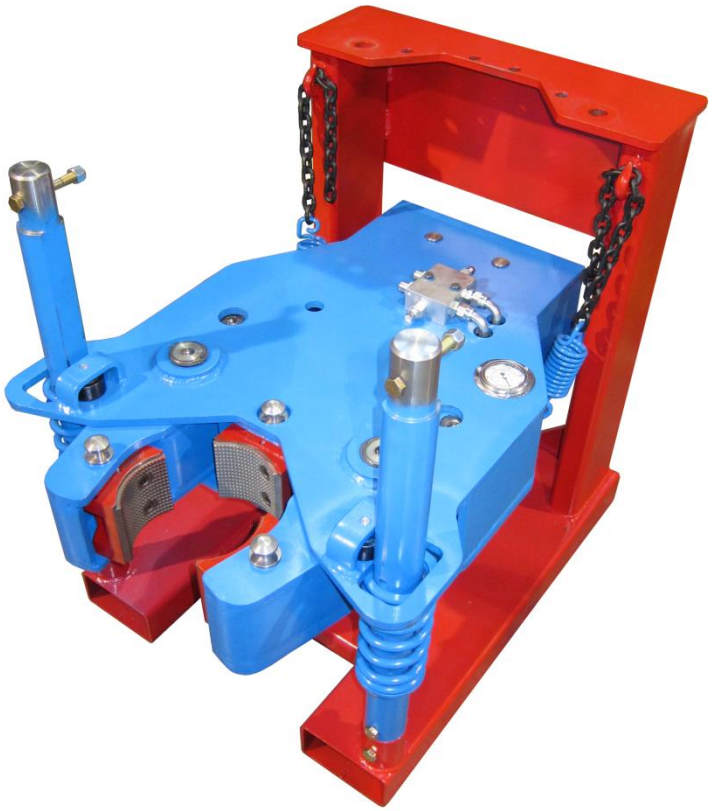
UNIVERSE
HYDRAULIC BACKUP
MODEL 02F06C
MANUAL



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While Universe Machine Corporation strives for accuracy in this manual, all contents are subject to change without notice.

Patents: CND: 2,269,393 USA: 6,263,763 & 8,443,700

1.0 INTRODUCTION

The Universe 6 Hydraulic Backup Unit is designed to attach to a Power Tong and to bite either tubing or casing in order to hold the tubular from rotating while the Tong unscrews or screws together the threaded joint.

This unit is designed and built to be sturdy and reliable. The unit will provide years of trouble-free performance. Like any mechanical device, regular maintenance covered in this manual will help extend the life and performance of this unit. It will also provide for safe and efficient operation.

It is therefore very important to read this manual carefully before using this Power Tong.

This manual also covers the major components that make up the Hydraulic Backup Unit. Although this machine is built to meet rigorous and tough working conditions, some parts over time may wear out and need replacing. If any replacement parts are required, or if you experience problems that this manual does not cover and need assistance, please contact any of our Universe dealers.

2.0 SPECIFICATIONS

2.1 HYDRAULIC BACKUP UNIT

Overall Dimensions (Without Tong):	26-3/8” wide x 31” long x 31-1/2” high (0.66 m wide x 0.79 m long x 0.80 m high)	
Weight (Frame & Backup):	650 lbs. (296 kg)	
Maximum Torque:	15,000 ft-lbs. (2,074 kg-m)	
Torque Arm:	24” (0.61 m)	
Maximum Operating Pressure:	3,500 psi (24,132 kPa)	
Jaw Sizes / Range Available:	JAW SIZE	RANGE
Wraparound Dies:	5-1/2” (139.7 mm) 4-1/8” (104.8 mm)	4-1/4” to 5-1/2” (108 mm to 139.7 mm) 2-1/16” to 4-1/8” (52.4mm to 104.8 mm)
Insert Dies:	5-1/2” (139.7 mm) 4” (101.6 mm)	4-3/8” to *6” (111.13 mm to 152.4 mm) 2-7/8” to 4” (73.0 mm to 101.6 mm)
	*NOTE: 5-1/2” Insert Die Jaws will bite 6” Collar of 5-1/2 Pipe	

2.2 HYDRAULIC OIL (Factory Default)

For normal operation (approximately between -18 to 40 deg. °C (0 to 104 deg. °F)), the hydraulic oil should be based on the following specifications:

- Mineral based oil 22cST – 56cSt (100 SSU – 250 SSU) at 40 °C (104 °F).
- Additives to resist corrosion, oxidation and foaming.
- Viscosity should remain at 22 cSt (100 SUU) at 21 °C (70 °F).

NOTE: Specifications of hydraulic oil may vary depending on environmental conditions. It is recommended to refer to a hydraulic fluid consultant to ensure the proper oil is specified for harsh or extreme environments.

3.0 AVAILABLE OPTIONS

3.1 BI-DIRECTIONAL TORQUE GAUGE LOAD CELL

The Backup Unit comes equipped with a cradle on each side of the unit to handle a bi-directional circular torque gauge load cell. The load cell needs to be of a compression type no larger than 6 inches in diameter with a thickness of less than 2 inches.

The Universe bi-directional piston compression load cell is designed to fit and work with all Universe Backup Units. It is important to ensure the pistons are fully extended prior to any load applied to them and positioned so that the piston faces the Backup body and not the side frame as shown in Figure 3.11.

It is important to ensure the torque arm on the gauge face is matched to the torque arm of the Backup otherwise all readings will be off. If filling the gauge via the fill port (see Figure 3.11), ensure not to overfill the unit. The gauge should always read “0” when not under load.

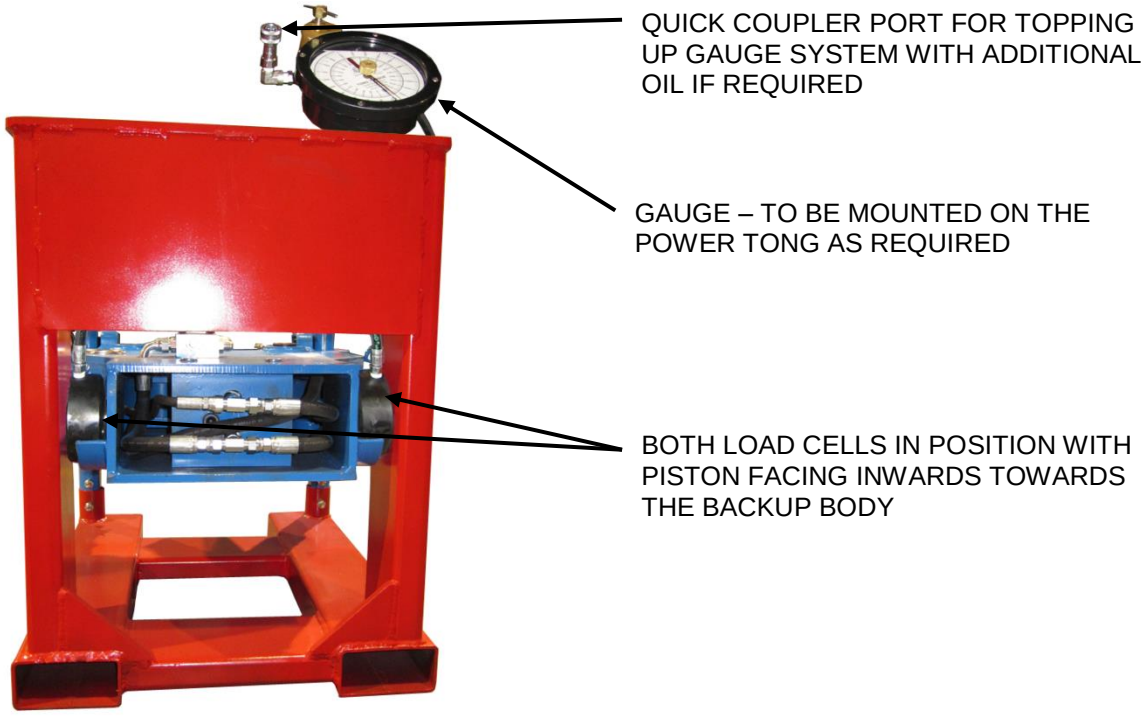


FIGURE 3.11: OPTIONAL BI-DIRECTIONAL LOAD CELL PLACEMENT

4.0 HEIGHT ADJUSTMENT AND LEVELING

The Backup Unit is designed to “float” with the use of two large compression springs in the front, and two tension springs in the back. This “float” allows the Backup Unit to move up or down to take up the vertical movement when making up or breaking out threads.

The rear two tension springs and chain allow the Backup to be kept relatively level with the Tong and are adjustable.

4.1 LEVELING THE BACKUP

When the Backup is sitting on the two front springs, the back height can be adjusted so that the Backup sits relatively parallel with the Tong by using the two chain hooks in the back as shown in Figure 4.11.

To adjust the height:

1. Lift up and support the back of the Backup body so that the chains can be safely removed from the hook.

   WARNING: ***To prevent sudden movements of the Backup body, ensure Backup is securely supported before removing chains.***

2. Remove the chain from the hook on both sides.
3. Adjust the support holding the back of the Backup body until level.
4. Insert the closest link into the hook ensuring as much slack as possible is removed. Ensure both sides are equal.
5. Remove support holding the Backup body.

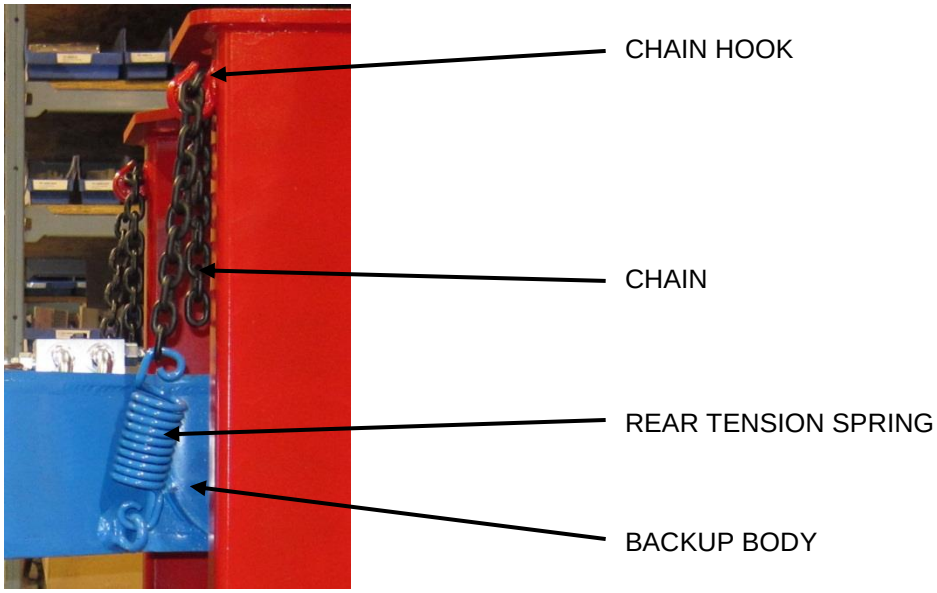
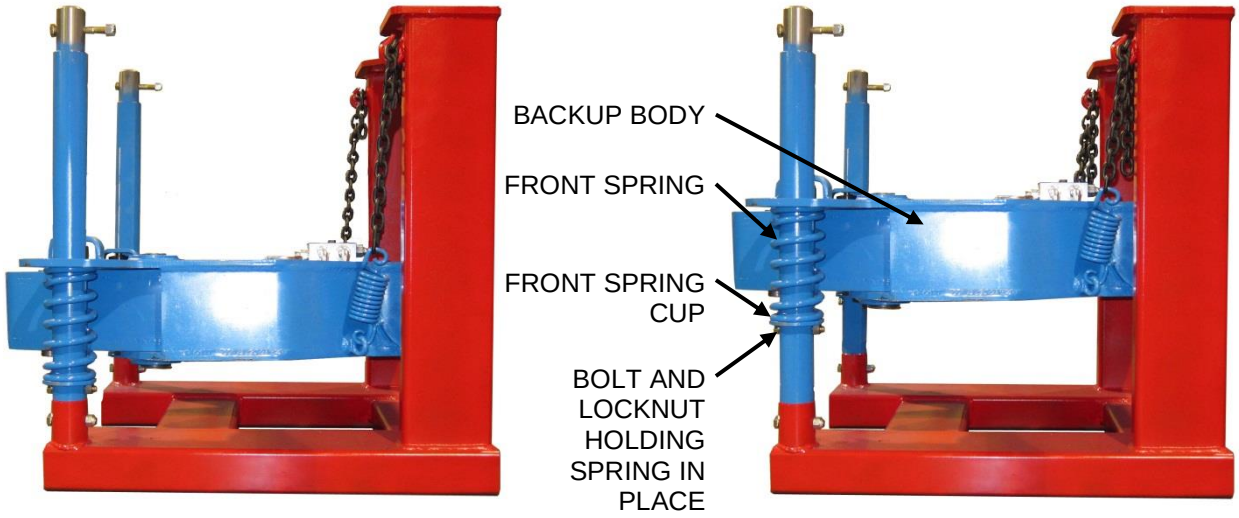


FIGURE 4.11: BACKUP REAR CHAIN LEVELING

4.2 ADJUSTING THE HEIGHT OF THE BACKUP

The Backup unit can be adjusted to four positions. By default, the unit is shipped in the lowest position providing the maximum distance between the Tong and Backup jaws. However, if an application requires the Backup to be moved to closer to the Tong, it can easily be placed in the closer positions.

There is no need to disconnect the tong unit from the frame in order to move the Backup into a different position.



Backup in Lowest Position (Default)

Backup in Higher Position

FIGURE 4.21: ADJUSTMENT OF HEIGHT OVERVIEW

To adjust the Backup closer to the Tong (upwards):

1. Move the Backup to a position that is slightly higher than the approximate desired position.
2. Ensure the Backup body is fully supported.

   WARNING: ***To prevent any sudden movements, ensure the Backup body is security supported before proceeding to the next steps.***

3. While holding the front spring and cup, remove the bolt and locknut.
4. Move up the front spring and cup until it touches the Backup body.
5. Insert the bolt to the nearest hole under the front spring and cup. If the spring and cup need to go higher to get the bolt into the desired hole, the Backup body will need to be raised further.
6. Ensure to do steps 3 to 5 for the front spring and cup on the other side.
7. Adjust the chain in the rear to ensure Backup body will remain as level as possible with the Tong (see Section 4.1 for leveling of the Backup).
8. Remove support holding up the Backup body. If Backup body still needs further leveling, refer to Section 4.1).

To adjust the Backup further from the Tong (downwards):

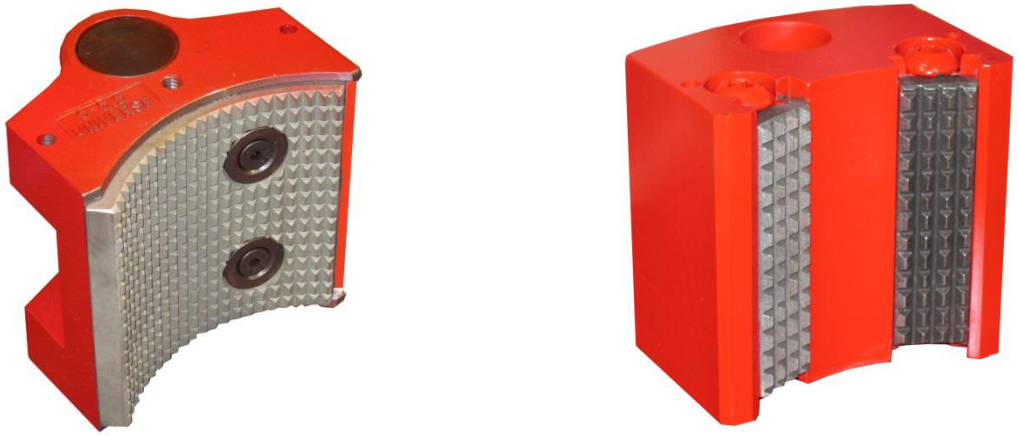
1. Move the Backup body slightly up so it no longer rests on the front springs.
2. Ensure the Backup body is fully supported.

   WARNING: ***To prevent any sudden movements, ensure the Backup body is security supported before proceeding to the next steps.***

3. While holding the front spring and cup, remove the bolt and locknut.
4. Move the front spring and cup down to the hole position that will place the Backup at the approximate desired position.
5. Insert the bolt to the nearest hole under the front spring and cup.
6. Repeat step 3 to 5 for the other front spring and cup.
7. Remove the chain holding the Backup body back end from chain hook on both sides.
8. Move the Backup body down until it is freely resting on the front spring, while still supporting the back of the Backup body.
9. Adjust the chain in the rear to ensure Backup body will remain as level as possible with the Tong (see Section 4.1 for leveling of the Backup).
10. Remove support holding up the back of Backup body. If Backup body still needs further leveling, refer to Section 4.1.

5.0 JAWS

The Power Tong uses three jaws as shown in Figure 5.01. Wraparound dies are used to bite tubular diameters of 2-1/6" to 5-1/2". Insert dies can bite from 2-7/8" to 6". For a summary of dies available, refer to Section 12.2.



Wraparound Jaw Insert Die Jaw

FIGURE 5.01: JAWS

5.1 INSTALLATION OR REMOVAL OF JAWS

The Backup unit uses a quantity of three jaws. Installation & removal can be done by removing the jaw pin and sliding out or in the jaws. The pins also have a hole near then ends so that a safety pin can be inserted in applications where the jaw pin may vibrate or slide out.

It is important to ensure the jaws are properly greased on the bores where the jaw pins are inserted to prevent contamination or moisture penetration that can lead to rusting and/or seizing of the pin.

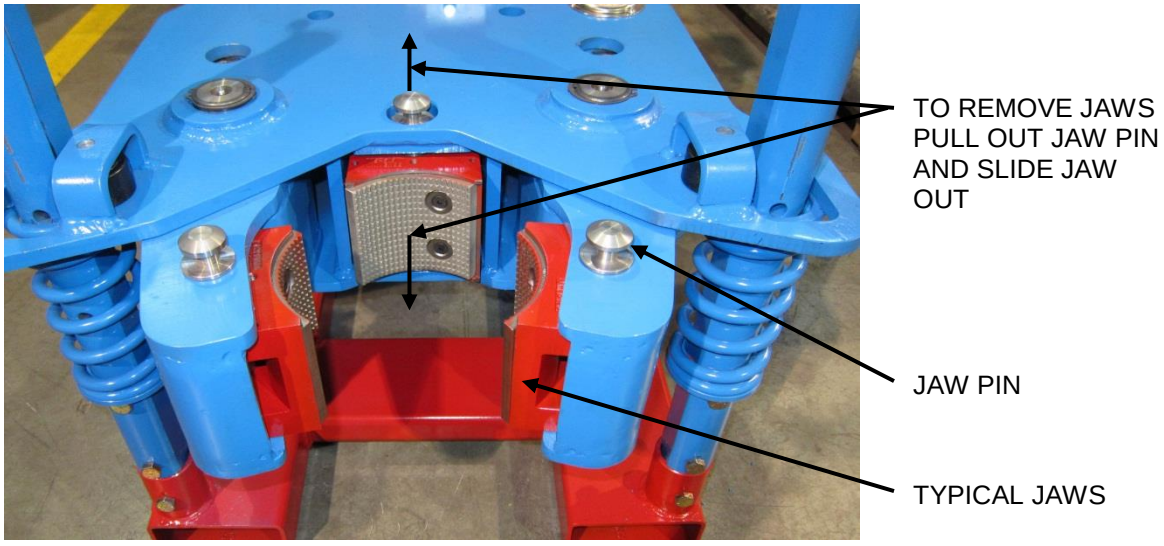


FIGURE 5.11: JAW DETAIL

6.0 CONNECTIONS TO POWER TONG

The Backup is designed to connect via hydraulic hoses to a four way, three position valve located on a Power Tong so that the it may be opened or closed as required and pressured up to hold the tubular in place.

WARNING: ***It is very important to ensure hoses are inspected on a regular basis for wear and damage. If replacing hoses, ensure hose pressure rating matches the maximum system pressure intended to be used with the Backup.***

Figure 6.01 shows a typical connection to a Power Tong. It should be noted the connection orientation to the Backup's pressure relief valve is typical and is recommended as shown. Depending on the exact operation of the four way, three position valve for opening and closing the Backup, if required, the hoses can be reversed on the connection to the valve bank.

As the Backup may be installed on a variety of Tongs (both Universe and other competitors), it is important that the maximum torque rating of the Backup Unit (see section 2.1) is never exceeded.

WARNING: ***Exceeding the maximum torque rating of the Backup Unit may result in damage to the Unit or possible injury to the operator.***

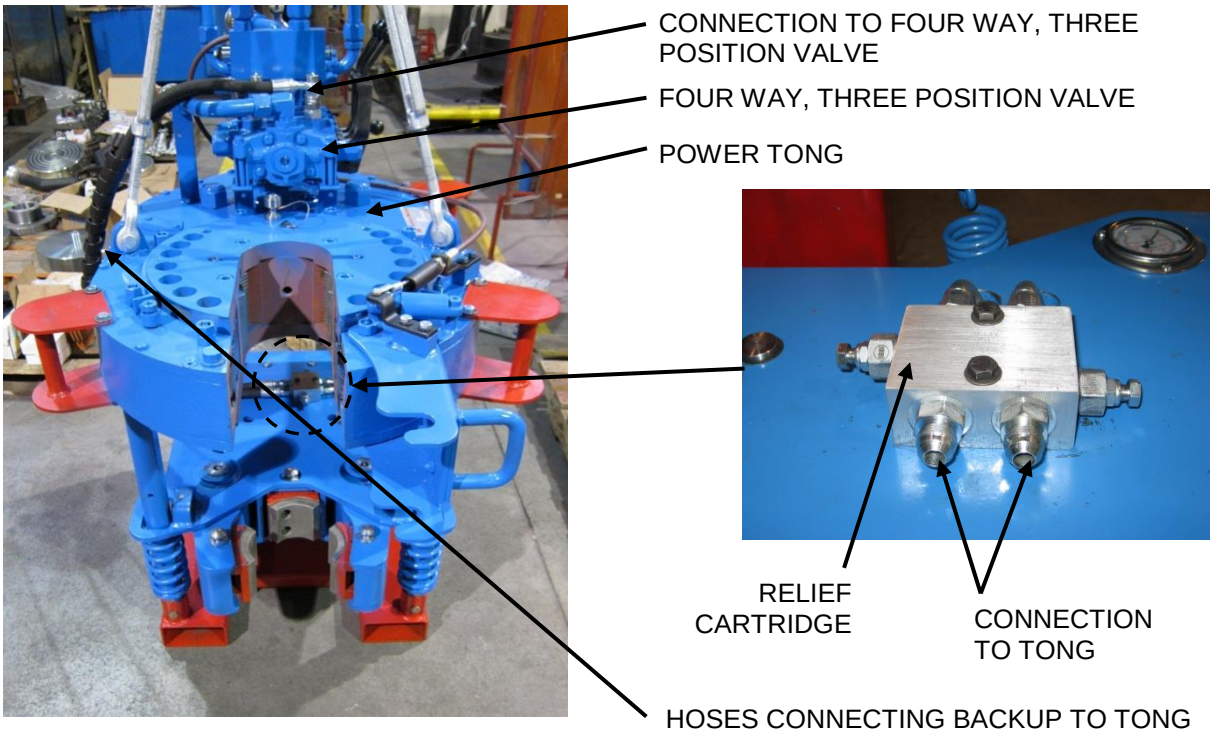


FIGURE 6.01: BACKUP CONNECTION TO POWER TONG

7.0 OPERATION OF UNIT

7.1 CHECKS TO BE PREFORMED PRIOR TO OPERATION OF THIS UNIT

In order to prevent injury to personnel and/or damage to this unit, the following steps need to be taken prior to the use of this unit:

1. Periodic checks should be made to all hydraulic fittings and any connected hoses to ensure they are all tightly fastened and are not leaking or damaged.

2. Ensure the Backup is in the desired position and leveled.
3. Make sure the Backup is floating freely on the spring and there are no objects that could block travel when making up or breaking joints.
4. Ensure all bolts holding the Backup to the Tong are tight.
5. Ensure jaws are in place with the proper size of dies for both the Tong and Backup. Note that in some cases the diameters might be different for what the Tong and Backup will bite (i.e. Backup biting on the collar).
6. Ensure the dies screws are all tight.
7. Check to ensure the jaw pins are fully inserted.
8. Jaws and all moving parts should be greased and lubricated as shown in the maintenance section of this manual.
9. Dies should be checked to ensure they are not worn and clean (use a wire brush if cleaning then is necessary).
10. Since this device operates with large forces, ensure that everyone except the operator is standing clear of the unit.

7.2 STANDARD OPERATION

Operation of makeup or breakout of a joint is as follows:

1. Ensure the Backup and Tong jaws are in the open position.
2. Position the Backup and Tong onto the tubular. Ensure the tubular comes to rest on the back jaw of the Backup.
3. From the Backup control on the Tong, close the arms until the jaws make contact with the tubular. Hold the control for about 1 – 2 seconds so that the pressure is allowed to build up to the desired reading before releasing.
4. Engage the Tong jaws onto the tubular and makeup or breakout the joint. If tightening the threads, on the last turn it is recommended to have the Tong in low speed to reduce any sudden shock loads on the unit from stops when the threading is fully engaged. If loosening threads, the torque should be built up smoothly on the Tong avoiding “jerks” of the control handle to try to “snap” apart the joint.

   WARNING: ***Avoid shock (snap) loading when taking apart joints. This could result in failure or premature wear of the Backup.***

5. Release the Tong jaws first and then the Backup jaws.
6. Move the Tong and Backup off the tubular.

7.3 COLD WEATHER OR ENVIRONMENT OPERATION

If the unit is to be operated in cold weather or environments, the following considerations and precautions should be taken into account:

1. Lubrication grease needs to be compatible with the temperatures and environment of operation. Ensure to grease when the unit is free of moisture or condensation.
2. Hydraulic fluid should also be compatible with the temperatures and environment of operation.
3. Always allow the unit to run free for at least 15 minutes to allow hydraulic oil and lubrication to warm up.
4. In extreme low temperatures, many components of the unit may be susceptible to brittle failures and therefore care is required in running the unit to avoid sudden or shock loading which may lead to failure or breakage.
5. The seals of the hydraulic cylinder of the Backup have an approximate operating minimum temperate of -35 °C (-31 °F) and should be good for majority of applications. If colder and harsh conditions are to be operated in, then consideration should be given to seals that can handle the environment.

NOTE: At lower temperatures then -35 °C (-31 °F), the hydraulic oil will need to be heated in order for the Backup to run with the current seals and hydraulics.

8.0 RELIEF VALVE ADJUSTMENTS

An adjustable relief valve is mounted on the top plate of the Backup that allows the amount of clamping force placed on the tubular.

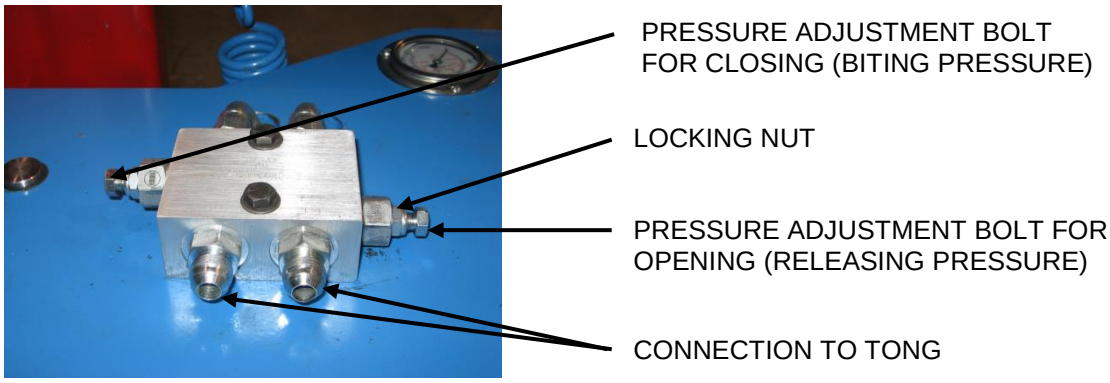


FIGURE 8.01: BACKUP RELIEF VALVES

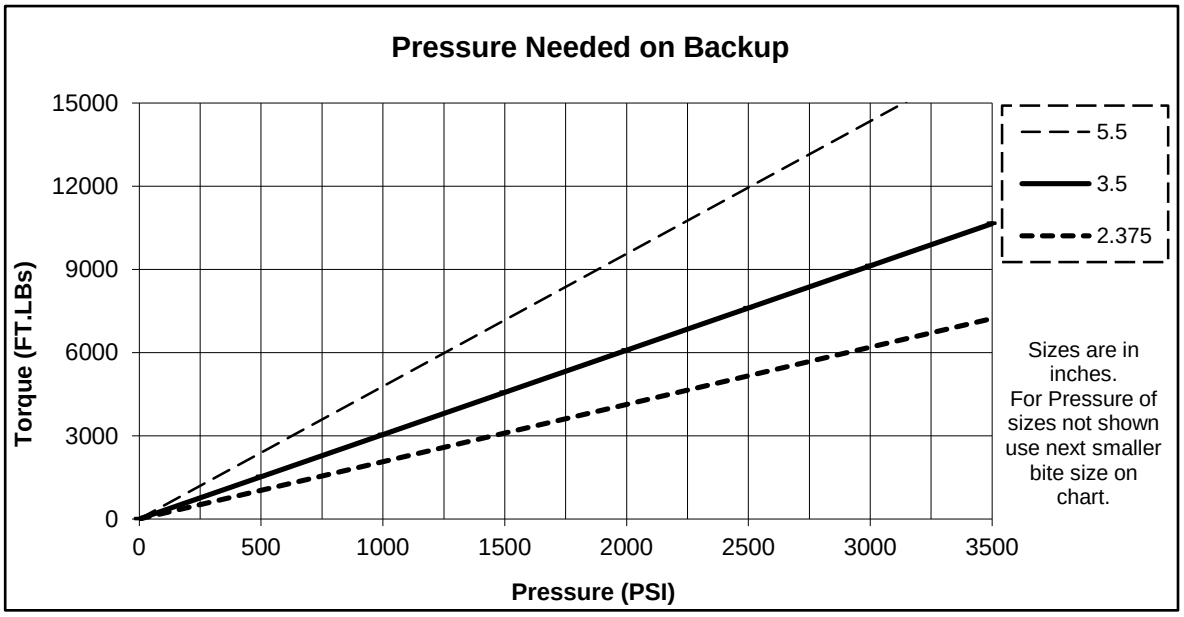
The relief valves are factory set to 500 psi (3,447 kPa) for opening the Backup and to 2,500 psi (17,237 kPa) for closing. This should cover almost all applications and should not require any adjusting.

If the application requires more clamping pressure, adjust the relief valve. Ensure to adjust the correct relief valve (refer to Figure 8.01). Adjust the relief valve as follows:

1. Loosen off the locking nut.
2. Slowly tighten the adjustment bolt. Ensure to test the maximum pressure on the Backup gauge by either biting a tubular or allowing the jaws to close all the way.
3. Once desired pressure is attained, tighten the locking nut.

It should be noted that the as the torque on the Tong increases, it is normal to see the Backup pressure increase.

The Graph below represents the Hydraulic Backup required pressures to hold some common tubular diameters and should be used as a guide to optimize setting on the backup.



9.0 MAINTANCE

9.1 LUBRICATION

Ensuring to lubricate the Backup Unit can greatly extend its life. The following serves as a simple guide that should be followed on a regular basis:

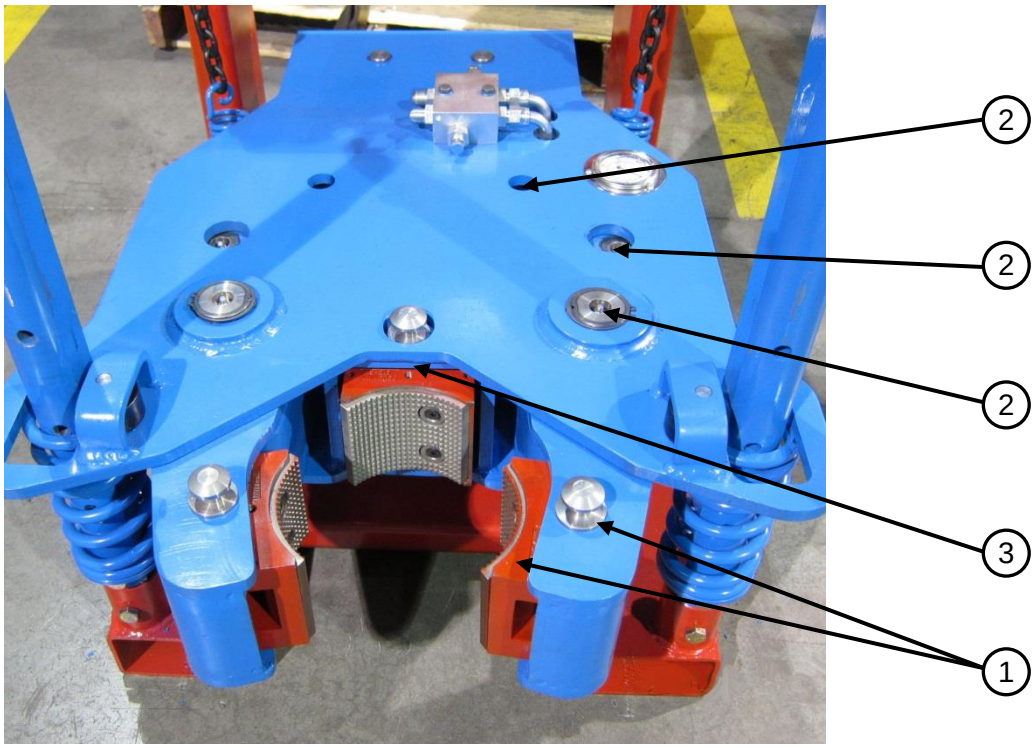


FIGURE 9.11: GREASING LOCATIONS

RECOMMENDED GREASE GUIDE:

LOC.	DESCRIPTION	GREASE TYPE	APPLICATION	FREQUENCY
1	Jaws & Pins	ESSO Unirex EP2	Manually	As required during job
2	Arm Pins		Grease Gun (1 - 2 pumps)	Daily during job
3	Hydraulic Cylinder Block		Manually	As required

NOTES: 1) Grease Type is Factory Default and covers operation between -30 to +40 °C (-22 to 104 °F). For other environments, consult a lubrication specialist.

9.2 HYDRAULICS

After every job the hydraulic fitting and hoses connecting the unit to the Tong as well as in the back of the Backup should be checked if tight as well as for leaks, wear, and any damage. Components that have excessive wear or are damaged should be replaced.

Ensure the oil filter used on the hydraulic power unit is kept clean. Dirty hydraulic oil will reduce the life of the hydraulic cylinder seals.

10.0 STORAGE

After each job the Backup should be properly cleaned with a petroleum based cleaning agent and the unit should be stored in a dry environment.

For long term storage the unit should be drained of all fluids and stored in a clean and dry environment. Before using, fully inspect all components of the unit and ensure to re-grease as per grease guide.

11.0 TROUBLESHOOTING GUIDE

The following serves as a simple guide to some of the problems that may be encountered while using the Hydraulic Backup. If the problem persists, or is not listed here, please contact any authorized Universe Power Tong service centers.

1. Jaws are slipping or not biting the tubular properly.

    a) Check the tubular diameter and ensure proper sizes of jaws and dies are being used. Refer to the die selection table in Section 12.2.
    b) Check to ensure that the jaws are greased.
    c) Ensure the dies are not worn and clean. Use a wire brush to clean if required. If worn, replace the dies.
    d) Ensure there is enough time being allowed for the pressure to build up in the cylinder when the jaws are clamped.
    e) Ensure the Backup is leveled when biting onto the tubular.
    f) Check that the pressure gauge mounted in the Backup is reading correctly by verifying the reading against another calibrated pressure gauge attached to the pressure side.
    g) Verify that when the Backup is clamping the tubular the pressure gauge is reading the correct required pressure. If not, adjust the pressure relief valve as per Section 8.0.
    h) If all of the above still does not remedy the situation, check to ensure all the arm pins or pins bores are not loose and worn. If they are, replace any worn pins or repair bores.

2. The Backup pressure clamping pressure decreases slowly.

    a) Check all fitting and hoses for leaks, especially those coming off the pressure side of the cylinder (refer to Section 12.3 for location).
    b) The cylinder seals may be worn or damaged. Take the cylinder out of the Backup and check or replace seals.
    c) The check valve located on the inside of the Backup (refer to Section 12.3) may be leaking and may need replacing.

3. The load cell gauge is not reading properly (not within 10%).

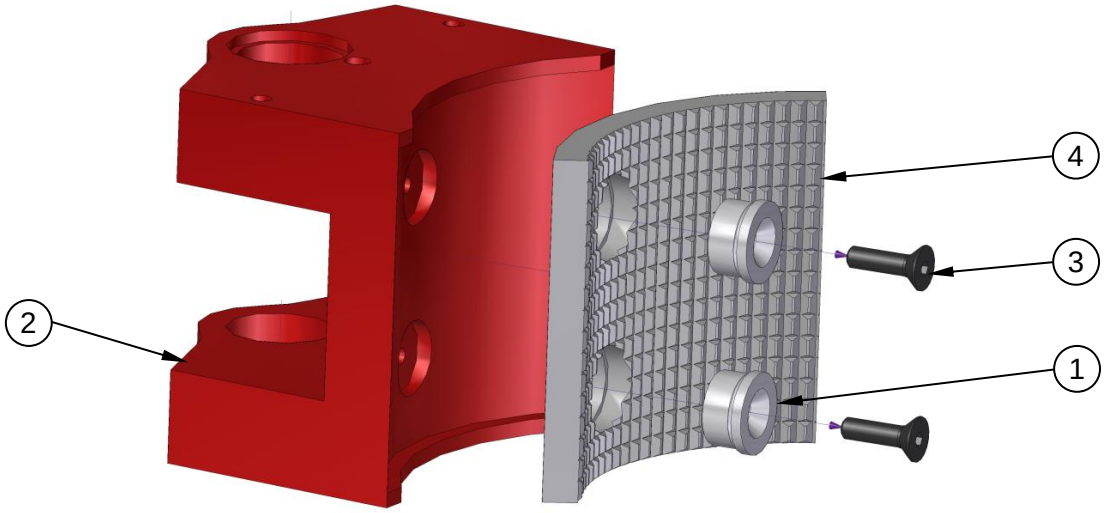
    a) Ensure when under no load the load cell piston is fully extended (should stick out 1/2”). If not, the load cell unit may require more oil (refer to Section 3.1).
    b) Check to make sure when under torque the back is free to move with no obstructions. The contact points when under torque should only be the load cell on the back and the side bearing rollers in the legs.
    c) Check to make sure the Tong is applying the correct torque output.

12.0 PART LISTS

12.11 JAW SETS

ITEM	QTY	DESCRIPTION	PART #
WRAPAROUND DIE JAW SETS:			
1	1 3	5-1/2” WRAPAROUND DIE JAW SET (5 - 5.5 IS STAMPED ON THE JAW BLOCK) (JAW RANGE: 4-1/4” to 5-1/2”) CONSISTS OF: – 5 - 5.5 WRAPAROUND DIE JAW ASSEMBLY	707 06420
2	1 3	4-1/8” WRAPAROUND DIE JAW SET (5 - 4.13 IS STAMPED ON THE JAW BLOCK) (JAW RANGE: 2-1/16” to 4-1/8”) CONSISTS OF: – 5 - 4.13 WRAPAROUND DIE JAW ASSEMBLY	707 06430
INSERT DIE (DP) JAW SETS:			
3	1 3	5-1/2” INSERT DIE (DP) JAW SET (5 - 5.5DP IS STAMPED ON THE JAW BLOCK) (JAW RANGE: 4-3/8” to 5-1/2”) CONSISTS OF: 5 - 5.5DP INSERT DIE (DP) JAW ASSEMBLY (AS STAMPED ON JAW BLOCK)	707 06425
4	1 3	4” INSERT DIE (DP) JAW SET (5 - 4.0DP IS STAMPED ON THE JAW BLOCK) (JAW RANGE: 2-7/8” to 4”) CONSISTS OF: 5 - 4.0DP INSERT DIE (DP) JAW ASSEMBLY (AS STAMPED ON JAW BLOCK)	707 06435

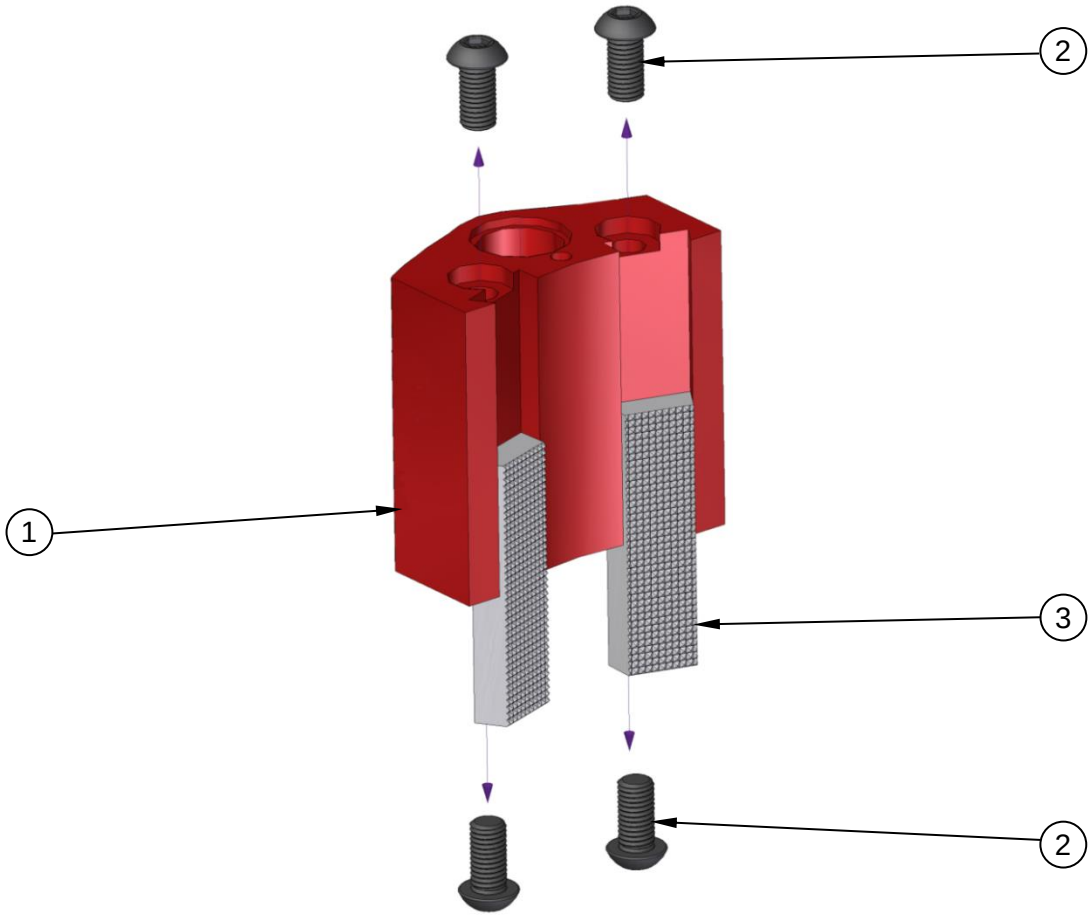
12.12 WRAPAROUND DIE JAW ASSEMBLY



ITEM	QTY	DESCRIPTION	PART #
1	2	DIE HOLDER – FOR 707 05005 JAW BLOCK – FOR 707 05010 JAW BLOCK	 707 05106 707 05110
2	1	JAW BLOCK (Same as Tong JAW Block) – 5 - 5.5 (AS STAMPED ON JAW BLOCK) (JAW RANGE: 4-1/4” to 5-1/2”) – 5 - 4.13 (AS STAMPED ON JAW BLOCK) (JAW RANGE: 2-1/16” to 4-1/8”) JAW BLOCK (Alternative – Backup only)* – 6 - 5.5 (AS STAMPED ON JAW BLOCK) (JAW RANGE: 4-1/4” to 5-1/2”) – 6 - 4.13 (AS STAMPED ON JAW BLOCK) (JAW RANGE: 2-1/16” to 4-1/8”)	707 05005 707 05010 707 06020 707 06030
3	2	SOCKET FLAT CAP SCREW – 1/4” UNC X 1” (FOR 707 05005 JAW BLOCK) – 1/4” UNC X 3/4” (FOR 707 05010 JAW BLOCK)	 N23 04083 N23 04063
4	1	WRAPAROUND DIE	SEE DIE SELECTION CHART

*NOTE: Alternative Jaw Blocks have no roller slot and fits into backup only, but are full interchangeable with the Tong Jaw Blocks in the backup.

12.13 INSERT DIE (DP) JAW ASSEMBLY



ITEM	QTY	DESCRIPTION	PART #
1	1	JAW BLOCK (Same as Tong JAW Block) – 5 - 5.5DP (AS STAMPED ON JAW BLOCK) (JAW RANGE: 4-3/8” to 5-1/2”) – 5 - 4.0DP (AS STAMPED ON JAW BLOCK) (JAW RANGE: 2-7/8” to 4”) JAW BLOCK (Alternative – Backup only)* – 6 - 5.5DP (AS STAMPED ON JAW BLOCK) (JAW RANGE: 4-3/8” to 5-1/2”) – 6 – 4.0DP (AS STAMPED ON JAW BLOCK) (JAW RANGE: 2-7/8” to 4”)	707 05015 707 05025 707 06025 707 06035
2	4	SOCKET BUTTON CAP SCREW – 1/2” UNC X 1”	N47 08083
3	2	INSERT DIE	SEE DIE SELECTION CHART

*NOTE: Alternative Jaw Blocks have no roller slot and fits into backup only, but are full interchangeable with the Tong Jaw Blocks in the backup.

13.2 DIE SELECTION CHARTS

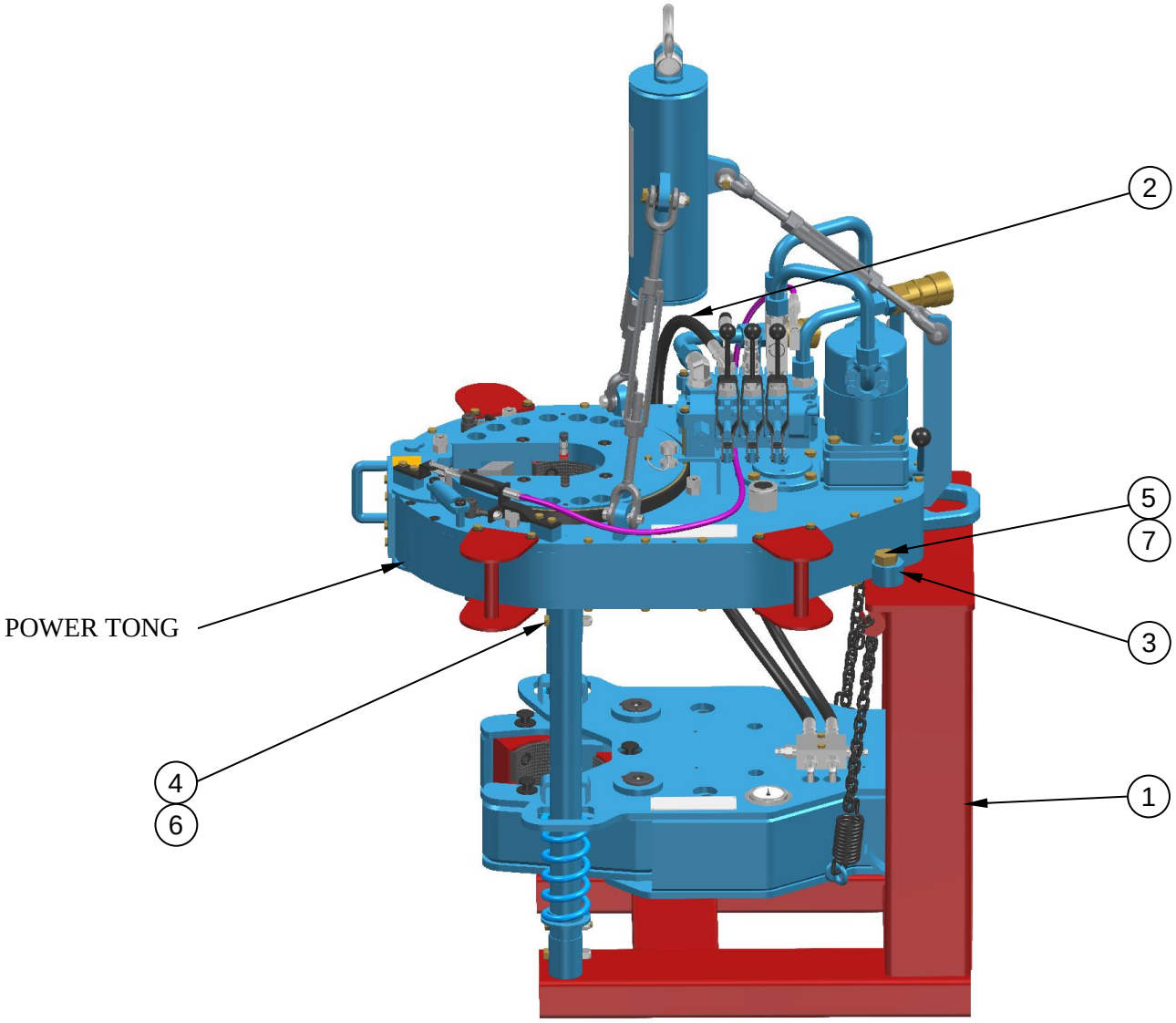
WRAP AROUND DIE SELECTION CHART		
JAW SIZE (As stamped on jaw block)	**DIE SIZES (BITING DIAMETER) Inches (mm)**	**DIE PART NUMBER**
5 – 5.5 or 6 – 5.5 (Alternative)	5.50 (139.7)	707 05255-55
	5.25 (133.3)	707 05255-52
	5.00 (127.0)	707 05255-50
	4.75 (120.7)	707 05255-47
	4.63 (117.6)	707 05255-46
	4.50 (114.3)	707 05255-45
	4.25 (108.0)	707 05255-42
5 – 4.13 or 6 – 4.13 (Alternative)	4.13 (104.9)	707 05260-31
	4.03 (102.4)	707 05260-17
	3.88 (98.4)	707 05260-27
	3.75 (95.3)	707 05260-21
	3.67 (93.2)	707 05260-20
	3.63 (92.1)	707 05260-24
	3.50 (88.9)	707 05260-04
	3.38 (85.7)	707 05260-14
	3.25 (82.6)	707 05260-13
	3.13 (79.4)	707 05260-11
	3.06 (77.7)	707 05260-18
	3.00 (76.2)	707 05260-07
	2.88 (73.2)	707 05260-03
	2.38 (60.5)	707 05260-02
	2.06 (52.4)	707 05260-01

INSERT DIE SELECTION CHART			
BITING DIAMETER (± 0.06 INCHES (1.5mm))		**3.88 X 1.25 X DIE (98.6mm x 31.8mm) THICKNESS**	**DIE PART NUMBER**
***5 – 5.5DP or *6 - 5.5DP (Alternative) (As stamped on jaw block) JAW SIZE**	**5 – 4.0DP or 6 - 4.0DP (Alternative) (As stamped on jaw block) JAW SIZE**		
*5.50 (139.7)	4.00 (101.6)	0.50 (12.7)	707 08250-01
5.38 (136.5)	3.88 (98.6)	0.56 (14.3)	707 08250-22
5.25 (133.4)	3.75 (95.3)	0.63 (15.9)	707 08250-32
5.13 (130.3)	3.63 (92.2)	0.69 (17.5)	707 08250-42
5.00 (127.0)	3.50 (88.9)	0.75 (19.1)	707 08250-51
4.88 (124.0)	3.38 (85.9)	0.81 (20.6)	707 08250-61
4.75 (120.7)	3.25 (82.6)	0.88 (22.2)	707 08250-71
4.63 (117.6)	3.13 (79.5)	0.94 (23.8)	707 08250-81
4.50 (114.3)	3.00 (76.2)	1.00 (25.4)	707 08250-91
4.38 (111.1)	2.88 (73.2)	1.06 (26.9)	707 08250-90

*NOTE: The jaw with standard Inserts will bit a 6” Collar.

12.3 PARTS BREAKDOWN

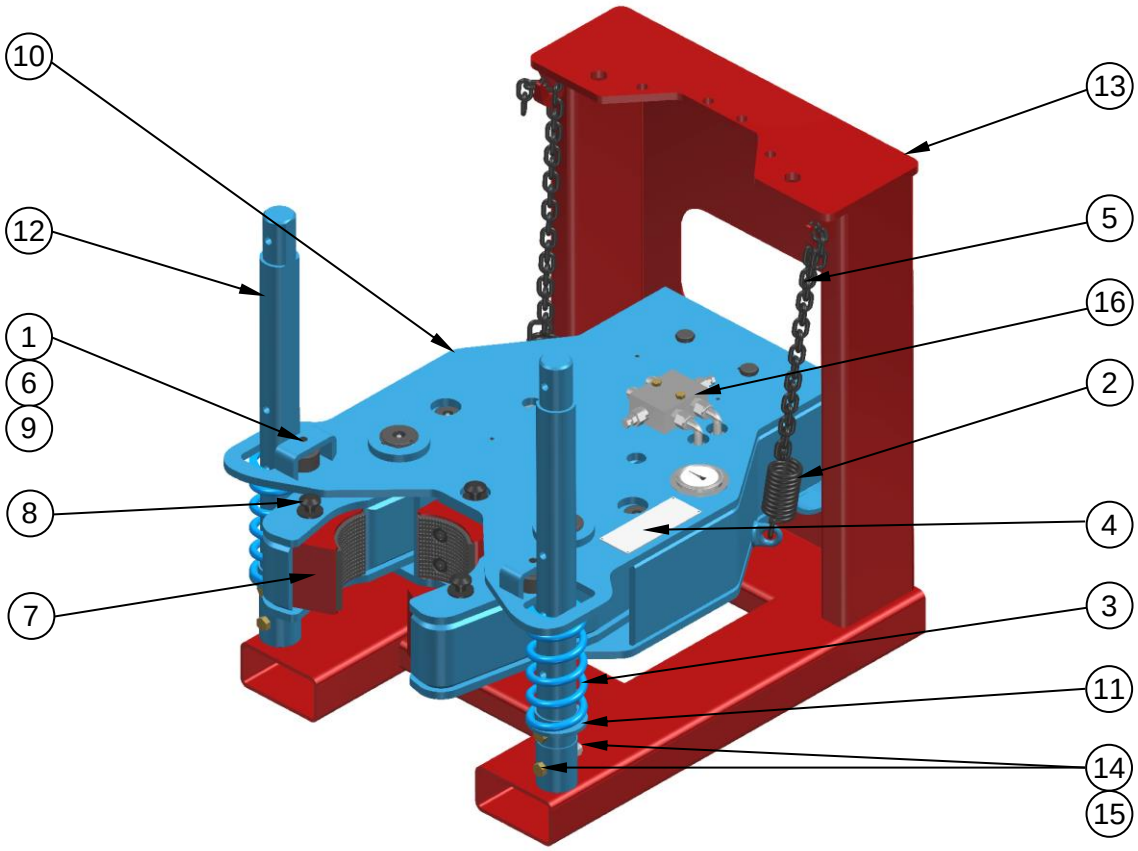
12.31 TONG AND BACKUP ASSEMBLY:



ITEM	QTY	DESCRIPTION	PART #
1	1	6 HYDRAULIC BACKUP	02F06C
2	1	BACKUP INSTALATION KIT	706F00030-05
3	2	BACKUP ADAPTOR LUG	712 05010
4	2	HEX BOLT – 1/2” UNC X 3”	N20 08243
5	2	HEX BOLT – 1” UNC X 3-1/2”	N20 16283
6	2	LOCKNUT – 1/2” UNC	N66 08522
7	2	LOCKNUT – 1” UNC	N66 16522

NOTES: 1) Unless otherwise stated, all hex bolts are grade 8 and plated.
2) All nuts and washers are plated.

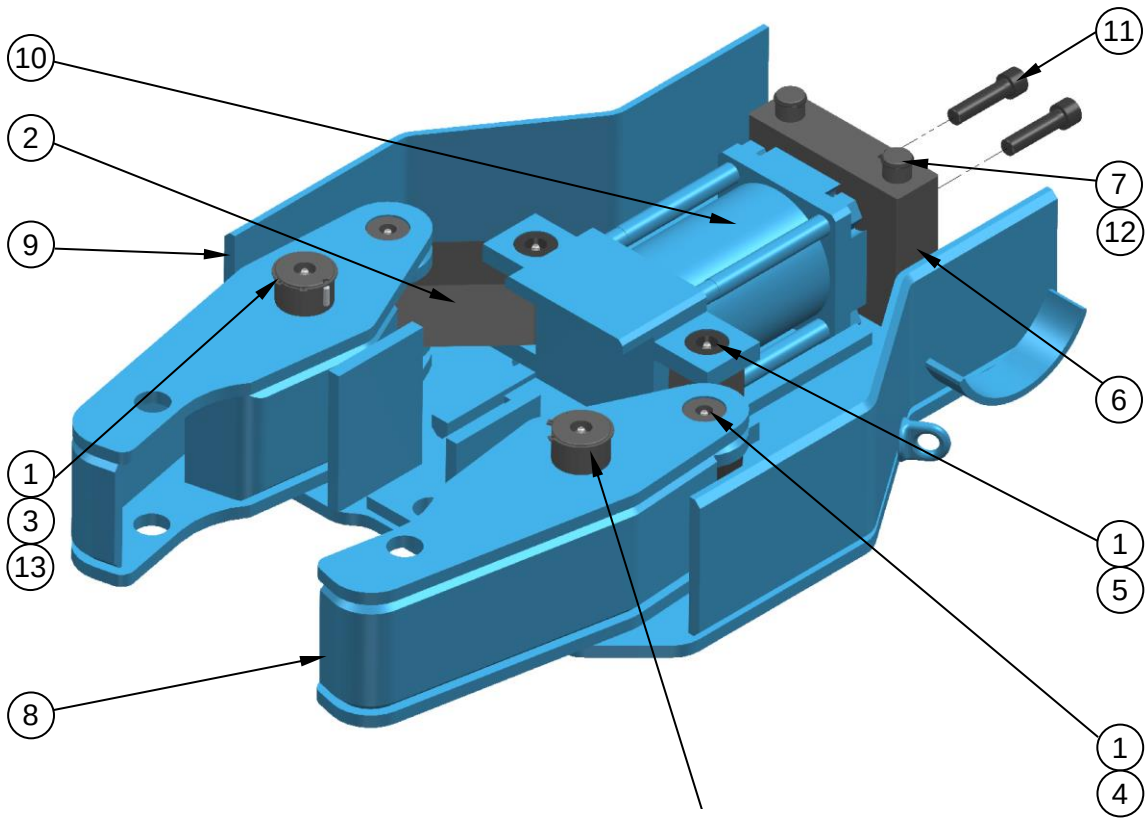
12.32 HYDRAULIC BACKUP UNIT ASSEMBLY:



ITEM	QTY	DESCRIPTION	PART #
1	2	COTTER PIN - 5/16” DIA. X 1”	004 10831
2	2	SPRING	015 95401
3	2	SPRING	015 97401
4	1	PLATE - UNIVERSE ID	049 00523
5	2	CHAIN – 1/4” X 36” GRADE 80	066 04073-24
6	2	CAM FOLLOWER - MCGILL CORY 1.88	085 19103
7	3	JAW SET	SECTION 12.11
8	3	ARM JAW PIN	710 06405
9	2	SIDE LOAD BEARING SHAFT	710 10050
10	1	HYDRAULIC BACKUP	710F06000
11	2	SPRING CUP	713 05003
12	2	LEG	713 06002
13	1	FRAME ASSEMBLY	713F06160
14	4	HEX BOLT – 1/2” UNC X 3”	N20 08243
15	4	LOCKNUT – 1/2” UNC	N66 08522
16	1	HYDRAULIC UNIT	SECTION 12.35

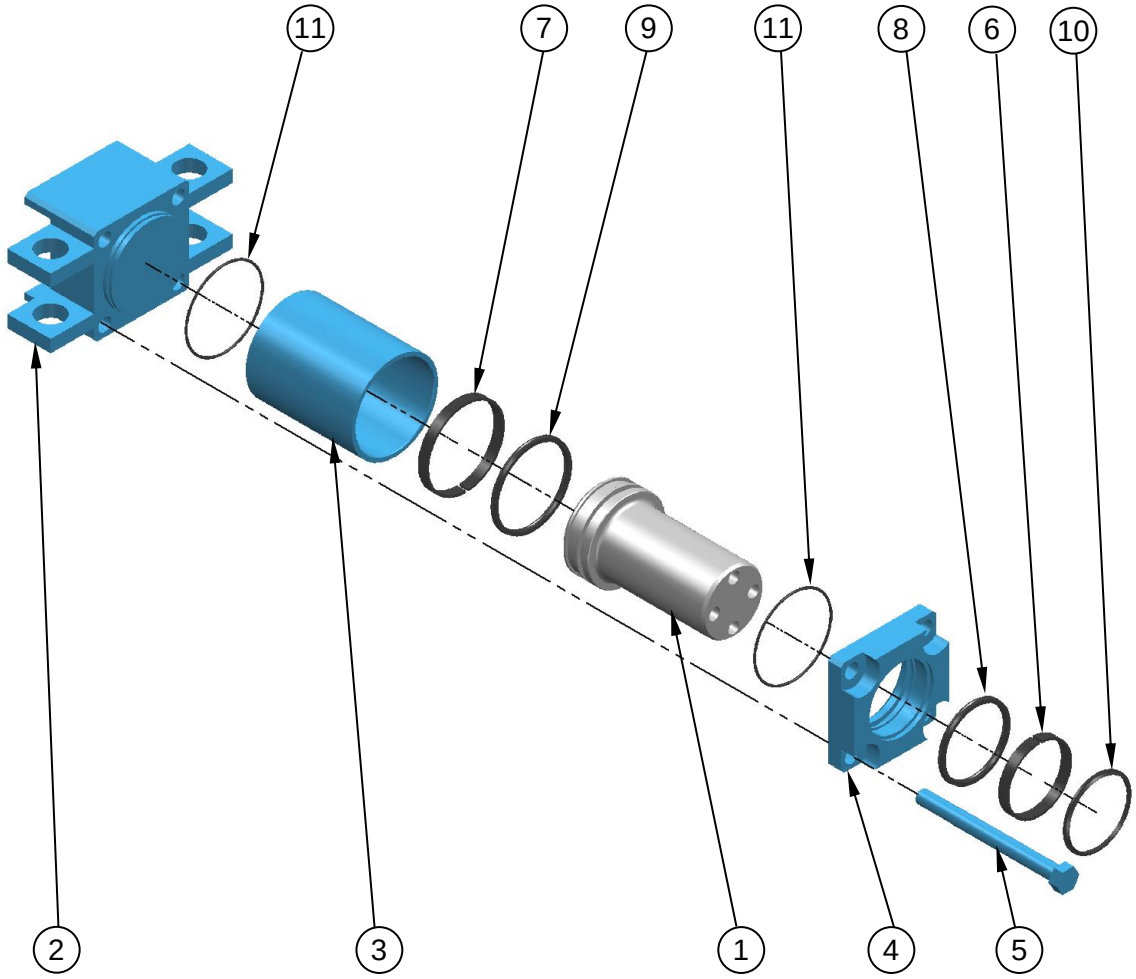
NOTES: 1) Unless otherwise stated, all hex bolts are grade 8 and plated.
2) All nuts and washers are plated.

12.33 HYDRAULIC BACKUP:



ITEM	QTY	DESCRIPTION	PART #
1	6	GREASE NIPPLE - 1/4" UNF	094 00202
2	2	LINK ARM	710 06050
3	2	HINGE PIN	710 14055
4	2	ARM LINK PIN	710 14060
5	2	CYLINDER LINK PIN	710 14065
6	1	BACK SUPPORT BLOCK	710 14080
7	2	BACK SUPPORT BLOCK PIN	710 14085
8	2	ARM ASSEMBLY	710F06200
9	1	BODY ASSEMBLY	710F06300
10	1	CYLINDER ASSEMBLY	711F14100
11	2	SOCKET CAP SCREW - 5/8” UNC X 2-3/4”	N45 10223
12	4	SNAP RING - 5100-100 - EXTERNAL	N69 16041
13	4	SNAP RING - 5100-200 - EXTERNAL	N69 32061

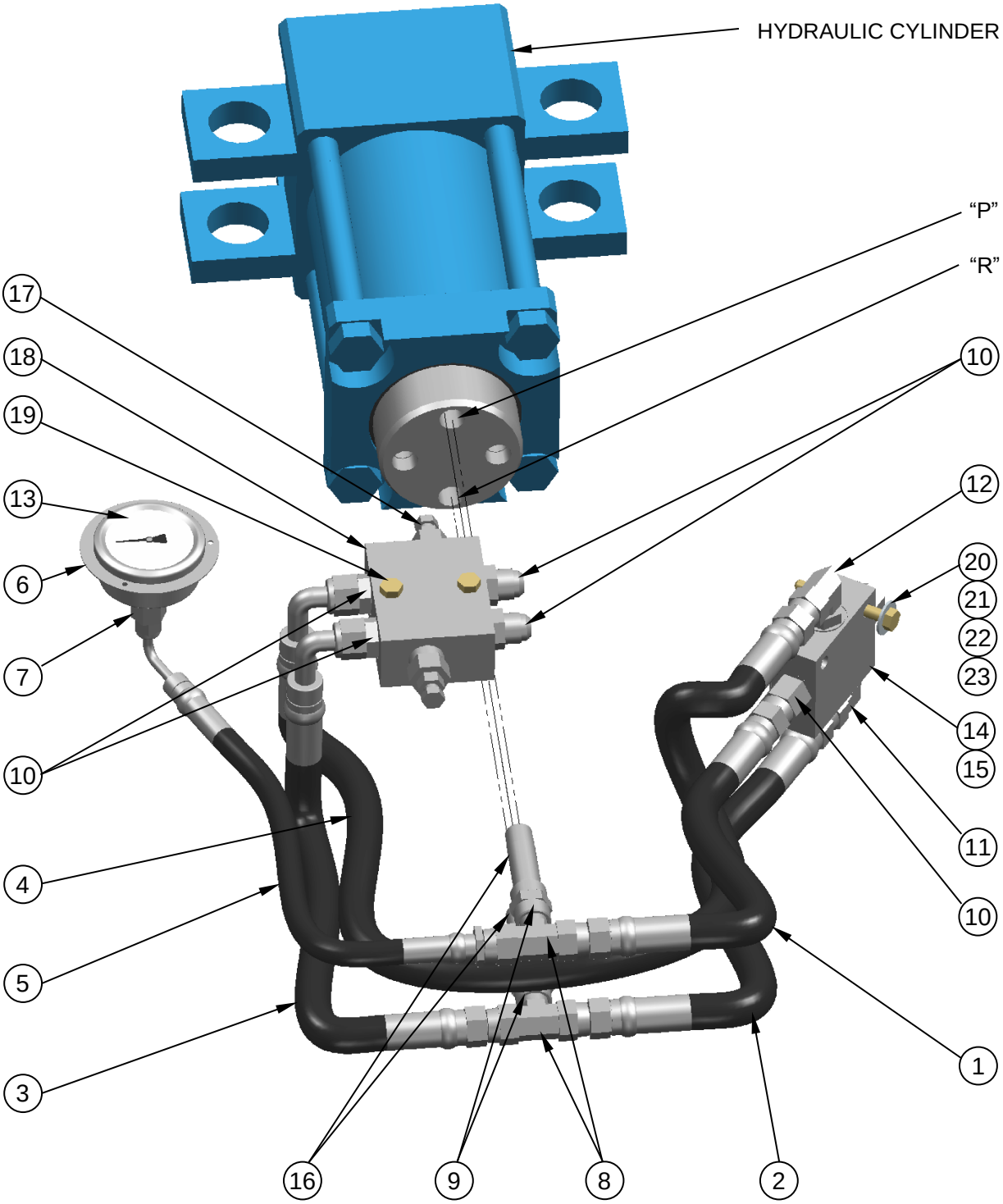
12.34 CYLINDER ASSEMBLY (711F14100):



ITEM	QTY	DESCRIPTION	PART #
1	1	PISTON / ROD	711S05006
2	1	CYLINDER BLOCK (SEE NOTE 2)	711S14105
3	1	CYLINDER TUBE	711S14110
4	1	GLAND BLOCK	711S14120
5	4	HEX BOLT - 3/4” UNC X 8	N20 12643
6	1	WEAR RING - W2-3750-500	N71 05648
7	1	WEAR RING - W2-4500-500	N71 06848
8	1	POLYPACK SEAL - 25003500	N72 28221
9	1	POLYPACK SEAL - 25004000	N72 32221
10	1	WIPER - SH 940-33	N73 28314
11	2	O-RING - #242 DURO 70	N90 24217

NOTES: 1) Unless otherwise stated, all hex bolts are grade 8 and plated.
2) Backup model & size needs to be specified if ordering this part.

12.35 HYDRAULIC BACKUP:



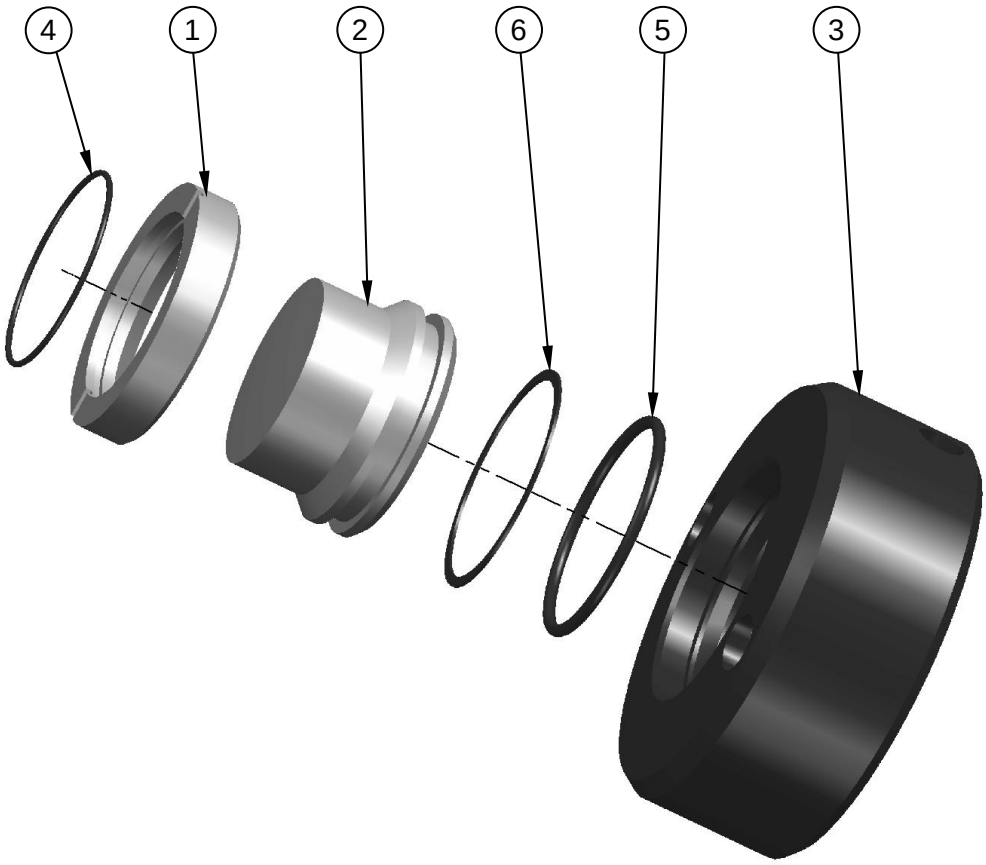
ITEM	QTY	DESCRIPTION	PART #
1	1	HOSE - 8 JICF X 8 JICF X 14”	039 11082-014
2	1	HOSE - 8 JICF X 8 JICF X 16”	039 11082-016
3	1	HOSE - 8 JICF X 8 JICF X 90 X 17-1/2”	039 21082-0175
4	1	HOSE - 8 JICF X 8 JICF X 90 X 32”	039 21082-032
5	1	HOSE - 8 JICF X 4 JICF X 90 X 18”	039 2108204-018
6	1	GAUGE - FRONT FLANGE	H1195751
7	1	FITTING - 4 JICM X 4 NPTF	H2405-4-4
8	2	FITTING - 8 JICM X 6 NPTM TEE	H2601-8-6
9	2	FITTING - 6 NPTF X 6 NPTF	H5000-6
10	5	FITTING - 8 JICM X 8 ORBM	H6400-8-8
11	1	FITTING - 8 JICM X 6 ORBM X 90	H6801-8-6
12	1	FITTING - 8 JICM X 8 ORBM X 90	H6801-8-8
13	1	GAUGE - 2-1/2” DIA. - STAINLESS	H9257255
14	1	CARTRIDGE	HCKCA-XCN
15	1	VALVE BODY	HECJ
16	2	PIPE – 6 NPTM X 6 NPTM X 2-1/2”	HNIP-06-2.5L-XH
17	2	CARTRIDGE	HRPEC-FAN
18	1	VALVE BODY	HYFJ
19	2	HEX BOLT - 5/16” UNC X 1-3/4”	N20 05282
20	1	HEX BOLT - 5/16” UNC X 2-1/2”	N20 05402
21	1	NUT - 5/16” UNC	N66 05032
22	1	WASHER - 5/16” ID TYPE B	N67 05012
23	1	LOCKWASHER - 5/16” ID	N67 05022

NOTES: 1) Unless otherwise stated, all hex bolts are grade 8 and plated.
2) All nuts and washers are plated.

12.36 OPTIONAL COMPRESSION LOAD CELL ASSEMBLY (706F06150-05):

ITEM	QTY	DESCRIPTION	PART #
1	2	HOSE - 4 NPTM X 4 JICF X 12”	039 15044-012
2	1	HOSE - 4 NPTM X 4 JICF X 60”	039 15044-060
3	2	COMPRESSION LOAD CELL	706K06150
4	1	TEE - 4 JICM	H2603-4-4
5	1	TORQUE GAUGE - 20,000 ft-lbs - 24” TORQUE ARM	HGA68-05

12.37 OPTIONAL COMPRESSION LOAD CELL (706K06150):



ITEM	QTY	DESCRIPTION	PART #
1	1	GLAND	706S06151
2	1	PISTON	706S06155
3	1	HOUSING	706S06157
4	1	O-RING - #033 - NITRILE DURO 70	N90 03317
5	1	O-RING - #227 - NITRILE DURO 70	N90 22717
6	1	BACKUP RING - BUN #227	N92 22717