**Installation, Operating and Maintenance Instructions**

**IMPORTANT:** To ensure the safe and efficient operation of this product please read this manual carefully prior to installation and first use and retain in a safe place for future reference.

This product is supplied on the condition that the user will install, commission, operate, inspect and maintain this product in accordance with this manual and utilise all reasonable skill, care and diligence. Users must also ensure that their use of this product complies with all applicable health and safety requirements, including compliance with such requirements as are mandated by applicable or local law and as would otherwise be expected to be complied with as a matter of good industry practice.

For the convenience of users, certain requirements of this manual are flagged as being at particular high risk of causing loss, damage or injury if not followed; however, users should note that they must comply with all requirements of this manual in order to ensure the safe and efficient operation of this product.

For further advice concerning this product or obtain a copy of this manual in selected alternative languages, please contact our technical team using the contact details set out at the end of this manual.
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Welcome

Dear Customer,

Thank you for purchasing from KLAW Products Ltd.

At KLAW we are here to provide you with a safe and environmental solution for your needs.

Prior to using this product, please carefully read all the information detailed in these Installation, Operating and Maintenance Instructions.

If you have any questions or uncertainty regarding the information provided please contact a member of the KLAW team who will be pleased to assist.

All installers/users of the supplied product should read these instructions prior to use; copies of this document should be available to all.

KLAW’s aim is to produce quality products, and to support them with a first class after-sales service. Please do not hesitate to contact us at www.klawproducts.com for any of your needs.

Sincerely,

A. Webber

Anthony Webber
Group Technical Director
KLAW Products Ltd
Legal Disclaimer

All products are supplied by Klaw Products Ltd subject to the version of our standard conditions of sale in force at the time of purchase, a copy of which is available on request from Klaw Products Ltd or by visiting www.klawproducts.com.

Klaw Products Ltd excludes to the fullest extent permitted by law any liability for loss or damage caused as a result of any failure by the user to install, commission, operate, inspect and maintain this product in accordance with the requirements of this manual and/or any attempt by the user to use this product for purposes for which it is not designed and/or outside of its standard operating tolerances and parameters.

Klaw Products Ltd reserves the right at its discretion to refuse to undertake warranty repairs or to levy an additional charge for undertaking such repairs in the event that any loss, damage or failure of this product is as a result of the user failing to comply with the requirements of this manual or with any other additional special instructions issued by KLAW.

The foregoing exclusions of liability shall not apply to the limited extent of any liability of Klaw Products Ltd for death or personal injury caused by its negligence and/or for any other liability which Klaw Products Ltd is not permitted to lawfully limit or exclude.

Copyright Notice

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Klaw Products Ltd reserves the right to amend or update this manual at anytime on notice and without implying any liability on its part.

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Klaw Products Ltd (or its third party licensors) are the owners of all intellectual property rights subsisting or capable of subsisting in this product (including in the design and specification of this product). All such rights are reserved and no sale or supply of this product shall act as transferring ownership of any such rights to the user.
Document Purpose

The purpose of this document is to provide instruction on the installation, operation and maintenance procedures required for this product.

Glossary

The following warning sign indicates:

![Caution! There is danger of serious risk to personnel, equipment, or the environment if instructions are not followed.]

Terminology:

- DN: Diameter Nominal
- MSDS: Material Safety Data Sheet
- NPS: Nominal Pipe Size
- PPE: Personal Protective Equipment
Product Information

Product Identification

“Old” Style Product Contract Number

“New” Style Product Serial Number

Material Heat Number (Body)

Please quote this serial number in all correspondence with KLA Products Ltd or KLA service centres. The use of this serial number will provide the relevant information regarding product specification and correct spares requirements.

Material Heat Number (Flap Valve)

Applicable Standards

PED Pressure Equipment Directive (97/23/EC)
How the Breakaway Coupling Valve Mechanism Works

1. **OPEN**: the two flaps interlock, offering the minimum head-loss until the breakaway coupling separates.

2. **BREAKAWAY LOAD EXCEEDED**: the breakstuds elongate and the flaps are released and rotate through a controlled arc.

3. **CLOSED**: the flaps have moved through 90 degrees, where they snap onto their seats prior to the breakaway coupling fully separating.

4. **BREAKAWAY**: with 100% shut-off achieved, the two halves of the breakaway coupling then separate completely.
Typical Applications
Exploded Assembly (Typical)

Female Housing Assembly

Breakstud (3 places)

Body Seal

Male Housing Assembly

Safety Washer (3 places)

Plain Nut (3 places)

Nylon Locking Nut (3 places)

Dowel (3 places)

Cross-sectional View

Flap Valve Seat Seal (2 places)

Flap (2 places)
Installation

Installation Guidelines

The KLAWS breakaway coupling is designed to fit into a hose string, and must be installed between two sections of hose. Installation of the breakaway coupling should be done within the breakaway coupling fully assembled.

Only KLAWS authorised and trained personnel should carry out installation, maintenance, assembly and disassembly operations.

Typically used in ship-to-offshore platform applications, the coupling has a longer-than-normal spigot to ensure that only an axial load can cause an activation. The coupling is also fitted with dowels so that any twisting in the hose string does not transmit torsional forces onto the breakstuds.

The KLAWS marine breakaway coupling MUST NOT be installed onto a rigid mounting as it is not designed to activate under an applied bending moment, but is designed to activate under a purely axial force.

To ensure that only an axial force can be applied as the hose becomes taught, fit the breakaway coupling between two sections of horse a minimum distance away from any rigid mounting – typically, minimum bend radius of hose x 4 is sufficient.

KLAWS recommends installing a suitable particle filter to be fitted into the system to prevent the marine breakaway coupling from becoming contaminated with foreign bodies.

If the marine breakaway couplings’ hose or loading arm assembly is the primary earth or static dissipation route, then the electrical continuity value of the assembly must be checked to ensure regulatory compliance.

The KLAWS marine breakaway coupling may be pressure tested, but such a pressure test must be limited to the breakaway coupling’s maximum working pressure, (unless a KLAWS protection jig is fitted, which limits the stress exerted onto the breakstuds).

Maximum Design Flow Rates

The KLAWS recommended maximum design flow rates, permitted at activation, are listed in the Maximum Design Flow Rates Table below.

<table>
<thead>
<tr>
<th>NOMINAL PIPE SIZE – NPS (inches)</th>
<th>DIAMETER NOMINAL – DN (mm)</th>
<th>MAXIMUM FLOW RATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 in (DN50)</td>
<td></td>
<td>50 m³/h (833 l/min)</td>
</tr>
<tr>
<td>2½ in (DN65)</td>
<td></td>
<td>75 m³/h (1250 l/min)</td>
</tr>
<tr>
<td>3 in (DN80)</td>
<td></td>
<td>100 m³/h (1667 l/min)</td>
</tr>
<tr>
<td>4 in (DN100)</td>
<td></td>
<td>150 m³/h (2500 l/min)</td>
</tr>
<tr>
<td>5 in (DN125)</td>
<td></td>
<td>225 m³/h (3750 l/min)</td>
</tr>
<tr>
<td>6 in (DN150)</td>
<td></td>
<td>300 m³/h (5000 l/min)</td>
</tr>
<tr>
<td>8 in (DN200)</td>
<td></td>
<td>450 m³/h (7500 l/min)</td>
</tr>
</tbody>
</table>

All flow rate figures stated above are based on water at ambient temperature.

If the flow rate exceeds the maximum design flow rate, KLAWS recommends that the flow should be stopped, or reduced to the maximum design rate, before any activation is permitted.

Installation
# Overall Installation Dimensions and Weight

<table>
<thead>
<tr>
<th>Diameter A</th>
<th>Ø50mm Nominal Bore</th>
<th>Ø65mm Nominal Bore</th>
<th>Ø80mm Nominal Bore</th>
<th>Ø100mm Nominal Bore</th>
<th>Ø125mm Nominal Bore</th>
<th>Ø150mm Nominal Bore</th>
<th>Ø200mm Nominal Bore</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall Length B</td>
<td>211 mm</td>
<td>224 mm</td>
<td>224 mm</td>
<td>284 mm</td>
<td>290 mm</td>
<td>317 mm</td>
<td>410 mm</td>
</tr>
<tr>
<td>Flanged</td>
<td>Dim. B +12mm</td>
<td>Dim. B +12mm</td>
<td>Dim. B +12mm</td>
<td>Dim. B +12mm</td>
<td>Dim. B +16mm</td>
<td>Dim. B +20mm</td>
<td></td>
</tr>
<tr>
<td>Diameter C</td>
<td>Ø114mm</td>
<td>Ø126mm</td>
<td>Ø140mm</td>
<td>Ø164mm</td>
<td>Ø208mm</td>
<td>Ø228mm</td>
<td>Ø279mm</td>
</tr>
<tr>
<td>Approx. Weight Weld or Threaded</td>
<td>5.4 kg</td>
<td>6.2 kg</td>
<td>7.8 kg</td>
<td>13.2 kg</td>
<td>24 kg</td>
<td>31 kg</td>
<td>55 kg</td>
</tr>
<tr>
<td>Approx. Weight ASA 150lb Flanged</td>
<td>10 kg</td>
<td>13.4 kg</td>
<td>16.2 kg</td>
<td>24.4 kg</td>
<td>36.6 kg</td>
<td>46 kg</td>
<td>79 kg</td>
</tr>
<tr>
<td>Approx. Weight ASA 300lb Flanged</td>
<td>12.2 kg</td>
<td>15 kg</td>
<td>20.2 kg</td>
<td>33.4 kg</td>
<td>49 kg</td>
<td>59.2 kg</td>
<td>99 kg</td>
</tr>
<tr>
<td>Materials (Body Housings)</td>
<td>Stainless Steel</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Materials (Internals)</td>
<td>As standard internal components stainless steel</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>End Connections</th>
<th>Flanged</th>
<th>Threaded</th>
<th>Welded</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASA DIN etc</td>
<td>NPT BSPT BSPP etc</td>
<td>Schedule 40 etc</td>
<td></td>
</tr>
</tbody>
</table>
Recommended Handling and Lifting Procedure

It is recommended that the transfer hose lifting arrangement detailed below is utilised to eliminate undue weight on the KLA W marine breakaway coupling during hose line deployment and retrieval.

Only KLA W authorised and trained personnel should carry out installation, maintenance, assembly and disassembly operations.

1. The hose clamp and sling should be positioned on the hose to provide the primary lifting point below the hammer union / KLA W marine breakaway coupling.

2. The standard lifting arrangement for a loading hose, with a lifting ring and a 5ft primary sling together with a secondary sling, is shown below. The 5ft primary sling should be slack during hose lifting with the full weight of the hose assembly taken below the breakaway coupling.

   Primary sling which keeps the breakaway coupling in line with the lower hose.

   Secondary sling which supports the weight of the hose.
Maintenance

Only KLAFlag authoritysed and trained personnel should carry out installation, maintenance, assembly and disassembly operations.

1. The breakaway coupling should be serviced every twelve months to ensure that it is in working order – though, depending on the type of service, this interval may be reduced to six months or less.

2. Damage, corrosion and dirt can all affect the operation of the breakaway coupling.

3. During maintenance the body seal and breakstud assemblies must be replaced. The seat seals must also be inspected and replaced if damaged.

4. Should any structural damage be found, which may require special attention outside normal reinstatement, refer back to KLAFlag Products Ltd for the recommended repair procedure.

5. KLAFlag recommends that the breakaway coupling has a visual inspection conducted prior to and after each and every transfer conducted, and in accordance with the following checks:

   **If the safety washer under the plain nut can be moved (in any of the breakstud assemblies), or there is a significant gap between the two breakaway coupling halves, then the breakstuds have been stretched (see image below). This could cause premature activation of the breakaway coupling. Remove the breakaway coupling from service and replace the breakstuds.**

6. When carrying out any maintenance work we respectfully suggest the following guidelines are adhered to:
   
   a. Check and be aware of all plant safety instructions and precautions.
   
   b. Use experienced and fully trained personnel.
   
   c. Refer to the “Recommended Handling and Lifting Procedure” on page 10.
Removal and Disassembly After Activation

1. Isolate and vent pipework and hoses attached to the breakaway coupling halves prior to removal from the hose string.
2. Detach breakaway coupling halves from hoses.
3. Inspect breakaway coupling halves. Should any structural damage be found, which may require special attention outside normal reinstatement, please refer back to Klaw Products Ltd for the recommended repair procedure.
4. Remove and discard all dowels and all the broken parts of each breakstud together with its nyloc locking nut, plain nut, and safety washer.
5. Remove the body seal if still in place.
6. Clean body joint sealing faces.

Only Klaw authorised and trained personnel should carry out installation, maintenance, assembly and disassembly operations.
Spares

Spares Recommendation
KLAW Products Ltd recommends that a minimum of one spare breakaway coupling and two spares kits are held at all times for each breakaway coupling in operation.

KLAW Products Ltd recommends as a minimum that each operational KLAW marine breakaway coupling is serviced once a year.

Spares Kits
To order spares kits please contact KLAW Products Ltd or our appointed distributor for your territory, with the breakaway coupling’s serial number, and we will be able to supply the current spares kits. Refer to “Product Identification” on page 4 to identify the serial number.

<table>
<thead>
<tr>
<th>NOMINAL PIPE SIZE – NPS (inches)</th>
<th>QTY</th>
<th>ITEM</th>
</tr>
</thead>
<tbody>
<tr>
<td>DIAMETER NOMINAL – DN (mm)</td>
<td></td>
<td>Body Seal</td>
</tr>
<tr>
<td>2 in (DN50) to 5 in (DN125)</td>
<td>1</td>
<td>Body Seal</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>Breakstuds</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>Safety Washers</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>Plain Nuts</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>Nyloc Locking Nuts</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>Dowels</td>
</tr>
<tr>
<td>6 in (DN150) to 8 in (DN200)</td>
<td>1</td>
<td>Body Seal</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>Breakstuds</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>Safety Washers</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>Plain Nuts</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>Nyloc Locking Nuts</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>Dowels</td>
</tr>
</tbody>
</table>
Spares Storage
Spare breakaway couplings and spares kits should be stored in a dry, cool, and dust free environment in order to maximize life expectancy of seals and limit corrosion.

KLAW Products Ltd recommends that each item is inspected prior to installation. This inspection should be in compliance with the maintenance section of this document.

Please refer to "Maintenance" on page 11.

Required Tools
Listed below are the typical tools required to disassemble, maintain and reassemble the breakaway coupling.

- Torque wrench
- Metric allen key (of appropriate size)
- Drift (flat punch)
- Spanner (of appropriate size)
- Long nose pliers
- Small flat-blade screwdriver
- Large flat-blade screwdriver (of appropriate size)
- Small hammer
- Small vice (with soft jaws)
- Two retaining wedges (non-metallic, smooth)
- Craft knife

Only KLAW authorised and trained personnel should carry out installation, maintenance, assembly and disassembly operations.
Reassembly Process

1. This reassembly process should be conducted in a clean environment.

2. Locate the replacement dowels and insert fully using a drift and hammer.

3. Fit the replacement breakstuds into the female half of the breakaway coupling (inserting them from the mating side of the female housing assembly, slotted end first). Hand-tighten until they come to a stop then invert the female housing assembly and use a large flat-blade screwdriver (of appropriate size) to continue until tight.

   If vibration proves problematic in the application of this product, then we recommend that a low-strength thread lock is used to retain each breakstud into the breakaway coupling. DO NOT use permanent adhesive as this will hamper removal following any future activation.
4. Fit a new body seal onto the male spigot as shown, and then lightly grease the seal.

5. If the breakaway coupling has alignment markings, carefully push down on flap and rotate to align markings on flap and breakaway coupling body.

6. By pressing lightly onto the front face of the flap valve, push the flap back off its seat until it stops against the pivot block. The flap should now pivot through 90 degrees. (The flap may have to be simultaneously rotated to find the correct position for it to pivot backwards.)

7. Once the flap is fully open, the reset screw should be inserted to hold the flap in position.

If the breakaway coupling does not have the reset screw facility, then an appropriate non-metallic and smooth retaining wedge should be used to retain the flap in the open position.
8. Repeat steps 5 to 7 for the other half of the breakaway coupling.
   DO NOT try to force the flap to move using tools, as this will cause damage to the flap sealing faces and the valve mechanism.

9. Inspect the flap valve seat seals before reassembly of the breakaway coupling and replace the flap valve seat seals if necessary.

10. The two halves of the breakaway coupling may now be assembled, ensuring that the flap valves are in the same plane opposing each other and will slide past each other without causing damage.

11. Bring the two halves of the breakaway coupling together.

12. Fit one safety washer and one plain nut on to each breakstud, hand-tighten the plain nuts.

13. Tighten the plain nuts evenly to draw the two halves of the breakaway coupling together until the two halves are fully mated with no gap between them.

   Do NOT apply torque above that stated in the “Torque Settings Table” on page 18, when drawing the two halves of the breakaway coupling together.
14. Continue to tighten plain nuts evenly and equally to the torque figures given below in the Torque Settings Table, then fit the nyloc locking nut and tighten against the plain nut.

<table>
<thead>
<tr>
<th>BREAKLOAD</th>
<th>TORQUE SETTING</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.7 kN per breakstud</td>
<td>4 N m (3 lbf ft)</td>
</tr>
<tr>
<td>10 kN per breakstud</td>
<td>7 N m (5 lbf ft)</td>
</tr>
<tr>
<td>15 kN per breakstud</td>
<td>11 N m (8 lbf ft)</td>
</tr>
</tbody>
</table>

For non-standard breakloads please apply the torque setting for the preceding rating as listed above.

If you have a breakload less than 6.7 kN per breakstud please contact Klaw Products Ltd for advice.

When tightening the nylon locking nut, ensure no additional torque is applied to the first plain nut, as this may compromise the breakstud and cause premature activation of the breakaway coupling.

15. Remove reset screws or retaining wedges and replace blanking plugs and sealing washers if fitted.

16. If required pressure test the breakaway coupling to the system working pressure.

Any pressure test of the Klaw marine breakaway coupling must be limited to the breakaway coupling’s maximum working pressure, (unless a Klaw protection jig is fitted, which limits the stress exerted onto the breakstuds).

17. The breakaway coupling is now ready for installation. It is important to keep two sets of spares for each breakaway coupling.
We are here to help and support you please contact us for any assistance you may require.

KLAW Products Ltd
Commerce Business Centre West Wilts
Trading Estate Westbury, Wiltshire
BA13 4LS, United Kingdom
Tel: +44 (0) 1373 827 100
Fax: +44 (0) 1373 858 877
Email: info@klawproducts.com

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