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Electronic pressure sensors
and pressure transmitters

Operating Instructions



TIANJIN SENTINEL ELECTRONICS CO.,LTD.
www.sentinel-china.com

Thank you for choosing the Sentinel SEH Series Programmable Display Integrated Pressure Sensor. This manual mainly describes the specifications, features, usage, and accessories of the Pressure sensor. Please read this manual carefully before using the product. Our company reserves the right to continuously improve the product. For the latest version of the documentation, please refer to the Sentinel company website (www.sentinel-china.com), as updates will not be separately notified.

1 Safety Instructions

- Please read and follow these safety precautions before installing, operating, and maintaining the product.
- To ensure personal and equipment safety, please follow the operating instructions or technical documentation to ensure that the product is suitable for your application range and is not subject to any limitations.
- This product should be used in an environment that meets the design specifications. Failure to do so may result in malfunctions, and any issues arising from non-compliance are not covered by the warranty.
- We are not liable for any personal injury or property damage caused by improper operation. Warranty claims will be void if the equipment is improperly installed or used.

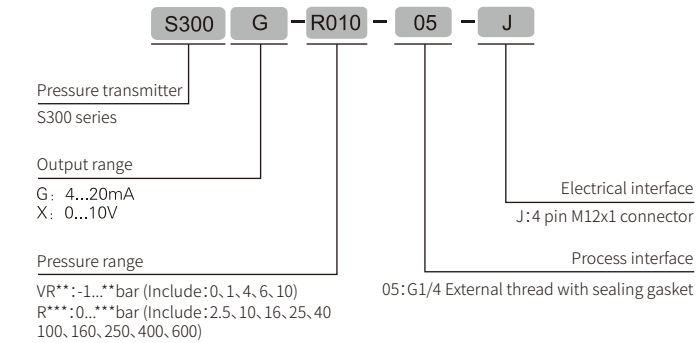
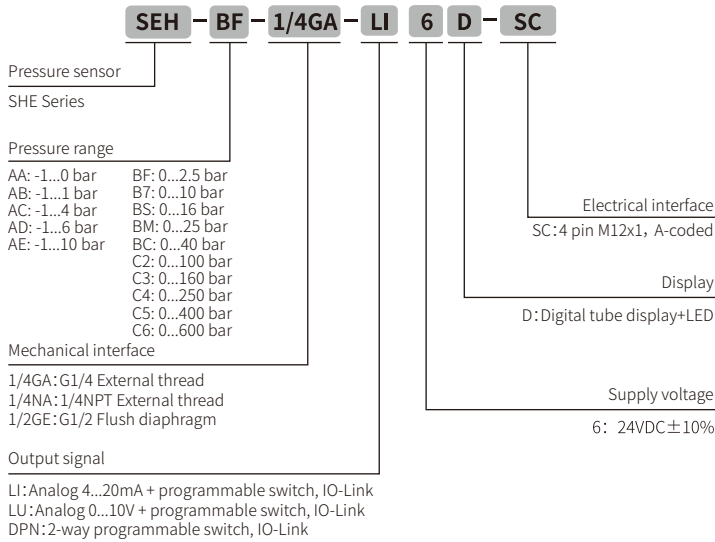
2 Product Overview

Pressure is one of the most commonly measured parameters in the industrial field. Whether it is the system pressure in the hydraulic system, the pipeline pressure in the cooling circuit, or the pressure parameter in the tank, it needs to be detected and measured at all times. Sentenya's pressure sensors have a variety of output signals and pressure measurement ranges. Among them, the SEH series pressure sensors have IO-Link function, which can meet the intelligent needs of Industry 4.0.

3 Features and Functions

- IO-Link Smart Pressure Sensor
- 4-digit large digital tube display, mirroring, semi-transparent design
- The upper part of the housing can be rotated 300°
- Normally open/normally closed, PNP/NPN/push-pull, hysteresis/window configurable
- Switching signal/analog signal, switching signal/IO-Link can be set
- Sensor parameters can be set via buttons and IO-Link
- The starting and ending points of the analog signal can be set
- The interface is M12 A code 4-pin
- Key lock function, simple key menu operation
- The display panel adopts an intergrated housing
- The main body of the housing is made of stainless steel

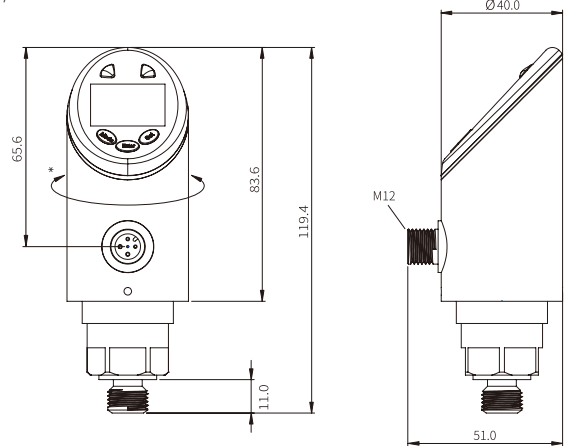
4 Selection Guide



5 Dimensions

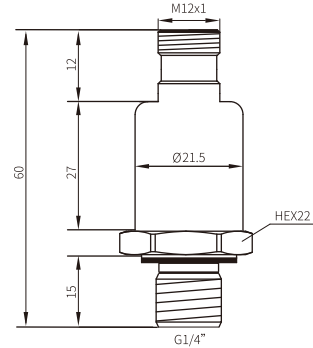
Unit:mm

5.1 G1/4 External thread



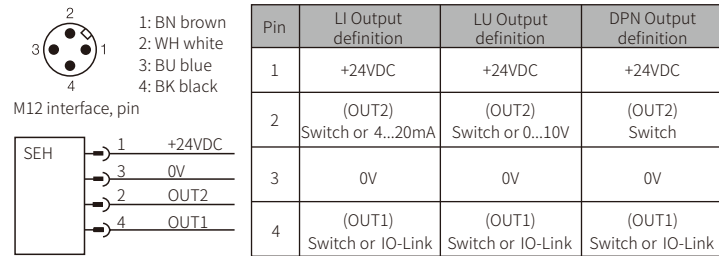
*The upper part of the housing can be rotated approximately 300°.

5.2 Pressure transmitter

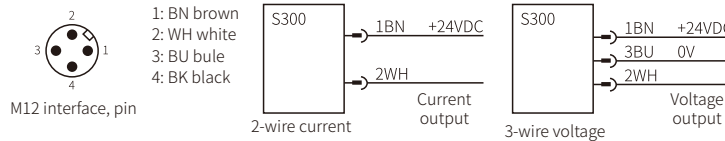


6 Wiring Diagram

6.1 Sensor wiring instructions



6.2 Transmitter wiring instructions

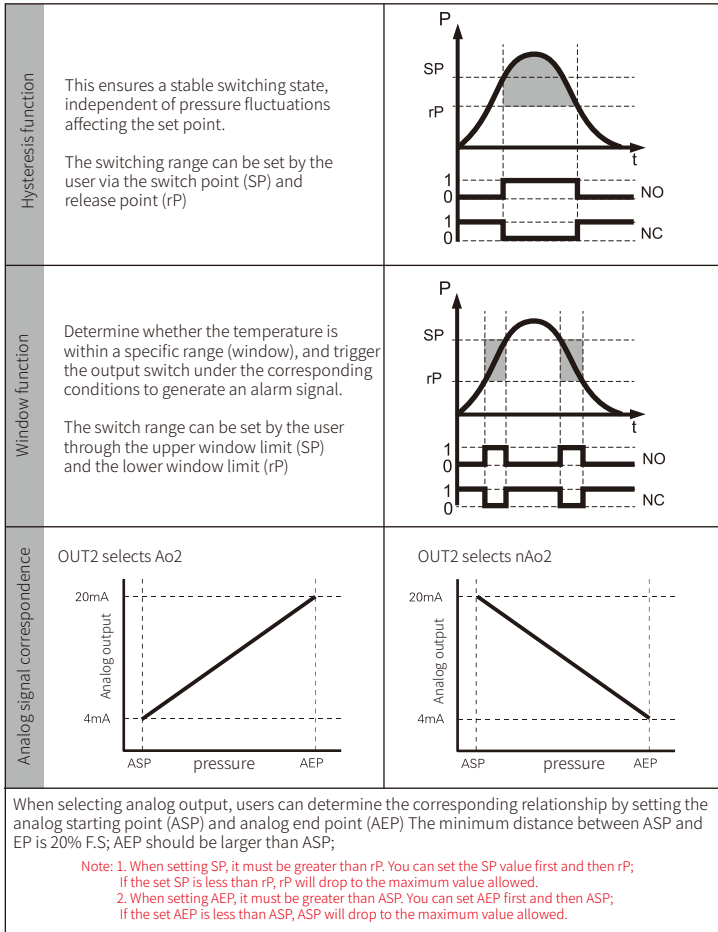


7 Installation Instructions

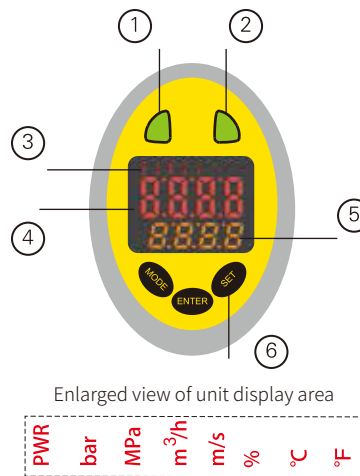
Before installing and removing equipment, make sure that the system is not under any pressure. Insert the sensor into the G1/4 process connection and tighten securely. The recommended tightening torque can be found in the table below.

Pressure range (unit: bar)	Tightening torque (unit: Nm)
-1...400	25...35
600	30...50
Depends on lubrication, sealing, and pressure load.	

8 Description of switching signal data and analog signal data output



9 Display and Operation Panel



	Definition	Status Indication
1	Output Status Indicator Light OUT1	Green On: The corresponding switch pin is turned on for output Off: The corresponding switch pin turns off the output Note: This LED indicates the output status and is not an alarm light.
2	Output Status Indicator Light OUT2	
3	Unit display area PWR	Red On: Power supply is normal Off: Power supply is abnormal Flashing: IO-Link is communicating normally
	Unit display area bar MPa	Red On: Represents the unit of the current digital tube display data Off: Not the current unit
4	Big digital tube	Red Display sensor measurement data "- - -" is displayed to indicate invalid data
5	Small digital tube	Orange Display L o c Indicates that the key lock is turned on
6	Setting button	

Note: The display area adopts a semi-transparent design. It can be seen when the LED is on, but not when it is off; other unused units are not visible on the sensor.

10 Key Operation

10.1 Simple menu operation

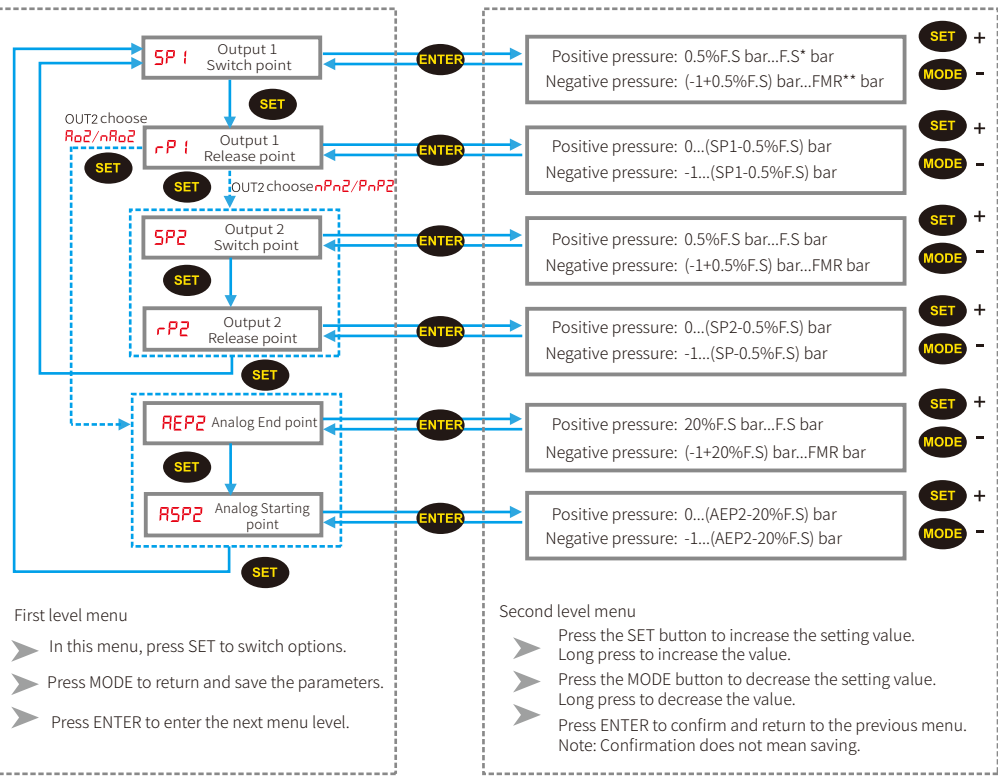


Normal display mode

➤ In this mode, press the MODE button for more than 2 seconds to enter the first level menu

➤ In this mode, press the ENTER key + SET key simultaneously for more than 6 seconds to turn the key lock on or off

When turned on, the small digital tube display area will display **LoC**



10.2 Programming menu operation

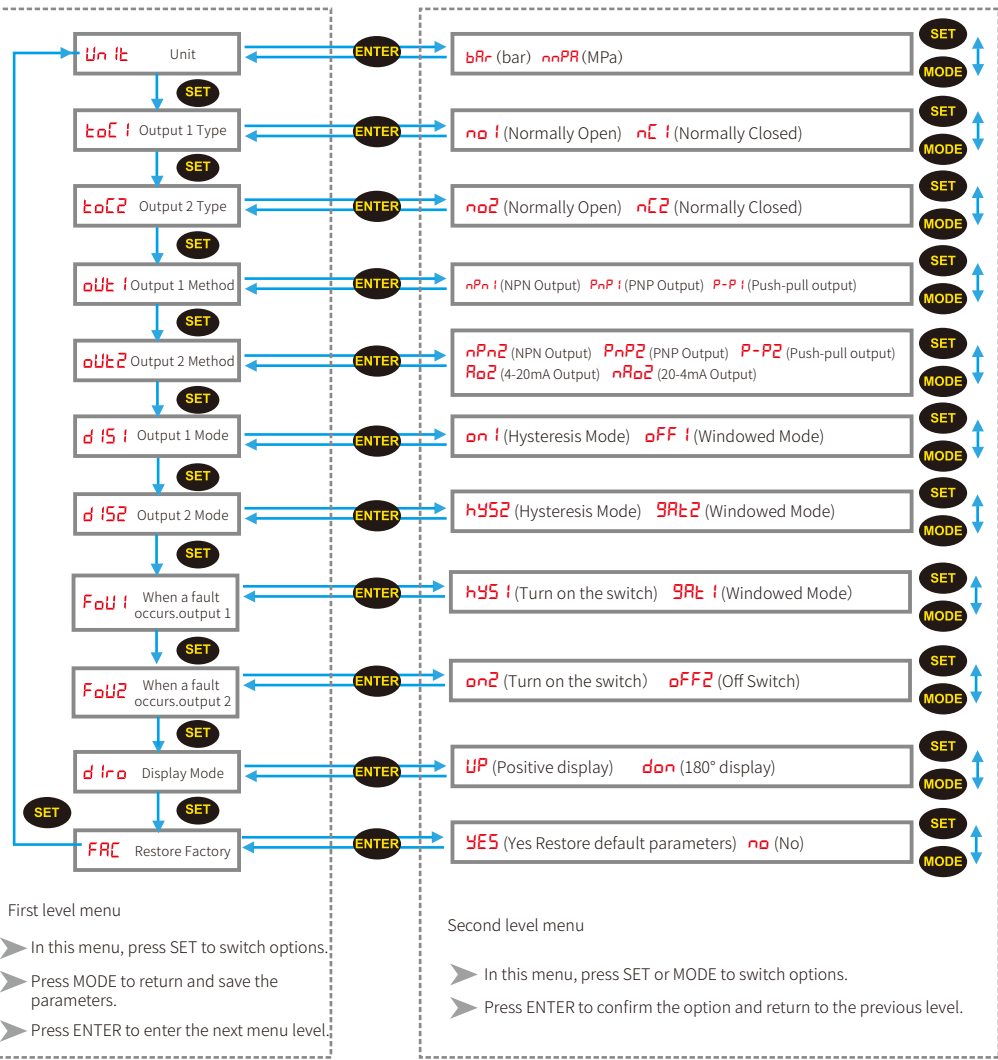


Normal display mode

➤ In this mode, press the MODE button for more than 2 seconds to enter the first level menu

➤ In this mode, press the ENTER key + SET key simultaneously for more than 6 seconds to turn the key lock on or off

When turned on, the small digital tube display area will display **LoC**



Note: After entering the simple or programming menu, if there is no key operation within 3.5 minutes, it will automatically return to the normal display mode without changing the setting parameters;
For the switch output mode, NPN controls the 0V switch, providing a low level without a high level; PNP controls the 24V switch, providing a high level without a low level;
P-P push-pull is a combination of NPN and PNP;

*F.S: Measuring range full scale (e.g. measuring range -1...6Bar, then F.S=7)

**FMR: Final value of the measuring range (e.g. measuring range -1...6Bar, then FMR=6)

11 IO-Link Parameter

11.1 Parameter data / Request data /Indexing Service(ISDU indexed service data unit)

Index	Subindex	Parameter name	Length	Permissions	Describe
0x02_2	0	System Commands	1Byte	Write	0x80 128 Reset device 0x82 130 Restore factory settings
0x10_16	0	Manufacturer's name	8Byte	Read	Sentinel
0x11_17	0	Manufacturer Description	41Byte	Read	Sentinel Industrial Ethernet manufacturer
0x12_18	0	Product name	17Byte	Read	SEH-xxx-xxx-SC
0x13_19	0	Product ID	8Byte	Read	19867301
0x14_20	0	Product Description	23Byte	Read	Pressure sensor io-link
0x15_21	0	Serial-Number	10Byte	Read	1986730101
0x16_22	0	Hardware version	8Byte	Read	HW-V0.01
0x17_23	0	Software version	8Byte	Read	FW-V0.01
0x18_24	0	Apply Tags	maximum 32Byte	Read Write	ApplicationSpecificTag is used to mark the device in the application This item is defined in the IODD file, Included in the DataStorage (DS)
0x19_25	0	Function Label	maximum 32Byte	Read Write	FunctionTag is a special tag for device functions, including This item is not defined in the IODD file, It can be set directly through Index.
0x1A_26	0	Local Tags	maximum 32Byte	Read Write	LocationTag is a special tag used for local devices, including DS This item is not defined in the IODD file, It can be set directly through Index.
0x24_36	0	Device status	1Byte	Read	0:The equipment is operating normally; 1:Need to maintain; 2:Running incorrect environment or parameters; 3:Device abeyance; 4:Device failed to run;

Index	Subindex	Parameter name	Length	Permissions	Ranges
0x1F4_500	0	Unit	1Byte	Read Write	0: bar 1: Mpa
0x1F5_501	0	toC1 Output 1 Type	1Byte	Read Write	0: NO Normally open 1: NC Normally Closed
0x1F6_502	0	toC2 Output 2 Type	1Byte	Read Write	0: NO Normally open 1: NC Normally Closed
0x1F7_503	0	oUt1 Output 1 method	1Byte	Read Write	0: NPN output 1: PNP output 2: P-P push-pull output
0x1F8_504	0	oUt2 Output 2 method	1Byte	Read Write	0: NPN output 1:PNP output 2:P-P push-pull output 3:Ao(4-20mA) 4:nAo(20-4mA)
0x1F9_505	0	diS1 Output 1 Mode	1Byte	Read Write	0: hyS hysteresis mode 1: gAt window mode
0x1FA_506	0	diS2 Output 2 Mode	1Byte	Read Write	0: hyS hysteresis mode 1: gAt window mode
0x1FB_507	0	diro Display Mode	1Byte	Read Write	0: UP positive display 1: don 180°display
0x1FC_508	0	Lock Key lock	1Byte	Read Write	0: Unlocked 1: Key locked
0x1FD_509	0	When FoU1 fails, output mode 1	1Byte	Read Write	0: oFF1(Off switch) 1: on1(Turn on the switch)
0x1FE_510	0	When FoU2 fails, output mode 2	1Byte	Read Write	0: oFF2(Off switch) 1: on2(Turn on the switch)
0x258_600	0	SP1 Output 1 Switch point	2Byte	Read Write	SP1 should be greater than rP1 otherwise it will be rejected
0x259_601	0	rP1 Output 1Release point	2Byte	Read Write	rP1 should be less than SP1 or it will be rejected
0x25A_602	0	SP2 Output 2 Switch point	2Byte	Read Write	SP2 should be greater than rP2 or it will be rejected
0x25B_603	0	rP2 Output 2 Release point	2Byte	Read Write	rP2 should be less than SP2 or it will be rejected
0x25C_604	0	ASP2 Analog Starting point	2Byte	Read Write	ASP2 should be smaller than AEP2 or it will be rejected
0x25D_605	0	AEP2 Analog End point	2Byte	Read Write	AEP2 should be greater than ASP2 otherwise it will be rejected

11.2 Error code

32785 / 0x8011 : Invalid index 32819 / 0x8033 : The length of the written parameter exceeds the defined length
32786 / 0x8012 : Invalid subindex 32820 / 0x8034 : The length of the written parameter is less than the defined length
32816 / 0x8030 : The written parameter exceeds the settable range

11.3 General information

The sensor has an IO-Link communication interface and requires a module with IO-Link function (IO-Link master) to operate. For more detailed information about IO-Link, please visit the company website.

12 FAC Default Parameter

12.1 Positive pressure

Parameter List	SP1	rP1	SP2	rP2	REP2	ASP2	Unit	tOC1	tOC2
FAC Default Value	25%F.S	23%F.S	75%F.S	73%F.S	F.S	0	bar	no1	no2
Parameter List	oUt1	oUt2	dIS1	dIS2	FoU1	FoU2	dIro	Loc	
FAC Default Value	PnP1	PnP2	hyS1	hyS2	oFF1	oFF2 *	UP	0:unlock	

12.2. Negative pressure

Parameter List	SP1	rP1	SP2	rP2	REP2	ASP2	Unit	tOC1	tOC2
FAC Default Value	25%FMR	23%FMR	75%FMR	73%FMR	FMR	-1	bar	no1	no2
Parameter List	oUt1	oUt2	dIS1	dIS2	FoU1	FoU2	dIro	Loc	
FAC Default Value	PnP1	PnP2	hyS1	hyS2	oFF1	oFF2 *	UP	0:unlock	

12.3. -1...0bar

Parameter List	SP1	rP1	SP2	rP2	REP2	ASP2	Unit	tOC1	tOC2
FAC Default Value	-0.75	-0.77	-0.25	-0.27	0	-1	bar	no1	no2
Parameter List	oUt1	oUt2	dIS1	dIS2	FoU1	FoU2	dIro	Loc	
FAC Default Value	PnP1	PnP2	hyS1	hyS2	oFF1	oFF2 *	UP	0:unlock	

* When [oUt2] selects analog signal output, In case of an internal fault, The output signal will run according to the parameter settings in [FoU2]

	FoU2=00	FoU2=0FF
[oUt2] =Ao2	20mA	4mA
[oUt2] =nAo2	4mA	20mA

13 IO-Link Process Data Mapping

BYTE	BYTE0							
BIT	15	14	13	12	11	10	9	8
DATA	Pbit13	Pbit12	Pbit11	Pbit10	Pbit9	Pbit8	Pbit7	Pbit6
BYTE	BYTE1							
BIT	7	6	5	4	3	2	1	0
DATA	Pbit5	Pbit4	Pbit3	Pbit2	Pbit1	Pbit0	OUT2	OUT1

Note:
Pbit represents 14-bit pressure data. The pressure data is a valid symbol number in bar, and the value is "W" times the actual pressure. For specific magnification, see Table 1
OUT1 and OUT2 represent the output status; use the right shift instruction to remove OUT1 and OUT2 to obtain 14 times the pressure data

表1

Parameter name Pressure range	Magnification W	SP1 Output 1 Switch point	rP1 Output 1 Release point	SP2 Output 2 Switch point	rP2 Output 2 Release point	ASP2 Analog Starting point	AEP2 Analog end point
-1...0 bar	1000	-995...0	-1000...-5	-995...0	-1000...-5	-1000...-200	-800...0
-1...1 bar	1000	-990...1000	-1000...-990	-990...1000	-1000...990	-1000...600	600...1000
-1...4 bar	1000	-975...4000	-1000...3975	-975...4000	-1000...3975	-1000...3000	0...4000
-1...6 bar	1000	-965...6000	-1000...5965	-965...6000	-1000...5965	-1000...4600	400...6000
-1...10 bar	100	-95...1000	-100...995	-95...1000	-100...995	-100...780	120...1000
0...2.5 bar	1000	12...2500	0...2488	12...2500	0...2488	0...2000	500...2500
0...10 bar	100	5...1000	0...995	5...1000	0...995	0...800	200...1000
0...16 bar	100	8...1600	0...1592	8...1600	0...1592	0...1280	320...1600
0...25 bar	100	12...2500	0...2488	12...2500	0...2488	0...2000	500...2500
0...40 bar	100	20...4000	0...3980	20...4000	0...3980	0...3200	800...4000
0...100 bar	10	5...1000	0...995	5...1000	0...995	0...800	200...1000
0...160 bar	10	8...1600	0...1592	8...1600	0...1592	0...1280	320...1600
0...250 bar	10	12...2500	0...2488	12...2500	0...2488	0...2000	500...2500
0...400 bar	10	20...4000	0...3980	20...4000	0...3980	0...3200	800...4000
0...600 bar	10	30...6000	0...5970	30...6000	0...5970	0...4800	1200...6000