

## KGKGK TUF-2000M

# KGKGK TUF-2000M Ultrasonic Liquid Flow Meter User Manual

## 1. INTRODUCTION

---

The KGKGK TUF-2000M is a compact and versatile ultrasonic liquid flow meter designed for accurate measurement in various applications. It offers complete functionalities and is suitable for installation in instrument boxes or distribution panels using guide rail mounting. This meter supports a wide range of pipe sizes from DN15 to DN6000mm and is compatible with single liquids that can transmit ultrasound, such as water, seawater, sewage, oil, and alcohol.

Key features include 1% accuracy, a velocity range of 0 to  $\pm 10$ m/s for bi-directional measurement, and robust protection levels (IP65 for the main unit, IP68 for the transducer). This manual provides essential information for the proper setup, operation, and maintenance of your TUF-2000M flow meter.

## 2. SAFETY INFORMATION

---

- Always read and understand this manual before operating the device.
- Ensure the power supply matches the device specifications (DC8~36V or AC85~264V).
- Do not attempt to open or repair the main unit or transducers unless qualified. Refer all servicing to qualified personnel.
- Protect the device from extreme temperatures, direct sunlight, and corrosive environments beyond its specified operating range.
- Ensure proper grounding to prevent electrical hazards.

## 3. PACKAGE CONTENTS

---

Verify that all items listed below are present in your package:

- TUF-2000M Host Unit
- Steel Belt (10 meters)

- Flow Signal Cable
- Connection Terminals
- User Manual
- Transducers (TS-2 type for DN15-100mm pipes, or TM-1 type for DN50-700mm pipes, depending on model purchased)



Figure 3.1: Contents of the TUF-2000M kit, including the main unit, transducers, cables, steel belts, and user manual.

## 4. SPECIFICATIONS

Parameter	Specification
Accuracy	1%
Velocity Range	0 – ±10m/s, Bi-directional measurement
Pipe Size Range	DN15 – DN6000mm (Note: Accuracy may be reduced for DN15-20mm pipes)

Parameter	Specification
Liquid Temperature	-30°C to 90°C (Standard Transducer) / -30°C to 160°C (High-Temperature Transducer)
Liquid Type	Single liquid capable of transmitting ultrasound (e.g., water, seawater, sewage, oil, alcohol)
Pipe Material	Steel, stainless steel, cast iron, copper, PVC, aluminum, glass steel, etc. (Liner is allowed)
Signal Output	1 x 4-20mA output, 1 x OCT pulse output, 1 x Relay output
Signal Input	3 x 4-20mA input (for heat measurement via PT100 platinum resistor)
Interface	RS485, supports MODBUS
Power Supply	DC8~36V or AC85~264V
Protection Level	Main Unit: IP65, Transducer: IP68
Humidity	85%RH
Operating Temperature (Main Unit)	-20°C to 60°C
Dimensions (Main Unit)	3"D x 2"W x 1"H (approximate)
Item Weight	50 Grams (approximate)

## 5. SETUP AND INSTALLATION

---

### 5.1 Main Unit Overview



Figure 5.1: Front view of the TUF-2000M main unit, showing the display and control buttons (MENU, Up, Right, ENT).

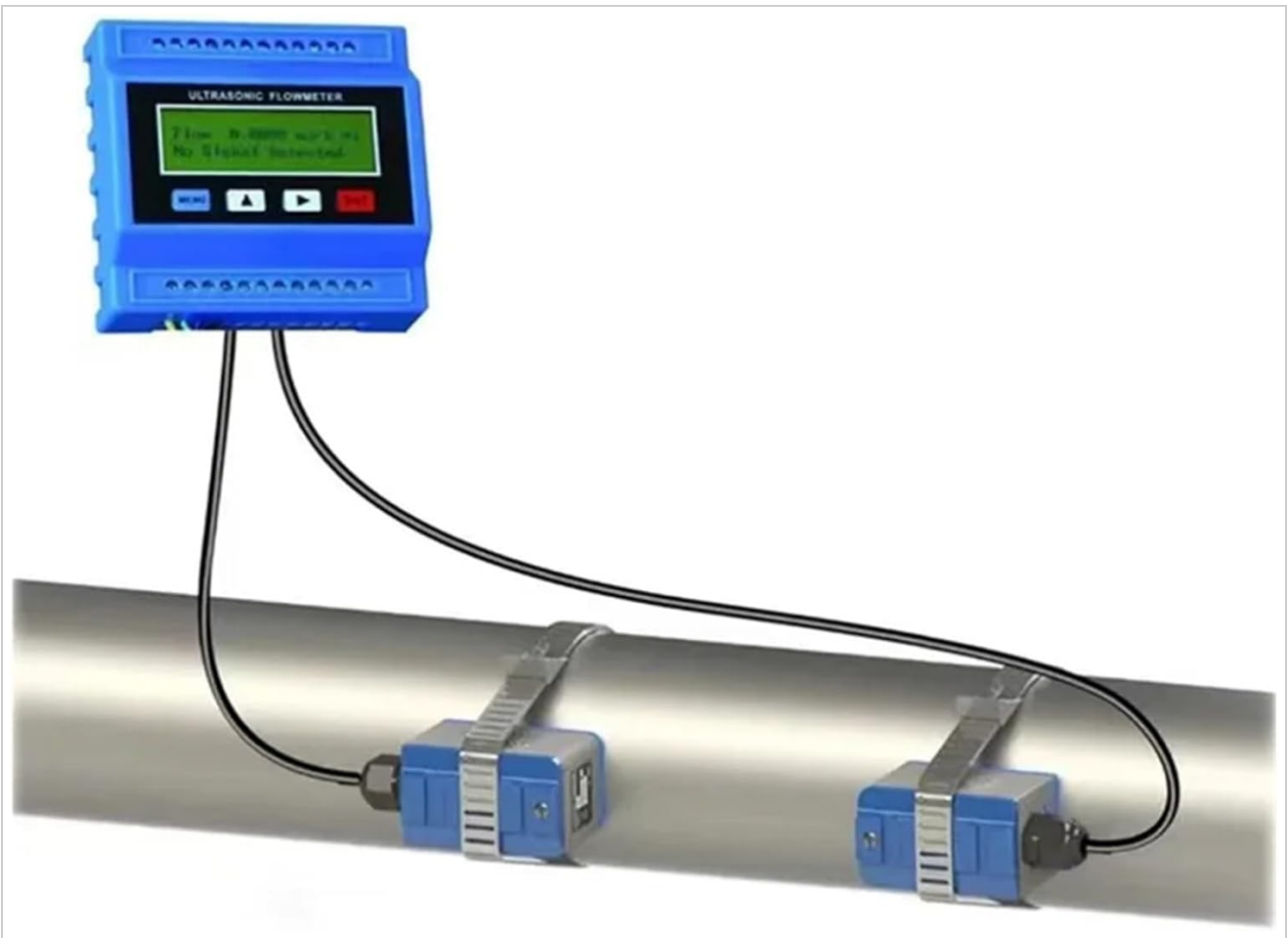


Figure 5.2: Back view of the TUF-2000M main unit, showing mounting points and QC labels.

## 5.2 Transducer Overview



Figure 5.3: Close-up view of the clamp-on ultrasonic transducers, which attach to the exterior of the pipe.

### 5.3 Wiring Diagram

The TUF-2000M is designed for guide rail installation within an instrument box or distribution panel. Proper wiring is crucial for accurate operation. Refer to the diagram below for connection details.

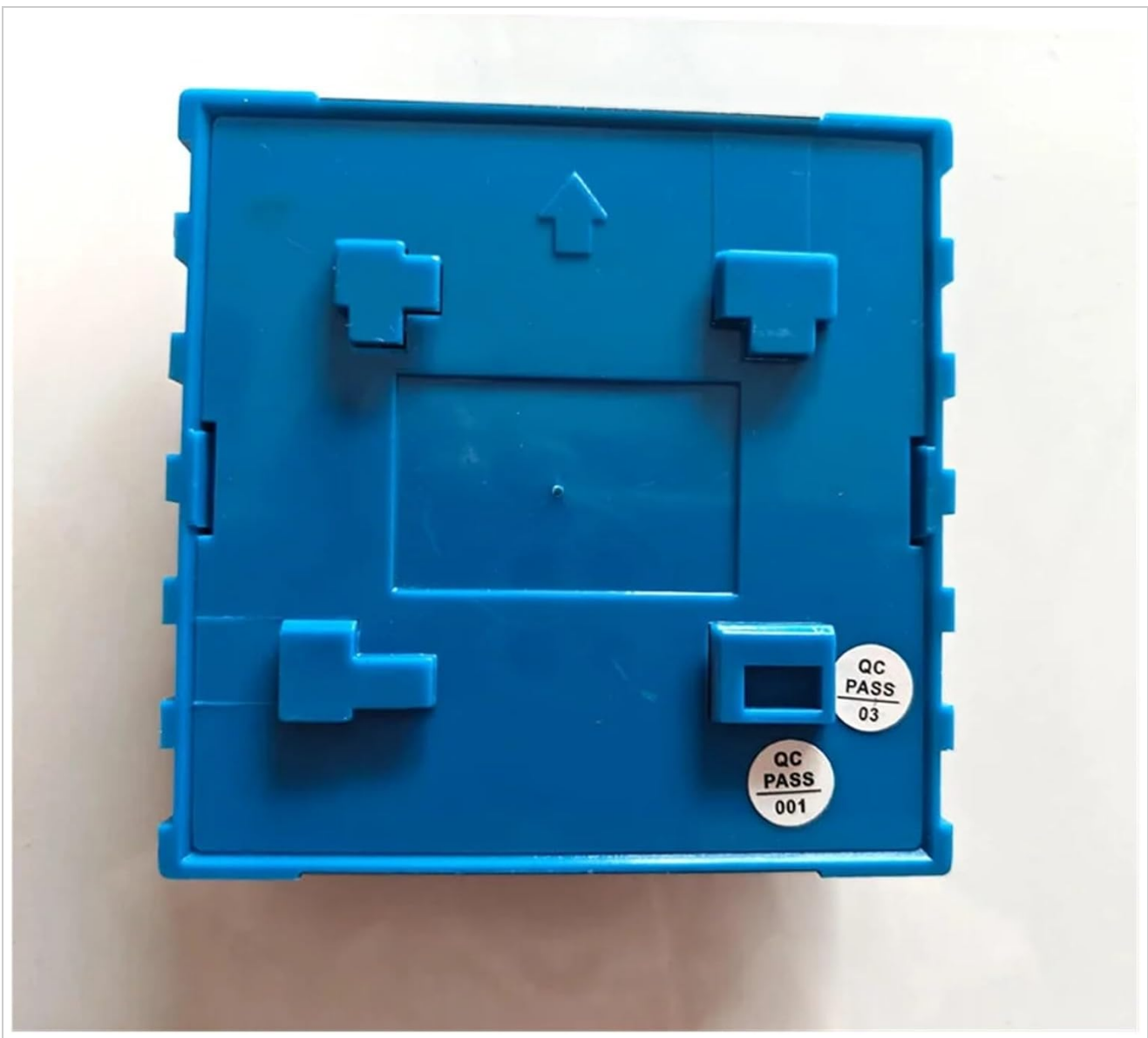


Figure 5.4: Wiring diagram illustrating the connection of the TUF-2000M main unit to the clamp-on transducers and the pipe.

## 5.4 Transducer Installation (Clamp-on Type)

1. **Select Installation Location:** Choose a straight section of pipe, free from valves, pumps, or other obstructions that could disturb flow. Ensure sufficient upstream and downstream straight pipe lengths as recommended for ultrasonic flow meters.
2. **Clean Pipe Surface:** Thoroughly clean the outer surface of the pipe where the transducers will be mounted. Remove any paint, rust, or debris to ensure good acoustic coupling.
3. **Apply Ultrasonic Gel:** Apply a generous amount of ultrasonic coupling gel to the contact surfaces of both transducers and the pipe. This gel is essential for transmitting the ultrasonic signals. *Note: Due to flight control regulations, ultrasonic gel is not included and must be purchased locally.*
4. **Mount Transducers:** Position the transducers on the pipe according to the specific measurement method (Z-method, V-method, etc.) and the calculated distance for your pipe diameter. Secure them firmly with the provided steel belts. Ensure they are parallel and aligned correctly.
5. **Connect Transducers to Main Unit:** Connect the transducer cables to the appropriate terminals on the TUF-2000M main unit as shown in the wiring diagram (Figure 5.4).
6. **Power On:** Connect the power supply to the main unit.

## 6. OPERATING INSTRUCTIONS

---

After successful installation and power-up, the TUF-2000M display will activate. The main unit features a display and control buttons (MENU, Up, Right, ENT) for navigation and parameter configuration.

- **Initial Configuration:** Upon first power-up or after a reset, you may need to configure basic parameters such as pipe diameter, pipe material, and liquid type through the menu system. Refer to the detailed user manual (physical copy) for specific menu navigation and parameter input instructions.
- **Flow Measurement Display:** Once configured, the display will show real-time flow rate, totalized flow, and other relevant measurement data.
- **Output Signals:** The 4-20mA, OCT pulse, and relay outputs will provide signals corresponding to the measured flow, which can be integrated with external control systems or data loggers.
- **Heat Measurement (Optional):** If PT100 platinum resistors are connected to the 4-20mA input, the meter can perform heat measurement functions.

## 7. MAINTENANCE

---

- **Regular Inspection:** Periodically inspect the transducers and cables for any signs of damage, corrosion, or loose connections.
- **Transducer Coupling:** Ensure that the ultrasonic gel between the transducers and the pipe remains effective. Reapply if it appears dry or degraded.
- **Cleaning:** Keep the main unit and transducers clean and free from dust and debris. Use a soft, dry cloth for cleaning. Do not use abrasive cleaners or solvents.
- **Environmental Conditions:** Ensure the operating environment remains within the specified temperature and humidity ranges to prevent damage to the electronics.

## 8. TROUBLESHOOTING

---

If you encounter issues with your TUF-2000M flow meter, consider the following common troubleshooting steps:

- **No Display/Power:** Check the power supply connections and ensure the voltage is within the specified range.
- **No Flow Reading or Inaccurate Readings:**
  - **Verify transducer installation:** Ensure transducers are correctly positioned, aligned, and securely clamped.
  - **Check ultrasonic gel:** Confirm sufficient coupling gel is applied between transducers and the pipe.
  - **Inspect pipe surface:** Ensure the pipe surface under the transducers is clean and smooth.
  - **Check cable connections:** Ensure transducer cables are securely connected to the main unit.
  - **Verify configuration parameters:** Double-check that the pipe diameter, material, and liquid type are correctly entered in the meter's settings.
  - **Ensure liquid flow:** Confirm there is actual liquid flow in the pipe.
- **Signal Output Issues:** Check wiring for 4-20mA, OCT, or relay outputs. Verify external receiving devices are correctly configured.
- **Communication Errors (RS485):** Check RS485 wiring and ensure communication parameters (baud rate, parity) match between the meter and the connected device.

If problems persist after performing these checks, contact customer support for further assistance.

## 9. WARRANTY AND SUPPORT

---

The KGKGK TUF-2000M Ultrasonic Liquid Flow Meter is covered by a standard manufacturer's warranty against defects in materials and workmanship. Please refer to the warranty card included with your product or contact your retailer for specific warranty terms and conditions.

For technical support, troubleshooting assistance, or inquiries regarding spare parts, please contact KGKGK customer service through the contact information provided on the product packaging or the official KGKGK website. When contacting support, please have your product model number (TUF-2000M) and purchase details ready.