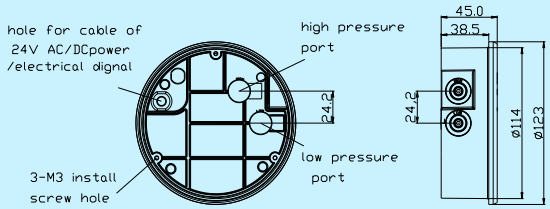
SDP Smart DP Monitor

Cast aluminum housing

ABS housing



Note: the diagram is for cast aluminum housing

Applications & Features

- Unique design with color TFT-LCD as dial display. It integrates the traditional pointer and digital display, switch control and transmitter output functions, which can realize the integrated functions of differential pressure detection, display, output and alarm control in the protected environment, and has a rich and beautiful display interface
- Apply high accuracy MEMS sensor and digital technologies, can measure positive, negative or differential pressure
- It can measure and control system pressure of fan, blower, filter, furnace draft and orifice plate and can apply to various clean room, biological safety cabinet, clean bench, ducts collection, medical or pharmaceutical machine, etc.
- Optional 2 individual single-pole single-throw relay switches, for alarm setting
- Fashionable, super slim design. Suitable for surface, panel or flush mount
- Multiple ranges, outputs, alarm, engineering units selectable
- No movable parts, no effect on vibration
- The accuracy is up to ±0.5% FS and the range can be 25Pa
- Function keys: zero calibrate, units select, relay set, etc.
- High brightness full color display, can display analog pointer, trend chart, measured value, alarm color, alarm status, alarm set point, etc., set by the buttons, refers to attached pictures

Specifications

Sensor: high accuracy MEMS sensor
Medium: non-combustible, non-corrosive air, not sensitive to moisture, dust, condensation and oil
Medium Temp.: 0-60°C
Material: ABS or Cast aluminum housing, PC plate and Chrome plated bezel
Size: 115mm (4") diameter opening, 38.5mm (cast aluminum) /33mm (ABS) thick for flush mount
Work Environment: -20-70°C
Compensated Temp.: 0-50°C
Work Pressure: overload 10xFS(≤1kPa)/8xFS(≥1kPa)
burst 20xFS(≤1kPa)/10xFS(≥1kPa)
Performance:

Accuracy %FS	±1.0%	±0.5%
Thermal effect %FS/°C(Zero/FS)	±0.05/0.08	±0.03/0.04
Stability %FS/Year	±0.5	±0.3

note: ±2%FS and ±1%FS@25Pa range
Response time: 0.5/1/2/5s, can be set by keys
Display: high contrast 3.5" TFT color LCD, resolution 320x480
Output: 0-10V & 4-20mA (3 wires), RS485/Modbus
Output Load: ≤500Ω (current), ≥2kΩ (voltage)
Relay output: 2×SPST, 0.5A/30VDC or 1×Buzzer
Key: 3 touch buttons
Electrical wiring: 0.5m connecting cable out from back or screw terminal on back (only for Cast aluminum housing)
Power: 16-28VAC, 9-28VDC
Connection: 1/8" ID tubing, two pairs (on left side and back)
Weight: 515g (cast aluminum)/ 400g (ABS)
Protection: IP65
Approval: CE, meet EN61326-1 for industrial equipment

Accessory: Standard accessories include 1002(5mm ID PVC tube 2m) and A-S0 (including 3 brackets and screws). Options are A-S1, A-S2 and A-S7-X. They can be used for surface, panel or flush mount and should be ordered separately. See details in Accessories.

Models

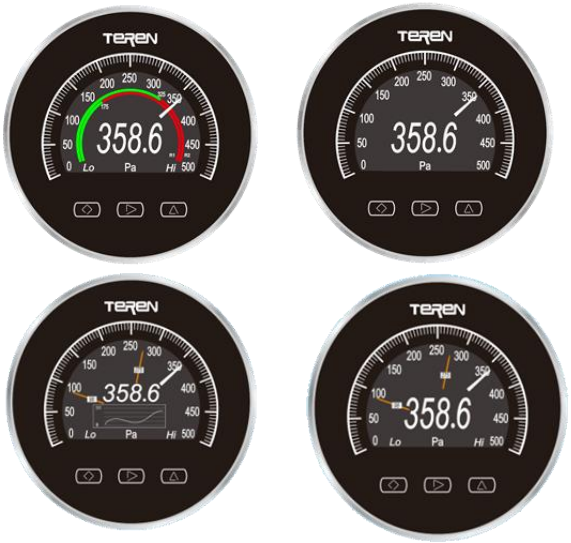
Model	SDP						Smart DP Monitor
Accuracy		0					1%FS
		1					0.5%FS
Range			x				Range selection
Relay				0			N/A
				1			2xSPST
				2			1×Buzzer
				3			1×Buzzer+2xSPST
Output					0		N/A
					1		0-10V&4-20mA
					8		RS485/Modbus
Housing						0	ABS
						1	Casting aluminum

The standard electrical connection is cable from the back of enclosure. Cast aluminum housing can be select screw terminals instead, add suffix -T after the model number.

Measuring Ranges

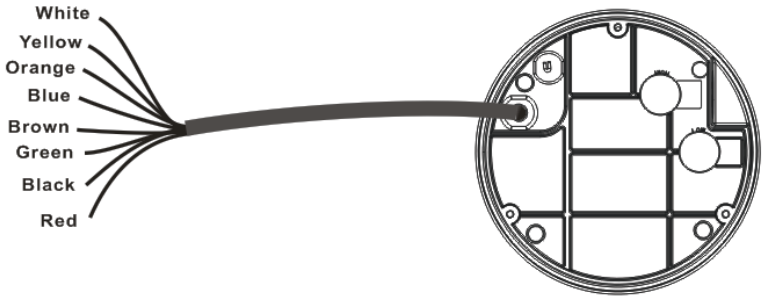
Code	UNIT & Range & Display Resolution					
	Pa	Pa	kPa	in w.c.	mm w.c.	mbar
0	**0-25**	25.0	0.025	0.100	2.50	0.250
1	**0-60**	60.0	0.060	0.250	6.00	0.600
2	**0-125**	125.0	0.125	0.500	12.00	1.250
3	**0-250**	250.0	0.250	1.000	25.00	2.500
4	**0-500**	500.0	0.500	2.000	50.00	5.000
5	**0-1000**	1000	1.000	4.000	100.0	10.00
6	**0-2500**	2500	2.500	10.00	250.0	25.00
7	**0-5000**	5000	5.000	20.00	500.0	50.00
8	**0-10000**	10000	10.000	40.00	1000.0	100.00

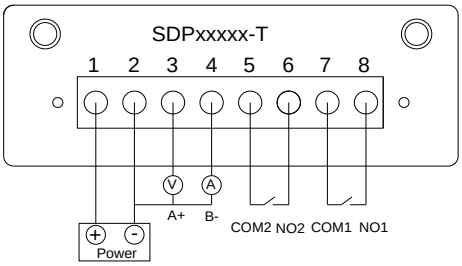
1. 5 engineering units can be set by the keys.
2. For zero center models, add "Z" at the end of the model. For example, SDPx1xxxxZ, means -30-0-30Pa. Only ranges 1~6 have this selection.



Connection

Different models have different electrical connections. Refer to the table as below (x means for any models).





Models	Eight Cores Cable								
SDPXX01X/ SDPXX21X	Cable Color	Red	Black	Yellow	White				
	Electrical Signal	+24V	GND	0-10V	4-20mA				
SDPXX11X/ SDPXX31X	Cable Color	Red	Black	Yellow	White	Green	Brown	Blue	Orange
	Electrical Signal	+24V	GND	0-10V	4-20mA	NO2	COM2	NO1	COM1
SDPXX08X/ SDPXX28X	Cable Color	Red	Black	Yellow	White				
	Electrical Signal	+24V	GND	A+	B-				
SDPXX18X/ SDPXX38X	Cable Color	Red	Black	Yellow	White	Green	Brown	Blue	Orange
	Electrical Signal	+24V	GND	A+	B-	NO2	COM2	NO1	COM1

Operation Instruction

Refer to **SDP Smart DP Monitor- Operation Instruction.**

Modbus Set

For RS485/Modbus models, user can use it to do all operation. Refer to the **SDP Smart DP Monitor RS485/Modbus Communication Data Table.**

Installation and Accessories

For different ways of installation, the instrument has two pairs of positive and negative pressure connection ports on bottom and left side. Use any pair of the two to complete pressure connection. Pay attention to the difference between the high and low ports. And use the attached plugs to seal the other pair of unused ports. It should be installed vertically.

• Installation of ABS housing models

It can be installed by surface, panel or flush mount with accessories.

1. Surface mount

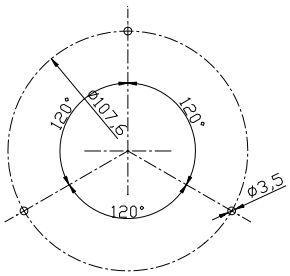


Figure 1

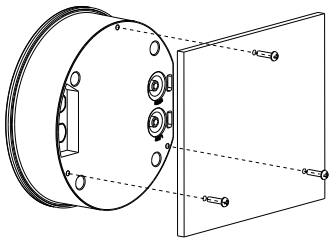


Figure 2

When surface mounted, drill 3 holes at each 120 degree on the circle with 105 mm diameter, each hole is 3.5 mm diameter, shown as figure 1. Then install the product by using 3 screws M3X8 on the surface, shown as figure 2, and connect the tube (be careful of the high/low ports). Be sure to seal another pair of pressure ports.

2. Panel mount

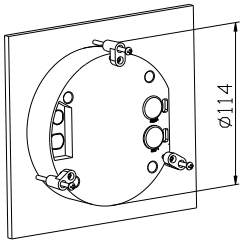


Figure 3

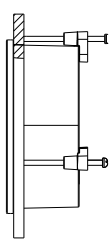


Figure 4

When panel mounted, drill a hole of 114 mm diameter, put the gauge body into the hole, install the accessories on the back of the gauge, fix 3 screws M3.5X45 shown as figure 3 and 4. Then connect with tube (be careful of the high/low ports and be sure to seal another pair of the pressure ports.).

3. Flush mount

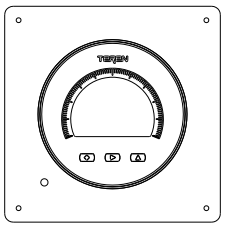


Figure 5

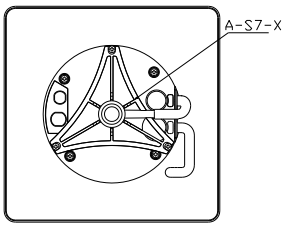


Figure 6

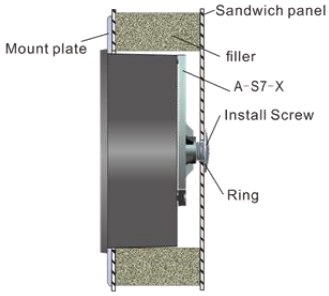


Figure 7

Flush mount needs extra panel or bracket accessories. Installation with the panel is as shown in figure 5(front view) and figure 6 (back view). Installation with the A-S7-X bracket is as shown in figure 7 (back view). Please refer to the A-S7-X bracket manual for the specific installation method.

• Installation of Cast aluminum housing models

It can be installed by surface, panel or flush mount with different accessories.

1. Surface mount

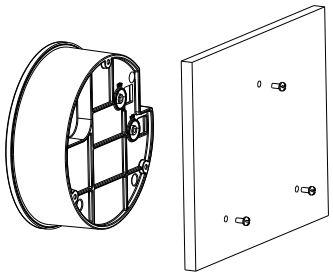


Figure 8

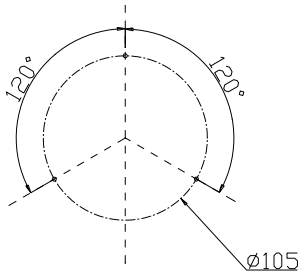


Figure 9

When surface mounted, drill 3 holes at each 120 degree on the circle with 105mm diameter, each hole is 3.5mm (shown as above). Then install the product by using 3 screws M3X8, and connect the tube (be careful of the high/low ports). Be sure to seal another pairs of the pressure ports.

2. Panel mount

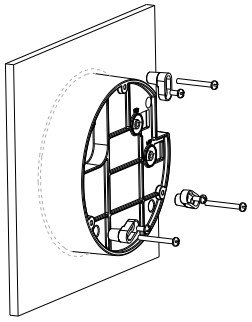


Figure 10

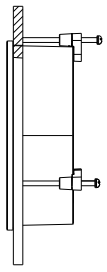


Figure 11

When flush mounted, drill a hole of 114mm diameter, flush the gauge body into the hole. Install the accessories on the back, fix 3 screws M3.5X50 as shown and connect with tube (be careful of the high/low ports).

Attention

It should be power OFF during installing and wiring. When using 24VAC, it is strongly recommended to power the unit with independent transformer. If sharing a 24VAC transformer with other equipments such as controllers, transmitters or actuators, please make sure the terminals 24V and GND are connected correctly. Otherwise, it may reduce serious damages.

Warranty

During warranty period, if failed, the product can be returned for repairing or replacing after confirmed normal operation.

SDP key function description and operation guide

1. Button definition:

◇ ▷ △

“SET”: Set/Confirm/Save; “SEL”: Bit Select/Decrease; “ADJ”: Adjust/Increase

Combination keys: ▷+◇, decrease by 100 times basic step; △+◇, increased by 100 times basic step .

Note: The combination keys are needed when setting the alarm value to a large range.

2. Main display window

Display the current measurement value, press "◇" to enter the menu window.

3. Menu window

The following eight different icons are displayed. Press "▷", "△" to select different icons, and press "◇" to enter the parameter window.

Icon	Name	Function
	Clear buzzer alarm	After entering, the display of “clear alarm success” means the current buzzer alarm is successful cleared. And the display of “clear alarm” means the alarm was never been preset, thus the operation does NOT have any function.
	Alarm setting	After entering, set the alarm parameters as follows: alarm mode, set point 1, set point 2, ON delay, OFF delay, etc.
	Built-in Diff. pressure sensor zero reset	After entering, if the product has a built-in pressure sensor, select "YES" to reset the zero point, or select "NO" to do nothing. If the product does not include a built-in pressure sensor, the function is NOT available.
	Trend chart settings	After entering, set the trend chart set point, range, mode and enable/disable.
	Display/unit setting	After entering, set the display mode, engineering unit, backlight brightness, refresh time, and input password to switch operation mode between user mode and factory mode, and select the alarm method.
	Calibration/communication setting	After entering, can operate pressure single-point calibration. “PV” is present measured value and “unit” is the engineering unit. For RS485 model, can set RS485 parameters, including address, baud rate, parity.
	Restore factory settings	After entering, select "YES" to restore the factory settings, or select "NO" to keep current settings.
	Return main menu Window	Press "◇ " to return to main menu window.

Note: Depending on the model selected, some of the above functions may not be available.

4. Parameter display window

When the parameter is flashing, press "◇", the displaying color will turn to green to indicate that it can be modified. Modify the parameter value with "▷" and "△", then confirm with "◇".

When the parameter flashes, move to the next or previous parameter with "▷" and "△ ".

If there is no any key operation in about 25-30s, it will automatically return to the main display window, the parameters will not be saved.

 When this icon flashes, press "◇" to confirm, then the parameters will be saved.

 When this icon flashes, press "◇" to confirm, then the parameters will NOT be saved.

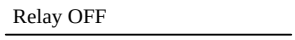
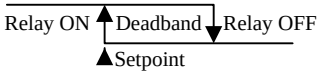
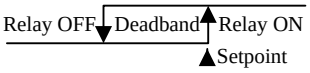
5. Alarm/Buzzer setting

Alarm parameters setting:

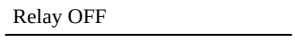
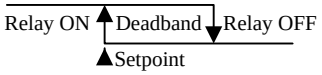
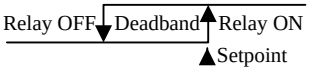
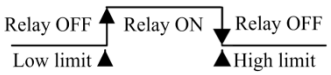
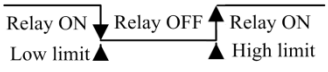
Item	R1	R2
Mode	parameter 1	parameter 6
Sp1	parameter 2	parameter 7
Sp2	parameter 3	parameter 8
On delay	parameter 4	parameter 9
Off delay	parameter 5	parameter 10

"R1" for relay 1, "R2" for relay 2. The parameters for different alarm mode are defined as follows (parameters 1-10):

5.1 Pointer alarm mode **Parameters and descriptions**

Mode Description		Sp1	Sp2	On delay	Off delay	Functional Diagram
0(NONE)	Cancel alarm function	N/A	N/A	N/A	N/A	
1(LOW)	Alarm actuate when input is lower than set point	Set point	Dead band	Actuate delay	Restore delay	
2(HIGH)	Alarm actuate when input is higher than set point	Set point	Dead band	Actuate delay	Restore delay	

5.2 Color circle alarm mode **Parameters and descriptions**

Mode Description		Sp1	Sp2	On delay	Off delay	Functional Diagram
0(NONE)	Cancel alarm function	N/A	N/A	N/A	N/A	
1(LOW)	Alarm actuate when input is lower than set point	Set point	Dead band	Actuate delay	Restore delay	
2(HIGH)	Alarm actuate when input is higher than set point	Set point	Dead band	Actuate delay	Restore delay	
3(IN)	Alarm actuate between high and low limits	Low limit	High limit	Actuate delay	Restore delay	
4(OUT)	Alarm actuate outside high and low limits	Low limit	High limit	Actuate delay	Restore delay	

Note: 1. If the engineering unit was changed, the alarm settings need to be re-set.

2. In the case of Mode 3 and Mode 4, the parameters should meet SP1<SP2.

3. The alarm settings is adjustable within the full range. After the full range was changed, the settings may be reset to be sure they are within the new full range.

6. Reset zero point of built-in pressure sensor

Press "◇", if the product has a built-in pressure sensor, select "YES" with "▷" and "△" to reset the zero point. or select "NO" to do nothing. If the product does not include a built-in pressure sensor, the operation is not available.

7. Trend chart setting

Item	SP	AV
DP	parameter 1	parameter 2
Mode	parameter 3	
Enable	parameter 4	

parameter 1: monitor point.

parameter 2: monitor zone.

parameter 3: trend chart display mode.

parameter 4: trend chart mode.

Note: The trend chart displays real-time pressure measured value. The gauge display has three available types: digital, pointer and trend chart display. Digital display: response time can be set (slow response); pointer display: filter processing is done during pointer rotation, not real-time pressure value (medium response); trend chart display: real-time pressure value (fast response).

8. Display/Engineering unit setting

Item	Value
Unit	parameter 1
DP Time	parameter 2
Bright	parameter 3
Lock	ON

Unlock	0000
Alarm Mode	parameter 4

parameter 1: can select: “Pa”, “kPa”, “mbar”, “mm wc”, “in wc”.

Note: If the unit is Pa or kPa, according to the principle of identification, the measured value 1kPa or more (including 1kPa) is displayed in kPa, and the value below 1kPa is displayed in Pa.

parameter 2: refresh time (0.5,1,2 or 5s, selectable).

parameter 3: LCD backlight brightness 30-100%, the more the brightness, the greater the power consumption and heat generated, which will affect the electronic performance.

parameter 4: Alarm mode, 0 is “color circle” and 1 is “pointer”.

9. Calibration/communication setting

Voltage/current output model:

Item	Value
Adj	Parameter 1
PV	Parameter 2
Unit	Parameter 3

parameter1: value of single point calibration, can be written.

parameter2: present value, can not be written.

parameter3: unit, can not be written here.

10. Restore factory settings

By pressing "◇" and selecting "YES" via "▷", "△", the factory settings will be restored. Select "NO" will not restore the factory settings.

11. Return main display Window

By pressing "◇", return to the main display window.

Modbus Register Table

Register address	R/W	Type	Definition	Remarks
40001,00000	R	Signed	Product code	SDP product code
…				
40003,00002	R/W	Signed	Alarm mode	0: color circle, 1: pointer
40004,00003	R	Signed	Diff. pressure	Pressure = Data / coefficient
40005,00004	R	Signed	Pressure coefficient	e.g. 1,10,100,1000,10000
40006,00005	R/W	Signed	Alarm set point(see the note following the table)	Can be set within the range
40007,00006	R/W	Signed	Alarm zone(see the note following the table)	Can be set within the range
40008,00007	R/W	Signed	Pressure unit	1:Pa, 2:kPa, 3:mbar, 4:mmwc, 5:inwc
…	…		…	…
40011,00010	R/W	Signed	Baud rate	9600 or 4800
40012,00011	R/W	Signed	Parity	0: NONE;1:ODD,2=EVEN
40013,00012	R/W	Signed	Stop	1or2
40014,00013	R/W	Signed	Slave address	Default 1
…				
40016,00015	R/W	Signed	Function register	Write (06 function) “21845” to reset default setting Write (06 function) “1234” to calibrate zero
…				
40017,00016	R	Signed	Negative range	0: Disable, 1: Enable
40018,00017	R	Signed	Range code	0-8, refer to the range table

40019,00018	R	Signed	Alarm output	0: Disable, 1: Enable
40020,00019	R	Signed	Transmitter output	0: Disable, 1: Voltage/current output 2: RS485 output
…				
40027,00026	R/W	Signed	Relay 1 operation mode	color circle: 0~4; pointer: 0~2 0: Off; 1: Relay activated below the set value. 2: Relay activated higher than set value. 3: Relay activated in the set region 4: Relay activated outside the set region
…				
40029,00028	R/W	Signed	Set point(mode1,2) or lower limit(mode3,4)	Relay 1 control parameters settings
40030,00029	R/W	Signed	Dead band(mode1,2) or higher limit(mode3,4)	
40031,00030	R/W	Signed	Relay 1 on delay(unit s)	
40032,00031	R/W	Signed	Relay 1 off delay(unit s)	
…				
40051,00050	R/W	Signed	Relay 2 operation mode	color circle: 0~4; pointer: 0~2 0: Off; 1: Relay activated below the set value. 2: Relay activated Higher than set value. 3: Relay activated in the set region 4: Relay activated outside the set region
…				
40053,00052	R/W	Signed	Set point(mode1,2) or lower limit(mode3,4)	Relay 2 control parameters settings
40054,00053	R/W	Signed	Dead band(mode1,2) or higher limit(mode3,4)	
40055,00054	R/W	Signed	Relay 2 on delay (unit s)	
40056,00055	R/W	Signed	Relay 2 off delay (unit s)	
…	…		…	…
40064,00063	R/W	Signed	LCD backlight brightness	range 300~1000
…	…		…	…
40068,00067	R/W	Signed	Channel 3 single point calibration	1k sensor: calibration input value=datax10 10k sensor: calibration input value=data
…	…		…	…
40083,00082	R/W	Signed	Display refresh time	Range 1-4, corresponding to 0.5/1/2/5

Note: The set point and alarm zone can be set within the range. When the engineering unit is Pa, the displayed value is the actual value; when the unit is kPa, the actual value is 1000 times of the display value. When the unit is mm wc, the actual value is 10 times of the display value. When the unit is mbar or in wc, the actual value is 100 times of the display value.

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