



# DSE...Z

## **Electromagnetic Sensors, without line amplifier**

## 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  $U_n$  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  $D_p$  and speed (n) can be calculated as follows:

$$U_{g0,1} = \frac{U_n \times n \times D_p \times \pi}{60 \times 5}$$

$$U_{g0,1} = \text{Sensor voltage (Vpp) at air gap } d = 0.1 \text{ mm}$$

where

$$U_n = \text{Sensor voltage (Vpp) under standard measurement conditions}$$

$$n = \text{Pole wheel speed in rpm}$$

$$D_p = \text{Pole wheel diameter in metres}$$

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  $U_g$  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  $N_{100}$  as a function of the pole wheel to core gap  $D_k$  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  $N_{100}$  for a given pole wheel to core gap  $D_k$  for other types, multiply the value from the curve for  $N_{100}$  by the factor  $K_n$  (Table 1 column 5).

The generally applicable formula to determine the minimum measurable speed  $N_{min}$  for any sensor type and known values for pole wheel diameter  $D_p$  (m) and gap  $D_k$  is:

$$N_{min} (D_k) = N_{100} \times K_n \times 0.1 D_p$$

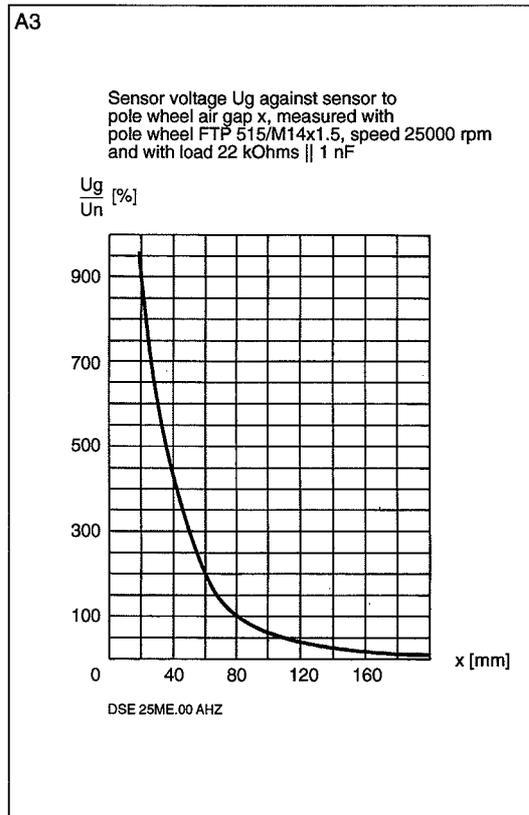
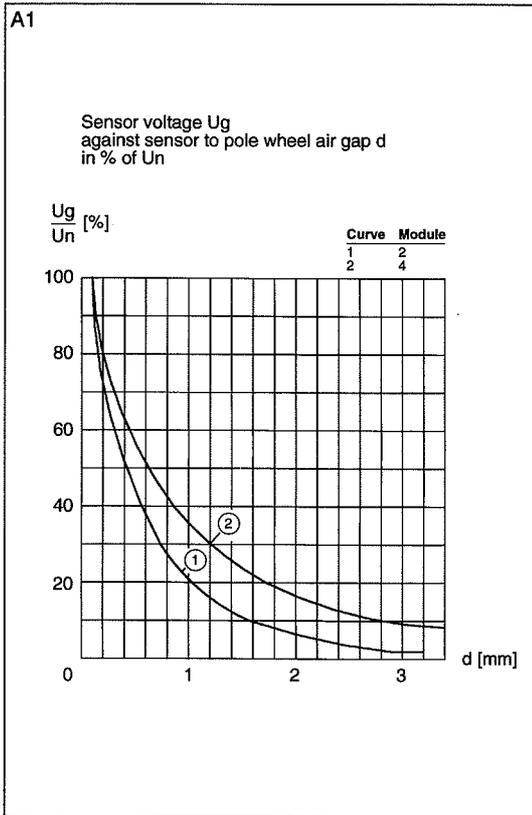
To determine  $N_{min}$  for a given sensor air gap  $d$ , the relationship  $D_k = f(d)$  (column 6) for the sensor in question must be factored in finally the calculated value for  $N_{min}$  will need to be adjusted by the ratio  $A$  (mVrms)/50 mVrms for instrument sensitivity other than the 50 mV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

**Table 1**  
**Technical Data (overview)**

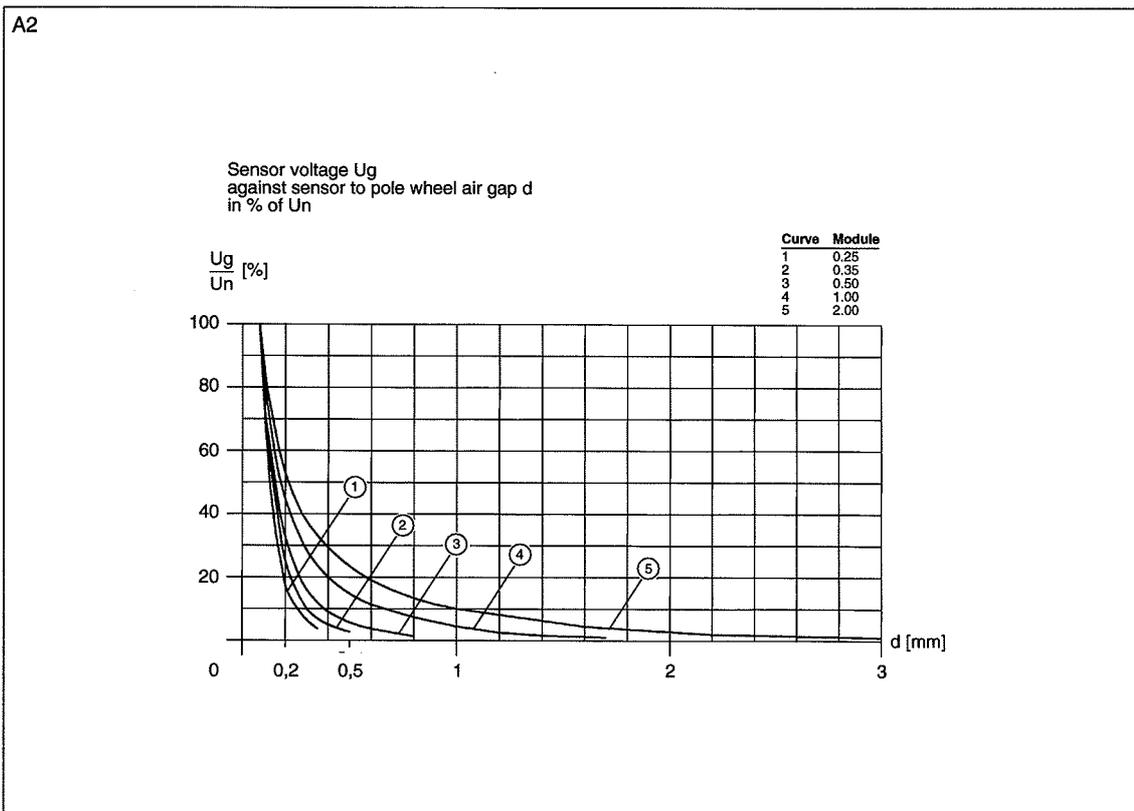
Type	Output-voltage Un <sup>1)</sup> [Vpp]	Module		Factor Kn	Relation- ship DK=f(d) [mm]	Characteristic		Coil Resis- tance Ri [Ω] ±20%	Coil Induc- tance Li [mH] ±20%	Core Ø [mm]
		Standard Pole wheel	Range			Diag. A Nr.	Diag. B Nr.			
DSE 0603.00SHZ	10	0.5	0.25...>2	1.0	Dk = d	A2/all	B2/all	3900	550	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 1010.00TZ	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 <sup>2)</sup>	4 pole magnet wheel	—	—	X = 80	A3/1	C2/all	400	2100	12.0

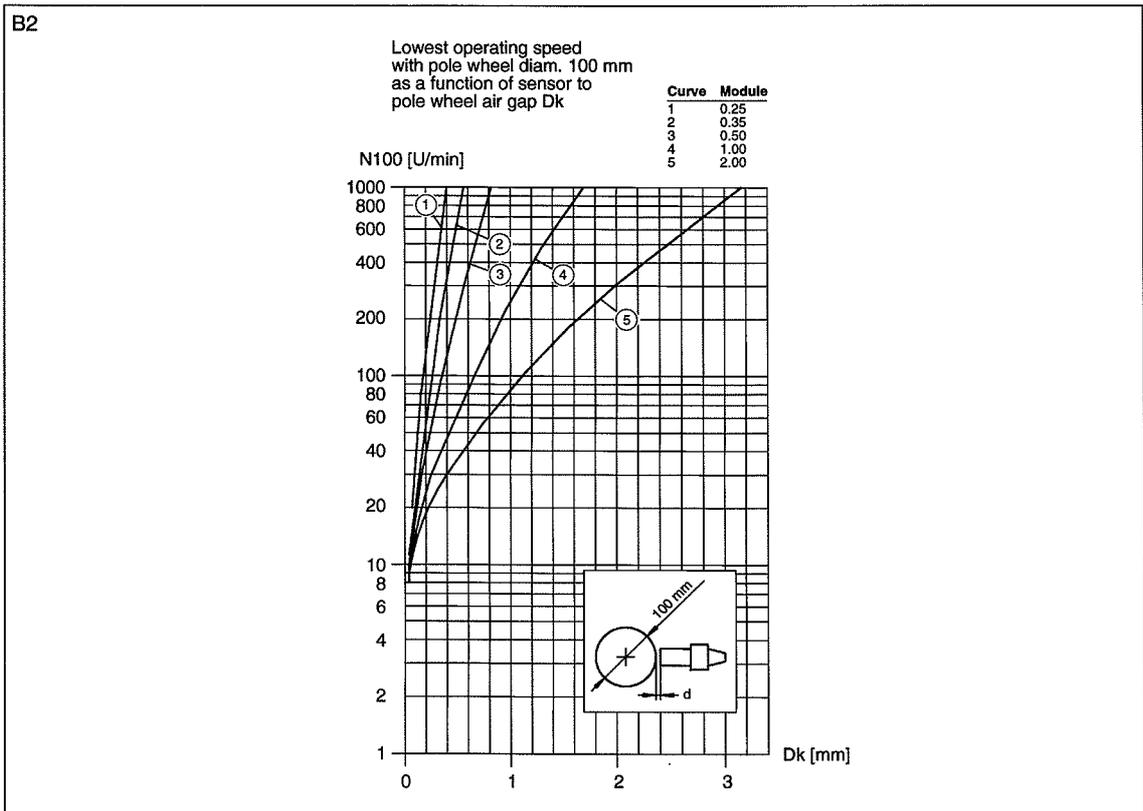
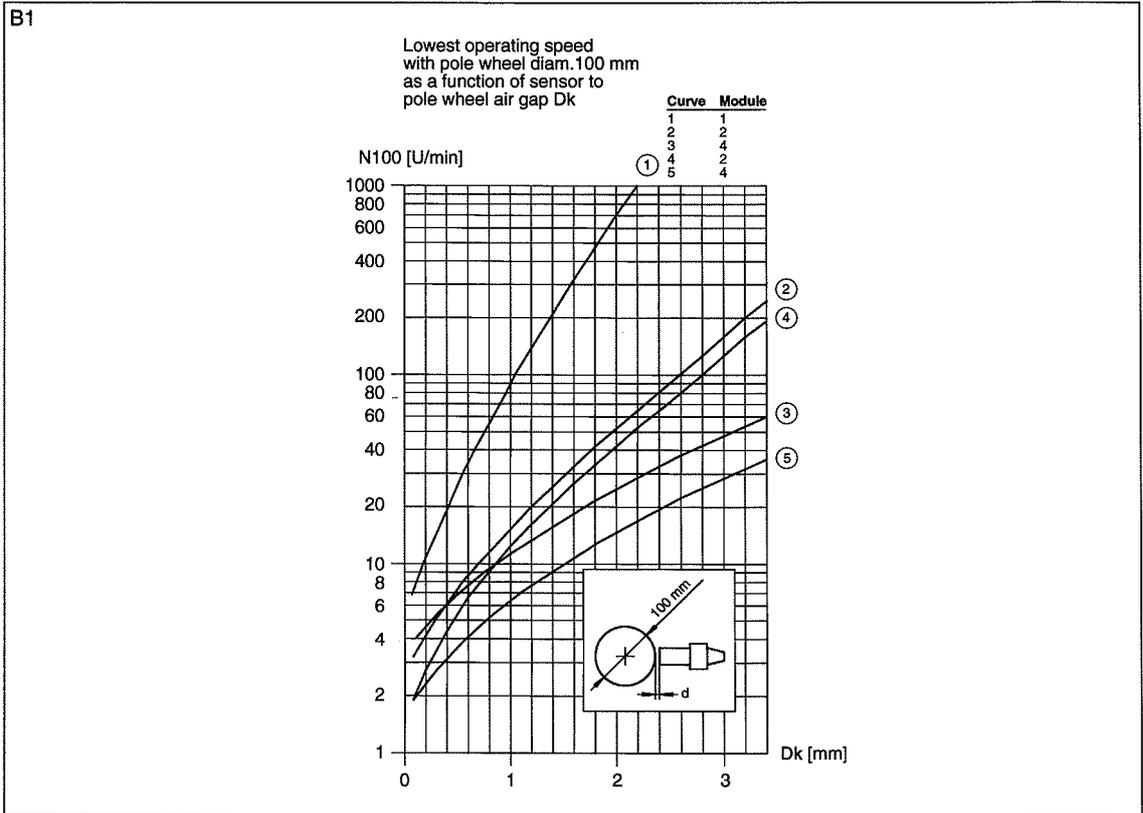
1) Measured with angular speed of 5 m/s. Standard polewheel module and air gap 0.1 mm.  
2) Standard measurement conditions per diagram A3.

# Electromagnetic Sensor without line amplifier



DIAGRAMS AND CHARACTERISTICS

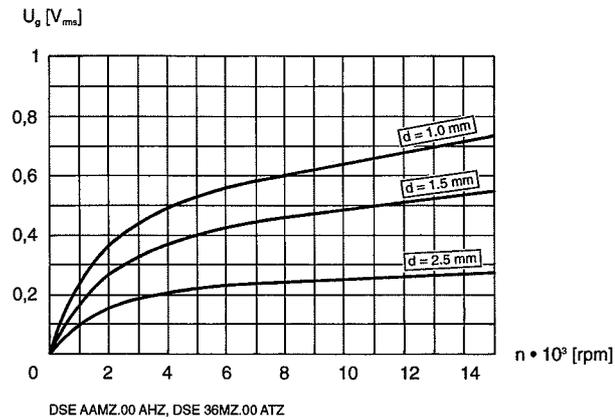




# Electromagnetic Sensor without line amplifier

C1

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

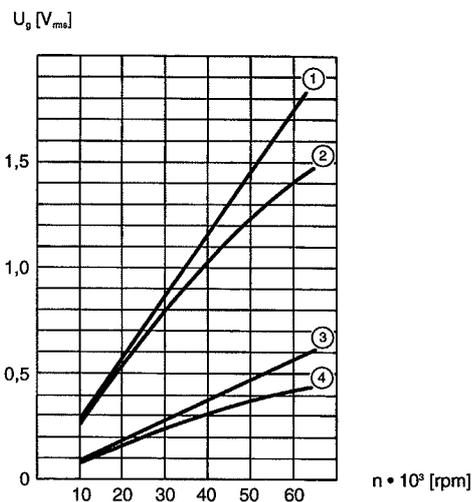


DIAGRAMS AND CHARACTERISTICS

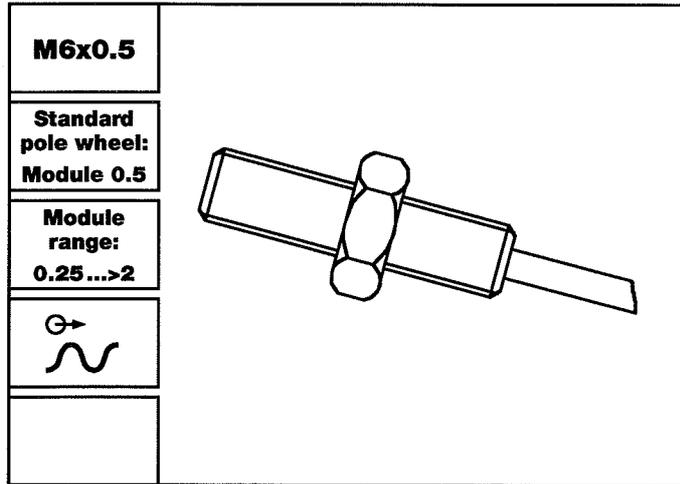
C2

- 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



## DSE 0603 S

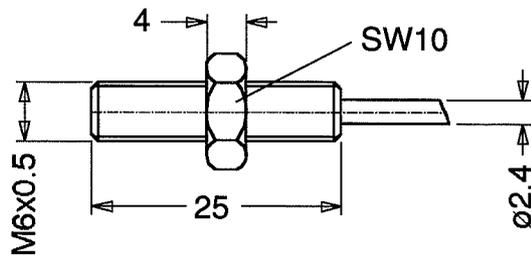


### Features

- Without line amplifier
- Lower frequency limit: 10 Hz
- High temperature version

## Dimensions

### Version S



## Model overview

Type	Part Nr.	Connection	Housing thread	Weight [g]	Operating temperature [°C]	Notes
DSE 0603.00 SHZ	304Z-03355	Cable 0.2 m	M6x0.5	6	-20...+130	previously FTG 160 SH

# Electromagnetic Sensor without line amplifier

## Technical Data

### Supply

Power supply Active sensor without power supply.  
Reverse polarity protection.  
No current consumption. Coil inductance acc. to Technical Data (see table 1).

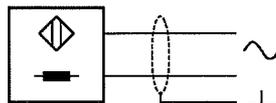
### Input

Frequency range ~10 Hz...25 kHz  
Noise immunity Cable shield connected to the supply negative pole. Noise generator between housing and electronics.  
1.5 kV/1.5 ms/max. 5 Hz (source resistance 500 Ω),  
2.0 kV/HF-bursts (level 4 in accordance with IEC 801-4),  
2.5 kV/1 MHz damped resonance (class III in accordance with IEC 255-4).  
Pole wheel Ferromagnetic toothed wheel i.e. Ust37-2, involute gear form preferred.  
Module  $\geq 1$ , min. tooth width 6 mm, side offset with min. tooth width:  $< 0.2$  mm, eccentricity  $< 0.2$  mm.  
Pole wheel-sensor gap  $\geq 0.1$  mm. Gap depending on rotational speed (circumferential) and module acc. to diagrams A2, B2 and Technical Data (see table 1).

### Output

Signal output A.C. voltage, approx. sinusoidal. Amplitude dependent on rotational speed, pole wheel-sensor gap, pole dimensions and structural shape (involute gear form preferred). Characteristics in diagram A2 show the dependence on gap d.  
Diagram B2 shows lowest measuring speed N100 for different modules and gaps d.  
Output voltage  $U_n$  at rotational speed of 5 m/sec is the reference value.  
(i.e. at pole wheel- $\varnothing$  64 mm,  $n = 1500 \text{ min}^{-1}$ ) acc. to Technical Data (see table 1).  
Short circuit proof and protected against reverse polarity.

### Connection



Shield to be connected with 0 V of power supply.

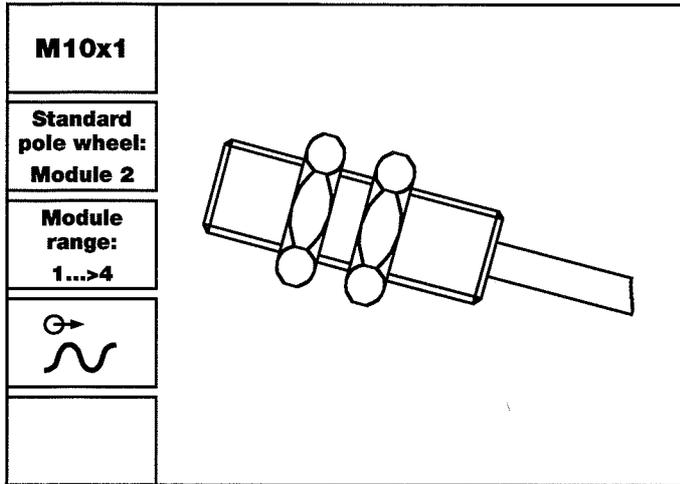
### Mechanical

Protection class IP 67 (head), IP 67 (cable connection).  
Vibration immunity 20  $g_n$  in the range 5...2000 Hz.  
Shock immunity 50  $g_n$  during 20 ms, half sine wave.  
Operating temperature Acc. to model overview.  
Insulation Housing and electronics galvanically isolated (500 V/50 Hz/1 min).  
Housing Stainless Steel 1.4305, electronic components potted in a chemical- and age-proof synthetic resin.  
Dimensions acc. to model overview and dimensional drawings.  
Weight Acc. to model overview.  
Operating instructions 304E-63919

### Versions

Version SH Teflon cable: Part nr. 824L-35647, 2wire, 2 x 0.092 mm<sup>2</sup> (AWG 28), stranded wire (metal net insulated from the housing), white.  
Outer  $\varnothing$  max. 2.4 mm, bending radius min. 24 mm, weight 9 g/m.  
Standard length for version SH: 0.2 m.

## DSE 1010 S

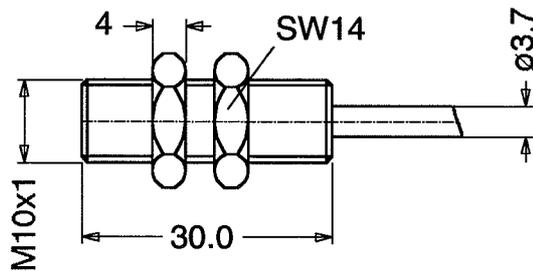


### Features

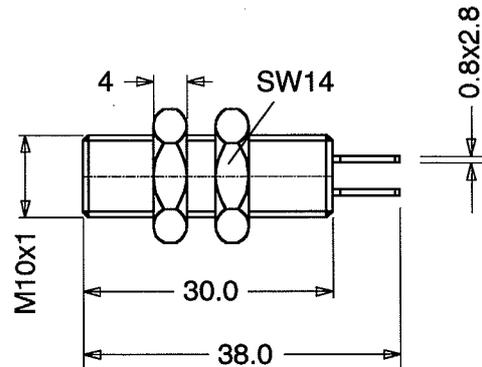
- Without line amplifier
- Lower frequency limit: 10 Hz

## Dimensions

**Version S**



**Version Z**



## Model overview

Type	Part Nr.	Connection	Housing thread	Weight [g]	Operating temperature [°C]	Notes
DSE 1010.00 STZ	304Z-03139	Cable 3 m	M10x1	15	-20...+85	previously FTG 242 K(S)
DSE 1010.00 ZTZ	304Z-03174	Flat pin terminal	M10x1	15	-20...+85	previously FTG 242 M(Z)

# Electromagnetic Sensor without line amplifier

## Technical Data

### Supply

Power supply Active sensor without power supply.  
Reverse polarity protection.  
No current consumption. Coil inductance acc. to Technical Data (see table 1).

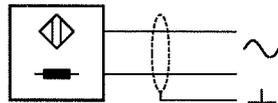
### Input

Frequency range ~10 Hz...50 kHz  
Noise immunity Cable shield connected to the supply negative pole. Noise generator between housing and electronics.  
1.5 kV/1.5 ms/max. 5 Hz (source resistance 500  $\Omega$ ),  
2.0 kV/HF-bursts (level 4 in accordance with IEC 801-4),  
2.5 kV/1 MHz damped resonance (class III in accordance with IEC 255-4).  
Pole wheel Ferromagnetic toothed wheel i.e. Ust37-2, involute gear form preferred.  
Module  $\geq 1$ , min. tooth width 6 mm, side offset with min. tooth width:  $< 0.2$  mm,  
eccentricity  $< 0.2$  mm.  
Pole wheel-sensor gap  $\geq 0.1$  mm. Gap depending on rotational speed (circumferential) and module acc. to diagrams A1, B1 and Technical Data (see table 1).

### Output

Signal output A.C. voltage, approx. sinusoidal. Amplitude dependent on rotational speed, pole wheel-sensor gap, pole dimensions and structural shape (involute gear form preferred). Characteristics in diagram A1 show the dependence on gap d.  
Diagram B shows lowest measuring speed N100 for different modules and gaps d.  
Output voltage  $U_n$  at rotational speed of 5 m/sec is the reference value.  
(i.e. at pole wheel- $\varnothing$  64 mm,  $n = 1500 \text{ min}^{-1}$ ) acc. to Technical Data (see table 1).  
Short circuit proof and protected against reverse polarity.

### Connection



Shield to be connected with 0 V of power supply.

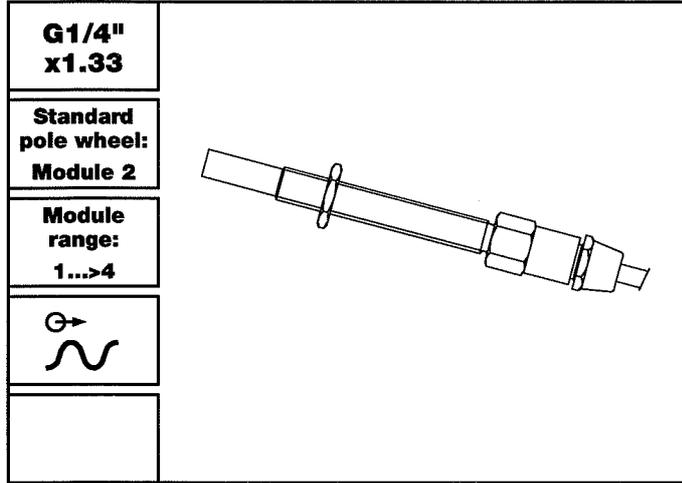
### Mechanical

Protection class IP 68 (head), IP 67 (cable connection), IP00 (tab connection).  
Vibration immunity 20  $g_n$  in the range 5...2000 Hz.  
Shock immunity 50  $g_n$  during 20 ms, half sine wave.  
Operating temperature Acc. to model overview.  
Insulation Housing and electronics galvanically isolated (500 V/50 Hz/1 min).  
Housing Argentan (German silver) CuNi10Zn42Pb DIN 2.0770, front side hermetically sealed, 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 instructions 304E-63918

### Versions

Version ST PVC cable: Part nr. 824L-35546, 2wire, 2 x 0.22 mm<sup>2</sup> (AWG 24), stranded wire (thermoplastic screening with continuity conductor, insulated from housing), grey. Outer  $\varnothing$  max. 4.2 mm, bending radius min. 60 mm, weight 19 g/m.  
Version ZT AMP connection: Part nr. 820K-31633, 0.8x2.8 DIN 46244,  
Flat pin terminal: Part nr. 820K-31636, 0.8x2.8 DIN 46245.

## DSE AD10 A, S

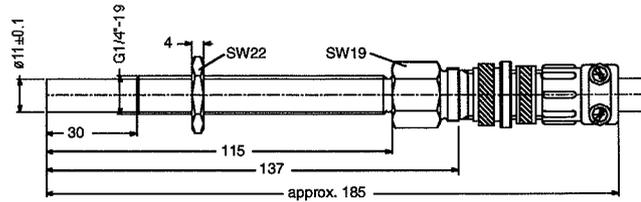


### Features

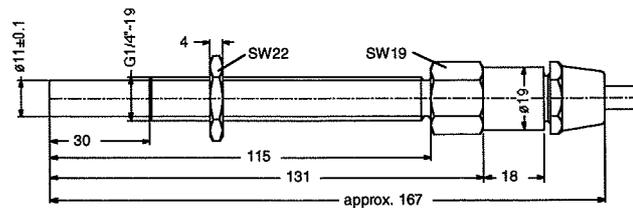
- Without line amplifier
- Turbocharger application
- High temperature version

## Dimensions

### Version A



### Version S



## Model overview

Type	Part Nr.	Connection	Housing thread	Weight [g]	Operating temperature [°C]	Notes
DSE AD10.00 AHZ	304Z-03181	Connector	G1/4"x1.33	150	-20...+150	previously FTG 231 A
DSE AD10.00 SHZ	304Z-03182	Cable 5 m	G1/4"x1.33	520	-20...+150	previously FTG 231 S

# Electromagnetic Sensor without line amplifier

## Technical Data

### Supply

Power supply Active sensor without power supply.  
Reverse polarity protection.  
No current consumption. Coil inductance acc. to Technical Data (see table 1).

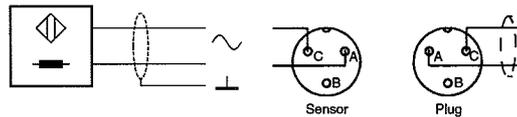
### Input

Frequency range ~10 Hz...50 kHz (acc. to specifications for turbocharger).  
Noise immunity Cable shield connected to the supply negative pole. Noise generator between housing and electronics.  
1.5 kV/1.5 ms/max. 5 Hz (source resistance 500  $\Omega$ ),  
2.0 kV/HF-bursts (level 4 in accordance with IEC 801-4),  
2.5 kV/1 MHz damped resonance (class III in accordance with IEC 255-4).  
Pole wheel Ferromagnetic toothed wheel i.e. Ust37-2, involute gear form preferred.  
Module  $\geq 1$ , min. tooth width 6 mm, side offset with min. tooth width:  $< 0.2$  mm, eccentricity  $< 0.2$  mm. Or acc. to specifications for turbocharger.  
Pole wheel-sensor gap  $\geq 0.1$  mm. Gap depending on rotational speed (circumferential) and module acc. to diagrams A1, B1 and Technical Data (see table 1).

### Output

Signal output A.C. voltage, approx. sinusoidal. Amplitude dependent on rotational speed, pole wheel-sensor gap, pole dimensions and structural shape (involute gear form preferred). Characteristics in diagram A1 show the dependence on gap d.  
Diagram B shows lowest measuring speed N100 for different modules and gaps d. Output voltage  $U_n$  at rotational speed of 5 m/sec is the reference value.  
(i.e. at pole wheel- $\varnothing$  64 mm,  $n = 1500 \text{ min}^{-1}$ ) acc. to Technical Data (see table 1).  
Short circuit proof and protected against reverse polarity.

### Connection



Shield to be connected with 0 V of power supply.

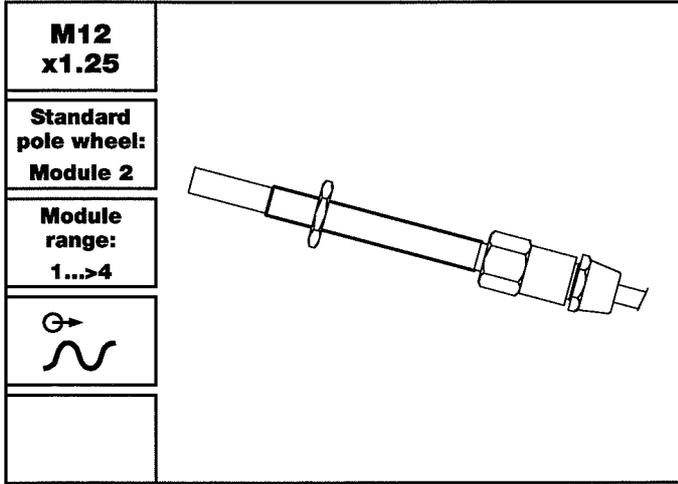
### Mechanical

Protection class IP 68 (head), IP 67 (cable connection), IP 50 (jack connection)  
Vibration immunity 20  $g_n$  in the range 5...2000 Hz.  
Shock immunity 50  $g_n$  during 20 ms, half sine wave.  
Operating temperature Acc. to model overview.  
Insulation Housing and electronics galvanically isolated (500 V/50 Hz/1 min).  
Housing Stainless steel 1.4305, front side hermetically sealed, electronic components potted in a chemical- and age-proof synthetic resin.  
Dimensions acc. to model overview and dimensional drawings.  
Weight Acc. to model overview.  
Operating instructions 304E-63922

### Versions

Version SH Teflon cable: Part nr. 824L-31841, 2wire, 2 x 0.75 mm<sup>2</sup>, stranded wire (metal net insulated from the housing), black. Outer  $\varnothing$  max. 5.0 mm, bending radius min. 80 mm, weight 45 g/m.  
Standard length for version SH: 5 m.  
Version AH Connection type: 820E-31142. Connection plug: 820E-31141.

## DSE 1210 A, S

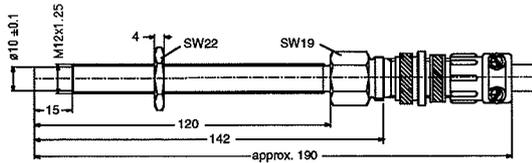


### Features

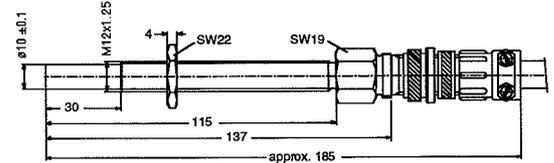
- Without line amplifier
- Turbocharger application
- High temperature version

## Dimensions

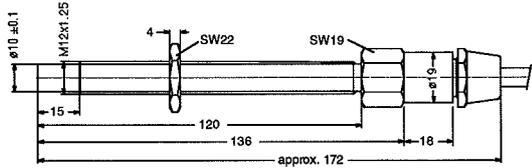
### Version A .01



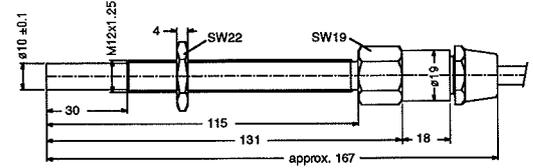
### .02



### Version S .01



### .02



## Model overview

Type	Part Nr.	Connection	Housing thread	Weight [g]	Operating temperature [°C]	Notes
DSE 1210.01 ATZ	304Z-03106	Connector	M12x1.25	150	-20...+85	previously FTG 232 A
DSE 1210.01 STZ	304Z-03107	Cable 5 m	M12x1.25	520	-20...+85	previously FTG 232 S
DSE 1210.02 AHZ	304Z-03109	Connector	M12x1.25	150	-20...+150	previously FTG 233 A
DSE 1210.02 SHZ	304Z-03110	Cable 5 m	M12x1.25	520	-20...+150	previously FTG 233 S

# Electromagnetic Sensor without line amplifier

## Technical Data

### Supply

Power supply Active sensor without power supply.  
Reverse polarity protection.  
No current consumption. Coil inductance acc. to Technical Data (see table 1).

### Input

Frequency range ~10 Hz...50 kHz  
Noise immunity Cable shield connected to the supply negative pole. Noise generator between housing and electronics.  
1.5 kV/1.5 ms/max. 5 Hz (source resistance 500  $\Omega$ ),  
2.0 kV/HF-bursts (level 4 in accordance with IEC 801-4),  
2.5 kV/1 MHz damped resonance (class III in accordance with IEC 255-4).

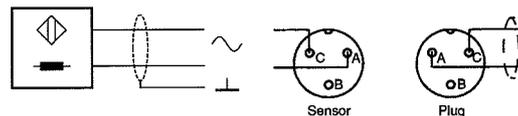
### Pole wheel

Ferromagnetic toothed wheel i.e. Ust37-2, involute gear form preferred.  
Module  $\geq 1$ , min. tooth width 6 mm, side offset with min. tooth width:  $< 0.2$  mm, eccentricity  $< 0.2$  mm or acc. to specifications for turbocharger.  
Pole wheel-sensor gap  $\geq 0.1$  mm. Gap depending on rotational speed (circumferential) and module acc. to diagrams A1, B1 and Technical Data (see table 1).

### Output

Signal output A.C. voltage, approx. sinusoidal. Amplitude dependent on rotational speed, pole wheel-sensor gap, pole dimensions and structural shape (involute gear form preferred). Characteristics in diagram A show the dependence on gap d.  
Diagram B shows lowest measuring speed N100 for different modules and gaps d. Output voltage  $U_n$  at rotational speed of 5 m/sec is the reference value.  
(i.e. at pole wheel- $\varnothing$  64 mm,  $n = 1500$  min $^{-1}$ ) acc. to Technical Data (see table 1).  
Short circuit proof and protected against reverse polarity.

### Connection



Shield to be connected with 0 V of power supply.

### Mechanical

Protection class IP68 (head version H), IP64 (head version T), IP67 (cable connection), IP50 (jack connection).  
Vibration immunity 20  $g_n$  in the range 5...2000 Hz.  
Shock immunity 50  $g_n$  during 20 ms, half sine wave.  
Operating temperature Acc. to model overview.  
Insulation Housing and electronics galvanically isolated (500 V/50 Hz/1 min).  
Housing Stainless steel 1.4305, front side hermetically sealed (H-version), electronic components potted in a chemical- and age-proof synthetic resin.  
Dimensions acc. to model overview and dimensional drawings.  
Weight Acc. to model overview.  
Operating instructions 304E-63922

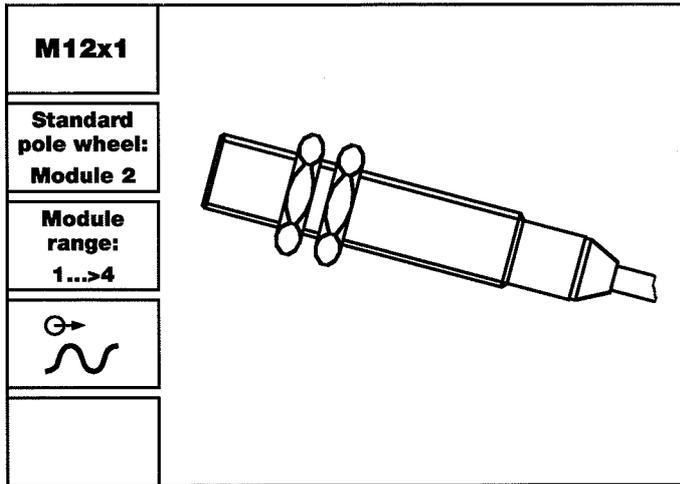
### Versions

Version ST PVC cable: Part nr. 824L-30894, 2wire, 2 x 0.75 mm $^2$ , stranded wire (metal net insulated from the housing), grey.  
Outer  $\varnothing$  max. 6,7 mm, bending radius min. 60 mm, weight 70 g/m.

Version SH Teflon cable: Part nr. 824L-31841, 2wire, 2 x 0.75 mm $^2$ , stranded wire (metal net insulated from the housing), black. Outer  $\varnothing$  max. 5.0 mm, bending radius min. 80 mm, weight 45 g/m.  
Standard length for version SH: 2 m, 5 m.

Version AH Connection type: 820E-31142. Connection plug: 820E-31141.

## DSE 1210 A, S, M

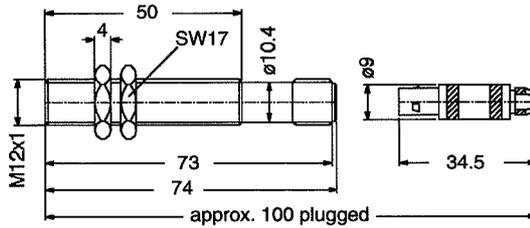


### Features

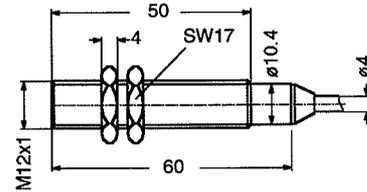
- Without line amplifier
- High temperature version

## Dimensions

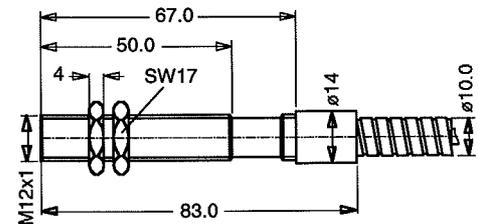
### Version A



### Version S



### Version M



## Model overview

Type	Part Nr.	Connection	Housing thread	Weight [g]	Operating temperature [°C]	Notes
DSE 1210.00 SHZ	304Z-04233	Cable 2 m	M12x1	100	-40...+150	Standard
DSE 1210.00 AHZ	304Z-04235	Connector	M12x1	35	-40...+150	Standard
DSE 1210.00 STZ	304Z-04232	Cable 5 m	M12x1	160	-20...+85	Standard
DSE 1210.00 ATZ	304Z-04234	Connector	M12x1	35	-40...+85	Standard
DSE 1210.00 MTZ	304Z-04236	Protection hose 5 m	M12x1	495	-20...+85	Standard

# Electromagnetic Sensor without line amplifier

## Technical Data

### Supply

Power supply Active sensor without power supply.  
Reverse polarity protection.  
No current consumption. Coil inductance acc. to Technical Data (see table 1).

### Input

Frequency range ~10 Hz...50 kHz  
Noise immunity Cable shield connected to the supply negative pole. Noise generator between housing and electronics.  
1.5 kV/1.5 ms/max. 5 Hz (source resistance 500  $\Omega$ ),  
2.0 kV/HF-bursts (level 4 in accordance with IEC 801-4),  
2.5 kV/1 MHz damped resonance (class III in accordance with IEC 255-4).

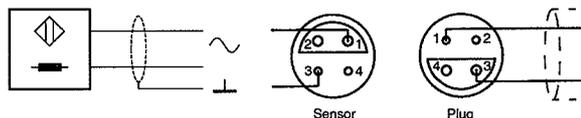
### Pole wheel

Ferromagnetic toothed wheel i.e. Ust37-2, involute gear form preferred.  
Module  $\geq 1$ , min. tooth width 6 mm, side offset with min. tooth width:  $< 0.2$  mm, eccentricity  $< 0.2$  mm or acc. to specifications for turbocharger.  
Pole wheel-sensor gap  $\geq 0.1$  mm. Gap depending on rotational speed (circumferential) and module acc. to diagrams A1, B1 and Technical Data (see table 1).

### Output

Signal output A.C. voltage, approx. sinusoidal. Amplitude dependent on rotational speed, pole wheel-sensor gap, pole dimensions and structural shape (involute gear form preferred). Characteristics in diagram A1 show the dependence on gap d.  
Diagram B shows lowest measuring speed N100 for different modules and gaps d. Output voltage  $U_n$  at rotational speed of 5 m/sec is the reference value.  
(i.e. at pole wheel- $\varnothing$  64 mm,  $n = 1500$  min<sup>-1</sup>) acc. to Technical Data (see table 1).  
Short circuit proof and protected against reverse polarity.

### Connection



Shield to be connected with 0 V of power supply.

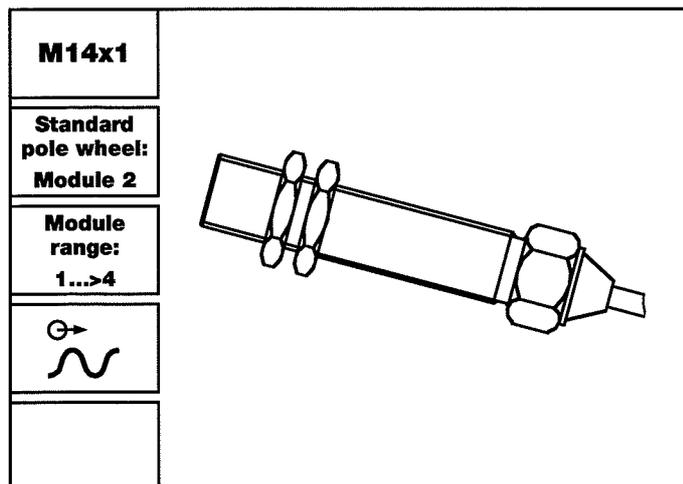
### Mechanical

Protection class IP68 (head), IP67 (cable connection), IP50 (jack connection).  
Vibration immunity 20 g<sub>n</sub> in the range 5...2000 Hz.  
Shock immunity 50 g<sub>n</sub> during 20 ms, half sine wave.  
Operating temperature Acc. to model overview.  
Insulation Housing and electronics galvanically isolated (500 V/50 Hz/1 min).  
Housing Stainless steel 1.4305, front side hermetically sealed, electronic components potted in a chemical- and age-proof synthetic resin.  
Dimensions acc. to model overview and dimensional drawings.  
Weight Acc. to model overview.  
Operating instructions 304E-63918

### Versions

Version ST PVC cable: Part nr. 824L-35546, 2wire, 2 x 0.22 mm<sup>2</sup> (AWG 24), stranded wire (thermoplastic screening with continuity conductor, insulated from housing), grey. Outer  $\varnothing$  max. 4.2 mm, bending radius min. 60 mm, weight 19 g/m.  
Version SH Teflon cable: Part nr. 824L-35053, 4wire, 2 x 0.22 mm<sup>2</sup> (AWG 24), stranded wire (metal net insulated from the housing), white. Outer  $\varnothing$  max. 4.0 mm, bending radius min. 60 mm, weight 32 g/m. Standard length for version SH: 2 m, 5 m.  
Version MT Protection hose over PVC cable: Part nr. 825G-36148, tube made of profile milled steel plate with PUR cover, blue. Weather and water proof, conditionally oil and acid resistant. Outer  $\varnothing$  10 mm, bending radius min. 45 mm, weight 75 g/m. Standard length for version MT: 5 m.  
Version A Connection type: 820A-35922. Connection plug: 820A-35921.

## DSE 1410 A, S, M

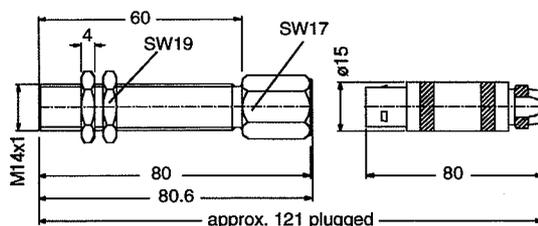


### Features

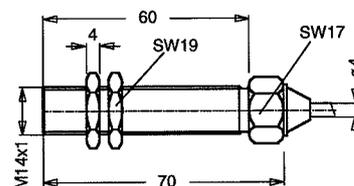
- Without line amplifier
- High temperature version

## Dimensions

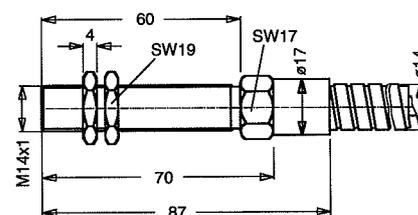
### Version A



### Version S



### Version M



## Model overview

Type	Part Nr.	Connection	Housing thread	Weight [g]	Operating temperature [°C]	Notes
DSE 1410.00 ATZ	304Z-04239	Connector	M14x1	90	-20...+85	Standard
DSE 1410.00 AHZ	304Z-04240	Connector	M14x1	90	-40...+150	Standard
DSE 1410.00 STZ	304Z-04237	Cable 5 m	M14x1	210	-20...+85	Standard
DSE 1410.00 SHZ	304Z-04238	Cable 2 m	M14x1	150	-40...+150	Standard
DSE 1410.00 MTZ	304Z-04241	Protection hose 5 m	M14x1	835	-20...+85	Standard

# Electromagnetic Sensor without line amplifier

## Technical Data

### Supply

Power supply Active sensor without power supply.  
Reverse polarity protection.  
No current consumption. Coil inductance acc. to Technical Data (see table 1).

### Input

Frequency range ~10 Hz...50 kHz  
Noise immunity Cable shield connected to the supply negative pole. Noise generator between housing and electronics.  
1.5 kV/1.5 ms/max. 5 Hz (source resistance 500 Ω),  
2.0 kV/HF-bursts (level 4 in accordance with IEC 801-4),  
2.5 kV/1 MHz damped resonance (class III in accordance with IEC 255-4).

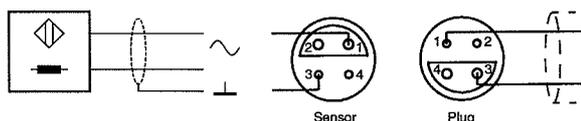
### Pole wheel

Ferromagnetic toothed wheel i.e. Ust37-2, involute gear form preferred.  
Module  $\geq 1$ , min. tooth width 6 mm, side offset with min. tooth width:  $< 0.2$  mm,  
eccentricity  $< 0.2$  mm.  
Pole wheel-sensor gap  $\geq 0.1$  mm. Gap depending on rotational speed (circumferential) and module acc. to diagrams A1, B1 and Technical Data (see table 1).

### Output

Signal output A.C. voltage, approx. sinusoidal. Amplitude dependent on rotational speed, pole wheel-sensor gap, pole dimensions and structural shape (involute gear form preferred). Characteristics in diagram A1 show the dependence on gap d.  
Diagram B shows lowest measuring speed N100 for different modules and gaps d. Output voltage  $U_n$  at rotational speed of 5 m/sec is the reference value.  
(i.e. at pole wheel- $\varnothing$  64 mm,  $n = 1500 \text{ min}^{-1}$ ) acc. to Technical Data (see table 1).  
Short circuit proof and protected against reverse polarity.

### Connection



Shield to be connected with 0 V of power supply.

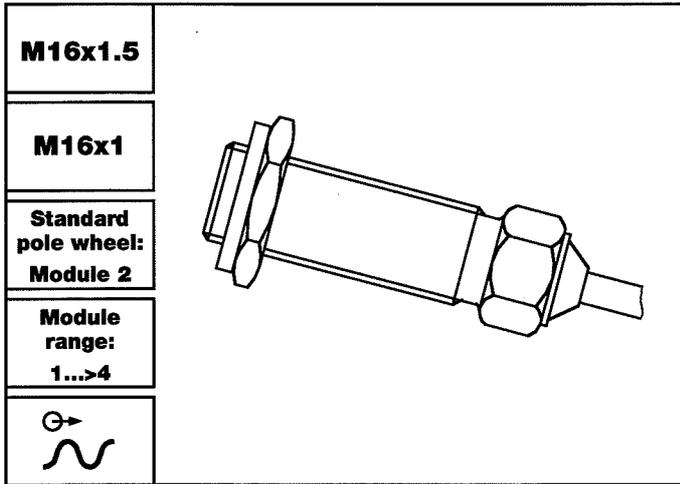
### Mechanical

Protection class IP68 (head), IP67 (cable connection), IP50 (jack connection).  
Vibration immunity 20  $g_n$  in the range 5...2000 Hz.  
Shock immunity 50  $g_n$  during 20 ms, half sine wave.  
Operating temperature Acc. to model overview.  
Insulation Housing and electronics galvanically isolated (500 V/50 Hz/1 min).  
Housing Stainless steel 1.4305, front side hermetically sealed, electronic components potted in a chemical- and age-proof synthetic resin.  
Dimensions acc. to model overview and dimensional drawings.  
Weight Acc. to model overview.  
Operating instructions 304E-63918

### Versions

Version ST PVC cable: Part nr. 824L-35546, 2wire, 2 x 0.22 mm<sup>2</sup> (AWG 24), stranded wire (thermoplastic screening with continuity conductor, insulated from housing), grey. Outer  $\varnothing$  max. 4.2 mm, bending radius min. 60 mm, weight 19 g/m.  
Version SH Teflon cable: Part nr. 824L-35053, 4wire, 2 x 0.22 mm<sup>2</sup> (AWG 24), stranded wire (metal net insulated from the housing), white. Outer  $\varnothing$  max. 4.0 mm, bending radius min. 60 mm, weight 32 g/m. Standard length for version SH: 2 m, 5 m.  
Version MT Protection hose over PVC cable: Part nr. 825G-30924, tube made of profile milled steel plate with PVC cover, grey. Weather and water proof, conditionally oil and acid resistant. Outer  $\varnothing$  14 mm, bending radius min. 40 mm, weight 130 g/m. Standard length for version MT: 5 m.  
Version A Connection type: 820A-35731. Connection plug: 820A-35732.

## DSE 1610 A, S, M

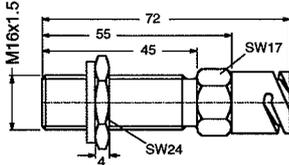


### Features

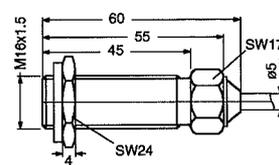
- Without line amplifier
- High temperature version
- Types .01 with gasket

### Dimensions

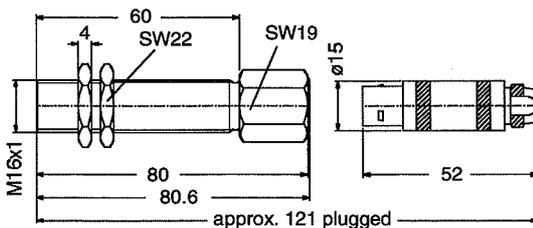
#### Version A .01



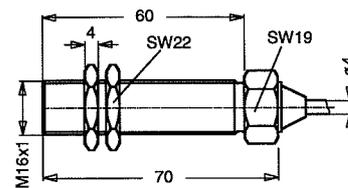
#### Version S .01



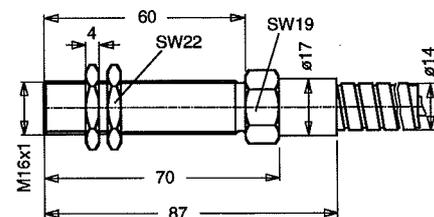
#### Version A .00



#### Version S .00



#### Version M



### Model overview

Type	Part Nr.	Connection	Housing thread	Weight [g]	Operating temperature [°C]	Notes
DSE 1610.01 AHZ	304Z-03774	Connector	M16x1.5	65	-40...+125	Standard
DSE 1610.01 SHZ	304Z-03773	Cable 1 m	M16x1.5	140	-40...+125	Standard
DSE 1610.00 ATZ	304Z-04244	Connector	M16x1	95	-20...+85	Standard
DSE 1610.00 AHZ	304Z-04245	Connector	M16x1	95	-40...+150	Standard
DSE 1610.00 STZ	304Z-04242	Cable 5 m	M16x1	215	-20...+85	Standard
DSE 1610.00 SHZ	304Z-04243	Cable 2 m	M16x1	155	-40...+150	Standard
DSE 1610.00 MTZ	304Z-04246	Protection hose 5 m	M16x1	840	-20...+85	Standard

# Electromagnetic Sensor without line amplifier

## Technical Data

### Supply

Power supply Active sensor without power supply, reverse polarity protection.  
No current consumption. Coil inductance acc. to Technical Data (see table 1).

### Input

Frequency range ~10 Hz...25 kHz

Noise immunity Cable shield connected to the supply negative pole. Noise generator between housing and electronics.

1.5 kV/1.5 ms/max. 5 Hz (source resistance 500 Ω),  
2.0 kV/HF-bursts (level 4 in accordance with IEC 801-4),  
2.5 kV/1 MHz damped resonance (class III in accordance with IEC 255-4).

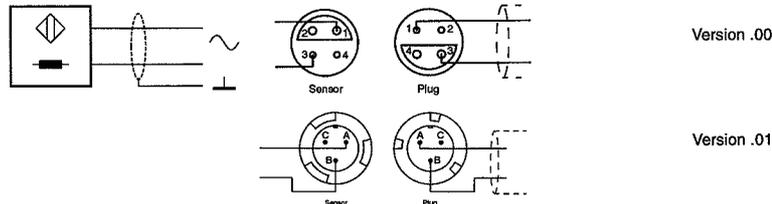
### Pole wheel

Ferromagnetic toothed wheel i.e. Ust37-2, involute gear form preferred.  
Module  $\geq 1$ , min. tooth width 3 mm, side offset with min. tooth width:  $< 0.2$  mm,  
eccentricity  $< 0.2$  mm. Pole wheel-sensor gap  $\geq 0.1$  mm. Gap depending on rotational speed (circumferential) and module acc. to diagrams A1, B1 and Technical Data (see table 1).

### Output

Signal output A.C. voltage, approx. sinusoidal. Amplitude dependent on rotational speed, pole wheel-sensor gap, pole dimensions and structural shape (involute gear form preferred). Characteristics in diagram A show the dependence on gap d. Diagram B shows lowest measuring speed N100 for different modules and gaps d. Output voltage  $U_n$  at rotational speed of 5 m/sec is the reference value. (i.e. at pole wheel- $\varnothing$  64 mm,  $n = 1500 \text{ min}^{-1}$ ) acc. to Technical Data (see table 1).  
Short circuit proof and protected against reverse polarity.

### Connection



Shield to be connected with 0 V of power supply.

### Mechanical

Protection class IP68 (head), IP67 (cable connection), IP50 (jack connection).

Vibration immunity  $20 g_n$  in the range 5...2000 Hz.

Shock immunity  $50 g_n$  during 20 ms, half sine wave.

Operating temperature Acc. to model overview.

Insulation Housing and electronics galvanically isolated (500 V/50 Hz/1 min).

Housing Stainless steel 1.4305, front side hermetically sealed, electronic components potted in a chemical- and age-proof synthetic resin. Dimensions acc. to model overview and dimensional drawings.

Weight Acc. to model overview.

Operating instructions 304E-63918: Version .00. 304E-63920: Version .01.

### Versions

Version ST PVC cable: Part nr. 824L-35546, 2wire,  $2 \times 0.22 \text{ mm}^2$  (AWG 24), stranded wire (thermoplastic screening with continuity conductor, insulated from housing), grey. Outer  $\varnothing$  max. 4.2 mm, bending radius min. 60 mm, weight 19 g/m.

Version SH .00 Teflon cable: Part nr. 824L-35053, 4wire,  $2 \times 0.22 \text{ mm}^2$  (AWG 24), stranded wire (metal net insulated from the housing), white. Outer  $\varnothing$  max. 4.0 mm, bending radius min. 60 mm, weight 32 g/m. Standard length for version SH: 2 m, 5 m.

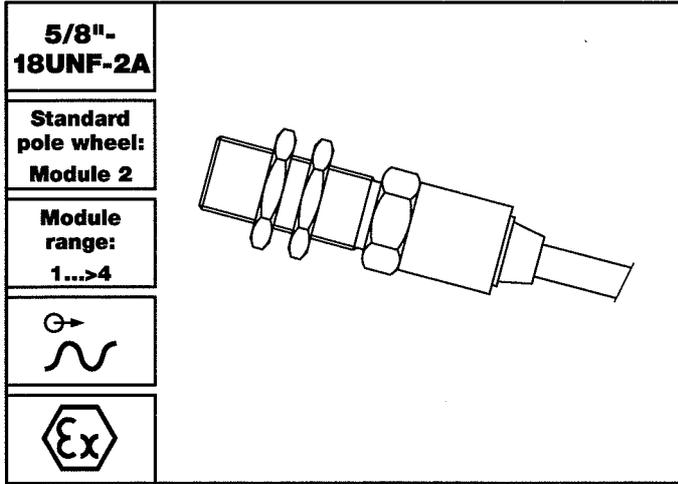
Version SH .01 Teflon cable: Part nr. 824L-31841, 2wire,  $2 \times 0.75 \text{ mm}^2$ , stranded wire (metal net insulated from the housing), black. Outer  $\varnothing$  max. 5.0 mm, bending radius min. 80 mm, weight 45 g/m. Standard length for version SH: 5 m.

Version MT Protection hose over PVC cable: Part nr. 825G-30924, tube made of profile milled steel plate with PVC cover, grey. Weather and water proof, conditionally oil and acid resistant. Outer  $\varnothing$  14 mm, bending radius min. 40 mm, weight 130 g/m. Standard length for version MT: 5 m.

Version .00 A Connection type: 820A-35731. Connection plug: 820A-35732.

Version .01 A Connection type: 820E-36087. Connection plug: 820E-36478.

## DSE EH10 A, S, M

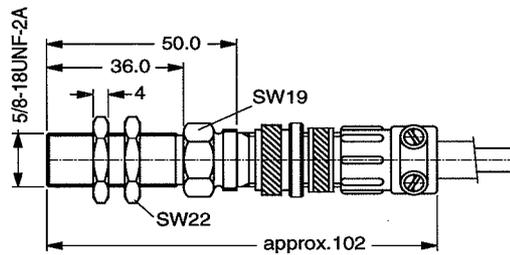


### Features

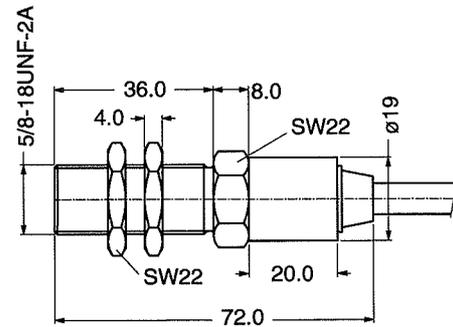
- Without line amplifier
- High temperature version
- Available as model FTG...Ex in intrinsically safe class Ex i G5 (zone 1)

### Dimensions

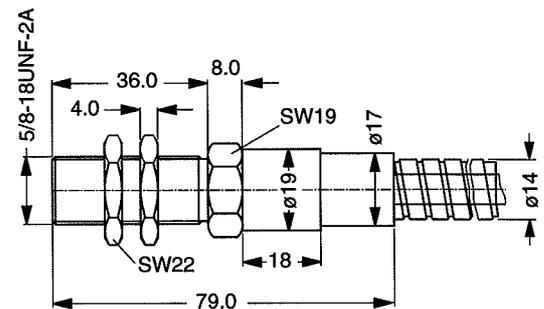
#### Version A



#### Version S



#### Version M



### Model overview

Type	Part Nr.	Connection	Housing thread	Weight [g]	Operating temp. [°C]	Notes
DSE EH10.00 STZ	304Z-04252	Cable 5 m	5/8"-18UNF-2A	450	-25...+85	prev. FTG 2110.00 S
DSE EH10.00 STZ Ex	347Z-04345	Cable 5 m	5/8"-18UNF-2A	450	-20...+65	prev. FTG 2150.00 S Ex
DSE EH10.00 MTZ	304Z-04256	Protection hose 5 m	5/8"-18UNF-2A	1200	-25...+85	prev. FTG 2110.00 M
DSE EH10.00 MTZ Ex	347Z-03969	Protection hose 5 m	5/8"-18UNF-2A	1200	-20...+65	prev. FTG 2150.00 SM Ex
DSE EH10.00 ATZ	304Z-04254	Connector	5/8"-18UNF-2A	80	-25...+85	prev. FTG 2110.00 A
DSE EH10.00 ATZ Ex	347Z-04313	Connector	5/8"-18UNF-2A	80	-20...+65	prev. FTG 2150.00 A Ex
DSE EH10.00 SHZ	304Z-04253	Cable 2 m	5/8"-18UNF-2A	220	-40...+150	prev. FTG 2210.00 S
DSE EH10.00 AHZ	304Z-04255	Connector	5/8"-18UNF-2A	80	-40...+150	prev. FTG 2210.00 A

# Electromagnetic Sensor without line amplifier

## Technical Data

### Supply

Power supply Active sensor without power supply. Reverse polarity protection.  
No current consumption. Coil inductance acc. to Technical Data (see table 1)

### Input

Frequency range ~10 Hz...25 kHz

Noise immunity Cable shield connected to the supply negative pole. Noise generator between housing and electronics.

1.5 kV/1.5 ms/max. 5 Hz (source resistance 500 Ω),  
2.0 kV/HF-bursts (level 4 in accordance with IEC 801-4),  
2.5 kV/1 MHz damped resonance (class III in accordance with IEC 255-4).

Pole wheel

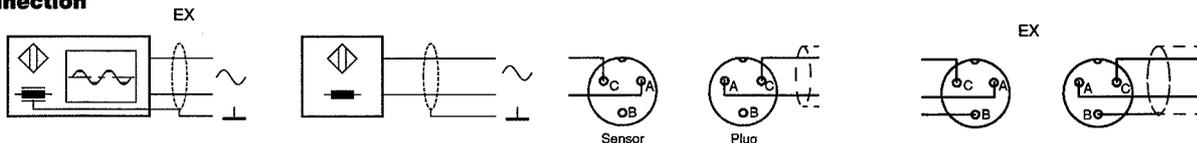
Ferromagnetic toothed wheel i.e. Ust37-2, involute gear form preferred.  
Module  $\geq 1$ , min. tooth width 6 mm, side offset with min. tooth width:  $< 0.2$  mm,  
eccentricity  $< 0.2$  mm.

Pole wheel-sensor gap  $\geq 0.1$  mm. Gap depending on rotational speed (circumferential) and module acc. to diagrams A1, B1 and Technical Data (see table 1).

### Output

Signal output A.C. voltage, approx. sinusoidal. Amplitude dependent on rotational speed, pole wheel-sensor gap, pole dimensions and structural shape (involute gear form preferred). Characteristics in diagram A show the dependence on gap d. Diagram B shows lowest measuring speed N100 for different modules and gaps d. Output voltage  $U_n$  at rotational speed of 5 m/sec is the reference value. (I.e. at pole wheel- $\varnothing$  64 mm,  $n = 1500 \text{ min}^{-1}$ ) acc. to Technical Data (see table 1).  
Short circuit proof and protected against reverse polarity.

### Connection



Shield to be connected with 0 V of power supply.

### Mechanical

Protection class IP67 (cable connection), IP50 (jack connection), IP68 (head).

Vibration immunity 20  $g_n$  in the range 5...2000 Hz.

Shock immunity 50  $g_n$  during 20 ms, half sine wave.

Operating temperature Acc. to model overview.

Insulation Housing, cable screen and system galvanically isolated (500 V/50 Hz/1 min).

Housing Stainless steel 1.4305, front side hermetically sealed, electronic components potted in a chemical- and age-proof synthetic resin.

Dimensions acc. to model overview and dimensional drawings.

Weight Acc. to model overview.

Operating instructions 304E-63926 standard, 347E-63910 Ex-version.

### Versions

Version ST PVC cable: Part nr. 824L-30894, 2wire, 2 x 0.75 mm<sup>2</sup>, stranded wire (metal net insulated from the housing), grey.

Outer  $\varnothing$  max. 6,7 mm, bending radius min. 60 mm, weight 70 g/m

Version SH Teflon cable: Part nr. 824L-31841, 2wire, 2 x 0.75 mm<sup>2</sup>, stranded wire (metal net insulated from the housing), black.

Outer  $\varnothing$  max. 5.0 mm, bending radius min. 80 mm, weight 45 g/m.

Standard length for version SH: 2 m, 5 m.

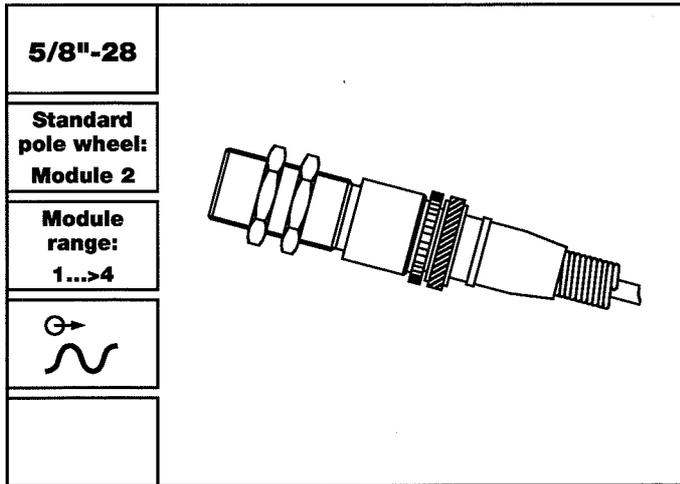
Version MT Protection hose over PVC cable: Part nr. 825G-30924, tube made of profile milled steel plate with PVC cover, grey. Weather and water proof, conditionally oil and acid resistant.

Outer  $\varnothing$  14 mm, bending radius min. 40 mm, weight 130 g/m.

Standard length for version MT: 5 m.

Version A Connection type: 820E-31142. Connection plug: 820E-31141.

## DSE EH10 A

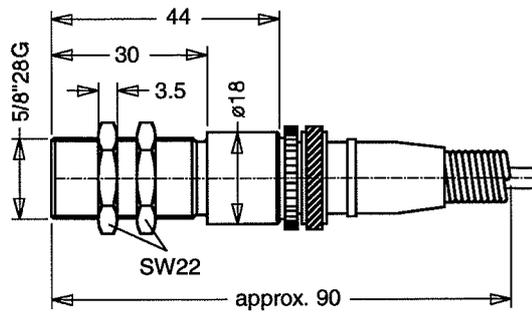


### Features

- Without line amplifier

## Dimensions

### Version A



## Model overview

Type	Part Nr.	Connection	Housing thread	Weight [g]	Operating temperature [°C]	Notes
DSE EH10.05 ATZ	304Z-03399	Connector	5/8"-28	90	-20...+85	previously FTG 101 A

# Electromagnetic Sensor without line amplifier

## Technical Data

### Supply

Power supply Active sensor without power supply.  
Reverse polarity protection.  
No current consumption. Coil inductance acc. to Technical Data (see table 1)

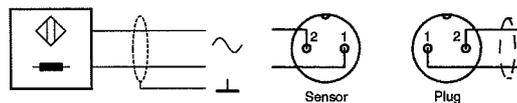
### Input

Frequency range ~10 Hz...50 kHz  
Noise immunity Cable shield connected to the supply negative pole. Noise generator between housing and electronics.  
1.5 kV/1.5 ms/max. 5 Hz (source resistance 500 Ω),  
2.0 kV/HF-bursts (level 4 in accordance with IEC 801-4),  
2.5 kV/1 MHz damped resonance (class III in accordance with IEC 255-4).  
Pole wheel Ferromagnetic toothed wheel i.e. Ust37-2, involute gear form preferred.  
Module  $\geq 1$ , min. tooth width 6 mm, side offset with min. tooth width:  $< 0.2$  mm,  
eccentricity  $< 0.2$  mm.  
Pole wheel-sensor gap  $\geq 0.1$  mm. Gap depending on rotational speed (circumferential) and module acc. to diagrams A1, B1 and Technical Data (see table 1).

### Output

Signal output A.C. voltage, approx. sinusoidal. Amplitude dependent on rotational speed, pole wheel-sensor gap, pole dimensions and structural shape (involute gear form preferred). Characteristics in diagram A1 show the dependence on gap d.  
Diagram B1 shows lowest measuring speed N100 for different modules and gaps d. Output voltage  $U_n$  at rotational speed of 5 m/sec is the reference value.  
(i.e. at pole wheel- $\varnothing$  64 mm,  $n = 1500 \text{ min}^{-1}$ ) acc. to Technical Data (see table 1).  
Short circuit proof and protected against reverse polarity.

### Connection



Shield to be connected with 0 V of power supply.

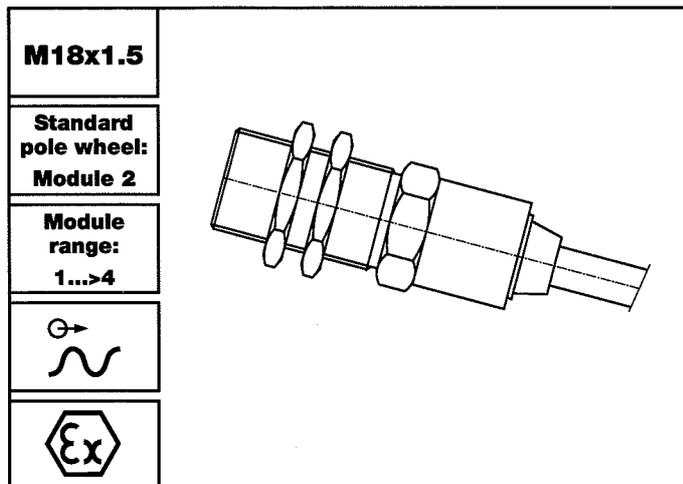
### Mechanical

Protection class IP67 (head), IP50 (jack connection).  
Vibration immunity 20  $g_n$  in the range 5...2000 Hz.  
Shock immunity 50  $g_n$  during 20 ms, half sine wave.  
Operating temperature Acc. to model overview.  
Insulation Housing, cable screen and system galvanically isolated (500 V/50 Hz/1 min).  
Housing Stainless steel 1.4305, electronic components potted in a chemical- and age-proof synthetic resin.  
Dimensions acc. to model overview and dimensional drawings.  
Weight Acc. to model overview.  
Operating instructions 304E-63918

### Versions

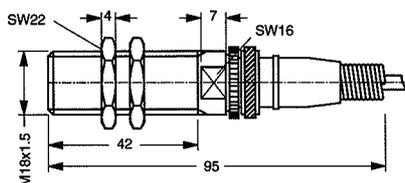
Version A Connection type: 820A-30658. Connection plug: 820A-30659.

## DSE 1810 A, S, M

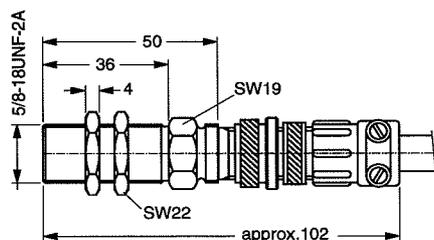


### Dimensions

#### Version A .09



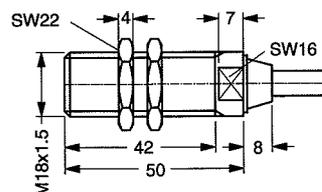
#### Version A .10/.11



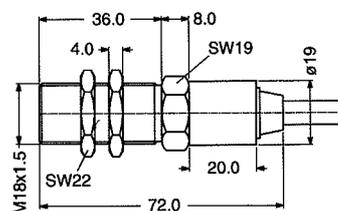
### Features

- Without line amplifier
- High temperature version
- Available as model FTG...Ex in intrinsically safe class Ex i G5 (zone 1)

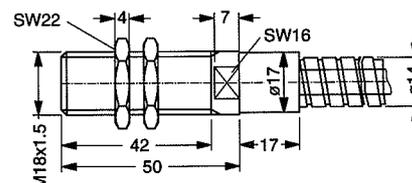
#### Version S .09



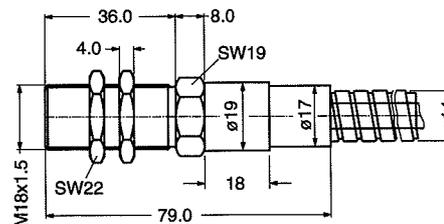
#### Version S .10/.11



#### Version M .09



#### Version M .10/.11



### Model overview

Type	Part Nr.	Connection	Housing thread	Weight [g]	Operating temperature [°C]	Notes
DSE 1810.09 ATZ	304Z-03171	Connector	M18x1.5	65	-25...+85	previously FTG 291 A
DSE 1810.09 STZ	304Z-03170	Cable 1.5 m	M18x1.5	135	-25...+85	previously FTG 291 S
DSE 1810.09 MTZ	304Z-04257	Protection hose 1.5 m	M18x1.5	280	-25...+85	previously FTG 291 SM
DSE 1810.11 ATZ	304Z-03148	Connector	M18x1.5	110	-25...+85	previously FTG 211 A
DSE 1810.10 ATZ Ex	347Z-03158	Connector	M18x1.5	110	-20...+65	previously FTG 215 A Ex
DSE 1810.11 AHZ	304Z-03154	Connector	M18x1.5	110	-40...+150	previously FTG 221 AH
DSE 1810.11 STZ	304Z-03149	Cable 5 m	M18x1.5	480	-25...+85	previously FTG 211 S
DSE 1810.10 STZ Ex	347Z-03159	Cable 5 m	M18x1.5	480	-20...+65	previously FTG 215 S Ex
DSE 1810.11 SHZ	304Z-03155	Cable 5 m	M18x1.5	250	-40...+150	previously FTG 221 SH
DSE 1810.11 MTZ	304Z-03150	Protection hose 5 m	M18x1.5	1230	-20...+85	previously FTG 211 SM
DSE 1810.10 MTZ Ex	347Z-04343	Protection hose 5 m	M18x1.5	1230	-20...+65	previously FTG 215 SM Ex

# Electromagnetic Sensor without line amplifier

## Technical Data

### Supply

Power supply Active sensor without power supply. Reverse polarity protection.  
No current consumption. Coil inductance acc. to Technical Data (see table 1).

### Input

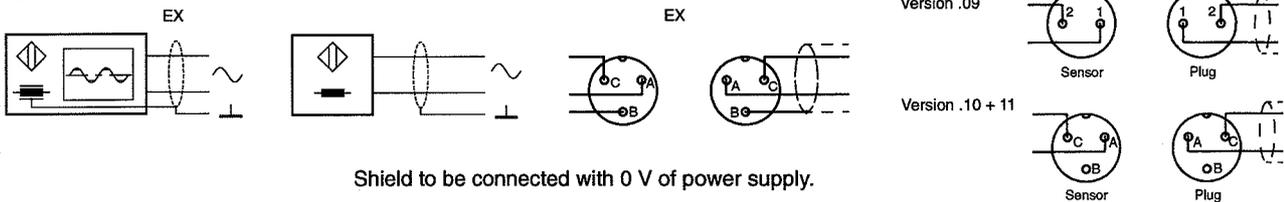
Frequency range ~10 Hz...25 kHz  
Noise immunity Cable shield connected to the supply negative pole. Noise generator between housing and electronics.  
1.5 kV/1.5 ms/max. 5 Hz (source resistance 500 Ω),  
2.0 kV/HF-bursts (level 4 in accordance with IEC 801-4),  
2.5 kV/1 MHz damped resonance (class III in accordance with IEC 255-4).

Pole wheel Ferromagnetic toothed wheel i.e. Ust37-2, involute gear form preferred.  
Module  $\geq 1$ , min. tooth width 6 mm, side offset with min. tooth width:  $< 0.2$  mm,  
eccentricity  $< 0.2$  mm. Pole wheel-sensor gap  $\geq 0.1$  mm. Gap depending on rotational speed (circumferential) and module acc. to diagrams A1, B1 and Technical Data (see table 1).

### Output

Signal output A.C. voltage, approx. sinusoidal. Amplitude dependent on rotational speed, pole wheel-sensor gap, pole dimensions and structural shape (involute gear form preferred). Characteristics in diagram A1 show the dependence on gap d. Diagram B1 shows lowest measuring speed N100 for different modules and gaps d. Output voltage  $U_n$  at rotational speed of 5 m/sec is the reference value. (i.e. at pole wheel- $\varnothing$  64 mm,  $n = 1500 \text{ min}^{-1}$ ) acc. to Technical Data (see table 1).  
Short circuit proof and protected against reverse polarity.

### Connection



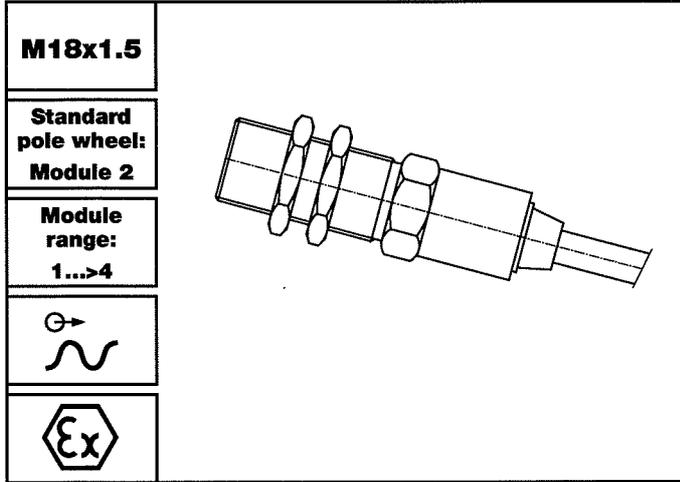
### Mechanical

Protection class IP 67 (cable connection), IP 50 (jack connection).  
IP 67 (head version T), IP 68 (head version H and Ex).  
Vibration immunity 20  $g_n$  in the range 5...2000 Hz.  
Shock immunity 50  $g_n$  during 20 ms, half sine wave.  
Operating temperature Acc. to model overview.  
Insulation Housing, cable screen and system galvanically isolated (500 V/50 Hz/1 min).  
Housing Version .09: Aluminium alloy Nr. 3.0615.  
Version .10 + .11: Stainless Steel 1.4305. Front side hermetically sealed (version H), electronic components potted in a chemical- and age-proof synthetic resin. Dimensions acc. to model overview and dimensional drawings.  
Weight Acc. to model overview.  
Operating instructions 304E-63918 Standard, 347E-63910 Ex-version.

### Versions

Version ST PVC cable: Part nr. 824L-30894, 2wire, 2 x 0.75 mm<sup>2</sup>, stranded wire (metal net insulated from the housing), grey.  
Outer  $\varnothing$  max. 6,7 mm, bending radius min. 60 mm, Weight 70 g/m.  
Version SH Teflon cable: Part nr. 824L-31841, 2wire, 2 x 0.75 mm<sup>2</sup>, stranded wire (metal net insulated from the housing), black.  
Outer  $\varnothing$  max. 5.0 mm, bending radius min. 80 mm, weight 45 g/m.  
Standard length for version SH: 2 m, 5 m.  
Version MT Protection hose over PVC cable: Part nr. 825G-30924, tube made of profile milled steel plate with PVC cover, grey. Weather and water proof, conditionally oil and acid resistant.  
Outer  $\varnothing$  14 mm, bending radius min. 40 mm, weight 130 g/m.  
Standard length for version MT: 5 m.  
Version .09 A Connection type: 820A-30658. Connection plug: 820A-30659.  
Version .10 + .11 A Connection type: 820E-31142. Connection plug: 820E-31141.

## DSE 1820 A, S, M

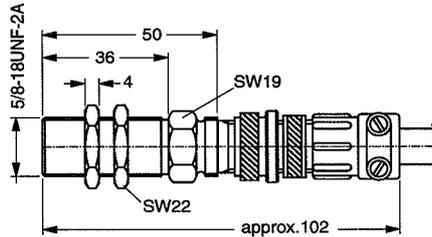


### Features

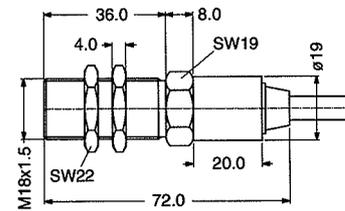
- Without line amplifier
- High temperature version
- Available as model FTG...Ex in intrinsically safe class Ex i G5 (zone 1)

## Dimensions

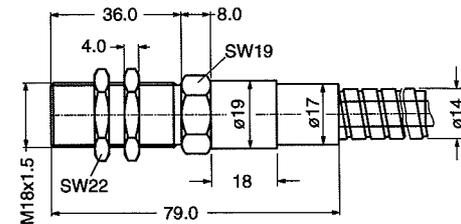
### Version A



### Version S



### Version M



## Model overview

Type	Part Nr.	Connection	Housing thread	Weight [g]	Operating temperature [°C]	Notes
DSE 1820.11 ATZ	304Z-03151	Connector	M18x1.5	110	-25...+85	previously FTG 212 A
DSE 1820.10 ATZ Ex	347Z-03161	Connector	M18x1.5	110	-20...+65	previously FTG 216 A Ex
DSE 1820.11 AHZ	304Z-03156	Connector	M18x1.5	110	-40...+150	previously FTG 222 AH
DSE 1820.11 STZ	304Z-03152	Cable 5 m	M18x1.5	480	-25...+85	previously FTG 212 S
DSE 1820.10 STZ Ex	347Z-03162	Cable 5 m	M18x1.5	480	-20...+65	previously FTG 216S Ex
DSE 1820.11 SHZ	304Z-03157	Cable 5 m	M18x1.5	250	-40...+150	previously FTG 222 SH
DSE 1820.11 MTZ	304Z-03153	Protection hose 5 m	M18x1.5	1230	-25...+85	previously FTG 212 SM
DSE 1820.10 MTZ Ex	347Z-04344	Protection hose 5 m	M18x1.5	1230	-20...+65	previously FTG 216 SM Ex

# Electromagnetic Sensor without line amplifier

## Technical Data

### Supply

Power supply Active sensor without power supply. Reverse polarity protection.  
No current consumption. Coil inductance acc. to Technical Data (see table 1).

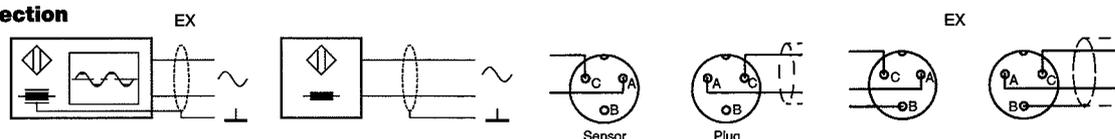
### Input

Frequency range ~10 Hz...25 kHz  
Noise immunity Cable shield connected to the supply negative pole. Noise generator between housing and electronics.  
1.5 kV/1.5 ms/max. 5 Hz (source resistance 500 Ω),  
2.0 kV/HF-bursts (level 4 in accordance with IEC 801-4),  
2.5 kV/1 MHz damped resonance (class III in accordance with IEC 255-4).  
Pole wheel Ferromagnetic toothed wheel i.e. Ust37-2, involute gear form preferred.  
Module ≥ 1, min. tooth width 6 mm, side offset with min. tooth width: < 0.2 mm,  
eccentricity < 0.2 mm. Pole wheel-sensor gap ≥ 0.1 mm. Gap depending on rotational speed (circumferential) and module acc. to diagrams A1, B1 and Technical Data (see table 1).

### Output

Signal output A.C. voltage, approx. sinusoidal. Amplitude dependent on rotational speed, pole wheel-sensor gap, pole dimensions and structural shape (involute gear form preferred). Characteristics in diagram A1 show the dependence on gap d.  
Diagram B1 shows lowest measuring speed N100 for different modules and gaps d. Output voltage  $U_n$  at rotational speed of 5 m/sec is the reference value.  
(i.e. at pole wheel-Ø 64 mm,  $n = 1500 \text{ min}^{-1}$ ) acc. to Technical Data (see table 1).  
Short circuit proof and protected against reverse polarity.

### Connection



Shield to be connected with 0 V of power supply.

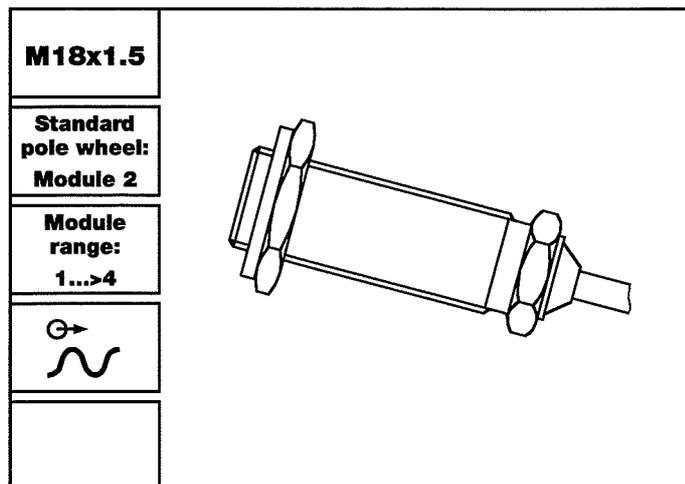
### Mechanical

Protection class IP 67 (cable connection), IP 50 (jack connection).  
IP 67 (head version T), IP 68 (head version H and Ex).  
Vibration immunity 20  $g_n$  in the range 5...2000 Hz.  
Shock immunity 50  $g_n$  during 20 ms, half sine wave.  
Operating temperature Acc. to model overview.  
Insulation Housing, cable screen and system galvanically isolated (500 V/50 Hz/1 min).  
Housing Stainless steel 1.4305.  
Front side hermetically sealed, electronic components potted in a chemical- and age-proof synthetic resin. Dimensions acc. to model overview and dimensional drawings.  
Weight Acc. to model overview.  
Operating instructions 304E-63918 Standard, 347E-63910 Ex-version.

### Versions

Version ST PVC cable: Part nr. 824L-30894, 2wire, 2 x 0.75 mm<sup>2</sup>, stranded wire (metal net insulated from the housing), grey, Outer Ø max. 6,7 mm, bending radius min. 60 mm, Weight 70 g/m.  
Version SH Teflon cable: Part nr. 824L-31841, 2wire, 2 x 0.75 mm<sup>2</sup>, stranded wire (metal net insulated from the housing), black. Outer Ø max. 5.0 mm, bending radius min. 80 mm, weight 45 g/m. Standard length for version SH: 2 m, 5 m.  
Version MT Protection hose over PVC cable: Part nr. 825G-30924, tube made of profile milled steel plate with PVC cover, grey. Weather and water proof, conditionally oil and acid resistant. Outer Ø 14 mm, bending radius min. 40 mm, weight 130 g/m. Standard length for version MT: 5 m.  
Version A Connection type: 820E-31142. Connection plug: 820E-31141.

## DSE 1810.01 A, S

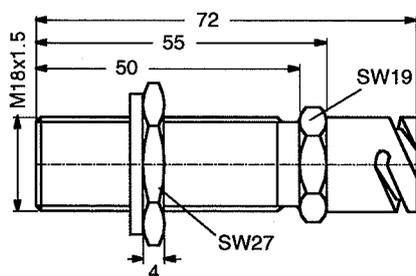


### Features

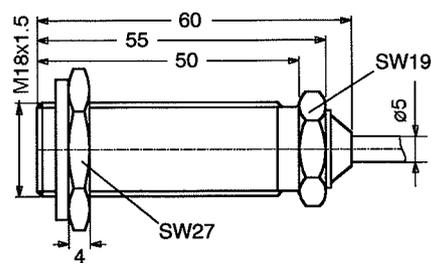
- Without line amplifier
- High temperature version
- With gasket

## Dimensions

### Version A



### Version S



## Model overview

Type	Part Nr.	Connection	Housing thread	Weight [g]	Operating temperature [°C]	Notes
DSE 1810.01 AHZ	304Z-03776	Connector	M18x1.5	100	-40...+125	Standard
DSE 1810.01 SHZ	304Z-03775	Cable 1 m	M18x1.5	160	-40...+125	Standard

# Electromagnetic Sensor without line amplifier

## Technical Data

### Supply

Power supply

Active sensor without power supply.  
Reverse polarity protection.  
No current consumption. Coil inductance acc. to Technical Data (see table 1).

### Input

Frequency range

~10 Hz...25 kHz

Noise immunity

Cable shield connected to the supply negative pole. Noise generator between housing and electronics.

1.5 kV/1.5 ms/max. 5 Hz (source resistance 500 Ω),  
2.0 kV/HF-bursts (level 4 in accordance with IEC 801-4),  
2.5 kV/1 MHz damped resonance (class III in accordance with IEC 255-4).

Pole wheel

Ferromagnetic toothed wheel i.e. Ust37-2, involute gear form preferred.

Module  $\geq 1$ , min. tooth width 6 mm, side offset with min. tooth width:  $< 0.2$  mm, eccentricity  $< 0.2$  mm.

Pole wheel-sensor gap  $\geq 0.1$  mm. Gap depending on rotational speed (circumferential) and module acc. to diagrams A1, B1 and Technical Data (see table 1).

### Output

Signal output

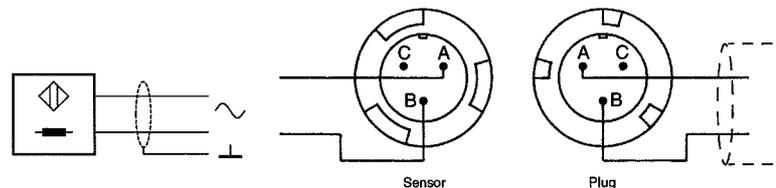
A.C. voltage, approx. sinusoidal. Amplitude dependent on rotational speed, pole wheel-sensor gap, pole dimensions and structural shape (involute gear form preferred). Characteristics in diagram A1 show the dependence on gap d.

Diagram B1 shows lowest measuring speed N100 for different modules and gaps d. Output voltage  $U_n$  at rotational speed of 5 m/sec is the reference value.

(i.e. at pole wheel- $\varnothing$  64 mm,  $n = 1500 \text{ min}^{-1}$ ) acc. to Technical Data (see table 1).

Short circuit proof and protected against reverse polarity.

### Connection



Shield to be connected with 0 V of power supply.

### Mechanical

Protection class

IP68 (head), IP67 (cable connection), IP50 (jack connection).

Vibration immunity

20  $g_n$  in the range 5...2000 Hz.

Shock immunity

50  $g_n$  during 20 ms, half sine wave.

Operating temperature

Acc. to model overview.

Insulation

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

Housing

Stainless steel 1.4305, front side hermetically sealed, electronic components potted in a chemical- and age-proof synthetic resin.

Dimensions acc. to model overview and dimensional drawings.

Weight

Acc. to model overview.

Operating instructions

304E-63920

### Versions

Version SH

Teflon cable: Part nr. 824L-31841, 2wire, 2 x 0.75 mm<sup>2</sup>, stranded wire (metal net insulated from the housing), black.

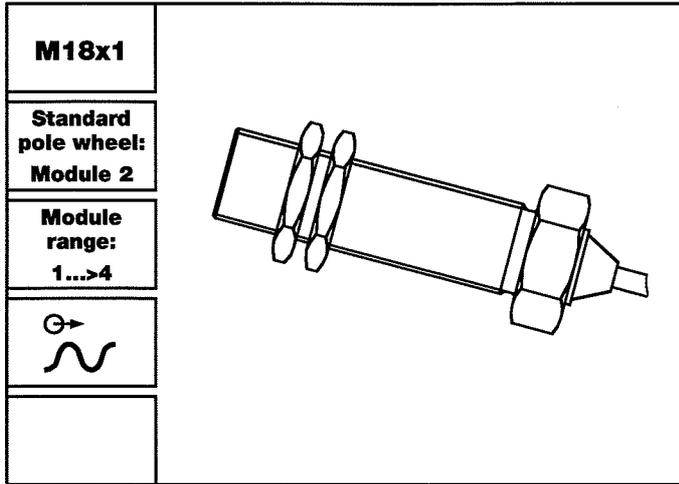
Outer  $\varnothing$  max. 5.0 mm, bending radius min. 80 mm, weight 45 g/m.

Standard length for version SH: 1 m.

Version AH

Connection type: 820E-36087. Connection plug: 820E-36478.

## DSE 1810 A, S, M

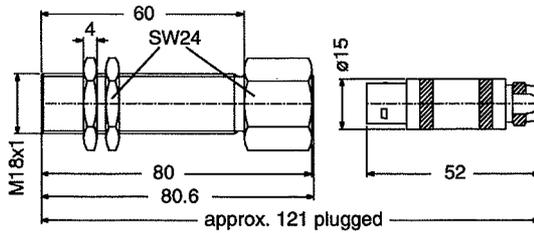


### Features

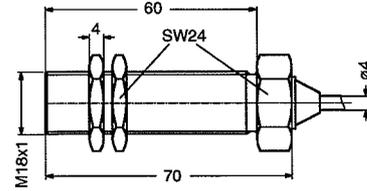
- Without line amplifier
- High temperature version

## Dimensions

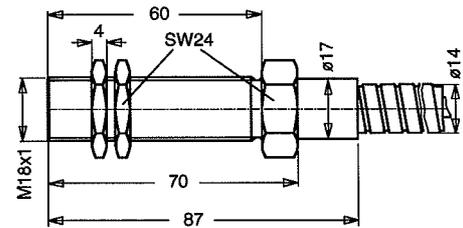
### Version A



### Version S



### Version M



## Model overview

Type	Part Nr.	Connection	Housing thread	Weight [g]	Operating temperature [°C]	Notes
DSE 1810.00 STZ	304Z-04247	Cable 5 m	M18x1	250	-25...+85	Standard
DSE 1810.00 ATZ	304Z-04249	Connector	M18x1	100	-25...+85	Standard
DSE 1810.00 MTZ	304Z-04251	Protection hose 5 m	M18x1	845	-25...+85	Standard
DSE 1810.00 SHZ	304Z-04248	Cable 2 m	M18x1	160	-40...+150	Standard
DSE 1810.00 AHZ	304Z-04250	Connector	M18x1	100	-40...+150	Standard

# Electromagnetic Sensor without line amplifier

## Technical Data

### Supply

Power supply Active sensor without power supply. Reverse polarity protection.  
No current consumption. Coil inductance acc. to Technical Data (see table 1).

### Input

Frequency range ~10 Hz...25 kHz

Noise immunity Cable shield connected to the supply negative pole. Noise generator between housing and electronics.

1.5 kV/1.5 ms/max. 5 Hz (source resistance 500  $\Omega$ ),  
2.0 kV/HF-bursts (level 4 in accordance with IEC 801-4),  
2.5 kV/1 MHz damped resonance (class III in accordance with IEC 255-4).

Pole wheel

Ferromagnetic toothed wheel i.e. Ust37-2, involute gear form preferred.

Module  $\geq 1$ , min. tooth width 6 mm, side offset with min. tooth width: < 0.2 mm,  
eccentricity < 0.2 mm.

Pole wheel-sensor gap  $\geq 0.1$  mm. Gap depending on rotational speed (circumferential) and module acc. to diagrams A1, B1 and Technical Data (see table 1).

### Output

Signal output

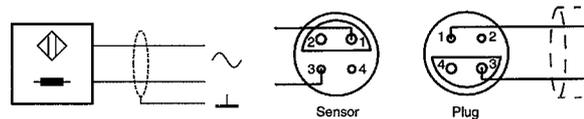
A.C. voltage, approx. sinusoidal. Amplitude dependent on rotational speed, pole wheel-sensor gap, pole dimensions and structural shape (involute gear form preferred). Characteristics in diagram A1 show the dependence on gap d.

Diagram B1 shows lowest measuring speed N100 for different modules and gaps d. Output voltage  $U_n$  at rotational speed of 5 m/sec is the reference value.

(I.e. at pole wheel- $\varnothing$  64 mm,  $n = 1500 \text{ min}^{-1}$ ) acc. to Technical Data (see table 1).

Short circuit proof and protected against reverse polarity.

### Connection



Shield to be connected with 0 V of power supply.

### Mechanical

Protection class IP68 (head), IP67 (cable connection), IP50 (jack connection).

Vibration immunity 20  $g_n$  in the range 5...2000 Hz.

Shock immunity 50  $g_n$  during 20 ms, half sine wave.

Operating temperature Acc. to model overview.

Insulation Housing and electronics galvanically isolated (500 V/50 Hz/1 min).

Housing Stainless steel 1.4305, front side hermetically sealed, electronic components potted in a chemical- and age-proof synthetic resin.

Dimensions acc. to model overview and dimensional drawings.

Weight Acc. to model overview.

Operating instructions 304E-63918

### Versions

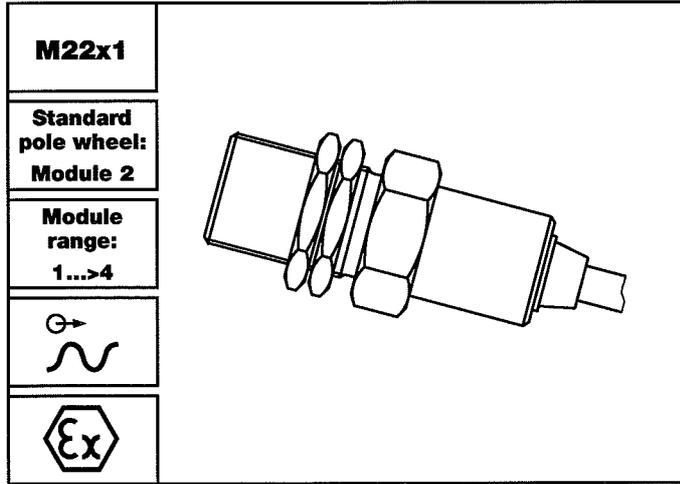
Version ST PVC cable: Part nr. 824L-35546, 2wire, 2 x 0.22 mm<sup>2</sup> (AWG 24), stranded wire (thermoplastic screening with continuity conductor, insulated from housing), grey. Outer  $\varnothing$  max. 4.2 mm, bending radius min. 60 mm, weight 19 g/m.

Version SH Teflon cable: Part nr. 824L-35053, 4wire, 2 x 0.22 mm<sup>2</sup> (AWG 24), stranded wire (metal net insulated from the housing), white. Outer  $\varnothing$  max. 4.0 mm, bending radius min. 60 mm, weight 32 g/m. Standard length for version SH: 2 m, 5 m.

Version MT Protection hose over PVC cable: Part nr. 825G-30924, tube made of profile milled steel plate with PVC cover, grey. Weather and water proof, conditionally oil and acid resistant. Outer  $\varnothing$  14 mm, bending radius min. 40 mm, weight 130 g/m. Standard length for version MT: 5 m.

Version A Connection type: 820A-35731. Connection plug: 820A-35732.

## DSE 2210 A, S, M

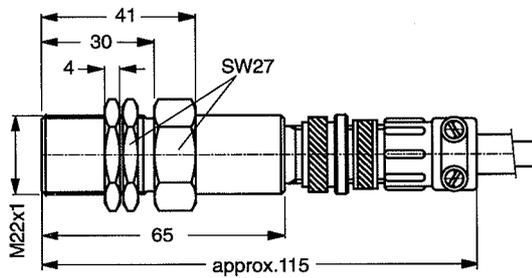


### Features

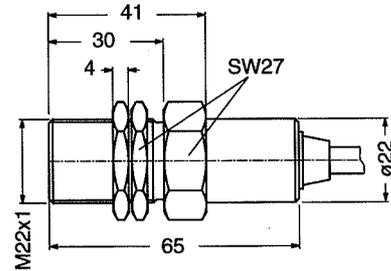
- Without line amplifier
- High temperature version
- Available as model FTG...Ex in intrinsically safe class Ex i G5 (zone 1)

### Dimensions

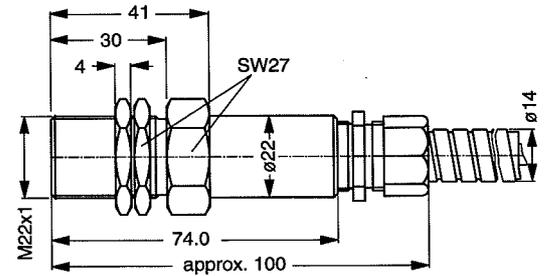
**Version A**



**Version S**



**Version M**



### Model overview

Type	Part Nr.	Connection	Housing thread.	Weight [g]	Operating temperature [°C]	Notes
DSE 2210 ATZ	304Z-03022	Connector	M22x1	200	-25...+85	previously FTG 1051 A
DSE 2210.10 ATZ Ex	347Z-03164	Connector	M22x1	200	-20...+65	previously FTG 1055 A Ex
DSE 2210 STZ	304Z-03023	Cable 5 m	M22x1	580	-25...+85	previously FTG 1051 S
DSE 2210.10 STZ Ex	347Z-03165	Cable 5 m	M22x1	580	-20...+65	previously FTG 1055 S Ex
DSE 2210 MTZ	304Z-03024	Protection hose 5 m	M22x1	1400	-25...+85	previously FTG 1051 SM
DSE 2210.10 MTZ Ex	347Z-03261	Protection hose 5 m	M22x1	1400	-20...+65	previously FTG 1055 SM Ex
DSE 2210 AHZ	304Z-03025	Connector	M22x1	200	-40...+150	previously FTG 1051 AH
DSE 2210 SHZ	304Z-03026	Cable 2 m	M22x1	340	-40...+150	previously FTG 1051 SH

# Electromagnetic Sensor without line amplifier

## Technical Data

### Supply

Power supply Active sensor without power supply. Reverse polarity protection.  
No current consumption. Coil inductance acc. to Technical Data (see table 1).

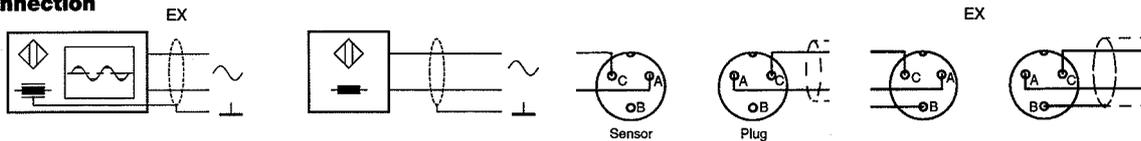
### Input

Frequency range ~10 Hz...25 kHz  
Noise immunity Cable shield connected to the supply negative pole. Noise generator between housing and electronics.  
1.5 kV/1.5 ms/max. 5 Hz (source resistance 500 Ω),  
2.0 kV/HF-bursts (level 4 in accordance with IEC 801-4),  
2.5 kV/1 MHz damped resonance (class III in accordance with IEC 255-4).  
Pole wheel Ferromagnetic toothed wheel i.e. Ust37-2, involute gear form preferred.  
Module ≥ 1, min. tooth width 6 mm, side offset with min. tooth width: < 0.2 mm,  
eccentricity < 0.2 mm.  
Pole wheel-sensor gap ≥ 0.1 mm. Gap depending on rotational speed (circumferential) and module acc. to diagrams A1, B1 and Technical Data (see table 1).

### Output

Signal output A.C. voltage, approx. sinusoidal. Amplitude dependent on rotational speed, pole wheel-sensor gap, pole dimensions and structural shape (involute gear form preferred). Characteristics in diagram A1 show the dependence on gap d.  
Diagram B1 shows lowest measuring speed N100 for different modules and gaps d. Output voltage Un at rotational speed of 5 m/sec is the reference value.  
(i.e. at pole wheel-Ø 64 mm, n = 1500 min<sup>-1</sup>) acc. to Technical Data (see table 1).  
Short circuit proof and protected against reverse polarity.

### Connection



Shield to be connected with 0 V of power supply.

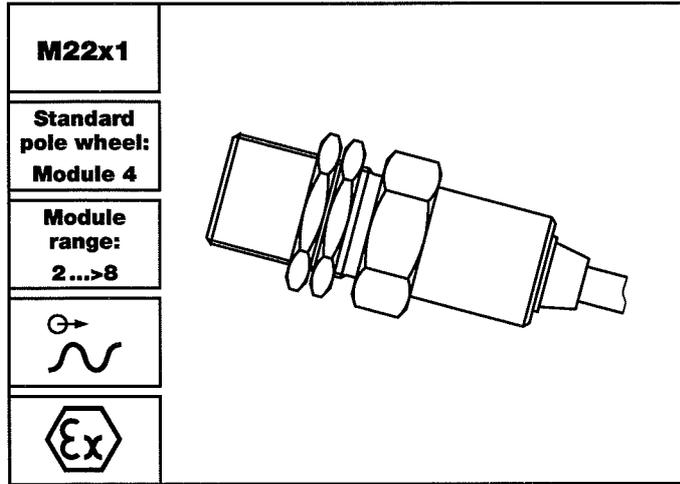
### Mechanical

Protection class IP67 (cable connection), IP50 (jack connection).  
IP67 (head version T), IP68 (head version H and Ex).  
Vibration immunity 20 g<sub>n</sub> in the range 5...2000 Hz.  
Shock immunity 50 g<sub>n</sub> during 20 ms, half sine wave.  
Operating temperature Acc. to model overview.  
Insulation Housing, cable screen and system galvanically isolated (500 V/50 Hz/1 min).  
Housing Stainless steel 1.4305, front side hermetically sealed, electronic components potted in a chemical- and age-proof synthetic resin.  
Dimensions acc. to model overview and dimensional drawings.  
Weight Acc. to model overview.  
Operating instructions 304E-63918 Standard, 347E-63910 Ex-version.

### Versions

Version ST PVC cable: Part nr. 824L-30894, 2wire, 2 x 0.75 mm<sup>2</sup>, stranded wire (metal net insulated from the housing), grey.  
Outer Ø max. 6.7 mm, bending radius min. 60 mm, weight 70 g/m.  
Version SH Teflon cable: Part nr. 824L-31841, 2wire, 2 x 0.75 mm<sup>2</sup>, stranded wire (metal net insulated from the housing), black.  
Outer Ø max. 5.0 mm, bending radius min. 80 mm, weight 45 g/m.  
Standard length for version SH: 5 m.  
Version MT Protection hose over PVC cable: Part nr. 825G-30924, tube made of profile milled steel plate with PVC cover, grey. Weather and water proof, conditionally oil and acid resistant.  
Outer Ø 14 mm, bending radius min. 40 mm, weight 130 g/m.  
Standard length for version MT: 5 m.  
Version A Connection type: 820E-31142. Connection plug: 820E-31141

## DSE 2220 A, S, M

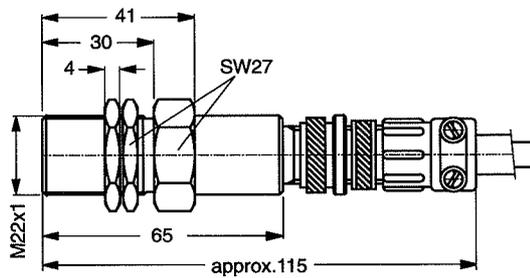


### Features

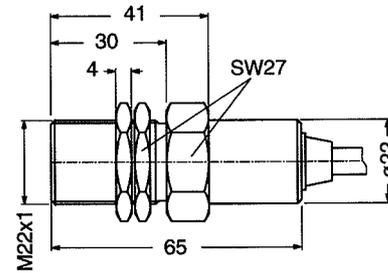
- Without line amplifier
- High temperature version
- Available as model FTG...Ex in intrinsically safe class Ex i G5 (zone 1)

### Dimensions

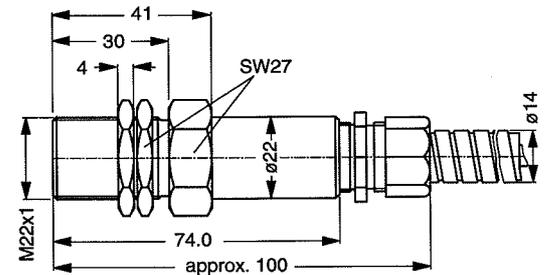
**Version A**



**Version S**



**Version M**



### Model overview

Type	Part Nr.	Connection	Housing thread	Weight [g]	Operating temperature [°C]	Notes
DSE 2220 ATZ	304Z-03027	Connector	M22x1	200	-25...+85	previously FTG 1052 A
DSE 2220.10 ATZ Ex	304Z-03167	Connector	M22x1	200	-20...+65	previously FTG 1056 A Ex
DSE 2220 STZ	304Z-03028	Cable 5 m	M22x1	580	-25...+85	previously FTG 1052 S
DSE 2220.10 STZ Ex	347Z-03168	Cable 5 m	M22x1	580	-20...+65	previously FTG 1056 S Ex
DSE 2220 MTZ	304Z-03029	Protection hose 5 m	M22x1	1400	-25...+85	previously FTG 1052 SM
DSE 2220.10 MTZ Ex	347Z-03262	Protection hose 5 m	M22x1	1400	-20...+65	previously FTG 1056 SM Ex
DSE 2220 AHZ	304Z-03030	Connector	M22x1	200	-40...+150	previously FTG 1052 AH
DSE 2220 SHZ	304Z-03031	Cable 2 m	M22x1	340	-40...+150	previously FTG 1052 SH

# Electromagnetic Sensor without line amplifier

## Technical Data

### Supply

Power supply Active sensor without power supply. Reverse polarity protection.  
No current consumption. Coil inductance acc. to Technical Data (see table 1).

### Input

Frequency range ~10 Hz...25 kHz

Noise immunity Cable shield connected to the supply negative pole. Noise generator between housing and electronics.

1.5 kV/1.5 ms/max. 5 Hz (source resistance 500 Ω),  
2.0 kV/HF-bursts (level 4 in accordance with IEC 801-4),  
2.5 kV/1 MHz damped resonance (class III in accordance with IEC 255-4).

Pole wheel

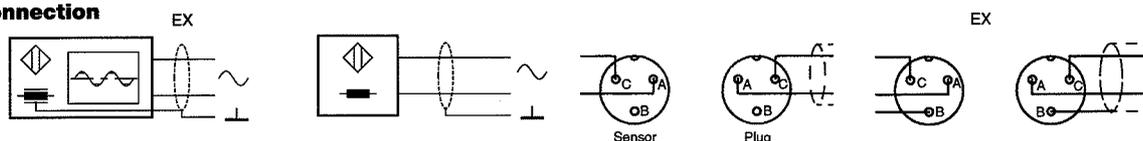
Ferromagnetic toothed wheel i.e. Ust37-2, involute gear form preferred.  
Module  $\geq 1$ , min. tooth width 6 mm, side offset with min. tooth width:  $< 0.2$  mm,  
eccentricity  $< 0.2$  mm.

Pole wheel-sensor gap  $\geq 0.1$  mm. Gap depending on rotational speed (circumferential) and module acc. to diagrams A1, B1 and Technical Data (see table 1).

### Output

Signal output A.C. voltage, approx. sinusoidal. Amplitude dependent on rotational speed, pole wheel-sensor gap, pole dimensions and structural shape (involute gear form preferred). Characteristics in diagram A1 show the dependence on gap d.  
Diagram B1 shows lowest measuring speed N100 for different modules and gaps d. Output voltage  $U_n$  at rotational speed of 5 m/sec is the reference value.  
(i.e. at pole wheel- $\varnothing$  64 mm,  $n = 1500 \text{ min}^{-1}$ ) acc. to Technical Data (see table 1).  
Short circuit proof and protected against reverse polarity.

### Connection



Shield to be connected with 0 V of power supply.

### Mechanical

Protection class IP67 (head version T), IP68 (head version H and Ex),  
IP50 (jack connection), IP64 (cable connection).

Vibration immunity 20  $g_n$  in the range 5...2000 Hz.

Shock immunity 50  $g_n$  during 20 ms, half sine wave.

Operating temperature Acc. to model overview.

Insulation Housing, cable screen and system galvanically isolated (500 V/50 Hz/1 min).

Housing Stainless steel 1.4305, front side hermetically sealed, electronic components potted in a chemical- and age-proof synthetic resin. Dimensions acc. to model overview and dimensional drawings.

Weight Acc. to model overview.

Operating instructions 304E-63918 Standard, 347E-63910 Ex-version.

### Versions

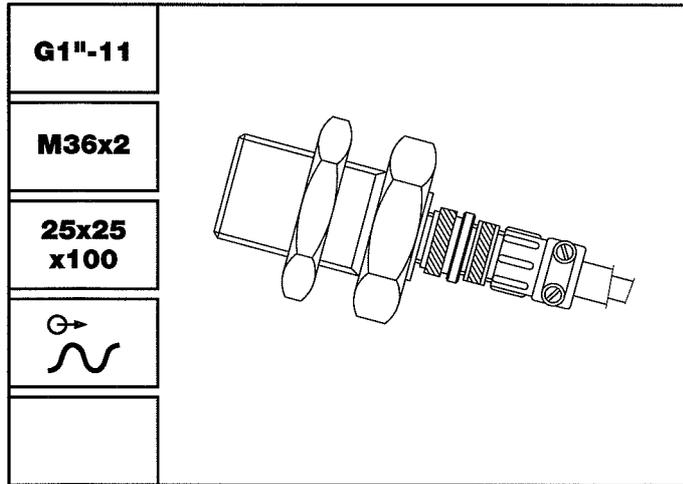
Version ST PVC cable: Part nr. 824L-30894, 2wire, 2 x 0.75 mm<sup>2</sup>, stranded wire  
(metal net insulated from the housing), grey.  
Outer  $\varnothing$  max. 6,7 mm, bending radius min. 60 mm, weight 70 g/m.

Version SH Teflon cable: Part nr. 824L-31841, 2wire, 2 x 0.75 mm<sup>2</sup>, stranded wire  
(metal net insulated from the housing), black.  
Outer  $\varnothing$  max. 5.0 mm, bending radius min. 80 mm, weight 45 g/m.  
Standard length for version SH: 2 m, 5 m.

Version MT Protection hose over PVC cable: Part nr. 825G-30924, tube made of profile milled steel plate  
with PVC cover, grey. Weather and water proof, conditionally oil and acid resistant.  
Outer  $\varnothing$  14 mm, bending radius min. 40 mm, weight 130 g/m.  
Standard length for version MT: 5 m.

Version A Connection type: 820E-31142. Connection plug: 820E-31141.

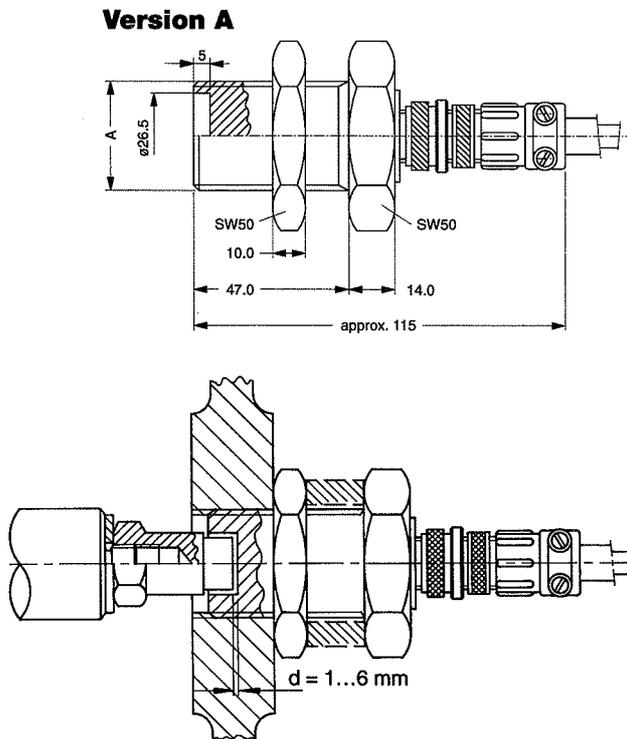
## DSE ..MZ/..ME A



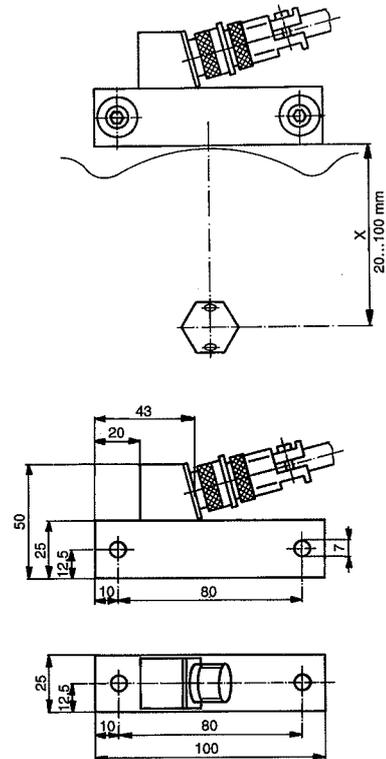
### Features

- Without line amplifier
- DSE AAMZ.00 AHZ - DSE 36MZ.00A.Z:  
Magnetic pole wheel, 4pole
- DSE 25ME.00 AHZ:  
Magnetic pole wheel, 2pole, for long distances
- Turbocharger application
- High temperature version

### Dimensions



### DSE 25ME.00



### Model overview

Type	Part Nr.	Connection	Housing	Weight thread	Operating [g]	Notes temperature [°C]
DSE AAMZ.00 AHZ	304Z-03146	Connector + cable 2 m	G1"-11	620	-50...+125 (135)	prev. FTG 103 SH2
DSE 36MZ.00 ATZ	304Z-03723	Connector + cable 5 m	M36x2	670	-25...+85	prev. FTG 104 S2
DSE 36MZ.00 AHZ	304Z-03147	Connector + cable 5 m	M36x2	670	-50...+125 (135)	prev. FTG 104 SH2
DSE 25ME.00 AHZ	304Z-03263	Connector	25x25x100	260	-20...+200	prev. FTG 110 A

# Electromagnetic Sensor without line amplifier

## Technical Data

### Supply

Power supply Active sensor without power supply. Reverse polarity protection.  
No current consumption. Coil inductance acc. to Technical Data (see table 1).

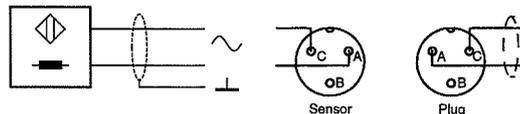
### Input

Frequency range ~10 Hz...25 kHz  
Noise immunity Cable shield connected to the supply negative pole. Noise generator between housing and electronics.  
1.5 kV/1.5 ms/max. 5 Hz (source resistance 500 Ω),  
2.0 kV/HF-bursts (level 4 in accordance with IEC 801-4),  
2.5 kV/1 MHz damped resonance (class III in accordance with IEC 255-4).  
Pole wheel Magnetic pole wheels see section pole wheels (FTP 511).  
4-pole magnetic pole wheels, centered at DSE...MZ.  
2-pole magnetic pole wheels, eccentric at DSE...ME.

### Output

Signal output A.C. voltage, approx. sinusoidal. Amplitude dependent on rotational speed, pole wheel-sensor gap d and pole wheel dimensions. Characteristics in diagram A3 show the dependence on gap d.  
Diagrams B3 and B4 show lowest measuring speed N100 for different modules and gaps d acc. to Technical Data (see table 1).  
Short circuit proof and protected against reverse polarity.

### Connection



Shield to be connected with 0 V of power supply.

### Mechanical

Protection class IP67 (head), IP50 (jack connection).  
Vibration immunity 20 g<sub>r</sub> in the range 5...2000 Hz.  
Shock immunity 50 g<sub>r</sub> during 20 ms, half sine wave.  
Operating temperature Acc. to model overview.  
Insulation Housing and electronics galvanically isolated (500 V/50 Hz/1 min).  
Housing Type ..MZ: brass 2.0371. Type ..ME: Stainless steel 1.4305.  
IP64, electronic components potted in a chemical- and age-proof synthetic resin.  
Dimensions acc. to model overview and dimensional drawings.  
Weight Acc. to model overview.  
Operating instructions DSE...MZ: 304E-63921  
DSE...ME: 304E-63923

### Versions

Version A Connection type: 820E-31142. Connection plug: 820E-31141.  
Version AT PVC cable: Part nr. 824L-30894, 2wire, 2 x 0.75 mm<sup>2</sup>, stranded wire (metal net insulated from the housing), grey.  
Outer Ø max. 6,7 mm, bending radius min. 60 mm, weight 70 g/m.  
Standard length for version AT: 5 m.  
Version AH Teflon cable: Part nr. 824L-31841, 2wire, 2 x 0.75 mm<sup>2</sup>, stranded wire (metal net insulated from the housing), black.  
Outer Ø max. 5.0 mm, bending radius min. 80 mm, weight 45 g/m.  
Standard length for version AH: 2 m.  
DSE 25ME...AH Connection type: 820E-34902. Connection plug: 820E-34903.