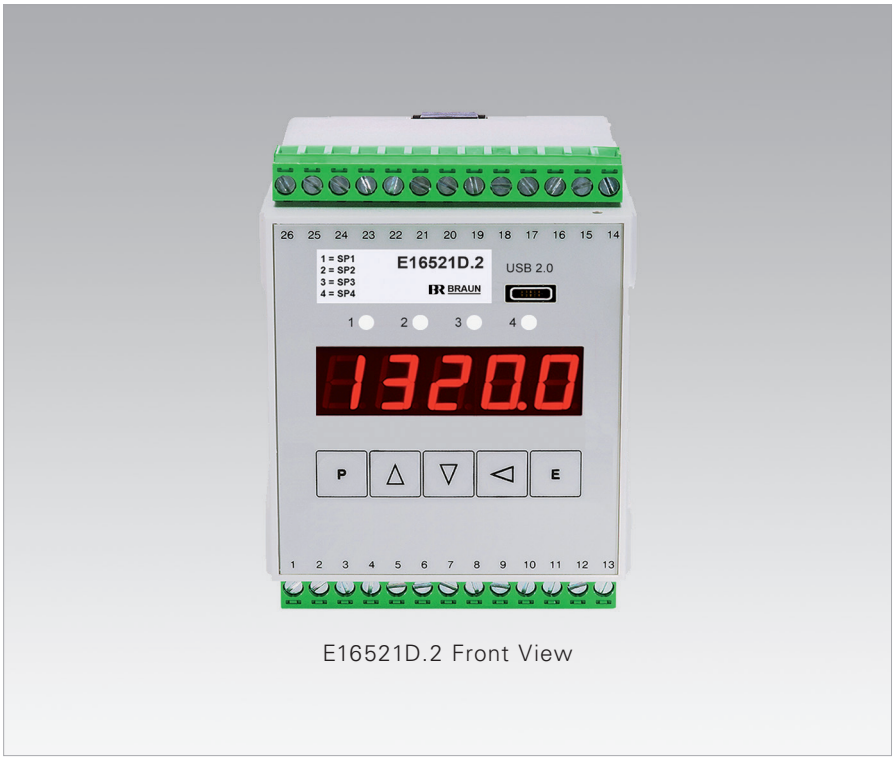
Single Channel Speed Monitor for Rotating Equipment with SIL2 requirements

E16521D.2



E16521D.2 Front View

KEY FEATURES

- SIL2 / IEC 61508:2010 compliant
- Single Channel Monitor with sensor monitoring and self-test function
- Frequency range 0 Hz…50 kHz
- 1 Analog Output 0/4…20 mA
- Bright red digital LED display
- 1 Safety Output as DPST relay
- 3 Alarm Outputs, one as SPST relay and two as PhotoMOS relays
- Input for Eddy-Current sensors (ECs)
- Square wave Pulse Output
- USB 2.0 Data Interface
- Two Monitors, suitably configured with their output contacts linked together, may provide a protection system with 1oo2 or 2oo2 redundancy
- Universal Power Supply range 20…265 Vuc

BENEFITS

- Fast, precise, and safe
- Maintenance-free during the lifetime, therefore minimized TCO
- Universal range of application, throughout mechanical and electrical engineering, in the chemical industry, in power plants, and at test stands
- Increased safety with 1oo2 architecture
- Maximum availability with 2oo2 architecture

SIL2 | SINGLE SIGNAL INPUT | ANALOG OUTPUT | SELF TEST

EAC

Fast, precise and safe – from zero motion to highest speed

The BRAUN Single Channel Speed Monitor E16521D.2 for increased safety requirements is SIL2 / IEC 61508:2010 compliant. It monitors motors, pumps, feeders, gears, rollers, and small turbines and provides protection against overspeed at any required value of rotational speed, including standstill.

The signal input is specially designed for Eddy-Current sensors (ECs).

With single-channel processing (1oo1), safety provision is solely determined by the device configuration. Therefore the use of sensor monitoring with integrated plausibility control is essential. In such a case, no redundancy is provided. Should a fault be detected, the entire system will be shut down immediately.

With two-channel systems, there is a choice of implementation, dependent upon requirements. In principle, the two monitors operate in parallel yet independently. Alarm indication can be realized through the linkage of their Alarm Outputs.

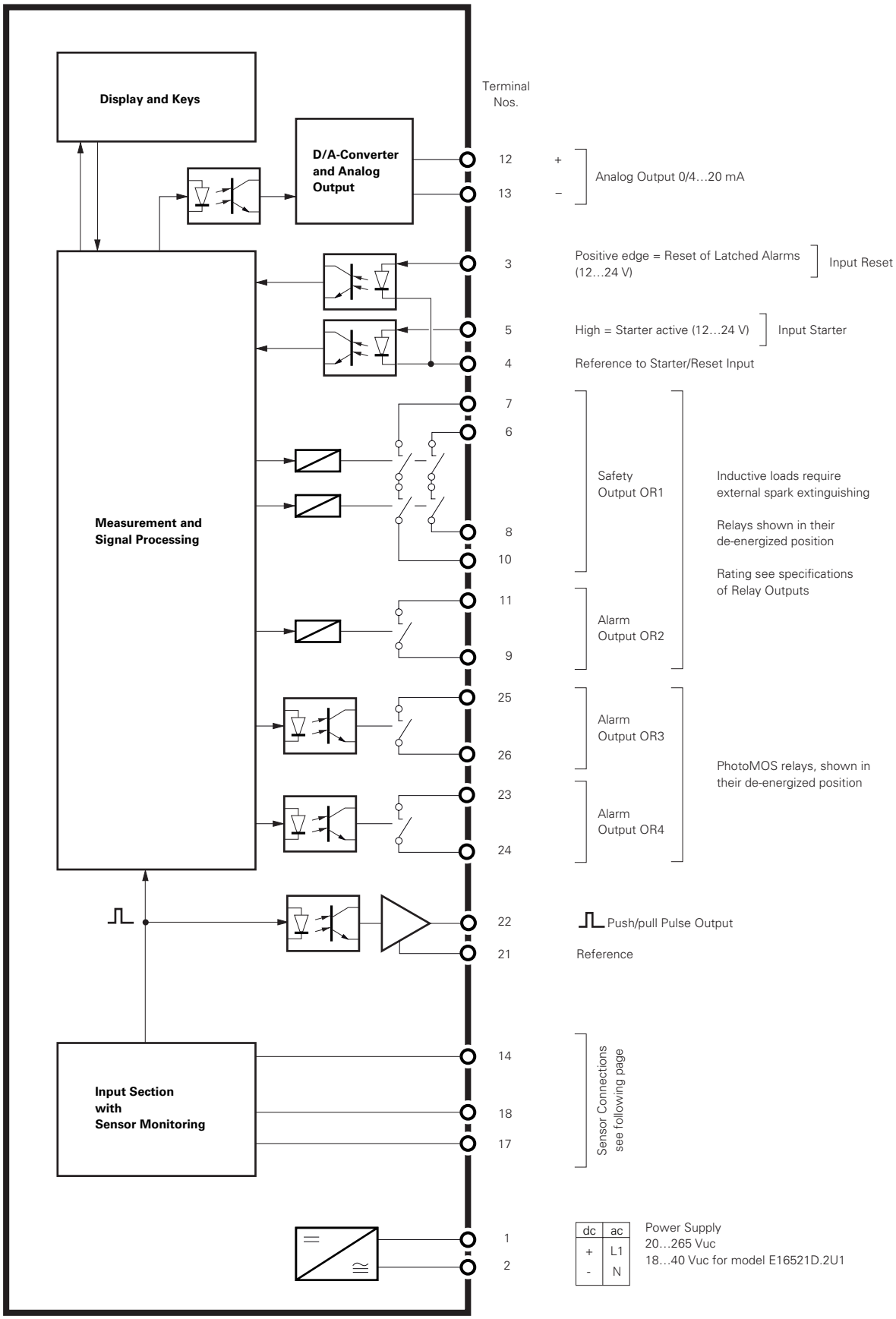
For 1oo2 processing, we have system redundancy with enhanced safety through comparative diagnosis. In the case of fault detection, the entire system will be shut down. With 2oo2 processing, we still have system redundancy but with enhanced availability. Only if both monitors fail, the whole system will be shut down.

The E16521D.2 Speed Monitor permanently monitors the speed sensor for its correct function. During its complete useful lifetime of 20 years, the monitor does not require any external proof tests and is completely maintenance-free.

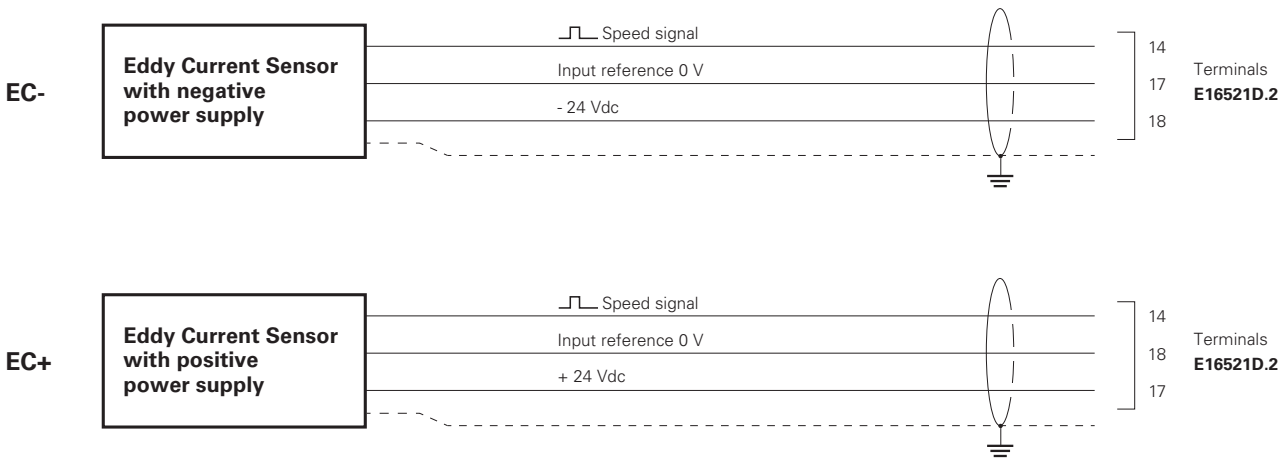
Specifications of E16521D.2

Conformity to Standards	**Directives**	**Standards**
	2014/30/EU (EMC Directive)	EN IEC 61000-6-4, EN IEC 61326-3-2
	2014/35/EU (Low Voltage Directive)	EN IEC 61010-1
	2011/65/EU (RoHS Directive)	EN IEC 63000
	SIL2 acc. EN IEC 61508:2010, EN ISO 13849:2008; PLc	
Measuring Principle	Frequency measurement, based on the input pulse distance, extended over a minimum period of time, programmable 5 milliseconds…9.999 seconds.	
Accuracy	±0.005% of value ±1 in last digit	
Response	1 input pulse interval + programmed minimum time + 5 milliseconds	
Analog Output	Isolated and protected against external short circuit. Current 0/4…20 mA with max. load of 500 ohms.	
Range	High and low end of span programmable	
Resolution	12 bit (1 : 4096)	
Linearity error	<0.1 %	
Drift by temperature	<0.02% within 0…+60 °C (+32…+140 °F)	
Relay Outputs	1 Safety Output: OR1 as DPST, 3 Alarm Outputs: OR2 as SPST, OR3 and OR4 as PhotoMOS (SPST).	
Setpoint adjustment	Individually programmable from zero speed up to any high speed	
Response characteristics	Hysteresis individually programmable in its position and width	
UL contact rating	Relay contacts OR1 and OR2:	30 Vdc, 2 A, 60 W resp. 250 Vac, 0.25 A, 62.5 VA, (inductive loads need external spark extinguishing device)
	PhotoMOS relays OR3 and OR4:	60 Vdc, 0.1 A, 3 W
Alarm state position	Individually programmable for excess, no power and input failure condition, starter period	
Starter function	Released by external control signal (12…24 V) to isolated input Extension programmable up to 999 sec.	
Display	5 digits with red LED figures, 10 mm high, with adjustable decimal point. Indicating the variable during operation, parameters during the programming phase	
Data Interface	USB 2.0 at USB-C front socket for programming	
Programming	Manually by front keys, alternatively via USB 2.0 (equipment required see optional accessories)	
Data protection	Parameters safe-guarded against power failure and code protected against unauthorized access	
Signal Input	Isolated circuit, responding to pulse signals	
Frequency range	0 Hz…50 kHz	
Signal level range	Maximum 30 V	
Trigger hysteresis	0.07 to 2.5 Vpp	
Input impedance	100 kohms	
Scaling factor	Programmable by 5 digits, considering any relation to the variable	
Suitable sensor types	All Eddy-Current sensors (EC)	
Sensor failure monitoring	Short-circuit or interrupt of supply, signal lead break sensors (with push/pull output only). A detected failure sets any of the alarms into a pre-programmable state.	
Sensor supply	Approx. 24 V / max. 40 mA, for model E16521D.2U1 approx. 24 V / max. 120 mA	
Pulse Output	Repeating the input signal, isolated and push/pull with approx. 20 V level	
Power Supply	Universal supply range 20…265 Vuc, for model E16521D.2U1: 18…40 Vuc. Power consumption approx. 5 W, resp. 5 VA. Insulation category Class 1	
Connectors (Wiring)	Screw mounting, 2 plug-in terminal blocks, accepting 0.2…2.5 mm^2 cross section	
Environmental Conditions	Ambient temperature in operation: 0…+60 °C (+32…+140 °F) Ambient temperature in storage: -40…+85 °C (-40…+185 °F) Relative humidity max. 95%, non-condensing	
Design	Snap-on-track plastic enclosure for 35 mm rail, field mounting enclosure (Option -G) on request	
Dimensions	See drawing dimensions	
Protection Grade	IP 40 for enclosure, IP 20 for terminals (also available in field mounting version, with transparent cover IP 65/NEMA 4)	
Weight	approx. 0.3 kg, resp. 1.0 kg for version -G	
Optional Accessories	**IS-RS232-E16:** Data Stick with Interface Software to program parameters **L3D07:** Plug-in adapter cable, with USB-C plug (male) to device and USB-A plug (male) to PC **L3D08:** Plug-in adapter cable, with double-sided USB-C plug (male)	

Function Diagram and Connections of E16521D.2

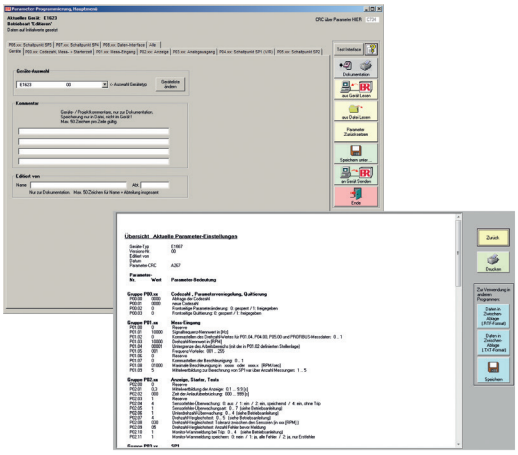


Connection of Eddy-Current sensor (EC) to E16521D.2



Optional Accessories

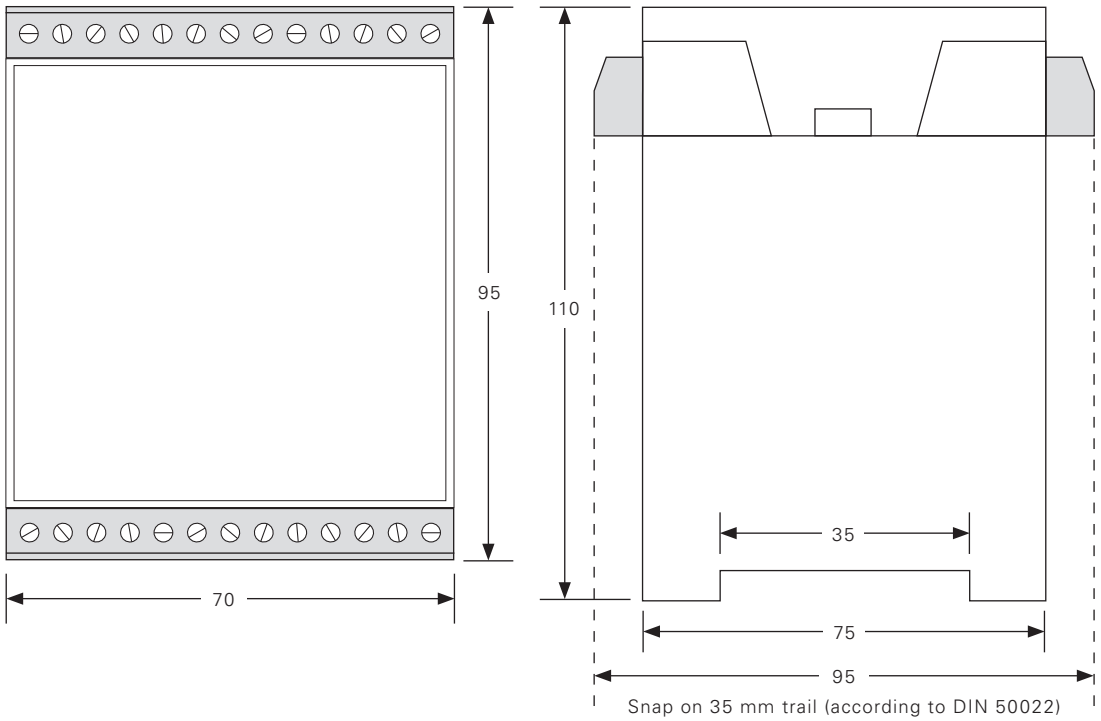
View of E16521D.2 Speed Monitor including field mounting enclosure with transparent cover.



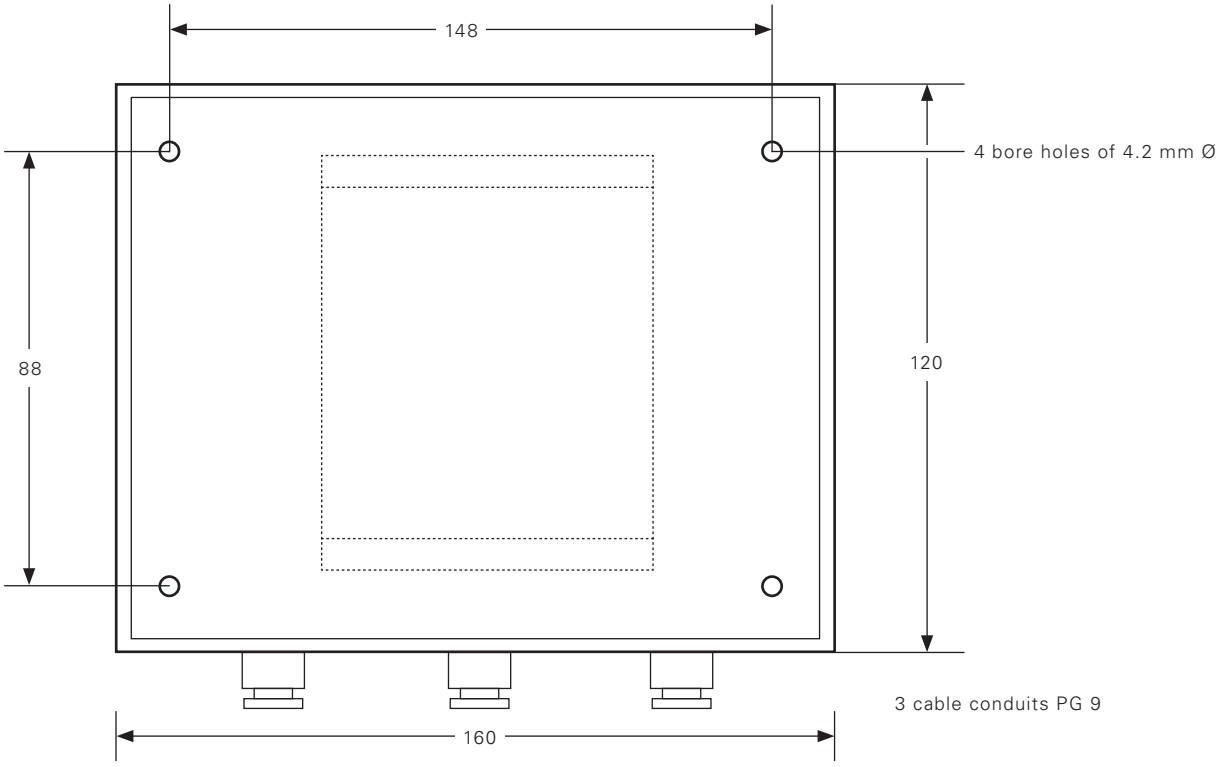
View of E16 Configuration Software, compatible up to Windows 10.

Dimensions (in mm)

Dimensions of Rail Mounting Enclosure (standard)



Dimensions of Field Mounting Enclosure (Option -G)



Ordering Key E16521D.2

E16	5	2	1	D	.	2	-G

Enclosure
suffix -G = field mounting enclosure with transparent cover
(omit if not required)

Examples:
E16521D.2 : Standard version for Eddy-Current sensors (ECs)

E16521D.2U1 : Special version with power supply 18...40 Vuc

E16521D.2-G : Version with field mounting enclosure with transparent cover

BRAUN – Speed Monitoring and Protection Systems for Rotating Equipment

BRAUN Industrial Electronics develops, produces, and sells an array of "Rotating Equipment" protection systems for use in industrial applications worldwide, focusing on overspeed protection. These systems comply with the highest standards of safety and availability.

As a globally leading technology provider with over 60 years of experience, BRAUN has been continually meeting and mastering the challenges associated with protecting the facilities of companies within the power generation, oil, gas, and chemical industries. Our protection systems are installed in more than 100 countries worldwide, and our customers use them in safety-critical applications with rotating parts.

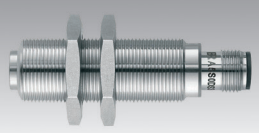
For our OEM customers, BRAUN is both a solution-oriented systems provider and a reliable partner.

Our solutions comprise a variety of products for the detection and monitoring of speed and related parameters.

Always matching the requirement. Always the perfect solution for safety and availability.

Protection Systems Triple Channel

Protection Systems Single Channel



Speed Sensors

Tachometers

BRAUN
Protecting Your Rotating Equipment

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