



Operating Instructions and Parts Manual

Rotary Draw Bender

Model RDB-175



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Edition 2 06/2025
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2.0 Safety Instructions

⚠ WARNING

Failure to follow these rules may result in serious personal injury

1. Only trained and qualified personnel can operate this machine.
2. Make sure guards are in place and in proper working order before operating machinery.
3. Remove any adjusting tools. Before operating the machine, make sure any adjusting tools have been removed.
4. Keep work area clean. Cluttered areas invite injuries.
5. Overloading machine. By overloading the machine you may cause injury from flying parts. DO NOT exceed the specified machine capacities.
6. Dressing material edges. Always chamfer and deburr all sharp edges.
7. 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 machines rated capacity.
8. 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.
9. Dress appropriate. 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.
10. Use eye and ear protection. Always wear ISO approved impact safety goggles. Wear a full-face shield if you are producing metal filings.
11. Do not overreach. Maintain proper footing and balance at all times. DO NOT reach over or across a running machine.
12. Stay alert. Watch what you are doing and use common sense. DO NOT operate any tool or machine when you are tired.
13. 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.
14. 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.
15. Keep children away. Children must never be allowed in the work area. DO NOT let them handle machines, tools, or extension cords.
16. 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.
17. 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.
18. DO NOT touch live electrical components or parts.
19. Turn off power before checking, cleaning, or replacing any parts.
20. Be sure all equipment is properly installed and grounded according to national, state, and local codes.
21. DO NOT bypass or defeat any safety interlock systems.
22. Keep visitors a safe distance from the work area.

Familiarize yourself with the following safety notices used in this manual:

⚠ CAUTION

This means that if precautions are not heeded, it may result in minor injury and/or machine damage.

⚠ WARNING

This means that if precautions are not heeded, it may result in serious injury or death.

⚠ DANGER

This means that if precautions are not heeded, it will result in serious or fatal, injury.

Save the Instructions

3.0 About This Manual

This manual is provided by Baileigh Industrial, covering the safe operation and maintenance procedures for a Baileigh Model RDB-175 Rotary Draw Bender. This manual contains instructions on installation, safety precautions, general operating procedures, maintenance instructions and parts breakdown. Your machine has been designed and constructed to provide consistent, long-term operation if used in accordance with the instructions as set forth in this document.

Technical Support handles questions on setup, operation, schematics, warranty issues, and individual parts needed. Our Technical Support department can be reached at 920-684-4990.

If there are questions or comments, please contact your local supplier or Baileigh Industrial. We can also be reached at our web site: www.baileigh.com.

Retain this manual for future reference. If the machine transfers ownership, the manual should accompany it.

WARNING

Read and understand the entire contents of this manual before attempting assembly or operation! Failure to comply may cause serious injury!

Register your product online -

<https://baileigh.com/product-registration>



4.0 Product Identification



Figure 4-1 Table 4-1

Item	Description	Function
A	Forward Foot Pedal	Will operate the machine in the cw direction
B	Reverse Foot Pedal	Will operate the machine in the ccw direction
C	Power Switch	For turning power on/off to the bender
D	Allen Wrench	Used for adjusting and tightening the ratchet slide plate.
E	Bend Angle Controller	For programming bend angle and displaying the bend angle position.
F	Hydraulic Cylinders	Supply the bending force to rotate the forming die.
G	Main Spindle And Drive Pins (shown with a forming die installed)	For supporting and driving the forming die.
H	Quick Release (shown with a counter die installed)	For pivoting counter die away from bend die to remove material quickly.
I	Grease Zerk	For greasing main spindle bearing
J	Encoder	Recording the spindle rotation and sending that information back to the controller to display the bend angle and stop bending at the programmed angle.

4.1 General Design Description

You have made a practical choice in purchasing the RDB-175 Hydraulic Bending Machine. It has been carefully built of high quality materials and designed to give many years of efficient service. The simplicity of design and minimum effort required to operate the machine contributes towards meeting schedules and producing greater profits.

The RDB-175 is an electric powered hydraulically operated "Rotary Draw" bending machine. To bend material, a bending die and counter die are required. The material is hooked by the bending dies' hook arm and is powerfully rotated in the clockwise direction. As the bending die rotates, the counter die arm also rotates about the same axis, forcing the material to conform to the radius and shape of the bending die.

The RDB-175 Bending Machine you have purchased is built of solid steel ensuring maximum rigidity. Tongue and groove design with grade 8 bolts throughout provides very high rigidity and stability.

Throughout this manual are listed various safety-related descriptions for attention. These matters for attention contain the essential information to the operators while operating, and maintaining. Failure to follow these instructions may result in great damage to the machine or injury to the operator.

5.0 Specifications

Table 5-1

Model number	RDB 175
Motor and Power	
Power Supply	110VAC, 20A, 1ph, 60Hz
General Specifications	
Maximum Center Line Radius (CLR)*	9" (229mm)
Minimum Center Line Radius (CLR)*	.5" (12.7mm)
Minimum OD	.25" (6.35mm)
Mild Steel Pipe (Schedule 40) Based on a material tensile strength of 60000 PSI – mild steel	2" (50.8mm)
Aluminum Pipe (Schedule 40)	2" (50.8mm)
Stainless Steel Pipe (Schedule 40)	1.5" (38.1mm)
Mild Steel Round Tube (Wall)	2.5" (.125) (63.5mm [3.175mm])
Aluminum Round Tube (Wall)	2.5" (.156) (63.5mm [3.96mm])
Stainless Steel Round Tube (Wall)	2.375" (.125) (60.325mm [3.175mm])
Chromolly Round Tube (Wall)	2" (.125) (50.8mm [3.175mm])
Mild Steel Solid Rod	1.25" (31.75mm)
Mild Steel Square Tube (Wall)	2" (.125) (50.8mm [3.175mm])
Sound level	<70db
Weights and Dimensions	
Shipping Weight (Lbs.)	700lbs. (318kg)
Shipping Dimensions (L x W x H)	68 x 60" x 44" (1727 x 1524 x 1118mm)

*CLR will vary based upon actual material and wall thickness.

WARNING

Read and understand the entire contents of this manual before attempting assembly or operation. Failure to comply may cause serious injury.

6.0 Setup and Assembly

6.1 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.

WARNING

If any parts are missing, **DO NOT** place the machine into service until the missing parts are obtained and installed correctly.

6.2 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.

6.3 Transporting and Lifting

NOTICE

Lifting and carrying operations should be carried out by skilled workers, such as a truck operator. Make sure the machine is well balanced. Choose a location that will keep the machine free from vibration and dust from other machinery. Keep in mind that having a large clearance area around the machine is important for safe and efficient working conditions.

Follow these guidelines when lifting:

- 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 fork lift 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.

6.4 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, work tables, 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. For stationary machines, 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 tool 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.

6.5 Assembly

WARNING

For your own safety, DO NOT connect the machine to the power source until the machine is completely assembled and you read and understand the entire instruction manual.

1. Remove the machine from the skid it was shipped on and install the casters and wheels.
2. Check the oil level and top off if necessary.
3. Read through the remainder of the manual and become familiar with the die installation and settings as well as normal operation.
4. Position the machine as desired following the installation guidelines.
5. Follow the electrical guidelines to connect the machine to a power supply.

7.0 Electrical Connections

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.

7.1 Motor Specifications

Your tool is wired for 110 volt, 60Hz alternating current. Before connecting the tool to the power source, make sure the machine is cut off from power source.

7.2 Considerations

- Observe local electrical codes when connecting the machine.
- The circuit should be protected with a time delay fuse or circuit breaker with a amperage rating slightly higher than the full load current of machine.
- A separate electrical circuit should be used for your tools. 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 tool.
- 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 tool 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 a qualified electrician or service personnel if the grounding instructions are not completely understood, or if in doubt as to whether the tool is properly grounded.
- Repair or replace damaged or worn cord immediately.

7.3 Extension Cord Safety

Extension cord should be in good condition and meet the minimum wire gauge requirements listed below:

Table 7-1

AMP RATING	LENGTH		
	25ft	50ft	100ft
0-6	16	16	16
7-10	16	16	14
11-12	16	16	14
13-16	14	12	12
17-20	12	12	10
21-30	10	10	No
WIRE GAUGE			

An undersized cord decreases line voltage, causing loss of power and overheating. All cords should use a ground wire and plug pin. Replace any damaged cords immediately.

7.4 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. Turn the switch OFF when the machine is not in operation.

8.0 Operation

⚠ CAUTION

Always wear proper eye protection with side shields, safety footwear, and leather gloves to protect from burrs and sharp edges.

⚠ CAUTION

Keep hands and fingers clear of the dies and swing arms. Stand to the front of the machine to avoid getting hit with the material during the bending process. When handling large heavy materials make sure they are properly supported.

8.1 Dry Running Machine

Before actually bending, several “dry runs” should be performed. This will remove any trapped air from the cylinders and hoses. Also, this will familiarize you with the controls and functions of the machine. To do this, set a bend angle and then activate the hydraulics to extend and retract the cylinders to simulate a bend.

8.2 Automation Direct Controller

1. To set the “Absolute” machine zero, power up the machine and reverse the machine until both cylinders are fully retracted. (If your display shows a “0” in RED when cylinders are fully retracted, your “Absolute” machine zero is already set.) Now using a pencil, press the “RESET” button. At this time, the large RED number, should change to “0”. (See pic below with 90 bend angle preset.)



Figure 8-1

2. To set an “Incremental” zero if desired, use a pencil to press the “RESET” button, when the

machine is at a position the user would like to be the “zero” point. The large RED numbers will change to “0”. Now the machine will count positive numbers in degrees from this point when the cylinders extend and will count negative numbers as the cylinders retract.

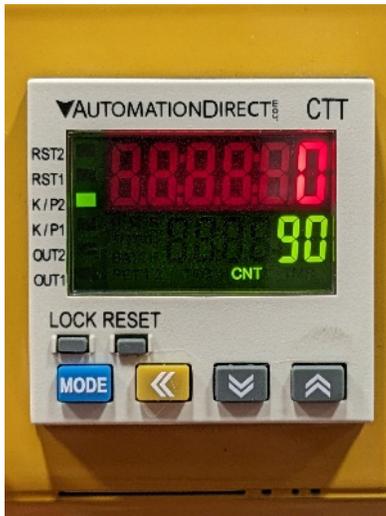


Figure 8-2

- To enter a desired bend degree (with either an Absolute or Incremental zero set), simply press the up or down button. There will now be a 6 digits number showing in GREEN on the display. The digit that is ready to be changed/edited, will be flickering. Use the up or down arrows to increase or decrease the number in that digit. If you want to edit the “tens”, or “hundreds” digit, simply press the YELLOW “left arrow” button to move over on digits. Once the desired bend angle is entered, you must push the BLUE “Mode” button to save that bend degree setting.

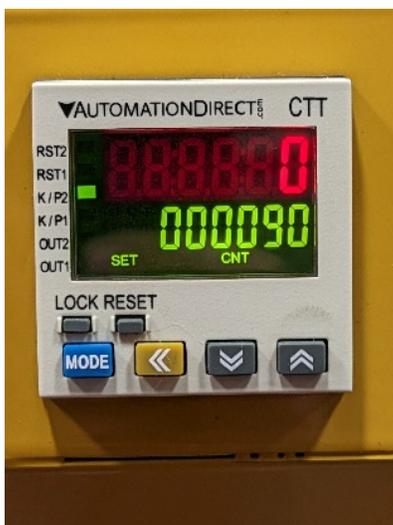


Figure 8-3

- Once the desired bend angle is set in the controller, simply press and hold the “forward” foot pedal to reach the preset bend angle. The display will show a bend degree value in RED

numbers, that is 1 deg higher than what was entered in previous step. This is normal and typically accepted.

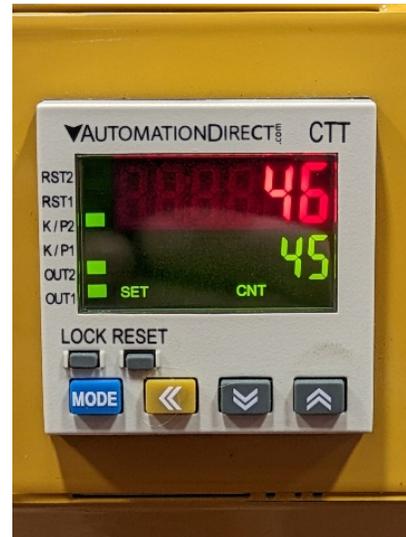


Figure 8-4

- Once the desired bend angle is reached, and it's noticed that more bend degrees are needed, either due to material “spring back”, or too low of a preset bend degree, simply push the “UP” or “DOWN” arrow to enter the mode for adjusting the desired bend degrees. Then press the BLUE “Mode” button to save that new bend degree value. Now, the user can press and hold the “forward” foot pedal again, to advance the machine further. (There is no need to return the machine back to absolute zero, when editing the desired bend degrees, by adding or subtracting.)

9.0 Die Selection and Installation

Before any bending can take place, the proper die set must be chosen to match the material being bent. (EX) 1-1/2” diameter tubing requires a die set marked 1-1/2” tube.

- A Hook Arm
- B Bend Die
- C Hold down Bolts
- D Plastic Slide
- E Counter Die Mount
- F Bronze Counter Die Insert
- G “0” Mark

Note: Pipe and Tube are not the same, (see table 1) for nominal pipe sizes. All BAILEIGH INDUSTRIAL dies are color coded to avoid confusion between pipe and tube (see table 2).

IMPORTANT: Damaged or worn tooling should be replaced before attempting to bend material. This will

ensure that bends are correct and provide a longer life to machine components.

When handling large heavy dies and/or material, make sure it is properly lifted and supported.

1. To install the die, slip the die over the centering pin until the three unequally spaced drive pins engage the receiving holes formed in the die.

Note: The die will only fit one way.

2. When the drive pins line up the die will drop all the way down to the spindle.
3. Install and tighten the 1/2-13 socket head bolts provided with the die. Tighten these bolts enough to hold the die firmly down to the spindle. Approximately 30-40ft-lb. (40-50N•m).

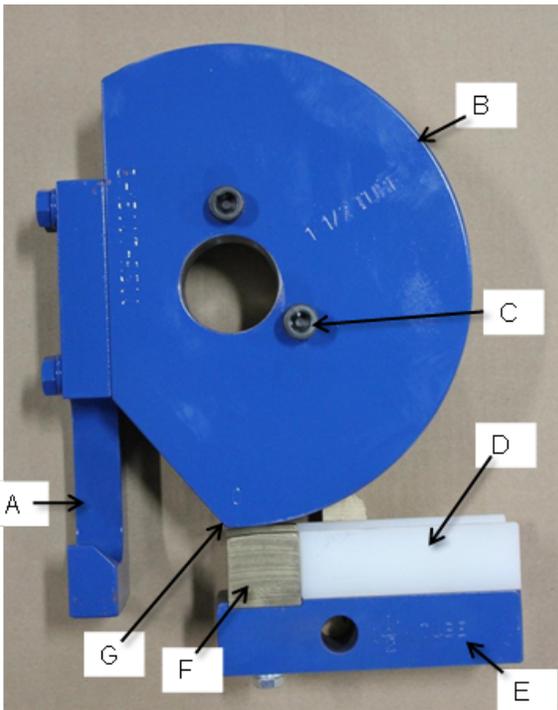


Figure 9-1

CAUTION

FAILURE TO PROPERLY BOLT DOWN DIE WILL RESULT IN DAMAGE TO MACHINE AND TOOLING.

- H Spindle
- I Die Drive Pins
- J 1/2-13 Tapped holes for bolting down dies
- K Center Pin
- L Hitch Pin

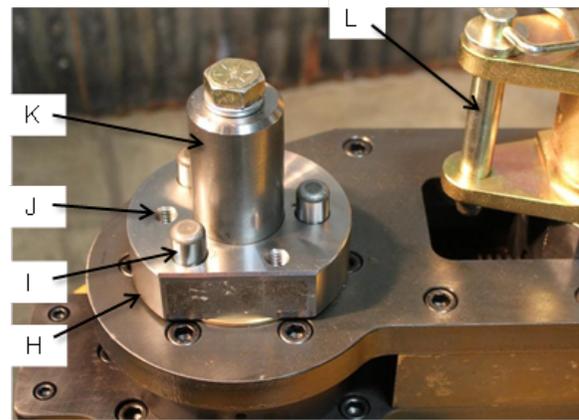


Figure 9-2

4. To install the counter die, remove the hitch pin and insert the counter die in the opening in the counter die mount until the 3/4" holes line up.
5. Now insert the hitch pin through all the holes, reinstall clip on the hitch pin with the engraved side of the counter die facing up.
6. The counter die should be positioned approximately 1/8" (3mm) away from the die. This can be accomplished by loosening the two socket head bolts (M) which hold the counter die pin tight.
7. Pull on the ratchet lock mechanism (N) and slide the whole assembly so that the counter die is approximately 1/8" away from the die.
8. Tighten the two socket head bolts to 200lbf ft. (27Nm).

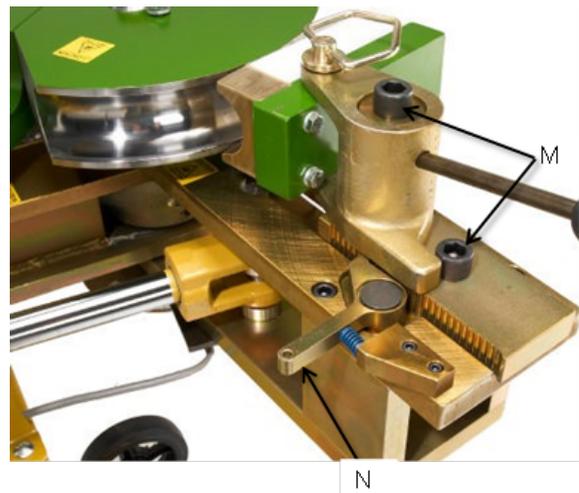
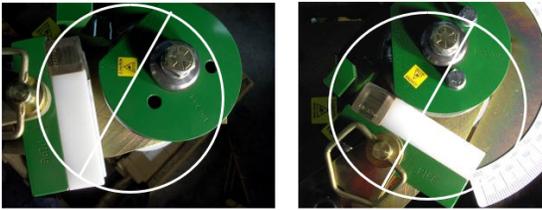


Figure 9-3

IMPORTANT: THE RATCHET WILL FAIL IF THE BOLTS ARE NOT TIGHTENED PROPERLY.

The ratcheting mechanism is for POSITIONING ONLY. The two 3/4-10 bolts hold the mechanism in place against the force generated during bending. Use the supplied wrench plus any needed assistance to achieve the proper torque.

9.1 Incorrect Counter Die Position



Too far away from die

Touching die

Figure 9-4

9.2 Correct Counter Die Position



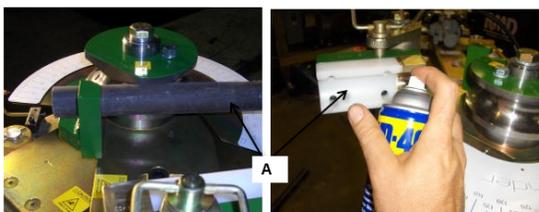
Approximately 1/8" (3mm) away

Figure 9-5

IMPORTANT: Be sure the long end of the counter die points away from the hook arm, or to the right of machine.

9.3 Material Insertion

1. Once the die set is properly installed, the material that matches the die can be inserted (I.E. 1-1/4" tube would go into a die mark D-1250T-R***).
2. Open the counter die quick release assembly and insert the material past the hook arm. The start of bend mark is engraved with an "O" on the top of the die. Once the material is placed properly, the counter die slide block assembly can be tightened.



Inserting material to start

Lubricating counter die bending

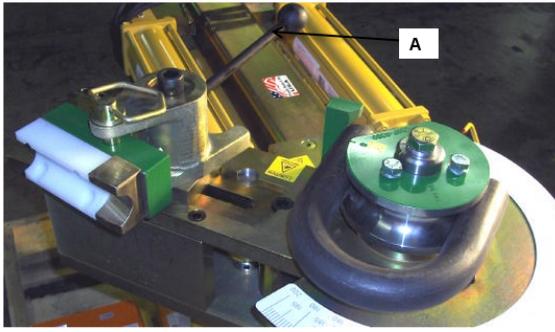
Figure 9-6

IMPORTANT: Liberally apply lubricant along the counter die and the 1/2 of the material that contacts the counter die (A) with a WD-40 style lubricant or equivalent. Do not lubricate the bending die. Lubricating the bending die will encourage slipping of material in the bending die.

3. Rotate the quick release counter die assembly until it firmly stops against its stop bolt. In some cases usually with pipe the quick release will not close all the way. This is ok, as the forward foot pedal is activated the material will force its way into the die and bend properly.
4. After the material is installed, bending can take place.
5. Turn on the power switch.
6. Set the desired bend angle on the bend angle controller.
7. Keep hands away from the bending zone.
8. Press the right foot pedal switch to rotate the die forward. Keeping the foot pedal activated, visually watch the digital display. The cylinders will stop when the forming die rotates to the desired bend angle as shown on the controller. The material will need to be bent past desired degree as all material has some degree of "springback". This varies by material and can even vary between the same grades of material.
9. If the bend requires more degrees. The controller will need to be set at a higher degree number. Increase the degrees by further activating the forward foot pedal switch. This allows the operator to gradually reach a bend angle, on the first set up piece. To determine the amount of springback for a certain material, it is necessary to bend a sample piece. Using a framing square or the like, bend a piece of material until a perfect 90° bend is achieved, when checked with a square. At that point, document the machines degree position. For example to a achieve a 90° on the piece in the picture, 105 degrees was the total bend amount or 15 degrees of springback. Now you can add 15 degrees to any nominal bend angle to achieve accurate results for this material.

9.3.1 Material Removal

1. After reaching the desired angle, the material needs to be removed.
2. Press the reverse (left) foot pedal. Both the die and the counter die will retract simultaneously. Run in reverse until all bending pressure is released from the bend.



Activating the quick release lever

Figure 9-7

3. Activate the quick release counter die lever (A) and completely remove the material.
4. After the material is safely removed, press the reverse (left) foot pedal keeping hands clear until both cylinders fully retract.
5. The machine is now at the “home” position and can be reloaded for the next bend.
6. Repeat previous steps.

9.4 Material Insertion Limitations



Left

Right

Figure 9-8

- The left figure shows the recommended minimum / correct amount of material remaining to be fully supported in plastic slide.
- The right figure shows the maximum amount the material can be pulled through the counter die. Pulling the material further than shown into the counter die, it will destroy the plastic slide.



Figure 9-9

- Extreme care must be taken when bending material with an existing bend. There must be enough straight material to complete the bend. If there is not enough material the bent part of the material will crash into the counter die and damage the machine and tooling. In the left figure, there is not enough material to complete a 90deg. bend. This bend will damage the dies.

IMPORTANT: Orienting your material in this fashion will cause damage to your tooling and machine!! DO NOT pull bent material into the counter die! Make sure you have enough straight material on the draw side of the material to create your bend.

10.0 Understanding Springback

Springback can be difficult to understand. As material is bent, the materials yield strength resists being formed. As a final degree is reached, the machine will have enough power to hold the bend at a set degree, but as the pressure of the machine is released, the material has a resistance built in, so it “springs back”.

Springback will vary with every size, type and wall thickness, so it will never be consistent from size to size.

The best way to determine a materials springback is to do sample bends to 90 degrees until a perfect 90 is obtained.

- At that point document the actual machine degrees.
- Full manual mode is the best place to do these tests.
- Use the overbend amount and enter that value into the springback field.

11.0 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.

11.1 Material Layout

In order to create accurate parts, you will have to layout the material in flat form. First you will need to determine how much material is used per degree of bend. Use the multiplier table on Table #3 to determine the arc lengths for the die in use. Or use the following formula:

Alternate arc length formula:

Example: $6.0 \text{ clr} \times 2 = 12$ $12 \times 3.14 = 37.699$
 $37.699 / 360 = 0.1047$ " per degree

$0.1047 \times 90 \text{ degrees} = 9.425$ " of material used for a 90 degree bend.

Once the arc lengths are determined you can begin layout of the material using Diagram #1 as a reference.

- Diagram #1 shows a simple part bent on the same plane in the same direction.
- Diagram #2 shows bending based off of a centerline in two directions.
- For symmetrical bends, centerline bending is easiest.
- For non-symmetrical bends, continuous one direction bending is best.
- Another way to layout material is to draw them in a 2D computer software program like Auto Cad. There are many free programs on the internet. In a 2D program you will draw the parts centerline only with corresponding clr's. Then you will be able to list individual segments of the bent part. This data can be directly entered into the control.
- Another program available is BEND-TECH which is a program specifically designed for tube bending and will give you all of the required data to make a part. This software is available from Baileigh Industrial.
- Bending with a rotary draw bender requires determining the start of bend point which will line up with the "0" mark on the die. The portion of the tube toward the hook arm will be locked to the die, the portion toward the counter die is the draw side and will slide along the counter die and conform to the dies shape/radius.

12.0 Pipe and Tube Bending Diagrams

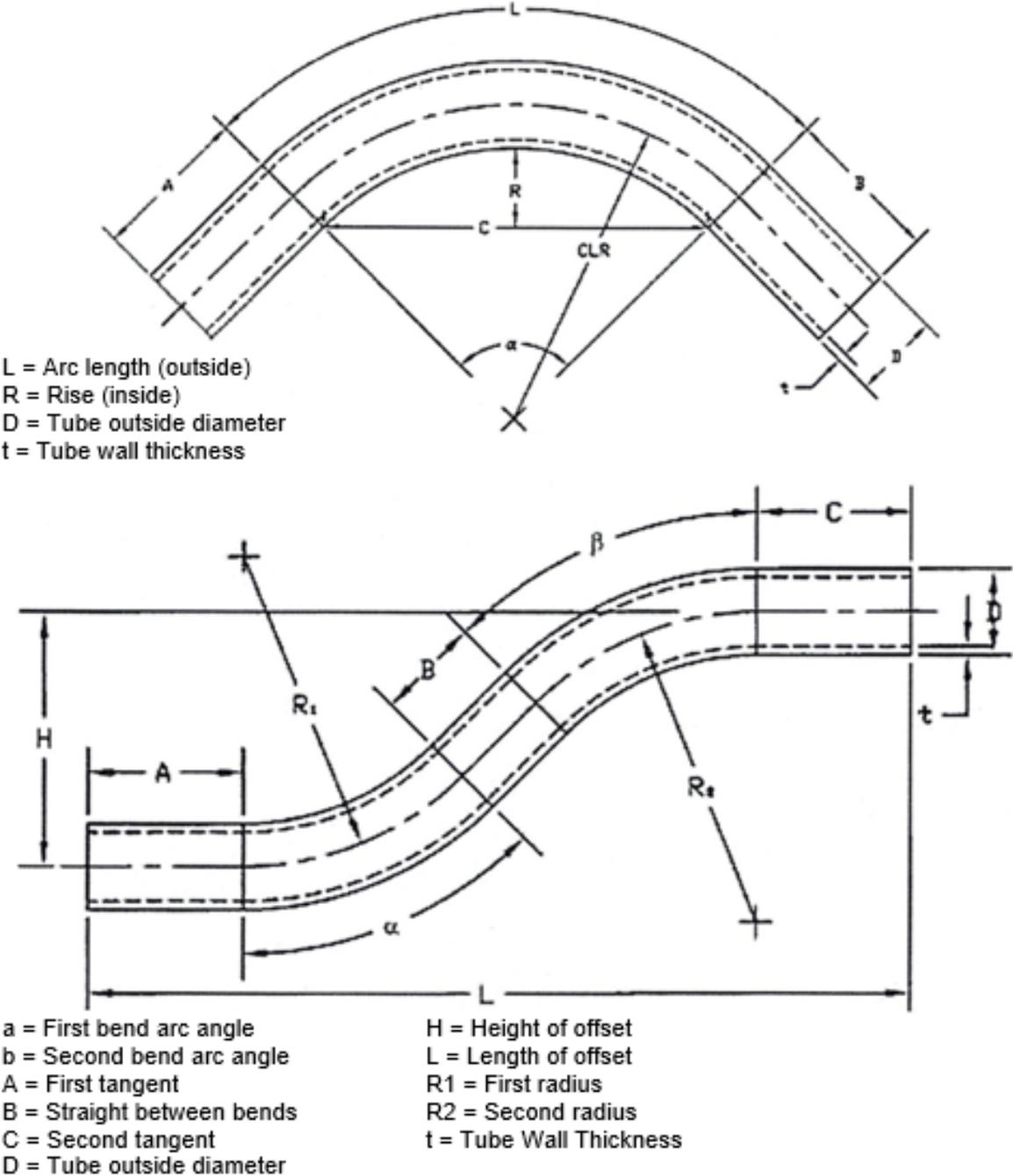


Figure 12-1

13.0 Bending Glossary

Table 13-1

Arc Length	The length of material along the centerline of the tubing
Centerline Radius (CLR)	Distance in inches from the center of curvature to the centerline axis of the tube bending or pipe bending bends. Abbreviated as CLR. See Tube Bending and Pipe Bending Diagram
Degree	Angle in degrees to which the tube/pipe bends are formed (i.e. 45 degrees, 90 degrees, 180 degrees, etc.)
Easy Way (EW)	Bending of a rectangular tube with its short side in the plane of the tube or pipe bend
Hard Way (HW)	Bending of a rectangular tube with its long side in the plane of the tube or pipe bend
I.D.	Inside diameter of the tube or pipe bends
Minimum Tangent	The minimum straight on the end of pipe bends required by the bending machine to form the bend
Neutral Axis	That portion of the pipe or tube that is neither in compression or tension.
O.D.	Outside diameter in inches of the tube or pipe
Out of Plane	The deviation of the horizontal plane of a single pipe bend between its tangent points, based on the theoretical center-line of the pipe bend
Ovality	The distortion or flattening of pipe or tube from its normal, round shape caused by the pipe bending process
Springback	Amount of degrees material will return after bending pressure is released
Tangent	The straight portion of material on either side of arc of bending bends. See Tube Bending and Pipe Bending Diagrams.
Tangent Point	The point at which the bend starts or ends. See Tube Bending and Pipe Bending Diagrams.
Wall	The thickness in inches of tubular pipe bending material.
Wrinkles	Waving or corrugation of pipe bending bends in the inner radius.

14.0 Bending Suggestions

14.1 Aluminum Bending

If bending aluminum, lubrication is very important, if the results are less than desirable with WD-40 other lubricants can be used such as:

- Johnson Paste Wax (seems to work the best)
- High Pressure grease
- Highly rich dish soap
- The bronze counter die must be polished and have no aluminum deposits or it will continue to pick up metal.
- If using BAILEIGH INDUSTRIAL's standard counterdie is not producing desired results, roller counter dies are also available.
- BAILEIGH INDUSTRIAL has both steel rollers as well as plastic rollers. Plastic rollers are used primarily for polished aluminum. Steel rollers would be used for non-polished materials.
- Some aluminum will crack as it is being bent, 6061-T6 is very hard and may need to be annealed or ordered in the "T-0" condition. Aluminum will age harden so if possible try to get freshly run material.

14.2 Heavy Wall DOM Tubing

If heavy wall materials are bent to a tight radius, they can tend to slip in the hook arm causing a poor bend result, below are some suggestions

- Use a vise clamp on the outside of the hook arm to "lock" the material in place.
- Use a piece of two sided coarse emery cloth in between the hook arm and the material, this works very well.
- In only this application, high pressure grease applied to the DIE GROOVE also helps.
- BAILEIGH INDUSTRIAL can make special clamps to hold material in place.

14.3 Bending with Square Dies

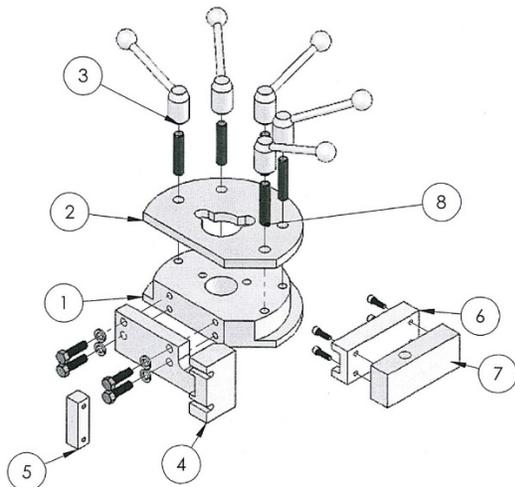


Figure 14-1

- Die Parts
 - 1 Main Bending Die
 - 2 Die Cap
 - 3 Quick Release Handles
 - 4 Hook-Arm
 - 5 Hook-Arm Clamp
 - 6 Plastic Slide
 - 7 Slide Mount
 - 8 Quick Release Studs

14.4 Square Tooling Setup

1. Install the bending die (1) on to the spindle. Be careful not to pinch your fingers as you lower the die on to the spindle. The die will only fit on the spindle one way. Bolt the die to the spindle using the holes in the die.
2. Install the plastic counter die assembly (6, 7) with the long end pointing away from the hook arm.
3. Snug up the cap clamps (3). Do not over tighten! Or they will be overly difficult to loosen after the bend is complete. Note: tighten clamps without material in the die. The clamps are lift and turn, so you can position them anywhere. This allows the handles to clear the counter-die mount during bending.
4. Insert the material in to the hook arm (4) and pull in to the die. It may be a tight fit. Continue to pull until the material is fully seated in the die's groove.
5. Lube the counter die and the material that will slide along the counter die. Bring the plastic counter die assembly up to the material, leaving about 1/8" to 1/4" gap. (Note: on some thinner material it helps to keep the counter die approx. 1" away from the material)

IMPORTANT: Do not lube the bending die surfaces. This will increase the possibility for slippage. Make sure all the die cap clamp handles (3) are inside the die diameter. They could catch the counter die mounting assembly and break off.

6. If the material slips during the bending operation, install the hook arm clamp (5). Do not use it unless you have to.
7. Activate the bender and bend to the desired angle.
8. To remove the material, open the counter die and return bender to the "home position". Using a soft mallet, gently tap the cap clamps open and the material will spring out of the die (1). Remove the material and re-slug the cap clamps.
9. Install the next piece of material to be bent and repeat these steps.

14.5 Large Size Square

When bending larger than 1.5" (38.1mm) thinner wall square tubing, the counter die position seems to work better between 1/2" and 1" (12.7-25.4mm) farther away from the die. This seems to reduce side wall distortion and inner wrinkling. Although this suggestion is to help on large size, the same steps can be used for any square, if trying to achieve better results. If the square material slips in the hook arm, use the supplied clamp and bolts to hold in place.

BAILEIGH INDUSTRIAL offer crush bend dies to form a concave crease on the inside of square bends to reduce the possibility of wrinkling.

15.0 Maintenance

WARNING

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

WARNING

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

WARNING

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.

- The fluid level in the power unit's reservoir should be checked monthly. If the level is below 1/2 full, fill to the top with AW-46 hydraulic fluid. Hydraulic fluid and the filter should be changed when the filter gauge reads "Change Filter".
- Check periodically for leaks. If a leak is detected, consult Baileigh Industrial.
- There are four grease zerks on the machine, at the main spindle pivots. Grease these zerks every month with only two pumps from a standard grease gun.
- Check for any loose or worn parts
- If hoses or fittings are replaced, they must be rated for 4000psi (275 bars, 282 kg/cm).

16.0 Troubleshooting

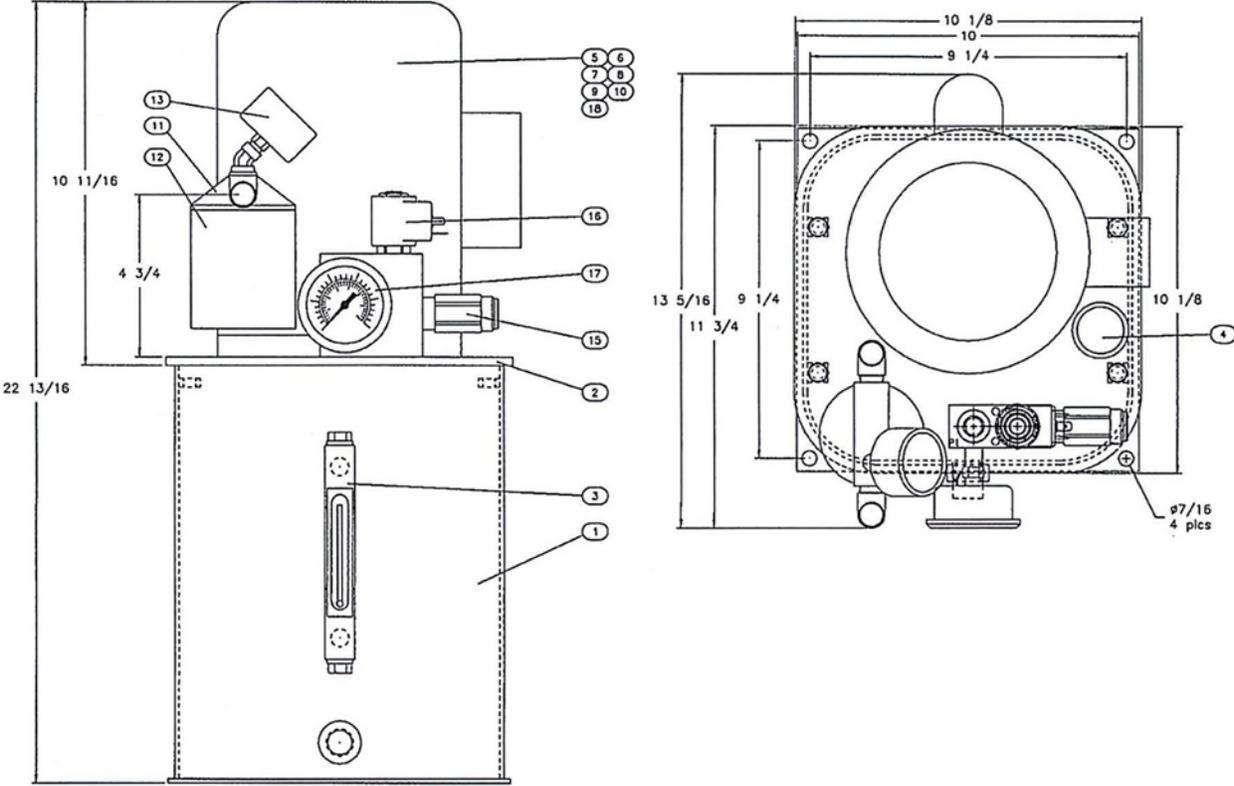
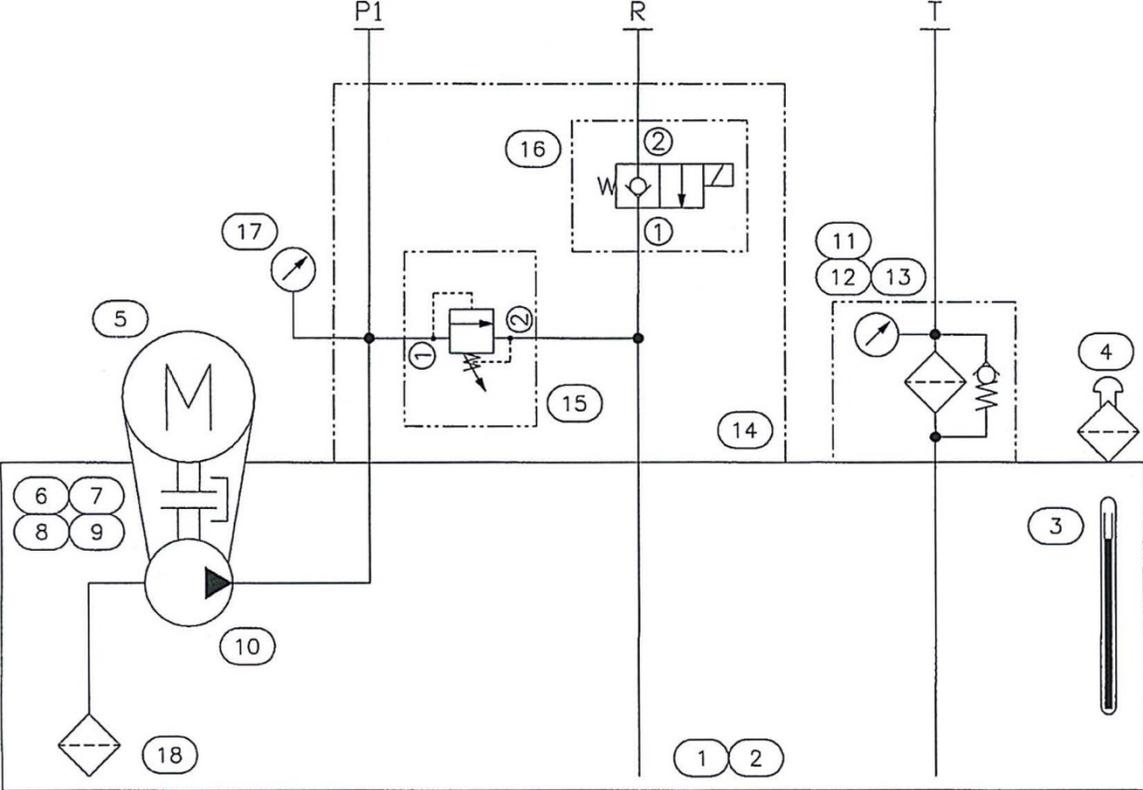
⚠ WARNING

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

Table 16-1

Problem	Solution
Cylinders not retracting all the way or not in sequence	Do the dry run sequence as outlined in section 8 of the manual under operation
Machine doesn't move forward or moves forward slowly and does not build up pressure	<p>Check that the solenoid valve has its wires connected. To Check it's functionality extend the cylinder all the way, let the machine deadhead and build up pressure approximately 2000 (Psi). At that point rotate the autostop dial the detent position and the pressure should drop to "0" Psi.</p>  <p>Solenoid switch</p>
Machine doesn't bend at pressure (2000 Psi)	If trying to bend material and the machine builds up pressure and stalls this usually means: The material is too thick, the material has too high of a yield strength, or the material is over the machines capacity.
Material slips in the hook arm	Too much lube on material and is transferring to the bend die clean the bend die with degreaser.
	The counter die should be lubed only
	The material may need to be clamped
	Wrong material for the die set
Spindle drive pins are damaged	If the bend dies are not bolted down properly the drive pins will get damaged. Replace drive pins.
Poor Bend Results	Check proper tooling for material IE Pipe Vs Tube. Green for pipe, Blue for tube, Red for metric and Gray for square or rectangle tubing. See Appendix C for pipe sizing chart
	Wall thickness is too thin

17.0 Hydraulic Diagram



18.0 Tables, Charts, & Diagrams

18.1 Standard Pipe Sizes and Schedules

Table 18-1

Pipe Sizes	O.D.	Pipe Schedules and Wall Thickness					
		5	10	40	80	160	XX STRONG
1/8	0.405	0.400	0.050	0.068	0.095		
1/4	0.540	0.500	0.070	0.088	0.119		
3/8	0.675	0.500	0.070	0.091	0.126		
1/2	0.840	0.700	0.080	0.109	0.147	0.188	0.294
3/4	1.050	0.700	0.080	0.113	0.154	0.219	0.308
1	1.315	0.700	0.110	0.133	0.179	0.250	0.358
1-1/4	1.660	0.700	0.110	0.140	0.191	0.250	0.382
1-1/2	1.900	0.700	0.110	0.145	0.200	0.281	0.400
2	2.375	0.700	0.110	0.154	0.218	0.344	0.436
2-1/2	2.875	0.800	0.120	0.203	0.276	0.375	0.552

18.2 Die Color Code Chart

Table 18-2

Material	Color
Pipe	Green
Tube	Blue
Metric	Red
Square or Rectangle	Gray

18.3 Arc Length Table

EXAMPLE: Arc Length = Constant x Bend Radius. Example: 90deg bend with 6" clr

EXAMPLE: 1.575 (from table) x 6" (clr) = 9.45" (Arc Length)

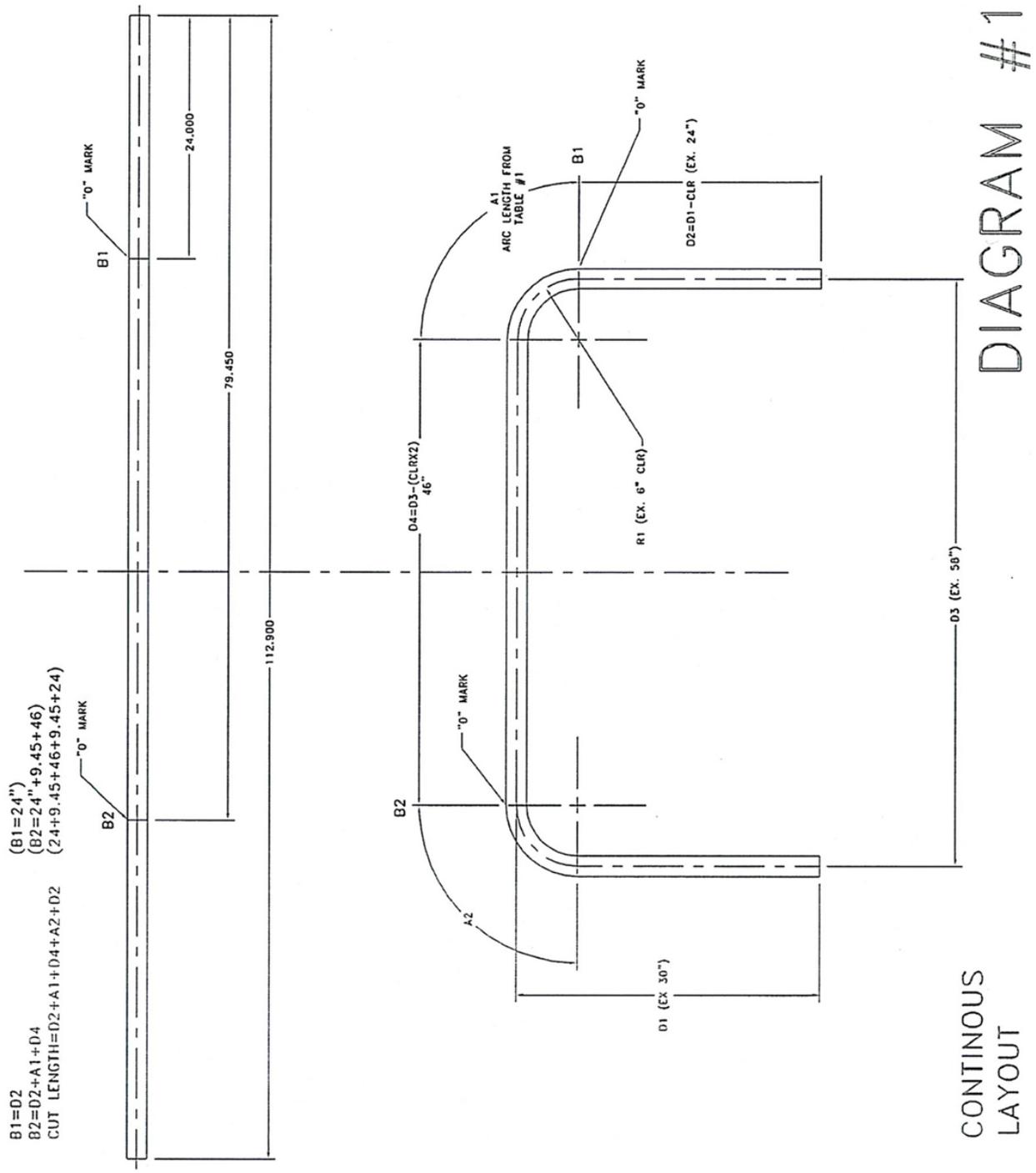
For bends more than 90deg, Constants can be added together.

Table 18-3

Degrees	Constant	Degrees	Constant	Degrees	Constant
1	0.0175	31	0.5410	61	1.0645
2	0.0349	32	0.5584	62	1.0819
3	0.0524	33	0.5759	63	1.0994
4	0.0698	34	0.5933	64	1.1168
5	0.0873	35	0.6108	65	1.1343
6	0.1047	36	0.6282	66	1.1517
7	0.1222	37	0.6457	67	1.1692
8	0.1396	38	0.6631	68	1.1866
9	0.1571	39	0.6806	69	1.2041
10	0.1745	40	0.6980	70	1.2215
11	0.1920	41	0.7155	71	1.2390
12	0.2094	42	0.7329	72	1.2564
13	0.2269	43	0.7504	73	1.2739
14	0.2443	44	0.7678	74	1.2913

Degrees	Constant	Degrees	Constant	Degrees	Constant
15	0.2618	45	0.7853	75	1.3088
16	0.2792	46	0.8027	76	1.3262
17	0.2967	47	0.8202	77	1.3437
18	0.3141	48	0.8376	78	1.3611
19	0.3316	49	0.8551	79	1.3786
20	0.3490	50	0.8725	80	1.3960
21	0.3665	51	0.8900	81	1.4135
22	0.3839	52	0.9074	82	1.4309
23	0.4014	53	0.9249	83	1.4484
24	0.4188	54	0.9423	84	1.4658
25	0.4363	55	0.9598	85	1.4833
26	0.4537	56	0.9772	86	1.5007
27	0.4712	57	0.9947	87	1.5182
28	0.4886	58	1.0121	88	1.5356
29	0.5061	59	1.0296	89	1.5531
30	0.5235	60	1.0470	90	1.5705

18.4 Diagram 1



18.5 Diagram 2

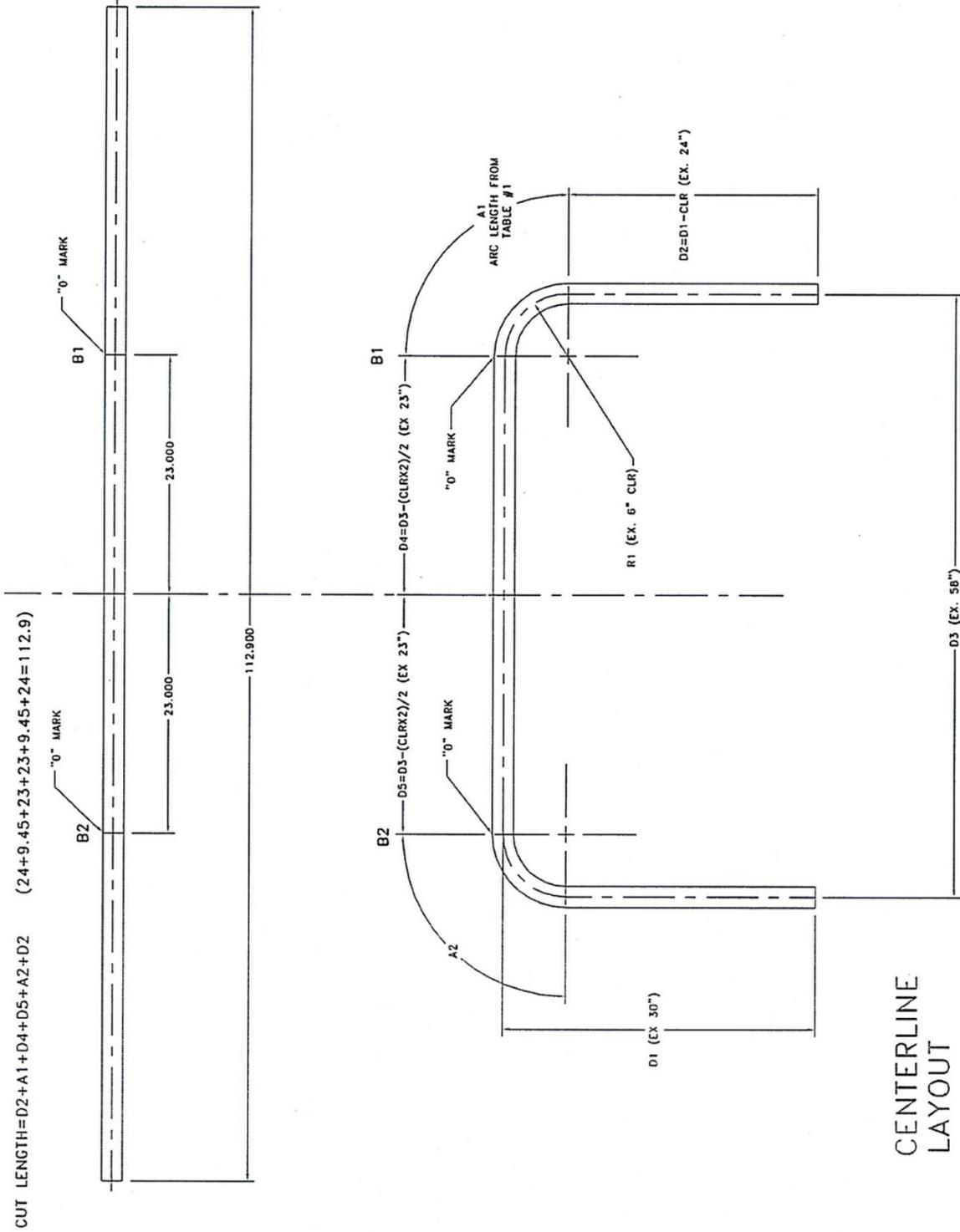
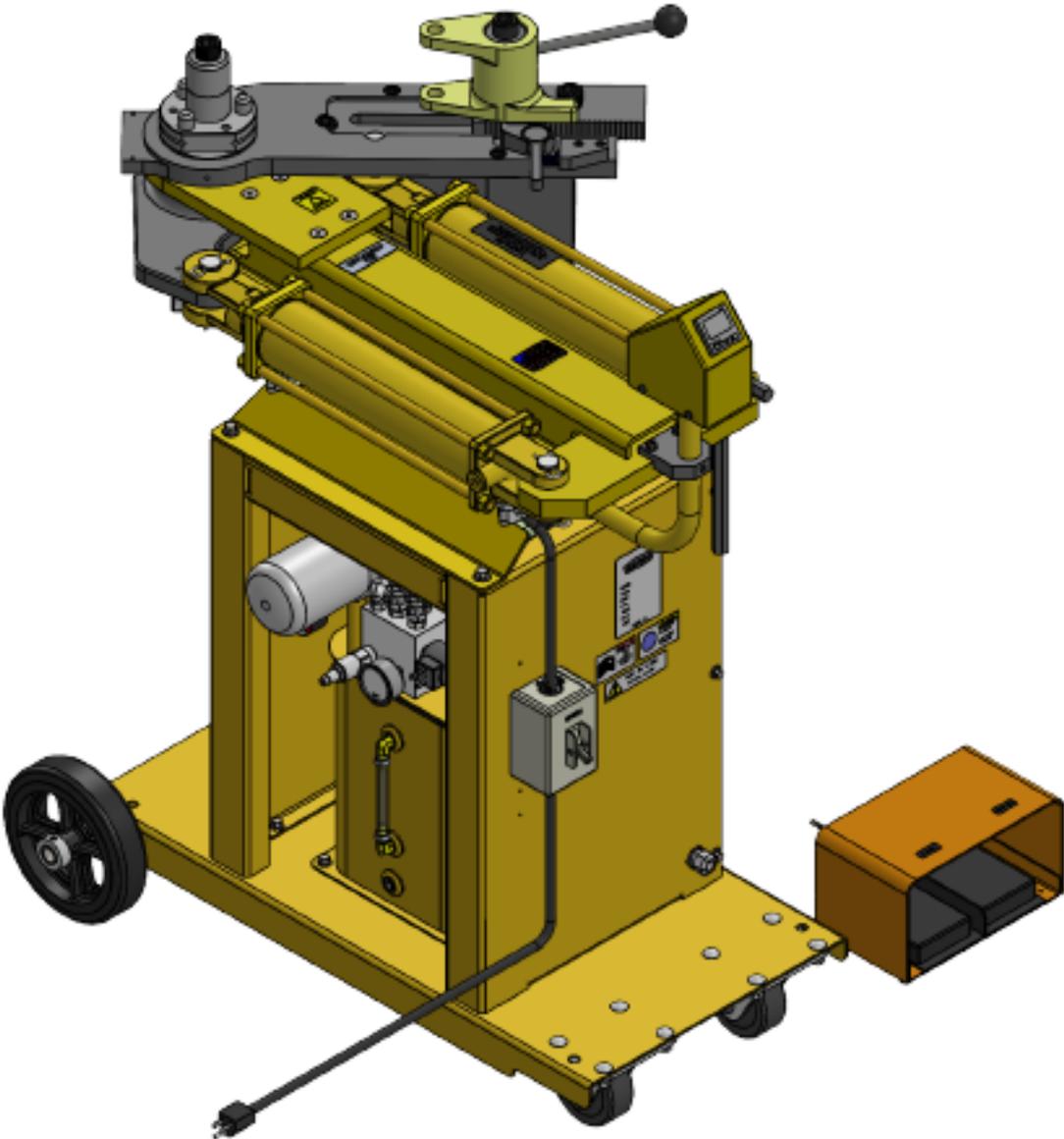


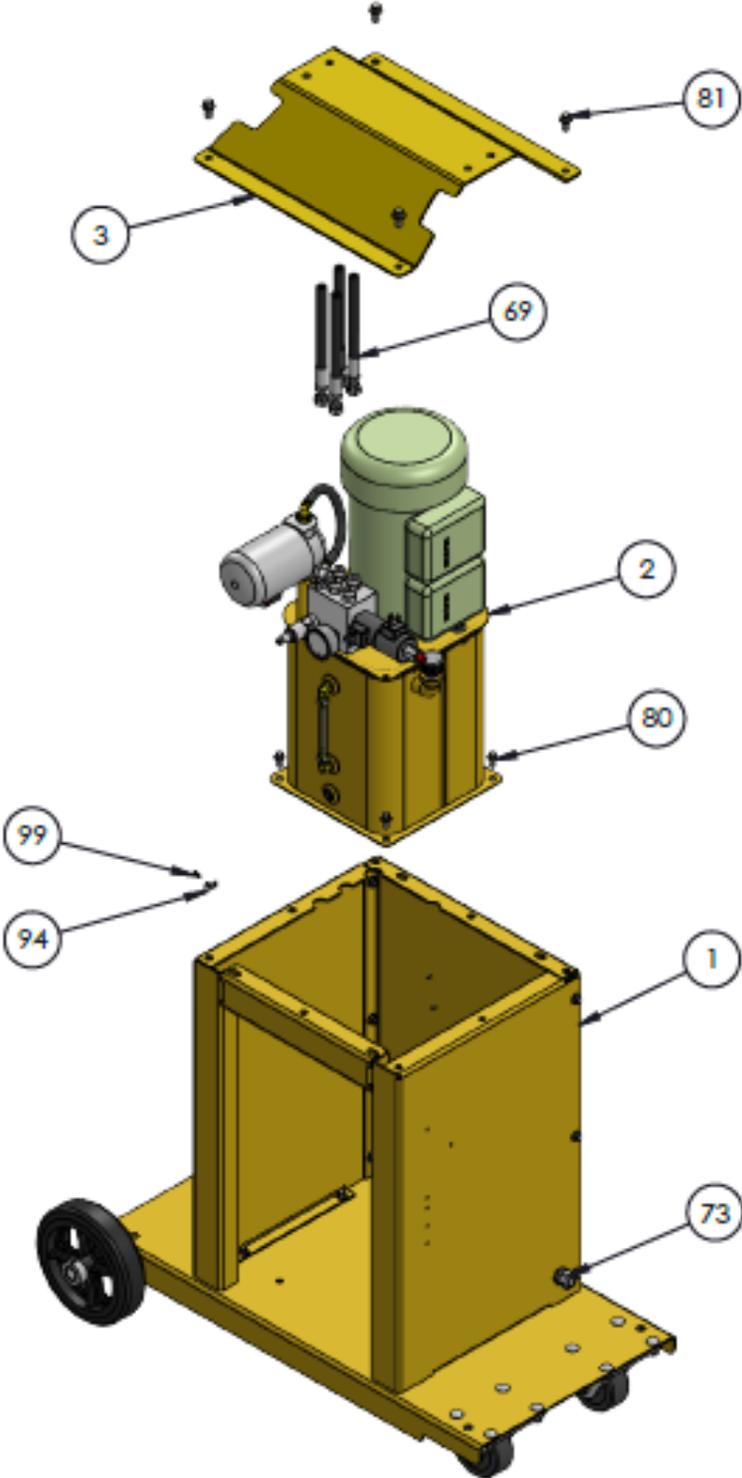
DIAGRAM #2

19.0 Replacement Parts

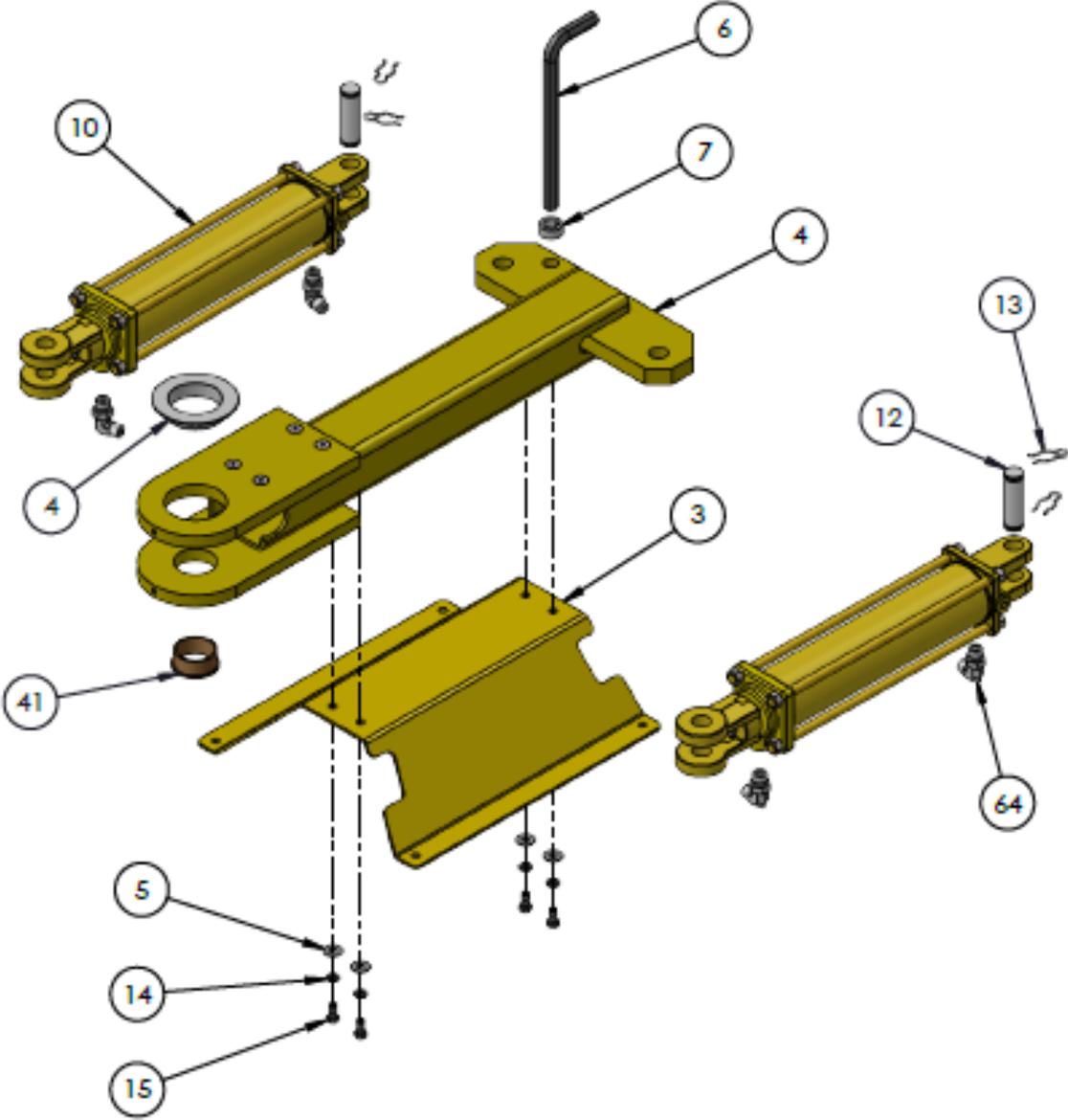
19.1.1 RDB-175 Assembly - Exploded View



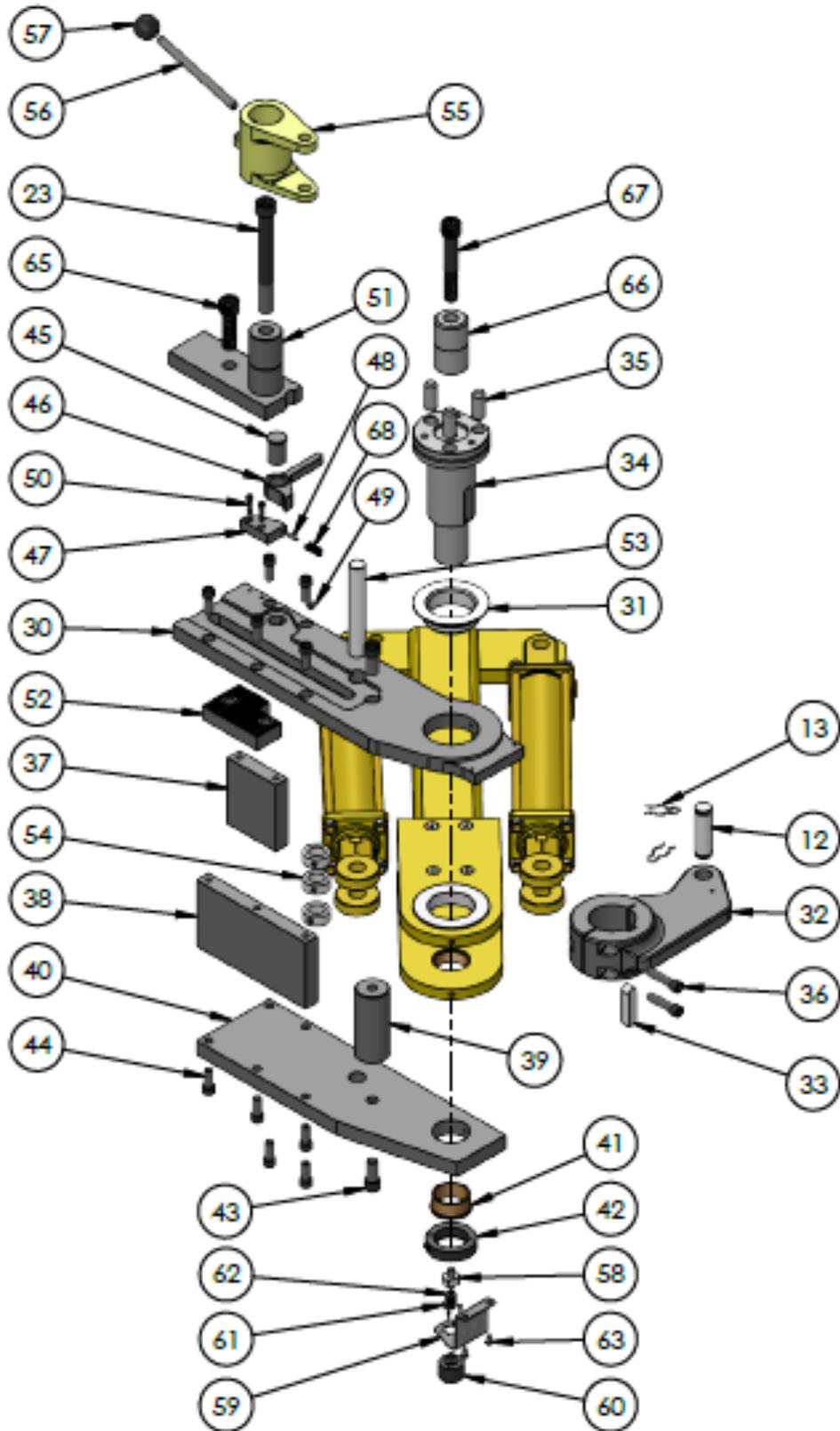
19.1.3 Cart & Power Unit Assembly - Exploded View



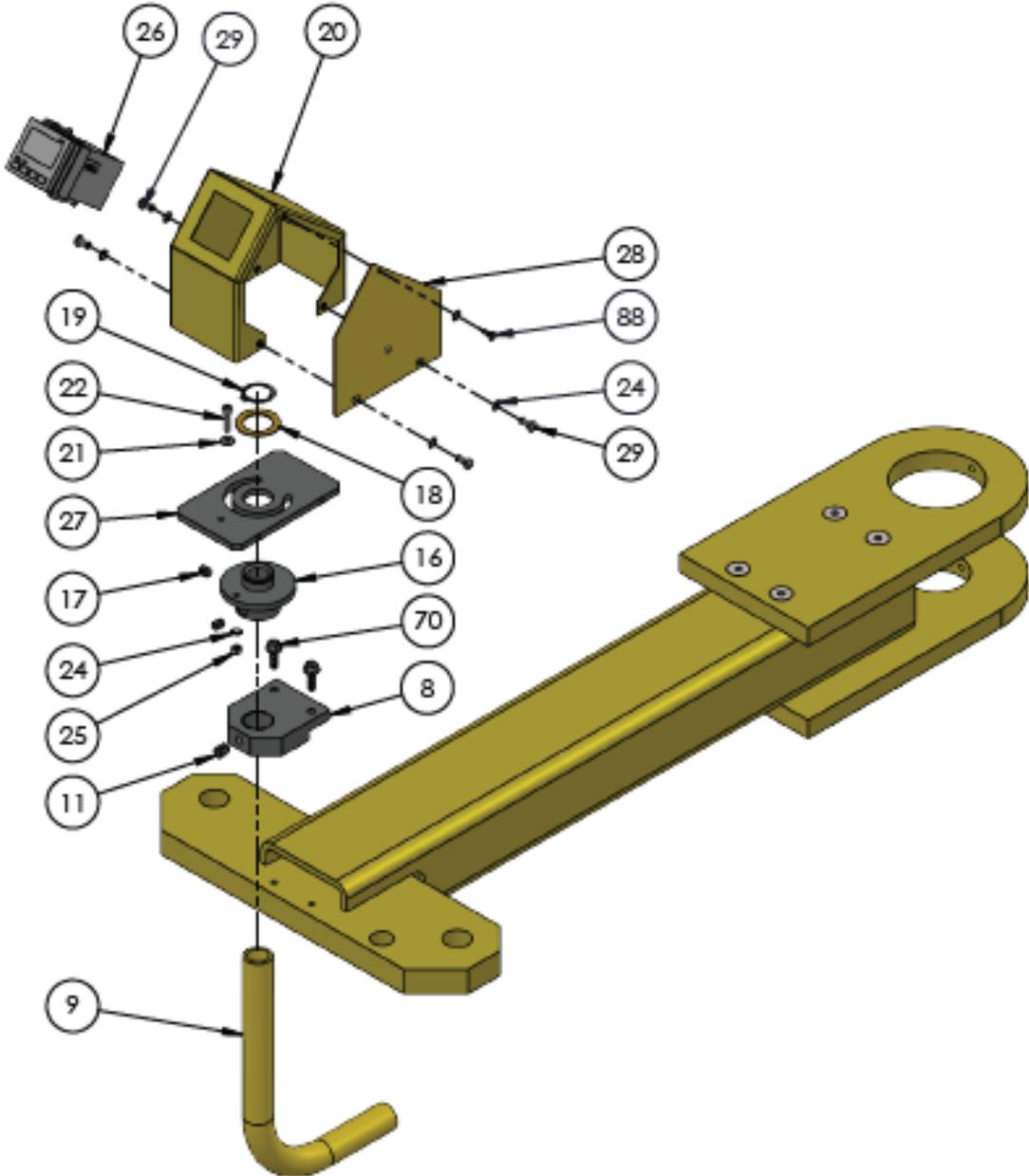
19.1.4 Maintube & Hydraulic Cylinders - Exploded View



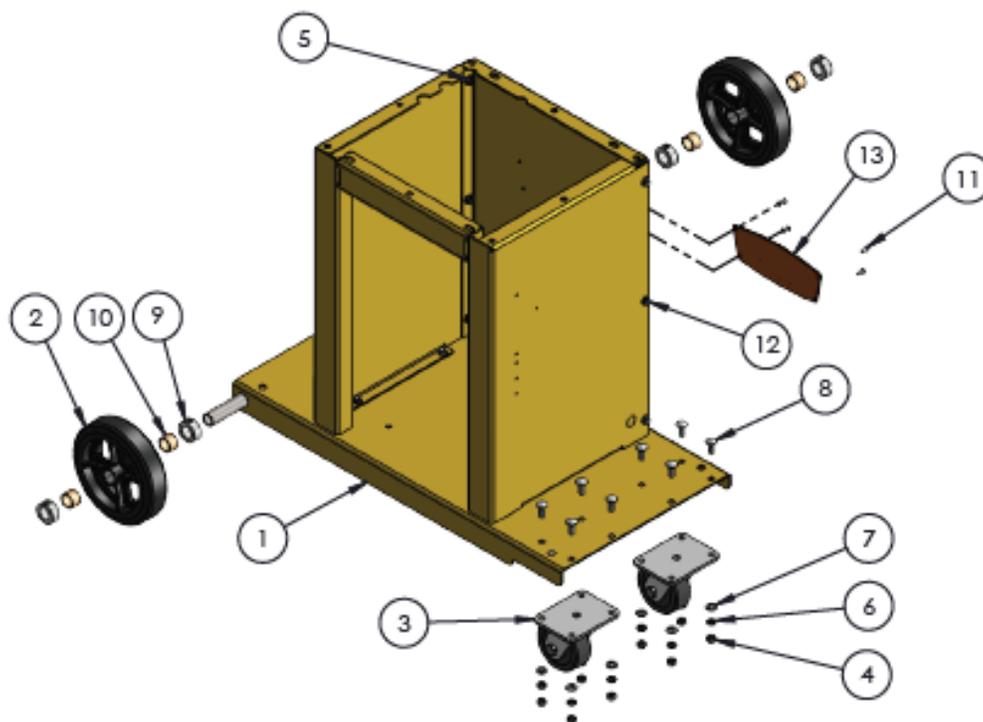
19.1.5 Swing Arm Assembly - Exploded View



19.1.6 Controller Housing - Exploded View



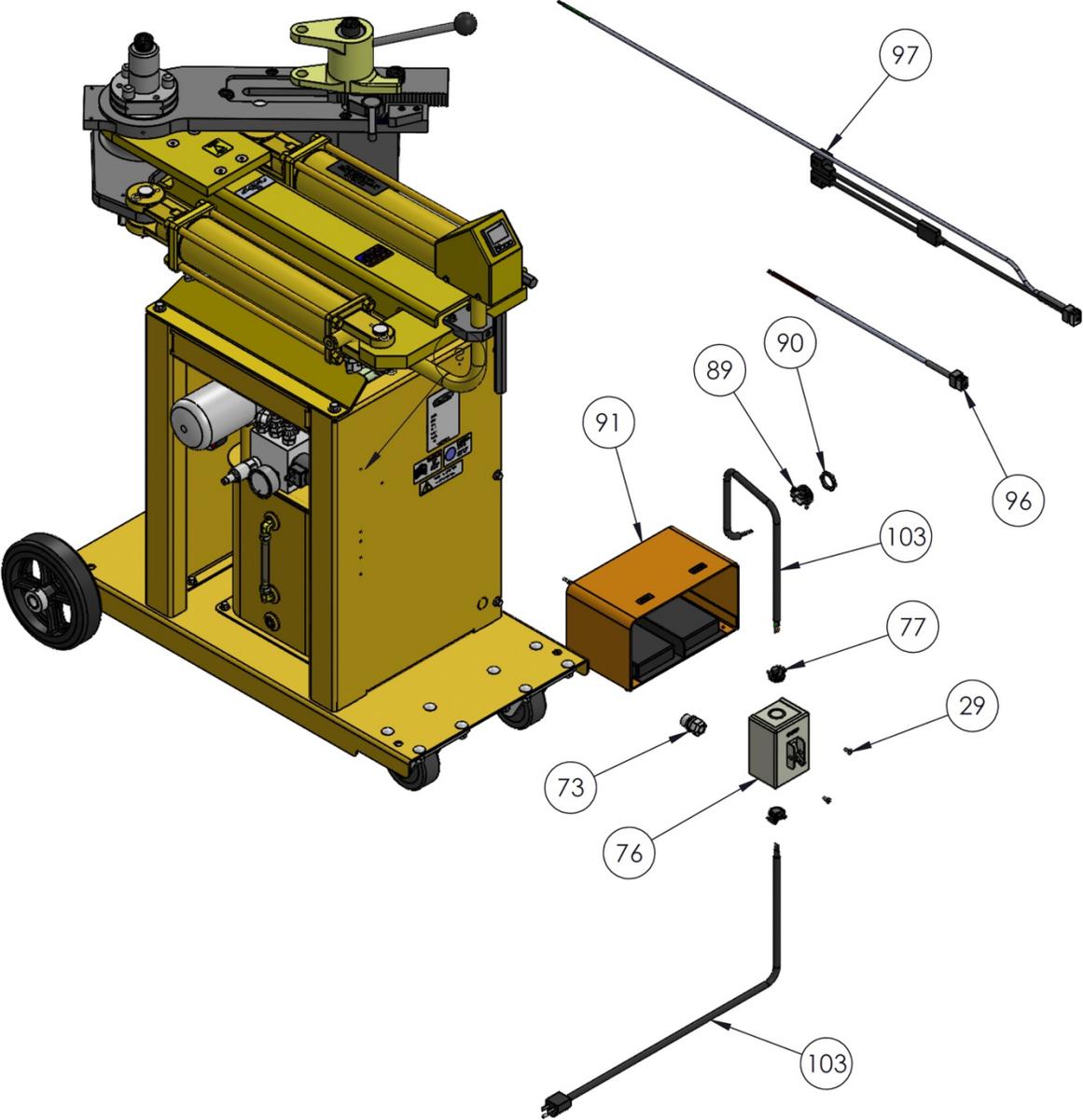
19.1.7 Cabinet Assembly - Exploded View



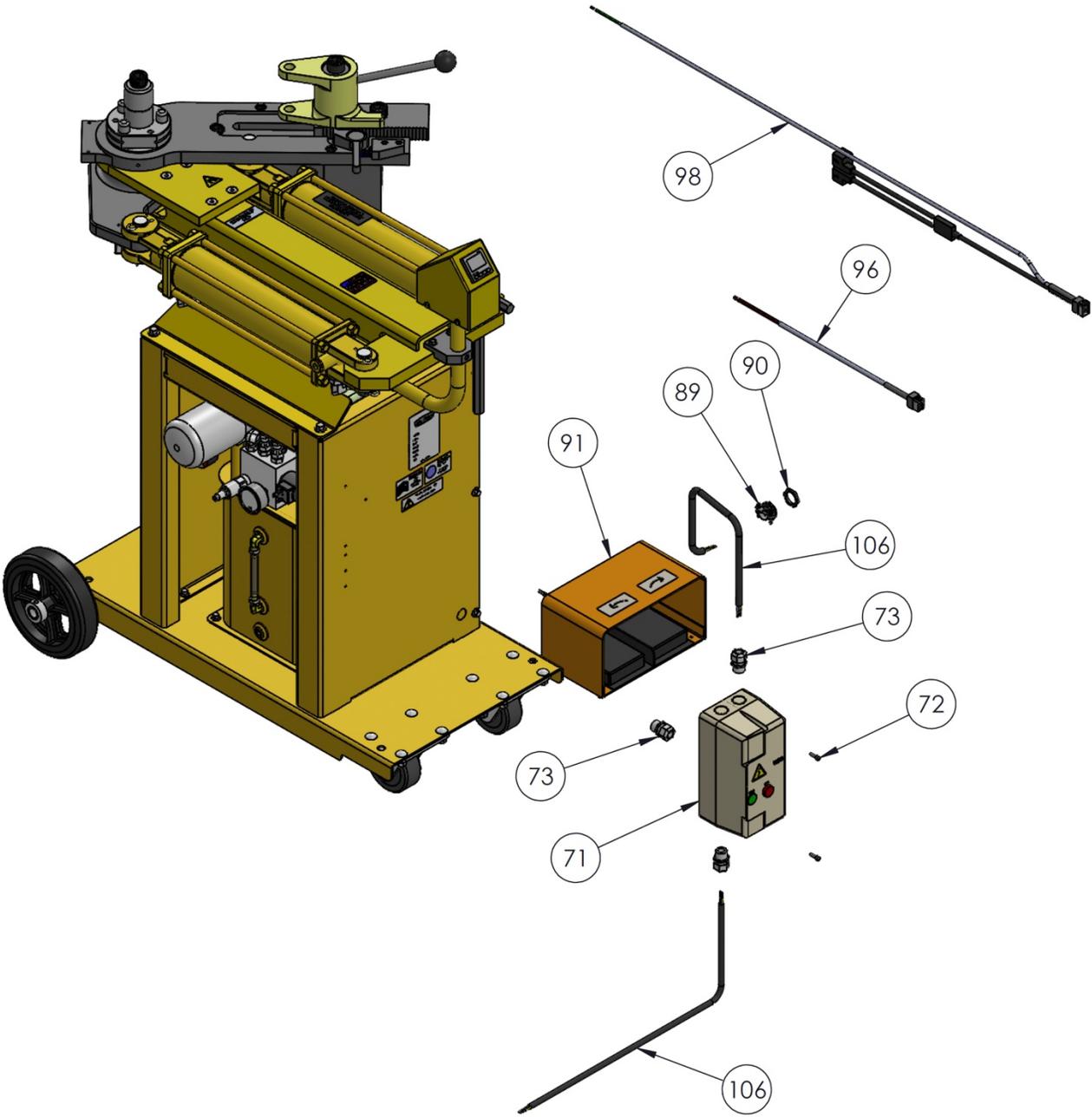
19.1.8 Cabinet Assembly - Parts List

Index No.	Part No.	Description	Size	Qty.
1	BA9-M1505A007	CABINET ASSEMBLY	M150	1
2	BA9-PP0064	RUBBER WHEEL	8" DIA.	2
3	BA9-PP0048	CASTER ASSEMBLY	4"	2
4	CM9-BS0125	HEX NUT, SILV ZINC, GR. 5	03-08-2016	8
5	CM9-BSM0260	SER FLG HEX NUT, SILV ZINC, GR. 8.8	M8 X 1.25	8
6	CM9-BS0074	LOCK WASHER, SILV ZINC, GR. 5	3/8"	8
7	BS-0083	FLAT WASHER, SILV ZINC, GR. 5	3/8"	8
8	CM9-BS0108	CARRIAGE BOLT, SILV ZINC, GR. 5	3/8-16 X 1	8
9	BA9-PP0035	SET SCREW COLLAR, SILVER ZINC	1"	4
10	BA9-PP0043	LG OIL IMP BRNZ BUSH (SAE 841)	1" ID X 1-3/16" OD X 3/4"	4
11	BA9-PP0487	ALUM. POP RIVET	3/16"	4
12	CM9-BSM0166	HEX FLG SCREW, SILV ZINC, GR. 10.9	M8 X 1.25 X 16	14
13	BA9-PP1912	LOGO PLATE	9"	1

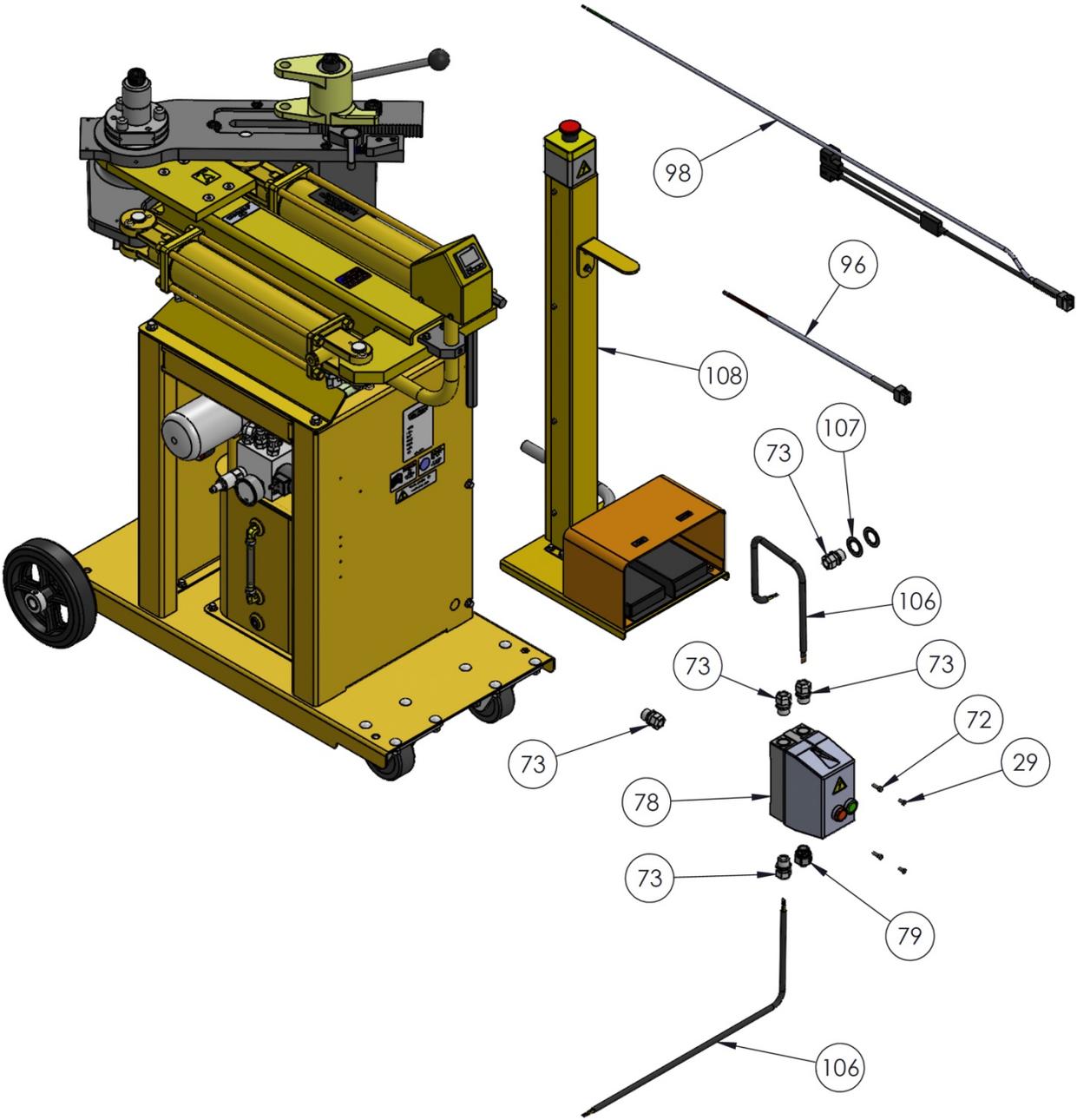
19.1.9 Electrical Assembly (U.S.) - Exploded View



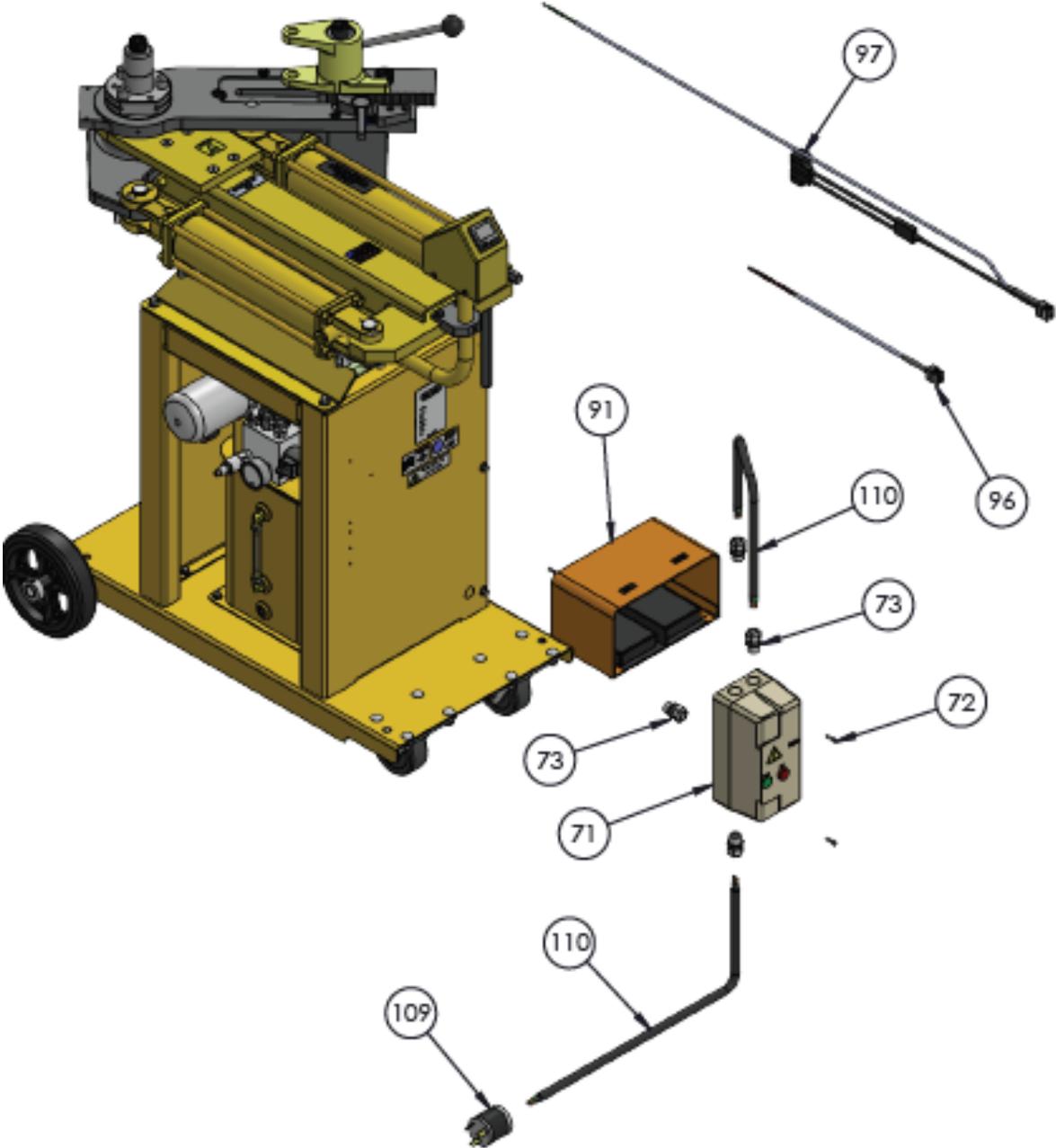
19.1.10 Electrical Assembly (CE) - Exploded View



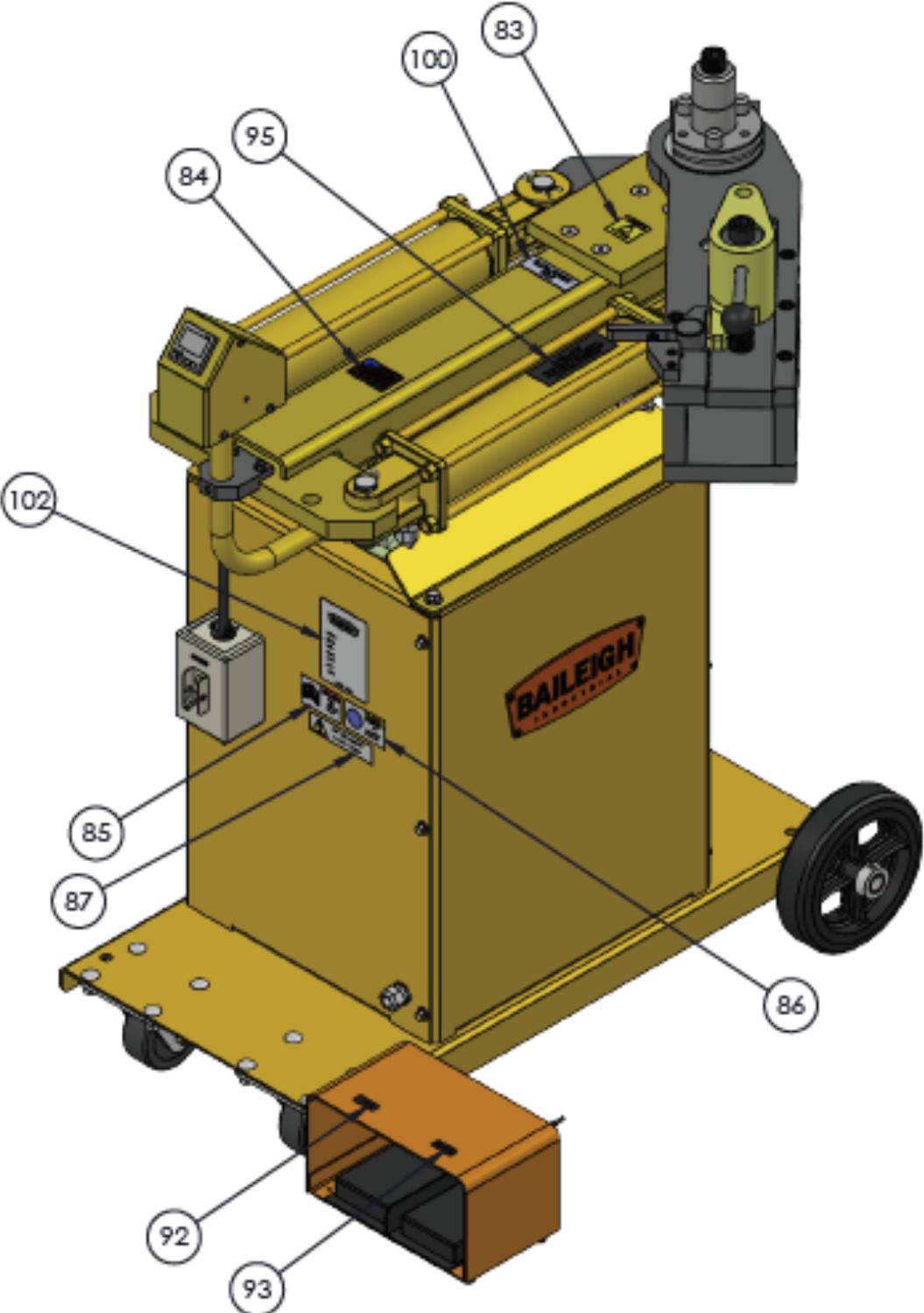
19.1.11 Electrical Assembly (AUS) - Exploded View



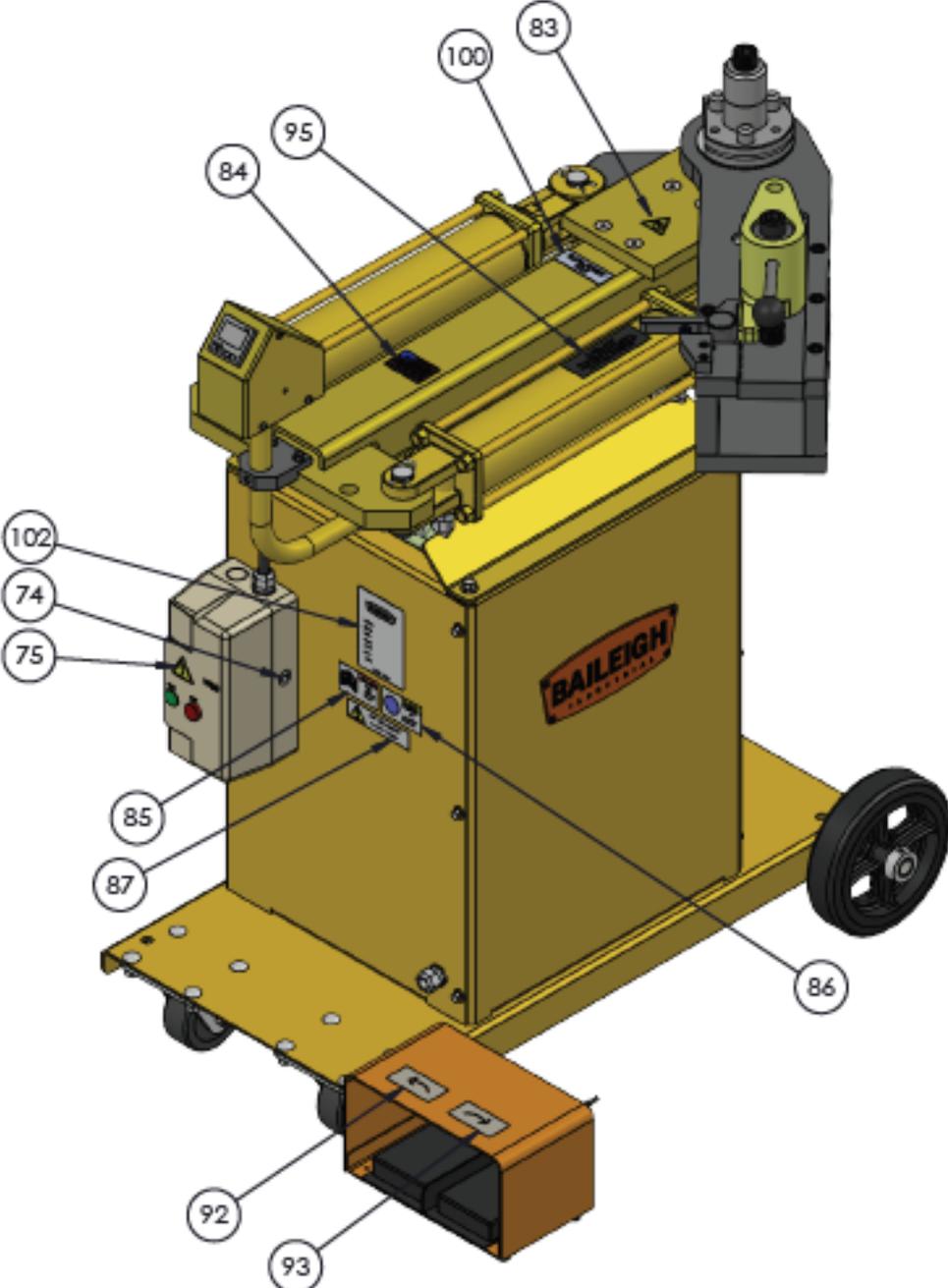
19.1.12 Electrical Assembly (CSA) - Exploded View



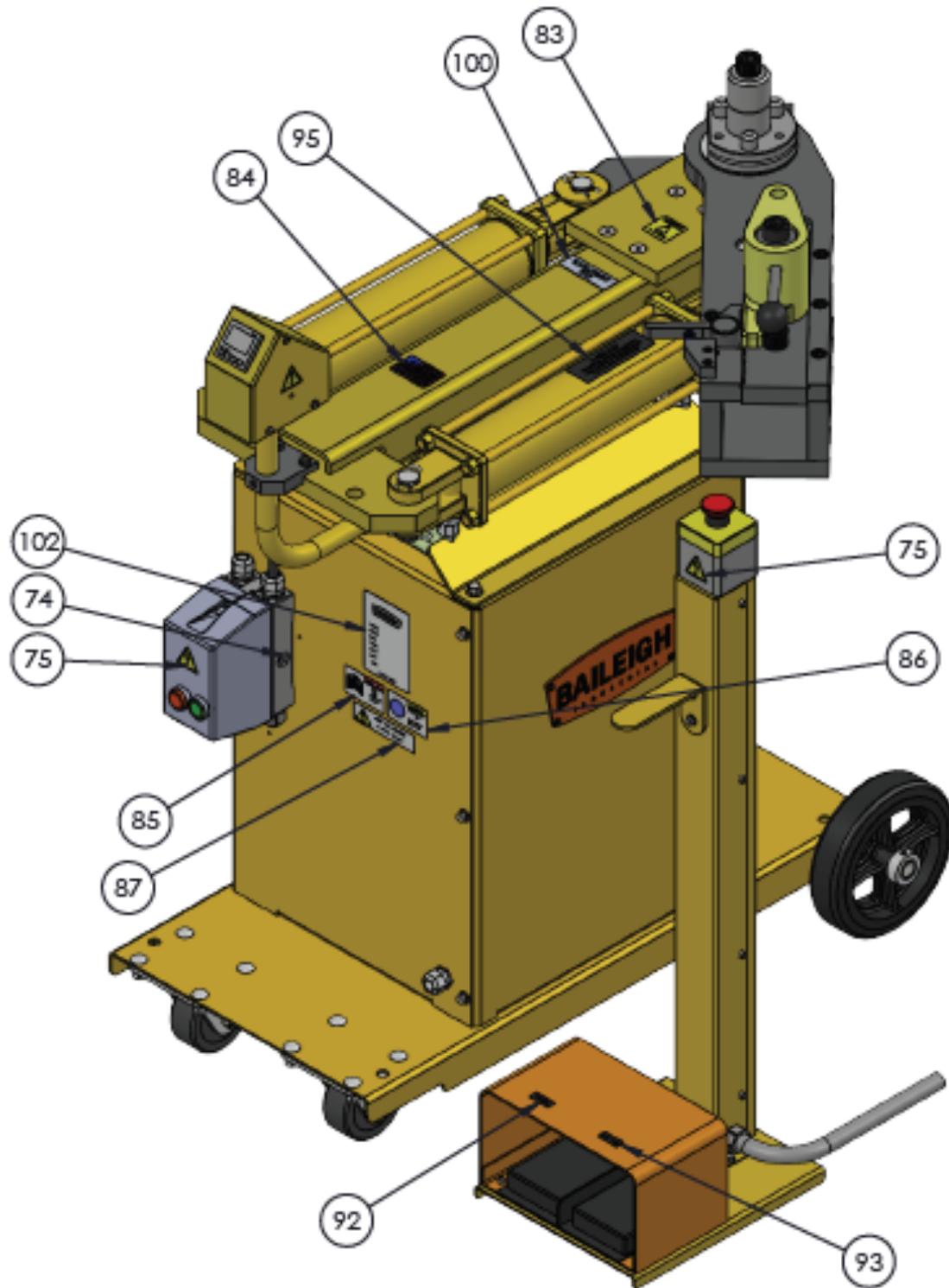
19.1.13 Product Lables (U.S.) - Exploded View



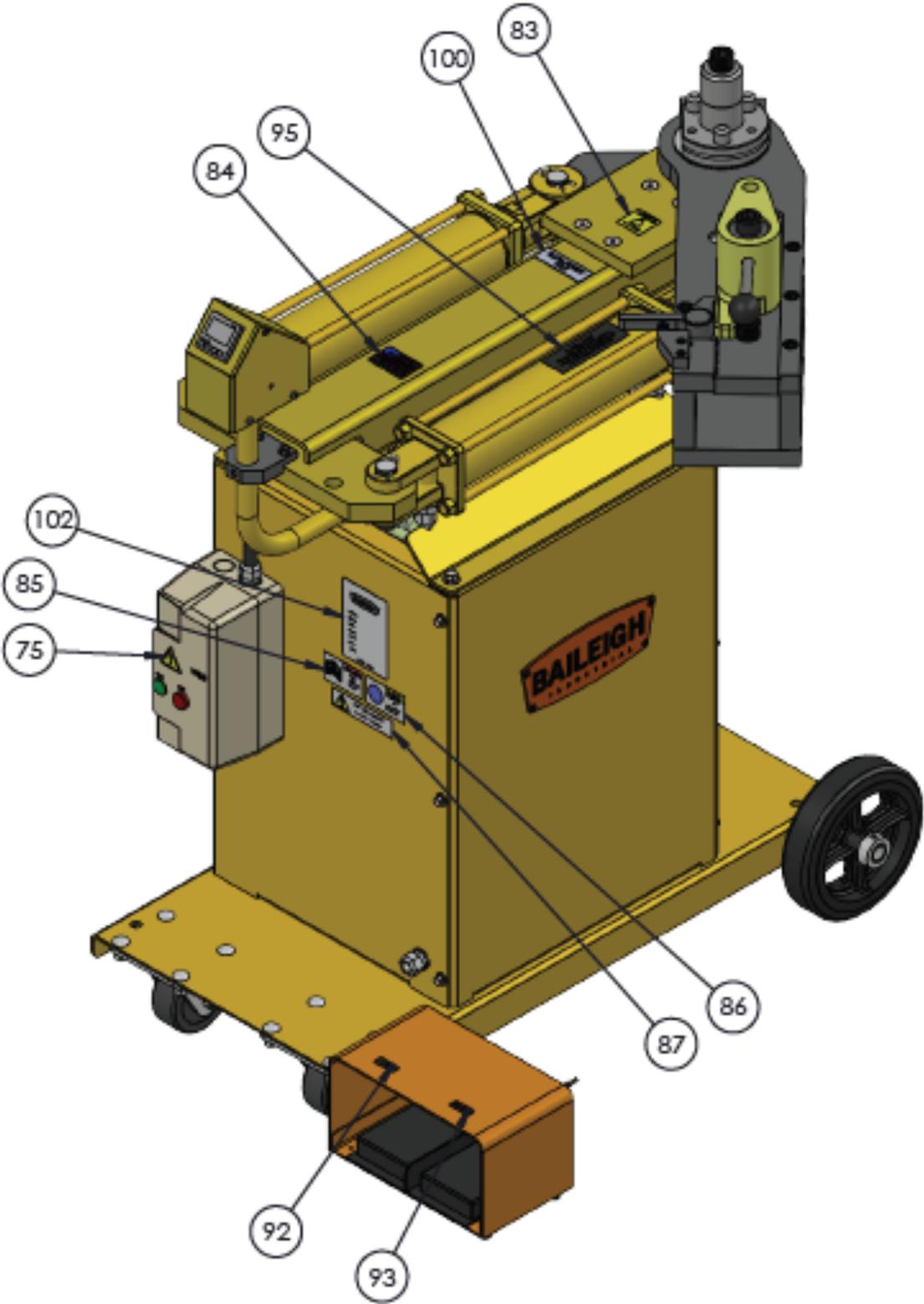
19.1.14 Product Labels (C.E.) - Exploded View



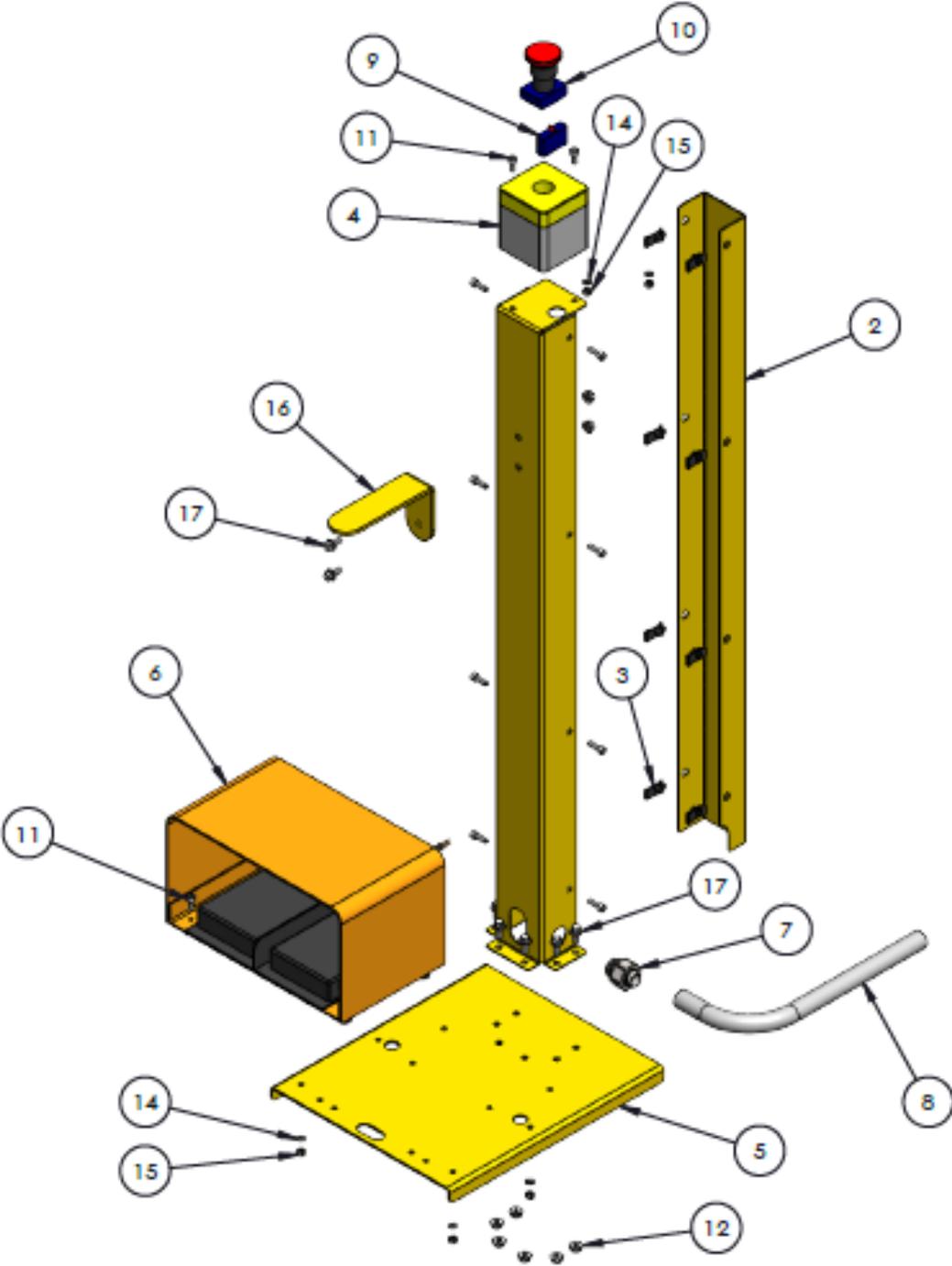
19.1.15 Product Labels (AUS) - Exploded View



19.1.16 Product Labels (CSA) - Exploded View



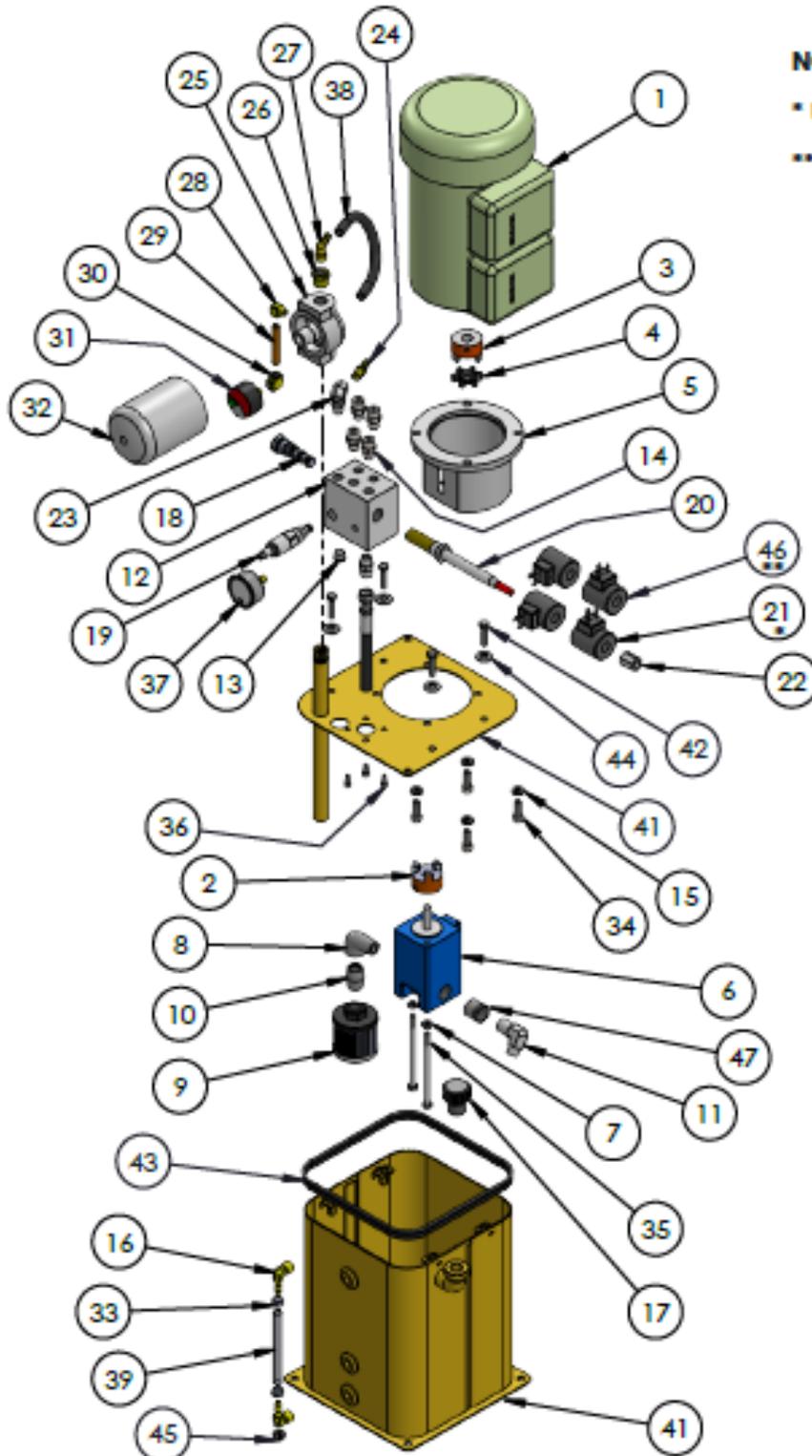
19.1.17 E-Stop Pendant-V2 - Exploded View



19.1.18 E-Stop Pendant-V2 - Parts List

Index No.	Part No.	Description	Size	Qty.
1	BA9-RP6010	E-STOP UPRIGHT		1
2	BA9-RP6011	E-STOP UPRIGHT COVER		1
3	BA9-PP0280	FOLD OVER NUT	M5 X 0.8	8
4	BA9-PP2063	E-STOP BOX		1
5	BA9-RP6009	PENDANT BASE		1
6	BA9-PP1143	FOOT PEDAL SWITCH (CE)		1
7	BA9-PP0020	STRAIGHT SEAL TIGHT CORD GRIP	(1/2")	1
8	BA9-PP2064	SEAL TIGHT TUBE	(1/2")	1
9	BA9-PP1099	CONTACTOR, RED		1
10	BA9-PP1098	EMERGENCY STOP BUTTON		1
11	CM9-BSM0115	BLK OXIDE, GR. 12.9	M5 X 0.8 X 12 SHCS	6
12	CM9-BSM0121	FLG NUT, SILV ZINC, GR. 8.8	M6 X 1.0 HEX	8
13	CM9-BSM0186	SHCS, BLK OXIDE, GR. 12.9	M5 X 0.8 X 16	8
14	CM9-BSM0197	EXTERNAL STAR WASHER, SILV ZINC, GR. 8.8	M5	6
15	CM9-BSM0131	HEX NUT, SILV ZINC, GR. 8.8	M5 X 0.8	6
16	BA9-RP6014	HANDLE		1
17	CM9-BSM0045	FLG, SILV ZINC, GR. 10.9	M6 X 1.0 X 14 HEX	8

19.1.19 Power Unit Assembly - Exploded View



NOTE:

* Used on US machines only

** Used on CE machines only

19.1.20 Hydraulic Power Unit - Parts List

Index No.	Part No.	Description	Size	Qty.
1	BA9-PP1075	2-HP 1-PHASE MOTOR		1
2	BA9-PP1102	RDB-175 PUMP COUPLING		1
3	BA9-PP1101	MOTOR COUPLING	5/8"	1
4	BA9-PP1103	RUBBER COUPLING INSERT		1
5	BA9-PP1100	RDB-175 PUMP MOTOR ADAPTOR		1
6	BA9-PP1104	RDB-175 HYD. PUMP		1
7	CM9-BS0073	LOCK WASHER, SILV ZINC, GR. 5	5/16"	2
8	BA9-PP1130	BLACK PIPE ELBOW	5"	1
9	BA9-PP1113	STRAINER		1
10	BA9-PP1131	STEEL PIPE NIPPLE	1/2" NPT X 1"	1
11	BA9-PP1127	MALE ELBOW #6 TO #8		1
12	BA9-PP1251	HYD. MANIFOLD (NEW POWER UNIT)		1
13	BA9-PP1269	PLUG	#6	1
14	BA9-PP0858	STRAIGHT FACE SEAL	#6 TO #6	5
15	CM9-BS0074	LOCK WASHER, SILVER ZINC, GR. 5	3/8"	4
16	BA9-PP1136	BRASS BARB ELBOW	03-Aug	2
17	BA9-PP1114	FILL CAP		1
18	BA9-PP1111	FLOW DIVIDER	RDB-175	1
19	BA9-PP1110	PRESSURE RELAESE VALVE		1
20	BA9-PP1203	SOLENOID VALVE		1
21	BA9-PP1404	SOLENOID, 115V (US MACHINES)		2
22	BA9-PP1203	SOLENOID NUT		1
23	BA9-PP1123	MALE-FEMALE ELBOW	-6	1
24	BA9-PP1137	STRAIGHT BARB BRASS	1/4" NPT X .375"	1
25	BA9-PP1105	FILTER HEAD		1
26	BA9-PP1132	NPT BRASS REDUCER BUSHING	1/2"	1
27	BA9-PP1128	MALE BARB BRASS 90-ELBOW	3/8" NPT MALE TO 3/8"	1
28	BA9-PP1134	BRASS 90 ELBOW	1/8 NPT F-M	1
29	BA9-PP1135	BRASS PIPE NIPPLE	1/8 NPT X 2-1/2"	1
30	BA9-PP1133	BRASS 90 ELBOW	1/8 NPT F-F	1
31	BA9-PP1107	FILTER INDICATOR		1
32	BA9-PP1106	OIL FILTER		1
33	BA9-PP1139	TUBE CLAMP-GAP FREE PINCH TYPE (POWERUNIT)		2
34	CM9-BS0016	SHCS, BLK OXIDE, GR. 8	3/8-16 X 1"	4
35	CM9-BS0292	HHCS, SILV ZINC, GR. 5	5/16-18 X 5"	2
36	CM9-BS0005	SHCS, BLK OXIDE, GR. 8	1/4-20 X 1/2"	3
37	BA9-PP1112	PRESSURE GAUGE (3000 PSI)		1
38	BA9-PP1124	FILTER HOUSING HOSE		1
39	BA9-PP1125	SIGHT GLASS TUBE		1
40	BA9-PP1126	HYD. HOSE		1
41	BA9-RDB-1755A005	HYD. TANK (FINISHED)	RDB-175	1
42	CM9-BSM0299	YEL ZINC, GR. 10.9	M8 X 1.25 X 35 HHCS	4
43	BA9-PP2228	TANK LID GASKET		1
44	BA9-PP1138	SEALING WASHER	3/8" X 1"	4
45	CM9-BS0382	NPT PIPE PLUG	3/8"	1
46	BA9-PP0940	SOLENOID, 240V (CE MACHINES)		2
47	BA9-PP0345	NPTF STEEL REDUCER BUSHING	3/4 NPTM X 1/2	1

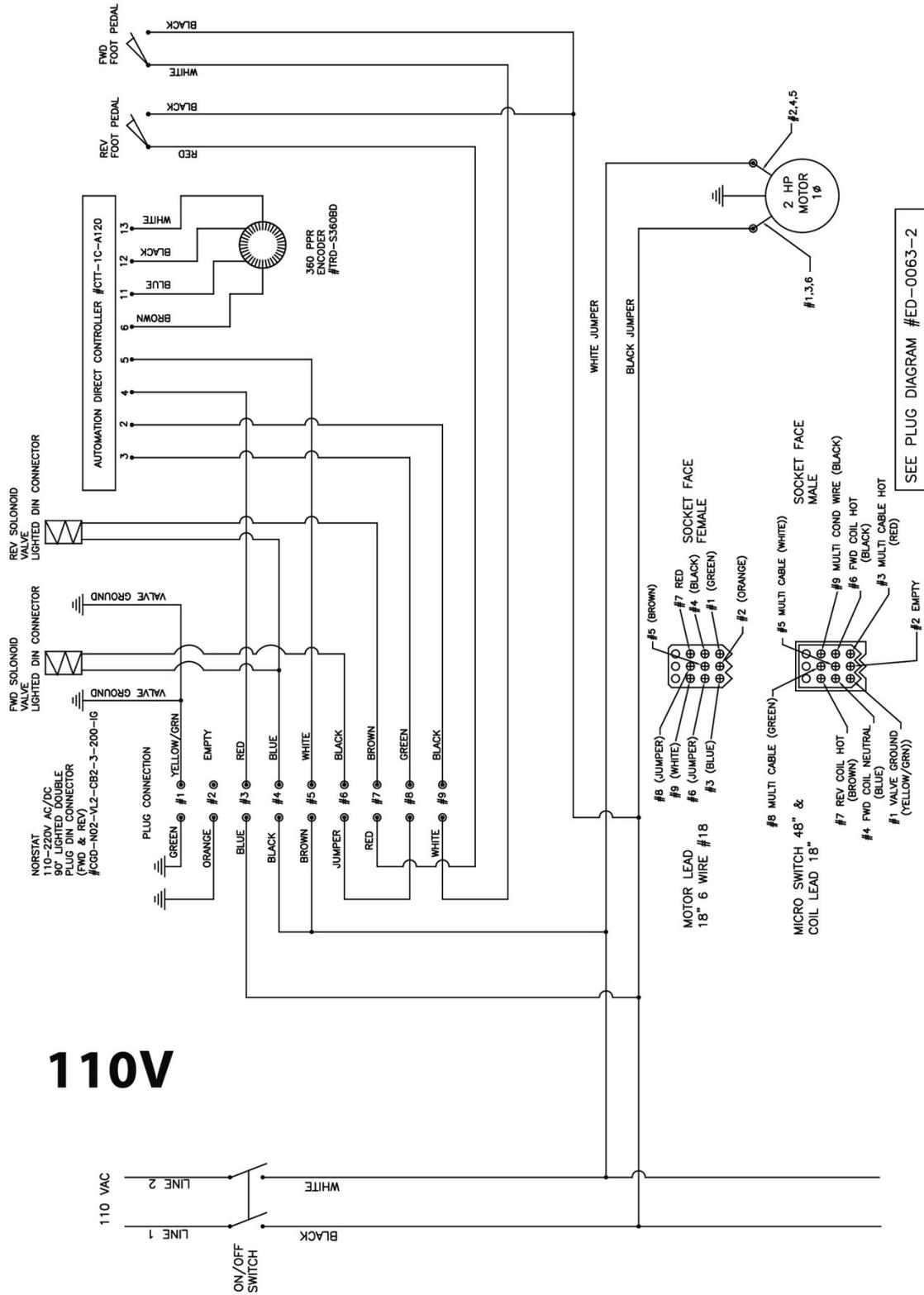
19.1.21 RDB-175 - Parts List

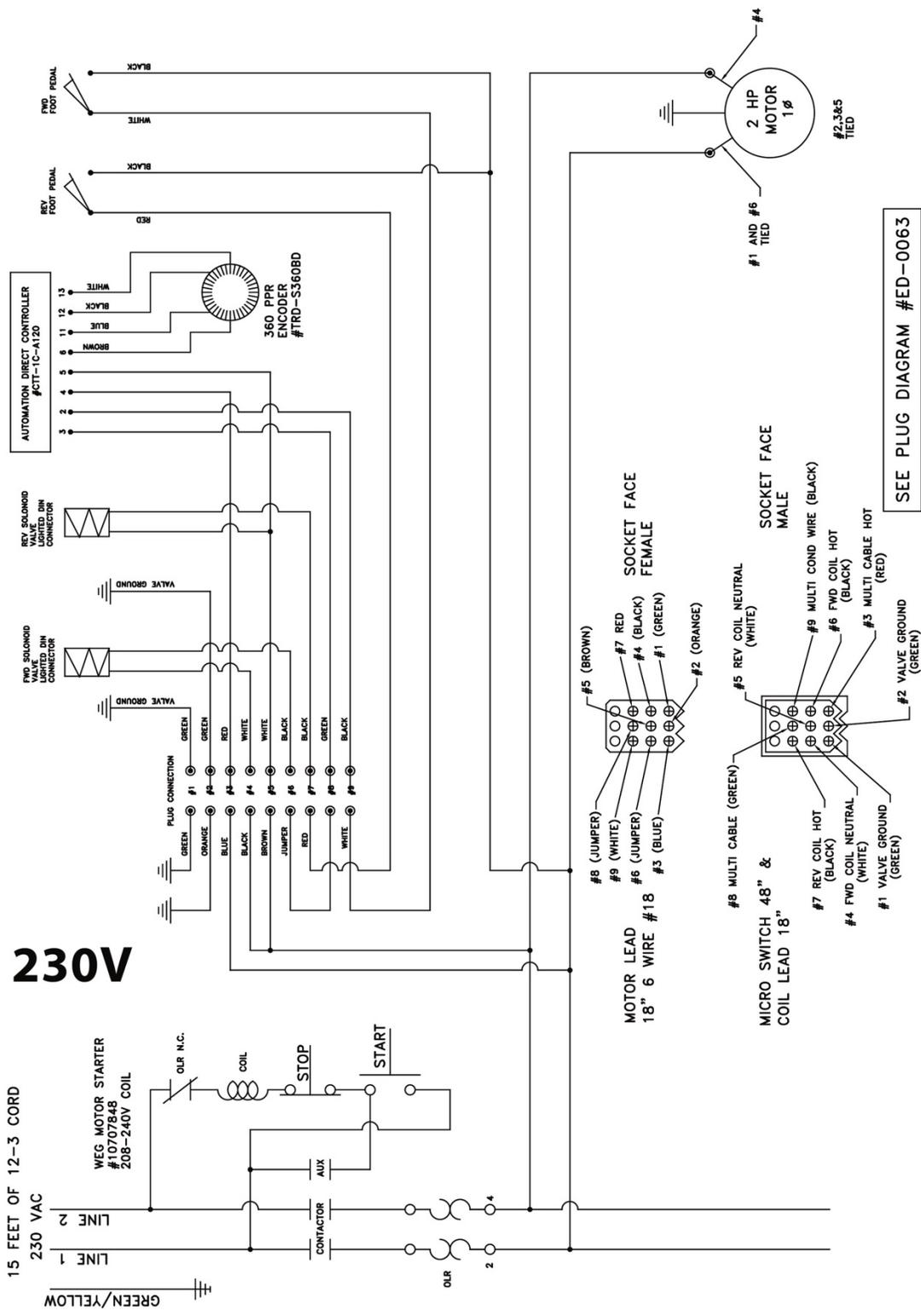
Index No.	Part No.	Description	Size	Qty.
1	BA9-M1505A007	MACHINE CART ASSEMBLY		1
2	BA9-PP1115	POWER UNIT	RDB-175	1
3	BA9-RDB-1756A016	RISER (YELLOW)		1
4	BA9-MEM1505A006	MAIN TUBE ASSEMBLY		1
5	CM9-BSM0199	EXTRA THK FLAT WASHER, SILV ZINC GR. 8.8	M10	4
6	BA9-PP1430	HEX KEY WRENCH	17MM	1
7	BA9-PP1494	SET SCREW COLLAR	20 MM	1
8	BA9-MERDB-1756A060	TUBE MOUNT		1
9	BA9-RDB-1757A007	PIVOT POST		1
10	BA9-PP0403	HYD. CYL ASSEMBLY	3" X 12"	2
11	CM9-BSM0130	CUP PT. SS, BLK OXIDE, GR. 12.9	M10 X 1.5 X 12	1
12	BA9-PP1343	CLEVIS PIN		3
13	BA9-PP1321	HAIRCLIP		6
14	CM9-BS0074	LOCK WASHER, SILV ZINC, GR. 5	3/8"	4
15	CM9-BS0114	SILV ZINC, GR. 5	3/8-16 X 3/4 HHCS	4
16	BA9-MERDB-1757A008	SWIVEL HUB		1
17	CM9-BSM0113	CUP PT SS, BLK OXIDE, GR. 12.9	M8 X 1.25 X 10	2
18	BA9-PP0935	THK BRZ WASHER	1" ID X 1-1/2" OD X 1/16"	1
19	CM9-BS0238	EXT. RETAINING RING, BLK OXIDE	1"	1
20	BA9-RDB-1756A058	PROGRAMMER BOX (RED LION CONTROLLER)		1
21	CM9-BS0079	FLAT WASHER, SILV ZINC, GR. 5	#10	1
22	CM9-BSM0143	SHCS, BLK OXIDE, GR. 12.9	M5 X 0.8 X 20	1
23	CM9-BSM0136	SHCS, BLK OXIDE, GR. 12.9	M20 X 2.5 X 180	1
24	CM9-BS0080	EXT. TOOTH LOCK WASHER, SILV ZINC, GR. 5	#10	6
25	CM9-BSM0131	NUT, SILV ZINC, GR. 8.8	M5 X 0.8 HEX	1
26	BA9-PP1293N	DIGITAL CONTROLLER		1
27	BA9-MERDB-1756A056	PIVOT BASE		1
28	BA9-RDB-1756A059	BOX COVER		1
29	CM9-BSM0132	PPHMS, SILV ZINC, GR. 8.8	M5 X 0.8 X 10	8
30	BA9-MERDB-1756A011	TOP PIVOT PLATE		1
31	BA9-M1507A014	TOP BUSHING		1
32	BA9-MEM1505A005	TORQUE ARM		1
33	BA9-M1506A019	DRIVE KEY		1
34	BA9-MERDB-1757A005	SPINDLE		1
35	BA9-PP1071	DOWEL PIN	3/4"	3
36	CM9-BSM0026	SHCS, BLK OXIDE, GR. 12.9	M12 X 1.75 X 50	2
37	BA9-MERDB-1756A004	TIE BAR (SHORT)		1
38	BA9-MERDB-1756A008	TIE BAR (LONG)		1
39	BA9-MEM1507A011	SPACER SHAFT (METRIC)		1
40	BA9-MERDB-1756A012	LOWER PIVOT PLATE		1
41	BA9-PP0295	FLG SLV BUSH	2" ID X 2-1/4" OD X 1" LG	1
42	BA9-PP0293	SPLIT CLAMP COLLAR	2"	1
43	CM9-BSM0157	BLK OXIDE, GR. 12.9	M16 X 2.0 X 35 SHCS	2
44	CM9-BSM0023	BLK OXIDE, GR. 12.9	M12 X 1.75 X 30 SHCS	10
45	BA9-RDB-1757A002	PIVOT PIN		1
46	BA9-RDB-1756A015	RATCHET LEVER		1
47	BA9-MERDB-1756A013	SPRING STOP		1

Index No.	Part No.	Description	Size	Qty.
48	CM9-BSM0137	BLK OXIDE, GR. 12.9	M6 X 1.0 X 20	
			CUP PT. SS	1
49	CM9-BSM0130	BLK OXIDE, GR. 12.9	M10 X 1.5 X 12	
			CUP PT. SS	1
50	CM9-BSM0003	BLK OXIDE, GR. 12.9	M6 X 1.0 X 25 SHCS	2
51	BA9-MERDB-1755A001	RATCHET QUICK RELEASE ASSY (METRIC)		1
52	BA9-MERDB-1756A009	SLIDE LOCK KEY		1
53	BA9-RDB-1757A004	CYLINDER PIN (LONG)		1
54	BA9-PP0035	SET SCREW COLLAR, SILVER ZINC	1"	3
55	BA9-M1505A001	QUICK RELEASE CASTING (SHORT)		1
56	BA9-M1507A013	QUICK RELEASE SHAFT		1
57	BA9-PP0133	BLACK BALL KNOB		1
58	BA9-RDB-1757A006	ENCODER ADAPTOR		1
59	BA9-RDB-1756A051	ENCODER BRACKET		1
60	BA9-PP1256	ENCODER		1
61	CM9-BSM0280	BLK OXIDE, GR. 12.9	M3 0.5 X 8 SHCS	3
62	BA9-PP1257	ENCODER COUPLING		1
63	CM9-BSM0138	BLK OXIDE, GR. 12.9	M6 X 1.0 X 12 BSHCS	2
64	BA9-PP0853	-8 TO -6 ELBOW		4
65	CM9-BSM0042	GR12.9, BLK OXIDE	M20 X 2.5 X 65 SHCS	1
66	BA9-MEM3007A003	CENTER PIN		1
67	CM9-BSM0150	BLK OXIDE, GR. 12.9	M20 X 2.5 X 120 SHCS	1
68	BA9-PP0795	COMPRESSION SPRING	1/2" X 1"	1
69	BA9-PP0750	LONG HYDRAULIC HOSE	24"	4
70	CM9-BSM0046	SILV ZINC, GR. 10.9	M6 X 1.0 X	
			20 HEX FLG	2
71	BA9-PP1297	ON/OFF SWITCH	M900 CE 230V	1
72	CM9-BSM0186	BLK OXIDE, GR. 12.9	M5 X 0.8 X 16 SHCS	4
73	BA9-PP0023	STRAIGHT CORD GRIP	5/16	8
74	BA9-PP1793	ROUND "CE" STICKER	3/4"	2
75	BA9-PP0737	TRIANGLE VOLTAGE STICKER	1-1/4"	4
76	BA9-PP0152	ON/OFF SWITCH (US MACHINE)		1
77	BA9-PP0411	CORD CLAMP ASSEMBLY	1/2"	2
78	BA9-PP2075	MOTOR STARTER (AUS.)	240V 50HZ	1
79	BA9-PP0020	STRAIGHT SEAL TIGHT CORD GRIP	(1/2")	1
80	CM9-BSM0166	FLG SCREW SILV ZINC, GR. 10.9	M8 X 1.25 X 16 HEX	4
81	CM9-BSM0058	FLG, SILV ZINC, GR. 10.9	M10 X 1.5 X 20 HEX	4
82	CM9-BSM0206	SER FLG HEX NUT, SILV ZINC, GR. 8.8	M10 X 1.5	4
83	BA9-PP0230	CAUTION: PINCH POINT STICKER	1.5 X 1.5	1
84	BA9-PP0260	"PROUDLY MADE IN USA" STICKER		1
85	BA9-PP1904	WARNING: READ MANUAL STICKER		1
86	BA9-PP2070	CAUTION: EAR & EYE PROTECTION STICKER		1
87	BA9-PP2260	WARNING: P65 CANCER STICKER		1
88	CM9-BS0328	PHILLIPS HEAD SHEET METAL SCREW	#8 X 1/2	1
89	BA9-PP1187	CORD CLAMP ASSEMBLY	3/4"	1
90	BA9-PP0474	CORD CLAMP LOCKNUT	3/4"	1
91	BA9-PP1143	FOOT PEDAL SWITCH (CE)		1
92	BA9-PP0227	STICKER, REVERSE		2
93	BA9-PP0228	STICKER, FORWARD		2
94	BA9-PP0174	NLYON CORD CLAMP	1/4"	1
95	BA9-PP1554	STICKER, RDB-175 RATCHET WARNING		1
96	BA9-PP0902	RDB-175 MOTOR WIRING HARNESS		1
97	BA9-PP1259	RDB-175 U.S. WIRING HARNESS		1
98	BA9-PP1557	RDB-175 C.E. WIRING HARNESS		1
99	CM9-BSM0132	SILV ZINC, GR. 5	M5 X 0.8 X 10 PPHMS	1
100	BA9-PP1154	RDB-175 PATENT STICKER		1
101	BA9-PP1503	TRIANGLE GEAR CRUSH HAND STICKER	1-1/2"	1
102	BA9-PP2095	BLANK ID TAG		1
103	BA9-PP0519	U.S. MOTOR CORD (12/3 AWG 28" LONG)		4

Index No.	Part No.	Description	Size	Qty.
104	BA9-PP0744	STICKER, CLOCKWISE ARROW		1
105	BA9-PP0745	STICKER, COUNTER-CLOCKWISE ARROW		1
106	BA9-PP1010	CE-HF MOTOR CORD (31" LONG 3G1.5)		2
107	BA9-PP0449	REDUCING WASHER	3/4 X 1/2	2
108	BA9-RP5007	E-STOP PENDANT V2 (SINGLE CONTACTOR)		1
109	BA9-PP0364	30A TWIST LOCK PLUG (M150-CAN)		1
110	BA9-PP0556	CSA MOTOR CORD (10-3 AWG 31" LONG)		2

20.0 Wiring Diagram





21.0 Warranty and Service

Thank you for your purchase of a machine from Baileigh Industrial. 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 an 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 an 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 an 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, (f) 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 Industrial issued RGA number PRIOR to returning any materials.
- Returned materials must be received at Baileigh Industrial 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 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 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



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