



WESTERN PRODUCTS
P.O. BOX 245038
MILWAUKEE, WISCONSIN 53224-9538

A DIVISION OF DOUGLAS DYNAMICS, INC.

Box No. 56210
Isarmatic® Mark IIIa
TRI-PLOW Hydraulic System
December 5, 2003

INSTALLATION INSTRUCTIONS

IMPORTANT: A 550 CCA or 70 amp hour battery and 55 amp alternator or larger are recommended.

ISARMATIC® MARK IIIa MOUNTING

Attach Lift Channel, from A-Frame box, to the top U-clip of the lift using $\frac{3}{4}$ " x $4\frac{1}{2}$ " bolt and locknut. Attach Isarmatic® Mark IIIa to lower U-clip with $\frac{3}{4}$ " x $3\frac{1}{2}$ " bolt and locknut and Isarmatic® Mark IIIa lift ram to Lift Channel with $\frac{3}{4}$ " x 4" bolt and locknut. Tighten bolts to permit free pivotal motion.

IIIa CONTROL

Using bracket and instructions furnished in Lift-Mount box, mount IIIa Control. Attach TRI-PLOW switch Mounting Bracket to either side of the IIIa Control with two #8 x $\frac{5}{8}$ " Hi-Lo hex head screws.

CONTROL CABLES

Drill two $\frac{1}{2}$ " holes through firewall to align with IIIa Control. **IMPORTANT:** These holes should be placed to avoid hot or moving engine parts. Insert a grommet into each hole and feed IIIa Control cables and wire into engine compartment. Drill two $\frac{1}{2}$ " holes through top edge of bulkhead adjacent to radiator. Insert grommets and pass cables through holes and grille. Slip hose grommet over cables for protection in grille area.

RAISE — LOWER CABLE

Remove rectangular cover plate and gasket from Isarmatic® Mark IIIa unit (four screws). Insert cable into hole above rectangular opening until you can place cable end over lever pin. Position cable to allow set screw to enter groove. Tighten set screw. Replace cover and gasket and secure with four screws.

WING IN/OUT CABLE (ANGLE CABLE) — ADJUSTABLE

Remove 5 sided cover (three screws). Insert cable into hole above opening and place end over lever pin. Position cable to allow set screw to enter groove. Leave set screw loose enough to rotate cable end. Activate IIIa Control lever in both directions and return lever to neutral. Lock control lever in neutral by pushing lock spool into center of cross slots. Adjust base end of cable to align valve lever pin, lever attaching screw, and roll pin. For final adjustment procedure, see VALVE ADJUSTMENT CHECK paragraph. Make sure there are no sharp bends (min. 8" radius) in control cables. Clamp cables to fender skirt at their mid-point. Drill $\frac{9}{64}$ " hole and secure Cable Clamp with #10 x 1" tapping screw.

ELECTRICAL

DISCONNECT THE BATTERY BEFORE PROCEEDING WITH THE ELECTRICAL HOOK-UP

Locate Isarmatic® Mark IIIa solenoid, with terminals up or horizontal, within 18" of vehicle primary battery in an area protected from road splash. Drill two $\frac{9}{32}$ " holes, using solenoid mounting as a template, and fasten with $\frac{1}{4}$ " x $\frac{3}{4}$ " bolts, flat washers and locknuts. Connect solenoid "BAT" terminal to battery "POS" terminal with 22" battery cable. (Option: Connect Isarmatic® Mark IIIa solenoid "BAT" terminal to vehicle solenoid "BAT" terminal.) Connect other large solenoid terminal to Isarmatic® Mark IIIa motor terminal with 60" red battery cable. Connect IIIa Control wire to unused small terminal on Isarmatic® Mark IIIa solenoid. Remove slack from all wires and tape in place. Connect 60" black ground cable to grounding bolt located on vehicle engine and to Isarmatic® Mark IIIa motor grounding clip with $\frac{3}{8}$ " x $\frac{3}{4}$ " bolt, lock washer and hex nut.

TRI-PLOW HARNESS AND SWITCH

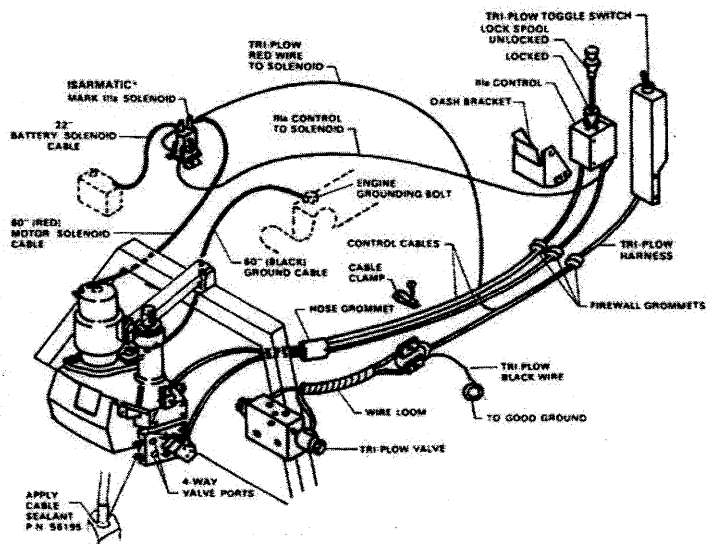
Drill a third $\frac{1}{2}$ " hole thru firewall next to cable holes. Install grommet and feed TRI-PLOW Harness into cab from engine compartment. In cab, attach red wire to center terminal of Switch and gray and purple wires to other terminals. Assemble hex nut half way down switch threads. Place switch into Switch Bracket with center terminal towards long leg of bracket. Secure with knurled facenut. Align hole in short leg of Switch Bracket to hole in Mounting Bracket and secure with #8 x $\frac{3}{8}$ " screw and lock washer. Affix label over switch. In engine compartment, attach TRI-PLOW Harness red wire to Isarmatic® Mark IIIa solenoid terminal with 60" red battery cable and black wire to a good ground. Secure harness away from hot or moving engine parts. Reconnect vehicle battery.

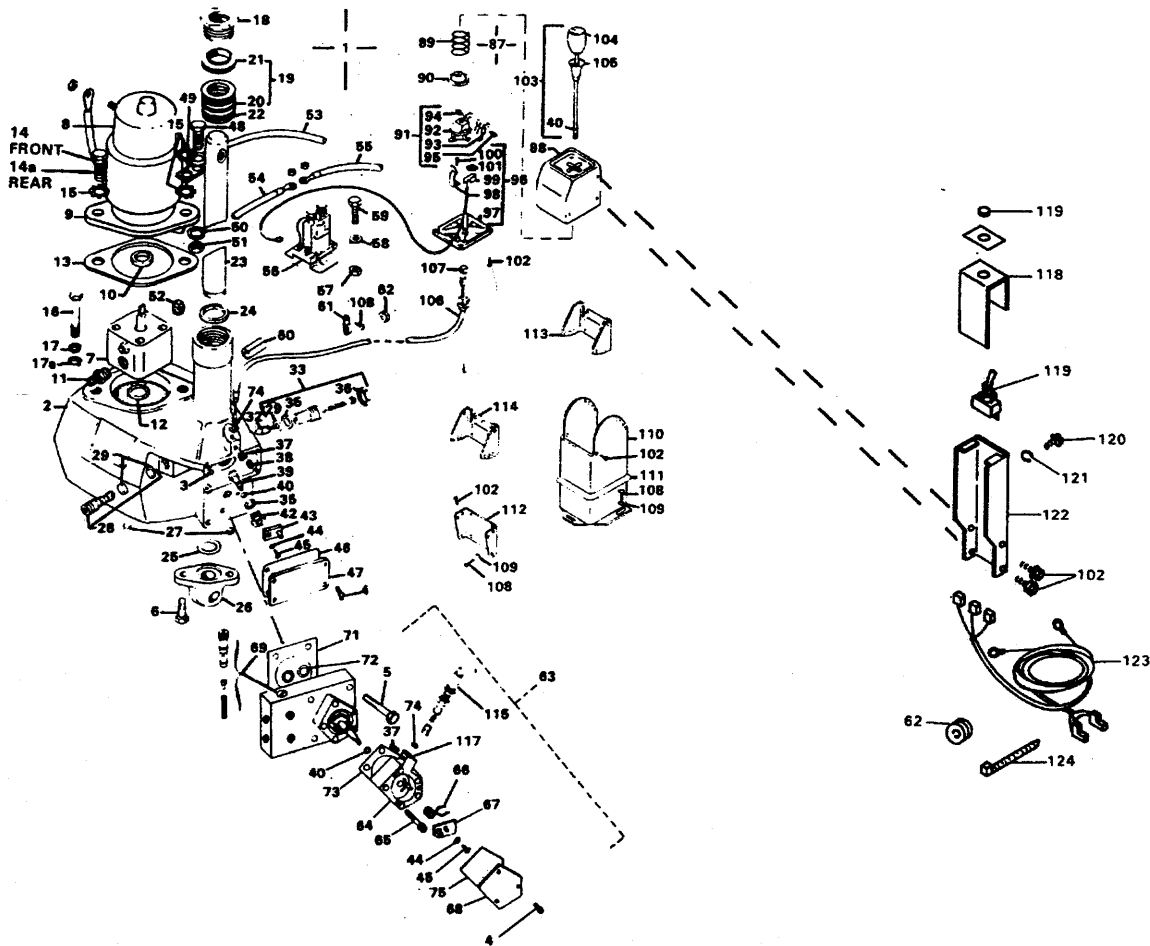
HOSE AND FITTING CONNECTIONS

IMPORTANT: Installing hoses and fittings per these instructions allows all hydraulic couplers to be cross-coupled when plow is removed from vehicle. This prevents dirt from entering the couplers.

INSTALLATION — (See Diagram, Page 4)

1. One male coupler onto each $\frac{1}{4}$ " high pressure hose.
2. Top Isarmatic® Mark IIIa 4-way valve port — hex nipple and female coupler.
3. Bottom Isarmatic® Mark IIIa 4-way valve port — $\frac{1}{4}$ " x 18" high pressure hose.
4. TRI-PLOW Valve Assembly
 - a. Curb side base end port — long male elbow with female coupler on short leg.
 - b. Curb side rod end port — long street elbow with $\frac{1}{4}$ " x 48" hose.
 - c. Driver side base end port — hex nipple with female coupler.
 - d. Driver side rod end port — $\frac{1}{4}$ " x 38" hose.
 - e. Bottom — base end — long male elbow with female coupler on short leg.
 - f. Bottom — rod end — $\frac{1}{4}$ " x 18" hose.
 - g. End of valve block — $\frac{3}{16}$ " x 24" low pressure hose to $\frac{1}{8}$ " street elbow.

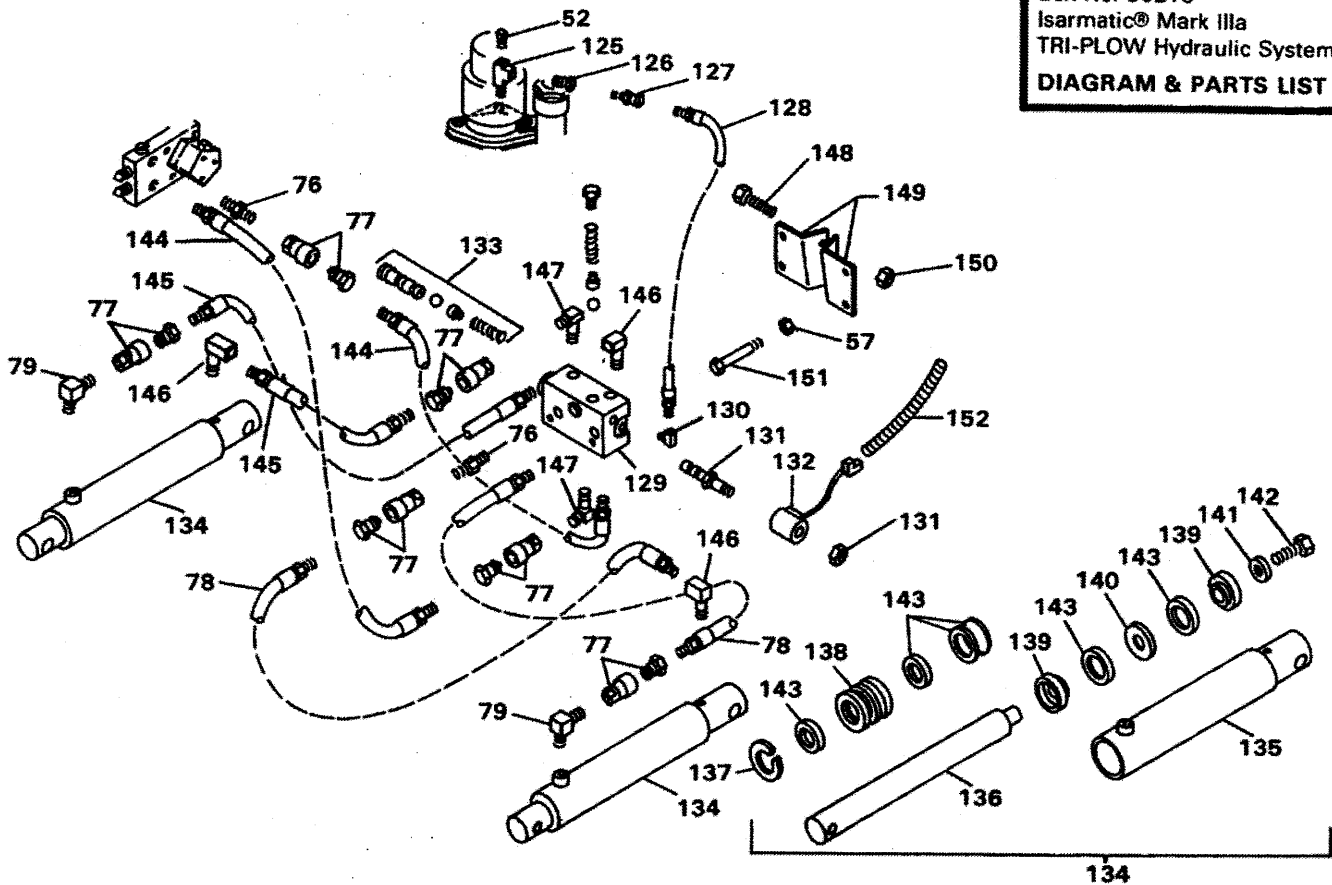




Item	Part No.	Quantity	Description
1	49217	1	Isarmatic® TRI-PLOW Hydraulic Unit with 4W Valve
2	55946	1	Main Housing — 1-1/2" Ram (Service)
3	55591	1	Expansion Plug — 1/4"
4	90666	4	Hex Head Tapping Screw #10 x 5/8"
5	93165	4	Capscrew — Thread Forming — 1/4"-20 x 1-3/4"
6	93166	2	Capscrew — Thread Forming — 5/16"-18 x 1-1/4"
7	49211	1	Hydraulic Pump Assembly (MTE) (Includes Items 11, 12, 16, 17, 17a)
8	56133	1	Motor Assembly — 4"
9	49064	1	Flange w/Bearing & Seal — 4"
10	49014	1	Oil Seal Only
11	56185	1	Suction Filter
12	25620	1	O-Ring — 115
13	25861	1	Gasket
14		1	Capscrew — 7/16"-14 x 1-1/4" Front
14a		1	Capscrew — 7/16"-14 x 1-1/2" Rear
15	91265	3	Lock Washer — 7/16" — External Tooth
16	90025	2	Capscrew — 5/16"-18 x 2-1/4" — Gr. 5
17	91220	2	Belleville Spring Washer
17a		2	Flat Washer — 1/4" Standard
18	25944	1	Packing Nut — 1-1/2" Ram
19	25205	1	Packing Set w/Wiper — 1-1/2" Ram
20	55136	1	Packing Set — 1-1/2" Ram
21	55137	1	Wiper Ring — 1-1/2" Ram
22	91167	1	Special Washer — 1-1/2" Ram
23	25202	1	Plunger — 1-1/2" x 6" Ram
24	25203	1	Retainer Ring — 1-1/2" Ram
25	25618	1	O-Ring — 216
26	25968	1	Base Lug w/#25618 O-Ring
27	92072	2	Socket Head Pipe Plug — 1/4"
28	49064	1	Lift Valve w/2 #25730 O-Rings
29	25730	2	O-Ring — O12
32	55570	1	Shuttle
33	55568	1	Check Valve Assembly
29	25730	1	O-Ring — O12
35	55587	1	O-Ring — 112
36	55569	1	Jam Nut — 5/8"-18
37	90600	1	Half Dog Point Set Screw #10-24 x 3/8"
38	92071	1	Socket Pipe Plug — 1/8"
39	55571	1	Camshaft
40	55371	1	O-Ring — 008

Item	Part No.	Quantity	Description
35	55587	1	O-Ring — 112
42	55572	1	Hub Nut
43	55573	1	Valve Lever
44	91259	1	Lock Washer — #6 — External Tooth
45	90655	1	Pan Head Screw — #6-32 x 1/4"
46	55350	1	Cover Plate Gasket
47	55958	1	Valve Cover Plate
48		1	Capscrew — 3/8"-16 x 3/4"
49	55757	1	Grounding Clip
50		1	Lock Washer — 3/8"
51		1	Hex Nut — 3/8"-16
52	92079	1	Pipe Plug — 3/8"
53	55984	1	Grounding Cable — 60" — 6 Ga. (Black)
54	25635	1	Battery Cable — 60" — 4 Ga. (Red)
55	22511	1	Battery Cable — 22" — 4 Ga. (Red)
56	56131	1	Extra Duty Solenoid Assembly
57	91331	4	Locknut — 1/4"-20
58		2	Flat Washer — 1/4" Standard
59		2	Capscrew — 1/4"-20 x 3/4"
60	55511	1	Hose Grommet
61	55381	1	Cable Clamp
62	25301	5	Rubber Grommet
63	49020	1	4 Way Valve Assembly
37	90600	1	Half Dog Point Set Screw — #10-24 x 3/8"
64	55342	1	Cable & Linkage Enclosure
65	90909	5	Socket Head Capscrew — 1/4"-20 x 1-1/2"
66	55359	1	Torsion Spring
67	55364	1	Valve Lever
44	91259	1	Lock Washer — #6 — External Tooth
45	90655	1	Pan Head Screw — #6-32 x 1/4"
68	55959	1	Enclosure Cover
4	90666	3	Hex Head Tapping Screw — #10-24 x 5/8"
69	49138	1	Cushion Valve Kit (2 Sets)
70	49005	1	4W Valve Gasket & O-Ring Kit (Not Shown)
71	55374	1	Manifold Gasket
72	55252	2	O-Ring — O15
40	55371	1	O-Ring — 008
73	55951	1	Shim Spacer — .0005 (Silver) Std.
73	55735	1	Shim Spacer — .0035 (Clear) Option

Box No. 56210
 Isarmatic® Mark IIIa
 TRI-PLOW Hydraulic System
DIAGRAM & PARTS LIST



Item	Part No.	Quantity	Description
74	25731	1	O-Ring — 010
75	55357	1	Cover Gasket
117	56195	1	Cable Sealant
76	25519	2	Hex Nipple — 1/4"
77	25232	6	Hydraulic Coupler — 1/4"
78	55020	2	High Pressure Hose — 1/4" x 38"
79	92278	2	Male Pipe Elbow — 1/4" x 90° — Short
87	56231	1	IIIa Control Assembly — TRI-PLOW
88	49220	1	Body w/Label — TRI-PLOW
89	56022	1	Centering Spring
90	56023	1	Spring Retainer
91	49015	1	Platen Assembly
92		1	Pivot Platen
93	56026	1	Contact Strip
94	56027	2	Ball Stud
95	93152	1	Hex Head Screw — #10 x 3/8" — Hi-Lo
96	56028	1	Bottom Cover Assembly
97		1	Bottom Cover
98	56030	1	Detent Spring
99	56032	1	Contact Tube Assembly
100	93153	1	Hex Head Screw — #6 x 3/8" — Hi-Lo
101	93168	1	Retainer Ring — 3/8"
102	93154	10	Hex Head Screw — #8 x 5/8" — Hi-Lo
103	49016	1	Knob & Lever Assembly — Standard
103	49147	1	Knob & Lever Assembly — Short (Option)
104	56039	1	Lens Label
105	49017	1	Lockspool w/Label
40	55371	1	O-Ring — 008
106	56158	1	Raise-Lower Cable — Short (7 1/2" Option)
106	56035	1	Raise-Lower Cable — Standard (9')
106	56180	2	Raise-Lower/Angling Cable — Adjustable — Long (12' Option)
115	56159	1	Angling Cable — Adjustable — Short (7 1/2" Option)
115	56130	1	Angling Cable — Adjustable — Standard (9')
74	25731	2	O-Ring — 010
107	49019	1	Ball Stud Retainer Clip
108		5	Tapping Screw — #10 x 1"
109		4	Lock Washer — #10
118	56253	1	Switch Bracket
119	56239	1	Toggle Switch — SPDT — with Knurled Facenut

Item	Part No.	Quantity	Description
120	93157	1	Capscrew — Thread Cutting - #8-32 x 3/8"
121	91231	1	Lock Washer — #8
122	56254	1	Mounting Bracket
123	56247	1	Harness — TRI-PLOW
124	59223	3	Cable Tie
125	92253	1	Pipe Tee — 3/8"
126	92179	1	Reducer Bushing — 3/8" x 1/8"
127	92924	1	Female Adapter Union (Swivel) — 1/8"
128	56226	1	Low Pressure Hose — 3/16" x 24"
129	56240	1	TRI-PLOW Valve Assembly
130	92202	1	Street Elbow — 1/8" x 90°
131	56251	2	Cartridge — 3 Way with Jam Nut
132	56252	2	Coil — 10 Volt
133	49219	1	Cushion Valve Kit — TRI-PLOW (2 Sets)
134	56206	2	Hydraulic Cylinder Assembly — 2" x 9-1/2" D.A.
135	56207	1	Cylinder Unit — 2" x 9-1/2" D.A.
136	56325	1	Plunger — 2" x 9-1/2" D.A.
137	56218	1	Retaining Ring — Internal
138	56214	1	Stop Plug
139	56209	2	Piston
140	56212	1	Spacer — Piston
141	56326	1	Retainer
142	90124	1	Capscrew — 9/16"-12 x 1-1/4" Grade 5 — Special
143	49218	1	Seal Kit — 2" x 9-1/2" D.A.
144	56224	2	High Pressure Hose — 1/4" x 18"
145	56225	2	High Pressure Hose — 1/4" x 48"
146	92208	3	Street Elbow — 1/4" x 90° — Long
147	92275	2	Male Pipe Elbow — 1/4" x 90° — Long
148		1	Capscrew — 3/8"-16 x 1-1/2"
149	56229	2	Mount Plate, TRI-PLOW Valve Assembly
150	91333	1	Locknut — 3/8"-16 — Nylon Insert Type
151		2	Capscrew — 1/4"-20 x 2-1/2"
152	56255	1	Wire Loom — 24"

Parts Listed Below are Furnished in Appropriate Lift-Mount Box.
 110 56079 1 Floor Bracket (Universal)
 111 56043 1 Rubber Boot (For Floor Bracket)
 112 56080 1 Dash Bracket
 113 56081 1 Dash Bracket
 114 56082 1 Dash Bracket

NOTE: Only those items listed with a PART NUMBER are available for service.

USE ONLY GENUINE WESTERN® REPLACEMENT PARTS
 Printed in U.S.A.

5. Base End Ports of Double Acting Cylinders — long street elbow with ¼" x 48" hose on curb side and ¼" x 38" hose on driver side.
6. Rod End Ports of Double Acting Cylinders — short male elbows with female couplers.
7. Tee on Isarmatic® Mark IIIa Unit — female adapter union.

TRI-PLOW VALVE AND MOUNT PLATES

Assemble two Mount Plates, large holes together, to inside of driver side lift angle at the lower light bracket hole with ¾" x 1½" bolt, lock washer and hex nut. Attach TRI-PLOW Valve to Mount Plates with ¼" x 2½" bolts and locknuts. Insert wires from the two TRI-PLOW Valve coils into Loom and feed thru grille into engine compartment. Plug connectors from coils into connectors on TRI-PLOW Harness.

HOSE CONNECTIONS. Attach Blade and A-Frame to vehicle.

1. Couple 18" hoses between BOTTOM of TRI-PLOW Valve and Isarmatic® Mark IIIa.
2. Couple 48" hoses between TOP of TRI-PLOW Valve and CURB side cylinder.
3. Couple 38" hoses between FRONT of TRI-PLOW Valve and DRIVER side cylinder.
4. Attach 3/16" x 24" hose from TRI-PLOW valve to female adapter union.

Whenever blade is removed from vehicle, cross-couple hose male ends into female couplers to prevent entrance of dirt.

OIL FILL

Remove filler plug in top of tee next to motor. Fill with automatic transmission fluid (ATF) (alternate 10W non-detergent motor oil — 5W in extreme cold). **IMPORTANT:** Fill the reservoir only through the filler opening as it is designed to prevent overfilling. Reservoir capacity is 1½ quarts. Total system capacity is 2¼ quarts.

OPERATION

Smoothly and without hesitation, move the IIIa Control lever into the desired position. Always return lever to the neutral position when not in operation.

RAISE-LOWER BLADE — Move IIIa Control lever up (forward) to raise blade. Move lever down (back) to lower/float blade.

LEFT WING — TRI-PLOW toggle switch to LEFT WING. Moving IIIa lever to right moves wing OUT (away from vehicle). Moving IIIa lever to left brings wing IN (towards vehicle).

RIGHT WING — TRI-PLOW toggle switch to RIGHT WING. Moving IIIa lever to right moves wing OUT (away from vehicle). Moving IIIa lever to left brings wing IN (towards vehicle).

NOTE: If wings do not operate as indicated, interchange coil plugs of the TRI-PLOW harness under the hood. The IIIa Control is equipped with a manual lock to prevent accidental movement of the blade. Push the Lock Spool down into the center of the cross slots to prevent movement. Pull up the spool to allow blade movement.

VALVE ADJUSTMENT CHECK

Lift Valve and 4W cable adjustments are extremely critical for proper operation. Move TRI-PLOW wings into scoop position. Back Lift Valve out (CCW) ½ turn or until plow will not lift in "raise" position. GRADUALLY turn Lift Valve in (CW) until plow just lifts. To adjust lowering speed, hold check valve (hex socket wrench) while loosening or tightening jam nut. Loosen jam nut maximum ¼ turn (to prevent O-Ring "blow out"). Turn check valve: IN (CW) to increase speed, OUT (CCW) to decrease speed. 4W cable adjustment affects wing speed. Wing IN time should be 5 seconds, wing OUT - 4 seconds. Turning base end of adjustable 4W cable: into female thread increases wing IN speed, out of female thread increases wing OUT. After adjusting, tighten the set screw, and tighten the jam nut to 12 in-lb. See TRI-PLOW Mechanics Guide for additional information. **IMPORTANT:** After adjustments, seal cable entries to housing with 56195 Cable Sealant.

CHECK OIL LEVEL

After cycling system for above checks, check Isarmatic® Mark IIIa reservoir level with both wings IN (V-shaped plow) and IIIa control lever in float (detent in lower) position. Do not collapse lift ram. Fill reservoir thru fill plug in tee only.

FINAL INSPECTION

Your Western Isarmatic® Mark IIIa TRI-PLOW is now installed and ready for operation. As a final check, make sure all fasteners and hydraulic and electrical connections are tight. Check the lift ram packing nut for possible oil leakage while raising the plow. If any leakage is observed, tighten not more than ¼ turn after you feel packing nut contact the packing. Over-tightening affects cylinder operation and life of the packing. After plow is operated a short time, chevron packing will become saturated and normally leakage stops.

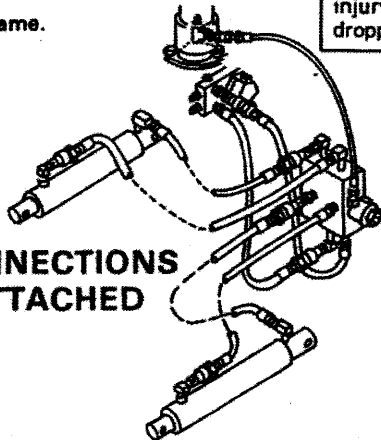
Form No. 13504

Care must be taken in routing of hydraulic hose to prevent pinching of hoses between vehicle bumper and A-Frame.

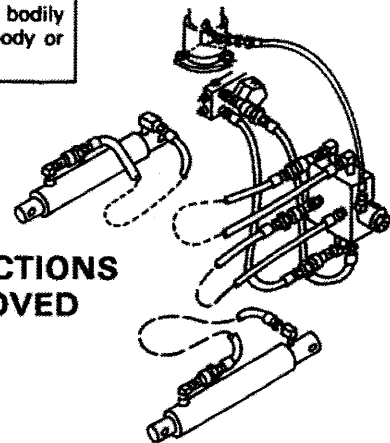


WARNING: DO NOT stand between the vehicle and blade or directly in front of blade when it is being raised, lowered or wings positioned. Clearance between vehicle and blade decreases as blade is operated. Serious bodily injury can result from blade striking a body or dropping on feet or hands.

**HOSE CONNECTIONS
PLOW ATTACHED**



**HOSE CONNECTIONS
PLOW REMOVED**



The following are registered® and unregistered™ Trade Marks of Douglas Dynamics, Inc.
WESTERN® ISARMATIC® Hydra-Turn® Roll-Action™ PRO-GUARD™

Western 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.

Printed in U.S.A.