JAQUET
PRODUCT INFO

JAQUET TECHNOLOGY GROUP

Speed sensors

SENSOR TECHNOLOGIES

DSD	Hall Effect (Differential Ferrostat) Sensors
DSD...W	Hall Effect (Differential Ferrostat) Sensor, dual sensing system
DSF...Z	Hall Effect (Ferrostat) Sensor, without amplifier
DSF...V	Hall Effect (Ferrostat) Sensor with amplifier
DSE...Z	Electromagnetic Sensor without line amplifier
DSE...V	Electromagnetic Sensor with line amplifier
DSH...N/Z	HF Sensor (inductive) without amplifier
DSH...V	HF Sensor (inductive) with amplifier
DSR	Photo-electric Reflective Sensor

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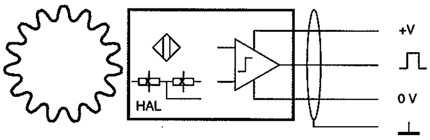
IN CHARGE OF SPEED

Differential Ferrostat Sensor
DSD



FUNCTION

DSD ferrostat sensors are suitable for generating speed dependent signals when used with a pole wheel (steel gear wheel, preferably with involute gear form).

They exhibit dynamic or static behaviour with guaranteed pulse generation down to between 5 and 0 Hz.

The sensor element is a magnetically biased differential Hall sensor followed by a short circuit proof amplifier. The sensor characteristic is not rotationally symmetrical.

CONNECTION AND INSTALLATION

Connection

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

1) A screened 3 core 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 S3 cable p/n 824L-31081.

Installation

These sensors incorporate a differential Hall element. The housing must therefore be orientated to the pole wheel as shown in the dimensional diagram (note the slot, arrow or hole). Incorrect positioning of the sensor affects its correct operation and noise immunity. The sensor is mounted with its centre over the centre of the pole wheel. With gear wheels or slots and radial mounting, the sensor is normally fixed over the middle of the wheel. Dependent on the gear width, a degree of axial movement is permissible. The centre of the sensor must however remain a minimum of 3 mm from the edge of the wheel under all operating conditions.

It is important to ensure a rigid, vibration free mounting of the sensor. Sensor vibration in relation to the pole wheel may induce additional pulses.

The sensors are insensitive to oil, grease etc. and can be used in arduous conditions. If the cable is to come into contact with aggressive materials, then teflon cable should be specified. The sensor should be installed with the smallest possible air gap. This air gap must however not allow the face of the sensor to come into contact with the pole wheel. The air gap does not affect the calibration of the complete system.

Differential Ferrostat Sensor, dual sensing system

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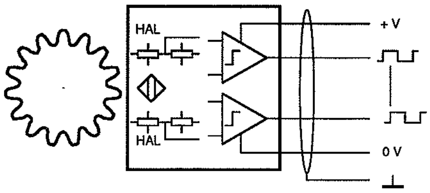
DSD...W



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.

Ferrostat Sensor without amplifier

DSF...Z

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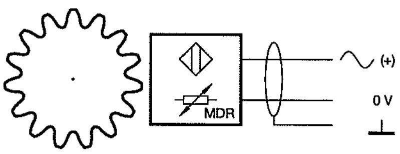
FUNCTION



DSF...Z ferrostat sensors are suitable for generating speed dependent signals when used with a pole wheel.

The sensing element is a magnetically biased magneto-resistive sensor whose resistance changes with magnetic field strength. The element is connected to the supply voltage via an external series resistor. An A.C. signal Ug is superimposed on the output as the pole wheel modulates the sensor's magnetic field. The D.C. component of the signal is capacitor decoupled in the instrument (note low end cut off frequency).

The static behaviour of these Ferrostat sensors allow their application as zero speed detectors.

The terms of the certificate of conformity must be adhered to when using Ex approved versions.

CONNECTION AND INSTALLATION

Connection

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

1) A screened 2 core 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-30894.

Under optimum operating conditions the following cable lengths are permissible when using the recommended Jaquet cable:

100 m max cable length: Sensor frequency to 4 kHz
40 m max cable length: Sensor frequency to 10 kHz
20 m max cable length: Sensor frequency to 20 kHz

Installation

The sensor is mounted with its centre over the centre of the pole wheel. With gear wheels or slots and radial mounting, the sensor is normally fixed over the middle of the wheel. Dependent on the gear width, a degree of axial movement is permissible. The centre of the sensor must however remain a minimum of 3 mm from the edge of the wheel under all operating conditions. It is important to ensure a rigid, vibration free mounting of the sensor. Sensor vibration in relation to the pole wheel may induce additional pulses.

The sensors are insensitive to oil, grease etc. and can be used in arduous conditions. If the cable is to come into contact with aggressive materials, then teflon cable should be specified. The sensor should be installed with the smallest possible air gap. This air gap must however not allow the face of the sensor to come into contact with the pole wheel. As a guide, a sensor gap of 0.4 mm can be used. Please note however the relationship between gap and temperature. The air gap does not affect the calibration of the complete system.

DIAGRAMS

Diagram A

Signal voltage Ug20 as function of pole wheel-sensor air gap

Curve	Module
1	4
2	2
3	1.5
4	1

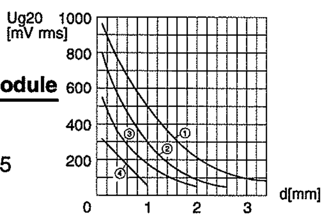
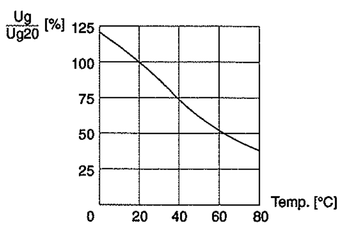
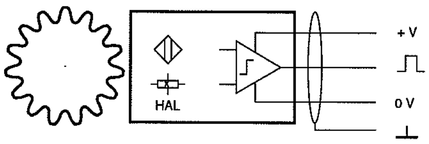


Diagram B

Temperature dependancy



Ferrostat sensor with amplifier
DSF...V



FUNCTION

DSF...V ferrostat sensors are suitable for generating speed dependent signals when used with a pole wheel.

They exhibit dynamic behaviour whereby operation down to 0.05 Hz is guaranteed.

The sensing element is a magnetically biased Hall sensor followed by a short circuit proof amplifier (version V).

CONNECTION AND INSTALLATION

Connection

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

1) A screened 3 core 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.

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 S3 cable p/n 824L-31081.

Installation

The sensor is mounted with its centre over the centre of the pole wheel. With gear wheels or slots and radial mounting, the sensor is normally fixed over the middle of the wheel. Dependent on the gear width, a degree of axial movement is permissible. The centre of the sensor must however remain a minimum of 3 mm from the edge of the wheel under all operating conditions.

It is important to ensure a rigid, vibration free mounting of the sensor. Sensor vibration in relation to the pole wheel may induce additional pulses.

The sensors are insensitive to oil, grease etc. and can be used in arduous conditions. If the cable is to come into contact with aggressive materials, then teflon cable should be specified. The sensor should be installed with the smallest possible air gap. This air gap must however not allow the face of the sensor to come into contact with the pole wheel. The air gap does not affect the calibration of the complete system.

Function, Design

The DSE series electromagnetic sensors essentially consist of an iron core with an inductive coil, behind which sits a permanent magnet. A ferromagnetic pole wheel passing the sensor head then influences the magnetic field, resulting in an A.C. voltage being induced in the coil. The induced voltage is proportional to the rate of flux change and hence pole wheel speed.

The level of output voltage is dependent on the sensor to pole wheel air gap and the size and form of the pole wheel. Additionally, the output level is as a first approximation proportional to the angular speed of the pole wheel and hence of the shaft being measured.

Electromagnetic sensors do not require an external supply in order to generate a speed signal. They are available in various housings and can be used at high temperature to 250 deg C and under high radiation levels due to their purely electromechanical design. They can therefore generally be used wherever the speed to be measured or controlled is a minimum of circa 10 rpm. Applications where they should not be used would be for zero speed and direction detection.

Signal output

In every speed measuring chain, care is needed to ensure that the sensor signal level exceeds the required instrument trigger level under all operating conditions. It is sufficient to verify that the sensor signal at the lowest operating speed is adequate for the instrumentation. See Table 1 Technical Data and diagrams A1,2,3 together with B1,2.

Column 2, Table 1 gives the sensor voltage Un for each sensor under standard measurement conditions. This corresponds to a standard pole wheel (column 3) angular speed of 5m/s and an air gap of 0.1mm.

The relationship between sensor voltage and angular speed is approximately linear and so the actual sensor voltage for a given pole wheel having diameter Dp and speed (n) can be calculated as follows:

$$Ug0{,}1 = \frac{Un \times n \times Dp \times \pi}{60 \times 5}$$

Ug0,1 = Sensor voltage (Vpp) at air gap d = 0.1 mm

where

Un = Sensor voltage (Vpp) under standard measurement conditions

n = Pole wheel speed in rpm

Dp = Pole wheel diameter in metres

Diagrams A1...3 provide an approximation of sensor voltage for pole wheel to sensor air gap d other than 0.1 mm. Expressed as a percentage-of the reference voltage at d = 0.1 mm, the voltage Ug can be read for any air gap d. The pole wheel module should be within the range or greater than that shown in column 4. It should be noted that the sensor voltage with a smaller pole wheel module than the given standard, especially with large air gaps, will be considerably lower than under standard measurement conditions. Larger than standard pole wheel modules generally provide only a small output voltage advantage-but may have other mechanical advantages.

Determination of minimum speed

Diagrams B and columns 5...8 in the "Technical Data" table simplify the pole wheel selection parameters (module and diameter) along with the air gap d and allow verification of the suitability of the chosen configuration for a particular application.

Diagrams B further provide the minimum detectable speed N100 as a function of the pole wheel to core gap Dk for various combinations of pole wheel module and sensor type. For this purpose the instrument sensitivity is taken to be 50mVrms. The curves are valid for pole wheel diameters of 100mm and represent a local constant sensor voltage of 50mVrms corresponding to 140 mVpp.

To determine the min. measuring speed N100 for a given pole wheel to core gap Dk for other types, multiply the value from the curve for N100 by the factor Kn (Table 1 column 5).

The generally applicable formular to determine the minimum measurable speed Nmin for any sensor type and known values for pole wheel diameter Dp (m) and gap Dk is:

Nmin (Dk) = N100 x Kn x 0.1Dp

To determine Nmin for a given sensor air gap d, the relationship Dk = f (d) (column 6) for the sensor in question must be factored in finally the calculated value for Nmin will need to be adjusted by the ratio A (mVrms)/50 mVrms for instrument sensitivity other than the 50 mV reference value.

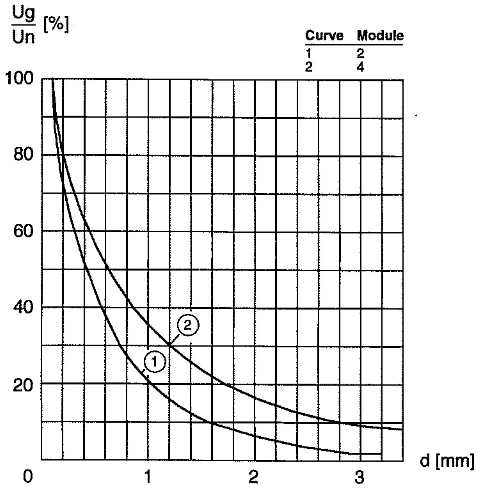
Table 1
Technical Data (overview)

Type	Output-voltage Un [1] [Vpp]	Module Standard Pole wheel	Module Range	Factor Kn	Relation-ship DK=f(d) [mm]	Characteristic Diag. A Nr.	Characteristic Diag. B Nr.	Coil Resis-tance Ri [Ω] ±20%	Coil Induc-tance Li [mH] ±20%	Core Ø [mm]
DSE 0603.00SHZ	10	0.5	0.25…>2	1.0	Dk = d	A2/all	B2/all	3900	550	0.6/1.5
DSE 1010.00STZ	18	2	1…>4	2.1	Dk = d	A1/1	B1/1,2,3	830	170	2.7
DSE 1010.00ZTZ	18	2	1…>4	2.1	Dk = d	A1/1	B1/1,2,3	830	170	2.7
DSE AD10.00AHZ	11	2	1…>4	2.1	Dk = d+0.2	A1/1	B1/1,2,3	830	170	2.7
DSE AD10.00SHZ	11	2	1…>4	2.1	Dk = d+0.2	A1/1	B1/1,2,3	830	170	2.7
DSE 1210.01AHZ	10	2	1…>4	3.8	Dk = d	A1/1	B1/1,2,3	830	170	Yoke
DSE 1210.01SHZ	10	2	1…>4	3.8	Dk = d	A1/1	B1/1,2,3	830	170	Yoke
DSE 1210.02AHZ	11	2	1…>4	2.1	Dk = d+0.2	A1/1	B1/1,2,3	830	170	2.7
DSE 1210.02SHZ	11	2	1…>4	2.1	Dk = d+0.2	A1/1	B1/1,2,3	830	170	2.7
DSE 1210.06AHZ	11	2	1…>4	2.1	Dk = d+0.2	A1/1	B1/1,2,3	830	170	2.7
DSE 1210.00 SHZ	11	2	1…>4	2.1	Dk = d+0.2	A1/1	B1/1,2,3	830	170	2.7
DSE 1210.00 AHZ	11	2	1…>4	2.1	Dk = d+0.2	A1/1	B1/1,2,3	830	170	2.7
DSE 1210.00 STZ	11	2	1…>4	2.1	Dk = d+0.2	A1/1	B1/1,2,3	830	170	2.7
DSE 1210.00 ATZ	11	2	1…>4	2.1	Dk = d+0.2	A1/1	B1/1,2,3	830	170	2.7
DSE 1210.00 MTZ	11	2	1…>4	2.1	Dk = d+0.2	A1/1	B1/1,2,3	830	170	2.7
DSE 1410.00 ATZ	11	2	1…>4	2.1	Dk = d+0.2	A1/1	B1/1,2,3	830	170	2.7
DSE 1410.00 AHZ	11	2	1…>4	2.1	Dk = d+0.2	A1/1	B1/1,2,3	830	170	2.7
DSE 1410.00 STZ	11	2	1…>4	2.1	Dk = d+0.2	A1/1	B1/1,2,3	830	170	2.7
DSE 1410.00 SHZ	11	2	1…>4	2.1	Dk = d+0.2	A1/1	B1/1,2,3	830	170	2.7
DSE 1410.00 MTZ	11	2	1…>4	2.1	Dk = d+0.2	A1/1	B1/1,2,3	830	170	2.7
DSE 1610.01 AHZ	27	2	1…>4	0.9	Dk = d+0.2	A1/1	B1/1,2,3	900	310	2.7
DSE 1610.01 SHZ	27	2	1…>4	0.9	Dk = d+0.2	A1/1	B1/1,2,3	900	310	2.7
DSE 1610.00 ATZ	27	2	1…>4	0.85	Dk = d+0.2	A1/1	B1/1,2,3	900	310	2.7
DSE 1610.00 AHZ	27	2	1…>4	0.9	Dk = d+0.2	A1/1	B1/1,2,3	900	310	2.7
DSE 1610.00 STZ	27	2	1…>4	0.85	Dk = d+0.2	A1/1	B1/1,2,3	900	310	2.7
DSE 1610.00 SHZ	27	2	1…>4	0.9	Dk = d+0.2	A1/1	B1/1,2,3	900	310	2.7
DSE 1610.00 MTZ	27	2	1…>4	0.85	Dk = d+0.2	A1/1	B1/1,2,3	900	310	2.7
DSE EH10.00 STZ	45	2	1…>4	0.85	Dk = d+0.2	A1/1	B1/1,2,3	900	310	2.7
DSE EH10.00 MTZ	45	2	1…>4	0.85	Dk = d+0.2	A1/1	B1/1,2,3	900	310	2.7
DSE EH10.00 ATZ	45	2	1…>4	0.85	Dk = d+0.2	A1/1	B1/1,2,3	900	310	2.7
DSE EH10.00 SHZ	27	2	1…>4	0.9	Dk = d+0.2	A1/1	B1/1,2,3	900	310	2.7
DSE EH10.00 AHZ	27	2	1…>4	0.9	Dk = d+0.2	A1/1	B1/1,2,3	900	310	2.7
DSE EH10.05 AHZ	18	2	1…>4	2.1	Dk = d	A1/1	B1/1,2,3	830	170	2.7
DSE 1810.09 ATZ	45	2	1…>4	0.85	Dk = d	A1/1	B1/1,2,3	900	310	2.7
DSE 1810.09 STZ	45	2	1…>4	0.85	Dk = d	A1/1	B1/1,2,3	900	310	2.7
DSE 1810.09 MTZ	45	2	1…>4	0.85	Dk = d	A1/1	B1/1,2,3	900	310	2.7
DSE 1810.11 ATZ	45	2	1…>4	0.85	Dk = d	A1/1	B1/1,2,3	900	310	2.7
DSE 1810.11 AHZ	23	2	1…>4	0.9	Dk = d+0.3	A1/1	B1/1,2,3	1150	490	2.7
DSE 1810.11 STZ	45	2	1…>4	0.85	Dk = d	A1/1	B1/1,2,3	900	310	2.7
DSE 1810.11 SHZ	23	2	1…>4	0.9	Dk = d+0.3	A1/1	B1/1,2,3	1150	490	2.7
DSE 1810.11 MTZ	45	2	1…>4	0.85	Dk = d	A1/1	B1/1,2,3	900	310	2.7
DSE 1820.11 ATZ	58	4	2…>8	1.0	Dk = d	A1/2	B1/4,5	900	360	5.0
DSE 1820.11 AHZ	36	4	2…>8	0.9	Dk = d+0.3	A1/2	B1/4,5	1100	455	5.0
DSE 1820.11 STZ	58	4	2…>8	1.0	Dk = d	A1/2	B1/4,5	900	360	5.0
DSE 1820.11 SHZ	36	4	2…>8	0.9	Dk = d+0.3	A1/2	B1/4,5	1100	455	5.0
DSE 1820.11 MTZ	58	4	2…>8	1.0	Dk = d	A1/2	B1/4,5	900	360	5.0
DSE 1810.01 AHZ	23	2	1…>4	0.9	Dk = d+0.3	A1/1	B1/1,2,3	1150	490	2.7
DSE 1810.01 SHZ	23	2	1…>4	0.9	Dk = d+0.3	A1/1	B1/1,2,3	1150	490	2.7
DSE 1810.00 STZ	23	2	1…>4	0.85	Dk = d+0.3	A1/1	B1/1,2,3	900	310	2.7
DSE 1810.00 ATZ	23	2	1…>4	0.85	Dk = d+0.3	A1/1	B1/1,2,3	900	310	2.7
DSE 1810.00 MTZ	23	2	1…>4	0.85	Dk = d+0.3	A1/1	B1/1,2,3	900	310	2.7
DSE 1810.00 SHZ	23	2	1…>4	0.9	Dk = d+0.3	A1/1	B1/1,2,3	1150	490	2.7
DSE 1810.00 AHZ	23	2	1…>4	0.9	Dk = d+0.3	A1/1	B1/1,2,3	1150	490	2.7
DSE 2210 ATZ	38	2	1…>4	1.0	Dk = d	A1/1	B1/1,2,3	900	310	2.7
DSE 2210 STZ	38	2	1…>4	1.0	Dk = d	A1/1	B1/1,2,3	900	310	2.7
DSE 2210 MTZ	38	2	1…>4	1.0	Dk = d	A1/1	B1/1,2,3	900	310	2.7
DSE 2210 AHZ	21	2	1…>4	1.0	Dk = d+0.3	A1/1	B1/1,2,3	950	360	2.7
DSE 2210 SHZ	21	2	1…>4	1.0	Dk = d+0.3	A1/1	B1/1,2,3	950	360	2.7
DSE 2220 ATZ	58	4	2…>8	1.0	Dk = d	A1/2	B1/4,5	900	360	5.0
DSE 2220 STZ	58	4	2…>8	1.0	Dk = d	A1/2	B1/4,5	900	360	5.0
DSE 2220 MTZ	58	4	2…>8	1.0	Dk = d	A1/2	B1/4,5	900	360	5.0
DSE 2220 AHZ	34	4	2…>8	1.0	Dk = d+0.3	A1/2	B1/4,5	850	360	5.0
DSE 2220 SHZ	34	4	2…>8	1.0	Dk = d+0.3	A1/2	B1/4,5	850	360	5.0
DSE AAMZ.00ATZ	4,2	4 pole magnet wheel		—	Dk = d	—	C1/all	300	330	6.0
DSE AAMZ.00AHZ	4,2	4 pole magnet wheel		—	Dk = d	—	C1/all	300	330	6.0
DSE 36MZ.00ATZ	4,2	4 pole magnet wheel		—	Dk = d	—	C1/all	300	330	6.0
DSE 36MZ.00AHZ	4,2	4 pole magnet wheel		—	Dk = d	—	C1/all	300	330	6.0
DSE 25ME.00AHZ	0,45[2]	4 pole magnet wheel		—	X = 80	A3/1	C2/all	400	2100	12.0

1) Measured with angular speed of 5 m/s. Standard polewheel module and air gap 0.1 mm.
2) Standard measurement conditions per diagram A3.

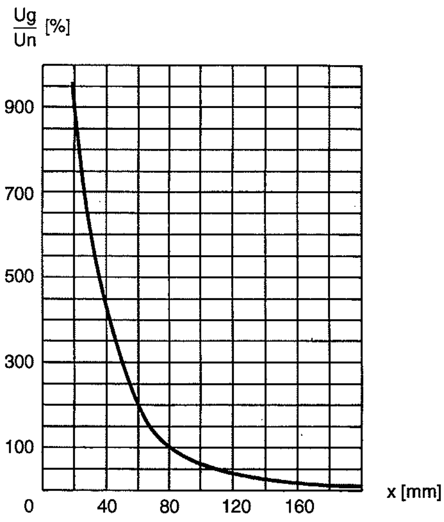
A1

Sensor voltage Ug
against sensor to pole wheel air gap d
in % of Un



A3

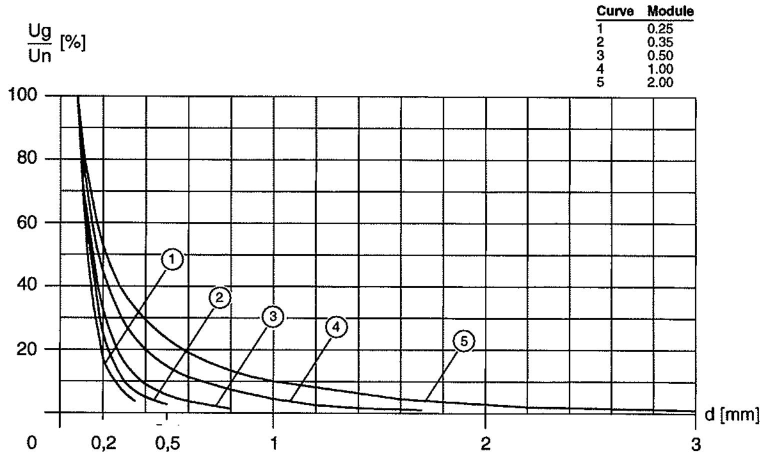
Sensor voltage Ug against sensor to
pole wheel air gap x, measured with
pole wheel FTP 515/M14x1.5, speed 25000 rpm
and with load 22 kOhms || 1 nF



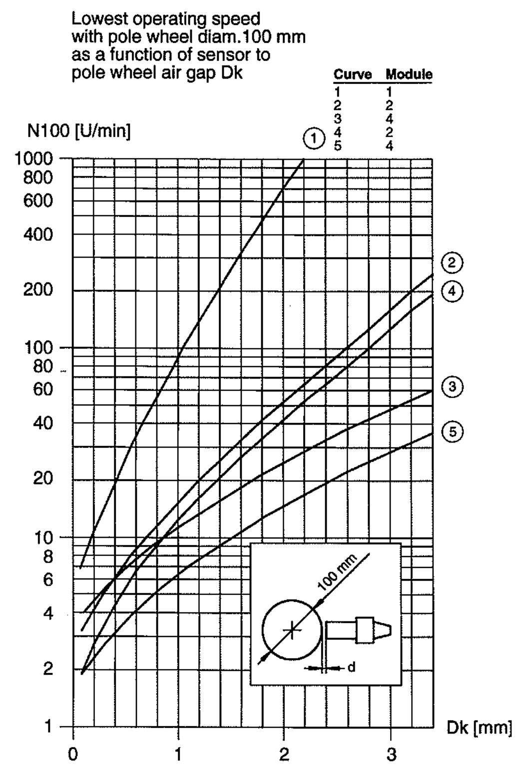
DSE 25ME.00 AHZ

A2

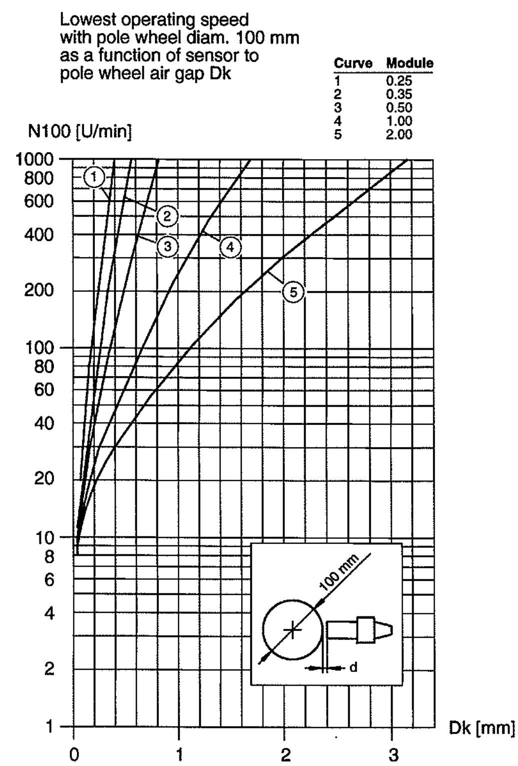
Sensor voltage Ug
against sensor to pole wheel air gap d
in % of Un



B1

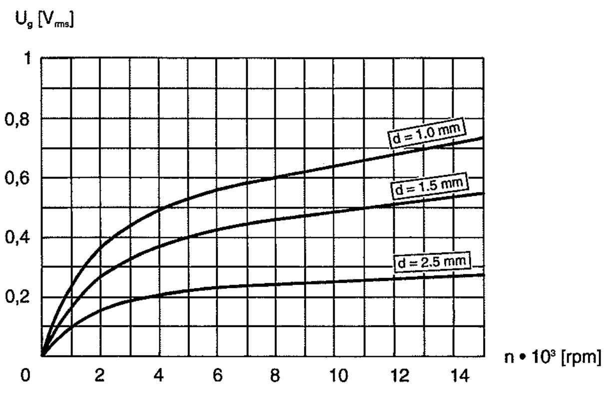

Lowest operating speed
with pole wheel diam.100 mm
as a function of sensor to
pole wheel air gap Dk
Curve Module
1 1
2 2
3 4
4 2
5 4
N100 [U/min]
1000
800
600
400
200
100
80
60
40
20
10
8
6
4
2
1
0
1
2
3
Dk [mm]
100 mm
d

B2


Lowest operating speed
with pole wheel diam. 100 mm
as a function of sensor to
pole wheel air gap Dk
Curve Module
1 0.25
2 0.35
3 0.50
4 1.00
5 2.00
N100 [U/min]
1000
800
600
400
200
100
80
60
40
20
10
8
6
4
2
1
0
1
2
3
Dk [mm]
100 mm
d

C1

Sensor voltage (rms value)
as a function of the speed with sensor to
pole wheel air gap d as a parameter

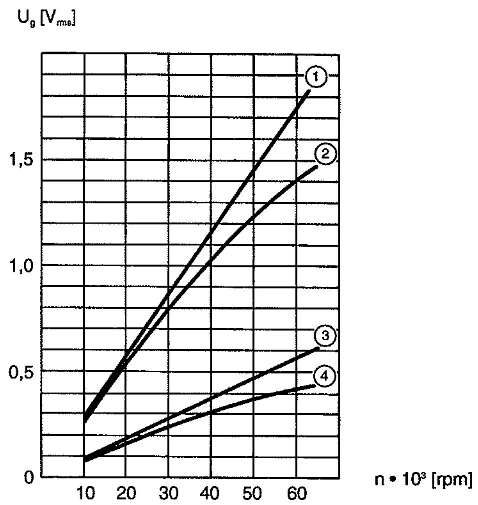


DSE AAMZ.00 AHZ, DSE 36MZ.00 ATZ

C2

1 DSE 25ME.00 AHZ
2 DSE 25ME.00 AHZ with load 22 kOhms || 1 nF
3 DSE 25ME.00 AHZ with protection ring
4 DSE 25ME.00 AHZ with protection ring and load

measured with pole wheel FTP 515/M14x1.5
and air gap X = 80 mm



DIAGRAMS AND CHARACTERISTICS

Electromagnetic Sensor with line amplifier

DSE...V

GENERAL

The DSE...V series electromagnetic sensors essentially consist of an iron core with an inductive coil, behind which sits a permanent magnet. A line amplifier is also included. A ferromagnetic pole wheel passing the sensor head then influences the magnetic field, resulting in an A.C. voltage being induced in the coil. The induced voltage is proportional to the rate of flux change and hence pole wheel speed.

The level of induced voltage is dependent on the sensor to pole wheel air gap and the size and form of the pole wheel. Additionally, the induced voltage level is as a first approximation proportional to the angular speed of the pole wheel and hence of the shaft being measured (see diagram B3).

These sensors have a transistor amplifier, which is overdriven in normal operation by the induced voltage. The output signal level is then essentially constant and determined by the external supply and a pull up resistor. Should the induced voltage be too low the output sits at 1...3 V.

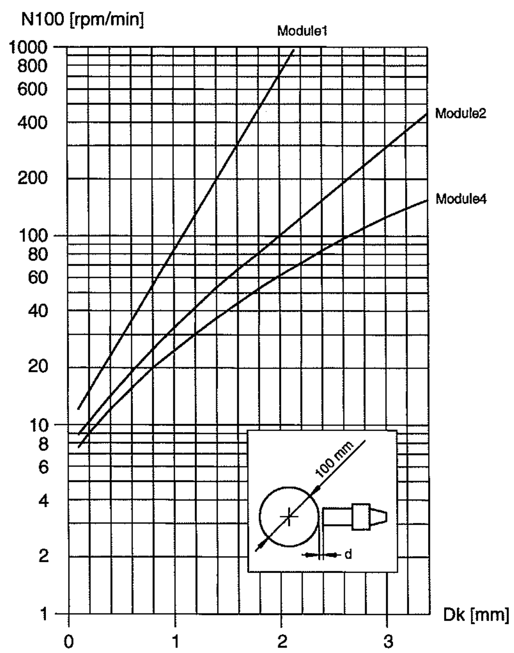
Where the sensor has a trigger stage, the output is digital even at low speeds i.e. low or high.

Electromagnetic sensors with line amplifiers require an external supply but may be 2 or 3 wire devices. They may generally be used wherever the speed to be measured or controlled exceeds 10 rpm.

DIAGRAM AND CHARCTERISTICS

B3

Lowest operating speed
with pole wheel diam. 100 mm
against air gap Dk

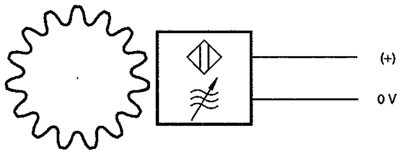


DSE 1010 STV/SHV
Dk = Sensor to pole wheel gap d + 0,2 mm

HF Sensor (inductive) without amplifier

DSH...N/Z

JAQUET TECHNOLOGY GROUP



FUNCTION

HF speed sensors without amplifier are suitable for generating speed signals from metallic (not necessarily ferrous) pole wheels.

The sensing element is an oscillator circuit at the face of the sensor. A metallic pole wheel passing the sensor head influences the damping in the oscillator. This modulates the current consumption of the HF oscillator and superimposes an A.C. signal on the D.C. biased output.

If the following instrumentation is A.C. coupled, the lower operating frequency should be allowed for.

The static behaviour of these HF sensors allow their use for zero speed detection.

Where Ex certified versions are used in hazardous areas the certificate guidelines must be followed!

CONNECTION AND INSTALLATION

Connection

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

1) A screened 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 sensor 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-30894.

Under favourable operating conditions and when used with JAQUET cable p/n 824L-30894 the following transmission lengths are possible:

100 m max. for sensor frequencies to 4 kHz

40 m max. for sensor frequencies to 10 kHz

20 m max. for sensor frequencies to 20 kHz

Mounting

The sensor is mounted with its centre over the centre of the pole wheel. With gear wheels or slots and radial mounting, the sensor is normally fixed over the middle of the wheel. Dependent on the gear width, a degree of axial movement is permissible. The centre of the sensor must however remain a minimum of 3 mm from the edge of the wheel under all operating conditions.

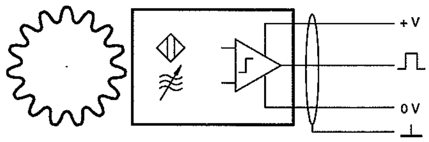
It is important to ensure a rigid, vibration free mounting of the sensor. Sensor vibration in relation to the pole wheel may induce additional pulses.

The sensors are insensitive to oil, grease etc. and can be used in arduous conditions. During installation the optimum sensor to pole wheel gap should be set. On no account should the sensor come into contact with the pole wheel during operation. As a guide, an air gap of 0.4 mm can be set. The air gap does not influence the calibration of the system.

HF sensors can be used with numerous metal pole wheels. Please note though that metals which are more conductive than steel reduce the air gap range since they dampen the sensor to a lesser extent.

HF Sensor (inductive) with amplifier

DSH...V



FUNCTION

HF speed sensors with amplifier are suitable for generating speed signals from metallic (not necessarily ferrous) pole wheels.

They exhibit either dynamic or static behaviour with signal generation guaranteed down to between 0 and 0.05Hz.

The sensing element is an oscillator circuit at the face of the sensor. A metallic pole wheel passing the sensor head influences the damping in the oscillator. This modulation is converted to a square wave output signal by an amplifier with trigger characteristics and a short circuit output stage.

CONNECTION AND INSTALLATION

Connection

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

1) A screened 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 the maximum sensor 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-31081.

Mounting

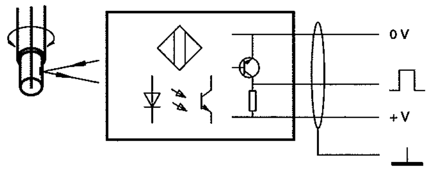
The sensor is mounted with its centre over the centre of the pole wheel. With gear wheels or slots and radial mounting, the sensor is normally fixed over the middle of the wheel. Dependent on the gear width, a degree of axial movement is permissible. The centre of the sensor must however remain a minimum of 3 mm from the edge of the wheel under all operating conditions.

It is important to ensure a rigid, vibration free mounting of the sensor. Sensor vibration in relation to the pole wheel may induce additional pulses.

The sensors are insensitive to oil, grease etc. and can be used in arduous conditions. Should the cable come into contact with aggressive materials then teflon cable should be specified. During installation the optimum sensor to pole wheel gap should be set. On no account should the sensor come into contact with the pole wheel during operation. The air gap does not influence the calibration of the system.

Photo-electric reflective sensor

DSR



FUNCTION

Photoelectric reflective sensors are suitable for speed measurements down to zero speed. They can also be used for simple position measurements.

These sensors essentially consist of an optoelectronic sensor that is illuminated by a LED. The phototransistor signal is amplified by an amplifier having a trigger characteristic. The LED and phototransistor sit adjacent on the same plane behind common optics. One or more equidistant reflective markers on the shaft being sensed are illuminated by the LED integrated in the sensor.

The light is only reflected to the phototransistor when the marker passes by. The phototransistor signal is amplified and provided as a square wave output signal with frequency proportional to speed.

CONNECTION AND INSTALLATION

Connection

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

1) A screened 3 core 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 the maximum sensor 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-31081.

Mounting

The sensor is mounted with its centre over the centre of the reflective markers. With gear wheels or slots and radial mounting, the sensor is normally fixed over the middle of the wheel. A degree of axial movement is then permissible.

It is important to ensure a rigid, vibration free mounting of the sensor. Sensor vibration in relation to the pole wheel may induce additional pulses.

The sensors are insensitive to oil, grease etc. and can be used in arduous conditions. Eventual interference through external light must be avoided and the optics should not become obscured during operation. Should the cable come into contact with aggressive materials then teflon cable should be specified. During installation the optimum sensor to shaft gap should be set. The air gap does not influence the calibration of the system.