



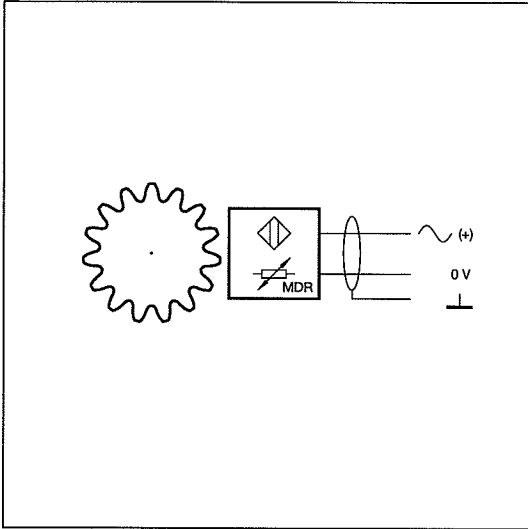
# DSF...Z

## **Hall Effect Sensors, without amplifier** (Ferrostat)

# Ferrostat Sensor without amplifier

# DSF...Z

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  $U_g$  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

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

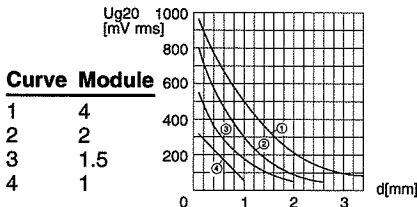
The sensor is mounted with its centre over the centre of the pole wheel. With gear wheels or slots and radial mounting, the sensor is normally fixed over the middle of the wheel. Dependent on the gear width, a degree of axial movement is permissible. The centre of the sensor must however remain a minimum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

CONNECTION AND INSTALLATION

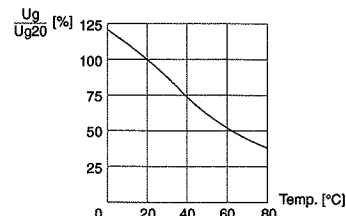
**Diagram A**

Signal voltage  $U_{g20}$  as function of pole wheel-sensor air gap



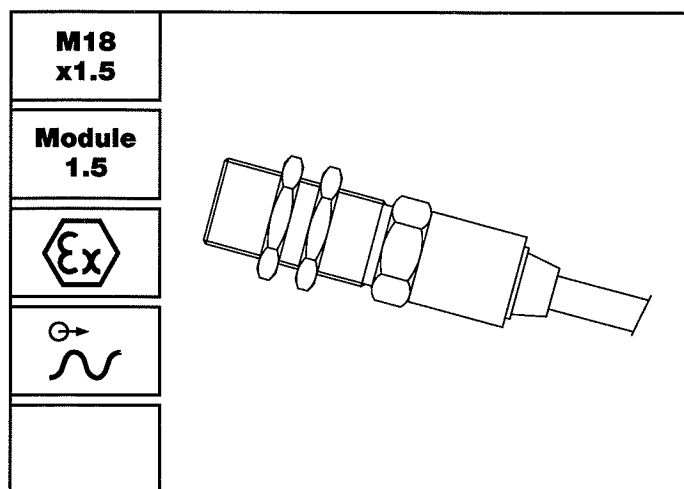
**Diagram B**

Temperature dependency



DIAGRAMS

## DSF 1815 A, S, M.Z

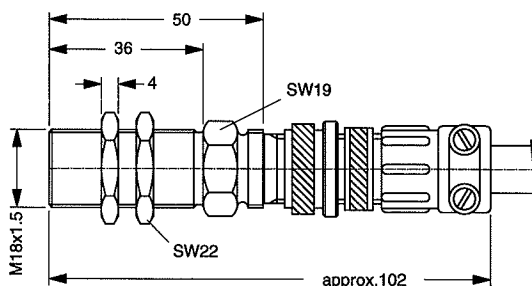


### Features

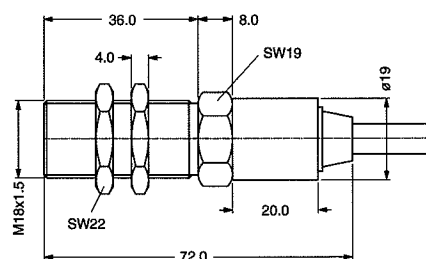
- Without amplifier
- Static characteristic
- Lower Frequency limit: 0 Hz
- Sensor types Ex, intrinsically safe (zone 1)  
EEx ia II C T5/T6 available

### Dimensions

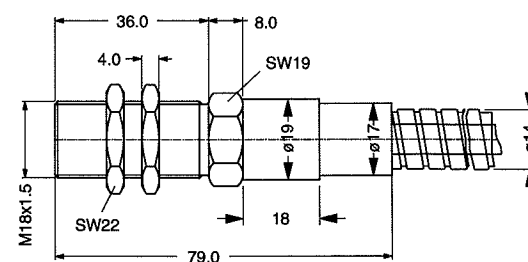
#### Version A



#### Version S



#### Version M



### Model Overview

Type	Part nr.	Connection	Housing thread	Weight [g]	Operating temperature [°C]	Notes
DSF 1815.00 ATZ	304Z-03766	MS plug	M18x1.5	110	-25...+85	previously FTG 285.01 A
DSF 1815.00 ATZ Ex	304Z-04007	MS plug	M18x1.5	110	acc. to certificate of conformity	previously FTG 285.01 A Ex
DSF 1815.00 STZ	304Z-03806	Wire 5 m	M18x1.5	480	-25...+85	previously FTG 285.01 S
DSF 1815.00 STZ Ex	304Z-04008	Wire 5 m	M18x1.5	480	acc. to certificate of conformity	previously FTG 285.01 S Ex
DSF 1815.00 MTZ	304Z-04009	Protection hose 5 m	M18x1.5	1230	-25...+85	previously FTG 285.01 SM
DSF 1815.00 MTZ Ex	304Z-04010	Protection hose 5 m	M18x1.5	1230	acc. to certificate of conformity	previously FTG 285.01 SM Ex

## Technical Data

### Supply

Power supply

Supply voltage: 12 V= ±10% via 820 Ω series resistor,  
Current consumption: max. 12 mA.

### Input

Frequency range

Depending on cable length and cable type (see paragraph connection).

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

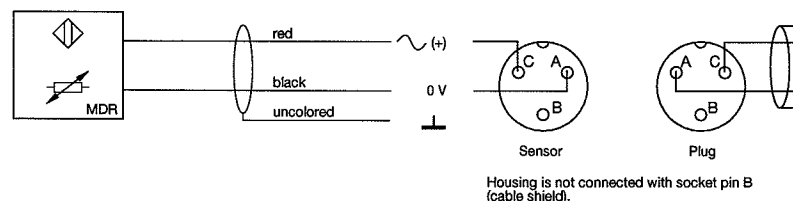
Ferromagnetic toothed wheel i.e. Ust37-2, involute gear form preferred.  
Module ≥ 1, min. tooth width 6 mm, side offset with min. tooth width: < 0.2 mm,  
eccentricity < 0.2 mm or ≤ 20% of pole wheel-sensor gap.  
Pole wheel-sensor gap acc. to diagram C.

### Output

Signal output

D.C. voltage of approx. +4 V with superimposed signal voltage  $U_g$ .  
Diagram A displays the signal voltage  $U_g$  20 as a function of pole wheel-sensor gap  $d$  with the pole wheel module as a parameter, at an ambient temperature of 20 °C.  
Internal resistance: Without influence by pole wheel at 20 °C: 400 Ω ±25%.  
If influenced by the pole wheel, the resistance increases by 10...250%.  
Temperature coefficient of the signal voltage  $U_g$  of the internal resistance: -2...-5%/°C.  
Diagram B (see section title) shows the signal voltage  $U_g$  20 at +20 °C (as a percentage) as a function of the temperature.

### Connection



Shield to be connected to 0 V of power supply.

### Mechanical

Protection class

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

Vibration immunity

5  $g_n$  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 shielding and coil 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 instruction

304E-63762

### Versions

Version A

Plug: Part nr. 820E-31142, at sensor.  
Connecting plug (cable socket) Part nr. 820E-31141, at cable.

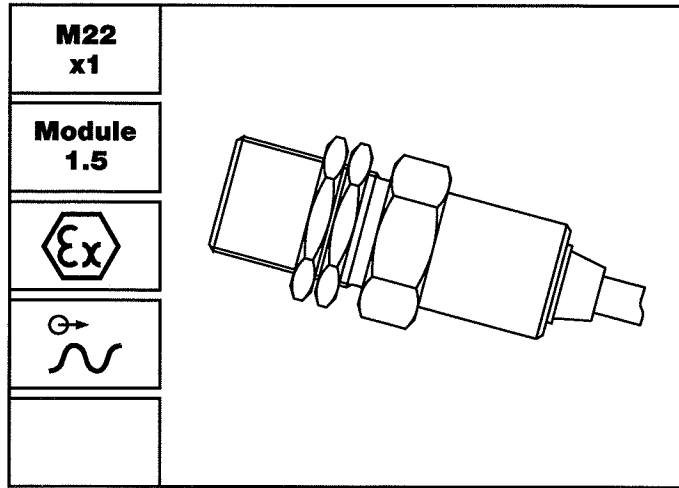
Version S

PVC-wire: Part nr. 824G-30894, 2wire, 2x0.75 mm<sup>2</sup>, wire stranded (metal net, isolated from housing), grey. Outer Ø max 6.7 mm, bending radius min. 60 mm, weight 70 g/m.

Version M

PVC cable with metal tube: Part nr. 825G-30924. Tube made of profile milled steel plate with PVC cover, grey. Weather and water proof, conditionally oil and acid resistant. Outer Ø 14 mm, bending radius min. 40 mm, weight 130 g/m.

## DSF 2215 A, S, M.Z

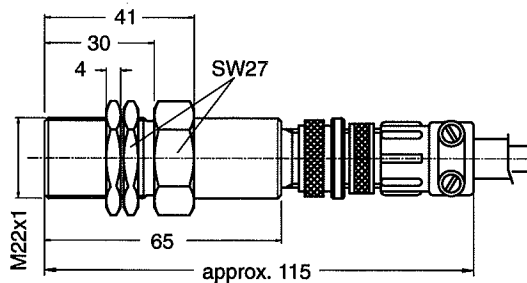


### Features

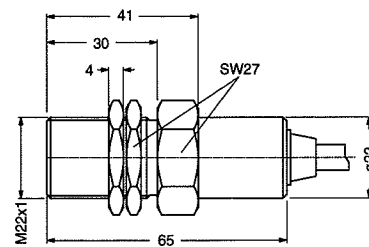
- Without amplifier
- Static characteristic
- Lower Frequency limit: 0 Hz
- Sensor types Ex, intrinsically safe (zone 1)  
EEx ia II C T5/T6 available

### Dimensions

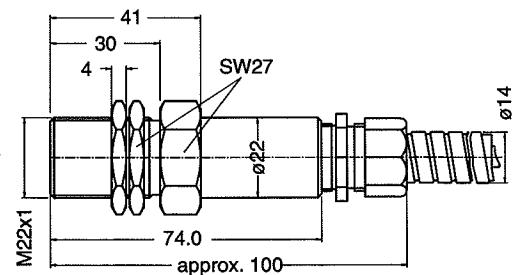
**Version A**



**Version S**



**Version M**



### Model Overview

Type	Part nr.	Connection	Housing thread	Weight [g]	Operating temperature [°C]	Notes
DSF 2215.00 ATZ	304Z-03765	MS plug	M22x1	200	-25...+85	previously FTG 1085.01 A
DSF 2215.00 ATZ Ex	304Z-03801	MS plug	M22x1	200	acc. to certificate of conformity	previously FTG 1085.01 A Ex
DSF 2215.00 STZ	304Z-03802	Wire 5 m	M22x1	550	-25...+85	previously FTG 1085.01 S
DSF 2215.00 STZ Ex	304Z-03803	Wire 5 m	M22x1	550	acc. to certificate of conformity	previously FTG 1085.01 S Ex
DSF 2215.00 MTZ	304Z-03804	Protection hose 5 m	M22x1	1300	-25...+85	previously FTG 1085.01 SM
DSF 2215.00 MTZ Ex	304Z-03805	Protection hose 5 m	M22x1	1300	acc. to certificate of conformity	previously FTG 1085.01 SM Ex

## Technical Data

### Supply

Power supply

Supply voltage: 12 V= ±10% via 820 Ω series resistor.  
Current consumption: max. 12 mA.

### Input

Frequency range

Depending on cable length and cable type (see paragraph connection).

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

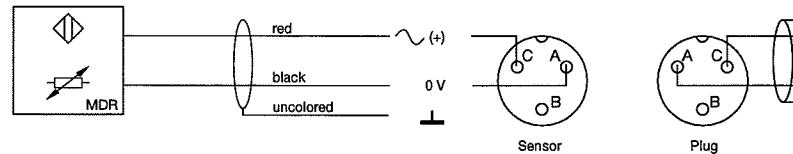
Ferromagnetic toothed wheel i.e. Ust37-2, involute gear form preferred.  
Module ≥ 1, min. tooth width 6 mm, side offset with min. tooth width: < 0.2 mm,  
eccentricity < 0.2 mm or ≤ 20% of pole wheel-sensor gap.  
Pole wheel-sensor gap acc. to diagram C.

### Output

Signal output

D.C. voltage of approx. +4 V with superimposed signal voltage  $U_g$ .  
Diagram A displays the signal voltage  $U_g$  20 as a function of pole wheel-sensor gap  $d$  with the pole wheel module as a parameter, at an ambient temperature of 20 °C.  
Internal resistance: Without influence by pole wheel at 20 °C: 400 Ω ±25%.  
If influenced by the pole wheel, the resistance increases by 10...250%.  
Temperature coefficient of the signal voltage  $U_g$  of the internal resistance: -2...-5%/°C.  
Diagram B (see section title) shows the signal voltage  $U_g$  20 at +20 °C (as a percentage) as a function of the temperature.

### Connection



Shield to be connected to 0 V of power supply.

### Mechanical

Protection class

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

Vibration immunity

5  $g_n$  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 shielding and coil 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 instruction

304E-63762

### Versions

Version A

Plug: Part nr. 820E-31142, at sensor.  
Connecting plug (cable socket) Part nr. 820E-31141, at cable.

Version S

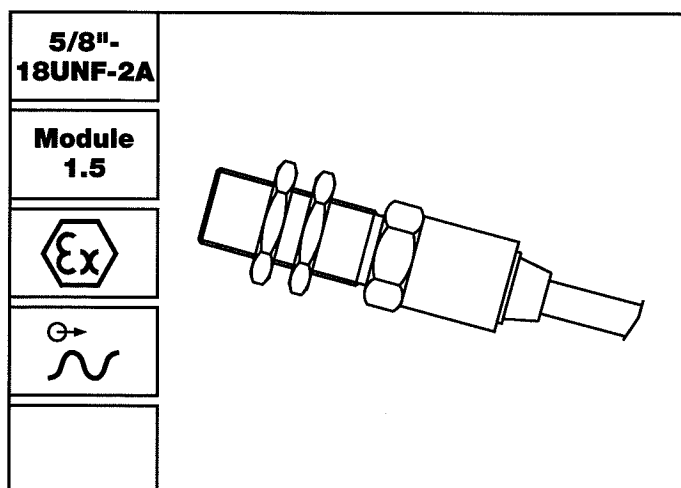
PVC-wire: Part nr. 824G-30894, 2wire, 2x0.75 mm<sup>2</sup>, wire stranded (metal net, isolated from housing), grey. Outer Ø max 6.7 mm, bending radius min. 60 mm, weight 70 g/m.

Version M

PVC cable with metal tube: Part nr. 825G-30924. Tube made of profile milled steel plate with PVC cover, grey. Weather and water proof, conditionally oil and acid resistant. Outer Ø 14 mm, bending radius min. 40 mm, weight 130 g/m.



## DSF EH15 A, S, M.Z

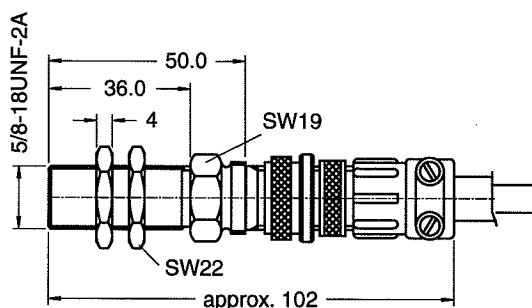


### Features

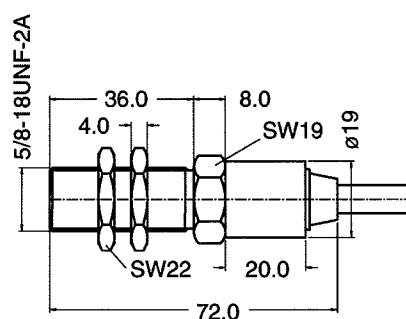
- Without amplifier
- Static characteristic
- Lower Frequency limit: 0 Hz
- Sensor types Ex, intrinsically safe (zone 1)  
EEx ia II C T5/T6 available

### Dimensions

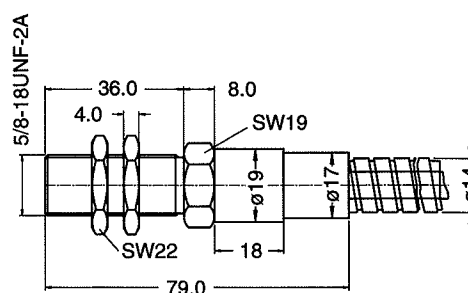
#### Version A



#### Version S



#### Version M



### Model Overview

Type	Part nr.	Connection	Housing thread	Weight [g]	Operating temperature [°C]	Notes
DSF EH15.00 ATZ	304Z-04011	MS plug	5/8"-18UNF-2A	80	-25...+85	prev. FTG 2850.00 A
DSF EH15.00 ATZ Ex	304Z-04012	MS plug	5/8"-18UNF-2A	80	acc. to certificate of conformity	prev. FTG 2850.00 A Ex
DSF EH15.00 STZ	304Z-04013	Wire 5 m	5/8"-18UNF-2A	450	-25...+85	prev. FTG 2850.00 S
DSF EH15.00 STZ Ex	304Z-03857	Wire 5 m	5/8"-18UNF-2A	450	acc. to certificate of conformity	prev. FTG 2850.00 S Ex
DSF EH15.00 MTZ	304Z-04014	Protection hose 5 m	5/8"-18UNF-2A	1200	-25...+85	prev. FTG 2850.00 SM
DSF EH15.00 MTZ Ex	304Z-04015	Protection hose 5 m	5/8"-18UNF-2A	1200	acc. to certificate of conformity	prev. FTG 2850.00 SM Ex

## Technical Data

### Supply

Power supply

Supply voltage: 12 V= ±10% via 820 Ω series resistor,  
Current consumption: max. 12 mA.

### Input

Frequency range

Depending on cable length and cable type (see paragraph connection).

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

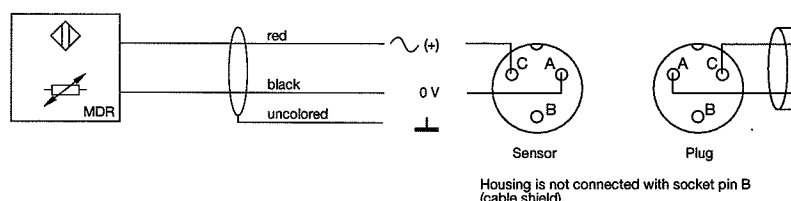
Ferromagnetic toothed wheel i.e. Ust37-2, involute gear form preferred.  
Module ≥ 1, min. tooth width 6 mm, side offset with min. tooth width: < 0.2 mm,  
eccentricity < 0.2 mm or ≤ 20% of pole wheel-sensor gap.  
Pole wheel-sensor gap acc. to diagram .

### Output

Signal output

D.C. voltage of approx. +4 V with superimposed signal voltage  $U_g$ .  
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Diagram B (see section title) shows the signal voltage  $U_g$  20 at +20 °C (as a percentage) as a function of the temperature.

### Connection



Shield to be connected to 0 V of power supply.

### Mechanical

Protection class

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

Vibration immunity

5  $g_n$  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 shielding and coil 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 instruction

304E-63762

### Versions

Version A

Plug: Part nr. 820E-31142, at sensor.

Connecting plug (cable socket) Part nr. 820E-31141, at cable.

Version S

PVC-wire: Part nr. 824G-30894, 2wire, 2x0.75 mm<sup>2</sup>, wire stranded (metal net, insulated from housing), grey. Outer Ø max 6.7 mm, bending radius min. 60 mm, weight 70 g/m.

Version M

PVC cable with metal tube: Part nr. 825G-30924. Tube made of profile milled steel plate with PVC cover, grey. Weather and water proof, conditionally oil and acid resistant. Outer Ø 14 mm, bending radius min. 40 mm, weight 130 g/m.