
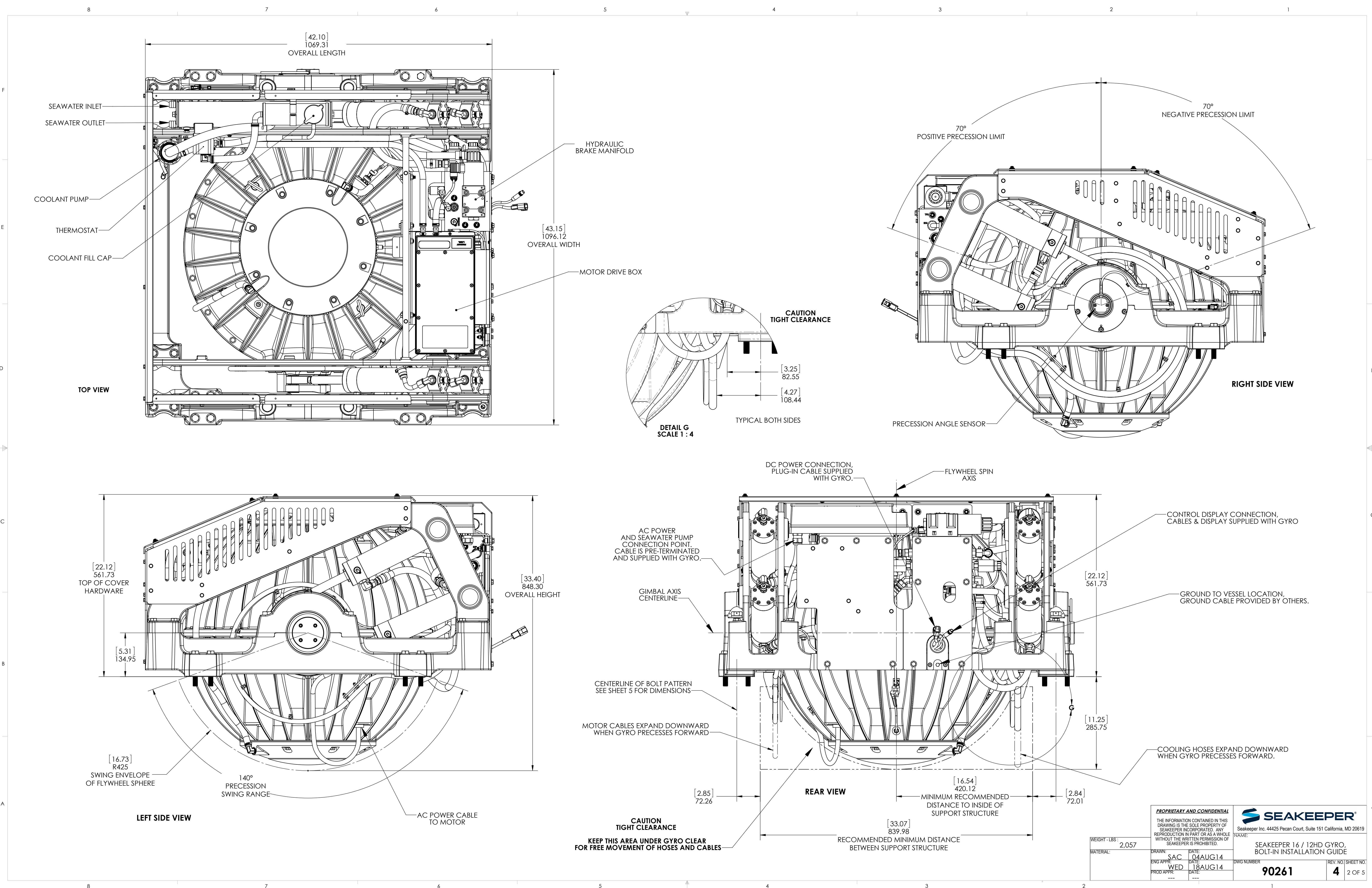


8) WHEN INSTALLING GYRO SEAKEEPER RECOMMENDS USING A BOLT HOLE LOCATION FIXTURE # 90282 AVAILABLE FROM SEAKEEPER. THIS FIXTURE WILL PROPERLY SPACE AND LOCATE HOLES TO BE DRILLED IN HULL STRUCTURE FOR BOLT-IN OF GYRO FOUNDATION. SEE REFERENCE 5 FOR DETAILS OF INSTALLATION PROCESS.

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<p>DRAWN: SAC DATE: 04AUG14</p> <p>ENG APPR: 04AUG14</p> <p>PROD APPR: WED 08AUG14</p> <p style="text-align: center;">--- DATE ---</p>	<p>DWG NUMBER: 90261</p> <p>REV. NO: 4 SHEET NO: 1 OF 5</p>



SEAWATER INLET
SEAWATER OUTLET

COOLANT PUMP
THERMOSTAT
COOLANT FILL CAP

HYDRAULIC
BRAKE MANIFOLD

[43.15]
1096.12
OVERALL WIDTH

MOTOR DRIVE BOX

TOP VIEW

CAUTION
TIGHT CLEARANCE

[3.25]
82.55

[4.27]
108.44

TYPICAL BOTH SIDES

DETAIL G
SCALE 1 : 4

70°
POSITIVE PRECESSION LIMIT

70°
NEGATIVE PRECESSION LIMIT

RIGHT SIDE VIEW

PRECESSION ANGLE SENSOR

[22.12]
561.73
TOP OF COVER
HARDWARE

[33.40]
848.30
OVERALL HEIGHT

[5.31]
134.95

[16.73]
R425
SWING ENVELOPE
OF FLYWHEEL SPHERE

140°
PRECESSION
SWING RANGE

LEFT SIDE VIEW

AC POWER CABLE
TO MOTOR

DC POWER CONNECTION,
PLUG-IN CABLE SUPPLIED
WITH GYRO.

FLYWHEEL SPIN
AXIS

AC POWER
AND SEAWATER PUMP
CONNECTION POINT.
CABLE IS PRE-TERMINATED
AND SUPPLIED WITH GYRO.

GIMBAL AXIS
CENTERLINE

CENTERLINE OF BOLT PATTERN
SEE SHEET 5 FOR DIMENSIONS

MOTOR CABLES EXPAND DOWNWARD
WHEN GYRO PRECESSES FORWARD

CONTROL DISPLAY CONNECTION,
CABLES & DISPLAY SUPPLIED WITH GYRO

GROUND TO VESSEL LOCATION.
GROUND CABLE PROVIDED BY OTHERS.

COOLING HOSES EXPAND DOWNWARD
WHEN GYRO PRECESSES FORWARD.

REAR VIEW

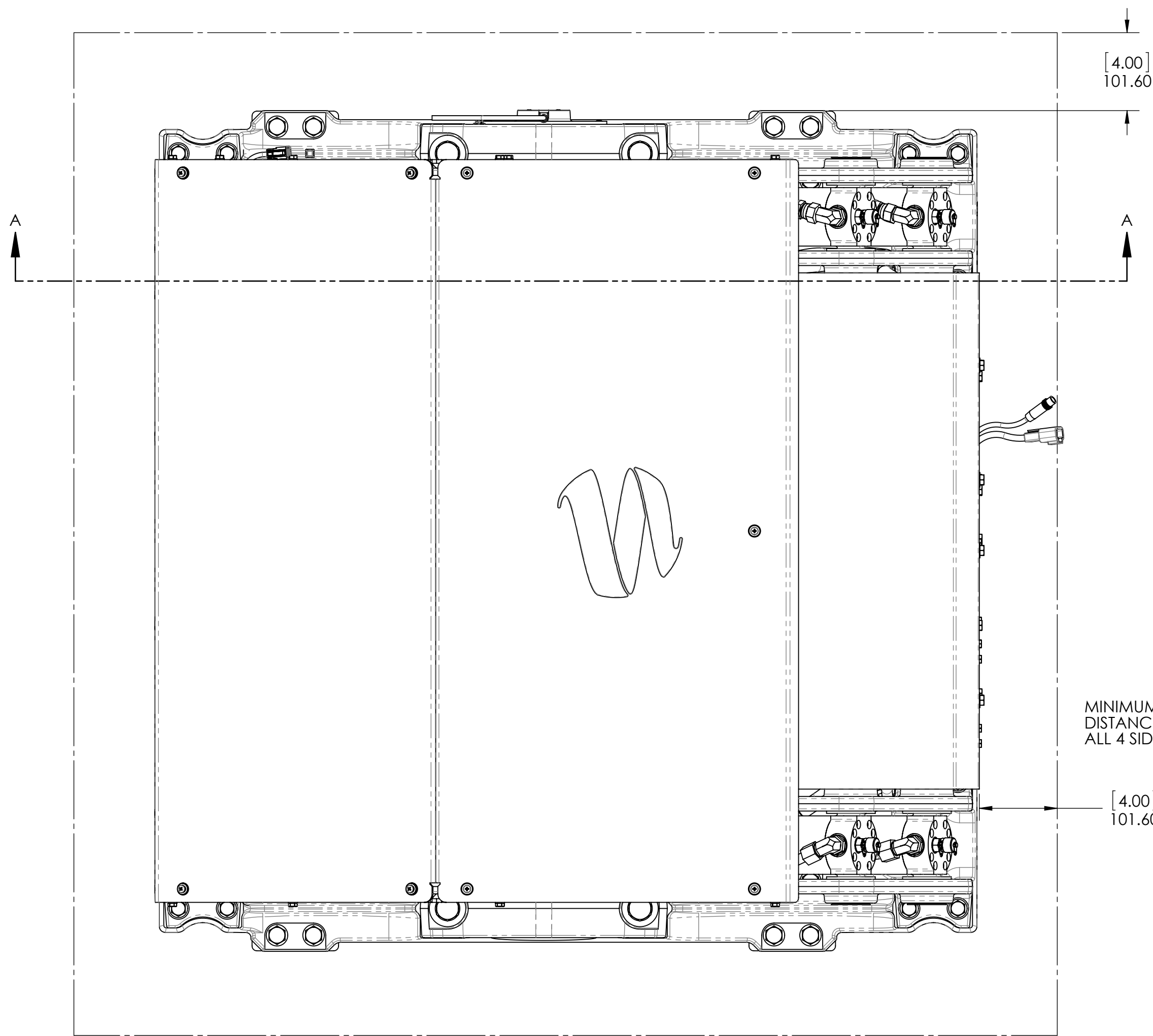
[16.54]
420.12
MINIMUM RECOMMENDED
DISTANCE TO INSIDE OF
SUPPORT STRUCTURE

[2.84]
72.01

[33.07]
839.98
RECOMMENDED MINIMUM DISTANCE
BETWEEN SUPPORT STRUCTURE

CAUTION
TIGHT CLEARANCE
KEEP THIS AREA UNDER GYRO CLEAR
FOR FREE MOVEMENT OF HOSES AND CABLES

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WEIGHT - LBS : MATERIAL : DRAWN : ENG APPR : PROD APPR :	2,057 SAC WED ---	DATE : 04AUG14 18AUG14 ---	DWG NUMBER : 90261 REV. NO. / SHEET NO. : 4 / 2 OF 5



MINIMUM RECOMMENDED
DISTANCE FOR TOOL CLEARANCE
ALL 4 SIDES.

[4.00]
101.60

SECTION A-A

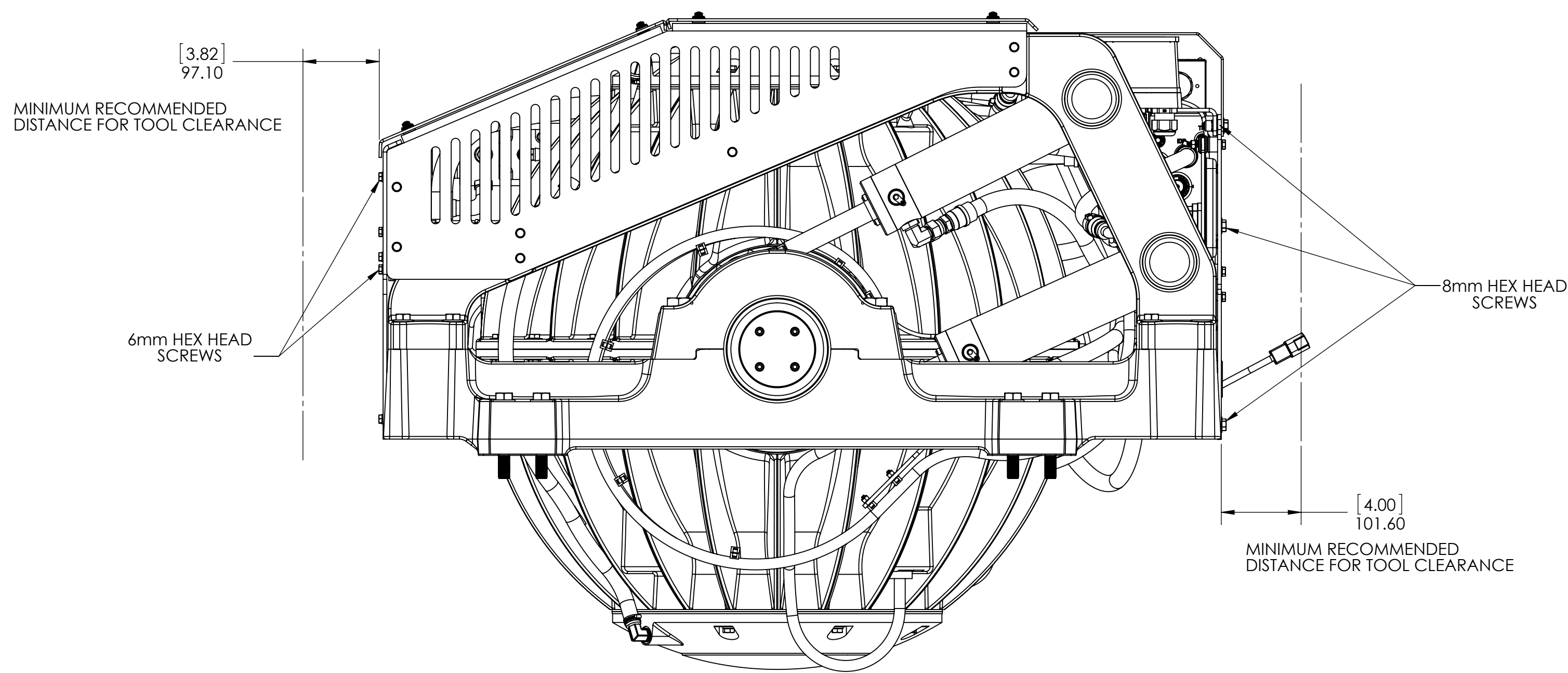
HULL STRUCTURE
SIMULATION
FOR REFERENCE ONLY

[1.00]
25.41

MINIMUM RECOMMENDED
DISTANCE FROM GYRO FRAME
TO ANY TRANSVERSE BEAM

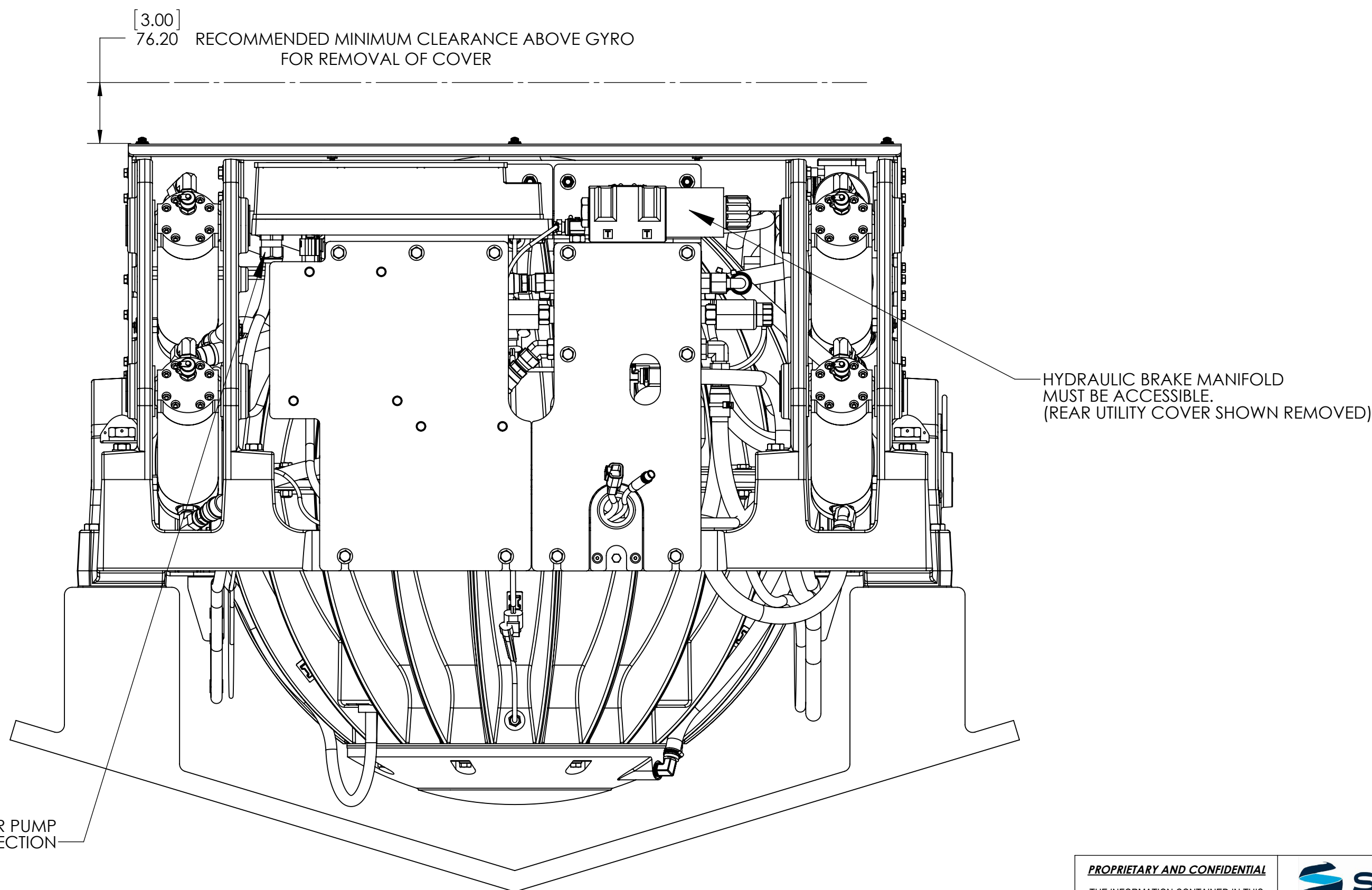
[1.00]
25.40

MINIMUM RECOMMENDED
DISTANCE FROM GYRO FRAME
TO ANY TRANSVERSE BEAM



MINIMUM RECOMMENDED
DISTANCE FOR TOOL CLEARANCE

AC POWER AND SEAWATER PUMP
CABLE CONNECTION



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

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SEAKEEPER 16 / 12HD GYRO,
BOLT-IN INSTALLATION GUIDE

DWG NUMBER

90261

REV. NO. | SHEET NO.

4

3 OF 5

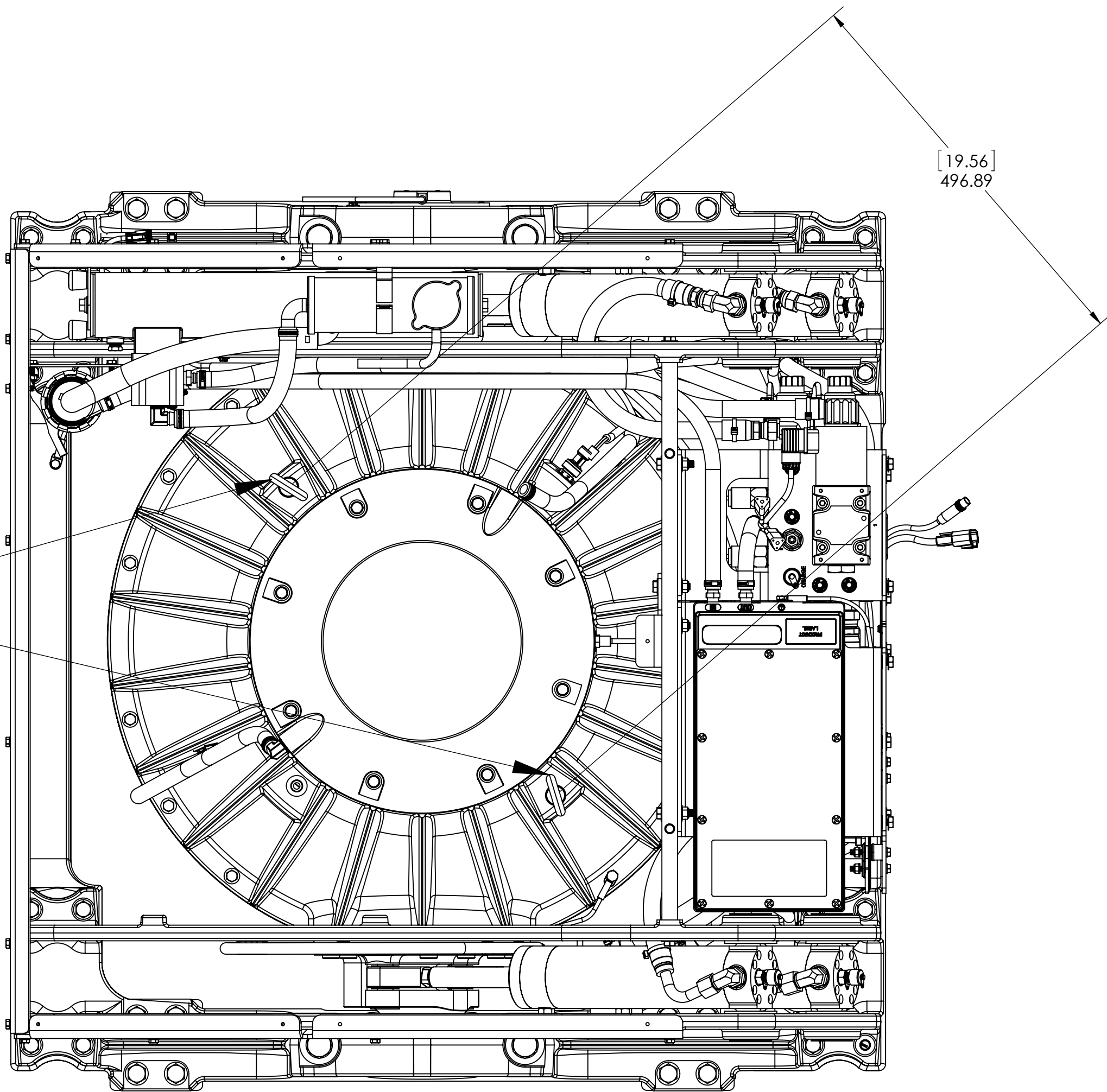
WEIGHT - LBS : 2,057

MATERIAL:

DRAWN: SAC DATE: 04AUG14

ENG APPR: WED DATE: 18AUG14

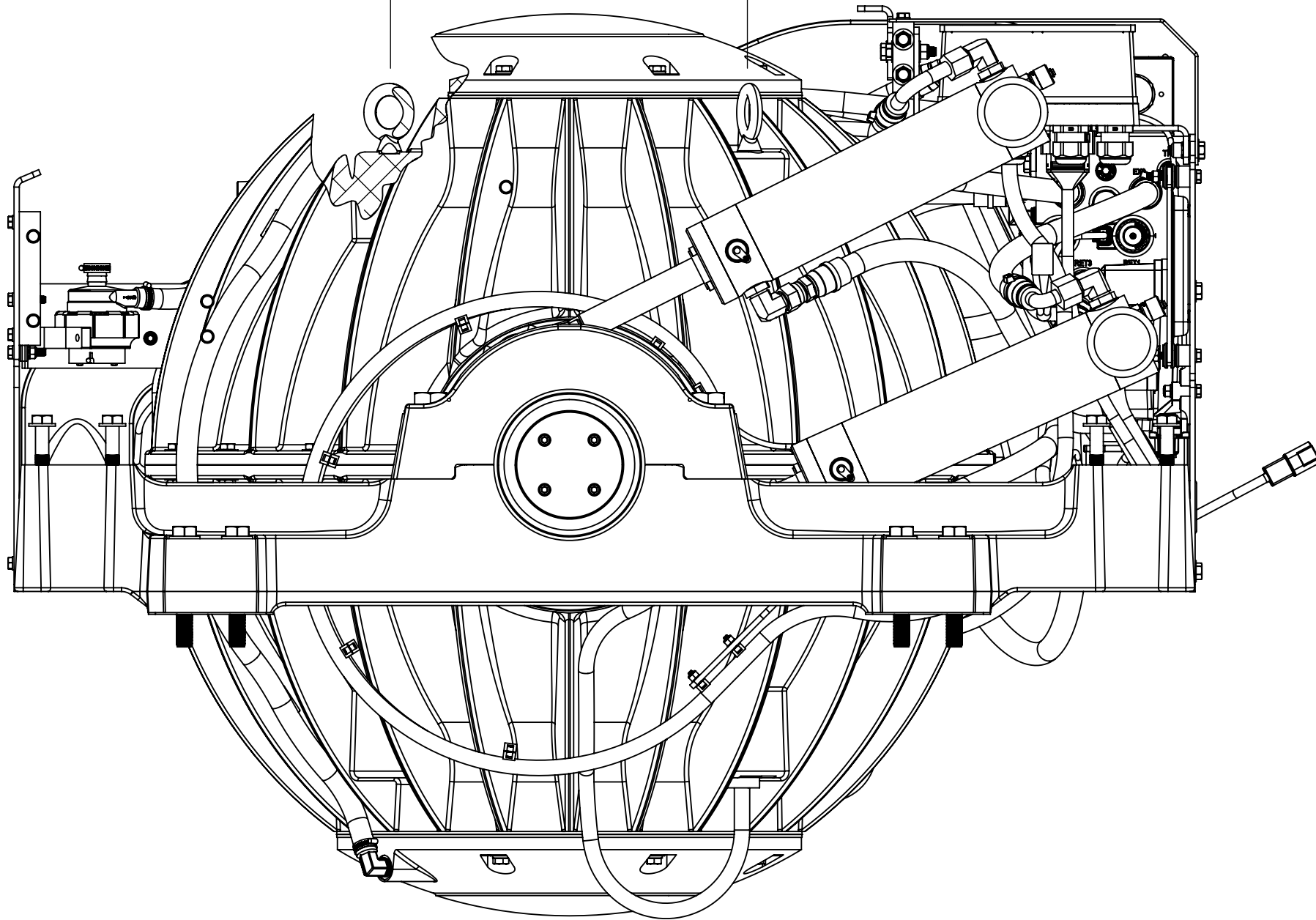
PROD APPR: DATE: ---



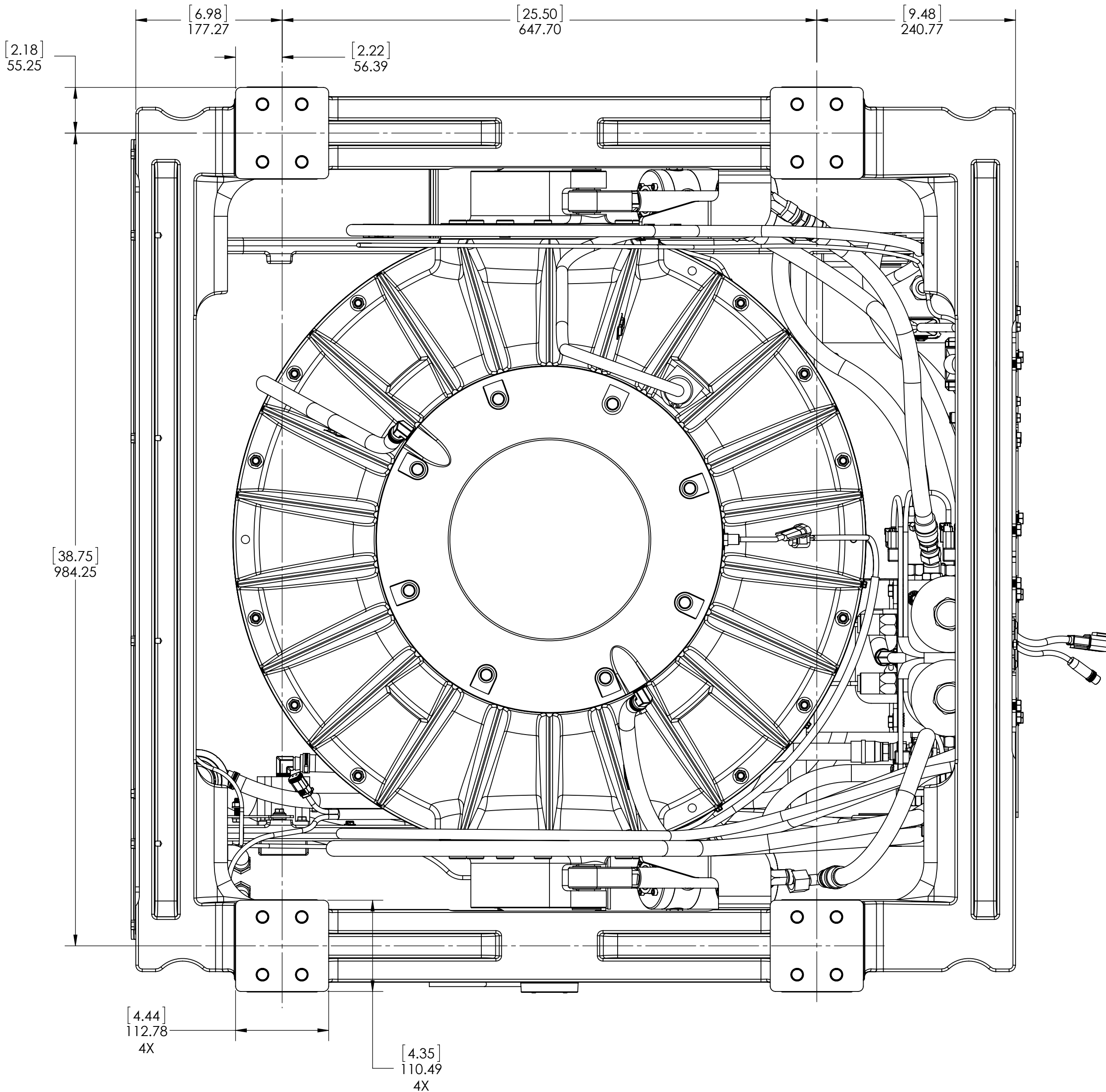
LIFTING POINTS
(2)

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

LIFT VERTICALLY USING
A SPREADER BAR OR SIMILAR
ARRANGEMENT



SEE SHEET 5 FOR BOLT PATTERN DIMENSIONS



BOTTOM VIEW
SCALE 1 : 4

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WEIGHT - LBS :
MATERIAL : 2,057

DRAWN: SAC
ENG APPR: WED
PROD APPR: ---
DATE: 04AUG14
DATE: 18AUG14
DATE: ---

NAME: SEAKEEPER 16 / 12HD GYRO,
BOLT-IN INSTALLATION GUIDE

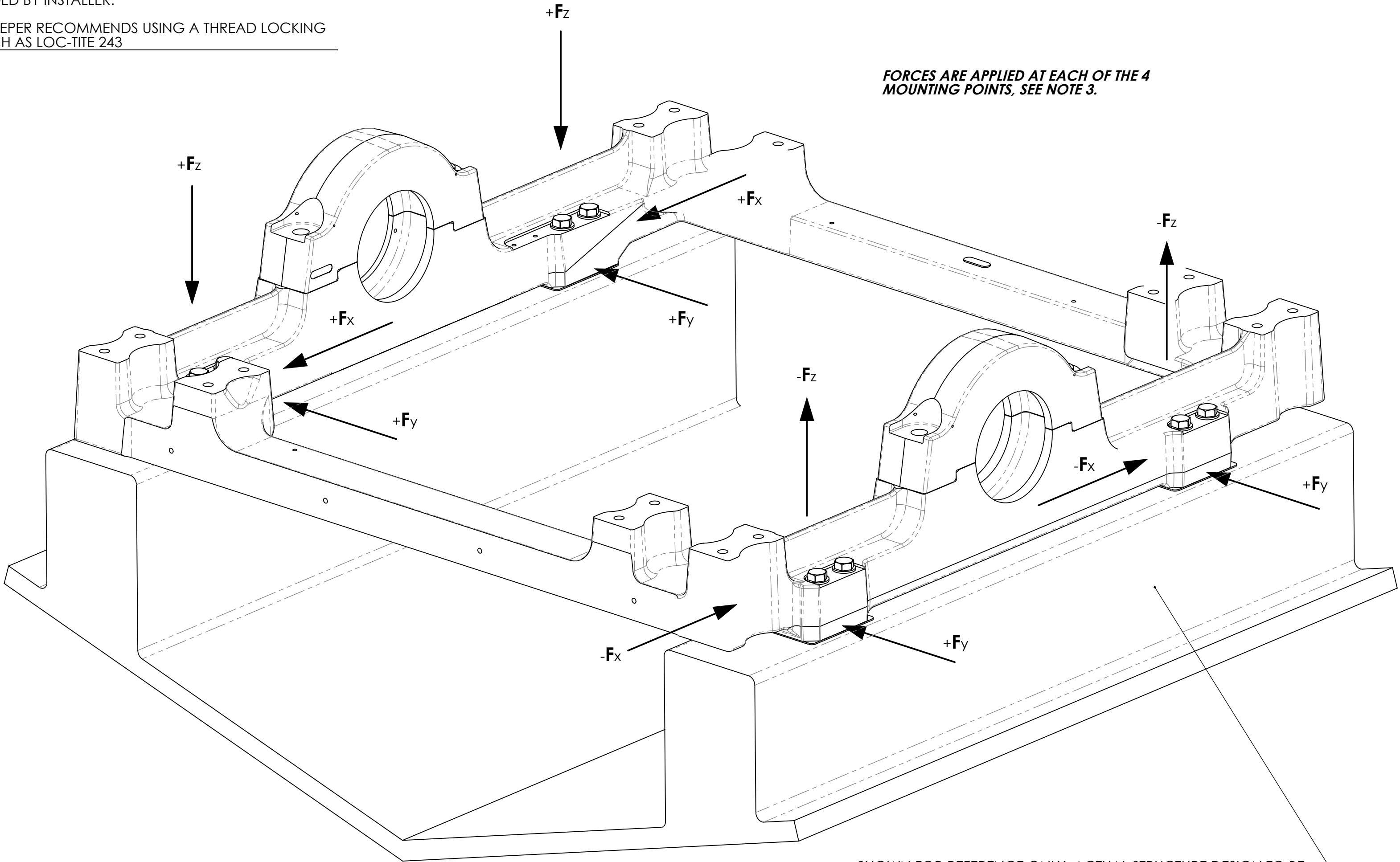
DWG NUMBER: 90261
REV. NO. / SHEET NO.: 4 / 5

GYRO LOADS FOR HULL STRUCTURE DESIGN :

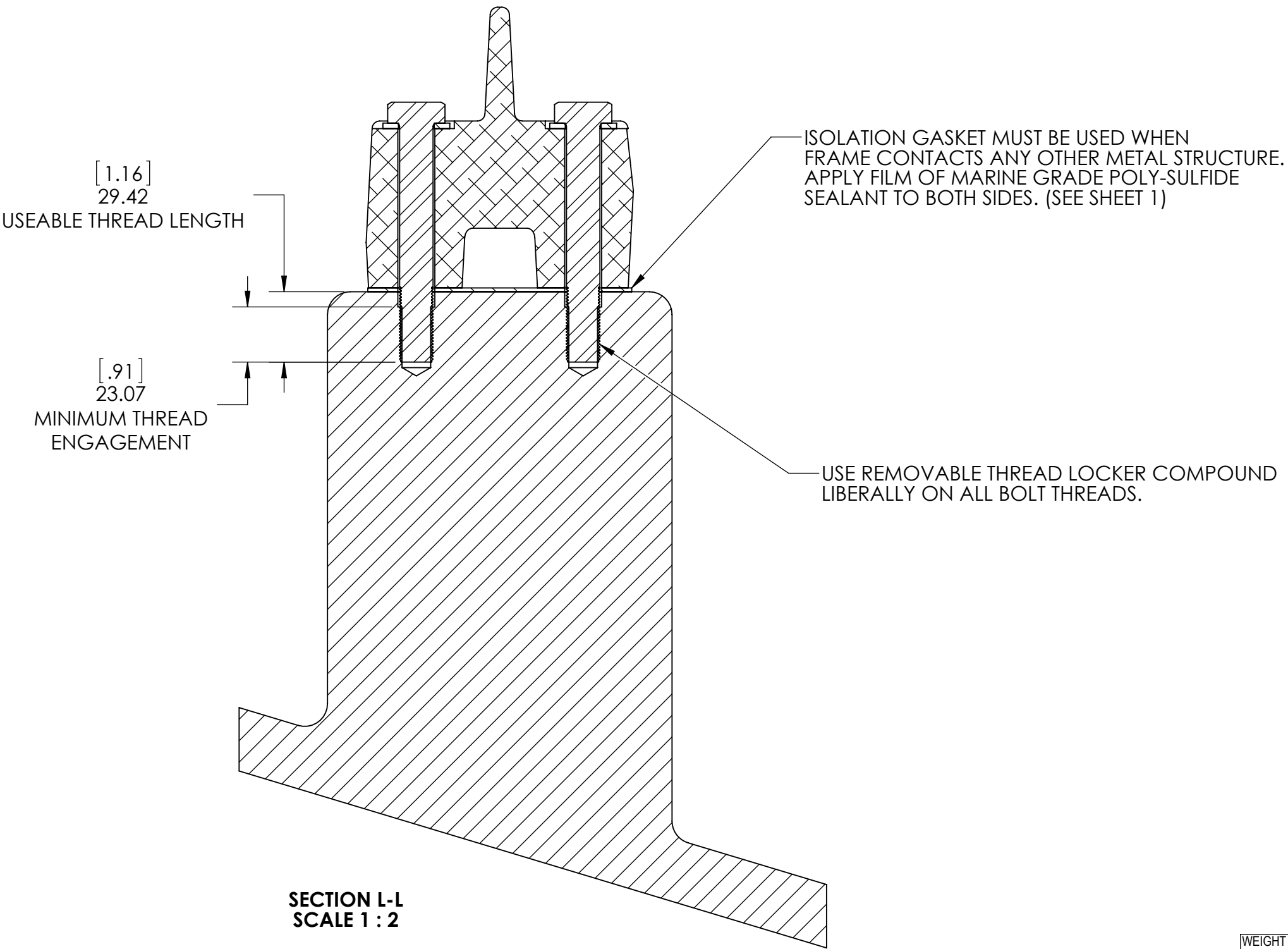
- (1) THE GYRO IS MOUNTED IN A RIGID FOUNDATION FRAME WHICH INCORPORATES SEMI-ELASTIC ANTI-VIBRATION ISOLATORS ENCASING THE GIMBAL BEARINGS THAT DAMPEN VIBRATIONS THAT COULD TRANSMIT INTO THE HULL STRUCTURE.
- (2) THE GYRO FOUNDATION FRAME IS BOLTED DIRECTLY TO THE HULL STRUCTURE. BE SURE TO USE THE FURNISHED ISOLATION GASKETS IF HULL STRUCTURE MATERIAL IS A DIS-SIMILAR METAL AS THE GYRO FRAME. THE BOLTING SURFACE OF THE HULL STRUCTURE MUST BE FLAT SO THAT THE 4 CONTACT POINTS OF THE GYRO FRAME ARE TOUCHING THE HULL STRUCTURE SIMULTANEOUSLY WITH NO NOTICEABLE ROCKING. THE BOAT BUILDER OR GYRO INSTALLER IS RESPONSIBLE TO DESIGN AND BUILD A HULL STRUCTURE THAT WILL ENSURE A FLAT BOLT SURFACE AS TO AVOID ANY INDUCED STRESSES INTO THE FRAME CASTING ONCE BOLTED DOWN. SEAKEEPER RECOMMENDS A SURFACE FLATNESS WITHIN 1.5 MILLIMETERS.
- (3) THE GYRO GENERATES PITCH MOMENTS, ROLL MOMENTS, YAW MOMENTS, AND VERTICAL AND HORIZONTAL FORCES - THE MAGNITUDE OF WHICH IS CONTROLLED BY THE GYRO'S ACTIVE BRAKE SYSTEM. THESE GYRO GENERATED FORCES AND MOMENTS RESULT IN LOADS BEING APPLIED AT THE FOUR POINTS WHERE THE GYRO FRAME BOLTS TO THE TOP FACE OF THE HULL STRUCTURE. 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) = 5,450 LBS. (24.24 kN) - (**APPLIED AT EACH OF THE 4 MOUNTING POINTS.**)
LONGITUDINAL FORCE (Fx) = 2,999 LBS. (13.34 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.
- (4) THE BOAT BUILDER OR THE GYRO INSTALLER IS RESPONSIBLE FOR DESIGNING THE HULL STRUCTURE TO WHICH THE GYRO IS ATTACHED TO ACCOMMODATE THE ABOVE FORCES AND MOMENTS PLUS A REASONABLE FACTOR OF SAFETY. SEAKEEPER SUGGESTS A SAFETY FACTOR OF 3.0 (YIELDING A SAFETY MARGIN OF 2.0)

THE GYRO FRAME IS BOLTED TO HULL STRUCTURE USING M14-2.0 ZINC PLATED, ALLOY STEEL, HEX HEAD CAP SCREWS, GRADE 8.8, 16 PLACES.
THIS HARDWARE IS PROVIDED AT A STANDARD LENGTH OF 100mm WITH THE SEAKEEPER BOLT-IN INSTALLATION KIT, #90309. ANY APPLICATIONS THAT REQUIRE LONGER HARDWARE OR HEX NUTS, MUST BE PROVIDED BY INSTALLER.

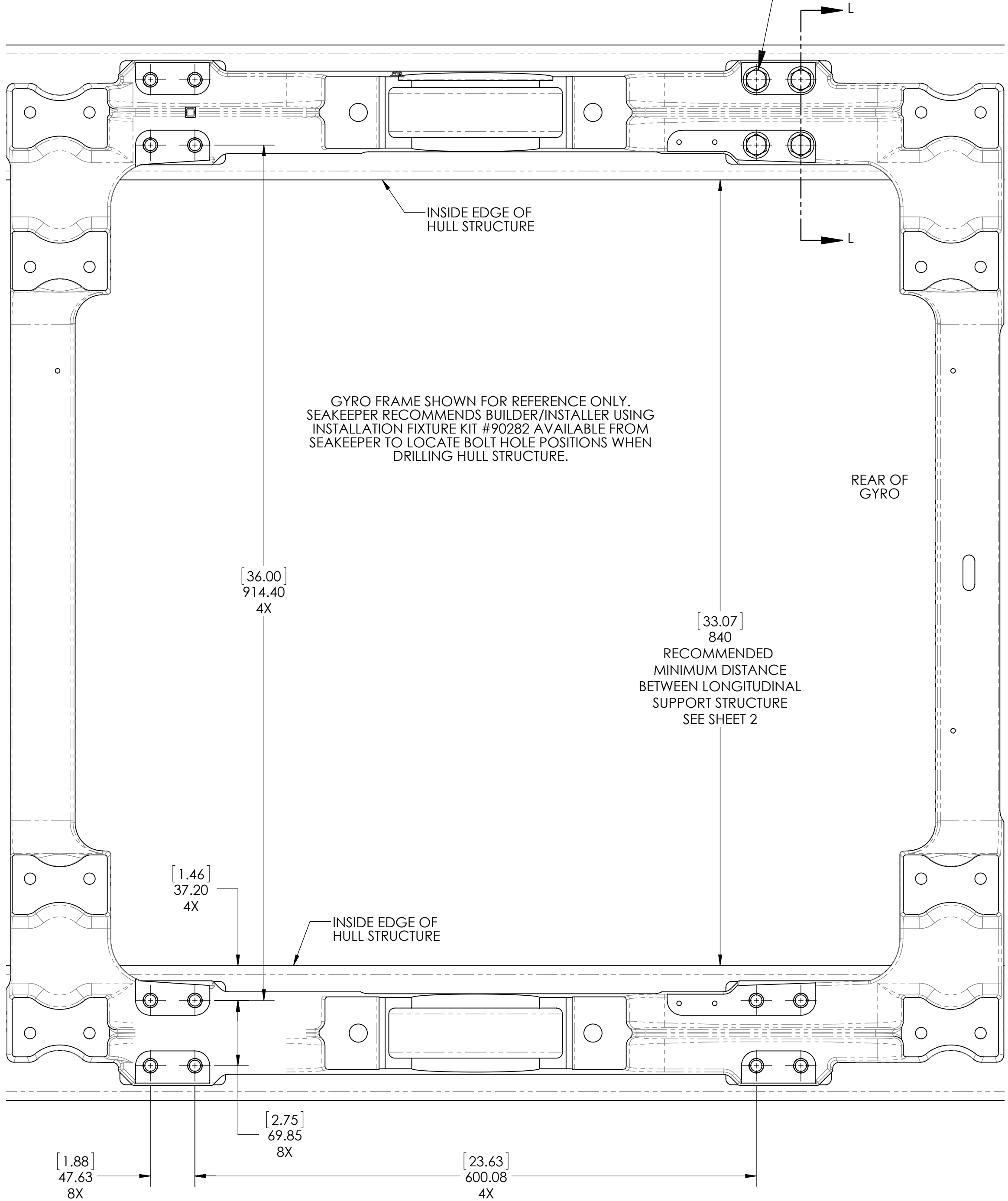
TORQUE BOLTS TO 100 FT/LBS. [135.6 Nm] SEAKEEPER RECOMMENDS USING A THREAD LOCKING COMPOUND SUCH AS LOC-TITE 243



SHOWN FOR REFERENCE ONLY. ACTUAL STRUCTURE DESIGN TO BE DETERMINED BY BOAT MANUFACTURER OR GYRO INSTALLER. **SUPPORT STRUCTURE MUST BE PARALLEL WITH WATERLINE.** SEE NOTE 4



SECTION L-L
SCALE 1 : 2



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SEAKEEPER 16 / 12HD GYRO, BOLT-IN INSTALLATION GUIDE			