JAQUET
PRODUCT INFO

JAQUET
TECHNOLOGY GROUP

Speed sensors

DSD...W

Hall Effect Sensors, dual sensing system

(Differential Ferrostat)

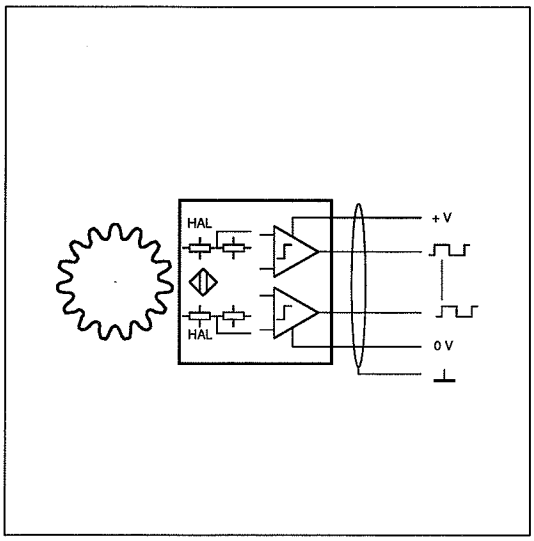
www.jaquet.com

IN CHARGE OF SPEED

Differential Ferrostat Sensor, dual sensing system

JAQUET TECHNOLOGY GROUP

DSD...W



FUNCTION

The DSD...W ferrostat sensor is suitable for generating 2 phase shifted speed dependent signals when used with a pole wheel (steel gear wheel, preferably with involute gear form) in order to measure speed and detect the direction of rotation. It exhibits static behaviour with guaranteed pulse generation down to 0 Hz.

The sensor element comprises of 2 magnetically biased differential Hall sensors, followed by a short circuit proof amplifier. The sensor must be orientated to the pole wheel as shown in the corresponding drawing.

CONNECTION AND INSTALLATION

Connection

The sensor connections are sensitive to interference. The following 2 points should therefore be noted:

1) A screened 4core cable must be used for connections. The screen must be taken all the way to the terminal provided on the instrument and not earthed.

2) The sensor cables should be laid as far from large electrical machines as possible and must never be laid parallel to high current cables.

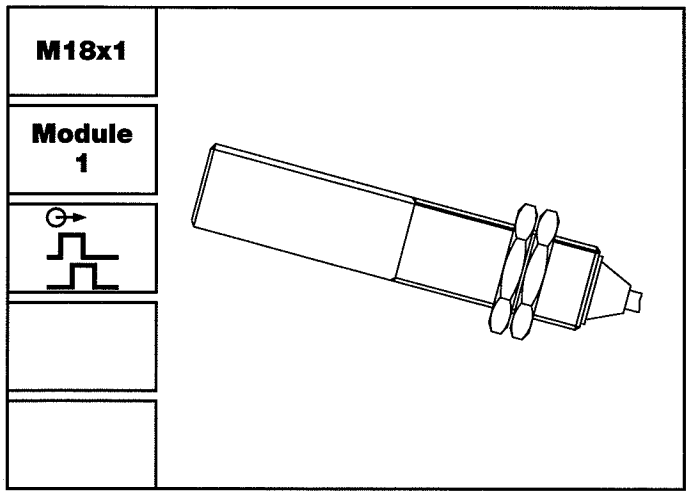
The maximum permissible cable length is a function of sensor supply voltage, cable routing along with cable capacitance and inductance and max. signal frequency.

In general it is advantageous to keep the distance between sensor and instrumentation to a minimum. The sensor cable may be lengthened via suitable IP 20 terminals and Jaquet cable p/n 824L-35053.

Installation

This sensor incorporates a differential Hall element. The housing must therefore be orientated to the pole wheel as shown in the dimensional diagram (note the flange pin-orientation slot in the case of DSD..20W). Incorrect positioning of the sensor affects its correct operation and noise immunity.

DSD 1810 A, S, M ... W

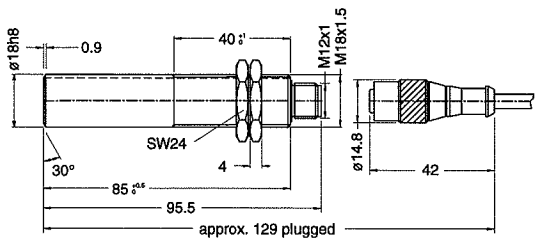


Features

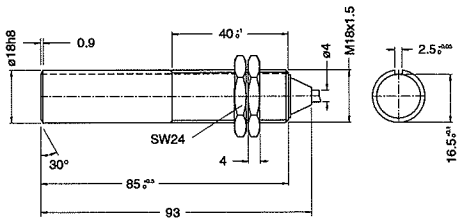
- Double sensing system with amplifier
- Direction discrimination
- Static characteristic
- Lower frequency limit: 0 Hz
- Sensor housing must be aligned to the pole wheel

Dimensions

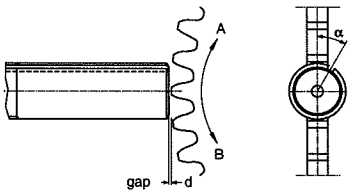
Version A



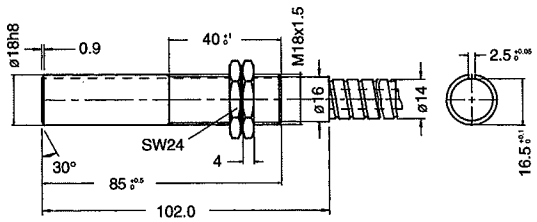
Version S



Alignment angle



Version M



Model overview

Type	Part nr.	Connection	Housing thread	Weight [g]	Operating temperature [°C]	Notes
DSD 1810.11 STW	374Z-04317	Cable 5 m	M18x1	300	-25...+85	Standard
DSD 1810.11 SHW	374Z-04318	Cable 2 m	M18x1	205	-40...+125	Standard
DSD 1810.11 ATW	374Z-04319	Connector + cable 2 m	M18x1	210	-25...+85	Standard
DSD 1810.11 AHW	374Z-04320	Connector + cable 2 m	M18x1	210	-40...+125	Standard
DSD 1810.11 MTW	374Z-04324	Protective hose 5 m	M18x1	970	-25...+85	Standard

Differential Ferrostat Sensor, dual sensing system

JAQUET TECHNOLOGY GROUP

Type DSD 1810...W
Version A, S, M

Technical Data

Supply

Power supply	Supply voltage: 10...30 V D.C. protected against reverse polarity and transient overvoltages. Current consumption: max. 35 mA (without load).

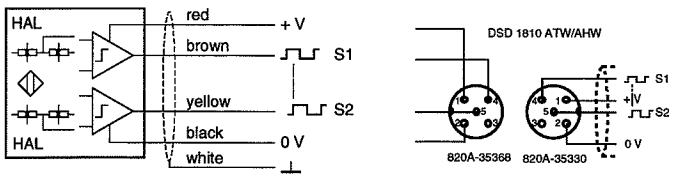
Input

Frequency range	0 Hz...20 kHz
Noise immunity (EMC)	With the cable shield connected to the supply negative pole, EMC protection prevents any malfunction of the sensor for the following conditions: Transient non repetetive surges: between 0 V and housing, up to 1.5 kV peak with 10 kV/µs rise time during 1.5 µs. Electrical fast transients/bursts: coupled to sensor cable with a capacitive coupling clamp, up to 2 kV peak, according to IEC 801-4, level 3. Damped resonance/1 MHz: Capacitve coupled to signal- and supply cable up to 2.5 kV peak, acc. to IEC255-4, level III.
Pole wheel	Ferromagnetic toothed wheel (i.e. USt37-2) involute gear wheel, radial sensing, eccentricity < 0.2 mm, min. tooth width 10 mm, side offset < 0.2 mm.
Pole wheel-sensor air gap at	Module 1: 0.1...0.4 mm Module 2: 0.1...1.0 mm
Alignment angle α at	Module 1: 12...**14**...16° Module 2: 28...**32**...35°

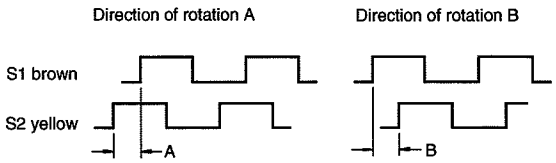
Output

Signal outputs	2 square wave signals shifted by 90° ±60° resp. 8...41%, push-pull output stage, coupled to the supply (negative pole = reference voltage), max. load: 25mA. Output voltage-HI: Supply voltage - 1.5 V at I = 20 mA. Output voltage-LO: <1.5 V at I = 20 mA. Duty cycle: 50% ±20%, dependent on direction of rotation, air gap and tooth design. The phase shift between positive and negative-going edges of the output signals is not normally of equal magnitude and depends on the duty cycle. Correct operation of subsequent rotation direction discriminators is however always ensured. Short circuit proof and protected against reverse polarity and transient overvoltages.

Connection



Impulse diagram



Shield to be connected with 0 V of power supply.

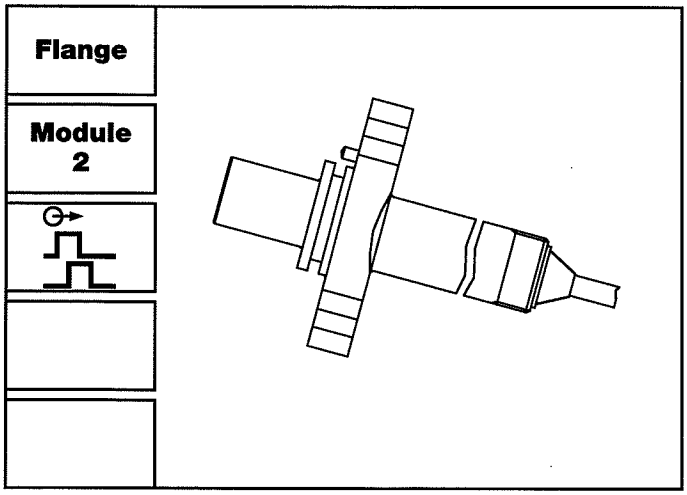
Mechanical

Protection class	IP68 (head), IP67 (cable connection), IP50 (jack connection).
Vibration immunity	3 g_n, 4...100 Hz.
Shock immunity	20 g_n, 6 ms during 11 ms half sine wave.
Operating temperature	Acc. to model overview.
Climatic resistance	Sensor function for 21 day damp heat, acc. to IEC 68-2-3, test Ca and storage for 1000 days at +125 °C, acc. to IEC 68-2-2. test Ba.
Isolation	Housing, cable shield and electronics galvanically isolated (500V/50 Hz/1 min).
Housing	Stainless steel 1.4305, frontside hermetically sealed and resistant against splashing water, oil, conducting carbon- or ferrous dust and salt mist. Electronic components potted in a chemical- and age-proof synthetic resin. Dimensions according to model overview and dimensional drawing.
Operating instruction	374E-63892

Versions

Version A	Connection plug: Part nr. 820A-35330, incl. 2 m cable. Connector type: Part nr. 820A-35368.
Version S	Teflon-Cable: Part nr. 824L-35053, 2 m, 4wire, 4x0.24 mm² (AWG24), stranded wire (metal net isolated from housing), white. Outer-Ø = 4.0 mm, bending radius min. 30 mm, weight 32 g/m.
Version M	PVC cable with metal tube: Part nr. 825G-30924. Tube made of profile milled steel plate with PVC cover, grey. Weather and waterproof, conditionally oil and acid resistant. Outer Ø 14 mm, bending radius min. 40 mm, weight 167 g/m.

DSD 1820 S, M ... W

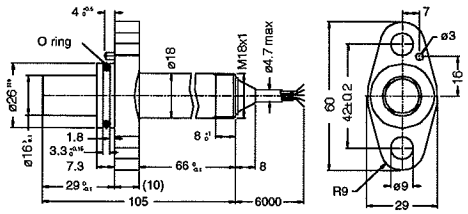


Features

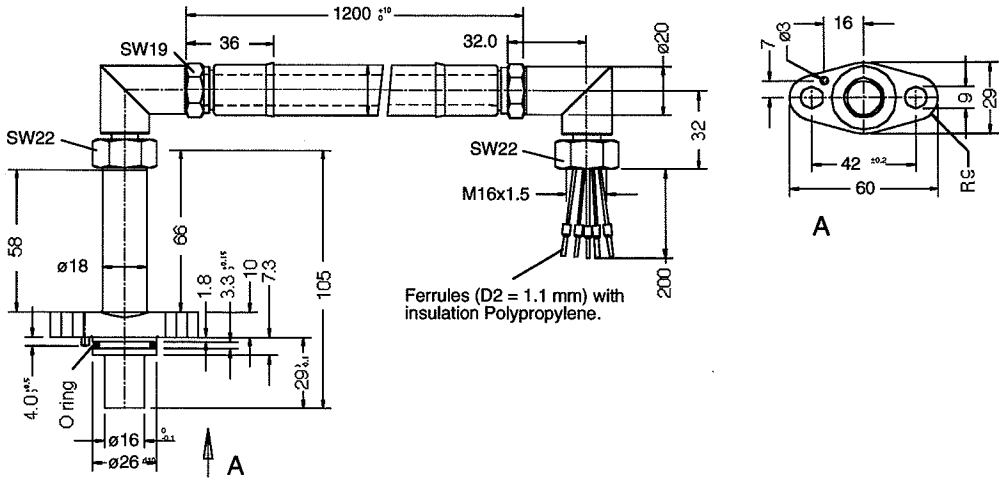
- Double sensing system with amplifier
- Direction discrimination
- Static characteristic
- Lower frequency limit: 0 Hz
- Sensor housing must be aligned to the pole wheel
- For railway applications

Dimensions

Version S



Version M



Model overview

Type	Part nr.	Connection	Housing thread	Weight [g]	Operating temperature [°C]	Notes
DSD 1820.11 SHW	374Z-03980	Cable 6 m	Flange	500	-40...+125	For railway vehicles
DSD 1820.11 MHW	374Z-04107	Protective hose 1.2 m	Flange	950	-40...+125	For railway vehicles

Differential Ferrostat Sensor, dual sensing system

JAQUET TECHNOLOGY GROUP

Type DSD 1820 ... W
Version S, M

Technical Data

Supply

Power supply

Supply voltage: 10...16 V D.C. protected against reverse polarity and transient overvoltages.
Current consumption: max. 75 mA (without load).

Input

Frequency range

0 Hz...40 kHz

Noise immunity (EMC)

With the cable shield connected to the supply negative pole, EMC protection prevents any malfunctions of the sensor for the following conditions: Transient non repetitive surges:
between 0 V or the housing and signal- and power supply wiring up to 7 kV peak during 0.1 µs;
4 kV peak during 1 µs; 3 kV peak during 5 µs; 1.5 kV peak during 45 µs; 800 V peak during 100 µs.
Electrostatic discharge: into housing, cable shield and wires.
Up to 4 kV peak acc. to IEC 801-2, severity level 2.
Radiated electromagnetic field: up to 30 V/m, 50% AM, 1 kHz in the range of 1 MHz to 1000 MHz acc. to IEC 801-3, severity level 3.
Electrical fast transients/bursts: coupled to Sensor cable with a capacitive coupling clamp.
Up to 4 kV peak, acc. to IEC 801-4, severity level 4.

Pole wheel

Ferromagnetic toothed wheel (i.e. USt37-2) involute gear wheel, radial sensing, module 2, eccentricity < 0.2 mm, min. tooth width 10 mm, side offset < 0.2 mm.
Pole wheel-sensor air gap Module 2: 0.5...1.5 mm

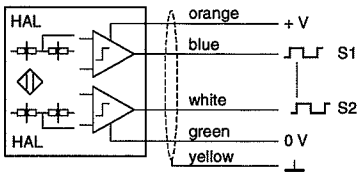
Output

Signal outputs

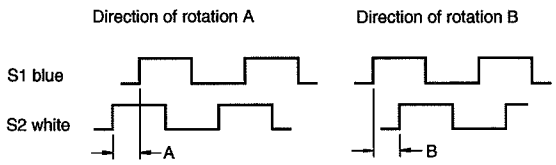
2 square wave signals shifted by 90° ±50% (±45°),
push-pull output stage, coupled to the supply (negative pole = reference voltage), max. load: 25mA.
Output voltage-HI: >8.2 V at I = 20 mA. Output voltage-LO: <1.5 V at I = 20 mA.
Duty cycle: 50% (40...60%) dependent on direction of rotation, air gap and tooth design.
The phase shift between positive and negative-going edges of the output signals is not normally of equal magnitude and depends on the duty cycle. Correct operation of subsequent rotation direction discriminators is however always ensured.

Short circuit proof and protected against reverse polarity and transient overvoltages.

Connection



Impulse diagram



Shield to be connected with 0 V of power supply.

Mechanical

Protection class

IP68 (head), IP67 (cable connection).

Vibration immunity

5 g_n, 10 ... 500 Hz, random noise.

Shock immunity

100 g_n, 6 ms, acc. to IEC 68-2-27.

Operating temperature

Acc. to model overview.

Climatic resistance

Sensor function for 21 day damp heat, acc. to IEC 68-2-3, test Ca and storage for 1000 days at +125 °C, acc. to IEC 68-2-2. test Ba.

Isolation

Housing, cable shield and electronics galvanically isolated (500V/50 Hz/1 min).

Housing

Stainless steel 1.4305, frontside hermetically sealed and resistant against splashing water, oil, conducting carbon- or ferrous dust and salt mist. Electronic components potted in a chemical- and age-proof synthetic resin. Dimensions according to model overview and dimensional drawing.

Weight

Acc. to model overview.

Operating instruction

374E-63721

Versions

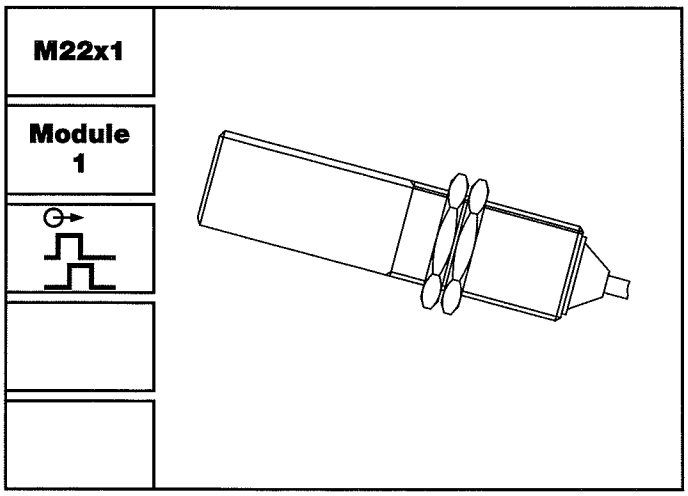
Version S

Teflon-Cable: Part nr. 824L-36222, 6 m, 4wire, 4x0.6 mm² (AWG20), stranded wire (metal net isolated from housing), white. Outer Ø = 4.7 mm,
bending radius min. 27 mm, weight 45 g/m.

Version M

Protective hose Kafon (Silicon) over teflon cable: fire retardant, low smoke, no PVC and non halogen, oil proof, waterproof, outer Ø 20.5 mm, bending radius 26 mm static, 85 mm dynamic, weight 300 g/m. Connection side with female fitting M16x1.5. Part nr. 825G-36402.

DSD 2210 A, S, M ... W

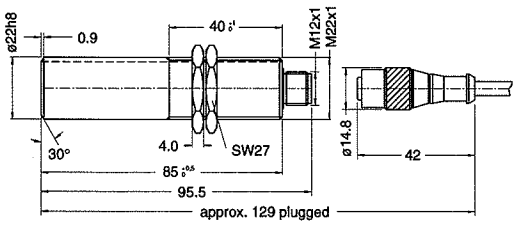


Features

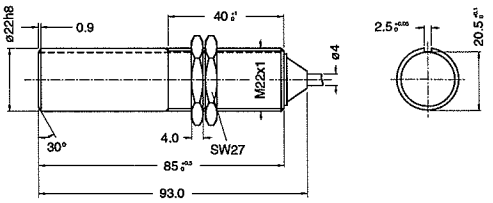
- Double sensing system with amplifier
- Direction discrimination
- Static characteristic
- Lower frequency limit: 0 Hz
- Sensor housing must be aligned to the pole wheel

Dimensions

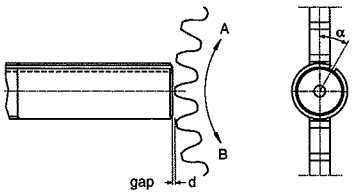
Version A



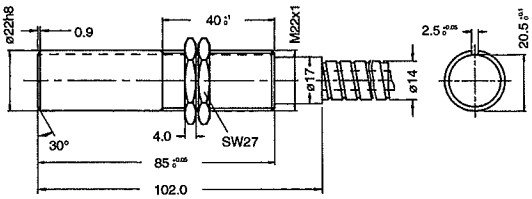
Version S



Alignment angle



Version M



Model overview

Type	Part nr.	Connection	Housing thread	Weight [g]	Operating temperature [°C]	Notes
DSD 2210.11 STW	374Z-04321	Cable 5 m	M22x1	320	-25...+85	Standard
DSD 2210.11 SHW	374Z-04322	Cable 2 m	M22x1	225	-40...+125	Standard
DSD 2210.11 ATW	374Z-04113	Connector + cable 2 m	M22x1	230	-25...+85	Standard
DSD 2210.11 AHW	374Z-04323	Connector+ cable 2 m	M22x1	230	-40...+125	Standard
DSD 2210.11 MTW	374Z-04325	Protective hose 5 m	M22x1	990	-25...+85	Standard

Differential Ferrostat Sensor, dual sensing system

JAQUET TECHNOLOGY GROUP

Type DSD 2210...W
Version A, S, M

Technical Data

Supply

Power supply

Supply voltage: 10...30 V D.C. protected against reverse polarity and transient overvoltages.
Current consumption: max. 35 mA (without load).

Input

Frequency range

0 Hz...20 kHz

Noise immunity (EMC)

With the cable shield connected to the supply negative pole, EMC protection prevents any malfunctions of the sensor for the following conditions:
Transient non repetetive surges: between 0 V and housing, up to 1.5 kV peak with 10 kV/µs rise time during 1.5 µs.
Electrical fast transients/bursts: coupled to sensor cable with a capacitive coupling clamp, up to 2 kV peak, according to IEC 801-4, level 3.
Damped resonance/1 MHz: Capacitve coupled to signal- and supply cable up to 2.5 kV peak, acc. to IEC255-4, level III.

Pole wheel

Ferromagnetic toothed wheel (i.e. USt37-2) involute gear wheel, radial sensing, eccentricity < 0.2 mm, min. tooth width 10 mm, side offset < 0.2 mm.

Pole wheel-sensor air gap at	Module 1:	0.1...0.4 mm
	Module 2:	0.1...1.0 mm
Alignment angle α at	Module 1:	12...**14**...16°
	Module 2:	28...**32**...35°

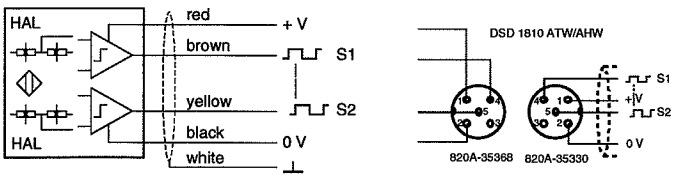
Output

Signal outputs

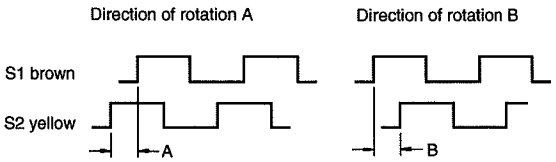
2 square wave signals shifted by 90° ±60° resp. 8...41%, push-pull output stage, coupled to the supply (negative pole = reference voltage), max. load: 25mA.
Output voltage-HI: Supply voltage - 1.5 V at I = 20 mA.
Output voltage-LO: <1.5 V at I = 20 mA.
Duty cycle: 50% ±20%, dependent on direction of rotation, air gap and tooth design.
The phase shift between positive and negative-going edges of the output signals is not normally of equal magnitude and depends on the duty cycle. Correct operation of subsequent rotation direction discriminators is however always ensured.

Short circuit proof and protected against reverse polarity and transient overvoltages.

Connection



Impulse diagram



Shield to be connected with 0 V of power supply.

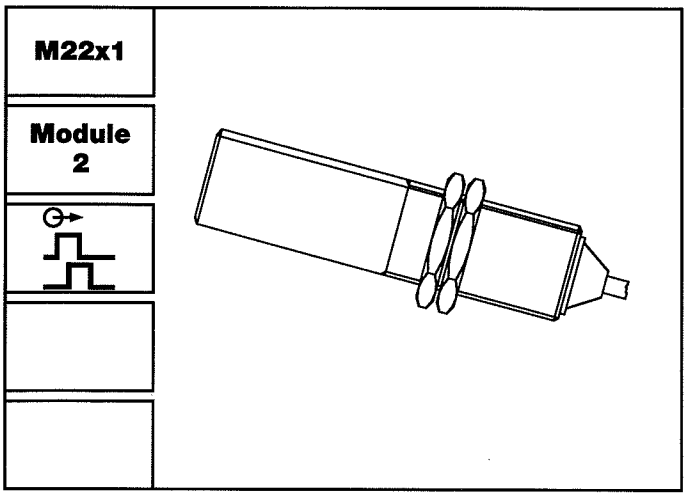
Mechanical

Protection class	IP68 (head), IP67 (cable connection), IP67 (jack connection).
Vibration immunity	3 g_n, 4...100 Hz.
Shock immunity	20 g_n, 6 ms during 11 ms half sine wave.
Operating temperature	Acc. to model overview.
Climatic resistance	Sensor function for 21 day damp heat, acc. to IEC 68-2-3, test Ca and storage-for 1000 days at +125 °C, acc. to IEC 68-2-2. test Ba.
Isolation	Housing, cable shield and electronics galvanically isolated (500V/50 Hz/1 min).
Housing	Stainless steel 1.4305, frontside hermetically sealed and resistant against splashing water, oil, conducting carbon- or ferrous dust and salt mist. Electronic components potted in a chemical- and age-proof synthetic resin. Dimensions according to model overview and dimensional drawing.
Operating instruction	374E-63892

Versions

Version A	Connection plug: Part nr. 820A-35330, incl. 2 m cable. Connector type: Part nr. 820A-35368.
Version S	Teflon-Cable: Part nr. 824L-35053, 2 m, 4wire, 4x0.24 mm² (AWG24), stranded wire (metal net isolated from housing), white. Outer Ø = 4.0 mm, bending radius min. 30 mm, weight 32 g/m.
Version M	PVC cable with metal tube: Part nr. 825G-30924. Tube made of profile milled steel plate with PVC cover, grey. Weather and waterproof, conditionally oil and acid resistant. Outer Ø 14 mm, bending radius min. 40 mm, weight 130 g/m.

DSD 2220 S... W

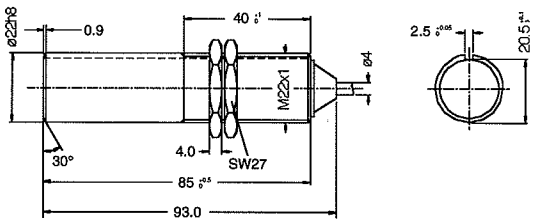


Features

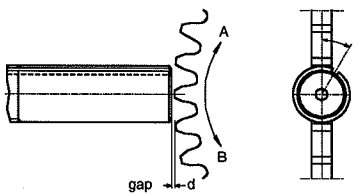
- Double sensing system with amplifier
- Direction discrimination
- Static characteristic
- Lower frequency limit: 0 Hz
- Sensor housing must be aligned to the pole wheel

Dimensions

Version S



Alignment angle



Model overview

Type	Part nr.	Connection	Housing thread	Weight [g]	Operating temperature [°C]	Notes
DSD 2220.00 SHW	374Z-04023	Cable 2 m	M22x1	245	-40...+125	—

Differential Ferrostat Sensor, dual sensing system

JAQUET TECHNOLOGY GROUP

Type DSD 2220 ... W
Version S

Technical Data

Supply

Power supply

Supply voltage: 10...16 V D.C. protected against reverse polarity and transient overvoltages.
Current consumption: max. 75 mA (without load).

Input

Frequency range

0 Hz....20 kHz

Noise immunity (EMC)

With the cable shield connected to the supply negative pole, EMC protection prevents any malfunctions of the sensor for the following conditions: Transient non repetitive surges: between 0 V or the housing and signal- and power supply wiring up to 7 kV peak during 0.1 µs; 4 kV peak during 1 µs; 3 kV peak during 5 µs; 1.5 kV peak during 45 µs; 800 V peak during 100 µs.
Electrostatic discharge: into housing, cable shield and wires.
Up to 4 kV peak acc. to IEC 801-2, severity level 2.
Radiated electromagnetic field: up to 30 V/m, 50% AM, 1 kHz in the range of 1 MHz to 1000 MHz acc. to IEC 801-3, severity level 3.
Electrical fast transients/bursts: coupled to Sensor cable with a capacitive coupling clamp.
Up to 4 kV peak, acc. to IEC 801-4, severity level 4.

Pole wheel

Ferromagnetic toothed wheel (i.e. USt37-2) involute gear wheel, radial sensing, module 2, eccentricity < 0.2 mm, min. tooth width 7 mm, side offset < 0.2 mm.

Pole wheel-sensor air gap at	Module 2:	0.5...1.2 mm
Alignment angle α		15...**32**...35°

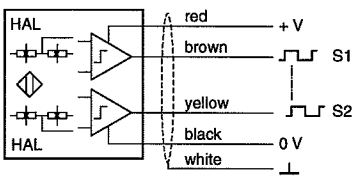
Output

Signal outputs

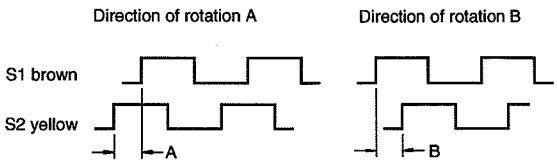
2 square wave signals shifted by 90° ±45°,
push-pull output stage, coupled to the supply (negative pole = reference voltage), max. load: 25mA.
Output voltage-HI: >8.2 V at I = 20 mA. Output voltage-LO: <1.5 V at I = 20 mA.
Duty cycle: 50% (40...60%) dependent on direction of rotation, air gap and tooth design.
The phase shift between positive and negative-going edges of the output signals is not normally of equal magnitude and depends on the duty cycle. Correct operation of subsequent rotation direction discriminators is however always ensured.

Short circuit proof and protected against reverse polarity and transient overvoltages.

Connection



Impulse diagram



Shield to be connected with 0 V of power supply.

Mechanical

Protection class	IP68 (head), IP67 (cable connection).
Vibration immunity	5 g_n, 10 ... 500 Hz, random noise.
Shock immunity	100 g_n, 6 ms, acc. to IEC 68-2-27.
Operating temperature	Acc. to model overview.
Climatic resistance	Sensor function for 21 day damp heat, acc. to IEC 68-2-3, test Ca and storage for 1000 days at +125 °C, acc. to IEC 68-2-2. test Ba.
Isolation	Housing, cable shield and electronics galvanically isolated (500V/50 Hz/1 min).
Housing	Stainless steel 1.4305, frontside hermetically sealed and resistant against splashing water, oil, conducting carbon- or ferrous dust and salt mist. Electronic components potted in a chemical- and age-proof synthetic resin. Dimensions according to model overview and dimensional drawing.
Weight	Acc. to model overview.
Operating instruction	374E-63778

Versions

Version S

Teflon-Cable: Part nr. 824L-35053, 2 m, 4wire, 4x0.24 mm² (AWG24), stranded wire (metal net isolated from housing), white. Outer-Ø = 4.0 mm, bending radius min. 30 mm, weight 32 g/m.