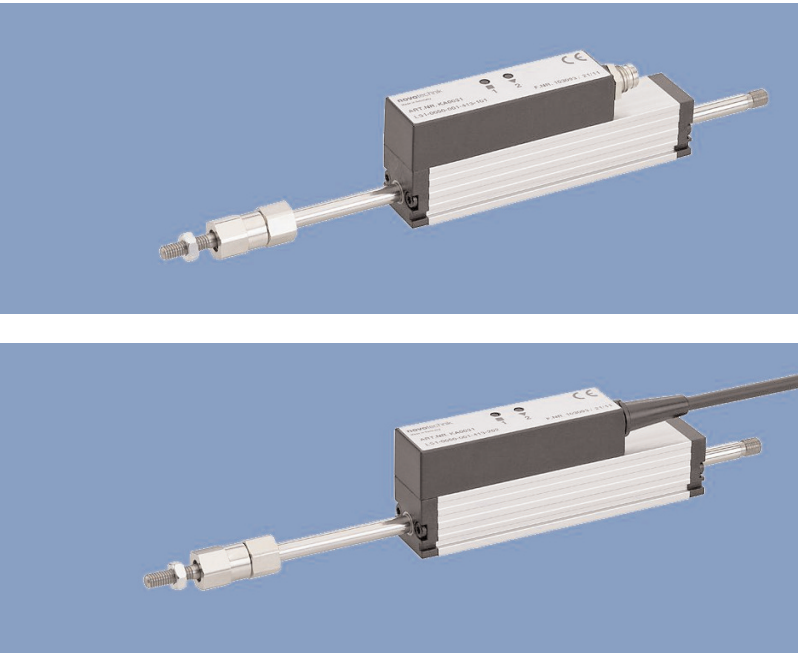


NOVOPAD
Position Transducers
up to 200 mm
non-contacting
Series LS1
with analog interface



Special features

- long life up to 100 Mio. movements, depending on application
- compact profile design 18x18 mm
- double-sided supported actuating rod
- pre-assembled ball coupling
- resolution 0.05 % o 0.1 %
- outstanding linearity ± 0.15 %
- Standard output signals current or voltage
- Teach-In via push-buttons with status LED
- insensitive to magnetic fields
- cable or connector version available

Position transducer with NOVOPAD non-contacting inductive measurement principle on printed circuit board basis, for direct, accurate measurement of travel in display- or feedback applications.

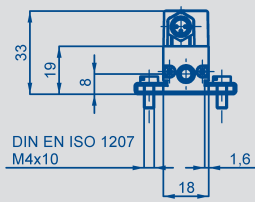
The actuating rod is supported on both ends by slide bearings, allowing high lateral forces on the tip of the rod. The robustness and the compact housing design make the LS1 a reliable solution for industrial environment. A ball coupling enables a backlash- and shear force free operation even with perpendicular or angular misalignment between the transducer axis and the direction of movement.

The integrated signal processor with Teach-In function provides an absolute and proportional current or voltage output signal.

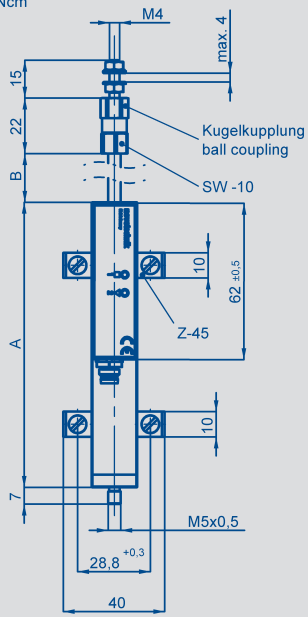
The non-contacting sensors are maintenance and wear-free and convince with an optimal reproducibility, resolution and linearity. The sensor can be exchanged without recalibration. Magnetic fields do not have any effects on the measurement signal.

Description	
Housing	Aluminium, anodized
Mounting	adjustable clamps
Actuating rod	stainless steel, AISI 303, external thread M5x0.5
Ball coupling	hardened ball with spring pressure on carbide plate
Bearings	both ends in metal-polymer slide bearings
Measurement principle	NOVOPAD inductive, based on printed circuit board
Electrical connections	3-pin round connector, shielded, M8 x 1 3-wire PVC-cable, 3 x 0.14 mm ² , shielded, 2 m length
Electronic	SMD with ASIC, integrated

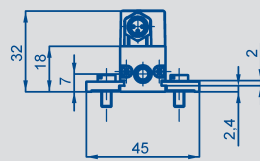
Standard (Z-45)



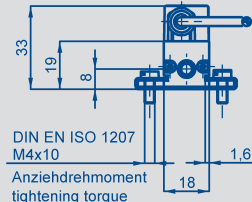
Anziehdrehmoment
tightening torque
max. 140 Ncm



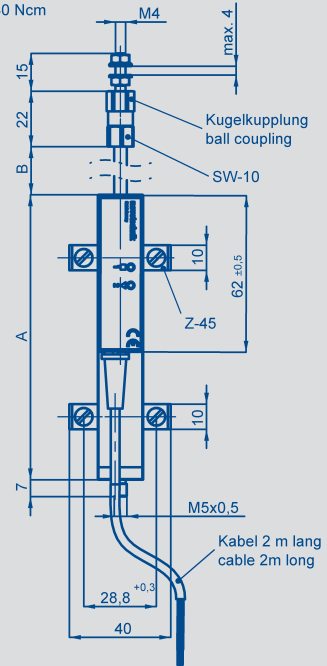
Optional (Z3-31)



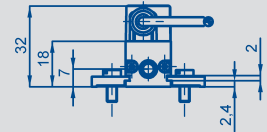
Standard (Z-45)



DIN EN ISO 1207
M4x10
Anziehdrehmoment
tightening torque
max. 140 Ncm



Optional (Z3-31)

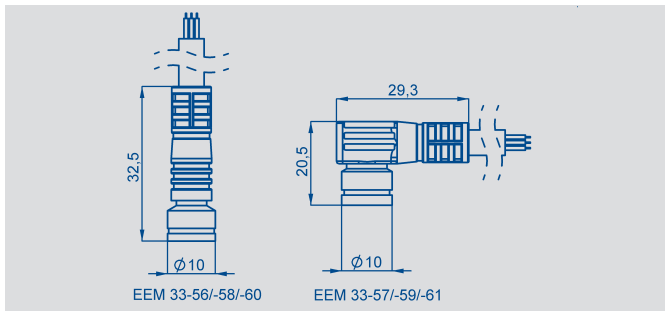


Type designations	LS1 0025	LS1 0050	LS1 0075	LS1 0100	LS1 0150	LS1 0200	
Electrical Data							
Electrical measuring range	25	50	75	100	150	200	mm
Absolute linearity	≤ ± 0.1	≤ ± 0.15					% F.S.
Tolerance of electr. zero point	± 0.5						mm
Output signal voltage or current	0.1...10 VDC (by load 470 kΩ) allowed load ≥ 10 kΩ 10...0.1 VDC (by load 470 kΩ) allowed load ≥ 10 kΩ 4...20 mA (burden ≤ 500 Ω) 20...4 mA (burden ≤ 500 Ω)						
Internal resistance of voltage output	120						Ω
Output, short-circuit-proof	against supply max. ... 30 VDC and GND (permanent)						
Update Rate	high speed mode ≥ 950; low speed mode ≥ 50						Hz
Repeatability	high speed mode ≤ 10 mV, typical < 3 mV low speed mode ≤ 5 mV, typical < 2 mV high speed mode ≤ 16 μA, typical < 5 μA low speed mode ≤ 8 μA, typical < 3 μA						mV mV μA μA
Supply voltage	16...30						VDC
Supply voltage ripple	max. 10						% V _{ss}
Power drain without load	< 1						W
Temperature coefficient	≤ 50						ppm/K
Overvoltage protection	< 40 (permanent)						VDC
Polarity protection	up to U _{max}						VDC
Insulation resistance (500 VDC)	≥ 10						MΩ
Mechanical Data							
Body length (dimension A)	63	88	113	138	188	238	+1 mm
Mechanical stroke (dimension B)	30	55	80	105	155	205	±1,5 mm
Weight approx. with cable	140	160	170	190	220	260	g
with connector	86	107	132	150	190	230	g
Operating force (horizontal)	≤ 0.3						N
Mobility of ball coupling	± 1 mm parallel offset, ± 2.5° angular offset						
Maximum permitted tightening torque for fixing screws	140						Ncm
Environmental Data							
Operating temperature range	-40...+85 with connector -30...+100 with cable						°C °C
Operating humidity range	0...95 (no condensation)						%RH
Shock per DIN IEC	100 (11 ms) (single hit)						g
Vibration per DIN IEC	20 (10...2000 Hz, A _{max} 0.75 mm)						g
Protection class	IP 40 DIN EN 60529						
Adjustment speed max.	5						m/s
Acceleration speed max.	5						g
Life	> 100x10 ⁶						movements
MTTF (ISO 13849-1, parts count method, w/o load)	24						years
CE-Conformity							
Emission	RF noise field strength EN 55011, class B						
Noise immunity	ESD EN 61000-4-2 Radiated immunity EN 61000-4-3 Burst EN 61000-4-4 Conducted disturbances induced by RF fields EN 61000-4-6						

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Included in delivery

2 mounting clamps Z-45 incl.
 4 cylinder screws M4x10,
 1 ball coupling

Optional accessories

4 mounting clamps Z3-31 incl.
 4 cylinder screws M4 x 10,
 Art.No. 059010;
 PUR-cable with 3-pin female
 connector, M8 x 1,
 3 x 0.25 mm², shielded:
 2 m length, EEM 33-56,
 5 m length, EEM 33-58,
 10 m length, EEM 33-60;
 PUR-cable with 3-pin female
 angled connector, M8 x 1,
 3 x 0.25 mm², shielded:
 2 m length, EEM 33-57,
 5 m length, EEM 33-59,
 10 m length, EEM 33-61.

On request available

Customized length and electrical
 connection e.g. cable with
 connector.

Ordering specifications

Preferred types printed in bold

Electrical interface
4: Analog interface

Output signal analog interface 4 _ _

1: Voltage output
2: Current output

Analog interface voltage output 41_
1: 0 VDC ... 10 VDC (high speed mode)
 2: 10 VDC ... 0 VDC (high speed mode)
 3: 0 VDC ... 10 VDC (low speed mode)
 4: 10 VDC ... 0 VDC (low speed mode)

Analog interface current output 42_
1: 4 mA ... 20 mA (high speed mode)
 2: 20 mA ... 4 mA (high speed mode)
 3: 4 mA ... 20 mA (low speed mode)
 4: 20 mA ... 4 mA (low speed mode)

Electrical connection

101: 3-pin round connector M8x1, axial output
202: NT standard cable 2 m, axial output

L S 1 - 0 2 0 0 - 0 0 1 - 4 1 1 - 1 0 1

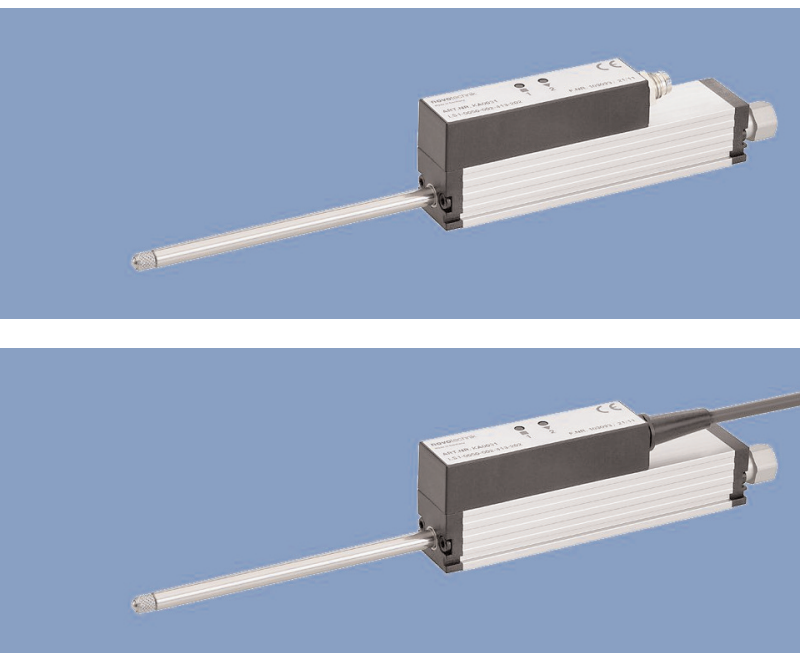
Series

Electrical measuring range
 Various standard lengths
 from 0025 mm up to 0200 mm

Mechanical version
001: Position transducer with one-side actuating rod

Output connector Code 101	Cable Code 202	Connector with cable EEM 33-56 /-57 /-58 /-59 /-60 /-61	Signal
Pin 1	GN green	BN brown	Supply voltage
Pin 4	WH white	BK black	Output signal
Pin 3	BN brown	BU blue	GND

NOVOPAD
Position Transducers
with return spring
up to 100 mm
non-contacting
Series LS1
with analog interface



Special features

- long life up to 100 Mio. movements, depending on application
- compact profile design 18x18 mm
- double-sided supported actuating rod
- compatible to standard probe tips
- resolution 0.05 % or 0.1 %
- outstanding linearity ± 0.15 %
- Standard output signals current or voltage
- Teach-In via push-buttons with status LED
- insensitive to magnetic fields
- cable or connector version available

Position transducer with NOVOPAD non-contacting inductive measurement principle on printed circuit board basis – with internal return spring – for direct, accurate measurement of travel in display- or feedback applications.

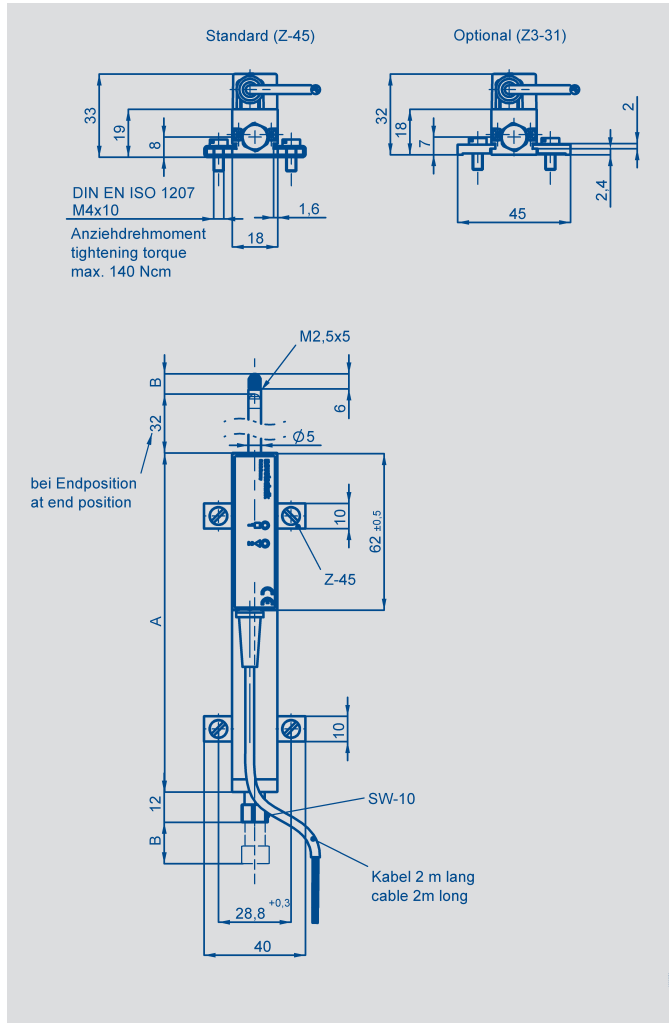
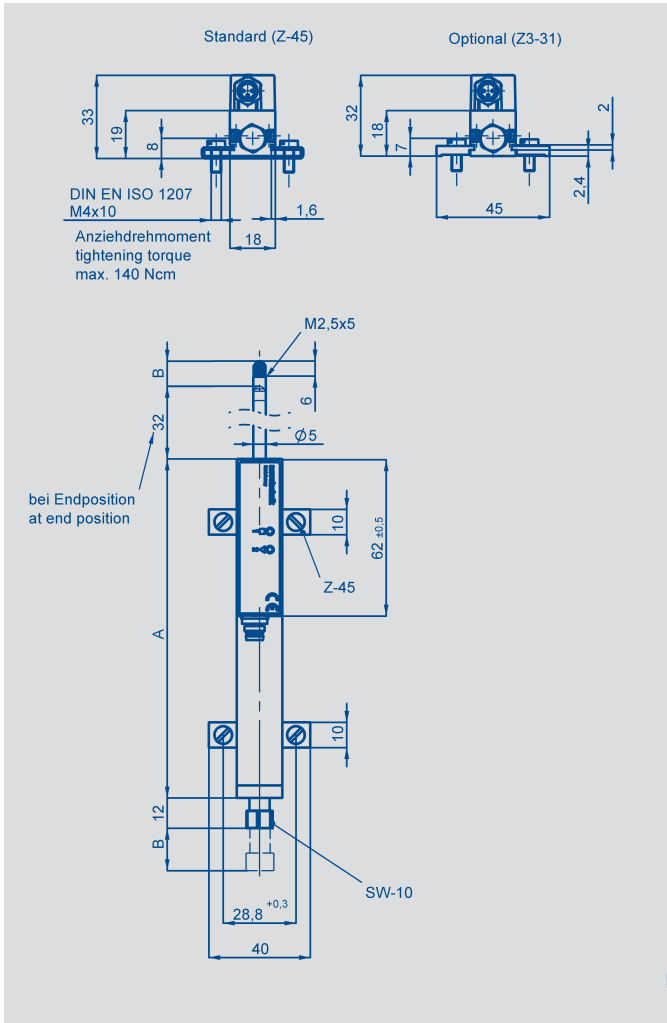
The actuating rod is supported on both ends by slide bearings, allowing high lateral forces on the tip of the rod. The robustness and the compact housing design make the LS1 a reliable solution for the industrial environment. The design of the rear end stop nut on the actuating rod simplifies the connection of actuators like pneumatic cylinders and solenoids.

The integrated signal processor with Teach-In function provides an absolute and proportional current or voltage output signal.

The non-contacting sensors are maintenance and wear-free and convince with an optimal reproducibility, resolution and linearity. The sensor can be exchanged without recalibration. Magnetic fields do not have any effect on the signal measurement.

Description

Housing	Aluminium, anodized
Mounting	adjustable clamps
Actuating rod	stainless steel, AISI 303, with anti-twist safeguard, intern. thread M2.5x6
Probe tip	stainless steel with external thread M2.5 and pressed-in hardened metal ball
Bearings	both ends in metal-polymer slide bearings
Measurement principle	NOVOPAD inductive, based on printed circuit board
Electrical connections	3-pin round connector, shielded, M8 x 1 3-wire PVC-cable, 3 x 0.14 mm ² , shielded, 2 m length
Electronic	SMD with ASIC, intergrated

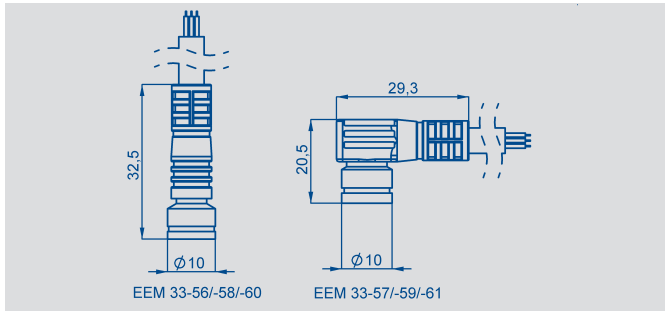


Type designations	LS1 0025	LS1 0050	LS1 0075	LS1 0100	
Electrical Data					
Electrical measuring range	25	50	75	100	mm
Absolute linearity	≤ ±0.1	≤ ±0.15			% F.S.
Tolerance of electr. zero point	± 0.5				mm
Output signal voltage or current	0.1...10 VDC (by load 470 kΩ) allowed load ≥ 10 kΩ 10...0.1 VDC (by load 470 kΩ) allowed load ≥ 10 kΩ 4...20 mA (burden ≤ 500 Ω) 20...4 mA (burden ≤ 500 Ω)				
Internal resistance of voltage output	120				Ω
Output, short-circuit-proof	against supply max. ... 30 VDC and GND (permanent)				
Update Rate	high speed mode ≥ 950; low speed mode ≥ 50				Hz
Repeatability	high speed mode ≤ 10 mV, typical < 3 mV low speed mode ≤ 5 mV, typical < 2 mV high speed mode ≤ 16 μA, typical < 5 μA low speed mode ≤ 8 μA, typical < 3 μA				mV mV μA μA
Supply voltage	16...30				VDC
Supply voltage ripple	max. 10				% V _{ss}
Power drain without load	< 1				W
Temperature coefficient	≤ 50				ppm/K
Overvoltage protection	< 40 (permanent)				VDC
Polarity protection	up to U _{max}				VDC
Insulation resistance (500 VDC)	≥ 10				MΩ
Mechanical Data					
Body length (dimension A)	63	94.4	134.4	166	+1 mm
Mechanical stroke (dimension B)	30	55	80	105	±1.5 mm
Weight approx. with cable	120	150	180	200	g
with connector	86	107	132	150	g
Weight actuating rod with puk	25	36	48	57	g
Operating force (horizontal)	≤ 2.5	≤ 2.5	≤ 2.5	≤ 2.5	N
Operating force retracted (horizontal)	≤ 5.0	≤ 5.0	≤ 5.0	≤ 5.0	N
Operating force to end stop	max. 5				N
Operating frequency max.	18	14	11	10	Hz
Maximum permitted tightening torque for fixing screws	140				Ncm
Environmental Data					
Operating temperature range	-40...+85 with connector -30...+100 with cable				°C °C
Operating humidity range	0...95 (no condensation)				%RH
Shock per DIN IEC	100 (11 ms) (single hit)				g
Vibration per DIN IEC	20 (10...2000 Hz, A _{max} 0.75 mm)				g
Protection class	IP 40 DIN EN 60529				
Adjustment speed max.	5				m/s
Acceleration speed max.	5				g
Life	> 100x10 ⁶				movements
MTTF (ISO 13849-1, parts count method, w/o load)	24				years
CE-Conformity					
Emission	RF noise field strength EN 55011, class B				
Noise immunity	ESD EN 61000-4-2 Radiated immunity EN 61000-4-3 Burst EN 61000-4-4 Conducted disturbances induced by RF fields EN 61000-4-6				

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Included in delivery

2 mounting clamps Z-45 incl.
 4 cylinder screws M4x10,
 1 probe tip with pressed-in
 hardened metall ball

Optional accessories

4 mounting clamps Z3-31 incl.
 4 cylinder screws M4x10,
 Art.No. 059010;
 PUR-cable with 3-pin female
 connector, M8 x 1,
 3 x 0.25 mm², shielded:
 2 m length, EEM 33-56,
 5 m length, EEM 33-58,
 10 m length, EEM 33-60;
 PUR-cable with 3-pin female
 angled connector, M8 x 1,
 3 x 0.25 mm², shielded:
 2 m length, EEM 33-57,
 5 m length, EEM 33-59,
 10 m length, EEM 33-61;
 roller head Z-R50.

On request available

Customized length and electri-
 cal connection e.g. cable with
 connector.

Ordering specifications

Preferred types printed in bold

Electrical interface
4: Analog interface

Output signal analog interface 4 _ _

1: Voltage output
2: Current output

Analog interface voltage output 41_
1: 0 VDC ... 10 VDC (high speed mode)
 2: 10 VDC ... 0 VDC (high speed mode)
 3: 0 VDC ... 10 VDC (low speed mode)
 4: 10 VDC ... 0 VDC (low speed mode)

Analog interface current output 42_
1: 4 mA ... 20 mA (high speed mode)
 2: 20 mA ... 4 mA (high speed mode)
 3: 4 mA ... 20 mA (low speed mode)
 4: 20 mA ... 4 mA (low speed mode)

Electrical connection
101: 3-pin round connector M8x1, axial output
 202: NT standard cable 2 m, axial output

L S 1 - 0 1 0 0 - 0 0 2 - 4 1 1 - 1 0 1

Series

Electrical measuring range
 Various standard lengths
 from 0025 mm up to 0100 mm

Mechanical version
002: Position transducer with return spring

Output connector Code 101	Cable Code 202	Connector with cable EEM 33-56 /57 /-58 /-59 /-60 /-61	Signal
Pin 1	GN green	BN brown	Supply voltage
Pin 4	WH white	BK black	Output signal
Pin 3	BN brown	BU blue	GND