

**WARNING:**  
Before putting tool in service, take  
to your immediate  
supervisor.



Model NMA Clamp  
Application, Operation and Maintenance Manual

OM 311-NMA



# Operators Manual

This Operator's Manual covers the Application, Operation and Maintenance of this RENFROE product. Operator's Manuals for other current RENFROE products are available upon request. Direct Requests to J.C. Renfroe & Sons, Inc., Jacksonville, Florida 32201.

**J.C. RENFROE & SONS,  
INCORPORATED**

of Jacksonville, Florida, has been an international leader in the manufacture and marketing of Lifting Clamps for over fifty years. **RENFROE** products are manufactured in Jacksonville, Florida. A worldwide network of stocking distributors provides a readily available source of supply and service.

**J.C. RENFROE & SONS, IN-  
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THIS PUBLICATION SUPERSEDES ALL PREVIOUSLY PUBLISHED AND/OR DISTRIBUTED INFORMATION BY MANUFACTURER AND/OR ITS DISTRIBUTORS WITH RESPECT TO APPLICABLE RENFROE PRODUCTS AND SUBJECT MATTER DESCRIBED OR CONTAINED HEREIN.

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## **WARNING:**

Prior to selection, operation and/or maintenance of RENFROE products, read and understand the information provided in this manual.

The understanding and use of the Definitions are important in determining the limitations and proper application of RENFROE products.

Failure to review and utilize recommended applications, operation and maintenance instructions may result in serious injury to operator and others.

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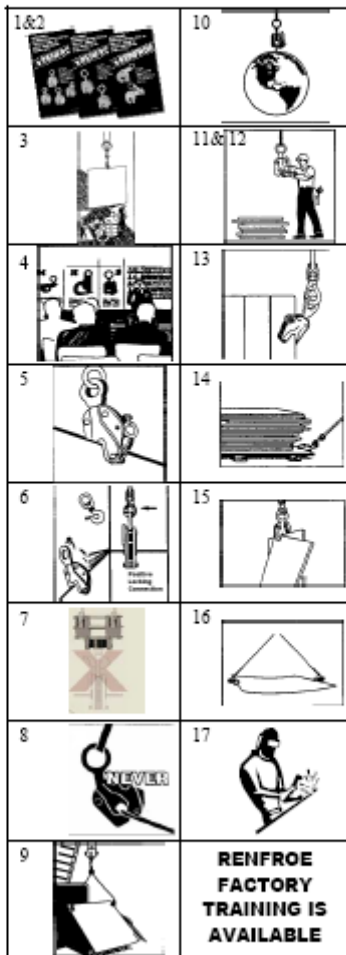
### **NOTICE OF EXCLUSION OF WARRANTY**

**RENFROE HAS HEREIN SET FORTH IN CONSPICUOUS LANGUAGE AN EXCLUSION OF ANY WARRANTY EITHER EXPRESSED OR IMPLIED, WHICH IS NOT SPECIFICALLY AND PARTICULARLY CONTAINED HEREIN. PLEASE REFER TO THAT STATEMENT FOR REPRESENTATIONS AND WARRANTIES OF PRODUCTS MANUFACTURED BY J.C. RENFROE & SONS, INC.**

# OPERATING AIDS

## (DO'S AND DON'TS)

- DO read and understand the operator's manual before using clamp.
- DO consult Operators Manual or RENFROE when in doubt.
- DON'T lift over workmen. DON'T lift over safety areas or personnel.
- DO attend a factory training class for establishing proper use of Renfroe Products.
- DO Lock clamp closed when clamps are fitted with a lock. DON'T lift with lock in open or "lock open" position.
- DON'T use a connection that may release the clamp.
- DON'T attach clamp directly to crane hook. DO use a flexible connection between crane hook and clamp shackle. DON'T use heavy flexible connection.
- DO use correct clamp for job. DON'T use large capacity clamps to lift light loads.
- DO use an adequate number of clamps to balance load. DON'T lift loads that are not balanced.
- DO use clamps within their rated capacity. DON'T overload clamps.
- Do inspect clamp before each lift, follow inspection and maintenance instructions outlined in the manual and use RENFROE replacement parts to assure proper operation of the clamp.
- DON'T use clamp that has been overloaded. DO refer to pre-lift inspection in Operator's Manual.
- DON'T side load with a straight shackle clamp.
- DON'T misuse. DON'T lift plate from bottom of plate stack.
- DON'T rush. DON'T lift more than one plate at a time with a vertical clamp.
- DON'T improvise. Always use correct clamp for the job. DON'T lift plate horizontally with a vertical lift only clamp.
- DON'T alter clamp. DON'T grind, weld or modify the clamp in any manner.



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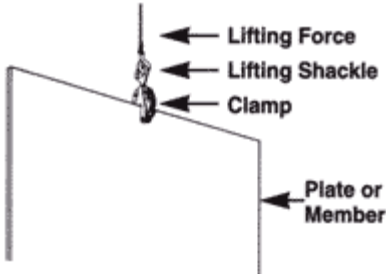
# OPERATING AIDS

## (DO'S AND DON'TS)

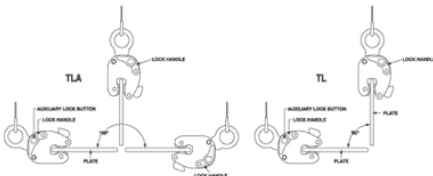
1. DO read and understand the Operators Manual before using the clamp
2. DO Consult Operator's Manual or RENFROE when in doubt.
3. DON'T Lift over workmen DON'T lift over Safety Areas or personnel.
4. Do attend a factory training class for establishing proper use of Renfro Products.
5. DO Lock clamp closed before lifting load. DON'T lift with lock in open or "Lock Open" position.
6. DON'T Use a connection that may release the clamp.
7. DON'T attach clamp directly to crane hook. DO use a flexible connection between crane and clamp shackle. DON'T use heavy flexible connection.
8. DO use correct clamp for job. DON'T use large capacity clamps to lift light loads.
9. DO Use an adequate number of clamps to balance load. DON'T lift loads that are not balanced.
10. DO Use clamps within their rated capacity. DON'T overload clamps
11. DO Inspect clamp before each lift, follow inspection and maintenance instructions outlined in this manual and use RENFROE replacement parts to assure proper operation of the clamp
12. DON'T Use clamp that has been overloaded. DO refer to pre-lift inspection in Operators Manual
13. DON'T Side load with a straight shackle clamp. DON'T lift from side with vertical clamp
14. DON'T Misuse. DON'T lift plate from bottom of plate stack.
15. DON'T Rush. DON'T lift more than one plate at a time with a vertical clamp.
16. DON'T Improvise. Always use correct clamp for job. DON'T lift plate horizontally with a vertical lift only clamp.
17. DON'T Alter clamp. DON'T grind, weld or modify the clamp in any manner.

# DEFINITIONS

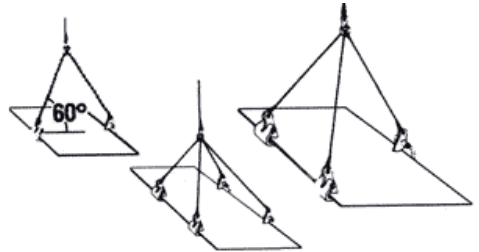
**VERTICAL LIFT:** The lifting of a single plate or member in which the lifting force exerted by the rigging is directly above and in line with the lifting shackle as shown in the illustration below.



**VERTICAL TURN/LIFT:** A vertical turn/lift clamp is a vertical lifting clamp specifically intended to turn a single plate or member thru a ninety degree (90°) arc and back to vertical thru the same ninety degree (90°) arc or from horizontal to vertical to horizontal thru a one hundred and eighty degree (180°) arc. Refer to Application Section of specific Turn/Lift clamps for further detail. During the turning operation the edge of the plate opposite the edge to which the clamp is attached should always be in contact with a supporting surface such as a factory floor and the load on the clamp not exceed one half rated capacity of clamp—refer to illustrations shown below.



**HORIZONTAL LIFT:** Clamps (used in pairs or multiples) are attached to the side edges of a plate or bundle of plates positioned horizontally to the floor level. The rigging attached to clamps is generally multi-legged slings with the connecting point of the slings being approximately centered between the distance separating the clamps. Refer to illustrations shown below. **WARNING:** The capacity of all horizontal clamps is based on a sling angle of sixty degrees (60°). See illustration below. Sling angles less than sixty degrees (60°) increase the load exerted on the clamps, Never exceed the rated capacity of a single clamp.



**STEEL PLATES:** Unless otherwise specified, lifting clamps are manufactured to handle hot-rolled steel plates whose Brinell Hardness does not exceed 300. **WARNING:** Do not lift plates with coatings or mill scale that prevent the gripping surfaces of the clamp from making positive contact with the base metal.

For applications not covered by the above information, secure written recommendations from RENFROE.

**FINISHED AND POLISHED PLATES:** Steel plates in this category have other than hot-rolled surfaces such as stainless steel, etc., are generally handled using non-marring clamps incorporating smooth gripping surfaces.

**WARNING:** For applications using clamps with serrated gripping surfaces on finished or polished plates, secure written recommendations from RENFROE.

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**STRUCTURAL MEMBERS—FABRICATED SECTIONS:** Unless otherwise specified, clamps described as capable of handling structural members and fabricated sections are limited to hot-rolled steel whose Brinell Hardness does not exceed 300. **WARNING: For applications not covered by the above information, secure written recommendations from RENFROE.**

**RATED CAPACITY:** The rated capacity of a RENFROE product is based on the product being in “new or as new” condition and represents the maximum load the product is to be subjected to when utilized in the manner described in this manual. Wear, misuse, abuse and other factors relating to usage may reduce the rated capacity. Shock loading and the factors listed must be taken into consideration when selecting a RENFROE product for a given application.

**PLATE THICKNESS:** The minimum and maximum plate thickness a clamp specified for handling plates is capable of lifting. **WARNING: Never use a clamp for lifting a plate where the plate thickness is less than or greater than the minimum and maximum stenciled on the clamp.**

**JAW OPENING:** The minimum and maximum thickness of a member of clamp specified as having a JAW OPENING is capable of handling. **WARNING: Never use a clamp on a member whose thickness is less than or greater than the range of jaw opening stenciled on clamp.**

**OPERATING TEMPERATURES:** Unless specified under the Application Section of the individual model, the approved operating temperature of RENFROE clamps is from zero degrees Fahrenheit (-18 Celsius) to a maximum of 200 degrees Fahrenheit (+93 degrees Celsius). The minimum and maximum temperatures apply to both ambient and the material being handled by the clamp. **WARNING: Secure written authorization from RENFROE before using clamps in temperatures other than shown.**

**“HOT LIFTS”:** The Model R and S clamps are available in modifications that are capable of making lifts where the temperatures of the member being lifted exceeds 200 degrees Fahrenheit (+93 degrees Celsius). Depending on conditions a lift may exceed 1000 degrees Fahrenheit (538 degrees Celsius). The exact application and temperatures of the plates to be handled are critical in selecting the proper model. **WARNING: Secure written instructions from RENFROE for all hot lift applications.**

**LOCKING CLAMPS:** Locking clamps are divided into the categories listed below. With the exception of the “Locking Wedge” and “Locking Screw” type the purpose of the locks are to facilitate the attaching and removing of the clamp from the member being handled.

**“LOCK CLOSED”** - an over-center spring loaded mechanism in which the spring exerts a force on the gripping cam when the lock handle is moved to the “Lock Closed” position. When the

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handle is moved to unlocked position the force exerted by the spring is relaxed and the gripping cam may be retracted by pushing the lifting shackle into body of clamp. Refer to the Operation Section of specific models of "Lock Closed" clamps for additional details. Typical "Lock Closed" clamps are Models DG, FR and M.

"LOCK OPEN ONLY" - normally used on "Hot Lift" clamps and consists of a manually operated "Lock Stop Pin" that is inserted when gripping cam of clamp is retracted and removed when clamp is positioned on the plate. Tag line may be used to permit operator to remove pin from a greater distance from clamp. Refer to the Operation Section of specific model of "Lock Open Only" clamps for additional details. Typical "Lock Open Only" clamp is the Model RO.

"LOCK OPEN-LOCK CLOSED" - an over-center spring loaded mechanism in which the spring exerts a force on the gripping cam when the lock handle is moved to the "Lock Closed" position. When the handle is moved to the "Lock Open" the gripping cam is maintained in the retracted position for ease in installing the clamp on a plate or member. The Model FRD contains individual "Lock Open" and "Lock Closed" mechanisms that must be operated separately. Refer to the Operation Section of specific models of the "Lock Open-Lock Closed" clamps for additional details. Typical "Lock Open-Lock Closed" clamps are Models FRD, R, S, SD, SEA, SX, TL, TLA and the J-Series.

"LOCKING WEDGE" - is a fluted steel wedge that is driven in place with a

hammer. The body of the wedge is positioned in a slot in the clamp body with the fluted edges contacting the member to which the clamp is being attached. Refer to Operation Section of specific models of the "Locking Wedge" clamps for additional details. Typical "Locking Wedge" clamps are Model A1, B1, B2 and PB.

"LOCKING SCREW" - "Lock Screw" clamps depend on manually adjusting a screw to hold the gripping surface in place for lifting and removing the clamp from member being lifted. Refer to Operation Section of a specific model of "Locking Screw" clamps for additional details. Typical "Locking Screw" clamps are Models AC, ACP, NM, PC, SCP and SCPA.

NON-LOCKING: "Non-Locking" clamps have no mechanisms to aid in attaching or removing clamp from member being lifted. It is necessary to have position of clamp maintained on the member being lifted until a properly applied force is exerted to the lifting shackle. Refer to Operation Section of specific models of the "Non-Locking" clamps for additional details. Typical "Non-Locking" clamps are Model AST, ASTL, BD, HR, HDR and WHSR. **WARNING:** A pointing out and notice of danger. The purpose of a "WARNING" is to apprise the operator and all other affected persons of the existence of danger of which he should be but may not be aware and to enable the operator to protect himself and others where applicable against such danger. An attempt is made herein to warn against reasonable and reasonably foreseeable danger in the proper use and possible reasonable misuse of RENFROE products described in this manual.



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**DESIGNATED PERSON** — A person selected by the employer or the employer's representative as being competent to perform those specific duties.

**QUALIFIED PERSON** — A person who, by possession of a recognized degree in an applicable field or certificate of professional standing, or who, by extensive knowledge, training, and experience, has successfully demonstrated the ability to solve problems relating to the subject matter at hand.

## MODEL NMA



## APPLICATION

The Model “NMA” clamp (non-marring) is manufactured with smooth gripping surfaces to prevent marring when gripping stainless, copper, aluminum and other polished metal plates. An adjusting wheel is used to compensate for various thicknesses of plate. Refer to definitions, pages 7 and 8, for explanation of “Lock Open” and “Lock Closed” clamp. Due to the variety of conditions that may exist in handling plates, it is recommended the clamps be used in pairs and attached to a chain or wire rope sling, supported by a spreader beam. Refer to figures 1, 2 and 3 on page 10. The Model “NMA” is supplied with stainless steel gripping surfaces and is available with steel or bronze upon request. The Model “NMA” may be used to turn plates from horizontal to vertical to horizontal. Refer to figure 3, page 10.

For identification of component parts, refer to assembly drawing of clamp located at the end of the Maintenance Section.

The Model “NMA” is not intended for use in transporting of plates using mobile equipment where shock loading may be severe.

**WARNING: Do not use on plates containing oil, paint or mill scale. Do not use for transporting of plates using mobile equipment. Refer to the sections on Operation and Maintenance for the approved procedures in the operation and maintenance of this product.**

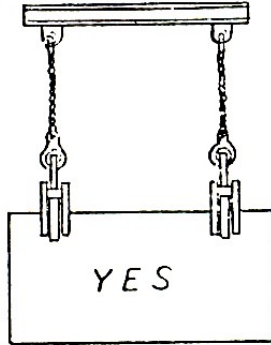


FIG. 1

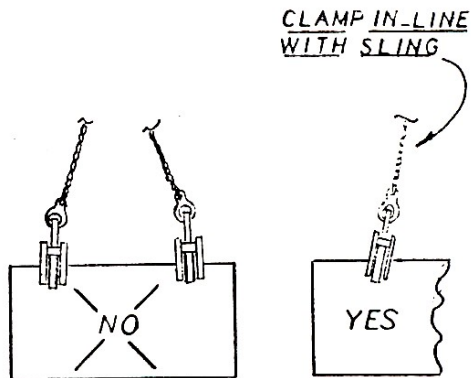


FIG. 2

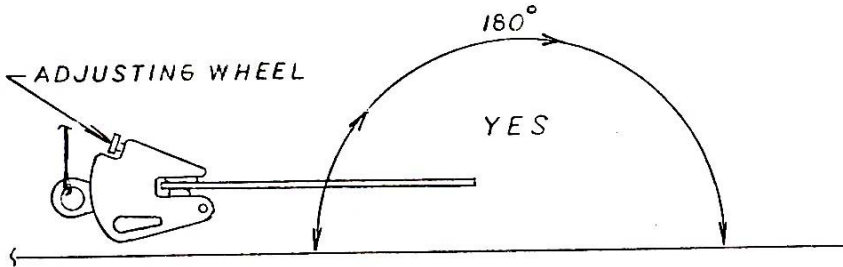


FIG. 3

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## **OPERATION**

### **Step 1**

Before using any RENFROE clamp, refer to the Application section to confirm the operation to be undertaken is recommended by RENFROE.

### **Step 2**

Select appropriate clamp and plate thickness range. The model, designation, capacity and plate thickness range is stenciled on each clamp.

**WARNING: Never exceed rated capacity or use on plates that are not within the range of plate thickness stenciled on clamp. Lift only one plate on each lift.**

### **Step 3**

Inspect clamp before each lift.

**WARNING: Do not use if in need of repair.**

If in doubt, refer to Maintenance Section for detailed maintenance instructions and assembly drawing of the clamp for part identification.

- Check the clamp to be certain the Identification and warning tags are present and legible.
- Do not use the clamp if the tags are missing or illegible
- Inspect gripping surfaces for wear and defects. Surfaces must be smooth and free of foreign material.
- Adjusting wheel should turn freely by hand—binding could indicate damage that would impair proper operation of the clamp.
- Inspect operation of linkages and lifting shackle. All components should move freely—binding indicates damaged parts. Check for bent shackle and elongation of the shackle eye.
- Inspect body for wear and damage; cam pin holes for elongation; jaw opening for distortion, fractures and excessive wear caused by overloading or excessive side-loading.

- 
- Inspect for worn or distorted pins and loose body bolts.
  - Check springs for damage and distortion; spring must produce a position over-center.

## **REMOVE ANY CLAMP FROM SERVICE IN NEED OF REPAIR.**

### **Step 4**

The clamp is a component of the rigging used in lifting or transporting a plate. It is important to use safe and adequate rigging. When in the “Lock Closed” position the lock is used to hold the clamp in place until the gripping mechanism is actuated by a force applied to the lifting shackle.

**WARNING: IMPROPER OR EXCESSIVELY HEAVY RIGGING MAY INTERFERE WITH THE OPERATION OF THE CLAMP AND ITS ABILITY TO MAINTAIN A PROPER POSITION ON THE PLATE. NEVER ATTACH CRANE HOOK DIRECTLY TO THE CLAMP - ALWAYS USE SLING BETWEEN CRANE HOOK AND CLAMP.**

**WARNING: SHACKLE MUST NOT BE UNDER TENSION FROM THE CRANE HOOK. TO AVOID DAMAGE TO LOCK ASSEMBLY, MAKE CERTAIN THE LIFTING SHACKLE SITS LOOSELY ON THE SLING ATTACHED TO THE CRANE HOOK.**

### **Step 5**

Place lock handle in “Lock Open” position. Refer to figure 5, page 15.

### **Step 6**

Turn adjusting wheel until indicator points to exact thickness of plate to be lifted. Refer to figure 4, page 15.

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### Step 7

Place clamp on plate to be lifted - Align clamp with sling. Refer to figure 1 and 2, page 10.

### Step 8

Move lock handle to "Lock Closed" - allow a 1/4" clearance from top of plate to inside of jaw opening. Refer to figure 6, page 15.

**WARNING: TOP OF PLATE MUST BE MINIMUM OF 3/4" ABOVE TOP OF GRIPPING CAM. REFER TO FIGURE 6, PAGE 15.**

### Step 9

Check gripping cam - if area painted red or scribe lines on side of gripping cam is visible - **DO NOT LIFT PLATE.** Refer to figures 7 and 9, page 16.

- A. Check thickness indicator to make certain it is set at same thickness as plate to be lifted. If not repeat, Steps 5 through 9.
- B. If scribe lines are area painted red is still visible - clamp is in need of maintenance.
- C. Red painted area must be highly visible. **DO NOT USE IF IN NEED OF REPAINTING.**

**WARNING: NEVER LIFT WHEN SCRIBE LINES OR AREA PAINTED RED IS VISIBLE.**

### Step 10

**WARNING: THE OPERATOR SHOULD POSITION HIMSELF AWAY FROM AND FULLY CLEAR OF THE MEMBER TO BE LIFTED. DO NOT COMMENCE LIFT UNTIL ALL PERSONNEL ARE CLEAR OF THE AREA OF THE LIFT. NEVER STAND UNDER OR NEAR A MEMBER BEING LIFTED.**

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## Step 11

To remove clamp after plate is fully supported and at rest in a stable position, relax lifting force. Move lock handle to “Locked Open” position. Remove clamp from plate.

## Step 12

Inspect clamp. Remove from service if in need of repair.

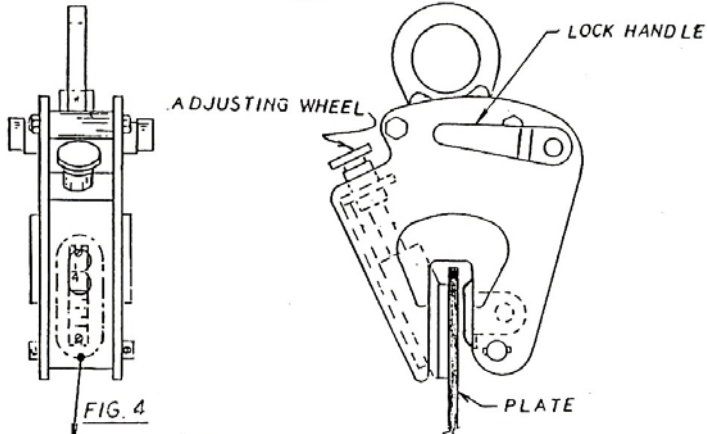
**WARNING: IN THE EVENT THE STENCILING IS WORN AND NOT LEGIBLE OR THE TAG CONTAINING THE MODEL, CAPACITY OR OTHER PERTINENT INFORMATION IS MISSING - DO NOT USE CLAMP UNTIL IT HAS BEEN PROPERLY LABELED. NEVER USE CLAMP UNLESS GUAGE PLATE IS IN PLACE AND LEGIBLE.**

Inspection kits are available at no charge upon request from the distributor or RENFROE. Kit contains:



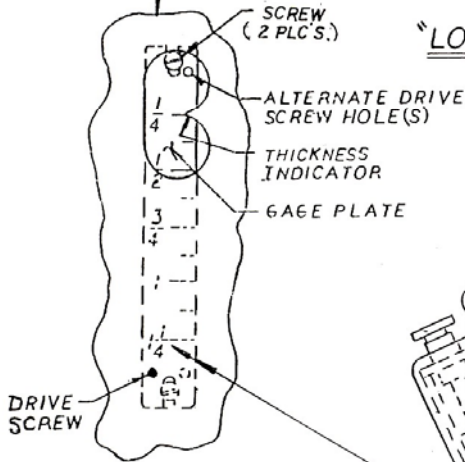
RENFROE clamps are constructed so the wearing parts may be replaced by installing individual parts or by using RENFROE Repair Kits containing all parts generally replaced due to normal wear.

NMA\_4-TON



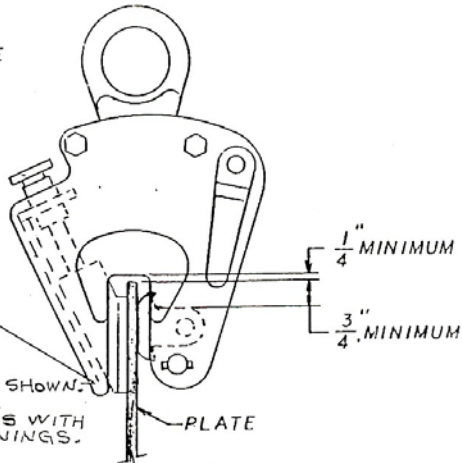
"LOCK OPEN" POSITION

FIG. 5



DETAIL OF FIG. 4

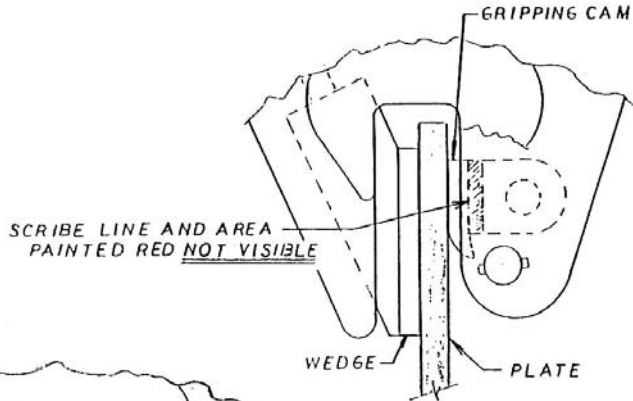
NOTE: TYPICAL GAGE PLATE SHOWN. NUMBERS SHOWN WILL BE DIFFERENT FOR CLAMPS WITH DIFFERENT JAW OPENINGS.



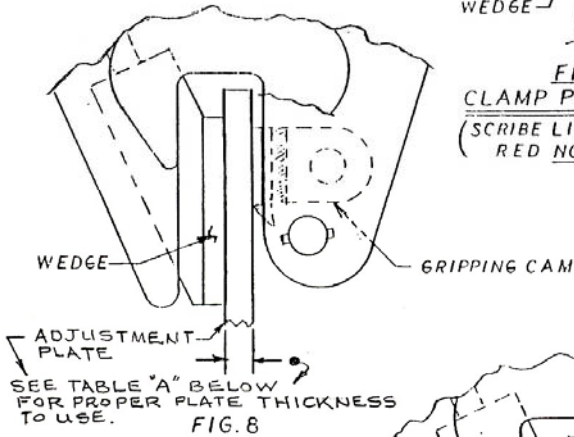
"LOCK CLOSED" POSITION

FIG. 6





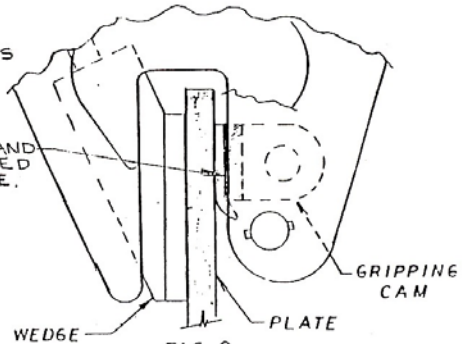
**FIG. 7**  
CLAMP PROPERLY ADJUSTED  
 (SCRIBE LINE AND AREA PAINTED RED NOT VISIBLE)



**FIG. 8**

TABLE "A"

CLAMP JAW OPENING (IN)	ADJUSTMENT PLATE THICKNESS (IN)	GAUGE PLATE READING (IN)
1/4 - 1 1/4	3/8	1/4
1 - 2	1 1/8	1



**FIG. 9**  
 CLAMP REQUIRES ADJUSTMENT OR MAINTENANCE - DO NOT USE

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## Maintenance Program for Renfroe Clamps Manufactured from Steel

The severity of service to which the clamp is subjected in the work place determines the frequency and type of inspection procedure required for the clamp. The frequency and type of inspection is determined by the clamp owner. Renfroe acknowledges the ASME B30.20 safety standard which sets forth minimum inspection requirements for “Below-the-Hook” lifting devices and the Renfroe Recommended Inspection Schedule meets and/or exceeds the ASME inspection recommendations.

**Before using a clamp operators should be trained by a qualified person to visually inspect a lifting clamp that will include but not be limited to the following:**

### **Every lift Inspection:**

*A visual inspection by the operator before and after each lift made by the clamp.*

- Check the clamp to be certain the Identification and warning tags are present and legible.
- Do not use the clamp if the tags are missing or illegible
- Check the clamp to be certain the Identification and warning tags are present and legible.
- Do not use the clamp if the tags are missing or illegible
- Inspect gripping surfaces for wear and defects. Surfaces must be smooth and free of foreign material.
- Adjusting wheel should turn freely by hand—binding could indicate damage that would impair proper operation of the clamp.
- Inspect operation of linkages and lifting shackle. All components should move freely—binding indicates damaged parts. Check for bent shackle and elongation of the shackle eye.
- Inspect body for wear and damage; cam pin holes for elongation; jaw opening for distortion, fractures and excessive wear caused by overloading or excessive side-loading.
- Inspect for worn or distorted pins and loose body bolts.
- Check springs for damage and distortion; spring must produce a position over-center.

Remove any clamp from service in need of repair.

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**WARNING: Do not use the clamp if in need of repair.**

If, during the every lift inspection, the operator believes the clamp exhibits excessively worn parts or is damaged, the clamp should be inspected by a qualified person who will make a determination as to its fitness to make a lift. At this time the condition of the clamp should be noted and recorded. After inspection by the qualified person, it may be decided that a periodic inspection procedure is necessary.

**Frequent Inspection:**

*A visual inspection (see every lift inspection) by an operator or other designated person timed according to the clamps service class.*

- **Normal Service:** monthly
- **Heavy Service:** weekly to monthly
- **Severe Service:** daily to weekly.

If, during the frequent lift inspection, the operator believes the clamp exhibits excessively worn parts or is damaged the clamp should be inspected by a qualified person who will make a determination as to its fitness to make a lift. At this time the condition of the clamp should be noted and recorded. After inspection by the qualified person, it may be decided that a periodic inspection procedure is necessary.

**Periodic Inspection:**

*A recorded inspection by a qualified person as described in the Periodic Inspection Procedure below timed according to the clamps service class.*

- **Normal Service:** annual
- **Heavy Service:** semi-annual
- **Severe Service:** quarterly.

If during any inspection a condition is found which leads to a periodic inspection then the next periodic inspection is due from the time the clamp is returned to service. See the table below.

**Normal Service-One Year**  
**Heavy Service-6 Months**  
**Severe Service-3 Months**

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**Warning: If any hazardous condition is found that may cause injury to the operator or other personnel then the clamp should be subjected to a Periodic Inspection by a Qualified Person.**

**Repair (replacement of worn parts)**

During regular maintenance when replacing parts that are worn a record should be made of the parts replaced. After the replacement of worn parts clamps need not be load tested.

**Repair (replacement of damaged parts)**

During a repair in which parts are replaced due to damage a record should be made of the repair. At this time the clamp should be marked with the following information as per the ASME B30.20 requirements:

- **Name and address of the repairer**
- **Repairer's unit identification**
- **Clamp weight (if altered)**
- **Rated load (if altered)**
- **ASME BTH-1 Design Category (if altered)**
- **ASME BTH-1 Service Class (if altered)**

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## Model NMA Periodic Inspection Procedures

**WARNING: A COMPLETE INSPECTION, UTILIZING THE STEP-BY-STEP PROCEDURES HEREINAFTER PROVIDED, SHOULD BE MADE ON A PERIODIC BASIS DEPENDING UPON THE TYPE AND EXTENT OF USE, BUT IN ALL EVENTS NOT LESS THAN NINETY (90) DAYS DURING ALL TIMES THAT THE PRODUCT IS IN SERVICE.**

For identification of component parts, refer to the assembly drawing of clamp located at the end of the Maintenance section.

### Step 1

Step 1. Verify the identity of the clamp by checking the I. D. plate on the clamp body. If the I. D. plate is missing or not legible an RFID chip (Radio Frequency Identification Device) is embedded in the clamp body or a clamp component. If the I. D. plate is missing and the RFID chip is unavailable call the Renfro factory for instructions on returning the clamp for recertification.

### Step 2

Completely disassemble clamp.

### Step 3

Remove all dirt, grease and other matter that may inhibit proper inspection of the clamp body or clamp components.

### Step 4

Inspect welds for fractures. RENFROE recommends a dye penetrant or similar method of detecting indications on the clamp. If an indication is found it may be necessary to use a magnetic particle, ultrasonic or similar methods for determining damage to the clamp or components.

## GRIPPING MECHANISM ADJUSTMENT:

A. Move the Lock Handle to the "Lock Open" position. Reference figure 5, page 15.

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- B. Place “Adjustment Plate” in clamp opening - See figure 8, page 16. Make certain the plate is wider than the gripping surface of the clamp. (See Table “A”, page 16, for the proper thickness of the Adjustment Plate to use for the different Clamp Jaw Openings).
  - C. Turn the Adjusting Wheel until the Adjustment Plate is held tightly between the Wedge and the Gripping Cam - See figure 8, page 16. The Thickness Indicator, (see figure 4, page 15), should not be pointing to one of the “Gauge Plate Readings” in table “A” depending on the Jaw Opening of the clamp being checked. If it does, the clamp is properly adjusted. (If the Thickness Indicator does not line up with the proper Gauge Plate Reading in Table “A” - see instruction F below).
  - D. To confirm adjustment—remove Adjustment Plate and turn Adjusting Wheel until the Thickness Indicator points to one of the Plate Thicknesses shown on the Gauge Plate. Install clamp on a plate of that same thickness. Move lock handle to the “Lock Closed” position. If adjustment is proper it will require a positive force to move lock handle to the “Lock Closed” position and the plate will be held firmly between the gripping surfaces of the clamp.
  - E. Check side of the gripping cam - If scribe lines or area painted RED are visible the clamp needs repair or adjustment - Refer to Figure 9, Page 16.

**WARNING: DO NOT USE CLAMP WHEN SCRIBE LINES OR AREA PAINTED RED ARE VISIBLE.**

- F. If the Thickness Indicator does not point to one of the Gauge Plate Readings when Step C was performed above, then remove drive screw from Gauge Plate and then loosen both screws - Refer to Figure 4, Page 15.
- G. With the lock handle in the “Lock Open” position and the Adjustment Plate held tightly in place, slide the Gauge Plate until the Thickness Indicator reads the correct Plate Thickness as shown in Table “A” page 16 for the clamp jaw opening. Tighten screws - If length of slotted holes in Gauge Plate will not accommodate the required adjustment - REPLACE ADJUSTING WEDGE.

---

**WARNING: NEVER USE THE CLAMP WHEN THE THICKNESS INDICATOR DOES NOT CORRESPOND TO THE PROPER GAUGE READING WITH THE ADJUSTMENT PLATE IN PLACE.**

H. After the Thickness Indicator is set correctly, drill 1/4" deep hole into the Adjusting Wedge body through one alternate Drive Screw hole in the Gauge Plate using a No. 52 drill. Insert a No. 0 x 3/16" long drive screw in the hole.

**WARNING: DO NOT USE CLAMP UNLESS DRIVE SCREW IS INSTALLED TO PREVENT THE GAUGE PLATE FROM SHIFTING POSITION.**

#### Step 5

##### ADJUSTING SCREW ASSEMBLY:

Inspect Adjusting Screw Assembly. Check nuts and screw for thread wear and screw for bending or distortion.

#### Step 6

##### ADJUSTING WEDGE:

Inspect Adjusting Wedge. The surface must be smooth and free of fractures and the surface flat and parallel with that of the Gripping Cam.

#### Step 7

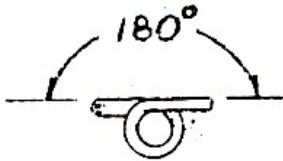
##### GRIPPING CAM:

Inspect Gripping Cam for elongated holes and distortion. Gripping Cam must pivot freely on cam link. Red painted area must be highly visible. Repaint as required.

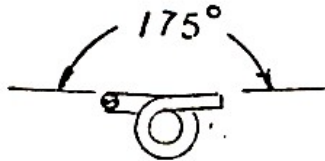
#### Step 8

##### SPRING:

Inspect Spring for wear and distortion. Spring legs must be 175 to 180 degrees as shown in Illustrations A and B at top of next page. Spring must not exceed 180 degrees as shown in Illustration C.



YES  
Illustration A



YES  
Illustration B



NO  
Illustration C

### Step 9

#### CAM LINK:

Inspect Cam Link for fractures, wear, distortion and elongated holes. Wear is most prevalent at areas where Cam engages floating cam pin and at pin holes.

**WARNING: REPLACE CAM LINKS THAT ARE FRACTURED, WORN OR DISTORTED.**

### Step 10

#### ASSEMBLY:

After reassembly, check operation of clamp. All parts should move freely without binding. Refer to assembly drawing for proper location of component parts.

**WARNING: ALL RETAINING PINS AND FASTENERS MUST BE IN PLACE.**

**WARNING: REPLACE ALL COMPONENT PARTS THAT ARE FRACTURED, WORN, DISTORTED, ETC.**



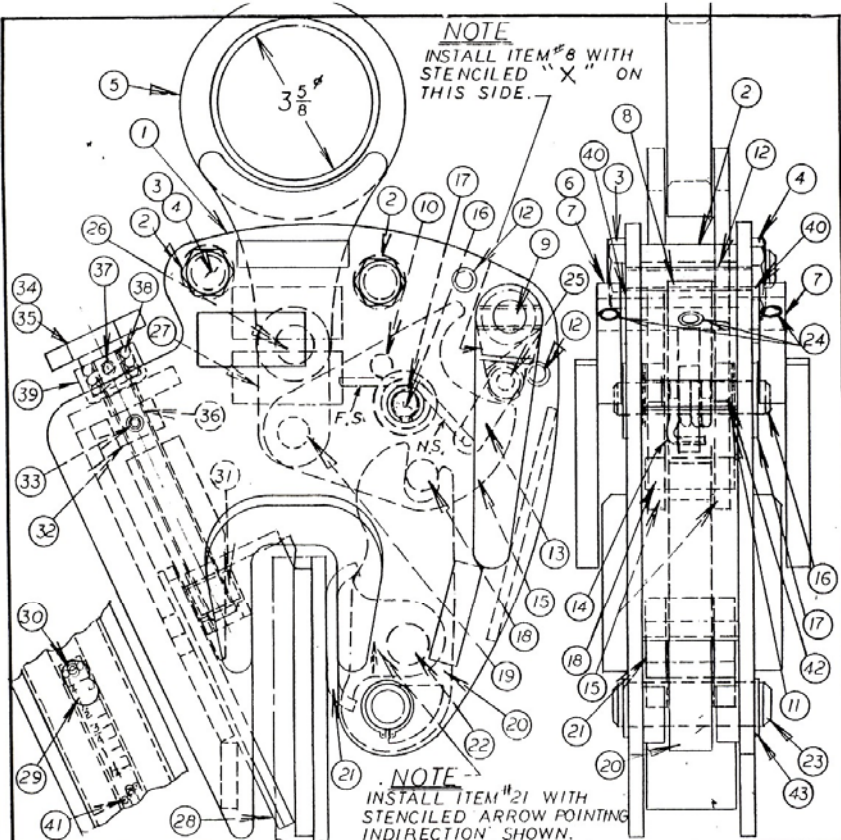
## GENERAL

RENFROE products may be returned to the factory for inspection and refurbishment in accordance with an established fee schedule.


Use only RENFROE replacement parts to insure maximum efficiency and safety factor originally built into the product.

**WARNING: DO NOT WELD, GRIND OR MODIFY THE CLAMP BODY OR COMPONENT PARTS IN ANY MANNER. IN THE EVENT THE STENCILING IS WORN AND NOT LEGIBLE OR THE TAG CONTAINING THE MODEL, CAPACITY, OR OTHER PERTINENT INFORMATION IS MISSING - DO NOT USE CLAMP UNTIL IT HAS BEEN PROPERLY LABELED.**

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REV. NO.	BY APP.	DATE	REVISION
1	JWH	3/29/85	REDRAWN FROM DRWG NO. B 4831-D.



**J. C. RENFROE & SONS, INC.**  
1926 SPEARING ST.  
JACKSONVILLE, FLORIDA

**DRAWING TITLE**

**CLAMP ASS'Y  
4 TON "NMA"**

<b>DO NOT SCALE DRAWING BREAK SHARP EDGES</b>	<b>MATERIAL</b>
<b>TOLERANCES</b>	SEE DETAIL
UNLESS OTHERWISE SPECIFIED	DATE
FRACTIONAL ±      DECIMAL ±	03-29-85
ANGULAR ±	DRWG. NO.
DRWN. BY J.W.H.	SCALE
CHKD. BY E.V.R.	NONE
APP. BY	NEXT ASSY.
	B-4831 A
	SHEET 1 OF 3




ITEM	PART NO.	SUB-ASSY PART NO.	NOMENCLATURE	QTY
26	P 1032		SHACKLE PIN	1
27	B 4857		SHACKLE LINK	1
28	B 4841		WEDGE ASSY	1
29	SEE TABLE BELOW		GAUGE PLATE	1
30		P P	NO. 6 - 32 X 1/4 LG. BUTTON HD. C. S.	2
31	R P.		3/4-6 L.H. ACME SQ. NUT	1
32	B 4813		RETAINING NUT	1
33	P P		3/16 X 1 1/4 LG. SPIROL PIN	1
34	B 4808		ADJUSTING SCREW ASSY	1
35		B 4810	WHEEL ADJUSTER	1
36		B 4814	ADJUSTING SCREW	1
37		P P	1/4 X 1" LG. SPIROL PIN	1
38	P. P.	C1225-112-0815 → <del>C1225-0679</del>	"BARNES SPRING"	1
39	B 4812		SPRING SLEEVE	1
40	B 5924		SPRING WASHER	2
41	P. P.		NO. 0 X 3/16 LG. DRIVE SCR. (3 SPARE)	4
42	B 4915		SPRING PIN ROLLER	2
43	P. P.		"WALDES-TRUARC" RET. RING NO. 5160-112	2

JAW OPENING	BODY ASSY PART NO.	GAUGE PLATE PART NO.	CLAMP ASSY PART NO.
1/4 - 1/4	B 4832	B 4908	B 4831
1 - 2	B 5273	B 5049	B 5272

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 1926 SPEARING ST.  
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DRAWING TITLE

**CLAMP ASSY  
4 TON "NMA"**

DO NOT SCALE DRAWING BREAK SHARP EDGES	MATERIAL
TOLERANCES UNLESS OTHERWISE SPECIFIED FRACTIONAL ±    DECIMAL ± ANGULAR ±	DATE 4-1-85
DRWN. BY J.W.H.	SCALE
CHKD. BY I.V.R.	NEXT ASSY.
APP. BY	DRWG. NO. B 4831 A

SHEET 3 OF 3

**EXCLUSION OF WARRANTY**

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EXPRESSED NOR IMPLIED WHICH EXTEND  
BEYOND THE DESCRIPTIONS OR STATE-  
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PART HEREOF.**



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