TECHNICAL MANUAL

Link Tilt System

1008910 & 1008649

PATENT PENDING

SPECIFICATIONS | OPERATION | MAINTENANCE | PARTS

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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.

Summary of Revisions		
Revision	**Date**	**Description of Revision**
00	OCT 2025	Initial Release
01	OCT 2025	Updated max. pressure on pages 21 & 93. Removed Gen II console.

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SECTION 1: INTRODUCTION, SAFETY GUIDELINES & PRODUCT DESCRIPTION

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

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

GENERAL SAFETY GUIDELINES

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 describe items of four levels of importance:

Danger, Warning, Caution, and Notice.

DANGER is represented by a hazard symbol coupled with a **"DANGER"** signal word and identifies items of the highest level of risk. Failure to heed information identified by 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 represented by a hazard symbol coupled with a bold **"WARNING"** signal word and identifies items of medium risk. Failure to heed information identified by a **WARNING** symbol may result in significant injury to personnel, catastrophic equipment failure, or harmful environmental contamination.

⚠ WARNING

THIS IDENTIFIES A WARNING REGARDING POTENTIAL INJURY OR CATASTROPHIC EQUIPMENT DAMAGE

A **CAUTION** is represented by a hazard symbol coupled with a bold **"CAUTION"** signal word and identifies items of low risk. Failure to heed information identified by a **WARNING** symbol may result in injury to personnel or equipment damage.

⚠ CAUTION

THIS IDENTIFIES A CAUTION REGARDING SAFE OPERATION OR THE POTENTIAL OF EQUIPMENT DAMAGE

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

NOTICE

THIS HIGHLIGHTS ITEMS OF IMPORTANCE UNRELATED TO PERSONAL INJURY

General Safe Operating Guidelines

Only authorized personnel shall operate equipment delivered by McCoy Global. Equipment shall be in proper technical condition prior to use and shall be used only for the purpose for which it is intended. Malfunctions or damages must be rectified before operation to ensure personnel safety and avoid equipment damage.

The user is responsible for ensuring the safety of all personnel while operating any McCoy Global product. McCoy Global is not responsible for injuries or equipment damage that arises from improper use of the equipment. McCoy Global recommends that a hazard assessment of the work area be performed by a designated safety representative before commencing operations. A designated safety representative is responsible for verifying that all operators have adequate equipment and safety training.

⚠ CAUTION

IT IS CRITICAL THAT THE END USER PERFORM A RISK ASSESSMENT AND MITIGATION PLAN FOR THE COMPLETE INTEGRATED SYSTEM FOR ALL ASPECTS OF WORK INCLUDING COMMISSIONING AND OPERATION, ETC. THE MANUAL ONLY CONTAINS INFORMATION RELEVANT TO THE SYSTEM SHOWN.

The area surrounding the equipment operating area must be clutter-free and free from tripping hazards, or protruding objects that may snag hoses or cables. Operating surface or drill floor must be kept free of slipping hazards like grease, oil, water, etc.

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

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

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

⚠ WARNING

FAILURE TO FOLLOW THE EQUIPMENT PLACEMENT/RIG-UP PROCEDURES OUTLINED IN THIS MANUAL MAY LEAVE EQUIPMENT UNGROUNDED AND AT RISK FOR BUILDING A STATIC CHARGE. ASSESSMENT FOR PROPER GROUNDING MUST BE PERFORMED PRIOR TO OPERATION IN ORDER TO MITIGATE THE SPARK RISKS ASSOCIATED WITH STATIC DISCHARGE.

McCoy Global recommends following an industry-accepted standard such as OSHA, ASME B30.9-2006, or manufacturer's guidelines when performing any rigging and overhead lifting. Use by untrained persons 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 improperly maintained. Never stand beneath a suspended load.

⚠ DANGER

NEVER STAND BENEATH A SUSPENDED LOAD

Maintenance Safety

All personnel are responsible for performing maintenance tasks in a manner that ensures worker, equipment, and environmental safety, and may require taking additional steps that are not identified in this section.

Maintenance of equipment shall be performed only by designated qualified maintenance personnel. Do not begin a maintenance task without the proper tools or materials on hand, or the proper drawings and documentation necessary.

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.

Where applicable, ensure electrical circuits within the affected equipment are deactivated or de-energized by an authorized, qualified person and locked out if necessary. Do not disconnect a live electrical circuit unless location is known to be non-hazardous.

⚠ 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 BEING APPLIED SHOULD NEVER EXCEED 2MM IN THICKNESS. EXCEEDING THIS THICKNESS MAY FACILITATE STATIC CHARGE BUILDUP AND PRESENT A POSSIBLE SPARK RISK ASSOCIATED WITH STATIC DISCHARGE.

Replacement Parts

All consumable and replacement parts must meet or exceed OEM specifications in order to maintain equipment integrity. Do not replace protective equipment such as hydraulic switches, circuit breakers, and fuses without first consulting with McCoy Global. Do not replace electrical or control hardware without consulting with McCoy Global. Using non-OEM replacement parts without the approval of McCoy Global may void equipment warranty.

Environmental Impact

McCoy Global equipment uses materials that may be harmful to the environment if improperly disposed of (hydraulic fluid, grease, fuel, electrical components, etc.). Dispose of all materials according to established environmental protection regulations in conjunction with published federal, state, provincial, and civic legislation.
In all cases observance of the following is the full responsibility of the user:

- All descriptions, information and instructions set out in this manual.
- Any regulation or requirement issued by an authority or agency which may influence operation, safety or integrity of the equipment that overrules the content of this document.
- Any legal or other mandatory regulation in force governing accident prevention or environmental protection.

PRODUCT DESCRIPTION

The Link Tilt System, designed in accordance with API 8C, is equipped with Dynamic Bails ranging from 57” to 69”, is a stand-alone solution compatible with both hydraulic and mechanical Casing Running Tools (CRT’s). It enhances operational efficiency, repeatability, and safety. The LTS is smarTR ready, allowing it to be seamlessly incorporated into a more advanced tubular running system, with integrated sensors and electronics that enhance control and the overall operational experience.

Illustration: 1008910 Link Tilt System

PRODUCT DESCRIPTION (CONTINUED):

⚠ WARNING

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

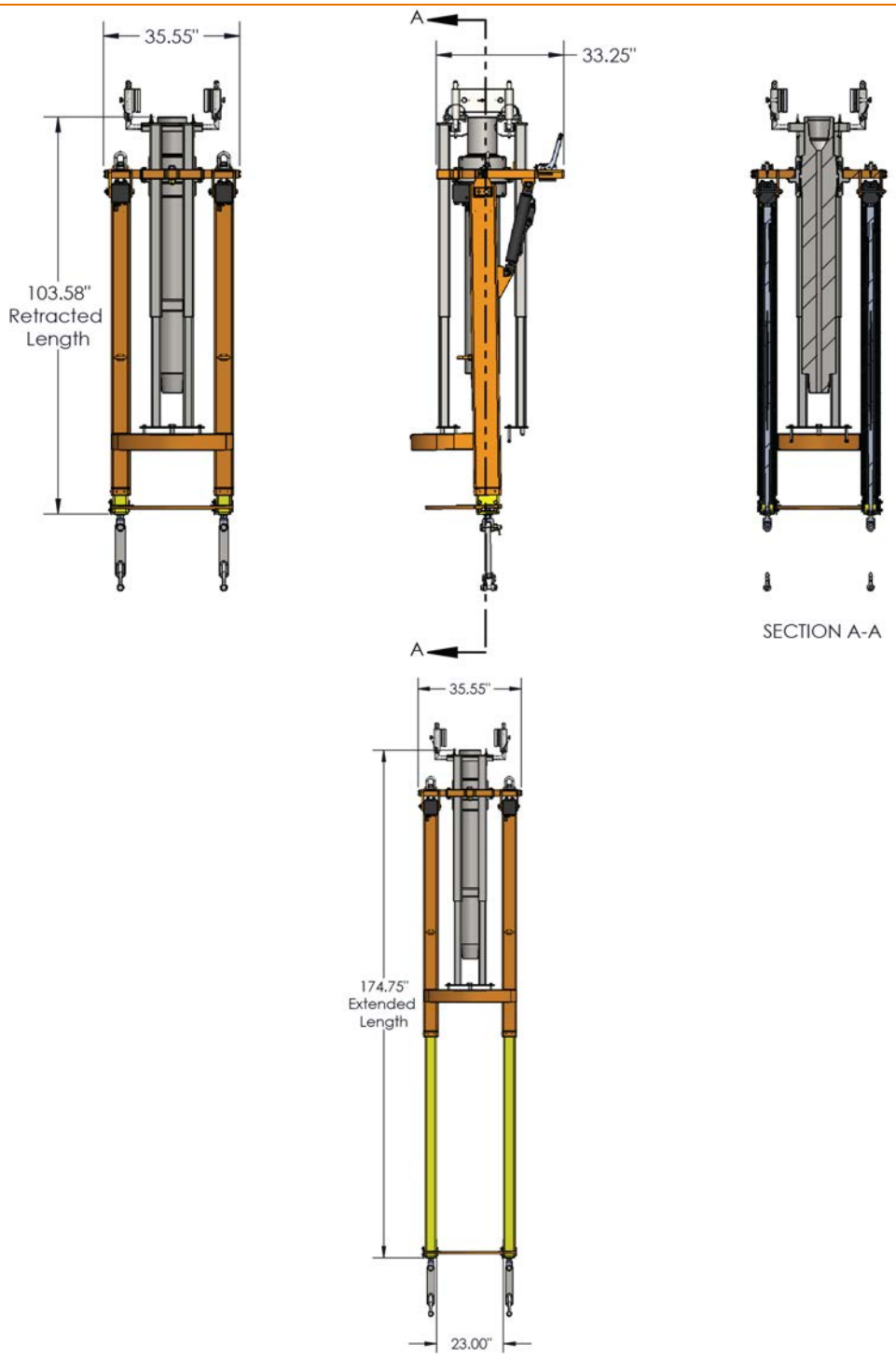
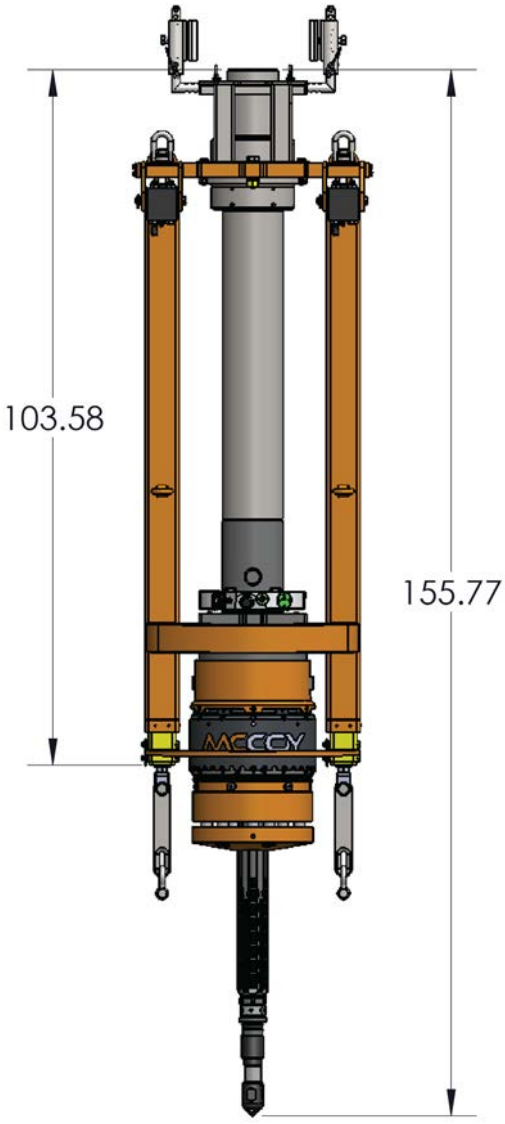


Illustration: 1008910 Dimensions and Hazard Areas

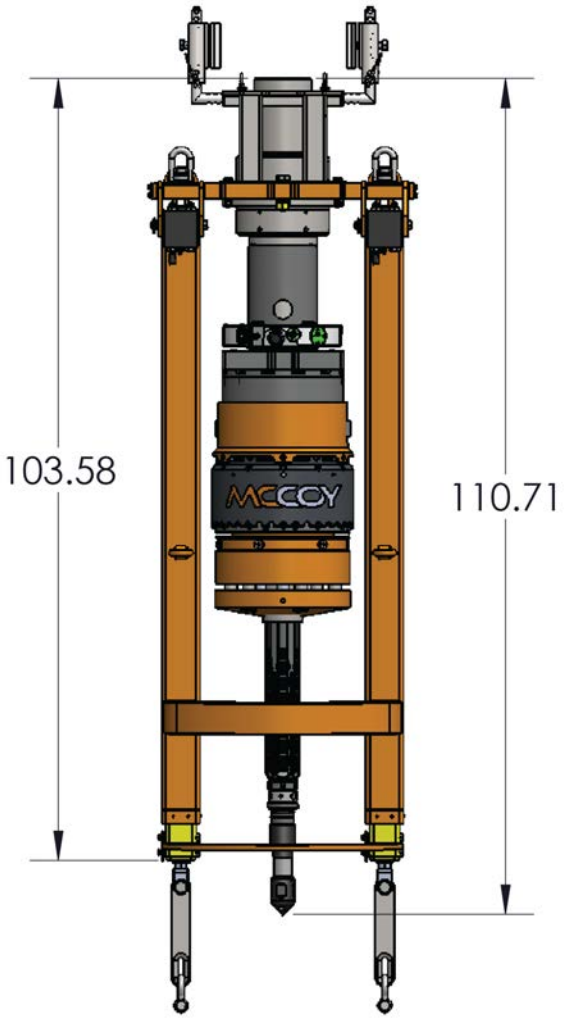
PRODUCT DESCRIPTION (CONTINUED):

There are two rig-up configurations for the Link Tilt System.

Option 1 – Spacer Mounted



Option 2 – Direct Mounted



Note: Dimensions are in inches

Advantages:

Hydraulically lift the tubular to the bump plate and engage the CRT prior to stabbing the pin into the box.

Advantages:

Reduce the stack-up length and extend the reach to the v-door. Hydraulically lift the tubular onto the circulator.

PRODUCT DETAILS

LINK TILT SYSTEM SPECIFICATION	
Maximum Tension Rating	**5 TONS**
Cylinder Stroke	**57 or 69 INCHES**
Tilt Angle	**80 DEGREES**
Weight	**2500 LBS**
Maximum Working Pressure	**1650 PSI**
Operating Temperature Range	**-20°C to 65°C**
Max Tubular Size	**20 INCHES**

Safety Devices and Standards:

- Designed Safety Factor – 3:1 per API 8C
- Load Bearing Devices – OSHA, ASME B30.9-2006
- Velocity Fuse – Will close if flow exceeds 25gpm (Ruptured Hose)

Features of the Link Tilt System

- 30% Increase in joints per hour (faster running time)
- Compatible with Mechanical and Hydraulic CRT's
- Reduces Stab-to-latch time
- Removes complexities with existing drilling rig link tilt systems

Benefits of the Link Tilt System

- Reduces Drillers' workload
- Enhanced Control and reach with Dynamic Bails
- Anti-Rotation Bracket for Safe Rig-in
- Multi-port Stucchi connector for efficient rig-in
- Reduces space out complexities
- Integrates into the McCoy smarTR package (optional)
- Remote operation via belly pack (optional)
- Reduces "Red Zone" Exposure
- Real-Time Drillers Data with Sensor Package (optional)

RECOMMENDED LUBRICANT SPECIFICATIONS

Hydraulic Fluid

McCoy Global recommends using high-quality hydraulic fluid containing rust & oxidation inhibitors and foam suppressant that meets the following requirements. Operating this equipment using hydraulic fluid that does not meet these requirements greatly 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 should be chosen with due regard to expected climactic conditions and equipment load. Note that this equipment may have been tested using hydraulic fluid that does not meet operational requirements beyond those specified in the above table. Therefore, McCoy recommends purging and flushing the equipment's hydraulic system before connecting to a hydraulic supply.

NOTICE

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

INSTALLATION AND COMMISIONING

RECEIPT, INSPECTION, AND HANDLING OF EQUIPMENT

⚠ CAUTION

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

Upon receipt, inspect packaging materials for shipping damage. Record all shipping damage on the shipping manifest and ensure the shipping company and McCoy are immediately contacted. Remove all protective shipping materials and perform a visual inspection of the equipment. Any damage to equipment must be repaired before connecting the equipment to a hydraulic power source.

McCoy recommends connecting the equipment to a hydraulic power source and testing complete functionality in a controlled environment before releasing 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 may have an effect on 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 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 WILL NOT GUARANTEE THE ABILITY OF THE LOAD BEARING DEVICE TO SUPPORT ANY OTHER PART, ASSEMBLY OR COMBINATION OF PARTS AND ASSEMBLIES. MCCOY GLOBAL WILL 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 (WIRE SLINGS, SPREADER BAR ASSEMBLY, FRAME, ETC.) NOTE THAT THE ASSOCIATED FASTENERS MUST BE TIGHTENED TO THE CORRECT TORQUE SPECIFIED FOR THAT SIZE OF FASTENER (SEE MAINTENANCE SECTION). ANY THREADED FASTENER IN A LOAD BEARING DEVICE MUST BE SECURED WITH RED OR BLUE LOCTITE™.

REPLACEMENT FASTENER (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 an industry-accepted standard such as OSHA, ASME B30.9-2006, or manufacturer's guidelines when performing any rigging and overhead lifting. Use by untrained persons 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 improperly maintained.

- Use only Grade 80 or Grade 100 alloy chain for overhead lifting applications.
- Working Load Limit (WLL) is the maximum allowable load in pounds or kilograms which may be applied to the load-bearing device, 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 alterations, sharp corner cutting action and other use conditions.
- Shock loading and extraordinary conditions must be taken into account when selecting alloy chain slings.

See OSHA Regulation for Slings 1910.184, ANSI/ASME B30.9-"SLINGS", ANSI/ASME B30.10-"HOOKS" and ANSI/ASME B30.26 "RIGGING HARDWARE" for additional information.

⚠ 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 avoid confusion, do not list the date of the next test or examination, only the most recent.

⚠ DANGER

THIS INFORMATION IS TO BE USED AS A GENERAL GUIDELINE ONLY. DETERMINING SITE SPECIFIC INSPECTION FREQUENCY AND METHODOLOGY IS ULTIMATELY THE RESPONSIBILITY OF THE END USER.

Proper Use of Load-Bearing Devices

Whenever any load-bearing device is used, the following practices shall be observed.

- Load-bearing devices that are damaged or defective shall not be used.
- Slings shall not be shortened with knots or bolts or other makeshift devices.
- Sling legs shall not be kinked.
- Load-bearing devices shall not be loaded in excess of their rated capacities.
- Slings shall be securely attached to their load.
- Load-bearing devices shall be protected from snagging and shall not be further obstructed by any object.
- Suspended loads shall be kept clear of all obstruction.
- All employees shall be kept clear of loads about to be lifted and of suspended loads.
- Hands or fingers shall not be placed between the sling and its load while the sling is being tightened around the load.
- Shock loading is prohibited.
- Do not stand directly under a load during lifting.

Storage Of Load-Bearing Devices

Proper storage of out-of-service load bearing devices is important to ensure full integrity of the device once it is returned to service. McCoy recommends observing the following practices.

- Wipe off all excess grease. Use a solvent-based cleaner on rags to wipe all external surfaces to remove residual grease or hydraulic fluid. Once the outside surfaces have been de-greased, wipe all external surfaces with clean water to remove residual solvent.

- McCoy recommends that 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.
- Store in a clean, dry location. When returning to service, note that a full inspection of the device must be performed.

Cable Sling Angle (If applicable)

The cables used to secure the SJE to the Link Tilt System will have a varied angle that could range from horizontal to vertical depending on the setup. Please ensure that the load is not exceeded for the cable regarding load per angle of the sling.

⚠ WARNING

DO NOT OVERLOAD THE CABLE SLING REGARDING LOAD PER ANGLE OF THE SLING.

Link Plate Arms

The links used to secure the SJE to the Link Tilt System will have a varied angle that could range from horizontal to vertical depending on the setup. Please ensure the configuration does not exceed 45 degrees.

General HPU Supplied by Customer & Control Console (Supplied by McCoy)

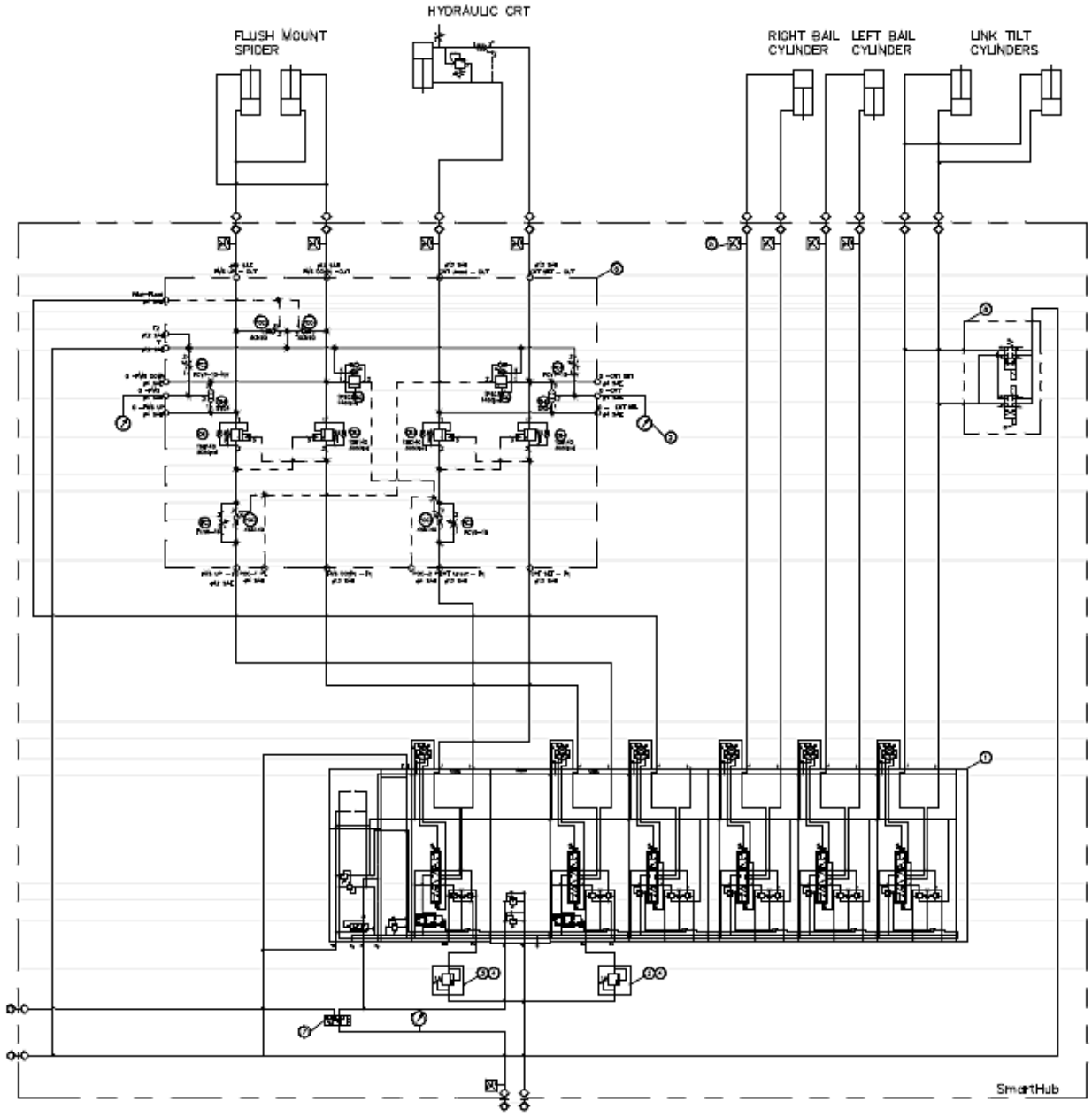
- HPU REQUIRED: Fixed or Variable Displacement Pump
- PRESSURE REQUIRED: 2000 PSI/138 Bar
- FLOW REQUIRED: 30 GPM/ 132 LPM
- HOSES REQUIRED: QTY (6) ¾" HOSES; LENGTH REQUIRED 100 FT

⚠ WARNING

THE HPU SYSTEM PRESSURE IS DIFFERENT THAN THE MAXIMUM OPERATING PRESSURE OF THE DYNAMIC BAILS AND LINK TILT SYSTEM. DO NOT EXCEED 2000 PSI ON THE DYNAMIC BAILS AND LINK TILT SYSTEM.

HYDRAULIC DETAILS

SCHEMATIC



1. DANFOSS VALVE BANK 159K0001
2. SPAN LFP-214-3000-PSI-G-WOB
3. WANDFLUH BADPM22-210-Z656
4. DAMAN B10046-1
5. NOSHOK 100-4000-1-1-2-95
6. DANFOSS MANIFOLD 11323702_P3
7. PARKER BV3D16N1SS1NE
8. HYDRAQUIP MG-111222

Main Hydraulic Connections

Inspect all connectors for damage, debris, or other contaminants before performing hydraulic connections. Clean connectors using compressed air, or an approved cleaning solvent and 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.

⚠ WARNING

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

Inspect these connections upon activation of the power unit. Leaking components must be repaired before releasing the bail arms to the operational environment. Deactivate the power unit and de-pressurize the hydraulic system. Disconnect the main hydraulic connections and inspect all connectors for damage or debris. If the connectors cannot be cleaned or easily repaired, McCoy recommends replacement of the leaking connector. Note that damage to one of the connectors may have caused damage to its mate.

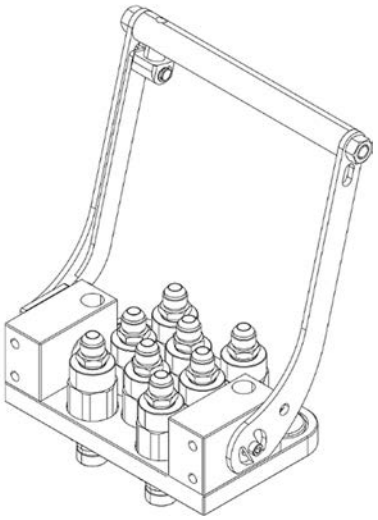
Turn off power unit and depressurize hydraulic system before disconnecting the main hydraulic lines under normal working conditions. McCoy recommends placing protective caps over the exposed connectors to protect them from water and impact damage.

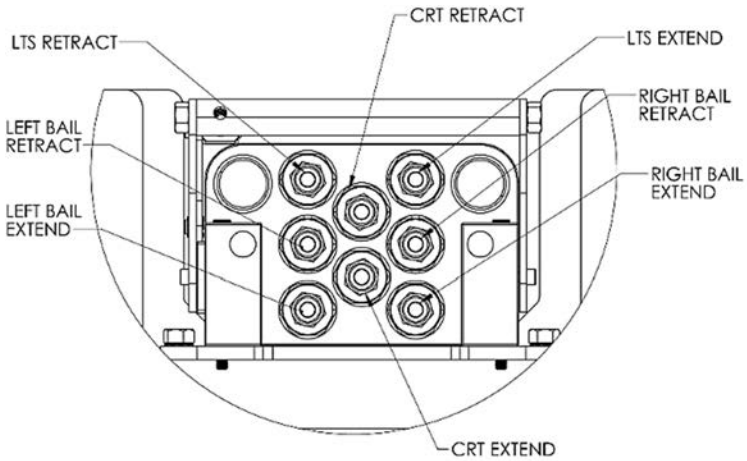
⚠ WARNING

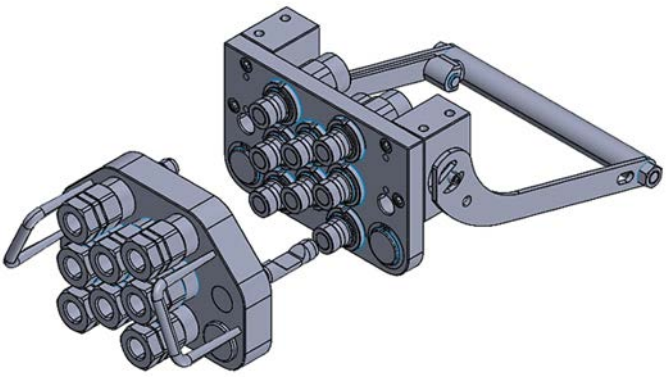
ALWAYS TURN OFF HYDRAULIC POWER AND DEPRESSURIZE HYDRAULIC SYSTEM BEFORE DISCONNECTING MAIN HYDRAULIC LINES.

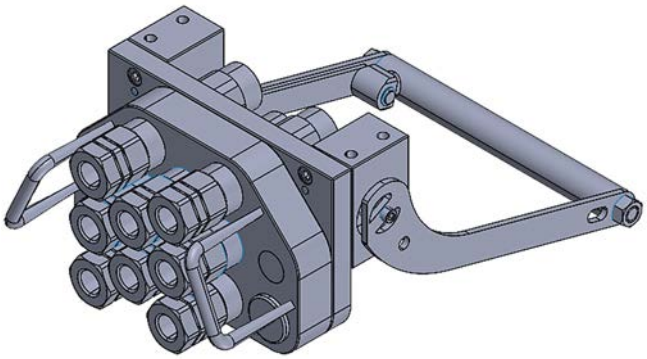
Hydraulic Ports Configurations

McCoy has installed a Hydraulic Multi Coupler connection to improve productivity and efficiency with single motion connection of multiple hydraulic lines mounted in our hydraulic multi coupler plates.









GEN3 SMARTHUB ASSEMBLY - (P/N 1009085-01)

See Section 7 for the data sheet.

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SECTION 2: MAINTENANCE, LUBRICATION, INSPECTION GUIDELINES AND CRITERIA

GENERAL MAINTENANCE SAFETY PRACTICES

All Maintenance activities must be performed by authorized, trained and skilled personnel. Any attempt to make unauthorized repairs to equipment exposes personnel to potential hazards and may cause catastrophic equipment failure. Contact McCoy Global if any question about the nature of repairs arises.

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 are:

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

Any replacement component must be 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

The practices identified here are intended as a guideline. All personnel are responsible for performing their tasks in a manner that ensures workers, 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 eye wear 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.

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 on the maintenance checklists, or in conjunction with a qualified technician’s best estimates of when this equipment is due for this maintenance and replacement of hoses or cables.

McCoy Global recommends tracking all maintenance activities 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 rig up. If critical components are replaced as part of repairs, ensure the tool documents are updated accordingly.

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.

PERIODIC INSPECTION

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

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

1. ☐ Inspect for hydraulic leaks.
2. ☐ Inspect for loose nuts or pins.
3. ☐ Inspect for service loop interference.
4. ☐ Inspect pivot links and pins for bends.
5. ☐ Visual inspection of paint or chalk line on all Rotary Shoulder Connections. This must occur every time the tool is disengaged to verify the cross-over connections are correctly torqued.

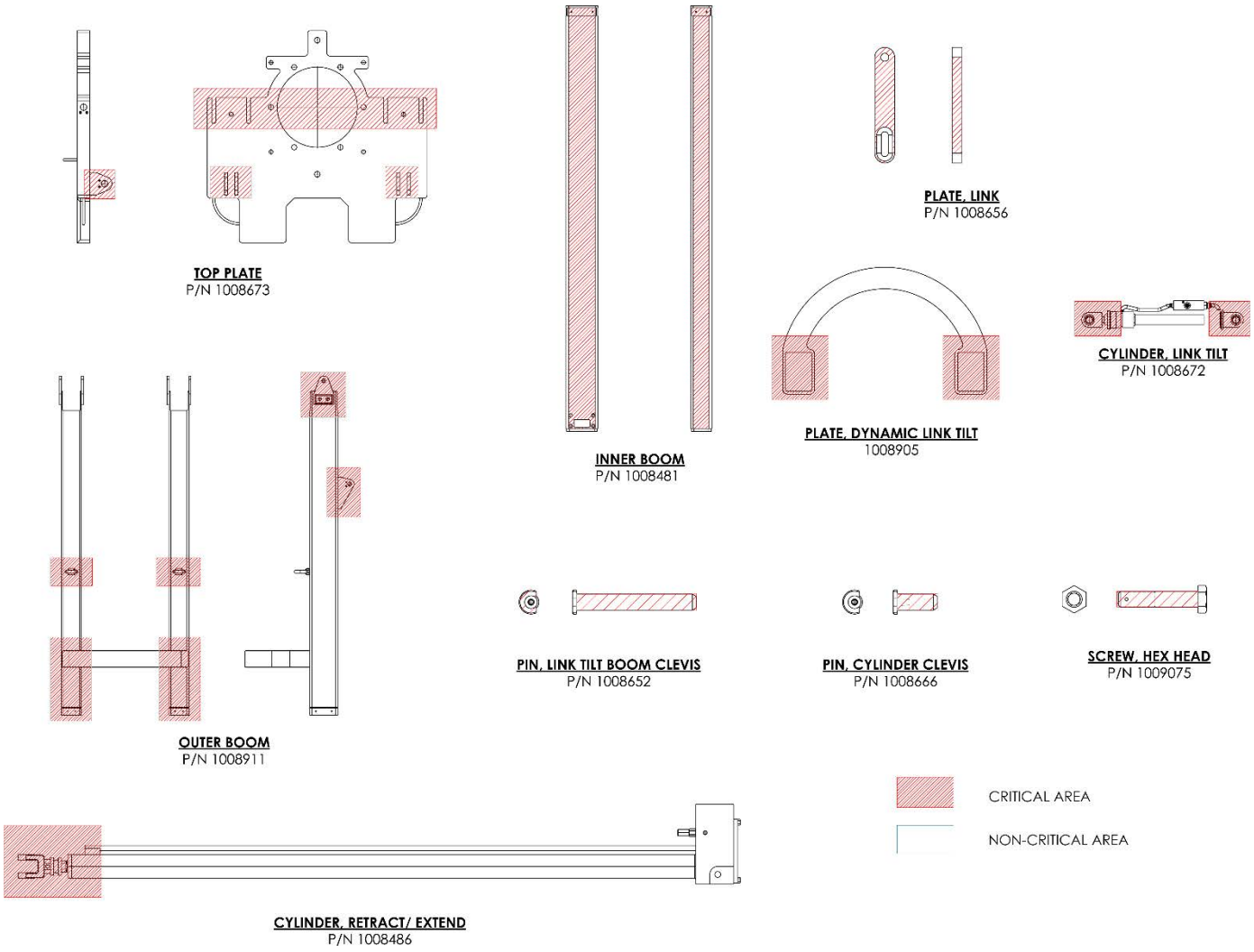
Category II

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

1. ☐ Wash and remove any excess dirt and grease.
2. ☐ Inspect all QDs and hydraulic fittings.
3. ☐ Check cylinder rods for wear.
4. ☐ Check hoses for wear.
5. ☐ Check for proper locking of all bolts, nuts, pins, pin holes for wear and ovality; Check for cotter pins, lock wire, retaining pins for wear and straightness, and other methods of secondary retention.
6. ☐ Inspect links and link pins for wear.
7. ☐ Function checks all cylinders (tilt and retract/ extend) at a minimum of 3 cycles per direction.
8. ☐ Inspect top plate crossover bearing ensure free to rotate.
9. ☐ Inspect the safety cable.

Category III (Every 6 months) – OEM Oversight recommended.

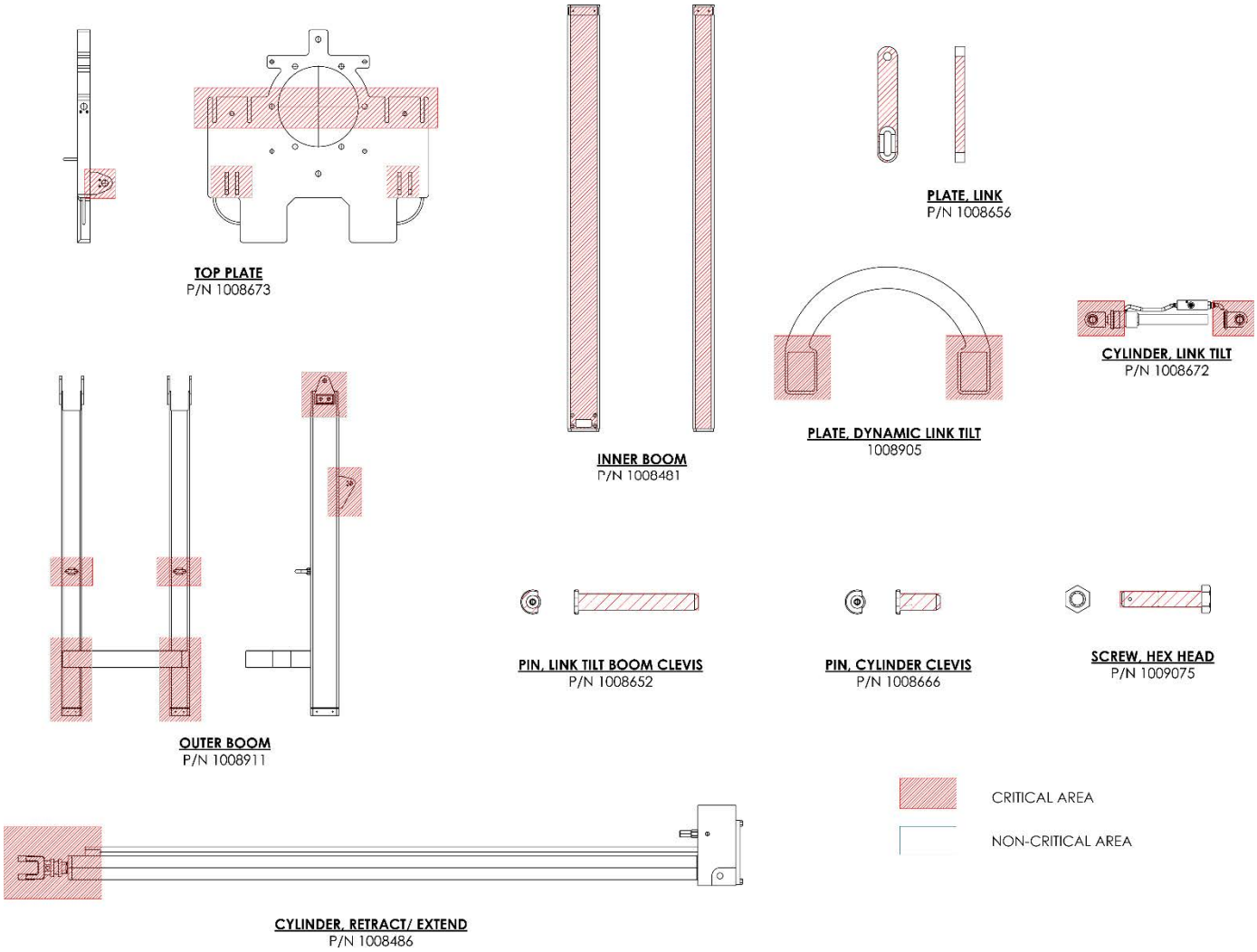
McCoy Global recommends Category II inspection plus further inspection which should include NDE of exposed critical areas and dimensional check of LTS assembly components. This requires disassembly to access specific components and identify wear that exceeds allowable tolerances. Carry out NDE on critical load-bearing components which are included below. Inspect rotary shoulder connections (pin and box) as per API 7-2, including MPI:



Category IV (Every 12 months) – OEM Oversight Recommended

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

1. ☐ NDE load bearing components per the critical area drawings in this manual for the following parts.



GREASE

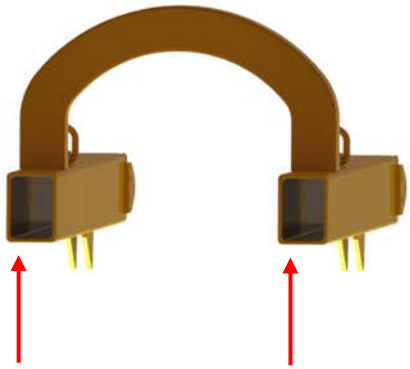
McCoy Global recommends using the following lubrication. The use of other lubricants may affect the performance and accelerate wear on critical components, thereby reducing the life expectancy of the parts and/or effectiveness of the tool.

Area	Lubrication
Between Inner and Outer Cylinder Tubes	NLGI No. 2 Lithium equivalent
Pivot points of cylinders	NLGI No. 2 Lithium equivalent

McCoy Global recommends thoroughly greasing the equipment before first use as per the lubrication instructions in this Section.

LUBRICATION INSTRUCTIONS

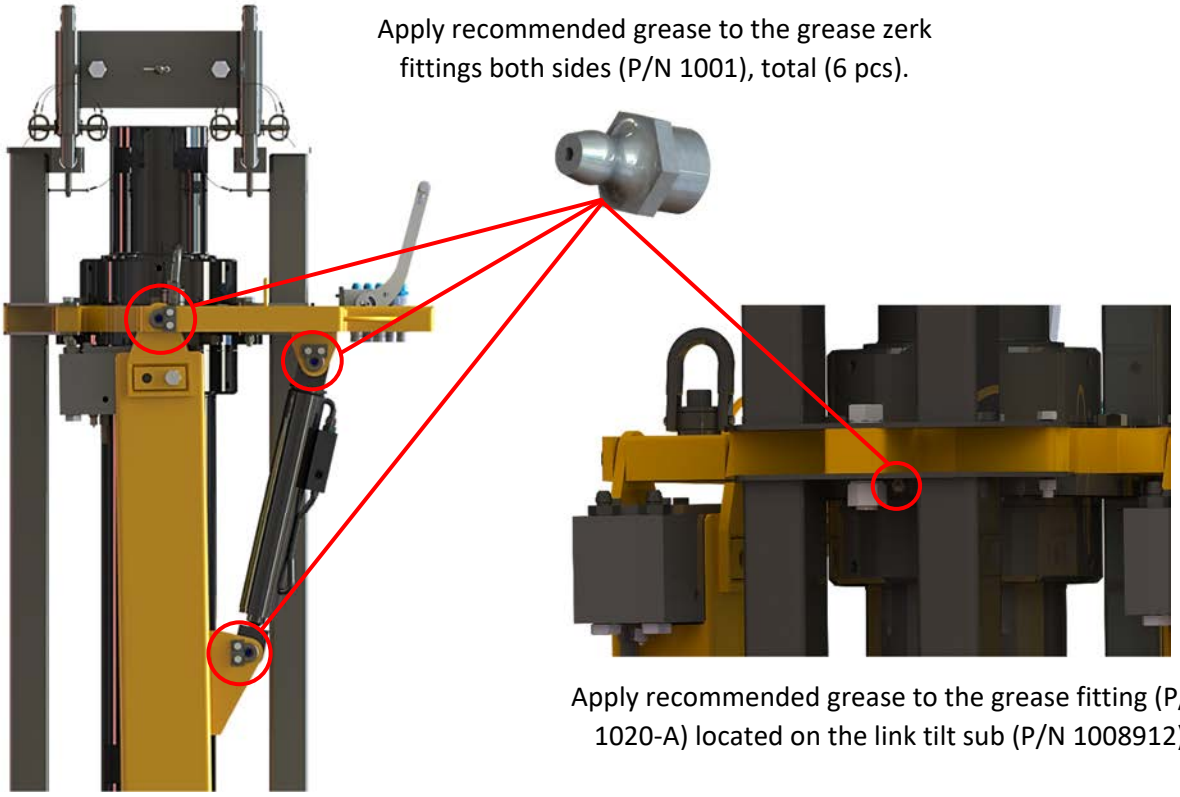
Recommend greasing between the telescoping cylinder tubes, pivot points of the cylinders and link tilt sub.



Grease inside around the edges of the outer tube (P/N 1008911)

Grease all sides of the inner tube (P/N 1008481)

Apply recommended grease to the grease zerk fittings both sides (P/N 1001), total (6 pcs).



Apply recommended grease to the grease fitting (P/N 1020-A) located on the link tilt sub (P/N 1008912)

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SECTION 3: SAFE WORK PROCEDURES

OPERATION

Operator Training

Many companies set qualification standards that must be met before equipment may be operated without supervision. McCoy Global recommends operator training, which typically consists of operation of the equipment under the supervision of a trained equipment operator until a satisfactory level of competence is achieved. Typical operator training should include:

- Introduction to and general description of equipment
- Technical specifications and performance data
- Operating instructions
- Control systems
- Operating hazards
- Checks and Inspections

Operator Safety

McCoy recommends that a hazard assessment of the work area be performed by a designated safety representative before commencing operations. A designated safety 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.

Areas painted yellow are designated as hazardous areas. Contact with those areas must be avoided during operation. Always wear all personal protective equipment (PPE) specified by established HSE guidelines.

⚠ CAUTION

ALWAYS WEAR APPROVED 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 bail arm hydraulic system before connecting or disconnecting quick-connect fittings.

⚠ WARNING

DEPRESSURIZE EQUIPMENT BEFORE DISCONNECTING MAIN HYDRAULIC LINES.

⚠ WARNING

WHEN TILTED AND EXTENDED AT THE FLOOR, THE BAILS COULD PRESENT A PINCH POINT BETWEEN THE BAILS AND THE RACKED DRILL PIPE OR THE JOINT IN THE V-DOOR. THIS SHOULD BE PROPERLY ASSESSED AND PROCEDURALLY MITIGATED ON SITE CONSIDERING LOCAL CONDITIONS AND ARRANGEMENTS.

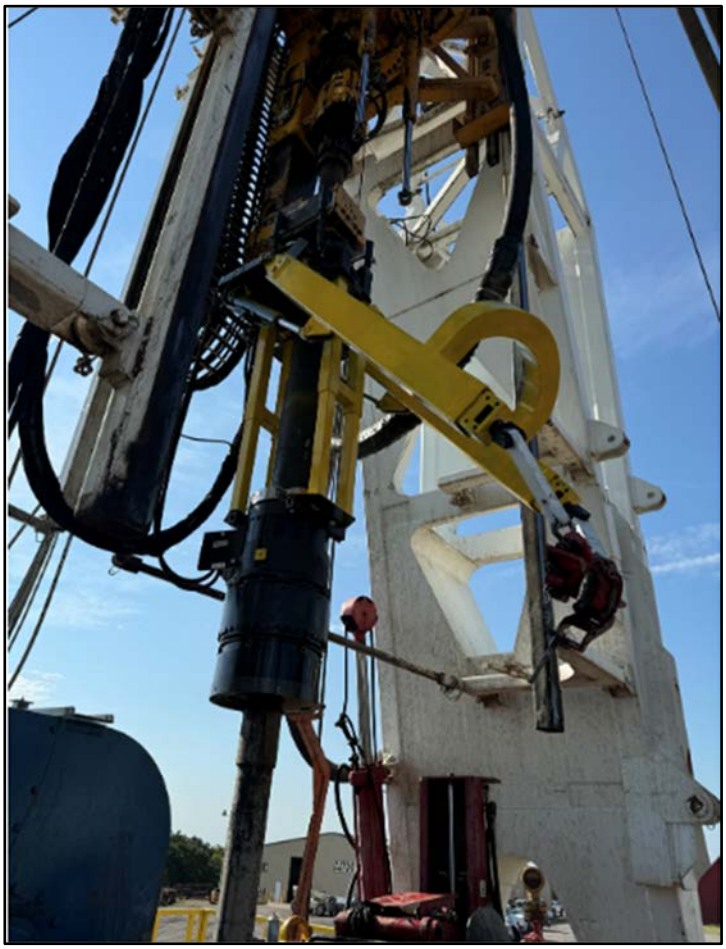


Illustration: Pinch point Hazard while connecting new single joint

Safety Devices

The dynamic bail arms have a velocity fuse, and a pressure relief valve installed inside the cylinder block. These are to prevent an uncontrolled fall in the event of a severed hose or lost hydraulic power. In the event the velocity fuse is activated by such an event, the fuse will reset when the cylinder is retracted.

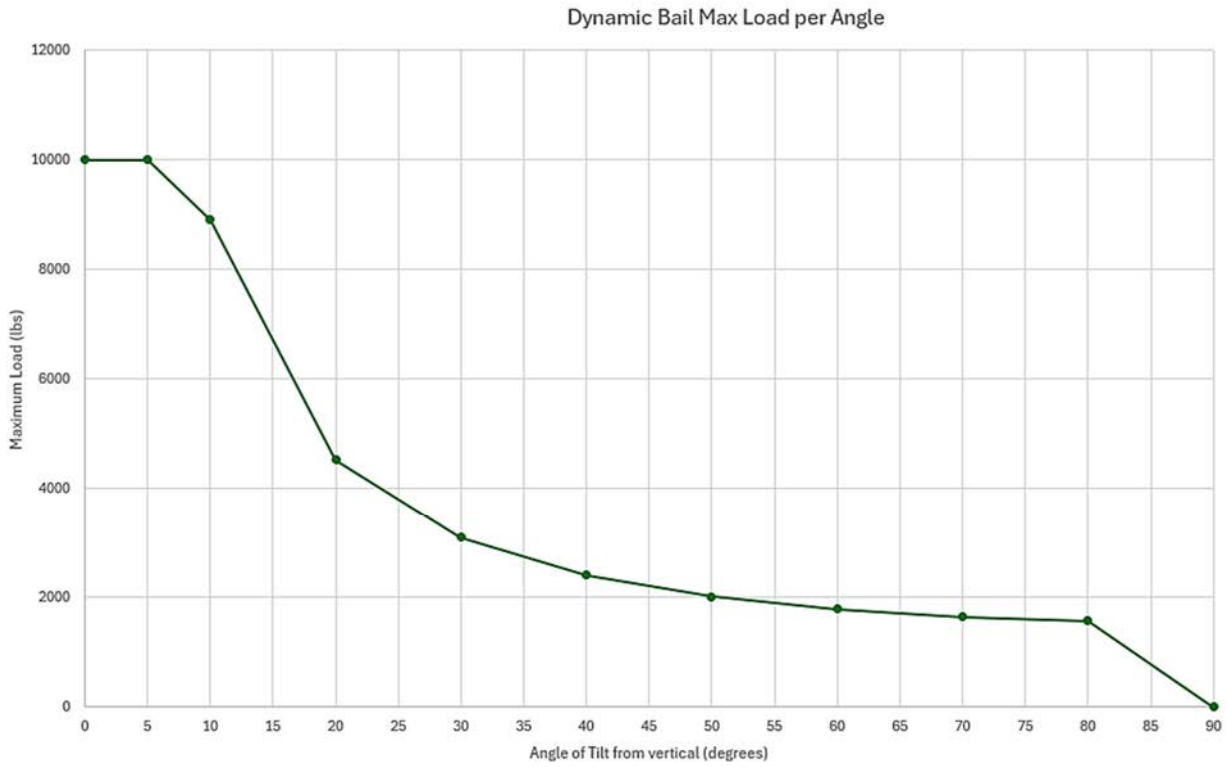
Bail Tilt Angle

When the dynamic bail arms are attached to the Link Tilt Plate, there may be an impact upon the ability of the bails to tilt out at the expected angle. This is a result of the extra weight and the change in the center of gravity. Please plan for a reduced link tilt angle of the bails.

Float Position

The LTS is equipped with pressure-reducing valves and a float position. It's important to understand Dynamic Bail Max Load per Angle and always put the LTS in the float position before hoisting the TDS with a load applied via the single joint elevator.

Dynamic Bail Max Load per Angle



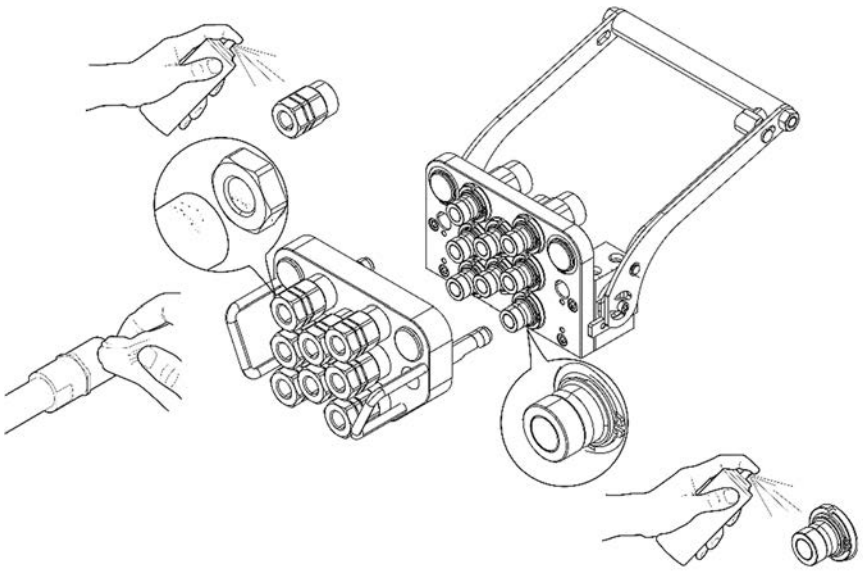
Max load per angle	
Degree of Tilt	**Max load (Lbs.)**
0	10000
5	10000
10	8907.30
20	4522.36
30	3093.47
40	2406.30
50	2019.12
60	1786.02
70	1646.00
80	1570.60
90	0

Link Tilt System Panel Setup and Test Procedure

Testing / Function Testing Sequence:

Refer to hydraulic schematic assembly, control console, GEN III smartHUB 1009085-01, and plumb hoses per hydraulic schematic 1009085HS.

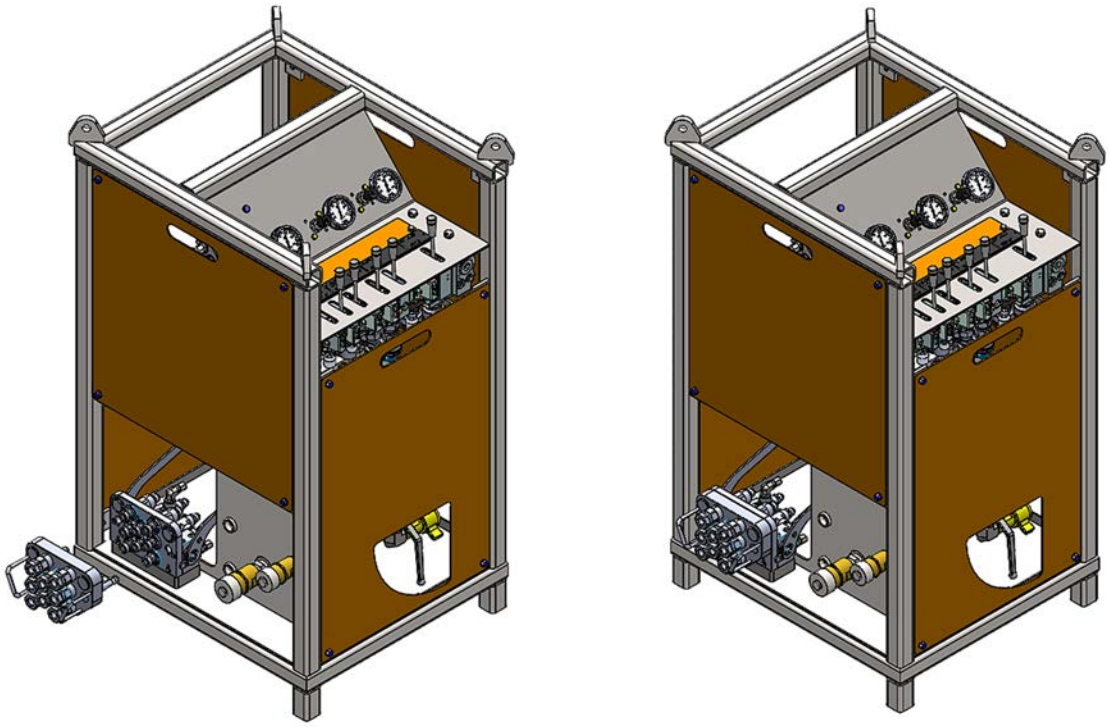
1. Inspect all connectors for compatibility, damage, debris, or other contaminants before performing hydraulic connections. Clean connectors using compressed air, or an approved cleaning solvent and lint-free cloth. Always cover disconnected fittings with the multi-port connection cover. These covers provide significant protection from dust, dirt, other contaminants, and impact damage.



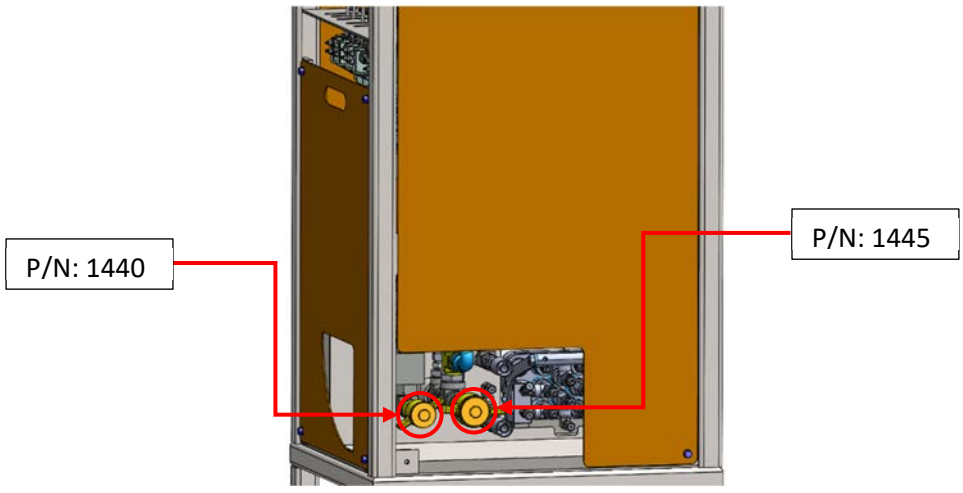
⚠ CAUTION

INSPECT ALL HYDRAULIC PLUMBING AND HOSES BEFORE USE

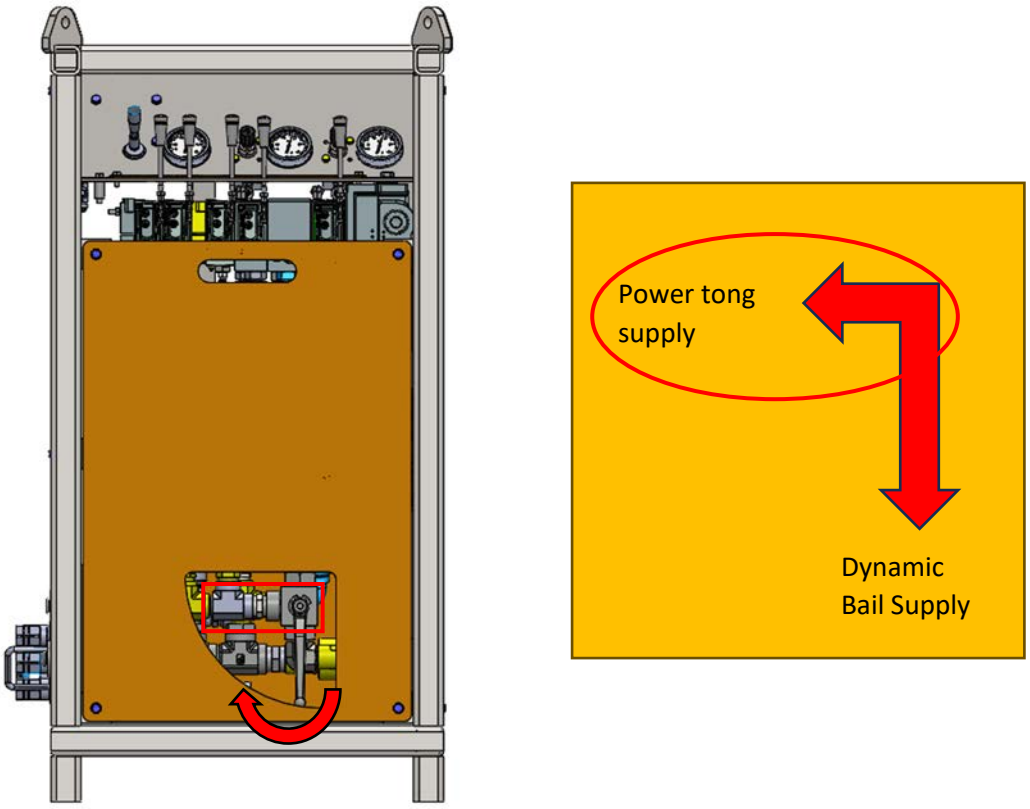
2. Proceed to connect multi-port connection to the Gen III control console.



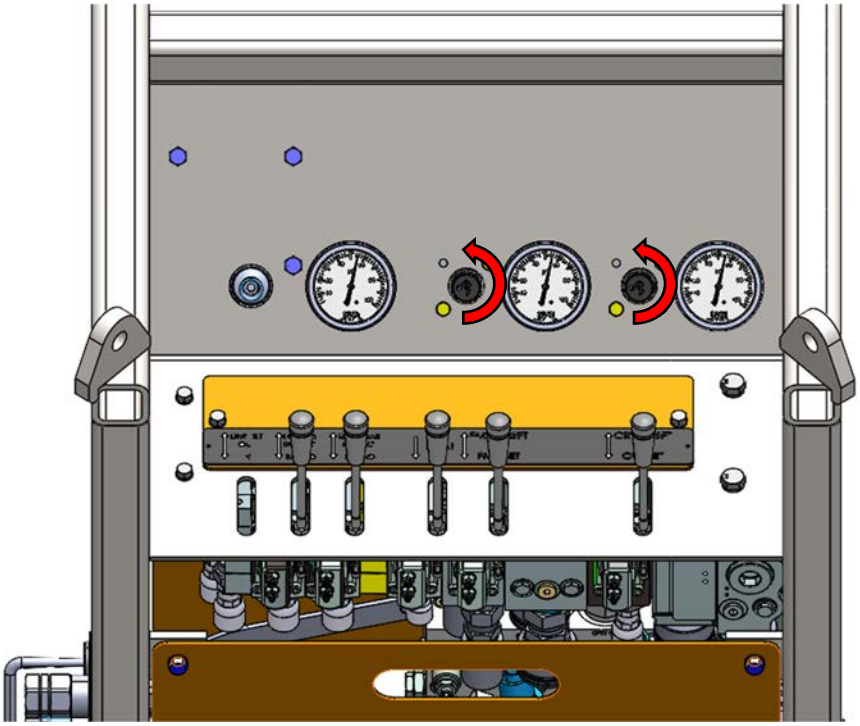
3. Connect the pressure and return jumper hoses coming from the hydraulic power tong into the DB panel connectors P/N: 1445 (1-1/4” return female wing type connector), 1440 (1” pressure male wing type connector). Ensure the wing-type connector has been tightened and properly connected, the O-ring located at male connectors must be inside of the wing-type connector to ensure correct functionality.



4. Select the position on the 1” ball valve P/N: BV3D16N1SS1NE for power the tong supply.



5. Fully rotate counterclockwise the retract and extend relief valve P/N: 1007560, to release the Hydraulic pressure in the panel and avoid a pressure overload.



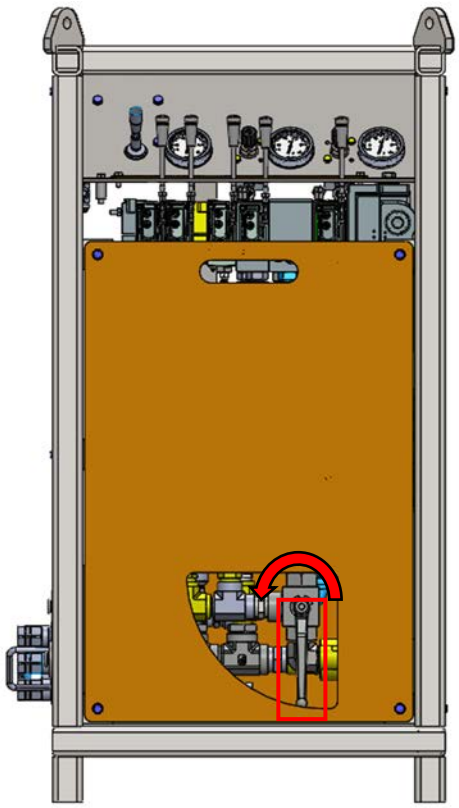
⚠ CAUTION

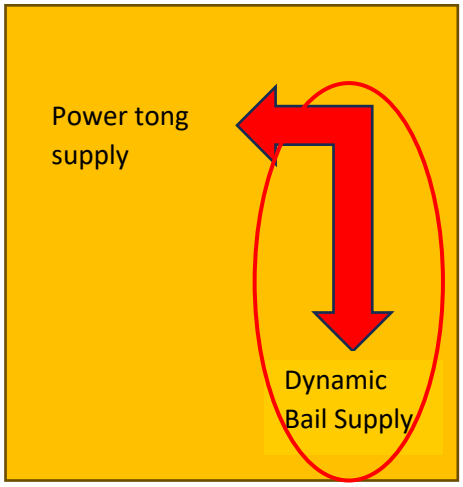
The MAXIMUM PRESSURE FOR THE LINK TILT SYSTEM IS 1,650 PSI. THIS PRESSURE IS SET INDEPENDENTLY ON THE GEN III SMARTHUB (WITH A SYSTEM PRESSURE OF 2,500 PSI).

BEFORE TURNING ON THE HYDRAULIC POWER UNIT, ENSURE THAT ALL CONNECTORS IN THE SYSTEM ARE PROPERLY CONNECTED.

PLEAE NOT THAT THE SYSTEM'S MAX PRESSURE CAPACITY MAY DECREASE SIGNIFICANTLY IF THE COUPLER IS NOT ATTACHED.

6. Turn on the hydraulic power unit and set a maximum pressure of 2,500 psi.
7. Proceed with a tong test (speed and torque test)
8. Select the position on the 1" ball valve P/N: BV3D16N1SS1NE for dynamic bails and LTS supply**.**





9. Set the Dynamic Bails retract pressure depending on the casing weight using the following procedure:

    - **LENGTHS BASED ON THE RANGE** R1=25 FT, R2=34 FT AND R3=45 FT
    - **CYLINDER ANNULUS AREA=** 3.14 in^2
    - **RETRACTING FORCE=** CASING WEIGHT (LB/FT) X MAX LENGTH (FT) X 1.15(Safety factor) / 2(# OF CYLINDERS)
    - **RETRACTING PRESSURE=** RETRACTING FORCE / CYLINDER ANNULUS AREA

Example: Running 9-5/8" 47# N80 R3 casing,

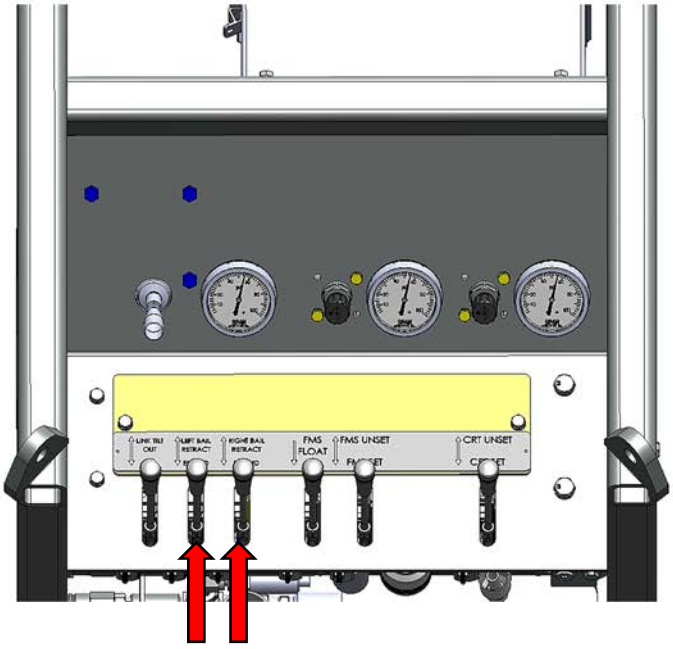
Retracting Force= (47 Lb./FT X 45 FT X 1.15 SF) / 2= 1216.12 Lb.

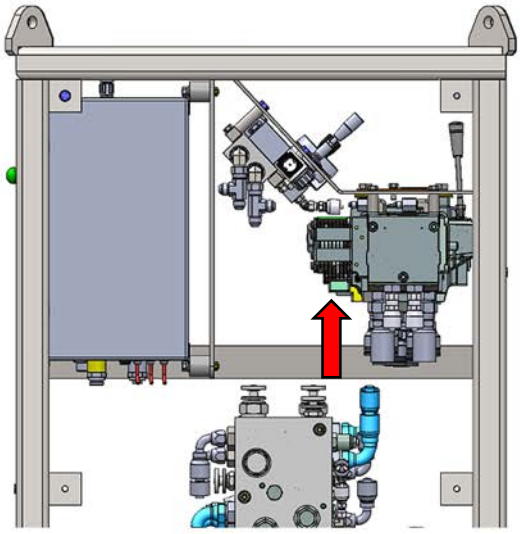
Retracting pressure= 1216.12 Lb./ 3.14 in^2 = 387.30 psi

The retract pressure should be set to a minimum value of 387.30 psi.

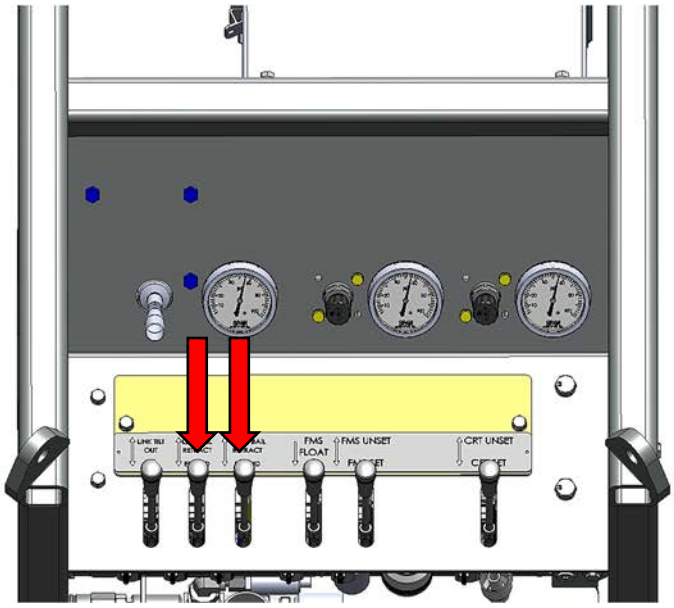
See Section 7- Appendix for the retracting and extending pressure table.

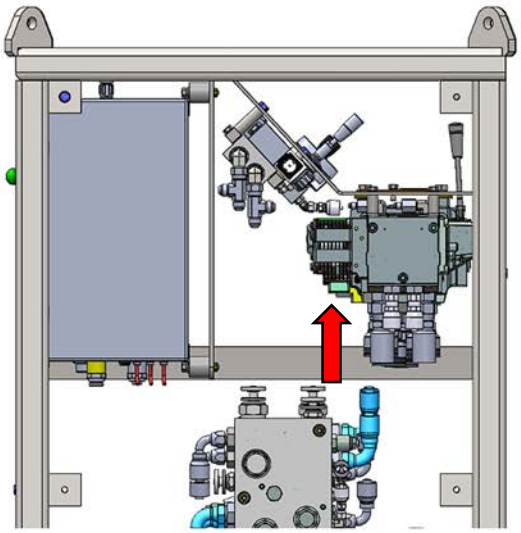
10. To set the pressure on the retract gauges move both levers fully on the control valve P/N: 1008192 to retract position, increase the pressure by rotating the Allen screw at the bottom of the control valve P/N: 1008192 clockwise, or decrease by rotating counterclockwise until it achieves the required pressure on the gauge.





11. To set the pressure on the extend gauges move both levers fully on the control valve P/N: 1008192 to extend position, increase the pressure by rotating the Allen screw at the bottom of the control valve P/N: 1008192 clockwise, or decrease by rotating counterclockwise until it achieves the required pressure on the gauge.





12. Proceed to repetitively verify the fully extended and retracted movements on the Dynamic Bails, ensuring correct operation.
13. Thoroughly check all connections for leaks.

⚠ CAUTION

CHECK FOR HYDRAULIC LEAKS BEFORE OPERATIONS TO PREVENT THE RELEASE OF HOT FLUIDS IN AN EXPLOSIVE ENVIRONMENT.

Pre- Job Measure up & Planning.

- Distance from saver sub face to bottom of extended grabber box.
- Cross-over length from LTS to saver sub.
- ARB extension brackets and requirements.
- Hose Loop hanging position (Slings / Shackles / Length etc.)

Pre-job Equipment Check

- Ensure the LTS is mounted on the CRT prior to leaving the shop.
- Maximum weight of single joint, double or triple (if applicable)
    - Do not exceed rated capacity of 5 Ton.
- Hydraulic hoses and hydraulic connections
- Transport covers on multi-port connections.

- Cable connections are not damaged (smarTR (if applicable))
- LTS is serviced, greased and visually inspected.

Loading the Link Tilt System Package in the Shop

The Link Tilt System should be mounted to the CRT. Please review Safe Work Procedures in the Hydraulic CRT manual.

Crew Arrival to Location

Refer to Safe Work Procedures in the Hydraulic CRT manual.

Rigging-up the Link Tilt System

Refer to Hydraulic CRT manual

Rigging-up the Service Loop.

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. Position the hose loop on the catwalk or beside the rig so that it can be hoisted to the rig floor.
3. Hoist the TDS to a safe height, allowing sufficient room to safely hang the hose loop.
4. Communicate to the Driller and Derrick hand the position on the rig where the hose loop must be hung, depending on the derrick style.

⚠ CAUTION

IF HANGING THE HOSE LOOP INSIDE OF THE DERRICK, ENSURE THE TOP DRIVE TRAVEL AREA, HOSE LOOP OR OTHER MOVING ITEMS CANNOT COME INTO CONTACT WITH IT DURING NORMAL OPERATION.

⚠ CAUTION

IF HANGING ON THE OUTSIDE OF THE DERRICK, ENSURE THAT THE HOSE LOOP CAN FREELY MOVE UP AND DOWN THE DERRICK WITHOUT BECOMING SNAGGED ON A PAD EYE OR OTHER PROTRUSION.

5. Clear the rig floor and install the hole cover to prevent drops.
6. Hoist the hose loop and secure it to an agreed upon point in the derrick.

⚠ CAUTION

LOOK UP WHEN RUNNING A TUGGER OR LIFTING, MAKE SURE THE CABLE IS NOT CAUGHT IN THE DERRICK.

⚠ CAUTION

FOR ALL LIFTS, CLEAR THE SWING PATH ON THE RIG FLOOR.

⚠ CAUTION

SECURE THE BRIDAL 40-45' IN THE DERRICK FOR CORRECT TRAVEL HEIGHT FOR NORMAL OPERATIONS. CONSIDER THE LENGTH OF THE HANGER ASSEMBLE OR OTHER ACCESSORIES IF LONGER THAN THE CASING JOINTS. USE THE SECONDARY RETENTION CABLE ON THE HOSE LOOP, CONNECT THE SAFETY LINE.

7. Once the hose loop is secure, lower the Top Drive back to the rig floor.
8. Connect the hydraulic hoses and Sensory Cables to the Link Tilt System and Console.
9. Secure the hoses to the upper spreader bar to ensure they are secure when the Top Drive is in motion.
10. Hoist the HPU hoses to the rig floor and connect them to the Console.
11. After ensuring everything is connected, clear the immediate area, and engage HPU.
12. Function tests the Link Tilt System & Dynamic Bails by extending/retracting 3-5 times. Ensure there is enough distance between the rig floor and the extended Dynamic Bails to fully function test.
13. Have someone enter the rig floor area after engaging hydraulics to check for any leaks.

Safe Operating Procedures

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. Lower the Top Drive, link the bails out and extend to reach the joint in the V-Door.
3. Lubricate the packer cup and circulator assembly prior to picking up the first joint.
4. 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.
5. Hoist the joint from the V-Door into the derrick (using a hold back rope if necessary for larger or heavier pipe).

⚠ CAUTION

ENSURE THAT THE LINK TILT SYSTEM IS IN THE FLOAT POSITION PRIOR TO HOISTING THE JOINT FROM THE V-DOOR.

6. As the bails float to center, disengage the float position approximately 10 degrees from hole center. Remove the protector and retract the link tilts over hole center.

⚠ CAUTION

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

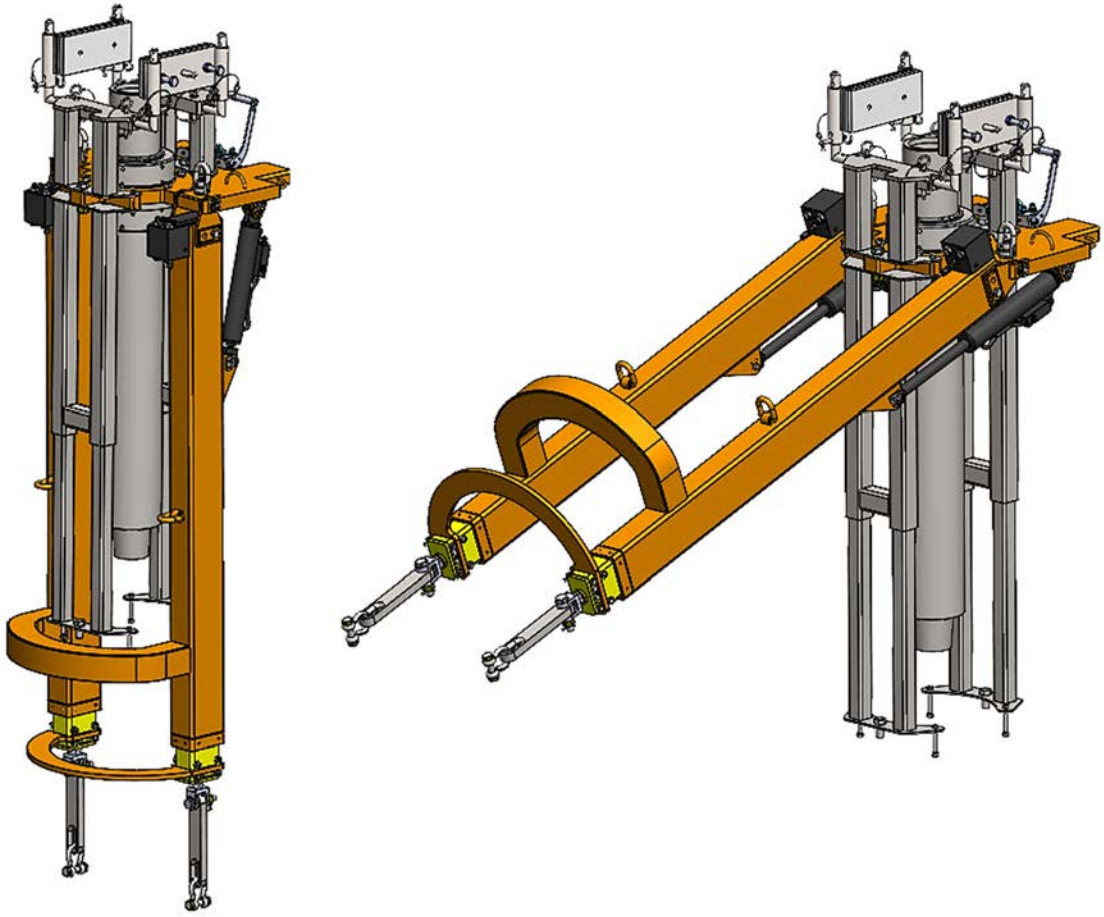
7. Using the Link Tilt System, slowly lift and stab the tubular onto the circulator assembly.
8. If there is front to back misalignment:
    a. Adjust the link tilt to align the tubular with the mandrel.
9. Use caution to ensure the tubular is aligned with the circulator. Avoid jamming the coupling on the circulator nose.
10. Once past the packer cup, communicate with the driller to determine the optimal position for smooth operations. (If using a Hydraulic CRT, and spaced correctly, consider the option to retract the bails and engage the tool prior to stabbing the pin into the box.)
11. Lower the top drive and stab the pin into the box.
12. Lower the CRT and engage the slips (if not already completed in step 7) apply back-up tongs or use a McCoy FMS that holds torque.
13. Rotate the tubular and make up the casing connection.
14. Once the desired torque is reached, release the applied torque, and prepare to hoist the tubular.
15. Remove the slips as the driller hoists.
16. Once slips are removed, begin to lower the tubular into the wellbore.
17. Extend the bails fully, to give the technician time to unlatch the single joint elevators.
18. Extend the link tilt towards the V-door after the single joint elevator has been unlatched.
19. IF POSSIBLE, extend and latch the elevators on to the next tubular in preparation for the lift after the CRT is disengaged.
20. Lower the tubular to the desired stump height and using visual communication with the driller set the slips as he slows to a stop.
21. Complete steps 2-20 for subsequent joints.

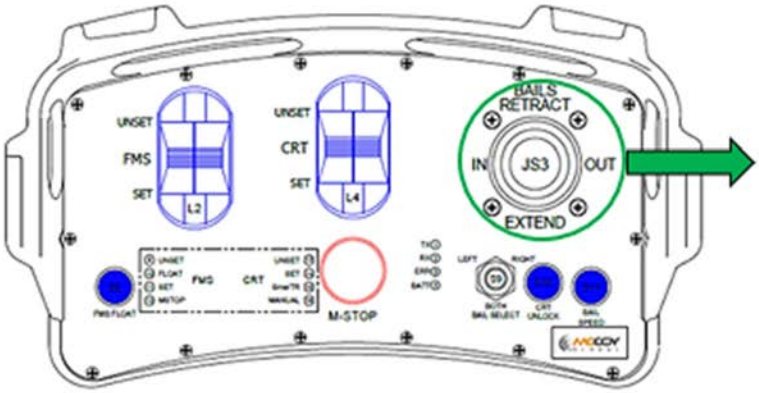
⚠ CAUTION

ENSURE THAT BOTH CYLINDERS AND HOSES ARE INSPECTED AND PRESSURE TESTED PRIOR TO EACH JOB.

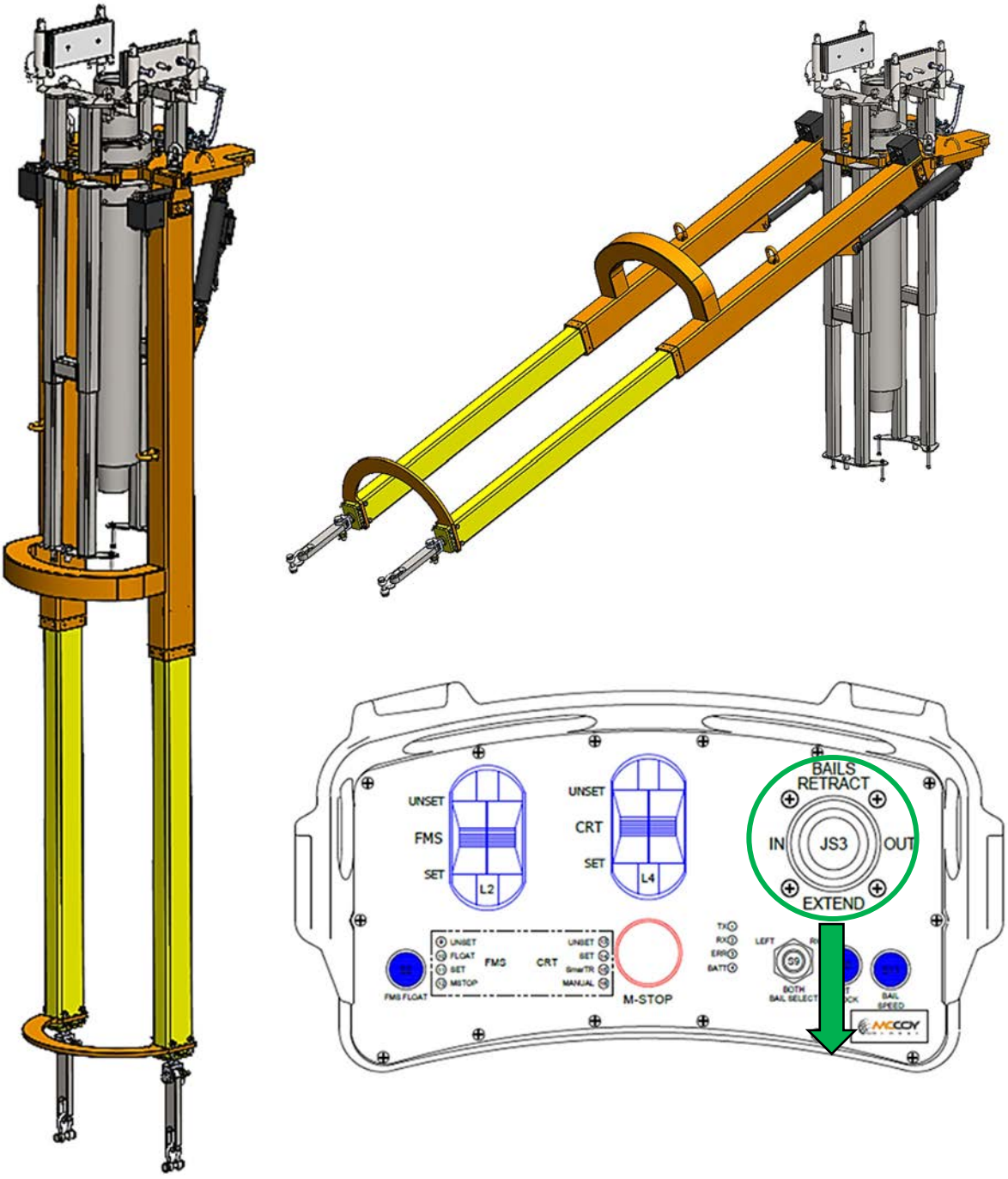
Safe Operating Procedures – Belly Pack

1. Understand and familiarize yourself with the Belly Pack functionality and paddle layout.
2. Using the Belly Pack, slowly lift and stab the tubular onto the circulator assembly.
3. If there is any misalignment, use the toggle switch to control either the left or right bail to align the tubular with the circulator. Once aligned, release the toggle switch, function the retract paddle and the bails will retract simultaneously.
4. To activate the Link Tilt Cylinder, hold the joystick (JS3) to the right towards the 'OUT' position to extend the Link tilt cylinder P/N: 1008672.





5. To activate the Dynamic Bail Cylinder, hold the joystick (JS3) in down position towards the ‘EXTEND’ position to extend the Dynamic Bail Cylinder P/N: 1008486.



6. Refer to steps 2-20 in safe operating procedures.

⚠ CAUTION

THE SINGLE BAIL FUNCTION IS ONLY TO BE USED FOR LEFT AND RIGHT TUBULAR ALIGNMENT. FULLY EXTENDED OR FULLY RETRACT THE BAILS TO RESET THE ADJUSTMENTS.

⚠ CAUTION

IF MISALIGNMENT IS OCCURING, ALIGN THE RIG. SMALL ADJUSTMENTS AT THE START WILL SAVE TIME AND MAKE THE ENTIRE RUN MORE EFFICIENT AND SAFER.

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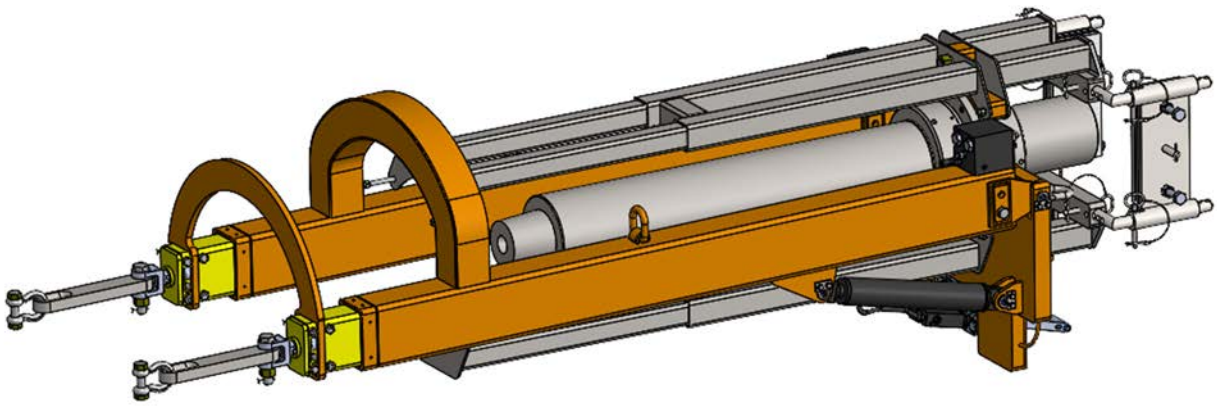
SECTION 4: ASSEMBLY AND DISASSEMBLY PROCEDURE

Disassembly Procedure

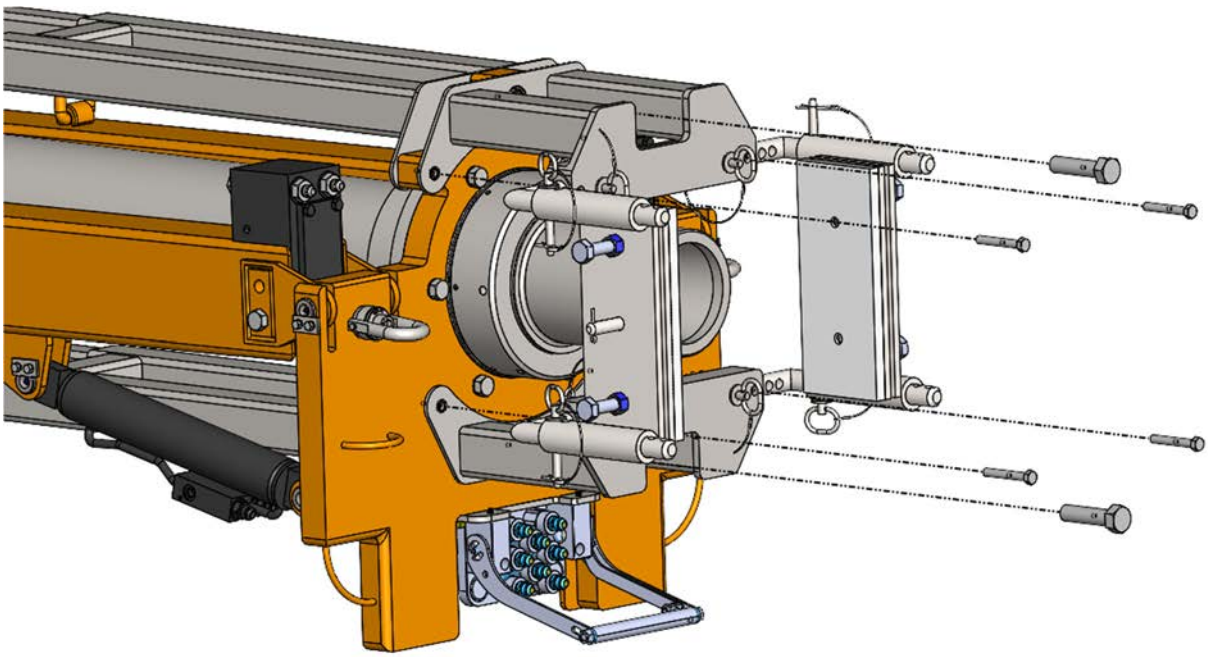
1. Place the Link Tilt System on a stable, stationary support, ensuring that the bottom of the body is easily accessible.



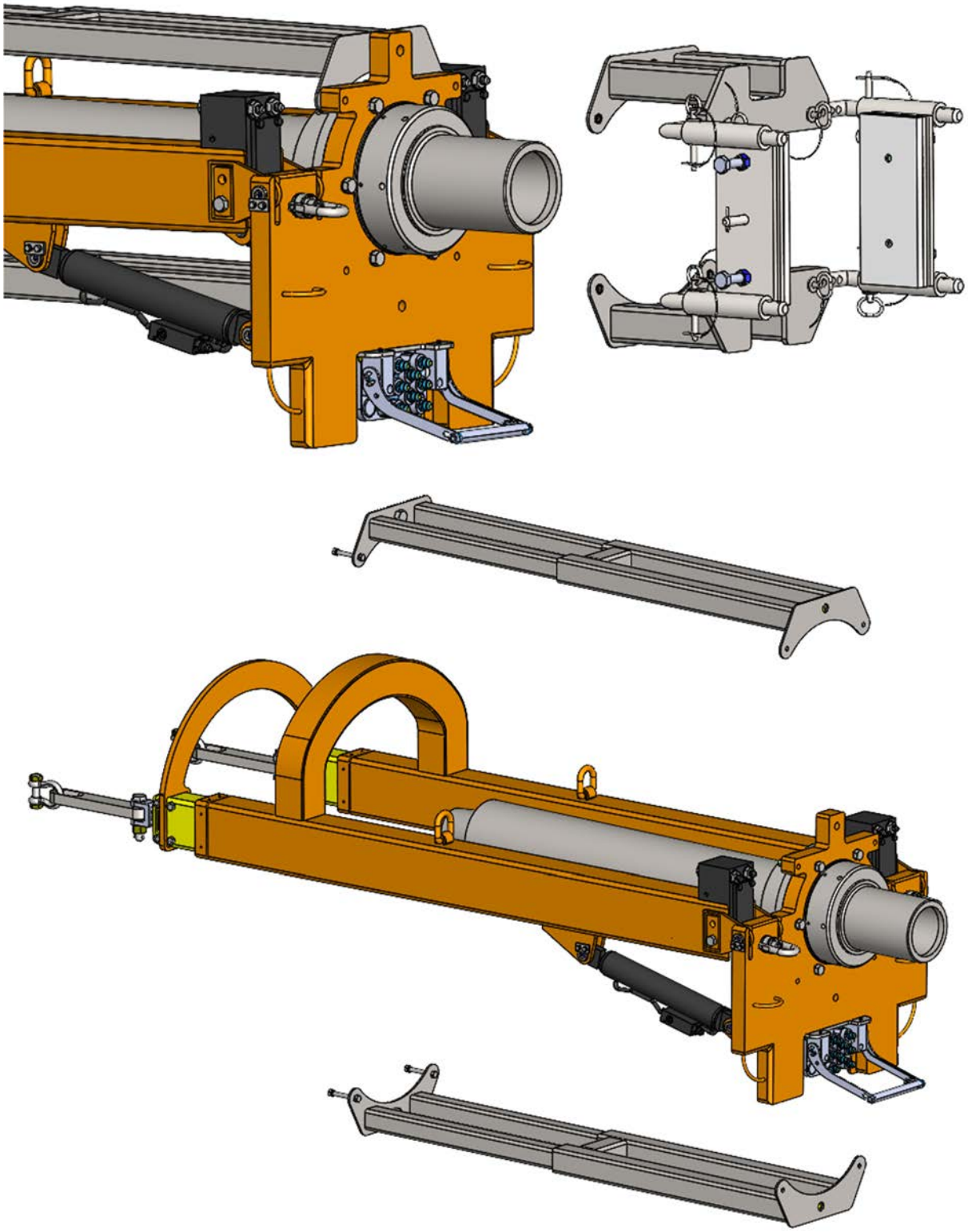
⚠ CAUTION

PROPERLY RESTRAIN OR FIX THE TOOL POSITION WHILE ASSEMBLING AND DISASSEMBLING

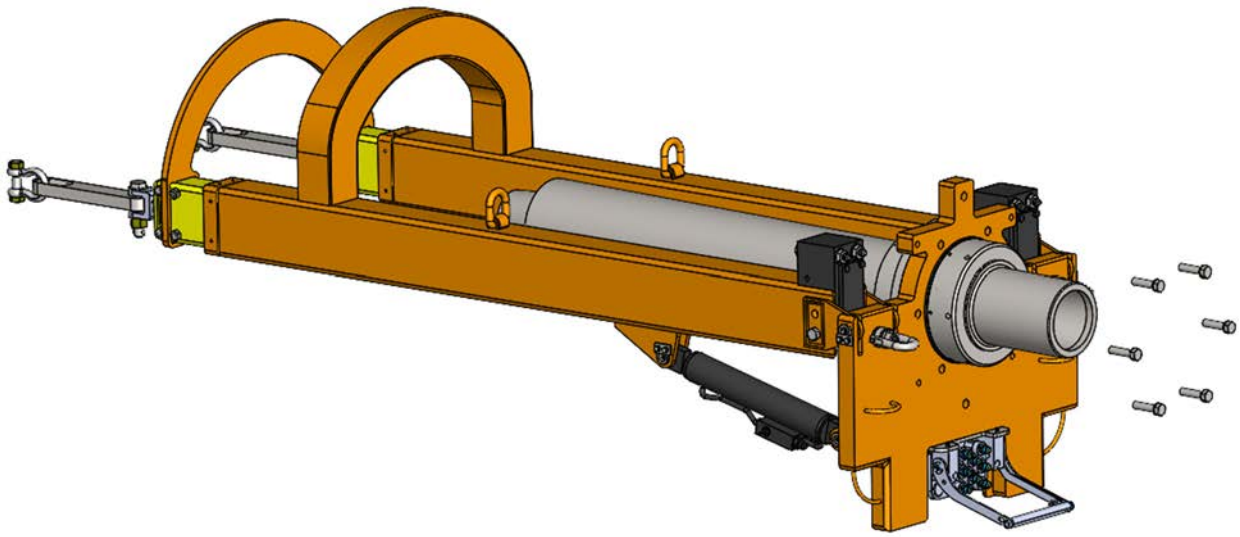
2. Unscrew the 1”-8 x 4 hex head bolts (2 ea., P/N: 1291) and the ½”-13 x 3 ½” GR8 hex head bolts (4 ea., P/N: 1120) from the Link Tilt Anti-Rotation Bracket (ARB) (P/N: 1008681) and the Anti-Rotation Housing (P/N: 1008673)."



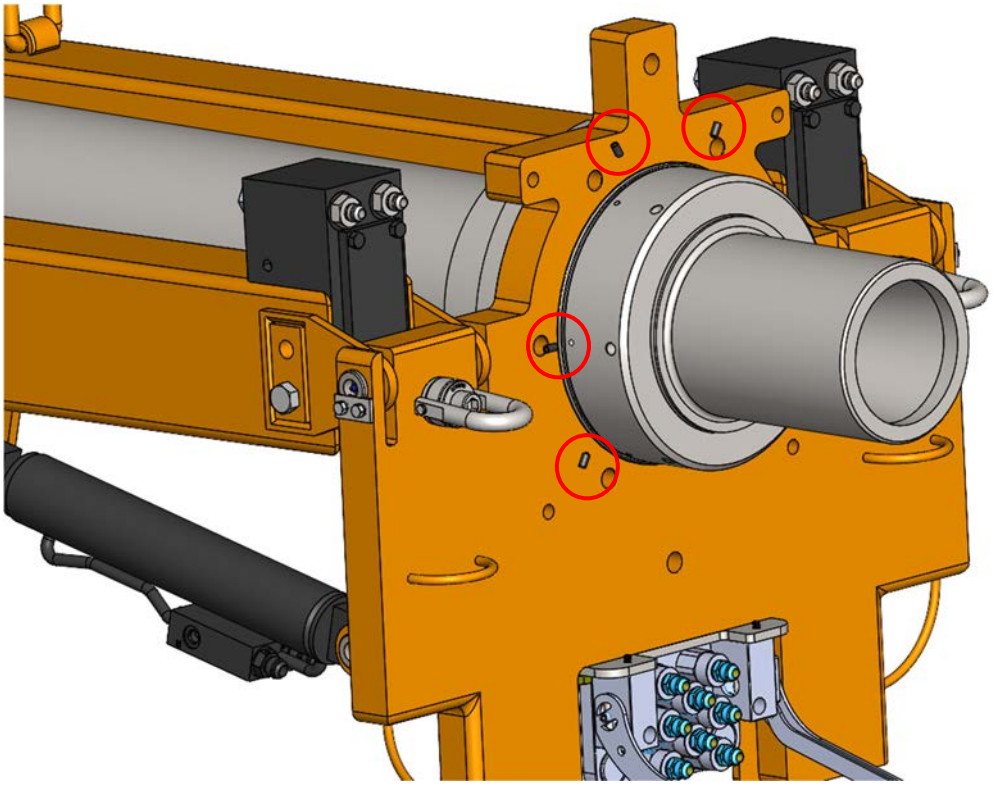
3. Remove the link tilt anti-rotation bracket (P/N: 1008372) with the weldment link tilt ARB (P/N: 1008681), inner beam (P/N: 1008918) and outer beam (P/N: 1008917)



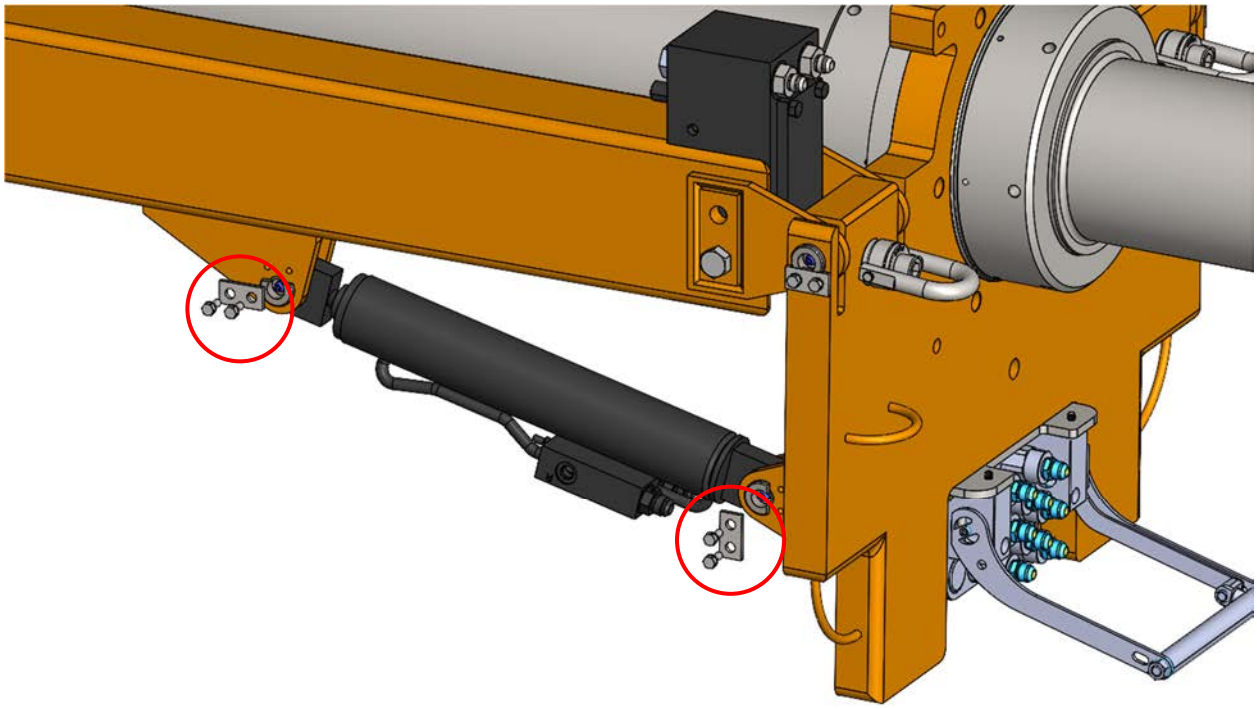
4. Remove the hex head 3/4”-10 X 3 GR8 bolts P/N: 1176 (6 ea.) in the anti-rotation housing P/N: 1008673.



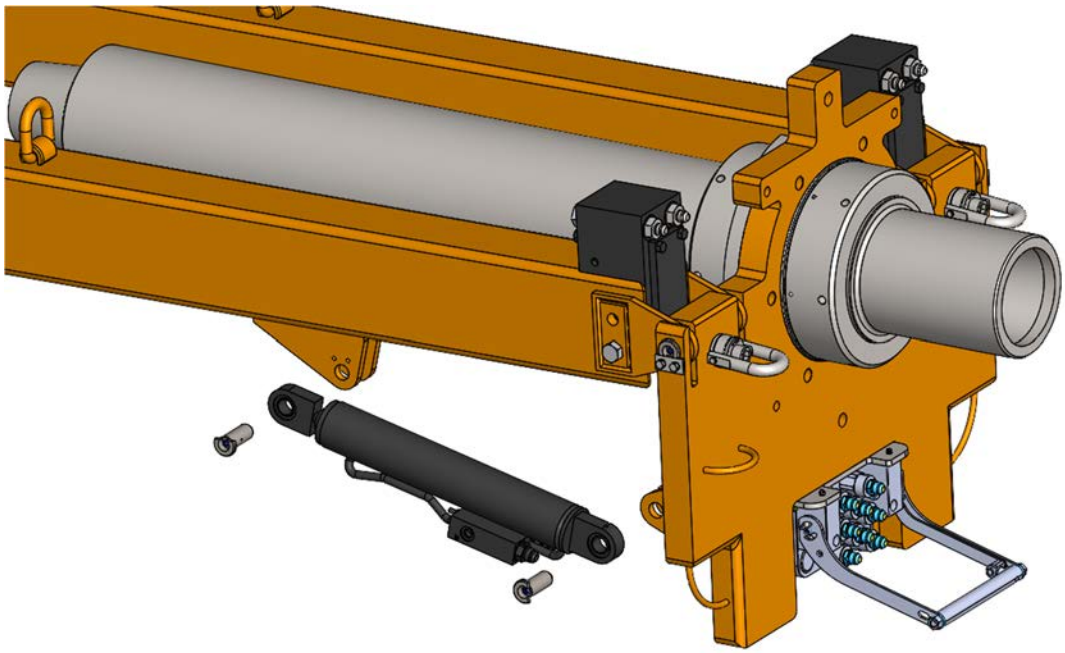
5. Remove the set screw 5/16-18 X 5/8, black oxide, cup point P/N: 1008675 (6 ea.) in the link tilt cap end P/N: 1008670.



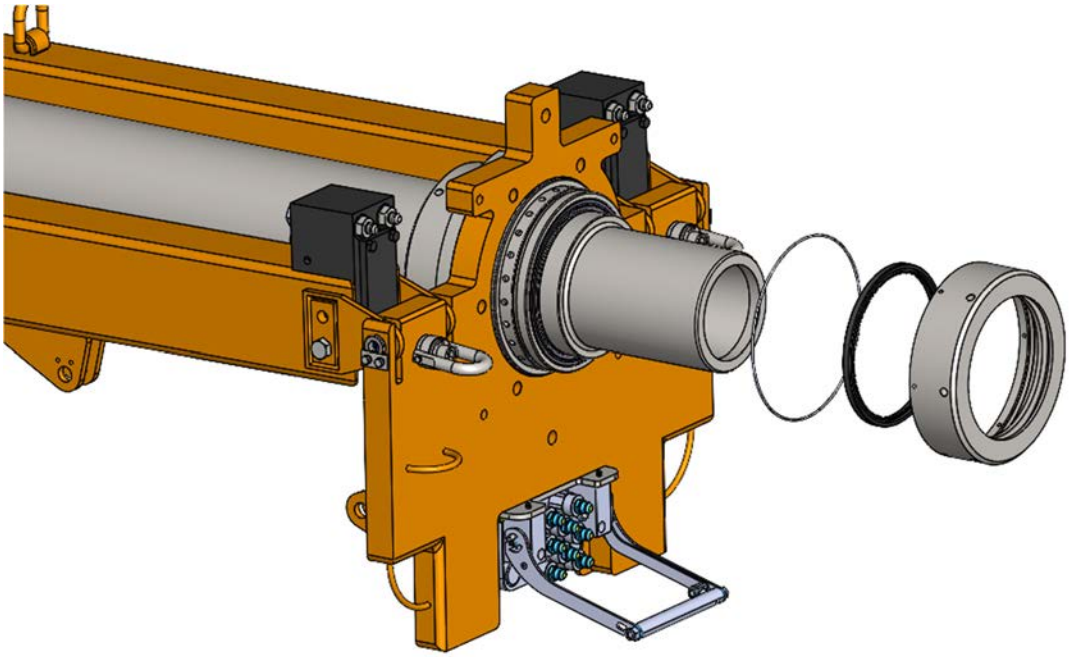
6. Proceed to remove the hex screw 5/16-18 X 3/4 GR8 (P/N: 121) and the lock plate (P/N: 1008662). Repeat same process to the other side.



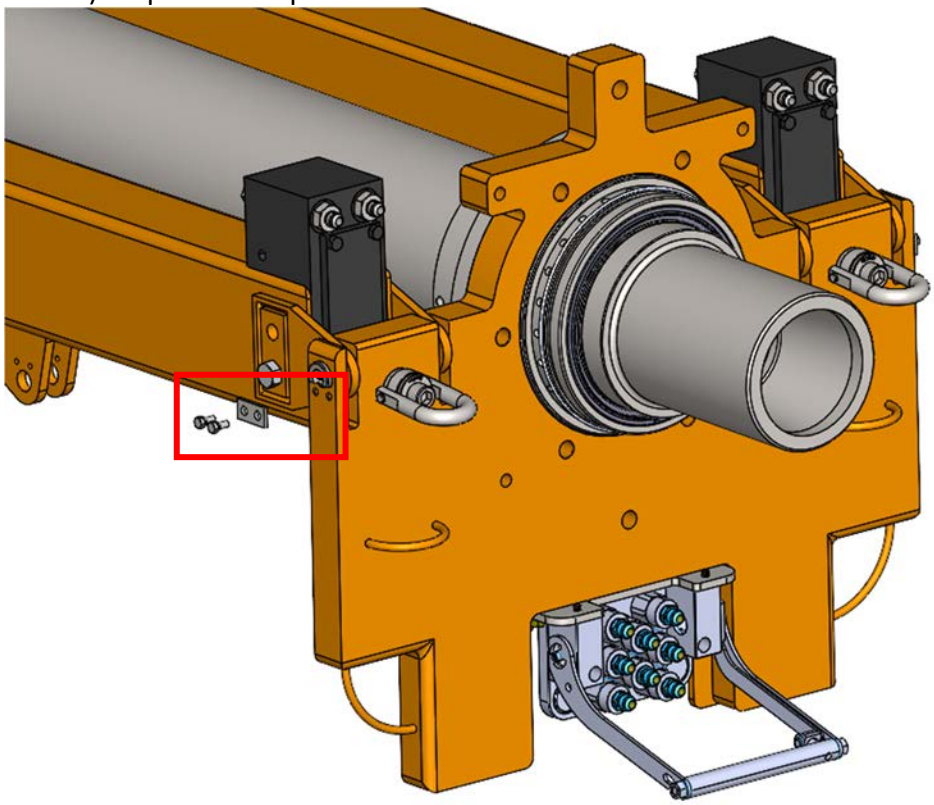
7. Remove the cylinder clevis pin P/N: 1008666 with grease fitting P/N: 1001 and proceed to remove the cylinder P/N: 1008672.



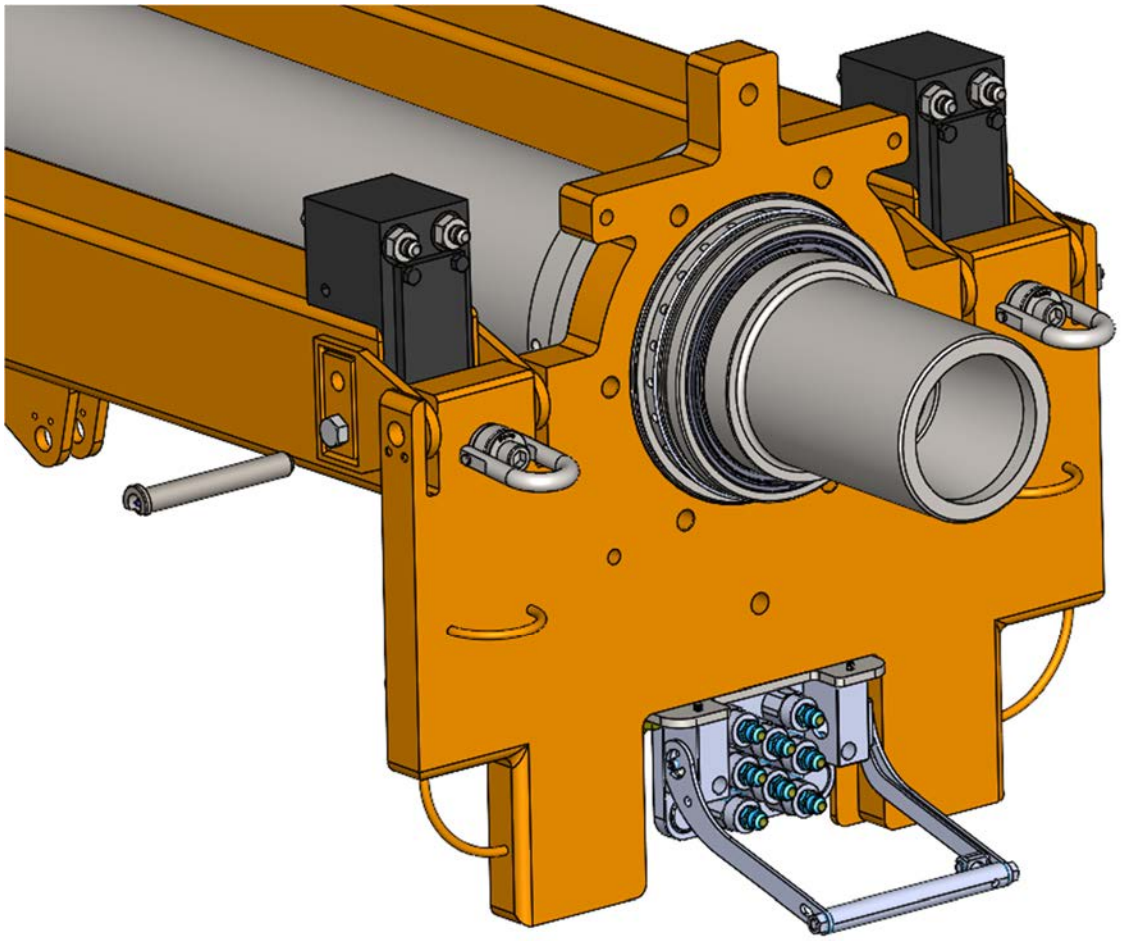
8. Unscrew the link tilt end cap P/N: 1008670 and remove the rotary seal P/N: 1008494 and the O-ring P/N: 1008677.



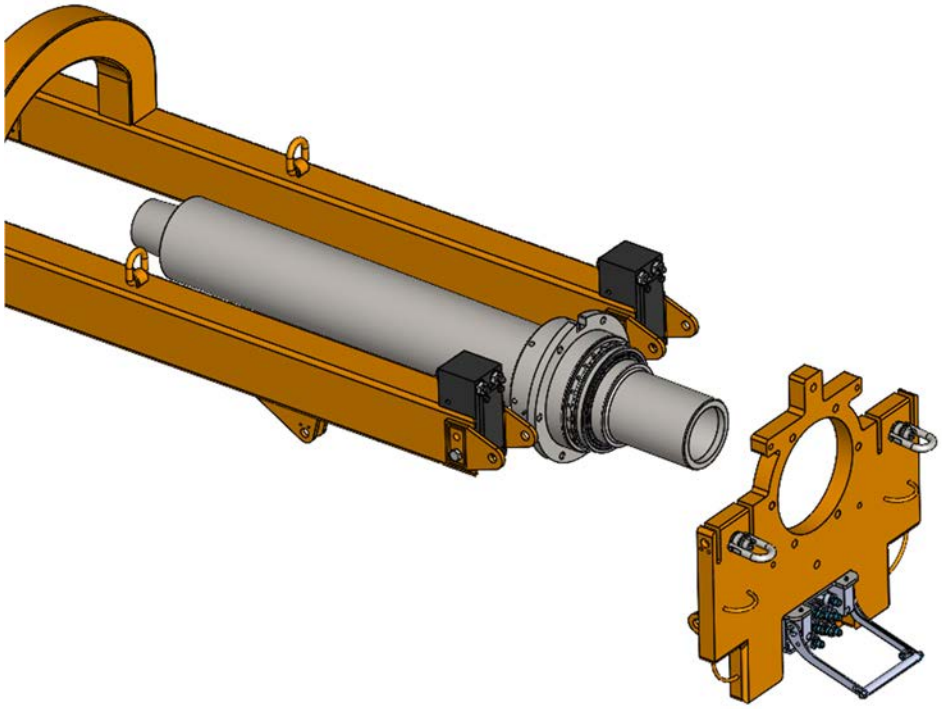
9. Proceed to remove the hex screw 5/16-18 X 3/4 GR8 (P/N: 121) and the lock plate (P/N: 1008662). Repeat same process to the other side.



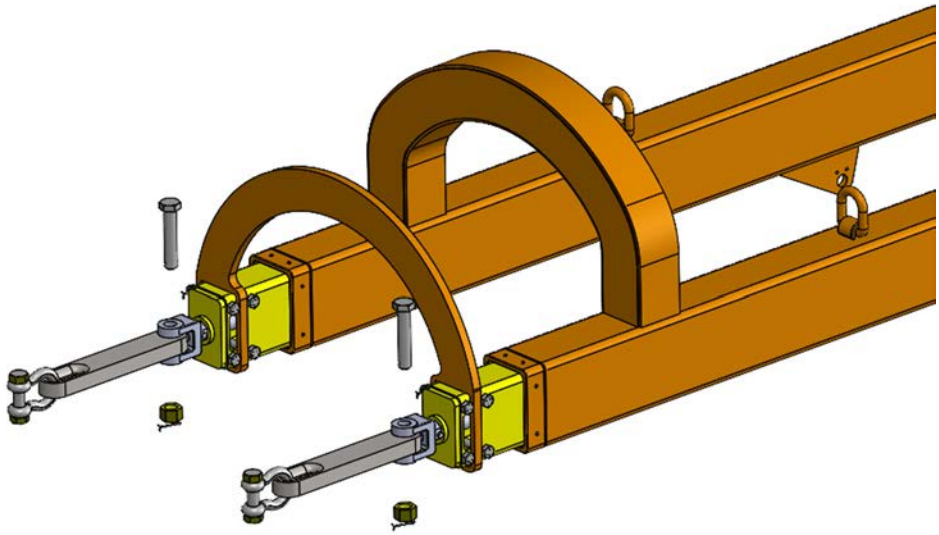
10. Remove the link tilt boom clevis pin P/N: 1008652 with grease fitting P/N: 1001



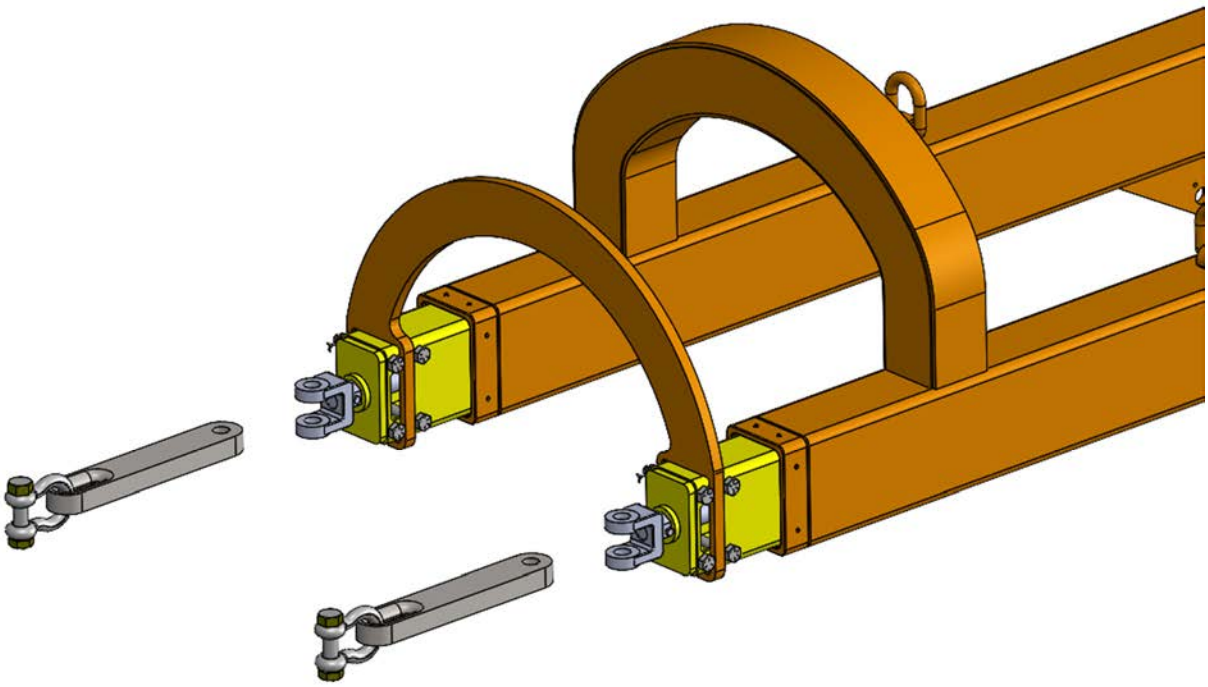
11. Proceed to remove the anti-rotation housing P/N: 1008673 and link tilt sub P/N: 1008912



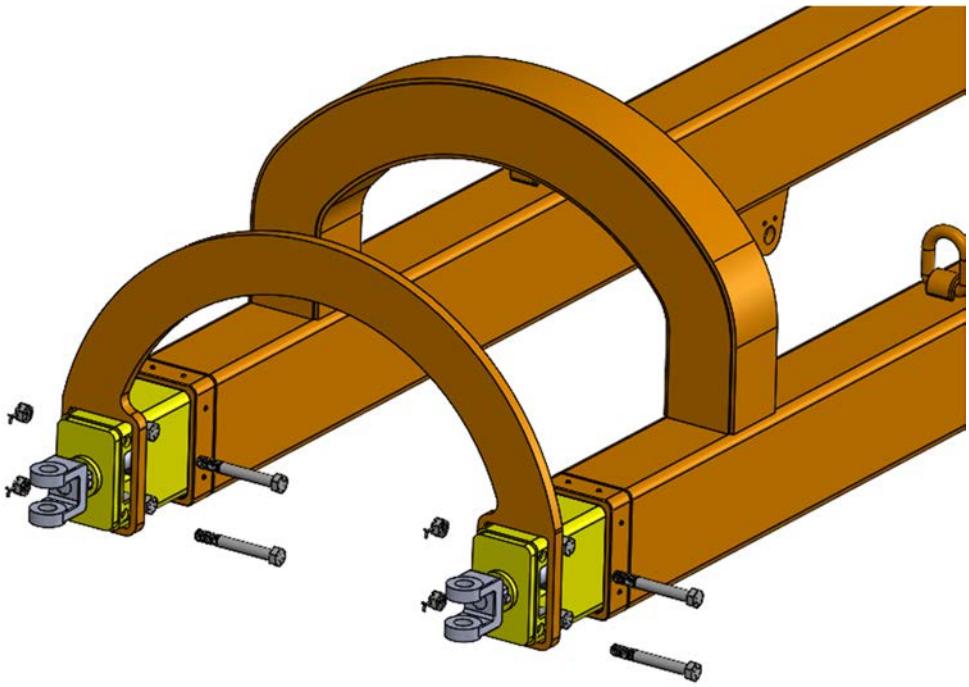
12. Remove the cotter pin 5/32 X 1 ½ PN: 10043 (2 ea.) and unscrew the hex nut 1”-8 P/N: 1683 (2 ea.).



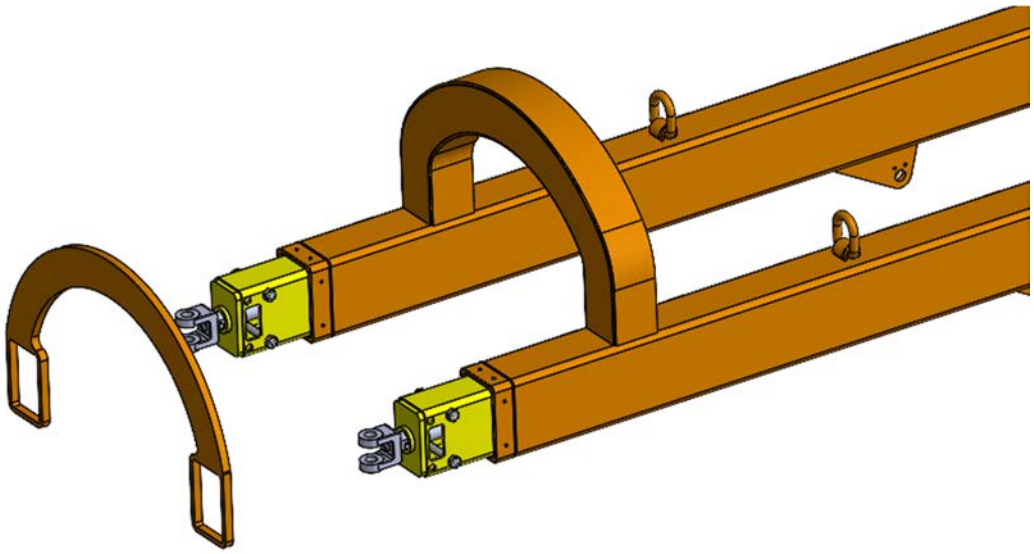
13. Remove the link plate P/N: 1008656 with shackles P/N: 30093



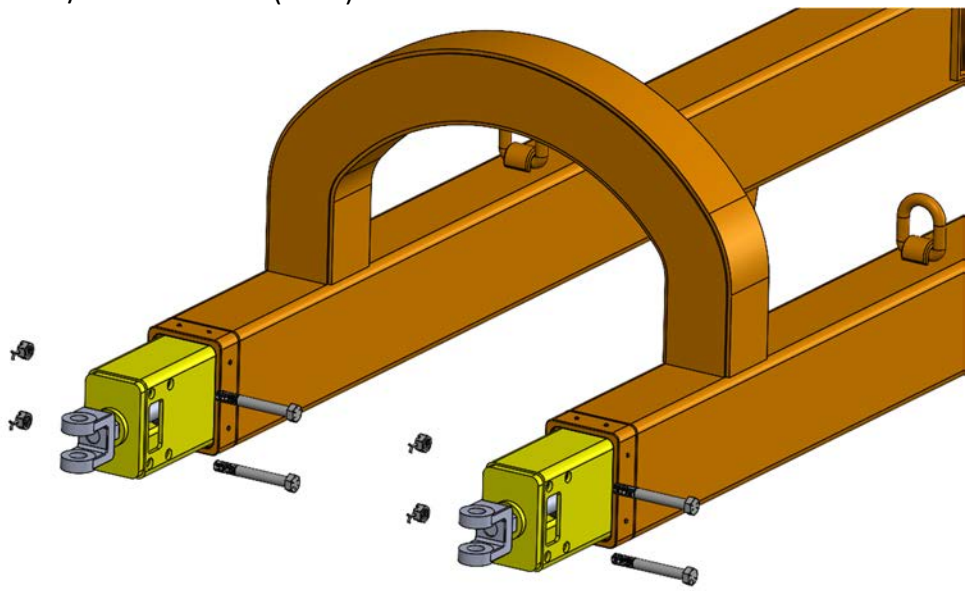
14. Remove the cotter pin 5/32 X 1 ½ PN: 10043 (4 ea.) and unscrew the hex nut slotted 5/8”-11 P/N: 97190A030 (4 ea.).



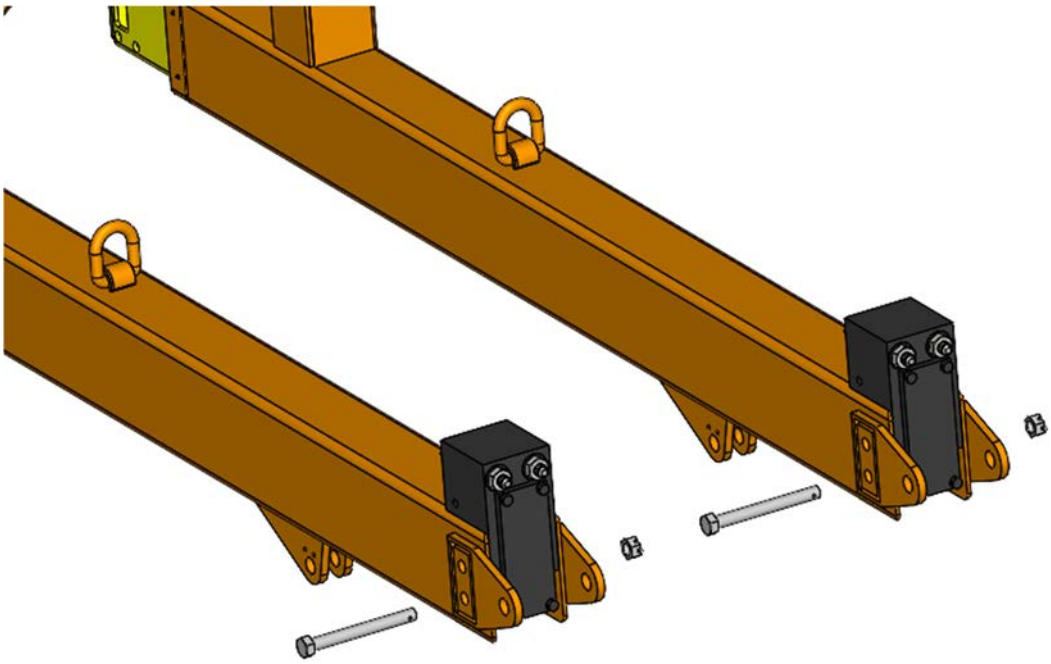
15. Proceed removing the dynamic link tilt plate P/N: 1008905



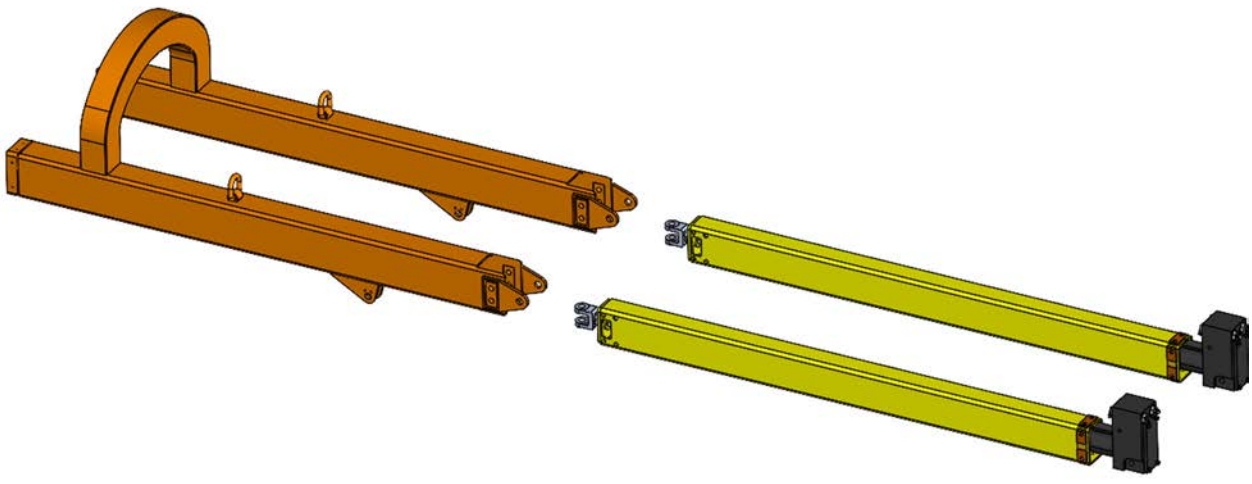
16. Remove the cotter pin 5/32 X 1 ½ PN: 10043 (4 ea.) and unscrew the hex nut slotted 5/8”-11 P/N: 97190A030 (4 ea.).



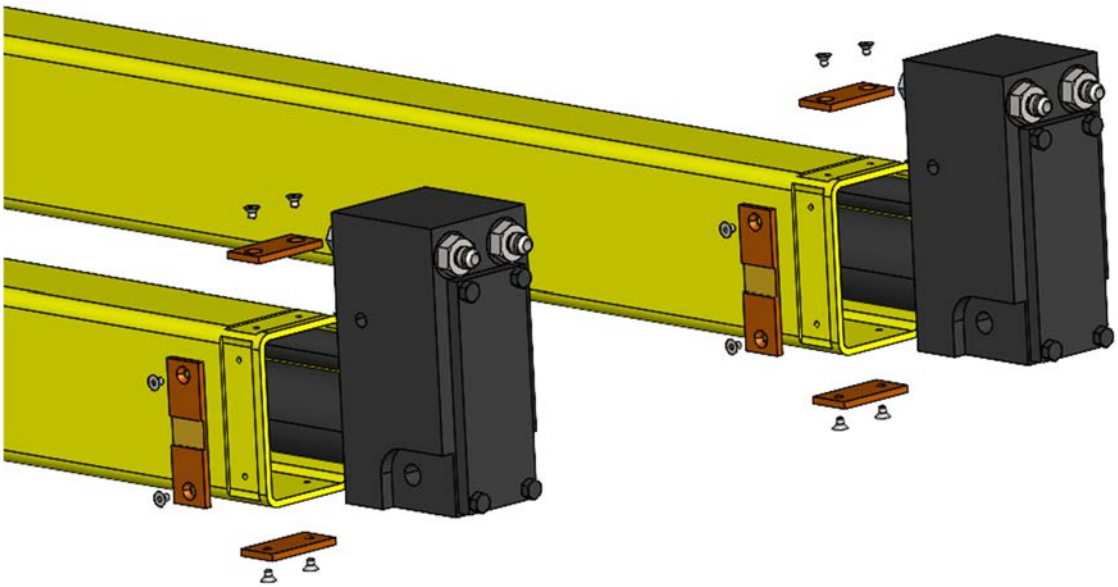
17. Remove the cotter pin 5/32 X 1 ½ PN: 10043 (2 ea.) and unscrew the nut slotted 3/4”-10 P/N: PH-50516-A (2 ea.).



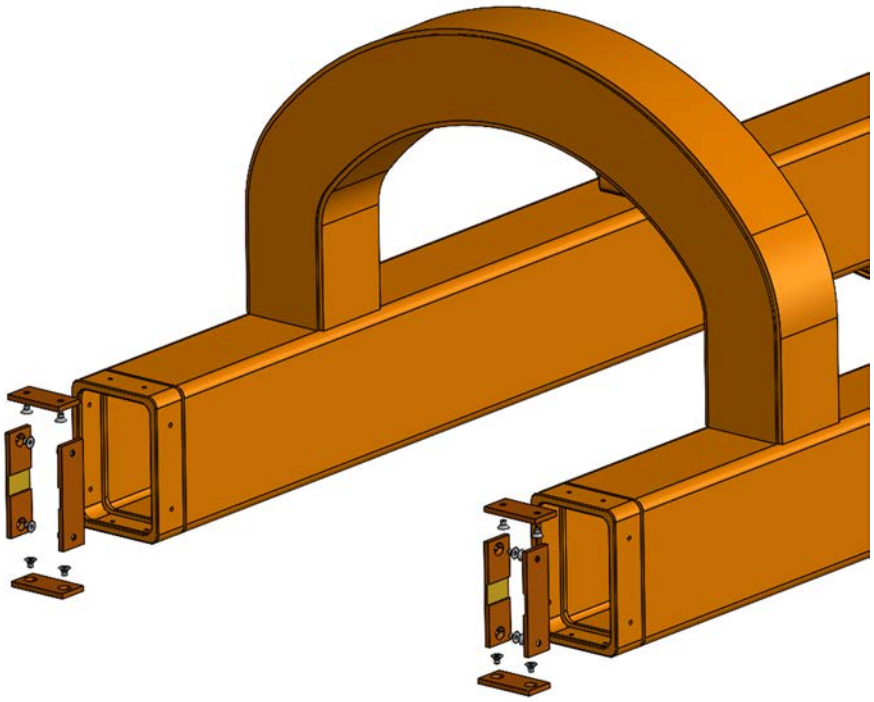
18. Proceed removing the cylinder P/N: 1008486 together with inner tube P/N: 1008481.



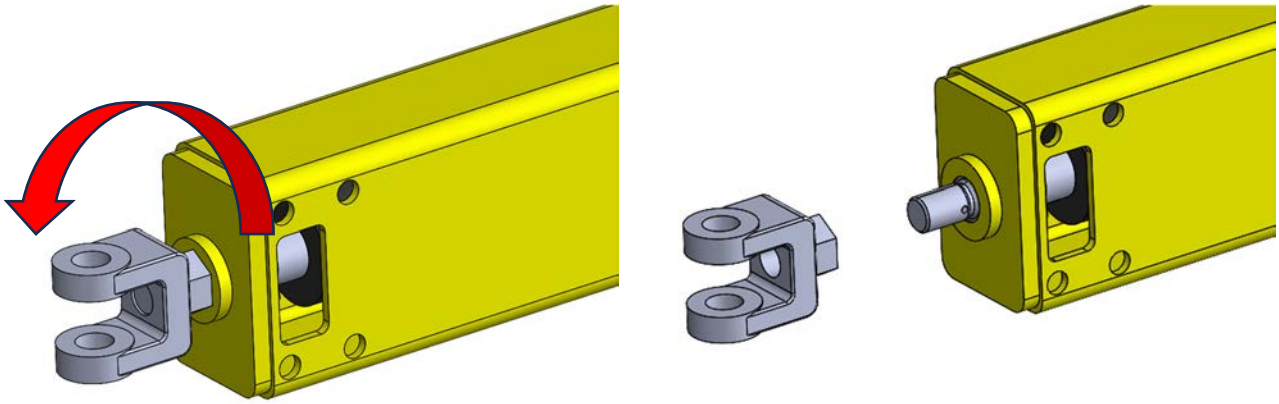
19. Unscrew countersink socket head ¼-20 x 3/8, P/N: 1009047 (total qty. 16 ea.) to remove wear bars PN: 1007888 and 1007889 (total qty. 8 ea.) from inner tube (PN: 1008481).



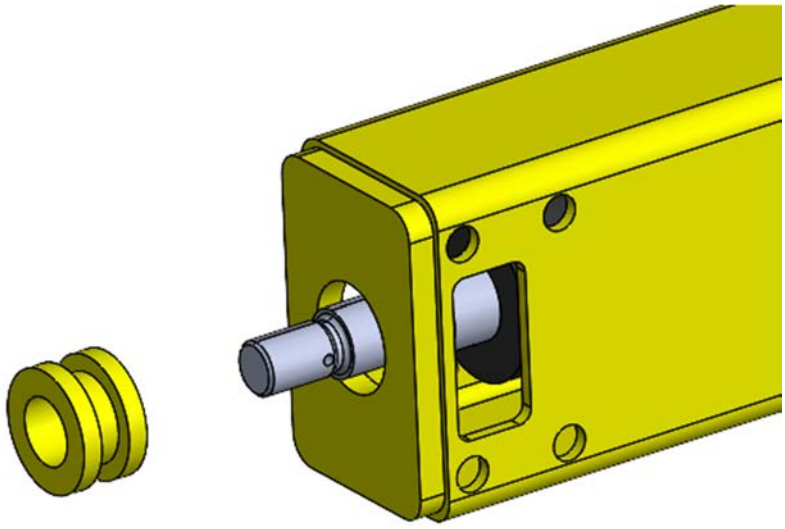
20. Unscrew countersink socket head ¼-20 x 3/8, P/N: 1009047 (total qty. 16 ea.) to remove wear bars PN: 1007888 and 1007889 (total qty. 8 ea.) from outer tube (PN: 1008911-1).



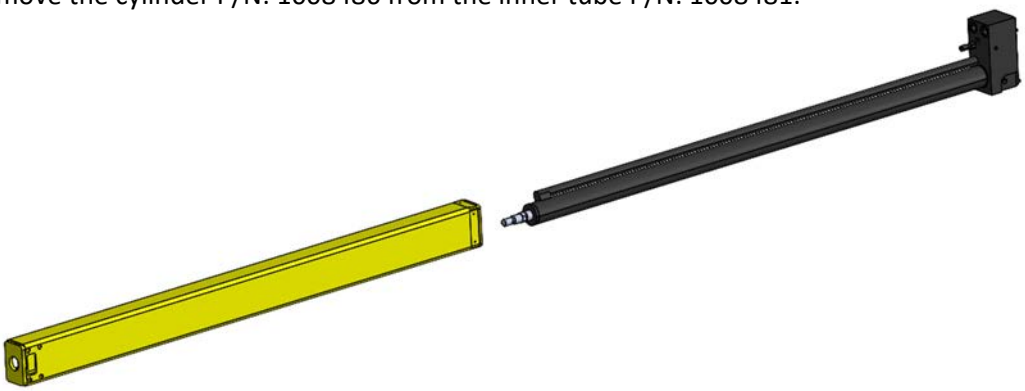
21. Rotate the clevis counterclockwise to disconnect from the cylinder P/N: 1008486.



22. Remove the rod bushing from the cylinder P/N: 1008486.



23. Remove the cylinder P/N: 1008486 from the inner tube P/N: 1008481.



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SECTION 5: TROUBLESHOOTING

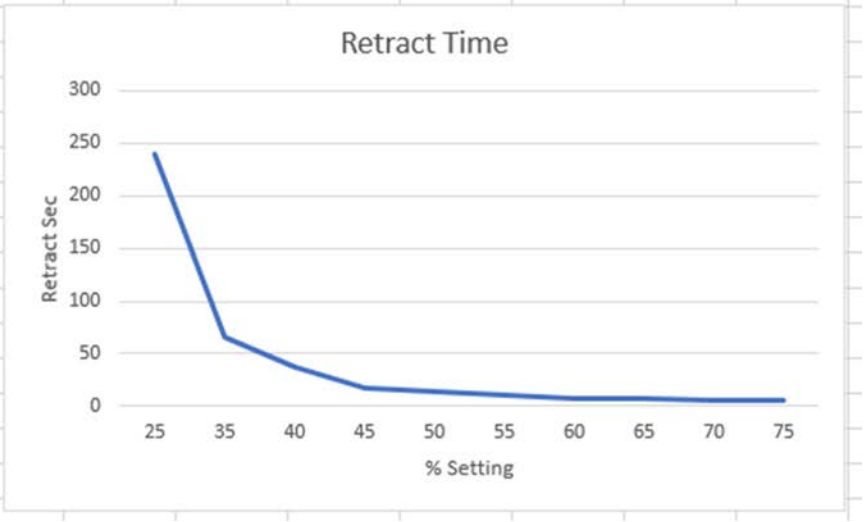
TROUBLESHOOTING

Adequate maintenance and proper fluid selection is 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 their evaluation and recommendations.

1) In the event of a severed hydraulic hose or lost hydraulic pressure, the velocity fuse will shut off the flow of fluid. After repairing hose, the velocity fuse will need to be reset by retracting the cylinder.
2) Misalignment of Left/Right proportional control
   The left and right controls will be as follows:
   - Bail speed is now restricted regardless of what percent value of valve is set on the drillers display – below is the chart showing that the scale is not linear, here are the tested times for retract vs % setting.

Percent	Retract Time
25	240
35	66
40	37
45	18
50	14
55	11
60	8
65	7
70	6
75	5



   - The standard setting is to both bails.
     - Retract - Full speed button not pressed: constant speed set by DD.
     - Extend - Set button not pressed: speed fixed at 55%.
     - You must select and hold, either left or right using a toggle switch to use them independently to shift the tubular from side to side.
     - Once the joint is aligned, release the individual bail selector toggle.
     - Press the full speed button and you will have a proportional control as seen below:
       Retract – Set button pressed: 50 – 100% proportional.
       Extend – Set button pressed: 50 - 100% proportional.

- Mitigation steps – use of guide nubbins or levelling the rig to align better when hanging (under the tool, not aligned on the stump).

3) Correct Space out requirements

Possible Problem	Solution
Fully extended but cannot reach joint V-door	Using longer slings (as long as you can still stab the CRT) is an option.
Fully extended but coupling hitting the CRT when vertical.	The bails have adjustment pins that can be lengthened.

4) Broken Hydraulic Hoses
   - Keep a spare hose readily available in case this problem occurs.

5) Hose loop height for landing joint configuration.
   - The hose loop should be hung at approximately 45 ft as the hose lengths are 45 ft / 55 ft respectively for connecting the bails on the Top Drive and the control panel.

6) Control Panel Troubleshooting

Possible Problem	Solution
Leaks	Shut down and tighten fittings as needed.

7) Cannot retract past the packer cup.
   - If you cannot retract past the packer cup, then shorten slings or adjust the bail length (pin holes on the bails).

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SECTION 6: SALES, MARKETING AND SPECIFICATION SHEET

LINK TILT SYSTEM (LTS)
for Casing Running Tools (CRT)

Application

The Link Tilt System, equipped with Dynamic Bails ranging from 60" to 72", is a stand-alone solution compatible with both hydraulic and mechanical Casing Running Tools (CRT's). It enhances operational efficiency, repeatability, and safety. The LTS is smarTR ready, allowing it to be seamlessly incorporated into a more advanced tubular running system, with integrated sensors and electronics that enhance control and the overall operational experience.

Link Tilt System provides:

- Safety and Repeatability
- Modular Application
- Dynamic Bails
- Wireless Control
- smarTR READY

Benefits

1. Reduces Drillers' workload
2. Enhanced Control and Reach with Dynamic Bails
3. Anti-Rotation Bracket for Safe Rig-In
4. Multi-port stucchi connector for efficient rig-in
5. Reduces space out complexities
6. Integrates into the McCoy smarTR package
7. Remote operation via belly pack
8. Reduces "Red Zone" Exposure
9. Real-Time Drillers Data with Sensor Package

Product Features

- 30% Increase in joints per hour (faster running time)
- Compatible with Mechanical and Hydraulic CRT's
- Reduces Stab-to-latch time
- Removes complexities with existing link tilt systems

MCCOY LINK TILT SYSTEM SPECIFICATIONS	
Maximum Tension Rating	5 TONS
Cylinder Stroke	57 or 69 INCHES
Tilt Angle	80 DEGREES
Weight	2500 LBS
Maximum Working Pressure	1650 PSI

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DYNAMIC BAIL ARMS

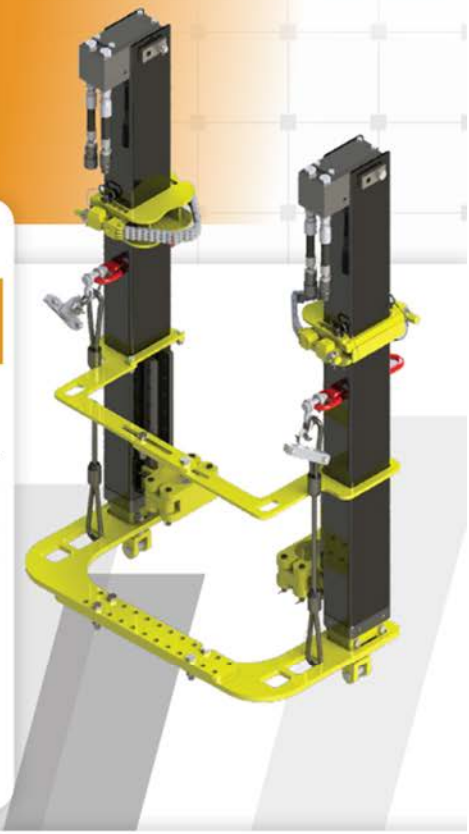
for Casing Running Tools (CRT)

Application

Dynamic Bail Arms streamline the CRT stabbing process. The Hydraulic Dynamic Bails represent an advanced add-on designed to mount on drilling rig bails, enhance casing operations by handling loads up to 5 tons. They securely latch onto the casing and hydraulically retract the tubular onto the mandrel. This reduces drilling complexities, improves safety and repeatability, and simplifies operations. The Dynamic Bails significantly enhance efficiency, safety, and versatility.

Dynamic Bail Arms provide:

- Efficiency Gains
- Safety Enhancements
- Operational Flexibility
- Cost Savings
- smarTR READY



Benefits

1. Decrease connection-to-connection time
2. Improve alignment between CRT, single joint and stump
3. Utilize existing drilling rig bails to enhance rig-in time
4. Versatility, adjusted lengths for operational use case
5. Reduces driller complexity when stabbing the CRT
6. Enhanced Control, Safety, and Repeatability
7. Integrate McCoy Dynamic Bails for use with smartCRT™, smartFMS™, smarTR™ & other McCoy SMART™ technology

Product Features

- Dynamic Bails will reduce casing running complexities by dynamically rasing the tubular onto the CRT mandrel
- Dynamic Bails offer extended reach from hole center to the V-Door reducing the requirements for slings
- Mechanical and Hydraulic CRT applications
- Independent left/right bail control
- Wireless belly pack option with smarTR

DYNAMIC BAIL ARMS SPECIFICATIONS		
Bail Arms Pair Rating	5 TONS	4.5 TONNES
Cylinder Stroke	57 INCHES	145 CM
Weight	1100 LBS	500 KG
Max Cylinder Pressure Rating	1650 PSI	114 BAR

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SECTION 7: APPENDIX

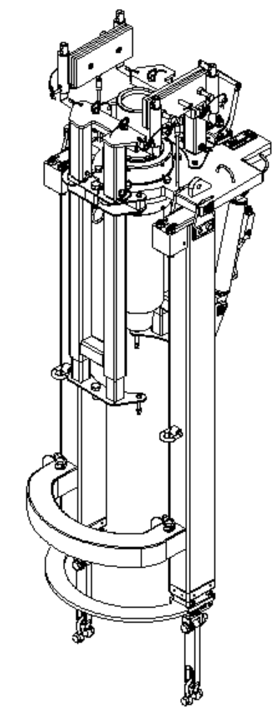
ASSEMBLY DRAWINGS

General Arrangement, sheet 1 of 3

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.	
1	1008911-1	WELDMENT, OUTER TUBE, 69" STROKE, LOAD TESTED	1	
2	1008481	WELDMENT, INNER TUBE	2	
3	PH-50516-A	NUT, SLOTTED, 3/4-10	2	
4	1007888	WEAR BAR, 1.5x5 SELF LUBE F256254-3	8	
5	1007889	WEAR BAR, 1.5x3 SELF LUBE 212-24	8	
6	1008512	SCREW, CAP, HEX HEAD 5/8-11 X 5, DRILLED SHANK	8	
7	97190A030	NUT, SLOTTED, HEX, 5/8-11	8	
8	1007929	SCREW, CAP, HEX HEAD, 3/4-10 X 7, ASTM A320 Gr L7	2	
9	10043	PIN, COTTER 5/32 X 1 1/2	14	
10	12 P5ON-S	FITTING, PLUG, 3/4" MORB	4	
11	1007925	CONNECTOR, BULKHEAD M12, TURCK FSFDV 4.4-0.5M	2	
12	8-12_F5OX-S	FITTING, 3/4 MORB, 1/2 MJIC, STRAIGHT, STEEL	4	
13	1008504	DUST CAP	2	
14	1008652	PIN, LINK TILT BOOM CLEVIS	2	
15	1001	FITTING, GREASE, STRAIGHT, 1/8 NPT	6	
16	1008662	PLATE, LOCK	6	
17	1008656	PLATE, LINK	2	
18	30093	SHACKLE, BOLT TYPE ANCHOR, 3/4, 4 3/4 TON, CROSBY #1019515	2	
19	1008673-1	WELDMENT, HOUSING, ANTI-ROTATION, LOAD TESTED	1	F
20	44Z08080801FH	QUICK RELEASE PLATE, MALE, 1/2" NPT	1	
21	1472	FITTING, STRAIGHT ADAPTER, 1/2 MNPT, 1/2 MJIC	8	
22	1008666	PIN, CYLINDER CLEVIS	4	
23	1008917	WELDMENT, OUTER BEAM, 36"	2	
24	1008918	WELDMENT, INNER BEAM, 36"	2	
25	1008680	PLATE, 3/8", MOUNT, CONTROLS	1	
26	1002546	WASHER, NORD-LOCK, .1/2, STEEL, ZINC	18	
27	1101	NUT, HEX HEAD, 1/2-13	8	
28	1010639	SCREW, HEX HEAD, 1/2-13 X 3 3/4 GR8, DRILLED SHANK	8	
29	91251A598	SCREW, SOCKET CAP, SOCKET, 5/16-18, 3-3/4	4	
30	1010645	BOLT, HEX, 1-8, 2, GR 8, ZINC, FULLY THREADED, DRILLED HEAD	2	E
31	1010643	BOLT, HEX, 1-8 X 4 1/4, DRILLED SHANK, GR8	2	E
32	1683	NUT, HEX, 1"-8	4	
33	1008672	CYLINDER, 13" STROKE, LINK TILT	2	
34	1008912	SUB, LINK TILT, 6 5/8 REG, 67" LG	1	
35	1002875	WASHER, NORD-LOCK, .34, .53, .1, STEEL, ZINC	12	
36	1003917	WASHER, NORD-LOCK, 1, STEEL, ZINC	4	
37	1009190	KIT, ANTI ROTATION BRACKET	1	
38	1008905	PLATE, DYNAMIC LINK TILT	1	
39	101-8256	BOLT, HEX, 3/4-10, 3, GR8, DRILLED HEAD	6	C
40	1002181	WASHER, NORDLOCK NL3/4"	6	E
41	1009075	SCREW, CAP, HEX HEAD, 1-8 X 5", ASTM A320 Gr L7	2	
42	1009047	SCREW, CSINK SOCKET HEAD, 1/4-20 X 3/8	32	
43	TAG-CLINCHER	PLATE, SERIAL NUMBER	1	
44	1007697	SCREW, FLAT HEAD, PHILLIPS, #10-24, 3/8, STEEL	8	
45	1006200	PLATE, TEXT, MCCOY	1	
46	1008486	CYLINDER, 72" STROKE, DYNAMIC BAIL	2	
47	7018-12HSS-01	SCREW, HEX HEAD, 5/16-18X.75" , DRILLED HEAD, MCMASTER 90121A581	12	B
48	1252B	PIN, COTTER, 1/8 X 1, STAINLESS	8	E, E

NOTE: ADD SPIRAL WRAP PN 02-E0203 TO HYDRAULIC HOUSES (E)

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	ECN24-0135	ADDED SHEET 3 WITH LOAD TEST INFORMATION. REPLACED 1007930 WITH 1009047. ADDED 1009190, TAG-CLINCHER, 1006200 AND 1007697. ADDED LOAD RATING INFO TO TAG-CLINCHER TAG	C RICHTER	1/31/2025
C	ECN25-0112	REPLACED 1008681 AND 1008372 WITH 1009190	6/2/2025	6/2/2025
D	ECN25-0137	REMOVED HOIST RINGS	[illegible]	
E	ECN25-0131	ADDED SECONDARY RETENTION TO SCREWS / BOLTS / SPIRAL WRAP / HYDRAULIC LAYOUT STICKER	[illegible]	8/5/2025
F	ECN25-0251	REPLACED 1008673 WITH 1008673-1	C RICHTER	10/3/2025

CRITICAL COMPONENT: YES

RATINGS: IF APPLICABLE

PROPRIETARY STATEMENT

DRAWN: C RICHTER 08/28/2024

DESCRIPTION: ASSEMBLY, DYNAMIC LINK TILT, 69" STROKE

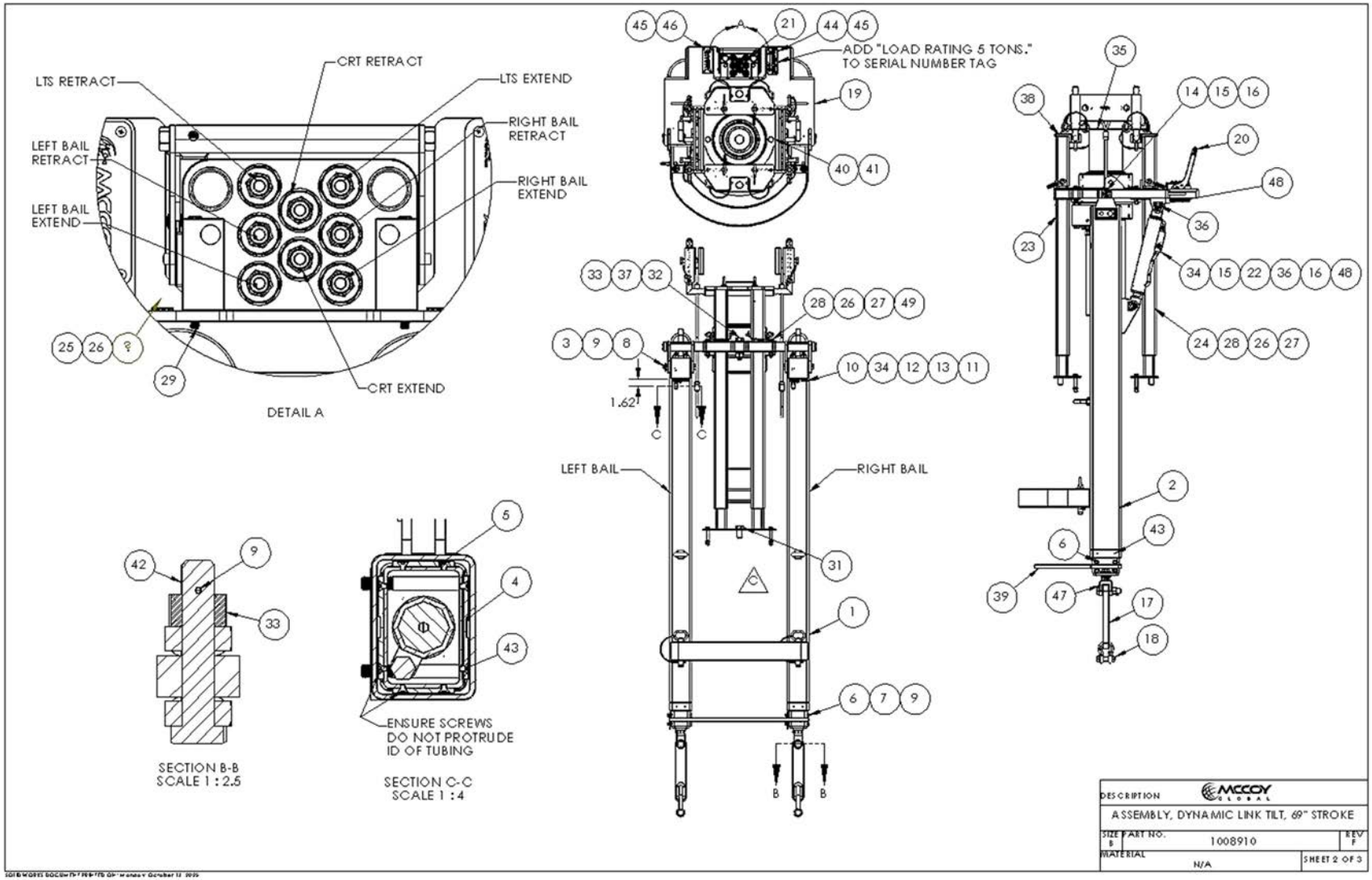
SIZE: B | PART NO.: 1008910 | REV: F

WEIGHT: 2308.9 LBS.

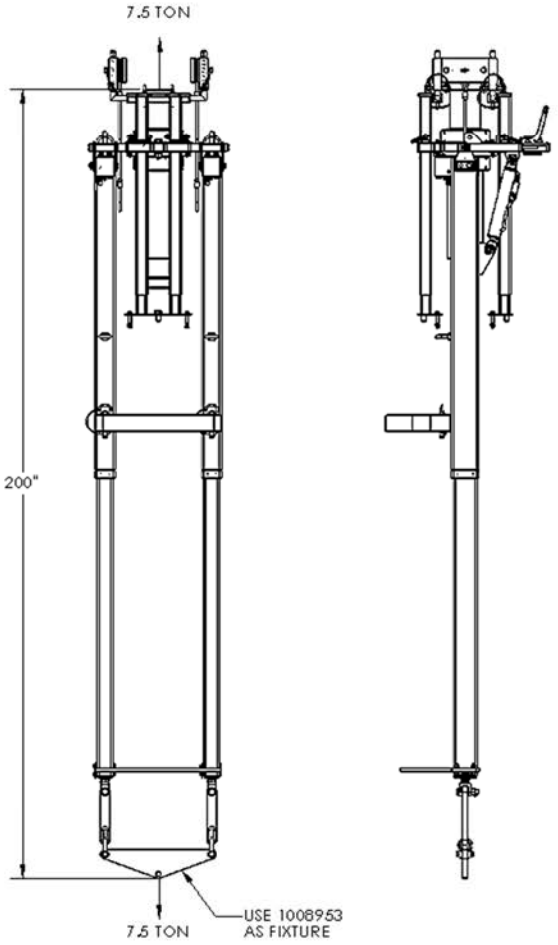
MATERIAL: N/A

SHEET 1 OF 3

General Arrangement, sheet 2 of 3



General Arrangement, sheet 3 of 3



P/N	DESCRIPTION	PROOF LOAD TEST	MPI
1008911	WELDMENT, OUTER TUBE, LOAD TESTED	✓	✓
1008913	MANDREL, LINK TILT	✓	✓
1008673-1	WELDMENT, HOUSING, ANTI-ROTATION, LOAD TESTED	✓	✓
1008667	FLANGE, BEARING, LINK TILT	✓	✓
1008670	CAP, END, LINK TILT	✓	✓
1008652	PIN, LINK TILT BOOM CLEVIS	✓	✓
1008486	CYLINDER, 72" STROKE, DYNAMIC BAIL	✓	✓
1007929	SCREW, CAP, HEX HEAD, 3/4-10 X 7, ASTM A320 Gr L7	✓	✓
1009075	SCREW, CAP, HEX HEAD, 1-8 X 5, ASTM A320 Gr L7	✓	✓
1008656	PLATE, LINK	✓	✓

F

TESTING REQUIREMENTS

1) EXTEND CYLINDER APPLY LOAD OF 7.5 TONS AND HOLD FOR A MINIMUM OF 5 MINUTES AS PER W-GL-PUR-015

2) AFTER TESTING, MPI REQUIRED FOR ALL CRITICAL COMPONENTS

MPI REQUIREMENTS FOR REQUIRED COMPONENTS (SEE CHART ABOVE)

1) VISUALLY INSPECT AND MT AS PER W-GL-PUR-005

DOCUMENTATION REQUIREMENTS:

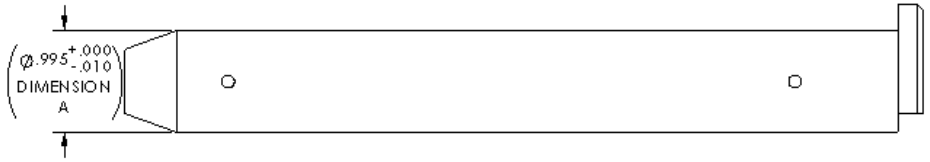
- COMPONENT IS TO BE SERIALIZED
- SERIALIZATION WILL BE TRACEABLE TO THE MATERIAL INFORMATION INCLUDED ABOVE.
- DATABOOK TO BE CREATED

DESCRIPTION	MCCOY GLOBAL	
ASSEMBLY, DYNAMIC LINK TILT, 69" STROKE		
SIZE B	PART NO. 1008910	REV F
MATERIAL N/A		SHEET 3 OF 3

WEAR LIMITS

P/N 1008652, PIN, LINK TILT BOOM CLEVIS

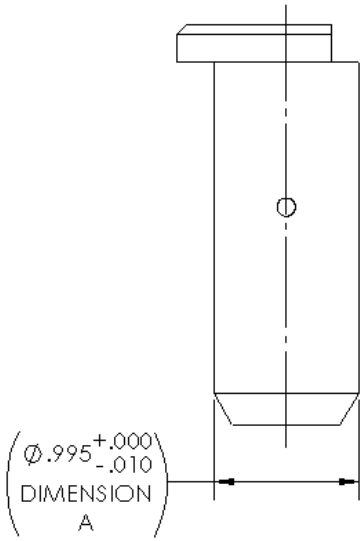
	WEAR LIMITS	
FEATURE	MANUFACTURING TOLERANCE	WEAR MAXIMUM
DIMENSION A DIAMETER	0.995/0.985	0.975



DESCRIPTION MCCOY GLOBAL
PIN, LINK TILT BOOM CLEVIS
SIZE B | PART NO. 1008652 | REV B
MATERIAL 17-4 PH H1150 | SHEET 3 OF 3

P/N 1008666, PIN, CYLINDER CLEVIS

	WEAR LIMITS	
FEATURE	MANUFACTURING TOLERANCE	WEAR MAXIMUM
DIMENSION A DIAMETER	0.995/0.985	0.975



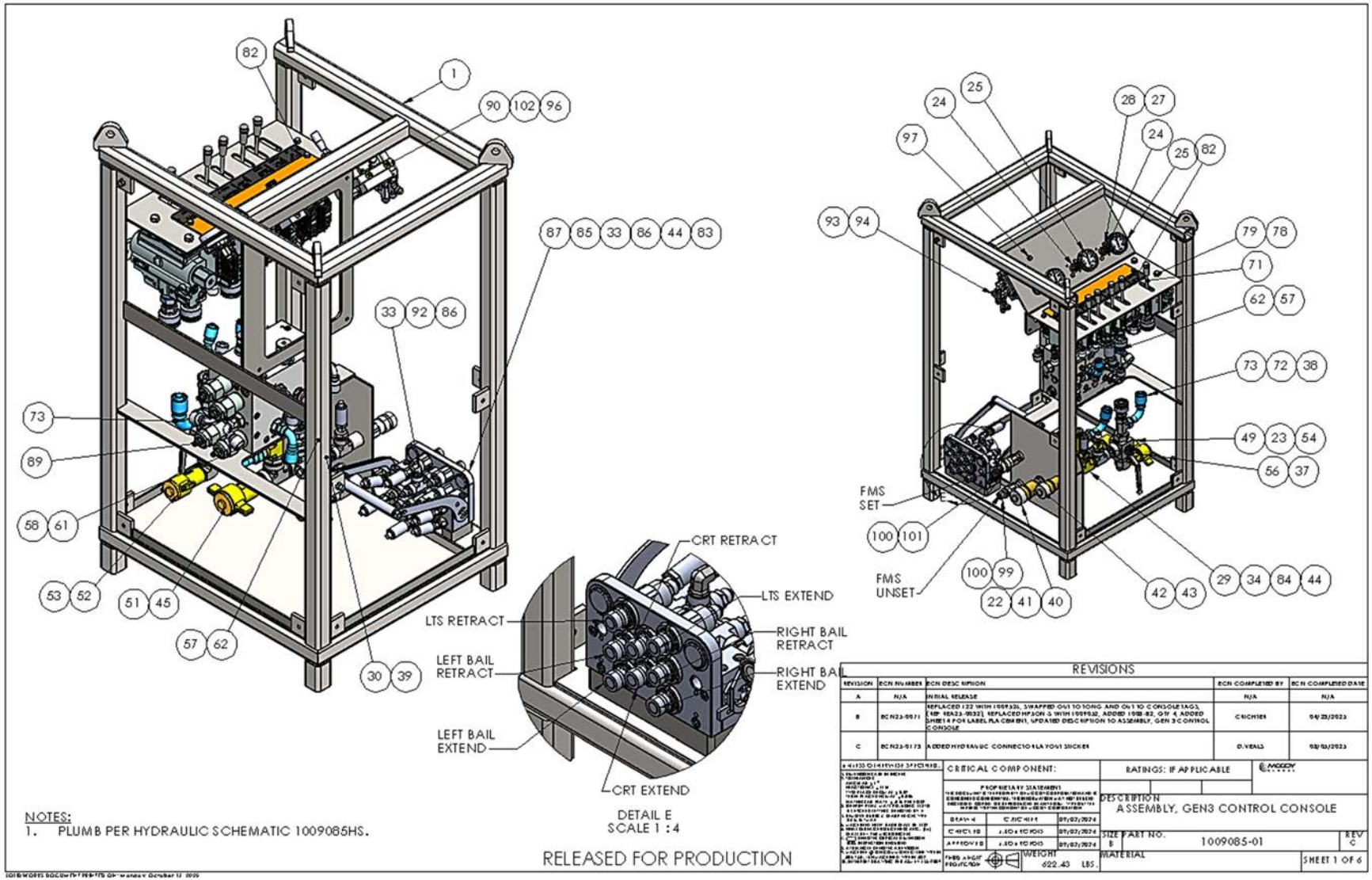
DESCRIPTION	PIN, CYLINDER CLEVIS	
SIZE A	PART NO. 1008666	REV C
MATERIAL 17-4 PH H1150		SHEET 3 OF 3

SOLIDWORKS DOCUMENT PRINTED ON: Thursday, October 9, 2025

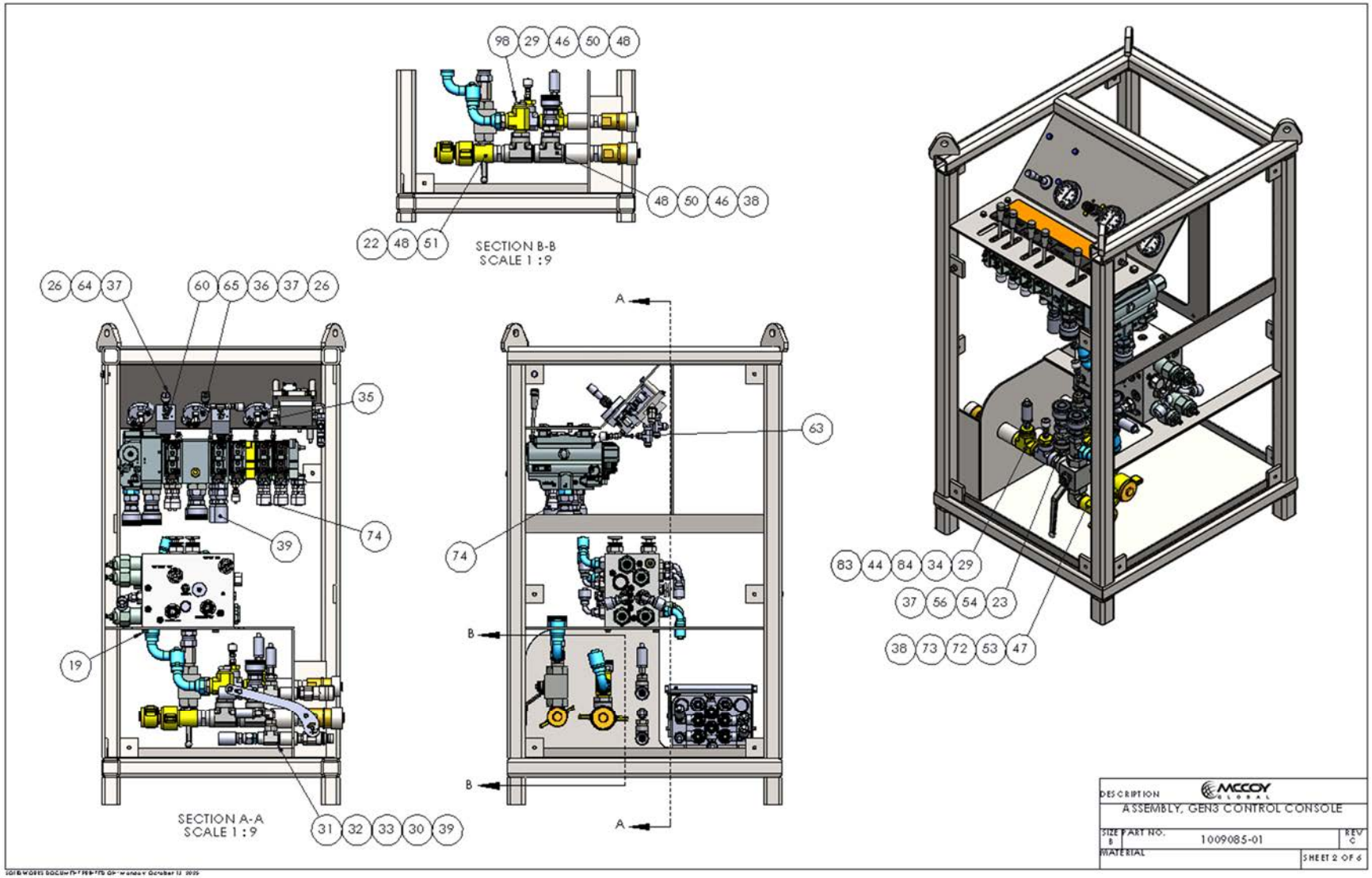
CONTROL PANEL OPTIONS

ITEM NO.	PART NUMBER	DESCRIPTION
2	1009085-01	ASSEMBLY, GEN3 CONTROL CONSOLE

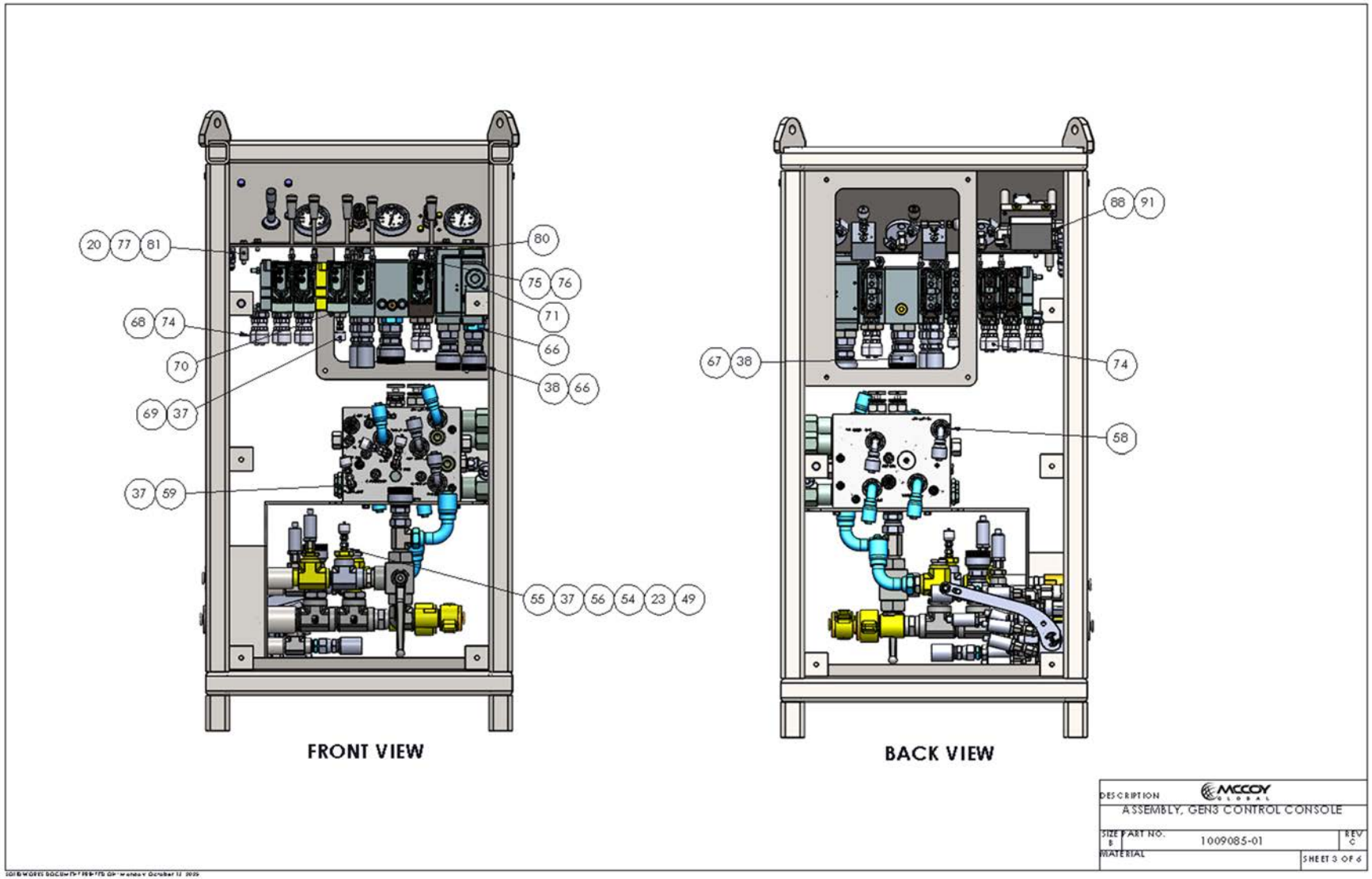
ASSEMBLY, GEN3 CONTROL CONSOLE, P/N 1009085-01, Sheet 1 of 6



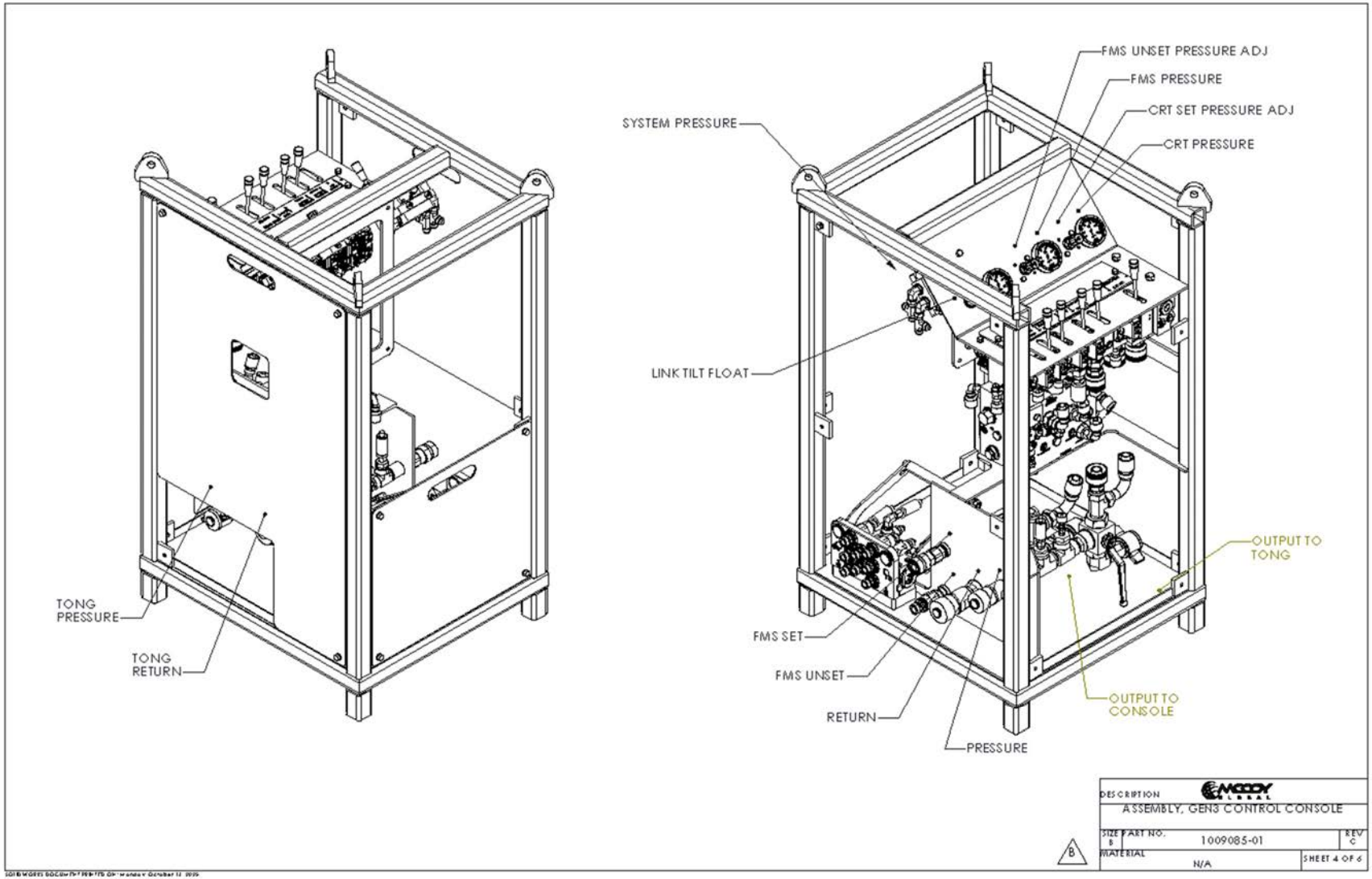
ASSEMBLY, GEN3 CONTROL CONSOLE, P/N 1009085-01, Sheet 2 of 6



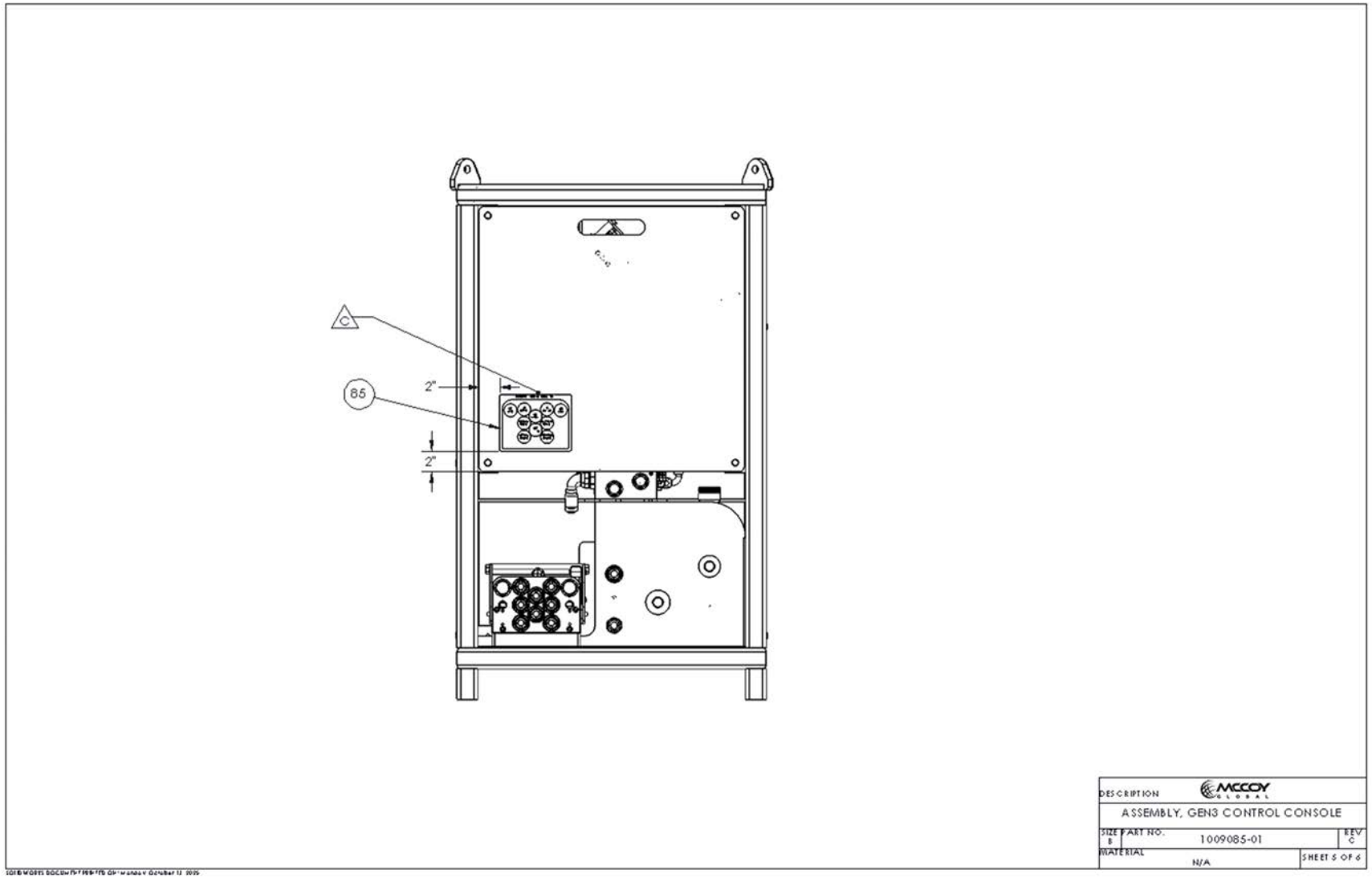
ASSEMBLY, GEN3 CONTROL CONSOLE, P/N 1009085-01, Sheet 3 of 6



ASSEMBLY, GEN3 CONTROL CONSOLE, P/N 1009085-01, Sheet 4 of 6



ASSEMBLY, GEN3 CONTROL CONSOLE, P/N 1009085-01, Sheet 5 of 6



ASSEMBLY, GEN3 CONTROL CONSOLE, P/N 1009085-01, Sheet 6 of 6

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	08-0874	FITTING, 1 1/4 MNPT, 1 1/4 MNPT, STRAIGHT	2
2	1003780	FITTING, 1 NPTM X 1 NPTM, HEX NIPPLE	2
3	1007560	VALVE, RELIEF PANEL MOUNT (WANDFLUH BADPM22-210-Z656)	2
4	1007562	PRESSURE GAUGE, PANEL MOUNT 3000PSI, (SPAN LFP-214-3000-PSI-G-WOB)	3
5	1007561	BODY, PANEL MOUNT (DAMAN B10046-1)	2
6	101	WASHER, LOCK, 1/4, GR8	4
7	104	SCREW, HEX, 1/4-20, 3/4	4
8	1616	FITTING, 1 FNPT, 1 MNPT, 1 FNPT, TEE	2
9	1467	ADAPTER, 3/4MNPT X 3/4MJIC, STRAIGHT	2
10	1007578	FITTING, 3/4 FNPT RUN TEE	2
11	1008127	BUSHING, REDUCER, 3/4 NPT X 1/8 NPT	2
12	1008128	FITTING, 1/8 FNPT X 1/8 MNPT X 90	7
13	1454	FITTING, 1 MNPT, 1/4 FNPT, STRAIGHT	1
14	1007594	FITTING, 1/4 MJIC X 1/4 FNPT X STRAIGHT	3
15	1007595	FITTING, 1/4 ORB X 1/4 JIC BRANCH TEE	1
16	1AA4FJ4	FITTING, 1/4 FJIC, 1/4 CRIMP, STRAIGHT	10
17	1BA16FJ16	FITTING, HOSE, 1 IN FJIC, 1 IN CRIMP	6
18	1AA12FJ12	FITTING, CRIMP, 3/4 FJIC	4
19	02-9212	FITTING, DUST CAP, 1 1/4	1
20	02-9215	FITTING, QUICK DISCONNECT, MALE 1 1/4	1
21	02-9213	FITTING, DUST CAP, 1	1
22	02-9214	FITTING, QUICK DISCONNECT, MALE 1	1
23	1008126	FITTING, ADAPTER, 1/8 NPT X 1/4 FORB	9
24	08-SPEC-9092	DUST PLUG, QUICK COUPLING, 1 1/4", BRASS	1
25	1469	FITTING, 1 MNPT, 1 MJIC, STRAIGHT	2
26	1440	FITTING, QUICK DISCONNECT, 1 FML-WING TYPE	1
27	1_1_4 MRO-S	FITTING, 1 1/4 FNPT, 1 1/4 FNPT, 1 1/4 MNPT, RUN TEE	2
28	BV3D16N1SS1NE_PART1	VALVE, BALL, 1" NPTF 3WAY; PARKER BV3D16N1SS1NE	1
29	02-E0487	REDUCER, 1-1/4 MNPT X 1 FNPT	2
30	1445	FITTING, QUICK DISCONNECT, WING TYPE 1 1/4 FEMALE	1
31	08-SPEC-0019	DUST PLUG, QUICK COUPLING, 1", BRASS	1
32	1 CR-S	FITTING, 1 MNPT, 1 MNPT, ELBOW	1
33	1 MRO	FITTING, RUN TEE, 1 FNPT, 1 FNPT	1
34	1562	FITTING, 1/4 MNPT, 1/4 MJIC, STRAIGHT	1
35	cm4025	BUSHING, REDUCER, 1 MNPT, 1/4 NPT	1
36	12F5OX	FITTING, 3/4 MORB, 3/4 MJIC, STRAIGHT, STEEL	6
37	8-12_F5OX-S	FITTING, 3/4 MORB, 1/2 MJIC, STRAIGHT, STEEL	8
38	1007596	FITTING, 1/4 MJIC X 1/4 ORB X 90	4
39	1003727	FITTING, 1/4 MORB, PLUG	8
40	1AA8FJB8	FITTING, CRIMP, 1AA8FJB8	6
41	1AA12FJB12	FITTING, CRIMP, 3/4 JIC 90	4
42	4 V5OX-S	FITTING, 1/4 MORB, 1/4 MJIC, 45 DEGREE	2
43	4f5ox-s	FITTING, 1/4 MORB, 1/4 MJIC, STRAIGHT	1
44	1AA4FJB4	FITTING, 1/4 FJIC, 1/4 CRIMP, ELBOW	1
45	16F5OX-S	FITTING, 1 MORB, 1 MJIC, STRAIGHT	2

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
46	16-20F5OX-S	FITTING, ADAPTER, STRAIGHT, 1 1/4 MORB X 1 MJIC	2
47	8-10F5OX-S	FITTING, 1/2 MJIC, 5/8 MSAE (#10), STRAIGHT	6
48	4-10 F5OX-S	FITTING, 1/4 MJIC, 5/8 MORB	1
49	6409-10-O	FITTING, 10 MORB, PLUG	1
50	1008192	ASSEMBLY, VALVE, CONTROL, BANK, DANFOSS PVG #159K0001	1
51	16_RTX-S	FITTING, 1 MNPT, 1 MJIC, 1 MJIC, RUN TEE	1
52	1AA16FJB16	FITTING, CRIMP	2
53	1AA8FJ8	FITTING, CRIMP, 1AA8FJ8	8
54	6-5_C5OX-S	FITTING, 5/16 MORB, 3/8 MJIC, ELBOW	2
55	1530	FITTING, REDUCER, 3/8 FJIC SWIVEL, 1/4 MJIC	2
56	125	SCREW, HEX, 5/16-18, 1.750, PARTIALLY THREADED, GRADE 8	2
57	1081	WASHER, LOCK, 7/16, STEEL, GR8	2
58	1023-B	WASHER, LOCK, 5/16, GR8	6
59	91280A203	SCREW, HEX, M12-1.75 X 25mm, CLASS8.8	2
60	1102	WASHER, FLAT, 1/2, STEEL, GR08	4
61	1008515	PIPE, 3/8 SCH 80 X 1.125 LG	2
62	121	SCREW, HEX, 5/16-18 X 3/4, GR8	4
63	1009101	LABEL, SMARTHUB GEN3 CONTROLS	1
B 64	1009052	TRANSMITTER, PRESSURE 1/4 MORB 4000PSI (NOSHOK PT40-4000psig-1-1-45-25)	9
65	1569-B	BUSHING, REDUCER, 1/4 X 1/8	1
66	8-8FTX-S	FITTING, STRAIGHT, 1/2 MJIC, 1/2 MNPT	8
67	8MRO-S	FITTING, RUN TEE, 1/2 FNPT, 1/2 FNPT	6
68	44Z08080801FH	QUICK RELEASE PLATE, MALE, 1/2" NPT	1
69	1009098	MANIFOLD, LINK TILT FLOAT, HYDRAQUIP MG-111222	1
70	1009096	MANIFOLD, SMARTHUB GEN3 HYDRAQUIP 11323702P3	1
71	1009099	MOUNT, LINK TILT MANIFOLD	1
72	float spacer	PIPE, 3/8 SCH 80 X 1.88 LG	3
73	4513K501	BUSHING, REDUCER, 1/2 NPT X 1/8 NPT	6
74	1007598	FITTING, 1/2 MJIC X 1/2 ORB X 90	3
75	8R6X-S	FITTING, 1/2 MJIC, 1/2 MJIC, 1/2 FJIC, TEE	2
76	1009100	LABELS, SMARTHUB GEN3	1
B 77	1009526	SCREW, SOCKET HEAD CAP, M5X.08 X 40MM, STEEL, BLACK OXIDE	4
78	145	BOLT, HEX, 3/8-16, 2 3/4, GR8	3
79	1496	BUSHING, REDUCER, 1 X 1/2	1
80	1007601	FITTING, QUICK DISCONNECT ISO 16028 MALE, 5/8 X 3/4 FORB, STUCCHI 801304011	1
81	1007591	FITTING, 3/4 MORB X 3/4 MNPT X STRAIGHT	2
B 82	1007602	FITTING, QUICK DISCONNECT ISO 16028 FEMALE, 5/8 X 3/4 FORB, STUCCHI 801304012	1
83	1008-B2	WASHER, FLAT, 1/4, GR8	4
84	1009086	WELDMENT, SMARTHUB GEN3 FRAME	1
C 85	1010659	LABEL, HYDRAULIC CONNECTOR	1

DESCRIPTION: ASSEMBLY, GEN3 CONTROL CONSOLE
SIZE B | PART NO. 1009085-01 | REV C
MATERIAL: N/A | SHEET 6 OF 6

SPARE PARTS

Spare Parts List (Stocking Quantity for 1 Year)

LINK TILT SYSTEM SPARE PARTS LIST		
PART NUMBER	**QTY**	**DESCRIPTION**
1007682-SK	**1**	**KIT, REBUILD, CYLINDER**

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

RETRACTING AND EXTENDING PRESSURE

TUBULAR SIZE	WEIGHT RANGE	RETRACTING PRESSURE (PSI)	EXTENDING PRESSURE (PSI)
4 1/2	9.5	78.28	90.03
	10.5	86.52	99.50
	11.6	95.59	109.93
	12.6	103.83	119.40
	13.5	111.25	127.93
	15.1	124.43	143.10
	16.6	136.79	157.31
	16.9	139.26	160.15
	17.7	145.86	167.73
	18.8	154.92	178.16
	21.6	177.99	204.69
	24.6	202.71	233.12
	26.5	218.37	251.13
5	11.5	94.77	108.98
	13	107.13	123.19
	15	123.61	142.15
	18	148.33	170.58
	20.3	167.28	192.37
	20.8	171.40	197.11
	21.4	176.35	202.80
	23.2	191.18	219.86
	24.2	199.42	229.33
	26.7	220.02	253.02
	32	263.69	303.25
5 1/2	13	107.13	123.19
	14	115.37	132.67
	15.5	127.73	146.89
	17	140.09	161.10
	20	164.81	189.53
	23	189.53	217.96
	26	214.25	246.39
	28.4	234.03	269.13
	29.7	244.74	281.45
	32.3	266.17	306.09
	36.4	299.95	344.95
	39.3	323.85	372.43

TUBULAR SIZE	WEIGHT RANGE	RETRACTING PRESSURE (PSI)	EXTENDING PRESSURE (PSI)
6	15	123.61	142.15
	18	148.33	170.58
	20	164.81	189.53
	23	189.53	217.96
	26	214.25	246.39
6 5/8	17	140.09	161.10
	20	164.81	189.53
	24	197.77	227.44
	28	230.73	265.34
	32	263.69	303.25
	35	288.42	331.68
	43.2	355.99	409.39
	69.63	573.78	659.85
7	17	140.09	161.10
	20	164.81	189.53
	23	189.53	217.96
	26	214.25	246.39
	29	238.97	274.82
	32	263.69	303.25
	35	288.42	331.68
	38	313.14	360.11
	41	337.86	388.54
	42.7	351.87	404.65
	44	362.58	416.97
	45.4	374.12	430.23
	49.5	407.90	469.09
	56.1	462.29	531.63
	58	477.95	549.64
	66.5	547.99	630.19

TUBULAR SIZE	WEIGHT RANGE	RETRACTING PRESSURE (PSI)	EXTENDING PRESSURE (PSI)
7 5/8	20	164.81	189.53
	24	197.77	227.44
	26.4	217.55	250.18
	29.7	244.74	281.45
	33.7	277.70	319.36
	39	321.38	369.58
	42.8	352.69	405.59
	45.3	373.29	429.29
	47.1	388.13	446.34
	51.2	421.91	485.20
	52.8	435.10	500.36
	55.75	459.40	528.32
8 5/8	24	197.77	227.44
	28	230.73	265.34
	32	263.69	303.25
	36	296.66	341.15
	40	329.62	379.06
	44	362.58	416.97
	49	403.78	464.35
	52	428.50	492.78
9 5/8	29.3	241.45	277.66
	32.3	266.17	306.09
	36	296.66	341.15
	38	313.14	360.11
	40	329.62	379.06
	43.5	358.46	412.23
	47	387.30	445.40
	53.5	440.86	506.99
	58.4	481.24	553.43
	59.4	489.48	562.90
	61.1	503.49	579.01
	64.9	534.80	615.03
	70.3	579.30	666.20
	71.8	591.66	680.41
9 7/8	62.8	517.50	595.13

TUBULAR SIZE	WEIGHT RANGE	RETRACTING PRESSURE (PSI)	EXTENDING PRESSURE (PSI)
10 3/4	32.75	269.87	310.36
	35.75	294.60	338.79
	40.5	333.74	383.80
	45.5	374.94	431.18
	51	420.26	483.30
	55.5	457.34	525.95
	60.7	500.20	575.22
	65.7	541.40	622.61
	71.1	585.90	673.78
	73.2	603.20	693.68
	76	626.27	720.21
	79.2	652.64	750.54
	81	667.48	767.60
11 3/4	38	313.14	360.11
	42	346.10	398.01
	47	387.30	445.40
	54	444.98	511.73
	60	494.43	568.59
	65	535.63	615.97
	66.7	549.64	632.08
	71	585.07	672.83
	73.6	606.50	697.47
	75	618.03	710.74
	76	626.27	720.21
	79	651.00	748.64
	80.5	663.36	762.86
	83	683.96	786.55
	87.2	718.57	826.35
	95	782.84	900.27
11 7/8	71.8	591.66	680.41

TUBULAR SIZE	WEIGHT RANGE	RETRACTING PRESSURE (PSI)	EXTENDING PRESSURE (PSI)
13 3/8	48	395.54	454.87
	54.5	449.10	516.47
	61	502.67	578.07
	68	560.35	644.40
	72	593.31	682.31
	77	634.51	729.69
	80.7	665.00	764.75
	83	683.96	786.55
	85	700.44	805.50
	86	708.68	814.98
	91	749.88	862.36
	92	758.12	871.84
	96	791.08	909.75
	98	807.56	928.70
	100.3	826.52	950.49
	102	840.53	966.60
13 5/8	88.2	726.81	835.83
16	65	535.63	615.97
	75	618.03	710.74
	84	692.20	796.03
	99	815.80	938.17
	109	898.21	1032.94
18	94	774.60	890.79
	105	865.25	995.03
	117	964.13	1108.75
	119	980.61	1127.71
	126	1038.30	1194.04
	128	1054.78	1212.99
18 5/8	87	716.92	824.46
	87.5	721.04	829.19
	94.5	778.72	895.53
	99	815.80	938.17
	106	873.49	1004.51
	112	922.93	1061.37
	117	964.13	1108.75
	124	1021.82	1175.09
	126	1038.30	1194.04
	136	1120.70	1288.81
	138	1137.18	1307.76

TUBULAR SIZE	WEIGHT RANGE	RETRACTING PRESSURE (PSI)	EXTENDING PRESSURE (PSI)
20	106	873.49	1004.51
	118	972.37	1118.23
	129	1063.02	1222.47
	133	1095.98	1260.38
	203	1672.81	1923.73
	209	1722.25	1980.59
22	115	947.65	1089.80
	169	1392.64	1601.53
	170	1400.88	1611.01
	224	1845.86	2122.74
24	157	1293.75	1487.81
	201	1656.33	1904.78
	245.64	2024.18	2327.81
	175	1442.08	1658.39

Important Note:

The maximum operating pressure of the Dynamic Bails is 2000 PSI. Do not exceed this pressure.

The above table articulates the pressure required to hoist the tubular. The table is a guideline to highlight the operational functionality and limitations of the Dynamic Bails.