NATIONAL

SAFETY
&
INSTRUCTION
MANUAL

MODEL **NH12025**
HYDRAULIC SHEAR

MADE IN USA

Trick-Tools.com
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Pella, IA 50219
Phone:1-877-VAN-SANT
E-mail: sales@trick-tools.com

CONTENTS 1/4" Hydraulic Shears

RECORD MACHINE INFORMATION HERE

(Necessary for Factory Service, Replacement Parts, etc.)

Model Number: _____

Serial Number: _____

Date Installed: _____

Purchased Through: _____

NATIONAL SHEET METAL MACHINES, INC.

SAFETY INSTRUCTIONS

WARNING: DO NOT operate this machine **WITHOUT** manufactures holddown assembly or an **APPROVED** Finger Guard installed…

WARNING: DO NOT operate or store this machine in Damp or Wet conditions…

WARNING: This machine **MUST** be wired to central power source by Qualified Electrician using materials and methods prescribed by Local Electrical codes…

NEVER place any part of your body under the blade area…

NEVER allow anyone to support material being cut from the rear position of the machine…

NEVER operate this machine with the front and/or back panels removed…

DO NOT stack material to be cut, design is for single layer only…

Keep floors dry and free of clutter, maintain good footing, and do not "OVERREACH"…

DO NOT use machine as a work table, material may slip into cutting path and cause serious damage and injury…

ALWAYS UNPLUG this machine before performing any type maintenance...

SAFETY CONTINUED

ALWAYS operate this machine from the front area…

Always lay material **FLAT** on table, do not support material as clamping may result in serious injury…

Always keep children, pets, and visitors at a **SAFE** distance from this machine when operating…

Feed material from the **FRONT** only…

Never **FORCE** the machine to cut, check Trouble Shooting Guide and Design Standards if problems arise…

Wear clothing that will **NOT** become caught on material. **NEVER** wear neckties, long jewelry around the neck or on an arm, loose garments, or accessories of any type…

Check machine before every use for Damaged or loose material between blades…

Follow Preventative Maintenance Guide **DAILY…**

Turn this machine **OFF** before leaving the work area…

ALWAYS WEAR SAFETY GLASSES OR ANY APPROVED EYE PROTECTION DEVICES WHEN OPERATING THIS MACHINE
KEEP FINGERS CLEAR OF THE BLADE AREA AND THE HOLDDOWN…

SAFETY SAVES AND SAFETY PAYS

DESIGN STANDARDS

This machine is designed and manufactured to **SAFELY** cut **"MILD STEEL"** by **GAUGE** and **TOLERANCES** outlined below.

DO NOT cut materials that are not within the specified tolerances of this machine… **SERIOUS DAMAGE and / or INJURY MAY OCCUR……**

Carbon Composition		Thickness Tolerance	Tensile Strength	Yield Strength	Rockwell (Hardness)
GAUGE			(Ksi)	(Ksi)	(Ksi)
1/4"	20 - 25	.220 – .270	50	30	B65

***** Maximum tolerance are "Built Into" above stated figures *****

Thickness of material must be **ADJUSTED** accordingly to compensate for **HIGHER** Tensile and / or **HIGHER** Rockwell.

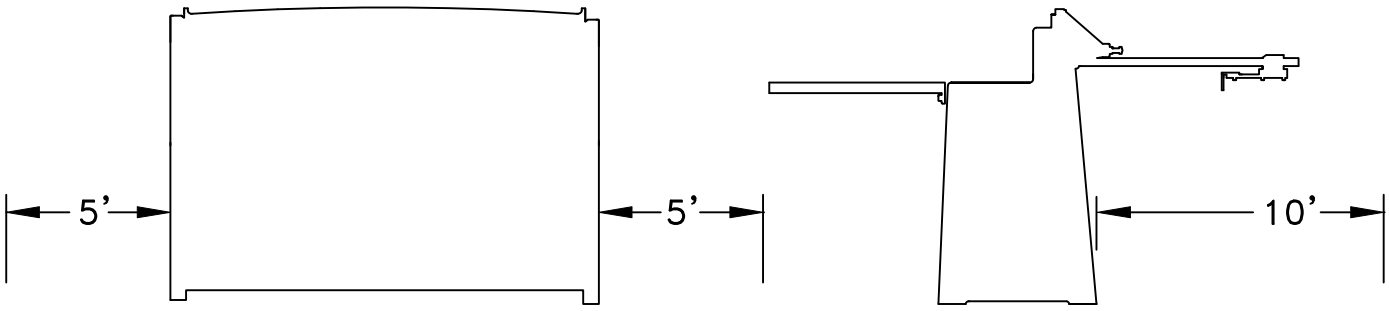
Aluminums, Stainless, Galvanized, and ALL alloys **MUST** fall within the above standards to accomplish a **SAFE** and **SATISFACTORY CUT….**

DO NOT CUT MATERIALS NOT DESIGNED FOR THIS MACHINE…EXTREME AND / OR COSTLY DAMAGE AND / OR SERIOUS INJURY MAY OCCUR…

****** NOTICE ******

This Machine has been Factory Tested to CAPACITY of MILD STEEL
DO NOT EXCEED MAXIMUM RATED CAPACITIES
AS SHOWN ABOVE

SAFE ZONE
(Working Zone)



1. Allow a minimum five (5) feet of open area, free of materials, and machinery on BOTH sides (left & right) of machine.

2. Allow a minimum ten (10) feet of open area, free of obstructions, etc. in REAR OF Machine.

3. Do NOT operate machine when People or Obstructions are within SAFE ZONE. Serious injury may occur.

4. Do NOT stack, store or place material, machinery, or any other obstructions in FRONT of machine that might cause tripping or in any way present a HAZARD to operators and / or helpers.

KEEP WORK AREA AND SAFE ZONES CLEAN

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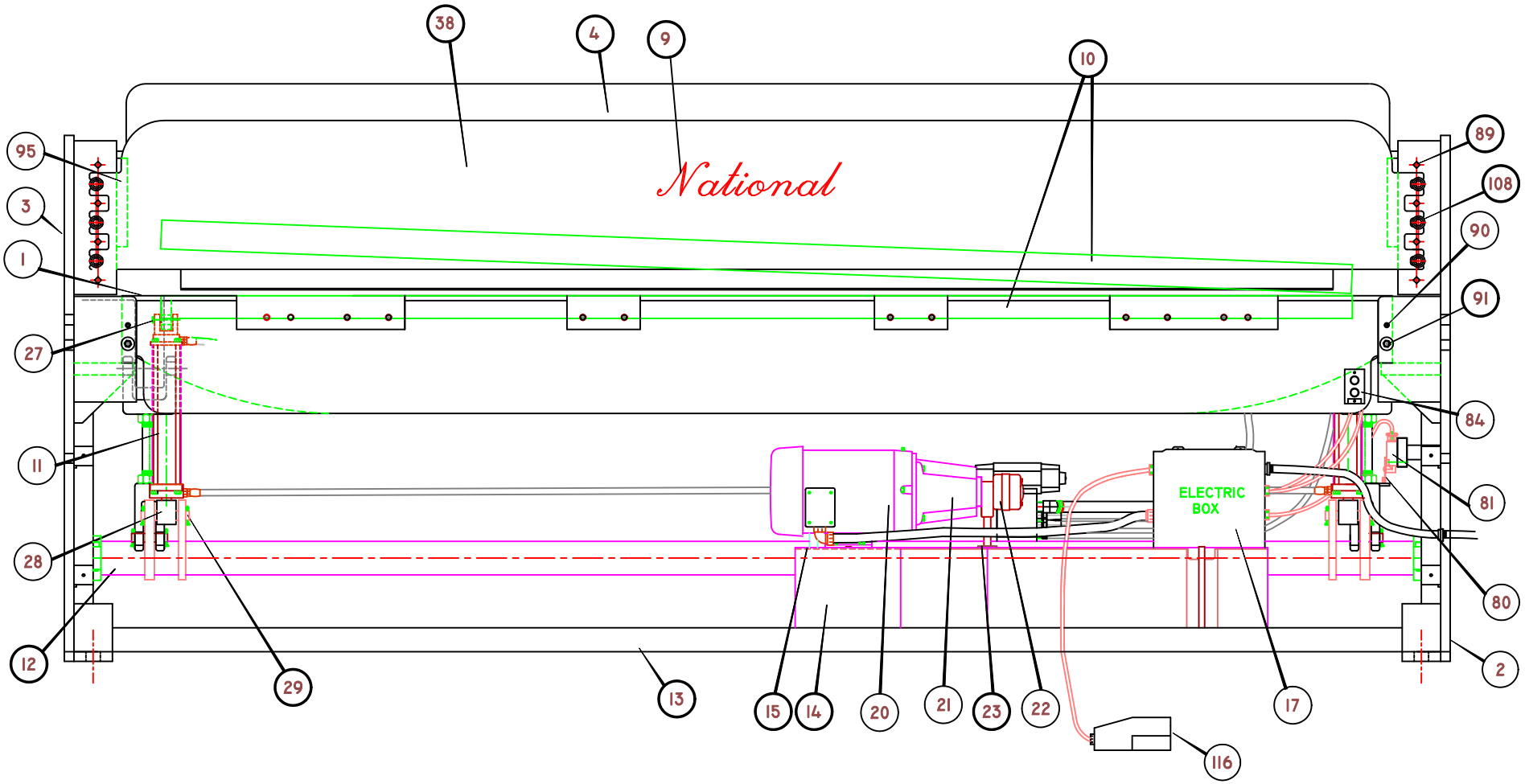
PARTS LIST FOR NH4825, NH7225, NH9625, NH12025 HYDRAULIC SHEARS

PART#	DESCRIPTION	QTY
1.	TABLE	1
2.	RIGHT SIDE PANEL	1
3.	LEFT SIDE PANEL	1
4.	CUTTERHEAD	1
5.	BEARING HOUSING	2
6.	SOLENOID	1
7.	X	X
8.	X	X
9.	NAME PLATE	1
10.	BLADE	2
11.	CYLINDER	2
12.	TREDLE ASSEMBLY	1
13.	HYD. TANK SUPPORT ANGLE	2
14.	HYDRAULIC TANK	1
15.	HYDRAULIC TANK TOP	1
16.	1/2-13NC X 1-1/2" LG FLAT HEAD	
	NH4825	16
	NH7225	26
	NH9625	26
	NH12025	32
17.	ELECTRIC BOX	1
18.	SUB PLATE	1
19.	PRESSURE RELIEF VALVE	1
20.	ELECTRIC MOTOR	1
21.	C-FACE ADAPTOR	1
22.	HYDRAULIC PUMP	1
23.	RUBBER WASHER	1
24.	SIDE SCALE	2
25.	GIB BEARING PLATE	4
26.	X	X
27.	CYLINDER PIN	2
28.	BOTTOM CYLINDER BLOCK	2
29	CYLINDER PIN	2
30.	PIN	2
31.	BOTTOM PULL ROD CLEVIS - RIGHT	1
32.	BOTTOM PULL ROD CLEVIS - LEFT	1
33.	PULL ROD	2
34.	NUT	2
35.	TOP PULL ROD CLEVIS	2
36.	PIN	2
37.	GREASE FITTING	4
38.	HOLDDOWN PLATE	1
39.	ALL THREAD ROD	2
40.	CYLINDER	
	NH4825	1
	NH7225	1
	NH9625	2
	NH12025	2
41.	X	X
42.	CYLINDER PIN	2
43.	BUSHING	12
44.	BUSHING	4
45.	FLOATING GIB	2
46.	LOWER BLADE ADJ. NUT & BOLT	27
47.	TABLE BOLT	2
48.	HOLDDOWN RUBBER	2
49.	21 1/2" HYD. HOSE	2
50.	FRONT ARM EXTENSION	2
51.	72" HYD. HOSE	2
52.	55" HYD. HOSE	1
53.	80" HYD. HOSE	1
54.	3/8" STL FITTING	2
55.	3/8" SWIVEL FITTING	2
56.	X	X
57.	X	X
58.	X	X
59.	X	X
60.	X	X
61.	X	X
62.	X	X
63.	X	X
64.	BACK GUIDES	3
65.	BACK GUIDE BOLTS	6
66.	X	X
67.	X	X
68.	LOCKNUT	2
69.	WASHER	2
70.	BUSHING	2
71.	SIDE PANEL CAP	2
72.	BOLT	4
73.	X	X
74.	CROSSHEAD ADJ. NUT	1
75.	CROSSHEAD ADJ. BAR	1
76.	BACK GAUGE ROD	2
77.	BACK GAUGE ANGLE	1
78.	BACK GAUGE BLOCK	2
79.	LOCK KNOB	2
80.	LIMIT SWITCH ARM	1
81.	LIMIT SWITCH	1
82.	X	X
83.	X	1
84.	START/STOP SWITCH	1
85.	X	X
86.	X	X
87.	ANGLE SUPPORT BRACKET	2
88.	ANGLE EXTENSION	2
89.	GIB NUT & BOLT	8
90.	SET SCREW	2
91.	BOLT & WASHER	4
92.	BOLT & WASHER	
	NH4825	2
	NH7225	2
	NH9625	4
	NH12025	4
93.	BOLT & WASHER	4
94.	X	X
95.	FLOURESCENT LIGHT FIXTURE	2
96.	FINGER GUARD	1
97.	X	X
98.	X	X
99.	X	X
100.	MOTOR TO PUMP COUPLING	1
101.	SEQUENCE VALVE	2
102.	BEARING	2
104.	BOLT & WASHER	12
105.	X	X
106.	X	X
107.	BOLT & WASHER	4
108.	BOLT	6
109.	FRONT PANEL (NOT SHOWN)	1
110.	BACK PANEL (NOT SHOWN)	1
111.	BACK DROP OFF PLATE (NOT SHOWN)	1
112.	RUBBER GUARD (NOT SHOWN)	2
113.	BACK DROP OFF PLATE SUPPORT ANGLE	4
114.	SPACER	4
115.	X	X
116.	FOOTSWITCH	1
117.	LEFT H/D CYL. HOSE ASSY.	1
118.	RIGHT H/D CYL. HOSE ASSY.	1
119.	UPPER LEFT CYL. HOSE ASSY.	1
120.	LOWER LEFT CYL. HOSE ASSY.	1
121.	UPPER RIGHT CYL. HOSE ASSY.	1
122.	LOWER RIGHT CYL. HOSE ASSY.	1
123.	RETURN HOSE ASSY.	1



FRONT VIEW

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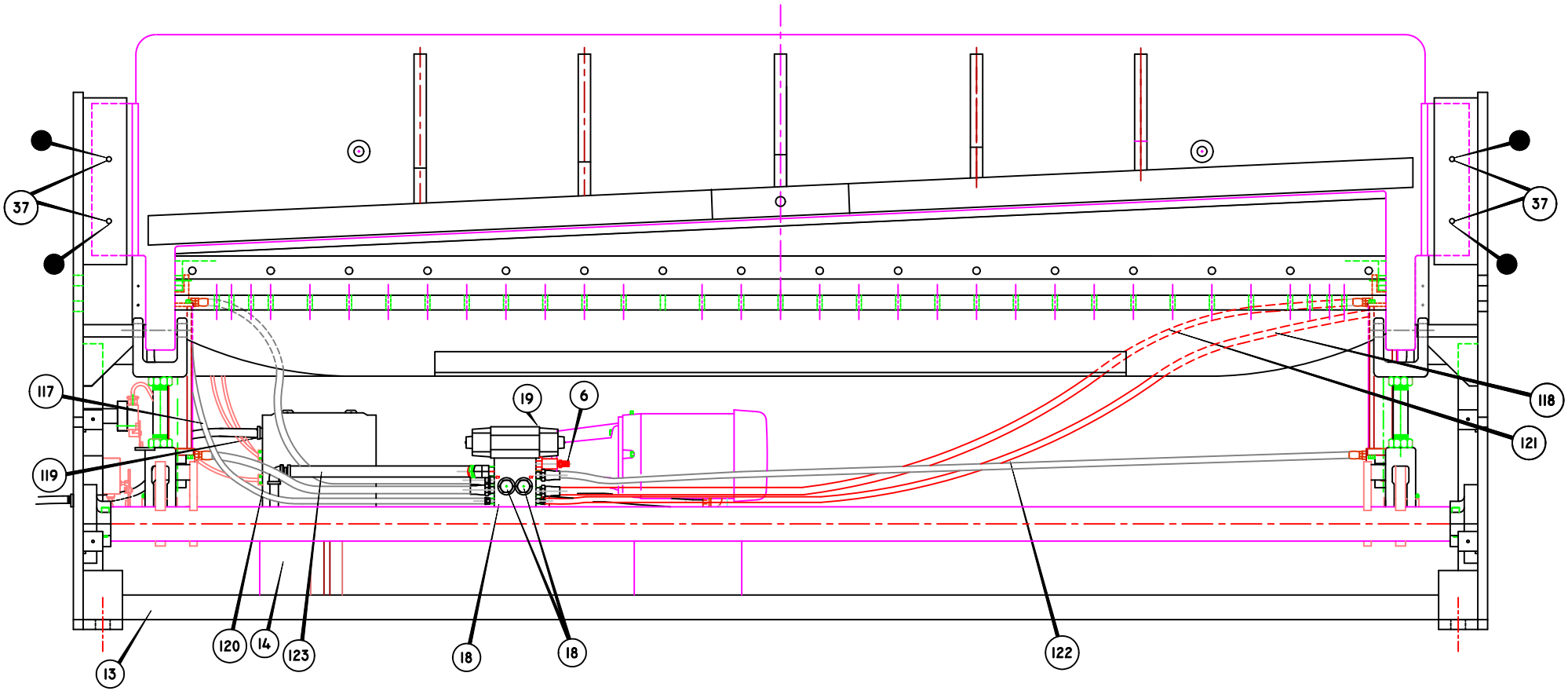
PARTS LIST NHI2025 HYDRAULIC SHEAR



REAR VIEW

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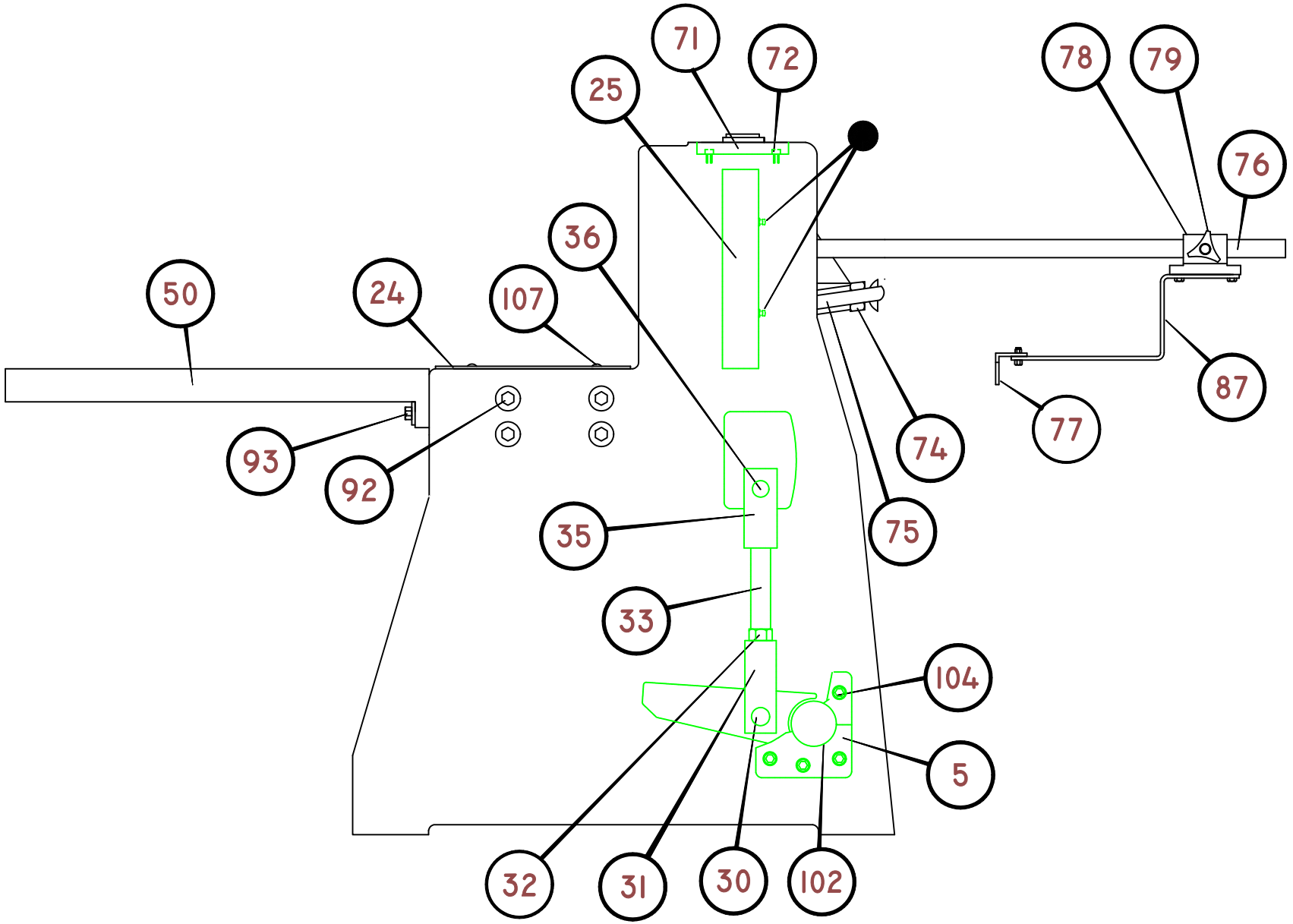
●-LUBRICATION POINT

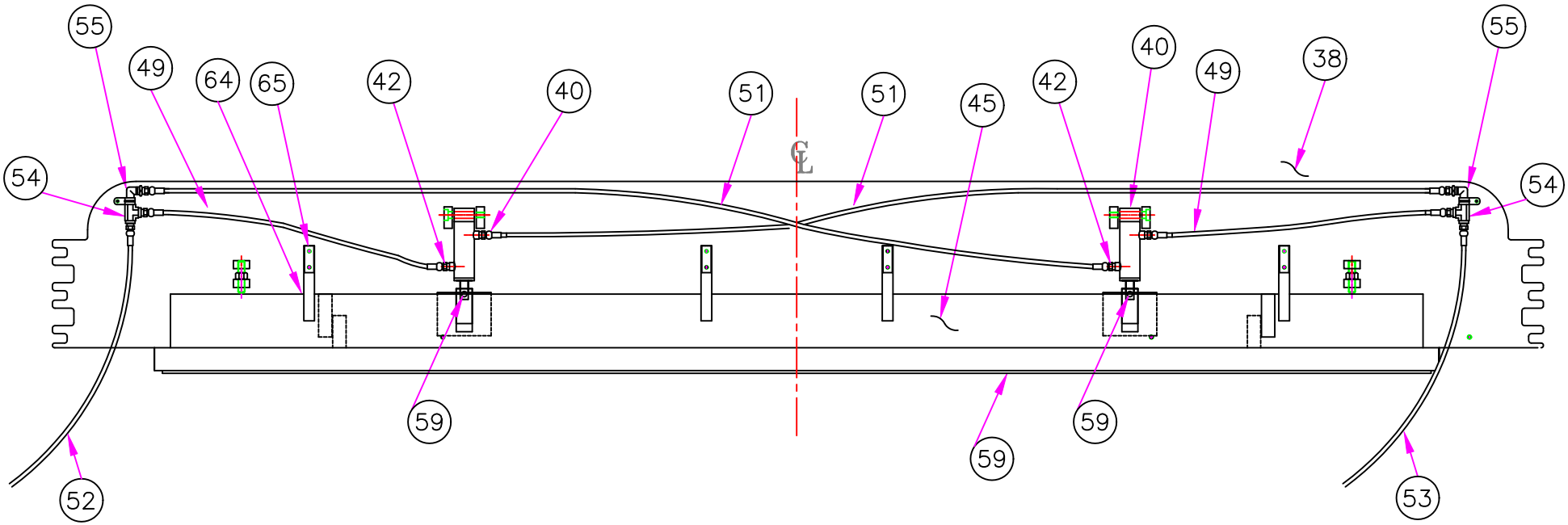
PARTS LIST NHI2025 HYDRAULIC SHEAR



●-LUBRICATION POINT

NATIONAL

PARTS LIST NH12025 HYDRAULIC SHEAR



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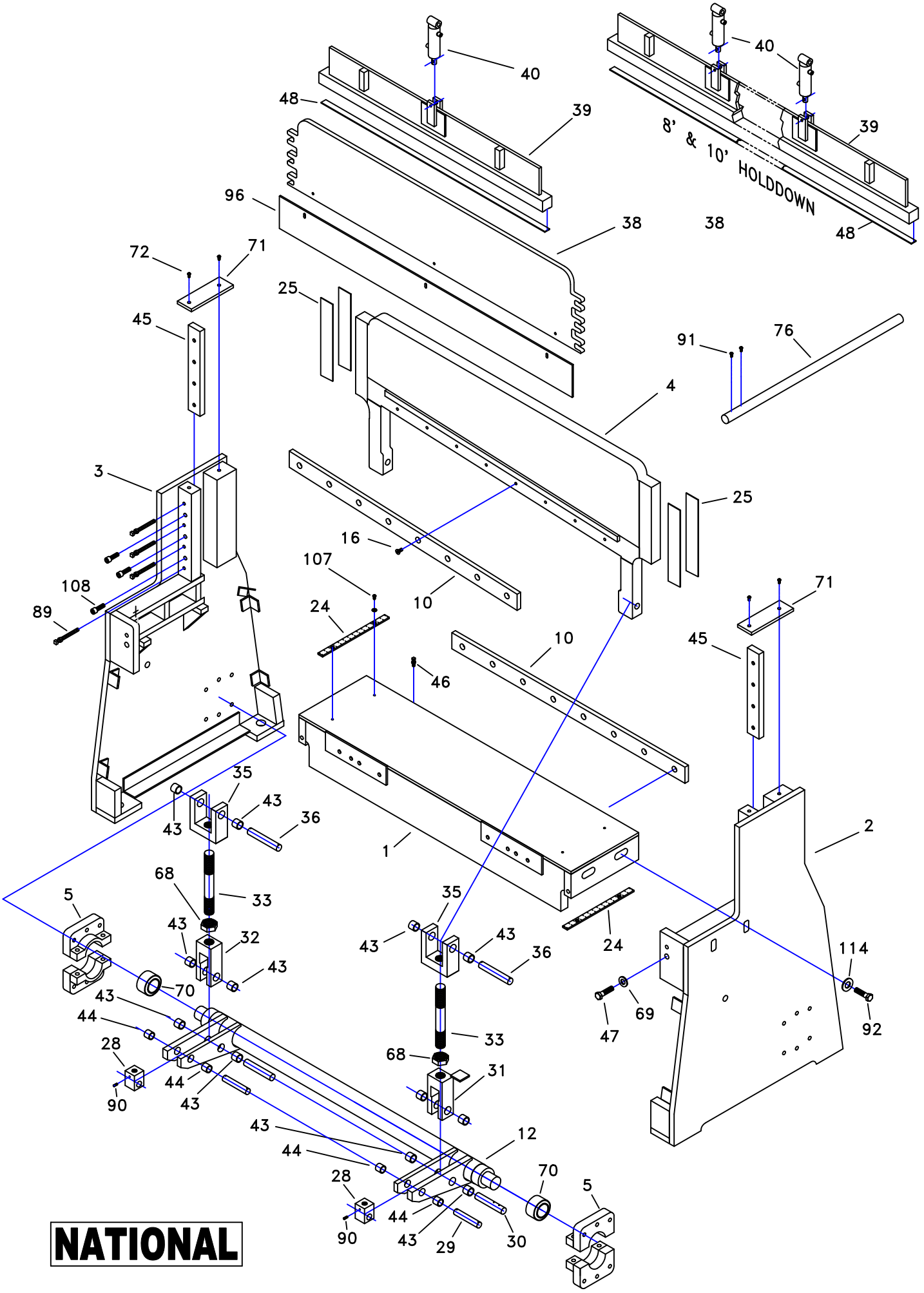
PARTS LIST FOR NH12025 HYDRAULIC SHEAR
HOLD DOWN ASSEMBLY



8' & 10' HOLDDOWN

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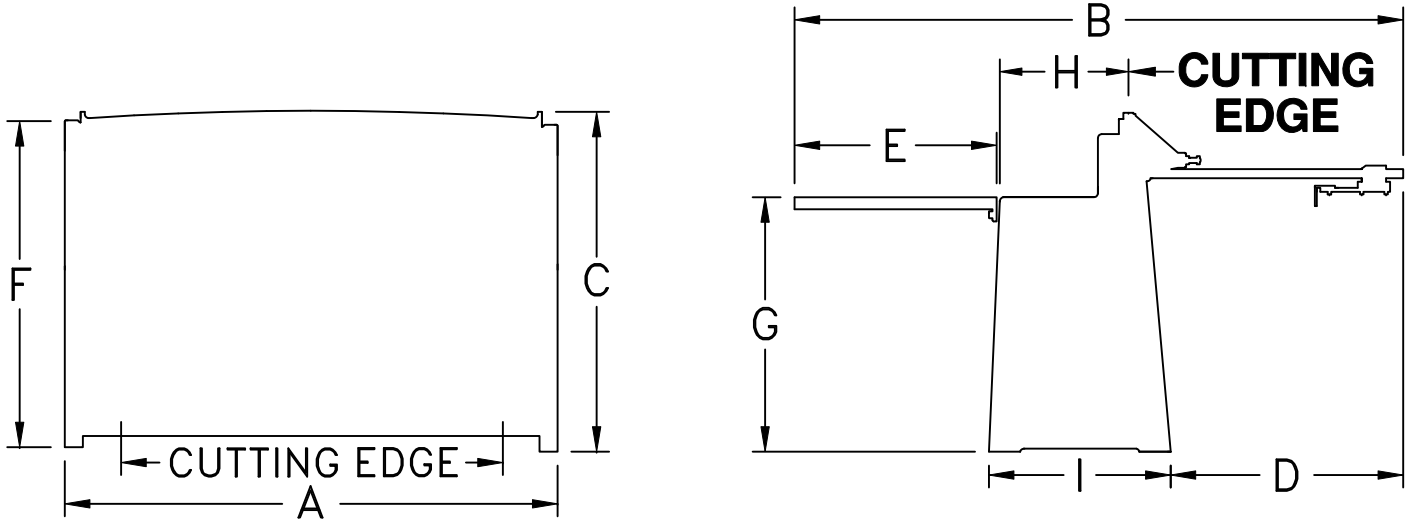
EXPLODED VIEW OF NH4825, NH7225, NH9625, NH12025 HYDRAULIC SHEARS

MACHINE DIMENSIONS



SHEAR	A	B	C	D	E	F	G	H	I	CUTTING WIDTH	APPROX. SHIPPING WEIGHT
NH4825	66 1/4"	95"	54"	31 1/2"	32"	52"	35 1/2"	20 1/2"	36 1/2"	48 1/2"	5,000 lbs.
NH7225	84"	98"	54"	31 1/2"	32"	52"	35 1/2"	20 1/2"	38"	72 1/2"	6,000 lbs.
NH9625	114"	106 1/2"	55"	39 1/2"	32"	54 3/4"	37 5/8"	20 3/4"	39 3/8"	121"	11,000 lbs.
NH12025	138"	106 1/2"	55"	39 1/2"	32"	54 3/4"	37 5/8"	20 3/4"	39 3/8"	121"	11,000 lbs.

- With optional SQUARING ARM add approx. 18 1/2" to E & B for 36" and 52" shears
- With optional SQUARING ARM add approx. 12 1/2" to E & B for 1/4" shears
- With optional DIGITAL BACK GAUGE add approx. 10" to D & B for all shears

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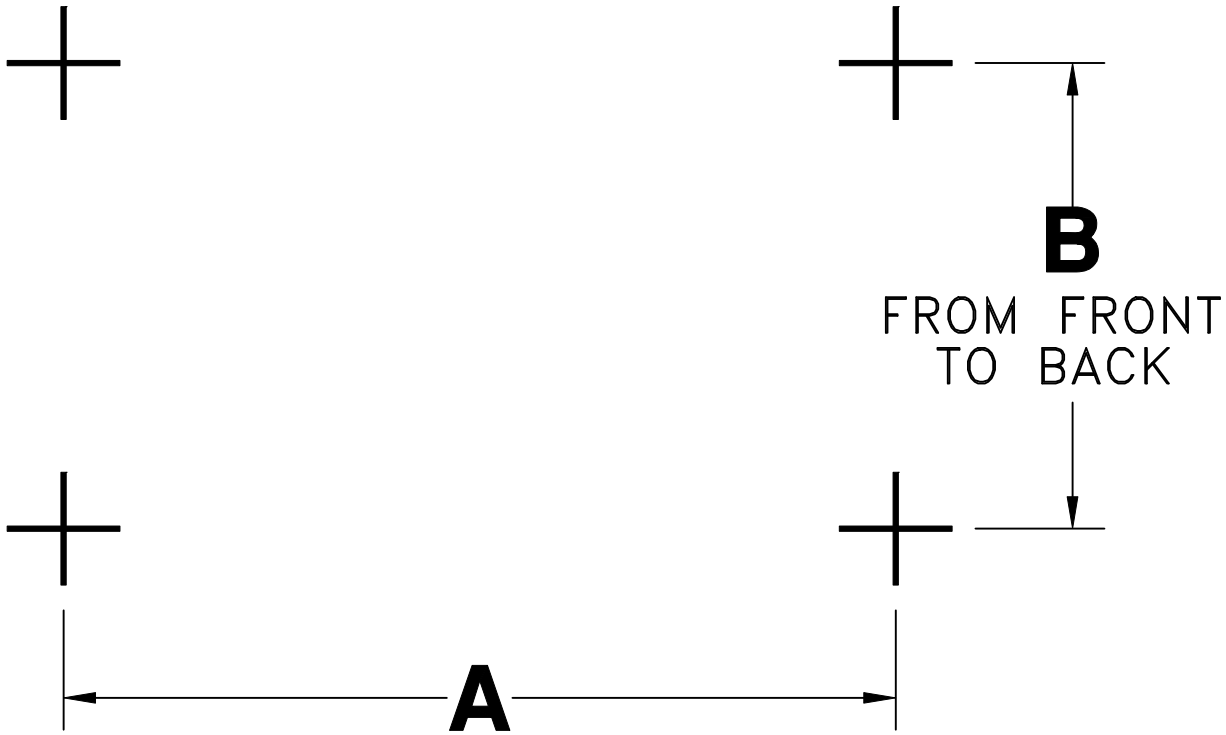
ANCHOR POINTS



Shear	A	B
48”	59”	30 1/2”
72”	86”	30 1/2”
96”	112”	32 1/2”
120”	137 1/2”	32 1/2”

>>>CAUTION<<<

Do NOT overtighten Legs to floor
Shim FLOOR TO MACHINE for Level Fit

NATIONAL

RATED AMPERAGES
MACHINE MODELS
NH4825, NH7225, NH9625, NH12025

3 PHASE MOTOR	VOLTS	AMPS (**1)	OVERLOAD
7.5 H.P.	208	21.4	LRD22
7.5 H.P.	220	20.4	LRD22
7.5 H.P.	480	10.2	LRD16
7.5 H.P.	575	8.2	LRD16

SINGLE PHASE MOTOR	VOLTS	AMPS (**1)	OVERLOAD
7.5 H.P.	230	29	LRD32

1. Amperages are based on use of BALDOR Electric Motors. Other motors, consult motor data plate.

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ELECTRICAL INFORMATION

1. Insure that Transformer PRIMARY VOLTAGE wiring is compatible with Commercial Power Being supplied.

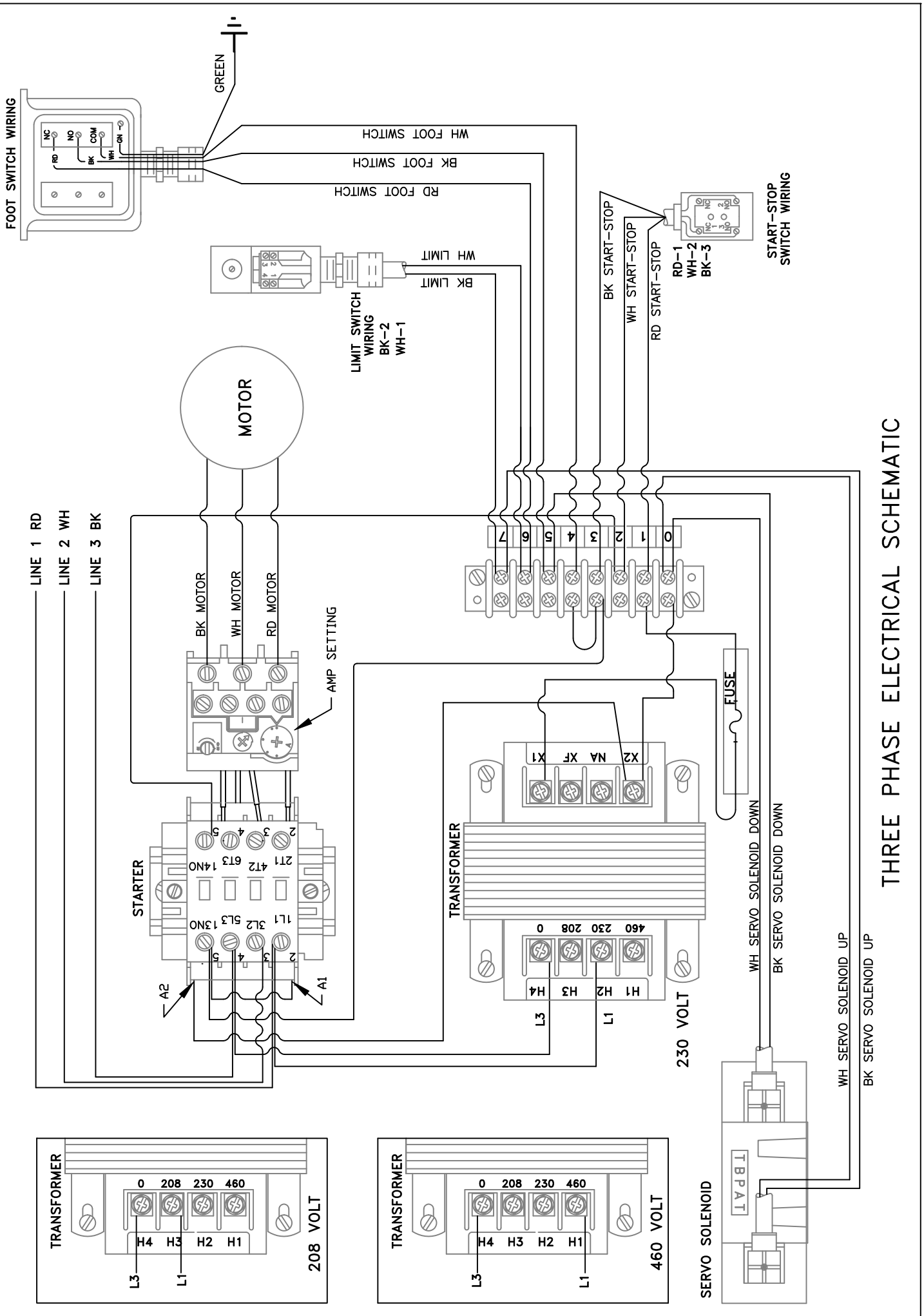
UNLESS OTHERWISE SPECIFIED THIS MACHINE HAS BEEN FACTORY WIRED AND SHIPPED 220 VOLTS ... 3 PHASE

2. Incoming Voltage lines shown below:
   (Local Codes prescribe Gauge and other Specifications for wiring to the machine. Consult the Amperage chart, Pg. 13 for your particular machine and voltage.)

3. Test voltage Lines for Readings as described below:

208 VOLT	220 VOLT	440 VOLT
L-1 to Gnd ... 115V	L-1 to Gnd ... 115V	L-4 to Gnd ... 277V
L-2 to Gnd ... 115V	L-2 to Gnd ... 220V	L-2 to Gnd ... 277V
L-3 to Gnd ... 115V	L-3 to Gnd ... 115V	L-3 to Gnd ... 277V

4. If IMPROPER Voltages are obtained, Consult Service Electrician or call Factory Representative.
5. Test RUN Motor (#64) (Briefly ON then OFF). Motor (#64) should run Clockwise when observed from the FAN housing. If Motor (#64) is running CCW, reverse L-1 and L-3
6. If you detect Excessive Noise, Squeal, or Chatter immediately **TURN MACHINE OFF** and consult The Trouble Shooting Guide.


THREE PHASE ELECTRICAL SCHEMATIC
FOOT SWITCH WIRING
NC
NO
COM
GN
RD
BK
WH
GREEN
WH FOOT SWITCH
BK FOOT SWITCH
RD FOOT SWITCH
LIMIT SWITCH WIRING
BK-2
WH-1
WH LIMIT
BK LIMIT
START-STOP SWITCH WIRING
RD-1
WH-2
BK-3
BK START-STOP
WH START-STOP
RD START-STOP
MOTOR
LINE 1 RD
LINE 2 WH
LINE 3 BK
BK MOTOR
WH MOTOR
RD MOTOR
AMP SETTING
STARTER
A2
A1
TRANSFORMER
230 VOLT
460 208 230 0
H1 H2 H3 H4
L3
L1
X2 NA XF X1
FUSE
WH SERVO SOLENOID DOWN
BK SERVO SOLENOID DOWN
WH SERVO SOLENOID UP
BK SERVO SOLENOID UP
SERVO SOLENOID
TBPAT
TRANSFORMER
208 VOLT
0 208 230 460
H4 H3 H2 H1
L3
L1
TRANSFORMER
460 VOLT
0 208 230 460
H4 H3 H2 H1
L3
L1

SET - UP PROCEDURE

SHEAR MACHINES

1. Prepare location for machine (See Safe Zone Diagram pg. 4 Machine Dimensions Chart pg. 9, and Anchor Points pg. 10 for proper positioning).
2. Install Anchors into floor at desired location.
3. Remove and properly dispose of all cardboard and metal wrap, inspect machine for damages and accountability of accessories.
4. Remove Front and Rear Panels (#83 & #84).
5. Unbolt Legs (#2L & #2R) from skid. Check for damages especially around Tank Bolt locations. Check for evident leaks around welds.
6. Carefully insert Fork Lift Tines or Sling Straps underneath TABLE (#1). **DO NOT LIFT MACHINE BY TANK ANGLES) (#66)**. Slowly lift and carefully position machine over Anchors.
7. **IMPORTANT** Shim FLOOR TO MACHINE for Level Fit. Do NOT draw machine Legs (#2L & #2R) down to floor as "BINDING" may result.
8. Tighten Anchor Bolts FIRMLY - **DO NOT OVERTIGHTEN...**
9. Check for excessive movement. Adjust as necessary for snug fit.
10. Fill Reservoir (#65) to proper level with Hydraulic Fluid. (See Recommended Lubricants, pg. 22)
11. Terminate incoming Electrical Connections. (See Electrical Information, pg.11-12-13 14)
12. Test run machine to determine if adjustments are necessary. Motor fan must be turning clockwise from rear of motor to operate. (See Adjusting procedures, pg. 16-17-18)
13. Read and understand **ALL SAFETY** notices attached to machine and herein enclosed.

1/4 " SHEARS
ADJUSTING PROCEDURES
GIB SLIDES

***NOTE - SHEAR IS PRESET AT FACTORY*

1. Loosen Lock Nuts on all Square head Gib Bolts (#89) on BOTH Legs (2L - 2R).

2. Tighten two (2) bolts randomly on each leg (#2 OR #2 & #3). **(DO NOT OVERTIGHTEN).**

3. "BUMP" tighten the remaining bolts to just beyond Finger Tight.

4. Loosen two (2) bolts previously tightened (2L – 2R) above and repeat "BUMP" Tighten procedure on all bolts. Insure that **ALL** bolts feel equal in pressure to allow a smooth travel of the Cutterhead (#4)

5. Exercise Machine listening for any indication of excessive movement and / or "DRYING" of slide areas.

6. Tighten Lock Nuts on Square Head Bolts (#89) on both Legs (2L – 2R).

CUTTERHEAD / BLADE ANGLE

1. Lower Cutterhead (#4) to extreme Bottom and turn machine OFF.
2. Visually check to insure the UPPER Blade (#10) passes LOWER Blade (#10) sufficiently to accomplish FULL Table (#1) Width Cut.

   If #2 above is satisfactory, no further Cutterhead (#4) Adjustments are Necessary…Correction procedures follow if Full Width Cut or Cutterhead (#4) Clearance is not adequate.

3. Loosen Lock Nuts on Pull Rod Assemblies (#33).

1/4" SHEARS CUTTERHEAD / BLADE ANGLE (CONTINUED)

4. Adjust "LOW END" (Right Side Facing) Blade (#10) clearance to the prescribed Height:

   9/16"

5. Raise or Lower "HIGH END" until there is a **MINIMUM. 003**" clearance between cutterhead (#4) and Leg (#2 or #2 & #3) at Gib slide area on either side or machine as viewed from the rear. (adjustments are made by turning the pull rod (#33**) CW or CCW** as necessary).
6. Test run machine, checking for smooth operation / travel and no apparent "DRYING" of slide areas or Gibs (#25). Insure that TOTAL Width cutting capability is obtained. (Top Blade (#10) Passes Lower Blade (#10)
7. Tighten Lock Nuts on Pull Rod Assemblies (#33).

BLADE GAP SETTINGS

1. Lower Cutterhead (#4) to Extreme Bottom and turn machine OFF.

2. Press HOLD "STOP" button (#84) and Depress and HOLD again.

3 Quickly release "STOP" button (#84) and depress and HOLD again. This releases all "upward" pressure on the table.

4. Loosen ALL Leg Bolts (#92) gently. Insure that table (#1) rests on all pads on legs (#2 or #2 & #3) as viewed from underside of machine. **SHIM FROM FLOOR AS NECESSARY.**

5. Loosen Socket Set Screws (#90) on both legs. Loosen Hex Bolts (#91) on both legs.

6 Tighten SSS (#90) on "Low End" leg (#2 or #2 & #3) until blades (#10) Touch then "Back OFF" approximately **.005"** with Hex Bolt (#91). Repeat this procedure on "High End".

7. Check **"CENTER"** for Parallel Alignment. If "BOW" is evident adjust Cutterhead Nut (#74) to align Blades (#10).

8. Adjust "High End" to specified Gap. Tighten Leg Bolts (#92).

9. As in #3 above, "BUMP" Cutterhead (#4) up until approximately 4 – 6 inches of blades (#10) have not passed. (**Do NOT Allow** Cutterhead (#4) to Advance Up to **STOP** Position).

BLADE GAP SETTINGS (continued)

10. Repeat Step #8 for "Low End".

11. Press and HOLD Foot Switch (#116) and repeat Step #2 and #3 until Cutterhead #4 is down approximately ½ the total travel distance.

12. Adjust the CENTER to the specified Gap with Nut (#74)

13. Repeat Step #11 until Cutterhead (#4) up and check "Low End".

14. As described, "BUMP" Cutterhead (#4) up and check "Low End".

15. Torque Leg Bolts (#91) approximately 120 pd @ 3 ft. bar end.

16. Test run checking for blade clearance end to end.

17. If Holddown assembly (#38) had been removed: Replace, Adjust, and Test Cut Material.

Blade Gap Settings

1/4" Shears .008 - .010

HYDRAULIC PRESSURE

1. **Install Fluid Gauge into Port below Pressure Relief Valve (#19) on Subplate Assembly (#18).**

2. **Relax Limit Switch Arm (#80) on Limit Switch (#81).**

3. **Loosen Lock Nut on Pressure Relief Valve (#19)**

4. **Turn machine ON and quickly adjust Pressure Relief Valve (#19) to prescribed Setting. Turn machine OFF.**

5. **Tighten Lock Nut and reset Limit Switch Arm (#80). Cutterhead (#4) should travel to extreme TOP position MINUS approximately .009". Exercise machine and listen for distinct differences in sound as machine stops at TOP. (Indicates Pressure By-Pass) Readjust Limit Switch (#81) as necessary to obtain proper cut off.**

HYDRAULIC PRESSURE SETTINGS

NH12025 HYDRAULIC SHEAR

1600 PSI

BLADE ROTATION

National Sheet Metal Machines, Inc., accepts no responsibility for any accident, injury, or damage caused by or resulting from improper or unsupervised Blade Rotation.

EXTREME CAUTION MUST BE OBSERVED AS BLADES ARE EXTREMELY SHARP AND DELICATE.

Standard Blades on ALL National Shears have four (4) available Cutting Edges.

1. Raise Cutterhead (#4) to it's Upper Most Position and Turn Machine OFF. DISCONNECT POWER from MAIN SOURCE.
2. Lock Cutterhead (#4) in position. It is recommended that a Wood 2" x 4" Brace be wedged under Cylinder Block (#28) (Left or Right Side) to the floor.
3. Remove Upper Blade (#10), clean and remove any burrs with emory stone, etc. Clean Blade Pad and flat file to remove burrs, etc.
4. Follow Step 4 for Bottom Blade (#10).
5. 1st ROTATION - Rotate Blades (#10) 180 degrees End to End (Left to Right)

   2nd ROTATION - Maintain same position as 1st Rotation above and LOWER Upper Blade to table (#1) and raise table blade to Cutterhead.

   3rd ROTATION - Repeat as 1st Rotation.
6. Adjust Table Blade (#10) LEVEL with Top of Table (#1). Lock Blade Bolts and Adjuster Nuts.
7. Raise Upper Blade (#10) to rest on Bumper Pad as much as Possible. Tighten Bolts.
8. Unlock Cutterhead (#4). Remove Locking Devise defined in Step 2.
9. Adjust Blade Gap Setting.
10. Replace Holddown Assembly, Adjust and Test.

1/4" SHEARS
PREVENTATIVE MAINTENANCE

1. Lubricate Machine often. Lubrication Points are shown on parts lists.
2. Maintain Hydraulic Fluid level as described in Recommended Lubricants. Recommend COMPLETE oil change after first 500 hours of operation and 2,000 hours thereafter.

3. Always keep Blades clean. Wipe DAILY with light weight lubricant. Keep blades SHARP, rotate as often as necessary. Sharp blades reduce Stress on Machine parts and helps to insure a long, Trouble - Free life for your machine.

RECOMMENDED LUBRICANTS TANK

Fill tank with Medium Weight Hydraulic Fluid (20 - 30 Wt. 220 SUS @ 100) to within (2) inches from top. Recommend Mobil AW 46, BP Energol HLPHD 46, Chevron 68, or Equivalent.

CUTTERHEAD & HOLDDOWN ASSEMBLY

Valvoline Multi - Purpose Lithium Grease PN: 609 or Equivalent

TREADLE ASSEMBLY

(All Moving Parts and Pins)

NAPA Dripless Oil, 3 in 1 Oil, or Equivalent

FLUID CAPACITIES

NH9625 / NH12025
Hyd Shears……App. 23 gal.

DO NOT FILL ABOVE LINE ON RESERVOIR
(App. 2" BELOW Top)
ALLOW FOR EXPANSION

Check Fluid Level Weekly
Change Fluid as recommended on pg. 22

ACCESSORIES INSTALLATION

(STANDARD EQUIPMENT)

FRONT ARM EXTENSIONS

1. Install Hex Bolts (#93) with Flat Washers (#93) into Tapped Holes adjacent to "T" slots in front of Table (#1).

2. Slip Extension Arm (#50) over Hex Bolts (#93) and line up "T" Slots.

3. Raise Extension Arm (#50) until FLUSH with Table (#1) Top, Tighten Hex Bolts (#93).

4. Repeat #1-2-3 above for all Extension Arms (#50) provided.

MANUAL BACK GAUGES

1. Slide Scaled Back Gauge Rods (#76) into large holes in back left And right side of Cutterhead (#4).

2. Push Back Gauge Blocks (#78) forward until Angle (#77) touches Table Blade (#10). Adjust Scaled Rods (#76) to "0" (first mark) and Tighten Set Screws in Cutterhead (#4).

3. Slide Back Gauge out to any point and Measure from Table Blade (#10) for accuracy to Rod (#76) to actual dimensions.

1/4" SHEARS
OPTIONAL ACCESSORIES

SQUARING ARM

1. Remove Scale (#24) from Left Side of Table (#1).
2. Install hex bolts with Flat Washers into Tapped Holes in front of Table (#1) (left).
3. Hang Squaring Arm over Hex Bolts. Tighten but allow for free Movement of Squaring Arm .
4. Install Squaring Arm Scale onto Table (#1). Square off Table Blade (#10) for accurate measurement, etc.
5. Lift Squaring Arm into position. (Scale should fit snug against Ridge On Arm).
6. Install Leg (short stud into Squaring Arm) adjust to floor for stability.

FRONT-OPERATED DIGITAL BACK GAUGE

(Available for ALL NATIONAL Hydraulic Models)

All Front Operated Digital Back Gauges are shipped with a **COMPLETE** and **Easy to Read** set of **INSTRUCTIONS.**

If you experienced ANY problems with the Installation or Operation of ANY NATIONAL Standard or Optional Standard or Optional Accessory, Call the Factory direct at **(931) 668-3643.**

You will be able to talk **DIRECTLY** to a qualified technician that will be able to rectify your situation.

TROUBLE-SHOOTING

(Most COMMON Problems Encountered)

1. **WILL NOT TURN ON**
   a.) Check CENTRAL Power Source (Circuit Breakers)
   b.) Check Starter TRIP Switch (Overload Heaters)
   c.) Check 6A Fuse in Electrical Box (#17)
   d.) Look for Loose or Disconnected wires in Electrical Box (#17)

2. **COMES ON BUT CUTTERHEAD (# 3) WILL NOT TRAVEL**
   a.) Check Motor (#20) Rotation - Should be clockwise looking from rear of machine (See Electrical Information)
   b.) Check for obstructions in Blade (#10) / Cutterhead (#4) travel areas
   c.) Check Fluid Level
   d.) Check SO Cable etc. to Foot Switch (#116)

3. **LOUD "CHATTER" IN MOTION (UP OR DOWN)**
   a.) Perform VOLTAGE Tests (See Electrical Information)
   b.) Test System Pressure (See Adjusting Procedures)

4. **LOUD "SQUEAL" WHILE ON**
   a.) Check FLUID level and condition
   b.) Check PVC Pick-Up tube for cracks and proper tightness
   c.) Inspect ALL hydraulic hoses for leaks

5. **WILL NOT MAKE FULL LENGTH CUT**
   a.) Inspect Blades (#10) for apparent Wear etc.
   b.) Check Blade (#10) GAP (See Adjusting Procedures)
   c.) Test System Pressure (See Adjusting Procedures)

6. **MACHINE CUTS OFF**
   a.) Check Limit Switch Arm (#80) for Adjustment
   b.) Perform Voltage Tests (See Electrical Information)
   c.) Consult Hydraulic Trouble-Shooting (Overheating)

LIMIT SWITCH TEST AND ADJUSTMENT

(1/4" Hydraulic Shears)

1. **Remove Rear Panel (#110)**

2. **Locate Limit Switch (#81) on lower section of Side Panel (#2), close to Electrical Box (#17) and Treadle Assembly (#12)**

3. **Turn Machine On**

   a.) Lift Limit Switch Arm (#80) approximately 1/2".

   b.) If no change is observed in sound of machine continue to (C-3) below.

   c.) Machine changes sound

      1.) Loosen 9/64” Allen Screw in center of Limit Switch Arm (#80).

      2.) Slide Limit Switch arm (#80) forward until noise level is again Reduced. Tighten Allen Screw.

      3.) Cycle machine to insure that Solenoid By-Pass (Noise Level Reduction) is obtained and that Cutterhead (#4) is in upper most Position as described on pg (#19) under (Cutterhead Blade Angle).

NATIONAL

Sheet Metal Machines, Inc.

HYDRAULIC

TROUBLE-SHOOTING GUIDE

AND MAINTENANCE HINTS

P. O. Box 72 • Smartt, TN 37378

TABLE OF CONTENTS

SECTION I – INTRODUCTION

1-1. GENERAL. The trouble-shooting charts and maintenance hints that follow are of a general system nature but should provide an intuitive feeling for a specific system. The more general information is covered in the immediately following paragraphs. Effect and probable cause charts appear in Section II.

1-2. SYSTEM DESIGN. There is, of course, little point in discussing the design of a system which has been operating satisfactorily for a period of time. However, a seemingly uncomplicated procedure such as relocating a system or changing a component part can cause problems. Because of this, the following points should be considered:

A. Each component in the system must be compatible with and form an integral part of the system. For example, an inadequate size filter on the inlet of a pump can cause cavitation and subsequent damage to the pump.

B. All lines must be of proper size and free of restrictive bends. Undersize or restricted line results in a pressure drop in the line itself.

C. Some components must be mounted in a specific position with respect to other components or the lines. The housing of an in-line pump, for example, must remain filled with fluid to provide lubrication.

D. The inclusion of adequate test points for pressure readings, although not essential for operation, will expedite trouble-shooting.

1-3. KNOWING THE SYSTEM. Probably the greatest aid to trouble-shooting is the confidence of knowing the system. Every component has a

purpose in the system. The construction and operating characteristics of each one should be understood. For example, knowing that a solenoid controlled directional valve can be manually actuated will save considerable time in isolating a defective solenoid. Some additional practices which will increase your ability and also the useful life of the system follow:

A. Know the capabilities of the system. Each component in the system has a maximum rated speed, torque, or pressure. Loading the system beyond the specifications simply increases the possibility of failure.

B. Know the correct operating pressures. Always set and check pressures with a gauge. How else can you know if the operating pressure is above the maximum rating of the components? The question may arise as to what the correct operating pressure is. If it isn't correctly specified on the hydraulic schematic, the following rule should be applied:

> The correct operating pressure is the lowest pressure which will allow adequate performance of the system function and still remain below the maximum rating of the components and machine.

Once the correct pressures have been established, note them on the hydraulic schematic for future reference.

C. Know the proper signal levels, feedback levels, and dither and gain settings in servo control systems. If they aren't specified, check them when the system is functioning correctly and mark them on the schematic for future reference.

1-4. DEVELOPING SYSTEMATIC PROCEDURES. Analyze the system and develop a logical sequence for setting valves, mechanical stops, interlocks, and electrical controls. Tracing of flow paths can often be accomplished by listening for flow in the lines or feeling them for warmth. Develop a cause and effect trouble-shooting guide similar to the charts appearing in Section II. The initial time spent on such a project could save hours of system down-time.

1-5. RECOGNIZING TROUBLE INDICATIONS. The ability to recognize trouble indications in a specific system is usually acquired with experience. However, a few general trouble indications can be discussed.

A. Excessive heat means trouble. A mis-aligned coupling places an excessive load on bearings and can be readily identified by the heat generated. A warmer than normal tank return line on a relief valve indicates operation at relief valve setting. Hydraulic fluids which have a low viscosity will increase the internal leakage of components resulting in a heat rise. Cavitation and slippage in a pump will also generate heat.

B. Excessive noise means wear, mis-alignment, cavitation or air in the fluid. Contaminated fluid can cause a relief valve to stick and chatter. These noises may be the result of dirty filters, or fluid, high fluid viscosity, excessive drive speed, low reservoir level, loose intake lines, or worn couplings.

1-6. MAINTENANCE. Three simple maintenance procedures have the greatest effect on hydraulic system performance, efficiency, and life. Yet, the very simplicity of them may be the reason they are so often overlooked. What are they? Simply these:

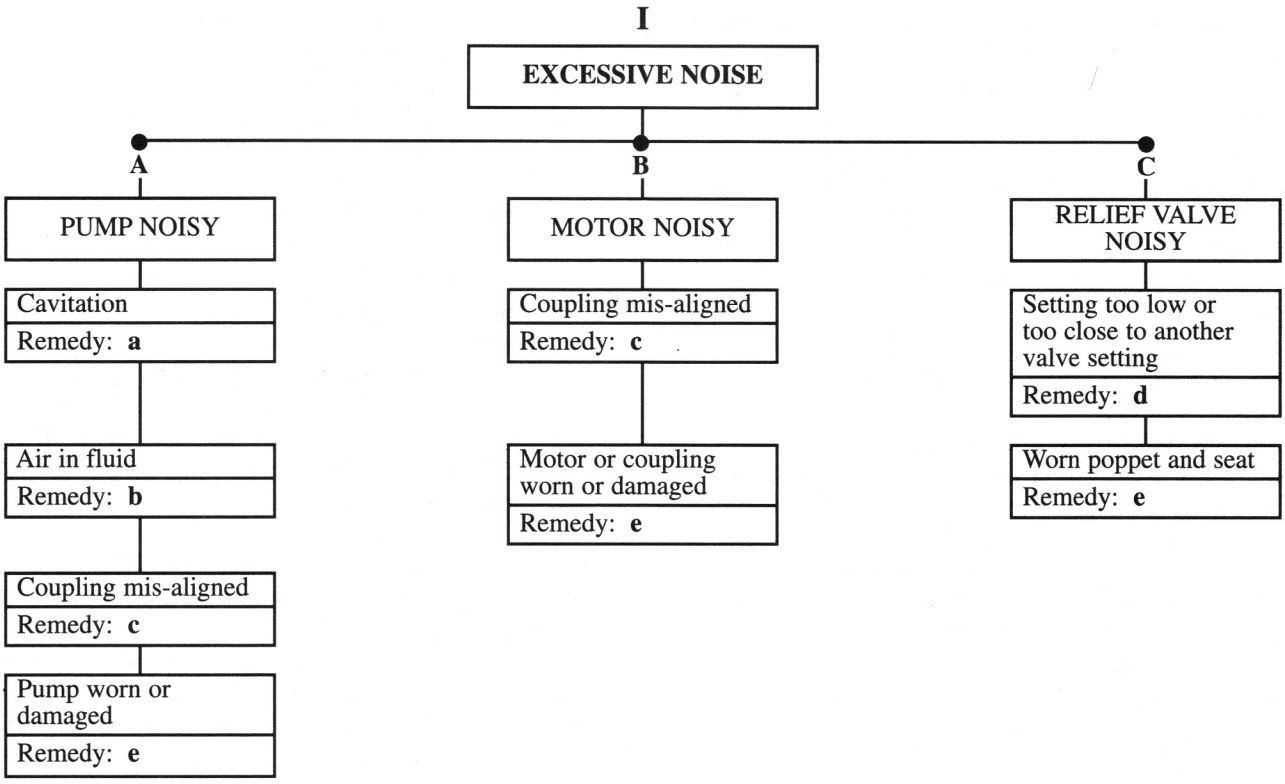
A. Maintaining a clean sufficient quantity of hydraulic fluid of the proper type and viscosity.

B. Changing filters and cleaning strainers.

C. Keeping all connections tight, but not to the point of distortion, so that air is excluded from the system.

SECTION II – TROUBLE-SHOOTING GUIDE

2-1. The following charts are arranged in five main categories. The heading of each one is an effect which indicates a malfunction in the system. For example: if a pump is exceptionally noisy, refer to Chart I titled EXCESSIVE NOISE. The noisy pump appears in Column A under the main heading. In Column A there are four probable causes for a noisy pump. The causes are sequenced according to the likelihood of happening or the ease of checking it. The first cause is cavitation and the remedy is "a". If the first cause does not exist, check for cause number 2, etc.



REMEDIES:

a. Any or all of the following: Replace dirty filters - Wash strainers in solvent compatible with system fluid - Clean clogged inlet line - Clean reservoir breather vent - Change system fluid - Change to proper pump drive motor speed - Overhaul or replace supercharge pump - Fluid may be too cold

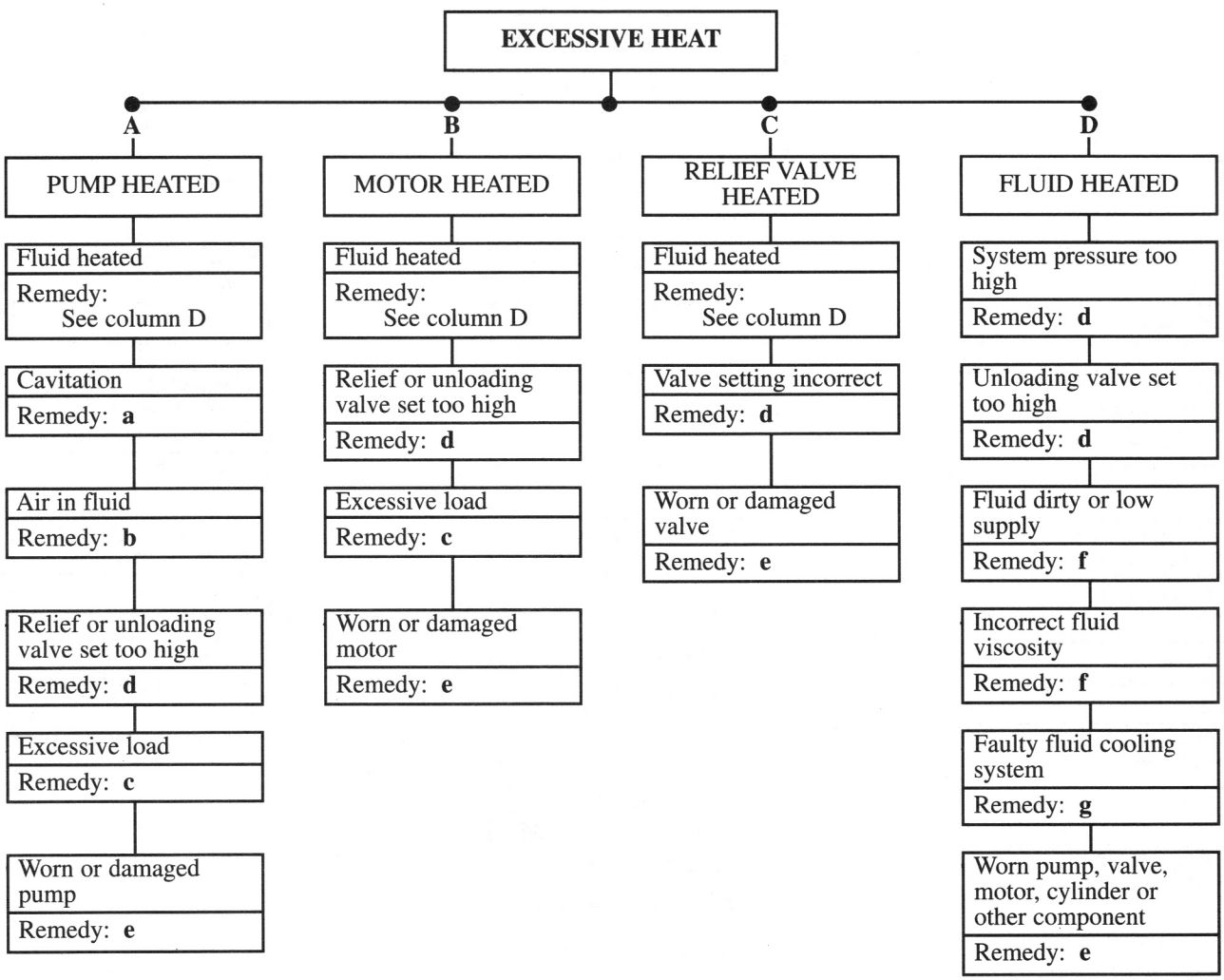
b. Any or all of the following: Tighten leaky inlet connections - Fill reservoir to proper level (with rare exception all return lines should be below fluid level in reservoir) - Bleed air from system - Replace pump shaft seal (and shaft if worn at seal journal)

c. Align unit and check condition of seals, bearings and coupling

d. Install pressure gauge and adjust to correct pressure

e. Overhaul or replace

II



REMEDIES:

a. Any or all of the following: Replace dirty filters - Clean clogged inlet line - Clean reservoir breather vent - Change system fluid - Change to proper pump drive motor speed - Overhaul or replace supercharge pump

b. Any or all of the following: Tighten leaky inlet connections - Fill reservoir to proper level (with rare exception all return lines should be below fluid level in reservoir) - Bleed air from system - Replace pump shaft seal (and shaft if worn at seal journal)

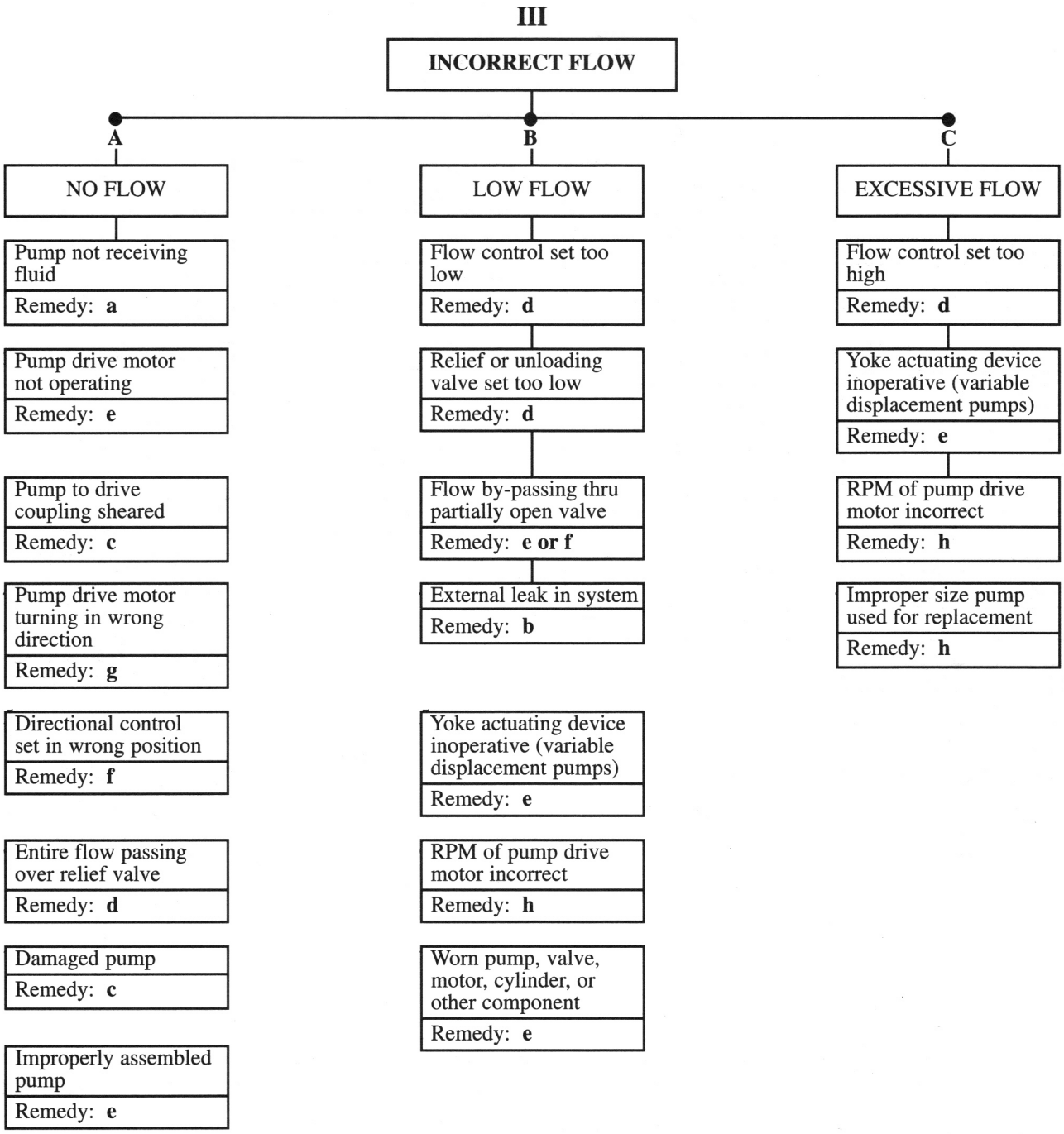
c. Align unit and check condition of seals and bearings - Locate and correct mechanical binding - Check for work load in excess of circuit design

d. Install pressure gauge and adjust to correct pressure (Keep at least 125 PSI difference between valve settings)

e. Overhaul or replace

f. Change filters and also system fluid if of improper viscosity - Fill reservoir to proper level

g. Clean cooler and/or cooler strainer - Replace cooler control valve - Repair or replace cooler



REMEDIES:

a. Any or all of the following: Replace dirty filters - Clean clogged inlet line - Clean reservoir breather vent - Fill reservoir to proper level - Overhaul or replace supercharge pump

b. Tighten leaky connections - Bleed air from system

c. Check for damaged pump or pump drive - replace and align coupling

d. Adjust

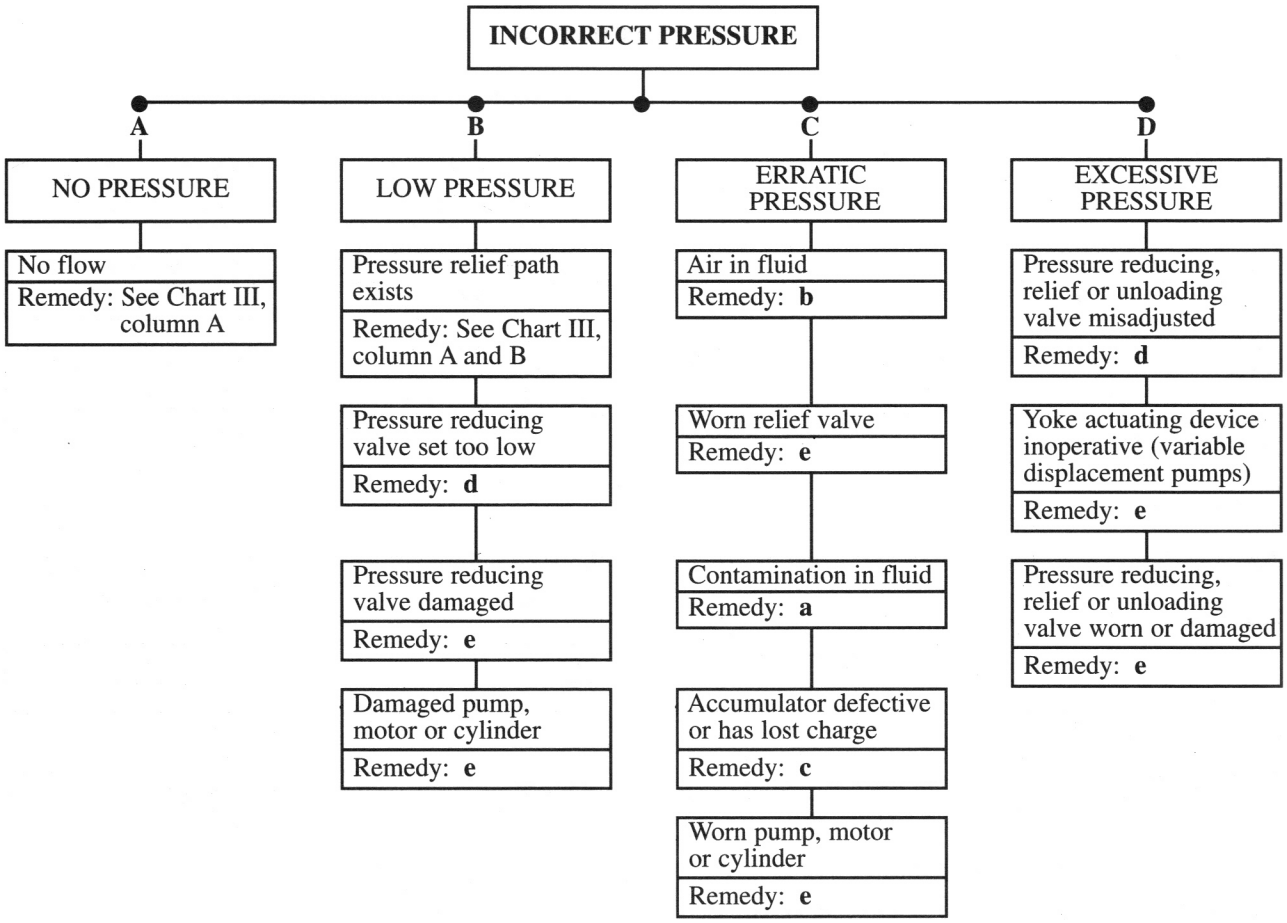
e. Overhaul or replace

f. Check position of manually operated controls - Check electrical circuit on solenoid operated controls - Repair or replace pilot pressure pump

g. Reverse rotation

h. Replace with correct unit

IV



REMEDIES:

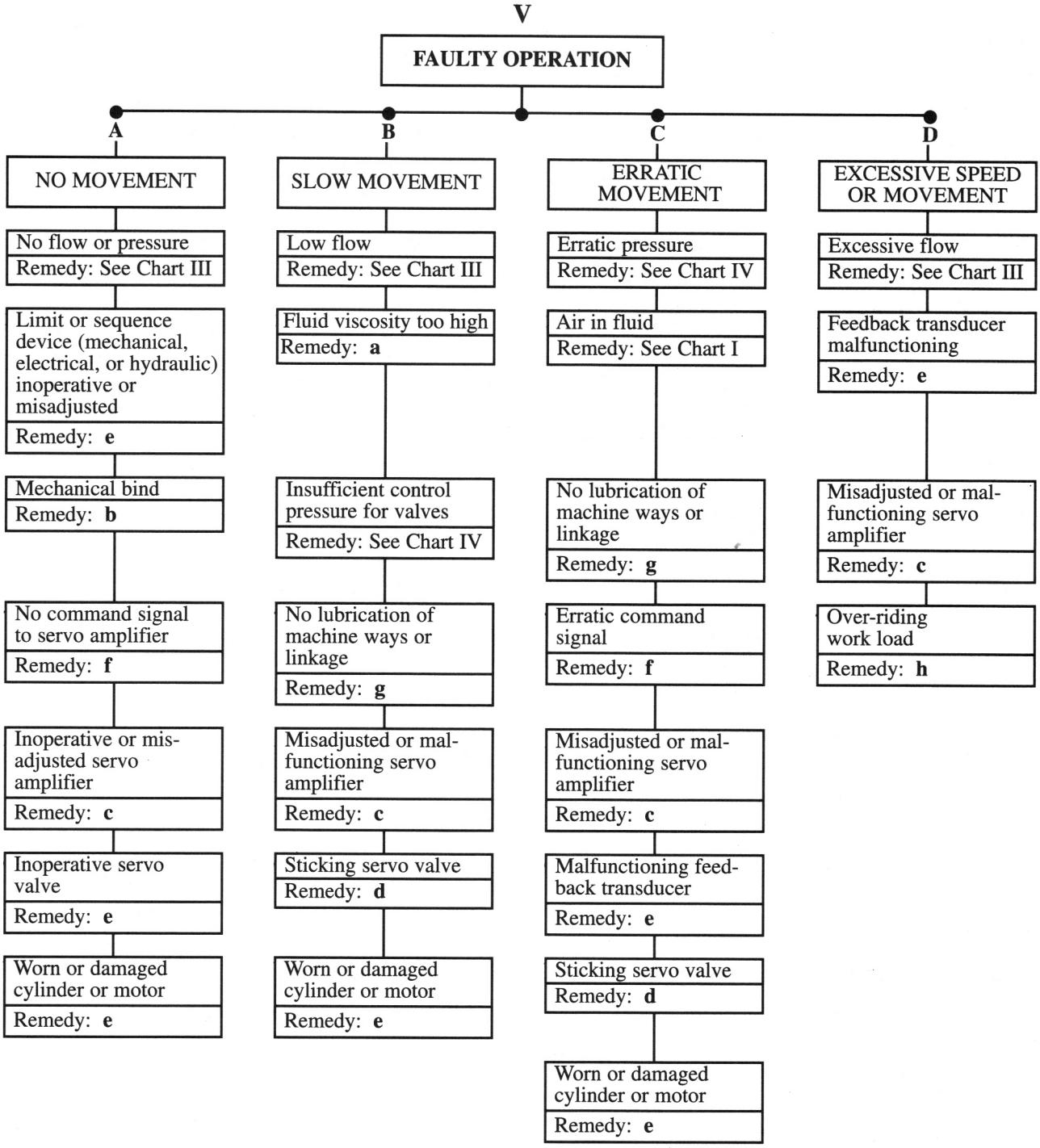
a. Replace dirty filters and system fluid

b. Tighten leaky connections (fill reservoir to proper level and bleed air from system)

c. Check gas valve for leakage - Charge to correct pressure - Overhaul if defective

d. Adjust

e. Overhaul or replace



REMEDIES:

a. Fluid may be too cold or should be changed to clean fluid of correct viscosity

b. Locate bind and repair

c. Adjust, repair, or replace

d. Clean and adjust or replace - Check condition of system fluid and filters

e. Overhaul or replace

f. Repair command console or interconnecting wires

g. Lubricate

h. Adjust, repair, or replace counterbalance valve.

WARRANTY

National Sheet Metal Machines, Inc. warrants this product to be free of defects in material and / or workmanship for a period of THREE (3) YEARS from the date of purchase. National Sheet Metal Machines, Inc. promises to replace any of this product that proves upon our inspection and within THREE (3) YEARS from date of purchase to be defective in material or workmanship. National Sheet Metal Machines, Inc. will honor a LIFE TIME WARRANTY on breakage of ***Steel*** Cutterhead, Table, Holddown and Side Panels for original purchaser of machine and a (60) day Warranty on Electronics on all Shear machines.

All labor and / or transportation cost or charges incidental to warranty service are at the expense and shall be borne by the Purchaser / User.

In NO event shall National Sheet Metal Machines, Inc. be liable for incidental or consequential damages, for damages as a result of neglect, misuse, abuse, or alterations of any kind to the machine.

No person is authorized to change, add to, or create any warranty of obligation other than that set forth herein.

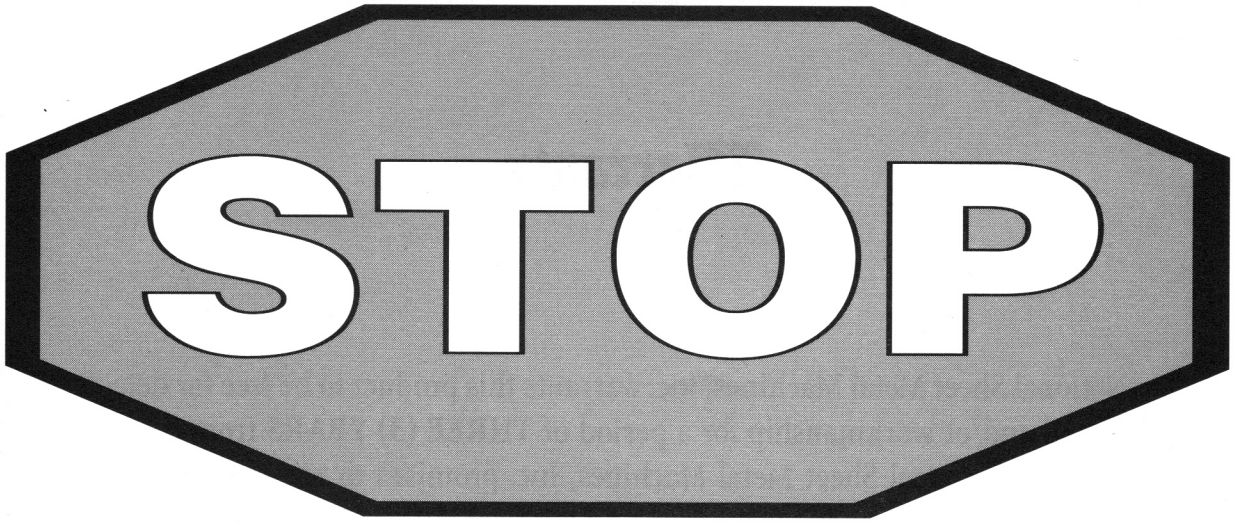
This machine is designed for and has been factory tested to cut Mild Steel of Low Carbon (20 - 25%) composition.

It is the Purchaser / User's sole responsibility to obtain material that is AT or BELOW specified standards.

National Sheet Metal Machines, Inc. accepts NO liability or assumes any responsibility for damages, accident or injury, or any charges incurred as a result of this machine.

To obtain Warranty service, contact the dealer from which machine was purchased.

MADE IN USA



TO INSURE SAFE OPERATION AND TO OBTAIN PROPER CUT, THIS MACHINE MUST BE LEVEL AND SECURELY ANCHORED TO THE FLOOR.

SEE SET-UP INSTRUCTIONS IN OPERATOR'S MANUAL