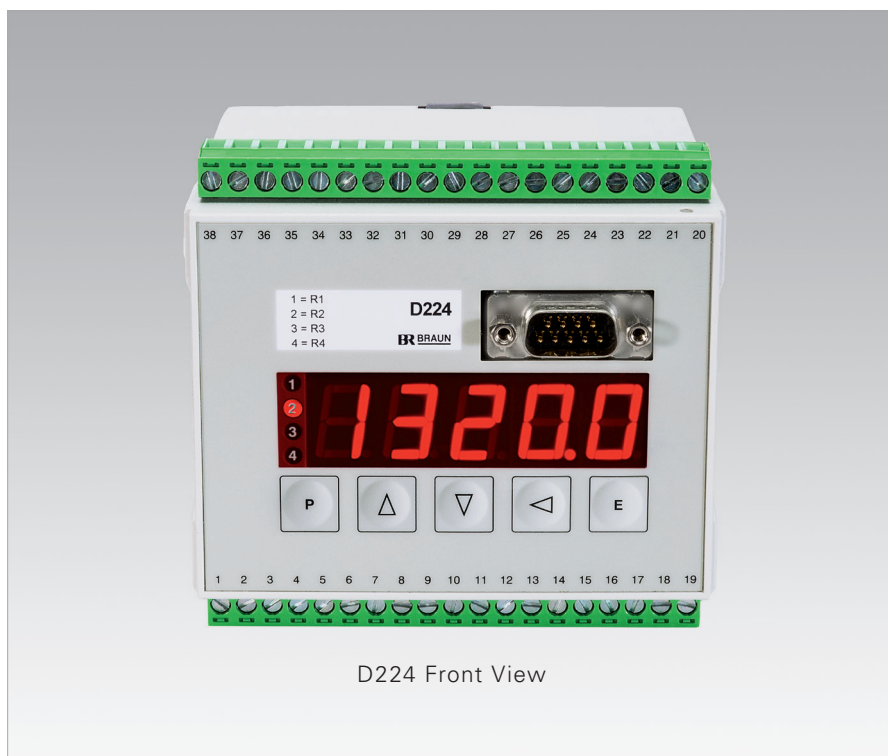# Dual Channel Monitor for Measurement of Speed and Ratio with SIL1 requirements Series D224.xx

D224 Front View

KEY FEATURES

- SIL1 / IEC 61508:2010 compliant
- Dual Channel Speed and Ratio 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
- 4 Alarm Outputs via relay contacts
- 2 Signal Inputs for connection with two A5S series sensors or
- 2 Universal Signal Inputs, also for Magnetic Pick-Up sensors (MPUs)
- RS232 Data Interface for version D224.11
- PROFIBUS Data Interface for version D224.12
- Universal Power Supply range 20…265 Vuc

BENEFITS

- Fast, precise and safe
- Maintenance-free during Lifetime, therefore minimized TCO
- Rapid and accurate response through period measurement

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

The BRAUN Dual Channel Speed and Ratio Monitor Series D224.xx for increased safety requirements is SIL1 / IEC 61508:2010 compliant. It receives receives input signals from speed sensors or flow rate transmitters. Two signal inputs are specially designed for our proven Differential-Hall-Effect based A5S sensors. The other two signal inputs are universally designed to accept any type of sensor signal.
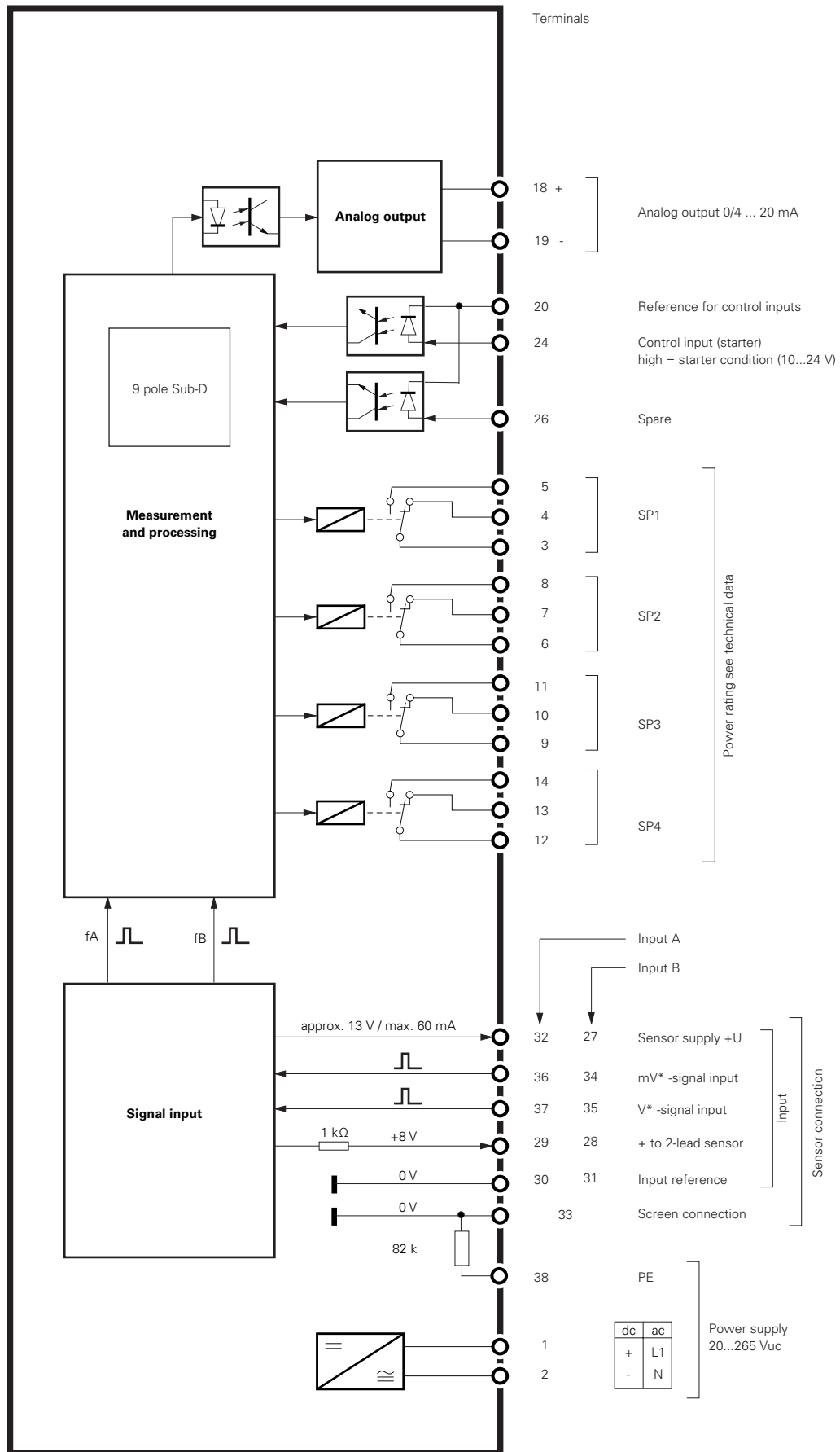
The monitor simultaneously measures one or two speed values (or other quantities transmitted as frequency) and computing their ratio or difference or sum, to read and monitor stretch / shrinkage or blend ratio, for instance.

Display, setpoints, and analog output may be adjusted to any speed. During its lifetime cycle, the monitor is completely maintenance-free. During its complete useful lifetime of 20 years, the monitor does not require any external proof tests and is completely maintenance-free.
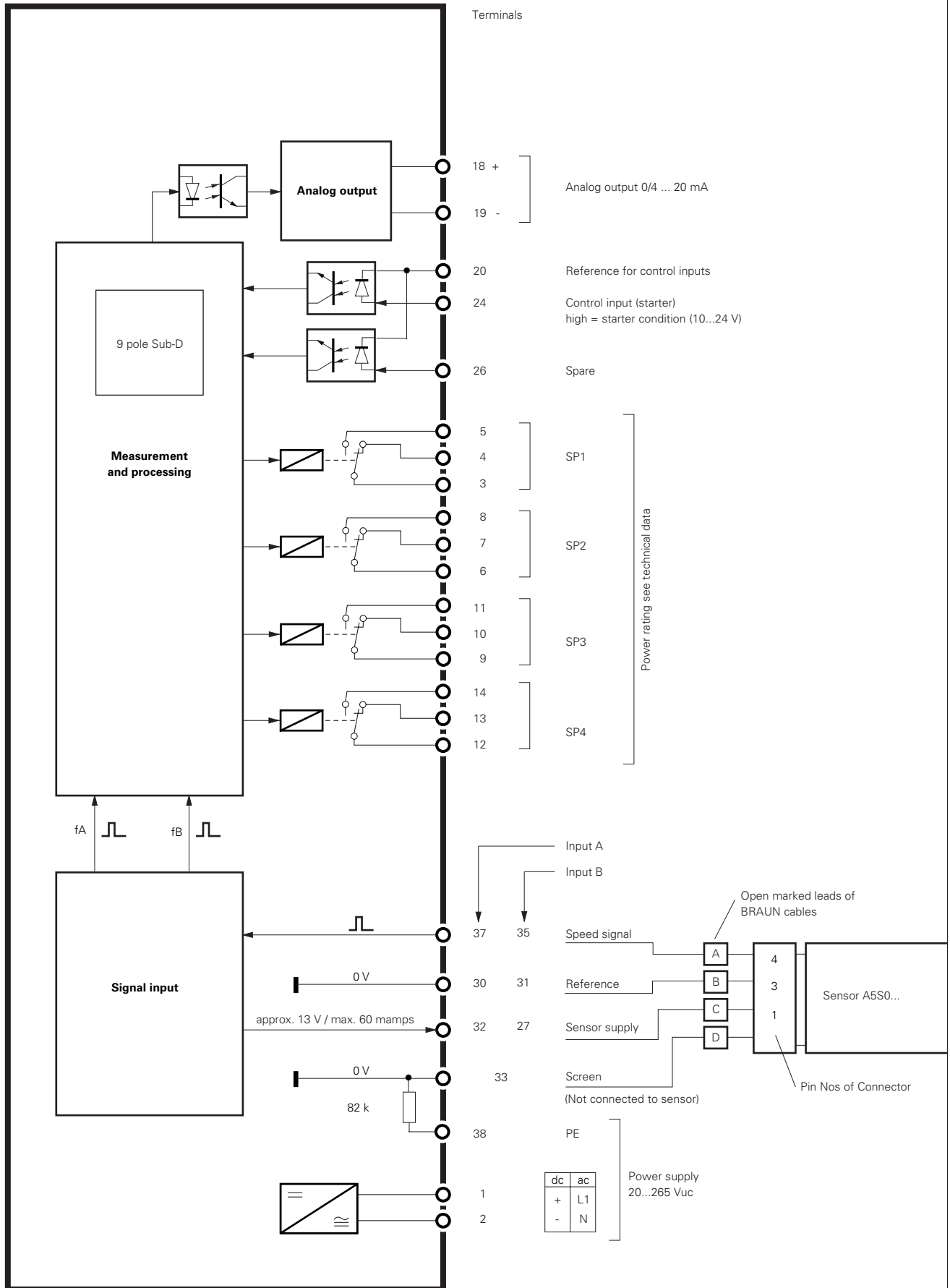
Specifications of D224.xx

Conformity to Standards	**Directives**		**Standards**
	2014/30/EU	(EMC Directive)	EN 61000-6-4, EN 61326-3-2
	2014/35/EU	(Low Voltage Directive)	EN 61010-1
	2011/65/EU	(RoHS Directive)	EN 50581
	SIL1 acc. 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)
Drift by temperature	<0.01% within 0…40 °C (32…104 °F)
Long term stability	<0.25% during 5000 hours of operation

Setpoint Alarms	Four individual setpoints, each with SPDT contacts, control an own relay output.
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
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, 15 mm high
	Indicating the variable during operation, parameters during the programming phase

Data Interface	RS232 at front socket (Baud rate programmable, up to 38400 baud) for version D224.11 PROFIBUS at front socket (Baud rate automatic) for version D224.12
Data output	Measurements and signals state, upon request
Data input	Programming the parameters (equipment required see below)

Programming	Manually by front keys, alternatively via RS232 (equipment required see below)
Data protection	Parameters safe-guarded against power failure and code protected against unauthorized access

Signal Input	Isolated circuit, responding to pulse signals of any waveform and to AC-signals
Frequency range	0 Hz…50 kHz
Signal level range	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, tachogenerators, 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	2x 13 V / max. 60 mA. Extra output 8 V via 1 kohm load resistor to passive 2 leads sensor types

Power Supply	D224.xxU3: Universal supply range 20…265 Vuc. Power consumption approx. 8 W
	Insulation category Class 1

Connectors (Wiring)	Screw mounting, 2 plug-in terminal blocks, accepting 0.2…2.5 mm² cross section

Operating Conditions	Ambient temperature: 0…50 °C (32…122 °F)
	Relative humidity max. 95%, non-condensing

Design	Snap-on-track enclosure for 35 mm rail, field mounting enclosure (Option -G) on request
Dimensions	Length 100 mm, width (including terminal blocks) 104 mm, height 110 mm
Protection Grade	IP 40 for enclosure (also available in field mounting version, with transparent cover IP 65/NEMA 4) IP 20 for terminals
Weight	approx. 0.4 kg

Optional Accessories	**IS-RS232-S:** CD-ROM with Interface Software to program parameters
	L3D03: Plug-in adapter cable, with 9-pole Sub-D (female) plug to PC

Function Diagram and Connections

Terminals

Analog output

Terminal		Description
18	+	Analog output 0/4 ... 20 mA
19	-	

9 pole Sub-D

20	Reference for control inputs
24	Control input (starter) high = starter condition (10...24 V)
26	Spare

Measurement and processing

5	
4	SP1
3	
8	
7	SP2
6	
11	
10	SP3
9	
14	
13	SP4
12	

Power rating see technical data

fA fB

Input A

Input B

Signal input

approx. 13 V / max. 60 mA

32	27	Sensor supply +U
36	34	mV* -signal input
37	35	V* -signal input
29 (1 kΩ +8 V)	28	+ to 2-lead sensor
30 (0 V)	31	Input reference
	33 (0 V)	Screen connection

Input / Sensor connection

82 k

38	PE

dc	ac	Power supply 20...265 Vuc
+	L1	
-	N	

1	
2	

Function Diagram and Connections for A5S0... Sensors

Terminals

Analog output

Terminal		Description
18	+	Analog output 0/4 ... 20 mA
19	−	

20	Reference for control inputs
24	Control input (starter) high = starter condition (10...24 V)
26	Spare

9 pole Sub-D

Measurement and processing

Terminal	Set point	Power rating
5	SP1	Power rating see technical data
4		
3		
8	SP2	
7		
6		
11	SP3	
10		
9		
14	SP4	
13		
12		

fA   fB

Signal input

Input A
Input B

Terminal		Description
37	35	Speed signal
30	31	0 V Reference
32	27	approx. 13 V / max. 60 mamps Sensor supply
33		0 V Screen (Not connected to sensor)
38		82 k PE
1		
2		

Open marked leads of BRAUN cables

Lead	Pin	
A	4	
B	3	Sensor A5S0...
C	1	
D		

Pin Nos of Connector

dc	ac
+	L1
−	N

Power supply 20...265 Vuc

Dimensions (in mm)

Dimensions of Rail Mounting Enclosure (standard)

104

110

100

35

75

104

Snap on 35 mm trail (according to DIN 50022)
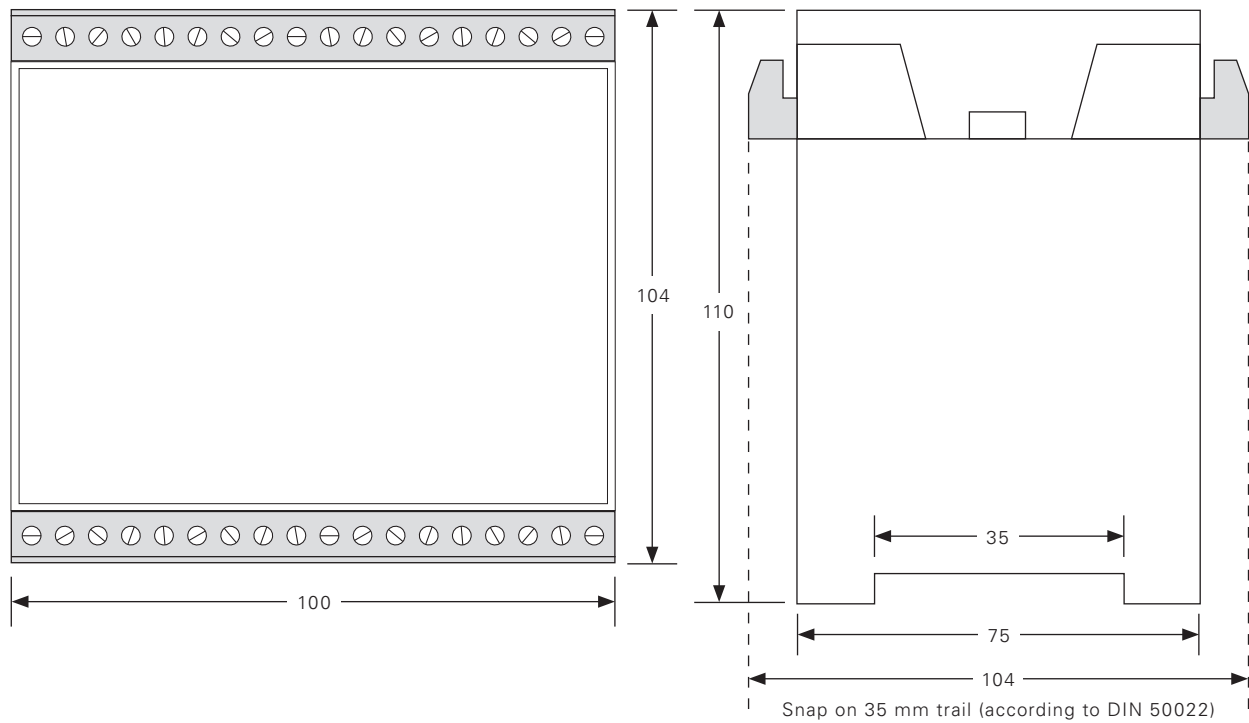
Dimensions of Field Mounting Enclosure (Option -G)

148

4 bore holes of 4.2 mm Ø

88

120

160

3 cable conduits PG 9
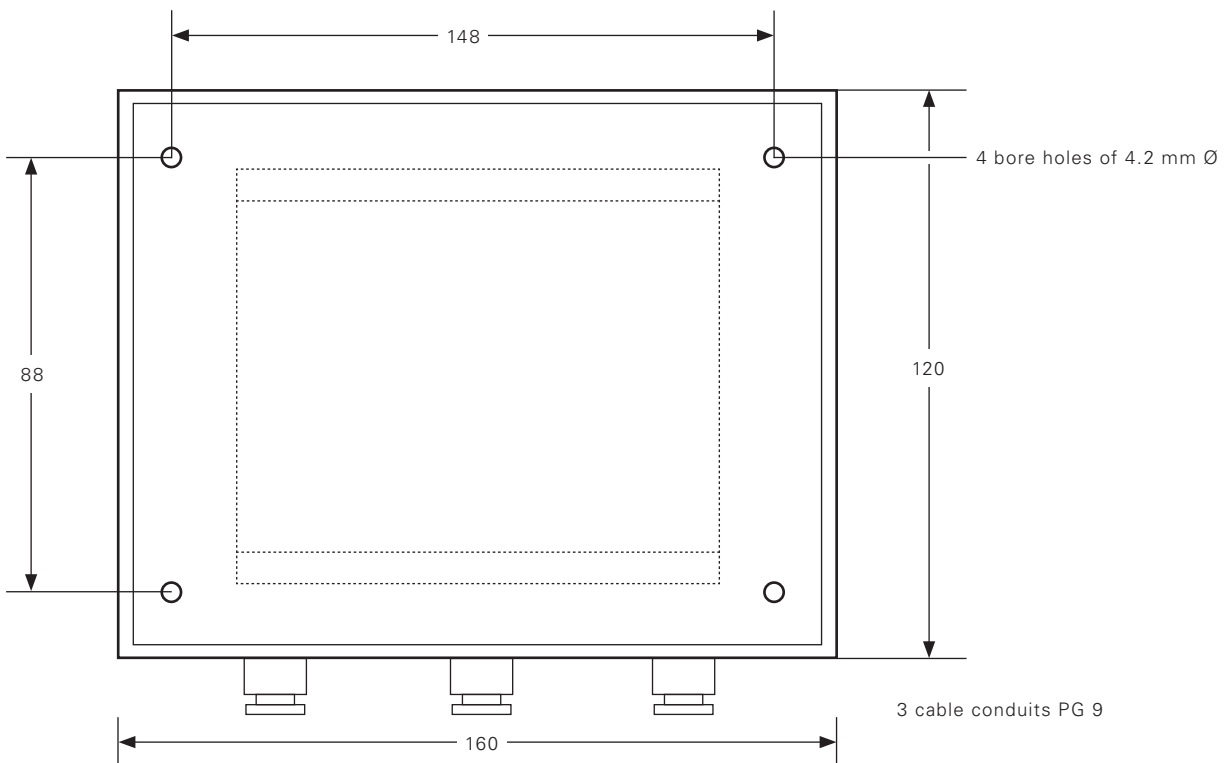
Ordering Key D224.xx

D224. 1 a U3 b

Data Interface
a = 1 : RS232
a = 2 : PROFIBUS

Supply Voltage
U3 : 20…265 Vuc

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

Examples:

D224.11U3   : RS232 Data Interface, 20…265 Vuc

D224.12U3   : PROFIBUS Data Interface, 20…265 Vuc

D224.11U3-G : RS232 Data Interface, 20…265 Vuc,
field mounting enclosure with transparent cover

D224.12U3-G : PROFIBUS Data Interface, 20…265 Vuc,
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.
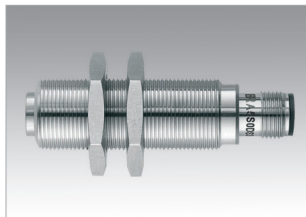
For our OEM customers, BRAUN is both a solution oriented systems provider and a reliable partner.

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**

BR BRAUN
Speed and Frequency