Displacement measurement

LVDT displacement sensor

P.53

Valve core position sensor

P.61

Economical displacement sensor

P.65

Magnetostrictive displacement sensor

P.69

LVDT displacement sensor

Differential transformer displacement sensor (LVDT) can be widely applied in aerospace, machinery, construction, textile, railway, coal, metallurgy, plastics, chemical engineering and scientific research institutions and other national economic fields to measure linear displacement, elongation, vibration, object thickness, expansion and on the like. The product has the characteristics of no-slip contact, long service life, safe and reliable, etc..

LVDT has excellent performance and adopts convenient single power source 9-28 V DC for power supply. With its electronic circuit sealed in stainless steel metal tubes, LVDT can work in the wet and dust and other extreme ambient. The output can be set into standard 0-5V voltage signal, 4-20mA current signal, or RS485 digital signal output and so on.

LVDT displacement sensor has three basic types: split type, spring-back type and pneumatic type, and can be customized according to customer's requirements. The measuring range of LVDT split type is 0-500mm. It has the characteristics of water-proof, dust-proof and good dynamic performance. The measuring stroke range of LVDT spring-back type is 0-100mm. The contact probe adopts wear-resistant chromium plating hard tool steel. The measuring stroke range of pneumatic type LVDT is 0-15mm, and the working pressure is 0.15-0.7MPa.

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- The resolution is up to 0.1 μm and the repeatability is 1 μm.
- No contact point friction, and long service life.
- Customizable non-standard product.

Application fields

Transportation

Hoisting equipment

Iron and steel smelting

Petrochemical industry

Product example

SDVB20 series spring-back type

Application fields: shaft diameter runout test, valve position test and control, material hardness and material stress test, wear measurement of high-speed train brake device and roll gap measurement.

SDVB20-25 spring-back type

Application fields: splashing environments, such as glass grinding machine and glass cutting, etc.

SDVG12 and SDVG8 micro series

Application fields: puncher, measuring shaft diameter of material testing machine and textile, etc.

SDVG12B-10 split type

Application fields: aircraft wind tunnel testing machine and aerospace.

SDVG20 series split type

Application fields: machine tools and tool positioning, hydraulic cylinder positioning, cement industry, bridge deck displacement detection, valve position detection and control, metro tunnel engineering protection.

SDVG20-35 split type

Application fields: automobile engine and valve detection.

SDVG20 split type with floater

Application fields: oil level measurement and control, and liquid level measurement in food industry.

SDVG20-VA AC sensor

Application fields: hydraulic motor, displacement test of power plant generator set, integrated detection system and valve position detection.

SDVG28 explosion-proof split type

Application fields: location detection in the ambient of petroleum and petrochemical, high-risk dust and the like.

SDVG38-100 underwater flange type

Application fields: applied in underwater environment such as river bed and sea floor, etc.

SDVH8 inductance measuring head

Application fields: axle diameter detection, precision micro-displacement measurement, mobile phone shell detection.

SDVN8-4 pneumatic type

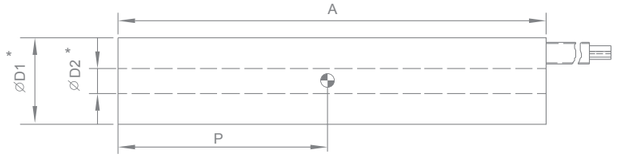
Application fields: glass production line detection, metal processing detection, cylinder displacement detection and control, building materials processing measurement and control.

Basic performance parameter

	SDVG20 series split	SDVB20 series resilient type	SDVN8-4 pneumatic mode	SDVH8 pen type series
Power supply	9 ~28V DC			Excitation voltage: 3Vrms
Operating current	Voltage output type power supply current ≤ 12mA			Excitation frequency: 5 KHz
	Second-wire 4-20 mA current output type LVDT, power supply current 4-20 mA displacement range			
Displacement range	2.5,5,10,15,25,50,100,250,500mm	2.5,5,10,15,25,50mm	4mm	2,5,8mm
Output signal	0-5 V (9-28 VDC supply voltage)			AC signal (output signal after transmitter is equipped is the same as left)
	0-10V (15-28V DC supply voltage)			
	4-20mA (two-wire system, 15-28 V DC supply voltage)			
	Digital output (9-12 VDC supply voltage)			
Linearity error	An alog output: ± 0.25%,and ± 0.5%, etc. are optional; digital output: 0.25%,and 0.1% ,etc. are optional			
Repetitive error	≤0.01%F.S	5μm，10μm	1μm	1μm，5μm
Resolution	<0.1μm (maximum), the digital output is 16bit			
Working temperature	-25℃ ~ +85℃			
Temperature coefficient	Zeropoint ≤0.01%/℃			
	Sensitivity ≤0.025%/℃			
Operating pressure	/		0.03~0.06MPa	/
Thrust force	/		0.25N（±0.05）	/
Leve of protection	IP64			

Machine dimension

Mechanical dimension diagram of SDVG series split-type：



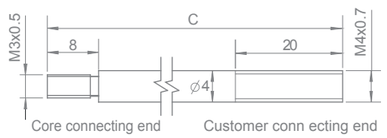
Parameter	SDVG series split type								
Displacement range (mm)	2.5	5	10	15	25	50	100	250	500
Outline length A (mm)	80	90	110	130	170	210	290	498	800
Core length B (mm)	20	30	40	50	70	80	120	150	180
Electrical zeropoint position P (mm)	21	26	36	46	66	86	126	230	381

Remark: the factory default is that when the sensor guider rod moves towards the outgoing line, the output will increase. The round point position where the center point of the core locates is the position of the electric zero point (middle point of measuring range).

※ Description: mechanical dimensions can be adjusted. If there are specific requirements, please consult the business personnel.

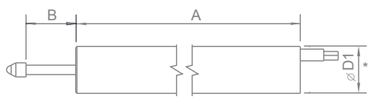
Standard outer dimensions D1=20 mm, D2=6.0 mm, D3=4.8 mm, M=3(common dimensions of D1 are 20 mm, 12 mm and 8 mm, and other dimensions can be customized as required.)

SDVG20 series core connecting rod dimension diagram:



Parameter	SDVG20 series core connecting rod dimension								
Displacement range (mm)	2.5	5	10	15	25	50	100	250	500
Core connecting rod length (mm) C	58	58	68	78	98	128	168	346	618

SDVB20 spring-back series mechanical dimension diagram:



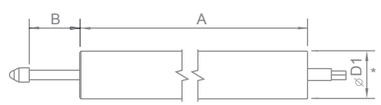
Parameter	SDVB20 spring-back type						
Displacement range (mm)	2.5	5	10	15	25	50	100
Outline length A (mm)	80	90	110	130	170	210	291
Guide rod free state exposed length B (mm)	5	8	15	22	34	60	131

Note:

1. The factory default is that the output increases when the sensor guide rod move inward.
2. Above size is limited to analog output. If it is digital output product, length A needs to be increased by 62 mm.

※ Description: standard outer diameter dimensions D1=20mm, which can also be customized according to customer requirements.

SDVB20 spring-back series mechanical dimension diagram：



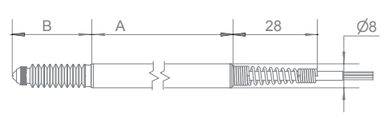
Parameter	Parameter SDVH20 spring-back type						
Displacement range (mm)	2.5	5	10	15	25	50	100
Outline length A (mm)	106	116	136	156	196	236	316
Guide rod free state exposed length B (mm)	5	8	15	22	34	60	115

Note:

1. Output in creases when the default sensor guide rod is moving inward.
2. Above size is limited to analog output. If it is a digital output product, length A needs to be increased by 62 mm.

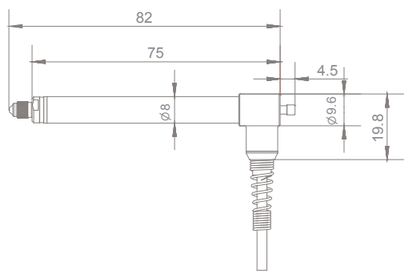
※ Description: standard outer dimensions D1=20mm, which can also be customized according to customer requirements.

SDVH8 pen type series mechanical dimension diagram:



Parameter	SDVH8 series spring-back type			
Displacement range (mm)	2	2.5	5	8
Outline length A (mm)	68	112	115	121
Guide rod free state exposed length B (mm)	19.6	20.3	23.3	30.3

SDVN8-4 Pneumatic Type Mechanical Dimensions:

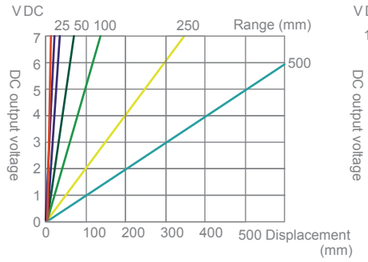


Mechanical dimensions of transmitters:

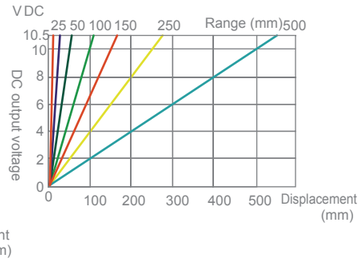
Position detection
Angle measurement
Speed measurement
Displacement measurement
Liquid level measurement
Flow measurement
Pressure measurement
Temperature and humidity measurement
Current measurement
Special sensor
LVDT displacement sensor
Valve core position sensor
Economical displacement sensor
Magnetostrictive displacement sensor

Output characteristic

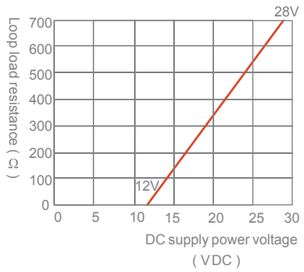
The relationship between 0-5V output voltage and displacement of different range SDVG 20 series:(power supply voltage 9-28 V DC, recommended power supply voltage 12 V DC)



The relationship between 0-10V output voltage and displacement of different range SDVG 20 series:(power supply voltage 15-28 V DC, recommended power supply voltage 15 V DC)



Relationship between maximum loop load resistance and power supply voltage of current output type LVDT:(power supply voltage 15-28 VDC, recommended power supply voltage 24VDC, load resistance 500Ω)

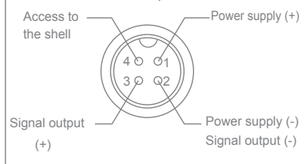


Wiring method

The output voltage value of DC stabilized power supply must be in the specified range (see the basic performance parameter table on page 3), and wiring should be carried out according to the correct connection position. The output connection modes include direct-out cable type and socket type.

Cable color definition:
Red wire power supply (+)
Black wire: power supply (-), signal output (-)
Blue wire: signal output (+)

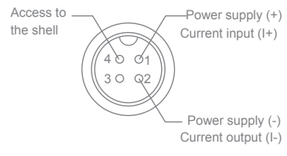
Definition of socket pin:



Analog voltage output

Cable color definition
Red wire: power supply (+), current input (I+)
Black wire: power supply (-), current output (I-)

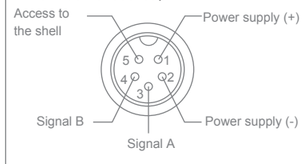
Definition of socket pin:



Analog current output

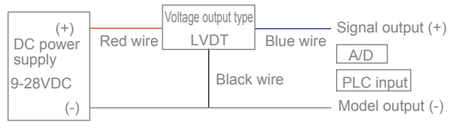
Cable color definition:
Red wire power supply (+)
Black wire: Power supply (-)
Blue wire: Signal A
White wire: Signal B

Definition of socket pin:

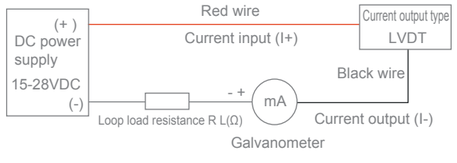


Digital RS485 signal output

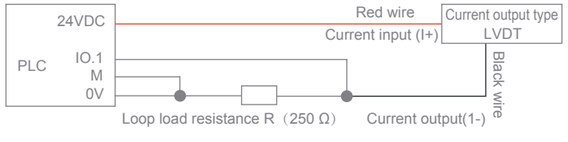
Voltage output type wiring diagram:



Two-wire current output type wiring diagram:



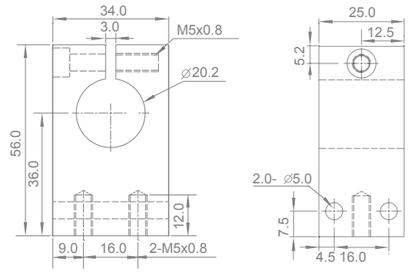
Two -wire current output type wiring diagram (PLC access):

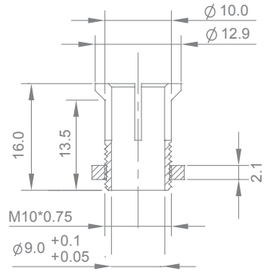


Method of installation

The location and installation of LVDT requires non-metallic fixture with low thermal expansion coefficient for fixation. If metal fixture is used, the product performance will be affected. The company has standard fixture accessories for users to choose, and users can also customize the installation of fixture.

Ø8.0 Pen type sensor fixture





Product selection list

SDV	□	□□	□	–	□□□	□	–	□□□	–	□□	□
	Sensor Type	Main body external diameter	Relationship between electronic case and main body structure		Range	Accuracy		Signal output		Installation information	Outgoing mode
	G Split E explosion-proof type B resilient type H long guide rail spring-back type N pneumatic mode	8 12 20 28	The standard form is the default; A: Double tubes B: The electronic case and the coil separate type; C: The electronic case without shell; Z: Customized		Up to 3 bits, unit: mm.	A：0.25% B：0.5% C：1% D：2% E：5% S：0.1%(Only applicable to digital output)		See Schedule 1-1 for information		See Schedule 1-2 for information	D: Aviation plug P: Straight-out cable M: With digital display output

Position detection
Angle measurement
Speed measurement
Displacement measurement
Liquid level measurement
Flow measurement
Pressure measurement
Temperature and humidity measurement
Current measurement
Special sensor
LVDT displacement sensor
Valve core position sensor
Economical displacement sensor
Magnetostrictive displacement sensor

Schedule 1-1 (Signal Output Information)

Signal output information selection (5 bits)					
	□	□	□	□	□
Analog output	Current or voltage output	Output range	Retention	Direction of travel	Transmission mode
	A: Current	1、4～20mA	X	P, positive N, reverse	Default: RS485
	V: Voltage	1、0～10V，2、0～5V			
Digital output	Output system	Data format	Baud rate		
	M:Modbus	R: RTU format A: ASCII format	1: 4800 2: 9600 3: 19200 4: 38400 5: 57600 6: 115200		

Schedule 1-2: Sensor body installation information

□	□			
C: Cylinder	Code	Thread/outside diameter	Code	Thread/outside diameter
M: Standard thread	1		B	12
T: Fine thread	2		C	14
	3		D	16
	4		E	18
	5		F	20
	6		G	22
	7		H	24
	8	8	I	28
	9		J	
	A10		Z	Customer customization

Selection example: SDVB20-20A-A1-CFP

Represents spring-back type, 20 mm outside diameter, 20 mm displacement range, accuracy 0.25% FS, current 4-20 mA forward output, stainless steel round shell, end direct-out standard cable.

Memorandum

Spool position sensor

- Accurately measu re the spool position to realize closed-loop control.
- Quick response,long service life, and small volume.
- Pressure resistance 35 Mpa.

The spool position sensor is made by adopting LVDT principle. It has the characteristics of quick response, long life, high pressure resistance, small volume and the like. It can accurately measure the spool position and realize the closed-loop control of the spool position.

Linear sensor outputs standard voltage, current and RS 485 digital signal to accurately monitor the full-stroke spool position.

Limit sensor outputs high-low-level signal to check whether or not the spool is fully open, accurate monitoring of safety.

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Application field

Proportional valve

Proportional valve

Product series

Linear displacement

Linear displacement

Linear displacement

Linear displacement

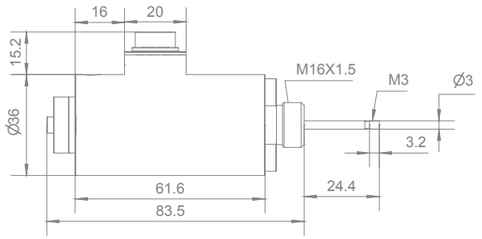
Basic performance parameter

Linear sensor

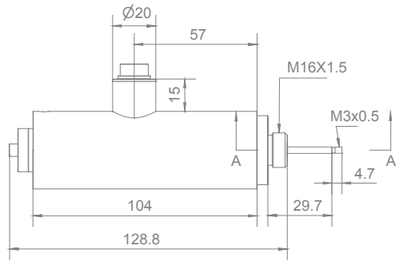
	SDVG36-8	SDVG36-40
Power supply	9 ~28V DC	
Operating current	Voltage output type power supply current ≤ 12mA	
	Second-wire 4-20 mA current output (power supply 4-20 mA)	
Effective travel	Applicable for 0-8mm	Applicable for 10-40mm
Output signal	0～5V (9-28V DC power supply voltage)	
	0 ~10V (15-28V DC power upply voltage)	
	4 ~20mA (two-wire system, 15-28 V DC power supply voltage)	
Linear error	＜1% or＜5%（F.S.)	
Working temperature	-25℃ ~ +85℃	
Temperature coefficient	≤0.025%/°C （F.S.)	
Pressure	30MPa	

Machine size

SDVG36-8 (Linear sensor)



SDVG36-40 (Linear sensor)



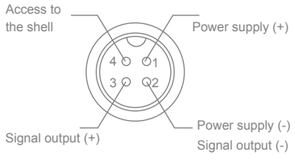
Linear sensor connection method

The output voltage value of the DC regulated power supply must be in the specified range (see the basic performance parameter table on the previous page), and wiring should be carried out according to the correct wiring position. The output connection modes include direct-out cable type and socket type.

Cable color definition

Red wire power supply (+)
Black wire: power supply (-), signal output (-)
Blue wire: signal output (+)

Definition of socket pin:

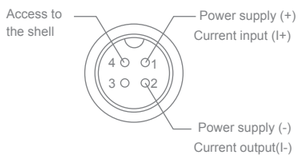


Analog voltage output

Cable color definition:

Red wire: power supply (+), current input (I+)
Black wire: power supply (-), current output (I-)

Definition of socket pin:

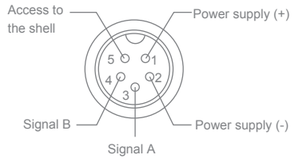


Analog current output

Cable color definition

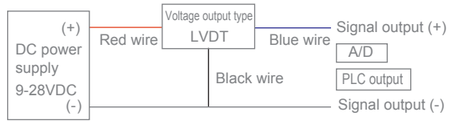
Red wire power supply (+)
Black wire: Power supply (-)
Blue wire: Signal A
White wire: Signal B

Definition of socket pin:

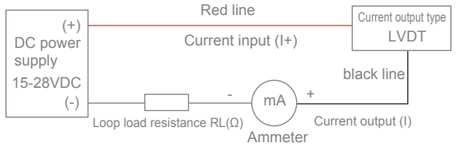


Digital RS485 signal output

Voltage output type wiring diagram:



Two-wire current output type wiring diagram:



Two-wire current output type wiring diagram (PLC access):

Memorandum

Economical displacement sensor

- With high precision and economy
- Small size,and suitable for small tooling
- Equipped with transmitter and upper computer,the detection function is diversified.

Economical displacement sensors such as SDHB08-1 are adopted to measure the outline dimensions of the product, so as to ensure the high-precision measurement requirements while controlling the use cost. This kind of displacement sensor can be adopted separately, and the output signal is 0.5-4.5V. It can also be used with a transmitter. The transmitter can be equipped with more than one displacement sensors. The transmitter can analyze and process the acquired displacement sensor signal to obtain the outline dimension data of the tested product and gives the result of whether the structure dimension is qualified. If needed, the relevant further corrected information can be provide.

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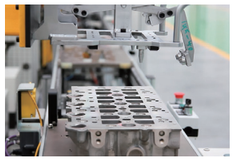
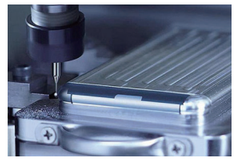
Application field



Product contour detection

Parts processing and inspection



3C shell processing and detection

Precision parts processing and detection

Product series

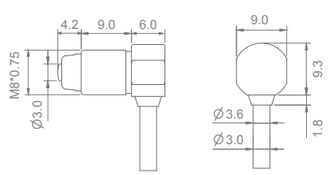
SDHB08-1 displacement sensor

SDVB16-4 displacement sensor

Basic performance parameter

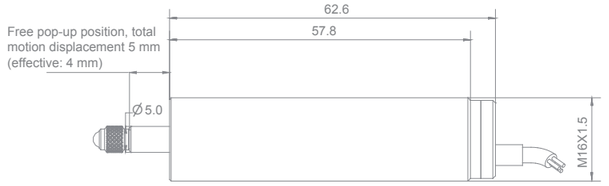
Model	SDHB08-1 displacement sensor	SDVB16-4 displacement sensor
Power supply voltage	5V DC， Transmitter 12V DC	9 ~28V DC wide voltage power supply
Displacement range	0~0.6 mm	0~4 mm
Output signal	0.5 ~ 4.5V	0.5 ~ 4.5V
Repeated accuracy	3um	≤ 8um
linearity		±25%FS
Resolution	1 um	5N（Maximum）
Operating temperature	0℃ ~ +85℃	-25℃ ~ +85℃
Leve of protection	IP67, resistance to cutting fluid corrosion	

Machine dimension



Mechanical Dimension Diagram of SDHB08-1 Displacement Sensor

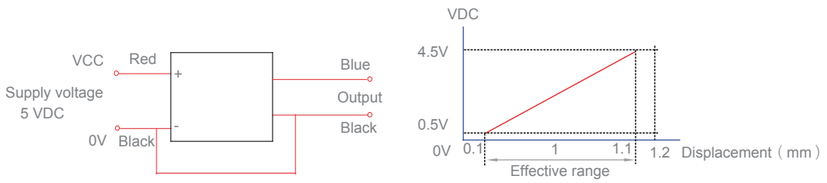
Unit： mm



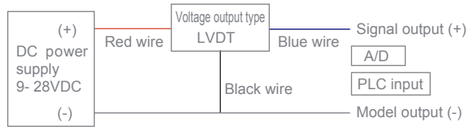
Mechanical dimension diagram of SDVB16 spring-back type displacement sensor

Wiring method

SDHB08-1 displacement sensor wiring diagram



SDVB16 DC spring-back type displacement sensor voltage output type wiring diagram



Note: The output voltage value of DC regulated power supply must be in the specified usage range (see performance parameter table), and wiring should be carried out according to the correct wiring position. The output connection modes include direct-out cable type and socket type.

Memorandum

Magnetostrictive displacement sensor

- Non-contact measurement, no wear and tear, long service life
- High precision up to 0.05% F. S.
- Absolute amount output, and it does not need to be reset to zero for restart
- High environmental adaptability, and regular calibration and maintenance are not required.
- Support current, voltage, Modbus, SSI and other output modes

Magnetostrictive displacement sensor is a high precision displacement measurement sensor developed by adoption of the principle of magnetostriction. Adopting non-contact measuring method, the product has long service life and strong environmental adaptability. Periodic calibration and maintenance are not required; The product is absolute output, and it does not need to be reset to zero for restart; it has the characteristics of high precision, high stability, high reliability and high repeatability; and output supports current, voltage, SSI, Modbus, PROFIBUS and various output methods, and it is widely adopted in petroleum, steel, chemical engineering, port, machinery, food and other harsh industrial ambients, which is the first choice of high-precision displacement control.

Inquiry Soway

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Data download

www.sowaysensor.com/product/

Application fields

Synchronous control of multi-cylinder system

Precision control of rolling mill stroke

Port machinery automatic control

Injection molding machinery

Product application example

SDM10T displacement sensor

Application fields: typically applied in the fields of piston position feedback of servo cylinder and hydraulic cylinder, template positioning and monitoring of injection machine, mechanical stroke control and so on.

SDM20T displacement sensor

Application fields: typically applied in machine tool displacement control, wood processing positioning control, mechanical positioning and displacement detection.

SDM40S explosion-proof displacement sensor

Application fields: typically applied in petroleum, coal mining machinery and other high-precision measurement fields with fire-proof and explosion-proof requirements.

SDM10A displacement sensor

Application fields: typically applied in the fields of mechanical stroke control, such as template positioning and monitoring of injection machine, tunnel drilling, bulldozer, excavator and so on.

SDM11B displacement sensor

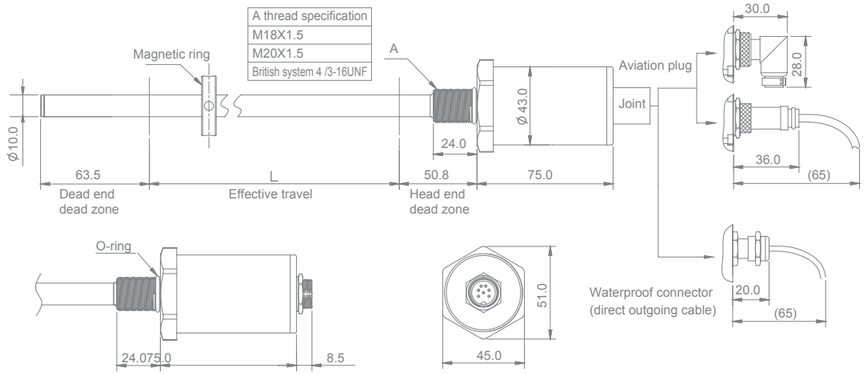
Application fields: typically applied in the fields of mechanical stroke control, such as template positioning and monitoring of injection machine, tunnel drilling, bulldozer, excavator and so on.

Basic performance parameter

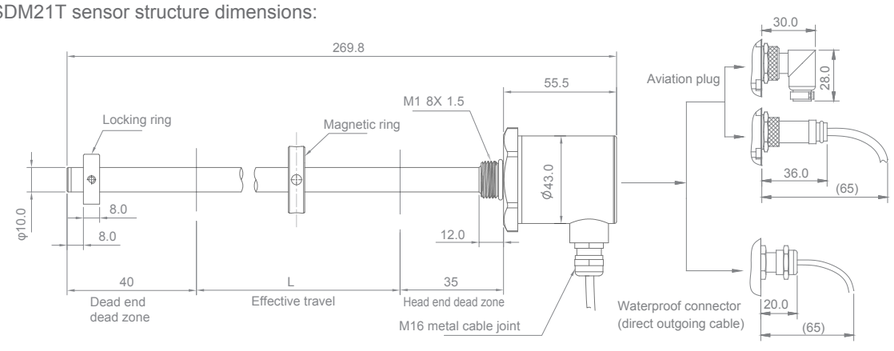
	Analog output	Digital output	
Power supply	24V DC	9~30V DC	
Measuring object	1~3 positions can be measurable	1~3 positions can be measurable	
Displacement range	Stainless steel measuring rod series: 80-5000mm Aluminum profile measuring rod series: 50-3000mm		
Output signal	Voltage 0-5V or 0-10V	Modbus	SSI
	Current 0-20mA or 4-20mA		
Load capacity	Voltage signal output minimum load ≥ 5K Ω	32 sensors can be networked	Point-to-point
	Current signal output maximum load resistance 600Ω		
Linear error	≤±0.05%F.S（最小±50μm）		
Repetitive error	≤±0.002%F.S		
Resolution	16 bit D/A conversion is adopted, 0.015% F. S	5μm	
Update time	1ms (stroke ≤ 1000mm), 2ms (stroke ≤ 3000mm)		
Hysteresis	≤0.002%F.S		
Working temperature	-20℃ ～+85℃.		
Temperature coefficient	≤0.007%F.S/℃		
Leve of protection	IP65-IP67(higher level is available)		

Machine size

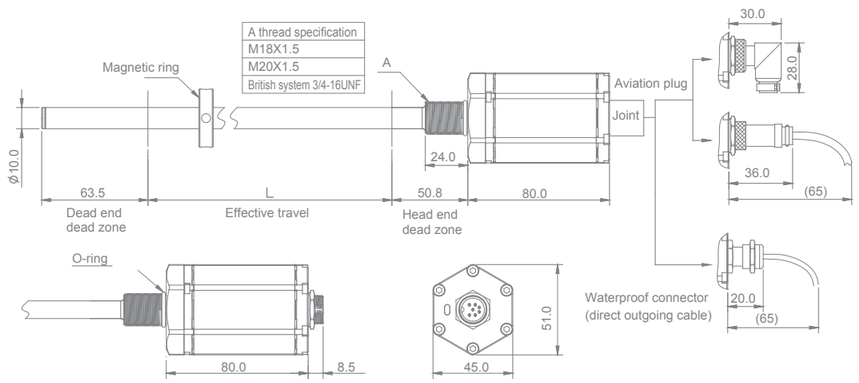
SDM20T sensor structure dimensions:



SDM21T sensor structure dimensions:

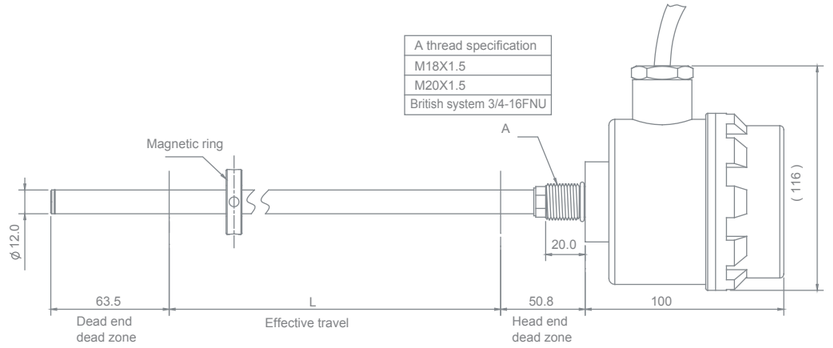


SDM10T sensor structure dimensions:

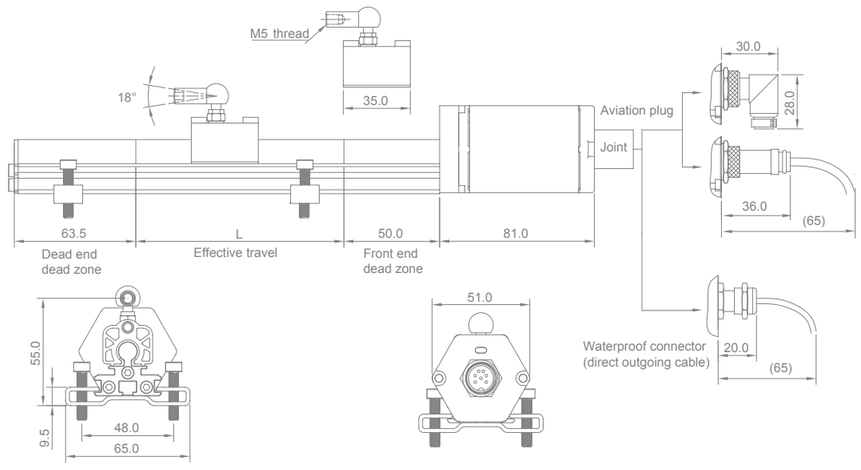


SDM40S sensor structure dimensions:

Explosion-proof Leve: Exd Ⅱ CT6 Gb IP65-IP67 (higher level can be consulted)



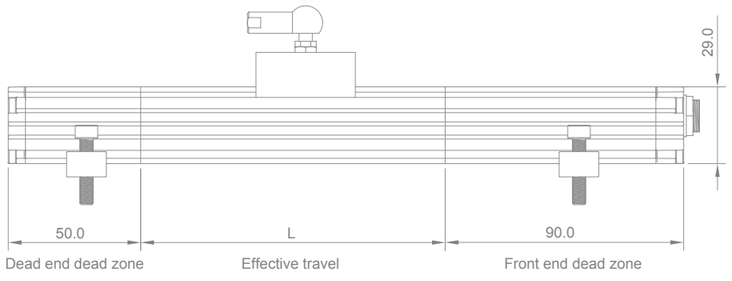
SDM10A sensor structure dimensions:

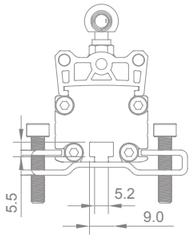


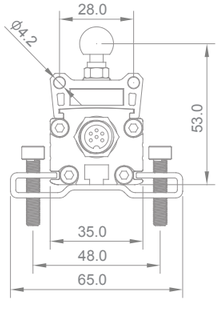
Position detection
Angle measurement
Speed measurement
Displacement measurement
Liquid level measurement
Flow measurement
Pressure measurement
Temperature and humidity measurement
Current measurement
Special sensor

LVDT displacement sensor
Valve core position sensor
Economical displacement sensor
Magnetostrictive displacement sensor

SDM11B sensor structure dimensions:

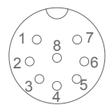






Wiring method

Wiring definition of SDM10A and SDM11B series

Electrical connection mode			Pin lead instructions		
Aviation plug		Cable color definition	Analog output	Modbus	SSI output
	Pin1	Red	Power supply (+)	Power supply (+)	Power supply (+)
	Pin2	White	Signal output (-)	NC	CLK（-）
	Pin3	Blue	Signal 1 output (+)	NC	CLK（+）
	Pin4	Yellow	Signal 2 output (+)	NC	NC
	Pin5	Green	NC	RS485 Signal B	DATA（+）
Male plug (sensor connector)	Pin6	Brown	NC	RS485 Signal A	DATA（-）
	Pin7	Bare wire	Shielded wire	Shielded wire	Shielded wire
	Pin8	Black	Power supply (-)	Power supply (-)	Power supply (-)

Wiring definition of SDM40S series

Cable color	Red	Black	Blue	White
Analog output	VCC	GND	OUT+	OUT-
Digital output	VCC	GND	485A	485B

Precautions:

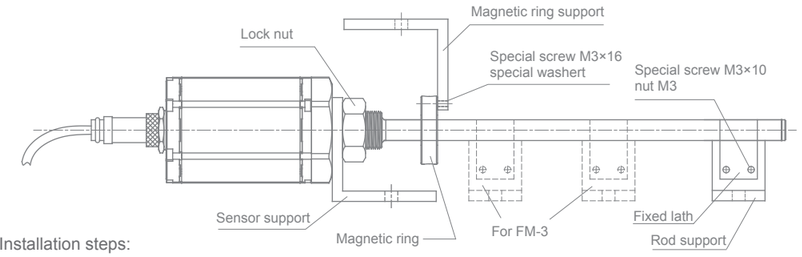
1.Sensor power supply requirements:+24VDC ± 10%, power supply current to each sensor must be greater than 150mA;

2.The shielded cable wiring of the sensor must avoid high-power electromechanical equipment, high-voltage cable and places with strong electromagnetic radiation;

3.The shielded wire of the cable must be kept intact without breaking and connected to the grounding end of the follow-up equipment.

Method of installation

Installation Diagram 1:(External, suitable for SDM10T, SDM20T, SDM40S series)



Installation steps:

1) The sensor is stuck with the sensor bracket and the support is secured to the sensor with a locking nut.
2) The magnetic ring shall be fixed on the magnetic ring support with two anti-loosewashers#6 and two special screws M3×16, and the magnetic ring shall be mounted on the measuring rod, and the screw head shall be oriented towards the hexagonal base side; The magnetic ring should be as concentric and non-contact as possible with the measuring rod, but slight eccentricity of the magnetic ring will not affect the performance of the sensor.
3) Tight the security strip around the end of the measuring rod, and fix the securitystrip on the measuring rod bracket with two M3×10 screws and two M3 nuts.
4) Finally, fix the sensor bracket and the measuring rod bracket (the initiallyassembled sensor unit) in the predetermined position of the installation site with the corresponding screws according to the installation requirements.

Notes:

1) When the displacement sensor is installed externally, it shall be equipped with open magnetic ring. FM-2 installation accessories are recommended for sensors with measuring range less than 1000mm. For those larger than 1500 mm,FM-3 installation accessories shall be selected.
2) The FM-2 installation accessories are provided with onlyone fixed slat, which is fixed within 25mm from the end ofthe measuring rod; The FM-3 installation accessories are provided with three fixed slats. The installation method is as follows: one slat is fixed within about 25mm from the end, and the other two are evenly distributed on the measuring rod.

Installation diagram II:(built-in hydraulic cylinder and applicable to SDM10T, SDM20T and SDM40S series)

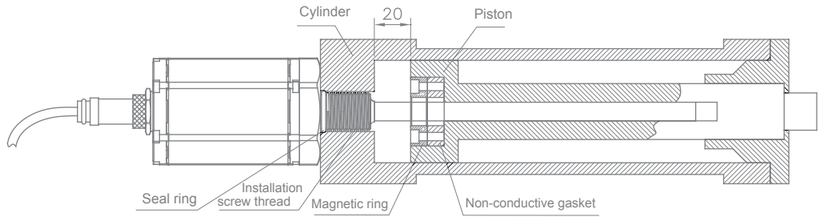


Figure 1: Hydraulic Cylinder Installation Diagram

Installation steps:

1) Screw the sensor into the installation hole of the external cylinder liner and tighten it, as shown in Figure 1. (Note: please machine the hydraulic cylinder installation hole to make it consistent with the sensor installation screw thread, the sealing surface of the "O"-ring should be machined as shown in Figure 2; and the sensors installation screw thread dimensions are shown in the table below)
2) According to the dimensions of the magnetic ring, the installation space of the magnetic ring and the non-magnetic guide gaskets (as shown in Figure 1) shall be machined on the piston rod and four M3 installation screw holes shall be machined. The non-magnetic guide gaskets on the magnetic ring gasket shall be fixed by special screws M3×16 and special washers#6.
3) Insert the measuring rod of sensor into the hollow piston cavity through the magnetic ring. The magnetic ring shall be concentric with the measuring rod as much as possible, but the slight eccentricity of the magnetic ring has no effect on the measuring precision. t

Sensor installation screw thread dimension table:

Dimension / Code	A	B	C
ME	M18×1.5	Ø20.0 $^{+0}_{-0.1}$	Ø18.7
MF	M20×1.5	Ø21.6 $^{+0}_{-0.1}$	Ø20.3
G6	3/4-16UNF	Ø20.3 $^{+0}_{-0.1}$	Ø19.3

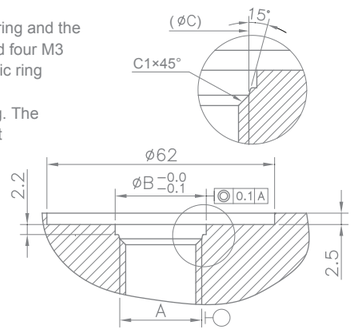
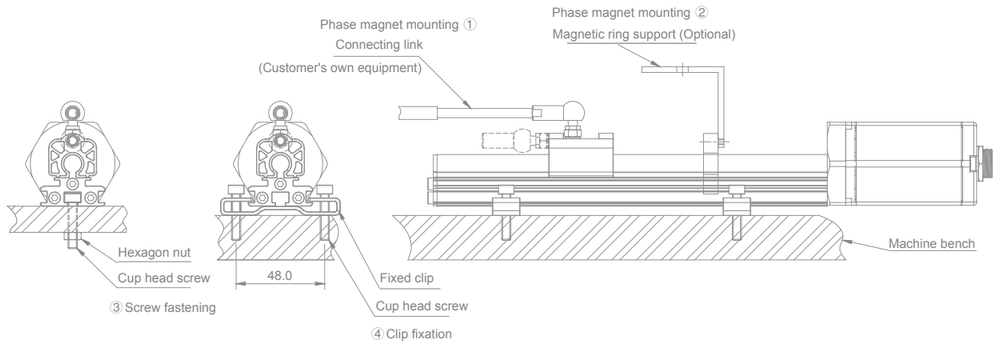


Figure 2: Processing Schematic Drawing of the Sealing Surface of O-ring

Installation Diagram III:(external type, and applicable to SDM10A series)



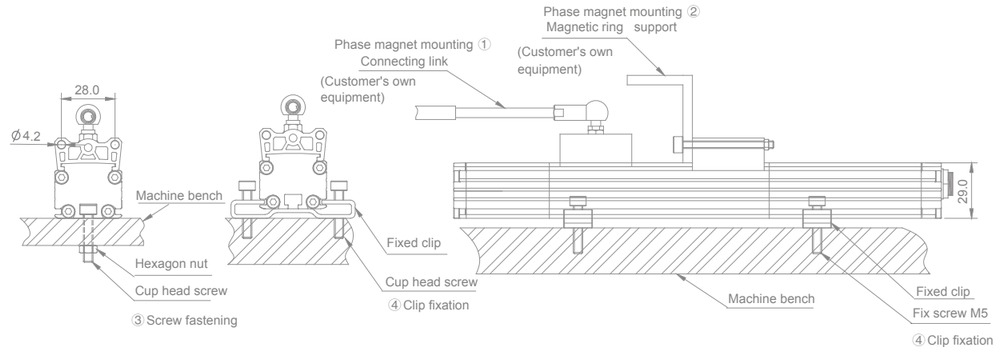
Installation steps:

1) Place the fixed clip (or hexagon screw) on the sensor guide rail (or chute) first.
2) Then move the sensor to the horizontal position of the machine bench, move the fixed clip to the pre-drilled mounting hole on the machine bench, align, calibrate and match the machine, then lock the screw.
3) When the phase magnet is installed, if the slider is chosen, the customers need to prepare the connecting rod by ourselves, if the open magnetic ring is chosen, the customers can go to our company to choose the magnetic ring support for installation.

Notes:

1) Try to level the sensor with the machine.
2) When the measuring range is within 500mm and 2PCS fixing clamping pieces shall be provided, and one more fixing clamping piece shall be Provided for each increased 500mm.
Example: When the measuring range is 1500mm, 4PCS fixed clips should be installed.

Installation Diagram IV:(external type and applicable to SDM11B series)



Installation steps:

1) Place the fixed clip (or hexagon screw) on the sensor guide rail (or chute) first.
2) Then move the sensor to the horizontal position of the machine bench, move the fixed clip to the pre-drilled mounting hole on the machine bench, align, calibrate and match the machine, then lock the screw.
3) When the phase magnet is installed, if the slider is chosen, the customers need to prepare the connecting rod by themselves, if the open magnetic ring is chosen, the customers can go to our company to choose the magnetic ring support for installation.

Notes:

When the measuring range is within 500mm and 2 PCS fixing clamping pieces shall be installed, and one more fixing clamping piece shall be installed for each increased 500mm.
Example: When the measuring range is 1500mm, 4PCS fixed clips should be installed.

Product selection list

SDM	□□	□	□	–	□□□□	□	–	□□□□□	–	□□	□	□□	–	□□□□	□
Electronic silo structure		Measuring rod type			Range	Accuracy		Signal output		Installation information		Cable length		Mounting attachment	
10: Hex aluminium 11: Square aluminum 20: Round stainless steel 21: small stainless steel 40: explosion-proof type		S: Ø12 stainless steel T: Ø10 stainless steel A: T-type aluminum shell B: Square aluminum shell	Retention		Digital expression unit mm The last letter indicates that the default is high precision and E is economic			See Table 1		See Table 3		Unit: m Electrical connection mode, D connector output P: Straight-out cable M: With digital display output		Type of magnetic ring installation accessories as shown in Schedule 2	Special customized identifier

Schedule 1: selection of signal output information

Signal output information selection (5 bits)					
	□	□	□	□	□
	Current or voltage output	Output range	Retention	Direction of travel	Transmission mode
Analog output	A: Current	1、4 ~ 20mA 2、0 ~ 20mA	X	P, positive N, reverse	Default：RS485
	V: Voltage	1、0 ~ 10V 2、0 ~ 5V			
Digital output	Output system	Data format	Baud rate		
	M:Modbus	R: RTU format A: ASCII format	1: 4800 4: 38400 2: 9600 5: 57600 3: 19200 6: 115200		
	S:SSI	H: Binary G: Gray code	0: 24 bit binary 1: 25 bit binary 2: 26 bit binary		

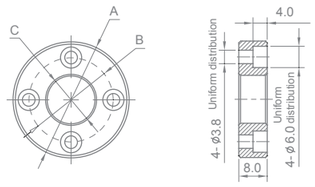
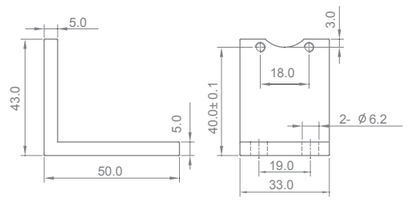
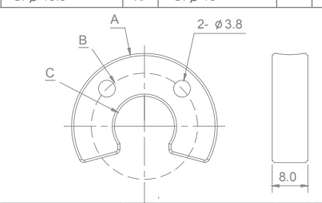
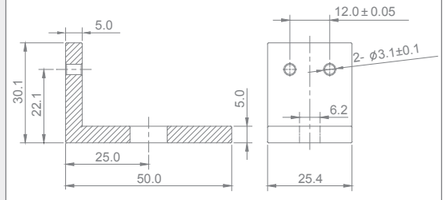
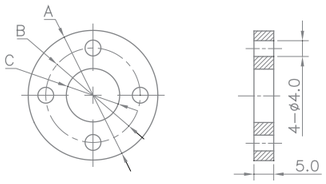
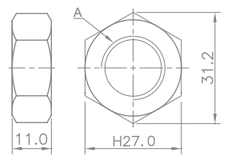
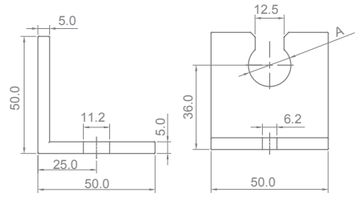
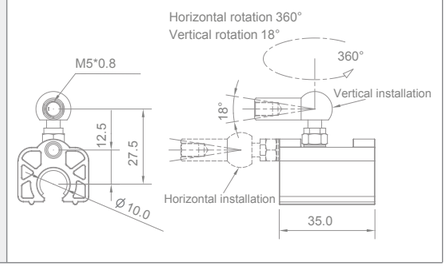
Schedule 2: Magnetic Ring and Installation Accessories Selection

Magnetic Ring Type (3 bits)			Installation attachment type (1 bit)
□	□	□	□
Magnetic Ring Type	Magnetic Ring Number	Reservation	
1: Close magnetic ring 1(Applicable to Φ 10 measuring rod) 2: Close magnetic ring 2(Applicable to Φ 12 measuring rod) 3: Open magnetic ring 1(Applicable to Φ 10 measuring rod) 4: Open magnetic ring 2(Applicable to Φ 12 measuring rod) A: Open magnetic ring 1(applicable to aluminum forming shell) B: Vertical Installation slider I C: Horizontal Installation Slider I D: Vertical mounting slider II E: Horizontal Installation Slide II X: Fill in X for magnetic ring without corresponding position (magnetic ring specifications are specified in Schedule 4)			1: Installation attachment group FM-1 2: Installation attachment group FM-2 3: Installation attachment group FM-3 A: Installation attachment group FM-4 X: No Installation accessories (The dimensions of the accessories are shown in Schedule 4, and the list of the accessory group is shown in Schedule 5)

Schedule 3: Installation information selection table

Installation information (2 bits)		
□	□	Standard
M	E	M18x1.5
M	F	M20x1.5
G	6	British 3/4-16UNF
F	X	customized flange

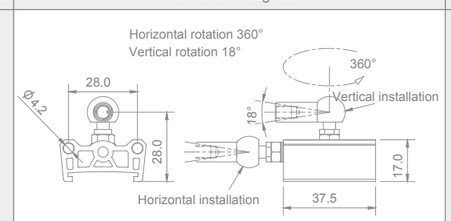
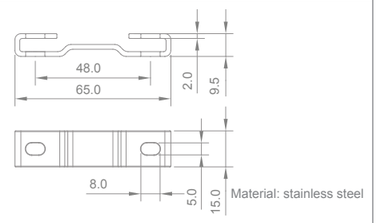
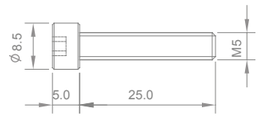
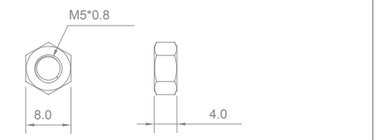
Schedule 4: Magnetic Ring and Displacement Sensor Installation Accessories List

In kind	Structural diagram	In kind	Structural diagram
Close magnetic ring		Magnetic ring support	
Number 1 / A: ø32.8 B: ø23.9 C: ø13.5 / Number 2 / A: ø35 B: ø25.5 C: ø15 / Material / Magnet		Number / General use of displacement sensor / Material / Aluminum alloy	
Open magnetic ring		Rod support	
Number 1 / A: ø32.8 B: ø23.9 C: ø13.5 / Number 2 / A: ø35 B: ø25.5 C: ø15 / Material / Magnet		Number / General use of displacement sensor / Material / Aluminum alloy	
Non-conductive gasket		Lock nut	
Number 1 / A: ø32.8 B: ø23.9 C: ø13.5 / Number 2 / A: ø35 B: ø25.5 C: ø15 / Material / Aluminum alloy		Number 1 / A: M18×1.5 / Number 1 / A: 3/4-16UNF Number 1 / A: M20×1.5 / Material / Stainless steel	
Sensor support		Slider I	
Number 1 / A: Ø18.2(M18×1.5) / Number 3 / A: Ø20.2(3/4-16UNF) Number 2 / A: Ø20.2(M20×1.5) / Material / Aluminum alloy			

Model selection example I: SDM20T-0800-A1XP-MEP03-2 XX1

It indicates that the ordered product is the SDM20 series high precision displacement sensor, with 20 type electronic bin, range of 800mm, current output of 4~20mA, single magnetic ring forward trave and standard working voltage of 24VDC. Its installation screw thread is metric M18x1.5, the direct outgoing cable (equipped with 3 meters PVC sheathed cable), and optional closed magnetic ring 2 and the installation accessory group FM-1.

Continued: physical objects of Schedule 4

Physical	Structural diagram	Physical	Structural diagram
Slider II		Fixed clip	
Fix screw		Mounting nut	

Schedule 5: Displacement Sensor Accessory Group List

Displacement sensor accessory list	Quantity			
	SDMS series			SDMA series
	FM-1	FM-2	FM-3	FM-4
Close magnetic ring	N*	-	-	-
Open magnetic ring	-	N*	N*	-
Non-conductive gasket	N*	-	-	-
Special screw M3×16	4×N*	2×N*	2×N*	-
Spring gasket	4×N*	2×N*	2×N*	-
Lock nut	-	1	1	-
Sensor support	-	1	1	-
Magnetic ring support	-	1	1	-
Rod support	-	1	3	-
Fixed lath	-	1	3	-
Special screw M3×10	-	2	6	-
Nut M3	-	2	6	-
Fixed clip	-	-	-	2
Installation screw M5*25	-	-	-	4
Mounting nut M5	-	-	-	4

Notes:

SDMXXT Series:

1. When the displacement sensor is applied to the internal installation of the hydraulic cylinder, it shall be equipped with closed magnetic ring and the accessory group FM-1 is optional.
2. When the displacement sensor is installed externally, it shall be equipped with open magnetic ring, and the accessory group FM-2(when the measuring range is less than 1000mm) or FM-3(when the measuring range is larger than 1500mm) is optional.
3. N*is the number of optional magnetic rings. SDMS series sensors can measure up to three positions, and the maximum number of equippedmagnetic rings is 3.

SDM1X Series:

If the clamping piece fixing installation method is selected, FM-4 shall be selected (when the range≤500mm, 2 clamps shall be equipped, and one more fixing clamp shall be equipped for each increased 500mm).

Model selection example II: SDM10A-0800-A11P-XXDS-BXXA

It indicates that the ordered product is the SDM10 series external displacement sensor, with hexagonal type electronic bin, range of 800mm, forward current output of 4-20mA, standard working voltage of 24V, and connected by the aviation plug (equipped with 3 meters PVC sheathed cable). The optional phase magnet is slider (vertical installation type), and the optional installation accessory group is FM-4(the sensor is installed by means of fixed clamping piece).