

**Technical Product Information No. 781**

**TENSIOBAR**

**Pneumatic line tension feedback control system for unwinding devices with pneumatically actuated tension brakes**

**- Operating console**

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## About this technical product information note (TPI)

### To whom is this TPI addressed?

This technical product information note is addressed to the final manufacturer's methods engineers and fitters and the final customer's works fitters and machine operators.

### What will you find in the TPI?

The TPI offers you all the important information needed for the installation and operating of the series 0-087-454-00-007-... operating console of the TENSIOBAR pneumatic line tension feedback control system.

0-087-454-00-007-...

Command value change-over switch	Manual changing of the brake range Number of switches	Valve actuation voltage
0 without, standard 1 with change-over switch	0 no switch, standard 1 change-over switch 2 change-over switches 3 change-over switches 4 change-over switches	0 24 V DC, standard 1 220 V, 50 Hz 2 110 V, 50/60 Hz 3 24 V DC, explosion protected 4 220 V, 50 Hz, explosion protected 5 110 V, 50/60 Hz, explosion protected

You will find information on the installation of the measuring device in TPI 790.

### What will you not find in the TPI?

The TPI does not provide information to support you in design work. You will find such information in the catalogue and in the prospectuses.

### Significance of the symbols accompanying the text

There is a danger of injury during installation and in the course of production!

There is a danger of damage to materials during installation and in the course of production!

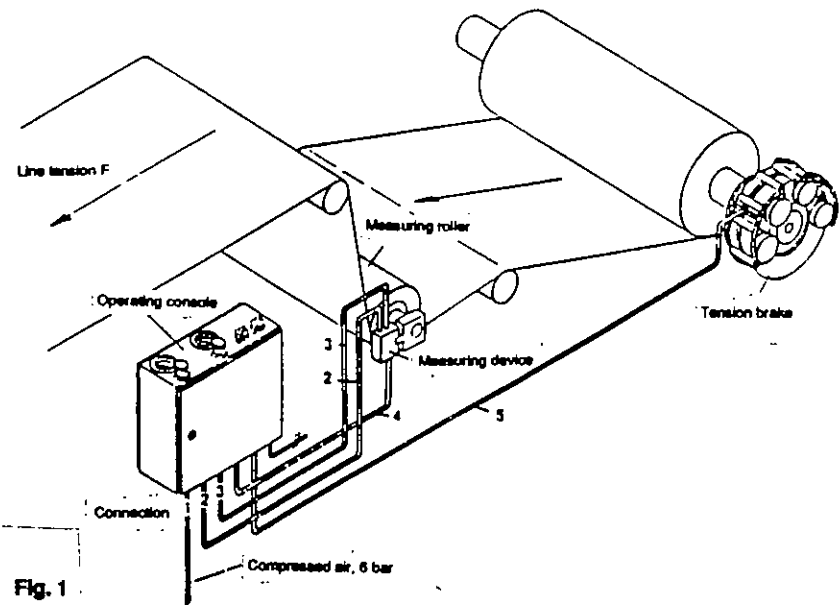


### Please pass on this TPI to your customers

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## Application and mode of functioning of the line tension feedback control system TENSIOBAR

The TENSIOBAR line tension feedback control system enables a uniform unwinding line tension to be achieved with unwinding devices with pneumatically actuated brakes. The preset line tension command value is compared with the actual value at the measuring device. A variance leads to the brake pressure being increased or decreased.



### Scope of delivery of the line tension feedback control system TENSIOBAR

The line tension feedback control system TENSIOBAR consists of the operating console 0-087-454-00-007-... and the measuring device 0-087-456-00-...

You will find information on the installation of the measuring device in TPI 790. The operating console is available in different forms of execution:

0-087-454-00-007-...

Command value change-over switch	Manual changing of the brake range Number of switches	Valve actuation voltage
0 without, standard 1 with change-over switch	0 no switch, standard 1 change-over switch 2 change-over switches 3 change-over switches  4 change-over switches	0 24 V DC, standard 1 220 V, 50 Hz 2 110 V, 50/60 Hz 3 24 V DC, explosion protected 4 220 V, 50 Hz, explosion protected 5 110 V, 50/60 Hz, explosion protected

**Installation of the operating console**

The operating console should be mounted on a vertical surface (e.g. machine frame) near the unwinding station (Fig. 2).

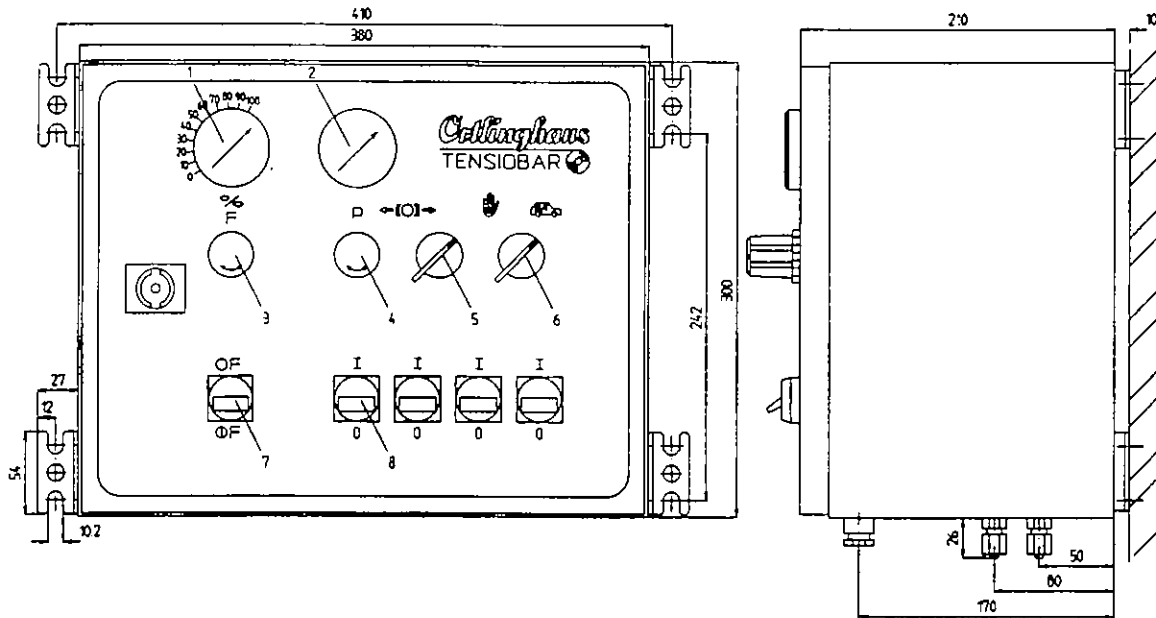


Fig. 2

**Compressed air connections**

The compressed air connections are located on the base of the housing (Fig. 3).

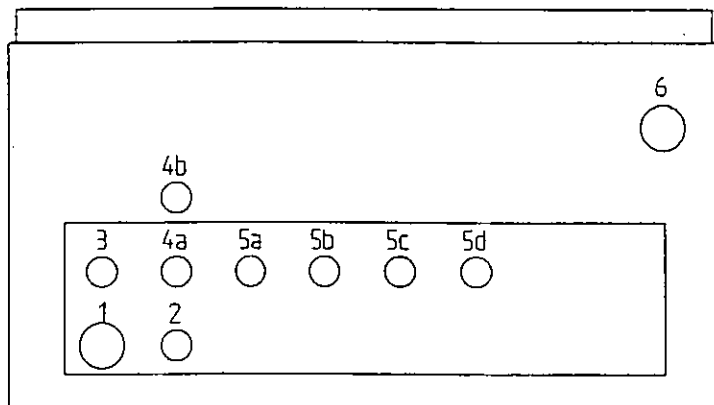


Fig. 3

Connection	Hose nominal diameter	
1 Input 2	NW6 NW4	Supply air, 6 bar, filtered Signal air from measuring device transmitter, connection 2, yellow
3 Output	NW 4	Compressed air to the measuring device transmitter, connection 1, black
	NW 4	Compressed air to the command value cylinder of the measuring device
5	NW 4	Connection 3 Control air to the tension brake
<b>Only version 0-087-454-00-007-1..</b>		
4b	NW 4	Compressed air to command value cylinder II of the measuring device Connection 4
<b>Only versions 0-087-454-00-007-.1. to 0-087-454-00-007-.4.</b>		
5a-5d	NW 4	Control air to the tension brake; the outputs are connected in each case with a brake caliper

### Electrical connections

Internal solenoid valve actuated with the "Line running" signal. The valve is connected direct at the plug head.

0-087-454-00-007-..X

X= Valve actuation voltage

0 24 V DC, standard

1 220 V, 50 Hz

2 110 V, 50/60 Hz

3 24 V, DC explosion protected 1 m cable cast on the coil\*

4 220 V, 50 Hz explosion protected 1 m cable cast on the coil\*

5 110 V, 50/60 Hz explosion protected 1 m cable cast on the coil\*

\* Type of protection in accordance with DIN EN 50019/VDE 0170/0171 Part 6/5.78: Observe Ex sG4 safety regulations!

"Line running" = valve excited

"Line stationary" = valve de-excited (after a delay of approx. 5 seconds)

It is possible to gate the control pulses for the operating state with the switching on and switching off of the drive motor for the line. In order in particular that the regulated brake pressure is maintained when the line is brought to a standstill rapidly and also after the drive motor is no longer live, the valve should be de-excited after a fixed delay (approx. 5 seconds).

**Operating elements**

- 1 Command value display showing the command value pressure (in bar) or the command value force (in %) of the maximum force
- 2 Brake pressure display showing the brake pressure acting
- 3 Command value setter
- 4 Pressure regulating valve for manual operating mode and for setting the holding pressure
- 5 Selector switch "Release brake" enabling the tension brake to be released when setting up the line
- 6 Selector switch "MAN/AUT"
- Position 1: The regulated brake pressure is active  
Position 2: The pressure as set with the pressure regulating valve (4) is active.
- 7 Option: only 0-087-454-00-007-1..  
Measuring range change-over switch  
With this switch a second command value cylinder can be switched in at the measuring device. In this way the measuring range of the measuring device is increased.
- 8 Option: only 0-087-454-00-007 - . 1 .  
- . 2 .  
- . 3 .  
- . 4 .

**Manual changing of the brake range**

Individual brake calipers can be switched in or out with switches. In this way the regulating range of the brake can be varied.

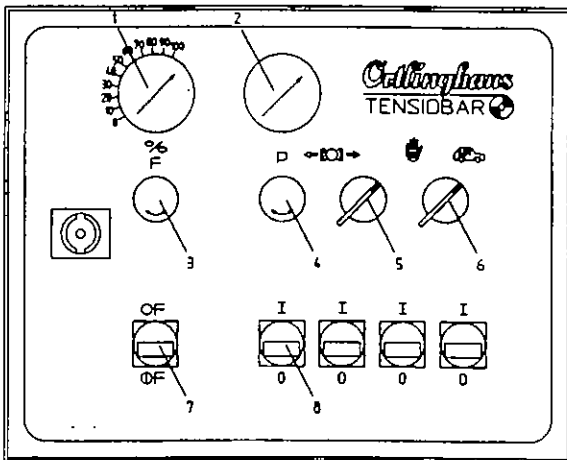


Fig. 4

### Starting up

- Connect the device in accordance with the instructions and supply with compressed air (6 bar).
- Put the "MAN/AUT" selector switch (6) to "AUT".
- Set the desired line tension on the command value setter (3) (see here also the section on determining the line tension).
- Set the holding pressure on the pressure regulating valve (4).
- The line tension feedback control system is now operational.
- The control system will start to function when the "Line running" valve is excited.
- If there are oscillations in the control loop (detectable through pulsing movements of the needle of the brake pressure display (2)), adjust the damping chokes by a small amount until the display becomes steady. The degree of damping influences the precision of the tension regulating. See the pneumatics circuit diagram in the appendix for the position of the chokes.

Basic setting as set in our works:

Pressure increase from 1 to 5 bar approx. 5 seconds

Pressure decrease from 5 to 1 bar approx. 5 seconds

- As soon as the "Line running" valve is de-excited, only the so-called holding pressure is applied to the brake. The holding pressure can be set with the manual regulating valve (4). It prevents the roll turning in an undesired manner and keeps the line of material tight when the line is stopped.

**Notes on setting the line tension**

The effective line tension as measured depends on the measuring device used and the way in which the material passes around the measuring roller. The nominal measuring force stated for the measuring device applies when the arc of contact of the material as it passes around the measuring roller is 90° whereby measuring direction and force direction are identical. In the case of variations therefrom, the maximum tension is calculated as follows:

$$F_{\max} = \frac{F_{\text{nom.}}}{\cos \alpha + \cos \beta}$$

$F_{\text{nom.}}$  = max. nominal force of the measuring device at 90° arc of contact

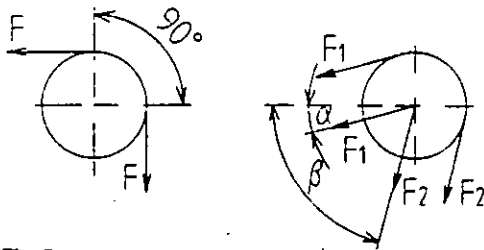
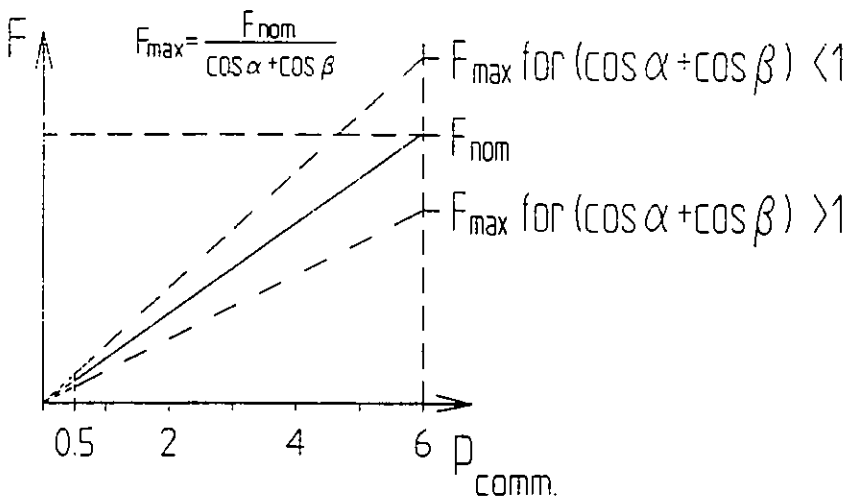


Fig. 5

Pneumatics plan

