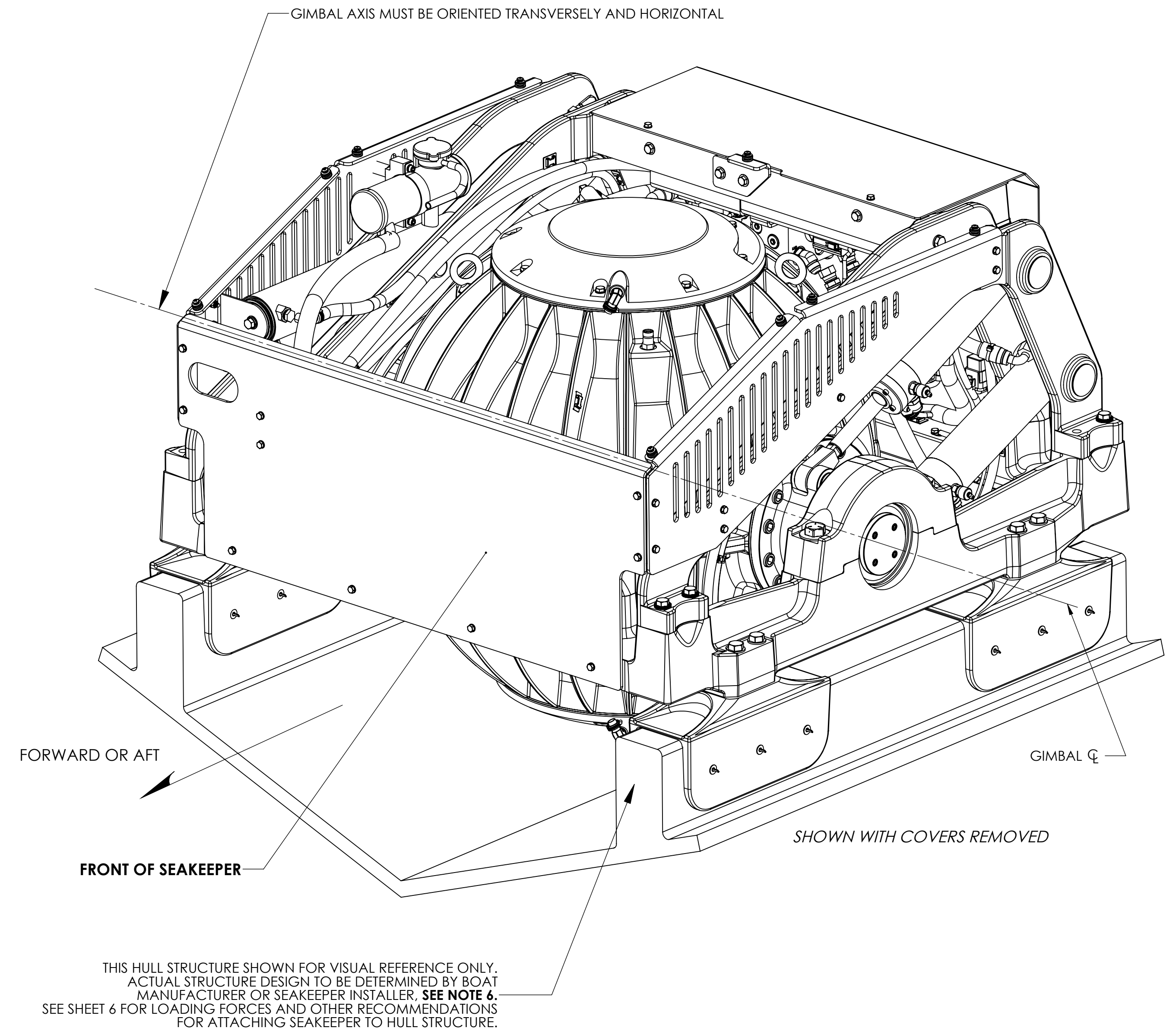
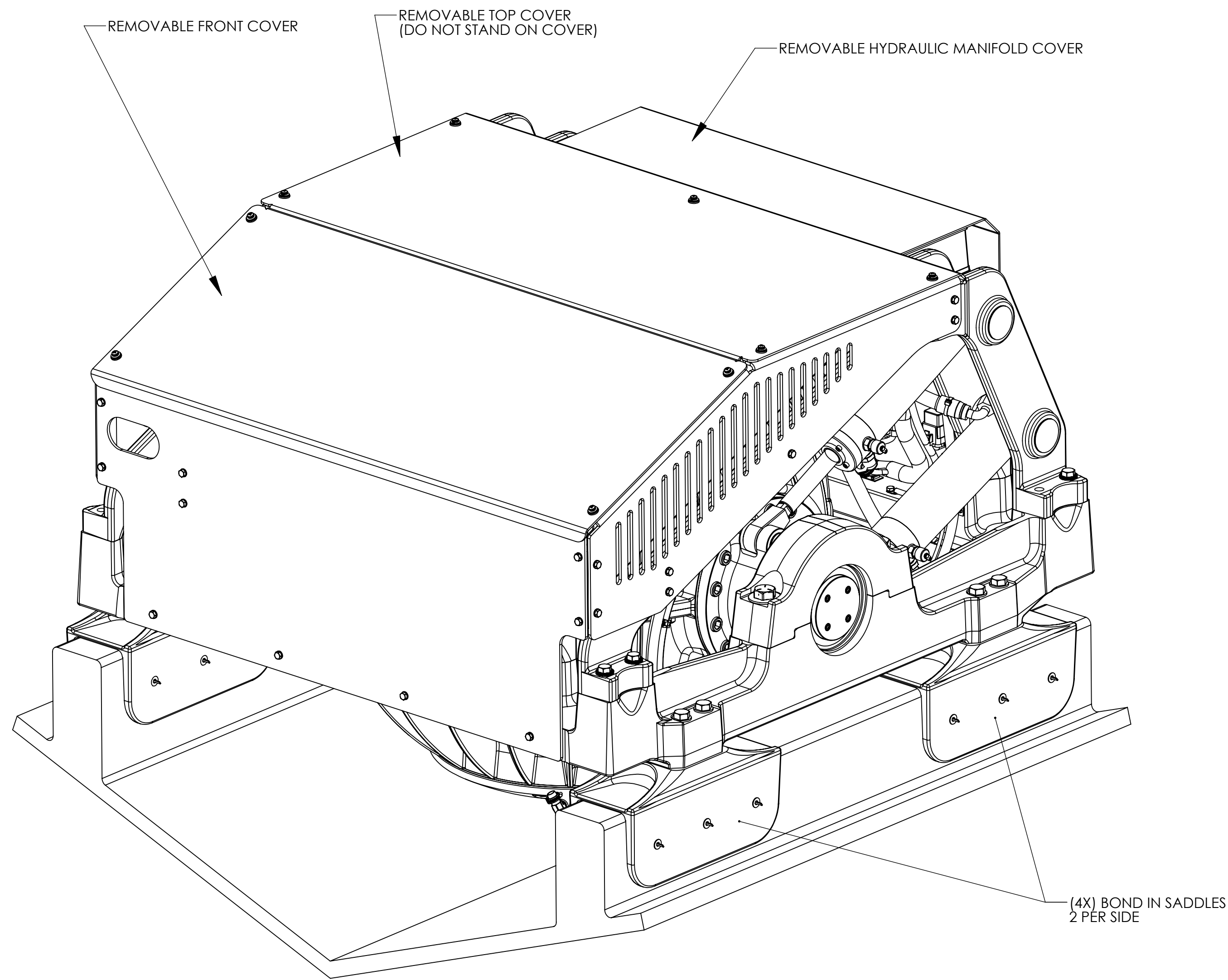


- NOTES:
- 1) SEE REFERENCES 1 THROUGH 7 FOR RELATED INSTALLATION MANUAL AND ELECTRICAL / ELECTRONIC AND COOLING CIRCUIT DRAWINGS.
 - 2) SEAKEEPER ASSEMBLY WEIGHT = 2,460 LBS. (1,115.8 Kg) / ESTIMATED WEIGHT
 - 3) RAW WATER COOLING REQUIREMENT IS BETWEEN 15 LPM (4 GPM) MINIMUM AND 30 LPM (8 GPM) MAXIMUM CONTINUOUS FLOW. PROVIDED CONNECTIONS ARE 19mm (3/4" INCH) HOSE BARB. USE OF RAW WATER STRAINER IS REQUIRED.
 - 4) TWO LIFTING EYES ARE PROVIDED ON THE TOP OF THE SEAKEEPER SPHERE FOR USE WITH A SPREADER BAR (SEE SHEET 3). TOP COVER MUST BE REMOVED TO ACCESS LIFTING EYES.
 - 5) COVERS ARE PROVIDED TO PREVENT PERSONNEL OR EQUIPMENT ENTANGLEMENT WHILE SEAKEEPER IS IN OPERATION. THESE COVERS ARE NOT TO BE STOOD ON OR TO HAVE ANYTHING STORED ON TOP OF. SEAKEEPER RECOMMENDS THE COVERS TO ALWAYS BE IN PLACE DURING OPERATION.
 - 6) SEAKEEPER IS RECOMMENDED TO BE INSTALLED AFT OF AMIDSHIP TO MINIMIZE VERTICAL HIGH ACCELERATION LOADING DUE TO HULL/WAVE IMPACTS DURING OPERATION AT HIGH SPEED OR IN LARGE WAVES. SEAKEEPER DOES NOT NEED TO BE MOUNTED ON CENTERLINE OF KEEL. SEAKEEPER SUPPORT STRUCTURE MUST BE PARALLEL TO VESSEL WATERLINE.
 - 7) ADHESIVE INJECTION HOLES ARE PROVIDED AS A SECONDARY MEANS TO ADD ADHESIVE IN AREAS THAT ARE LACKING ADHESIVE BETWEEN THE SADDLE SIDES AND HULL STRUCTURE. THE INJECTION PROCESS IS ONLY USED TO RECOVER FROM INADEQUATE OR UN-EVEN ADHESIVE APPLICATION. REFER TO INSTALLATION MANUAL FOR ADHESIVE INSTALLATION PROCEDURE. NO FASTENERS ARE TO BE USED IN THE INJECTION HOLES.
 - 8) SEAKEEPER MAY BE INSTALLED FACING FORWARD OR AFT AS SHOWN. SEAKEEPER ORIENTATION SHOULD BE SELECTED TO PROVIDE THE MOST ACCESSABILITY FOR FUTURE SERVICE AND MAINTENANCE. INSTALLATION, START-UP, AND OPERATION IS THE SAME REGARDLESS OF SEAKEEPER ORIENTATION. THE BOND-IN ADAPTOR SADDLES USED IN THIS INSTALLATION APPLICATION, MUST BE ORIENTED SO THAT EACH LEFT AND RIGHT SIDE SADDLE OFFSETS TO THE REAR OF THE SEAKEEPER UNIT.
 - 9) WHEN INSTALLING, SEAKEEPER RECOMMENDS USING A SADDLE LOCATION FIXTURE # 90282 AVAILABLE FROM SEAKEEPER. THIS FIXTURE WILL PROPERLY SPACE AND ALIGN SADDLES FOR THE BONDING PROCESS. SEE REFERENCE 5 FOR DETAILS OF INSTALLATION PROCESS.

REV NO.	ECN NO.	ZONE	DESCRIPTION	DATE	APPRVD.
1	0757	---	INITIAL RELEASE	12/12/2019	WMG
2	0844	SHT1, A8 SHT2, E7, B7 SHT5, B4	REPLACED 90262 WITH 90547. SEAKEEPER 16/18 BOND-IN SADDLE KIT; ADDED CENTER OF MASS FOR REFERENCE; UPDATED "SEAKEEPER RECOMMENDS USING A THREAD LOCKING COMPOUND SUCH AS ANTI-SEIZE" TO "APPLY A MODERATE COAT OF MARINE ANTI-SEIZE ON ALL BOLTS"	8/19/2020	WMG
3	0803		UPDATED OVERALL WEIGHT AND REFERENCES ON SHT 1. ADDED SHT 5 IN-FIELD BRG REPLACEMENT CLEARANCES, UPDATED FOUNDATION BOLT DETAILS ON SHT 6.	6/6/2021	EMS



REF.	DWG. NO.	DWG. TITLE
1	90540	SEAKEEPER 16/18 COOLING WATER SCHEMATIC
2	90679	SEAKEEPER 18 CABLE BLOCK DIAGRAM
3	90438	OPERATOR DISPLAY ENVELOPE AND MOUNTING DETAILS
4	90282	SEAKEEPER 16/18 INSTALLATION FIXTURE KIT
5	90672	SEAKEEPER 18 INSTALLATION MANUAL
6	90547	SEAKEEPER 16/18 BOND-IN SADDLE KIT
7	90382	SEAKEEPER ADHESIVE RECOMMENDATIONS

- SHEET 2 - SEAKEEPER FOUNDATION DIMENSIONS.
- SHEET 3 - RECOMMENDED LIFTING POINTS.
- SHEET 4 - RECOMMENDED CLEARANCES TO HULL STRUCTURE.
- SHEET 5 - SERVICE CLEARANCES FOR IN-FIELD BEARING REPLACEMENT.
- SHEET 6 - SEAKEEPER LOADS FOR HULL STRUCTURE DESIGN & MOUNTING DETAILS.

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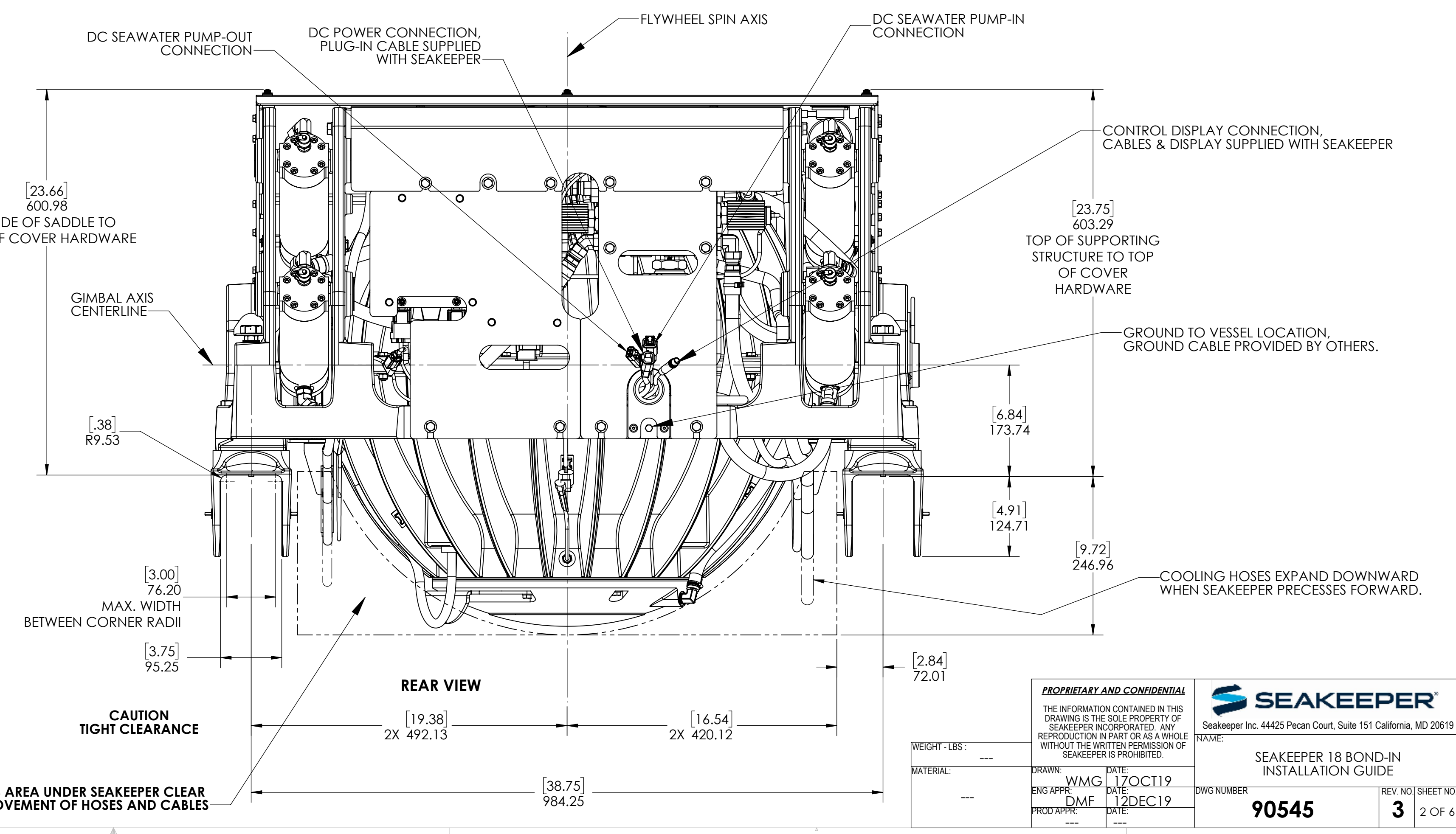
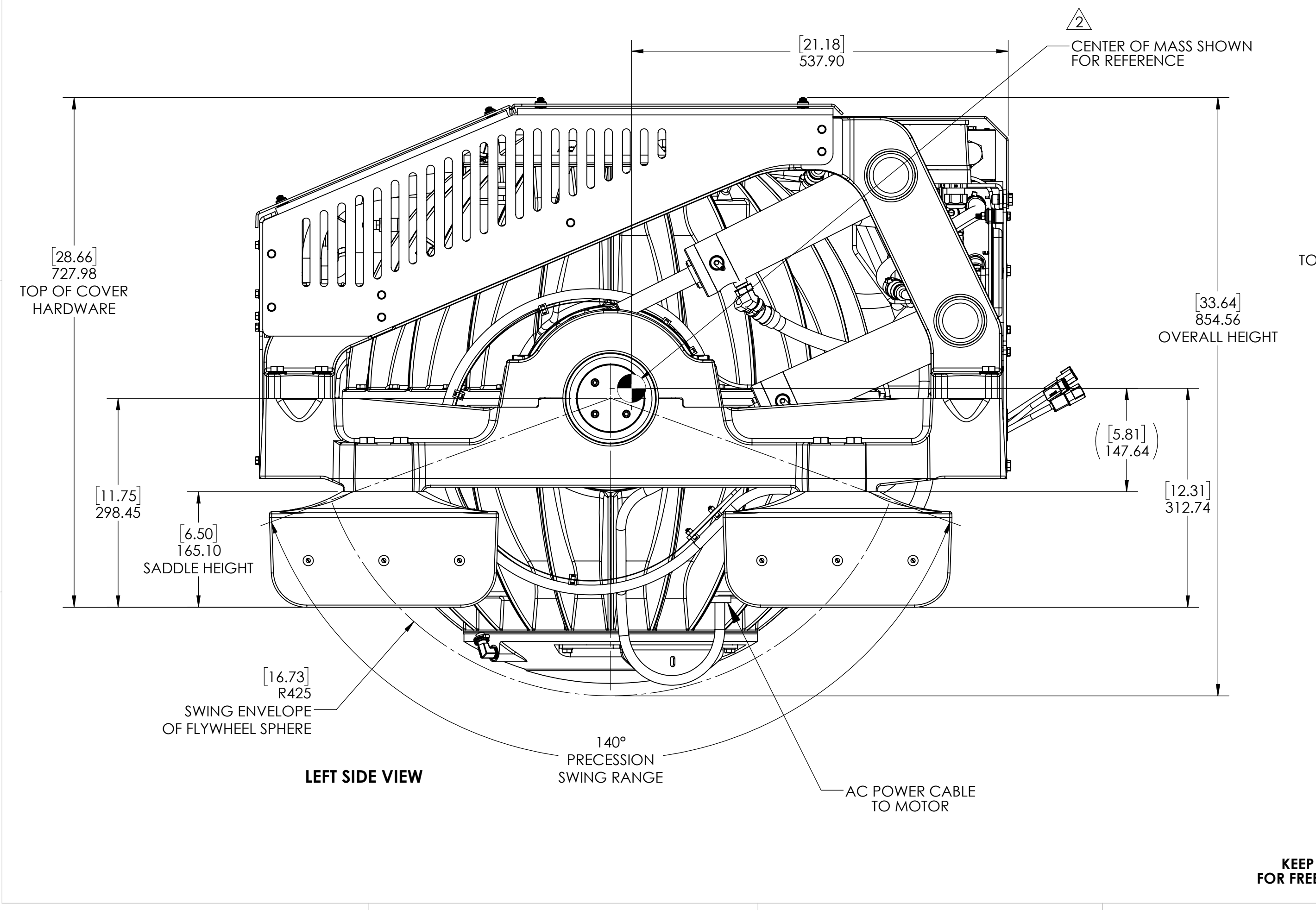
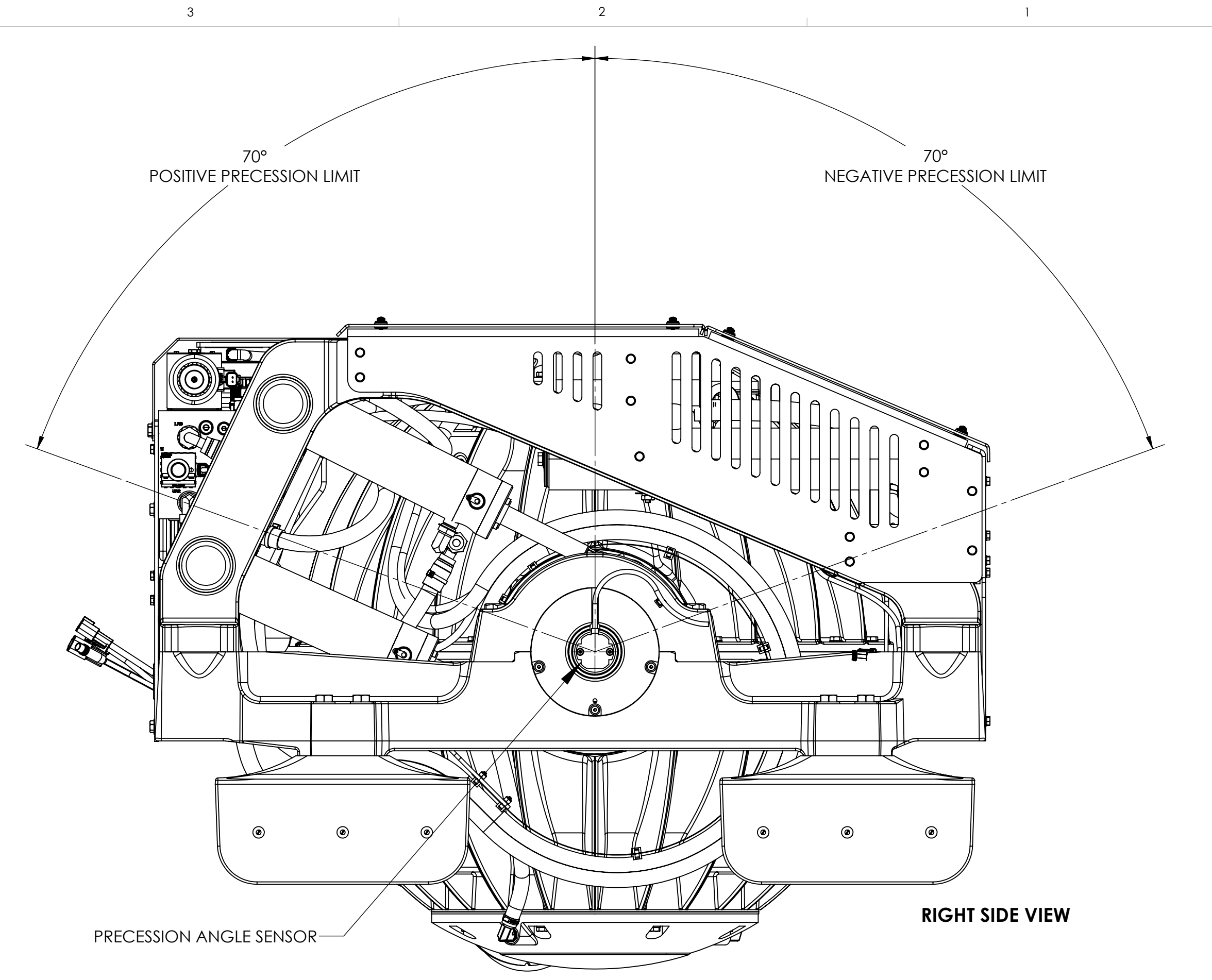
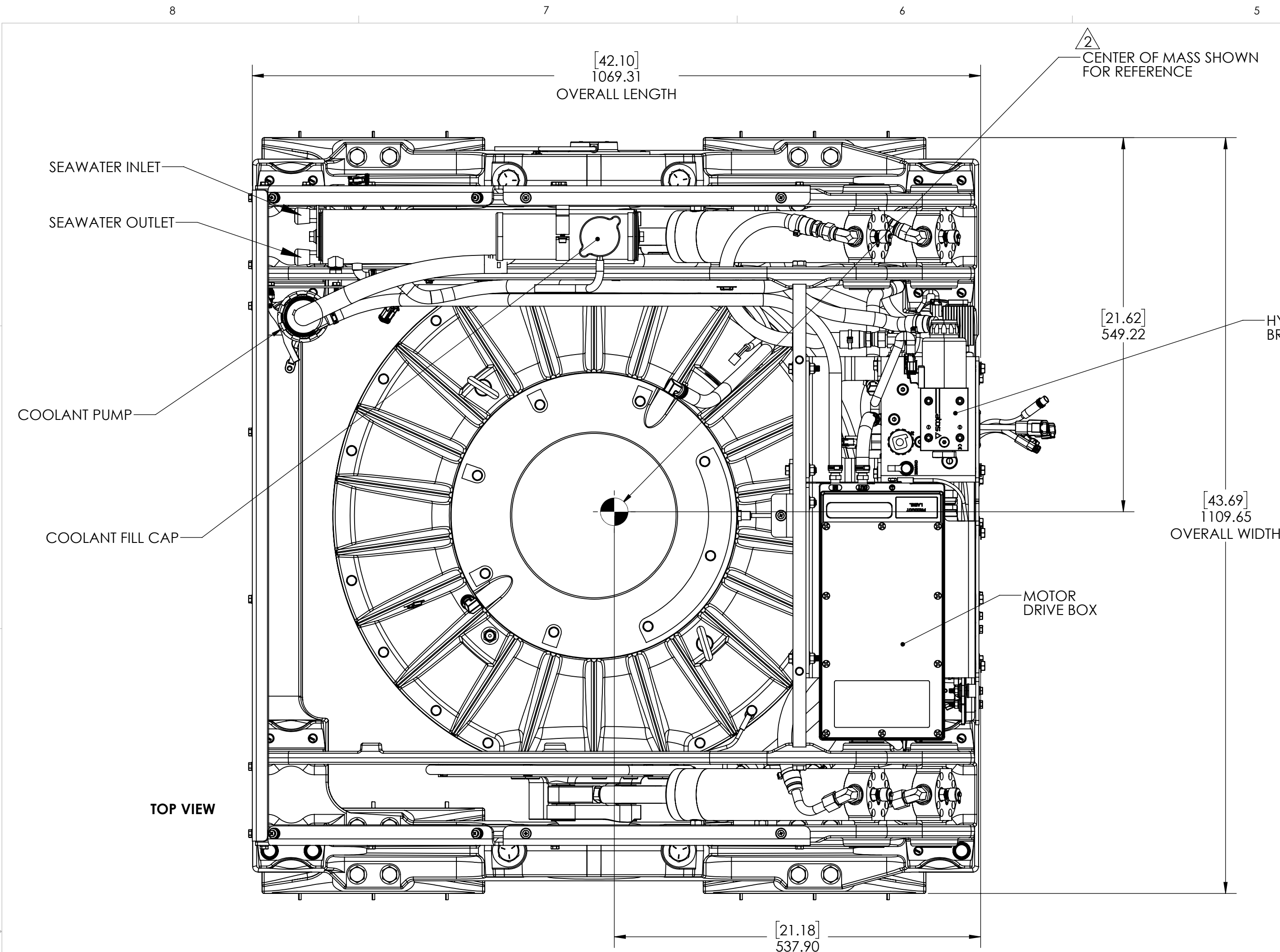
NAME: SEAKEEPER 18 BOND-IN INSTALLATION GUIDE

DRAWN: WMG DATE: 17OCT19
ENG APPR: DMF DATE: 12DEC19
PROD APPR: --- DATE: ---

WEIGHT - LBS: ---
MATERIAL: ---

DWG NUMBER: **90545**

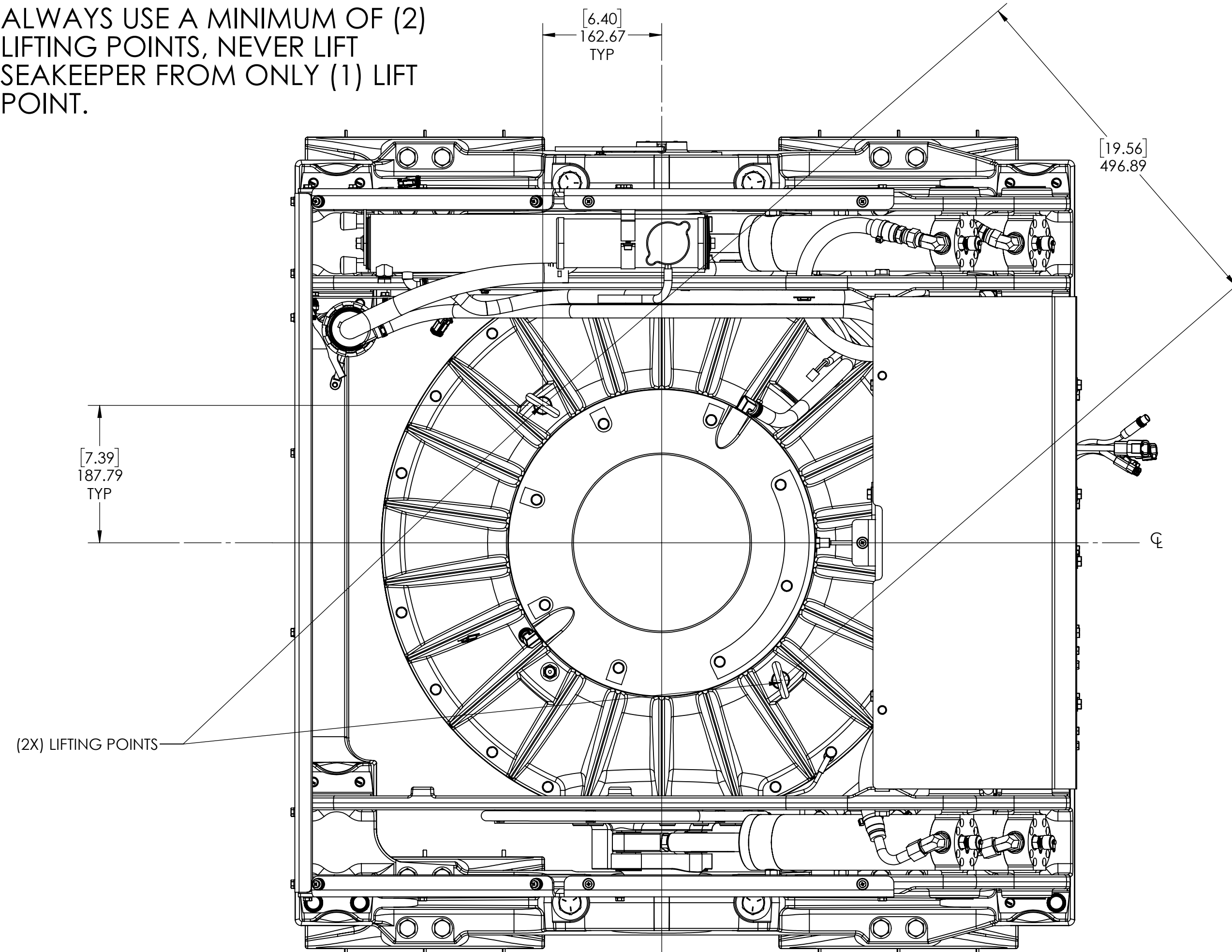
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MATERIAL: ---	ENG APPR: DMF	DATE: 12DEC19	REV. NO. SHEET NO. 3 2 OF 6
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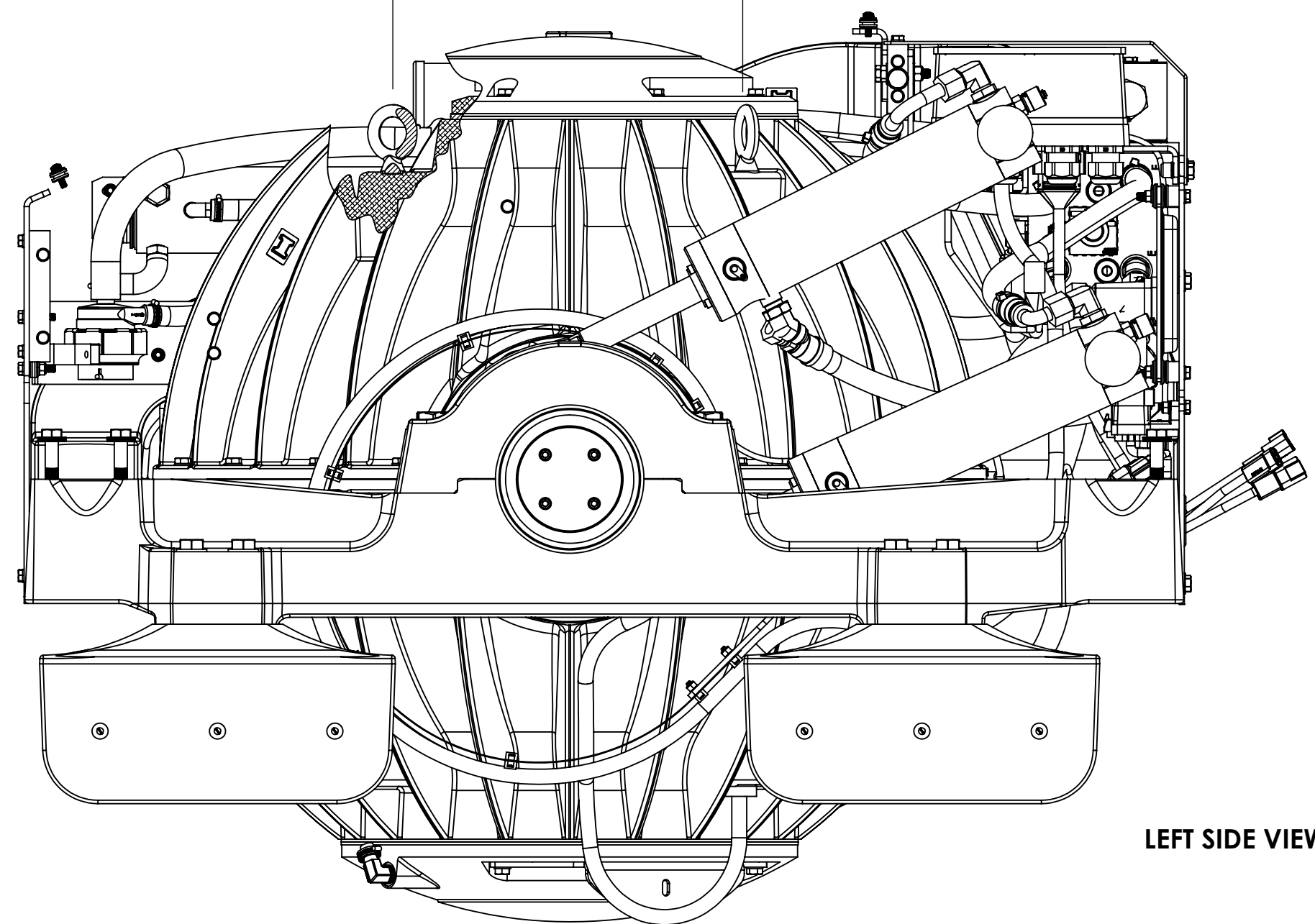
LIFTING DETAILS AND DIMENSIONS

CAUTION : ALWAYS USE A MINIMUM OF (2) LIFTING POINTS, NEVER LIFT SEAKEEPER FROM ONLY (1) LIFT POINT.



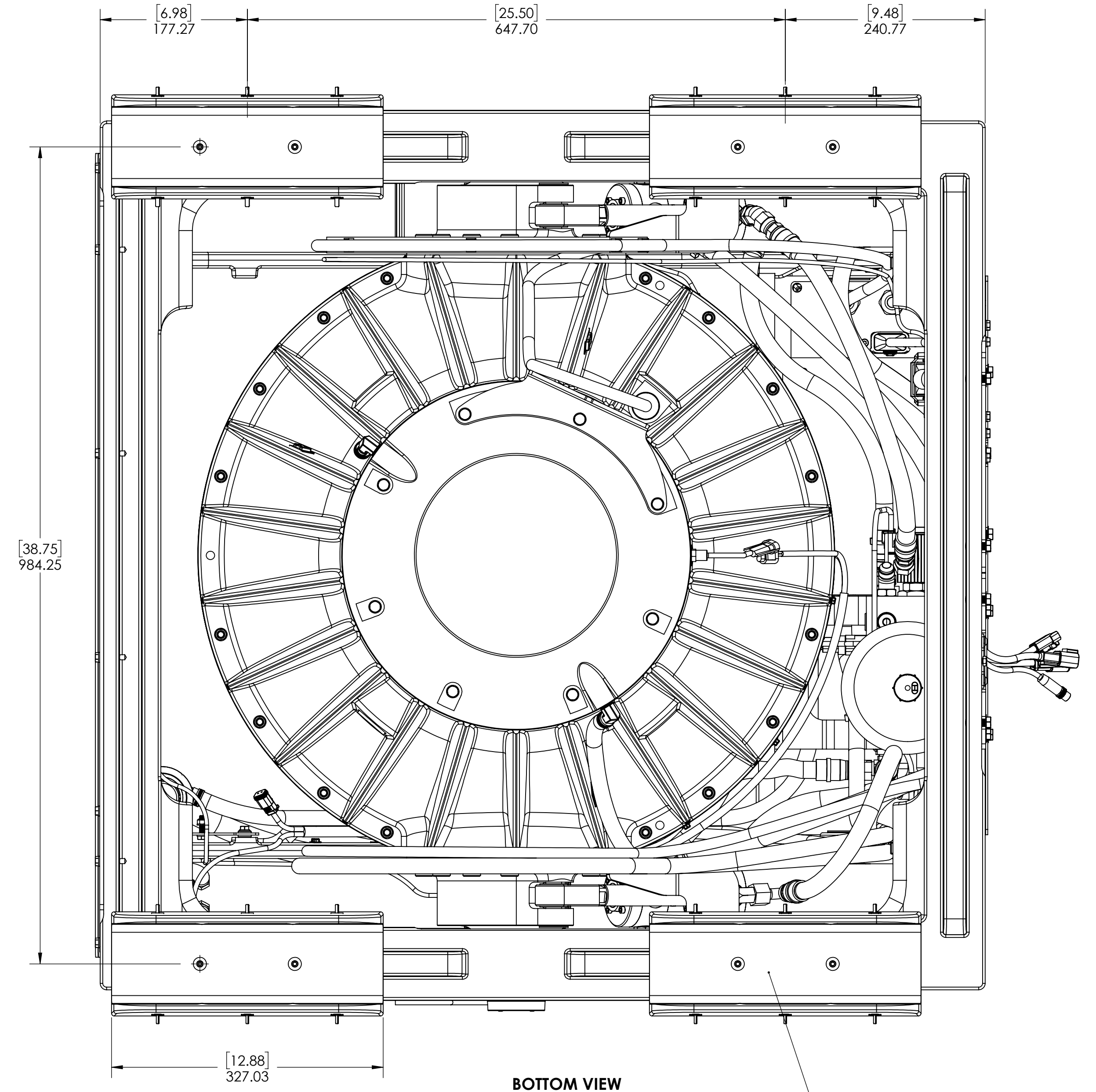
TOP VIEW

LIFT VERTICALLY USING A SPREADER BAR OR SIMILAR ARRANGEMENT



LEFT SIDE VIEW

SEE SHEET 6 FOR BOLT PATTERN DIMENSIONS



NYLON SCREWS ARE FOR CREATING A SPACE FOR BONDING ADHESIVE BETWEEN TOP SURFACE OF HULL STRUCTURE AND SADDLE CASTING.

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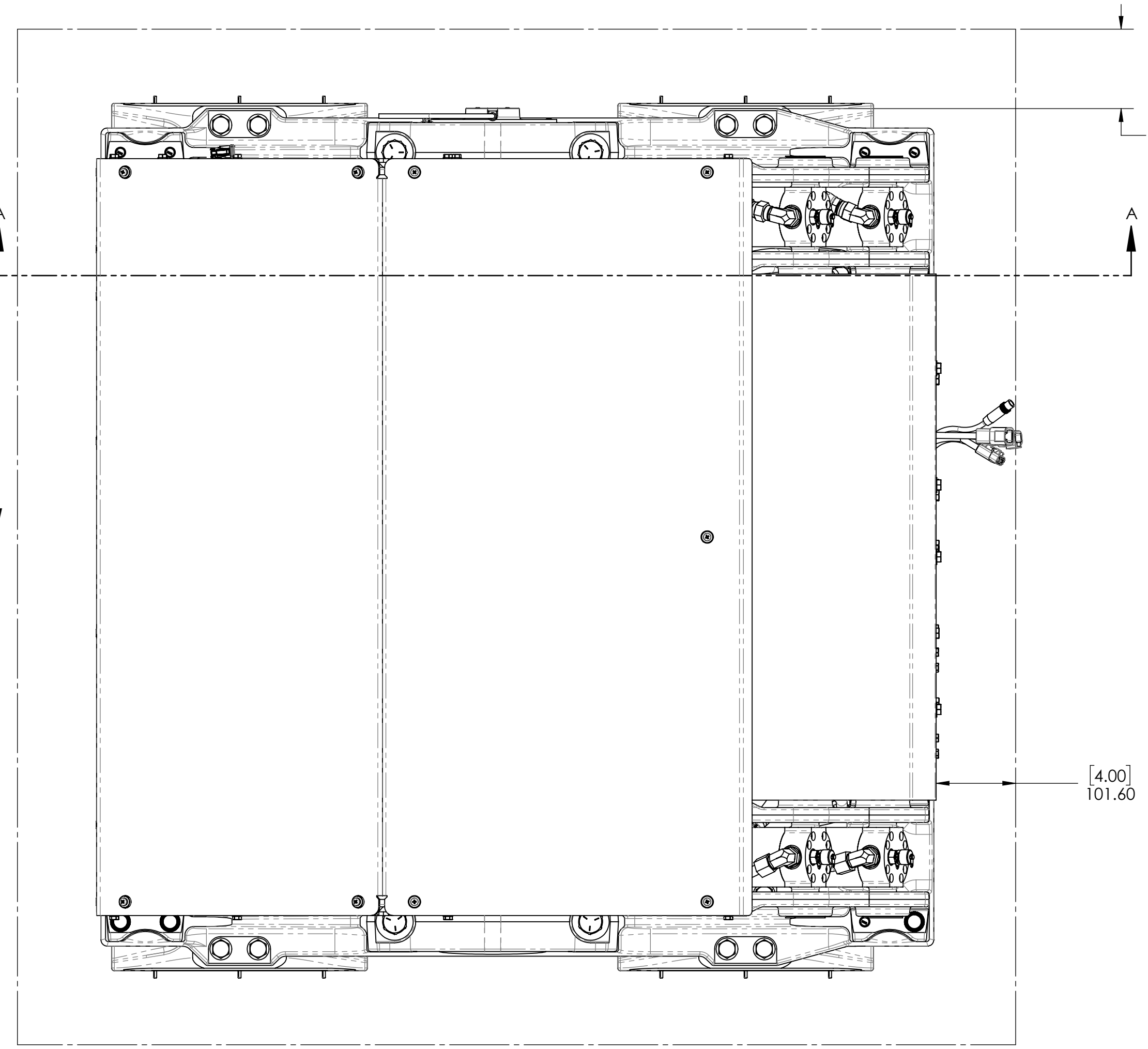
SEAKEEPER 18 BOND-IN INSTALLATION GUIDE

DWG NUMBER: 90545

REV. NO. SHEET NO. 3 3 OF 6

8 7 6 5 4 3 2 1

TOP VIEW



HULL STRUCTURE
SIMULATION
FOR REFERENCE ONLY

SECTION A-A

[1.00]
25.40
MINIMUM RECOMMENDED
DISTANCE FROM SEAKEEPER FRAME
TO ANY TRANSVERSE BEAM

[1.00]
25.40
MINIMUM RECOMMENDED
DISTANCE FROM SEAKEEPER FRAME
TO ANY TRANSVERSE BEAM

[4.00]
101.60
MINIMUM RECOMMENDED
DISTANCE FOR TOOL CLEARANCE

6mm HEX HEAD
SCREWS

8mm HEX HEAD
SCREWS

[4.00]
101.60
MINIMUM RECOMMENDED
DISTANCE FOR TOOL CLEARANCE

LEFT SIDE VIEW

[12.00]
305
SERVICE
ACCESS

HYDRAULIC BRAKE MANIFOLD
MUST BE ACCESSIBLE.
(REAR UTILITY COVER SHOWN REMOVED)

[34.22]
869

REAR VIEW

**VIEWS SHOWING RECOMMENDED CLEARANCE AROUND SEAKEEPER
FOR USE OF HAND TOOLS, EASE OF MAINTENANCE, INSTALLATION
AND PROPER OPERATION.**

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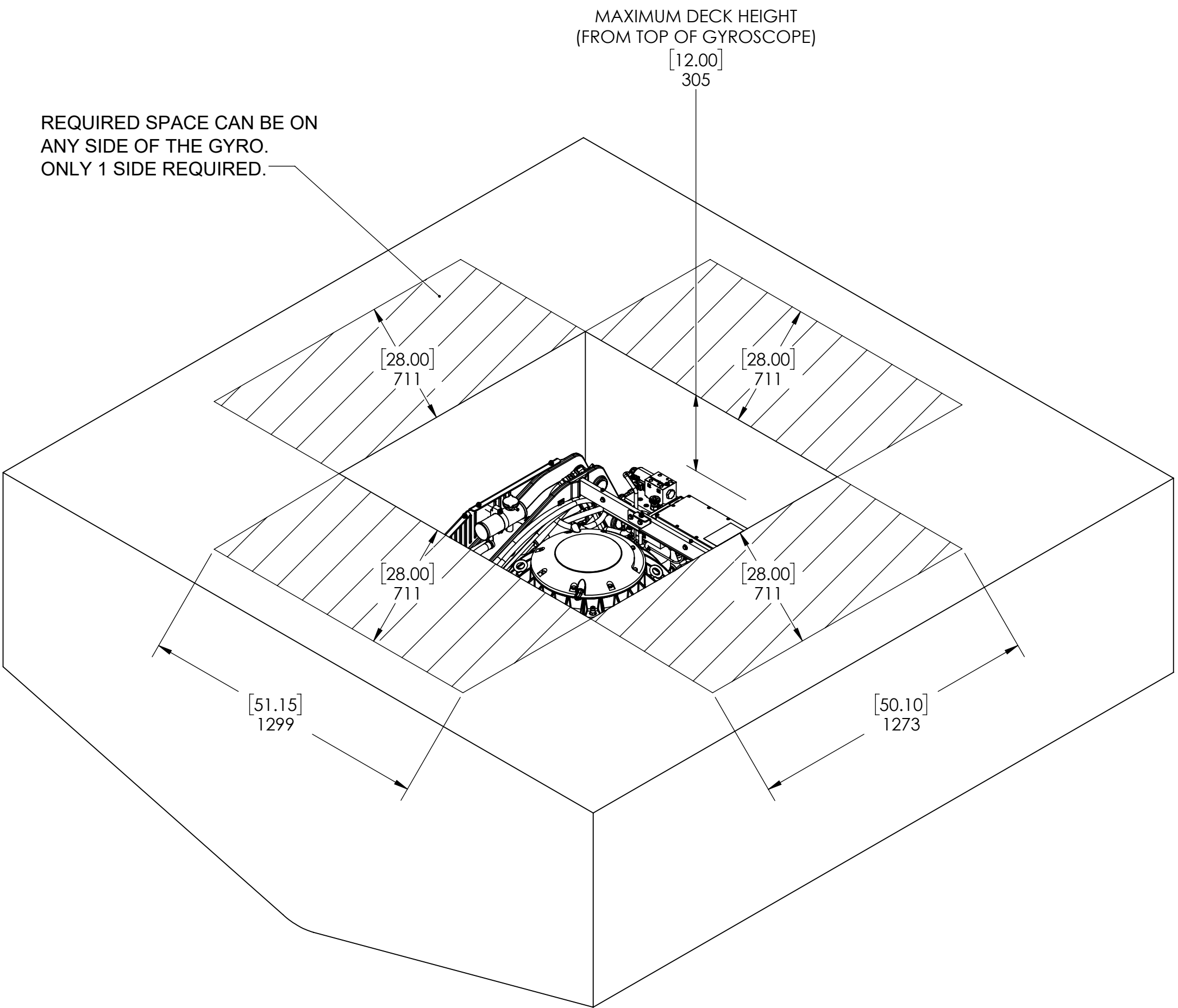
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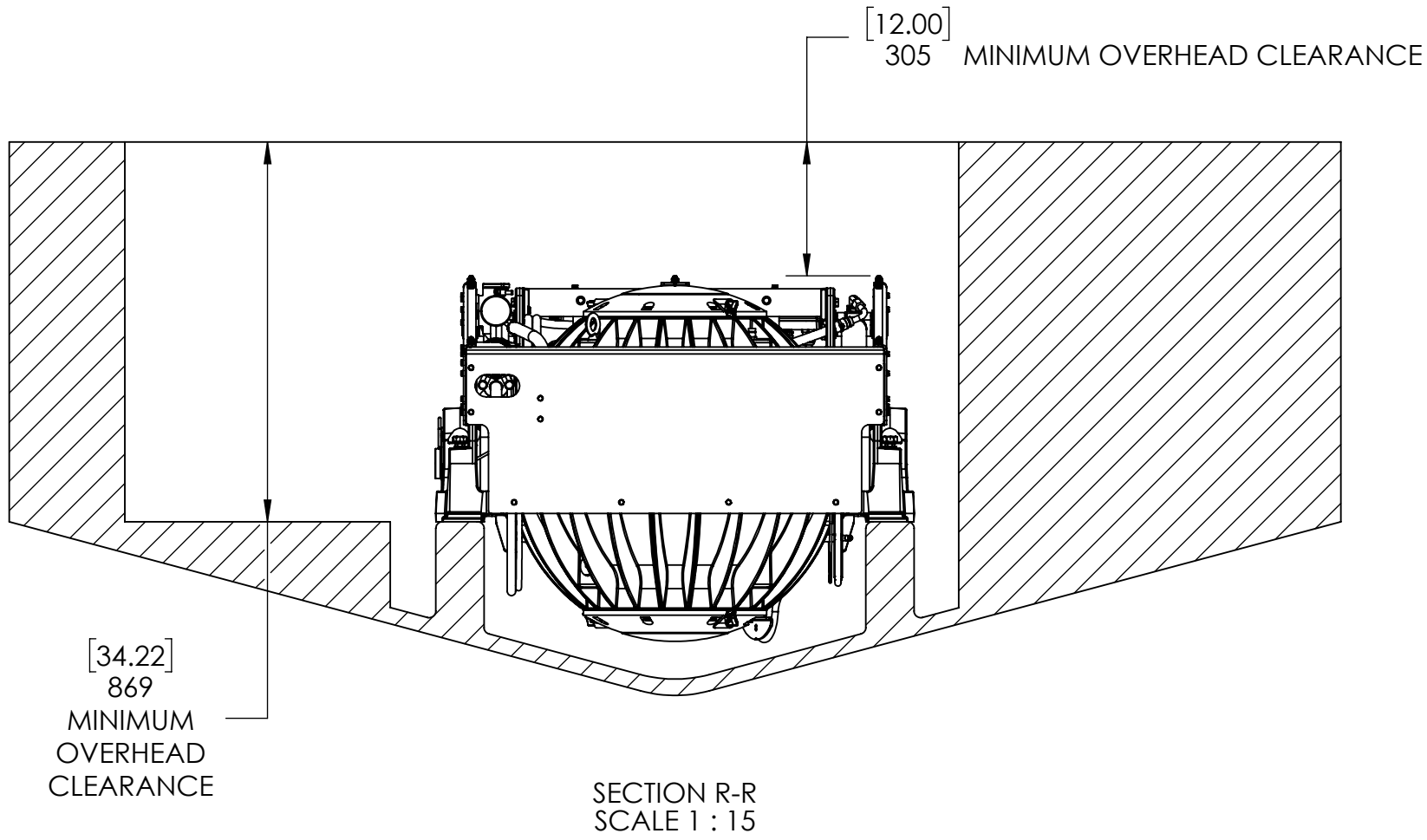
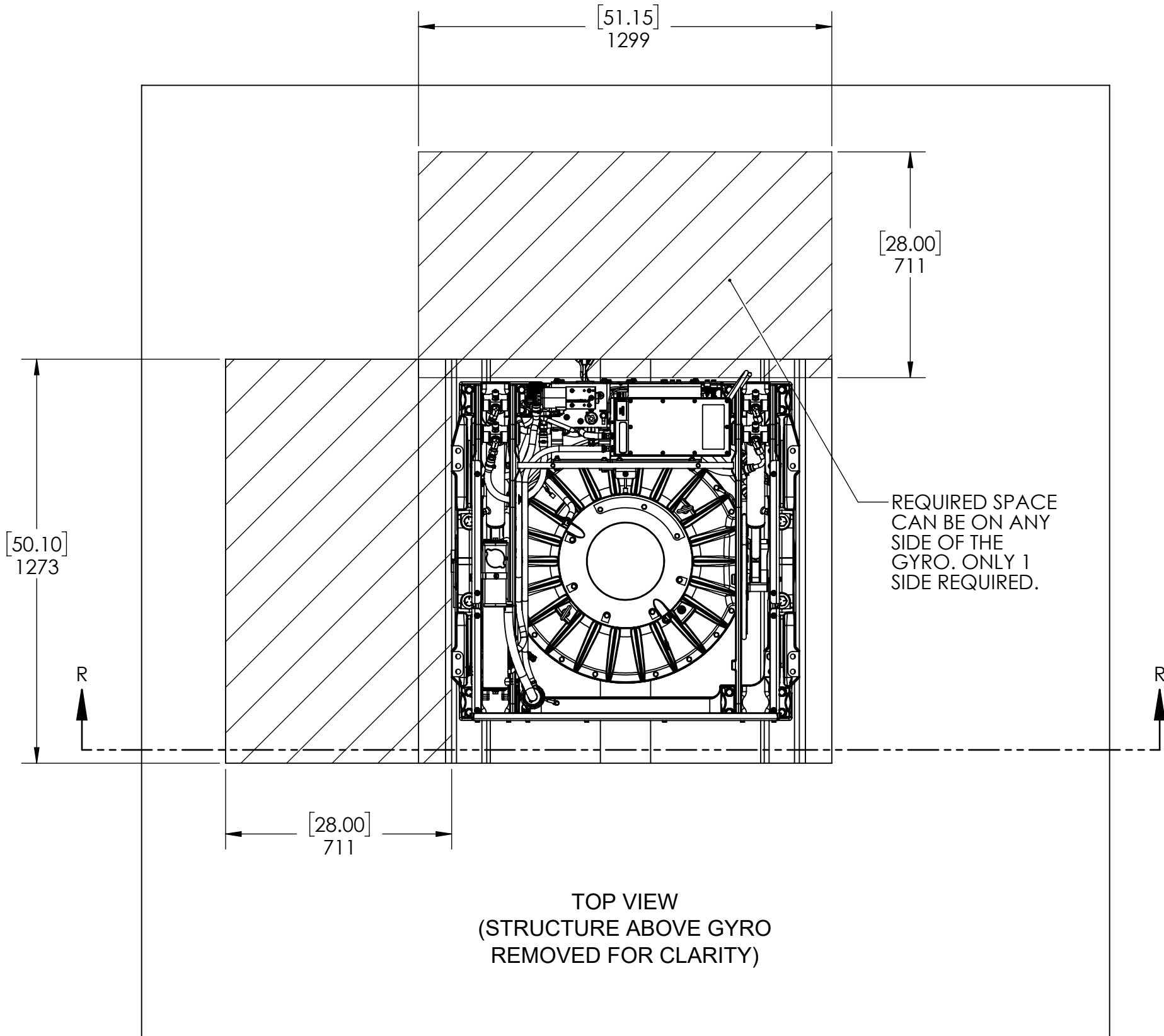
SERVICE CLEARANCES FOR IN-FIELD BEARING REPLACEMENT

NOTIONAL INSTALLATION WITH OVERHEAD ACCESS

INSTALLATIONS WITH MINIMAL SERVICE ACCESS FOR ROUTINE MAINTENANCE AROUND ALL 4 SIDES OF GYRO AS SHOWN ON SHEET 4 REQUIRE OVERHEAD ACCESS AND DECK SPACE ON ONE OF THE FOUR SIDES OF THE GYRO AS SHOWN BELOW.



NOTIONAL INSTALLATION WITHOUT OVERHEAD ACCESS



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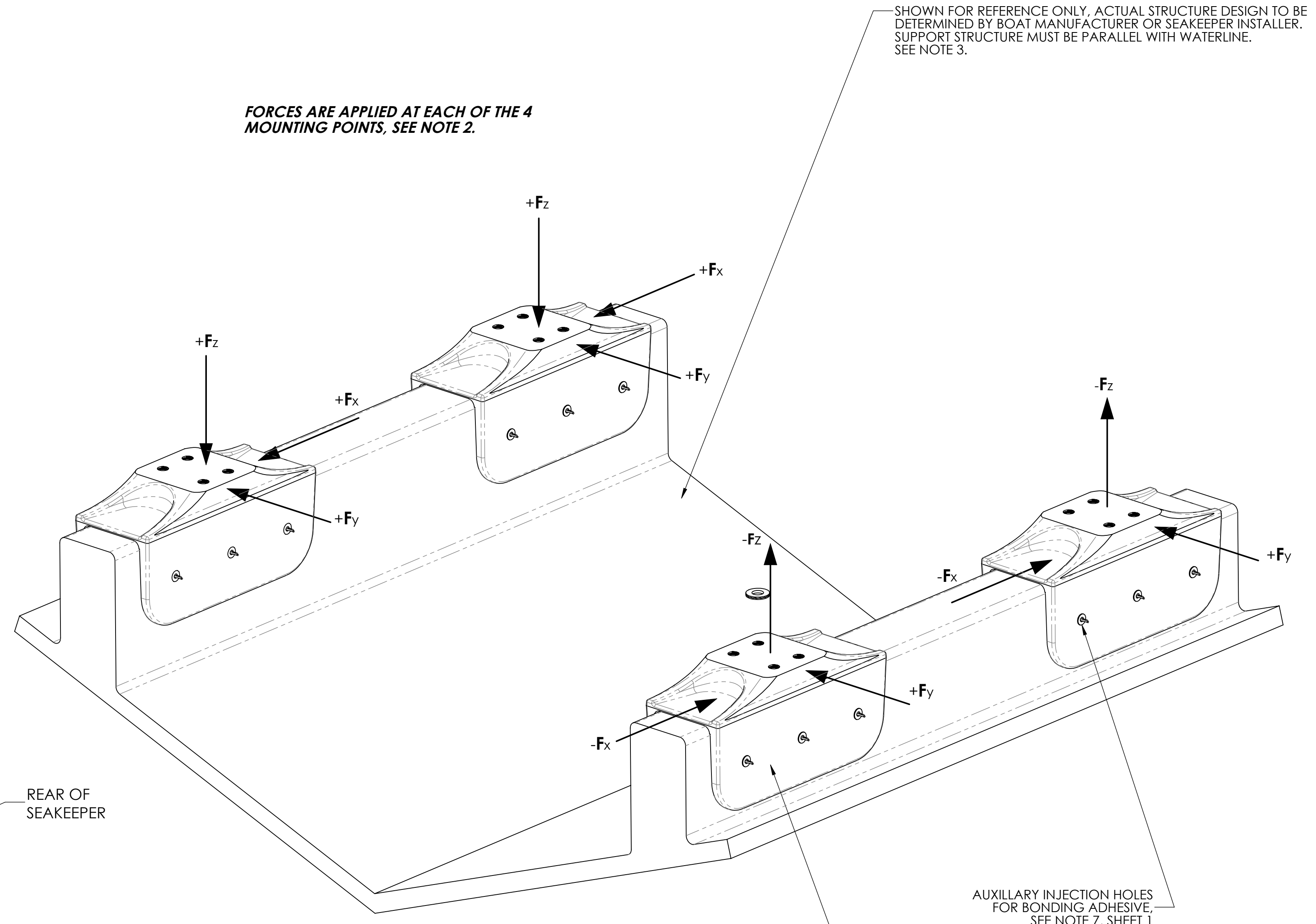
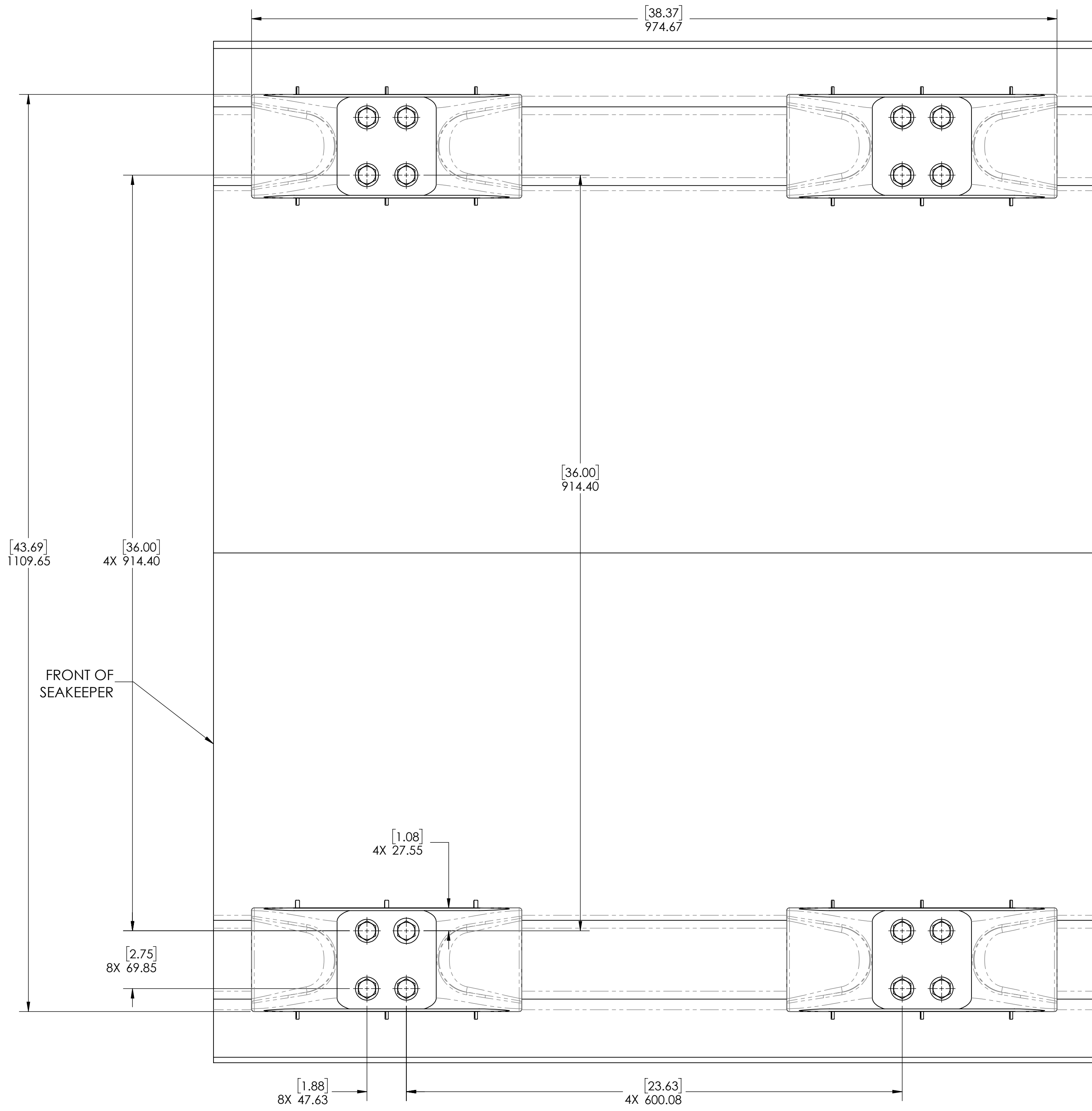
3 | 5 OF 6

SEAKEEPER LOADS FOR HULL STRUCTURE DESIGN:

- SEAKEEPER IS MOUNTED IN A FOUNDATION FRAME WHICH IS BOLTED TO FOUR SADDLE FITTINGS MADE OF A356-T6 CAST ALUMINIUM. THE SEAKEEPER FRAME INCORPORATES SEMI-ELASTIC ANTI-VIBRATION ISOLATORS ENCASED THE GIMBAL BEARINGS THAT DAMPEN VIBRATIONS THAT COULD TRANSMIT INTO THE HULL STRUCTURE. THE SADDLES ARE DESIGNED TO BE PERMANENTLY ATTACHED TO LONGITUDINAL GRP HULL BEAMS WITH A STRUCTURAL ADHESIVE. THIS MOUNTING ARRANGEMENT DISTRIBUTES THE CYCLIC, FULLY REVERSING FORCES AND MOMENTS GENERATED BY SEAKEEPER OVER A LARGE SURFACE AREA. THE BONDED IN SADDLES ARE NOT DESIGNED TO BE BOLTED TO THE HULL STRUCTURE AND THIS METHOD OF ATTACHMENT SHOULD NEVER BE ATTEMPTED WITHOUT CONSULTATION WITH SEAKEEPER INC.
- SEAKEEPER GENERATES PITCH MOMENTS, ROLL MOMENTS, YAW MOMENTS, AND VERTICAL AND HORIZONTAL FORCES - THE MAGNITUDE OF WHICH IS CONTROLLED BY THE SEAKEEPER'S ACTIVE BRAKE SYSTEM. THESE SEAKEEPER GENERATED FORCES AND MOMENTS RESULT IN LOADS BEING APPLIED AT THE FOUR POINTS WHERE THE SEAKEEPER FRAME BOLTS TO THE TOP FACE OF THE SADDLE FITTINGS. THE RESULTANT FORCES AT THESE POINTS ARE ILLUSTRATED ON THE ADJACENT FIGURE AND THE VALUES TO BE USED FOR HULL STRUCTURE DESIGN ARE SUMMARIZED BELOW:

 VERTICAL FORCE (Fz) = 5,965 LBS. (26.53 kN) - **(APPLIED AT EACH OF THE 4 MOUNTING POINTS.)**
 LONGITUDINAL FORCE (Fx) = 3,409 LBS. (15.16 kN) - **(APPLIED AT EACH OF THE 4 MOUNTING POINTS.)**
 LATERAL FORCE (Fy) = 500 LBS. (2.22 kN) - **(APPLIED AT EACH OF THE 4 MOUNTING POINTS.)**

 THESE FORCES SHOULD BE CONSIDERED TO BE ACTING SIMULTANEOUSLY, FULLY REVERSING, AND WILL REPEAT AN INFINITE NUMBER OF TIMES.
- THE RESPONSIBLE PARTY FOR DESIGNING THE SUPPORTING HULL STRUCTURE (BOAT BUILDER OR HIRED SUB-CONTRACTOR) MUST ACCOMMODATE THE ABOVE FORCES PLUS A REASONABLE FACTOR OF SAFETY. SEAKEEPER RECOMMENDS A MINIMUM SAFETY FACTOR OF 3.0 (YIELDING A SAFETY MARGIN OF 2.0)
- THE BOAT BUILDER OR SEAKEEPER INSTALLER IS ALSO FULLY RESPONSIBLE FOR SELECTING THE STRUCTURAL ADHESIVE TO SECURE THE ALUMINIUM SADDLE FITTINGS TO THE GRP HULL BEAMS. SEAKEEPER RECOMMENDS THAT THE BUILDER OR INSTALLER USE A STRUCTURAL ADHESIVE WITH A MINIMUM SHEAR STRENGTH OF 13.8 MPa (2000 psi). ADDITIONALLY IT IS STRONGLY SUGGESTED THAT THE BUILDER OR INSTALLER TEST THE COMPATIBILITY OF THE SELECTED ADHESIVE WITH CAST A356 T6 ALUMINIUM AND PLANNED HULL MATERIALS BY PERFORMING MECHANICAL PROPERTY TESTS. TO AID IN DETERMINING THE QUANTITY OF ADHESIVE REQUIRED, THE INTERIOR SURFACE AREA (BONDING SURFACES) OF EACH SADDLE FITTING IS 1,058 SQ. CM. (164 SQ. IN.) TOTAL BONDED SURFACE AREA FOR ALL 4 SADDLES = 4,232 SQ. CM. (656 SQ.IN.)



BUILDER/INSTALLER IS TO INSTALL 4 SADDLE FITTINGS USING STRUCTURAL ADHESIVE, SEE NOTE 4. REFER TO #90382, STRUCTURAL ADHESIVE RECOMMENDATIONS. SEAKEEPER RECOMMENDS USING AN INSTALLATION FIXTURE #90282, AVAILABLE FROM SEAKEEPER, TO MAINTAIN ALIGNMENT AND LOCATION OF SADDLES DURING THE BONDING PROCESS. AFTER ADHESIVE IS FULLY CURED, SEAKEEPER FRAME IS THEN FASTENED TO THE SADDLES USING THE HARDWARE INCLUDED WITH THE BOND-IN SADDLE KIT #90547 - M14-2.0 X 90mm LONG, ALLOY STEEL HEX HEAD CAP SCREWS. **TORQUED TO 100 FT/LBS [135.6 Nm]**. APPLY NICKEL-BASED ANTI-SEIZE TO BOLT THREADS AND MARINE GRADE SEALANT UNDER FLAT WASHERS & BOLT HEADS. SEE INSTALLATION MANUAL #90549 FOR DETAILS OF INSTALLATION PROCEDURE.

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