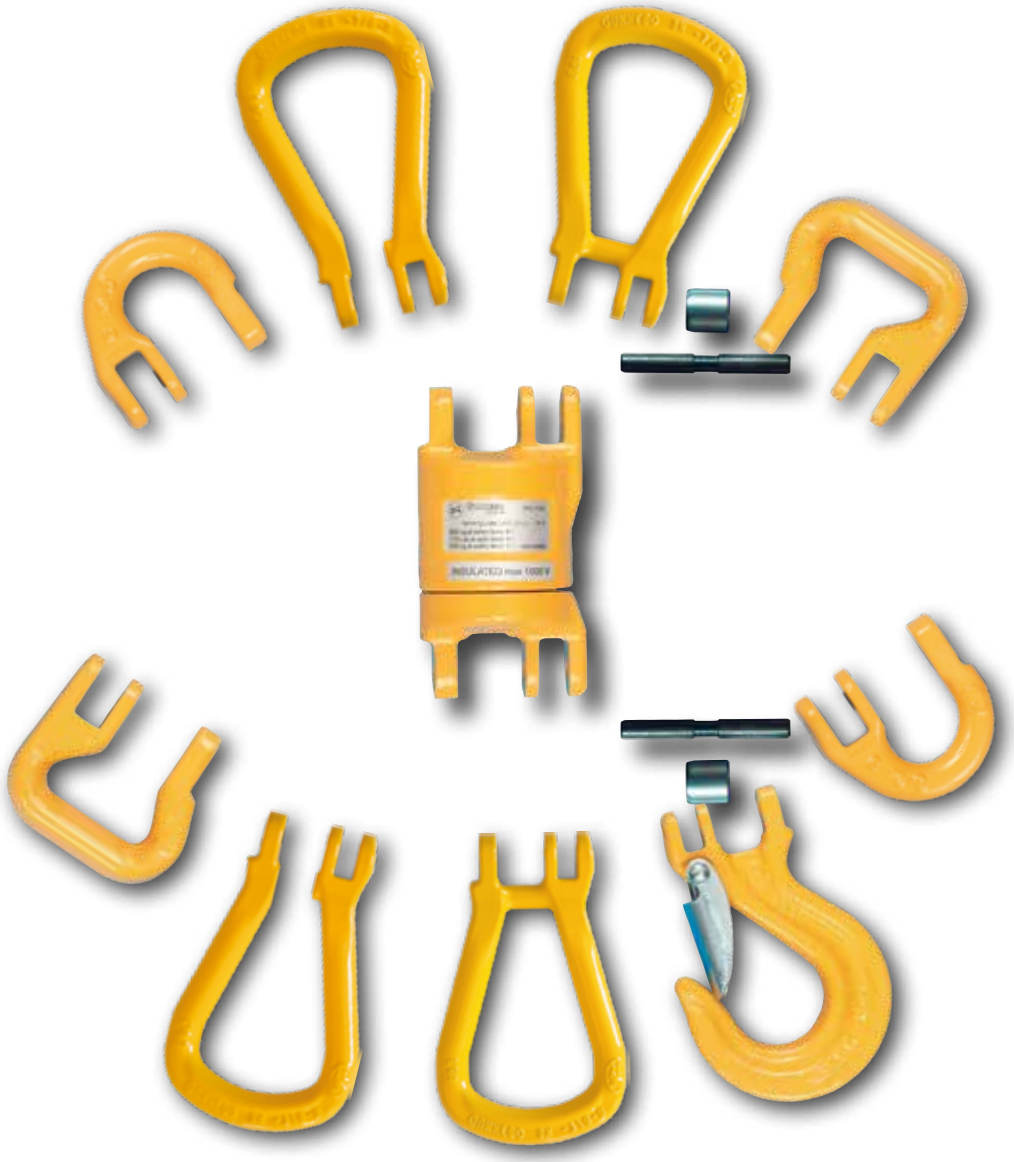
KITO CROSBY™

GUNNEBO® Industries

User Manual

SK-system



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1. Product overview

SKLI

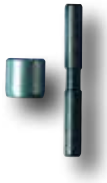
SKG

SKO

SKT

SKR

SKN/ESKN



SKA

Chain size		SKLI	SKLU[1]	SKG	SKO	SKR	SKT	SKN	ESKN	SKA
Grade		8	8	8	8	8	8	8	8	8
Metric (mm)	Imperial (inch)									
7/8	9/32 / 5/16	X		X	X	X	X	X		X
10	3/8	X		X	X	X	X	X		X
13	1/2	X		X	X	X	X		X	X
16	5/8	X		X	X	X	X		X	X
18/20	3/4	X		X	X	X	X		X	X
22	7/8		X			X	X			X
26	1		X			X	X			X

[1] Roller bearing swivel not electrically insulated (Uninsulated)

2. Introduction and EC declaration

This manual is an original instruction in accordance with Directive 2006/42/EC on machinery section 1.7.4 Instructions and Annex II Declarations. It also meets the requirements in standard EN 1677:2008 Components for slings– Safety – Part 1: Forged steel components. This manual is valid for ”SK-system”.
See page 2 for an overview of included variants.

This manual is valid in addition to Gunnebo Industries’ instruction for slings and lifting guide.
All manuals are continuously updated and are only valid in its latest version, which can be downloaded from gunneboindustries.com.

2.1 EC declaration of conformity and incorparation

Authorized person to compile the technical file is the R&D Manager.

We declare that the lifting component described in this user manual fulfil all the relevant provisions of the Directive 2006/42/EC as a partly completed machine.

The products main use is to be incorporated as part/s of a CE-marked lifting assembly but must in that case not be put into service until the final lifting assembly has been declared in conformity with the provisions of the Directive 2006/42/EC.

Our quality management system complies with ISO 9001:2015 and is certified by LRQA Sverige AB for and on behalf of Lloyd's Register Quality Assurance Limited (certificate identity number: 10140613).

Information about which harmonized and national standards/technical specifications that are applied as well as the valid version of this user instruction are available at: **gunneboindustries.com**.

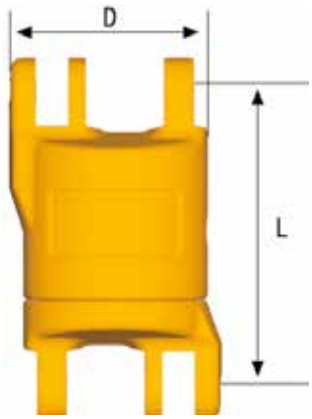
If the products are modified without approval from Gunnebo Industries, this declaration becomes invalid.

Växjö,

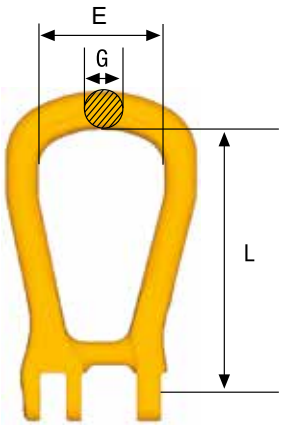
Engineering Manager

3. General description

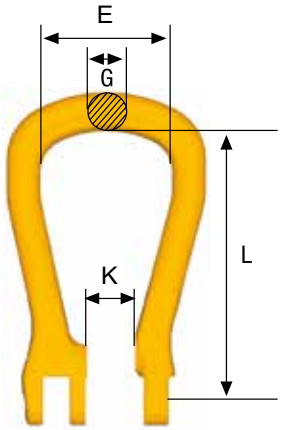
Main measurements and technical data available at **gunneboindustries.com**



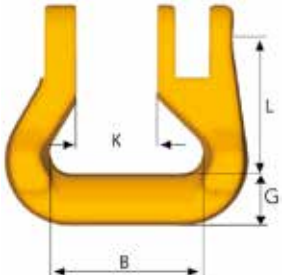
Roller bearing swivel
SKLI/SKLU



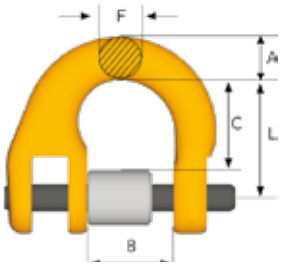
Master Link
SKG (closed)



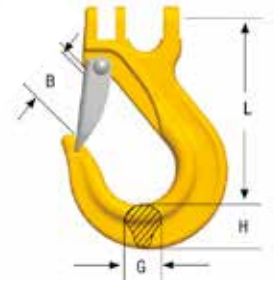
Master Link
SKO (open)



Round Sling Coupling SKR



Half-Link SKT
(includes locking set SKA)



Sling Hook ESKN with latch
Sling Hook SKN without latch

Type tests include deformation-, static tensile-, fatigue-, bend, and latch test. Gunnebo Industries manufacturing test regime includes proof loading 100% of the lot/batch.

Each part is marked as follows:
- Manufacturer identification (GUNNEBO SWEDEN)
- Product name, chainsize, material grade
- Batch/traceability code[2]
- Third party approval (BG H32)

Gunnebo Industries issues a manufacturer´s certificate according to EN 1677-1 and a 3.1 material certificate acc. to EN 10204

3.1 Summary of standards /norms applied

EN 1677:2008, ISO 8539:2009, ASTM A952/A952M-02, AS 3776:2015 and SANS 1595:2003.

Authorized resellers may provide their own documentation but will be able to provide the original certificates upon request.

4. Intended use and restrictions

4.1 Intended use

The SK system consists of a universal swivel coupling, SKLI and connectable parts. All components are manufactured from alloy steel for use with Grade 8 chain.

Combined with SKG, SKO, SKR, SKT and ESKN/SKN it can be used also for steel wire and synthetic lifting slings.

The SK system enables a broad variety of combinations possible to adapt to different lifting challenges.

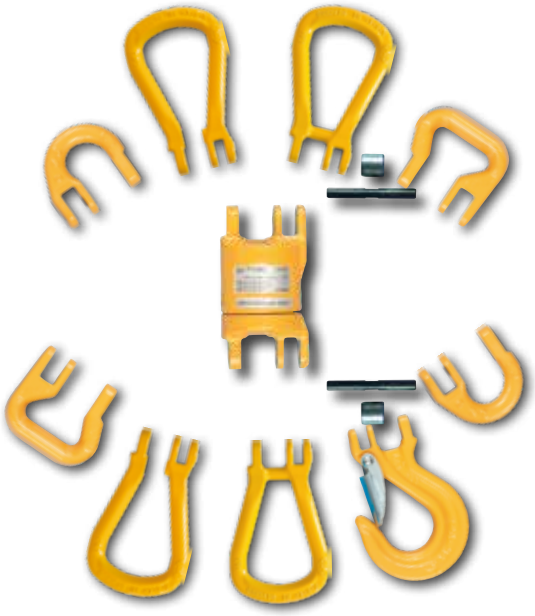
The SK system parts can also be part of customized lifting equipment.

Secure assembly with standardized dimensions within each size range eliminates the wrong assembly of components with different working loads. For example, SKLI-10-8 can only be paired with SKG-10-8, SKO-10-8, SKR-10-8, SKT-10-8 and SKN-10-8. When paired together the Working Load Limit (WLL) is equal for all.

See WLL values in the Gunnebo Industries product catalogue, **gunneboindustries.com.**

[2.] The traceability code consists of letters and numbers that identifies exactly which plant the product was made in, the year and the batch. This gives the ability to trace the product back through the manufacturing process, all the way back to the specific raw material.

4.2 The SK-system



The SKLI swivel uses lubricated roller bearings and sealing to ensure full rotation ability even at max working load limit. This enables secure positioning before, during and after the lift.

SKLI swivel has electrical insulation and may be used for welding operations on suspended loads. The product is tested to resist 1000 V. Statutory regulations regarding use and maintenance must be followed. The SKLU has the same functionality as the SKLI but is not electrically insulated and not intended for welding.

System combinations table for the SKLI system.
As example at the top connection, it is OK to combine an SKR with an ESKN at the bottom.

Top/ Bottom	SKG	SKO	SKR	SKT	ESKN /SKN

For example, SKLI can be combined with SKG, SKO, SKR, SKT or ESKN/SKN. The connection is made with SKA consisting of load pin and locking collar.

SKLI Swivel electrically insulated tested for max 1000V

SKLI, ESKN, SKO

The SK components can be paired together without the SKLI/SKLU swivel. The intended use could be to attach a synthetic sling to a chain sling or vice versa. Enable a flexible attachment for a special application.

SKG paired with SKT

Combination table of SK parts without using the swivel SKLI/SKLU.

Top/ Bottom	SKG	SKO	SKR	SKT	ESKN /SKN

As an example SKG can be combined with SKG, SKO, SKR, SKT or ESKN/SKN. The connection is made with SKA.

The Master links SKG/SKO have a closed or open link. Both can be connected to the lower or upper connection of the swivel SKLI/SKLU or to SKR, SKT or ESKN/SKN. The connection is made with the Load pin and locking collar set, SKA

SKG (closed), SKO (open) and SKA (Pin and collar)

The couplings SKR and SKT are intended to be combined with chain of grade 8 respectively a synthetic textile lifting sling. Be sure to choose the correct WLL of the textile band in line with the used SKLI components and adapted to the lifting combination.

SKR and SKT

The Hooks are available with spring latch ESKN and without SKN. It is always recommended to a hook with a latch.

ESKN/SKN

The SK system can only be used for lifting when the user has a valid certificate.

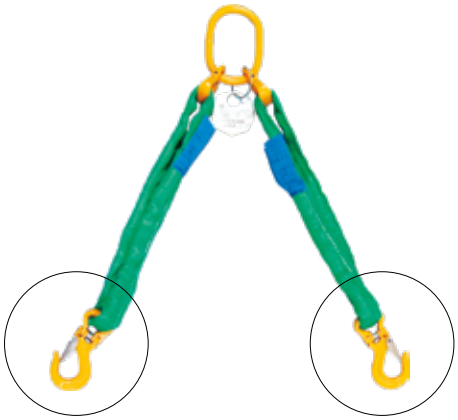
The product/s can be incorporated as part/s of a CE-marked lifting assembly but must not be put into service until the final lifting assembly has been declared in conformity with the provisions of the Directive 2006/42/EC.

Authorized resellers may provide their own documentation, but will be able to provide the original certificates upon request.

4.3 Example of usage of the SK system

Welded object electrically insulated to crane with the SKLI swivel

SK system parts adapted to enable a tailor-made lift



SKT and ESKN combined to enable connection to synthetic round sling

The SK system can on demand be adapted to customer specific demands.

SK system adapted to Helicopter rescue

SK system used for Helicopter transport of goods

4.4 General limitations of use

- The latch should always be used. Before usage of SKN the customer must make their own risk assessment.
- If chain is used use only Gunnebo short link chain.
- Never modify, repair or reshape the product by welding, heating or bending as this will affect the nominal WLL.
- Never heat treat the product as this may affect the WLL.
- The product must not be galvanized or subject to any plating or coating process without the approval of the manufacturer.
- The product must not be used in alkaline or acidic conditions.
- The product must not be exposed to aggressive chemicals, acids and vapors.

4.5 Use in exceptionally hazardous conditions

The rating of lifting accessories in European Standards assumes the absence of exceptionally hazardous conditions.

- Exceptionally hazardous conditions include:
- Offshore activities
- Lifting of persons
- Lifting of potentially dangerous loads (such as molten metals, corrosive materials or fissile materials)

In such cases the degree of hazard should be assessed by a competent person and the working load limit adjusted accordingly.

4.6 WLL reduction at elevated temperatures

The general allowed service temperature is -40 °C/-40 °F to +200 °C/392 °F.

For service temperatures higher than +200 ° C/392 °F, the following apply:

Service temperature	New load capacity in % of original WLL
200-300 °C 292 - 572 °F	90 %
300 - 400 °C 572 - 752 °F	75 %
> 400 °C > 752 °F	Not allowed

4.7 Fatigue

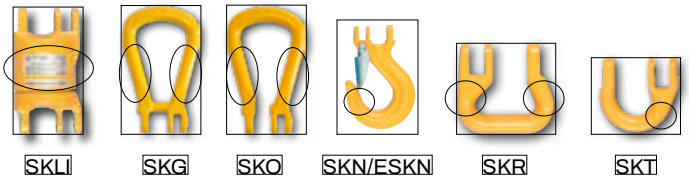
It is important to realize that fatigue failure can occur even if the prescribed WLL[3] has not been exceeded. Scenarios, in which the SK system is subjected to variable load over a prolonged period of time, will carry the risk of inducing fatigue. Consider this when dimensioning and deciding service intervals.

4.8 Additional marking

If markings such as project code, serial numbers etc. are added it must be done in a way that does not reduce the strength, corrosion resistance or the legibility of the manufacturer's own marking.

Provided these conditions are met, we recommend the following methods of marking:
marking tape, engraving tool or low stress punches.

Recommended areas for punched or engraved marking.



5. Assembly

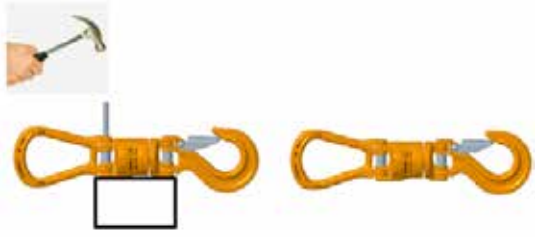
When the SK system is incorporated as a part of a lifting sling, it must be part of the certification and WLL rating of the complete sling. The assembly of the SK system may only be executed by a qualified person.

Assembly instruction - All parts in the system are assembled/disassembled in the same way.
See the configuration tables in chapter 3.

The tools needed are a hammer and a pin. The pin must have a smaller diameter than the load pin.
See below for general instruction exemplified on the SKG and SKLI.

5.1 Assembly

- Put the SKLI on a solid support. Position the locking collar and tap gently on the load pin with a hammer to drive it in position. Check that the load pin sticks out evenly on each side and that it is locked by the collar.



SKG assembled with SKLI

- Verify that all markings are readable on the the connected parts.

[3] The maximum working load a lifting accessory or lifting assembly can be subjected to.
[4] Download the lifting guide from gunneboindustries.com and instructions for slings.

5.2 Disassembly

Put the SKLI on a solid support with opening for the load pin. Position a pin tool smaller in diameter than the load pin. Tap gently to drive the load pin out of position.

SKG disassembled with SKLI

5.3 Spare parts

Available spare parts
- Locking set SKA.
- Latch with spring and rivet for ESKN.
- Open close trigger with spring and flexible pin.

See www.gunneboindustries.com for article numbers or Gunnebo Industries Product Catalogue.

5.4 Limitation placement

Only use the described components in this instruction since, no other parts are to be used in the SK system.

Check that the locking collar of the retainer pin is working and that it secures the load pin. If it does not work do not use the component before it has been replaced.

6. User instructions

The SK system is only to be used after reading and understanding this manual. For further recommendations regarding safe use of the SK System in sling applications, the user is referred to Gunnebo Industries' instruction for safe use of slings and lifting guide.

6.1 Verification prior to first use

Before first use ensure that:
- The SK System is precisely as ordered.
- The manufacturer's certificate is in order.

6.2 Inspection prior to each use

Before each use, the parts must be inspected for obvious damage or deterioration. The inspection should be done in accordance with local regulations but the items listed in section 7 - Inspection should as a minimum always be controlled. If there is any doubt with regards to these criteria being met, the SK system must not be used for a lifting operation.

6.3 Before loading

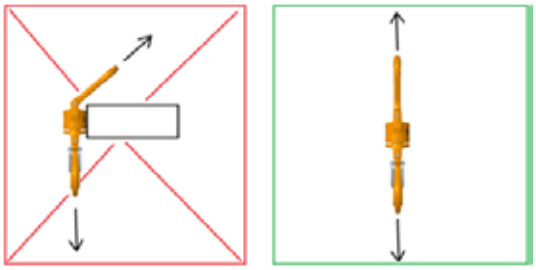
- Know the weight of the load and the centre of gravity.
- Check the conformity of the load with the WLL of the lifting equipment for the specific working configuration.
- Ensure that the SK system has been correctly assembled in accordance with section 5.
- Ensure that no obstacles will obstruct the lift and prepare the landing site.

6.4 General instructions for safe use

- The rigger must be a competent person able to judge the condition of the SK system and that it is correct dimensioned to the demands of the lifting object The rigger is responsible for safety regulations related to the lifting operation and that limitations of the equipment are respected.

- Visual function check - Before each operation check that the SK system and the connecting parts are correctly attached to eachother.

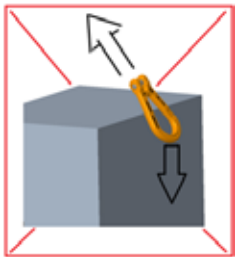
- Make sure that the SK system aligns with the pull direction. Check that the lifting chain/steel wire/synthetic textile band is not twisted or rotated.



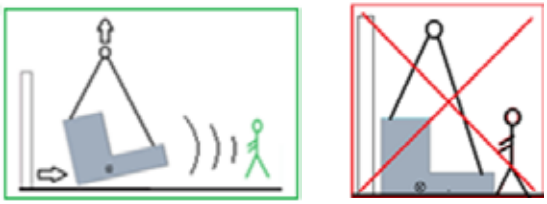
- Never point load the hook.

- Never lift an object without the latch closed.
- Only insert one object into each SK Part. If more than one the rigger must make a risk assessment.

- Never side load any SK part.



- When lifting asymmetric loads, be aware of sudden movement of the load.
  Keep a safe distance!



- The SKN Hook without latch, must only be used when the person responsible for the lift has performed a risk assemement.

SKN

- The SKLI/SKLU swivel allow rotation to position the load during the lift. But is not to be used for continuous rotation.

SKLI

6.5 End of use/Disposal

The SK Components are to be recycled/scrapped as general steel scrap.

7. Maintenance

7.1 General - Inspection

During service lifting equipment is subjected to conditions which affect their safety. It is therefore necessary to ensure that the equipment should be safe for continued use. The SK system should be withdrawn from service and referred to a competent person for thorough examination if any of the following are observed:

- The markings are illegible.
- More than 10% reduction of dimension at any point.
- Cuts, nicks, gouges, cracks, excessive pitting or corrosion, heat discoloration, bent or distorted or any other defects.

7.2 Thorough examination

A thorough examination should be carried out by a competent person at intervals not exceeding twelve months. The inspection interval should be less where deemed necessary taking into consideration:

- Local-, national-, or branch-specific regulation
- The service condition of the SK Component
- Eventual use in demanding environments (e.g. corrosive or extreme temperature)
- Eventual use where the SK Component is subjected to repeated loads that may induce metal fatigue

Records of such examinations should be maintained.

Prior to the examination the SK system parts are to be cleaned free from oil, dirt and rust. Any cleaning method which does not damage the parent metal is acceptable. Methods to avoid are those using acids, overheating, removal of metal or movement of metal which may cover cracks or surface defects.

7.3 Specific - SKLI /SKLU Swivel

Below description is based on SKLI but can also be used also for the non-electrically insulated Swivel type SKLU. The insulation parts M and L are then not included.

The Swivel type SKLI uses lubricated roller bearings and sealing to ensure full rotation ability even at max working load limit. SKLI prevents the sling legs from twisting. SKLI has electrical insulation and may be used for welding operations on suspended loads. The product is tested to resist 1000 V. Statutory regulations regarding use and maintenance must be followed.

Annual maintenance is normally sufficient. Maintenance should be carried out more frequently if necessary due to working conditions. On delivery the swivel is lubricated with bearing grease, type Texaco Multifak EP 2 or equivalent quality.

Annual maintenance Wear of load bearing parts must not exceed 10 % of original dimensions. Rotate the swivel in both directions while loaded by approximately 5% of max working load limit. The swivel should rotate easily. If not or if the sealing is suspected to be damaged, the swivel should be dismounted and inspected. Lubrication is carried out by dismounting screw (B) and mounting a grease nipple. Add grease until grease appears between house and shank and remount screw (B)

Dismounting and change of sealing (G)

1. Dismount stop screws (A) and screw (B).
2. Rotate the shank until the carrier holes (C) in shank (D) and carrier (E) are in line with each other.
3. Insert a pin of suitable diameter through the carrier holes (C).
4. Unscrew housing (F) from the shank assembly. 5. Dismount spring pin (I) from nut (H).
6. Dismount the nut. Note! Each nut and shank is machined together and shall only be used together!
7. Dismount and inspect bearing (K). Replace bearing if damaged.
8. Dismount the carrier (E) and renew the sealing.
9. Inspect the housing and the shank.

7.4 Assembly

1. Check that the seal is correctly mounted. The spring inside the seal shall be visible.

2. Assemble all shank parts in reverse order step 5–8. Make sure the bearing-halves are correctly mounted. The one with the largest inner diameter (marked GS) shall be mounted inside the insulation bush (L). The one with smallest inner diameter (marked WS) shall be mounted towards the nut.
Do not forget to mount insulation bush (M).

3. Mount the shank assembly into the housing in reverse order step 1–4. Screw on the housing until it stops. Then loosen it until the locking holes are in line with each other (approximately 1/2 of a revolution). Add a few drops of locking fluid type Loctite 242 to the stop screws and mount the stop screws securely.

4. Lubricate the swivel according to instructions above.

5. Measure isolation with multimeter by connection one probe to screw (B) and the other one to inside of carrier hole (C)

7.5 Repair

Repairs must only be done by a competent person who has the knowledge and technical skills.
The SK system parts shall only be returned to service after approval by a designated person.

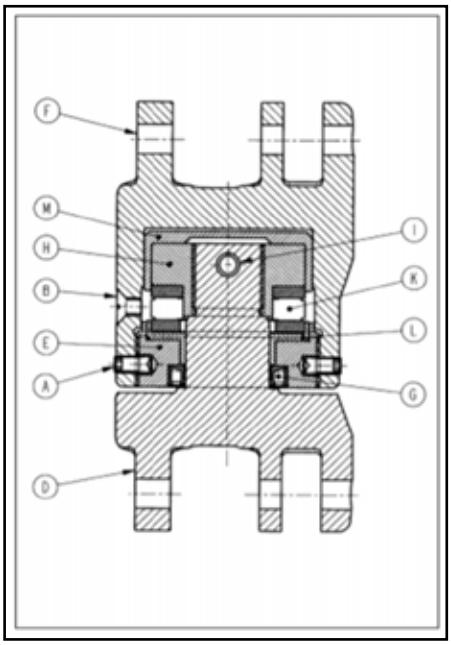
Records of repairs should be maintained.For replacement use only original Gunnebo spare parts.

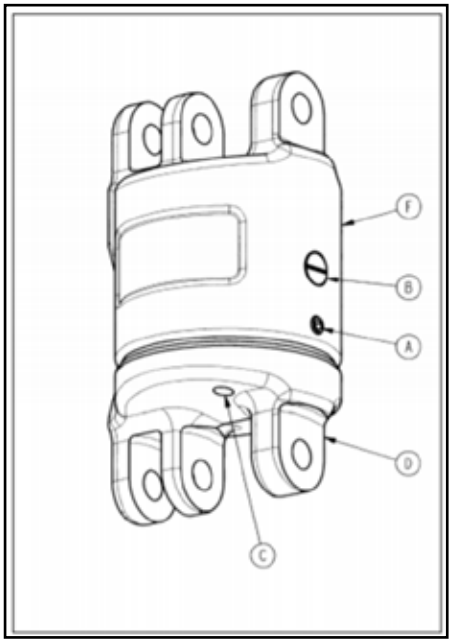
Components that are cracked, visibly distorted or twisted, severely corroded or have deposits which cannot be removed should be discarded and replaced.

Minor damage such as nicks and gouges may be removed by careful grinding or filing. The surface should blend smoothly into the adjacent material without abrupt change of the section.

The complete removal of the damage should not reduce the thickness of the section at that point to less than the manufacturer's specified minimum dimensions or by more than 10 % of nominal thickness of the section.

SKLI Swivel





A – Stop Screws
B - Screw
C – Carrier Hole
D - Shank
E - Carrier
F - Housing
G - Sealing
H - Nut
I – Spring Pin
K - Bearing
L – Insulation bush