



Owner's Manual

VCL (ONEWAY 2-STAGE PLOW)



Record the MODEL and SERIAL NUMBER of equipment for parts ordering information.

PURCHASED FROM: _____

DATE: _____

MODEL: _____

SERIAL NUMBER: _____



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VIKING-CIVES LTD. (Canada)
MOUNT FOREST, ONTARIO
TELEPHONE (519) 323-4433



*****LIMITED WARRANTY*****

VIKING-CIVES LTD. (Canada) warrants products of its manufacture against defects in workmanship and material for a period of one year from date of shipment to customer; and in consequence of this warranty, any component part or parts of such products proving defective within the above specified time will be repaired or replaced by **VIKING-CIVES LTD. (Canada)**. This warranty will not apply to any product, which have been repaired or altered outside of the **VIKING-CIVES LTD. (Canada)** factory in any way so as, in **VIKING-CIVES LTD. (Canada)** sole judgment, to affect its stability or reliability, nor which has been subjected to misuse, negligence or accident.

The obligations of **VIKING-CIVES LTD. (Canada)** under this limited warranty are limited to the replacement of defective parts as set forth above; such obligations are exclusive and in lieu of all other remedies, warranties, guarantees or liabilities, express or implied, with respect to each product delivered hereunder, arising by law or otherwise (including without limitation any obligation or liability of **VIKING-CIVES LTD. (Canada)**, arising from negligence or with respect to fitness for a particular purpose, merchantability, loss or use, revenue, or profit, or any incidental, indirect, special or consequential damages or injuries, even if **VIKING-CIVES LTD. (Canada)** has been advised of the possibility of such damages or injuries; and all other remedies, warranties, guarantees, or liabilities are hereby expressly excluded and disclaimed. This limited warranty shall not be extended, altered, or varied except by a written instrument signed by **VIKING-CIVES LTD. (Canada)**.

VIKING-CIVES LTD. (Canada) assumes no responsibility for engines, electrical equipment, or any other equipment and accessories not manufactured by **VIKING-CIVES LTD. (Canada)**.



IDENTIFICATION OF EQUIPMENT

Your specific unit is identified by a unique serial number. *To ensure accurate service, your Viking-Cives representative will need this identification number whenever parts and/or service is required.* All units assembled at Viking-Cives Ltd., Mt Forest, ON will have a National Safety Mark label inside the driver's door. Refer to sample label shown below. Your identification number will be in the following format:

Date of Manufacture prior to 2002	Date of Manufacture after 2002
99-000 (1999)	E 00001
20-000 (2000)	
21-000 (2001)	

MANUFACTURED BY / FABRIQUÉ PAR: VIKING-CIVES LTD. MOUNT FOREST ON				
TYPE:	V.I.N. / N.I.V.:		COLD INFL. PRESS. / PRESS. DE GONF. À FROID PSI/LPC KPA	
GVWR / PNBV:	KG	DATE:		
GAWR / PNBE	TIRE / PNEU	RIM / JANTE		
FR/AV	KG			
INT 1:	KG			
INT 2:	KG			
RR/AR:	KG			

E 00001
99-000
20-000

In order to provide accurate service, you may also be asked to provide your individual equipment Model and Serial No. The information required to identify the equipment may be found on the serial number tag secured to the equipment.

VIKING-CIVES, LTD.

Mt. Forest, Ontario, Canada

Model

Serial No.

Example:

Model 500HD
Serial 00001



ORDERING PARTS

Delays and errors can be eliminated when ordering instructions are followed correctly.

1. Place orders direct with your nearest dealer, or contact Viking-Cives Group for assistance.
2. State Company name, address, and postal/zip code.
3. Give the exact model and serial number of the equipment and/or unit identification number.
4. Furnish part number, description, and quantities required. Print or type order clearly.
5. Give specific shipping instructions.



VIKING-CIVES LTD. - Mount Forest, Ontario, Canada N0G 2L0;

VIKING-CIVES (USA) - Harrisville, New York 13648;

VIKING-CIVES MIDWEST INC. - Morley, MO 63767;

VIKING-CIVES of WESTERN NEW YORK - Batavia, NY 14020

Ph. (519) 323-4433, Fax (519) 323-4608

Ph. (315) 543-2321, Fax (315) 543-2366

Ph. (573) 262-3545, Fax (573) 262-3369

Ph. (585) 344-7122, Fax (585) 344-7157

Dealer	
Address	
Phone:	
Toll Free:	
Fax:	



WARRANTY REQUEST PROCEDURE

To obtain warranty consideration one must provide VIKING-CIVES LTD with required information including unit identification number, date of manufacture and individual model and serial numbers.

TO OBTAIN PARTS WARRANTY CONSIDERATION:

1. Contact VIKING-CIVES LTD customer service to obtain a Return Material Authorization (RMA) number. Any product arriving at VIKING-CIVES LTD without an RMA number will be rejected and returned to the sender at the sender's expense.
2. Goods are to be shipped prepaid to VIKING-CIVES LTD, Mount Forest, Ontario, Canada. **All items should be clearly marked with the appropriate RMA number.**

When a replacement item is supplied prior to return of the defective part for warranty consideration the following additional steps will occur:

- a. An invoice will be generated for the value of the replacement item(s).
 - b. The defective part(s) must be returned prepaid to VIKING-CIVES LTD.
3. Upon receiving the defective part(s), VIKING-CIVES LTD will issue and process a Discrepant Material Report (DMR). Once the evaluation of the DMR report is complete and the parts are deemed warranty, a credit will be issued against the outstanding invoice. **If the part(s) are deemed Non-warranty, the invoice will remain outstanding to be paid to VIKING-CIVES LTD.** Any part(s) to be returned to the customer will be at the customer's expense.

TO OBTAIN PARTS & LABOUR REPAIR WARRANTY CONSIDERATION:

All repairs considered for warranty that are performed outside of VIKING-CIVES LTD require prior written authorization from VIKING-CIVES LTD. Failure to obtain written warranty authorization prior to repairs may result in the rejection of the warranty claim. NOTE: VIKING-CIVES LTD warranty labour rates will apply unless specifically determined otherwise.

1. Contact your VIKING-CIVES Customer Service Department to obtain a Warranty Claim Form (WCF) and warranty authorization number.
2. Fill out all required WCF information and fax or mail the completed form to VIKING-CIVES LTD, attention Customer Service Department.
3. Once the WCF report has been reviewed, warranty authorization will be granted or denied. Any part(s) involved in a WCF request must follow the Parts Warranty Consideration procedures.

FOR WARRANTY REQUESTS PLEASE CONTACT:

VIKING-CIVES LTD. - Mount Forest, Ontario, Canada N0G 2L0;
VIKING-CIVES (USA) - Harrisville, New York 13648;
VIKING-CIVES MIDWEST INC. - Morley, MO 63767;
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Ph. (585) 344-7122, Fax (585) 344-7157



INTRODUCTION

The purpose of this manual is to assist in assembling, mounting, operating, and maintaining your new Viking-Cives Snow & Ice Control Equipment. It has been prepared to familiarize operators and service people with the design features of the unit, and to instruct the proper installation, operation and maintenance.

The illustrations and data used in this manual were current at the time of printing, but due to possible engineering and/or production changes, the actual product may vary slightly in detail. Viking-Cives reserves the right to redesign and/or change components as may be necessary without notification.

Read this manual carefully before operating and servicing your Snow & Ice Control Equipment. Remember that you are working with heavy equipment that can injure you or someone else. Following the procedures carefully can help lessen the chance of injury.

Throughout this manual, references may be made to the following terms.

Prime Mover	The chassis/vehicle to which this product is attached.
Right, Left, Front, Rear, Drivers Side, Curb Side	Directions as determined in relation to the operator when seated in the normal operation position.
IMPORTANT	Precautions that must be followed to prevent damage to equipment.
NOTICE	Precautions that must be followed to prevent substandard performance.

A WORD ABOUT SAFETY

The equipment described in this manual is normally being operated in adverse winter conditions with bad weather, snow and ice. Due to these adverse operating conditions it is important that you, the operator, use good safety practices at all times to protect yourself, co-workers and others when using the equipment.

It is not practical or possible to warn you about all the hazards associated with the operation and maintenance of this equipment. You should always use your own good judgment supplemented with the information found on the safety decals; instructions in this manual; your employer's safety programs; safety codes; local, state/provincial, and federal laws, rules and regulations.

Remember at all times that as the operator you are responsible for the safe operation of this equipment and responsible for the safety of others. Good safety practices not only protect you, but also protect the people around you.

DEFINITION OF SAFETY TERMS AND SYMBOLS

Throughout this manual, the terms **CAUTION**, **WARNING**, and **DANGER** are used to indicate the degree of hazard to personnel if proper safety procedures are not followed. These words will be used in conjunction with the Safety Alert Symbol: a dark triangle containing a white exclamation mark.



The Safety Alert Symbol means: **ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED!**

NOTE	Identifies tips, helpful hints, and maintenance information the owner/operator should know. May be used to alert against unsafe practices that may result in non-personal injury or damage.
CAUTION	Indicates a potentially hazardous situation that, if not avoided, <u>MAY</u> result in minor or moderate injury.
WARNING	Indicates an imminently hazardous situation that, if not avoided, <u>COULD</u> result in death or serious injury.
DANGER	Indicates an imminently hazardous situation that, if not avoided, <u>WILL</u> result in death or serious injury.



SAFETY INSTRUCTIONS



WARNING:

Obey all the safety instructions listed in this section and throughout this manual. Failure to obey instructions in this section could result in death or serious injury.



WARNING:

If incorrectly used, this equipment can cause severe injury. To avoid possible injury, anyone operating or servicing this equipment must read this manual and follow the safety procedures related to this equipment.

BEFORE ATTEMPTING ANY TYPE OF ASSEMBLY, OPERATION, MAINTENANCE, OR OTHER WORK ON OR NEAR THIS PRODUCT:

- READ AND COMPLETELY UNDERSTAND THIS MANUAL.
- READ AND COMPLETELY UNDERSTAND THE MANUALS PROVIDED WITH YOUR PRIME MOVER/VEHICLE.
- Read and understand all safety signs on this product and on your prime mover/vehicle.
- Know all your controls and know how to quickly stop all equipment or vehicle movement in case of an emergency.
- Know and follow good work practices when assembling, mounting, maintaining, repairing, removing, and storing this product.
- Never allow anyone, except the operator, to be around the prime mover or this product when either is in motion.
- Do not start-up unless others are clear of the work area.
- Do not stand or climb on this product.
- All decals must be kept clean and complete. Replace any decals that are unreadable.

SUGGESTED LOCKOUT PROCEDURE

Before leaving the operator's position or beginning any type of work on this product:

1. Lower all attachments to the ground.
2. Apply the prime mover's parking brake, stop the engine and remove the starter key.
3. Wait for all moving parts to stop.
4. Relieve all pressure in the hydraulic system.



WARNING:

After following Lockout Procedures, pneumatic pressure may be present in the system. As air pressure is relieved, component motion may occur. Extreme caution must be used when servicing pneumatic systems.



DANGER:

Springs may be present throughout the equipment, including brake chambers used in the design of the Pro-line tailgate locks. Springs under pre-load pressure may not be secured by following Lockout Procedures. **Viking-Cives Ltd does not recommend or encourage tampering with and/or servicing spring loaded mechanisms without comprehensive training. Mishandling could result in severe injury..**



DAILY INSPECTION AND LUBRICATION

Daily inspection along with periodic preventive maintenance will reduce the chance of any major repairs and down time during equipment use. Before any plow is attached to the vehicle, all equipment should be inspected and checked to ensure that everything is in safe operating condition. Any and all defects, when noted, should be scheduled for repair or immediate replacement. The following checklist should be performed prior to and at the completion of each plowing shift to ensure operational readiness.

1. Check the fluid level in the hydraulic oil reservoir. If the sight gauge indicates low oil level, add the appropriate amount of the specified hydraulic fluid.
2. Grease all required components:
 - All plow harness sheave nipples.
 - All hydraulic pump drive shaft nipples.
 - Front and rear tower sheaves and swivel blocks.
 - Wing extension arm nipples.
 - Front and rear tower guide tracks.
 - All front harness pivot points.
3. Check all components for loose and/or missing fasteners. Tighten and/or replace as necessary.
4. Visually inspect all hydraulic connections and hoses for cracks and/or leaks.
5. Check all cables, chains and sheaves for excessive wear or damage.
6. Visually inspect all caution and warning decals. All decals should be complete and legible. If cleaning the decals does not make them legible, install new decals.
7. Visually inspect plow and wing units. Check cutting edges and shoes for signs of excessive wear and replace as necessary. Some cutting edges may be rotated or "flipped over" to use the opposite side edge.
NOTE: Do not allow cutting edge to wear down to mounting angle. Any wear to the mounting angle may affect the operation and safety of the equipment. Replacement is costly.

GENERAL OPERATING INSTRUCTIONS

1. The operator should familiarize himself with all equipment prior to operation. The cab controls are placed at a comfortable reach of the operator, with an allowable amount of adjustment. If necessary, the controls can be adjusted for either driver or passenger use.
2. The in-cab control levers are clearly marked as to the equipment/function they control.
3. To raise the plow or wing, pull back on the appropriate control lever, to lower the plow or wing, push the control lever forward.
NOTE: The in cab controls are proportional to the hydraulic valve, therefore the further the control lever is moved the faster the plow or wing will raise or lower.
4. Listen for any unusual sounds which may indicate worn or damaged parts. Repair and/or replace as necessary.



INSTALLATION



**SAFETY FIRST!!
READ AND UNDERSTAND THE SAFETY INSTRUCTIONS BEFORE PROCEEDING WITH ANY
INSTALLATION.**

Viking-Cives LTD manufactures various models of front one-way plows. While each of these plows vary in style from one model to the next, the basic installation process remains the same for all models.

NOTE: These installation instructions are intended as a guide to aid in the mounting of your Viking-Cives **One-way Plow**. All dimensions provided in these instructions are approximate and could vary due to variables such as: chassis make and model, tire size, type of suspension, customer preference, and/or unknown interference caused by immovable attachments. Viking-Cives LTD assumes no responsibility/liability for improper plow installation, unless installed by Viking-Cives LTD.

ATTACHMENT TO PRIME MOVER

During the initial installation of the plow to the vehicle, some adjustments will be necessary to insure proper operation of the plow and trip mechanisms. **WARNING: When plow is being raised, lowered or reversed – STAND CLEAR!**

The proper installation and setup of the one-way plow is critical in order to achieve the desired plowing results. The installation of the plow on the truck and the adjustment of the moldboard must be performed on a flat, level hard surface, such as a concrete garage floor or paved area as follows.

SNOW PLOW MOUNTING

1. Set plow unit on a firm, level surface (such as a concrete garage floor or paved area) that is large enough to safely accommodate this product.
2. Drive the prime mover into position. Connect the plow drive frame to the vehicle push harness, this is done by inserting the drive pins/bars (which are chained to the push harness) thru the holes in the drive swivel, secure with lynch pins.



**DANGER
NEVER STAND BETWEEN THE PRIME MOVER AND THE PLOW DRIVE FRAME WHEN THE
VEHICLE IS BEING MOVED INTO POSITION.**

3. Before connecting the drive frame to the push harness, shut the vehicle engine down and make sure that the parking brake is engaged.
4. The drive lugs of the plow swivel are to be pinned to the set of mounting holes in the vehicle push-plate which are closet to 21 inches +/- 1.5 inches), greater height variances should be corrected prior to plow hookup. Before measuring push height, it is important to ensure that the plow unit is properly ballasted. If the plow is equipped with a Quick-tac swivel, drive height will be have been pre-selected for you.
5. With the lift cylinder fully retracted, attach the appropriate links in the lift chains to the grab links on the lifting arm. Adjust the chains to ensure that the plow lifts with the intake nose slightly higher than the discharge end of the plow. *When the plow lift has been properly adjusted, the cable/chain links should be marked with paint to ensure quick and easy remounting of the plow when required.*
6. Adjustable push-frame shoes are provided to stabilize the plow and carry the drive frame when trip action takes place. With the plow down and the lift chains slack, ensure that the drive frame shoes are adjusted so that they have a clearance of 3/16 to 1/4-inch from the pavement (*a piece of plywood will facilitate this*). Although under some plowing conditions other settings may be required.



WARNING

IMPROPERLY ADJUSTED OR MISSING SHOES CAN RENDER THE TRIP MECHANISM INEFFECTIVE, WHICH CAN LEAD TO AN EXTREMELY DANGEROUS CONDITION.

7. The push frame shoes should be mounted in such a way that the shoe tips up at the front when the plow is raised. The shoe-mounting bracket may be offset in order to accomplish this requirement.
8. Adjusting the cutting edge attack angle is accomplished using the pinning holes in the telescopic moldboard standoff arm. Lengthening the arm will increase the attack angle, while shortening the arm will decrease the attack angle. Approved cutting angles are 50-degrees from vertical for tungsten carbide blades and 45-degrees for standard or hardened steel blades. NOTE: For tungsten carbide blades, any other attack angles may cause the inserts to "chatter" and break prematurely. A simple magnetic angle gauge is used for measuring these angles (McMaster-Carr #2150A25).
9. The compression trip assemblies should be pre-assembled with an initial compression or spring pre-load factory set. If adjusting or repairing the spring assemblies the spring cap should be tightened until the compressed spring length is 12-3/4 inches. The spring free length under no compression is approximately 14 inches.

DISCONNECTING THE PLOW

Disconnecting the plow can be accomplished easily by reversing the procedure set out in the mounting instructions previously mentioned as follows:

1. Transport plow to an accessible location.
2. Block pushframe.
3. Lower lifting arm.
4. Remove drive pins connecting pushframe to vehicle push-plate.
5. Disconnect lift chains (ensure that the links have been marked to facilitate easy future hook-up).
6. Back vehicle away from plow.



DAILY INSPECTION INSTRUCTIONS

Before any plow is attached onto the vehicle, all equipment should be thoroughly inspected and checked to ensure that everything is in safe operating condition. Any and all defects, when noted, should be scheduled for repair(s) and/or immediate replacement. The following checklist should be performed prior to and at the end of each plowing shift, to ensure operational readiness when required.

1. The operator(s) should familiarize themselves with all equipment and safety procedures prior to plow operation.
2. Inspect plow(s) for damaged or worn cutting edges, wear shoes and bent or broken nose shoe.
3. Inspect plow(s) for torn and/or split deflectors.
4. Inspect push-frame for signs of damage such as broken or worn bolts and pins, cracked welds, bent sections and/or excessive rusting.
5. Inspect compression trip mechanisms for damage such as broken springs, cracked welds, or missing bolts/nuts. Note: Tripping mechanisms should be disassembled, cleaned and lubricated annually.
6. Inspect moldboard(s) for signs of damage such as cracked welds, bent or broken sections and excessive rusting.
7. If the moldboard cutting edge is not straight: the maximum deflection, which can be tolerated, is +/- 3/4 inch from the horizontal.
8. Inspect mounting holes on the push-plate, standoff arm and trip lugs for excessive wear. Holes having greater than 3/16-inch clearance are to be repaired.
9. Inspect plow(s) for broken, worn or stretched lift chains, grab links and clevises.
10. Inspect plow assembly to ensure that all fasteners: bolts, nuts, cotter pins, lock rings, etc. are properly secured. Replace any components that are damaged and/or missing.



MAINTENANCE



**SAFETY FIRST!!
READ AND UNDERSTAND THE SAFETY INSTRUCTIONS BEFORE PROCEEDING WITH ANY
INSTALLATION.**

In preparation for the snowplowing season a visual equipment inspection must be performed. Look for any damaged components, bends, cracked welds, hydraulic leaks, etc. Inspect all fasteners; tighten any that have loosened and replace any that are damaged. Check all hydraulic hoses for cuts, cracks and/or leaks. Visually check plow lift chains and cable(s) for loose clamps and frays. **Immediately replace any damaged chains and/or frayed cables.** On plows with push frame mounted shoes, check shoes for wear and all shoe mounting bolts for tightness and/or proper adjustment. Correct shoe height setup is critical for plow operation and performance.

Periodically during plowing, stop to inspect plow cutting edges and moldboard/push frame shoes for wear. At the first sign of excessive wear, discard and replace with new parts. When the plow is disconnected from the prime mover, be sure to couple the hydraulic hoses together, to prevent damage to the quick disconnect hose ends and to help prevent the introduction of foreign material into the hydraulic system.

BEFORE EACH USE

- Make sure that all nuts and bolts are in place and properly tightened.
- Make sure that all other fasteners are in place and are performing their specified function.
- Make sure all safety signs are in place, are clean, and are legible.
- Replace any damaged parts or excessively worn parts.
- Inspect for damage to any part of the plow moldboard or push frame, such as broken or worn bolts or pins, cracked welds, bent sections and/or excessive rusting.
- Inspect for damage to trip mechanisms, such as broken springs, cracked welds, worn or broken bolts.
- Check all hoses for cuts, cracks and leaks.

AFTER EVERY 10 HOURS OF USE

- Grease all grease fittings and pivot points: see Parts Pages and Parts Lists for reference.

REPLACEMENT OF CUTTING EDGE

1. Park the prime mover/vehicle on a level surface (such as a concrete garage floor or paved area) that is large enough to safely accommodate unit with the plow attached.
2. Place the vehicles transmission in "Park" and set the parking brake.
3. Lower the plow onto suitable blocking positioned immediately behind the moldboard. This blocking must be of sufficient height to hold the cutting edge approximately 6" to 8" above the level surface.
4. Shut off the prime movers engine, remove the starter key, wait for all moving parts to come to a stop, and relieve all pressure in the hydraulic lines.
5. Loosen the nuts on all the cutting edge bolts; remove all nuts and bolts except the bolts on each end of the cutting edge.
6. While holding up the end of the cutting edge, remove the nut and bolt from that end and allow the cutting edge to pivot down to the level surface.
7. Repeat Step 6 for the other end of the cutting edge. If using a standard center punched reversible cutting edge, flip the edge from top-to-bottom and reinstall. Properly dispose of worn-out edges and all bolts and nuts.
8. Reinstall a new wear edge by reversing the procedures in steps 7 thru 5; tightening all nuts to recommended torque values.



BOX 1120, NORPARK DRIVE, MOUNT FOREST, ONT. N0G 2L0 (519)323-4433 PH (519)323-4608 FX

OPERATION:

SWITCH, 2-STAGE ON, PLOW DEPLOYED. 2-STAGE WILL LOWER ONCE ONEWAY CONTACTS ROAD. IF ONEWAY PLOW IS LIFTED OFF ROAD SURFACE, 2-STAGE WILL AUTOMATICALLY RAISE ONCE ONEWAY CONTACTS ROAD SURFACE AGAIN 2-STAGE WILL AUTOMATICALLY LOWER.

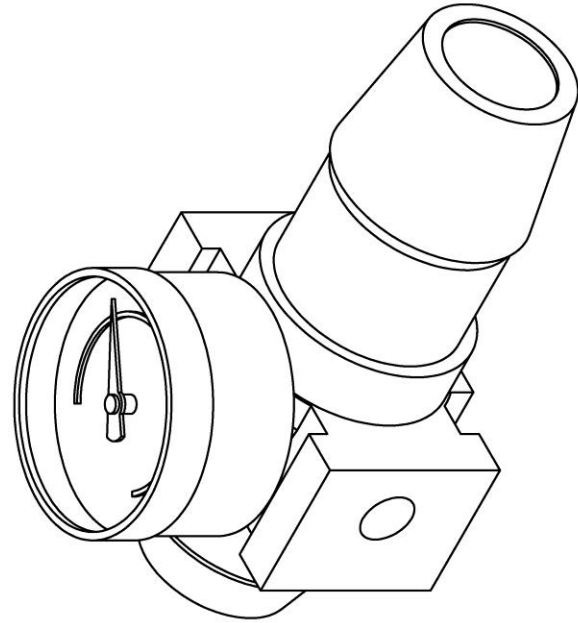
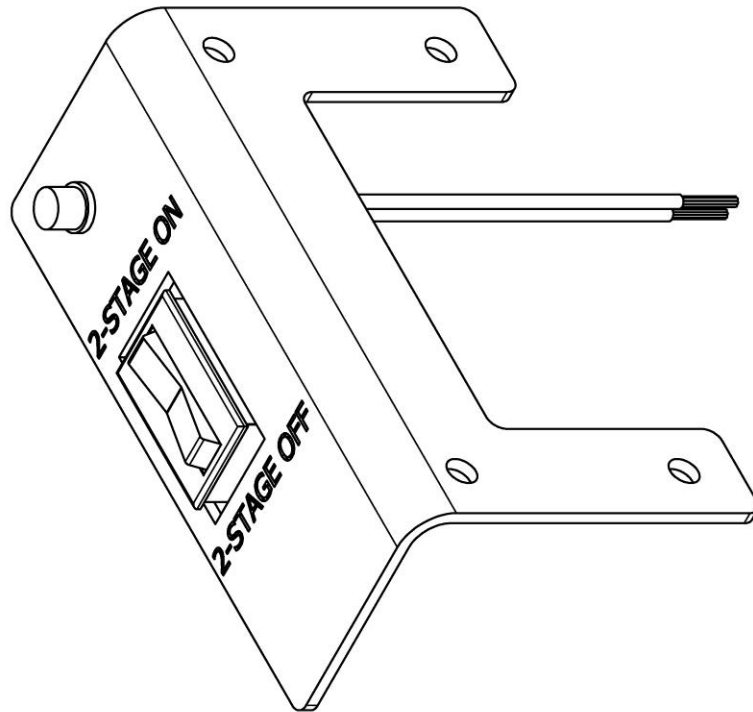
2-STAGE OFF: 2-STAGE WILL REMAIN IN LIFTED POSITION ALL THE TIME.

LIGHT: LIT WHENEVER 2-STAGE IN LOWERED POSITION.

REGULATOR: LOCATED BELOW CONTROL PANEL. NOT TO EXCEED **30 psi**. THIS WILL ACHIEVE RECOMMENDED TYNE FORCE AT 60 lbs. EACH. TOTAL PRESSURE OF 2000lbs. AT ROAD SURFACE.

ROAD TRAVEL: WHILE TRAVELING WITH MAIN PLOW RAISED, 2-STAGE SHOULD BE TURNED OFF. THIS WILL PREVENT 2-STAGE FROM CYCLING ON ROUGH ROADS.

WARNING:
NEVER REVERSE TRUCK WITH 2-STAGE ON ROAD!
TYNE DAMAGE WILL RESULT.
LIFT ONEWAY SLIGHTLY OFF ROAD.



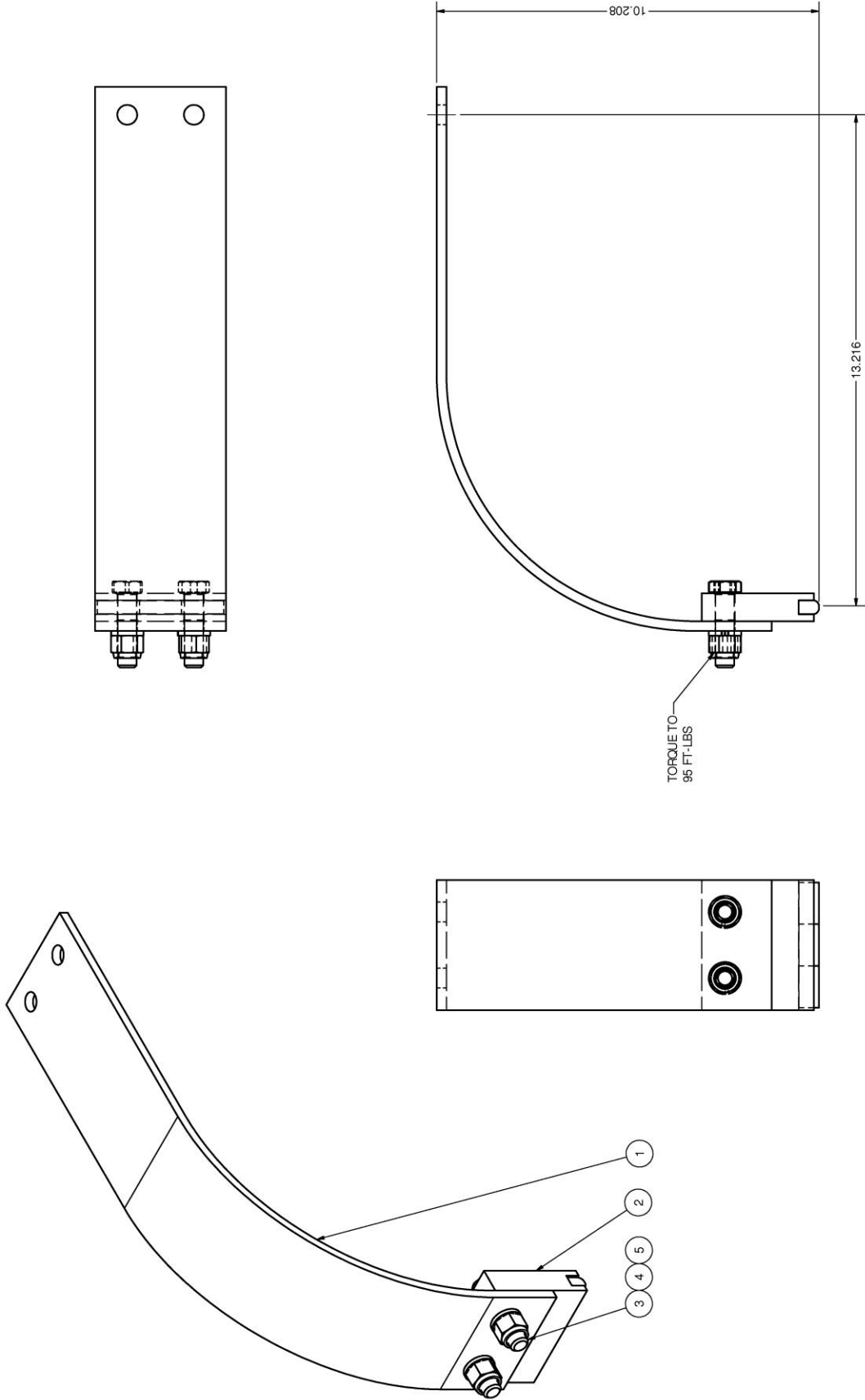
EQUIPMENT MAY NOT BE EXACTLY AS SHOWN. SOME COMPONENTS MAY BE OPTIONAL.
TO MAINTAIN OUR ON-GOING PRODUCT DEVELOPMENT AND IMPROVEMENT PROGRAM, VIKING-GIVES LTD. RESERVES THE RIGHT TO CHANGE EQUIPMENT & SPECIFICATION WITHOUT NOTICE.



PARTS PAGES



BOX 1120, NORPARK DRIVE, MOUNT FOREST, ONT. N0G 2L0 (519)323-4433 PH (519)323-4608 FX



EQUIPMENT MAY NOT BE EXACTLY AS SHOWN. SOME COMPONENTS MAY BE OPTIONAL. VIKING-GIVES LTD. RESERVES THE RIGHT TO CHANGE EQUIPMENT & SPECIFICATION WITHOUT NOTICE.

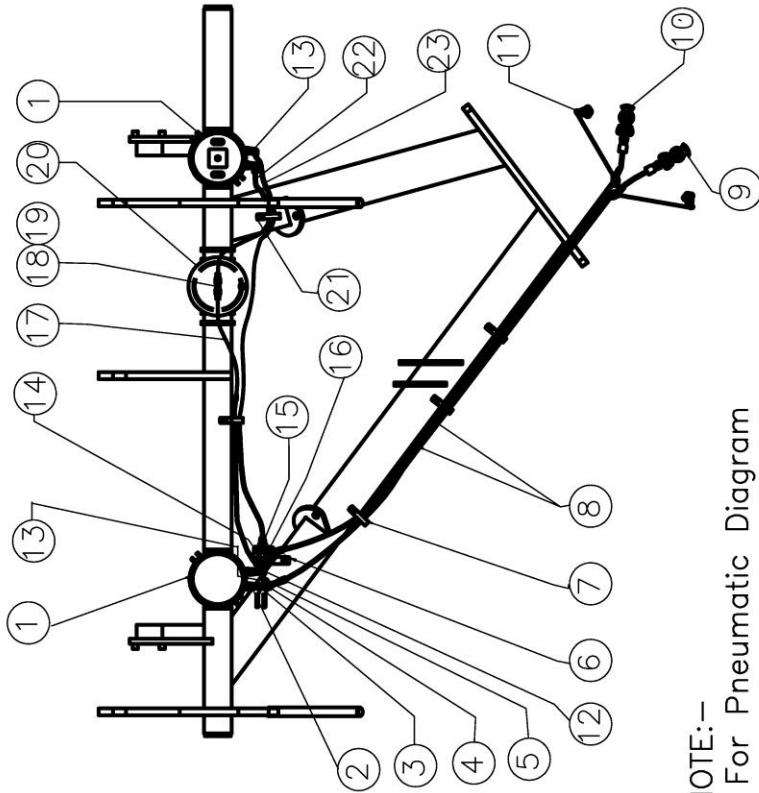


SECONDARY CUTTING EDGE ASS'Y

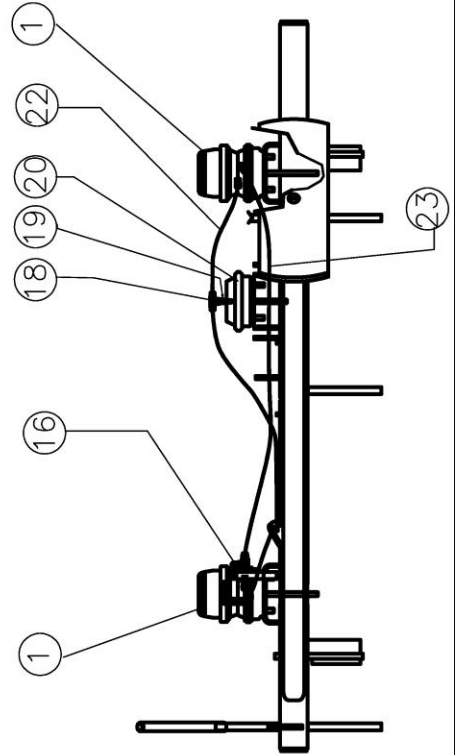
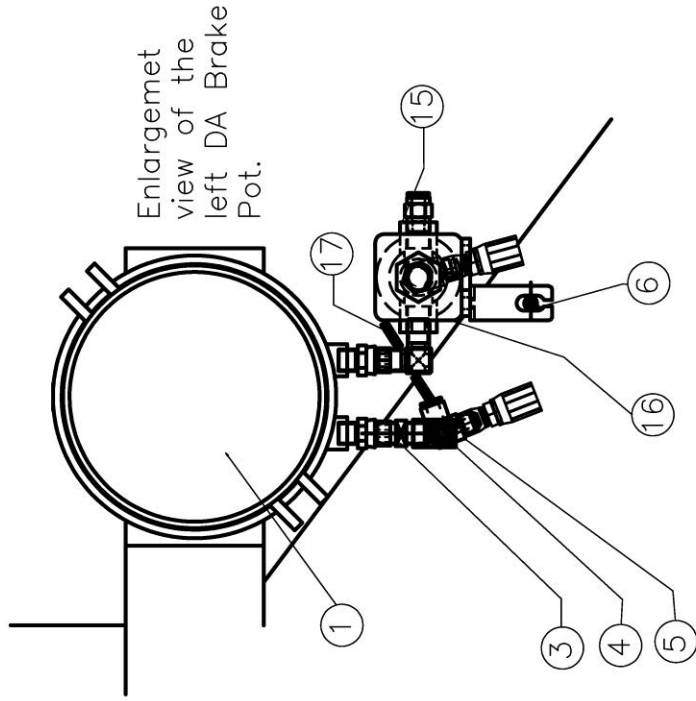
ITEM	DRAWING NO.	DESCRIPTION	QTY
1	40801096	SPRING TYNE 2-STAGE PLOW 3 1/2 WIDE	1
2	0500188	CARBIDE EDGE FOR SECONDARY 2 -STAGE PLOW	1
3	HW40A-0816	BOLT HEX 1/2 X 2 UNC ZINC	2
4	HW14C-08	LOCKWASHER SPLIT 1/2 ZINC	2
5	HW36D-08	NUT HEX ELASTIC 1/2 UNC ZINC	2

Note: An alpha designation on the Item ID column indicates a sub-component of a parent item. When placing parts orders reference the parent item to receive a complete assembly. Individual items can be ordered separately, if required, by ordering the alpha designated item number.


ITEM	DRAWING NO.	ALT ITEM NO.	DESCRIPTION	QTY
1	0720049		BRAKE POT DA AIR TWO STAGE FLOW	2
2	0630034		3/8 MALE NPT 3/8 FEMALE NPT SWIVEL	2
3	0630245		HYD ADAPTOR NIPPLE 3/8 MNPT 3/8 MNPT	2
4	0630083		3/8 BRASS FNPT TEE	1
5	0630046		HYD ADAPTER 3/8 MNPT 90 3/8 JIC MALE	2
6	40801125		MTG BRACKET FOR QUICK RELIEFING AIR VALVE	1
7	0630130		HOSE CLAMP 3 SINGLE HOSE INSTALLED	4
8	41500037		HOSE HYD 3/8-100R 0630116-84-0630284	2
9	0720088		GLANDHAND RED FOR EMERGENCY	1
10	0720124		GLANDHAND BLUE FOR SERVICE	1
11	0720124		GLANDHAND PACIFIER (DUST CAP)	2
12	HH-00882-004		ELBOW MALE 90 DEG 1/2 X 3/8 NPT	1
13	0630433		FITTING AIR 3/8 MNPT 90 DEG 3/8 TUBE FTL	2
14	0630044		HYD ADAPTER 1/2 MNPT 90 DEG 3/8 JIC MALE	1
15	0630487		FITTING AIR 3/8 NPT STR 3/8 TUBE PTL	1
16	0530056		VALVE QUICK RELEASE AIR	1
17	0630280		AIR BRAKE TUBING 3/8 X 47 INCH LONG	1
18	0630286		UNION TEE 1/4 MNPT X 3/8 AIR	1
19	0530291		FITTING REDUCER BRASS 3/8 MALE TO 1/4 FEM	1
20	0720202		SINGLE ACTING BRAKE POT	1
21	0630019		HOSE CLAMP 3/8 SINGLE HOSE INSULATED	2
22	0630280		AIR BRAKE TUBING 3/8 X 22 INCH LONG	1
23	0630280		AIR BRAKE TUBING 3/8 X 63 INCH LONG	1



NOTE:-
For Pneumatic Diagram
on Truck, SEE Dwg # 40801126



REV.	DATE	BY	CHKD.	DESCRIPTION	APP'D.	DATE
1						

 **Viking**
 Cives Ltd.
 250 BRIDGE CREEK WEST AVE.
 PLYMOUTH PLAINFIELD, INDIANA

DRAWING NO. 40801116
 REV. NO. 1

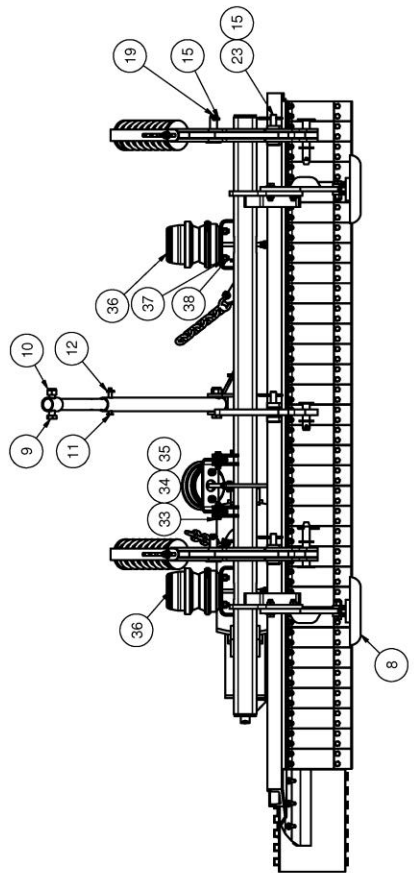
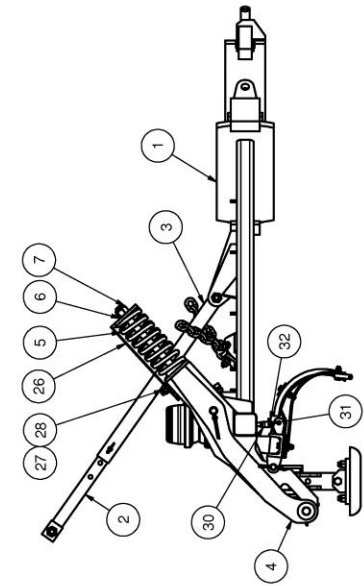
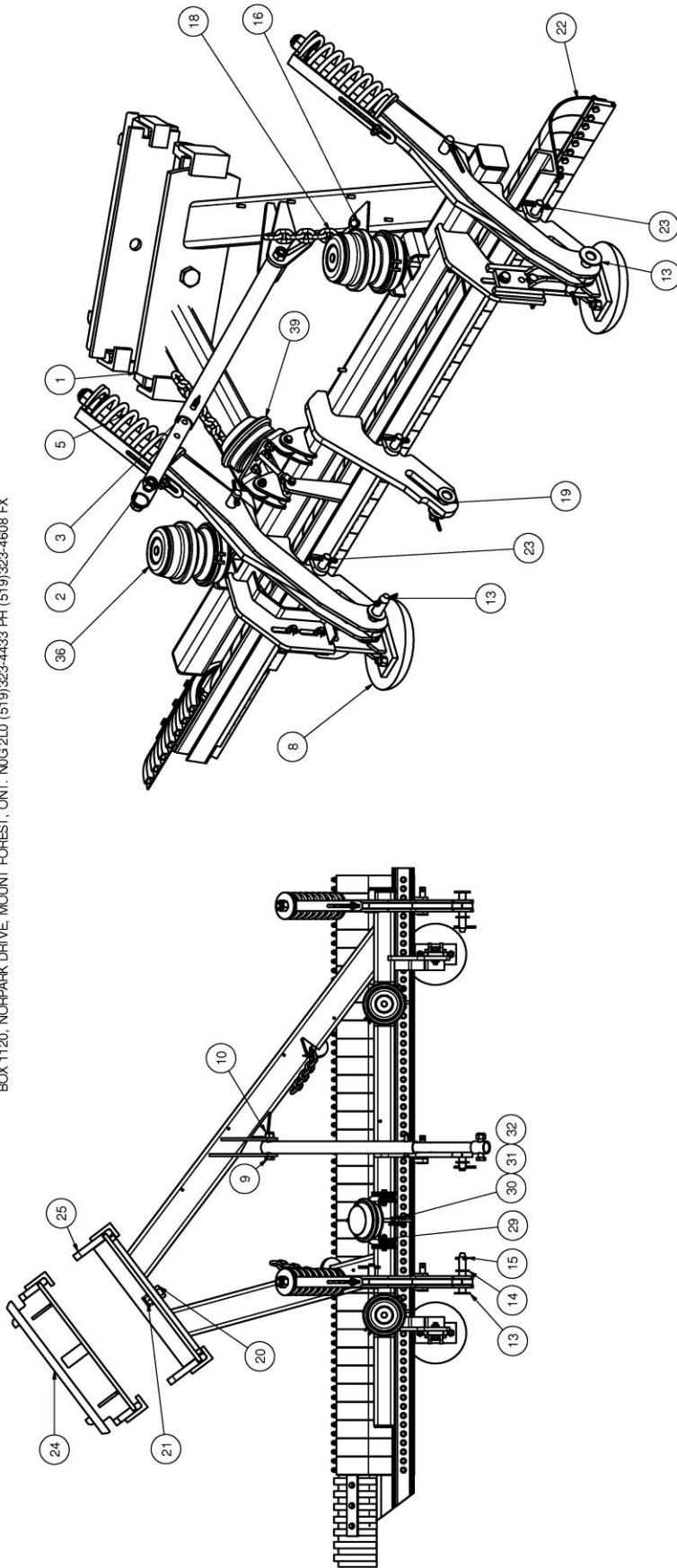


PNEUMATIC PLUMBING DIAGRAM

ITEM ID	ITEM NO	DESCRIPTION	QTY REQ
1	0720049	BRAKE POT DA AIR TWO STAGE PLOW	2
2	0630034	3/8 MALE NPT 3/8 FEMALE NPT SWIVEL	2
3	0630245	HYD ADAPTOR NIPPLE 3/8 MNPT 3/8 MNPT	2
4	0630363	3/8 BRASS FNPT TEE	1
5	0630046	HYD ADAPTOR 3/8 MNPT 90 3/8 JIC MALE	2
6	40801125	MTG BRKT FOR QUICK RELEASE AIR VALVE	1
7	0630130	HOSE CLAMP 3/4 SINGLE HOSE INSULATED	4
8	4150037	HOSE HYD 3/8-100R 0630116-84-0630284	2
9	0720086	GLADHAND RED FOR EMERGENCY	1
10	0720087	GLADHAND BLUE FOR SERVICE	1
11	0720124	GLADHAND PACIFIER (DUST CAP)	2
12	HH-00882-004	ELBOW MALE 90 DEG 1/2 X 3/8 NPT	1
13	0630433	FITTING AIR 3/8 MNPT 90 DEG 3/8 TUBE PTL	2
14	063044	HYD ADAPTOR 1/2 MNPT 90 DEG 3/8 JIC MALE	1
15	0630487	FITTING AIR 3/8 NPT STR 3/8 TUBE PTL	1
16	0530056	VALVE QUICK RELEASE AIR	1
17	0630290	AIR BRAKE TUBING 3/8 X 47 INCH LONG	1
18	0630296	UNION TEE 1/4 MNPT X 3/8 AIR	1
19	0630291	FITTING REDUCER BRASS 3/8 MALE TO 1/4 FEM	1
20	0720202	SINGLE ACTING BRAKE POT	1
21	0630019	HOSE CLAMP 3/8 SINGLE HOSE INSULATED	2
22	0630290	AIR BRAKE TUBING 3/8 X 22 INCH LONG	1
23	0630290	AIR BRAKE TUBING 3/8 X 63 INCH LONG	1



BOX 1120, NORPARK DRIVE, MOUNT FOREST, ONT. N0G 2L0 (519)323-4433 PH (519)323-4608 FX



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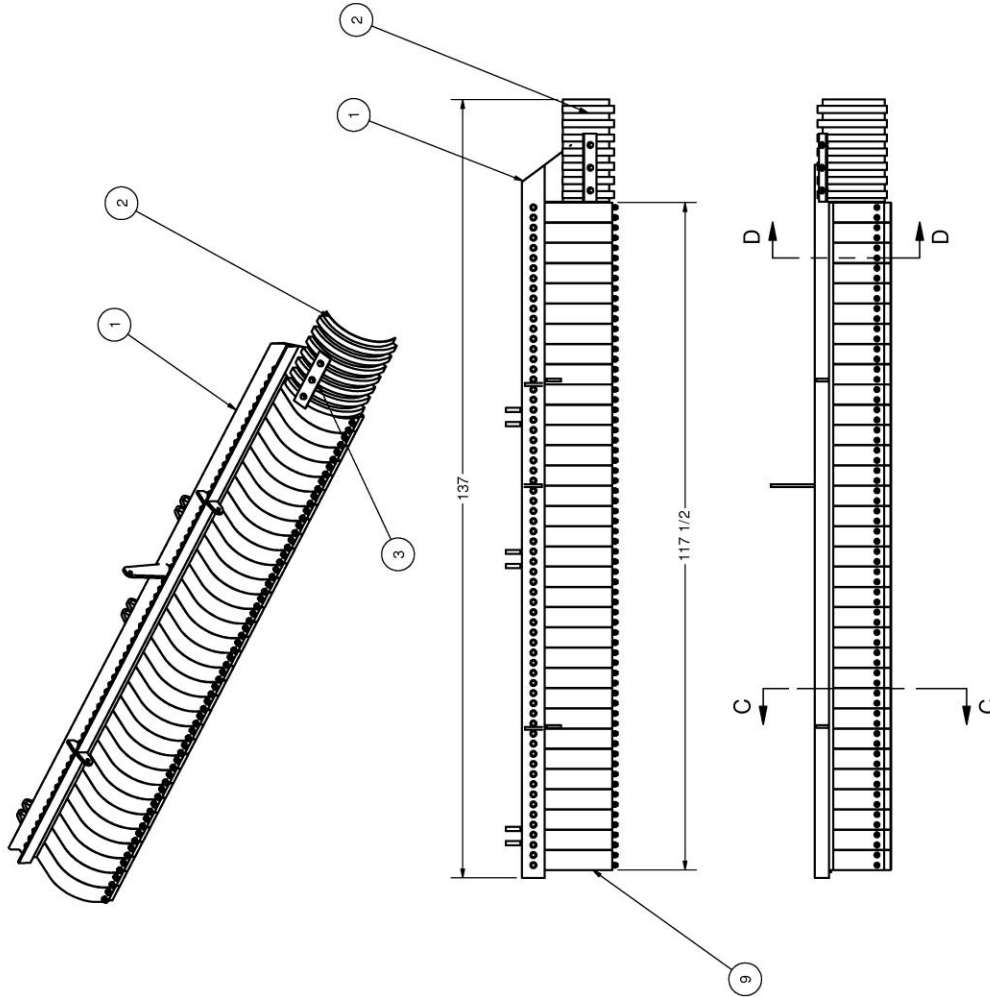


PUSHFRAME ASS'Y ONE WAY TWO-STAGE RTH

ITEM	DRAWING NO.	DESCRIPTION	QTY
1	40801118	PUSH FRAME WELDMNT	1
2	01201036	INNER ARM WELD'T	1
3	01201052	OUTER ARM WELD'T	1
4	40801029	TRIP ARM ASSEMBLY	2
5	0580008	SPRING COMP 5.250 X 0.688 X 14.000	2
6	00800023	SPRING RETAINER WELD'T	2
7	HW36D-20	NUT HEX ELASTIC 1 1/4 UNC ZINC	2
8	01101749	MUSHROOM SHOE INSTALL KIT	2
9	HW40A-1636	BOLT HEX 1 X 4 1/2 UNC ZINC	2
10	HW36D-16	NUT HEX ELASTIC 1 UNC ZINC	2
11	00900087	PIN 0.625 DIA X 4.000 WELD'T	1
12	HW13A-0624	COTTER PIN 3/16 X 1 1/2 ZINC	1
13	00900088	PIN 1.250 X 6.750 WELD'T	2
14	HW14A-20	FLATWASHER SAE 1 1/4 ZINC	3
15	HW13A-1248	COTTER PIN 3/8 X 3 ZINC	9
16	0590037	SHACKLE 1/2 BOLT TYPE RD PIN CW NUT/COTT	2
17	00401907	CHAIN 1/2 GR 30 X 55.000 LG	1
18	00401918	CHAIN 1/2 GR 30 X 65.000 LG	1
19	00900086	PIN 1.250 DIA X 4.000 WELD'T	3
20	00900207	BOLT DRILLED 1.500 DIA X 2.813	1
21	HW30C-24	NUT HEX SLOTTED 1 1/2 UNC ZINC	1
22	40801123	SECONDARY BLADE ASSEMBLY	1
23	00900113	PIN 1.000 DIA X 4.625 WELD'T	3
24	02600000	DRIVE SWIVEL WELD'T QUICK-TACK	1
25	02600079	DRIVE SWIVEL WELD'T 30-1/2 STD	1
26	10803013	SPRING RETAINING WELDMNT UPPER	2
27	HW14A-10	FLATWASHER SAE 5/8 ZINC	2
28	HW36D-10	NUT HEX ELASTIC 5/8 UNC ZINC	2
29	40801110	SWIVEL MTG PLATE FOR MIDDLE BRAKE POT	1
30	0590043 CLEVIS	CLEVIS YOKE END 5/8- 18 UNF ADJUSTABLE	3
31	0590043 PIN	CLEVIS PIN 1/2	3
32	HW13A-1032	COTTER PIN 5/16 X 2 ZINC	3
33	HW40A-0822	BOLT HEX 1/2 X 2 3/4 UNC ZINC	2
34	HW14A-08	FLATWASHER SAE 1/2 ZINC	4
35	HW30D-08	NUT HEX STOVER 1/2 UNC ZINC	2
36	0720049	BRAKE POT DA AIR TAILGATE	2
37	HW14C-10	LOCKWASHER SPLIT 5/8 ZINC	6
38	HW30E-10	NUT CENTER LOCK 5/8 UNC ZINC	6
39	0720202	SINGLE ACTING BRAKE POT	1



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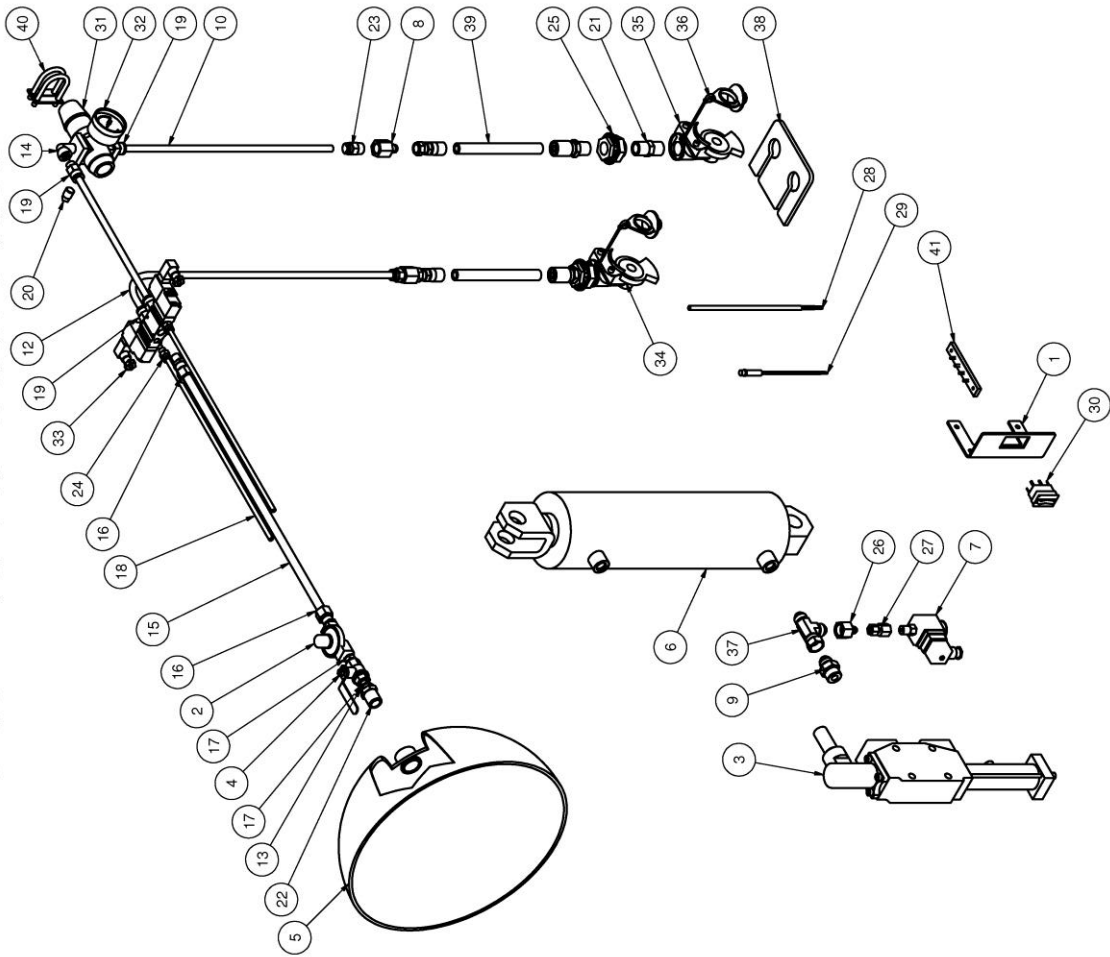


SECONDARY BLADE ASS'Y

ITEM	DRAWING NO.	DESCRIPTION	QTY
1	40801124	SECONDARY CHANNEL WELD'T	1
2	40801088	PLASTIC DISCHARGE PIPE	1
3	40801072	REINFORCEMENT PLATE FOR PLASTIC DISCHARGE PIPE	1
4	HW40A-0824	BOLT HEX 1/2 X 3 UNC ZINC	3
5	HW14A-08	FLATWASHER SAE 1/2 ZINC	138
6	HW36D-08	NUT HEX ELASTIC 1/2 UNC ZINC	69
7	HW40A-0820	BOLT HEX 1/2 X 2 1/2 UNC ZINC	66
8	40801098	URETHANE TINE PAD	1
9	40801108	SECONDARY CUTTING EDGE ASSY	33



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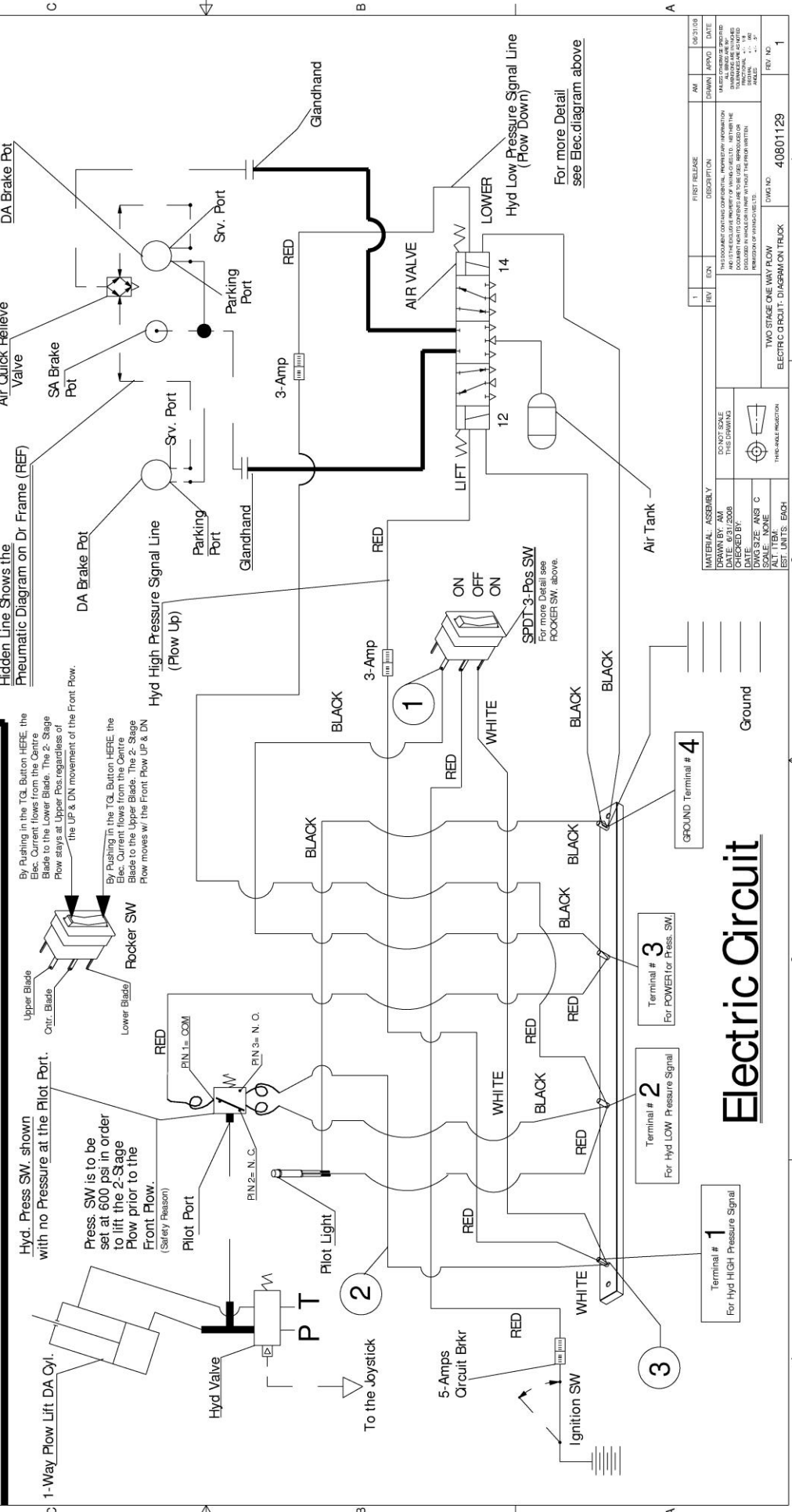
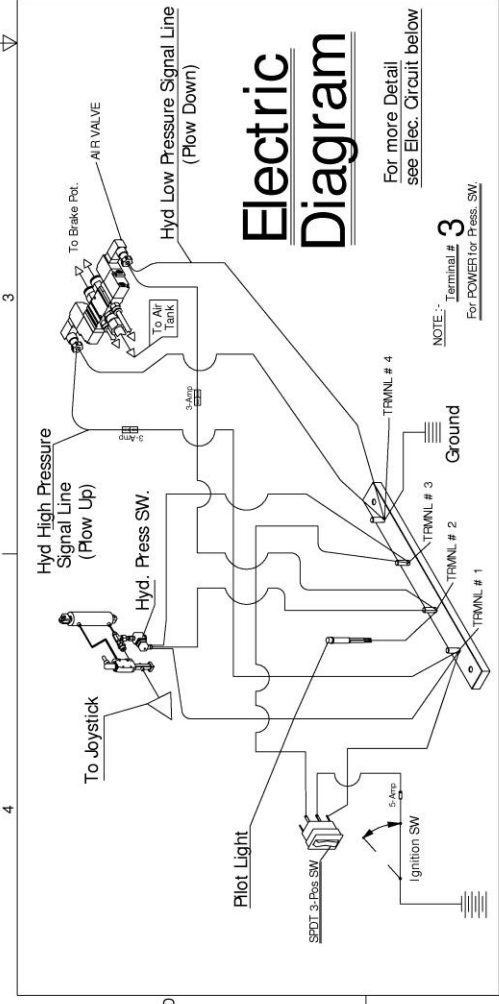
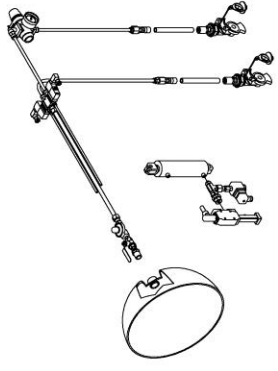


PNEUMATIC PLUMBING DIAGRAM ON TRUCK

ITEM	DRAWING NO.	DESCRIPTION	QTY
1	00200086	BRACKET SINGLE AIR TOGGLE	1
2	0530058	VALVE PRESSURE PROTECTION AIR	1
3	0530099	VALVE SECTION DA AIR HCD-6	REF
4	0530176	VALVE BALL 1/4 NPT 1/4 TURN	1
5	0530176-1	AUX AIR TANK ON TRUCK	REF
6	0540040	CYLINDER HYD DA 4 X 10 FRONT LIFT	REF
7	0560084	HIGH PRESSURE SWITCH SPDT. COM, 1 & 2	1
8	0630042	HYD ADAPTOR 3/8 FLARE TUBE END 3/8 NPT	2
9	0630087	HYD ADAPTER 5/8 ORB 1/2 JIC	1
10	0630290 - 216	AIR BRAKE TUBING 3/8 PRESSURE & RETURN	1
11	0630290 - 24	AIR BRAKE TUBING 3/8 VALVE - REGUATOR	1
12	0630290-217	AIR BRAKE TUBING 3/8-218	1
13	0630291	FITTING REDUCER BRASS 3/8 TO 1/4	1
14	0630294	FITTING BRASS 1/4 90 DEG STREET ELBOW	1
15	0630299 - 180	AIR BRAKE TUBING 1/2 PROTECTION VALVE	1
16	0630302	FITTING BRASS MALE CONN 1/2 TUBE 1/4 NPT	2
17	0630303	FITTING BRASS HEX NIPPLE 1/4 NPT	2
18	0630333-120	AIR BRAKE TUBING 1/4 -120	2
19	0630371	FITTING BRASS 1/4 NPT X 3/8 AIR	4
20	0630376	FITTING BRASS 1/4 PLUG	1
21	0630462	BRASS HEX NIPPLE 1/2 NPT	2
22	0630472	FITTING BRASS REDBUSH 1/2 MNPT 3/8 FNPT	1
23	0630487	FITTING AIR 3/8 NPT STR 3/8 TUBE PTL	2
24	0630524	FITTING AIR 1/8 NPT X 1/4 TUBE PTL	2
25	0630610	FITTINGS BRASS 1/2" BULKHEAD	2
26	0630640	ADAPTER 1/2 JICF TO 1/4 JICM	1
27	0630641	ADAPTER 1/4 JIC FEM TO 1/4 NPT FEM	1
28	0650390-300	CABLE 3 COND BELDEN 8770 -300	1
29	0660006	PILOT LIGHT GREEN	1
30	0660045	ROCKER SWITCH FREIGHT LINER	1
31	0690076	INTERNAL BYPASS-REV.FLOW AIR REGULATOR	1
32	0690077	AIR PRESSURE GAUGE	1
33	0690078	SOL OPRTD 5-WAY 3 POS CNTR CLSD AIR VALVE	1
34	0720086	GLANDHAND RED FOR EMERGENCY	1
35	0720087	GLANDHAND BLUE FOR SERVICE	1
36	0720124	GLANDHAND PACIFIER (DUST CAP)	2
37	112C-08	CHAMPION HYD ADAPTER 1/2 RUN TEE SWIVEL	1
38	41412374	AIR LINE SUPPORT PLATE	1
39	41500038	HOSE HYD-3/8-100 R2-0630116-48-0630284	2
40	HH-00237-007	MUFFLER CLAMP 1 1/4	2
41	HH-00958-001	COMMON FEED 4 POLE TERMINAL STRIP	1

ITEM	DRAWING NO.	ALT. ITEM NO.	DESCRIPTION	QTY.
1	NI 50717		18 Ga SPADE	3
2	8770-500		3-WIRE CABLE - 40 FT (Network Electronic)	1
3	NA	NA	RING TERMINAL # 10 NYLON 16/14 GA	10
4	NA	NA	NA	NA

NOTE :-
For more Details on Pneumatic Diagram & Hardwares, See Idw # 40801128.



MATERIAL ASSEMBLY	REV	EDN	DESCRIPTION	AW	DATE
DO NOT SCALE THIS DRAWING	1		THIS DOCUMENT CONTAINS CONFIDENTIAL INFORMATION AND IS THE PROPERTY OF PHOENIX HELIX. NO PART OF THIS DRAWING IS TO BE REPRODUCED OR TRANSMITTED IN ANY FORM OR BY ANY MEANS, ELECTRONIC OR MECHANICAL, INCLUDING PHOTOCOPYING, RECORDING, OR BY ANY INFORMATION STORAGE AND RETRIEVAL SYSTEM.		08/21/08

SCALE: NONE
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SCALE: NONE

TWO STAGE ONE WAY FLOW ELECTRIC CIRCUIT DIAGRAM ON TRUCK

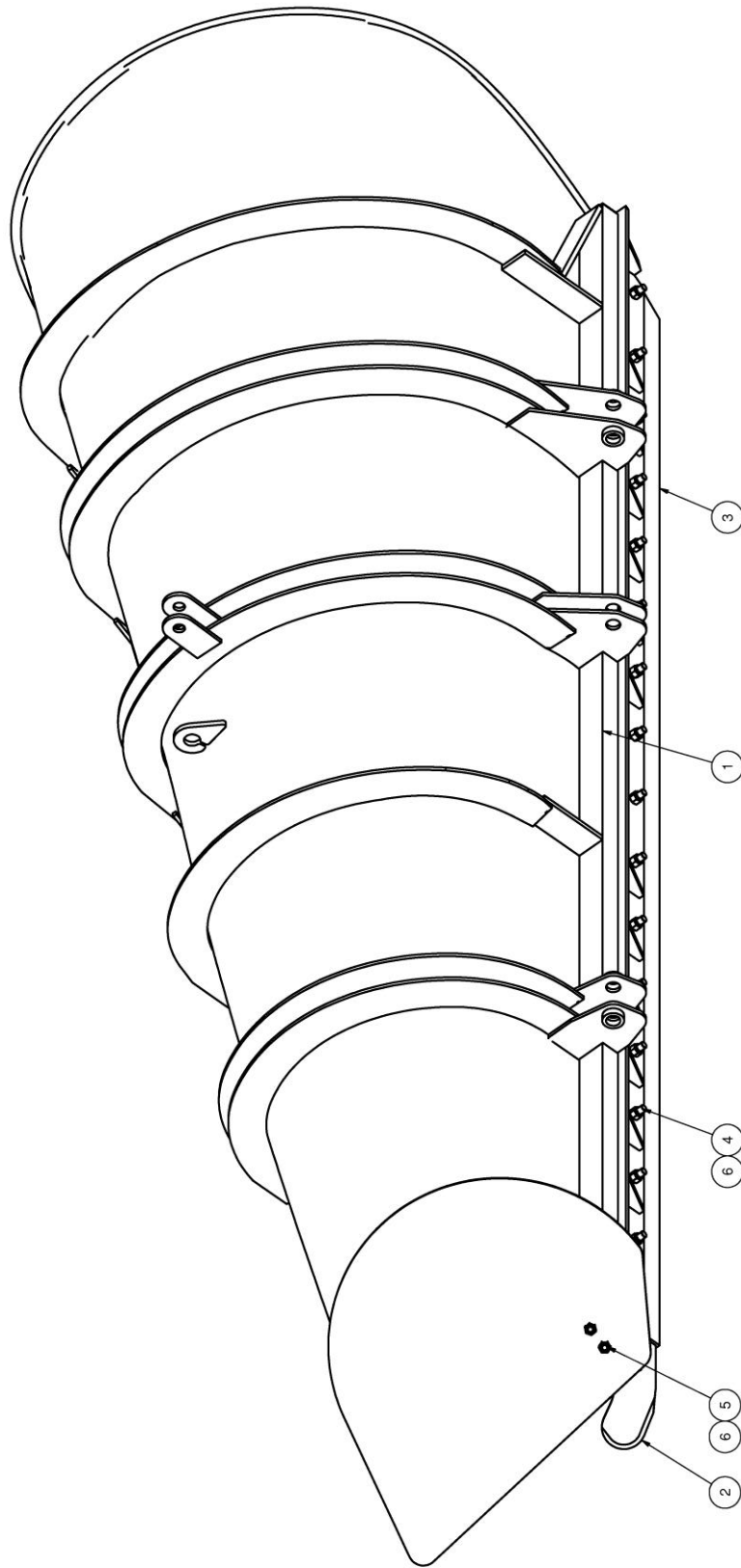
DWG NO. 40801129
REV. NO. 1

Electric Circuit

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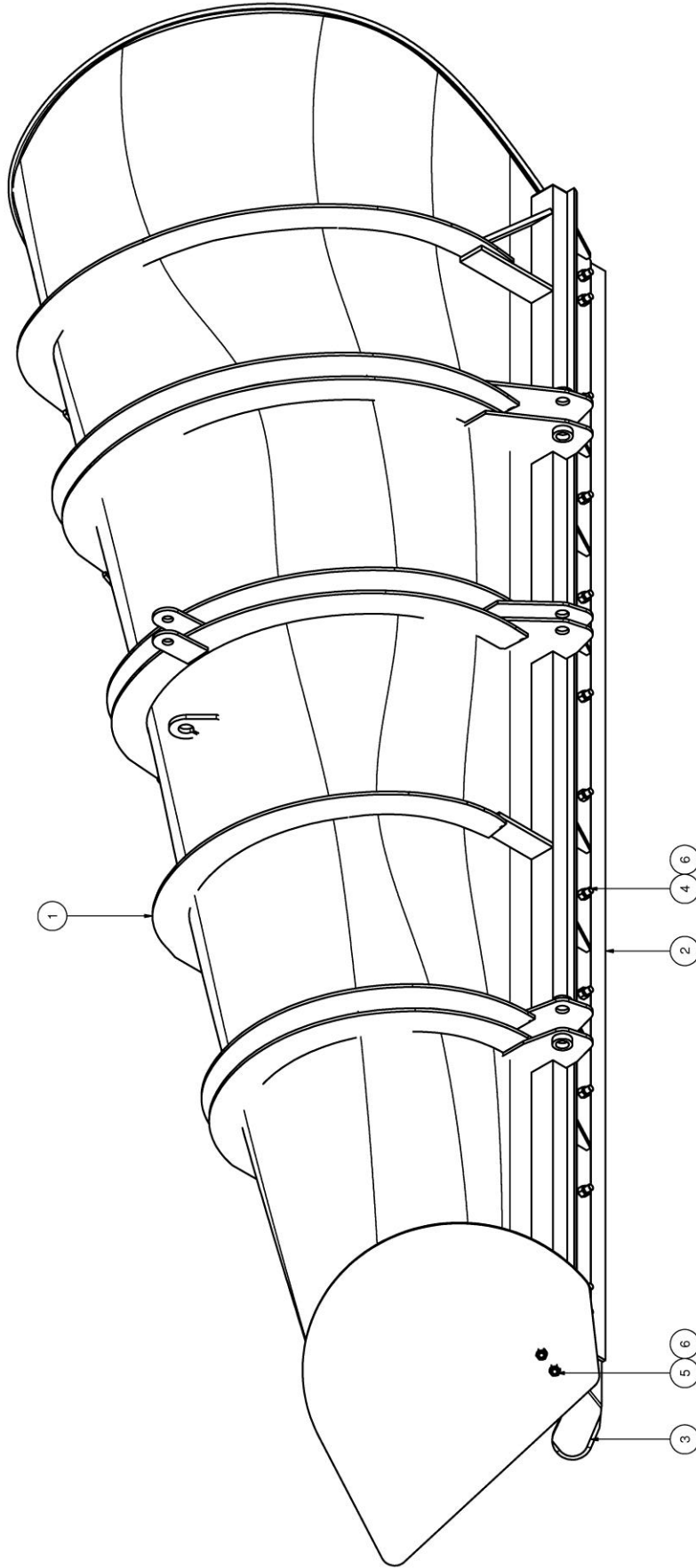


MOLDBOARD ASS'Y 120HSE9-8IN

ITEM ID	ITEM NO	DESCRIPTION	QTY REQ
1	00800064	MOLDBOARD WELD'T 120HSE9 - 8IN	1
2	0500015	BLADE 8 CP 1/2 X 8 X 132 2 IN START	1
3	00808800	NOSE SHOE WELD'T ONE-WAY PLOW	1
4	HW40C-1020	BOLT CARRIAGE 5/8 X 2 1/2 UNC ZINC	18
5	HW40A-1016	BOLT HEX 5/8 X 2 UNC ZINC	2
6	HW36D-10	NUT HEX ELASTIC 5/8 UNC ZINC	20



BOX 1120, NORPARK DRIVE, MOUNT FOREST, ONT. N0G 2L0 (519) 323-4433 PH: (519) 323-4608 FX



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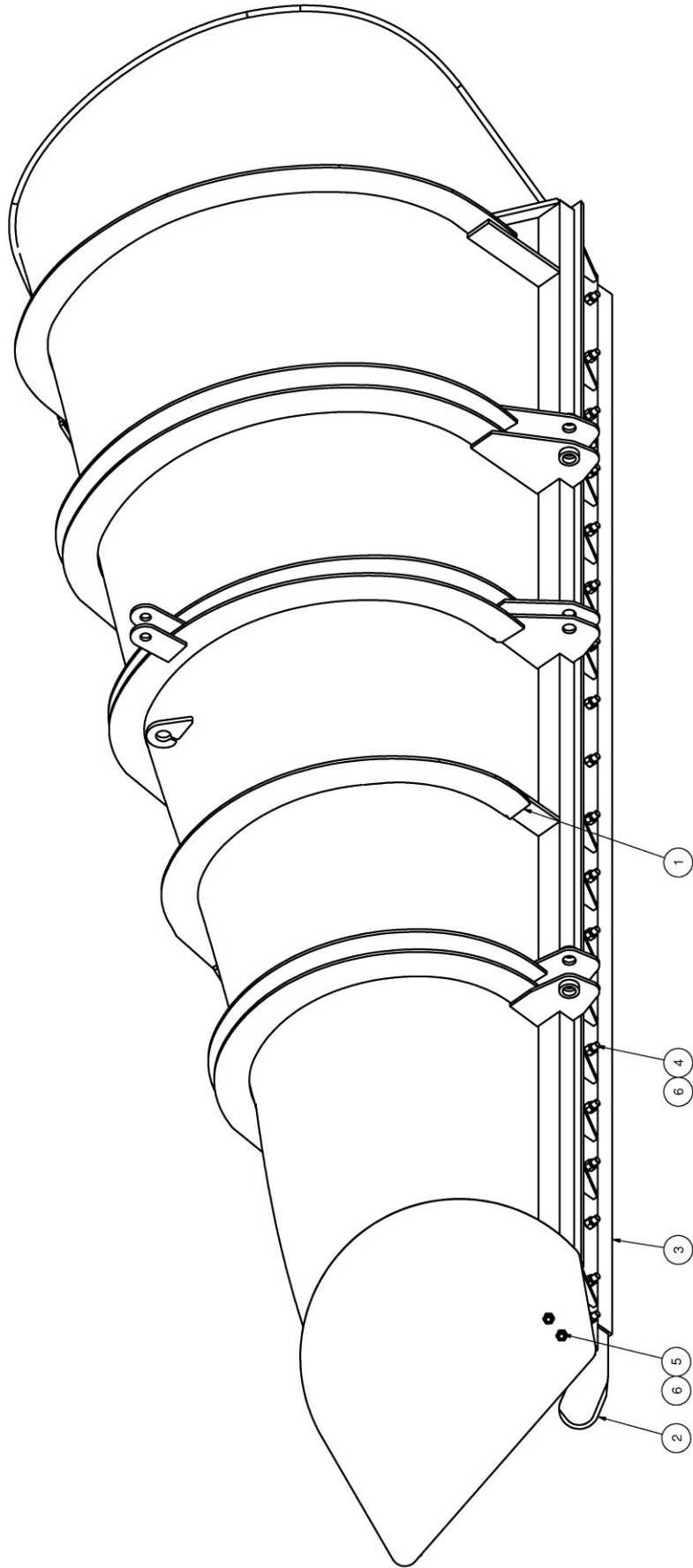


MOLDBOARD ASS'Y 120HSE9 - 12IN

ITEM ID	ITEM NO	DESCRIPTION	QTY REQ
1	00800175	MOLDBOARD WELD'T 120HSE9 - 12IN	1
2	0500016	BLADE 12 CP 1/2 X 8 X 132	1
3	00808800	NOSE SHOE WELD'T ONE-WAY PLOW	1
4	HW40C-1020	BOLT CARRIAGE 5/8 X 2 1/2 UNC ZINC	14
5	HW40A-1016	BOLT HEX 5/8 X 2 UNC ZINC	2
6	HW36D-10	NUT HEX ELASTIC 5/8 UNC ZINC	16



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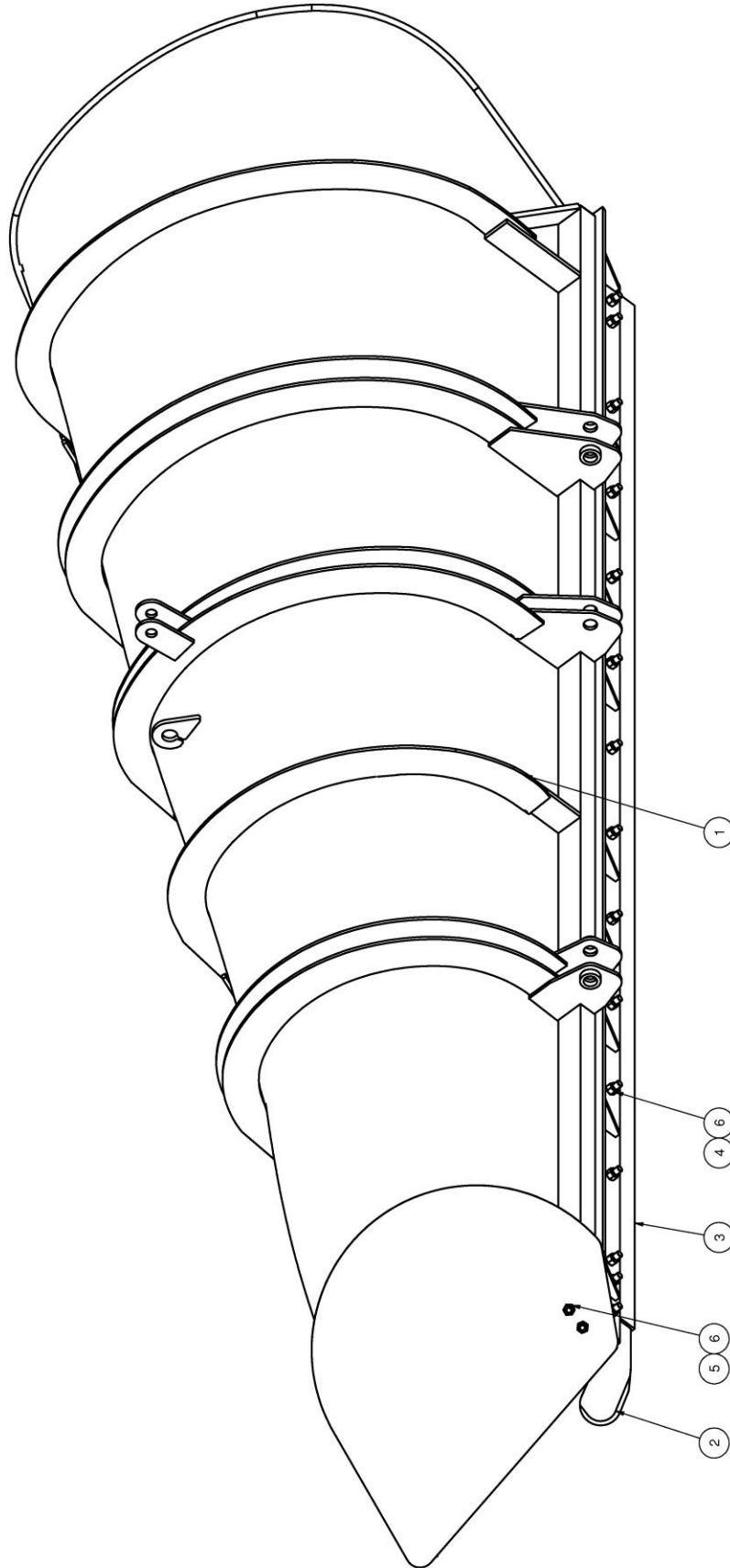


MOLDBOARD ASS'Y 120HSE10 - 8IN

ITEM ID	ITEM NO	DESCRIPTION	QTY REQ
1	00800146	MOLDBOARD WELD'T 120HSE10 - 8IN	1
2	0500018	BLADE 8 CP 1/2 X 8 X 144	1
3	00808800	NOSE SHOE WELD'T ONE-WAY PLOW	1
4	HW40C-1020	BOLT CARRIAGE 5/8 X 2 1/2 UNC ZINC	19
5	HW40A-1016	BOLT HEX 5/8 X 2 UNC ZINC	2
6	HW36D-10	NUT HEX ELASTIC 5/8 UNC ZINC	21



BOX 1120, NORPARK DRIVE, MOUNT FOREST, ONT. N0G 2L0 (519) 323-4433 PH (519) 323-4608 FX



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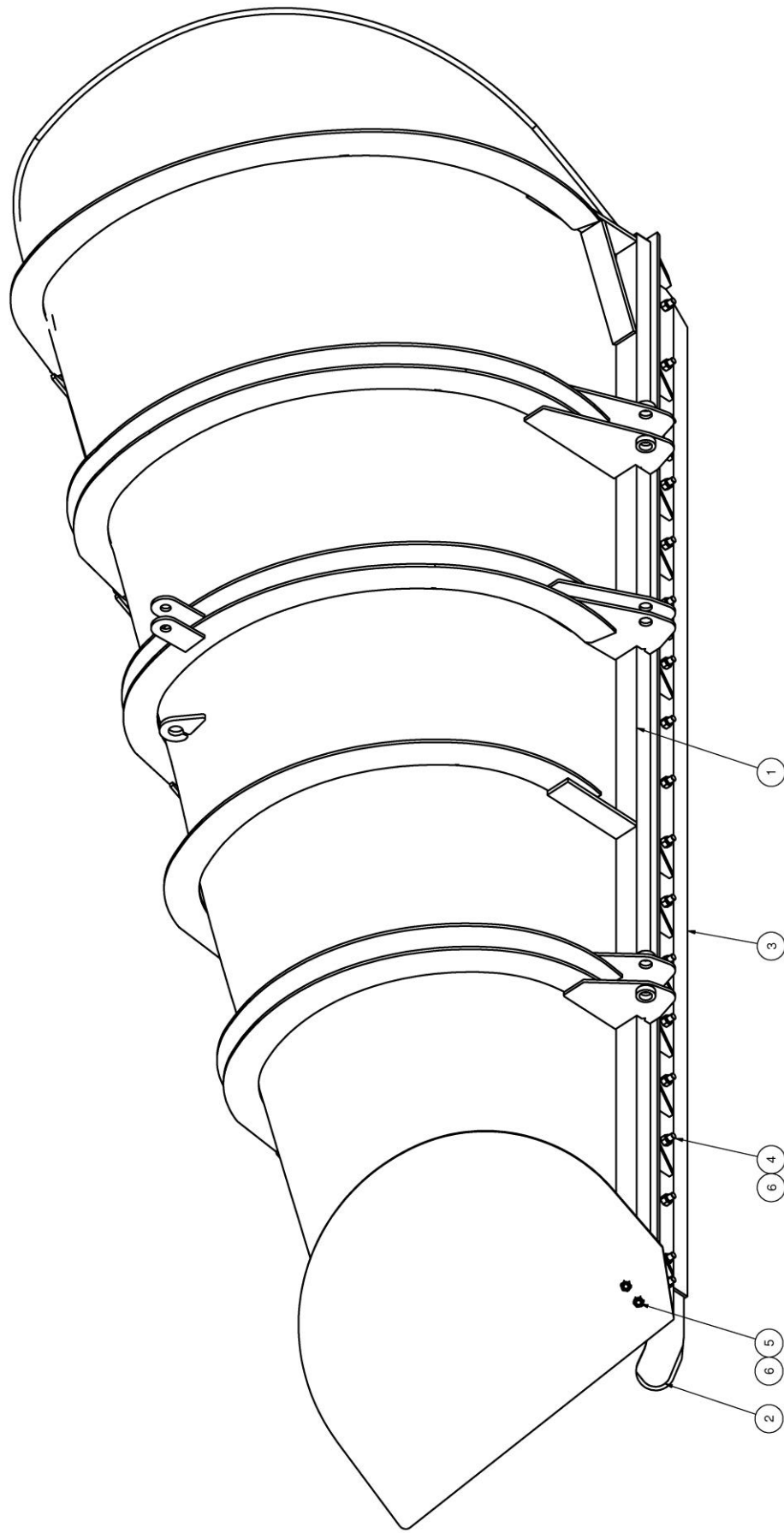


MOLDBOARD ASS'Y 120HSE10 - 12IN

ITEM ID	ITEM NO	DESCRIPTION	QTY REQ
1	00800089	MOLDBOARD WELD'T 120HSE10 - 12IN	1
2	0500019	BLADE 12 CP 1/2 X 8 X 144	1
3	00808800	NOSE SHOE WELD'T ONE-WAY PLOW	1
4	HW40C-1020	BOLT CARRIAGE 5/8 X 2 1/2 UNC ZINC	15
5	HW40A-1016	BOLT HEX 5/8 X 2 UNC ZINC	2
6	HW36D-10	NUT HEX ELASTIC 5/8 UNC ZINC	17



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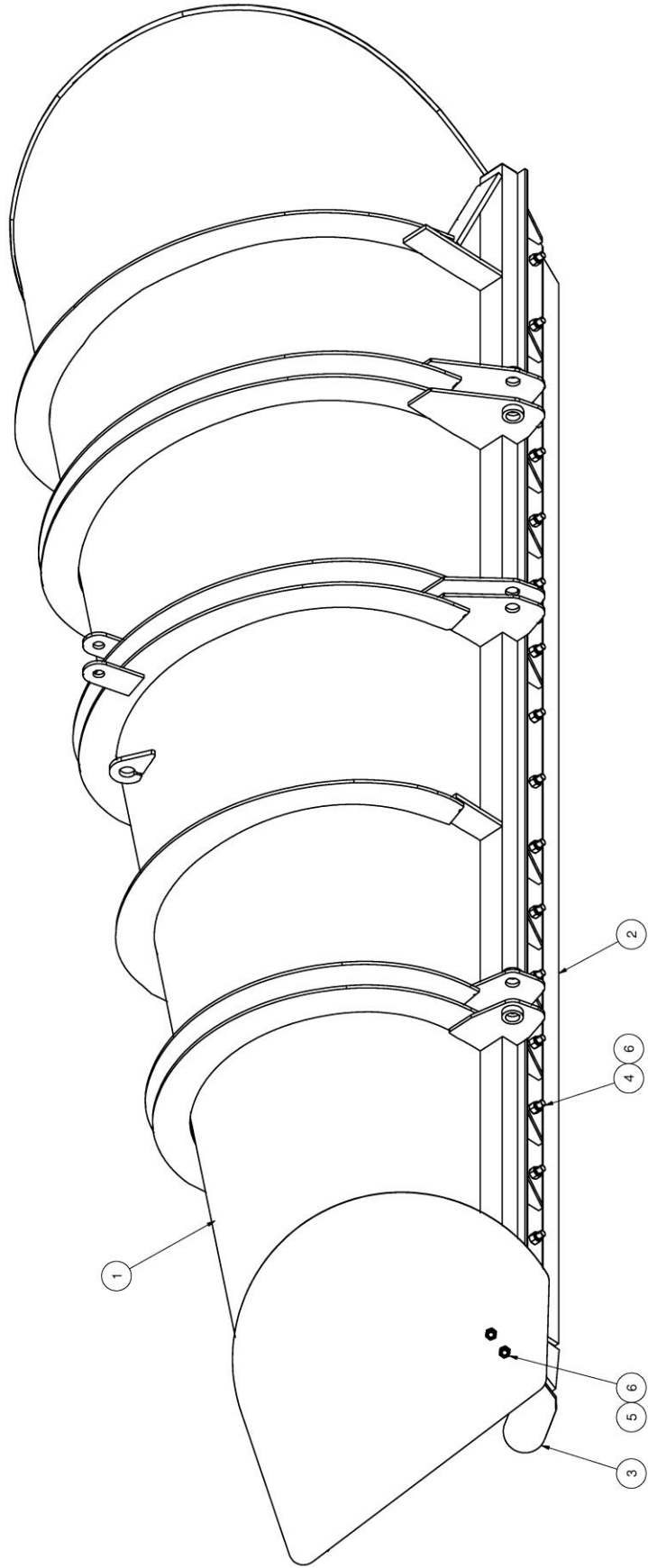


MOLDBOARD ASS'Y 135HSE9 - 8IN

ITEM ID	ITEM NO	DESCRIPTION	QTY REQ
1	00800026	MOLDBOARD WELD'T 135HSE9 - 8IN	1
2	0500015	BLADE 8 CP 1/2 X 8 X 132 2 IN START	1
3	00808800	NOSE SHOE WELD'T ONE-WAY PLOW	1
4	HW40C-1020	BOLT CARRIAGE 5/8 X 2 1/2 UNC ZINC	18
5	HW40A-1016	BOLT HEX 5/8 X 2 UNC ZINC	2
6	HW36D-10	NUT HEX ELASTIC 5/8 UNC ZINC	20



BOX 1120, NORPARK DRIVE, MOUNT FOREST, ONT. N0G 2L0 (519)323-4433 PH (519)323-4608 FX



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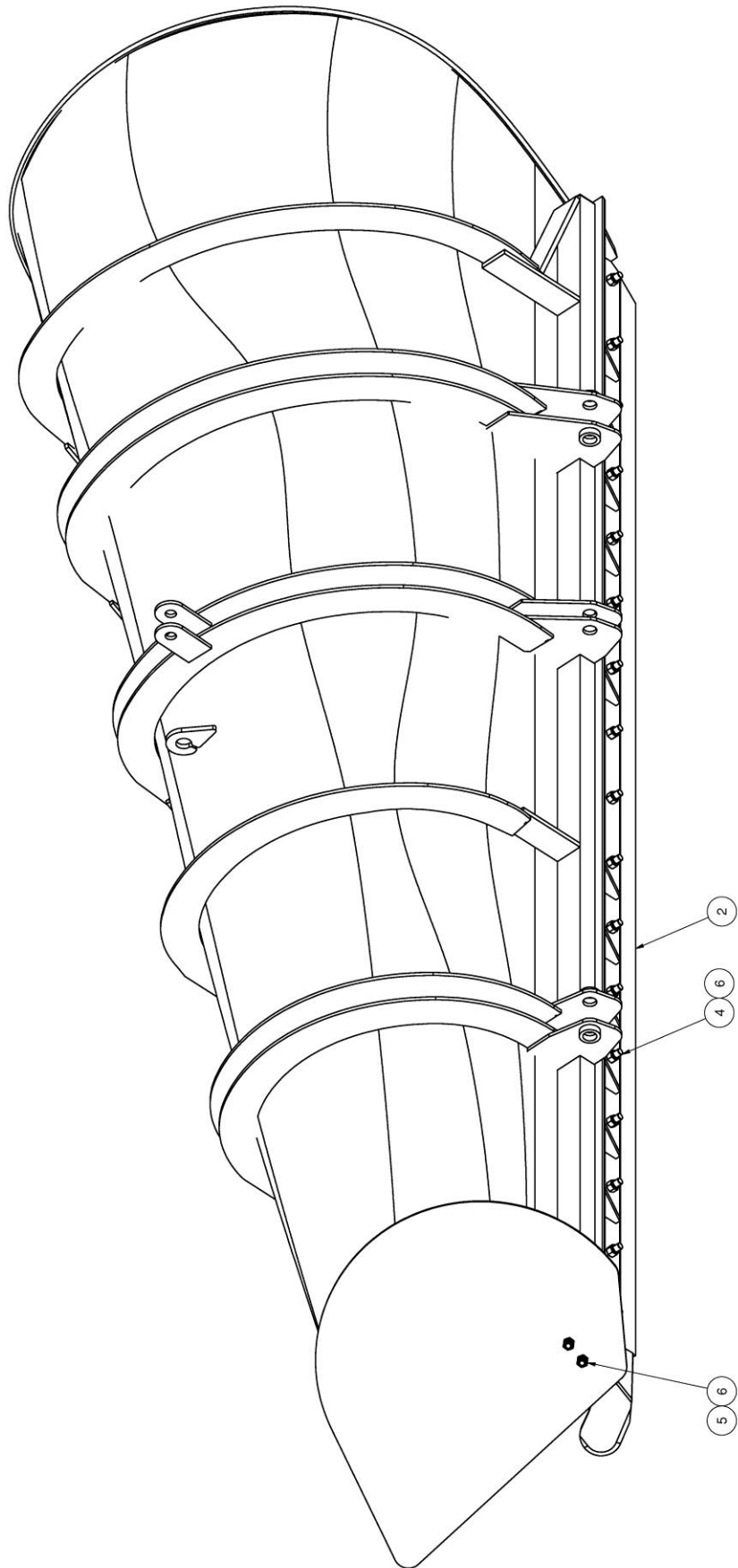


MOLDBOARD ASS'Y 135HSE9 - 12IN

ITEM ID	ITEM NO	DESCRIPTION	QTY REQ
1	00800156	MOLDBOARD WELD'T 135HSE9 - 12IN	1
2	0500017	BLADE 12 TP 1/2 X 8 X 132	1
3	00808800	NOSE SHOE WELD'T ONE-WAY PLOW	1
4	HW40C-1020	BOLT CARRIAGE 5/8 X 2 1/2 UNC ZINC	14
5	HW40A-1016	BOLT HEX 5/8 X 2 UNC ZINC	2
6	HW36D-10	NUT HEX ELASTIC 5/8 UNC ZINC	16



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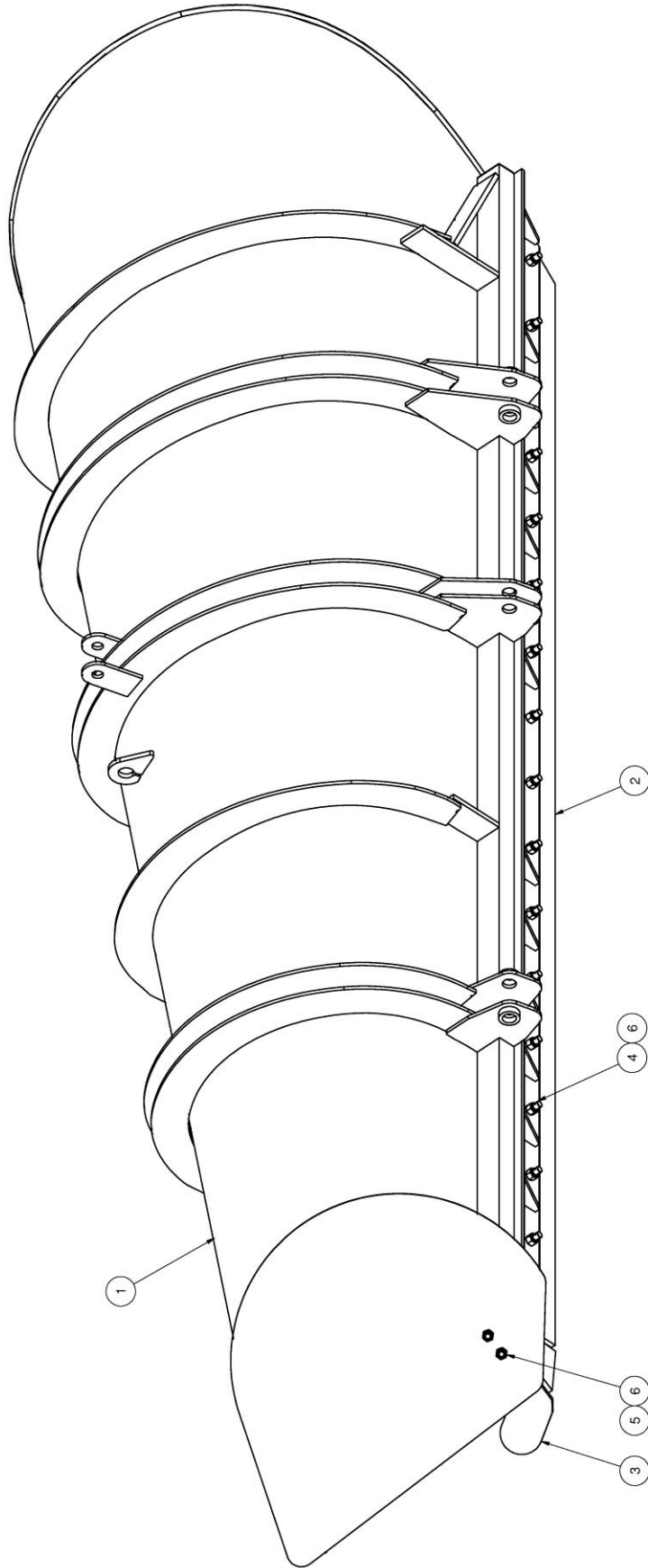


MOLDBOARD ASS'Y 135HSE10 - 8IN

ITEM ID	ITEM NO	DESCRIPTION	QTY REQ
1	00800088	MOLDBOARD WELD'T 135HSE10 - 8IN	1
2	0500018	BLADE 8 CP 1/2 X 8 X 144	1
3	00808800	NOSE SHOE WELD'T ONE-WAY PLOW	1
4	HW40C-1020	BOLT CARRIAGE 5/8 X 2 1/2 UNC ZINC	19
5	HW40A-1016	BOLT HEX 5/8 X 2 UNC ZINC	2
6	HW36D-10	NUT HEX ELASTIC 5/8 UNC ZINC	21



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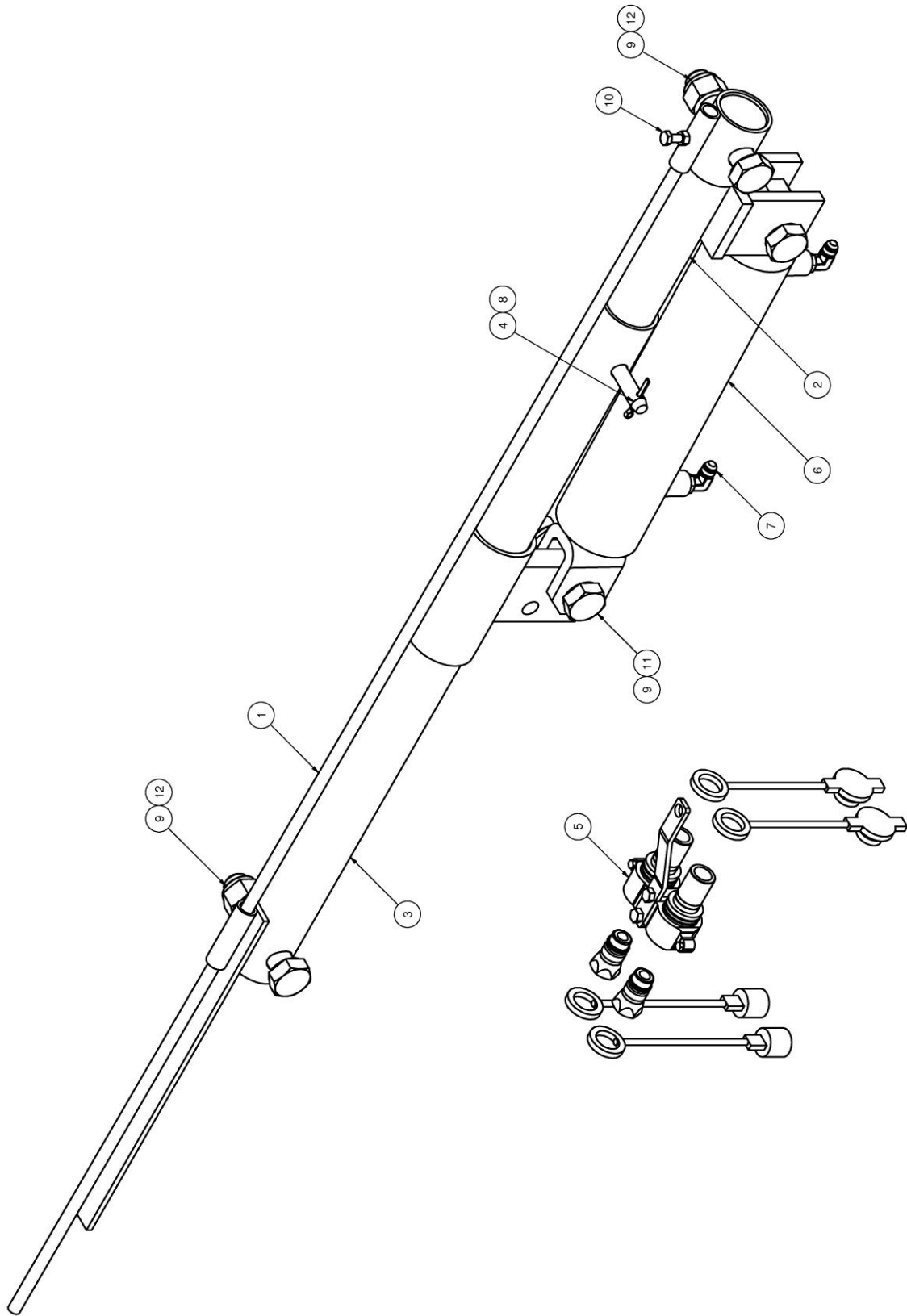


MOLDBOARD ASS'Y 135HSE10 - 12IN

ITEM ID	ITEM NO	DESCRIPTION	QTY REQ
1	00800173	MOLDBOARD WELD'T 135HSE10 - 12IN	1
2	0500020	BLADE 12 TP 1/2 X 8 X 144	1
3	00808800	NOSE SHOE WELD'T ONE-WAY PLOW	1
4	HW40C-1020	BOLT CARRIAGE 5/8 X 2 1/2 UNC ZINC	15
5	HW40A-1016	BOLT HEX 5/8 X 2 UNC ZINC	2
6	HW36D-10	NUT HEX ELASTIC 5/8 UNC ZINC	17



BOX 1120, NORPARK DRIVE, MOUNT FOREST, ONT. N0G 2L0 (519)323-4433 PH (519)323-4608 FX



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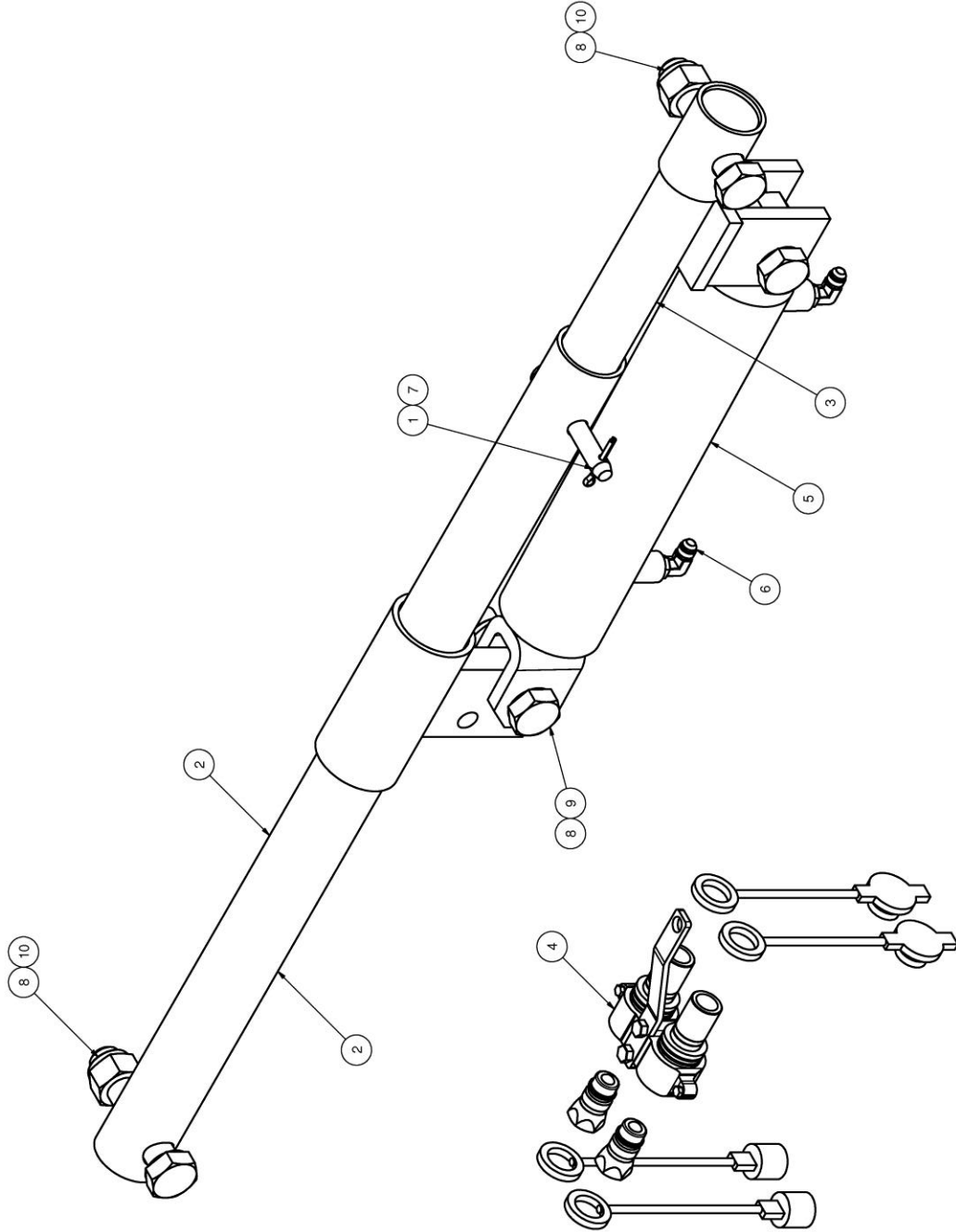


HYD PLOW BRACE ONEWAY W/ANGLE IND.

ITEM	DRAWING NO.	DESCRIPTION	QTY
1	00402200	BAR 0.500 DIA X 63.000	1
2	00800209	INNER ARM WELD'T PWRTILT ONEWAY W/IND	1
3	00800210	OUTER ARM WELD'T PWRTILT ONEWAY W/IND	1
4	00900087	PIN 0.625 DIA X 4.000 WELD'T	1
5	01900238	SAFEWAY QUICK DISC KIT	1
6	0540063	CYLINDER HYD DA 3 X 6 FRONT LIFT	1
7	0630016	HYD ADAPTER 3/8 SAE 90 3/8 JIC	2
8	HW13A-0624	COTTER PIN 3/16 X 1 1/2 ZINC	1
9	HW36D-16	NUT HEX ELASTIC 1 UNC ZINC	4
10	HW40A-0508	BOLT HEX 5/16 X 1 UNC ZINC	1
11	HW40A-1632	BOLT HEX 1 X 4 UNC ZINC	2
12	HW40A-1640	BOLT HEX 1 X 5 UNC ZINC	2



BOX 1120, NORPARK DRIVE, MOUNT FOREST, ONT. N0G 2L0 (519)323-4433 PH (519)323-4608 FX



TO MAINTAIN OUR ON-GOING PRODUCT DEVELOPMENT AND IMPROVEMENT PROGRAM, VIKING GIVES LTD. RESERVES THE RIGHT TO CHANGE EQUIPMENT & SPECIFICATION WITHOUT NOTICE.



HYD PLOW BRACE ONEWAY – NO INDICATOR

ITEM	PART NUMBER	DESCRIPTION	QTY
1	00900087	PIN 0.625 DIA X 4.000 WELD'T	1
2	01201033	OUTER ARM WELD'T POWER TILT ONEWAY PLOW	1
3	01201039	INNER ARM WELD'T POWER TILT ONEWAY PLOW	1
4	01900238	SAFEWAY QUICK DISC KIT	1
5	0540063CYL	CYLINDER HYD DA 3 X 6 FRONT LIFT	1
6	0630016	HYD ADAPTER 3/8 SAE 90 3/8 JIC	2
7	HW13A-0624	COTTER PIN 3/16 X 1 1/2 ZINC	1
8	HW36D-16	NUT HEX ELASTIC 1 UNC ZINC	4
9	HW40A-1632	BOLT HEX 1 X 4 UNC ZINC	2
10	HW40A-1640	BOLT HEX 1 X 5 UNC ZINC	2

