Operating Instructions

**Electronic preselection counter
NE215 preliminary testing by PTB**

General Information

In the following you will find the explanations of the symbols used in this operating manual.

Explanation of symbols

➤ This symbol indicates activities to be carried out.
● This symbol indicates supplementary technical information.

⚠ This symbol is located before texts to which particular attention is to be paid to ensure proper use of the NE215.

This symbol is located before texts that provide important additional information.

Italics Important terms in the left text column are printed in italics to help you find information more quickly.

1 Safety Instructions

1.1 General information

The products has been developed and built in accordance with the recognized rules of technology. The units have left the manufacturing plant ready to operate and in safe condition.
To keep the units in this condition, it is necessary that the units be installed and operated
– properly,
– in a safety and hazard-conscious manner,
– under observance of this operating manual and in particular of these safety precautions!

Make sure that the personnel has read and understood the operating manual, and in particular the "Safety Instructions" chapter. In addition to the operating manual, the generally applicable legal and other binding regulations for accident prevention and environmental protection must be observed and ensured.

1.2 Proper use

The application of the units consists of controlling and monitoring industrial processes in the metal, wood, plastics, paper, glass and textile industry etc.
The units may only be operated
– in the properly installed state and
– in accordance with the specifications of the technical data!

⚠ Operation not covered by the specified descriptions/parameters is improper and can lead to
– fatal injuries,
– serious damage to health,
– property damage or
– damage to the units
in conjunction with the systems/machines/processes
to be controlled/monitored!

The overvoltages to which the units are subjected at the connection terminals must be limited to the value of the overvoltage category II (see Technical Data)!

The units may not be operated
– in hazardous areas,
– as medical units,
– in applications expressly named in EN 61010!

If the units are used to control/monitor machines or processes with which, as the result of a failure/malfunction or incorrect operation of the units
– a life-threatening danger,
– health risks or
– a danger of property or environmental damage
could result, then appropriate safety precautions
must be taken!

Do not open the housing of the units or make any changes to it!
Tampering with the units can have a negative affect on their operating safety, resulting in dangers!
Do not make repairs on the units! Return defective units to the manufacturer!

1.3   Installation/commissioning

In case of changes (including in the operating behavior) that impair safety, shut-down the units immediately.

Installation may only be carried out in accordance with the procedure described in Chapter 3 "Connecting".
During installation work on the units, the power supply must always be disconnected. Installation work may only be carried out by appropriately trained experts.
Max. voltage 250 V terminal - terminal, ground - terminal.

Following proper assembly and installation, the units are ready for operation. Following commissioning, familiarize yourself with the use of the units in Chapter 4 "Operator Level".

1.4   Maintenance/repairs

Always disconnect the power supply of all units involved. Maintenance and repair work may only be carried out by appropriately trained experts.

If troubleshooting is unsuccessful, do not continue to use the units. Please contact the manufacturer in this case.

## 2   Getting to know the counter

The counter comprises the following:

– Presetting the counter with 2 preset value, (preliminary testing by PTB)
– Secondary counter with preset value and multiplier,
– Totalizing counter, (preliminary testing by PTB)
– Time meter

Components / LED-display

XP   Counter status, main counter
P1   Preset value 1, main counter
P2   Preset value 2, main counter
m   Meter display
Σ   Totalizing counter
B1   Preset value, sec. counter
⏱   Current value, time meter

Control panel

0...9   Numerical keypad
→   Selector key for function display
P/R   Selector key for programming/operating mode
F   Function key

Druck   Key for printing

C   Reset key
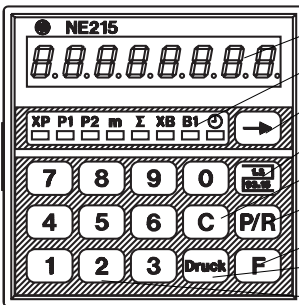
Function display
LEDs- Symbol display
Selector key/Function display
PTB-Number
Reset key C
Selector key for programming/operating mode
Function key
Key for printing
Numerical keypad

The counter is a micro-processor controlled electronic device with serial interface for counting, controlling and monitoring. The device is approved by the German Physical Technical Authorities (PTB) as calibrated for the use as: "measured value transfer device for application in calibrated machines for length measurement".

Address for printer:
DATAMEGA Mikrodatent. GmbH
Landsberger Str. 318-320
80687 München
Tel.: +49 (0)89 56017-300

Registration	From	Reference number
NE215	23.12.1993	1.62-3251.11 / IVO-040293
1. addendum	16.03.1995	1.62-3251.11 / IVO-040293
2. addendum	28.09.1997	1.62-3251.11 / IVO-040293
3. addendum	24.06.1999	5.23-99037480
4. addendum	29.03.2001	5.21-01028291

PTB-Approval:

1.3
93.15

⚠ The counter is only PTB approved in combination with an encoder. The PTB- approved system for example provides a chart printer model STAR SP298.

Example for print
```
LAENGE*000123.45m
SUMME *000124.48m
LAENGE*00012.345m
SUMME *00013.579m
```
cm-Messung
_____
mm-Messung

Main counter systems: (PTB-approved)
1 up/down preset counter with totalizer.

Batch counter systems: 1 preset counter, adding.
A key provided at the counter enables switching the display to the respective counters ⏩ of the main respectively batch counting system.

Counter function   The counter is administrating the inputs of both counting systems and will react by the programmed output action upon achieving the set presets respectively limit values.

Thanks to various programming options the device is capable of many machine monitoring and controlling tasks. Running values and the set parameters remain even after power failure.

The serial interface allows printout of counter values.

Applications
● Interior use for monitoring and control of production machines and systems.

● In any branches of industry where length measurement is subject to calibration.

The device must not be used in: explosive areas, medical appliances as well as in applications explicitly mentioned in the standards of VDE 0411 part 100.

2.1 Block diagram

The block diagram shows the components together with its contacts and connections.
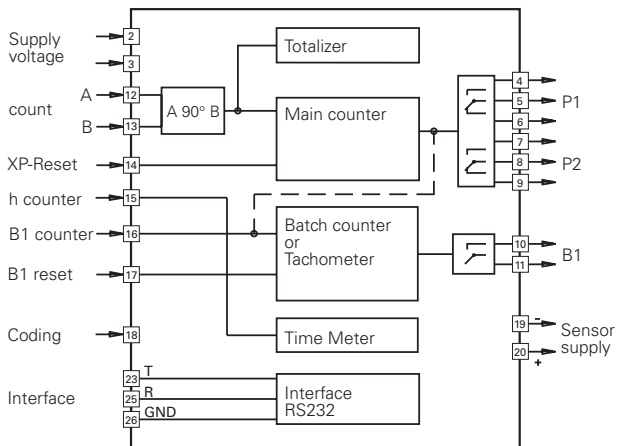
3   Counter connect

This chapter will explain how the contacts are assigned.
Under chapters 3.1 to 3.5 you will find actual tips and technical data
for the various connections.

The electrical inputs and outputs are assigned to two 12-pole plug-in
screw terminals, coded to prevent reversed polarity.

Assignment

max. 250 V ⏦ Terminal - Terminal / ⏚ - Terminal
* Models with scaling
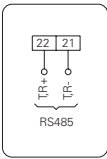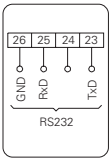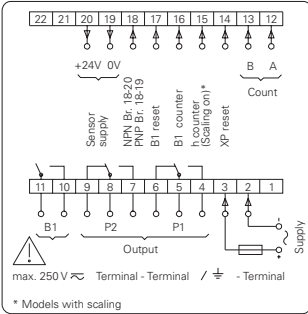
Contact	Function
1	Not assigned
2	Supply voltage
3	Supply voltage
4	
5	⎫
6	⎬ 1 Relay contact output P1
7	
8	⎬ 1 Relay contact output P2
9	
10	
11	⎬ 1 Relay contact output B1
12	Signal input, track A
13	Signal input, track B
14	Reset XP
15	Time meter
16	Signal input, track B1
17	Reset B1
18	Coding input for input logic
19	Encoder supply 0 Volt
20	Encoder supply +24 Volt
21	Option RS485 T,R-
22	Option RS485 T,R+
23	Option RS232 TXD
24	-
25	Option RS232 RXD
26	Option RS232 GND

⚠ Litz contact only by means of connector sleeves with insulating
enclosures for reasons of shock protection according to VDE 0411
part 100. Do not otherwise assign contacts that have been left
unassigned ex factory. We recommend to screen all encoder
terminal leads and to ground the shield on one side. Shields on
both sides are recommended in case of RF interference or in case
of equipotential bonding over long distances. The encoder leads
should not be in the same phase winding as the MAINS supply and
the output contact leads.

3.1 Connecting the power supply

For power supply following voltage ranges are available:
AC 115/230 VAC (50/60 Hz)
DC 24 VDC ±10 %

115 VAC 230 VAC

Voltage supply	Recommended external fuse
115/230 VAC	M 125 mA
24 VDC	M 400 mA
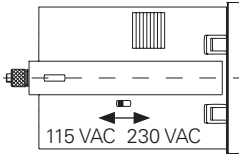
➜ Assign voltage supply to terminals 2 and 3 according to diagramm.

DC-voltage 24 VDC:

Connect voltage supply that is free from any interference. Do not utilize the voltage supply for parallel supply of drives, shields, magnetic valves, etc. Supplying lines must be separated from lines providing load current.

⚠ Fire protection: Operate the instrument using the recommended external fusing indicated in the terminal diagram. EN 61010 specifies that 8 A/150 VA (W) must never be exceeded in the event of a fault.
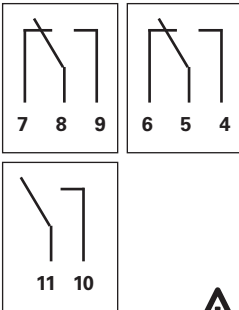
3.2 Assignment signal output „relay contact"

7 8 9

6 5 4

11 10

Terminals 4, 5, 6 and 7, 8, 9 are no-potential changeover contacts. Terminals 10 and 11 are configured as NC or NO contacts in accordance with the purchase order specification. The signal outputs can be assigned in accordance with the adjoining wiring diagram. Implementation as a pulse or continuous signal, together with the pulse time, is effected in the programming mode (lines 31, 32, 33).

Max. rating	Max. voltage	Max. current
150 VA/30 W	265 V	1 A

⚠ The user is responsible for ensuring that a switching load of 8 A/150 VA (W) is not exceeded in the event of a fault. Internal spark suppression by means of two zinc oxide varistors (275 V).

➜ Assign terminals 4, 5, 6; 7, 8, 9; and 10, 11 (relay contactoutputs) accordingly.

3.3 Assignment the signal inputs

Terminals 12 to 17 are AC optocoupler inputs. Terminals 12 (track A) and 13 (track B) are pulse inputs for the main counter (XP) counting function.
Terminal 14 is an external reset input for the main counter.
Depending on what is set in the programming mode (line 40), terminal 15 serves as a starting input for the operating hours counter. Terminal 16 (track B1) is the pulse input for the secondary counter (XB). Terminal 17 is the input for resetting the secodary counter.

Terminal	Input resistance	Starting current	Abschaltstrom
12	1,65 Kohm	> 9 mA, < 16 mA	< 0,5 mA
13	1,65 Kohm	> 9 mA, < 16 mA	< 0,5 mA
14	3,3 Kohm	> 5 mA, < 8 mA	< 0,5 mA
15	3,3 Kohm	> 5 mA, < 8 mA	< 0,5 mA
16	1,65 Kohm	> 9 mA, < 16 mA	< 0,5 mA
17	3,3 Kohm	> 5 mA, < 8 mA	< 0,5 mA

The main counter (XP) is reset by pplying an external signal (signal width ≥ 30 ms) at terminal 14; the secondary counter (XP) at terminal 17. While an external signal is present, no counter take place. The method of resetting is set in the programming mode (lines 29, 30).

➤ Assign terminals 12 to 17 accordingly. The maximum counter frequency is selected in the programming mode (line 26).

Programming input logic   The signal input logic can be programmed by means of a bridge between terminals 18, 19 and 20, in accordance with the table below.

Apply	Encoder signals	Pin assignment
- if encoder supply is not provided by the counter. - if the encoder is featuring push-pull or PNP output - if several counters are triggered in a parallel way by one encoder	PNP, triggered by positive signals.	18 and 19
- if the encoder is featuring a NPN output.	NPN, triggered by negative signal.	18 and 20

Electrical isolation is provided for instruments with an AC power supply and a relay output without interface.

3.4 Connecting the encoder supply

Connect the encoder supply at terminals 19 and 20.
Do not use the encoder supply to supply non-earthed inductive or capacitive loads.

The encoder power supply is not short-circuit proof.

Terminal	Voltage	Max. residual ripple	Max. permissible current
19	0V	–	–
20	+24 VDC +10 %/-50 %	Depending on load	80 mA

3.5 Interface connect

The serial interface is capable of executing the following functions:
– Data printout

Interface parameter are as follows:
– Data transmission rate (baud rate),
– Parity bit,
– Number of stop bits,
The interface parameters can be set in the programming
(lines 43, 44, 45 and 46).

The following interfaces can be connected to the counter:
– RS232

Interface characteristics

RS232 Transmission with the following characterisics:
– Asymmetric
– Two leads
– Point-to-Point connection - 1 transmitter and 1 receiver
– Max. data transmission distance: 30 m

3.6 Executing the test routine

The test routine is described below.

To start test ➤ Press the (**2**) and (**Druck**) key simultaneously.
          ➤ Switch the counter on.

● All the display segments will be displayes automatically in sequence and are therby tested for functional capability.

Test extension ➤ Using the (→) key, test the keyboard, the inputs, outputs and interface in sequence.

⚠   No machine fuctions may connected when the outputs are tested.

ᴸᴬˢᵗᴱ

Keyboard test

ᴵⁿᴬᵇʳ⁵ᵇʳ

Input test

● Inputs can be triggered simultaneously or individually. A display is only provided when a signal is applied.

out   123

Output test

➤ Press keys (**1**), (**2**) and (**3**).

The outputs are now activated.
Reset the outputs with the (**c**) key.

5Er FAI L

Interface test

nE2 15 01

Display: Model and program number

140693 1

Display: Program date and version

End of test The test routine is terminated, the counter is now in the operating mode.

4   Operating mode

The operation and use of the counter are described in this section.

●   As soon as the power supply has been switched on, the
    counter is automatically set to the operating mode.

Operating mode   In the operating mode:
– the current main counter status can be read and reset;
– the preset values for the main and secondary counters can be
  read;
– the current total can be read and reset;
– the current status of the secondary counter can be read and reset;
– the operating hours counter can be read.
All the parameters can be disabled in the programming mode.

Main counter status
The current counter status is displayed in the operating mode;
no keying is necessary.

To read   ➤   Readout running counter value.

```
 378946
```
XP P1 P2 m Σ XB B1 ⏲

Reset   Resetting must be enabled in the programming mode.

➤   Press the Ⓒ key.

Main counter preset value
Resetting must be enabled in the programming mode

To read   ➤   Press the ⊡ key.
           ➤   Read preset value P1.

```
    100
```
XP P1 P2 m Σ XB B1 ⏲

To change   ➤   Press the (P/R) key.
             ●   LED P1 flashes.
             ➤   Press the Ⓒ key.
             ●   Preset 1 is being deleted.
             ➤   Input the preset value P1 via the numerical keypad.
             ➤   Press the (P/R) key.
             ●   The change is completed.

> If a key is not operated within 15 seconds, the preset value will
> automatically be re-displayed in the operating mode.

Other changes   ➤   Press the ⊡ key.
                 ●   The following values can also be changed.

○
工   If other values are changed, the value at witch the operating level
     was left can be re-displayed with the [P/R] key after the
     programming mode has been left.

Other changes   ➤   Press the [→] key.
                  ●   Read preset value P2

```
   1000
```
XP P1 P2 m Σ XB B1 ⏱

To change   ➤   Press the [P/R] key.
              ●   LED P2 flashes.
              ➤   Press the [C] key.
              ●   Preset 2 is being deleted.
              ➤   Input the preset value P2 via the numerical keypad.
              ➤   Press the [P/R] key.
              ●   The change is completed.

○
工   If a key is not operated within 15 seconds, the preset value will
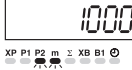   automatically be re-displayed in the operating mode.

Other changes   ➤   Press the [→] key.
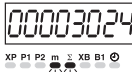   ●   The following values can also be changed.

○
工   If other values are changed, the value at witch the operating level
     was left can be re-displayed with the [P/R] key after the
     programming mode has been left.

Totalizing counter
The totalizing counter can be disabled in the programming mode.

To read   ➤   Press the [→] key.
            ➤   Read the totalizing counter.
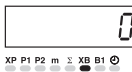
```
00003024
```
XP P1 P2 m Σ XB B1 ⏱

Reset   Press the [C] key.

Secondary counter status
The secondary counter can be disabled in the programming mode.

To read   Press the [→] key.
            ➤   Read off the current limit value secondary counter status

Reset   ➤   Press the [C] key.

```
        0
```
XP P1 P2 m Σ XB B1 ⏱

Secondary counter preset status

To read ➤ Press the ⟥ key.

➤ Read the secondary preset value.

```
  ┌─────────────────┐
  │              /0  │
  └─────────────────┘
   XP P1 P2 m Σ XB B1 ⏀
   ▪  ▪  ▪  ▪ ▪  ▪  ▪  ☗
```
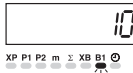
To change ➤ Press the ⟪P/R⟫ key
● LED B1 flashes.

➤ Press the ⟨c⟩ key.
● Preset value of the batch counter is being deleted.
➤ Input the new secondary counter preset value via the numerical keypad.
➤ Press the ⟪P/R⟫ key.
● To change is completed.

If a key is not operated within 15 seconds, the preset value will automatically be re-displayed in the operating mode.

Other changes ➤ Press the ⟥ key.
● The following values can also be changed.

If other values are changed, the value at witch the operating level was left can be re-displayed with the ⟪P/R⟫ key after the programming mode has been left.

Time meter

The time meter can be disbled in the programming mode.

To change ➤ Press the ⟥ key.
➤ Read the time meter

```
  ┌─────────────────┐
  │            4. 2  │
  └─────────────────┘
   XP P1 P2 m Σ XB B1 ⏀
   ▪  ▪  ▪  ▪ ▪  ▪  ▪  ☗
```
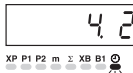
➤ Press the ⟨c⟩ key.

5   Programming mode

This section describes the procedure for programming the counter.

Programming mode   Operating parameters are set in the programming mode, which is subdivided into four programming segments.

Programming segment 1   In the **first programming segment,** all the operating parameters can be accessed and changed. The operating parameters which are disabled in the operating mode are also displayed here. The first programming segment consists of 8 lines.

Programming segment 2   In the **second programming segment,** the individual operating parameters for access to the operating mode can be disabled and enabled. In the first programming segment, access is possible to these disabled operating parameters.

Programming segment 3   In the **third programming segment,** all the machine-related functions and values can be programmed.

Programming segment 4   In the **fourth programming segment,** the interface parameters can be programmed.

Keying

To access programming   The same key assignments apply to the individual programming segments. Since key functions may vary in the operating and programming modes, however, all the functions are described in full below.

Key ⊕

Function in operating and programming modes   Transfer to the next operating parameters in the operating and programming modes. For a fast run-through, hold the key down.

Key P/R

Function in operating and programming modes   Transfer from programming to operating mode and vice versa.

Keys 0 ... 9

Function in operating and programming modes   Change of values via the numerical keypad.

Key C

Function in the operating mode   Deletes the display. Reset of possible programmed operating continuous contacts.

Function in the programming mode   Deletes the display. Reset of possible programmed operating continuous contacts. Selection of output signals on continuous signal (latch).

Key F

Function in the operating mode   Transfer from any display to a parameter corresponding the selection in line 35.

Function in the programming mode   In conjunction with the P/R key, transfer to programming mode.

Key for printing ⬚Druck⬚

Function in the operating mode   The simultaneous operation of the Key for printing an the ②key starts the test routine; the power supply must be switched on at the same time.

Function in operating and   Printout release of the main counter.
programming modes

The method of accessing the programming mode is described below, together with the four programming segments in the order in which they are used.

To access programming

➤   Press the ⬚P/R⬚ key.
●   The system transfers from the operating to the programming mode.
➤   Press the ⬚F⬚ key.
●   *CodE* is displayed. The code applies to programming segments 1 - 4.
➤   Input code.
➤   Press the ⬚→⬚ key.

No code is entered before delivery.

In correct code   If an incorrect code has been input:

●   *Error* appears in the display when the ⬚→⬚ key is pressed.
●   The counter reverts to the operating mode.
➤   Press the ⬚P/R⬚ key.
➤   Press the ⬚F⬚ key.
➤   Input the correct code.

Correcter code unkown   If the correct code is not known:
➤   Return the counter to the factory.

➤   When the correct code has been input, press the ⬚→⬚ key.
●   Now the programming lines are being called off one after the other.
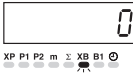
Programming segment 1
Information on the displays and changing individual values is also given in Part 4.

➤ Press the ⟳ key again.
● The operating parameters are now called up. The respective LED flashes.

To changing operating parameters ➤ Input the new values via the numerical keypad.
P/R F $CodE$ ⟳

Line 1

| | 0 |

XP P1 P2 m Σ XB B1 ⊘

XP - Current counter status

Line 2
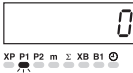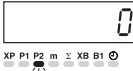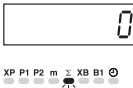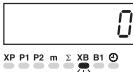
| | 0 |

XP P1 P2 m Σ XB B1 ⊘

P1 - Preset value 1
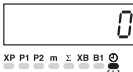
The LED display below the meter symbol "m" is always active with length measurement parameters.

Line 3

| | 0 |

XP P1 P2 m Σ XB B1 ⊘

P2 - Preset value 2

Line 4

| | 0 |

XP P1 P2 m Σ XB B1 ⊘

Σ - Totalizer

Line 5

| | 0 |

XP P1 P2 m Σ XB B1 ⊘

XB - Secondary counter status

Line 6

| | 0 |

XP P1 P2 m Σ XB B1 ⊘

B1 - Secondary counter preset value

Line 7

| | 0 |

XP P1 P2 m Σ XB B1 ⊘

⊘ - Time meter

● At the conclusion of the first programming segment, a broken line appears in the display.

Programming segment 2

In the second programming segment, the message STAT appears in the display, signifying status selection.

● $5 t\,Rt$ appears in the display. The LED for the corresponding operating parameter flashes.

Significance of status numbers

0   Full access for operator (read and alter parameters).

1   Restricted access for operator (read parameters only).

2   None access for operator (No altering, no reading of parameters).

To change status   ➤   Input the appropriate status number.
        ●   The changed status will automatically be stored when the next programming line is selected.
        ➤   Press the ⏋ key again.
        ●   The status of each individual operating parameter is called up in sequence.
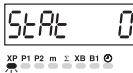
Line 1 | $5tRt$ 0 | **XP - Main counter status**

Line 2 | $5tRt$ 0 | **P1 - Preset value 1**
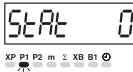
Line 3 | $5tRt$ 0 | **P2 - Preset value 2**
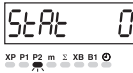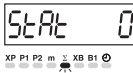
Line 4 | $5tRt$ 0 | Σ **- Totalizer**

Line 5 | $5tRt$ 0 | **XB - Secondary counter status**

Line 6 | $5tRt$ 0 | **B1 - Secondary counter preset value**

Line 7 | $5tRt$ 0 | ⏱ **- Time meter**
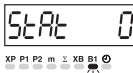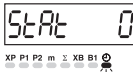
●   At the conclusion of the first programming segment, a broken line appears in the display.

⚠   The default operating parameter status is zero.

Programming segment 3
Programming segment 3 begins with programming line 21.
14 programming lines are displayed in sequence in these segments.

Default settings are always printed with * .

Line 21

`21    0`

Operating modes
0   * Step preset
1   P1 Self-adjusting preset

Line 23

`23    1`

Multiplier, secondary counter
1   * 1
2   2-99

Line 26

`26    0`

Frequency, secondary counter XB
0   * 10 kHz
1   25 Hz
2   15 Hz

Line 30

`30    0`

Reset secondary counter
0   * Autom. reset and external static
1   Autom. reset and external differential
2   External static
3   External differential

Line 31

`31   00.00`

Output time P1
00.00 * Data in Sec. (Tol. -0.01 s, range 00.02 -99.99 s)
00.25 0.25
99.99 Maximum puls time
LAtch Latch= continuous signal

Line 32

`32   00.00`

Output time P2
00.00 * Data in Sec. (Tol. -0.01 s, range 00.02 -99.99 s)
00.25 0.25
99.99 Maximum puls time
LAtch Latch= continuous signal

Line 33

`33   00.00`

Output time B1
00.00 * Data in Sec. (Tol. -0.01 s, range 00.02 -99.99 s)
00.25 0.25
99.99 Maximum puls time
LAtch Latch= continuous signal

Line 34

`34    0`

Accept presets P1, P2 and B1
0   * On reset
1   Effective immediately

Line 35

`35    0`

Adresses for function key (F)
0   * No function
1   Any parameter selection
:
8

Line 36

<!-- display: 36 0 -->
```
36      0
```
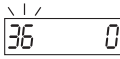
Secondary counter functions XB
0   * External
1   Internal
2   Tachometer

Line 37

<!-- display: 37 1.00 -->
```
37    1,00
```
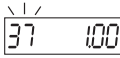
Pulses per unit of measurement, as tachometer
1.00 * 1,00
0,01   - 9999.99

Line 38

<!-- display: 38 0 -->
```
38      0
```
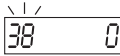
Input of time measurement in seconds (s)
0   * Time base 1 s
1   Time base 2 s
2   Time base 3 s
3   Time base 6 s
4   Time base 10 s
5   Time base 20 s
6   Time base 30 s
7   Time base 60 s

The time base must be selected in accordance with the pulse
rate.

Examples

Pulses per rev.	Time base in seconde
≥ 60 pulses/rev	1 s
< 60 ≥ 30 pulses/rev	2 s
to	to
1 pulses/rev	60 s

Line 40

<!-- display: 40 0 -->
```
40      0
```
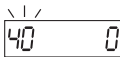
Function input time meter
0   * *Operating hours with supply* on/off
1   Operating hours on/off

Line 41

<!-- display: 41 0 -->
```
41      0
```
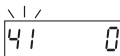
Code setting
0   * No code
1   -9999

●   At the conclusion of these programming lines, a broken line will
       appear in the display, signifying the competion of the third
       programming segment.

Programming field 4

Line 43
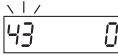
```
\ | /
43      0
```

Baud rate

0 * 4800 baud
1   2400 baud
2   1200 baud
3   600 baud

Line 44

```
\ | /
44      0
```

Parity

0 * Even parity
1   Odd parity
2   No parity

Line 45

```
\ | /
45      0
```
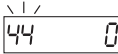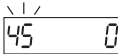
Address

  * 0
    1-99

Line 46

```
\ | /
46      0
```
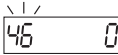
Stop bits

0 * 1 Stop bit
1   2 Stop bits

● At the conclusion of these programming lines, a broken line will appear in the display, signifying the competion of the fourth programming segment.

To leave programming mode ➤ Press the (P/R) key.
● Counter now reverts to the operating mode.

Reprogramming the counter ➤ Switch on the instrument and press the (C) key simultaneously.
to the defaults settings ● All the programmed values will now revert to their defaults settings.

5.1 Operating modes

The operating modes are described below.

Step preset On reaching a preset value, the counter continues to count to the next preset value. Preset values are always processed in the sequence: preset value 1, preset value 2. Any values can be chosen. External or manual resetting can be carried out at any time.

P1- Self-adjusting preset Preset value P1 serves as a preliminary signal and functions as a self-adjusting preset. The preliminary signal always switches to the input value before the final signals is given. Any second preset value can be chosen.
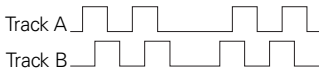
5.2 Counting modes for the main and totalizing counter

Up/down counting with two counting signals, phase-offset by 90 degrees

The counting direction is automatically identified from the leading/lagging 90° phase offset.
The internal phase discriminator performs the necessary evaluation.

5.3 Output responses (Output Modes)

Signal output response is determined by the following:
– Programming of the preset value, output time, output logic and output function;
– external resetting;
– external counting direction control.

The diagrams belows show the output signal responses.
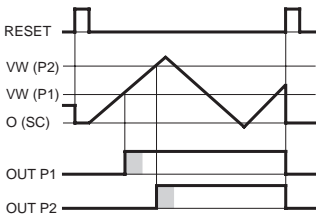
Adding operating mode

Step preset with continuous signal, without automatic reset
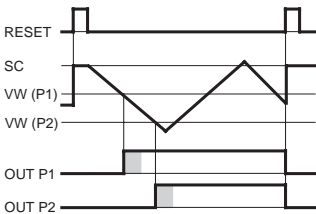
Adding operating mode

Step preset with pulse signal, without automatic reset
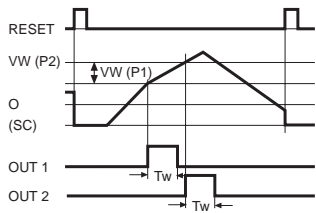
Adding operating mode

Self-adjusting preset with pulse signal, without automatic reset

Input of the preset value P1 corresponds to the interval between the preliminary signal and the final signal. This means that, if the final signal (i.e. preset value P2) is changed, the preliminary signal is automatically readjusted.

6 Technical data

Display	7-segment-LED display
	8-digit, red
	with minus sign
Digit height	7,6 mm
Power supply	As per purchase order
Power consumption	7 VA, 6 W
Encoder power supply	12...26 VDC, max. 80 mA
Optocoupler inputs	NPN, PNP
Max. counting frequency	15 Hz, 25 Hz for XB
	10 kHz für XP
Data storage	> 10 years
Mounting	With clamping frame
Dimensions	DIN-housing 72 x 72 mm, housing for front panel mounting
Mounting depth	100 mm
Core cross-section	max 1,5 mm^2
Housing material	Polycarbonate black, UL 94V-0
Weight	AC version: approx. 450 g
	DC version: approx. 320 g
Ambient temperature	0...+50 ^{o}C
Storage temperature	-20...+70 ^{o}C
Relative humidity	Max. relative humidity 80%, at 25 °C, not-condensing
General rating	EN 61010 part 1
	- Protection class II
	- Overvoltage protection category II
	- Contamination factor 2
Interference immunity	EN 50082-2
Emitted interference	EN 50081-1
Max. speed	Measuring in mm 600 m/min
Max. speed	Measuring in cm 6000 m/min

6.1 Dimensions and cutout size

Sealing screw

Cutout
68 + 0.7 x 68 + 0.7 mm
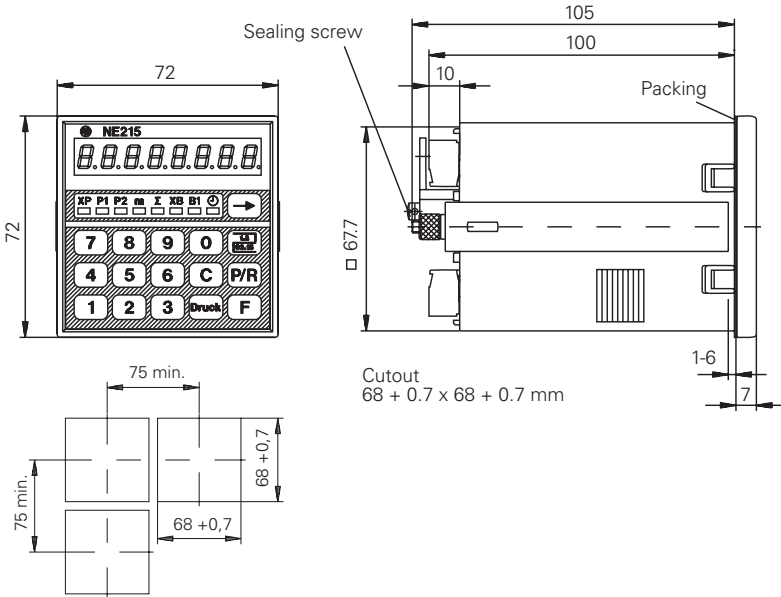
6.2 Default settings

The following parameters are programmed into the counter by the factory prior to delivery:

Preset value, main counter P1	100
Preset value, main counter P2	1000
Preset value, secondary counter B1	10
Secondary counter multiplier	1
Display	Depending on the model with either 2 or 3 DP
Pulse signal time main/secondary counters	0.25s
Counting mode	1 (step preset)
Preset change	the new preset becomes active after reset.
Input function, secondary counter	External triggering
Counting frequency, secondary counter	10 kHz

6.3 Error messages

Error messages $\boxed{Err\ 1}$ and $\boxed{Err\ 2}$:   Fault must be rectified by the factory.

$\boxed{Err\ 6}$:   Excessively fast sequences, i.e. inadequate intervals between presets at high counting frequency.

● Error messages $\boxed{Err\ 6}$ and $\boxed{Err\ 7}$ can be cleared with the $\boxed{C}$ key.

7   Open interface description

7.1   General information

The open interface is of the RS485 type. It is possible to send the commands documented in the „Description of the Open Interface" for remote control to the counter. The interface allows to call up data and to change the programming of parameters not relevant for the values to be calibrated.

In general, the counter is operated via the serial interface on a personal computer – that is why the external device will be called PC for short in the following. However, it is also possible to use another device with similar features.

7.2   Transmission protocol

Transmission is effected character by character in ASCII code. Each character consists of 8 bits. The 8th bit is the parity bit; in case of „no parity", the 8th bit will always be transmitted as a zero. The counter responds to every request of the PC via the serial interface – if data have been transmitted correctly.

The transmission of characters is introduced by the start-of-text character <STX> and closed by the end-of-text character <ETX>. In addition, the tachometer also sends a <CR> (carriage return) after the character <ETX>. This allows the input (in high-level languages such as BASIC) of a complete record of data with only one command. The character <STX> is followed by an address allotted to the counter. This allows a target approach of the counter in a serial network. The address is followed by the indication of the line (position) that is to be read out or programmed. In case of a programming instruction, the line indication is followed by a „P" (program) and the data (parameters).

The protocol is split into three groups, as described in the following:

a) Reading of storage locations (READ instruction):
```
   <STX> Address Line <ETX> [<CR>]
```

b) Programming of storage locations (WRITE instruction):
```
<STX> Address Line P [VZ] Data <ETX> [<CR>]
```

c) Special commands:
```
<STX>    Address Parameter <ETX> [<CR>]
<STX>    Start of Text (02Hex)
Address  00..99 (device address)
Line     01..XX (please refer to operating plan)
P        Programming command
D        Print command
VZ       Plus/Minus sign, only indicated if value
         is negativ
Data     Programming data
Parameter Special commands
<ETX>    End of Text (03Hex)
<CR>     0DHex (Control character „carriage return").
         „CR" needs not be indicated (optional),
         will however, always be returned by
         counter.
```

Important The blanks between the particular characters of the commands only serve the purpose of better legibility. The input at the PC must be effected without blanks. Control characters (less than 20Hex) are set in „pointed" brackets. If a false protocol has been sent by the PC, the counter will return an error message. Please read the paragraph regarding error messages on page 29 under 7.7.

7.3   Reading of storage location

All storage locations that are indexed with a line number in the programming scheme (except the separating lines that are indexed dashes) can be read out. The protocol: <STX> Address line <ETX> [<CR>] can be used for each line. The return answer of the counter may vary in the protocol length from one line to the other. This depends on the data length of the individual storage locations.

The counter can also be read out if operated in the RUN mode as well as in the PGM mode. The only difference is that the return answer of the counter will contain an „R" or a „P" in the mode parameter, as described in the following.

Answer to a Read instruction (general):

`<STX> Address Line Mode VZ Data <ETX> <CR>`

Mode **P** = Counter is in **P**rogramming mode
R = Counter is in **R**UN mode
VZ Plus/Minus sign, only indicated if value is negative
Data Max. number of digits, with leading zeros w/o decimal point.

7.3.1 Examples for the reading of storage locations

The following statement applies for the subsequent examples:
Counter address = 35; Counter mode = R (RUN mode)

Readout of preselection counter XP (Line=01, Count=-15.00)
Polling: `<STX>3501<ETX>`
Answer: `<STX>3501R-00001500<ETX><CR>`

Readout of operating mode (Line=21, Setting=Pos. 1)
Polling: `<STX>3521<ETX>`
Answer: `<STX>3521R1<ETX><CR>` (1 corresponds to P1 trailing preselection)

Readout of output time P1 (Line=31, Setting=0,25s)
Polling: `<STX>3531<ETX>`
Answer: `<STX>3531R0025<ETX><CR>`

Readout of address (Line=45, Address=35)
Polling: `<STX>3545<ETX>`
Answer: `<STX>3545R35<ETX><CR>`

7.4   Programming of storage locations

All storage locations that are indexed with a line number according to the programming plan, except for the separating lines (that are indexed by dashes) and the lines 1, 5, 6 and 8, may be programmed.

The protocol: <STX> Address line P [VZ] data <ETX> [<CR>]
can be used for each line. The answer of the counter that is returned
after every programming step is the same as for the readout of the
line.
All storage locations may, principally, be programmed during the
RUN mode in the programming mode.

Please refer to page 27 (under 7.5.2) to find out how to switch to the
PGM mode.
Programming command (general):

<STX> Address Line P [VZ] Data <ETX> [<CR>]

7.4.1. Examples for the programming of storage locations

The following statement applies for the subsequent examples:
Counter address = 35; Counter mode = R (RUN mode)

Programming of preselection P1 (Line=02, Preselection P1=12.50)

Command: `<STX>3502P00001250<ETX>`
Answer: `<STX>3502R00001250<ETX><CR>`

Programming of preselection P2 (Line=03, Preselection P2=50.00)

Command: `<STX>3503P00005000<ETX>`
Answer: `<STX>3503R00005000<ETX><CR>`

Programming of output time P3 (Line=33, Time=0.30s)

Command: `<STX>3533P0030<ETX>`
Answer: `<STX>3533R0030<ETX><CR>`

7.5   Special commands

In the case of special commands, we are talking about instructions
that do not refer to any line number, with the exception of the
commands „Clear count" and „Output to printer".

7.5.1 Clear counts

The counts XP (line 1), totalizer (line 5), batch counter (line 6), and
operating time meter (line 8) can be cleared via this special
command. It concerns all lines that cannot be programmed. All other
lines, such as preselections, are cleared by programming the value
ZERO (as described under item 4).
The instruction to clear corresponds to a reset via the C key and/or to
an external reset if a reset input is available.
The response (answer) of the counter when clearing is the same as
when reading the corresponding line.

General: `<STX> Address Line <DEL> <ETX>`
Example: Clearing of preselection counter XP
Address=35, Line=01, Status=RUN mode
Command: `<STX>3501<DEL><ETX>` <DEL> = 7FHex
Answer: `<STX>3501R00000000<ETX><CR>`

7.5.2 Switch counter to PGM mode or RUN mode

This command allows you to switch the counter upon every call between the PGM mode and the RUN mode.
The current line, as with the reading command on this line, will be returned as an answer.

General: `<STX> Address <DC1> <ETX>`

Example: Address=35, Status=RUN mode, Current line = 1, Count=0.15
Command: `<STX>35<DC1><ETX> <DC1> = 11Hex`
Answer: `<STX>3501`**P**`00000015<ETX><CR>`

If the instruction is repeated, the program switches back to the RUN mode.

Command: `<STX>35<DC1><ETX>`
Answer: `<STX>3501`**R**`00000015<ETX><CR>`

7.5.3 Read out counter identification

It is only possible to read the identification data. Two parameters follow the address: the command parameter „I" (for identification) and the selection parameter „T" (Type and programming number) or „D" (date and version) for the different identification data.

Readout device type and programming number:

Address=35, Type=NE215, Programming number=03
Command: `<STX>35IT<ETX>`
Answer: `<STX>35NE215 03<ETX><CR>`

Readout date and version number:

Address=35, Date=16.02.95, Versions number=01
Command: `<STX>35ID<ETX>`
Answer: `<STX>35160295 1<ETX><CR>`

7.5.4 Readout of counter identification

It is only possible to read the identification data.
Two parameters follow the address: the command parameter „I" (for identification) and the selection parameter „T" (Type and programming number) or „D" (date and version) for the different identification data.

General: `<STX> Address E <ETX>`
Example: *Address=35, Status=Error mode, Error=7*
Command: `<STX>35E<ETX>`
Answer: `<STX>35Error 7<ETX><CR>`

7.5.5 Clearing the error message

This command allows to clear error messages appearing on the counter display. It is only possible to clear the error message that can be cleared via the C key on the device itself (e.g.: not Error 1 or 2). The contents of the current line will be returned as an answer.

Address=35, Status=Error mode, Error=7, Line=01, Count=25.00
Command: `<STX>35<ACK><ETX> <ACK> = 06H`
Answer: `<STX>3501R00002500<ETX><CR>`

7.6 Output to the printer

The command parameter „D" allows the initiation of the output of the lines 01, 02, 03 and 05 to the printer.

7.6.1 Appearance of the printout

The printout comprises
- date and time that need to be sent along by the PC upon a print command
- optionally further data, which the PC may send along
- the length measurement needing to be calibrated, indexed by the sign * .

Example: **29.08.94 10:30:45**
LENGTH*000123.45m

7.6.2 Printout of the XP values

The protocol addressed to the counter is as follows:

```
Counter address=35, Line=01, Count XP=000223.68
PC Command: <STX>3501D<Date_Time> <Data><ETX>
```

<Date_Time> must be given in the following format:
<TT.MM.JJ hh:mm:ss>

TT: Tag	MM: Monat	JJ: Jahr
hh: Stunden	mm: Minuten	ss: Sekunden

TT:Day	MM: Month	JJ: Year
hh: Hour	mm: Minutes	ss: Seconds

All values must be 2-digit values and the punctuation must be observed. (The characters < bzw. > / < and/or > only serve the purpose of indexing and should not be transmitted.)

<Daten>:

<Data>: Up to 11 data at choice may additionally be sent to the counter, which will then also be printed. The sign * should not occur, otherwise it will be ignored by the counter, i.e. it will not be sent to the printer.

Date and time serve the purpose of clearly allocating the printed length measurement to the data of the PC. After printing, the counter will automatically trigger a carriage return so that the length indication will always stand on a separate line.

Example:
```
Data_Time=29.08.94 10:32:20
PC Command: <STX>3501D29.08.94 10:32:20<ETX>
```

Printout: **29.08.94 10:32:20**
LENGTH*000223.68m

The counter will only respond to the PC when all characters have been sent to the printer. The protocol then returned will contain the value emitted to the printer:

Answer: `<STX>3501D00022368<ETX><CR>`

7.6.3 Error message

If the PC does not send the date and the time as described above, i.e. date/time are not complete or the punctuation is wrong, there will be no printout and the counter sends an error message to the PC.

Answer: `<STX>3501D<CAN>4<ETX><CR>`

7.6.4 Printout of the lines 02, 03: preselections P1 and P2

As these are not length measurements that need to be calibrated, the value of the preselections P1 and P2 is not printed with the sign *, and it is also not necessary that the PC sends Date/Time along.

Example:
```
Counter address=35, Line=02, P1=1.00
Further data=29.08.94 10:33:18
PC Command: <STX>3502D29.08.94 10:33:18<ETX>
```

Printout: **29.08.94 10:33:18**
            P1   1.00

Answer:
```
<STX>3502D00000100<ETX><CR>
Counter address=35, Line=03, P2=10.00
Further data=29.08.94 10:33:29
PC Command: <STX>3503D29.08.94 10:33:29<ETX>
```

Printout: 29.08.94 10:33:29
            P2   10.00m

Answer: `<STX>3503D00001000<ETX><CR>`

7.6.5 Printout of Line 05: totalizer Σ

The value of the totalizer is printed with the sign *. Similarly Date/Time will have to be sent along as with the XP value, otherwise the same error message will be returned.

Example:
```
Counter address=35, Line=05,
Totalizer count Σ=001223.68,
Data_Time=29.08.94 10:34:52
PC Command: <STX>3505D29.08.94 10:34:52<ETX>
```

Printout: **29.08.94 10:34:52**
            SUM *001223.68m

Answer: `<STX>3505D00122368<ETX><CR>`

7.6.6 Printing via key [Print] / [Druck]

If you press the key [Druck] during operation and if the value of the preselection counter XP, the preselection P1, the preselection P2 or the totalizer Σ are displayed, then the value will be indexed with the sign * as with the PC command for the counter XP (line 01) and for the totalizer (line 05). There is no printout of any additional data.

7.7   Error messages during data transfer

If the PC sends a wrong data protocol to the counter (e.g.: line that does not exist or letter instead of digit), then the counter will return a corresponding error message to the counter. In order to still receive an error message after an error, the control character <STX> and the address must at least be correct. If this is not the case, the data block received by the counter will not be considered, and the counter will not respond to the PC. If the PC does not receive a response after a request has been sent, i.e. not even an error message, then a fatal error has occurred. This may be the case if the control character <STX> or the address are missing and if the interface parameter of PC and counter are not congruent. Should these be correct, however, then it can only be a matter of a failure of the hardware or of the data line.

General structure of the error messages:

`<STX> Address Line Status <CAN> Error number <ETX> <CR>`

Example: Address=35, Line=09 (invalid line),
Error number=2 `<STX>3509R`**`<CAN>2`**`<ETX><CR>`

The two positions „Line" and „Status" will not occur with the special commands.

Error description in particular:

Error 1:   Format error (`<ETX>` not at the right place). This error might happen, for example, if the data format was not observed when programming (e.g.: when programming the limit value, only 5 instead of 6 data positions are transmitted.)

Error 2:   Line (position) not available or separating line

Error 3:   Parameter error (inadmissible values in the protocol). This means, for example, that the limit value consists not only of digits but also of other inadmissible characters, or that a value given lies outside the admissible range.

Error 4:   This error message occurs if the PC requests the counter to print in the programming mode, if the printout of any line except the lines 01-03 and 05 is to be initiated, or if the PC does not send Date/ Time or sends them in a wrong format. The counter will not allow the value to be sent to the printer and responds with an error mistake to the PC.

Example for a returned error message:
Address=35, Line=01, Error number=4
`<STX>3501D`**`<CAN>4`**`<ETX><CR>`

7.8   List of the control characters used

Control character	Hex	Decimal
`<STX>`	02	02
`<ETX>`	03	03
`<ACK>`	06	06
`<LF>`	0A	10
`<CR>`	0D	13
`<DC1>`	11	17
`<CAN>`	18	24
`<DEL>`	7F	127

7.9 Operating Plan

Line	Display	Short description
01	`000000`	Preselection counter XP
02	`1.00`	Preselection 1
03	`10.00`	Preselection 2
		Not applicable
05	`00000000`	Totalizer
06	`0`	Batch counter
07	`10.00`	Preselection batch counter
08	`0.0`	Time meter
10	`------`	Separating line
11	`StAt  0`	Status of preselection counter XP
12	`StAt  0`	Status of preselection 1
13	`StAt  0`	Status of preselection 2
14		Not applicable
15	`StAt  0`	Status of totalizer
16	`StAt  0`	Status of batch counter
17	`StAt  0`	Status of batch counter preselection
18	`StAt  0`	Status of time meter
20	`------`	Separating line
21	`21    0`	Operating mode main counter
22		Not applicable
23	`23    0`	Scaling factor batch counter
24		Not applicable
25		Not applicable
26	`26  bF2`	Frequency batch counter counting input
27		Not applicable
28		Not applicable
29		Not applicable
30	`30    0`	Reset batch counter
31	`31  0000`	Output time P1
32	`32  0000`	Output time P2
33	`33  0000`	Output time P3
34	`34    0`	Take-over of preselections P1, P2, P3
35	`35    0`	Address of function key
36	`36    0`	Function of batch counter
37	`37  1.00`	Impulses per unit of tachometer
38	`38    0`	Selection of time base for the tachometer functions
39		Not applicable
40	`40    0`	Operating time counter input
41	`41  0000`	Code setting
42	`------`	Separating line
43	`43    0`	Baud rate
44	`44    0`	Parity
45	`45   00`	Address
46	`46    0`	Stop bits
47	`------`	Separating line

7.10 Programming plan

Lines in *italic** = Factory setting

Line 11-18 **Status for line 11-18**
   0 * Parameter can be changed
   1   Clearing and/or input disabled
   2   Parameter is skipped

Line 21 **Operating mode principal count system**
   0 * Progressive preselections
   1   P1 Trailing preselection

Line 22 **Not applicable**

Line 23 **Scaling factor batch counter**
   00   Minimum value
   1 * Default value
   99   Maximum

Line 24 **Not applicable**

Line 25 **Not applicable**

Line 26 **Frequency batch counter counting**
   0 * 10 kHz
   1   25 Hz
   2   15 Hz

Line 27 **Not applicable**

Line 28 **Not applicable**

Line 29 **Not applicable**

Line 30 **Reset batch counter**
   0 * Autom. reset and external static
   1   Autom. reset and external differential
   2   External static
   3   External differential

Line 31 **Output time P1, (P2), (P3), B1**
   00.00   Maintained contact (LAtcH displayed)
   0.25 * Default value
   99.99   Maximal value

Line 32 **Output time P1, (P2), (P3), B1**
   00.00   Maintained contact (LAtcH displayed)
   0.25 * Default value
   99.99   Maximal value

Line 33 **Output time P1, (P2), (P3), B1**
   00.00   Maintained contact (LAtcH displayed)
   0.25 * Default value
   99.99   Maximal value

Line 34 **Take-over of preselection P1, P2, B1**
   0 * In case of reset
   1   After input

Line 35 **Address for function key**
   0 * Function key not connected
   :
   8   Maximum value

Line 36 **Function of batch counter**
*0 * external*
1 internal
2 Tachometer

Line 37 **Impulses per unit at tachometer**
00.00 Minimum value
*1.00 * Default value*
9999.99 Maximum value

Line 38 **Time basis for tachometer function**
*0 * 1 secound*
1 2 secounds
2 3 secounds
3 6 seconds
4 10 secounds
5 20 seconds
6 30 seconds
7 60 seconds

Line 39 **Not applicable**

Line 40 **Function of time meter**
*0 * Time meter is running*
1 Time meter on / off

Line 41 **Code setting**
*0000 * Code not active*
:
9999

Line 43 **Baud rate**
*0 * 4800 Baud*
1 2400 Baud
2 1200 Baud
3 600 Baud

Line 44 **Parity**
*0 * Even Parity*
1 Odd Parity
2 No Parity

Line 45 **Device address**
*00 * Minimum value*
:
99 Maximum value

Line 46 **Stop bit**
*0 * 1 Stop Bit*
1 2 Stop Bit

8. Supplementary operation manual for open and closed interface
(February 1994, Erg. 31.8.1994)

The addendum describes the interfaces and documents the modifications of the Operating Instructions for the Counter regarding the additional open interface. Corresponding to the 1st. addendum to file number: 1.62-3251.11 IVO-040293 dated 16.03.1995.

8.1 The closed interface

The closed interface is of the RS232 type. It allows to send data that can be calibrated to the printer. The interface parameters cannot be modified and are to be set at the printer as follows: Parity off, 7 data bits, 1stop bit, Baud rate: 4800 Baud. Configuration of the interface data at the printer: DIL-switch 7 and 8 „ON".

Features of the RS232 interface:
– asymmetric
– 3 lines
– Point-to-point connection: 1 emitter and 1 receiver
– Data transmission distance: max. 30 m

8.2 The open interface

The open interface is of the RS485 type. It is possible to send the commands documented in the „Description of the open interface" for remote control to the counter. The interface allows to call up data and to change the programming of parameters not relevant for the values to be calibrated.

Features of the RS485 interface:
– symmetric
– 2 lines
– Multipoint connection: Emitter and receiver (max. 32 devices)
– Data transmission distance: max. 1500 m

8.3 Modifications of the operating instructions

8.4 Modifications in Chapter 2: „Get to know your counter"

All indications regarding interfaces refer to the closed interface.

8.5 Modifications in Chapter 3: „Counter connection"

All indications regarding interfaces refer to the closed interface.

8.6 Modifications in Chapter 3.5: „Interface connection"

The closed interface:
Set the interface parameters as indicated under Chapter 1.1.
The contacts 23-26 are assigned to the closed RS232-type interface.

The open interface:
It is possible to choose the interface parameters as described in the Operating Instructions under lines 43 - 46.

Interface parameters are:
- the speed of transmission (Baud rate)
- the parity bit

- the number of stop bit

The contacts 21(-T,R) and 22(+T,R) are assigned to the open RS485-type interface.

9. Supplement to the scaling factor manual
(May 1999)

This supplementary manual is describing the modification of the counter's operation manual regarding application of the scaling factor and the alibi printer SP 298 of the company Star. It is according to the third addendum of licence No. 1.62-3251.11 file number 5.23-99037480 dated 24.06.1999.

Address for printer: DATAMEGA Mikrodatentechnik GmbH
Landsberger Str. 318-320
80687 München
Tel.: 089/56017-300

9.1 Modifications in Chapter 2: „Get to know the counter"

The counter consist of

- preset counter with 2 presets (PTB-approved) and scaling factor
- batch counter with preset and multiplier
- totalizer, (PTB-approved) with scaling factor
- hour counter

The device is approved by the German Physical-Technical Authorities (PTB) for calibration. The PTB-approved register system provides a printer model Star SP298 with serial interface RS232.

Printer DIP switch settings (for counters with closed interface):

Schalter	1	2	3	4	5	6	7
	Off	On	Off	Off	Off	Off	On
	Baudrate: 4800 Bit/s		7 Datenbits	gerade Parität		Xon/Xoff	2K Puffer

The settings correspond to the counter default parameters in programming lines 43 and 44. Upon any modifications the DIP switch settings have to be adapted correspondingly.

Printer DIP switch settings (for counters with closed and open interface):

Schalter	1	2	3	4	5	6	7
	Off	On	Off	On	Off	Off	On
	Baudrate: 4800 Bit/s		7 Datenbits	keine Parität		Xon/Xoff	2K Puffer

These settings are always valed since they cannot be altered in any way at the counter.

9.2   Modifications in Chapter 3: „Counter connection"

New pin assignment for pin 15: scaling on.

9.2.1 Modifications in Chapter 3.3: „Assignment of signal inputs"

Pin 15 is for activating the setting of the scaling factor (line 22 programming level). Prior to sealing the pins the setting of the scaling factor is activated by the signal trigger "scaling on" (pin 15). Activation is realized by connecting pins 15 and 20, by a bridge from 18 to 19 or by 15 to 19, if 18 has to be connected to 20 (refer also to page 8 "programming of input logic" in the operation manual).

After having set the scaling factor, the connection to pin 15 has to be removed. Once being sealed, this pin is no longer accessible and the scaling factor is indicated in the programming level without allowing any alteration.

9.3   Modifications in Chapter 5: „programming the counter"

The scaling factor of the main counter is shown in programming line 22. Any modification is only possible if pin 15 is being activated (see above).

Programming line 22:   *2 2   1.0 0 0 0*   Scaling factor main counter

```
Line 22  Scaling factor main counter
 1.0000  Default
 0.0001  Scaling range  0,0001
99.9999  up to 99,9999
```

Programming line 40 "function of the hour counter input" is obsolete. The hour counter is always active after "on".

10. Suitable encoder

Technical Data

Model	Incremental Encoder
RPM value	10.000 min^{-1}
Supply Voltage	10...30 VDC, with reverse voltage protection
Input signals	Push-pull, outp., short-circuit-protect.
Signal output	Kanal A, B, N
Resolution	Up to 500 Impuls
Current consumption	Max. 60 mA (w/o load) for 24 VDC
Ambient temperature	-20...+70 °C
Storage temperature	-20...+100 °C
Protection to	
Shaft w/o seal	IP 54
Shaft with seal	IP 65
Relative humidity	Max. 95 %, not condensing
Endurance	
Vibration	IEC 68 part 2-6 ≤100 m/s^2 / 16-2000 Hz
Schock	IEC 68 part 2-27 ≤1000 m/s^2 4 ms
Starting torque	
w/o seal (IP54)	≤0,010 Nm
with seal (IP65)	≤0,015 Nm
Interference immunity	EN 50082-2
	EN 61000-4 - 2 to 4 Serverity grade 3
Emitted interference	EN 50081-2
Shaft loading	Axial < 20 N, radial < 40 N
Inertia torque	1,45 x 10^{-6} kgm^2
Housing material	Aluminium
Weight	Ca. 250 g

Order designation

Order	Flange / Shaft
0	Clamping flange / 10 mm, mounting M3
1	Clamping flange / 10 mm, mounting M4
5	Servo flange / 6 mm, mounting M4

Voltage / Signals

10	10...30 VDC push-pull output A 90° B +0

Connection

12	Cable 2 m axial, Pg9
14	Cable 5 m axial, Pg9
16	Cable 10 m axial, Pg9
22	Cable 2 m radial, Pg9
24	Cable 5 m radial, Pg9
26	Cable 10 m radial, Pg9

Impuls

39	50 Imp./rev.
15	500 Imp./rev.

GPI0W.

Pin assignment

Assignment	Cable color
A	blue
B	beige
0	green
UB	brown
0V	black

Output signals

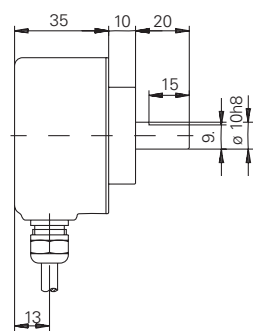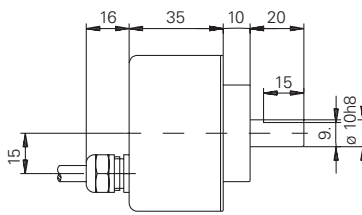Signals with clockwise sense or rotation when looking at the flange.
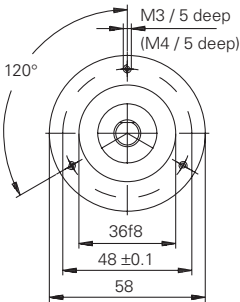
Track A ⎍⎍⎍⎍⎍⎍⎍

Track B ⎍⎍⎍⎍⎍⎍⎍

Zero pulse ⎍
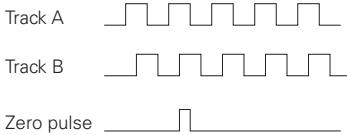
Push-pull output (10...30 VDC)

Level High	≥ UB -3 V	(with I = -20 mA)
Level Low	≤ 1,5 V	(with I = 20 mA)
Load High	≤ 40 mA	
Load Low	≤ 40 mA	

Dimensions

GPI0W Clamping flange

GPI0W Servo flange
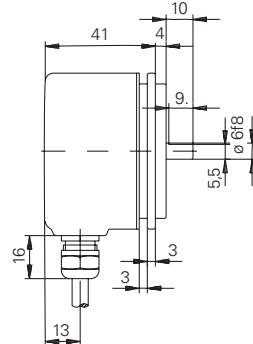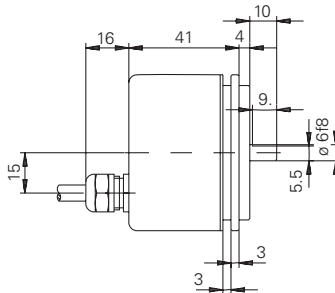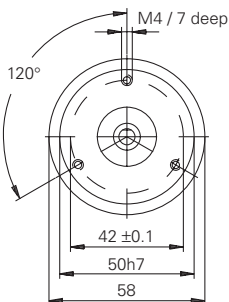
Part number

NE215. [ ] 1 [ ] AX0 [ ]

Display
5 In cm, 9999.99
   50 pulses/rev.
   w/o interface/RS232
6 In mm, 999.999
   500 pulses/rev.
   w/o interface/RS232
7 In cm, 9999.99
   50 pulses/rev.
   at RS232/RS485
8 In mm, 999.999
   500 pulses/rev.
   at RS232/RS485

Voltage supply

2 115/230 VAC
3 24 VDC

Outputs
1 Relay outputs, B1 normally closed

Interface
0 Without interface
1 RS232
2 RS232/RS485