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# **PRODUCT SPECIFICATION**

**CUSTOMER: FURUNO ELECTRIC CO. (FEC)**

**CUSTOMER PART: CM265LH**

**DESCRIPTION: DUAL FREQUENCY TRANSDUCER**

**AIRMAR PART NUMBER: 41-469-1-03**

**AIRMAR MODEL: CM265LH**

## AIRMAR APPROVALS

FUNCTION	SIGNATURE	DATE
DRAWN	A.BIATHROW	11/09/12
CHECKED	M.KAY	12/12/12
APPROVED	L.JEFFERS	12/12/12

## FURUNO APPROVALS

FUNCTION	SIGNATURE	DATE
APPROVED	T.SATO	12/18/12

**AIRMAR** Technology Corporation

35 Meadowbrook Drive, Milford, New Hampshire 03055 USA

phone: (603) 673-9570

fax: (603) 673-4624

e-mail: sales@airmar.com

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# AIRMAR Product Specification

## AIRMAR # 41-469-1-03      FURUNO # CM265LH

### GENERAL SPECIFICATIONS

- Product description: Depth and temperature transducer with Transducer ID feature.
- RoHS Compliant
- Depth Measurement:
  - 42-65A kHz
  - 130-210C kHz
- Temperature sensor: AIRMAR #07-978-01
  - Nominal resistance value: 10,000 ohms at 25°C.
  - Temperature range: 0°C to 25°C.
  - Thermistor accuracy: from 0°C +/- 0.1°C
  - from 0°C to 25°C.
  - Operating tolerance: +/-0.05°C from 0 to 25°C.
  - 25/85C Beta Value= 3976
- Operating temperature range: 0°C to 33°C (32°F to 92° F).
- Stored temperature range: -20°C to 70°C (-4°F to 158° F).
- Sealcast model: AIRMAR #93-119-01 (CM265)
  - Description: Urethane sealcast mold.
  - Material of sealcast: urethane.
  - Color of sealcast: black.
- Acoustic Window: Urethane
- Cable: AIRMAR #06-044-02 (C44-02)
  - Description: shielded, multi-conductor, multi color, braided cable.
  - Pair 1 and 2
  - Conductor size: 18 AWG twisted shielded pair with a 24 AWG drain wire.
  - Quad 1
  - Conductor size: 22 AWG twisted shielded quad with a 24 AWG drain wire.
  - Drain Wire: 22 AWG
  - Overall shielding material: tinned copper braid.
  - Jacket material: TPR.
  - Cable Diameter: 11.81mm+/-0.41mm / 0.465" +/-0.016.
- Cable length: 12 meters +/- 0.1524 meters (40' +/- 6")
- No Connector: Stripped/Tinned leads
- Packing carton: AIRMAR #19-061-01
  - Box dimensions (external):
  - 263.5 mm x 187.3 mm x 247.7mm
  - (10.375" x 7.375" x 9.75").
- Packing List:
  - CM265LH Transducer
- Product Identification: Waterproof label affixed to the cable with model, serial number, mfg date code, BOM revision level, item description and Airmar part number on cable.
- Waterproof
  - Sensor: IEC60529IPX8
- Mass of fully packaged unit: 6.53 kg (14.40 lbs)
- Mass of unit: 5.13 kg (11.30 lbs)

• XID Version 2.006.

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# AIRMAR Product Specification

## AIRMAR # 41-469-1-03      FURUNO # CM265LH

### 42 to 65 kHz-A (Broadband)

Transformed to 100 ohms minimum

Power Rating:

- 1 kW @ 1% duty cycle
- 25 W @ CW<sup>(4)</sup>

Q ≈ 2

7 x 28.6 mm (1.13 in) PZT

Active Area: 45 cm<sup>2</sup> (6.9 in<sup>2</sup>)

Radiating Surface: Urethane

Cable Type: C335

Cable Length: 10 m (33 ft)

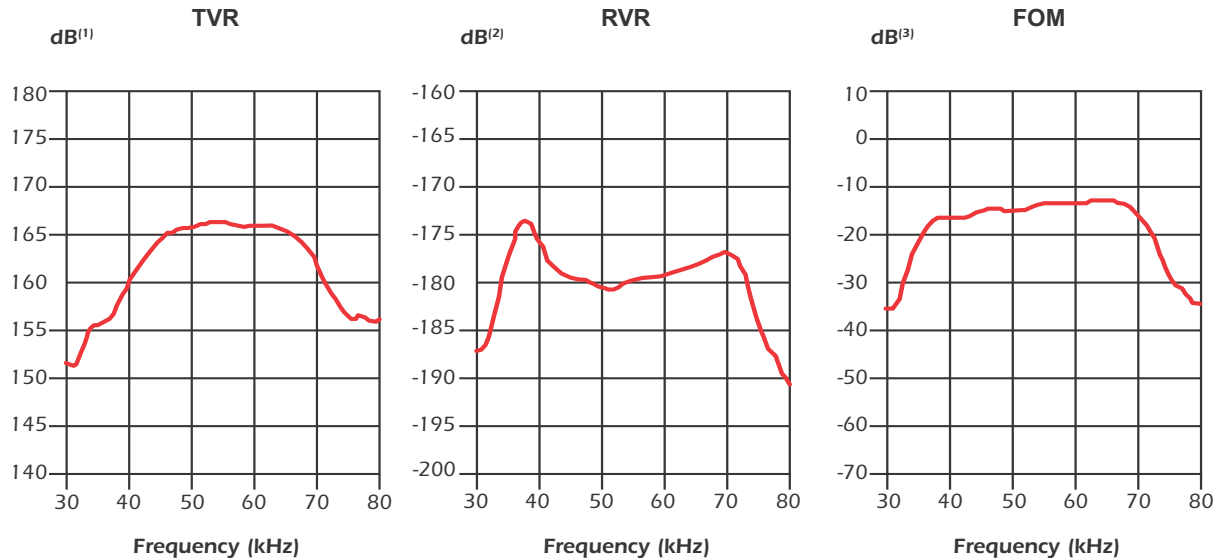
Notes:

(1) dB re 1 μPa per volt at 1 meter

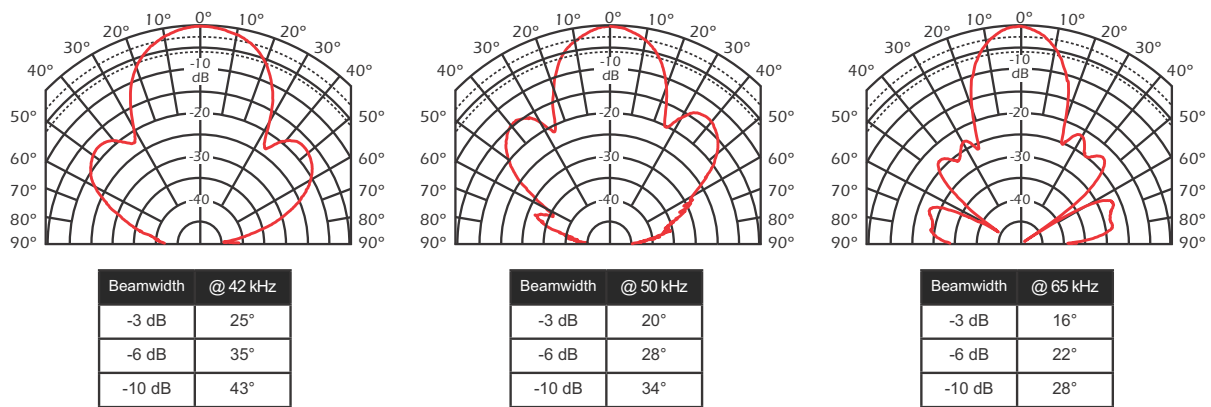
(2) dB re 1 volt per μPa

(3) Sum of transmitting voltage response and receiving voltage response

(4) CW Power ratings is for B265 housing at 20°C seawater temperature. Consult Airmar for different housing CW ratings.



### Transmit Radiation Pattern



Acoustic Data: td files:Stored Data:New:Epoxy/Urethane:100222-02:Test#1:06Direct  
 Acoustic Data: td files:Stored Data:New:Epoxy/Urethane:100222-02:Test#2:06Direct  
 Acoustic Data: td files:Stored Data:New:Epoxy/Urethane:100222-02:Test#3:06Direct  
 Pattern Data: td files:Stored Data:42-65A:Epoxy/Urethane:100236-01:Test#1: 02Sens

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# AIRMAR Product Specification

## AIRMAR # 41-469-1-03      FURUNO # CM265LH

### 42 to 65 kHz-A (Broadband)

Note: Impedance data includes cable

**Balanced Impedance Table (Nominal Value) in 20°C Water**

Test Frequency (kHz)	Impedance Magnitude (Ω)	Phase Angle (°)	Series Resistance (Ω)	Series Reactance (Ω)	Parallel Conductance (mS)	Parallel Susceptance (mS)	Parallel Resistance (Ω)	Parallel Capacitance (pF)
40.00	305.87	-15.48	294.78	-81.62	3.15	0.87	317.38	3470.98
41.00	247.24	-19.88	232.50	-84.08	3.80	1.38	262.91	5339.42
42.00	203.32	-20.42	190.54	-70.94	4.61	1.72	216.95	6502.90
43.00	173.62	-19.56	163.60	-58.14	5.43	1.93	184.26	7138.63
44.00	152.61	-16.64	146.22	-43.70	6.28	1.88	159.28	6786.59
45.00	140.30	-12.05	137.20	-29.29	6.97	1.49	143.46	5262.71
46.00	134.39	-8.36	132.96	-19.55	7.36	1.08	135.83	3745.19
47.00	129.98	-5.84	129.31	-13.23	7.65	0.78	130.66	2651.98
48.00	126.28	-3.80	126.00	-8.37	7.90	0.53	126.55	1740.80
49.00	123.64	-1.69	123.58	-3.64	8.08	0.24	123.69	773.95
50.00	119.60	0.02	119.60	0.03	8.36	0.00	119.60	-7.13
51.00	115.87	3.54	115.65	7.15	8.61	-0.53	116.09	-1661.96
52.00	116.85	7.67	115.81	15.59	8.48	-1.14	117.91	-3495.61
53.00	120.09	11.08	117.86	23.07	8.17	-1.60	122.37	-4803.73
54.00	125.09	13.76	121.50	29.74	7.77	-1.90	128.78	-5602.29
55.00	131.10	15.44	126.37	34.90	7.35	-2.03	136.01	-5875.61
56.00	138.17	16.25	132.65	38.67	6.95	-2.03	143.92	-5757.18
57.00	144.18	16.30	138.39	40.46	6.66	-1.95	150.22	-5434.31
58.00	147.81	16.55	141.69	42.11	6.48	-1.93	154.20	-5288.48
59.00	154.64	17.23	147.70	45.81	6.18	-1.92	161.91	-5167.01
60.00	159.67	16.88	152.79	46.36	5.99	-1.82	166.86	-4823.14
61.00	164.96	17.59	157.25	49.84	5.78	-1.83	173.05	-4778.87
62.00	171.78	18.35	163.05	54.08	5.53	-1.83	180.99	-4704.40
63.00	182.10	18.89	172.28	58.97	5.20	-1.78	192.47	-4492.47
64.00	190.26	19.35	179.52	63.03	4.96	-1.74	201.65	-4330.09
65.00	203.20	20.59	190.22	71.47	4.61	-1.73	217.07	-4238.17
66.00	220.23	21.49	204.92	80.67	4.23	-1.66	236.68	-4010.94
67.00	244.22	21.86	226.65	90.94	3.80	-1.52	263.14	-3622.18
68.00	275.19	21.56	255.95	101.11	3.38	-1.34	295.89	-3124.79
69.00	319.03	20.17	299.48	109.98	2.94	-1.08	339.87	-2492.40
70.00	381.73	15.34	368.12	101.01	2.53	-0.69	395.84	-1576.06

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# AIRMAR Product Specification

## AIRMAR # 41-469-1-03      FURUNO # CM265LH

### 130 to 210 kHz-C (Broadband)

Transformed to 100 ohms minimum

Power Rating:

- 1 kW @ 1% duty cycle
- 18 W @ CW<sup>(4)</sup>

Q ≈ 2

65 mm (2.56 in) PZT

Active Area: 33 cm<sup>2</sup> (5.1 in<sup>2</sup>)

Radiating Surface: Urethane

Cable Type: C334/C335

Cable Length: 15 m (50ft)

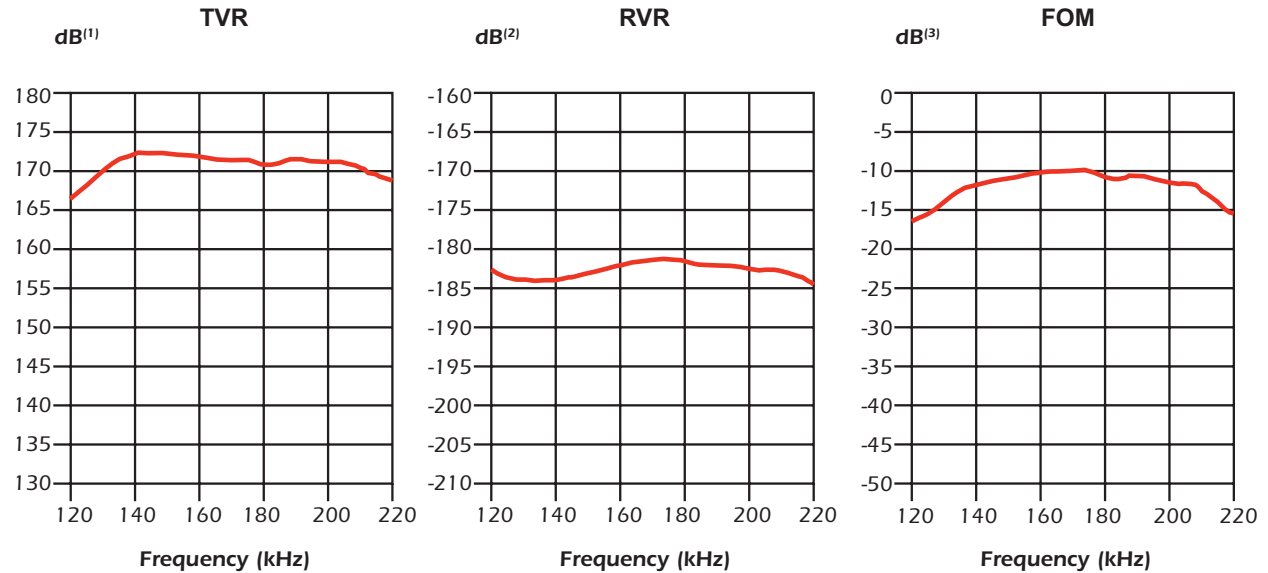
Notes:

(1) dB re 1 μPa per volt at 1 meter

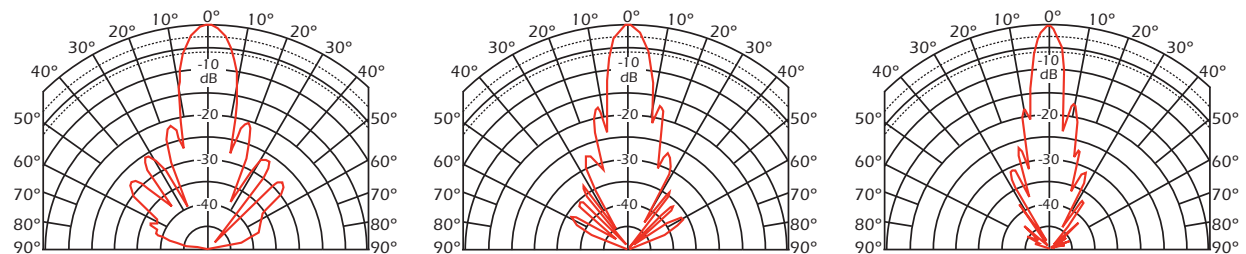
(2) dB re 1 volt per μPa

(3) Sum of transmitting voltage response and receiving voltage response

(4) CW Power ratings is for B265 housing at 20°C seawater temperature. Consult Airmar for different housing CW ratings.



### Transmit Radiation Pattern



Beamwidth @ 130 kHz	
-3 dB	10°
-6 dB	14°
-10 dB	18°

Beamwidth @ 160 kHz	
-3 dB	8°
-6 dB	12°
-10 dB	15°

Beamwidth @ 210 kHz	
-3 dB	6°
-6 dB	8°
-10 dB	11°

Acoustic Data: td files:Stored Data:130-210C:Urethane:090267-01:Test#2:06Direct  
 Acoustic Data: td files:Stored Data:130-210C:Urethane:090267-01:Test#3:06Direct  
 Acoustic Data: td files:Stored Data:130-210C:Urethane:090267-01:Test#4:06Direct  
 Pattern Data: td files:Stored Data:130-210C:Urethane:090267-01:Test#1:02Sens

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# AIRMAR Product Specification

## AIRMAR # 41-469-1-03      FURUNO # CM265LH

### 130 to 210 kHz-C (Broadband)

Note: Impedance data includes cable

**Balanced Impedance Table (Nominal Value) in 20°C Water**

Test Frequency (kHz)	Impedance Magnitude (Ω)	Phase Angle (°)	Series Resistance (Ω)	Series Reactance (Ω)	Parallel Conductance (mS)	Parallel Susceptance (mS)	Parallel Resistance (Ω)	Parallel Capacitance (pF)
120.00	208.31	-17.43	198.75	-62.39	4.58	1.44	218.33	1906.87
123.00	177.31	-19.75	166.89	-59.91	5.31	1.91	188.39	2465.59
126.00	152.23	-18.99	143.95	-49.52	6.21	2.14	160.99	2699.47
129.00	133.22	-16.34	127.84	-37.48	7.20	2.11	138.83	2605.27
132.00	120.55	-12.05	117.89	-25.17	8.11	1.73	123.27	2088.34
135.00	112.76	-6.38	112.06	-12.54	8.81	0.99	113.46	1162.56
138.00	109.48	-0.54	109.48	-1.04	9.13	0.09	109.49	99.87
141.00	109.94	4.87	109.55	9.33	9.06	-0.77	110.34	-871.61
144.00	114.62	9.71	112.98	19.33	8.60	-1.47	116.29	-1626.25
147.00	121.20	13.15	118.02	27.58	8.03	-1.88	124.47	-2032.96
150.00	129.57	15.12	125.09	33.80	7.45	-2.01	134.22	-2135.96
153.00	138.30	15.64	133.18	37.28	6.96	-1.95	143.61	-2027.51
156.00	146.78	16.08	141.05	40.65	6.55	-1.89	152.76	-1924.61
159.00	157.83	16.02	151.70	43.56	6.09	-1.75	164.21	-1750.40
162.00	170.16	14.70	164.60	43.17	5.68	-1.49	175.92	-1464.75
165.00	181.46	12.13	177.41	38.14	5.39	-1.16	185.61	-1117.37
168.00	189.54	9.04	187.18	29.80	5.21	-0.83	191.93	-785.73
171.00	196.75	5.79	195.75	19.86	5.06	-0.51	197.76	-477.60
174.00	203.68	3.22	203.35	11.45	4.90	-0.28	204.00	-252.53
177.00	210.86	-0.59	210.84	-2.18	4.74	0.05	210.87	44.16
180.00	215.04	-4.94	214.24	-18.53	4.63	0.40	215.85	354.23
183.00	211.15	-9.70	208.13	-35.56	4.67	0.80	214.21	693.78
186.00	203.43	-11.87	199.07	-41.86	4.81	1.01	207.87	865.47
189.00	200.71	-12.44	195.99	-43.24	4.87	1.07	205.53	903.98
192.00	203.60	-13.26	198.17	-46.70	4.78	1.13	209.18	933.89
195.00	208.49	-15.13	201.27	-54.40	4.63	1.25	215.97	1021.47
198.00	211.19	-18.13	200.70	-65.71	4.50	1.47	222.22	1184.30
201.00	209.20	-20.47	195.99	-73.17	4.48	1.67	223.31	1323.75
204.00	210.75	-21.44	196.17	-77.03	4.42	1.73	226.42	1353.04
207.00	217.91	-22.49	201.34	-83.35	4.24	1.76	235.85	1349.54
210.00	229.47	-25.57	207.00	-99.03	3.93	1.88	254.38	1425.29
213.00	240.32	-30.09	207.94	-120.48	3.60	2.09	277.74	1558.76
216.00	244.20	-35.87	197.88	-143.09	3.32	2.40	301.36	1768.05
219.00	244.10	-41.77	182.06	-162.59	3.06	2.73	327.26	1983.11
220.00	242.56	-43.83	174.98	-167.99	2.97	2.86	336.26	2065.48

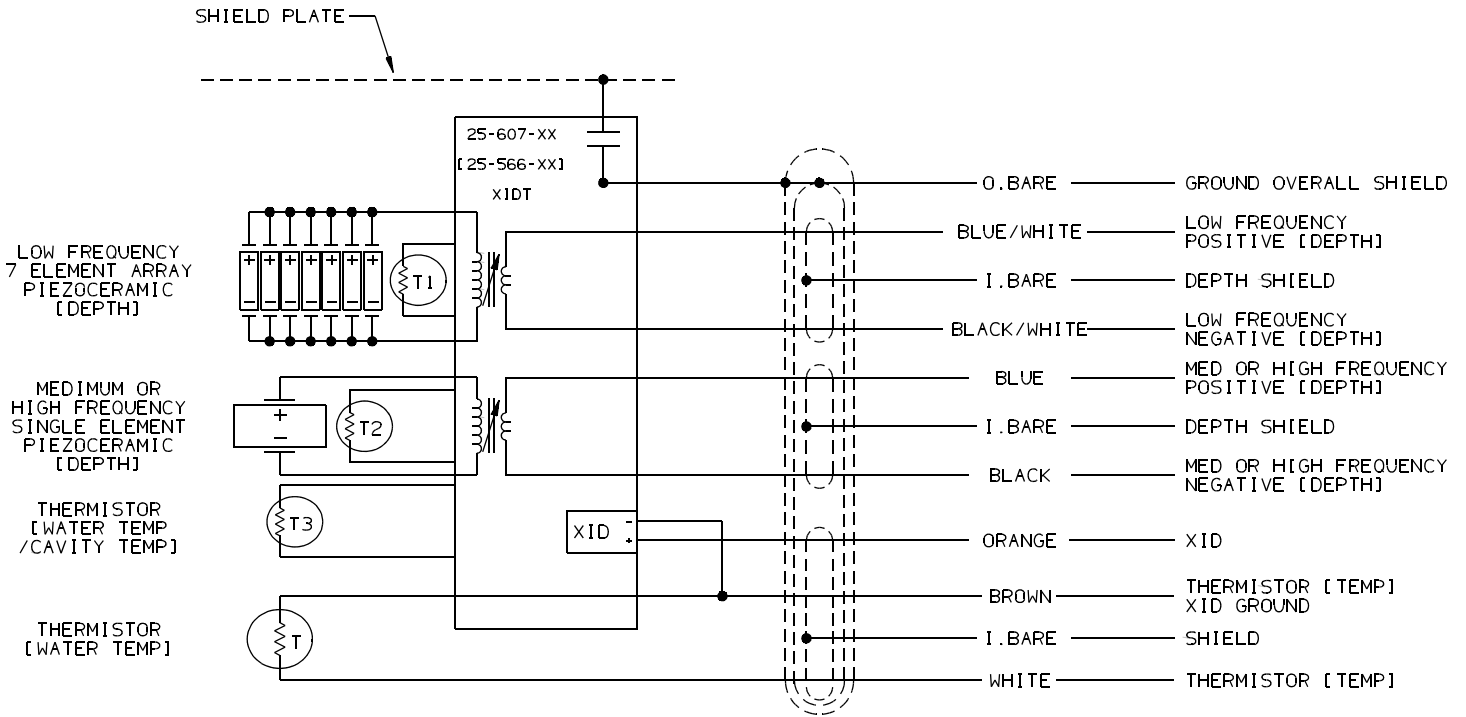
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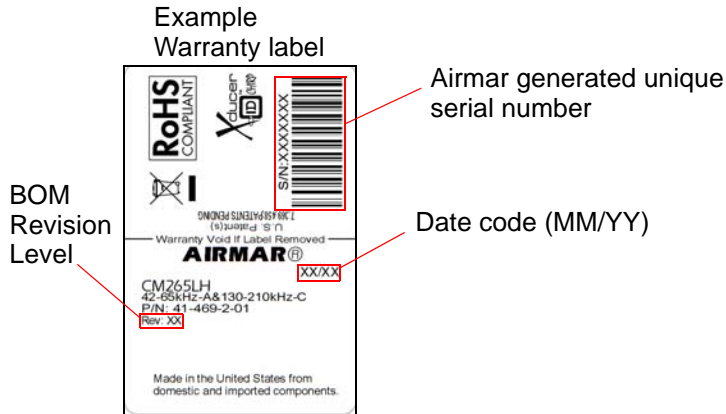
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## AIRMAR # 41-469-1-03      FURUNO # CM265LH

WIRING DIAGRAM: 91-1077



NOTE: Violet wire is cut off on both ends of the cable.



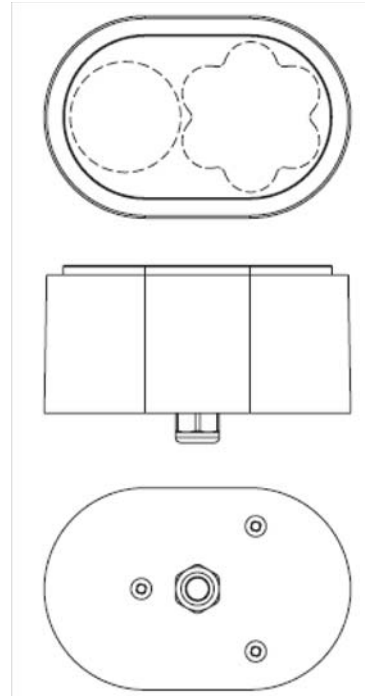
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OUTLINE DRAWINGS:

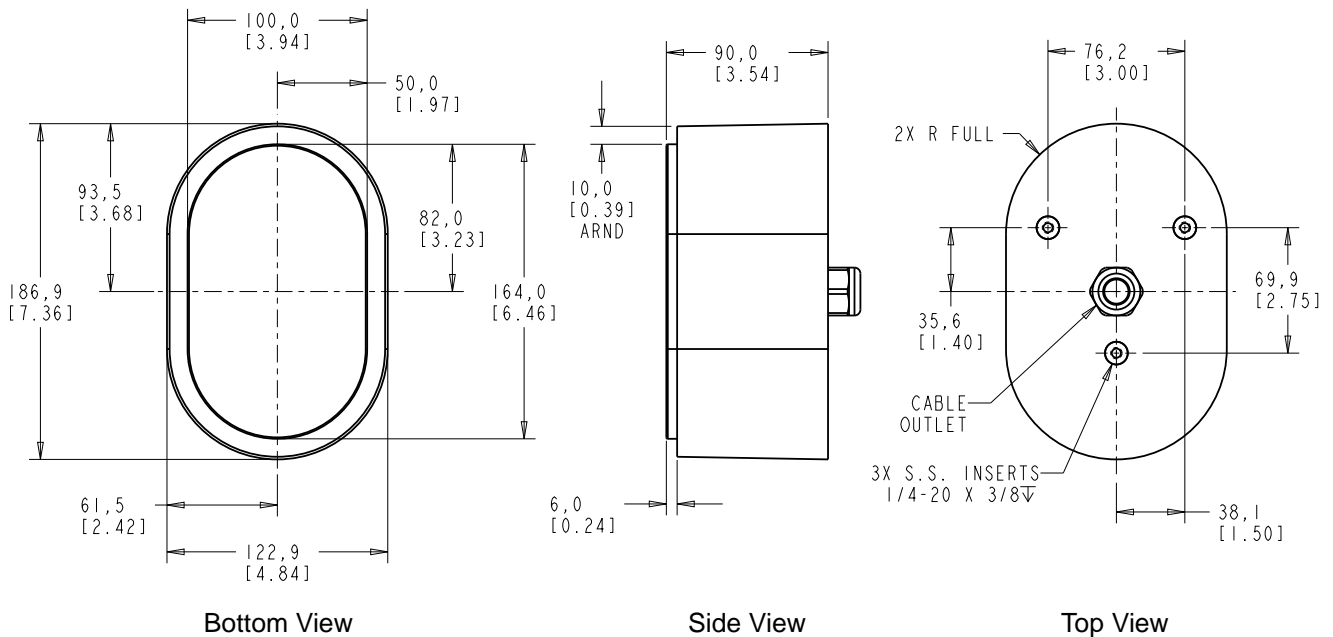
CERAMIC LOCATIONS



TRANSDUCER

DIMENSIONS ARE IN MM [INCH]

TOLERANCE: +/- 1 MM [0.04"]



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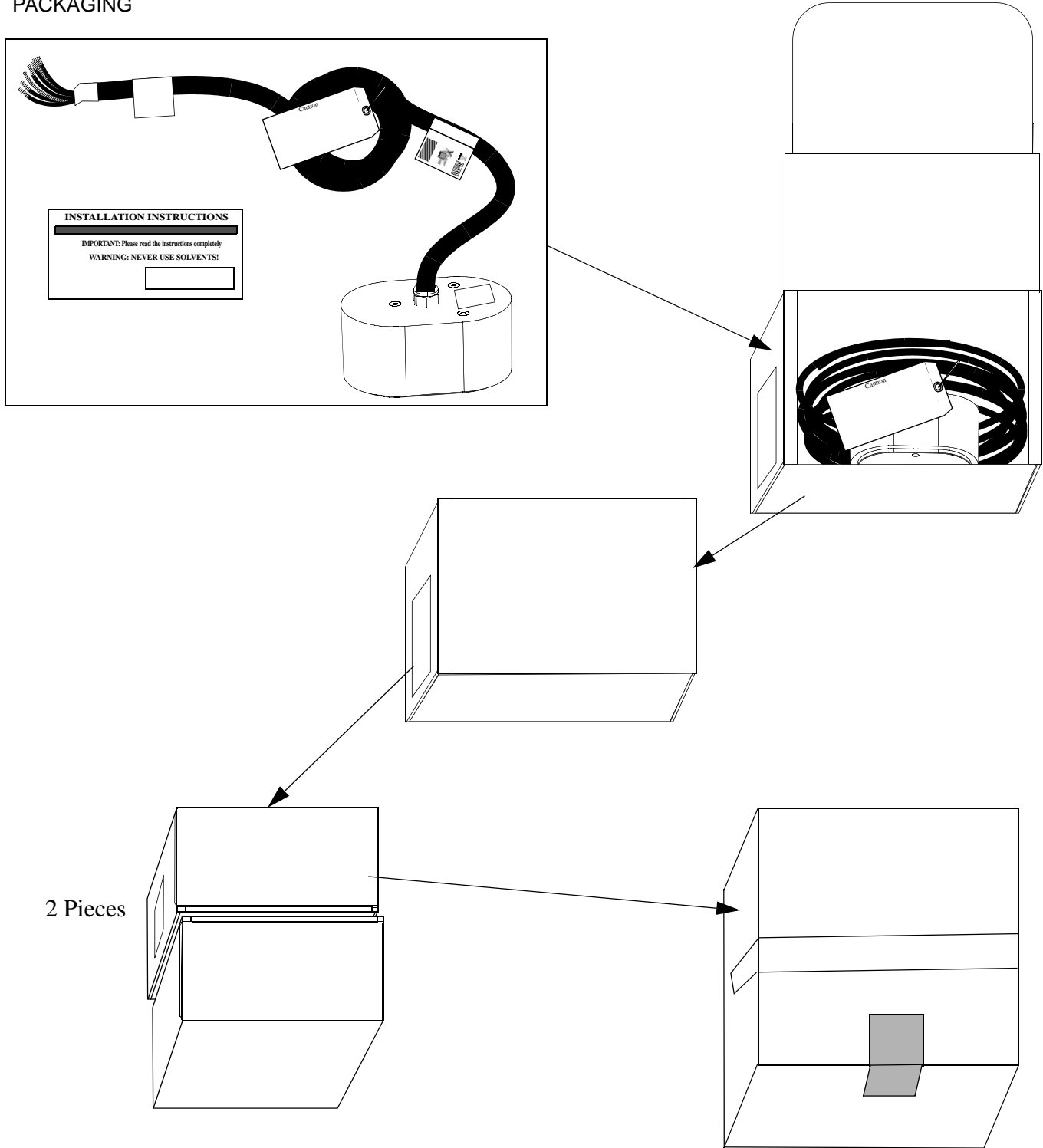
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# AIRMAR Product Specification

AIRMAR # 41-469-1-03      FURUNO # CM265LH

## PACKAGING



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# AIRMAR Product Specification

## AIRMAR # 41-469-1-03      FURUNO # CM265LH

### External appearance inspection standard

Deficiencies					
Group	coated articles <sup>(*6)</sup>	surface-treated articles <sup>(*6)</sup>	resin-molded articles	cast articles	pass/fail criteria
a)	1) basis material exposure 2) peeling 3) crack 4) scab 5) cissing 6) transparentess	1) basis material exposure <sup>(*2)</sup> 2) peeling 3) crack 4) scab	3) crack  1) short shot 2) chipping 9) whitening 15) Scratch 17) silver streak	3) crack  1) insufficient filling 2) chipping 4) cold shut	Existence of any item of deficiencies is not allowed. <sup>(*4)</sup>
b)	7) blank • slobber 8) dulling 9) orange peel <sup>(*1)</sup> 10) grinding mark	7) blank • slobber 8) dulling  5) rough surface 6) stain <sup>(*3)</sup>	5) weld mark 6) flow mark 7) blur 8) galling 10) flash 11) shrinkage 12) gate-treated mark 13) warping	5) burn-in 6) crinkling 7) rough surface 8) galling 10) flash 11) shrinkage 12) gate/overflow-treated mark 13) warping	Not Specified
c)	11) pinhole	9) pinhole		9) porosity	Not specified
d)	12) foreign materials		14) foreign materials 4) gas burn		1.5 mm <sup>2</sup> 2 pcs. <sup>(*5)</sup> (foreign materials with 0.3 mm <sup>2</sup> or less is not considered as deficiency.)
e)	13) scratch	11) scratch	15) Scuff Mark	14) scratch	W: 0.2 mm, L: 20 mm    2 pcs. <sup>(*5)</sup> (scuff mark with W: 0.1 mm, L: 10 mm or less is not considered as deficiency.)
f)	14) bruise	12) bruise	16) bruise	15) bruise	2.0 mm <sup>2</sup> 3 pcs. <sup>(*5)</sup> (bruise with 0.3 mm <sup>2</sup> or less is not considered as deficiency.)
g)	15) original surface flaw	13) original surface flaw			Not specified
h)	16) difference in color	10) color heterogeneity			Not specified
Dealing for coexistence of multiple groups					Coexistence of more than two groups except a), is not allowed.

(Numeral shown means within.)

- NOTE <sup>(\*1)</sup>: Pattern coating is not subject to "orange peel".  
<sup>(\*2)</sup>:When basis material exposure at edges of products where air bubbles are easily collected, is touched up with gold varnish, it is allowed to be used.  
<sup>(\*3)</sup>:As for stain, when white powder is observed, it is considered to be failed.  
<sup>(\*4)</sup>: [When nothing has been found after looking at sample under inspection (4 to 6 sec), the sample is considered to be passed.]  
<sup>(\*5)</sup>: If multiple deficiencies exist within a group, the space between them shall be 50 mm or more.  
<sup>(\*6)</sup>: As for coated and surface-treated articles, if their basis materials are resin-molded or cast articles, the 3<sup>rd</sup> and 4<sup>th</sup> columns are also applicable to them.

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**AIRMAR Product Specification**  
**AIRMAR # 41-469-1-03      FURUNO # CM265LH**

**Inspection Record**

Operator	Date	Part Number	Serial Number	Continuity	Temperature	Rp Measurement	Sound Pressure	Calculate Thermal Data from 20°C
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