

D521 Speed Monitors

Increased safety according to IEC 61508 SIL 2
2 or 4 setpoint alarms, analog output,
RS232 Data interface



Application Characteristics

Single channel monitoring the speed of any type of drive: motor, turbines, feeders, gears, and rollers, with increased safety requirements, at any speed.

Specific Features

- Up to 4 setpoint alarms, 2 as standard with SPDT relay contact outputs, 2 more on option, with electronic switch outputs. Each individually programmable for its speed setpoint, its hysteresis performance, its state at starter condition, power failure, and at a sensor input failure.
- Measurement uses the advantageous principle of quartz controlled pulse distance evaluation, automatically extended over a programmable minimum period of time. The ideal combination of fast response and averaging of measurements, as appropriate for the application.
- RS 232 data interface as standard, to transmit measurements, alarm status and failures. Optional addition to configure all parameters, supplementing the manual front keys, by an external data source and also logging their settings.
- Optional analog output 20 ma / 10 v, programmable for its span and live zero.
- 5-digit display by bright red figures.

- Input 0 ... 300 kHz with adjustable level of response.
- Programmable input frequency divider balances signals as from irregular profiles. Important advantage in gaining steady measurements.
- Pulse output to other devices. Repeats the input signal as square wave. With input sequence or subsequent to the input frequency divider.

Safety aspects

- Rapid response to a speed variation, by the specific measuring principle.
- Monitoring sensor supply and sensor signal (if applicable). A failure throws setpoints and analog output into a state, as predetermined by programming.
- Facility to establish a plausibility range comprising the entire function. Releasing the failure signal indispensable for safe monitoring. Utilizing one (or two) of the alarm outputs: programmed to a response setpoint out of the operating speed range used by the monitored device, and its alarm condition assigned to an input or power failure. Skipped by the starter circuit until the machine has gained its operational speed.
- Two units D521 may be arranged as a double redundant system, connecting their alarm outputs as appropriate to the required mode of alarm.

Speed Measurement

Based on the frequency of the sensor signal. Using the principle of pulse distance, extended over a minimum period of time, programmable 5 milliseconds ... 99 seconds. Accuracy $\pm 0.05\%$ of value ± 1 in last digit. Response 1 input pulse interval + programmed minimum time + 5 milliseconds.

Setpoint Alarms

2 alarms as standard both with SPDT contacts. 2 additional alarms optional with solid state electronic switch. Setpoints level individually programmable from zero speed up to any high speed. Each individually programmable in its hysteresis position and bandwidth. Alarm state individually programmable for excess, no power, starter period and input failure condition. Starter period initiated by external 24 v control signal to isolated input. Extension programmable up to 999 sec. Power handling of relay contacts 250 v, 2 amps, 100 w AC, of electronic switches 60 v, 0.1 amp DC. External overload protection required.

Analog output (option)

Isolated and protected against external short circuit. Current 0/4 ... 20ma with max. load of 500 ohms, convertible to voltage 0/2 ... 10 v with max. load 10 ma. High and low end of span programmable. Resolution 12 bit (1 : 4096). Temperature drift $< 0.01\%$ within 0 ... 40 °C (32 ... 104 °F). Long term stability $< 0.25\%$ during 5000 hours of operation.

Signal input to sensors

Isolated circuit, responding to pulse signals of any wave form, and to AC-signals. Range 0 ... 300 kHz. Response level programmable by steps. Minimum signal 50 millivolts _{RMS}, maximum 100 volts. Impedance 100 k. Scaling factor programmable by 5 digits, to consider any relationship between signal frequency and the variable.

Applicable sensors: all BRAUN sensors, or equivalent, NAMUR type sensors, tachogenerators, encoders. Sensor supply: 12 volts / max. 60 ma. Extra output 8 volts via 1 k load resistor to passive 2 leads sensor types.

Input frequency divider

Balances signals as from irregular profiles, if set to the repetition of the irregularity (= reduction of the sequence to one per period). Factor programmable 001... 256.

Input monitoring

Short-circuit or interrupt of supply (NAMUR types also), signal lead break (requires push-pull sensor output). A detected failure sets any of the alarms to a pre-programmable state.

Input signal repeating output

Direct output: level 10 volts, 1 k source impedance. Output subsequent to frequency divider: isolated opto-coupler (to max 30 volts, 10 ma).

RS232 Data interface

Baud rate programmable, up to 19200 Baud. Output of measurements and signals state, subsequent to request. Input for programming the parameters (equipment required see ordering information).

Display

5 digits with red LED figures, 8 mm high. Indicating the variable during operation, parameters while programming.

Programming

Structurized as groups for fast and easy access, manually by front keys, alternatively via RS 232. Parameters are safe-guarded against power failure, and code protected against unauthorized access.

Power supply

Comprehensive supply range 20 volts ... 265 volts AC/DC. Power consumption approx. 7 watts. Insulation Category class 1.

Design

Snap-on-track enclosure for 35 mm rail. Length 70 mm, width (including terminals) 103 mm, height 110 mm. Weight approx. 0.3 kg. Protection grade IP 20. Available in field mounting enclosure as well. Grade IP 65 / NEMA 4, with transparent cover. Suffix -G to ordering No.

Wiring

2 plug-in terminal blocks, accepting 0.2 ... 2.5 mm² cross section. RS 232 at USB Mini B front socket.

Operating conditions

Ambient temperature - 20 °C ... +60 °C (-5 ... + 140 °F), Humidity max. 75 %, without dew.

Compatibility to Standards

EMI according to EN 610000-6-2, EN 610000-6-4. Safety according to EN 61010-1

Ordering Informations

D521. **-G** suffix to identify field mounting enclosure

analog output
0 = none
1 = one output

setpoint alarms
2 = 2 with SPDT contacts
4 = 2 with SPDT contacts
+ 2 with electronic switch

Data interface Accessories

L3D01 for plug-in adapter cable, with 9-pole Sub-D (female) plug to PC
D521-IS-RS232 for CD-ROM with software to program parameters

