

Tin Knocker OPERATOR MANUAL

TDC-P

Transverse Duct Connector Profile Roll Former



TAAG INDUSTRIES CORP.

"The Tin Knocker People"

1550 SIMPSON WAY, ESCONDIDO, CA 92029

Tel: (800) 640-0746 Fax: (760) 727-9948

Website: www.tinknocker.com Email: info@taagind.com

NOTICE

Failure to read instructions before operating equipment is a major cause of accidents. This is a complicated machine requiring understanding of its workings and adjustments. Reading this manual before operation will accelerate your safe success in putting it to work for you.

Important safety tips:

1. Never make adjustments while running.
2. Never lubricate the machine while running.
3. Gloves are suggested to be used while operating to reduce chances of hand cuts.
4. Never operate the machine with the hood removed.

Table of Drawings

<u>Description Of Attachments</u>	<u>Drawing No.</u>	<u>Page#</u>
Entrance Gauge Settings, Left Outboard Rolls.....	1	12
Entrance Gauge Settings, optional inboard drive cleat rolls.....	2	13
Pillow Block Screw Torque Settings.....	3	14
Pillow block shim sizes and locations	4	15
Idler roll assembly between stations 5-6, left TDC-P rolls.....	5	16
Slide assembly, between stations 5-6, 6-7 inboard drive cleat rolls.....	6	17
Exit straightener basic operations drawing.....	7	18
Exit straightener, TDC-P drive cleat rolls	8	19
Idler roll assembly, between 12-13, left TDC-P rolls	9	20
Idler roll assembly, between stations 13-14, left TDC-P rolls.....	10	21
Entrance gauge settings, optional right outboard drive cleat rolls.....	11	22
Left hand duct exit straightener.....	12	23

Table of Drawings, Continued

<u>Description-Core Machine</u>	<u>Drawing No.</u>	<u>Page#</u>
TDC-P Clip Profile Specifications	21187	27
Plate & Table Assembly.....	55049	28
Head Assembly.....		29
Sheet Support Assembly (Stand Structure).....	58175	30
Chassis Details (Drive Assembly)	58160	31
Schematic Diagram.....	59295	32
Wrench Wldmt.....	53590	33

Also, within:

Special lubrication instructions

Lube system manual

Roll former troubleshooting guide

NOTE: This machine comes with all adjustments preset and the machine tested for correct operation. One important purpose of this manual is to facilitate re-adjustment, should the machine come out of adjustment during transport and handling. Do not hesitate to call us if you need help in set up or adjustments.

SPECIFICATIONS

The Tin Knocker TDC-P is a 14 station roll former with double extended shafts (DES) and has the following specifications.

- 5 inch horizontal centers at stations 1-5 and 8 inch horizontal centers at stations 6-14 and 5 inch vertical centers throughout.
- 1 ¼ inch diameter shafts
- Heavy duty race cage bearings throughout, each having it's own grease fitting for certain manual lubrication.
- Constant speed drive of approximately 60 feet per minute.
- 10 HP motor, with 220 volt, 3 phase, 60 hz electrics as standard. Other electrics as requested by customer (option).

TOOLING

- **TDC-P duct forming rolls outboard on left outboard side.**
- **TDC Clip rolls mounted outboard on the right side.**
- **Empty spaces between the side plates to accommodate auxiliary tooling of the user's design/need.**

SET UP

- Uncrate and ensure no foreign materials or obstructions are in the gears or working mechanisms of the machine.
- Level the machine at its operating site.
- Connect the machine to the appropriate electrical source. Check rotation to ensure machine is running in the correct direction.

TABLE OF CONTENTS

	PAGE
Operation Guidelines.....	7
Entrance Gauge & Settings.....	7
Pillow Block Screw Torque Settings.....	8
Pillow Block Shim Information.....	8
Idler Assembly, Stations 5-6.....	9
Slide Assembly.....	9
Exit Straightener, Basic Operation.....	11
Exit Straightener Drawing.....	18
Idler Assembly Drawing, Stations 12-13.....	20
Idler Assembly Drawing, Stations 13-14.....	21
Entrance Guide Settings.....	10
Left Hand Exit Duct Straightener.....	
Lubrication Instructions.....	24
Trouble Shooting Guide.....	25-26
TDC-P Clip Drawing.....	27
Plate & Table Assembly Drawing.....	28
Head Assembly Drawing.....	29
Stand Structure Drawing.....	30
Drive Assembly Drawing.....	31
Wiring Diagram.....	32
Wrench Weldment Drawing.....	33
Parts List.....	34

OPERATION GUIDELINES

OPERATION OF TDC JOINT PROFILE ROLLSET, MOUNTED LEFT OUTBOARD

ROLL CAPACITY: 18-24 Ga. Galv. Steel

STOCK WIDTH: FORMS SHEET EDGE. TDC shape takes up approx. 1-7/8" of sheet edge, so for a duct section 36" long, blank must be approx. 39-3/4" (36+2x1-7/8).

NOTES: To form a duct using this profile, both edges of a sheet must be run through this rollset, held flush against the gauge bars mentioned below. Also, the corner notching of these pieces must be finished before rollforming, and the Pittsburgh lock must be formed before the TDC flange. The TDC Flange would interfere with the sheet passing through Pittsburgh forming rolls.

ENTRANCE GAUGE BAR SETTINGS:

Located on the front of the rollformer is an entrance table. The purpose of this table is to support the material being fed into the rollforming operations. On the top of the entrance table are the entrance gauge bars, mounted (for this rollset) with a riser plate to lift the entering stock to the best passline level.

The entrance gauge bars ensure correct alignment of the stock when entering the starting rolls. These bars are adjustable and it is important that they are set correctly. The exact locations of the entrance gauge bars have been determined during final machine testing. Inaccurately set or loose gauge bars can feed the stock improperly. Improperly fed stock can alter the amount of material engaged in the rolls, causing poorly formed or distorted shapes, material runout, and possibly jam the material in the rolls.

The entrance gauge locations should be checked periodically for accuracy. The correct locating dimensions are determined as follows:

Place straight edge along the outside face of the rolls (rollfaces have outer and inner hubs; place edge against inner hubs) and extending over the entrance table. Measure 2-7/16" from the straight edge to the gauge bar and lock it in place parallel to the gauge bar feed stock straight. See Illustration #1

CHECK FASTENERS FREQUENTLY: THEY SHOULD BE FIRMLY TIGHTENED.

The horizontal distance between the roll stations of the TDC machine may be too great for shorter pieces to be properly gripped and formed by the next rolls in sequence. The special Sliding Stock Guide Attachment (SSGA) shipped mounted at the exit end of the machine on its outboard Glide Rail is used as a movable clamp, allowing pieces 6 – 15" long to have the TDC profile formed on them by outboard TDC rolls.

The SSGA is used by lifting off and removing the Upper Sheet Support Attachment over which the stock ordinarily slides (part #51135) as noted in the accompanying drawing, #55049. With the lower Glide Rail exposed, slide the SSGA into place on it at the entrance end of the machine beside the gauge bars, with its clamps nearer the entrance end. The slots in the lower legs of the SSGA are made to fit precisely over the edges of the rail, allowing the Attachment to slide straight but freely along it.

To form a short piece, position it with the edge to be formed against the gauge bar as usual and its rear edge against the back stop of the Attachment. Then fasten the SSGA clamps down on the piece to hold it firmly. If it is not wide enough to be secured by the outer clamp, use a vise grip to hold it near its outer edge. A piece must be fastened in two places, or it may pivot. The rollformer may then be turned on, and holding the Attachment so hands remain as far from the rolls as possible, push it towards them, driving the piece into their grip. Allow the piece to be pulled normally by the rolls while it is engaged in them, pushing just firmly enough to compensate for the extra drag/weight of the attachment. Push the SSGA smoothly as it leaves one station, until the piece is firmly engaged in the next rolls. Push with extra force between Stations 5 & 6 because the piece must pass through an idler roll at this location, and may become stalled. Continue this procedure until the part comes out the exit end. Remove SSGA and reinstall the Upper Sheet Support Attachment to return to normal forming process. Refer to drawing #58175 for reinstallation settings of the Attachment at proper passline height and parallel, as required, to machine plate. Fine set the attachment level as needed for proper support.

Also, for this machine, the Upper Support Attachment is removed to make the TDC flange on an edge at 90 degrees (or any angle) from an edge with the TDC profile formed on it already, to allow clearance for the flange in place to pass.

SHEET HOLDDOWN ROLL ASSEMBLY

The long plate that is perpendicular above the Upper Sheet Support Attachment is mounted with rubber rollers that help control the tendency of the panel to bend upward as it is rollformed. These rollers have been placed so that their outer diameters are approximately level with the passline of the stock, and they will compress to allow for the different profiles (Pittsburgh lock or Right Angle Flange). If these rollers ever seem to be impeding the stock however, or not controlling the upward bow, their mounting plate may be raised or lowered (respectively) by simply loosening the bolts holding it to its overhead brackets and raising or lowering it in small increments as desired. If 18 Ga. stock does not form a satisfactory right angle, lower these rolls to press down on stock slightly more. Raise them again for thinner stock. Test a new setting with care, as settling rollers too low could impair the sheet's freedom of movement. This feature should not require resetting when the Upper Sheet Support Attachment is removed or reinstalled.

PILLOW BLOCK ADJUSTMENTS:

Each roll station is spring loaded and designed to float within an adjustable range of vertical travel. All roll stations can be adjusted independently.

This spring loaded design is intended to compensate for metal thickness variations by making the horizontal clearance between top and bottom mating rolls adjustable. Exact lateral positioning is maintained by dowel pins inserted into top of machine plate and pillow block base.

By increasing the tightness of the pillow block screws the vertical travel of the upper rolls is lessened and the horizontal clearance is reduced. Less horizontal clearance results in increased roll grip, tighter formed profile, and smaller inside corner radii. If formed part shows signs of marring, scratching, or fracturing of bends: increasing the horizontal clearance is suggested by loosening the pillow block screws.

Exact pillow block settings have been determined during final testing of machine. To achieve optimum results, it is recommended that all pillow blocks be set as follows; firmly tighten all pillow block screws, then loosen each set of two according to torque adjustment chart. The degree of looseness of the final two stations on the left machine plate is greater than other locations because of the idler here. See Illustration #3

NOTE! Before starting to form stock that is 18 Ga. thick or more, it is necessary to reset Pillow Block Screws on Stations 13 and 14 (only on plate adjacent to TDC rolls); first, fully tighten the screws at these Stations, as explained above, then loosen these screws by 2-1/2 to 3 full turns; this should allow the profile to be formed at a correct degree of looseness. To return to forming thinner stock, reset these Pillow Block screws to their standard 1-1/4 turn loose setting.

SHIMS UNDER PILLOW BLOCKS:

The shims which are located between the pillow blocks and the machine plates help control the effective vertical distance between the top and bottom rolls. Rolls are designed based on .027" shims at each location. Exact shim sizes and locations are determined during final analysis and testing of rolls.

Each roll station may contain different quantities and thicknesses of shims according to assembly requirements for each machine. See Illustration #4 for shimming arrangement.

IF PILLOW BLOCKS ARE EVER REMOVED, IT IS IMPORTANT THAT ALL SHIMS ARE REPLACED IN THEIR EXACT LOCATIONS WHEN RE-ASSEMBLED.

It is suggested that the shims be taped or wired to their respective pillow blocks to ensure correct reassembly location. Shims (.020" each) have been placed on the shafts behind both the top and bottom rolls at Stations 3 & 4. These shims must be returned to these positions if they are ever removed to ensure correct roll alignment.

IDLER ROLLS: See Illustration #5, 9 & 10

When forming some profiles it is common that only the main forming rolls are needed to provide desired results. Many rollforming applications can be done more efficiently by adding idler rolls either between roll stations or directly on the roll station itself.

Maintaining angularity of bends, opening of thin clearance sections, guiding of stock into next operations, and maintaining straightness are but a few conditions controlled by idler rolls. For this rollset, idlers have been installed between Stations 5-6, 12-13 and 13-14.

It is important that the material clearance dimension between the mating rolls allow material to move freely but be formed correctly. All idler assemblies have been factory set to form all stocks properly, so readjustment of these idler assemblies should seldom, if ever, be necessary. If these settings ever seem to need changing or are disturbed so that they need to be returned to original settings however, the following information may be used:

At Stations 5-6 the inner idler (nearer machine plate) is spring loaded and a small angle iron stop is bolted into place behind it to prevent roll from moving more than the proper amount of clearance. If desired, its forming power (the pressure it exerts on the stock) is adjustable by increasing or decreasing the tension of the spring on which the idler bracket is mounted. This tension may be adjusted at the screws on the rear of the bracket, under the crossbar. This must only be reset in small, gradual increments and tested after each change to reduce the possibility of stock jamming as it enters too rigid a setting. Its factory setting was with adjusting bolt heads approx. 3/8" away from bracket.

The lower, outer idler was factory set at slightly more than 2" between its edge and the machine plate for all gauges of metal. This setting should not require changing, and the roll should remain as located, reset only if problems arise. If this seems to be necessary, loosen lower bolts and outer bracket setting bolts and position this assembly at slightly more than 2" out. The upper idler/bracket must be removed entirely to allow access for measurement between the lower roll and plate. To do this, loosen two spring bolts to relieve their tension and remove the two 3/8" bolts (one at each end of the bracket crossbar) and lift off bracket. When reinstalling this reset spring bolts to approx. 3/8" from the plate. See reference dimensions show in Illustration #5

The idler assembly at Stations 12-13 need no adjustment, having been set correctly for all gauges at the factory and 13-14 inner idler needs one adjustment. The outer idlers are mounted in springed brackets, and these idlers are up against the stationary inner ones until pushed apart by the stock passing between them. The outer positioning bolts of the outer idlers were both tightened so their ends were up against the rollblock, then loosened by one full turn at Stations 12-13, and 1-1/2 turn at Stations 13-14. These bolt settings allow the rolls to move the correct amount to let stock pass properly. Reset them this way if necessary. Illustration #9-10 show correct mating and clearance areas.

TO FORM 18 GA. STOCK, MOVE INNTER (NEARER THE PLATE) 13-14 IDLER IN 1/32" TO ALLOW ENOUGH CLEARANCE. The inner idler at 12-13, should be kept at its original factory setting.

CAUTION! IF CLEARANCE DIMENSION IS SET TOO TIGHT, A STOCK JAM-UP MAY OCCUR CAUSING POSSIBLE DAMAGE AND UNCESSARY DOWNTIME OF MACHINE!

EXIT STRAIGHTENING DEVICE – Mounted to the machine plate after the final forming rolls is an attachment designed to control any tendency of the stock to bow up or down. This is a bracket holding two idler rolls at a fixed distance apart, so that the profile passes between them. The bracket itself is slotted so the rolls may be raised or lowered together as needed to correct a down bow or an up bow, respectively, in gradual increments. Machines are generally shipped with this device set to straighten thicker stock, so it will probably be necessary to reset it to straighten thinner stock. See Illustration #20.

OPERATION OF TDC CLIP ROLLS MOUNTED RIGHT OUTBOARD

NOTE! Stamped numbers of Cliprolls (in right outboard position) must face inwards, towards the plate, away from Installer! If such rolls must ever be installed at right outboard position, be sure to orient them this way!

ROLL CAPACITY: .035/.038" Galv. Steel (this thickness is critical)

STOCK WIDTH: 2.125"

ENTRANCE GAUGE BAR SETTINGS:

Located on the front of the roll former is an entrance table. The purpose of this table is to support the material being fed into the rollforming operations. On the top of the entrance table are the entrance gauge bars.

The entrance gauge bars ensure correct alignment of the stock when entering the starting rolls. These bars are adjustable and it is important that they are set correctly. The exact locations of the entrance gauge bars have been determined during the final machine testing. Inaccurately set or loose gauge bars can feed the stock improperly. Improperly fed stock can alter the amount of material engaged in the rolls, causing poorly formed or distorted shapes, material runout, and possibly jam the material in the rolls.

The entrance gauge locations should be checked periodically for accuracy. The original reference dimensions are determined as follows:

RIGHT OUTBOARD: Place a straight edge on the outside face of the rolls (not spacers mounted on shafts beside them), extending over entrance table. Measure 2-9/16" from straight edge to the end of the bar nearest the rolls, and 2-19/32" from straight edge to the end of the bar furthest from the rolls, and lock the bar in place at this position, to feed stock at a slightly tapered angle. Set the right bar stock width 2.125" away. See Illustration #11

NOTE: Drawing #21187 shows precise specifications of the piece to be produced by these rolls. Before installation, check clip against this print to determine accuracy of these 3 dimensions, which are critical (within tolerance): 1. 11/16" top leg overall length, 2. 78 degree angle of top right bend, 3. Length of 13/64" leg. If these are formed inaccurately, installation may not be affected, but clip may not hold reliably. These dimensions may be corrected by making changes in tension of pillow block screws (in gradual increments) at Stations 5&6 to loosen or tighten profile, as seems necessary. If 42 degree, 13/64" final leg is formed too long and a reinforcing bar is used, installation may be difficult. If it is too short, clip may not stay in place. This length may be adjusted as desired by moving gauge bars slightly (but maintaining blank width distance between them) to engage stock further to right or left in rolls, altering length of this final leg as needed. Using steel thinner than tolerance dimension may also cause inaccurate forming.

CHECK GAUGE FASTENERS FREQUENTLY: THEY SHOULD BE FIRMLY TIGHTENED.

PILLOW BLOCK ADJUSTMENTS:

Each roll station is spring loaded and designed to float within an adjustable range of vertical travel. All roll stations can be adjusted independently.

This spring loaded design is intended to compensate for metal thickness variations by making the horizontal clearance between top and bottom mating rolls adjustable. Exact lateral positioning is maintained by dowel pins inserted into top of machine plate and pillow block base.

By increasing the tightness of the pillow block screws the vertical travel of the upper rolls is lessened and the horizontal clearance is reduced. Less horizontal clearance results in increased roll grip, tighter formed profile, and smaller inside corner radii. If formed part shows signs of marring, scratching, or fracturing of bends: increasing the horizontal clearance is suggested by loosening the pillow block screws.

Exact pillow block settings have been determined during final testing of machine. To achieve optimum results, it is recommended that all pillow blocks be set as follows; firmly tighten all pillow block screws, then loosen each set of two according to torque adjustment chart. See Illustration #3

SHIMS UNDER PILLOW BLOCKS:

The shims which are located between the pillow blocks and the machine plates help control the effective vertical distance between the top and bottom rolls. Rolls are designed based on .027" shims at each location. Exact shim sizes and locations are determined during final analysis and testing of rolls.

Each roll station may contain different quantities and thicknesses of shims according to assembly requirements for each machine. See Illustration #4

IF PILLOW BLOCKS ARE EVER REMOVED, IT IS IMPORTANT THAT ALL SHIMS ARE REPLACED IN THEIR EXACT LOCATIONS WHEN RE-ASSEMBLED

It is suggested that the shims be taped or wired to their respective pillow block to ensure correct re-assembly location.

ROLL SHIMS AND SPACERS

RIGHT OUTBOARD – In this position, spacers are placed only on the outside face of the rolls. These rolls, spacers and any shims that may have been placed on the shafts with them for best forming results must be reinstalled in their original positions if the shaft assemblies are ever removed from the chassis and their components separated.

SLIDES: See Illustration #6

Occasionally it is necessary to provide one or more slides to enable partially formed stock to pass smoothly from station to station and minimize material springback. For these rolls, slides have been placed between Stations 6-7 and 7-8. These slides usually require no adjustments, however if removal or replacement is ever necessary, install the slide so that its contact surface is parallel to the passline and tangent to the outside roll diameter at the section in which it aligns. If specific positioning is required it will be illustrated on the accompanying sketch or layout drawing. Be sure that the slide contact surface bears no extreme pressure on part being formed.

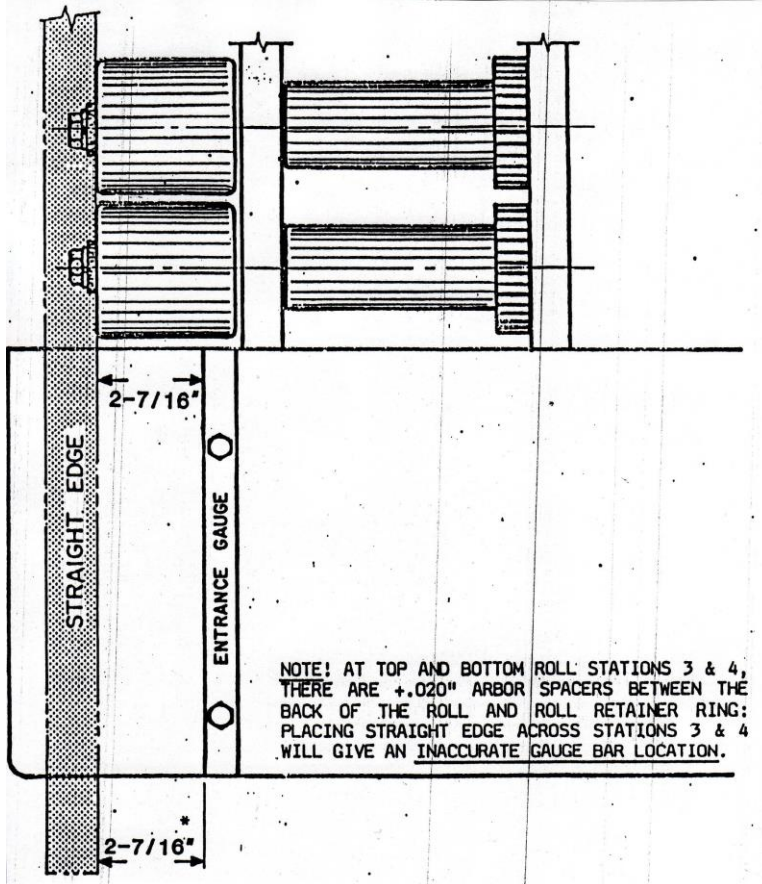
EXIT STRAIGHTENER: See Illustration #7, 8

As the material passes through roll former, stresses can be induced by the bending process causing material to bow as it exits the machine. The straightening unit attached to the exit table is used to eliminate bowing.

The straightener is designed using one or more bars properly fitted to the contour of the formed piece and is adjustable vertically and laterally.

The straightener operates on a principal of counteracting the force causing the bow by moving the unit in the opposite direction of the bow. For example, if the part emerges with a DOWN BOW the unit should be raised: if part emerges with a SIDE BOW to the left the unit should be moved to the right, etc. This straightener has already been set at an angled position to compensate for a side bow, and it is recommended that this position only be changed in small increments. Raising the straightener to control a DOWN bow can be done in small, gradual increments by raising the table, placing shims under the exit end of the straightener or turning the jacking screws (if present) beneath it until satisfactory results are achieved. To correct an UP bow by lowering the straightener, it may be necessary to lower the table, unless shims can be removed or an upward jackscrew setting lowered to move the straightener down.

The idler roll on the exit straightener can be adjusted UP or DOWN to reduce a vertical bow by turning the adjustment screw in fine increments until the desired result is obtained. If range of adjustment does not improve part straightness proceed as outlined in preceding paragraph, then fine adjust with roll.



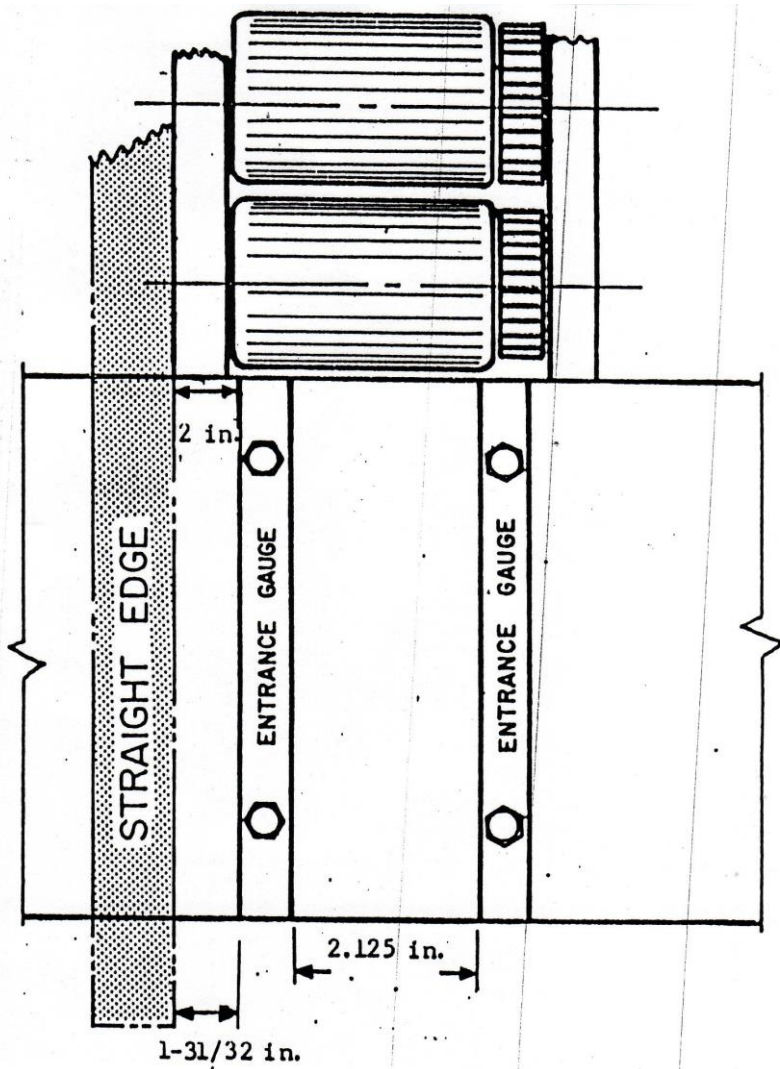
**Illustration #1 (TDC-P DES INSTRUCTIONS)
ENTRANCE GAUGE SETTING**

PLACE A STRAIGHT EDGE FLUSH AGAINST THE SIDE OF THE TOP ROLLS AT (ONLY) THE FIRST 2 STATIONS, AND MEASURE AS SHOWN ABOVE, TO CONFIRM THE GIVEN SETTING.

THE GIVEN GAUGE BAR SETTING IS STANDARD, AND CUSTOMER MAY VARY IT SLIGHTLY TO SUIT HIS NEEDS.

*AN ADDITIONAL 1/32" HERE MAY HELP KEEP MATERIAL UP TO THE GAUGE.

CHECK POSITION OF ENTRANCE GAUGE BAR OFTEN. BE SURE THAT THE BAR'S FASTENERS ARE KEPT TIGHT.



**Illustration #2 TDC CLIP ROLLS (INBOARD POSITION)
ENTRANCE GAUGE SETTING**

POSITION STRAIGHT EDGE FLUSH AGAINST THE SIDE OF THE MACHINE PLATE AND HOLD FIRMLY IN PLACE WHILE MAKING MEASUREMENTS.

CHECK POSITION OF ENTRANCE GAUGE BARS OFTEN.

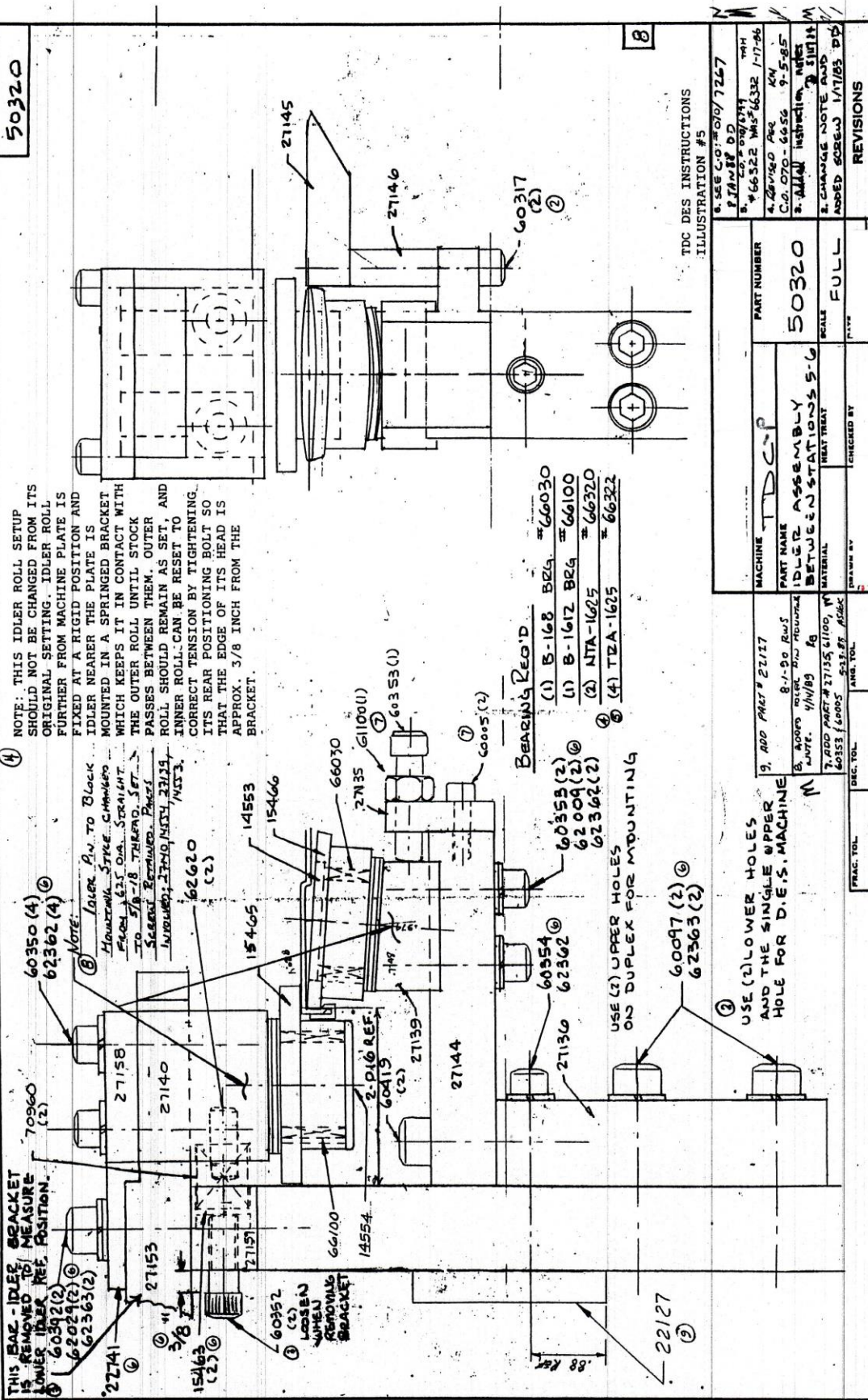
BE SURE THAT ALL ENTRANCE GAUGE FASTENERS ARE KEPT TIGHT.

50320

THIS BAR - IDLER BRACKET IS REMOVED TO MEASURE LOWER IDLER REF. POSITION.

NOTE: LATER P.V. TO BLACK HORIZONTAL STRIP CHAMFERED FROM 635 DIA. STRAIGHT TO 5/8-18 THREAD. SET SQUARE REQUIRED. PASSES BETWEEN THEM. OUTER ROLL UNTIL STOCK ROLL SHOULD REMAIN AS SET, AND INNER ROLL CAN BE RESET TO CORRECT TENSION BY TIGHTENING ITS REAR POSITIONING BOLT SO THAT THE EDGE OF ITS HEAD IS APPROX. 3/8 INCH FROM THE BRACKET.

NOTE: THIS IDLER ROLL SETUP SHOULD NOT BE CHANGED FROM ITS ORIGINAL SETTING. IDLER ROLL FURTHER FROM MACHINE PLATE IS FIXED AT A RIGID POSITION AND IDLER NEARER THE PLATE IS MOUNTED IN A SPRING BRACKET WHICH KEEPS IT IN CONTACT WITH THE OUTER ROLL UNTIL STOCK PASSES BETWEEN THEM. OUTER ROLL SHOULD REMAIN AS SET, AND INNER ROLL CAN BE RESET TO CORRECT TENSION BY TIGHTENING ITS REAR POSITIONING BOLT SO THAT THE EDGE OF ITS HEAD IS APPROX. 3/8 INCH FROM THE BRACKET.



- BEARING REQ'D**
- (1) B-168 BRG. #66030
 - (1) B-1612 BRG. #66100
 - (2) NTA-1625 #66320
 - (4) TBA-1625 #66322

USE (2) UPPER HOLES ON DUPLEX FOR MOUNTING

USE (2) LOWER HOLES AND THE SINGLE UPPER HOLE FOR D.E.S. MACHINE

TDC DES INSTRUCTIONS ILLUSTRATION #5

MACHINE	TDGP
PART NAME	BLETZ ASSEMBLY
PART NUMBER	50320
SCALE	FULL
CHECKED BY	
DATE	
REVISED	
REVISIONS	