

# Single Channel Speed Monitor for Rotating Equipment with SIL1 requirements

## Series D521.xx



D521 System Front View

### KEY FEATURES

- SIL1 / IEC 61508:2010 compliant
- Single Channel Monitor with sensor monitoring and self-test function
- Frequency range 0 Hz...50 kHz
- 1 Analog Output (option)
- Bright red digital LED display
- 2 Alarm Outputs as SPDT relays (option)
- 2 Alarm Outputs as PhotoMOS relays (option)
- Universal Input, also for magnet-inductive sensors (MPUs)
- Square wave Pulse Output
- RS232 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

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

The BRAUN Single Channel Speed Monitor Series D521 for increased safety requirements 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 universally designed. It fits for BRAUN A5S... sensors, as well as NAMUR type sensors, tacho generators or magnet-inductive sensors (MPUs).

With single channel processing (1oo1) security 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 security 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 entire system will be shut down.

The D521 Speed Monitor permanently monitors the speed sensors for their correct function. During its complete lifetime cycle, the monitor does not require any external proof tests and is completely maintenance-free.

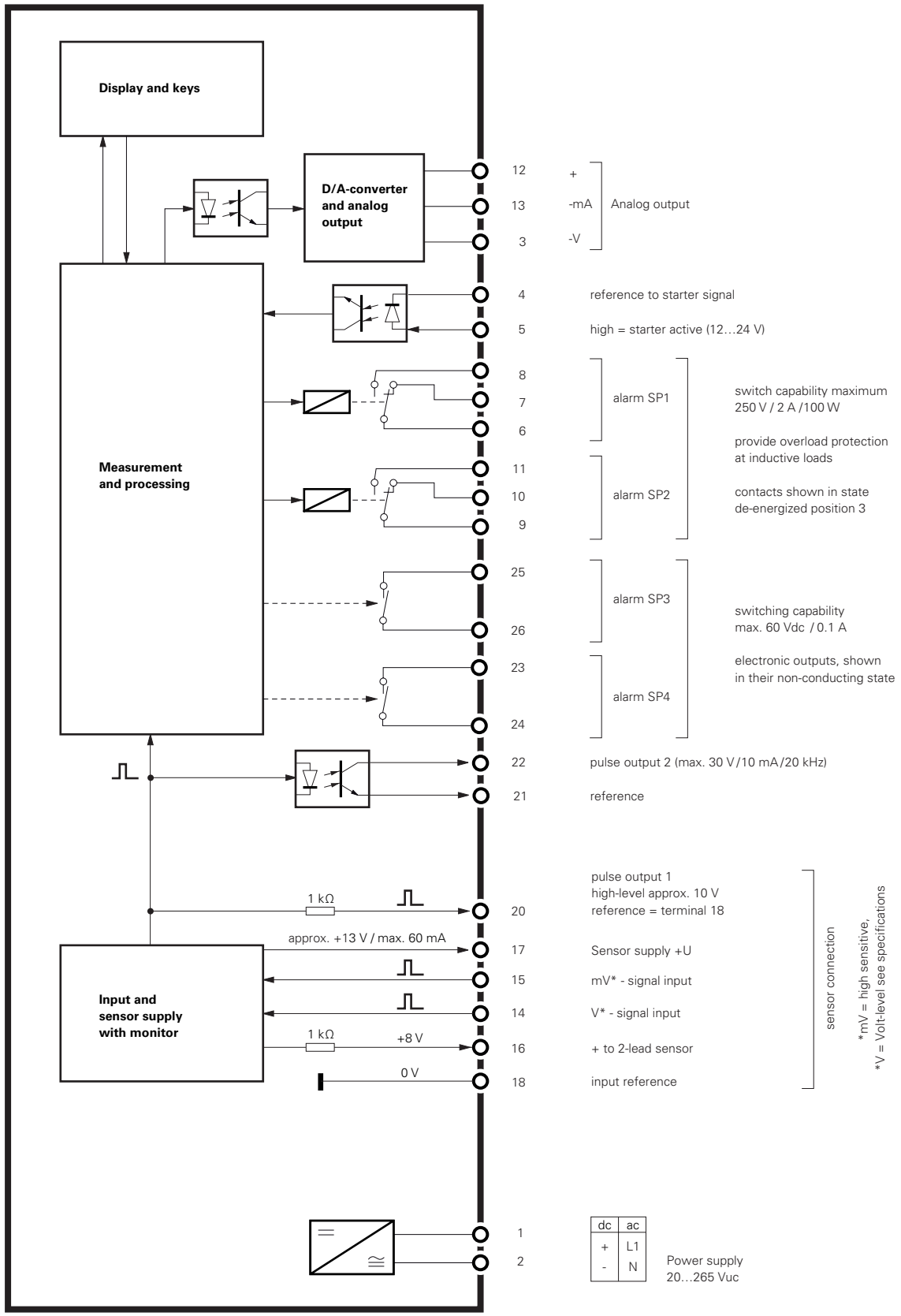
### BENEFITS

- Fast, precise and safe
- Maintenance-free during 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

## Specifications of D521.xx

<b>Conformity to Standards</b>	<b>Directives</b> 2014/30/EU (EMC Directive) 2014/35/EU (Low Voltage Directive) 2011/65/EU (RoHS Directive) SIL1 acc. IEC 61508:2010, EN ISO 13849:2008; PLc	<b>Standards</b> EN 61000-6-4, EN 61326-3-2 EN 61010-1 EN 50581
<b>Measuring Principle</b>	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	
<b>Analog Output (option)</b>	Isolated and protected against external short circuit. Current 0/4...20 mA with max. load of 500 ohms, convertible to voltage 0/2...10 V with max. load 10 mA.	
Range	High and low end of span programmable	
Resolution	12 bit (1 : 4096)	
Drift by temperature	<0.01% within 0...40 °C (32...104 °F)	
Long term stability	<0.25% during 5000 hours of operation	
<b>Relay Outputs</b>	Two, both with SPDT contacts, also, as option, further two with PhotoMOS contacts.	
Setpoints adjustment	Individually programmable from zero speed up to any high speed	
Response characteristics	Hysteresis individually programmable in its position and width	
Handling capacity	Relay contacts 250 V, 2 A, 100 W AC, PhotoMOS contacts 60 V, 0.1 A DC	
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.	
<b>Display</b>	5 digits with red LED figures, 10 mm high Indicating the variable during operation, parameters during the programming phase	
<b>Data Interface</b>	RS232 at USB Mini B front socket (Baud rate programmable, up to 38400 baud)	
Data output	Measurements and signals state, upon request	
Data input	Programming the parameters (equipment required see below)	
<b>Programming</b>	Manually by front keys, alternatively via RS232 (equipment required see optional accessories)	
Data protection	Parameters safe-guarded against power failure and code protected against unauthorized access	
<b>Signal Input</b>	Isolated circuit, responding to pulse signals of any waveform and to AC-signals	
Frequency range	0 Hz...50 kHz	
Signal level range	Response level with step selection. Minimum signal 50 mV RMS, maximum 100 V	
Input impedance	100 kohms	
Scaling factor	Programmable by 5 digits, considering any relation to the variable	
Suitable sensor types	All BRAUN sensors or equivalent, NAMUR type sensors, tacho generators, incremental encoders, MPUs	
Sensor failure monitoring	Short-circuit or interrupt of supply (NAMUR types also), signal lead break sensors (with push-pull output only). A detected failure sets any of the alarms into a pre-programmable state.	
Sensor supply	13 V / max. 60 mA. Extra output 8 V via 1 kohm load resistor to passive 2 leads sensor types	
<b>Input Signal Repeater</b>	Direct output: level 10 V, 1 k source impedance, isolated opto-coupler (to max. 30 V, 10 mA)	
<b>Power Supply</b>	Universal supply range 20...265 Vuc. Power consumption approx. 8 W Insulation category Class 1	
<b>Connectors (Wiring)</b>	Screw mounting, 2 plug-in terminal blocks, accepting 0.2...2.5 mm <sup>2</sup> cross section	
<b>Environmental Conditions</b>	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	
<b>Design</b>	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	
<b>Optional Accessories</b>	<b>IS-RS232-S:</b> CD-ROM with Interface Software to program parameters <b>L3D01:</b> Plug-in adapter cable, with 9-pole Sub-D (female) plug to PC	

# Function diagram and connections of D521.xx



⏏ = internal zero isolated from supply

dc	ac
+	L1
-	N

Power supply  
20...265 V<sub>ac</sub>

## Ordering Key D521.xx

D521. a b c

### Analog Output

a = 0 : without Analog Output  
a = 1 : 1 Analog Output

### Alarm Outputs

b = 0 : no output contacts  
b = 2 : 2 with SPDT contacts  
b = 4 : 2 with SPDT contacts + 2 with PhotoMOS contacts

### Enclosure

c = suffix „-G“ : field mounting enclosure with transparent cover  
(omit if not required)

### Examples:

D521.02 : without Analog Output, 2 Alarms with SPDT contacts  
D521.04 : without Analog Output, 2 Alarms with SPDT contacts + 2 with PhotoMOS contacts  
D521.10 : with 1 Analog Output, no output contacts  
D521.12 : with 1 Analog Output, 2 Alarms with SPDT contacts  
D521.14 : with 1 Analog Output, 2 Alarms with SPDT contacts + 2 with PhotoMOS contacts  
D521.12-G : with 1 Analog Output, 2 Alarms with SPDT contacts, 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 with the focus on overspeed protection. These systems comply with the highest standards of safety and availability.

As a globally leading technology provider with over 50 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 around the world and are mainly used in safety-critical applications with rotating parts.

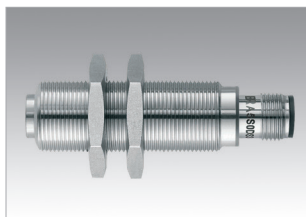
For our OEM customers, BRAUN is both a solution oriented systems provider and a reliable partner.

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



SPEED SENSORS



TACHOMETERS



PORTABLE TACHOMETERS

