

Changes on devices SPE 670 for frequency, revolution, flow and event measurements included.

After power on the display shows 0 for about 2 seconds. If the Real Time Clock is not mounted or the clock batteries are empty the display shows 8888 after 2 seconds, otherwise the first measuring value is displayed. This applies only for devices for flow and event measurements and for devices for frequency and revolution measurement and only if the RS232 interface is integrated. Key SP1 displays the threshold value of SP1 and key SP2 the threshold value of SP2.

ROUTINES

No: Description:

- 1 Applies to flow and event counter: Initialization of memory or entering preset value. The measuring value which is stored on power off will be overwritten with the newly entered preset value.
Setting 0 = erase value.
 - 2 N/A for flow and event counter.
 - 3 N/A for flow and event counter.
 - 4 N/A for flow and event counter.
 - 5 Measurement or clock time.
With parameter set to 1 the clock time of the SPE is displayed in hours and minutes (i.e.: 12:35)
0 = display measuring value
1 = display clock time
 - 6 Decimal point position.
0 = 9999 no decimal point
1 = 999.9
2 = 99.99
3 = 9.999
 - 11 Switch point hysteresis SP1
 - 12 Switch point hysteresis SP2
The hysteresis increases the on-threshold and decreases the off-threshold of the relays.
Setting: 0 - 999 (Default 0)
- Example:**
Threshold value = 500, hysteresis = 100:
on-threshold = 600, off-threshold = 400
- 13 Test function Relay SP1
 - 14 Test function Relay SP2
Arrow key [^] closes the relay contact, arrow key [<] opens the relay contact. The display shows EIN for a closed relay contact and AUS for an open relay contact..
 - 19 Inquiry of the measured maximum value. Push arrow keys simultaneously to erase the stored value.
 - 20 Inquiry of the measured minimum value. Push arrow keys simultaneously to erase the stored value.
 - 23 Applies to flow meter: Selection of quantity display
0 = actual flow per second
1 = total quantity (minimum quantity 1 liter/sec.)
The total quantity value will be stored on power-off of the SPE.

- 24 Sets the pulse rate per revolution for a rotation signal distributor: 1 – 9999 for flow and revolution measurements
Default = 100
(must be adapted to the applied rotation signal distributor.)
 - 25 Activation of the RS232 interface
0 = locked (seconds),
2 = locked (minutes),
1 = activated (seconds)
3 = activated (minutes)
Locked (seconds / minutes) effects the transmission cycle rate if jumper JP 4 is closed.
 - 27 Setting the baud rate of the serial interface
0 = 150,
1 = 300,
2 = 600,
3 = 1200,
4 = 2400
5 = 4800
Data format: no parity check, 8 Data bits and 1 Stop bit.
 - 28 Real-Time-Clock minutes
This value is the minute of the actual clock time.
Setting: 0-59 minute
 - 29 Real-Time-Clock hours
This value is the hour of the actual clock time.
Setting: 0-23 hour
 - 30 Real-Time-Clock day of date
This value is the day of the actual date.
Setting: 1-31
 - 31 Real-Time-Clock week of date. This value is the weekday of the actual date.
0 = Sunday 1 = Monday 2 = Tuesday 3 = Wednesday
4 = Thursday 5 = Friday 6 = Saturday
 - 32 Real-Time-Clock month of date
This value is the month of the actual date.
Setting: 1-12 1 = January, ... 12 = December
 - 33 Real-Time-Clock year of date
This value is the least significant part of the year number of the actual date.
The most significant part is set to 20.
Setting: 0-99 02 = 2002, 03 = 2003, , 99 = 2099
 - 34 Transmission cycle rate for the serial interface.
In the pace of the adjusted transmission cycle, date and time values are added to the measuring value and transmitted via the serial interface. The entered cycle number is either in seconds or in minutes (Routine 25) and is the distance of time between two consecutive transmissions.
- Note that the serial interface must be activated in general with Routine 25 before transmission can commence.
Setting: 0-255:
0 = Timer Stop (no transmission)
1 = 1 second / minute,

2 = 2 second / minute

...

255 = 255 seconds (4 min 15 sec) or 255 minutes (4 h 15 min) The amount of transmission cycles also effects the transmission of the measuring values if jumper JP4 is closed. With the parameter set to 0 transmission is stopped.

35 Dimension of the measuring value
The dimension is the physical size of the displayed measuring value (i.e.: m=Milli, μ =Micro, p=Piko.... °=Degree) Dimensions are not shown on the display of the SPE670 but on its printout.
Dimensions are entered in ASCII-Code decimal. For extended character set (codes 128-256) the international code table IBM (code page 437) applies.

Examples: 8= 248, m = 109, n = 110, p = 112 k = 107, M = 77, G = 71,

.....

36 Naming the measuring value. The name is the physical type of the displayed measuring value (i.e.: V=Volt, A=Ampere, C=Celsius). The name is not shown on the display of the SPE670 but in its printout. The name is entered as ASCII-Code decimal. For extended character set (Codes 128-256) the international code table IBM (code page 437) applies.

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

37 Customer defined signs for the measuring value. The customer defined sign expands the display to three signs whereby definitions like "Bar" are made possible. The sign does not show on the display of the SPE670 but in its printout. The sign is entered as ASCII-code decimal. For extended character set (Codes 128-256) the international code table IBM (code page 437) applies

Examples: B - 66 in Routine 35

a - 97 in Routine 36

r - 114 in Routine 37

m - 109 in Routine 35

A - 65 in Routine 36

Space - 32 in Routine 37

Code table for Routines 35, 36 und 37 see ASCII/extended character set – table

Jumper JP4:

If Jumper JP4 is set, measuring values are transmitted according to the adjusted transmission cycle via the serial interface, even if the interface is deactivated through Routine 25.

Through Routine 34 transmission cycle rates can be set or transmission can be suppressed.

Display: The display shows at the end of the self-test the accurate type of the loaded program.

P.075 Program for frequency

P.070 Revolution

P.080 Flow

P.085 Event counter

Data transmission of measuring values of the SPE670 via the serial interface.

Settings for the serial interface:

Routine 25: Activating / deactivating and second / minute selection of the serial interface

Routine 27: Setting the baud rate of the serial interface

Routine 34: Transmission cycle rate of the serial interface

With jumper JP4 the releasing or locking function through Routine 25 can be bridged, the interface is in this case always active. The cycle rate setting of Routine 34 is still valid. Therefore transmission can be deactivated only with transmission cycle parameter set to 0.

Data transmission format:

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. The length of the telegram is extended by one sign if the measuring value contains a comma.

Day.Month.Year Hour:Minute –Measuring value with comma
Dimension Name Custom-sign.
DD.MM.YYYY hh:mm –XXX,XDNC
DD = day 00 - 31
MM = month 00 - 12
YYYY = year 2000 - 2099
hh = hour 0 - 23
mm = minute 0 - 59
- = minus sign or space
XXX,X = measuring value 0000 - 1999 with comma at proper position
D = dimension of measuring value m-Milli, k-Kilo, ...
N = name of measuring value V-Volt, A-Ampere, ...
C = customer defined special sign
. = dot (ASCII - 2Eh, 46d)
: = colon (ASCII - 3Ah, 58d)
= space (ASCII - 20h, 32d)
, = comma (ASCII - 2Ch, 44d)

Examples: Telegram = 21.05.2001 13:15 1,234Bar

Char. 2 1 . 0 5 . 2 0 0 1 SP 1 3 : 1 5 SP SP
ASCII 50 49 46 48 53 46 50 48 48 49 32 49 51 58
49 53 32 32
1 , 2 3 4 B a r LF CR
49 44 50 51 52 66 97 114 10 13 (decimal)
Char 2 1 . 0 5 . 2 0 0 1 SP 1 3 : 1 5 SP SP
32 31 2E 30 35 2E 32 30 30 31 20 31 33 3A 31 35 20 20
1 , 2 3 4 B a r LF CR

31 2C 32 33 34 42 61 72 0A 0D (hex code)
Telegram = 07.10.2025 07:32 -25,12°C
Char. 0 7 . 1 0 . 2 0 2 5 SP 0 7 : 3 2 SP
ASCII 48 55 46 49 48 46 50 48 50 53 32 48 55 58 51 50 32
- 2 5 , 1 2 ° C SP LF CR
45 50 53 44 49 50 248 67 32 10 13 (dezimal)
Char. 0 7 . 1 0 . 2 0 2 5 SP 0 7 : 3 2 SP
ASCII 30 37 2E 31 30 2E 32 30 32 35 20 30 37 3A 33 32 20
- 2 5 , 1 2 ° C SP LF CR
2D 32 35 2C 31 32 F8 43 20 0A 0D (hex code)

ASCII-Table: (Codes 0-127d, 00-7Fh)

| Dec. | Hex. | Char. | Dec. | Hex. | Char. | Dec. | Hex. | Char. | Dec. | Hex. | Char. |
|------|------|-------|------|------|-------|------|------|-------|------|------|-------|
| 0 | 00 | NUL | 32 | 20 | SP | 64 | 40 | @ | 96 | 60 | ` |
| 1 | 01 | SOH | 33 | 21 | ! | 65 | 41 | A | 97 | 61 | a |
| 2 | 02 | STX | 34 | 22 | " | 66 | 42 | B | 98 | 62 | b |
| 3 | 03 | ETX | 35 | 23 | # | 67 | 43 | C | 99 | 63 | c |
| 4 | 04 | EOT | 36 | 24 | \$ | 68 | 44 | D | 100 | 64 | d |
| 5 | 05 | ENQ | 37 | 25 | % | 69 | 45 | E | 101 | 65 | e |
| 6 | 06 | ACK | 38 | 26 | & | 70 | 46 | F | 102 | 66 | f |
| 7 | 07 | BEL | 39 | 27 | ' | 71 | 47 | G | 103 | 67 | g |
| 8 | 08 | BS | 40 | 28 | (| 72 | 48 | H | 104 | 68 | h |
| 9 | 09 | HT | 41 | 29 |) | 73 | 49 | I | 105 | 69 | i |
| 10 | 0A | LF | 42 | 2A | * | 74 | 4A | J | 106 | 6A | j |
| 11 | 0B | VT | 43 | 2B | + | 75 | 4B | K | 107 | 6B | k |
| 12 | 0C | FF | 44 | 2C | , | 76 | 4C | L | 108 | 6C | l |
| 13 | 0D | CR | 45 | 2D | - | 77 | 4D | M | 109 | 6D | m |
| 14 | 0E | SO | 46 | 2E | . | 78 | 4E | N | 110 | 6E | n |
| 15 | 0F | SI | 47 | 2F | / | 79 | 4F | O | 111 | 6F | o |
| 16 | 10 | DLE | 48 | 30 | 0 | 80 | 50 | P | 112 | 70 | p |
| 17 | 11 | DC1 | 49 | 31 | 1 | 81 | 51 | Q | 113 | 71 | q |
| 18 | 12 | DC2 | 50 | 32 | 2 | 82 | 52 | R | 114 | 72 | r |
| 19 | 13 | DC3 | 51 | 33 | 3 | 83 | 53 | S | 115 | 73 | s |
| 20 | 14 | DC4 | 52 | 34 | 4 | 84 | 54 | T | 116 | 74 | t |
| 21 | 15 | NAK | 53 | 35 | 5 | 85 | 55 | U | 117 | 75 | u |
| 22 | 16 | SYN | 54 | 36 | 6 | 86 | 56 | V | 118 | 76 | v |
| 23 | 17 | ETB | 55 | 37 | 7 | 87 | 57 | W | 119 | 77 | w |
| 24 | 18 | CAN | 56 | 38 | 8 | 88 | 58 | X | 120 | 78 | x |
| 25 | 19 | EM | 57 | 39 | 9 | 89 | 59 | Y | 121 | 79 | y |
| 26 | 1A | SUB | 58 | 3A | : | 90 | 5A | Z | 122 | 7A | z |
| 27 | 1B | ESC | 59 | 3B | ; | 91 | 5B | [| 123 | 7B | { |
| 28 | 1C | FS | 60 | 3C | < | 92 | 5C | \ | 124 | 7C | |
| 29 | 1D | GS | 61 | 3D | = | 93 | 5D |] | 125 | 7D | } |
| 30 | 1E | RS | 62 | 3E | > | 94 | 5E | ^ | 126 | 7E | ~ |
| 31 | 1F | US | 63 | 3F | ? | 95 | 5F | _ | 127 | 7F | ~ |

Code 32d, 20h = SP (space)

Extende character IBM: (Codes 128-255, Code page 437)

| Dec. | Hex. | Char. | Dec. | Hex. | Char. | Dec. | Hex. | Char. | Dec. | Hex. | Char. |
|------|------|-------|------|------|-------|------|------|-------|------|------|-------|
| 128 | 80 | À | 160 | A0 | † | 192 | C0 | ¿ | 224 | E0 | ‡ |
| 129 | 81 | Á | 161 | A1 | ° | 193 | C1 | ¡ | 225 | E1 | · |
| 130 | 82 | Â | 162 | A2 | ¢ | 194 | C2 | ª | 226 | E2 | , |
| 131 | 83 | Ã | 163 | A3 | £ | 195 | C3 | » | 227 | E3 | " |
| 132 | 84 | Ä | 164 | A4 | § | 196 | C4 | ƒ | 228 | E4 | ‰ |
| 133 | 85 | Å | 165 | A5 | o | 197 | C5 | ˜ | 229 | E5 | |
| 134 | 86 | Û | 166 | A6 | ¶ | 198 | C6 | . | 230 | E6 | Ê |
| 135 | 87 | á | 167 | A7 | ß | 199 | C7 | « | 231 | E7 | Á |
| 136 | 88 | à | 168 | A8 | ® | 200 | C8 | » | 232 | E8 | Ë |
| 137 | 89 | â | 169 | A9 | © | 201 | C9 | ... | 233 | E9 | È |
| 138 | 8A | ä | 170 | AA | ™ | 202 | CA | | 234 | EA | Í |
| 139 | 8B | ã | 171 | AB | ´ | 203 | CB | À | 235 | EB | Î |
| 140 | 8C | ä | 172 | AC | ¨ | 204 | CC | Ã | 236 | EC | Ï |
| 152 | 98 | ò | 184 | B8 | . | 216 | D8 | ÿ | 248 | F8 | ˘ |
| 153 | 99 | ó | 185 | B9 | p | 217 | D9 | ÿ | 249 | F9 | ¸ |
| 154 | 9A | ô | 186 | BA | . | 218 | DA | / | 250 | FA | ÿ |
| 155 | 9B | õ | 187 | BB | ª | 219 | DB | ¼ | 251 | FB | º |
| 156 | 9C | ú | 188 | BC | º | 220 | DC | ¸ | 252 | FC | , |
| 157 | 9D | ù | 189 | BD | . | 221 | DD | ¸ | 253 | FD | _ |
| 158 | 9E | û | 190 | BE | æ | 222 | DE | fi | 254 | FE | _ |
| 159 | 9F | ü | 191 | BF | ø | 223 | DF | fl | 255 | FF | j |

Transmission of the parameterset via the RS232 interface to the SPE670. Device parameters can not only be entered via the device keys but also be transferred via the RS232-Interface into the SPE670 and stored there. In this fashion it is necessary to always enter the complete parameter-set instead of a single parameter. The used telegram format is described in the following section. Transmission commences with ASCII character STX (Code 02) followed by the amount of bytes of net characters exclusive the STX character, inclusive the checksum. (amount = 61 bytes). The parameter-set follows. Each individual parameter is transmitted as a 16-bit value or 2 bytes. The low-order byte is received first then the high-order byte. Parameters are transferred as binary code, BCD-code or ASCII-code.

Parameter-set:

- Measuring value: start range (BCD: -9999 - 9999)
- Display value: start range (BCD: -9999 - 9999)
- Measuring value: end range (BCD: -9999 - 9999)
- Display value: end range (BCD: -9999 - 9999)
- Function selection (binary: 0 - 3)
- Decimal point (binary: 0 - 7)
- Schaltpunkt SP1 (BCD: -9999 - 9999)
- Activation SP1 (binary: 0 - 1)
- Threshold SP2 (BCD: -9999 - 9999)
- Activation SP2 (binary: 0 - 1)
- Hysteresis SP1 (BCD: 0 - 9999)
- Hysteresis SP2 (BCD: 0 - 9999)
- Test function SP1 (N/A)
- Test function SP2 (N/A)
- Relay function SP1 (binary: 0 - 1)
- Relay function SP2 (binary: 0 - 1)
- Time delay SP1 (BCD: 0 - 9999)
- Time delay SP2 (BCD: 0 - 9999)
- Rounding last digit (binary: 0 - 5)
- Amount of measurements for average (BCD: 0 - 9999)
- Special measurement / PT100 (binary: 0 - 1)
- °C / F (binary: 0 - 1)
- Activation RS232 (binary: 0 - 1)
- Division by 10 (binary: 0 - 1)
- Baud rate RS232 (binary: 0 - 6)
- RTC - minutes(low-order) / hours(high-order) (binary: 0 - 59 / 0 - 23)
- RTC - day(low-order) / weekday(high-order) (binary: 1 - 31 / 0 - 6)
- RTC - month(low-order) / year(high-order) (binary: 1 - 12 / 0 - 99)
- RTC - timer(low-order) / display - dimension(high-order) (binary: 0 - 255 / ASCII)
- Display - name(low-order) / custom-sign (high-order) (ASCII / ASCII)
- 16-Bit-variable (BCD: 0 - 9999)

The last sign is the 8-bit checksum. The checksum is the sum of all bytes of the parameter-set except the STX character and the amount of bytes of net characters. Checksum calculation: MeasStrtRng(low-order) + MeasStrtRng(high-order) + DspStrtRng(low-order) + + Custom-sign(high-order) = Checksum Telegram: STX, amount, MeasStrtRng(low-order), MeasStrtRng(high-order), DspStrtRng(low-order), .., Custom-sign(high-order), Checksum. If the parameter-set has been received correctly by the SPE670, the reception will be acknowledged by sending the ASCII-character ACK (code 06) and the parameter-set will be excepted. On errors the acknowledgement signal will not be sent, the existing parameters are still available.