



**BALTIMORE
AIRCOIL COMPANY**

TrilliumSeries™ Adiabatic Cooler - TRF

RIGGING & ASSEMBLY INSTRUCTIONS



TrilliumSeries™ adiabatic cooler should be rigged and assembled as outlined in this bulletin.

These procedures should be thoroughly reviewed prior to the actual rigging and assembly of the equipment to acquaint all personnel with procedures to be followed and to assure that all necessary equipment will be available beforehand. Only personnel qualified to do so should undertake the installation, operation, maintenance, and repair of this equipment. Proper care, procedures, and tools must be used in handling, lifting, installing, operating, maintaining, and repairing this equipment to prevent personal injury and/or property damage.



Be sure to have a copy of the submittal package available for reference. If you do not have a copy of this drawing, or if you need additional information about this unit, contact your local BAC Representative whose name and telephone number are on a label adjacent to the access door. The model number and serial number of the unit are also located in this area.



TrilliumSeries™ Adiabatic Cooler - TRF

RIGGING & ASSEMBLY INSTRUCTIONS

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1. Warnings and Cautions

Safety Precautions



DANGER

- **DANGER:** All electrical, mechanical, and rotating machinery are potential hazards, particularly for those not familiar with their design, construction, and operation. Accordingly, use appropriate lockout procedures. Do not perform any service on or near the fans, motors, and drives, without first ensuring that the fans are disconnected, locked out, and tagged out. Adequate safeguards (including the use of protective enclosures where necessary) should be taken with this equipment both to safeguard the public from injury and to prevent damage to the equipment, its associated system, and the premises.
- **DANGER:** Failure to use designated lifting points can result in a dropped load causing severe injury, death, and/or property damage. Lifts must be performed by qualified riggers following BAC published Rigging Instructions and generally accepted lifting practices. The use of supplemental safety slings may also be required if the lift circumstances warrant its use, as determined by the rigging contractor.
- **DANGER:** Incoming power lines to the disconnect switch remain energized. To prevent electrocution, which is likely to cause severe injury or death take proper electrical precautions when working near energized equipment.



WARNING

- **WARNING:** To prevent severe injury or death the top horizontal surface of the unit is not intended to be used as a walking surface or working platform. If access to the top of the unit is desired, the purchaser/end-user is cautioned to use appropriate means complying with applicable safety standards of governmental authorities.
- **WARNING:** To prevent severe injury, death and/or property damage the unit must be properly anchored before operation begins.

Equipment Precautions



NOTICE

- Before an actual lift is undertaken, open the access hatch(es) and check to ensure no water, snow, ice, or debris has collected in the sump or elsewhere in the unit. Such accumulations will substantially add to the equipment's lifting weight.
- BAC units are typically installed immediately after shipment, and many operate year-round. However, if the unit is to be stored for a prolonged period either before or after installation, certain precautions should be observed. Refer to Section Prolonged Outdoor Storage for details.
- Do not use steam, high-pressure water, or high-pressure air to clean any component.
- Field piping must not be supported by the unit inlet or outlet connections.
- The installer must ensure a proper air purging of the system prior to operation. Entrained air can restrict the capacity of the cooler, resulting in higher process temperatures. All connections including those installed by others must be leak free and tested accordingly.
- To prevent possible contamination of the make-up water supply, install a backflow prevention method in accordance with applicable local and national codes.
- The pre-cooler pads are made of flammable material and should be removed when performing hot work on or near the unit. No actions that can generate sparks should be performed on or near the unit.
- To prevent excessive degradation do not attempt to remove the pre-cooler pads while wet.
- When connecting power to the unit, do not penetrate the control panel. Doing so may allow moisture to enter the panel. All cable and conduit should be supported separately from the unit. Do not penetrate the unit for supports or other connections.

2. Rigging

Adequate precautions appropriate for the installation and location of these products should be taken to safeguard the equipment and the premises from damage, and the public from possible injury. **The procedures listed in this manual must be thoroughly reviewed prior to rigging and assembly. Read all warnings, cautions and notes.**



DANGER: All electrical, mechanical, and rotating machinery are potential hazards, particularly for those not familiar with their design, construction, and operation. Accordingly, use appropriate lockout procedures. Do not perform any service on or near the fans, motors, and drives, without first ensuring that the fans are disconnected, locked out, and tagged out. Adequate safeguards (including the use of protective enclosures where necessary) should be taken with this equipment both to safeguard the public from injury and to prevent damage to the equipment, its associated system, and the premises.

Shipping

BAC TrilliumSeries™ adiabatic coolers are factory assembled to ensure uniform quality with minimum field assembly. For each unit only one lift is required. Contact your local [BAC Representative](#) for more information. For the dimensions and weights of a specific unit or section, refer to the submittal drawings.

Pre-Rigging Checks

When the unit is delivered to the jobsite, it should be checked thoroughly to ensure all required items have been received and are free of any shipping damage prior to signing the bill of lading.



DANGER: Failure to use designated lifting points can result in a dropped load causing severe injury, death, and/or property damage. Lifts must be performed by qualified riggers following BAC published Rigging Instructions and generally accepted lifting practices. The use of supplemental safety slings may also be required if the lift circumstances warrant its use, as determined by the rigging contractor.



WARNING: To prevent severe injury or death the top horizontal surface of the unit is not intended to be used as a walking surface or working platform. If access to the top of the unit is desired, the purchaser/end-user is cautioned to use appropriate means complying with applicable safety standards of governmental authorities.

The following parts should be inspected (if applicable for the unit's configuration):

- | | |
|---|--|
| <input type="checkbox"/> Adiabatic pre-cooler pads | <input type="checkbox"/> Interior surfaces |
| <input type="checkbox"/> Control panel | <input type="checkbox"/> Sump components |
| <input type="checkbox"/> Coil surfaces | <input type="checkbox"/> Water connection piping |
| <input type="checkbox"/> EC fan module(s) | <input type="checkbox"/> Water distribution system |
| <input type="checkbox"/> Exterior surfaces | |
| <input type="checkbox"/> Fan guard(s) | |
| <input type="checkbox"/> Leaving fluid temperature sensor | |

For TrilliumSeries™ adiabatic coolers that have been shipped charged with nitrogen, verify that the coil maintained pressure of 15 psi (1 bar) by measuring the pressure with a pressure gauge on the Shrader valve prior to installation. The leaving fluid temperature sensor is shipped loose and stored inside the electrical cabinet for installation on site.

Unit Weights

Before rigging any unit, the weight of each section should be verified with the unit submittal drawing. In the event of extended lifts or where hazards exist, the lifting devices should be used in conjunction with safety slings placed under the unit.



NOTICE: Before an actual lift is undertaken, open the access hatch and check to ensure no water, snow, ice, or debris has collected in the sump or elsewhere in the unit. Such accumulations will substantially add to the equipment's lifting weight.

Anchoring

7/8" diameter holes are provided in the bottom flanges of the unit for bolting the unit to the support beams. Refer to the suggested support drawing included in the submittal for location and quantity of the mounting holes. **The unit must be level within 1/16" per foot in both length and width directions for proper operation.** Supporting steelwork and anchor bolts are to be designed and furnished by others. BAC recommends 3/4" diameter, SAE J429 Grade 5, ASTM A325 Type 1 or equivalent anchor bolts. Beams should be selected in accordance with accepted structural practices. Supporting steel must be greater than or equal to the length of the unit's base, and the unit may not be point supported. Each beam should be designed, as a minimum, for 65% of the total unit operating weight applied as a uniformly distributed load. If vibration isolators are to be used, the units shall be installed on steel support first and the vibration isolators (provided by others) should be mounted under the steel support. Refer to the vibration isolator manufacturer's guidelines before loading/unloading weight from the unit. When a unit is anchored directly to concrete on grade without steel supports, the support concrete must be flush and level at top. Concrete for unit support and anchors are to be designed and furnished by others in accordance with accepted structural practices. When units are anchored by anchor rods, 3/4" diameter ASTM F1554 Gr. 105 anchor rods or equivalent are generally recommended.



WARNING: To prevent severe injury, death and/or property damage the unit must be properly anchored before operation begins.

Layout Guidelines

TrilliumSeries™ adiabatic coolers require an adequate supply of fresh air to the coils. The axial fan(s) are not equipped to overcome external static pressure. When units are located adjacent to walls or in enclosures, care must be taken to ensure that the discharge does not recirculate back into the air intakes. Each unit must be located and positioned to prevent the introduction of discharge air into building ventilation systems, including the installed location and adjacent buildings. For detailed recommendations, see the [Layout Guidelines](#) available on BAC's public website.

Warranties

Please refer to the Terms and Conditions in the submittal package applicable to and in effect at the time of the sale/ purchase of these products.

Rigging Summary

1. The equipment arrives on site by truck. A crane must always be used to unload the unit from the truck. Do not attempt to unload the unit using a forklift.
2. Spreader bars spanning the full width of the unit must be used between the lifting cables to prevent damage to the unit. Refer to **Table 1** and **Section 4. Rigging Drawings** for model number specific rigging dimensions.
3. For extended lifts or where hazards exist, it is recommended to use the lifting devices in conjunction with safety slings placed under the unit.
4. For each unit, only one lift is required. Multiple lifting ears with 1-3/4" holes are provided as shown in **Figure 1**.

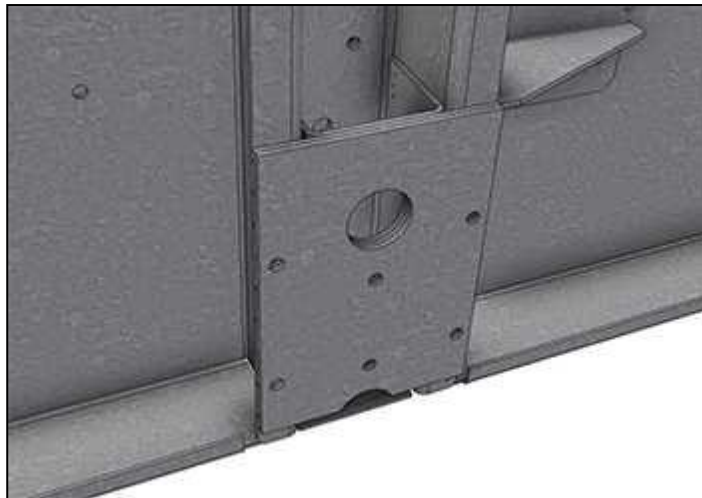


Figure 1. Lifting Ear

5. Attach the lifting devices to the unit as per rigging methods below. Unload the unit from the truck.
6. Install the unit in its final position and anchor it to the support beams (supplied by others).

Rigging

Refer to **Table 1** for the model number specific rigging drawing. Refer to the appropriate rigging drawing for model number specific rigging dimensions.

Model Number	# of Fans	Rigging Drawing Page #
TRF-1010N-C80GX17E	4	16
TRF-1014N-C80GX26E	6	17
TRF-1018N-C80GX34E	8	18
TRF-1022N-C80GX43E	10	19
TRF-1026N-C80GX51E	12	20
TRF-1030N-C80GX60E	14	21
TRF-1034N-C80GX68E	16	22
TRF-1038N-C80GX77E	18	23

Table 1. Rigging Drawing Page Numbers

Prolonged Outdoor Storage

The TrilliumSeries™ adiabatic cooler is shipped wrapped. If the unit is going to remain in outdoor storage in excess of three months prior to installation, remove the stretch-wrap and tarp, and follow the storage recommendations below.



NOTICE: BAC units are typically installed immediately after shipment, and many operate year-round. However, if the unit is to be stored for a prolonged period of time either before or after installation, certain precautions should be observed.

Storage Preparation

- Ensure that the sump is fully drained. Ensure the sump drain valve remains open. Remove any leaves or debris that may have accumulated in the sump and water channels.
- Coils must be empty and closed off. For extended shutdown periods after start-up, coils should be charged with nitrogen at 15 psig in the field and capped by adding a welded cap. Upon start-up, the coil connections will require cutting.
- Insert desiccant bags into the control panel to absorb moisture. Seal the control panel for storage.
- Inspect the protective finish on the unit. Clean as required.



NOTICE: Do not use steam, high-pressure water, or high-pressure air to clean any component.

Motor Recommendations

TrilliumSeries™ adiabatic cooler motors are designed for storage at ambient temperatures of -40°F to 176°F (-40°C to 80°C). Prolonged periods of exposure above or below these specified conditions could degrade components of the motor and cause malfunction or premature failure.

- Care must also be taken to protect the motor from flooding or from harmful chemical vapors.
- The storage area should be free from ambient vibration. Excessive vibration can cause damage.
- Keep stored motor(s) dry and protected from weather.
- Rotate the fan once per month.

Preparation After Prolonged Storage

Keep in mind that start-up procedures after long periods of storage are just as important as pre-shutdown procedures. Follow instructions in the TrilliumSeries™ Adiabatic Cooler – TRF Operation & Maintenance Manual shipped with the unit and also available at BaltimoreAircoil.com. Be especially thorough with cleaning and inspection prior to start-up.

3. Installation

Piping Guidelines

When piping the unit, route the water pipes down or to the side so that there is a clear landing area in front of the unit for accessing the control panel and access hatch(es) in compliance with NEC regulations.



NOTICE: Field piping must not be supported by the unit inlet or outlet connections.



NOTICE: The installer must ensure a proper air purging of the system prior to operation. Entrained air can restrict the capacity of the cooler, resulting in higher process temperatures. All connections including those installed by others must be leak free and tested accordingly.

Water Connection

Refer to **Figure 2** for typical water connection location and detail. The TrilliumSeries™ adiabatic cooler requires a water supply between 15 and 300 psi. See **Table 2** for nominal pipe size of water connection based on the number of units installed. Refer to the unit submittal package for specific water connection type, size, and location. To prevent possible contamination of the make-up water supply, install a backflow prevention method in accordance with applicable local and national codes.

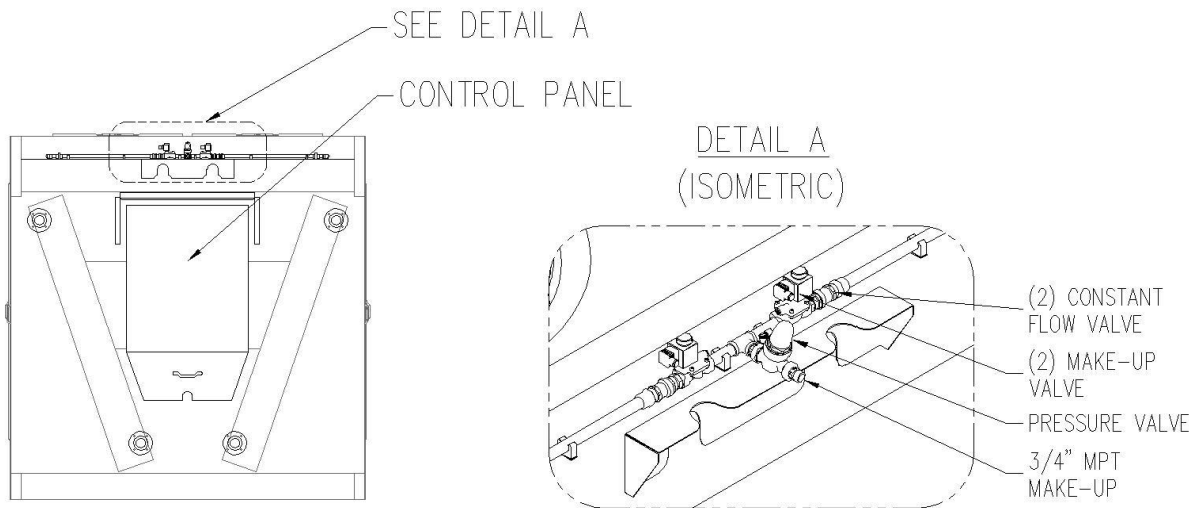


Figure 2. Water Connection Location & Detail

Number of Units	Nominal Pipe Size of Main Water Line (Inches)
1	1-1/2"
2	2"
3	2-1/2"
4	3"
5	3"
6	4"
7	4"
8	4"
9	4"
10	5"

Table 2. Water Connection Size for TRF Units

Installation of Leaving Fluid Temperature Sensor

A leaving fluid temperature sensor is supplied on units configured as self-contained and is shipped inside the electrical panel together with a socket for installation in the return pipe. **Figure 3** and **Figure 4** show the dimensions of the socket. The socket is equipped with a PG7 - IP68 cable gland applied to the hexagonal end to secure the cable. The socket and sensor need to be installed in accordance with the applicable rules of good workmanship. The socket needs to be installed behind the manifold connecting the coil connections from both sides. The minimum distance between the manifold and the socket is advised to be $\pm 39\text{-}3/8"$ (1 m) in order to ensure the flow from both sides is well mixed and that the correct temperature is relayed to the PLC.

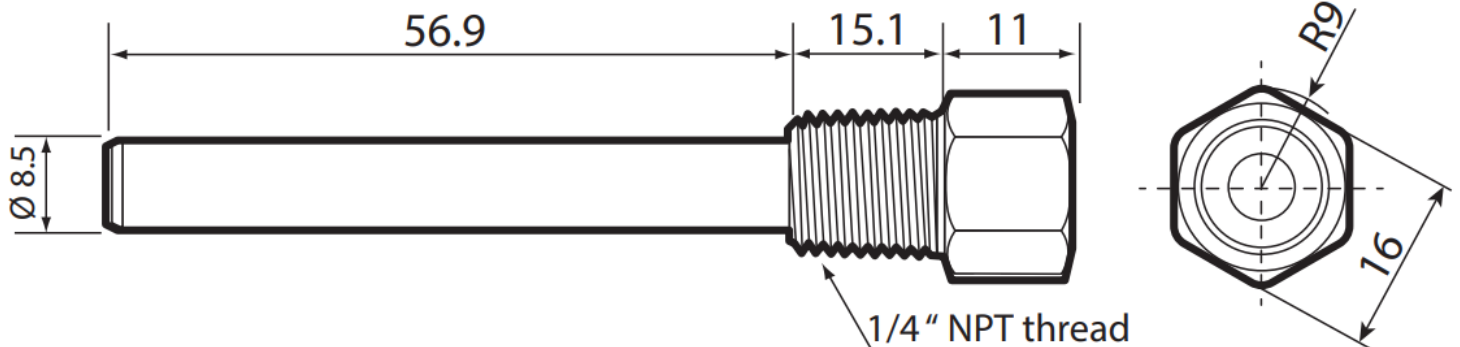


Figure 3. Leaving Fluid Temperature Sensor Socket (Metric)

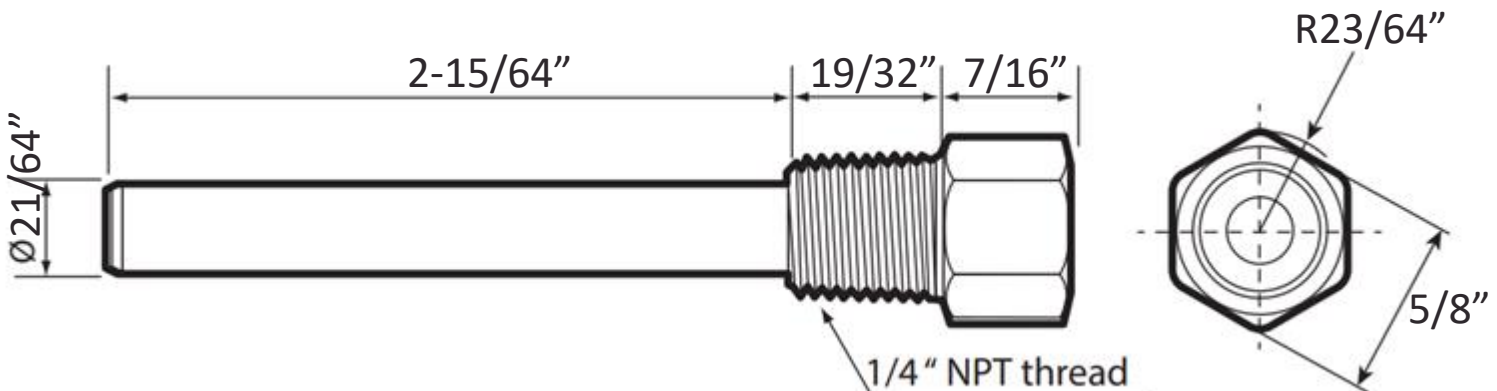


Figure 4. Leaving Fluid Temperature Sensor Socket (Converted to Imperial)

Flange Coil Connections

Units configured with flange coil connections are supplied with class 150 floating flanges. Refer to unit submittal drawings for flange size. For shipment, sheet metal blanks are zip tied to floating flanges to secure flanges and to seal off the coil connection. Remove zip ties and sheet metal blank prior to installation. Install flanges according to ASTM B16.5.

Plain Pipe Stub Coil Connections Nitrogen Charge Removal

To better protect the inside coil surface from corrosion, coils supplied with a plain pipe stub coil connection are capped and charged with nitrogen from the factory. Plain pipe stub coil connections must be field cut and beveled before welding. Prior to cutting the pipe stub relieve the pressure inside each coil using the factory installed Schrader valve.



NOTICE: The pre-cooler pads are made of flammable material and should be removed when performing hot work on or near the unit. No actions that can generate sparks should be performed on or near the unit.



NOTICE: To prevent excessive degradation do not attempt to remove the pre-cooler pads while wet.

Wiring and Electrical Information

Electrical Power Quality

This unit requires clean electrical power to operate properly. Voltage and frequency should be within 10% of the designed voltage for the unit. Failure to provide this power may damage the unit. The controls wiring should be provided in a separate conduit from any power wiring. It is recommended to use shielded wire to avoid interference. Refer to the unit submittal package for wiring and electrical information.

Power Connections

Please ensure that the correct voltage is supplied to the unit. Check your unit's submittal to verify that the provided power matches your unit. The enclosure includes a pre-punched hole for the power supply connection. This hole will be plugged with a NEMA 4/IP66 rated plug. Remove the plug and be sure to use proper sealing methods to comply with NEMA standards. This will maintain the panel's NEMA 4 rating and prevent water ingress to the unit.



DANGER: Incoming power lines to the disconnect switch remain energized. To prevent electrocution, which is likely to cause severe injury or death take proper electrical precautions when working near energized equipment.



NOTICE: When connecting power to the unit, do not penetrate the control panel. Doing so may allow moisture to enter the panel. All cable and conduit should be supported separately from the unit. Do not penetrate the unit for supports or other connections.

Control Connections

The controls wiring should be provided in a separate conduit from any power wiring. Do not penetrate the control panel, cord grips are provided in the bottom of the control panel for all possible connections. Cord grips ship plugged to seal the control panel during shipment. It is recommended to use shielded wire to avoid interference.

BAC offers the following options to control the TrilliumSeries™ adiabatic cooler. Check the submittal package for configuration settings and wiring diagrams.

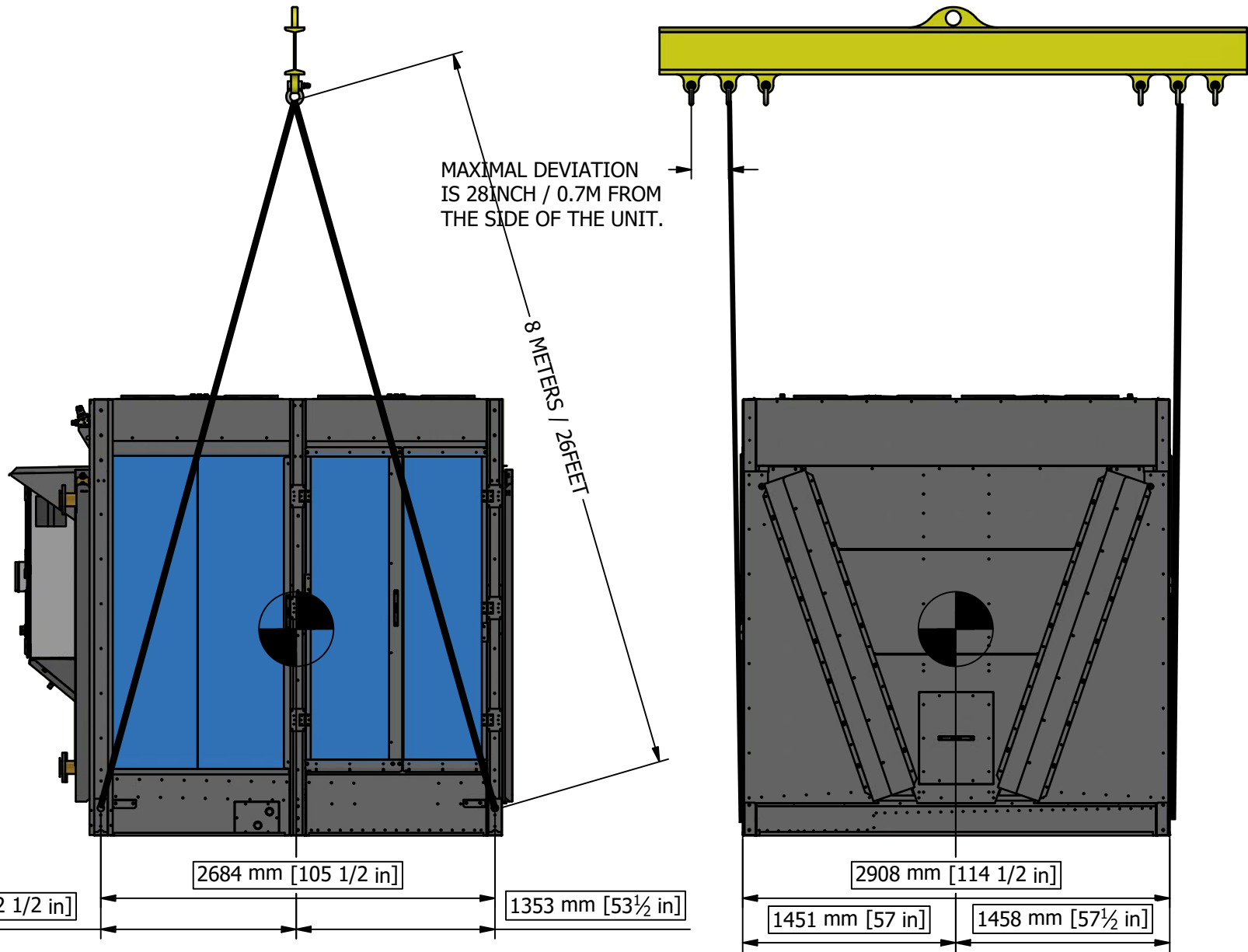
- **Self-contained unit (leaving fluid temperature control):** The leaving fluid temperature is monitored with a sensor installed in the leaving water piping. The sensor must be wired to terminals as shown in wiring diagrams included with submittal package.
- **Communications via Modbus RS485, BACnet MS/TP or BACnet IP:** For RS485 connection, BAC recommends the use of twisted shielded twisted paired wire with a ground. The Modbus and BACnet connections do not have any device restrictions or proprietary protocols. Contact your building management system provider or controls integrator to verify your system will work with the TrilliumSeries™ adiabatic cooler communications protocols. Please see the TrilliumSeries™ Adiabatic Cooler – TRF Operation & Maintenance Manual shipped with the unit and available at BaltimoreAircoil.com for specific communication points map.
- **Customer control via input signal (10-0VDC, 0-10VDC or 4-20mA):** 10-0VDC analog signal where 10V is 0% fan speed and 0V is 100% fan speed, 0-10VDC analog signal where 0V is 0% fan speed and 10V is 100% fan speed. 4-20mA analog signal where 4mA is 0% fan speed and 20mA is 100% fan speed.

Unit Operation

Prior to start-up and unit operation, refer to the TrilliumSeries™ Adiabatic Cooler – TRF Operation & Maintenance Manual shipped with the unit and also available at BaltimoreAircoil.com.

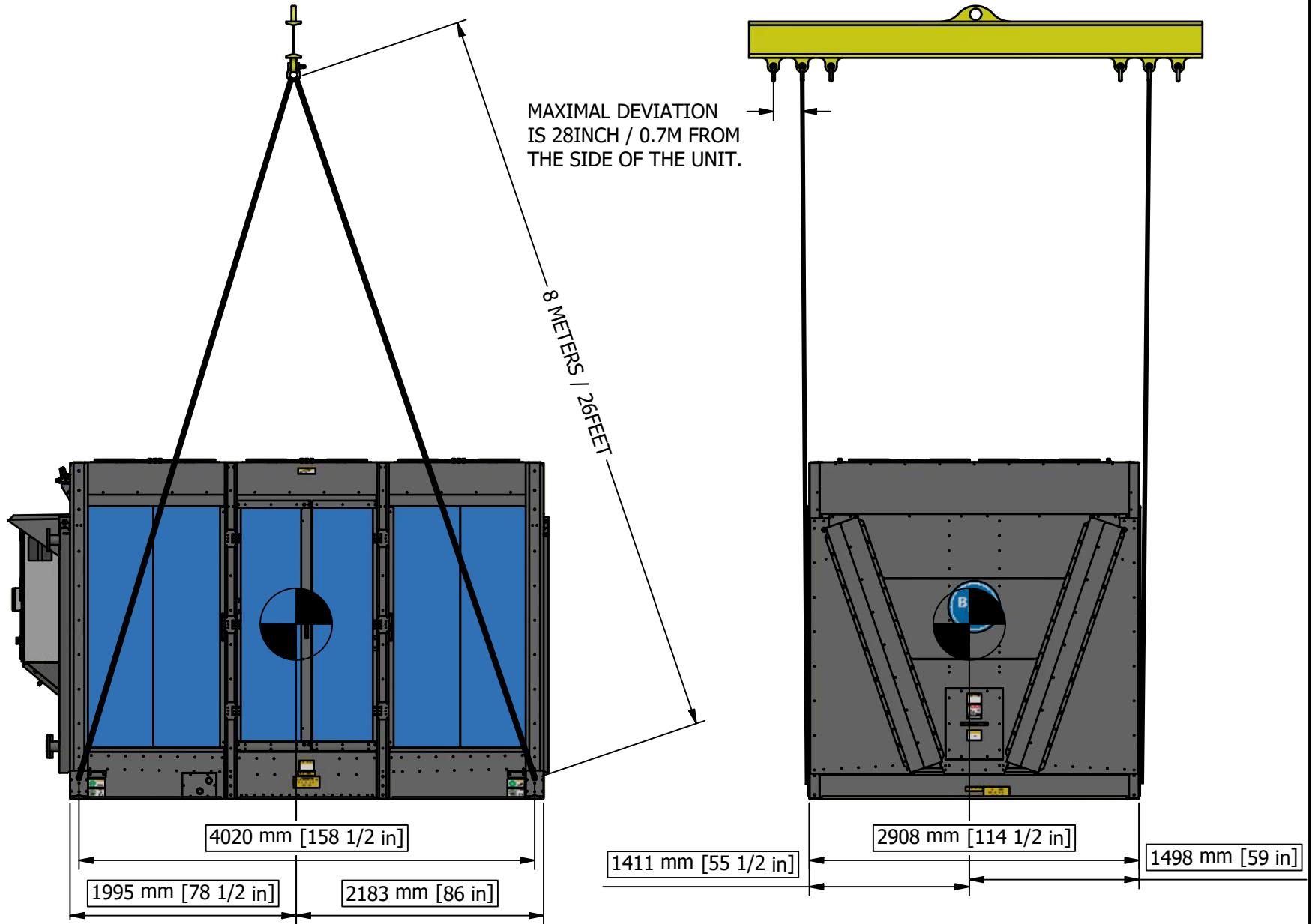
4. Rigging Drawings

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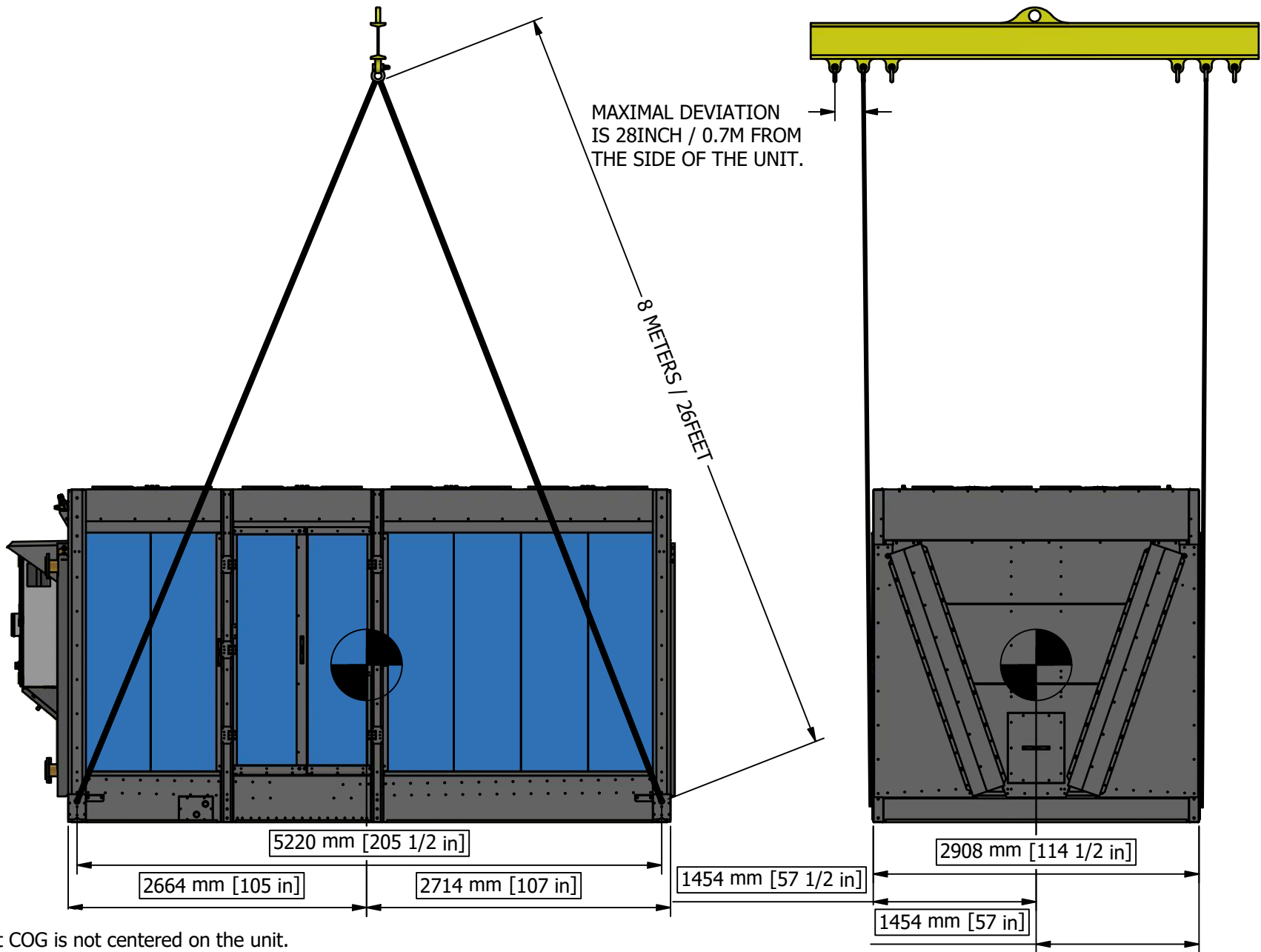
NOTES:
Please note that COG is not centered on the unit.

Category: OM - Operation and Maintenance	Drawing Description: 4-FAN RIGGING	Document Number: RGOMTRF301	
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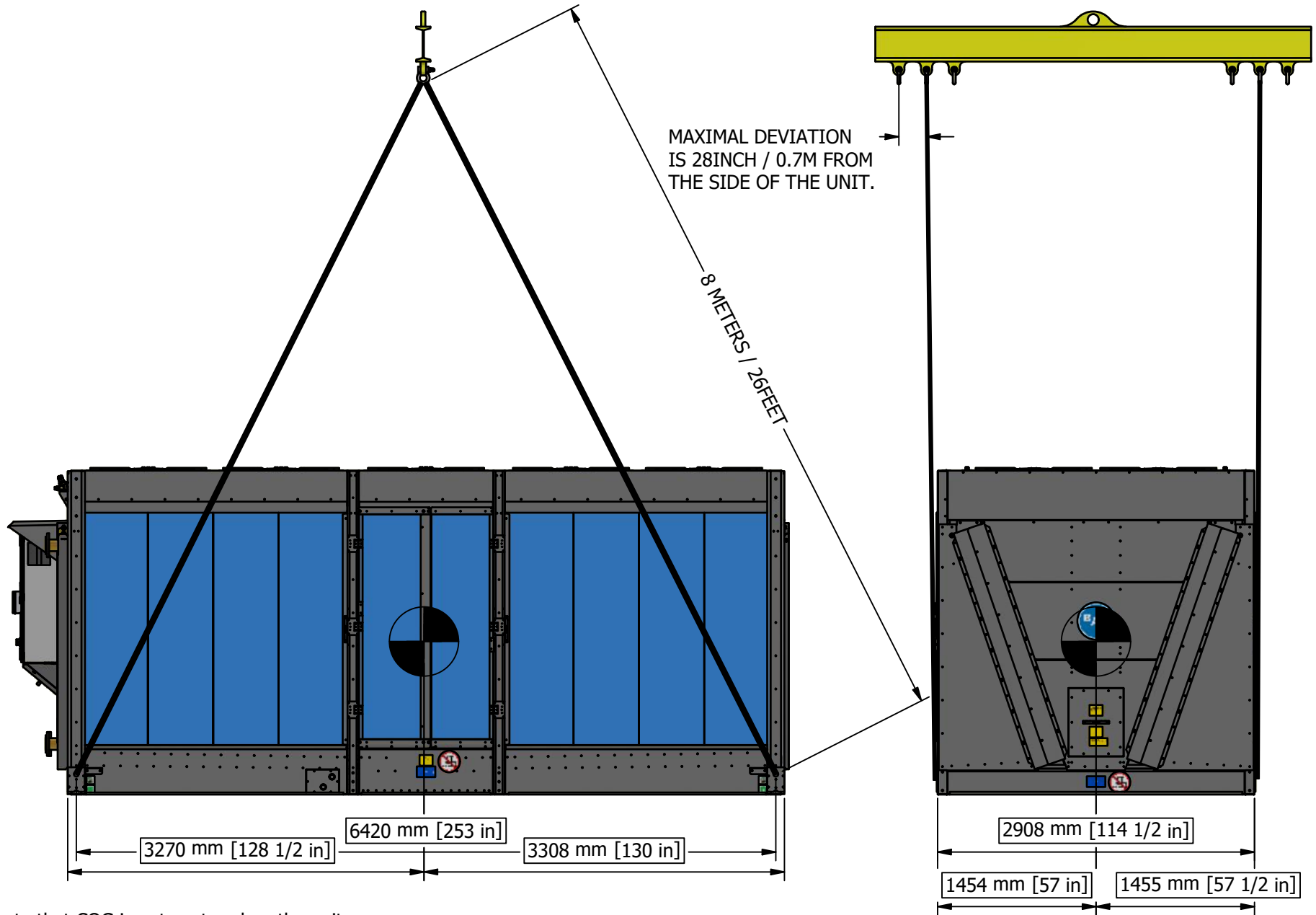
NOTES:
Please note that COG is not centered on the unit.

Category: OM - Operation and Maintenance	Drawing Description: 6-FAN RIGGING	Document Number: RGOMTRF301	
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		Date: 26-01-2022	



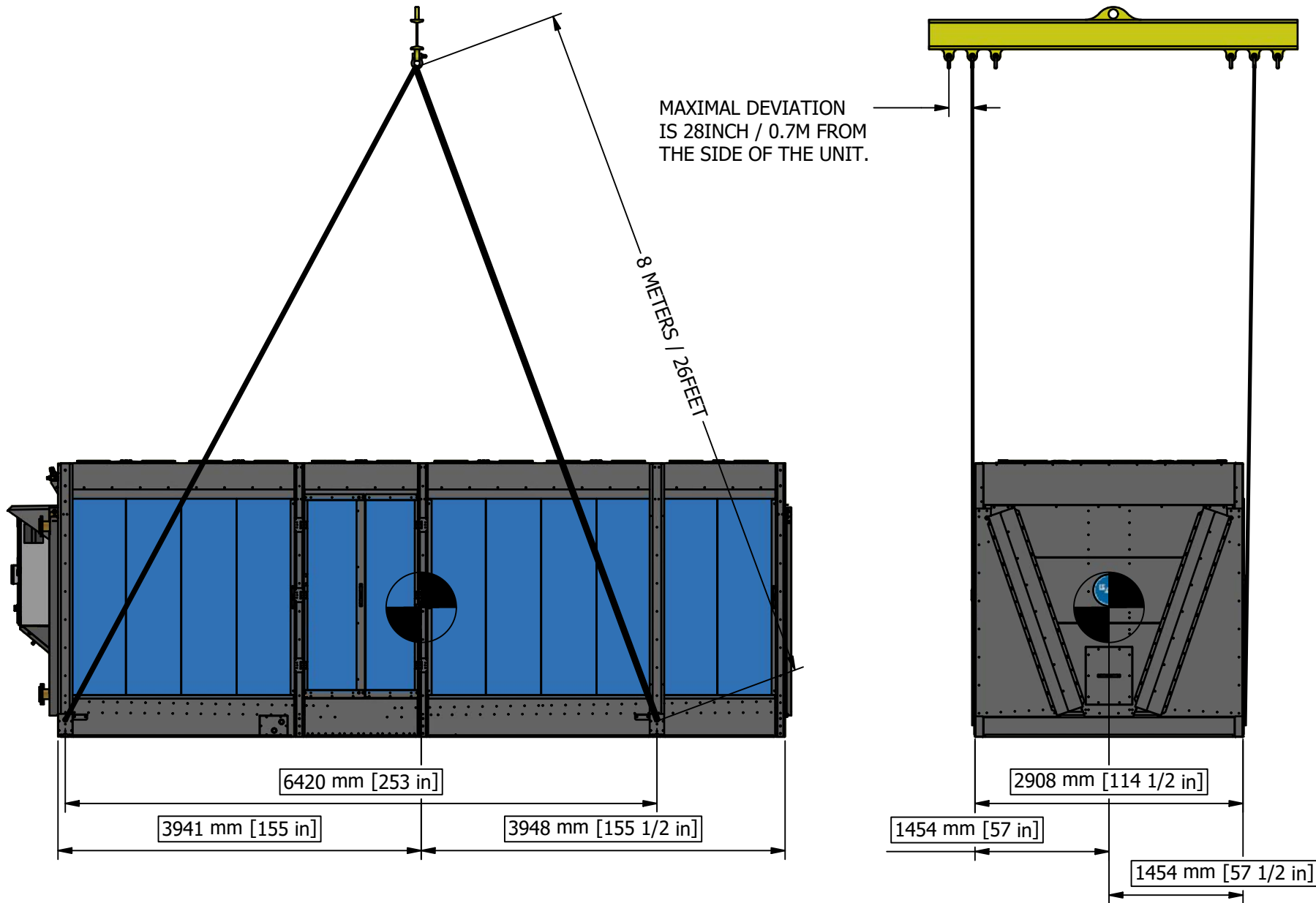
NOTES:
Please note that COG is not centered on the unit.

Category: OM - Operation and Maintenance	Drawing Description: 8-FAN RIGGING	Document Number: RGOMTRF301
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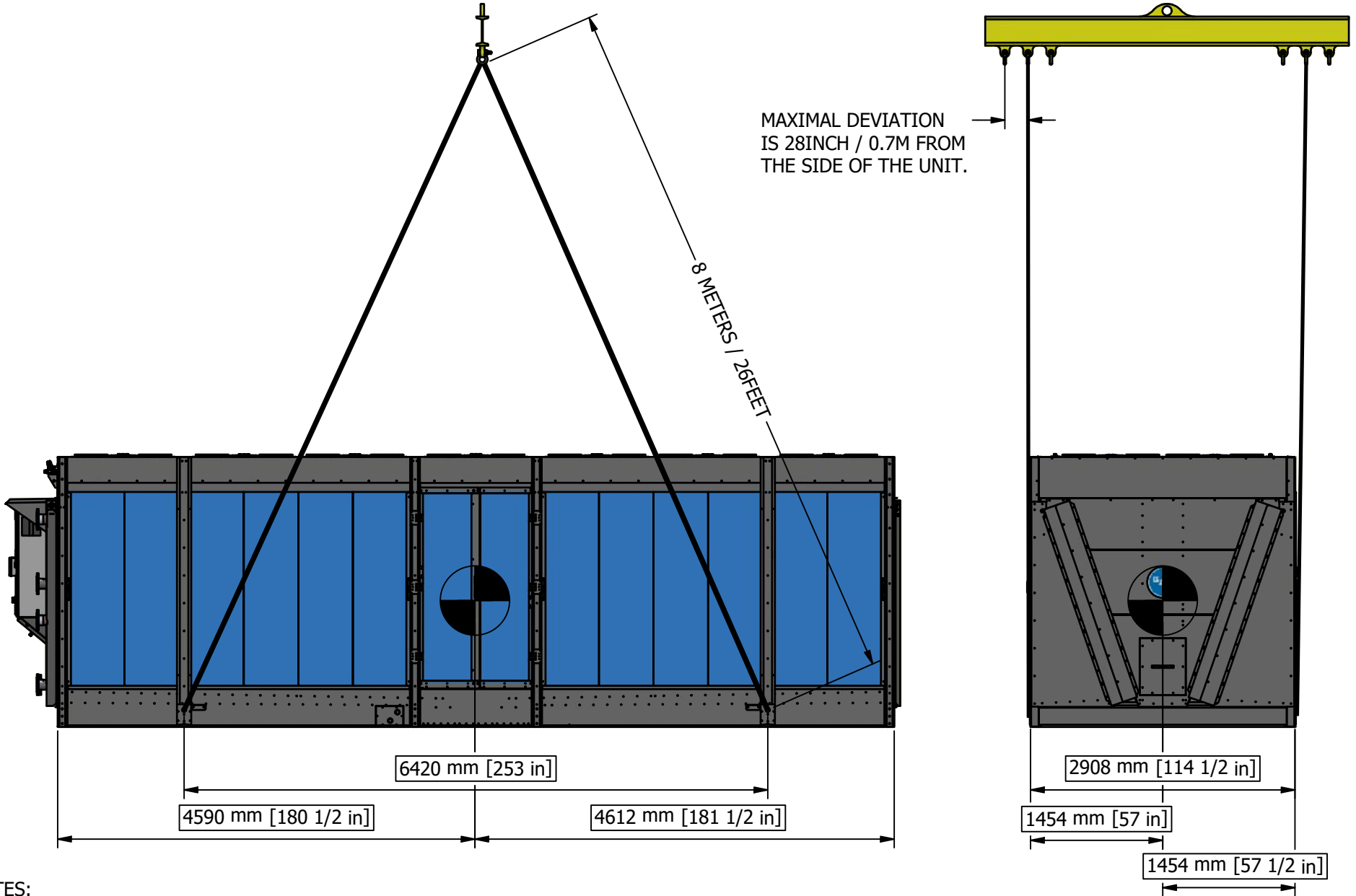
NOTES:
Please note that COG is not centered on the unit.

Category: OM - Operation and Maintenance	Drawing Description: 10-FAN RIGGING	Document Number: RGOMTRF301	
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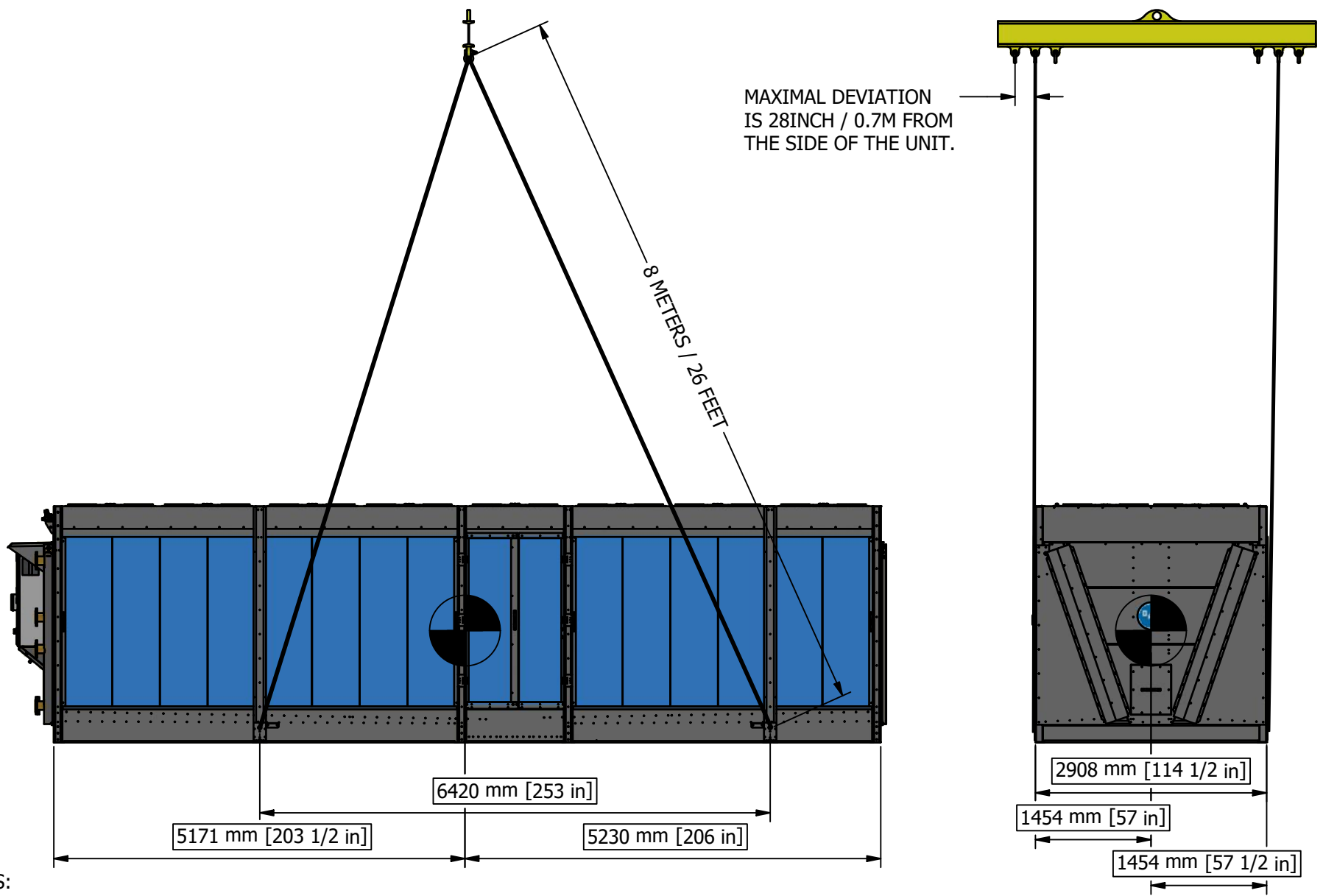
NOTES:
Please note that COG is not centered on the unit.

Category: OM - Operation and Maintenance	Drawing Description: 12-FAN RIGGING	Document Number: RGOMTRF301
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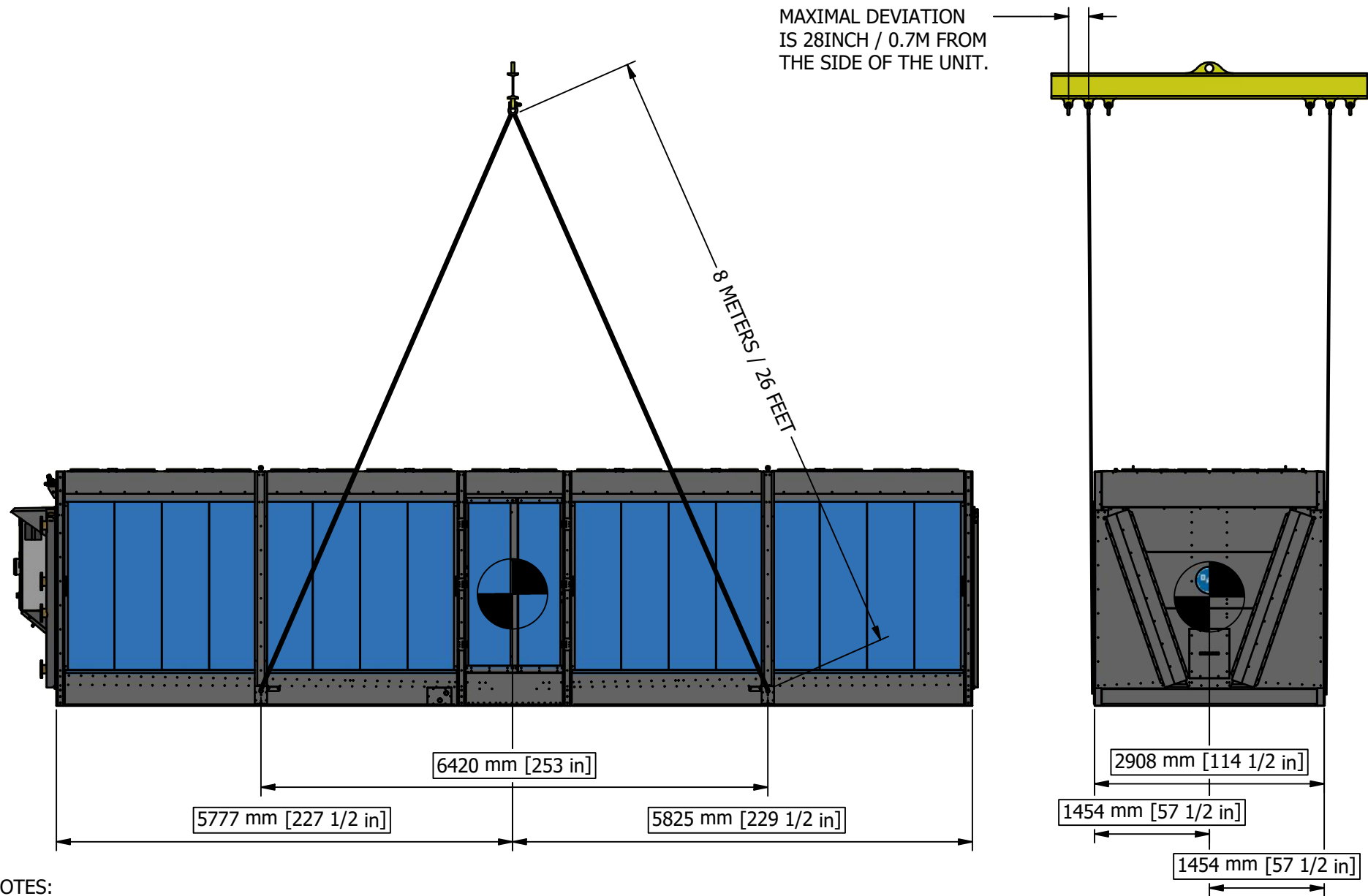
NOTES:
Please note that COG is not centered on the unit.

Category: OM - Operation and Maintenance	Drawing Description: 14-FAN RIGGING	Document Number: RGOMTRF301
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NOTES:
Please note that COG is not centered on the unit.

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