F L U X M E T E R B 2

Instructions for use

1.1 **Connect the instrument** using the main lead into a socket with a voltage of 230 Volts AC.

Switch on the Fluxmeter using the switch "Power On-Off" (1).
The warm up time for the instrument is 15-30 minutes.

1.2 **Use the red and blue sockets of the "INPUT"** (14) to connect the measuring coil. If the polarity is important, please check the correct connection of the coil.

1.3 Input (14): **the input resistance of the Fluxmeter** is 10 000 Ohm and the resistance of the measuring coil should be small to 10 000 Ohm.
A coil resistance of 100 Ohm produces a measuring error of 1 %.

1.4 When the coil resistance is higher, **the measuring constant K** has to be multiplied by (R coil + 10 0000 Ohm) : 10 000 Ohm.
Some measuring coils have a second constant on the name-plate called "Kkorr".
In this case please use the constant "Kkorr".

1.5 **Drift compensation:** if the Fluxmeter is not used during some minutes you can see a deflection (drift) of the instrument of some digits.

Set the instrument to zero by pushing the switch "Reset" (10).

If the drift is to high, the drift has to be compensated by using knob "Drift" (2) when the measuring coil is connected.

If a compensation of the drift is not possible, disconnect the measuring coil and switch on the measuring range 10 E-7.

The drift can be compensated now by using the potentiometer "I-Off" (22) on the backside of the instrument.

Turn the potentiometer until the value of the instrument display "stands".

Now connect the measuring coil and wait a few minutes until the thermo voltage disappears.

The remaining drift can be compensated by using the potentiometer "U-Off" (23). While doing this, the knob "Drift" (2) should be in middle position.

After finishing this alignment the last drift-correction is to do using the knob "Drift" (2).

1.6 **Zero of the measuring amplifier:**

When pushing the switch "RESET" (10) the digital display must show "000".
If there is an other value turn the potentiometer "ZERO" (24)
until the value "000" is shown.

2.1 **Changing the measuring constant** of the fluxmeter:

You can change the fixed constant of the 4 measuring ranges using the switch "VAR" (12) and the Potentiometer "VAR" (11).

When the switch "VAR" is in the pushed position, you can change the constant by turning the potentiometer "VAR".

2.2 **Arrow-switches** (8 and 9):

These switches allow to use another starting position for measuring than zero.

For special measurements it is possible to add the measuring value to a constant value of for example 100 digits.

While pushing the arrow-switch (9) wait a time until the value "100" is shown at the display.

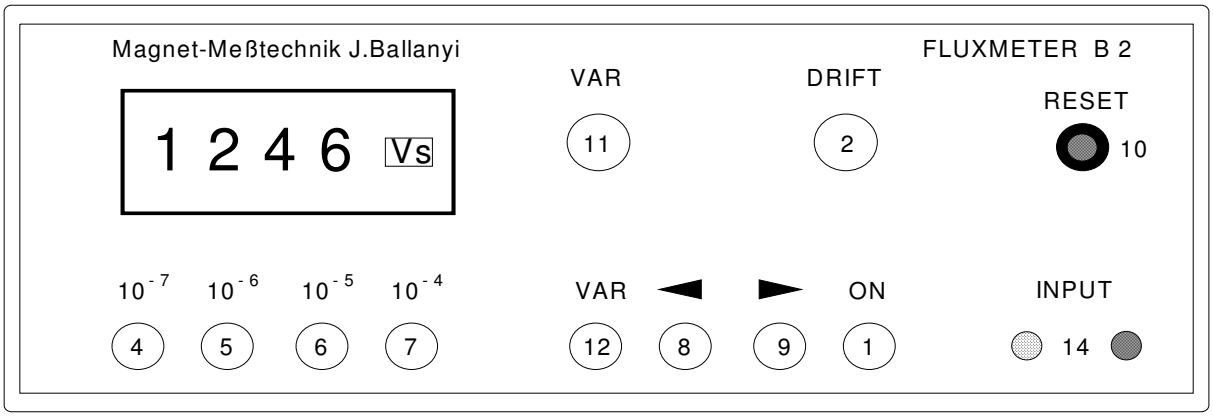
2.3 **Analog output:**

At the backside of the Fluxmeter you find the socket "Analog out" (21).
Here you can connect for example a X-Y-recorder or an analog instrument.

Pin 3 = + signal, pin 1 = - signal (ground)
The output- voltage is 0 .. 199,9 mV

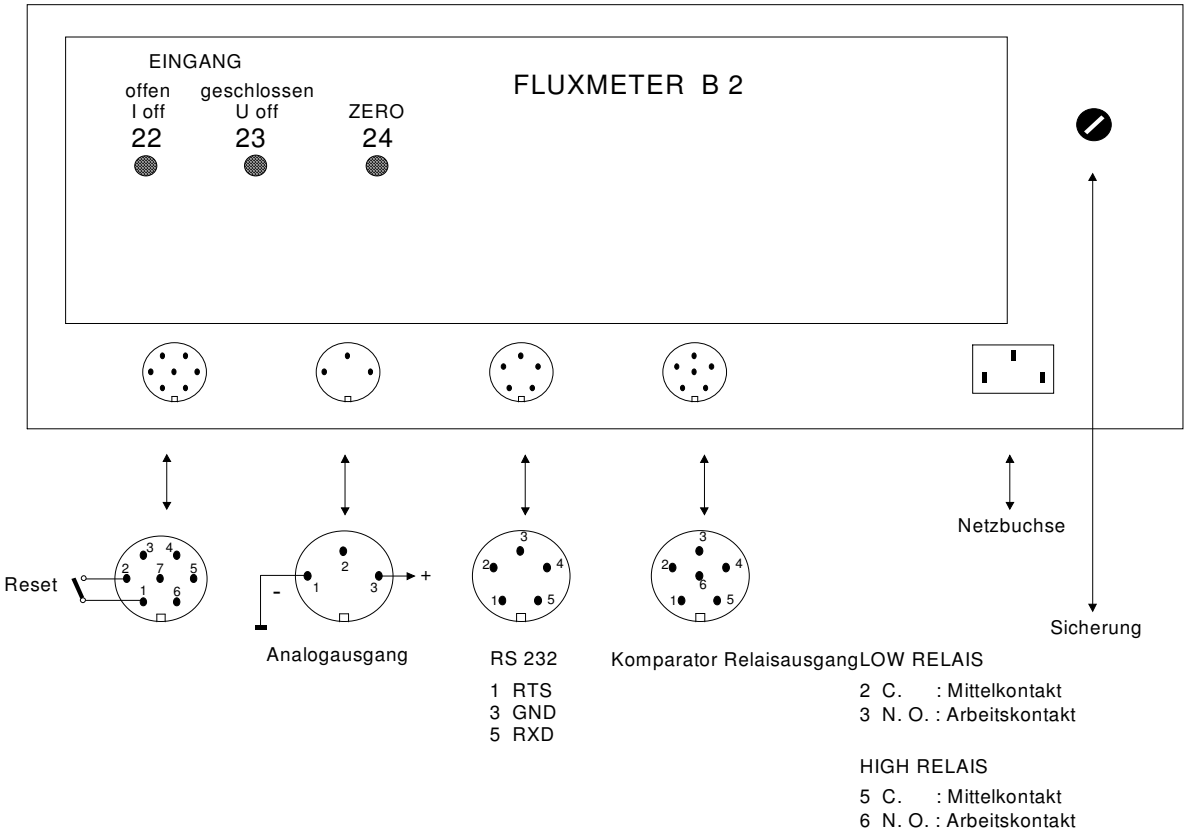
2.4 You can **reset the measuring value** using the switch "RESET" (10).

There is the possibility to connect a foot-switch for "RESET" using the socket "RESET" (20) at the backside of the Fluxmeter. The Art. Nr. is 260.



Frontplatte Fluxmeter B2

Back Panel Fluxmeter B2



Schwille - Elektronik **Digitale Panelmeter SPE 670 - 010 for AC / DC Voltage Measurements**

Digital Panel Meter SPE 670 - 010

Meas. Type:	Voltage, AC / DC
Dimension Display:	V (Standard)
Display/ Rate:	3_ Digits / 2.5 Meas./s
Display Type:	LED 12.5mm, red
Polarity:	Auto., "-" sign
Decimal Point:	Programmable
Protection Index:	IP50, DIN 40050
Operating Temp.:	-10°C ...+50°C
Control Outputs:	2 Relays N/O or N/C
Limit Values:	Programmable
Relay Contact:	230V / 5A
Connector Type:	Lift clamp
Front Panel:	DIN 48 x 96
Mounting Depth:	D = 115mm
Panel Cut-out:	H x W = 44.5x90.5mm
Supply:	230V 50-60Hz 4.5VA
Meas. Ranges:	Set by jumper
Front keys:	Lockable by jumper
Sensor Supply:	24V / 30mA DC

Measuring Ranges and Functions:

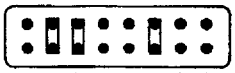
Voltages (DC)
Accuracy: ±0.1% ± 1 Digit of measuring value

I	0-200mV	Ri 1MOhm
II	0-2V	Ri 1MOhm
III	0-20V	Ri 1MOhm
IV	0-200V	Ri 1MOhm
V	0-1000V	Ri 10MOhm

Voltages (AC)
" true R.M.S. "
Accuracy: ±0.5% ± 2 Digit of measuring value

I	0-200mV	Ri 1MOhm
II	0-2V	Ri 1MOhm
III	0-20V	Ri 1MOhm
IV	0-200V	Ri 1MOhm
V	0-500V	Ri 10MOhm

Setting Ranges and Functions:

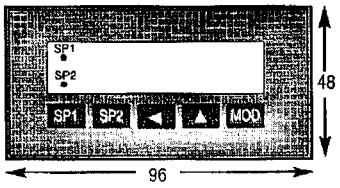


Measuring Range and AC/DC function are freely settable through jumpers at the right side of the device housing.

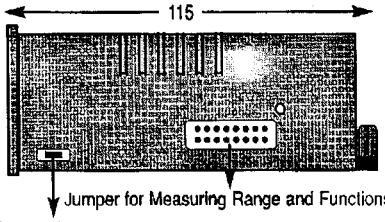
Jumper 1	Meas. Range	200mV AC/DC
Jumper 2	Meas. Range	2V AC/DC
Jumper 3	Meas. Range	20V AC/DC
Jumper 4	Meas. Range	200V AC/DC
Jumper 5	Meas. Range	1000V DC/ 500V AC
Jumper 8	Set one jumper only for DC voltage measurements	
Jumper 6,7	Set two jumpers for AC voltage measurements	

Attention:
Either set Jumper 6,7(for AC) or Jumper 8 (for DC). Other combinations may lead to serious damages of the device. Jumpers may not be changed while the device is being connected to power.

Operation Instruction:



MOD	enter or leave programming mode
▲	increment selected digit
◄	select next digit / position
SP1	display threshold value of SP1 relay
SP2	display threshold value of SP2 relay
SP1	ON : SP1 relay contact is closed
SP2	ON : SP2 relay contact is closed

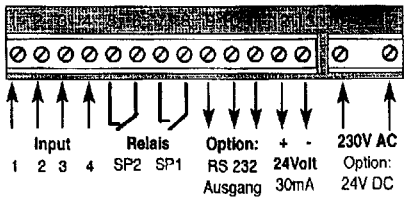


Key Lock:
The jumper is placed on the main board and is accessible from the side of the device housing.
By removing the jumper the keys are locked.

Error indications
If the measuring signal exceeds or falls short of the allowed measuring range the LED display shows:
"oooo" = Measuring range exceeded
"uuuu" = Measuring range fallen short

Reset to default device setting
Turn off power. Push simultaneously the leftmost three keys. Hold and turn on power. Release keys after 3 seconds.

Terminal Legend:



Input 1:	Voltage measuring In-HI for 0-1000V DC, 0-500V AC
Input 2:	Voltage measuring In-HI for 0-200V range DC/AC
Input 3:	GND measuring DC/AC
Input 4:	GND measuring DCV/AC
Relay SP1:	Potential free switch
Relay SP2:	Potential free switch
Opt.RS232:	Galvanic separated RS232 output GND(11), RXD(10), TXD(9) Output: 24V, 30mA galvanic separated voltage supply for external sensors
230V AC:	Standard AC Power input (15,17) or Optional 12V / 24V DC supply input

Option: 12V / 24V DC Supply

In derivation of the standard model the device can be ordered for following auxiliary supply voltages: 12V DC or 24V DC (Conn. 15 "-", 17 "+"). For these models the 24V / 30mA sensor supply voltage is not available.
Using this option measurements for up to 200V DC / AC can be performed only since the DC-DC converter isolates 500V. Special DC-DC Converter are available on request for higher measurements.

Option: RS 232 with Real Time Clock

he RS232 module with Real Time Clock provides a printer output via the serial interface. Data, Time and Measuring values with dimension are available. The isolated RS232 interface is bi-directional and comes with a driver software. Models 670/... can be controlled external via this interface.
(See description on back page)

Option: Analog Output Terminal 9, 11

Models -010 / -020 / -030 / -050 / -060

Output:	-1999 digits generate = 0V
Terminal 9 = + V	±000 digits generate = +5V
Terminal 11 = GND	1999 digits generate = +10V

With this option the 24V voltage supply is not available

Safety Precautions:

Employing these instruments, regulations for working with high voltage equipment, as well as any Professional Trade Association regulation for working with electrical appliances and installations have to be observed.

CE-Guidelines

Meets the EMV Guideline (89/336/EWG) and the German EMV ruling by applying the Basic Standard EN 50080/ EN 50081. Meets the Low Voltage Guideline (73/23/EWG) by applying Product Standard EN 61010.

Guarantee Regulations

Regulations by law apply for guarantee within 12 month. All equipment is factory tested and calibrated. Excluded from the guarantee are normal wear and tear, defects due to misuse, negligence, chemical exposure, mechanical stress as well as equipment, which has been modified, re-labeled or otherwise altered or if attempts to repair have been made. All guarantee claims are subject to our scrutiny and approval.

Programming

The programmable **Panel Meter 670-XXX with its integrated** measuring routines can be controlled by a variety of parameters for the measuring cycle. New values can be entered as on a pocket calculator via keyboard, easy and comfortable.
This is how to select a measuring routine:

Push MOD to enter programming mode	MOD
Select routine number with increase key	▲
Push MOD again to confirm selection	MOD
To change value on selected routine:	
Enter desired value with increase key	▲
Select next position with shift key, decimal point of selected digit is blinking	◄
Select value with increase key	▲
Enter inserted value	MOD

The device now works again in the measuring mode.

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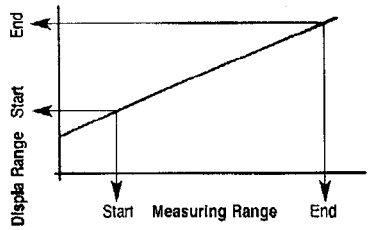
Schwille - Elektronik Digitale Panelmeter SPE 670 - 010 for AC / DC Voltage Measurements

Integrated Programming Routines

Routine 1 – 4: Special Measuring Range only
With routines 1-4 the ration between the measuring range and the display range is set. Thereby the slope of the line between start and end values as well as a zero-offset value can be set. To excess these routines parameter 1 must be set in Routine 23.



Routine 1: Start of measuring range
Routine 2: Start of display range
Routine 3: End of measuring range
Routine 4: End of display range

Example: Measuring Range. 0 - 1000
Display Range. 0 - 780
- Routine 23 set to 1
- Routine 1 set to 000
- Routine 2 set to 000
- Routine 3 set to 1000
- Routine 4 set to 780

Routine 5: Setting the Options
DAC (Analog Output) or
RS232 / Real Time Clock board mounted
000 = DAC or no extension board
001 = RS232 / RTC board

Routine 6: Setting the Decimal Point
Setting the position of the comma on the LED display
- 000 = No decimal point (default)
- 001 = 1.999
- 002 = 19.99
- 003 = 199.9

Routine 7: Setting the Switch Point SP 1 With this routine the desired threshold (display) value for SP 1 can be set.
Routine 8: Activating Switch Point SP 1 The switch point function can be turned on or off.
000 = Inactive, 001 = Active

Routine 9: Setting the Switch Point SP 2 With this routine the desired threshold (display) value for SP 2 can be set.
Routine 10: Activating Switch Point SP 2 The switch point function can be turned on or off.
000 = Inactive, 001 = Active

Routine 11: Switch Point Hysteresis SP 1
Routine 12: Switch Point Hysteresis SP 2
The hysteresis is set as an amount of digits (max. 1999).
Default value 000

Routine 13: Test Function Relay SP 1
Routine 14: Test Function Relay SP 2
EIN is displayed if the relay is energized and if the relay is programmed as Closer (N/O). Otherwise
AUS is displayed if programmed as Opener (N/C).

Routine 15: Setting of relay function SP 2
Routine 16: Setting of relay function SP 2
Each relay can operate as Closer (N/O) or Opener (N/C) when the Switch Point is reached. If the last digit is set to 1 = Opener (N/C) the current circuit is inter-rupted. If the last digit is set to 000 = Closer (N/O) the current circuit is closed. Default = 000.

Routine 17: ON- / OFF- delay of SP 1
Routine 18: ON- / OFF- delay of SP 2
When reaching the threshold value the relay function is time-delayed. The time-delay is proportional to the number of measuring cycles (max. 1999 cycles). Number of measuring cycles = Time-delay Default: 000

Routine 19: Viewing Maximum measuring value retention
Routine 20: Viewing Minimum measuring value retention
The maximum and minimum measuring values since the last reset are continuously recorded and stored. These values can be reset while the min.or max. value is displayed by pushing and holding for at least 3 seconds keys SP 1 and SP 2 simultaneously

Routine 21: Rounding the last digit
The last digit can be rounded to 0, 2 or 5.
Setting: 000 = last digit will be set to 0
001 = last digit will be displayed (default)
002 = 2 / 4 / 6 / 8
003 = 0 / 5 / 0

Routine 22:
Setting the number of measurements to generate an average value The average measuring value will be displayed.
Setting: 000 = no average value generation (default).
002 – 1999 number of measuring cycles used to generate an average value

Routine 23: Selection of measuring method
Setting: 000 = standard measuring (default)
001 = special measuring range.
Routines 1 – 4 can be accessed

Routine 25: Activation und Time setting for RS232 Interface
Setting: 000 = no measurement output (default)
001 = output activated, cycle time Minutes
002 = output activated, cycle time Seconds

Data format:
4800 Bd, no Parity, 1 Stop bit and 8 Data bits

Routine 26: Measurement division by 10
Setting: 000 = no division (default)
001 = measuring value divided by 10

Routine 27: Setting the Baud Rate of the RS232 interface
Setting: 0 = 150, 1 = 300, 2 = 600,
3 = 1200, 4 = 2400
5 = 4800, 6 = 9600 Baud

Setting the Real Time Clock (RTC)

Routine 28: Minutes
This value sets the actual time in minutes
Setting range: 0 – 59 minutes

Routine 29: Hours
This value sets the actual time in hours
Setting range: 0 – 23 hours

Routine 30: Day of date
This value sets the actual day of the date
Setting range: 1 – 31

Routine 31: Day of week
This value sets the actual day of the week
Setting: 0 = Sunday, 1 = Monday, 2 = Tuesday,
3 = Wednesday, 4 = Tuesday, 5 = Friday,
6 = Saturday

Routine 32: Month of date
This value sets the actual month of the date Setting range:
1 = January, ... 12 = December

Routine 33: Year of date
This value is least significant part of the year number of the actual year of date. The most significant part is set to 20.
Setting range: 0 –99
0 = 2000, 99 = 2099

Routine 34: Setting the Transmission cycle for serial interface Date and time are added to the measuring value at the time interval of the programmed transmission cycle and transmitted via the serial interface. The time distance of transmissions is entered in minutes Note that transmission must be activated first either through Routine 25 or through Jumper 4 (see description further down).
Setting range: 0 – 255
0 = Timer Stop (no transmission)
1 = transmission occurs every minute
2 = every 2 minutes
255 = every 255 minutes (4h 15min)

Dimensioning measurements The dimension of a physical unit consists mainly of two parts, the size and the type of the unit. Dimensions are not displayed on the SPE 670 series but appear on the printout. The dimension size and type can be entered in ASCII-code as a decimal value. For the extended characterset code page 437 (IBM) applies.

Routine 35: Size of dimension
Sets the size of the physical unit for the displayed measuring value:
m = Milli, μ = Micro, p = Pico ...° = Grad. Examples: ° = 248, μ = 230, m = 109, n = 110, p = 112, k = 107, M = 77, G = 71.

Routine 36: Type of dimension
Sets the type of the physical unit for the displayed measuring value: V = Volt, A = Ampere ... C = Celsius
Examples: A = 65, C = 67, V = 86, Ü = 234 (Ohm).

Routine 37: Customizing signs for measurements
Covering a wider variety of naming measuring values a third sign can be entered. Through this feature names like "Bar" are possible. In this example enter
B = 66 in Routine 35, a = 65 in Routine 36 and r = 114 in Routine 37.
For character translation see ASCII-code table or IBM code page 437.

Jumper 4 Single or event triggering
If Jumper 4 is set measuring values are transmitted at programmed time intervals via the serial interface, even if the inter face is deactivated through Routine 25. The transmission cycle is set through Routine 34 respectively can be stopped. Jumper 4 is accessible on the main board left hand side of the display unit. (seen from the front view)

Service

We are glad that you decided on an instrument from our product range. If there are what so ever any defects, please send the instrument (postage paid) to your distributor.

For technical information contact us via E Mail
Info@schwille.de

Technical changes reserved.
Edition: 02.May 2003

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Schwille - Elektronik 670 – 232 Output Module for Models SPE 670-010 / -020 / -030 / -050 / -060

The following routines apply only to the 232-output module. Various parameters can be set through these routines.

ROUTINES

No Description:

Routine 5: Option Setting
(Analog Output) DAC 670 – 204 or
RS232 / RTC 670 – 232 mounted
0 = DAC (670 – 204) or no extension
1 = RS232 / RTC (670 – 232) board

Routine 25: Activation und Time setting for RS232
000 = no measurement output (default)
001 = cycle time Minutes
002 = cycle time Seconds

Routine 27: Setting the Baud Rate of the serial interface
0 = 150
1 = 300
2 = 600
3 = 1200
4 = 2400
5 = 4800
6 = 9600 Baud

Routine 28: Real-Time-Clock Minutes
This value sets the actual time in minutes
Setting range: 0 – 59 minutes

Routine 29: Real-Time-Clock Hours
This value sets the actual time in hours
Setting range: 0 – 23 hours

Routine 30: Real-Time-Clock Day of date
This value sets the actual day of the date
Setting range: 1 – 31

Routine 31: Real-Time-Clock Day of week
This value sets the actual day of the week
0 = Sunday
1 = Monday
2 = Tuesday,
3 = Wednesday
4 = Tuesday
5 = Friday
6 = Saturday

Routine 32: Real-Time-Clock Month of date
This value sets the actual month of the date
Setting range: 1 – 12
i.e. 1 = January ... 12 = December

Routine 33: Real-Time-Clock Year of date
This value is least significant part of the year number of the actual year of date. The most significant part is set to 20.
Setting range: 0 –99
0 = 2000,
99 = 2099

Routine 34: Setting the Transmission cycle rate for the serial interface Date and time are added to the measuring value at the time interval of the programmed transmission cycle and transmitted via the serial interface. The time distance of transmissions is measured in minutes or seconds according to the setup in Routine 25. Note that transmission must be activated first through Routine 25.

Setting range:
0 – 255
0 = Timer Stop (no transmission)
1 = transmission occurs every minute
2 = every 2 minutes
I
255 = every 255 minutes (4h 15min)
The amount of transmission cycles also effects the transmission of the measuring values if Jumper 4 is closed. If the parameter is set to 0 transmission is stopped.

Dimensioning measurements
The dimension of a physical unit consists mainly of two parts, the size and the type of the unit. Dimensions are not displayed on the SPE 670 series but appear on the printout. The dimension size and type can be entered in ASCII-code as a decimal value. For the extended characterset refer to IBM-code page 437.

Routine 35: Size of dimension
Sets the size of the physical unit for the displayed measuring value: m = Milli, μ = Micro, p = Pico ... ° = Grad.

Examples: ° = 248, μ = 230, m = 109, n = 110, p = 112, k = 107, M = 77, G = 71.

Routine 36: Type of dimension
Sets the type of the physical unit for the displayed measuring value: V = Volt, A = Ampere ... C = Celsius

Examples: A = 65, C = 67, V = 86, Ω = 234 (Ohm).

Routine 37: Customizing signs for measurements
Covering a wider variety of naming measuring values a third sign can be entered.
Through this feature names like "Bar" or "mA" are possible.
In this example enter
B = 66 in Routine 35
a = 97 in Routine 36
r = 114 in Routine 37

m = 199 in Routine 35
A = 65 in Routine 36
Space = 32 in Routine 37

For character translation see ASCII-code table or IBM code page 437.

Jumper and Start display

Jumper 4:
If Jumper 4 is set measuring values are transmitted at programmed time intervals via the serial interface, even if the inter face is deactivated through Routine 25. The transmission cycle is set through Routine 34 respectively can be stopped.

Display:
At the end of the selftest routine the type of the loaded program is displayed.

SPE6xx.UI Program for voltage and current (U/I)
SPE6xx.PT Program for PT100/PT1000 sensors
SPE6xx.TH Program for thermo element

xx = device type = 70: SPE670, = 75: SPE675

Data transmission of SPE670 measuring values via the serial interface

Routine 25 Transmission activated / deactivated
Routine 27 Baud rate for the interface selected
Routine 34 Transmission cycle set

If transmission is deactivated in Routine 25 , Jumper 4 must be set in order to transmit Data. Data will be transmitted by the setting of the transmission cycle of Routine 34 in minutes. The individual characters are transmitted in ASCII-code. The sign of the measuring value is transmitted for negative values as minus otherwise as space.

Data transmission commences with the first character of the day and finishes with LF (line feed – 10d, 0Ah) and CR (carriage return – 13d, 0Dh) in order to start a new line for a connected printer or monitor.
Day.Month.Year Hour:Minute
- Measuring value (incl. comma)
Dimension size type custom-character

DD.MM.YYYY hh:mm –XXX,XSTC

Legend:
DD = day
MM = month
YYYY = year
hh = hour
mm = minute
- = minus sign or space
XXX.X = 0000 – 1999, comma properly placed
S = size of dimension: m=Milli, k=Kilo
T = type of dimension: A=Ampere, V=Volt
C = custom character:
. = dot (ASCII – 46d, 2Eh)
: = colon (ASCII – 58d, 3Ah)
= space (ASCII – 20h, 32d)
, = comma (ASCII – 44d, 2Ch)

Example:

Telegram = 21.05.2001 13:15 1.234Bar

Character	ASCII (decimal)
2	50
1	49
.	46
0	48
5	53
.	46
2	50
0	48
0	48
1	49
space	32
1	49
3	51
:	58
1	49
5	53
space	32
space	32
1	49
.	46
2	50
3	51
4	52
B	66
a	97
r	114
LF	10
CR	13