

**FFL500 Series**

# User Manual

**FY/JC 120 A / O 15/11 v 1.1**



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# FFL500 Magnetic float level meter

## 1、 Summary

FFL500 Magnetic float level meter , which use vacuum panel combined with LCD liquid crystal display, to make the measurement and control of the liquid level are simple and easy to understand.

## 2、 Main Parameters

- 1 ) Measuring range : 300-8000mm
- 2 ) Material : PP、 SUS304、 SUS316L、 SUS304+PTFE
- 3 ) Accuracy :  $\pm 10\text{mm}$ 、  $\pm 5\text{mm}$
- 4 ) Powder supply : 220V AC、 24V DC
- 5 ) Communication protocol : RS485、 HART
- 6 ) Powder :  $\leq 720\text{mw}$
- 7 ) Output signal : 4 ~ 20mA
- 8 ) Working pressure : 1.6MPa 2.5MPa
- 9 ) IP grade : IP65
- 10 ) Explosion-proof grade : ExiaIICT4
- 11 ) Electrical interface : M20\*1.5
- 12 ) Installation form : Top installation、 Side installation



### 3、 Basic performance

Structure	Conditions			Flange Connection		The component of the media
	Working Tem <sup>o</sup> C	Working Pressure MPa	Density g/cm <sup>3</sup>	DN	PN	
Basic Type	-20~100	≤2.5	0.5~2.0	25	1.0,2.5	1Cr18Ni9Ti 304
	-20~200					
High temperature low pressure	≤450	≤2.5	0.5~2	25	2.5	00Cr17Ni14M2,304,316L
High temperature middle pressure	≤520	≤4.0	0.38~2	25	4.0	
High temperature high pressure	≤520	≤6.4	0.6~2	25	6.4	
High temperature high pressure	According to thermometer, the max working temperature ≤520 <sup>o</sup> C, the max working pressure ≤32MPa		0.6~2	25	10.0	
High temperature high pressure			0.6~2	25	16.0	
High temperature high pressure			0.6~2	25	25.0	
High temperature high pressure			0.6~2	25	42.0	
Low temperature (Frosting)	-40~100	≤4.0	0.38~1.2	25	4.0	
Low temperature (Frosting)	-196~100	≤4.0	0.38~1.2	25	4.0	
Special type of liquid ammonia and liquefied petroleum gas	-20~100	≤4.0	0.4~1.2	25	2.5,4.0	
corrosion resistant	-30~200	≤2.5	0.5~2.0	25	2.5	PTFE
No blind zone corrosion resistant	-30~200	≤2.5	0.5~2.0	25	2.5	PTFE
corrosion resistant	-20~90	≤1.0	0.5~2	25	1.0	PPR
corrosion resistant	PP、CPVC:-20~100 <sup>o</sup> C UPVC: -20~60	≤0.6	0.5~2	25	1.0	UPVC、PP CPVC
corrosion resistant	-20~80	≤0.6	0.6~2	25	1.0	PP
Special type for liquid sulfur	≤250	≤1.6	0.9~2	50	1.6	1Cr18Ni9Ti
Health standard type	-20~150	≤0.6	0.9~1.2	25	0.6	316L,Ti

## 4、 Application

1、 Measure the medium containing solid suspended impurities and ferromagnetic impurities, users can consider adding filters. ;

2、 The liquid level gauge with a variable output electrical signal has a medium temperature of not more than 140 degrees..

## 5、 Installation

User need to check the package after receiving the products, and then check the product quality , the package should be intact and clearly marked. If there is obvious broken on the package , need to contact the shipper for the problems and inform our company. If there is no problem with the package, open the package and take out the product , check the products, the steps are as below:

①、 Remove the float chamber flange and install the float in the upward direction of the arrow (at this time the float magnets in the upper part of the float) into the float chamber. Re-install the float chamber flange. Pay attention to installing the sealing gasket and tighten it evenly.

②、 Block up the flange under the level gauge and gently inject clean water into the float chamber through the upper connecting flange opening. If the indicator should have a level indication and be sensitive to no pulsation, the level gauge will show normal operation. ;

③、 If the indicator is a tracking indicator, the indicator float can be sucked up by the spare tool magnet to couple with the float in the float chamber (float indicator) or correctly indicated by the magnet bottom-up suction indicator. In the process of testing, you can contact us by

phone..

When installing the liquid level gauge, you should gently handle it so as not to affect your application. The following steps can be taken to install the mechanical part. :

①、 Connect the connecting flange (or thread) of the level gauge with the corresponding flange (or thread) of the equipment, and install the necessary sealing devices (such as gaskets) on the joint surface of the process connection, and fix the gauge on the flange of the device.

②、 When the instrument is installed on the pressure vessel, it should be tested with the vessel according to the relevant regulations, that is, through the hydraulic test of 1.25 times working pressure and the air tightness test of 1.05 times working pressure, it can be put into use after confirming that there is no leakage.

③、 When the test pressure exceeds 1.25 times the instrument working pressure, the float should be removed from the float chamber. After the water pressure test is qualified, the float should be loaded into the float chamber to carry out the air tightness test under the instrument working pressure not more than 1.05 times.

④、 Installation of top-mounted instruments should first install a float rod and move the float by hand to simulate the change of liquid level. The indicator should be able to operate normally. When the instrument is installed, the floating ball rod is inserted into the main pipe through the flange hole of the instrument, and the push-pull floating ball drives the magnetostatic device to move up and down, and then the display panel (indicator) is observed whether the display is normal. After confirming that the liquid level gauge is working normally, the flange of the level gauge is connected firmly with the flange on the device..

Instruments with a level transmitter (remote transmission of electrical signals) should use magnets to attract the magnet float move, simulation of liquid level changes, to detect whether

the level transmitter is working properly. For explosion-proof instruments, not only the working parameters of the transmitter should be detected, but also the explosion-proof performance of the detector (such as the strength of the explosion-proof shell, coating, sealing, etc.). Besides this:

A、 The connecting cable between the level meter transmitter and the related equipment is a two-core shielded cable, and the cross section of the cable core should not be less than 0.5mm. The shielding layer of cables should be grounded in safe place..

B、 When installing instruments with explosion-proof requirements, users must abide by the "Electrical Safety Regulations of the People's Republic of China for Dangerous Places (Trial Implementation)"; maintenance must be carried out in a safe place. The power must be cut off during installation and maintenance. After the power is off, the instrument terminal box is turned on again. The earthing terminals on the junction box of the instrument must be connected with reliable ground wires. In the process of adjustment and use, attention should be paid to protecting the explosion-proof thread joint surface on the instrument junction box from scratches, collisions and other damage..

C、 After the instrument on-site display part is put into operation, connect the teletransmission, cover the instrument junction box, confirm the sealing and power on. Observing the liquid level value of the digital display, if the liquid level value transmitted by remote electricity is not consistent with the liquid level value displayed on the spot, the throat hoop can be loosened and the upper and lower position of the transmitter can be adjusted appropriately until the consistency is reached. Then tighten the throat hoop.

D、 The alarm switch of the liquid level gauge is a passive dry contact switch. Generally speaking, switches can be divided into normal opening, normal closing, self-maintenance and so

on, single-pole double-throw switch is available according to the needs of users. The level meter controller (alarm point) is mainly used to control low power load (relay, contactor, etc.). It can't be used for direct control of high-power loads (such as motors etc.) Note: switch type and switching capacity in accordance with the contract.

The installation of explosion-proof liquid level meters must strictly abide by the relevant provisions of the Electrical Safety Regulations of the People's Republic of China for Explosive Hazardous Sites (Trial Implementation) and the Electrical Installation of Electrical Equipment for Explosive Gas Environment Part 15 (Except Coal Mines) of the People's Republic of China.

① . The shell of the transmitter of the liquid level gauge should be reliably grounded. ;  
② . Users should not change the internal electrical components of the transmitter at will. ;  
③ . The installation places of transmitters should avoid sun and rain. Explosion-proof signs can be classified as flameproof and intrinsically safe. :

a. Flameproof liquid level meter should confirm that the power supply has been cut off before wiring, the junction box of liquid level meter transmitter is forbidden to open with electricity, the junction box of liquid level transmitter is opened with power off, the connection cable between liquid level meter transmitter and related equipment is two-core shielded cable, and the section of cable core wire should not be less than 0.5mm<sup>2</sup>. The shielding layer of cables should be grounded in safe place..

In addition, in order to ensure the explosion-proof performance of the transmitter, the outer diameter of the cable should be between 8.2 and 8.5 (if the cable is laid through the explosion-proof hose or cable tube, please customize the appropriate thread as required), if necessary, other sealing measures can be adopted (e.g. casting solidified packing seal, etc.). After the cable is connected, please tighten the clamping nut and the clamping sheet. After the



connection is completed, please tighten the junction box cover again. Pay attention to the protection of explosion-proof thread!

b. The transmitter of the intrinsically safe liquid level meter has few electronic components, such as capacitors, inductors and other energy storage components. And the performance is stable.

The connecting cable between the level meter transmitter and the related equipment is a two-core shielded cable, and the cross section of the cable core should not be less than 0.5mm<sup>2</sup>. The allowable distributed capacitance of the cable is not more than 0.06μF, and the allowable distribution inductance of the cable is not more than 2mH. Because the distributed capacitance and inductance of the cable will ultimately affect the maximum allowable length of the transmitter cable, the appropriate cable should be selected to ensure the transmission distance. The shielding layer of the cable should be grounded in a safe place.

In addition, in order to ensure the sealing performance of the transmitter, the outer diameter of the cable should be between 8.2 and 8.5 (if the cable passes through explosion-proof hose or cable pipe laying, please customize the appropriate thread as required), if necessary, other sealing measures can be adopted (e.g. casting solidified packing seal, etc.).

The intrinsically safe level gauge should be used in conjunction with an appropriate safety grating. The safety grating parameters are as below: maximum voltage (AC peak value or DC)  $U_m : \leq 250V$  AC/DC

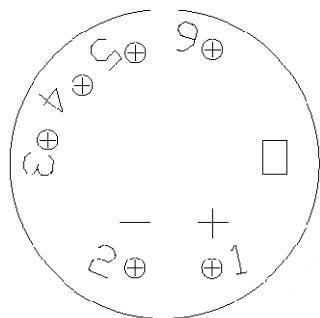
maximum output voltage  $U_0 : \leq 28V$  DC maximum output current  $I_0 : \leq 93mA$  DC

Maximum external capacitance  $C_0 : < 0.083\mu F$  Maximum external inductance  $L_0 : < 4mH$

**Note: the connection terminals of the intrinsically safe liquid level gauge and the flameproof liquid level gauge are similar.**

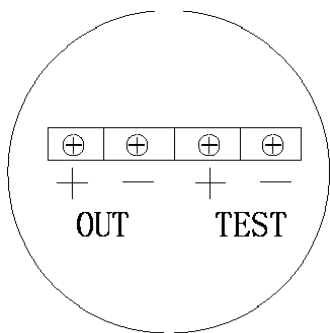
When the instrument is in operation, it should first open the upper valve, then slowly open the lower valve, so that the medium slowly flows into the float chamber, to prevent the liquid level rising too fast, causing the indicator can not track or cause the damage of the .float.

## 6、Wiring diagram



**1+ : 24VDC Input**  
**2- : 4~20mA Output**

**Wiring diagram of waterproof junction box**



**OUT+ : 24VDC Input**  
**OUT- : 4~20mA Output**

**Wiring diagram of explosion proof junction box**



**Kx-1:Open**

**Kx-2:Close**

**Kx-1**

**Kx-2**

## 7、 Selection Code

Sensor code					Transmitter code				optional	Description	
FFL500	-X	X	-X	X	X	-X	X	-X	X	-X	-Measure range(M)
Type	-Z									Side install	
	-D									Top install	
Explosion-proof form	—									standard	
	Ex									CT6	
Floater material	-P									PP	
	-N									SUS 304	
	-L									SUS 316	
	-F									SUS 304+PTFE	
Panel + pipe form	1									PP+PP	
	2									Vacuum + PP	
	3									Vacuum + SIS 304	
	4									Vacuum + SUS 304+PTFE	
Blow down valve +air evacuation valve	1									PP	
	2									304 SS	
	3									304 SS+PTFE	
	4									Blind plate	
	5									—	
Powder supply+ signal output	-1									Panel LCD display	
	-2									Display 220V AC+4~20MA	
	-3									Display 24V DC+4~20MA	
	-4									No display switch output	
Communication protocol	0									—	
	1									RS485	
	2									HART	
Electrical interface	-M									M20*1.5	
	-N									1/2" NPT	
Precision grade	A									±10mm	
	B									±5mm	
Accessories										flange , signal line_( m )	

### Illustration

Model : FFL500-Z-P11-10-NA-1200mm

Magnetic float level meter , iInstallation form : side install , Floater material : PP , panel +pipe form : PP+PP , Blow down valve+air evacuation valve : PP , Powder supply+ signal output : panel type , Precision grade : ±10mm , measure range : 1200mm



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