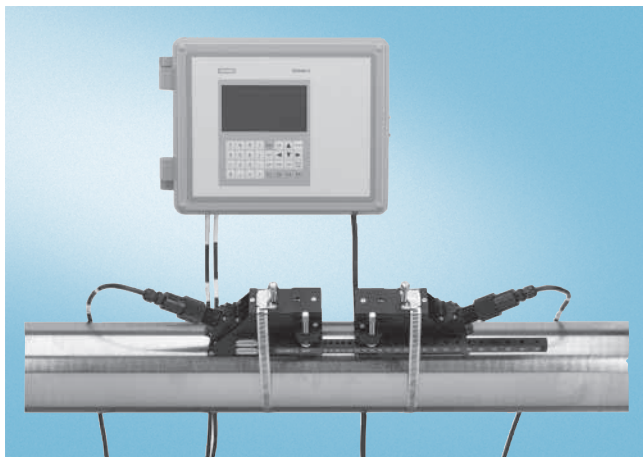


SITRANS F flowmeters

SITRANS F US

SITRANS FUS1010 Standard clamp-on

Overview



SITRANS FUS1010 is the most versatile clamp-on ultrasonic flow display computer available today. It can operate in either Wide-Beam Transit-Time or Reflexor (Doppler) mode, making it suitable for virtually any liquid, even those with high aeration or suspended solids.

SITRANS FUS1010 is available in single, dual and optional four beam configurations, with your choice of IP65 (NEMA 4X) or IP65 (NEMA 7) and IP66 (NEMA 7) explosionproof enclosures.

Benefits

- Versatility; there is no need to change meters when operating conditions change
- Easy installation; no need to cut pipe or stop flow
- Minimal maintenance; external transducers do not require periodic cleaning
- No moving parts to foul or wear
- No pressure drop or energy loss
- Wide turn-down ratio
- Choice of single channel or dual channel/dual path, with doppler capability. Four channel/four beam optional.
 - Optional four channels allow measurement of four independent pipes at the same time, reducing overall ownership costs
 - Dual mode allows for transit time and reflexor operation at the same time on the same pipe
 - Dual path allows for two sets of transducers to be set up on one pipe and averaged for higher accuracy
- Zeromatic Path automatically sets zero without stopping flow and reduces zero drift, even at low flow

Application

FUS1010 is suitable for a wide variety of liquid applications, including the following:

- Water industry
 - Raw water
 - Potable water
 - Sludges
 - Chemicals
- Wastewater industry
 - Raw sewage
 - Effluent
 - Sludges
 - Mixed liquor
 - Chemicals
- HVAC industry
 - Chillers
 - Condensers
 - Hot and cold water systems
- Power industry
 - Nuclear
 - Fossil
 - Hydroelectric
- Processing industry
 - Process control
 - Batching
 - Rate indication
 - Volumetric and mass measurement

Design

FUS1010 is available in three configurations:

- IP65 (NEMA 4X) enclosure
 - Single channel
 - Dual channel / dual path
 - Four channel (optional)
- IP65 (NEMA 7) Compact explosionproof enclosure
 - Single channel
 - Dual channel / dual path
- IP66 (NEMA 7) Wall mount explosionproof enclosure
 - Single channel
 - Dual channel / dual path
 - Four channel (optional)

Function

- IP65 (NEMA 4X) and IP66 (NEMA 7) flow display computers have integral 33 button keypads and large (128 x 240 pixel) graphic displays visible up to 12 m (40 ft) away
- IP65 (NEMA 7) compact flow display computer has a 2 x 16 Alphanumeric LCD display
- Current, voltage, status alarm, frequency and RS232 outputs (see specification section for details)
- Optional current, voltage and temperature inputs (see specification section for details)
- Zeromatic Path automatically sets zero
- Bidirectional flow operation
- 1 MByte data logger with both site and data logger storage
- English, Spanish, German, Italian and French language options

Technical specifications

SITRANS FUS1010, IP65 (NEMA 4X) Flow display computer



Enclosure IP65 (NEMA 4X)

Input

Flow range	± 12 m/s (± 40 ft/s), bidirectional
Pipe size	6.4 mm ... 9.14 m (0.25" ... 360")
Optional inputs	<ul style="list-style-type: none"> • Current: 2x 4 ... 20 mA DC • Voltage: 2x 0 ... 10 V DC • Temperature: 2x 4 wire 1 kΩ RTD
Single channel	

Output

Outputs	<ul style="list-style-type: none"> • Current: 2x 4 ... 20 mA DC (1 kΩ at 30 V DC) • Voltage: 2x 0 ... 10 V DC (5 kΩ min.) • Status Alarm: 4x SPDT relays • Frequency: 2x 0 ... 5 kHz • RS232
Single channel	

Accuracy

Accuracy	<p>± 0.5% ... 1.0% of flow, for velocities greater than 0.3 m/s (1 ft/s)</p> <p>± 0.0015 ... 0.003 m/s (± 0.005 ... 0.01 ft/s), for velocities less than 0.3 m/s (1 ft/s)</p>
Batch repeatability	<p>± 0.15% of flow, for velocities greater than 0.3 m/s (1 ft/s)</p> <p>± 0.0005 m/s (± 0.0015 ft/s), for velocities less than 0.3 m/s (1 ft/s)</p>

Data refresh rate 5 Hz

Rated operation conditions

Degree of protection	IP65 (NEMA 4X)
Liquid temperature	
• Standard	-40 ... +120 °C (-40 ... +250 °F)
• Optional	-40 ... +230 °C (-40 ... +450 °F)
Ambient temperature	-18 ... +60 °C (0 ... 140 °F)

Design

Dimensions	see SITRANS F US Clamp-on „System info and selection guide“
Weight	see diagrams
Power supply	90 ... 240 V AC, 50 ... 60 Hz, 30 VA or 9 ... 36 V DC, 12 W

Indication and operation

Data logger memory	1 MByte
Display	128 x 240 pixel LCD with backlight
Keypad	33 keypad buttons with tactile feedback
Language options	English, Spanish, German, Italian, French

Certificates and approvals

FM and CSA ratings	I.S. Class I, II, Div 1 N-I Class I, Div 2 S Class II, Div 2 (FM only)
ATEX ratings	
• Flow display computer	Ex II (1) G [EEx ia] IIC Ex II 3 (1) G EEx nC [ia] IIC T5
• Transducers	Ex II 1 G EEx ia IIC T5 Ex II 2 G EEx m II T5 (for use with flowmeter in safe area)
CCOE rating (India)	EEx (ia)
INMETRO ratings (Brazil)	
• Flow display computer	[BR-Ex ia] IIC T6 BR-Ex nC [ia] IIC T6
• Transducers	BR-Ex ia IIC T6 IP65
GoST ratings (Russia)	
• Flow display computer	[Exia]IIC
• Transducers	ExialICT5

SITRANS F flowmeters

SITRANS F US

SITRANS FUS1010 Standard clamp-on

SITRANS FUS1010, IP65 (NEMA 7) Compact explosionproof



4

Enclosure IP65 (NEMA 7)

Input

Flow range	± 12 m/s (± 40 ft/s), bidirectional
Pipe size	6.4 mm ... 9.14 m (0.25" ... 360")
Optional inputs single channel	<ul style="list-style-type: none"> • Current: 1x 4 ... 20 mA DC • Temperature: 2x 4 wire 1 kΩ RTD

Output

Outputs single channel	<ul style="list-style-type: none"> • Current (externally powered): 1x 4 ... 20 mA DC (1 kΩ at 30 V DC) • Status Alarm: 1x Isolated open collector • Frequency: 2x 0 ... 5 kHz • RS232
------------------------	---

Accuracy

Calibratable accuracy	0.1% (API proving method)
Intrinsic accuracy	± 0.5% ... 1.0% of flow, for velocities greater than 0.3 m/s (1 ft/s) ± 0.0015 ... 0.003 m/s (± 0.005 ... 0.01 ft/s), for velocities less than 0.3 m/s (1 ft/s)
Batch repeatability	± 0.15% of flow, for velocities greater than 0.3 m/s (1 ft/s) ± 0.0005 m/s (± 0.0015 ft/s), for velocities less than 0.3 m/s (1 ft/s)

Data refresh rate	5 Hz
--------------------------	------

Rated operation conditions

Degree of protection	IP65 (NEMA 7)
Liquid temperature	<ul style="list-style-type: none"> • Standard -40 ... +120 °C (-40 ... +250 °F) • Optional -40 ... +230 °C (-40 ... +450 °F)
Ambient temperature	-18 ... +60 °C (0 ... 140 °F)

Design

Dimensions	see SITRANS F US Clamp-on „System info and selection guide“
Weight	see diagrams

Power supply	90 ... 240 V AC, 50 ... 60 Hz, 15 VA or 9 ... 36 V DC, 10 W
---------------------	---

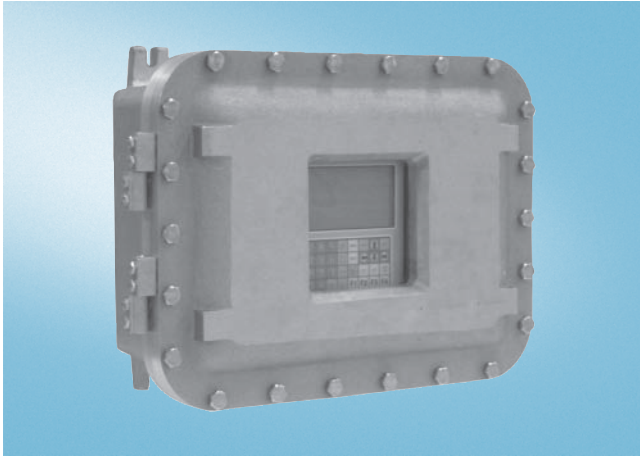
Indication and operation

Data logger memory	1 MByte
Display	2 x 16 alphanumeric LCD display
Keypad	5 Magnetic hall effect switches
Language options	English, Spanish, German, Italian, French

Certificates and approvals

FM and CSA ratings	Ex Class I, Div 1 D-I Class II, Div 1 I.S. Class I, Div 1 N-I Class I, Div 2 S Class II, Div 2 (FM only)
ATEX ratings	
• Flow display computer	Ex II 2 (1) G EEx d [ia] IIC T5
• Transducers	Ex II 1 G EEx ia IIC T5
CCOE rating (India)	EEx d
INMETRO ratings (Brazil)	
• Flow display computer	BR-Ex d [ia] IIC T6
• Transducers	BR-Ex ia IIC T6 IP65

SITRANS FUS1010, IP66 (NEMA 7) Wall mount explosionproof enclosure



Enclosure IP66 (NEMA 7)

Input

Flow range	± 12 m/s (± 40 ft/s), bidirectional
Pipe size	6.4 mm ... 9.14 m (0.25" ... 360")
Optional Inputs single channel	<ul style="list-style-type: none"> • Current: 2x 4 ... 20 mA DC • Voltage: 2x 0 ... 10 V DC • Temperature: 2x 4 wire 1 kΩ RTD

Output

Outputs single channel	<ul style="list-style-type: none"> • Current: 2x 4 ... 20 mA DC (1 kΩ at 30 V DC) • Voltage: 2x 0 ... 10 V DC (5 kΩ min.) • Status Alarm: 4x SPDT Relays • Frequency: 2x 0 ... 5 kHz • RS232
---------------------------	---

Accuracy

Accuracy	± 0.5% ... 1.0% of flow, for velocities greater than 0.3 m/s (1 ft/s) ± 0.0015 ... 0.003 m/s (± 0.005 ... 0.01 ft/s), for velocities less than 0.3 m/s (1 ft/s)
Batch repeatability	± 0.15% of flow, for velocities greater than 0.3 m/s (1 ft/s) ± 0.0005 m/s (± 0.0015 ft/s), for velocities less than 0.3 m/s (1 ft/s)

Data refresh rate 5 Hz

Rated operation conditions

Degree of protection	IP66 (NEMA 7)
Liquid temperature	
• Standard	-40 ... +120 °C (-40 ... +250 °F)
• Optional	-40 ... +230 °C (-40 ... +450 °F)
Ambient temperature	-18 ... +60 °C (0 ... 140 °F)

Design

Dimensions	see SITRANS F US Clamp-on „System info and selection guide“
Weight	see diagrams

Power supply 90 ... 240 V AC, 50 ... 60 Hz, 30 VA or 9 ... 36 V DC, 12 W

Indication and operation

Data logger memory	1 MByte
Display	128 x 240 pixel LCD with backlight
Keypad	33 keypad buttons with tactile feedback
Language options	English, Spanish, German, Italian, French

Certificates and approvals

FM and CSA ratings	Ex Class I, Div 1 D-I Class II, Div 1 I.S. Class I, Div 1 N-I Class I, Div 2 S Class II, Div 2 (FM only)
ATEX ratings	
• Flow display computer	Ex II (1) G [EEx ia] IIC Ex II 3 (1) G EEx nC [ia] IIC T5 Ex II 2 (1) G EEx d [ia IIC] IIB T5
• Transducers	Ex II 1 G EEx ia IIC T5
INMETRO ratings (Brazil)	
• Flow display computer	[BR-Ex ia] IIC T6 BR-Ex nC [ia] IIC T6 BR-Ex d [ia] IIC T6
• Transducers	BR-Ex ia IIC T6 IP65

SITRANS F flowmeters

SITRANS F US

SITRANS FUS1010 Standard clamp-on

4

Selection and Ordering data

Order-No. Ord. code

SITRANS FUS1010 Standard clamp-on

- IP65 (NEMA 4X) F **7ME3530-**
- IP65 (NEMA 7) compact F **7ME3531-**
- IP66 (NEMA 7) wall mounted F **7ME3532-**
- IP66 (NEMA 7) with display window F **7ME3533-**

0 -

Number of channels/ultrasonic beams

- Single channel **1**
- Dual channel / Dual beam **2**
- Special: Four channel / Four Beam (NEMA 4X and NEMA 7 wall mount only) **9** **H 1 A**

Flowmeter functions and I/O configurations

includes graphic or digital display and Reflexor capability for all except IP65 (NEMA 7) compact units

IP65 (NEMA 4X) and IP66 (NEMA 7 wall mounted) units

- Type 1 Standard **A**
 - 2x 0 ... 10 V
 - 2x 4 ... 20 mA
 - 2x pulse output
 - 4x relay C type

- Type 3 option adder **C**
 - UniMass capability with 2x RTD input and 4x 4 ... 20 mA analog input

IP65 (NEMA 7) compact units

- Type 1 Standard **D**
 - 1x 4 ... 20 mA (Loop) and 1x status (open collector) **per channel**
 - 1x pulse output for single channel units only

- Type 3 option adder **F**
 - UniMass capability with 1 RTD input and 1x analog input **per channel**

- Other version (Expanded I/O and/or Mercury wetted relays) **Z** **J 1 Y**
Add order code and plain text.

- Type 3 with Mercury wetted relays **Z** **J 1 A**

- Type 3 with expanded I/Os (4 additional 4 ... 20 mA outputs) and form C relay **Z** **J 1 B**

- Type 3 with expanded I/Os and Mercury wetted relays **Z** **J 1 C**

Meter power options

- 90 ... 240 V AC **A**
- 9 ... 36 V DC (except compact NEMA 7) **B**
- 9 ... 36 V DC negative GND (compact only) **J**
- 9 ... 36 V DC positive GND (compact only) **K**

Communication options

- RS232 (standard) **0**
- MODBUS (dedicated only, excludes NEMA 7 compact) **1**
- Special: Dial up Modem (dedicated only, excludes compact NEMA 7), max. 9600 Baud Dial up Modem **9** **L 1 Y**

Selection and Ordering data

Order-No. Ord. code

SITRANS FUS1010 Standard clamp-on

- IP65 (NEMA 4X) F **7ME3530-**
- IP65 (NEMA 7) compact F **7ME3531-**
- IP66 (NEMA 7) wall mounted F **7ME3532-**
- IP66 (NEMA 7) with display window F **7ME3533-**

0 -

RTD temperature sensor

(includes mounting hardware for pipes between 1.5" and 24" outer diameter)

- No RTDs **0**
- 1x standard clamp-on RTD **1**
- 2x standard clamp-on RTD **2**
- 1x submersible clamp-on RTD **3**
- 2x submersible clamp-on RTD **4**
- Special (for insert style RTDs), describe RTD length, thermowell and lagging **9** **N 1 Y**
- 1x Insertion style RTD with thermowell and lagging **9** **N 1 A**
- 2x Insertion style RTD with thermowell and lagging **9** **N 1 B**

Transducer for channel 1

(includes pipe mounting kit and spacer bar for indicated max. OD listed) See „Transducer selection charts“ for specifications.

- no transducer **A**
- A2 universal to 3"/track mount **B**
- B3 universal to 5"/track mount **C**
- C3 universal to 13"/mounting frame **D**
- D3 universal to 24"/mounting frame **E**
- E2 universal to 48"/mounting frame **F**
- A1H (high precision) to 3"/track mount **G**
- A2H (high precision) to 3"/track mount **H**
- A3H (high precision) to 3"/track mount **J**
- B1H (high precision) to 5"/track mount **K**
- B2H (high precision) to 5"/track mount **L**
- C1H (high precision) to 24"/mounting frame **M**
- C2H (high precision) to 24"/mounting frame **N**
- D1H (high precision) to 48"/mounting frame **P**
- D2H (high precision) to 48"/mounting frame **Q**
- D4H (high precision) to 48"/mounting frame **R**
- Doppler to 12" with strap kit (not for IP65 (NEMA 7)) **S**

Other versions (different size, mount, type or pipe larger than DN 1200 (48"), or corrosion resistant), add Order code and plain text.

High temperature transducer size 2 for up to 230 °C (446 °F) (30 to 200 mm diam. (1.18 to 7.67 inch diam.)) **Z** **P 1 A**

High temperature transducer size 3 for up to 230 °C (446 °F) (150 to 610 mm diam. (5.90 to 24 inch diam.)) **Z** **P 1 B**

High temperature transducer size 4 for up to 230 °C (446 °F) (400 to 1200 mm diam. (15.75 to 47.25 inch diam.)) **Z** **P 1 C**

High temperature range HP transducer size B1H for temperatures up to 104 °C (220 °F) **Z** **P 1 K**

High temperature range HP transducer size B2H for temperatures up to 104 °C (220 °F) **Z** **P 1 L**

High temperature range HP transducer size C1H for temperatures up to 104 °C (220 °F) **Z** **P 1 M**

High temperature range HP transducer size C2H for temperatures up to 104 °C (220 °F) **Z** **P 1 N**

High temperature range HP transducer size D1H for temperatures up to 104 °C (220 °F) **Z** **P 1 P**

High temperature range HP transducer size D2H for temperatures up to 104 °C (220 °F) **Z** **P 1 Q**

High temperature range HP transducer size D4H for temperatures up to 104 °C (220 °F) **Z** **P 1 R**

◆ Mainstream products (delivery time 4 to 6 weeks)

F) Subject to export regulations AL: 91999, ECCN: N.

SITRANS FUS1010 Standard clamp-on

Selection and Ordering data	Order-No.	Ord. code
SITRANS FUS1010 Standard clamp-on		
• IP65 (NEMA 4X)	F) ◆	7ME3530-
• IP65 (NEMA 7) compact	F)	7ME3531-
• IP66 (NEMA 7) wall mounted	F)	7ME3532-
• IP66 (NEMA 7) with display window	F)	7ME3533-
		0 -
Transducer for channel 2 (includes pipe mounting kit for indicated max. OD listed) See „Transducer selection charts“ for specifications.		
no transducer		A
A2 universal to 3"/track mount		B
B3 universal to 5"/track mount ◆		C
C3 universal to 13"/mounting frame ◆		D
D3 universal to 24"/mounting frame ◆		E
E2 universal to 48"/mounting frame ◆		F
A1H (high precision) to 3"/track mount		G
A2H (high precision) to 3"/track mount		H
A3H (high precision) to 3"/track mount		J
B1H (high precision) to 5"/track mount		K
B2H (high precision) to 5"/track mount ◆		L
C1H (high precision) to 24"/mounting frame		M
C2H (high precision) to 24"/mounting frame ◆		N
D1H (high precision) to 48"/mounting frame ◆		P
D2H (high precision) to 48"/mounting frame		Q
D4H (high precision) to 48"/mounting frame		R
Doppler to 12" with chain or strap kit (not for IP65 (NEMA 7)) ◆		S
Other versions (different size, mount, type or pipe larger than DN 1200 (48"), or corrosion resistant), add Order code and plain text.	Z	Q 1 Y
High temperature transducer size 2 for up to 230 °C (446 °F) (30 to 200 mm diam. (1.18 to 7.67 inch diam.))	Z	Q 1 A
High temperature transducer size 3 for up to 230 °C (446 °F) (150 to 610 mm diam. (5.90 to 24 inch diam.))	Z	Q 1 B
High temperature transducer size 4 for up to 230 °C (446 °F) (400 to 1200 mm diam. (15.75 to 47.25 inch diam.))	Z	Q 1 C
High temperature range HP transducer size B1H for temperatures up to 104 °C (220 °F)	Z	Q 1 K
High temperature range HP transducer size B2H for temperatures up to 104 °C (220 °F)	Z	Q 1 L
High temperature range HP transducer size C1H for temperatures up to 104 °C (220 °F)	Z	Q 1 M
High temperature range HP transducer size C2H for temperatures up to 104 °C (220 °F)	Z	Q 1 N
High temperature range HP transducer size D1H for temperatures up to 104 °C (220 °F)	Z	Q 1 P
High temperature range HP transducer size D2H for temperatures up to 104 °C (220 °F)	Z	Q 1 Q
High temperature range HP transducer size D4H for temperatures up to 104 °C (220 °F)	Z	Q 1 R
Approvals		
FM/CSA ◆		1
ATEX		2
INMETRO (Brazil)		3
Special ATEX EEx m add Order code and plain text: Length of integral cable:		9 R 1 Y

Selection and Ordering data	Order code
Further designs	
Please add „-Z“ to Order No. and specify Order code(s).	
Cable assembly for transducers (add for No. of channels) See „Transducer cable selection chart“	K..
Cable assembly for RTDs (add for No. of RTDs) See „RTD cable selection chart“	R..
Cable termination kit (for one cable pair)	
• Termination for standard, plenum and armored transducer cable	T01
• Termination for submersible transducer cable	T11
• RTD cable termination kit for standard RTD	T21
• RTD cable termination kit for submersible RTD	T31
• Insert RTD cable termination kit	T41
Languages (Meter, Labels and Documentation), English (default)	
• German	◆ B10
• French	B12
• Spanish	B13
• Italian	B14
Wet flow transfer calibration (priced for 1 pipe calibration)	
• 6 point up to 4 inch (DN 100)	D10
• 6 point up to 5 to 8 inch (DN 125 to DN 200)	D11
• 6 point up to 10 to 12 inch (DN 250 to DN 300)	D12
• 6 point up to 14 to 16 inch (DN 350 to DN 400)	D13
• 6 point up to 18 to 20 inch (DN 450 to DN 500)	D14
• 6 point up to 22 to 24 inch (DN 550 to DN 600)	D15
• 6 point up to 26 to 30 inch (DN 650 to DN 750)	D16
• 6 point up to 32 to 36 inch (DN 800 to DN 900)	D17
Tag name plate	
• Stainless steel tag with 3.2 mm (0.13 inch) character size (26 characters max.)	Y17
• Stainless steel tag with 3.2 mm (0.13 inch) character size (68 characters max.)	Y19
◆ Mainstream products (delivery time 4 to 6 weeks)	



F) Subject to export regulations AL: 91999, ECCN: N.

SITRANS F flowmeters

SITRANS F US

SITRANS FUS1010 Standard clamp-on

MLFB example

Application example

A clamp-on meter is required for a 12" carbon steel jet fuel line, with a wall thickness of 12.7 mm (0.5"). Meter electronics is to be located in a Class I Div 2 area only 18 m (60 ft) from the pipeline. 12 V DC power is available at the site.

Dual beam operation is desired for improved accuracy and redundant measurement.

MLFB Order No.: **7ME3530-2AB00-0QQ1-Z**
K03 + K03

4

Selection and Ordering data

	Order-No.	Ord. code
FUS1010 meter family	7 ME 3 5 3	0 - - - - -
IP65 (NEMA 4X) enclosure		0
Dual Beam		2
Standard I/O option		A
9 ... 36 V DC power option		B
RS232 Standard		0
No RTD required		0
Transducer code for path 1		Q
Transducer code for path 2		Q
FM approval required		1
30 m (100 ft) transducer cable for path 1		K 0 3
30 m (100 ft) transducer cable for path 2		K 0 3

Transducer selection charts

Universal transducers for any pipe material

Transducer	Order Code	Outer diameter range (mm)		Outer diameter range (inches)	
		min.	max.	min.	max.
A2	B	12.7	50.8	0.5	2
B3	C	19	127	0,75	5
C3	D	51	305	2	12
D3	E	203	610	8	24
E2	F	254	6096	10	240

High precision transducers for steel pipe with outer diameter/wall thickness ratio >10

Transducer	Order Code	Pipe wall (mm)		Pipe wall (inches)	
		min.	max.	min.	max.
A1H	G	0.64	1.02	0.025	0.04
A2H	H	1.02	1.52	0.04	0.06
A3H	J	1.52	2.03	0.06	0.08
B1H	K	2.03	3.05	0.08	0.12
B2H	L	3.05	4.06	0.12	0.16
C1H	M	4.06	5.84	0.16	0.23
C2H	N	5.84	8.13	0.23	0.32
D1H	P	8.13	11.18	0.32	0.44
D2H	Q	11.18	15.75	0.44	0.62
D4H	R	15.75	31.75	0.62	1.25

Transducer cable selection chart

Transducer cable codes for length and type options

Cable length m (ft)	Standard (PVC jacket)	Submersible (polyethylene jacket)	Plenum Rated (teflon jacket)	Armored
	-40...+80 °C (-40...+176 °F)	-40...+80 °C (-40...+176 °F)	-40...+200 °C (-40...+392 °F)	-40...+80 °C (-40...+176 °F)
	Order code			
6 (20)	K01	K11	K21	K31
15 (50)	K02	K12	K22	K32
30 (100)	K03	K13	K23	K33
46 (150)	K04	K14	K24	K34
61 (200)	K05	K15	K25	K35
91 (300)	K06	K16	K26	K36

RTD cable selection chart

RTD cable codes for length and type

Cable length m (ft)	Standard (teflon wrapped)	Submersible (extruded jacket)
	-40 ... +200 °C (-40 ... +392 °F)	-40 ... +200 °C (-40 ... +392 °F)
	Order code	
6 (20)	R01	R11
15 (50)	R02	R12
30 (100)	R03	R13
46 (150)	R04	R14
61 (200)	R05	R15
91 (300)	R06	R16