



THE KET TYPE "E" 250 TON AIR SPIDER OPERATING PROCEDURE MANUAL



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TYPE “E” SERIES SPIDER

SAFETY INSTRUCTIONS

The most important safety device for this tool is **YOU**. Your good judgment is the best protection against injury.

⚠ WARNING



To reduce the risk of injury, everyone using, installing, performing maintenance, changing accessories on, or working near this tool must read and understand these instructions before performing any such task.

Operating Hazards

⚠WARNING: Do not overload the spider. Overloading the recommended rating could cause series injury or death.

⚠WARNING: Check the safety latch for proper engagement. A malfunctioning latch could cause the spider to unexpectedly raise the slip and could result in injury or death.

⚠WARNING: Always ensure that the spider and slips are correct for the tubular it is to be used on. Failure to use the proper spider and slips could result in injury or death.

⚠WARNING: Always ensure that the tool joint or collar O.D. of the pipe is correct. Failure to maintain adequate contact area could result in injury or death.

⚠WARNING: To prevent injury or spider malfunction, inspect the spider slips, inserts, retainer screws, slip bolts, bushings, latch, hinge pin, crankshaft, and link age system regularly for wear. Failure to inspect these parts could cause injury or death.

⚠WARNING: Do not use undersized pipe. Using undersized pipe could cause an inadequate load bearing area and uneven stress distribution. Both of which may result in injury or death.

⚠WARNING: Do not use the spider if the safety latch is malfunctioning. Latch failure, may result in injury or death.

⚠WARNING: All warning labels attached to the equipment must be observed. The warning labels must be present on the tool. Do not remove the labels. If they are missing, replacing is mandatory.

⚠WARNING: The company operating the tool is responsible for issuing work instructions for safe and proper use of the equipment.

⚠WARNING: The operating company is responsible for verifying that any personnel operating, servicing, inspecting, or otherwise involved with the use of the tool must be properly trained correctly.

⚠WARNING: Do not use oversized pipe. Using oversized pipe could make it difficult or impossible to properly latch the slips.

DO NOT DISCARD – GIVE TO USER

Keystone ENERGY TOOLS

TYPE "E" SERIES SPIDER

SAFETY INSTRUCTIONS

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⚠ WARNING



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Workplace Hazards

⚠ WARNING: keep hands/fingers clear of the spider bore when installing the spider around the pipe.

⚠ WARNING: Always use the proper tools and wear eye, head, hand, and foot protection when servicing this spider.

⚠ WARNING: Maintain a balanced body position and secure footing.

⚠ WARNING: For professional use only.

Maintenance Hazards

⚠ WARNING: Use only Keystone Energy Tool components on equipment. Failure to do so may affect the correct functioning of the tool and may cause injury or death.

⚠ WARNING: KET equipment is made of cast alloy heat treated steel and should never be welded on in the field. Improper welding can cause cracks or brittleness in the castings which could result in drastic weakening or failure of the equipment. Any welding or machining must be performed by an authorized KET or API certified repair center.

⚠ WARNING: Improper welding and/or re-machining of cast alloy heat treated steel can cause personnel injury, property damage, or death.



Read Operation manual before use.



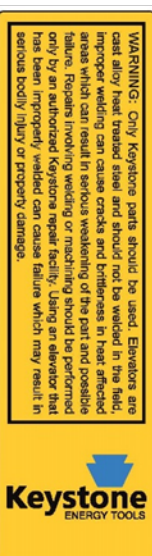
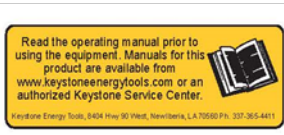
Pay attention: do not place your hands between moving parts.



DO NOT lift from this area.



Be careful when lifting from these areas.



1.0 Introduction

This technical manual contains operation and maintenance instructions for Keystone Type “E” Air Spider, with assembly drawings and complete parts breakdown. It provides a guide for proper field use, disassembling, and repair.

The Keystone Type “E” Air Spider is designed to be used to support the tubing string when running production tubular downhole or raising from the well bore with a load bearing capacity of 250 Tons (500,000 lbs.). The tubing spider assembly is located and held in position over the well head and blowout preventer system by bolting it to the rig floor or directly onto the top of the stack.

The spider assembly is operated using pneumatic pressure (90-120 psi). The pressure source forces the piston in the cylinder to move in and outward actuating the lift arms, crank shaft, and link integrated system to ultimately lift the slips up in the open position and set them downward in the holding position.

The body is designed to accommodate the passage of up to 7 5/8” diameter tubulars so the air spider does not need to be removed to pass tubing packers and/or other downhole specialized tools.

The Type “E” Air Spider incorporates a four-slip interlocking gripping mechanism assuring of uniform grip with minimum marking to the tubular. All Keystone spiders are made up of high alloy, heat treated, steel construction, and designed to meet or exceed API specifications.

The 4 integral slips have machined dovetails to incorporate the utilization of machined inserts as an alternative to mill-cut slips for up to 7 5/8’ applications.

The Type “E” Air Spider incorporates a latch and safety latch lock combination. The size range of the Type “E” Air Spider is as illustrated in the table provided. **See figure 1**

Model	Tons	Range
Type “E”	250	2.3/8” – 7.5/8”

Figure 1

NOTE: WARNING labels have been installed at critical areas on the tool. Familiarize yourself with their message and locations before proceeding to operate equipment.

See Safety Instructions Page 3 & 4

⚠WARNING: During use, keep fingers, hands, and all body parts away from the actuating lift arm, slip assembly, link and crank shaft apparatus to prevent possible bodily injury and/or death to the rig crew.

⚠WARNING: Ensure that the operating hoses are carefully and strategically routed to the tubing spider, control valve, and pressure sources to prevent any type of potential trip hazard or interference with other personnel or equipment movement on the rig floor.

2.0 Installation

The Spider should be installed directly over the wellhead utilizing the mounting slots in the base of the spider body to hold the spider in place during operations. When installing directly on a rotary table an adapter plate is required to be used. The adapter plates are manufactured to be used for both API Square and pin drives.

Before mounting over the wellhead into position, it is best practice to make sure the slip size and inserts are already properly installed for the tubular size being used to prevent any accidental parts dropping into the well bore.

All air hoses that are going to be used to connect the air control valves on the spider to the foot control valve assembly should be inspected for any damage or debris and replaced or cleaned before making connections.

The air supply can either come from the rig air supply or portable compressor unit flowing air to the foot control valve that then flows the air supply to the air control valves located on the spider assembly.

Place the foot control valve and the filter, regulator, lubricator (FRL) assembly in a safe location that is convenient and easily accessed by the rig crew. Prior to connecting or disconnecting the hose, ensure there is no air pressure in the lines. Connect the male end of supply hose (10' and 15') to the FRL lubricator and the other to the bottom make connectors on the foot control valve. Install the two operating hoses (25') to the top connectors on the foot control and the cylinder on the spider. Next connect the other supply hose (10' and 15') to the FRL filter and air supply. Inspect the hoses for cracks and leaks prior to installation. Verify connectors are free from foreign material. (Figure 2)

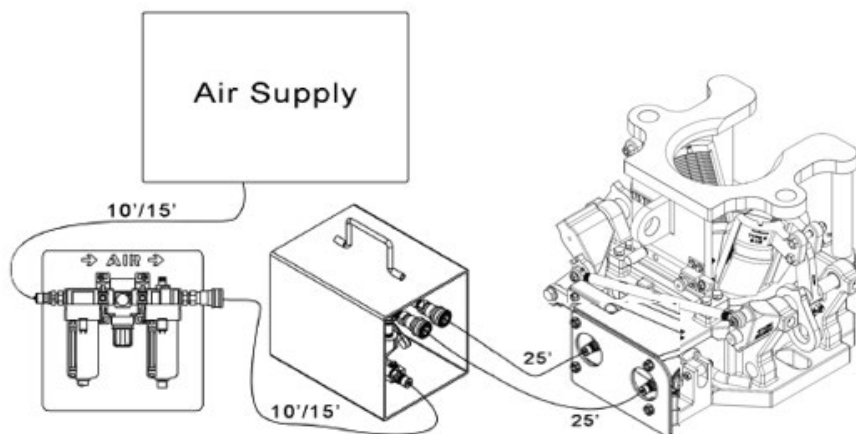


Figure 2

3.0 Operation

Operation of the Type “E” Air Spider operated from pneumatic pressure that forces its cylinder to actuate a piston that is connected to the lifting arms, crankshaft, and links which are attached to the slip assemblies. When the cylinder moves the piston, the lifting arms then spin the crank shaft that raises and lowers the links that are connected to the slips. This actuating system allows the slips to move in the upward or downward position.

Never operate the spider assembly without a proper functioning safety latch. The safety latch prevents you from accidentally dropping a string of tubular downhole in the wellbore.

NEVER ROTATE TUBULAR WITH THE SLIPS SET

- ▶ Type “E” series spiders should only be used with the proper size slips and inserts for the tubular they are being used on.
- ▶ Spiders are manufactured to operate at rated capacity in a vertical direction and should never be overloaded by exceeding the rated capacity.
- ▶ Keep hands, fingers, and feet clear of the spider and slips operating parts of the spider assembly.
- ▶ Strategically route the hoses to the tubing spider in a manner to prevent any “trip hazards” or interference with personnel movement on the rig floor.
- ▶ Always position the slips in the lowered position in the bowl and disconnect the power source before moving, installing new parts, or performing maintenance on the equipment.
- ▶ Any moving components or protection guards on the spider assembly should never be used for lifting or hoisting the spider assembly.
- ▶ All protective guards should be installed at all times during the use and operation of the spider assembly.
- ▶ When needing to lift or move the spider assembly on the rig floor, use one of the two lift points located on the spider guard. Always ensure that the bodyguard is properly secured before lifting or hoisting from this part.
- ▶ Never operate the spider assembly without the gate and gate hinge pins installed. When the gate is needed to be removed it should only be removed using the gate lifting eye.
- ▶ Make sure all slip segments are free and in the up position when lowering or raising tubular strings from the wellbore.
- ▶ Undersized pipe will cause the slips to not set properly and possibly allow the tool joint to slip through the spider assembly.

3.0 Operation

- ▶ Always inspect the inserts for proper size and wear. A wrong insert size could allow the pipe to become wedged or fall through the spider assembly into the wellbore.
- ▶ Inspect the bowl bore, slip backs, gate and gate hinge pins regularly for wear.

PASSAGEWAY CAPABILITY

The thru bore of the Type “E” Air Spider allows for the passage of up to 7.5/8” OD tubing packers or other specialized tools downhole without having to unmount and move the air spider.

If the downhole apparatus is larger than the passageway of the air spider, then the spider must be unmounted and moved out the way until the tool has reached the well bore. When installing the spider assembly back in position, remove the hinge pins and gate, slide the body around the tubular, install the gate and gate hinge pins, and bolt the spider back onto the rig floor.

See passageway illustration below Figure 3

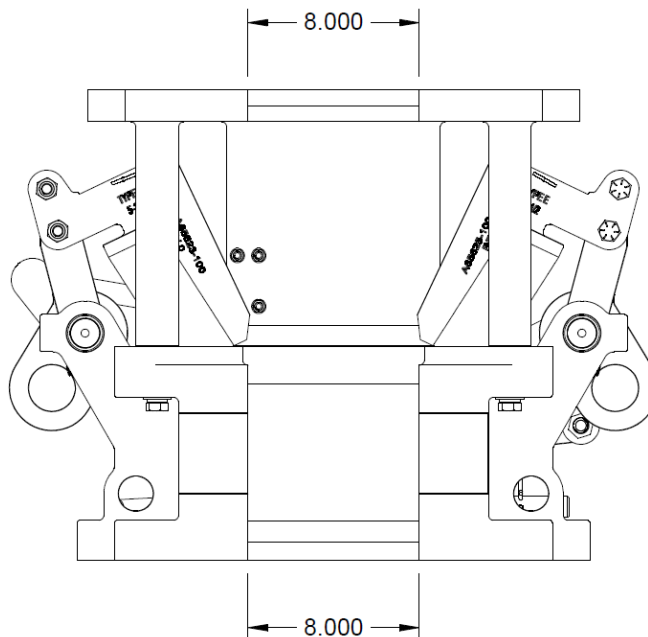


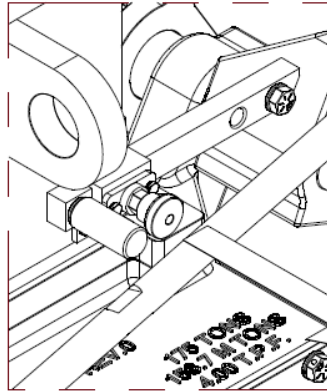
Figure 3

3.0 Operation

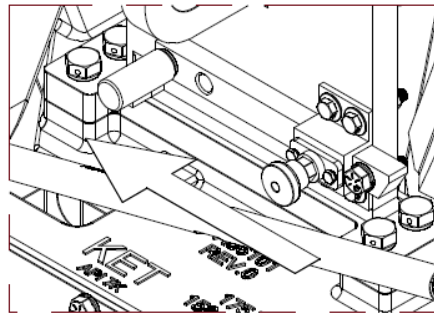
The Air Spider has a safety latch mechanism incorporated on the back of the guard. This safety mechanism allows the tool to be set where the slips can not be released to prevent accidental dropping of the string.

See the below instructions in **Figure 4** of how the safety mechanism operates.

PULL SPRING PLUNGER
HANDLE OUTWARD.



SLIDE CRANK SHAFT OVER
UNTIL HOLE LINES UP WITH PIN.



RELEASE SPRING PLUNGER HANDLE,
MAKING SURE THAT THE PIN HAS
SUCCESSFULLY ENTERED THE HOLE,
LOCKING CRANK SHAFT STOP IN PLACE.
THE SLIPS CAN NOW BE LOWERED
INTO THE BOWL.

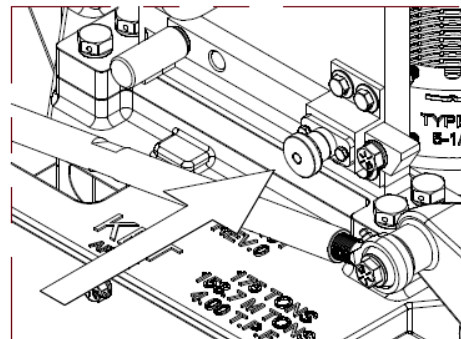


Figure 4

3.0 Operation

Insert & Slip Assembly Replacement

Always wear eye protection when removing or replacing inserts to protect against chip fragments.

Always ensure that the spider assembly is away from the well when changing out the inserts or slips. It is never recommended to replace any parts when spider is directly over the wellbore. If the user chooses to change out inserts, slips, and/or replace components when the spider is positioned over the well bore, then the rig personnel should take the necessary risk assessment precautions during the activity to avoid dropping parts/components down into the well.

Cycle the control valve until the lifting system positions the slip bodies in the fully open/retracted position to provide adequate access to the slip inserts. Make sure that the safety latch is engaged to prevent the lift arms from closing and disconnect the hoses to the operating cylinder to prevent accidental operation.

INSERT REPLACEMENT - (Figure 5)

TO REMOVE WORN INSERTS OR CHANGE SIZES:

- Remove the 4 cotter pins and the 4 insert slip pins from the slip bodies. The slip pin may need to be driven outward by using a tool commonly referred too as punch, dowel rod, or drift pin.
- Remove the 4 inserts by sliding the insert out of the slip body slot.
- Clean and remove any dirt, grit, and old grease from the slip bodies.

Important: Install the correct size inserts for the tubing used.

INSTALLING INSERTS - (Figure 5)

- Clean the slips if necessary and grease the taper portion of the slip body.
- Install the new slip inserts by sliding them into the slip bodies aligning the vertical groove on the insert back with the groove on the slip body.

The inserts should fit firm in the slots. If the fit appears to be too loose, then the slips need to be inspected and may need to be replaced.

- Insert the retainer pin into the hole that is formed by aligning the insert groove with the slip body groove.
- Install the cotter pins into the hole above the insert in the slip body. Spread the cotter legs so that the pin cannot come out.

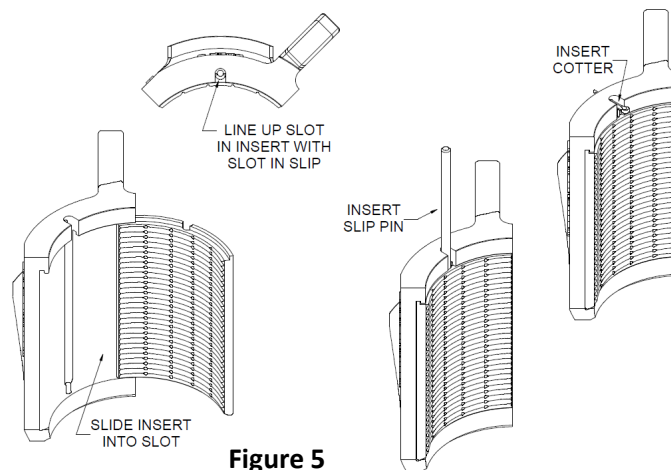


Figure 5

3.0 Operation

Insert & Slip Assembly Replacement – Figure 6

Always wear eye protection when removing or replacing inserts to protect against chip fragments.

The slip assembly is a set of 4 slip segments and each segment is marked with a unique serial number to ensure a matched set is installed into the spider. The slip assembly is made up of two halves bolted together that attaches to the lifting arm by passing a bolt through the outside hole on the lifting lugs of the slips and the slot on the lifting arm.

Never mix match sets of slip segments. They are machined together as a set and failure to comply may result in possible bodily injury and/or death.

TO REMOVE THE SLIPS FROM THE SPIDER ASSEMBLY:

- Remove the lower nuts and bolts from the arm and the two slip assembly halves will release from the pivoting arm.

SLIP INSERTION:

- Install the new arm bolt and nut into the top hole of each new slip assembly. The top hole, bolt, and nut hold the slips together and the bottom hole attaches to the lifting arm.
- Install the new slip inserts by sliding them into the slip bodies.
- Install one slip half at a time. Position and align the lower hole in the slip assembly half with the hole at the bottom of the lifting arm. Install the arm bolt into the aligned holes and screw the nut on. Tighten the nut, ensuring the Teflon on the lock nut is past the start of the threads on the bolt.

Important: The slip assembly needs to have movement with respect to the lifting arm, so that the slip assembly is free to float in the spider bowl, as the slips are set to support the tubing string.

Operate the pneumatic system to check the function of the slip assembly in the bowl after the spider is assembled, and if necessary, adjust the air pressure controlling the rate of speed for raising and lowering the slips. Adjustment to the travel stop and cylinder yoke may be necessary when changing out slip body sizes. Due to the difference in weight of slip body sizes, the air pressure may need to be adjusted to compensate for the difference of weight when changing out slip body sizes.

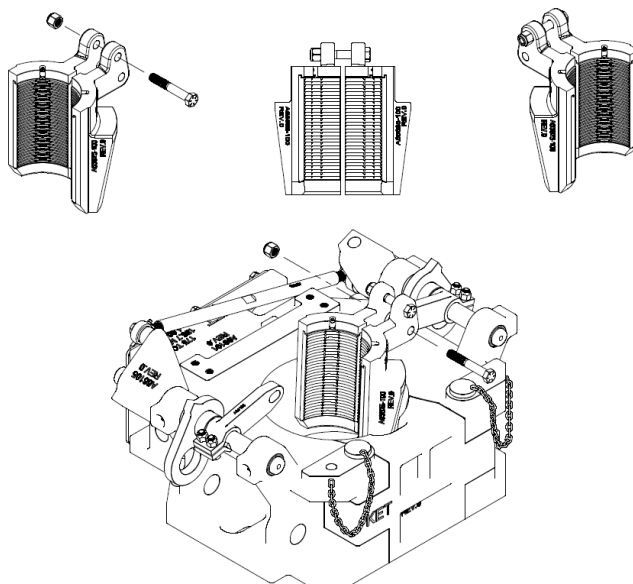


Figure 6

4.0 Maintenance & Inspection

PRACTICE SAFETY AT ALL TIMES WHEN SERVICING THE EQUIPMENT AND USE APPROVED SAFETY METHODS, MATERIAL, AND TOOLS. ALWAYS WEAR PROTECTIVE GEAR FOR EYES, HEAD, AND HANDS.

TO ENSURE OPTIMUM PERFORMANCE FROM THE AIR SPIDER THE FOLLOWING CHECKS SHOULD BE PERFORMED BY A PERSON KNOWLEDGEABLE OF THE EQUIPMENT AND ITS FUNCTION, A MINIMUM OF:

DAILY:

- ☐ Visually inspect for cracks, loose fits or connections, elongation of parts, and other signs of wear, corrosion or overloading.
- ☐ Loose or missing components, deterioration, proper lubrication, and adjustment.
- ☐ Check for worn crank shaft, link rods, links, arms, & pins. These may inhibit proper operations of slip mechanism system.
- ☐ Ensure the slip insert teeth are clean and free of dried or hardened materials that may inhibit proper teeth engagement.
- ☐ Check inserts for wear, chipped, and/or broken teeth.
- ☐ Check to ensure the lifting arms do not have any excessive travel and/or movement to them by testing the assembly by holding a string of tubing extended through the tubing spider and check the following:
 - ☐ The lifting arms should not contact the top of the body
 - ☐ The bottom surface of the slip should not be lower than the bowl bore.
- ☐ Ensure that the pneumatic system functions and operates correctly.

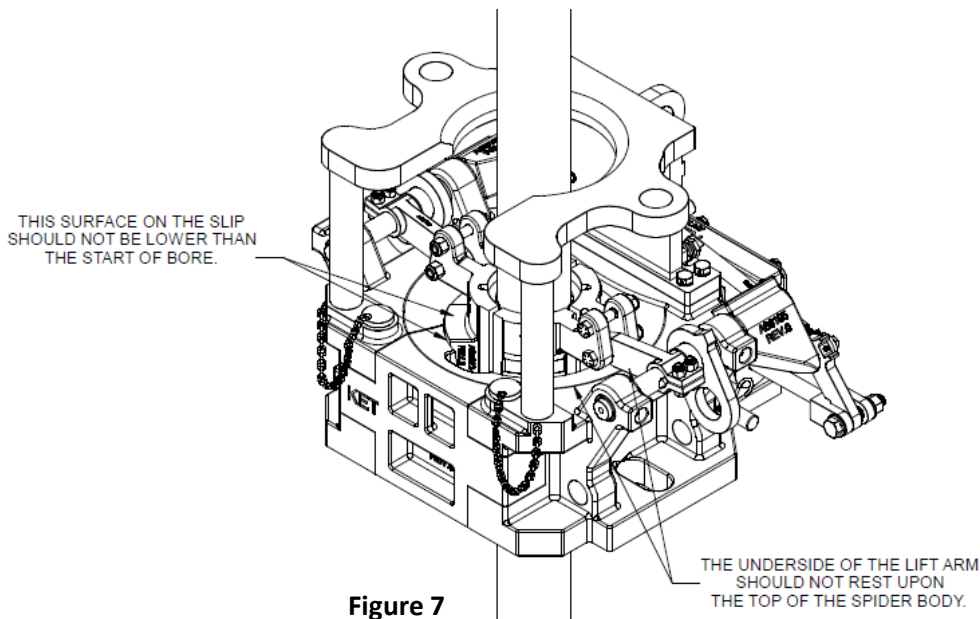


Figure 7

4.0 Maintenance & Inspection

Lubricate the spider regularly during usage and when in storage to prevent corrosion. Use an extreme pressure, multi-purpose, lithium base grease of no. 1 or no. 2 consistency or multi-weight motor oil. When the spider is in use, lubricate according to the following schedule.

DAILY:

- ☐ Bushing locations on the crank shaft (A, B, C, E, F, & G)
- ☐ Pivot Arm locations (D & E)

WEEKLY:

- ☐ Body Bowl Bore Taper
- ☐ Back of Slip Taper

DAILY:

- ☐ When greasing the bushings on the crank shaft, ensure there is not any excessive wear with the bushings or crank shaft that would inhibit the proper functioning and actuating of the slips.
- ☐ Verify the bolts that go between the yoke and link are not loose or worn.
- ☐ Verify the bolts that bolt the end of the cylinder and mounting bracket on the body are not loose or worn.

Lubrication Locations

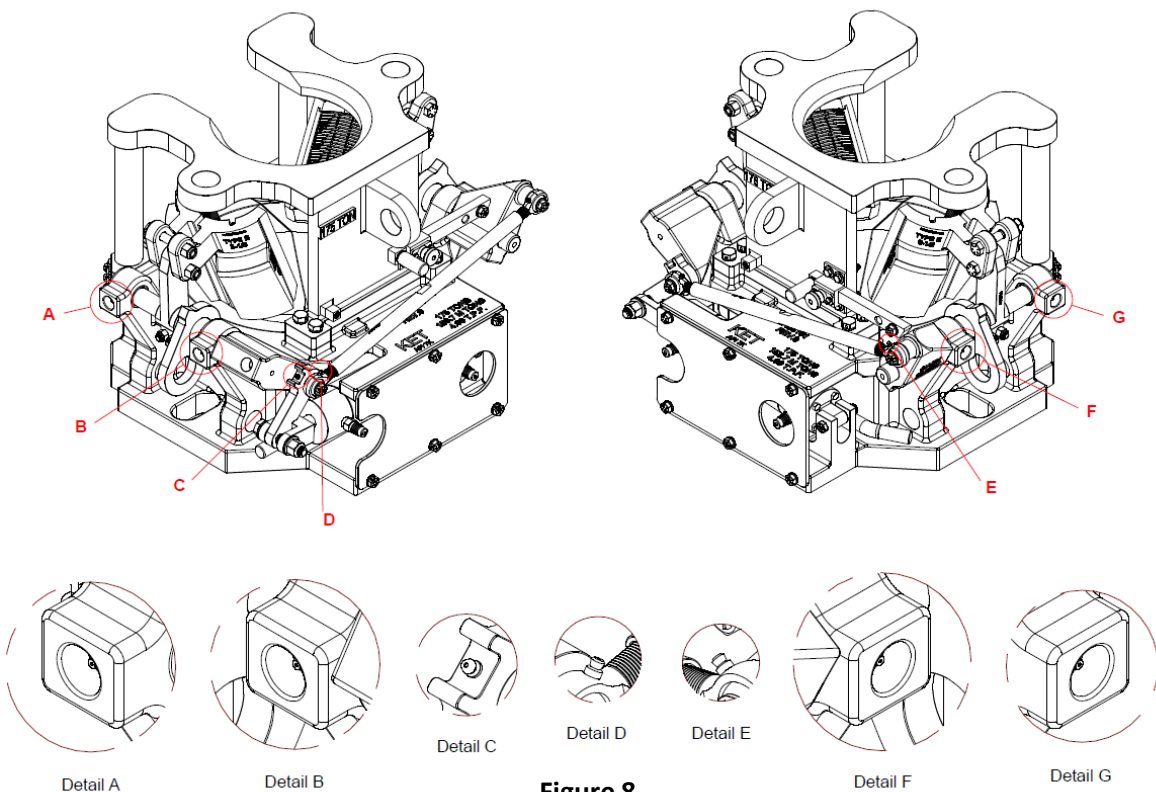


Figure 8

4.0 Maintenance & Inspection

EVERY 6 MONTHS:

- ☐ This inspection should include everything that is done in the daily inspection plus.
- ☐ Replace all body bushings located on the crank shafts and on the links.
- ☐ If cylinder exhibits any type of leaks, replace cylinder.
- ☐ A full NDT inspection of all primary-load carrying components critical areas as defined by the manufacturer.
- ☐ Inspect for excessive wear, cracks, flaws and deformations.

Primary Load carrying components are identified as: Slip Bodies, Spider Body, Spider Gate, and Door Pins.

To perform the 6 month inspection all foreign material such as dirt, paint, grease, oil, scale, etc. shall be removed from the spider by a suitable method of either, grit blasting, or paint stripping and steam cleaning.

FREQUENCY OF INSPECTIONS:

The owner/user of the equipment should develop schedules of inspection based upon experience, the manufactures recommendations, and one or more of the following factors.

- | | |
|---------------------------|-----------------|
| ▶ Environment | ▶ Testing |
| ▶ Load cycles | ▶ Repairs |
| ▶ Regulatory requirements | ▶ Remanufacture |
| ▶ Operating time | |

EVERY 12 MONTHS:

- ☐ This inspection should include everything that is done in the daily inspection plus.
- ☐ Fully disassemble the tubing spider by removing the slip assembly, slip inserts, body gate, door pins, lift arms, crank shafts, links, and cylinders in order to conduct a full MPI Inspection.
- ☐ Replace the crank shafts, cylinder, and bushings throughout the entire assembly. Any other parts that seem to have wear or may be loose should be replaced.
- ☐ A full NDT inspection of all primary-load carrying components as defined by the manufacturer.
- ☐ Inspect for excessive wear, cracks, flaws and deformations.
- ☐ Inspect the door pins, gate, and body for excessive wear.
- ☐ Reassemble the tubing spider with the new cylinder, crank shaft, bushings and all other parts and check the function of the tubing spider to verify it is functioning properly.

4.0 Maintenance & Inspection

EVERY 6 & 12 MONTHS:

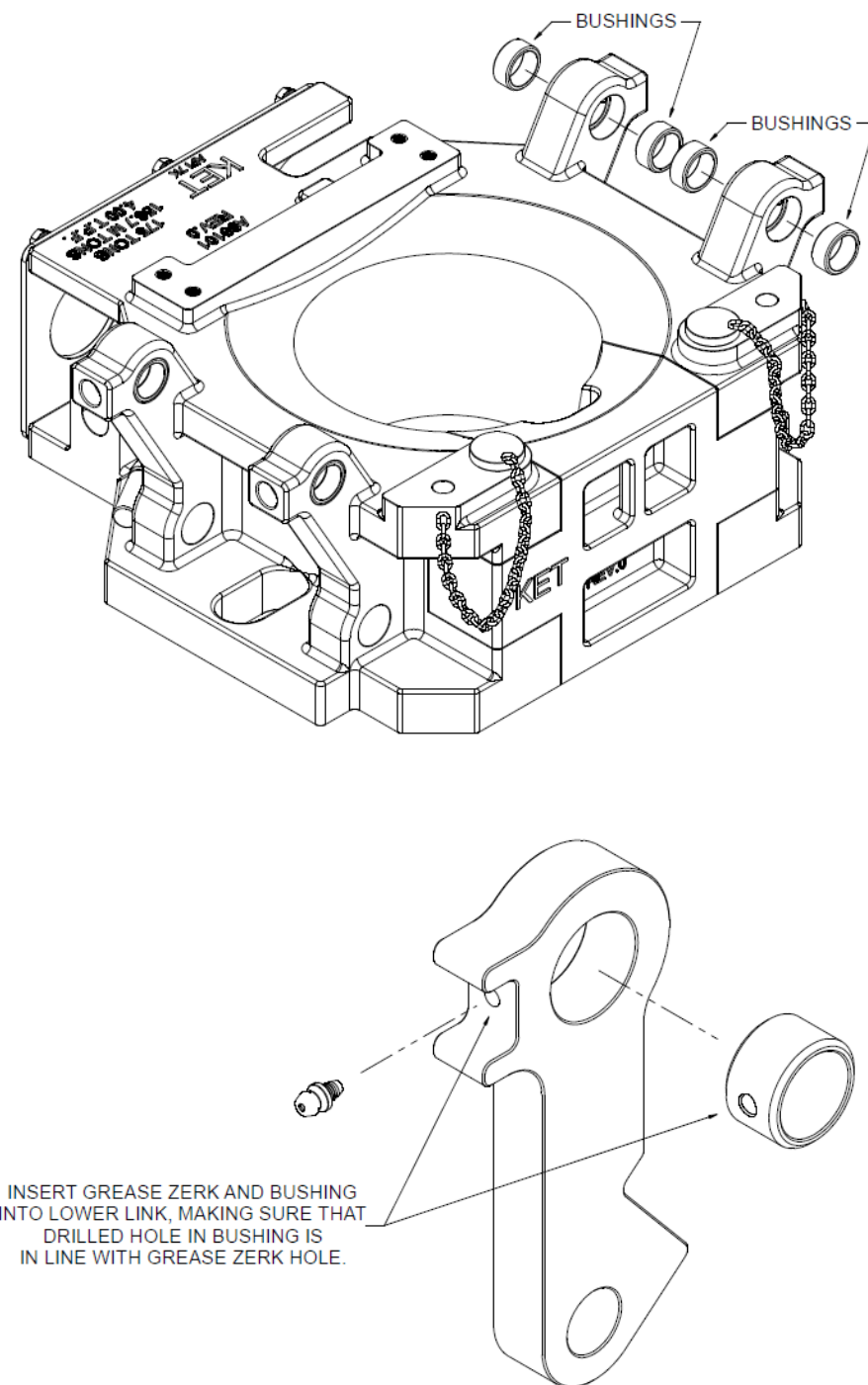
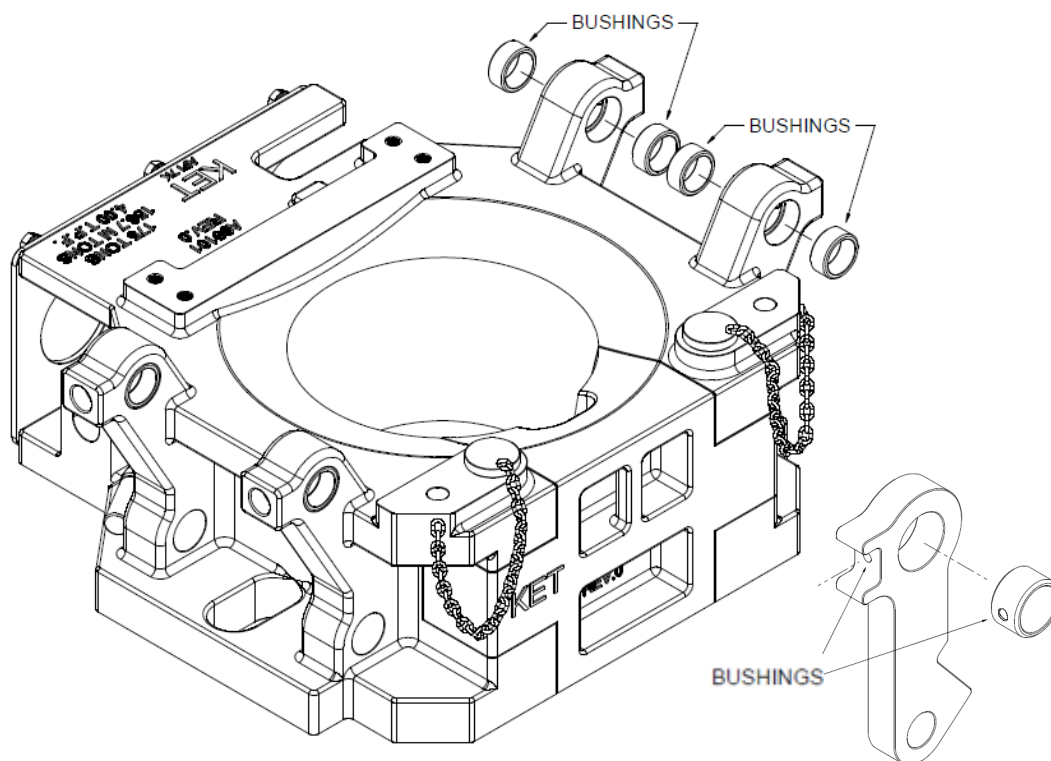


Figure 9

4.0 Maintenance & Inspection

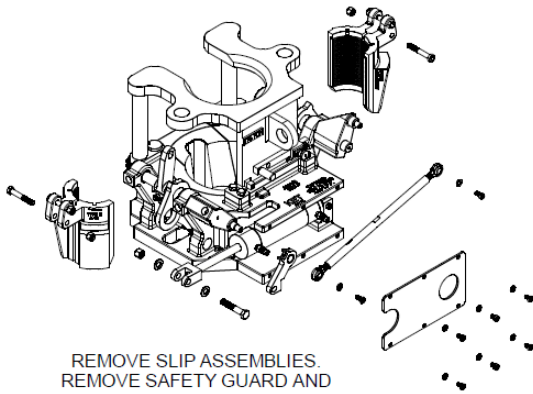
Bushing Replacement

1. Remove the slip assembly.
2. Bleed off the pressure from the cylinder.
3. Remove the two retainer rings, and remove link from the left/right crank shaft.
4. Use a press or bushing puller to remove the two bushings from the link.
5. Remove bolts and nuts.
6. Slide lift arms off of the key and remove keys.
7. Lightly tap on the ends of the left/right crank shaft to remove them from the spider body.
8. Use a press or bushing puller to remove the four bushings from the spider body.
9. Install four new bushings into the spider body.
10. Install two new bushings into the link.
11. Install the left crank shaft into the spider body with spacer and lifting arm in proper position with key and repeat for the opposite side.
12. Install link onto the ends of the left/right crank shafts. Install the retainer rings on the crank shafts to retain the link.
13. Tighten down the bolts and nuts to hold the lift arms onto both sides of the crank shaft.
14. Attach the slip assembly halves to the lifting arms.

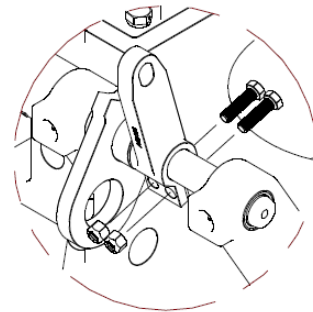


4.0 Maintenance & Inspection

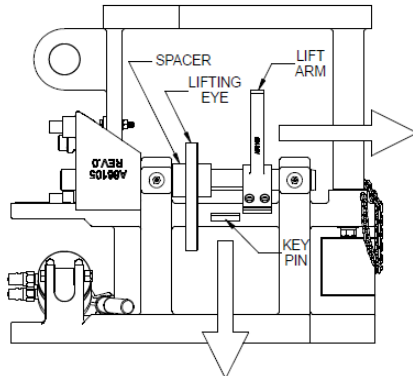
Crankshaft Replacement



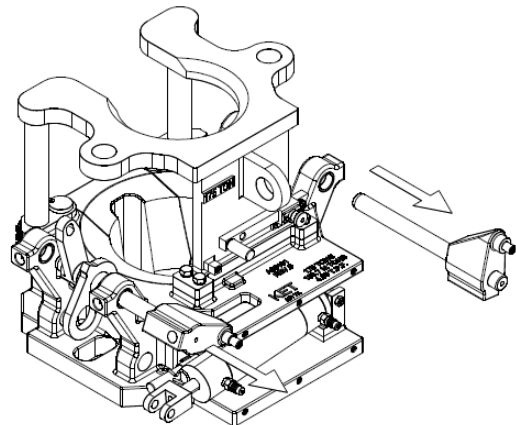
REMOVE SLIP ASSEMBLIES.
REMOVE SAFETY GUARD AND
DISCONNECT CYLINDER ROD END.
REMOVE LINK AND LOWER LINK
FROM CRANK SHAFTS.



LOOSEN AND REMOVE THE NUTS
AND BOLTS FROM BOTH LIFT ARMS.



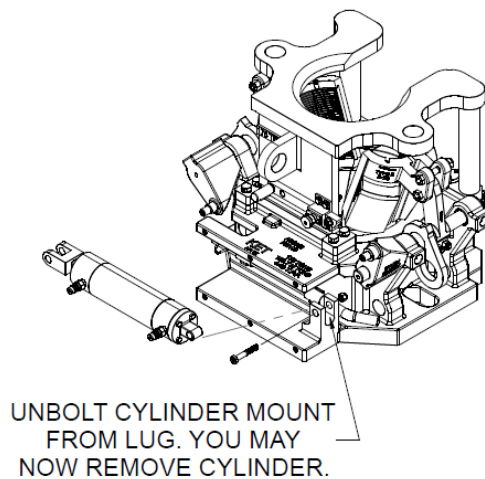
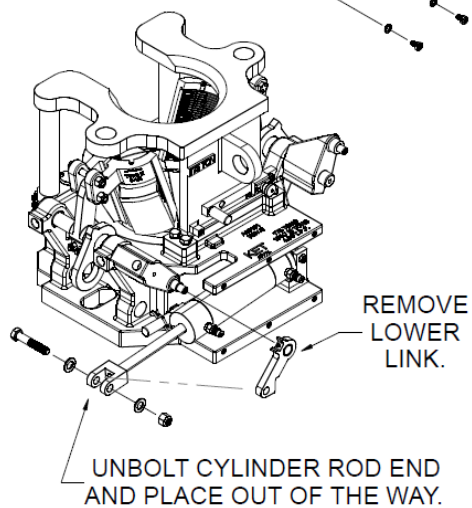
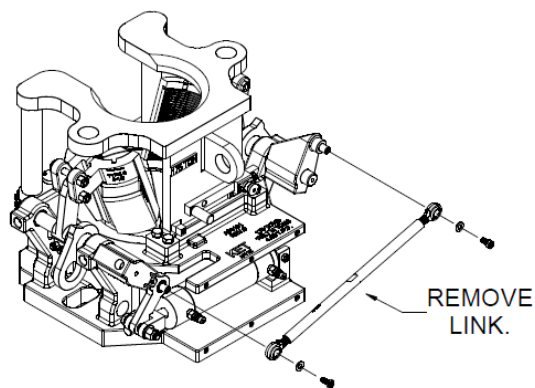
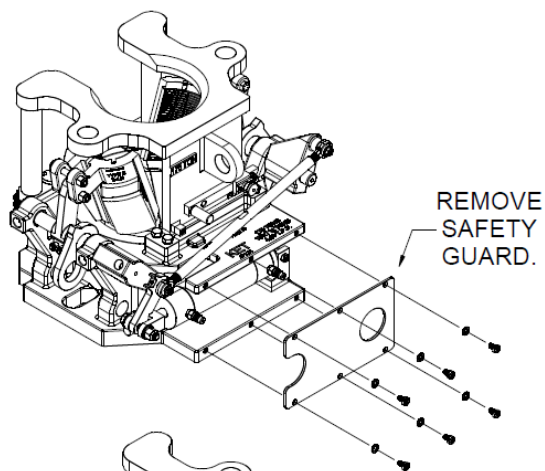
SLIDE LIFT ARM OVER SO THAT
THE KEY PIN CAN BE REMOVED.



CRANK SHAFTS CAN NOW BE PULLED OUT.
REMEMBER THAT THE LIFT ARMS, SPACERS,
AND LIFTING EYES WILL FREELY COME OFF.

4.0 Maintenance & Inspection

Cylinder Replacement



5.0 Repair Critical Areas

Examination method and Acceptance Criteria

The examination methodology and acceptance criteria affecting the type and degree of discontinuities associated with the above identified critical and non-critical areas are defined below. (Reference ASTM E125). Use the defined methodology to examine the subject tool and acceptance criteria to evaluate all identified discontinuities.

Methodology

Subject the above identified critical area to a 100% magnetic particle examination. Such an examination is only to be performed after the areas have been final heat treated and machined. Machined surfaces shall be examined by the wet florescent method., whereas all other surfaces shall be examined by the wet or dry method. Magnetic particles examinations are to be performed in accordance with ASTM E709. Examiners must be certified Level II (as a minimum) in accordance with the American Society of Nondestructive Testing ASNT-TC-1A. Examinations can only be performed 24-hours after load testing.

Use the reference photographs described in ASTM E125 to evaluate identified discontinuities. These photographs contain actual discontinuities identified in accordance with ASTM E709 using a peak magnetizing current of 600 to 800 amps and a prod spacing of 4" to 6".

NOTE: the white discontinuities in the photographs are a result of painting the casting area with a slurry of lamp-black in kerosene, gasoline, or alcohol. The black line discontinuities are a result of applying reg magnetic powder to the casting surface and photographing the magnetic particle discontinuities.

Each reference photograph from ASTM E125 is identified with a number that corresponds to the severity degree identified in Figure ##. It is understood that it is impossible to rigidly interpret magnetic particle discontinuities on castings to a set of reference photographs. As a result, KET will work closely with the purchaser to reach an agreement on the identified discontinuities. However, in cases where agreement cannot be obtained, the KET interpretation shall prevail.

5.0 Repair Critical Areas

ACCEPTANCE CRITERIA - Figure 10 below defines the discontinuity types illustrated in the referenced photos of ASTM E125.

DISCONTINUITY		
TYPE	DESCRIPTION	DEFINITION
I	Crack, Hot Tears	Ragged lines of variable width. May appear as a single jagged line or exists in groups. They may or may not have a definite line of continuity. They usually originate at the casting surface and generally become smaller as they go deeper.
II	Shrinkage	Appears as a jagged area of irregular patches. Shrinkage is a subsurface discontinuity that may be brought to the surface by machining or other methods of metal removal.
III	Inclusions	Isolated, irregular or elongated variations of magnetic particles occurring singly, in a linear distribution or scattered at random in feathery streaks. The indications are the result of the presence of sand, slag or oxides in the surface metal.
IV	Internal Chills, Unfused Caplets	A uniform line or band outlining the object and indicating lack of fusion between the metal object and the casting.
V	Porosity	Appears as rounded and elongated clusters of magnetic particles of various sizes; scattered at random.

Figure 10

The below **figure 11** provides a summary of the types and severity of discontinuities identified in API Specification 7K.

DISCONTINUITY SEVERITY		
DISCONTINUITY TYPE	CRITICAL AREAS	NON-CRITICAL AREAS
I	None	Degree 1
II	Degree 2	Degree 2
III	Degree 2	Degree 2
IV	Degree 1	Degree 1
V	Degree 1	Degree 2

Figure 11

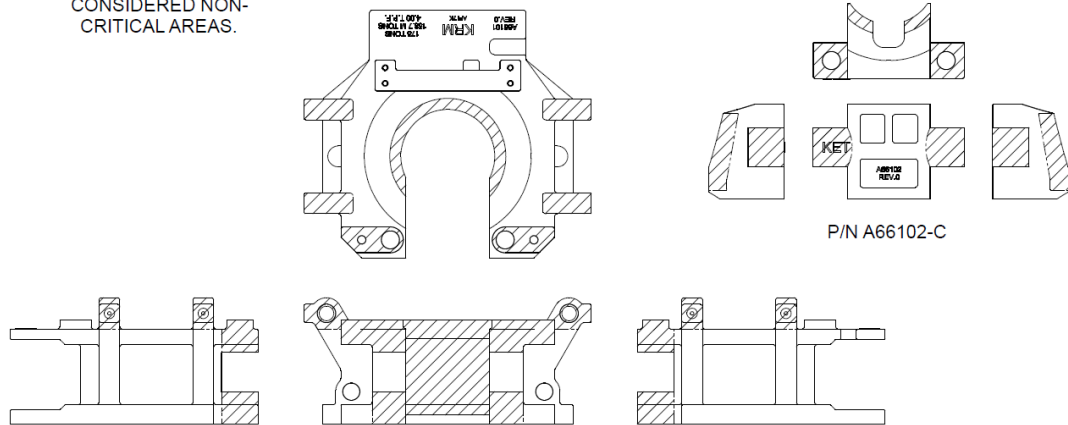
Only those discontinuities with major dimensions greater than 1/16" and associated with a surface rupture shall be considered relevant. Inherent discontinuities not associated with a surface rupture are considered non-relevant. If magnetic particle discontinuities greater than 1/16" are believed to be non-relevant, they shall be examined by liquid penetrant surface NDE or remove and re-inspected to prove their non-relevancy.

DISCONTINUITY REPAIR

If the relevant discontinuities are discovered upon inspection, removal of these discontinuities is acceptable through grinding and blending. However, grinding should not exceed 3/16" deep or 25% of the material thickness on cast surfaces. Machined surface discontinuities or discontinuities beyond acceptance depths should be evaluated by KET or a KET authorized repair facility.

5.0 Repair Critical Areas

AREAS HATCHED ARE
CONSIDERED CRITICAL AREAS.
AREAS NOT HATCHED ARE
CONSIDERED NON-
CRITICAL AREAS.



P/N A66101-C

P/N A66102-C

UNLESS OTHERWISE SPECIFIED:

MACHINING DIMENSIONS:
3 PLACE DECIMAL: XXX ±.005
2 PLACE DECIMAL: XX ±.010
1 PLACE DECIMAL: X ±.030
FRACTIONAL: 1/16 ±.003
ALL DIMENSIONS ARE IN INCHES.

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TOOLS, LLC.

DRAWN:
C. FONTENOT

DATE:
10/19/2023

APPROVED:
J. RAMEY

DATE:
10/19/2023

MATERIAL GRADE:
MS-004

MATERIAL HARDNESS:
—

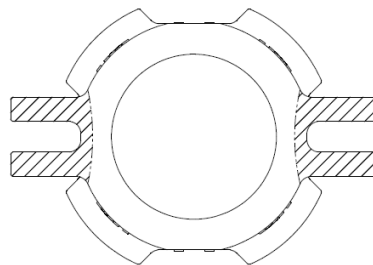
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KEYSTONE ENERGY TOOLS

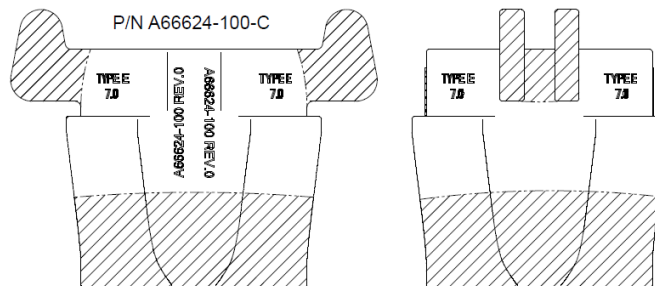
TITLE:
CRITICAL AREAS
FOR KET A66000 TYPE E AIR SPIDER

SIZE: B FSCM NO. 337-365-4458 DWG NO. A66000-C

SCALE: 1:1 SHEET: 1 OF 2



P/N A66624-100-C



AREAS HATCHED ARE
CONSIDERED CRITICAL AREAS.
AREAS NOT HATCHED ARE
CONSIDERED NON-
CRITICAL AREAS.

UNLESS OTHERWISE SPECIFIED:

MACHINING DIMENSIONS:
3 PLACE DECIMAL: XXX ±.005
2 PLACE DECIMAL: XX ±.010
1 PLACE DECIMAL: X ±.030
FRACTIONAL: 1/16 ±.003
ALL DIMENSIONS ARE IN INCHES.

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C. FONTENOT

DATE:
11/30/2023

APPROVED:
J. RAMEY

DATE:
11/30/2023

MATERIAL GRADE:
MS-004

MATERIAL HARDNESS:
—

WEIGHT:
—

KEYSTONE ENERGY TOOLS

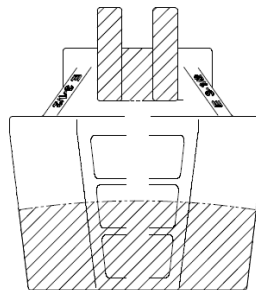
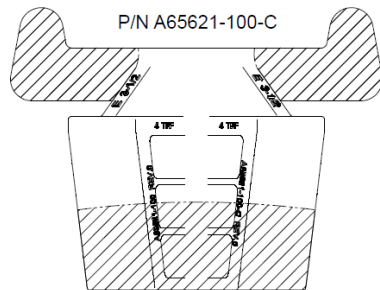
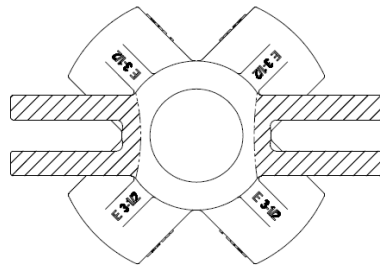
TITLE:
CRITICAL AREAS
FOR KET A66624-100 TYPE E SLIP BODY CASTING

SIZE: B FSCM NO. 337-365-4458 DWG NO. A66624-CA

SCALE: 1:1 SHEET: 1 OF 2

Keystone ENERGY TOOLS

5.0 Repair Critical Areas



AREAS HATCHED ARE
CONSIDERED CRITICAL AREAS.
AREAS NOT HATCHED ARE
CONSIDERED NON-
CRITICAL AREAS.

UNLESS OTHERWISE SPECIFIED:

MACHINING DIMENSIONS:
3 PLACE DECIMAL: .XXX ± .005
2 PLACE DECIMAL: .XX ± .010
1 PLACE DECIMAL: .X ± .030
FRACTIONAL: ± .030
ALL DIMENSIONS ARE IN INCHES.

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TOOLS, LLC.

DRAWN:
C. FONTENOT

DATE:
11/30/2023

APPROVED:
J. RAMEY

DATE:
11/30/2023

MATERIAL GRADE:
MS-004

MATERIAL HARDNESS:
—

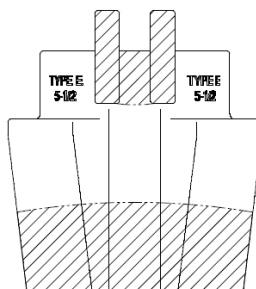
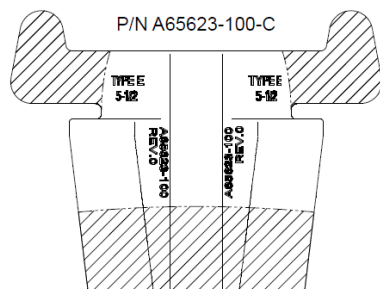
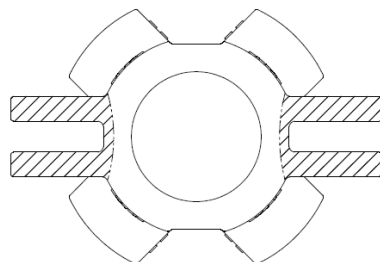
WEIGHT:
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KEYSTONE ENERGY TOOLS

TITLE:
CRITICAL AREAS
FOR KET A65621-100 TYPE E SLIP BODY CASTING

SIZE: B FSCM NO. 337-365-4456 DWG NO. A65621-CA REV. 0
SCALE: 1 : 3 SHEET 1 OF 2

REVISIONS			
REV	DESCRIPTION	DATE	APPROVED
0	INITIAL RELEASE	11/30/2023	J. RAMEY



AREAS HATCHED ARE
CONSIDERED CRITICAL AREAS.
AREAS NOT HATCHED ARE
CONSIDERED NON-
CRITICAL AREAS.

UNLESS OTHERWISE SPECIFIED:

MACHINING DIMENSIONS:
3 PLACE DECIMAL: .XXX ± .005
2 PLACE DECIMAL: .XX ± .010
1 PLACE DECIMAL: .X ± .030
FRACTIONAL: ± .030
ALL DIMENSIONS ARE IN INCHES.

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WITHOUT THE PERMISSION OF KEYSTONE ENERGY
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DRAWN:
C. FONTENOT

DATE:
11/30/2023

APPROVED:
J. RAMEY

DATE:
11/30/2023

MATERIAL GRADE:
MS-004

MATERIAL HARDNESS:
—

WEIGHT:
—

KEYSTONE ENERGY TOOLS

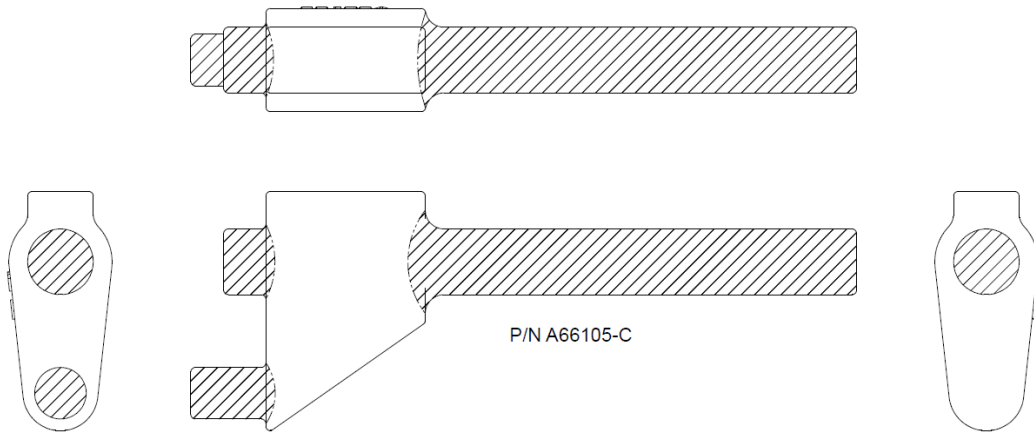
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FOR KET A65623-100 TYPE E SLIP BODY CASTING

SIZE: B FSCM NO. 337-365-4456 DWG NO. A65623-CA REV. 0
SCALE: 1 : 3 SHEET 1 OF 2

Keystone ENERGY TOOLS

5.0 Repair Critical Areas

REVISIONS			
REV.	DESCRIPTION	DATE	APPROVED
0	INITIAL RELEASE	10/19/2023	J. RAMEY



AREAS HATCHED ARE
CONSIDERED CRITICAL AREAS.
AREAS NOT HATCHED ARE
CONSIDERED NON-
CRITICAL AREAS.

UNLESS OTHERWISE SPECIFIED:

MACHINING DIMENSIONS:

3 PLACE DECIMAL: .XXX ± .008
2 PLACE DECIMAL: .XX ± .010
1 PLACE DECIMAL: .X ± .030
FRACTIONAL: ± .132
ALL DIMENSIONS ARE IN INCHES.

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DRAWN:
C. FONTENOT

DATE:
10/19/2023

APPROVED:

J. RAMEY

DATE:
10/19/2023

MATERIAL GRADE:
MS-004

MATERIAL HATCHES:

WEIGHT:

KEYSTONE ENERGY TOOLS

TITLE:
CRITICAL AREAS
FOR KET A66000 TYPE E AIR SPIDER

SIZE:
B

PCDM NO.
337-565-4456

DWG NO.
A66000-C

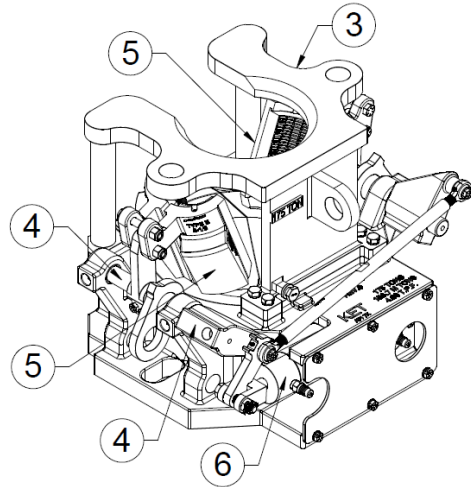
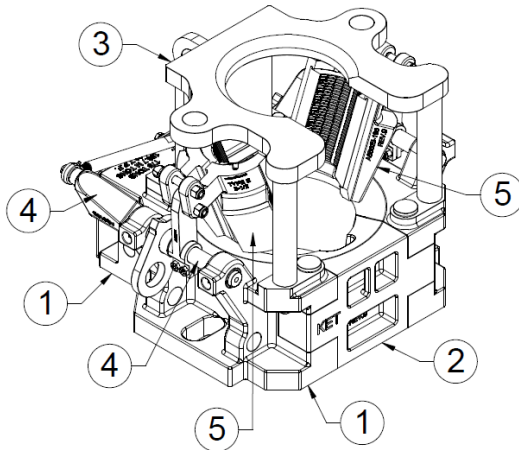
REV.
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SCALE:
1 : 2

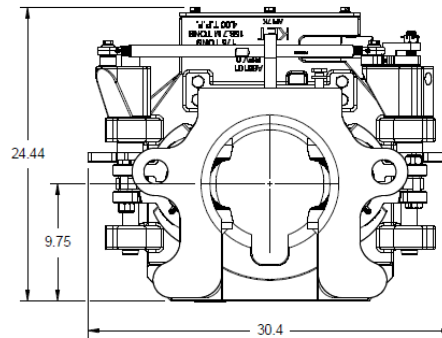
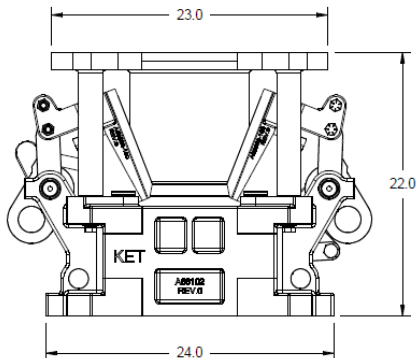
SHEET:
2 OF 2

6.0 Technical Drawings

1. SPIDER BODY
2. SPIDER GATE
3. SAFETY GUARD
4. CRANK SHAFT
5. SLIP BODIES
6. PNEUMATIC CYLINDER



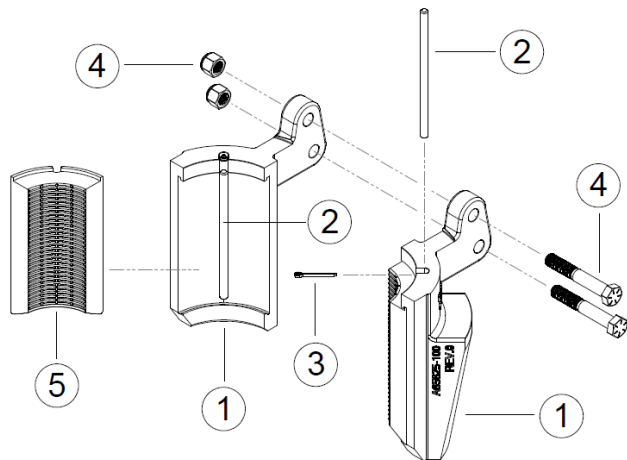
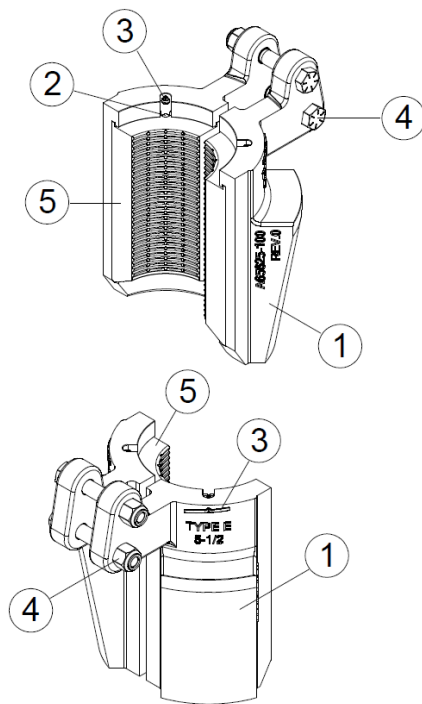
UNLESS OTHERWISE SPECIFIED:		REVISIONS	
MACHINING DIMENSIONS:		REV.	DESCRIPTION
3 PLACE DECIMAL: .XXX ± .005		0	INITIAL RELEASE
2 PLACE DECIMAL: .XX ± .010			
1 PLACE DECIMAL: .X ± .020			
FRACTIONAL: ± 1/32			
ALL DIMENSIONS ARE IN INCHES			
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DRAWN:	C. FONTENOT	DATE:	10/19/2023
APPROVED:	J. RAMEY		
MATERIAL GRADE:	MS-004		
MATERIAL HARDNESS:	--		
WEIGHT:	--		
		KEYSTONE ENERGY TOOLS	
		TITLE:	
		MAIN COMPONENTS	
		FOR KET A66000 TYPE E AIR SPIDER	
SIZE	B	FSCM NO.	337-365-4456
DWG NO.	A66000-A	REV.	0
SCALE:	1 : 6	SHEET:	1 OF 1



UNLESS OTHERWISE SPECIFIED:		REVISIONS	
MACHINING DIMENSIONS:		REV.	DESCRIPTION
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2 PLACE DECIMAL: .XX ± .010			
1 PLACE DECIMAL: .X ± .020			
FRACTIONAL: ± 1/32			
ALL DIMENSIONS ARE IN INCHES			
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DRAWN:	C. FONTENOT	DATE:	10/19/2023
APPROVED:	J. RAMEY		
MATERIAL GRADE:	--		
MATERIAL HARDNESS:	--		
WEIGHT:	1,150 LBS. APPROX.		
		KEYSTONE ENERGY TOOLS	
		TITLE:	
		APPROXIMATE SIZE DIMENSIONS	
		FOR KET A66000 TYPE E AIR SPIDER	
SIZE	A	FSCM NO.	337-365-4456
DWG NO.	A66000-D	REV.	0
SCALE:	1 : 12	SHEET:	1 OF 1

Keystone ENERGY TOOLS

6.0 Technical Drawings



UNLESS OTHERWISE SPECIFIED:		DRAWN:		DATE:		KEYSTONE ENERGY TOOLS	
MACHINING DIMENSIONS:		C. FONTENOT		01/03/2024		TITLE:	
3 PLACE DECIMAL: .XXX ± .005		APPROVED:				TYPE E SLIP ASSEMBLY COMPONENTS	
2 PLACE DECIMAL: .XX ± .010		MATERIAL GRADE:		--		AND PARTS BREAK-DOWN	
1 PLACE DECIMAL: .X ± .030		MATERIAL HARDNESS:		--		SIZE: FSCM NO.	
FRACTIONAL: ALL DIMENSIONS ARE IN INCHES		WEIGHT:		--		DWG NO.	
THIS DOCUMENT CONTAINS PROPRIETARY INFORMATION AND SUCH INFORMATION MAY NOT BE DISCLOSED TO OTHERS FOR ANY PURPOSES WITHOUT THE PERMISSION OF KEYSTONE ENERGY TOOLS, LLC.						A55623-CB	
						REV	
						0	
						SCALE: --	
						SHEET: 1 OF 1	

1. Slip Body
2. Liner Key
3. Cotter Pin
4. Slip Retainer Bolt & Nut
5. Insert

7.0 Assemblies

Type "E" Spider Assemblies

Part Number	Description	Size Range	Rating	Weight (lbs.)
A66000-250	KET MODEL "E" AIR-OPERATED SPIDER	2 3/8" – 7 5/8"	500,000 Lb. (250 Tons)	

Type "E" Slip Assemblies

Part Number	Description	Weight (lbs.)
A65621-100	3-1/2" MODEL "E" AIR-OPERATED SPIDER SLIP BODY	89.00
A66623-100	5-1/2" MODEL "E" AIR-OPERATED SPIDER SLIP BODY	88.50
A66624-100	7" MODEL "E" AIR-OPERATED SPIDER SLIP BODY	77.00
A66624-176	7-5/8" MODEL "E" AIR OPERATED SPIDER SLIP BODY	34.00

3-1/2" Body Type "E" Insert Sets

Tool Size	Pipe Size	STD Part #	KEY-GRIT Part #	Weight (lbs.)
3-1/2"	2-3/8"	A34-164	A34-164-G1	20.57
3-1/2"	2-7/8"	A34-165	A34-165-G1	16.46
3-1/2"	3-1/2"	A34-166	A34-166-G1	10.50

5-1/2" Body Type "E" Insert Sets

Tool Size	Pipe Size	STD Part #	KEY-GRIT Part #	Weight (lbs.)
5-1/2"	4"	A34-182	A34-182-G1	54.21
5-1/2"	4-1/2"	A34-183	A34-183-G1	43.37
5-1/2"	5"	A34-184	A34-184-G1	32.53
5-1/2"	5-1/2"	A34-185	A34-185-G1	21.69

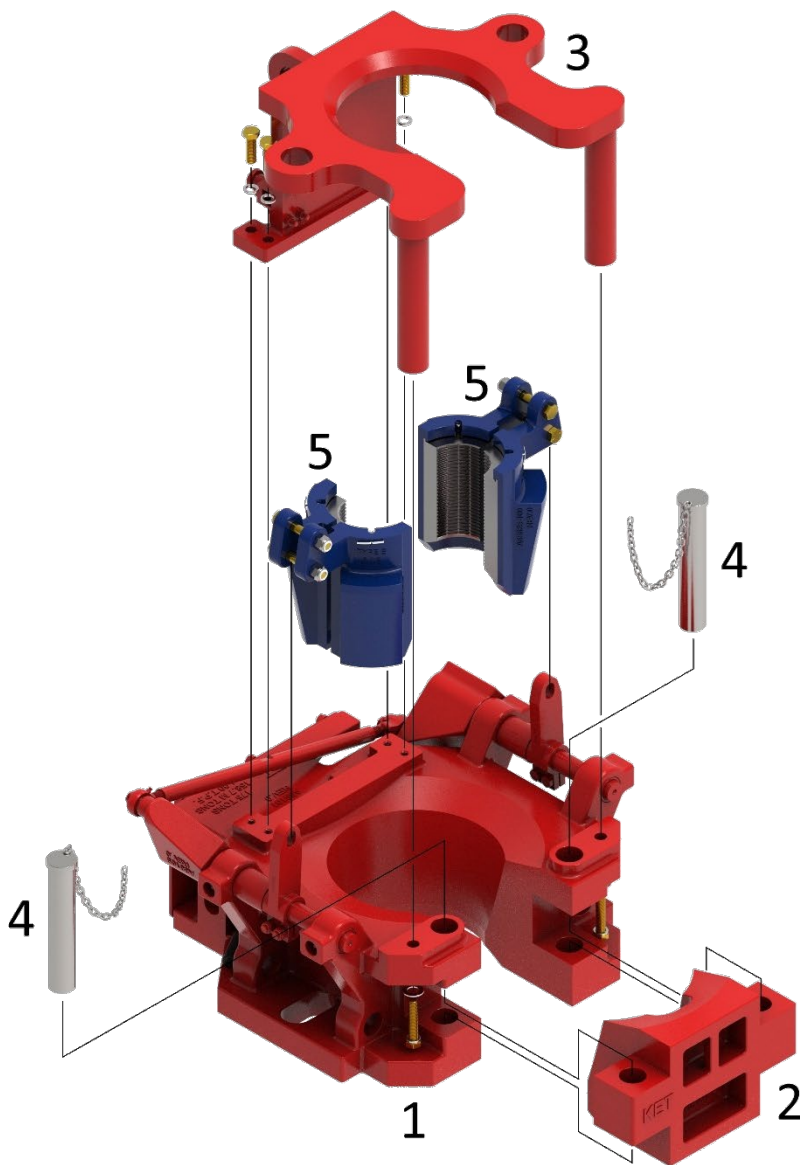
7" Body Type "E" Insert Sets

Tool Size	Pipe Size	STD Part #	KEY-GRIT Part #	Weight (lbs.)
7"	5-1/2"	A34-192	A34-192-G1	52.41
7"	6-5/8"	A34-191	A34-191-G1	28.85
7"	7"	A34-190	A34-190-G1	20.96

7" Body Type "E" Insert Sets

Tool Size	Pipe Size	STD Part #	KEY-GRIT Part #	Weight (lbs.)
7-5/8"	7-5/8"	A20-103	A20-103-G1	0.22

8.0 Replacement Parts

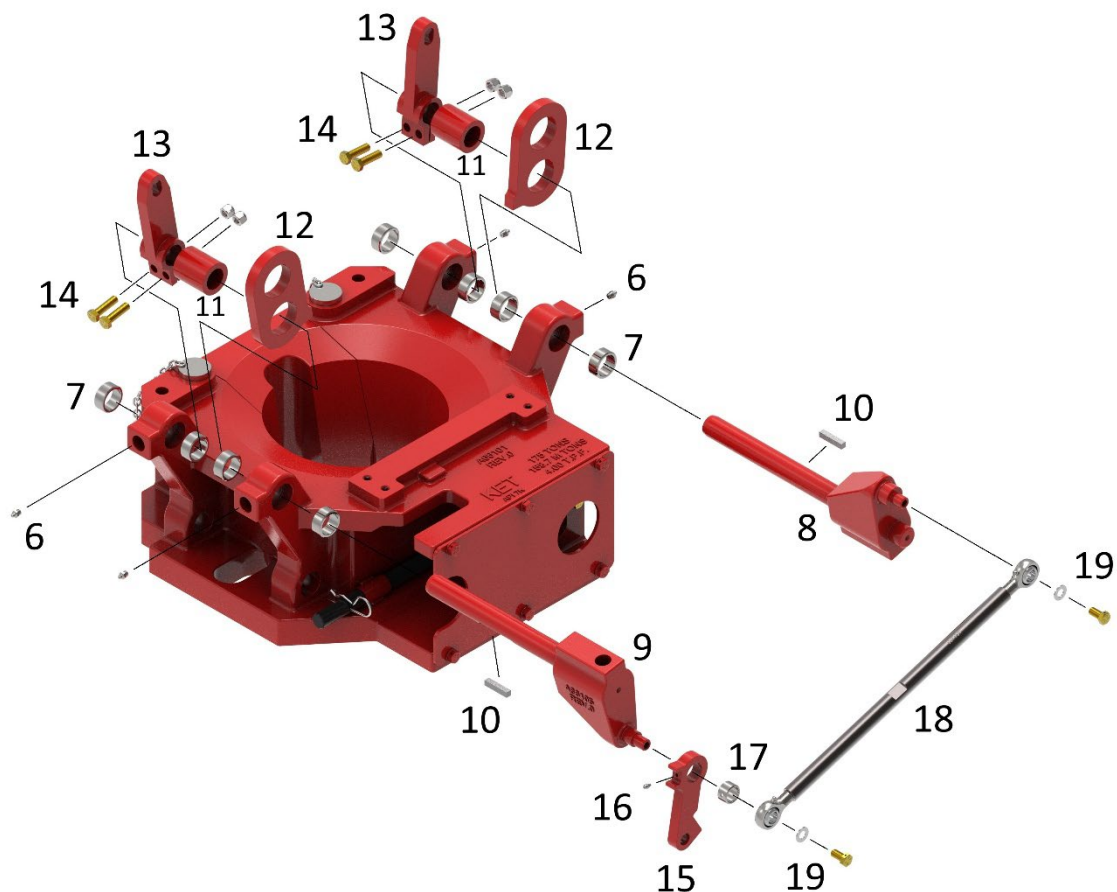


Main Component Breakdown

#	Part Number	Description	QTY
1	A66101	Body	1
2	A66102	Spider Gate	1
3	A66000-100	Safety Guard	1
4	A66114	Door Pin	2
5	SEE CHART	Slip Assembly	2

Keystone ENERGY TOOLS

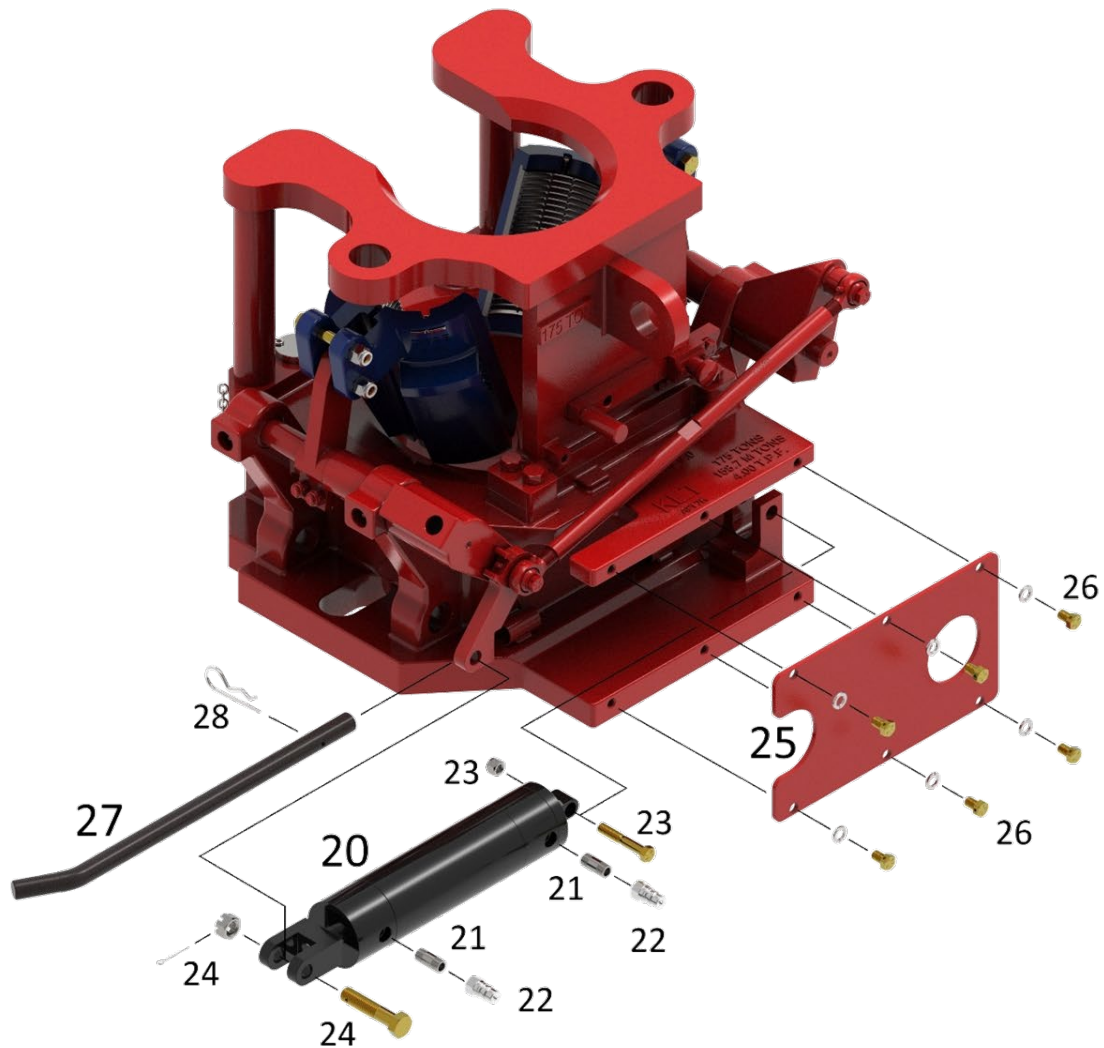
8.0 Replacement Parts



Crankshaft System Breakdown

#	Part Number	Description	QTY
6	E940308-1	Grease Zerk for Body	4
7	A66124	Crank Shaft Bushing	8
8	A66105-L	Left Crank Shaft	1
9	A66105-R	Right Crank Shaft	1
10	A66119	Lift Arm Key	2
11	A66126	Spacer for Crank Shafts	2
12	A66204	Lifting Eye	2
13	A66106	Lift Arm	2
14	A66107	Retainer Bolt & Lock Nut f/Lift Arm	4
15	A66103-2	Lower Link	1
16	E316-TI	Lower Link Grease Zerk	1
17	A65125	Lower Link Bushing	1
18	A66103	Link Rod	1
19	A66104	Retainer Bolt & Lock Washer f/Link	2

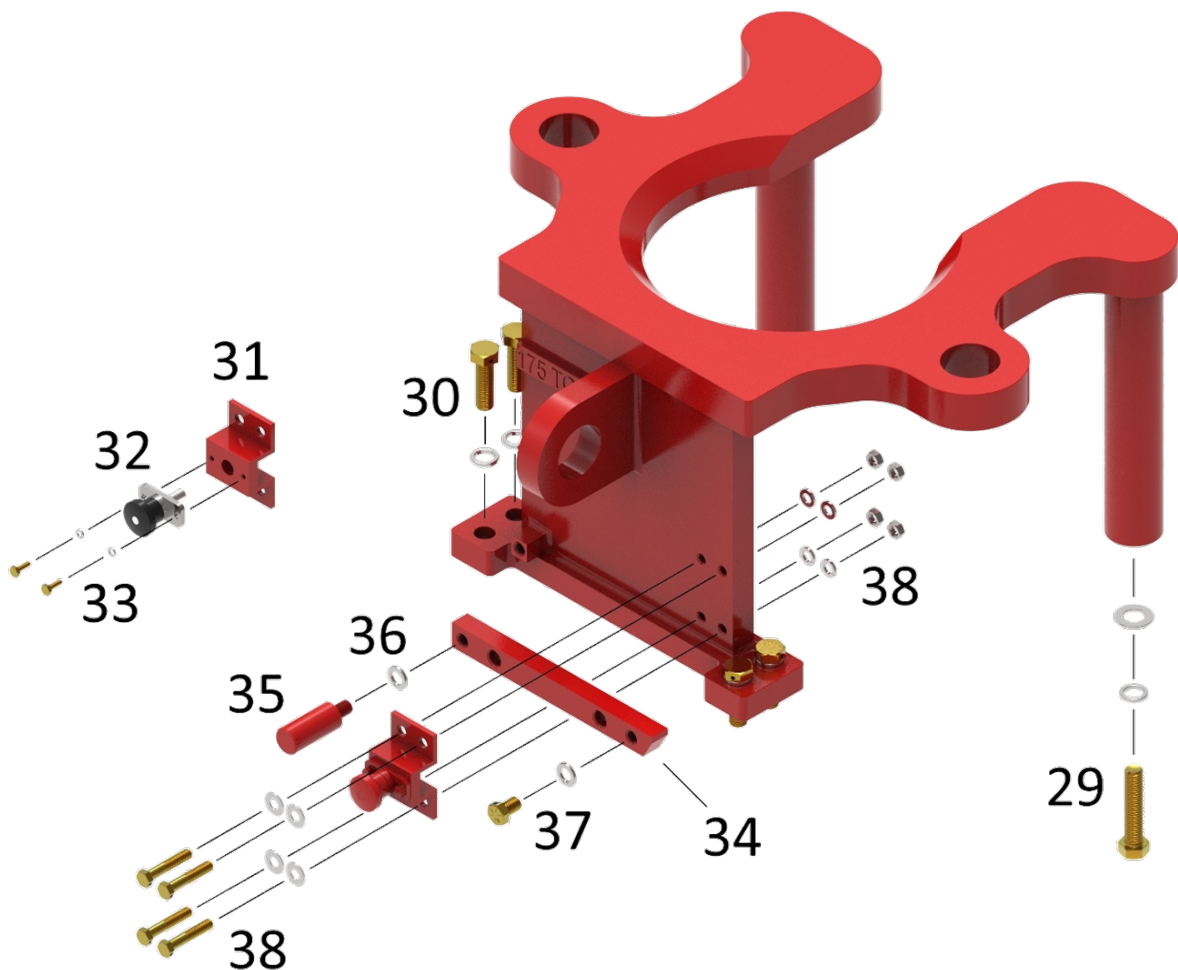
8.0 Replacement Parts



Cylinder Breakdown

#	Part Number	Description	QTY
20	A66140	Pneumatic Cylinder	1
21	A46053	Nipple	2
22	992285-MH-6-6	Male Quick Disconnect	2
23	A66141	Retainer Bolt & Lock Nut f/Cylinder	1
24	A66142	Retainer Bolt & Lock Nut f/Cylinder	1
25	A66108	Cylinder Guard	1
26	A66109	Retainer Bolts f/Guard	6
27	A66169	Manual Lift Arm	1
28	A992047-13	Bridge Pin	1

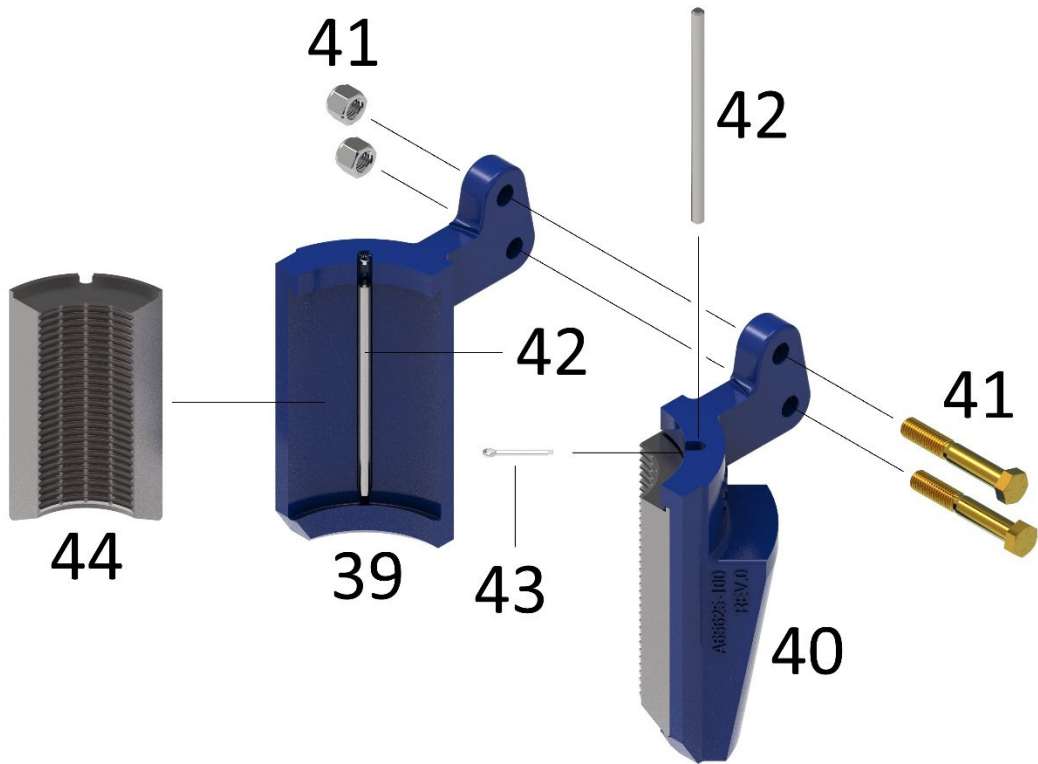
8.0 Replacement Parts



Safety Guard Breakdown

#	Part Number	Description	QTY
29	A66001	Retainer Bolt, Lock Washer, & Flat Washer f/Guard	2
30	A66002	Retainer Bolts & Lock Washer f/Guard	4
31	A66003	Bracket for Spring Plunger	1
32	A66004	Plate-Mount Retractable Spring Plunger	1
33	A66005	Retainer Bolt & Lock Washer f/Plunger	2
34	A66006	Plate for Crank Shaft Stop	1
35	A66007	Handle for Crank Shaft Stop	1
36	A66008	Lock Washer	1
37	A66009	Retainer Bolt & Lock Washer f/Crankshaft Stop	1
38	A66010	Retainer Bolt, Washer, Lock Washer, & Nut f/Spring Bumper	4

8.0 Replacement Parts



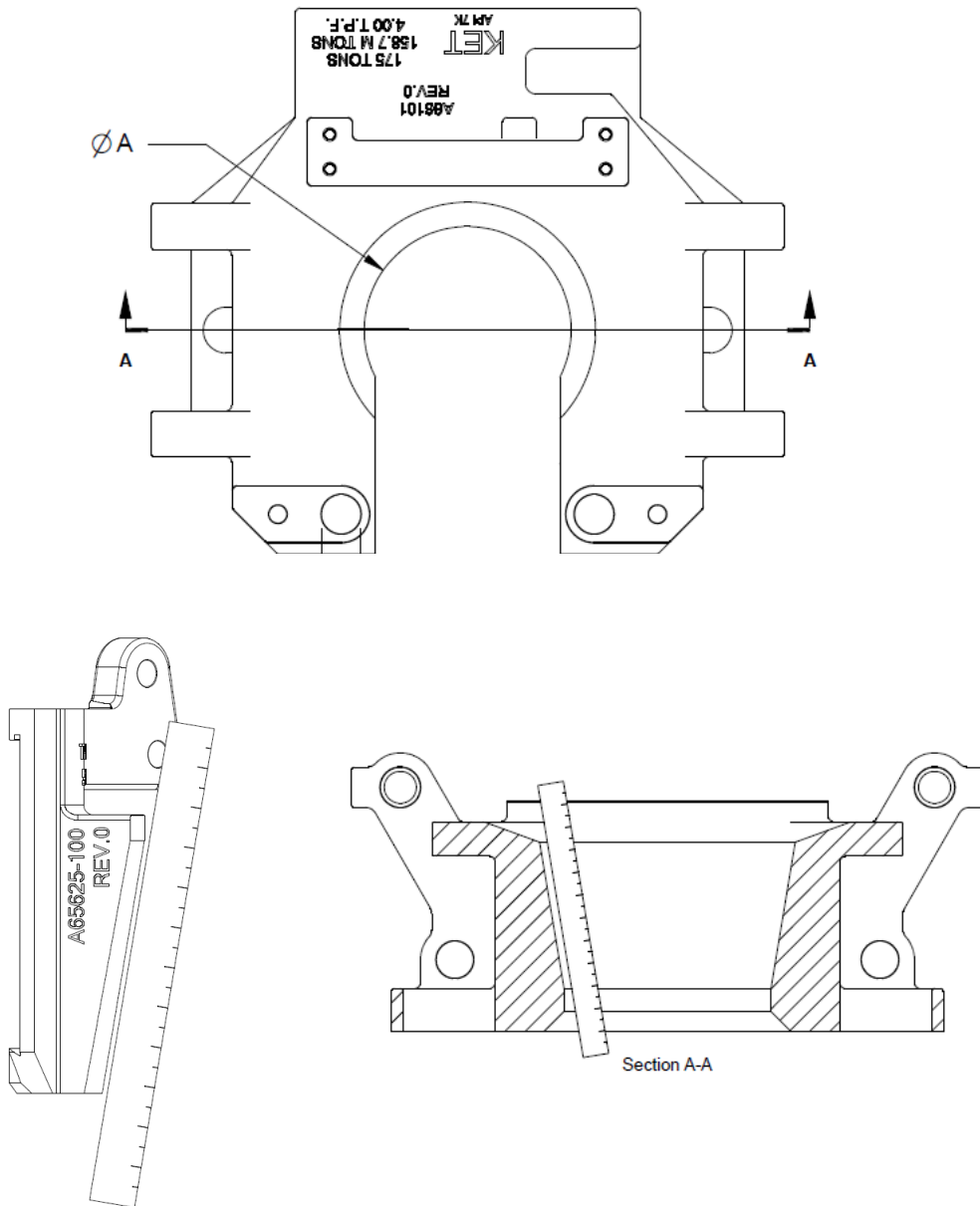
Slip Assembly Breakdown

#	Part Number	Description	QTY
39	N/A	Slip Body A	2
40	N/A	Slip Body B	2
41	A66602	Retainer Bolt & Lock Nut f/Slip Body	4
42	A66601	Retainer Pin for Insert	4
43	A66603	Cotter Pin for Insert	4
44	SEE CHART	Insert	4

9.0 Spider Body Wear Data

Wear Data

- Inspect slip inserts for any sign of wear or damage. Any broken or worn insert must be replaced immediately.
- Check the slip backs and bowl taper with a straight edge and replace as necessary.
- The Spider Thru-Bore Dia. (Dim A) max = 9.125"



10.0 Reception, Storage, Transport & Decommissioning

Reception

Check the tool immediately after reception and re-preserve the tool as required (try to have this completed within 1 month).

Any exposed or non painted metal surfaces should be coated with a rust preventative to prevent any corrosion build up.

Storage

The tool should be stored or palletized in a clean and dry place to avoid all environmental elements. It is recommended to store in an indoor environment of 60 – 70 Deg F with max humidity of 80%. If the tool is to be stored outdoor, then a cargo container would be appropriate to ensure the tool is not exposed to weather conditions.

Preserve the tool by greasing all areas defined in the maintenance requirements per the manual.

During storage, the tool shall still be inspected annually per inspection requirements in the user's manual.

Transport

When lifting the tool do so only by using its lifting points only. The best way of transporting the tool is in its original palletized state. Ensure the tool is banded down accordingly to prevent the possibility of potential dropped objects and broken shipments.

Decommissioning

The tool may contain grease, steel, rubbers, plastic, stainless steel, mild steel and several assembled components with undefined consistency or mixtures. The tool can be contaminated with drilling fluids, hydraulic fluids and preservatives. After the tool is decommissioned, it is recommended to disassemble the tool in a place where waste fluids can be contained and properly disposed of.

⚠WARNING: any fluids, mud, or grease are potentially unsafe when in contact with the skin. Always wear gloves and safety goggles when disassembling the tool.

1. Clean the tool with a steam cleaner.
2. It is recommended to disassemble the tool in a place with drainage for waste fluids if possible.

CERTIFICATE OF WARRANTY AND GUARANTEE OF QUALITY

KET warrants all materials and products manufactured to be free from defects in material and workmanship, under normal use and service, when installed, used, and serviced in the manner provided and intended by the seller for a period of twelve (12) months after delivery. Seller's obligation under this warranty is expressly limited to repair or replacement, at its option, of any materials or products, returned to the seller's plant in Broussard, Louisiana and which are determined by the seller to be defective. All freight charges for return and reshipment shall be paid by the customer. A new warranty period shall not be established for repaired or replaced material or products; such items shall remain under warranty only for the remainder of the warranty period on the original materials or products. This is the sole warranty of the seller and no other warranty is either expressed or implied, in fact or by law, including any warranty as to the merchantability or fitness for a particular use or purpose.

In case of goods or parts not wholly of seller's manufacture, seller shall make available to the customer whatever warranty or guarantee is extended to seller for such goods or parts by the supplier or manufacturer thereof.

Seller will not assume responsibility or liability for any repairs, rebuilding, welding or heat treating done to its material or products outside of seller's plant, such work shall void all warranties. All parts used in the manufacture and /or final assembly of seller's materials or products are necessary for both safety and operational performance. Omission of any part or failure to replace any worn part may result in the malfunction and a consequent safety hazard for which seller disclaims any responsibility or liability for injuries or damage as a result thereof.

Buyer's sole and only remedy in regard to any defective materials or products shall be the repair or replacement thereof as herein provided, and seller shall not be liable for any consequential, special, incidental or punitive damages resulting from or caused by any defective materials, products or supplies.



For more information, please contact us at:

Keystone Energy Tools

3711 Melancon Rd.

Broussard, LA 70518

www.k-e-t.com

Office: 1-337-365-4411

Fax: 1-337-365-4456

Revision History

Rev	Date	Changes	By
0	07/15/2025	Original release	Cody H.
01	09/24/2026	Added 7-5/8" slip body w/inserts to manual	Cody H.