OTT Spanntechnik JAKOB

Product Information

Position-Controller

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JAKOB GRUPPE

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symbol explanation:

keep attention - malfunction

1 Safety notes

Consider always the following points:

Important

- Follow the operating instructions
- avoid vibrations and other physical damage to the sensor electronics
- power supply may not exceed indicated values
- the sensor system has to be connected following the safety directions for electrical equipment
- protect sensor cable against damage
- check the correct wiring on all connections before starting the system
- run the electronics for at least 2 minutes before starting the measuring process
- OTT-JAKOB does not take any liability for improper setting of the position-controller
- The limit values are precisely adjusted. A hysteresis of 0,1 mA (equals approx. 0,15 mm) accounts for existing tolerances e.g. thermal expansions. However, this hysteresis is programmed only for the positions “tool released” and “clamped without tool”. No additional tolerance has to be considered!

1.1 Intended Use

The position-controller is designed for industrial use only.

The measuring system may be operated only within the values given in the technical data.

The machine control is to be programmed in such a way that during malfunction (simultaneous setting of two outputs) or total failure (no output set) of the position-controller, no persons are harmed or machines are damaged.

The limit values may be adjusted only by instructed specialists.

2 Product Description

2.1 Application

With the help of the position-controller the following tool positions can be monitored:
- tool released
- tool clamped
- clamped without tool

The position-controller is a module of the OTT-JAKOB position monitoring system.

2.2 Components of the Monitoring System

2.2.1 Sensor

The unclamp unit contains a cylindrical, inductive analog sensor which works according to the LVDT principle. It consists of a primary and a secondary coil.

The drawbar connection moves axially through the analog sensor. A target ring on the drawbar connection triggers the output signal. The signal increases the further the target ring enters the sensor (view from the cable exit). Thus the position is monitored also during the milling process.

2.2.2 Sensor Electronics

The sensor electronics supply the primary coil with constant frequency and amplitude. A demodulator transforms the signal of the secondary coil into a stable DC-output signal (4-20 mA).

2.2.3 Position-Controller

The position-controller evaluates the current signal of 4 - 20 mA and sets the output signals S1...S3 at the adjustable limits. The display is available in mA or in mm. A digital filter compensates existing peak values. The position-controller is equipped with a meter for operating hours and operating cycles.

2.3 Technical Data

Dimensions		50 x 96 x 42 mm
Energy	supply	24 V DC
	capacity max	0,5 A
Measuring input	analog signal	4 - 20 mA
	R_i	250 ohms
	scanning rate (adjustment to sensor)	3,3 ms
	measuring cycle	350 µS
	resolution	0,02 mA
Display		Display
		light emitting diodes (LED)
Output		3 transistors
	output voltage	24 V DC
	total power output for all 3 transistors	300 mA
	response time	<300 µs
Safety standard		IP 40

The position-controller follows the European Union guideline EU 89/336/EWG "Elektromagnetic Compatibility".

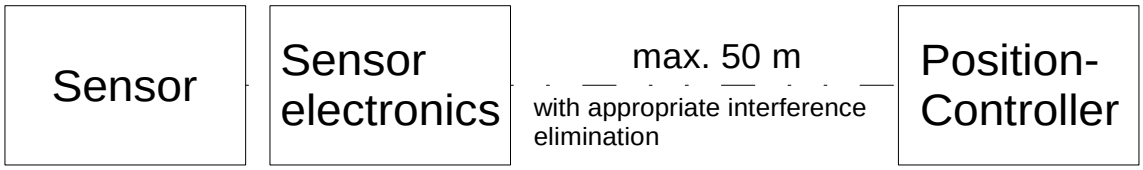
3 Start-up

3.1 Assembly

We recommend the mounting of the position-controller in the electrical cabinet and/or in a waterproof terminal box

- Position-controller to be fastened on a DIN rail

3.2 Wiring

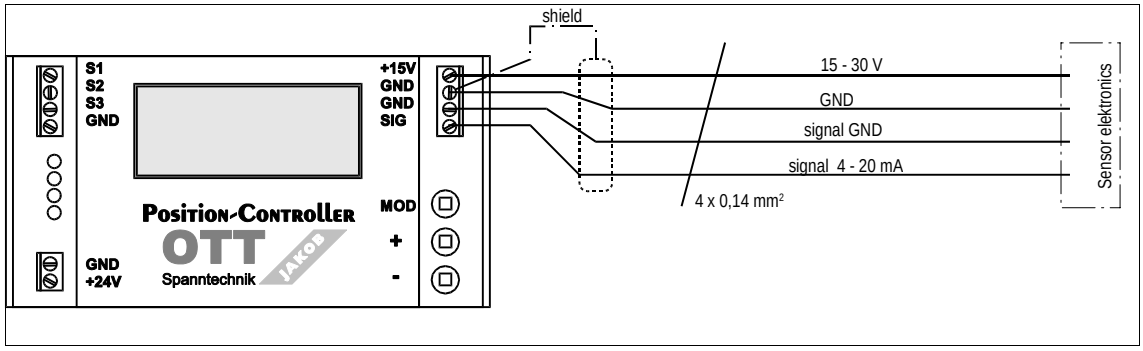


At the output side of the sensor electronics is a connector. The cable has to have following characteristic:

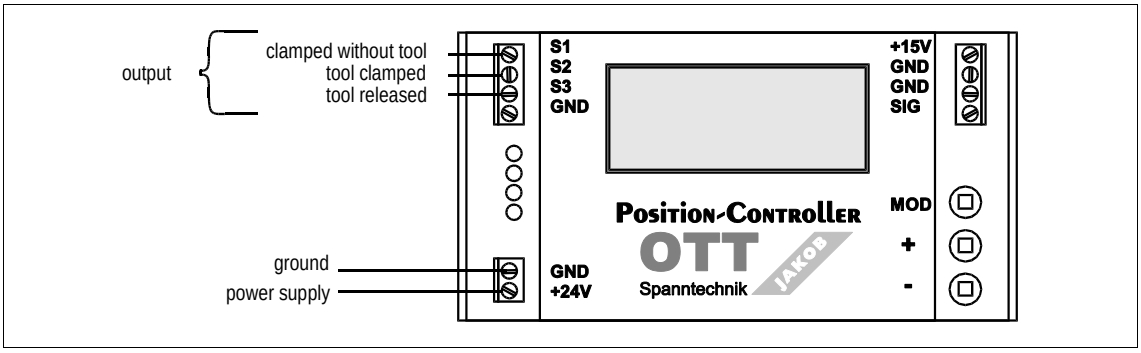
- outside diameter max.: 5 mm
- 4 x 0,14 mm²
- with shield
- highly flexible: suitable for cable carriers
- max. length appropriate interference elimination: 50 m

Note for interference elimination:
e.g. EMV filter (e.g. BNP002) or attach a ferrite core to each wire

Input Position-Controller



Output Position-Controller



- Connect the terminals "GND". (-) and +24V with the operating voltage 18... 28V
- Connect the outputs "S1... S3" with the control

The outputs "S1... S3" forward the power supply during the active status. These outputs can be charged with 100 mA each. The mode is additionally indicated by three green LED's.

3.3 Settings

Important !

- The setting of the position-controller is to be made specifically for each tool spindle!
- After changing the clamping set a new setting of the position-controller is required!
- Before applying power to the electronics, the correct wiring of the sensor connections, the signal cable and the power supplies has to be controlled!

After applying the operating voltage the display shows the release number for approx. one second followed by the value set by the factory as well as the active outputs.

Values of factory setting:

Modes				Scaling			Filter
A1	A2	A3	A4	min.	max.	diff.	
8,37	8,9	9,92	16,31	4	20	25	3
mA				mA		mm	

Important !

The display of the measured value is either in mA or in mm. During the setting of the position-controller the display **must** be in **mA**. The selection can be made by the MOD key.

First, certain trigger points in the machine system are started successively in the adjusting mode. Then follows the scaling of these trigger points, the definition of the filter value and the display of the operating time and the operating cycles. From there you return to the display mode.

3.3.1 Trigger Point Setting

To move from the display mode to the adjusting mode:
- Press MOD key for at least 5 seconds to move immediately to the first trigger point

The setting of the individual trigger points follows always the same pattern:

Select trigger point by
- briefly pressing the MOD key
- positioning the machine system

Store value by
- briefly pressing + and - simultaneously

The following trigger points are set through the above procedure:

Trigger points	***Display***
Clamped without tool	*A1*
Clamped with permissible max. tool	*A2*
Clamped with permissible min. tool	*A3*
Tool released	*A4*
Scale factor min	min
Scale factor max	max

If set correctly the signal increases from A1 to A4.
For setting the values *clamped with tool max/min* and *scale factor max/min* an appropriate reference tool is to be used. The OTT-JAKOB-Power-Check with the appropriate setting can also be used for this purpose.

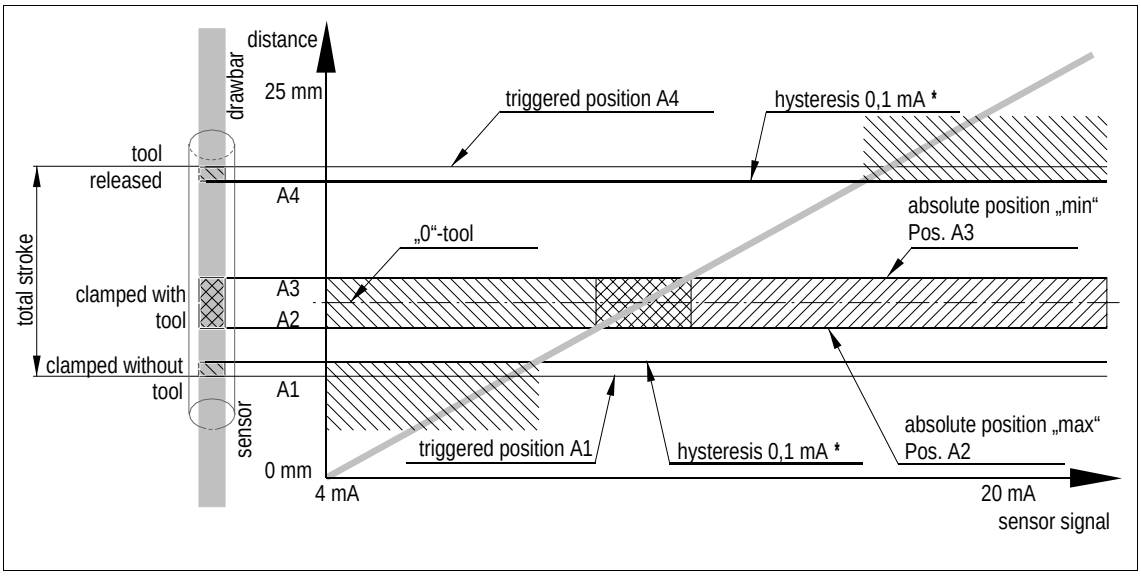
3.3.2 Scale Factor Difference

Display: diff

The next value required is the scale factor: Stroke input through + or -.

When employing an unclamp unit with relief stroke this value has to be added!

Position and trigger points



* The limits are exactly adjusted. A hysteresis of 0,1 mA (equals approx. 0,15 mm) accounts for existing tolerances e.g. thermal expansions. However, this hysteresis is programmed only for the positions "tool released" and "clamped without tool". No additional tolerance has to be considered!

3.3.3 Filter Values

Press the MOD key again to move to the setting of the *filter values*.

Display: *Average*

Possible values are:

0	no filter 2^0 measurements
1	sliding average value over 2^1 measurements
2	sliding average value over 2^2 measurements
3	sliding average value over 2^3 measurements
4	sliding average value over 2^4 measurements
5	sliding average value over 2^5 measurements

Factory setting: filter = 3

For changing the value:

- press + or -

3.3.4 Operating and Cycle Time

Press the MOD key again to display the operating period in hours and the operating cycle counter; display in multiples of 20. These values can be changed only at the OTT-JAKOB factory.

To move from the adjusting mode to the display mode:

- press the MOD key

3.4 Evaluation

The position-controller program links the trigger points and sets the outputs S1 - S3.

Only "S1" is active if the value has fallen below limit"A1" (clamped without tool).

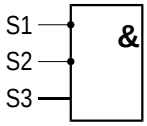
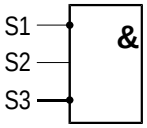
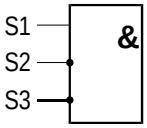
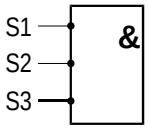
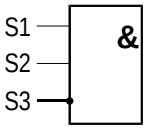
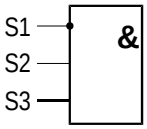
"S1" and "S2" are active in the transient area between "A1" and "A2".

Only "S2" is active in the range between "A2" and "A3" (clamped with tool).

"S2" and "S3" are active in the transient area between "A3" and "A4".

Only "S3" is active if "A4" is exceeded (tool released).

Evaluation examples:

Tool released 	Tool clamped 	Clamped without tool 
Failure 	Interference: clamped without and with tool: failure 	Interference: tool clamped and tool released: failure* 

* During the working stroke the outputs S2 and S3 are briefly set!

3.5 Final Inspection

Logging of

- Values for the trigger points
- Stroke cycles
- Operating hours

4 Maintenance

4.1 Maintenance Intervals

4.1.1 6 Months Intervall

- Control of the values for the trigger points
- Logging of the stroke cycles and the operating hours

Protocol

Inspector							
Date							
Serial no. Spindle							
Serial no. Unclamp unit							
Release number							
Operating hours							
Operating cycles							
Trigger points	A1						
	A2						
	A3						
	A4						
Scale	min						
	max						
	diff						
Filter value							

Remarks:

Order number: 0.966900.005

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