

LK-20

OPERATOR'S MANUAL

PITTSBURGH LOCK MODEL 20

WITH AUTO-GUIDE POWER FLANGING ATTACHMENT
INSTRUCTIONS AND PARTS DIAGRAM



VER. US. LK20-02
11-2005


LOCKFORMER

A PRODUCT OF

FORMTEK
More Productive Metalforming Solutions

WARNING

THIS EQUIPMENT IS DESIGNED TO BE OPERATED WITH ALL COVERS SECURED IN PLACE. OPERATION WITHOUT THESE SAFEGUARDS MAY RESULT IN CONDITIONS WHICH ARE HAZARDOUS TO THE OPERATOR AND OBSERVERS.

SAFETY GUIDELINES

Before operating the machine, study and follow the safety precautions in this section. These precautions are intended to prevent injury to you and your fellow workers. They cannot, however, cover all possible situations. Therefore, EXERCISE EXTREME CAUTION and use COMMON SENSE before performing any procedure or operation.

Safety Precautions BEFORE Starting The Machine(s)

Only one person should control the machine(s). Never allow anyone to operate the controls while you are operating or working on this equipment. In addition to disconnecting power **always use lock outs and tagouts** to prevent accidental start-up when performing maintenance procedures.

Keep your hands away from internal workings of the machinery when starting, running or stopping.

Keep your work area clean. Remove all scrap, oil spills, rags, tools and other loose items that could cause you to slip, trip and fall.

When cleaning the machine or any of its components, do not use toxic or flammable substances. Do not perform any cleaning while the equipment is running.

Never override or disable any safety switch or safety interlock.

If so equipped, make sure that hydraulic and pneumatic pressures are at specified levels before operating this equipment.

Do not operate the rollformer unless all covers and guards are in place.

Be sure that this Instruction Manual is kept near the machine so the operator can refer to it when necessary.

Keep this equipment properly maintained.

Always turn off power to the machine(s) at the main disconnect before performing any maintenance or adjustments so accidental start-up or electrocution cannot occur.

Safety Precautions WHILE Operating The Machine(s)

Never leave the work area while the equipment is in operation.

Never leave the machine unattended while it is under power or in operation.

Always be alert while operating machinery.

Be alert for loose, worn or broken parts. Do not attempt to operate any machinery with such parts present or if the machinery is making unusual noises or actions.

Avoid skin contact, prolonged breathing, or eye exposure to any stock lubrication fluid being used.

Be aware of the locations of the **Power Off** or **Emergency Stop** button in case of an emergency.

Be sure all guards and covers are in place.

Continually observe the rollforming process and related equipment. If any unusual condition develops, immediately stop and inspect the machine.

Protect yourself ! Wear safety glasses. Do not wear loose clothing, neckties, or jewelry. If long sleeves must be worn, avoid loose cuffs and buttons. Tie back and contain long hair.

Never adjust any roll feature or perform work near the rolls, gears or power take off while they are running.

General

If any pneumatic or hydraulic feature is used, disconnect the main supply and exhaust pressure and bleed the lines to prevent cycling on retained pressure.

Always shut off the power at the main disconnect switch before entering the electrical control box.

Do not use compressed air to clean the machines. Air pressure may drive dirt and small chips into the machine(s) bearing surfaces or cause bodily injury.

IMPORTANT The information contained herein is to be use as a general guide only. For further safety information obtain and read the ANSI bulletin entitled: **ANSI B11.12-1996 Rollforming and Roll-Bending Machines safety Requirements for Construction, Care and Use.**

**CONTACT: American National Standards Institute
11 West 42nd Street
New York, New York 10036**

WARRANTY

Our warranty on the products we manufacture is limited to repair or replacement without charge, of any part found to be defective in materials or workmanship. This warranty is for a period of one year (unless otherwise specified) from the date of shipment from our factory, for all mechanical features of the machine except purchased components that carry the warranty of the original manufacturer.

This warranty is conditioned on proper installation, maintenance and use of the equipment. The warranty will be void if the equipment is subjected to misuse or abused or if used beyond the standards in this manual, including material dimensions and gauge.

Warranty parts and components will be shipped freight collect from FORMTEK. If the defective part has not been returned to FORMTEK within 15 working days after receiving the replacement part, your company will be responsible for the cost of replacement.

The warranty provided in this clause is in lieu of all other warranties, express or implied, arising by law or otherwise, including the implied warranties of merchantability and fitness for a particular purpose which are hereby disclaimed by FORMTEK and excluded from this agreement. This warranty shall not be modified for any reason. In no event shall FORMTEK be liable for consequential or incidental damages, including the cost of assembly or disassembly, lost production or personal injury.



CAUTION

To provide clarity to points in question the illustrations and photos appearing in this manual are shown with covers and guards removed.

NEVER OPERATE THIS EQUIPMENT UNLESS ALL COVERS AND GUARDS ARE IN PLACE.

The information in this document has been reviewed and is believed to be complete and accurate. No responsibility is assumed for minor inaccuracies or content not addressed in this manual. Furthermore, FORMTEK reserves the right to make changes to any products herein, at any time, to improve reliability, function, or design. FORMTEK does not assume any liabilities arising out of any use of any product described herein, nor does it convey any license under its trade secrets or patent rights nor the rights of others.

SAFETY FIRST

Common sense and **extreme** care must be used at all times during the operation and maintenance of this equipment. It is important that ALL personnel who will operate, maintain, or supervise the use of this equipment, read and understand the sections of this manual concerning **SAFETY** and the **OPERATION** of the equipment.

The equipment described in this manual was designed and manufactured for a specific function. It should not be used for any other purpose or outside of the design specifications as this may result in damage to the equipment and/or injury to the operator. Modifications or additions to this equipment should not be made. Any such modifications or additions will void the warranty and may subject the operator to injury.

Replacement and maintenance parts must be purchased from FORMTEK or the component original equipment manufacturer. Use of other parts may result in unsafe operation or failure of the machinery. If there is a question to the suitability of a part, proper personnel FORMTEK should be consulted.

In general, every piece of equipment must be treated with extreme care. While operating or maintaining this equipment, each individual must be aware of their own safety as well as the safety of all bystanders.

SAFETY SIGN-OFF SHEET

It is the employer's responsibility to instruct all persons who may come in contact with this equipment on the safe operation and maintenance of this equipment. If a language barrier or other restriction limits understanding, this manual can be read to the individual with appropriate follow up questions to verify understanding. Have each individual sign below only after demonstrating their understanding of the safety practices described in this manual.

I verify that I have read and understand the safety and operation sections for this equipment:

NAME	DATE	NAME	DATE

SAFETY GUIDELINES



You are **NOT** ready to operate this equipment if you have not read and understood all of the safety information in this manual.



WARNING:

Do not wear loose clothing, neckties, improper gloves, or jewelry while operating this machine. If long sleeves must be worn, avoid loose cuffs or buttons, Tie back or contain long hair.

Wear proper gloves to prevent lacerations caused by sharp edges of stock as it travels through the forming operation.

Never operate this equipment unless all covers and guards are properly installed.

Be alert for loose, worn, or broken parts. Never operate this equipment unless it is in good working condition.

As the stock enters the guides and feeds into the rolls, a pinch point is created as the stock advances. Keep hands clear of area and all pinch points.

Always disconnect the main power supply power and install lock outs using a lockout / tagout procedure when making adjustments or repairs.

When transporting, take into consideration that the machine is top heavy and may suddenly tip over. The machine is designed for fixed installations and are not intended for portability.

Remember that the information contained in this manual is only a portion of an adequate training program. It must be coupled with specific instructions for your application along with full information of national and local safety regulations that may apply.

INSTALLATION

Provide a clean, flat, well lighted installation site. Level the machine and anchor it to the floor. Inspect the gears and drive assembly, and remove any debris that may have accumulated during shipping.

ELECTRICALS

Standard electricals: motor 2H.P. (1.5KW).
110 volts, 1 phase. Grounded power supply. Provide a 110 volt receptacle at the point of operation. If a 230 or 3 phase motor is ordered install the power supply in compliance with local and national electrical codes. For further information, contact a certified electrician or the FORMTEK Service Department(contact information at www.formtekinc.com).

* Electrical specifications (voltages) are specific to each region or territory.

CAPACITY

Maximum 1mm thickness (20 Gauge) black iron mild steel and Galvanized steel.

MATERIAL ALLOWANCE: = 25mm, 1"

- (1) 25mm (1"), female PITTSBURGH
- (2) 6mm (1/4")90 degree (MALE)

Total amount of material (25mm Female PITTSBURGH + 6mm MALE)=31mm.

(1" Female PITTSBURGH + 1/4" MALE)= 1-1/4"

This allowance to be added for the seam formed sections for calculation of sheet sizes. The above dimensions can be modified by moving the entrance gauge position to suit the requirements of a specific project or material.

Note: The machine has been tested and adjusted at the factory on 0.6mm (26ga) through 1mm (20 ga) thickness material and as delivered is ready for normal operation.



Female PITTSBURGH



90 degree (MALE)

OPERATING INSTRUCTIONS

BASIC OPERATION

Hold the material against the entrance gauge and slide it into the forming rolls. Be sure that the material remains against the gauge until the trail edge of material is engaged in the rolls.

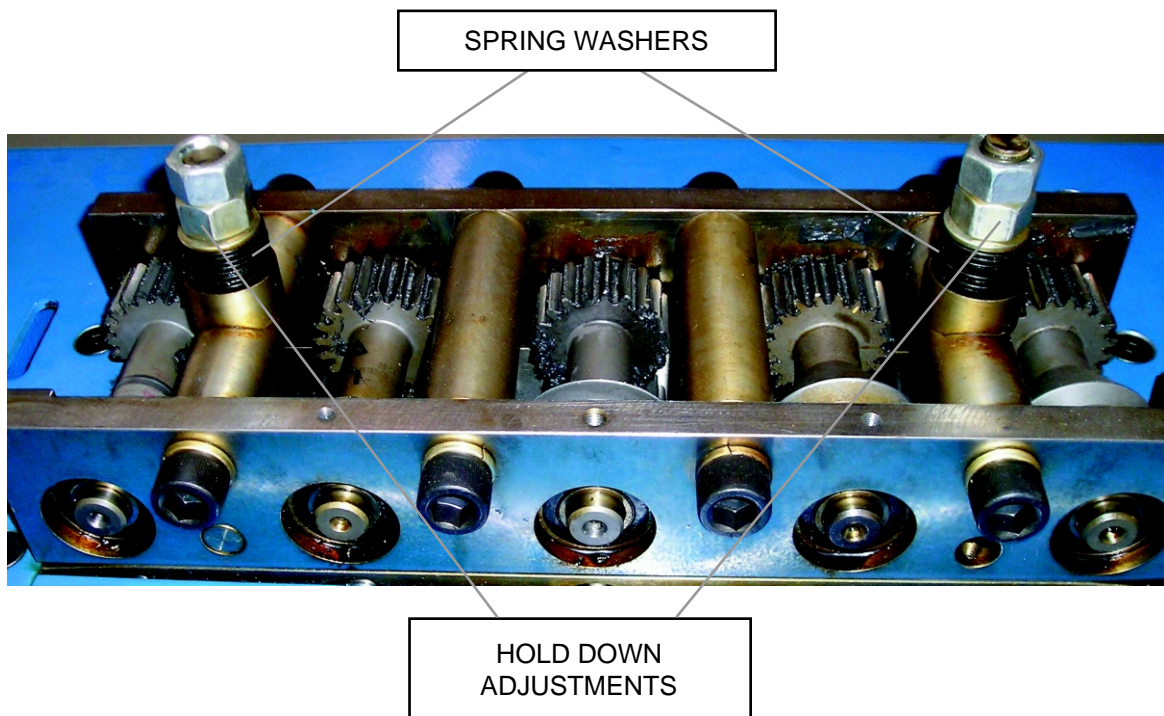
Note: Minimum part length is 175mm(7").

Make hold down adjustments as outlined below, to accommodate slight variations in metal thickness and hardness.

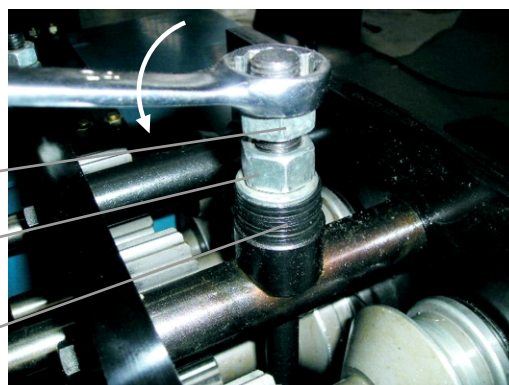
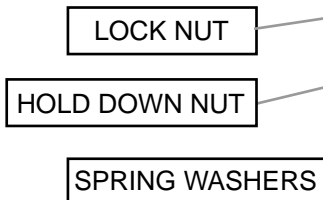
PITTSBURGH FEMALE HOLD DOWN ADJUSTMENT PROCEDURE

The HOLD DOWN ADJUSTMENTS NUTS are used to set the tension on the SPRING WASHERS. These SPRING WASHERS are used to allow the top rollers to float upwards. This is necessary on an LK-20 because of the various metal thicknesses that an LK-20 will form.

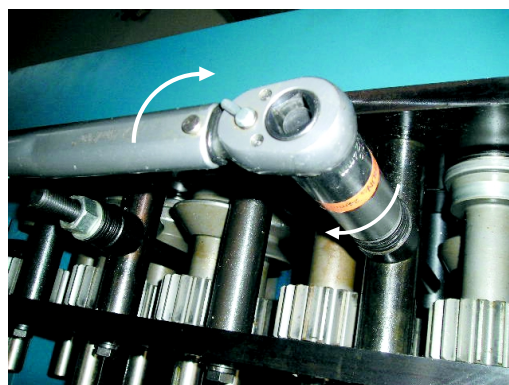
- ⚠ 1. DISCONNECT POWER!
2. Install electrical lock outs to prevent accidental start up.
3. Remove top cover.



- Loosen and remove the HOLDDOWN lock nuts.



- Tighten the hold down NUTS fully tight, or set to a torque value of 60MN (50 ft. lbs.)
- After tightening, loosen the NUT 1/4 turn (90 degrees).
- Retighten the lock NUT.
- ⚠** INSTALL THE COVER, remove electrical power lock outs, restore power.
- Run a test piece.



- If the stock slips in the rolls, tighten the hold down nuts. It may be necessary to tighten the 1st and 2nd HOLD DOWN nut unequally in order to obtain the desired result.
- If the stock curls up after forming or shows extremely pressure marks, loosen the hold down NUTS slightly.

*Do not adjust hold downs NUTS unless the stock slips in the rolls, pulls away from the entrance gauge, or curls when exiting the rolls.

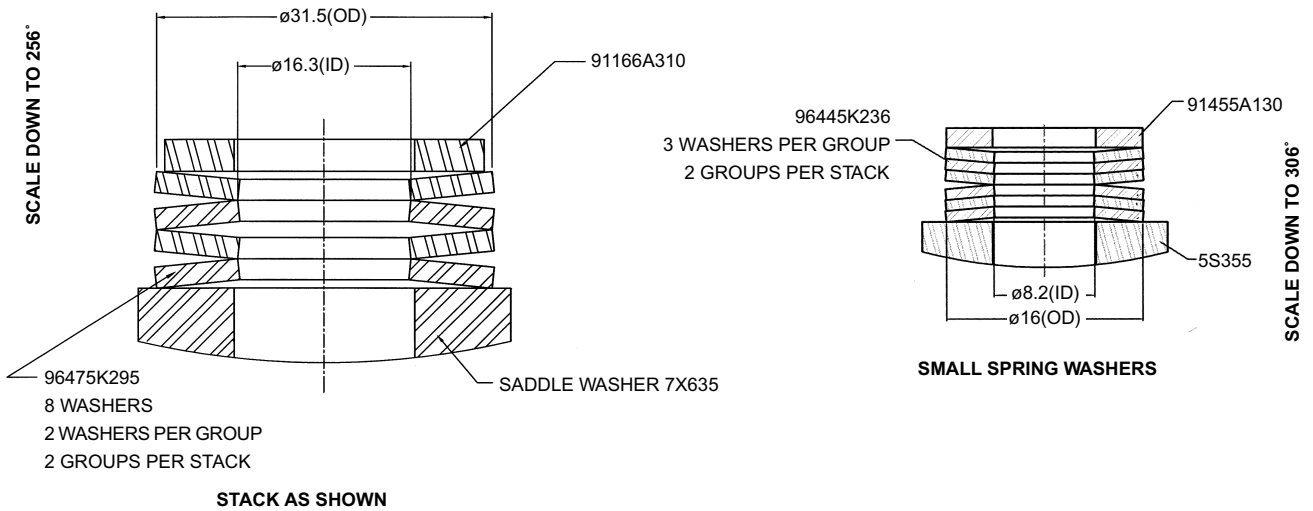
AUXILIARY ROLL HOLD DOWN NUTS

The Standard settings for the Auxiliary HOLD DOWN nuts are as follows:

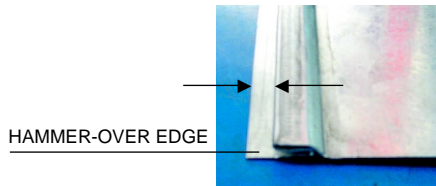
- Tighten the Auxiliary HOLD DOWN NUTS fully tight.
- Loosen Auxiliary HOLD DOWN NUTS $\frac{3}{4}$ of a turn (270 degrees)

FORMTEK Machinery offers options for Auxiliary Rolls. Specific HOLD DOWN NUT adjustments depend on which optional rolls are installed. The $\frac{3}{4}$ turn specification may change depending on the Auxiliary Rolls installed.

HOLD DOWN SPRING WASHERS



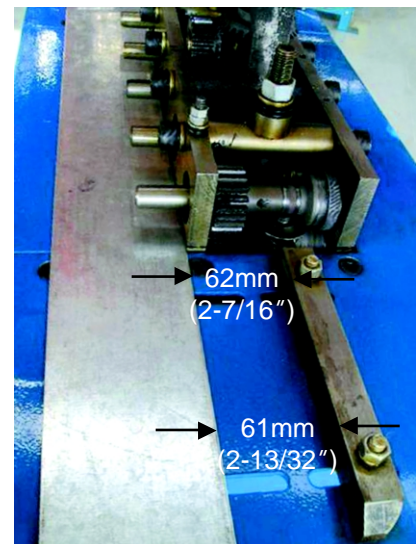
FEMALE PITTSBURGH LOCK



HAMMER-OVER EDGE ADJUSTMENT (ENTRANCE GAUGE)

The width of the FEMALE Pittsburgh lock hammer over edge is adjustable. Move the FEMALE PITTSBURGH lock entrance gauge to produce a larger or smaller hammer over edge.

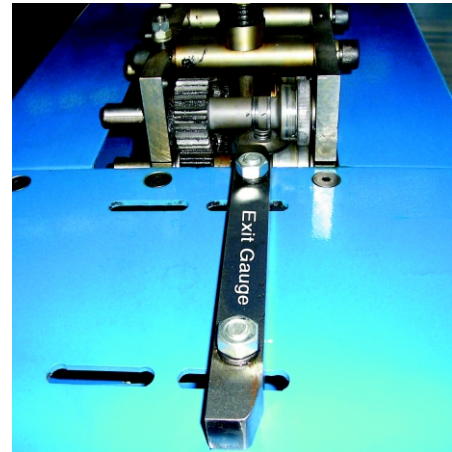
NOTE: There should be a deep scribe or scratch mark in the paint along the side of the entrance gauge and exit gauge. This is the original line location of the gauge from the factory. Slight adjustment from this line may be required to increase or decrease the hammer over edge width.



EXIT GAUGE

Never move the exit gauge bar for this roll set. This gauge is not intended to contact the material under normal circumstances.

NOTE: There should be a deep scribe or scratch mark along the side of the exit gauge, this is the original line location of the exit gauge from the factory. Slight adjustment from this line may be required.



OPENING ROLL

CAUTION: The flat roll (called the opening roll) mounted horizontally after the last roll station maintains the opening of the gap in the PITTSBURGH lock. Twisted or bent notches should be flattened prior to feeding stock material into the machine. Failure to do this can result in breakage of the opening roll.

INSTALLATION AND OPERATION OF AUXILIARY ROLLS

NOTE: Standard auxiliary rolls are interchangeable between the standard LK 20 and the Super-Speed models. Since different entrance gauges are required, the model for which the rolls are intended should be specified.

DOUBLE SEAM or STRAIGHT RIGHT ANGLE FLANGE ROLLS

- ⚠ 1. DISCONNECT POWER
2. Install lock outs to prevent accidental start up.
3. Remove the cover.
4. Unscrew and remove the right hand side table top section. This will expose the auxiliary shafts on which the rolls will be mounted.
5. Select the first pair of rolls which are marked T1 (Top roll first station) and B1 (Bottom roll first station). Slide them as a mated pair onto the shafts. All information stamped on the rolls must face outward. Slide a key into each keyseat. Follow this procedure in sequence with each remaining pair of rolls.
6. Fasten the rolls onto the shafts with the screws and washers provided.
7. Mount the entrance gauge and set it to the dimensions shown in the illustration.
8. Mount the exit gauge so the outside face of the vertical leg is parallel to the part as it passes over the exit table. Set to allow approximately 1.5mm clearance between the part and the exit gauge.

9. Replace the table top.
- ⚠ 10. INSTALL THE COVER
11. Remove the lock outs.
12. Restore power to the machine.

DRIVE CLEAT ROLLS

- ⚠ 1. DISCONNECT POWER.
2. Install lock outs to prevent accidental start up.
3. Remove the cover.
4. Unscrew and remove the right hand side table top section. This will expose the auxiliary shafts on which the rolls will be mounted.
5. Select the first pair of rolls which are marked T1 (Top roll first station) and B1 (Bottom roll first station). Slide them as a mated pair onto the shafts. All information stamped on the rolls must face outward. Slide a key into each key seat. Follow this this procedure in sequence with each remaining pair of rolls.
6. Fasten all rolls except the top number 2 onto the shafts with the screws and washers provided. Do not insert a mounting screw into the top 2 rollshaft; this allows the roll to “float” laterally, and center itself to the bottom roll as the stock passes through.
7. Mount the entrance gauges so that the centerline of the stock aligns with the centerline of the rolls.
8. Tighten the stud nuts so that the T5 and B5 rolls do not separate as the drive cleat passes through.
9. Mount the exit gauge so the outside face of the vertical leg is parallel to the part as it passes over the exit table. Set to allow approximately 1.5mm clearance between the part and the exit gauge.
10. Replace the table top.
- ⚠ 11. INSTALL THE COVER.
12. Remove the lock outs.
13. Restore power to the machine.

IMPORTANT: BE SURE TO CUT STOCK EXACTLY 53mm (2¹/₈”) WIDE TO INSURE AN ACCURATELY FORMED CLEAT.

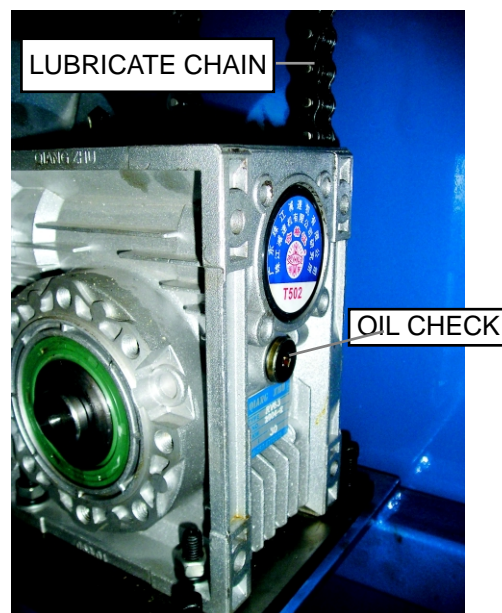
MAINTENANCE

LUBRICATION

GEAR REDUCTION UNIT

NOTE: Change oil after the initial 40 hours of machine operation. After the first oil change the regular oil change interval is 4000 hours of operation.

The recommended oil for the gear reduction unit is G-N320W, WA460 (or 90 weight gear oil if none other is available). There is a fill hole on the top and a level check hole near the middle of the unit. Check oil level every 3 months of operation. When leakage is detected service unit immediately.



LUBRICATE CHAIN

Periodically the drive chain needs to be lubricated. A light oil should be applied when ever the chain appears dry or every 40-80 hours of operation.

GREASE DRIVE GEARS

The recommended lubricant is Castrol Molub-Alloy 777-1 or equivalent. Apply grease to all drive gears after every 40 hours of operation. If the machine is to be used in a damp environment, apply a film of oil or grease to all unpainted metal surfaces to prevent rust.

CLEANING THE ROLLS

Keeping the forming rolls clean is an important step toward efficient operation of your machine. Lockformer's GALV-OFF aerosol spray cleaner, will soften galvanized build up so that it flakes off by itself. Daily use is recommended. GALV-OFF cleans and lubricates, as well as protects the forming rolls.

LK-20 CENTER SPACER



The CENTER SPACER is positioned between the top and the bottom forming heads on the 2nd large hold down stud (at the exit end of the machine near the opening roll). The function of this spacer is to control the vertical clearances between the top and bottom rolls at stations 4 and 5. The vertical clearance between top and bottom rolls is set in the factory with a feeler gauge to a clearance of 0.2-0.4mm (0.008"-0.010") at the outside edge of the rolls.

NOTE: It may be necessary to insert shim washers above the spacer to obtain the proper clearance.

TROUBLE CHECKS

IMPROPERLY FORMED/DEFORMED EDGES

-It may be necessary to add a slight lubricant to the surface of the sheet being formed to aid the flow of material through the forming rolls. Lockformer's GALV-OFF available from FORMTEK is recommended.

-The operator may have to experiment with hold down settings for desired results. Run test pieces to check different settings on the hold down nuts or bolts.

RUNNOUT

Some materials may have a tendency to drift away or runnout from the entrance gauge. The edge dimensions will be uneven from beginning to end. Check the following points when runnout is a problem.

-Be sure to hold the material firmly against the entrance gauge. Some materials will require significantly more pressure than others.

- Hold down settings should be checked and reset. Some materials may require settings that are tighter than this manual specifies. Use caution when setting the holdowns tighter than normal. Prolonged use of the machine with tighter settings will reduce the life span on some of the machines parts.

-Due to variations of the physical characteristics of material, it may be necessary to reset the entrance gauge bar if the material pushes away from the gauge bar or the lock is not formed properly. There should be a scratched line along the side of the entrance gauge to locate the original factory setting. Also it may be necessary to "Taper" the entrance gauge (set the gauge at a slight angle) to eliminate runnout.

-The exit gauge bar can be used to push on the exiting material when the material is not flowing straight or evenly throughout it's length such as when the edge is running out. Difficult parts may

require exit gauge pressure along the materials edge such as long heavy pieces where an awkward weight and size make it difficult for the operator to hold the piece straight during the forming process. This technique must be used carefully. Other conditions may be causing the runout, such as loose settings on the hold downs or improperly adjusted entrance gauges (those settings should always be checked first).

Having the exit gauge bar push too hard against the material might make the situation worse. The operator must run test pieces and inspect the formed product to determine the best adjustment position of the exit gauge bar.

 **FOLLOW ALL SAFETY PRECAUTIONS IN THE MANUAL WHEN MAKING ADJUSTMENTS**

LK-20-AGF

AUTO GUIDE FLANGING ATTACHMENT

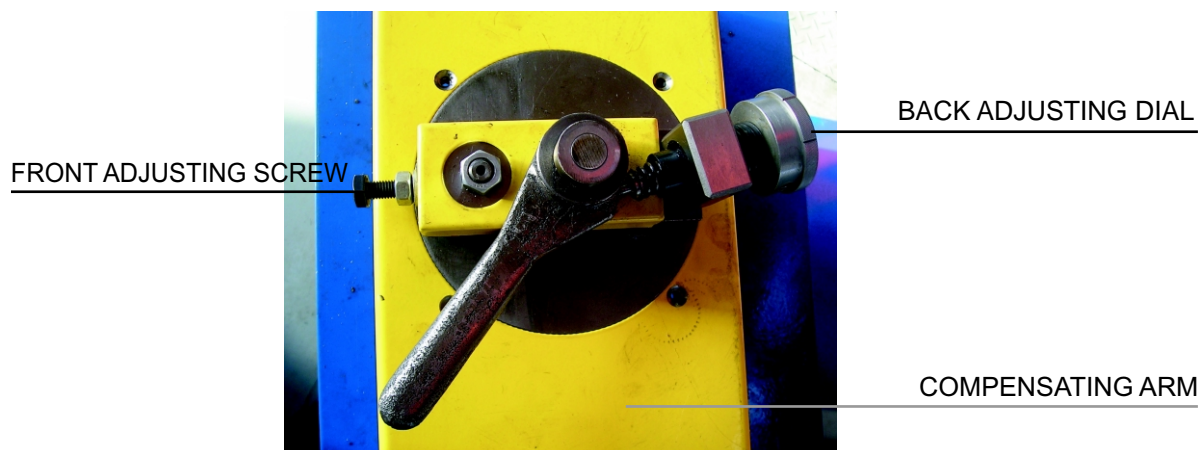


OPERATING INSTRUCTIONS

ADJUST UNIT FOR GAUGE MATERIAL TO BE USED

To adjust clearance between flanging rolls, tighten the adjusting screw on the front of the block of the machine all the way, then loosen the screw approximately one eighth of a turn. (This setting is usually correct for 26 gauge material). Do not set front gauge adjusting screw too tight. It should be set just tight enough to draw the metal through the rolls. Too tight a setting will stretch and wrinkle the material.

To adjust the spring tension on the compensator arm, tighten the adjusting dial on the back side of the flanger to the stop and then turn back to the proper gauge setting shown on the adjusting dial.



TURN UP A “STARTING FLANGE”

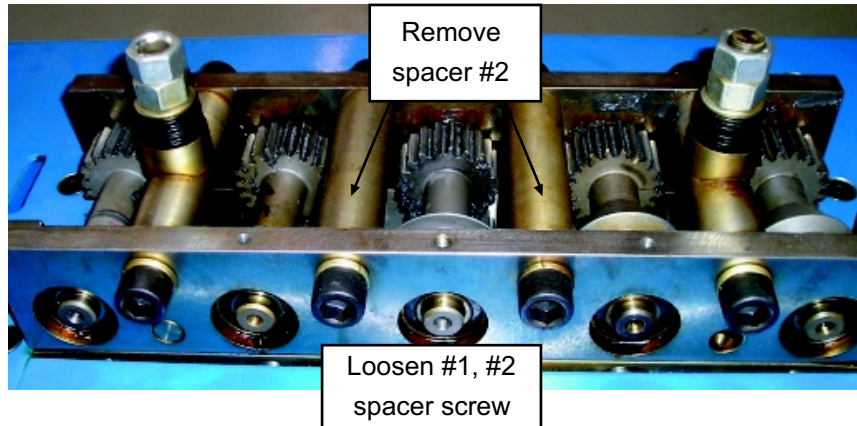
Before inserting material into the rolls, turn up a “starting flange” This is done by inserting the leading edge of the work to be flanged in the slot cut into the table and bending the piece away from the operator approximately 45°. Start the leading edge of the material into the rolls. As the material passes through the rolls, the compensator arm will make contact with the material and guide it through the rolls. If the material pulls out of the rolls, it is an indication that either the front adjusting screw is loose or the back adjusting dial is not tight enough.

IMPORTANT: When starting a partially formed part that has a radius:

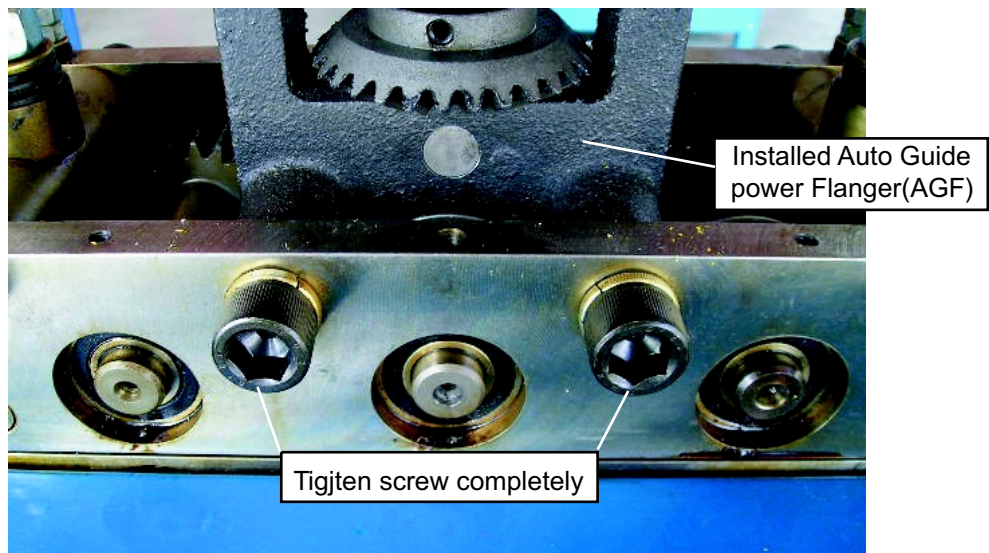
1. Push the compensator arm back
2. Feed the part into the rolls
3. As the unformed part enters the rolls, move the compensator arm forward against the part
4. Push firmly on the part while watching the flange height, guide the part through the rolls and as the flange is forming the compensator arm should hold the part.
5. The operator should only need to hold the piece gently as the compensator arm controls the part as it flows through the machine.

INSTALLATION AND OPERATION

- ⚠ 1. DISCONNECT POWER – INSTALL ELECTRICAL LOCKOUTS
2. Remove the top cover from the2. Loosen the front mounting screws on spacers # 1 and # 4



3. Remove spacers #2 and # 3 by removing their mounting screws. Install Auto Guide power Flanger (AGF)



*Be sure to allighn and mesh the gears !

- ⚠ 4. Replace the top cover.
5. Remove electrical lockouts
6. Restore Power

LK-20 PARTS DIAGRAM

FIG.1 Chassie

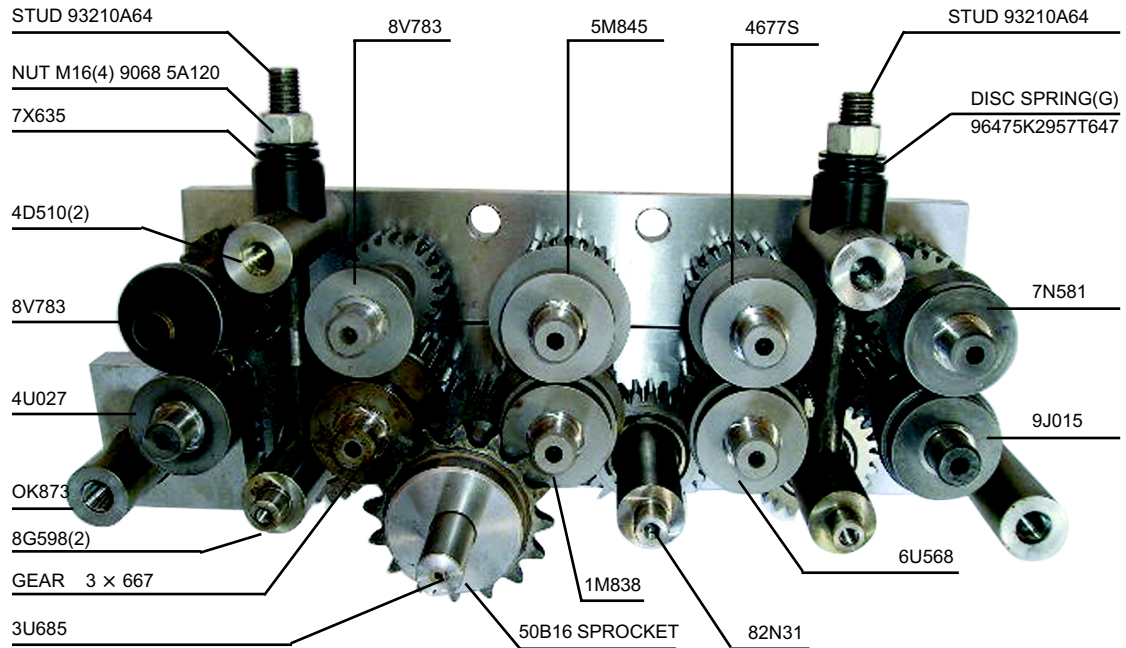


FIG.2 Opening Roll

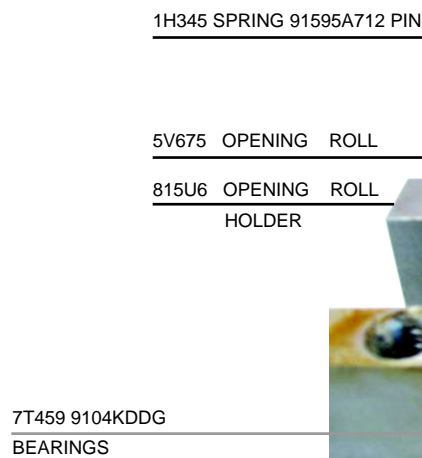


FIG.3 Hold Down

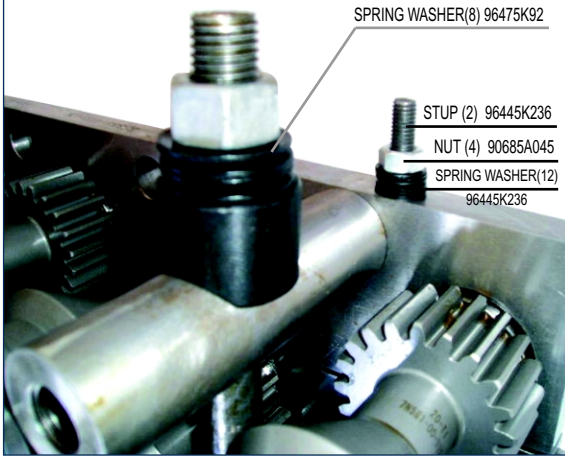


FIG.4 Straightener Roll

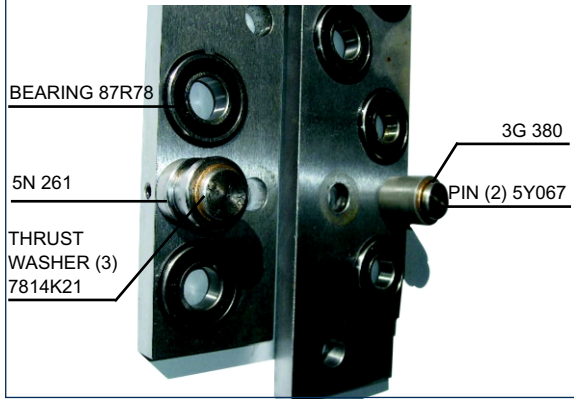


FIG.5 Top Sprocket

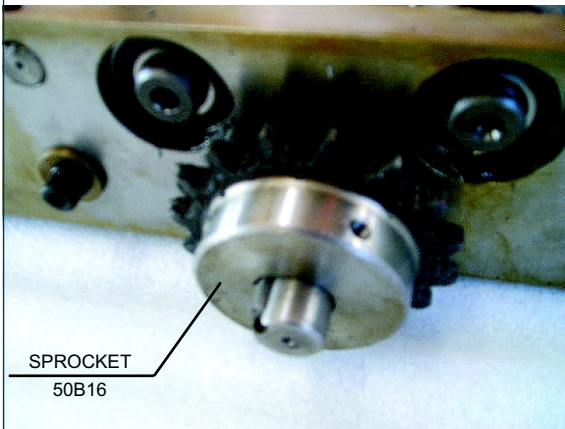


FIG.6 Exit Gauge

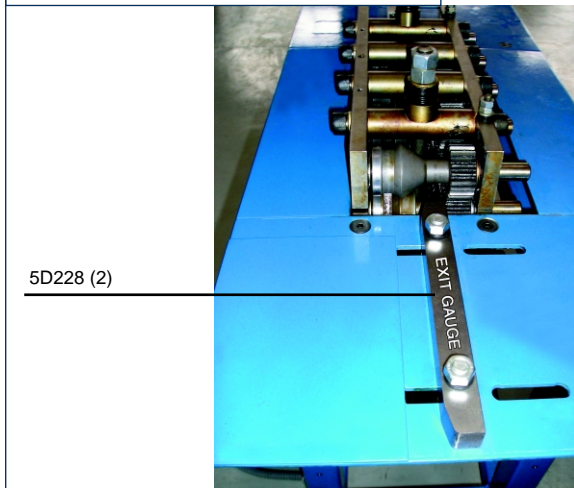


FIG.7 Motor Control

37V73 STARTER ENCLOSURE
3905Y (380V) UNDERVOLTAGE TRIP
4E768 (4AMP) MANUAL STARTER



FIG.8 Motor

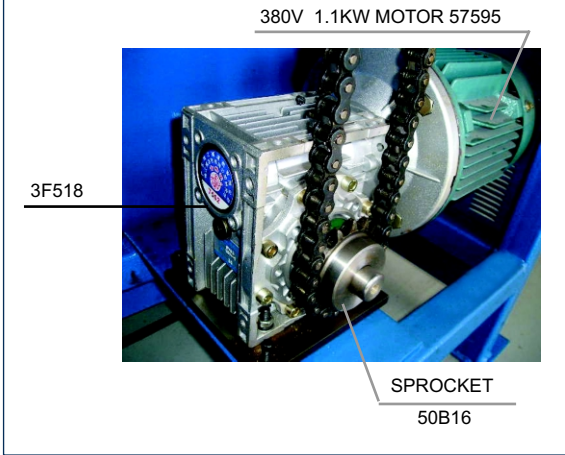


FIG.9 AGF Parts

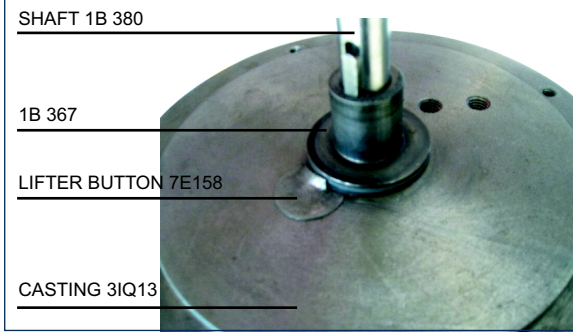


FIG.10 AGF Parts

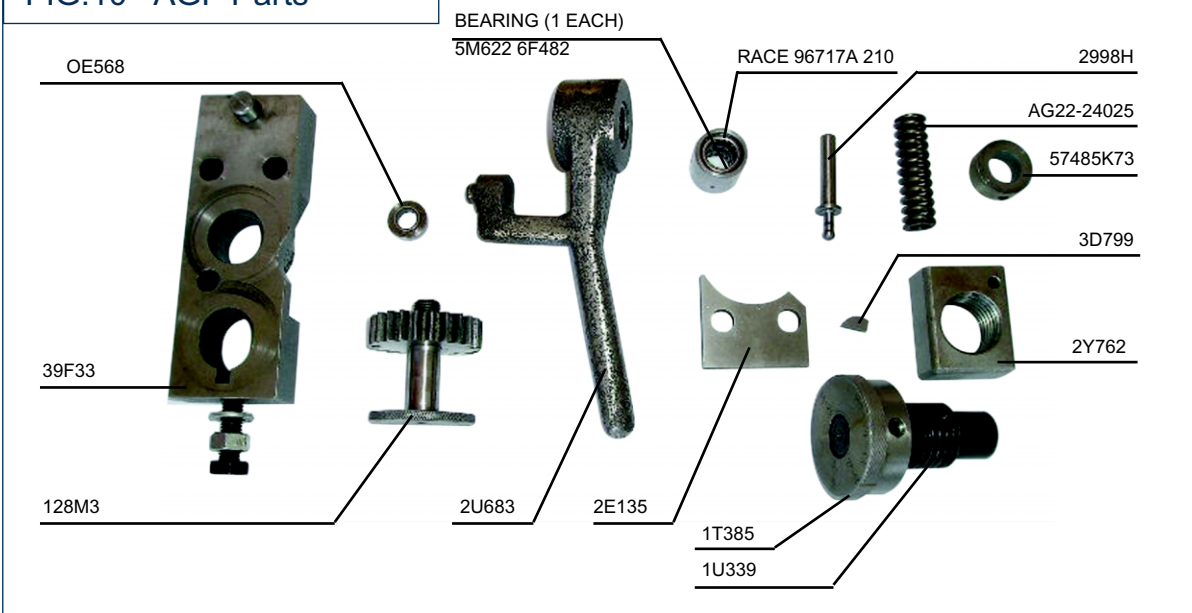
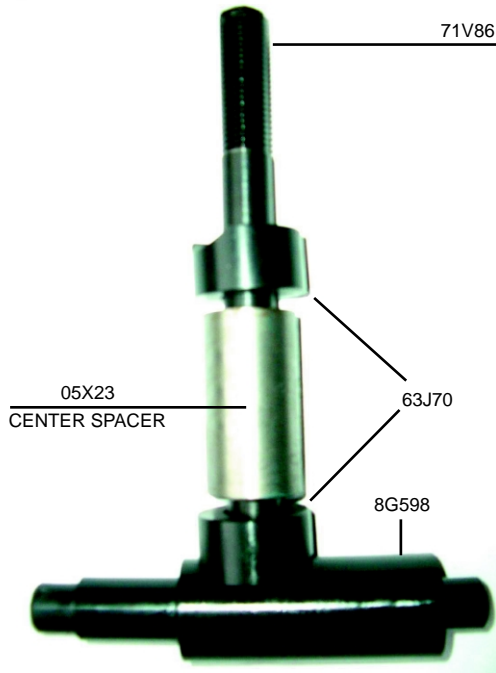


FIG.11 Center Spacer



Due to continuous improvements, FORMTEK reserves the right to modify the product design and specifications contained herein without notice. Please contact your Lockformer sales representative for the most current specification information.

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