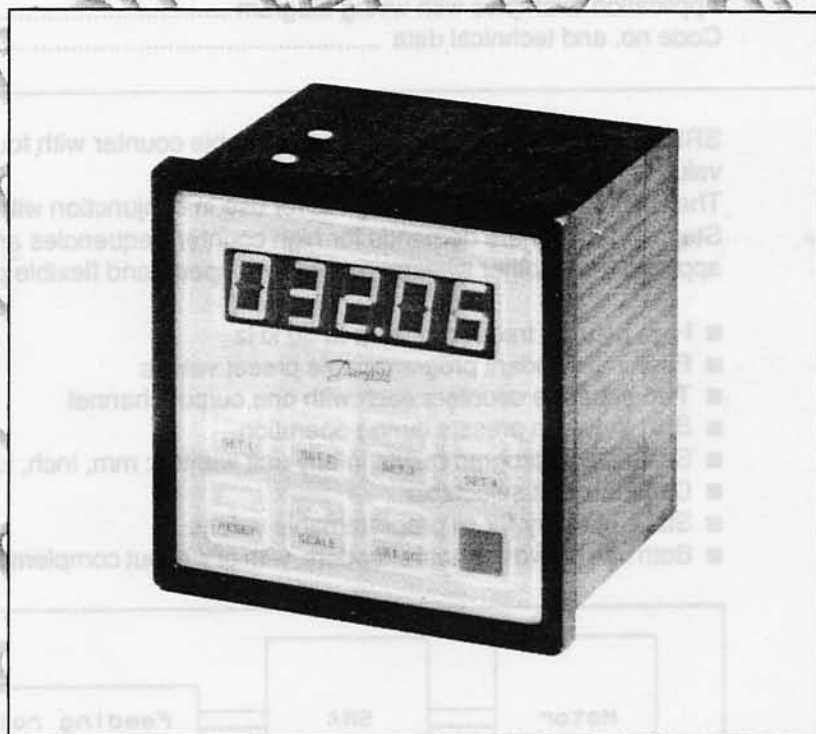


Programmable Counter type SRB 3206

Manual



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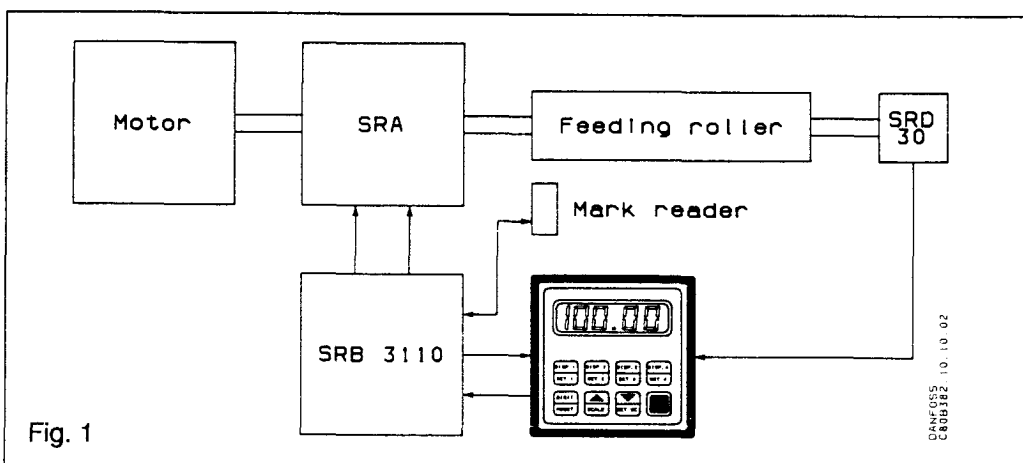
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Presentation

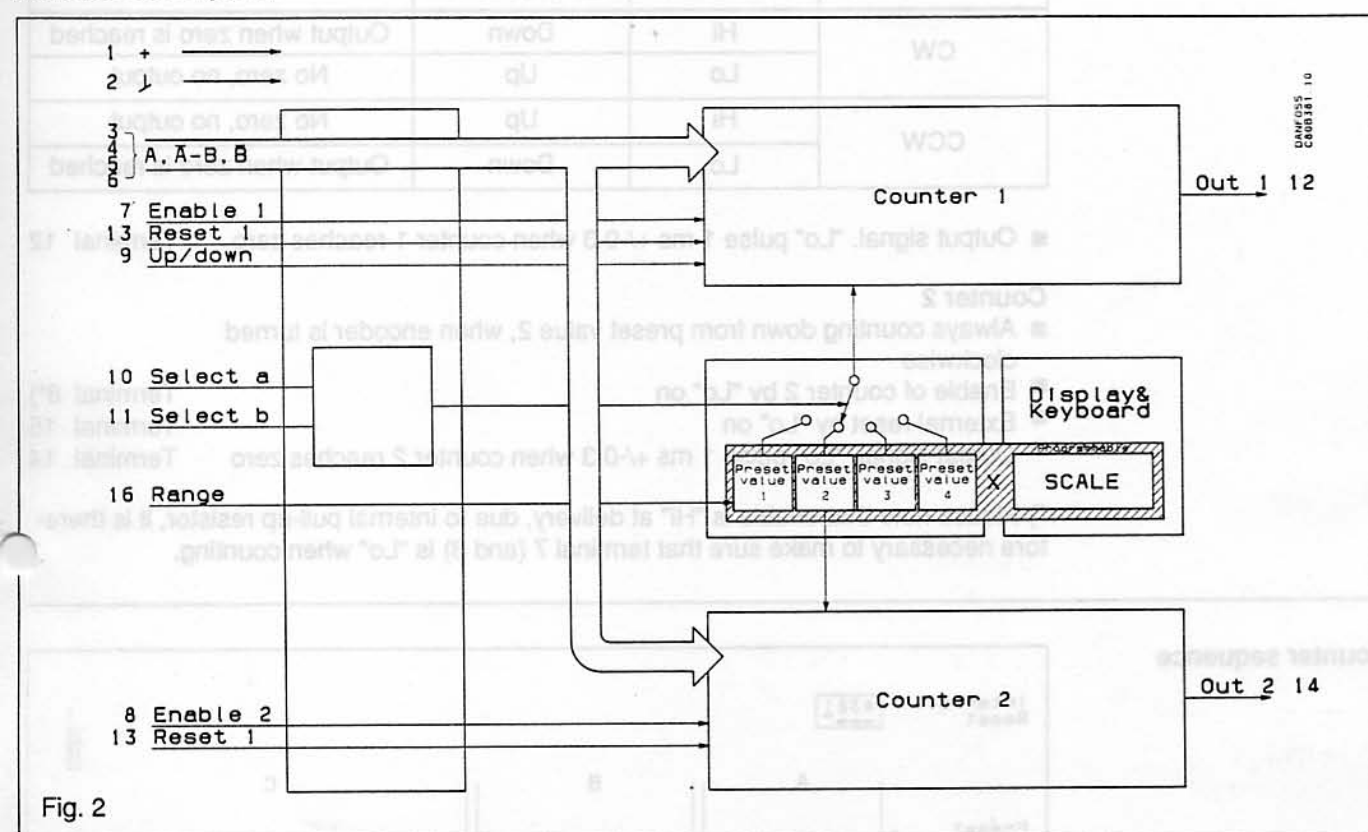
SRB 3206 is a multipurpose 5 decade double counter with four programmable preset values.

The SRB 3206 counter is designed for use in conjunction with the Danfoss Precision Step System, where demands for high counter frequencies are significant, but is also applicable with other systems where high speed and flexible presets are required.

- High counter frequencies, up to 50 kHz
- Four independent programmable preset values
- Two separate counters each with one output channel
- Shift between presets during operation
- Scale factor programmable in any unit wanted: mm, inch, kg, ounces etc.
- Decimal point selectable
- Static memory for all programmable values
- Both one or two channel encoders, with or without complementary signals can be used



Function description



SRB 3206 In general

- Both counters use the same encoder signal
- The programmable scale factor is valid for all four presets
- Each input terminal is supplied with pull-up resistors, and both outputs are of open collector type, with zener protection diodes
- Internal reset depending on DIP-switch coding, see page 4
- Range

	Preset value	Scale factor
Hi	888.88	88.888
Lo	88.888	888.88

Terminal 16

Counter 1

- Can be set to all four programmed values, depending on signal on select terminals (Hi = 1, Lo = 0)

Select a	1	1	0	0
Select b	1	0	1	0
Preset value	1	2	3	4

Terminal 10

Terminal 11

- Enable of counter 1 by "Lo" on
- External reset by "Lo" on
- Up/down counting

Terminal 7*)

Terminal 13

Terminal 9

Encoder turns	Terminal 9	Countingdirection	Terminal 12
CW	Hi	Down	Output when zero is reached
	Lo	Up	No zero, no output
CCW	Hi	Up	No zero, no output
	Lo	Down	Output when zero is reached

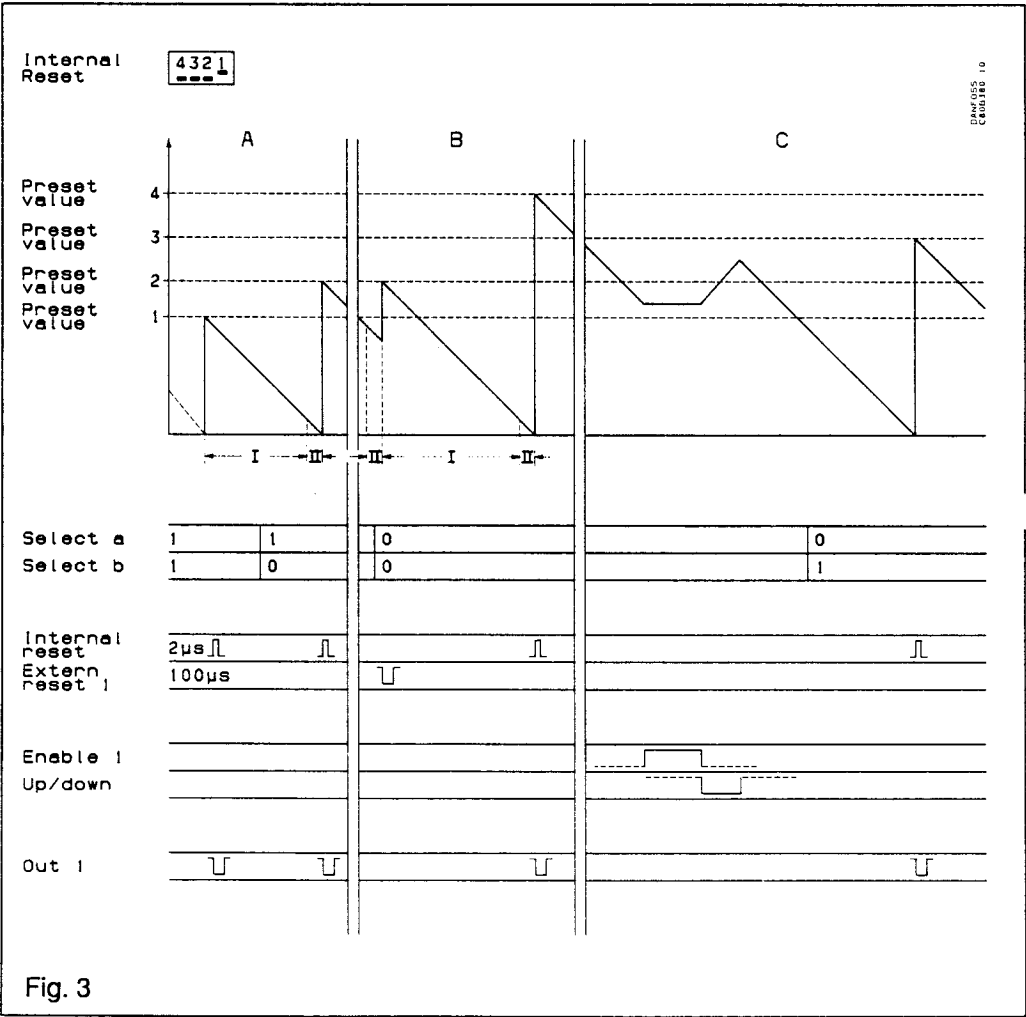
- Output signal. "Lo" pulse 1 ms +/-0.3 when counter 1 reaches zero Terminal 12

Counter 2

- Always counting down from preset value 2, when encoder is turned clockwise
- Enable of counter 2 by "Lo" on Terminal 8*)
- External reset by "Lo" on Terminal 15
- Output signal, "Lo"-pulse 1 ms +/-0.3 when counter 2 reaches zero Terminal 14

*) Please note that enable is "Hi" at delivery, due to internal pull-up resistor, it is therefore necessary to make sure that terminal 7 (and 8) is "Lo" when counting.

Counter sequence



The diagram shows an example of a counter sequence for counter 1, where the encoder is turned clockwise.

- I: The period between reset and down to 5 ms before new reset, external as well as internal. The "select" signal can be altered as required during this period.
- II: Less than 5 ms before reset (external or internal). Changes on "select" inputs will not be registered to the first reset, but will be executed by the next reset signal.

Section A

The counter is reset internally as the counter reaches zero, to preset value 1. Select a,b = 1,1. Select is altered in period I, and when counter 1 reaches zero, it is reset to preset value 2 (select a,b = 1,0), while output goes "Lo" in 1 ms.

Section B

The counter counts down from preset value 2. Less than 5 ms before reset, (in this case external) select is altered to a,b = 0,0 (preset value 4). Because of the registration period on 5 ms, the change is not registered at the first reset, but is valid at the next reset.

Section C

The counter is stopped by "Hi" on "enable 1", terminal 7, and the counter direction is inverted by "Lo" on "up/down", terminal 9. Select is altered in period I, and the change registered.

Reset coding

	DIP-switch setting	4	3	2	1	4	3	2	1	4	3	2	1	4	3	2	1	4	3	2	1	4	3	2	1
		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Counter 1 is reset by	Counter 1	●				●	●							●											
	Counter 2						●				●	●			●										
	External reset 1 Terminal 13	●	●	●	●	●	●	●	●	●	●	●			●										
Counter 2 is reset by	Counter 1						●	●			●	●													
	Counter 2			●	●		●										●								
	External reset 2 Terminal 15	●	●	●	●	●	●	●	●	●	●	●											●		

1*) 2*) 3*) 4*) 1*) 2*)

1*) Counter 2 reaches zero only once. No reset

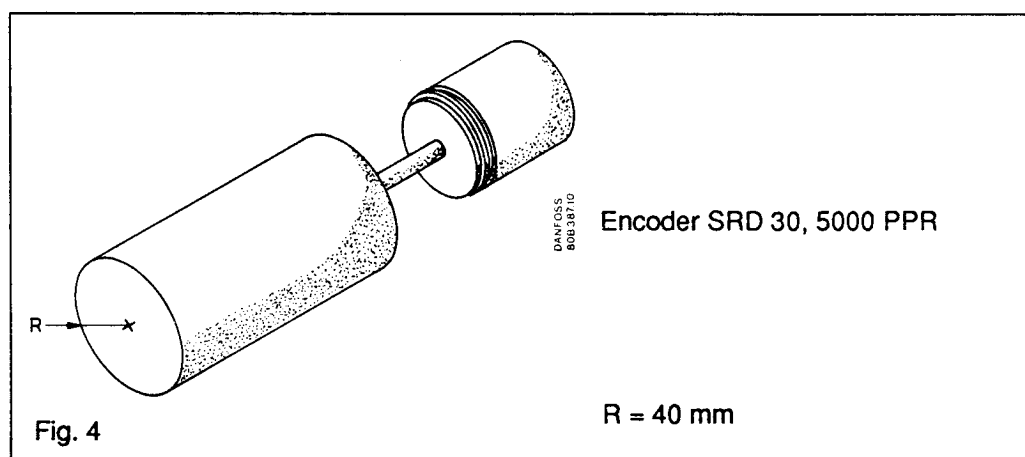
2*) Counter 1 reaches zero only once. No reset

3*) C1 > C2 ok, C1 < C2: Counter 2 never reaches zero. No output 2

4*) C1 < C2 ok, C1 > C2: Counter 1 never reaches zero. No output 1

Scale factor and preset value

To calculate the scale factor in this example the encoder's pulse per revolution, and the circumference of the feeding roller, are needed.



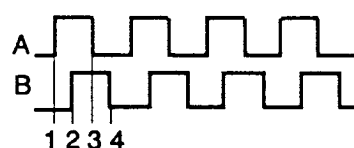
$$\frac{\text{PPR}}{2 \times \pi \times R} = \text{Scale factor}$$

$$\frac{5000}{2 \times \pi \times R} = 19.894 \text{ pulses/mm}$$

The scale factor can now be programmed to 19.894, see page 8, and the preset values will be the feeding length in mm. See programming on page 6. It might be convenient to use an encoder with 3600 PPR, in case of counting on angular degrees, the scale factor will then be 10.000, and therefore no decimal errors will occur.

Resolution

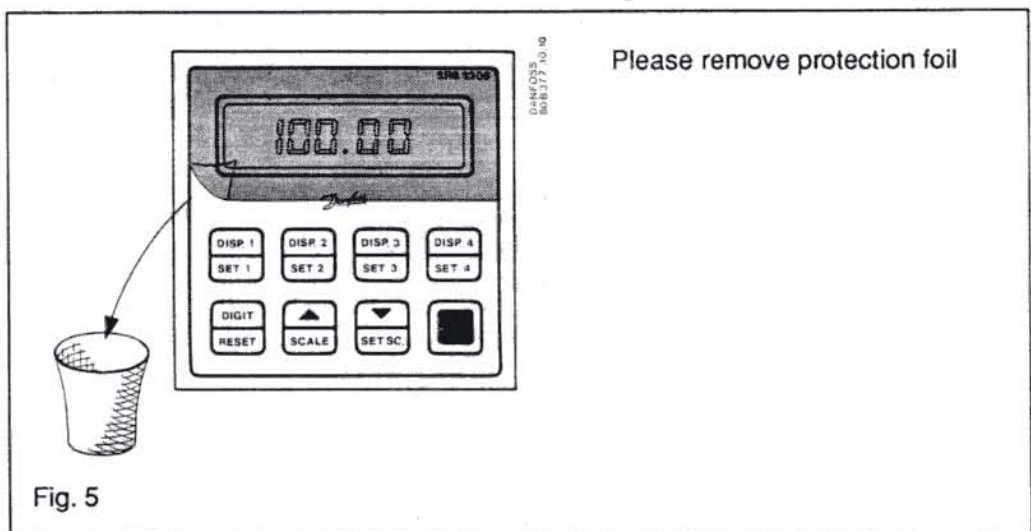
The counter is counting on both positive and negative edges:



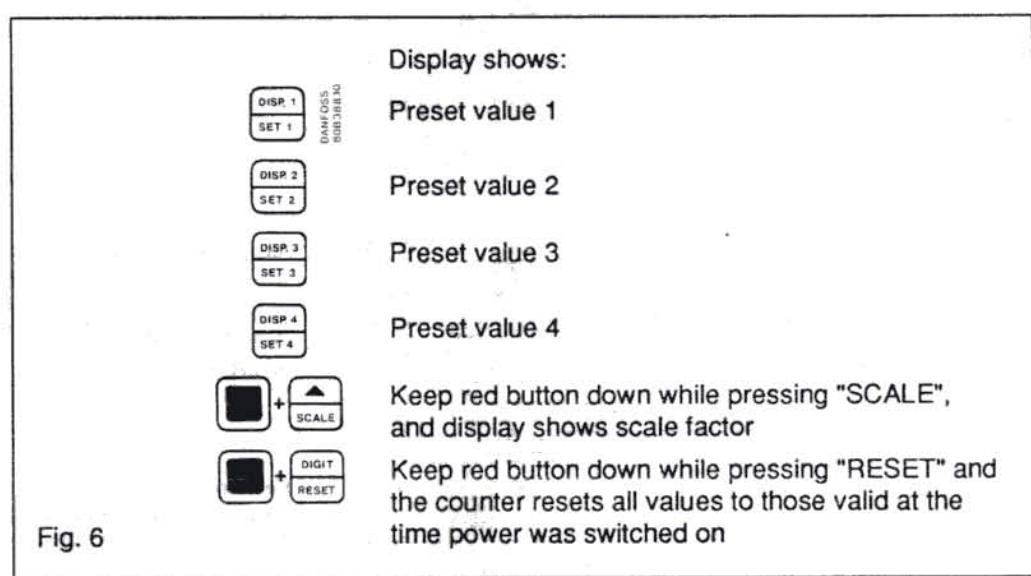
Which means the resolution is four times better than one signal cycle. In connection with the example mentioned above, the resolution can be calculated as:

$$\frac{2 \times \pi \times 40}{5000} \times \frac{1}{4} = 0.0125 \text{ mm/pulse}$$

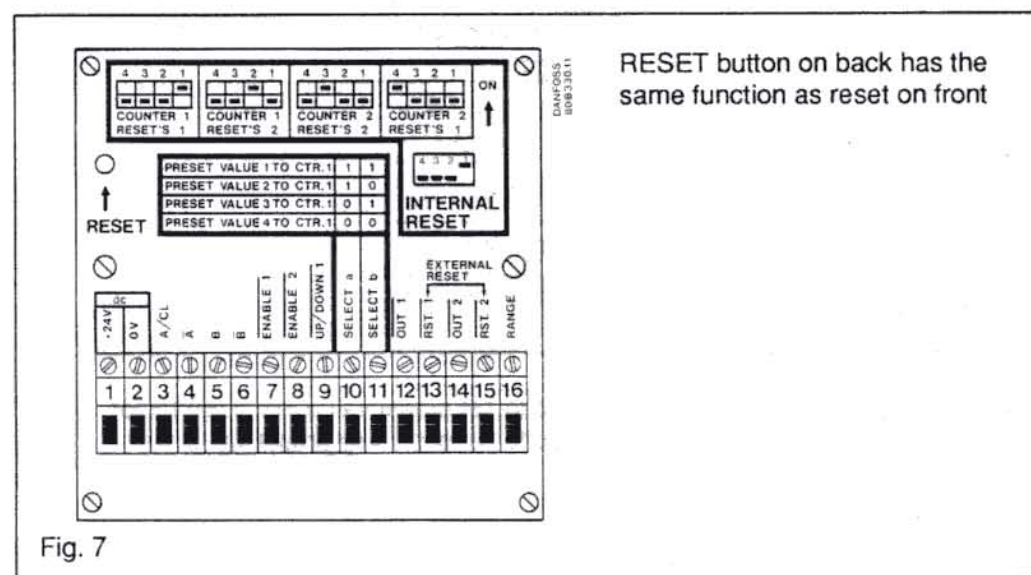
Front



Buttons



Back



Programming example / Preset value

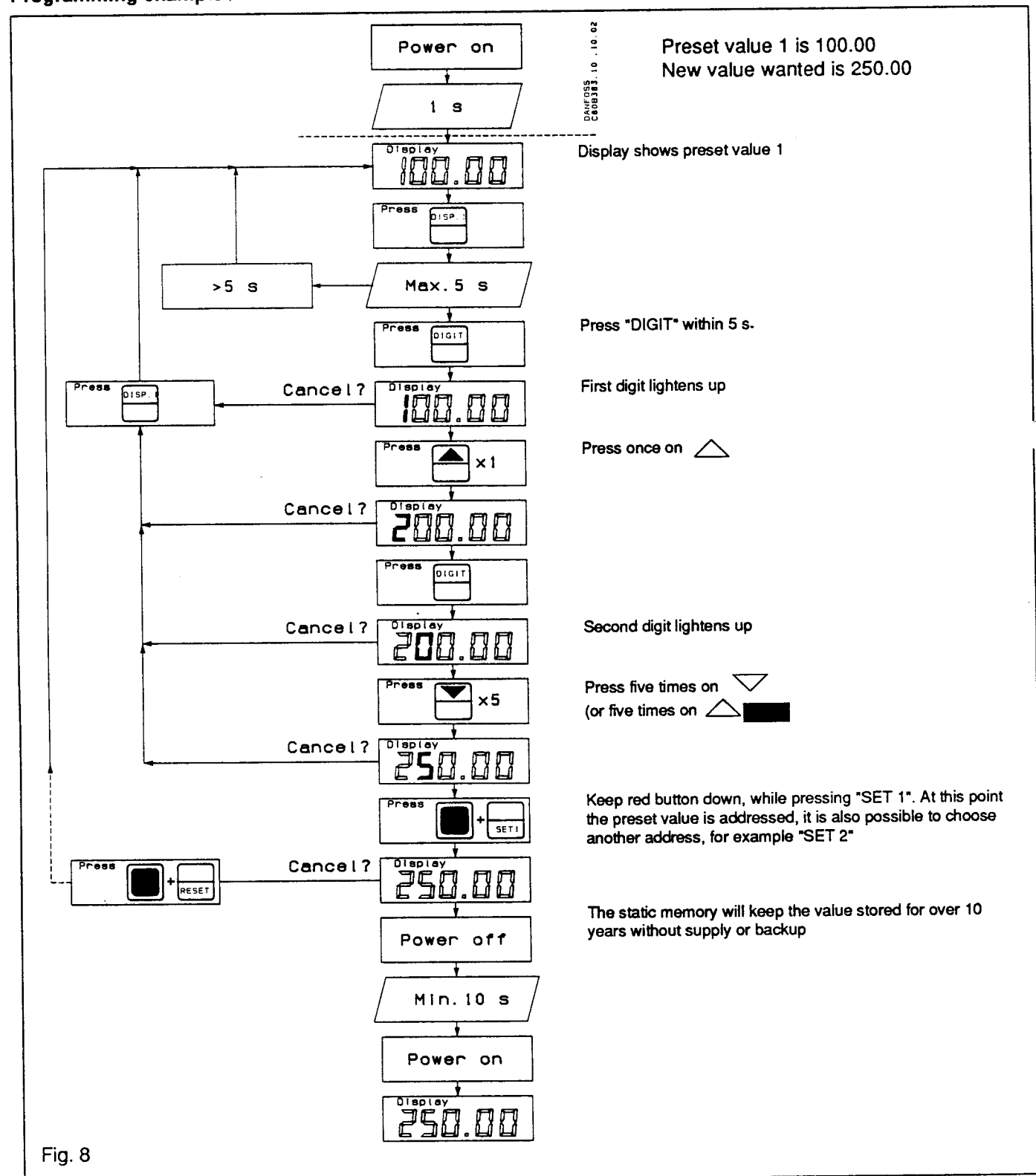
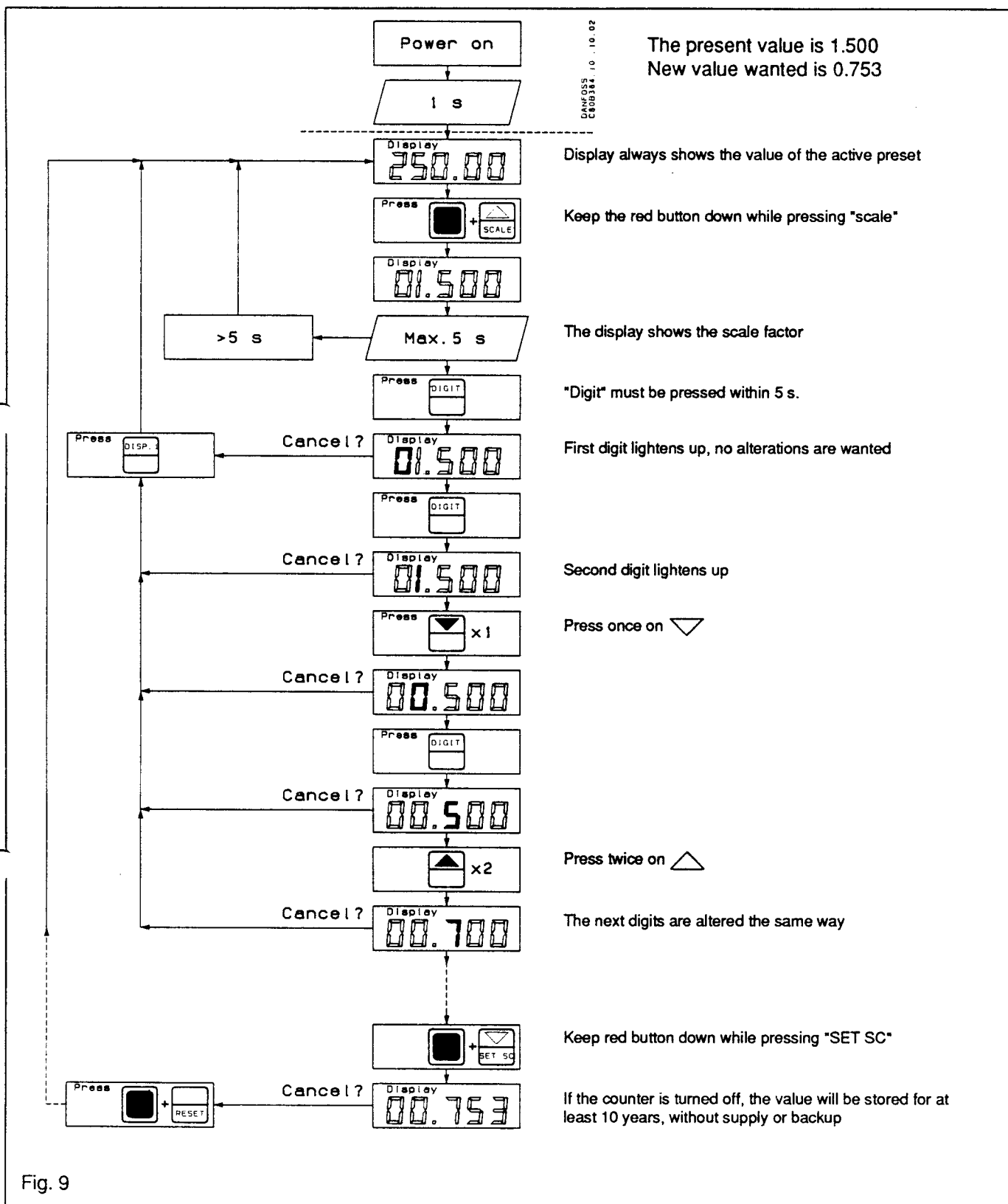


Fig. 8

Error messages

- Err 02: Tried to set preset value into scale factor
- Err 01: Tried to set scale into preset value 1-4

Programming example / Scale factor

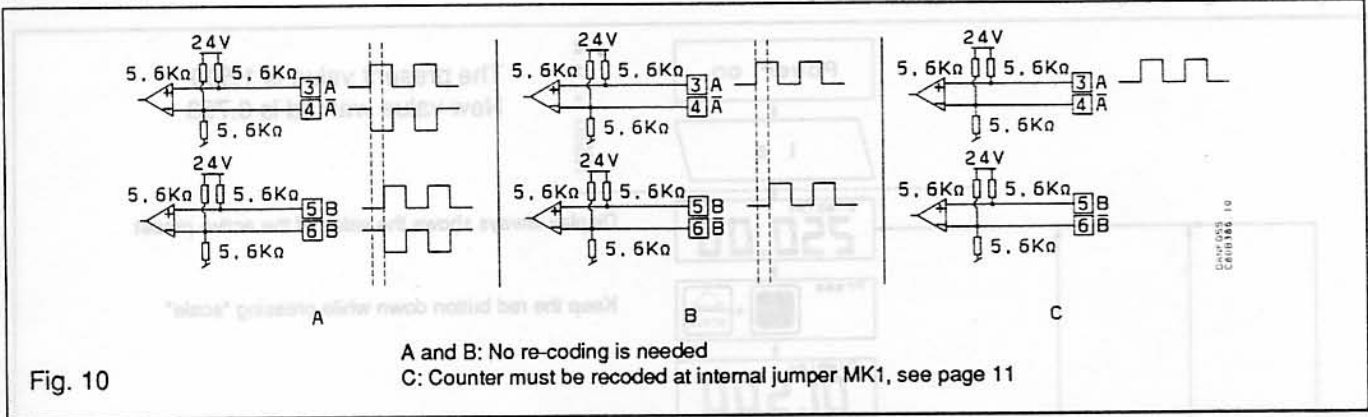


Error messages

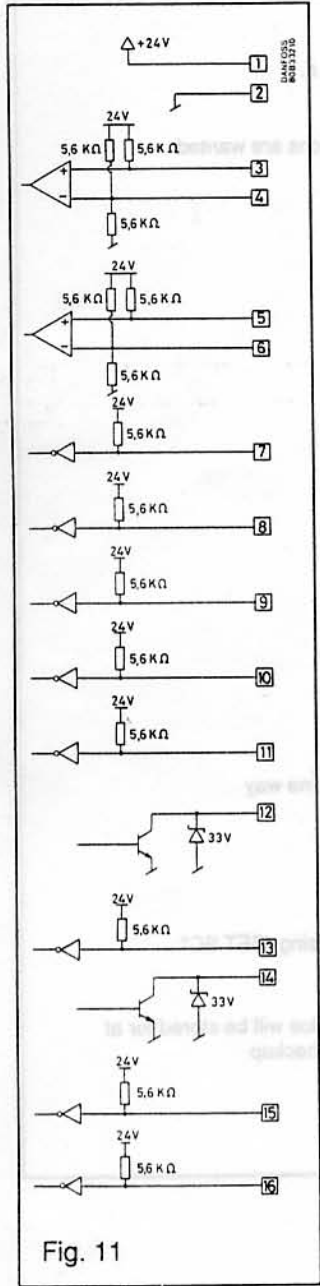
Err 02: Tried to set scale factor into preset value 1-4

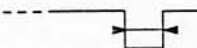
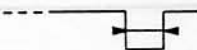
Err 01: Tried to set preset value into scale factor

Counter signals



Terminals



1	+24V DC	Power supply																
2	0V																	
3	A/cl	Counter signals, see above																
4	$\bar{A}$																	
5	B																	
6	$\bar{B}$																	
7	$\overline{\text{ENABLE 1}}$	Enables counter 1 by "Lo" on terminal *)																
8	$\overline{\text{ENABLE 2}}$	Enables counter 2 by "Lo" on terminal *)																
9	$\overline{\text{UP/DOWN}}$	Counter 1 counts up by "Lo" on terminal *) (Counter 2 always counts down)																
10	SELECT a	<table><tr><td>Select a *)</td><td>1</td><td>1</td><td>0</td><td>0</td></tr><tr><td>Select b *)</td><td>1</td><td>0</td><td>1</td><td>0</td></tr><tr><td>Preset value</td><td>1</td><td>2</td><td>3</td><td>4</td></tr></table>	Select a *)	1	1	0	0	Select b *)	1	0	1	0	Preset value	1	2	3	4	Hi = 1 Lo = 0
Select a *)	1	1	0	0														
Select b *)	1	0	1	0														
Preset value	1	2	3	4														
11	SELECT b	Counter 2 always uses preset value 2																
12	$\overline{\text{OUT 1}}$	When counter 1 reaches zero: 	1 ms +/- 0.3															
13	$\overline{\text{RESET 1}}$	External reset. Counter 1 resets by "Lo" on terminal *) 	Min. 100 μ s															
14	$\overline{\text{OUT 2}}$	When counter 2 reaches zero: 	1 ms +/- 0.3															
15	$\overline{\text{RESET 2}}$	External reset. Counter 2 resets by "Lo" on terminal *) 	Min. 100 μ s															
16	RANGE *)	<table><tr><td></td><td>Preset value</td><td>Scale factor</td></tr><tr><td>Hi</td><td>888.88</td><td>88.888</td></tr><tr><td>Lo</td><td>88.888</td><td>888.88</td></tr></table>			Preset value	Scale factor	Hi	888.88	88.888	Lo	88.888	888.88						
	Preset value	Scale factor																
Hi	888.88	88.888																
Lo	88.888	888.88																

*) Note internal pull-up resistor

Fig. 11

Dimensions and mounting

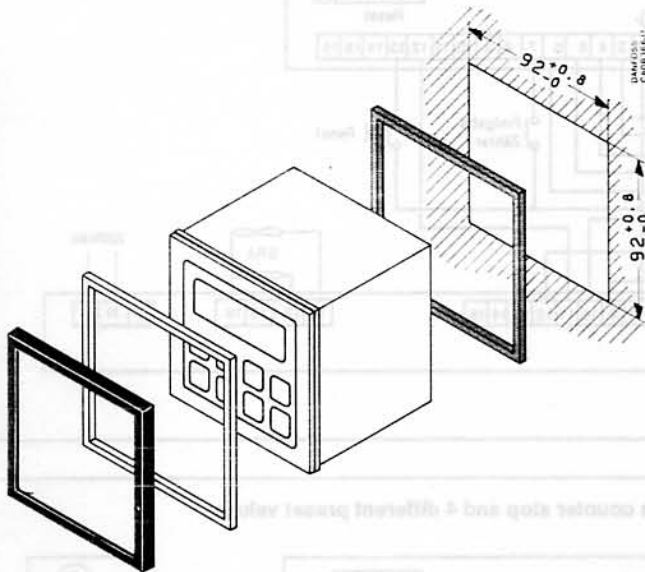


Fig. 12

Large gasket between housing and mounting plate
Small gasket between frame and front

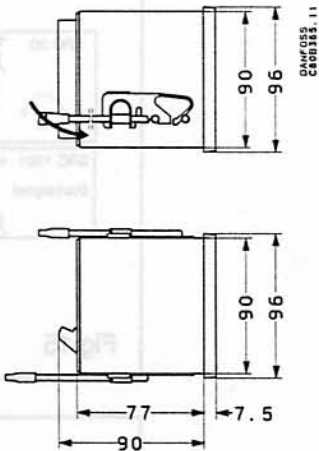


Fig. 13

After inserting the counter into the mounting hole, place snap-on screw by pressing screw head in arrow direction

Re-coding of MK1

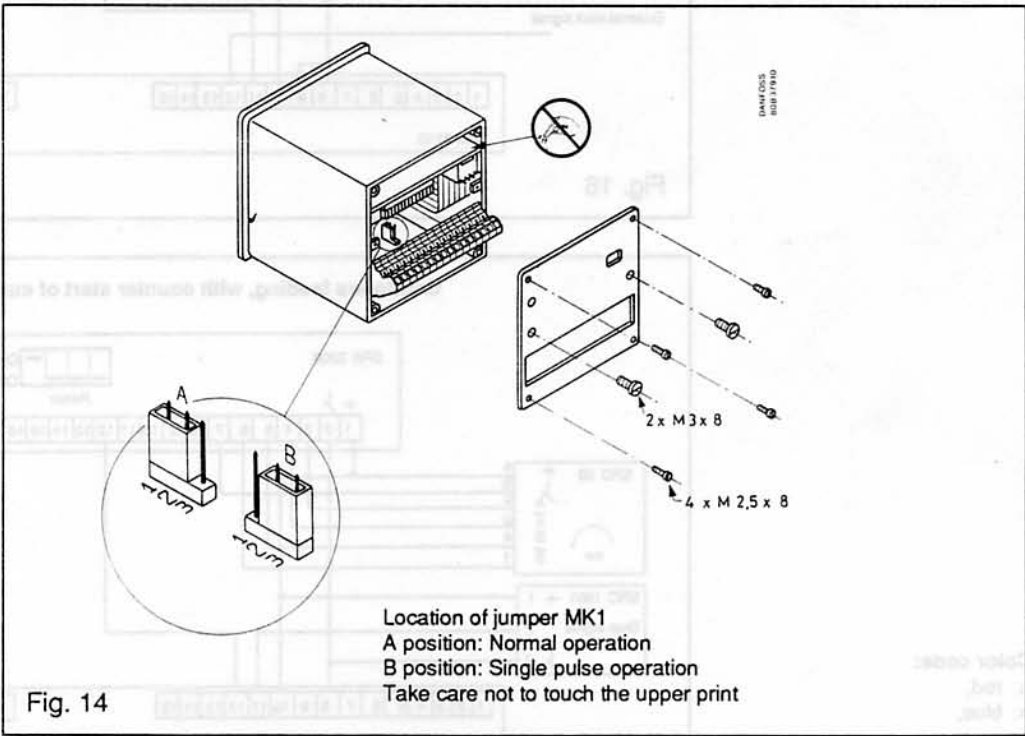
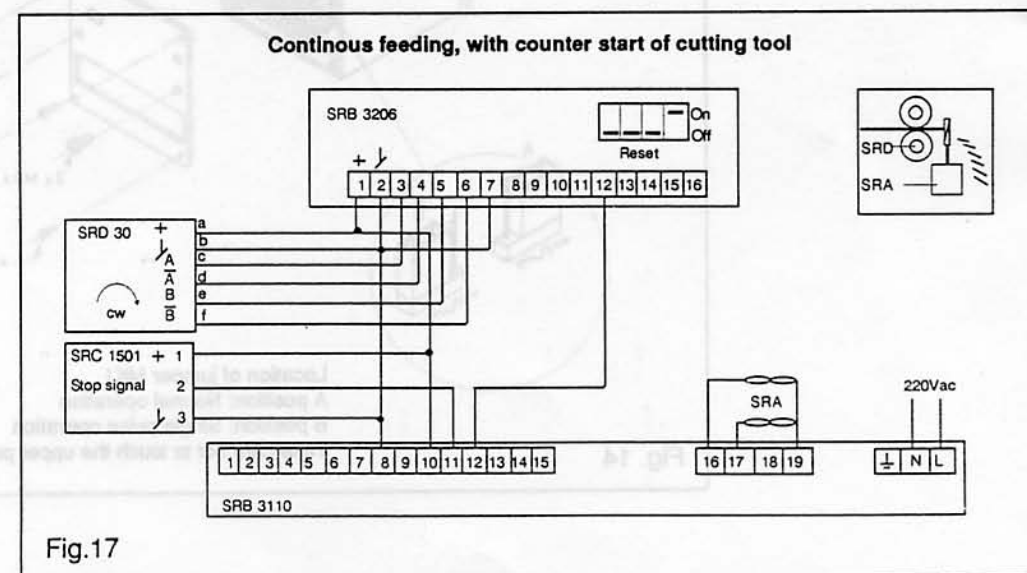
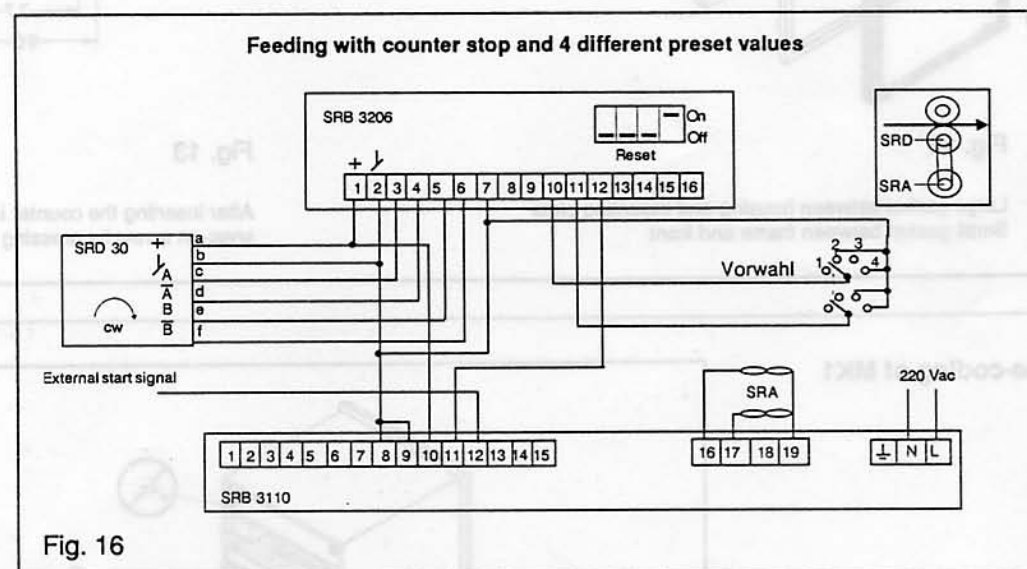
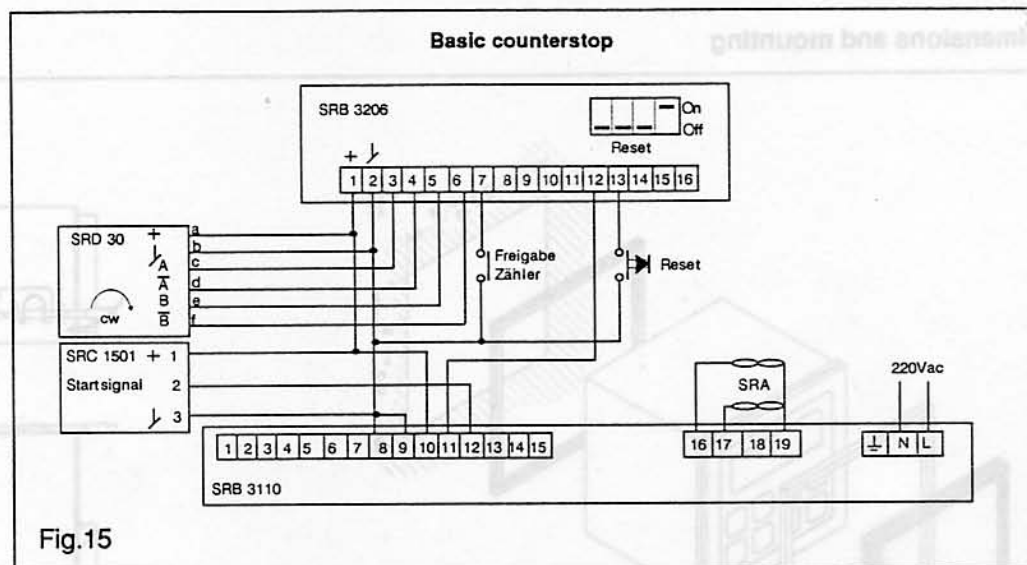


Fig. 14

Application example

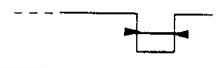
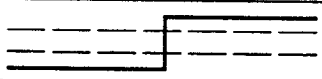
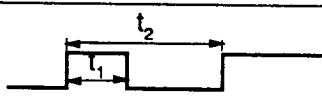
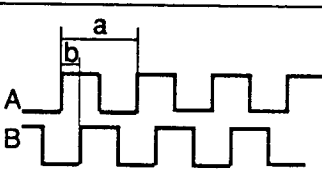
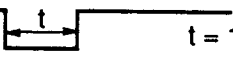


Color code:

- a: red,
- b: blue,
- c: green,
- d: white,
- e: yellow,
- f: black.

Code no.	Type	Code no.
	SRB 3206	080B1062

Technical data

Digits	5
Counter range	0-999.99 or 0-99.999
Counter frequency	SRD 30 or similar complementary signals > 50 kHz Open collector signal source < 10 kHz
Reset period	Internal reset < 2 μ s External reset, min. 100 μ s 
Signal levels	 $U_{Hi} > 16V$ $U_{Lo} < 2V$
Input signals	 $t_1 > 4 \mu s$ $t_2 > 100 \mu s$ A (cl) single pulse
	 $a = 360^\circ$ $b = 90^\circ \pm 25$
Output	 $t = 1 \text{ ms } \pm 0.3$ NPN open collector, max. 30 mA/output
Voltage supply	24V DC $\pm 6V$
Consumption	Max. 3 W
RF-immunity	Resistant towards 10V/m, according to DIN 45305, part 302: 0,15-150 MHz
Transient immunity	SS 436 15 03, pl. 3
Humidity: - static - cyclic	Meet the demands of IEC 68-2-3 Meet the demands of IEC 68-2-30
Memory	Non volatile RAM. Storage time without supply or backup > 10 years
Ambient temperatures	During operation: 0 to 50°C Storage ratio: -40 to +70°C
Weight	0.45 kg
Dimensions	96 x 96 x 83 mm (DIN 43700)
Enclosure	IP 54, when mounted in IP 54 cabinet and according to instructions