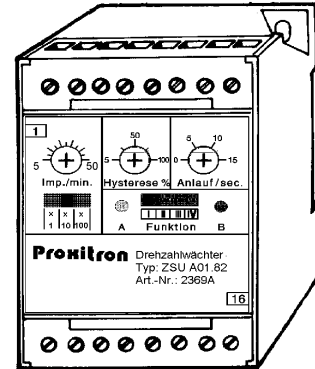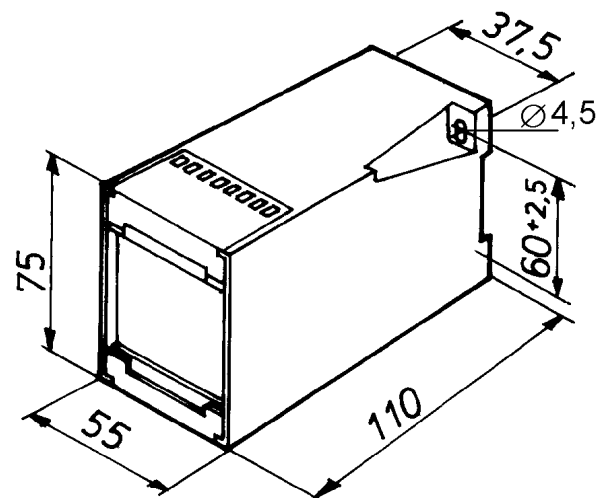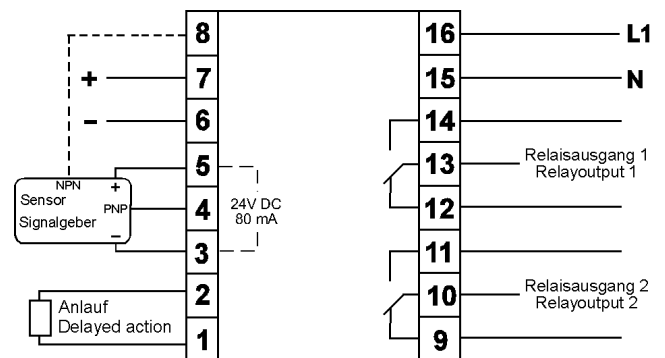**Proxitron®**
Sensoren für Automation

The ZSU speed controller is a monitor of rotating or oscillating machine parts. The speed controller continuously compares the set speed with the actual speed and produces a switching output in the event of excessive variation. The actual speed is monitored by a sensor at the machine in a non-contact method.

Technical Data

Type	ZSU A01.52
Art.-Nr.	2369B
Range of adjustment	5 - 5000 puls./min.
Supply voltage	115 V AC +/- 10 % or 24 V DC +/- 20 %
Power frequency	45 - 65 Hz (AC)
Power consumption	3,5 VA
Start delay (adjustable)	0 - 15 sec.
Output	2x potential-free changeover relay
Relay contact load	5 A / 240 V AC
Power voltage for external sensor	24 V DC 80 mA max.
Hysteresis (adjustable)	5 - 100 %
Ambient temperature	-25 to +70 °C
Protection class	IP40, Recessed screw terminals to VDE 0100 / IP 20
Connection	Terminals up to 4 mm^2
Function display	LED "A" = actual speed below the set speed LED "B" = actual speed above the set speed
Housing	Plastic housing to the regulations of the machine and automotive industry. Mounting to DIN 46121 (2 boreholes) or on a DIN Rail to DIN 46227/EN 50022
Further disigns aviable:	**Type:**
Supply voltage 230 V	ZSU A01.82

Diagram of Connections

Drehzahlwächter
Typ: ZSU A01.82
Art.-Nr.: 2369A

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Advantages

- Control of speeds which fall below the set speed or exceed the set speed
- 115 V AC or 24 V DC
- potential free D.P.D.T. relay
- state of operation indicated by LEDs
- start up delay adjustable
- hysteresis adjustable
- programmable working current or static current behaviour

Usable sensors

- 3 wire, PNP or NPN sensors
- 2 wire, sensors
- magnetic proximity switches
- any type of limit switches
- any type of inductive, magnetic or capacitive proximity sensors
- any type of photoelectric reflex, proximity or through beam sensors

Pulses/min.

The set speed is adjusted by the potentiometer *"Imp./min."* and by the three-step slide switch. So in the three steps the speed ranges 5 - 50 (x1), 50 - 500 (x10) and 500 - 5000 (x100) pulses per minute are reached.

Hysteresis

The hysteresis is defined as the difference in speed between the relay switching on and off. Hysteresis to the low speed switching point can be adjusted by the potentiometer *"Hysterese%"* from 5% to 100% (hysteresis factor 1,05 to 2,0).

Start Delay

After start up a motor will not be at rated speed for some seconds. To avoid an unwanted alarm this time can be adjusted up to 15 seconds. This delay time is adjusted by a potentiometer *"Anlauf/sec."* or, alternatively, by an external resistance between the terminals 1 and 2. For external adjustment, the internal potentiometer must be set to 15 seconds.
Start up delay set by external resistance:

Resistance [ohm]	27 K	56 K	120 K	270 K	470 K	1 m	2M2	without
Time [sec.]	1	2	4	6	8	10	12	15

Modes of operation

By means of the four-step slide switch *"Funktion"* different modes of operation are adjustable in order to guarantee compliance with the safety requirements.

Function	Modes of control	Relay		Contact		LED	
		during start	at rated speed	9 / 10 12 / 13	10 / 11 13 / 14	A	B
I	speed falls below	off	off	close	open		•
II	rated speed	on	on	open	close		•
III	rated speed	off	off	close	open	•	
IV	exceeded	on	on	open	close	•	
	during starting both LED`s lighten within preselected time					•	•

09.07.1998 Details are subjekt to change without notice.

Operation Instructions for programming device Proxibox ID1.0
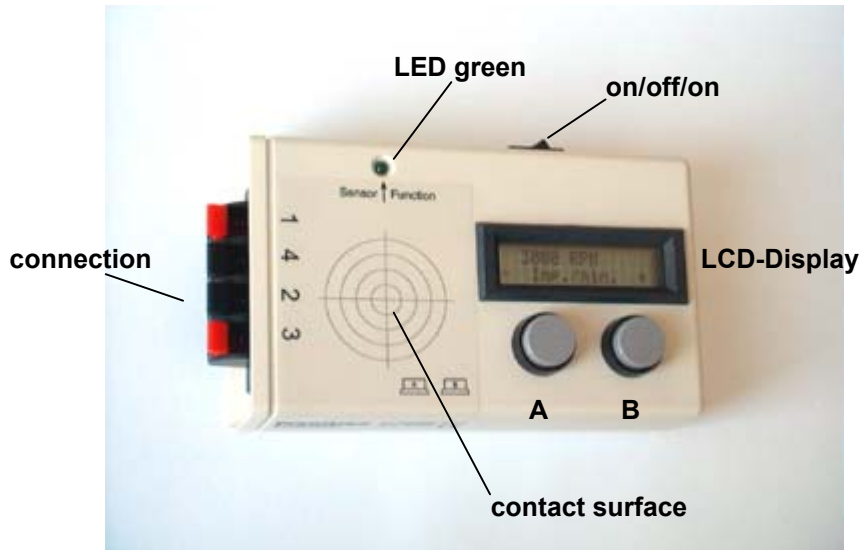
Short description

Proxibox simulates at its contact surface the speed of a machine. By this function simple programming of the compact Proxitron speed controllers (sensor type IDL and IDLA) is rendered possible.

An additional speedometer function permits the pulse counting/minute by means of any proximity switch or the Proxitron sensors IDL resp. IDLA.

Current supply of the Proxibox is effected via 4 mignon cells (type AA) which are inserted into the battery box which can be reached from the back side. The internal switching produces the voltage supply for the sensor (approx. 24 VDC at terminals 1 + and 3 -; max. 10mA). The batteries should be replaced with the display shows „Low Batt."

The meaning of the push-buttons A and B changes in the steps of operation (softkey) and is shown in the display always.

In the description below the signs have following meaning:
(   )   = shown in the display above pushbuttons A and B
<   >   = shown in the display after action is fulfilled.
By pushing the push-button once the indication is changed by one step, by longer pushing them quick passing is reached.

1   Measuring of speed „tachometer"

This mode can be used by commercial proximity switches with PNP function or analogously by means of other contact transmitters.

1.1.   Connect sensor; terminal 2 is of no importance for this mode.

1.2.   Switch on display < IDL>

1.3.   Push push-button A (Function) 2 times <Tachometer>

1.4.   Confirm push-button B (OK) <Speed>

1.5.   Mount sensor at object to be measured and start machine (Indication of pulses per minute)

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2   Programming of speed controller IDL

2.1   Connect sensor

2.2   Switch on display <IDL>

2.3   Confirm push-button B (OK) <3000 RPM>

2.4   Set limit value requested by means of push-buttons A and B (- Imp./min +) between 5 and 6000 Imp/min.

Explanation: Sensor IDL is equipped with teach-in function which when programmed at a machine in operation automatically sets the limited value to 20 % below the actual value. Consistently the Proxibox adds these 20 % at its contact surface compared with the indication.

2.5   Place sensor on the contact surface. The green LED of the Proxibox shows that the sensor connected correctly re-indicates the given switching sequence of the Proxibox at terminal 4.

2.6   Detach protection screw at the sensor and push push-button „Set" by means of a small screw driver until the sensor LED gives red light. After releasing the push-button the automatical programming of the given limit value starts and is finished when the sensor LED changes to green. Additional sensors can now be programmed with the same pre-setting.

In case of extremely slow processes (5 Imp/min) this can take upto 48 sec. The limit value stored is kept also in case of voltage failure.

3   Programming of speed controller IDLA

3.1   Connect sensor

3.2   Switch on display <IDL>

3.3   Push push-button A (Function) <IDLA>

3.4   Confirm push-button B (OK) <3000 RPM Set 2 High> for the upper limit value (perhaps go on with 3.8)

3.5   By means of push-buttons A and B (- Imp./min +) set requested upper limit value between 5 and 6000 Imp/min.

3.6   Place sensor on the contact surface. The green LED of the Proxibox shows that the sensor connected correctly re-indicates the given switching sequence of the Proxibox at terminal 4.

3.7   Detach protection screw Set 2 at the sensor and push push-button „Set 2" by means of a small screw driver until the sensor LED gives red light. After releasing the push-button the automatical programming of the given upper limit value starts and is finished when the sensor LED stops to give light.

   In case of extremely slow processes (5 Imp/min) this can take upto 48 sec. The limit value stored is kept also in case of voltage.

3.8   Push push-buttons A and B (- Set 1 Low +) simultaneously <2400 RPM Set 1 Low> for lower limit value.

3.9   By means of push-buttons A and B (- Imp./min +) set requested lower limit value between 5 and 6000 Imp/min. The lower limit value must be at least 15 % lower than the upper value; see also explanation in point 5).

3.10 Detach protection screw Set 1 at the sensor and push push-button „Set 1" by means of a small screw driver until the sensor LED gives red light. After releasing the push-button the automatical programming of the given upper limit value starts and is finished when the sensor LED stops to give light. For identical pre-settings you can go to 3.6 by pressing push-buttons A and B simultaneously for three times.

   In case of extremely slow processes (5 Imp/min) this can take upto 48 sec. The limit value stored is kept also in case of voltage.

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4   Programming of start-up time of IDL and IDLA

4.1   Connect sensor

4.2   Switch on display <IDL>

4.3   Push push-button B (OK) <3000 RMP Imp./min.>

4.4   Push push-buttons A and B) simultaneously <9 Sec. - Time Delay +>

4.5   By means of push-buttons A and B (- Time Delay +) set desired start-up time to a value between 1 and 120 seconds.

4.6   Push push-buttons A and B (- Time Delay +) simultaneously <desired time in Sec Cancel Start>

4.7   Place sensor on the contact surface.

4.8   By means of a small screw driver push the sensor push-button Set resp. Set 1 and at the same time actuate push-button B (Start). As soon as the sensor LED gives red intermittent light, release sensor push-button (within one second). <Time in Sec. counts down to 0 and returns to the time desired>.

When the sensor LED stops to give light, the time is stored. Additional sensors can now be programmed with the same pre-setting.

The process can be stopped by pushing push-button A (Cancel) and can be started new.

Explanation: During programming the Proxibox automatically makes different procedures during which the supply voltage is switched and the dampening of the active surface is simulated.

In case of both types programming of the start-up time can alternatively be started after speed programming (xxxRPM) with 4.4.

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5   Checking of the stored limit values IDL / IDLA

5.1   Connect sensor

5.2   Switch on display <IDL>

5.3   Push push-button A (Function) once <IDLA>

5.4   Confirm push-button B (OK) <3000 RPM Set2 High>

5.5   Place sensor on the contact surface. The green LED of the Proxibox indicates correct operation of the sensor.

5.6   IDL

5.6.1   When the sensor LED gives green light, the switching threshold is lower than 3000 Imp/min. Reduce by means of push-button A (-) the < indicated value RPM > until the sensor LED stops to give light. = Switching-off value.

5.6.2   By means of push-button B (+) increase < indicated value RPM > until the sensor-LED gives green light. = Switching-on value. Switching-on value – switching-off value = hysteresis.

5.7   IDLA

5.7.1   If the sensor LED gives green light, the indicated value is within the acceptable range. If the sensor LED does not give green light when starting 5.7.2, the acceptable range is looked for by testing by means of push-buttons A and B.

5.7.2   Reduce the <indicated value rpm> by means of push-button A (-) until the sensor LED does not give light any longer = acceptable range lower switch-off value.

5.7.3   Increase the <indicated value RPM> by means of push-button B (+) until the sensor LED gives green light = acceptable range lower switch-on value.

5.7.4   By push-button „B" (- Set. 2 High. +) increase the <indicated valued RPM> until sensor LED stops to give green light = acceptable range upper switch-off value.

5.7.5   By push-button „A" (- Set. 2 High. +) increase the <indicated value RPM> until the sensor LED stops to give light = acceptable range upper switch-on value.
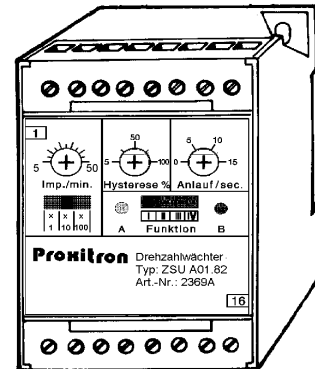
Explanation: For reasons of operational safety the limit values of the acceptable range are pre-set with a stabilizing hysteresis. Thus the four switching points 5.7.2 to 5.7.5 are noted during testing. The limit values which are noted when leaving the acceptable range are detected as rated values and are thus different from the limit values which result in switching-back when starting beyond the acceptable range.

The hysteresis values of 2 x 6,25 % result in following condition: lower limit value <= 0,85 x upper limit

Slight deviations from the 4-digit indication programmed are normal and are based on internal rounding deviations.

Example: The sensor IDLA is to monitor an acceptable range of between 2400 and 3000 rpm and was programmed accordingly. Determined lower switch-off value 2441 rpm, determined lower switch-on value 2576 rpm, determined upper switch-off value 2967 RPM, determined upper switch-on value 2790 RPM

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Technical Data

Type	ZSU A01.82
Art.-Nr.	2369A
Range of adjustment	5 - 5000 puls./min.
Supply voltage	230 V AC +/- 10 % or 24 V DC +/- 20 %
Power frequency	45 - 65 Hz (AC)
Power consumption	3,5 VA
Start delay (adjustable)	0 - 15 sec.
Output	2x potential-free changeover relay
Relay contact load	5 A / 240 V AC
Power voltage for external sensor	24 V DC 80 mA max.
Hysteresis (adjustable)	5 - 100 %
Ambient temperature	-25 to +70 °C
Protection class	IP40, recessed screw terminals to VDE 0100 / IP 20
Connection	Terminals up to 4 mm²
Function display	LED "A" = actual speed below the set speed LED "B" = actual speed above the set speed
Housing	Plastic housing to the regulations of the machine and automotive industry. Mounting to DIN 46121 (2 boreholes) or on a DIN Rail to DIN 46227/EN 50022
Further designs available:	**Type:**
Supply voltage 110 V AC +/- 10 %	ZSU A01.52

Diagram of Connections
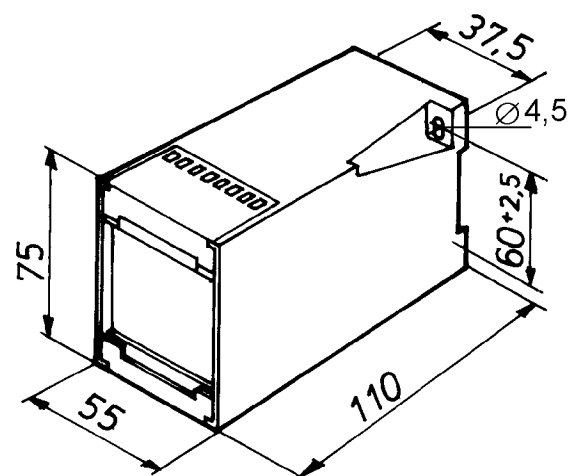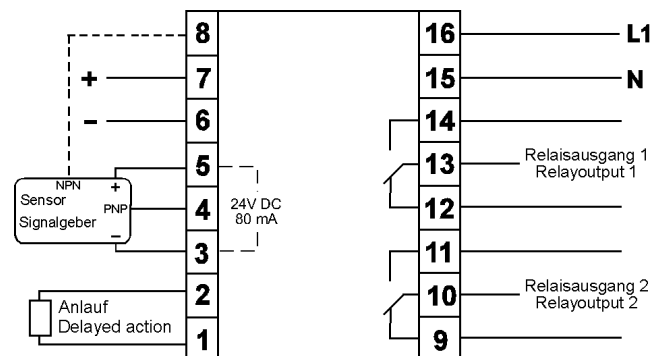
Advantages

- Control of speeds which fall below the set speed or exceed the set speed
- 230V AC or 24V DC
- potential free D.P.D.T. relay
- state of operation indicated by LEDs
- start up delay adjustable
- hysteresis adjustable
- programmable working current or static current behaviour

Usable sensors

- 3 wire, PNP or NPN sensors
- 2 wire, sensors
- magnetic proximity switches
- any type of limit switches
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Pulses/min.

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The hysteresis is defined as the difference in speed between the relay switching on and off. Hysteresis to the low speed switching point can be adjusted by the potentiometer *"Hysterese%"* from 5% to 100% (hysteresis factor 1,05 to 2,0).

Start Delay

After start up a motor will not be at rated speed for some seconds. To avoid an unwanted alarm this time can be adjusted up to 15 seconds. This delay time is adjusted by a potentiometer *"Anlauf/sec."* or, alternatively, by an external resistance between the terminals 1 and 2. For external adjustment, the internal potentiometer must be set to 15 seconds.
Start up delay set by external resistance:

Resistance [ohm]	27 K	56 K	120 K	270 K	470 K	1 m	2M2	without
Time [sec.]	1	2	4	6	8	10	12	15

Modes of operation

By means of the four-step slide switch *"Funktion"* different modes of operation are adjustable in order to guarantee compliance with the safety requirements.

Function	Modes of control	Relay		Contact		LED	
		during start	at rated speed	9 / 10 12 / 13	10 / 11 13 / 14	A	B
I	speed falls below	off	off	close	open		•
II	rated speed	on	on	open	close		•
III	rated speed	off	off	close	open	•	
IV	exceeded	on	on	open	close	•	
	during starting both LED`s lighten within preselected time					•	•

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