



INTERFACE CONTROL DOCUMENT

EM7204 RECEIVER UNIT



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EM7204 Receiver Unit – Interface Control document

Revision History:

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1.01	27 May 02	Initial Issue	D. Suchman
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This document describes the interfaces between the Reson EM 7204 Receiver Unit and the vehicle on which it is housed.

It is provided to the Monterey Aquarium Research Institute in partial satisfaction of Milestone D, as defined in Section 3.4 of Attachment A (Scope of Supply) to the Purchase and Sale Agreement.



1 Interface Between EM 7204 Receiver Unit and the Ocean

1.1 Acoustical Interface

The EM 7204 Receiver Unit receives acoustic signals from the water column beneath the AUV and forms them into narrow beams that cover a 150-degree wide sector. The acoustic signals are received through a polyurethane window that surrounds the structure. The beams formed by the EM 7204 have the following characteristics.

Characteristic	Parameter
Frequency	200 kHz
Number of beams across-track	349 beams
Vertical beam width (along track)	27 degrees (-3 dB)
Across-track Coverage	150 degrees
Horizontal beam width (across track)	1 degrees (-3 dB)
Horizontal Beam Offset	0.43 degrees

Table 1-1. Receiver Unit Characteristics

1.2 Physical Interface to the Environment

The EM 7204 Receiver Unit interfaces to the ocean through a polyurethane acoustic window bonded to an aluminum base.

When mounted in the AUV or ROV, the EM 7204 will successfully withstand exposure to 6,500 meters test depth (9,250 psi hydrostatic pressure). It will operate within specifications at depths to 6,000 meters (8,540 psi).



2 Interface Between EM 7204 Receiver Unit and the Vehicle

2.1 Mechanical Interface

The EM 7204 Receiver Unit is shown in Figure 1. The EM 7204 is packaged as a 21" (533.4 mm) outer diameter hollow cylinder 122 mm high. In air, the EM 7204 weighs 28 $\pm$ 2 kg . In water, it weighs 14 $\pm$ 2 kg . The center of gravity is 13 mm below the center line. Dimension detail is shown in Figure 3.



Figure 1. EM 7204 Receiver Unit

Receiver EM 7204:	
Housing Materials:	Aluminum (AlMgSi1), hard anodized and painted. Delrin, High Density Polyurethane
Temperature range	-30°C to +70°C
Depth rating:	6,000 meters operational (8,540 psi) 6,500 meters test depth (9,250 psi)



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The housing is pressure compensated by means of a small oil reservoir. Figure 2 shows the location of this reservoir.

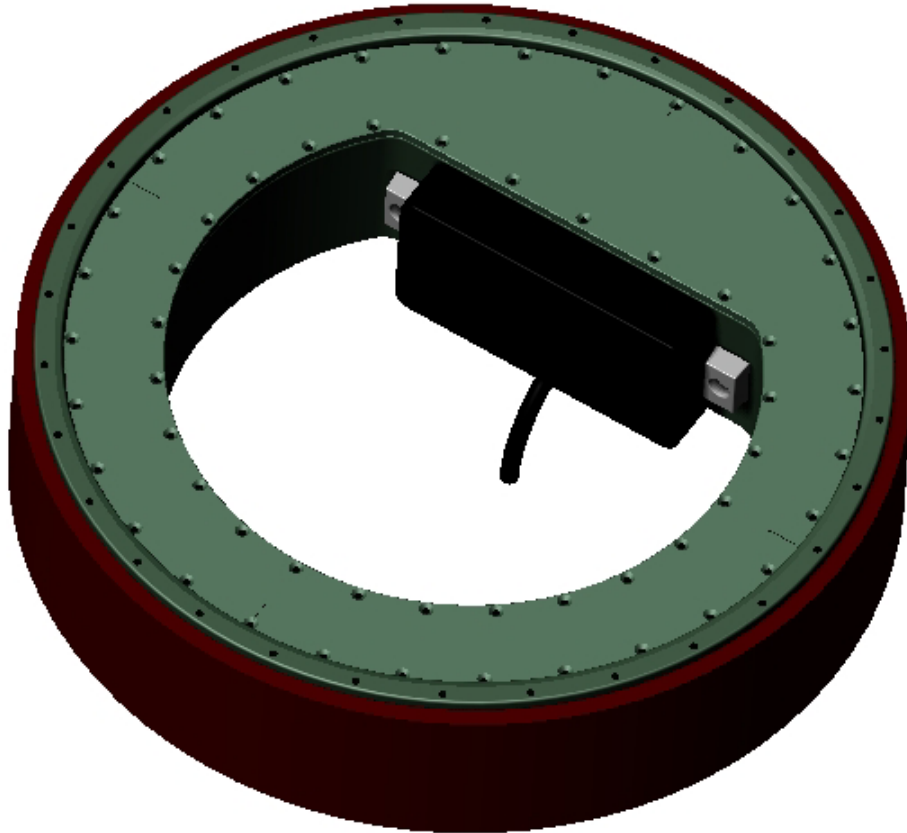


Figure 2a. EM 7204 Receiver Unit With Pressure Equalization Reservoir



Figure 2b. Pressure Equalization. Bladder is painted to protect against corrosion.



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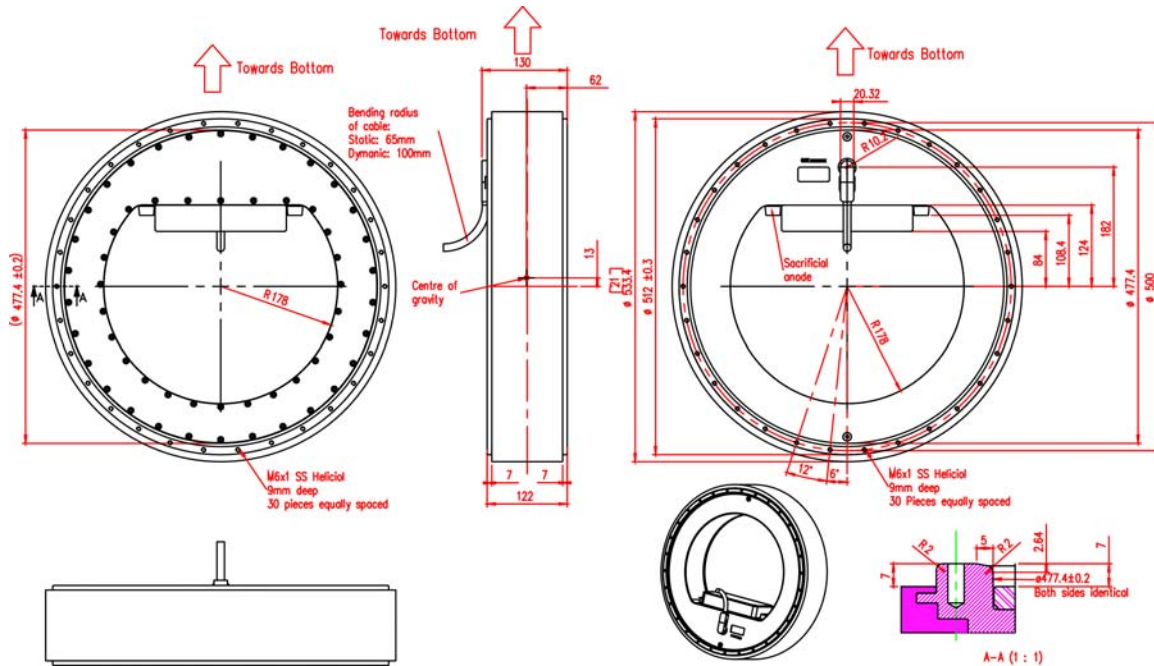


Figure 3. Outline Dimensions of EM 7204 Receiver Unit

The unit is shown with the external oil reservoir placed directly on the housing. Notice the arrow indicating orientation of the receiver. Except for the 2x30 M6 threaded holes (equally spaced on a 500 mm diameter), there are no additional holes for suspension.

Figures 4 through 6 show an example of how the EM7204 Receiver Unit can be installed on an AUV, ROV or Towbody.



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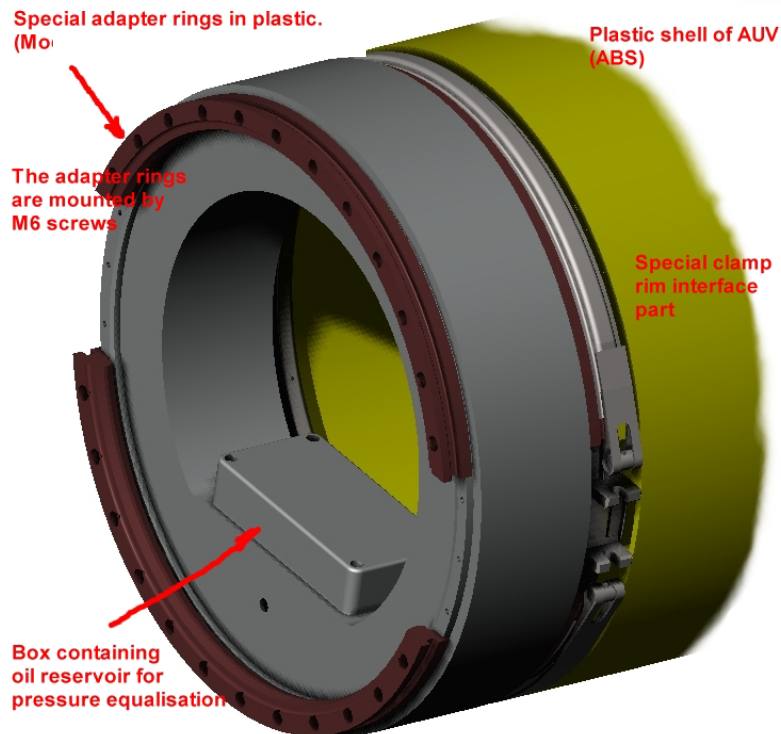


Figure 4. Special Adapter Rings

Note: A fiber-reinforced plastic material will be used as the interface between the AUV section rings. Figure 5 shows how the sections are put together.

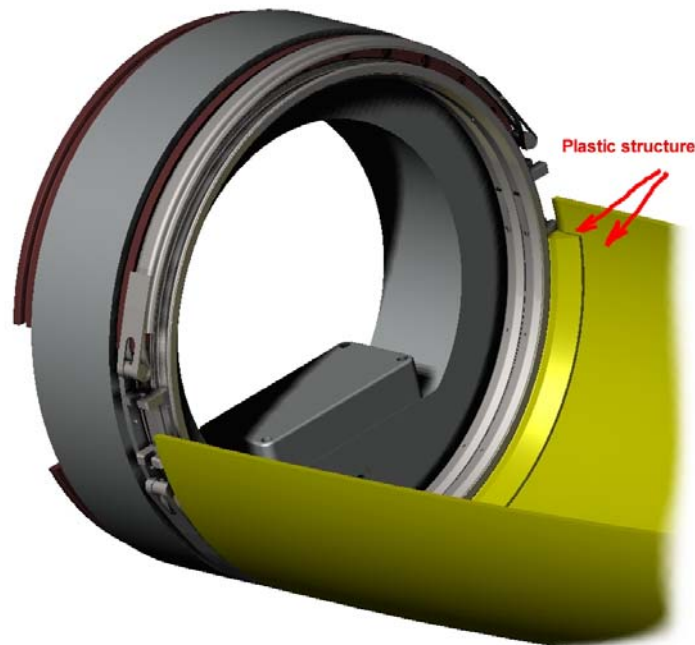


Figure 5. Assembly Method



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Bicycle rims are welded together and combined with a special tension band, which holds the sections together. Due to the very large cross-sectional area, the plastic is sufficiently strong to carry the load. One advantage of this approach is that the receiver unit is electrically insulated from the AUV structure. Another advantage is that the plastic rings are unlikely to damage the surface of the housing.

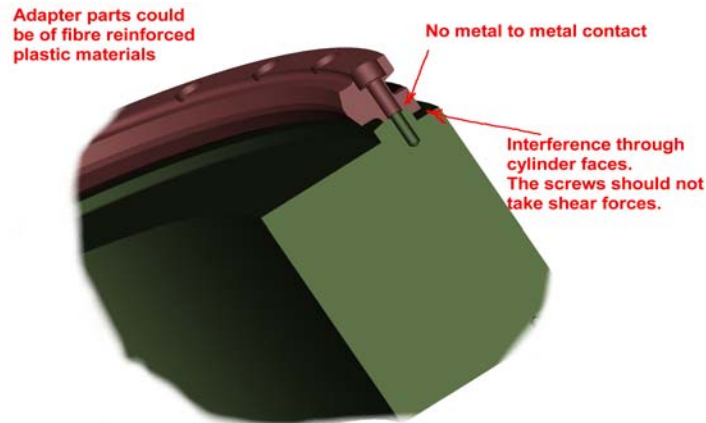


Figure 6. Interface Between Housing and Adapter Rings

The shear force at the interface between the housing and the ring will be carried by cylinder-face interference. The screws will not take shear forces.



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2.2 Electrical Interface

The EM 7204 Receiver Unit interfaces electrically to the LCU or ICPU through a single TBD long cable (RESON, Inc. Dwg. No. 11392-X – where X denotes the cable length). At the Receiver Unit end of the cable, there is a male 8-pin connector (Model LPMIL-8-MP). At the end of the cable that interfaces with the Pressure Vessel housing the LCU or ICPU, there is a female connector (Model MCIL-8-FS). The maximum allowable length for this cable is 3 meters.

The connection between the ICPU and the Receiver Unit is an internal RESON interface.

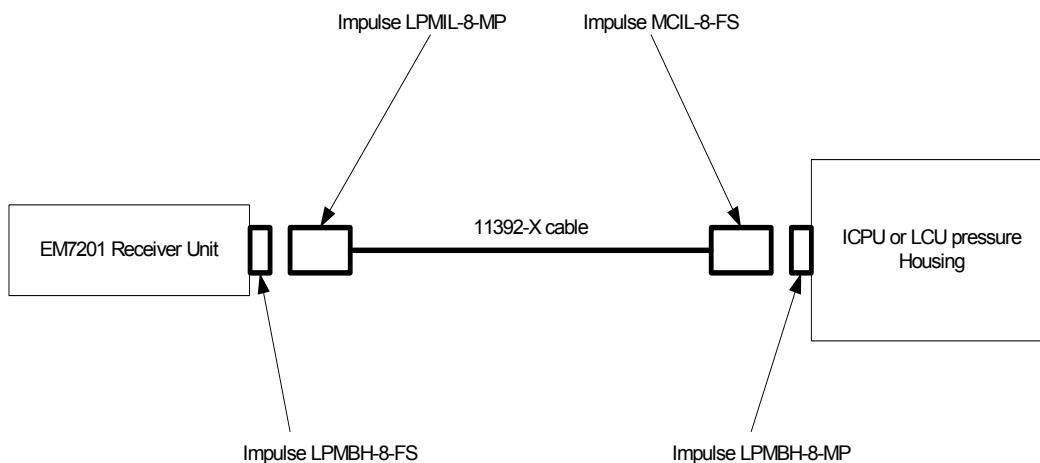


Figure 7. – EM7204-LCU/ICPU Electrical Interface

(An ICPU is used for an AUV. An LCU is used for an ROV, Towbody or Surface Ship)