SensorsX

SX-DLNC Series

LVDT Displacement Sensor

Linear Variable Differential Transformer Position Sensor



0.1 μm	1 μm	9–28 VDC
Resolution (highest)	Repeatability	Supply Voltage

■ OVERVIEW

The SensorsX SX-DLNC Series comprises LVDT (Linear Variable Differential Transformer) sensors designed for linear displacement and position measurement. Based on electromagnetic induction, the sensors provide contactless electrical sensing without sliding contacts. The series includes split-type, spring-return, pneumatic, pen-type, and specialized configurations, with measurement ranges and output options varying by model. Available outputs include 0–5 V, 4–20 mA, and RS-485, while certain AC-excited models require an external transmitter for conditioned DC outputs.

■ FEATURES

◆ Resolution down to 0.1 μm; repeatability ≤0.01% FS or 1 μm, depending on the model	◆ Contactless electromagnetic sensing without sliding electrical contacts
◆ Precision-guided construction with a service life of over 10 million cycles (applicable models)	◆ Repeatable zero position
◆ Rugged and durable construction	

■ TYPICAL APPLICATIONS

- Rail transit
- Building structures
- Bridge and structural monitoring
- Precision measurement
- Petroleum, petrochemical, and coal mining
- Machine tool and tool positioning
- Machinery and equipment
- Cement industry
- Valve-position detection and control

The information in this document is subject to change without notice. SensorsX Technology Inc. assumes no responsibility for errors or omissions.

■ BASIC PERFORMANCE PARAMETERS

Product Series	Split-Type SX-DLNC-S Series	Spring-Return SX-DLNC-L Series	Pneumatic SX-DLNC-U Series	Pneumatic Pen-Type SX-DLNC-H Series	Pneumatic Pen-Type SX-DLNC-G Series	Spring-Return Pen-Type SX-DLNC-P Series
Outline Drawing	Fig. 1	Fig. 3	Fig. 4	Fig. 5	Fig. 6	Fig. 7
Measurement Range	2.5, 5, 10, 15, 25 mm / 50, 100, 250, 500 mm	2.5, 5, 10, 15, 25 mm / 50, 100 mm	2.5, 5, 10, 15 mm	4 mm	8 mm	2, 5, 8 mm / 10 mm
Linearity Error	±0.25%F.S / ±0.5%F.S	±0.25%F.S / ±0.5%F.S	±0.25%F.S	±0.25%F.S	±0.25%F.S	±0.35%F.S
Repeatability	≤ 0.01%F.S	≤ 0.01%F.S	1 μm	1 μm	1 μm	1 μm
Working Air Pressure	/	/	0.22–0.45 MPa	0.03–0.06 MPa	0.03–0.06 MPa	/
Contact Force	/	/	0.3 N–0.5 N	0.1 N–0.35 N	0.1 N–0.35 N	1 N
Protection Rating	IP64	IP64	IP64	/	/	/
Resolution	Resolution: down to 0.1 μm; digital output resolution: 16-bit	Resolution: down to 0.1 μm; digital output resolution: 16-bit	Resolution: down to 0.1 μm; digital output resolution: 16-bit	Resolution: down to 0.1 μm; digital output resolution: 16-bit	Resolution: down to 0.1 μm; digital output resolution: 16-bit	Resolution: down to 0.1 μm; digital output resolution: 16-bit
Supply Voltage	9–28 VDC	9–28 VDC	9–28 VDC	1–3 Vrms/5 kHz, sine wave	1–3 Vrms/5 kHz, sine wave	1–3 Vrms/5 kHz, sine wave
Operating Current	Voltage-output type: supply current ≤ 12 mA	Voltage-output type: supply current ≤ 12 mA	Voltage-output type: supply current ≤ 12 mA	AC-excited sensor; DC supply-current specification does not apply.	AC-excited sensor; DC supply-current specification does not apply.	AC-excited sensor; DC supply-current specification does not apply.
	Two-wire 4–20 mA current-output LVDT: Two-wire 4–20 mA loop-powered output	Two-wire 4–20 mA current-output LVDT: Two-wire 4–20 mA loop-powered output	Two-wire 4–20 mA current-output LVDT: Two-wire 4–20 mA loop-powered output	External transmitter required for conditioned DC output.	External transmitter required for conditioned DC output.	External transmitter required for conditioned DC output.
Output Signal	0–5 V (9–28 VDC supply)	0–5 V (9–28 VDC supply)	0–5 V (9–28 VDC supply)	AC output (native sensor signal)	AC output (native sensor signal)	AC output (native sensor signal)
	4–20 mA (two-wire, 15–28 VDC supply)	4–20 mA (two-wire, 15–28 VDC supply)	4–20 mA (two-wire, 15–28 VDC supply)	0-5 V or 4-20 mA through an external transmitter	0-5 V or 4-20 mA through an external transmitter	0-5 V or 4-20 mA through an external transmitter
	Digital output (9–28 VDC supply)	Digital output (9–28 VDC supply)	Digital output (9–28 VDC supply)	RS485 through an external transmitter	RS485 through an external transmitter	RS485 through an external transmitter
Operating Temperature	−25 °C to +85 °C	−25 °C to +85 °C	−25 °C to +85 °C	−25 °C to +85 °C	−25 °C to +85 °C	−25 °C to +85 °C
Temperature Coefficient	Zero-Point Temperature Coefficient: ≤0.025% FS/°C;Temperature Coefficient of Sensitivity: ≤0.025% FS/°C	Zero-Point Temperature Coefficient: ≤0.025% FS/°C;Temperature Coefficient of Sensitivity: ≤0.025% FS/°C	Zero-Point Temperature Coefficient: ≤0.025% FS/°C;Temperature Coefficient of Sensitivity: ≤0.025% FS/°C	Zero-Point Temperature Coefficient: ≤0.025% FS/°C;Temperature Coefficient of Sensitivity: ≤0.025% FS/°C	Zero-Point Temperature Coefficient: ≤0.025% FS/°C;Temperature Coefficient of Sensitivity: ≤0.025% FS/°C	Zero-Point Temperature Coefficient: ≤0.025% FS/°C;Temperature Coefficient of Sensitivity: ≤0.025% FS/°C

Product Series	Explosion-Proof SX-DLNC-X Series	Valve-Spool SX-DLNC-O Series	Gap Displacement SX-DLNC-A Series	Crack Meter SX-DLNC-K Series	Valve-Spool SX-DLNC-Q Series
Outline Drawing	Fig. 8, Fig. 9	Fig. 10, Fig. 11	Fig. 12	Fig. 13	Fig. 14, Fig. 15
Measurement Range	15 mm / 63 mm	8 mm, 40 mm	6 mm	10, 25 mm / 50, 100 mm	15, 30 mm
Linearity Error	±0.25%F.S / ±0.5%F.S	±2%F.S	±0.5%F.S	±0.25%F.S / ±0.5%F.S	±2%F.S
Repeatability	≤ 0.01%F.S	≤ 0.01%F.S	≤ 0.01%F.S	≤ 0.01%F.S	≤ 0.01%F.S
Pressure Rating	/	35 MPa	/	/	35 MPa

The information in this document is subject to change without notice. SensorsX Technology Inc. assumes no responsibility for errors or omissions.

Contact Force	/	/	/	/	/
Protection Rating	IP65	IP65	IP65	IP65	IP67
Resolution	Resolution: down to 0.1 μm; digital output resolution: 16-bit	Resolution: down to 0.1 μm; digital output resolution: 16-bit	Resolution: down to 0.1 μm; digital output resolution: 16-bit	Resolution: down to 0.1 μm; digital output resolution: 16-bit	Resolution: down to 0.1 μm; digital output resolution: 16-bit
Supply Voltage	9–28 VDC	9–28 VDC	9–28 VDC	9–28 VDC	1–3 Vrms/5 kHz, sine wave
Operating Current	Voltage-output type: supply current ≤ 12 mA	Voltage-output type: supply current ≤ 12 mA	Voltage-output type: supply current ≤ 12 mA	Voltage-output type: supply current ≤ 12 mA	/
	Two-wire 4–20 mA current-output LVDT: Two-wire 4–20 mA loop-powered output	Two-wire 4–20 mA current-output LVDT: Two-wire 4–20 mA loop-powered output	Two-wire 4–20 mA current-output LVDT: Two-wire 4–20 mA loop-powered output	Two-wire 4–20 mA current-output LVDT: Two-wire 4–20 mA loop-powered output	/
Output Signal	0–5 V (9–28 VDC supply)	0–5 V (9–28 VDC supply)	0–5 V (9–28 VDC supply)	0–5 V (9–28 VDC supply)	AC output
	4–20 mA (two-wire, 15–28 VDC supply)	4–20 mA (two-wire, 15–28 VDC supply)	4–20 mA (two-wire, 15–28 VDC supply)	4–20 mA (two-wire, 15–28 VDC supply)	AC output
	RS485 digital output (9–28 VDC supply)	RS485 digital output (9–28 VDC supply)	RS485 digital output (9–28 VDC supply)	RS485 digital output (9–28 VDC supply)	AC output
Operating Temperature	−25 °C to +85 °C	−25 °C to +85 °C	−25 °C to +85 °C	−25 °C to +85 °C	−40 °C to +125 °C
Temperature Coefficient	Zero-Point Temperature Coefficient: ≤0.025% FS/°C;Temperature Coefficient of Sensitivity: ≤0.025% FS/°C	Zero-Point Temperature Coefficient: ≤0.025% FS/°C;Temperature Coefficient of Sensitivity: ≤0.025% FS/°C	Zero-Point Temperature Coefficient: ≤0.025% FS/°C;Temperature Coefficient of Sensitivity: ≤0.025% FS/°C	Zero-Point Temperature Coefficient: ≤0.025% FS/°C;Temperature Coefficient of Sensitivity: ≤0.025% FS/°C	Zero-Point Temperature Coefficient: ≤0.025% FS/°C;Temperature Coefficient of Sensitivity: ≤0.025% FS/°

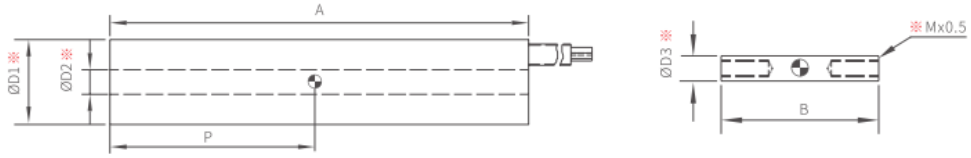
Notes:

1. Digital-output linearity error options: 0.25%F.S, 0.1%F.S, and others available.
2. For custom AC-excited sensors, excitation voltage 1–3 Vrms, excitation frequency 5 kHz.
3. SX-DLNCH, SX-DLNCG, and SX-DLNCP pen types require a transmitter to obtain a DC output signal.
4. Custom 0–10 V output is available upon request.

■ MECHANICAL DIMENSIONS

All dimensions in millimeters unless otherwise noted.

Fig.1: SX-DLNC-S Series – Split type



Measurement Range	2.5	5	10	15	25	50	100	250	500
Overall Length A	80	90	110	130	170	210	290	498	800
Core Length B	20	30	40	50	70	80	120	150	180
Electrical Zero Position P	21	26	36	46	66	86	126	230	381

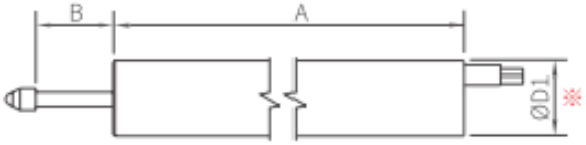
Note:

1. By default, the output increases as the measuring rod moves toward the cable outlet. The electrical zero position corresponds to the midpoint of the measurement range (see dimension P in Fig. 1).
2. Standard dimensions: D1 = 20 mm, D2 = 6.0 mm, D3 = 4.8 mm, with an M3 thread. Common D1 diameters include 20, 12, and 8 mm. Other

The information in this document is subject to change without notice. SensorsX Technology Inc. assumes no responsibility for errors or omissions.

dimensions are available upon request.

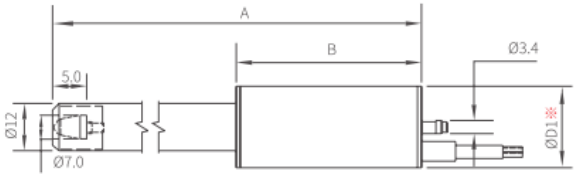
Fig.3: SX-DLNC-L Series – Spring Return type



Measurement Range	2.5	5	10	15	25	50	100
Overall Length A	80	90	110	130	170	210	291
Rod Free-State Exposed Length B	5	8	15	22	34	60	131

Note: The listed dimensions apply to analog-output models. For digital-output models, add 62 mm to the overall length A.

Fig.4: SX-DLNC-U Series – Pneumatic type



Measurement Range	2.5	5	10	15
Main Body Length A	118	118	118	154
Electronics Housing B	42.3	42.3	42.3	46.5

Note: The housing diameter D1 is 20 mm for analog-output models and 28 mm for digital-output models.

Fig.5: SX-DLNC-H Series –Pneumatic Pen-Type

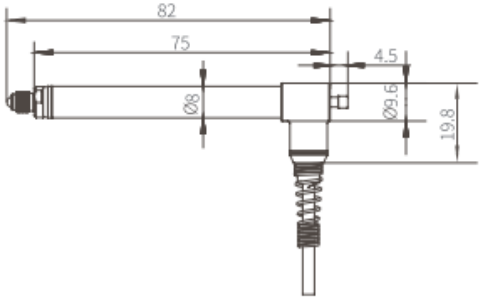
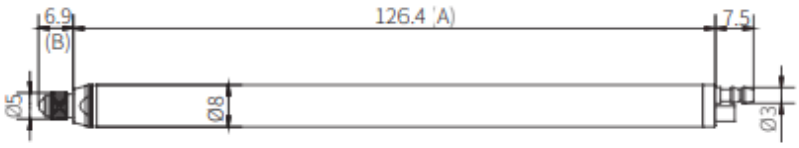
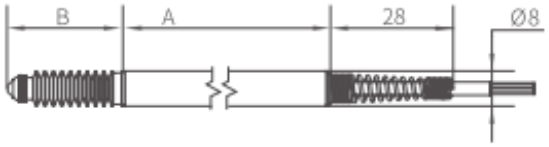


Fig.6: SX-DLNC-G Series –Pneumatic Pen-Type



The information in this document is subject to change without notice. SensorsX Technology Inc. assumes no responsibility for errors or omissions.

Fig.7: SX-DLNC-P Series –Pen Spring Return type



Measurement Range	2	2.5	5	8	10
Overall Length A	65	65	91	121	121
Rod Free-State Exposed Length B	17	17	20	30.3	30.3

Fig.8: SX-DLNC-X Series –Explosion Proof type

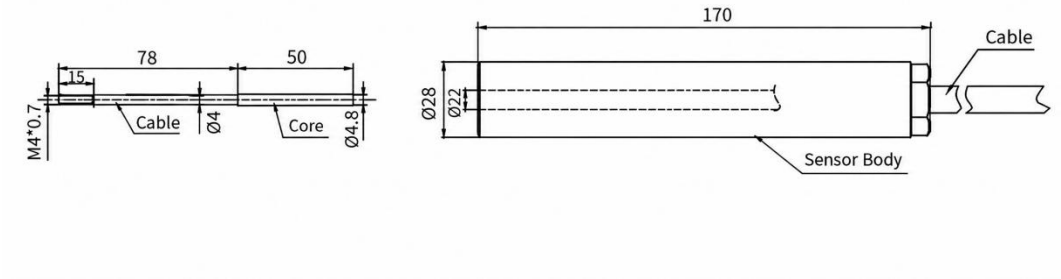
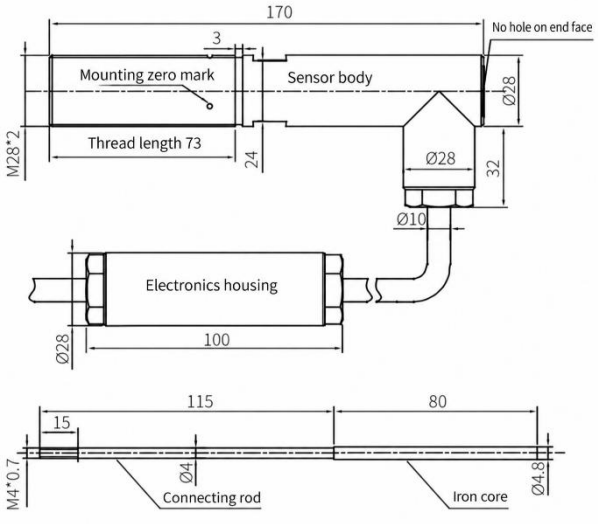


Fig.9: SX-DLNC-X Series –Explosion Proof type



The information in this document is subject to change without notice. SensorsX Technology Inc. assumes no responsibility for errors or omissions.

Fig.10: SX-DLNC-O Series –Valve Spool type

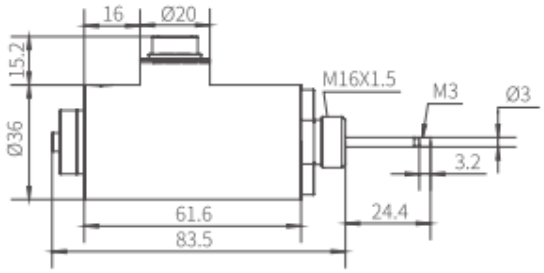


Fig.11: SX-DLNC-O Series –Valve Spool type

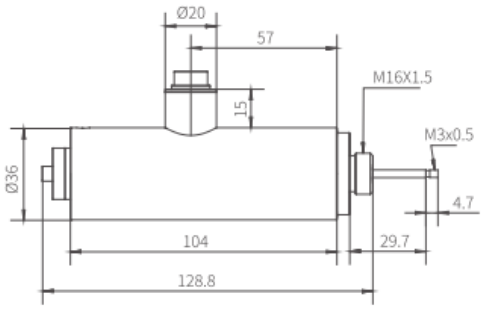


Fig.12: SX-DLNC-A Series –Gap Displacement type

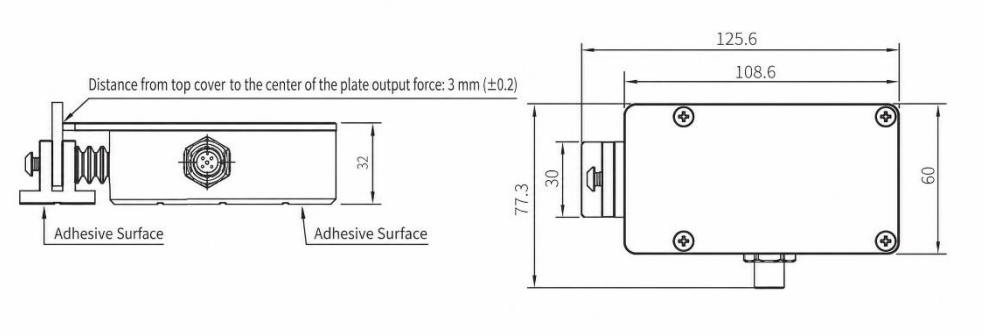
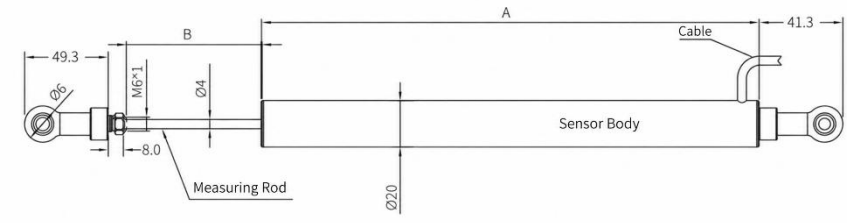


Fig.13: SX-DLNC-K Series –Crack Meter type



Measurement Range	10	25	50	100
Main Body Length A	172	220	260	340
Measuring Rod Length B	15	34	60	131

The information in this document is subject to change without notice. SensorsX Technology Inc. assumes no responsibility for errors or omissions.

Fig.14: SX-DLNC-Q Series –Valve Spool type

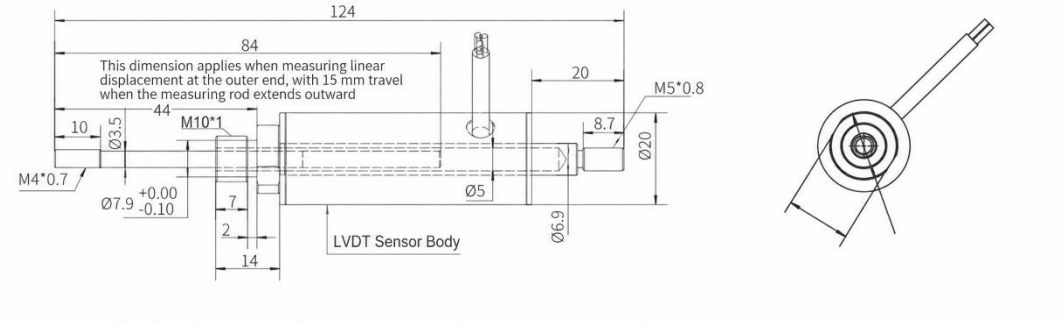


Fig.15: SX-DLNC-Q Series –Valve Spool type

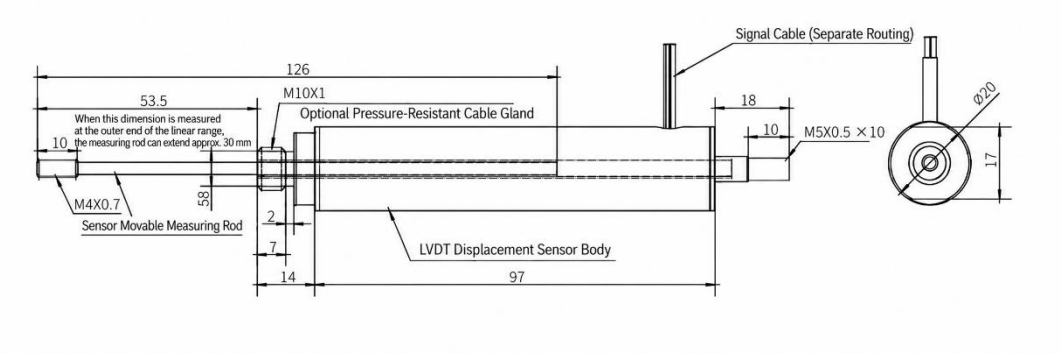


Fig.16: SX-DLNMC Series – Transmitter

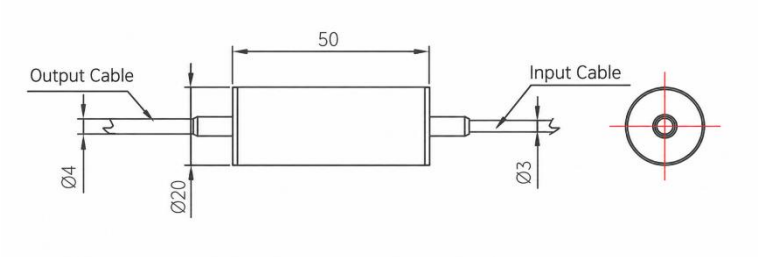
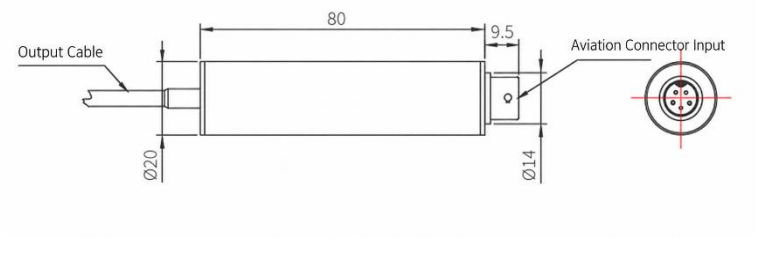


Fig.17: SX-DLNTC Series – Transmitter

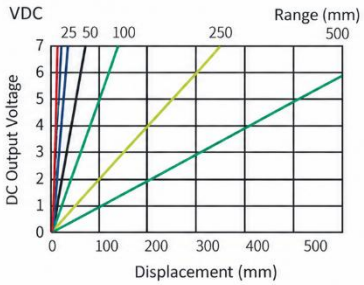


The information in this document is subject to change without notice. SensorsX Technology Inc. assumes no responsibility for errors or omissions.

■ OUTPUT CHARACTERISTICS

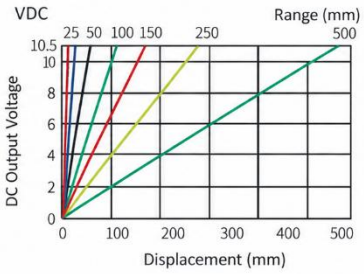
Displacement vs. 0–5 V Output Voltage for SX-DLNCS Series (Different Ranges):

Supply voltage: 9–28 VDC,
Recommended supply voltage: 12 VDC



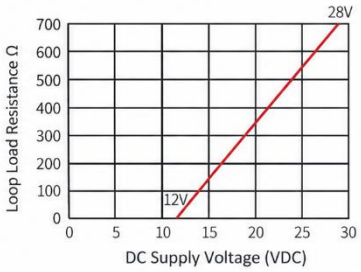
Displacement vs. 0–10 V Output Voltage for SX-DLNCS Series (Different Ranges).

Supply voltage: 15–28 VDC,
Recommended supply voltage: 15 VDC



Relationship Between Maximum Loop Load Resistance and Supply Voltage for Current Output LVDT:

Supply voltage: 15–28 VDC, Recommended supply voltage: 24 VDC, Load resistance: 500 Ω

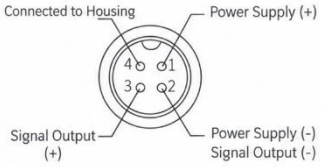


■ WIRING METHOD

The DC regulated power supply output voltage must remain within the specified operating range. Connect the sensor according to the specified terminal assignments. Direct-cable and connector configurations are available.

Cable Wire Color Definition:
Red: Power Supply (+)
Black: Power Supply (-), Signal Output (-)
Blue: Signal Output (+)

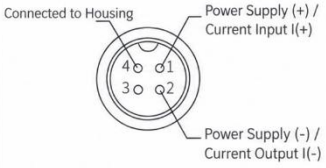
Socket Pin Definition:



Analog Voltage Signal Output

Cable Wire Color Definition:
Red: Power Supply (+), Current Input I(+)
Black: Power Supply (-), Current Output I(-)

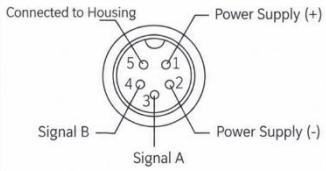
Socket Pin Definition:



Analog Current Signal Output

Cable Wire Color Definition:
Red: Power Supply (+)
Black: Power Supply (-)
Blue: Signal A
White: Signal B

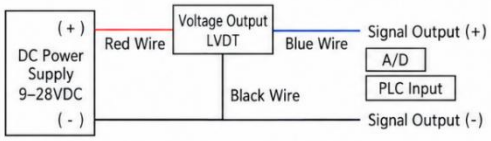
Socket Pin Definition:



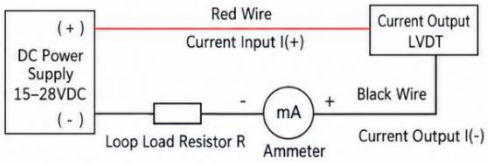
Digital RS485 Signal Output

The information in this document is subject to change without notice. SensorsX Technology Inc. assumes no responsibility for errors or omissions.

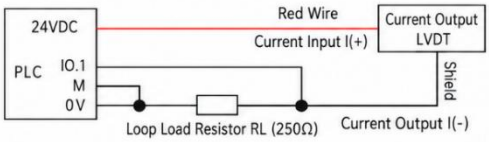
Voltage Output Wiring Diagram:



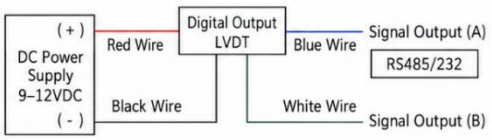
Two-Wire Current Output Wiring Diagram:



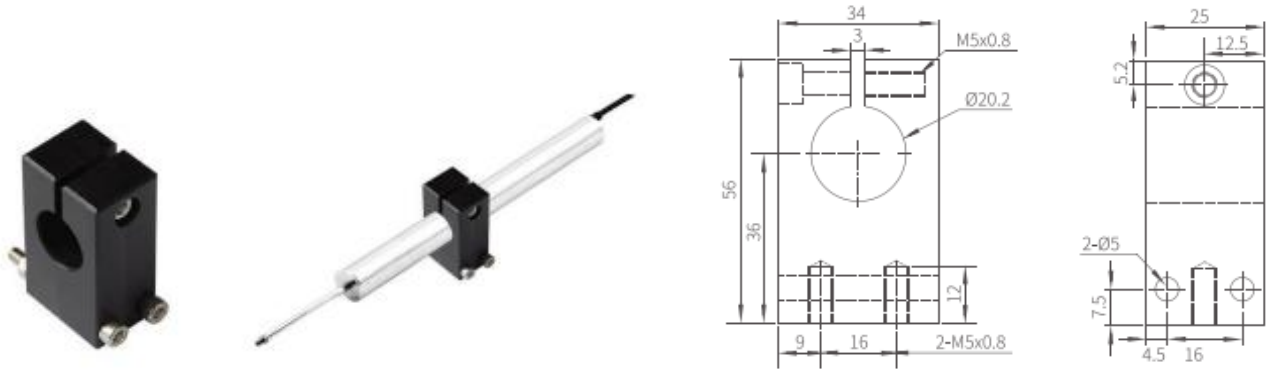
Two-Wire Current Output Wiring Diagram (PLC Connection):



Digital Output Wiring Diagram:



■ MOUNTING ACCESSORIES



Mounting Accessories: SX-DLNIC-20 (Ø20 Fixture)



Mounting Accessories: SX-DLNIC-8 (Ø8 Locking sleeve)

Order Code	Application	Installation Requirement
SX-DLNIC-20	For displacement sensors with a 20 mm outside diameter	Use a low-expansion, non-metallic clamping fixture.
SX-DLNIC-8	For 8 mm pen-type displacement sensors	Use the dedicated Ø8 locking sleeve.

Mounting requirement: Use a non-metallic fixture with a low coefficient of thermal expansion. A metal block fixture can affect sensor performance.

The information in this document is subject to change without notice. SensorsX Technology Inc. assumes no responsibility for errors or omissions.

■ SHIELDED TPU CABLE OPTIONS

Order Code	Cable Specification	Length	Typical Use
SX-DLNSC-31	Black TPU Ø3 jacket, shielded cable	1 m	Pen-type sensors
SX-DLNSC-32	Black TPU Ø3 jacket, shielded cable	2 m	Pen-type sensors
SX-DLNSC-35	Black TPU Ø3 jacket, shielded cable	5 m	Pen-type sensors
SX-DLNSC-41	Black TPU Ø4 jacket, shielded cable	1 m	General-purpose sensors
SX-DLNSC-42	Black TPU Ø4 jacket, shielded cable	2 m	General-purpose sensors
SX-DLNSC-45	Black TPU Ø4 jacket, shielded cable	5 m	General-purpose sensors

■ PROBE-TIP ORDER CODES & DIMENSIONS

FLAT TIPS

SX-DLNPC-F01	SX-DLNPC-F02	SX-DLNPC-F03	SX-DLNPC-F04	SX-DLNPC-F05
Steel Flat Contact Tip	Steel Flat Contact Tip	Steel Flat Contact Tip	Steel Flat Contact Tip	Steel Flat Contact Tip
				
SX-DLNPC-F06	**SX-DLNPC-F07**	**SX-DLNPC-F08**	**SX-DLNPC-F09**	**SX-DLNPC-F10**
Steel Flat Contact Tip	Steel Flat Contact Tip	Steel Flat Contact Tip	Steel Flat Contact Tip	Steel Flat Contact Tip
				
SX-DLNPC-F11	**SX-DLNPC-F12**	**SX-DLNPC-F13**	**SX-DLNPC-F14**	**SX-DLNPC-F15**
Steel Flat Contact Tip	Steel Flat Contact Tip	Steel Flat Contact Tip	Tungsten Carbide Flat Contact Tip	Tungsten Carbide Flat Contact Tip
				

BALL TIPS

SX-DLNPC-B01	SX-DLNPC-B02	SX-DLNPC-B03	SX-DLNPC-B04	SX-DLNPC-B05	SX-DLNPC-B12
Zirconia	PAI plastic	Stainless steel	Steel	White acetal ball	Black ceramic
					
SX-DLNPC-B06	**SX-DLNPC-B07**	**SX-DLNPC-B08**	**SX-DLNPC-B09**	**SX-DLNPC-B10**	**SX-DLNPC-B11**
Ruby	Ruby / plastic	Carbide	Carbide	Carbide	Carbide
					

The information in this document is subject to change without notice. SensorsX Technology Inc. assumes no responsibility for errors or omissions.

OTHER TIPS

SX-DLNPC-H01	SX-DLNPC-C02	SX-DLNPC-T03
Knife-edge	Semicircular	Tapered
		

■ COMPATIBLE DATA ACQUISITION SYSTEMS



Model	Channel Count	Communication Output
SX-DLNRC-8R	8	RS485
SX-DLNRC-8U	8	USB
SX-DLNRC-16R	16	RS485
SX-DLNRC-16U	16	USB
SX-DLNRC-32R	32	RS485

Parameter	Specification
Power Supply	220 VAC or 24 VDC
Measurement Mode	Single-ended or differential
Measurement Signal Range	0-5 V, ±5 V, or ±10 V
Input Signal	0-5 VDC
Resolution	24-bit ADC: 5 μV at 10 SPS; 16-bit ADC: 80 μV at 10 SPS
Sampling Rate	Adjustable from 5 SPS to 200 kSPS
A/D Conversion Time	1.5 μs
ADC Architecture	16-bit SAR and 24-bit delta-sigma
System Measurement Accuracy	±0.001%
Operating Temperature	-25 °C to +85 °C
Storage Temperature	-30 °C to +100 °C
Overall Dimensions	275 × 250 × 110 mm (L × W × H)

■ ORDER INFORMATION

Complete model number example: SX-DLNCS5AV2PP11

Model Number	
SX-DLNC	
Measurement Principle	
S	Split-type

The information in this document is subject to change without notice. SensorsX Technology Inc. assumes no responsibility for errors or omissions.

L	Spring-return
U	Pneumatic
H	Pneumatic Pen, L-type
G	Pneumatic Pen
P	Spring-Return Pen
X	Explosion-proof
O	Valve-spool, compact
A	Gap displacement
K	Crack meter
Q	Valve-spool
Measurement Range	
2	2 mm (Only Spring-Return Pen is available)
2.5	2.5 mm (Only Split-type, Spring-return, Pneumatic are available)
4	4 mm (Only Pneumatic Pen L-type is available)
5	5 mm (Only r Split-type, Spring-return, Pneumatic, Spring-Return Pen are available)
6	6 mm (Only Gap displacement is available)
8	8 mm (Only r Pneumatic Pen, Spring-Return Pen, Valve-spool compact are available)
10	10 mm (Only Split-type, Spring-return, Pneumatic, Spring-Return Pen, Crack meter are available)
15	15 mm (Only Split-type, Spring-return, Pneumatic, Explosion-proof, Valve-spool are available)
25	25 mm (Only Split-type, Spring-return, Crack meter are available)
30	30 mm (Only Valve-spool is available)
40	40 mm (Only Valve-spool compact is available)
50	50 mm (Only Split-type, Spring-return, Crack meter are available)
63	63 mm (Only Explosion-proof is available)
100	100 mm (Only Split-type, Spring-return, Crack meter are available)
250	250 mm (Only Split-type is available)
500	500 mm (Only Split-type is available)
Accuracy	
A	0.25%
B	0.5%
C	1%
D	2%
Output	
VA	AC output
V2P	0…5 V (transmitter required for SX-DLNCP, SX-DLNCH, SX-DLNCG)
V2N	5…0 V (transmitter required for SX-DLNCP, SX-DLNCH, SX-DLNCG)
A1P	4…20 mA (transmitter required for SX-DLNCP, SX-DLNCH, SX-DLNCG)
A1N	20…4 mA (transmitter required for SX-DLNCP, SX-DLNCH, SX-DLNCG)
MRP	RS-485 Digital Output, positive direction: output increases as the measuring rod moves inward.
MRN	RS-485 Digital Output, reverse direction: output increases as the measuring rod moves outward.
Electrical Connector	
P01	TPU Ø3, direct cable outlet, 1 m
P02	TPU Ø3, direct cable outlet, 2 m
P05	TPU Ø3, direct cable outlet, 5 m
P11	TPU Ø4, direct cable outlet, 1 m

The information in this document is subject to change without notice. SensorsX Technology Inc. assumes no responsibility for errors or omissions.

P12	TPU Ø4, direct cable outlet, 2 m
P15	TPU Ø4, direct cable outlet, 5 m
Optional / Customized Information	
D	Specify requirements when ordering

The information in this document is subject to change without notice. SensorsX Technology Inc. assumes no responsibility for errors or omissions.