

DSD xx10.01 SxV / MTV

Ferrostat Differential Speed Sensors

Product ID

Type	Product P/N:	Drawing number
DSD 1210.01 MTV	374Z-04136	111478D-MXCU
DSD 1210.01 SHV (10m)	374Z-04135	110428D-1-MXCU
DSD 1210.01 SHV (2m)	374Z-03761	110428D-1-MXCU
DSD 1210.01 SHV (5m)	374Z-03762	110428D-1-MXCU
DSD 1210.01 STV (5m)	374Z-03712	110428D-1-MXCU
DSD 1410.01 S1HV (20m)	3742610821	123565-JAQC
DSD 1410.01 SHV (2m)	374Z-04183	4-111496D-1-JAQC
DSD 1410.01 STV (5m)	374Z-04182	4-111496D-1-JAQC
DSD 1610.01 SHV (5m)	374Z-04187	4-111498D-1-SIEM
DSD 1610.01 STV (5m)	374Z-04185	4-111498D-1-SIEM
DSD 1810.01 SHV (2m)	374Z-03991	110687D-1-MXCU
DSD 1810.01 SHV (5m)	374Z-04189	110687D-1-MXCU
DSD 1810.01 STV (5m)	374Z-04188	110687D-1-MXCU
DSD 2210.01 MTV (5m)	374Z-04146	111482D-1-JAQC
DSD 2210.01 SHV (2m)	374Z-03782	4-110777D-1-MXCU
DSD 2210.01 SHV (5m)	374Z-04190	4-110777D-1-MXCU
DSD 2210.01 STV (5m)	374Z-03750	4-110777D-1A-MXCU

OPERATING INSTRUCTIONS

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General

Function	<p>The Ferrostat Differential Speed Probes are suitable, in conjunction with a pole wheel (toothed wheel made of steel, preferred evolvent gear wheel) for generating a pulse frequency proportional to the rotary speed.</p> <p>They have a static behaviour, so that pulse generation is guaranteed down to a speed corresponding to a frequency of 0 Hz.</p> <p>The sensing element is a magnetically based Differential Hall device followed by an amplifier short-circuit proof. (Suffix V).</p> <p>The speed sensors must be aligned with reference to the plane of the pole wheel according to the drawing sensor alignment.</p>
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Technical Data

Supply voltage	8...30 VDC protected against transient overvoltages						
Current consumption	max. 18 mA (without load)						
Signal output	<ul style="list-style-type: none">• square wave• Push-pull output : $I_{max} = \pm 20$ mA<ul style="list-style-type: none">○ with pull-up resistor (for $I = I_{max}$): $U_{low} < 2.5$ V, $U_{high} > 0.95 * U_{supply}$○ with pull-down resistor (for $I = I_{max}$): $U_{low} < 0.1$ V, $U_{high} > U_{supply} - 4.0$ V• The outputs are short circuit proof and protected against reverse polarity.						
Frequency range	0 Hz...20 kHz						
Electromagnetic compatibility (EMC) Immunity	<p>With cable shield connected to the supply negative pole.</p> <p>Noise generator between housing and electronics</p> <p>Surges according to IEC 61000-4-5</p> <ul style="list-style-type: none">• 1.5 kV/50 μs/max.5 Hz (Source resistance 500 Ohm) <p>Electrical fast transients/bursts according to IEC 61000-4-4 coupled to sensor cable with a capacitive coupling clamp</p> <ul style="list-style-type: none">• 2.0 kV/HF-Bursts (Level 4 in accordance with IEC 801-4) <p>Oscillatory waves immunity test according to IEC 61000-4-12</p> <ul style="list-style-type: none">• 2.5 kV/1 MHz damped resonance (Class III in accordance with IEC 255-4)						
Insulation	Housing, cable shield and electronics are galvanically separated (500 V/50 Hz/1 Min.)						
Operating temperature	<ul style="list-style-type: none">• Version T: -40°C ... +85°C• Version H: -40°C ... +125°C <p>Check properties of cable and protective conduits.</p>						
Housing	<p>Stainless steel (material number 1.4305 or 1.4301), front side hermetically sealed and resistant against splashing water, oil, conducting carbon- or ferrous dust and salt mist. Electronic components potted in a chemical and age proof synthetic resin or ceramic.</p> <p>Tightening moment max.:</p> <table><tr><td>12 Nm for M12x1</td><td>25 Nm for M14x1</td><td>35 Nm for M16x1</td></tr><tr><td>50 Nm for M18x1</td><td>75 Nm for M22x1</td><td></td></tr></table>	12 Nm for M12x1	25 Nm for M14x1	35 Nm for M16x1	50 Nm for M18x1	75 Nm for M22x1	
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50 Nm for M18x1	75 Nm for M22x1						
Protection class	IP68 (head), IP67 (cable entrance)						
Vibration immunity	5 g_n in the range of 5 ... 2000 Hz, random noise						
Shock immunity	50 g_n , 20 ms, half sine wave						

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Pole wheel	<p>Toothed wheel of a magnetically permeable material (e.g. Steel 1.0036)</p> <p>Optimal performance with</p> <ul style="list-style-type: none">• Involute gear• Tooth width > 10 mm• Side offset < 0.2 mm• Eccentricity < 0.2 mm• Sensor is optimized to operate with involute gears of module 1 and larger. <p>Air gap between pole wheel (evolute gear) and sensor housing:</p> <ul style="list-style-type: none">• Module 1: 0.1...0.5 mm• Module 2: 0.1...1.3 mm• Module 4 and larger: 0.1...1.5 mm				
Reliability	<p>The following MTF and failure rates were computed based on Siemens SN29500 and valid for an operating temperature of 60°C. They include the electrical failure modes but not the mechanical.</p> <table border="1"><thead><tr><th>MTTF [hours]</th><th>Failure rate [FIT]</th></tr></thead><tbody><tr><td>2'555'000</td><td>391.4</td></tr></tbody></table>	MTTF [hours]	Failure rate [FIT]	2'555'000	391.4
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2'555'000	391.4				
Safety	<p>All mechanical installations must be carried out by an expert. General safety requirements have to be met.</p>				
Connection	<p>The sensors must be connected according to sensor drawing.</p> <p>Sensor wires are susceptible to radiated noise. Therefore, the following points have to be considered when connecting a sensor:</p> <p>The sensor wires must be laid as far as possible from large electrical machines. They must not run parallel in the vicinity of power cables.</p> <p>The maximum permissible cable length is dependent upon the sensor voltage, the cable routing, along with cable capacitance and inductance. However, it is advantageous to keep the distance between sensor and instrument as short as possible. The sensor cable may be lengthened via a terminal box located in an IP20 connection area in accordance with EN 60529.</p>				
Installation	<p>The sensor has to be aligned to the pole wheel according to the sensor drawing. Deviations in positioning may affect the performance and decrease the noise immunity of the sensor. During installation, the smallest possible pole wheel to sensor gap should be set. The gap should however be set to prevent the face of the sensor ever touching the pole wheel.</p> <p>A sensor should be mounted with the middle of the face side over the middle of the pole wheel. Dependent upon the wheel width, a certain degree of axial movement is permissible. However, the middle of the sensor must be at minimum in a distance of 3 mm from the edge of the pole wheel under all operating conditions.</p> <p>A solid and vibration free mounting of the sensor is important. Eventual sensor vibration relative to the pole wheel can induce additional output pulses.</p> <p>The sensors are insensitive to oil, grease etc. and can be installed in arduous conditions. Within the air gap specified the amplitude of the output signals is not influenced by the air gap.</p>				
Maintenance	<p>Sensors are maintenance-free.</p> <p>The sensors are fully potted and sealed and cannot be repaired.</p>				
Transport	<p>Product must be handled with care to prevent damage of the front face.</p>				
Storage	<p>Product must be stored in dry conditions. The storage temperature corresponds to the operation temperature.</p>				
Disposal	<p>Product must be disposed of properly, it must not be disposed as domestic waste.</p>				

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Connection type

Sensor Type	Connection type	Cable length [mm]	Cable P/N
DSD 1210.01 MTV	Cable with protection conduit	5000	825G-36148
DSD 1210.01 SHV (10m)	Cable	10000	824L-35053
DSD 1210.01 SHV (2m)	Cable	2000	824L-35053
DSD 1210.01 SHV (5m)	Cable	5000	824L-35053
DSD 1210.01 STV (5m)	Cable	5000	824L-35665
DSD 1410.01 S1HV (20m)	Cable	20000	8242610868
DSD 1410.01 SHV (2m)	Cable	2000	824L-35053
DSD 1410.01 STV (5m)	Cable	5000	824L-35665
DSD 1610.01 SHV (5m)	Cable	5000	824L-35053
DSD 1610.01 STV (5m)	Cable	5000	824L-35665
DSD 1810.01 SHV (2m)	Cable	2000	824L-35053
DSD 1810.01 SHV (5m)	Cable	5000	824L-35053
DSD 1810.01 STV (5m)	Cable	5000	824L-35665
DSD 2210.01 MTV (5m)	Cable with protection conduit	5000	825G-30924
DSD 2210.01 SHV (2m)	Cable	2000	824L-35053
DSD 2210.01 SHV (5m)	Cable	5000	824L-35053
DSD 2210.01 STV (5m)	Cable	5000	824L-31081

Cables

Cable P/N	Properties
824L-31081	PVC cable, 3-wire, 0.75 mm ² , outer-Ø max. 7.3 mm, bending radius min. 110 mm, screened (metal net), grey Operating temperature: -30°C to +70°C
824L-35053	FEP cable, 4-wire (brown wire is not connected), 0.2 mm ² (AWG 24), outer-Ø max. 4.2 mm, bending radius min. 60 mm, screened (metal net), white Operating temperature: -100°C to +135°C
824L-35665	PVC cable, 3-wire, 0.23 mm ² (AWG 24), outer-Ø max. 4.2 mm, bending radius min. 60 mm, screened (metal net), grey Operating temperature: -20°C to +80°C