Version: 5620-110722

Series SHR-5620 Digital Display Volumetric Meter
Operation Instruction

1. Introduction

SHR-5620 Digital Display Volumetric Meter ,Produced by full-automatic chip mounter with surface mounting technology, has strong anti-jamming capability, and can collect liquid level data of regular and irregular tanks, and display and convert the data into tank volume, applicable to monitoring, control, and collection of process parameters.

2. Technical Specifications

Input				
Input signal	Current		Voltage	
Input impedance	≤250Ω		≥500KΩ	
Maximum input current	≤30mA			
Maximum input voltage			≤6V	
Output				
Output signal	Current	Voltage	Relay	24V distribution or feed
Output load capability	≤500Ω	≥250 KΩ (Note: Please replace the module for higher load capacity)	AC220V/3A (large) DC24V/3A (large)	≤30mA
Comprehensive parameter				
Accuracy	0.2%FS±1bit			
Setting mode	Panel touch key setting; Parameter setting values locked; Permanent storage of the setting values under power-off			
Display mode	-1999~9999 measured value display, LBD display for working status			
Working environment	Ambient temperature: 0~50℃; relative humidity: ≤85%RH; far from strong corrosive gas			
Power supply	AC 100~240V (switch power), (50-60HZ); DC 20~29V (switch power)			
Power	≤5W			
Frame	Standard snap-on			
Communication	Standard MODBUS communication protocol; RS-485 communication distance up to 1 km, RS-232 communication distance up to 15 meters; note: While with communication function, the communication converter should be an active one.			

3. Display Panel and Function Keys

1) The instrument dimension and hole size:

Dimensions	Hole Size
160*80mm (Horizontal/bar graph)	152*76mm
80*160mm (vertical/bar graph)	76*152mm
96*96mm (Square)	92*92mm

2) Digitron

PV: display measured value of liquid level, subject to user's requirements; in parameter setting status, display parameter symbols.

SV: display measured value of volume, subject to user's requirements; in parameter setting status, display setting parameters value.

3) Keys

	Enter key: conformation for digits and parameters change Page Down: Page down for parameter settings Exit key: Hold for 2 seconds to return to measurement screen
	Shift key: Shift to the left one bit by every press; Return key: Hold for 2 seconds to return to the upper level of parameters
	Minus key: to reduce the value; display time under print function
	Plus key: to increase the value; Manual print under print function

4) Four indicators

1AL1: Channel 1 alarm 1 indicator
1AL2: Channel 1 alarm 2 indicator
2AL1: Channel 2 alarm 1 indicator
2AL2: Channel 2 alarm 2 indicator

4. Standard Wiring

Attention shall be paid to the following items during wiring:

PV input (process signal input)

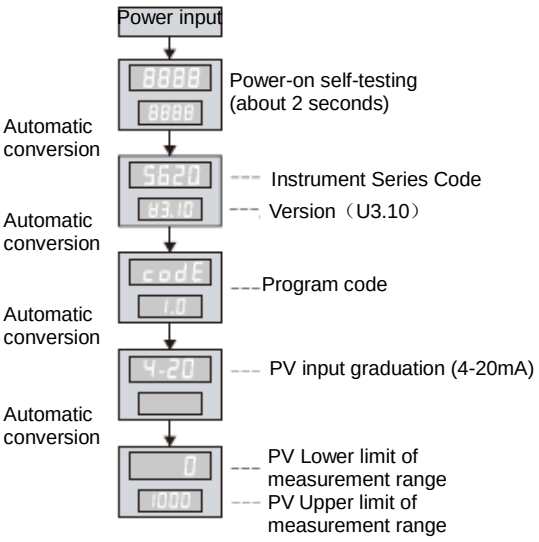
1. To reduce electrical interference, the low-voltage DC signal and sensor input wire should stay away from heavy-current electrical wire. Otherwise shielded wire shall be used and grounding shall be made at the same point.
2. Any device between the sensor and terminal may affect the measurement accuracy due to resistance or leakage current.

5. Power-on Setting

As soon as the instrument is powered on, it enters into the self-testing status (see figure on the right), and when self-testing is completed, it automatically transfers to the working status. In the working status, press the button and it displays LOC, LOC parameter settings are listed in the following:

1. 1) You can enter into Level 1 menu whatever the Loc is (LOC = 00;no locking if LOC=32);
   2) When Loc=132, press button for 4 seconds to enter Level 2 menu;
   3) When Loc=130, press button for 4 seconds to enter the time setting menu, only for the instrument with print function.
   4) When Loc=other values, press the button for 4 seconds to return to the measuring screen.
2. If Loc=577, in the Loc menu, press the key and for 4 seconds simultaneously to restore all the parameters to factory default settings.
3. In any other menu, press the button for 4 seconds to return to the measuring screen.
4. Time setting

In the status where PV displays measured values, press the button to enter into parameters setting screen. Set LOC = 130, the PV displays LOC and SV displays 130, and then press and hold button for 4 seconds to enter into time parameter setting screen. At this time, the instrument PV displays " d=09", SV displays "0720", indicating the current date is July 20, 2009; in this status, the current date may be set according to parameter setting methods. In the status of displaying current date, press the key, and PV displays "T=18", SV displays 3047, indicating the current time is 18:30:47), and in this status, the current time may be set according to parameter setting methods. In the status of displaying current time, press the key again to exit time setting screen and return to the status where PV displays measured value.



★Back to working status

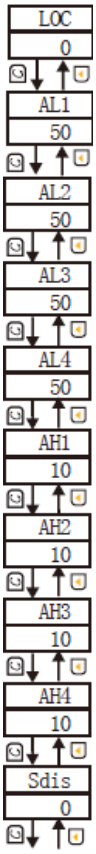
1. Manual: In the status of parameters setting, press the button for 4 seconds, the instrument will automatically return to real-time measurement status.
2. Auto: In the status of parameters setting, do not press any button. After 30 seconds the instrument will automatically return to real-time measurement status.

6. Parameters Setting

6.1 Level 1 parameters setting

In working status, press button and PV displays LOC, SV displays the parameter values: Press or to set parameters. Press button for 2 seconds to return to upper level parameter. You can enter into Level 1 parameter setting when Loc = any value.

Default setting



Back to original screen LOC

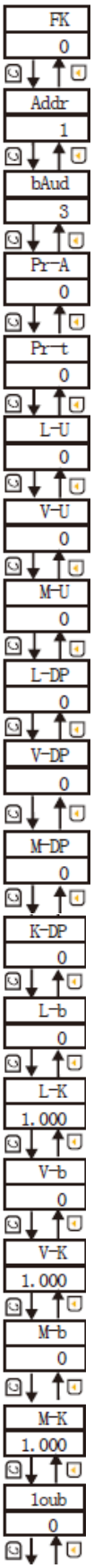
Parameters	Setting range	Description
LOC Parameters locking	0~999	LOC=00: No locking (Level 1 parameters can be modified) LOC≠00, 132: Locking (Level 1 parameters can not be modified) LOC=132: No locking (Level 1 and Level 2 parameters can be modified)
AL1 Alarm 1 value	-1999~9999	Setting value of Alarm 1
AL2 Alarm 2 value	-1999~9999	Setting value of Alarm 2
AL3 Alarm 3 value	-1999~9999	Setting value of Alarm 3
AL4 Alarm 4 value	-1999~9999	Setting value of Alarm 4
AH1 Alarm 1 return difference	0~9999	Return difference value of Alarm 1
AH2 Alarm 2 return difference	0~9999	Return difference value of Alarm 2
AH3 Alarm 3 return difference	0~9999	Return difference value of Alarm 3
AH4 Alarm 4 return difference	0~9999	Return difference value of Alarm 4
SdiS Screen contents	0~3	SdiS=0: PV displays liquid level, SV displays volume SdiS=1: PV displays liquid level, SV displays liquid mass SdiS=2: PV displays volume, SV displays liquid level SdiS=3: PV displays liquid mass, SV displays liquid level

6.2 Level 2 parameters setting

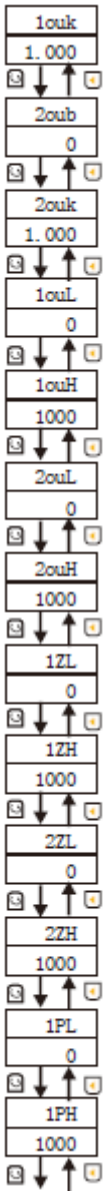
In the working status, press key , and PV displays LOC and SV displays parameter values: press or for setting; press and hold for 2 seconds to return to upper level parameter; When Loc = 132, press for 4 seconds to enter Level 2 parameters.

Default setting

Parameters	Setting range (bits)	Description
Pn Input graduation	25~31	Set type of input graduation (see Model Selection Table)
ALM1 Alarm 1 value	-0~6	ALM1=0: no alarm ALM1=1: liquid level lower limit alarm ALM1=2: liquid level upper limit alarm ALM1=3: volume lower limit alarm ALM1=4: volume upper limit alarm ALM1=5: mass lower limit alarm ALM1=6: mass upper limit alarm
ALM2 Alarm 2 value	0~6	ALM2=0: no alarm ALM2=1: liquid level lower limit alarm ALM2=2: liquid level upper limit alarm ALM2=3: volume lower limit alarm ALM2=4: volume upper limit alarm ALM2=5: mass lower limit alarm ALM2=6: mass upper limit alarm
ALM3 Alarm 3 value	0~6	ALM3=0: no alarm ALM3=1: liquid level lower limit alarm ALM3=2: liquid level upper limit alarm ALM3=3: volume lower limit alarm ALM3=4: volume upper limit alarm ALM3=5: mass lower limit alarm ALM3=6: mass upper limit alarm
ALM4 Alarm 4 value	0~6	ALM4=0: no alarm ALM4=1: liquid level lower limit alarm ALM4=2: liquid level upper limit alarm ALM4=3: volume lower limit alarm ALM4=4: volume upper limit alarm ALM4=5: mass lower limit alarm ALM4=6: mass upper limit alarm



Parameters	Setting range (bits)	Description
FL Filter coefficient	0~19 times	Setting filter coefficients to prevent value flicking (see instrument parameters instruction 2)
Addr Device ID	0~250	Set the ID of the instrument in communication
bAUd Communication baud rate	0~3	Baud=0: communication baud rate is 1200bps; Baud=1: communication baud rate is 2400bps Baud=2: communication baud rate is 4800bps; Baud=3: communication baud rate is 9600bps
Pr-A Alarm printing function	0~1	Pr-A=0: no alarm printing function (no such parameter if this function is unavailable) Pr-A=1: alarm printing function available (no such parameter if this function is unavailable)
Pr-t Interval of printing	10~2400 min	Set the interval of printing (when interval is less than 10 minutes, no printing will be made) (No such parameter if this function is unavailable)
L-U Liquid level unit	0~45	See Table of Unit Codes
V-U Volume unit	0~45	See Table of Unit Codes
M-U Mass unit	0~45	See Table of Unit Codes
L-dP Decimal point of liquid level	0~3	L-dP=0: No decimal point; L-dP=1: Ten decimal places (XXX.X) L-dP=2: One hundred decimal places (XX.XX) L-dP=3: One thousand decimal places (X.XXX)
V-dP Decimal point of volume	0~3	V-dP=0: No decimal point; V-dP=1: Ten decimal places (XXX.X) V-dP=2: One hundred decimal places (XX.XX) V-dP=3: One thousand decimal places (X.XXX)
M-dP Decimal point of mass	0~3	M-dP=0: No decimal point; M-dP=1: Ten decimal places (XXX.X) M-dP=2: One hundred decimal places (XX.XX) M-dP=3: One thousand decimal places (X.XXX)
K-dP Decimal point of mass linear conversion proportion	0~3	K-dP=0: No decimal point; K-dP=1: Ten decimal places (XXX.X) K-dP=2: One hundred decimal places (XX.XX) K-dP=3: One thousand decimal places (X.XXX)
L-b Zero shift of liquid level input	-1.999~ 9.999	Set and display zero shift of input (see instrument parameters instruction 3)
L-K Measuring range amplification scale of liquid level input	-1.999~ 9.999	Set and display amplification scale of measuring range of input (see instrument parameters instruction 3)
V-b Zero point of volume conversion	-1.999~ 9.999	Zero point of volume linear conversion (same decimal places as volume) (See instrument parameters instruction 3)
V-K Proportion of volume conversion	-1.999~ 9.999	Proportion of volume linear conversion (one thousand decimal places) (See instrument parameters instruction 3)
M-b Zero point of mass conversion	-1.999~ 9.999	Zero point of mass linear conversion (same decimal places as mass) (See instrument parameters instruction 3)
M-K Proportion of mass conversion	-1.999~ 9.999	Proportion of mass linear conversion (one hundred decimal places) (See instrument parameters instruction 3)
loub Zero shift of Channel 1 transducing output	0~1.2	Set zero shift of transducing output (for PV value transducing) (See instrument parameters instruction 4)



Parameters	Setting range (bits)	Description
1ouK Amplification scale of channel 1 transducing output	0~1.2	Set amplification scale of transducing output (for PV value transducing) (See instrument parameters instruction 4)
2oub Zero shift of Channel 2 transducing output	0~1.2	Set zero shift of transducing output (for SV value transducing, i.e. volume or mass) (See instrument parameters instruction 4)
2ouK Amplification scale of channel 2 transducing output	0~1.2	Set amplification scale of transducing output (for SV value transducing, i.e. volume or mass) (See instrument parameters instruction 4)
1ouL Channel 1 transducing output range lower limit	Full range	Set lower limit of measuring range of transducing output (for PV value transducing)
1ouH Channel 1 transducing output range upper limit	Full range	Set upper limit of measuring range of transducing output (for PV value transducing)
2ouL Channel 2 transducing output range lower limit	Full range	Set lower limit of measuring range of transducing output (for SV value transducing, i.e. volume or mass)
2ouH Channel 2 transducing output range upper limit	Full range	Set upper limit of measuring range of transducing output (for SV value transducing, i.e. volume or mass)
1ZL PV bar graph display range lower limit	Full range	Set lower limit of PV bar graph display range (only useful in case of bar graph)
1ZH PV bar graph display range upper limit	Full range	Set upper limit of PV bar graph display range (only useful in case of bar graph)
2ZL SV bar graph display range lower limit	Full range	Set lower limit of display range of bar graph (only useful in case of bar graph)
2ZH SV bar graph display range upper limit	Full range	Set upper limit of display range of bar graph (only useful in case of bar graph)
1PL Liquid level measuring range lower limit	Full range	Set lower limit of measuring range of input signal
1PH Liquid level measuring range upper limit	Full range	Set upper limit of measuring range of input signal

Back to original screen Pn

Table of Unit Codes:

Code	0	1	2	3	4	5	6	7	8	9
Unit	Kgf	Pa	KPa	Mpa	mmHg	mmH2O	bar	°C	%	Hz
Code	10	11	12	13	14	15	16	17	18	19
Unit	m	t	1	m3	Kg	J	MJ	GJ	Nm3	m/h
Code	20	21	22	23	24	25	26	27	28	29
Unit	t/h	1/h	m3/h	kg^i	J/h	MJ/h	GJ/h	Nm3/h	m/m	t/m
Code	30	31	32	33	34	35	36	37	38	39
Unit	1/m	m3/m	kg/m	J/m	MJ/m	GJ/m	Nm3/m	m/s	t/s	1/s
Code	40	41	41	43	44	45				
Unit	m3/s	kg/s	J/s	MJ/s	GJ/s	Nm3/s				

7. Instrument Parameters Instruction

1. Alarm output (AL1, AL2, AH1, AH2)

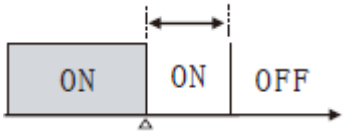
★About return difference:

Return difference for alarm output available to prevent frequent action of output relay upon fluctuation around output critical point; see specific output status below:

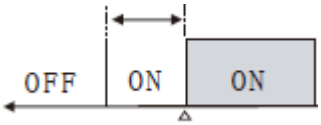
★The measured value increases from a low value: ★The measured value decreases from a low value:

Lower-limit return difference value (AH2) Upper-limit return difference value (AH1)

Lower-limit output (ON)



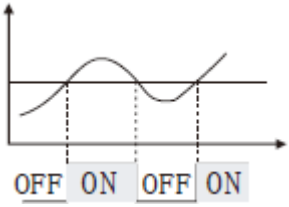
Upper-limit output (ON)



Lower-limit setting value (AL2) Upper-limit setting value (AL1)

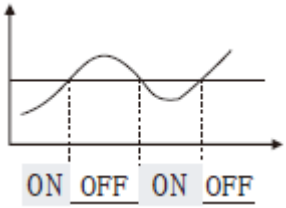
★Alarm output at upper limit:

Setting value for upper limit alarm



★Alarm output at lower limit:

Setting value for lower limit alarm



2. Filter coefficient means setting of sampling times to prevent flopping of measured and displayed value. Sampling period: at the analog value input, the instrument will collect data every 0.5 second. The relation between PV display value and filter coefficient and sampling period:

For example, at the analog value input, if filter coefficient is set as 6 (times), it will automatically average values sampled in 3 (6*0.5) seconds and update PV display value in the recurrence method (i.e. the display value will always be average sampled value in previous 3 seconds).

3. Shift and Amplification of Display Input

For regular collation, Pb and PK may be adjusted to change display error of measurement value.

Pb and PK calculation formula: PK= set display range / actual display range * original PK

Pb= set lower limit of display range – actual lower limit of display range* PK + original Pb

Take one instrument with input of direct current 4-20mA for example, its measurement range is -200-1000KPa. At the collation, it's found that in case of 4mA input, it will display -202 and in case of 20mA, it will display 1008. (Original Pb=0, original PK=1.000)

Based on the formula, PK= set display range / actual display range * original KK1

=[1000-(-200)]÷ (1008-(-202) ×1=1200÷1210×1≈0.992

Pb= set lower limit of display range – actual lower limit of display range* PK + original Pb1

= -200 - (-202×0.992)+0 = 0.384

It's set that Pb=0.384 and PK=0.992.

4. Transmission output shift 1Oub,1OuK, 2Oub, 2OuK

Instrument transmission and control output will be collated at 0-20mA or 0-5V; change of output range or output bias correction may be realized by the following formulas:

$$\text{New Oub} = \text{current Oub} - \frac{\text{current output lower limit} - \text{set output lower limit}}{\text{full range}}$$

$$\text{New Oub} = \text{current Oub} - \frac{\text{current output lower limit} - \text{set output lower limit}}{\text{full range}}$$

Where in case of current signal output, full range = 20mA; in case of voltage signal output, full range = 5V.

Example 1: transducing current output 0-20mA is now desired to be changed to 4-20mA output. At the moment of measurement, output zero is 0mA; at the moment of full range of input, output is 20mA; current Oub=0, current OuK=1.

New $Oub = 0 - \frac{0-4}{20} = 0.2$ $OuK = 1 - \frac{20-20}{20} = 1$

Therefore, set Oub as 0.2 without change of OuK, the 0-20mA output will be changed to 4-20mA.

Example 2: for transducing current output of 4-20mA, at the moment of measurement, output zero is 4.2mA; at the moment of full range of input, output is 20.5mA; current Oub=0.2, current OuK=1.

New $Oub = 0.2 - \frac{4.2-4}{20} = 0.19$ New $OuK = 1 - \frac{2.5-20}{20} = 0.975$

8. Instrument Models and Wiring Diagram

1. Models

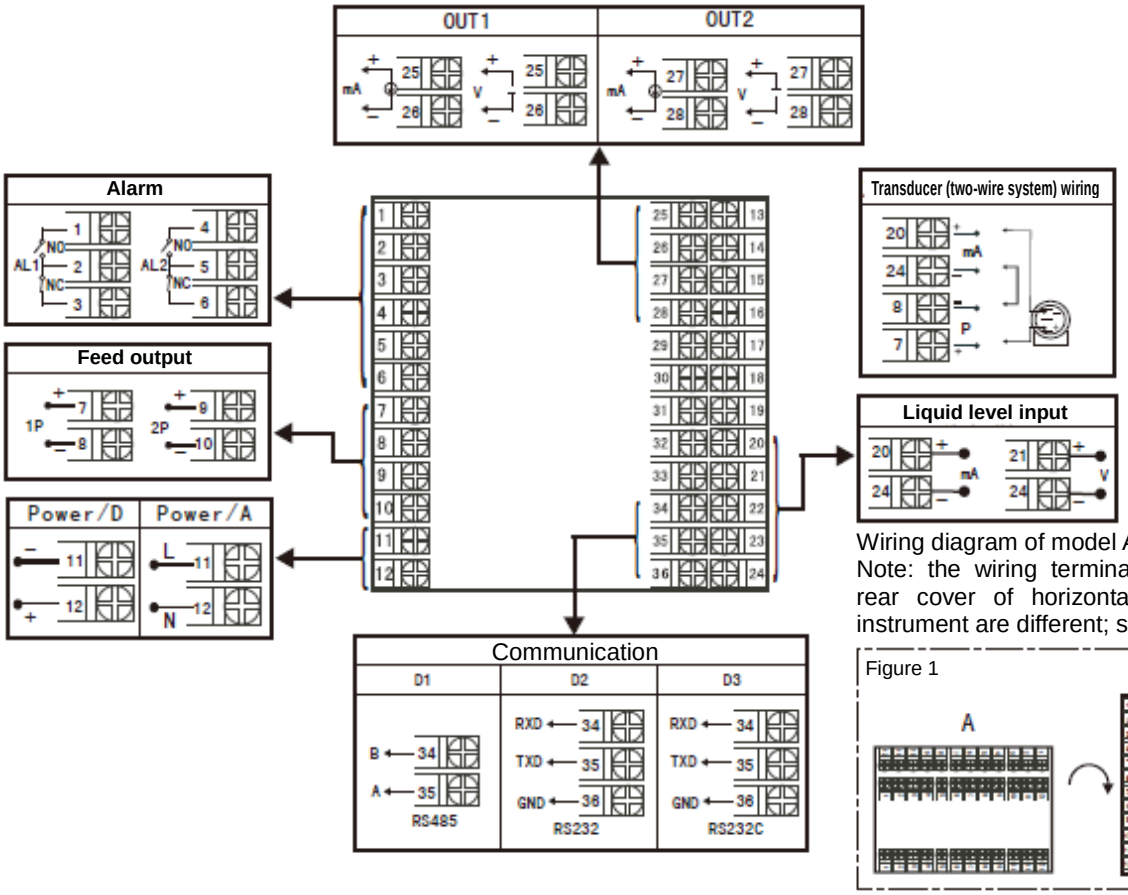
SHR-5620 □ - □ - □ / □ / □ / □ / □ ( ) - □ - ( )
① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨

①Specification		②Input graduation		③Transducing output1 (OUT1)		④Transducing output2 (OUT2)	
Code	Width*height*depth	Code	Graduation (measuring range)	Code	Output type (load resistanceRL)	Code	Output type (load resistanceRL)
A	160*80*110mm(horizontal)	25	0~20mA (-1999-9999)	X	No output	X	No output
B	80*160*110mm (vertical)	26	0~10mA (-1999—9999)	0	4-20mA(RL^600Q)	0	4-20mA(RL^600Q)
C	96*96*110mm (square)	27	4~20mA (-1999-9999)	1	l-5V(RL=5250KQ)	1	l-5V(RL>250Kfi)
		28	0—5V (-1999—9999)	2	0-10mA(RL^l. 2KQ)	2	0-10mA(RL<1.2KQ)
		29	1-5V (-1999-9999)	3	0-5V(RL^250KQ)	3	0-5V(RL>250KO)
		30	-5-5V (-1999-9999)	4	0-20mA(RL^600Q)	4	0-20mA(RL^600Q)
		31	0—10V (-1999—9999)	5	0-10V(RL3=4KQ)	5	0-10V(RL3=4KQ)
		56	Special specification				

⑤ Relay contacts output		⑥Communication output		⑦Feed output		⑧Power supply	
Code	Limits for alarm	Code	Communication Interface	Code	Feed output (output voltage)	Code	Voltage range
X	No output	X	No output	X	No output	A	AC/DC 100—240V (AC/50-60Hz)
1	1-limit alarm	Dl	RS-485	IP	1-channel feed output		
2	2-limit alarm	D2	RS232	2P	2-channel feed output	D	DC 20-29V
3	3-limit alarm	D3	RS232C print interface				
4	4-limit alarm						

⑨Note
N/A, omissible

2. Wiring Diagram



Wiring diagram of model A, B and C
Note: the wiring terminal directions at rear cover of horizontal and vertical instrument are different; see Figure 1.

9. Print Function

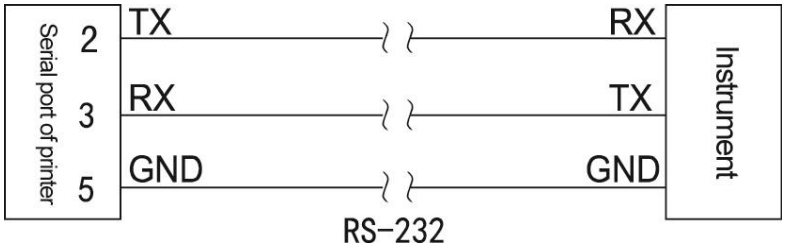
1. Manual print

In the status of displaying measured value, press the button to print the current real-time measured values.

2. Timed print

Every interval time, the instrument will control the printer to print the current real-time measured values. Printing format will be as followed:

3. Connection mode



10. Communication

This instrument is capable of communicating with master computer which can complete automatic adjustment of slave computer, parameters setting, data collection and monitoring and control. Combined with IPC software and under Windows (Chinese) system, dynamic image display, data setting, image/table generation, storage record, and report printing are available.

Technical specification: communication mode of RS-485 and RS-232; baud rate: 1200~9600 bps.

Data format: one start bit, eight data bits, and one stop bit.

★ See the "Instrument Communication Manual" for specific parameters.

The instrument can be directly connected with device with serial input/output interfaces for control.

★ Conversion between volume and liquid level will be realized through software downloaded to the volumetric meter.