TMS-TRBA-010-A03

TRBA Terminal Manual Annex 03

STS Hose Cryogenic Flange Connector Procedure

Rev: 1.0

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Contents

1.0 INTRODUCTION

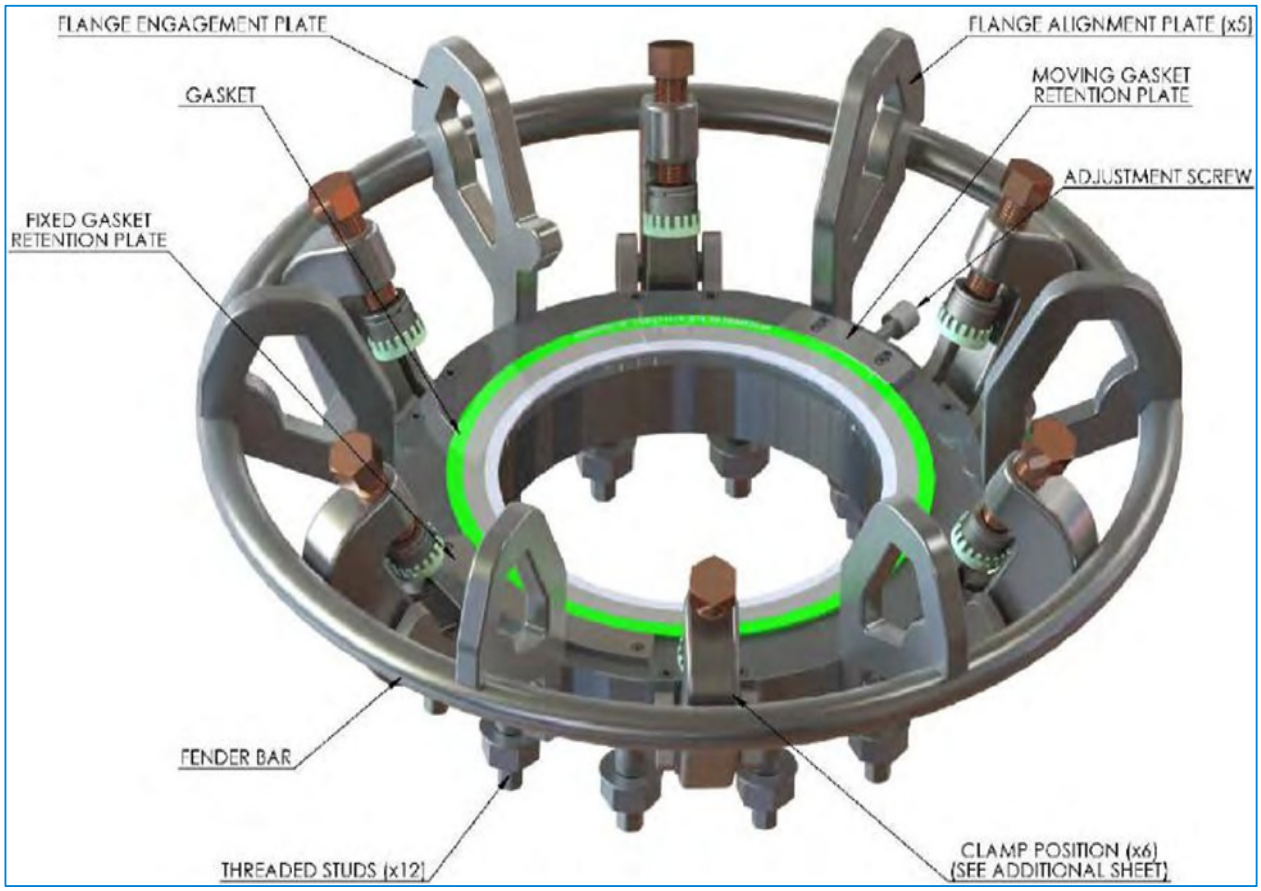
001 The purpose of this document is to provide instruction on the connection and disconnection of the Cryogenic Flange Connector.

002 For maintenance of the Cryogenic Flange Connector reference shall be made to the KLAW Installation, Operating and Maintenance Instructions (Document Number IOM0026 Issue A)

003 The following warning sign indicates

⚠	**Caution There is a serious risk to personal, equipment or the environment if instructions are not followed.**

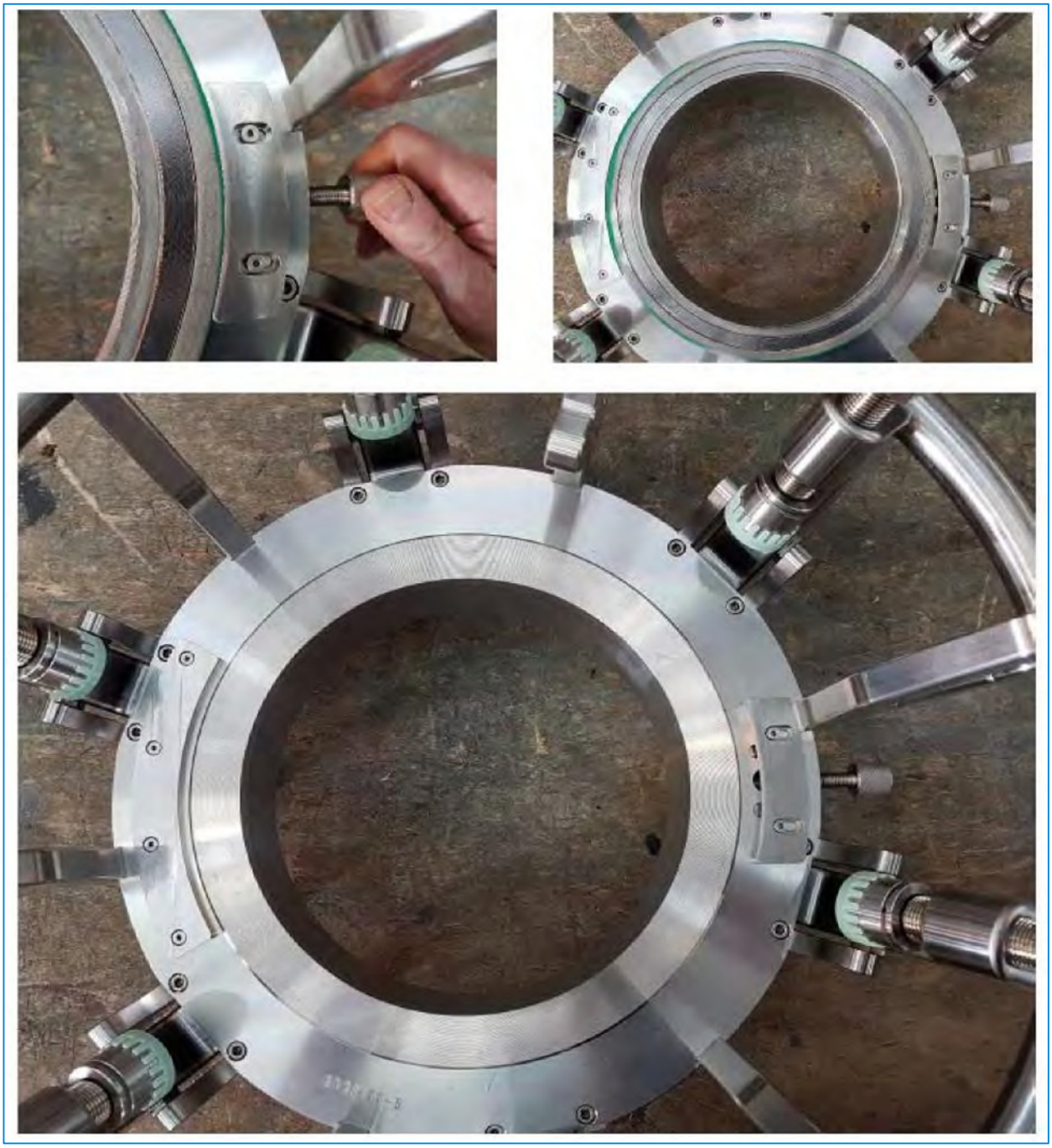
2.0 CRYOGENIC FLANGE CONNECTOR DIAGRAM



3.0 CLAMP DIAGRAM

4.0 GASKET REMOVAL

004 The Cryogenic Flange Connector is fitted with a quick release gasket retention system. To remove a gasket, undo the thumb screw, located at the side of the unit, until the clamp is fully open. Now you can lift the gasket away.

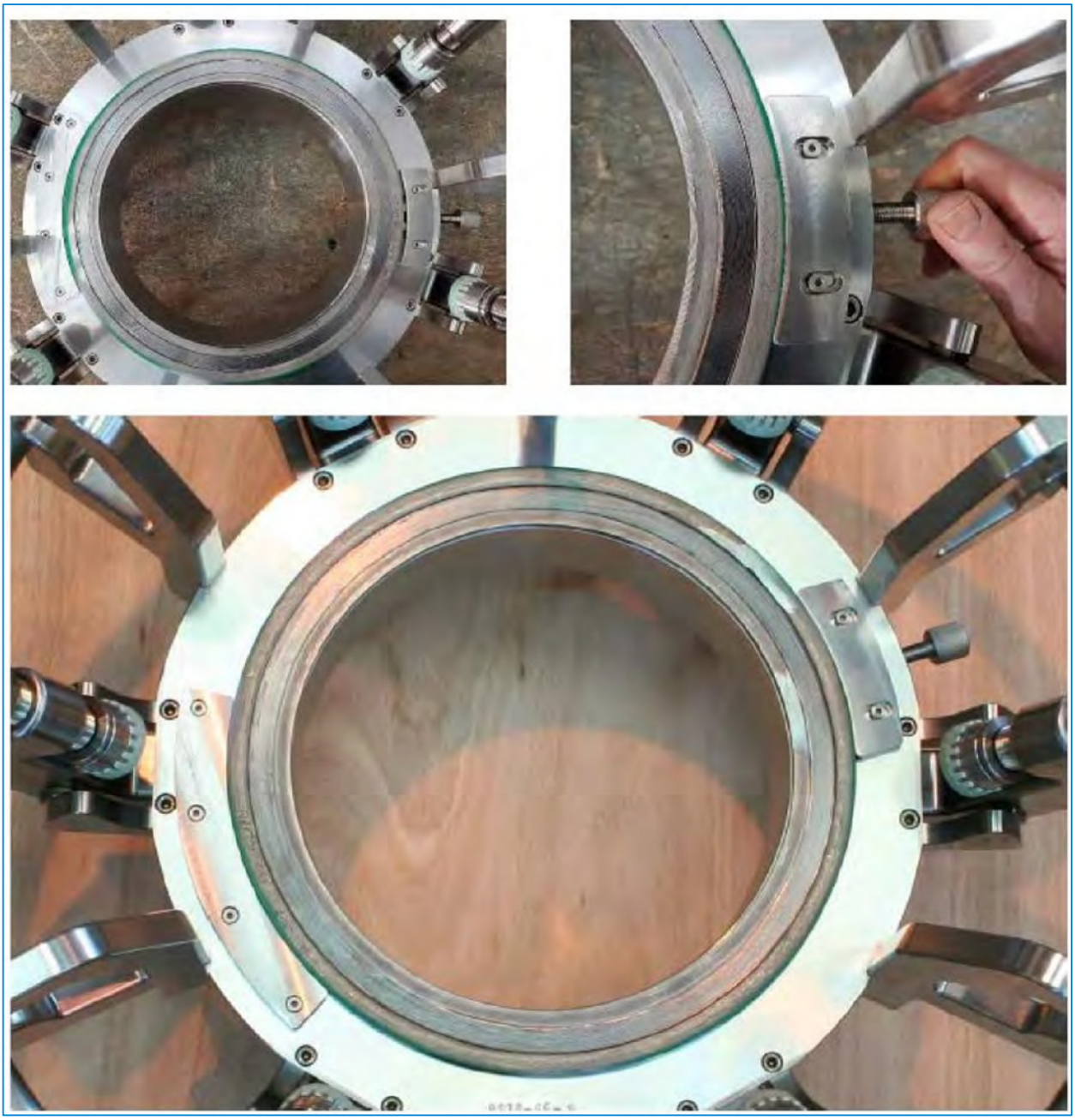


5.0 GASKET FITTING

005 Position a replacement gasket up against the fixed retention plate ensuring that it is radially located.

006 Tighten the thumbscrew until the gasket is secure, if there is some play in the gasket re-centralise it until it is fully secure. If a metal reinforced gasket, then the metal reinforcing ring on the gasket should be sub flush of the moving plate.

007 Do not over tighten the clamp screw, the gasket should be rigidly held but not deformed.

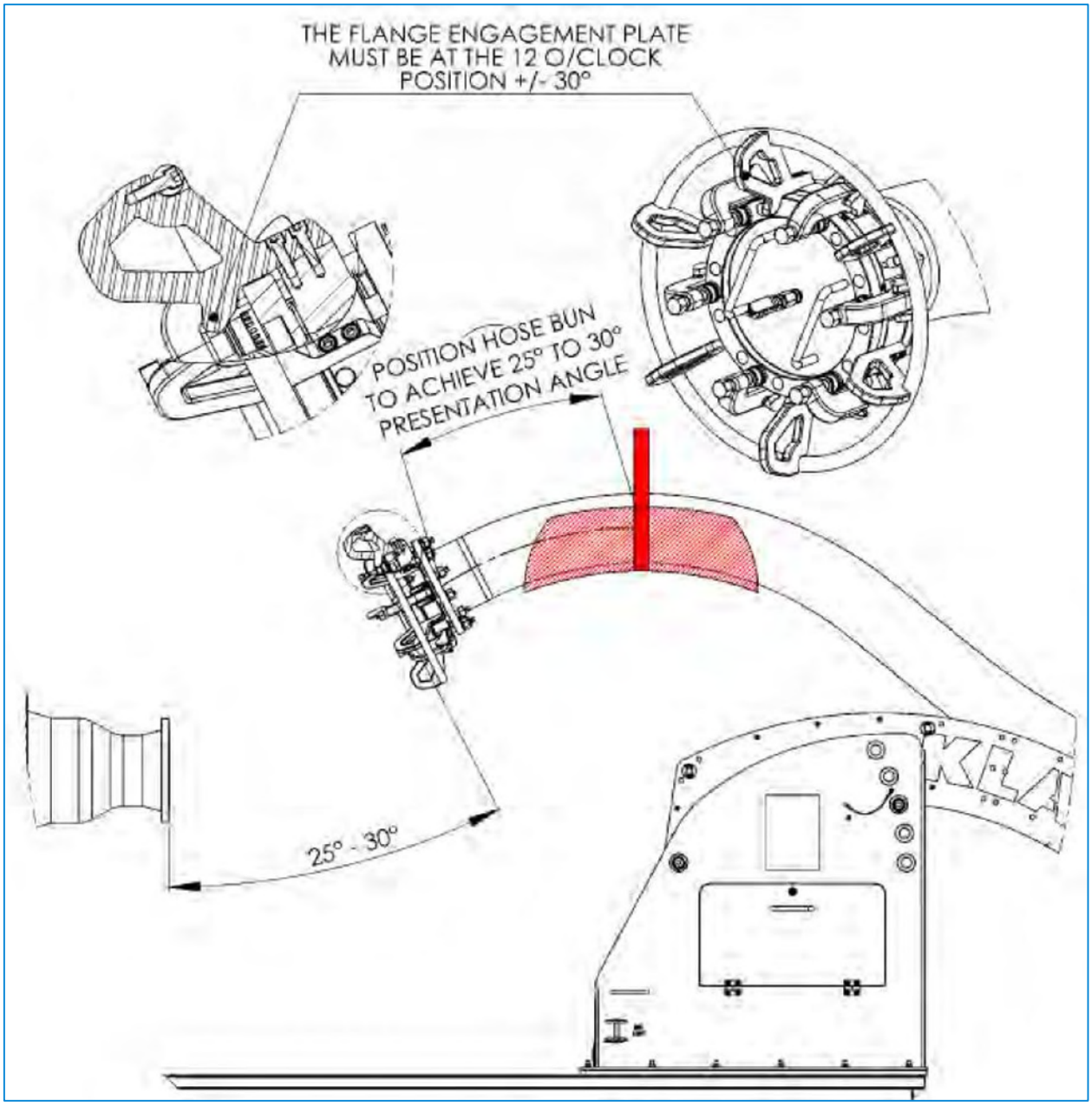


6.0 FLANGE CONNECTOR ORIENTATION DETAIL

008 An approved hose bun must be used for lifting and hose support, it should be positioned to ensure that:

1. The flange connector is suspended with a presentation angle of 25°-30°. It is recommended that this position is recorded and that the hoses are indelibly marked to enable re-fitting of the hose bun in the correct position.
2. Flange engagement plate must be set at the 12 o'clock position +/-30°.

Failure to position the hose bun correctly may result in damage to the equipment.

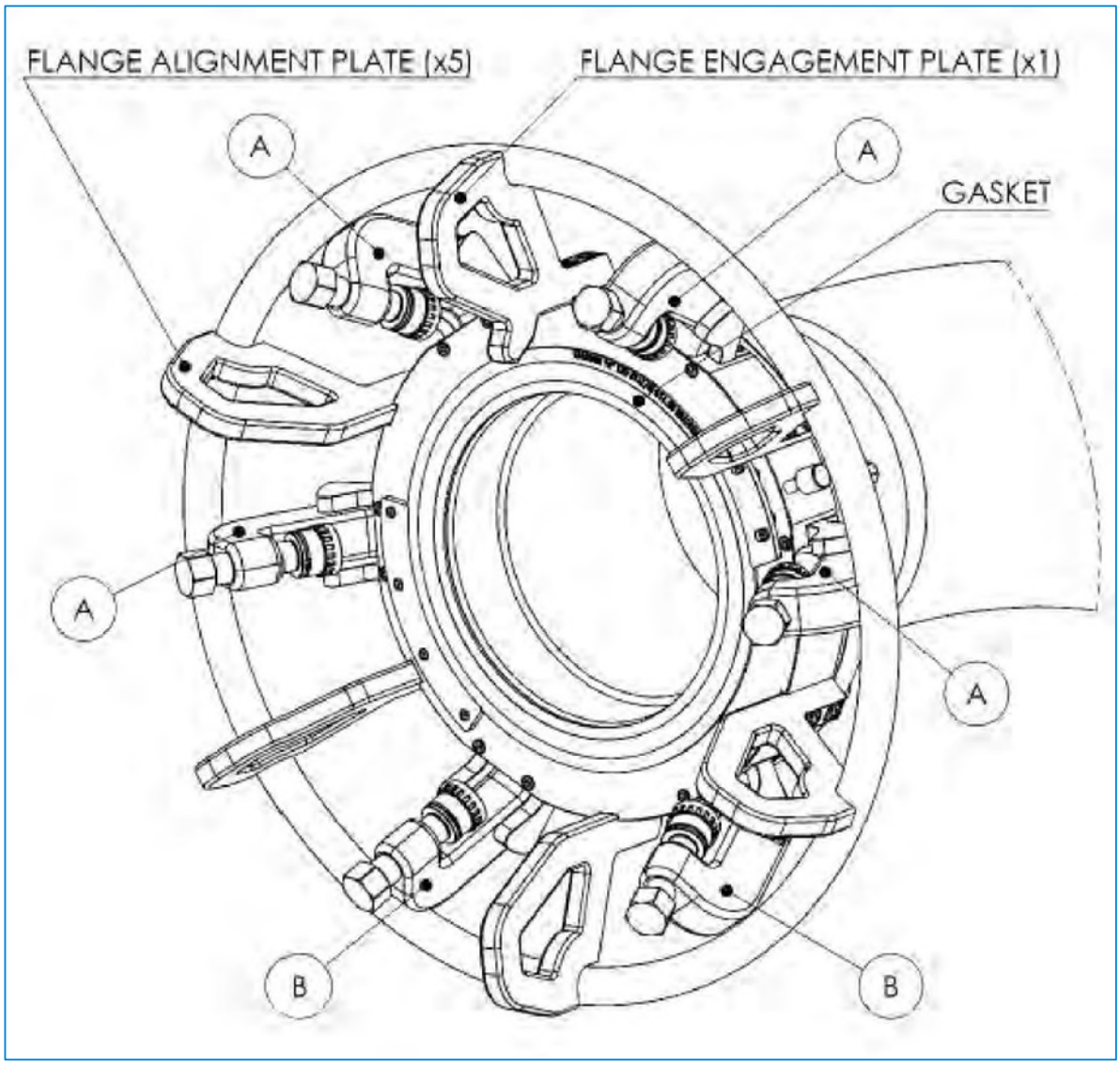


7.0 BLANKING FLANGE REMOVAL

009 Loosen the clamp bolts and unscrew each position 2 full turns.

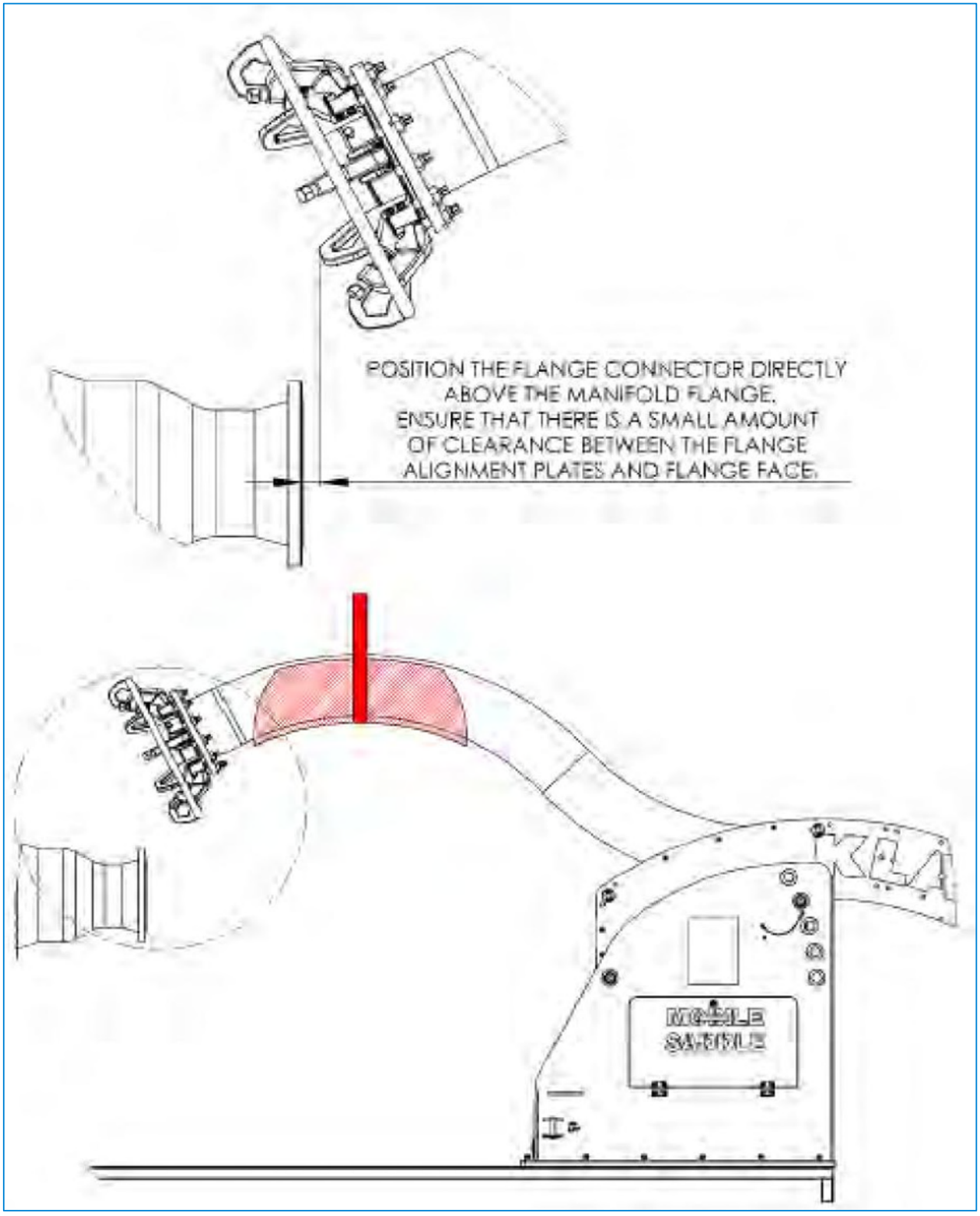
010 Swing back the clamps at the positions marked `A` until they are in the open position, a positive engagement should be felt when the clamps are fully open and they will remain in place when released.

⚠	**Do not open the clamps 'B' at this stage.**



011 Now support the blanking flange and swing back the 2 clamps `B` until they are engaged in the open position. The blanking flange assembly can now be removed. The bottom of the flange should be pulled forward to clear the flange alignment plates and then can be released from the engagement plate. Store the blanking flange securely. Before continuing ensure a suitable gasket is fitted and inspect for damage. If required, the gasket should be replaced see Installation Guidelines' section for fitting instructions.

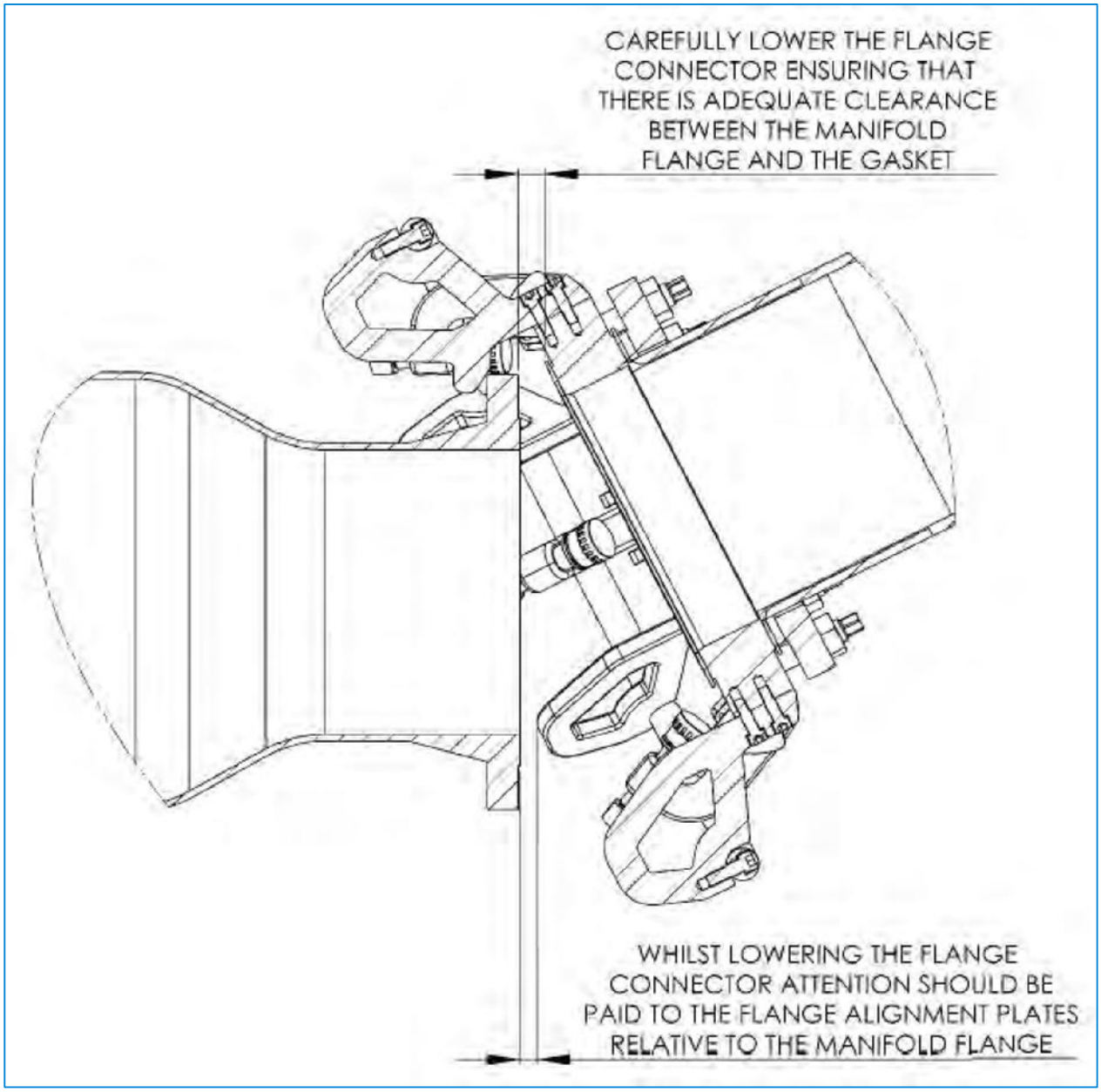
8.0 CRYOGENIC FLANGE CONNECTOR PRESENTATION PROCEDURE



9.0 CRYOGENIC FLANGE CONNECTOR INITIAL ENGAGEMENT PROCEDURE

Before lowering the flange connector ensure all clamps are fully open.

During lowering visually check the presentation angle is correct and that there is clearance between the flange alignment plates and the manifold flange. Also ensure that the sealing gasket is not damaged by the manifold flange.

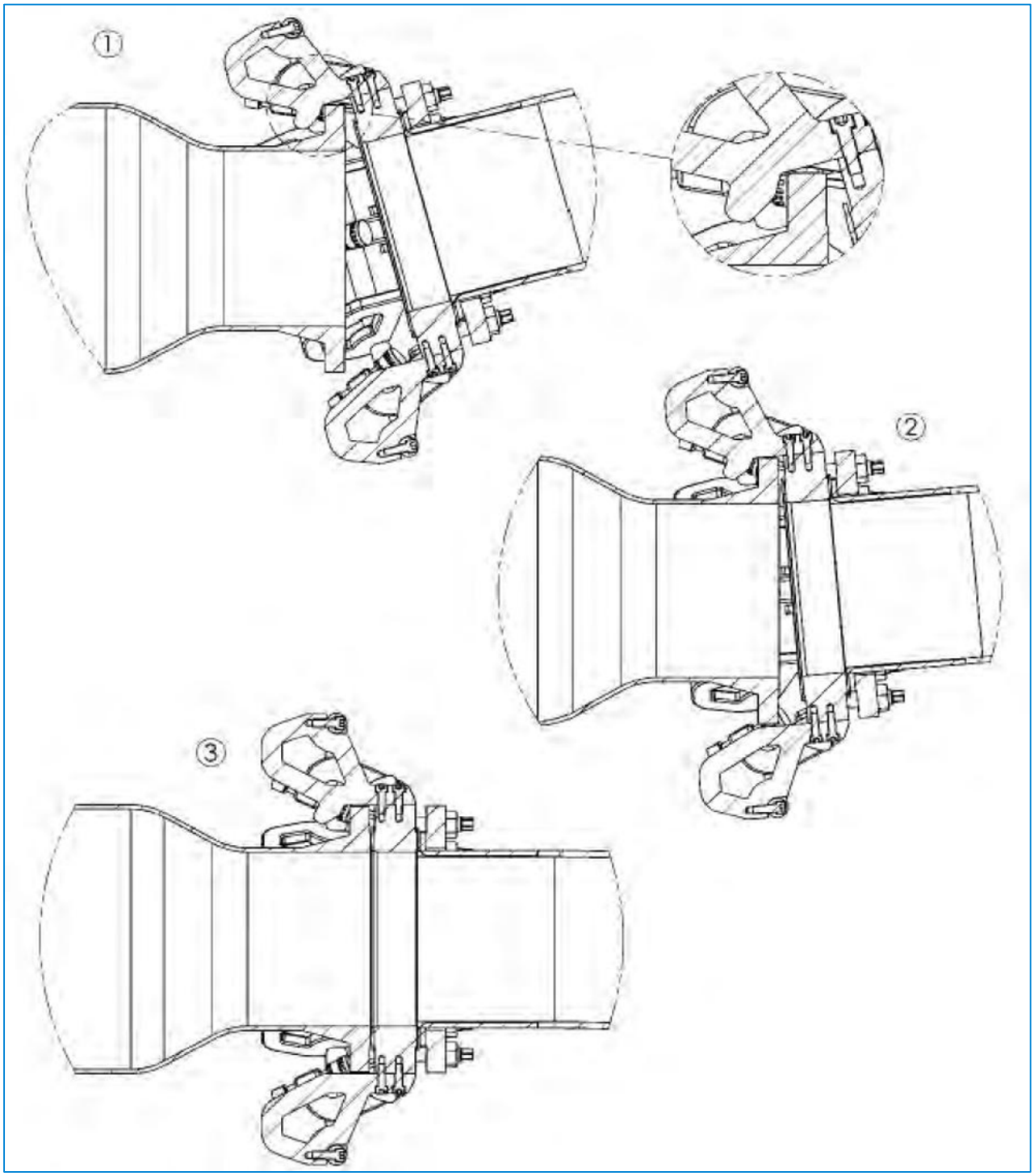


10.0 CRYOGENIC FLANGE CONNECTOR FULL ENGAGEMENT PROCEDURE

012 When the flange engagement plate is fully located (1) the flange connector can continue to be lowered.

013 The flange alignment plates will centralize the manifold flange (2).

014 When the hose bun lifting strap becomes loose the flange connector will be fully located (3).



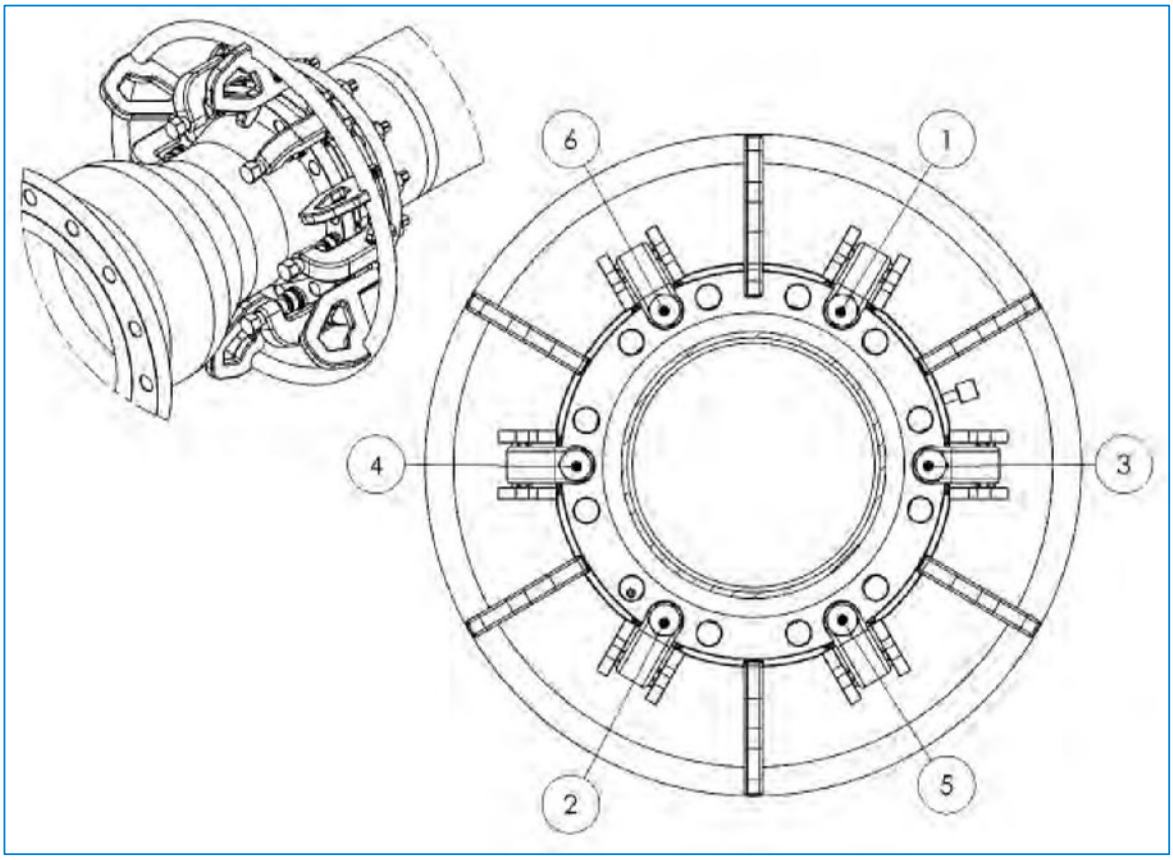
11.0 TIGHTENING PROCEDURE

015 The clamps can now be set and tightened.

016 Swing each clamp over to engage on the back of the manifold flange. Some additional loosening may be required if there is not sufficient clearance. A positive engagement should be felt when the clamps are fully closed, and they will remain in place when released.

017 Loosely tighten each clamp position to ensure that the gasket is presented flat and even across the manifold flange sealing face.

⚠	**Do not over tighten any clamp at this stage, as this could cause uneven setting of the sealing gasket.**



018 The clamps should now be tightened.

019 While tightening it is important that correct clamp order is maintained. KLAW recommends that 2 operators simultaneously

020 tighten the clamp positions using a pair of torque wrenches at positions: 1 & 2, 3 & 4, 5 & 6.

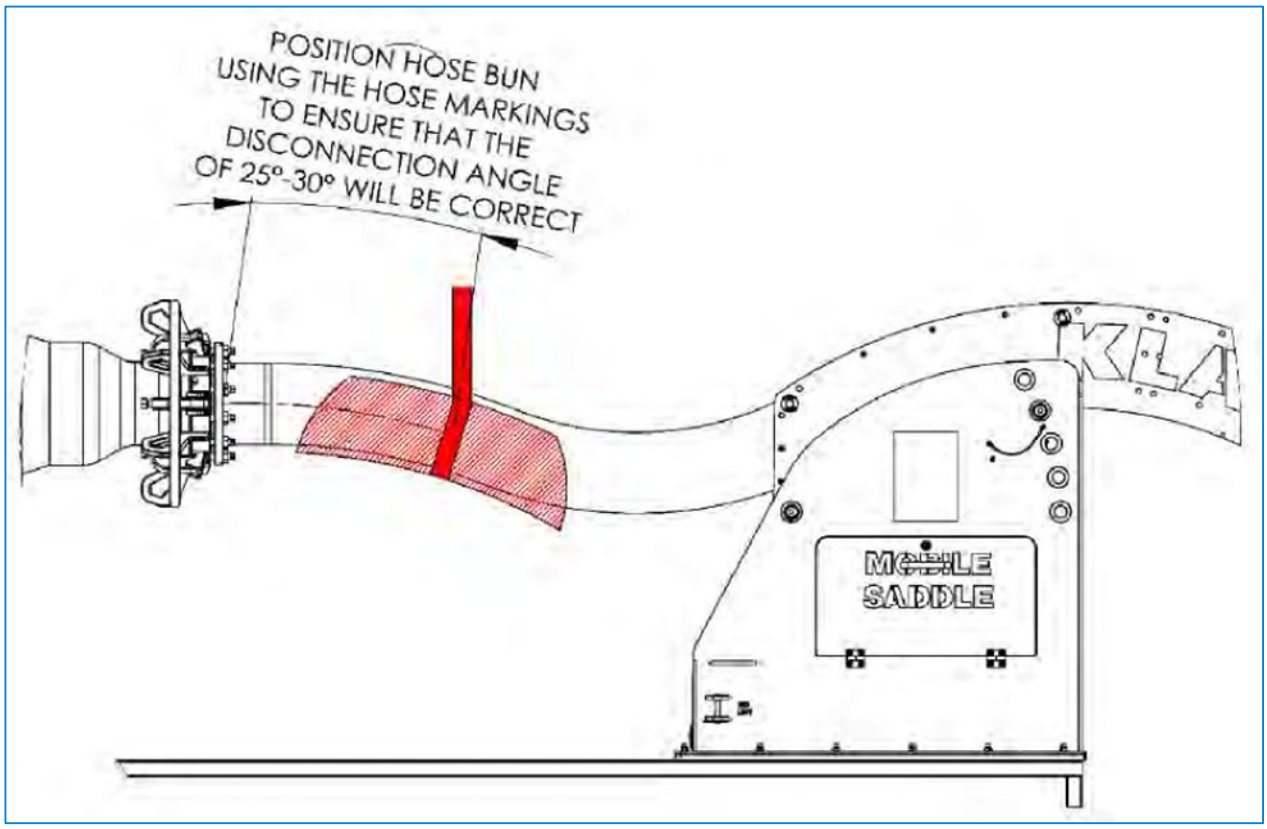
021 A preset torque of 100Nm should be applied at all clamp positions. And then a final torque of 250 Nm at all positions. (torque ratings stated are for metal reinforced spiral wound gaskets. For other gasket types please refer to KLAW) All positions will typically require retightening due to gasket compression.

12.0 HOSE BUN REINSTALLING

022 Reinstall the hose bun which must be positioned to ensure that the flange connector, when suspended, will have a disconnection angle of 25°-30°.

023 If the hoses are marked as recommended the bun should be positioned accordingly.

⚠	**Failure to ensure that the hose bun is correctly positioned may result in damage to the equipment.**



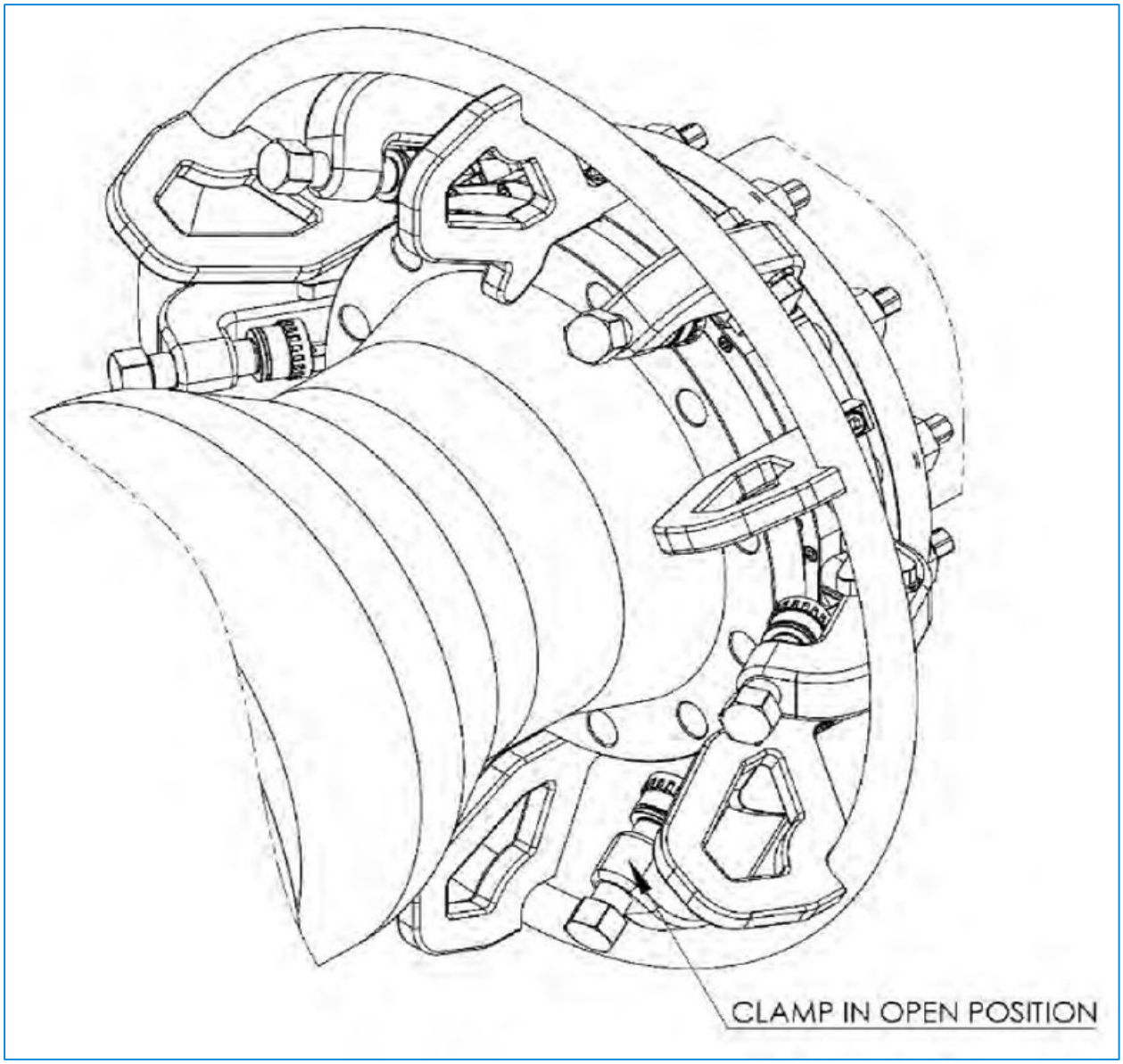
024 After correct positioning of hose bun a small amount of lift should be applied to it to take hose load away from the flange connector.

13.0 UNCLAMPING PROCEDURE

025 Loosen the clamp bolts and unscrew each position 2 full turns.

026 Swing back all of the clamps until they are in the open position, a positive engagement should be felt when the clamps are fully open and they will remain in place when released.

027 The flange assembly can now be disconnected.

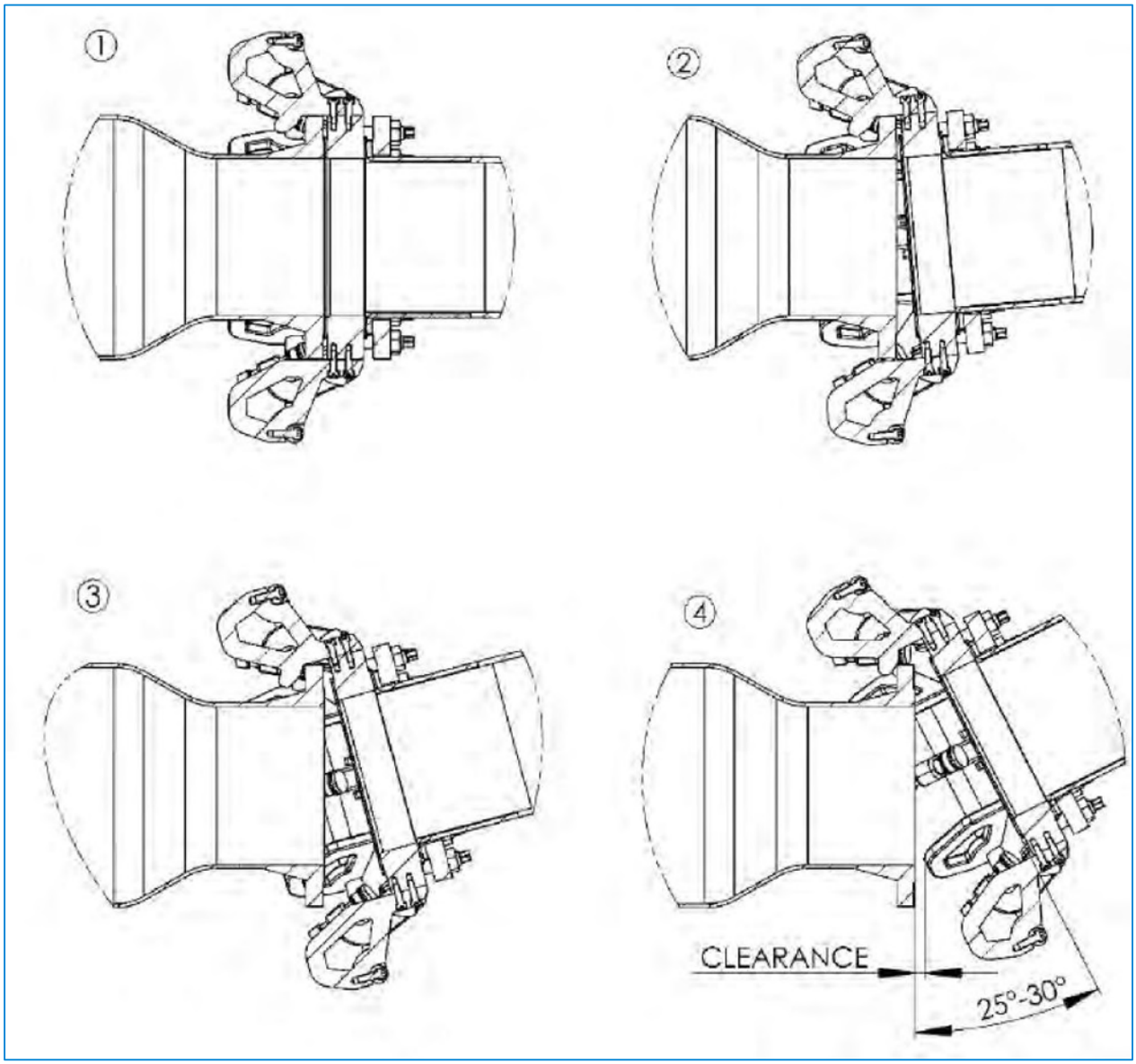


14.0 LIFTING PROCEDURE

028 Slowly lift the hose bun, the flange connector will rotate about the flange engagement plate 1, 2 & 3.

029 When the lower flange alignment plates are disconnected `4`, the flange connector can be lifted away from the manifold.

⚠	**Before lifting ensure all clamps are fully open. Damage may occur to equipment if clamps are closed.** **Before commencing and during lift, visually check the disconnection angle is correct and that there is clearance between the flange alignment plates and the manifold flange.**



15.0 BLANKING FLANGE CONNECTION

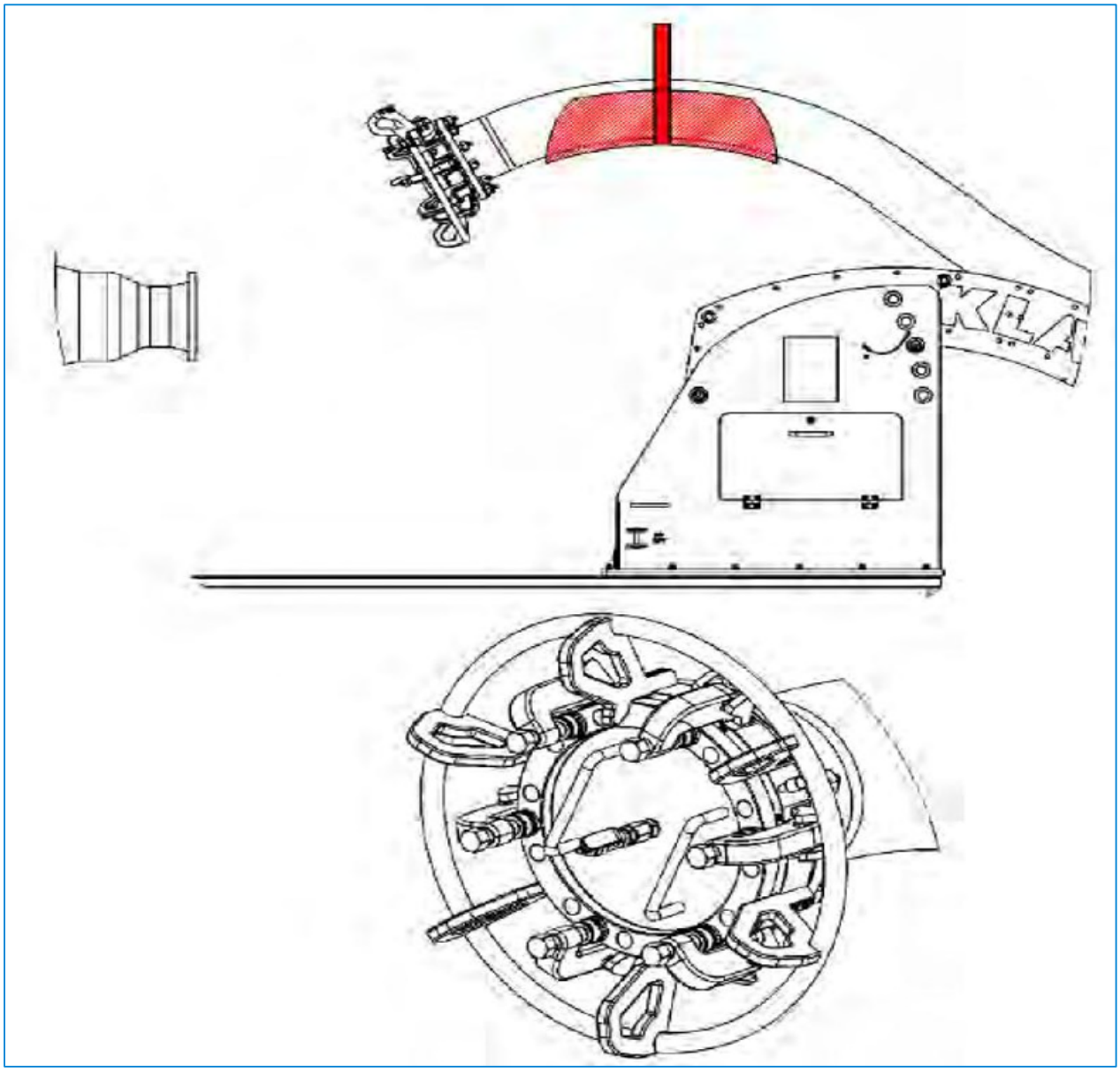
030 When the flange connector is clear of the manifold and in a suitable position the blanking flange can be reinstalled.

031 Engage the blanking flange into the flange engagement plate and swing it into the flange alignment plates.

032 Hold it securely in position and close each clamp, a positive engagement should be felt when the clamps are fully closed, and they will remain in place when released.

033 Loosely tighten each clamp position to ensure that the gasket is presented flat and even across the manifold flange sealing face.

⚠	**Do not over tighten any clamp at this stage, as this could cause uneven setting of the gasket.**



034 The clamps should now be tightened.

035 While tightening it is important that correct clamp order is maintained. KLAW recommends that 2 operators simultaneously tighten the clamp positions using a pair of torque wrenches at positions: 1 & 2, 3 & 4, 5 & 6.

036 A torque of 100nm should be applied at all clamp positions.

037 Cryogenic Flange connectors should be fitted with the KLAW blanking flange assembly when not in use. (the purge valve assembly shown above is optional)

Standard blanking flanges must not be used.