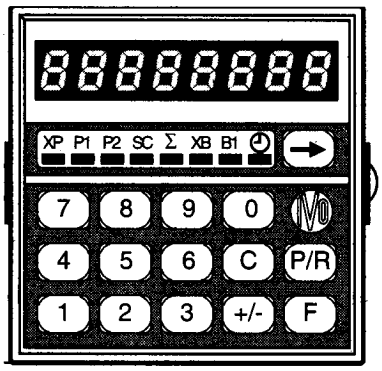
IVO IRION & VOSSELER

COUNTERS · CONTROL UNITS · ENCODERS



Operating Instructions

Electronic counting, controlling and monitoring unit NE 212

Contents Page

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General

Meanings of symbols used in these operation instructions:

Explanation of symbols:

➜ This symbol represents an activity to be carried out

● This symbol represents supplementary technical information

This symbol indicates instructions or information which is of particular importance to ensure the correct use of the NE 212.

This symbol indicates important additional information.

Italics To permit you to find information quickly, key terms are indicated on the left-hand column in italics.

1 Safety remarks

The NE 212 is constructed in line with the state of the art.
Only ever use it

- when in a technically flawless condition,
- in accordance with its intended application
- and paying attention to safety and potential hazards, in accordance with the operating instructions.

Use in accordance with the intended application

The electronic tachometer may only be used as a built-in device in interior working environments in production lines in the metal, woodworking, plastics, paper, glass and textile industries.

The NE 212 may only be operated when correctly installed.

The NE 212 may only be operated in accordance with the data provided in chapter 6.

The NE 212 is not approved for use in potentially explosive atmospheres, in the medicinal appliance sector or in spheres of application specifically mentioned in VDE 0411 Part 100.

If the NE 212 is used for the control of machines or operating processes in which failure or an operating error at the NE 212 could result in damage to the machine or injury to operating staff, the necessary safety precautions must be taken.

Organizational measures

Ensure that the operating staff have read and understood the operating instructions, in particular the chapter „Safety remarks". In addition to these operating instructions, general statutory and other binding directives and regulations governing the prevention of accidents and environmental protection must be observed and adhered to.

Safety-conscious operation

In the event of changes (including operating behaviour) which impair working safety, withdraw the NE 212 from service immediately.

Installation

When executing installation work at the NE 212, always switch off the electrical supply first. Installation may only be carried out by suitably qualified staff. Before putting the NE 212 into operation, check the position of the voltage selection switch, and ensure that the device is set for the required voltage.

Repairs/ maintenance/ troubleshooting

Switch off the power supply to every item of equipment connected to the unit, without fail. Operations of this nature may only be carried out by a suitably qualified technician. If an attempted repair is unsuccessful, the unit must not be re-used. In such cases, please contact your dealer.

Familiarization

As soon as the unit is operational, familiarize yourself with its use in accordance with the instructions laid down in 'Getting to know the NE 212'.

Other hazards

Provided the unit has been properly connected and is used for the prescribed purpose – as described above – no further hazards are posed by the NE 212.

2 Getting to know the NE 212

2.1 The NE 212 comprises the following:

- Presetting the counter with 2 preset values and a scaling factor
- Secondary counter with preset value and multiplier
- Totalizing counter
- Operating hours counter

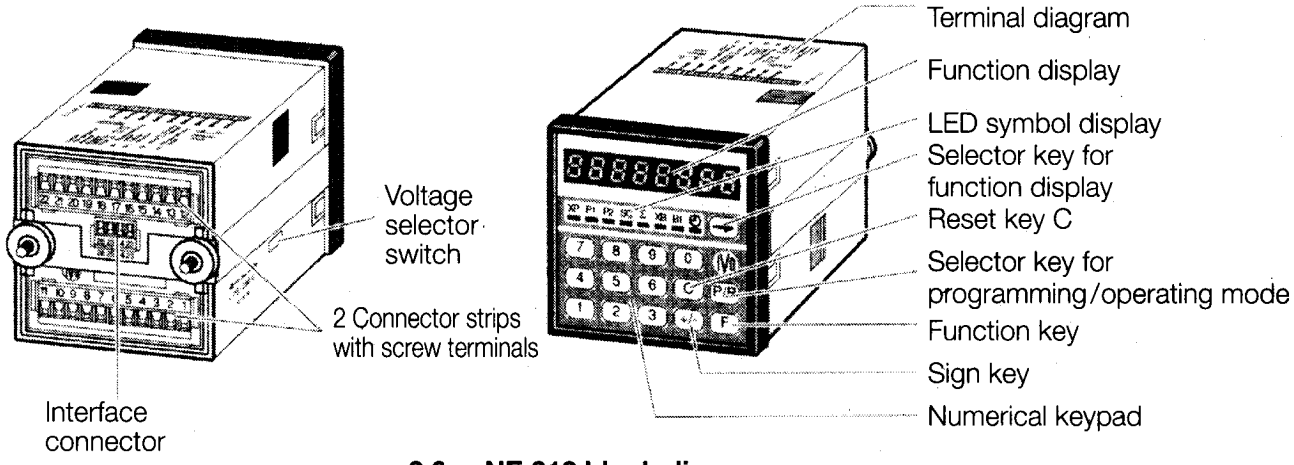
NE 212 components

Control panel

- [0] ... [9] Numerical keypad
- [->] Selector key for function display
- [P/R] Selector key for programming/ operating mode
- [F] Function key
- [+/-] Sign key
- [C] Reset key

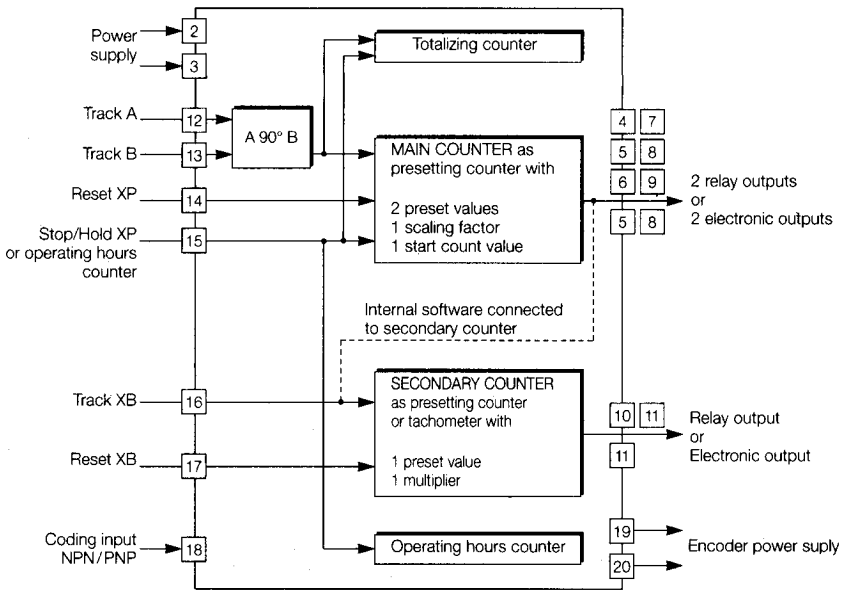
LED symbol display

- XP Current counter status
- P1 Preset value 1, main counter
- P2 Preset value 2, main counter
- SC Start count, main counter (XP)
- Σ Totalizing counter
- XB Counter sattus, sec. counter
- B1 Preset value, sec. counter
- ◴ Current value, operating hours counter



2.2 NE 212 block diagram

The block diagram shows the component parts of the NE 212, together with the terminals and connections

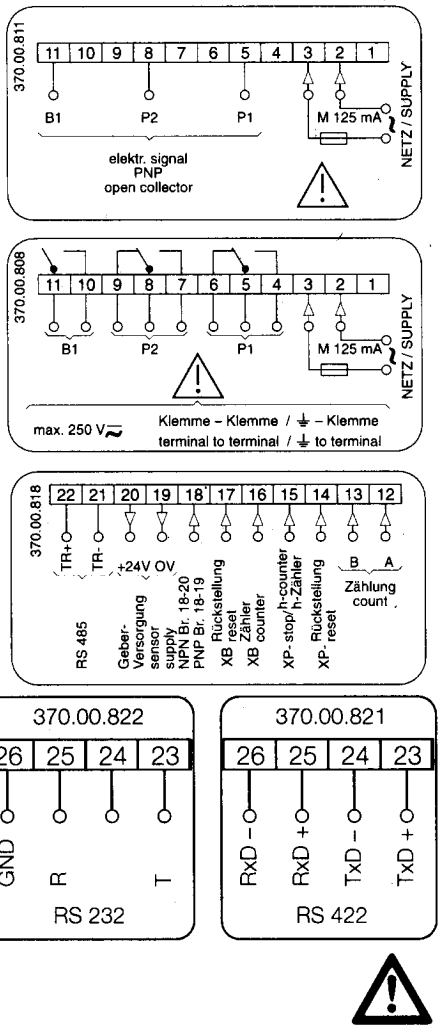


3 Connecting the NE 212

This section describes the terminal assignments, accompanied by some examples of typical connections.
Sections 3.1 to 3.5 contain specific instructions and technical data relating to the individual terminals.

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

Connection examples



Terminal assignments

Terminal	Function	
1	Not assigned	
2	Power supply	
3	Power supply	
4 5 6	1 Relay contact output P1 or 1 electronic output at pin 5	
7 8 9	1 Relay contact output P2 or 1 electronic output at pin 8	
10 11	1 Relay contact output B1 or 1 electronic output at pin 11	
12	Signal input, track A	
13	Signal input, track B	
14	Reset XP	
15	Stop/Hold XP/operating hours counter	
16	Signal input, XB counter	
17	Reset XB	
18	Coding input for input logic	
19	Encoder power supply (0V)	
20	Encoder power supply (+24V)	
21	Option, RS 485 TR-	
22	Option, RS 485 TR+	
	Option RS 232	Option RS 422
23	T	TXD+
24		TXD-
25	R	RXD+
26	GND	RXD-

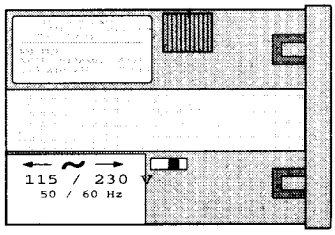
For protection against shock hazards as specified in VDE 0411 part 100, stranded conductors may only be connected using wire end ferrules with insulating caps. Terminals which are not assigned in the factory must not be otherwise assigned by the user. We recommend shielding all encoder connecting leads and earthing the shield at one end. Earthing at both ends is recommend to avoid RF interference or if equipotential bonding conductors are installed over long distances. Encoder connecting leads should not be laid in the same trunking as the mains power supply cable and output contact leads.

3.1 Connecting the power supply

AC voltage connection

Power supply AC voltage	Recommended external fusing
24 V ± 10% 50/60 Hz	M 400 mA
48 V ± 10% 50/60 Hz	M 400 mA
115 V ± 10% 50/60 Hz	M 125 mA
230 V + 6%, -10% 50/60 Hz	M 125 mA

It is possible to switch between two different alternating voltage ratings (see adjoining table) by means of the voltage selector switch at the side of the unit. The higher of the two alternating voltage ratings (48V or 230V) is preset by the factory.



➜ Set the required alternating voltage with the voltage selector switch.

➜ Connect the alternating voltage supply to terminals 2 and 3 in accordance with the NE 212 wiring diagram.

DC voltage connection

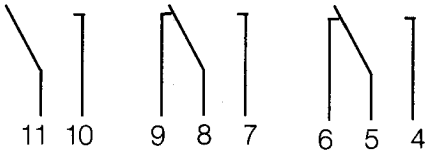
Power supply DC voltage	Recommended external fusing
24 V ± 10% max. 5 % residual ripple	M 400 mA

Connect an interference-free power supply, i.e. do not use it for the parallel connection of drive systems, contactors, solenoid valves, etc.

➜ Connect the DC voltage in accordance with the NE 212 wiring diagram.

Fire protection: Operate the instrument using the recommended external fusing indicated in the terminal diagram. VDE 0411 specifies that 8A/150 VA(W) must never be exceeded in the event of a fault.

3.2 Assigning signal outputs (relay contacts)



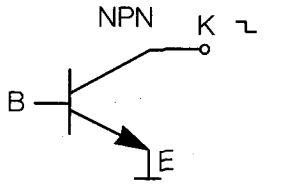
Terminals 4, 5, 6 and 7, 8, 9 are no-potential changeover contacts. Terminals 10 and 11 are configured as NC or NO contacts in accordance with the purchase order specification. The signal outputs can be assigned in accordance with the adjoining wiring diagram. Implementation as a pulse or continuous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

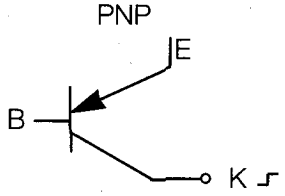
Max. switching output	Max. switching voltage	Max. switching current
150 VA/30 W	250 V	1 A

The user is responsible for ensuring that a switching load of 8A/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 contact outputs) accordingly.

3.3 Assigning the electronic outputs





The electronic outputs (terminals 5, 8 and 11) are programmed by the factory as NPN or PNP switching transistors (open collectors) in accordance with the purchase order specification. The outputs are programmed as pulse or continuous signals in the programming mode (lines 31, 32 and 33).

Output logic	Max. switching voltage	Max. switching current
NPN	+35 V	50 mA
PNP	+12 – +24 VDC bei AC power supply, load-dependent	20 mA with AC power 50 mA with DC power

The electronic outputs are not short-circuit proof.

➜ Assign terminals 5, 8 and 11 accordingly.

3.4 Assigning 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 counting stop input for the main counter (XP);
- as a starting input for the operating hours counter, or
- to store the display (HOLD function) of the selected parameter. This process simultaneously disables the keypad.

Terminal 16 (XB counter) is the pulse input for the secondary counter (XB). Terminal 17 is the input for resetting the secondary counter.

Terminal	Input resistance	Starting current	Breaking current
12	1.65 KΩ	>9 mA, <16 mA	<0.5 mA
13	1.65 KΩ	>9 mA, <16 mA	<0.5 mA
14	3.30 KΩ	>5 mA, < 8 mA	<0.5 mA
15	3.30 KΩ	>5 mA, < 8 mA	<0.5 mA
16	1.65 KΩ	>9 mA, <16 mA	<0.5 mA
17	3.30 KΩ	>5 mA, < 8 mA	<0.5 mA

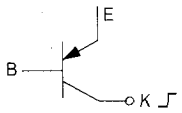
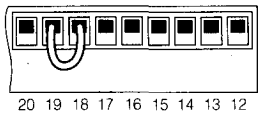
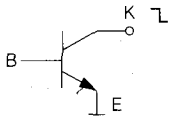
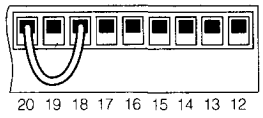
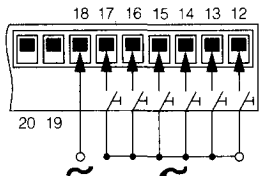
The main counter (XP) is reset by applying an external signal (signal width ≥ 30 ms) at terminal 14; the secondary counter (XB) at terminal 17. While an external signal is present, no counting takes place. The method of resetting is set in the programming mode (lines 29, 30).

➜ Assign terminals 12 to 17 accordingly.

The maximum counting frequency is selected in the programming mode (lines 24, 25 and 26). For suitable pulse generators, see the IVO Pulse Generator Catalogue.

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.

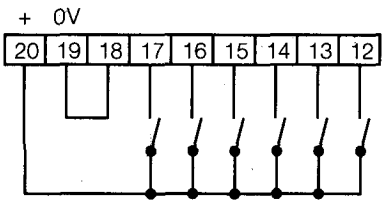
To be used:	Encoder signals	Terminal assignments
• If the pulse generator is not supplied by the encoder power supply from the counter. • If the pulse generator has a push-pull or PNP *output stage.* • If several counters are triggered in parallel by a single pulse generator.	PNP, triggered by a plus signal 	18 and 19 
• If the pulse generator has an NPN output stage. • If a NAMUR encoder is connected.	NPN, triggered by a minus signal 	18 and 20 
• In conjunction with a max. 24 VAC power supply.	Alternating voltage input, triggered by max. 24 VAC. Counting frequency at 15 Hz for all counting inputs essential (lines 24, 25 and 26)	12 to 17 

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

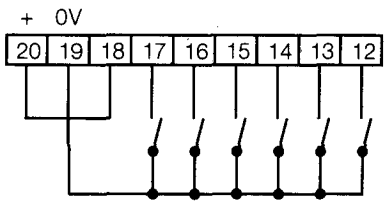
3.4.1 Typical connections

Triggering by no-potential contacts

Plus actuated

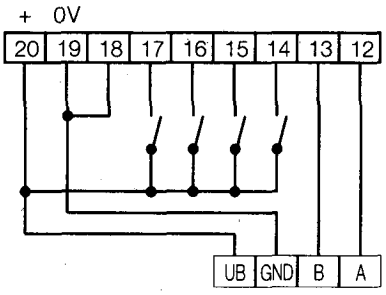


Zero actuated

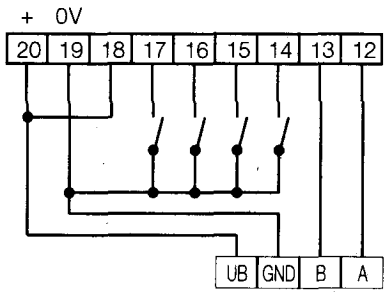


Triggering by incremental rotary encoders

PNP or push-pull

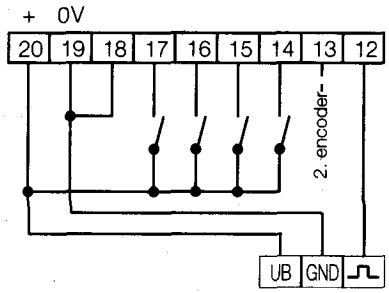


NPN or push-pull

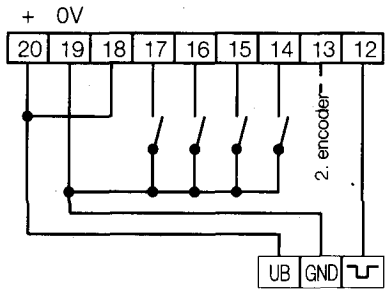


Triggering by proximity switches

PNP or push-pull



NPN or push-pull



3.5 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

3.6 Connecting the interfaces

The serial interface is capable of executing the following functions:
- Accessing data
- Programming parameters

Interface parameters are as follows:
- Data transmission rate (baud rate)
- Parity bit
- Number of stop bits
- Address used to access the control unit from a master computer.

The interface parameters can be set in the programming mode (lines 43, 44, 45 and 46).

The following standard interfaces can be connected to the NE 212:
- RS232
- RS422
- RS485

Interface characteristics

RS232 Full duplex transmission with the following characteristics:
- Asymmetric
- Three leads
- Point-to-point connection - 1 transmitter and 1 receiver
- Max. data transmission distance: 30 m

RS422 Full duplex transmission with the following characteristics:
- Symmetrical
- Four leads
- Multi-point connection - 1 transmitter and 32 receivers
- Max. data transmission distance: 1500 m

RS485 Semi-duplex transmission with the following characteristics:
- Symmetrical
- Two leads
- Multi-point connection - transmitters and receivers (max. 32 units)
- Max. data transmission distance: 1500 m

➜ Assign terminals 21 and 22 and, where applicable, 23, 24 and 25 to the corresponding interface.

3.7 Executing the test routine

The test routine is described below.

To start test
➜ Press the [2] and [+/-] keys simultaneously.
➜ Switch on the NE 212 (hold down the above keys at the same time)
● All the display segments will be displayed automatically in sequence and are thereby tested for functional capability.

Test extension
➜ Using the [->] key, test the keyboard, the inputs, outputs and interface in sequence.

No machine functions may be connected when the outputs are tested.

	tASTE	Keyboard test
	inAbr Sbr	Input test ● Inputs can be triggered simultaneously or individually. A display is only provided when a signal is applied.
	9999.99	Output test ➜ Press keys [1], [2] and [3]. The outputs are now activated. Reset the outputs with the [C] key.
Typical displays	SEr FA IL	Interface test
	nE2 12 01	Display: Instrument model and program number
	100295 1	Display: program date and version
End of test		The test routine is terminated; the NE 212 is now in the operating mode.

4 Operating the NE 212

The operation and use of the NE 212 are described in this section.

● As soon as the power supply has been switched on, the NE 212 is automatically set to the operating mode.

Operating mode

In the operating mode:
- the current counter status can be read and reset;
- the preset values for the main and secondary counters can be read;
- the start count count value 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.

„Current main counter status"

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

To read

➜ Read the counter status.

Reset

Resetting must be enabled in the programming mode

➜ Press the [C] key.

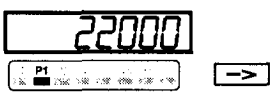
„Main counter preset values"

The preset value functions must be enabled in the programming mode.

To read

➜ Press the [->] key.

➜ Read preset value P1



To change

➜ Press the [P/R] key.

● LED P1 flashes.

➜ Input the new preset value P1 via the numerical keypad; the old value will be deleted.

➜ 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.

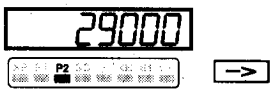
Other changes

➜ Press the [->] key.
● The following values can also be changed.

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

To read

➜ Press the [->] key.
➜ Read preset value P2



To change

➜ Press the [P/R] key.
● LED P2 flashes.
➜ Input the new preset value P2 via the numerical keypad; the old value will be deleted.
➜ 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.

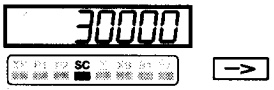
If other values are changed, the value at which the operating level was left can be re-displayed with the [P/R] key after the programming mode has been left.

Main counter start count value

The start count value function must be enabled in the programming mode.

To read

➜ Press the [->] key.
➜ Read the start count value



To change

➜ Press the [P/R] key.
● LED SC flashes
➜ Input the new start count value via the numerical keypad; the old value will be deleted.
➜ 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

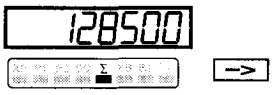
➜ Press the [->] key.
● The following values can also be changed.

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

Totalizing counter
To read

The totalizing counter can be disabled in the programming mode.

➜ Press the [->] key.
➜ Read the totalizing counter.



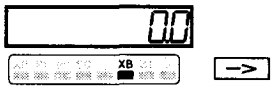
To reset

➜ Press the [C] key.

Secondary counter status
To read

The secondary counter can be disabled in the programming mode.

➜ Press the [->] key.
➜ Read the secondary counter

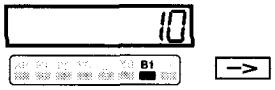


To reset

➜ Press the [C] key.

Secondary counter preset value
To read

➜ Press the [->] key.
➜ Read the secondary preset value



To change

➜ Press the [P/R] key.
● LED B1 flashes.
➜ Input the new secondary counter preset value via the numerical keypad; the old value will be deleted.
➜ 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

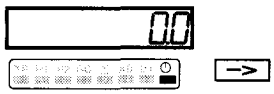
➜ Press the [->] key.
● The following values can also be changed.

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

Operating hours counter
To read

The operating hours counter can be disabled in the programming mode.

➜ Press the [->] key.
➜ Read the operating hours counter.



To reset

➜ Press the [C] key.

Rapid preset value input with F-key

If frequent changes to a certain preset value are required by the user, the F-key can be used.

When the [F] key is operated, the LED symbol display transfers direct to the desired preset value (selection is effected in programming line 35), and the new preset value can be input immediately via the numerical keypad, thereby automatically deleting the old value. To confirm the new value, press the [F] key again.

Procedure

1. Press [F].
2. Input preset value.
3. Press [F].

5 Programming the NE 212

This section describes the procedure for programming the NE 212.

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 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 parameter 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 value via the numerical keypad.

Key [C]

Function in operating and programming modes Deletes the display. Counted value reset to zero or to the main counter start count value. 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 for rapid preset value input.

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

Sign key [+/-]

Function in the operating mode The simultaneous operation of the [+/-] sign key and the [2] key starts the test routine; the power supply must be switched on at the same time.

Function in operating and programming modes Input of a plus or minus sign.

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.

Incorrect code

If an incorrect code has been input:
- [Error] appears in the display when the [->] key is pressed.
- The NE 212 reverts to the operating mode.
➜ Press the [P/R] key.
➜ Press the [F] key.
➜ Input the correct code.

Correct code unknown

If the correct code is not known:
➜ Return the NE 212 to the factory.

Correct code

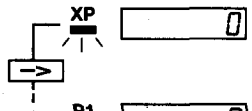
When the correct code has been input, press the [->] key.
- The programming segments are now called up in succession.

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 value via the numerical keypad.

Line 1 

XP – Current counter status

Line 2

P1 – Preset value 1

Line 3

P2 – Preset value 2

Line 4

SC – Main counter start count value

Line 5

Σ – Totalizing counter

Line 6

XB – Secondary counter status

Line 7

B1 – Secondary counter preset value

Line 8

◴ – Operating hours counter

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

Programming procedure for removing the sign from Σ:
- Set the counter to the programming mode.
- Select Line 5 (Σ).
- Erase totalizing counter with the [C] key.
- Operate the [+/-] key; [-oFF 0] appears in the display.
- The function can be activated or cut out with the repeated application of the [+/-] key.
- When the line with the [-oFF 0] display is left, the output of the sign by the totalizing counter is suppressed.

Programming segment 2

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

- [StAt] appears in the display. The LED for the corresponding operating parameter flashes.

Significance of status numbers

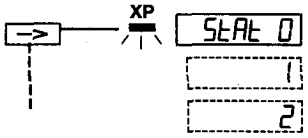
0	**Full access** for operator (read and alter parameters)
1	**Restricted access** for operator (read parameters only)
2	**None access** for operator (No altering, no reading of parameters)

To change status

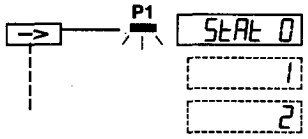
➜ Input the appropriate status number via the numerical keypad.
- The changed status will automatically be stored when the next programming line is selected.

➜ Press the [->] key again.
- The status of each individual operating parameter is called up in sequence.

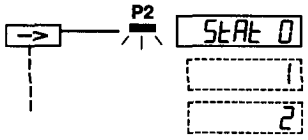
[P/R] [F] [CodE 2] [->]

Line 11 

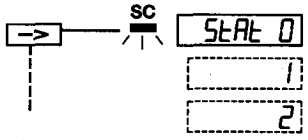
XP – Main counter status

Line 12 

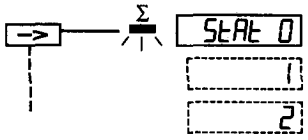
P1 – Preset value 1

Line 13 

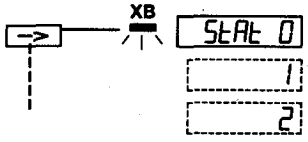
P2 – Preset value 2

Line 14 

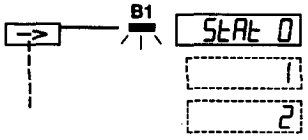
SC – Main counter start count value

Line 15 

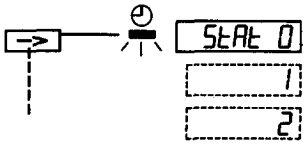
Σ – Totalizing counter

Line 16 

XB – Secondary counter status

Line 17 

B1 – Secondary counter preset value

Line 18 

◴ – Operating hours counter

[->] [--------] At the conclusion of these programming lines, a broken line will appear in the display, signifying the completion of the second programming segment.

The default operating parameter status is zero.

Programming segments 3 and 4

Programming segment 3 begins with programming line 21, programming segment 4 with line 43. 26 programming lines are displayed in sequence in these segments.

Default settings are always printed with *double spacing and in italics.*

➜ Press the [->] key again.
● Programming lines are displayed in succession. The input is stored when the next line is called up.

Line 21 [->] [21 0]

Operating modes
Step preset

[1] Main presets
[2] Parallel comparison
[3] P1 Self-adjusting preset

Line 22 [->] [22 1.0000] [->] [1.0000]

Scaling factor, main counter
Scaling range from 0.0001 to 99.9999
1,0000
[0.0001] 0.0001
[999999] 9999.99

Line 23 [->] [23 1]

Multiplier, secondary counter
1
[2] 2
[99] 99

Line 24 [->] [24 0]

Frequency, main counter track A
10 kHz
[1] 25 Hz
[2] 15 Hz

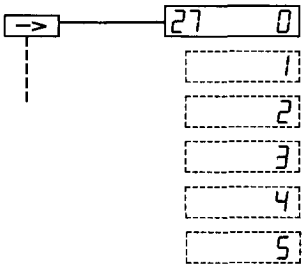
Line 25 [->] [25 0]

Frequency, main counter track B
10 kHz
[1] 25 Hz
[2] 15 Hz

Line 26 [->] [26 0]

Frequency, secondary counter XB
10 kHz
[1] 25 Hz
[2] 15 Hz

Line 27



Counting mode XP and Σ

Track A and UP/DOWN signal on track B

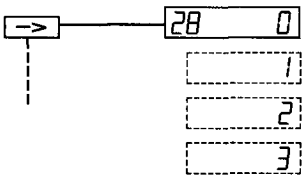
Differential counting, track A adding, track B subtracting (A-B)

Totalizing, tracks A and B adding (A+B)

Track A 90° track B single evaluation
Track A 90° track B twofold evaluation
Track A 90° track B fourfold evaluation
} e.g. with incremental encoders with A and B signal output

- To set track A at 90° to track B, the input frequencies for both tracks must be adjusted to 10 kHz (lines 26 and 27).

Line 28



Decimal point (applies to XP, P1, P2, SC, Σ)

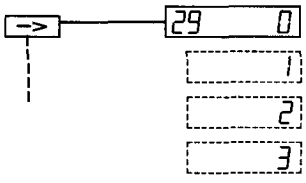
No decimal point

0.0

0.00

0.000

Line 29



Reset main counter

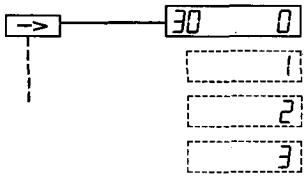
Automatic reset and external, statically effective

Automatic reset and external, edge active

External reset only, statically effective

External reset only, edge effective

Line 30



Reset secondary counter

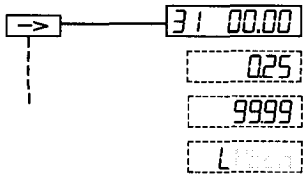
Automatic reset and external, statically effective

Automatic reset and external, edge active

External reset only, statically effective

External reset only, edge effective

Line 31



Output time P1

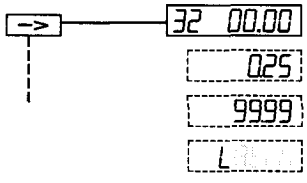
Data in seconds (tol. -0.1 s, range 00.02 – 99.99 s)

0,25

Maximum pulse time

Latch = continuous signal, press C key

Line 32



Output time P2

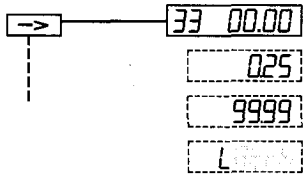
Data in seconds (tol. -0.1 s, range 00.02 – 99.99 s)

0,25

Maximum pulse time

Latch = continuous signal, press C key

Line 33



Output time B1

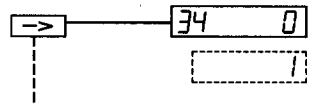
Data in seconds (tol. -0.1 s, range 00.02 – 99.99 s)

0,25

Maximum pulse time

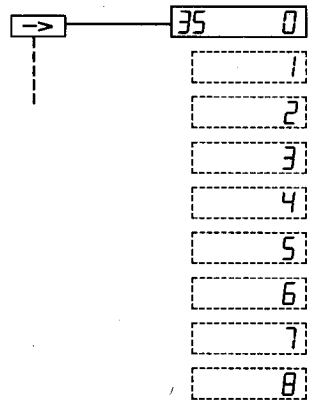
Latch = continuous signal, press C key

Line 34



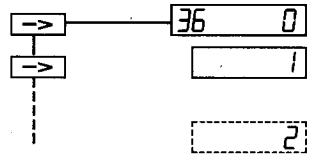
Accept presets P1, P2 and B1
On reset
Effective immediately

Line 35



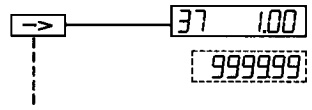
Adresses for function key F
No function
XP – Current main counter status
P1 – Preset value 1
P2 – Preset value 2
SC – Main counter start count value
Σ – Totalizing counter
XB – Secondary counter status
B1 – Secondary counter preset value
◴ – Operating hours counter

Line 36



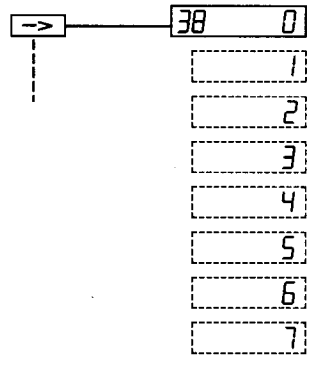
Secondary counter functions XB
Triggering via external input XB
Automatic triggering on reaching P2 (e.g. for batch counting)
Tachometer function (signal input on XB)

Line 37



Pulses per unit of measurement, as tachometer
1,00
0,01 – 9999,99

Line 38



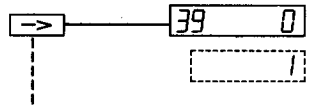
Input of time measurement in seconds (s)
Time base 1s
Time base 2 s
Time base 3 s
Time base 6 s
Time base 10 s
Time base 20 s
Time base 30 s
Time base 60 s

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

Examples

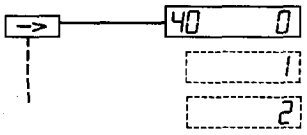
Pulses per rev	Time base in seconds
≥ 60 pulses/rev	1 s
< 60 ≥ 30 pulses/rev	2 s
...	...
1 pulses/rev	60 s

Line 39



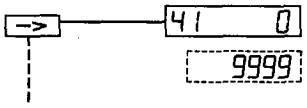
Assignment output B1
Secondary counter XB
Zero contact output for main counter XP

Line 40



Function, input XP stop
XP Stop
Operating hours on/off; on while signal preset
Hold for display/keys disabled while signal present

Line 41

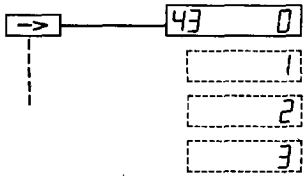


Code setting
No code
1 – 9999

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

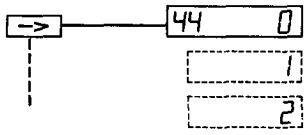
Programming field 4

Line 43



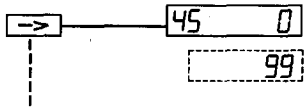
Baud rate
4800 baud
2400 baud
1200 baud
600 baud

Line 44



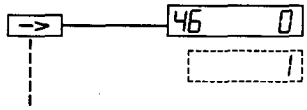
Parity
Even barity
Odd barity
No barity

Line 45



Adress
0
1 – 99

Line 46



Stop bits
1 Stop bit
2 Stop bits

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

To leave the programming mode

➜ Press the P/R key.
● NE 212 now reverts to the operating mode

Reprogramming the NE 212 to the default settings

➜ Switch on the instrument and press the C and P/R keys simultaneously.
● All the programmed values will now revert to their default settings. The message „Clr Pro" appears briefly in the display.

Programming lines

Line	Default setting	Customer's program	Short description
01	0		XP – Main counter status
02	100		P1 – Preset value 1
03	1000		P2 – Preset value P2
04	0		SC – Main counter start count value
05	0		Σ – Totalizing counter
06	0		XB – Secondary counter statusr
07	10		B1 – Secondary counter preset value
08	0.0		◴ – Operating hours counter
10	--------		Separating line
11	StAt 0	StAt	XP – Main counter status
12	StAt 0	StAt	P1 – Preset value 1
13	StAt 0	StAt	P2 – Preset value 2
14	StAt 0	StAt	SC – Main counter start count value
15	StAt 0	StAt	Σ – Totalizing counter
16	StAt 0	StAt	XB – Secondary counter status
17	StAt 0	StAt	B1 – Secondary counter preset value
18	StAt 0	StAt	◴ – Operating hours counter
20	--------		Separating line
21	21 0	21	Operating modes, main counter
22	22 1.0000	22	Scaling factor, main counter
23	23 1	23	Multiplier, secondary counter
24	24 0	24	Frequency, main counter, track A
25	25 0	25	Frequency, main counter, track B
26	26 0	26	Frequency, secondary counter XB
27	27 0	27	Counting mode, main counter
28	28 0	28	Decimal point (applies to XP, P1, P2, SC, Σ)
29	29 0	29	Reset, main counter
30	30 0	30	Reset, secondary counter
31	31 0.25	31	Output time, P1
32	32 0.25	32	Output time, P2
33	33 0.25	33	Output time, P3
34	34 0	34	Accept presets P1, P2, B1
35	35 0	35	Addresses for function key
36	36 0	36	Secondary counter XB functions
37	37 1.00	37	Pulses per unit of measurement as tacho
38	38 0	38	Input of time measurement in seconds (s)
39	39 0	39	Assignment, output 3
40	40 0	40	Function, input 15
41	41 0	41	Code setting
42	--------		Separating line
43	43 0	43	Baud rate
44	44 0	44	Parity
45	45 00	45	Adress
46	46 0	46	Stop bits
47	--------		Separating line

5.1 Operating modes

The operating modes are described below.

Step preset On reaching a preset value, the NE 212 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. Automatic *resetting to the start count value can be obtained with the second pre*set value. External or manual resetting can be carried out at any time.

Main preset On reaching the individual preset values, the NE 212 is reset to the start count value. Preset values are always processed in the sequence: preset value 1, preset value 2. Automatic resetting to the start count value can be obtained with P2. External or manual resetting can be carried out at any time.

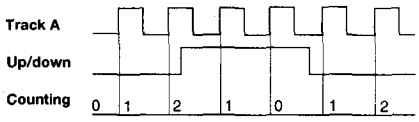
Parallel comparison On reaching the preset values, the outputs switch to continuous signals if the respective preset value in either counting direction is exceeded. Any preset values can be chosen; they are processed independently of each other. Pulse signals cannot be given in the parallel comparison mode.

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 signal is given. Any second preset value can be chosen.

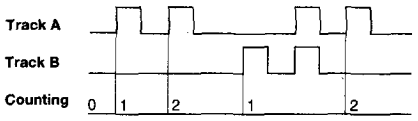
Zero contact The output signal B1 from the secondary counter can be assigned to the main counter as a zero contact in every operating mode (line 39). The secondary counter then has no output signal.

5.2 Counting modes for the main and totalizing counter (input modes)

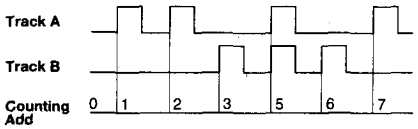
This counter is able to count in either direction. The counting direction is independent of the adding or subtracting operating mode.
The exception to this is totalizing (A+B).



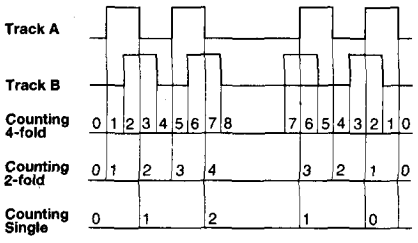
Up/down counting with one counting track A and an external up/down signal on track B



Differential counting, track A adding, track B subtracting (A-B)
Any signal duration and time.



Totalizing, tracks A and B adding (A+B)
The operating mode and consequent counting direction are selected in the programming mode.



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. Twofold or fourfold evaluation is possible.

5.3 Output responses (output modes)

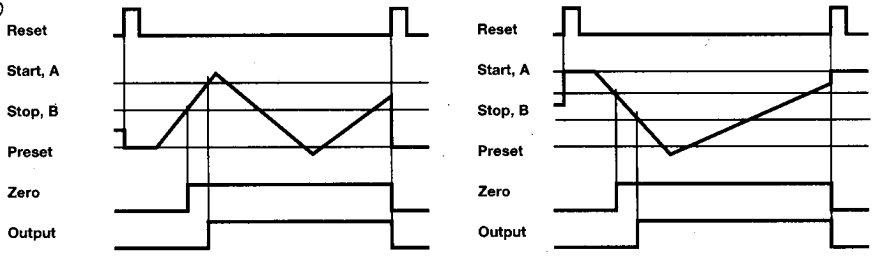
Signal output response is determined by the following:
- Programming of the preset value, start count value, output time, output logic and output function;
- External resetting;
- External counting direction control.

The diagrams below show the output signal responses.

Adding operating mode **Subtracting operating mode**

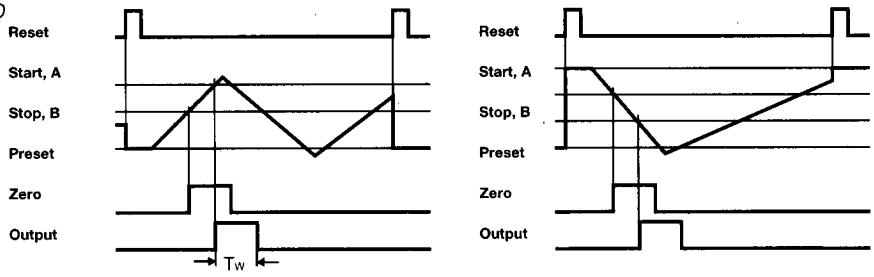
Step preset with continuous signal, without automatic reset

Start count value at zero



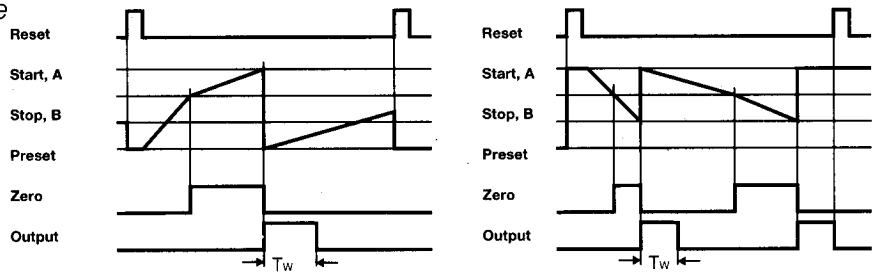
Step preset with pulse signal, without automatic reset

Start count value at zero



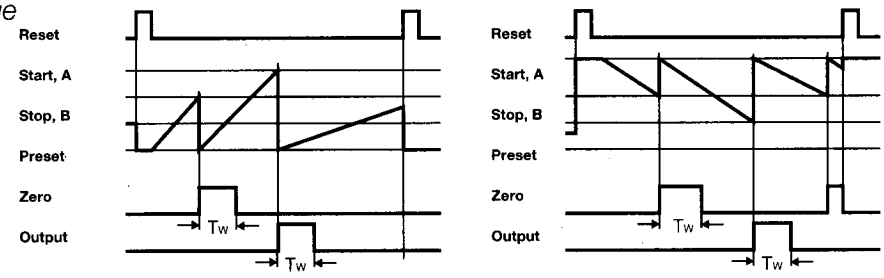
Step preset with pulse signal, but preliminary contacts as continuous signal, with automatic reset

With minus start count value



Main preset with pulse signal, with automatic reset

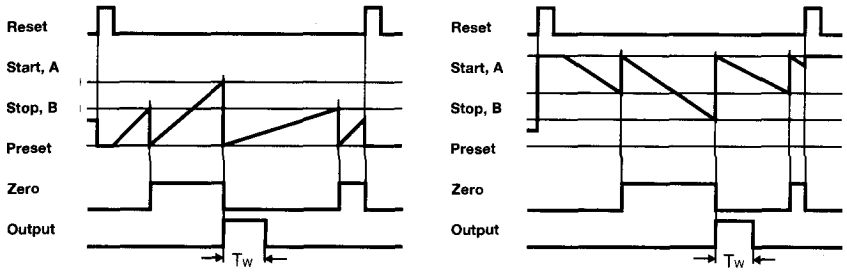
With minus start count value



Adding operating mode **Subtracting operating mode**

Main preset with pulse signal, but output signal P1 as continuous signal, with automatic reset

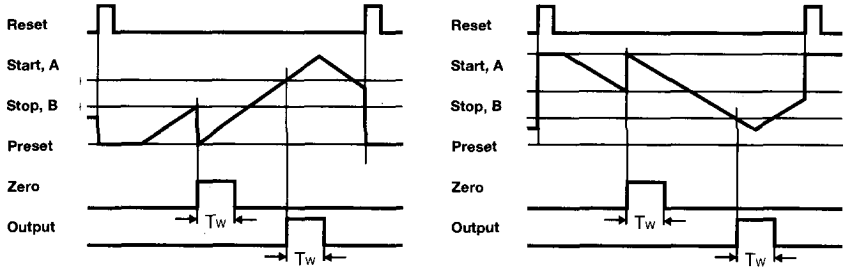
Start count value at zero



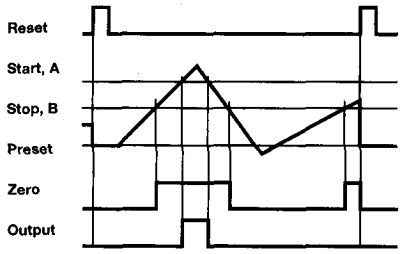
Adding operating mode **Subtracting operating mode**

Main preset with pulse signal, without automatic reset

Start count value at zero

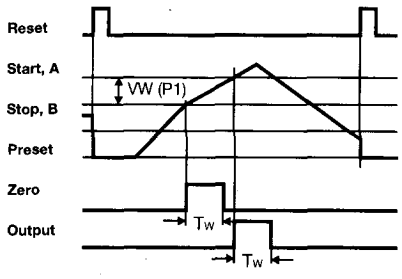


Parallel comparison



Operation in the subtracting mode is impractical.

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.

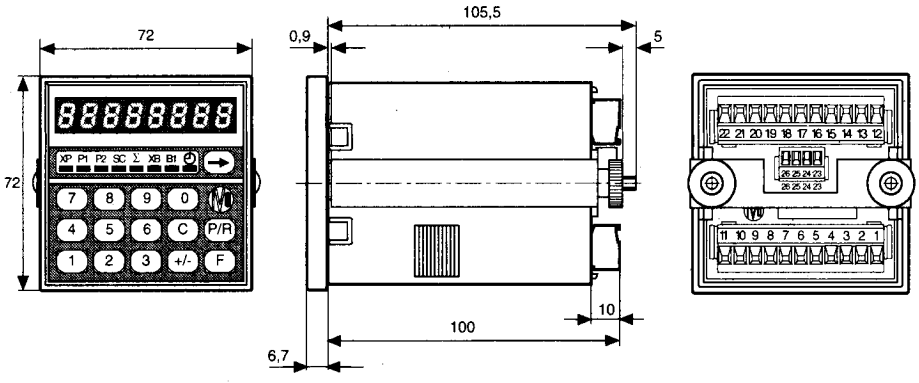
The adding mode is set if the chosen start count value SC is lower than preset values P1 and P2.
The subtracting mode is set if the chosen start count value SC is greater than preset values P1 and P2.
The subtracting mode is impractical in operating modes 2 (parallel comparison) and 3 (self-adjusting preset).

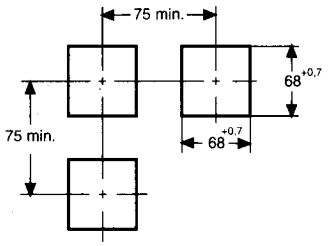
6 Technical data

Display	7-segment LED display 8-digit, red, with prefix zero suppression and minus sign
Digit height	7.6 mm
Power supply	As per purchase order
Power consumption	7 VA, 5W
Encoder power supply	+24 VDC, +20%/–50%, max. 80 mA
Optocoupler inputs	NPN, PNP or AC logic
Max. counting frequency	15 Hz, 25 Hz or 10 kHz
Data storage	> 10 years (via EEPROM)
Mounting	With clamping frame
Dimensions	72 x 72 mm, housing for front panel mounting
Mounting depth	Approx. 100 mm
Terminals	Plug-in screw terminals
Core cross-section	Max. 1.5 mm²
Housing material	Front: polycarbonate, matt black, UL 94V-0
Weight	AC version: approx. 450 g DC version: approx. 320 g
Protection class	II
Type of protection to DIN 40 050	From front in installed condition with IP 54 seal
Conditions of use	As per contamination factor 2
Overvoltage/application class II	
Interference resistance	Severity 3
Ambient temperature	0° C to +50° C
Storage temperature	–20° C to +70° C
Humidity	Max. relative humidity 80% no condensation
General specification	As per VDE 0411

6.1 Dimensions and installation diagrams

Dimensions in mm





6.2 Default settings

The following parameters are programmed into the NE 212 by the factory prior to delivery:

Preset value, main counter P1	100
Preset value, main counter P2	1000
Start count value, main counter SC	0
Scaling factor, main counter XP	1.0000
Preset value, secondary counter B1	10
Secondary counter multiplier	1
Display	No decimal point
Pulse signal time, main and secondary counters	0.25 s
Operating mode	Step preset
Counting frequency, main and totalizing counters	10 kHz
Input function, secondary counter	External triggering
Counting frequency, secondary counter	10 kHz

6.3 Error messages

NE 212 error messages

Error 1

and

Error 2: Fault must be rectified by the factory.

Error 6: Excessively fast sequences, i.e. inadequate intervals between presets at high counting frequency.

Error 7: Counting frequency for track A or B too high.

- Error messages Error 6 and Error 7 can be cleared with the C key.

7 Models and order designations

Digit I	Interface
0	None
1	RS 485
2	RS 422
3	RS 232

Digit II	Secondary counter B1 relay as		Electronic signal output		Electrical isolation	
	NO	NC	PNP	NPN	with	without
0						
1	•				•	
2		•			•	
3			•			•
4				•		•

Electrical isolation only available with AC power supply and no interface; 1 and 3 are stock models.

Digit III	Voltage	
1	24/48 VAC	Voltage selector switch set to higher voltage on delivery
2	115/230 VAC	
3	24 VDC 5 % residual ripple	

Digit IV	Housing and mounting
A	Front 72 x 72 mm, U-type damp

Digit V	Not assigned

Digit VI	Program version
A2	Program 01

NE212. ☐☐☐AXA2

Product No.

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