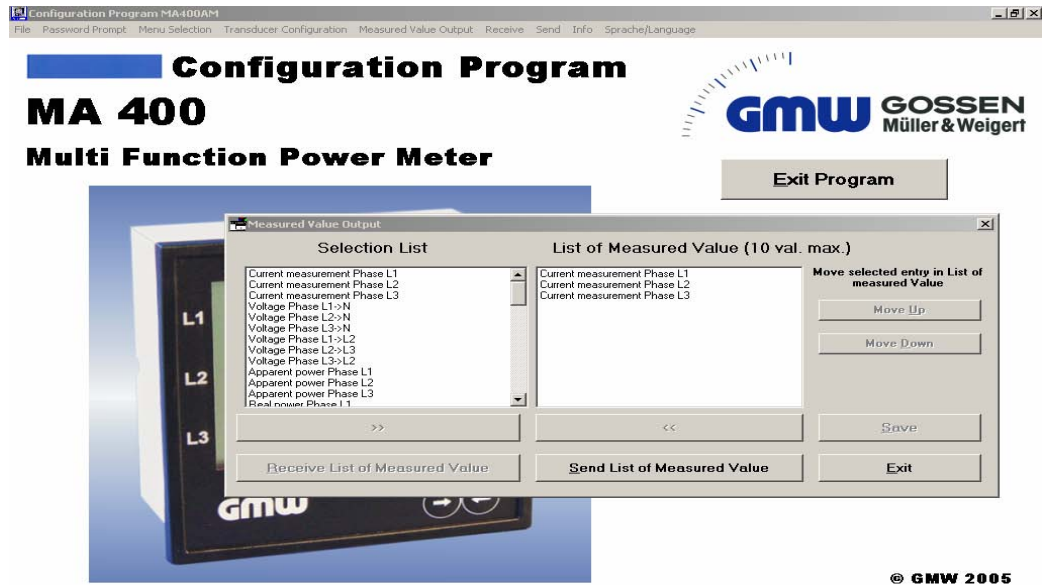


Figure 5: Measured Value Output

The List of Selected Measured Values is transmitted to the MA 400 using the “Send List of Measured Values” button. After the list has been transmitted, you will get into the “Table of Measured Values” window when you click the “Receive List of Measured Values” button.

Clicking the “Exit” button completes the selection of measured values and you will be prompted to save the values.

### **3.2.6. "Messwertetabelle" (Table of Measured Values) Window**

This window (refer to Figure 6) is used to receive the measured values from the MA 400 and to display them in a tabular form.

Provided the MA 400 is connected to the PC interface, the “Receive Measured Values” button can be used to establish the communication with the MA 400. If the interface has not yet been initialised as long as the program has been in use, the “Interface Setup” is invoked. The procedure is the same as described under "Interface Setup".

The measured values selected in the transmission table are displayed in the measured value table. The Measured Value Transmission Status Indicator shows the status of the transmission. Any errors occurring in transmission are indicated by the Transmission Error message.

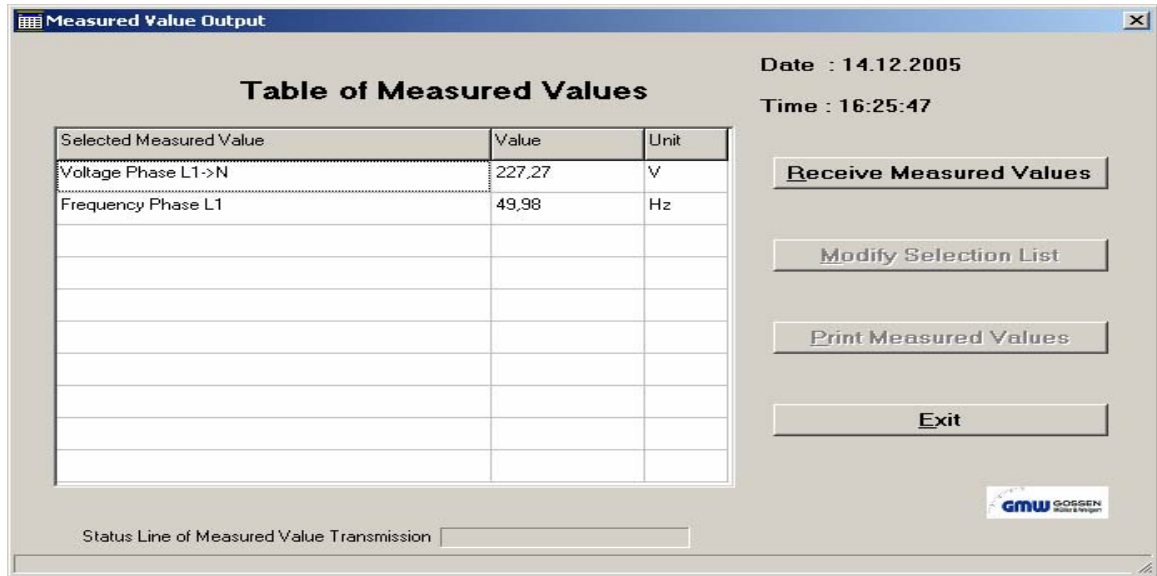


Figure 6: Table of Measured Values

If measured values are intended to be received from an MA 400 for which no measured values have been selected according to the above procedure, a “No Measured Values selected” error message will be displayed.

The value is always shown in a five-digit format xxx.xx. The dimension changes according to the value shown, e.g. from "A" to "kA" or "MA".

By clicking the “Modify Selection List” button you enter the “Measured Value Output” window which lets you modify the selection of the measured values. Then the selected measured values are again transmitted to the MA 400 and the procedure described is repeated.

Use the “Print Measured Values” button to print the measured values currently shown.

A negative sign shown for power factor and complex power values indicates "capacitive". No sign for these values indicates "inductive".

A negative sign shown for real power values indicates energy output whereas no sign indicates energy consumption.

### **3.2.7. Transmit or Receive MA 400 Configuration Data**

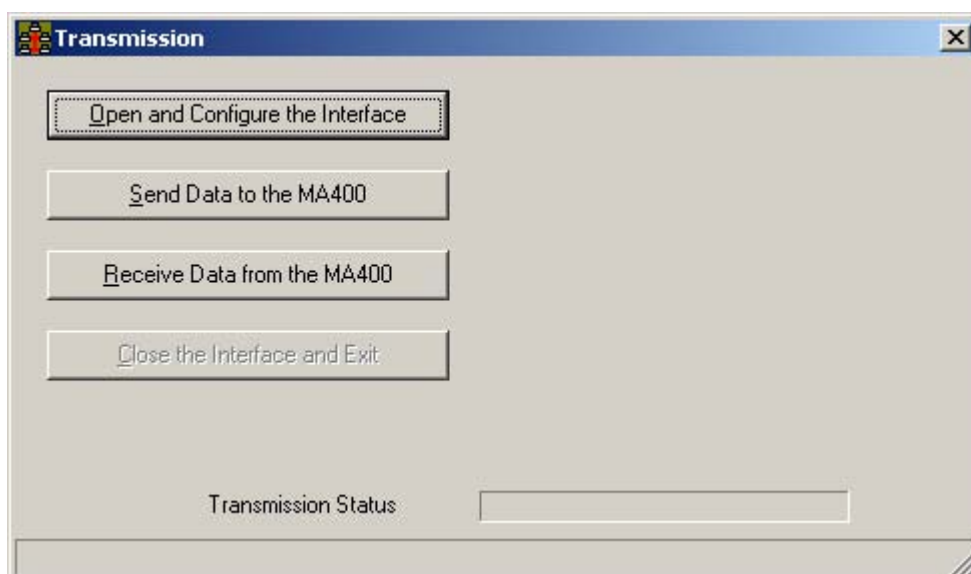


Figure 7: Transmission

For transmitting configuration data to or reading them out from the MA 400, the functionalities of the “Transmission” window (Figure 7) are used. No settings are necessary on the MA 400.

The controls provided by this window are used to configure the serial interface and to either send configuration data to or receive them from the MA 400 (depending on which button is enabled or disabled).

### **Open and Configure the Interface**

Setting up the interface only includes selecting the number of the serial interface COM x (x - number of the interface to be used).

To accomplish this, an unused PC interface has to be selected.

The baud rate is set to 38,400 baud and cannot be changed.

No standard hardware or software protocols are used (refer to Interface Description).

In case the interface cannot be opened because it is already used by another PC hardware component or another application, this will be indicated by the “Interface could not be opened” message in the status line of the Transmission window. When this happens you should change the PC interface.

### **Send Data to the MA 400**

Clicking the "Daten zum MA 400 senden" button will cause the configuration data to be transmitted to the MA 400. The status of the data transmission is shown by the “Transmission Status” box.

### **Receive Data from the MA 400**

Clicking the “Receive Data from the MA 400” button will cause the MA 400 to send its configuration data.

When there are errors occurring during transmission or if no device is connected the “No connection” error message appears. Repeat the procedure after having checked and, if necessary, re-established the connection.

### **Exit the Interface and Close**

Clicking this button will close the interface and terminate the data transmission.

### **3.2.7 Printing the Configuration**

You may create a printout of your configuration data when you select the File – Print menu.

Before printing you may verify the configuration data using the Print Preview function.

The File – Printer Setup function is used to select the appropriate printer and perform a setup, if necessary.

#### **4. Serial Interface Specifications**

The line speed is pre-set to a baud rate of 38,400. If you request another baud rate, please specify it in your order. We have defined a baud rate to minimise the number of field settings required.

The following RS232 lines are used:

RXD  
TXT  
Ground

There is no hardware handshake used.

After the MA 400 is powered up there is no data transmission to the data terminal. The data terminal must send an XON signal (17h) to initiate the start of the transmission. After having received the XON signal, the MA 400 sends the measured values according to the Table of the Measured Values that was previously transmitted by the Configuration Program or according to the Table of the Measured Values saved in the MA 400.

The data transmission can be stopped by sending an XOFF signal to the MA 400. The XOFF signal may be sent by the data terminal only after the Measured Values Block has been completely transmitted. The structure of the Measured Values Block can be obtained from Table 2. Table 3 shows an example transmission of two measured values. To identify the measured values each of them has an ID. This assignment is obtained from Table 1.

The measured value has a maximum length of 13 characters, e.g.

-999999999.99. Two digits after the decimal are transmitted on principle. The decimal is sent as "." (2Eh). The length of the measured value depends on the value of the figure, e.g. for a transmitted figure of 1.00 the length is 4. Resulting from the length transmitted, a receive buffer of at least 160 Bytes capacity must be provided in the data terminal.

It must be noted again that the MA 400 is designed to transmit a maximum of 10 different measured values. This number can be increased upon request. Also, a certain protocol desired by the customer as well as a hardware handshake protocol can be implemented upon request at short notice. The pin assignments and additional information can be obtained from the tables attached below.

**Table 1: Variables for Transmission**

No.	ID hex	Variable	Value Range
1	21 h	Phase L1 current	0,00 -999.999.999,99 A
2	22h	Phase L2 current	0,00 -999.999.999,99 A
3	23h	Phase L3 current	0,00 -999.999.999,99 A
4	24h	Phase L1->N voltage	0,00 -999.999.999,99 V
5	25h	Phase L2->N voltage	0,00 -999.999.999,99 V
6	26h	Phase L3->N voltage	0,00 -999.999.999,99 V
7	27h	Phase L1-L2 voltage	0,00 -999.999.999,99 V
8	28h	Phase L2-L3 voltage	0,00 -999.999.999,99 V
9	29h	Phase L3-L1 voltage	0,00 -999.999.999,99 VA
10	2Ah	Phase L1 apparent power	0,00 -999.999.999,99 VA
11	2Bh	Phase L2 apparent power	0,00 -999.999.999,99 VA
12	2Ch	Phase L3 apparent power	0,00 -999.999.999,99 W
13	2Dh	Phase L1 real power	+/-0,00 -999.999.999,99 W
14	2Eh	Phase L2 real power	+/-0,00 -999.999.999,99 W
15	2Fh	Phase L3 real power	+/-0,00 -999.999.999,99 W
16	30h	Phase L1 reactive power	+/-0,00 -999.999.999,99 VAR
17	31 h	Phase L2 reactive power	+/-0,00 -999.999.999,99 VAR
18	32h	Phase L3 reactive power	+/-0,00 -999.999.999,99 VAR
19	33h	Phase L1 frequency	0,00-50 Hz
20	34h	Phase L2 frequency	0,00-50 Hz
21	35h	Phase L3 frequency	0,00-50 Hz
22	36h	Phase L1 power factor	+/- 0,00 -1,00
23	37h	Phase L2 power factor	+/- 0,00 -1,00
24	38h	Phase L3 power factor	+/- 0,00 -1,00
25	39h	Phase L1, 8 min average current	0,00 -999.999.999,99 A
26	3Ah	Phase L2, 8 min average current	0,00 -999.999.999,99 A
27	3Bh	Phase L3, 8 min average current	0,00 -999.999.999,99 A
28	3Ch	Phase L1, 8 min average current with slave pointer	0,00 -999.999.999,99 A
29	3Dh	Phase L2, 8 min average current with slave pointer	0,00 -999.999.999,99 A
30	3Eh	Phase L3, 8 min average current with slave pointer	0,00 -999.999.999,99 A
31	3Fh	Phase L1, 15 min average current	0,00 -999.999.999,99 A
32	40h	Phase L2, 15 min average current	0,00 -999.999.999,99 A
33	41 h	Phase L3, 15 min average current	0,00 -999.999.999,99 A
34	42h	Phase L1, 15 min average current with slave pointer	0,00 -999.999.999,99 A
35	43h	Phase L2, 15 min average current with slave pointer	0,00 -999.999.999,99 A
36	44h	Phase L3, 15 min average current with slave pointer	0,00 -999.999.999,99 A
37	45h	Total reactive power	0,00-999.999.999,99 VA
38	46h	Total real power	+/-0,00-999.999.999,99 W
39	47h	Total apparent power	0,00-999.999.999,99 VAR
40	48h	Total power factor	+/-0,00-1,00
41	49h	Phase L1 instantaneous maximum current	0,00 -999.999.999,99 A
42	4Ah	Phase L2 instantaneous maximum current	0,00 -999.999.999,99 A
43	4Bh	Phase L3 instantaneous maximum current	0,00 -999.999.999,99 A
44	4Ch	Phase L1 instantaneous maximum voltage	0,00 -999.999.999,99 V
45	4Dh	Phase L2 instantaneous maximum voltage	0,00 -999.999.999,99 V
46	4Eh	Phase L3 instantaneous maximum voltage	0,00 -999.999.999,99 V
47	4Fh	Phase L1 instantaneous maximum apparent power	0,00 -999.999.999,99 VA
48	50h	Phase L2 instantaneous maximum apparent power	0,00 -999.999.999,99 VA
49	51 h	Phase L3 instantaneous maximum apparent power	0,00 -999.999.999,99 VA
50	52h	Phase L1 instantaneous maximum real power	0,00 -999.999.999,99 W
51	53h	Phase L2 instantaneous maximum real power	0,00 -999.999.999,99 W
52	54h	Phase L3 instantaneous maximum real power	0,00 -999.999.999,99 W
53	55h	Phase L1 instantaneous maximum reactive power	0,00 -999.999.999,99 VAR
54	56h	Phase L2 instantaneous maximum reactive power	0,00 -999.999.999,99 VAR
55	57h	Phase L3 instantaneous maximum reactive power	0,00 -999.999.999,99 VAR
56	58h	Maximum apparent power	0,00 -999.999.999,99 VA
57	59h	Maximum real power	0,00 -999.999.999,99 W
58	5Ah	Maximum reactive power	0,00 -999.999.999,99 VAR

**Table 2: Block Structure of Measured Value Transmission**

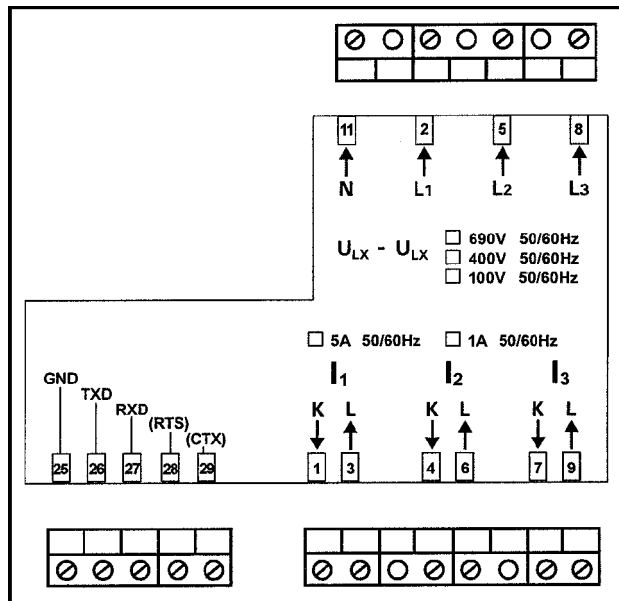
<b>Block Structure of Measured Value Transmission</b>		
AK	Start code	0Fh
IDNRxx	Measured value ID	0x21 - 0x5A
Meas. value	1 <sup>st</sup> digit of measured value or negative sign	30h...39h bzw. 2Dh
Meas. value	2 <sup>nd</sup> digit of measured value	30h...39h
Meas. value	3 <sup>rd</sup> digit of measured value	30h...39h
Meas. value	4. 4 <sup>th</sup> digit of measured value	30h...39h
Meas. value	5 <sup>th</sup> digit of measured value	30h...39h
Meas. value	6 <sup>th</sup> digit of measured value	30h...39h
Meas. value	8 <sup>th</sup> digit of measured value	30h...39h
Meas. value	9 <sup>th</sup> digit of measured value	30h...39h
Decimal	10 <sup>th</sup> digit of measured value	2Eh
Meas. value	11 <sup>th</sup> digit of measured value	30h...39h
Meas. value	12 <sup>th</sup> digit of measured value	30h...39h
EKMW	Measured value end code	0Dh
IDNRxx	Measured value ID	
Meas. value	1 <sup>st</sup> digit of measured value or negative sign	30h...39h bzw. 2Dh
Meas. value	- measured value up to nine digits	30h...39h
Decimal	X <sup>th</sup> .digit of measured value	2Eh
Meas. value	X <sup>th</sup> .digit of measured value	30h...39h
Meas. value	X <sup>th</sup> .digit of measured value	30h...39h
EKMW	Measured value end code	0Dh
EK	End code	0Eh

**Table 3: Example:  
Transmission of the values for  
voltage of Phase L1->N = 230.90 V  
real power of Phase L2 = -123.00 W**

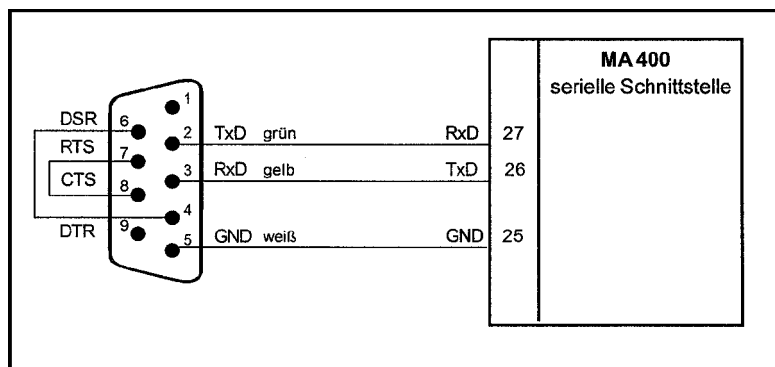
AK	0Fh	0Fh
IDNR	24h	24h
Meas. Value	2	32h
Meas. Value	3	33h
Meas. Value	0	30h
Decimal	.	40h
Meas. Value	0	39h
Meas. Value	0	30h
EKMW	0Dh	0Dh
IDNR	2Eh	2Eh
Sign	-	2Dh
Meas. Value	1	31h
Meas. Value	2	32h
Meas. Value	3	33h
Decimal	.	2Eh
Meas. Value	0	30h
Meas. Value	0	30h
EKMW	0Dh	0Dh
EK	0Eh	0Eh

**Table 4:  
Serial Interface Specifications**

Type	RS232 C
Baud rate	38,400 baud
Data format	8 bit
Parity	No
Stop bit	1
Used lines	RXD,TXD,Ground



MA 400 Pin Assignment



PC Pin Assignment (9 pin D sub socket) --> MA 400



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