UTM20 Series
Ultrasonic Transit-time Flowmeters

Description

The Spirax Sarco UTM20 ultrasonic transit time flowmeter measures volumetric flow and heating/cooling energy rates in clean liquids as well as those with small amounts of suspended solids or aeration, such as surface water or raw sewage.
UTM20 flow and energy meters clamp onto the outside of pipes and do not make contact with the liquid inside the pipe.

Benefits

By clamping onto the outside of pipes, the meters have inherent advantages over other flow meter technologies, including:

- Reduced installation time and cost
- Non-invasive, non-contact measurement
- Continued operation during installation - no need to shut down the process
- No pressure head loss
- No moving parts to maintain or replace

Features

- Large, bi-directional flow measuring range
- Data log up to 8 records
- Modbus® RTU or BACnet® MS/TP over EIA-485; Modbus TCP/IP; BACnet/IP
- Configure and troubleshoot over USB with SoloCUE software
- Reynolds number, ultrasonic speed and temperature compensation
- Large, easy-to-read graphical display
- Rugged, aluminum enclosure for a long service life in harsh environments

Applications

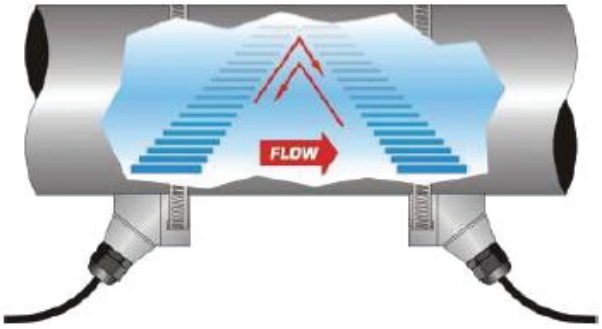
The UTM20 meter is available in a variety of configurations that permit the user to select a meter with features suitable to meet particular application requirements.

The UTM20 meter is available in two versions:

- A volumetric flow meter for water, sewage, cooling water, water-glycol mixtures, alcohols and chemicals.
- A heating/cooling energy flow meter used in conjunction with dual clamp-on RTDs for temperature measurement; ideal for hydronic process and HVAC applications.

Operation

Transit time flow meters measure the time difference between the travel time of an ultrasound wave going with the fluid flow and against the fluid flow. The time difference is used to calculate the velocity of the fluid traveling in a closed-pipe system. The transducers used in transit time measurements operate alternately as transmitters and receivers. Transit time measurements are bi-directional and are most effective for fluids that have low concentrations of suspended solids and are sonically conductive.



An ultrasonic meter equipped with heat flow capabilities measures the rate and quantity of heat delivered or removed from devices such as heat exchangers. By measuring the volumetric flow rate of the heat exchanger liquid, the temperature at the inlet pipe and the temperature at the outlet pipe, the energy usage can be calculated.

Technical specifications

System

Liquid Types	Most clean liquids or liquids containing small amounts of suspended solids or gas bubbles	
Flow Accuracy	Medium and Large Pipes (RZ, NZ, WZ, HZ, LZ, YZ, JZ, KZ)	± 0.5% ± 0.0049 ft/s (0.015 m/s)
	Small Pipes (CA-CT, UZ)	1" (25 mm) and larger = ±1% ± 0.03 ft/s (0.009 m/s) ¾" (19.05 mm) and smaller = ±1% of full scale
Repeatability	0 2% above 1 5 ft/s	
Velocity	Medium and Large Pipes	Up to 40 ft/s (12.2 m/s), depending on pipe and fluid
	Small Pipes	Up to 20 ft/s (6.1 m/s), depending on pipe and fluid
Straight Run Requirements	10 diameters upstream, 5 diameters downstream from single elbow	
Certification and Compliance	**General Safety (all models):** cCSAus, CE, Pollution Degree 2, CE compliance to Low Voltage Directive, 2014/35/EU **U.S./Canada Hazardous Location transmitter and transducers:** **Transmitter and transducers (certification option B): cCSAus Class I Division 2 Groups ABCD T4** **Volumetric Flow Meter Only (not available for Energy Meter)** Requires flexible conduit Not available with UZ, HZ or JZ and KZ (Easy Rail) transducers, Auxiliary Dry Contact card **Transmitter (certification option R):** cCSAus Class I Division 2 Groups ABCD T4; cCSAus Ex ec ic nC IIC T4 Gc; Ex tc IIIB T100° C Dc; Class I, Zone 2, AEx ec ic nC IIC T4 Gc; Zone 22, AEx tc IIIB T100° C Dc; Class II, Division 2, Groups FG; Class III Not available with Auxiliary Dry Contact card **Transducers LZ, NZ, RZ, WZ and YZ (certification option R):** cCSAus Ex ec IIC T6 Gc; Ex tc IIIB T60° C Dc; Class I, Zone 2, AEx ec IIC T6 Gc; Zone 22, AEx tc IIIB T60° C Dc; Class II, Division 2, Groups FG; Class III Requires flexible conduit Not available with CA-CT, UZ, HZ or JZ and KZ (Easy Rail) transducers	

Technical specifications (continued)

Transmitter

Power Options	24 Vdc/AC	9…28 Vdc @ 8 W max or 20…26 AC 47...63 Hz @ 0 5 A max , 2 Amp slow-blow fuse, not field replaceable
	Mains AC	85…264 Vac 47...63 Hz @ 24VA max 1 Amp slow-blow fuse, manually field replaceable
		Over-Voltage Rating Category II (CAT II)
Display	Options	Display with keypad or no display/keypad
	Keypad	4-button navigation, keypad with tactile feedback; polyester film
	Display	128 × 64 pixel LED backlit graphical display; adjustable brightness and timeout; polycarbonate window
	Flow rate/total	8-digit
Enclosure	NEMA Type 4X, IP67	
Construction	Aluminum construction; painted; wall, panel or pipe mounting; stainless steel fasteners and mounting hardware; EPDM gasket	
	Conduit Holes	(4) 1/2 in NPT, M20 × 1.5 or 1/2 BSPP; cable glands available for NPT and M20
Environmental Ratings	Pollution Degree	2
	Altitude Restriction	Up to 2000 m (6561 ft)
	Ambient Temperature Range	-4…140°F (-20…60°C)
	Storage Temperature Range	-40…176°F (-40…80°C)
	Humidity	0…85%, non-condensing
Configuration	Via optional keypad or SoloCUE configuration software; SoloCUE available on DVD or download	
Units (Field-Selectable)	Velocity	feet/second, meters/second
	Volumetric total	US Gallons, Million Gallons, Imperial Gallons, Million Imperial Gallons, Acre-Feet, Liters, Hectoliters, Cubic Meters, Cubic Feet, Oil Barrels (42 gallons), Fluid Barrels (31.5 gallons), Imperial Fluid Barrels (36 imperial gallons), Pounds (Kilograms) and custom units
	Flow rate	Acre Feet/Day, Liters/Second, Liters/Minute, Liters/Hour, Cubic Meters/Second, Cubic Meters/Minute, Cubic Meters/Hour, Cubic Feet/Minute, Cubic Feet/Minute, Cubic Feet/Hour, Gallons/Second, Gallons/Minute, Gallons/Hour, Million Gallons/Day, Imperial Gallons/Second, Imperial Gallons/Minute, Imperial Gallons/Hour, Million Imperial Gallons/Day, Oil Barrels/Day, Fluid Barrels/Day, Imperial Fluid Barrels/Day and custom units
	Energy total (energy meters)	British Thermal Unit (Btu), Thousand Btu, Millions Btu, Kilocalories, Mega calories, Kilowatt-hour, Megawatt hour, Kilojoules, Mega joules, Ton-hour (Refrigeration)
	Heat/cooling rate (energy meters)	Btu/hour, Thousand Btu/hour, Millions Btu/hour, Ton (Refrigeration), Watts, Kilowatts, Megawatts, Kilojoules/hour, Mega joules/hour, Kilocalories/hour, Mega calories/hour
	Temperature (energy meters)	Farenheit, Celcius, Kelvin

Technical specifications (continued)

Transmitter

		Flow Meter	Energy Meter
Inputs and Outputs	0/4…20 mA output	One 16-bit, isolated, max 800 Ohms, internal or external power	Two 16-bit, isolated, max 800 Ohms, internal or external power
	Digital input	One 5…30 Vdc, isolated, externally or internally sourced, reset totalizer or alarm output	
	Digital output	Two selectable pulse, alarm, flow direction, sink isolated open collector, 5…30 Vdc, max 50 mA externally or internally sourced, leakage current 1uA max	Three selectable pulse, frequency, alarm, flow direction, isolated open collector, 5…30 Vdc, externally or internally sourced, leakage current 1uA max
		Frequency output: 50% duty cycle, 63…10k Hz maximum frequency	
		Pulse (totalizer) output: 5 kHz max output, open collector, pulse width 5…500 ms programmable	
		Optional: Two dry contact output for alarm or flow direction 30 Vdc max , 5A max (Ethernet not available with this option)	
	RTD (energy only)	None	Two 2-wire, 3-wire or 4-wire Pt100/ Pt1000 RTD 12-bit inputs; Range of -40…200°C (-40...392 °F); Clamp-on resistor kits available
Ports	Programming	USB 2.0 mini B connector for connection to a device with SoloCUE configuration software	
	EIA-485	Modbus RTU command set or BACnet MS/TP; Baud rates 9600, 14400,19200, 38400, 57600, 76800, 115k; terminating resistor selectable	
	Ethernet	Optional 10/100 Base T RJ45, communication via Modbus TCP/IP or BACnet/IP	
Data Logging	Number of points	Up to 8 parameters per record Selectable 1 second to 1 day Transfer logs via memory card	
	Real Time Clock	Backed up with a super capacitor, minimum of 32 days of data retention without power; Requires no servicing	
	MicroSD card slot	8 GB card, included with transmitter	
Alarms	Records 150 previous alarms, warnings or errors		
Languages	English, French, German, Italian, Spanish		
Security	Four levels: Read-only, Operator, Service and Admin; 6-digit passcode number; selectable auto logout		

Technical specifications (continued)

Transducers

Model	Construction	Cable Length Max.	Pipe/Tubing Sizes [1]	Flow Rate Max. GPM (LPM)	Pipe/ Tubing Materials
CA-CT [5] fixed small pipe	CPVC, Ultem®, Nylon cord grip, PVC cable jacket; -40…194°F (-40...90 °C)	100 ft (30.5 m)	0.5…2 in (12.7...50.8 mm)	190 (719)	See [2]
UZ adjustable small pipe	CPVC, Ultem, and anodized aluminum track system; Nickel-plated brass connector with Teflon insulation; PVC cable jacket, -40…194°F (-40…90°C)				
NZ (IP67) standard pipe	PVC, Ultem®, Nylon cord grip, PVC cable jacket; -40…194°F (-40…90°C)	300 ft (91.4 m)	2.5…12 in (DN65…DN300)	4000 (15,142)	
RZ (IP54) standard pipe	PBT glass filled, Ultem®, Nylon cord grip; PVC cable jacket; -40…250°F (-40…121°C)				
JZ, KZ (IP54) standard pipe, integrated rail	PBT glass filled, Ultem, Nylon cord grip; PVC cable jacket; -40…250°F (-40… 121°C)		2.5…6 in (DN65…DN150) 2.5…12 in (DN65…DN300)		
WZ (IP68) standard pipe, submersible	CPVC, Ultem, Nylon cord grip; Polyethylene cable jacket; -40…194°F (-40…90°C)		2.5…12 in (DN65…DN300)		
HZ high temperature	PTFE, Vespel, Nickel-plated brass cord grip; FEP cable jacket; -40…350°F (-40…176°C)				
LZ (IP67) large pipe	CPVC, Ultem, Nylon cord grip PVC cable jacket; -40…194°F (-40…90°C)		8…48 in (DN200…DN1200) [3, 4]	33,000 (124,919)	
YZ (IP68) large pipe, submersible	CPVC, Ultem, Nylon cord grip; Polyethylene cable jacket; -40…194°F (-40…90°C)				

[1] Recommendations based on unlined, new pipes with water Recommended pipe or tubing sizes vary with pipe conditions and fluid

[2] PVC, CPVC, HDPE, PTFE, PDVF, stainless steel, ductile iron, aluminum, brass naval, carbon steel copper

[3] Large pipe transducers are recommended for 8…12" (203…305 mm) pipes if normal velocity is expected to be greater than 12 ft/s (3.6 m/s)

[4] Consult factory for larger pipe sizes

[5] Not for metric pipes

RTD Kits

Part Number	Description	Installation	RTD Type	Construction	Temperature Range
76290	RTD pair; 15 ft (4 5 m) cable	Pipe clamp, surface mount, IP54	Pt 1000, Class A ± (0.15 + 0 002*| t |) with t as temperature °C	Aluminum body, silicone cable jacket	-58…356°F (-50…180°C)
76291	RTD pair; 50 ft (15 m) cable				
76292	RTD pair; 100 ft (30 m) cable				

SoloCUE Flow Device Manager Software

The flow meter may be programmed through the keypad or with SoloCUE software. If the meter is ordered without a display/ keypad, the flow meter must be programmed with SoloCUE software. The software is used to configure, calibrate and communicate with UTM20 meters with English, French, German, Italian and Spanish menus. Additionally, it has numerous troubleshooting tools to make diagnosing and correcting installation problems easier.

SoloCUE	Used to configure, calibrate and troubleshoot flow meters and control valves; Software is compatible with Windows 7, 8, 10	
USB Cable	RC820648	USB 2.0 mini B connector to A connector, shielded

How to order the UTM20 Ultrasonic Transit-time Flowmeter

Category	Description	Suffix codes
Base Mode	Velocity Meter	UTM20-S
	Energy Meter	UTM20-E
Approvals	General Safety. cCSAus, CE	G
	Hazardous Location Class I, Division 2 (Certification available for Velocity Meter only) [5]	B
Transducer Type	½" ANSI Pipe -40 to 194 °F (-40 to 90 °C) [1]	CA
	¾" ANSI Pipe -40 to 194 °F (-40 to 90 °C) [1]	CB
	1" ANSI Pipe -40 to 194 °F (-40 to 90 °C) [1]	CC
	1¼" ANSI Pipe -40 to 194 °F (-40 to 90 °C) [1]	CD
	1½" ANSI Pipe -40 to 194 °F (-40 to 90 °C) [1]	CE
	2" ANSI Pipe -40 to 194 °F (-40 to 90 °C) [1]	CF
	½" Copper Tube -40 to 194 °F (-40 to 90 °C) [1]	CG
	¾" Copper Tube -40 to 194 °F (-40 to 90 °C) [1]	CH
	1" Copper Tube -40 to 194 °F (-40 to 90 °C) [1]	CT
	1¼" Copper Tube -40 to 194 °F (-40 to 90 °C) [1]	CJ
	1½" Copper Tube -40 to 194 °F (-40 to 90 °C) [1]	CK
	2" Copper Tube -40 to 194 °F (-40 to 90 °C) [1]	CL
	½" Stainless Steel Tube -40 to 194 °F (-40 to 90 °C) [1]	CM
	¾" Stainless Steel Tube -40 to 194 °F (-40 to 90 °C) [1]	CN
	1" Stainless Steel Tube -40 to 194 °F (-40 to 90 °C) [1]	CP
	1¼" Stainless Steel Tube -40 to 194 °F (-40 to 90 °C) [1]	CQ
	1½" Stainless Steel Tube -40 to 194 °F (-40 to 90 °C) [1]	CR
	2" Stainless Steel Tube -40 to 194 °F (-40 to 90 °C) [1]	CS
	Small pipe (½" to 2"), universal adjustable with track (conduit not available) -40 to 194 °F (-40 to 90 °C)	UZ
	2½" and larger -40 to 194 °F (-40 to 90 °C), NEMA 6 (IP67)	NZ
	2½" and larger -40 to 250 °F (-40 to 121 °C), NEMA 3 (IP54)	RZ
	2½" and larger, submersible -40 to 194 °F (-40 to 90 °C), NEMA 6P (IP68)	WZ
	2½ to 6" with Easy Rail (not available with conduit) -40 to 250 °F (-40 to 121 °C), NEMA 3 (IP54)	JZ
	2½ to 12" with Easy Rail (not available with conduit) -40 to 250 °F (-40 to 121 °C), NEMA 3 (IP54)	KZ
	2½" and larger, high temperature -40 to 350 °F (-40 to 177 °C)	HZ
	8" and larger -40 to 194 °F (-40 to 90 °C), NEMA 6 (IP67) [2]	LZ
	8" and larger, Submersible -40 to 194 °F (-40 to 90 °C), NEMA 6P (IP68) [2]	YZ

Notes:

[1] Not suitable for metric pipes.

[2] Large pipe transducers are recommended for 8" to 12" pipes if normal velocity is expected to be greater than 12 ft/s (3.7 m/s).

[5] Requires Conduit

How to order the UTT20 Ultrasonic Transit-time Transducers (continued)

Category	Description	Suffix codes
Electrical Power	110/220 VAC	R
	24 VDC/AC	B
Display	Display and Keypad	S
Cable Length	15 feet (9.1 m)	AC
	30 feet (9.1 m)	AF
	50 feet (15.2 m)	AK
	75 feet (22.9 m)	AR
	100 feet (30.5 m)	BW
	150 feet (45.7 m)	BK
	200 feet (61.0 m)	DW
	250 feet (76.2 m)	DK
	300 feet (91.4 m)	EW
	350 feet (106.7 m) [3]	EK
	400 feet (121.9 m) [3]	FW
	450 feet (137.2 m) [3]	FK
	500 feet (152.4 m) [3]	GW
	550 feet (167.6 m) [3]	GK
	600 feet (182.9 m) [3]	HW
Conduit Length [4]	None	WW
	5 feet (1.5 m)	AA
	15 feet (9.1 m)	AC
	30 feet (9.1 m)	AF
	50 feet (15.2 m)	AK
	75 feet (22.9 m)	AR
	100 feet (30.5 m)	BW
	150 feet (45.7 m)	BK
	200 feet (61.0 m)	DW
	250 feet (76.2 m)	DK
	300 feet (91.4 m)	EW
RTD Type	None	XX
	Surface, Commercial (Energy Meter Only)	C

Notes:

[3] Large pipe (LZ, YZ Transducers) only. Contact factory for pricing.

[4] For hazardous locations, conduit is required and must be the same length as the cable. For general area, conduit length can be less than or equal to cable length

How to order the UTT20 Ultrasonic Transit-time Transducers (continued)

Category	Description	Suffix codes
RTD Cable Length	15 feet (4.6 m)	AC
	50 feet (15.2 m)	AK
	100 feet (30.5 m)	BW
	none (user provided/Not Applicable)	WW
Cable Connection Hardware	½" NPT Threads, Poly cable glands	S
	½" NPT Threads, Nickel Plate Brass cable glands	T
	½" NPT Threads, no cable glands	N
	M20 Threads, no cable glands	A
	½" BSPP Threads, no cable glands	B
	M20 Threads, Poly cable glands	C
	M20 Threads, Nickel Plated Brass cable glands	D
Endpoint Wiring Method	None	XX
Digital Communications	Standard Output: Modbus RTU or BACnet MS/TP (field selectable)	S
	Standard Output plus 10/100 Base-T RJ45 Modbus TCP/IP	T
	Standard Output plus 10/100 Base-T RJ45 Ethernet/IP	U
	Standard Output plus 10/100 Base-T RJ45 BACnet/IP	V
	Standard Output plus Aux Output [6]	9
Unit of Measure	Volumetric Units: Gallons/gallons per minute (field selectable)	G
Totalizer/Rate	Energy Units: Thousand BTU/BTU per hour (field selectable)	C
Testing and Tagging	Factory Calibrated	F
	Factory Calibrated/Stainless Steel Tag	S

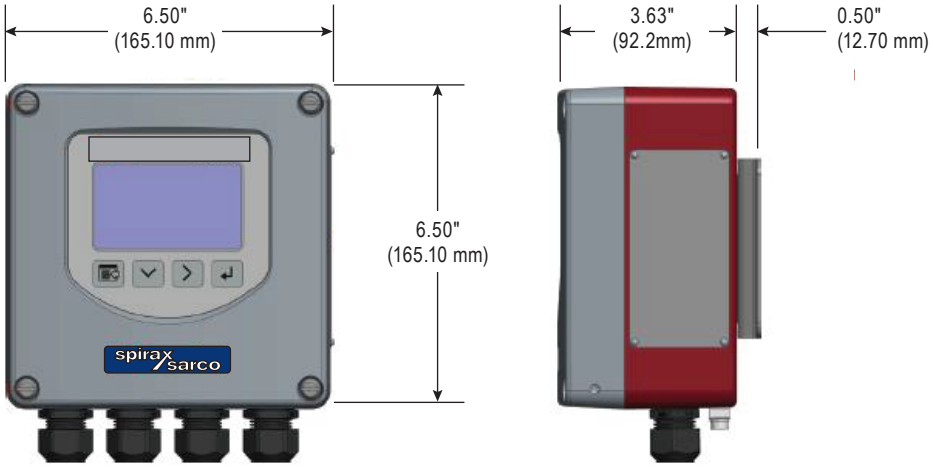
Example: **UTM20** - S - G - NZ - R - S - AK - WW - XX - WW - N - XX - S - G - F

Notes:

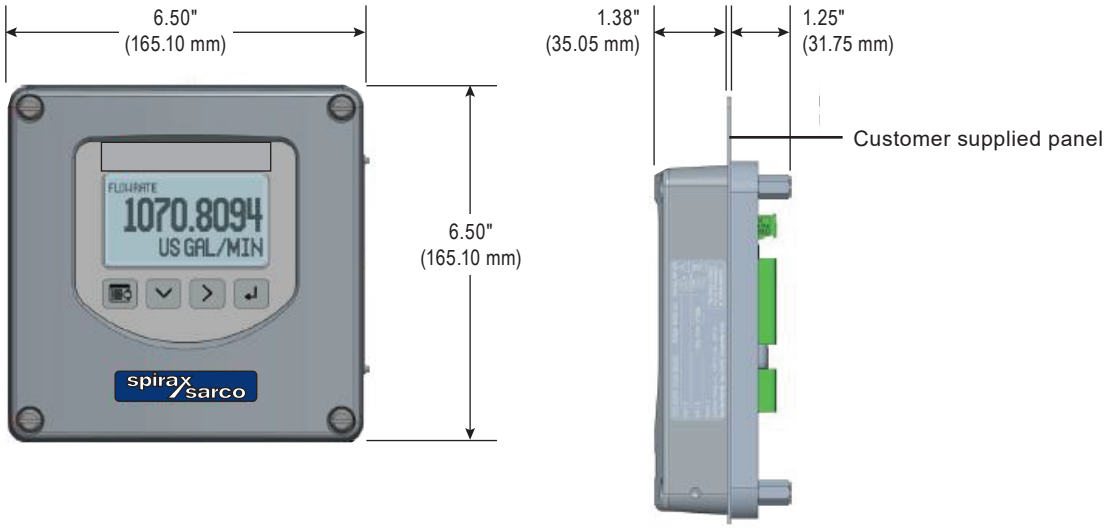
[6] Two dry contact pulse outputs 20 VDC max, 5A max, 16 Hz max (No Ethernet or HART)

Dimensions

Remote System Enclosure



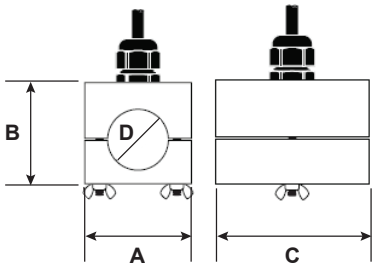
Panel Mount Enclosure



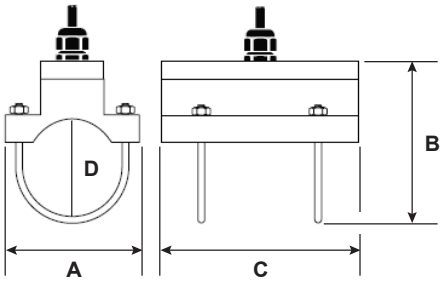
Consult factory for part number selection

Transducers

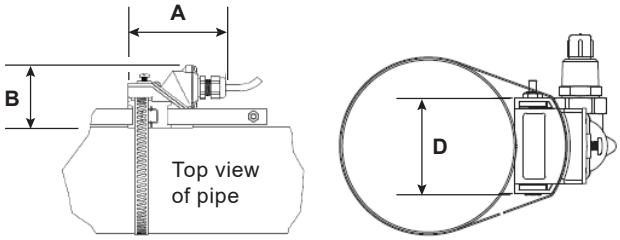
Fixed Small Pipe
Pipes and Tubing 1/2 . .. 2" (Not for metric pipes.)



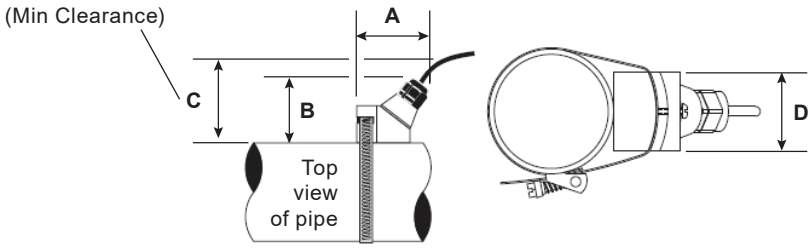
Fixed Small Pipe U-Bolt Connections CF, CL
ANSI/ON and Copper 2" Models /Not for metric pipes.)



RZ
Pipes Larger than 2" (51 mm)



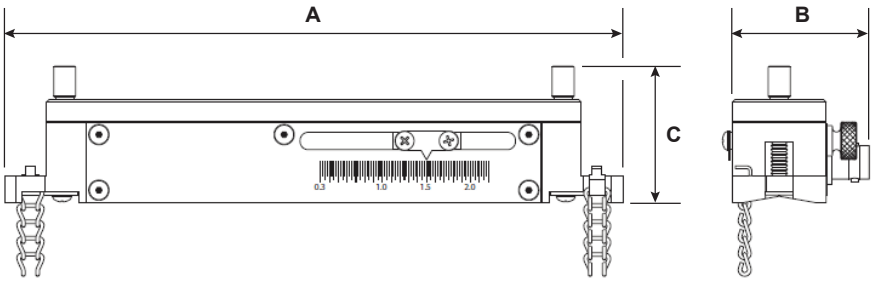
NZ, WZ, HZ, LZ, YZ
Pipes Larger than 2" (51 mm)



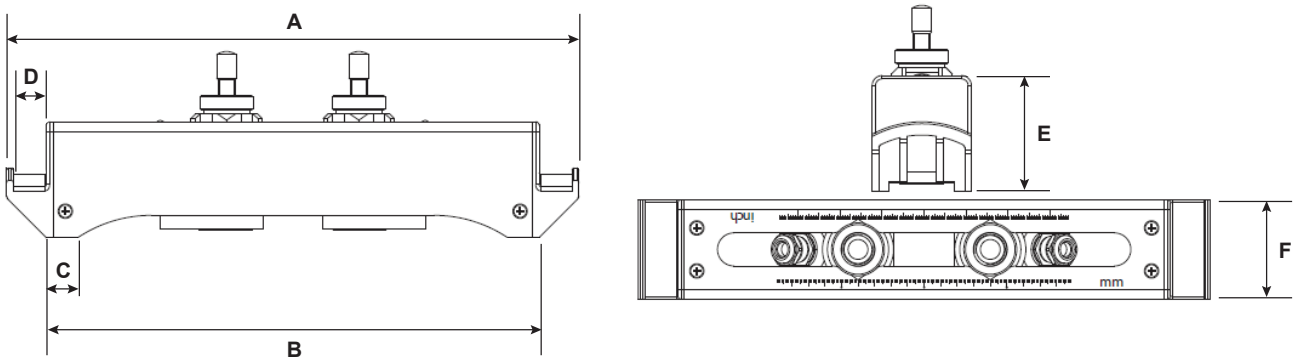
	RZ	NZ,WZ	HZ	LZ, YZ
A	3.75" (95.3 mm)	2.95" (74.9 mm)	2.95" (74.9 mm)	3.40" (86.4 mm)
B	2.35" (59.7 mm)	2.75" (69.9 mm)	2.75" (69.9 mm)	2.94" (74.7 mm)
C	-	3.00" (76.2 mm)	3.00" (76.2 mm)	3.20" (81.3 mm)
D	2.19" (55.6 mm)	1.70" (43.2 mm)	1 .71" (43.4 mm)	2.50" (63.5 mm)

Transducers (continued)

UZ
Adjustable Small Pipe



Easy Rail (JZ, KZ)



	UZ	JZ	KZ
A	7" (177.80 mm)	13.62" (345.95 mm)	19.92" (505.97 mm)
B	1.6" (40.64 mm)	11.73" (297.94 mm)	18.03" (457.96 mm)
C	1.5" (38.10 mm)	0.75" (19.05 mm)	0.75" (19.05 mm)
D	-	0.79" (20.07 mm)	0.79" (20.07 mm)
E	-	2.76" (70.10 mm)	2.76" (70.10 mm)
F	-	2.36" (59.94 mm)	2.36" (59.94 mm)