压力变送器

PRESSURE TRANSMITTER

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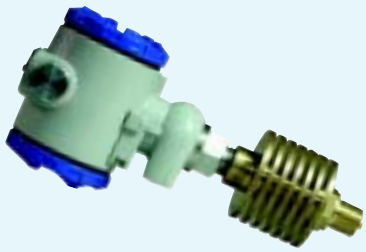
产品目录 Index



TY – PB 压力变送器

TY-PB Pressure Transmitter

一、概述

选用进口扩散硅压力芯片，经过精密的补偿技术、信号处理技术。转换成标准的电流信号输出，可直接与二次仪表以及计算机控制系统连接，实现生产过程的自动检测和控制。可广泛应用于各种工业领域中的气体、液体的压力检测。

I General Description

We adopt imported diffusive silicon chip, with precision compensation technology and signal processing technology, the pressure could be transformed into output of standard current signal, and it could be directly connected with second meter and computer control system to realize automatic test and control during production process. It is widely used to measure the pressure of gas and liquid in various industrial fields.

二、特点

1、高准确度、高稳定性，选用进口原装传感器，对整机在使用温度范围内的综合性温度漂移，非线性进行精细补偿，因此在使用范围内非线性小，温度稳定性好。
2、可靠的机械保护和防爆保护，适用于各种恶劣环境。
3、可用于测量粘稠，结晶及腐蚀性介质。
4、4~20mADC 标准电流信号输出，二线制工作。
5、体积小、重量轻，安装、调试、使用方便。

II Features

1.It has high accuracy and reliability. With adoption of imported sensor, precision and nonlinear compensation on complex temperature drift of the transmitter within temperature range could be realized. Therefore it has small non-linearity and high reliability within application range.
2.With reliable mechanical protection and explosion-proof protection, suitable with various worse environment
3.It could be used to measure media with high viscosity, crystallization and corrosion.
4.With output of 4~20mA D.C. standard current signal of double wire system
5.With small volume and weight, convenient for installation, debugging and operation

三、技术指标

III.Technical Indices

测量范围 Measuring Range	0~35MPa	过载极限 Overloading Limit	1.5~3 倍 Times
精度 Accuracy	0.5 级 Class	供电电压 Power Voltage	12~36VDC
负载电阻 Loading Resistance	⩽ 750 Ω	输出信号 Output Signal	4~20mA
使用环境温度 Environment Temperature	-10~+80℃	长期稳定性 Long-term Stability	0.3%F.S/ 年 Year
使用环境湿度 Environment Humidity	⩽ 85%	绝缘电阻 Insulation Resistance	＞ 40M Ω
抗震 Shock Resistance	10g 50Hz	外壳材料 Outer Shell Material	铝合金 Aluminum Alloy
过程连接方式 Process Connection Way	1/2NPT;M20 × 1.5		

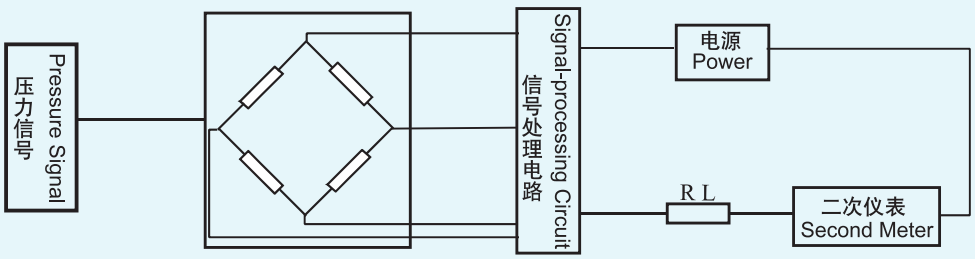



四、工作原理：

变送器由扩散压力芯片和信号处理电路组成，当外加压力时，将引起压力芯片的输出电压发生变化，再经信号处理电路将其放大，并转换为与输入压力成线性对应关系的标准电流输出信号。

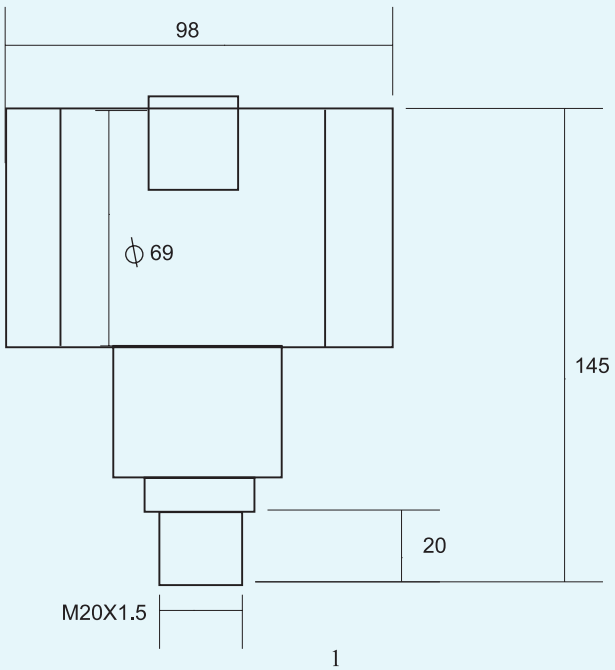
Ⅳ.Operation Theory

It is composed of diffusive silicon chip and signal processing circuit. Adding pressure on it from outside results in output voltage change of pressure chip. After being amplified through signal-processing circuit, it is transformed into output signal of standard current in linear relation with input pressure.



五、结构

Ⅴ. Structure:





六、型号选择

VI.Type Naming

TY－PB　压力变送器　　TY-PB　Pressure Transmitter

代号	压力类型	Code	Pressure Type
A	绝对压力	A	Absolute Pressure
G	表压	G	Meter Pressure
S	密封表压（在标准大气压力下测得）S		Pressure of Sealed Meter (tested under standard air pressure)

代号	测量范围	Code	Measuring Range
1	0-5KPa-35KPa	1	0-5KPa-35KPa
2	0-35KPa100KPa	2	0-35KPa100KPa
3	0-50KPa-200KPa	3	0-50KPa-200KPa
4	0-100KPa-350KPa	4	0-100KPa-350KPa
5	0-200KPa-700KPa	5	0-200KPa-700KPa
6	0-500KPa-2.1KPa	6	0-500KPa-2.1KPa
7	0-1KPa-3.5KPa	7	0-1KPa-3.5KPa
8	0-3KPa-7KPa	8	0-3KPa-7KPa
9	0-7KPa-21KPa	9	0-7KPa-21KPa
10	0-15KPa-35KPa	10	0-15KPa-35KPa

代号	精度等级	Code	Accuracy Class
A	0.1%F.S	A	0.1%F.S
B	0.25%F.S	B	0.25%F.S
C	0.5%F.S	C	0.5%F.S

代号	接口方式	Code	Connection
1	M20 × 1.5	1	M20 × 1.5
2	1/2NPT	2	1/2NPT

代号	防爆方式	Code	Explosion-proof Type
N	普通不防爆	N	Without Explosion-proof Performance
I	本安防爆	I	Intrinsic Safety Explosion-proof Type
E	隔离防爆	E	Explosion-separation Type
X	带现场显示	X	With on-the-spot Display
H	耐高温	H	Heat Resistance

TY－PB　G　1　B　1　N　　选型举例　Example




TY－YB 液位变送器

TY-YB Liquid Level Transmitter

一、概述

选用进口扩散硅压力芯片制成，当外界液位发生变化时，压力作用在不锈钢隔离膜片上，通过隔离硅油传递到扩散硅压力敏感元件上引起电桥输出电压变化，经过精密的补偿技术、信号处理技术，转换成标准的电流信号。该电流信号的变化正比于液位的变化。

I General Description

We adopt imported diffusive silicon pressure chip for it. When liquid level of tested media changes, the pressure has effect on separation diaphragm of stainless steel, and is passed onto pressure-sensitive diffusive silicon component through separation silica oil, which results in output voltage change of electrical bridge. With precision compensation and signal processing technology, it is transformed into standard current signal. The change of current signal is in direct relation with that of liquid level.

二、特点

1、使用被测介质广泛，可测油、水及与316不锈钢兼容的糊状物，具有一定的防腐能力。
2、高准确度、高稳定性，选用进口原装传感器，线性好，温度稳定性高。
3、体积小、重量轻，安装、调试、使用方便。
4、不锈钢全封闭外壳，防水好。
5、压力传感器直接感测被测液位压力，不受介质起泡、沉积的影响。

II Features:

1.With wide application, suitable with oil, water, and paste compatible with stainless steel 316, and with certain corrosion-resisting performance
2.With high accuracy and reliability, adoption of imported sensor with good linearity and high thermal reliability
3.With small volume and weight, convenient for installation, debugging and operation
4.Wholly sealed shell of stainless steel with good water-proof performance
5.Liquid level pressure of tested media is directly measured with pressure sensor free from effect of bubble or precipitation.

三、技术指标

III.Technical Indices

测量范围 Measuring Range	0.5~100 m	通电电缆材料 Power Cable Material	聚氯乙烯 PVC
精度 Accuracy	0.5 级 Class	供电电压 Power Voltage	12~36VDC
负载电阻 Loading Resistance	⩽ 750 Ω	输出信号 Output Signal	4~20mA
使用环境温度 Environment Temperature	0~70℃	长期稳定性 Long-term Stability	0.3%F.S/ 年 Year
外壳保护等级 Protection Class of Outer	IP65	温度漂移 Shell Temperature Drift	0.3%F.S℃
外壳材料 Outer Shell Material	铝合金 Aluminum Alloy	绝缘电阻 Insulation Resistance	>20M Ω
直径 Diameter	34mm		

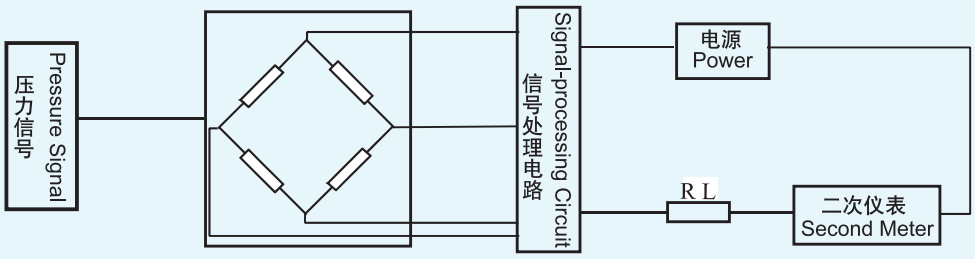


四、工作原理

当被测介质（液体）的压力作用于传感器时，压力传感器将压力信号转换成电信号,经差分放大和输出放大器放大，最后经V／A电压电流转换成与被测介质（液体）的液信压力成线性对应关系的4~20MA标准电流输出信号。

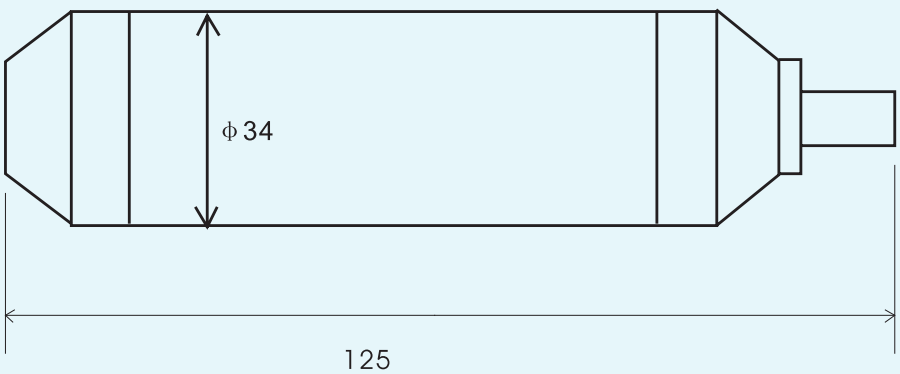
Ⅳ Operation Theory:

The pressure of tested media (liquid) has effect on the sensor. With the sensor, pressure signal is transformed into electrical signal. After differential amplification and being amplified through output amplifier, and via V/A switch, it is transformed into 4~0mA output signal of standard current in linear relation with liquid level pressure of tested media (liquid).



五、外型尺寸

Ⅴ Figure & Size






六、型号选择　　VI.Type Naming

TY－YB　液位变送器	TY-YB　Pressure Transmitter

代号	现场指示形式	Code	On-the-spot Indication Way
1	现场无指示	1	Without On-the-spot Indication
2	100%等分刻度指示	2	100% Equal Division Dial Indication
3	液晶显示	3	LCD

代号	测量范围	Code	Measuring Range
1	0-1m	1	0-1m
2	0-5m	2	0-5m
3	0-10m	3	0-10m
4	0-20m	4	0-20m
5	0-35m	5	0-35m
6	0-70m	6	0-70m
7	0-210m	7	0-210m

代号	精度等级	Code	Accuracy Class
B	0.25%F.S	B	0.25%F.S
C	0.5%F.S	C	0.5%F.S

代号	传感器结构	Code	Sensor Structure
1	节流型	1	Throttle Type
2	防阻塞型	2	Block-proof Type

代号	防爆方式	Code	Explosion-proof Type
N	普通不防爆	N	Without Explosion-proof Performance
I	本安防爆	I	Intrinsic Safety Explosion-proof Type

代号	结构形式	Code	Structure
1	投入式	1	Insert Type
2	直杆式	2	Straight Pole Type
3	螺纹式	3	Thread Type
4	法兰式	4	Flange Type
5	防腐式	5	Corrosion-resisting Type

TY－YB	1	1	B	1	N	1	选型举例	Example



第一部分　一般介绍

Unit One General Introduction

TY－1151系列电容式变送器是本公司引进国外先进制造技术和设备，并吸取了国外同类产品的先进工艺，变送器电子元器件和关键零部件均选用国际上高质量产品，并以优惠的价格供国内外用户，深受广大用户欢迎。

本样本对TY－1151系列电容式变送器的共同特性作一般的介绍，包括产品型号命名、产品系列、主要特点、工作原理、功能参数，如果要详细了解，请参考TY－1151系列各种型号的使用说明书。

TY-1151 series of capacitance type transmitters are produced with import of overseas advanced manufacturing technology and equipments.

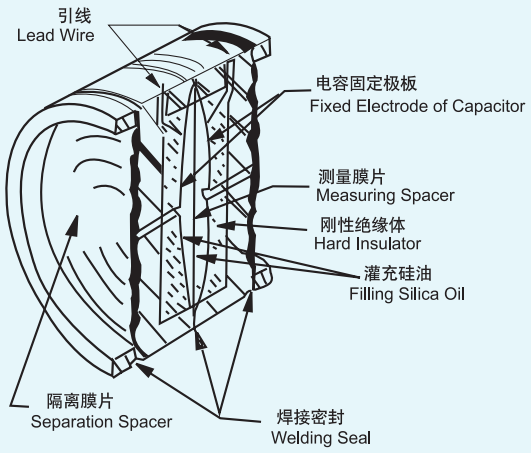
General introduction on common characters of TY-1151 series of pressure transmitters will be made in the catalogue, including type naming, specification, main features, operation theory and functional parameters. If you want more information in detail, please make reference to individual manuals of the series.

一、工作原理

被测介质的两种压力通入高、低两压力室，作用在δ元件（即敏感元件）的两侧隔离膜片上，通过隔离膜片和δ元件内的填充液传到预张紧的测量膜片两侧。测理膜片与两侧绝缘体上的电极各组成一个电容器，在无压力通入或两压力均等时测量膜片处于中间位置，两侧两电容器的电容量相等，当两侧压力不一致时，致使测量膜片产生位移，其位移量和压力差成正比，故两侧电容就不等，通过检测，放大转换成4－20mA的二线制电流信号.压力变送器和绝对压力变送器的工作原理和差压变送器相同，所不同的是低压室压力是大气压或真空　元件的结构图见图1

I Operation Theory

The two different pressure of tested media enters pressure rooms and has effect on separation spacer on both sides of δ component (sensitive component). They are sensed by measuring spacer through separation spacer and filling oil inside δ component. Measuring spacer and electrodes of the insulator on both sides form two capacitors respectively. In time of no pressure being added or equality of pressure, measuring spacer lies in the middle and capacitance of two capacitors on both sides remains equal. Pressure difference results in displacement of measuring spacer, and displacement size is in direct ratio to pressure difference. Thus, capacitance on both sides remains different. After being tested, it is amplified and transformed into D.C. 4~20mA signal of double wire system. Operation theory of pressure transmitter and absolute pressure transmitter remains the same as that of differential pressure transmitter, the difference lies in that the pressure in low-pressure room is barometric pressure or in vacuum status. Please see Figure 1for the structure of　component.



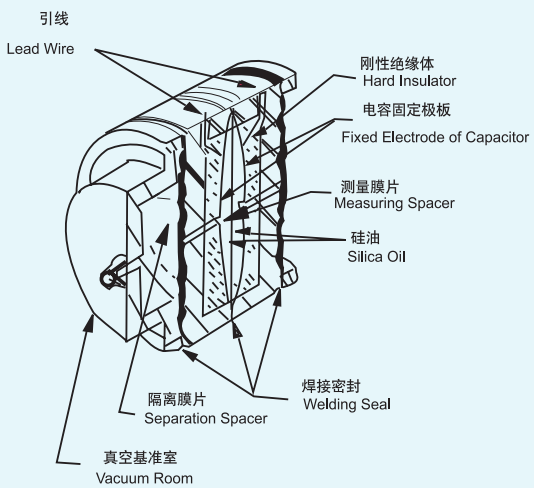


图1　元件的结构图见　　Figure 1 Structural Figure of　Component




二、主要特点

本公司生产的TY-1151系列电容式变送器有下列特点

1、品种齐全、精度高、稳定性好，价格比同类进口仪表便宜;

2、采用二线制的工作方式;

3、敏感元件采用固体化结构，小型坚固，抗振能力强;

4、量程和零位可要外部连续调节;

5、主要部件可与1151同类产品进行互换;

6、关键零部件、电子元件及接插件均采用国际上高质量产品。本系列产品可靠性好，质量稳定，故障率少。

7、正迁移可达500%，负迁移可达600%（最小量程时）;

8、阻尼可调;

9、LCD3-1/2位液晶显示指示器和指针式指示表。

从表6~8可知，本公司生产的TY-系列电容式变送器品种齐全，用户可按不同需要任意选用，自微差压至大差压，从低压力至高压力、绝对压力、高静压差压。TYDP/GP型变送器带上各种远传装置后，就成为远传式差压、压力变送器。采用ANSI标准，管道尺寸3″，法兰等级150磅（2.5MPa），插入筒式远传装置，插入筒长度一般为50、100、150mm，用户可根据需要选择其长充。TY法兰式液位变送器一般是本体工，只要用户需要也可提供远传结构，同样对远传差压变送器用户也右选用一侧远传装置，毛细管单根长度为1.5、3、4.5、6、7.5m供用户选择。接液材料除316L不锈钢外，还有哈氏C合金，蒙耐尔合金、钽，可使用于各种腐蚀介质场合。

TY-1151DP/GP系列变送器设计精巧，安装使用和调校都很方便简单，电气外壳采用二腔结构，即接线端子和放大器线路各占一腔，密闭性较好，具有防爆和全天候结构，放大器线路有反向极性保护，防止因电源极性接错而损坏变送器。由于该变送器工作的容积变化小于0.16cm^3。因此不需为补偿容积变化而增加冷凝器或液位筒。

本厂生产的TY系列变送器，可配指针式电流表0~100%作现场输出指示，也可配数字显示器作现场输出指示。该显示器为3-1/2位LCD液晶显示，读数精度 ± 0.5% ± 1字，由于显示器中的A/D转换器，放大器，液晶片等均采用高质量器件。因此精确、耐用可靠。用户可根据自行的习惯从优选择。

IIMain Features:

TY-1151 series of capacitance type transmitter produced by us have the following features:

1.Full category, high accuracy, good stability and competitive price

2.Operation in double-wire system

3.Solid structure for sensor, small and strong, with better shock-resistant performance

4.Continual setting of measuring range and zero could be realized from outside.

5.Major components are exchangeable with similar products.

6.High quality of key parts, electronic components and joint parts ensure high reliability and stability.

7.Measuring range could be expanded by 500% or reduced by 600% (Min. measuring range).

8.Adjustable damping

9.3 digits LCD indicator and dial indicator

From Form 6~8, we know that TY series of capacitance type transmitters have full category. The user may freely select them for minute or big differential pressure, low or high pressure, absolute pressure, or high static differential pressure. With remote transmission device attached, TYDP/GP type transmitters become remote transmission type differential or general pressure transmitters. We adopt ANSI standard, 3″ tube, and 150 pounds flange (2.5Mpa) for them. The insert tube length generally is 50mm, 100mm or150mm for insert tube remote transmission device, the user may select them as demand. Generally, TY flange type liquid level transmitter is of individual structure, we also provide user with that with remote transmission device. For differential pressure transmitter with remote transmission device, the user also may select that with remote transmission device on one side. Single capillary length includes 1.5, 3, 4.5, 6, 7.5m for user selection. Liquid-contacting material includes H. alloy, monel alloy, and tantalum for environment with corrosive media excluding 316L stainless steel.

The design of TY-1151 DP/GP series of transmitters is excellent, and installation and rectification is very simple and convenient. The electric shell is of double room structure that wiring terminals and amplifier circuit occupy one room respectively with good sealing, explosion-resistant and weather-proof performance. The amplifier circuit has reverse pole connection protection to prevent transmitter from damage due to wrong power pole connection. It is unnecessary to add condenser or liquid level tube for compensation on volume change because transmitter volume change in operation is less than 0.16 cm^3.

TY series of transmitters produced by us could match with dial type current meter 0~100% or digital monitor for output display on the spot. The monitor is of 3-1/2digits LCD with reading accuracy of ± 0.5% ± 1 digit. As we adopt high quality components for A/D switch, amplifier, liquid crystal unit, etc. in the monitor, the transmitter is accurate, durable and reliable. The user may freely select them as usage custom.

负载特性图

三、功能规范

1、使用对象：液体、气体和蒸汽

2、测量范围：见表 1

3、输出信号:4~20mA DC。(特殊可为四线制0~10mA DC 输出)

4、供电电源：供电电源为 12~45V DC，带 LCD 数字显示器为 15~45V DC，一般工作电源为 24V DC。

5、负载：与供电电源有关。在某一电源电压时带负载能力见图 2

负载阻抗 R 与电源电压 V 关系式为 R ⩽ 50（V-12）Ω

III Function & Specifications:

1. Tested Media: liquid, gas or vapor
2. Measuring Range: see Form1
3. Output Signal: D.C. 4~20mA (or D.C. 0~10mA signal of four wire system)
4. Power Supply: D.C.12~45V, or D.C.15~45V for that with LCD digital indicator, D.C.24V for general operation power
5. Loading Capacity: It concerns power supply. Please see Figure 2 for loading capacity with power supply of certain voltage.

Relation formula between loading impedance R and power voltage V:R ⩽ 50（V-12）Ω

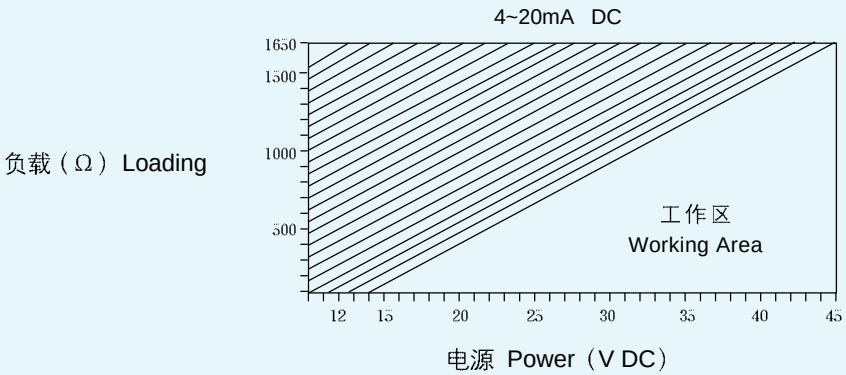


图2 负载特性图 Figure 2 Loading Character

6、量程和零位：外部连续可调。

7、正负迁移:

差压变送器：最大正迁移量为测量范围上限值（URL 以下同）与测量量程之差;
最大负迁移为 URL

压力变送器：最大正迁移量为 URL 与测量量程之差;
最大负迁移量不大于大气压。

绝对压力变送器：最大正迁移量为URL与测量量程之差;
无负迁移。

8、环境温度范围：一般变送器 -25℃~+70℃;带现场显示器 -15℃~+70℃;

9、过载压力：不超过规定压力的 1.5 倍，变送器不会损坏。

10、贮藏温度：-10℃~+55℃;

11、阻尼时间：在 0.2~1.67 秒内连续可调，微、低差压和法兰变送器，阻尼时间较大些;

12、容积变化量：小于 0.16cm³

13、指示器：现场输出指示有电流表，线性指示0~100%和平方根指示 0~100%；3-1/2 位 LDC 液晶显示器，字高 13mm。输出按百分数显示。

14、启动时间：2 秒，不需要预热;

15、防爆：本厂生产两种防爆类别变送器，由国家级仪表防爆安全监督检查站（NEPSI）- 上海工业自动化仪表研究所鉴定认可:a 隔爆型;b 本质安全型.

6. Measuring Range & Zero: It could be set continually from outside.
7. Positive & Negative Drift:

· Differential Pressure Transmitter: Max. positive drift volume is the difference between URL and measuring range, and max. negative drift volume is URL.

· Pressure Transmitter: Max. positive drift volume is the difference between URL and measuring range, and max. negative drift volume is no more than barometric pressure.

·Absolute Pressure Transmitter: Max. positive drift volume is the difference between URL and measuring range, no negative drift.

8. Ambient Temperature Range: -25℃~+70℃ for general transmitter; -15℃~+70℃ for that with on-the-spot indicator
9. Overloading Pressure: no higher than 1.5 times of rated pressure, no damage
10. Storage Temperature : -10℃~+55℃
11. Damping Time: continually adjustable within 0.2~1.67 seconds, longer time for minute or low differential pressure transmitter and transmitter with flange
12. Volume Change: less than 0.16cm³
13. Indicator: with galvanometer indication on the spot, linear indication 0~100% and square root indication 0~100%; 3-1/2 digits LCD indicator, 13mm for digit height, in terms of percentage
14. Starting Time: 2 seconds, no need for preheating
15. Explosion-proof performance: The two kinds of explosion-proof transmitter produced by us had gotten appraisal and recognition from Shanghai Automatic Instrument Research Institute, branch of National Explosion-proof Security Inspection (NEPSI): a. Explosion-separation Type; b. Intrinsic Safety Type




四、技术参数

Ⅳ Technical Parameters:

（在无迁移，标准参比条件，充硅油和隔离膜片是316L不锈钢的情况下）精确度等级：见表6~7

1、稳定性：六个月内不超过变送器的精度;

2、温度影响：在最大量程时，每10℃变化量参见表3;

(Without drift, under standard reference condition, with silica oil filling and separation spacer of 316L stainless steel)

Accuracy: see Form 6~7

1.Stability: not exceed transmitter accuracy within 6 months

2.Temperature Effect: See Form 3 for error per 10℃ change on top of measuring range

表3 Form3

量程代号或名称 Measuring Range Code or Type	精确度等级 Accuracy		
	0.2级 Class	0.25级 Class	0.5级 Class
2	/	/	⩽ ± 0.54%
3	/	⩽ ± 0.30%	⩽ ± 0.45%
0.4~9	⩽ ± 0.20%	⩽ ± 0.30%	⩽ ± 0.30%
远传、液位Remote Transmission, Liquid Level	/	/	⩽ ± 0.60%

3、不灵敏区：无

4、静压影响：在最大量程时见表4

3.Blind Area of Sensitivity: no

4.Static Pressure Effect: See Form 4 (on top of measuring range)

表4 Form4

量程代号或名称 Measuring Range Code or Type	精确度等级 Accuracy		
	0.2级 Class	0.25级 Class	0.5级 Class
2	/	/	1%
3	/	⩽ 0.50%	0.6%
4、5、6、7、8	⩽ 0.25%	⩽ 0.30%	0.6%
高静压High Static Pressure 4、5、6、7	/	2%	2.5%

5、电源影响：小于输出范围的 ± 0.005/V

6、负载影响：电源稳定时，几乎无负载影响。

7、振动影响：在任何方向上振动频率200Hz时，所引起的误差为最大范围的0.05%/g，量程代号2（微差压为 ± 0.25%/g）.

8、结构材料:

压力容室、接头、泄放阀、隔离膜片等与介质接角的零件材料见各种型号“订货型号规格“表;

螺栓为碳钢镀铬;

电气外壳为低铜铝合金;

电气外壳表面涂层为环氧喷塑。

9、导压连接件：在压力容室上的连接螺孔为 1/4-18NPT，引压接头上的连接螺孔为1/2-14NPT。其中心距见各种型号的外形尺寸图。

放大器电缆连接孔的螺孔为 M20 × 1.5

10、安装位置影响：当工作膜片未垂直安装时，可能产生不大于0.24 kPa的零位系统误差，此误差可通过调整零位来消除，对量程无影响。

11、重量：约5kg（不包括附件，带法兰变送器外）

5.Power Effect: less than output range by ± 0.005/V

6.Load Effect: almost no effect at time of stable power

7.Shock Effect: at time of 200,Hz for shock frequency on any direction, the error is 0.05%/g of the highest one, measuring rang code 2 (± 0.25%/g for minute differential pressure transformer)

8.Structure Material:

see material of spare parts which touches the tested media such as pressure room, joint, exhaust valve, separation spacer from Type and Specification Form for Ordering

Chromate treated carbon steel for bolt

Aluminum alloy with low Cu content for electric shell

Epoxy resin spraying for surface coating of electric shell

9.Pressure Connection Part: 1/4-18NPT for joint thread in pressure room, 1/2-14NPT for join thread in pressure guiding joint, see center distance from the figures of various types

Thread M20 × 1.5 for cable connection hole of amplifier

10. Installation Position Effect: When operation spacer isn fixed vertically, it might result in zero error of no more than 0.24 kPa. The error could be eradicated by zero reset and has no effect on measuring range.

11. Weight: around 5Kg (excluding fittings except for transmitter with flange)



五、电路方块图和连接图

Ⅴ Block Diagram & Wiring Diagram

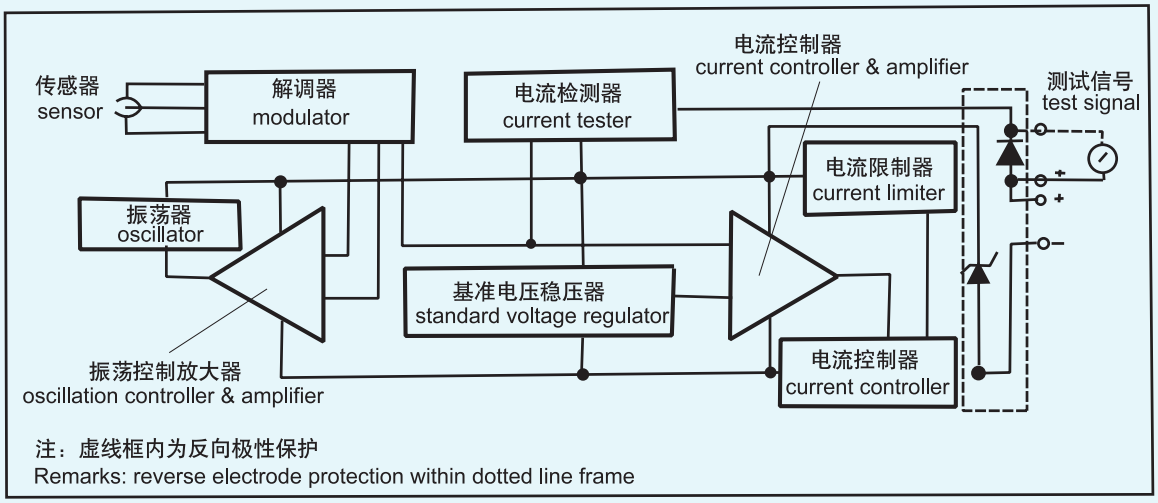


图3 电器方块图　　Figure 3 Block Diagram

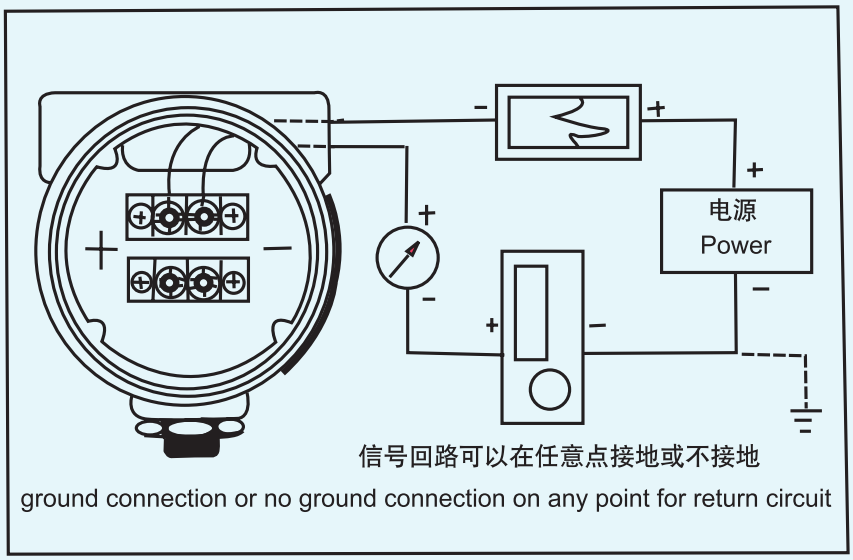


图4　现场导线的接线图　　Figure 4 Wiring Diagram




六、变送器的型号命名　　Ⅵ Type Naming:

表5 变送器型号命名　　Form5 Type Naming

必选　Selection　　任选　Optional

代号 Code	品种 Specification
DR	微差压变送器 Minute differential pressure transmitter
DP	差压变送器 Differential pressure transmitter
HP	高静压差压变送器 High static differential pressure transmitter
AP	绝对压力变送器 Absolute pressure transmitter
GP	压力变送器 Pressure transmitter
LT	法兰式液位变送器 Flange type hydraulic transmitter
DP／GP	远传差压、压力变送器 Long range differential/general pressure transmitter

代号 Code	测量范围 Measuring Range
2	0-0.125~1.5kPa
3	0-1.3~7.5kPa
4	0-6.2~37.4kPa
5	0-31.1~186.8kPa
6	0-117~690kPa
7	0-345~2068kPa
8	0-1170~6890kPa
9	0-3450~20680kPa
0	0-6890~41370kPa

代号 Code	输出 Output
E	4~20mADC
H	HART 通讯
F	FF 通讯

代号 Code	结构材料 Structure Materials			
	法兰接头 Flange Connection	排气/排气阀 Exhaust Valve	隔离膜片 Separation Spacer	灌充液体 Filling Liquid
22	316 SS	316 SS	316 SS	硅油 Silica oil
23	316 SS	316 SS	哈氏合金 C H. Alloy C	
24	316 SS	316 SS	蒙乃尔 Monel	
25	316 SS	316 SS	钽 Tantalum	
33	哈氏合金 C H. Alloy C	哈氏合金 C H. Alloy C	哈氏合金 C H. Alloy C	
35	哈氏合金 C H. Alloy C	哈氏合金 C H. Alloy C	钽 Tantalum	
44	蒙乃尔 Monel	蒙乃尔 Monel	蒙乃尔 Monel	

代号 Code	附加功能 Additional function
M1	0-100%线性指示数 0-100% linear index
M2	0-100%平方根指示数 0-100% square index
M3	3-1/2LD 数字显示器 3-1/2LD digital display
B1	管装弯安装板 Bent Fixing Board for Pipe Mounting
B2	板装弯安装板 Bent Fixing Board for Board Mounting
B3	管装平安装板 Flat Fixing Board for Pipe Mounting
D1	侧面泄放阀在压力室上部 Exhaust valve on the side lies above pressure room
D2	侧面泄放阀在压力室下部 Exhaust valve on the side lies below pressure room
不注 No	1/2-14NPT 锥管阴螺纹接块 1/2-14NPT cone female scew connection
C1	1/2-14NPT 引压接头,后部焊接 ϕ 14 引压管 1/2-14NPT pressure induction connector welded with pipe of 14 for diameter
C2	M20 × 1.5 丁字形阳螺纹连接块 M20 × 1.5 shape male screw connection
C21	M20 × 1.5 丁字形阳螺纹连接块另加工字形接头 M20 × 1.5 shape male screw connection with “工” connecter
d	隔爆型 Exd Explosion-proof type
i	本安型 Exia Intrinsic safety type



七、产品系列　　Ⅶ Products:

1、主要产品系列见表 6　Major products See Form 6

名称型号 Description	测量范围(kPa) Measuring Range	精确度 Accuracy	备注 Remarks
TY－1151DP 型差压变送器 TY-1151DP type differential pressure transmitter	0-1.3~7.5 0-1170~6890	0.2 0.25	
TY－1151DR 型微差压变送器 TY-1151DR type Minute differential pressure transmitter	0-0.125~1.5	0.5	
TY－1151HP 型高静压差变送器 TY-1151HP type High static differential pressure transmitter	0-6.2~37.4 0-345~2068	0.25 0.5	工作压力 25Mpa 与 32Mpa 任选 Optional working pressure 25Mpa or 32 Mpa
TY－1151GP 型压力变送器 TY-1151GP type Pressure transmitter	0-1.3~7.5 0-6890~41370	0.25 0.5	
TY－1151AP 型绝对压变送器 TY-1151LT type flange type hydraulic transmitter	0-6.8~37.4 0-117~6890	0.25 0.5	
TY－1151LT 型法兰式液位变送器 TY-1151LT type Flange type hydraulic transmitter	0-6.2~37.4 0-117~6890	0.25 0.5	平法兰与扦入式法兰任选 Optional flange flat or plug in
TY－1151DPT 型远传差压变送器 TY-1151DPT type long-range differential pressure transmitter	0-6.2~37.4 0-1170~6890	0.5	运传装置任选 Optional device fox long-range purpose
TY－1151GPT 型远传压力变送器 TY-1151GPT type long-range pressure transmitter	0-6.2~37.4 0-1170~689	0.5	运传装置任选 Optional device fox long-range purpose

2、详细规格见表 7　　2.Specification in detail See Form 7

序号 No	名称 Description	型号 Type	测量范围 (kPa) Measuring Range	最大工作压力 (kPa) Maximum working pressure	精确度等级 Accuracy
1	微差压变送器 Minute differential pressure transmitter	TY-1151DR2F	0-0.125~1.5	⩽ 6.0	0.5
2	差压变送器 Differential pressure transmitter	TY-1151DP3E	0-1.3~7.5	⩽ 14	0.2、0.5
3		TY-1151DP4E	0-6.2~37.4		0.2、0.5
4		TY-1151DP5E	0-31.1~186.8		0.2、0.5
5		TY-1151DP6E	0-117~690		0.25、0.5
6		TY-1151DP7E	0-345~2068		0.25、0.5
7		TY-1151DP8E	0-1170~6890		0.25、0.5
8	高静压差压变送器 High static differential pressure transmitter	TY-1151HP4E	0-6.2~37.4	⩽ 32	0.25、0.5
9		TY-1151HP5E	0-31.1~186.8		
10		TY-1151HP6E	0-117~690		
11		TY-1151HP7E	0-345~2068		
12					
13	压力变送器 Pressure transmitter	TY-1151GP3E	0-1.3~7.5	/	0.25、0.5
14		TY-1151GP4E	0-6.2~37.4		
15		TY-1151GP5E	0-31.1~186.8		
16		TY-1151GP6E	0-1170~6890		
17		TY-1151GP7E	0-345~2068		
18		TY-1151GP8E	0-1170~6890		
19		TY-1151GP9E	0-3450~2068		
20		TY-1151GP0E	0-6890~41370		
21	绝对压力变送器 Absolute pressure transmitter	TY-1151AP4E	0-6.8~37.4	/	0.25、0.5
22		TY-1151AP5E	0-31.1~186.8		
23		TY-1151AP6E	0-1170~6890		
24		TY-1151AP7E	0-345~2068		
25		TY-1151AP8E	0-1170~6890		




续表 7

序号 No	名称 Description	型号 Type	测量范围 (kPa) Measuring Range	最大工作压力 (kPa) Maximum working pressure	精确度等级 Accuracy
26	法兰式液位变送器 Flange type hydraulic transmitter	TY-1151LT4E	0-6.2~37.4	2.5	0.25、0.5
27		TY-1151LT5E	0-31.1~186.8		
28		TY-1151LT6E	0-117~690		
29	远传压力变送器 Long-range pressure transmitter	TY-1151GP4E	0-6.2~37.4	/	0.5
30		TY-1151GA5E	0-31.1~186.8		
31		TY-1151GP6E	0-117~690		
32		TY-1151GP7E	0-345~2068		
33		TY-1151GP8E	0-1170~6890		
34	远传差压变送器 Long-range differential pressure transmitter	TY-1151DP4E	0-6.2~37.4	2.5、10	0.5
35		TY-1151DP5E	0-31.1~186.8		
36		TY-1151DP6E	0-117~690		
37		TY-1151DP7E	0-345~2068		
38		TY-1151DP8E	0-1170~6890		

远传差压、压力变送器、单根毛细管长度分 1.5、3、4.5、6、7.5m 五种。

You have five choices of 1.5m、3m、4.5m、6m、7.5m for the length of single capillary of long-range differential/general pressure transmitter.



第二部分　选型和订货资料

Unit Two Material for Type Selection and Contracting


一、TY－1151DP 型差压变送器

以差动电容为检测原理组成电容式变送器，输入压力分别为0~7.5kPa, 0~34.4kPa, 0~186.8kPa等，输出 4~20mA DC 模拟信号.

使用对象：液体、气体和蒸气。

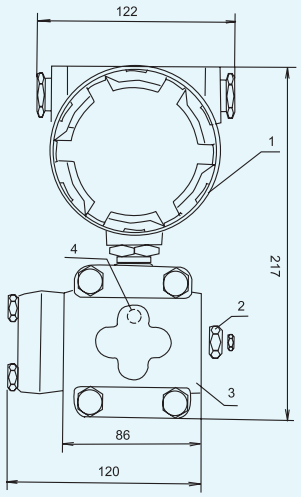
外形尺寸图（TY-1151DR, TY-1151HP, TY-1151DP 型相同）

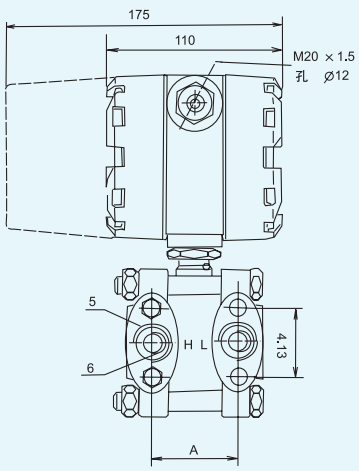
I TY-1151DP Type Differential Pressure Transmitter

Input Pressure: 0~7.5kPa, 0~34.4kPa, 0~186.8kPa, and so onOutput: 4~20mA D.C. analogue signal

Usage Object: liquid, gas and vapor

Figure& & Size: (Those of TY-1151DR, TY-1151HP, TY-1151DP types remain the same.)





1、铭牌（量程零位调整时卸开）;
2、泄放阀;
3、压力容室，可翻转;
4、1/4-18NPT 螺纹，装泄放阀（上面或下面）用;
5、连接块上引压连接孔为 1/2-14NPT 螺纹注：连接块可以翻转;
6、不用连接块进压力容室上有 1/4-18NPT 螺纹孔，供引压连接用

1.Naming Mark (remove it in time of reset adjusting)
2.Exhaust Valve
3.Pressure Vessel (rollable)
4.1/4-18NPT Screw for Exhaust Valve
5.1/2-14NPT Screw for Pressure Induction on connection block
Remarks: The connection block is turnable
6.1/4-18NPTScrew on Pressure Vessel for Pressure Induction Connection without Connection Block.

图5　差压变送器外形尺寸图

Figure 5 Figure & Size of Differential Pressure Transmitter

量程范围代号 Measuring Range Code	L、M	Q、K
A(mm)	54.0	55.6

注：连接块翻转后 A 尺寸还可得到 54 ± 3mm,55.6 ± 3mm 尺寸.
Remarks: Size A would be 54 ± 3mm after the connection block is turned over.




TY-1151DP 型差压变送器
TY-1151DR 型微差压变送器
TY－1151HP 型高静压差压变送器

TY-1151DP Type Differential Pressure Transmitter
TY-1151DR Type Minute Differential Pressure Transmitter
TY-1151HP Type High Static Pressure Transmitter

安装形式图（用户可选择）　Mounting Figure

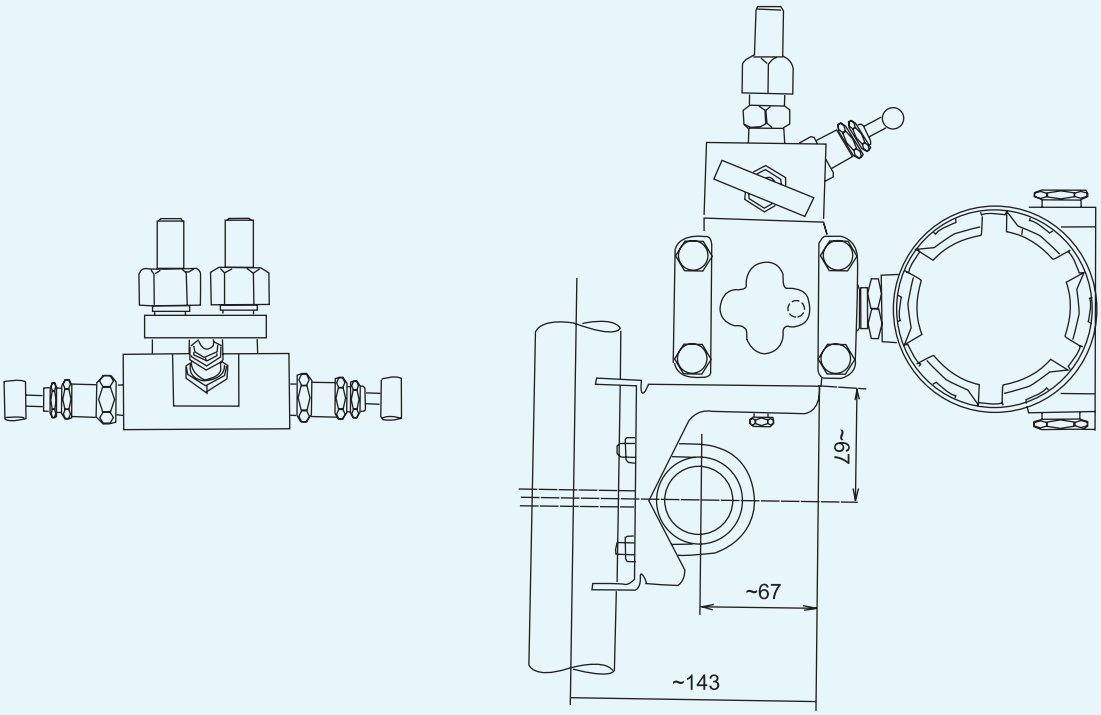


图 6 弯支管装带三阀组　订货号 B1

Figure 6 Bent Pipe Stand　Order No.B1

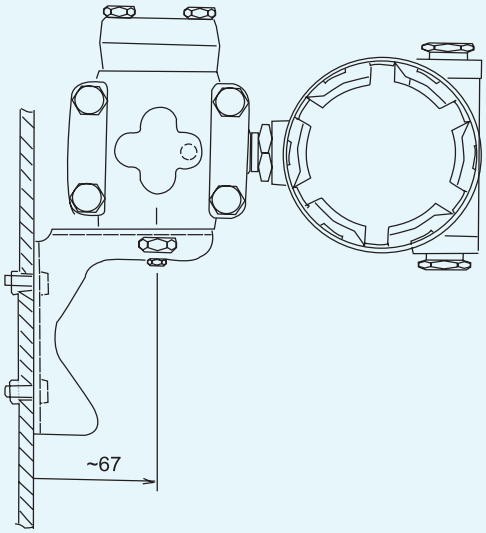


图 7 弯支架板装　订货号 B2

Figure 7 Bent Board Stand　Order No.B2

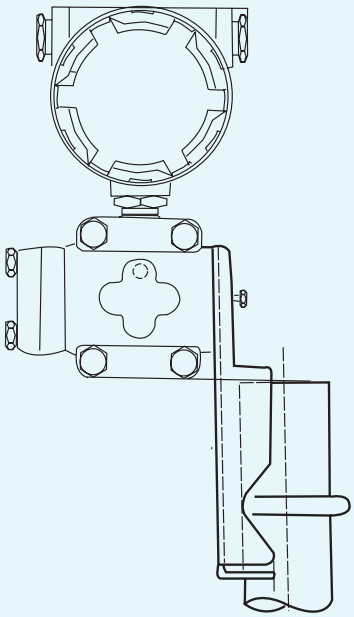


图 8 平支架管装　订货号 B2

Figure 8 Flat Board Stand　Order No.B2



TY-1151DP 型差压变送器型号及规格代号表

Type & Specification Codes of TY-1151DP Type Differential Pressure Transmitter

TY－1151DP 型　差压变送器　　TY-1151DP Type　Differential Pressure Transmitter

代号	量程范围	Code	Measuring Range kPa
3	0-1.3~7.5 最大工作压力 6.9MPa	3	0-1.3~7.5(Maximum Working Pressure 6.9 Mpa)
4	0-6.2~37.4	4	0-6.2~37.4
5	0-31.1~186.8	5	0-31.1~186.8
6	0-117~690	6	0-117~690
7	0-345~2068	7	0-345~2068
8	0-1170~6890	8	0-1170~6890

代号	输出	Code	Output
E	4~20mADC	E	4~20mADC
H	HART 通讯	H	HART
F	FF 通讯	F	FF

代号 Code	结构材料 Structure Materials			
	法兰接头 Flange Connection	排气 / 排气阀 Exhaust Valve	隔离膜片 Separation Spacer	灌充液体 Filling Liquid
22	316 SS	316 SS	316 SS	硅油 Silica oil
23	316 SS	316 SS	哈氏合金 C　H. Alloy C	
24	316 SS	316 SS	蒙乃尔 Monel	
25	316 SS	316 SS	钽 Tantalum	
33	哈氏合金 C　H. Alloy C	哈氏合金 C　H. Alloy C	哈氏合金 C　H. Alloy C	
35	哈氏合金 C　H. Alloy C	哈氏合金 C　H. Alloy C	钽 Tantalum	
44	蒙乃尔 Monel	蒙乃尔 Monel	蒙乃尔 Monel	

代号	量大工作压力(Mpa)	Code	Maximum Working Pressure (Mpa)
B-	4	B-	4
C-	10	C-	10
D-	14	D-	14

代号 Code	附加功能 Additional function
M1	0-100%线性指示数 0-100% linear index
M2	0-100%平方根指示数 0-100% square index
M3	3-1/2LD 数字显示器　3-1/2LD digital display
B1	管装弯安装板　Bent　Fixing Board for Pipe Mounting
B2	板装弯安装板 Bent Fixing Board for Board Mounting
B3	管装平安装板　Flat Fixing Board for Pipe Mounting
D1	侧面泄放阀在压力室上部 Exhaust valve on the side lies above pressure room
D2	侧面泄放阀在压力室下部 Exhaust valve on the side lies below pressure room
不注 No	1/2-14NPT 锥管阴螺纹接块 1/2-14NPT cone female scew connection
C1	1/2-14NPT 引压接关,后部焊接 ϕ 14 引压管 1/2-14NPT pressure induction connector welded with pipe of 14 for diameter
C2	M20 × 1.5 丁字形阳螺纹连接块 M20 × 1.5 shape male screw connection
C21	M20 × 1.5 丁字形阳螺纹连接块另加工字形接头 M20 × 1.5 shape male screw connection with “工” connecter
d	隔爆型 Exd Explosion-proof type
i	本安型 Exia　Intrinsic safety type

TY－1151DP 3　E　22　C-　M1B1　　选型举例　Example




TY-1151DR 型微差压变送器型号及规格代号表

Type & Specification Codes of TY-1151DR Type Minute Differential Pressure Transmitter

TY－1151DR 型 微差压变送器	TY-1151DR type Minute Differential Pressure Transmitter

代号	量程范围	Code	Measuring Range kPa
2	0-1.25~1.5	2	0-1.25~1.5

代号	输出	Code	Measuring Range
E	4~20mA DC	E	4~20mA DC
H	HART 通讯	H	HART
F	FF 通讯	F	FF

代号 Code	结构材料 Structure Materials			
	法兰接头 Flange Connection	排气/排气阀 Exhaust Valve	隔离膜片 Separation Spacer	灌充液体 Filling Liquid
22	316 SS	316 SS	316 SS	硅油 Silica oil

代号	量大工作压力 (Mpa)	Code	Maximum Working Pressure (Mpa)
不注		No	
B-	N(特殊K,V)	B-	N (K.V for special ones)

代号 Code	附加功能 Additional function
M1	0-100%线性指示数 0-100% linear indexx
M3	31/2LD 数字显示器 31/2LD digital display
B1	管装弯安装板 Bent Fixing Board for Pipe Mounting
B2	板装弯安装板 Bent Fixing Board for Board Mounting
B3	管装平安装板 Flat Fixing Board for Pipe Mounting
D1	侧面泄放阀在压力室上部 Exhaust valve on the side lies above pressure room
D2	侧面泄放阀在压力室下部 Exhaust valve on the side lies below pressure room
不注 No	1/2-14NPT 锥管阴螺纹接块 1/2-14NPT cone female scew connection
C1	1/2-14NPT 引压接头,后部焊接 ϕ 14 引压管 1/2-14NPT pressure induction connector welded with pipe of 14 for diameter
C2	M20 × 1.5 丁字形阳螺纹连接块 M20 × 1.5 shape male screw connection
C21	M20 × 1.5 丁字形阳螺纹连接块另加工字形接头 M20 × 1.5 shape male screw connection with “工” connecter
d	隔爆型 Exd Explosion-proof type
i	本安型 Exia Intrinsic safety type

TY－1151DR 2	E	22	B	B1	选型举例 Example



三`TY-1151HP 型高静压变送器

高静压变送器可在工作压力32 Mpa下测量差压,由于具有 32 Mpa 的耐工作压力和过载保护,确保了变送器能在高静压系统中得到可靠的应用.

输出 4~20mA DC 模拟信号

Ⅲ.TY-1151HP Type High Static Pressure Transmitter

It may be used to measure differential pressure under working pressure of 32Mpa. Its ability to bear working pressure of 32Mpa and its overloading protection ensure its reliable application in high static pressure system.

The output is 4~20mA D.C. simulated signal.

TY-1151HP 型高静压变送器型号及规格代号表

Type & Specification Codes of TY-1151HP type Pressure Transmitter

TY－1151HP 型　高静压变送器　　TY-1151HP type　Differential Pressure Transmitter

代号	量程范围（kPa）	Code	Measuring Range （kPa）
4	0-6.2~37.4	4	0-6.2~37.4
5	0-31.1~186.8	5	0-31.1~186.8
6	0-117~690	6	0-117~690
7	0-345~2068	7	0-345~2068

代号	输出	Code	Measuring Range
E	4~20mA DC	E	4~20mA DC
H	HART 通讯	H	HART
F	FF 通讯	F	FF

代号 Code	结构材料 Structure Materials			
	法兰接头 Flange Connection	排气/排气阀 Exhaust Valve	隔离膜片 Separation Spacer	灌充液体 Filling Liquid
22	316 SS	316 SS	316 SS	硅油 Silica oil

代号	量大工作压力（Mpa）	Code	Maximum Working Pressure (Mpa)
E-	25	E-	25
F-	32	F-	32

代号 Code	附加功能 Additional function
M1	0-100%线性指示数 0-100% linear index
M2	0-100%平方根指示数 0-100% square index
M3	3-1/2LD 数字显示器 3-1/2LD digital display
B1	管装弯安装板 Bent Fixing Board for Pipe Mounting
B2	板装弯安装板 Bent Fixing Board for Board Mounting
B3	管装平安装板 Flat Fixing Board for Pipe Mounting
D1	侧面泄放阀在压力室上部 Exhaust valve on the side lies above pressure room
D2	侧面泄放阀在压力室下部 Exhaust valve on the side lies below pressure room
不注 No	1/2-14NPT 锥管阴螺纹接块 1/2-14NPT cone female scew connection
C1	1/2-14NPT 引压接头,后部焊接 φ 14 引压管 1/2-14NPT pressure induction connector welded with pipe of 14 for diameter
C2	M20 × 1.5 丁字形阳螺纹连接块 M20 × 1.5 shape male screw connection
C21	M20 × 1.5 丁字形阳螺纹连接块另加工字形接头 M20 × 1.5shape male screw connection with “工” connecter
d	隔爆型 Exd Explosion-proof type
i	本安型 Exia Intrinsic safety type

TY－1151HP 5　E　22　E-　B1　　选型举例　Example

四、TY－1151GP 型压力变送器

TY－1151GP 型电容式压力变送器（表压）测量最小压力 1.3 kPa.

使用对象：液体、气体和蒸气

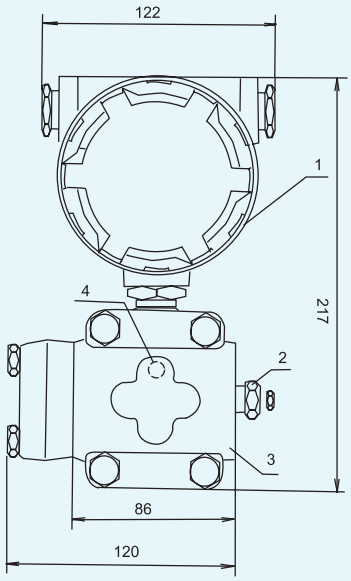
输出 4~20mAD.C.模拟信号

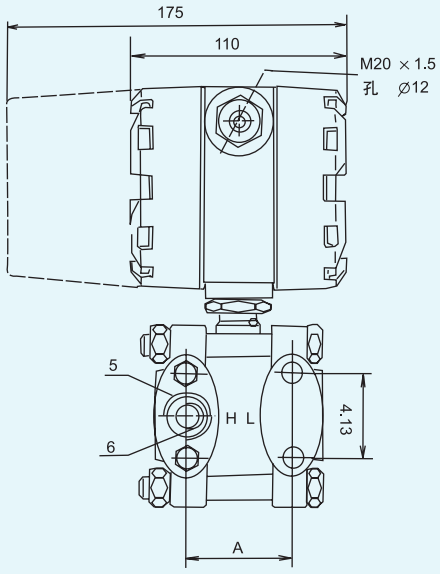
Ⅳ.TY-1151GP Type Pressure Transmitter

The lowest pressure in measuring range of TY-1151GP type pressure transmitter with capacitor is 1.3 kPa.

Tested Media: Liquid, gas or vapor

Output:4~20mA D.C.analogue signal





1、铭牌（量程零位调整时卸开）;
2、泄放阀;
3、压力容室，可翻转;
4、1/4-18NPT 螺纹，装泄放阀（上面或下面）用;
1.Naming Mark (remove it in time of reset adjusting)
2.Exhaust Valve
3.Pressure Vessel (roll able)
4.1/4-18NPT Screw for Exhaust Valve

1、连接块上引压连接孔为 1/2-14NPT 螺纹
注：连接块可以翻转;
2、不用连接块进压力容室上有 1/4-18NPT 螺纹孔，供引压连接用
1.1/2-14NPT Screw for Pressure Induction on connection block
Remarks: The connection block is reversible.
2.1/4-18NPT Screw on Pressure Vessel for Pressure Induction Connection without Connection Block

图 9 TY-1151GP 型　压力（表压）变送器外形尺寸图
TY-1151AP型　绝对压力变送器外形尺寸图

Figure 9 Figure & Size of TY-1151GP Type Pressure Transmitter
Figure & Size of TY-1151AP Type Absolute Pressure Transmitter

表 12　Form12

量程范围代号 Measuring Range Code	L.M.N.U.	Q.K	P	I	V
A(mm)	54.0	55.6	57.2	57.9	59.1

注：连接块翻转后，上述 A 尺寸还可得到 A ± 3mm 尺寸。
Remarks: Size A would be size A ± 3mm after the connection block is turned .

TY－1151GP型压力变送器
TY－1151AP型绝对压力变送器

TY-1151GP Type Pressure Transmitter
TY-1151AP Type Absolute Pressure Transmitter

安装形式图（用户可选择）

Mounting Figure (Optional)

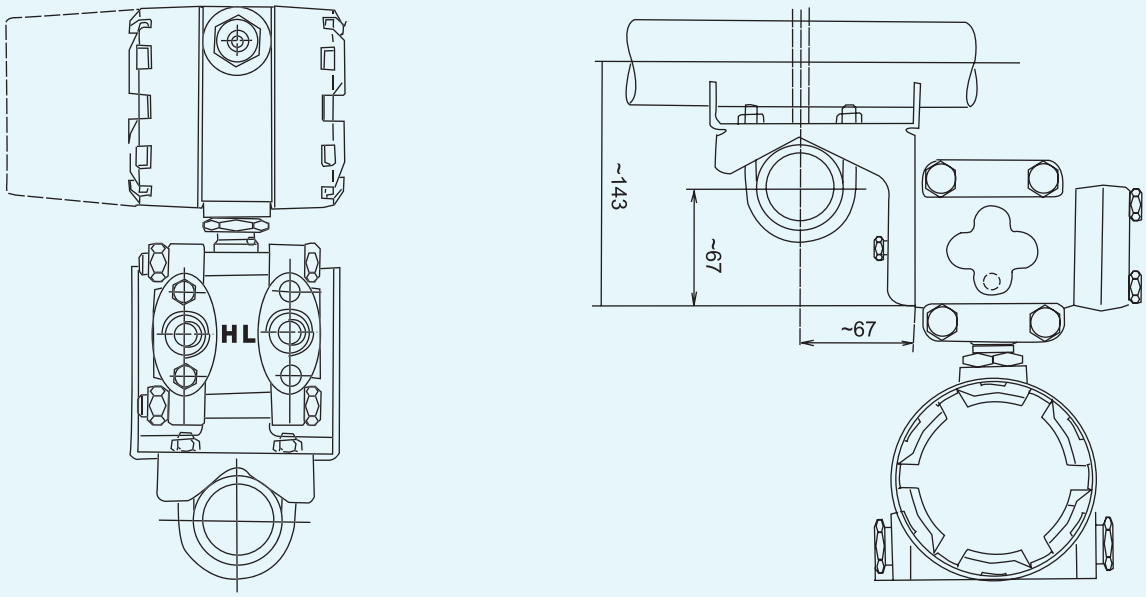


图10 弯支架管装 订货号B1

Figure 10 Bent Stand for Pipe Installation Order No.B1

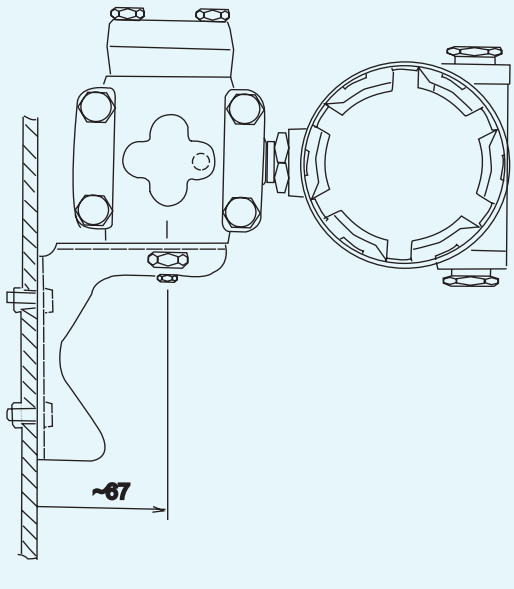


图11 弯支架板装 订货号B2

Figure 11 Bent Stand for Board Installation
Order No.B2

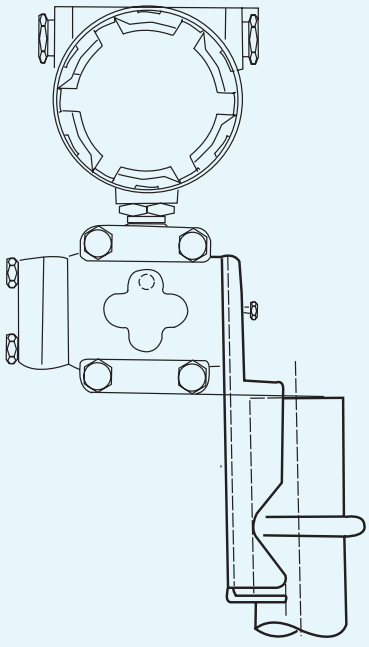


图12 平支架管装 订货号B3

Figure 12 Flat Stand for Pipe Installation
Order No.B3




TY－1151GP型压力变送器型号及规格代号表　Type & Specification Codes of TY-1151GP Type Pressure Transmitter

TY－1151DP 型　压力变送器　TY-1151GP Type　Differential Pressure Transmitter

代号	量程范围	Code	Measuring Range kPa
3	0-1.3~7.5	3	0-1.3~7.5
4	0-6.2~37.4	4	0-6.2~37.4
5	0-31.1~186.8	5	0-31.1~186.8
6	0-117~690	6	0-117~690
7	0-345~2068	7	0-345~2068
8	0-1170~6890	8	0-1170~6890
9	0-3450~20680	9	0-3450~20680
0	0-6890~41370	0	0-6890~41370

代号	输出	Code	Output
E	4~20mADC	E	4~20mADC
H	HART 通讯	H	HART
F	FF 通讯	F	FF

代号 Code	结构材料 Structure Materials			
	法兰接头 Flange Connection	排气/排气阀 Exhaust Valve	隔离膜片 Separation Spacer	灌充液体 Filling Liquid
22	316 SS	316 SS	316 SS	硅油 Silica oil
23	316 SS	316 SS	哈氏合金 C H. Alloy C	
24	316 SS	316 SS	蒙乃尔 Monel	
25	316 SS	316 SS	钽 Tantalum	
33	哈氏合金 C H. Alloy C	哈氏合金 C H. Alloy C	哈氏合金 C H. Alloy C	
35	哈氏合金 C H. Alloy C	哈氏合金 C H. Alloy C	钽 Tantalum	
44	蒙乃尔 Monel	蒙乃尔 Monel	蒙乃尔 Monel	

代号 Code	附加功能 Additional function
M1	0~100%线性指示数 0~100% linear index
M3	3-1/2LD 数字显示器 3-1/2LD digital display
B1	管装弯安装板 Bent Fixing Board for Pipe Mounting
B2	板装弯安装板 Bent Fixing Board for Board Mounting
B3	管装平安装板 Flat Fixing Board for Pipe Mounting
D1	侧面泄放阀在压力室上部 Exhaust valve on the side lies above pressure room
D2	侧面泄放阀在压力室下部 Exhaust valve on the side lies below pressure room
不注 No	1/2-14NPT 锥管阴螺纹接块 1/2-14NPT cone female scew connection
C1	1/2-14NPT 引压接头,后部焊接 ϕ 14 引压管 1/2-14NPT pressure induction connector welded with pipe of 14 for diameter
C2	M20 × 1.5 丁字形阳螺纹连接块 M20 × 1.5 shape male screw connection
C21	M20 × 1.5 丁字形阳螺纹连接块另加工字形接头 M20 × 1.5 shape male screw connection with “工” connecter
d	隔爆型 Exd Explosion-proof type
i	本安型 Exia Intrinsic safety type

TY－1151GP 8　E　22　M1B1　选型举例　Example



五、TY－1151AP 型绝对压力变送器

TY－1151AP型绝对压力变送器，可以实现对除气系统，蒸馏塔、蒸发器和结晶器等的绝对压力测量。允许在10MPa下的过压

使用对象：液体、气体和蒸气，输出4~20mA DC模拟信号

V.TY-1151AP Type Absolute Pressure Transmitter

It may be used to measure the absolute Pressures of exhausting system. Distilling tower, evaporator and in process of crystallization with pressure overloading allowance of 10Mpa.

Tested Media: Liquid, gas or vapor Output: D.C.4-20mA simulated signal

TY－1151AP型绝对压力变送器型号及规格代号表

Type & Specification Codes of TY-1151AP type Absolute Pressure

表13 Form13

TY－1151AP型 绝压变送器 TY-1151AP Type Differential Pressure Transmitter

代号	量程范围kPa	Code	Measuring Range kPa
4	0-6.2~37.4	4	0-6.2~37.4
5	0-31.1~186.8	5	0-31.1~186.8
6	0-117~690	6	0-117~690
7	0-345~2068	7	0-345~2068
8	0-1170~6890	8	0-1170~6890

代号	输出	Code	Output
E	4~20mA DC	E	4~20mA DC
H	HART通讯	H	HART
F	FF通讯	F	FF

代号 Code	结构材料 Structure Materials			
	法兰接头 Flange Connection	排气/排气阀 Exhaust Valve	隔离膜片 Separation Spacer	灌充液体 Filling Liquid
22	316 SS	316 SS	316 SS	硅油 Silica oil
23	316 SS	316 SS	哈氏合金C H. Alloy C	
24	316 SS	316 SS	蒙乃尔 Monel	
33	哈氏合金C H. Alloy C	哈氏合金C H. Alloy C	哈氏合金C H. Alloy C	
44	蒙乃尔Monel	蒙乃尔Monel	蒙乃尔 Monel	

代号Code	附加功能 Additional function
M1	0~100%线性指示数0~100% linear index
M3	3-1/2LD数字显示器 3-1/2LD digital display
B1	管装弯安装板 Bent Fixing Board for Pipe Mounting
B2	板装弯安装板 Bent Fixing Board for Board Mounting
B3	管装平安装板 Flat Fixing Board for Pipe Mounting
D1	侧面泄放阀在压力室上部 Exhaust valve on the side lies above pressure room
D2	侧面泄放阀在压力室下部 Exhaust valve on the side lies below pressure room
不注No	1/2-14NPT锥管阴螺纹接块 1/2-14NPT cone female scew connection
C1	1/2-14NPT引压接头,后部焊接φ14引压管 1/2-14NPTpressure induction connector welded with pipe of 14 for diameter
C2	M20 × 1.5丁字形阳螺纹连接块 M20 × 1.5 shape male screw connection
C21	M20 × 1.5丁字形阳螺纹连接块另加工字形接头 M20 × 1.5shape male screw connection with “工” connecter

TY－1151AP 6 E 22 M1B1 选型举例 Example




六、TY－1151LT 型法兰式液位变送器

VI.TY-1151LT Type Flange Installed Liquid Level Transmitter


TY－1151LT 型电容式液位变送器的安装法兰标准按 ANSI3″、4″，法兰等级为 150LB，法兰安装尺寸见下图表。如用户采用 GB9116－88 标准，则 DN＝80、100、P=2MPA。接液膜片材料有 316L、哈氏 C－276、蒙耐尔、钽等。本厂也可为用户提供其它特殊规格安装法兰。用户不注明时我厂以 3 “150LB 安装法兰供货。

We adopt ANSI 3" or 4" for the fixing flange of the type and 150LB for flange grade. Please see the flange measurement from the following figure and form .If GB9116-88 standard is adopted as user demand, then Dn=80 or 100, Pn=2Mpa. The materials of spacer which touches the tested media include 316L stainless steel, H. alloy C.276, monel or tantalum, etc. We also may provide other fixing flanges of special specifications. We generally provide 3"150LB fixing flange if no other demand from the users.

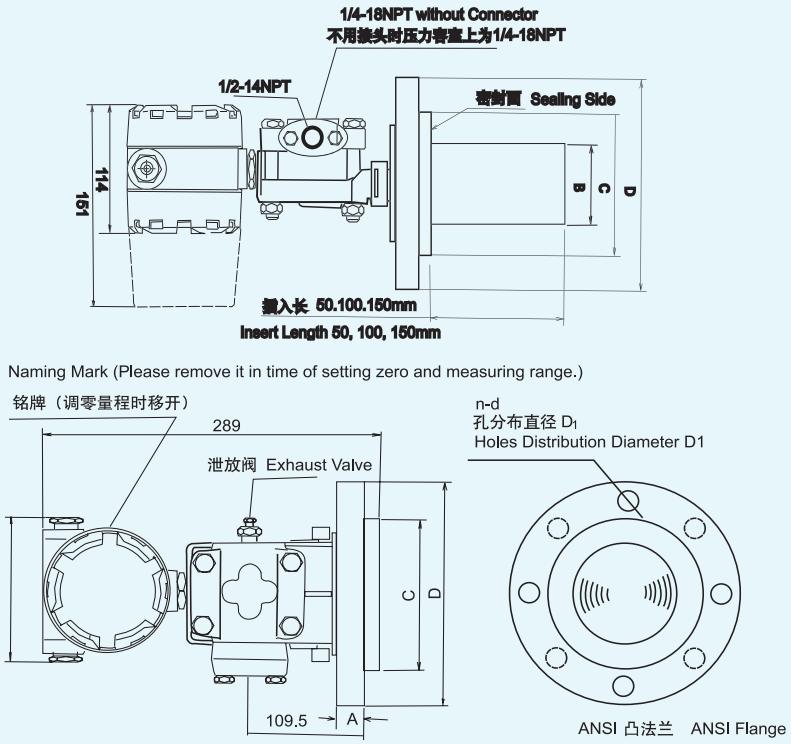


图 13 TY－1151LT 型液位变送器外形尺寸

Figure 13 Figure & Size of TY-1151LT Type Liquid Level Transmitter

上图中 D, D1, n, d, A, B 尺寸见下表 See size D, D1, n, d, A, B from the following form

法兰尺寸 Flange Size (mm)					螺栓孔 Bolt Hole		
标称法兰尺寸 Nominal Flange Size	外径 D Outer Diameter	厚度 A Thickness	B	C	数量 n Quantity	直径 d(mm) Diameter	分布直径 D(mm) Distribution Diameter
3″	190	30	66	127	4	19	152
4″	229	30	89	157	8	19	191



TY－1151LT型法兰式液位变送器型号及规格代号表

Type & Specification Codes of TY-1151LT Type Flange Installed Liquid Level Transmitter

TY－1151LT型　法兰液位变送器　　TY-1151LT Type Absolute Pressure Transmitter

代号	量程范围	Code	Measuring Range kPa
4	0-6.2~37.4	4	0-6.2~37.4
5	0-31.1~186.8	5	0-31.1~186.8
6	0-117~690	6	0-117~690

代号	输出	Code	Output
E	4~20mADC	E	4~20mADC
H	HART 通讯	H	HART
F	FF 通讯	F	FF

代号 Code	公称直径尺寸	插入筒长度	高压侧隔离膜片材料
A0	80(mm)	平	316LSS
A2	80(mm)	50	316LSS
A4	80(mm)	100	316LSS
A6	80(mm)	150	316LSS
B0	100(mm)	平	316LSS
B2	100(mm)	50	316LSS
B4	100(mm)	100	316LSS
B6	100(mm)	150	316LSS
C0	80(mm)	平	哈氏 H. AlloyC-276
C2	80(mm)	50	哈氏 H. AlloyC-276
C4	80(mm)	100	哈氏 H. AlloyC-276
C6	80(mm)	150	哈氏 H. AlloyC-276
D0	100(mm)	平	哈氏 H. AlloyC-276
D2	100(mm)	50	哈氏 H. AlloyC-276
D4	100(mm)	100	哈氏 H. AlloyC-276
D6	100(mm)	150	哈氏 H. AlloyC-276
E0	80(mm)	平	钽 Tantalum
F0	100(mm)	平	钽 Tantalum

代号 Code	安装法兰　　Fixing Flange
A	3″ 1501b　碳钢镀锌　3″ 1501b Galvanized Steel
B	4″ 1501b　碳钢镀锌　4″ 1501b Galvanized Steel
C	3″ 3001b　碳钢镀锌　3″ 3001b Galvanized Steel
D	3″ 3001b　碳钢镀锌　4″ 1501b Galvanized Steel

代号 Code	结构材料　Structure Materials			
	法兰接头 Flange Connection	排气 / 排气阀 Exhaust Valve	隔离膜片 Separation Spacer	灌充液体 Filling Liquid
22	316 SS	316 SS	316 SS	硅油 Silica oil
23	316 SS	316 SS	哈氏合金 C H. Alloy C	
24	316 SS	316 SS	蒙乃尔 Monel	
25	哈氏合金 C H. Alloy C	哈氏合金 C H. Alloy C	哈氏合金 C H. Alloy C	
33	哈氏合金 C H. Alloy C	哈氏合金 C H. Alloy C	钽 Tantalum	
35	蒙乃尔 Monel	蒙乃尔 Monel	蒙乃尔 Monel	

代号 Code	附加功能 Additional function
M1	0~100%线性指示数 0~100% linear index
M3	3-1/2LD 数字显示器　3-1/2LD digital display
D1	侧面泄放阀在压力室上部 Exhaust valve on the side lies above pressure room
D2	侧面泄放阀在压力室下部 Exhaust valve on the side lies below pressure room
不注 No	1/2-14NPT 锥管阴螺纹接块 1/2-14NPT cone female scew connection
C1	1/2-14NPT 引压接头,后部焊接 ϕ 14 引压管 1/2-14NPT pressure induction connector welded with pipe of 14 for diameter
C2	M20 × 1.5 丁字形阳螺纹连接块 M20 × 1.5 shape male screw connection
C21	M20 × 1.5 丁字形阳螺纹连接块另加工字形接头 M20 × 1.5 shape male screw connection with “工” connecter
d	隔爆型 Exd Explosion-proof type
i	本安型 Exia　Intrinsic safety type

TY－1151LT　5　　E　　A6　　A　　22　　M1　　选型举例　Example




七、TY-1151DP/GP 型带远传装置的差压 / 压力变送器

Ⅶ.TY-1151DP/GP Type Differential/General Pressure Transmitter with Remote Transmission Device


TY-1151DP/TY-1151GP 变送器带远传密封装置后，就成为TY-1151DP/GP远传差压/压力变送器

TY-1151DP/GP远传差压/压力变送器，可避免被测介质直接和变送器和隔离膜片接触的可靠测量方法，它适用于下面几种情况:

1、被测介质对变送器接头和敏感元件有腐蚀作用时;

2、需要将高温被测介质与变送器隔离进;

3、被测介质中有固体悬浮物或高粘度易堵塞变送器接头和压力容室时;

4、被测介质用引压管引出易固化或结晶时;

5、更换被测介质需要冲洗而不容交混时;

6、必须保持卫生条件，防止污染时。

TY-1151DP/GP型带传密封装置的远传差压/ 压力变送器，仍具有TY-1151DP/GP型差压/压力变送器的各种特点:

测量范围：0-6kPa~0-10MPa

提供多种结构材料，远传装置组件焊接结构，可靠性强。充液腔低容积设计，减少温度影响，根据用户要求内充DC200系列硅油使用温度-40~+149℃；高温硅油使用温度15至315℃，详见表25

远传装置工作压力上限是用户选择远传装置的额定值，工作压力不低于3.5kPa（绝对压力）

对腐蚀介质的选择隔离膜片材料参见表26，仅作用户选用时参考。

Added with long-range transmission sealed device, TY-1151DP/TY-1151GP pressure transmitters became TY-1151DPT/GPT Long-rang transmission differential/general pressure transmitters

TY-1151DPT/GPT Long-range Transmission Differential/General Pressure Transmitters are applicable to the following circumstances, with avoidance of direct contact between tested media and separation spacer:

1. Tested media has corrosion effect on connector and sensitive parts of pressure transmitter.

2. Tested media of high temperature should be separated from pressure transmitter.

3. Tested media with suspended solid or with high viscosity easily block up the connector and pressure vessel of pressure transmitter.

4. Easy solidification or crystallization of tested media out of pressure induction tube.

5. Washing is necessary in replacement of tested media but without allowance of mixture

6. Keeping it clean

TY-1151DP/GP Type Differentia/General Pressure Transmitters with remote transmission and sealing device have various characters of TY-1151DP/GP type differential/general pressure transmitter.

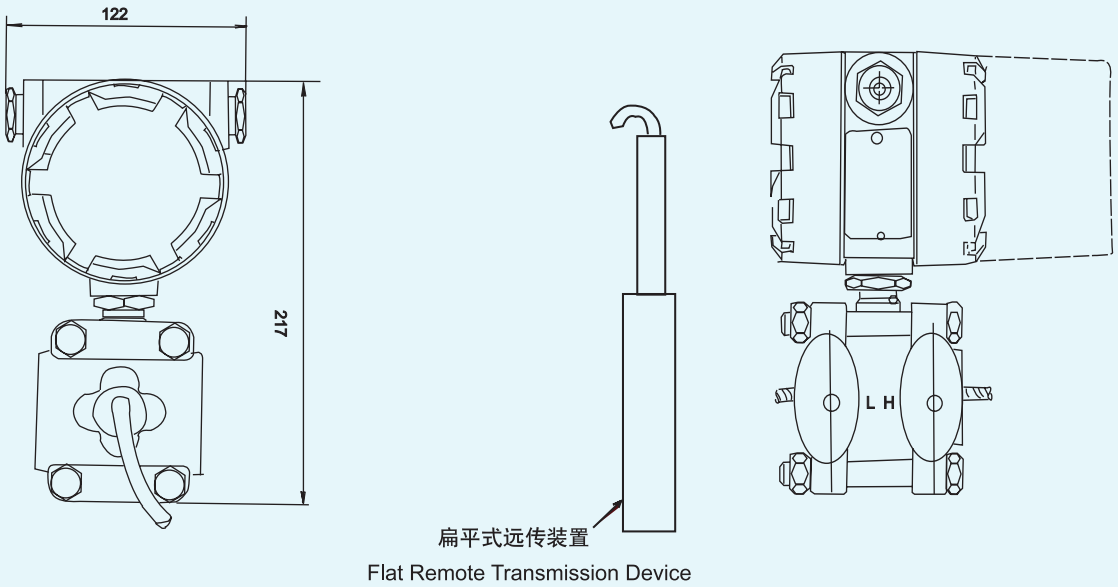
Measuring Range :0-6kPa~0-10Mpa

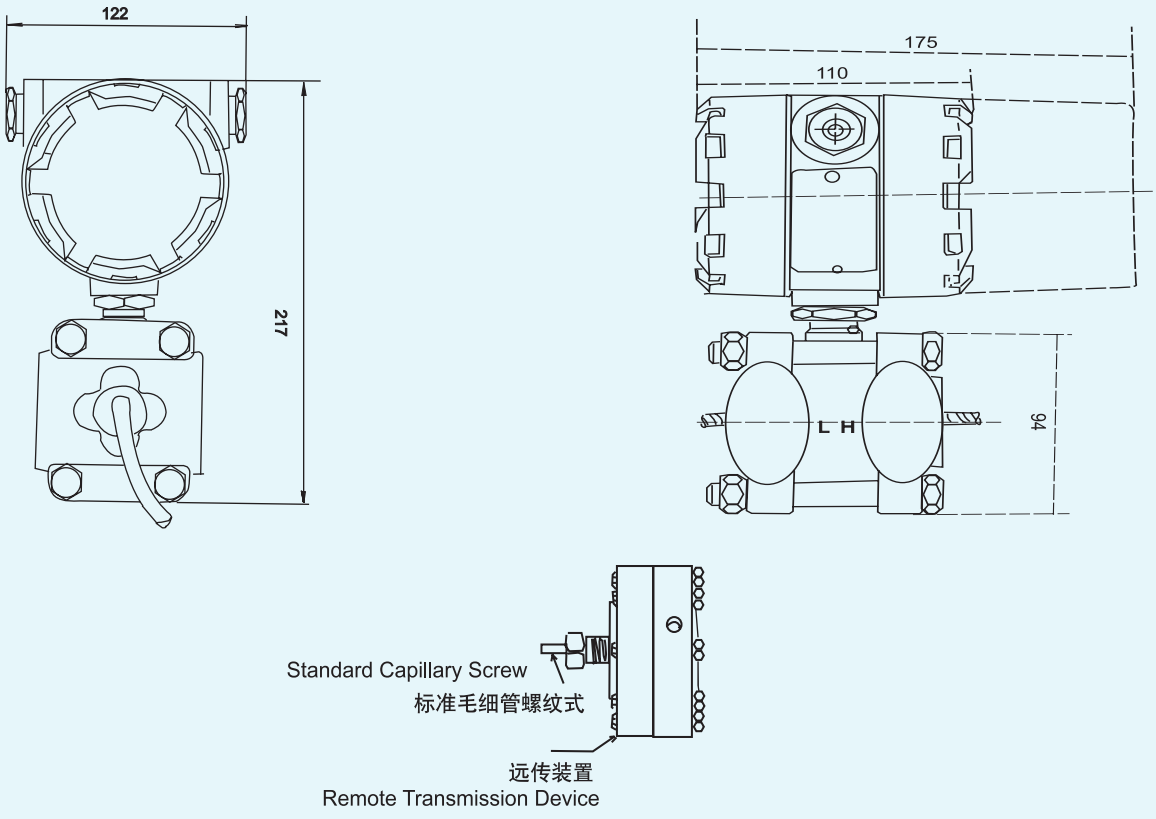
The user may choose different material for structure, long-range transmission device is of welded structure with high reliability .We adopt small-volume design for liquid-filling vessel to lowering temperature effect. DC2000series of silica oil is filled into the vessel -40~+149 for its working temperature, and 15~315 for that of high-temperature silica oil. Please see more from Form 25.

The upper limit of working pressure of long-range transmission device is the rated volume for the user to choose long-range transmission device .The working pressure is no less than 3.5KPa. (absolute pressure).

Please see Form 26 separation spacer materials for corrosive media for reference only.







TY—1151DP／GP型带远传装置的差压／压力变送器外形尺寸图

Figure 14 Figure & Size of TY-1151DP/GP Type Differential/General Pressure Transmitter with Remote Transmission Device



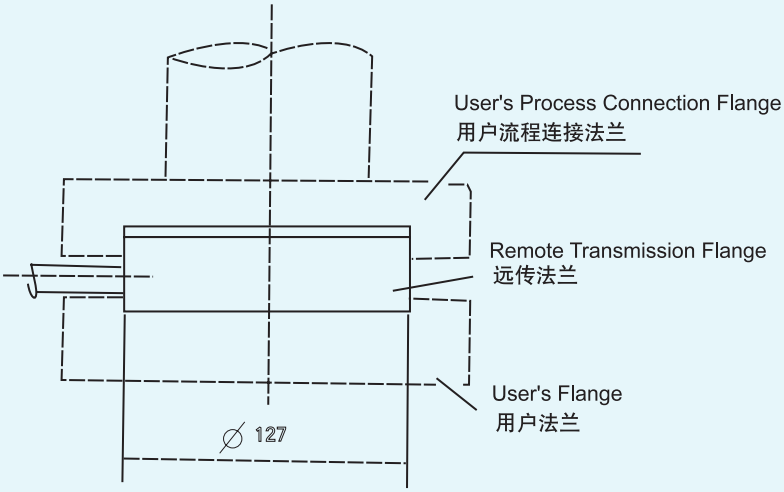



图15　1199PFW型扁平式远传装置（标准3”，工作压力）外形尺寸图

Figure15 Figure & Size of 1199 PFW Type Flat Remote Transmission Device (Standard 3", Operation Pressure)

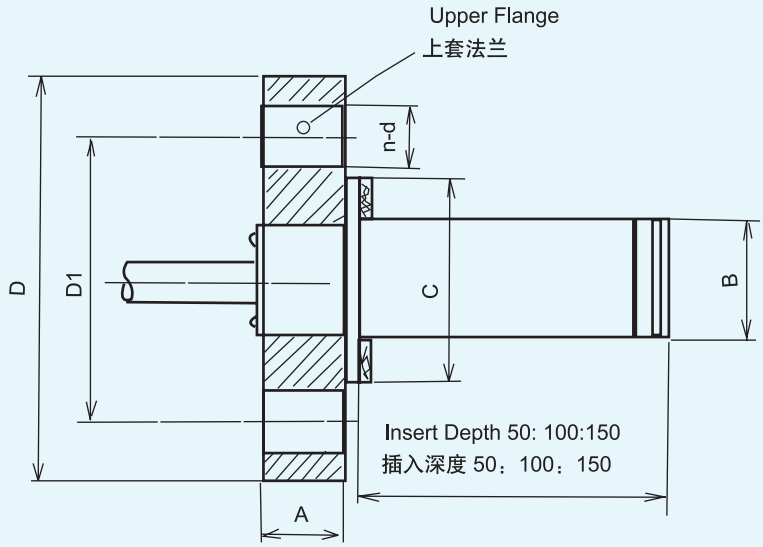


图16　1199EFW型插入筒式远传装置（标准3″,工作压力2.5MPa）外形尺寸图

Figure16 Figure & Size of 1199 PFW Type Insert Tube Remote Transmission Device (Standard 3″, Operation Pressure 2.5Mpa)

插入深度50mm,100mm,150mm 的型号分别标注为L1、L2、L3

(L1, L2, L3 refers to those with inserting depth of 50mm, 100mm & 150mm respectively.)

上图中D、D1、n、d、A、B 尺寸见下表　　See size D, D_1, n, d, A, B from the following form

表16　Form 16

法兰尺寸 Flange Size（mm）					螺栓孔 Bolt Hole		
标称法兰尺寸 Nominal Flange Size	外径 D Outer Diameter	厚度 A Thickness	B	C	数量 n Quantity	直径 d(mm) Diameter	分布直径 D(mm) Distribution Diameter
3″	190	30	66	127	4	19	152
4″	229	30	89	157	8	19	191

注：在用户不注明时按ANSI标准3″ 150LB安装法兰供货　Notes: We generally provide ANSI 3" 150LB flange for delivery if no other demand from the user.



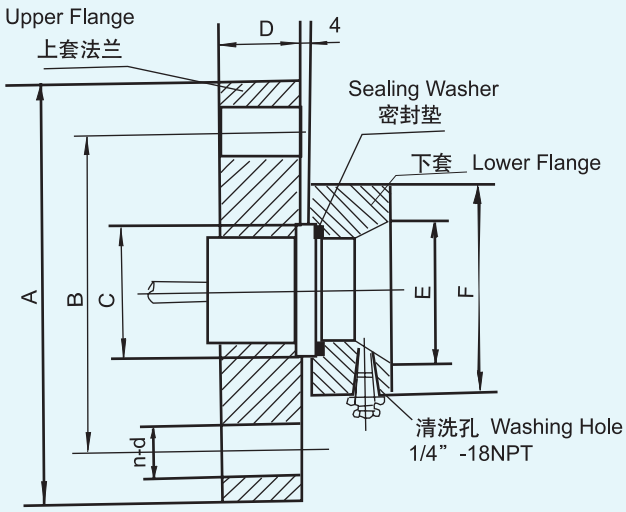


图 17　1199RFW 型法兰安装远传装置（外形尺寸）

Figure17 Figure & Size of 1199 RFW Type Flange Installed Remote Transmission Device

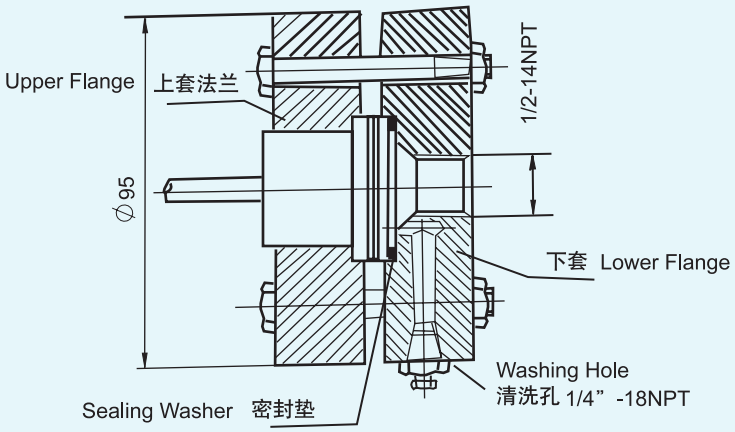


图 18　1199RTW 型螺纹安装式远传装置（最大工作压力 10MPa）外形尺寸图

Figure18 Figure & Size of 1199 RTW Type Thread Installed Remote Transmission Device (Maximum Operation Pressure 10MPa)

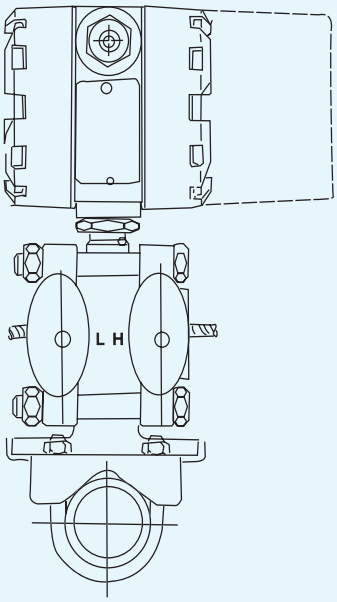
上套法兰尺寸 Upper Flange Sizes：　　表 17　Form 17　　下套尺寸 Lower Flange Size:

公称管径 Nominal Tube Diameter	公称压力 Nominal Pressure	凸台直径 Flange Stand Diameter	外径 Outer Diameter	厚度 Thickness	螺孔中心距 Bolt Hole Center Distance	栓孔数量 Bolt Hole Quantity	栓孔直径 Bolt Hole Diameter	直径 Diameter	直径 Diameter
(Inch)	(LB/MPa)	C	A	D	B	n	d	E (mm)	F (mm)
1	150/2	64.1	108	14.3	79.4	4	16	26.9	66.5
	300/5	66.9	124	17.2	88.9	4	20		
1-1/2	150/2	73.0	127	17.2	98.4	4	16	41.9	78.7
	300/5	73.0	156	20.7	114.5	4	23		
2	150/2	92.1	152	19.1	120.6	4	20	52.5	95.2
	300/5	92.1	165	22.2	127.0	4	20		
3	150/2	127.0	191	23.8	152.4	4	20	79.0	127.0
	300/5	127.0	210	25.5	168.3	8	23		




TY－1151DP／GP型带远传装置的差压／压力变送器任选安装形式图（用户可选择）

Mounting Figure of TY-1151DP/GP Type Differential/ General Pressure Transmitter with Remote Transmission Device (Optional)



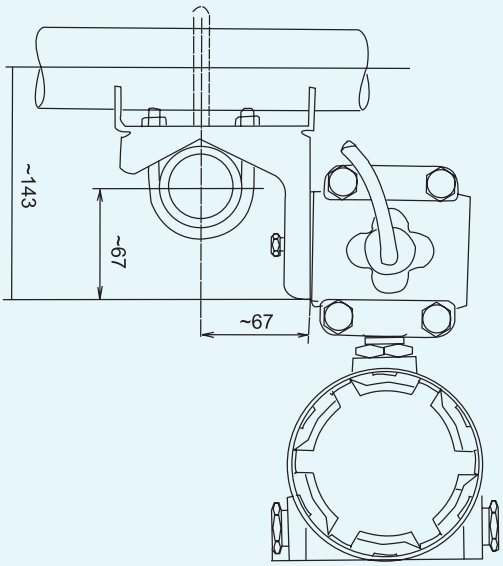


图19　弯支架管　订货号B1

Figure 19 Bent Stand for Pipe Installation Order No.B1

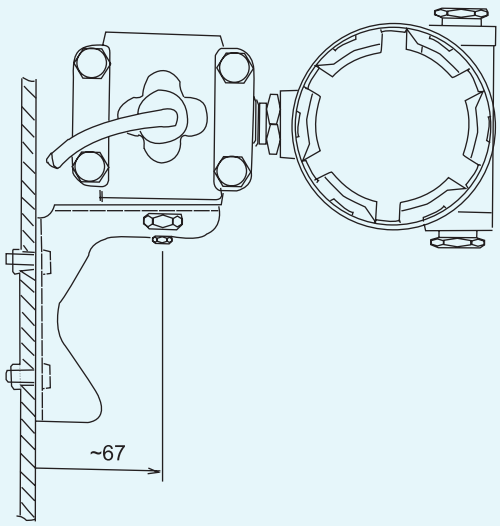


图20　弯支架板装　订货号B2

Figure 20 Bent Stand for Board Installation Order No.B2

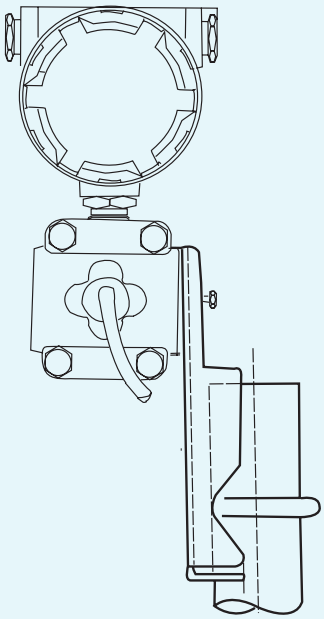


图21　平支架管装　订货号B3

Figure 21 Flat Stand for Pipe Installation Order No.B3



TY－1151DP／GP型带远传装置的差压、压力变送器型号及规格代号表

Type & Specification Codes of TY-1151DP/GP Type Differential/General Pressure Transmitter with Remote Transmission Device

TY－1151DP/GP 型　远传差压、压力变送器　TY-1151AP Type Remote Transmission Differential/General Pressure Transmitter

代号	量程范围 kPa	Code	Measuring Range kPa
N	0-6.2~37.4	N	0-6.8~37.4
U	0-31.1~186.8	U	0-31.1~186.8
Q	0-117~690	Q	0-117~690
K	0-345~2068	K	0-345~2068
P	0-1170~6890	P	0-1170~6890

代号	输出	Code	Output
E	4~20mA DC	E	4~20mA DC
H	HART 通讯	H	HART
F	FF 通讯	F	FF

代号 Code	代号法料 Material	隔离膜片 Separation Spacer
12	碳钢镀镍 Galvanized Carbon Steel	316L SST
22	316L SST	316L SST

S1	一个远传装置 One remote transmission device	根据表 20、21、22、23、25 订货 Order according form 20、21、22、23、24、25
S2	二个远传装置 Double remote transmission	

代号 Code	附件和附加功能 Additional function
M1	0-100%线性指示数 0-100% linear index
M3	3 -1/2LD 数字显示器 3-1/2LD digital display
B1	管装弯安装板 Bent Fixing Board for Pipe Mounting
B2	板装弯安装板 Bent Fixing Board for Board Mounting
B3	管装平安装板 Flat Fixing Board for Pipe Mounting
d	隔爆型 Exd Explosion-proof type
i	本安型 Exia Intrinsic safety type

TY－1151GP U　N　22　S2　M1B1i　选型举例 参阅表 20 －－ 25　Type Selection Example Reference to Form 20~25

1199RFW11A13-30

扁平式远传装置订货规格表

Form 20

Specification of Flat Remote Transmission Device for Ordering

1199PFW 型　扁平式远传装置　1199PFW Type　Flat Remote Transmission Device for Ordering

代号	型式	Code	Type
11	3″ -150LB	11	3″ -150LB

代号	远传装置膜片材料	Code	Spacer Material of Remote Transmission Device
A	316L SST	A	316L SST
B	哈氏合金 C-276	B	H. Alloy C-276
C	钽	C	Tantalum

代号 Code	壳体材料 Shell Material
11	316L SST

1199PFW　11　A　11　扁平式远传装置选型举例　Type Selection Example




螺纹安装式远传装置订货规格表

Specification of Screw-connection Long-range Transmission Device for Ordering

1199RTW 型　螺纹安装式远传装置（最大工作压力 10MPa）　1199RTW Type Thread-installed Remote Transmission Device (Max. Working Pressure 10MPa)

代号	冲洗备用孔	Code	Spare Washing Hole
11	无	11	No
21	有	21	Yes

代号	远传装置膜片材料	Code	Spacer Material of Remote Transmission Device
A	316L SST	A	316L S. ST
B	哈氏合金 C－276	B	H. Alloy C-276
C	钽	C	Tantalum

代号 Code	结构材料 Structure Material
11	上套为 316SST，安装环为碳钢镀锌，垫圈为石棉或氟橡胶、丁晴橡胶 316 s. steel for upper sleeve, galvanized carbon steel for mounting ring, asbestos, fluorinated rubber or butadiene-N rubber for washer
31	上套为 316SST，安装环为 316SST，垫圈为石棉或氟橡胶、丁晴橡胶 316 s. steel for upper sleeve, 316 s. steel for mounting ring, asbestos, fluorinated rubber or butadiene-N rubber for washer

代号	结构材料	Code	Structure Material
A	316SST	A	316L S. ST
B	哈氏合金 C	B	H. Alloy C

代号	引压连接孔	Code	Pressure Induction Connection Hole
13	1/2-14NPT 锥管螺纹	13	1/2-14NPT Cone Thread

1199RTW　21　A　11　A　13　扁平式远传装置选型举例　Type Selection Example

插入筒式远传装置订货规格表

Specification of Insert Type Remote Transmission Device for Ordering

1199EFW 型　插入筒式远传装置　1199EFW Type　Insert Tube Remote Transmission Device

代号	插入筒直径和按液部分材料	Code	Diameter of Insert Tube & Material of Media-contacting Part
11	(3")66mm 316SST	11	(3″)66mm 316 S. ST
12	(3")66mm 哈氏合金（特殊订货）	12	(3″)66mm H. Alloy (Special Order)
13	(4")89mm 316SST	13	(4″)89mm 316 S. ST
14	(4")89mm 哈氏合金（特殊订货）	14	(4″)89mm H. Alloy (Special Order)

代号 Code	远传装置膜片材料	Code	Spacer Material of Long-range Transmission Device
A	316L S. ST 只用于 11、13 代号	A	316L S. ST Only for Code 11, 13
B	哈氏合金 C-276 只用于 11、13 代号	B	H. Alloy C-276 Only for Code 11, 13
C	钽	C	Tantalum

代号	插入筒长度	Code	Insert Tube Length
l_1	(2″)50mm	l_1	(2″)50mm
l_2	(4″)100mm	l_2	(4″)100mm
l_3	(6″)150mm	l_3	(6″)150mm

代号 Code	法兰材料和额定压力 Flange Material & Rated Pressure
A11	碳钢镀锌，最大工作压力 2.5MPa Galvanized carbon steel, maximum working pressure 2.5 MPa
A12	碳钢镀锌，最大工作压力 5MPa（不推荐） Galvanized carbon steel, maximum working pressure 5MPa (non-recommended)

1199EFW　11　A　1_3　A11　扁平式远传装置选型举例　Type Selection Example



法兰安装式远传装置订货规格表

Specification of Flange Installed Remote Transmission Device for Ordering

1199PFW 型　法兰安装式远传装置	1199PFW Type Flange Installed Remote Transmission Device

代号	冲洗备用孔	Code	Spare Washing Hole
11	无	11	No
21	有	21	Yes

代号	远传装置膜片材料	Code	Spacer Material of Remote Transmission Device
A	316L SST	A	316L S. ST
B	哈氏合金C－276	B	H. Alloy C-276
C	钽	C	Tantalum

代号Code	结构材料 Structure Material
11	上套为316SST，上套法兰为碳钢镀锌，垫圈为石棉或氟橡胶 316 s. steel for upper sleeve, galvanized carbon steel for upper sleeve flange, asbestos or fluorinated rubber for washer
31	上套为316SST，上套法兰为不锈钢，垫圈为石棉或氟橡胶 316 s. steel for upper sleeve, 316 s. steel for upper sleeve flange, asbestos or fluorinated rubber for washer

代号 Code	下套尺寸 Lower Sleeve Size	最大工作压力38℃ Max. Working Pressure at 38℃	下套材料 Lower Sleeve Material
A21	1″	2.5MPa	316S.ST (推荐 Recommended)
B21	1″	2.5MPa	哈氏合金C－276H. Alloy C-276
E21	1″	2.5MPa	碳钢镀锌 Galvanized Carbon Steel
A41	1-1/2″	2.5MPa	316S.ST (推荐 Recommended)
B41	1-1/2″	2.5MPa	哈氏合金C－276H. Alloy C-276
E41	1-1/2″	2.5MPa	碳钢镀锌 Galvanized Carbon Steel
A51	2″	2.5MPa	316S.ST (Recommended)
B51	2″	2.5MPa	哈氏合金C－276H. Alloy C-276
E51	2″	2.5MPa	碳钢镀锌 Galvanized Carbon Steel
A71	3″	2.5MPa	316S.ST (Recommended)
B71	3″	2.5MPa	哈氏合金C－276H. Alloy C-276
E71	3″	2.5MPa	碳钢镀锌 Galvanized Carbon Steel
A22	1″	5MPa	316S.ST (Recommended)
B22	1″	5MPa	哈氏合金C－276H. Alloy C-276
E22	1″	5MPa	碳钢镀锌 Galvanized Carbon Steel
A42	1-1/2″	5MPa	316S.ST (Recommended)
B42	1-1/2″	5MPa	哈氏合金C－276H. Alloy C-276
E42	1-1/2″	5MPa	碳钢镀锌 Galvanized Carbon Steel
A52	2″	5MPa	316S.ST (Recommended)
B52	2″	5MPa	哈氏合金C－276H. Alloy C-276
E52	2″	5MPa	碳钢镀锌 Galvanized Carbon Steel
A72	3″	5MPa	316S.ST (Recommended)
B72	3″	5MPa	哈氏合金C－276H. Alloy C-276
E72	3″	5MPa	碳钢镀锌 Galvanized Carbon Steel

1199RTW	21	A	11	A21	法兰安装式远传装置选型举例	Type Selection Example




毛细管订货型号规格表　　Capillary Specification for Ordering

1199CAP 型　材质 304,尺寸Φ 3 × 1　　1199CAP Type Material 304 Size Φ 3 × 1

代号	冲洗备用孔	Code	Spare Washing Hole
15	1.5m	15	1.5mm
30	3.0m	30	3.0mm
45	4.5m	75	4.5mm
60	6.0m	60	6.0mm
75	7.5m	75	7.5mm

代号	保护套管	Code	Protection Tube
不注	铠装 304	No	304 Armor
A	PVC- 护套,铠装 304	A	PVC Sheath, 304 Armor

1199CAP　45　　选型举例　Type Selection Example

充灌液特性表　　Filling Fluid Characters

代号 Code	充灌液① Filling Fluid①	温度范围 Temperature Range	比重(g/cm³) Specific Gravity	温度膨胀系数 Heat Expansion Coefficient	25℃时粘度 (MPa · S) Viscosity at 25℃
注 Remarks	200 系列硅油 200 Series Silica Oil	-40 ~ 149℃	0.934	0.00108	<20
S	高温硅油② Heat-resistant Silica Oil②	15 ~ 315℃	1.07	0.00053	44~50
F	氟油 Fluoro Oil	-45~ 205℃	1.85	0.000864	65

注:　1 在真空场合温度极限降低;
2.如果压力超过 590KMa
3.选型代号写在毛细管代号后面;
举例: TY-1551DP4E22S2M1B1、1199RFW21A11A-30

Remarks :　① Temperature limit would be lower under vacuum circumstance.
② The pressure is higher than 590KMa.
③ Type selection code follows capillary code.
Example: TY-1551DP4E22S2M1B1、1199RFW21A11A-30



第三部分　附件连接及订货参考资料

Unit Three Contracting Material of Connection Fittings

一、安装支架及安装形式

I Installation Stand & Installation Ways

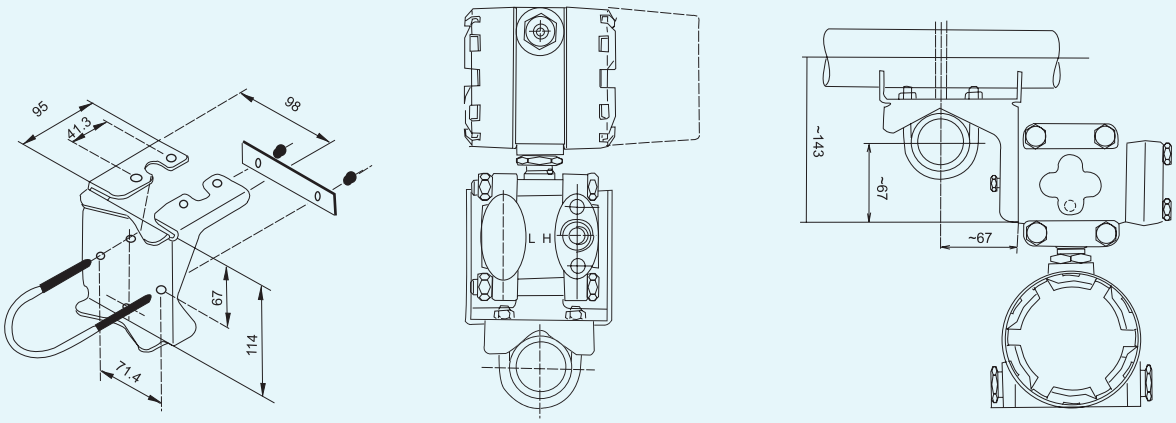


图 22　弯支架管　订货号 B1

Figure 22　Order No.B1

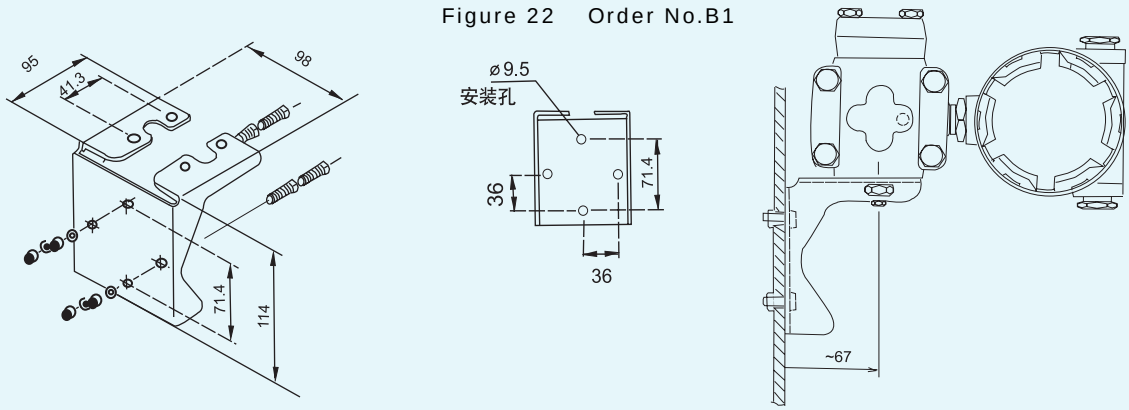


图 23　弯支架板装　订货号 B2

Figure 23　Order No.B2

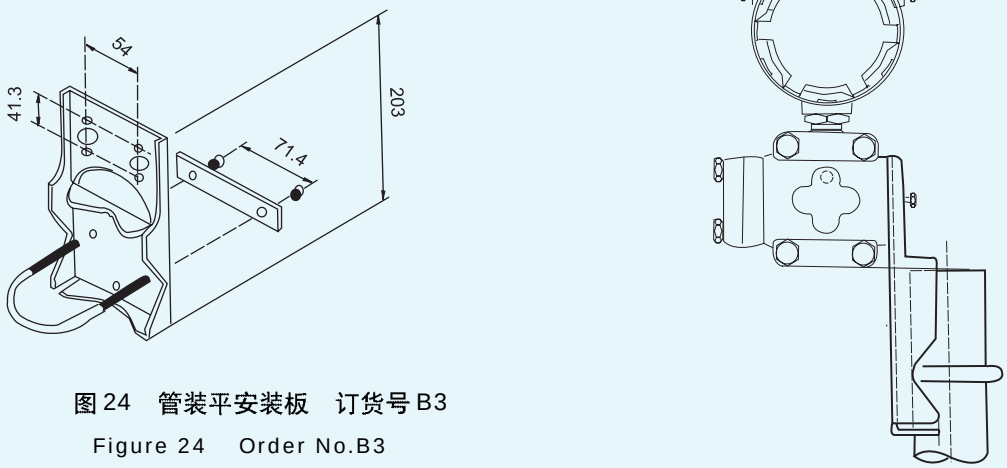


图 24　管装平安装板　订货号 B3

Figure 24　Order No.B3

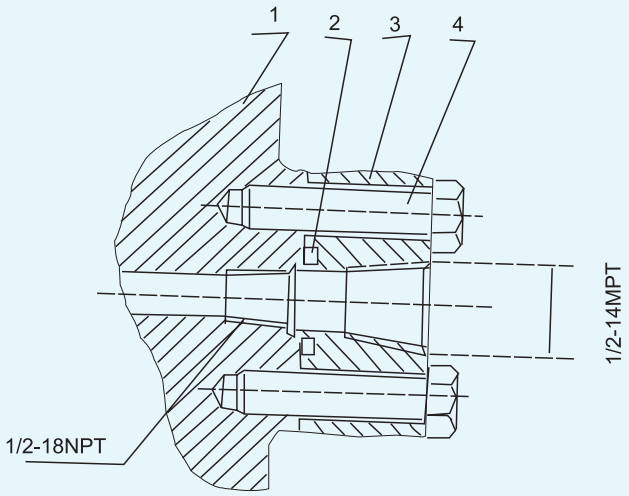



二、引压连接接头

IIPressure Guiding Connector

1.压力腔法兰
2.“O”形密封圈
3.腰形法兰
4.螺栓

1.Pressure Room Flange
2. O-shaped Sealing Washer
3.Waist-shaped Flange
4.Bolt

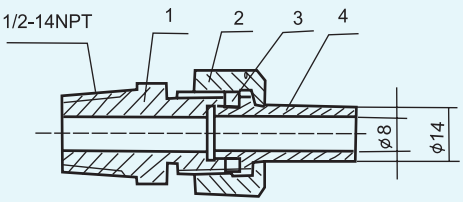


1／2—14NPT锥管阴螺纹连接

1/2-14NPT Cone Tube Female Thread Connection

1.1／2NPT过渡接头
2.螺母M20×1.5
3.密封圈
4.ϕ14引压管

1. 1/2 NPT Connector
2.NutM20×1.5
3. Sealing Washer
4.ϕ14 Pressure Guiding Pipe

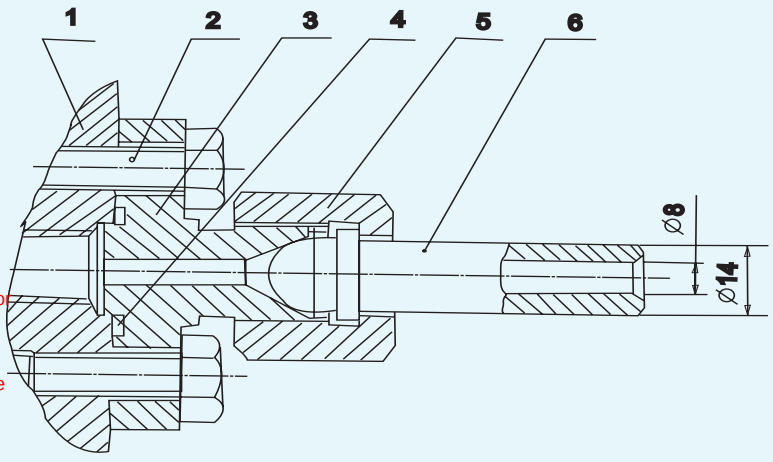


1／2—14NPT锥管阴螺纹过渡引压接头

1/2-14NPT Cone Tube Female Threaded Connector for Pressure Guiding

1　压力腔法兰
2　螺栓
3　M20×1.5螺纹接头
4　“O”形密封圈
5　螺母M20×1.5
6　ϕ14引压管

1　Pressure Room Flange
2　Bolt
3　M20×1.5Threaded Connector
4　O-shaped Sealing Washer
5　Nut　M20×1.5
6　ϕ14　Pressure Guiding Tube



M20×1.5螺纹接头(　代号C21)

M20×1.5 Threaded Connector (Code C21)

图25 引压边接接头

Figure 25Pressure Guiding Connector



三、过程法兰连接尺寸

凡用户订 TY －1151LT 型法兰式液位变送器或 TY －1151DPT ／ GPT 型带远传装置的差压／压力变送器中 EFW。RFW 法兰安装所配 3”、4 “150LB 过程连接法兰尺寸和密封垫圈尺寸 ，下图所示供参考。

Ⅲ Process Flange Connection Size

Please see the following figure for the sizes of 3″ ,4″ 150LB process connection flange and sealing washer in match with EFW, RFW flanges for TY-1151LT flange type liquid level transmitter or TY-1151DPT/GPT differential pressure/pressure transmitter with remote transmission device.

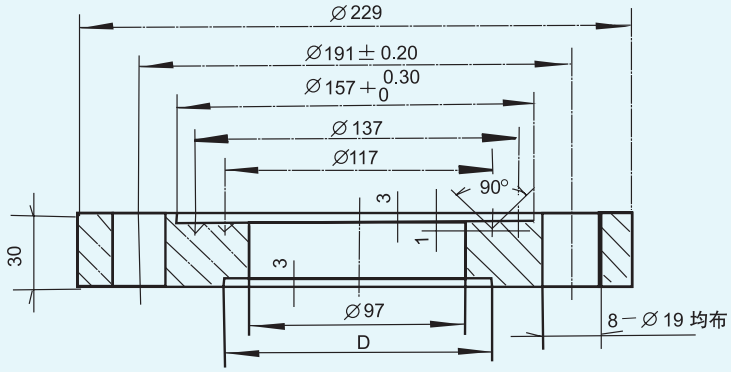


图 26　3”150LB 法兰用户过程连接法兰（ 其中尺寸 D 自用户自定）（ 参考）

Figure 26 3″ 150LB Process Connection Flange (Size D is decided by the user.) (Reference)

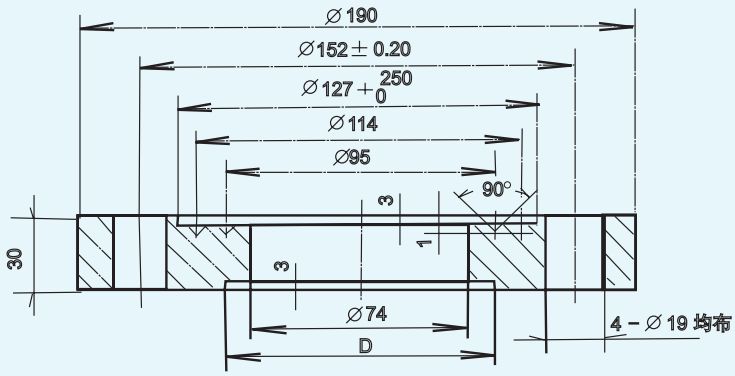


图 27　4 “150LB 法兰用户过程连接法兰（ 其中尺寸 D 自用户自定）（ 参考）

Figure 27 3″ 150LB Process Connection Flange (Size D is decided by the user.) (Reference)

配用法兰 Matched Flange	D	d
3”	127	80
4”	157	100

法半密封垫圈尺寸表

Sizes of Flange Sealing Washer

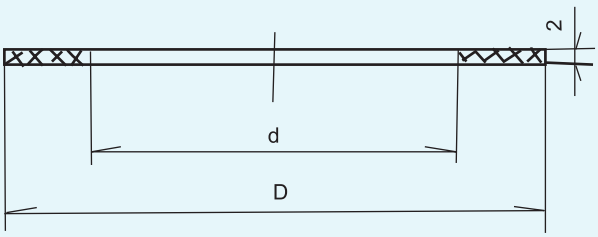


图 28 法兰密封垫圈图

Figure 28 Flange Sealing Washer Figure

法兰密封垫圈用户按接液介质特征，自行选择密封垫圈材质,哂公司推荐石棉橡胶、丁腈橡胶、氟橡胶、尼龙、聚四氟乙烯等材质。

The user may chose freely material for sealing washer according media characters. The material recommended includes asbestos rubber, butadiene-N rubber or fluorinated rubber, nylon, PTFE, etc.




第四部分 TY-151 系列智能电容式变送器

Unit Four TY-1151 Intellectual Capacitance Type Transmitters


TY-1151 系列智能电容式变送器（以下简称智能变送器）是以微处理器为核心的压力仪表，它在传统的1151电容式变送器的结构上增加了通讯和其它功能。用268、275通讯器或采用HART协议的其它主机可在控制室、变送器现场或在同一控制回路的任何地方同它进行双向通讯（读、写数据和诊断）。

TY-1151 series of intellectual capacitance type transmitters (abbreviated as intellectual transmitter below) are pressure instrument with microprocessor as its core. On the basis of traditional TY-1151 capacitance type transmitter, communication and other functions are added. With 268, 275 communicators or other devices based on HART agreement, communication in double direction (reading, writing and examination of data) with the transmitter could be realized in control room, on the spot with transmitter, or any place in connection with control return circuit.

1、 主要特点

TY-1151 系列智能电容式变送器除了一般电容式变送器的固有特点外，还具有如下特点:

智能电子部件仅由一块板组成

- 量程比 15：1 或 10：1
- 0-0.6~0-42000KPa
- 就地按键调整量程和零点
- 可更新现存的TY-1151（包括1151）各种模拟式变送器为智能仪表
- 符合 HART 协议，可用 HART 通讯器 268、275 与本智能表进行双向通讯而不中断输出信号
- 在采用HART协议的分散控制系统中同主机进行双向通讯
- 具有自诊断和远传诊断功能
- 带有 EEPROM，不怕断电丢失数据

I Main Features

TY-1151 series of intellectual capacitance type transmitters have the following features besides those of general capacitance type transmitter:

- Measuring Range 15:1 or 10:1
- 0-0.6~0-42000KPa
- Setting of measuring range and zero by pushing key on the spot
- To upgrade existed TY-1151 (including 1151) analogue transmitters into intellectual instrument
- Compliant with HART agreement; With 268, 275 communicators based on HART agreement, communication in double direction with the transmitter could be realized without signal interruption
- Communication in double direction with main processor of decentralized control system based on HART agreement.
- With function of self examination and remote examination
- With EEPROM for data storage in power failure

2、 工作原理

被测介质的两种压力通入高、低两压力室，作用在δ元件（即敏感元件）的两侧隔离膜片上，通过隔离膜片和元件内的填充液传送到测量膜片两侧。测量膜片与两侧绝缘片上的电极各组成一个电容器。

IIOperation Theory

The two different pressure of tested media enters pressure rooms and has effect on separation spacer on both sides of δ component (sensitive component). They are sensed by measuring spacer through separation spacer and filling oil inside δ component. Measuring spacer and electrodes of the insulator on both sides form two capacitors respectively.



当两侧压力不一致时，致使测量膜片产生位移，其位移量和压力差成正比，故两侧电容量就不等，通过振荡和解调环节转换成与压力成正比的信号。压力变送器和绝对压力变送器的工作原理和差压变送器相同，所不同的是低压室压力是大气压或真空。智能变送器工作原理见图:

Pressure difference results in displacement of measuring spacer, and displacement size is in direct ratio to pressure difference. Thus, capacitance on both sides remains different. After oscillation and demodulation, it is transformed into signal in direct ratio to pressure. Operation theory of pressure transmitter and absolute pressure transmitter remains the same as that of differential pressure transmitter, the difference lies in that the pressure in low-pressure room is barometric pressure or in vacuum status.

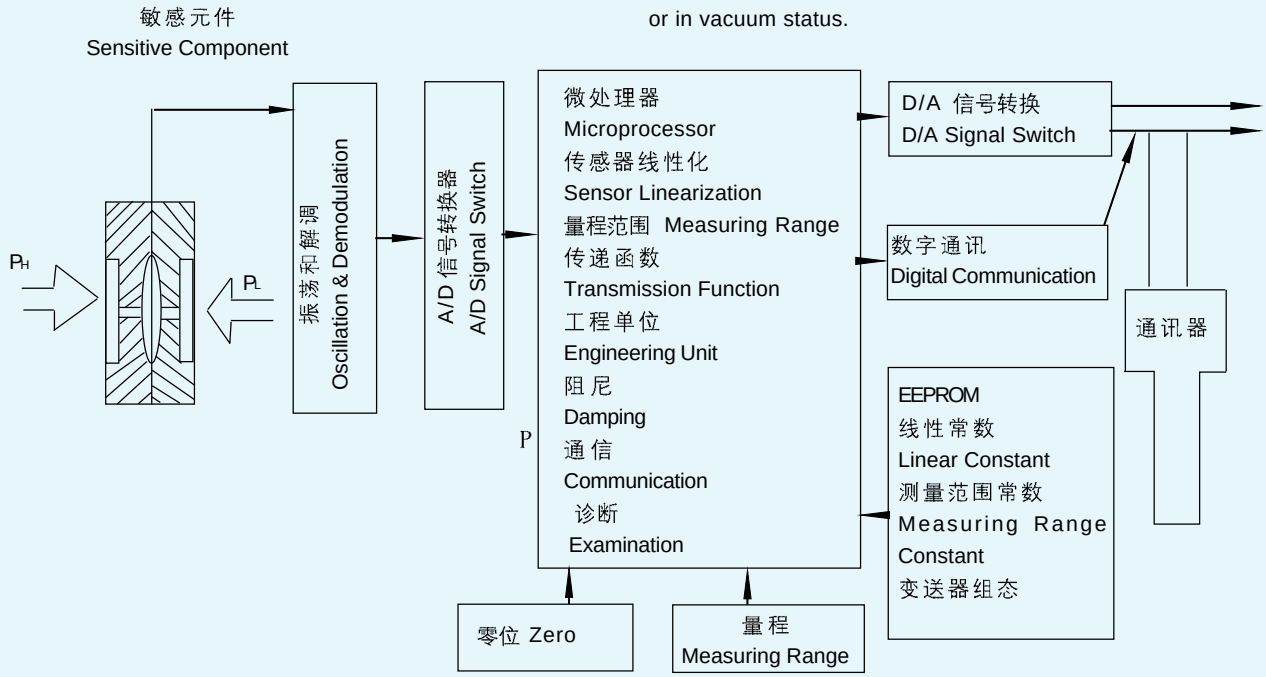


图 29 智能变送器工作原理图

Figure 29 Operation Theory Diagram of Intellectual Transmitter

A/D 转换器将解调器的电流转换成数字信号，其值被微处理器用来判定输入压力值。微处理器控制变送器的工作。另外，它进行传感器线性化、重置测量范围、工程单位换算、阻尼、开方，传感器微调等运算，以及诊断和数字通信。

本微处理器中有16字节程序的RAM，并有三个16位计数器，其中之一执行A/D转换。

D/A转换器把微处理器来的并经校正过的数字信号微调数据，这些数据可用变送器软件修改。数据贮存在EEPROM内，即使断电也保存完整。

数字通信线路为变送器提供一个与外部设备（如275型智能通信器或采用HART协议的控制系统）的连接接口。此线路检测叠加在4~20mA信号的数字信号，并通过回路传送所需信息。通信的类型为移频键控FSK（Frequency Shift Keying）技术并依据Bell 202标准。

With A/D switch, demodulator current is transformed into digital signal, its value is used by microprocessor to judge input pressure value. Microprocessor control the operation of transmitter conducting calculation on sensor linearization, measuring range resetting, engineering unit conversion, damping, evolution, fine tuning, self examination and digital communication.

There is RAM of 16 bytes program and three 16-digit counters in the microprocessor, among which one is for A/D switch.

Rectified digital signal fine tuning data from microprocessor could be modified with software and the data is stored in EEPROM. The data could be kept in power failure.

Digital communication circuit provides transmitter with one inlet for connection with outer devices (such as 275 type intellectual communicator or control system based on HART agreement). The circuit tests digital signal plus 4~20mA signal and transmits necessary information through return circuit. The communication is based on FSK technology (Frequency Shift Keying) and Bell 202 requirements.

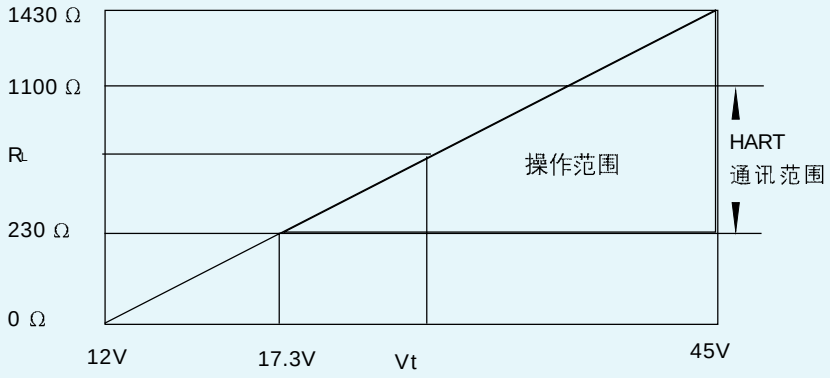



3、 功能规范

使用对象：液体、气体和蒸汽。
测量范围：见表 1

Ⅲ Function & Specification

Application Object: Liquid, gas and vapor
Measuring Range: see Form 1



输出信号：二线制4~20mA直流信号上叠加数字信号，由用户选择开方或线性输出。

供电电源：供电电源12~45VDC，带LCD数字显示器15~45VDC，一般工作电源为24VDC。

负载特性：电路板的最大负载电阻RL为：

RL=Vs-12V/0.023A

式中：RL为最大负载电阻

Vs为供电电源电压V.

指示器：现场输出指示有电流表;

线性指示0~100%;

3-1/2位LCD，字高13mm，输出按百分数显示

量程和零位 就地按钮调整或通过采用HART通讯器进行调整。

正负迁移：差压变送器的最大正迁移量范围上限值（URL以下同）与测量量程之差；最大负迁移量URL。

压力变送器的最大正迁移值为URL与测量量程之差；最大负迁移量不大于大气压。绝对压力变送器：最大正迁移值为URL测量量程之差。无负迁移。

故障报警：自诊断程序检测出故障，模拟输出高于22mA，或低于3.8mA报警，报警高低可通过电子部件上开关进行选择。

变送器使用温度：-40~85℃，

传感元件使用温度：充硅油：-40~104℃；充惰性油：-18~71℃

储藏温度：-10~55℃

阻尼：电气阻尼为0~16S，可按0.1S间隔调整，敏感元件（充硅油）固有时间0.2S。

Output Signal: D.C. 4~20mA signal of double wire system plus digital signal, choice on evolution or linear output by customer

Power Supply: D.C.12~45V, D.C. 15~45V for that with digital LCD, D.C. 24V for general operation power

Loading Characters: Max. resistance under loading of circuit board: RL= Vs- 12V/0.023A

RL: Max. Resistance under Loading Vs: Power Supply Voltage V

Indicator: with galvanometer indication on the spot, linear indication 0~100%; 3-1/2 digits LCD indicator, 13mm for digit height, in terms of percentage

Measuring Range & Zero: to be set by pushing key on the spot or with communicator based on HART agreement

Positive & Negative Drift: Differential Pressure Transmitter: Max. positive drift volume is the difference between URL and measuring range, and Max. negative drift volume is URL; Pressure Transmitter: Max. positive drift volume is the difference between URL and measuring range, and Max. negative drift volume is no more than barometric pressure; Absolute Pressure Transmitter: Max. positive drift volume is the difference between URL and measuring range, no negative drift.

Trouble Alarm: Alarm shall be made when analogue output is higher than 22mA or lower than 3.8mA according to self-examination program. Alarming sound may be set through switch on electronic component.

Transmitter Status Writing Protection: -40~85℃; Sensitive Component (silica oil filling): -40~104℃ (inertia oil filling): -18~71℃

Storage Temperature: -10~55℃

Damping: electric damping 0~16S, set with 0.1S interval, 0.2S for fixed time for sensitive component (silica oil filling)



4．技术参数

（参比条件：无迁移、充硅油和隔离膜片为316L不锈钢情况下）

精确度：±0.25%

稳定性：十二个月内不超过变送器精度。

温度影响：：（每变化10℃对于DP、GP变送器总误差（±0.3%最大量程限值，其他变送器和其他量程，以上误差值将增加一倍。

静压影响：

DP类零位误差：对于14MPa，±0.25%最大量程限值或±0.5%最大量程限值，在管道压力下通过调零给予校正。

量程误差：同上。

HP类零位误差：±2%最大量程限值，对于32MPa在管道压力下能过调零给予校正

量程误差：±0.25%输入读数，每变化7MPa

振动影响：0.1%最大量程值，10~60HZ，S=0.07mm，60~150HZ,g=9.8m/s^2,在任何方向上。

电源影响：小于0.005%输出量程/V。

电磁辐射影响：0.1最大量程值，接受辐射频率27~500MHZ，试验场强3V/M。

安装位置影响 当工作膜片不垂直时，可能产生不大于0.24Kpa的零位误差，但此误差可通过调整零位来消除，对量程无影响。

结构材料：压力容室、接头、泄放阀、隔离膜片等与介质接触的零件材料见各种型号的“订货型号规格表”

螺栓为碳钢镀锌 电气外壳为低铜铝合金 电气壳表面涂层为环氧喷塑

导压连接：在压力容室上连接螺孔为NPT1/4，引压接头上的连接螺孔为NPT1/2，其中心距可通过改变连接块予以改变（51、54、57mm）。

电气连接：变送器壳体有2个M20×1.5螺孔，或NPT1/2内螺纹用以连接电缆管，壳体内有接线端和测量垫片，用以测试。如与通讯相连时，则必须固定在测量垫片小孔上。

重量：约5KG（不包括附件，带法兰变送器除外）。

Ⅳ Technical Parameters

(Reference Condition: without shift, silica oil filling, and 316L s. steel for separation spacer)

Accuracy: ± 0.25%

Stability: not exceed transmitter accuracy within 6 months

Temperature Effect: Total error of DP/GP transmitter per 10 ℃ change shall be no more than ± 0.3% of top value of measuring range, and that for other transmitter or transmitter with different measuring range shall be twice as the former.

Static Pressure Effect:

DP Transmitter Zero Error: ± 0.25% or ± 0.5% of top value of measuring range for 14MPa, it shall be rectified under pipe pressure by setting zero.

Measuring Range Error: same as above

HP Transmitter Zero Error: ±2% of top value of measuring range for 32MPa, it shall be rectified under pipe pressure by setting zero. Measuring Range Error: ± 0.25% of input reading per 7MPa change.

Shock Effect: 0.1% of top value of measuring range, 10~60HZ, S=0.07mm, 60~15HZ, g=9.8m/s, in any direction

Power Effect: less than 0.005% of output measuring range/V

Electromagnetic Radiation Effect: 0.1% of top value of measuring range, radiation frequency 27~500MHZ, test field strength 3V/M

Installation Position Effect: When operation spacer isn fixed vertically, it might result in zero error of no more than 0.24 Kpa. The error could be eradicated by zero reset and has no effect on measuring range.

Structural Materials: See material of spare parts which touches the tested media such as pressure room, Joint, exhaust valve, separation spacer from Type and Specification Form for Order, chromate treated carbon steel for bolt, low copper aluminum alloy for electric shell, epoxy resin spraying for the surface coating of electric shell

Pressure Connection: NPT1/4 for joint screw in pressure room, NPT 1/2 for joint screw of pressure guiding joint; Its central distance may be changed by changing connection block. (51, 54, 57mm)

Electric Connection: 2 M20 × 1.5 screws on transmitter shell, or NPT1/2 inner thread for connection with cable tube, with wiring end and measuring spacer within shell for test; In connection with communication, it shall be fixed on the hole of measuring spacer.

Weight: around 5Kg (excluding fittings except for transmitter with flange)




5、智能电子部件

Ⅴ Intellectual Electronic Component

采用先进的集成电路及表面贴装（SMT）技术，变送器的电子部件由一块电路板组成。变送器的微处理器控制A/D和D/A转换的工作，也能完成自诊断及实现数字通讯。

工作时，一个数字压力值被微处理器处理，并作为数字储存，以确保精密的修正和工程单位的转换。此外，微处理器也能完成传感器的特征化、量程、阻尼时间以及其它功能，EEPROM存储所有的组态，特征化及数字微调的参数，存储器为非易失性的，因此即使断电，所存储的数据仍能完好保持，以随时实现智能的通讯。

软件：

通过一台275或268通讯器对TY-1151系列（包括1151，以下同）智能电容工工变送器进行测试和组态。或者通过任意的支持HART通讯协议的上位系统主机完成通讯。HART协议使用工业标准BELL202移频键控（FSK）技术，以1200HZ或2200HZ的数字信号叠加在4~20MA的信号上实现通讯。通讯时频率信号对4~20MA的过程信号不产生任何干扰。

自诊断

TY-1151系列智能电容式变送器可完成连续地自诊断。如果变送器被检测出故障，则变送器的输出
由用户可选择22MA或3.8MA中一个值，并且任何HART上位设备均能显示该变送器自诊断的特殊信息代码。

格式化

格式化功能是在变送器的初始化和对数字电子部件进行维护时使用的，需标准的格式化菜单提供了两个功能：特征化和数字微调。

特征化:
尽管TY-1151系列智能电容式变送器在出厂时就已被特征化处理好的，但用户仍可以使用这一功能将现有的TY-1151（或1151）模拟变送器作一些简单的更新，使它转换成智能型。调节TY-1151系列智能电容式变送器的电子部件，让它正确地反映传感器组件的输出。

数字微调:
本功能允许对变送器的特性进行数字标定，以达到制造厂标定的压力标准值。数字微调包括两种独立的操作：传感器微调：可以调节数字过程变量的读数，使之精确反映压力输入；4~20MA微调：是处理电子部件输出量的调整。

With adoption of advanced integrated circuit and surface mounting technology (SMT), the electronic component is one piece of I/C board. The microprocessor of transmitter controls A/D & D/A transformation and realizes self-examination and digital communication.

In operation, one digital pressure value is processed by microprocessor and is stored in digits to ensure precision rectification and conversion of engineering unit. Besides these, the microprocessor also completes characterization of sensor, and other function concerning measuring range, damping time, etc. Configuration, characterization, and digital fine-tuning parameters are stored in EEPROM. Even in power failure, all stored data could be still kept well to realize timely intellectual communication.

Software

Test and configuration on TY-1151 series (including 1151, the below remains the same.) of intellectual capacitance type transmitter could be realized through one set of 275 or 268 type communicator or through any system main processor based on HART agreement. Communication is realized according to HART agreement with adoption of FSK technology as BELL 202 standard and with 1200HZ or 2200 HZ digital signal plus 4~20mA signal. In communication, frequency signal has no any interference on 4~20mA.

Self Examination

TY-1151 series of intellectual capacitance type transmitter may complete continually self-examination. If any trouble is found, the user may chose 22mA or 3.8mA, and any devices based on HART agreement may display special information code of self-examination.

Format

Format function is used in initialization of transmitter and maintenance of digital electronic component including two parts on standard menu: Characterization & Digital Fine Tuning
Characterization: Although characterization of the transmitter is completed before delivery, the user may still use the function to renovate existed TY-1151 (or 1151) analogue transmitter into intellectual one. Function: to reset electronic component of TY-1151 series of intellectual capacitance type transmitter to have them display correctly the output of sensors.
Digital Fine Tuning: Digital indication of transmitter characters could be realized with the function in order to reach standard pressure value indicated by manufacturer including two independent operations. Sensor Fine Tuning: to reset readings of digital process variable to have them reflect exactly pressure input; 4~20mA Fine Tuning: to reset output of electronic component



组态

标准组态除非特定，否则将按下列组态供货：工程单位-kPa；4ma-量程下限值；20mA-量程上限值；输出—线性。

软件标签：空白（软件标签8个字符，除非指明，否则是空白）

特殊组态：除标准组态参数外，用户还可以指定下列附加的数据：

Configuration

Unless configuration is specified, we supply product as the following configuration: engineering unit- KPa; 4mA- bottom limit of measuring range; 20mA Top Limit of measuring range; linear output

Software Label: blank (8 figures for software label, it remains blank unless it is indicated.)

Special Configuration: Besides standard configuration parameters, the user may specify the following attached data.

描述符 Description Code	16字符 16 Figures	隔离膜片材料 Separation Spacer Material	类型码信息 Type Code Information
信息 Information	32字符 32 Figures	传感器充液 Sensor Filling Liquid	类型友情信息 Type Related Information
日期 Date	日月年 Date/Month/Year	排液/排气 Liquid/Gas Exhaust	类型码信息 Type Code Information
阻尼 Damping	秒 Second	一体化表头 Integrated Head	已安装或没有 Mounted or Not
法兰材质 Flange Material	类型信息 Type Information	故障报警模式 Trouble Alarm Mode	高或低 High or Low
远传膜盒 Remote Transmission Spacer Box	特定的信息 Specific Information		
O型圈材料 O-shaped Ring Material	类型码信息 Specific Code Information	参数定保护 Parameter Set Protection	关或开 Close or Open

6、现场接线图

Ⅵ On-the-spot Wiring Diagram

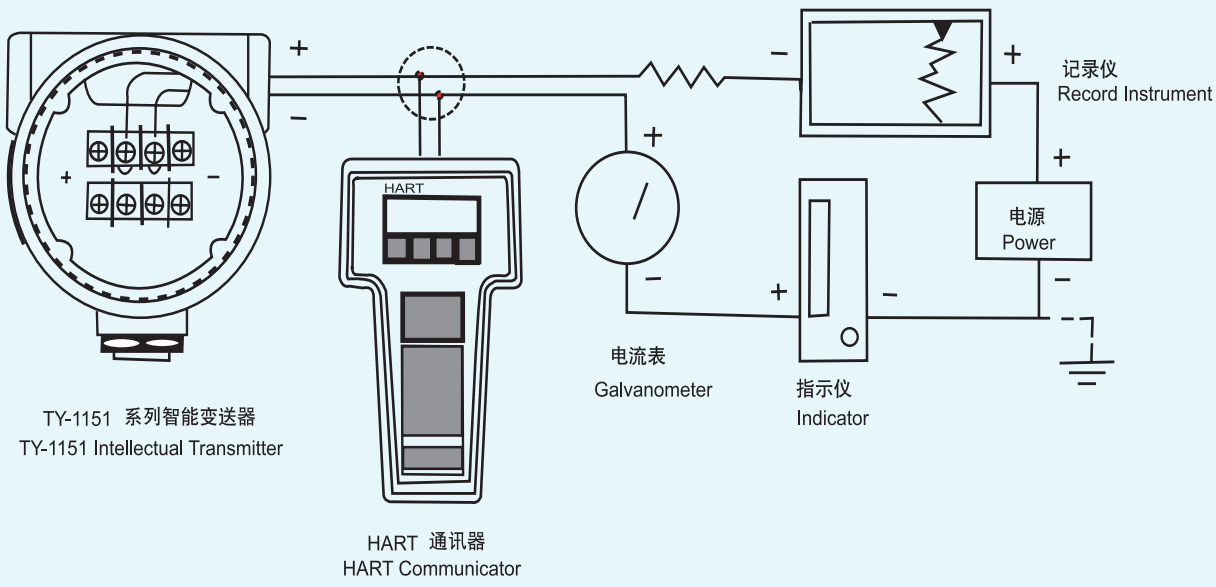


图30 TY-1151系列智能电容式变送器现场接线图

Figure 30 On-the-spot Wiring Diagram of TY-1151 Intellectual Capacitance Transmitter




附：订货参考资料　Attachment Reference Material for Ordering

变送器接触介质部分耐腐蚀材料的选用参考　Corrosion-resistant Material of Medium-contacting Part

介质名称 Media Name	浓度% Consistency	温度℃ Temperature	316	哈氏合金 H. Alloy C	蒙乃尔 Monel	钽 Tantalum	介质名称 Media Name	浓度% Consistency	温度℃ Temperature	316	哈氏合金 H. Alloy C	蒙乃尔 Monel	钽 Tantalum
硫酸 Sulfuric Acid	5	室温Room Temp. 沸点Boiling Point	☆ ×	☆ ○	☆ ○	☆ ☆	氢氟酸 Hydrofluoric Acid	5 48	室温Room Temp. 沸点Boiling Point	×	× ×	☆ ○	× ×
	10	室温Room Temp. 沸点Boiling Point	× ×	☆ ×	☆ ○	☆ ☆	醋酸 Acetic Acid	100	室温Room Temp. 沸点Boiling Point	☆	☆ ☆	☆ ☆	☆ ☆
	60	室温Room Temp. 沸点Boiling Point	×	☆ ○	☆ ○	☆ ☆	甲酸 Formic Acid	10	室温Room Temp. 沸点Boiling Point	× ×	☆ ☆	○	☆ ☆
	80	室温Room Temp. 沸点Boiling Point	× ×	☆ ×	☆	☆ ○	草酸 Oxalic Acid	10	室温Room Temp. 沸点Boiling Point	○ ×	○ ○	○ ○	☆ ○
	95	室温Room Temp. 沸点Boiling Point	☆ ×	☆ ×	× ×	☆ ×	柠檬酸 Citric Acid	50	室温Room Temp. 沸点Boiling Point	☆ ☆	☆ ☆	○ ○	☆ ☆
盐酸 Hydrochloric Acid	5	室温Room Temp. 沸点Boiling Point	× ×	○ ×	× ×	☆ ☆	苛性钠 Caustic Soda	20	室温Room Temp. 沸点Boiling Point	☆	☆	☆ ○	× ×
	10	室温Room Temp. 沸点Boiling Point	× ×	○ ×	× ×	☆ ☆		40	室温Room Temp. 沸点Boiling Point	☆	☆	☆ ○	× ×
	20	室温Room Temp. 沸点Boiling Point	× ×	○ ×	× ×	○ ○	苛性钾 Caustic Potash	50	室温Room Temp. 沸点Boiling Point	○	○	☆	☆
	35	室温Room Temp. 沸点Boiling Point	× ×	○ ×	× ×	○ ○	氯化铁 Iron Chloride	30	室温Room Temp. 沸点Boiling Point	× ×	○ ×	× ×	☆ ☆
硝酸 Nitric Acid	10	室温Room Temp. 沸点Boiling Point	☆ ☆	○ ○	× ×	☆ ☆	氯化钠 Sodium Chloride	20 饱和aturation	室温Room Temp. 沸点Boiling Point	○	☆ ○		☆ ☆
	30	室温Room Temp. 沸点Boiling Point	☆ ○	○ ×	× ×	☆ ☆	氯化铵 Ammonium Chloride	25	室温Room Temp. 沸点Boiling Point	○	☆	○ ○	☆ ☆
	68	室温Room Temp. 沸点Boiling Point	☆ ○	○ ×		☆ ☆	氯化钙 Calcium Chloride	25	室温Room Temp. 沸点Boiling Point	○	☆	☆ ☆	☆ ☆
	发烟 With smoke	室温Room Temp. 沸点Boiling Point				☆	氯化镁 Magnesium Chloride	42	室温Room Temp. 沸点Boiling Point	○ ○	☆ ☆	○ ○	☆ ☆
磷酸 Phosphoric	30	室温Room Temp. 沸点Boiling Point	☆ ○	☆ ☆	× ×	☆ ☆	硫酸铵 Ammonium Sulfate	20 饱和aturation	室温Room Temp. 沸点Boiling Point	☆	☆ ○	☆ ○	☆ ☆
	60	室温Room Temp. 沸点Boiling Point	☆ ○	☆ ☆	× ×	☆ ☆	氯化钠 Sodium Chloride	10	室温Room Temp. 沸点Boiling Point	☆ ○	☆ ☆	☆ ☆	☆ ☆
	70	室温Room Temp. 沸点Boiling Point	☆ ×	☆ ○	× ×	☆ ☆	硫酸钠 Sodium Sulfate	50	室温Room Temp. 沸点Boiling Point	☆ ☆	☆ ☆	☆ ○	☆ ☆
	80	室温Room Temp. 沸点Boiling Point	☆ ×	☆ ×	× ×	☆ ☆	硝酸铵 Ammonium Nitrate	10	室温Room Temp. 沸点Boiling Point	☆ ☆	☆ ☆	×	☆ ☆
硫酸＋硝酸 Sulfuric Acid + Hydrochloric Acid		室温Room Temp. 沸点Boiling Point				☆	硝酸钾 Potassium Nitrate	全部	室温Room Temp. 沸点Boiling Point	○	○	○ ○	☆ ☆
							氯气 Chlorine	干 Dry	室温Room Temp. 沸点Boiling Point	☆	☆	○	☆
铬水 Liquid Chrome	20	室温Room Temp. 沸点Boiling Point		☆		☆ ☆		湿 Wet	室温Room Temp. 沸点Boiling Point	×	○		☆
王水 Aqua regia		室温Room Temp. 沸点Boiling Point	× ×	× ×		☆ ☆	氯气 Chlorine Water	饱和 saturation	室温Room Temp. 沸点Boiling Point	×	○	○	☆
							二氧化硫 SO_2	湿 Wet	室温Room Temp. 沸点Boiling Point	☆			☆
							硫化氢 Hydrogen Sulfide	湿 Wet	室温Room Temp. 沸点Boiling Point	☆ ☆		☆	☆
							氨水 Ammonia Water	＜100	50℃ 100℃	○	☆ ☆		

☆耐蚀性好的材料　○尚耐蚀的材料　× 不耐蚀的材料
☆ Good corrosion-resistant material　○ Common corrosion-resistant material　× Corrodible Material