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## 1. Safety guide

### Safety precautions

In order to ensure safety operation for WIDE PLUS –L series liquid level transmitter, which must abide the following explanations:

Before install and use, please careful read this operational manual!

For short, the manual does not include the detail explanation of all product mode, also has not about every particular of assemble, operation and maintenance. If want to know deeply or special question, then the operational manual has not detail introduce part, please contact with us, and obtain necessary information.

Please pay attention to warn sign on the package! Iced measured medium can damage the sensor!

Only qualified or authorized persons are able to carry out installation, electric connection, operate and maintenance of the transmitter.

Qualified personnel means who have experience in transmitters or similar devices and have related certificates such as electric circuit, high voltage, corrosive medium. Such as have training, guide or authorization for safety engineering standard operational maintain device or equipment of electric circuit, high voltage and corrosive medium.

In order to your safe, please attention: when electric connect, it only to be able to use enough to absolute tool.

In addition, it must abide related safety specification about electric install construction and operation. For explosion-proof transmitter that should be has related specification and recommend standard with explosion-proof. The transmitter may operate in the field of high voltage and corrosive medium; if handle is not correct, then it is possible to cause serious person injury or material damage. When use in others country, which must abide relate national specification.

## 2. Main characteristic

WIDE PLUS –L series liquid level transmitter adopts the sensor with international advanced level, incorporate of high accurate electronic element under strict control of process. It uses dry-pressure measurement technique without mediation liquid, full scope to technical advantage of the ceramic sensor and to make WIDEPLUS –L series liquid transmitter have superior technical performance. Its anti-overload and anti-impulse ability is strong; temperature offset is small, high stability, and have the very high measuring accuracy.

WIDE PLUS –L series liquid level transmitter have many output signal, range, process connection and material. May widely use to petroleum, chemical industry, electrical power, metallurgy, pharmaceutical, food, and other many industrial fields, and may be suitable for each field and medium. In particular, use to ideal upgrade successor for traditional pressure meter and transmitter, is also ideal pressure measure instrument in industrial automation field.

## 3. Working principle

Certain point static pressure in liquid is proportional to the distance between this point and its level, namely

$$P = \rho \cdot g \cdot h$$

In which P – measured pressure (stress)

ρ —medium density

g --- gravity acceleration

h --- height from measured point to level

Measured pressure is only relative to height from measured point to level when ρ and g known.

WIDE PLUS-L series level transmitter makes use of the above principle to measure liquid level.

Note: Measured liquid container must be lead to atmosphere that is open type, cannot sealed. Otherwise, measured result has not meaning.

Measurement system



Fig. 3-1

WIDEPLUS –L series liquid level transmitter combines with WP series digital display namely make up of static liquid level meter. Measured liquid level pressure signal is transmitted to digital display from liquid level transmitter. Display transforms into and indicates corresponding level value according to the specific gravity of the medium and other parameter.

Select display please refers to < Intelligent display / control regulation instrument> sample and relative technical file.

Relation between load resistance and supply power voltage shown as the fig. 3-2:

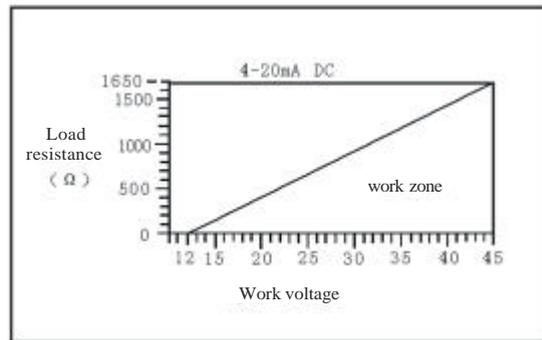


Fig. 3-2

## 4. Operational manual of explosion-proof type transmitter

### 4.1 Explosion-proof type and mark

This transmitter divided into two kinds: frame-proof type and essence safe type, pass through national named explosion-proof quality examine organization carry on check and get the explosion-proof certificate of quality.

A. Frame -proof type: ExidIICT6 certificate of quality number CNEX 03.1088

B. Essence safe type: ExiaIICT6 certificate of quality number CNEX03.822

### 4.2 The classification, grade, and temperature group of the explosion-proof electrical equipment used into explosibility environment

A. Classification

I class: electrical equipment used to below will of the coalmine.

II class: Factory used electrical equipment

This transmitter belong to II class electricalequipment

B. Grade and temperature group

II class electrical equipment according to its suit used to explosibility gas compound ratio of the maximum examine safe gap ME—SG (for frame-proof type) and the minimum ignition current MIC (for essence safe type) divided into A. B. C three grade (see table 1-1), and according to its highest surface temperature divided into T1 ~ T6 group (see table 1 ~ 2).

Table 1-1 MESG grade table

Grade	MESG (mm)	MIC
IIA	MESG > 0.9	MIC > 0.8
IIB	0.9 > MESG > 0.5	0.8 > MIC > 0.45
IIC	0.5 > MESG	0.45 > MIC

Table 1-2 Permissible electric apparatus surface temperature-grouping table

Temperature group	T1	T2	T3	T4	T5	T6
Permit the highest surface temperature ( )	450	300	200	135	100	85

### 5. Frame-proof type transmitter before install and use notice points:

Transmitter strict according to GB 3836.15 ~ 2000 (explosibility gas environment used electrical equipment fifth part: Dangerous field electric install (except coal mine) relative item carry on install.

Frame-proof type transmitter when apply in dangerous field, the transmitter case cover must turn tighten, in order to ensure apply safety must strict keep safe regulations, absolute not permit when make contact open the transmitter cover.

When install the frame-proof type transmitter, must ensure cable lead out port with fine seal.

Transmitter external case must be grounding good.

After essence safe type transmitter must match used safety grid only can used in the dangerous field with explosibility compound. Safety grid must correspond to GB3836.4 ~ 2000 “Explosibility gas environment used electrical equipment fourth part essence safe “i” regulation, and pass through relative explosion-proof department carry on check and get the explosion-proof certificate of quality, according to its operation manual requirements carry on install.

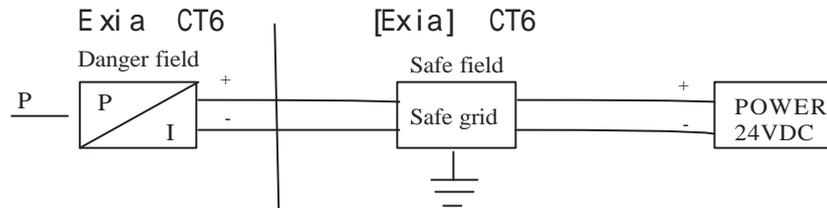


Fig:5-1

$U_i = 28\text{VDC}$ ,  $I_i = 30\text{ mA DC}$ ,  $P_i = 0.84\text{W}$ ,  $C_i = 0.04\ \mu\text{F}$ ,  $L_i = 0.1\text{mH}$

$U_o$   $V_i$ ,  $I_o$   $I_i$ ,  $P_o$   $P_i$ ,  $C_o = C_p + C_i$ ,  $L_o = L_p + L_i$

$U_o$ ,  $I_o$ ,  $P_o$ ,  $C_o$ ,  $L_o$  is essence-safe explosion-proof parameter of the safety grid;  $C_p$ ,  $L_p$  is distributed parameter of the connected cable.

In order to safety must distinguish the essence safe loop and the non-essence safe loop, and hold the essence safe loop wiring and other electrical loop wiring separate run wire.

When inside element of the frame-proof type transmitter fail it need to repair or to replace, in principle should undertake by manufacture factory. When user oneself repairs, must according to relative note matter, concrete repair method please according to repair chapter and sections carry on. (Repair of the essence safe type instrument only limit within described scope carry out, out of the scope repair must consult with manufacture factory). After pass through checked and repaired only can renew put into revolve.

User may carry on the repair, only limit within the use common tool scope, but not allow use electric iron. Repair must after the equipment stop power supplied and take off outside wiring, the faulty equipment take to non-danger field, then can be carried on.

Prohibit reform and change standards

The product of the get explosion-proof certificate of quality not permit at will replace which for explosion-proof performance influential parts or construction.

The power transformer supplied to safety grid must correspond to GB3836.4 ~ 2000 standard 8.1th item requirement.

## 6. Construction and technical parameter of liquid level transmitter

### 6.1 Construction and technical parameter of WIDEPLUS –LD Direct Mount Type static pressure liquid-level transmitter

Technical parameter

Power supply: 12.5V ~36V DC

Output signal: 4 mA ~20mA 2-wire system

Measuring Range: 0~100m (Max)

Accuracy: 0.2 grade, 0.5 grade

Stability: <0.1%FS/year

Temperature: normal temperature

Medium: -20~70° C

Environment: -20~70°C

Storage: -20~80°C

Relative humidity: 0~95% RH

Material: Process connection: Stainless steel 1Cr18Ni9Ti

Seal: fluorine rubber

PTEE

Sealed weld

Membrane: 316 L stainless steel

Ceramic capacitance

Mode of process connection: flange (approves DN50 PN1.6 MPa)

Protection grade: IP65 K1 shell is IP67

Dimensions (mm)

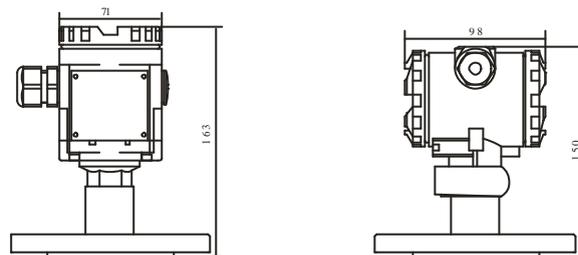


Fig. 6-1 Outline dimension of WIDEPLUS-LD Direct Mount type static pressure liquid-level transmitter

**6-2 Construction and technical parameter of WIDEPLUS-LC Cable Type static pressure liquid-level transmitter**

Power supply: 12.5 V~36V DC

Output signal: 4~20mA 2-wire system

Measuring Range: 0~100m (Max)

Accuracy: 0.2grade, 0.5 grade

Stability: better than 0.1%FS/year

Atmosphere pressure: 86~108KPa

Temperature: normal temperature

Medium: -20~60° C

Environment: -20~70°C

Storage: -40~80°C

Material contacted with the medium

Housing: Stainless steel 1Cr18Ni9Ti

Seal: fluorine rubber

PTEE

Sealed weld

Membrane: 316 L stainless steel

Ceramic capacitance

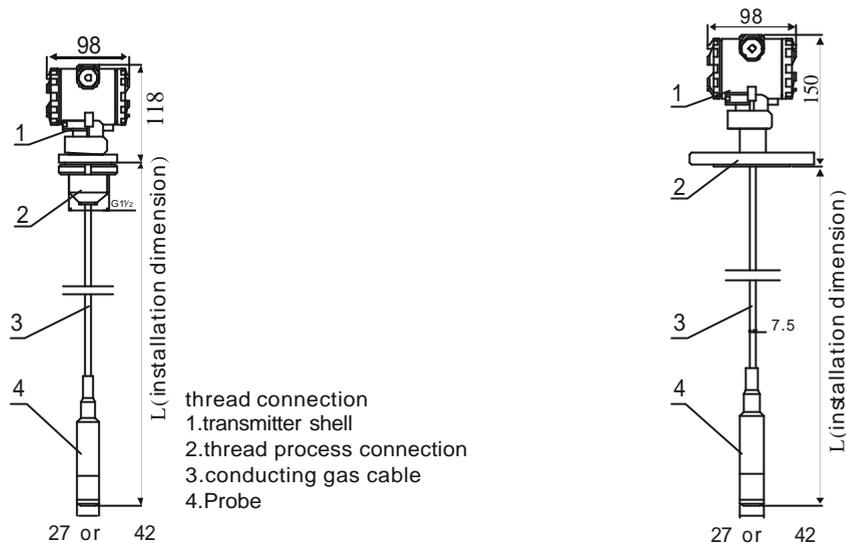
Material of guide gas cable: combination of polyethylene chloride and nitride rubber

Mode of process connection: outer thread  $G1\frac{1}{2}$

flange (approves DN20, PN0.6)

Protection grade: the part of sensor is IP68, connection box is IP65 (K1 shell is IP67)

Dimensions (mm)



Note: the probe diameter of ceramic capacitance and diffusion silicon is respectively 42 and 27

### 6-3 Construction and technical parameter of WIDEPLUS-LR bar type static pressure liquid-level transmitter

Technical parameter

Power supply: 12.5 V~36VDC

Output signal: 4~20mA

Measuring Range: 0~4m (Max.)

Accuracy: 0.2 grade, 0.5 grade

Stability: better than 0.1% FS/year

Permission Temperature: Standard temperature

Medium: -20~70° C

Atmosphere: -20~70°C

Storage: -40~80°C

Material contacted with the medium

Housing: Stainless steel 1Cr18Ni9Ti

Seal: fluorine rubber

PTEE

Sealed weld

Membrane: 316 L stainless steel

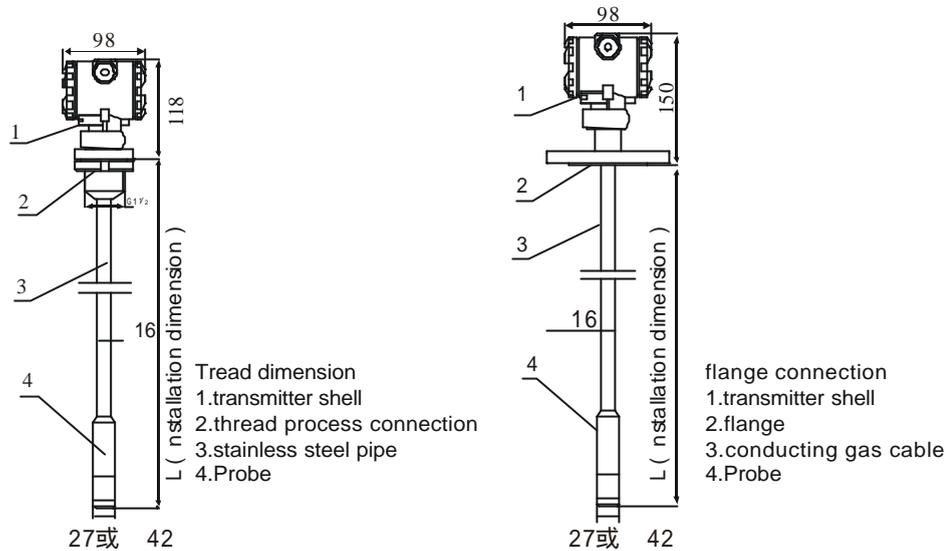
Ceramic capacitance

Mode of process connection: outer thread  $G1$

flange (approves DN20, PN0.6)

Protection grade: the part of sensor is IP68, connection box is IP65 (K1 shell is IP67)

Dimensions (mm)



**Note: the probe diameter of ceramic capacitance and diffusion silicon is respectively 42 and 27**

## 7. Debugging (WIDEPLUS-L series)

### 7-1 debugging

Cable, tube and direct mount type transmitters are calibrated in factory by “dry calibration” according to medium density offered by user. Because the calibration condition is not same as process condition, user needs re-calibration generally. Make level up to its span, and then set output current to 20.000mA by turning Span Potentiometer. If the level cannot be making up to its span, calibration can carry out according to below equation:

$$I_n = (h_n / h_{max}) * 16 + 4 \text{ mA}$$

In which:  $I_n$ - output current relative to n point level (mA)

$h_n$ - n point level (m)

$h_{max}$ - Max. level (ie, span, m)

Please refer to factory record for higher accuracy.

### 7-2 Zero and range adjustment

Regarding to intrinsic safe transmitter, its Zero and range potentiometers are located in wiring case. Slide the plate marking “Z” and “S” in which “Z” represents zero and “S” span.

Regarding to explosion-proof transmitter, potentiometers locate in the electrical circuit which is in the housing. You will see the potentiometers after opening the housing.

### 7-3 Schematic diagram for debugging wiring

A. Regulate system shown as the Fig. 7-1:

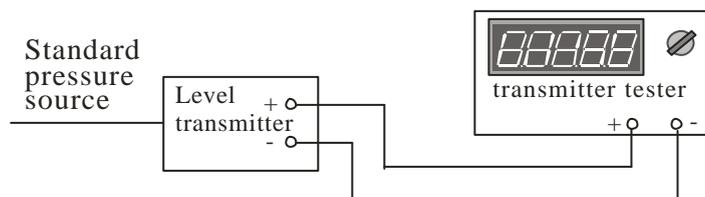


Fig. 7-1 Wiring Diagram

B. If process tester are not available, the test system can replace with a 24Vdc power, a 250Ω or a

50Ω standard resistance and a 4 1/2 digital voltage meter (Fig. 7-2)

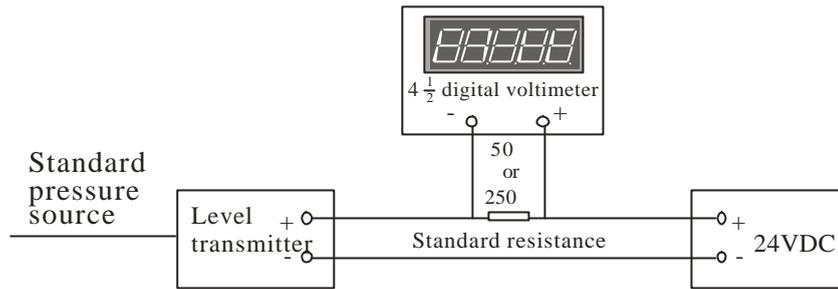


Fig.7-2 Compound wiring diagram

#### 7-4 Tester requirements

No.	Tester Name	Measuring Range	Remark
1	Process Tester	0-30mA, +/-0.05% with 24Vdc power	
2	Digital Pressure Meter	0-20KPa+/-0.05% FS	Optional
3	Digital Pressure Meter	0-2000KPa+/-0.05% FS	
4	Piston Pressure Source	0-60MPa+/-0.05% FS	
5	Pressure Source	Pneumatic setter, micro-pressure adjuster	
6	24Vdc Power	24Vdc+/-10%	When Process Tester unavailable
7	Standard Resistance	250Ω or 50Ω +/-0.01%	
8	Digital Voltage Meter	4 1/2 digital voltage meter, 0.01%	

#### 7-5 Calibration procedure

- A. Connect pressure source and transmitter and seal the connection.
- B. Apply zero pressure to transmitter; output of transmitter should be 1.000V or 4.000mA. If not, turn zero potentiometer.
- C. Apply span pressure to transmitter; output of transmitter should be 5.000V or 20.000mA. If not, turn span potentiometer.
- D. Repeat step B and C until meeting the requirements.

### 8. Installation

#### 8-1 Wiring

Intrinsic safe: Signal terminals locate in a separate cabinet. Screw the back cap of housing; find five terminals (See Fig. 8-1) in which two terminals are used for signal, the other two for testing or connecting display meter. There is a diode between test terminals, so power cannot be supplied to them directly.

Explosion-proof: Signal terminals locate in a separate cabinet. Screw the back cap of housing; find four terminals (See Fig. 8-1) in which middle two terminals are used for signal, the other two for testing or connecting display meter.

There are two electric conduits on both sides of housing using for cable. Screw the nut to secure cable. Conduit unused be sealed. There is a fixing for explosion-proof transmitter that be fixed after operation.

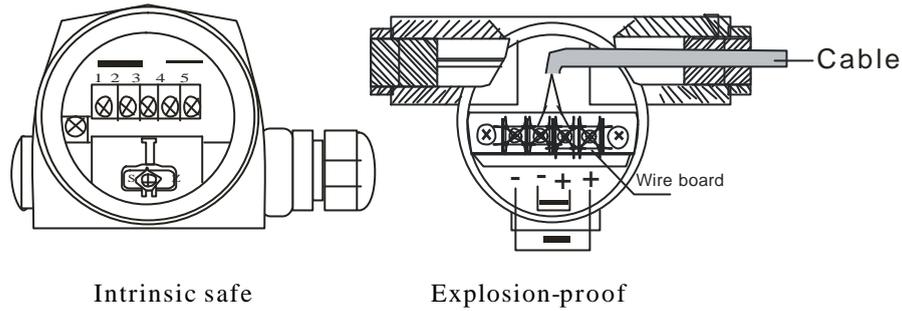


Fig. 8-1

### 8-2 Basic requirements for installation and usage

- A. Installation condition meets the requirements of this manual.  
Avoid installing in violent vibration, heating source and corrosive atmosphere.
- B. A holder is used for fixing housing. Avoid pressing or clamping the “ ventilation” tube.
- C. A separate cable (two cores, O.D 9~10mm) with metal screen grounded is used for Explosion-proof transmitter. The electric conduit is as follows:

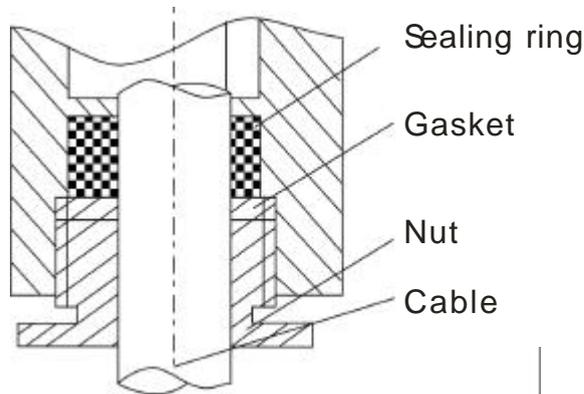


Fig. 8-2

Screw the nut to secure cable and meet requirements of explosion-proof and waterproof. Pay attention to various disturbances: cable is in a line not in rolls; keeping distance from high voltage cables; distributed capacitance <math><0.19\mu\text{F}</math> and inductance <math><1.0\text{mH}</math>.

- D. Grounding: Screw grounding bolt to secure grounding wire. Make sure that grounding resistance is less than 4 ohm. Grounding gasket be pressed under M10X16 bolt.
- E. Meet requirements of explosion-proof regulations. When safe grid is used, refer to User’s Manual of safe grid and note cable length, distributed capacitance and inductance.

### 8-3 Installation (Cable Type and bar Type)

- A. Screw connection: Supply a G11/2 round nut with each transmitter. There are two installations: 1. There is a G11/2 screw in site so screw the transmitter directly; 2. There is no a G11/2 screw in site so a  $\text{Ø}50\sim 60\text{mm}$  hole or a holder with  $\text{Ø}50\sim 60\text{mm}$  hole is needed, then screw the transmitter on it.
- B. Flange connection: Default flange complies with GB 9119.6-88 DN 50. If there is flanges in site please provides flange size or standard to manufacturer.  
Note: Direct mount transmitter flange meets GB 9119.6-88 DN50.
- C. The sensor head can be submersed directly in liquid or with heavy material or with anchor fixing on tank wall. Which installation is used depending on the practical conditions. Basic consideration is that the sensing hole cannot be blocked up by sediment; for example, to measure river level a plate is used to smooth the level and the output signal. Make sure that the sensing hole is not

blocked when measuring paste level.

D. Do not alter or change elements, which may affect the explosive ability.

## 9. Maintenance and Trouble shooting

The instrument must carry on check regularly to its basic characteristic when operation, adjusting zero. Replace fault elements; find trouble and shoot, to ensure the instrument's operation is normal and reliable, now the general trouble shooting method listed table explanation as follows:

Phenomenon	Cause	Shooting
No output	Power voltage misused	Power voltage is not match with load.
	Load resistance misused	
	Power polarity	Re-wire
	Output wire broken	Switch on
Output=100% or =0%	Measuring system un-correct	Check isolation meters, display instrument and transmitters.
	Zero, span and potentiometer Un-correct or damage	Replace damage elements and re-calibrate.
	Span coarse setting un-correct	Correct

Note: Please send transmitters to factory if above does not work.

## 10. Ordering Information

### 10-1 Please note the followings when order explosion proof transmitter.

- There are two kinds of transmitters for dangerous area use: explosion-proof and intrinsic safe. User should select according to GB 3836.15-2000 《Electric Device Used in Explosive Gas Environment No. 15 Section: Dangerous Location Electric Installation (Exclusive of Coal Mine)》.
- Determine the composition of inflammable or explosive medium, and then select the relative proof group and class according to GB 3836.
- The selected transmitter, which group and class should be higher than that of medium.
- Temperature environment for explosion proof transmitter is -20~70°C.
- Intrinsic safe transmitter should use with related safe grid according to requirements of explosion-proof or user's manual. Safe grid made by our company is recommended.

### 10-2 Please offer the followings when order:

- Model
- Standards, explosion-proof area
- Process connection and its material
- Sensor and its material
- Installation size
  - Cable type: cable length L=( )m
  - Tube type: tube length L=( )m ( From flange face to sensor face)
- Measuring range
- Medium and its density

### 10-3 Example

Capacitive cable level transmitter, explosion-proof, cable type, 316 screw G11/2.

Medium: water

Installation size: 5m

Measuring range: 4m

Ordering code: WIDEPLUS-LCD1TC1F2A5HG09

Medium: water

h=4m

L=5m

# 11. Type spectrum table for WIDE PLUS -L series liquid-level transmitter

## 11-1 Type spectrum table

Model										Explanation		
<b>WIDE PLUS -L</b>												
<b>Type</b>	C											C standard cable type (cable temperature 70 °C)
												C1 integrated explosion-proof carries the connection box (note 1)
												C2 integrated carries the connection box (note 1)
	R											Pole type (note 1)
D											Direct-mounting type	
G												Armored cable type (note 1) G1 armored pipe for 304 G2 armored pipe for 316 SS
<b>Explosion-proof rank</b>	S											Standard type (no explosion-proof)
	D											Isolated explosion type Exd IIBT6 or Exd IICT6 (K1 outline)
	I											Intrinsic safety type ExibiICT6 or ExiaIICT6
<b>Material of process connection</b>		1										316 L SS
		2										304 SS
		3										1Gr18Ni9Ti SS
		9										Special requirement
<b>Mode of process connection</b>			T									Outer thread G1 1/2
			F									Flange (note 2)
			Y									Special appointed
<b>Membrane material</b>			A									Membrane of diffusion silicon A1: standard type A2: super stable type
			C									Ceramic capacitance membrane
<b>Material of seal element</b>			1F									Fluorine rubber
			2F									Nitrile rubber
			3F									PTEE (does not apply for diffusion silicon)
			4F									Full sealed weld (only used to diffusion silicon)
<b>Mode of signal output</b>			2									(4 ~ 20) mA DC two wire system
			9									Special requirement
<b>Display mode</b>				A								No field indication
				B								0 ~ 100% linear display
				C								LCD digital range display (liquid crystal)
				D								LED digital range display (numeral tube)
				E								0 ~ 100% LCD digital display
				F								0 ~ 100% LED digital display
<b>Accuracy grade</b>				1								0.1 grade (note 3)
				2								0.2 grade
				5								0.5 grade
<b>Counterpoise</b>				H								No counterpoise
				Z								Standard counterpoise (please provides flow rate, density)
				Y								Special requirement
<b>Installation dimension</b>												It only limited cable type and pole type (note 4)
<b>Measuring scope</b>												See the standard range table for WIDE PLUS -L series universal pressure transmitter
<b>Option gives an example</b>	WIDE PLUS -LCS1FA1F2A5H											

Note: approves K1 outline

Notice to the order: density of liquid medium ( ), temperature ( )

The range of liquid level h = ( )m

Cable type: cable length L = ( ) m

Pole type: insert depth L = ( ) m (distance from the probe to flange)

Note 1: The integration is that mode for which adopts import the sensor with stainless steel isolation membrane and high-performance special amplification circuit be directly packed in the probe.

Note 2: cable and pole type liquid-level flange approves DN 20 PN 0.6 MPa, direct-mounted liquid-level flange approves DN 50 PN 1.6 MPa, threaded type approves the thread is G1 1/2, special demand please noted it when ordering.

Note 3: 0.1 grade precision can be realized only if it should be employed the membrane material of super stable diffusion silicon (A2).

Note 4: Installation dimension used in the cable and pole transmitter, if measuring range of well water-level is 10 m, installation dimension is 11 m, then extra 1 m use to installation regulating, actual measurement is 10 m and does not notice. Cable type approves height regulation is 1 m pole type users should be detail noted the installation dimension.

Note: Guide gas cable of cable liquid-level transmitter adopts high-performance environmental protection material such as import abrasion-proof, weak acid-proof (concentration), anti-low temperature, and may apply to food, medicine and other survey field.

#### 11-2.WIDPLUS series pressure transmitter standard span table

Gauge pressure code	Measure scope	Range	Capacitance type overload	Diffusion silicon overload	Capacitance type	Diffusion silicon
G03	0-10KPa	4KPa-20KPa	0.6MPa	30KPa		×
G04	0-16KPa	6.4KPa-20KPa	0.6MPa	30KPa		
G05	0-20KPa	8KPa-35KPa	0.6MPa	50KPa		
G06	0-25KPa	10KPa-35KPa	1.0MPa	55KPa		
G07	0-30KPa	12KPa-35KPa	1.0MPa	55KPa		
G08	0-35KPa	14KPa-35KPa	1.0MPa	55KPa		
G09	0-40KPa	16KPa-70KPa	1.0MPa	105KPa		
G10	0-60KPa	24KPa-70KPa	1.0MPa	105KPa		
G11	0-100KPa	40KPa-100KPa	1.0MPa	300KPa		
G12	0-160KPa	64KPa-200KPa	1.8MPa	300KPa		
G13	0-200KPa	80KPa-200KPa	1.8MPa	300KPa		
G14	0-250KPa	100KPa-350KPa	2.5MPa	525KPa		
G15	0-400KPa	160KPa-700KPa	2.5MPa	1.05MPa		
G16	0-600KPa	240KPa-700KPa	4.0MPa	1.05MPa		
G17	0-1.0MPa	0.4MPa-10MPa	4.0MPa	1.5MPa		

NOTE: “×”,means do not provide; “ ” means provide by standard range.