evoARC User Manual

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Contents

1 Introduction

This manual is designed to provide the user with details of the operational aspects and correct use of the evoARC encoder.

All users, regardless of experience level are encouraged to read this manual in its entirety before first use.

2 Product Overview

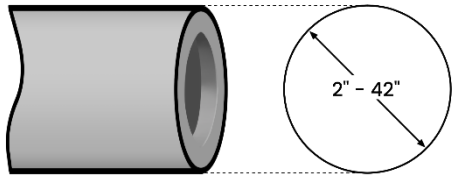
evoARC is a patented, innovative, first of kind, non-contact Circumferential encoder designed to attach to and integrate with common industrial scanners.

The core features are as follows:

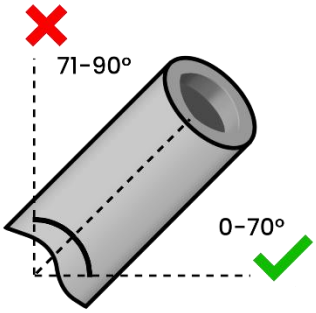
- Circumferential non-contact encoding with no moving parts.
- Onboard LEDs to indicate approaching and true cardinal clock positions (12, 3, 6, 9 o'clock).
- Effortlessly attaches to multiple existing scanners via toolless, quick release custom mounts.
- Eliminates the need to mark-up scan lines on horizontal pipelines, vessels and curved structural assets.
- Eliminates multiple acquisition initiation points at commencement of scanning runs.
- Enables uninterrupted scanning around partial test restrictions such as nozzles, nodes, supports, stands, saddles, reinforcement pads and penetrations.
- Replaceable (non-integrated) cable.

3 Product Applications and Limitations

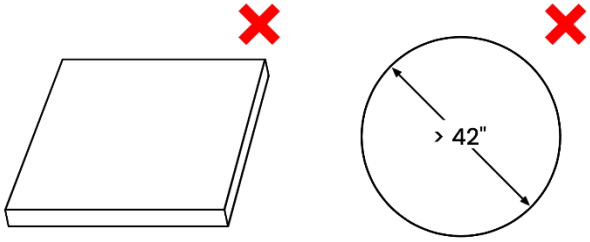
The evoARC is intended for use on cylindrical or curved subjects (pipes/vessels/curved structures) of diameter 2" (51mm) to 42" (~1050mm).



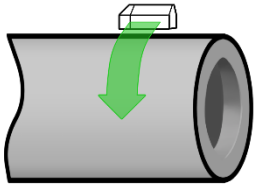
The evoARC is ***limited*** for use on cylindrical or curved subjects (pipes/vessels/curved structures) oriented from horizontal to 20° from vertical



The evoARC is ***not*** intended for use on flat subjects (plate), cylindrical or curved subjects (pipes/vessels/curved structures) of diameter > 42" (~1050mm).



The evoARC encodes in the circumferential (X) direction.



4 Specifications

4.1 General Specifications

Dimensions (mm)	50 x 40 x 24
Weight	53g
Power Requirement	5V
Storage Temperature Range	-40°F to 185°F (-40°C to 85°C)
Operating Temperature Range	-5°F to 140°F (-15°C to 60°C)
Encoding Channel	Encoder 2
Encoding Type	Quadrature

4.2 Encoder Resolution

Diameter (mm)	Resolution (Pulses per mm)[1]	Resolution (mm)[2]
60.3	76.01	0.013
88.9	51.56	0.019
114.3	40.10	0.025
168.3	27.24	0.037
323.9	14.15	0.071
610	7.51	0.13
762	6.02	0.17
900	5.03	0.20
1067	4.29	0.23

Diameter (inch)	Resolution (Pulses per inch)[1]	Resolution (inch)[2]
2	1931	0.00052
3	1309	0.00076
4	1019	0.00098
6	692	0.0014
12	359	0.0028
24	191	0.0052
30	153	0.0065
36	127	0.0077
42	109	0.0092

Calibration Formula

$$\frac{Ticks}{mm/IN} = \frac{4583}{Diameter_{outer}}$$

Note: This applies for both Metric and Imperial Units. Use actual outer diameter values for pipe sizes

5 SAFETY CONSIDERATIONS

5.1 General

No user serviceable parts inside unit.

The attachment utilizes a clamping system and is a possible pinch point. Take care when attaching or remove evoARC encoder from the mount.

6 Disclaimer

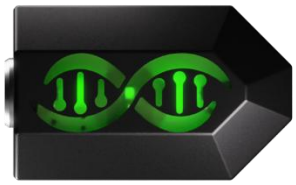
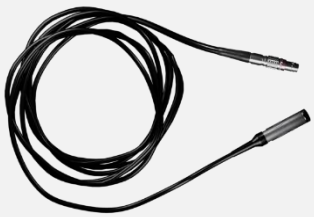
While every effort has been made to ensure the accuracy and currency of the information in this manual, evoSonic Pty Ltd reserves the right to make changes without prior notice. Users should verify critical information before use where applicable.
evoSonic Pty Ltd is not responsible for errors in this manual or for any incidental, indirect, or consequential damages arising from the supply or use of this manual or associated equipment.
This manual is provided "as is" without warranties of any kind, express or implied, including, but not limited to, implied warranties of merchantability and fitness for a particular purpose.

While every attempt is made to ensure that the information contained within this manual is valid and up to date, the information is subject to change without notice and any information with critical dependencies should be verified before use.

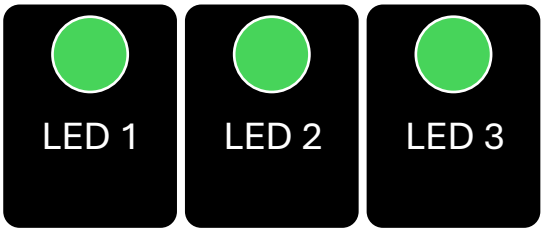
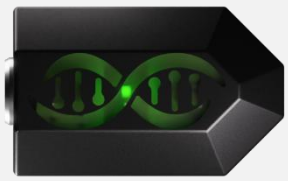
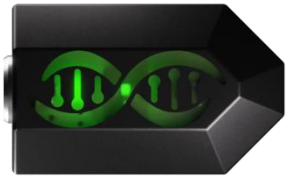
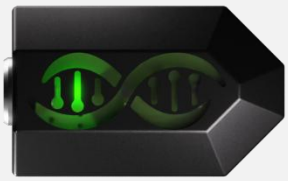
For product warranty information, please visit: https://evosonic.ai/warranty/

For EULA information please visit https://evosonic.ai/eula

7 Parts List

Part	Picture
evoARC Encoder Part No. (00812)	
Encoder Cable Part No. (00870)	
Flex Mount Assembly Part No. (00875)	
Y-Splitter Part No. (00880)	

8 evoARC encoder cardinal LEDs

Cardinal	Picture
The evoARC encoder has three (3) distinct LED lights to indicate circumferential positioning	
Single central LED illumination (LED 2) < 0.5° off cardinal position (3, 6, 9, 12 o'clock)	
Dual LED illumination (LED 1&2 or 2&3) ≥0.5° and <2° off cardinal position (3, 6, 9, 12 o'clock)	
Single off-center LED illumination (LED 1 or 3) ≥2° and <5° off a cardinal position (3, 6, 9, 12 o'clock)	

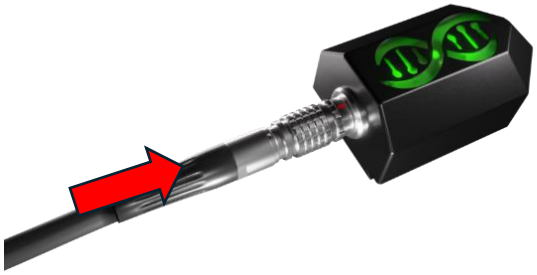
9 EVOARC – Installation & Setup

9.1 Connecting EvoARC encoder (Single axis 'x' encoder)

Step 1	Picture
Plug encoder cable (LEMO 6 pin male end) into evoARC.	

Step 2	Picture
Plug encoder cable (LEMO 16 pin male end) into pulser unit / PA set.	

9.2 Connecting EvoARC encoder (Dual axis 'x' & 'y' encoder)

Step 1	Picture
Plug encoder cable (LEMO 6 pin male end) into evoARC.	

Step 2	Picture
Plug encoder cable (LEMO 16 pin male end) into splitter	

Step 3	Picture
Plug alternate scanner/encoder cable (LEMO 16 pin male end) into splitter	

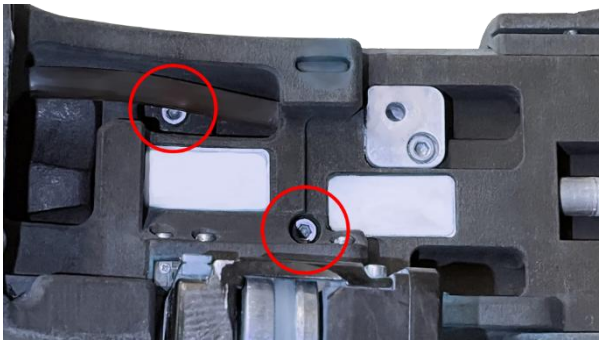
Step 4	Picture
Plug splitter cable (LEMO 16 pin male end) into pulser unit / PA set.	

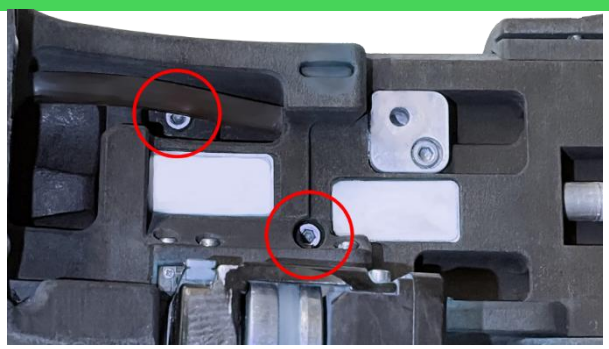
9.3 Mounting EvoARC encoder on FlexoFORM ™

Step 1	Picture
The evoARC Encoder mount replaces the aluminium plate on a FlexoFORM™.	

Step 2	Picture
Loosen the scanner using the large body mounted wheel to remove the water wedge/probe.	

Step 3	Picture
Remove the water wedge/probe insert	

Step 4	Picture
Turn the scanner over and unscrew the mount cover from under the scanner (2x M3 Socket head Cap Screws)	

Step 5	Picture
Align the mount with the slots in the scanner.	
Step 6	Picture
Install the flex mount onto the scanner	
Step 7	Picture
Turn over the scanner while holding the mount, replace the screws and tighten	
Step 8	Picture
Reinstall the water wedge/probe and tighten	

Step 9	Picture
Open the Cam lever and slide the ARC into the mount	
Step 10	Picture
Close the lever to secure the ARC in place. If the lever doesn't operate correctly rotate the cam anticlockwise to adjust tension	
Step 11	Picture
Attach cable to the evoARC encoder and fit the cable inside the cable sleeving for cable management	

9.4 Pairing & Calibrating the EvoARC encoder with pulser unit / set

- Select “encoder 2” or “input 2” on pulser unit / set
- Set encoder type to “Quadrature”
- Conduct encoder calibration as per pulser unit / PA set guidance documentation.

For a video procedure, visit: https://evosonic.ai/productsupport/evoarc-support/

Nominal Pipe Size mm (in)	Outside Diameter mm (in)	Steps/mm	Steps/in
50 (2)	60.33 (2.375)	76	1931
65 (2 ½)	73.02 (2.875)	62.77	1594
80 (3)	88.9 (3.5)	51.56	1310
90 (3 ½)	101.6 (4)	45.11	1146
100 (4)	114.3 (4.5)	40.1	1019
125 (5)	141.3 (5.563)	32.44	824
150 (6)	168.27 (6.625)	27.24	692
200 (8)	219.08 (8.625)	20.92	531
250 (10)	273 (10.75)	16.79	426
300 (12)	323.8 (12.75)	14.15	359
350 (14)	355.6 (14)	12.89	327
400 (16)	406.4 (16)	11.28	286
450 (18)	457 (18)	10	255
500 (20)	508 (20)	9	229
550 (22)	559 (22)	8.2	208
600 (24)	610 (24)	7.51	191
650 (26)	660 (26)	6.94	176
700 (28)	711 (28)	6.45	164
750 (30)	762 (30)	6.02	153
800 (32)	813 (32)	5.64	143
850 (34)	864 (34)	5.31	135
900 (36)	914 (36)	5.01	127
950 (38)	965(38)	4.75	121
1000 (40)	1016 (40)	4.51	115
1050 (42)	1067	4.3	109

Table 1 - Steps/mm & Steps/in for common pipe diameters

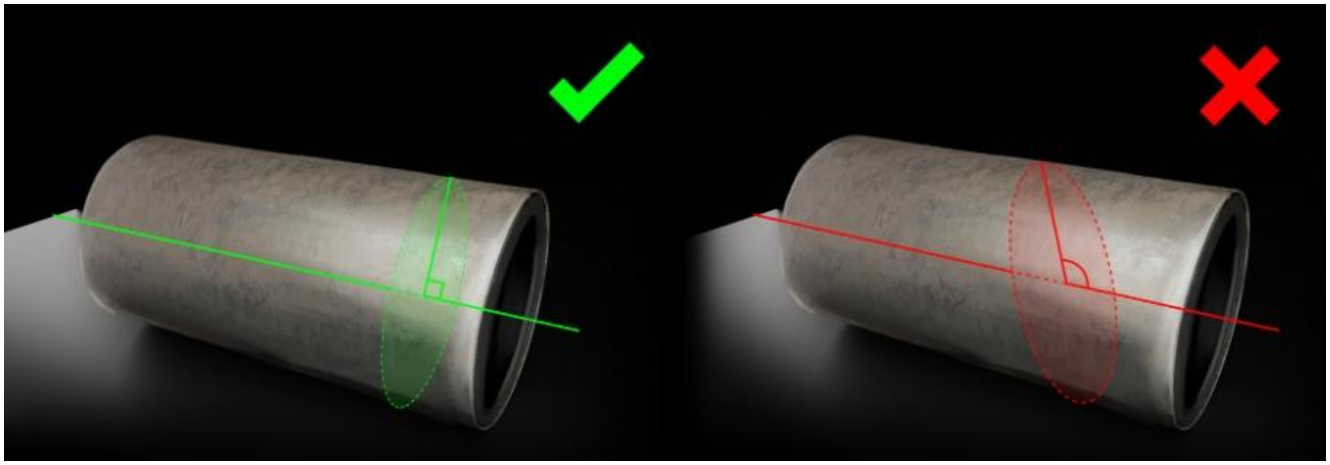
10 Scanning Procedure

10.1 Starting Position

- Place scanner at assigned or known starting position, for example 12 o'clock position (pipe top dead center) using the central cardinal LED as an indicator as per section 8 of this manual.
- Mark position on item to indicate datum / starting position.
- 'Zero' pulser unit / PA set.

10.2 Scanning

- For greatest accuracy, circumferential scanning should be performed in an arc as close as possible to perpendicular to the pipe axis.



- 12 o'clock position should be verified every three full rotations or as noted in relevant procedure.

11 General Maintenance

11.1 Pre-Start Checks:

- Check evoARC plug and LEMO encoder cable for damage or debris, clean as required.
- Check mounting plate included threaded areas for damage or debris, clean as required.
- With encoder plugged in and powered, check cardinal LED lights are operating correctly by rotating encoder through 360° checking for illumination at 90°, 180°, 270° and 360° (3, 6, 9, 12 o'clock)

11.2 Post Scanning:

- Check evoARC socket and LEMO encoder cable for damage or debris, clean as required.

12 Pin out for plugs

PIN	Signal	Description	Level
1	NC		
2	+5VDC	Power Supply	+5VDC
3-10	NC		
11	PhB1	Encoder 2-A	TTL
12	PhB2	Encoder 2-B	TTL
13-15	NC		
16	GND	Ground	0VDC

More Information

For more information on this product, please scan the QR code below

evosonic.ai/productsupport/evoarc-support/

For product warranty information, please scan the QR code below

evosonic.ai/warranty/

13 Copyright

14 EMC Compliance

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Changes or modifications to the housing or cabling not expressly approved by evoSonic may void the users authority to operate the equipment

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.