

# Speed Monitors



**50.1**

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# Speed Monitor ESC

## Protects against Speed Deviations and Speed Differentials

Electronic Speed Control **ESC** by RINGSPANN is a series of modern units for monitoring speed.

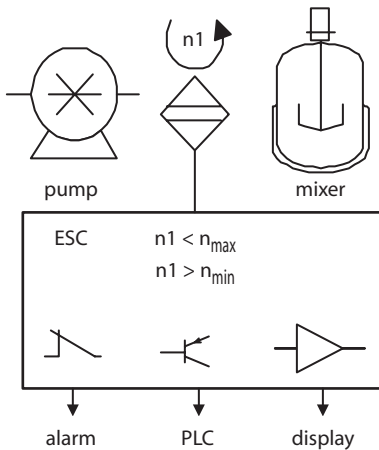
The sequences of signals from proximity switches or encoders are translated by the ESC via cycle measurements into the actual speed. The speed value is therefore available with each signal marker. It is compared with the digitally set limit of

the speed deviation or the speed differential. Exceeding the limit causes a relay or transistor to be actuated for the introduction of preventative measures against consequential damage.

The signal sequence can be produced by existing screw heads, teeth or other signal markers as long as they are spread evenly around the circumference.

The series ESC 1XX has splashproof wall housings and is suitable for outdoor use. The series ESC 2XX has a very small standard railsnap fitting housing for a minimum installation requirement in the control cabinet.

### Speed Deviations

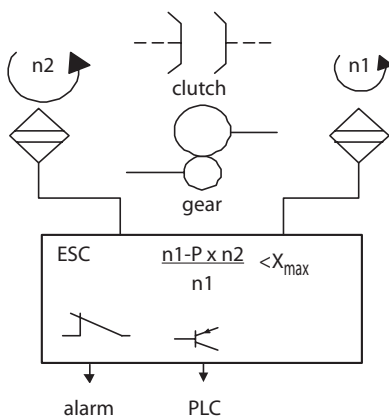


When monitoring deviations in speed the ESC compares the signal sequence  $n1$  with the preset speed limit from the point of stillstanding up to  $300\,000\text{ min}^{-1}$ . Exceeding the limit or falling below the limit triggers off a switching signal. The bridging start which is important for monitoring a speed deficiency can be extended with an external tracer or relay. There are units available with analogue speed output for indicating or recording the speed.

Typical applications can be found in rotating installations, like:

- belt conveyors
- mixers and centrifuges
- worm drive gears
- pumps
- mills

### Speed Differentials



When monitoring speed differentials (slipping) two signal sequences  $n1$ ,  $n2$  are compared with each other. Based on a given speed ratio of  $n1 = P \times n2$ , each deviation from this is calculated and put in relation to  $n1$ . The result is compared with the preset percentage limit value so that the synchronism of  $n1$  and  $n2$  is monitored relatively and independent of the actual speed. A change in one of these speeds causes a switch-off; if both speeds change equally then relay and transistor remain in the normal position. The adjustable factor  $P$  matches the speed ratio which is given by gears or pitch differences of the signal markers. Even minute speed differentials are

detected to prevent damage of friction locking components even in fast rotating machines. Below are typical examples of equipment to be monitored:

- friction clutches
- v-belt pulleys
- drive shafts
- gears
- conveyor installations
- lifting apparatus, cranes
- torque limiters

# Speed Monitor ESC 1XX

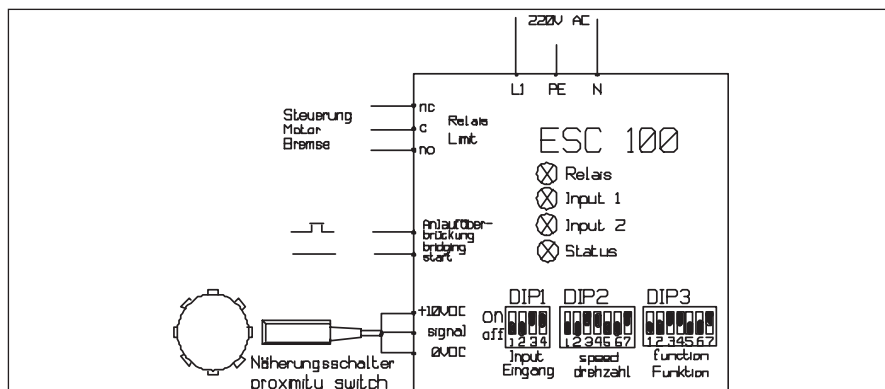
## Wall Housing for Outdoor Mounting

### ESC 100

Monitoring speed deviations can be effected by a setting for deficiency or for excess. Using microprocessor technology and DIP switches, a precise speed limit can be selected without a test run. On reaching the speed limit a center-zero relays is switched over. The waiting time of the built-in bridge starter can be started or extended as necessary.

The relay can be used with or without self-reset. Resonance or fluttering is prevented by a speed hysteresis of 12 % and a re-engagement delay of 0,2 s.

NAMUR or standard proximity switches (NPN, PNP for 10 VDC) can be connected.

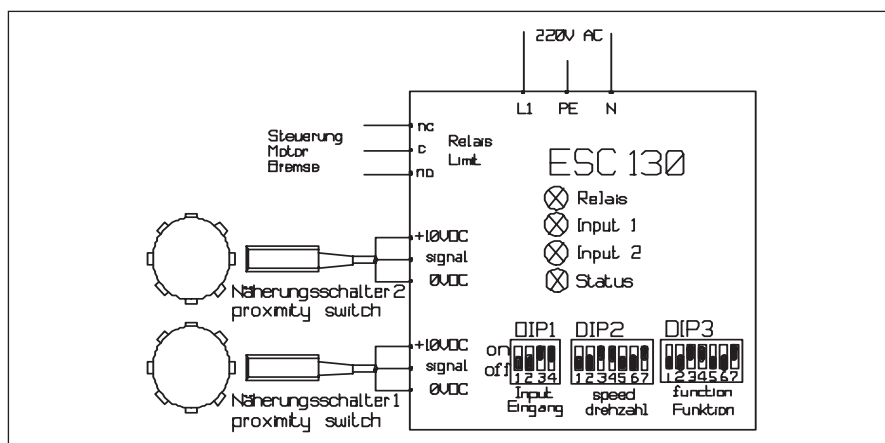


Supply voltage Ub:	12 V~, 24 V~, 115 V~, 230 V~ ±20%
Power input:	1,2 VA
EMC-limits:	EN 50081-1, EN 50082-2
Ambient temperature:	-10...+65° Celsius
Transmitter supply:	8V and 10V built-in
Switching threshold NPN, PNP:	2,2 V, 7,0 mA (+/-15%)
Switching threshold NAMUR:	7,0 V, 0,9 mA
Relay output:	250 V, 5 A, changer
Status display:	Yes, via 4 LEDs
Speed range:	0,1...200 000 Imp./min
Speed limit range:	0,3...130 000 Imp./min
Bridging start time:	10 seconds
Order number:	3501.100.X01.BYYYYY
(Housing see page 5)	X = housing type, Y = Ub

### ESC 130

The ESC 130 monitors the relative speed differential which can be selected from 8 possible percentage values. On reaching this differential a centerzero relay is switched over. For balancing gear multiplications or difference of the number of speed markers one can use DIP switches for setting a factor P. The relay can of course be set either self-locking or selfresetting. Resonance or fluttering is prevented by a speed hysteresis of 25 % and a reengagement delay of 0,2 s.

There are four settings for adjusting cut-off sensitivity.



Technical Data as ESC 100, but:

Speed range:	4...60 000 Imp./min
Speed differentials:	0,5%, 1,0%, 1,5%, 2,5% 4,0%, 6,25%, 10%, 14,3%
Speed hysteresis:	25% of preset differential
Order number:	3501.130.X01.BYYYYY
(Housing see page 5)	X = housing type, Y = Ub
Example for ordering:	3501.130.201.B220VW

# Speed Monitor ESC 2XX

## Housing for Control Panel Mounting (35mm rails)

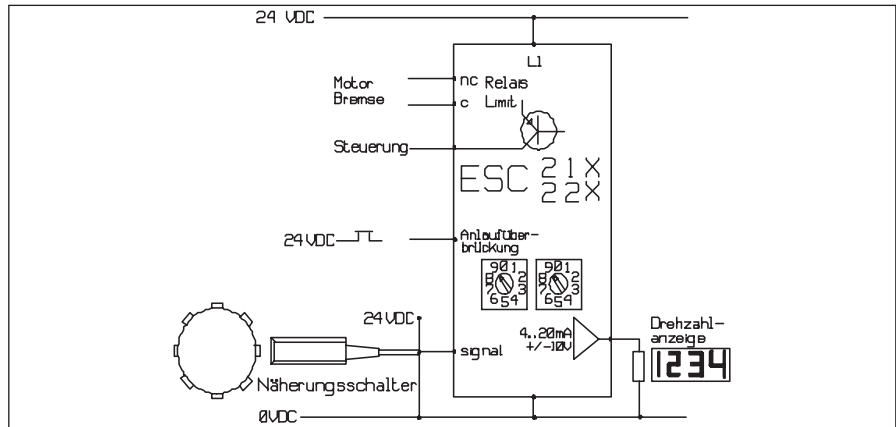
### ESC 21X, ESC 22X

The units ESC 21X and ESC 22X are used to monitor deviations in speed, with ESC 21X being designed for speed deficiency and ESC 22X for speed excess. With the aid of micro-processor technology and HEX/binary coding it is possible to select a precise speed limit within the range of 4...200 000 min<sup>-1</sup> without a test run. On reaching the preset limit the relay switches off and a 24 V switching transistor isolates.

The waiting time of the built-in bridging start can be extended as necessary via a second input.

An optional analogue output supplies a 12 Bit speed signal for display or controls with a selection of 8 speed ranges. The order should therefore indicate the following:

- Typ X=0: no analogue output
- Typ X=1: 4...20 mA
- Typ X=2: 0...20 mA
- Typ X=3: 0...10 V

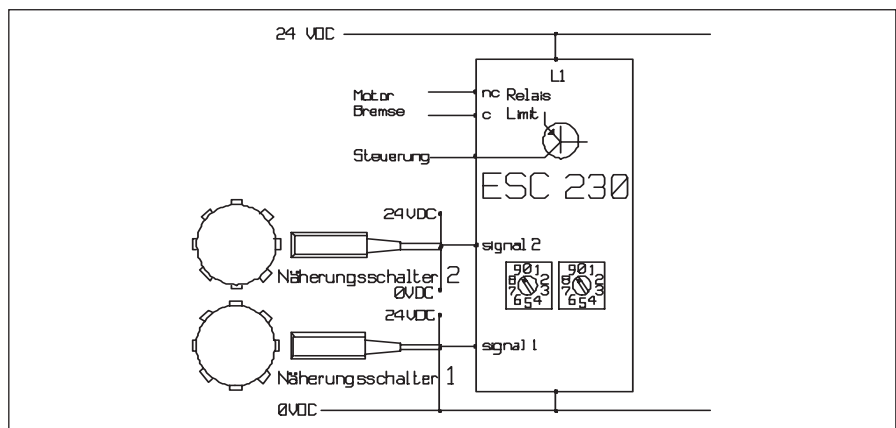


Supply voltage $U_b$ :	12 VG, 24 VG, +/- 20%, 80 mA
EMC-limits:	EN 50081-1, EN 50082-2
Ambient temperature:	0...+50° Celsius
Speed range:	0,1...300 000 Imp./min
Speed limit range:	4...200 000 Imp./min
Switching threshold PNP/NPN:	7,1 V / 7,7V +/-10%
Switching threshold NAMUR:	5,4 V, - 1,2 mA
Relay output:	250 V, 5 A, opener
Transistor output:	PNP, 24 V / 100 mA, opener
Bridging start time:	5 seconds
Load on analogue output:	Typ 1,2 Rmax < 600 Ohm
Full scale speed values for analogue output:	20, 100, 500, 2 000, 6 000, 20 000, 60 000, 200 000 min <sup>-1</sup>
Monitor for speed deficiency:	3501.21X.101.BYYYYY
Monitor for speed excess:	3501.22X.101.BYYYYY
	X= analogue output, Y = $U_b$

### ESC 230

The ESC 230 monitors the relative speed differential which can be selected from 8 possible percentage values. On reaching this differential a relay and a 24 V transistor are switched.

For balancing gear multiplications or differences in the number of speed markers one can use Hex switches for setting a factor P. The relay can of course be set either self-locking or self-resetting. Resonance or fluttering is prevented by a speed hysteresis of 25 % and a re-engagement delay of 0,2 s.



Technical Data as ESC 21X, but:	
Speed range:	4...60 000 Imp./min
Selectable speed differentials:	0,5%, 1,0%, 1,5%, 2,5%, 4,0%, 6,25%, 10%, 14,3%
Speed hysteresis:	25% of differential
Order number:	3501.230.101.BYYYYY with Y= $U_b$



# Speed Monitor ESC

## Housing Designs and Proximity Switches

### Housing for ESC 1XX

Type 0: Board only

Type 2: ABS, IP65 (EN 60529)

Type 3: Polycarbonat, IP65

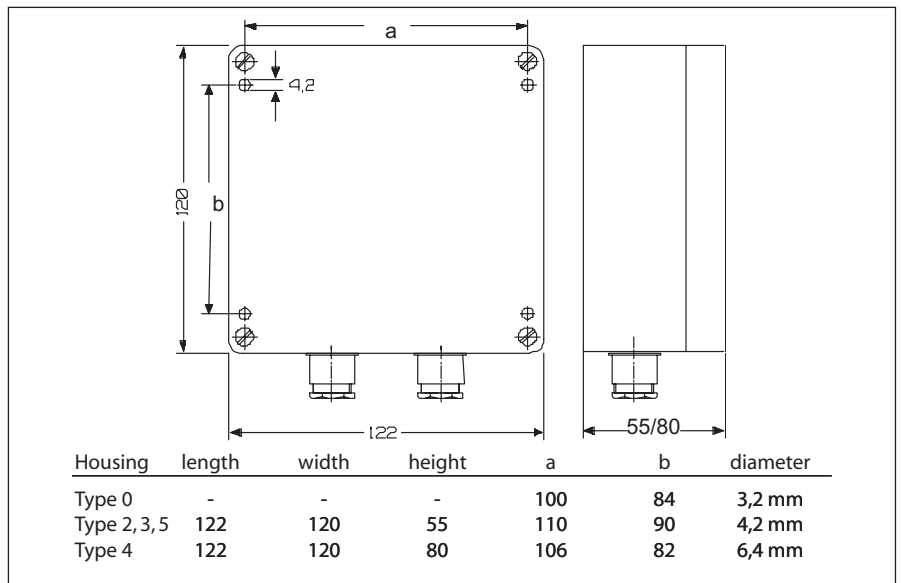
Type 4: Aluminium, IP65

Type 5: ABS with transparent cover

Each housing has two cable connections PG 11.

The internal terminal strip has 13 screw terminals for max. 2,5 mm<sup>2</sup>.

Weight ca. 300g



### Housing for ESC 2XX

Type 1: Makrolon 8020

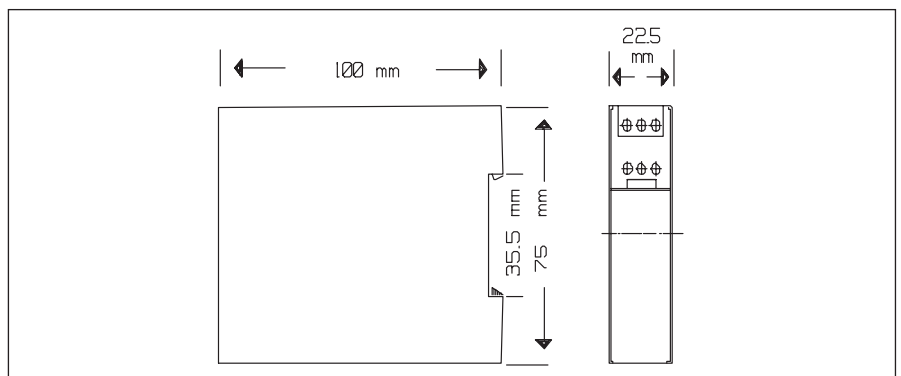
Protection type-housing: IP40

Protection type-terminals: IP20

Each housing has 12 terminals for max. 2,5 mm<sup>2</sup>.

The coding switch and LED are behind a safety glass front panel.

The weight is ca. 200g



### Proximity Switches

Existing proximity switches may be used which supply the switching thresholds.

The units ESC 1XX deliver 10 V DC supply voltage. If the intended proximity switches require higher operating voltages, an external voltage supply will have to be provided. The table on the right shows some of the proximity switches available from RINGSPANN which fulfil all the requirements. The order number 3505.zzz.001.A00002 should be supplemented by the order reference.

Function	M5x0,5	M8x1	M12x1	M18x1
Nominal switching prox.	0,8	1,5	2,0	5,0 (mm)
Maximum frequency	5000	5000	2000	500 (Hz)
Min. operating temp.	-25	-25	-25	-25 (°C)
Max. operating temp.	+75	+80	+80	+80 (°C)
Protection (EN 60529)	IP67	IP67	IP67	IP67
Cable length	2	2	2	2 (m)
Housing material	V4A	V4A	V4A	V4A
Transistor-type	PNP-no	PNP-no	PNP-no	PNP-no
Operating voltage	7...35	10...35	10...35	10...35 VDC
LED-display	ja	ja	ja	ja
Order reference: zzz	005	008	012	018

### Freewheels

#### Backstops

Automatic protection against reverse running of conveyor belts, elevators, pumps and fans.



Catalogue 88

#### Indexing Freewheels

For gradual feed of materials.



Catalogue 80

#### Overrunning Freewheels

Automatic engaging and disengaging of drives.



Catalogue 80

#### Housing Freewheels

Automatic engaging and disengaging for multi-motor drives for installations with continuous operation.



Catalogue 80.1

#### Freewheel Elements

Cage Freewheels, Sprag Sets and Freewheel Chains.



Catalogue 89

### Brakes

#### Industrial Disc Brakes

Spring Activated – Pneumatic Release.



Catalogue 46

#### Industrial Disc Brakes

Spring Activated – Hydraulic Release.



Catalogue 46

#### Industrial Disc Brakes

Pneumatically Activated.



Catalogue 46

#### Industrial Disc Brakes

Brake Calipers – Hydraulically Activated.



Catalogue 46

#### Fail-Safe Clamping Units

For secure and precise positioning of piston rods.



Catalogue 32

### Torque and Force Limiters

#### Torque Limiter with Screw Face

Reliable overload protection for tough operating conditions.



Catalogue 45

#### Torque Limiter with Rollers

With double or single Roller. Through ratcheting or disengaging, also for 360° synchronous running.



Catalogue 45

#### Torque Limiter with Spherical Rollers

Reliable overload protection with maximum response accuracy. Also backlash free.



Catalogue 45

#### Torque Limiter with Friction Linings

RIMOSTAT Torque Limiter for constant torque. Belleville Spring Torque Limiter for simple release.



Catalogue 45

#### Force Limiter

Reliable axial overload protection in piston rods.



Catalogue 49

### Couplings

#### Flexible Couplings

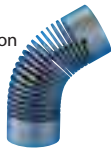
Large, safe radial and angular misalignments. Minimum resiliency.



Catalogue 44

#### HELICAL-Flexures Shaft Couplings

Special construction on specific application requirements.



Catalogue 43

#### HELICAL-Flexures with Integrated Connectors

Shaft coupling, space saving connectors integrated.



Catalogue 43

#### HELICAL-Flexures Spring Elements

Single Spring element with maximum resistance to wear.



Catalogue 43

#### Clamping Coupling

For the automatic coupling of rolls. Fast, safe and free from slipping connection.



### Shaft-Hub-Connection

#### Cone Clamping Elements

For shaft-hub connections. High torques with small dimensions.



Catalogue 31

#### Three-part Shrink Discs

External clamping connection for the fastening of hollow shafts on solid shafts



Catalogue 31

#### Two-part Shrink Discs

External clamping connection. Advantages: Simple, secure mounting even without torque wrench.



Catalogue 31.1

#### Star Discs

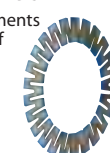
Ideal for shaft-hub-connection for frequent release.



Catalogue 30

#### Star Spring Washers

Axial spring elements for preloading of ball bearings.

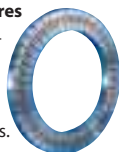


Catalogue 20

### Precision Clamping Fixtures

#### Standard Parts for Clamping Fixtures

The RINGSPANN-System for the manufacture of your own precision clamping fixtures.



Catalogue 14

#### Standard Clamping Fixtures

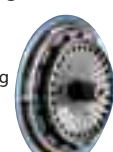
Standard program in high precision, ready manufactured Chucks and Mandrels.



Catalogue 13

#### Special Clamping Fixtures

Custom made solutions for specific clamping problems.



#### Glidebush Mandrels

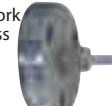
Universal, cost effective standard series. Fast tool change to other clamping diameters.



Catalogue 15

#### Hydraulic Expanding Clamping Tools

Mandrels and chucks with high concentricity. Clamping several work pieces in one process possible.



Catalogue 16