# CURTIS

# V-Plow Kit for UTV's 6'6" Wide Snow Plow p/n: 1UTVPV



# 

ISTALLATION & OWNER'S MANUAI

Heavy duty front springs or heavy duty spring damper assemblies are required when plow is installed on vehicle.

### NOTICE

It is recommended that when the plow is installed on the vehicle, ballast be placed in the rear of the vehicle to help counter balance the weight of the plow. Ballast may include a bed or tailgate mounted spreader (also available from Curtis Industries, LLC).

Approximate Installation Time *
Experienced Dealer Technician – 3 Hours
Average Dealer Technician – 4 Hours
Do-It-Yourself – 5 Hours

Weight: 400 lbs. (plow plus mount kit = 440 lbs.)

Plow Width: 6'-6" (78")

Plow Width at angle: 5' (60")

(\*=Not including accessories)

Note:

- These instructions are valid only for the plow kit. Please see separate instructions for the required mount kit.
- The contents of this envelope are the property of the owner. Leave with the owner when installation is complete.

Rev. B, 11/3/2016

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# WARNINGS, TIPS & REQUIRED TOOLS

Curtis plows feature an assembly of parts designed for your vehicle which require adjustment and alignment of components to accommodate vehicle variations. For accurate installation, proper operation, and years of satisfaction, please read and understand the installation and owner's manual fully prior to installing the plow.

From all of us at Curtis, we thank you for choosing our product.

## 

Curtis Cabs, blades and general accessories add additional weight to the base vehicle. All Curtis accessory weights are listed in product brochures. Deduct the accessory's total weight from the vehicle's rated capacity and never exceed the vehicle's rated capacity including driver and passenger.

#### **Exposure to Carbon Monoxide** can Cause illness, serious injury

or death. Never operate vehicle if suspicious of Carbon Monoxide. Inspect exhaust system for leaks monthly. Leaks can result from loose connections, corrosion, cracks or other damage to the exhaust manifold. If leaks are found, repair or replace exhaust system. Do not use vehicle until repair or

### WARNING: Serious injury or death:

- Never stand or ride on the plow assembly.
- Never operate the plow near pets or other people.
- Never leave the vehicle running unattended with plow attached.
- Never plow or carry plow at high speeds.
- Never clean or perform maintenance with plow raised.
- Never clean or service with plow in tripped condition.
- Never dislodge an obstruction with any part of the body.
- Warning This attachment affects the handling performance.
- Warning Before starting installation, park RTV in a flat area, ensure parking brake is engaged, and engine is turned off.

# **GENERAL INFORMATION BEFORE YOU START**

#### **HELPFUL HINTS:**

- Check carton contents prior to beginning installation.
- Work in an organized area large enough to fit vehicle and plow.
- Have the required tools ready to speed up the installation time.
- Have an assistant available to help move heavy parts and assemblies.
- The installation should be done by qualified personnel only.

### MAINTENANCE NOTES:

- Check and tighten all fasteners in the plow assembly and vehicle mounting after initial use and every 5 hours of use thereafter.
- After every 10 hours of use, lubricate all pivot bolts, pins, snap lock latches, and any other moving parts in the plow assembly with all-season grease.

**CAUTION:** Keep all connectors greased with dielectric grease on a regular basis to minimize corrosion & potential damage or wear to the pins. It is critical that all electrical connections be tight and secure. Loose connections on the plow circuit can cause overheating, component failure, or intermittent operation.

**CAUTION:** For safety reasons, the blade drops very slowly on the plow as shipped. To adjust the drop speed of the blade use a flat blade screwdriver and turn the lowering speed adjustment on the front of the hydraulic power unit counter clockwise. Turn it clockwise to slow the blade drop speed. Do this only while the blade is dropped, and tighten the jam nut after adjusting.

### **TOOLS REQUIRED:**

- Grease Gun
- Lithium Grease
- Dielectric Grease
- AW 32 Plow Oil

### **VEE BLADE HANDHELD CONTROL**

1. Turn the vehicle ignition switch to the ON position.

2. Turn the ON/OFF switch on the control to the ON position. The control keypad will glow green, indicating the control is on.

# NOTE: The ON/OFF switch can be used as an emergency stop when required.

3. Press the DOWN button for 2.5 seconds to engage the FLOAT mode. The FLOAT indicator light, located in the center of the keypad, will change from green to red. To cancel the FLOAT mode, momentarily press the UP button.

FLOAT mode will automatically cancel after 20 minutes, and the FLOAT indicator light will turn back to green. To restart FLOAT mode, repeat step 3.

#### **Blade Operation Time Outs**

All control functions automatically time out (shut off) after a period of time. This helps reduce wear on the pump motor and prevent unnecessary battery drain. All functions will time out after 6 to 8 seconds.

#### Automatic Shutdown

After being idle for approx. 22 minutes, the control will automatically turn off and the indicator light located at the center of the keypad will blink from red to green. To restart the control, turn the control OFF (ON/OFF switch) and then back ON.

### Soft Stop

The Control automatically allows the blade to coast to a soft stop. This results in smoother operation and decreased wear on the plow's hydraulic system.

### Double Tap (UP & FLOAT)

A quick Double Tap of the UP button will automatically raise the plow for 2.6 seconds.

A quick Double Tap of the DOWN button will automatically engage FLOAT (WARNING: Plow will immediately drop to the ground when Double Tapping the DOWN button).

NOTE: The Double Tap feature does not replace the normal operation (Press & Hold) of the UP & DOWN buttons, it is an added feature designed to enhance the performance of the control.



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### \Lambda WARNING

TO PREVENT ACCIDENTAL ACTIVATION OF PLOW,TURN PLOW OFF WHEN NOT IN USE

### **U-SET (User Settings) FEATURE**

This feature allows the user to customize features on this control to their own preferences. Customizable features include:

- \* Soft Stop
- \* Quick Float

Disclaimer: The manufacturer of this control is NOT responsible for any damage or injury caused by the use of these customizable features. By changing the settings on the control, you take on all of the liability.

#### Soft Stop

The standard configuration (out of the box) for this control includes Soft Stop. This feature provides smooth operation and reduces wear on the plow's hydraulic system. At times, a plow operator may prefer the plow to have quicker and more precise movements. Follow the instructions below to toggle the Soft Stop feature OFF & ON.

1. Turn the control to the OFF position.

2. PRESS and HOLD the "DOWN" button, then turn the control to the ON position. When the indicator light in the center of the keypad flashes BLUE, RELEASE the "DOWN" button. (You are now in programing mode and the control will not operate the plow)

3. PRESS the "R" or "RIGHT" button once, the indicator light will turn to GREEN. PRESS the "R" or "RIGHT" button again, the indicator light will turn to RED. The indicator light will toggle between GREEN and RED every time you press the "R" or "RIGHT" button.

GREEN = Soft Stop - ON

RED = Soft Stop - OFF

4. Once the indicator light is set correctly (GREEN or RED), PRESS the "UP" button one time. The indicator light will flash BLUE and your chosen setting is now programed.

5. PRESS the "DOWN" button to exit programing mode. The keypad will glow GREEN and your control is ready to use. Test the control to ensure proper changes were made.

#### **Quick Float**

The standard configuration (out of the box) for this control does not include the Quick Float feature. This feature reduces operating time by dropping the plow immediately into FLOAT with one touch of the DOWN button. This eliminates the need to hold the DOWN button for the given time to engage FLOAT. Follow the instructions below to toggle the Quick Float feature ON & OFF.



1. Turn the control to the OFF position.

2. PRESS and HOLD the "DOWN" button, then turn the control to the ON position. When the indicator light in the center of the keypad flashes BLUE, RELEASE the "DOWN" button. (You are now in programing mode and the control will not operate the plow)

3. PRESS the "L" or "LEFT" button once, the indicator light will turn to GREEN. PRESS the "L" or "LEFT" button again, the indicator light will turn to RED. The indicator light will toggle between GREEN and RED every time you press the "L" or "LEFT" button.

GREEN = Quick Float - OFF

RED = Quick Float - ON

4. Once the indicator light is set correctly (GREEN or RED), PRESS the "UP" button one time. The indicator light will flash BLUE and your chosen setting is now programed.

5. PRESS the "DOWN" button to exit programing mode. The keypad will glow GREEN and your control is ready to use. Test the control to ensure proper changes were made.

# **PLOW ASSEMBLY & INSTALLATION**

#### STEP 1: (Plow Assembly)

Curtis V-Plow snowplows are shipped almost completely assembled to minimize the amount of time from box to plowing. The illustrations are representative only and may differ from your hardware. Please see the parts diagrams for specific part numbers.

**1.1.** Attach the chain lift to the upper lift frame and lift cylinder using two 7/8" x 4" clevis pins and cotter pins.

**1.2**. Attach the moldboards to the lift frame kit using the hinge pin, washer, and cotter pin as shown. Check that the moldboards rotate freely around the hinge pin.

**1.3**. Install the two cylinder rods to each moldboard half with the clevis pins, washers and cotter pins as shown.

1.4. Install the blade guides using the included hardware kit.

**1.5.** Grease the seven hinge pin tubes using a needle style grease gun tip. The grease hole is located in the front of each hinge pin tube.

1.6. Adjust the center cutting edges. The gap between the two cutting edges should be between 1/4" - 3/8".



ltem	Description
1	LIFT FRAME ASSY
2	MOLDBOARDS
3	HINGE PIN KIT
4	CLEVIS PIN, 7/8" X 4" LG
5	CHAIN LIFT
6	BLADE MARKER KIT

# **PLOW ASSEMBLY & INSTALLATION**

#### STEP 2: (Harness Installation)

The plow side control harness has been preinstalled. The vehicle side control harness is routed through the grille, by the battery, and through the firewall to the controller. It is preferable when possible to keep the plow connector on the driver's side to make mount/dismount easier and faster. See the Control Harness Diagram below for routing.

**2.1.** Route the CONTROL HARNESS through the vehicle grille, by the battery, and through the firewall. Some vehicles will require drilling a  $\emptyset$ 1.50" hole through the firewall, while some will have holes provided (usually plugged). Check your vehicle Owner's Manual for details. If the hole is drilled, it is critical that a grommet be used to prevent damage to the wire harness.

**2.2.** Mount the MOTOR RELAY in a convenient and secure location on the battery side of the vehicle using the included self tapping screws.

**2.3.** The small RED WIRE from the CONTROL HARNESS is connected to a small terminal of the MOTOR RELAY.

**2.4.** The small BLACK WIRE from the CONTROL HARNESS has two leads – one is connected to the other small terminal of the MOTOR RELAY. The other is connected directly to vehicle/chassis ground.

**2.5.** The large (4 gage) BLACK WIRE on the CONTROL HARNESS must be connected directly to the NEGATIVE (-) battery terminal. A BATTERY TERMINAL ADAPTER may be required.

**2.6.** The large (4 gage) RED WIRE on the CONTROL HARNESS is connected to one of the large terminals on the MOTOR RELAY.

**2.7.** The shorter red BATTERY CABLE is used to connect the other large terminal of the MOTOR RELAY with the POSITIVE (+) terminal on the battery. A BATTERY TERMINAL ADAPTER may be required.

2.8. The CONTROLLER CONNECTOR is routed through the firewall.

**2.9.** Connect the handheld controller and locate in a convenient location for the operator using the included mounting bracket or Velcro.

**2.10.** Male spade connectors on the BLACK and RED/WHITE wires are not used in this application and should be taped/covered.



# **PLOW MOUNTING / DISMOUNTING**

### SNOWPLOW MOUNTING

- 1. Check that the pins are fully retracted. The foot pedal should be pushed towards the truck and will lock in the retracted position.
- 2. Drive in to the plow so that the cross bar on the mount engages with the receiver notch on the plow.
- 3. Pull the foot pedals away from the truck to release the pins.
- 4. Push up on the lift frame to engage the pins. To verify the lift frame is fully connected, check to see that the yellow-plated pins are visible from each side. Insert the lock pin through the foot pedal and pedal linkage.
- 5. Connect the hydraulic control connectors.

### SNOWPLOW DISMOUNTING

- 1. Put the plow in float by holding the down button for (1) second.
- 2. Press down on the chain lift to retract the lift cylinder. The chain must have slack for ease of plow removal.
- 3. Push on the foot pedals and the lift frame towards the vehicle simultaneously. The pins will retract and the lift frame will rotate forward to rest on A-frame.
- 4. Disconnect the hydraulic connectors.
- 5. Back away from the snowplow.





MOUNTED PLOW

DISMOUNTED PLOW

# PLOW STORAGE, MAINTENANCE, & TIPS

### STORAGE

- 1. Before disconnecting the plow from your vehicle, using the handheld controller, fully compress the lift cylinder by pressing the down button.
- 2. Disconnect the plow from your vehicle
- 3. Coat all electrical connection points with dielectric grease
- 4. Repair/touch up any chipped paint or rusted areas
- 5. Apply a coat of oil or grease to all exposed chrome (on angle and lift cylinders)
- 6. Grease all grease fittings on trip pins and king pin

### **REMOVAL FROM STORAGE**

- 1. Check all fasteners and hydraulic fittings for tightness.
- 2. Replace any cracked hydraulic hoses
- 3. Coat all electrical connection points with dielectric grease
- 4. Connect plow to vehicle

#### MAINTENANCE

The Curtis V-Plow has been designed for reliable service. In order to ensure the reliability of your plow, observe the following maintenance items and regularly inspect:

- Fasteners and retaining devices for proper installation and tightness.
- Hydraulic cylinders for damage, pitting, or leakage.
- Hydraulic hoses for wear, damage or leakage. Replace any damaged hose.
- All electrical connections for corrosion apply dielectric grease as required.
- Cutting edge wear.
- Grease fittings (2x trip pins and king pin).

### HYDRAULIC SYSTEM

- All Curtis plows use Curtis brand Hi-Performance Snowplow Oil (p/n: 1TBP123) available from Curtis dealers.
- The reservoir should be filled through the top port until oil reaches the top.
- Recheck and tighten all fittings and valves every season or as necessary. Vibration due to normal use can cause fittings to loosen.
- Loctite or Teflon tape should not be used on any fittings or hoses. The only plugs where pipe sealant may be used are the reservoir plugs.
- The reservoir should be drained and refilled every season to ensure that the oil remains free of water and contaminants. If contaminants are known to be present, it is recommended that the reservoir be removed and cleaned.

With proper maintenance and care, your Curtis snow plow will provide years of trouble free service!

### **PLOWING TIPS**

- Know the area you are plowing. Be aware of all hidden obstacles (pipes, drains, berms, etc.)
- Plow with the storm, do not let snow accumulate
- Always lower the plow blade when parking to minimize the risk of the plow dropping and to reduce the load on the truck suspension.
- When driving the vehicle with the plow installed and in the up position, monitor coolant temperature. If the vehicle is running hot, adjust the plow position to allow additional airflow to the radiator.
- Plowing at high speeds increases the potential for damage to your plow AND your vehicle.

# TROUBLESHOOTING

Disconnect the RELAY MODULE CONNECTOR for the following steps. The controller will not detect most electrical faults with the relay module connected.

Symptom / Diagnostic	Result	Solution						
PUMP MOTOR NOT RUNNING WHEN UP, LEFT, OR RIGHT PRESSED								
Status light blinks ONCE	Continuity problem	Check RED WIRE / MOTOR RELAY						
Check voltage at MOTOR terminals with UP, LEFT, or RIGHT buttons pressed	If voltage present - MOTOR is faulty	Replace MOTOR						
Check cable continuity between MOTOR RELAY and MOTOR	If no continuity, check cable, connections, and replace if necessary	Repair / replace cable or connections						
Check control signal to MOTOR RELAY (small wires to motor relay) with UP, LEFT, or RIGHT buttons pressed	If voltage present and no click is heard when buttons are pressed, MOTOR RELAY is faulty	Replace MOTOR RELAY						
Check ground continuity between control ground at MOTOR RELAY and battery ground	If no continuity, check cable, connections, and replace if necessary	Repair / replace cable or connections						
PLOW WILL NOT MOVE AT ALL, MOVE	ES SPORADICALLY, VERY SLOWLY, OF	R CHATTERS						
Check fluid level in reservoir	Fluid should be visible from fill cap-reservoir should be ~3/4 full	Add fluid						
Air in fluid	Bleed air from system	Slightly loosen fittings to angle cylinders and angle the plow. Tighten fittings while fluid is escaping. Do this over an absorbent mat, or hold a rag over fitting to absorb excess fluid.						
OIL IS LEAKING FROM CYLINDERS								
	Packing is loose	Tighten gland until leak stops						
	Rods are pitted	Polish rods with fine steel wool						
OIL SPRAYS OUT OF VENT PORT IN P	OWER UNIT							
Air in fluid	Bleed air from system	Slightly loosen fittings to angle cylinders and angle the plow. Tighten fittings while fluid is escaping.						
Check fluid level	Fluid should be visible in elbow fitting	Remove fluid if necessary - in most cases the problem will subside as entrapped air dissipates.						
PLOW WILL NOT DROP								
Status light blinks 8 times	Continuity problem	Check PURPLE WIRE/S1B COIL						
Check voltage at S1B VALVE coil	If no voltage present, check cable and connections.	Replace/repair cable or connections						
Check DROP SPEED control valve	DROP SPEED valve should be several turns from fully closed	Open DROP SPEED valve						
Check S1B VALVE for contamination	Poppet must move freely, and seat area must be clear of any debris	Remove S1B VALVE and check free movement of poppet. Clean any chips/debris from poppet seat. Replace, if necessary.						
Check LIFT LOCK valve for contamination	Poppet must move freely, and seat area must be clear of any debris	Remove LIFT LOCK valve and check free movement of poppet. Clean any chips/debris from poppet seat. Replace, if necessary.						
PLOW WILL NOT LIFT								
Status light blinks 2 times	Continuity problem	Check BLUE WIRE/S1A COIL						
Check voltage at S1A VALVE coil	If not voltage present, check cable and	Replace/Repair cable or connections						

# **TROUBLESHOOTING - CONTINUED**

Symptom / Diagnostic	Result	Solution								
PLOW WILL NOT LIFT - CONTINUED										
Check S1A VALVE for contamination	Poppet must move freely, and seat area must be clear of any debris	Remove S1A VALVE and check free movement of poppet. Clean any chips/debris from poppet seat.								
LEFT OR RIGHT WING WILL NOT EXTEND										
Status light blinks 5 times	Continuity problem	Check BLUE/WHT WIRE/S4 and S5 COILS								
Check voltage at S4 (LEFT) or S5 (RIGHT) VALVE coil	If no voltage present, check cable and connections.	Replace/repair cable or connections								
Check S4/S5 VALVE for contamination	Poppet must move freely, and seat area must be clear of any debris	Remove S4/S5 valve and check free movement of poppet. Clean any chips/debris from poppet seat. Replace, if necessary.								
LEFT OR RIGHT WING WILL NOT RET	RACT									
Status light blinks 6 times	Continuity Problem	Check GRN/WHT WIRE/S7 VALVE								
Status light blinks 7 times	Continuity Problem	Check ORG/WHT WIRE/S6 VALVE								
Check voltage at S6 (LEFT) or S7 (RIGHT) VALVE coil	If no voltage present, check cable and connections.	Replace/repair cable or connections								
Check S6/S7 VALVE for contamination	Poppet must move freely, and seat area must be clear of any debris	Remove S6/S7 VALVE and check free movement of spool. Clean any chips/debris from valve. Replace, if necessary.								
ANGLE LEFT AND ANGLE RIGHT DO I	NOT FUNCTION									
Check voltage at S8 VALVE coil	If no voltage present, check cable and connections.	Replace/repair cable or connections. Confirm BLUE/BLK wire at S8 VALVE. Replace RELAY MODULE.								
Check S8 VALVE for contamination	Poppet must move freely, and seat area must be clear of any debris	Remove S8 VALVE and check free movement of spool. Clean any chips/debris from valve. Replace, if necessary.								
PLOW DRIFTS WHILE PLOWING SNO	N									
Air in fluid	Bleed air from system	Slightly loosen fittings to angle cylinders and angle the plow. Tighten fittings while fluid is escaping.								
Check CHECK VALVES for contamination	Poppet must move freely, and seat and piston must be clear of any debris	Remove CHECK VALVES and clean								
Check RELIEF valves for contamination	Poppet must move freely, and seat area must be clear of any debris	Remove RELIEF VALVES and clean								
WINGS SCOOP WHEN RIGHT OUT IS F	PRESSED									
Status light blinks 3 times	Continuity Problem	Check GRN WIRE/S2A AND B COIL								
Check S2A and S2B VALVES for contamination										
Problem goes away when relay module is disonnected	Relay module is faulty	Replace RELAY MODULE								
WINGS SCOOP WHEN LEFT OUT IS PRESSED										
Status light blinks 4 times	Continuity Problem	Check ORG WIRE/S3A AND B COIL								
Check S3A and S3B VALVES for contamination										
Problem goes away when relay module is disconnected	Relay module is faulty	Replace RELAY MODULE								





Harness Diagram

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# PARTS LIST

Item	Part Number	QTY	Description	Item	Part Number	Qty	Description
1	16101180	1	Hinge Pin Kit	72	16153100	1	Hose, 18
2a	16101202	1	Spring, Torsion Trip, DS	73	16153170	2	Hose, 1/4in X 45in
2b	16101203	1	Spring, Torsion Trip, PS	74	16154310	2	Cylinder, 8
3	16101240	2	Spring Retainer Kit	75	16154220	1	Cylinder, 6 Polypak
4	16102144	6	Clevis Pin Kit, 1	76	16151326	1	Vent
5	16101242	2	Torsion Tube	77	16152330	4	Check Valve
8	16102110	2	Clevis Pin Kit	79	16152332	1	Plug, BSPP
12	16102142	4	Clevis Pin Kit	85	16160300	1	Truckside Control Harness
14	16103000	1	Chain, Grade 43, 24 Links	85	16160310	1	Bepair End
15	16103020	1	U-bolt Kit	87	16160402	1	Large Spring Cage Kit -2
16	16110140	1	Lift Frame Assembly	87	16160404	7	Small Spring Cage
16	16112140	1	Lift Frame Weldment	97	16160512	1	Grill Connector Can
17	16111151	2	Lock Pin Kit, MD	07	10100512	1	
17	16112102	2	Lock Pin	87	16161400B	1	Plow Harness
18	16112104	2	Mount Spring	88	16160410	1	Motor Helay
18a	16102104	2	Washer, 1in	89	16160500	1	Battery Cable
22a	16111113	2	Foot Pedal	93	16161420B	1	Ground Harness
23a	16111111	2	Pedal Linkage	94	16161430	1	S8 Harness
24	16113240	1	Aframe	95	16160448	1	Relay Module
32a	16111124	2	Snapper Pin, 2-1/2in	98	1HHV-U	1	Hand Held Controller
34	16120860	2	Cutting Edge, 26-1/2 x 1/4	99	16153180	2	Hose, 1/4in x 42in
35	16120114	1	Cutting Edge Hdw Kit, 5/8-11, 14 pcs	101	16101001	2	Screw, Hex Head SST
37	16120110	1	Moldboard Skin Hardware Kit	103	16101003	2	Screw, Hex Head 16 x 2.5
40	16122100	1	Blade Guide Kit	106	16101006	4	Nut, Nylock, SST
41	16122250	1	Moldboard Weldment, DS	107	16101007	6	Washer, SST
43	16120842	1	Center Cutting Edge, DS	112	16111118	2	Roll Pin, 2
44	16120852	1	Center Cutting Edge, PS	112a	16111126	2	Clevis Pin Kit
47	16122254	1	Trip Angle, DS	113	16101016	2	Stud
40	16122250	1	Moldboard Woldmont BS	114	16101017	2	Screw, Hex Head
49 50	16152040	1	Top Block Accomply, VMD//XE	115	16101018	2	Washer, Lock
50	16152040	1	Top Block Assembly, VMD/VXF	116	16101019	2	Nut. Serrated Flange
50	16152102	1	Top Block to Center Block O-ring Kit	180	16152334	4	Angle Belief Valve 3000 PSI
51	16151100	1	Gear Pump	183	16151312	8	Solenoid Valve, 2-way, Normally Closed
51	16159116	1	Shaft Seal	192	16150102	Q	Soal Kit
52	16151102	1	Inlet Strainer w/Elbow	100	16150102	0	Soroon
53	16152004	1	Spline Coupler	183	10154000	ъ С	
54	16151110	1	Reservoir Kit	184	10151330	2	Solenoid Valve, 2-way, Normally Open
5. F1	10151114		Reservoir Fastener Kit (4 Cap Screws; 8 Flat	184	16159102	2	
54	101501114	1	washers)	185	16152336	10	Coll, 8 size, Flying Leads
04 55	16151110	1	RESERVOIL SEAL NIL	186	16152340	1	Solenoid Valve, 2-way, Normally Closed Bidirectional
00 55	10151112	2	r iug, 42437 INF I Boliof Diug	186	16159109	1	Seal Kit
56	16151200	1	Motor 2HP	187	16152342	1	Coil, 10 size, Dual Spade
50	16151200		Main Relief Valve	189	16151321	1	Elbow, -4 JICM/JIC Swivel
60	16152010	1	Center Block No Valves VMD//YE	190	16152346	4	Elbow, -6 SAEM/JICM
61	16151308	1	Lift Check Valve	191	16152120	1	HPU Top Cover, HV/HX
61	1600010	I	Lift Check Removal Tool	193	16152124	1	HPU PS Front Cover, HV/HX
62	16151310	1		194	16152126	3	Thumb Screw
62	16152016	ی د	Plug -2 SAF	195	16152128	1	Cable Grommet
64	16152010	20 1		196	16152130	1	Tray
67a	16151325	1	Connector4 SAEM/JICM	ACC	1TBP123	1	Hi-Performance Snowplow Oil, (1 case with 12 quarts)
u/d	10101020	I					ensimance ensupion on, (1 base with 12 qualts)

## **BOLT TORQUE**

#### GENERAL TORQUE SPECIFICATION TABLE

Use the following torques when special torques are not given. These values apply to fasteners as received from suppliers, dry, or when lubricated with normal engine oil. They do not apply if special graphited or moly disulphide greases or other extreme pressure lubricants are used. This applies to both UNF and UNC threads. Remember to always use grade five or better when replacing bolts.

SAE G	rade No.	2			5			8*						
Bolt head id mark as per	entification grade.		4	<u>-</u>		D				0				
NOTE: Man Marks Will V	ufacturing ary					$ \begin{array}{c} & \\ & \\ & \\ \end{array} \end{array} $								
			TOR	RQUE TORQUE					TOF	QUE				
Bolt	Size	Pound	ls Feet	Newto	n-Meters	Pound	ls Feet	Newton	-Meters	Pound	ls Feet	Newton-Meters		
Inches	Millimeters	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	
1/4	6.35	5	6	7	8	9	11	12	15	12	15	16	20	
5/16	7.94	10	12	14	16	17	20.5	23	28	24	29	33	39	
3/8	9.53	20	23	27	31	35	42	48	57	45	54	61	73	
7/16	11.11	30	35	41	47	54	64	73	87	70	84	95	114	
1/2	12.70	45	52	61	70	80	96	109	130	110	132	149	179	
9/16	14.29	65	75	88	102	110	132	149	179	160	192	217	260	
5/8	15.88	95	105	129	142	150	180	203	244	220	264	298	358	
3/4	19.05	150	185	203	251	270	324	366	439	380	456	515	618	
7/8	22.23	160	200	217	271	400	480	542	651	600	720	814	976	
1	25.40	250	300	339	406	580	696	787	944	900	1080	1220	1464	
1-1/8	25.58	-	-	-	-	800	880	1085	1193	1280	1440	1736	1953	
1-1/4	31.75	-	-	-	-	1120	1240	1519	1681	1820	2000	2468	2712	
1-3/8	34.93	-	-	-	-	1460	1680	1980	2278	2380	2720	3227	3688	
1-1/2	38.10	-	-	-	-	1940	2200	2631	2983	3160	3560	4285	4827	
	*Thick Nuts must be used with Grade 8 bolts													

#### METRIC BOLT TORQUE SPECIFICATIONS

	T	T				$\smile$ $\langle$	
			Course Thread				
Size of Screw	Property Class	Pitch (mm)	Pounds Feet	Newton-Meters	Pitch (mm)	Pounds Feet	Newton-Meters
	5.6		3.6-5.8	4.9-7.9		-	-
M6	8.8	1.0	5.8-9.4	7.9-12.7	-	-	-
	10.9		7.2-10	9.8-13.6		-	-
	5.6		7.2-14	9.8-19		12-17	16.3-23
M8	8.8	1.25	17-22	23-29.8	1.0	19-27	25.7-36.6
	10.9		20-26	27.1-35.2		22-31	29.8-42
	5.6		20-25	27.1-33.9		20-29	27.1-39.3
M10	8.8	1.5	34-40	46.1-54.2	1.25	35-47	47.4-63.7
	10.9		38-46	51.5-62.3		40-52	54.2-70.5
	5.6		28-34	37.9-46.1		31-41	42-55.6
M12	8.8	1.75	51-59	69.1-79.9	1.25	55-68	75.9-92.1
	10.9		57-66	77.2-89.4		62-75	84-101.6
	5.6		49-56	66.4-75.9		52-64	70.5-86.7
M14	8.8	2.0	81-93	109.8-126	1.5	90-106	122-143.6
	10.9		96-109	130.1-147.7		107-124	145-168
	5.6		67-77	90.8-104.3		69-83	93.6-112.5
M16	8.8	2.0	116-130	157.2-176.2	1.5	120-138	162.6-187
	10.9		129-145	174.8-196.5		140-158	189.7-214.1
	5.6		88-100	119.2-136		100-117	136-158.5
M18	8.8	2.0	150-168	203.3-227.6	1.5	177-199	239.8-269.6
	10.9		175-194	237.1-262.9		202-231	273.7-313
	5.6		108-130	146.3-176.2		132-150	178.9-203.3
M20	8.8	2.5	186-205	252-277.8	1.5	206-242	279.1-327.9
	10.9		213-249	288.6-337.4		246-289	333.3-391.6

5.6

8.8

10.9