INTRODUCTION

In 1968, Yokogawa introduced the world’s first vortex flowmeter. The YEWFLO series of microprocessor-based intelligent flowmeters not only has high accuracy and wide rangeability, but also high reliability and excellent durability. YEWFLO is field proven, with 200,000 units in the field. Using YEWFLO, no periodic maintenance is required to adjust for zero or span drift, and the YEWFLO self-diagnostic functions provide alarms and error messages which identify any problems immediately. YEWFLO means lower installation and maintenance costs, compared with other flowmeters.

YEWFLO can handle a wide range of applications, even applications which are difficult for other flowmeters, and Yokogawa has created many special-purpose vortex flowmeters to meet customer and application requirements.

YEWFLO’s high accuracy, reliability, and durability – and Yokogawa’s ongoing development program – will maintain our lead in the vortex flowmeter market.

Operating Principle

Vortex flowmeters utilize the vortex-shedding phenomenon known as the von Karman effect. When a vortex shedder is installed in a process flow line, Karman vortices appear downstream of the shedder (Fig. 1). The vortex generation frequency is directly proportional to fluid velocity – so by measuring this frequency, fluid velocity can be determined.

The output of a vortex flowmeter depends on the K-factor, which is related to flowmeter geometry (pipe internal diameter, shedder bar width, etc.). The K-factor varies with Reynolds number, but is virtually constant over a wide flow range, as shown in Fig. 2.

When the flowmeter is operated within its linear operating range, its characteristics are not affected by changes in fluid viscosity, density or pressure, and flow readings are very accurate.
The unique design of the YEWFLO sensor not only results in high accuracy, but also withstands severe conditions such as high temperature and pressure. Two different sensing methods are used in the YEWFLO series:

YEWFLO Style E: two piezoelectric sensor elements are embedded in the shedder bar. The sensor and fluid are not in contact.

ULTRA YEWFLO: the two ultrasonic sensors are outside the flowmeter pipe. Sensors don’t contact the measured fluid, and can be replaced without interrupting the flow.

YEWFLO Style E Vortex Flowmeter

The YEWFLO Style E vortex flowmeter measures liquid, gas and steam. It is widely used in many industries world-wide. YEWFLO Style E costs less to install and maintain than other types of flowmeter. Its superior performance is field proven. The simple construction, without moving parts, provides high reliability and durability. Since YEWFLO Style E is designed for international use in industry, it conforms with many major international standards. The process and electrical connections are designed to meet JIS, ANSI, DIN and other standards. YEWFLO Style E comes in sizes from 0.5” to 12”, with standard wafer and flange ratings up to ANSI 600. The process flow temperature range covers -200°C to 400°C. JIS, FM, SAA, and CENELEC approved explosionproof and intrinsically safe versions are available. YEWFLO also meets EMC standards, and integral and remote versions are available.

Features

- Intelligent amplifier.
- Simple construction – no moving parts.
- The two piezoelectric sensors, embedded in the shedder bar, don’t contact the measured fluid.
- Measures liquids, gases and steam.
- Operates over a wide temperature and pressure range.
- BRAIN, HART and Fieldbus communications.
- Totalized flow, and instantaneous flow rate in engineering units or percent (%) of span, display in sequence.
- Cryogenic version – down to -200°C.
- High-temperature version: up to 400°C.
- Integral or remote versions.
- Auto-tuning function: New software features to eliminate piping vibration noise automatically.
OVERVIEW

ULTRA YEWFLO
Ultrasonic Vortex Flowmeter
Intelligent, and ideal for liquid metering

The ULTRA YEWFLO ultrasonic vortex flowmeter incorporates 30 years of vortex flowmeter research and development experience. ULTRA YEWFLO detects vortex frequency using a pair of ultrasonic sensors outside the flowmeter pipe. The sensors don’t contact the measured fluid, and can be replaced without interrupting the flow. The simple construction, without moving parts, provides high reliability and durability. With its unique design and digital technology, the flowmeter provides high accuracy even under severe measuring conditions. As for YEWFLO Style E, using ULTRA YEWFLO reduces installation and maintenance costs, compared with using other types of flowmeters. Computer communications is also easy to set up.

Features

- Intelligent amplifier.
- Simple construction, with no moving parts.
- Sensors are outside the flowmeter pipe, don’t contact measured fluids, and can be replaced without interrupting the flow.
- Accuracy ±1%, ±0.5% of reading.
- Simultaneous analog and pulse output.
- Wide rangeability.
- Totalized flow, instantaneous flow rate in engineering units or percent (%) of span, display in sequence.
- BRAIN Communications.

* ULTRA YEWFLO should be applied to the liquid condition under no bubbles or cavitation.

YFCT
Flow Computing Totalizer

The model YFCT field-mounting microprocessor-based Flow Computing Totalizer can be used in combination with a YEWFLO vortex flowmeter, differential pressure transmitter, or magnetic flowmeter etc. It has all the basic functions required to carry out scaling and totalizing processing for pulse signals received from a flowmeter, and can use signals from temperature and pressure transmitters and density meter to compensate flow signals. This compensation computation allows volumetric flow of steam, natural gas, general gases and liquids to be measured and also converted to equivalent heat quantity flow. This compensation computation is carried out by a microprocessor; programming is unnecessary – computation parameter settings are sufficient for operation. Options such as alarm functions and retransmission outputs – for connecting a recorder and/or counter – are also available.

Features

- Compensation computations can be performed for a wide variety of fluids.
- No programming required.
- Self-contained field-mounting unit.
- Various display functions.
- Flow signal retransmission function (analog and pulse signals).
- Alarm functions.
- Self-diagnostic functions.
- Low instrumentation cost.