DATASHEET

SLT SERIES | LVDT

Inductive Transducer: Ultra robust LVDT series with spring loaded and air actuated versions.

- Measurement range 10...300 mm
- Linearity up to ±0.10 %
- Housing ø20 mm
- Protection class up to IP67
- Working temperature up to 200 °C
- Customized versions availableJ

eddylab

INTRODUCTION

LVDTs (Linear Variable Differential Transformers) are inductive sensors excellent for use in harsh industrial environments, e.g. high temperature and pressure ranges, as well as high accelerations and measuring cycles.

Based on the SL series, the SLT probes are also characterized by an ultra robust construction and a fully stainless steel housing which makes them suitable for harsh environments.

The combination of a hardchrome plated shaft with 6 mm in diameter and precision bearings guarantees highest resistance to lateral forces on the push rod.
There are three different functional variants available to meet the demands of most measuring tasks:

- Spring loaded mechanism: The push rod is fully extended by an internal spring.
- Pneumatic version 1: The push rod extends by applying pressurized air. An internal spring retracts the push rod after releasing the pressure.
- Pneumatic version 2: The push rod retracts by applying pressurized air. An internal spring extends the push rod after releasing the pressure.

Note: A measuring amplifier is required to operate LVDT sensors. eddylab offers the digital signal conditioners **DEEneo** for DIN rail mounting and **DEEneo-ISC**, a version integrated into the sensor connection cable. See p.5 or separate data sheets at www.eddylab.com.
The electronics take over the sensor supply and convert the sensor signal into a standardized, analogue output signal with the help of a microcontroller output signal. They also feature simple adjustment (teach function) and linearization of the sensor characteristic curve to achieve the highest possible precision.

TECHNICAL DATA - SENSORS

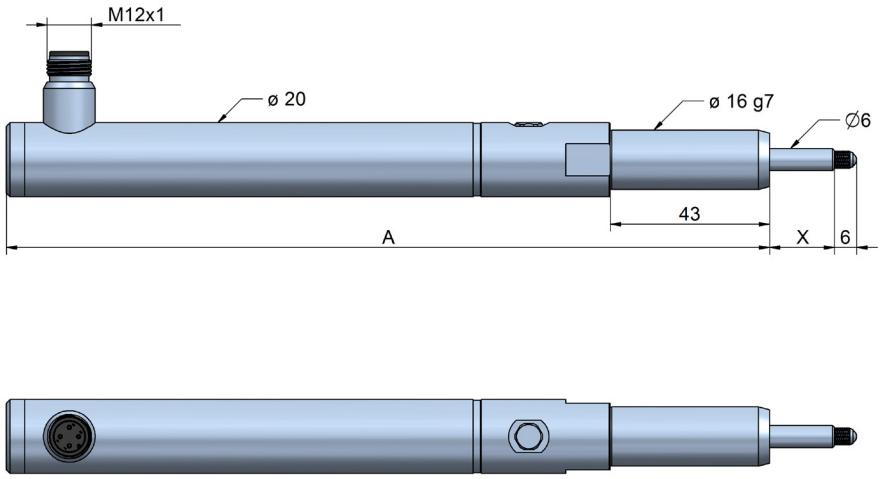
SENSOR								
Measurement range FS [mm]	0...10	0...25	0...50	0...80	0...100	0...150	0...200	0...300
Linearity [% of FS]	0,30 % (0,20 % optional), 0,10 % for selected models							
Types	spring loaded mechanism							
	pneumatic version PR1: pressurized air extends push rod							
	pneumatic version PR2: pressurized air retracts push rod							
Protection class	IP65, optional IP67							
Vibration stability DIN IEC68T2-6	10 G							
Shock stability DIN IEC68T2-27	200 G/ 2 ms							
Supply voltage / frequency	3 V_{eff}/ 3 kHz							
Supply frequency	2...10 kHz							
Temperature range	-40...+120 °C (150 °C and 200 °C on option)							
Mounting	ø 16 and 20 mm clamp diameter							
Housing	stainless steel 1.4571, 1.4305							
Connection	4 core cable or M12-connector with coupling nut							
cable TPE (standard)	ø 4,5 mm, 0,14 mm², non-halogen, suitable for drag chains							
cable PTFE (option H)	ø 4,8 mm, 0,24 mm², max. temperature 205 °C, UL-style 2895							
Max. cable length	100 m between sensor and electronics							
weight (approx., without cable) [g]	280	300	340	460	560	610	660	760
Spring loaded type								
Spring force (middle of range) [N]	2,5	2,5	3	3	3,5	3,5	3,5	3,5
Life cycle	> 10 million cycles							
Pneumatic actuated versions								
Air supply	1,5...2,5 bar, free of oil, water and dust							

TECHNICAL DRAWINGS

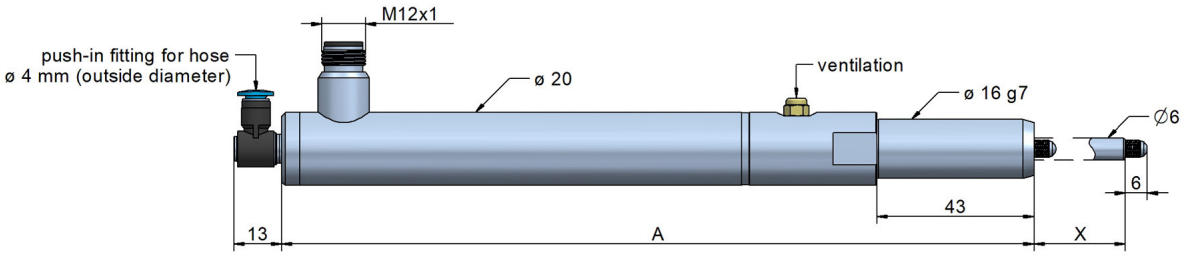
RANGE (FS) [MM]	HOUSING LENGTH A [MM]
0...10	176
0...25	206
0...50	256
0...80	316

RANGE (FS) [MM]	HOUSING LENGTH A [MM]
0...100	356
0...150	456
0...200	556
0...300	776

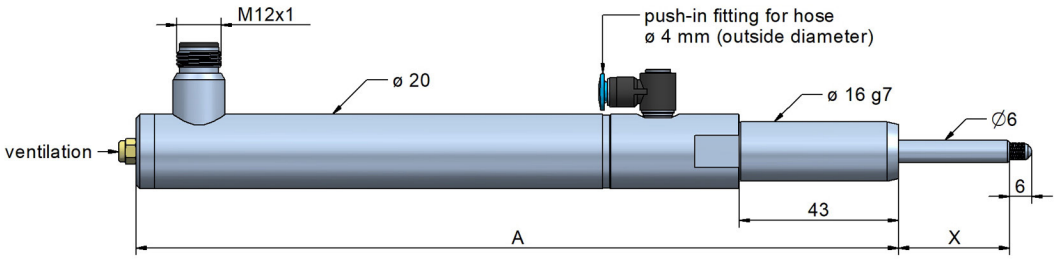
TYPE: SPRING LOADED



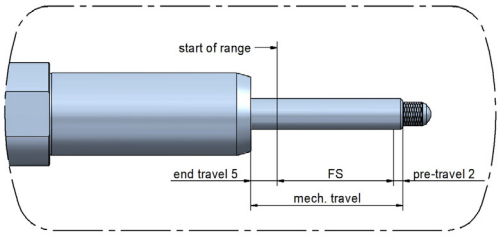
TYPE: PNEUMATIC ACTUATED PR1 (PRESSURIZED AIR EXTENDS PUSH ROD)



TYPE: PNEUMATIC ACTUATED PR2 (PRESSURIZED AIR RETRACTS PUSH ROD)



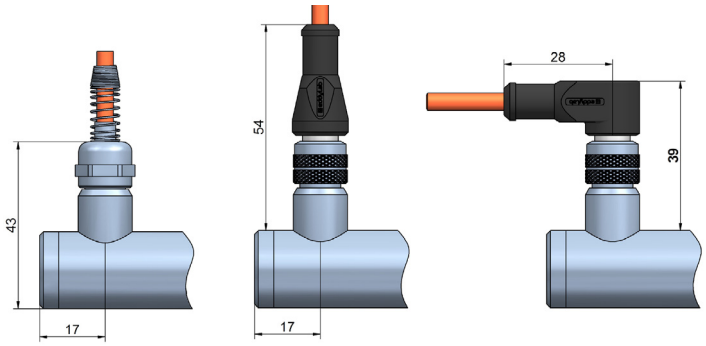
EXPLANATION: MECHANICAL TRAVEL



POSITION OF PUSH ROD	X [MM]
mechanical stop, retracted position	0
start of range	5
end of range	FS + 5
fully extended position	FS + 7

SENSOR TYPES

CONNECTOR / CABLE OUTPUT RADIAL

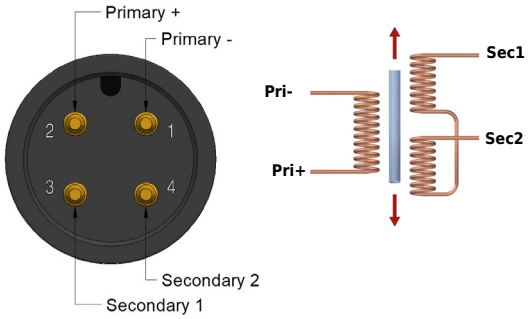


Sensors with cable output have a cable fitting and a spring for bend protection of the cable. The standard cable length is 2 m.

For sensors with connector output the cable has to be ordered separately. You can choose from a cable with a straight connector or with an angular connector. The connector is protected from accidental removal by a threaded fitting (M12). When bolted, the connector pair has the protection class IP67.

CABLE/PIN ASSIGNMENT (AC OUTPUT)

	WIRE COLOUR OF EDDYLAB CABLES		M12 CONNECTOR
FUNCTION	TPE CABLE	PTFE-UL CABLE	PIN
Primary +	white	white	2
Primary -	brown	yellow	1
Secondary 1	blue	brown	3
Secondary 2	black	green	4

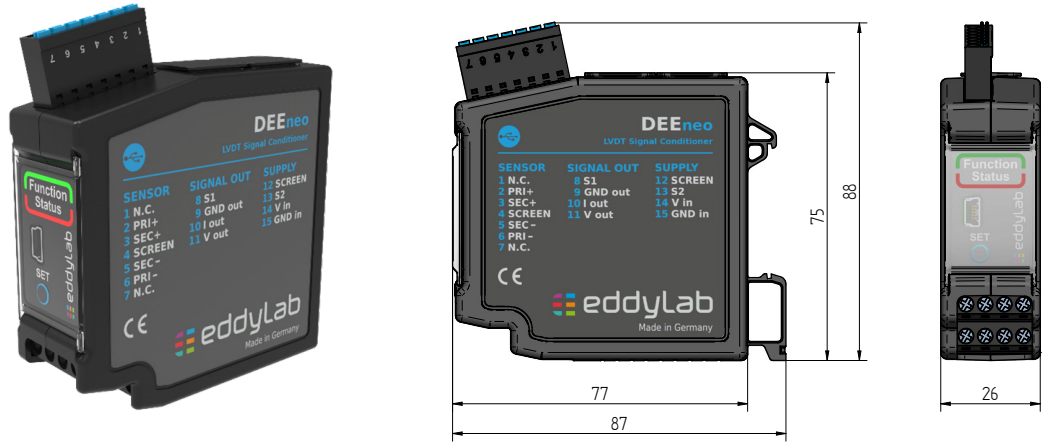


DEENEO | DEENEO-ISC

The **DEEneo** signal conditioner was developed for operating inductive LVDT sensors (full bridge). The electronics supply the sensor and convert the sensor signal into a standardized, analogue output signal with the help of a microcontroller. A push button (SET button) is used for the basic configuration and to set the measuring range limits - this enables quick and easy adaptation to the customer's application. Where possible, eddylab calibrates the sensor and electronics together. The sensor characteristic curve can be linearized to meet the highest demands on the accuracy of the measuring chain. Further features can be configured via the **eddySetup** configuration software. Further information can be found in the DEEneo and DEEneo-ISC data sheets.

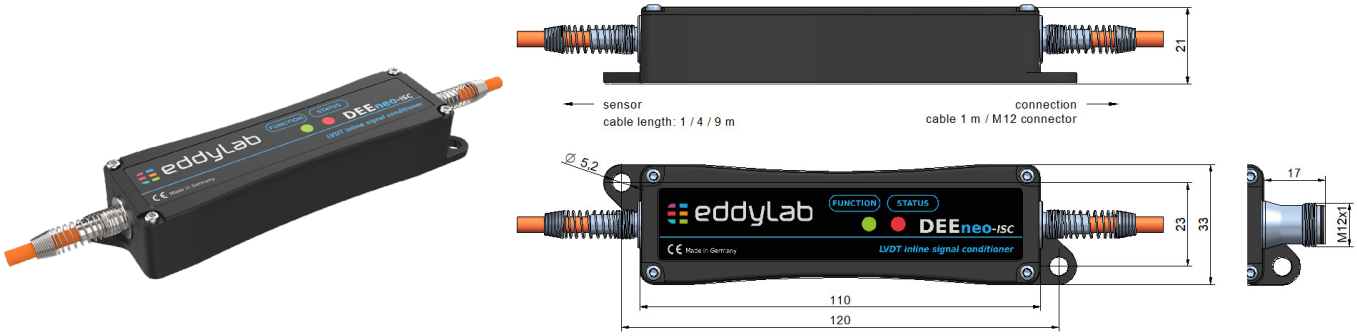
DEEneo*

Digital signal converter for DIN rail mounting



DEEneo-ISC*

Inline Signal Conditioner (cable electronics)



TECHNICAL DATA

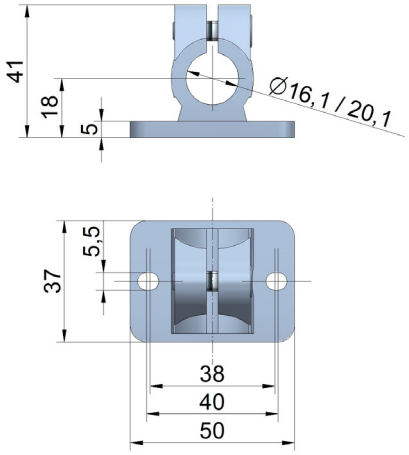
ELECTRONICS	DEEneo*	DEEneo-ISC*
Output signal	0...20 mA, 4...20 mA (Last < 300 Ohm)	
	0...5 V, ± 5 V; 0...10 V, ± 10 V	
Mounting	on 35 mm DIN rail in accordance with DIN EN 60715	integrated in sensor cable
Power supply	9...36 VDC	
Power consumption	70 mA at 24 VDC, 130 mA at 12 VDC	
Sensor supply	standard: 3V / 3.3 kHz, can be modified by software	
Settings (factory setting)	frequency, amplitude, output signal	
Resolution	16 bit	
Signal processing	digital via microcontroller	
Signal adjustment	via SET-button or software	
Linearisation of sensor	yes, optionally possible	
Features		
Switching output	open drain up to 60 V, max. 115 mA	-
Alarm output	open drain up to 60 V, max. 115 mA	-
Cable break detection	yes	

*Separate data sheets for DEEneo and DEEneo-ISC at www.eddylab.com

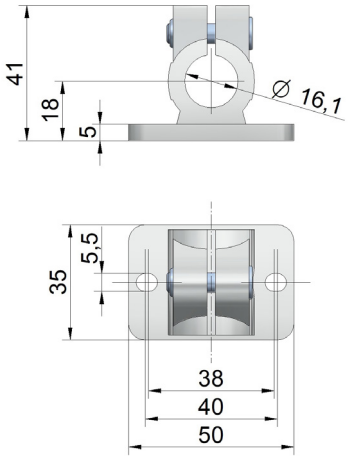
ACCESSORIES

MOUNTING PARTS

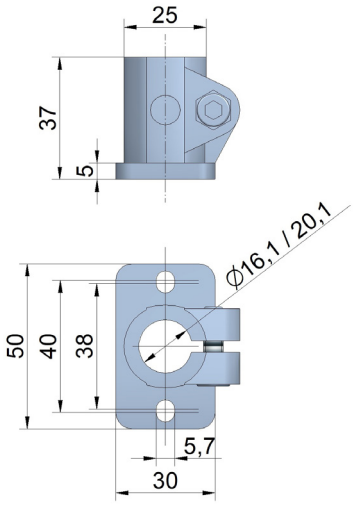
Flanschklemmstück 16-VA / 20-VA, flange clamp
material: stainless steel, temperature resistant up to 200 °C



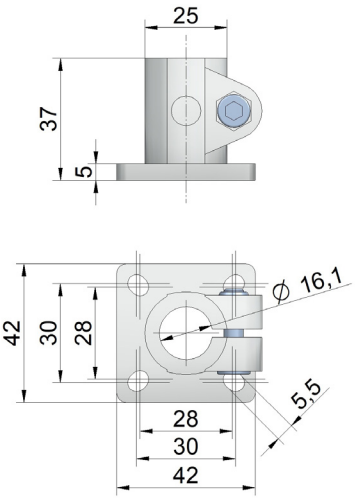
Flanschklemmstück 16-AL, flange clamp
material: aluminium, temperature resistant up to 120 °C



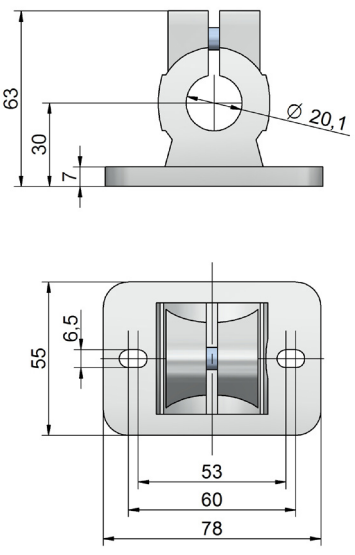
Fußklemmstück 16-VA / 20-VA, base clamp
material: stainless steel, temperature resistant up to 200 °C



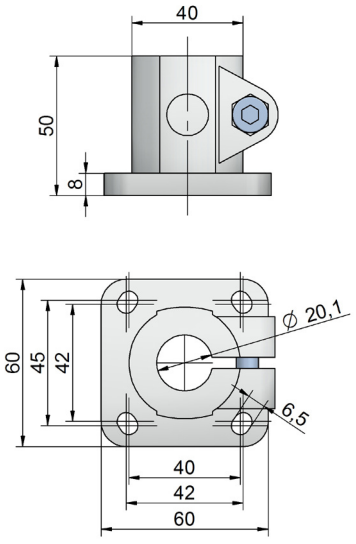
Fußklemmstück 16-AL, base clamp
material: aluminium, temperature resistant up to 120 °C



Flanschklemmstück 20-AL, flange clamp
material: aluminium, temperature resistant up to 120 °C



Fußklemmstück 20-AL, base clamp
material: aluminium, temperature resistant up to 120 °C



CONNECTION CABLE (SHIELDED) FOR CONNECTOR OUTPUT

CABLE M12 WITH ANGULAR CONNECTOR	
K4P2M-SW-M12	2 m
K4P5M-SW-M12	5 m
K4P10M-SW-M12	10 m
K4P15M-SW-M12	15 m
K4P20M-SW-M12	20 m
K4P50M-SW-M12	50 m

CABLE M12 WITH STRAIGHT CONNECTOR	
K4P2M-S-M12	2 m
K4P5M-S-M12	5 m
K4P10M-S-M12	10 m
K4P15M-S-M12	15 m
K4P20M-S-M12	20 m
K4P50M-S-M12	50 m

MATING CONNECTOR M12 (SHIELDED)

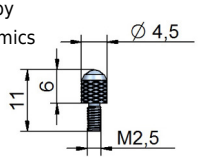
	STRAIGHT CONNECTOR D4-G-M12-S	ANGULAR CONNECTOR D4-W-M12-S
Protection class	IP67	
Temperature range	-25...+90 °C	
Mode of connection	spring closure construction	
Cable diameter	ø 4...8 mm	
Conductor	0,14...0,34 mm²	

FEELER

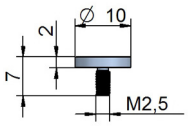
MATERIAL OF TASTKOPF-01 FEELER BALLS:

steel: for standard applications
ruby: much harder and wear resistant than steel, non-conductive, for all applications except for measuring on aluminium and cast iron
ceramics: comparable to ruby, best choice for measuring on aluminium and cast iron

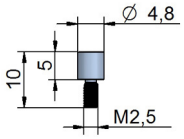
- Tastkopf-01, steel (standard)
- Tastkopf-01-HM, cemented carbide
- Tastkopf-01-R, ruby
- Takopf-01-K, ceramics



- Tastkopf-02, steel
- Tastkopf-02-HM, cemented carbide



- Tastkopf-03, steel
- Tastkopf-03-HM, cemented carbide



ORDER CODE SENSOR

SLT X (a) – X (b) – X (c) – X (d) X (e) X (f) X (g) X (h)

a measurement ranges [mm]
10 / 25 / 50 / 80 / 100 / 150 / 200 / 300

b type
T = spring loaded
PR1 = pneumatic PR1
PR2 = pneumatic PR2

c cable / connector
KR = cable radial
SR = M12 connector radial

d cable / connector output

S1: sensor with connector output
1 = radial connector output M12 (no cable)

S2: sensor with cable output, open cable end for DEEneo
A = TPE cable 2 m
B = TPE cable 5 m
C = TPE cable 10 m
D = PTFE-UL cable 2 m (option H)
E = PTFE-UL cable 5 m (option H)
F = PTFE-UL cable 10 m (option H)

S3: sensor with cable output output for DEEneo-ISC
G = TPE cable 2 m
H = TPE cable 5 m
J = TPE cable 10 m
K = PTFE-UL cable 2 m (option H)
L = PTFE-UL cable 5 m (option H)
M = PTFE-UL cable 10 m (option H)

e linearity
1 = 0,30 % (standard)
2 = 0,20 % (option L20)
3 = 0,10 % (option L10)

f temperature range
1 = -40...+120 °C (standard)
2 = -40...+150 °C (option H)
3 = -40...+200 °C (option H200)

g push rod sealing
1 = - (standard)

h protection class
1 = IP65
2 = IP67 (option IP67)

ORDER CODE ELECTRONICS

DEEneo – X (a)

DEEneo-ISC – X (a) – X (b)

type
DEEneo = external electronics
DEEneo-ISC = inline signal conditioner

a output signal
020A = 0...20 mA
420A = 4...20 mA
10V = 0...10 V
5V = 0...5 V
±5V = -5...5 V
±10V = -10...10 V

b type of cable / length

E1: for sensor with cable output
- = integrated in sensor cable

E2: for sensor with connector output
A = cable 2 m, M12 straight female conn.
B = cable 2 m, M12 angular female conn.
C = cable 5 m, M12 straight female conn.
D = cable 5 m, M12 angular female conn.
E = cable 10 m, M12 straight female conn.
F = cable 10 m, M12 angular female conn.

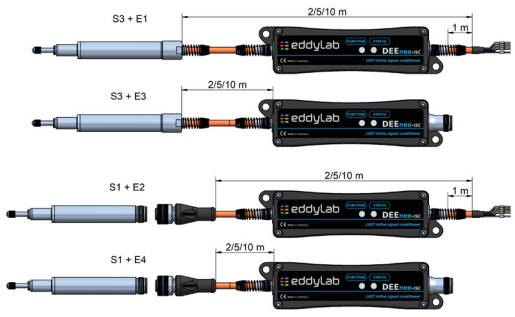
b type of cable / length

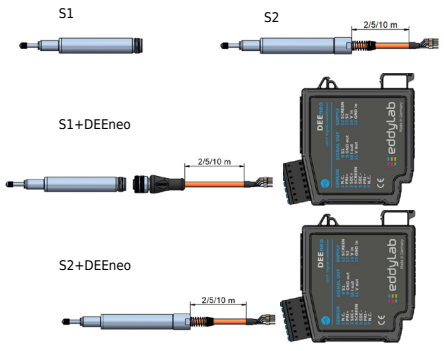
E3: for sensor with cable output
M12 = integrated in sensor cable, M12 connector

E4: for sensor with connector output
M12A = cable 2 m, M12 straight female conn., M12 conn.
M12B = cable 2 m, M12 angular female conn., M12 conn.
M12C = cable 5 m, M12 straight female conn., M12 conn.
M12D = cable 5 m, M12 angular female conn., M12 conn.
M12E = cable 10 m, M12 straight female conn., M12 conn.
M12F = cable 10 m, M12 angular female conn., M12 conn.

possible combinations:

- S3+E1: sensor with cable output, DEEneo-ISC integrated in sensor cable
- S3+E3: sensor with cable output, DEEneo-ISC integrated in sensor cable, M12 connector
- S1+E2: sensor with connector output, DEEneo-ISC with cable K4PxM
- S1+E4: sensor with connector output, DEEneo-ISC with cable K4PxM, M12 connector
- S1+DEEneo: sensor with connector output, cable K4PxM, electronics DEEneo
- S2+DEEneo: sensor with cable output, electronics DEEneo





version: 28.03.2025

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