

Safety Engineered Hoist Rings (SEHR)



Safety Engineered Hoist Rings are lifting accessories which have a machined lifting bail that pivots 180 degrees and rotates 360 degrees prior to and during loading. Safety Engineered hoist rings are designed to interface with other lifting accessories, such as slings, hooks, and shackles, to perform safe lifting operations. Users of Safety Engineered hoist rings manufactured by ADB® Hoist Rings (ADB®) shall be knowledgeable of the intended use and capabilities which each Safety Engineered hoist ring is designed to meet. Serious injury or death may occur when Safety Engineered hoist rings are not used for intended purposes or used incorrectly. When selecting a Safety Engineered hoist ring, the increased force generated on the Safety Engineered hoist ring, because of angular loaded sling angles, must be calculated and known by Safety Engineered hoist ring users. **Angular loading only increases the force applied on the Safety Engineered hoist ring and it is the responsibility of the user to not exceed the working load limit on the Safety Engineered hoist ring.** Safety Engineered hoist rings do not have reduced working load limits based on angular loading, and the marked working load limit is applicable to loads applied from 0° to 90° from the bolt axis.

No portion of the human body shall be on or near a Safety Engineered hoist ring under tension. All personnel shall not be underneath a suspended load and shall stay a safe distance away as defined by safety personnel.

Each ADB® Safety Engineered hoist ring is supplied with a yellow safety tag attached and must be read by each user. As the tag shows, Safety Engineered hoist rings have been proof tested to a load equal to the working load limit times the static test coefficient of 2. It is the manufacturer's intention for the warning label to stay affixed to the Safety Engineered hoist ring during use. In the case that removal of the warning label is warranted, the label must be kept on file in the safety procedures and training records of the users of Safety Engineered hoist rings. Acknowledgment and demonstration of applying the proper rigging practices by the user of Safety Engineered hoist rings shall be documented prior to use.

1 SAFETY INSTRUCTIONS:

- Safety Engineered hoist ring users shall have competency of ASME B30.26 and OSHA 1910.184, which should include completion of a basic rigger training course.
- Never exceed the marked working load limit. (See also installation force calculations)
- During transportation and installation, users should take note of the Safety Engineered hoist ring weight and use proper handling equipment.
- Safety Engineered hoist rings should be handled using the top of the bail to prevent pinching or crushing of hands.



Figure 1 - Bushing Gap



Figure 2 - Contact Edge



Figure 3 - Spacer



Figure 4 - Oversized Hook

- Users should wear gloves while handling Safety Engineered hoist rings to protect against sharp edges, such as threads.
- Users should wear safety glasses to protect from potential ejection of material in the event of failure.
- Visually inspect the Safety Engineered hoist ring for damage before each use. (See also inspection and maintenance)
- During installation, user should be aware of rotating components and the gap between the mating surface and bushing base of the hoist ring to prevent harm to hands.
- Apply the marked torque value prior to each installation and before each use validate torque to ensure conditions have not caused loosening.
- During preloading, ensure that each Safety Engineered hoist ring bail has pivoted and swiveled to be in line with the sling direction to apply the proper loading direction to the Safety Engineered hoist ring as designed.
- During preloading, ensure that load to which a Safety Engineered hoist ring is attached is not fastened to earth.
- Apply loads gradually to avoid shock loads.
- Do not leave a gap between the bushing flange and mounting surface. (Fig. 1)
- Safety Engineered hoist ring bail must be free to rotate and swivel, and cannot contact an edge. (Fig. 2)
- Do not use spacers between the bushing flange and the mounting surface. (Fig. 3)
- Do not use oversized hooks or attachment methods that spread the bail. (Fig. 4)
- Do not side load the bail. (Fig. 5)
- Do not attach guidelines to Safety Engineered hoist rings.
- Do not interchange Safety Engineered hoist ring components with those from other hoist ring models or manufacturers, as ADB® components have undergone

- If a Safety Engineered hoist ring is involved with any rigging failure, it must be thoroughly inspected before it can return to service.

2 INTENDED USE:

- Safety Engineered hoist rings are intended to be used as an attachment point for rigging hardware for the means of lifting a load.
- Safety Engineered hoist rings are intended to be used in a variety of lifting applications via attachment to a load by means of a threaded blind hole or in a thru-hole with bottom nut and washer.
- Safety Engineered hoist rings can be loaded from 0° to 90° from the bolt axis and can swivel to align with the load. (Fig. 6)
- Safety Engineered hoist rings can be used as lashing points when installed directly to a fixed object, and not as linkage within a lashing means.
- Safety Engineered hoist rings are intended to be affixed to a load and positioned on the basis of the identification of the center of gravity of the load which most symmetrically allocates the load to each Safety Engineered hoist ring uniformly. The use of larger working load Safety Engineered hoist rings in positions to compensate for the complete weight of the load may be required. Consult a competent person with rigger training for choosing and positioning Safety Engineered hoist rings to loads, when the center of gravity is identified.
- Safety Engineered hoist rings are intended to compensate for pitch and sway during loading.

3 UNINTENDED USE:

- The Safety Engineered hoist ring bail shall never make contact with the load or a fixed surface during loading.
- Safety Engineered hoist rings shall not be used as a substitute for a barrel swivel.
- Safety Engineered hoist rings are not intended for high frequency rotation or assembled to an object which undergoes a high frequency motion or vibration.
- Safety Engineered hoist rings are not a shackle and components shall not be welded, modified, or disassembled for installation or use.
- The Safety Engineered hoist ring bail shall not be held mechanically or installed in a manner to prevent the free motion of pivot and swivel.
- Safety Engineered hoist rings shall not be used or exposed to temperatures exceeding 400°F (204°C) to -20°F (-29°C).
- Safety Engineered hoist rings shall not be exposed to acidic or caustic solutions or fumes which may induce hydrogen embrittlement.
- Multiple Safety Engineered hoist ring bails shall not be reeved with slings.
- Safety Engineered hoist rings are not to be used to strike other objects, thrown, or handled in a manner that will cause material damage.



Figure 5 - Side Loading



Figure 6 - Permitted Loading Angles

- non-destructive testing for crack detection.
- Do not modify Safety Engineered hoist rings.
- Replace fastener with only ADB® manufactured and approved replacement bolt kits which have undergone non-destructive testing for crack detection.
- Do not remove the identification tag attached to Safety Engineered hoist rings without approval and proper storage of tag.
- Do not drill any Safety Engineered hoist ring component to attach an identification tag.
- Failure to follow these instructions could result in injury or death and damage to property.
- In the event of a failure, all Safety Engineered hoist rings must be unloaded so they may be safely approached and uninstalled. All missing components must be identified and stored together for any future review.

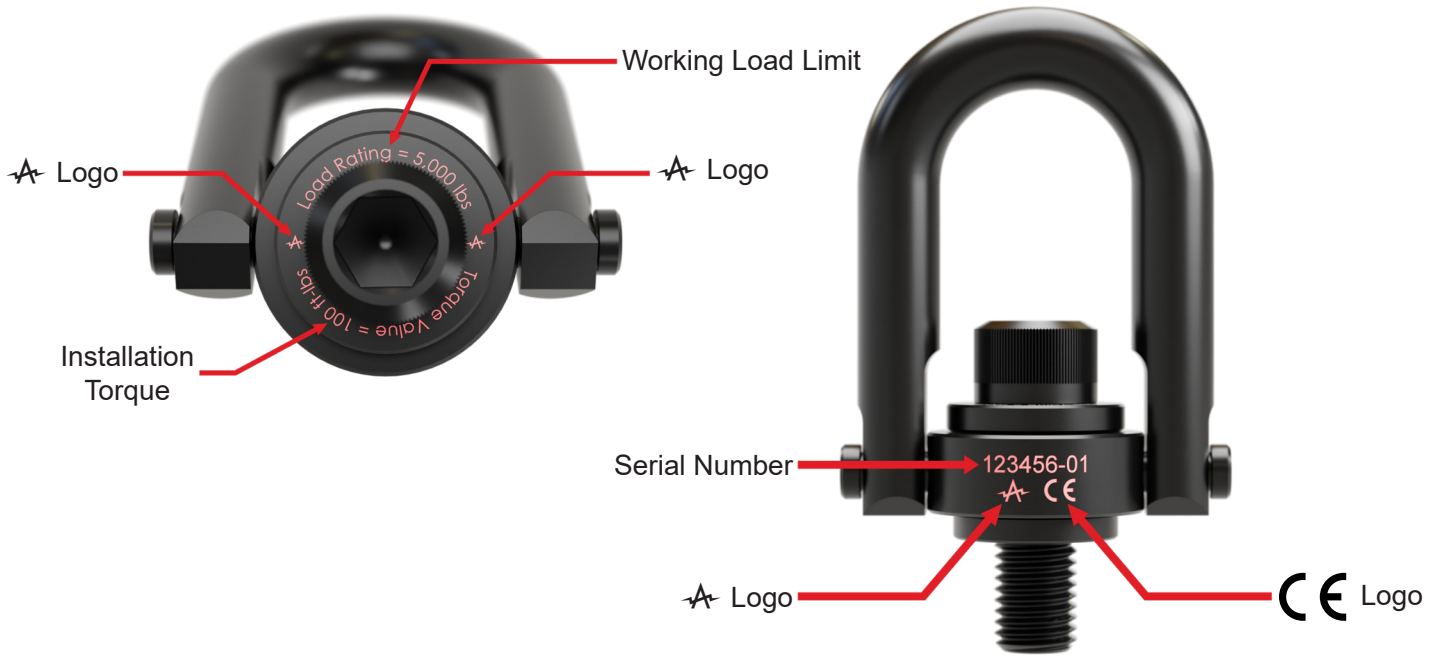


Figure 7 - Safety Engineered Hoist Ring Markings



Figure 8 - Safety Engineered Hoist Ring Alternate Markings

4 INSTALLATION NOTES:

- Tap thread perpendicular to the mounting surface.
- Mounting surface should be flat to provide 360° flush seating for the Safety Engineered hoist ring bushing base.
- It's important to pay close attention to the markings on the Safety Engineered hoist rings to ensure that proper installation torque is applied and the working load limit is appropriate for the application. (Fig. 7 & 8)
- For installation in ferrous materials the bolt should be tightened to the full torque load (+/-10%). All torque values are based on a dry installation without the use of lubricant. If lubricant is used, contact ADB®'s engineering department for revised torque value.
- ADB® recommends the ultimate tensile strength of the mating material to be a minimum of 80,000 psi.
- For weaker mating material, if possible, consider using longer bolts or through-hole mounting with a nut and washer on the back side.
 - ◊ Bottom side nuts shall be SAE J995 Grade 8 or ASTM A194 Grade 2H for inch and ISO 898-2 Class 12 or ASTM A194M Grade 2H for metric.

- ◊ Bottom washers shall be made from hardened steel.
- The applied load to each Safety Engineered hoist ring must be calculated to ensure the load rating will not be exceeded. This formula can be used when the sling angles are the same in relation to horizontal and all loads are equally applied.

$$F = \frac{W}{N \sin \theta}$$

F = force applied to each hoist ring
 W = total weight
 N = number of lifting points
 Θ = lifting angle in relation to horizontal

- When using 3 or 4 leg slings, it's recommended to calculate load based on 3 legs only, as it will be very difficult to equally load all legs of the sling.
- After installation, validate that the Safety Engineered hoist ring swivels and pivots freely in all directions.
- Safety Engineered hoist rings subject to rotation under load must be lubricated on the internal bearing surfaces.

- Operational temperature range for Safety Engineered hoist rings is from 400°F (204°C) to -20°F (-29°C). Consult ADB®'s engineering department for uses beyond these limits.
- Safety Engineered hoist rings cannot be exposed to chemically active or acidic environments. A change in material properties, which reduce the mechanical performance of the Safety Engineered hoist ring, can occur and can result in a failure, which can result in injury or death.

5 INSPECTION AND MAINTENANCE:

- Safety Engineered hoist rings need to be inspected visually for damage prior to use.
- Only qualified personnel should inspect and make judgment on the safe use of Safety Engineered hoist rings.
- All new Safety Engineered hoist rings should be inspected fully prior to first use.
- A periodic inspection schedule shall be established by a qualified person based on the frequency of use, severity of service conditions, the lifting application, and experience gained from similar applications.
- General time intervals for complete inspections:
 - ◊ Normal service – yearly
 - ◊ Severe service – monthly/quarterly
 - ◊ Special service – as recommended from a qualified person
- General guidelines for removal of Safety Engineered hoist rings below:
 - ◊ Missing or illegible identification
 - ◊ Missing components
 - ◊ Indications of heat damage, including weld spatter or arc strikes
 - ◊ Excessive pitting or corrosion
 - ◊ Bent, twisted, distorted, stretched, elongated, cracked, or broken load-bearing components
 - ◊ Excessive nicks or gouges
 - ◊ A 10% reduction of the original or catalog dimension at any point
 - ◊ Excessive thread damage or wear
 - ◊ Evidence of unauthorized welding or modification
 - ◊ Lack of the ability to freely rotate or pivot before and after installation torque is applied
 - ◊ Other conditions, including visible damage, that cause doubt as to continued use
- Replacement bolt kits are available for all standard Safety Engineered hoist ring part numbers.
- Assembly/disassembly instructions are detailed in section 9.

6 TRANSPORT AND STORAGE:

- During transportation, users should take note of the Safety Engineered hoist ring weight and use proper handling equipment.
- Safety Engineered hoist rings should be handled using the top of the bail to prevent pinching or crushing of hands.

- Users should wear gloves while handling Safety Engineered hoist rings to protect against sharp edges, such as threads.
- Appropriate precautions should be taken to prevent damage to Safety Engineered hoist rings during transport and storage.
- Contact to threads must be prevented to ensure damage does not occur.
- Metal to metal contact should be avoided to prevent any nicks and gouges.
- If Safety Engineered hoist ring identification tags are at risk of being lost or damaged, serial numbers should be noted and tags stored in a designated location along with safety and training records.
- Safety Engineered hoist rings must be stored in a dry environment to prevent any corrosion.

7 PRODUCT VERSIONS:

- ADB® variations to the standard Safety Engineered hoist ring product design are made to the same requirements as identified in this document and oftentimes have the following changes to standard processes not requiring additional design testing.
 - ◊ Thread projections
 - ◊ Larger thread diameters
 - ◊ Thread pitches
 - ◊ Plating
 - ◊ Non-destructive
 - ◊ Proof testing

8 PRODUCT TABLE NOTES:

- The intention of the product table is to identify the capacities and other specifications required for the selection of a Safety Engineered hoist ring.
- The table is a reference for a competent rigging person for the selection of the lifting point once all known lift variables are identified. (i.e. center of gravity, number of slings, force applied to each lifting point with sling angles considered during loading, vertical or horizontal positions of the load during loading, and environmental conditions)

9 ASSEMBLY INSTRUCTIONS:

These instructions are to be followed in the event that the Safety Engineered hoist ring must be disassembled and reassembled due to maintenance, inspection, or replacement of component.

SAFETY ENGINEERED HOIST RING WITH RETAINING RINGS (Fig. 9)

DISASSEMBLE:

1. For Safety Engineered hoist rings containing a retaining ring (1), remove the retaining ring from the groove in the mounting screw (2).
2. Remove the bushing (3) from the sub-assembly (4).
3. Remove the sub-assembly (4) and washer (5) from the screw (2).

ASSEMBLE:

1. For Safety Engineered hoist rings that will experience rotation under load or with a working load limit of 15,000 lbs or greater, lubricate the sleeve diameter of the bushing (3), and top and bottom surfaces of the washer (5) with Molykote P-37.
2. Place the washer (5) on the screw (2) with the markings facing the head of screw.
3. Place the sub-assembly (4) on the screw (2).
4. Slide the sleeve of the bushing (3) into the inner diameter of the sub-assembly (4).
5. Install the retaining ring (1) into the groove on the screw (2) within the recess of the bushing (3).

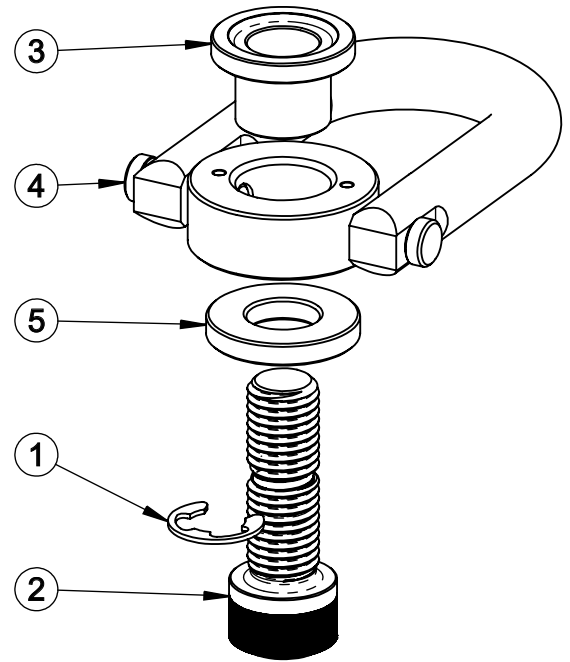


Figure 9 - Safety Engineered Hoist Ring With Retaining Ring

SAFETY ENGINEERED HOIST RING WITH STUD ASSEMBLY (Fig. 10)

DISASSEMBLE:

1. For Safety Engineered hoist rings containing a stud (6), remove the dowel pin (2) from the nut (1) by hammering from the opposite side of the knurl.
2. Unthread the nut (1) from the stud (6).
3. Remove the stud (6) from the assembly.
4. The remaining components are free to be separated.

ASSEMBLE:

1. For Safety Engineered hoist rings that will experience rotation under load or with a working load limit of 15,000 lbs or greater, lubricate the sleeve diameter of the bushing (5), and top and bottom surfaces of the washer (3) with Molykote P-37.
2. Place the bushing (5) on the stud (6) with the larger flange facing the mating threads.
3. Place the sub-assembly (4) onto the bushing sleeve (5) with the thick side of the body (4) facing away from the bushing.
 - a. Round body style sub-assemblies (4) can be placed on the bushing (5) in either direction.
4. Place the washer (3) on the stud (6) with the markings facing away from the body (4).
5. Thread the nut (1) on the stud (6) with the grade markings on the nut facing away from the washer (3) until the predrilled holes are fully aligned.
6. Insert the non-knurled end of the dowel pin (2) into the nut (1) and stud (6). Dowel pin must be new.
7. Hammer the dowel pin (2) flush with the flats of the nut (1).

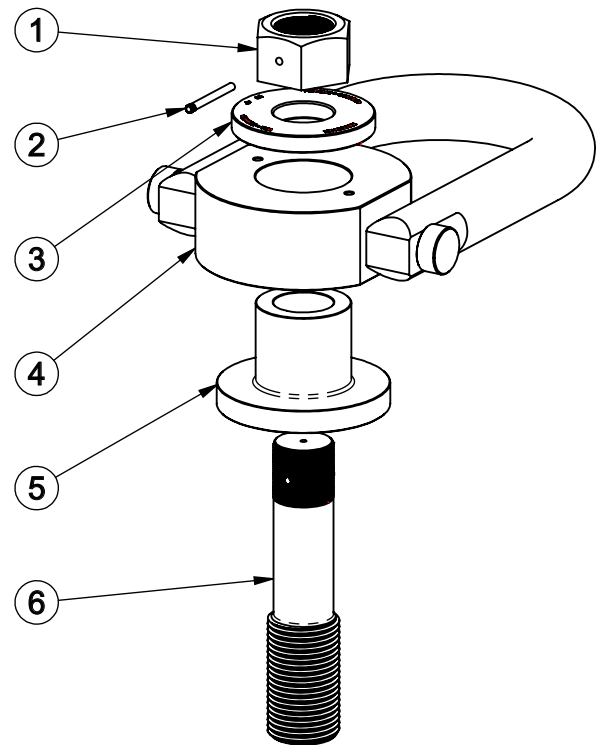


Figure 10 - Safety Engineered Hoist Ring With Stud Assembly

SUB-ASSEMBLY (Fig. 11)

DISASSEMBLE:

1. Remove the dowel pins (1) from the body (3) by hammering from the opposite side of the knurl.
2. Remove the shoulder pins (2) from the body (3) and u-bar (4).
3. The body (3) and u-bar (4) are free to be separated.

ASSEMBLE:

1. Lubricate the inner diameters of the u-bar (4) and body (3), and the outer diameter of the shoulder pins (2) with Molykote P-37.
2. Insert shoulder pins (2) while aligning u-bar (4) and body (3) inner diameters.
3. Insert the non-knurled end of the dowel pins (1) into the body (3). Dowel pins must be new.
4. Hammer the dowel pins (1) flush with the surface of the body (3)

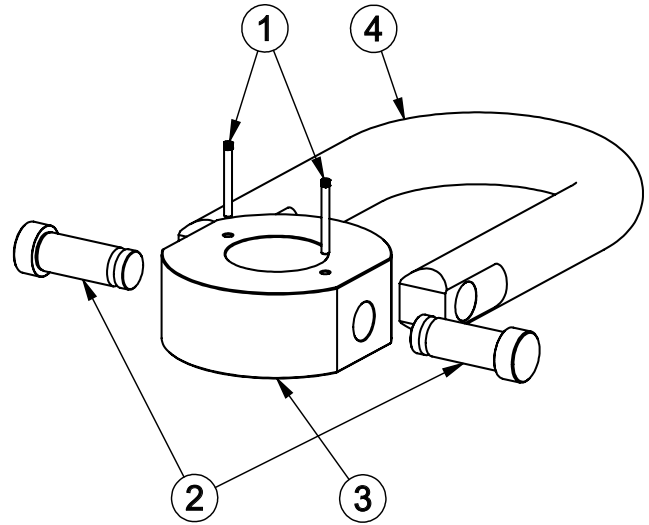
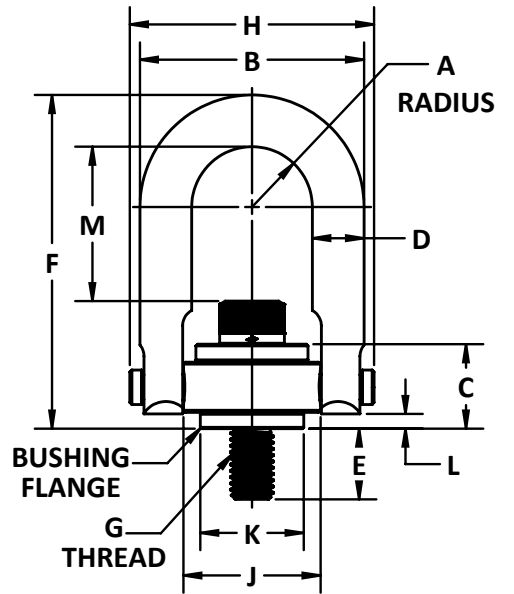


Figure 11 - Sub-Assembly



Inch																
Part No.	Rated Load (lbs)	A	B	C	D	E +/- .12	F	G	H	J	K	L	M	Hex Size	Torque (ft-lbs)	Weight (lbs)
23050	550	.43	1.61	.71	3/8	.54	2.67	1/4-20	1.84	1.00	.75	.17	1.33	3//16	5	0.3
23051	800	.43	1.61	.71	3/8	.29	2.67	5/16-18	1.84	1.00	.75	.17	1.27	1/4	7	0.3
23052	800	.43	1.61	.71	3/8	.54	2.67	5/16-18	1.84	1.00	.75	.17	1.27	1/4	7	0.31
23053	1000	.43	1.61	.71	3/8	.54	2.67	3/8-16	1.84	1.00	.75	.17	1.21	5/16	12	0.32
23301	2,500	.70	2.40	.93	9/16	1.07	3.77	1/2-13	2.58	1.49	1.25	.20	1.84	3/8	28	0.93
23004	2,500	.88	3.25	1.22	3/4	.78	4.78	1/2-13	3.52	1.99	1.50	.16	2.31	3/8	28	2.2
•23322	2,500	.88	3.25	1.22	3/4	.78	6.72	1/2-13	3.52	1.99	1.50	.16	4.25	3/8	28	2.7
23005	2,500	.88	3.25	1.22	3/4	1.03	4.78	1/2-13	3.52	1.99	1.50	.16	2.31	3/8	28	2.2
•23323	2,500	.88	3.25	1.22	3/4	1.03	6.72	1/2-13	3.52	1.99	1.50	.16	4.25	3/8	28	2.7
23006	2,500	.88	3.25	1.22	3/4	1.28	4.78	1/2-13	3.52	1.99	1.50	.16	2.31	3/8	28	2.2
•23324	2,500	.88	3.25	1.22	3/4	1.28	6.72	1/2-13	3.52	1.99	1.50	.16	4.25	3/8	28	2.7
23001	4,000	.88	3.25	1.22	3/4	.78	4.78	5/8-11	3.52	1.99	1.50	.16	2.18	1/2	60	2.3
•23319	4,000	.88	3.25	1.22	3/4	.78	6.72	5/8-11	3.52	1.99	1.50	.16	4.12	1/2	60	2.8
23002	4,000	.88	3.25	1.22	3/4	1.03	4.78	5/8-11	3.52	1.99	1.50	.16	2.18	1/2	60	2.3
•23320	4,000	.88	3.25	1.22	3/4	1.03	6.72	5/8-11	3.52	1.99	1.50	.16	4.12	1/2	60	2.8
23003	4,000	.88	3.25	1.22	3/4	1.28	4.78	5/8-11	3.52	1.99	1.50	.16	2.18	1/2	60	2.3
•23321	4,000	.88	3.25	1.22	3/4	1.28	6.72	5/8-11	3.52	1.99	1.50	.16	4.12	1/2	60	2.8
23007	5,000	.88	3.25	1.22	3/4	1.03	4.78	3/4-10	3.52	1.99	1.50	.16	2.06	5/8	100	2.4
•23325	5,000	.88	3.25	1.22	3/4	1.03	6.72	3/4-10	3.52	1.99	1.50	.16	4.00	5/8	100	2.8
23008	5,000	.88	3.25	1.22	3/4	1.28	4.78	3/4-10	3.52	1.99	1.50	.16	2.06	5/8	100	2.4
23326	5,000	.88	3.25	1.22	3/4	1.28	6.72	3/4-10	3.52	1.99	1.50	.16	4.00	5/8	100	2.9
23009	5,000	.88	3.25	1.22	3/4	1.53	4.78	3/4-10	3.52	1.99	1.50	.16	2.06	5/8	100	2.4
•23327	5,000	.88	3.25	1.22	3/4	1.53	6.72	3/4-10	3.52	1.99	1.50	.16	4.00	5/8	100	2.9
23102	7,000 ^A	1.40	4.80	1.71	1	1.04	6.52	3/4-10	5.14	3.00	2.37	.24	3.06	5/8	100	6.4
•23329	7,000 ^A	1.40	4.80	1.71	1	1.04	8.11	3/4-10	5.14	3.00	2.37	.24	4.65	5/8	100	7.1
23103	7,000 ^A	1.40	4.80	1.71	1	1.54	6.52	3/4-10	5.14	3.00	2.37	.24	3.06	5/8	100	6.4
•23330	7,000 ^A	1.40	4.80	1.71	1	1.54	8.11	3/4-10	5.14	3.00	2.37	.24	4.65	5/8	100	7.1
23101	8,000	1.40	4.80	1.71	1	1.04	6.52	7/8-9	5.14	3.00	2.37	.24	2.93	3/4	160	6.5
•23328	8,000	1.40	4.80	1.71	1	1.04	8.11	7/8-9	5.14	3.00	2.37	.24	4.52	3/4	160	7.2
23105	10,000	1.40	4.80	1.71	1	1.29	6.52	1"-8	5.14	3.00	2.37	.24	2.81	3/4	230	6.7
•23331	10,000	1.40	4.80	1.71	1	1.29	8.11	1"-8	5.14	3.00	2.37	.24	4.40	3/4	230	7.4
23106	10,000	1.40	4.80	1.71	1	1.54	6.52	1"-8	5.14	3.00	2.37	.24	2.81	3/4	230	6.8

Inch																
Part No.	Rated Load (lbs)	A	B	C	D	E +/- .12	F	G	H	J	K	L	M	Hex Size	Torque (ft-lbs)	Weight (lbs)
•23332	10,000	1.40	4.80	1.71	1	1.54	8.11	1"-8	5.14	3.00	2.37	.24	4.40	3/4	230	7.5
23107	10,000	1.40	4.80	1.71	1	2.29	6.52	1"-8	5.14	3.00	2.37	.24	2.81	3/4	230	6.9
•23333	10,000	1.40	4.80	1.71	1	2.29	8.11	1"-8	5.14	3.00	2.37	.24	4.40	3/4	230	7.6
23108	10,000	1.40	4.80	1.71	1	2.29	6.52	1 1/8"-8	5.14	3.00	2.37	.24	2.81	7/8	230	7.2
23402	15,000	1.75	6.00	2.11	1 1/4	1.89	8.73	1 1/4"-8	6.50	3.76	3.20	.35	4.12	7/8	470	14
23401	15,000	1.75	6.00	2.11	1 1/4	1.89	8.73	1 1/4"-7	6.50	3.76	3.20	.35	4.12	7/8	470	14
23204	24,000	2.25	8.00	2.81	1 3/4	2.70	12.47	1 1/2"-8	8.55	4.87	4.20	.47	6.41	1	800	33
23202	24,000	2.25	8.00	2.81	1 3/4	2.70	12.47	1 1/2"-6	8.55	4.87	4.20	.47	6.41	1	800	33
†23203	30,000	2.25	8.00	2.81	1 3/4	2.96	12.47	2"-8	8.55	4.87	4.20	.47	6.41	2 1/4	1,100	34
†23200	30,000	2.25	8.00	2.81	1 3/4	2.96	12.47	2"-4 1/2	8.55	4.87	4.20	.47	6.41	2 1/4	1,100	34
23201	30,000	2.25	8.00	2.81	1 3/4	2.96	12.47	2"-4 1/2	8.55	4.87	4.20	.47	6.41	1 1/2	1,100	35
†23501	50,000	3.00	10.50	4.09	2 1/4	4.00	16.87	2 1/2"-8	11.67	6.52	5.75	1.12	8.03	3	2,100	81
†23503	50,000	3.00	10.50	4.09	2 1/4	4.00	16.87	2 1/2"-4	11.67	6.52	5.75	1.12	8.03	3	2,100	81
†23600	75,000	3.75	13.00	5.27	2 3/4	5.20	19.50	3"-4	14.15	8.10	7.25	1.00	8.48	3 3/4	4,300	170
†23701	100,000	4.00	14.50	6.06	3 1/4	7.00	22.09	3 1/2"-4	15.90	8.60	7.25	1.09	9.28	4 5/8	6,600	250
†23751	150,000	5.00	18.00	7.50	4	8.50	27.38	4 1/4"-4	19.69	10.75	9.87	1.33	12.13	5 3/4	12,000	460
†23760	200,000	6.00	22.00	9.00	5	9.00	33.00	5"-4	24.00	13.00	12.38	1.88	14.50	6 1/2	19,800	810
†23770	250,000	6.00	22.00	9.00	5	9.00	33.00	6"-4	24.00	13.00	12.38	1.88	14.00	7 1/4	29,000	840

NOTE: Hex size for stud and nut part numbers refers to the external hex size of the nut. All other part numbers refer the internal hex size of the socket.

• Long Bar Models

† Supplied with stud and nut

^ The 7,000 lb. WLL when loaded at 90 degrees to the bolt axis, is established with a 4.5 design factor

Metric																
Part No.	Rated Load (kg)	A	B	C	D	E +/- 3.0	F	G	H	J	K	L	M	Hex Size	Torque (Nm)	Weight (kg)
24008	400	10.9	40.9	18	9.5	17	67.8	M8x1.25	46.7	25.4	19.1	4.3	32.1	6	9	0.14
24010	450	10.9	40.9	18	9.5	17	67.8	M10x1.5	46.7	25.4	19.1	4.3	30.2	8	16	0.15
24012	1,050	22.4	82.5	31	19	19	121.4	M12x1.75	89.4	50.5	38	4.1	59.4	10	37	0.98
•24014	1,050	22.4	82.5	31	19	19	170.6	M12x1.75	89.4	50.5	38	4.1	108.6	10	37	1.2
24016	1,900	22.4	82.5	31	19	24	121.4	M16x2.0	89.4	50.5	38	4.1	55.4	14	80	1.1
•24018	1,900	22.4	82.5	31	19	24	170.6	M16x2.0	89.4	50.5	38	4.1	104.6	14	80	1.3
24020	2,200	22.4	82.5	31	19	30	121.4	M20x2.5	89.4	50.5	38	4.1	51.4	17	135	1.1
•24021	2,200	22.4	82.5	31	19	30	170.6	M20x2.5	89.4	50.5	38	4.1	100.6	17	135	1.4
24022	3,000	35.6	121.2	43.4	25.4	29	165.8	M20x2.5	130.5	76.2	58.7	6.1	77	17	135	2.9
•24023	3,000	35.6	121.2	43.4	25.4	29	206.7	M20x2.5	130.5	76.2	58.7	6.1	117.9	17	135	3.3
24024	4,200	35.6	121.2	43.4	25.4	34	165.8	M24x3.0	130.5	76.2	58.7	6.1	73	19	310	3
•24026	4,200	35.6	121.2	43.4	25.4	34	206.7	M24x3.0	130.5	76.2	58.7	6.1	113.9	19	310	3.4
24030	4,500	35.6	121.2	43.4	25.4	54	165.8	M30x3.5	130.5	76.2	58.7	6.1	67	22	310	3.4
•24032	4,500	35.6	121.2	43.4	25.4	54	206.7	M30x3.5	130.5	76.2	58.7	6.1	109.9	22	310	3.7
24040	7,000	44.5	152.4	53.6	31.8	46	221.7	M30x3.5	165.1	95.5	81.3	8.9	106.3	22	635	5.9
24042	7,000	44.5	152.4	53.6	31.8	66	221.7	M30x3.5	165.1	95.5	81.3	8.9	106.3	22	635	6
24050	11,000	57.2	203.2	71.4	44.5	69	316.7	M36x4.0	217.2	123.7	106.7	11.9	164.8	27	1,085	15
†24052	12,500	57.2	203.2	71.4	44.5	79	316.7	M42x4.5	217.2	123.7	106.7	11.9	158.8	2 1/4"	1,085	16
†24054	13,500	57.2	203.2	71.4	44.5	79	316.7	M48x5.0	217.2	123.7	106.7	11.9	152.8	2 1/4"	1,085	16
†24060	22,000	76.2	266.7	104	57.2	102	428.5	M64x6.0	296.4	165.6	146.1	28.4	203.3	3"	2,845	37
†24062	31,500	95.3	330.2	134.2	69.9	132	496	M72x6.0	360.3	205.7	183.6	26.1	228.5	3 1/4"	5,670	73
†24064	51,000	101.5	368	153.9	82.6	178	561.8	M90x6.0	406.3	217.7	196.9	28.5	249.2	4 5/8"	9,560	120

NOTE: Hex size for stud and nut part numbers refers to the external hex size of the nut. All other part numbers refer the internal hex size of the socket.

• Long Bar Models

† Supplied with stud and nut