

Dimensions

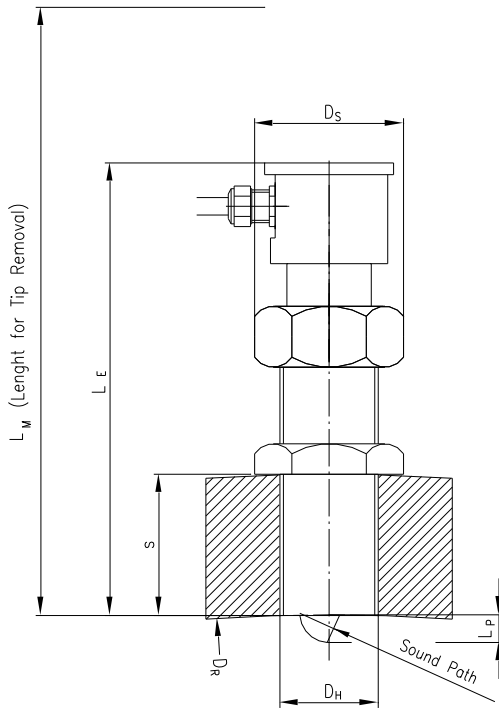


Figure 2: Spare transducer type MFATZ.x

Figure 1: RISONIC transducer type C mounted

- | | |
|-------------------------------------|--|
| D_R = Diameter of pipe | S = Pipe wall thickness |
| D_S = Max. diameter of transducer | L_E = Height of installed transducer |
| D_H = Throat size | L_P = Distance between tip of transducer and pipe wall |

Dimensions referring to Figure 1 [ft., " / mm]							
Type Frequency	Pipe Dimensions		Transducer Dimensions				D_H
	D_R^1	S	D_S	L_E	L_P	L_M	
MFATC1x.60 1 MHz	0.8 – 6.6 ft. 250 – 2000	0.3" - 2.4"	2.05" 52	7.28" 185	0.47" 12	9.1" 230	G 1"
MFATC2x 1 MHz	4.6 – 32.8 ft. 1400 – 10000		2.52" 64	7.56" 192	0.71" 18	9.4" 240	G 1 1/4"
MFATC05x 500 kHz	10.8 – 148 ft. 3600 ² – 45000	8 - 60	3.54" 90	7.56" 192	1.57" 40	9.4" 240	2.36" M60x2

Table 1: Dimensions of RISONIC transducers

¹ In practice suitable corresponding diameter at 1E1P and 45° path angle

² Smaller pipe diameters are possible on request.

Short description

The RISONIC modular transducers MFATCxxx.xx serve alternately as transmitter and/or receiver. A voltage surge excites the piezo ceramic oscillator. The ultrasonic sound pulses propagate through the transducer insert and into the medium to be measured. On the opposite side of the pipe, the sound pulses are received, converted into an electrical signal and further processed by the RISONIC Ultrasonic Transit Time and Controller modules.

Given by the operating frequency, the RISONIC modular transducers can be placed away at a maximum distance from the RISONIC Ultrasonic Transit Time module of 300 m at 1 MHz or 500 m at 500 kHz. To prevent cables from damages, protection tubes and/or flexible conduits are to be used.

Transducer insert changeable under pressure, a special replacement kit required.

Layouts for single and multiple path measurement

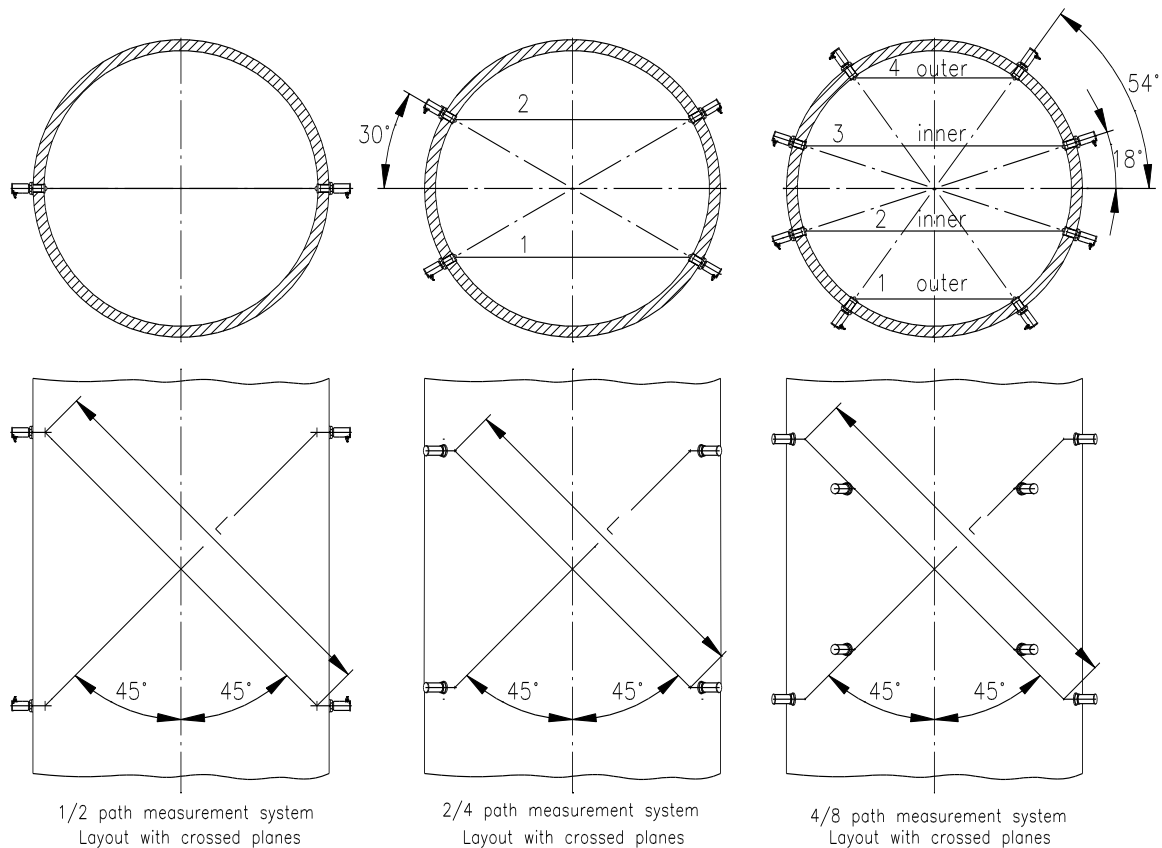


Figure 3: Layouts for single and multiple path measurement (45° path layer angle)

Type of transducers

Available are 1 MHz transducers with small (MFATC1x) and large (MFATC2x) sizes of the piezo ceramic oscillator and also a 500 kHz transducers (MFATC05x), which lead to according shapes of the transducers. The piezo ceramic oscillator frequency and size as well as the path arrangement define the min. and max. pipe diameter to be measured.

Transducer type vs. approved pipe diameter

Type	Path layer angle	Pipe diameter at 1E1P		Pipe diameter at 1E2P		Pipe diameter at 1E4P	
		Min.	Max.	Min.	Max.	Min.	Max.
MFATC1x	45°	0.61 ft. 0.20 m	6.9 ft. 2.10 m	0.71 ft. 0.22 m	8.0 ft. 2.40 m	1.07 ft. 0.33 m	7.3 ft. 2.20 m
MFATC1x	45°	2.30 ft. 0.70 m	34.0 ft. 10.60 m	2.80 ft. 0.84 m	40.0 ft. 12.20 m	4.10 ft. 1.24 m	36.0 ft. 11.10 m
MFATC05x	45°	11.7 ft. 3.60 m	116.0 ft. 35.00 m	13.6 ft. 4.20 m	134.0 ft. 40.00 m	20.0 ft. 6.10 m	122.0 ft. 37.00 m
MFATC1x.065 ³	65°	0.77 ft. 0.24 m	8.90 ft. 2.70 m	0.90 ft. 0.28 m	10.30 ft. 3.10 m	1.35 ft. 0.41 m	9.40 ft. 2.80 m
MFATC2x.065 ³	65°	3.10 ft. 0.92 m	44.00 ft. 13.60 m	3.50 ft. 1.07 m	51.00 ft. 15.70 m	5.20 ft. 1.58 m	46.00 ft. 14.30 m
MFATC05x.065 ³	65°	15.0 ft. 4.60 m	148.0 ft. 45.00 m	17.3 ft. 5.30 m	171.0 ft. 52.00 m	25.6 ft. 7.80 m	156.0 ft. 47.00 m

Table 2: Transducer type vs. approved pipe diameter

Technical data

- Protection class transducer sleeve: IP68 (NEMA 6) up to 1160 psi / 80 bar (higher pressure ratings on request)
- Protection class PCB housing: IP68 (NEMA 6) up to 145 psi / 10 bar
- Frequency of oscillator: | 1 MHz | 500 kHz |
- Max. cable length to RIMOUSTT: | 984 ft. / 300 m | 1640 ft. / 500 m |
- Minimum Sound Path Length: | 9.8" / 250 mm | 197" / 5 000 mm² |
- Maximum Sound Path Length: | 591" / 15 000 mm | 1969" / 50 000 mm |
- Penstock wall thickness: 0.3" to 2.36" / 8 to 60 mm (thicker on request, thinner have to be reinforced with a sleeve/flange)
- Material Transducer: Stainless steel 316L
- Suitable for: Fresh / potable water
- Operating Temperature: -22 °F to +158 °F / -30 °C to +70 °C
- Humidity: 100 % r. humidity

Notes on the correct use of ultrasonic flow measurement units

- The RISONIC modular transducers have to be mounted according to the preferences of Rittmeyer Ltd.. The positions of the transducers depend on the hydraulic conditions and the water pollution. Depending on the application and the required accuracy, the installation can be carried out by the customer. IEC 60041 / ASME PTC 18 will be executed by Rittmeyer specialists.
- The guidelines in the assembly and setup instructions are to be followed for survey of the transducer positions, installation and setting up of the RISONIC flow measurement transducers.
- For all diameters a transducer alignment accuracy under operating conditions of $\pm 1^\circ$ or better is necessary. To get the most accurate survey on the transducer positions a theodolite system is usually required.
- The fresh / potable water must not contain too high concentration of air bubbles or entrained particles and sediments.
- The transducers are screwed into the penstock and glued to the pipe wall.
- The client is responsible for a suitable cable protection.

³ Attention: special version with 65° path layer-angle!

- The layout and the position of the transducers depends on the hydraulic conditions and the influences of the elements upstream like valves, bends and restrictions.
- On request transducers with other sound path angles than 45° could be ordered.

Ordering information

Transducers (order number set) are packed as a set for a complete single plane 1ExP flow measurement system and include transducers for a one, two or four path measurement application (=2, 4 or 8 transducers).

For 2ExP crossed plane systems twice the amount of transducers have to be ordered!

Default measurement setup 45° (articles marked in orange only on request)

Path qty.	RISONIC transducer (Figure 1)				Spare transducer insert (Figure 2)		
	Type	Order number (set)	Transd. qty.	Weight ⁴	Type	Order number (single)	Path position ⁵
1	MFATC11.60	00 66 627.002	2	7.3 lb., 3.3 kg	MFATZ.1	00 66 509.001	single
	MFATC21	00 66 632.001		9.9 lb., 4.5 kg	MFATZ.2	00 66 559.001	
	MFATC051	00 68 004.001		23.8 lb., 10.8 kg	MFATZ.34	00 68 007.001	
2	MFATC12.60	00 66 626.002	4	13.9 lb., 6.3 kg	MFATZ.3	00 66 508.001	
	MFATC22	00 66 631.001		19.2 lb., 8.7 kg	MFATZ.4	00 66 558.001	
	MFATC052	00 68 005.001		39.2 lb., 17.5 kg	MFATZ.31	00 68 008.001	
4	MFATC14.60	00 66 625.002	8	28.9 lb., 13.1 kg	MFATZ.5	00 66 507.001	inner (2+3)
					MFATZ.6	00 66 506.001	outer (1+4)
	MFATC24	00 66 630.001		40.6 lb., 18.4 kg	MFATZ.7	00 66 557.001	inner (2+3)
					MFATZ.8	00 66 556.001	outer (1+4)
	MFATC054	00 68 006.001		82.0 lb., 37.2 kg	MFATZ.32	00 68 009.001	inner (2+3)
MFATZ.33	00 68 010.001	outer (1+4)					

Table 3: Ordering information default measurement setup 45°

Special measurement setup 65° (articles marked in orange only on request)

Path qty.	RISONIC transducer (Figure 1)				Spare transducer insert (Figure 2)		
	Type	Order number (set)	Transd. qty.	Weight ⁴	Type	Order number (single)	Path position ⁵
1	MFATC11.065	00 66 440.001	2	7.3 lb., 3.3 kg	MFATZ.40	00 66 427.001	single
	MFATC21.065	00 66 445.001		9.9 lb., 4.5 kg	MFATZ.41	00 66 425.001	
	MFATC051.065	00 68 018.001		23.8 lb., 10.8 kg	MFATZ.54	00 68 020.001	
2	MFATC12.065	00 67 049.001	4	13.9 lb., 6.3 kg	MFATZ.42	00 66 424.001	
	MFATC22.065	00 66 444.001		19.2 lb., 8.7 kg	MFATZ.43	00 66 426.001	
	MFATC052.065	00 68 019.001		39.2 lb., 17.5 kg	MFATZ.51	00 68 021.001	
4	MFATC14.065	00 67 048.001	8	28.9 lb., 13.1 kg	MFATZ.44	00 67 047.001	inner (2+3)
					MFATZ.45	00 67 046.001	outer (1+4)
	MFATC24.065	00 66 443.001		40.6 lb., 18.4 kg	MFATZ.46	00 67 043.001	inner (2+3)
					MFATZ.47	00 67 042.001	outer (1+4)
	MFATC054.065	00 68 017.001		82.0 lb., 37.2 kg	MFATZ.52	00 66 428.001	inner (2+3)
MFATZ.53	00 66 429.001	outer (1+4)					

Table 4: Ordering information special measurement setup 65°

⁴ Weight of transducers including packaging

⁵ Refer to layout in Figure 3

Accessories (optional)

Description	Type	Order No.
Coaxial cable 75 ohm (Refer to data sheet 22.210.04649xx.001)	RIMOZKKxx	04 64 90x
Spare Transducer according to Table 3 and Table 4	MFATZ.x	00 66 5xx.001
Reduction for Protection Tubing (M14x1.5 / NPT 1/2")	00 66 590.003	00 66 590.003
Tool case for transducer installation MFATA/B/C	MFATZMK3	00 66 575.003
Transducer insert replacement kit		On request

Table 5: Accessories