

# SSW-10 Pneumatic Spianing Wrench

**Cam-Tech** 

**Products**, Inc.

# Installation and Maintenance Manual

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## CAM-TECH PRODUCTS, Inc.

Cam-Tech is dedicated to providing the drilling industry quality pipe handling equipment, excellent service, and competitive prices. Our sales representatives and agent network are qualified and respected with many years of experience and are capable of handling the most complex situations.

### CAM-TECH current products include.

- Kelly Bushings Pin and SquareOrive
- Kelly Bushing Safety Drive Pin
- Master Bushings Solid, Hinged, and Split
- Casing Bowls through 30"
- · Rotary Slips Short, Medium, and Long
- Safety "Flex" Handles for Manual Slips
- AS-16 Air Slips (Gerifla Grip)
- Drill Collar Shos Short, Regular, and Long
- Casing Slips through 30<sup>\*\*</sup>
- Safety Clamps through 30<sup>r/
  </sup>
- SSW-10 Spinning Wrenches and parts
- SW-30 Spinning Wrenches and parts
  - SSW-40 Spinning Wrenches and parts

Rydraulic Fower Units

### CAM-TECH reconditioned equipment include ...

- (Kelly Bushings
- Master Bushings and Bowls
- Rotary Slips
- Drill Collar Slips
- Spinning Wrenches
- Kelly Spinners
- TW-61 Torque Wrenches
- Iron Roughnecks
- Spring Slips (PS-15)
- Power Slips (PS-16)



#### Description

The Safety Spinning Wrench SSW-10 is a pneumatically powered tool for spinning drill pipe from 3-1/2" to 5 1/2" O.D. Using the proven principle of friction drive contact, the spinning wrench can spin drill pipe in or out quickly and efficiently without damage to the drill pipe and without the hazards of a spinning chain.

#### **Theory of operation**

During a typical spin up procedure, the wrench is swung onto the drill pipe above the pipe upset. The clamping control is actuated and the pressure rollers clamp and lock onto the drill pipe. The pipe is now tight against the two aluminum drive rollers. The operator can row turn the throttle control to operate the variable speed drive motor and spin the pin into the box. After the pipe is spun in, the joint formed by the pin and box can be torqued using the proper torquing device. For spinning out drill pipe, the operation is repeated in a reverse of spin in.

#### Specifications



## **GENERAL SPECIFICATIONS**



### **LUBRICATION & MAINTENANCE**

#### **Recommended General Purpose EP grease**

Lube code description Castrol Chevron Exxon Gulf Mobil Shell Texaco

Union

Avi-Motive Lidok EP2 Gulfcrown EP2 Mobikix EP2 Alvania EP2 Multifak EP2

Unoba EP2

MP grease

Above -20° C

Below -20° C n/a Avi-Motive W Lidok EP1 Gulfcrown ER1 Mobilux EP1 Alvania ER1 Multifak EP1 Unoba EP1

Make sure that all pheumatic supply is isolated before AN work is carried out WARNING!! the sinning Wrench. What off the Power Unit, close the valves.

Do Art use casing and tubing lubricant. Thread compound (pro tope) must be WARNING! volied to the tool joint every time it is made up.

Procedure daily	maintenance	& Iubrication	(when in use)	ee Figure L-1
$\sim (/ / )^{\sim}$	$\langle \rangle \rangle \langle \rangle \langle$	$\langle \rangle \rangle$		

$\bigcap$	Daily jubrication No	o. of Jube	Application	Lube Cycle
		points		
	Lubricate the swive	2	Apply multipurpose grease: Apply	Every trip
2	Air motor	2	Multipurpose grease	Every trip
3	Pressure rollers	2	Multipurpose grease	Every trip
4	Drive roller bearing	4	Multipurpose grease	Every trip
5	Adjustable links	2	Multipurpose grease	Every trip
6	Cylinder rod end pin	1	Multipurpose grease	Every trip
7	Throttle control valve	1	SAE 10	Every trip
8	Lubricator	1	See Service page 6	Every trip
9	Filter	1	See Service page 7	Every trip
Ū	Gear case	1	See Service page 5	Every 3 months



### SERVICE -- GEAR CASE AND OIL CHANGE INSPECTION

Procedure

- Remove gear case **1** and drain oil.
- Clean case.
- Check the socket head bolts holding the air motor to wrench housing located under drive gears. Torque to 110 Lbs-Ft (149 Nm),
- Check castle nut 2 holding gear on motor shaft is tight.
- Check idler gear bearing and shafts **③**. If either shows wear, replace.
- Reinstall the gear case with a new gasket ④.
- Fill case with 2 quarts (1.9L) SAE W90 transmission oil.

### **SERVICE -- LUBRICATOR**

Procedure

Fill lubricator with SAE 10 oil.

Reservoir can be filled with-out turning off the inlet supply pressure as follows:

- 1. Close air shut-off valve by turning clockwise.
- 2. Remove self-venting fill plug.
- 3. Fill to bottom of sight tube with hydraulic oil (approx. 80 to 150 SSU at 100°F e.g. SAE 5 or 10).

NOTE: Drip rate is factory set and must not be changed.

4. Replace fill plug hand tight and fully open a valve.

5. If replacing filter, set drip rate according to instructions given with unit.

CAUTION!! Avoid exposing plastic bottles to any chemicals that would deteriorate plastic, such as solvents, thinners and carbon tetrachloride.



### **SERVICE -- FILTER**

Procedure

- Shut off power supply and open cock valve to vent pressure.
- Remove hex nut, base and bowl.
- Bowl can be cleaned with mild soap and water, or keresene.
- Do not use solvents, thinner or carbon tetrachioride.
- Unscrew baffle nut and baffle plate, and remove element and element retainer.
- Install new element and element retainer.
- Screw baffle plate up hand tight and secure with baffle nut wrench tight.



### **SERVICE -- ADJUSTMENTS**

Change rollers as follows:

- Select proper roller size for drill pipe size as indicated in chart below.
- Place roller in proper hole in roller arm and secure roller pin with clips provided.
- Adjust the pressure arm with adjustable links to 2" as shown for Chicago Pneumatic motor. Links must be adjusted equally on both sides.

NOTE: Adjustments must be performed when wrench is NOT clamped onto drill pipe. Front Rollers Rear Rollers Roller P/N Drill Pipe Roller R/N Drill Pipe Roller Roller OD diameter ÓD diameter 5" 12035 5″ 3-112 12050 6-5/8% 4″ 4″ 12040 5-1/2" 12055 5-3/4" 4-1/2" 4-3/4 12045 EQUAL ADJUSTMENT BOTH SIDES REAR HOLE FRONT HOLE -ŦЪ PRESSURE ROLLERS Oř CHICAGO PNEUMATIC

## NSTALLATION & COMMISSIONING

### **INSTALLING THE SPINNING WRENCH -- See Figure I-1**

There are two (2) methods of hanging the spinning wrench:



A fixed line method; or

The preferable using a counter balanced line

#### **FIXED LINE METHOD**

- 1. Attach a 1/2'' or 5/8'' cable in the derrick at a height that will allow a free easy swing. The higher the fixed line the easier it will be to move the wrench onto the pipe.
- 2. Attach the cable at a cross member approximately 2 1/2 feet (0.75 m) from drill pipe centerline as shown, and position the wrench across from the drifler where the chainman normally would stand.
- 3. Suspend the wrench approx. 5 feet (1.5 m) above the floor.

#### **COUNTER BALANCE METHOD**

- 1. Attach the pulley assembly in the derrick at the same point as shown in the fixed line installation.
- 2. Attach a counterweight equal to the weight of wrench on free end of cable.

#### **BACK UP CABLES**

1. Attach two back up cables to the rear of the wrench to restrict movement to 1 foot (0.3 m) in either direction



If only one back up line is attached, the wrench can rotate into the Operator and cause injury.

#### **CONNECTING AIR LINES**

CAUTION!!

- The wrench requires 240 cfm @ 90 Psi (113 l/m @ 620 KPa).
- It is equipped with a regulator to prevent damage from excessive air pressure.



NOTE: During installation use as few pipe fittings as possible and route the air line direct from the air supply, keeping distance as short as possible.

- 1. Run a 1-1/2'' air supply line up to the rig floor in a protected area easily accessible for maintenance.
- 2. Install a 1-1/2" shut off valve to the air supply line (as shown) to allow maintenance of the tool.
- 3. Attach the filter end of the filter/regulator/lubricator assembly to the shut off valve.
- 4. Connect the 25 foot (7.6 m) air hose assembly provided to the lubricator end of the filter/ regulator/lubricator assembly.
- 5. Blow out air line to remove any trapped moisture and debris.
- 6. Pour 1/2 pint (0.47 l) SAE 10 oil into the 25 foot (7.5 m) hose, then connect to spinning wrench swivel fitting.
- 7. Level tool with the rig floor using the hanger adjustment screw provided.

# INSTALLATION & COMMISSIONING



## **OPERATION**

### NORMAL USAGE

The spinning wrench is designed to:

• Spin in and spin out various types of tubing and casing

CAUTION!! Back up lines must be attached to limit rotational movement to one foot (0.3m) in each direction.

#### PROCEDURE

- 1. Swing wrench onto drill pipe approximately one foot (0.3m) above the tool joint.
- 2. Do not operate the wrench on pipe upset or tool joint.
- 3. To clamp wrench to pipe, actuate clamp control valve located on wrench body.
- 4. To spin pipe, rotate throttle control handle in the direction of spin required.

1 FOOT

UPSET

5. To release wrench from pipe, actuate clamp control valve.

CHICAGO PNEUMATIC

SPIN OU

THROTTLE CONTROL



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CLAMP CONTROL

## 





### **CONTROLS** and **INDICATORS**

1) Clamping control

This is a two position directional control valve that clamps and unclamps the pressure rollers on the drill pipe

2) Throttle control (spin in, spin out)

This is a shift type control that operates the variable speed drive motor to power the aluminum drive rollers and spins in or spins out the drill pipe. This control is equipped with a lock out device to prevent accidental shifting to the wrong direction.

3) Air regulator/gauge

This is a combination air regulator and gauge that indicates the input line pressure from 0 - 160 PSI (0 - 1,100 KPa) and prevents premature wear. The air regulator is factory set and should not be reset.

### TIPS ON OPERATION

1. Pin should be stabbed into the box as vertical as possible. Spinning wrench can not spin an improperly aligned connection

Spin pin into box until pin and box are just shouldered together; at this point stop and torque joint with the torque wrench. Do not use the spinning wrench to torque joints.

Keep clamping arms adjusted. Slipping rollers will cause rollers to wear. If drive rollers start to slip on the pipe, check the pressure roller adjustment and adjust equally on both sides. See adjustment procedure.

4. Replace worn drive rollers. If the drive rollers start to slip and the roller arms have been adjusted to maximum, this may indicate drive rollers require replacement.

## **OPERATION**

### TIPS ON HANDLING THE DRILL STEM

#### Picking up and laying down the drill stem

• Use thread protectors when available. When threads and shoulders are unprotected, do not permit the tool joints to strike steel surfaces such as walks, stairs, steel floors, or machinery. Use wood surfaces where the tool joint may hit.

#### Cleaning and lubrication (thread compounds)

- · Pin and box threads and shoulders should be thoroughly cleaned,
- Use solvent and wipe dry with a clean rag.
- Inspect carefully for any burrs or nicks on the shoulders or threads.
- Damaged connections should never be run in the hole.
- After cleaning, apply tool joint thread compound to threads and shoulders with a round, stiff bristle brush.
- Use thread compounds containing 40% to 50% by weight of finely powdered metallic zinc.

CAUTION!! Never, under any circumstances, use casing and tubing lubricant. Thread compound must be applied to the tool joint every time it is made up.

#### Stabbing and spinning the drill stem

- Do not allow the ends of the pin to strike the box shoulders. The shoulder must not be nicked or otherwise damaged.
- Before spinning the pipe, make sure connections are in alignment.
- Do not rotate the pipe too fast, especially when wobbling or binding occurs.
- Extra care is necessary when a power operated spinner is used.

### **OPERATION**

### TIPS ON HANDLING THE DRILL STEM

#### Making up the drill stem (torque)

- Torque measuring equipment must be used.
- When using tongs, it is important that line pull be measured when the line is at right angles or 90° to the tong handle.
- When applying line pull, do not jerk the tongs.
- Over-torque can be just as damaging as under-torque.
- Use both tongs (when tongs are used) when making up tool joints.
- Do not make up pipe using spinners only. Torquing devices must be used.

#### Breaking in new connections

· Initial makeup is most critical and extra care is essential for long trouble-free service.

#### Follow these steps:

- Inspect threads and shoulder for any damage.
- Clean and lubricate as indicated above.
- Walk in or slowly rotate joints together.
- Makeup to recommended torque.
- Breakout and slowly spin out.

#### Breaking and spinning out the drill stem

- When breaking out the joint, use both tongs (when using tongs). Always follow these steps:
- Do not let the end of the pipe strike the box shoulder.
- Come out of the hole on a different break each trip so that every connection can be periodically broken and its condition and torque checked.
- When standing the pipe back, be sure the set back area is clean where the pin will rest.

## TROUBLESHOOTING

### TROUBLESHOOTING

If a problem with the spinning wrench cannot be solved after following this section on troubleshooting, contact an authorized Cam-Tech representative.

WARNING!! Make sure the pressure line valve is fully opened before pressurizing the Spinning Wrench.

### **GENERAL SYMPTOMS**

When troubleshooting the wrench, the following symptoms should be checked first:

- 1. Air pressure -- this should be 90 to 125 psi at regulator with air consumption at 240 cfm or 16 cubic feet per connection.
- 2. Hoses -- check that hoses are free and not kinked or pinched.

**DRIVE ROLLERS** 

**MUFFLER** 

3. Connections -- check all connections are secure and do not leak air or that any connections have not been made that would reduce the line LD. thereby restricting air flow.

PRESSURE ROLLER ARMS

CLAMP VALVE

- 4. Lubricator -- check lubricator is full (SAE 10 oil).
- 5. Filter -- check and drain as required.

PRESSURE ROLLERS

- 6. Muffler -- check mufflers are not blocked with mud, etc.
- 7. Control valve -- check valve is functioning properly.

## TROUBLESHOOTING

### SOLUTIONS

<b>SYMPTOM</b>	PROBABLE CAUSE	SOLUTION
Wrench fails to spin or clamp onto drill pipe	No air pressure	Check general symptoms
Wrench fails to clamp onto drill pipe	No air pressure	Check general symptoms
	Dirty or clogged air exhaust mufflers	Clean and/or replace mufflers
	Faulty clamp valve	Replace valve or install sear kit if unit indi- cates leaky seals. Kit shown in parts list.
Wrench drive rollers slip on drill pipe	Pressure arms out of adjustment	Re-adjust arms as indicated in Service sec- tion of "Lubrication & Maintenance"
	Drive rollers are worn and will not contact pipe adequately	Check rollers and replace as required
	Drive roller gears, idler gears and/or gear is worn excessively	Check these gears as noted in the disas- sembly procedures and inspect all affected parts for excessive wear and replace as required.
	Wrench is not equipped with check valve. This valve prevents pressure decay in the air lines.	Check if wrench is equipped with check valve. If not, install
Air motor does not operate, or operates slowly and drive rollers will not rotate	Insufficient air pressure	See General Symptoms
	Throttle control handle is frozen	Lubricate control handle front and back
	Drive shaft or drive key is broken. Possible damage to drive gear and idler gear.	Disassemble wrench and replace shaft and/or gears. It is recommended to replace all seals and check bearings when replacing gears at all times.
	Air motor is frozen up.	Remove air motor and check internal mechanisms and replace damaged components.
	Cap screw and lock washer used to retain main drive gear on air motor has come loose and has caused mis- alignment and damage.	Lower gear box, and check drive gear. If cap screw has come loose, it is recommended that it be replaced.
Wrench slips on drill pipe but drive rollers and motor operate.	Pressure roller is worn.	Replace pressure rollers and bearings.
	Pressure roller arms have a metal fatigue	Check both arms for cracks between the drive roller and pressure mounting holes.
	Spool valve has leaking seals and will not hold required pressure.	Replace valve and/or seals.

### Figure 2 -- SPINNING WRENCH ASSEMBLY

Item	Cam-Tech Part No.	Description	Qty
	C-10426-35	SSW-10 ASSEMBLY with 3-1/2" Rollers	Ref.
	C-10426-40	SSW-10 ASSEMBLY with 4" Rollers	Ref.
	C-10426-45	SSW-10 ASSEMBLY with 4-1/2" Rollers	Ref.
	C-10426-50	SSW-10 ASSEMBLY with 5' Rollers	Ref.
	C-10426-55	SSW-10 ASSEMBLY with 5-1/2" Rollers	Ref.
1	6987	ANCHOR, Shackle	1
2	51402-10	PIN, Cotter	2
3	10445	PIN, Hanger	2
4	15060	SPRING HANGER	1
5	50005-28-C8	SCREW	2
6	50905-C	LOCKWASHER	2
7	15144	SUPPORT, Handle	1
8	52820-16-G	BUSHING, Pipe Reducing	1
9	11934	SWIVEL JOINT	1
15	10659	AIR HOSE ASSEMBLY (includes safety chain assembly)	1
16	52824-20-G	BUSHING, Ripe Reducing	1
17	6598	LUBRICATOR	1
18	52824-20-G	BUSHING, Pipe Reducing	2
19	53920-G	NIPPLE	2
20	14119	REGULATOR ASSEMBLY (same as P/N 14073)	1
21	6599	FILTER	1
22		SPINNING WRENCH ASSEMBLY - Fig 2A (see Figure 2A for breakdown)	Ref.
23	50010-16-C8	SCREW, Socket Head Cap	1
24	50310-C	NUT, Hex, Jam	1
25	10452	HANGER	1
26	C-94061	SAFETY HANDLE	2
27	C-94015	SCREW, Hex Head Cap	4
28	C-94016	LOCK WASHER	4
29	C-90141	FLAT WASHER	4
17			



### Figure 2A -- SPINNING WRENCH ASSEMBLY

	Cam-rech		
Item	Part No.	Description	Qty
1		SPINNING WRENCH ASSEMBLY - Eig 24	
		(see Figure 2 for peyt higher assembly)	Ref.
1	56501-8-8-5	CONNECTOR 37º External Pine	1
	10447		1
<u> </u>	10447		1
<u> </u>	10448		1
4	15180	BRACKET WELDMENT	1
5	14//6	SUPPORT, Pipe	$\frac{1}{1}$
6	50805-R-C	• FLAT WASHER	$\frac{1}{2}$
7	50905-C	LOCK WASHER	2
8	50005-6-C8	SCREW, Hex Head	2
9	50910-C	LOCK WASHER	4
10	56501-8-8-5	CONNECTOR 399 External Pipe	2
11	10469	AIR LINE, Cylinder, Short	1
12	56506-12-8-5	ELBOW, /90 degree, 37° External Pipe	2
13	10470	AIR LINE, Cylinder, Long	1
17	52408-G	ELBOW, Maia/Een/ale	2
18	51104-C	N LOCK WASHER, Hi-Collar	3
19	50104-18-C	SCREW, Socket Head Cap	3
20	12070	VALVE-Direction Copyrol (see Figure 3 for breakdown)	1
21	10743	MUFFLER	2
22	11152	GLIARD	1
23	50008-26-08	SCREW, Hey Head Can	5
24	50908-0		12
25	50000 2		5
25	5000-12-00		12
20	10420		12
20	10425		1
20	E1402.12		2
27	51403-12		 
			<u> </u>
22	10629		<u> </u>
	10620		
	10451	SPACER	4
	55110-20-08	SCREW, Socket Head Cap	4
	51(NU-C	LOCK WASHER, HI-CONBr	4
36	10630	SHAFI, Idler, Gear	2
37	51205-14	PIN, Dowel	2
38	10658	ROLLER BEARING, Idler Gear	4
39	10,6,29	GEAR, Idler 🔍	2
40	10,660	WASHER, Thrust	4
41		SPINNING WRENCH ASSY - Fig 2B (See Figure 2B for breakdown)	Ref.
42	10632	GASKET, Air Motor	1
43	10454	KEY, Drive Gear	1
44	14000	MOTOR ASSEMBLY, Air - Chicago Pneumatic	1
44	14055	(see Figure 4 for breakdown)	1
45	16978	TUBE, Valve	1
46	17021	VALVE, Check-Inline	1
47	56501-6-8-5	CONNECTOR, 37° External Pipe	2
48	17001	TUBE, Valve	1
49	56506-8-8-5	ELBOW, 37° External Pipe	1
50	50008-16-C5	SCREW, Hex Head Cap	2
51	72918	PLUG, DRAIN (not shown)	1
<u> </u>			-





### Figure 2B -- SPINNING WRENCH ASSEMBLY

1         50005-10-CS         SCRE W, Hex Head         8           2         50005-C         LOCK WASHER         12           3         12053         COVER, Bearing         2           4         10882         GASKET, Bearing Cover         2           5         50512-C         NUT, Hex, Slotted         4           6         51403-12         PIN, Cotter         5           7         12082         WASHER, Retaining, Large         22           8         12083         SPACER, Drive Shaft         4           10         12081         HOUSING, Bebains         4           11         12047         BEARING, Roller*         4           12         55500-325         RING, Retaining,         4           13         10631         NMMERLAR         4           14         53301-10-6         SCREW, Drive         4           15         11933         PIN, Tink-With Gréades Fitting         1           16         53203         OKERALY, Ese Fitting         2           17         10462         CVI, MIDERI Ari (see Figure 7/67 broads/down)         1           18         10432         CVI MDERI Ari (see Figure 7/67 broads/down)         1 <t< th=""><th>Item</th><th>Cam-Tech Part No.</th><th>Description</th><th>Qty</th></t<>	Item	Cam-Tech Part No.	Description	Qty
2         50905-C         LOCK WASHER         12           3         12053         COVER, Bearing         2           4         10882         GASKET, Bearing Cover         2           5         50512-C         MUT, Hex, Slotted         4           6         51403-12         PIN, Cotter         5           7         12082         WASHER, Retaining, Large         2           8         12083         BEARING, Thrust         4           9         12088         SPACER, Drive Shaft         4           10         12081         HOUSING, Relating         4           11         12077         BEARING, Roliter         4           12         53500-325         RING, Relating         4           13         10631         NAMEPLATE         1           14         53301-10-6         SCREW, Drive         4           15         11933         PIN/LTIK-WHICH-Grégse Fitting         1           16         53203         - GARACE/FITTING         1           17         10462         CNLWDER/Rod End         2           20         10664         WASHER, Retaining         2           21         12084         SPACER, Gea	1	50005-10-C5	SCREW, Hex Head	8
3       12053       COVER, Bearing       2         4       10982       GASKET, Bearing Cover       2         5       50512-C       NUT, Hex, Slotted       4         6       51403-12       PIN, Cotter       5         7       12082       WASHER, Retaining, Large       22         8       12083       BEARING, Thrust       4         9       12086       SPACER, Drive Shaft       4         10       12081       HOUSING, Bekaing       4         11       12047       BEARING, Roller       4         12       53500-325       RING, Retaining       4         13       10631       NAMEPLATE       1         14       53301-10-6       SCREW, Drive       4         15       11933       PIN_Unitwikh Greesize Fitting       1         16       53203       GARCASCER, Geese       2         20       10628       GEAR, Driven       2         21       12084       SPACER, SEMELY       2         22       C-119805       BOOY ASSEMBLY       2         23       12054'       • DOWEL PIN-       2         24       12054'       • SPACER, SEMELY       2	2	50905-C	LOCK WASHER	12
4       10882       GASKET, Bearing Cover       2         5       50512-C       NUT, Hex, Slotted       4         6       51403-12       PIN, Cotter       5         7       12082       WASHER, Retaining, Large       2         8       12083       BEARING, Thrust       4         9       12088       SPACER, Drive Shaft       4         10       12081       HOUSING, Relight       4         11       12047       BEARING, Roller       4         12       53500-325       RING, Relight       4         13       10651       NAMEPLATE       4         14       53301-10-6       SCREW, Drive       4         15       11933       PIN, URIN, With Gréase Fitting       1         16       53203       O (SRAE) FITING       1         17       10462       CYL MDEB, Kod End       2         20       10664       WASHER, Retaining       2       2         21       12084       SPACER, Gear       2       2         22       14052       CYL MDEB, Kod End       1       2         23       5/(206+7)       DOWEL PIN       2       2         24	3	12053	COVER, Bearing	2
5       50512-C       NUT, Hex, Slotted       4         6       51403-12       PIN, Cotter       5         7       12082       WASHER, Retaining, Large       22         8       12083       BEARING, Thrust       4         9       12086       SPACER, Drive Shaft       4         10       12081       HOUSING, Bebaing       4         11       12047       BEARING, Roller       4         12       53500-325       RING, Retaining, Retaining       4         13       106631       NAMEPLATE       1         14       53301-10-6       SCREW, Drive       4         15       11933       PIN_CINK-WICH Greate Fitting       1         16       53203       -GREAGE FITTING       1         17       10462       CVLINDER, Act Sergure 7 for breakdown)       1         18       10432       CVLINDER Act Sergure 7 for breakdown)       1         19       10664       WASHER, Retaining       2       2         20       10628       GEAR, Driven       2       2         21       12084       SPACER, Gear       2       2         22       LIVE ROLEEDSHAFT ASEEMELY - Each Consisting at:       2<	4	10882	GASKET, Bearing Cover	2
6         51403-12         PIN, Cotter         5           7         12082         WASHER, Retaining, Large         2           8         12083         BEARING, Thrust         4           9         12088         SPACER, Drive Shaft         4           10         12081         HOUSING, Bearing         4           11         12047         BEARING, Thrust         4           12         53500-325         RING, Retaining         4           13         10631         NAMERLAYE         4           14         53301-10-6         SCREW, Drive         4           15         11933         PIN, Colk with Grease Fitting         1           16         53203         • GREASE FITTING         1           17         10462         CYLINDER, Rot End         1           18         10432         CYLINDER, Rot End         2           20         10628         GRAP, Driven         2         2           21         12084         SPREER, Gear         2         2           22         C-LI950         BODY ASSEMBLY         2         1           23         51/206-Y         • DOWEL PIN         2           24	5	50512-C	NUT. Hex, Slotted	4
7       12082       WASHER, Retaining, Large       2         8       12083       BEARING, Thrust       4         9       12088       SPAZER, Drive Shaft       4         10       12081       HOUSING, Bearing       4         11       12047       BEARING, Roller       4         12       53500-325       RING, Retaining       4         13       10631       MAMEPLATE       1         14       53301-10-6       SCREW, Urive       4         15       11933       PIN, Dink with Gréase Fitting       1         16       53203       - (SREASE FITTING       1         17       10462       CYLINDER, Rot End       1         18       10432       CYLINDER, Rot End       2         20       10628       GEAR, Driven       2         21       12084       SPACER, Gear       2         22       C-LIASD       BODY ASSEMBLY       2       2         21       12054       SIMACE ROLE       2       2         23       5(206-7)       O.DWEL PIN       2       2       2         24       12851       INNER RACE       2       2       2       2	6	51403-12	PIN, Cotter	5
8         12083         BEARING, Thrust         4           9         12088         SPACER, Drive Shaft         4           10         12081         HOUSING, Beaining         4           11         12047         BEARING, Roller         4           12         53500-325         RINS, Retaining         4           13         10631         NAMEPLATE         1           14         53301-10-6         SCREW, drive         4           15         11933         PIN-Unit-With Grease Fitting         1           16         53203         • GREASE/FITTING         1           17         10462         Crit With GR, Arc (see Figure 7/for foreskiddwin)         1           18         10432         Crit With ER, Retaining         2           20         10664         WASHER, Retaining         2           21         12084         Sirker R, Gear         2           22         C-14950         BODY ASSEMELY         1           23         5(206-7         DOWEL PIN-         2           24         12051         INNER RACE         2           25         12054         Staff, Drive Roller         2           26         10453 <td>7</td> <td>12082</td> <td>WASHER, Retaining, Large</td> <td>)]2</td>	7	12082	WASHER, Retaining, Large	)]2
9         12088         SPACER, Drive Shaft         4           10         12081         HOUSING, Bearing         4           11         12047         BEARING, Roller         4           12         53500-325         RING, Retaining         4           13         10631         NAMEPLATE         1           14         53301-10-6         SCRW, Lrive         4           15         11933         PIW, TDR.With Grease Fitting         1           16         53203         SAEASE, FITTING         1           17         10462         CVLINDER, Rod End         1           19         10664         WASHER, Retaining         2         2           20         10662         GEAR, Driven         2         2           21         12084         SPACER, Gear         2         2           22         C-LIA950         BODY ASSEMBLY         2         2           23         5/206-7         • DOWEL PIN         2         2           24         12054         • SHAPT, Drive Roller (not available separately, see P/N 13068)         1           25         12054         • SHAPT, Drive Roller         2         2           26 <t< td=""><td>8</td><td>12083</td><td>BEARING, Thrust</td><td><math>\overline{\overline{}}</math></td></t<>	8	12083	BEARING, Thrust	$\overline{\overline{}}$
10         12081         HOUSING, Bearing, Rolley         4           11         12047         BEARING, Rolley         4           12         53500-325         RING, Rotley         4           13         10631         NAMEPLAYE         1           14         53301-10-6         SCREW, Drive         4           15         11933         PIN/, Tüh-With-Grégée Fitting         1           16         53203         - GAEASE/FITTING         1           17         10462         CVL NODER, And End         1           18         10432         CVL NODER, Rode End         2           20         10664         WASHER, Retaining         2           21         12084         SFACER, Gear         2           22         C-L1950         BODY ASSEMBLY         1           23         5 (2064)         - DOWER POLICER/SHAFT ASSEMBLY - Each Consisting of:         2           24         12851         - INNER RACE         2         2           25         12054         - SHAFT, BURVeROUER/SHAFT ASSEMBLY - Each Consisting of:         2           26         10435         KEYL, NollePORINE         2           27         103180         KEYL-Roller Mink ASSEMBLY, Wi	9	12088	SPACER, Drive Shaft	4
11       12047       BEARING, Roller       4         12       53500-325       RING, Realising       4         13       10651       NAMEPLATE       1         14       53301-10-6       SCREW, Drive       4         15       11933       PIN, Eloi-With Gréase Fitting       1         16       53203       • (SRE ASE FITTING       1         17       10462       CVLWDER, Air (see Figure 7 for breakdown)       1         18       10432       CVLWDER, Rod End       1         20       10664       WASHER, Retaining       2         21       12084       SPACER, Gear       2         22       CL1950       BODY ASSEMBLY       1         23       5 (206-7)       • DOWEL PIM       2         24       120651       • INNER RACE       2         25       12054       • SHAFT, Dr.We Roller (not available separately, see P/N 13068)       1         26       10453       KEY, Noller Orive       2         27       13180       KEY, Roller Orive       2         28       10435       DRIVE ROLLER AM       2         31       10431       CLEVIS LINK       2         29       1	10	12081	HOUSING, Beaking	4
12       53500-325       RING, Retaining       4         13       10631       NAMEPLATE       1         14       53301-10-6       SCREW, Grive       4         15       11933       PIN, Tink-With Grease Fitting       1         16       53203       • GREAGE ATTING       1         17       10462       CVL WOER, Rod End       1         18       10432       CVL WOER, Retaining       2         20       10664       WASHER, Retaining       2         21       12084       SPACER, Gear       2         22       C-L1950       BODY ASSEMBLY       1         23       5/2067       • DOWEL PIN       2         13668       DRIVE ROLER SHAFT ASSEMBLY - Each Consisting of:       2         24       12054       • INNER RAGE       2         25       12054       • SHAFT, Brive Roller       2         26       10453       KEY, Drive Roller       2         27       13180       KEY, Roller Orive       2         28       10435       DRIVE ROLLER       2         30       10431       CEVIS LINK       ASSEMELY + Each Consisting of:         31       11932       ADJUSTABL	11	12047	BEARING, Roller	4
13       10631       NAMEPLATE       1         14       53301-10-6       SCRE W, Brive       4         15       11933       PIN, Enk-with Grease Fitting       1         16       53203       • GRE ASE FITTING       1         17       10462       CVLINDER, Rod End       1         18       10432       CVLINDER, Rod End       1         19       10664       WASHER, Retaining       2         20       10628       GEAR, Driven       2         21       12084       SPACER, Gear       2         22       C-L1450       BODY ASSEMBLY       1         23       5 (206-7)       • DOWEL PIN       2         24       12054       • DIVE ROLER SHAFT ASSEMBLY - Each Consisting ef:       2         25       12054       • SHAFT, Drive Roller (not available separately, see P/N 13068)       1         26       10453       KeY, Drive Roller       2       2         27       13180       KEY, Roller Drive       2       2         28       10435       DRIVE ROLLER       2       2         29       10742       SEAL, Drive Roller       4       1         30       10431       CLEVIS L	12	53500-325	RING, Retaiping	4
14       53301-10-6       SCREW, Drive       4         15       11933       PIN, CDK-With Grease Fitting       1         16       53203       • GRE ASE_FITTING       1         17       10462       CN TNDER, Air (see Figure 7 for Greakdown)       1         18       10432       CYLINDER, Rod End       1         19       10664       WASHER, Retaining       2         20       10628       GEAR, Driven       2         21       12084       SPACER, Gear       2         22       C-L1950       BODY ASSEMBLY       1         23       5 (206-7)       • DOWEL PIN       2         24       12051       • INNER RACE       2         25       12054       • SHAFT, Drive Roller (not available separately, see P/N 13068)       1         26       10453       Kelf, Drive Roller       2         27       13160       KEY, Roller Orive       2         28       10435       DRIVE ROLLER       2         29       10742       SEAW, Drive Roller       4         30       10431       CLÉVIS LINK       2         31       10332       MEDUSTABLE-LINK ASEMBLY, with Grease Fitting       2	13	10631	NAMEPLATE	1
15       11933       PIN, CDR.with Grease Fitting       1         16       53203       • GREASE ANTTING       1         17       10462       CYLINDER, Rot Engure 7 for breakdown)       1         18       10432       CYLINDER, Rod End       1         19       10664       WASHER, Retaining       2         20       10628       GEAR, Driven       2         21       12084       SPACER, Gear       2         22       C-11950       BODY ASSEMBLY       1         23       5 (206-2)       • DOWEL PIN       2         24       12851       • INNER RACE       2         25       12054       • SHAPT, Drive Roller (not available separately, see P/N 13068)       1         26       10453       KEY, Drive Roller       2         27       13180       KEY, Norler Roller       2         28       10435       DRIVE ROLLER AND       2         29       10742       SEAL, Drive Roller       4         30       10431       CLEVIS LINK       2         31       11932       ADJUSTABLEY-LINK ASSEMBLY & Each Consisting of:       2         33       10549       DETENT PIN, Roller And       1	14	53301-10-6	SCREW, Drive	4
16       53203       • GREASE FITTING       1         17       10462       CNUMPER Air (see Figure / for breakdown)       1         18       10432       CYUMPER/ Rod End       1         19       10664       WASHER, Retaining       2         20       10628       GEAR, Driven       2         21       12084       SPACER, Gear       2         22       C-14950       BODY ASSEMBLY       1         23       51206-7       • DOWEL PIN       2         24       12851       • INNER RACE       2         25       12054       • SHRF, Drive Roller (not available separately, see P/N 13068)       1         26       10453       KEV, Drive Roller       2         27       13180       KEV, Roller Orive       2         28       10435       DRIVE ROLLER       2         29       10742       SEAL, Drive Roller       4         30       10431       CLEVES LINK       2         31       11930       ROLLER ARM ASSEMELY - Each Consisting of:       2         32       7320/4       • GREASE FITTING, Str       2         34       10428       • ROLLER ARM ASSEMBLY - Each Consisting of:       2	15	11933	PIN Link with Grease Fitting	1
17         10462         CVLINGER, Air (see Figure 7 for breakdown)         1           18         10432         CVLINGER, Rod End         1           19         10664         WASHER, Retaining         2           20         10628         GEAR, Driven         2           21         12084         SPACER, Gear         2           22         C-11950         BODY ASSEMBLY         1           23         51006-7         • DOWEL PIN-         2           24         (12054)         • INNER RACE         2           25         12054         • SHAPT, brüne Roller (not available separately, see P/N 13068)         1           26         10453         KEV, Drive Roller         2         2           27         13180         KEV, Roller Drive         2         2           28         10435         DRIVE ROLLER         2         2           29         10742         SEAL, Drive Roller         4         3           31         10431         CLEVIS LINK         2         1           32         73204         • GREASE PITINAGS Sti         1         1           33         10849         DETENT PIN, Roller Arm         2         1	16	53203	• GREASE FITTING	1
18         10432         CYLINDEB, Rod End         1           19         10664         WASHER, Retaining         2           20         10628         GEAR, Driven         2           21         12084         SPACER, Gear         2           22         C-11450         BODY ASSEMBLY         1           23         5(206-2)         • DOWEL PIM         2           24         12051         • INNER RACE         2           25         12054         • SHAFT, Drive-Roller (not available separately)-see P/N 13068)         1           26         10453         KEV, Orive Roller         2           27         13180         KEV, Roller Orive         2           28         10435         DRIVE ROLLER         2           29         10742         SEAL, Drive Roller         2           30         10431         CLEVIS LINK         2           31         11932A         ADJUSTABLE-LINK ASSEMBLY with Grease Fitting         2           32         53204         • GREASE PITMAG, Sth         1           33         10549         DETENT PIN, Roller Arm         2           34         10428         • ROLLER ARM ASSEMBLY - Each Consisting of:         2	17	10462	CWLWVDER, Air (see Figure 7 for breakdown)	1
19         10664         WASHER, Retaining         2           20         10628         GEAR, Driven         2           21         12084         SPACER, Gear         2           22         C-L1950         BODY ASSEMBLY         1           23         51(206-7)         • DOWEL PIN-         2           24         13068         DRIVE ROLERSHAFT ASSEMBLY - Each Consisting of:         2           25         12054         • SHAPT, Drive-Roller (not available) separately, see P/N 13068)         1           26         10453         KEV, Roller Orive Roller         2           27         13180         KEV, Roller Orive         2           28         10435         DRIVE ROLLER         2           29         10742         SEAL, Drive Roller         4           30         10431         CLEVIS LINK         2           31         11932         ADJUST ABLE-LINK ASSEMBLY with Grease Fitting         2           32         53204         • GREASE FITTING, Sth         1           33         10549         DETENT PIN, Rolfar Arg         2           34         10428         • ROLLER ARM ASSEMBLY - Each Consisting of:         2           35         53201	18	10432	CYLINDER, Rod End	1
20         10628         GEAR, Driven         2           21         12084         SPACER, Gear         2           22         C-11950         BODY ASSEMBLY         1           23         51/206-2         DOWEL PIM         2           24         12051         INNER RACE         2           25         12054         INNER RACE         2           25         12054         SHAPF, Drive-Roller (not available separately) see P/N 13068)         1           26         10453         KEV, Roller Orive         2           27         13180         KEV, Roller Orive         2           28         10435         DRIVE Roller         4           30         10431         CLEVIS LINK         2           31         11932         ADJUST ABLEY-LINK ASSEMBLY with Grease Fitting         2           32         53204         GREASE PLITING Sth         1           33         10849         DETENT PIN, Roller Arm         2           34         10428         ROLLER ARM         1           35         53201         GREASE FITTING, Str         2           38         53201         GREASE FITTING, Str         2           39         <	19	10664	WASHER, Retaining	2
21         12084         SPACER, Gear         2           22         C-11450         BODY ASSEMBLY         1           23         5(206-7)         • DOWEL PIM         2           13068         DRIVE ROLLER/SHAFT ASSEMBLY - Each Consisting of:         2           24         12051         • INNER RAZE         2           25         12054         • SHAPT, Drive-Roller (not available separately, see P/N 13068)         1           26         10453         KBV, Drive-Roller         2           27         13180         KEY, Roller Orive         2           28         10455         DRIVE ROLLER         2           29         10742         SEAL, Drive Roller         4           30         10431         CLEVIS LINK         2           31         11932         ADJUST ABLEY-LINK ASSEMBLY with Grease Fitting         2           32         53804         • GREASE FITINING, Sth         1           33         10849         DETENT PIN, Roller Arm         2           34         10428         • ROLLER ARM         2           35         53201         • GREASE FITTING, Str         2           36         51204-6         • DOWEL PIN         4      <	20	10628	GEAR, Driven	2
22         C-11950         BODY ASSEMBLY         1           23         5(206-7)         • DOWEL PIM         2           3068         DRIVE ROLLER/SHAFT ASSEMBLY - Each Consisting of:         2           24         12051         • INNER RACE         2           25         12054         • SHAFT, Drive Roller (not available separately, see P/N 13068)         1           26         10453         KEV, Rolleh Drive         2           27         13180         KEX/ Rolleh Drive         2           28         10435         DRIVE ROLLER         2           29         10742         SEAL, Drive Roller         4           30         10431         CLEVIS LINK         2           31         11932         ADJUST ABLE LINK ASSEMBLY with Grease Fitting         2           32         53204         • GREASE PLITINK SSEMBLY - Each Consisting of:         2           34         10428         • ROLLER ARM         1         1           35         53201         • GREASE FITTING, Str         2           36         51204-6         • DOWEL PIN         4           37         15126         PIN, Pressure Roller with Grease Fitting (replaces P/N 10438)         2           38	21	12084	SPACER, Gear	2
23         5 (206-7         • DOWEL PIN         2           - 13068         DRIVE ROLER:SHAFT ASSEMBLY - Each Consisting of:         2           24         12851         • INNER RAZE         2           25         12054         • SHAFT, br/we Roller (not available separately, see P/N 13068)         1           26         0453         KEV, Drive Roller         2         2           27         13180         KEV, Roller Drive         2         2           28         10435         DRIVE ROLLER         2         2           29         10742         SEAL, Drive Roller         4         2           30         10431         CLEVIS LINK         2         2           31         11932         ADJUSTABLE-LINK ASSEMELY - With Grease Fitting         2           32         53204         • GREASE PLITING, Sth         1           33         10549         DETENT PIN, Roller Arm         1           34         10428         • ROLLER ARM         1           35         53201         • GREASE FITTING, Str         2           36         51204-6         • DOWEL PIN         4           37         15126         PIN, Pressure Roller with Grease Fittting (replaces P/N 10438)	22	C-1,1950		1
13068         DRIVE ROLLER SHAFT ASSEMBLY - Each Consisting of:         2           24         12051         • INNER RACE         2           25         12054         • SHAPT, Drive-Roller (not available separately, see P/N 13068)         1           26         10453         KEY, Drive-Roller (not available separately, see P/N 13068)         1           26         10453         KEY, Drive-Roller         2           27         13180         KEY, Roller Orive         2           28         10435         DRIVE ROLLER         2           29         10742         SEAL, Drive Roller         4           30         10431         CLEVIS LINK         2           31         11932         ADJUSTABLErLINK ASSEMBLY + Each Consisting         2           31         10349         DETENT PIN, Roller Arm         1           33         10549         DETENT PIN, Roller Arm         2           34         10428         • ROLLER ARM         1           35         53201         • GREASE FITTING, Str         2           36         51204-6         • DOWEL PIN         4           37         15126         PIN, Pressure Roller with Grease Fitting (replaces P/N 10438)         2           38	23	5 (206-7	• DOWEL PIN	2
24         12051         INNER RACE         2           25         12054         • SHAPT, Drive-Roller (not available separately, see P/N 13068)         1           26         10453         KEV, Drive-Roller         2           27         13180         KEV, Roller Drive         2           28         10435         DRIVE ROLLER         2           29         10742         SEAL, Drive Roller         4           30         10431         CLEVIS LINK         2           31         11932         ADJUST ABLER-LINK ASSEMBLY with Grease Fitting         2           32         53204         • GREASE PUT NAGS Sth         1           33         10549         DETENT PIN, Roller Arm         2           34         10428         • ROLLER ARM         1           35         53201         • GREASE FITTING, Str         2           36         51204-6         • DOWEL PIN         4           37         15126         PIN, Pressure Roller with Grease Fitting (replaces P/N 10438)         2           38         53201         GREASE FITTING, Str         2         2           39         10576         CLIP, Hinge Pin         2         2           40         513		13068	DRIVE ROLLER SHAFT ASSEMBLY - Each Consisting of:	2
25         12054         • SHAPT, brive-Roller (not available) separately, see P/N 13068)         1           26         10453         KEY, Drive Roller         2           27         13180         KEY, Roller Drive         2           28         10435         DRIVE ROLLER         2           29         10742         SEAL, Drive Roller         4           30         10431         CLEVIS LINK         2           31         11932         AdJUST ABLER-LINK ASSEMBLY, with Grease Fitting         2           32         53204         • GREASE PLINKAG, Sth         1           33         10549         DETENT PIN, Roller Arm         2           41         10428         • ROLLER ARM         1           35         53201         • GREASE FITTING, Str         2           36         51204-6         • DOWEL PIN         4           37         15126         PIN, Pressure Roller with Grease Fitting (replaces P/N 10438)         2           38         53201         GREASE FITTING, Str         2           39         10576         CLIP, Hinge Pin         2           40         51300-347-B         O-RING, Arm         4           41         12035         ROLLER AS	24	<u>(1205)</u>	• INNER RAZE	2
26         10453         KEV, Drive Roller         2           27         13180         KEV, Roller Drive         2           28         10435         BRIVE ROLLER         2           29         10742         SEAL, Drive Roller         4           30         10431         CLEVIS LINK         2           31         11932         ADJUSTABLER-LINK ASSEMELY with Grease Fitting         2           32         53204         • GREASE PLITING'S Sth         1           33         10549         DETENT PIN, Roller Armo         2           34         10428         • ROLLER ARM         1           35         53201         • GREASE FITTING, Str         2           36         51204-6         • DOWEL PIN         4           37         15126         PIN, Pressure Roller with Grease Fitting (replaces P/N 10438)         2           38         53201         GREASE FITTING, Str         2           39         10576         CLIP, Hinge Pin         2           40         51300-347-8         O-RING, Arm         4           41         12035         ROLLER ASSEMBLY, 3-1/2" Drill Pipe         1           12040         ROLLER ASSEMBLY, 4-1/2" Drill Pipe         1	_25	12054	SHAFT, Drive Roller (not available separately, see P/N 13068)	1
27         13180         KEY, Roller Drive         2           28         10435         DRIVE ROLLER         2           29         10742         SEAL, Drive Roller         4           30         10431         CLEVIS LINK         2           31         11932         ADJUST ABL F-LINK ASSEMBLY with Grease Fitting         2           32         53204         • GREASE PIT MAG, Sth         1           33         10549         DETENT PIN, Roller Arm         2           11930         ROLLER ARM ASSEMBLY - Each Consisting of:         2           34         10428         • ROLLER ARM         1           35         53201         • GREASE FITTING, Str         2           36         51204-6         • DOWEL PIN         4           37         15126         PIN, Pressure Roller with Grease Fitting (replaces P/N 10438)         2           38         53201         GREASE FITTING, Str         2           39         10576         CLIP, Hinge Pin         2           40         51300-347-B         O-RING, Arm         4           41         12035         ROLLER ASSEMBLY, 3-1/2" Drill Pipe         1           12040         ROLLER ASSEMBLY, 4-1/2" Drill Pipe         1 <td></td> <td></td> <td></td> <td>2</td>				2
28         10435         DRIVE ROLLER         2           29         10742         SEAL, Drive Roller         4           30         10431         CLEVIS LINK         2           31         11932         AdJUST ABLEY-LINK ASSEMBLY, with Grease Fitting         2           32         53204         • GREASE PLINK ASSEMBLY, with Grease Fitting         2           32         53204         • GREASE PLINK ASSEMBLY, with Grease Fitting         2           33         10549         DETENT PIN, Roller Arm         1           33         10549         DETENT PIN, Roller Arm         2           11930         ROLLER ARM ASSEMBLY - Each Consisting of:         2           34         10428         • ROLLER ARM         1           35         53201         • GREASE FITTING, Str         2           36         51204-6         • DOWEL PIN         4           37         15126         PIN, Pressure Roller with Grease Fitting (replaces P/N 10438)         2           38         53201         GREASE FITTING, Str         2           39         10576         CLIP, Hinge Pin         2           40         51300-347-8         O-RING, Arm         4           41         12035         <	<u> - 27 () /</u>			2
29         10742         SEAL, Drive Roller         4           30         10431         CLÉVIS LINK         2           31         11932         ADJUST ABLE LINK ASSEMBLY with Grease Fitting         2           32         53204         • GREASE PLINK ASSEMBLY with Grease Fitting         2           33         10549         DETENT PIN, Roller Arm         1           33         10549         DETENT PIN, Roller Arm         2           11930         ROLLER ARM ASSEMBLY - Each Consisting of:         2           34         10428         • ROLLER ARM         1           35         53201         • GREASE FITTING, Str         2           36         51204-6         • DOWEL PIN         4           37         15126         PIN, Pressure Roller with Grease Fitting (replaces P/N 10438)         2           38         53201         GREASE FITTING, Str         2           39         10576         CLIP, Hinge Pin         2           40         51300-347-8         O-RING, Arm         4           41         12035         ROLLER ASSEMBLY, 3-1/2" Drill Pipe         1           12040         ROLLER ASSEMBLY, 4" Drill Pipe         1         1           12045         ROLLER ASSEMB	<u>(</u>	10435	DRIVEROLLER	2
30         10431         CLEVIS LINK         2           31         11932         ADJUSTABLEY-LINK ASSEMBLY with Grease Fitting         2           32         53204         • GREASE PLINK ASSEMBLY with Grease Fitting         2           33         10549         DETENT PIN, Roller Area         2           11930         ROLLER ARM ASSEMBLY - Each Consisting of:         2           34         10428         • ROLLER ARM         1           35         53201         • GREASE FITTING, Str         2           36         51204-6         • DOWEL PIN         4           37         15126         PIN, Pressure Roller with Grease Fitting (replaces P/N 10438)         2           38         53201         GREASE FITTING, Str         2           39         10576         CLIP, Hinge Pin         2           40         51300-347-B         O-RING, Arm         4           41         12035         ROLLER ASSEMBLY, 3-1/2" Drill Pipe         1           12040         ROLLER ASSEMBLY, 4-1/2" Drill Pipe         1           12045         ROLLER ASSEMBLY, 4-1/2" Drill Pipe         1           12055         ROLLER ASSEMBLY, 5-1/2" Drill Pipe         1           12055         ROLLER ASSEMBLY, 5-1/2" Drill Pipe	29	10742	SEAL, Drive Roller ( V/ ) V	4
31         11932         ADJUSTABLE-LINK ASSEMBLY with Grease Fitting         2           32         53204         • GREASE PUTNING, Sth         1           33         10549         DETENT PIN, Rollar Arm         2           11930         ROLLER ARM ASSEMBLY - Each Consisting of:         2           34         10428         • ROLLER ARM         1           35         53201         • GREASE FITTING, Str         2           36         51204-6         • DOWEL PIN         4           37         15126         PIN, Pressure Roller with Grease Fitting (replaces P/N 10438)         2           38         53201         GREASE FITTING, Str         2           39         10576         CLIP, Hinge Pin         2           40         51300-347-B         O-RING, Arm         4           41         12035         ROLLER ASSEMBLY, 3-1/2" Drill Pipe         1           12040         ROLLER ASSEMBLY, 4" Drill Pipe         1           12045         ROLLER ASSEMBLY, 5" Drill Pipe         1           12050         ROLLER ASSEMBLY, 5" Drill Pipe         1           12055         ROLLER ASSEMBLY, 5" Drill Pipe         1           12055         ROLLER ASSEMBLY, 5" J2" Drill Pipe         1 <tr< td=""><td>30 )  </td><td>10431</td><td></td><td>2</td></tr<>	30 )	10431		2
32         53204         • GREASE PITINIG, Sth         1           33         10549         DETENT PIN, Roher Arro         2           11930         ROLLER ARM ASSEMBLY - Each Consisting of:         2           34         10428         • ROLLER ARM         1           35         53201         • GREASE FITTING, Str         2           36         51204-6         • DOWEL PIN         4           37         15126         PIN, Pressure Roller with Grease Fitting (replaces P/N 10438)         2           38         53201         GREASE FITTING, Str         2           39         10576         CLIP, Hinge Pin         2           40         51300-347-B         O-RING, Arm         4           41         12035         ROLLER ASSEMBLY, 3-1/2" Drill Pipe         1           12040         ROLLER ASSEMBLY, 4" Drill Pipe         1           12040         ROLLER ASSEMBLY, 4-1/2" Drill Pipe         1           12050         ROLLER ASSEMBLY, 5" Drill Pipe         1           12055         ROLLER ASSEMBLY, 5-1/2" Drill Pipe         1           12055         ROLLER ASSEMBLY, 5-1/2" Drill Pipe         1           12055         ROLLER ASSEMBLY, 5-1/2" Drill Pipe         1           12030 <td></td> <td>11932</td> <td>ADJUSTABLE LINK ASSEMBLY with Grease Fitting</td> <td>2</td>		11932	ADJUSTABLE LINK ASSEMBLY with Grease Fitting	2
33         10549         DETENT PIN, Roller Area         2           11930         ROLLER ARM ASSEMBLY - Each Consisting of:         2           34         10428         • ROLLER ARM         1           35         53201         • GREASE FITTING, Str         2           36         51204-6         • DOWEL PIN         4           37         15126         PIN, Pressure Roller with Grease Fitting (replaces P/N 10438)         2           38         53201         GREASE FITTING, Str         2           39         10576         CLIP, Hinge Pin         2           40         51300-347-8         O-RING, Arm         4           41         12035         ROLLER ASSEMBLY, 3-1/2" Drill Pipe         1           12040         ROLLER ASSEMBLY, 4" Drill Pipe         1           12040         ROLLER ASSEMBLY, 4-1/2" Drill Pipe         1           12045         ROLLER ASSEMBLY, 4-1/2" Drill Pipe         1           12050         ROLLER ASSEMBLY, 5-1/2" Drill Pipe         1           12055         ROLLER ASSEMBLY, 5-1/2" Drill Pipe         1           12055         ROLLER ASSEMBLY, 5-1/2" Drill Pipe         1           12055         ROLLER ASSEMBLY, 5-1/2" Drill Pipe         1           120439 <td>-32</td> <td>53204</td> <td>V • GREASE PUTYING, SUL</td> <td>1</td>	-32	53204	V • GREASE PUTYING, SUL	1
Image: Note of the system         ROLLER ARM ASSEMBLY - Each Consisting of:         2           34         10428         • ROLLER ARM         1           35         53201         • GREASE FITTING, Str         2           36         51204-6         • DOWEL PIN         4           37         15126         PIN, Pressure Roller with Grease Fitting (replaces P/N 10438)         2           38         53201         GREASE FITTING, Str         2           39         10576         CLIP, Hinge Pin         2           40         51300-347-B         O-RING, Arm         4           41         12035         ROLLER ASSEMBLY, 3-1/2" Drill Pipe         1           12040         ROLLER ASSEMBLY, 4" Drill Pipe         1           12040         ROLLER ASSEMBLY, 4-1/2" Drill Pipe         1           12045         ROLLER ASSEMBLY, 5" Drill Pipe         1           12055         ROLLER ASSEMBLY, 5" Drill Pipe         1           12055         ROLLER ASSEMBLY, 5-1/2" Drill Pipe         1           12039 </td <td>33</td> <td>10549</td> <td>DETENT PIN, Roller And</td> <td>2</td>	33	10549	DETENT PIN, Roller And	2
34         10428         • ROLLER ARM         1           35         53281         • GREASE FITTING, Str         2           36         51204-6         • DOWEL PIN         4           37         15126         PIN, Pressure Roller with Grease Fitting (replaces P/N 10438)         2           38         53201         GREASE FITTING, Str         2           39         10576         CLIP, Hinge Pin         2           40         51300-347-B         O-RING, Arm         4           41         12035         ROLLER ASSEMBLY, 3-1/2" Drill Pipe         1           12040         ROLLER ASSEMBLY, 4" Drill Pipe         1           12045         ROLLER ASSEMBLY, 4" Drill Pipe         1           12050         ROLLER ASSEMBLY, 5" Drill Pipe         1           12055         ROLLER ASSEMBLY, 5-1/2" Drill Pipe         1           12039         • THRUST WASHER         2		<u>    (                                </u>	ROLLER ARM ASSEMିଷ୍ଟ୍ରା Y - Each Consisting of:	2
35         53261         • GREASE FITTING, Str         2           36         51204-6         • DOWEL PIN         4           37         15126         PIN, Pressure Roller with Grease Fitting (replaces P/N 10438)         2           38         53201         GREASE FITTING, Str         2           39         10576         CLIP, Hinge Pin         2           40         51300-347-B         O-RING, Arm         4           41         12035         ROLLER ASSEMBLY, 3-1/2" Drill Pipe         1           12040         ROLLER ASSEMBLY, 4" Drill Pipe         1           12045         ROLLER ASSEMBLY, 4" Drill Pipe         1           12050         ROLLER ASSEMBLY, 5" Drill Pipe         1           12050         ROLLER ASSEMBLY, 5-1/2" Drill Pipe         1           12055         ROLLER ASSEMBLY, 5-1/2" Drill Pipe         1           12055         ROLLER ASSEMBLY, 5-1/2" Drill Pipe         1           12055         ROLLER ASSEMBLY, 5-1/2" Drill Pipe         1           12050         • BEARING, Set of 3         1           10439         • THRUST WASHER         2	34	10428//	• ROLLER ARM	1
36         51204-6         • DOWEL PIN         4           37         15126         PIN, Pressure Roller with Grease Fitting (replaces P/N 10438)         2           38         53201         GREASE FITTING, Str         2           39         10576         CLIP, Hinge Pin         2           40         51300-347-8         O-RING, Arm         4           41         12035         ROLLER ASSEMBLY, 3-1/2" Drill Pipe         1           12040         ROLLER ASSEMBLY, 4" Drill Pipe         1           12045         ROLLER ASSEMBLY, 4" Drill Pipe         1           12045         ROLLER ASSEMBLY, 5" Drill Pipe         1           12050         ROLLER ASSEMBLY, 5" Drill Pipe         1           12055         ROLLER ASSEMBLY, 5-1/2" Drill Pipe         1           12050         ROLLER ASSEMBLY, 5-1/2" Drill Pipe         1           12055         ROLLER ASSEMBLY, 5-1/2" Drill Pipe         1           12055         ROLLER ASSEMBLY, 5-1/2" Drill Pipe         1           12055         ROLLER ASSEMBLY, 5-1/2" Drill Pipe         1           12039         • THRUST WASHER         2	35	53201	GREASE FITTING, Str	2
37         15126         PIN, Pressure Roller with Grease Fitting (replaces P/N 10438)         2           38         53201         GREASE FITTING, Str         2           39         10576         CLIP, Hinge Pin         2           40         51300-347-B         O-RING, Arm         4           41         12035         ROLLER ASSEMBLY, 3-1/2" Drill Pipe         1           12040         ROLLER ASSEMBLY, 4" Drill Pipe         1           12045         ROLLER ASSEMBLY, 4-1/2" Drill Pipe         1           12050         ROLLER ASSEMBLY, 5" Drill Pipe         1           12055         ROLLER ASSEMBLY, 5" Drill Pipe         1           12050         ROLLER ASSEMBLY, 5-1/2" Drill Pipe         1           12055         ROLLER ASSEMBLY, 5-1/2" Drill Pipe         1           12050         ROLLER ASSEMBLY, 5-1/2" Drill Pipe         1           12055         ROLLER ASSEMBLY, 5-1/2" Drill Pipe         1           12055         ROLLER ASSEMBLY, 5-1/2" Drill Pipe         1           12050         •BEARING, Set of 3         1           10439         •THRUST WASHER         2	36	51204-6	DOWEL PIN	4
38         53201         GREASE FITTING, Str         2           39         10576         CLIP, Hinge Pin         2           40         51300-347-B         O-RING, Arm         4           41         12035         ROLLER ASSEMBLY, 3-1/2" Drill Pipe         1           12040         ROLLER ASSEMBLY, 4" Drill Pipe         1           12045         ROLLER ASSEMBLY, 4-1/2" Drill Pipe         1           12045         ROLLER ASSEMBLY, 5" Drill Pipe         1           12050         ROLLER ASSEMBLY, 5" Drill Pipe         1           12055         ROLLER ASSEMBLY, 5-1/2" Drill Pipe         1           10439         • THRUST WASHER         2	37	15126	PIN, Pressure Roller with Grease Fitting (replaces P/N 10438)	2
39         10576         CLIP, Hinge Pin         2           40         51300-347-B         O-RING, Arm         4           41         12035         ROLLER ASSEMBLY, 3-1/2" Drill Pipe         1           12040         ROLLER ASSEMBLY, 4" Drill Pipe         1           12045         ROLLER ASSEMBLY, 4-1/2" Drill Pipe         1           12050         ROLLER ASSEMBLY, 5" Drill Pipe         1           12050         ROLLER ASSEMBLY, 5" Drill Pipe         1           12055         ROLLER ASSEMBLY, 5-1/2" Drill Pipe         1           10439         • THRUST WASHER         2	38	53201	GREASE FITTING, Str	2
40         51300-347-B         O-RING, Arm         4           41         12035         ROLLER ASSEMBLY, 3-1/2" Drill Pipe         1           12040         ROLLER ASSEMBLY, 4" Drill Pipe         1           12045         ROLLER ASSEMBLY, 4" Drill Pipe         1           12045         ROLLER ASSEMBLY, 4-1/2" Drill Pipe         1           12050         ROLLER ASSEMBLY, 5" Drill Pipe         1           12055         ROLLER ASSEMBLY, 5-1/2" Drill Pipe         1           10439         • THRUST WASHER         2		10576	CLIP, Hinge Pin	2
41         12035         ROLLER ASSEMBLY, 3-1/2" Drill Pipe         1           12040         ROLLER ASSEMBLY, 4" Drill Pipe         1           12045         ROLLER ASSEMBLY, 4-1/2" Drill Pipe         1           12050         ROLLER ASSEMBLY, 5" Drill Pipe         1           12055         ROLLER ASSEMBLY, 5-1/2" Drill Pipe         1           12055         ROLLER ASSEMBLY, 5-1/2" Drill Pipe         1           12050         • BEARING, Set of 3         1           10439         • THRUST WASHER         2	40	51300-347-B	O-RING, Arm	4
12040         ROLLER ASSEMBLY, 4" Drill Pipe         1           12045         ROLLER ASSEMBLY, 4-1/2" Drill Pipe         1           12050         ROLLER ASSEMBLY, 5" Drill Pipe         1           12055         ROLLER ASSEMBLY, 5-1/2" Drill Pipe         1           72380         • BEAR ING, Set of 3         1           10439         • THRUST WASHER         2	41	12035	ROLLER ASSEMBLY, 3-1/2" Drill Pipe	1
12045         ROLLER ASSEMBLY, 4-1/2" Drill Pipe         1           12050         ROLLER ASSEMBLY, 5" Drill Pipe         1           12055         ROLLER ASSEMBLY, 5-1/2" Drill Pipe         1           72380         • BEAR ING, Set of 3         1           10439         • THRUST WASHER         2		12040	ROLLER ASSEMBLY, 4" Drill Pipe	1
12050         ROLLER ASSEMBLY, 5" Drill Pipe         1           12055         ROLLER ASSEMBLY, 5-1/2" Drill Pipe         1           72380         • BEARING, Set of 3         1           10439         • THRUST WASHER         2		12045	ROLLER ASSEMBLY, 4-1/2" Drill Pipe	1
12055         ROLLER ASSEMBLY, 5-1/2" Drill Pipe         1           72380         • BEAR ING, Set of 3         1           10439         • THRUST WASHER         2		12050	ROLLER ASSEMBLY, 5" Drill Pipe	1
72380         • BEAR ING, Set of 3         1           10439         • THRUST WASHER         2		12055	ROLLER ASSEMBLY, 5-1/2" Drill Pipe	1
10439 • THRUST WASHER 2		72380	BEARING, Set of 3	1
		10439	THRUST WASHER	2

### Figure 3 -- DIRECTIONAL CONTROL VALVE, HEAVY DUTY

	Cam-Tech		
Item	Part No.	Description	Qty
		VALVE ASSEMBLY, Directional Control, Heavy Duty	
	12070	(see Figure 2A for next higher assembly)	Ref.
	13000	KIT, Button Operator, Heavy Duty Walve - Each Consisting of	2
1	12070-1	BUTTON	1
2	12070-2	• SHAFT (( ))	)) 1
3	50104-10-S	• SCREW	4
4	50904-C	WASHER	4
5	12070-4		1
6	50103-5-C	CAP SCREW \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\	1
7	12070-5	ADAPTER	1
8	12070-3	• PISTON, Cushieñ 🗸 👘 🗸	1
9	51300-123-B	• O-RING	1
10	12070-7		1
	13001	KIT Body Seal - Each consisting of	1
11	12070-9	• SRATER	1
12	12070-6	RING, Spacer Sealing	6
13	12070-10	GUIDE END	2
14	12070-8	sìpóol // ////	> 1
3			0



### Figure 4 -- AIR MOTOR ASSEMBLY (Chicago Pneumatic)

14855       MOTOR ASSEMBLY, Air, Chicago Pneumatic (see Figure 2A for next higher assembly)       Ref.         1       14857       SCREW, Sheetmetal       4         2       15063       MUFFLER       1         3       14694       AIR MOTOR, Chicago Pneumatic (see Figure 5 for breakdowr))       1         4       16041       LAREL, Direction, Caution, RH       1         5       11915       KNOB       1         6       15255       SHAFT       1         7       15333       COLLAR, Aft       1         8       50706-7-A       SET SCREW, Socket Head       2         10       51300-333-B       O-RING       1       1         11       16042       LAREL, Direction, Caution, 2H       1       1         12       15335       SLEEVE, Direction, Caution, 2H       1       1         13       50103-5-C       SCREW, Socket Head       1       1         14       15334       COLLAR, Aft Medor       1       1         13       50103-5-C       SCREW, Socket Head       1       1         14       15334       COLLAR, Aft Medor       1       1         15       14856       COVER, Aft Medor       1
1       14857       SCREW, Sheetmetal       4         2       15063       MUFFLER       1         3       14694       AIR MOTOR, Chicago Pneumatic (see Figure 5 for breakdown)       1         4       16041       LABEL, Direction, Caution, RH       1         5       11915       KNOB       1         6       15255       SHAFT       1         7       15333       OLLAR, Aft       1         9       50706-7-A       SET SCREW, Socket Head       2         10       51300-333-B       O-RING       1         11       16042       LABEL, Direction, Caution, LH       1         12       15335       SLEEVE, Direction, Caution, LH       1         13       50103-52-C       Socket Head       2         10       51300-333-B       O-RING       1         11       16042       LABEL, Direction, Caution, LH       1         12       15335       SLEVE, Direction, Caution, Caution, LH       1         13       50103-5-C       Socket Head Cop       1         14       15334       *COU/AR, #front       1         15       14956       COV/AR, #fr Mefor       1         16
1       14857       SCREW, Sheetmetal       4         2       15063       MUFTLER       1         3       14694       AIR MOTOR, Chicago Pneumatic (see Figure 5 for breakdown)       1         4       16041       LABEL, Direction, Caution, RH       1         5       11915       KNOB       1         6       15255       SHAFT       1         7       15333       OULAR, Aft       1         8       50706-7-A       SET SCREW, Socket Head       1         9       50706-4-A       SET SCREW, Socket Head       2         10       51300-333-B       O-RING       1       1         11       16042       LABEL, Direction, Caution, LH       1       1         12       15335       SLEEVE, Direction, Caution, LH       1       1         13       50103-5-C       *SCREW, Foddet Head       1       1         14       15334       *COUL/AR from the for       1       1         15       14856       COUVER, Afr Motor       1       1         16       50905-C       EOCK WASHER       4       1         19       52804-2-G       BUSHING, Reducing       1       1
2       15063       MUFHER       1         3       14694       AIR MOTOR, Chicago Pneumatic (see Figure 5 kr breakdown)       1         4       16041       LABEL, Direction, Caution, RH       1         5       11915       KNOB       1         6       15255       SHAFT       1         7       15333       COLLAR, Aft       1         8       50706-7-A       SET SCREW, Socket Head       2         10       51300-333-B       O-RING       1         11       16042       LABEL, Direction, Caution, IH       1         12       15335       SLEEVE, Direction, Caution, IH       1         12       15334       COULAR, Afr Molor       1         13       50103-5-C       *SCREW, Socket Head       2         14       15334       *COULAR, Arront Caution, IH       1         15       14856       COUVER, Arr Molor       1         16       50905-C       LOCK WACHER       4         17       50005-6-C5       SCREW, Hex Head Cap       4         18       6581       VALVE, Relief       1         19       52804-2-G       BUSHING, Reducing       1
3       14694       AIR MOTOR, Chicago Pneumatic (see Figure 5 for breakdown)       1         4       16041       LABEL, Direction, Caution, RH       1         5       11915       KNOB       1         6       15255       SHAFT       1         7       15333       COLLAR, Aft       1         8       50706-7-A       SET SCREW, Socket Head       2         10       51300-333-B       O-RING       1         11       16042       LABEL, Direction, Caution, LH       1         12       15333       SLEEVE, Direction, Caution, LH       1         13       50103-53-C       *SCREW, Socket Head       2         10       51300-33-B       O-RING       1         14       15334       SCULAR, from Caution, LH       1         13       50103-5-C       *SCREW, Socket Head Cap       1         14       15334       *SCULAR, from Caution       1       1         15       14856       COVER, Air Metor       1       1         16       50905-C       LOCK WASHER       4       1         19       52804-2-G       BUSHING, Reducing       1       1         19       52804-2-G       BUS
4       16041       LABEL, Direction, Caution, RH       1         5       11915       KNO8       1         6       15255       SHAFT       1         7       15333       COLLAR, Aft       1         8       50706-7-A       SET SCREW, Socket Head       2         10       51300-333-B       O-RING       1         11       16042       LABEL, Direction, Caution, LH       1         12       15335       SLEEVE, Directional Control       1         13       50103-5-C       *SCREW, Socket Head       2         14       15334       *COLLAR, Aront       1         15       14856       COULAR, Aront       1         16       50905-C       LOCK MASHER       4         17       50005-6C       SCREW, Hex Head Cap       4         18       6581       VAIVE, Relief       1         19       52804-2-G       BUSHING, Reducing       1
5       11915       KNOB       I         6       15255       SHAFT       1         7       15333       COLLAR, Aft       1         8       50706-7-A       SET SCREW, Socket Head       2         10       51300-333-B       O-RING       1         11       16042       LABEL, Direction, Caution, 1H       1         12       15335       SLEE VE, Direction, Caution, 1H       1         13       50103-5-C       *SCREW, Socket Head Cap       1         14       15334       *COUL AR, Front ©       1         15       14856       COVER, Air Motor       1         16       50905-C       NOCK WASHER       4         17       50005-6-CS       SCREW, Hex Head Cap       4         18       6581       VAIVE, Relief       1         19       52804-2-G       BUSHING, Reducing       1
6       15255       SHAFT       1         7       15333       COLLAR, Aft       1         8       507067-A       SET SCREW, Socket Head       1         9       507064-A       SET SCREW, Socket Head       2         10       51300-333-B       O-RING       1         11       16042       LABEL, Direction, Caution, LH       1         12       13335       SLEEVE, Directional Control       1         13       50103-5-C       *SCREW, Socket Head Cap       1         14       15334       *COLL AR, Arront       1         15       14856       COVER, Air Motor       1         16       50905-C       bOCK WASHER       4         17       50005-6-C5       SCREW, Hex Head Cap       4         18       6581       VAIVE, Relief       1         19       52804-2-G       BUSHING, Reducing       1
7       15333       COLLAR, Aft       1         8       50706-7-A       SET SCREW, Socket Head       1         9       50706-4-A       SET SCREW, Socket Head       2         10       51300-333-B       O-RING       1         11       16042       LABEL, Direction, Caution, 1H       1         12       15335       SLEEVE, Directional Control       1         13       50103-5-C       *SCREW, Socket Head Cap       1         14       15334       *COLLAR, from C       1         15       14856       COVER, Air Motor       1         16       50905-C       LOCK WASHER       4         17       50005-6-C5       SCREW, Hex Head Cap       4         18       6581       WAVE, Relief       1         19       52804-2-G       BUSHING, Reducing       1
8       50706-7-A       SET SCREW, Socket Head       1         9       50706-4-A       SET SCREW, Socket Head       2         10       51300-333-B       O-RING       1         11       16042       LABEL, Direction, Caution, LH       1         12       15335       SLEEVE, Direction Control       1         13       50103-5-C       *SCREW, Socket Head Cap       1         14       15334       *COLLAR, Front       1         15       14856       COVER, Air Motor       1         16       50905-C       LOCK WASHER       4         17       50005-6-C5       SCREW, Head Cap       4         18       6581       VALVE, Relief       1         19       52804-2-G       BUSHING, Reducing       1
9       50706-4-A       SET SCREW, Socket Head       2         10       51300-333-B       O-RING       1         11       16042       LABEL, Direction, Caution, LH       1         12       15335       SLEEVE, Direction and Control       1         13       50103-5-C       *SCREW, Forket Head Cap       1         14       15334       *COLL AR, Front       1         15       14856       COVER, Air Motor       1         16       50905-C       LOCK WASHER       4         17       50005-6-C5       SCREW, Hex Head Cap       4         18       6581       VALVE, Relief       1         19       52804-2-G       BUSHING, Reducing       1
10       51300-333-B       O-RING       1         11       16042       LABEL, Direction, Caution, LH       1         12       15335       SLEEVE, Directional Control       1         13       50103-5-C       *SCREW, Sockethead Cap       1         14       15334       *SCOLI AR, Front       1         15       14856       COVER, Air Motor       1         16       50905-C       EOCK WASHER       4         17       50005-6-C5       SCREW, Hex Head Cap       4         18       6581       VALVE, Relief       1         19       52804-2-G       BUSHING, Reducing       1
11       16042       LABEL, Direction, Caution, 2H       1         12       15335       SLEEVE, Directional Control       1         13       50103-5-C       *SCREW, Socket head Cap I       1         14       15334       *COLLAR, Front I       1         15       14856       COVER, Air Motor       1         16       50905-C       box K WASHER       4         17       50005-6-C5       SCREW, Hex Head Cap       4         18       6581       VAIVE, Relief       1         19       52804-2-G       BUSHING, Reducing       1
12       15335       SLEEVE, Directional Control       1         13       50103-5-C       *SCREW, Socket head Cap (*)       1         14       15334       *COLLAR, From (*)       1         15       14856       COVER, Air Motor       1         16       50905-C       LOCK WASHER       4         17       50005-6-C5       SCREW, Hex Head Cap       4         18       6581       VALVE, Relief       1         19       52804-2-G       BUSHING, Reducing       1         19       52804-2-G       BUSHING, Reducing       1
13       50103-5-C       *SCREW, Socket head Cap       1         14       15334       *COLLAR, Front       1         15       14856       COVER, Air Motor       1         16       50905-C       bock WASHER       4         17       50005-6-C5       SCREW, Hex Head Cap       4         18       6581       VALVE, Relief       1         19       52804-2-G       BUSHTING, Reducing       1
14       15334       COULAR From C       1         15       14856       COVER, Air Motor       1         16       50905-C       DOCK WASHER       4         17       50005-6-C5       SCREW, Hex Head Cap       4         18       6581       VALVE, Relief       1         19       52804-2-G       BUSHING, Reducing       1
15       14856       COVER, Air Mötör       1         16       50905-C       ÞOCK WASHER       4         17       50005-6-C5       SCREW, Hex Head Cap       4         18       6581       VALVE, Relief       1         19       52804-2-G       BUSHING, Reducing       1         10       2       3       4       5         10       1       1       1       1       1
16     50905-C     LOCK WASHER     4       17     50005-6-C5     SCREW, Hex Head Cap     4       18     6581     VALVE, Relief     1       19     52804-2-G     BUSH ING, Reducing     1
17     50005-6-C5     SCREW, Hex Head Cap     4       18     6581     VALVE, Relief     1       19     52804-2-G     BUSHING, Reducing     1
18     6581     VALVE Relief     1       19     52804-2-G     BUSHING, Reducing     1
19 52804-2-G BUSHING, Reducing 1
11 11 11 11 11 11 11 11 11 11
FIGURE 4 Air Motor (Chicago Pneumatic)

### Figure 5 -- AIR MOTOR (CHICAGO PNEUMATIC)

Idegrad         AIR MOTOR ASSEMBLY (see Figure 4 for next/highen assembly)         Ref.           1         14694-23         PLUG, Oil         1           2         51300-112-B         O-RING         1           3         14694-22         NUT, Feed Post         1           4         50105-12         SCREW         7           5         51105         LOG WASHER         111           6         14694-23         SCREW Meaning Clamp         1           7         14694-25         GASKET, Cover         1           8         14694-32         SCREW, Bearing Clamp         1           9         14694-33         NUT, Bearino, Clamp         2           11         14694-37         BEARING         2           12         14694-39         PUSING, Motoh (Includes/vaverse valve bushing PIN14694-27)         1           14         14694-30         BDLT         2         1           14         14694-30         BDLT         2         1           16         14694-46         BEARING, Roller         1         1           16         14694-50         GASKET, Clamp         2         1           17         14694-68         BEARING, Roller	Ttom	Cam-Tech Part No	Description	Otv
Interver         Alk MOTOR ASSEMBLY (see Figure 4 for hex/program.assembly)         Ref.           1         14694-23         PLUG, OI         1           3         14694-22         NUT, Feed Post         1           4         50105-12         SCREW         7           5         51105         LOCK WASHER         11           6         14694-23         COVER, Housing         1           7         14694-23         SCREW, Bearing Clamp         1           9         14694-32         SCREW, Bearing Clamp         1           10         14694-32         SCREW, Bearing Clamp         2           11         16         14694-23         SCREW, Bearing Clamp         1           10         14694-30         BEARING, Moto/includes/deverse valve Eusbing P[M] 14694-27)         1           12         14694-23         GASKET         1         1           14         14694-30         BblT         2         1           15         14694-56         PEARING, Roller         2         1           16         14694-66         BEARING, Roller         1         1           17         14694-56         SCREW, Hex Head Cap         5         5	Item	14604		
1       14094-23       PLUS, OII       1         2       51300-112-B       O-RING       1         3       14694-22       NUT, Feed Post       1         4       50105-12       SCREW       7         5       51105       LOCK WASHER       11         6       14694-24       COVER, Housing       1         7       14694-25       GASKET, Cover       1         8       14694-34       NUT, Bearing Clamp       1         10       14694-34       NUT, Bearing Clamp       1         11       16694-28       NUT, Febre/Inset       12         12       14694-28       NUT, Febre/Inset       1         14       1694-68       EARING       1         15       14694-29       GASKET (       1         16       14694-55       PLARE, Timbéer       1         16       14694-55       GASKET (See       1         17       1694-65       GASKET, Gear       1         18       S5005-30       SCREW, Head Cáp       5         19       14694-69       BEARING, Roller       1         20       14694-69       GEARE, Spindle (47 teeth)       1		14694	AIR MOTOR ASSEMBLY (see Figure 4 for hext/higher assembly)	
2       S1300-112-29       OFKING       1         3       14694-22       NUT, Feed Post       1         4       50105-12       SCREW       7         5       51105       LOCK WASHER       11         6       14694-24       COVER, Housing       1         7       16694-25       GASKET, Cover       1         8       14694-32       SCREW, Bearing Clamp       1         9       14694-32       SCREW, Bearing Clamp       1         10       14694-34       NUT, Bearing Clamp       2         11       14694-34       NUT, Theor Inset       12         12       14694-28       NUT, Thore Inset       12         13       14694-29       GASKET       1         14       14694-56       BEARING, Ball       1         15       14694-57       PLATE, Transfer       1         16       16944-59       BASKET (Lead Cape       5         19       14694-56       GASKET, Gear       1         20       14694-57       SERAN, Spindle (47 teeth)       1         21       14694-54       SPACER, Gear       1         22       14694-43       BEARING, Ball       1<		14094-23		
3       14094-22       NUL, Feed Pose       1         4       50105-12       SCREW       7         5       51105       LOCK WASHER       11         6       14694-25       GASKET, Cover       1         7       16694-25       GASKET, Cover       1         8       14694-32       SCREW, Bearing Clamp       1         9       14694-34       NUL, Bearing-Clamp       1         10       14694-37       BEARING       2         11       14694-37       BEARING       2         12       14694-37       BEARING, Motoh-(Include>reverse valve Eusthing, PIN.14694-27)       1         13       14694-52       QASKET       1       1         14       14694-53       PLATE, Transfer       1       1         15       14694-55       PLATE, Transfer       1       1         16       14694-69       BEARING, Köll       2       1       1         20       14694-69       SCREW, Head Gap       5       1       1         21       14694-69       SERING, Köll       1       1       1         21       14694-69       SERING, Köll       1       1       1	<u></u>	51300-112-B		1
4         SUUS-12         SCREW         //           5         51105         LOCK WASHER         /1           6         16691-24         COVER, Housing         /1           7         14691-25         GASKET, Cover         /1           8         16691-32         SCREW, Bearing Clamp         1           9         14691-34         NUT, Bearing Clamp         2           10         14691-37         BEARING         2           11         14691-68         NUT, Fiber/Inseit         12           13         14691-29         GASKET         1           14         14691-66         BEARING, Pall         1           15         14691-65         PLAKET, Transfer         1           16         14691-65         GASKET, Gear         1           16         14691-65         PLAKET, Transfer         1           17         16691-65         PLAKET, Transfer         1           18         S5005-60         SCREW, Head Cap         5           19         14691-50         SEARING, Roller         1           21         14691-51         GEAR, Sprindle (47 teeth)         1           22         14691-57         SPINDEE,		14694-22	NUT, Feed Post	1
3         51105         LOCK WASHER         11           6         14694-24         COVER, Housing         1           7         14694-25         GASKET, Cover         1           8         14694-32         SCREW, Bearing Clamp         1           9         14694-34         NUT, Bearing Clamp         1           10         14694-37         BEE ARING         2           11         14594-19         HOUSING, Motoh (Includes) reverse valve builbing PIM14694-27)         1           12         14694-66         BE ARING, Ball         1           14         14694-66         BE ARING, Ball         1           15         14694-57         RASKET (Sell         1           16         14694-50         BOLT         2           17         14694-56         GASKET (Sell         1           18         S5005-40         SCREW, Head Cap         5           19         14694-58         GASKE Gas         1           21         14694-59         BEARING, Roller         1           22         14694-59         SEARING, Roller         1           21         14694-54         SPACER, Gear         1           22         14694-54	<u>4</u>	50105-12		$\rightarrow$
6       14694-24       COVER, Housing       1         7       14694-32       SCREW, Bearing Clamp       1         9       14694-32       SCREW, Bearing Clamp       1         10       14694-37       BEARING       2         11       14694-37       BEARING       2         11       14694-37       BEARING, Motor (Includes) reverse valve builting P/RV14694-27)       1         12       14694-28       NUT, Fiber Inset       1         13       14694-29       GASKET       1         14       14694-35       PLATE, Transfer       1         15       14694-55       PLATE, Transfer       1         16       14694-66       BEARING, Roller       2         17       14694-65       GASKET, Gear       1         20       14694-66       CASE, Gear       1         20       14694-67       SPACER, Gear       1         21       14694-68       CASE, Gear       1         22       14694-57       SPIACER, Gear       1         23       14694-57       SPIACER, Gear       1         24       14694-57       SPIADIE       1         25       14694-57       SPIADIE <td></td> <td>51105</td> <td></td> <td><math>\frac{11}{11}</math></td>		51105		$\frac{11}{11}$
7       14694-25       GASKE 1, LOWER         9       14694-32       SCREW, Bearing Clamp       1         10       14694-37       BEARING       2         11       14694-37       BEARING       2         11       14694-37       BEARING       2         11       14694-37       BEARING       2         12       14694-28       NUT, Fiber/Inset       12         13       14694-29       GASKE 1       12         14       14694-66       BEARING, Ball       1         15       14694-57       PLATE, Transfer       1         16       1494-30       BOLT/       2       2         17       14694-65       GASKE T, Selar Case       1       1         20       14694-56       CASE, Gear       1       1         21       14694-57       SEAL, Oil       1       1         22       14694-54       SPACER, Gear       1       1         23       14694-55       SPACER, Gear       1       1         24       14694-55       SPACER, Gear       1       1         25       14694-57       SPINDTE       1       1         26 <td></td> <td>14694-24</td> <td></td> <td></td>		14694-24		
8       14694-32       SCREW, Bearing Liamp       1         9       14694-34       NUT, Bearing Camp       1         10       14694-37       BEARING       2         11       14694-19       HOUSING, Motor (Includes reverse valve bushing PM) 14694-27)       1         12       14694-28       NUT, Fiber (Includes reverse valve bushing PM) 14694-27)       1         14       14694-56       GASKET       1         15       14694-55       PLATE, Transfer       1         16       14694-55       GASKET, Sear Case       1         17       14694-65       GASKET, Sear Case       5         19       14694-65       GASKET, Sear Case       1         20       14694-69       OEARING, Roller       1         21       14694-70       SEAL, Oll       1         22       14694-70       SEAL, Oll       1       1         23       14694-70       SEAL, Oll       1       1         24       14694-70       SEAL, Oll       1       1         25       14694-70       BEARING (Ball)       1       1         26       14694-71       DEOST, Febd       1       1         26       14694-64		14694-25	GASKET, Cover	
9       14694-37       BEARING       1         10       14694-37       BEARING       2         11       14694-19       HOUSING, Motoh (includek reverse valve bushing, PM) 14694-27)       1         12       14694-28       NUT, Fiber (nseit)       12         13       14694-29       GASKET       1         14       14694-55       PLATE, Transfer       1         16       14694-55       GASKET       2         17       14694-65       GASKET       2         18       55005-70       SCREW, Hex Head Cáp       5         19       14694-66       CASE, Gear       1         20       14694-69       SEAL, Oll       1         21       14694-70       SEAL, Oll       1         22       14694-70       SEAL, Oll       1         23       14694-84       SPACER, Gear       1         24       14694-74       BEARING Föll       1         25       14694-64       SHAFT, Privah       3         29       14694-64       SHAFT, Privah       3         31       14694-63       BEARING, Sell       1         29       14694-63       SEARING, Ball       1	8	14694-32	SCREW, Bearing Clamp	
10       14694-37       BEARING       2         11       14694-19       HOUSING, Motor (includes reverse valve busing PRV14694-27)       1         12       14694-28       NUT, Fiber Insert       1         13       14694-29       GASKET (       1         14       14694-60       BEARING, Ball       1         15       14694-55       PLATE, Transfer       1         16       14694-65       GASKET (, Gear Case       1         17       14694-65       GASKET (, Gear Case       1         20       14694-66       CASE, Gear       1         21       14694-67       SEARING, Roller       1         22       14694-67       SEAR, Oll       1         23       14694-57       SPIADE, Gear       1         24       14694-57       SPIADE, Gear       1         25       14694-57       SPIADE, Steve Needle       3         24       14694-57       SPIADE, Steve Needle       3         25       14694-53       MEY, Ring Gear       1         26       14694-53       MEY, Ring Gear       1         27       14694-53       BEARING, Sleve Needle       3         38       14	- 9	14694-34		1
11       14694-19       HOUSING, Motor(includes/geverse valve busing, P/N14694-27)       1         12       14694-28       NUT, Fiber/Graek       12         13       14694-29       GASKET       1         14       14694-66       BEARING, Rall       1         15       14694-55       PLATE, Transfer       1         16       14694-55       GASKET, Gear Case       1         17       14694-65       GASKET, Gear Case       1         18       55005-00       SCREW, Head Cap       5         19       14694-68       CASE, Gear       1         20       14694-69       BEARING, Roller       1         21       14694-57       SPLORER, Gear       1         23       1µ4694-57       SPLORER, Gear       1         24       1µ694-32       BEARING, Ball       1         25       14694-57       SPLODE       1         26       14694-57       SPLODE       1         27       14694-58       kB/Y, Ring Gear       1         28       14694-64       3µAFT, Finion       3         390       71122       RINION/ASSEMBLY       3         31       14694-59       BEAR	10	14694-37	BEARING	2
12       14094-28       NUI, Hber/Lesert       12         13       14694-29       GASKET       1         14       14694-55       RAKET       1         15       14694-55       PLATE, Transfer       1         16       14694-55       GASKET, Gelar Case       1         17       14694-55       GASKET, Gelar Case       1         18       55005-70       SCREW, Hex Head Cap       5         19       14694-66       CASE, Gear       1         20       14694-67       SEAL, Oil       1         21       14694-67       SEAL, Oil       1         22       14694-67       SEAL, Oil       1         23       14694-70       SEAL, Oil       1         24       14694-72       BEARING, Rear       1         25       14694-72       BEARING, Ball       1         26       14694-757       SPIAUER, Gear       1         27       14694-63       KEY, Ring Gear       1         28       14694-64       SHAT, Pihioh       3         29       14694-63       SEARING, Ball       1         311       14694-64       SHAT, Pihioh       3		14694-19	HOUSING, Motor (Includes veverse valve bushing P/N/14694-27)	1
13       14694-29       GASKET (       1         14       14694-66       BEARING, Ball       1         15       14694-55       PLATE, Transfer       1         16       14694-55       GASKET, Jene Case       1         17       14694-55       GASKET, Jene Case       1         18       55005-00       SCREW, Hex Head Case       5         19       14694-56       GASKET, Sear       1         20       14694-50       BEARING, Roller       1         21       14694-70       SEAL, OI       1         22       14694-70       SEAL, OI       1         23       14694-70       SEAL, OI       1         24       14694-70       SEAL, OI       1         25       14694-70       SEAL, OI       1         26       14694-75       SPINDTE       1         27       14694-63       SEARING, Sear       1         28       14694-63       SEARING, Sear       1         29       14694-63       SEARING, Sear       1         27       14694-63       SEARING, Sear       1         31       14694-63       SEARING, Sear       1		14694-28	NUT, Fiber/Insert	12
14       14694-66       EEARING, Ball       1         15       14694-55       PLATE, Tansfer       1         16       14694-63       BOLT       2         17       14694-65       GASKET, Jensfer       1         18       55005-f0       SCREW-Hex Head Car       5         19       14694-68       CASE, Gear       1         20       14694-69       BEARING, Roller       1         21       14694-70       SEAL, Oll       1         22       14694-54       SPACER, Gear       1         23       [µ694-54       SPACER, Gear       1         24       14694-70       SEARING, fpill       1         25       14694-57       SPLATE       1         26       14694-57       SPLATE       1         27       14694-64       SHAFT, Philoh       3         29       14694-63       BEARING, Sleeve Needle       3         30       71122       RINION ASSEMBLY       3         31       14694-63       SPLATER, Sleeve Needle       3         34       14694-64       SPLATER, Sleeve Needle       3         33       14694-64       SPLATING, Ball       1	13	14694-29	GASKET	1
15       14694-55       PLATE, Transfer       1         16       14694-65       GASKET, Jean Case       1         17       14694-65       GASKET, Jean Case       1         18       55005-10       SCREW, Mex Head Gap       5         19       14694-66       CASE, Gear       1         20       14694-69       BEARING, Roller       1         21       14694-69       BEARING, Roller       1         22       14694-54       SPACER, Gear       1         23       1/4694-54       SPACER, Gear       1         24       1%694-54       SPACER, Gear       1         25       1%694-50       POST, Felad       1         26       14694-57       SPINDTE       1         26       14694-53       BEARING, Sleeve Needle       3         29       71122       RINION-X5SEMBLY       3         31       14694-53       BEARING, Sleeve Needle       3         32       14694-53       BEARING, Ball       1         34       14694-53       SPINDLE, Gear (18 teeth)       1         35       14694-54       SPINDLE, Gear (18 teeth)       1         36       14694-59	14	14694-66	BEARING, Ball	1
16       14694-30       BDLL       2         17       14694-65       GASKET, Gear       1         18       S5005-00       SCREW, Hex Head Cap       5         19       14694-69       BEARING, Roller       1         20       14694-69       BEARING, Roller       1         21       14694-70       SEA, Oil       1         22       14694-54       GEAR, Spindle (47 teeth)       1         23       14694-54       SPACER, Gear       1         24       14694-54       SPACER, Gear       1         25       14694-54       SPACER, Gear       1         26       14694-57       SPMDEE       1         26       14694-57       SPMDEE       1         27       14694-63       BEARING, Sleeve Needle       3         29       14694-53       BEARING, Ball       1         31       14694-59       BEARING, Ball       1         33       14694-59       BEARING, Ball       1         34       14694-59       BEARING, Ball       1         33       14694-59       BEARING, Ball       1         34       14694-59       BEARING, Ball       1	15	14694-55	PLATE, Transter	1
17       14694-65       GASKET, Jear Case       1         18       55005-10       SCREW, Head Case       5         19       14694-68       CASE, Gear       1         20       14694-69       ØBARING, Roller       1         21       14694-70       SEAL, Oll       1         22       14694-70       SEAL, Oll       1         23       14694-74       BEARING (Fall       1         24       14694-75       SPACER, Gear       1         25       14694-75       SPACER, Gear       1         26       14694-57       SPMODE       1         26       14694-53       KEY, Ring Gear       1         27       14694-63       BEARING, Sleeve Needle       3         29       14694-63       BEARING, Sleeve Needle       3         30       71122       RINGNA ASSEMBLY       3         31       14694-59       BEARING, Ball       1         32       14694-63       SEINDLE, Gear (18 tebth)       1         33       14694-59       BEARING, Ball       1         34       14694-59       BEARING, Ball       1         35       14694-69       BEARING, Ball	16	14694-30	BDLT	2
18       55005 ± 00 SCREW. Hex Head Cap       5         19       14694 ± 68       CASE, Gear       1         20       14694 ± 68       CASE, Gear       1         21       14694 ± 70       SEAL, Oil       1         22       14694 ± 70       SEAL, Oil       1         23       14694 ± 70       SEAL, Oil       1         23       14694 ± 70       SEAL, Oil       1         24       14694 ± 70       BEARING, Gear       1         24       14694 ± 70       BEARING, Gear       1         25       14694 ± 70       BEARING, Bear       1         26       14694 ± 63       SHAFT, Philoph       3         29       14694 ± 63       SHAFT, Philoph       3         29       14694 ± 63       SEARING, Sleeve Needle       3         30       71122       RINIOW ASSEMBLY       3         31       14694 ± 59       BEARING, Ball       1         32       14694 ± 50       PINION (14 teeth)       1         33       14694 ± 50       PINION (14 teeth)       1         36       14694 ± 12       SLEEVE, Reverse Valve       1         38       14694 ± 12       SLEEVE, Reverse	17	14694-65	GASKET, Gelar Case	1
19       14694-68       CASE, Gear       1         20       14694-69       ØBARING, Roller       1         21       14694-70       SEAL, Oil       1         22       14694-70       SEAL, Oil       1         23       1/4694-74       GEAR, Spindle (47 teeth)       1         23       1/4694-70       BEARING (6a)       1         24       1/4694-77       BEARING (6a)       1         25       1/4694-77       SPJNDTE       1         26       1/4694-78       Kg (7 Ring Gear       1         27       1/4694-64       SHAFT, Pihigh       3         29       1/4694-63       SEARING, Sleeve Needle       3         30       71122       RINION-ASSEMBLY       3         31       14694-59       BEARING, Ball       1         32       14694-59       BEARING, Ball       1         33       14694-59       BEARING, Ball       1         34       T4694-59       BEARING, Ball       1         35       1/4694-50       PINION (14 teeth)       1         36       14694-14       BEARING, Ball       1         37       14694-14       SEE SCREW       1 <td>18</td> <td>55005-10</td> <td>SCREW, Head Cap</td> <td>5</td>	18	55005-10	SCREW, Head Cap	5
20       14694-69       BBARING, Roller       1         21       14694-70       SEAL, Oil       1         22       14694-70       SEAL, Oil       1         23       [µ4694-54]       GEAR, Spindle (47 teeth)       1         23       [µ4694-54]       SPACER, Gear       1         24       14694-72       BEARING/Bâl       1         25       14694-73       SPACER, Spindle (47 teeth)       1         26       14694-57       SPINDLE       1         27       14694-58       K# (Y, Ring Gear       1         28       14694-64       SHAFT, Pinigh       3         29       14694-63       BEARING, Sleeve Needle       3         31       14694-59       BEARING, Sleeve Needle       3         34       7122       RINIOWASSEMBLY       3         31       14694-59       BEARING, Ball       1         32       14694-52       BEARING, Ball       1         33       14694-60       BEARING, Ball       1         34       74694-52       BEARING, Ball       1         35       14694-60       BEARING, Ball       1         36       14694-61       GEAR, 1st		14694-68	CASE, Gear	1
21       14694-70       SEAL, Oil       1         22       14694-54       GEAR, Spindle (47 teeth)       1         23       1/4694-54       SPACER, Gear       1         24       1/694-77       BEARING (Bill)       1         25       1/4694-77       BEARING (Bill)       1         26       1/4694-77       SPINDEE       1         26       1/4694-78       Kg/Y, Ring Gear       1         27       1/4694-64       SHAFT, Pihigh       3         29       1/4694-64       SHAFT, Pihigh       3         29       1/4694-64       SHAFT, Pihigh       3         30       71122       RINIOW-ASSEMBLY       3         311       14694-63       BEARING, Ball       1         32       1/4694-59       BEARING, Ball       1         33       14694-59       BEARING, Ball       1         34       14694-52       BEARING, Ball       1         35       1/4694-52       BEARING, Ball       1         36       1/4694-48       BEARING, Ball       1         37       1/4694/48       BEARING, Ball       1         38       1/4694-14       SEEEVE, Reverse Valve	20	14694-69	BEARING, Roller	1
22       14694-54       GEAR, Spindle (47 teeth)       1         23       14694-54       SPACER, Gear       1         24       14694-47       BEARING (Ball)       1         25       14694-57       SPINDLE       1         26       14694-57       SPINDLE       1         26       14694-64       SHAFT, Fihigh       3         29       14694-63       BEARING, Sleeve Needle       3         29       14694-63       BEARING, Sleeve Needle       3         30       71122       RINKOWASSEMBLY       3         311       14694-59       BEARING, Ball       1         33       14694-50       BEARING, Ball       1         34       14694-52       BEARING, Ball       1         35       14694-50       PINION (14 teeth)       1         36       14694-50       PINION (14 teeth)       1         36       14694-71       CP THROTTLE ASSEMBLY - Consisting of all items on this parts       1         38       14694-71       CP THROTTLE ASSEMBLY - Consisting of all items on this parts       1         39       14694-14       SET SCREW       1       1         39       14694-14       SELEVE, Reverse Valve </td <td>21</td> <td>14694-70</td> <td>SÉAL, OIL</td> <td>1</td>	21	14694-70	SÉAL, OIL	1
23       [/4694-54       SPACER, Gear       1         24       1/4694-47       BEARING, Ball       1         25       1/4694-20       POST, Febd       1         26       1/4694-57       SPINDEE       1         27       1/4694-58       KEY, Ring Gear       1         28       1/4694-64       SklAFT, Pihioh       3         29       1/4694-63       BEARING, Sleeve Needle       3         30       71122       RINGOVASSEMBLY       3         311       1/4694-59       BEARING, Ball       1         32       1/4694/53       SPINDLE, Gear (18 teeth)       1         33       1/4694/53       SPINDLE, Gear (18 teeth)       1         34       1/4694/53       BEARING, Ball       1         35       1/4694/53       BEARING, Ball       1         36       1/4694/48       BEARING, Ball       1         37       1/4694/48       BEARING, Ball       1         36       1/4694/48       BEARING, Ball       1         37       1/4694/48       BEARING, Ball       1         38       1/4694/48       BEARING, Ball       1         39       1/4694/48       BEARING	22	1/1694-51	GEAR, Spindle (47 teeth)	1
24       14694-47       BEARING (Bål)       1         25       14694-67       SPUNDLE       1         26       14694-57       SPUNDLE       1         27       14694-58       KEY, Ring Gear       1         28       14694-64       SHAET, Pinion       3         29       14694-63       BEARING, Sleeve Needle       3         30       71122       RINION-ASSEMBLY       3         31       14694-59       BEARING, Ball       1         32       14694-59       BEARING, Ball       1         33       14694-59       BEARING, Ball       1         34       14694-50       BEARING, Ball       1         34       14694-50       BEARING, Ball       1         35       14694-50       BEARING, Ball       1         36       14694-50       PINION (14 teeth)       1         36       14694-50       PINNON (14 teeth)       1         36       14694-71       CP THROTTLE ASSEMBLY - Consisting of all items on this parts       1         37       14694-71       CP THROTTLE ASSEMBLY - Consisting of all items on this parts       1         38       14694-12       SLEEVE, Reverse Valve       1       1	23	14694-54	SPACER, Gear	1
25       14694-20       POST, Febd       1         26       14694-57       SPLADTE       1         27       14694-58       KEY, Ring Gear       1         28       14694-64       SHAFT, Pinion       3         29       14694-63       SEARING, Sleeve Needle       3         30       71122       RINION ASSEMBLY       3         31       14694-59       BEARING, Ball       1         32       14694-59       BEARING, Ball       1         33       14694-59       BEARING, Ball       1         34       14694-50       BEARING, Ball       1         35       14694-50       PINION (14 teeth)       1         36       14694-71       CP THROTTLE ASSEMBLY - Consisting of all items on this parts       1         37       14694-71       CP THROTTLE ASSEMBLY - Consisting of all items on this parts       1         38       14694-14       SEEEVE, Reverse Valve       1         39       14694-14       SEEEVE, Reverse Valve       1         39       14694-14       SEEVEVE, Retainer       1         40       14694-3       SPRING, Throttle       1         41       14694-1       SLEEVE, Retainer       1 </td <td>24</td> <td>14694-47</td> <td>BEARING/Ball</td> <td>1</td>	24	14694-47	BEARING/Ball	1
26       14694-57       SPINDLE       1         27       14694-58       KEY, Ring Gear       1         28       14694-64       SHAFT, Pihion       3         29       14694-64       SHAFT, Pihion       3         30       71122       RINION ASSEMBLY       3         31       14694-59       BEARING, Ball       1         32       14694-59       BEARING, Ball       1         32       14694-59       BEARING, Ball       1         32       14694-59       BEARING, Ball       1         33       14694-59       BEARING, Ball       1         34       14694-52       BEARING, Ball       1         35       14694-52       BEARING, Ball       1         36       14694-19       GEAR, 1st       1         37       14694-71       CP THROTTLE ASSEMBLY - Consisting of all items on this parts       1         38       14694-12       SLEEVE, Reverse Valve       1         39       14694-14       SET SCREW       1         40       14694-3       SPRING, Throttle       1         41       14694-3       SPRING, Throttle       1         42       14694-11       SL	25	<u> </u>	POST, Feled	1
27       14694-58       KEY, Ring Gear       1         28       14694-64       3HAFT, Pihloh       3         29       14694-63       BE ARING, Sleeve Needle       3         30       71122       RINION ASSEMBLY       3         31       14694-59       BEARING, Ball       1         32       14694-59       BEARING, Ball       1         32       14694-59       BEARING, Ball       1         33       14694-60       BEARING, Ball       1         34       14694-52       BEARING, Ball       1         35       14694-50       PINION (14 teeth)       1         36       14694-49       GEAR, 1st       1         37       14694-48       BEARING, Ball       1         37       14694-48       BEARING, Ball       1         36       14694-19       GEAR, 1st       1         37       14694-48       BEARING, Ball       1         38       14694-12       SLEEVE, Reverse Valve       1         39       14694-14       SET SCREW       1         40       14694-3       SPRING, Throttle       1         41       14694-3       SPRING, Throttle       1 <td>26</td> <td>14694-57</td> <td>SPINDLE</td> <td>1</td>	26	14694-57	SPINDLE	1
28       14694-64       SHAFT, Pihigh       3         29       14694-63       BE ARING, Sleeve Needle       3         30       71122       RINJOW ASSEMBLY       3         31       14694-59       BEARING, Ball       1         32       14694-59       BEARING, Ball       1         32       14694-59       BEARING, Ball       1         33       14694-60       BEARING, Ball       1         34       14694-52       BEARING, Ball       1         35       14694-52       BEARING, Ball       1         36       14694-60       BEARING, Ball       1         35       14694-52       BEARING, Ball       1         36       14694-69       GEAR, 1st       1         37       14694-48       BEARING, Ball       1         38       14694-71       CP THROTTLE ASSEMBLY - Consisting of all items on this parts       1         14694-71       CP THROTTLE ASSEMBLY - Consisting of all items on this parts       1         39       14694-14       •SET SCREW       1         40       14694-3       •SPRING, Throttle       1         41       14694-3       •SPRING, Throttle       1         42 <td></td> <td>14694-58</td> <td>KEY, Ring Gear</td> <td>1</td>		14694-58	KEY, Ring Gear	1
29         14694-63         BE ARING, Sleeve Needle         3           30         71122         RIMON ASSEMBLY         3           31         14694-59         BEARING, Ball         1           32         14694/53         SPINDLE, Gear (18 teeth)         1           33         14694-60         BEARING, Ball         1           34         14694-52         BEARING, Ball         1           35         14694-52         BEARING, Ball         1           36         14694-52         BEARING, Ball         1           36         14694-94         GEAR, 1st         1           37         14694/48         BEARING, Ball         1           37         14694/48         BEARING, Ball         1           37         14694-48         BEARING, Ball         1           38         14694-12         • SLEEVE, Reverse Valve         1           39         14694-14         • SEE SCREW         1           40         14694-3         • SPRING, Throttle         1           41         14694-3         • SPRING, Throttle         1           42         14694-11         • SLEEVE, Retainer         1           43         14694-2	- 28	14694-64	SHAFT, Pinigh	3
30       71122       RINION/ASSEMBLY       3         311       14694-59       BEARING, Ball       1         32       14694-59       BEARING, Ball       1         33       14694-50       BEARING, Ball       1         34       14694-52       BEARING, Ball       1         35       14694-52       BEARING, Ball       1         36       14694-52       BEARING, Ball       1         36       14694-49       GEAR, 1st       1         37       14694-48       BEARING, Ball       1         14694-71       CP THROTTLE ASSEMBLY - Consisting of all items on this parts       1         14694-71       CP THROTTLE ASSEMBLY - Consisting of all items on this parts       1         137       14694-12       SLEEVE, Reverse Valve       1         38       14694-12       SLEEVE, Reverse Valve       1         39       14694-14       SET SCREW       1         40       14694-3       SPRING, Throttle       1         41       14694-3       SPRING, Throttle       1         42       14694-11       SLEEVE, Retainer       1         43       14694-2       SLEEVE, Throttle       1         44	<u>√_2́9(</u>	14694-63	BEARING, Sleeve Needle	3
311       14694-59       BEARING, Ball       1         32       14694/53       SPINDLE, Gear (18 testh)       1         33       14694-60       BEARING, Ball       1         34       14694-52       BEARING, Ball       1         35       14694-52       BEARING, Ball       1         36       14694-52       BEARING, Ball       1         36       14694-19       GEAR, 1st       1         37       14694/48       BEARING, Ball       1         1694-71       CP THROTTLE ASSEMBLY - Consisting of all items on this parts       1         18       14694-12       • SLEEVE, Reverse Valve       1         38       14694-12       • SLEEVE, Reverse Valve       1         39       14694-14       • SET SCREW       1         40       14694-3       • SPRING, Throttle       1         41       14694-3       • SPRING, Throttle       1         42       14694-11       • SLEEVE, Retainer       1         43       14694-2       • SLEEVE, Throttle       1         44       14694-1       • CAP, Throttle       1         45       14694-10       • ROLLER, Throttle Stem       1	- 30	71122	RINION/ASSEMBLY	3
82         14694/53         SPINDLE, Gear (18 teeth)         1           33         14694-60         BEARING, Ball         1           34         14694-52         BEARING, Ball         1           35         14694-52         BEARING, Ball         1           36         14694-49         GEAR, 1st         1           37         14694-49         GEAR, 1st         1           37         14694-71         CP THROTTLE ASSEMBLY - Consisting of all items on this parts         1           14694-71         CP THROTTLE ASSEMBLY - Consisting of all items on this parts         1           14694-12         SLEEVE, Reverse Valve         1           39         14694-14         SET SCREW         1           40         14694-3         SPRING, Throttle         1           41         14694-3         SPRING, Throttle         1           42         14694-1         SLEEVE, Retainer         1           43         14694-2         SLEEVE, Retainer         1           44         14694-1         CAP, Throttle         1           45         14694-10         ROLLER, Throttle Stem         1	31	14694-59	BEARING, Ball	1
33         14694-60         BEARING, Ball         1           34         14694-52         BEARING, Ball         1           35         14694-52         BEARING, Ball         1           36         14694-60         PINION (14 teeth)         1           36         14694-69         GEAR, 1st         1           37         14694-69         GEAR, 1st         1           37         14694-71         CP THROTTLE ASSEMBLY - Consisting of all items on this parts         1           14694-71         CP THROTTLE ASSEMBLY - Consisting of all items on this parts         1           38         14694-12         SLEEVE, Reverse Valve         1           39         14694-14         SET SCREW         1           40         14694-3         SPRING, Throttle         1           41         14694-3         SPRING, Throttle         1           42         14694-11         SLEEVE, Retainer         1           43         14694-2         SLEEVE, Throttle         1           44         14694-1         CAP, Throttle         1           45         14694-10         ROLLER, Throttle Stem         1	82	14694-53	SPINDLE, Gear (18 teach)	1
34         14694-52         BEARING, Bail         1           35         14694-50         PINION (14 teeth)         1           36         14694-49         GEAR, 1st         1           37         14694-48         BEARING, Ball         1           37         14694-48         BEARING, Ball         1           14694-71         CP THROTTLE ASSEMBLY - Consisting of all items on this parts         1           14694-71         CP THROTTLE ASSEMBLY - Consisting of all items on this parts         1           14694-12         SLEEVE, Reverse Valve         1           38         14694-12         SLEEVE, Reverse Valve         1           39         14694-14         SET SCREW         1           40         14694-3         SPRING, Throttle         1           41         14694-3         SPRING, Throttle         1           42         14694-1         SLEEVE, Retainer         1           43         14694-2         SLEEVE, Throttle         1           44         14694-1         CAP, Throttle         1           45         14694-10         ROLLER, Throttle Stem         1		14694-60	BEARING, Ball	11
35         14694-50         PINION (14 teeth)         1           36         14694-49         GEAR, 1st         1           37         14694-48         BEARING, Ball         1           14694-71         CP THROTTLE ASSEMBLY - Consisting of all items on this parts         1           14694-71         CP THROTTLE ASSEMBLY - Consisting of all items on this parts         1           38         14694-12         SLEEVE, Reverse Valve         1           39         14694-14         SET SCREW         1           40         14694-3         SPRING, Throttle         1           41         14694-3         SPRING, Throttle         1           42         14694-11         SLEEVE, Retainer         1           43         14694-2         SLEEVE, Throttle         1           44         14694-1         CAP, Throttle         1           45         14694-10         ROLLER, Throttle Stem         1	34	14694-52	BEARING, Ball	1
36         14694-19         GEAR, 1st         1           37         14694-48         BEARING, Ball         1           14694-71         CP THROTTLE ASSEMBLY - Consisting of all items on this parts         1           14694-71         CP THROTTLE ASSEMBLY - Consisting of all items on this parts         1           38         14694-12         SLEEVE, Reverse Valve         1           39         14694-14         SET SCREW         1           40         14694-3         SPRING, Throttle         1           41         14694-3         SPRING, Throttle         1           42         14694-11         SLEEVE, Retainer         1           43         14694-2         SLEEVE, Throttle         1           44         14694-1         CAP, Throttle         1           45         14694-10         ROLLER, Throttle Stem         1	35	14694-50 >>	PINION (14 teeth)	11
37         14694/48         BEARING, Ball         1           14694-71         CP THROTTLE ASSEMBLY - Consisting of all items on this parts         1           1         14694-71         CP THROTTLE ASSEMBLY - Consisting of all items on this parts         1           38         14694-12         SLEEVE, Reverse Valve         1           39         14694-14         SET SCREW         1           40         14694-4         VALVE, Throttle         1           41         14694-3         SPRING, Throttle         1           42         14694-11         SLEEVE, Retainer         1           43         14694-2         SLEEVE, Throttle         1           44         14694-1         CAP, Throttle         1           45         14694-10         ROLLER, Throttle Stem         1	36	14694-#9	GEAR, 1st	1
14694-71         CP THROTTLE ASSEMBLY - Consisting of all items on this parts         1           1         1         1         1         1           38         14694-12         • SLEEVE, Reverse Valve         1           39         14694-14         • SET SCREW         1           40         14694-4         • VALVE, Throttle         1           41         14694-3         • SPRING, Throttle         1           42         14694-11         • SLEEVE, Retainer         1           43         14694-2         • SLEEVE, Throttle         1           44         14694-1         • CAP, Throttle         1           45         14694-10         • ROLLER, Throttle Stem         1	37	14694/48	BEARING, Ball	1
list marked with "•"         38       14694-12       • SLEEVE, Reverse Valve       1         39       14694-14       • SET SCREW       1         40       14694-4       • VALVE, Throttle       1         41       14694-3       • SPRING, Throttle       1         42       14694-11       • SLEEVE, Retainer       1         43       14694-2       • SLEEVE, Throttle       1         44       14694-1       • CAP, Throttle       1         45       14694-10       • ROLLER, Throttle Stem       1		14694-71	CP THROTTLE ASSEMBLY - Consisting of all items on this parts	1
38         14694-12         SLEEVE, Reverse Valve         1           39         14694-14         SET SCREW         1           40         14694-4         VALVE, Throttle         1           41         14694-3         SPRING, Throttle         1           42         14694-11         SLEEVE, Retainer         1           43         14694-2         SLEEVE, Throttle         1           44         14694-1         CAP, Throttle         1           45         14694-10         • ROLLER, Throttle Stem         1			list marked with "•"	
39         14694-14         • SET SCREW         1           40         14694-4         • VALVE, Throttle         1           41         14694-3         • SPRING, Throttle         1           42         14694-11         • SLEEVE, Retainer         1           43         14694-2         • SLEEVE, Throttle         1           44         14694-1         • CAP, Throttle         1           45         14694-10         • ROLLER, Throttle Stem         1	38	14694-12	SLEEVE, Reverse Valve	1
40         14694-4         VALVE, Throttle         1           41         14694-3         • SPRING, Throttle         1           42         14694-11         • SLEEVE, Retainer         1           43         14694-2         • SLEEVE, Retainer         1           44         14694-1         • CAP, Throttle         1           45         14694-10         • ROLLER, Throttle Stem         1	39	14694-14	SET SCREW	1
41         14694-3         • SPRING, Throttle         1           42         14694-11         • SLEEVE, Retainer         1           43         14694-2         • SLEEVE, Throttle         1           44         14694-1         • CAP, Throttle         1           45         14694-10         • ROLLER, Throttle Stem         1	40	14694-4	VALVE, Throttle	1
42         14694-11         • SLEEVE, Retainer         1           43         14694-2         • SLEEVE, Throttle         1           44         14694-1         • CAP, Throttle         1           45         14694-10         • ROLLER, Throttle Stem         1	41	14694-3	SPRING, Throttle	1
43         14694-2         SLEEVE, Throttle         1           44         14694-1         • CAP, Throttle         1           45         14694-10         • ROLLER, Throttle Stem         1	42	14694-11	SLEEVE, Retainer	1
44         14694-1         • CAP, Throttle         1           45         14694-10         • ROLLER, Throttle Stem         1	43	14694-2	SLEEVE, Throttle	1
45 14694-10 • ROLLER, Throttle Stem 1	44	14694-1	CAP, Throttle	1
	45	14694-10	ROLLER, Throttle Stem	1
4614694-9 • PIN, Roller1	46	14694-9	• PIN, Roller	1
47 14694-16 • HANDLE, Live Air 1	47	14694-16	HANDLE, Live Air	1
48 51300-216-B • O-RING 2	48	51300-216-B	• O-RING	2

### Figure 5 -- AIR MOTOR (CHICAGO PNEUMATIC) ... continued



### Figure 7 -- AIR CYLINDER

Item	Cam-Tech Part No.	Description	Qty
		AIR CYLINDER ASSEMBLY	
	10462	(see Figure 2B for next higher assembly)	Ref.
1	55410-C	NUT, Tie Rod	8
2	10462-12	HEAD, Blind End	1
3	10462-11	LOCKNUT, Piston Rod	
4	10462-10	PISTON	
	10462-14		
6	10462-9	BODY, Cylinder	
	10462-8		
	10462-13		
	10402-4		
<u> </u>	10402-10		
	10402-15		
12	10462-2	(used only on old cylinders with threaded ro	depoleads) 1
13	55004-5 <del>-H</del>	∧ BOLIT. Hex Head	6
	13652	SEAL KIT, Standard - Consisting of	<u> </u>
14	10462-1	SCRAPER, Rod Assembly 3 piece kit	1
15	10462-3	PACKING, Rod	3
16	51300-016-B	• Q-RING, Piston to Rod Seal	1
17	10462-7 🔨		2
18	51308-167-8	<ul> <li>O-RING, Body to Head Seal</li> </ul>	$\Delta V() P 2$
-3-			
	2) (3) (4)	ଞ 	
27		FIGURE 7Air Cylinder	

Item	Cam-Tech Part No.	Description	Qty
	15953	ONE YEAR'S FOREIGN SPARE PARIS KIP For SSW-10 less Air Motor	
		Consists of the following:	
1	10435	, ROLLER, Drive	2
2	10576		V 6
3	105 49	, PIN, Detent	2
4	15126	. PIN, Pressure Roller W/o Grease Fitting	2
5	10439	, WASHER, Thrust	4
6	72380	BEARING, Pressure Roller	6
4	1204/		4
8	12083		4
9	10882	, GASKET, Bearing Cover	4
10	12051		4
12	104/5 *	ACKET, Gear Case Cover	
12 1	106.52 E12.00-2.47-D	ARDINE I, AIR MOLOR BEDI	
14	107.42		4
15	13990	KIT Button Operator	× 1
16	180.01	KIT. Body See	1
17	12070-8	SPOOL	1
18	107 43	MUFFLER	1
	7		
J () Item	Cam-Tech Part No.	Description	Qty
) (tern	Cam-Tech Part No.	Description	Qty
	Cam-Tech Part No.	Description ONE YEAR's FOREIGN SPARE PARTS KIT For SSW-10 Chicago Preumatic Air Motor	Qty 1
	Cam-Tech Part No.	Description ONE YEAR's FOREIGN SPARE PARTS KIT For SSW-10 Chicago Preumatic Air Motor Consists of the following:	Qty 1
ltern	Cam-Tech Part No. 15955	Description ONE YEAR's FOREIGN SPARE PARTS KIT For SSW-10 Chicago Preumatic Air Motor Consists of the following: . GASKET, Cover	<b>Qty</b> 1
	Cam-Tech Part No. 15955 14694-25 14694-37	Description ONE YEAR's FOREIGN SPARE PARTS KIT For SSW-10 Chicago Preumatic Air Motor Consists of the following: . GASKET, Cover . BEARING, Ball	Qty 1
	Cam-Tech Part No. 15955 146.94-25 146.94-35 146.94-39 146.94-39	Description ONE YEAR's FORSIGN SPARE PARTS KIT For SSW-10 Chicago Preumatic Air Motor Consists of the following: . GASKET, Cover . BEARING, Ball . VANE	Qty 1 2 2 6
1 2 3 4	Cam-Tech Part No. 15955 14694-25 14694-25 14694-39 14694-39 14694-50	Description ONE YEAR's FOREIGN SPARE PARTS KIT For SSW-10 Chicago Preumatic Air Motor Consists of the following: . GASKET, Cover . BEARING, Ball . VANE . GEAR, 1st (52 teeth) DINICON (14 horth)	Qty 1 2 2 6 1
1 2 3 4 5	Cam-Tech Part No. 15955 146 94-25 146 94-37 146 94-39 146 94-49 146 94-50 146 94-70	Description ONE YEAR's FOREIGN SPARE PARTS KIT For SSW-10 Chicago Preumatic Air Motor Consists of the following: . GASKET, Cover . BEARING, Ball . VANE . GEAR, 1st (52 teeth) . PINION (14 teeth) SEAL OIL	Qty 1 2 6 1 1
1 2 3 4 5 6 7	Cam-Tech Part No. 15955 14694-25 14694-25 14694-39 14694-39 14694-49 14694-50 14694-6	Description ONE YEAR's FOREIGN SPARE PARTS KIT For SSW-10 Chicago Preumatic Air Motor Consists of the following: . GASKET, Cover . BEARING, Ball . VANE . GEAR, 1st (52 teeth) . PINION (14 teeth) . SEAL, Oil BEARING, Ball	Qty 1 2 6 1 1 1