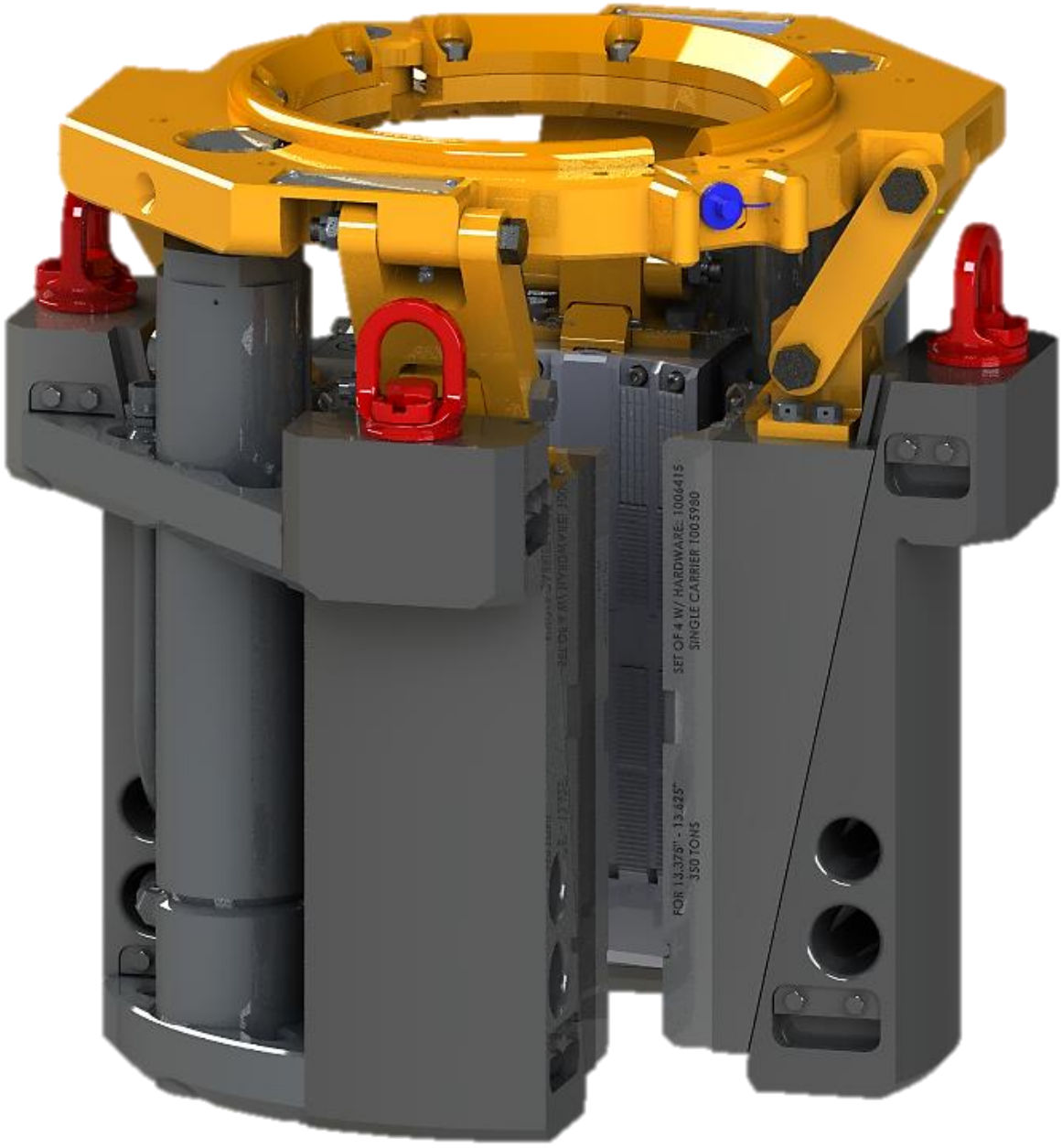
MCCOY GLOBAL

TECHNICAL MANUAL

FMS-350-275-C

Flush Mounted Spider



SPECIFICATIONS | OPERATION | MAINTENANCE | PARTS

McCoy has made every effort to ensure the information contained in this document is accurate and current. This manual is intended to provide equipment operation and safety instructions for your equipment. However, McCoy does not warrant or guarantee that the information is either complete or accurate in every respect and the user of the manual should consult with its McCoy sales representative for any clarifications and updates.

The user of the manual shall protect, indemnify, and hold harmless McCoy and its directors, officers, employees, and agents from and against all liability for personal injury, death, or property damage resulting directly or indirectly from the use of the information contained in this manual.

Observance of all descriptions, information and instructions set out in this manual is the full responsibility of the user. This manual is intended for guidance and informational purposes and must be used in association with adequate training and on-the-job supervision to provide safe and effective equipment use.

It is the responsibility of the user to conform to all regulations and requirements issued by an authority or agency which may affect the operation, safety, or equipment integrity, which may overrule the content of this documentation.

The user will acknowledge and obey any general legal or other mandatory regulation in force relating to accident prevention, safety, and equipment integrity.

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Summary of Revisions		
Revision	**Date**	**Description of Revision**
0	March 2022	Initial Release.
1	October 2022	Update to chart on page 25 to update die part numbers and include additional parts created since initial release.
2	January 2023	Update to chart on page 25 to add overall weight of tool. Add weight range to page 10. Add maximum flow to page 25. Add warning regarding locking rotary table to page 31. Add warning to positively stop the cylinders while changing carriers on page 27. Add FMS Layout drawing.
3	March 2023	Update to chart on page 25 to add new carrier size Update FMS Layout Drawing. Add information on the rotary adapter accessory Add console GA drawings. Update charts on page 10.
4	June 2024	Manual rewritten.

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SECTION 1: INTRODUCTION, SAFETY GUIDELINES & PRODUCT DESCRIPTION

1.0 INTRODUCTION & CONTACT INFORMATION

Congratulations, and thank you for purchasing quality tubular connection equipment from McCoy Global. This unit will provide years of outstanding performance. Proper maintenance and care will extend its life and ensure years of excellent performance and reliability. The installation and commissioning, operating, and maintenance instructions in this manual will assist you in giving your equipment the care it requires. Please read the manual before installing and using your equipment. Replacement parts are readily available from McCoy Global. Should you need replacement parts, or should you experience any difficulty not covered in this manual, please contact:

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Technical manuals are produced and published by McCoy Global Inc. McCoy Global has made an effort ensure that all information in this document is accurate, but please note that some illustrations used in this manual may not visually match actual purchased equipment. If you believe the information in this publication is missing or erroneous, please contact our Technical Publications Department.

Standard Terms and Conditions of Sale (including warranty information):

https://www.mccoyglobal.com/download/terms-conditions-sales/

AUTHORIZED USE ONLY

READ THIS MANUAL BEFORE USING EQUIPMENT

Only authorized, trained, and competent personnel shall operate, maintain, and repair this equipment.

Fully review this manual and comply with all safety and environmental protection instructions before operating equipment.

Hazard Labels

McCoy Global uses four levels of hazard/notice labels to indicate four levels of importance: Danger, Warning, Caution, and Notice.

DANGER is identified by a hazard symbol combined with the word **"DANGER"** and signifies the highest level of risk. Ignoring information marked with a **DANGER** symbol may result in severe bodily injury or death.

⚠ DANGER
THIS IDENTIFIES AN EXTREME HAZARD OF PERSONAL INJURY OR DEATH.

A WARNING is indicated by a hazard symbol paired with the word **"WARNING"** and denotes items of medium risk. Ignoring information marked with a **WARNING** symbol may result in significant injury to personnel, catastrophic equipment failure, or harmful environmental contamination.

⚠ WARNING
THIS IDENTIFIES A WARNING ABOUT POTENTIAL INJURY OR CATASTROPHIC EQUIPMENT DAMAGE.

A CAUTION is indicated by a hazard symbol paired with the word **"CAUTION"** and represents items of low risk. Ignoring information marked with a **CAUTION** symbol may result in injury to personnel or equipment damage.

⚠ CAUTION
THIS IDENTIFIES A CAUTION ABOUT SAFE OPERATION OR THE POTENTIAL FOR EQUIPMENT DAMAGE.

A NOTICE highlights information or items of importance unrelated to personal injury that may assist the user during the installation, commissioning, assembly, or operation of the equipment.

NOTICE
THIS HIGHLIGHTS ITEMS OF IMPORTANCE THAT ARE UNRELATED TO PERSONAL INJURY.

GENERAL SAFE OPERATING GUIDELINES

Only authorized personnel shall operate equipment delivered by McCoy Global. Prior to use, the equipment must be in proper technical condition and used solely for its intended purpose. Any malfunctions or damage must be addressed and rectified before operation to ensure personnel safety and prevent equipment and/or property damage.

Users are accountable for ensuring the safety of all personnel when operating any McCoy Global product. It is recommended that a safety representative conducts a hazard assessment of the work area before starting operations. This representative is tasked with confirming that all operators possess the necessary equipment and have undergone the required safety training. McCoy Global bears no responsibility for injuries, equipment damage, or property damage resulting from the improper use of the equipment.

⚠ CAUTION

IT IS CRITICAL FOR THE END USER TO CONDUCT A RISK ASSESSMENT AND MITIGATION PLAN FOR THE ENTIRE INTEGRATED SYSTEM, INCLUDING ALL ASPECTS SUCH AS COMMISSIONING AND OPERATION. PLEASE NOTE THAT THIS MANUAL ONLY CONTAINS INFORMATION RELEVANT TO THE SYSTEM SHOWN.

The area surrounding the equipment operating area must remain free of clutter, tripping hazards, and protruding objects that could snag hoses or cables. Ensure that the operating surface or drill floor remains clear of slipping risks such as grease, oil, and water.

Adequate lighting of the work area is required. All warnings, labels, gauges, and signs must be clearly visible.

Equipment components painted green are deemed safe for continuous handling. Areas painted yellow, along with any other equipment components that rotate, or move are designated as hazardous areas. During operation, contact with those areas must be avoided.

Always wear all personal protective equipment (PPE) specified by established HSE policies and follow all safety guidelines.

Never attempt to clamp to a tubular using incorrectly sized dies. Operators must always use the correct carrier size equipped with the correct dies. Use of incorrectly sized dies poses a hazard to personnel and potentially damage equipment.

Tools should not be clamped onto any tubular without being in either the rotary or the shipping stand.

⚠ WARNING

NEVER ATTEMPT TO CLAMP ONTO TUBULARS WITH INCORRECTLY SIZED DIES.

⚠ WARNING

FAILURE TO FOLLOW THE EQUIPMENT PLACEMENT AND RIG-UP PROCEDURES OUTLINED IN THIS MANUAL CAN LEAVE EQUIPMENT UNGROUNDED AND AT RISK FOR BUILDING A STATIC CHARGE. BEFORE OPERATING, AN ASSESSMENT FOR PROPER GROUNDING MUST BE CONDUCTED TO MINIMIZE THE RISKS OF SPARKS ASSOCIATED WITH STATIC DISCHARGE.

⚠ WARNING

TOOLS SHOULD NOT BE CLAMPED ON ANY TUBULAR WITHOUT BEING INSTALLED INTO EITHER THE ROTARY TABLE, ADAPTER BUSHING OR SHIPPING STAND.

McCoy Global recommends adhering to recognized industry standards such as OSHA, ASME B30.9-2006, or manufacturer's guidelines when performing any rigging and overhead lifting. The use of this equipment by untrained people is hazardous. Improper use will result in serious injury or death. Do not exceed rated capacity. Slings will fail if damaged, abused, misused, overused, or not properly maintained. Never stand beneath a suspended load.

⚠ DANGER

NEVER STAND BENEATH A SUSPENDED LOAD

⚠ WARNING

AREAS OF THIS EQUIPMENT THAT ARE COATED YELLOW ARE HAZARDOUS WHEN THE EQUIPMENT IS ACTIVE. KEEP HANDS CLEAR WHEN EQUIPMENT IS ENERGIZED.

MAINTENANCE SAFETY

All personnel are responsible for performing maintenance tasks that prioritize worker, equipment, and environmental safety. This may involve taking additional precautions that are not identified in this section.

Maintenance of equipment shall only be performed by qualified maintenance personnel. Prior to initiating any maintenance task ensure you have the necessary tools, materials, drawings, and documentation.

To safeguard personnel from inadvertent exposure to a hazard, isolate the maintenance area underway using tape, rope, or signage to clearly indicate an 'off-limits' area.

Where applicable ensure electrical circuits within the affected equipment are deactivated or de-energized by an authorized and qualified person. If necessary, the circuit should be locked out. Do not disconnect a live electrical circuit unless you are certain that the area is free from hazards.

⚠ DANGER

DISCONNECT POWER SUPPLY AND RETURN HOSES BEFORE PROCEEDING WITH MAINTENANCE – ALWAYS DISCONNECT SUPPLY FIRST AND CONNECT IT LAST.

⚠ WARNING

WHEN REPAINTING EQUIPMENT, THE PAINT COAT APPLIED SHOULD NEVER EXCEED 2MM IN THICKNESS. EXCESS THICKNESS COULD LEAD TO THE ACCUMULATION OF STATIC CHARGE, INCREASING THE RISK OF SPARKS DUE TO STATIC DISCHARGE.

Replacement Parts

All consumable and replacement parts must meet or surpass OEM specifications to maintain equipment integrity. Do not replace protective equipment such as hydraulic switches, circuit breakers, and fuses without first consulting McCoy Global. Do not replace electrical or control hardware without consulting McCoy Global. The use of non-OEM replacement parts without the approval of McCoy Global could invalidate the equipment warranty.

Environmental Impact

McCoy Global equipment incorporates materials that could be environmentally harmful if not disposed of correctly, such as hydraulic fluid, grease, fuel, electrical components, and more. Ensure that all materials are disposed of in accordance with established environmental protection regulations and in compliance with applicable federal, state, provincial, and local legislation.

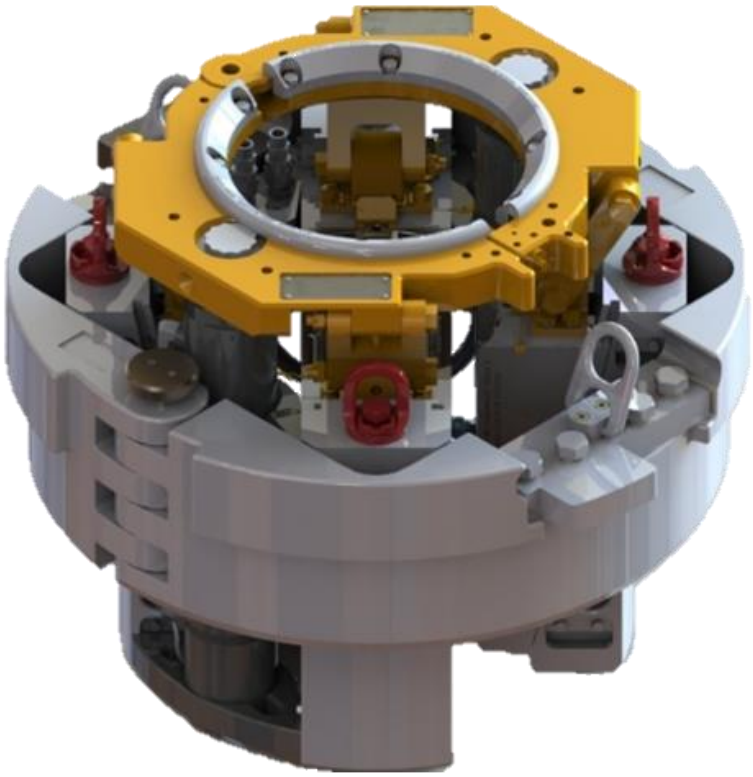
The user is fully responsible for adhering to the following:

- All descriptions, information, and instructions are within this manual.
- Any regulation or requirement issued by a relevant authority or agency that pertains to the operation, safety, or integrity of the equipment takes precedence over the content provided in this manual.
- All legal or other mandatory regulations in force governing accident prevention or environmental protection.

PRODUCT DESCRIPTION

The Hydraulic Flush Mounted Spider (FMS) is a rotary equipment specifically designed to handle casing, accommodating sizes ranging from 2-3/8” to 13-5/8” using replaceable die carriers. Developed to meet the demand for larger and higher-capacity casing tools, the FMS increases both running efficiency and safety. Depending on the casing size and weight, it is capable of handling casing string weights up to 350 Ton.

An adapter (P/N 1007514) is available to allow the FMS to be used inside of a 37 ½” Rotary Table. See the Appendix section for dimensions and two configurations of the adapter.



Adapter with FMS installed.

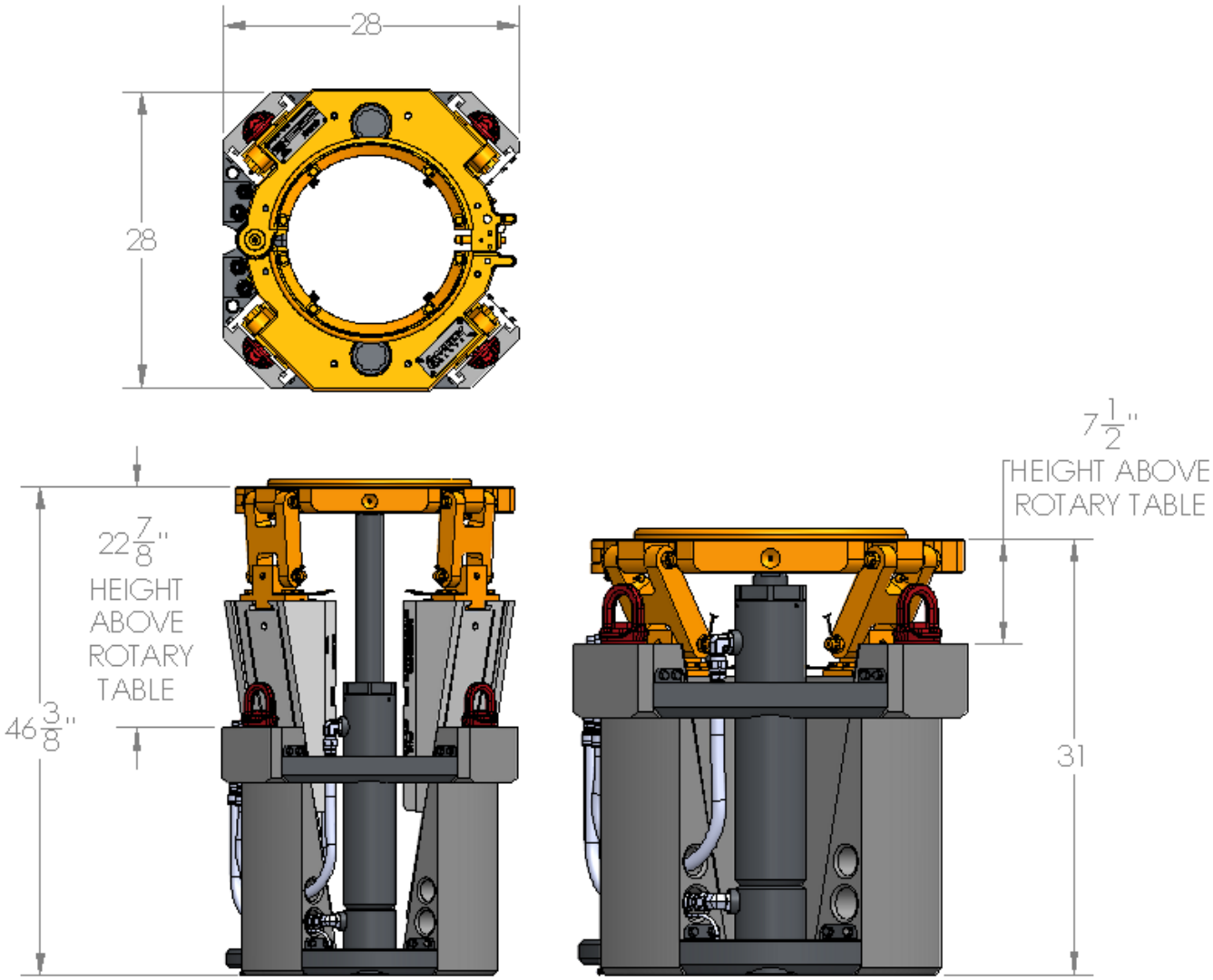
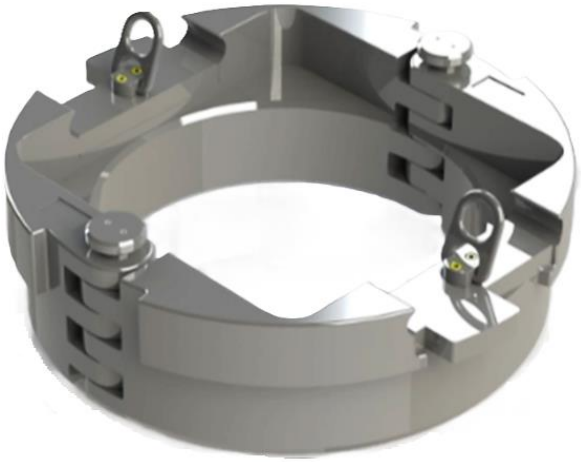
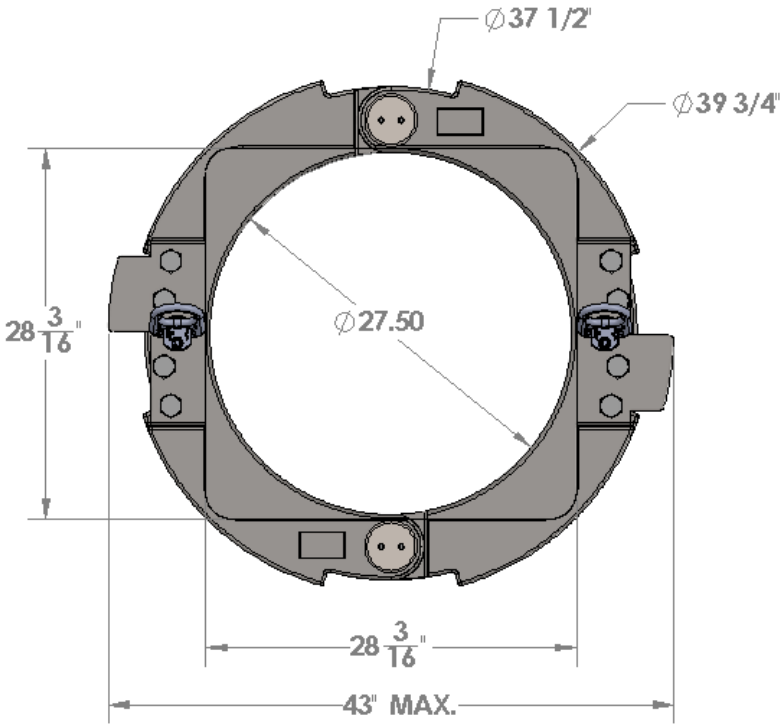


Illustration : FMS-350-275 - C Dimensions

PRODUCT DESCRIPTION CONTINUED

The Adapter (P/N 1007514) allows the FMS to be used inside of a 37 ½" Rotary Table, supporting two configurations for National and EMSCO standards.
See the Appendix section for dimensions and two configurations of the adapter.





PRODUCT DETAILS

FLUSH MOUNT SPIDER SPECIFICATIONS		
MAXIMUM TENSION RATING	350 TONS	317 TONNES
MAXIMUM WORKING PRESSURE	2000 PSI	138 BAR
RECOMMENDED FLOW RATE	34 GPM	128 LPM
MASS (TOOL ONLY)	2900 LBS	1315 KG
MASS RANGE (CARRIERS AND GUIDE PLATES INCLUDED)	3050-3700 LBS	1383 - 1678 KG
TIME TO EXTEND AND RETRACT	6 SECONDS @ 34 GPM	
COMPATIBLE ROTARY TABLE	API 27 1/2"	
CASING SIZE RANGE	13.625"	2.375"

TENSION RATING FOR CARRIERS	
PIPE SIZE (INCHES)	MAX TENSIONS (TONS)
13.625 - 6.000	350
*6.000	240/350
6.000 - 4.500	240
3.500 - 2.375	100
*For 6" OD, max values shown are for utilizing carrier part number 1007270. Please note that when carrier part number 1008198 is in use, the maximum load is 240 tons and not to be exceeded.	

MAXIMUM TORQUE AT 2000 PSI WORKING PRESSURE ON A SINGLE JOINT	
PIPE SIZE (INCHES)	TORQUE (FT-LB)
13.625 - 7.625	50000
7.563 - 7000	38000
6.938 - 5.500	30000
5.438 - 4.500	22000
4.438 - 3.500	14000
3.438 - 2.375	3000
*TORQUE VALUES ARE DETERMINED BY SLIP UPON THE PIPE AND NOT THE LIMITATIONS OF THE TOOL.	

RECOMMENDED LUBRICANT SPECIFICATIONS

Hydraulic Fluid

McCoy Global recommends using high-quality hydraulic fluid that contains rust & oxidation inhibitors, as well as foam suppressant, meeting specific requirements listed below. Operating this equipment using hydraulic fluid that does not meet the requirements significantly accelerates equipment damage due to, but not limited to, premature component wear, premature seal failure, cavitation, and fluid starvation.

⚠ CAUTION

OPERATING THIS EQUIPMENT USING HYDRAULIC FLUID THAT DOES NOT MEET THE LISTED REQUIREMENTS GREATLY ACCELERATES EQUIPMENT DAMAGE.

HYDRAULIC FLUID STANDARDS	
CHARACTERISTIC	**REQUIREMENT**
MAXIMUM VISCOSITY AT COLD STARTUP	<1000 cST (<4600 SUS)
OPERATING VISCOSITY RANGE	100 To 16 cST (170 TO 80 SUS)
MINIMUM VISCOSITY (INTERMITTENT PERIODS ONLY)	10 cST (60 SUS)
HYDRAULIC FLUID OPERATING TEMPERATURE RANGE	86° - 140°F (30° - 60°C) MEASURED IN MAIN RESERVOIR
MAXIMUM FLUID TEMPERATURE	180°f (82°C)
FLUID CLEANLINESS	FILTERED TO ISO 4406:1999 (18/16/13)

Hydraulic fluid selection should consider the expected climactic conditions and equipment load. Note that this equipment may have undergone testing using hydraulic fluid that does not exceed the operational requirements outlined in the above table. Therefore, McCoy Global recommends purging and flushing the equipment's hydraulic system before connecting it to a hydraulic supply.

NOTICE

MCCOY GLOBAL RECOMMENDS PURGING AND FLUSHING THE EQUIPMENT'S HYDRAULIC SYSTEM BEFORE CONNECTING TO A HYDRAULIC SUPPLY.

Grease

McCoy Global recommends using the lubrication or grease listed below and thoroughly applying to the equipment before first use, following the lubrication instructions outlined in the Maintenance Section. Using alternative lubricants can compromise performance and accelerate wear on critical components, thereby reducing the lifespan of the parts and/or effectiveness of the tool.

Area	Product
	Lubrication, Grease, Loctite
Slips and Corner blocks Taper Surfaces (-20C – 60C)	NLGI No. 3 Lithium equivalent
Bolts and Set Screw Threads	Loctite 76764 (McCoy P/N: 700093)
Pins, latch mechanism, grease fittings	NLGI No. 2 Lithium equivalent
Die Carrier Slots and between the dies	CRC 3-36 Multi-Purpose Lubricant & Corrosion Inhibitor

INSTALLATION AND COMMISSIONING
RECEIPT, INSPECTION, AND HANDLING OF EQUIPMENT

⚠ CAUTION

EQUIPMENT SHOULD BE INSPECTED FOR SHIPPING DAMAGE UPON RECEIPT AND TESTED BEFORE BEING RELEASING TO AN OPERATIONAL ENVIRONMENT.

Upon receipt, inspect packaging materials for shipping damage. Record all shipping damage on the shipping manifest and immediately notify both the shipping company and McCoy Global.

Next, remove all protective shipping materials and perform a visual inspection of the equipment. If any damage is detected, ensure repairs are completed before connecting the equipment to a hydraulic power source.

McCoy Global recommends connecting the equipment to a hydraulic power source and testing complete functionality in a controlled environment before releasing it to an operational environment.

⚠ CAUTION

MCCOY GLOBAL RECOMMENDS TESTING EQUIPMENT BEFORE RELEASING TO AN OPERATIONAL ENVIRONMENT.

This equipment may have been factory tested using hydraulic fluid that does not meet operational requirements of the end user. Variances in ambient temperature could affect factory adjusted components. McCoy Global recommends purging and flushing the hydraulic system before connecting to third-party hydraulic power units.

Perform the following steps as a general functionality test:

1. Perform a complete lubrication of the equipment.
2. Confirm the spring latch carrier retainer mechanism operates correctly.
3. Perform a complete functional test of the equipment.

SLING / LOAD BEARING DEVICE SAFETY

⚠ DANGER

A "LOAD-BEARING DEVICE" IS A WIRE SLING, SPREADER BAR ASSEMBLY, FRAME, OR ANY OTHER DEVICE THAT BEARS THE PARTIAL OR TOTAL WEIGHT OF THE EQUIPMENT FOR WHICH THIS MANUAL HAS BEEN PRODUCED.

THE LOAD-BEARING DEVICE SUPPLIED BY MCCOY GLOBAL IS DESIGNED TO SUPPORT THE EQUIPMENT DESCRIBED IN THIS MANUAL. MCCOY GLOBAL DOES NOT GUARANTEE THE ABILITY OF THE LOAD BEARING DEVICE TO SUPPORT ANY OTHER PART, ASSEMBLY OR COMBINATION OF PARTS AND ASSEMBLIES. ALSO, MCCOY GLOBAL DOES NOT GUARANTEE THE ABILITY OF THE LOAD-BEARING DEVICE TO LIFT OR SUPPORT THE EQUIPMENT DESCRIBED IN THIS MANUAL IF THERE ARE ANY MODIFICATIONS TO THE LOAD-BEARING DEVICE, OR ANY ADDITIONS TO THE EQUIPMENT DESCRIBED IN THIS MANUAL THAT ADD WEIGHT TO THE EQUIPMENT, UNLESS SUPPLIED BY MCCOY GLOBAL.

⚠ WARNING

WHEN RE-ASSEMBLING LOAD-BEARING DEVICES SUCH AS WIRE SLINGS, SPREADER BAR ASSEMBLIES, FRAMES, ETC., THE ASSOCIATED FASTENERS MUST BE TIGHTENED TO THE CORRECT TORQUE SPECIFIED FOR THAT SIZE OF FASTENER (SEE MAINTENANCE SECTION). FOR ANY THREADED FASTENER WITHIN A LOAD-BEARING DEVICE MUST BE SECURED WITH RED OR BLUE LOCTITE™.

REPLACEMENT FASTENERS INCLUDING BOLTS, NUTS, CAP SCREWS, MACHINE SCREWS, ETC. USED DURING MAINTENANCE OR OVERHAUL MUST BE GRADE 8 OR EQUIVALENT UNLESS OTHERWISE SPECIFIED.

McCoy Global recommends following recognized industry standards such as OSHA, ASME B30.9-2006, or the manufacturer's guidelines when performing any rigging and overhead lifting. Use by untrained persons in these operations is hazardous and poses significant risks, including the potential for serious injury or death. Do not exceed rated capacity of the equipment. Slings will fail if damaged, abused, misused, overused, or inadequately maintained.

- Use only appropriately rated chains for overhead lifting applications.
- Working Load Limit (WLL) is the maximum allowable load in pounds or kilograms that can be applied to the load-bearing device. This limit is applicable when the device is new or in "as new" condition, and when the load is uniformly and directly applied. The WLL must never be exceeded.
- The Working Load Limit or Design factor may be affected by wear, misuse, overloading, corrosion, deformation, intentional modifications, sharp corner cutting actions, and other use conditions.
- Shock loading and extraordinary conditions must be considered when selecting alloy chain slings.

For further information and related safety guidelines, please refer to the following resources:

- OSHA Regulation for Slings: 1910.184
- ANSI/ASME B30.9: "Slings"
- ANSI/ASME B30.10: "Hooks"
- ANSI/ASME B30.26: "Rigging Hardware"

Inspection of Load-Bearing Devices and Structures

1. Initial Inspection: Prior to initial use, a qualified person shall conduct a thorough inspection of new load-bearing devices and attachments. Each component shall be examined individually, ensuring to expose and examine all surfaces including the inner link surface.
2. Daily inspection: A qualified person of fastenings and attachments shall be performed by a designated person. If any damage or defects are detected at either inspection, the damaged or defective component shall be quarantined from service. It should remain out of service until it undergoes proper repair or replacement.

A load-bearing device shall be removed from service if any of the following conditions are observed:

- Presence of cracks or breaks.
- Visible evidence of tampering, such as missing tamper-proof nuts.
- Signs of impact on load-bearing components, including but limited to spreader bars, lifting lugs, rigid slings & their weldments, and legs & leg mounts.
- Broken or damaged welds.
- Excessive wear, nicks, or gouges.
- Excessive pitting of the components due to rust and/or corrosion.

Inspect all lugs and fixing points for signs of elongation and/or bending, or for material build-up around the holes. Repair or replace components that appear distorted. Confirm that all hardware is securely tightened and is in good condition. If any hardware is missing, promptly replace it. All hardware must be free of rust and corrosion.
Additional inspections shall be performed where service conditions warrant, such as a maritime environment.
Periodic inspection intervals shall not exceed one year. The frequency of periodic inspections should be based on:

- The frequency of use of the load-bearing device.
- Severity of service conditions.
- In sights gained from the service life of load-bearing devices used in similar circumstances.

General inspection interval guidelines:

- Normal Service: Conduct inspections on an annual basis.
- Severe Service – Inspections should occur monthly to quarterly.
- Special Service – Inspections as recommended by a qualified person.

McCoy Global advises all users of lifting or load-bearing assemblies to establish inspection criteria or adopt a relevant inspection standard assigned to a competent inspection body. NDE should be performed per ASTM E165 and ASTM E709 standards. After conducting Magnetic Particle Inspection, ensure that all parts are free of metal shavings. McCoy Global recommends an inspection schedule similar to the one outlined in the following table.

TIME / INTERVAL	PROOF LOAD TEST(s)	NON-DESTRUCTIVE EXAMINATION (NDE) OF LIFTING POINTS	THROUGH VISUAL EXAMINATION
Initial certification by McCoy Global	YES	YES	YES
Interval not exceeding 6 months	NO	At discretion of inspection body	YES
Interval not exceeding 12 months	NO	YES	YES
Interval not exceeding 24 months	YES	YES	YES
Following substantial repair or alteration	YES	YES	YES

1. **Load Testing Procedures:**
   - Load tests should align with the inspection criteria established by the end user. McCoy Global performs the initial load test at 1.5 times the rated load. This value is recommended following a substantial repair. A subsequent load test at 1 times the rated load is recommended by McCoy Global every two years.

2. **Definition of Substantial Repair or Modification:**
   - For the context of this standard, a substantial repair or modification is defined as any repair and/or modification that, in regard to the inspection body, could impact the load-bearing elements of the container or lifting device, or any elements that contribute directly to its structural integrity.

⚠ WARNING

IF THE LOAD-BEARING DEVICE HAS BEEN MECHANICALLY DAMAGED OR OVERLOADED, IT MUST BE IMMEDIATELY REMOVED FROM SERVICE AND QUARANTINED UNTIL IT HAS BEEN RECERTIFIED.

Record the inspection dates and results in a visible location, including a description of the condition of the loadbearing equipment. To prevent confusion, only list the most recent inspection date, do not list the date of the next test or examination.

⚠ DANGER

THIS INFORMATION SERVES AS A GENERAL GUIDELINE ONLY. THE DETERMINATION OF SITE-SPECIFIC INSPECTION FREQUENCY AND METHODOLOGY IS ULTIMATELY THE RESPONSIBILITY OF THE END USER.

Proper Use of Load-Bearing Devices

When utilizing any load-bearing device, adhere to the following practices:

1. Do not use Load-bearing devices that are damaged or defective.
2. Slings shall not be shortened with knots or bolts or other makeshift devices.
3. Ensure Sling legs are not kinked.
4. Never exceed the rated capacities of load-bearing devices.
5. Confirm Slings are securely attached to their load.
6. Protect load-bearing devices from snagging and avoid further obstruction by objects. object.
7. Keep suspended loads clear of any obstructions.
8. Ensure all employees remain clear of loads about to be lifted and of suspended loads.
9. Avoid placing hands or fingers between the sling and its load while tightening around the load.
10. Shock loading is prohibited.
11. Never stand directly under a load while lifting.

Storage Of Load-Bearing Devices

Ensuring the proper storage of out-of-service load bearing devices is important for preserving the full integrity of the device once it is returned to service. McCoy Global recommends observing the following practices:

- **Degreasing:** Remove all excess grease from the device's external surfaces using solvent-based cleaners on rags to wipe all external surfaces to remove residual grease or hydraulic fluid. After degreasing, wipe all external surfaces with clean water to remove residual solvent.
- **Anti-Corrosion Treatment:** McCoy Global recommends applying an anti-corrosive agent, such as Tectyl® 506, to all external surfaces of the device. Refer to manufacturer data sheets for proper application and safety information. Allow the anti-corrosive coating ample time to dry; refer to manufacturer data sheets for drying times at room temperature.
- **Storage:** Store the device in a clean and dry environment. Prior to the device returning to service, a full inspection of the device must be performed.

FMS LIFTING ACCESSORIES

The FMS comes equipped with four swivel hoist rings. These can be used to help lift the unit out of the rotary table by installing them into the corner blocks.

Additionally, The FMS includes a lifting basket, P/N 605227, and a spreader bar assembly, P/N 605327, used for transporting the FMS.

See Appendix section for additional information.

FMS LIFTING PROCEDURE

When lifting the FMS, use the Crosby swivel hoist rings installed on the corner blocks of the Unit. Do not use the threaded holes in the top plate to lift the entire FMS unit. These threaded holes are intended solely for the manual release of the tool from the pipe.

⚠ WARNING

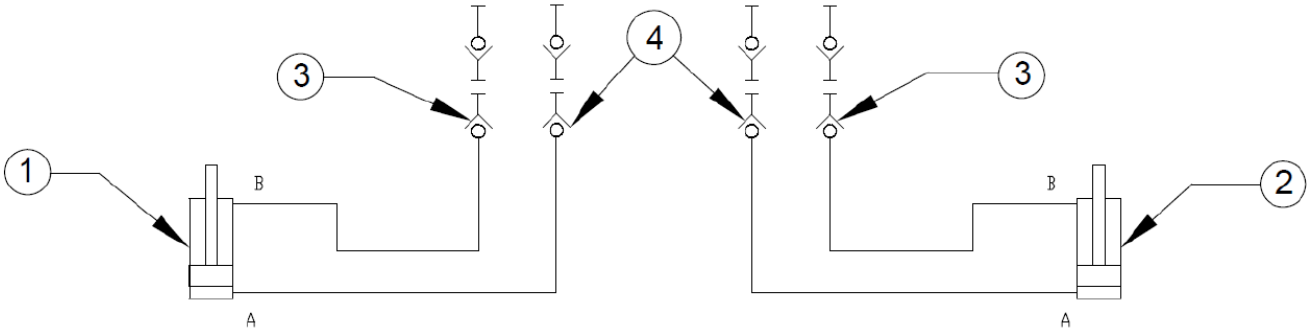
DO NOT LIFT FMS USING THREADED HOLES IN TOP PLATES.

GENERAL HPU/CONSOLE REQUIREMENTS (Supplied by Customer)

1. **Pressure:** Maximum 2000 PSI
2. **Flow:** The FMS requires 35 GPM to achieve a 6-second cycle time.
3. **Independent Pressure Adjustment:** Pressure in both directions shall be independently adjusted.
4. **Pressure Bleed-off:** If the elevators and pipes are lowered onto the top plate of the FMS, the system needs to quickly bleed off the pressure building on the bore side of the cylinders that would build on the bore side for the cylinders being forcibly retracted by external forces. Bleed off flow rate at 34 GPM.
5. **Safety Mechanism:** The control panel must incorporate a safety mechanism preventing accidental opening of the slips. This can include options like a two-hand operational release or a dual-function lever.
6. **Float Position:** The joystick must include three distinct positions: Set, Neutral, and Unset. Please refer to the work instructions for specific operations.
7. **Set Position:** Implement a detent lever that will maintain the adjusted pressure between 500-2000 psi.
8. **Lower Extension Pressure:** The lower extension pressure and regen circuit is used to prevent accidental slip opening by limiting upward force. You will need to reduce the extension force with the given pressure.
9. **Operations:** See Control Panel Operations Instructions.

HYDRAULIC DETAILS

FMS SCHEMATIC



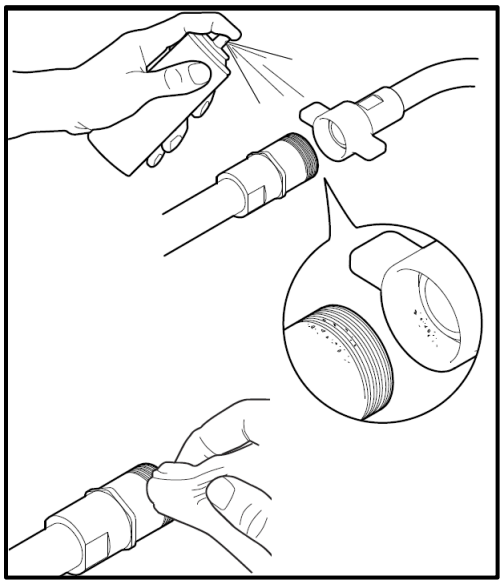
ITEM	QTY	P/N	DESCRIPTION
1	1	1006086	WELDMENT, CYLINDER, LEFT, 4 BORE X 2 ROD X 15.348 STROKE
2	1	1006073	WELDMENT, CYLINDER, RIGHT, 4 BORE X 2 ROD X 15.348 STROKE
3	2	1006262	FITTING, QUICK DISCONNECT, STAINLESS STEEL, STUCCHI 802404115
4	2	1006261	FITTING, QUICK DISCONNECT, STAINLESS STEEL, STUCCHI 802404114

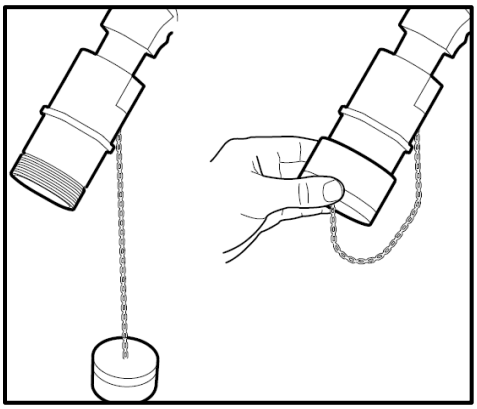
MAIN HYDRAULIC CONNECTIONS

- For cylinder extension, use ¾ SAE female stainless steel connectors.
- For cylinder retraction, use ¾ SAE male stainless steel connectors.

Before making any hydraulic connections, Inspect all connectors for potential damage, debris, or contaminants. Clean the connectors using compressed air, or an approved cleaning solvent with a lint-free cloth.

Always cover disconnected fittings with a clean brass or plastic dust cap, typically attached to each connector with a lightweight chain or flexible line. These caps provide significant protection from dust, dirt, other contaminants, and impact damage.





HYDRAULIC SYSTEM MAINTENANCE

Poor hydraulic fluid maintenance is a leading cause of hydraulic equipment failure. Contaminants are introduced to the hydraulic system through several sources including dirty hydraulic connections, dirty hydraulic cylinder rods, and through the wear of internal components. Failure to remove contaminants through the use of a maintained filtration system will contribute to rapid wear of system components. McCoy recommends protecting equipment by filtering to ISO 4406:1999 standards.

Premature fouling of particulate filters within the prime mover or ancillary hydraulic power unit indicates a high level of contaminants and requires immediate hydraulic fluid laboratory analysis to identify the contaminants. High levels of wear metals in the fluid may be symptomatic of impending failure of a component in the hydraulic system. Early identification of the potential failure enables the user to schedule preventive repairs, preventing costly breakdown maintenance.

Fluid that has been repeatedly and consistently overheated will provide much poorer response and overall performance than fluid in a temperature-managed hydraulic system. McCoy

recommends the use of hydraulic heaters and/or coolers to maintain the fluid temperature within the operating temperature range specified in the Product Description Section. Maintaining adequate fluid level in the hydraulic reservoir helps dissipate heat in the hydraulic system. Fluid repeatedly heated to high temperatures (above 80°C) is subject to rapid depletion of the additives that prevent oxidation and water emulsification, leading to the build-up of sludge, gum, and varnish. These contaminants will build up on internal surfaces of the hydraulic system causing “sticky” operation or clogging orifices and small passages. Water entrained in the fluid will react with components in the hydraulic system to produce rust and increase the rate of oxidation of the fluid.

Schedule hydraulic fluid analysis regularly as part of a preventive maintenance routine. Test particulate content using a portable fluid analysis kit and compare the fluid sample to new hydraulic fluid. Fluid that is discolored or has a strong odor should be sent to a qualified laboratory for detailed analysis. Hydraulic fluid that is no longer capable of operating within the parameters specified by this manual must be replaced in conjunction with a complete hydraulic system flush.

Fluid that is unused for a long period of time should be tested before circulating through the hydraulic system. Hydraulic systems operated in environments experiencing extreme temperature variances are susceptible to condensation within the oil reservoir. Over a period of time, the condensation will accumulate in the bottom of the reservoir. This condensation should be drawn off as required or at six-month intervals.

⚠ WARNING

A CLEARLY IDENTIFIABLE EMERGENCY STOP FOR THE REMOTE POWER PACK MUST BE INSTALLED IN THE IMMEDIATE VICINITY OF THE OPERATOR.

Inspect all connections upon activation of the power unit. Leaking components must be repaired before releasing the FMS to the operational environment. Prior to disconnecting the main hydraulic connections, deactivate the power unit and de-pressurize the hydraulic system. Disconnect the main hydraulic connections and inspect all four connectors: two male and two female for signs of damage or debris. If the connectors cannot be cleaned or easily repaired, McCoy Global recommends replacing any leaking connector. Note: Damage to one connector may also affect its corresponding mate.

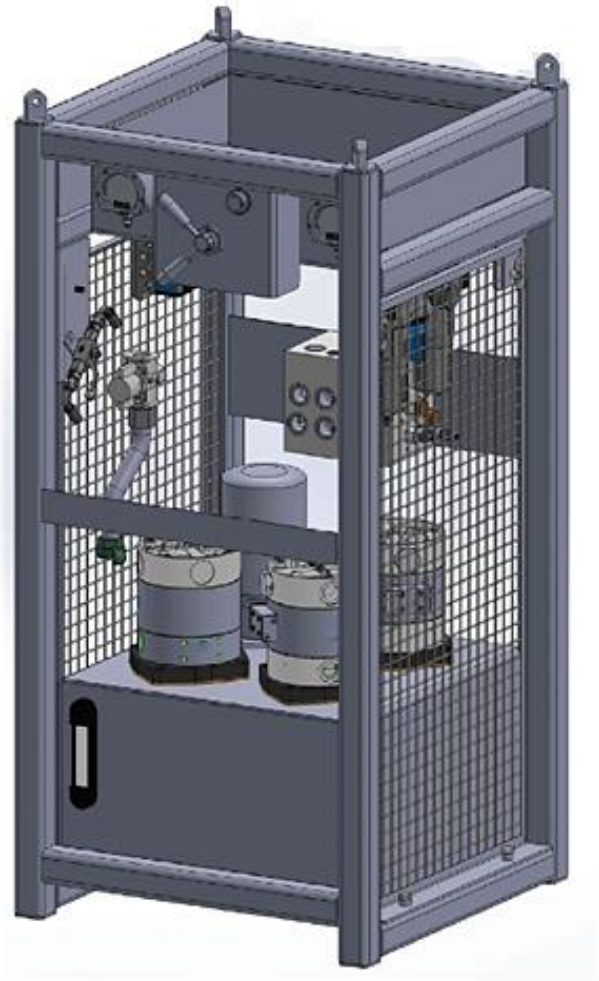
Under standard operational conditions, always turn off the power unit and de-pressurize the hydraulic system before disconnecting the main hydraulic lines. McCoy Global recommends covering exposed connectors with protective caps to protect them from water and impact damage.

⚠ WARNING

ALWAYS TURN OFF HYDRAULIC POWER AND DE-PRESSURIZE THE HYDRAULIC SYSTEM BEFORE DISCONNECTING THE MAIN HYDRAULIC LINES.

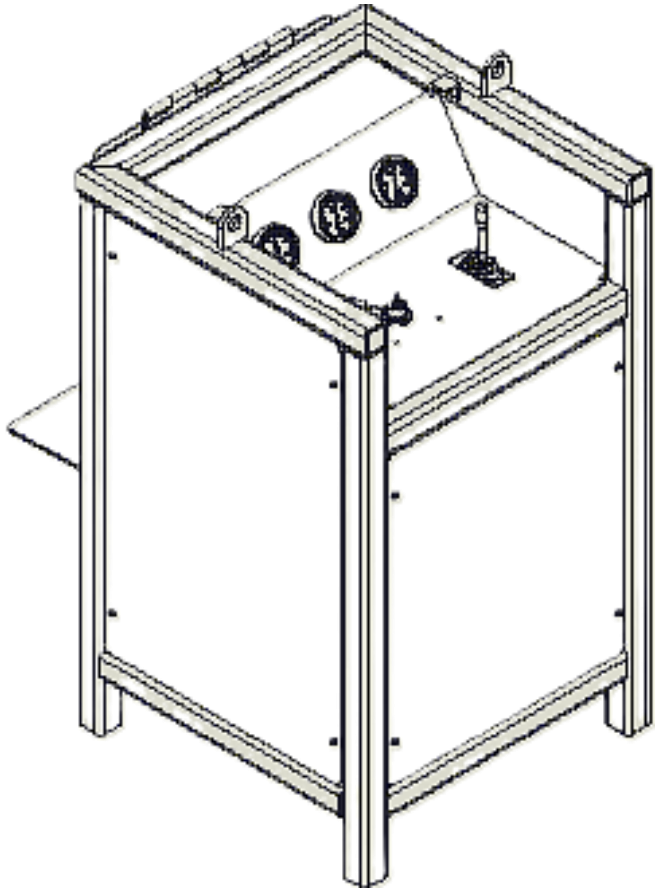
FMS AIR OVER HYDRAULIC CONSOLE 1007792

See the Appendix Section for the data sheet.



CONSOLE, HYDRAULIC, FMS 1007798

See the Appendix Section for the data sheet.



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SECTION 2: MAINTENANCE, LUBRICATION, INSPECTION GUIDELINES AND CRITERIA

MAINTENANCE

McCoy Global recognizes that minor on-site repairs and modifications are required to maintain peak operating condition of this equipment, or to reconfigure the equipment to suit the operating environment. Examples of minor repairs include:

- Replacement of damaged hoses, cables, and fittings
- Replacement of fasteners

Any replacement component must be an identical component supplied by McCoy Global. Fasteners must be Grade 8 or equivalent, unless otherwise specified by McCoy Global. All repairs must be performed by authorized, skilled personnel. Any attempt to make unauthorized repairs to equipment beyond the minor repairs described above exposes personnel to potential hazards and may cause catastrophic equipment failure. Contact McCoy Global if any question about the nature of repairs arises.

⚠ DANGER

UNAUTHORIZED REPAIRS TO EQUIPMENT EXPOSES PERSONNEL TO POTENTIAL HAZARDS AND MAY CAUSE CATASTROPHIC EQUIPMENT FAILURE.

By nature, steel machinery with rotating and moving parts have the potential to generate ignition sources, i.e., sparks. As outlined in this manual, scheduled maintenance, lubrication, timely replacement of worn components and most importantly, on-site risk assessments with stringent standard operating procedures are all required to prevent the potential of spark generation.

⚠ WARNING

USE THE MAINTENANCE INFORMATION IN THIS MANUAL TO DEVELOP AND IMPLEMENT PROCEDURES TO HELP ELIMINATE SPARK GENERATION.

GENERAL MAINTENANCE SAFETY PRACTICES

The practices identified here are intended as a guideline. All personnel are responsible for performing their tasks in a manner that ensures worker, equipment, and environmental safety, and may require taking additional steps that are not identified in this section.

Equipment maintenance shall be performed only by designated qualified maintenance. personnel. Wear approved eyewear and footwear and follow all safety guidelines. Do not begin a maintenance task without the proper tools or materials on hand, or the proper drawings and documentation necessary.

Schedule planned maintenance with operators to avoid conflicts, unnecessary downtime, and the danger of accidental equipment activation. Notify operations when maintenance procedures are complete and equipment functionality is restored.

Isolate the location of the maintenance under way to prevent unaware personnel from inadvertently exposing themselves to a hazard. Use tape, rope, or signage to clearly indicate “off limits” area.

Replacement of large, heavy individual parts and/or heavy structural components must be performed using an approved lifting device of sufficient lifting capacity. Use care when attaching the lifting device. Safeguard area to avoid endangering personnel or equipment.

All spare parts must meet or exceed OEM specifications in order to maintain equipment integrity, especially protective equipment.

Ensure equipment is isolated from hydraulic power before commencing maintenance operations.

This equipment uses materials that may be harmful to the environment if improperly disposed of (hydraulic fluid, grease, etc.). Dispose of all materials according to environmental protection regulations.

CLEANING

After every usage, internal/external parts of the tool and slips need to be power washed with water. McCoy Global recommends that the equipment be periodically partially disassembled so that internal components can be properly cleaned.

CLEAN PREVENTIVE MAINTENANCE PRACTICES

Regular maintenance programs must be established to assure safe, dependable operation of this equipment and to avoid costly repairs. The following maintenance procedures provide information required to properly maintain your equipment. This equipment may require more or less maintenance depending upon the frequency of use and the operational field conditions.

These maintenance procedures are designed for equipment operating at normal operating temperatures for 10 hours per day. McCoy Global recommends that the inspection and maintenance procedures in this section be performed as recommended in the maintenance checklists, or in conjunction with a qualified technician’s best estimates of when this equipment is due for this maintenance.

McCoy Global recommends tracking all maintenance activity including the lubrication schedule and replacement of hoses or cables. A maintenance log is a valuable tool that can be used for easily retrieving maintenance history or identifying trends that require correction.

Tool documentation should be kept by the user and updated as the tool components are changed out on the tools. It is recommended to establish a serial or asset number to tie all documentation to. The serial or asset number will contain all the individual parts and serial numbers. The documentation is the responsibility of the user and should be checked prior to the job in the event documentation needs to be provided prior to rigging up.

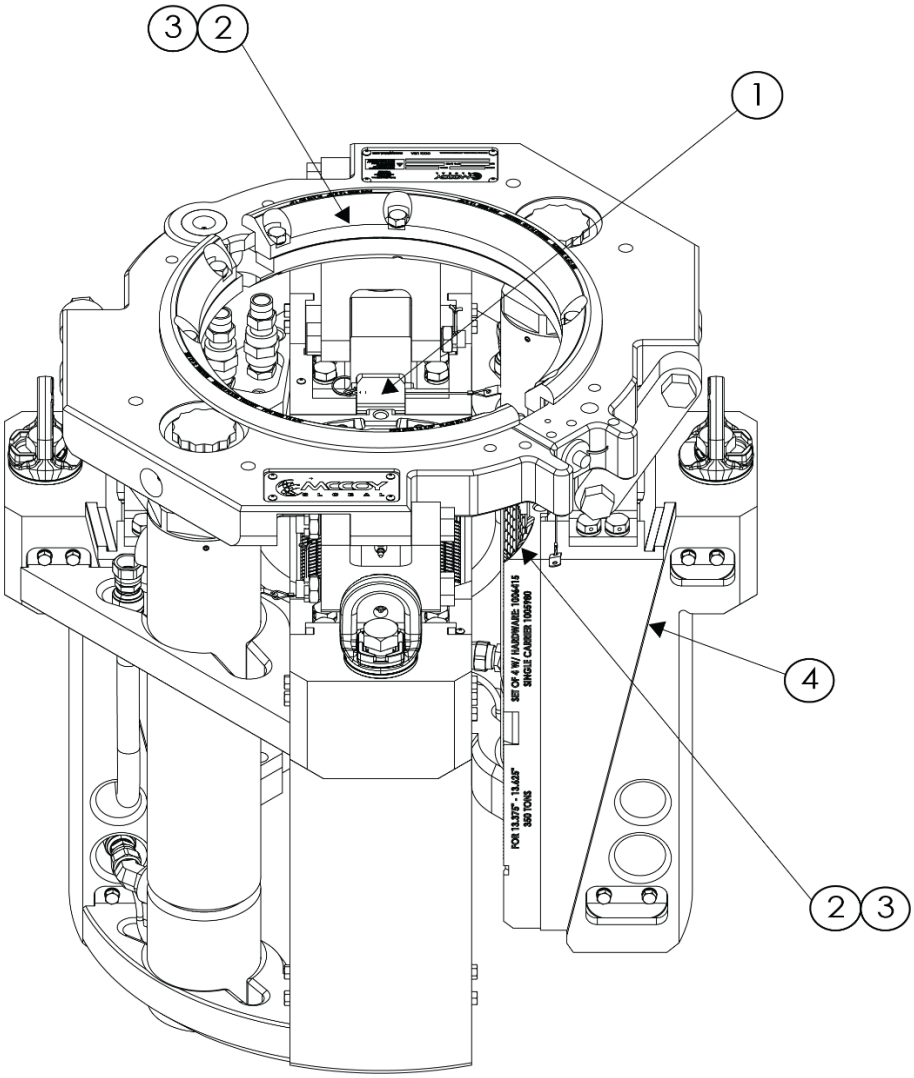
MAINTENANCE CHECKLISTS

The following maintenance checklists are intended as a guideline rather than a definitive maintenance schedule. More or less maintenance may be required depending upon the frequency of use and the field conditions under which the equipment operates.

Category I (Per Use Inspection)

McCoy recommends the following inspection as Category I Inspection which is to be performed during the job.

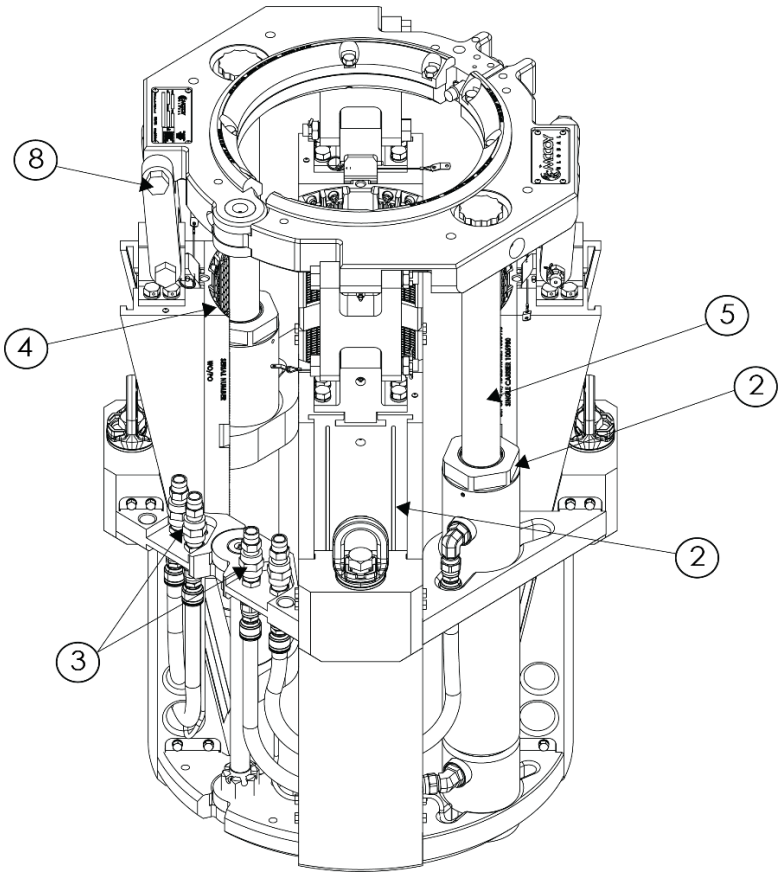
1. ☐ Check latch mechanism for functionality.
2. ☐ Check that the correct sizes of insert carriers, inserts, and top guides are installed.
3. ☐ Check that the insert carriers and top guides are installed correctly.
4. ☐ Grease the back of the slips.



Category II (Post Use Inspection)

McCoy recommends that the following inspection and maintenance procedures be performed before and after each job, and at least once per day when the FMS is in steady use. The following procedures are to be performed in addition to Category I.

1. ☐ Wash and remove any excess dirt and grease.
2. ☐ Extend cylinders fully. Check back of slip for wear. Please note that the back of the slip has two grooves in it that are the maximum allowable wear depth. When these slots are no longer present, it is time to replace the slips.
3. ☐ Inspect all QDs and hydraulic fittings.
4. ☐ Check dies and carriers for wear. Replace dies if there are broken or have flat teeth. Replace carriers if the rear lugs and/or die slots appear damaged.
5. ☐ Check cylinder rods for wear.
6. ☐ Check hoses inside of the tool for wear.
7. ☐ Check for proper locking of all bolts and nuts, slotted nuts & cotter pins, lock wire, and retaining pins.
8. ☐ Inspect linkage pins for wear.
9. ☐ Grease all pins and the latch mechanism, and steel mating areas(slips).



Category III (Biannual Inspection)

McCoy Global recommends that the following inspection and maintenance procedures be performed every six months under normal operating conditions in addition to all Category I & II actions.

A. *(6) Month Inspection*

1. ☐ Visually Inspect External weld of both cylinders.
2. ☐ Visually inspect carrier mid load plates and bottom of carrier die slot for deformation.
3. ☐ Activate cylinders and monitor hydraulic seals and replace any that are damaged.
4. ☐ Visually Inspect linkage pins, linkage, and latch housing for wear according to the wear limits that proceed to Appendix section. (Pages 90-95)
5. ☐ Visually Inspect top plates, corner block, slip, carrier, and load plates for wear according to the wear limits that proceed to Appendix section. (Pages 90-95)
6. ☐ Visually Inspect all guide plates that have been used in the past six months for wear according to the wear limits that proceed to Appendix section. (Pages 90-95)

B. *Yearly Inspection*

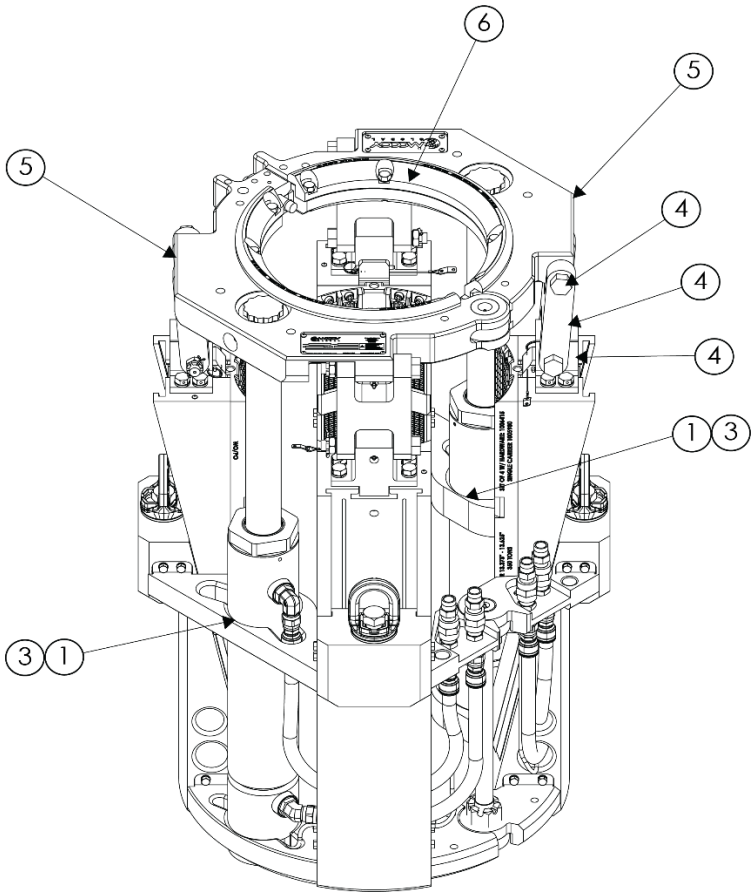
McCoy Global recommends that the following inspection and maintenance procedures be performed when the tool is disassembled, every year under normal operating conditions in addition to all Category I, II, III actions. NDE load bearing components per the critical area drawings in this manual for the following parts. See Appendix Section for reference.

1. ☐ Inspect External weld of both cylinders.
2. ☐ Visually inspect carrier mid load plates and bottom of carrier die slot for deformation.
3. ☐ Activate cylinders and monitor hydraulic seals and replace any that are damaged.
4. ☐ Inspect linkage pins, linkage, and latch housing for wear according to the wear limits that proceed to Appendix section. (Pages 90-95)
5. ☐ Inspect top plates, corner block, slip, carrier, and load plates for wear according to the wear limits that proceed to Appendix section. (Pages 90-95)
6. ☐ Inspect all guide plates that have been used in the past six months for wear according to the wear limits that proceed to Appendix section. (Pages 90-95)

Category IV (Load Testing, frequency - yearly)

McCoy Global recommends that the following inspection and maintenance procedures be performed every two years under normal operating conditions in addition to all Category I, II, & III actions.

3. ☐ NDE load bearing components per the critical area drawings in this manual for the following parts. See Appendix Section for reference.
    a. ☐ Corner blocks.
    b. ☐ Slips.
    c. ☐ All carriers used in the past 2 years.
    d. ☐ All carrier load plates used in the past 2 years.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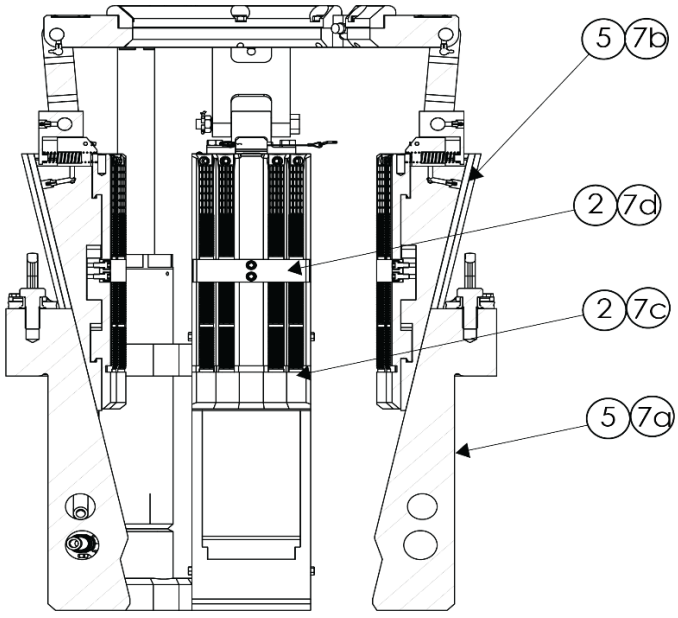
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7b
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7d
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7c
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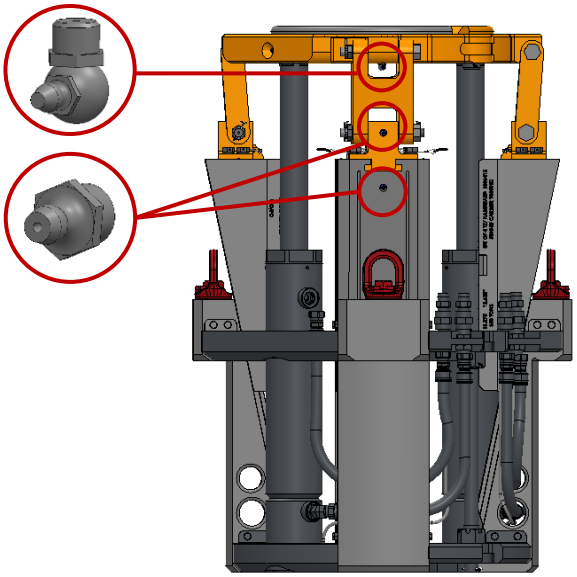
7a

LUBRICATION INSTRUCTIONS

Use a quality multipurpose bearing lubricant that will remain within its viscosity range at expected operating temperatures. In addition, McCoy recommends the following lubrication procedure at the completion of each job prior to storage.

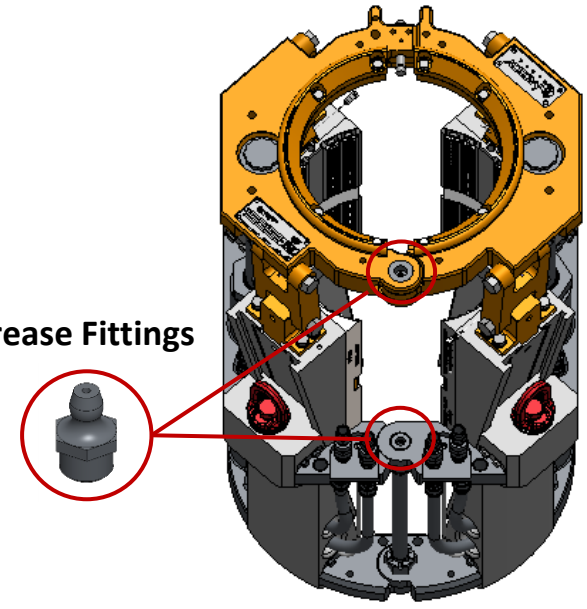
- Apply grease to the (3) highlighted locations for every slip assembly every 125 cycles.
- Grease all hinge pins and linkage pins (P/N 1006010) after every job.
- Please reference chart on page 20 for type of grease recommended for components.

Grease Fittings



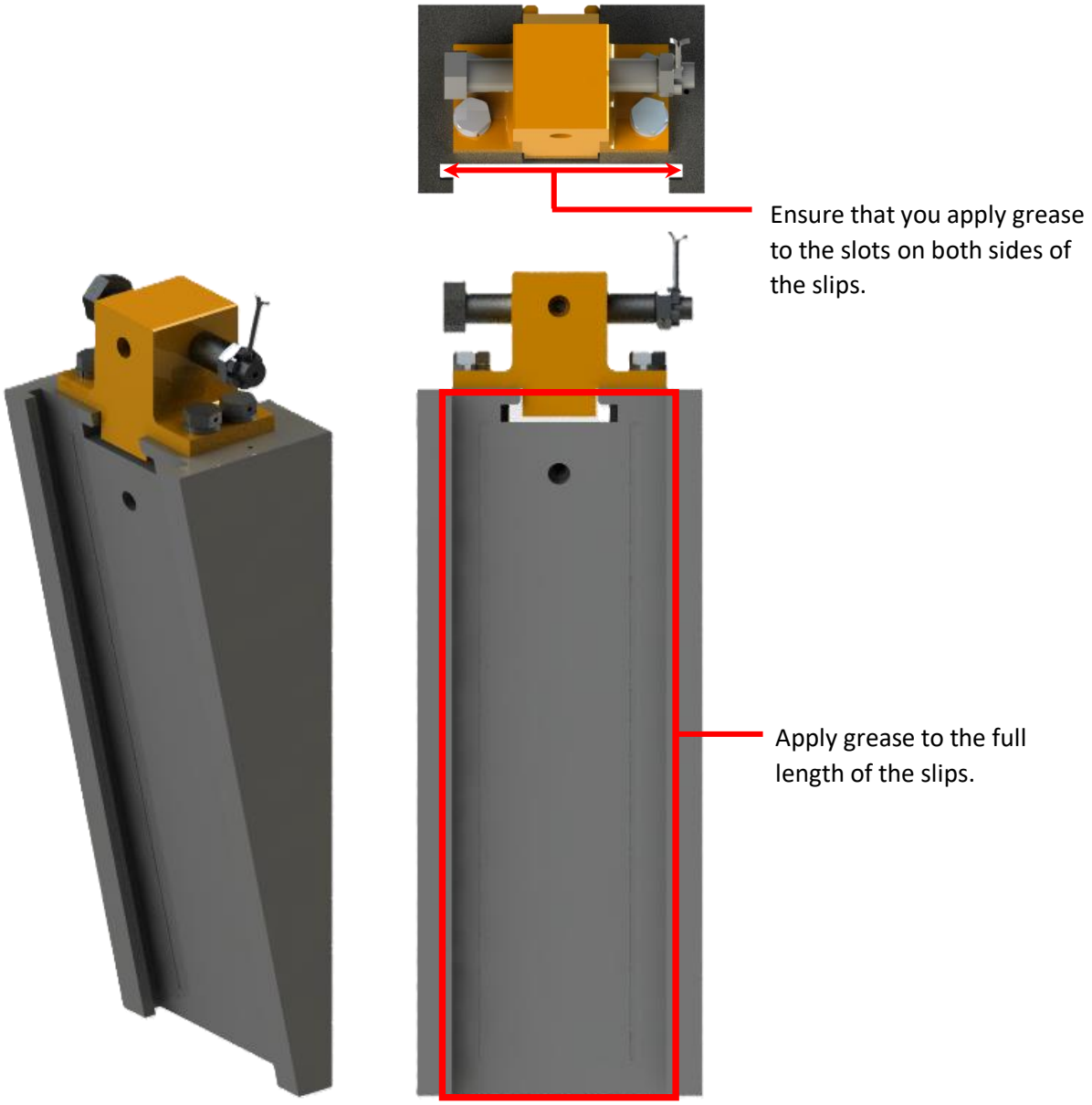
- Apply grease to the (2) highlighted pivot locations.

Grease Fittings



LUBRICATION INSTRUCTIONS CONTINUED

- Prior to assembly, apply grease to the (4) slips in the highlighted locations for each slip assembly.
- The slips require manual greasing on the rear of the slips every 125 cycles.
- Please reference chart on page 20 for type of grease recommended for components.



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SECTION 3: SAFE WORK PROCEDURES

OPERATION

Operator Safety

McCoy Global recommends conducting a hazard assessment of the work area by a designated safety representative before initiating operations. This representative is responsible for verifying that all operators have adequate equipment and safety training.
Adequate lighting of the work area is required. All warnings, labels, gauges, and signs must be clearly visible to operators.

Areas painted yellow indicate hazardous zones. Operators must avoid contact with these areas during operations. Always wear all required personal protective equipment (PPE) specified in established HSE guidelines.

⚠ CAUTION

ALWAYS WEAR APPROVED AND REQUIRED PERSONAL PROTECTIVE EQUIPMENT (PPE) WHEN OPERATING HYDRAULICALLY POWERED EQUIPMENT.

Ensure hydraulic power is deactivated and hydraulics are de-pressurized before disconnecting the main hydraulic lines. McCoy recommends depressurizing the FMS hydraulic system before connecting or disconnecting quick-connect fittings.

⚠ WARNING

DEPRESSURIZE EQUIPMENT BEFORE DISCONNECTING MAIN HYDRAULIC LINES.

PRE- JOB MEASURE UP & PLANNING.

• API Rotary Table. EMSCO and National 37.5” rotary tables with the use of the McCoy Rotary Adapter P/N 1007514.
• FMS Control Panel Position

PRE-JOB EQUIPMENT CHECK

• Confirm Connection torque data.
• Confirm Tubular OD

LOADING THE FMS PACKAGE

1. Secure the FMS to the cradle using securement pins, this is so that when it is hoisted using either the crane or the forklift it cannot move or fall out.
2. If using an overhead crane or other method that requires a sling, ensure that the FMS/Adapter/ Control Panel are hoisted evenly so that it does not slide or tilt during the lift. Using a forklift to hoist it ensures that the forks are level or lilted back.

3. Hoist the FMS / Adapter / Control Panel using the crane or forklift and place it in the appropriate position on the truck.
4. Stand clear of the tool being hoisted before and ensure not to place yourself or anyone else under a suspended load.
5. Secure all items.
6. Load all the other accessories needed for the job and secure to the transportation vehicle.

⚠ CAUTION

ALWAYS ENSURE THE LOAD IS SECURELY STRAPPED DOWN AND CANNOT MOVE. IN THE EVENT OF AN ACCIDENT ANY TOOLS IN THE BACK OF YOUR VEHICLE UNSECURED CAN BECOME A PROJECTILE.

7. Complete the pre job load out sheet to ensure that each item is loaded and accounted for.

ARRIVAL TO LOCATION

Discuss FMS / Adapter / Control Panel & operation with onsite representative as needed.

- Casing Stencil, weight, grade, and connection check
- Torque data to be cross checked by rep.
- Confirm Table configuration – FMS.
- Communicate with rig personnel on operations and specification needs.

Order:

Control Panel

- FMS
- Adapter Bushing (if necessary)
- Hoses

⚠ CAUTION

FOR ITEMS IN CRADLES, REMOVE THEM AND LEAVE THEM ON THE TRUCK OR SET THEM BESIDE THE CATWALK PRIOR TO LIFTING THEM AND SETTING THEM ON THE CATWALK TO BE HOISTED TO THE RIG FLOOR.

1. Keep your hands clear of all pinch points while the equipment operator is getting the equipment into position to make the lift.

⚠ CAUTION

GIVE CLEAR AND CONCISE DIRECTIONS AND DO NOT "TRY AND FIX SOMETHING" WITH THE LIFTING EQUIPMENT AS THE LIFT IS IN PROGRESS. STOP THE OPERATOR, FIX THE ERROR, AND CONTINUE THE LIFT.

2. Use a tagline to keep the tool from swinging or spinning and never place yourself under a suspended load.

⚠ CAUTION

ENSURE THE SLING IS SECURE ON THE FORK OF THE VEHICLE BEING USED TO MOVE EACH COMPONENT OF THE SMARTR FROM THE TRUCK TO THE CATWALK. IF A STINGER WITH A SAFETY HOOK IS AVAILABLE USE IT AS IT IS THE SAFEST METHOD.

3. Ensure the area on the catwalk you are setting each component is free of other items and ensure the set each component gently.
4. Set the tool on the catwalk and connect the slings to the floor tugger to be hoisted in the order outlined.

RIGGING-UP THE FMS

1. Complete a Pre-Job Safety Meeting (PJSM) and review the Job Safety Analysis (JSA) documents to ensure that everyone knows the steps that need to be taken to complete the task safely.
2. Order of lift operations:
   - Control Panel
     - Place the Control Panel so that you are out of the view of the driller, out of the line of fire and so that the normal casing operation can commence around you.
   - FMS (optional Adapter Bushing)
     - Ensure they do not contact anything on the way up the v door.
     - Connect all hoses in preparation for pressure.
   - Hoses
     - Route the hoses so that they are not a tripping hazard and out of the line of fire, should something be dropped.
3. Remove the table bushings (27.5") or master bushings (37.5")
4. For a 37.5" opening hoist the Adapter Bushing (ensuring the correct adapter ears are installed) and install into the rotary table.
5. For a 27.5" opening, or after installing the Adapter Bushing, hoist the FMS and install into the rotary table.

⚠ CAUTION

FOR ALL LIFTS CLEAR THE SWING PATH ON THE RIG FLOOR AND THE CATWALK IN CASE SOMETHING GOES WRONG, AND THE TOOL IS DROPPED OR SWINGS ONTO THE RIG FLOOR ONCE THE TOOL REACHES THE TOP OF THE V-DOOR.

⚠ CAUTION

ALWAYS LEAVE THE ITEM BEING LIFTED AS CLOSE TO THE FLOOR AS POSSIBLE. THIS WILL ALLOW IT TO DRAG ALONG THE FLOOR INSTEAD OF SWINGING IN.

6. Connect hydraulic hoses.
7. Lift HPU hoses to the rig floor and connect them to the Control Panel
   If using a Power Tong, connect hoses and Power Tong now.
8. Start the HPU and apply pressure to the system.

9. Function test FMS (Power Tong as well)
   - Unset FMS
   - Float FMS
   - Set FMS
   - Confirm all pressures

10. Ensure the FMS is in the unset position and lower the tubular through.
11. Set the FMS when the tubular is at the desired stump height.
12. Normal running operations can now be carried out.

SETTING CONNECTION MAKE-UP TORQUE WITH THE FMS

The FMS can be used from Joint #1 to carry out normal torquing capabilities on the tubular OD. Consult the Manual for specific restriction via tubular OD (torque values per size).

MAKING UP CONNECTIONS WITH THE FMS

1. Complete a Pre-Job Safety Meeting (PJSM) and review the Job / Hazard Safety Analysis (JSA / HSA) documents to ensure that everyone knows the steps that need to be taken to complete the task safely.

2. Latch the elevators (ensure safety latch or pin is activated) on casing joint in the V-Door (whether they are SJE's and slings or bails and conventional elevators). Watch hand and body placement and keep them clear of all pinch points.
3. Hoist the joint off of the V door, into the derrick (using a hold back rope if necessary for larger or heavier pipe).
4. Remove the thread protector and wait for the driller to link in the bails.

⚠ CAUTION

WHEN REMOVING THE PROTECTOR KEEP YOUR HANDS, FEET, AND BODY OUT FROM UNDER THE TUBULAR BECAUSE IT IS NOW A SUSPENDED LOAD.

5. Lower the tubular to the rig floor and install the float shoe & thread locking compound.
6. Once secure, clear the floor and open the FMS using the Control Panel.

⚠ CAUTION

THE FMS LEVELING BEAMS RAISE WHEN OPENING, SO ENSURE NOT TO OPEN THEM INTO THE FLOAT SHOE ASSEMBLY AS THIS COULD DAMAGE BOTH ITEMS.

7. Set the FMS by using the procedures outlined in the Control Panel manual.
8. Applying Torque and make-up connection.
9. Confirm connection is properly made-up and float the slips.
10. Unset the FMS by using the procedures outlined in the Control Panel manual.

⚠ CAUTION

THE HANDLE MUST REMAIN IN SET AT ALL TIMES, OR THE SYSTEM WILL BUILD HEAT.

11. Lower the tubular to the desired stump height and using visual communication with the driller set the slips as he slows to a stop.

⚠ CAUTION

FOR ANY ELONGATED CIRCULATING TIME, USE THE MANUAL VENT VALVE ON THE TOP OF THE CONTROL PANEL TO VENT THE SYSTEM TO THE POWER TONG. YOU WILL HAVE TO CLOSE THIS TO RESUME NORMAL OPERATION.

12. Release the Elevators once the slack off and Repeat steps 2-11.

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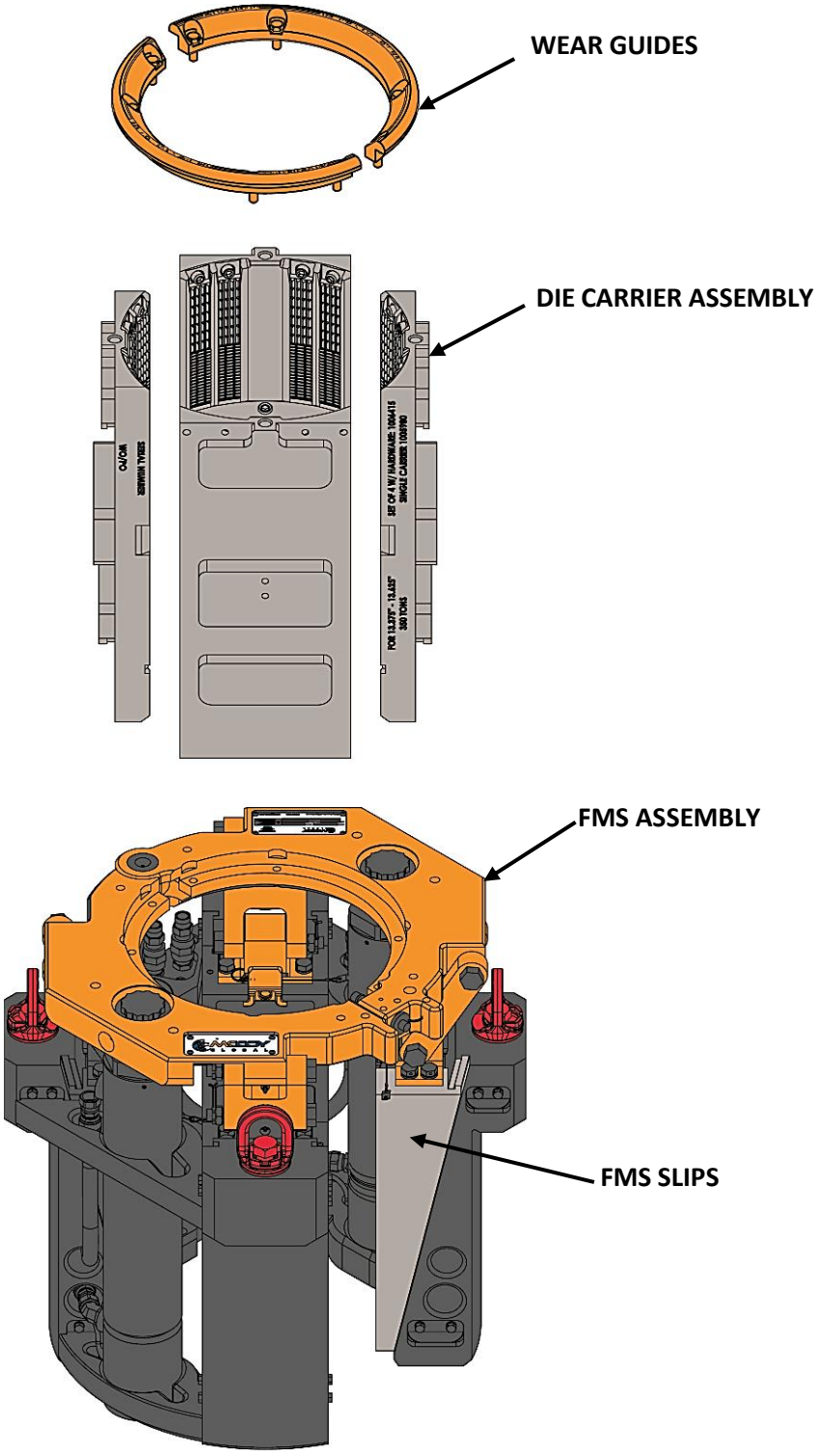
SECTION 4: DISASSEMBLY PROCEDURES AND ASSEMBLY PROCEDURES

Guide plates and die carrier assemblies for reference.



A Base Stand (P/N 1008038) is available to facilitate in the disassembly and assembly processes. The advantages of using the base stand include:

- Minimizing safety risks.
- Providing a consistent, secure, and stable workspace.
- Reduce disassembly and assembly times.

Base Stand with FMS assembled.

Please note: The die carrier assembly must be removed prior to using the base stand.

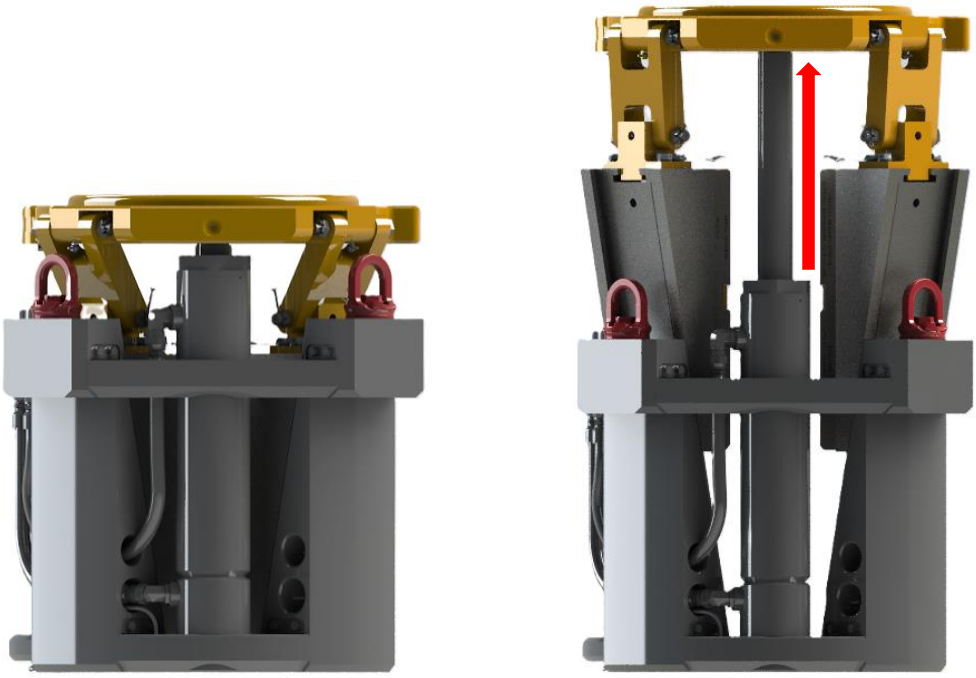
***Additional accessories can be found in the Appendix.**

CARRIER REMOVAL

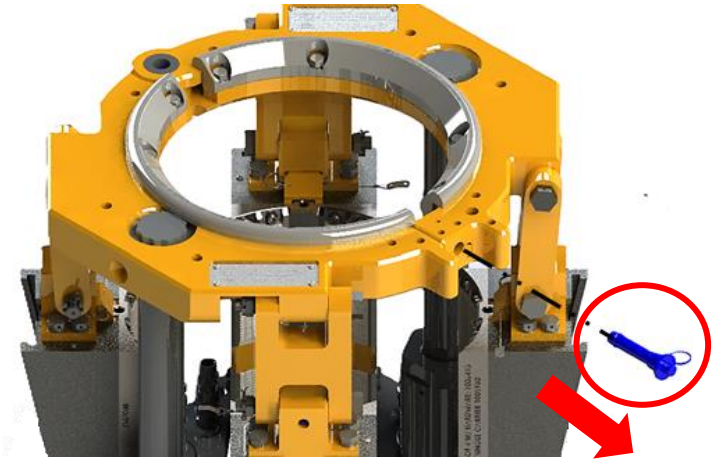
⚠ CAUTION

WHEN HANDLING DIES/CARRIERS, BE AWARE THAT THEY MAY PRODUCE METAL SLIVERS. ALWAYS WEAR STURDY WORK GLOVES FOR PROTECTION.

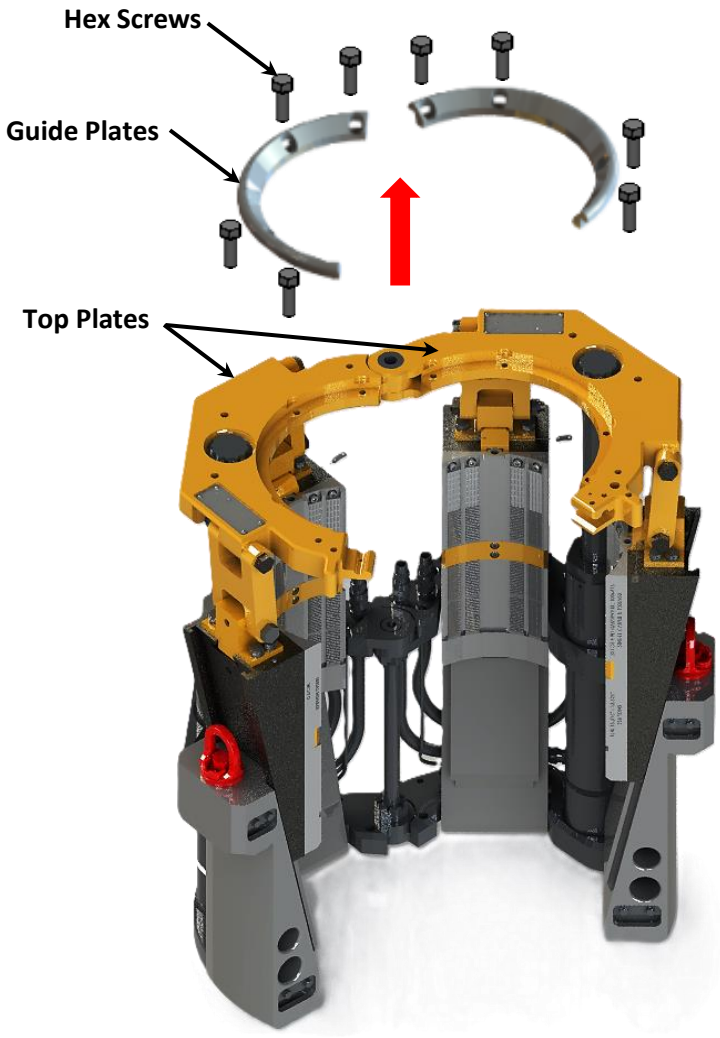
1. Extend the cylinders to fully open the slips.



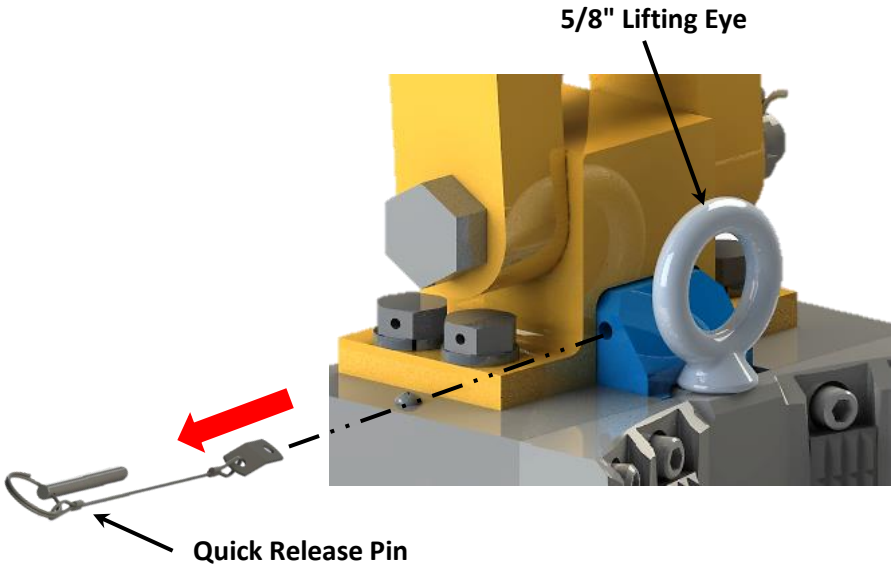
2. Pull the top plate latch pin (P/N 700049) and spread open the tool to remove the guide plates and carrier die assembly.



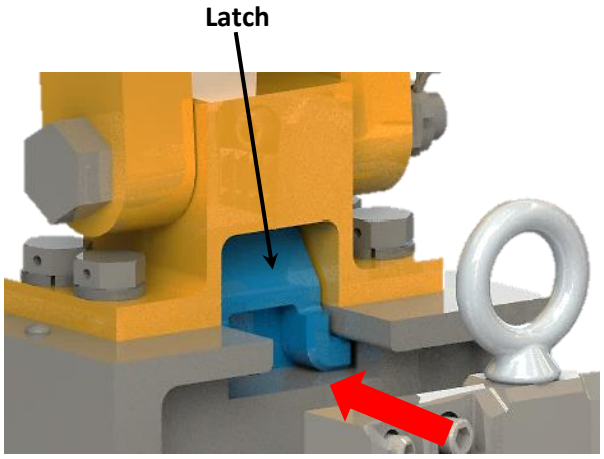
3. Remove the (8) 1/2-13, 1-1/2” Hex Screws (P/N 1112) and guide plates (P/N 1006227) from the top plates of the tool.



4. Remove the quick release pin (P/N 1006229).
5. Insert the lifting eye bolt into the 5/8” -11 tapped hole on top of the carrier. Then secure it with a lifting strap.



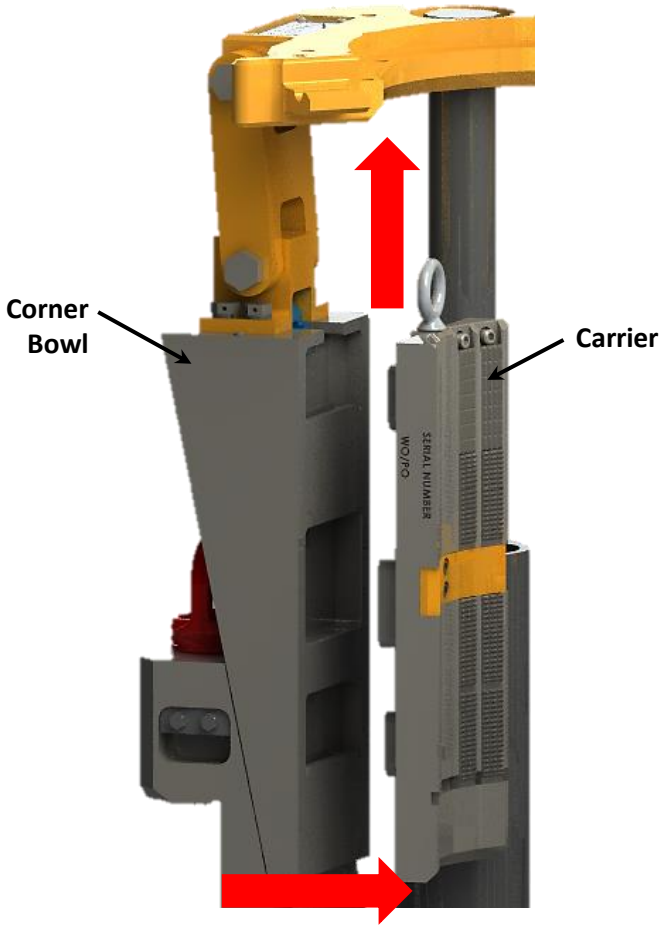
6. Depress the latch (P/N 1006008) to release the carrier.



⚠ CAUTION

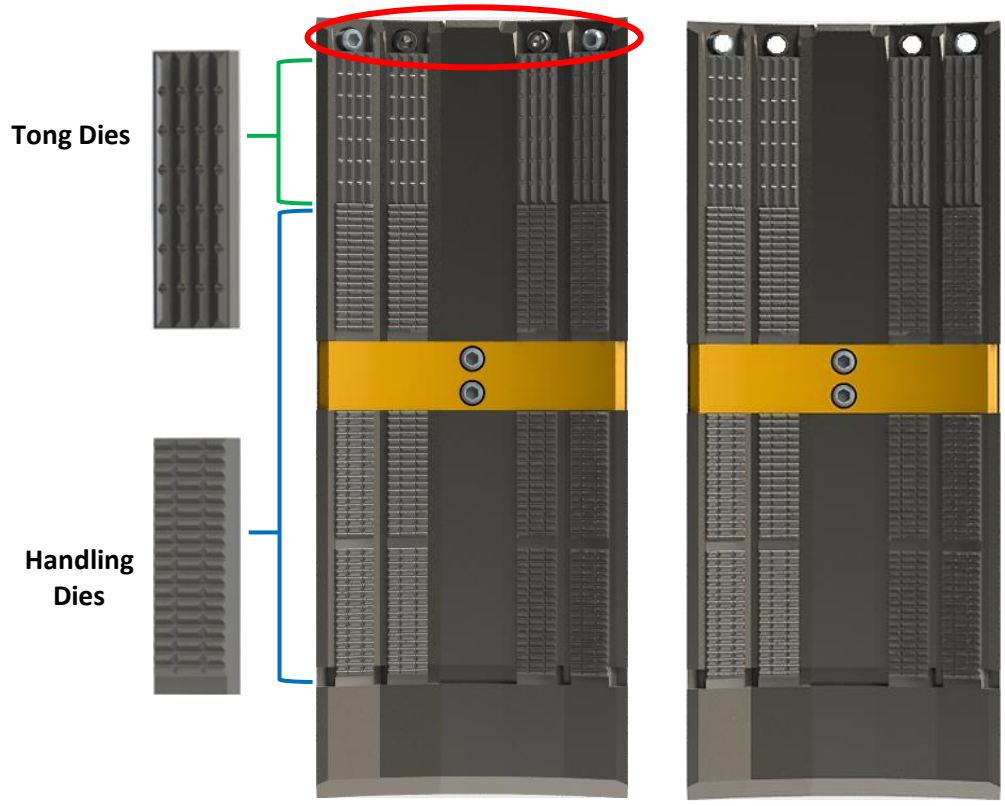
USE A TOOL SUCH AS A BAR TO DEPRESS THE LATCH. DO NOT USE HANDS OR FINGERS, AS THIS IS A PINCH POINT.

7. Hoist the carrier upward to lift out of the corner bowl pockets & pull the carrier forward free from the corner bowl pocket.
8. Move the carriers aside to proceed with changing/disassembling the dies.
9. Repeat steps 4-8 to remove the remaining carriers.

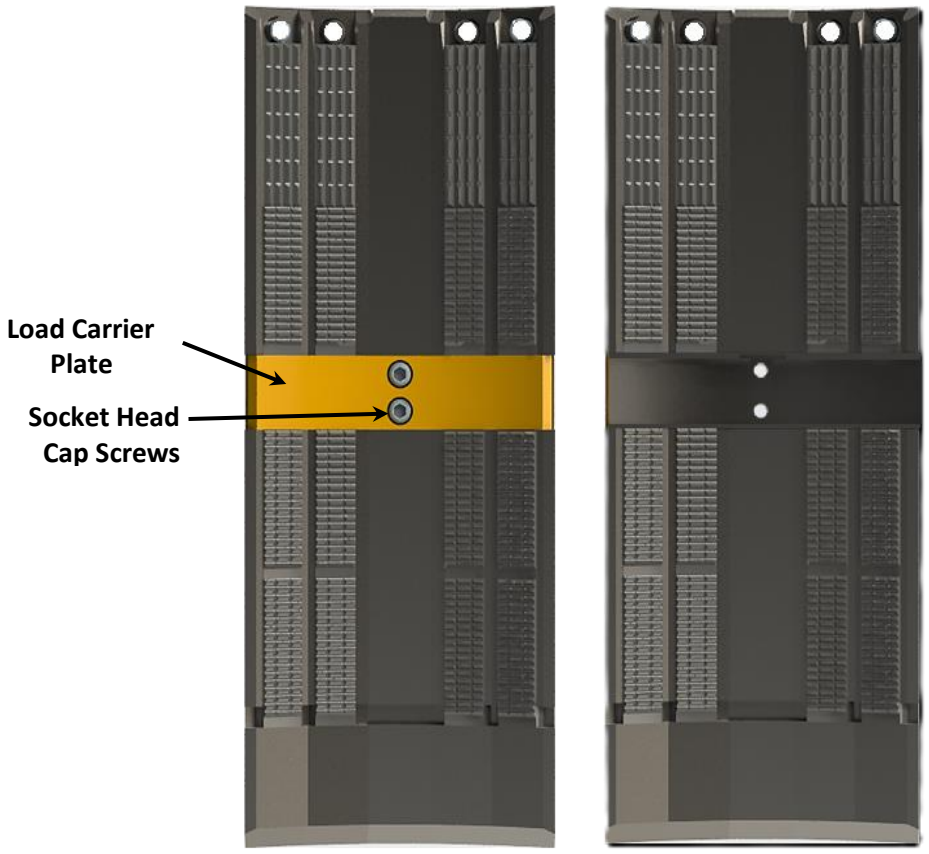


DIE CHANGE / DISASSEMBLY

1. With the carriers removed from the FMS, remove the die retainer bolt screws (P/N1040-A), at the top of each die column, Socket head cap, 3/8 – 16, 3/4” lg. steel.



2. Remove the (2) socket head cap screws (P/N 1040-A), 3/8 – 16, 3/4” long, steel to detach the load carrier plate (P/N 1006178).



3. Remove dies from carrier. If necessary, gently tap the worn dies from the bottom using a brass / low impact hammer and a similar bar to remove them.

⚠ WARNING

CLEAN UP ANY SHARP, FLATTENED OR DAMAGED EDGES TO REMOVE THE DIES. ENSURE THAT IF ANY DAMAGE OCCURS WHILE REMOVING DIES, IT MUST BE REPAIRED BEFORE REASSEMBLY.

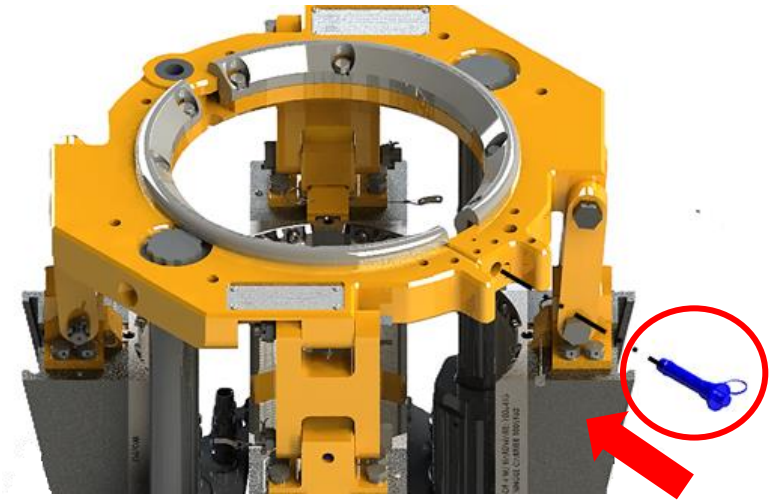
FMS DISASSEMBLY INSTRUCTION

Preparation steps prior to continuing disassembly:

1. Choose an area that is relatively clean, free of any slip/trip/fall hazards, and have access to an overhead crane capable of lifting the FMS.
2. The area will also need pallets or a large worktable for storing the FMS components. Inspect all rigging, fasteners, and flat bars for signs of compromised integrity.
3. The disassembly process and sequence may vary depending on whether the Assembly Base Stand (P/N 10008038) is being used or not.
4. Always verify all components secure and supported during disassembly.
5. Ensure there is no trapped hydraulic pressure in the system.

FMS disassembly steps:

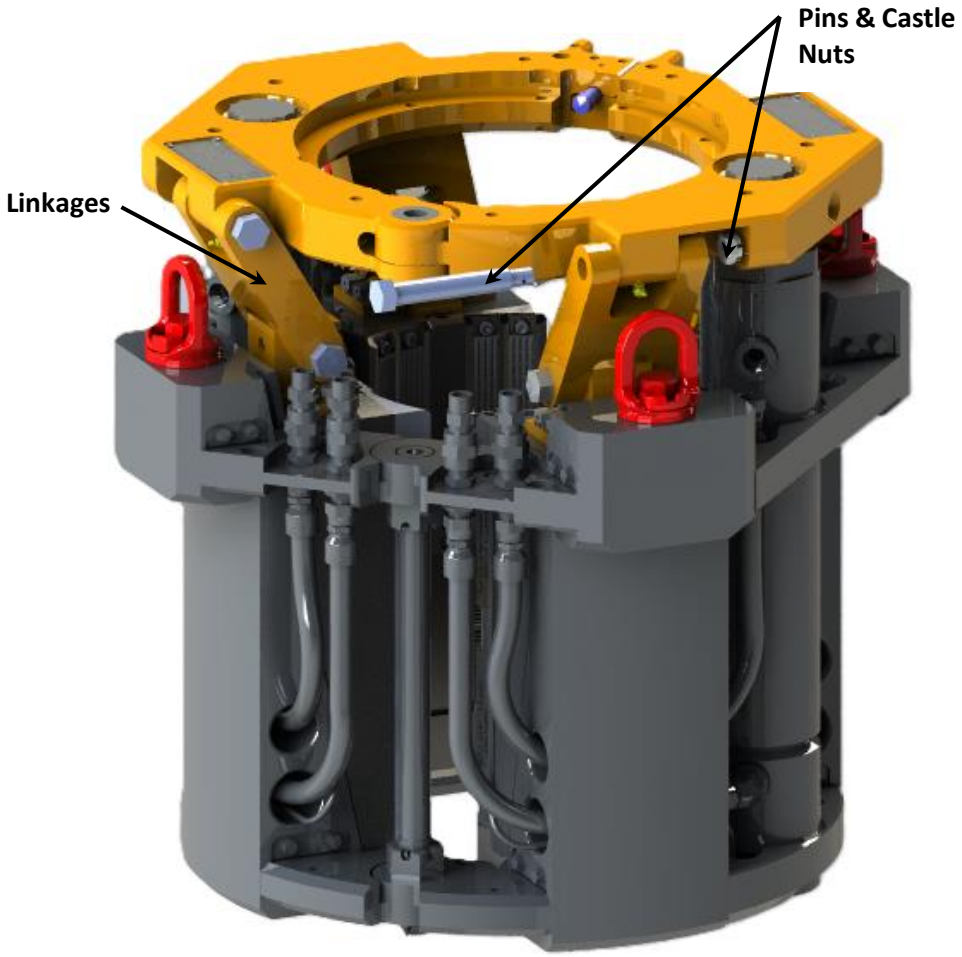
4. Close tool and reinsert the latch pin (P/N 700049) before continuing with disassembly.



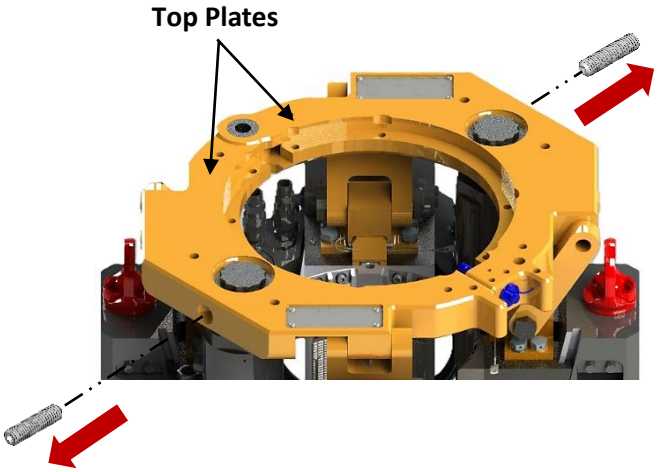
5. Remove the (4) upper pins and castle nuts (P/N 1006010 & 1006226) from the top of the linkages.

⚠ CAUTION

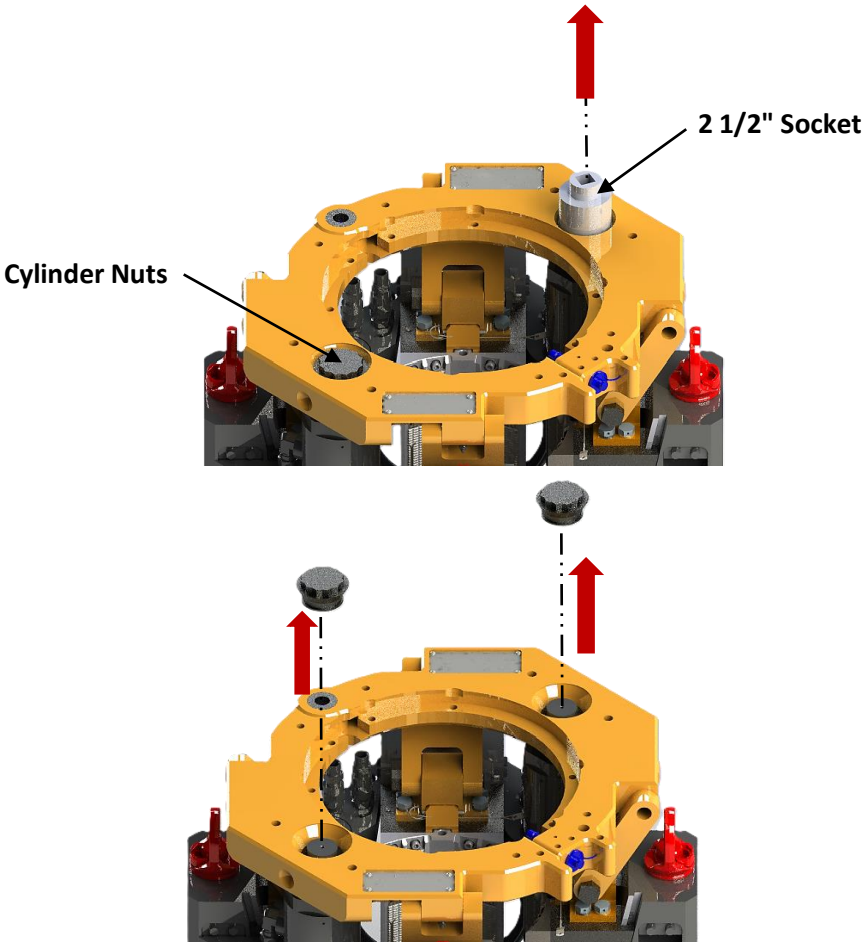
REMOVING THE PINS & NUTS WILL CAUSE THE SLIP TO SLIDE TO THE FLOOR; ENSURE WOODEN BLOCKS OR THE PROPER DISASSEMBLY STAND IS BEING USED BEFORE REMOVING THE PINS.



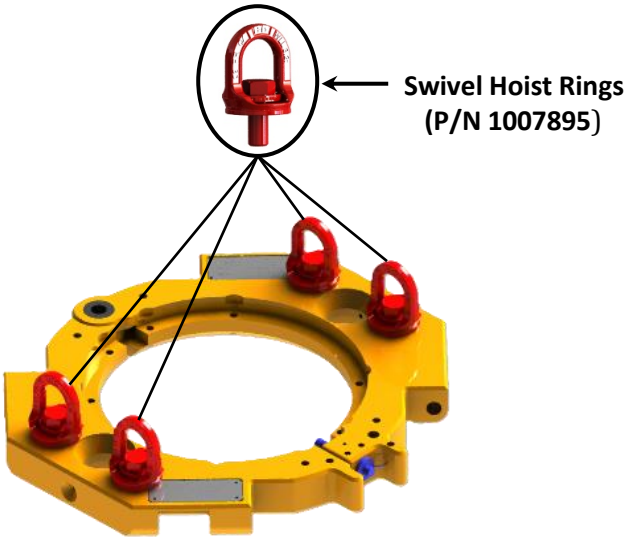
4. Remove the (2) 3/8-16, 1.500” LG set screws (P/N 1007182) from the left and right top plates.



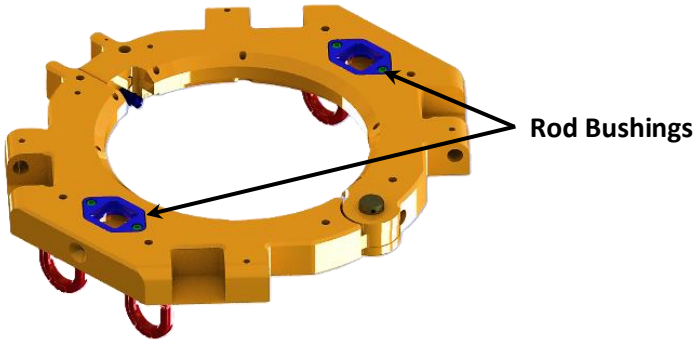
5. Remove the (2) cylinder nuts (P/N 1006193) from both top plates using the 2-1/2” square drive socket (P/N 1006424), provided with the FMS kit.



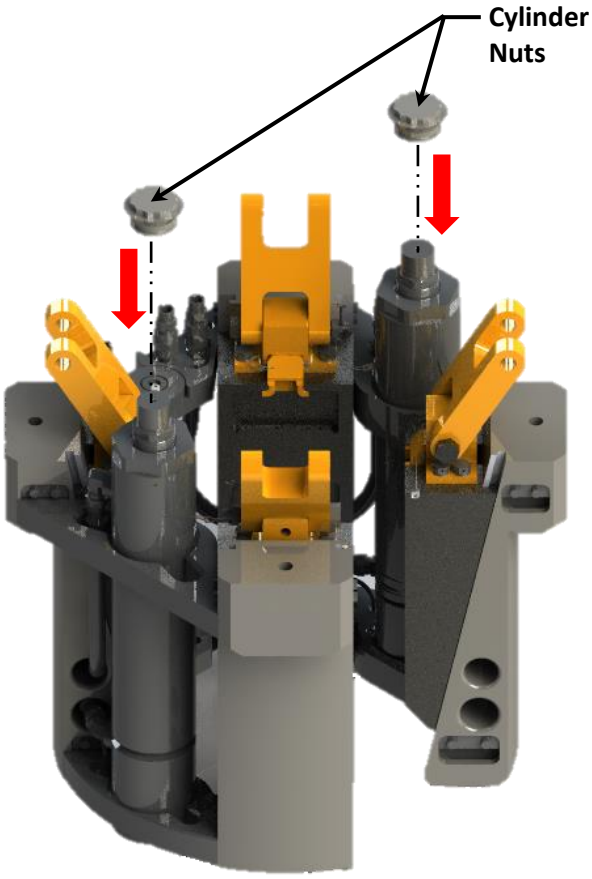
6. Fully thread the (4) swivel hoist rings into the 5/8” holes on the top plates. Lift the top plate assembly off the tool and move off to the side to proceed with disassembly.



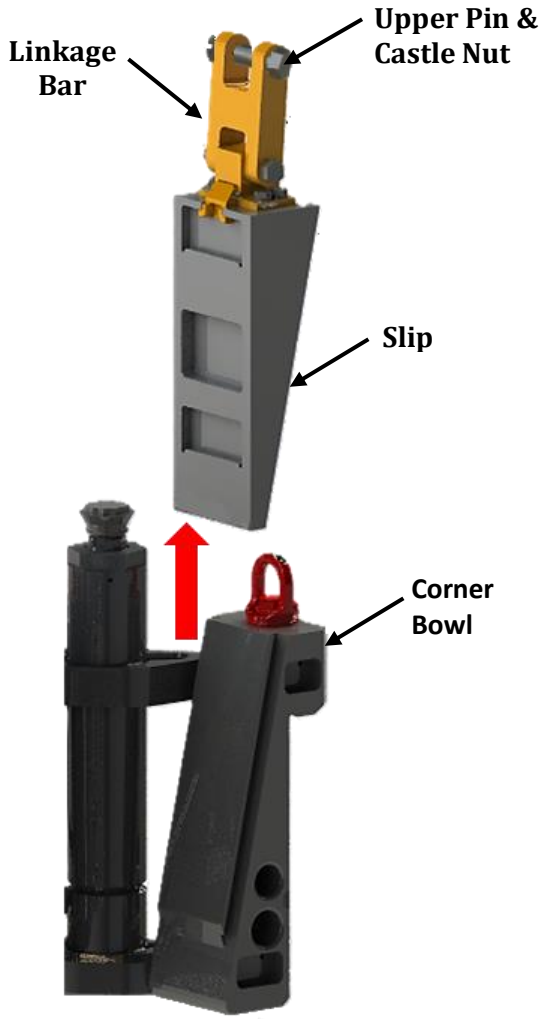
7. Turn the top plates over to inspect the (2) rod bushings (1008287); replace if damaged or deformed.



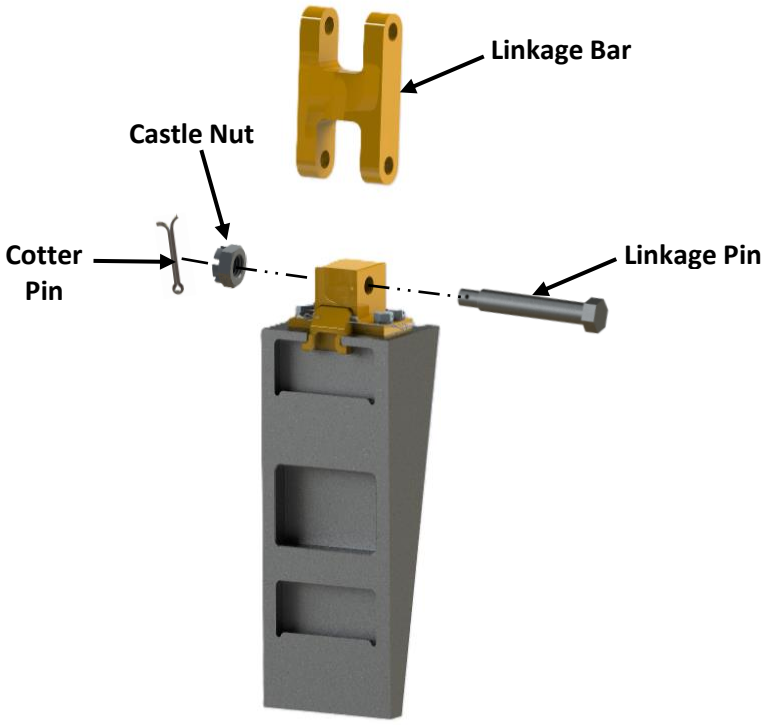
8. Reinstall the cylinder nuts (P/N 1006193) onto the rod threads, to prevent damage if they are impacted.



9. Secure a lifting strap to the linkage bar (P/N 1006189), using the upper pin and castle nut (P/N 1006010 & 1006226).
10. Hoist the slip assembly off the corner bowl. Place off to the side to continue disassembly of the slip.



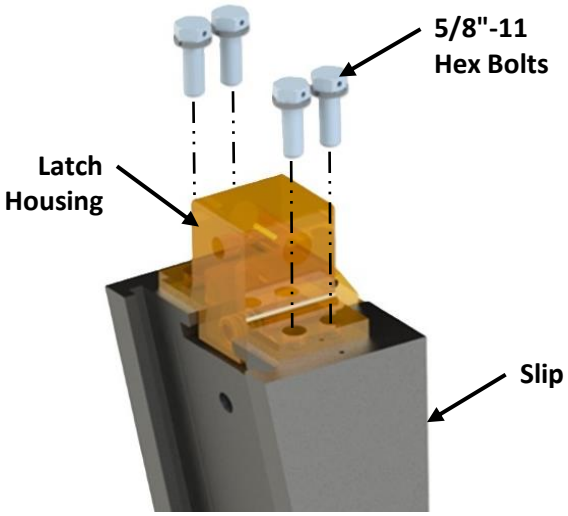
11. Start disassembling the slip by removing the cotter pin (P/N 10043), 5/32 x 1-1/2, followed by unscrewing the castle nut (P/N 1006226), 3/4”-10 grade 5.
12. 5. Next remove the linkage pin (P/N 1006010) and linkage Bar (P/N 1006189) from latch housing.



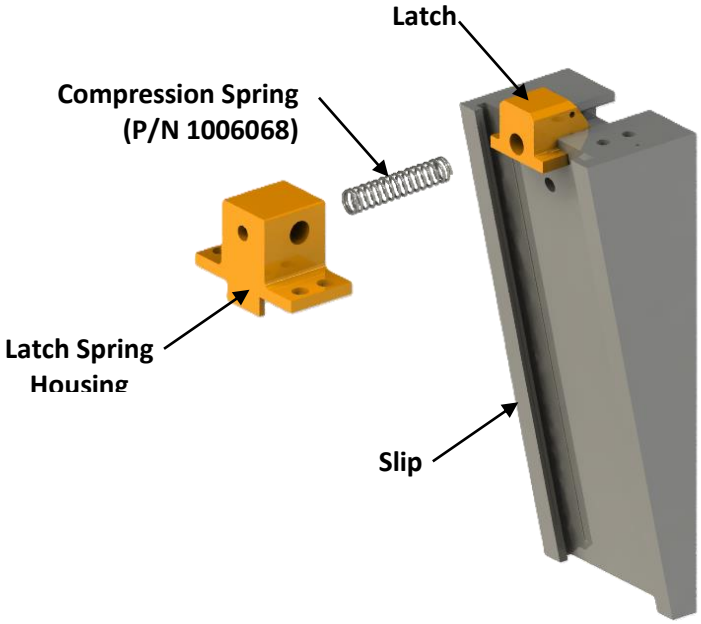
13. Remove the 5/8”-11 hex bolts (GR8, drilled head P/N 1005998) that secure the latch spring housing (P/N 1006005) to the slip (P/N 1005994).

⚠ CAUTION

Be aware that there is a spring (P/N 1006068) inside of the mechanism that will release towards the back of the slip during removal.



14. With the latch housing and spring removed, slide the latch (P/N 1006008) out of the slip (P/N 1005994). Repeat steps for each slip.

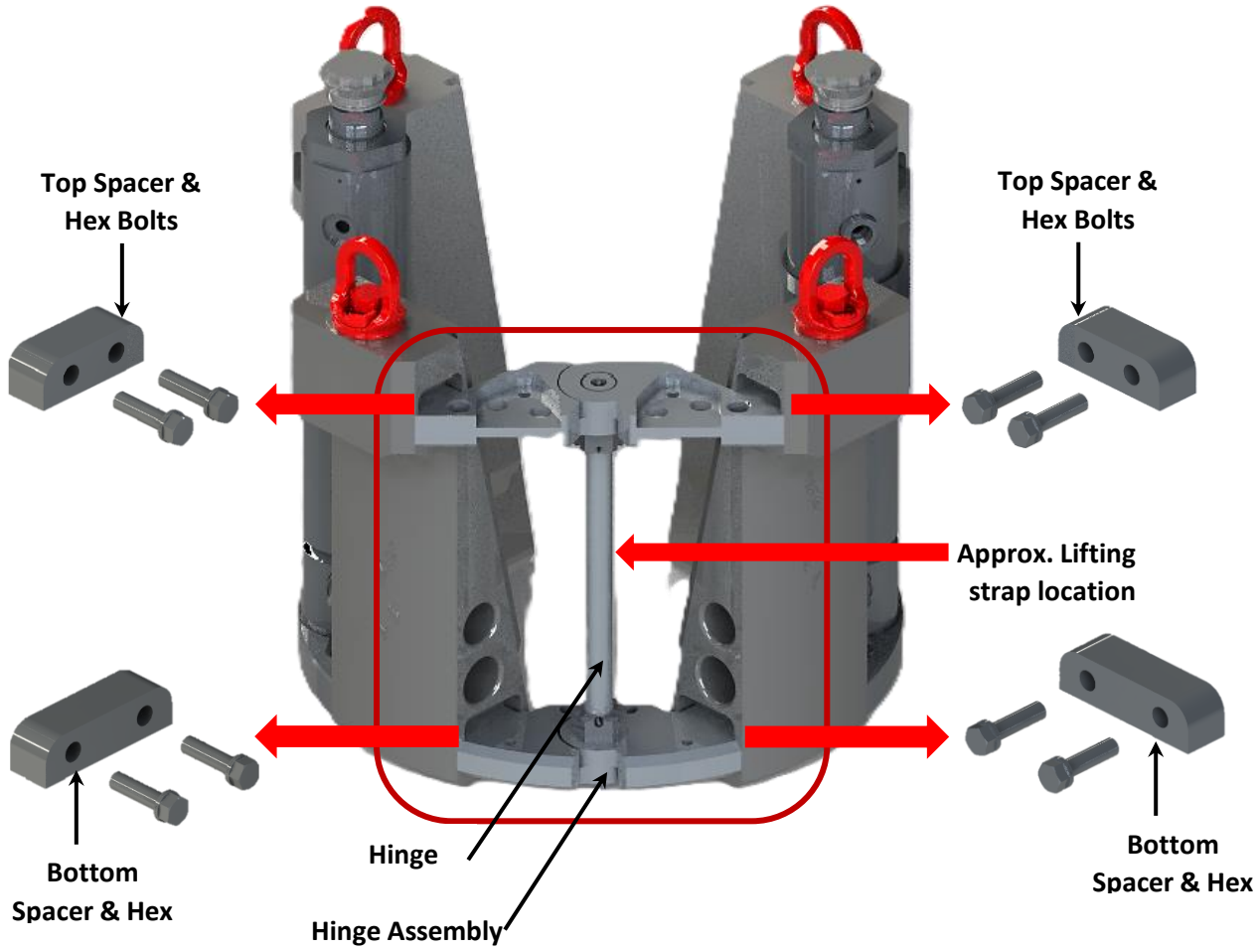


15. Remove hoses from FMS cylinders**.** Plug and cap hydraulic fittings.

⚠ CAUTION

ENSURE TO BLEED HOSES BEFORE REMOVING THEM TO AVOID TRAPPED PRESSURE.

16. Before removing the hinge assembly, secure a lifting strap around the inside of the Hinge Pin (PN 1006256). Bias the loop toward the center of the tool. Pick up with the crane until the hinge assembly moves upwards slightly.
    NOTE: PICKING UP TOO MUCH CAN FLIP OVER THE ASSEMBLY.
17. Using a 6” extension and a 9/16” swivel head socket, remove the hex bolts, 3/8 – 16 X 1-1/2, from both the top (P/N 1006268) & bottom spacers (P/N 1006030).
18. Using a tool such as needle nose pliers or a magnetic probe remove the top & bottom spacers.



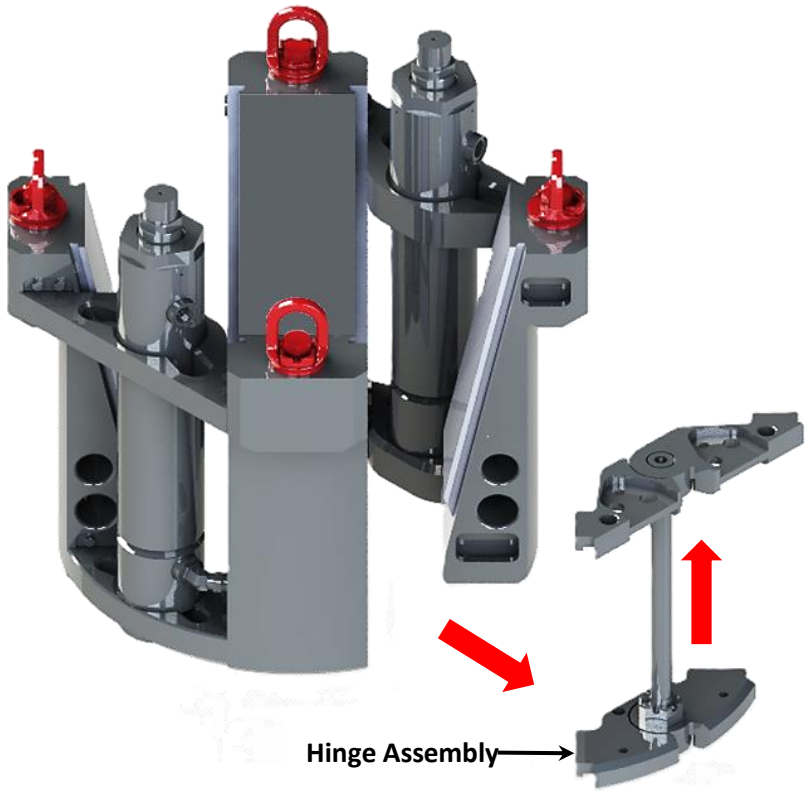
⚠ CAUTION

REMOVAL OF HINGE ASSEMBLY WITH HANDS MAY LEAD TO HAND INJURY.

⚠ CAUTION

KEEP HANDS CLEAR OF RIGGING THAT IS ENGAGED OR UNDER TENSION. USE CAUTION, AS POTENTIAL RIGGING FAILURE MAY LEAD TO HAND INJURY. BE AWARE OF HAND PLACEMENT IN RELATION TO RIGGING AND PARTS.

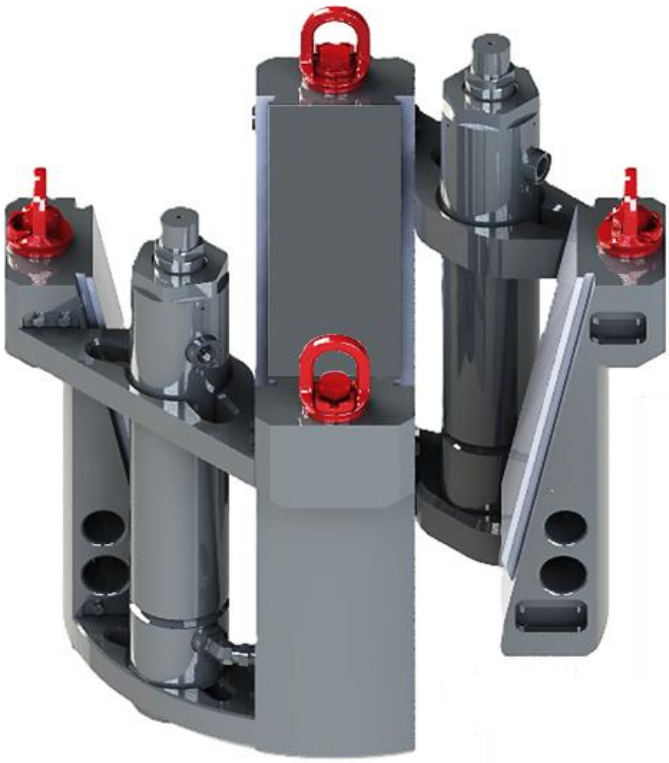
19. Hold and guide the hinge pin, placing your hand under the lifting strap on the hinge pin. Use this as a gripping point for stability and to adjust as needed to free it from the corner bowls. The hinge assembly can now be lifted outward and upward with the crane. Set hinge assembly off to the side for further disassembly or evaluation.



⚠ WARNING

AS COMPONENTS ARE REMOVED, THE REMAINING COMPONENTS CAN BECOME UNSTABLE. ENSURE ALL REMAINING COMPONENTS ARE SECURE TO PREVENT THEM FROM FALLING AND TO AVOID INJURIES OR DAMAGE TO EQUIPMENT, BE AWARE OF THE HAZARD.

There will now be two distinct halves of the tool.



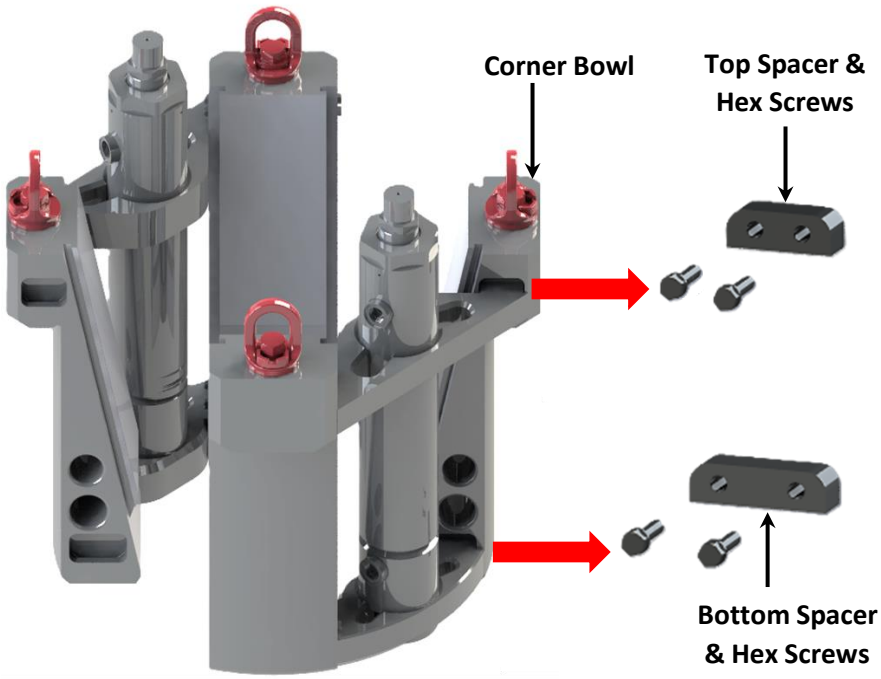
⚠ CAUTION

BE AWARE OF HAND PLACEMENT IN RELATION TO RIGGING WHEN HOISTING, AS RIGGING FAILURE MAY LEAD TO POTENTIAL HAND INJURY.

⚠ CAUTION

REMOVAL OF RETAINING PLATE WITH HANDS MAY LEAD TO HAND INJURY.

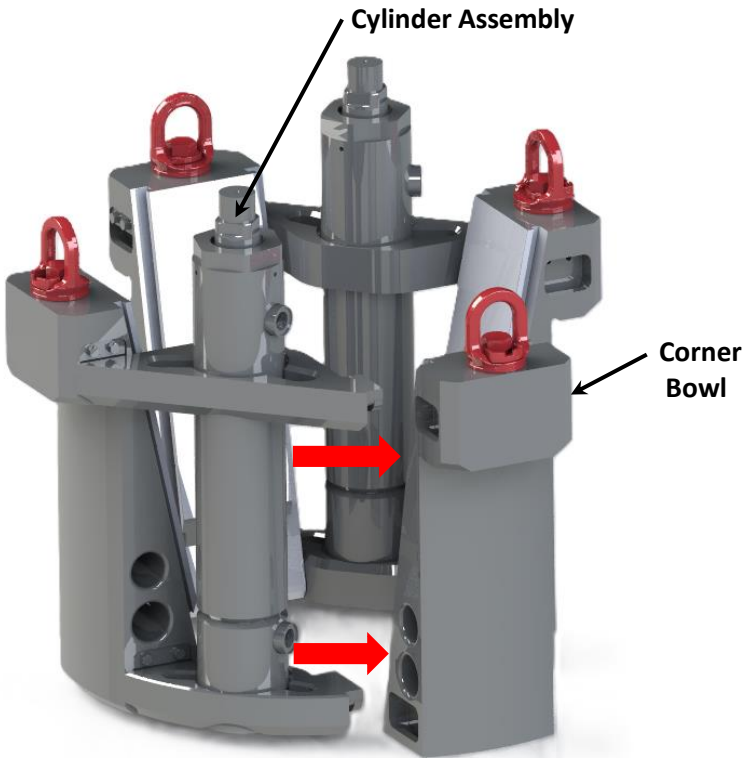
4. Prior to removing the first corner bowl (P/N 1006069), attach a lifting strap to the swivel hoist ring on top of the corner bowl.
5. Remove the corner bowl by using a 6” extension and a 9/16” swivel head socket to remove the hex screws, 3/8 – 16 X 1-1/2”, from both the top (P/N 1006268) & bottom spacers (P/N 1006030).
6. Use a tool such as needle nose pliers or a magnetic probe to remove the top & bottom spacers.



7. Maneuver / adjust the corner bowl to ensure it moves freely from the cylinder assembly. Once the cylinder assembly tab is clear of the spacer pockets, pull the corner bowl away to remove it. Adjusting the strap or using a rubber mallet sometimes is needed.
8. Secure the corner bowl on flat level surface for inspection or storage.
9. Before removing the opposing corner bowl, ensure the cylinder is secured by placing a single lifting strap around the cylinder, creating a choker position with the single leg rising in front of the center of the cylinder barrel, Or, by using a C-clamp to secure it.

⚠ CAUTION

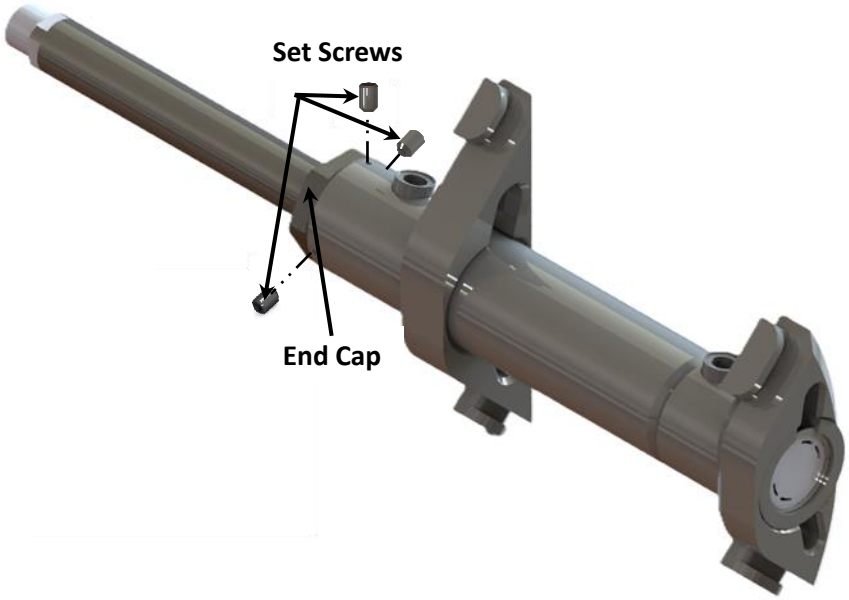
THE CORNER BOWL IS LARGE AND CUMBERSOME. KEEP HANDS CLEAR, AS IT MAY ROTATE OR SWING ONCE FREE OF THE CYLINDER ASSEMBLY.



10. Repeat steps 4-9 for the remaining corner bowls.
11. After removing all corner bowls, hoist the cylinder assembly and place it on a secure, flat, level surface for inspection or storage.
12. For cylinder disassembly see the next section.

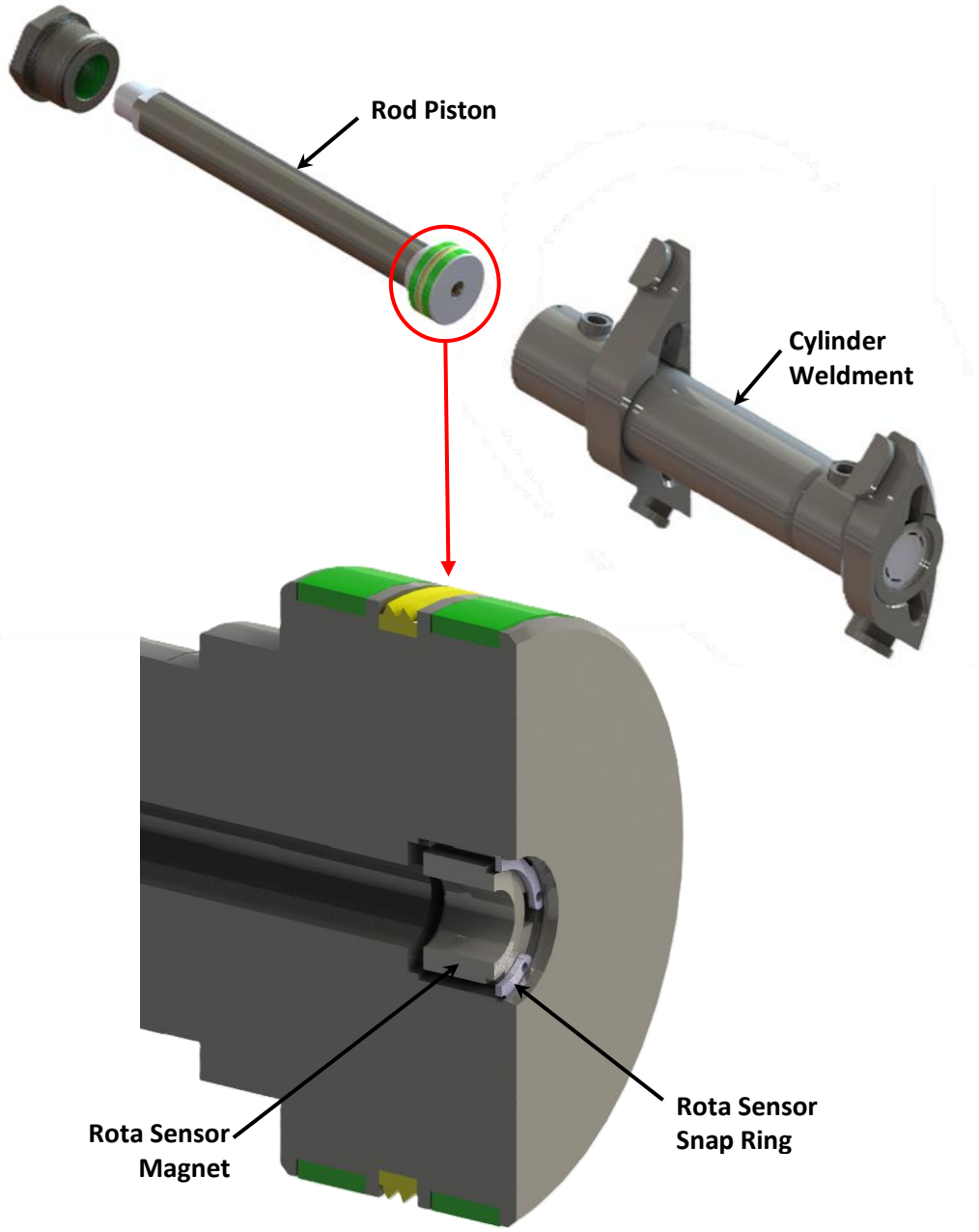
CYLINDER DISASSEMBLY (P/N 1006086)

1. Remove the (3) set screws 5/16”-18, 7/16” that are retaining the end cap (P/N 1006180) in place.



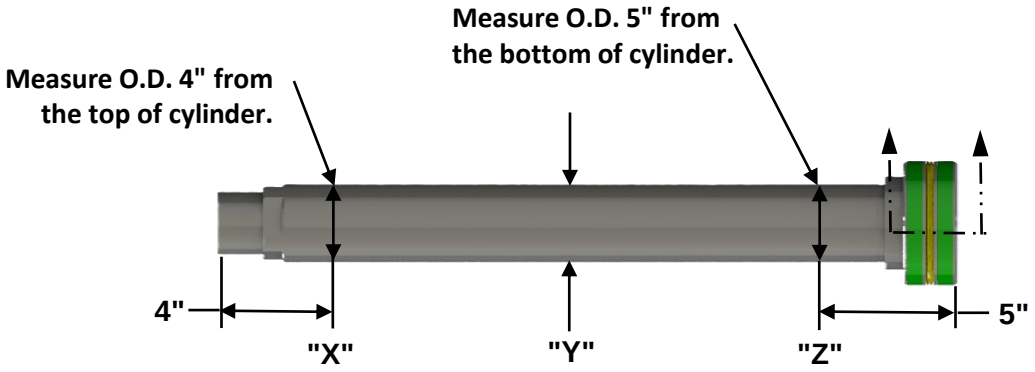
2. Unscrew the end cap rod from the cylinder barrel weldment.

3. Pull the rod piston (P/N 1006061) from the cylinder weldment (P/N 1007645).
4. Ensure proper installation of the Rota Sensor Magnet (P/N 1006101) & Rota Sensor Snap Ring (P/N 1007569) as shown in the bottom image. Note: Failure to secure the snap ring may lead to the magnet falling out, potentially causing damage to the cylinder and cylinder weldment.



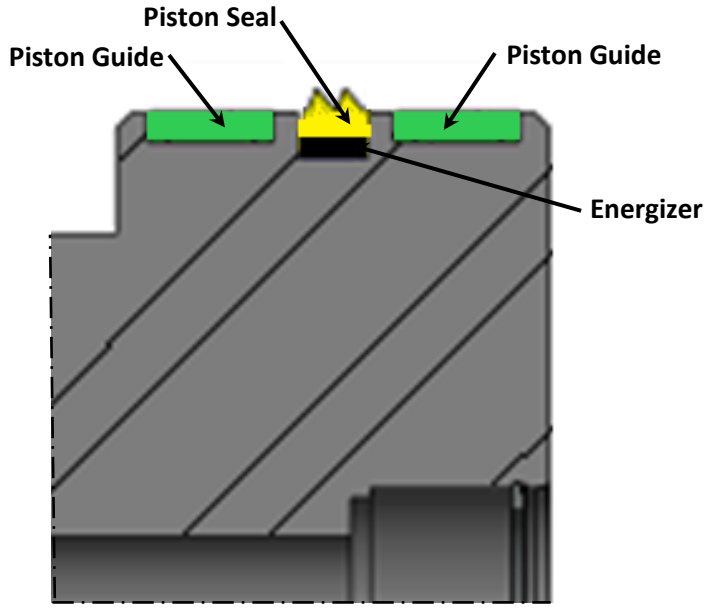
ROD PISTON, CYLINDER P/N 1006061

1. Measure the diameter of the Rod Piston at the (3) locations identified below: “X”, “Y”, “Z”.



WEAR LIMITS		
FEATURE	MANUFACTURED TOLERANCE	WEAR MAXIMUM
ROD DIAMETER	2.496 / 2.499	2.493
PISTON DIAMETER	3.992 / 3.997	3.987

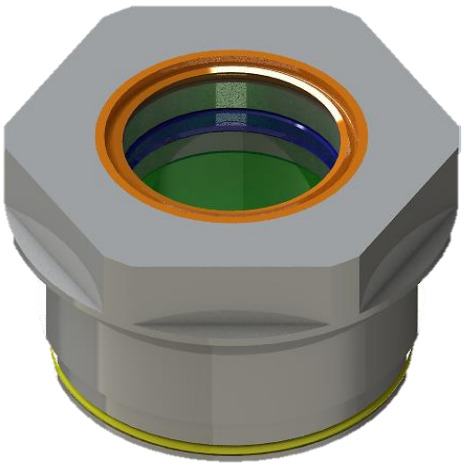
1. Installation of the (2) Piston Guides (P/N 700074), Piston Seal (P/N 700073), and Energizer (P/N 763333).

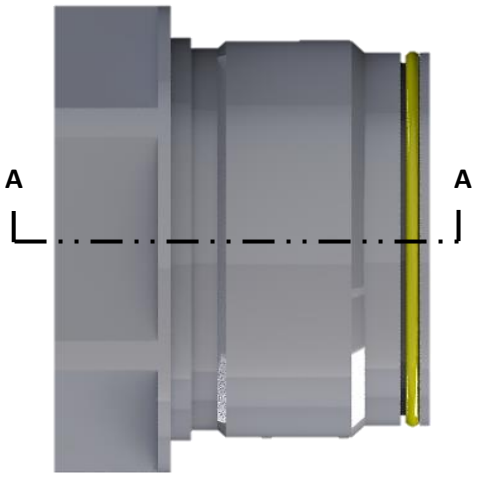


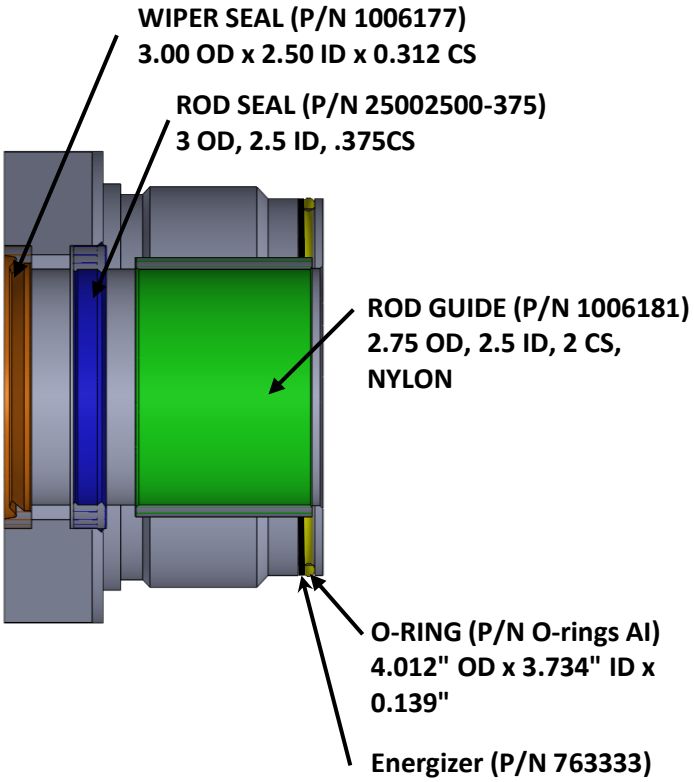
Notes:
1. Install the (2) piston guides; they can be placed in either up or down orientation.
2. The energizer is placed in position first, prior to installing the piston seal. The Energizer is flat and does not have a specific up or down orientation.
3. Install the piston seal on top of the energizer with the flat side facing downwards.

END CAP, ROD P/N 1006180

1. Installation of the O-rings & seals as shown below.



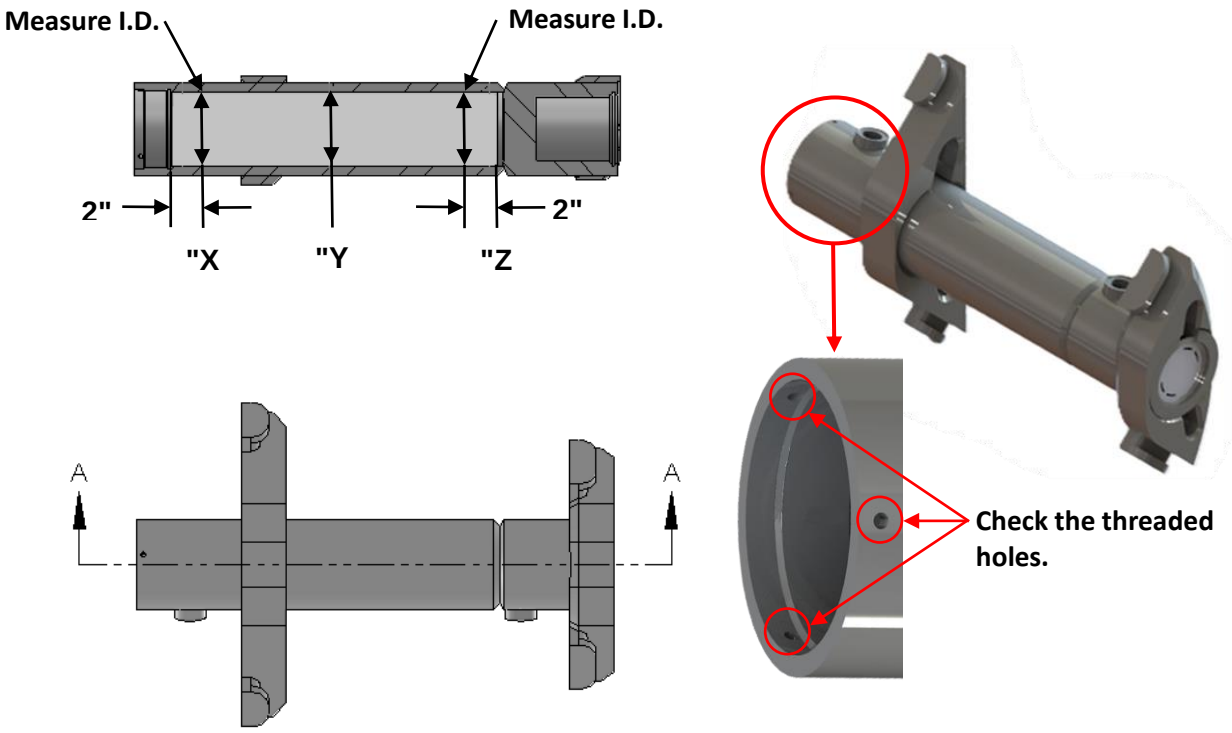




Notes:
1. Position the wiper seal with the flat side facing downwards in the bottom of the pocket.
2. The rod seal (Poly-Pak) is installed with the flare facing outward, towards the direction of the oil.
3. The rod guide is split, allowing for easy installation inside the end cap and can be oriented either upwards or downwards.
4. First, position the energizer, followed by placing the O-ring on top of it. Both the energizer and O-ring can be oriented either upwards or downwards.

CYLINDER WELDMENT P/N 1007645

2. Measure inside diameter of the cylinder (P/N 1007645) in the (3) locations identified below: “X”, “Y”, “Z”.
3. Check the (3) thread holes for damage or burrs in the locations depicted below. Repair as needed before reassembly, using a proper deburring tool or emery cloth.



WEAR LIMITS		
FEATURE	MANUFACTURED TOLERANCE	WEAR MAXIMUM
BORE DIAMETER	4.000 / 1.002	1.010

REASSEMBLY

1. Reinstall the Cylinders, hinge assembly, and FMS components using the disassembly sections as your guide for the process steps.

DIE INSTALLATION

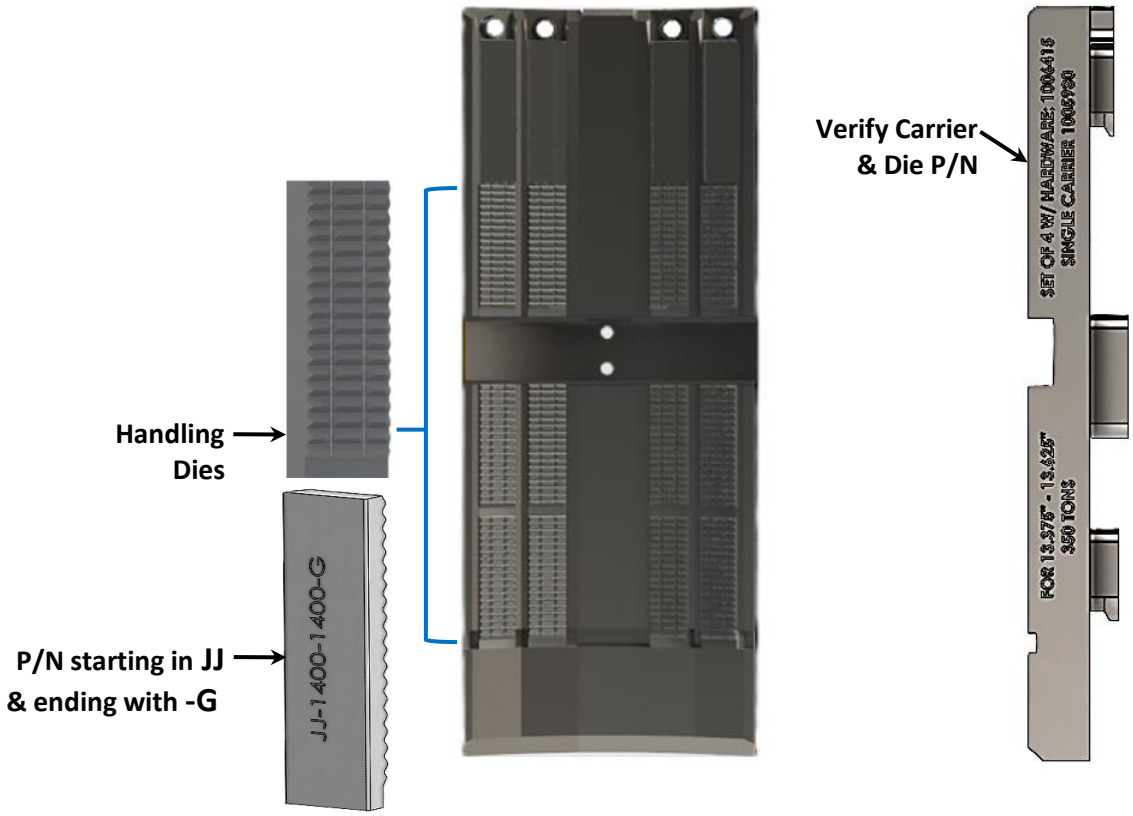
1. Setup a safe, secure, and level work area to install the dies.
2. Inspect the carrier slots and dies for sharp, flattened, or damaged edges. Repair any damage using Emory cloth or a file.
3. Select carrier size and use a metal brush to clean any debris from the die slots. Repeat steps for each carrier.

4. McCoy recommends applying CRC 3-36 Multi-Purpose Lubricant & Corrosion Inhibitor in the die slots before installing the dies.

⚠ WARNING

DO NOT APPLY GREASE OR ANTI SEIZE COMPOUNDS TO THE SLOTS OF THE CARRIERS OR THE DIES WHEN INSTALLING. APPLYING GREASE CAUSES DECREASED FRICTION, LEADING TO THE INCREASED LOADING ON THE SLOT AND REDUCES CARRIER LIFESPAN.

5. Install (2) handling dies into each carrier slot. Verify the carrier assembly number and part number for the handling dies. The bottom (3) rows of dies are slip or handling dies with a part number starting in JJ and ending with -G. Please refer the FMS die chart in the appendix section.



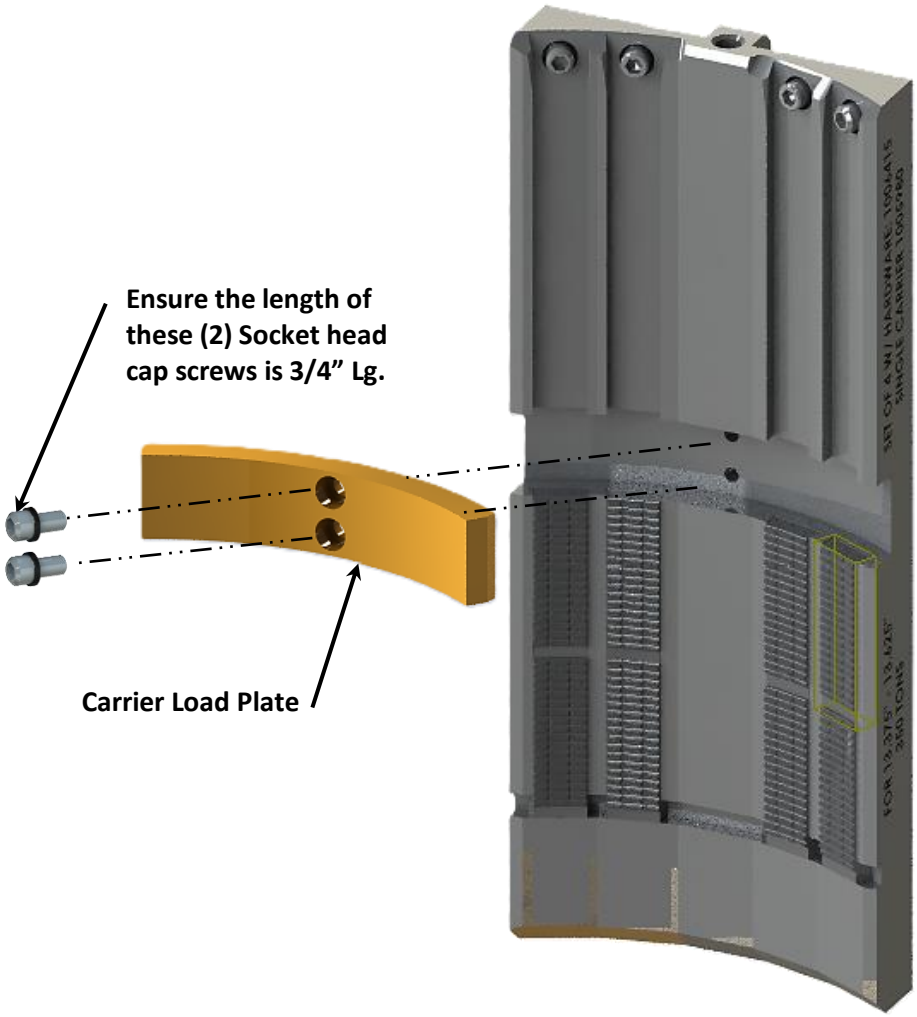
⚠ WARNING

NON-STANDARD POWER TONG DIES ARE USED IN THE FMS. STANDARD DIES DO NOT APPLY THE PROPER BITE PROFILE / DEPTH THEREFORE CANNOT BE USED IN THE FMS.

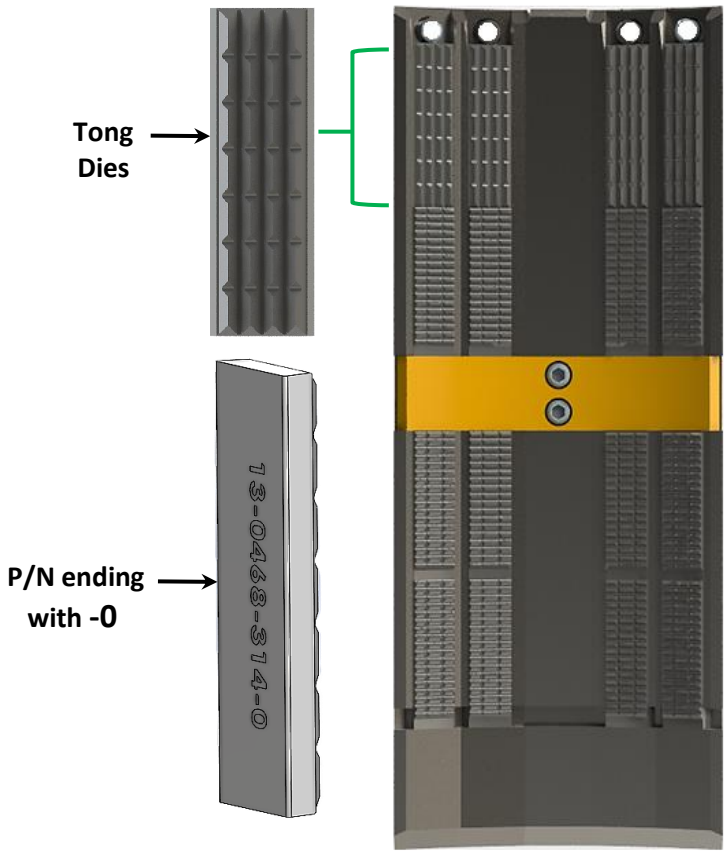
⚠ CAUTION

ONLY BI-DIRECTIONAL SLIP DIES ARE TO BE USED ON THE BOTTOM 3 ROWS OF THE FMS DIE CARRIERS.

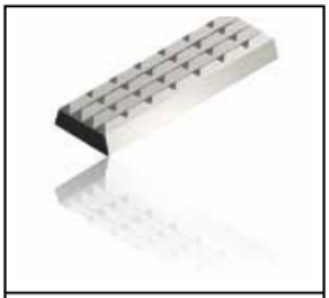
6. Reinsert the mid carrier load plate (P/N 1006178) and secure in place using the (2) socket head cap screws (P/N 1040-A), 3/8” – 16, 3/4” long, steel. Make sure to place the 3/8” NORDLOCK washer (P/N MDC1002100) in the correct orientation.
7. Apply copper coat high-temperature anti-Seize compound and torque the bolts to 33 ft-lbs.



8. Install (1) tong die into the top row of the (3) carrier slots. Verify the part number of the handling dies (ending with "– 0"). Refer to FMS Die Chart in the appendix section.



TONG DIE PART NUMBER DECODER



1 3 - 0008 - 0314 - 0

STYLE IDENTIFIER

1 = STRAIGHT TOOTH INSERT
G = **GRITFACE®** TONG DIE

DIE THICKNESS

FIRST TWO DIGITS ARE SIZE IN INCHES
00 = 0"

LAST TWO DIGITS ARE FRACTIONAL SIZE IN SIXTEENTHS OF INCH
08 = 8/16" = 1/2"

0 0 0 8 = ½ INCHES

DIE LENGTH

FIRST TWO DIGITS ARE SIZE IN INCHES
03 = 3"

LAST TWO DIGITS ARE FRACTIONAL SIZE IN SIXTEENTHS OF INCH
14 = 14/16" = 7/8"

0 3 1 4 = 3 7/8 INCHES

WIDTH IDENTIFIER

1 = 5/8" WIDE TONG DIE
2 = 1" WIDE TONG DIE
3 = 1¼" WIDE TONG DIE

MODIFIER

0 = NO GRIT COATING OR SPECIAL FEATURES
1 = 90-100 MESH (FINE) GRIT COATING
-1 COATING FOR SAFETY CLAMPS ONLY
2 = 40-50 MESH GRIT COATING
3 = 30-40 MESH (MEDIUM) GRIT COATING
4 = 25-30 MESH GRIT COATING
5 = 20-25 MESH (COARSE) GRIT COATING
P = PYRAMID TOOTH PATTERN
FP = FINE PYRAMID TOOTH PATTERN
D = "DIAMOND" TOOTH DIE

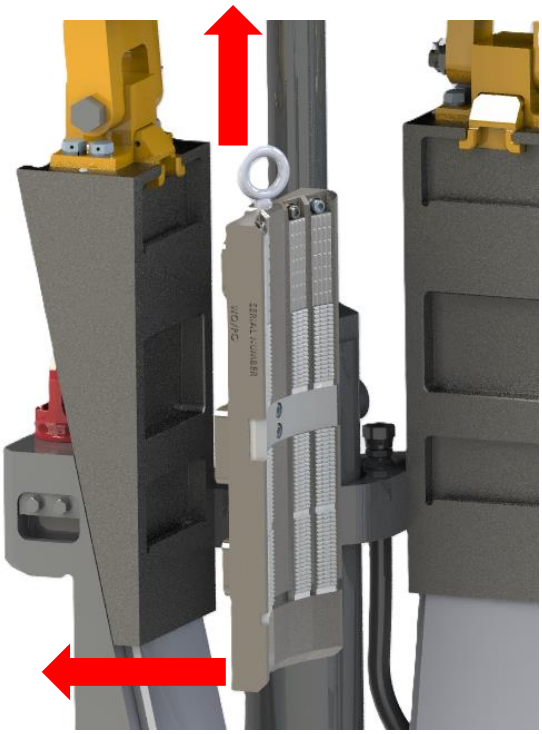
CARRIER INSTALLATION

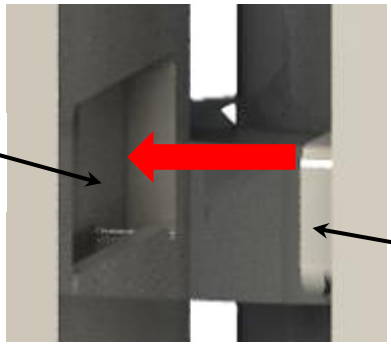
⚠WARNING

WHEN INSTALLING AND REMOVING CARRIERS, USE A POSITIVE STOP TO PREVENT THE CYLINDER FROM RETRACTING DUE TO HYDRAULIC POWER LOSS. THE STOP CAN BE INSTALLED UNDERNEATH THE SLIPS OR BETWEEN THE TOP PLATES AND CYLINDERS.

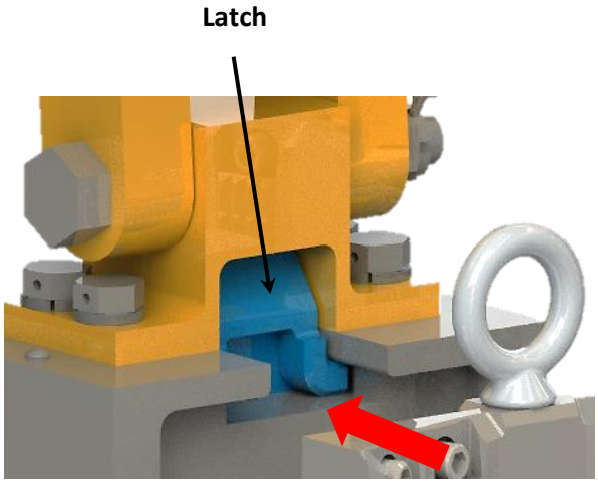
Note- This step is intended to be completed when the tool is out of the Rotary Table.

9. Select a carrier with the dies inserted and install the lifting eye bolt into the top of the carrier.
10. Connect a lifting strap to the lifting eye bolt and move the carrier into position to attach to the corner bowl.
11. Lubricate the back of the die carriers and the front slots and face of the slips with a thin coat of NLGI No. 3 Lithium or equivalent.
12. Insert the carrier into the corner bowls, aligning the (3) back ledges of the carrier into the pockets in the slip.





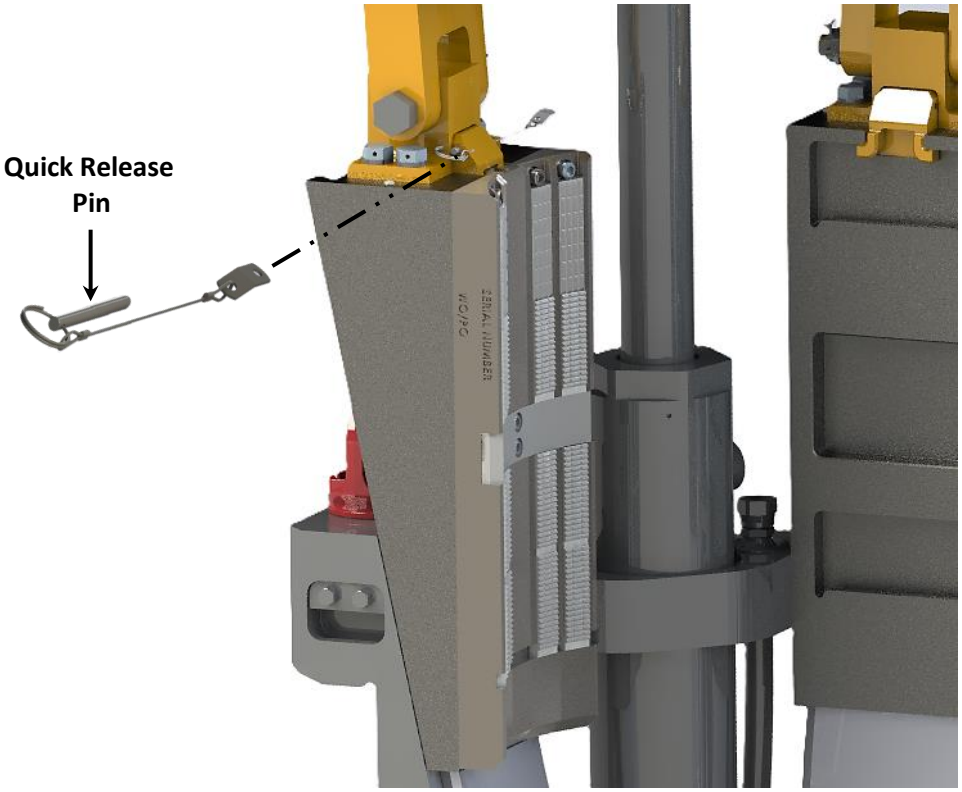
13. Push the latch (P/N 1006008) back to install the carrier.



⚠ CAUTION

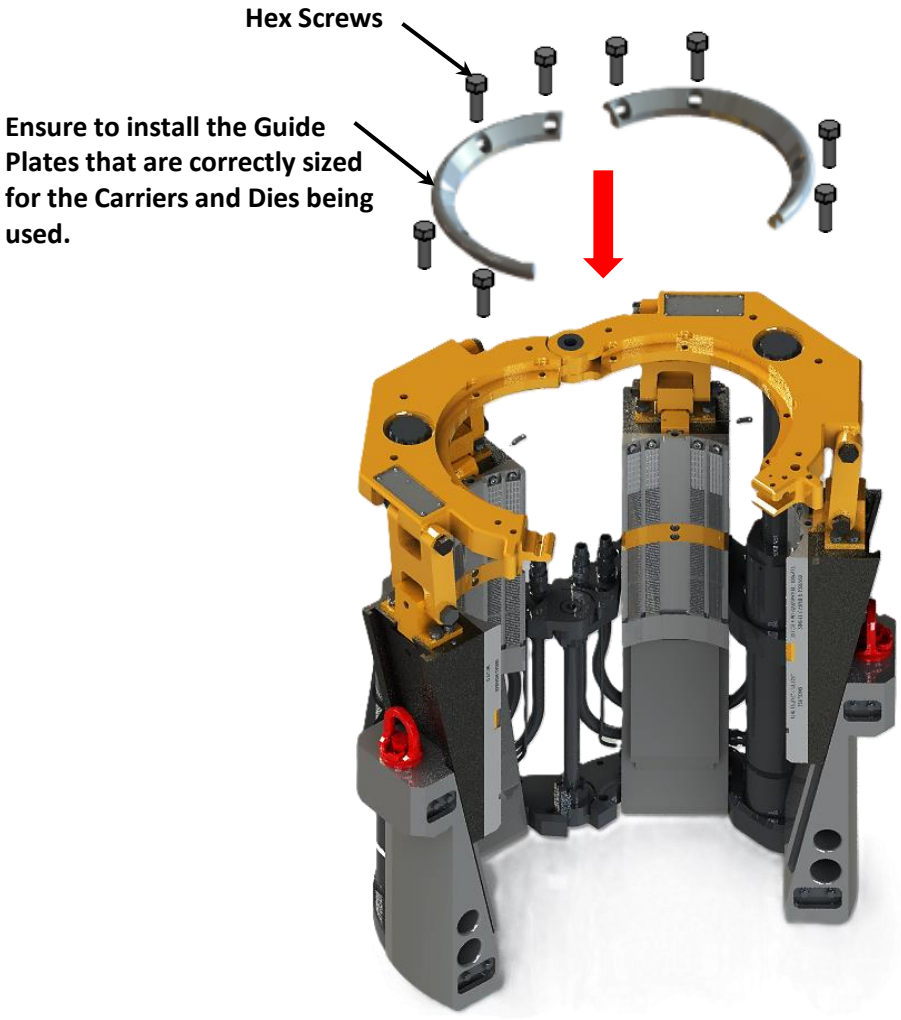
USE A TOOL SUCH AS A BAR TO DEPRESS THE LATCH. DO NOT USE HANDS OR FINGERS, AS THIS IS A PINCH POINT.

14. Once the spring latch secures the carrier (latch springs back), install the safety pin (P/N 1006229) and remove the hoist ring.



15. Repeat steps 9-14 for the remaining corner bowls.

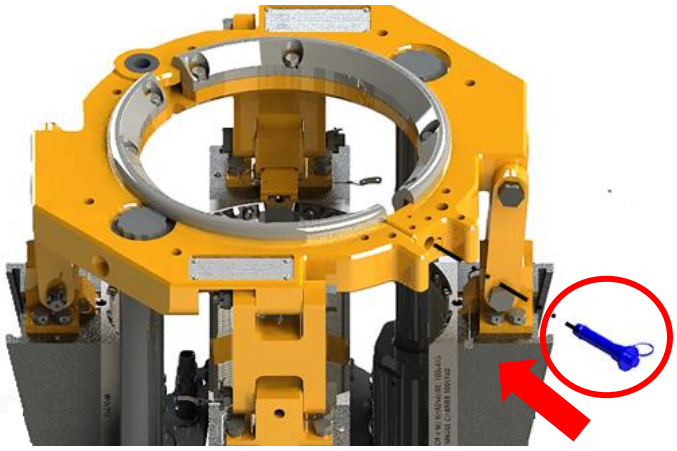
16. Install the Top Guide Plates (P/N determined by the sizing chart) that match the Carrier and dies that are being used. Uninstall (8) 1/2-13, 1-1/2" hex screws to secure them in place. Reference the die chart in the Appendix section.



⚠ CAUTION

INCORRECT USED OF TOP GUIDE PLATES CAN CAUSE DAMAGE ON THE TOOL, PLEASE REFER TO THE CHART IN APPENDIX SECTION FOR THE CORRECT TOP GUIDE PLATE INFORMATION DEPENDING ON CASING SIZES.

17. Ensure all pinch points are avoided and swing close the FMS using a bar or an overhead lifting device.
18. Install the safety pin (P/N 700049).



19. Function test the slips to ensure proper fit.

⚠ CAUTION

DO NOT APPLY AXIAL LOAD TO THE FMS, UNLESS IT IS INSTALLED IN AN ADAPTER BUSHING OR TEST STAND.

⚠ WARNING

NEVER ATTEMPT TO CLAMP TUBULARS WITH INCORRECTLY SIZED DIES. OPERATORS MUST BE AWARE OF THE SIZE OF TUBULAR TO BE GRIPPED AND THAT CORRECTLY SIZED DIES ARE INSTALLED. USE OF INCORRECTLY SIZED DIES POSES A HAZARD TO PERSONNEL AND EQUIPMENT.

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SECTION 6: TROUBLESHOOTING

TROUBLESHOOTING

Adequate maintenance and proper fluid selection are essential for minimizing hydraulic-related failures. All troubleshooting must be performed by a technician trained in hydraulic systems, and familiar with the equipment design, assembly, and operation.

The following troubleshooting instructions are intended to be guidelines only. Any faults not solved through the use of this guide should be referred to our engineering department for evaluation and recommendations.

1. In the event of power loss, the slips will need to be removed from the pipe manually. Install lifting eyes into the 5/8-11 holes on the top plates near the cylinder nut, then attach the lifting straps and use a crane to release the pipe.
2. In the event of pipe slippage, please verify that the correct dies and/or carriers are installed for the pipe being clamped.

1.0 - FMS Not Holding Torque/Pipe slipping through the inserts

	Possible Problem	Solution
1	Dies Slipping on Pipe Due to tong dies not properly installed	Ensure tong dies are installed in the top row of each carrier column and both correct carriers and dies are the correct size for the application
2	Dies slipping on Tubular	Ensure tong dies are not worn to the point that they cannot grip.
		Ensure that the correct tong dies are installed to ensure proper die penetration
		Debris or other material build-up can cause issues with proper die engagement. Ice in cold climates can affect this as well. Ensure the tubulars are free of debris where the FMS is contacting, and that proper penetration is occurring.
3	Power unit is not producing adequate pressure for beginning of string (2,000 psi minimum)	Troubleshoot power unit (see user's manual for power unit)
4	Poor hydraulic pressure at the FMS cylinder despite adequate pressure at the power unit.	Restrictions exist in line between power unit and FMS. Inspect the integrity of self-sealing couplings to ensure they are allowing full fluid flow. Check to ensure no other restrictions exist
5	Fluid viscosity is not appropriate (too high or too low)	Ensure hydraulic fluid being used is the viscosity recommended by McCoy Global. Power unit pump may not prime if fluid is too heavy, and the hydraulic system will overheat if fluid is too light. Replace with proper viscosity fluid
		Hydraulic fluid viscosity is affected by environmental conditions. Ensure the fluid being used is suitable for high or low temperatures. Replace with proper viscosity fluid for the operating conditions if necessary
6	Adequate Pressure/Flow not being provided through console	Troubleshoot console (see user's manual for console)

2.0 - Latch mechanism not functioning properly

	Possible Problem	Solution
1	Console not supplying adequate flow	Troubleshoot Console
2	Hydraulic Pressure supply too low	Troubleshoot Console and then troubleshoot power unit
3	Piston rod seals are leaking	Disassemble the cylinder and inspect the rod seals for damage (cut, melted, rolled etc.).

3.0 - Slips are traveling too slow

	Possible Problem	Solution
1	Cylinder nuts too loose	Confirm cylinder nuts are properly torqued
2	Slips and other surfaces of FMS are not properly lubricated	Please lubricate the tool
3	FMS cylinders leaking or damaged	Confirm that the pressure supplied is to the maximum working pressure of the cylinder. Replace any damaged seals

3.1 - FMS cylinders are not functioning together

3.2 Cylinders leaking

	Possible Problem	Solution
1	Cylinder leaking during operation	Disassemble the cylinder and check for the proper durometer rubber (90) or damaged seals (cut, melted, rolled etc.).
2	Cylinder leaking during operation	Disassemble the cylinder and confirm proper seals or the proper seal assembly order has been carried out on the Rod End Cap. (Ring & Spacer installed).

	Possible Problem	Solution
1	Spring is not installed, is incorrect or is damaged	Ensure proper spring is installed and functional
2	Proper Lifting eye not installed	Use specified lifting eye to retract the latch.
3	Mechanical interference (sticking) between the housing and the latch as it is retracted	Filing or adding a slight radius to the back of the latch (if not already done) removes the interference and prevents the latch from interfering.

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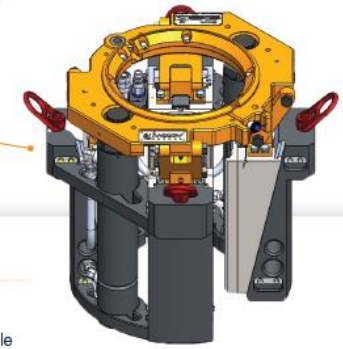
SECTION 7: SALES, MARKETING & SPECIFICATION SHEET

McCoy Flush Mounted Spider

Applications

McCoy's FMS is a rotary equipment developed to handle casing using replaceable die carriers and **provides back-up torque of up to 50,000 ft.lbs. from first pipe joint,** hence removing the need for manual backup tongs.

- Fits inside of rotary with a relatively low profile
- Reacts backup torque
- Holds weight of casing string
- Removes casing crew from the possible pinch points



Performance Specifications

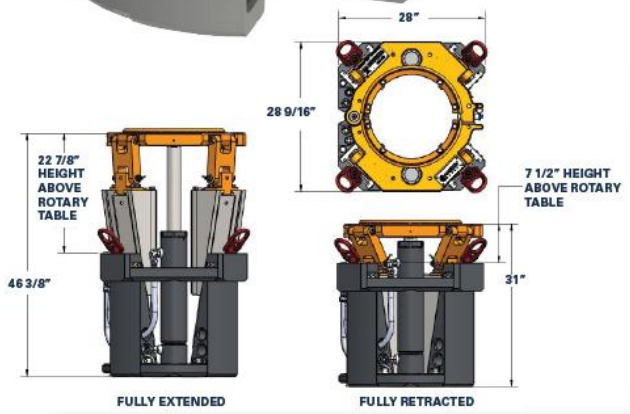
- Maximum Tension Rating – 350 tons
- Designed to fit inside of a 27 ½" API Rotary Table
- Total cylinder cycle time is 6 seconds
- Tool Grip Range – Casing sizes 13 5/8" – 2 3/8"

FLUSH MOUNT SPIDER SPECIFICATIONS		
MAXIMUM TENSION RATING	350 TONS	317 TONNES
MAXIMUM WORKING PRESSURE	2000 PSI	138 BAR
FLOW RATE REQUIRED	34 GPM	128 LPM
MASS (TOOL ONLY)	2900 LBS	1315 KG
MASS RANGE (CARRIERS AND GUIDE PLATES INCLUDED	3050-3700 LBS	1383-1678 KG
TIME TO EXTEND AND RETRACT	6 SECONDS	
COMPATIBLE ROTARY TABLE	27 1/2", 37 1/2*	
CASING SIZE RANGE	13.625"	2.375"

*WITH ADDITION OF THE ADAPTER RING, SAME FMS CAN BE USED WITH ANY OF THE MOST COMMON 37 1/2" ROTARIES: NATIONAL OR EMSCO CONFIGURATION

* MAXIMUM TORQUE AT 2000 PSI WORKING PRESSURE ON A SINGLE JOINT	
PIPE SIZE	TORQUE (FT-LB)
13.625 - 7.625	50000
7.563 - 7.000	38000
6.938 - 5.500	30000
5.438 - 4.500	22000
4.438 - 3.500	14000
3.438 - 2.375	3000

*TORQUE VALUES ARE DETERMINED BY SLIP UPON THE PIPE AND NOT THE LIMITATIONS OF THE TOOL.



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McCoy Flush Mounted Spider

Leading-Edge Solutions for Optimal Performance

McCoy Global is transforming the industry with innovative technology solutions that enable our customers' success, delivering optimal operational efficiency and performance, while keeping people, assets and the environment safe

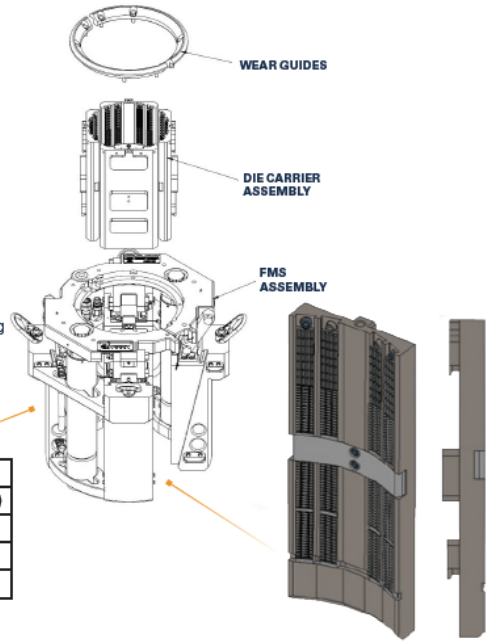
Interchangeable Parts

Insert Carriers

- Multiple sizes of insert carriers to cover the full range of gripping
- Carrier utilize a combination of tong dies and handling tool dies that need to be changed out to grip different sizes without needing to open the FMS
- Carriers are easily interchangeable, utilizing a spring latch to hold the carriers secure
- Due to geometry, the tension rating for carriers decreases for the smaller pipe sizes

Wear Guides

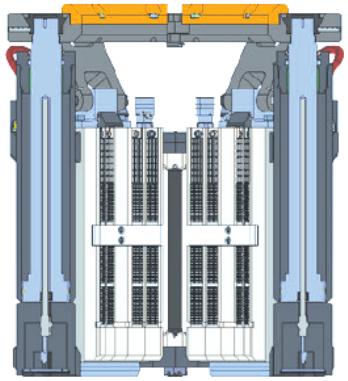
- Need to be changed for individual sizes of casing in order to help ensure a good bite
- Sized to allow common centralizer sizes through without need to remove them



TENSION RATING FOR CARRIERS	
PIPE SIZE	MAX TENSION IN TONS (TONNES)
13.625 - 6.000	350 (317)
5.500 - 4.500	240 (218)
3.500 - 2.375	100 (91)

smartFMS™

This is a fully connected device that in real-time provides information on the state of the tool to the driller's display (also used with a smartCRT™). Both tools are constantly monitored, providing enhanced safety and reassurance that these are not open at the same time. smartFMS™ increases efficiency and safety by eliminating human error and guaranteeing consistency and repeatability of operations.



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SECTION 7: APPENDIX

FMS-350-275-C ASSEMBLY BOM General Arrangement

ITEM	Qty.	P/N	DESCRIPTION
1	4	1006069	CORNER, BOWL
2	8	1006010	PIN, HEX, LIFT LINK
3	8	1006030	SPACER, BOTTOM CONNECTOR
4	1	1006073	ASSEMBLY, CYLINDER, RIGHT, 4 BOREX 2 ROD X 15.348 STROKE
5	2	1006193	NUT, CYLINDER
6	8	1006268	SPACER, TOP CONNECTOR
7	1	700049	PIN, POSITIVE LOCKING, PL2X2500B----X0
8	1	1006086	ASSEMBLY, CYLINDER, LEFT, 4 BORE X 2 ROD X 15.348 STROKE
9	1	1006044	PLATE, HINGE, TOP LEFT
10	1	1006286	HINGE, BOTTOM, LEFT
11	1	1006032	PIN, HINGE, TOP PLATE
12	1	1006007	HINGE, TOP RIGHT
13	1	605354	HINGE, BOTTOM RIGHT
14	1	1006256	PIN, HINGE
15	1	1006257	NUT, CASTLE, JAM, 1 1/4 - 12,
16	2	700064	NUT, CASTLE, 1 3/8 - 12, GR 8, STEEL
17	4	700057	COTTER PIN, 1/4, 2
18	32	1049	SCREW, HEX, 3/8 - 16, 1 1/2, GR08
19	2	12V5OX-SS	FITTING, 3/4 MORB, 3/4 MJIC, 45 DEGREE, STAINLESS STEEL
20	4	12 WFTX-WLN-S	CONNECTOR, BULKHEAD, 3/4 MJIC X 3/4 MNPT
21	2	12C5OX-SS	FITTING, 3/4 MORB, 3/4 MJIC, ELBOW, STAINLESS STEEL
22	2	H10-34-FJFJ	HOSE, GH781-10, 34 L, 1AA10FJ12, 1AA10FJ12
23	2	H10-23-FJFJ	HOSE, GH781-10, 23 L, 1AA12FJ10, 1AA12FJ10
24	4	1005994	SLIP, FMS
25	4	1006008	LATCH
26	4	1006005	SPRING HOUSING, LATCH

ITEM	Qty.	P/N	DESCRIPTION
27	4	1006068	SPRING, COMPRESSION, CENTURY SPRING S-1136
28	4	1006189	BAR, LINKAGE
29	4	1002	FITTING, GREASE, 1/8 MNPT, 90 DEGREE
30	1	1006195-S1	PLATE, TOP RIGHT
31	1	1006191-S1	PLATE, TOP LEFT
32	4	1007895	RING, HOIST, SWIVEL, CROSBY 1068452
33	1	TAG-CLINCHER	PLATE, SERIAL NUMBER
34	1	1006200	PLATE, TEXT, MCCOY
35	11	1001	FITTING, GREASE, STRAIGHT, 1/8 NPT
36	16	1005998	BOLT, HEX, 5/8-11, 1 3/4, GR8, DRILLED HEAD
37	8	1006226	NUT, CASTLE, 3/4-10, GRADE 5
38	16	1151	LOCKWASHER, 5/8, STEEL, GR8
39	8	10043	PIN, COTTER 5/32 X 1 1/2
40	4	1006229	PIN, QUICK RELEASE, 1/4 X 2.2, STAINLESS STEEL
41	32	MDC1002100	NORDLOCK WASHER, 3/8"
42	8	MDC1002099	NORDLOCK WASHER, 1/2"
43	8	1112	SCREW, HEX, 1/2"-13, 1 1/2"
44	2	1007182	SCREW, SET, 3/8-16, 1.500 LG, STEEL, CUP POINT
45	12	1007697	SCREW, FLAT HEAD, PHILLIPS, #10-24, 3/8, STEEL
46	1	1006424	SOCKET, 12 POINT, 2 1/2" SIZE, 1" SQUARE DRIVE
47	4	3-4FF-S	FITTING, NIPPLE, 3/4 MNPT, 3/4 MNPT
48	4	3-4gg-s	FITTING, COUPLING, 3/4 FNPT, 3/4 FNPT
49	2	1008287	BUSHING, ROD MOUNT, FMS
50	4	1041	SCREW, SOCKET HEAD, 3/8-16 X 1, ASTM A574
51	4	MDC1002515	WASHER, NORD-LOCK, 3/8", .65 OD, McMASTER: 91074A131

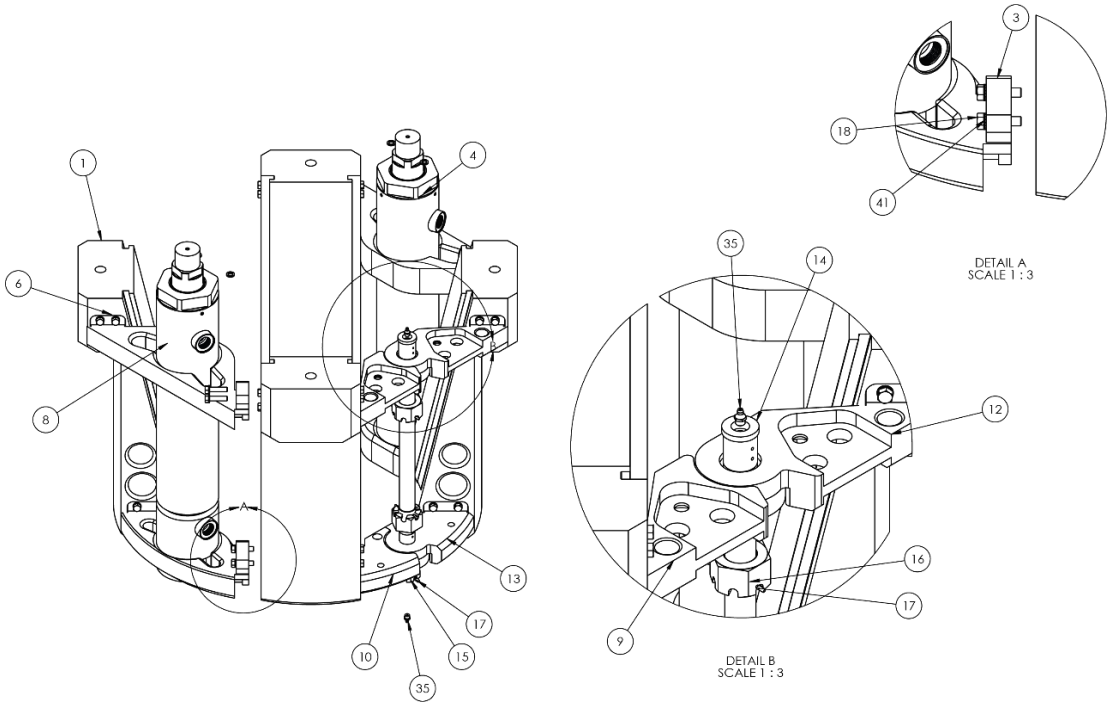
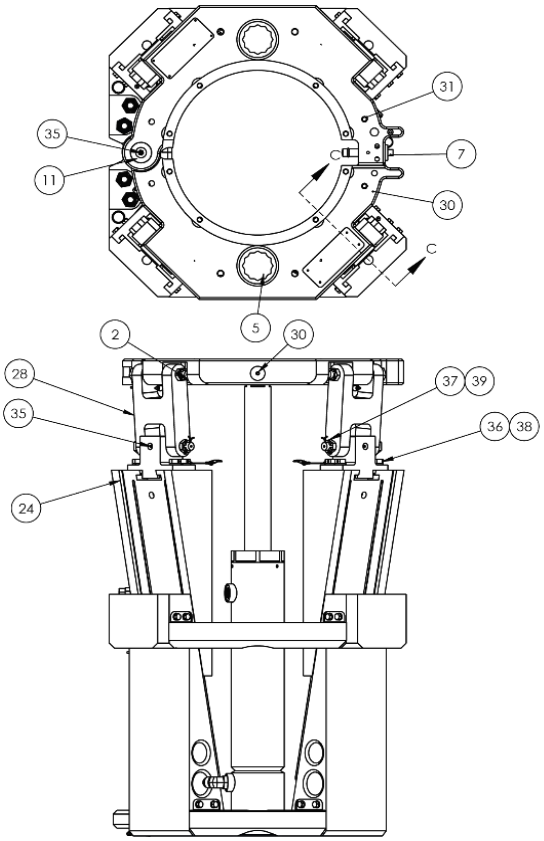
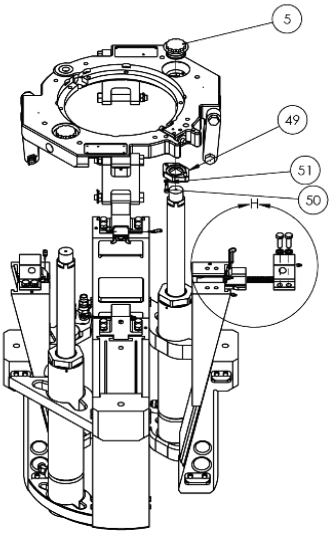


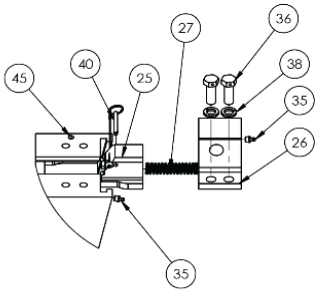
Illustration: FMS-350-275-C ASSEMBLY, SPIDER, FLUSH MOUNTED



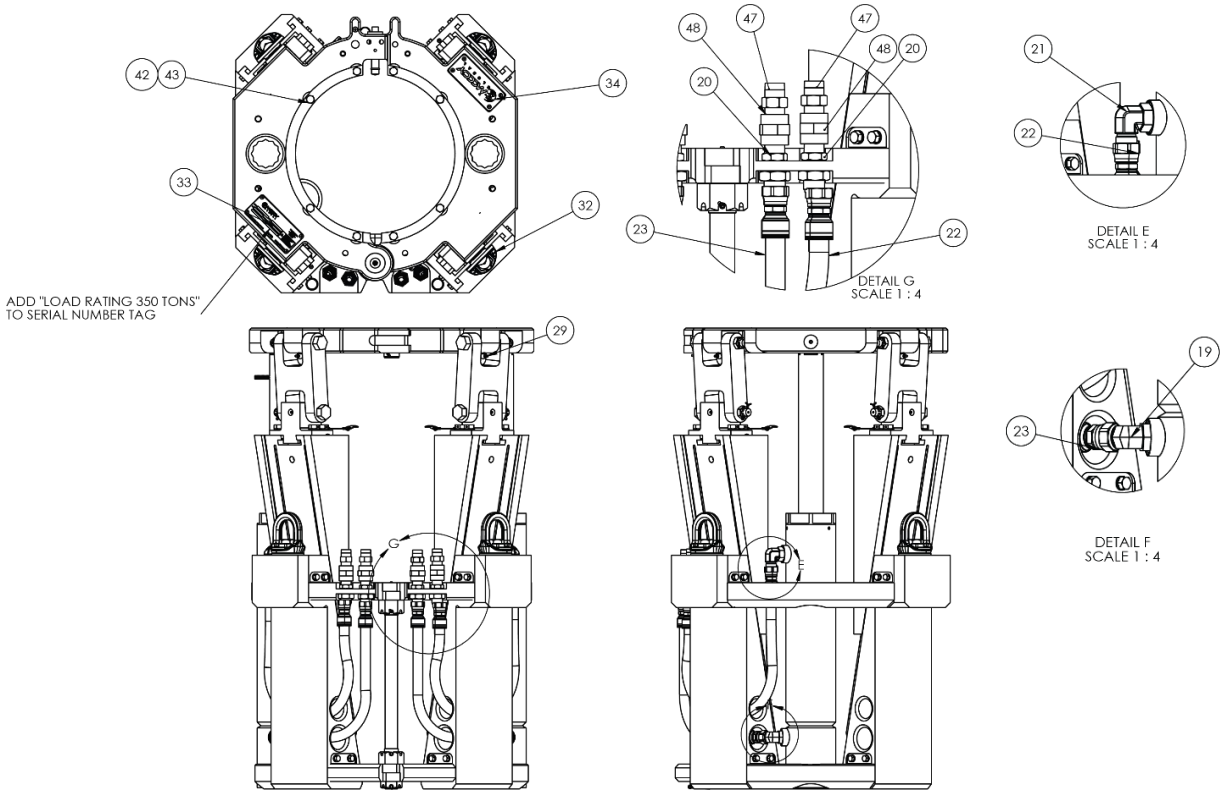


LATCH MECHANISM NOTES:

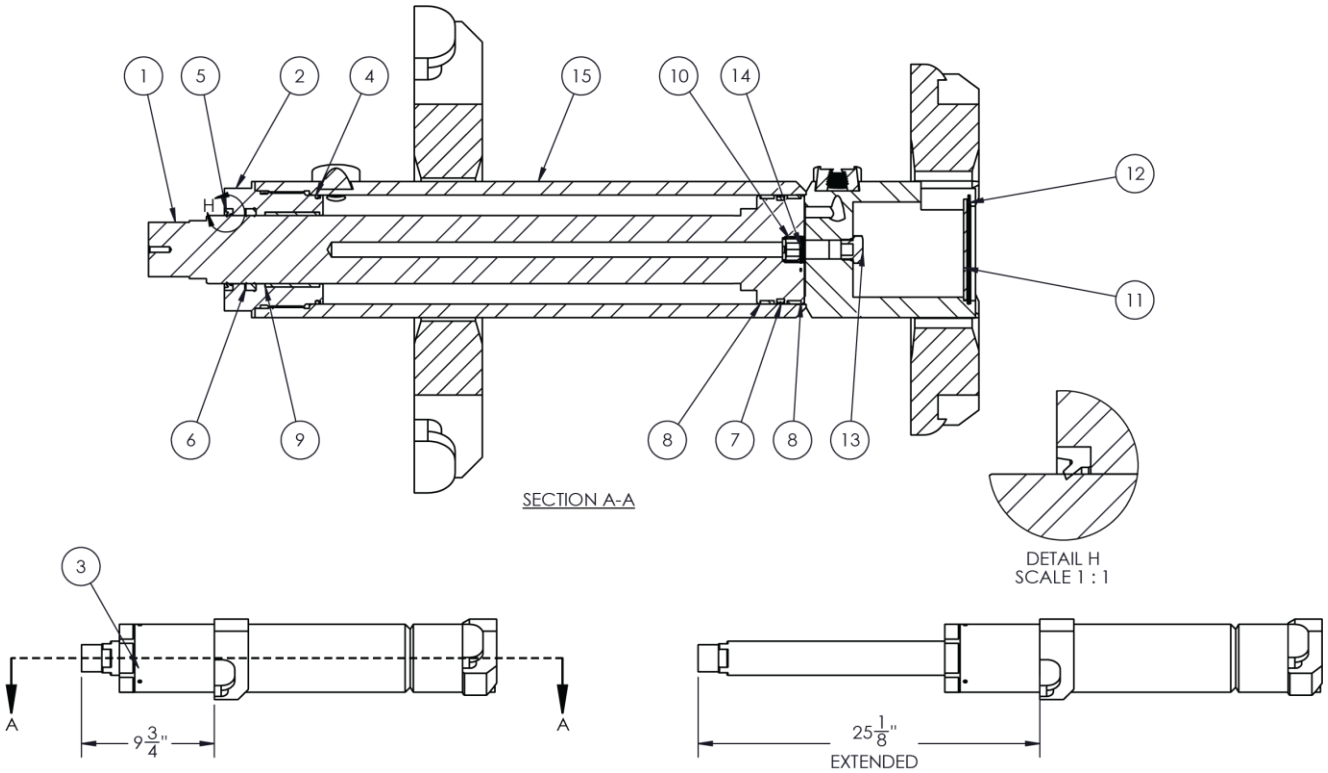
1. LATCH (25) MUST BE INSTALLED FROM REAR OF SLIP
2. PLACE SPRING (27) INSIDE OF LATCH
3. ALLIGN REAR OF LATCH HOUSING (26) WITH SPRING AT AN ANGLE
4. BOLT LATCH HOUSING AND INSERT RETAINING PIN (40)



DETAIL H
SCALE 1 : 6


42
43
34
33
32
ADD "LOAD RATING 350 TONS" TO SERIAL NUMBER TAG
48
47
47
48
20
20
23
22
DETAIL G
SCALE 1 : 4
21
22
DETAIL E
SCALE 1 : 4
29
19
23
DETAIL F
SCALE 1 : 4

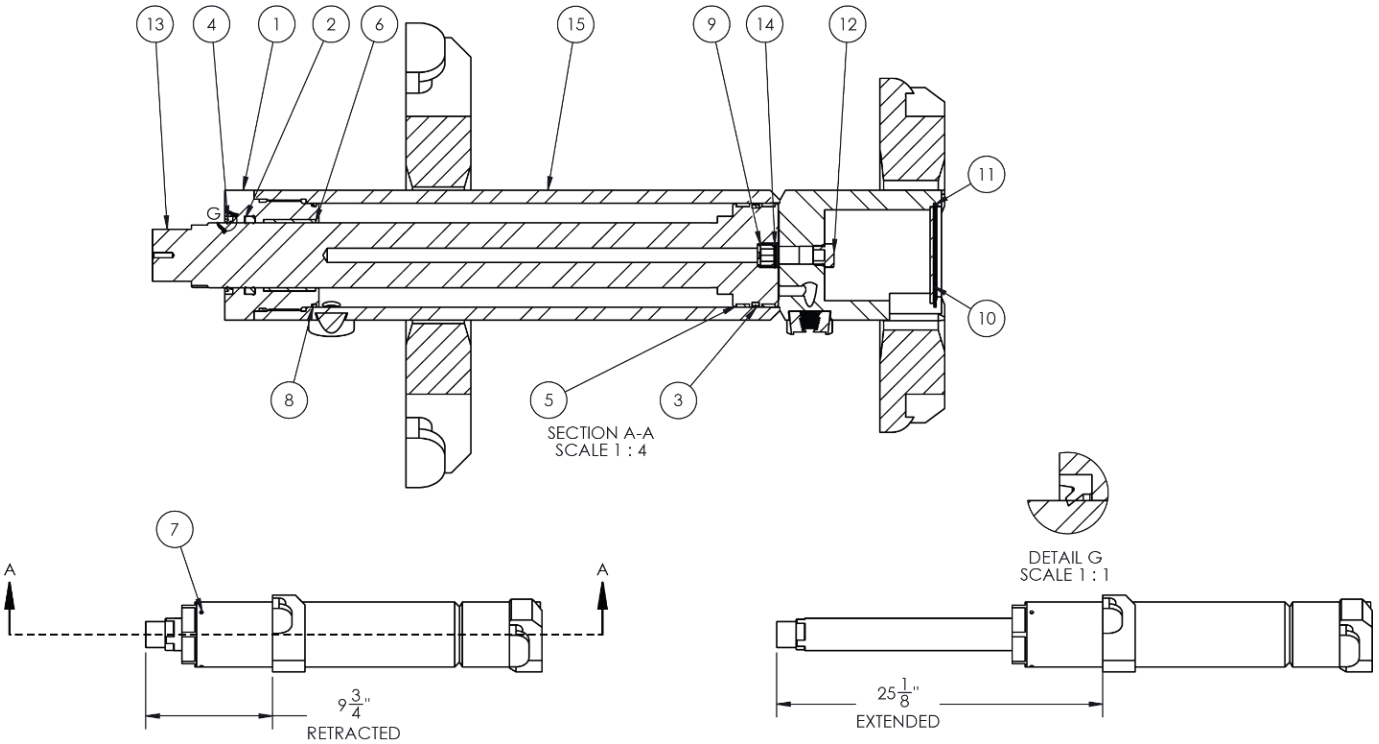
GENERAL CYLINDER INFORMATION
1006073 ASSEMBLY, CYLINDER, RIGHT, 4 BORE X 2 ROD X 15.348 STROKE



ITEM	QTY.	P/N	DESCRIPTION
1	1	1006061	ROD PISTON, CYLINDER
2	1	1006180	END CAP, ROD
3	3	700068	SET SCREW, 5/16-18, 7/16
4	1	700069	O-RING, 4.012” OD X 3.734” ID X 0.139” CS (Replaces Part @ 224000)
5	1	1006177	WIPER SEAL, 3.00 OD X 2.50 ID X 0.312 CS, 4700J02500
6	1	25002500-375	SEAL, ROD, 3 OD, 2.5 ID, .375CS, 4300BD25002500N375
7	1	700073	SEAL, PISTON, 4 OD, 3.63 ID, .281 CS, 4300PSP342A
8	2	700074	GUIDE, PISTON, 4 OD, 3.75 ID, .5 CS 4733WPT125-04000-0500
9	1	1006181	GUIDE, ROD, 2.75 OD, 2.5 ID, 2 CS, NYLON, W2027502000

10	1	1006101	MAGNET, SENSOR, ROTA LJ1234
11	1	1006090	PLATE, COVER, CYLINDER
12	1	1006097	RING, RETAINING, INTERNAL, 3 3/4 ID
13	1	8P5ON-S	FITTING, PLUG 1/2 MORB
14	1	1007569	SNAP RING, SENSOR, ROTA, PN: 251477
15	1	1007645	WELDMENT, CYLINDER, LEFT, 4 BORE X 2 ROD X 15.348 STROKE

1006086 ASSEMBLY, YLINDER, LEFT, 4 BORE X 2 ROD X 15.348 STROKE



ITEM	QTY.	P/N	DESCRIPTION
1	1	1006180	END CAP, ROD
2	1	25002500-375	SEAL, ROD, 3 OD, 2.5 ID, .375CS, 4300BD25002500N375
3	1	700073	SEAL, PISTON, 4 OD, 3.63 ID, .281 CS, 4300PSP342A
4	1	1006177	WIPER SEAL, 3.00 OD X 2.50 ID X 0.312 CS, 4700J02500
5	2	700074	GUIDE, PISTON, 4 OD, 3.75 ID, .5 CS 4733WPT125-04000-0500
6	1	1006181	GUIDE, ROD, 2.75 OD, 2.5 ID, 2 CS, NYLON, W2027502000
7	3	700068	SET SCREW, 5/16-18, 7/16

8	1	700069	O-RING, 4.012" OD X 3.734" ID X 0.139" CS (Replaces Part @ 224000)
9	1	1006101	MAGNET, SENSOR, ROTA LJ1234
10	1	1006090	PLATE, COVER, CYLINDER
11	1	1006097	RING, RETAINING, INTERNAL, 3 3/4 ID
12	1	8P5ON-S	FITTING, PLUG 1/2 MORB
13	1	1006061	ROD PISTON, CYLINDER
14	1	1007569	SNAP RING, SENSOR, ROTA, PN: 251477
15	1	1007645	WELDMENT, CYLINDER, LEFT, 4 BORE X 2 ROD X 15.348 STROKE

GUIDANCE OF INSPECTION AND MAINTENANCE OF FLUSH MOUNTED SPIDER

This section is intended to provide recommended guidance for an overhaul event, which consists of specific inspection and maintenance items. For routine inspection and maintenance refer to sections X-Y-Z.

1) PRECAUTIONS

PRACTICE SAFETY PROCEDURES AT ALL TIMES WHEN SERVICING FLUSH MOUNTED SPIDER AND USE PERSONAL PROTECTIVE EQUIPMENT.

TURN OFF HYDRAULIC POWER, DEPRESSURIZE HYDRAULIC SYSTEM, AND DISCONNECT SUPPLY TO THE FMS BEFORE PERFORMING ANY INSPECTION OR MAINTENANCE ACTIVITIES.

2) DEFINITIONS

- Adapter: allowing the FMS to be used inside of a 37 ½" rotary table.
- Corner Block: primary load carrying component of FMS that allow the slips to slide up and down.
- Cylinders: responsible for extending and retracting the equipment.
- Die Carrier: the component of FMS that holds the dies/inserts.
- Bushing Rod Mount: reducing friction between moving parts and absorbing shock and vibrations in the equipment. (e.g.: Bushing Rod Mount etc.)
- FMS Slips: primary load carrying component of FMS that holds the Die Carrier Assembly.
- Grease Fitting: A metal fitting used in FMS to feed lubricants, usually lubricating grease, into a pin or hinge surface under moderate or high pressure using a grease gun.

- High Stress Component: Parts of the tool which see a high ratio of force to area during operation.
- Hydraulic Fitting: The quick disconnects (male and female) that are used in FMS main supply and return line. (e.g.: ¾" SAE Female Quick Disconnect Fitting etc.)
- Linear Indication: A indication in which the length is more than three times the width.
- Load Bearing Component: Parts such as a chain sling, spreader bar assembly, frame, or any other device that bears the partial or total weight of the equipment.
- Hydraulic Hoses: allow fluid/air to flow from one component to another.
- Hydraulic Supply: required to operate the tool.
- Inserts: used to hold/grip the casing to prevent slippage or mishandling.
- Nipple Fitting: used to connect the hydraulic hoses to the supply line.
- Wear Component: Parts that are bound to or design to wear out or fail with repetitive use and will require periodic repair or replacements.

3) FREQUENCY

Organizations should determine and set the frequency of overhaul events based on factors such as prevention of non-productive time and ensuring safe operation of the equipment. There are many factors that will impact the frequency required such as commercial terms, utilization, in-service and post-job maintenance regimes, storage conditions, and many more. These factors are different for every case, we recommend that each organization set the frequency to meet your needs.

McCoy recommends that end users determine the intervals based on the equipment's as-found condition during previous overhaul and maintenance events. It is recommended to start with a minimum overhaul schedule of 1-year, record the as-found condition, and functionality of the equipment. These records will illustrate the need to modify the interval time needed to match the expected performance during the set span between overhauls.

4) PREPARATION

Once the FMS has been received, begin preparation for inspection and maintenance.

The intended purpose of the preparation step is to pre-check for any visual or audial indications that the FMS is not working as intended. It is also recommended to record the 'As-Found' condition of the equipment for use in determining frequency of maintenance intervals.

a. Visually inspect the FMS for any moving or loose parts and signs of premature wear of moving parts that are rubbing (bare metal where there used to be paint is a good indication of wear) before connecting to a supply.

b. Visually inspect all external welds. Any weld that is cracked or separating must be repaired and repainted before returning the FMS to service.
c. Visually inspect all fasteners, second retention devices, and protruding body pieces (example: QDs, hydraulic fittings, inlet & outlet line supports, latch pin, cotter pins, linkage pins, retaining pins, bolts & nuts). If there are any leaks, tighten to the recommended specifications or replace loose or missing fasteners. Use grade 8 bolts only unless otherwise specified. McCoy recommends that damaged or missing body parts be repaired or replaced prior to returning to service.
d. Connect the FMS to a hydraulic power source and ensure the FMS is working as intended.
1. Check condition of all hydraulic hoses and fittings. Visually inspect all hydraulic hoses fitted to the FMS for any signs of leaks, cuts, or wears. Hydraulic hoses should be replaced as per the original hose manufacturer recommendations and completion of a Certificate of Conformity is required.
e. If any of the previous checks failed, turn off the hydraulic power, depressurize the hydraulic system, and disconnect the supply to the FMS and begin prepping for the additional inspection or maintenance steps.
f. Clean the interior spaces of the tool thoroughly, using either a water hose with a spray nozzle (do not use a pressure washer), or an appropriate solvent-based grease-cutting cleaner such as Varsol. Ensure adequate containment is in place to prevent environmental contamination from residual hydraulic fluid, dirty grease, and cleaning agents. Make a note if any metal shavings or metal pieces are flushed out of the top plates, corner block, slip, carrier, and dies - if shavings or metal pieces are seen, the source must be identified during the overhaul process.
g. Begin disassembling the FMS, and separate parts by component type.

5) INSPECTION & MAINTENANCE

Overhaul inspections and maintenance are recommended to be performed, per the following criteria. To ensure optimum performance for McCoy Flush Mounted Spider, the following checks should be performed.

- Visually inspect all parts for any surface defects such as, but not limited to, cracks, scratches, misalignments, corrosion, and other physical defects.
- Repair or replace any damaged or missing external body parts, such as guide plates, corner block, slip, die carrier, dies, load plates etc.

Category I (Daily Inspection)

The following inspection is Category 1 Inspection that should be performed during the job.

a. Check latch mechanism for functionality.

b. Check that the correct sizes of insert carriers, inserts, and top guides are installed.
c. Check that the insert carriers and top guides are installed correctly.
d. Grease the back of the slips. Please note this must be done every twenty cycles.

Category II (Daily Inspection)

The following inspection and maintenance procedures should be performed before and after every job in addition to Category I, at least once a day when the FMS is in steady use.

a. Wash and remove any excess dirt and grease.
b. Extend cylinders fully. Check back of slip for wear. Please note that the back of the slip has two grooves in it that are the maximum allowable wear depth. When these slots are no longer present, it is time to replace the slips.
c. Inspect all QDs and hydraulic fittings.
d. Check dies and carriers for wear. Replace dies if there are broken or have flat teeth. Replace carriers if the rear lugs and/or die slots appear damaged.
e. Check cylinder rods for wear.
f. Check hoses inside of the tool for wear.
g. Check for proper locking of all bolts and nuts, slotted nuts & cotter pins, lock wire, and retaining pins.
h. Check the guide plates ID. Please note that all guide plates have a .500 wear allowance on the internal diameter.
i. Inspect linkage pins for wear.
j. Grease all pins and the latch mechanism.

Category III (Every 6 months)

The following inspection and maintenance procedures should be performed every six months under normal operating conditions in addition to all Category I & II actions.

a. Inspect External weld of both cylinders.
b. Visually inspect carrier mid load plates and bottom of carrier die slot for deformation.
c. Activate cylinders and monitor hydraulic seals and replace any that are damaged.
d. Inspect linkage pins, linkage, and latch housing for wear according to the wear limits that proceed this section.
e. Inspect top guide plates, corner block, slip, carrier, and leveling beams for wear according to the wear limits that proceed this section.
f. Inspect all guide plates that have been used in the past six months for wear according to the wear limits that precede this section.

Category IV (Yearly Inspection)

The following inspection and maintenance procedures should be performed every year under normal operating conditions in addition to all Category I, II, & III actions.

4. NDE load bearing components per the critical area drawings in this manual for the following parts.
    a. Corner blocks.
    b. Slips.
    c. All carriers used in the past year.
    d. All carrier load plates used in the past year.

Component Name	Component Type	Inspection		Acceptance
ADAPTER	WEAR	Visually inspect adapter for wear, damage, or scratch	PASS	No signs of wear, damage, and scratch.
			FAIL	If there are any signs of wear, damage, and scratch, the adapter must be replaced.
CORNER BLOCK	WEAR	Visually inspect corner block for cracks, damage, or wear according to wear limits.	PASS	No cracks or signs of wear, or damage in the corner block.
			FAIL	Any cracks, wear, or excessive damage that is outside of the wear limit listed on Corner block drawings below. Page (8 & 19).
CYLINDER	WEAR	Visually inspect the cylinder rods for wear and corrosion. Check the external weld of both cylinders.	PASS	No signs of wear, damage, or corrosion in the cylinder. No weld damage
			FAIL	Any signs of wear, damage, or corrosion in the cylinder. Excessive damage that is outside of wear limit listed on cylinder rod drawing below. Page (21).
BUSHING ROD MOUNT	WEAR	Visually inspect bushing rod mount. If there are any signs of wear, the bushing must be replaced.	PASS	No signs of wear on bushing rod.
			FAIL	If there are any signs of wear, the bushing rod must be replaced.
DIE CARRIER	WEAR	Visually inspect die carrier for cracks, damage, or wear.	PASS	No cracks, scratch, or damage in the die carrier
			FAIL	Any cracks, scratch, or damage in the die carrier
DIES	WEAR	Visually inspect the dies. If there are any signs of wear, broken or have flat teeth it must be replaced.	PASS	No signs of wear, no broken or no flat teeth
			FAIL	If there are broken or have flat teeth, dies should be replaced.
SEAL	WEAR	Visually inspect all seals. Check for any cracks, glazing, loss of elasticity,	PASS	No visible wear or damage.
			FAIL	Any leaking, damaged, or worn seals will need to be replaced.

		scarring, swelling, wear, deterioration, etc.		
HYDRAULIC FITTINGS	WEAR	Visually inspect hoses around the fittings for leaks. Check for corrosion and crushed or cracked hydraulic fittings.	PASS	No corrosion or damage to hydraulic fittings.
			FAIL	Any damaged or leaking hydraulic fittings will need to be replaced.
HOSE KIT	WEAR	Visually inspect hoses inside of the tool for wear and damage.	PASS	No signs of wear and damage
			FAIL	Any signs of wear and damage, the hose kit must be replaced.
LINKAGES	WEAR	Visually inspect the linkages for wear, damage, or bent.	PASS	No wear or damage to linkages.
			FAIL	If there is a wear or damage to the linkages, it should be replaced.
LATCH SPRING HOUSING	WEAR	Visually inspect the latch spring housing for wear limits.	PASS	No wear or damage to the latch spring housing.
			FAIL	Excessive damage that is outside of the wear limit listed on latch spring housing drawing below. Page (15).
CARRIER LOAD PLATE	WEAR	Visually inspect the carrier load plates for deformation.	PASS	No wear or deformation to the carrier load plate.
			FAIL	Any wear, damage, or deformation to carrier load plate will need to be replaced.
GREASE FITTINGS	WEAR	Visually inspect grease fittings for leaks. Check for corrosion and crushed or cracked grease fittings. Confirm grease port is not clogged.	PASS	No corrosion or damage to grease fittings.
			FAIL	Any damaged, clogged, or leaking grease fittings will need to be replaced.
PINS	WEAR	Visually inspect pins for wear according to wear limits.	PASS	No signs of wear to the pins
			FAIL	If there is wear or excessive damage that is outside of the wear limit listed in pins drawing below page (21) it should be replaced.
SLIPS	WEAR	Visually inspect slips for wear according to wear limits.	PASS	No damage or wear in the slips.
			FAIL	If there is wear or excessive damage that is outside of the wear limit listed on Corner block drawings below. Page (6 & 18).
GUIDE PLATES	WEAR	Visually inspect guide plates for wear according to wear limits.	PASS	No damage or wear in the guide plates
			FAIL	If there is wear or damage to the guide plates, then it should be replaced.

TOP RIGHT LEVELING BEAM	WEAR	Visually inspect top right leveling beam for wear according to wear limits.	PASS	No signs of wear to the top right leveling beam.
			FAIL	If there is wear or excessive damage that is outside of the wear limit listed on Top Right Leveling Beam drawings below. Page (17).
TOP LEFT LEVELING BEAM	WEAR	Visually inspect top left leveling beam for wear according to wear limits.	PASS	No signs of wear to the top left leveling beam.
			FAIL	If there is wear or excessive damage that is outside of the wear limit listed on Top Left Leveling Beam drawings below. Page (16).

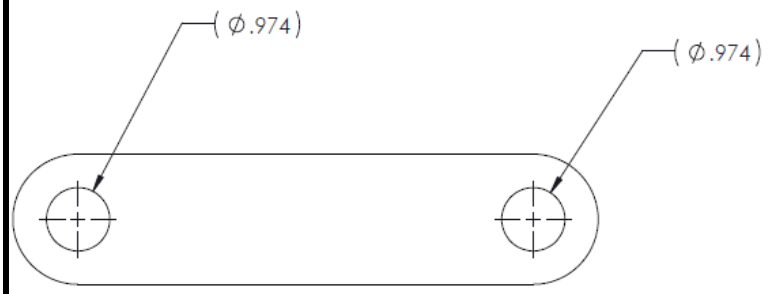
- **MPI requirements for components:**
    - Where instructed in the table above, MPI welds & visually inspect per ASTM E709 after load /test.
    - The following acceptance criteria shall apply:
        - Linear indications (Major dimensions at least 3 times minor dimension)
        - In base metal: no relevant linear indications with a major dimension equal to or greater than 3/16" (4.7mm).
        - In welds: no rounded indications with a major dimension greater than 1/8" (3.2mm).
        - No more than 10 relevant indications in any continuous 6 sq. in. (40 sq. cm) area.
        - No more than 3 relevant indications in a line separated by less than 1/16" (2mm) edge-to-edge.
        - No relevant indications in pressure-sealing areas, in the root areas of threads, or in the stress-relief features of threaded joints.

WEAR LIMITS OF KEY COMPONENTS

LINKAGES (PN 1006189)

	WEAR LIMITS	
FEATURE	MANUFACTURING TOLERANCE	WEAR MAXIMUM
HOLE DIAMETER	.974/.979	1.010

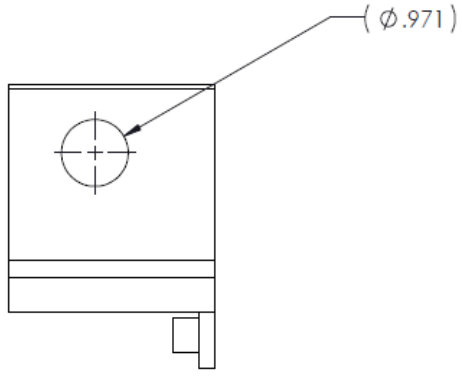
NOTE:
IT IS NOT ACCEPTABLE FOR THE HOLE TO BE OUTSIDE OF DRAWING TOLERANCE WHEN NEW



LATCH SPRING HOUSING (PN 1006005)

	WEAR LIMITS	
FEATURE	MANUFACTURING TOLERANCE	WEAR MAXIMUM
HOLE DIAMETER	.969/.971	1.002

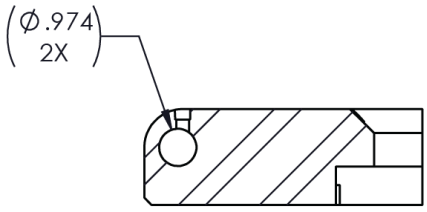
NOTE:
IT IS NOT ACCEPTABLE FOR THE HOLE TO BE OUTSIDE OF DRAWING TOLERANCE WHEN NEW



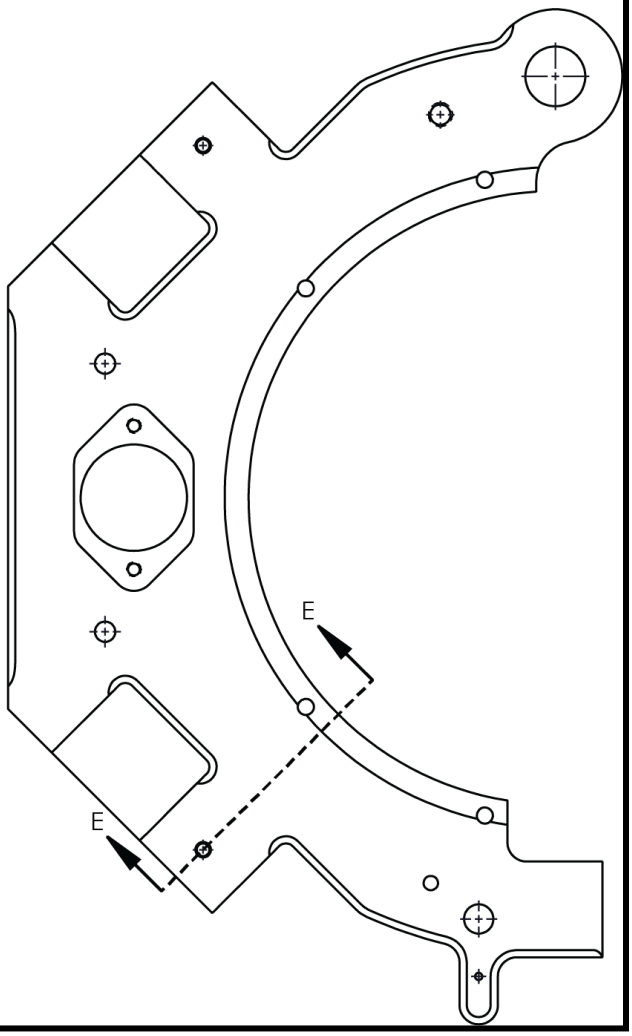
TOP LEFT PLATE (PN 1006191-S1)

WEAR LIMITS		
FEATURE	MANUFACTURING TOLERANCE	WEAR MAXIMUM
HOLE DIAMETER	.974/.979	1.010

NOTE:
IT IS NOT ACCEPTABLE FOR THE HOLE TO BE OUTSIDE OF DRAWING TOLERANCE WHEN NEW



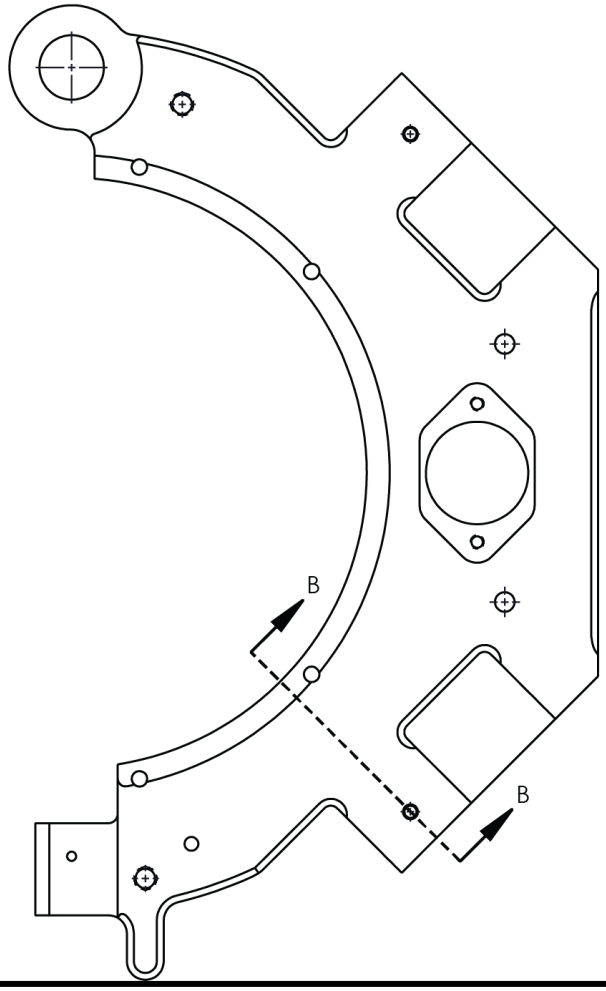
SECTION E-E

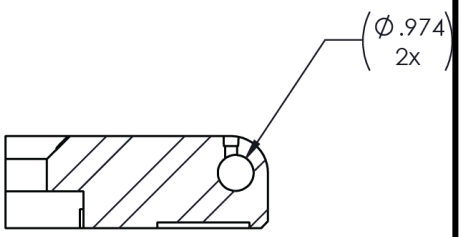


TOP RIGHT PLATE (PN 1006195-S1)

	WEAR LIMITS	
FEATURE	MANUFACTURING TOLERANCE	WEAR MAXIMUM
HOLE DIAMETER	.974/.979	1.010

NOTE:
IT IS NOT ACCEPTABLE FOR THE HOLE TO BE OUTSIDE OF DRAWING TOLERANCE WHEN NEW



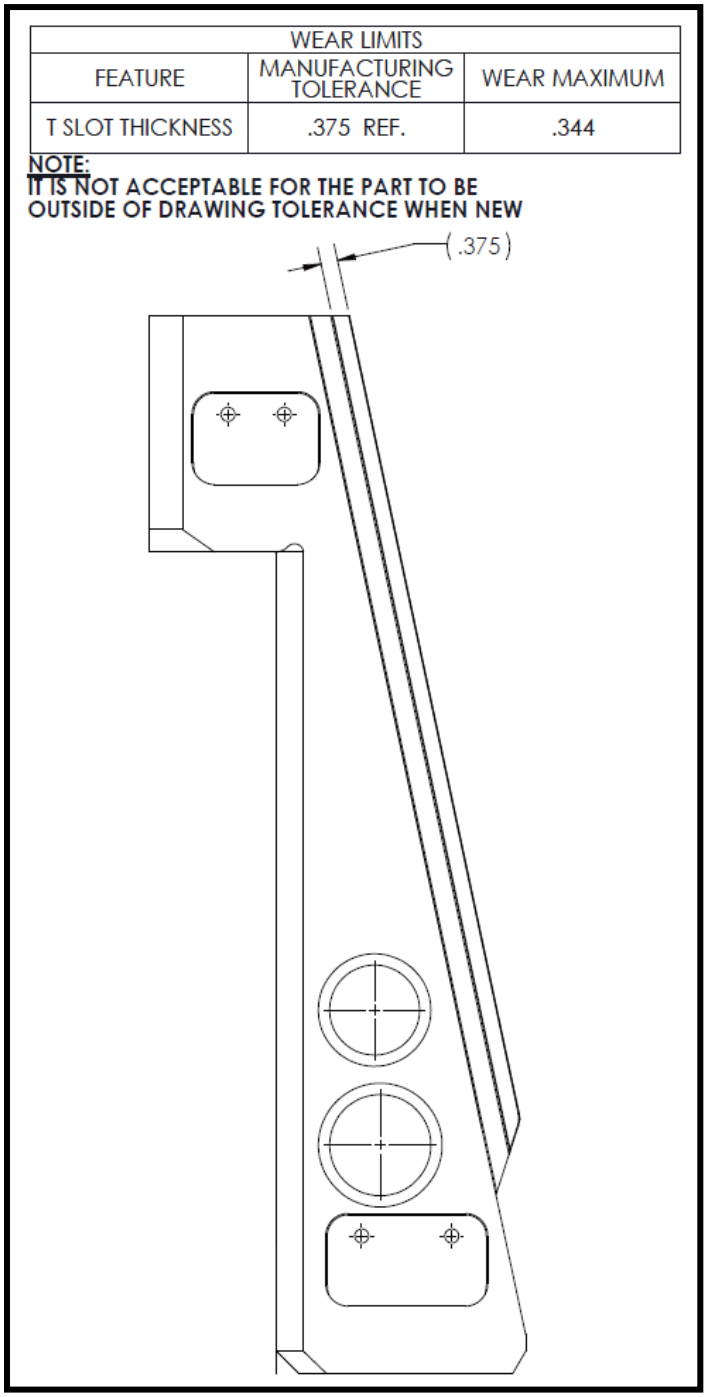


SECTION B-B

CORNER BLOCK (PN 1006069)

WEAR LIMITS		
FEATURE	MANUFACTURING TOLERANCE	WEAR MAXIMUM
T SLOT THICKNESS	.375 REF.	.344

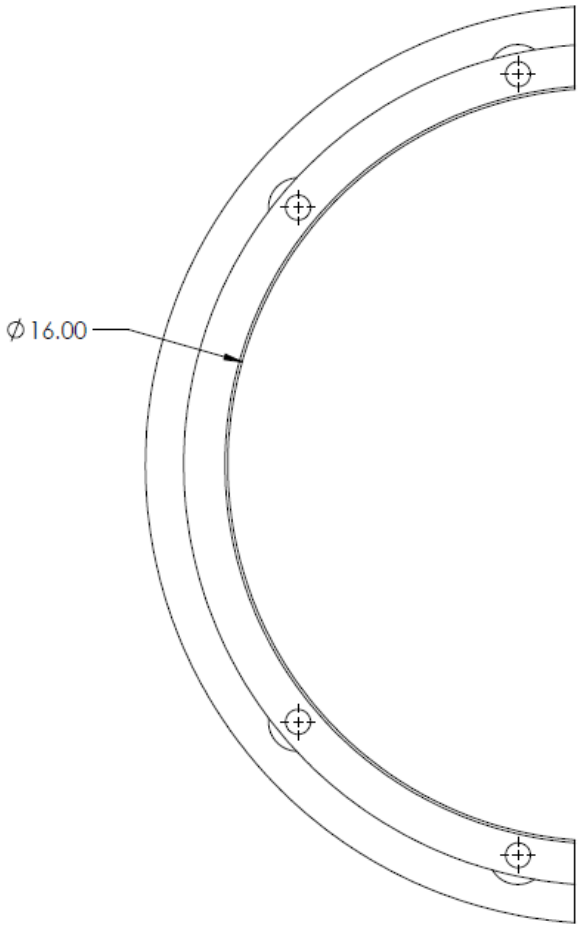
NOTE:
IT IS NOT ACCEPTABLE FOR THE PART TO BE OUTSIDE OF DRAWING TOLERANCE WHEN NEW



13 5/8 GUIDE PLATE (PN 1006227)

	WEAR LIMITS	
FEATURE	MANUFACTURING TOLERANCE	WEAR MAXIMUM
HOLE DIAMETER	16.00 +.010/-0	16.5

NOTE:
IT IS NOT ACCEPTABLE FOR THE HOLE TO BE OUTSIDE OF DRAWING TOLERANCE WHEN NEW

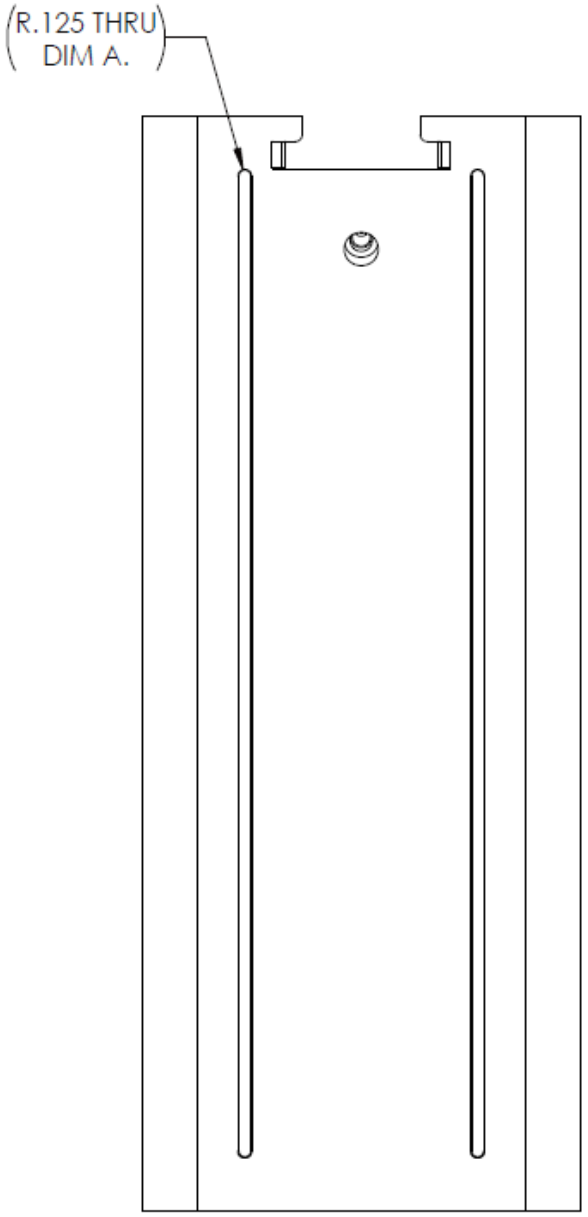


Please note that all guide plates have a .500 wear allowance on the internal diameter.

FMS SLIP (PN 1005994)

	WEAR LIMITS	
FEATURE	MANUFACTURING TOLERANCE	WEAR MAXIMUM
DIMENSION A SLOT DEPTH	.031 ±.005	0

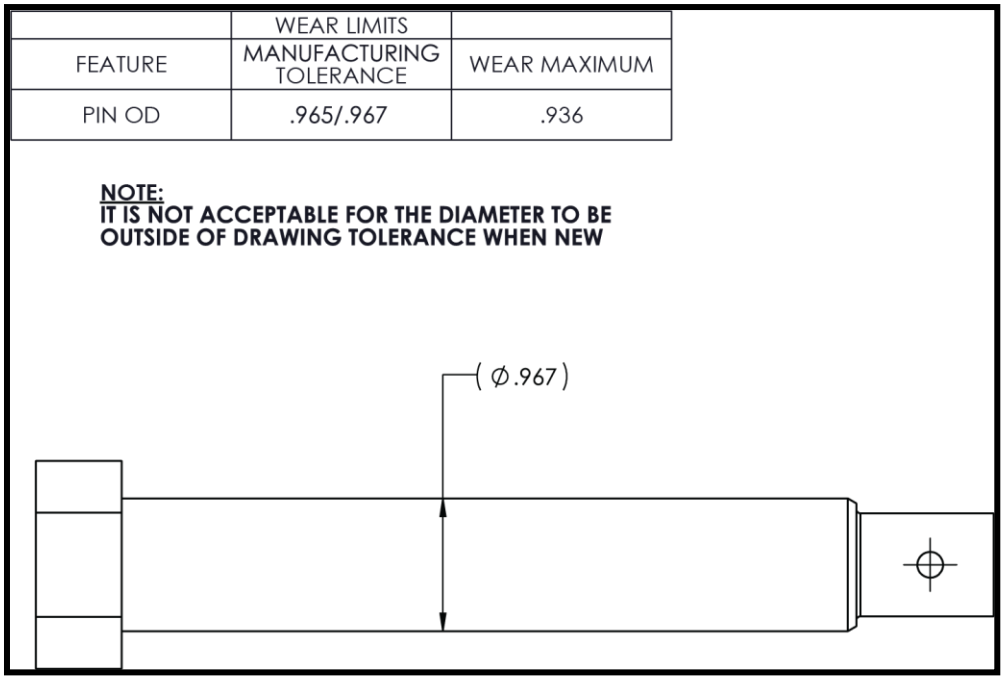
NOTE:
IT IS NOT ACCEPTABLE FOR THE HOLE TO BE OUTSIDE OF DRAWING TOLERANCE WHEN NEW



Pin, Hex, Lift Link (PN 1006010)

	WEAR LIMITS	
FEATURE	MANUFACTURING TOLERANCE	WEAR MAXIMUM
PIN OD	.965/.967	.936

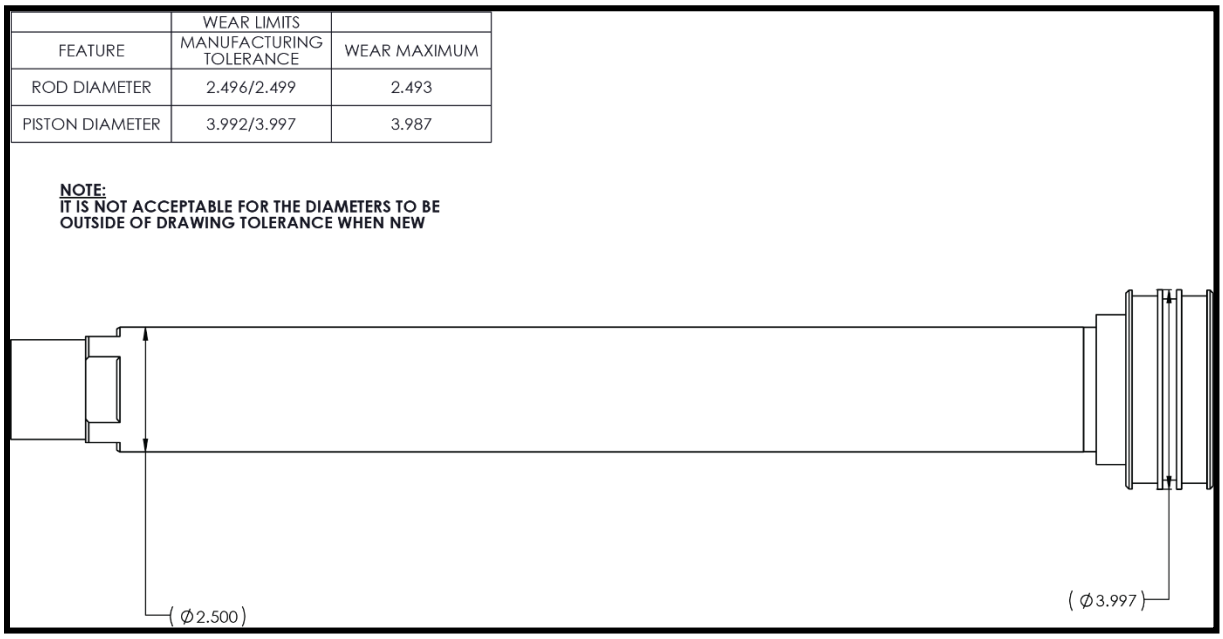
NOTE:
IT IS NOT ACCEPTABLE FOR THE DIAMETER TO BE OUTSIDE OF DRAWING TOLERANCE WHEN NEW



Rod Piston, Cylinder (PN 1006061)

	WEAR LIMITS	
FEATURE	MANUFACTURING TOLERANCE	WEAR MAXIMUM
ROD DIAMETER	2.496/2.499	2.493
PISTON DIAMETER	3.992/3.997	3.987

NOTE:
IT IS NOT ACCEPTABLE FOR THE DIAMETERS TO BE OUTSIDE OF DRAWING TOLERANCE WHEN NEW

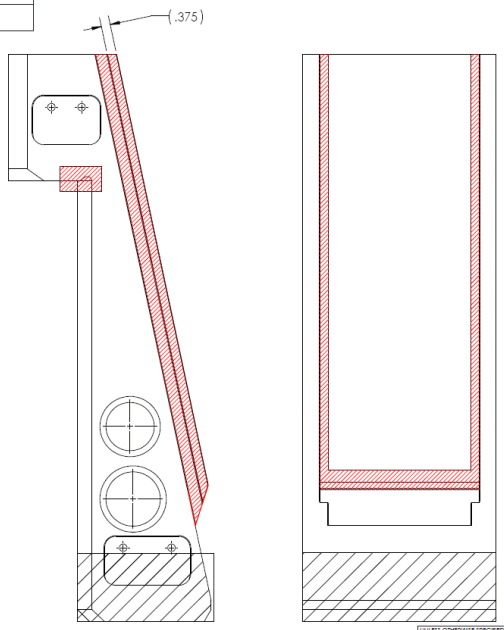


CRITICAL AREA LOAD MAPS

WEAR LIMITS		
FEATURE	MANUFACTURING TOLERANCE	WEAR MAXIMUM
T SLOT THICKNESS	.375 REF.	.344

NOTE:
IT IS NOT ACCEPTABLE FOR THE PART TO BE OUTSIDE OF DRAWING TOLERANCE WHEN NEW

CRITICIAL AREA MAP



LEGEND:

CRITICAL AREAS

EXEMPT FROM MPI

UNLESS OTHERWISE SPECIFIED: | CRITICAL COMPONENT: YES | RATINGS: IF APPLICABLE | 350 TONS | DESCRIPTION: CORNER, BOWL | SIZE: B | PART NO.: 1006069 | REV: A | MATERIAL: SEE SHEET 4 | SHEET 5 OF 5 | DRAWN: M.BUDDEN 08/13/2020 | CHECKED: M.MICKL 09/29/2020 | APPROVED: M.MICKL 09/29/2020 | WEIGHT: 196.86 LBS.

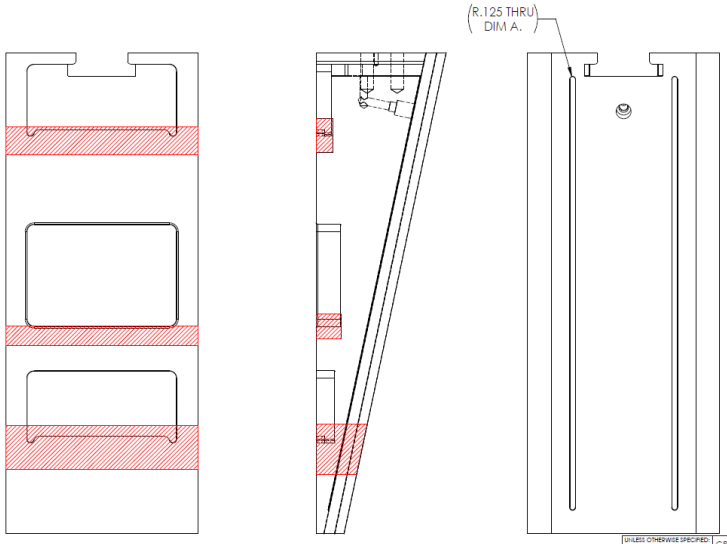
UNDER REVISION

SOLIDWORKS DOCUMENT PRINTED ON: Thursday, December 17, 2020

WEAR LIMITS		
FEATURE	MANUFACTURING TOLERANCE	WEAR MAXIMUM
DIMENSION A SLOT DEPTH	.031±.005	0

NOTE:
IT IS NOT ACCEPTABLE FOR THE HOLE TO BE OUTSIDE OF DRAWING TOLERANCE WHEN NEW

CRITICIAL AREA MAP



LEGEND:

CRITICAL AREAS

EXEMPT FROM MPI

UNLESS OTHERWISE SPECIFIED: | CRITICAL COMPONENT: YES | RATINGS: IF APPLICABLE | 350 Ton | DESCRIPTION: SLIP, FMS | SIZE: B | PART NO.: 1005994 | REV: A | MATERIAL: SEE SHEET 2 | SHEET 4 OF 4 | DRAWN: M.BUDDEN 08/13/2020 | CHECKED: M.MICKL 09/29/2020 | APPROVED: M.MICKL 09/29/2020 | WEIGHT: 100.18 LBS.

UNDER REVISION

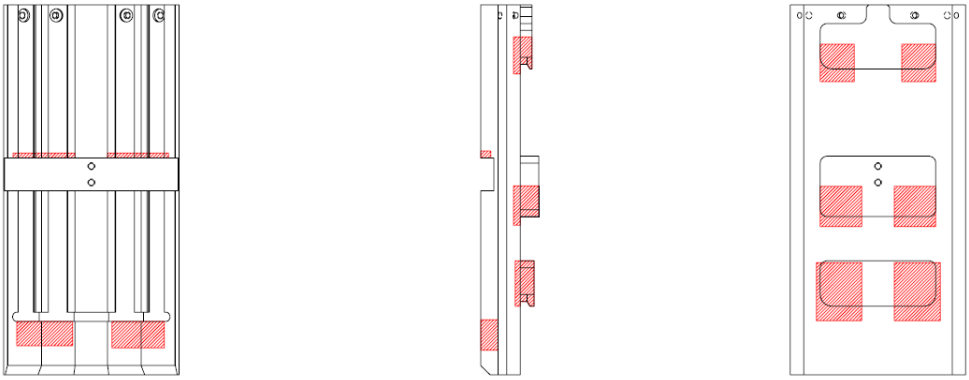
SOLIDWORKS DOCUMENT PRINTED ON: Thursday, December 17, 2020

CRITICIAL AREA MAP

LEGEND:

CRITICAL AREAS

EXEMPT FROM MPI



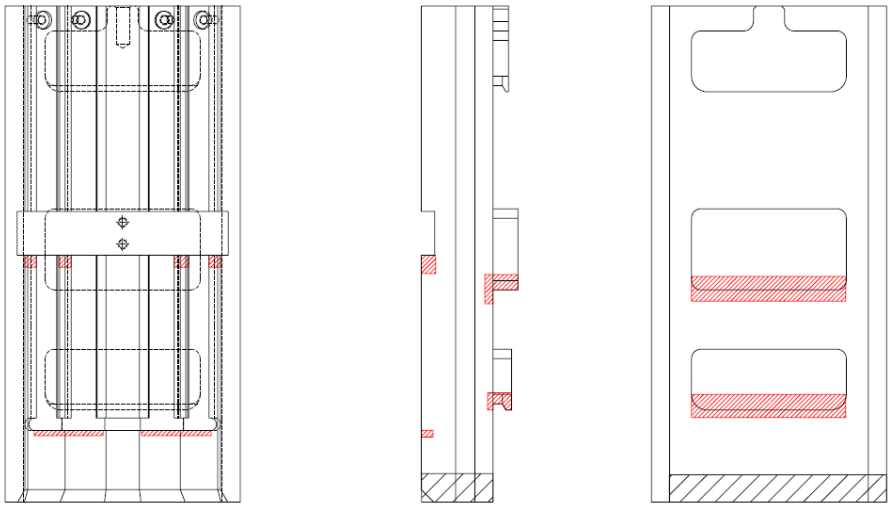
DESCRIPTION		
CARRIER, DIES, 13375-13625		
SIZE B	PART NO. 1005980	REV B
MATERIAL SEE SHEET 3		SHEET 4 OF 4

CRITICIAL AREA MAP

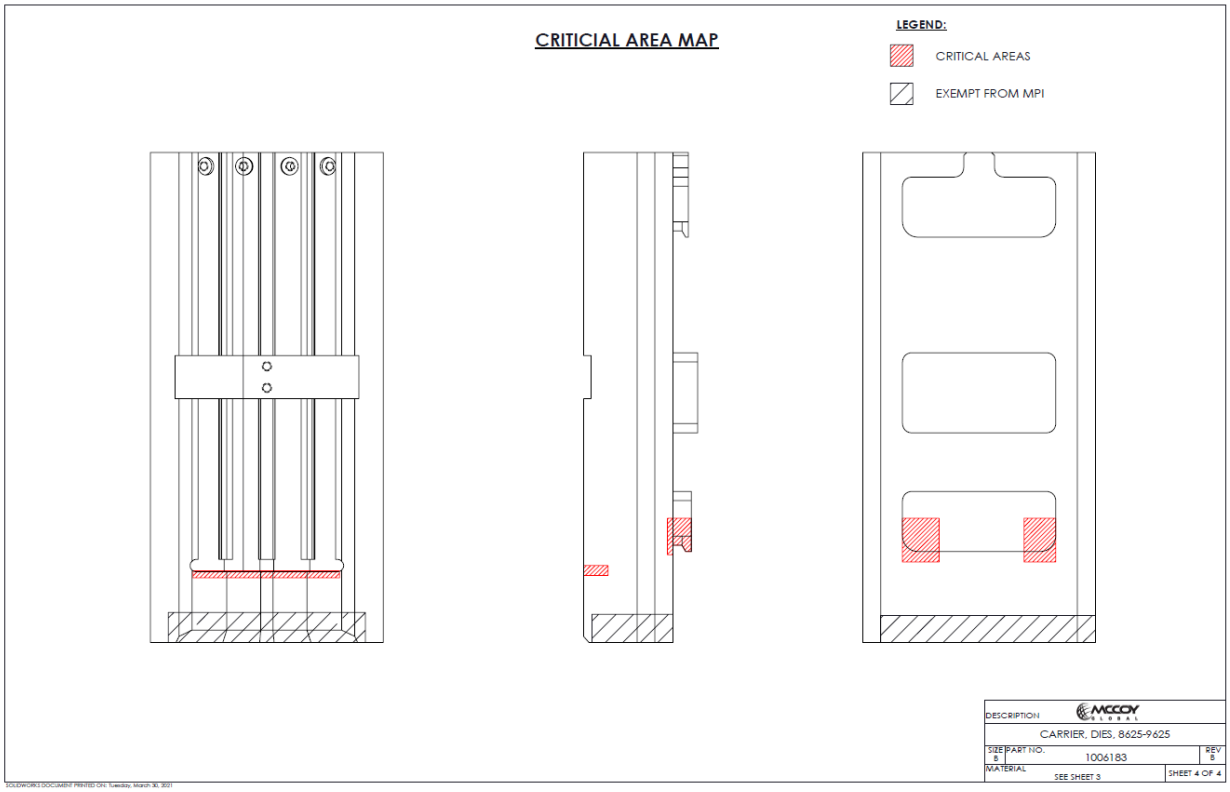
LEGEND:

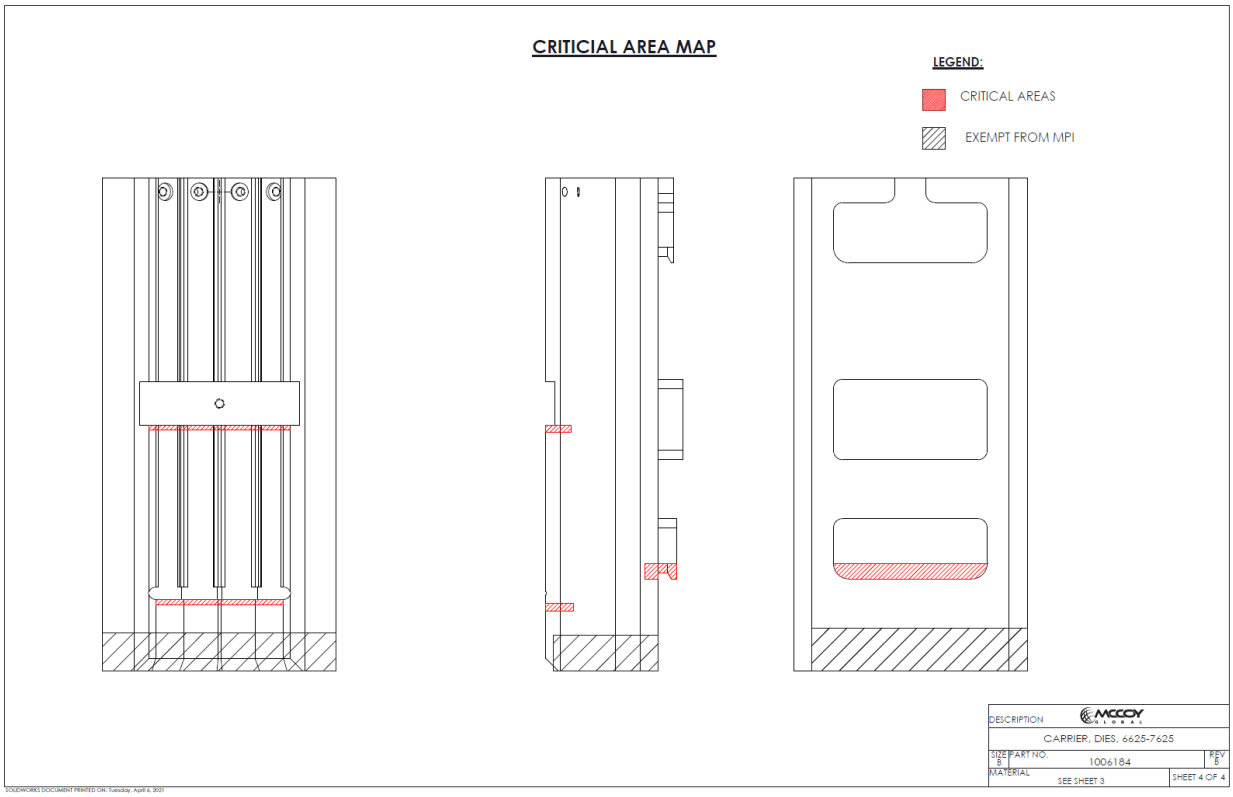
CRITICAL AREAS

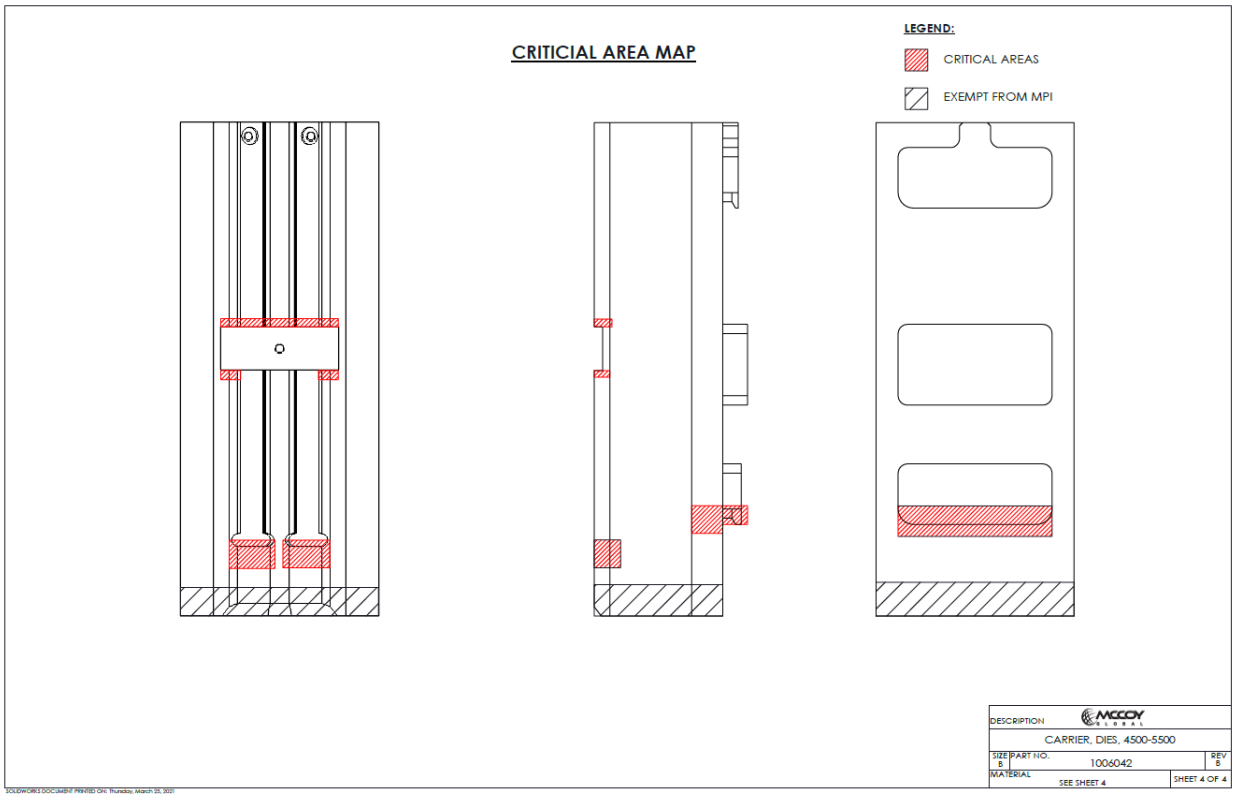
EXEMPT FROM MPI

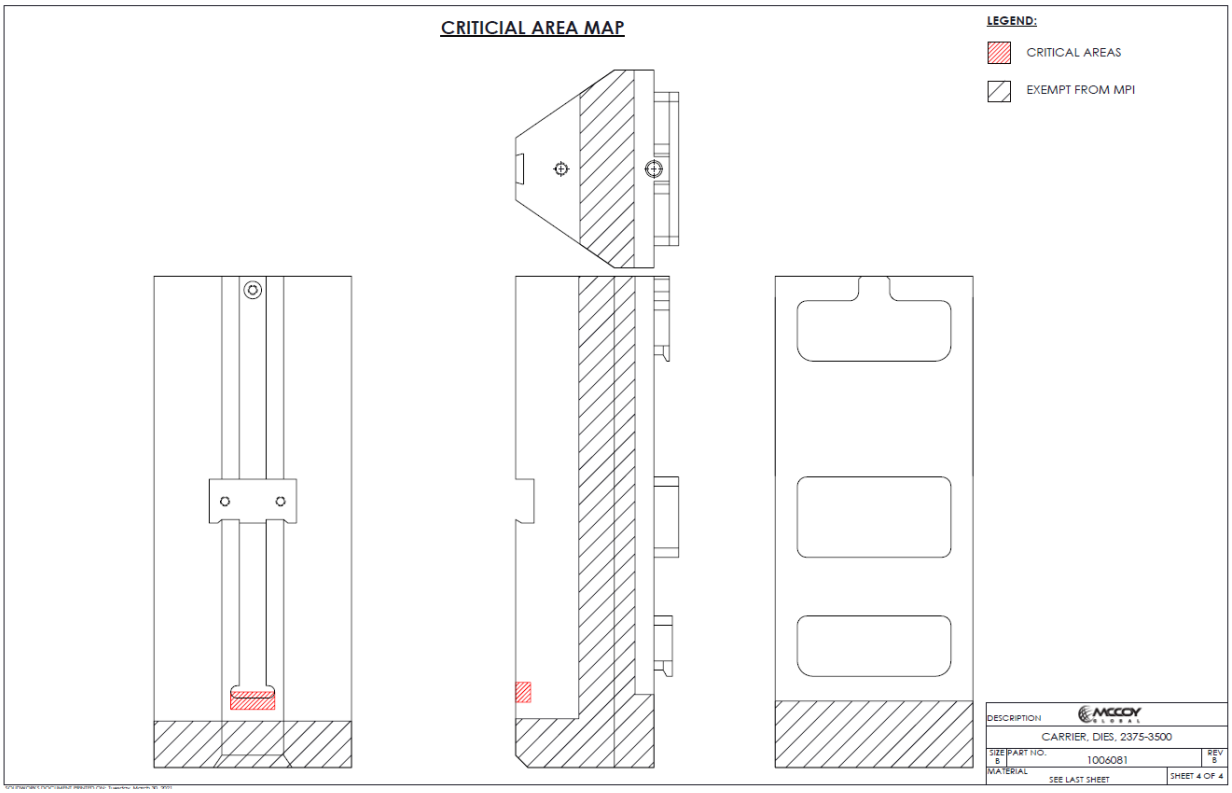


DESCRIPTION		
CARRIER, DIES, 10750-11750		
SIZE B	PART NO. 1006182	REV B
MATERIAL SEE SHEET 3		SHEET 4 OF 4


CRITICIAL AREA MAP
LEGEND:
CRITICAL AREAS
EXEMPT FROM MPI
DESCRIPTION
CARRIER, DIES, 8625-9625
SIZE
B
PART NO.
1006183
REV
B
MATERIAL
SEE SHEET 3
SHEET 4 OF 4


CRITICIAL AREA MAP
LEGEND:
CRITICAL AREAS
EXEMPT FROM MPI
DESCRIPTION
CARRIER, DIES, 6625-7625
SIZE
B
PART NO.
1006184
REV
B
MATERIAL
SEE SHEET 3
SHEET 4 OF 4


CRITICIAL AREA MAP
LEGEND:
CRITICAL AREAS
EXEMPT FROM MPI
DESCRIPTION
CARRIER, DIES, 4500-5500
SIZE B
PART NO. 1006042
REV B
MATERIAL
SEE SHEET 4
SHEET 4 OF 4


CRITICIAL AREA MAP
LEGEND:
CRITICAL AREAS
EXEMPT FROM MPI
DESCRIPTION
CARRIER, DIES, 2375-3500
SIZE B
PART NO. 1006081
REV B
MATERIAL
SEE LAST SHEET
SHEET 4 OF 4

CRITICIAL AREA MAP

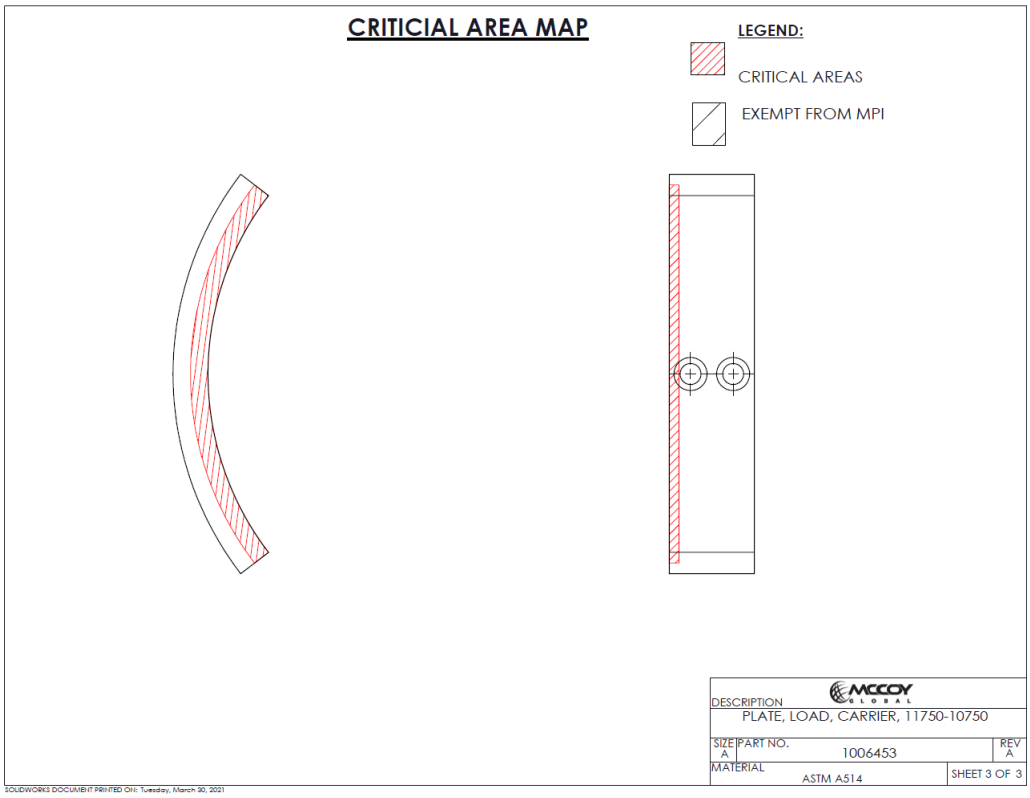
LEGEND:

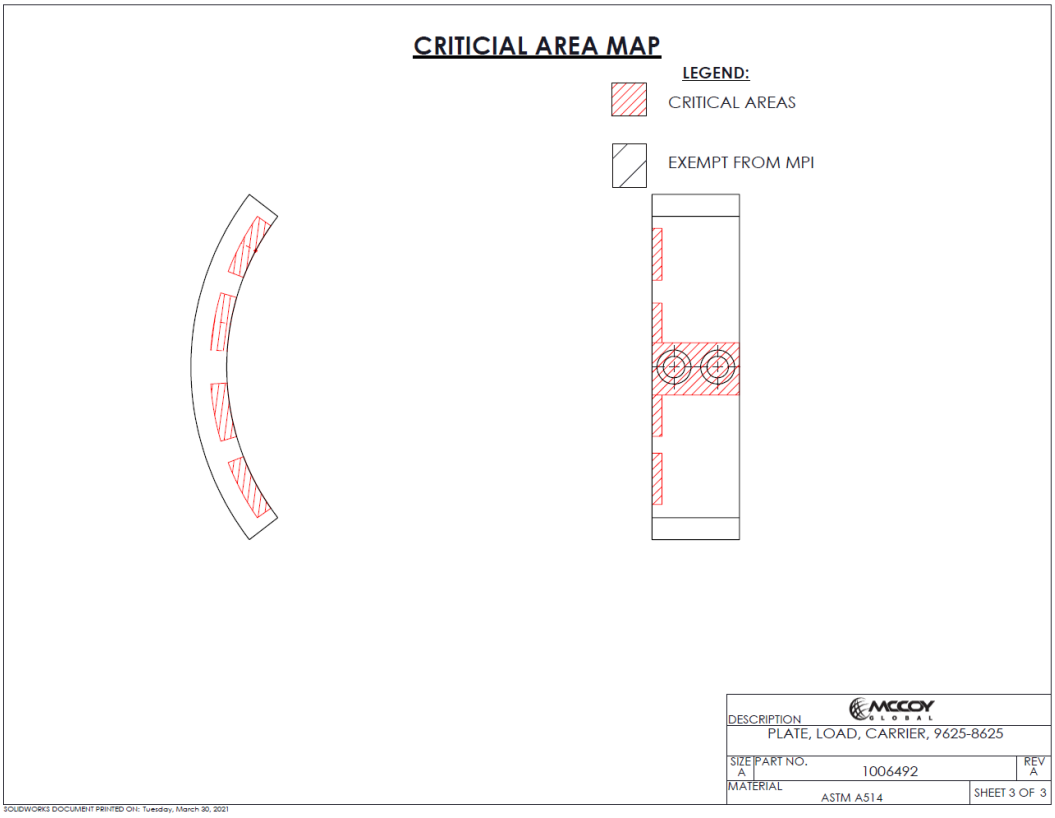
CRITICAL AREAS

EXEMPT FROM MPI

DESCRIPTION	PLATE, LOAD, CARRIER, 13375-13625	
SIZE A	PART NO. 1006178	REV A
MATERIAL	ASTM A514	SHEET 3 OF 3

SOLIDWORKS DOCUMENT PRINTED ON: Tuesday, March 30, 2021


CRITICIAL AREA MAP
LEGEND:
CRITICAL AREAS
EXEMPT FROM MPI
DESCRIPTION
PLATE, LOAD, CARRIER, 11750-10750
SIZE A
PART NO.
1006453
REV A
MATERIAL
ASTM A514
SHEET 3 OF 3
SOLIDWORKS DOCUMENT PRINTED ON: Tuesday, March 30, 2021


CRITICIAL AREA MAP
LEGEND:
CRITICAL AREAS
EXEMPT FROM MPI
DESCRIPTION
PLATE, LOAD, CARRIER, 9625-8625
SIZE A
PART NO. 1006492
REV A
MATERIAL ASTM A514
SHEET 3 OF 3
SOLIDWORKS DOCUMENT PRINTED ON: Tuesday, March 30, 2021

CRITICIAL AREA MAP

LEGEND:

CRITICAL AREAS

EXEMPT FROM MPI

DESCRIPTION	PLATE, LOAD, CARRIER, 9625-8625	
SIZE A	PART NO. 1006185	REV A
MATERIAL	ASTM A514	SHEET 3 OF 3

SOLIDWORKS DOCUMENT PRINTED ON: Tuesday, March 30, 2021

CRITICIAL AREA MAP

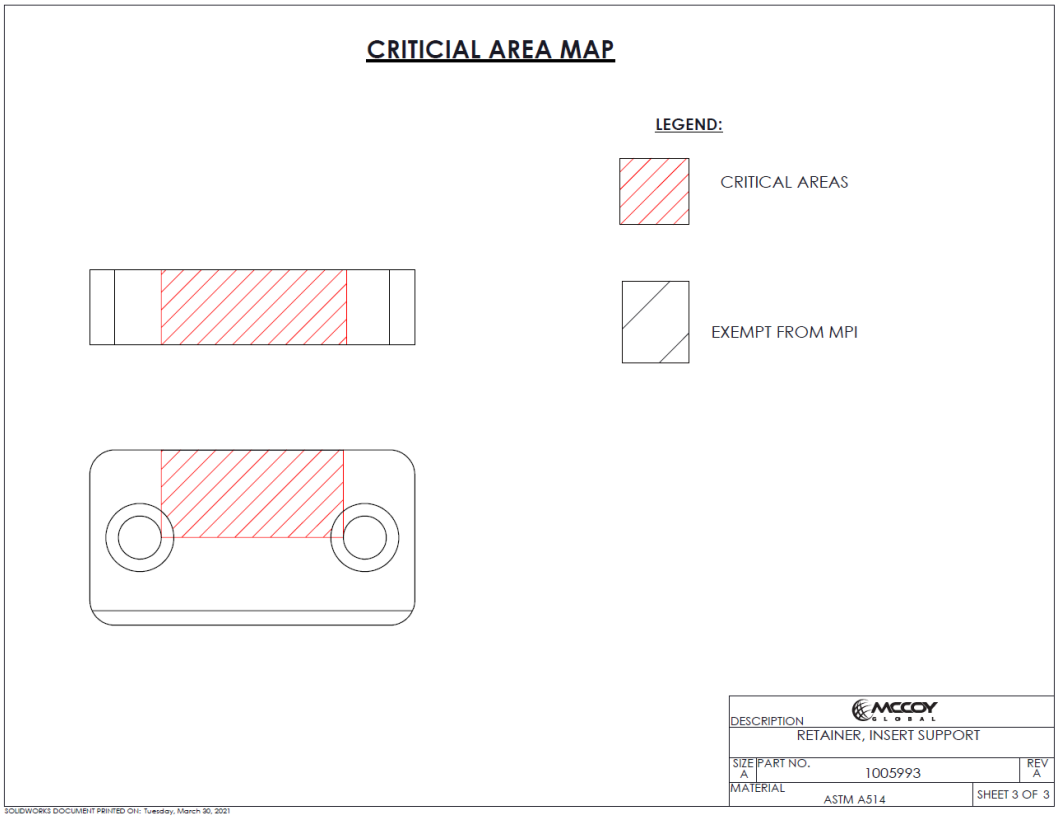
LEGEND:

CRITICAL AREAS

EXEMPT FROM MPI

DESCRIPTION: PLATE, LOAD, CARRIER, 5500 - 4500		
SIZE A	PART NO. 1006258	REV A
MATERIAL: AISI 4145H MOD, MIN YIELD 120 KSI		SHEET 3 OF 3

SOLIDWORKS DOCUMENT PRINTED ON: Thursday, March 25, 2021



ASSEMBLY

Once the overhaul inspection and maintenance has been performed proceed to assembling the FMS.

a) Replace any components that failed inspection with the new recommended parts.
b) Reinstall all parts which were removed for inspection. Lubricate Equipment according to maintenance schedule located in the FMS manual.
c) When re-assembling load bearing devices, all the associated fasteners must be tightened to the correct torque specified for that size of fastener.
d) Any threaded fastener in a load bearing device must be secured with red or blue Loctite.
e) Any replacement fastener (bolts, nuts, cap screws, machined screws, etc.) used during maintenance or overhaul must be grade 8 or equivalent unless otherwise specified.
f) Visually inspect all paint – locations in which the paint has been damaged must be repaired prior to the equipment being returned to service. Paint the FMS remembering to mask off surfaces not intended to paint with grease or masking tape.

Paint Repair Specification

- Touch Up

  Any chip/crevice smaller than 1/8” in diameter which has not broken through to expose bare metal may be sanded to feather edges and filled without rework of the area by filling the crevice with primer and topcoat only.

- Rework

  Damaged/chipped areas shall be removed and the edge around the area shall be cut back to solid material. The rework areas should be sanded and edges of the tightly adhered coating reaming around the area must be feathered so that the recoated surface has a smooth appearance from the repaired area to the intact coating. Rework will be done to a depth required to reach a well adhered underlying coating and reworked area should have all affected coats restored (primer, base coat, and topcoat).

g) Complete dated inspection report giving details of all duties performed along with complete list of items replaced. A completed Certificate of Conformity is required.

SAFETY AND FINAL CHECKLIST

Preservation & Storage Recommendations

The purpose of preservation is to preserve the conformity of equipment during internal processing through delivery to the intended destination. The preservation of equipment includes all steps taken to ensure the proper identification, handling, packaging, storage, and protection of equipment.

1. Identification: The ability to identify a part or assembly during various phases of manufacture, inspection, maintenance, or storage.

2. Handling: The product is handled safely to prevent user injury and damage to equipment.

3. Packaging: The parts shipped for transport must be properly crated or palletized to avoid damage in shipping.

4. Storage: Proper storage of out-of-service equipment is important to ensure full integrity of the tool once it is returned to service. It is important to document the date the FMS is placed into storage, whether it is intended to be short or long term. The same efforts should be undertaken during short and long-term storage to preserve and protect the equipment. The amount of time equipment should be stored will be dependent on the customer's needs. To maintain the integrity of installed seals, McCoy recommends that the maximum storage interval does not exceed 1-year. Operating the FMS is not required during storage, but if the FMS is being recommissioned and has been in storage for more than 3-months, McCoy recommends completing the checks and tests as outlined for proper functionality, beginning on page 17.

   McCoy recommends observing the following storage practices:

   a. Wipe off all excess grease. Use a solvent-based cleaner on rags to wipe all external surfaces to remove residual grease. Once the outside surfaces have been de-grease, wipe all external surfaces with clean water to remove residual solvent.
   b. Use of an anti-corrosive agent such as Tectyl® 506 be applied to all external surfaces. Refer to manufacturer data sheets for proper application and safety information. Allow the anti-corrosive coating ample time to dry – refer to manufacturer data sheets for drying times at room temperature.

c. Storage area should be clean and dry, and if possible, stored in a sealed, climate-controlled environment. If isolated storage is not available, McCoy recommends storing wrapped equipment in a secure, out-of-the-way location, using silica gel desiccant to reduce the humidity within the wrapping. As a guideline, use 125 g. of desiccant for each cubic meter of space, or 3.5 g. per cubic foot.

d. Recommended lubrication for storage can be found in the user manual.

e. When returning to service, note that a full inspection of the device must be performed.

5. Protection: All equipment must be protected from potential deterioration or damage. If FMS sits idle, or is expected to sit idle, for an extended period, McCoy recommends that you take steps to preserve it during storage. The decision on what constitutes an extended period varies based on many factors, all of which should be taken into consideration. Some such factors are, but not limited to, include:

- Extreme Heat or Cold
- Fire or Water Damage
- High Humidity
- Excessive Corrosion
- Vehicle Circulation
- Animal Activity
- Exposure to UV light
- Air Quality/Contamination (such as sand or dust in the air)

BOLT TORQUE SPECIFICATION

⚠ WARNING

REPLACEMENT FASTENER (BOLTS, NUTS, CAP SCREWS, MACHINE SCREWS, ETC.) USED DURING MAINTENANCE OR OVERHAUL MUST BE GRADE 8 OR EQUIVALENT UNLESS OTHERWISE SPECIFIED.

TIGHTENING TORQUE GUIDE (DRY)			
SAE GRADE 8 - FINE THREAD			
SIZE	CLAMP LOAD	PLAIN (ft. lbs.)	PLATED (ft. lbs.)
1/4 - 28 (.250)	3,263	14	10
5/16 - 24 (.3125)	5,113	27	20
3/8 - 24 (.375)	7,875	49	37
7/16 - 20 (.4375)	10,650	78	58
1/2 -20 (.500)	14,400	120	90
9/16 - 18 (.5625)	18,300	172	129
5/8 - 18 (.625)	23,025	240	180
3/4 - 16 (.750)	33,600	420	315
7/8 - 14 (.875)	45,825	668	501
1 - 12 (1.000)	59,700	995	746
1 - 14 (1.000)	61,125	1019	764
1-1/8 - 12 (1.125)	77,025	1444	1083
1-1/4 - 12 (1.125)	96,600	2012	1509
1-3/8 - 12 (1.375)	118,350	2712	2034
1-1/2 - 12 (1.500)	142,275	3557	2668
SAE GRADE 8 - COARSE THREAD			
SIZE	CLAMP LOAD	PLAIN (ft. lbs.)	PLATED (ft. lbs.)
1/4 - 20 (.250)	2,850	12	9
5/16 - 18 (.3125)	4,725	25	18
3/8 - 16 (.375)	6,975	44	33
7/16 - 14 (.4375)	9,600	70	52
1/2 - 13 (.500)	12,750	106	80
9/16 - 12 (.5625)	16,350	153	115
5/8 - 11 (625)	20,325	212	159
3/4 - 10 (.750)	30,075	376	282
7/8 - 9 (.875)	41,550	606	454
1 - 8 (1.000)	54,525	909	682
1-1/8 - 7 (1.125)	68,700	1288	966
1-1/4 - 7 (1.125)	87,225	1817	1363
1-3/8 - 6 (1.375)	103,950	2382	1787
1-1/2 - 6 (1.500)	126,450	3161	2371

DETERMINING PIPE CRUSHING LOADS

The maximum pipe weight which can be lifted safely with the FMS, equals the critical hook load of the pipe MINUS the applied power down force. The effective slip-pipe contact reduction factor for different configurations can be found in the chart following the calculations. The chart represents a theoretical calculation. Friction, wear, and pipe type may alter performance.

Pipe Crush for various grades** (tons)					
Casing Size	**Casing Weight (lb./ft)**	**55**	**80**	**110**	**125**
2.375"	4.7	16	30	46	55
2 7/8"	7.8	36	60	88	100*
	10.5	55	86	100*	100*
	11.5	62	97	100*	100*
3 1/2"	9.2	42	67	98	100*
	15.5	84	100*	100*	100*
	17	93	100*	100*	100*
4"	9.5	42	67	98	114
	13.2	65	102	146	168
	18.9	101	154	218	240*
4 1/2"	11.6	53	84	122	140
	13.5	63	99	142	164
	15.1	75	116	166	190
5"	15	72	111	158	182
	18	89	137	194	223
	21.4	109	166	233	240*
	23.2	120	181	240*	240*
5 1/2"	15.5	71	111	158	182
	17	80	123	175	201
	20	97	148	209	239
	23	112	170	240	240*
	26	129	195	240*	240*
	26.8	136	204	240*	240*
6"	20	92	141	200	229
	23	110	166	234	240***/269
	26	126	190	240***/267	240***/306
6 5/8"	24	109	165	233	267
	28	130	196	276	316
	32	149	224	313	350*

7"	23	101	154	217	249
	26	117	177	249	285
	29	132	200	280	320
	32	148	222	311	350*
	35	163	243	340	350*
7 5/8"	26.4	111	169	238	272
	29.7	128	194	272	311
	33.7	148	223	312	350*
	42.8	195	290	350*	350*
8 5/8"	24	95	145	205	235
	36	149	223	313	350*
	40	168	251	350*	350*
9 5/8"	36	138	208	292	334
	47	188	281	350*	350*
	53.5	218	324	350*	350*
	59.4	243	350*	350*	350*
	58.4	238	350*	350*	350*
9 7/8"	62.8	253	350*	350*	350*
10 3/4"	60.7	231	343	350*	350*
	55.5	209	312	350*	350*
	65.7	252	350*	350*	
	108.7	350*	350*	350*	350*
11 3/4"	47	164	245	343	350*
	71	258	350*	350*	350*
13 3/8"	54.5	176	263	350*	350*
	72	241	350*	350*	350*
	85	286	350*	350*	350*
13 5/8"	88.2	296	350*	350*	350*

The values above account for 2000 psi set pressure applied to the cylinders. The following is the increase in the rating for various set pressures. Please note that the rating of the tool/carriers is not to be exceeded.

Pressure (psi)	String Weight (tons)
1500	**4**
1000	**8**
500	**11**

***The theoretical load is greater than the tool's capacity.**
****No factor of safety is taken into account for pipe crush value.**
*****For 6" OD, max values shown are for utilizing carrier part number 1007270. Please note that when carrier part number 1008198 is in use, the maximum load is 240 tons and not to be exceeded.**

SPARE PARTS LIST (Stocking Quantity for 1 Year)

SPK-350-275-C SPARE PARTS KIT			
ITEM	QTY.	P/N	DESCRIPTION
1	6	1001	FITTING, GREASE, STRAIGHT, 1/8 NPT
2	2	1002	FITTING, GREASE, 1/8 MNPT, 90 DEGREE
3	1	1006005	SPRING HOUSING, LATCH
4	2	1006010	PIN, HEX, LIFT LINK
5	2	1006177	WIPER SEAL, 3.00 OD x 2.50 ID x 0.312 CS, 4700J02500
6	2	1006181	GUIDE, ROD, 2.75 OD, 2.5 ID, 2 CS, NYLON, W2027502000
7	1	1006189	BAR, LINKAGE
8	4	1007601	FITTING, QUICK DISCONNECT ISO 16028 MALE, 5/8 X 3/4 FORB, STUCCHI 801304011
9	4	1007602	FITTING, QUICK DISCONNECT ISO 16028 FEMALE, 5/8 X 3/4 FORB, STUCCHI 801304012
10	2	25002500-375	SEAL, ROD, 3 OD, 2.5 ID, .375CS, 4300BD25002500N375
11	2	700073	SEAL, PISTON, 4 OD, 3.63 ID, .281 CS, 4300PSP342A
12	2	700074	GUIDE, PISTON, 4 OD, 3.75 ID, .5 CS, 4733WPT125-04000-0500
13	2	700069	O-RING, 4.012" OD x 3.734" ID x 0.139" CS (Replaces Part #224000)
14	4	700056	FITTING, TRIPLE-LOK, FLARE JIC, 12 WF5OX-S
15	1	1006424	SOCKET, 12 POINT, 2 1/2" SIZE, 1" SQUARE DRIVE

ACCESSORY AVAILABILITY & INSTALLATION

CARRIER & GUIDE PLATE AVAILABILITY & INSTALLATION

The following table lists the standard stocked sizes for carrier assemblies available with this FMS model. Each assembly comprises four carriers tailored to suit the appropriate gripping range. However, the dies required for different pipe sizes are not included in the assemblies and must be purchased separately. Refer to the below chart that lists dies for various casing sizes. Note that the pass- through diameter allowed must be less than the guide plate ID.

NOTICE

MCCOY GLOBAL'S CARRIER ASSEMBLIES AND RECOMMENDED DIES ARE DESIGNED TO GRIP DESIGNATED SIZES WITHIN THE API MAXIMUM AND MINIMUM TOLERANCES ONLY.

FMS ACCESSORIES, KIT PART NUMBER

FMS Accessories Kit Part Number	1006423
Standard EMS Hose Kit	KITHOSE-FMS-15

*Torque values are determined by slip upon the pipe and not the limitations of the tool.

**For 5 1/2" casing size (2) guide plate opening options are available for this tool.

Casing Size	Insert Part Numbers												
	Handling Dies		Tong Dies										
	Part Number	QTY	Part Number	QTY	Torque Rating (ft-lbs.) *	Tension Rating (tons)	Carrier Assembly Number	Weight of Total Tool- Guide plates, carriers, dies (lbs.)	Guide Plate ID**	Guide Plate Set Part Number	Degrees of Pipe Contact	% of Pipe Coverage	Stroke Remaining Range (in)
13 5/8	JJ-1400-1400-G	48	13-0468-314-0	16	50,000	350	1006415	3050	16.00	1007375	129.3	35.9%	3.081 - 1.021
13 3/8	JJ-1400-1312-G	48	13-0591-314-0	16	50,000	350		3050	15.88	1007374	131.7	36.6%	
11 3/4	JJ-1112-1112-G	48	13-0468-314-0	16	50,000	350	1006416	3200	14.50	1007373	150.0	41.7%	3.113 - 1.1
10 3/4	JJ-1112-1012-G	48	13-0968-314-0	16	50,000	350		3250	13.50	1007372	164.0	45.5%	
9 5/8	JJ-0910-0910-G	48	13-0468-314-0	16	50,000	350	1006417	3350	12.38	1007371	183.2	50.9%	2.998 - 2.732
8 5/8	JJ-0910-0810-G	48	13-0968-314-0	16	50,000	350		3400	11.38	1007370	204.5	56.8%	
8 5/8	JJ-0810-0810-G	48	13-0468-314-0	16	50,000	350	1007755	3500	11.38	1007370	204.5	56.8%	2.998 - 2.732
7 5/8	JJ-0810-0710-G	48	13-0968-314-0	16	50,000	350		3550	10.25	7007369	231.5	64.3%	
7 5/8	JJ-0710-0710-G	36	13-0468-314-0	12	50,000	350	1006418	3550	10.25	1007369	173.6	48.2%	2.911 - 1.126
7	JJ-0710-0700-G	36	13-0780-314-0	12	38,182	350		3550	9.63	1007368	189.2	52.6%	
6 5/8	JJ-0710-0610-G	36	13-0968-314-0	12	36,136	350		3550	9.50	1007367	200.0	55.5%	
7	JJ-0700-0700-G	36	13-0468-314-0	12	38,182	350	1007272	3650	9.63	1007368	189.2	52.6%	3.105 - 1.375
6	JJ-0700-0600-G	36	13-0968-314-0	12	32,727	350		3650	8.50	1007365	221.0	61.4%	
5 1/2	JJ-0508-0508-G	24	13-0468-314-0	8	30,000	240	1006419	3650	8.50	1007364	160.8	44.7%	2.966 - 1.199
								3700	8.60	1007462	177.1		
5	JJ-0508-0500-G	24	13-0719-314-0	8	27,273	240		3700	7.75	1007363	197.1	49.2%	
4 1/2	JJ-0508-0408-G	24	13-0968-314-0	8	22,314	240		3700	7.25	1007362	127.4	54.7%	
3 1/2	JJ-0308-0308-G	12	13-0468-314-0	4	14,200	100	1006420	3700	6.13	1007361	127.4	35.4%	2.366 - .453
2 7/8	JJ-0308-0300-G	12	13-0719-314-0	4	7,423	100		3700	5.63	1007360	156.1	43.3%	
2 3/8	JJ-0308-0208-G	12	13-0968-214-0	4	3,205	100		3700	5.25	1007359	190.7	53.0%	

GUIDANCE FOR MIXED STRING APPLICATIONS*

Casing Size	Insert Part Numbers				Insert Carrier Info					Guide Plate Info				Pipe Contact		Stroke Remaining Range (in)
	Handling Dies		Tong Dies													
	Part Number	QTY.	Part Number	QTY.	Carrier Number	Torque Rating (ft-lbs.) *	Tension Rating (tons)	Carrier Assembly Number	Mid load plate number	Guide Plate ID**	Guide Plate Weight (lbs.)	Guide Plate Set Part number**	Guide Plate part number	Degrees of Pipe Contact	% of Pipe Coverage	
6	JJ-0600-0512-G	24	13-0591-314-0	8	1008196	30,000	240	1008198	1008199	9.13	74.80	1007365	1007273	147.3	40.9%	3.59-1.097
5 1/2										8.50	79.70	1007364	1006217	160.8	44.7%	
5 1/2	JJ-0508-0504-G	24	13-0591-314-0	8	1006042	30,000	240	1006419	1006258	8.50	79.70	1007364	1006217	160.8	44.7%	3.554-.531
										8.60	87.20	1007462	1007424			
5										7.75	85.10	1007362	1006215	177.1	49.2%	
5	JJ-0508-0412-G	24	13-0844-314-0	8		22314	240			7.75	85.10	1007363	1006216	177.1	49.2%	
4 1/2		24								7.25	88.40	1007362	1006215	197.1	54.7%	

* ½” ranges can be used within the existing parameters of the carriers by going a ¼” above and below the designed nominal pipe size. For example, dies used for 6 - 5-1/2 range have a contour for 5-3/4" pipe.

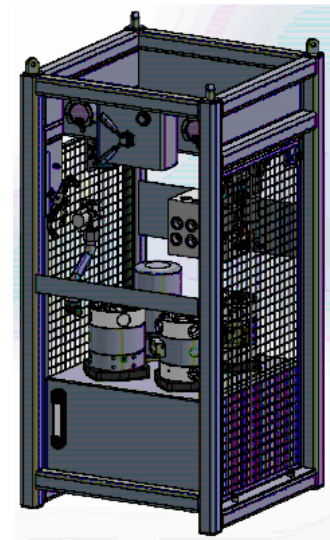
** Correctly sized guide plates are required for the casing being ran in mixed string applications per the OD of the pipe.

FMS AIR OVER HYDRAULIC CONSOLE 1007792

General arrangement drawing for the Air Over Hydraulic Console that can be used to control the FMS.

AIR OVER HYDRAULIC CONSOLE SPECIFICATIONS:

- MAXIMUM AIR PRESSURE - 100 PSI / 7 BAR
- NO HYDRAULIC INPUT INQUIRED
- OPERATES FMS ONLY
- 2 MODES OF OPERATION
  - START OF STRING OPERATION - SLOWER IN ORDER TO PREVENT UNINTENDED OPENING WITH LESS WEIGHT
  - ONCE STRING WEIGHT IS IN PLACE - FASTER CYCLE TIME
-
- 3 AIR DRIVEN RECIPROCATING HYDRAULIC PUMPS
  - TWO PUMPS HAVE AIR/OIL PRESSURE RATIO OF 5:1
  - ONE PUMP HAS AIR/OIL PRESSURE RATIO OF 30:1
  - CHANGE OVER BETWEEN THE PUMPS DEPEND ON RESISTANCE OF SLIPS; NO OPERATOR INPUT REQUIRED
- 8 GALLON/30 LITER RESERVOIR
- RETURN LINE AND SUCTION FILTERS TO ENSURE CLEANLINESS OF HYDRAULIC OIL
- SAFETY FEATURES INCLUDE
  - SLIP CONTROL REQUIRING LEVER OPERATION AND AN INTERLOCK PUSH BUTTON
  - PNUMATIC INTERLOCK
- FRAME FULLY NDT TESTED
- MAXIMUM FLOW - 5.8 GPM / 22 L/MIN
- MAX HYDRAULIC PRESSURE - 3000 PSI / 210 BAR
- MAX AIR PRESSURE - 100 PSI / 7BAR
- DIMENSIONS
  - LENGTH - 23 5/8 INCHES/600 MM
  - WIDTH - 23 5/8 INCHES/600 MM
  - HEIGHT - 47 1/4 INCHES/1200 MM
- WEIGHTS
  - EXCLUDING OIL - 600 LBS / 275 KG
  - WITH OIL - 660 LBS /300 KG
- TOTAL CYCLE TIME FOR FMS - 12 SECONDS



RELEASED FOR PRODUCTION

REVISIONS

REVISION	ECN NUMBER	ECN DESCRIPTION	ECN COMPLETED BY	ECN COMPLETED DATE
A	N/A	INITIAL RELEASE	N/A	N/A

CRITICAL COMPONENT: NO

RATINGS: IF APPLICABLE

DESCRIPTION: CONSOLE, AIR OVER HYDRAULIC, FMS

SIZE: B

PART NO.: 1007792

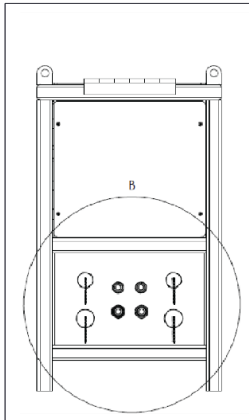
REV: A

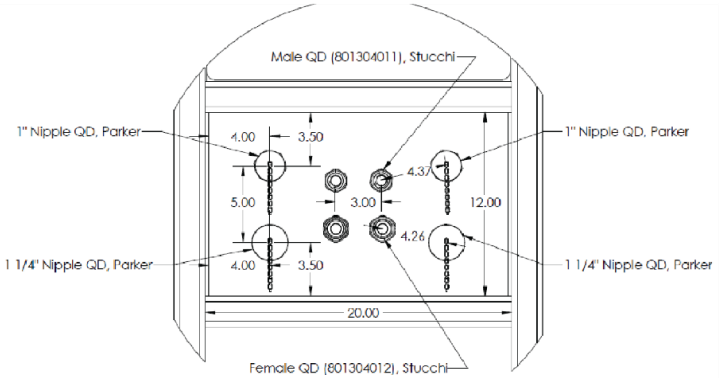
MATERIAL: N/A

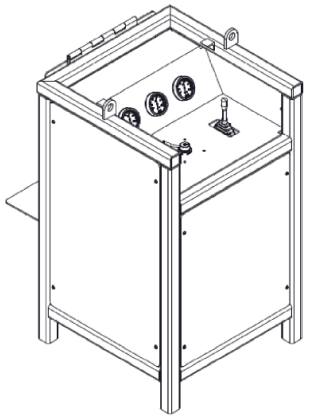
SHEET 1 OF 1

FMS HYDRAULIC CONSOLE 1007798

General arrangement drawing for the Hydraulic Console that can be used to control the FMS and a power tong.







FMS HYDRAULIC CONSOLE SPECIFICATIONS:

- CAPABLE OF OPERATING FMS AND TONG
- AUTOMATICALLY KEEPS PRESSURE ON FMS WHILE SIMULTANEOUSLY RUNNING THE TONG. CONSOLE CYCLES THE PRESSURE AUTOMATICALLY TO KEEP CONTINUOUS PRESSURE ON THE FMS
- HAS FLOAT POSITION THAT ALLOWS FOR PIPE TO BE RELEASED BY RAISING THE SLIPS
- HAS MECHANICAL LOCK ON THE HANDLE AND TWO STEP ACTIVIATION TO PREVENT THE ACCIDENTAL OPENING OF THE SLIPS
- MAXIMUM FLOW CAPACITY - 60 GPM/ 227 LPM
- DIMENSIONS
  - LENGTH - 24 INCHES/600 MM
  - WIDTH - 24 INCHES/600 MM
  - HEIGHT - 42 1/4 INCHES/1200 MM
- WEIGHTS
  - EXCLUDING OIL - 330 LBS/ 150 KG
- TIME TO FMS STROKE COMPLETION IN ONE DIRECTION
  - OPEN - 3 SECONDS
  - CLOSE - 3 SECONDS
- TOTAL CYCLE TIME - 6 SECONDS

RELEASED FOR PRODUCTION

SOLIDWORKS DOCUMENT PRINTED ON: Monday, March 27, 2023

REVISIONS

REVISION	ECN NUMBER	ECN DESCRIPTION	ECN COMPLETED BY	ECN COMPLETED DATE
A	N/A	INITIAL RELEASE	N/A	N/A

UNLESS OTHERWISE SPECIFIED:

CRITICAL COMPONENT: NO

RATINGS: IF APPLICABLE

PROPRIETARY STATEMENT

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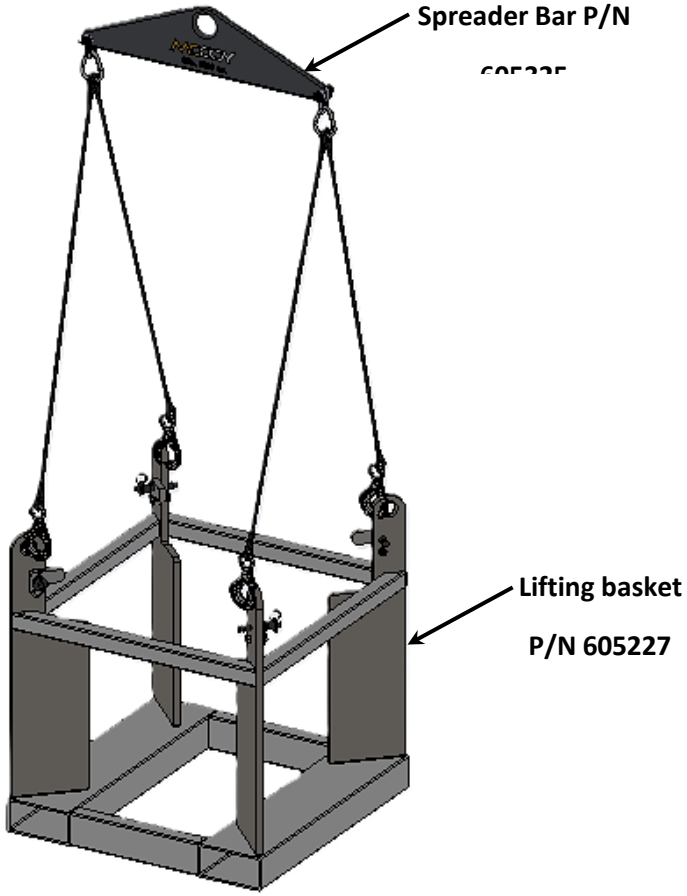
DESCRIPTION: CONSOLE, HYDRAULIC, FMS

DRAWN		03/27/2023
CHECKED	J.BOURGEOIS	03/27/2023
APPROVED	J.BOURGEOIS	03/27/2023

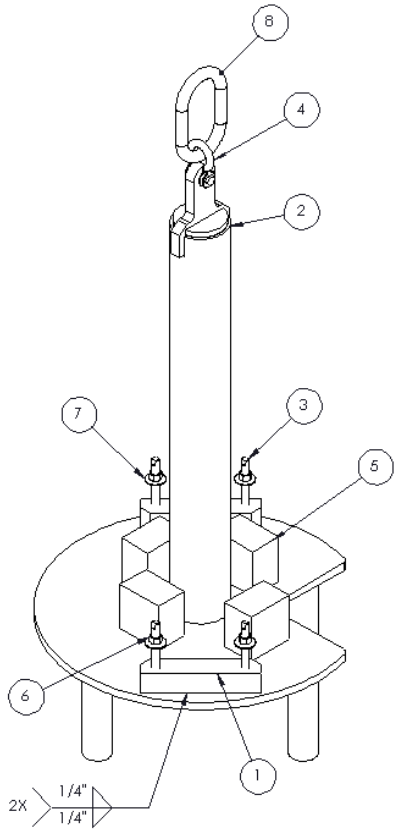
SIZE B | PART NO. 1007798 | REV A

THIRD ANGLE PROJECTION | WEIGHT 0.0 LBS. | MATERIAL N/A | SHEET 1 OF 1

Spreader Bar Assembly



ASSEMBLY, BASE STAND P/N 1008038



ITEM	Qty.	P/N	DESCRIPTION
1	2	1008041	PLATE, BASE, LIFT
2	1	1008149	WELDMENT, LIFT STAND
3	4	1008156	ROD, THREADED, 5/8-11, 5
4	1	TDMB1025-S2	BOLT, SHACKLE, ANCHOR, CROSBY #1019490
5	4	1008161	PLATE, CARRIER BLOCK
6	4	194	NUT, HEX, 5/8-11, STEEL, GR8
7	4	195-A	FLATWASHER, 5/8
8	1	02-9128	LINK, 1" MASTER

NOTE:
1. ITEM 1 WILL BE FIT IN ASSEMBLY
2. ITEM 5 IS NOT WELDED.
3. REMOVE ITEM 5 PRIOR TO LIFTING THE ASSEMBLY.

RELEASED FOR PRODUCTION

REVISIONS

REVISION	ECN NUMBER	ECN DESCRIPTION	ECN COMPLETED BY	ECN COMPLETED DATE
A	N/A	INITIAL RELEASE	N/A	N/A

CRITICAL COMPONENT: NO

RATINGS: IF APPLICABLE

DESCRIPTION: ASSEMBLY, BASE STAND

DRAWN		08/18/2023
CHECKED	M.SAMOHIN	08/23/2023
APPROVED	M.SAMOHIN	08/23/2023

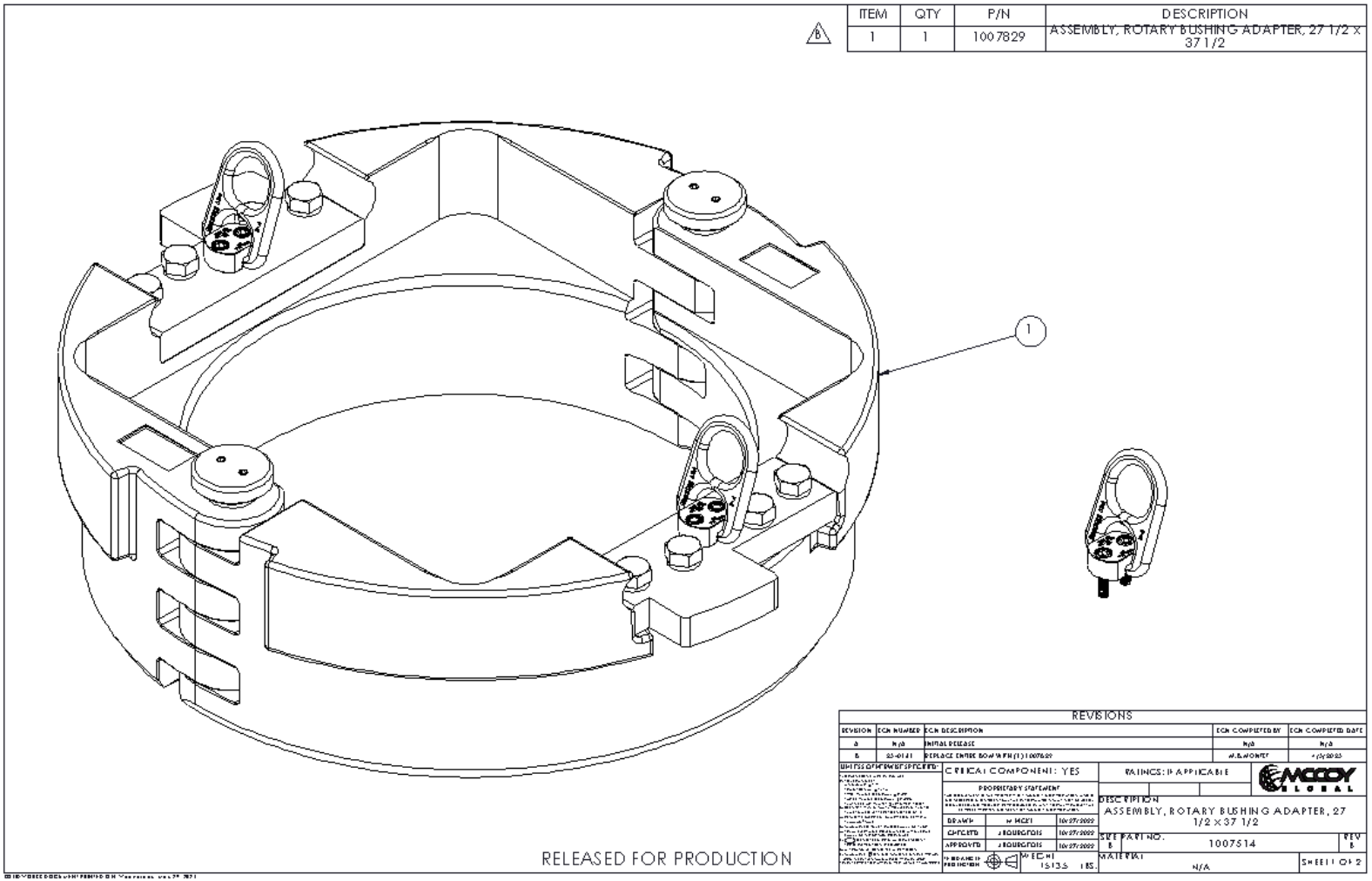
WEIGHT: 305.2 LBS.

SIZE: B | PART NO.: 1008038 | REV: A

MATERIAL: N/A

SHEET 1 OF 1

ASSEMBLY, ROTARY BUSHING ADAPTER, 27 ½ X 37 ½ P/N 1007514



ITEM	QTY	P/N	DESCRIPTION
1	1	1007829	ASSEMBLY, ROTARY BUSHING ADAPTER, 27 1/2 X 37 1/2

RELEASED FOR PRODUCTION

REVISIONS

REVISION	ECN NUMBER	ECN DESCRIPTION	ECN COMPLETED BY	ECN COMPLETED DATE
A	N/A	INITIAL RELEASE	N/A	N/A
B	22-0121	REPLACE ENTIRE BOM WITH (1) 1007829	M.S.MONTEY	4/25/2022

UNLESS OTHERWISE SPECIFIED

CRITICAL COMPONENT: YES

RATINGS: IF APPLICABLE

PROPRIETARY STATEMENT

DRAWN	M MEEI	10/27/2022
CHECKED	J BOURGEOIS	10/27/2022
APPROVED	J BOURGEOIS	10/27/2022

MFG APPROVED

DESCRIPTION: ASSEMBLY, ROTARY BUSHING ADAPTER, 27 1/2 X 37 1/2

SIZE B | PART NO. 1007514 | REV B

MATERIAL N/A

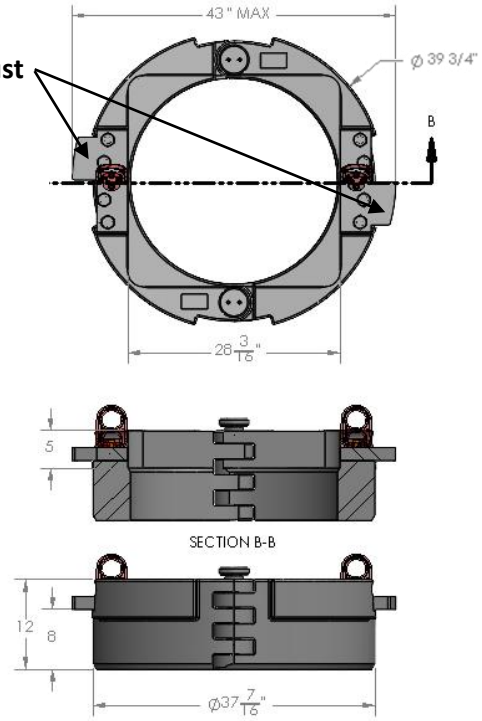
SHEET 1 OF 2

FMS ADAPTER P/N 1007514

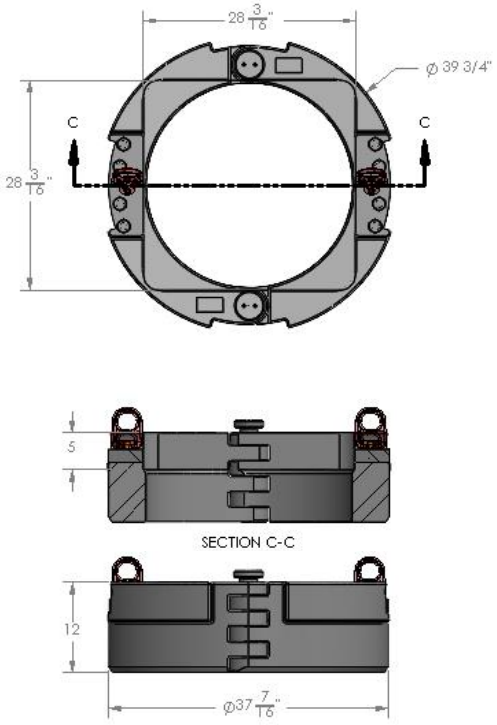
An Adapter, with two different configurations, is available to allow the FMS to be used inside of a 37 ½" Rotary Table (See illustration below).

***The Adapter must be installed with the locking tabs facing outward.**

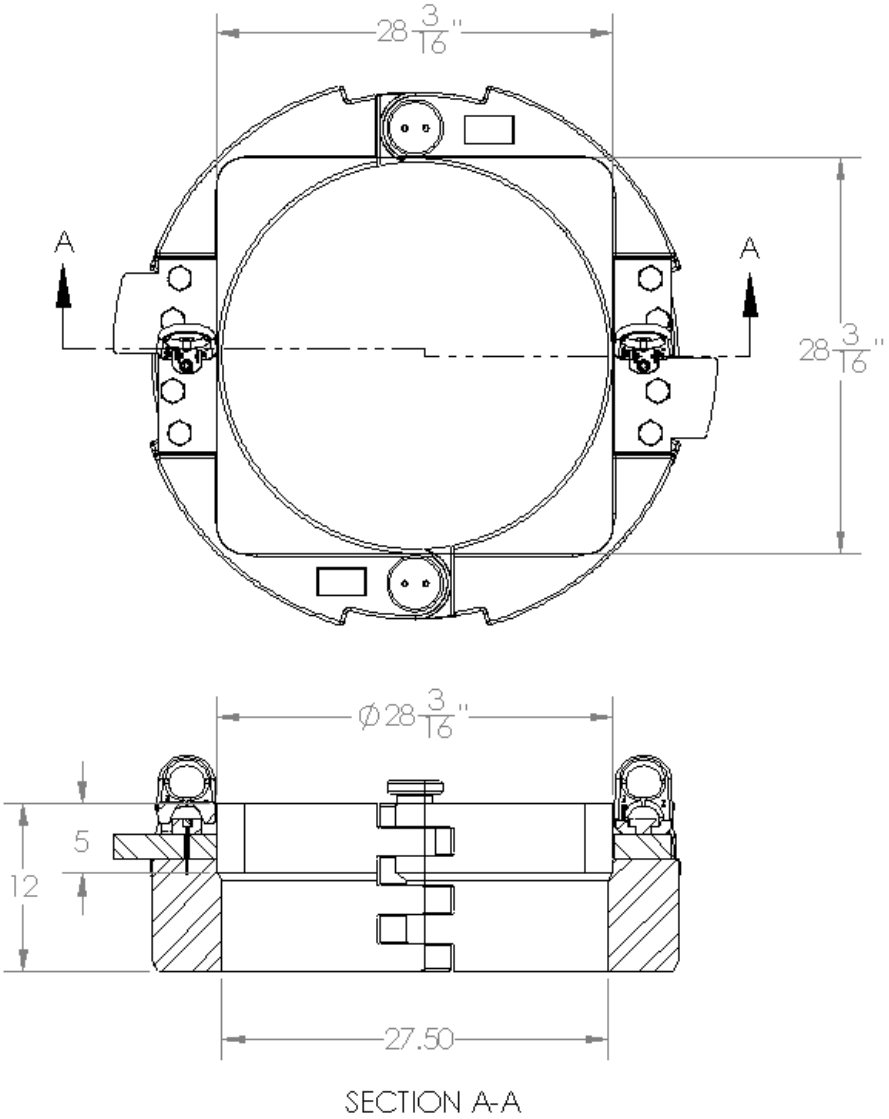
CONFIGURATION FOR NATIONAL 37 ½" ROTARY



CONFIGURATION FOR EMSCO 37 ½" ROTARY

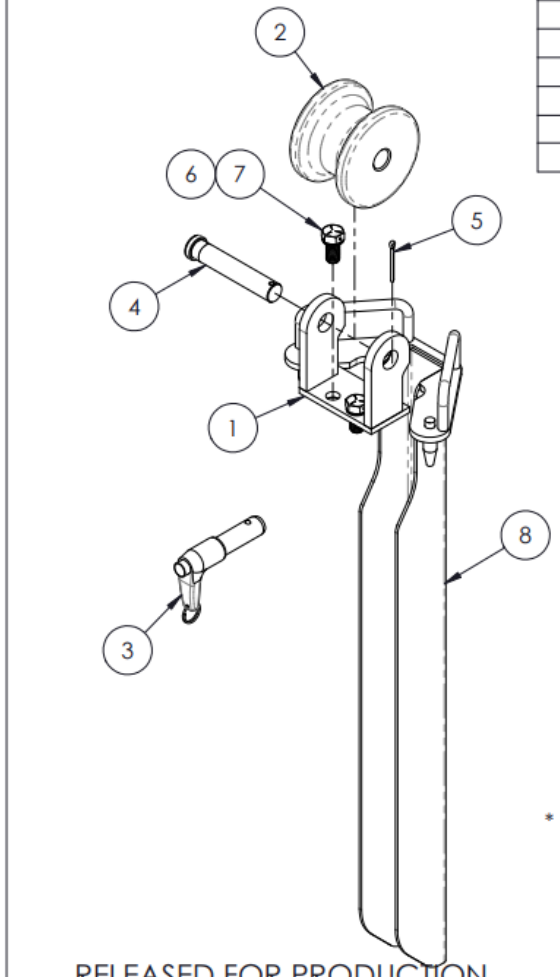


Note that this FMS is designed to fit inside of a rotary table opening of 27 ½" and complies with API 7K standards. The necessary dimensions for the rotary table are detailed below. If you use a bushing to accommodate the FMS in a larger rotary, ensure that the selected bushing can handle/react to torque and aligns with the below dimensions.



SECTION A-A

FMS CONTROL LINE GUIDE KIT P/N 1007859



ITEM NO.	QTY.	PART NUMBER	Description
1	1	1007855	WELDMENT, BRACKET, ROLLER
2	1	1007858	ROLLER, CONTROL LINE
3	1	1007856	PIN, QUICK-RELEASE, L-HANDLE LOCKING
4	1	1007857	PIN, CLEVIS, 3/4 X 3 3/4, ZINC-PLATED
5	1	09-0254	COTTER PIN, 1/8" X 1 1/2"
6	2	MDC1002099	NORDLOCK WASHER, 1/2"
7	2	1003432	SCREW, HEX, 1/2-13, 1, STEEL, GR 08, ZINC, DRILLED HEAD
8	1	1007200	WELDMENT, CHUTE, CABLE

RELEASED FOR PRODUCTION

SOLIDWORKS DOCUMENT PRINTED ON: Thursday, April 20, 2023

REVISIONS

REVISION	ECN NUMBER	ECN DESCRIPTION	ECN COMPLETED BY	ECN COMPLETED DATE
A	N/A	INITIAL RELEASE	N/A	N/A

UNLESS OTHERWISE SPECIFIED:

1. DIMENSIONS ARE IN INCHES
2. TOLERANCES:
ANGULAR ± 1 °
FRACTIONAL ± 1/16
TWO PLACE DECIMAL ± 0.02
THREE PLACE DECIMAL ± 0.005
FLATNESS AR PLATE: ± .015 PER FOOT
3. IDENTIFY P/N & MFR. P/O. USING 1/8 TO 1/4 ETCHED LETTERS; DENOTED BY "X"
4. REMOVE BURRS & SHARP EDGES WITH 1/64x45° MAX
5. MACHINED FILLET RADII SHALL BE 1/32
6. FINAL SURFACE ROUGHNESS AVG. (Ra) SHALL BE ≤ 250 MICRON CNES
7. ⌀ DENOTES CRITICAL DIMENSION; 100% INSPECTION REQUIRED
8. A TRIANGULEDEN OTES A REVISION
9. MACHINE ⌖ ON COMMON C-LINE WITHIN .005 T.I.R. - UNMACHINED WITHIN .020
10. INTERPRET DRAWING PER ASME Y14.5-2009

CRITICAL COMPONENT: NO

RATINGS: IF APPLICABLE

MCCOY GLOBAL

PROPRIETARY STATEMENT

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DRAWN	C.RICHTER	04/18/2023
CHECKED	J.BOURGEOIS	04/19/2023
APPROVED	J.BOURGEOIS	04/19/2023

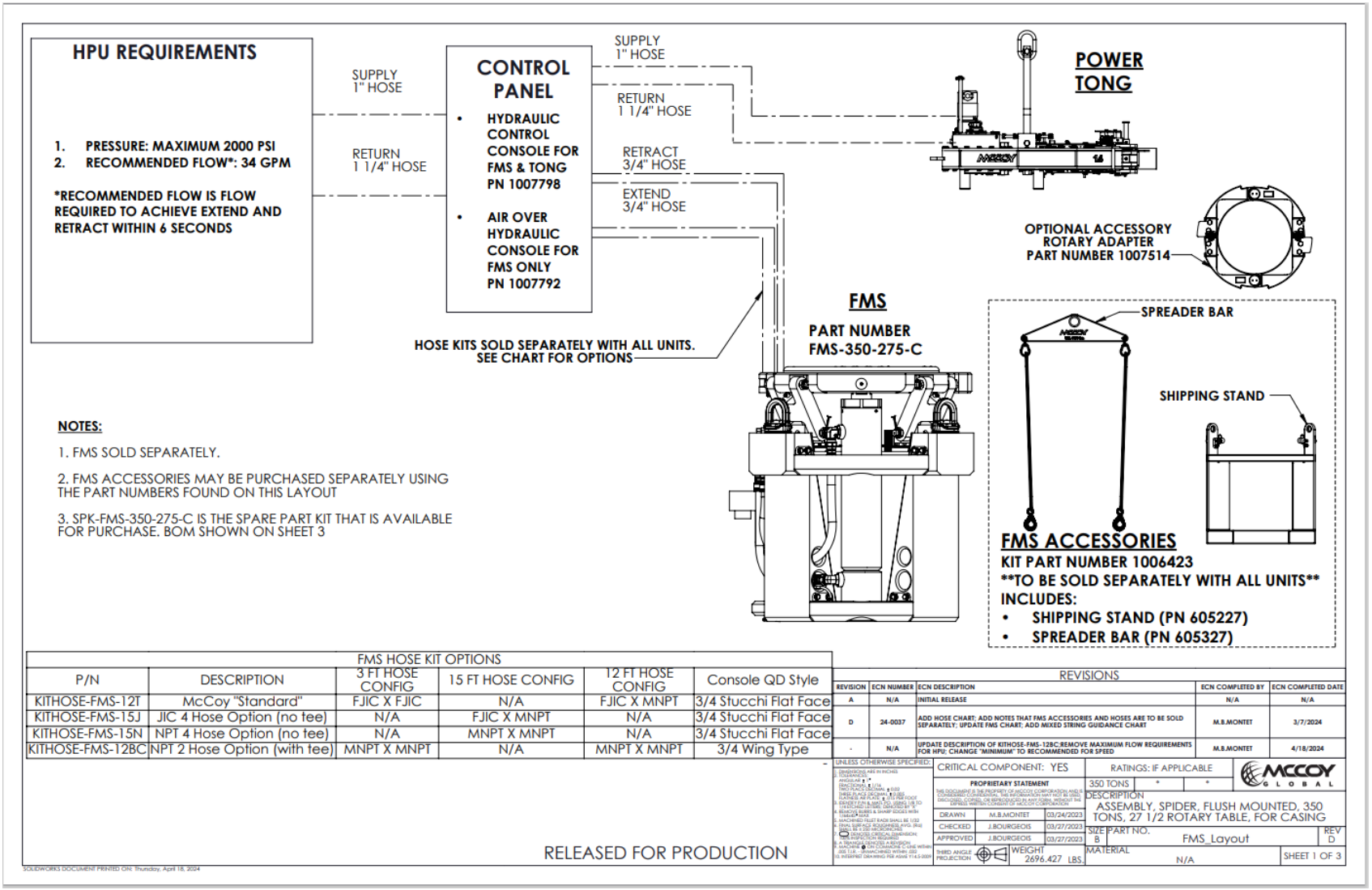
DESCRIPTION
KIT, GUIDE, CONTROL LINE GUIDE, FMS-350

SIZE A | PART NO. 1007859 | REV A

THIRD ANGLE PROJECTION | WEIGHT 10.6 LBS.

MATERIAL N/A | SHEET 1 OF 1

SALES LAYOUT DRAWING



FMS HOSE KIT OPTIONS

P/N	DESCRIPTION	3 FT HOSE CONFIG	15 FT HOSE CONFIG	12 FT HOSE CONFIG	Console QD Style
KITHOSE-FMS-12T	McCoy "Standard"	FJIC X FJIC	N/A	FJIC X MNPT	3/4 Stucchi Flat Face
KITHOSE-FMS-15J	JIC 4 Hose Option (no tee)	N/A	FJIC X MNPT	N/A	3/4 Stucchi Flat Face
KITHOSE-FMS-15N	NPT 4 Hose Option (no tee)	N/A	MNPT X MNPT	N/A	3/4 Stucchi Flat Face
KITHOSE-FMS-12BC	NPT 2 Hose Option (with tee)	MNPT X MNPT	N/A	MNPT X MNPT	3/4 Wing Type

REVISIONS

REVISION	ECN NUMBER	ECN DESCRIPTION	ECN COMPLETED BY	ECN COMPLETED DATE
A	N/A	INITIAL RELEASE	N/A	N/A
D	24-0037	ADD HOSE CHART; ADD NOTES THAT FMS ACCESSORIES AND HOSES ARE TO BE SOLD SEPARATELY; UPDATE FMS CHART; ADD MIXED STRING GUIDANCE CHART	M.B.MONTET	3/7/2024
-	N/A	UPDATE DESCRIPTION OF KITHOSE-FMS-12BC;REMOVE MAXIMUM FLOW REQUIREMENTS FOR HPU; CHANGE "MINIMUM" TO RECOMMENDED FOR SPEED	M.B.MONTET	4/18/2024

UNLESS OTHERWISE SPECIFIED:
PROPRIETARY STATEMENT
CRITICAL COMPONENT: YES
RATINGS: IF APPLICABLE
350 TONS * *
DESCRIPTION: ASSEMBLY, SPIDER, FLUSH MOUNTED, 350 TONS, 27 1/2 ROTARY TABLE, FOR CASING

DRAWN	M.B.MONTET	03/24/2023
CHECKED	J.BOURGEOIS	03/27/2023
APPROVED	J.BOURGEOIS	03/27/2023

THIRD ANGLE PROJECTION | WEIGHT 2696.427 LBS.
SIZE B | PART NO. FMS_Layout | REV D
MATERIAL N/A | SHEET 1 OF 3
SOLIDWORKS DOCUMENT PRINTED ON: Thursday, April 18, 2024

Hazard Assessment & Analysis

Step No.	Description of Job Steps	Potential Hazards	Required Protective Controls	Frequency	Consequence	Risk Rank
1	Inspect equipment being used.	Equipment failure Manual handling, Pinch points	Inspect equipment prior to use. Ensure equipment has relevant Documentation and SWL has been checked. Good Body positioning. Correct PPE at all times	2	2	4
2	Lift FMS to Rig Floor.	Heavy overhead lift, Uncontrolled Load, Dropped objects, Pinch points Trapped against or in between	Ensure all parties fully understand Toolbox Talk and instructions for lifting FMS. Ensure all securing devices in good condition and utilized. Correct Tools and Slings for Job using a communicated lift Plan, LOLER regulations. Competent Banksman and Deck Crew. Tag Lines and Stiffy Hand Tools when available. PA announcement and/or barriers as required to inform others not involved with Operation.	2	4	8
3	Positioning of FMS to Rotary Table.	Heavy overhead lift, Uncontrolled Load, dropped objects, pinch points Trapped against or in between.	Ensure all securing devices in good condition and utilized. Correct Tools and Slings for Job using a communicated lift Plan, LOLER regulations. Competent Air Hoist Operator/s Competent person on TDS Brake. Tag Lines and Stiffy Hand Tools as required. Controlled slow movement of FMS Good Communication, Signals, and awareness by all Parties	2	4	8
4	Rig up Adapter Plate/ FMS.	Manual handling. Stored energy. Pinch points. Dropped object. Trapped against or in between.	Use correct manual handling and lifting techniques. Correct hand tools for job Wear fall protection if working at height Awareness of surroundings (ABBI) Above, Below, Behind and Inside. Witness proper torque applied by driller on tool. Verify proper torque application.	2	4	8
5	Rig Down FMS.	Manual handling. Stored energy. Trip hazard. Possible working at heights. Pinch points. Dropped object. Trapped against or in between.	Use correct manual handling and lifting techniques. Correct hand tools for job Wear fall protection if working at height Awareness of surroundings (ABBI) Above, Below, Behind and Inside.	2	4	8
6	Remove FMS from Drill floor.	Heavy overhead lift, Uncontrolled Load, dropped objects, pinch points Trapped against or in between.	Ensure all securing devices in good condition and utilized. Correct Tools and Slings for Job using a communicated lift Plan, LOLER regulations. Competent Banksman and Deck Crew Tag Lines and Stiffy Hand Tools when available. PA announcement and/or barriers as required to inform others not involved with Operation. Ensure all Lifting devices are in good condition and secure prior to moving the CRT	2	4	8

Frequency	Consequence				
	Insignificant 1	Minor 2	Moderate 3	Major 4	Critical 5
Almost Certain 5	5	10	15	20	25
Likely 4	4	8	12	16	20
Possible 3	3	6	9	12	15
Unlikely 2	2	4	6	8	10
Rarely 1	1	2	3	4	5

Frequency X Consequence = Risk Ranking

FREQUENCY

Almost certain (Score 5)	Constant, daily, high repetition	Critical (Score 5)	Outcome of event is certain fatality or catastrophic incident
Likely (Score 4)	Expected to happen at some time, task performed on a weekly basis	Major (Score 4)	Incident would result in a lost time incident or serious damage
Possible (Score 3)	Can be expected to occur occasionally	Moderate (Score 3)	Incident would result in a recordable injury or moderate damage
Unlikely (Score 2)	Not likely to occur in normal circumstances	Minor (Score 2)	Incident would result in a minor first aid injury or light damage
Rare (Score 1)	Could possibly happen, but probably never will	Insignificant	Non-first aid required injury, near miss or no damage resulting