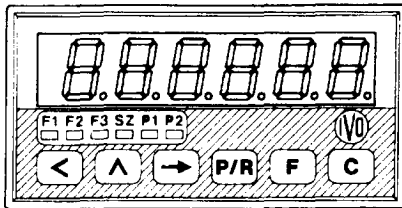




# IVO IRION & VOSSELER

COUNTERS · CONTROL UNITS · ENCODERS



## Operating Instructions

### Tachometer TA 202

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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



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This symbol indicates instructions or information which is of particular importance to ensure the correct use of the TA 202

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This symbol indicates important additional information.

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

## 1. Safety remarks

The electronic tachometer is constructed in line with the state of the art. Only ever use the TA 202

- 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, wood-working, plastics, paper, glass and textile industries.

The TA 202 may only be operated when correctly installed.

The TA 202 may only be operated in accordance with the data provided in chapter 6.



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The TA 202 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.

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If the TA 202 is used for the control of machines or operating processes in which failure or an operating error at the TA 202 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 TA 202 from service immediately.

*Installation*

When executing installation work at the TA 202, always switch off the electrical supply first. Installation may only be carried out by suitably qualified staff. Before putting the TA 202 into operation, check the position of the voltage selection switch, and ensure that the device is set for the required voltage.



<i>Repairs/ maintenance/ troubleshooting</i>	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.
<i>Familiarization</i>	As soon as the unit is operational, familiarize yourself with its use in accordance with the instructions laid down in 'Getting to know the TA 202'.
<i>Other hazards</i>	Provided the unit has been properly connected and is used for the prescribed purpose – as described above – no further hazards are posed by the TA 202.

## 2. Getting to know the TA 202

The TA 202 comprises

- two separate tachometer units, tachometer 1 with an internal phase evaluator
- programmable measurement functions
- maximum memory „slave pointer“
- adjustable limiting values

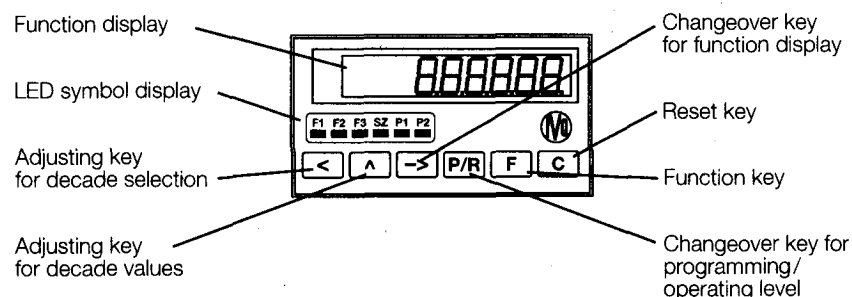
### Components of the TA 202

#### Control panel

- Changeover key for function display
- Adjusting key for decade selection
- Adjusting key for decade values
- Changeover key for programming/control level
- Function key
- Reset key

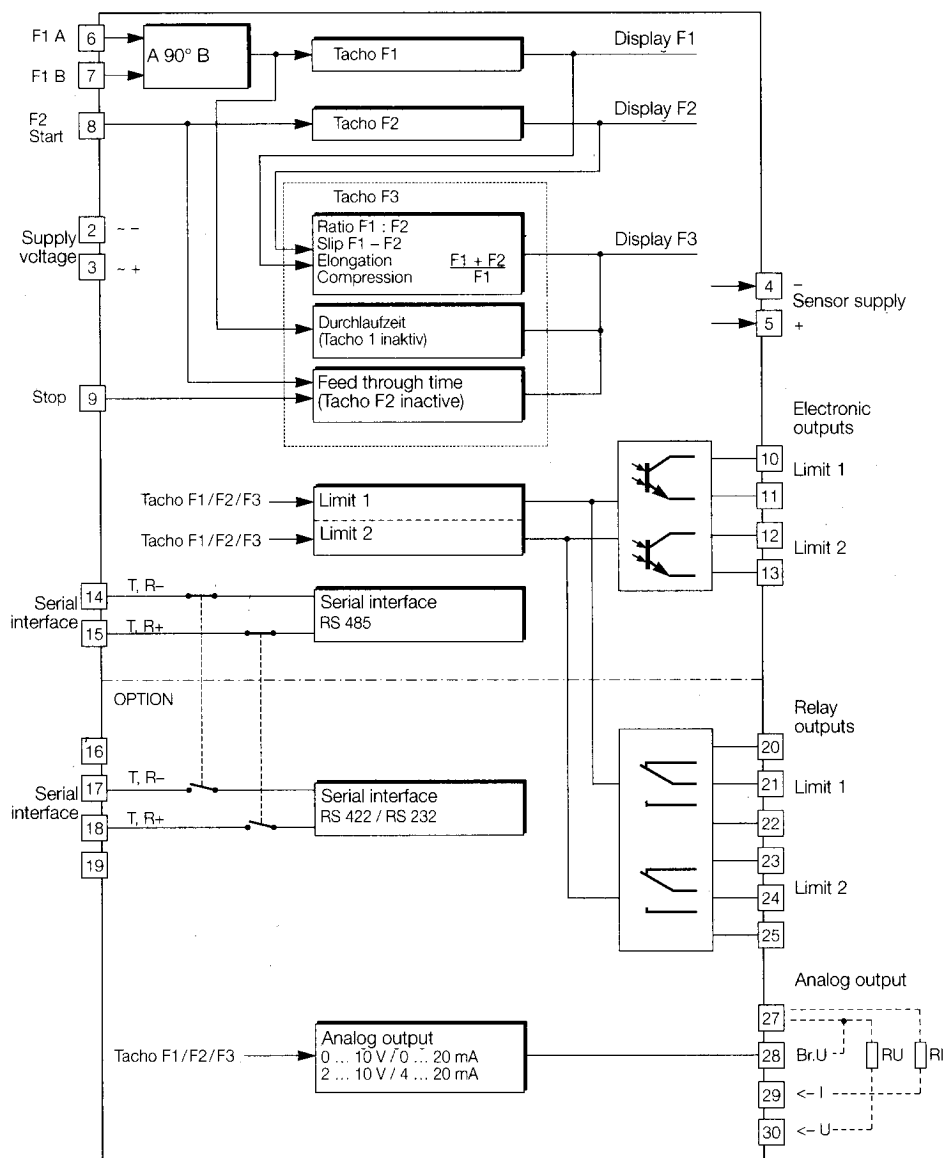
#### LED symbol display

- F1 Display tachometer 1
- F2 Display tachometer 2
- F3 Display of measurement function
- SZ „Max hold“ display
- P1 Limit value 1
- P2 Limit value 2



## 2.1 Block diagram of the TA 202

The block diagram indicates the components of the TA 202, as well as terminals and connection points.



## 3. Connecting the TA 202

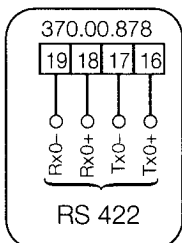
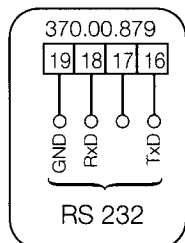
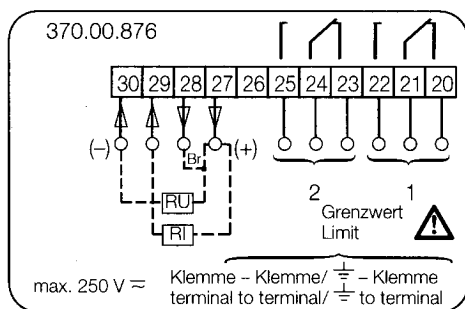
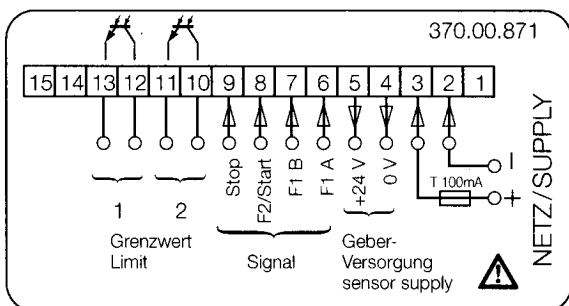
This chapter first describes terminal assignment of the TA 202, followed by some connection examples.

Chapters 3.1 to 3.5 provide concrete remarks and specifications regarding the individual terminals.

The electrical inputs and outputs are configured on two plug-in screw terminals. The two 15-pole screw-type terminals are 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	Signal f1/A (track A)
7	Signal f1/B (track B)
8	Signal f2/Start
9	Signal Stop
10	Limit value 1 (collector)
11	Limit value 1 (emitter)
12	Limit value 2 (collector)
13	Limit value 2 (emitter)
14	Reserved for option RS 485 T, R-
15	Reserved for option RS 485 T, R+
16-19	Reserved for option RS 232 or RS 422
20-22	Reserved for option relay output limit value 1 (P1)
23-25	Reserved for option relay output limit value 2 (P2)
27	Reserved for option analogue output
28	Reserved for option analogue output (jumper at U)
29	Reserved for option analogue output (I)
30	Reserved for option analogue output (U)

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.

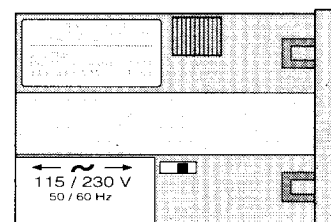
## 3.1 Connecting the supply voltage

For alternating current connection

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.

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

- 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 202



For direct voltage connection

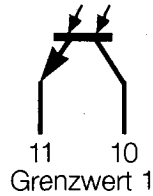
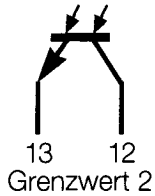
Supply voltage Direct voltage	Recommended external fusing
24 V ± 10% max. 5 % RW	T 500 mA

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 202



**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 electronic outputs

The electronic outputs (terminals 10, 11 and 12, 13) are optocoupler outputs with separate assignment of the respective collector and emitter. Limit values are assigned in lines 33 and 34 of the program.

Max. switching voltage	Max. switching current	Max. residual voltage
+40 V	15 mA	< 1 V



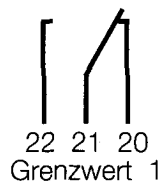
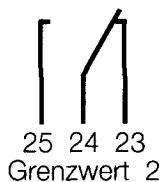
The electronic outputs are not short-circuit proof!

→ Assign terminals 10, 11 and 12, 13 accordingly.

## 3.3 Assigning the signal outputs (relay contacts) (Option)

Terminals 20, 21 and 22 as well as 23, 24 and 25 are potential-free changeover contacts. The signal outputs can be assigned in accordance with the terminal diagram on the left.

The limit values are assigned in lines 33 and 34 of the program.



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 8 A/150 VA (W) is not exceeded in the event of a fault.

→ Assign terminals 20, 21 as well as 23, 24 and 25 accordingly.

## 3.4 Assigning the signal inputs

Terminals 6 to 9 are signal inputs. Terminals 6 (f1/A) and 7 (f1/B) are inputs for the tachometer display F1. The type of signal and signal logic are determined in lines 23 and 24 of the program.

Terminal 8 (f2/Start) serves

- as a signal input for tachometer display F2
- or as a start input for time measurements depending on the setting in line 21 of the program.

Terminal 9 (stop) is used as a stop input in the case of time measurements.

Input resistance	appr. 3 kOhm
Max. input level	+/-40 Volts
Max. frequency F1	10 kHz
Max. frequency F2	40 kHz

→ Assign terminals 6 to 9 accordingly.

For suitable pulse encoders, see the IVO encoder catalogue.

## 3.5 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 capacitive 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

## 3.6 Connecting the interfaces (Option)

The serial interface is capable of executing the following functions:

- Accessing data
- Programming parameters

Interface parameters include:

- Data transmission rate (baud rate)
- Parity bit
- Number of stop bits
- Address used to access the TA 202 from a master computer

These interface parameters can be set on the programming level (lines 51, 52, 53 and 54).

The following standard interface types can be connected to the TA 202:

- RS 232
- RS 422
- RS 485

### Interface characteristics

**RS 232** Full duplex transmission with the characteristics:

- Asymmetrical
- 3 leads
- Point to point connection – 1 transmitter and 1 receiver
- Max. data transmission length max. 30 metres

**RS 422** Full duplex transmission with the characteristics:



- Asymmetrical
- 4 lines
- Multiple-point connection – 1 transmitter and 32 receivers
- Max. data transmission length 1500 metres


**RS 485** Semi-duplex transmission with the characteristics:

- Symmetrical
- 2 lines
- Multiple-point connection – 1 transmitter receivers (max. 32 appl.)
- Max. data transmission length 1500 metres
- ➔ Assign terminals 14 and 15 and where applicable also 16, 17, 18 and 19 with the respective interface.

## 3.7 Executing the test routine

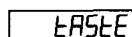
The test routine is described below.

- Test start*
- Press keys  and  at the same time.
  - Switch on the TA 202 (hold down the above keys for this period)
  - All display segments are displayed automatically in sequence and so performance tested.

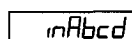
- Test extension*
- Using the  key, test the keyboard and the inputs in turn.



When testing the appliance outputs, ensure that no machine functions are connected

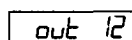


Keyboard test



Input test

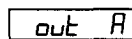
- The inputs can be triggered simultaneously or individually. The display is active in the idle status.



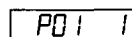
Output test

- Press the keys  and 

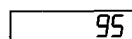
The outputs are now activated. Reset the outputs using the  key.



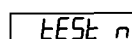
Analogue output test (only when using the option with analogue output).



Display: Program number and version number




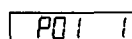
Display: Program date



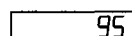
Test of various input levels (operating points), signal forms and of the phase discriminator (test of numbers 1 to 9)

- Test end*
- The test routine can only be interrupted by switching off the device. After switching the mains supply back on, the TA 202 is automatically ready for operation.

- Test program version*
- Press the  key, switch on the TA 202 (hold the key down for this period).



Display: Program number and version number



Display: Program date

## 4. Working with the TA 202

Operation and application of the TA 202 are described in this chapter.

- After switching on the supply voltage, the TA 202 is automatically ready for operation.

- Operating level*
- On the operating level, it is possible
- to read tachometer display F1, e.g. supply speed;
  - to read tachometer display F2, e.g. rpm;
  - read the measurement display F3, e.g. ratio between F1:F2;
  - read, delete and modify the „max hold“ display, e.g. F2 max.;
  - read, delete and modify the limit values P1 and P2

On the programming level, it is possible to disable all parameters (for more information, see also chapter 5, programming field 2.)



### Tachometer display F1

Read → Read the displayed value

**2 8 0 0 0**

**F1**

### Tachometer display F2

Read → Press the key **→**

→ Read the displayed value

**2 3 0 0 0**

**F2**

### Measurement function F3

Read → Press the key **→**

→ Read the displayed value

**1 . 2 1 7**

**F3**

### „Max hold“

Read → Press the key **→**

→ Read the „max hold“ value

Reset → Press the key **C**

**2 8 5 0 0**

**SZ**

### Limit value P1

Read → Press the key **→**

→ Read the set limit value P1

**2 2 0 0 0**

**P1**

Modify → Enter the limit value P1 using **<** and **^**, sign before the 6th decade after figure 9

→ Press the key **→**

● Modification completed

### Limit value P2

Read → Press the key **→**

→ Read the set limit value P2

**2 9 0 0 0**

**P2**

Modify → Enter the limit value P2 using **<** and **^**, sign before the 6th decade after figure 9

→ Press the key **→**

● Modification completed



After 15 seconds without activating a key, the previous limit value is automatically restored and displayed.

## 5. Programming the TA 202

This chapter describes the process used to program the TA 202.

*Programming level* On the programming level, it is possible to adjust the operating parameters. The programming level is subdivided into three different programming fields.

*1st programming field* In the first programming field, it is possible to access and modify all the operating parameters. Those operating parameters which are disabled on the operating level are also displayed here. The first programming field consists of 6 lines. (Lines 1 – 4 are not programming lines).

*2nd programming field* In the second programming field, the individual operating parameters can be disabled and enabled for access to the operating level.  
It is possible to access disabled operating parameters from the first programming field.

*3rd programming field* In the third programming field, it is possible to program all machine-related functions and values, as well as the interface parameters.

*Key assignment* For the individual programming fields, the assignment of keys is the same. 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 operating and programming level* Switches to the next operating parameter on the operating and programming level. For fast run-through, keep the key pressed down.

### Key

*Function on the operating and programming level* Switches over between programming and operating level

### Key

*Function on the operating and programming level* Selects the first or next required decade. The respective selected decade position flashes.


### Key

*Function on the operating level* Deletes the display.

*Function on the programming level* Deletes the display. Reset to the value zero. Reset of possible programmed operating values.

### Key

*Function on the operating level* Switches from any optional display to a parameter in accordance with selection made in line 41.

*Function on the programming level* In conjunction with the  key, switches over to the programming level.

### Key

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

*Function on the operating and programming level* When the key is pressed, the respective decade position switches on by one point until the maximum setting value is reached.



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
- Press the key **F**
- The **Code** display appears.  
The code exists for programming fields 1 – 3
- 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**
- Press the key **F**
- Enter the correct code

*Unknown correct code*

If you do not know the correct code:

- Send the TA 202 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 1

For information on the displays and on modification of the individual values, see chapter 4.

- Press the key **→** again
- Select the operating parameters. The respective LED flashes

*Altering the operating parameters*

- Enter the altered value using the keys **<** and **^**.

Line 1		-----		F1 – display tachometer 1
Line 2		-----		F2 – display tachometer 2
Line 3		-----		F3 – display for the measurement function
Line 4		-----		SZ – display for „max hold“ (maximum memory)
Line 5		-----		P1 – limit value 1
Line 6		-----		P2 – limit value 2

- After completion of the first programming field, a dotted line appears in the display.

## Programming field 2


In the second programming field, the letters StAt appear, standing for status selection.

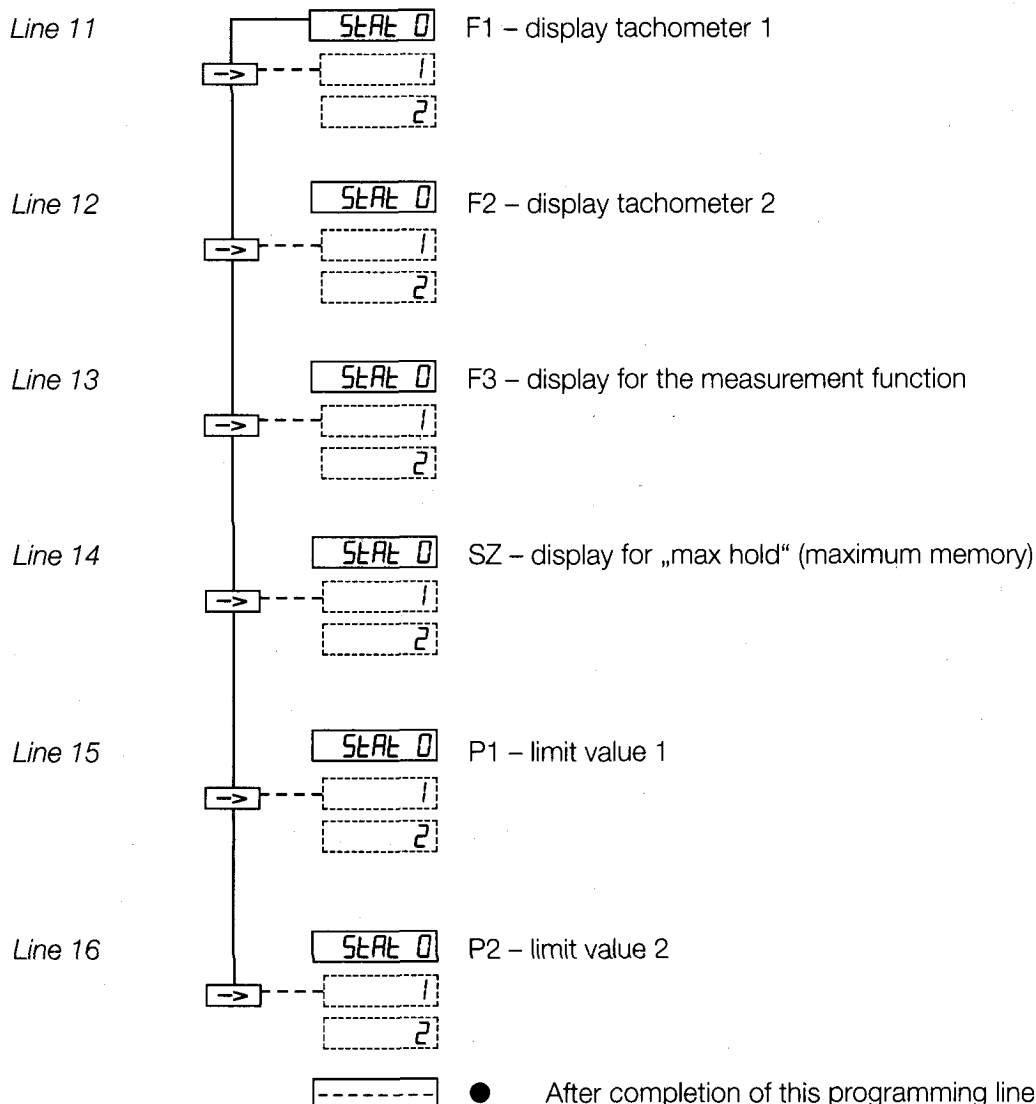
- StAt appears in the display. The LED for the respective operating parameter flashes.

Meaning of the status numbers

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

Modifying the status




- Enter the respective status number
- The altered status number is automatically stored when the next programming line is selected
- Press the key  again
- The status of every individual operating parameter is selected in sequence.



The default operating parameter status is zero.

### Programming field 3

Programming field 3 begins with programming line 21. In this programming field, the programming lines are displayed in sequence. The default setting is always written spaced out.

- ➔ 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  key to switch back from the programming to the operating level.

#### Measurement functions (Display at F3)

Ratio F1:F2

Difference between F1 - F2 (with sign)

Extension/compression (with sign)

Throughfeed time of a defined path

Time measurement via start and stop signal

Time measurement of period duration

Time measurement of pulse duration

Pulse rate measurement

#### Measurement function 0, 1 and 2

Measurement function as in line 21

F1 - F2 inverted

#### F1 signal type and max. frequency of F2

Track A possibly with up/down, F2 40 kHz

Track A 90° track B, F2 40 kHz

Track A possibly with up/down, F2 25 Hz

Track A 90° track B, F2 25 Hz

#### Input logic

PNP, switching voltage at appr. 11 V

NPN, switching voltage at appr. 11 V

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

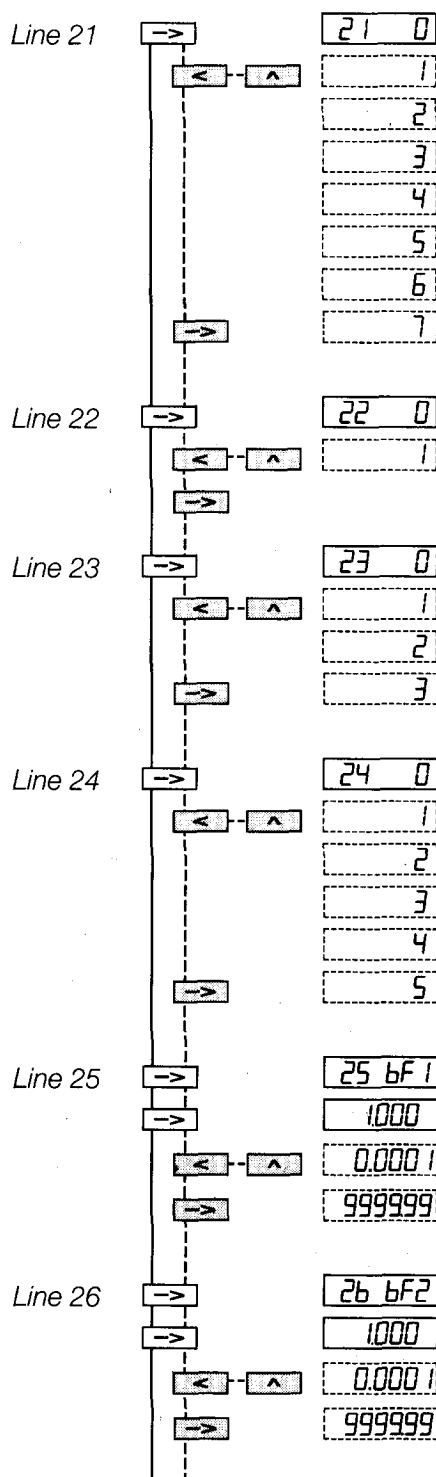
NPN, switching voltage at appr. 5 V, or Namur without intrinsic safety

PNP, switching voltage at appr. 2.5 V

NPN, switching voltage at appr. 2.5 V

**Scale F1** (divider), e.g. speed measurement: Pulses/rev.  
Circumference

**Scale F2** (divider) e.g. rpm measurement: Pulses/rev.



Line 27

→

27 bF3

→

1000

<

0.0001

→

999999

**Scale F3 (multiplier)**

e.g. to 100,000 for display of an extension comparison in percentage terms

1,0000

0,0001

9999,99

Line 28

→

28 0

<

1

→

2

<

3

→

4

<

5

→

6

<

7

→

8

**Update time (display repetition)**

0,5 s

1 s

2 s

3 s

5 s

10 s

20 s

30 s

60 s

Line 29

→

29 0

<

1

→

2

<

3

→

4

<

5

→

6

<

7

→

8

<

9

**Time out F1 - F3 (see line 21)**

On standstill, after expiry of this period:

a reset to zero occurs with measurement functions 0 to 6

an update of the display occurs with function 7 „pulse rate measurement“

1 s

0,1 s

2 s

0,2 s

3 s

0,3 s

5 s

0,5 s

10 s

1,0 s

20 s

2,0 s

30 s

3,0 s

60 s

6,0 s

Time-out not operational

Time-out not operational, with storage of F1, F2 and F3 in the event of a power failure.

Line 30

→

30 0

<

1

→

2

**Time unit F1**

1/min

1/s

1/h

Line 31

→

31 0

<

1

→

2

**Time unit F2**

1/min

1/s

1/h

Line 32

→

32 0

<

1

→

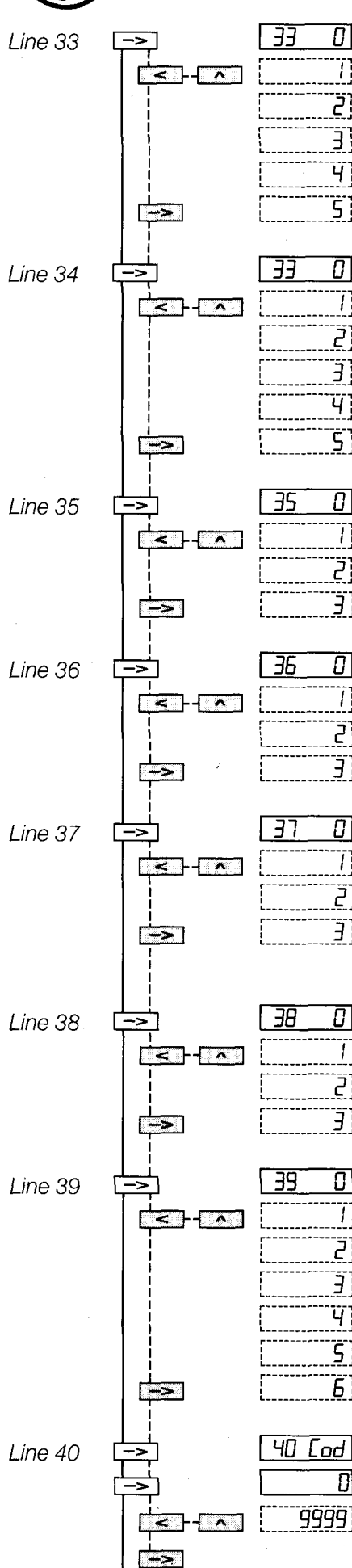
2

**Assignment of the „max-hold“**

F1

F2

F3



### Assignment of the limit value P1

Upper limit value of F1

- lower limit value of F1
- upper limit value of F2
- lower limit value of F2
- upper limit value of F3
- lower limit value of F3

### Assignment of the limit value P2

Upper limit value of F1

- lower limit value of F1
- upper limit value of F2
- lower limit value of F2
- upper limit value of F3
- lower limit value of F3

### Output logic for digital output

Output logic for digital output

- P1 n.c. contact, P2 n.o. contact
- P1 n.o. contact, P2 n.c. contact
- Both outputs as n.c. contacts

### Decimal point for F1

No decimal point

- 0.0
- 0.00
- 0.000

### Decimal point for F2

No decimal point

- 0.0
- 0.00
- 0.000

### Decimal point for F3

No decimal point

- 0.0
- 0.00
- 0.000

(see line 21)  
with scale factor 3, 4 5 or 6  
59,59,59 min.  
99.59.59 h

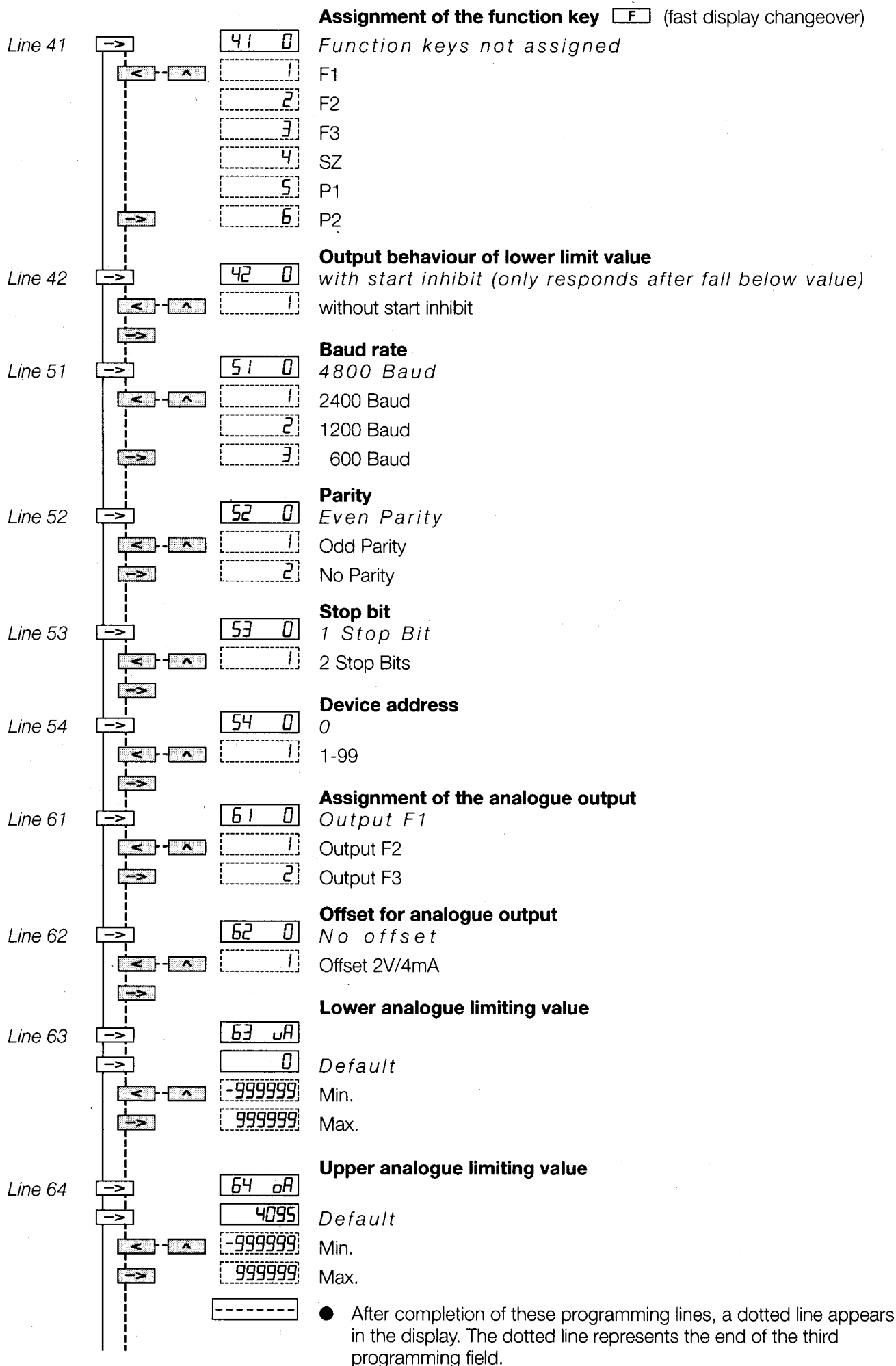
### Assignment of the basic display (reset after 15 s)

No switchover to the basic display

- F1
- F2
- F3
- SZ
- P1
- P2

### Code setting

- No code
- 1 - 9999







Switching back  
through the program lines

→ Hold down the key  $\boxed{\wedge}$  and press the key  $\boxed{\rightarrow}$  again.

Switching off the  
programming mode

→ Press the key  $\boxed{P/R}$

● The TA 202 is now on the operating level again.

Reprogramming the TA 202  
with the default setting

→ Switch on the device and press the keys  $\boxed{\leftarrow}$  and  $\boxed{\wedge}$  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 202 for measurement of revolutions per minute, the time unit for F1 (tachometer 1) is set for r.p.m. in line 30, and for F2 (tachometer 2) in line 31. The number of pulses per revolution (scale) is specified in line 25 for F1, in line 26 for F2.

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, 26)	Decimal point (lines 36, 37)	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 202 for speed measurement for m/min., the time unit for F1 and F2 is set in lines 30 and 31 (rpm), and the number of pulses per metre (scale) for F1 is located in line 25, for F2 in line 26.

Formula for calculation of the scale factor:

Pulses/rev.
Circumference

Example	Circumference (measuring wheel)	Pulses/Rev (encoder)	Scale (line 25, 26)	Decimal point (line 36, 37)	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 Measurement functions

The measurement functions are described below. These functions are selected in line 21.

For monitoring two speeds or rpm values or of one speed and one rpm value which you wish to display in the form of a ratio, differential or extension/compression value (discrepancy in percentage terms).

In the event of a percentage display, the scale is set with the factor 100. For decimal places, see above.

Example	Formula	rpm	Scale (line 27)	Decimal point (line 38)	Display
Ratio	F1 F2	F1=100 U/min F2=200 U/min	10	0.0	0.5

<i>Differential</i>	F1-F2	F1=200 U/min F2=100 U/min	1	none	100
<i>Extension/compression</i>	$\frac{F2-F1}{F1}$	F1=100 U/min F2=200 U/min	100	none	100 (%)
		F1=200 U/min F2=100 U/min	1000	0.0	-50.0 (%)

### 5.3 Time measurements

When using the TA 202 as a time measurement system, the user is offered the following functions, which can also be programmed in line 21. The time range and resolution are defined in line 38. The measurement result is displayed at F3.



After time-out, the display begins again at 00.00.00., whereby any limit contacts which have been set are released again.

*Path runthrough time* Measurement of the runthrough time (e.g. of a conveyor belt) required for a certain path (from A to B) taking into account the speed factor. The measurement result is displayed at F3. The speed can be picked up using an incremental pulse encoder with two signal tracks „A 90° B“ on tachometer F1.

In line 27, the required measurement path must be programmed.



For this application, F1 is bypassed. On selection of this application, „F1 OFF“ is displayed. F2 can be used to display rpm or speed.

<i>Example</i>	<b>Circumference</b> (measuring wheel)	<b>Pulses/Rev</b> (encoder)	<b>Scale</b> (line 25)	<b>Path</b> (line 27)	<b>Display range</b> (line 38)
	0,5 m	50	$\frac{50}{0,5} = 100$	10.00 m	99.59.59 h 59.59.99 min

*Measurement using the start and stop signal* Time measurement is initiated by a pulse at the input „F2/Start“ and terminated by a pulse at the input „Stop“. Both inputs respond to the front pulse flank. F2 indicates a currently running measurement process.

*Period duration* Time measurement is started by the front pulse flank at the input „F2/Start“ and terminated with the subsequent front pulse flank. The measurement process can be interrupted by means of the „Stop“ input (gate function). F2 indicates a currently running measurement process.

*Pulse duration* Time measurement is started by the front pulse flank at the input „F2/Start“ and terminated with rear pulse flank. The measurement process can be interrupted by means of the „Stop“ input (gate function). F2 indicates a currently running measurement process.

*Pulse rate measurement* The pulse rate measurement is started by the first pulse at the input „F1/A“ and terminated after recognition of a pulse rate pause. Standstill recognition automatically ensures an update of the display following every pulse rate. The pause time between pulse rates is programmed under „time out“ in line 29. Possible applications: For forward feed display and monitoring on punching machines etc.

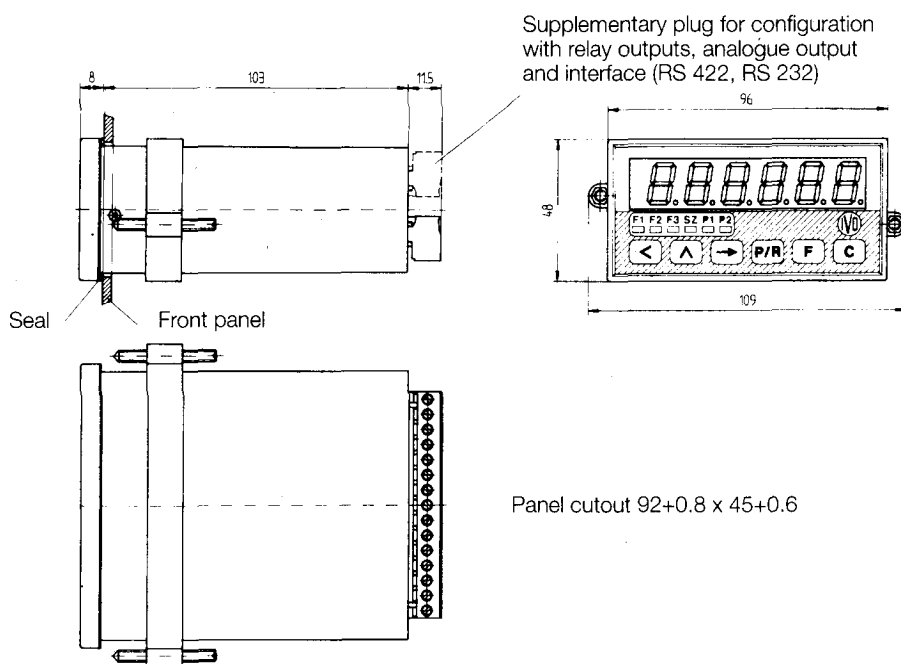
## 6 Technical data

Display	7-segment LED display, 6-digit, red with initial zero suppression with minus sign
Figure height	14 mm
Power supply	24/48 VAC $\pm 10\%$ 115 VAC $\pm 10\%$ / 230 VAC $+6\%$ , $-10\%$ 24 VDC $\pm 10\%$
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	$\pm 40$ V
Max. input frequency, F1, F2	10 kHz, 40 kHz
Precision	0.02% of the respective range limit value generally $\pm 1$ digit
Signal outputs	optocoupler for limit values 1 and 2
Max. switching voltage	40 V
Max. switching current	15 mA
Max. residual voltage	$< 1$ V
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 class	Protection class II
Protection type as per DIN 40050	From front in mounted status with seal IP 54
Field of application	In accordance with pollution severity 2
Overvoltage/application category	Category II
Interference immunity	Severity 3
Ambient temperature	$0^{\circ}\text{C} - +50^{\circ}\text{C}$
Storage temperature	$-20^{\circ}\text{C} - +70^{\circ}\text{C}$
Humidity	max. relative humidity 80%, non-condensing

### Technical data Analogue output

Resolution	12 bit (4096 steps)
Output range	
Current output	0...20 mA 4...20 mA (programmable)
1 bit resolution value	4.884 $\mu\text{A}$
max. loading	500 Ohm
Voltage output	0...10 V 2...10 V (programmable)
1 bit resolution value	2.442 mV
max. loading	1000 Ohm
Accuracy	$\pm 0,1\%$ of final value
Nonlinearity	$\pm 1$ LSB
Output thermal coefficient	typ. $\pm 50$ ppm/ $^{\circ}\text{C}$
Offset tolerance	max. $\pm 0.50$ $\mu\text{A}$
max. $\pm 0.25$ mV	
Thermal coefficient of offset	max. $\pm 20$ ppm/ $^{\circ}\text{C}$
Reference voltage	$-2.5$ V
Insulation	250 VRMS Min. output to tachologic
Operating temperature	$0...50^{\circ}\text{C}$
Others	All outputs are shortcircuitproof, galvanically insulated to all other functions and parameters. Output range is programmable via key pad 4...20 mA/2...10 V

## 6.1 Measurements and mounting dimensions



## 6.2 Default setting

The TA 202 is supplied programmed with the following default parameters:

P1 limit value 1	1000
P2 limit value 2	2000
Measurement function	ratio F1 : F2
Signal type at F1	one track (up/down)
Input logic	PNP
Scale F1, F2, F3	1.000
Display update	every 1 second
Time-out	1 second
Time unit F1, F2	rpm
Assignment of the slave pointer	to F1
Assignment for limit value 1	1st upper limit value of F1
Assignment for limit value 2	2nd upper limit value of F1
Output logic for digital output	both outputs as n.o. contacts
Decimal point F1, F2, F3	no decimal point
Assignment of basic display	no reset after 15 secs
Program protection code	no code set
Assignment for the function key	function key unassigned
Output characteristics of lower limit value	Only responds on drop below set value

<i>Option</i>	Baud rate	4800 Baud
	Parity	Even parity
	Stop bit	1 stop bit
	Device address	0
<i>Option</i>	Assignment of the analogue output	Output of F1
	Offset for analogue output	no offset (2V or 4mA)
	Lower analogue limit value	0
	Upper analogue limit value	4095

**6.3 Error indications***Error codes of the TA 202***Err 1 and Err 2  
Err 6**

Hardware error, must be sent in for repair.

Input frequency at tachometer F1 is too high.

The error code can be cancelled by pressing the **[G]** 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

 $100/0.01 \times 3600 = \mathbf{3600000}$ 

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

**6.4 Programming**

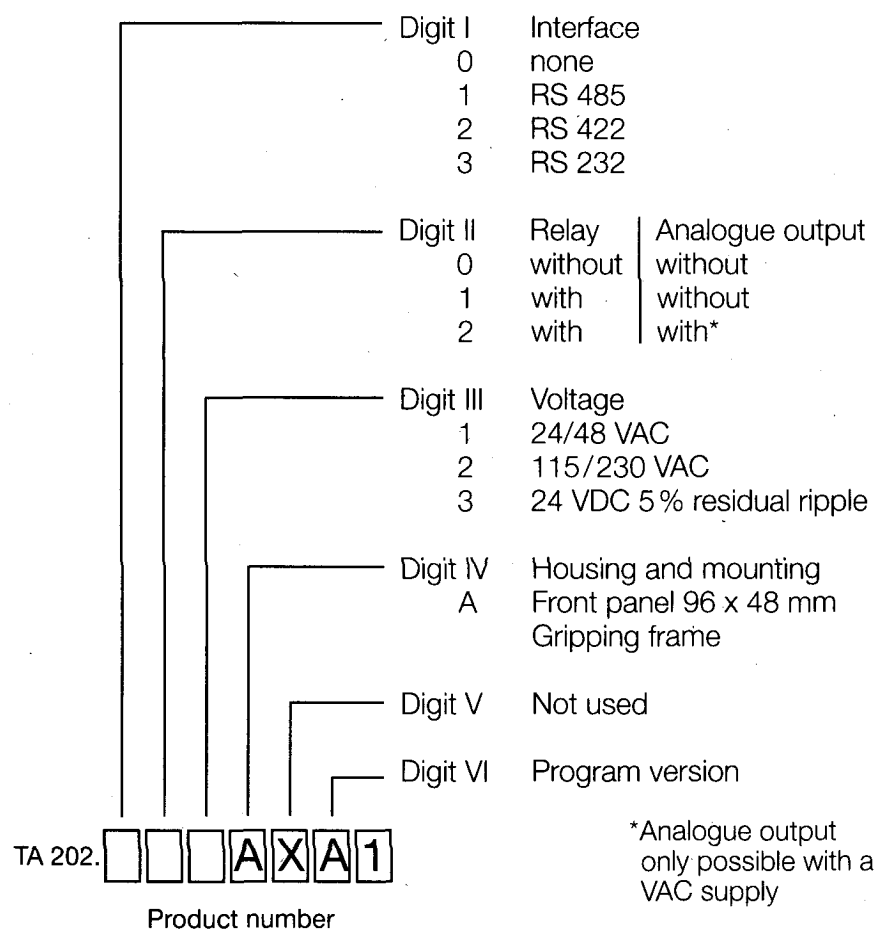
Line	Default setting	Customer program	Short form
01	<input type="text" value="0"/>		Tacho display F1
02	<input type="text" value="0"/>		Tacho display F2
03	<input type="text" value="0"/>		Tacho display F3
04	<input type="text" value="0"/>		Max hold
05	<input type="text" value="1000"/>		Limit 1
06	<input type="text" value="2000"/>		Limit 2
10	<input type="text" value="-----"/>		Separating line
11	<input type="text" value="SEAL 0"/>	<input type="text" value="SEAL"/>	Display access status F1
12	<input type="text" value="SEAL 0"/>	<input type="text" value="SEAL"/>	Display access status F2
13	<input type="text" value="SEAL 0"/>	<input type="text" value="SEAL"/>	Display access status F3
14	<input type="text" value="SEAL 0"/>	<input type="text" value="SEAL"/>	Status „max hold“
15	<input type="text" value="SEAL 0"/>	<input type="text" value="SEAL"/>	Status Limit 1
16	<input type="text" value="SEAL 0"/>	<input type="text" value="SEAL"/>	Status Limit 2
20	<input type="text" value="-----"/>		Separating line
21	<input type="text" value="21 0"/>	<input type="text" value="21"/>	Measuring function
22	<input type="text" value="22 0"/>	<input type="text" value="22"/>	Inverted function of line 21
23	<input type="text" value="23 0"/>	<input type="text" value="23"/>	Signal type F1
24	<input type="text" value="24 0"/>	<input type="text" value="24"/>	Input logic
25	<input type="text" value="25 bF1"/>	<input type="text" value="25 bF1"/>	Scaling F1
	<input type="text" value="1.0000"/>	<input type="text" value=""/>	
26	<input type="text" value="26 bF2"/>	<input type="text" value="26 bF2"/>	Scaling F 2
	<input type="text" value="1.0000"/>	<input type="text" value=""/>	
27	<input type="text" value="27 bF3"/>	<input type="text" value="27 bF3"/>	Scaling F3

## Technical data

	1.0000		
28	28 1	28	Update time F1, F2, F3
29	29 0	29	Time-out F1, F2, F3
30	30 0	30	Time until F1
31	31 0	31	Time until F2
32	32 0	32	Assignment of „max hold“
33	33 0	33	Assignment limit P1
34	34 0	34	Assignment limit P2
35	35 0	35	Output logic for digital outputs
36	36 0	36	Decimal point F1
37	37 0	37	Decimal point F2
38	38 0	38	Decimal point F3
39	39 0	39	Assignment of basic display
40	40 Cod 0	40 Cod	Code setting
41	41 0	41	Assignment of F key
42	42 0	42	Output mode lower limit value
51	51 0	51	Baud rate
52	52 0	52	Parity
53	53 0	53	Stop bit
54	54 0	54	Address
61	61 0	61 0	Assignment analog output
62	62 0	62 0	Offset of analog value
63	63 uA 0	63 uA	Lower analog value
64	64 mA 4095	64 mA	Upper analog value
65	-----		Separating line



## 7 Types and order designations



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