

This kit contains O-rings and backup rings for the hydraulic units listed below:

System	Page
Insta-Act® hydraulics for:	
Straight Blades (except HT Series™ Blades)	2
HT Series Blades	4
EZ-V® Blades	6
XtremeV™ Blades	8
XLS™ Blades	10
SEHP hydraulics for Straight Blades	12
Hydraulic Fitting and Hose Installation	14
O-Ring/Backup Ring Size Chart	15

Use the chart at the end of this document to sort O-rings by size. This kit contains more O-rings than needed for any application. The small bag contains -903, -904, and -906 O-rings for the SAE O-ring plugs. See note on chart about these O-rings. Use red -008 O-rings only on EZ-V Insta-Act pilot-operated check valve spools. Apply light film of hydraulic fluid to all O-rings before installation.

## GLAND NUT RAMS (Hex Flange Head on Nut)

### Piston Locknut to Rod (Double-Acting Rams Only)

**2" Rams:** 100–120 ft-lb

**1-1/2" Rams:** 35–40 ft-lb

### Gland Nut

**1" Single-Acting & 1-1/2" Double-Acting Rams:**  
120–150 ft-lb

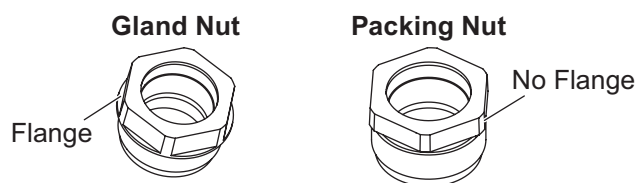
**All Other Rams:** 150–180 ft-lb

**Alternate Method:** Thread nut into coupling. Insert feeler gauge (0.015" for 1" single-acting and 1-1/2" double acting rams, 0.012" for all other rams) between front surface of cylinder tube face and hex of gland nut. Tighten the gland nut until it is snug against the feeler gauge. Remove the feeler gauge, and tighten the gland nut an additional **1/4 turn**. This adjustment procedure will provide the torque listed above. Undertightening may result in nut loosening during snowplow operation.

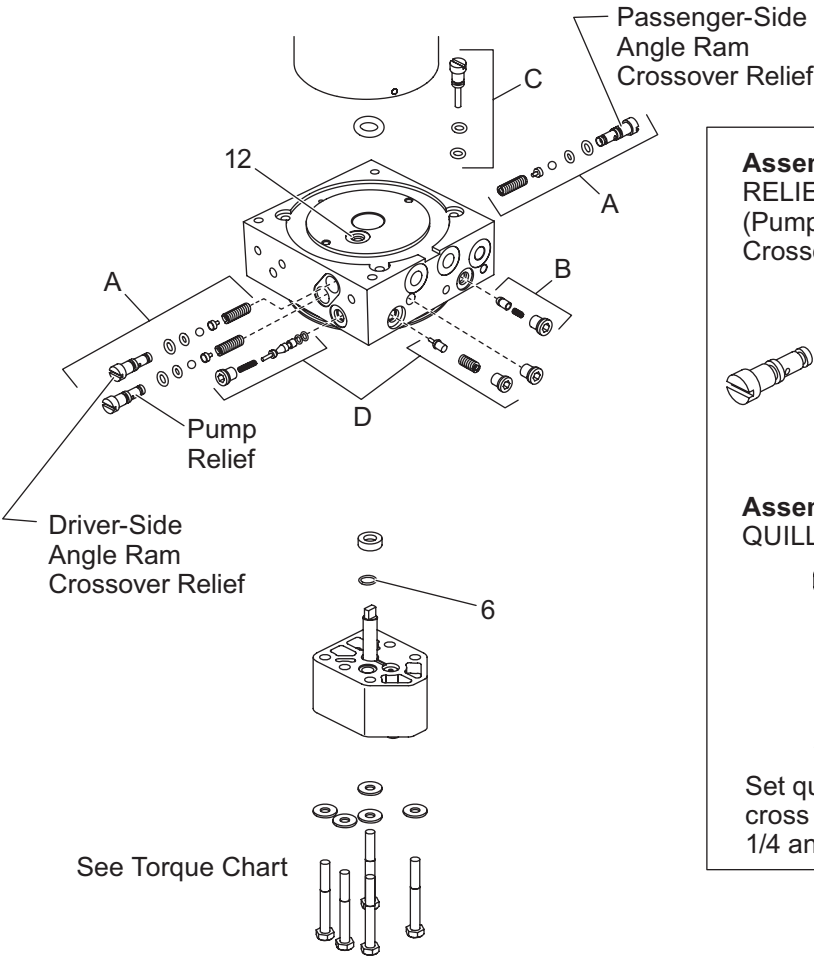
## PACKING NUT RAMS (Hex Head on Nut)

### Lift Ram Packing Nut (Single-Acting Rams Only)

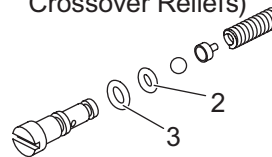
Tighten packing nut not more than 1/4 turn after you feel packing nut contact packing. Overtightening affects ram operation and packing life.



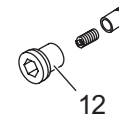
Insta-Act® HYDRAULIC UNIT PARTS DIAGRAM  
(Straight Blades Except HT Series™ Blades)



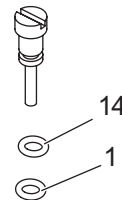
**Assembly A**  
RELIEF VALVE  
(Pump and  
Crossover Reliefs)



**Assembly B**  
BYPASS CHECK  
VALVE ASSEMBLY

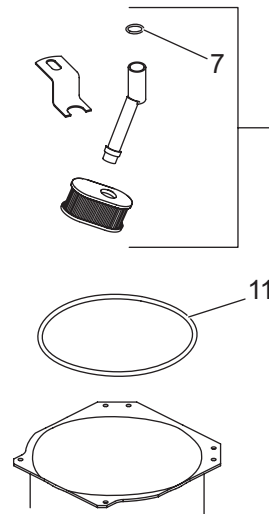
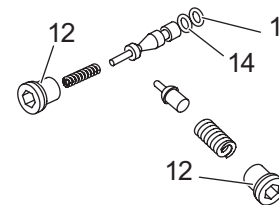


**Assembly C**  
QUILL

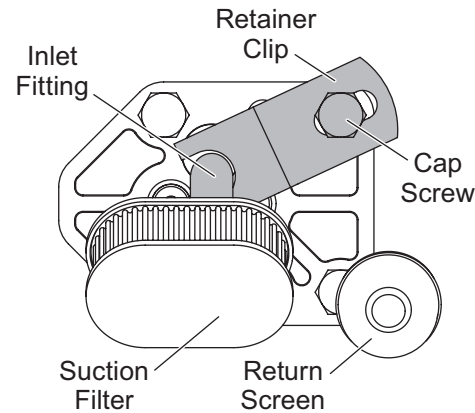


Set quill to block  
cross hole between  
1/4 and 1/2.

**Assembly D**  
POPPET CHECK  
VALVE ASSEMBLY



**Filter and Pick-Up Tube Orientation  
Straight Blade Snowplows**



Item	Part	Qty*	Description
1	25622	2	O-Ring -006
2	55371	3	O-Ring -008 (black)
3	25731	3	O-Ring -010
6	56274	1	O-Ring -013
7	56416	1	O-Ring -014
11	66519	1	O-Ring -250
12	26784	4	O-Ring -903
14	56315	2	Backup -006

\* Qty used for this application. Kit contains extra parts.

Assemble parts as shown and tighten relief valve stems until spring is fully compressed. Then, back off valve stem (rotate counterclockwise) the number of turns indicated in the chart.

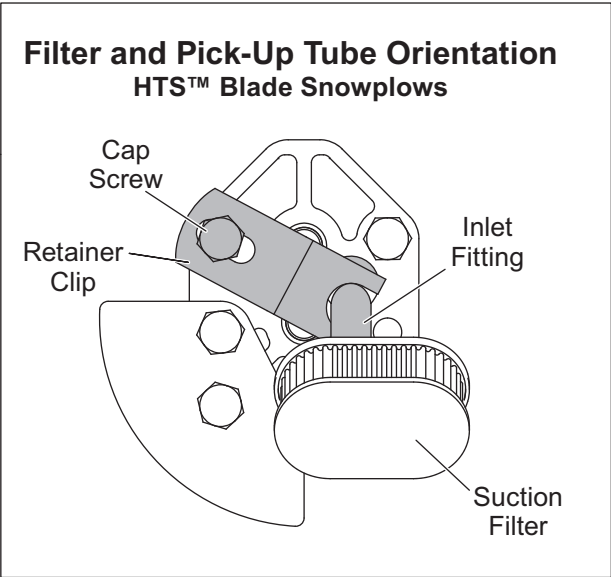
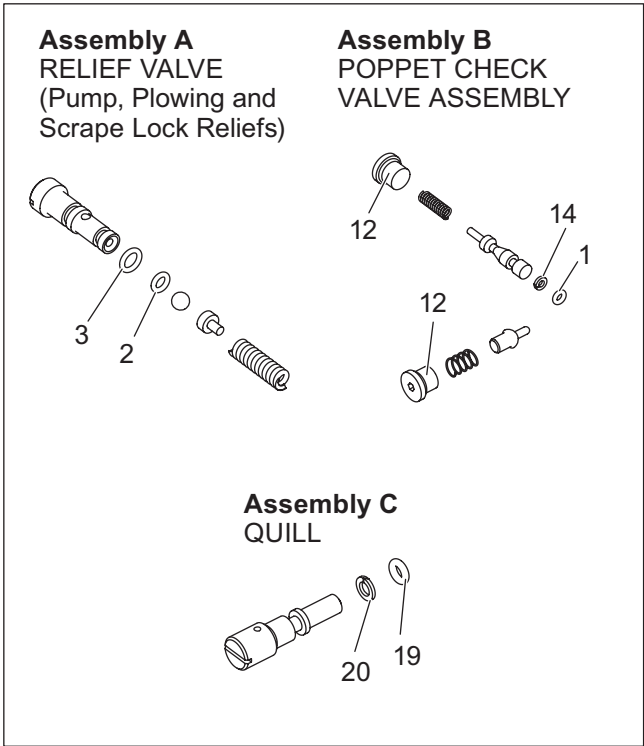
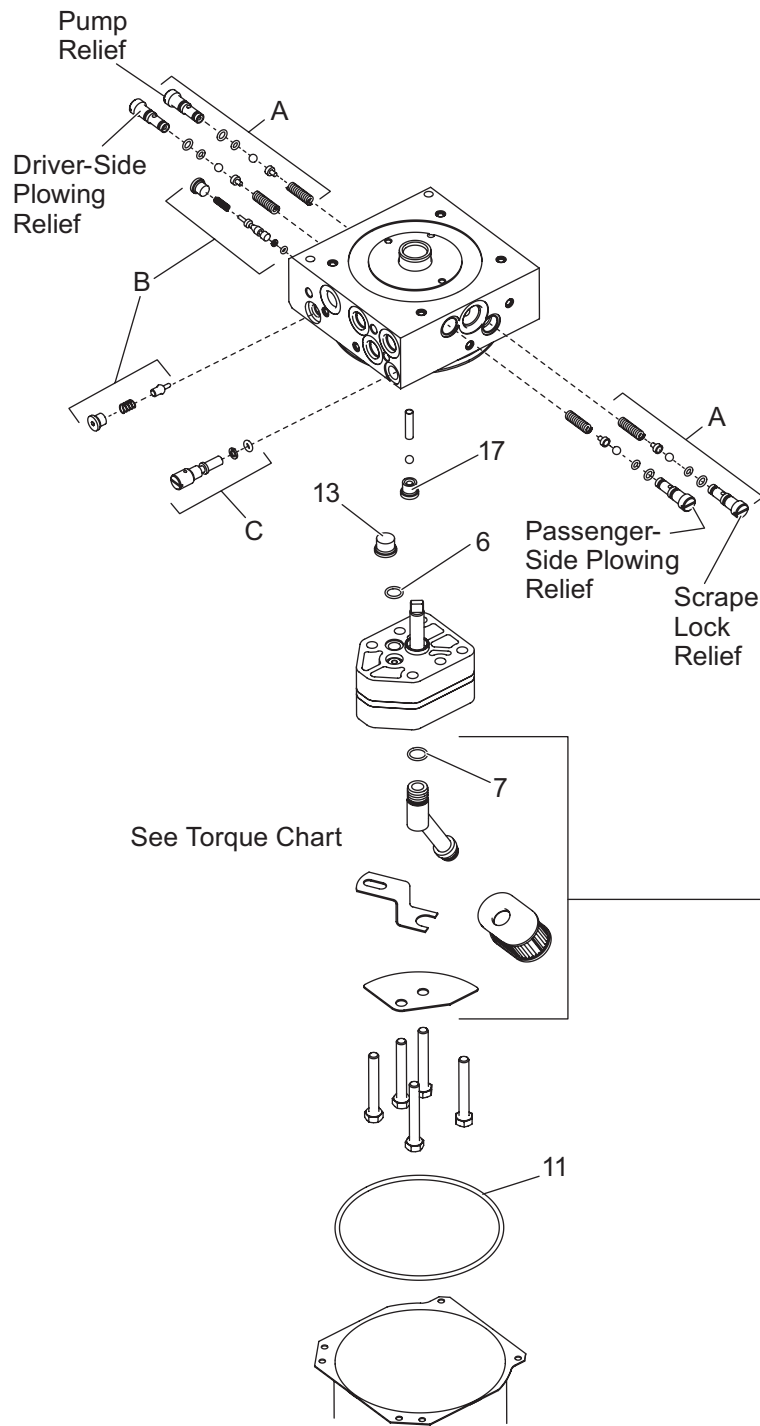
Relief Valve	No. of Turns Off (CCW) from Fully Seated	Approximate Relief Valve Pressure ( $\pm 50$ psi)
Pump Relief	2-1/4 to 2-1/2	2250**
Driver- & Passenger-Side Angle Ram Crossover Relief	1 to 1-1/4	4000

\*\* Install a tee in line with the passenger-side angle ram hydraulic hose and attach a 3000 psi gauge. Read the pressure at pump relief when holding the angle left function button. Adjust pump relief valve to obtain  $2250 \pm 50$  psi. Relieve pressure before adjusting.

### TORQUE CHART FOR Insta-Act® HYDRAULIC UNITS (Straight Blades Except HT Series™ Blades)

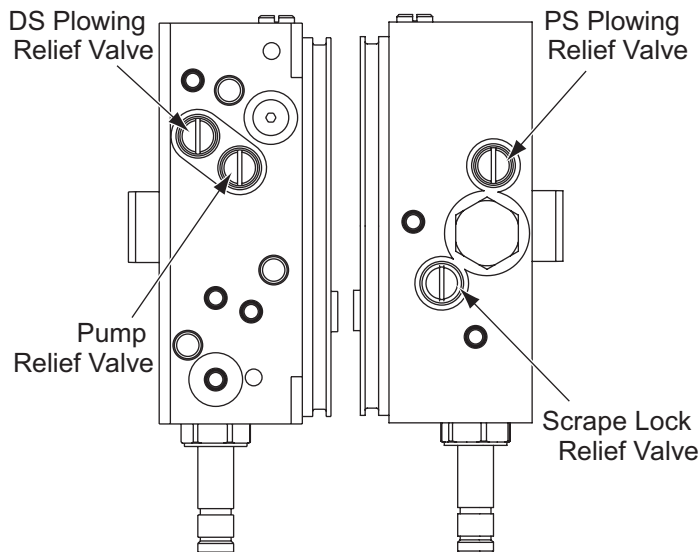
Straight Blades		
Location	Fastener Size	Torque (in-lb)
Pump Cap Screws	5/16-18 x 2-1/2 <b>with</b> Flat Washer <b>or</b> 5/16-18 x 2-1/4 <b>without</b> Flat Washer	150–160
Motor Terminals (+ and –)	5/16-18 or 5/16-24 Nut	50–60
Motor to Manifold Cap Screws	1/4-20 x 6-1/4	55–65
Reservoir Screws	#10-24 x 5/16	30–35
Valve Cartridges	7/8 Head Hex	120–144
Coil Nuts	3/4 Head Hex Jam Nut	40–60
Cartridge/Coil Cover Screws	#8-32 x 1/2	15–20
SAE O-Ring Plugs	1/8 or 5/32 Internal Hex	55–65
Manifold Mount Bolts	1/4-20 x 2-3/4	105–115

Insta-Act® HYDRAULIC UNIT PARTS DIAGRAM (HT Series™ BLADES)



Item	Part	Qty*	Description
1	25622	1	O-Ring -006
2	55371	3	O-Ring -008 (black)
3	25731	3	O-Ring -010
6	56274	1	O-Ring -013
7	56416	1	O-Ring -014
11	66519	1	O-Ring -250
12	26784	4	O-Ring -903
13	56569	1	O-Ring -906
14	56315	1	Backup -006
17	44343	1	O-Ring -904
19	48239	1	O-Ring -106
20	48240	1	Backup -106

\* Qty used for this application. Kit contains extra parts.



## RELIEF VALVE SERVICE

Apply one drop of low-strength threadlocker to all relief valve stems.

The spring for the scrape lock relief is different from the other springs and should not be interchanged.

## Passenger-Side and Driver-Side Plowing Relief Valve Adjustment:

Screw stem in until spring is fully compressed, then back out 1 to 1-1/4 turns for approximately 4000 psi angle ram relief.

### ⚠ WARNING

Do not stand between the vehicle and the blade or within 8 feet of a moving blade. A moving or falling blade could cause personal injury.

## Pump Relief Valve Adjustment:

Attach 3000 psi gauge in line with passenger-side ram. Adjust relief valve C to obtain 1650 psi pump relief pressure at full angle left. Relieve pressure before adjusting.

## Scrape Lock Relief Valve Adjustment:

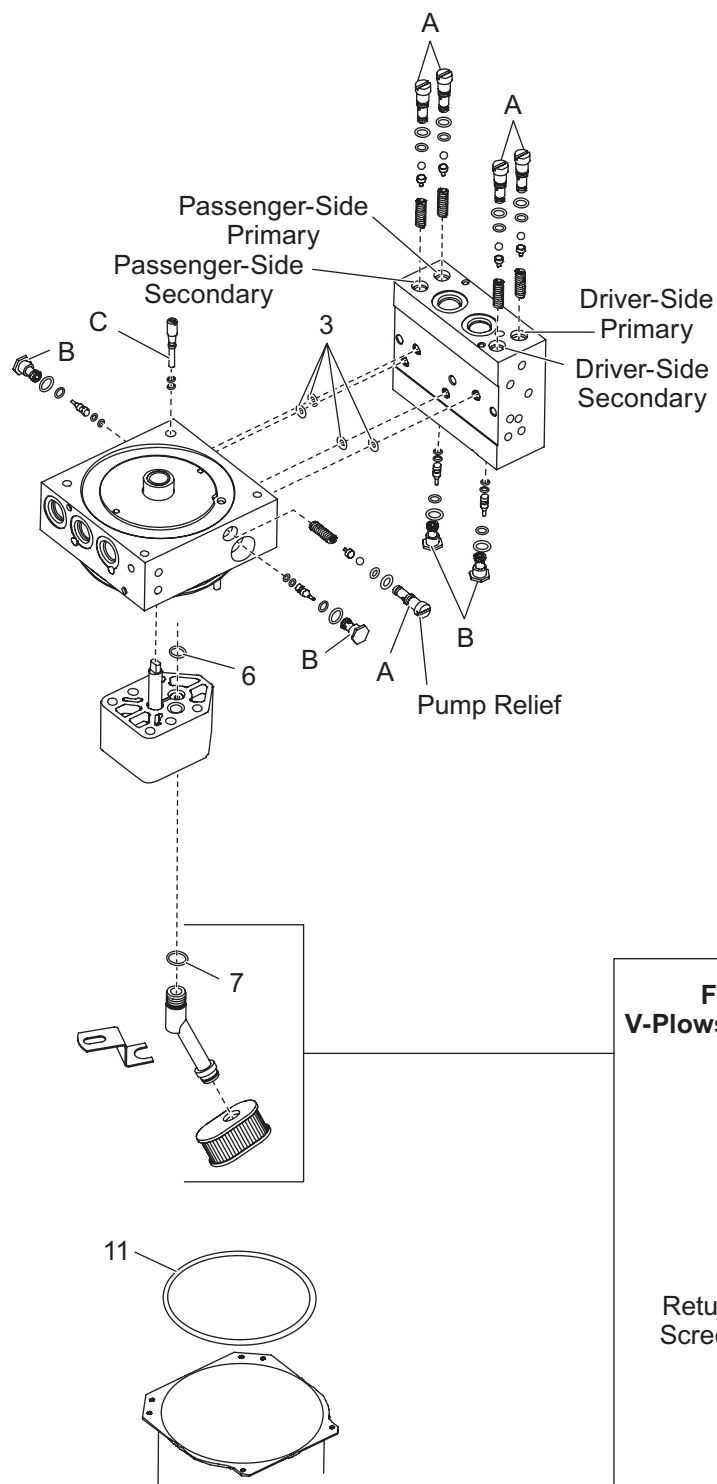
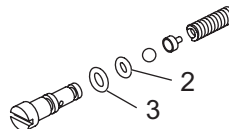
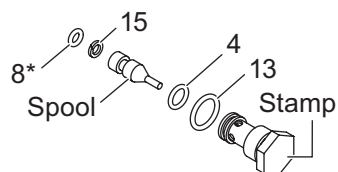
Attach 3000 psi gauge in line with base end of lift ram. Adjust relief valve D to obtain 275 psi while blade is being raised. Relieve pressure before adjusting.

## TORQUE CHART FOR Insta-Act® HYDRAULIC UNITS (HT Series™ Blades)

MUX Straight Blade w/Scrape Lock Hydraulic Unit Torque Chart		
Location	Fastener Size	Torque
Pump Cap Screws	5/16-18 x 2-1/4	150–160 in-lb
Motor Terminals (+ and –)	M6 Nut	25–35 in-lb
Motor to Manifold Cap Screws	M5 x .8	35–45 in-lb*
Reservoir Screws	#10-24 x 5/16	30–35 in-lb*
Solenoid Valves	7/8 Hex Head	19–21 ft-lb
Coil Nuts	3/4 Hex Head Jam Nut	48–60 in-lb
SAE O-Ring Plugs	1/8 or 5/32 Internal Hex	55–65 in-lb
Hydraulic Unit Mount Bolts	3/8-16 x 1	22–25 ft-lb
Check Valves	7/8 Hex Head	19–21 ft-lb
Motor Relay Small Terminals	10-32 Nut	15 in-lb max
Motor Relay Large Terminals	5/16-24 Nut	35 in-lb max
Motor Relay Mount Screws	1/4-20 x 5/8	75–85 in-lb
Plow Module Mount Screws	1/4-20 x 5/8	60–70 in-lb

\* Torque with low-strength threadlocker

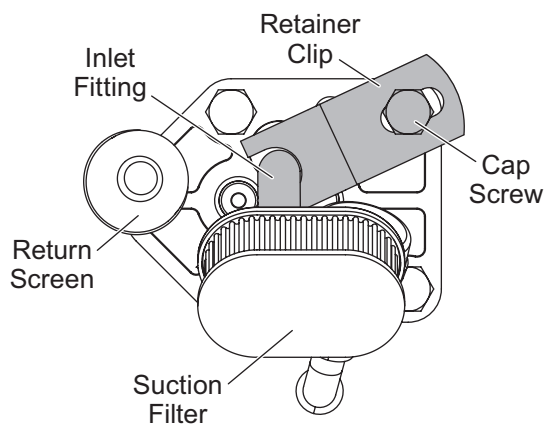
## EZ-V® Insta-Act® HYDRAULIC UNIT PARTS DIAGRAM

**Assembly A**  
RELIEF VALVE**Assembly B**  
PILOT-OPERATED  
CHECK VALVE

\*Early production used 55371 O-ring -008 (black). Replace with 56776 O-ring -008, red.

**Assembly C**  
QUILL

Set quill to block cross hole between 1/4 and 1/2.

**Filter and Pick-Up Tube Orientation**  
V-Plows with Vertically Mounted Hydraulic Unit

Item	Part	Qty*	Description
1	25622	1	O-Ring -006
2	55371	5	O-Ring -008 (black) 90 durometer
3	25731	9	O-Ring -010
4	66627	4	O-Ring -011 (Check Valves Stamped V4 and Lower)
	25730	4	O-Ring -012 (Check Valves Stamped V5 and Higher)
6	56274	1	O-Ring -013
7	56416	1	O-Ring -014
8	56776	4	O-Ring -008, red 70 durometer
11	66519	1	O-Ring -250
13	56569	4	O-Ring -906
14	56315	1	Backup -006
15	66628	4	Backup -008

\* Qty used for this application. Kit contains extra parts.

Assemble parts as shown and tighten relief valve stems until spring is fully compressed. Then, back off valve stem (rotate counterclockwise) the number of turns indicated in the chart.

Relief Valve	No. of Turns Off (CCW) from Fully Seated	Approximate Relief Valve Pressure (± 50 psi)
Pump Relief	2-1/4 to 2-3/4	1750**
Driver- & Passenger- Side Angle Ram Primary Relief	1-1/4 to 1-1/2***	3500
Driver- & Passenger- Side Angle Ram Secondary Relief	1 to 1-1/4***	4000

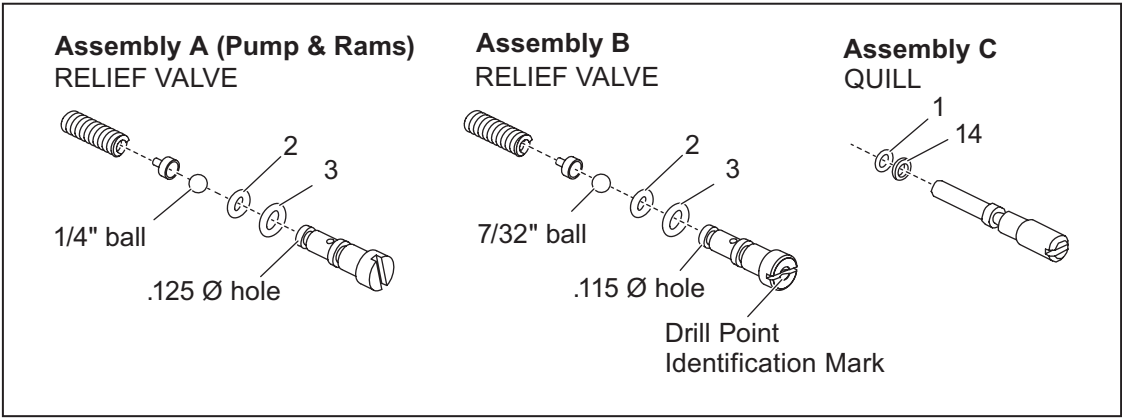
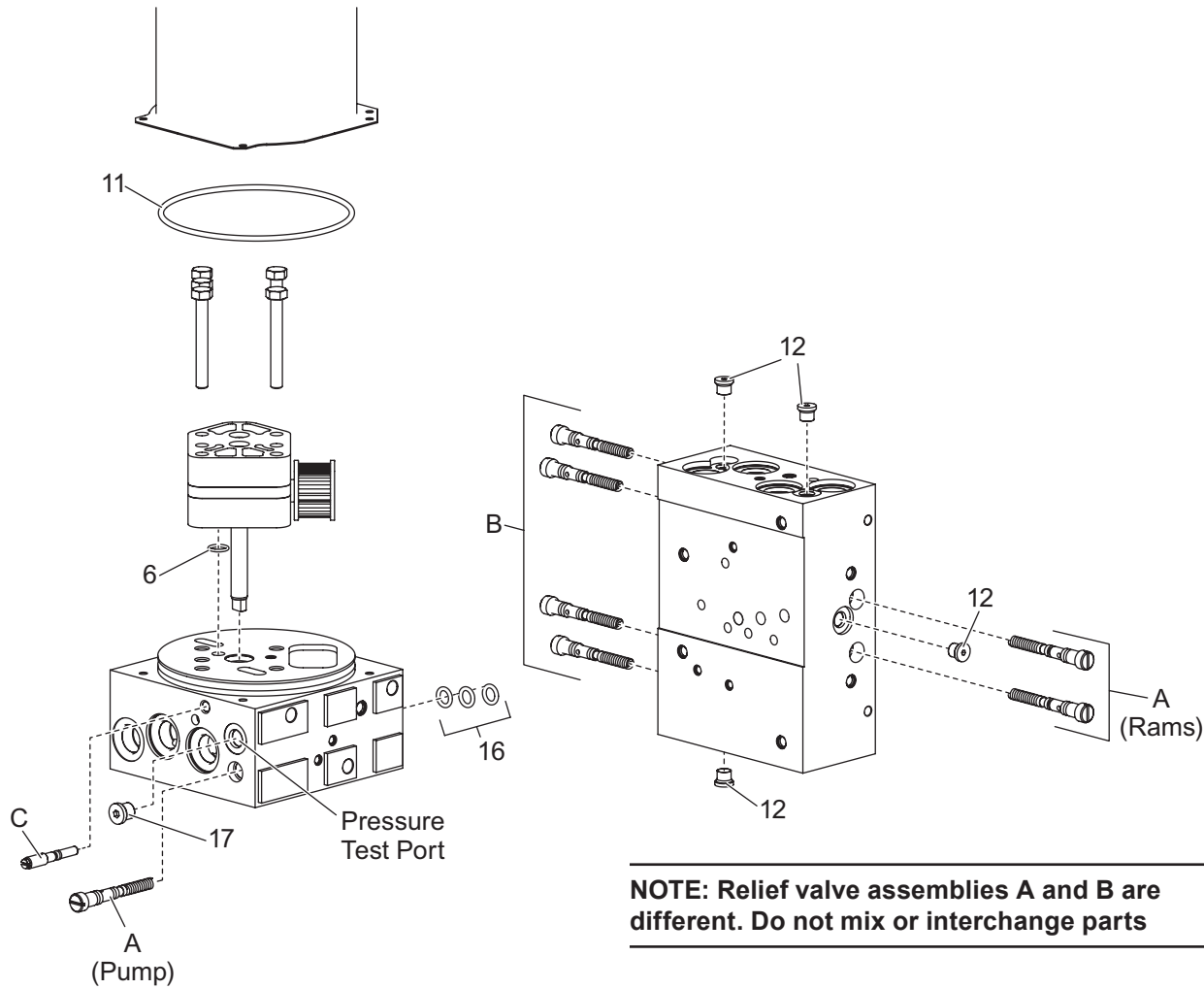
\*\* Install a tee in line with the passenger-side rod-end angle ram hydraulic hose and attach a 3000 psi gauge. Read the pressure at pump relief when holding the right retract function button. Adjust pump relief valve to obtain 1750 ± 50 psi. Relieve pressure before adjusting.

\*\*\* Be certain the ram primary relief valve stem is backed out 1/4 turn farther than the secondary relief valve stem.

## TORQUE CHART FOR EZ-V® Insta-Act® HYDRAULIC UNIT

EZ-V Blades		
Location	Fastener Size	Torque (in-lb)
Pump Cap Screws	5/16-18 x 2-1/2 <b>with</b> Flat Washer <b>or</b> 5/16-18 x 2-1/4 <b>without</b> Flat Washer	150–160
Motor Terminals (+ and –)	5/16-18 or 5/16-24 Nut	50–60
Motor to Manifold Cap Screws	1/4-20 x 6-1/4	55–65
Reservoir Screws	#10-24 x 5/16	30–35
Valve Cartridges	7/8 Head Hex	120–144
Coil Nuts	3/4 Head Hex Jam Nut	40–60
Cartridge/Coil Cover Screws	#8-32 x 1/2 Long	15–20
SAE O-Ring Plugs	1/8 or 5/32 Internal Hex	55–65
Manifold Mount Bolts	1/4-20 x 2-3/4	105–115
Check Valves	11/16 Hex Head	120–144
Secondary to Primary Manifolds	1/4-20 x 2-1/2	105–115

XtremeV™ Insta-Act® HYDRAULIC UNIT PARTS DIAGRAM





Item	Part	Qty*	Description
1	25622	1	O-Ring -006
2	55371	7	O-Ring -008 (black) 90 durometer
3	25731	7	O-Ring -010
6	56274	1	O-Ring -013
11	66519	1	O-Ring -250
12	26784	4	O-Ring -903
14	56315	1	Backup -006
16	29077	3	O-Ring -110
17	44343	1	O-Ring -904

\* Qty used for this application. Kit contains extra parts.

Relief valve B uses 7/32" ball and stem is marked with drill point in screwdriver slot.

Relief valves A and C use 1/4" ball and stems are unmarked. DO NOT MIX OR INTERCHANGE PARTS.

Adjustment. Screw stem in until spring is fully compressed and back out number of turns in chart.

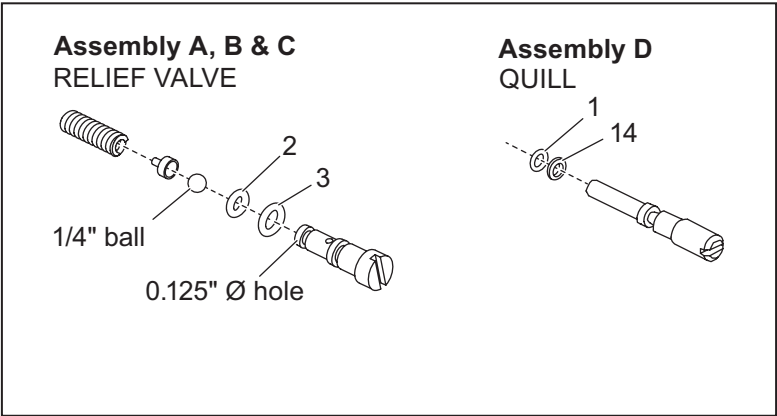
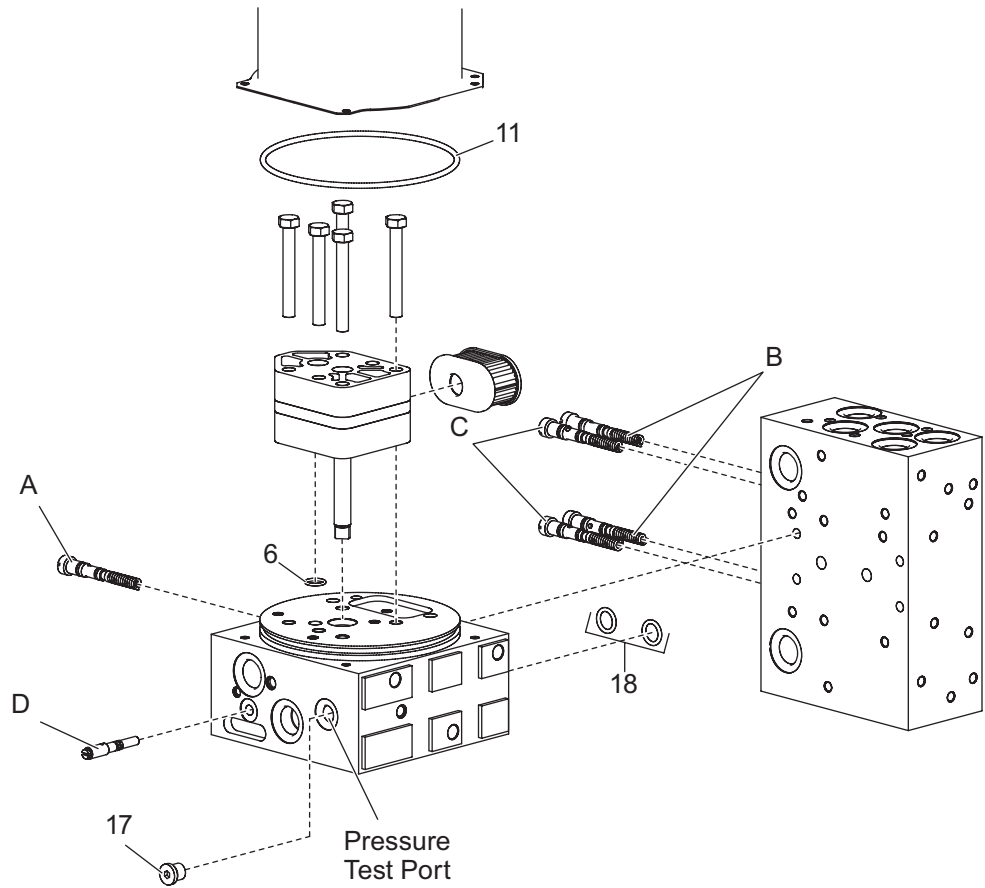
Relief Valve	No. of Turns Off (CCW) from Fully Seated	Approximate Relief Valve Pressure (± 50 psi)
A (rams)	1-1/4	3700
B	1-1/4	4600
A (pump)	2-1/2	2250**

\*\* Attach 3000 psi gauge to pressure test port above valve. Read pump relief pressure when holding the right retract button. Adjust pump relief valve to obtain 2250 ± 50 psi. Relieve pressure before adjusting.

## TORQUE CHART FOR XtremeV™ Insta-Act® HYDRAULIC UNIT

XtremeV Blades		
Location	Fastener Size	Torque (in-lb)
Pump Cap Screws	5/16-18 x 2-1/2	150–160
Motor Terminals (+ and –)	5/16-18 Nut	50–60
Motor to Manifold Cap Screws	1/4-20 x 6-1/4	55–65
Reservoir Screws	#10-24 x 5/16	30–35
Solenoid Valves	7/8 Head Hex	19–21 ft-lb
Coil Nuts	3/4 Head Hex Jam Nut	40–60
Cover Screws	1/4-20 x 1/2 Shoulder Screw	60–80
SAE O-Ring Plugs	1/8 or 5/32 Internal Hex	55–65
Hydraulic Unit Mount Bolts	3/8-16 x 1	25–33 ft-lb
Check Valves	7/8 Hex Head	19–21 ft-lb
Secondary to Primary Manifolds	1/4-20 x 3	10–13 ft-lb
Motor Relay Small Terminals	10-32 Nut	15 max
Motor Relay Large Terminals	5/16-24 Nut	35 max
Motor Relay Mount Screws	1/4-20 x 1/4	78–85
Plow Module Mount Screws	1/4-20 x 5/8	60–70

**XLS™ Insta-Act® HYDRAULIC UNIT PARTS DIAGRAM**



Item	Part	Qty*	Description
1	25622	1	O-Ring -006
2	55371	5	O-Ring -008 (black) 90 durometer
3	25731	5	O-Ring -010
6	56274	1	O-Ring -013
11	66519	1	O-Ring -250
14	56315	1	Backup -006
17	44343	1	O-Ring -904
18	55587	2	O-Ring -112 (spotted)

\* Qty used for this application. Kit contains extra parts.

Assemble parts as shown and tighten relief valve stems until spring is fully compressed. Then, back off valve stem (rotate counterclockwise) the number of turns indicated in the chart.

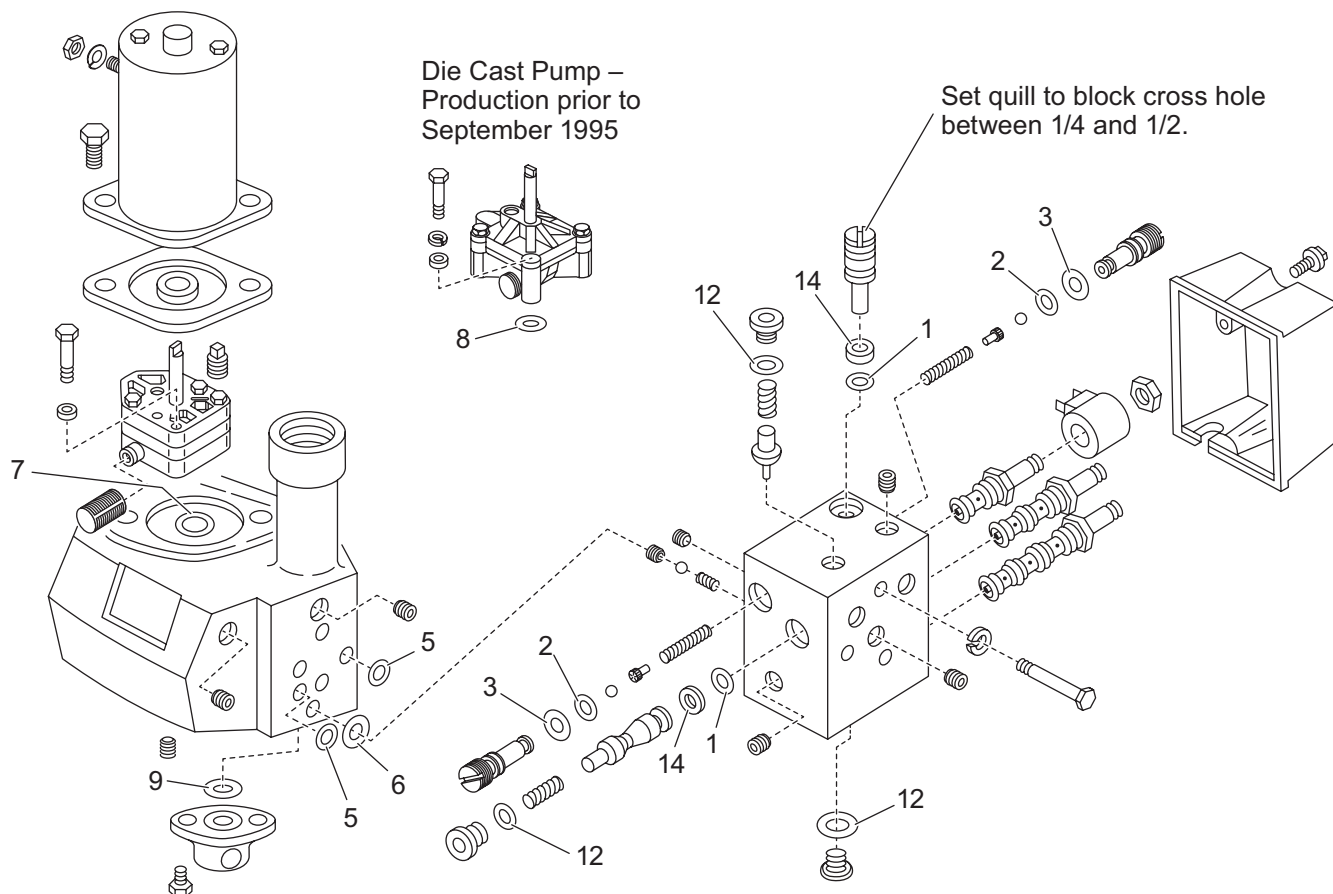
Relief Valve	No. of Turns Off (CCW) from Fully Seated	Approximate Relief Valve Pressure ( $\pm 50$ psi)
A	2-1/4	2250**
B	3-1/8	1500
C	3	1700

\*\* Attach 3000 psi gauge to pressure test port on face with coils. Read pump relief pressure when holding the angle right button. Adjust pump relief valve located on port side to obtain  $2250 \pm 50$  psi. Relieve pressure before adjusting.

## TORQUE CHART FOR XLS™ Insta-Act® HYDRAULIC UNIT

XLS Blades		
Location	Fastener Size	Torque (in-lb)
Pump Cap Screws	5/16-18 x 2-1/2	150–160
Motor Terminals (+ and –)	5/16-18 Nut	50–60
Motor to Manifold Cap Screws	1/4-20 x 6-1/4	55–65
Reservoir Screws	#10-24 x 5/16	30–35
Solenoid Valves	7/8 Head Hex	19–21 ft-lb
Coil Nuts	3/4 Head Hex Jam Nut	40–60
Cover Screws	1/4-20 x 1/2 Shoulder Screw	60–80
SAE O-Ring Plugs	1/8 or 5/32 Internal Hex	55–65
Hydraulic Unit Mount Bolts	3/8-16 x 1	25–33 ft-lb
Check & PO Check Valves	7/8 Hex Head	19–21 ft-lb
Secondary to Primary Manifolds	1/4-20 x 3	10–13 ft-lb
Motor Relay Small Terminals	10-32 Nut	15 max
Motor Relay Large Terminals	5/16-24 Nut	35 max
Motor Relay Mount Screws	1/4-20 x 1/4	75–85
Plow Module Mount Screws	1/4-20 x 5/8	60–70

## SEHP HYDRAULIC UNIT PARTS DIAGRAM



Item	Part	Qty*	Description
1	25622	2	O-Ring -006
2	55371	2	O-Ring -008 (black)
3	25731	2	O-Ring -010
5	25730	2	O-Ring -012
6	56274	1	O-Ring -013
7	56416	1	O-Ring -014
8	25620	1	O-Ring -115
9	5823	1	O-Ring -216
12	26784	3	O-Ring -903
14	56315	2	Backup -006

\* Qty used for this application. Kit contains extra parts.

See Torque Chart on the following page.

Assemble parts as shown and tighten relief (cushion) valve stems until spring is fully compressed. Then, back off valve stem (rotate counterclockwise) the number of turns indicated in the chart.

Angle Ram (Dia. x Stroke)	No. of Turns Off (CCW) from Fully Seated	Approximate Relief (Cushion) Valve Pressure (± 50 psi)
1-1/2" x 6"	1-3/4	2500
1-1/2" x 12"	1-3/8	3500
2" x 16"	1-3/8	3500

**TORQUE CHART FOR SEHP HYDRAULIC UNITS (Straight Blades Only)**

Location	Fastener Size	Torque (in-lb)
Base Lug	5/16-18 x 1-1/4	180–215
Pump	5/16-18 x 2-1/4 (Die Cast Pump only) or 5/16-18 x 2-1/2	175–185
Front or Rear Motor	7/16-14 x 1-1/4	180–240
Rear Motor	7/16-14 x 1-1/2	180–240
Valve Manifold	1/4-20 x 3-1/4	50–55
Motor Terminals (+ and –)	5/16-24 Nut	50–60
Cable Ground Bolt to Motor Frame	5/16-18 x 1/2	175–185
Valve Cartridges	7/8 Head Hex	120–144
Coil Nuts	3/4 Head Hex Jam Nut	48–50
Cartridge/Coil Cover Screws	#8-32 x 1/2	15–20
SAE O-Ring Plugs	1/8 or 5/32 Internal Hex	55–65

**Lift Ram Packing Nut Adjustment:** Tighten packing nut not more than 1/4 turn after you feel packing nut contact packing. Overtightening affects ram operation and packing life.

## HYDRAULIC HOSE AND FITTING INSTALLATION

**NOTE: Overtightening JIC hose fitting ends will result in a fractured fitting.**

**DO NOT** use any type of sealant or tape on the fittings or hoses. This could damage product. Always use two wrenches to ensure proper tightening of fittings and hoses.

### SAE O-Ring Style

#### Fittings

1. Turn jam nut on fitting as far back as possible.
2. Lubricate O-ring with clean hydraulic fluid.
3. Screw fitting into port by hand until the washer contacts port face and shoulder of the jam nut threads.
4. Unscrew fitting to proper position no more than one full turn.
5. Using two wrenches, hold fitting body in position and tighten jam nut until the washer again contacts port face, then tighten an additional 1/8 to 1/4 turn to lock fitting in place. Final torque on the jam nut should be approximately 20 ft-lb.

#### Hydraulic Hoses

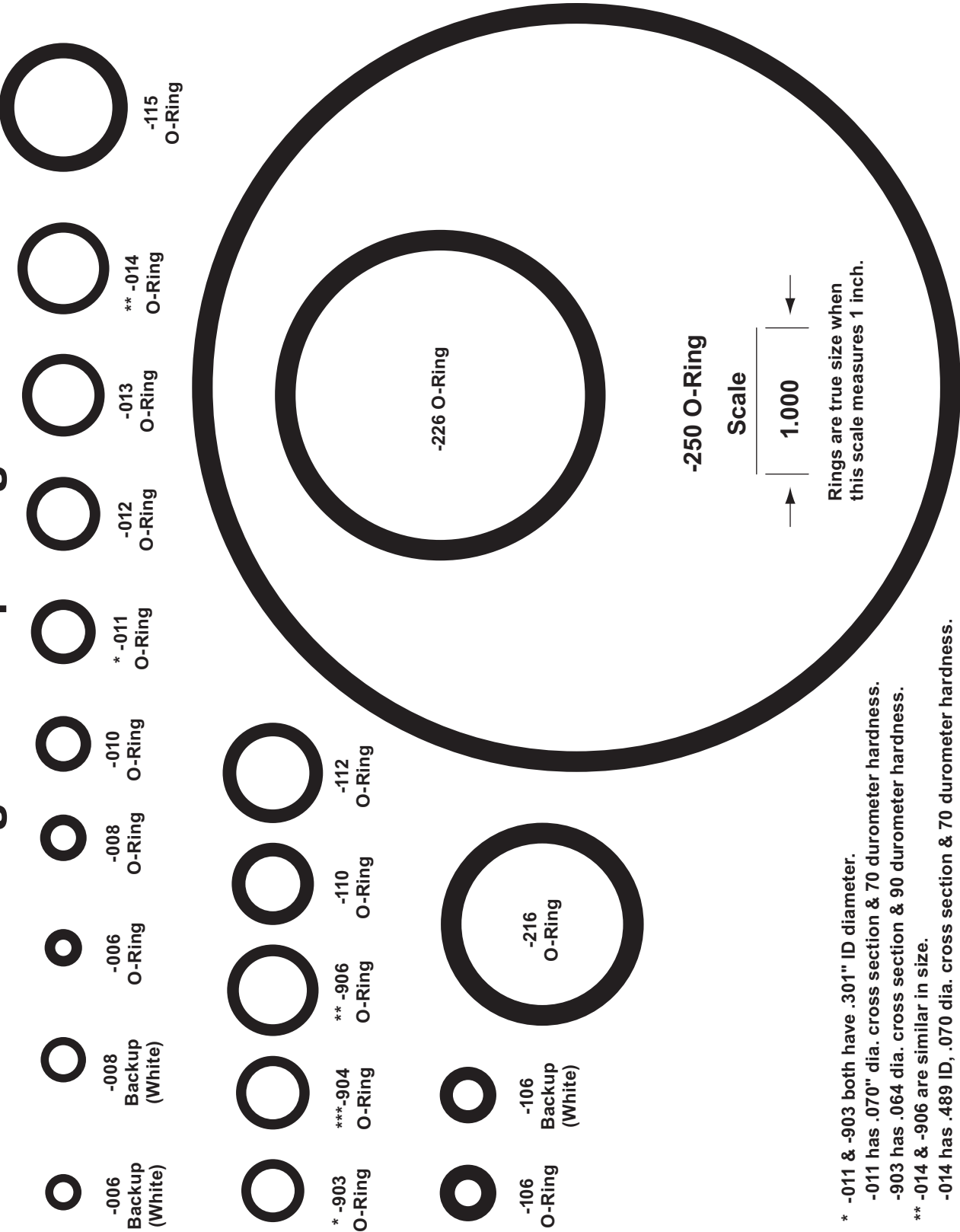
1. Screw flare nut onto fitting flare and hand tighten.
2. Align hose so there are no twists or sharp bends.
3. Using two wrenches, hold the hose in position and tighten flare nut 1/8 to 1/4 turn beyond hand tight. Final torque on the flare nut should be approximately 20 ft-lb.

### NPTF Pipe Thread Style

1. Screw fitting into female pipe port to the finger tight position.
2. Wrench tighten fitting to the appropriate turns from finger tight (TFFT) shown in chart stopping at the position where the joining tube can be attached. Avoid overtightening and then backing out the fitting to make the connection as this will likely result in a leaking or weeping connection.

Pipe Thread Size (NPTF)	TFFT
1/8-27	2.0–2.5
1/4-18	1.5–2.0
3/8-18	2.0–2.5
1/2-14	2.0–2.5
3/4-14 & Larger	1.5–2.0

O-Ring / Backup Ring Size Chart



\* -011 & -903 both have .301" ID diameter.  
-011 has .070" dia. cross section & 70 durometer hardness.  
-903 has .064 dia. cross section & 90 durometer hardness.  
\*\* -014 & -906 are similar in size.  
-014 has .489 ID, .070 dia. cross section & 70 durometer hardness.  
-906 has .468 ID, .078 dia. cross section & 90 durometer hardness.  
\*\*\* -012 & -904 are similar in size.  
-012 has .364 ID, .070 dia. cross section & 70 durometer hardness.  
-904 has .351 ID, .072 dia. cross section & 90 durometer hardness.

Copyright © 2014 Douglas Dynamics, LLC. All rights reserved. This material may not be reproduced or copied, in whole or in part, in any printed, mechanical, electronic, film or other distribution and storage media, without the written consent of Fisher Engineering. Authorization to photocopy items for internal or personal use by Fisher Engineering outlets or snowplow owner is granted.

Fisher Engineering reserves the right under its product improvement policy to change construction or design details and furnish equipment when so altered without reference to illustrations or specifications used. Fisher Engineering or the vehicle manufacturer may require or recommend optional equipment for snow removal. Do not exceed vehicle ratings with a snowplow. Fisher Engineering offers a limited warranty for all snowplows and accessories. See separately printed page for this important information. The following are registered (®) or unregistered (™) trademarks of Douglas Dynamics, LLC: EZ-V®, HT Series™, Insta-Act®, XLS™, XtremeV™.

**Printed in U.S.A.**

---