



Common Faults and Solutions of Electromagnetic Flowmeters

When encountering issues with an electromagnetic type flowmeters, it is essential to inspect the following four aspects to identify the root cause.

1. Installation Issues

Improper installation of the electromagnetic flow sensor is a frequent cause of faults. Typical problems include:

- Installing the sensor at the highest point of a pipeline where gas accumulates.
- Placing the sensor on a vertical pipe where fluid flows from top to bottom, which can lead to emptying.
- Lack of back pressure after the sensor, causing the fluid to discharge into the atmosphere, resulting in a partially filled measuring tube.

2. Environmental Interference

Environmental factors often lead to issues such as stray currents in the pipeline, strong electromagnetic wave interference, and magnetic fields from large motors. Effective grounding can mitigate stray current interference. In severe cases, additional measures like insulating the flow sensor from the pipeline might be necessary. Electromagnetic wave interference, usually introduced via signal cables, can be countered with single or multi-layer shielding.

3. Lightning Strikes

Lightning can induce high voltage and surge currents in instrument circuits, causing damage. This typically occurs through power lines, excitation coils, or signal lines between the sensor and the converter, especially those from the control room power lines.

4. Environmental Condition Changes

During initial debugging, favorable environmental conditions (e.g., lack of interference sources) may result in normal operation. However, if installation conditions are neglected (e.g., poor grounding), any change in environmental conditions, such as new interference sources (e.g., welding on nearby pipelines, installation of large transformers), can disrupt the flowmeter's operation, leading to fluctuating output signals.

To ensure the flowmeter's longevity and stability, it is crucial to avoid harsh environments prone to lightning, high temperatures, moisture, corrosion, and variable frequency interference. If such conditions cannot be avoided, appropriate protective measures should be taken. The installation location should ensure a straight pipe section of more than 10 times the diameter upstream and more than 5 times the diameter downstream of the flowmeter. Additionally, the pipeline must be fully filled with the liquid being measured to avoid empty or partially filled pipes.



Five Common Problems for Electromagnetic Flowmeter

1. Inaccurate Flow Measurement

When flow measurements are inaccurate, it is important to identify the reference point. Often, comparisons are made against a water pump, which is not suitable for measuring electromagnetic flow. Factors affecting the water pump's flow, such as pipeline length and height, introduce inaccuracies. Ensure the pipeline is fully filled; partial filling can lead to overestimated flow. For wastewater measurements, check for blockages in the sewage pump. If using an insertion-type electromagnetic flowmeter, inspect the probe for obstructions.

2. Unstable Flow Readings

Verify that the instrument is properly grounded. The meter body must be connected to the pipeline and then grounded, especially for plastic pipelines. Additionally, check for high-voltage variable frequency interference near the instrument.

3. No Flow Display

3.1. No Backlight Display: Check if the fuse is blown and inspect the power board's indicator light to determine if the power board is damaged.

3.2. Flashing Backlight:

- Check if the excitation circuit is short-circuited and ensure proper insulation.
- Verify if the excitation circuit is short-circuited with the housing or ground wire and insulate accordingly.

3.3. No Flow Display with Alarms (SYS, FGP):

- SYS Excitation Alarm:

- For integrated systems, this indicates a coil open circuit.
- For separate systems, measure the resistance between EXT+ and EXT- using a multimeter (should be 55-60 ohms). If correct, the sensor is fine, and the converter may need replacement. If no resistance, inspect the cable for damage, then the sensor.

- FGP Empty Pipe Alarm:

- Ensure the pipeline is fully filled. For separate systems, short-circuit the three signal wires and observe if the alarm disappears. If it does, the converter is functioning correctly.
- Check and possibly cut the signal shield wire 100-200mm from the separate meter box to confirm circuit continuity.
- If the medium's conductivity is low, causing an empty pipe alarm, adjust the empty pipe threshold to normal. The default value is 500; adjust based on observed MTP values.

4. 4-20mA Current Output Issues

No Current Output:

- Remove all external connections and measure voltage/current with a multimeter.
- Inspect for mainboard damage due to lightning, moisture, high temperature, or incorrect wiring.



5. No Pulse Output

5.1. Ensure the parameters are set for pulse output.

5.2. For separate systems, verify the second terminal of the dip switch is engaged.

5.3. For integrated systems, ensure the pulse power supply voltage is adequate, potentially requiring an external 24V supply.

By addressing these common faults with targeted solutions, the reliability and accuracy of electromagnetic flowmeters can be significantly enhanced, ensuring smooth and efficient operation in various industrial applications.