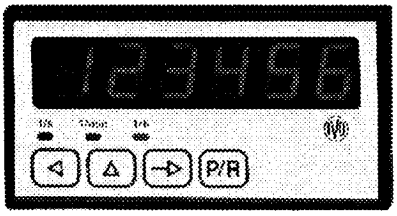
COUNTERS · CONTROLLERS · ENCODERS



Operating Instructions

Electronic Tachometer TA 200

Contents Page

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12.99 171.02.166/1

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 TA 200.

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 indications

Ther electronic counter, controller and monitor has been designed to the latest state of the art.

Use the instrument only

- in an absolutely correct technical state,
- for the intended purpose,
- when conscious of relevant safety and danger, by observing the operating instructions.

Intended purpose

The instrument is to be used only indoors as built-in model.
Its fields of application are industrial processes and controls on production lines of the metal, wood, plastic, paper, glass and textile industries; the overvoltage protection of the terminals must be limited to the voltages of category II.
Description of the overvoltage category under DIN VDE 0110, Part 2.
The instrument may only be operated in a correctly mounted state.
The instrument may only be operated as described under chapter „Technical Data".

The instrument may not be used in hazardous areas, for medical apparatus, nor for applications expressly declared under EN 61010.

If the instrument is to be used to control machines or processes, where the machine could be damaged or the operator could be injured due to a breakdown of the instrument or to a failure in operation, then relevant safety precautions will have to be taken.

Organizational measures

Make sure that all operators have read and understood the operating instructions, especially the chapter „Safety indications".
In addition to the operating instructions, please make sure that generally applicable legal and other mandatory regulations relevant to accident prevention and environment protection are observed.

Be conscious of operation

In the event of safety-relevant modifications (including changes in the behavior of the instrument during operation), immediately stop operation of instrument.

Installation

The installation may only be effected as described under the chapter „Connection".
When installing the instrument, take care to cut off the power supply.

The instrument may only be installed by a skilled expert.
Prior to initial operation of the instrument, please control the voltage selection. Set the switch to the required a.c. voltage. During installation, make sure that supply voltage and connection of the output contacts are provided from the same MAINS phase.
Max. voltage 250 V terminal – terminal, earth – terminal.

Initial operation The instrument is ready for use after it has been correctly mounted and installed.

Maintance/Servicing/ Trouble shooting Cut off power supply of all connected instruments. This kind of work may only be effected by a skilled expert. In case of unsuccessful trouble shooting, interrupt use of instrument and contact your dealer.

Getting acquainted After successful initial operation, make yourself familiar with the operation of your instrument by studying the chapter „Getting to know".

2 Getting to know the TA 200

Components of the TA 200

Control panel

[->] Changeover key for function display

[<] Adjusting key for decade selection

[^] Adjusting key for decade values

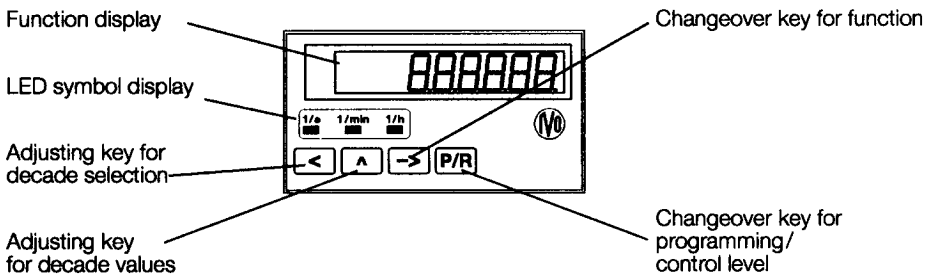
[P/R] Changeover key for programming/control level

LED symbol display

F1 Display of time unit 1/s

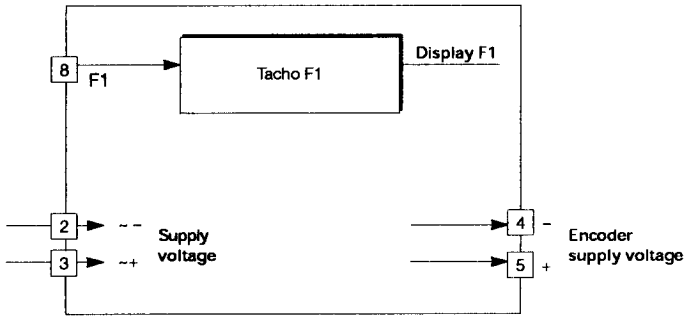
F2 Display of time unit 1/min

F3 Display of time unit 1/h



2.1 Block diagram of the TA 200

The block diagram indicates the components of the TA 200, as well as terminals and connection points.



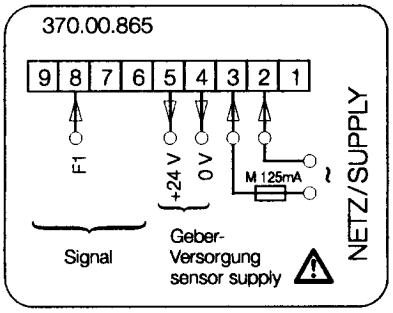
3 Connecting the TA 200

This chapter first describes terminal assignment of the TA 200, followed by some connection examples.

Chapters 3.1 to 3.3 provide concrete remarks and specifications regarding the individual terminals.

The electrical inputs and outputs are configured on two plug-in screw terminals. The two 9-pole screw-type terminal is coded without pole loss.

Connection examples



Terminal assignment

Terminal	Function
1	Not assigned
2	Supply voltage (–)
3	Supply voltage (+)
4	Encoder supply 0 volts
5	Encoder supply +24 volts
6	
7	
8	Signal f1
9	

For protection against shock hazards as specified in VDE 0411, part 100, only use wire end ferrules with insulator caps for stranded wire connection. Do not use terminals for any other purposes if they have not been connected at the works. It is recommended to screen all sensor connecting wires and to earth the screen on one side. Earthing on both sides is advisable if HF interferences are encountered and if wires should not be laid along with mains power supply cables and the output contact wires.

3.1 Connecting the supply voltage

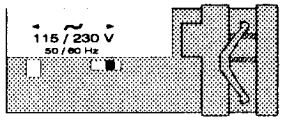
For alternating current connection

Supply voltage Alternating voltage	Recommended external fusing
24 V ± 10% 50/60 Hz	T 400 mA
48 V ± 10% 50/60 Hz	T 400 mA
115 V ± 10% 50/60 Hz	T 100 mA
230 V + 6%, -10% 50/60 Hz	T 100 mA

It is possible to switch between two different alternating voltage ratings as required using the voltage changeover switch accessible from the side of the device. The higher of the two alternating voltage ratings (48 V or 230 V) is set in the factory.

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

➜ Connect alternating voltage to terminals 2 and 3 in accordance with the terminal diagram of the TA 200



For direct voltage connection

Supply voltage Direct voltage	Recommended external fusing
24 V ± 10% max. 5 % RW	T 400 m

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

➜ Connect direct voltage in accordance with the terminal diagram of the TA 200

Fire protection: Operate the device using the recommended external fusing indicated in the terminal diagram. According to VDE 0411, in case of a fault 8 A / 150 VA (W) must never be exceeded.

3.2 Assigning the signal inputs

Terminal 8 (f1) is the signal input. The frequency and signal logic are determined in lines 23 and 24 of the program.

Input resistance	appr. 3 kOhm
Max. input level	+/- 40 Volts
Max. frequency F1	40 kHz/25 Hz

For suitable pulse encoders, see the IVO encoder catalogue.

3.3 Connecting the encoder supply

Connect the encoder supply at terminals 4 and 5. However, do not use the encoder supply to supply unearthed inductances or capacitative loads.

The encoder supply is not short circuit-proof.

Terminal	Voltage	Maximum residual ripple	Maximum permissible current
4	0V	–	–
5	+24 VDC +10% /-50%	Depending on load	100 mA

3.4 Executing the test routine

The test routine is described below.

Test start

➜ Press keys [<] and [P/R] at the same time.
➜ Switch on the TA 200 (hold down the above keys for this period)
● All display segments are displayed automatically in sequence and so performance tested.

Test extension

➜ Using the [->] key, test the keyboard and the inputs in turn.

[tASTE] Keyboard test

[inAbcd] Input test
● The display is active in the idle status.

Display examples

[P01 1] Display: Program number and version number

[95] Display: Program date

[tEST n] Test of various input levels (operating points), (test of numbers 2, 4, 6, 8 and 9)

Test end

The test routine can only be interrupted by switching off the device. After switching the mains supply back on, the TA 200 is automatically ready for operation.

Test program version

Press the [^] key, switch on the TA 200 (hold the key down for this period).

[P01 1] Display: Program number and version number

[95] Display: Program date

4 Working with the TA 200

Operation and application of the TA 200 are described in this chapter.

- After switching on the supply voltage, the TA 200 is automatically ready for operation.

Operating level

On the operating level, it is possible to read tachometer display F1, e.g. supply speed, rotational speed, cycle rate, no. of strokes, flow etc.

Tachometer display F1
Read

➜ Read the displayed value

5 Programming the TA 200

This chapter describes the process used to program the TA 200.

Programming level

On the programming level, it is possible to adjust the operating parameters.

In the programming field, all machine-related functions and values can be programmed.

Key assignment

There can be a difference between the key assignment used on the operating and programming level. For this reason, all functions are described here in full.

Key [->]

Function on the programming level

Switches to the next operating parameter on the operating and programming level. For fast run-through, keep the key pressed down.

Key [P/R]

Function on the operating and programming level

Switches over between programming and operating level

Key [<]

Function on the programming level

Selects the first or next required decade. The respective selected decade position flashes.

Key [^]

Function on the programming level

When this key is pressed, the respective decade position switches on by one value.

Programming set-up and the three programming fields are now described in order of their application.

Switching on the programming function

➜ Press the key [P/R]
- The system switches from the operating to the programming level
- The **CodE** display appears.

➜ Enter the code [<] and [^].

➜ Press the key [->]

There is no code entered on delivery.

Incorrect code

Entering an incorrect code:

- **CodE** appears in the display after pressing the [->] key
- After 15 seconds, the system switches automatically back to the operating level
- ➜ Press the key [P/R]
- ➜ Enter the correct code

Unknown correct code

If you do not know the correct code:

- ➜ Send the TA 200 back to the manufacturer

Correct code

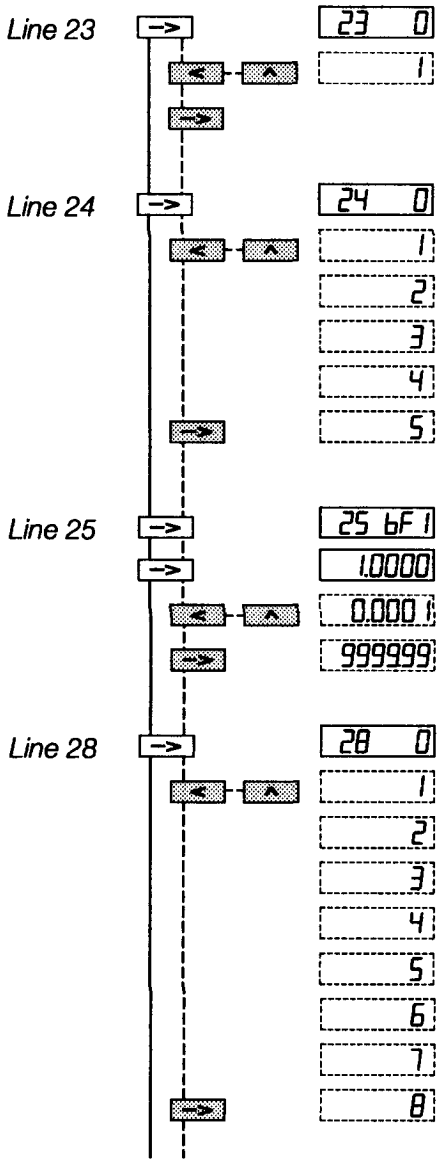
- ➜ If the code is correct, press the key [->]
- The programming fields are then accessed one after the other

Programming field

The programmingfield begins with programming line 23. In this programming field, the programming lines are displayed in sequence. The default setting is always written s p a c e d o u t.

- ➜ Press the key [->] again, for fast run-through hold the key down.
- The programming lines are selected in sequence. To switch back through the program lines, hold down the [^] key at the same time.

The input is stored when you use the [P/R] key to switch back from the programming to the operating level.



Frequency of F1

F1 40 kHz

F1 25 Hz

Input logic (for F1)

PNP (switching voltage at appr. 11 V)

NPN (switching voltage at appr. 11 V)

PNP (switching voltage at appr. 5V, or Namur with 8 V external supply)

NPN (switching voltage at appr. 5V, or Namur without intrinsic safety)

PNP (switching voltage at appr. 2,5V)

NPN (switching voltage at appr. 2,5V)

Scale F1 (divider), at rpm measurement: Pulses/rev.

1,0000

0,0001 – 9999,99

Update time

0,5 s

1 s

2 s

3 s

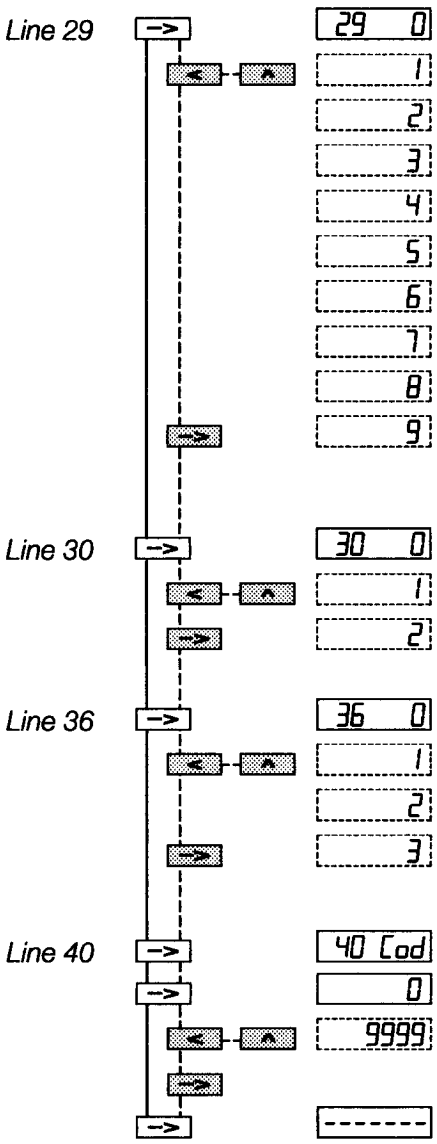
5 s

10 s

20 s

30 s

60 s



Time out F1
On stillstand, after expiry of this period a reset to zero occurs

1 s
2 s
3 s
5 s
10 s
20 s
30 s
60 s
Time-out not operational
Time-out not operational,
with storage of F1 in the event of a power failure.

Time unit F1

1/min
1/s
1/h

Decimal point for F1

No decimal point
0.0
0.00
0.000

Code setting

0 No code
1 – 9999

- After completion of these programming lines, a dotted line appears in the display. The dotted line represents the end of the third programming field.

Switching back through the program lines

➜ Hold down the key [^] and press the key [->] again.

Switching off the programming mode

➜ Press the key [P/R]
- The TA 200 is now on the operating level again.

Reprogramming the TA 200 with the default setting

➜ Switch on the device and press the keys [<] and [^] at the same time
- All values which have already been programmed are returned to the default settings. Display shows for a short time „Clr Pro".

5.1 Measuring speed and rpm

When using the TA 200 for measurement of revolutions per minute, the time unit for F1 (tachometer 1) is set for r.p.m. in line 30.
The number of pulses per revolution (scale) is specified in line 25 for F1.

Decimal places

If you wish the display to include decimal places, this must be taken into account when setting the measurement and decimal point as follows:

1 decimal place	Scale x 0.1	Decimal point 0.0
2 decimal places	Scale x 0.01	Decimal point 0.00
3 decimal places	Scale x 0.001	Decimal point 0.000

Rpm measurement

	Pulses/rev.	**Scale** (lines 25)	**Decimal point** (lines 36)	**Display example**
Example	1 rev = 1 pulse	1	none	9999 (rpm)
	1 rev = 1 pulse	0,1	0.0	999.9 (rpm)
	1 rev = 10 pulse	10	none	9999 (rpm)
	1 rev = 10 pulse	1	0.0	999.9 (rpm)

Speed measurement

When using the TA 200 for speed measurement for m/min., the time unit for F1 is set in line 30 (rpm), and the number of pulses per metre (scale) for F1 is located in line 25.

Formula for calculation of the scale factor:

$$\frac{\text{Pulses/rev.}}{\text{Circumference}}$$

Example

Circumference (measuring wheel)	**Pulses/Rev** (encoder)	**Scale** (line 25)	**Decimal point** (line 36)	**Display example**
0,5 m	1	$\frac{1}{0,5} = 2$	none	9999 (rpm)
0,5 m	50	$\frac{50}{0,5} = 100$	none	9999 (rpm)

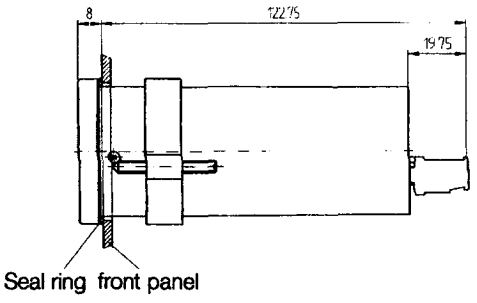
5.2 Programming

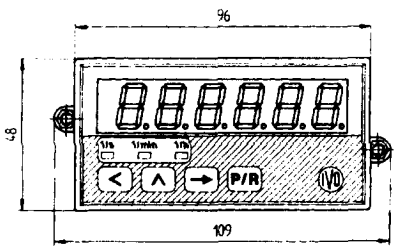
Line	Default setting	Customer program	Short form
23	23 0	23	Input frequency
24	24 0	24	Input logic
25	25 bF 1 10000	25 bF 1	Scaling factor
28	28 1	28	Update time
29	29 0	29	Time-out
30	30 0	30	Time unit
36	36 0	36	Decimal point
40	40 Cod 0	40 Cod	Code
65	--------		Dashed line

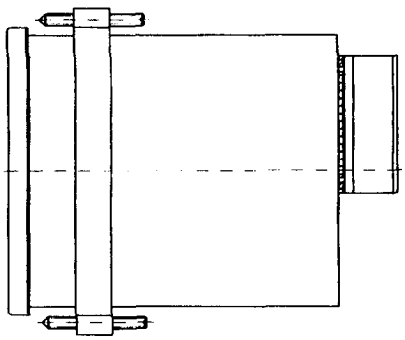
6 Technical data

Display	7-segment LED display, 6-digit, red with initial zero suppression with minus sign
Figure height	14 mm
Power supply	24/48 VAC ±10% 115 VAC ±10% / 230 VAC +6%, -10% 24 VDC ±10%
Power consumption	7 VA, 5 W
Encoder output supply	+24 VDC +10% /-50%, max. 100 mA
Programmable signal inputs	PNP, NPN
Input resistance	appr. 3 kOhm
Max. input level	+/- 40 V
Max. input frequency, F1	40 kHz
Precision	0.02% of the respective range limit value generally +/-1 digit
Data storage	> 10 years (using EEPROM)
Fixture	By means of gripping frame
Dimensions	96 x 48 mm, housing for front panel mounting
Mounting depth	appr. 115 mm
Terminals	Plug-in screw-type terminals
Core cross-section	max. 1.5 mm
Housing material	Macrolon 6485
Front membrane	Polyester
Weight	AC version appr. 350 g DC version appr. 250 g
Protection	According to EN 61010, category II
Type of protection per DIN 40050	From the front, when mounted, with seal: IP 65
Operational requirements	According to contamination factor 2
Overvoltage protection	According to EN 61010, category II
Interference immunity	Acc. to EN 50082-2 } factor 2 to 3
Emitted interference	Acc. to EN 50081-2 } factor 2 to 3
Ambient temperature	0 °C ... +50 °C
Storage temperature	-20 °C ... +70 °C
Relative humidity	Max. relative humidity 80%, non-condensing
General rating	According to EN 61010

6.1 Measurements and mounting dimensions







Panel cutout: 92+0.8 x 45+0.6

6.2 Default setting

The TA 200 is supplied programmed with the following default parameters:

Frequency of F1	40 kHz
Input logic	PNP
Scale F1	1.0000
Display update	every 1 seconds
Time-out	1 second
Time unit F1	rpm
Decimal point F1	no decimal point
Program protection code	no code set

6.3 Error indications

Error codes of the TA 200

Err 1 and **Err 2** Hardware error, must be sent in for repair.

Err 6 Input frequency at tachometer F1 is too high.

The error code can be cancelled by pressing the C key.

999999 flashes Over-range of displays F1, F2, F3.

Can also occur at low frequencies due to unfavourable parameter settings.

For example:

F1 = 100 Hz, bF = 0.01, unit = 1/h

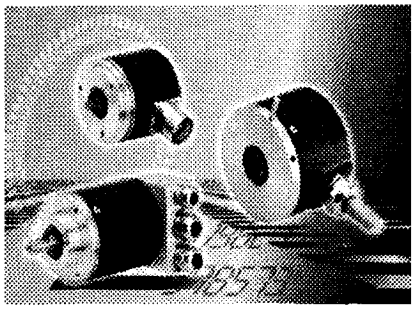
100 / 0.01 x 3600 = **3600000**

Flashing of the numbers 999999 is automatically cleared after correcting the parameter or reducing the frequency.

7 Configurations and order designations

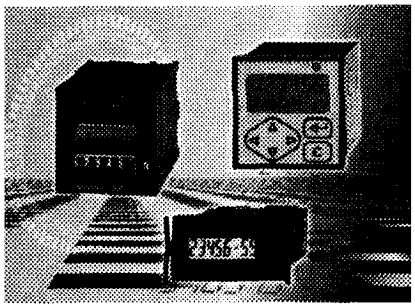
TA 200.001.AXA1	Supply voltage 24/28 VAC
TA 200.002 AXA1	Supply voltage 115/230 VAC
TA 200.003 AXA1	Supply voltage 24 VDC 5% Res. ripple

IVO Product Range



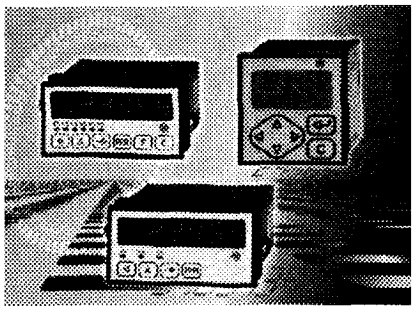
Absolute and incremental Encoders

IVO encoders are used for many different shafts, flanges and plugs, either as absolute or incremental encoders with the usual interfaces.



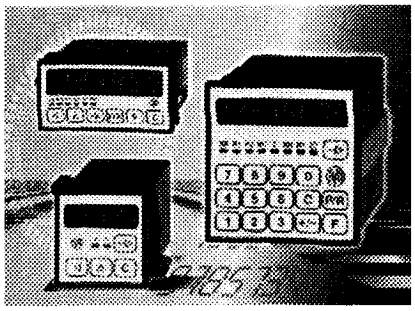
Electronic operating time meters

Our electronic operating time meters are available with LCD, LED-display, up to 2 presets, and different output levels.



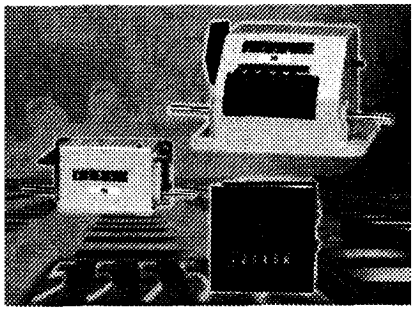
Electronic tachometers

To process digital and analog signals with a multiplicity of calculation functions.



Electronic totalizers and preselection counters

IVO offers competitive solutions from simple totalizing applications up to complex preset counters with a variety of control functions.



Mechanical and electro-mechanical counters

Range from simple pulse counters up to mechanical printing counters.

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