LS1 Manual

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1 General description

The LS1 series is an inductive transducer for direct, accurate measurement of travel in display- or feedback applications.

2 Safety instructions

2.1 Intended use

The transducer is intended to be installed in a machine or system. Together with a controller (e.g. PLC) it comprises a position measuring system and may only be used for this purpose.

Unauthorized modifications, improper usage or non-observance of the instructions for installation will result in the loss of warranty and liability claims.

2.2 Installation & startup

The transducer must be installed by qualified personnel in consideration of all relevant safety regulations.

All necessary safety measures to protect personnel and property in case of a transducer defect or failure must be taken before startup.

2.3 Check connections

Improper connections and overvoltage can damage the transducer.
Therefore check always the connections carefully before turning-on system.

Potential differences between supply voltage GND and signal GND must be avoided.
With different potentials between supply voltage GND and signal GND the transducer can be destroyed!

2.4 Turning on the system

The system may execute uncontrolled movements during first turning-on mainly when the transducer is a part of a control system whose parameters have not yet been set. Therefore make sure that hereof no dangers for personal and property can result.

2.5 Check measured values

After replacement of a transducer, it is advisable to verify the output values for start- and end position in manual mode. (Transducers are subject to modification or manufacturing tolerances)

2.6 Check functionality

The functionality of the transducer and all its associated components should be regularly checked
and recorded.

2.7 Failure malfunction

If the transducer doesn‘t operate properly, it should be taken out of service and protected against unauthorized use.

4 Instruction for installation

Note the maximum tightening torque of 140Ncm when fastening down the mounting clamps.
Do not exceed the mechanical adjusting range (dim. B, see data sheet or drawing)!
Do not lubricate the actuating rod!
The attack strength in mechanical end position of the return spring configuration (LS1 - _ _ _ _ - 002 - _ _ _ - _ _ _) may not be exceed **5N**!

For the area of the cable please take care that enough space is available, the minimum bending radius has been observed and sharp edges have be avoided!

5 Wiring

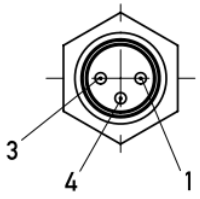
Note the following when making electrical connection:
System (supply voltage GND) and control cabinet (signal GND) must be at the same potential.
To ensure the electromagnetic compatibility (EMC), the following instructions must be strictly followed:

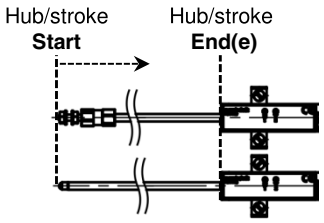
- Transducer and controller must be connected by using shielded cable.
- Shielding: Copper filament braided, 85% coverage.
- On the controller side the cable shield must be grounded, i.e. be connected with the protective earth conducter.

Cable connection may not extended over 30m!

5.1 Terminal assignment

front view of flange connector





Plug Code **101**	Plug Code **102**	cable Code **202**	Connector with cable EEM **33-56/-58/-60** EEM **33-57/-59/-61**	Signal	Code **411** / **413**	Code **412** / **414**	Code **421** / **423**	Code **422** / **424**
PIN **1**	PIN **3**	GN / green	BN / brown	+24 VDC				
PIN **4**	PIN **4**	WH / white	BK / black	**Start**	0…	10…	4…	20…
				End(e)	10 VDC	0 VDC	20 mA	4 mA
PIN **3**	PIN **1**	BN / brown	BU / blue	GND				

6 Teach-In & LED function

Do **not** activate Teach-In during machine operation. Machine must be put out of operation before activating Teach-In.

6.1 Description

Starting and/or final position and/or the output voltages/ -currents can additional be adjusted, in order to specify the setting range(s) custom-specific.
The output range can be defined independently of the actual travel length.
Use push buttons keys for programming.
Teach-In modi is displayed via the installed LEDs.

6.2 Important details

Use a digital volt meter to monitor output signal during programming.
After Teach-In all relevant safety regulations as in item **2** mentioned, must be considered.
It is not possible to switch to a different programming mode or to reset a unit during programming.
The last programmed values remain stored in memory, also after power-off.
After re-programming the linearity correction remains active.

6.3 Reset to factory setting

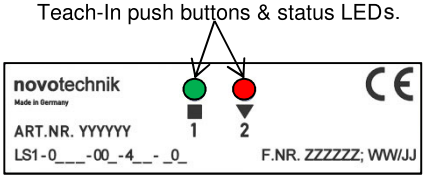
Teach-In must be completed:
■&▼Press push buttons simultaneously for at least 6 s till LED 1 & LED 2 flashing simultaneously.
Release push buttons ⇨ factory setting.

3.4 Status display via LED´s

The LED's display the status and the times during the operation of the buttons.
During the Teach-In the respective LED flash by pressing the push-button ■ and/or ▼after 3 s slowly and after 6 s quickly.
By completing of the respective mode all LED's will be off.

	LED 1	LED 2
Position Teach-In	on / flashes	off
Level Teach-In	off	on / flashes
Offset Teach-In	on / flashes	on / flashes

Teach-In push buttons & status LEDs.



Example of LS1 type label.

To avoid pushing by accindentally the push buttons these are immerged fitted.
Therefore use for pushing these suitable auxiliary material.

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7 Position-programming

(setting up zero- and/or limit point)
Complete programming must be final within 180 s.

1 Activation position Teach-In
■&▼Press push buttons simultaneously for at least 3 s
till LED 1 & LED 2 flashing alternately.
1a Release push buttons ⇨ LED 1 on/flashing, LED 2 off.

2 Setting up zero-point
2a Start-up new zero-point position.
2b ■ Press push-button for at least 3 s
till LED 1 flashing slowly .
2c Release push-button ⇨ new **zero-point.**
2d Reset zero-point
2e ■ Press push-button > 6 s
till LED 1 flashing slowly / LED 2 quickly.
2f Release push-button.

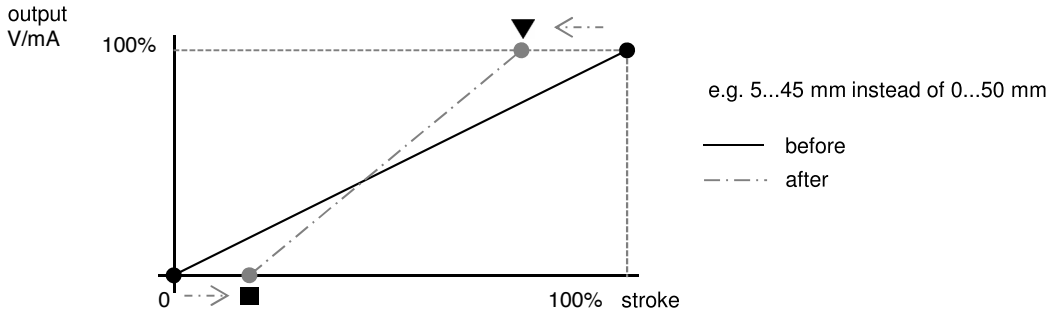
3 Setting up limit point
3a Start-up new limit point position.
3b ▼ Press push-button for at least 3 s
till LED 1 flashing slowly.
3c Release push-button ⇨ new **limit point.**
3d Reset limit point
3e ▼ Press push-button > 6 s
till LED 1 flashing slowly / LED 2 quickly.
3f Release push-button.

4 Finalize Teach-In
■&▼Press push buttons simultaneously for at least 6 s
till LED 1 flashing slowly / LED 2 quickly,
or after this time has elapsed 180 s.

The programming sequence of item **2** and/or **3** can be made in any order and as often as desired.
Also a programming of only zero- or limit point is possible.

By programming *limit position* smaller than *start position*, the gradient is inverted automatically (rotated characteristic).

Combination of position- and level- programming is possible one after another, the programming sequence is here optional.



characteristic 1: Setting up zero- and/or limit point

8 Level-programming

(setting up signal value for initial and/or final position)
Complete programming must be final within 180 s.

1 Activation level Teach-In

■&▼ Press push buttons simultaneously for at least 3 s
till LED 1 & LED 2 flashing alternately, then
■ Release push-button and hold at the same time ▼
push-button for at least 6 s.
till LED 1 & LED 2 flashing simultaneously.

1a ▼ Release push-button ⇨ LED 1 off, LED 2 on/flashing.

2 Min. or max. position

2a Start-up desired output level.
2b ■ Press push-button for at least 3 s
till LED 2 flashing slowly.
2c Release push-button ⇨ New output level (**L1).**
2d Reset output level (L1)
2e ■ Press push-button > 6 s
till LED 1 flashing slowly / LED 2 quickly,
2f Release push-button.

3 Max. or min. position

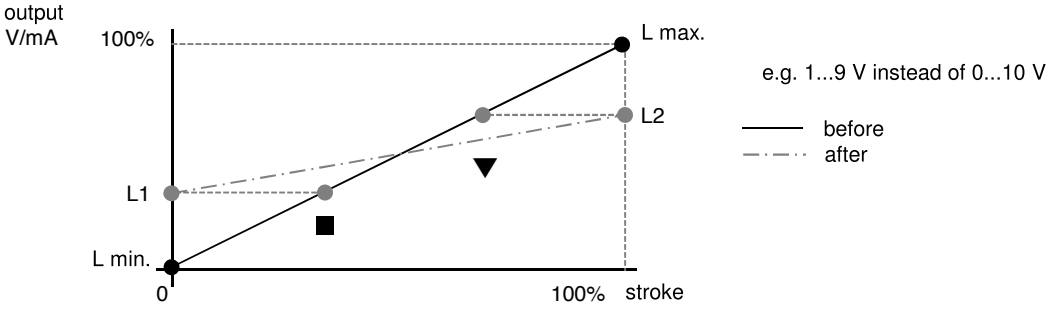
3a Start-up desired output level.
3b ▼ Press push-button for at least 3 s
till LED 2 flashing slowly,
3c Release push-button ⇨ New output level (**L2).**
3d Reset output level (L2)
3e ▼ Press push-button > 6 s
till LED 1 flashing slowly / LED 2 quickly.
3f Release push-button.

4 Finalize Teach-In

■&▼ Press push buttons simultaneously for at least 6 s
till LED 1 flashing slowly / LED 2 quickly,
or after this time has elapsed 180 s.

The programming sequence of item **2** and/or **3** can be made in any order and as often as desired.
Also a programming of only minimum- or maximum level is possible.
Max. Level less than Min. Level not possible.

Combination of position- and level- programming is possible one after another, the programming sequence is here optional.



characteristic 2: Min. Setting up min. and/or max. output level.

9 Offset-programming

Complete programming must be final within 180 s.

Offset-programming can not be combined with other programming.
Before activating the offset Teach-In, the system must be reset, only if a position- and/or level programming have been set.
Reset to factory setting:
Teach-In must be completed:

■&▼ Press push buttons simultaneously for at least 6 s
till *LED 1 & LED 2 flashing simultaneously,*
Release push buttons ⇨ Factory setting.

1 Activation offset Teach-In

■&▼ Press push buttons simultaneously for at least 3 s
till LED 1 & LED 2 flashing alternately, then
▼ Release push-button and hold at the same time
push-button ■ for at least 6 s,
till LED 1 & LED 2 flashing simultaneously

1a ■ Release push-button ⇨ LED 1 & LED 2 on/flashes.

2 ■ Press push-button,
⇨ zero-point shifted direction measuring start,
output value **> increase**.

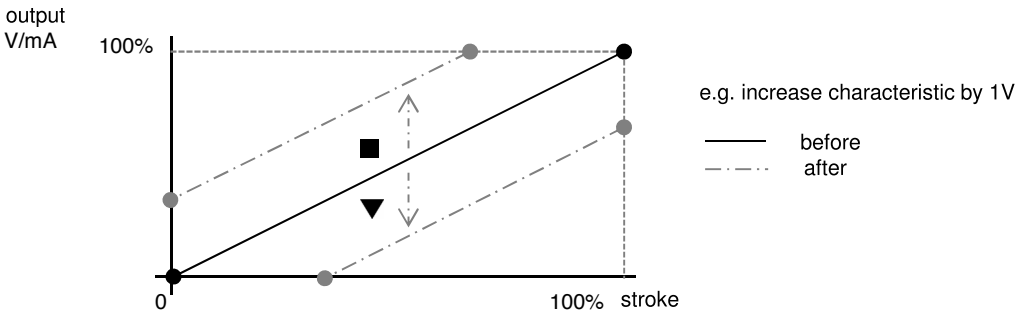
3 ▼ Press push-button,
⇨ zero-point shifted direction measuring end,
output value **< decrease**.

4 Finalize Teach-In

■&▼ Press push buttons simultaneously for at least 6 s
till LED 1 flashing slowly / LED 2 quickly,
or after this time has elapsed 180 s.

The programming sequence of item **2** and/or **3** can be made in any order and as often as desired.

Per time unit (0.5 s) the offset will be shifted at 1/200 of the measuring length or rather 1/200 of the rank.

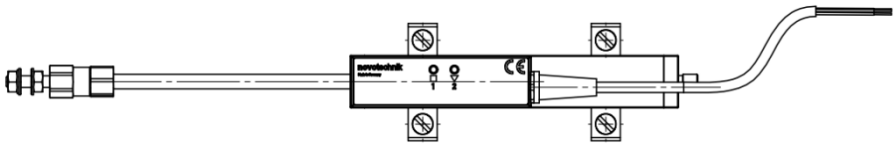


characteristic 3: Offset setting up offset

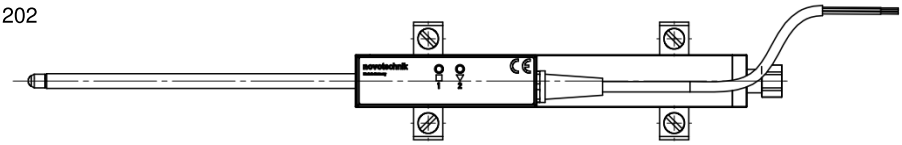
10 Models

10.1 Cable connection

LS1 - _ _ _ _ - 001 - _ _ _ - 202

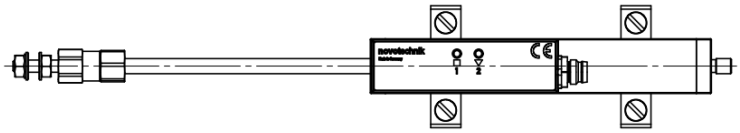


LS1 - _ _ _ _ - 002 - _ _ _ - 202

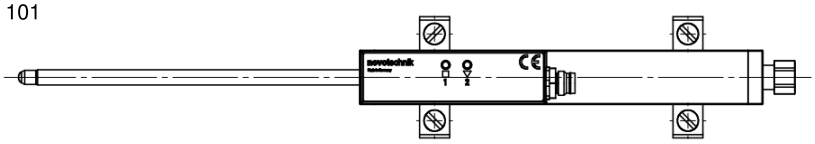


10.2 Plug connection

LS1 - _ _ _ _ - 001 - _ _ _ - 101



LS1 - _ _ _ _ - 002 - _ _ _ - 101



11 Included in delivery

- LS1 - _ _ _ _ - 001 - _ _ _ - _ _ _
  2x mounting clamps Z-45 incl.
  4x cylinder screws M4x10,
  1x ball coupling;
- LS1 - _ _ _ _ - 002 - _ _ _ - _ _ _
  2x mounting clamps Z-45 incl.
  4x cylinder screws M4x10,
  1x probe tip with pressed-in hardened metal ball;

12 Optional accessories

- PUR-cable with 3-pin female connector,
  M8x1, 3x0,25 mm², shielded:
  2 m length, EEM 33-56 (Part No. 005602)
  5 m length, EEM 33-58 (Part No. 005604)
  10 m length, EEM 33-60 (Part No. 005606)
- PUR-cable with 3-pin female angled connector,
  M8x1, 3x0,25 mm², shielded:
  2 m length, EEM 33-57 (Part No. 005603)
  5 m length, EEM 33-59 (Part No. 005605)
  10 m length, EEM 33-61 (Part No. 005607)
- 4x mounting clamps Z3-31 incl.
  4x cylinder screws M4x10 (Part No. 059010)

13 ordering code

LS1 - _ _ _ _ - _ _ _ - _ _ _ - _ _ _

Electrical measuring range

Mechanical configuration

Electrical interface

Electrical connection