



OPERATOR'S MANUAL

Metal Working



MANUAL PINCH ROLL BENDER MODEL: R-H60-HD AND R-M60-HD

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THANK YOU & WARRANTY

Thank you for your purchase of a machine from Baileigh Industrial Holdings LLC. We hope that you find it productive and useful to you for a long time to come.

Inspection & Acceptance. Buyer shall inspect all Goods within ten (10) days after receipt thereof. Buyer's payment shall constitute final acceptance of the Goods and shall act as a waiver of the Buyer's rights to inspect or reject the goods unless otherwise agreed. If Buyer rejects any merchandise, Buyer must first obtain a Returned Goods Authorization ("RGA") number before returning any goods to Seller. Goods returned without an RGA will be refused. Seller will not be responsible for any freight costs, damages to goods, or any other costs or liabilities pertaining to goods returned without a RGA. Seller shall have the right to substitute a conforming tender. Buyer will be responsible for all freight costs to and from Buyer and repackaging costs, if any, if Buyer refuses to accept shipment. If Goods are returned in unsalable condition, Buyer shall be responsible for full value of the Goods. Buyer may not return any special-order Goods. Any Goods returned hereunder shall be subject to a restocking fee equal to 30% of the invoice price.

Specifications. Seller may, at its option, make changes in the designs, specifications or components of the Goods to improve the safety of such Goods, or if in Seller's judgment, such changes will be beneficial to their operation or use. Buyer may not make any changes in the specifications for the Goods unless Seller approves of such changes in writing, in which event Seller may impose additional charges to implement such changes.

Limited Warranty. Seller warrants to the original end-user that the Goods manufactured or provided by Seller under this Agreement shall be free of defects in material or workmanship for a period of twelve (12) months from the date of purchase, provided that the Goods are installed, used, and maintained in accordance with any instruction manual or technical guidelines provided by the Seller or supplied with the Goods, if applicable. The original end-user must give written notice to Seller of any suspected defect in the Goods prior to the expiration of the warranty period. The original end-user must also obtain a RGA from Seller prior to returning any Goods to Seller for warranty service under this paragraph. Seller will not accept any responsibility for Goods returned without a RGA. The original end-user shall be responsible for all costs and expenses associated with returning the Goods to Seller for warranty service. In the event of a defect, Seller, at its sole option, shall repair or replace the defective Goods or refund to the original end-user the purchase price for such defective Goods. Goods are not eligible for replacement or return after a period of 10 days from date of receipt. The foregoing warranty is Seller's sole obligation, and the original end-user's exclusive remedy, with regard to any defective Goods. This limited warranty does not apply to: (a) die sets, tooling, and saw blades; (b) periodic or routine maintenance and setup, (c) repair or replacement of the Goods due to normal wear and tear, (d) defects or damage to the Goods resulting from misuse, abuse, neglect, or accidents, (e) defects or damage to the Goods resulting from improper or unauthorized alterations, modifications, or changes; and (f) any Goods that has not been installed and/or maintained in accordance with the instruction manual or technical guidelines provided by Seller.

EXCLUSION OF OTHER WARRANTIES. THE FOREGOING LIMITED WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED. ANY AND ALL OTHER EXPRESS, STATUTORY OR IMPLIED WARRANTIES, INCLUDING BUT NOT LIMITED TO, ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE ARE EXPRESSLY DISCLAIMED. NO WARRANTY IS MADE WHICH EXTENDS BEYOND THAT WHICH IS EXPRESSLY CONTAINED HEREIN.

Limitation of Liability. IN NO EVENT SHALL SELLER BE LIABLE TO BUYER OR ANY OTHER PARTY FOR ANY INCIDENTAL, CONSEQUENTIAL OR SPECIAL DAMAGES (INCLUDING, WITHOUT LIMITATION, LOST PROFITS OR DOWN TIME) ARISING FROM OR IN MANNER CONNECTED WITH THE GOODS, ANY BREACH BY SELLER OR ITS AGENTS OF THIS AGREEMENT, OR ANY OTHER CAUSE WHATSOEVER, WHETHER BASED ON CONTRACT, TORT OR ANY OTHER THEORY OF LIABILITY. BUYER'S REMEDY WITH RESPECT TO ANY CLAIM ARISING UNDER THIS AGREEMENT IS STRICTLY LIMITED TO NO MORE THAN THE AMOUNT PAID BY THE BUYER FOR THE GOODS.



Force Majeure. Seller shall not be responsible for any delay in the delivery of, or failure to deliver, Goods due to causes beyond Seller's reasonable control including, without limitation, acts of God, acts of war or terrorism, enemy actions, hostilities, strikes, labor difficulties, embargoes, non-delivery or late delivery of materials, parts and equipment or transportation delays not caused by the fault of Seller, delays caused by civil authorities, governmental regulations or orders, fire, lightning, natural disasters or any other cause beyond Seller's reasonable control. In the event of any such delay, performance will be postponed by such length of time as may be reasonably necessary to compensate for the delay.

Installation. If Buyer purchases any Goods that require installation, Buyer shall, at its expense, make all arrangements and connections necessary to install and operate the Goods. Buyer shall install the Goods in accordance with any Seller instructions and shall indemnify Seller against any and all damages, demands, suits, causes of action, claims and expenses (including actual attorneys' fees and costs) arising directly or indirectly out of Buyer's failure to properly install the Goods.

Work By Others; Safety Devices. Unless agreed to in writing by Seller, Seller has no responsibility for labor or work performed by Buyer or others, of any nature, relating to design, manufacture, fabrication, use, installation or provision of Goods. Buyer is solely responsible for furnishing and requiring its employees and customers to use all safety devices, guards and safe operating procedures required by law and/or as set forth in manuals and instruction sheets furnished by Seller. Buyer is responsible for consulting all operator manuals, ANSI or comparable safety standards, OSHA regulations and other sources of safety standards and regulations applicable to the use and operation of the Goods.

Remedies. Each of the rights and remedies of Seller under this Agreement is cumulative and in addition to any other or further remedies provided under this Agreement or at law or equity.

Attorney's Fees. In the event legal action is necessary to recover monies due from Buyer or to enforce any provision of this Agreement, Buyer shall be liable to Seller for all costs and expenses associated therewith, including Seller's actual attorney fees and costs.

Governing Law/Venue. This Agreement shall be construed and governed under the laws of the State of Wisconsin, without application of conflict of law principles. Each party agrees that all actions or proceedings arising out of or in connection with this Agreement shall be commenced, tried, and litigated only in the state courts sitting in Manitowoc County, Wisconsin or the U.S. Federal Court for the Eastern District of Wisconsin. Each party waives any right it may have to assert the doctrine of "forum non conveniens" or to object to venue to the extent that any proceeding is brought in accordance with this section. Each party consents to and waives any objection to the exercise of personal jurisdiction over it by courts described in this section. Each party waives to the fullest extent permitted by applicable law the right to a trial by jury.

Summary of Return Policy.

- 10 Day acceptance period from date of delivery. Damage claims and order discrepancies will not be accepted after this time.
- You must obtain a Baileigh issued RGA number PRIOR to returning any materials.
- Returned materials must be received at Baileigh in new condition and in original packaging.
- Altered items are not eligible for return.
- Buyer is responsible for all shipping charges.
- A 30% re-stocking fee applies to all returns.

Baileigh Industrial Holdings LLC makes every effort to ensure that our posted specifications, images, pricing and product availability are as correct and timely as possible. We apologize for any discrepancies that may occur. Baileigh Industrial Holdings LLC reserves the right to make any and all changes deemed necessary in the course of business including but not limited to pricing, product specifications, quantities, and product availability.

For Customer Service & Technical Support:

Please contact one of our knowledgeable Sales and Service team members at:
(920) 684-4990 or e-mail us at Baileigh-Service@jpwindustries.com



INTRODUCTION

The quality and reliability of the components assembled on a Baileigh Industrial Holdings LLC machine guarantee near perfect functioning, free from problems, even under the most demanding working conditions. However, if a situation arises, refer to the manual first. If a solution cannot be found, contact the distributor where you purchased our product. Make sure you have the serial number and production year of the machine (stamped on the nameplate). For replacement parts refer to the assembly numbers on the parts list drawings.

Our technical staff will do their best to help you get your machine back in working order.

In this manual you will find: (when applicable)

- Safety procedures
- Correct installation guidelines
- Description of the functional parts of the machine
- Capacity charts
- Setup and start-up instructions
- Machine operation
- Scheduled maintenance
- Parts lists

GENERAL NOTES

After receiving your equipment remove the protective container. Do a complete visual inspection, and if damage is noted, **photograph it for insurance claims** and contact your carrier at once, requesting inspection. Also contact Baileigh Industrial Holdings LLC and inform them of the unexpected occurrence. Temporarily suspend installation.

Take necessary precautions while loading / unloading or moving the machine to avoid any injuries.

Your machine is designed and manufactured to work smoothly and efficiently. Following proper maintenance instructions will help ensure this. Try and use original spare parts, whenever possible, and most importantly; **DO NOT** overload the machine or make any modifications.



Note: *This symbol refers to useful information throughout the manual.*



IMPORTANT

PLEASE READ THIS OPERATORS MANUAL CAREFULLY

It contains important safety information, instructions, and necessary operating procedures. The continual observance of these procedures will help increase your production and extend the life of the equipment.



SAFETY INSTRUCTIONS

LEARN TO RECOGNIZE SAFETY INFORMATION

This is the safety alert symbol. When you see this symbol on your machine or in this manual, **BE ALERT TO THE POTENTIAL FOR PERSONAL INJURY!**



Follow recommended precautions and safe operating practices.

UNDERSTAND SIGNAL WORDS

A signal word – **DANGER**, **WARNING**, or **CAUTION** – is used with the safety alert symbol. **NOTICE**, which is not related to personal injury, is used without a symbol.

DANGER: Indicates a hazardous situation which, if not avoided, will result in death or serious injury.

WARNING: Indicates a hazardous situation which, if not avoided, could result in death or serious injury.

CAUTION: Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

NOTICE: Indicates a situation which, if not avoided, could result in property damage.

DANGER

WARNING

CAUTION

NOTICE

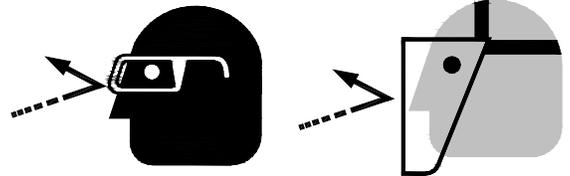


SAVE THESE INSTRUCTIONS.
Refer to them often and use them to instruct others.



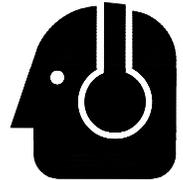
PROTECT EYES

Wear safety glasses or suitable eye protection when working on or around machinery.



PROTECT AGAINST NOISE

Prolonged exposure to loud noise can cause impairment or loss of hearing. Wear suitable hearing protective devices such as earmuffs or earplugs to protect against objectionable or uncomfortable loud noises.



KEEP CLEAR OF MOVING OBJECTS

Always be aware of the position of the clamp handle and the counterweight. They are heavy and can swing back suddenly causing serious body or head injuries.



HYDRAULIC HOSE FAILURE

Exercise **CAUTION** around hydraulic hoses in case of a hose or fitting failure.

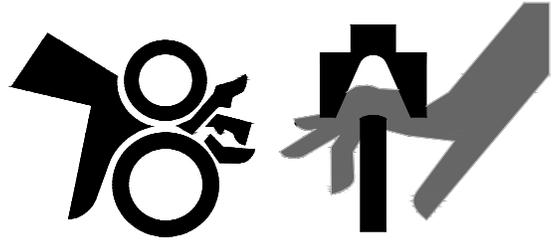




BEWARE OF PINCH POINTS AND CRUSH HAZARD

Keep hands and fingers from between the roller and die when bending materials to avoid possible injury.

NEVER place your hands, fingers, or any part of your body in the die area of this machine.



HIGH VOLTAGE

USE CAUTION IN HIGH VOLTAGE AREAS. DO NOT assume the power to be off.
FOLLOW PROPER LOCKOUT PROCEDURES.



EMERGENCY STOP BUTTON

In the event of incorrect operation or dangerous conditions, the machine can be stopped immediately by pressing the **E-STOP** button. Twist the emergency stop button clockwise (cw) to reset. Note: Resetting the E-Stop will not start the machine.



CALIFORNIA PROPOSITION 65

WARNING: Cancer and Reproductive Harm.
www.P65Warnings.ca.gov





SAFETY PRECAUTIONS



Metal working can be dangerous if safe and proper operating procedures are not followed. As with all machinery, there are certain hazards involved with the operation of the product. Using the machine with respect and caution will considerably lessen the possibility of personal injury. However, if normal safety precautions are overlooked or ignored, personal injury to the operator may result.

Safety equipment such as guards, hold-downs, safety glasses, dust masks and hearing protection can reduce your potential for injury. But even the best guard will not make up for poor judgment, carelessness or inattention. **Always use common sense** and exercise **caution** in the workshop. If a procedure feels dangerous, don't try it.

REMEMBER: Your personal safety is your responsibility.



WARNING: FAILURE TO FOLLOW THESE RULES MAY RESULT IN SERIOUS PERSONAL INJURY

Dear Valued Customer:

- All Baileigh machines should be used only for their intended use.
- Baileigh does not recommend or endorse making any modifications or alterations to a Baileigh machine. Modifications or alterations to a machine may pose a substantial risk of injury to the operator or others and may do substantial damage to the machine.
- Any modifications or alterations to a Baileigh machine will invalidate the machine's warranty.

PLEASE ENJOY YOUR BAILEIGH MACHINE!PLEASE ENJOY IT SAFELY!

1. **FOR YOUR OWN SAFETY, READ INSTRUCTION MANUAL BEFORE OPERATING THE MACHINE.** Learn the machine's application and limitations as well as the specific hazards.
2. **Only trained and qualified personnel can operate this machine.**
3. **Make sure guards are in place and in proper working order before operating machinery.**
4. **Remove any adjusting tools.** Before operating the machine, make sure any adjusting tools have been removed.
5. **Keep work area clean.** Cluttered areas invite injuries.
6. **Overloading machine.** By overloading the machine, you may cause injury from flying parts. **DO NOT** exceed the specified machine capacities.
7. **Dressing material edges.** Always chamfer and deburr all sharp edges.



8. **Do not force tool.** Your machine will do a better and safer job if used as intended. **DO NOT** use inappropriate attachments in an attempt to exceed the machine's rated capacity.
9. **Use the right tool for the job. DO NOT** attempt to force a small tool or attachment to do the work of a large industrial tool. **DO NOT** use a tool for a purpose for which it was not intended.
10. **Dress appropriately. DO NOT** wear loose fitting clothing or jewelry as they can be caught in moving machine parts. Protective clothing and steel toe shoes are recommended when using machinery. Wear a restrictive hair covering to contain long hair.
11. **Use eye protection.** Always wear ISO approved protective eye wear when operating machinery. Wear a full-face shield if you are producing metal filings. Eye wear shall be impact resistant, protective safety glasses with side shields which comply with ANSI Z87.1 specification. Use of eye wear which does not comply with ANSI Z87.1 specification could result in severe injury from breakage of eye protection.
12. **Do not overreach.** Maintain proper footing and balance at all times. **DO NOT** reach over or across a running machine.
13. **Stay alert.** Watch what you are doing and use common sense. **DO NOT** operate any tool or machine when you are tired.
14. **Check for damaged parts.** Before using any tool or machine, carefully check any part that appears damaged. Check for alignment and binding of moving parts that may affect proper machine operation.
15. **Observe work area conditions. DO NOT** use machines or power tools in damp or wet locations. Do not expose to rain. Keep work area well lighted. **DO NOT** use electrically powered tools in the presence of flammable gases or liquids.
16. **Keep children away.** Children must never be allowed in the work area. **DO NOT** let them handle machines, tools, or extension cords.
17. Keep visitors a safe distance from the work area.
18. **Store idle equipment.** When not in use, tools must be stored in a dry location to inhibit rust. Always lock up tools and keep them out of reach of children.
19. **DO NOT operate machine if under the influence of alcohol or drugs.** Read warning labels on prescriptions. If there is any doubt, **DO NOT** operate the machine.
20. **DO NOT** bypass or defeat any safety interlock systems.



TECHNICAL SPECIFICATIONS

Pipe Capacity	Size: 2.5" (sch. 40) / Min. Dia.: 48"
Round Tube Capacity	Size: 2.75" (.083") / Min. Dia.: 60"
Square Tube Capacity	Size: 2" (.120") / Min. Dia.: 51"
Solid Round Capacity	Size: 1.5" / Min. Dia. 28"
Flat Bar Easy Way	Size: 4" (.75") / Min. Dia. 28"
Flat Bar Hard Way	Size: 3.25" (.375") / Min. Dia.: 32"
Angle Iron Capacity	Size: 2" (.250") / Min. Dia.: 36"
Shaft Diameter	2.36" (60mm)
Shaft Center Distance Lower Rolls	9.562" (242.8mm)
Roll Diameter	5.827" (148mm)
Roll Adjustment (Top Roll)	Hydraulic
Driven Rolls	3
Pinch	Single
Rolling RPM	27.5
Power	220VAC, 1Ph, 60hz, 30A
Hydraulic Motor	5hp (3.7kw) 220VAC, 1Ph, 60hz, 27A
Hydraulic Pressure	2500psi (17236kPa)
Hydraulic Capacity	4.5Gal (17L)
Shipping Dimensions	60" x 44" x 68" (1524 x 1118 x 1727mm)
Shipping Weight	1475lbs. (669kg)
All Specs based on 60,000 PSI (42 Kg/mm ²) Tensile Strength – Mild Steel.	

TECHNICAL SUPPORT

Our technical support department can be reached at 920.684.4990 and asking for the support desk for purchased machines. Tech Support handles questions on machine setup, schematics, warranty issues, and individual parts needs: (other than die sets and blades).

For specific application needs or future machine purchases contact the Sales Department at: Baileigh-Service@jpwindustries.com, Phone: 920.684.4990, or Fax: 920.684.3944.



Note: *The photos and illustrations used in this manual are representative only and may not depict the actual color, labeling or accessories and may be intended to illustrate technique only.*



Note: *The specifications and dimensions presented here are subject to change without prior notice due to improvements of our products.*



UNPACKING AND CHECKING CONTENTS

Your Baileigh machine is shipped complete. Separate all parts from the packing material and check each item carefully. Make certain all items are accounted for before discarding any packing material.

⚠ WARNING: SUFFOCATION HAZARD! Immediately discard any plastic bags and packing materials to eliminate choking and suffocation hazards to children and animals.
If any parts are missing, **DO NOT** place the machine into service until the missing parts are obtained and installed correctly.

Cleaning

⚠ WARNING: DO NOT USE gasoline or other petroleum products to clean the machine. They have low flash points and can explode or cause fire.

⚠ CAUTION: When using cleaning solvents work in a well-ventilated area. Many cleaning solvents are toxic if inhaled.

Your machine may be shipped with a rustproof waxy coating and/or grease on the exposed unpainted metal surfaces. Fully and completely remove this protective coating using a degreaser or solvent cleaner. Moving items will need to be moved along their travel path to allow for cleaning the entire surface. For a more thorough cleaning, some parts will occasionally have to be removed. **DO NOT USE** acetone or brake cleaner as they may damage painted surfaces.

Follow manufacturer's label instructions when using any type of cleaning product. After cleaning, wipe unpainted metal surfaces with a light coating of quality oil or grease for protection.



Important: This waxy coating is **NOT** a lubricant and will cause the machine to stick and lose performance as the coating continues to dry.





TRANSPORTING AND LIFTING

NOTICE: *Lifting and carrying operations should be carried out by skilled workers, such as a truck operator, crane operator, etc. If a crane is used to lift the machine, attach the lifting chain carefully, making sure the machine is well balanced.*

Follow these guidelines when lifting with truck or trolley:

- The lift truck must be able to lift at least 1.5 – 2 times the machines gross weight.
- Make sure the machine is balanced. While transporting, avoid rough or jerky motion, and maintain a safe clearance zone around the transport area.
- Use a forklift with sufficient lifting capacity and forks that are long enough to reach the complete width of the machine.
- Remove the securing bolts that attach the machine to the pallet.
- Approaching the machine from the side, lift the machine on the frame taking care that there are no cables or pipes in the area of the forks.
- Move the machine to the required position and lower gently to the floor.
- Level the machine so that all the supporting feet are taking the weight of the machine and no rocking is taking place.



INSTALLATION

IMPORTANT:

Consider the following when looking for a suitable location to place the machine:

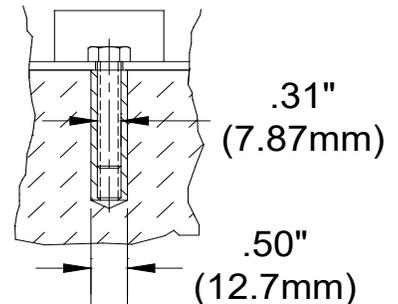
- Overall weight of the machine.
- Weight of material being processed.
- Sizes of material to be processed through the machine.
- Space needed for auxiliary stands, worktables, or other machinery.
- Clearance from walls and other obstacles.
- Maintain an adequate working area around the machine for safety.
- Have the work area well illuminated with proper lighting.



- Keep the floor free of oil and make sure it is not slippery.
- Remove scrap and waste materials regularly, and make sure the work area is free from obstructing objects.
- If long lengths of material are to be fed into the machine, make sure that they will not extend into any aisles.
- **LEVELING:** The machine should be sited on a level, concrete floor. Provisions for securing it should be in position prior to placing the machine. The accuracy of any machine depends on the precise placement of it to the mounting surface.
- **FLOOR:** This machine distributes a large amount of weight over a small area. Make certain that the floor is capable of supporting the weight of the machine, work stock, and the operator. The floor should also be a level surface. If the unit wobbles or rocks once in place, be sure to eliminate by using shims.
- **WORKING CLEARANCES:** Take into consideration the size of the material to be processed. Make sure that you allow enough space for you to operate the machine freely.
- **POWER SUPPLY PLACEMENT:** The power supply should be located close enough to the machine so that the power cord is not in an area where it would cause a tripping hazard. Be sure to observe all electrical codes if installing new circuits and/or outlets.

Anchoring the Machine

- Once positioned, anchor the machine to the floor, as shown in the diagram. Use bolts and expansion plugs or sunken tie rods that connect through and are sized for the holes in the base of the stand.
- This machine requires a solid floor such as concrete at a minimum of 4" (102mm) thick. 6" (153mm) minimum is preferred.



Tank Filling

The hydraulic oil is the primary medium for transmitting pressure and also must lubricate the running parts of the pump.

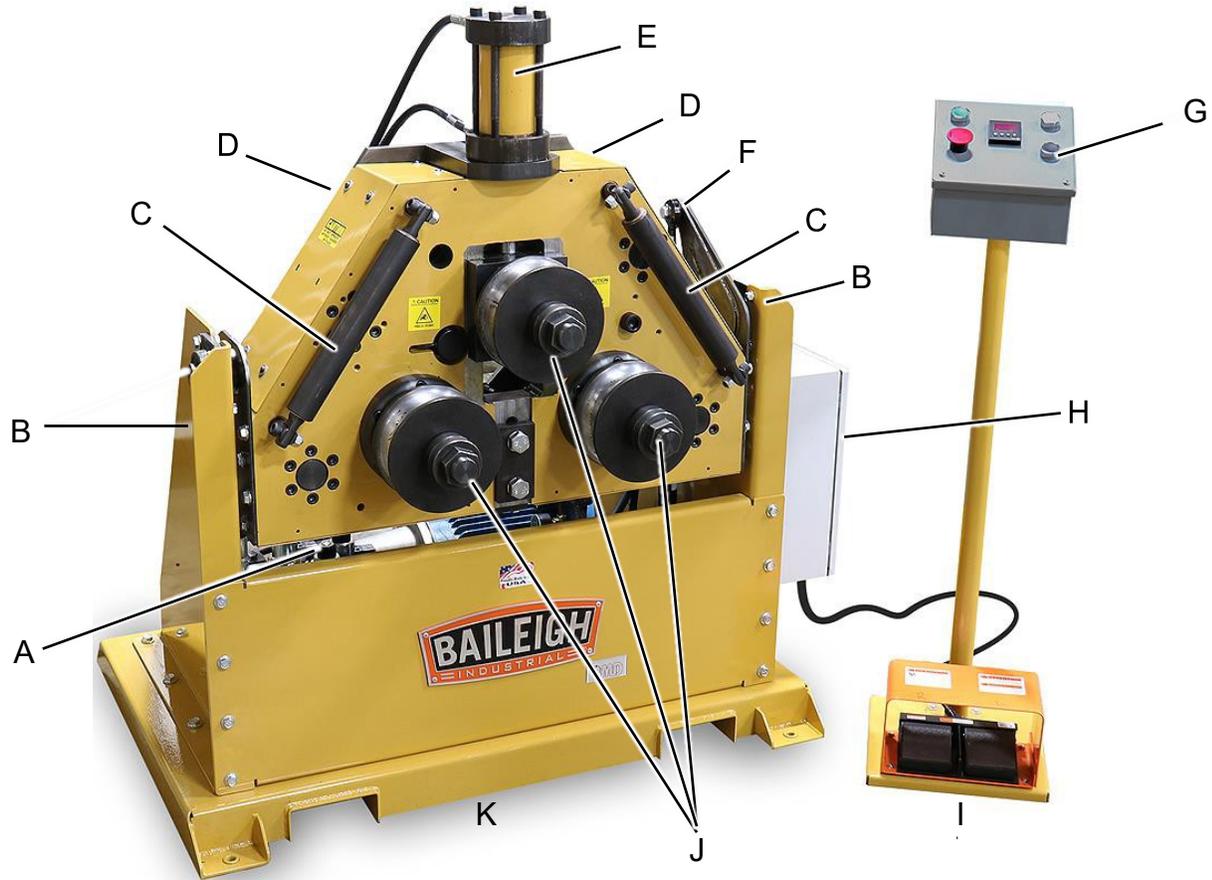
After installation of the machine and before machine startup, bring the oil level up to 90% of capacity. Refer to any labels or marking affixed to the outside of the machine, If none exist, use SHELL BRAND #46 or #68 hydraulic oil or an equivalent with similar specifications. (Based upon location temperature and availability.)

Verify that any cylinder rams are in the retracted position to prevent overfilling of the tank. Recheck the oil level after the first few hours of operation and again after the first full week of operation.

A shortage of hydraulic oil can cause hydraulic system breakdown and damage to major mechanical parts due to overheating.



GETTING TO KNOW YOUR MACHINE





Item	Description
A	Hydraulic components. Manifold with valves, reservoir, and motor and pump assembly.
B	Bending head pivot point.
C	Lateral Guide Rolls. Material side support to hold the material on plane or create a spiral.
D	Lateral Guide Roll adjustment points. (On back side as shown) Located on the back of the bending head, at the lateral guide mounting points.
E	Pinch Roll Cylinder. Supplies the pressure to press the center pinch roll into the material to create the desired radius.
F	Head Tipping Cylinder. Tips and hold the bending head from the vertical position (shown) to the horizontal position.
G	Operator Control Station. Powers the hydraulics On and operates the pinch roll cylinder down and up.
H	Electrical Enclosure. Has the main disconnect switch and the bending head tipping controls on the door and houses the electrical components.
I	Foot Pedals. Press the left foot pedal to activate the rolls to move the material to the left. Press the right foot pedal to activate the rolls to move the material to the right.
J	Bending rolls. Segmented rolls are supplied with the machine. These rolls can be configured many ways to bend a wide variety of material shapes. Specific rolls (typically for pipe or tube) may be made or ordered for other specific materials.
K	Base with forklift pockets





ELECTRICAL

⚠ CAUTION: HAVE ELECTRICAL UTILITIES CONNECTED TO MACHINE BY A CERTIFIED ELECTRICIAN!
Check if the available power supply is the same as listed on the machine nameplate.

⚠ WARNING: Make sure the grounding wire (green) is properly connected to avoid electric shock. DO NOT switch the position of the green grounding wire if any electrical plug wires are switched during hookup.

Power Specifications

Your machine is wired for 220 volts, 60hz alternating current. Before connecting the machine to the power source, make sure the power source is OFF.

Before switching on the power, you must check the voltage and frequency of the power to see if they meet with the requirement, the allowed range for the voltage is $\pm 5\%$, and for the frequency is $\pm 1\%$.

Considerations

- Observe local electrical codes when connecting the machine.
- The circuit should be protected with a time delay fuse or circuit breaker with an amperage rating slightly higher than the full load current of machine.
- A separate electrical circuit should be used for your machines. Before connecting the motor to the power line, make sure the switch is in the "OFF" position and be sure that the electric current is of the same characteristics as indicated on the machine.
- All line connections should make good contact. Running on low voltage will damage the motor.
- In the event of a malfunction or breakdown, grounding provides a path of least resistance for electric current to reduce the risk of electric shock. This machine is equipped with an electric cord having an equipment-grounding conductor and a grounding plug. The plug must be plugged into a matching outlet that is properly installed and grounded in accordance with all local codes and ordinances.

⚠ WARNING: In all cases, make certain the receptacle in question is properly grounded. If you are not sure, have a qualified electrician check the receptacle.



- Improper connection of the equipment-grounding conductor can result in risk of electric shock. The conductor with insulation having an outer surface that is green with or without yellow stripes is the equipment-grounding conductor. If repair or replacement of the electric cord or plug is necessary, do not connect the equipment-grounding conductor to a live terminal.
- Check with qualified electrician or service personnel if the grounding instructions are not completely understood, or if in doubt as to whether the machine is properly grounded.
- Repair or replace damaged or worn cord immediately.

Power cord connection:

1. Turn the main disconnect switch on the control panel to the OFF position.
2. Unwrap the power cord and route the cord away from the machine toward the power supply.
 - a. Route the power cord so that it will NOT become entangled in the machine in any way.
 - b. Route the cord to the power supply in a way that does NOT create a trip hazard.
3. Connect the power cord to the power supply and check that the power cord has not been damaged during installation.
4. When the machine is clear of any obstruction. The main power switch may be turn ON to test the operation.
5. Turn the switch OFF when the machine is not in operation.



MATERIAL SELECTION

 **CAUTION:** It must be determined by the customer that materials being processed through the machine are NOT potentially hazardous to operator or personnel working nearby.

When selecting materials keep these instructions in mind:

- Material must be clean and dry. (without oil)
- Material should have a smooth surface so it processes easily.
- Dimensional properties of material must be consistent and not exceed the machine capacity values.
- Chemical structure of material must be consistent.
- Buy certificated steel from the same vendor when possible.



IMPORTANT: All materials have many grades and variation which will change the characteristics of the material and thus the ability for the material to be formed. Below is a sample list of some of the many variations shown from a basic specification chart. Each having very different bending characteristics and many over capacity!

Schedules:	5s, 10s, 40s (STD), true 40, 80s (XH), true 80, 100, 120, 160, XXH
Carbon Steel:	A53A, A53B, A106B, API-5LB, X42, X52, A333
Stainless Steel:	304, 310, 316, 321, 347
Exotic Alloys:	Alloy 20, Hastelloy C276, Duplex 2205, Super Duplex 2507, Nickel 200, Monel 400, Inconel 600, Inconel 625, Incoloy 800H, Incoloy 825, P5, P11, P22
Coatings:	FBE (Fusion Bond Epoxy), TGF3 (Doped & Wrapped), Galvanized, Blasted & Primed, Custom Paint Specs



Note: Thorough cleaning of the rolls is necessary to avoid possible sliding of the profile through the rolls.

When bending pipe or tube the outer part of the bend is stretched and the inner section compressed. The result of these opposite and unequal stresses is that the pipe or tube tends to flatten or collapse. To prevent such distortion, the common practice is to support the wall of the pipe or tube in some manner during the bending operation. One such method is to fill the piece with sand and plug the ends. Other methods can be found to achieve favorable results.



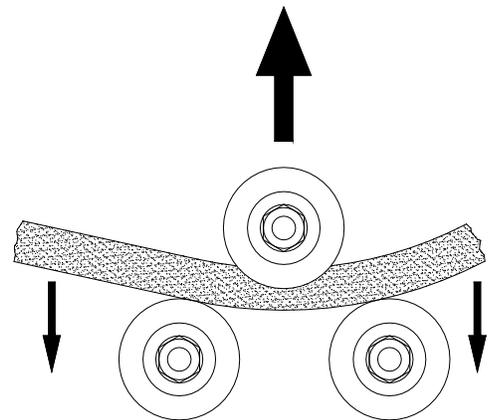
Listed below are some of the factors that control or influence the success of a bending operation.

- Mechanical properties of the material being bent.
- Thickness of the material to be bent.
- Size of the inside bend radius.
- Speed at which the bend occurs.
- Grain direction of the steel to be bent.
- Coefficient of friction.
- Roller design.

UNDERSTANDING SPRINGBACK

Springback, also known as elastic recovery, is the result of the metal wanting to return to its original shape after undergoing compression and stretch. After the bending leaf is removed from the metal and the load is released, the piece part relaxes, forcing the bent portion of the metal to return slightly to its original shape. All metals exhibit a certain amount of spring back.

The key to obtaining the correct bend angle is to over bend the metal a little and allow it to spring back to the desired angle. This is best handled through testing and record keeping.





MOUNTING THE ROLLS

⚠ CAUTION: The rolls are heavy and usually lubricated from use and may be slippery. Use care to prevent dropping the rolls as this may not only cause damage to the rolls and but cause crushing injury to hands, feet, or ankles.

Rolls must be mounted correctly, depending on the type of profile to be bent. This will save the machine from undue stress and limit defects in the profile.

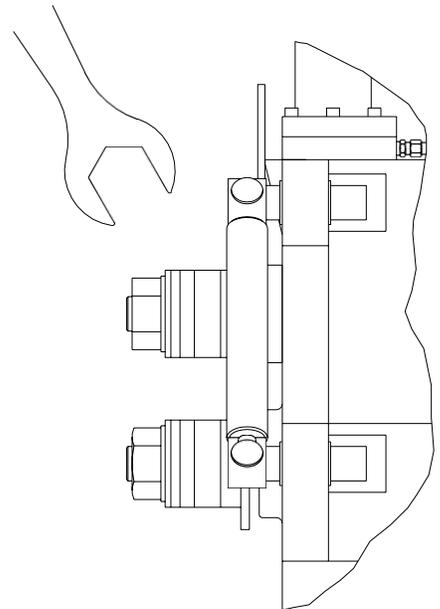
To change roll configurations, use the (supplied) wrench to remove the shaft nuts. All three shafts are connected to the drive so they will not spin.

When using the standard rolls, position the roll segments onto the shafts to create the type of profile needed to hold and form the material profile to be used. See the examples to follow.

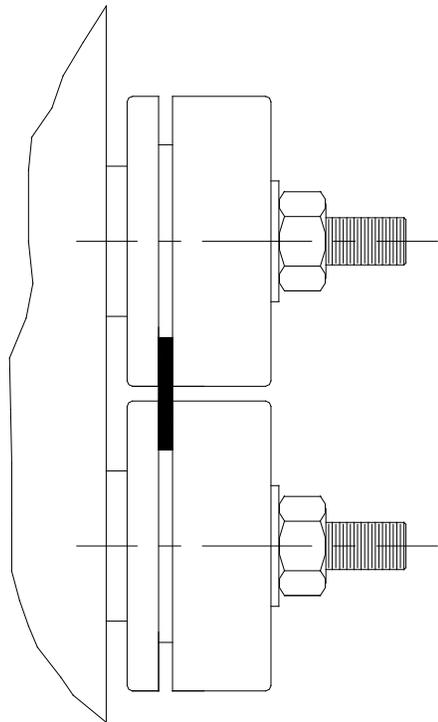
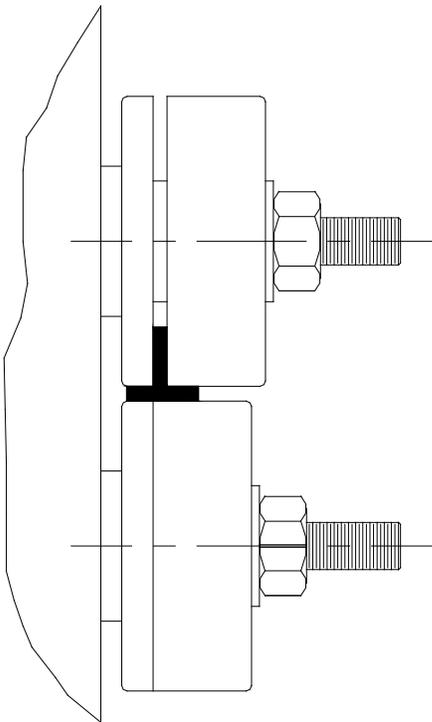
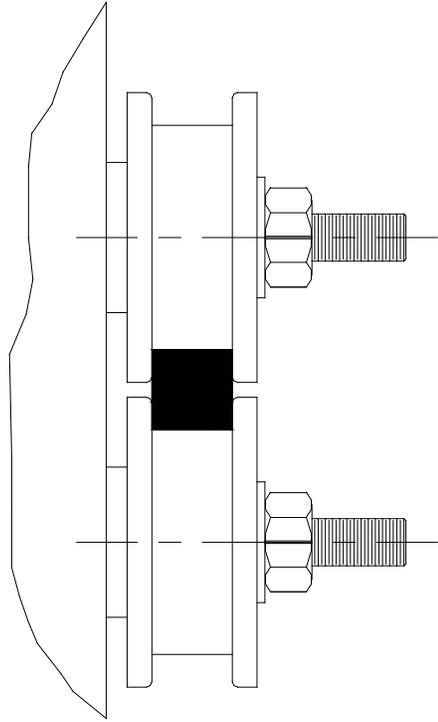
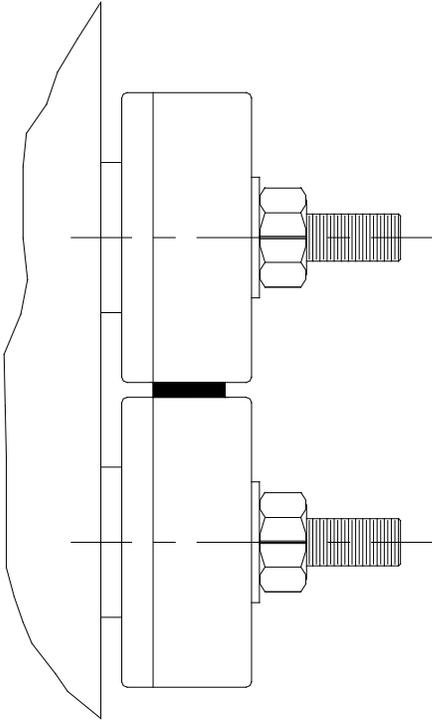
After changing rolls, replace and tighten nut to shaft.

To find the distance needed between the top and bottom rolls, place a sample of the material to be bent in between the rolls. The groove of the upper roll should be 2-4 mm (.078"-.156") larger than the thickness of the material. Make a test bend with a sample of your material. This allows you to find the material spring back, and to determine the number of passes needed to achieve the desired radius.

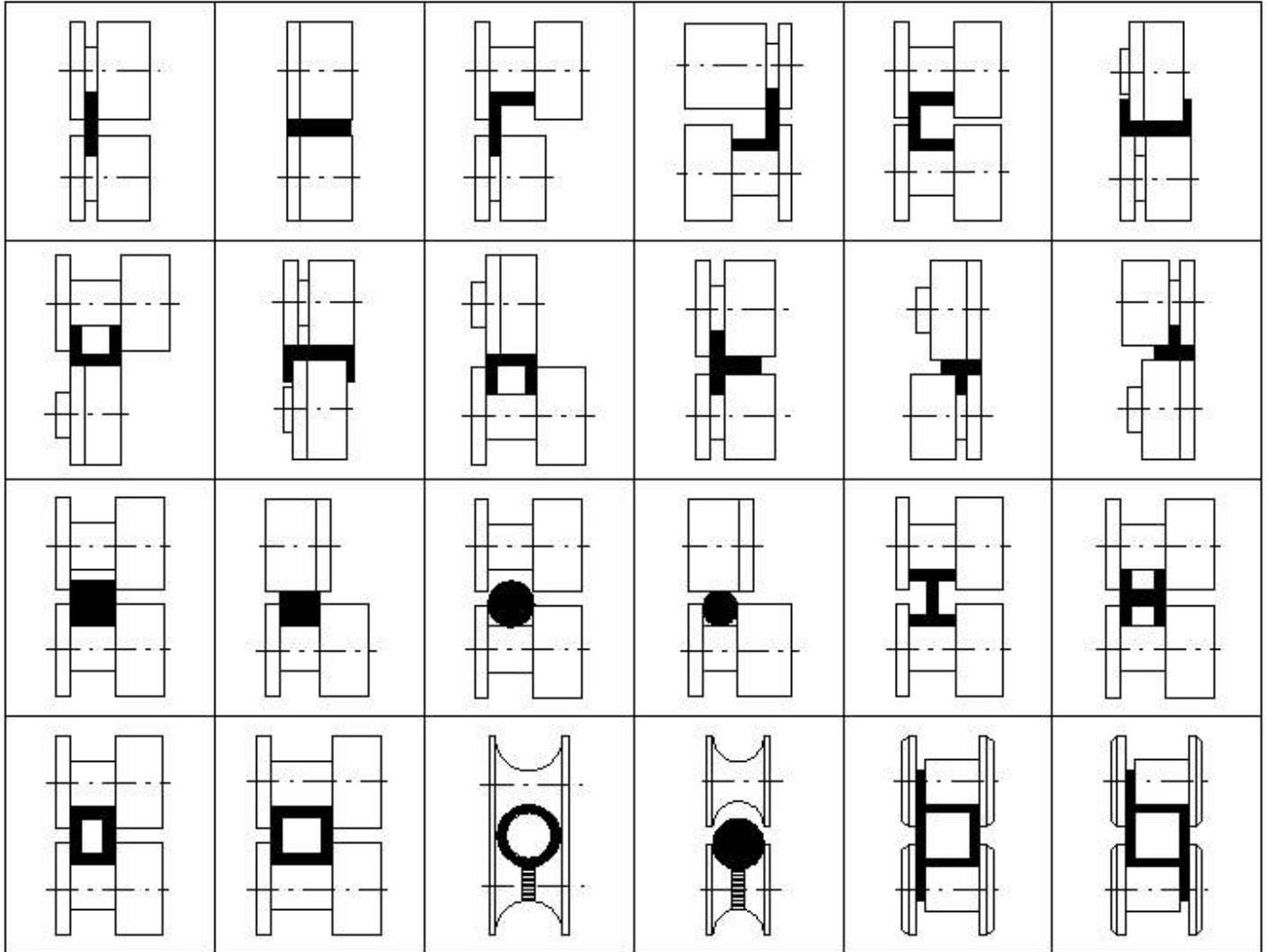
Rolls are keyed to the shaft. If vibrations are felt during the bending process, remove the key from the lower right roller shaft to make the rolls freewheeling.



ROLL CONFIGURATIONS



- Using specials rolls, many material profile configurations are possible.



Note: The tooling shown for these shapes of material are for reference only. Custom tooling has individual lead times and pricing and is non-returnable.

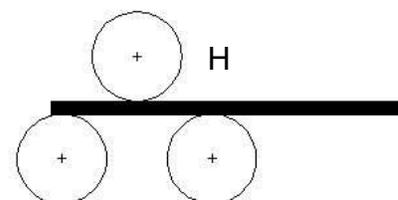


START – UP INSTRUCTIONS – HYDRAULIC PINCH

⚠ CAUTION: MAKE SURE area around rolls is free from any obstructions.

1. With power disconnected, install the desired rolls in the desired profile configuration.
2. MAKE SURE area around rolls is free from any obstructions.
3. Turn main disconnect switch (A) to the ON position. The controller (B) will boot up and the screen will illuminate.
4. Twist and release the E-Stop switch (C).
5. Press the green start button (D) to start and run the hydraulic pump.
6. Decide if the bend will be completed with the bending head in the vertical or horizontal position.
7. Use the selector switch (E) on the electrical cabinet door to set the bending head position. In either position, be sure that the material is properly supported, and the area is clear for the movement and swing of the material during the bending process.
8. Press the white UP button (F) to open the pinch roll from the stationary rolls to allow the material to be loaded.
9. DO NOT LOAD MATERIAL AT THIS TIME. This is an example step. If material was to be loaded, the material would be placed to balance on the bottom rolls.

Press the black DOWN button (G) to lower the center pinch roll to JUST contact the material without causing the material to bend (H). In the example (H), the end of the material is centered over the left roll. This is a common starting point when creating the bend.



Note: As stated in step 9, NO material was actually loaded.



10. Step on the left foot pedal and confirm that the bottom rolls rotate to the left, counterclockwise (ccw).
11. Step on the right foot pedal and confirm bottom rolls rotate to the right clockwise (cw).
12. Pressing the EMERGENCY STOP switch (C) will stop all functions. Twist the emergency stop button to reset.

OPERATION – HYDRAULIC PINCH



CAUTION: Always wear proper eye protection with side shields, safety footwear, and leather gloves to protect from burrs and sharp edges. When handling large heavy materials make sure they are properly supported.

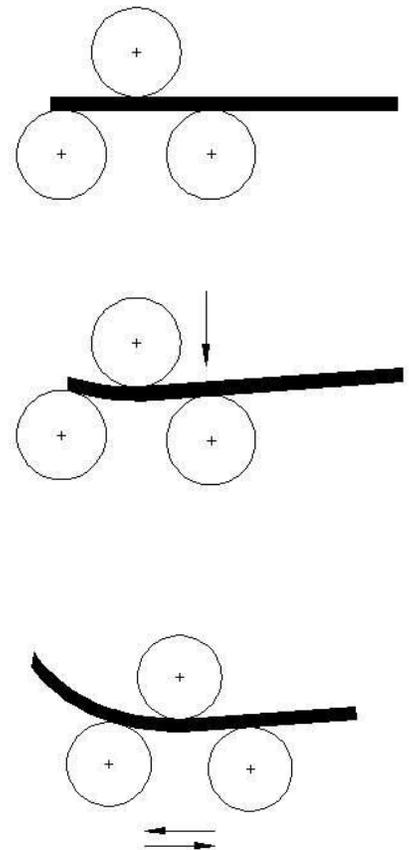
1. Place the material flat on the rolls as shown in top image. Make sure that material is placed parallel to the floor and touching all three rolls at the same time. This condition is called “zero position”.
2. Push the black down button to move the upper roll down and position it to apply enough force to bend the material slightly. To avoid deforming the piece, DO NOT apply more force than necessary.
3. To get desired radius, make consecutive passes through the rolls using left and right foot pedals and gradually lower the upper roll after each pass.

If the radius is larger than needed, move the upper roll down to apply more force. Keep track of your up/down position using the Red Lion DRO as a guide. This will help ensure consistency of parts.



Important: Most bends WILL require multiple passes through the rolls.

4. When the desired radius is formed, Note the position value on
5. the DRO (This is in the top number field). Program this noted value into the Programmed Value (PV) number (This is in the bottom number field) to create the second test/setup piece part.
6. For the second test/setup part, repeat steps 1 thru 3 stopping when the desired radius formed or when the PV number is met whichever comes first.





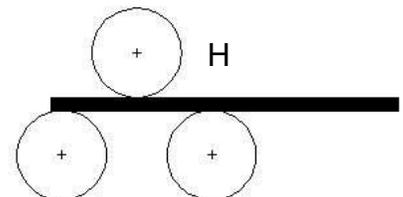
7. If the desired radius is achieved when the PV number is matched for both piece part 1 and piece part 2, use that PV number to program the controller. This will set the stop point to give a repeatable bend.
8. If the desired radius is achieved with a is different PV number, recheck the material for similarity and consistency. Items like cleanliness and the position of the weld seam will cause different results. Repeat the test/setup procedure on additional material being as consistent as possible until the desired radius is achieved on a regular basis.
9. Once the PV (stop) value is programmed, lower the upper roll with each pass through the rolls. When the programmed value is achieved, the roll will stop moving downward.
10. When the bend is complete, press the white up button to raise the upper roll and allow for the material to be unloaded and if desired, load the next piece of material.

START – UP INSTRUCTIONS – MANUAL PINCH



CAUTION: MAKE SURE area around rolls is free from any obstructions.

1. With power disconnected, install the desired rolls in the desired profile configuration.
2. MAKE SURE area around rolls is free from any obstructions.
3. Decide if the bend will be completed with the bending head in the vertical or horizontal position. In either position, be sure that the material is properly supported, and the area is clear for the movement and swing of the material during the bending process. Place the head in the desired position and lock in place.
4. Turn main disconnect switch to the ON position.
5. Twist and release the E-Stop switch.
6. Press the green start button to start and run the hydraulic pump.
7. Use a wrench to turn the adjustment shaft to open the pinch roll from the stationary rolls to allow the material to be loaded. DO NOT LOAD MATERIAL AT THIS TIME. This is an example step. If material was to be loaded, the material would be placed to balance on the bottom rolls.
8. Adjust the pinch roll DOWN to lower the center pinch roll to JUST contact the material without causing the material to bend (H). In the example (H), the end of the material is centered over the left roll. This is a common starting point when creating the bend.



loaded.

Note: As stated in step 7, NO material was actually



9. Step on the left foot pedal and confirm that the bottom rolls rotate to the left, counterclockwise (ccw).
10. Step on the right foot pedal and confirm bottom rolls rotate to the right clockwise (cw).
11. Pressing the EMERGENCY STOP switch will stop all functions. Twist the emergency stop button to reset.

OPERATION – MANUAL PINCH



CAUTION: Always wear proper eye protection with side shields, safety footwear, and leather gloves to protect from burrs and sharp edges. When handling large heavy materials make sure they are properly supported.

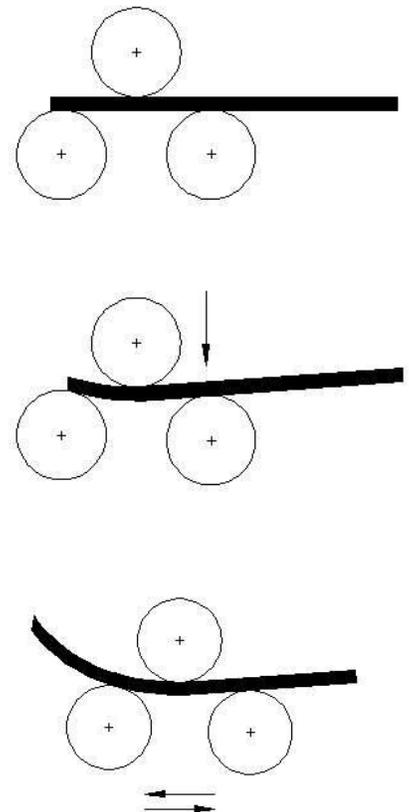
1. Place the material flat on the rolls as shown in top image. Make sure that material is placed parallel to the floor and touching all three rolls at the same time. This condition is called “zero position”.
2. Adjust the pinch roll down to move the upper roll down and position it to apply enough force to bend the material slightly. To avoid deforming the piece, DO NOT apply more force than necessary.
3. To get desired radius, make consecutive passes through the rolls using left and right foot pedals and gradually lower the upper roll after each pass.

If the radius is larger than needed, move the upper roll down to apply more force. Keep track of your up/down position using the height scale to help ensure consistency of parts.



Important: Most bends WILL require multiple passes through the rolls.

4. When the desired radius is formed, Note the pinch roll height position. Returning to this position will create repeatable bends.
5. For the second test/setup part, repeat steps 1 thru 3 stopping when the desired radius formed or when the height scale reading number is met whichever comes first.
6. If the desired radius is achieved when the height scale number is matched for both piece part 1 and piece part 2, use that height scale number. This will set the stop point to give a repeatable bend.





7. If the desired radius is achieved with a is different height scale number, recheck the material for similarity and consistency. Items like cleanliness and the position of the weld seam will cause different results. Repeat the test/setup procedure on additional material being as consistent as possible until the desired radius is achieved on a regular basis.
8. Once the height scale stop value is found, lower the upper roll with each pass through the rolls. When the height scale value is achieved, stop moving the pinch roll downward.
9. When the bend is complete, raise the upper (pinch) roll and allow for the material to be unloaded and if desired, load the next piece of material.

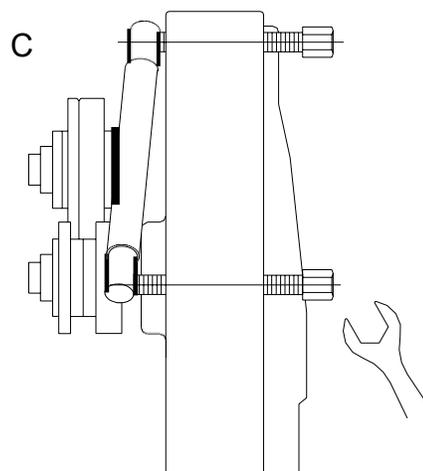
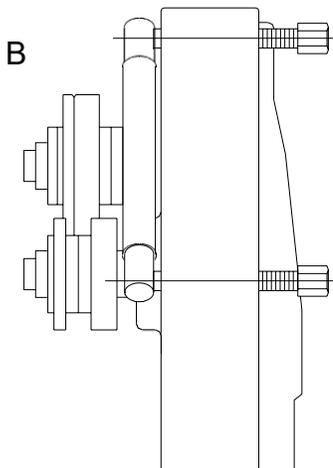
Lateral Guide Rolls

The lateral guide rolls are used to either guide the material to roll on a single plane, or to push the material off of a single plane to create a spiral.

1. To prevent material from bending off of a single plane turn the lateral guide roll adjustment nuts (A) to set the rolls to guide the material to the desired plane.
2. As the guides are adjustable on top and bottom (B and C), you can arrange them to the opposite direction that the material is inclined to go.

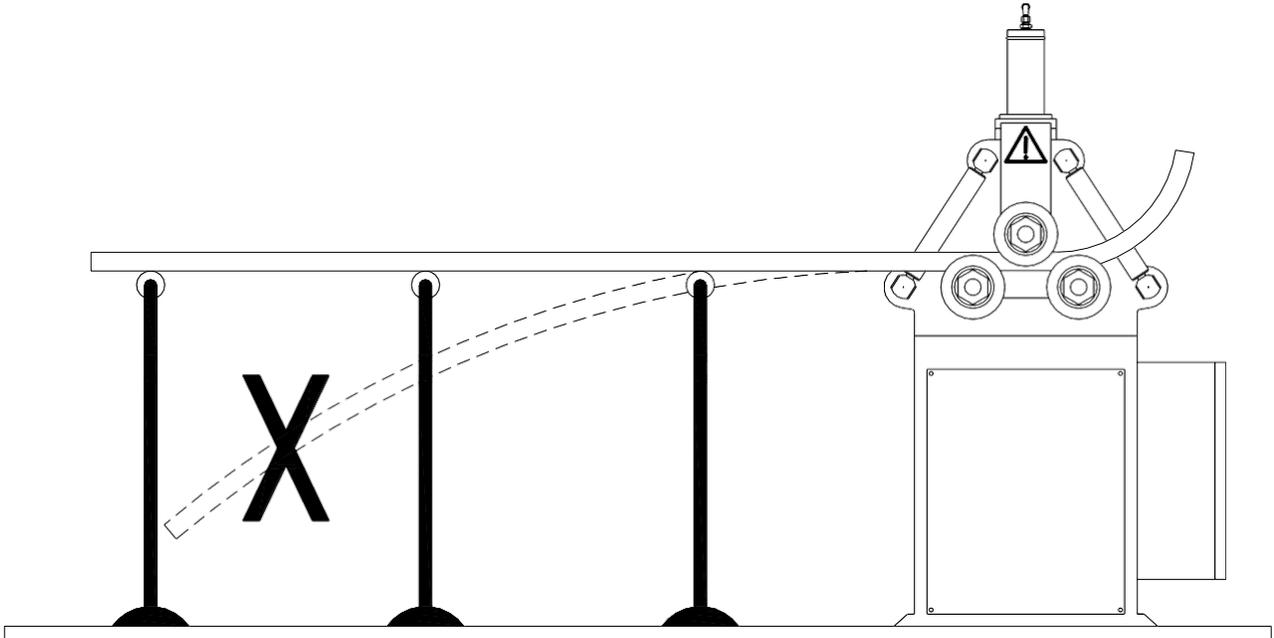


Note: To get a circular profile, side guide joints must be parallel (B) to the machine face. Otherwise you get spiral profiles (C).





When bending long materials, an adjustable conveyor is recommended to keep work piece parallel to floor, allowing for easier loading of Roll Bender. If necessary, the machine can be laid on its back to operate in a horizontal position. See the installation information at the front of this manual.



CAUTION: DO NOT feed profiles having a thickness greater than specified for the capacity of the machine. DO NOT feed more than one piece at a time. DO NOT use machine for purposes other than designed for.



LUBRICATION AND MAINTENANCE



WARNING: Make sure the electrical disconnect is OFF before working on the machine.

Maintenance should be performed on a regular basis by qualified personnel.

Always follow proper safety precautions when working on or around any machinery.

- Check daily for any unsafe conditions and fix immediately.
- Check that all nuts and bolts are properly tightened.
- On a weekly basis clean the machine and the area around it.
- Lubricate threaded components and sliding devices.
- Apply rust inhibitive lubricant to all non-painted surfaces.



Note: Proper maintenance can increase the life expectancy of your machine.

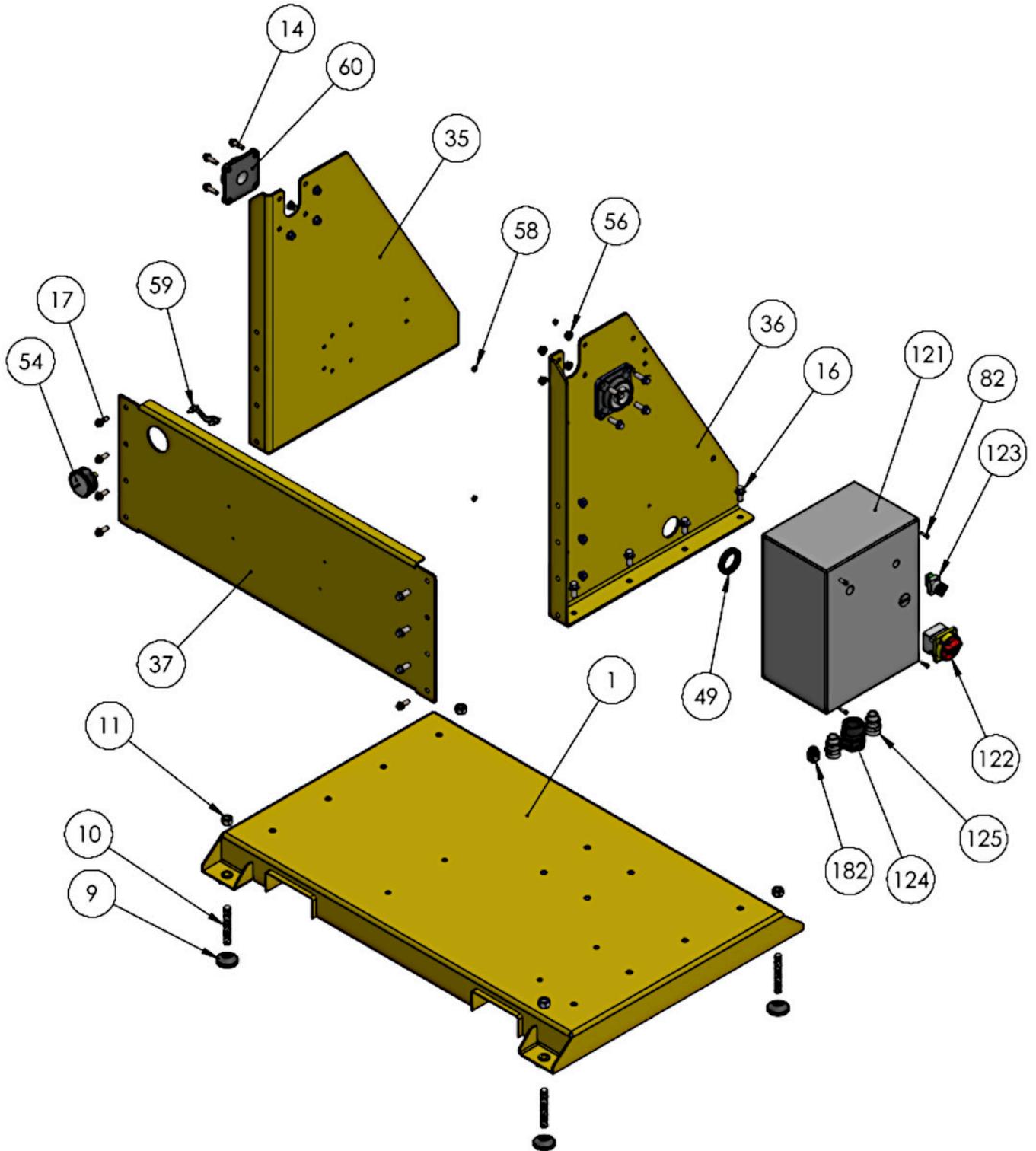
Hydraulic Oil

The hydraulic oil is the primary medium for transmitting pressure and also must lubricate the running parts of the pump.

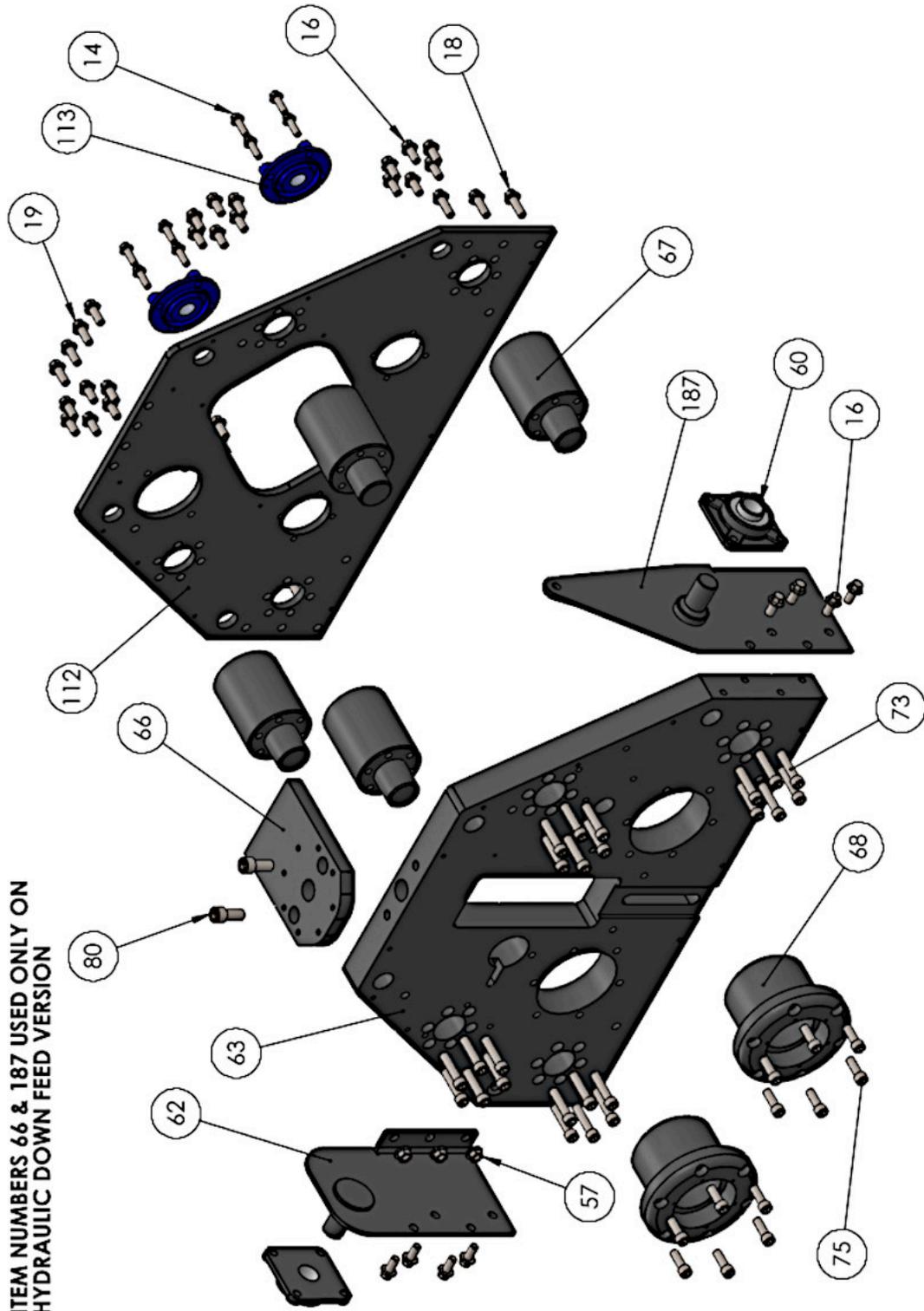
After installation of the machine and before machine startup, bring the oil level up to 90% of capacity. **A shortage of hydraulic oil can cause hydraulic system breakdown and damage to major mechanical parts due to overheating.**

1. Use SHELL BRAND #46 or #68 hydraulic oil or an equivalent with similar specifications. (Based upon location temperature and availability.)
2. Keep hydraulic reservoir filled to 90% of capacity.
3. **DO NOT** rely totally on the oil gauge as they can sometimes indicate an incorrect level reading. Do a visual inspection with the oil fill cap removed as well.
4. A shortage of hydraulic oil will cause hydraulic system breakdown to major mechanical components due to overheating.
5. Change the hydraulic oil every 6 months along with the oil filter.

BASE ASSEMBLY PARTS DIAGRAM



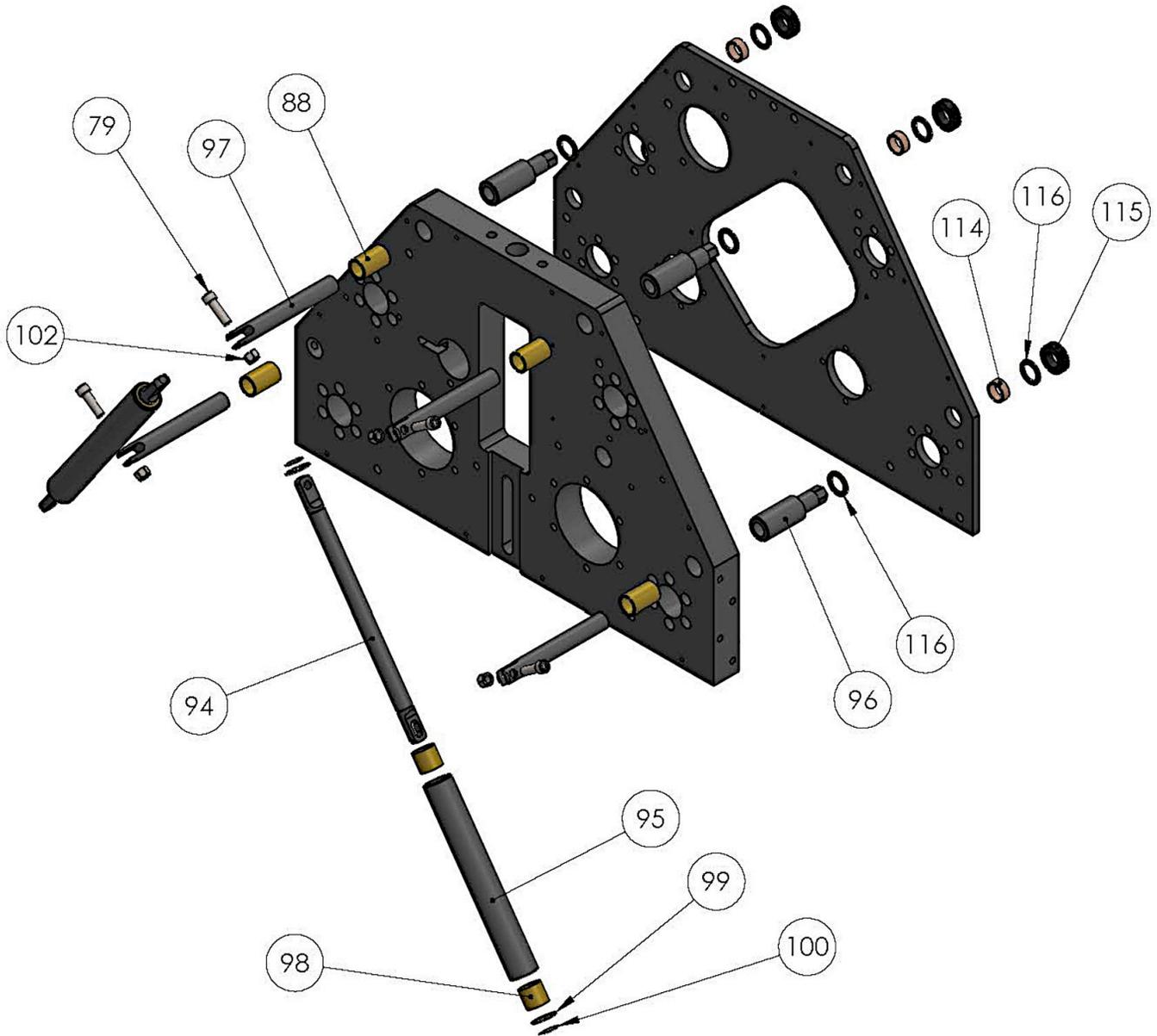
MAIN FRAME ASSEMBLY PARTS DIAGRAM



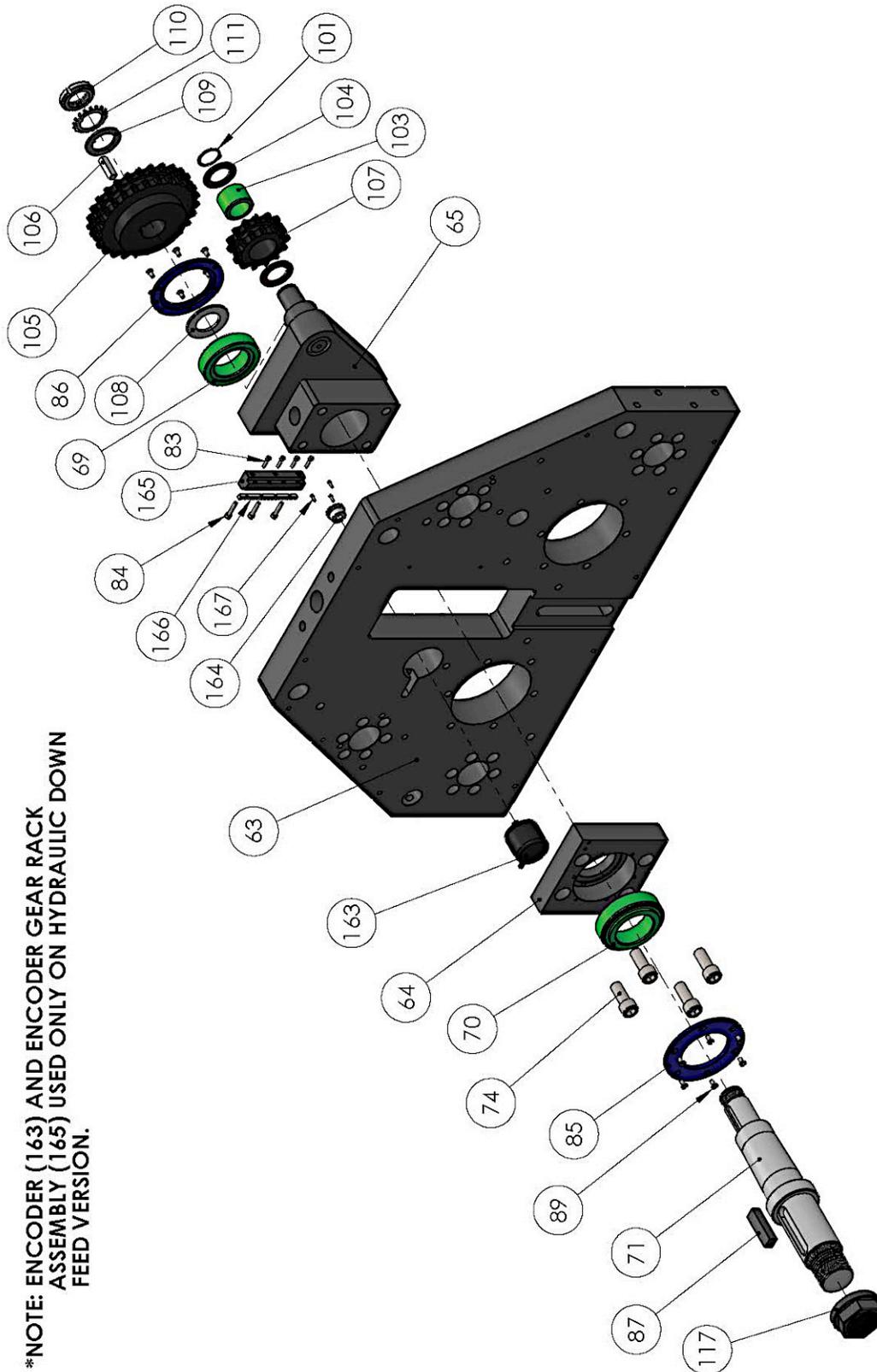
*NOTE: ITEM NUMBERS 66 & 187 USED ONLY ON HYDRAULIC DOWN FEED VERSION



SPIRAL ROLL ASSEMBLY PARTS DIAGRAM



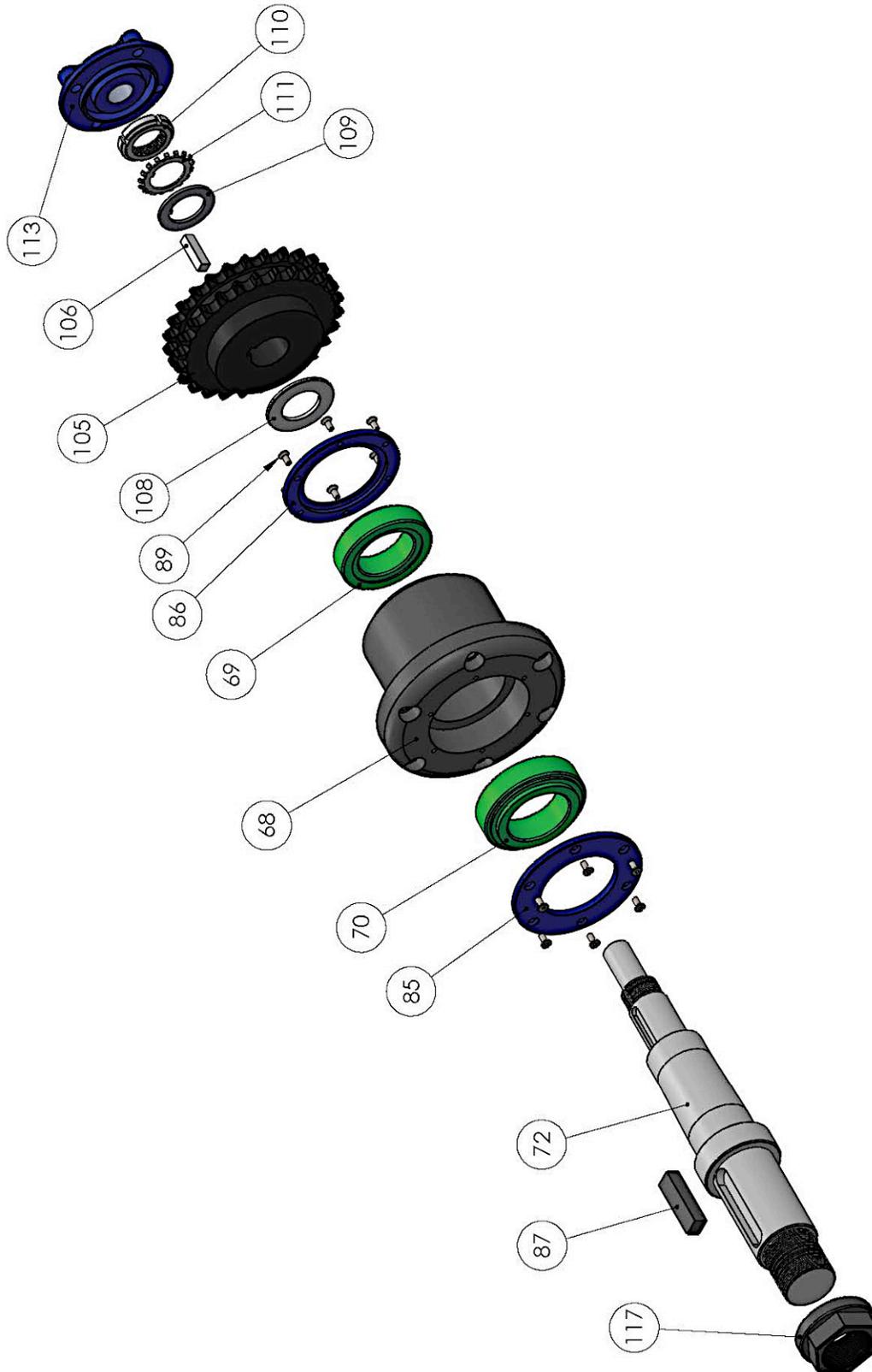
SLIDE BLOCK ASSEMBLY PARTS DIAGRAM



*NOTE: ENCODER (163) AND ENCODER GEAR RACK ASSEMBLY (165) USED ONLY ON HYDRAULIC DOWN FEED VERSION.



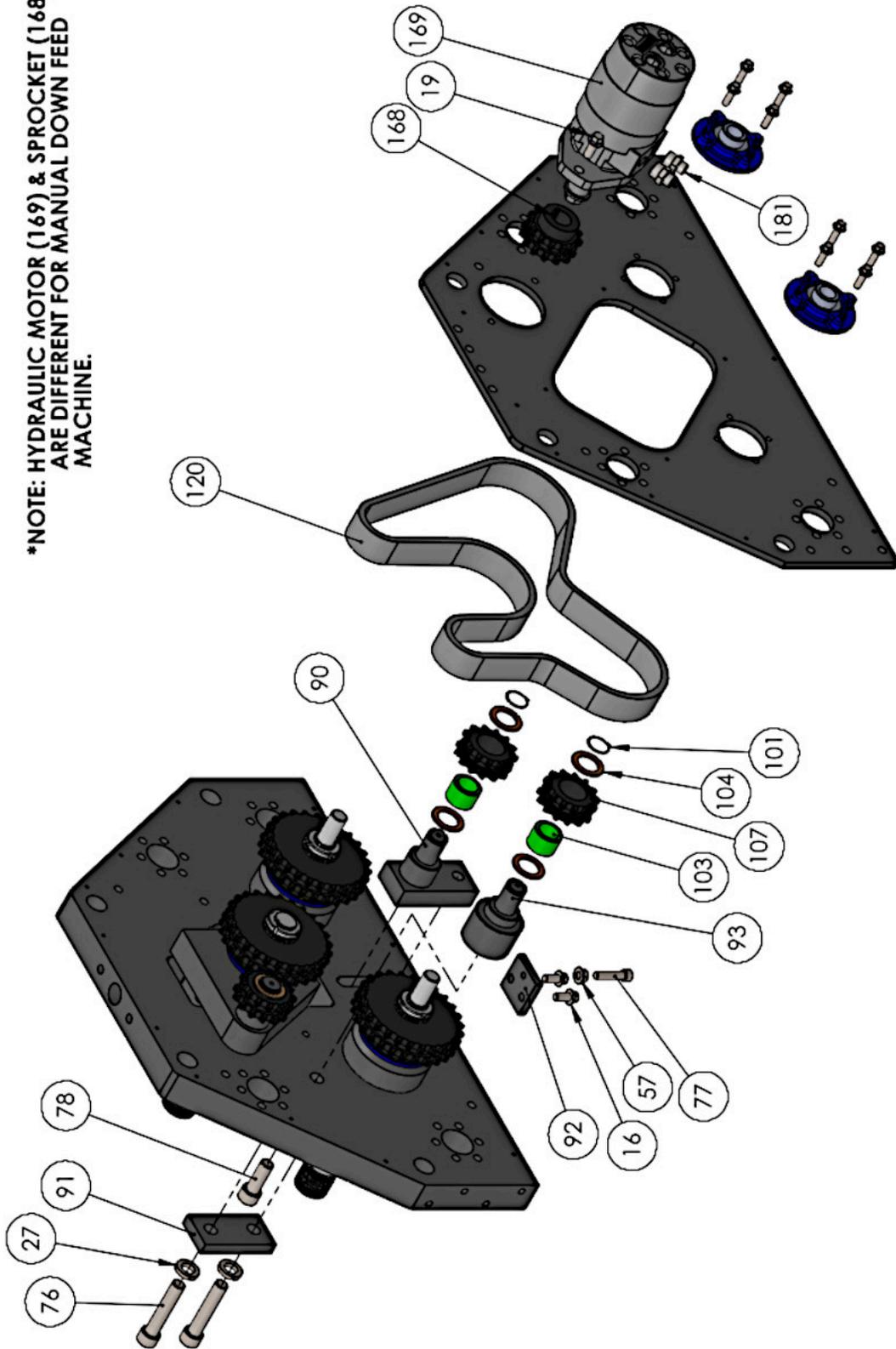
AXLE HUB ASSEMBLY PARTS DIAGRAM





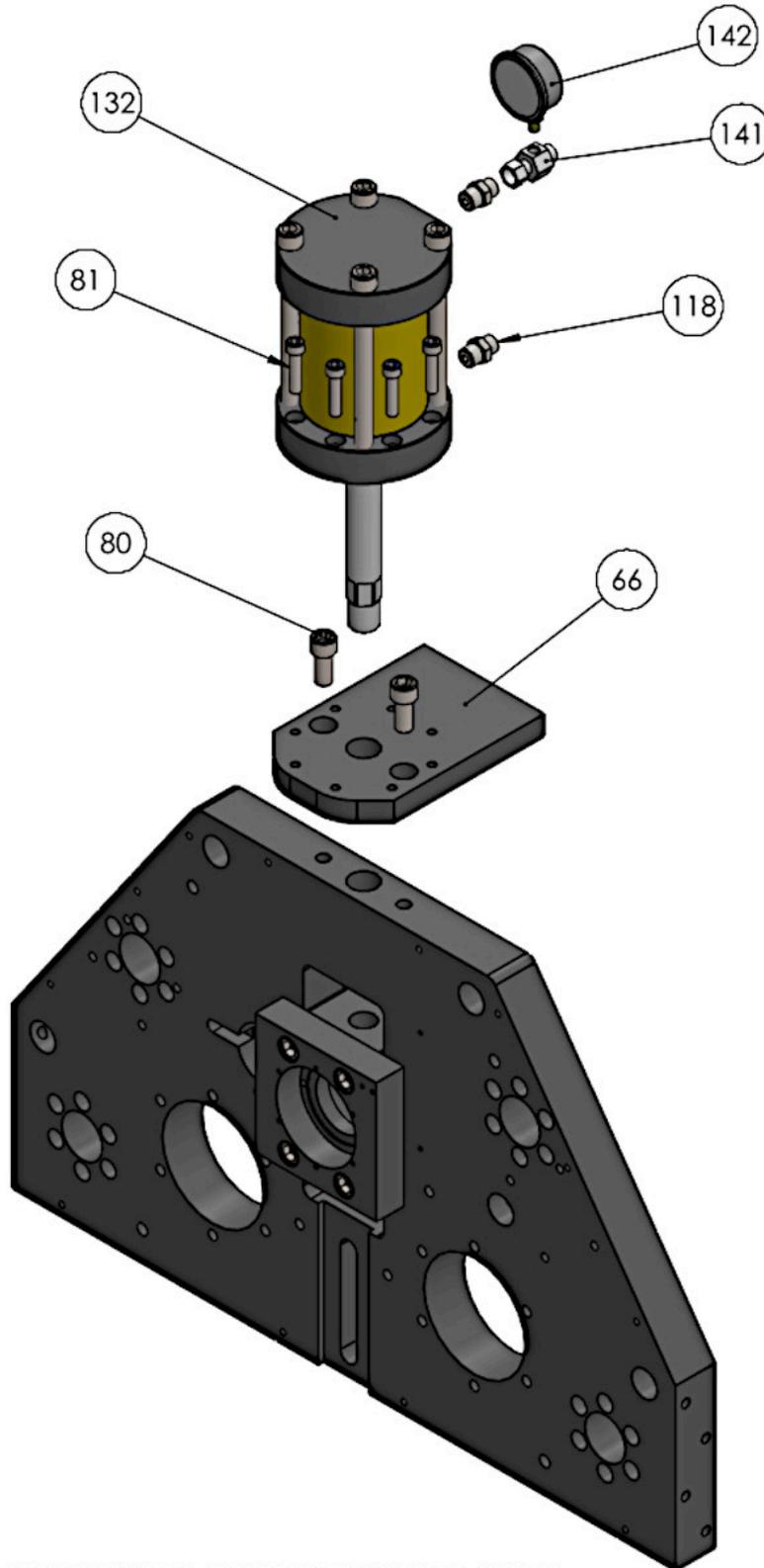
CHAIN LAYOUT ASSEMBLY PARTS DIAGRAM

*NOTE: HYDRAULIC MOTOR (169) & SPROCKET (168) ARE DIFFERENT FOR MANUAL DOWN FEED MACHINE.





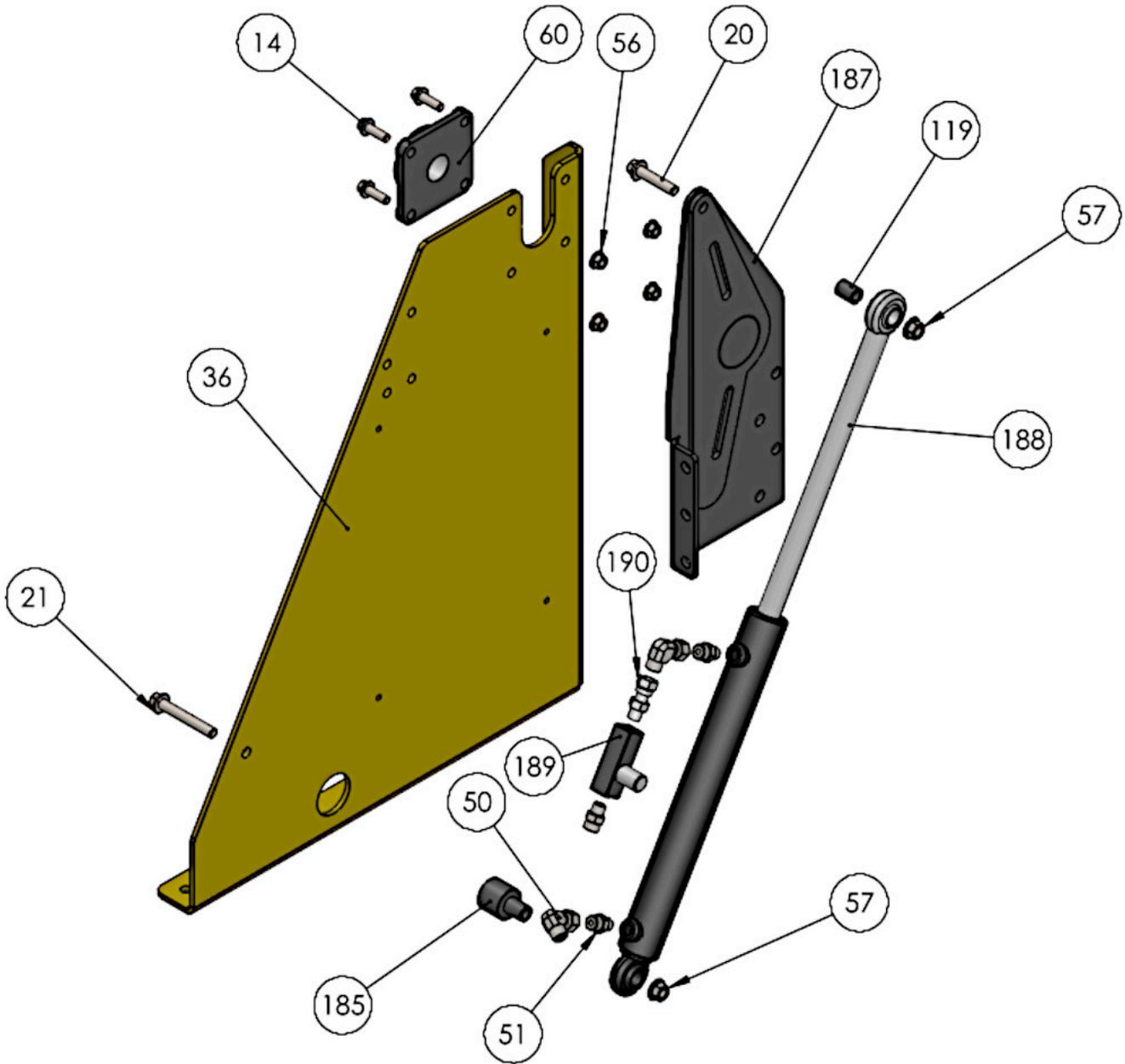
DOWN FEED CYLINDER ASSEMBLY PARTS DIAGRAM



HYDRAULIC DOWN FEED VERSION ONLY

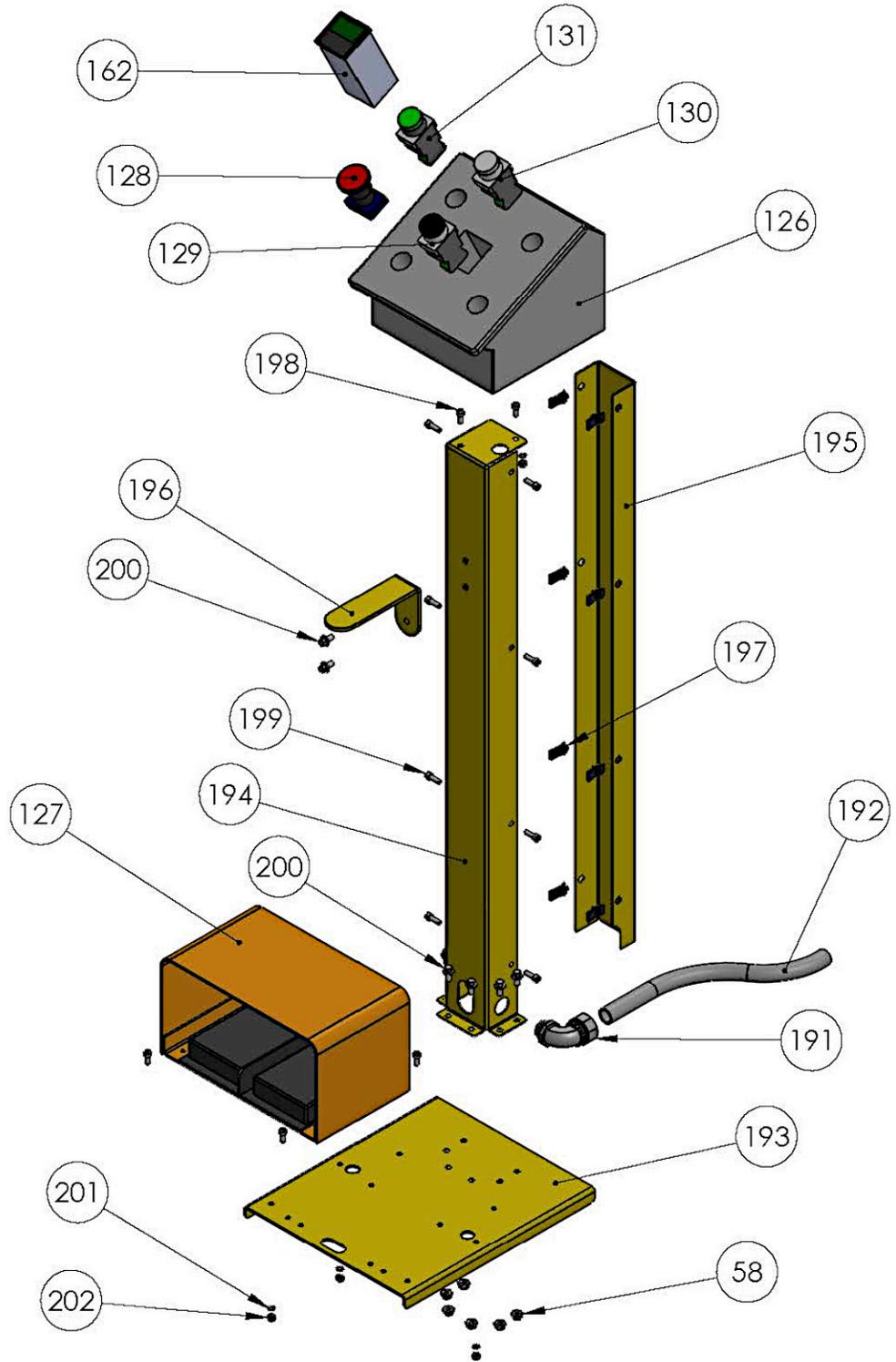


HYDRAULIC TILT ASSEMBLY PARTS DIAGRAM





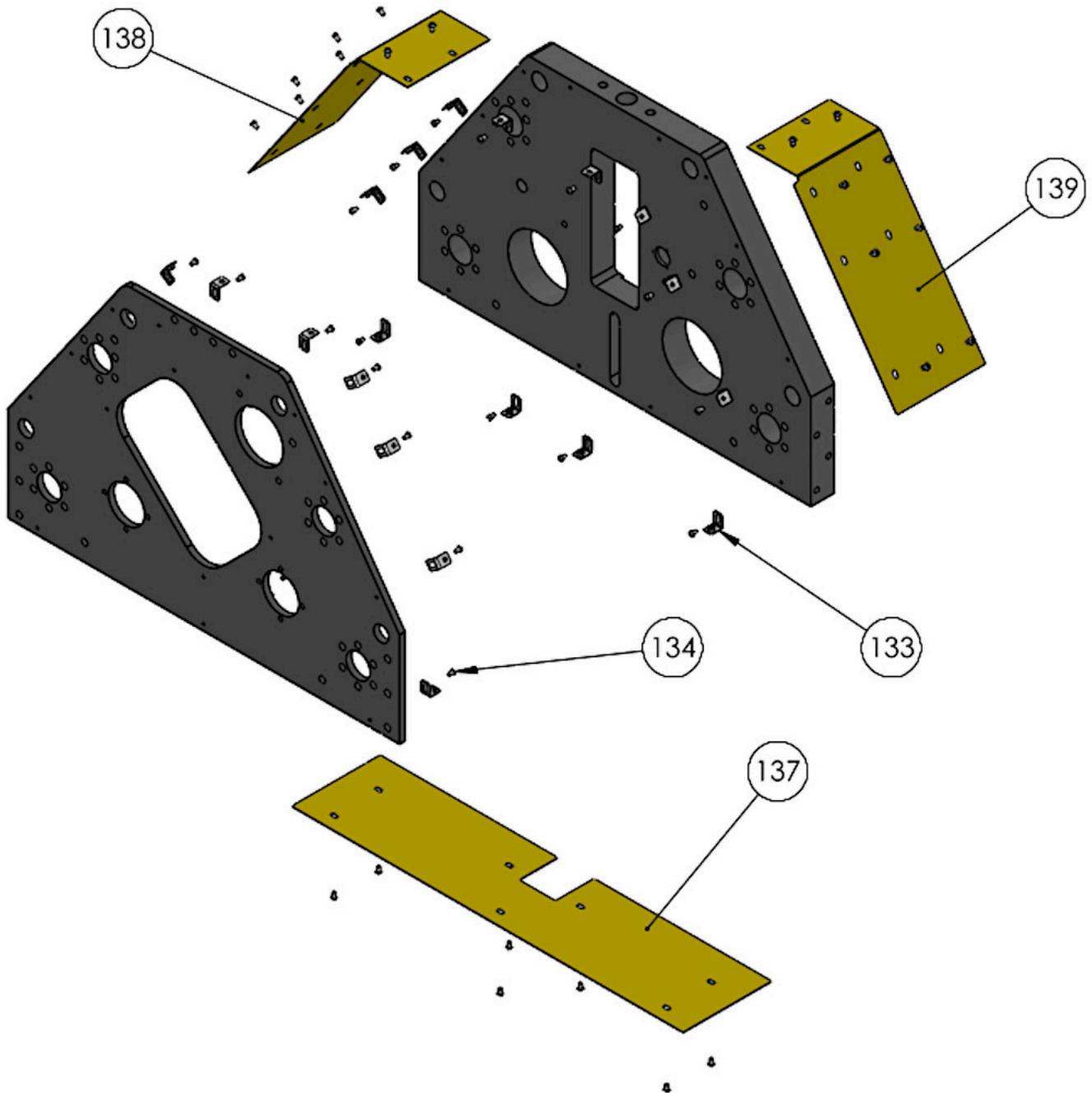
PENDANT ASSEMBLY PARTS DIAGRAM



***NOTE: THIS STYLE PENDANT USED ON
HYDRAULIC DOWN FEED
MACHINES ONLY**

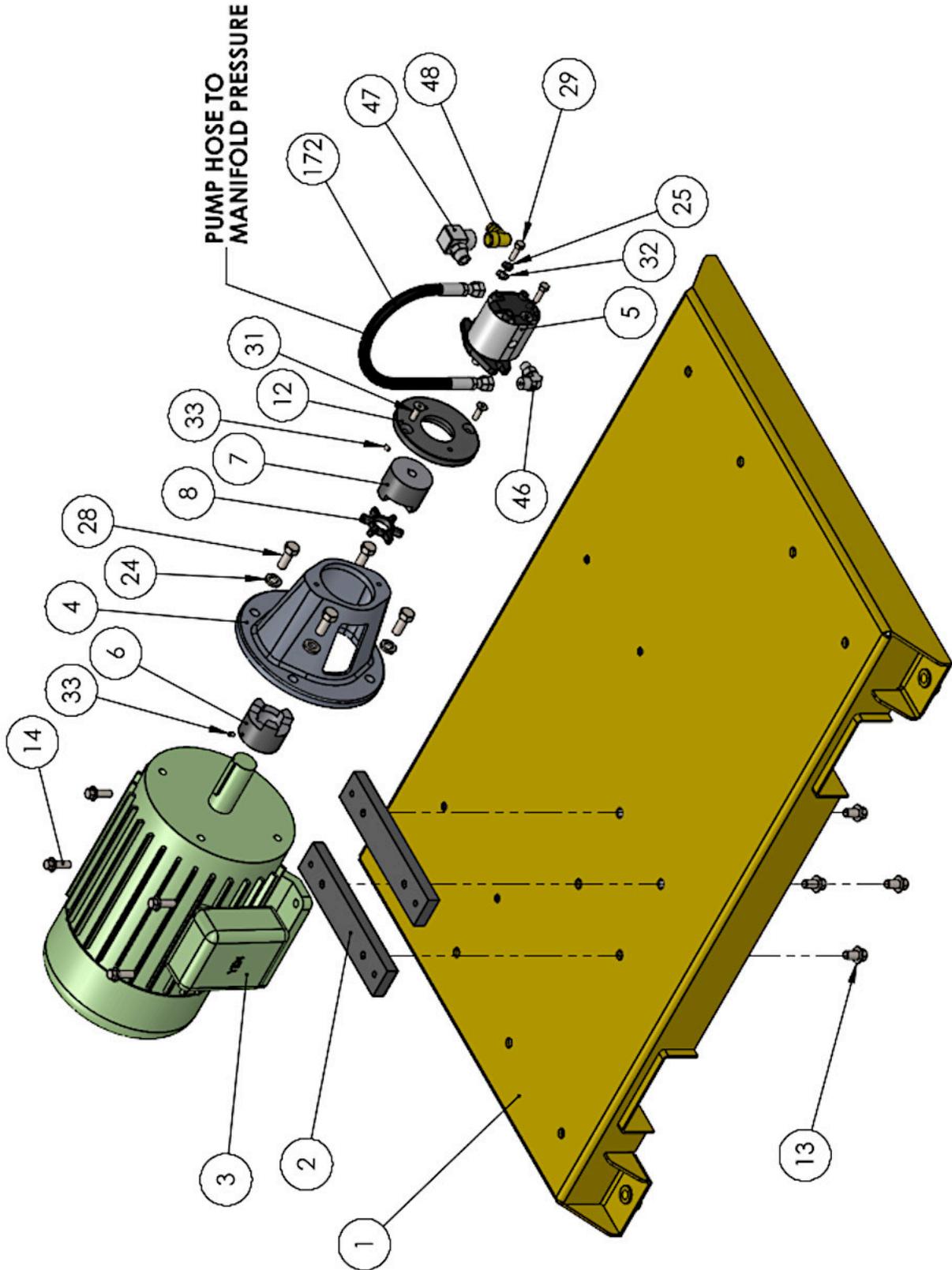


GUARD ASSEMBLY PARTS DIAGRAM

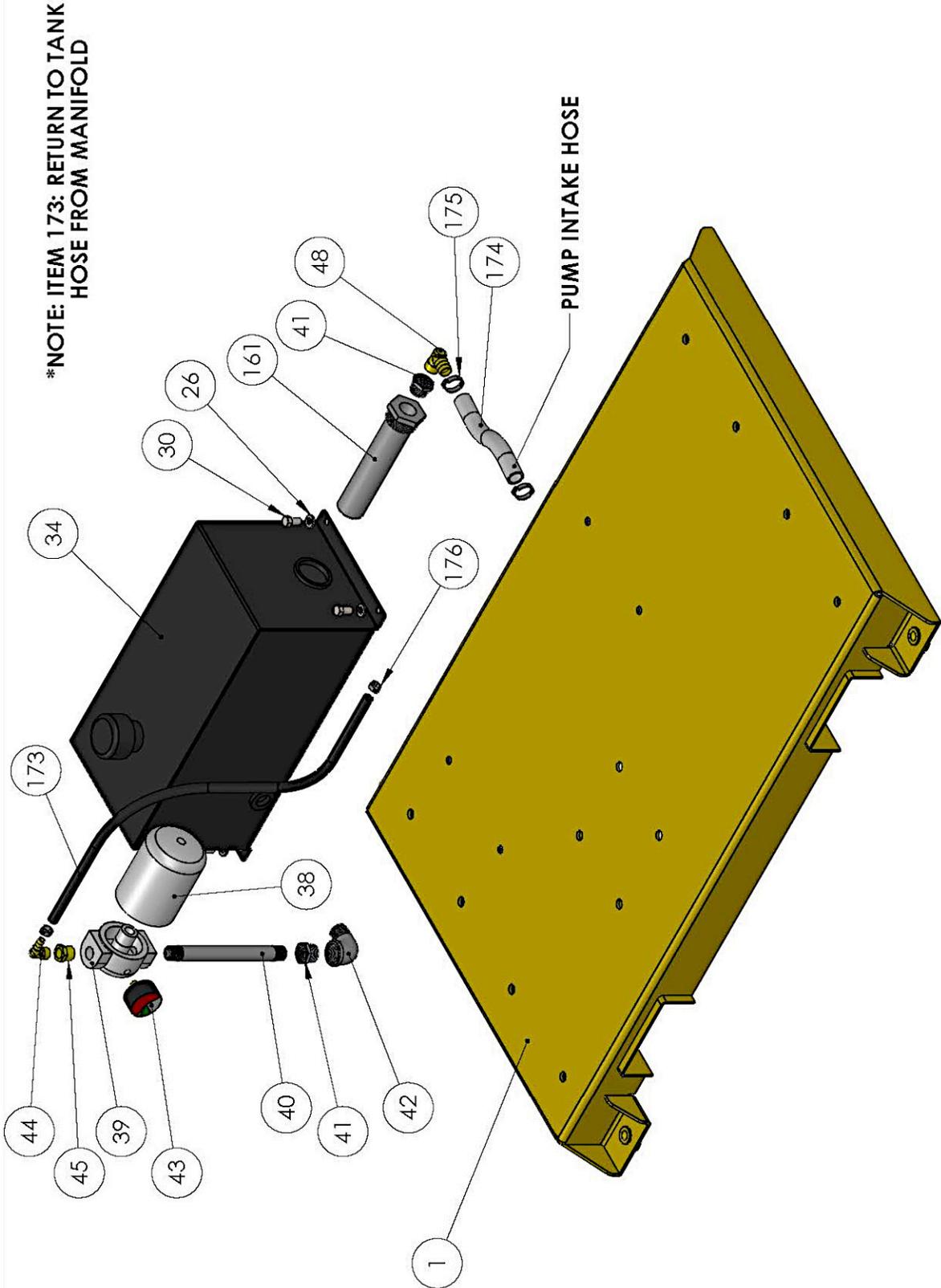




ELECTRIC MOTOR ASSEMBLY PARTS DIAGRAM



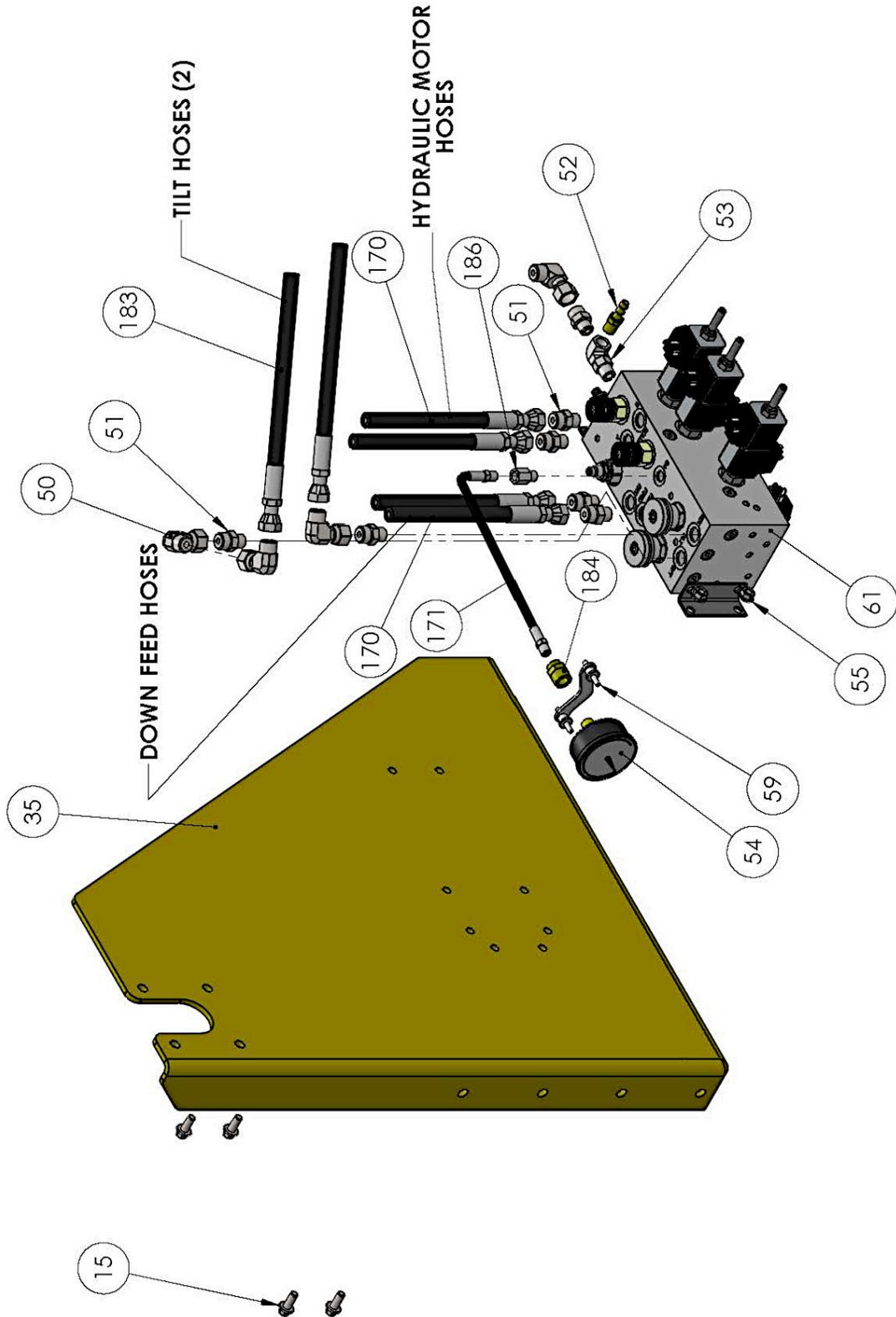
HYDRAULIC TANK ASSEMBLY PARTS DIAGRAM





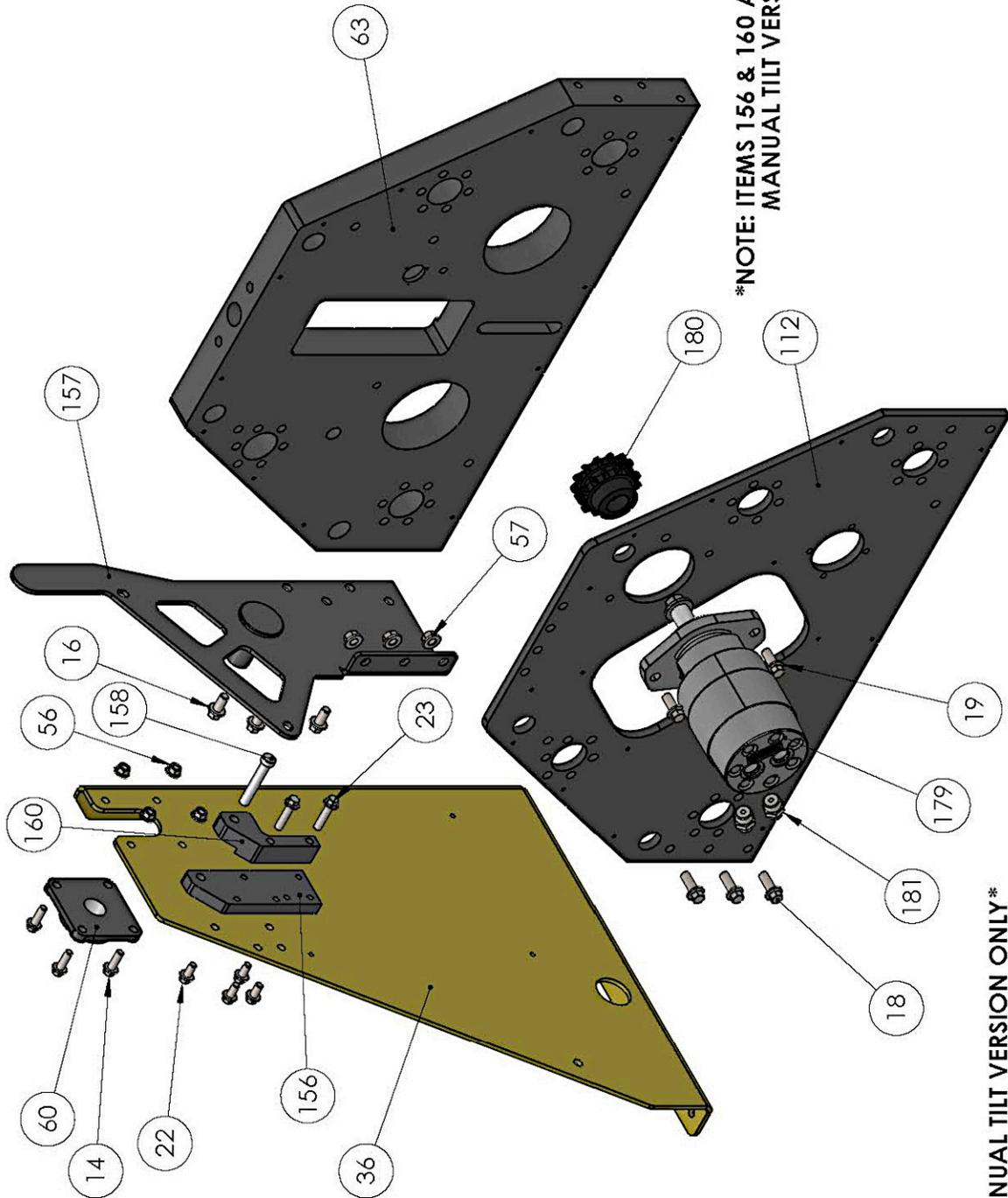
MANIFOLD ASSEMBLY PARTS DIAGRAM

Hydraulic Pinch





MANUAL TILT ASSEMBLY PARTS DIAGRAM

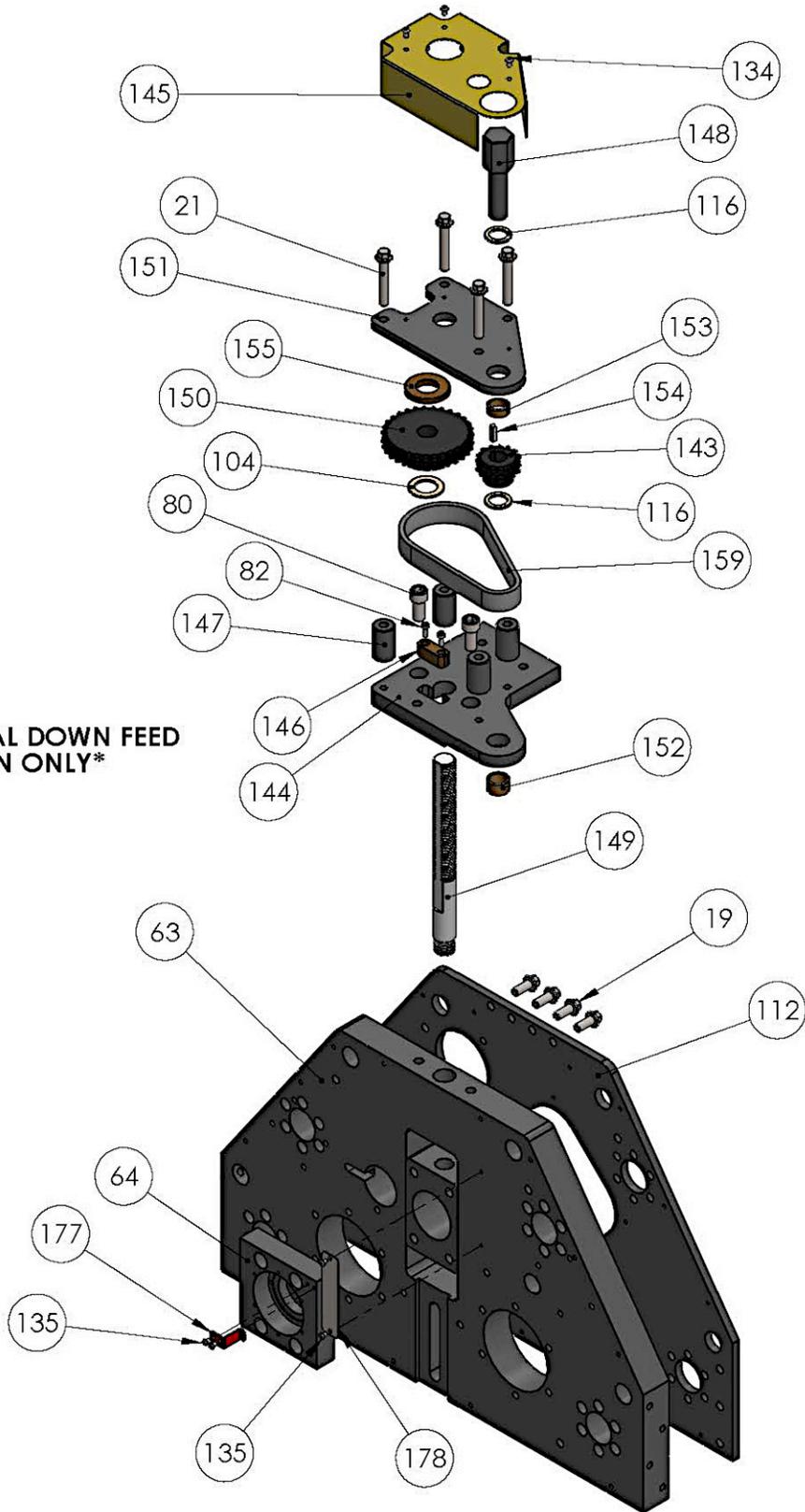


*NOTE: ITEMS 156 & 160 ARE USED ON MANUAL TILT VERSION ONLY

MANUAL TILT VERSION ONLY



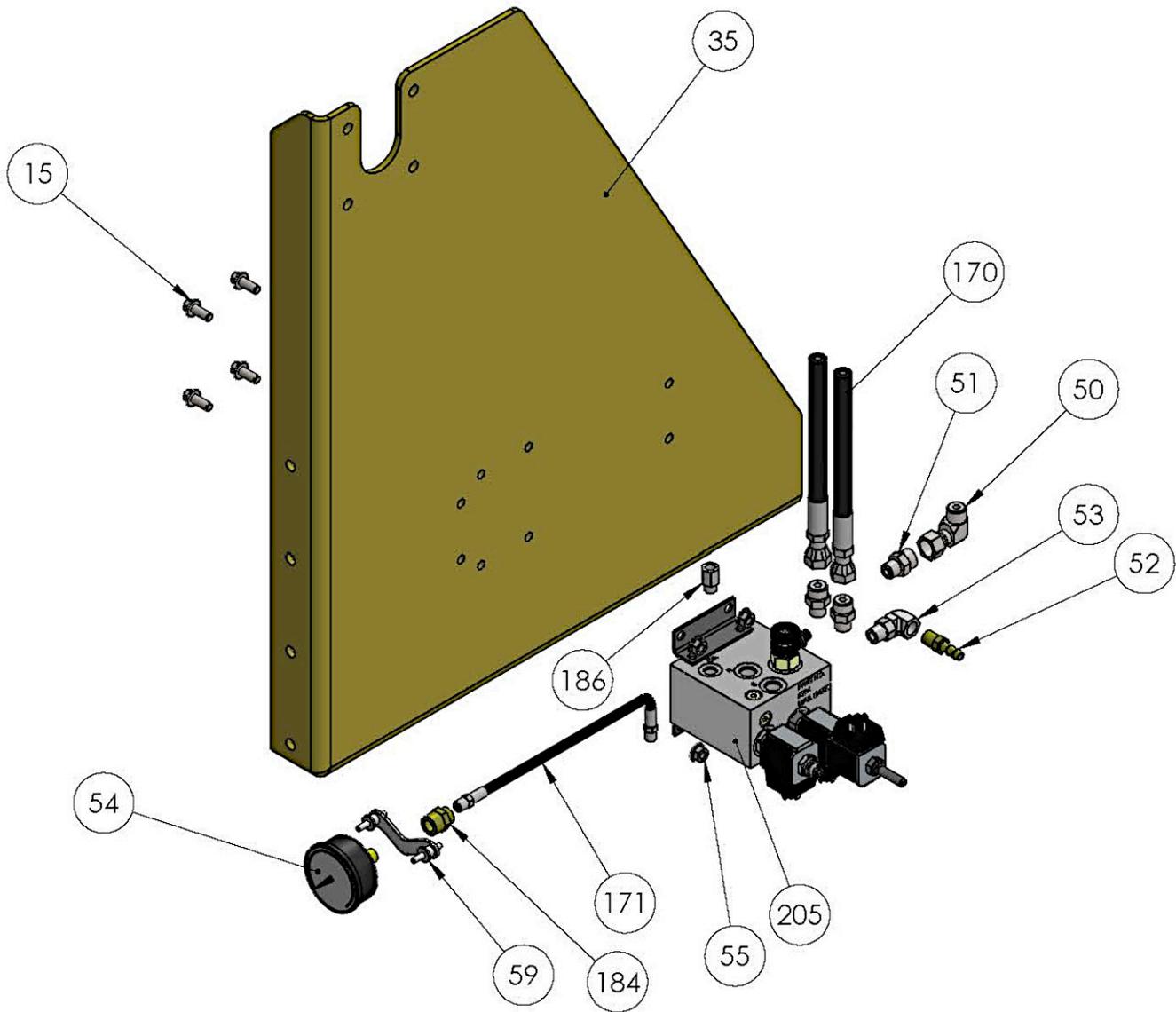
MANUAL DOWN FEED ASSEMBLY PARTS DIAGRAM



***MANUAL DOWN FEED
VERSION ONLY***

MANIFOLD ASSEMBLY PARTS DIAGRAM

Manual Pinch





Parts List

Item	Part Number	Description	Hydraulic Version	Manual Version
1	RR240-5002	Ring Roller Base	1	1
2	RR240-6031	Motor Spacer	2	2
3	PP-1937	5hp 1 Phase Motor	1	1
4	PP-1917	Motor Pump Adaptor	1	1
5	PP-1925	Hydraulic Pump	1	1
6	PP-1965	1.375 Coupler	1	1
7	PP-1966	.50 Coupler	1	1
8	PP-1967	Center Spider	1	1
9	M350-7A071	Leveling Foot	4	4
10	BS-0323	Foot Pad Shaft	4	4
11	BS-0223	5/8-11 Hex Nut	4	4
12	RR240-7023	Pump Adapter	1	1
13	BSM-0268	M12 x 1.75 x 20 Hex FLG	4	4
14	BSM-0060	M10 x 1.5 x 30 Hex FLG	20	20
15	BSM-0052	M8 x 1.25 x 20 Hex FLG	4	4
16	BSM-0066	M12 x 1.75 x 25 Hex FLG	42	42
17	BSM-0059	M10 x 1.5 x 25 Hex FLG	8	8
18	BSM-0174	M12 x 1.75 x 35 Hex FLG	6	6
19	BSM-0067	M12 x 1.75 x 30 Hex FLG	6	6
20	BSM-0134	M12 x 1.75 x 55 Hex FLG	1	-
21	BSM-0159	M12 x 1.75 x 80	1	4
22	BSM-0058	M10 x 1.5 x 20 Hex FLG	-	4
23	BSM-0062	M10 x 1.5 x 45 Hex FLG	-	2
24	BS-0075	1/2 Lock Washer	4	4
25	BS-0073	5/16 Lock Washer	2	2
26	BS-0074	3/8 Lock Washer	4	4
27	BSM-0117	M20 Lockwasher	2	2
28	BS-0047	1/2-13 x 1.25 HHCS	4	4
29	BS-0040	5/16-18 x 1.0 HHCS	2	2
30	BS-0114	.375-16 x .75 HHCS	4	4
31	BS-0221	5/16-18 x 1.0 FHCS	2	2
32	BS-0082	5/16 Flat Washer	2	2
33	BS-0063	1/4-20 x .375 Set Screw	2	2



34	PP-1916	5 Gal. Reservoir	1	1
35	RR240-6011-V2	L.H. Upright	1	1
36	RR240-6002-V2	R.H. Upright	1	1
37	RR240-6006	Front Panel	1	1
38	PP-1106	Filter	1	1
39	PP-1105	Filter Head	1	1
40	PP-1988	1/2NPT x 8 Pipe	1	1
41	PP-0345	3/4NPT to 1/2NPT Reducer	2	2
42	PP-1987	3/4NPT Elbow	1	1
43	PP-1107	Filter Indicator	1	1
44	PP-1128	Brass Barb Elbow	1	1
45	PP-1132	.5" Brass Reducer	1	1
46	PP-1276	#6 Threaded Elbow	1	1
47	PP-1268	#8 Elbow To .5 NPT	1	1
48	PP-1986	1/2NPT x 3/4 Barb Elbow	2	2
49	PP-2041	1.75 Rubber Grommet	1	1
50	PP-0969	-6 Swivel Elbow	6	1
51	PP-0858	-6 Straight Connector	10	3
52	PP-1137	1/4NPT x .375 Straight Barb	1	1
53	PP-1123	-6 Male-Female Elbow	1	1
54	PP-1367	Pressure Gauge	1	1
55	BSM-0242	M8 x 1.25 FLG Nut	4	4
56	BSM-0187	M10 x 1.5 FLG Nut	16	16
57	BSM-0096	M12 x 1.75 FLG Nut	17	15
58	BSM-0121	M6 x 1.0 Flanged Nut	12	12
59	PP-1367 MOUNT	Pressure Gauge Mount	1	1
60	PP-1919	1.25 Flange Bearing	2	2
61	PP-1924	Hydraulic Manifold (Fully Loaded)	1	-
62	RR240-5006-V2	L.H. Pivot Plate	1	1
63	RR240-6001	Main Plate	1	1
64	RR240-6050	Bearing Block Retainer 60mm	1	1
65	RR240-5007	Slide Block Assembly	1	1
66	RR240-6052	Cylinder Mount (4.0 Bore)	1	-
67	RR240-7010	Plate Spacer	4	4
68	RR240-7040	Axle Hub	2	2
69	PP-1932	55mm Bearing	3	3



70	PP-2013	60mm Bearing	3	3
71	RR240-7041	Upper Drive Shaft 60mm	1	1
72	RR240-7039	Lower Drive Shaft 60mm	2	2
73	BSM-0213	M12 x 1.75 x 55 SHCS	24	24
74	BSM-0030	M16 x 2.0 x 40 SHCS	4	4
75	BSM-0110	M12 x 1.75 x 35 SHCS	12	12
76	BSM-0212	M20 x 2.5 x 100 SHCS	2	2
77	BSM-0026	M12 x 1.75 x 50 SHCS	1	1
78	BSM-0269	M20 x 2.5 x 55 SHCS	1	1
79	BSM-0024	M12 x 1.75 x 40 SHCS	4	4
80	BSM-0157	M16 x 2.0 x 35 SHCS	2	2
81	BSM-0018	M10 x 1.5 x 45 SHCS	8	-
82	BSM-0001	M6 x 1.0 x 14 SHCS	4	6
83	BSM-0270	M4 x 0.7 x 16 SHCS	4	-
84	BSM-0210	M5 x 0.8 x 25 SHCS	3	-
85	RR240-7042	Front Dust Cover	3	3
86	RR240-7043	Rear Dust Seal	3	3
87	RR240-6053	60mm Shaft Drive Key	3	3
88	PP-0142	1.0 x 1.25 x 2.0 Sleeve Bushing	4	4
89	BSM-0271	M5 x 0.8 x 12 FHCS	36	36
90	RR240-5001	Tensioner Mount	1	1
91	RR240-6016	Lock Cap	1	1
92	RR240-6021	Jack Screw Block	1	1
93	RR240-7009	Fixed Idler Stud	1	1
94	RR240-7007	Roller Shaft	2	2
95	RR240-7008	Guide Roller	2	2
96	RR240-7016	Adjuster Sleeve	4	4
97	RR240-7017	Threaded Adjuster	4	4
98	PP-2040	1.0I.D. x 1.375O.D. x 1.25 Bushing	4	4
99	PP-0935	1.0I.D. x 1.5 O.D. x .0625 THK	4	4
100	BS-0238	1.0 External Retaining Ring	4	4
101	BS-0279	1.25" External Retaining Ring	3	3
102	BSM-0264	M12 x 1.75 Nylock Nut	4	4
103	PP-1456	1.25I.D. x 1.25LG Needle Bearing	3	3
104	PP-1981	1.25 x 2.0 x .125 Thrust Washer	6	7
105	PP-1920	26T #60-2 Sprocket	3	3



106	RR240-6037	Sprocket Drive Key	3	3
107	RR240-7028	13T #60-2 Sprocket	3	3
108	RR240-7032	Sprocket Spacer	3	3
109	PP-1936	Tongued Washer	3	3
110	PP-1934	Locking Nut	3	3
111	PP-1935	Locking Washer	3	3
112	RR240-6027	Rear Main Plate	1	1
113	PP-1453	1.0 Cartridge Bearing	2	2
114	PP-0836	1.0I.D. x 1.25O.D. x .50 Sleeve Bushing	4	4
115	PP-0036	1.0 Clamp Collar (Split)	4	4
116	PP-0056	1.0I.D. x 1.5O.D. x .125 THK	8	10
117	RR240-7044	Die Nut	3	3
118	PP-0784	-6 To -8 Straight Connector	2	-
119	RR240-7036	Cylinder Sleeve	1	-
120	PP-1923	#60 Double Strand Chain	1	1
121	PP-2011	Electrical Box	1	1
122	PP-0362	Main Disconnect	1	1
123	PP-1949	Return to Center Switch	1	-
124	PP-1661	6 Wire Cord Grip	1	1
125	PP-0290	Cord Grip	2	2
126	PP-1979	Control Box	1	-
127	PP-1143	Foot Pedal	1	1
128	PP-1098	Emergency Stop Button	1	1
129	PP-1955	Black Push Button Switch	1	-
130	PP-1957	White Push Button Switch	1	-
131	PP-1363	Green Push Button Switch	1	-
132	RR240-5009	4.0 Bore 3.25 Stroke Cylinder	1	-
133	ME-MH19-5A005	Guard Tab	23	23
134	BSM-0103	M6 x 1.0 x 10 BHCS	50	53
135	BSM-0119	M5 x 0.8 x 8 BHCS	-	4
136	RR240-6040	Access Guard	1	1
137	RR240-6025	Bottom Guard	1	1
138	RR240-6023	R.H. Guard	1	1
139	RR240-6022	L.H. Guard	1	1
140	PP-1911	Large Logo Plate	1	1
141	PP-1883	-6-4 Swivel	1	-



142	PP-1994	Pressure Gauge	1	-
143	PP-1951	14T #40-2 Sprocket	-	1
144	RR240-6029	Adjuster Mount	-	1
145	RR240-6032	Top Sprocket Guard	-	1
146	RR240-6035	Guide Block	-	1
147	RR240-7024	Adjustment Spacer	-	4
148	RR240-7025	Adjustment Drive Shaft	-	1
149	RR240-7033	Adjustment Shaft	-	1
150	PP-1950	30T #40-2 Sprocket	-	1
151	RR240-6030	Adjustment Top Plate	-	1
152	PP-1191	1.25O.D. x 1.0I.D. x .75LNG	-	1
153	PP-0836	1.0I.D. x 1.25O.D. x .50LNG	-	1
154	RR240-6074	.25 x .25 x 1.0 Key	-	1
155	RR240-7053	Sprocket Washer	-	1
156	RR240-6049	Pivot Plate Base	-	1
157	RR240-5008	Manual Tilt Bracket	-	1
158	PP-1492	Tooling Pin	-	1
159	PP-1952	#40 Double Chain	-	1
160	RR240-6060	Pivot Latch Cap	-	1
161	PP-1970	Tank Strainer	1	1
162	PP-1293	Red Lion Controller	1	-
163	PP-1577	Encoder	1	-
164	PP-1954	Miter Gear	1	-
165	RR240-6020	Encoder Gear Track Mount	1	-
166	RR240-6036	Gear Rack	1	-
167	BS-0202	4-40 x .375 SHCS	3	-
168	PP-1922	13T #60-2 1.25 Bore Sprocket	1	-
169	PP-1926	Hydraulic Motor	1	-
170	PP-1313	50" Hyd. Hose	4	2
171	PP-2046	Instrument Hose	1	1
172	PP-1126	Hyd. Hose	1	1
173	PP-1124	3/8 Rubber Hose	1	1
174	PP-1984	.75 Clear Hose	1	1
175	PP-1985	1.0 Pinch Hose Clamp	2	2
176	PP-1989	.5625 Pinch Hose Clamp	2	2
177	RR240-6073	Height Indicator	-	1



178	RR240-6072	Ruler Plate	-	1
179	PP-2053	Hydraulic Motor (Manual Version)	-	1
180	PP-2052	13T #60-2 1.0 Bore Sprocket	-	1
181	PP-2001	-6 To -10 Straight Connector	2	2
182	PP-2066	1/2" Seal Tight Straight	1	1
183	PP-0968	44" Hyd. Hose	2	-
184	PP-1416	1/4 To 1/8 NPT Adaptor	1	1
185	RR240-7066	Cylinder Lower Spacer	1	-
186	PP-2099	-4 ORFS x .125 NPT Adaptor	1	1
187	RR240-5005-V3	R.H. Pivot Plate	1	-
188	PP-1918	1.5" Bore 12.0" Stroke Cylinder	1	-
189	PP-2210	Needle Valve	1	-
190	PP-1680	#6 Female Straight Swivel Fitting	1	-
191	PP-0022	1/2" Seal Tight Elbow	1	1
192	PP-2064	1/2" Seal Tight Tube	1	1
193	RP-6009	Pendant Base	1	1
194	RP-6010	E-Stop Upright	1	1
195	RP-6011	E-Stop Upright Cover	1	1
196	RP-6014	Handle	1	1
197	PP-0280	M5 x 0.8 Fold Over Nut	8	8
198	BSM-0115	M5 x 0.8 x 12 SHCS	6	6
199	BSM-0186	M5 x 0.8 x 16 SHCS	8	8
200	BSM-0045	M6 x 1.0 x 14 Hex FLG	8	8
201	BSM-0197	M5 Star Washer	6	6
202	BSM-0131	M5 x 0.8 Nut	6	6
203	PP-2063	E-Stop Box	-	1
204	PP-1099 (RED) PP-1220 (GREEN)	Contactor	-	2
205	PP-2050	Manual Downfeed Manifold	-	1



NOTES



NOTES



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