



OPERATOR'S MANUAL

Metal Working



ROLL BENDER

MODEL: R-M20-110 AND R-M20-220

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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, lightening, 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 sales@baileigh.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

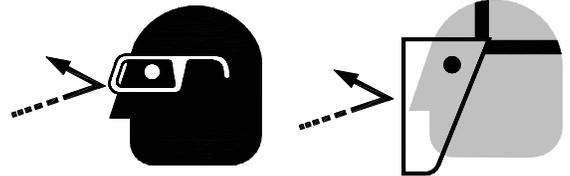


SAVE THESE INSTRUCTIONS.
Refer to them often and use them to instruct others.



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 ear muffs or earplugs to protect against objectionable or uncomfortable loud noises.



KEEP CLEAR OF MOVING OBJECTS

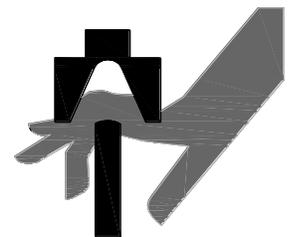
Always be aware of the position of the material as it is moving through the rolls. The material moves quickly and with some force causing serious body or head injuries.



BEWARE OF PINCH POINTS AND CRUSH HAZARD

Keep hands and fingers from between the roller 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.



CALIFORNIA PROPOSITION 65

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





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.



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 won't 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 machines 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 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.
11. **Use eye and ear protection.** Always wear ISO approved impact safety goggles. Wear a full-face shield if you are producing metal filings.
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. **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.
18. **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.
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. Inspect power and control cables periodically. Replace if damaged or bare wires are exposed. **Bare wiring can kill! DO NOT** touch live electrical components or parts.
22. **DO NOT** bypass or defeat any safety interlock systems.
23. Keep visitors a safe distance from the work area.



TECHNICAL SPECIFICATIONS

Driven Rolls	2
Pinch	Single
Shaft Center Distance Lower Rolls	10.88" (276mm)
Shaft Diameter	.78" (20mm)
Roll Diameter	3.38" (86mm)
Roll Adjustment	Manual (Upper Roll)
Roll Speed	12rpm
Round Tube Capacity	1" (.0625") Minimum Ø16" (25.4mm [1.6mm] Minimum Ø406mm)
Solid Round Capacity	0.5" Minimum Ø5" (12.7mm Minimum Ø127mm)
Pipe Capacity	0.5" (sch. 40) Minimum Ø14" (12.7mm [sch. 40] Minimum Ø355mm)
Square Capacity	1.25" Minimum Ø20" (31.75mm Minimum Ø508mm)
Square Tube Capacity	0.75" (.0625") Minimum Ø12" (19mm [1.6mm] Minimum Ø305mm)
Angle Iron Capacity	0.75" (.125") Minimum Ø10" (19mm [3.1mm] Minimum Ø254mm)
Flat Bar Easy Way	1.75" Minimum Ø12" (44.5mm Minimum Ø305mm)
Flat Bar Hard Way	1" Minimum Ø8" (25.4mm Minimum Ø203mm)
Power Requirements (Verify Model)	110V / 1Ph / 60hz 220V / 3Ph / 60hz
Shipping Weight	420lbs (190kg)
Shipping Dimensions	60" x 44" x 68" (1524 x 1118 x 1727mm)
Based on a material tensile strength of *64000 PSI (42 kg/mm ²) – mild steel **100000 PSI – stainless 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: sales@baileigh.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.



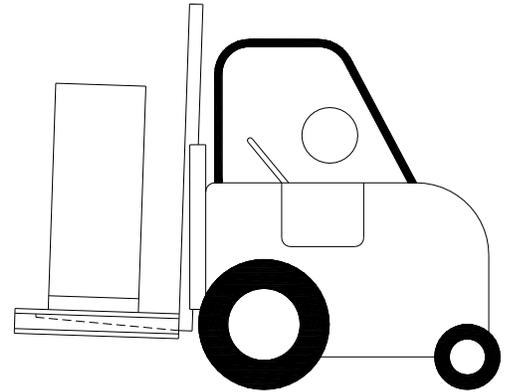


TRANSPORTING AND LIFTING

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.*

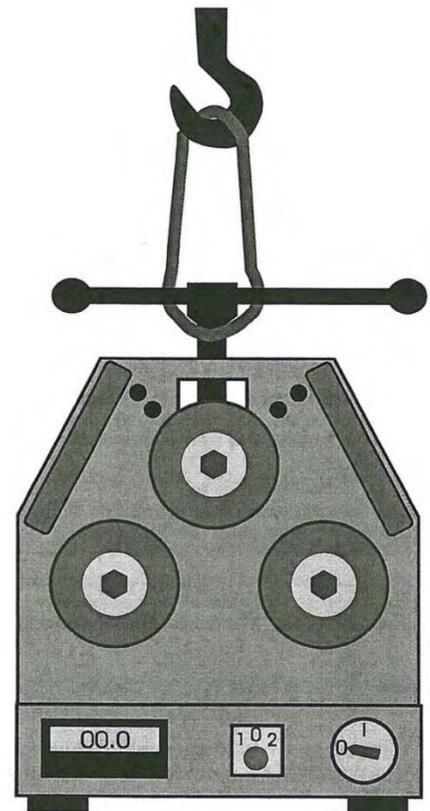
Follow these guidelines when lifting with truck or trolley:

- 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.



Follow these guidelines when lifting crane or hoist:

- Always lift and carry the machine with the lifting holes provided at the top of the machine.
- Use lift equipment such as straps, chains, capable of lifting 1.5 to 2 times the weight of the machine.
- Take proper precautions for handling and lifting.
- Check if the load is properly balanced by lifting it an inch or two.
- Lift the machine, avoiding sudden accelerations or quick changes of direction.
- Locate the machine where it is to be installed, then lower slowly until it touches the floor.





INSTALLATION

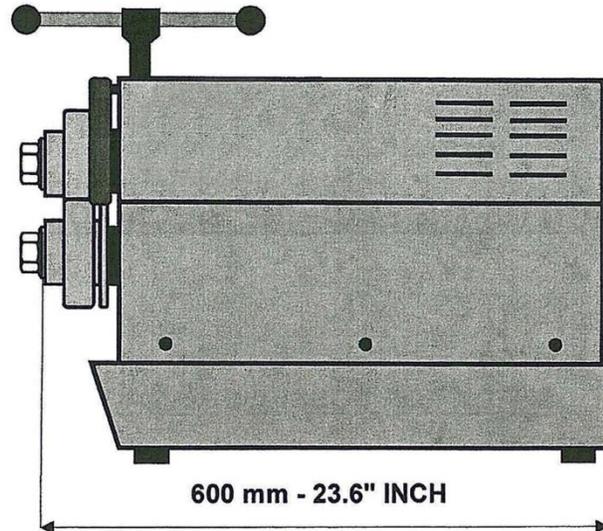
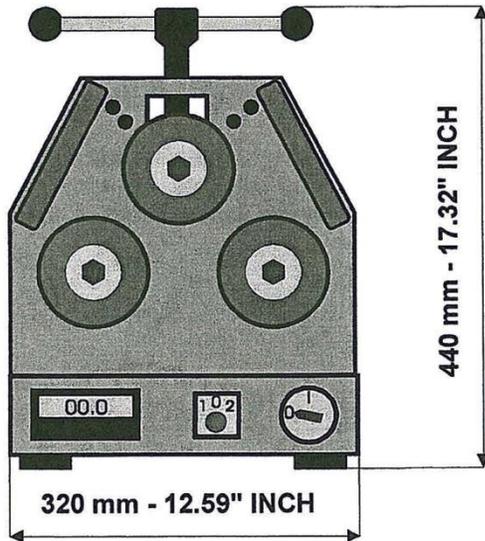
IMPORTANT:

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.



⚠ WARNING: ALL UNAUTHORIZED PERSONNEL MUST STAY BEYOND A DESIGNATED 3-FT (1 METER) SAFETY ZONE

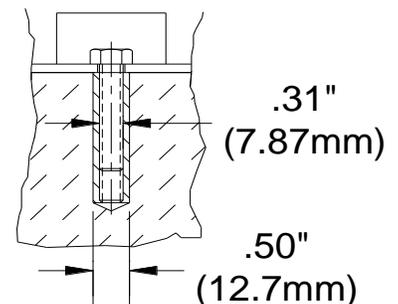


Operator Working Position Description

The R-M20 can be placed on a bench having the most comfortable height for the operator, (usually 30" ±2" [762mm ±51mm]). The best position for the operator to operate the machine, is the one which allows proper footing to maintain balance to allow for control of the work material and provides each reach and access to the operation controls, especially the STOP/EMERGENCY switch.

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.





GENERAL DESCRIPTION

The R-M20 is a 3 roll universal section bending machine designed to bend common small profiles.

- The use of special design rolls, permits the bending of many types of profiles according to its mechanical features and dimensions.
- The machine works with the two lower rolls having fixed positions and which are motorized for rotation.
- The lower rolls are knurled in order to assure the constant forward driving of the profile between the roll during bending.
- Rotational power to the lower rolls is transmitted through gears and a coaxial motor gearbox.
- The top roll is idle and is vertically adjustable (pyramidal design) to determine the requested bending radius of the profile.
- The vertical movement of the top roll is manual and obtained by means of an adjusting screw and its position is displayed on a digital readout.
- The main structure is in pantograph, bored and machined steel plates assembled with screws.
- All gears are in carbon steel and milled from solid stock.
- The standard set of rolls is in special steel alloy, heat treated and submitted to a surface hardening treatment.
- The main shafts and the motor shaft are in special steel alloy.



ELECTRICAL

⚠ WARNING: Baileigh Industrial Holdings LLC is not responsible for any damage caused by wiring up to an alternative 3-phase power source other than direct 3-phase. If you are using an alternate power source, consult a certified electrician or contact Baileigh Industrial Holdings LLC prior to energizing the machine.

⚠ 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

VERIFY YOUR SPECIFIC WIRING AND VOLTAGE.

Your machine is wired for either 110 volts or 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.

Extension Cord Safety

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

AMP RATING	LENGTH		
	25ft	50ft	100ft
1-12	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.

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.
5. Pressing the left foot pedal will cause the bottom rolls to rotate counterclockwise. Pressing the right foot pedal will cause the bottom rolls to rotate clockwise.

220V 3Phase Only - Check for correct rotation of the motor

6. If the bottom rolls do not rotate as described:
 - a. Disconnect power to the machine, and switch the L1 and L3 wires. DO NOT move the ground wire.
7. Retest roll rotation.

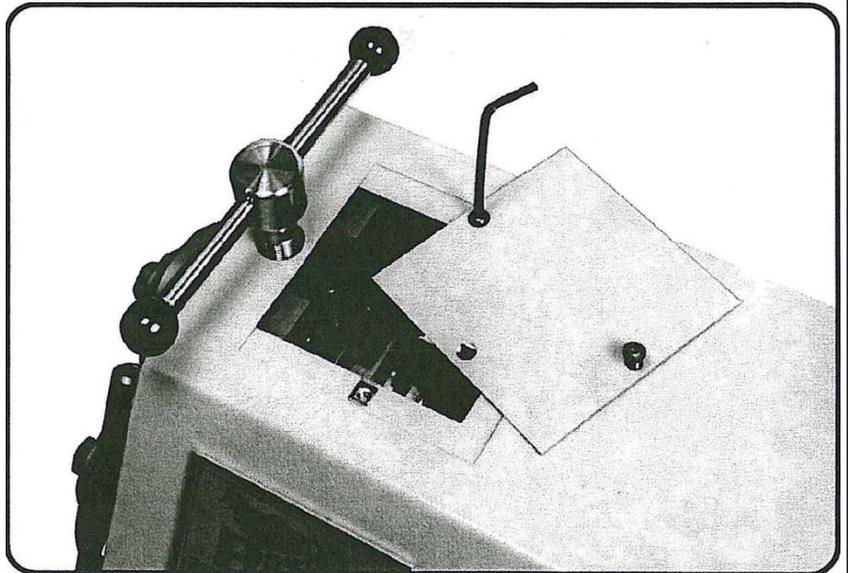


ADJUSTMENT OF SLIDE BLOCK-WAYS

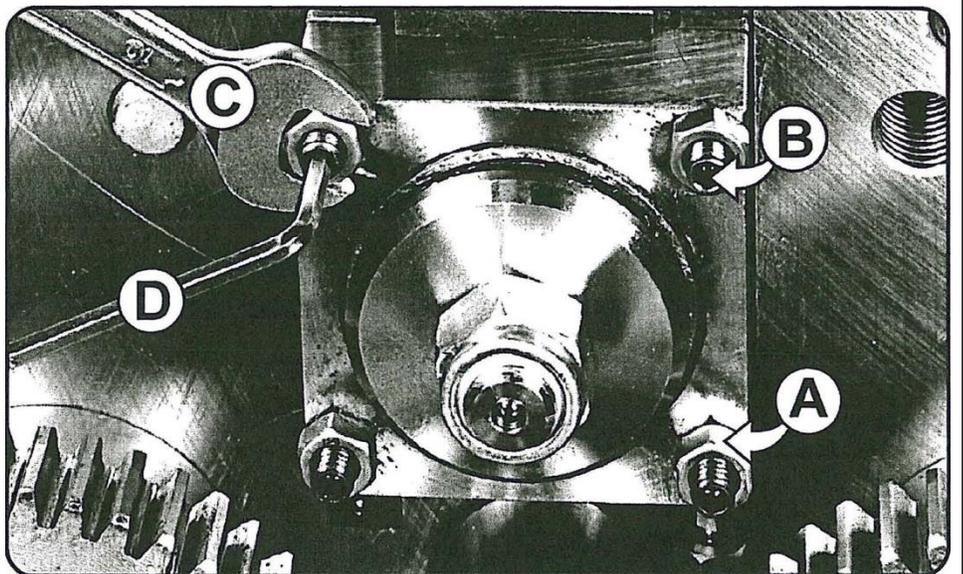
Whenever abnormal movement of the slide block is noticed or if play develops, it is necessary to perform the adjustment procedure as described below:

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

1. Disconnect and lockout power to the machine!
2. Remove the top cover from the machine.



3. Unscrew, with the wrench (C), the 4 lateral guides roll hexagonal locking nuts (A).
4. Tighten the 4 set dowels (B) and at the same time verify that the slide block is sliding homogeneously and smoothly.
5. Once the correct sliding is obtained, tighten the 4 locking nuts (A) to block the four set dowels.





USE OF THE IDLE ROLL LOCK PIN

On the R-M20 model, the feed of the profile to be bent, is obtained only through the two knurled lower rolls. The knurled surface of the lower rolls will assure the correct traction of the profile during bending operations to avoid any possible sliding.

Since the top roll is idle and free turning it may be necessary to halt its rotation when mounting or demounting the top roll components. To lock the rolls with the locking nut on the head of the shaft it is necessary to block the shaft rotation.

For this reason the machine has been equipped with a roll lock pin device.

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

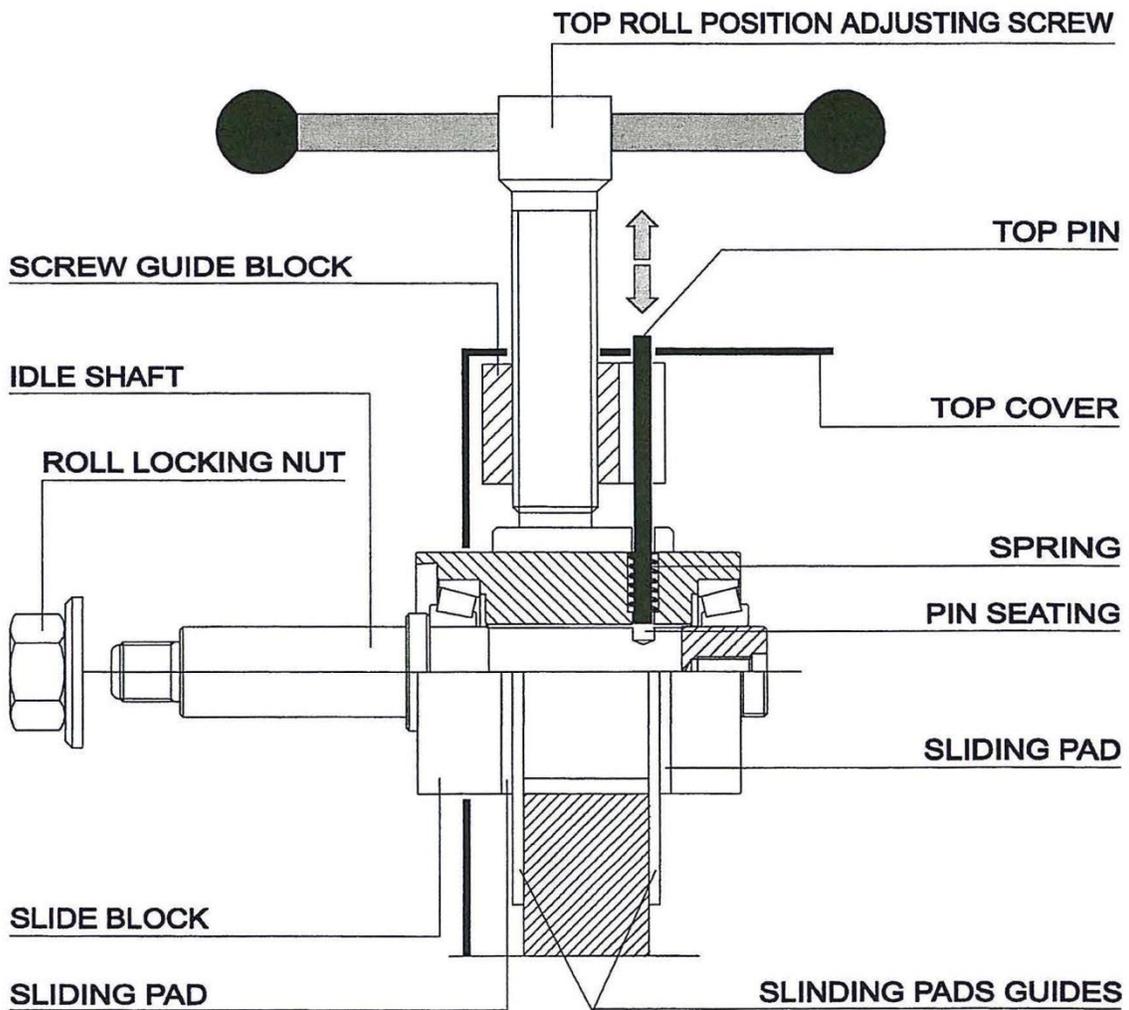
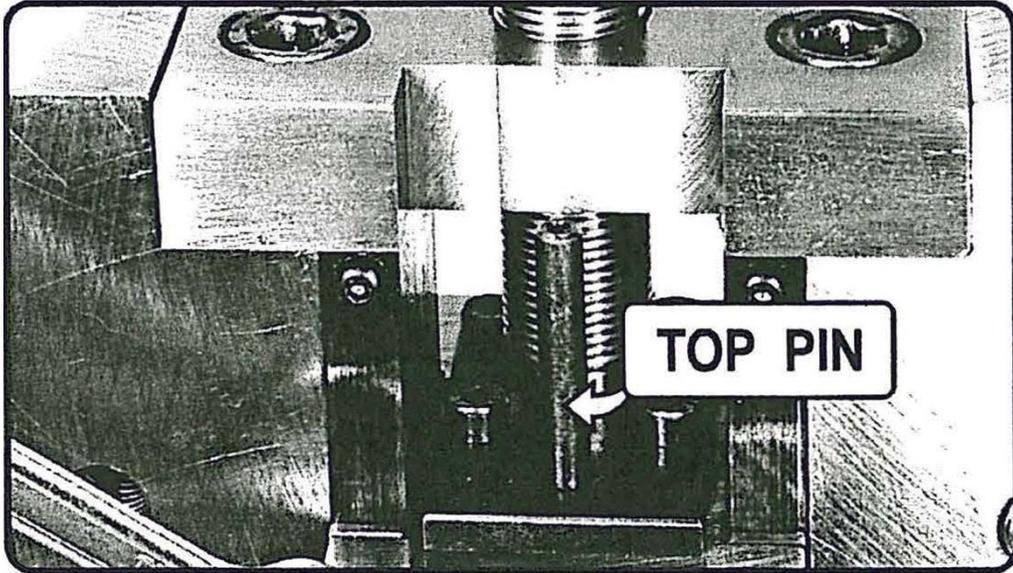
 **CAUTION:** Use of the top idle roll locking pin is required for roll installation and removal only. Using the machine with the roll locking pin inserted, could cause serious damages to the system.

To avoid any damage to the machine, we suggest you to carefully read the description of the necessary operation for the correct use of this device:

- By means of the top roll position adjusting screw, take the sliding block to its maximum top position so that the locking pin protrudes for 0.25" (5mm) from the top cover.
- With a finger, press the locking pin and with the wrench on the roll locking nut turn the idle shaft until the locking pin inserts in its seating on the idle shaft.
- Now the idle shaft is locked, thus it is possible to install/remove the rolls and so lock them with the roll locking nut.
- Once the rolls installation or removal operation is completed, release the locking pin.



IMPORTANT: Using small steps, turn alternatively clockwise and counterclockwise, and the idle shaft so to release the locking pin. This operation has to be repeated each time before operating the machine.





BENDING ALLOWANCE

To bend sheet metal accurately, you will need to consider the total length of each bend. This is referred to as bend allowance. Subtract the bend allowance from the sum of the outside dimensions of the workpiece to obtain the actual overall length or width of the piece. Because of differences in sheet metal hardness, and whether the bend is made with the grain or against it, exact allowances must sometimes be made by trial and error. However, bend allowances for general use can be obtained from metal working books or from the Internet.

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.



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 factors that control or influence the success of a bending operation.

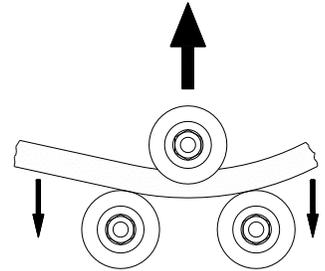
- Mechanical properties of the material being bent
- Thickness of the material to be bent
- Size of the inside bend radius
- Speed at which the bend occurs



- Grain direction of the steel to be bent
- Coefficient of friction
- Roller design

UNDERSTANDING SPRINGBACK

Spring back, 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 top roll is removed from the metal and the load is released, the work piece relaxes, forcing the bent portion of the metal to return slightly to its original shape. The key to obtaining the correct bend radius is to over bend the metal and allow it to spring back to the desired angle. All metals exhibit a certain amount of spring back.





OPERATING THE MACHINE

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

Keep hands and fingers clear of the rollers. Do not stand in line with the material to avoid getting hit during the bending operation.

When handling large heavy material make sure it is properly supported.

! IMPORTANT: You might not be able to roll some sections to the desired radius or diameter in one pass when nearing the maximum capacity of the machine. **Rolling in one pass could damage the machine and void the warranty.** It may take several repeat passes while gradually increasing the top roll position. If you have any questions or concerns contact Baileigh Industrial, Inc. at **920.684.4990**.

Control Panel Description

This machine is of simple use; all functions and operations are as following indicated:

Digital Display (A)

The machine is equipped with a digital display (A) which allows visualizing with decimal precision the top roll position. The display shows a reference value which correspond to the bending radius. This value is subject to the different mechanical features of each different profile or section type. This means that the value determined with a certain profile will be useful only for that particular profile and not for profiles with different shape or mechanical features. The digital display is set at the factory and should need no further adjustment.

Main Power Disconnect (B)

Input power is routed through the main disconnect (B) before it is passed on to the other electrical components. Turn the disconnect off to remove power to all but the incoming supply line. Turn power on to supply power to the machine for operation.





Emergency Stop Switch (C, D)

There are two Emergency Stop switches to stop the machine in the case of an unintended operation. Either switch will stop the machine's operation. One is located on the face of the control panel (C) and the other is located on the top of the operating pedestal (D). Simply press either switch to stop the machine. Twist the cap clockwise 1/8 turn to reset the switch. Resetting the switch will not restart the machine.

ON/OFF Switch (E)

The ON/OFF switch is used for normal operation of the bender to start and stop the bender motor. Press the top green button to start the motor and the bottom red button to stop the motor.

Foot Pedals (not shown)

The foot pedals are used to control the direction of the rollers and thereby the feed direction of the work material. When facing the front of the machine, the left foot pedal will cause the work piece to move through the rollers from right to left. When the right foot pedal is pressed, the work piece will move through the rollers from left to right.



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

⚠ 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.



MACHINE FUNCTIONING

The universal bending roll permits the production of rings using many different cross-sections and profiles and various material types. This is possible thanks to the pyramidal position of the 3 rolls, two of which (lower) serve as supports with fixed inter axis, and the third roll (superior) serves as the forming roll. To the linear movement of the superior roll toward the horizontal centerline of the lower rolls, is added a force to feed the profile among the rolls, which permits the production of rings. The feeding movement is guaranteed thanks to the knurled surface of the lower rolls motion of which is obtained by means of gears and worm screw gearbox.

The linear movement of the superior roll is manual and it is obtained through the adjusting screw on the top of the machine.

The position of the top roll with respect to the two lower rolls will determine the bending radius. This position is visualized on a digital display.

The other important element to obtain good bending result, is the composition of the roll set (shoulders and spacers) which has the function to hold and contrast any possible deformation of the profiles.

STANDARD SET OF ROLLS

With the R-M20 universal angle roll, is supplied one set of standard rolls designed to allow the operator to arrange compositions with different insertion thickness' and shoulders, suitable to bend the most common types of profiles (Flat bar on edge or on flat, square tubing, channels etc.).

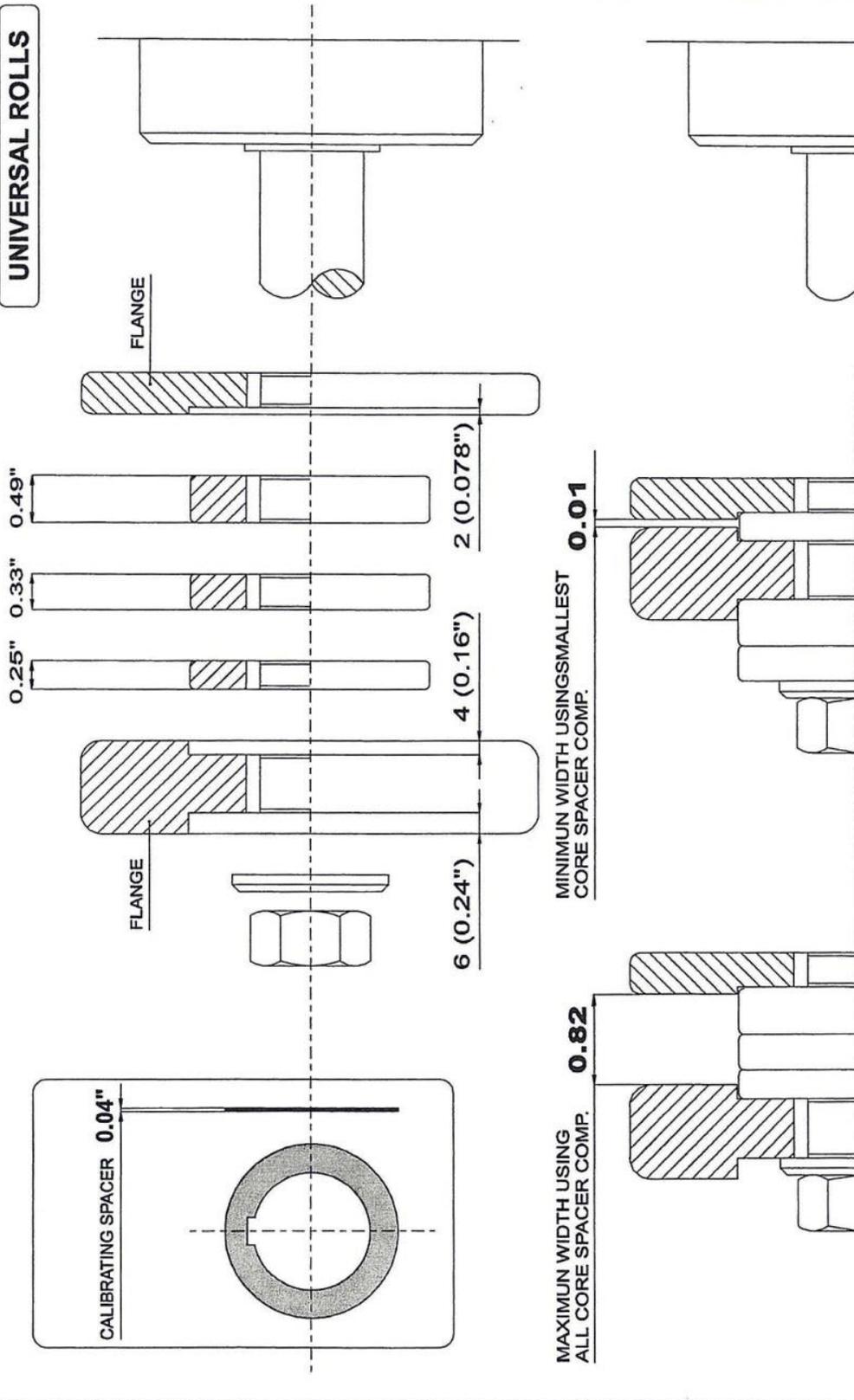
The standard set of rolls consists of a total of 15 pieces:

N°3	Flanges	(thin shoulders)	(0-2)
N°3	Flanges	(thick. shoulders)	(4-6)
N°3	Spacers		6, 3 mm. (1/4") thick.
N°3	Spacers		8, 3 mm. (32") thick.
N°3	Spacers		12, 3 mm. (48") thick.

All thicknesses have been calculated considering both the expansion and the compression of the profile during bending operation. The main technical feature of this type of rolls is to give the possibility to have, for each type of profile to be bent, a constant and rigid support always necessary to guarantee perfect profile planarity after bending.

For more details and information please refer to the capacity chart and to the following rolls composition examples.

UNIVERSAL ROLLS

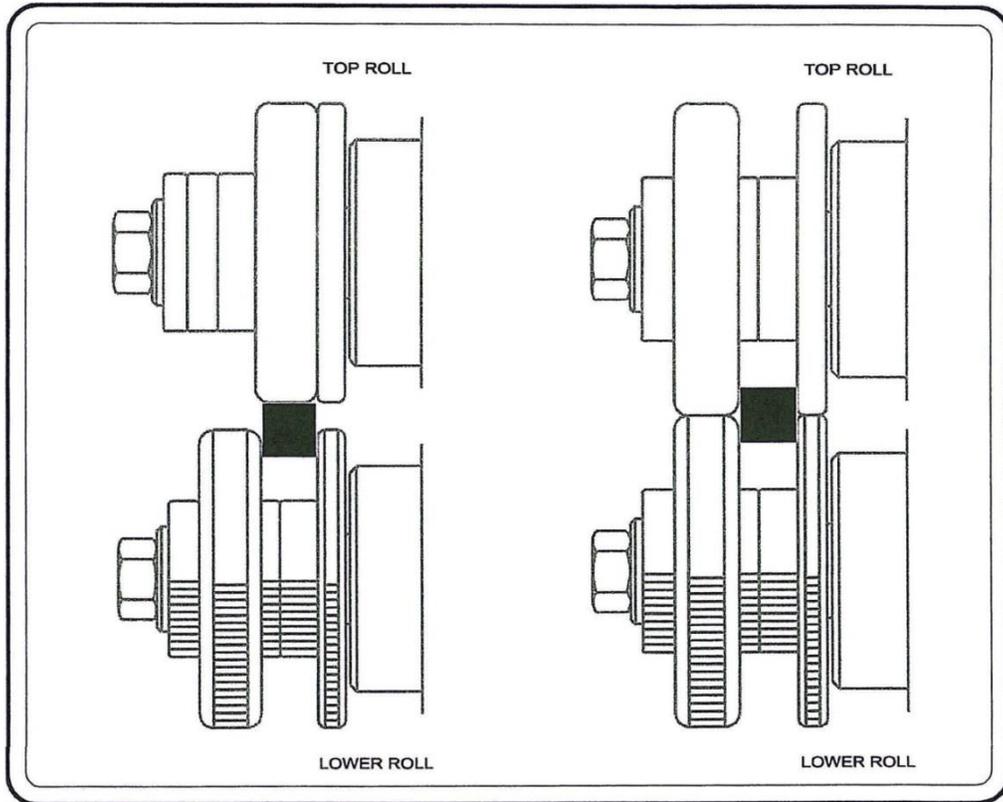
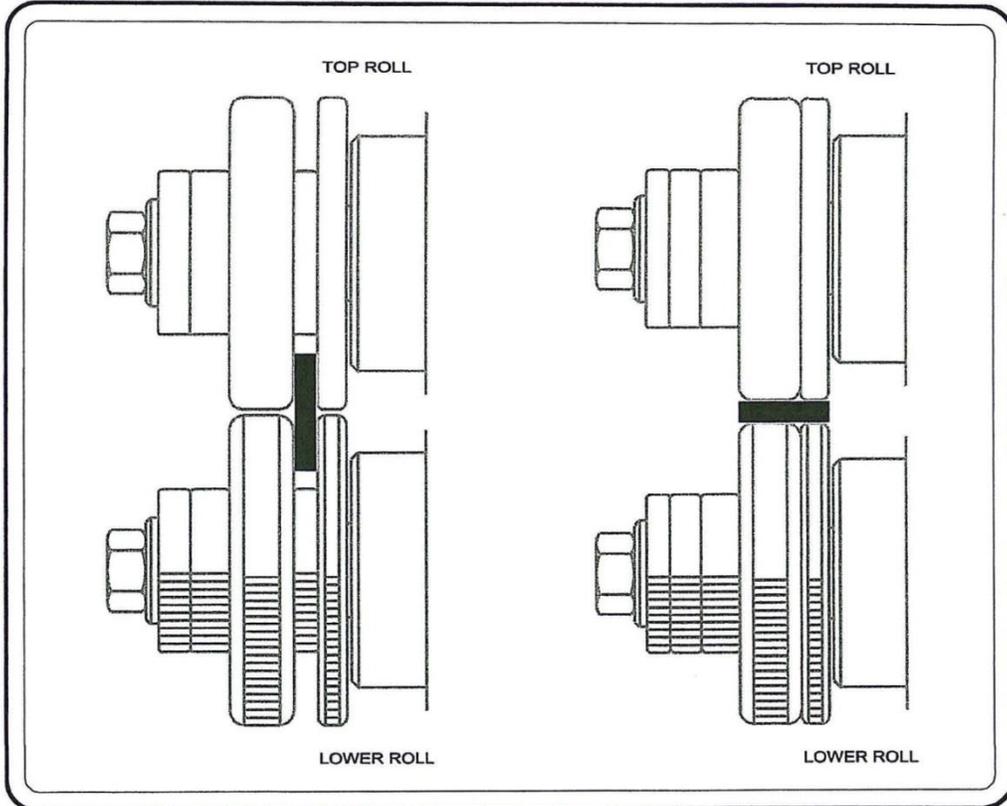


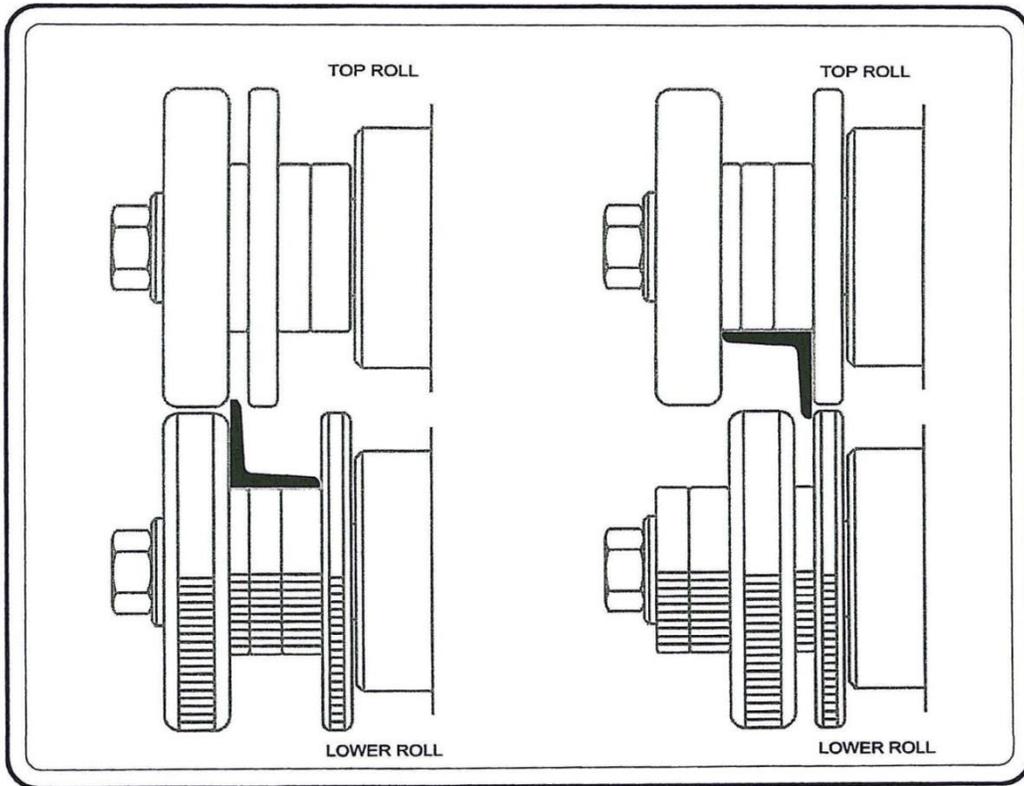
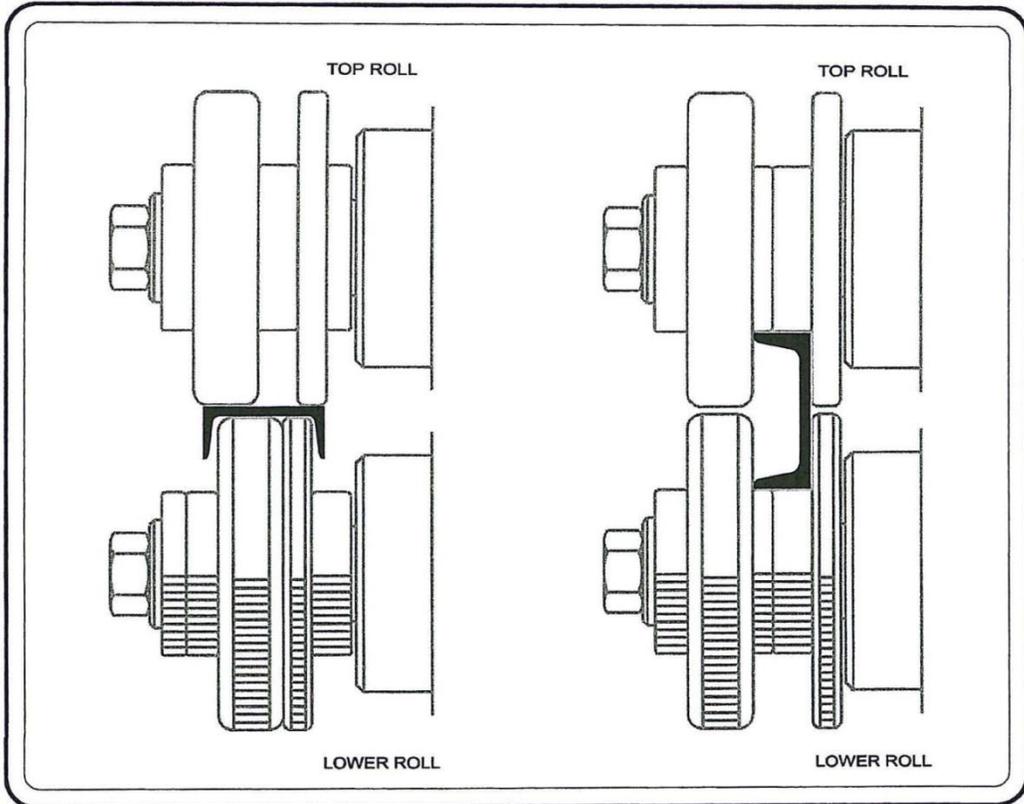
NOTE: IN CASES WHEN THE THROAT WIDTH (CALCULATING THE EXPANSION OF A PROFILE ON ITS COMPRESSION SURFACE DURING BENDING) BECOME TOO TIGHT, EXCESSIVE FRICTION BETWEEN THE PROFILE AND THE SHOULDER FLANGE SIDE WALLS MAY CAUSE THE DRIVE MOTOR OVERLOAD PROTECTIVE CIRCUITRY TO ENGAGE STOPPING ROTATION, USE THE ADDITIONAL SPACERS.

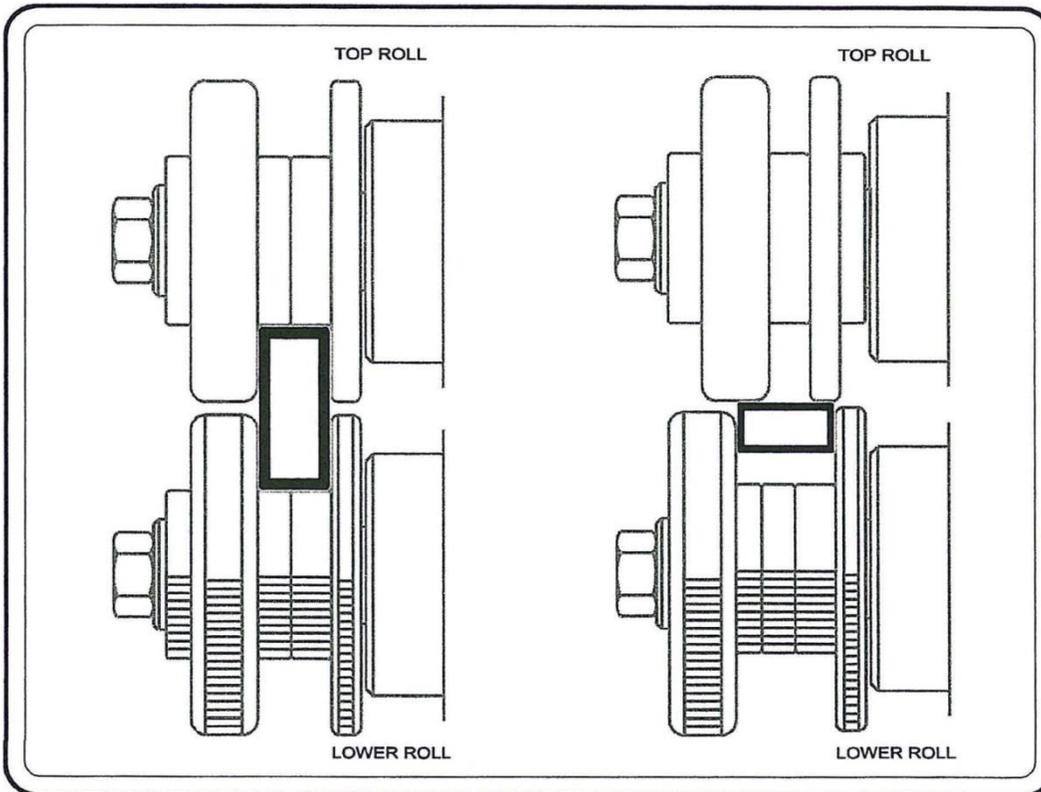
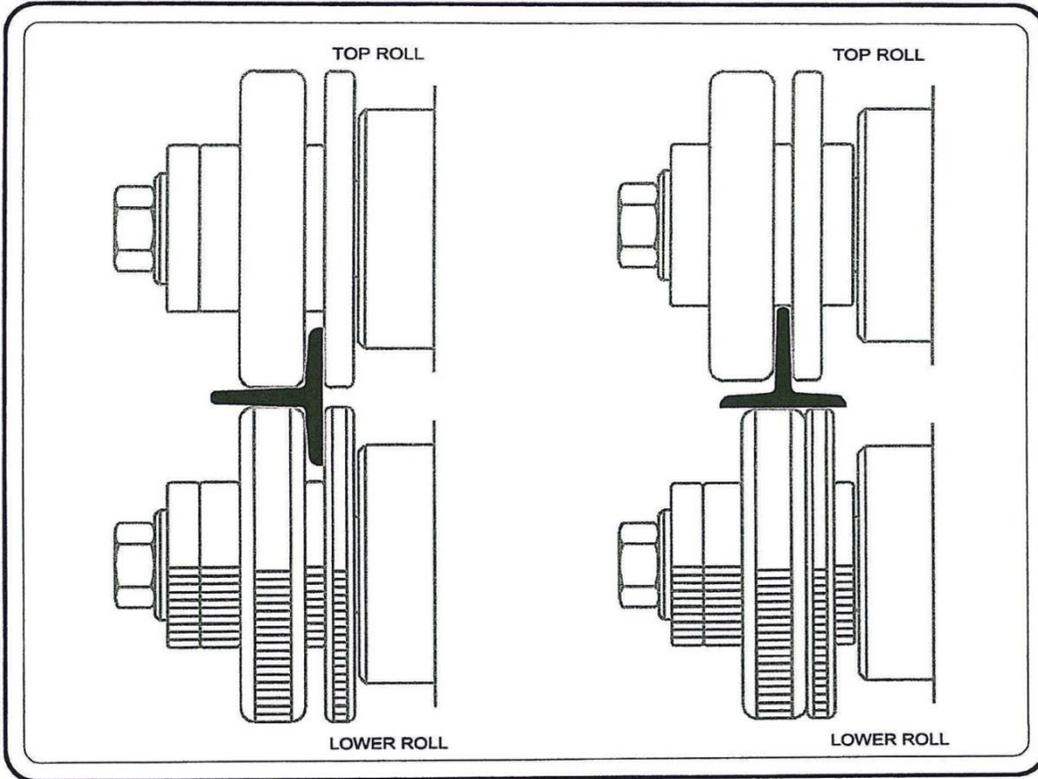


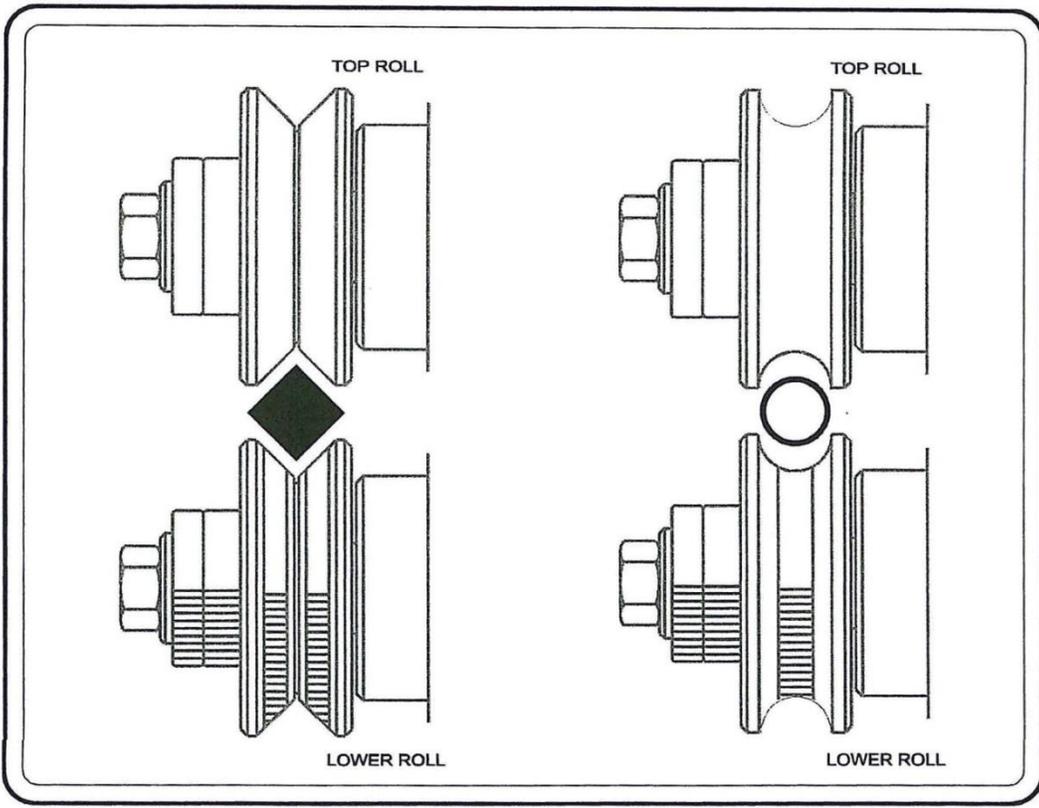
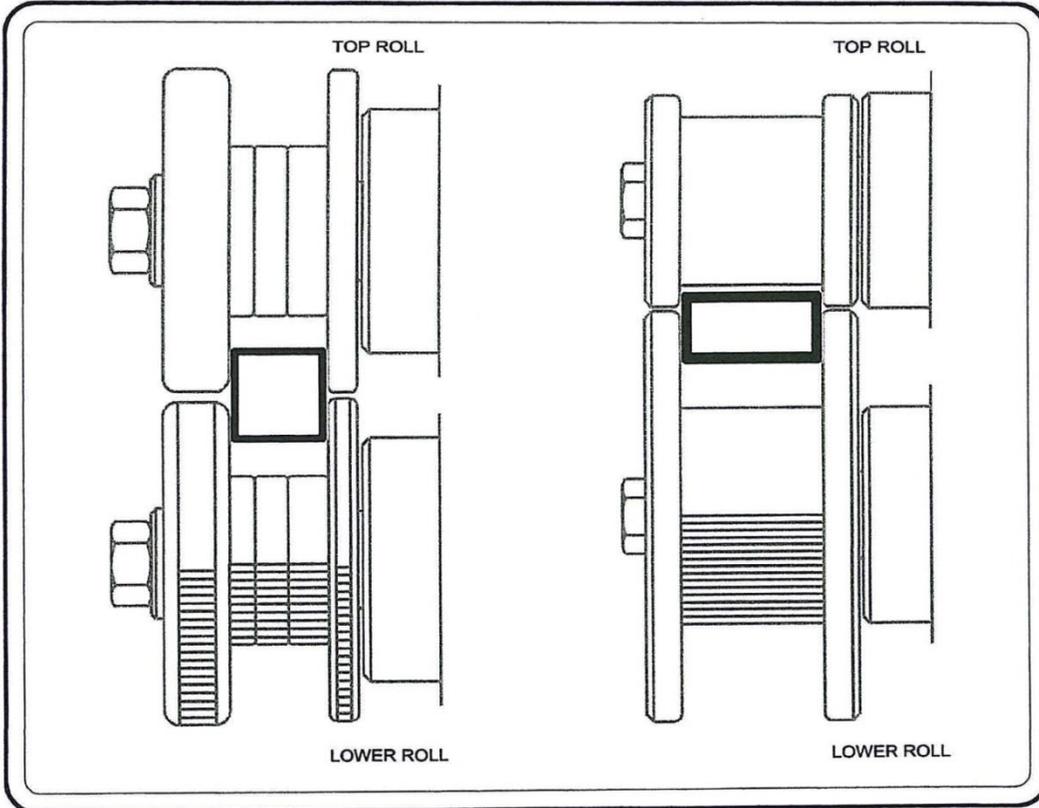
BENDING CAPACITY

REF	SECTION PROFILE	SIZE		MESURES		DIA INT. MIN.		
		MM		INCH		MM	INCH	
1		10 x 2 25 x 6		3/8 x 1 1/16 1 x 1/4		80 200	3 8	•
2		20 x 3 45 x 10		3/4 x 1/8 1 3/4 x 3/8		90 300	3 1/2 12	
3		12		1/2		110	4 1/2	•
4		20 x 20 x 1,5		3/4 x 3/4 x 1/16		250	10	
5		30 x 10 x 1,5		1 1/8 x 3/8 x 1/16		300	12	
6		15 x 15 x 3 25 x 25 x 4		5/8 x 5/8 x 1/8 1 x 1 x 1/8		100 200	4 8	
7		15 x 15 x 3 25 x 25 x 4		5/8 x 5/8 x 1/8 1 x 1 x 1/8		100 200	4 8	
8		25 x 12 x 1,5 30 x 15 x 4		1 x 1/2 x 1/16 1 1/8 x 5/8 x 5/32		140 250	5 1/2 10	
9		30 x 15 x 4		1 1/8 x 5/8 x 5/32		250	10	•
10		12		1/2		120	5	SPECIAL ROLLS
11		10 x 1,5 3/4 GAS		3/8 x 1/16 1 1/16		80 400	3 16	
12		30 x 1,5		1 1/8 x 1/16		400	16	
13		20 x 20 x 4		3/4 x 3/4 x 1/8		150	6	
14		20 x 20 x 4		3/4 x 3/4 x 1/8		200	8	











LATERAL GUIDE ROLLS

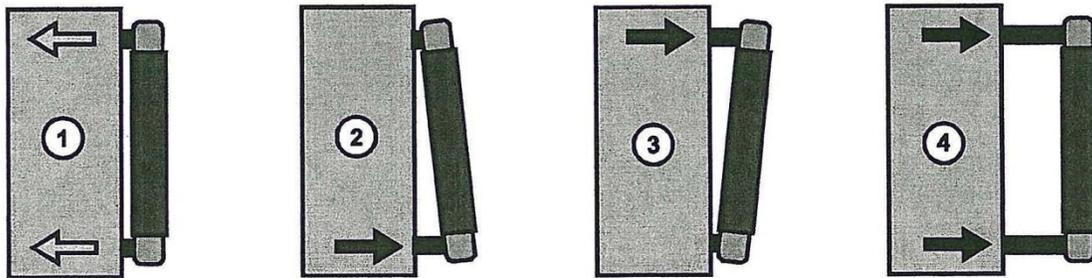
Use of the lateral guide rolls (side straighteners) is necessary whenever the profile to be bent, has the tendency to twist or to spring out of shape under bending stresses. This behavior, typical for box-type profiles with "Z" or "L" shape, is easily avoidable, by opposing this mechanical tendency. Adjustable shoulders which function to maintain the profile in correct position are located besides the rolls. These lateral guides can also be used for other functions such as the production of spirals and coils. See Below.

PRODUCTION OF SPIRALS OR SERPENTINES is a common operation especially when using tubing or solid bars, round or square, where the spiral pitch must be equal to two or more times the diameter/width of the tube/square itself.

This operation is possible by using only one guide roll, acting on the adjusting screws. The greater the pressure applied against the profile (tube), the greater the spiral pitch will be.

For the correction of deformation during the production of small diameters, the machine has been equipped with 3 different lateral guide positions to bring the surface of the guide closer to the top roll of the machine.

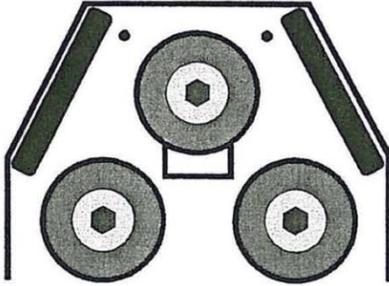
MAXIMUM LATERAL GUIDE ROLL INCLINATION = 4°



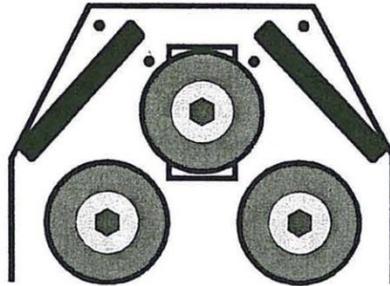
IMPORTANT: Whenever use of the lateral guides is not required, position them so as to avoid interference with the profile movement during bending.



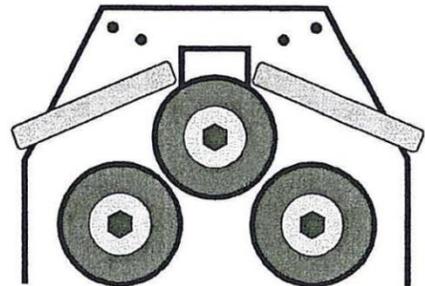
LATERAL GUIDE ADJUSTMENT



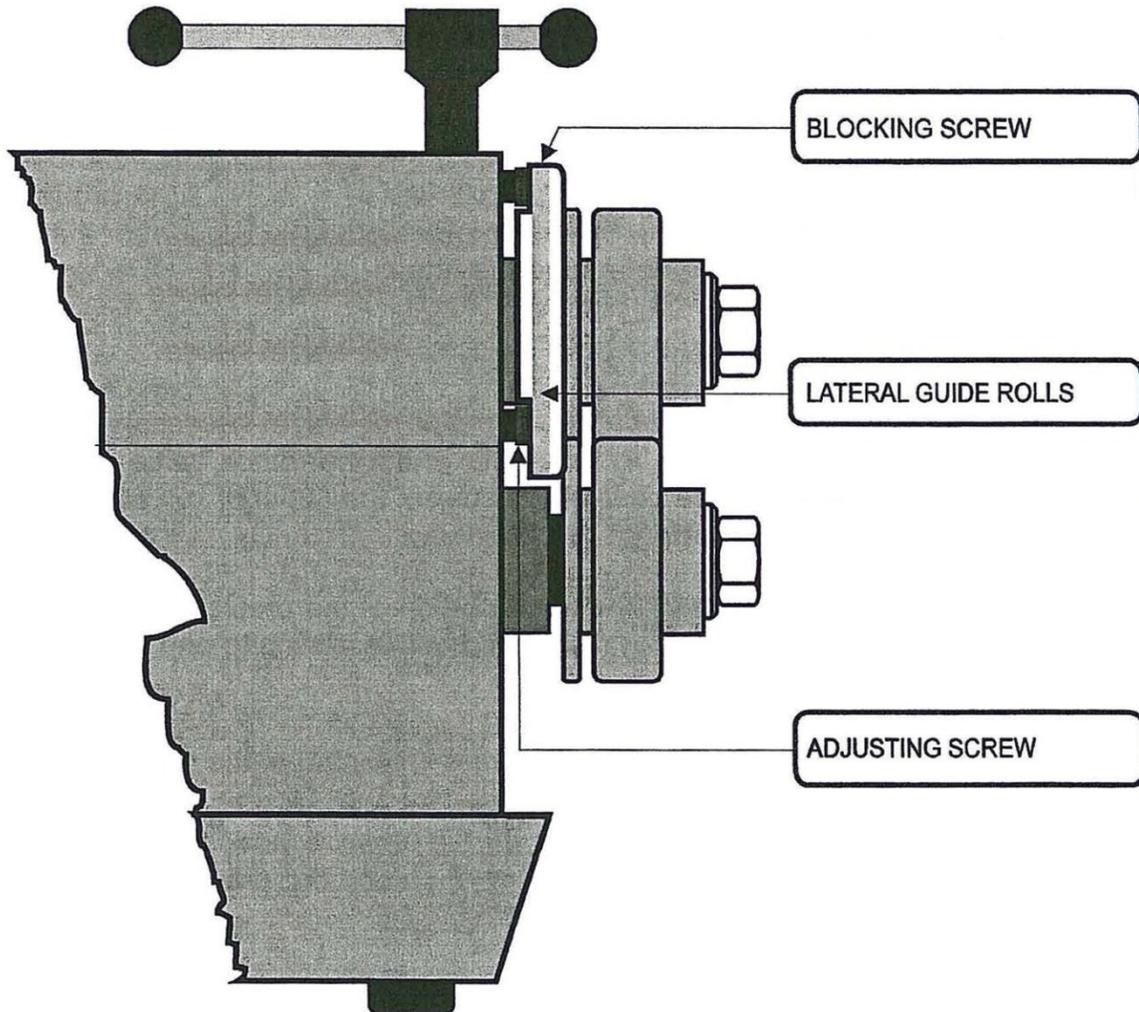
POSITION A



POSITION B



POSITION C





BENDING TECHNIQUES

The first operation necessary for profile bending is the choice and assembly of the proper set of rolls. For standard profile bending, refer to the rolls composition examples described in this instruction manual; for special profile bending, it will be necessary to use a properly designed roll set.



ATTENTION: The linear movement of the superior roll, obtained through the positioning screw, **MUST NOT BE USED TO DEFORM THE MATERIAL** thus, in order to bend the profile you must follow step by step the bending phases here under indicated:

Once the proper roll set is mounted it will be possible to begin the bending operation:

1. Insert the profile and then bring the superior roll in contact with the profile.
2. With the rotation sense selector, rotate the rolls in order to back the profile to the minimum pinching position. Now, after having set selector in neutral position (0) to determine the rotation arrest, lower the top roll until the profile contacts the lower roll, but **WITHOUT FORCING THIS OPERATION**.
3. At this stage we have set, most probably, a superior roll height necessary to bend the profile. It will be an operator duty, to take note of the reference value displayed on the digital display, so that will be possible to correct the superior roll position should the desired final bending diameter not be obtained.

! IMPORTANT: During bending operations, the material inserted between the rolls is submitted to a compression load. This compression causes its thickness to expand at the point of contact with considerable friction against the shoulder rolls.

The spacers of the standard set of rolls have been designed considering this friction and thus are of proper widths. It is anyway possible that the forces involved can cause an improper rotation of the motorized shafts and possibly a complete motor lock up:

Absolutely avoid keeping the motor in lock up since this will cause a serious damage.

If this occurs; immediately stop the machine and mount, between shoulders and spacers. The aluminum calibrating washer 1mm thick, supplied with the machine. So as to facilitate the sliding of the profile.



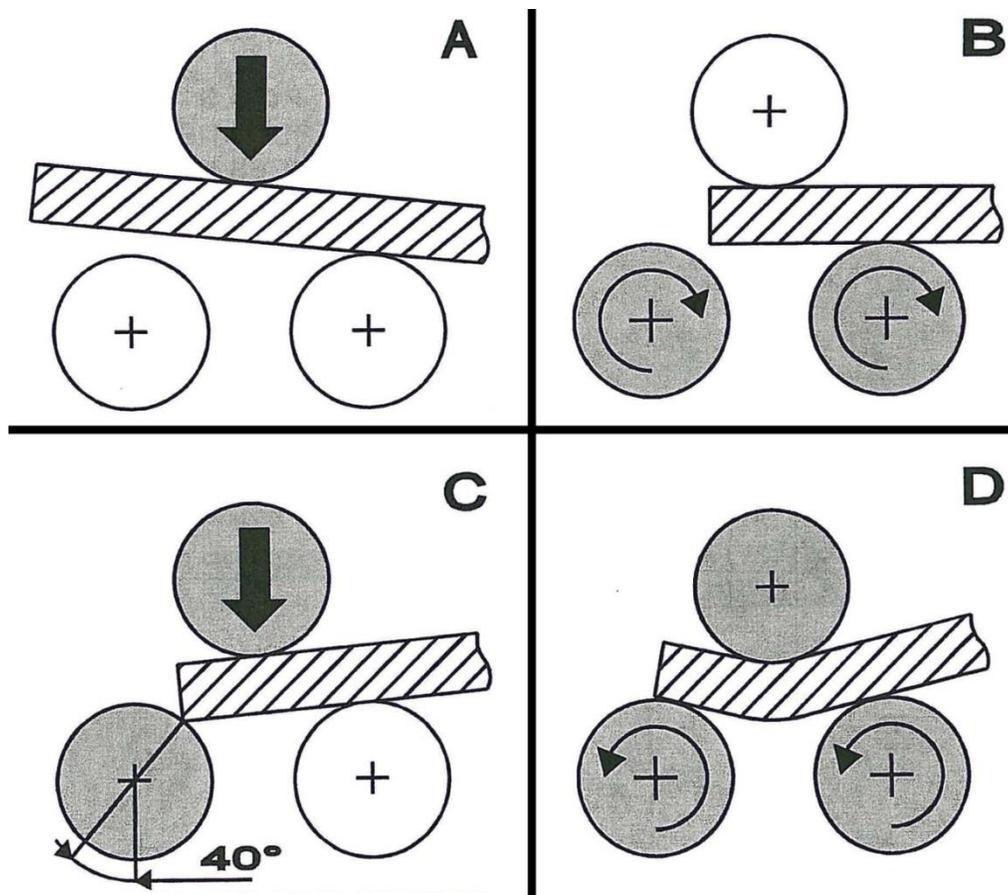
Start rolls rotation and proceed to bend one short portion of the profile circa 200mm (8"); check the bending radius and act according to one of the following hypotheses:

- A) The radius is correct: proceed with bending on the full length of the profile.
- B) The radius is too large: repeat the steps as per point 2 and, by considering the previous value indicated on the digital display, increase the position of the superior roll to reduce the bending radius.
- C) The third hypothesis, to obtain a tighter radius than the one requested, has to be avoided because it is extremely hard to straighten up the material after that it has been already bent. In order to avoid this condition, we suggest, for the first bending of a new profile shape, to proceed with small increments of the superior roll.



IMPORTANT: During sampling phase for serial production, the final position of the superior roll reached to deform the material in one or more passes to determine the requested bending diameter, will be different from the position reached to obtain the same diameter in only one pass.

The final position of the top roll to bend a certain profile to a certain diameter. Will depend from the number of passes.





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.

Regularly inspect, clean, and re-lubricate the moving parts of the machine. Gears, threaded shafts, and bearings should be greased once a month with Shell Alvania R3 or equivalent grease. Also check that all nuts and bolts are properly tightened.

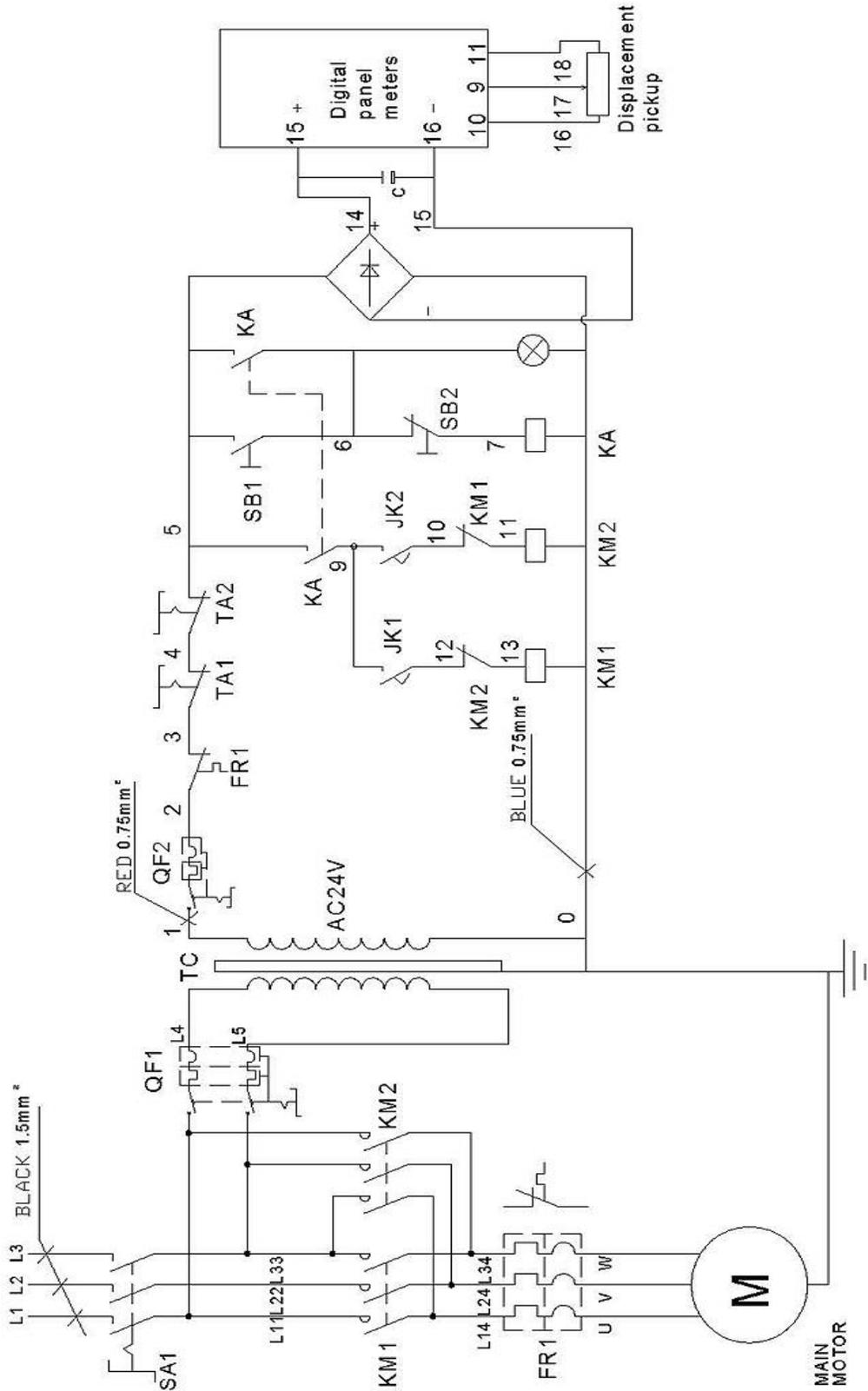
Many different profiles, pipes, and tubes can be bent with your Baileigh R-H65 hydraulically powered roll bender. To achieve consistent results you must also use good quality materials. Find a reputable steel distributor in your area to supply all your steel needs.



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

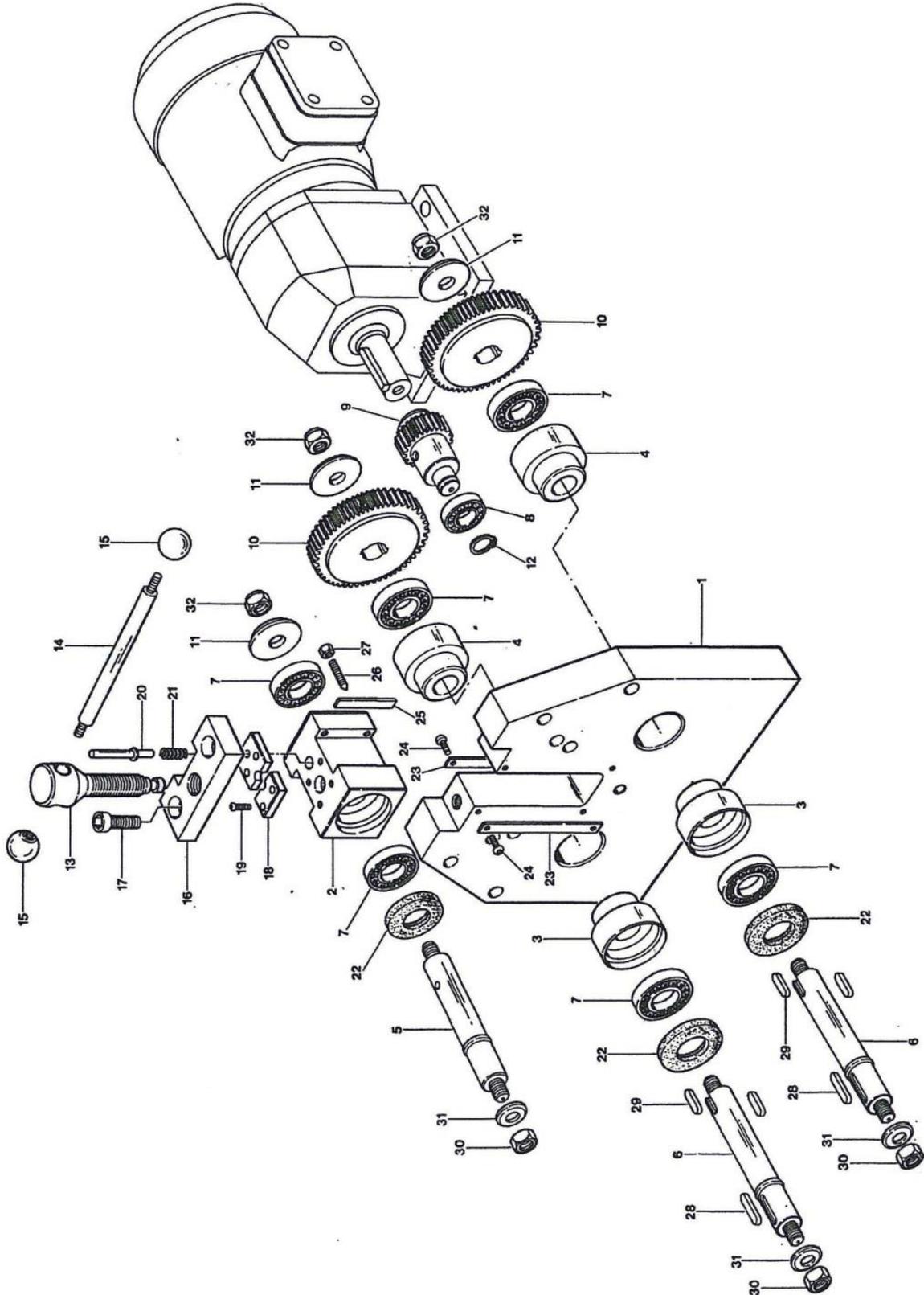


ELECTRICAL SCHEMATIC – 220V, 3Ph





DRIVE TRAIN PARTS DIAGRAM - A





Drive Train Parts List – A

Item	Part No.	Description
1	RM20-A1	Front Plate
2	RM20-A2	Forming Block
3	RM20-A3	Bearing Journal Front
4	RM20-A4	Bearing Journal Rear
5	RM20-5	Upper Shaft
6	RM20-6	Lower Shaft
7	RM20-7	Tapper Roller Bearing 30204, 20ID x 47OD x 15.25mm
8	RM20-A8	Pinion Gear Bearing 6002 2RS
9	RM20-A9	Motor Shaft/Pinion
10	RM20-10	Lateral Spur Gear
11	RM20-A11	Washer
12	RM20-A12	Lock Ring 15mm
13	RM20-A13	Forming Block Adjusting Screw
14	RM20-A14	Lever
15	RM20-A15	Lever End Balls, GAMM 25mm M8 PB
16	RM20-A16	Top Plate
17	RM20-A17	Screw
18	RM20-A18	Screw Support Plate
19	RM20-A19	Screw
20	RM20-A20	Upper Roll Rotation Lock Pin
21	RM20-A21	Spring
22	RM20-A22	Cover, MM 25 x 52 x 7
23	RM20-A23	Slider Guide
24	RM20-A24	Screw
25	RM20-A25	Rear Slider
26	RM20-A26	Dowel
27	RM20-A27	Nut
28	RM20-A28	Roll Key 6 x 6 x 36mm
29	RM20-A29	Gear Key 6 x 6 x 18mm
30	RM20-A30	Rolls Lock Nut
31	RM20-A31	Rolls Washer
32	RM20-A32	Nut

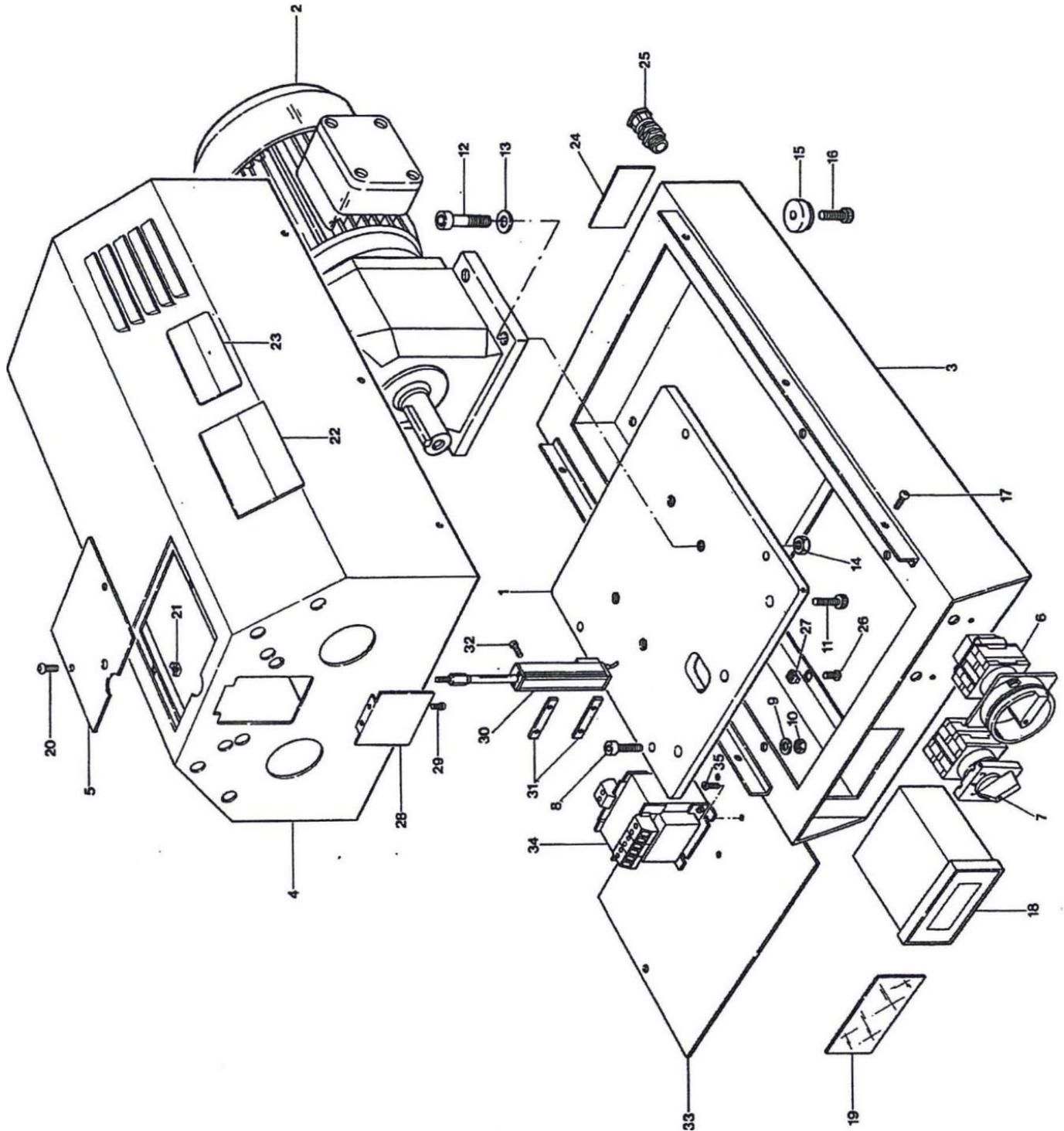


Rolls and Lateral Guide Rolls Parts List – B

Item	Part No.	Description
1	RM20-B1	Lateral Guide Roll
2	RM20-B2	Lateral Guide Roll Adjusting Screw
3	RM20-B3	Screw
4	RM20-B4	Knurled Roll 4 - 6 Thick = 17mm 0.67"
5	RM20-B5	Knurled Roll 0 - 2 Thick = 8mm 0.31"
6	RM20-B6	Knurled Spacer Thick = 6, 3mm 0.24"
7	RM20-B7	Knurled Spacer Thick = 8, 3mm 0.32"
8	RM20-B8	Knurled Spacer Thick = 12, 3mm 0.48"
9	RM20-B9	Smooth Roll 4-6 Thick = 17mm 0.67"
10	RM20-B10	Smooth Roll 0 - 2 Thick = 8mm 0.31"
11	RM20-B11	Smooth Spacer Thick = 6, 3mm 0.24"
12	RM20-B12	Smooth Spacer Thick = 8, 3mm 0.32"
13	RM20-B13	Smooth Spacer Thick = 12, 3mm 0.48"



FRAME AND CABINET PARTS DIAGRAM





Frame and Cabinet Parts List

Item	Part No.	Description
1	RM20-C1	Base Plate
2	RM20-C2	Motor Reducer C202P 43.3S1B3
	RM20-C2-Seal	Oil Seal SKF CRW1 35 x 62 x 8mm 13970
	RM20-C2-Seal-A	Oil Seal NQK TC 35 x 62 x 8mm
	RM20-MOTOR	110V Single phase motor
	RM20-MOTOR-220V	220V Three phase motor
3	RM20-C3	Base Frame
4	RM20-4	Machine Cover
5	RM20-C5	Service Plate
6	RM20-C6	Main Power Switch T0-2-1/EA/SVB
7	RM20-C7	Roll Rotation Direction Selector Switch
8	RM20-C8	Screw
9	RM20-C9	Serrated Washer
10	RM20-C10	Nut
11	RM20-C11	Screw
12	RM20-C12	Screw
13	RM20-C13	Washer
14	RM20-C14	Nut
15	RM20-C15	Support Foot
16	RM20-C16	Screw
17	RM20-C17	Screw
18	RM20-C18	Digital Display
19	RM20-C19	Digital Display Front
20	RM20-C20	Screw
21	RM20-C21	Clip Nut 6mm
22	RM20-C22	Information Plate
23	RM20-C23	Information Plate
24	RM20-C24	Information Plate
25	RM20-C25	Power Cable Pass Through
26	RM20-C26	Screw
27	RM20-C27	Clip Nut 6mm
28	RM20-C28	Slide Block Protective Cover
29	RM20-C29	Screw



Item	Part No.	Description
30	RM20-C30	Linear Transducer
31	RM20-C31	Linear Transducer Mounting Spacers
32	RM20-C32	Screw
33	RM20-C33	Electrical Service Plate
34	RM20-C34	Transformer 3GHXNX~30VA
35	RM20-C35	Screw

NOTES



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