

Tension Control



BZS 3

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1. Design



1. Design

The tension control is used to maintain constant unwinding and winding pull on mechanical winders.

The unwinder must be fitted with a pneumatic brake or the winder must be fitted with a pneumatic slip clutch.

The tension control consists of a sensor for non-contact scanning of the roll or lap or reel and the control module which converts the electric signal in an analogue pressure signal.

2. Technical specifications



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Principal dimensions:

Control box (W x H x D) 300 x 300 x 120 mm

Sensor 88 x 30 x 65 mm

Energy connections:

Electricity 230 V / 50 Hz / 30 W

Compressed air max. 7 bar (105 psi) filtered 0.3 μ m

Output pressure max. 5.0 bar (75 psi)

Roll / lap / reel $\varnothing$ max. 1600 mm (max. 63")

Intrinsic air consumption 9 l/min

Enclosure IP 54

3. Function

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Web pull in winders is generated by a pneumatic brake or slip clutch. To maintain a constant pull with any roll / lap / reel diameter is measured by ultrasonic sensor and the sensor signal converted in the control module to produce the required pneumatic pressure for the brake or slip clutch. The required pull can be set.

The function is illustrated in figures 1 and 2.

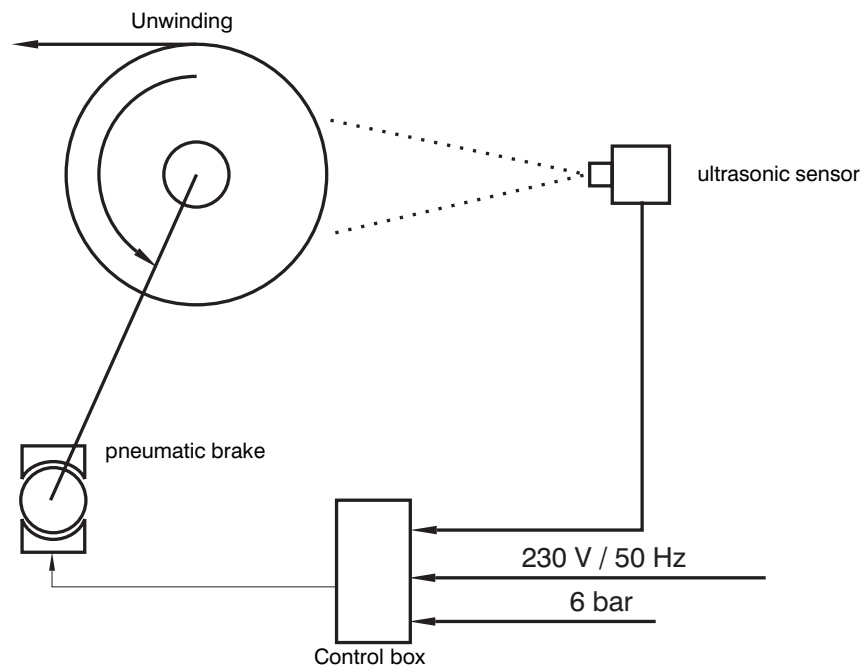


Figure 1: Unwinding

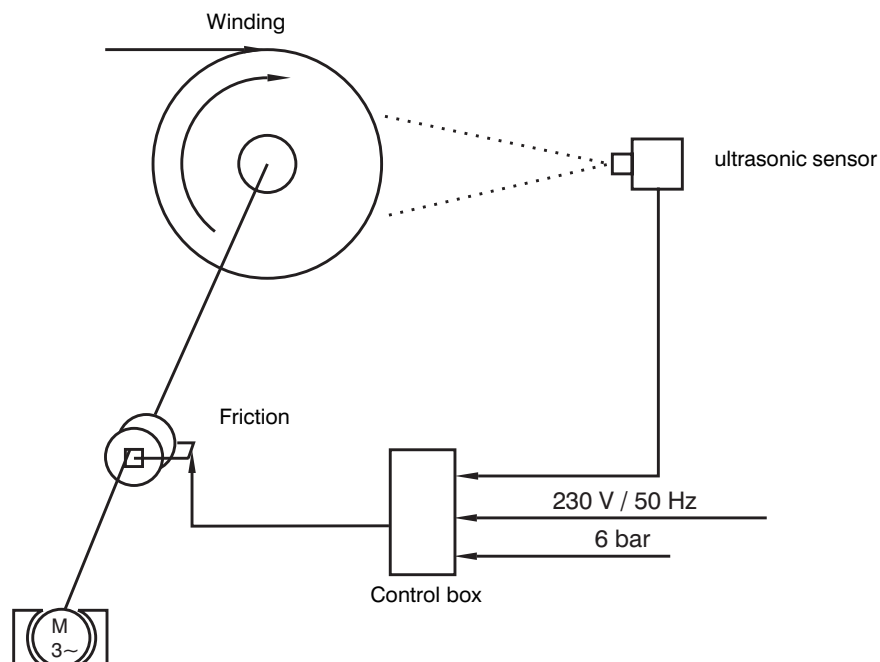


Figure 2: Winding

4. Installation

4. Installation

Install the web pull control in direct vicinity of the winder.

The supplier assumes that a 2.5 m cable is sufficient for the electric connection and a 2.0 m cable for connecting the ultrasonic sensor.

Figure 3 contains the fastening dimensions.

Figure 4 contains the mounting dimensions.

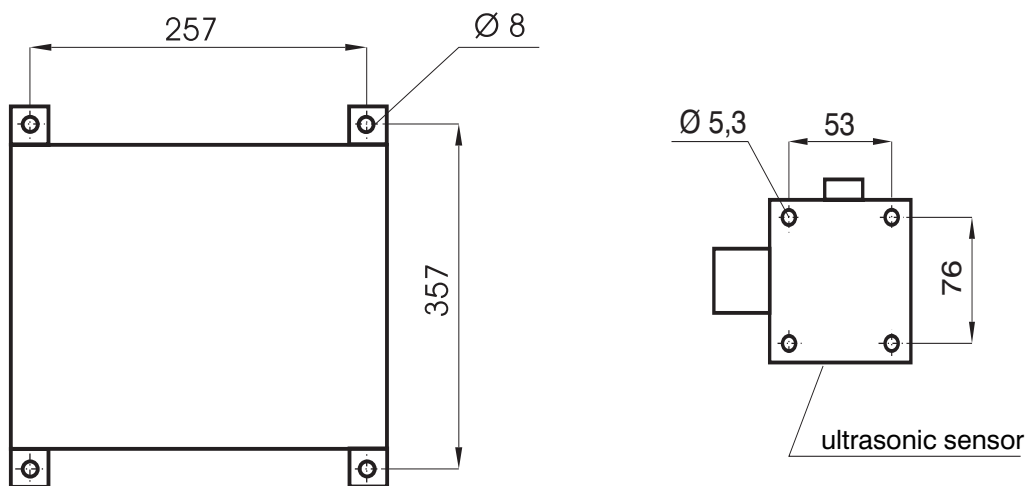


Figure 3: Fastening dimensions

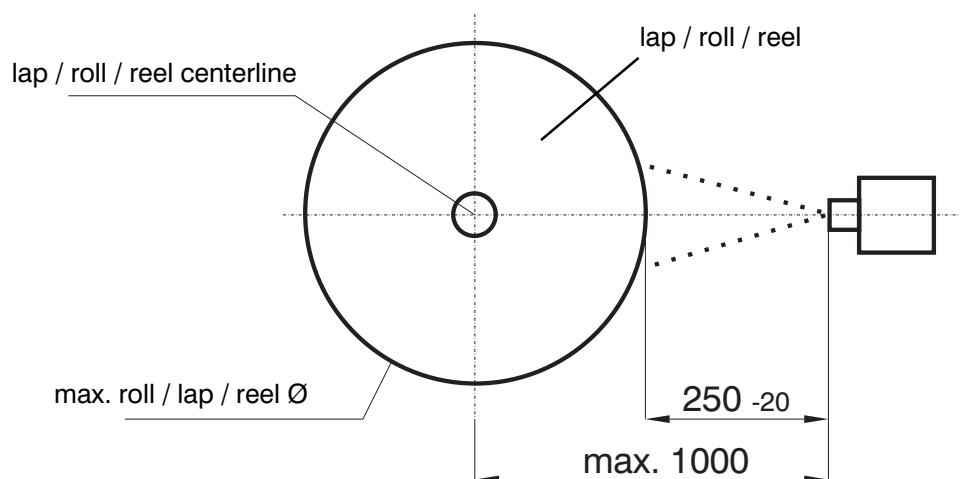


Figure 4: Mounting dimensions

4. Installation

Observe the working range of the ultrasonic sensor.

Figure 5 illustrates the terminal on the control module.

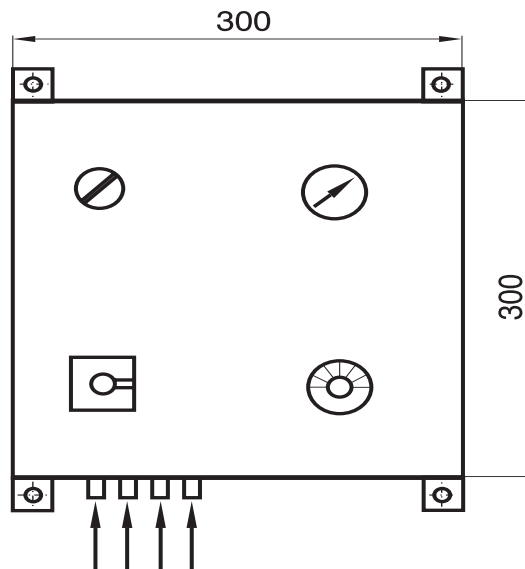


Figure 5

Make sure that the ultrasonic sensor is directed at the lap / roll / reel centerline and that dust or dirt cannot collect on the sensor head.

Connect the hose between the control module and the brake or slip clutch and the compressed air supply. This completes the installation. A shutoff valve should be installed in the compressed air line. Install an ultra-fine filter (0,3 μm) in the air supply line because otherwise the regulating valve may fail.

5. Start-up and operation

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Make sure that the installation of the web pull control is correct. Then switch on the voltage supply.

- Setting the ultrasonic sensor

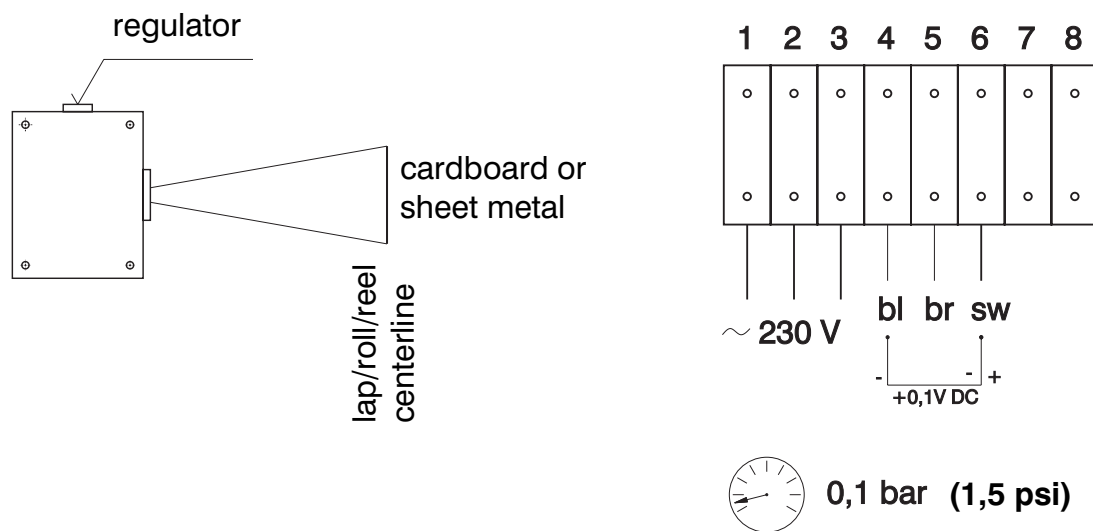


Figure 6: Setting the ultrasonic sensor

Using the control on the ultrasonic sensor, set the web pull control in relation to the distance of the ultrasonic sensor to the lap/roll/reel centerline with. The zero point of the ultrasonic sensor must always be in the lap/roll/reel centerline. Therefore make the setting without the lap/roll/reel shaft. Put a piece of cardboard or metal as reflector in the plane of the lap/roll/reel c/l and turn the control knob until a pressure of 0 - 0.1 bar (0 - 1.5 psi) is obtained. The potentiometer for the required pull (2) must be at 100 % when the ultrasonic sensor setting is made and the braking pressure (1) has to be switched on.

- Setting the regulating valve

The regulating valve is factory-set to ensure that the delivery pressure is 0.05 bar (0.75 psi) if the input voltage is 0.1 V. At 10 V the delivery pressure is 0.5 bar (7.5 psi).

Note

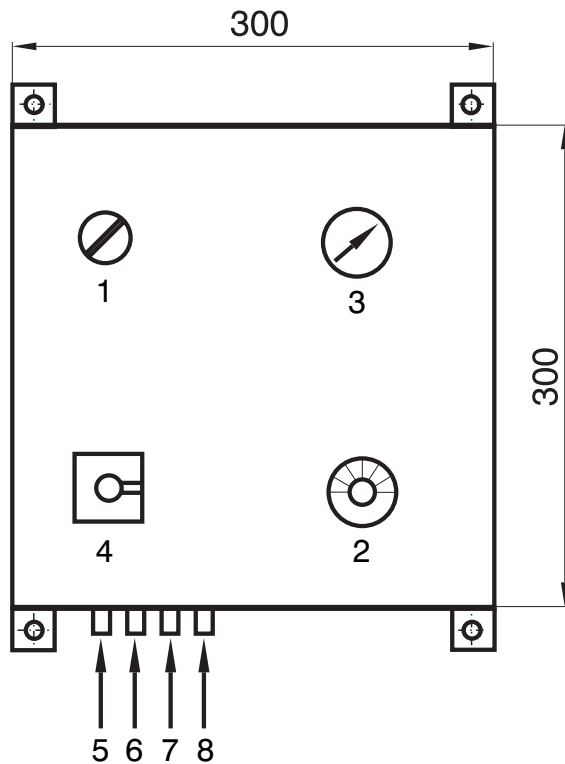
The audible hiss of air in the control module is functional and is not a leak.
The control module vibrates, which causes humming.

5. Start-up and operation

- Operation

At first, open the valve in the compressed-air supply line and switch on main supply switch (4). Set the required pull (2). Depending on the diameter of the lap/roll/reel and the required pull, brake pressure (3) is obtained.

If for certain operations it is necessary to run the lap/roll/reel unbraked, the braking pressure can be switched off with switch (1) at Zero.



Controls and connections:

- 1 Braking pressure
- 2 Required pull
- 3 Brake pressure
- 4 Main power switch
- 5 Supply voltage 230 V / 50 Hz
- 6 Ultrasonic sensor
- 7 Compressed air connection
6 bar / 0,3 μ m
- 8 Control air

6. Maintenance



6. Maintenance

The web pull control does not require maintenance. Make sure that no dust, dirt or moisture collect on the ultrasonic sensor head.

7. Characteristic

The pulling force (braking force) is maintained constant at any diameter of the lap/roll/reel. The amount of pulling force is defined by the selected brake.

The required pull is set as a percentage of maximum pull on the potentiometer.

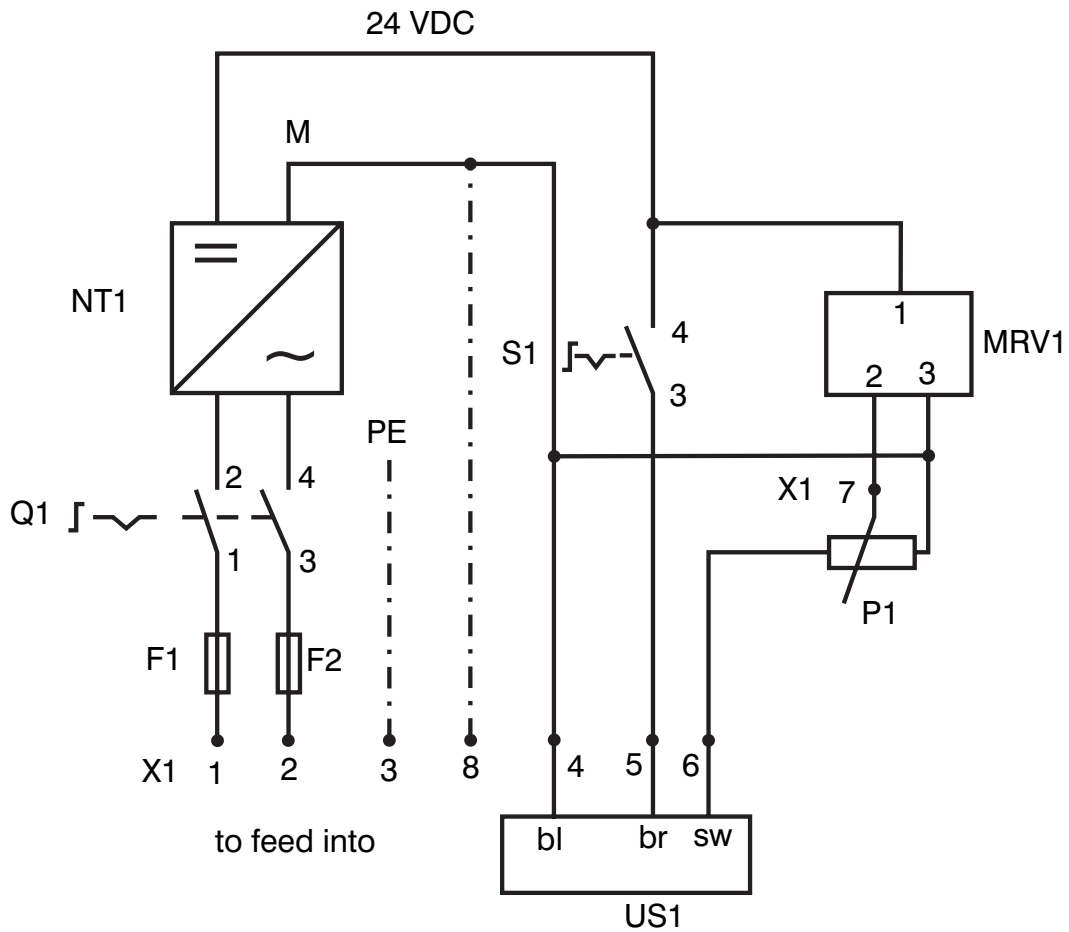
CAUTION !

If the pull force is not completely constant, the cause can be friction of bearings in the winding system and their inertia during acceleration or deceleration.

The effect of bearing friction is seen especially with lap/roll/reel of small diameter. The pulling force increases in this case. This can be corrected by setting the ultrasonic sensor zero in front of the lap/roll/reel centerline, instead of exactly on the centerline directly. (Hold a piece of cardboard or metal nearer the sensor).

The effect of inertia can be reduced by extending the time of acceleration/deceleration.

8. Circuit diagram



- Q1 Main power switch
 S1 Brake on / off
 NT1 Power pack 24 V DC
 US1 Ultrasonic sensor
 MRV1 Solenoid valve