General Specifications

US300FM
Ultrasonic Flowmeter

GS 01G05B03-01E

■ GENERAL

The model US300FM is an ultrasonic flowmeter for measuring liquid flow in a fully filled pipe. With the advanced signal processing and correlation detection method, US300FM provide fast, accurate, and no-zero-offset flow measurements in clean to dirty fluids.

The measuring principle is based on the influence of the flowing fluid to the traveling time of sound. The sound is transmitted through the pipe and the transit time difference between the forward and backward directions is used to determine the flow velocity (transit time method).

Because of its clamp-on transducers, no cutting of the pipe is necessary and the measurement is independent of liquid pressure or conductivity.

■ FEATURES

- **Quick and Easy Setup with Calibrated No-Zero-Offset Transducers**
  The transducers are matched-pair and factory-calibrated one by one, realizing no-zero-offset transducers with our latest electronics design, thus enabling quick and easy setup.
- **High Accuracy Realized by our Exclusive Measuring Technology**
  The accuracy through process calibration is as high as 0.5% of reading realized by patented digital signal processing for the correlation detection method.
- **Stable Measurement against Air Bubbles**
  The measurement against air bubbles or entrained solids in the fluid has been improved greatly than was previously possible with our signal noise suppression technique.
- **Dual-Channel / Dual-Path Inputs with Two Sets of Transducers for a Variety of Applications**
  The dual-channel enables two measurements in two separate pipes with one meter reducing the cost per measurement point. The dual-path enables the measurement in a single pipe that reduces the effect of flow profile distortions. Addition / subtraction on two flow inputs are also available for specific systems.
- **Dual Current Outputs**
  Maximum two current outputs are available with free assignment of any flow value. When necessary, it is also possible to assign sound velocity and ultrasonic signal amplitude during the measurement.
- **Wide and Simple Fluid Temperature Ranges for Transducers**
  The fluid temperature ranges for transducers are as wide and simple as –30° to 130°C / –30° to 200°C (–22° to 266°F / –22° to 392°F), enabling the measurement for wide temperature range heating/cooling systems.
- **Small Sizes and Light Weights Making the Installation Work Simple and Easy**
  The main unit has only about 7 cm (2.8 inches) depth and 2.8 kg (6.17 lb) weight, enabling simple wall-mounting installation. The transducers (sensor elements) are also as small as we can hold them in our hand, enabling the installation even at limited places quick and easy.

■ STANDARD SPECIFICATIONS

● General

Fluid:
Liquid (Turbidity < 10,000 mg/L, Sound velocity 800 to 3,500m/s, Temperature –30° to +200°C / –22° to +392°F)

Measured Quantities:
Volume flow, mass flow (by setting density), flow velocity, sound velocity in the fluid

Measuring Principal:
Transit time method using ultrasonic signal

Pipe Sizes:
25 to 6,500 mm (1 to 255 inches)
(covered by three types of transducers)

Pipe and Lining Materials:
Carbon steel, Stainless steel, Grey cast iron, Ductile iron, Copper, Glass, PVC, etc.

Note: When the pipe material is ductile iron, or when the inner surface of the pipe may have any rust, corrosion, or scale, select the transducers of "large type" (suffix code CG or CH) even when the pipe size is between 100 to 400 mm (4 to 16 inches).
When the length of connection cable (US300FC) is long, the measurement might be difficult depending on the pipe/fluid condition, especially with the transducers of "medium type"

6th Edition Oct. 29, 2010(KP)

(suffix code BG or BH).
For such cases, and also when pipe/fluid condition is unknown, please consult us. It is often recommended to do the test measurement beforehand using our portable ultrasonic flowmeter US300PM.

Flow Velocity Range:
±0.01 to ±25 m/s (±0.033 to ±82 ft/s)

Resolution:
0.025 cm/s (0.01 in/s)

Repeatability:
0.15% of reading ±0.01 m/s (0.033 ft/s)

Accuracy:
(Note) Under fully developed rotationally symmetrical flow profile
Volumetric flow:
±1 to 3% of reading ±0.01 m/s (0.033 ft/s) depending on pipe geometry and accuracy of entered pipe dimensions.
Flow velocity:
±0.5% of reading ±0.01 m/s (0.033 ft/s) over sonic path

Measuring Cycle:
100 to 1000 Hz (per one channel)

Straight Pipe Run in the Upstream:
10 to 50 pipe diameters, depending on the kind of flow disturbances

● Ultrasonic Flowmeter, Main Unit

Housing Material:
Aluminum

Painting:
Front cover:
Deep sea moss green, Polyuretane and acrylic resin corrosion-resistance water-based coating
Back cover:
Agate grey, Polyester resin corrosion-resistance powder coating

Degrees of Protection:
- IP65 (EN60529)

Mounting Method:
- Wall mounting
- Pipe mounting fixture (for 2-inch pipe, optional)

Measuring Input :
One or two (dual) (Channel A, Channel B).

Current Output:
- One or two
- Range 4 to 20 mA (Load resistance 0 to 500 Ω)

Note: The current outputs may temporarily turn unstable during the power-on sequence (including re-starting after power failure) and parameter display / setting mode. Take care of your process not to be affected by this behavior.

Frequency Output:
- None (standard), or one (optional)
- Range 0 to 1 kHz
- Contact type: Open-collector, 24 V / 4 mA

Binary Output:
- None (standard), one, or two (optional)
- Contact type: Open-collector, 24 V / 4 mA

Input / Output Terminal Configuration:
Screw-type pillar terminals

LCD Display:
2 line × 16 character LCD display with backlight. Configurable to display two measured values (e.g., flow rate and total flow) simultaneously, or to display values from optional dual input channels alternately.

Keyboard:
15 keys (numerical, functional, or both) including four arrow-shaped keys for cursor operation, enabling easy access through its interactive menu structure.

Display Language:
Czech, Danish, Dutch, English (default), French, German, Norwegian, Polish, Turkey

Flow Measurement:
Flow velocity, Volume flow, Mass flow

Sound Velocity / Signal Amplitude Measurement (On-line):
Sound velocity and signal amplitude in the fluid available on-line simultaneously with flow measurement.

Totalization Function:
Totalizes the volume flow or mass flow. Ten-digit number for both forward/reverse directions of each channel.

Damping Function:
Time constant 0 to 100 seconds, moving average.

Sound Velocity Measurement (Off-line):
Measures the sound velocity of unknown fluid starting from its estimated sound velocity. The result can be transferred to the current fluid parameter.

Arithmetic Operation on Optional Dual-Channel / Dual-Path Inputs:
Arithmetic operations get the outcomes for calculation channel Y and Z by taking sum, average, or difference of two flow values from input channel A and B. Taking absolute values of each input independently in the calculation is also possible.
Note: Two sets of transducers are necessary.

Pulse Output (optional):
Available via optional binary outputs.
- Pulse value: 0.01 to 1000 of totalization unit
- Pulse width: 100 to 1000 ms (±20%)
- Maximum output rate: 2pps (pulse/second) ±20%

Alarm Output (optional):
Available via optional binary outputs where each alarm item is assigned one-to-one. Alarm properties are also selectable for each alarm one-by-one.
- Alarm items: High limit, Low limit, Flow direction change, Quantity limit (for batch operation), and Error (measurement impossible)
- Alarm properties: Normal open / Normal close, Non-hold / Hold (at the alarm detection)

Output Signal Configuration:
Freely configurable including independent dual flow value outputs.

- Current / frequency outputs: Flow velocity, Volume flow, Mass flow, Sound velocity, or Signal amplitude
- Binary outputs: Pulse or Alarm

Data Logging Function:

Data storage capacity of 27,000 values.
Storage rate is selectable from 1 s, 10 s, 1 min, 10 min, 30 min, 1h, or any other rate between 1 s to 43200 s (12 h) by the second. For each period of measurement, stored values are grouped by a user-defined measuring point name.
Stored values can be transferred to a personal computer via RS232 serial communication port.

(Note) As the RS232 port is on the front panel inside housing, use this function only for test / service / maintenance purposes.

Communication Function:

Transfers the measured values to a personal computer or a serial printer. Both on-line/off-line transfer during/after the measurement available.

- Output item: Flow value (flow velocity, volume flow, or mass flow), Totalization (forward, reverse), Sound velocity, Signal amplitude
- Output format setting: Spacing (for printer), Decimal point character, Data delimiter
- Communication interface: RS232
- Communication port: D-sub 9-pin, male

(Note) As the RS232 port is on the front panel inside housing, use this function only for test / service / maintenance purposes.

Time-Programmable Measurement Function:

Automatic start / stop of the measurement without human operation using internal clock for specific systems. Can be used with current output, binary output, data logging function, and/or communication function for recording the measurement.

Site Parameters Storage Function:

Eliminates the necessity of re-entering parameters for additional measurement on a site.
Totally 80 sets of site parameters for pipe/fluid settings are available with user-defined site names.

Material / Fluid List Customization Function:

The lists of material / fluid in the parameter menu are editable. Unnecessary items can be cut off from the menu for user's convenience. Registration of new material / fluid data is also possible totally up to 13 items with user-defined names.

Power Supply:

Power supply voltage:
100 to 230 VAC ±10% (50/60 Hz ±5%)
or 24 VDC ±10%
Power consumption: Less than 15 W

Safety and EMC Standard:

General safety: EN61010 (CE marking)
EMC regulation: EN55011, EN61000 (CE marking)
AS/NZS 2064 (C-Tick mark)

Operating Conditions:

Ambient temperature: –10° to +60°C (14° to 140°F)

● Transducers

Basic Construction:

A set of transducers are composed of a pair of sensor elements (often called just as "transducers"), and transducer cables with a junction box at one end, which is to be connected to US300FM main unit by dedicated connection cable US300FC.
The transducer cables are armed with stainless steel flexible tube.

(Note) Fixing hardware (fixing strap, clips, etc.) and acoustic couplant are usually included in a set of transduces, specified in its model code by their kinds or with/without.

Material:

Case of sensor elements:
Stainless steel EN/DIN 1.4571
(JIS SUS 316Ti, AISI 316Ti SS equivalent)
Sensing surface of sensor elements:
General temperature type: PEEK (Poly Ether Ether Keton)
High temperature type: Polyimid

Degrees of Protection:

General type: IP65 (EN60529)
Immersible type: IP67 (EN60529)

Applicable Pipe Sizes (inner diameter):

Medium type: 25 to 400 mm (1 to 16 inches)
Lager type: 100 to 2,500 mm (4 to 98 inches)
Very large type: 2,000 to 6,500 mm (78 to 255 inches)

(Note) Only "6,500mm" above is the size for outer diameter.

Fluid Temperature Range:

General temperature type:
–30° to +130°C (–22° to +266°F)
High temperature type:
–30° to +200°C (–22° to +392°F)

Note: Pay attention also to temperature specification of the couplant you choose.

● Connection Cable

Connection cable is always necessary to connect the transducers (junction box) and the US300FM main unit. The length is specifiable from 1 m (3 ft) to 300 m (984 ft) by the meter.

● Accessories

Fixing Hardware, Couplant, etc:

Specified in the suffix code of US300FM/US300FT.
Model codes as accessories also available for separate/additional orders (listed later).

● Data Transfer Software

General:

The software installed on a personal computer receives one or more records of logging data and parameter sets stored in US300FM main unit via RS232 communication port.
Data can be viewed or graphed on a PC monitor, or exported as a text file.
This software works while US300FM is off-line (not measuring flow) where current output goes down to zero.

Function:

Displaying Parameter Record:
Display parameter record of selected measuring data set.

Displaying Measured Data in Table:
Display measured data of selected measuring data set in table format.

Displaying Data in Graph:
Display measured data of selected measuring data set in graphic format. Marker type and color for each line of values selectable. Scales for time-axis and value-axis can be changed from default condition of automatic scaling. Graph printing function embedded.

Displaying Statistical Data:
Display statistical data of the measurement. Total data points, minimum, maximum, average and standard deviation of the measured data can be shown. Data range for statistical processing can be designated if necessary.

Exporting Text File:
Parameter record and measured data can be exported to a text file. Options for exporting items or their formats are available.

Entering Remarks:
User's remarks for each measured data can be entered and edited in the transferred data file on a personal computer. Remarks can be displayed in the main window of the software.

Display Language:
English, German
(Note) Help is available only in English.

Operating Environment:

Personal Computer:
Microsoft® Windows® hardware compatible, one or more RS232 port

Operating System:
Microsoft® Windows® 98, ME, NT, 2000, XP

Standard Accessories:
RS232 cable, RS232 adapter 9/25

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■ MODEL AND SUFFIX CODE

Ultrasonic flowmeter

Model	Suffix code	Specification
US300FM	· · · · · · · · · · · · · · ·	Ultrasonic flowmeter
Output	**-A1** · · · · · · · · · · · ·	One current output
	-A2 · · · · · · · · · · · ·	Two current outputs
Power Supply	**1** · · · · · · · · · ·	100 to 230 V AC ±10%
	4 · · · · · · · · · ·	24 V DC ±10%
Input Channel	**-1** · · · · · · · ·	One input channel (one-path)
	-2 · · · · · · · ·	Two input channels (dual-path)
Electrical connection	**-4** · · · · · ·	ISO M20 x 1.5 female
Option	**/PU1** · ·	One binary (pulse or alarm) output (open-collector) (*1)
	/PU2 · ·	Two binary (pulse or alarm) outputs (open-collector) (*1)
	/FQ1 · ·	Frequency output (open-collector, 0 to 1 kHz) (*2)
	/BGT · ·	Tag number on nameplate (in the nameplate label, maximum 16 characters)
	/SCT · ·	Tag number on stainless steel tag plate (maximum 16 characters)
	/PMT · ·	Pipe mounting fixture

T01.EPS

*1: Option /PU1 and /PU2 are exclusive.
*2: Option /FQ1 is not selectable for two current output (-A2) models

Connection cable (*8)

Model	Suffix code	Specification
US300FC	· · · · · · · · · · · · · · ·	Connection cable
Length	**-Gxxx** · · · · · · · · ·	xxx: Cable length 001 to 300[m]

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*8: Two sets of connection cables are necessary when applying dual channel/path measurement.

Data transfer software

Model	Suffix code	Specification
US300SA	· · · · · · · · · · · · · · ·	Data transfer software (Windows version) Including connecting kit (RS232 cable for connection, RS232 adapter 9/25)
Language	**-1** · · · · · · · · · · · · · ·	English / German version
	00 · · · · · · ·	Always 00

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Transducers (*3)

Model	Suffix code	Specification
US300FT	· · · · · · · · · · · · · · · ·	Transducers for fixed type
Usage (*4)	**-G** · · · · · · · · · · · · ·	General purpose (IP65)
	-W · · · · · · · · · · · · ·	Waterproof (IP67)
Pipe Size / Fluid Temperature (*5)	**BG** · · · · · · · · · · · ·	Medium & General (with 3 m / 9.8 ft cable)
	BH · · · · · · · · · · · ·	Medium & High (with 3 m / 9.8 ft cable)
	CG · · · · · · · · · · · ·	Large & General (with 4.4 m / 14.4 ft cable)
	CH · · · · · · · · · · · ·	Large & High (with 4.4 m / 14.4 ft cable)
	DG · · · · · · · · · · · ·	Very large & General (with 12 m / 39.4 ft cable)
	-N· · · · · · · · · · ·	Always N
Fixing band, strap and clips (*6)	**B** · · · · · · · · ·	For 25 to 1,400 mm (1 to 55 in.) Two fixing bands One strap of 10 m (32 ft) length Two clips of medium type Two clips of large type
	C · · · · · · · · ·	For 1,400 to 2,800 mm (55 to 110 in.) One strap of 20 m (65 ft) length Two clips of large type
	D· · · · · · · · ·	For 2,800 to 6,500 mm (110 to 255 in.) Two straps of 20 m (65 ft) length Two clips of large type
	N· · · · · · · · ·	None
Acoustic couplant (*7)	**G** · · · · · · ·	General temperature type (non-adhesive, –30° to +130°C / –22° to +266°F)
	H · · · · · · ·	High temperature type (non-adhesive, –30° to +200°C / –22° to +392°F)
	R · · · · · · ·	Weatherproof type (adhesive, –40° to +180°C / –40° to +356°F)
	N · · · · · · ·	None
Option	**/TTP** · ·	Transducer tag plate (maximum 16 characters)

T04.EPS

*3: Two sets of transducers are necessary when applying dual channel/path measurement.

*4: A Tokuchu request is necessary when transducers are installed where condensation occurs. However the pipe size must be over 100 mm (Large type or Very large type).

*5: The alphabetic characters in the suffix code represent pipe sizes and fluid temperature ranges are below.
B: Medium type (25 to 400 mm / 1 to 16 in.)
C: Large type (100 to 2,500 mm / 4 to 98 in.)
D: Very large type (2,000 to 6,500 mm / 78 to 255 in.)
G: General temperature (–30° to +130°C / –22° to +266°F)
H: High temperature (–30° to +200°C / –22° to +392°F)

*6: When the pipe size is less than 50mm (2 in.), select N(None) here first and order separately one each of USPA053 mounting fixture short ruler type, USPA036 fixing chains (0.5m/1.6ft length), and USPA097 couplant weatherproof type. It will avoid any stress that could be caused by expansion of the pipe after installation. The couplant weatherproof type can be specified by the code R for couplant.

*7: The couplant weatherproof type is recommended for permanent installation in the outdoor, etc. It is adhesive liquefied rubber and tight contacts between transducers and pipe surface can be obtained by curing it. It usually takes one to three days for complete curing depending on the conditions. The operating condition of ambient temperature is as below.
Before and during curing : 0 to +50°C / 32 to 122°F
After curing : –40 to +180°C / –40 to 356°F

Accessories (for ultrasonic flowmeter US300FM)

Model	Description
USPA201	Pipe mounting fixture(to add the option /PMT)
USPA221	Blind plug for cable gland port
USPA231	Cable gland

T05.EPS

Accessories (others)

Model	Description
USPA401	RS232 cable (*9)
USPA402	RS232 adapter 9/25 (*9)
USPA411	Measuring tape

T06.EPS

*9: Included in data transfer software US300SA as standard.

Accessories (for transducers US300FT)

Model	Description
USPA001	Fixing strap (10 m / 32 ft length)
USPA002	Fixing strap (20 m / 65 ft length)
USPA011	Fixing clips (medium type, for pipe size 40 to 100 mm / 1.5 to 4 in., set of two clips)
USPA012	Fixing clips (large type, for pipe size 100 to 6500 mm / 4 to 255 in., set of two clips)
USPA021	Fixing bands (only for pipe size 25 to 50 mm / 1 to 2 in.)
USPA032	Fixing chains (set of two extensible chains) (2 m / 6.5 ft length, equal to 600 mm / 23 in. diameter)
USPA033	Repair set for fixing chains
USPA034	Retaining clips (set of two clips, used with fixing chains)
USPA036	Fixing chains (set of two extensible chains) (0.5m / 1.6 ft length, equal to 150mm / 5.9 in. diameter)
USPA037	Fixing chains (set of two extensible chains) (1m / 3.2 ft length, equal to 300mm / 11.8 in. diameter)
USPA053	Mounting fixture short ruler type (for transducers medium pipe size type, temperature range –30° to +200°C / –22° to +392°F, set of two blocks with 120mm / 4.7 in. ruler)
USPA054	Mounting fixture standard type (for transducers medium pipe size type, temperature range –30° to +200°C / -22° to +392°F, set of two blocks with 330mm / 13 in. ruler)
USPA055	Mounting fixture magnetic general temperature type (for transducers medium pipe size type, temperature range –30° to +100°C / –22° to +212°F, set of two blocks with 330mm / 13 in. ruler)
USPA057	Mounting fixture standard type (for transducers large or very large pipe size type, temperature range –30° to +200°C / –22° to +392°F, set of two blocks with 330mm / 13 in. ruler)
USPA058	Mounting fixture magnetic general temperature type (for transducers large or very large pipe size type, temperature range –30° to +100°C / –22° to +212°F, set of two blocks with 330mm / 13 in. ruler)
USPA073	Additional magnets for mounting fixture magnetic general temperature type (for transducers medium pipe size type, temperature range –30° to +100°C / –22° to +212°F, set of two magnets)
USPA075	Additional magnets for mounting fixture magnetic general temperature type (for transducers large or very large pipe size type, temperature range –30° to +100°C / –22° to +212°F, set of two magnets)
USPA081	Ruler for mounting fixture (marked length 120 mm, equivalent to 4.7 in.)
USPA082	Ruler for mounting fixture (marked length 330 mm, equivalent to 13 in.)
USPA091	Acoustic couplant general temperature type (non-adhesive) (100 g, –30° to +130°C) (0.22 lb, –22° to +266°F)
USPA092	Acoustic couplant high temperature type (non-adhesive) (100 g, –30° to +200°C) (0.22 lb, –22° to +392°F)
USPA097	Acoustic couplant weatherproof type (adhesive) (*10) (100 g, –40° to +180°C) (0.22 lb, –40° to +356°F)

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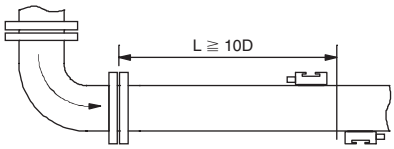
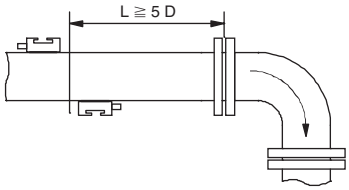
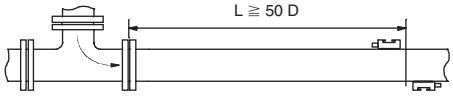
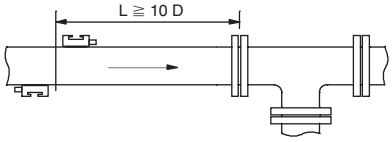
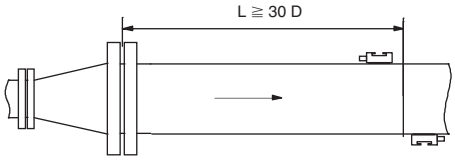
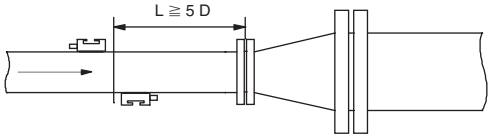
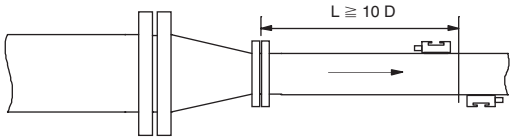
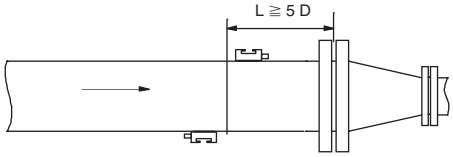
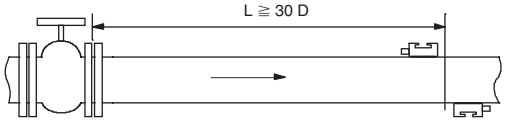
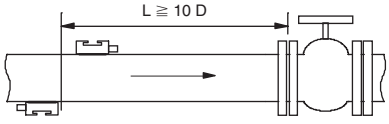
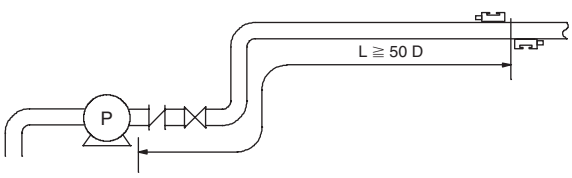
*10: The operating condition of ambient temperature is as below.
Before and during curing : 0 to +50°C / 32 to 122°F
After curing : –40 to +180°C / –40 to 356°F

■ INSTALLATION CONDITION

Notice for Installation

(1) When the inner surface of the pipe may have any rust, corrosion, or scale because of the old pipe, etc, check the best position of the pipe to install the transducers.
(2) When the pipe is a new mortar or cement lined one, it is necessary to install the meter after running the fluid about one month.
(3) The pipe must be always fully filled with liquid.
(4) The instrument must not be installed in a corrosive atmosphere.
(5) It is recommended to take some straight pipe run in the upstream and downstream direction of the transducers as shown below.

Piping layout and straight pipe run (D: Pipe diameter)

Type	Upstream Direction	Downstream Direction
90°-elbow	L≧10D 	L≧5D 
T-section	L≧50D 	L≧10D 
Diffuser	L≧30D 	L≧5D 
Reducer	L≧10D 	L≧5D 
Valve	L≧30D 	L≧10D 
Pump	L≧50D 	

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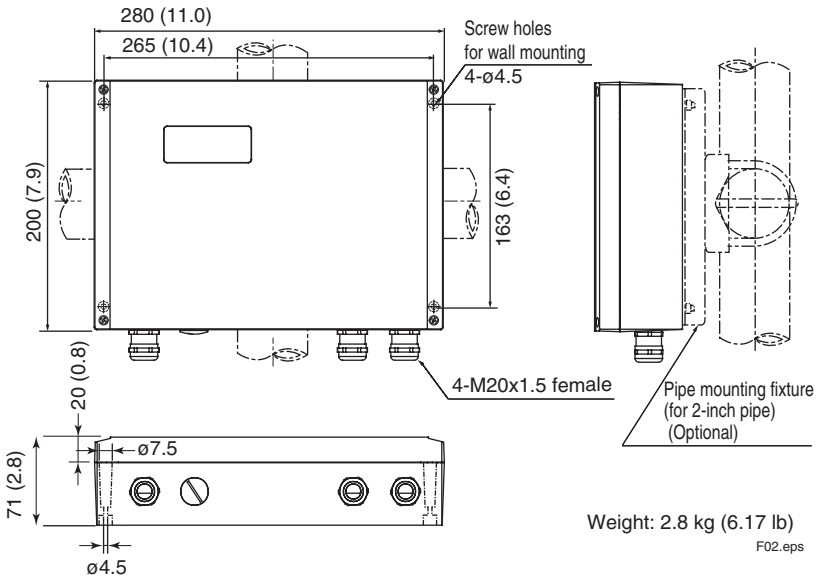
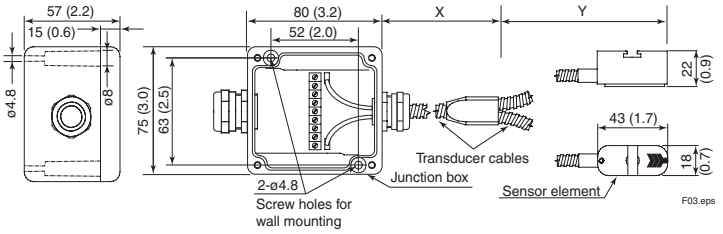
■ DIMENSIONAL DRAWING

Ultrasonic flowmeter US300FM

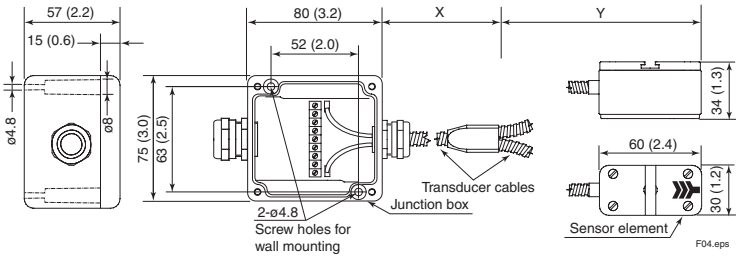
Unit: mm (inch)



Transducers US300FT-□B□



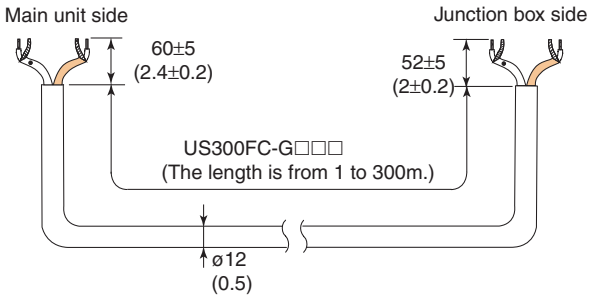
Transducers US300FT-□C□, US300FT-□D□



Transducers	X m (inch)	Y m (inch)	X+Y m (inch)	Weight kg (lb)
US300FT- □B□	2.0 (78.7)	1.0 (39.4)	3.0 (118.1)	0.9 (1.98)
US300FT- □C□	2.0 (78.7)	2.4 (94.5)	4.4 (173.2)	1.5 (3.31)
US300FT- □D□	5.0 (196.9)	7.0 (275.6)	12.0 (472.4)	2.5 (5.51)

T08.eps

Connection Cable US300FC



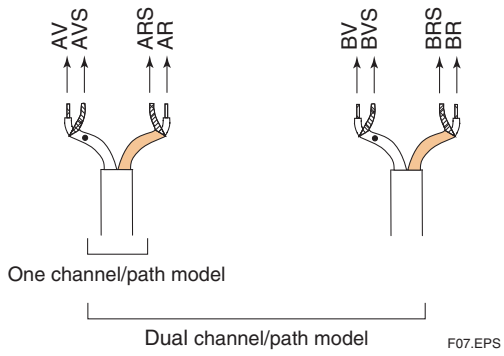
Weight: approx. 167 g/m (0.37 lb/m) F05.eps

■ WIRINGS

Terminal Layout

F06.eps

Cable Connection



F07.EPS

Terminal Designations

Terminal Name	Description
AV AVS	Downstream transducer signal for channel A
AR ARS	Upstream transducer signal for channel A
BV BVS	Downstream transducer signal for channel B
BR BRS	Upstream transducer signal for channel B
SA1 SA2 SA3 SA4	Sensor ROM for channel A
SB1 SB2 SB3 SB4	Sensor ROM for channel B

Terminal Name	Description	
P1+ P1–	Current output (+,–)	
P2+ P2–	Current output (+,–) when specifying "two current outputs"	
P3+ P3–	Frequency output (+,–)(optional)	
P5a P5b	Binary (pulse or alarm) output (optional)	
P6a P6b	Same as above	
PE N(–) L(+)	Earth Neutral AC power supply (100 to 230 V AC ±10%)	*1
PE N(–) L(+)	(Earth) DC– DC+ (24 V DC ±10%)	*1

T09.eps

*1: Either of these according to specified power supply specification.

Ordering Information

Specify the following when ordering.

1. Model, suffix and option code
   (1) First, specify the main unit US300FM, the transducers US300FT (one set of transducers when using only one channel, or two sets when using two channels), and the connection cable US300FC (one cable when using only one channel, or two cables when using two channels) .
   (2) The transducers and cables can be added later but the number of channels for the main unit can not be added later.
   (3) US300FM main unit is not normally quipped with pulse outputs or alarm outputs as standard. Specify the corresponding code when necessary like /PU1 or /PU2 for pulse or alarm output.
   (4) Specify the accessories when necessary or suitable. For example we may use “fixing chain” instead of “fixing strap” to fix the transducers to the pipe. Please consult us for the details.

2. Tag number (when necessary)
Maximum sixteen (16) characters for the cases below.
   (1) In the nameplate label of the main unit US300FM (necessary to specify the option /BGT at the same time)
   (2) In the stainless steel tag plate hanged onto the main unit US300FM (necessary to specify the option /SCT at the same time)
   (3) In the tag plate for the transducers US300FT (necessary to specify the option /TTP at the same time)