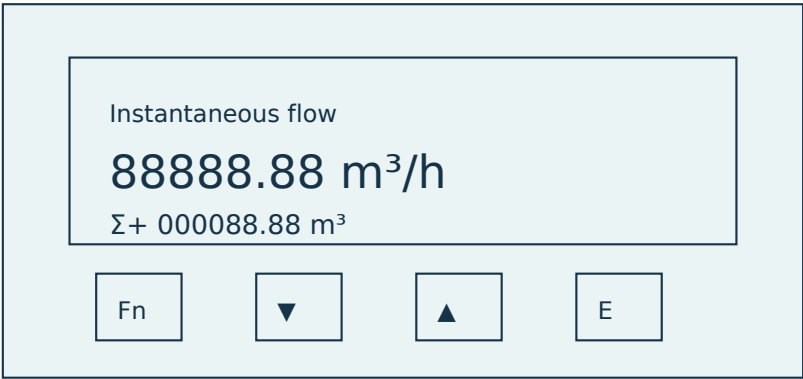


Operation manual

Display, configuration, converter wiring and calibration

1. Display and keys

On power-up, the instrument enters automatic measurement mode and displays the measured data. Use the four front-panel keys to display and configure instrument parameters.



Key / combination	Function
▲	Increase the digit at the cursor by 1; cycle the upper display.
▼	Decrease the digit at the cursor by 1; cycle the lower display.
Fn + ▼	Move the cursor left; reduce LCD contrast on the main screen.
Fn + ▲	Move the cursor right; increase LCD contrast on the main screen.
Fn + E	Open the password screen from automatic measurement; confirm a password; enter a submenu; save a parameter.
E	Return to the previous menu. Hold for more than 2 seconds and release to return to automatic measurement from any screen.

2. Passwords

The instrument has three password levels. Level 1 can change its own password. Level 2 can change its own password and view the level 1 password. Level 3 can change its own password and view the level 1 and level 2 passwords.

Level	Factory password
1	10000
2	40000
3	99999

After entering the menu with a password and returning to the main display, access remains remembered for 5 minutes. On the password screen, press Fn + E without re-entering the password.

Configuration menus

3. Measurement settings

Menu item	Setting / selection
Measuring pipe diameter	3-3000mm; fine adjustment ± 0 to ± 99 mm
Damping time	0-99s
Flow units	L/h, L/m, L/s, m ³ /h, m ³ /m, m ³ /s, t/h, t/m, t/s, kg/h, kg/m, kg/s, GPM
Flow decimal places	Automatic or manual; manual: 0, 1, 2 or 3 decimal places
Totalizer units	0.001m ³ , 0.01m ³ , 0.1m ³ , 1m ³ ; 0.001L, 0.01L, 0.1L, 1L; 1t, 1kg, GAL
Instrument range	Set the upper flow limit
Excitation frequency	1/8 of the mains frequency
Fluid density	Set the fluid density

4. Function settings

Menu item	Setting / selection
Measurement direction	Forward / reverse
Reverse measurement	Enable / disable
Reverse output	Enable / disable
Apply cutoff to display	Enable / disable
Low-flow cutoff	Set the cutoff threshold
Instrument alarms	Enable / disable; disabling turns off all alarm displays
Excitation alarm	Enable / disable
Empty-pipe alarm	Enable / disable
Empty-pipe alarm threshold	Set the threshold

In the displayed unit abbreviations, “m” after the slash means minute; for example, m³/m means m³/min. The converter’s diameter menu is a configuration capability and does not establish the available sizes of a particular sensor.

Communication and outputs

5. Communication settings

Modbus parameter	Setting / selection
Address	001-255; address 0 is reserved
Baud rate	300, 600, 1200, 2400, 4800, 9600, 19200, 38400
Parity	None, odd or even

6. Output settings

Menu item	Setting / selection
Output type	Pulse / frequency
Pulse polarity	Positive / negative
Volume per pulse	0.001-10000L
Pulse width	0.1-100ms
Frequency output range	0-10000Hz; full-scale frequency is adjustable from 1 to 10000Hz

7. System settings

Menu item	Setting / selection
Language	Chinese / English
Restore factory settings	Restore the saved factory parameters
Save factory settings	Save the parameters used as factory settings
LCD contrast	Adjust contrast
LCD backlight	On / off
Backlight timeout	1, 5, 10, 30 or 60 minutes; any key turns the backlight on
Forward total preset	Set the forward cumulative total
Reverse total preset	Set the reverse cumulative total
Clear total	Reset the cumulative flow total
Password display	Display passwords for levels 1, 2 and 3, subject to access level
Password setting	Set passwords for levels 1, 2 and 3, subject to access level

Calibration and terminals

8. Calibration settings

Menu item	Setting / selection
Flow zero correction	Set the zero correction
Sensor factor	Set the sensor calibration factor
Sensor factor calculation	Enter a reference flow to calculate the sensor factor automatically
Converter normalization factor	Factory converter normalization
Piecewise correction units	m ³ /h, m ³ /m, m ³ /s, kg/h, kg/m, kg/s, t/h, t/m, t/s, GPM, m/s, L/h, L/m, L/s
Correction pairs 1-5	Flow correction point 1 / reference flow 1; point 2 / reference 2; point 3 / reference 3; point 4 / reference 4; point 5 / reference 5
Enable piecewise correction	Enable / disable; the individual correction settings take effect only when enabled

9. Converter connections

Use the supply connection appropriate to the converter version: 220VAC uses N / PE / L; 24VDC uses – / PE / +. PE is protective earth. The signal strip order is shown below; follow the terminal markings on the instrument.

Terminal / group	Signal
EXT–, EXT+	Sensor excitation – and +
ICOM, IOUT, IVee	Current-output common, current output and external supply connection for passive output
TXR–, TXR+	RS485 – and +
POUT, PCOM	Pulse/frequency output and common
SIG1, SGND, SIG2	Sensor electrode signal 1, signal ground and electrode signal 2
Two-position DIP switch	Pulse/frequency mode selection; see the next page

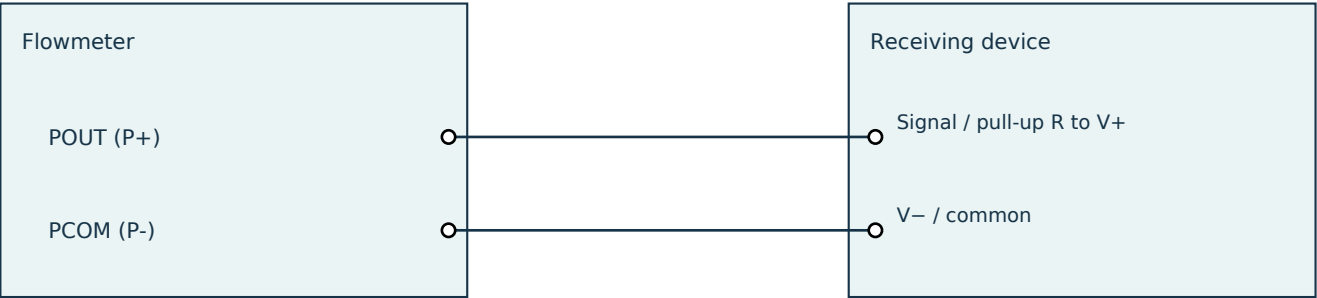
Signal strip, left to right: EXT– | EXT+ | ICOM | IOUT | IVee | TXR– | TXR+ | POUT | PCOM. The sensor signal block is SIG1 | SGND | SIG2.

Pulse and frequency wiring

Pulse and frequency outputs share POUT (P+) and PCOM (P-). Select pulse or frequency in the output menu. Three wiring arrangements are supported.

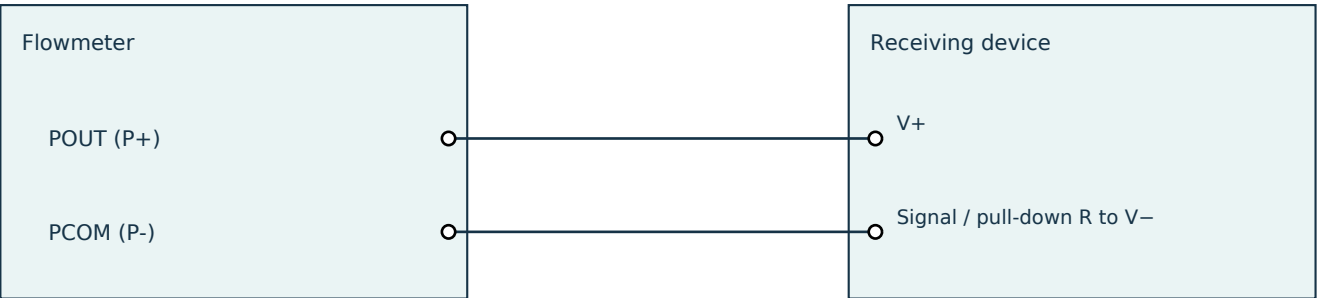
10. Passive open-collector output with pull-up

Set both J11 DIP positions to OFF, toward the “1 2” marking. POUT carries the signal. Connect a 2-10kΩ pull-up resistor from the receiving signal to an external +5V, +12V or +24V supply. PCOM connects to the supply return.



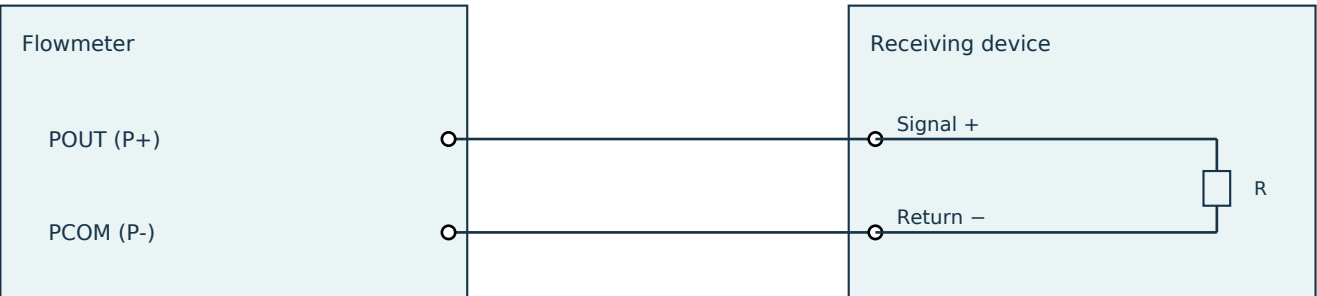
11. Passive open-collector output with pull-down

Set both J11 DIP positions to OFF. Connect POUT directly to external V+. PCOM carries the signal; connect the receiving pull-down resistor between that signal and V-. This arrangement is commonly used with PLC inputs.



12. Active level output

Set both J11 DIP positions to ON, toward the “ON” marking. POUT carries the output signal and PCOM is its return. The active output can drive the receiving load directly.



The diagrams show external wiring and terminal assignments. Internal transistor, diode and switch circuitry is omitted for clarity.

Current-output wiring

The current-output circuit uses a high-precision integrated circuit and requires no separate zero or full-scale adjustment. It supports two-wire active and two-wire passive current-output arrangements using IOU, ICOM and IVee.

13. Two-wire active current output

Connect IOU (I+) to the receiving instrument's positive current input. Connect ICOM (I-) to its negative input / common. The receiving load R is between these inputs.



14. Two-wire passive current output

Use IVee and IOU. Connect external +24V to IVee. Connect IOU to the receiving load, with the other side of that load returning to the external supply common.



Terminal identification: In the passive circuit, the positive supply goes to IVee. IOU remains the current-output terminal even though the receiving-side drawing labels that connection I-. Follow the physical terminal names shown here.

Read before initial use

Read this manual after receiving the instrument and before first operation. Keep it for future reference. Product improvements may result in changes to the technical information without prior notice.

Detailed parameter guidance

15. Measurement parameters

Diameter: The converter accepts sensor diameters from 3 to 3000mm. Fine adjustment accommodates nonstandard diameters or diameter deviations. For example, 50 – 01mm gives 49mm; 50 + 01mm gives 51mm.

Damping: Longer damping stabilizes the indicated flow and output signal and is suitable for totalizing pulsating flow. Shorter damping gives a faster response for process control. The structured menu specifies 0–99s.

Units and decimal places: Select the flow and totalizer units for the process. Automatic decimal selection depends on pipe diameter; manual selection allows 0–3 decimal places.

Instrument range: Set the upper flow limit Q_{max} . The lower limit is automatically zero. This setting determines percentage indication, frequency output and current scaling:

Quantity	Relationship
Percentage	$q / Q_{max} \times 100\%$
Frequency	$q / Q_{max} \times \text{full-scale frequency}$
Current	$q / Q_{max} \times \text{current span} + \text{zero offset}$
Volume pulse output	Independent of the instrument range setting

Here q is measured flow. For a 4–20mA signal, the current span is 16mA and the zero offset is 4mA.

16. Output parameters

Frequency: The output is a square wave proportional to flow percentage. Set its full-scale value between 1 and 10000Hz.

Pulse: Each rectangular pulse represents a selected volume from 0.001 to 10000L. This is typically used with a totalizer. A smaller volume per pulse produces a higher pulse frequency at the same flow and reduces totalization quantization error.

Pulse width: Set the width between 0.1 and 100ms to suit the receiving instrument.

Direction, alarms and totals

17. Direction and low-flow behavior

Measurement direction: If the flow direction during commissioning differs from the intended direction, change the direction parameter. There is no need to interchange excitation or signal wiring.

Reverse measurement: When enabled, the converter measures reverse flow and indicates it as a negative value. When disabled, reverse flow is displayed as zero.

Reverse output: When enabled, pulse and current outputs follow the flow value. When disabled and flow reverses, pulse output is zero and current output is 4mA.

Low-flow cutoff: The threshold is a percentage of the selected instrument range. Flow at or below this threshold is suppressed for signal output. The “apply cutoff to display” setting determines whether the displayed flow, velocity and percentage are also zeroed.

18. Alarm settings

Instrument alarm enable: When enabled, each alarm follows its individual setting. Disabling this master setting turns off all alarm indications. Excitation and empty-pipe alarms can also be enabled or disabled individually.

Empty pipe: The converter detects an empty-pipe condition without an additional electrode. With the alarm enabled, detection sets the analog and digital outputs to their zero-signal states and the displayed flow to zero.

Threshold: With the pipe full of fluid, either moving or stationary, adjust the empty-pipe threshold using the “empty-pipe ratio” value on the measurement display.

19. Communication and system use

For a multi-instrument Modbus system, select the instrument address, baud rate and parity from the communication menu. Address 0 is reserved. The complete available settings are listed in section 5.

Select Chinese or English display language and adjust LCD contrast, backlight and timeout. A key press restores the backlight after timeout.

Forward and reverse total presets allow cumulative readings to be carried over during maintenance or instrument replacement. “Clear total” resets the accumulated flow. Higher password levels can view lower-level passwords; each level can set its own new password using its existing access credential.

Zero and flow calibration

20. Flow zero correction

Fill the sensor pipe completely and keep the liquid stationary before adjusting zero. Zero is expressed as velocity in mm/s.

Display line	Meaning
Upper: $\pm 00000\text{mm/s}$	Zero correction value
Lower: FS = $\pm 00000\text{mm/s}$	Actual measured zero; unaffected by the correction setting

Set the correction to the same magnitude as FS with the opposite sign. The zero value is a sensor-specific constant. Record the sensor zero on its record sheet and nameplate in mm/s, with the sign opposite to the correction value.

21. Sensor factor

The sensor factor is the calibration coefficient for the complete electromagnetic flowmeter. It is determined by calibration and marked on the sensor nameplate.

For automatic factor calculation, enter the reference flow and save with Fn + E. For example, if the instrument indicates $9\text{m}^3/\text{h}$ and the reference flow is $10\text{m}^3/\text{h}$, enter $10\text{m}^3/\text{h}$ and save. The live instrument flow appears on the last display line.

The converter normalization factor is for factory normalization of the converter.

22. Piecewise flow correction

Choose a correction unit and enter up to five pairs: correction point 1 and reference flow 1, through correction point 5 and reference flow 5. Enable piecewise correction for these entries to take effect. Available units are listed in section 8.

Configuration notes

Use the circuit for the selected pulse or frequency output. Follow the J11 operating instructions for the active-output switch. The damping menu permits 0–99s. Current scaling uses the calibrated span and zero offset.