

NUCOR BUILDING SYSTEMS

CFR

SEAMING MANUAL

FOR FIELD USE

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1.0**GENERAL****1.0 GENERAL****1.1 PURPOSE OF THIS MANUAL**

This installation manual is provided to Nucor Builders and their erectors as the recommended procedure for the correct seaming of the Nucor Building Systems (NBS) CFR Roof System.

This manual is intended to be used in conjunction with the CFR Erection Manual and the project's erection drawings to help plan and organize the installation of the NBS CFR Roof System. The erection drawings govern specific seam requirements. **In the case of conflict between this manual and the erection drawings, the erection drawings will take precedence.**

1.2 BUYER'S RESPONSIBILITY

The buyer must take the responsibility for selecting a competent erector, insist that the work be performed by qualified and experienced standing seam metal roof installers, insist that the erector take time to study and understand this manual, then assure that the erector correctly follows the manual's instructions.

NBS does not guarantee and is not liable for the quality of erection. NBS is not responsible for building defects that may be attributed to improper erection or the negligence of other parties.

Clarification concerning the NBS CFR roof installation and seaming should be directed to the **QUALITY SERVICE REPRESENTATIVE** or the Customer Service Manager at the NBS plant. The following is a list of addresses and phone numbers for the Quality Service Representative at each NBS division:

WATERLOO, IN

305 Industrial Parkway
Waterloo, IN 46793
Phone: 260-837-7891
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BRIGHAM CITY, UT

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Brigham City, UT 84302
Phone: 435-919-3100
Fax: 435-919-3101

1.3 MBMA

This building is designed, manufactured, and delivered in accordance with the **2006 M.B.M.A. METAL BUILDING SYSTEMS MANUAL. CONSULT THE INFORMATION IN THE "COMMON INDUSTRY PRACTICES" SECTION.**

1.4 DISCLAIMER

THE PRODUCTS AND PROCEDURES IN THIS MANUAL ARE SUBJECT TO CHANGE WITHOUT NOTICE

1.5 RECEIVING AND SHIPPING

Upon receipt of the seaming kit, and before the signing the shipping receipt, check and verify that the seaming kit is received in good condition, without damage or loss of contents. **See section 5.0 for a list of kit contents.**

If there is damage or loss of contents, immediately file the claim with the shipper and notify NBS for replacement instructions.

Upon completion of roof seaming, promptly return the seaming kit to NBS, in accordance with the instructions on the return shipping documents. The return shipping documents are included in the seaming kit.

1.0 GENERAL**1.6 HANDLING AND STORAGE**

Provide safe and secure handling of the seaming tools when in use.

The Motorized Seaming Machine weighs 65lbs., and can cause severe injury and damage if it falls.

The machine is too heavy to safely carry up a ladder. Always hoist the machine onto the roof with proper lifting equipment and securely tied to the machine's front lifting handle.

When starting and stopping the seaming machine at the edges of the roof, the operator must be securely positioned so they can safely lift the machine on and off of the seam.

CAUTION: When running the machine in the downslope direction, the machine will have greater downhill inertia and coasting distance.

When not locked to the seam, the Motorized Seaming Machine can freely roll on its wheels. Always secure the machine to prevent it from rolling or sliding off of the roof.

When the seaming tools are not in use, they must be stored in the seaming kit chest and in a safe and dry area. The seaming tools must be cleaned and dried before storing.

1.7 INSURANCE

The NBS CFR seaming tools are custom built specialized equipment and are costly to replace. Provide adequate insurance coverage on the seaming tools while they are in your possession.

1.8 POWER SUPPLY

The seaming machine motor requires a minimum electrical power supply of: 20 amps @ 120 volt @ 60 hz. AC.

1.9 ELECTRICAL SERVICE AND CORDS

The electrical service and cords to the seaming machine must be of sufficient capacity to provide the full 20 amp @ 120 volts. **AT THE SEAMING MACHINE.** If other tools or equipment are being used on the same service, the service and cord capacity must be increased accordingly

IMPORTANT NOTE: LOW VOLTAGE DUE TO INSUFFICIENT SERVICE CAPACITY, INSUFFICIENT CORD SIZE OR EXCESSIVE CORD LENGTH WILL CAUSE OVERHEATING AND BURNOUT OF THE SEAMING MACHINE'S MOTOR.

1.10 ELECTRICAL SAFETY AND CORD CLEARANCE

Check that the power cords are fitted with the correct plug for safe and secure connection to the seaming machine. Check that the power cords are properly grounded and that the service has a ground fault circuit breaker.

Check that the electrical cord is of sufficient length to extend the full length of the area to be seamed, without stress on the cord or its connections. Check that the path for the cord is clear and that the cord is clear of snagging on panel edges or entanglement onto the seaming machine rolls.

1.11 ROOF PERFORMANCE

The roof panels must be correctly installed, hand crimped, and seamed before the roof system can provide its designed wind load and weather resistance capability. This means that an un-seamed roof is subject to wind load failure and weather resistance failure. **The erector shall be responsible to ensure that the proper seaming method is followed (Either Nucor Roll Lock™, Nucor Vise Lock®, or Nucor Vise Lock 360®).**

2.0 IMPORTANCE OF SEAMING/CRIMPING**2.0 IMPORTANCE OF SEAMING/ HAND CRIMPING****2.1 WHEN TO HAND CRIMP**

As work progresses, the erector is required to hand crimp the panels at the low eave, each clip, endlap and high eave/ridge end of panel. Utilize the proper hand crimper to accomplish this.

Hand crimping the entire roof into a finished Roll Lock Seam, will suffice in *temporarily* securing the roof panel until the proper finished seam can be completed. Also, hand crimping is required prior to motor seaming of the roof panel.

2.2 WHEN TO SEAM

Whenever possible, the installed roof panels should be seamed at the completion of each day's work. If high winds or rain/snow conditions are imminent, the installed roof panels must be seamed before such conditions occur.

Refer to the project erection drawing **ROOF SHEETING PLAN(S)** and/or **DETAIL PAGE(S)** to determine what seaming option is required. The detail on the next page is a copy of the detail that will appear on the erection drawings. **NOTE:** This detail conveys the **MINIMUM** seaming requirements based on the design of the project. Additional seaming may be necessary as specified by the builder. **ALSO NOTE: Multiple seaming types may be required on a project. Review the Roof Sheeting Plan(s) and Detail(s) carefully. Multiple seam types means that you could have two different seamers each producing a different seam profile. SEE page 10 defining seam types.**

2.3 SPECIALIZED SEAMING TOOLS

On roofs requiring Nucor Vise Lock® or Nucor Vise Lock 360® seams, it may not always be practical or feasible to motor seam the roof panels until after the roof installation is completed. Motor seamed roof panels are difficult to reposition or replace. Motorized Seaming Machines may not always be available during the entire roof installation period.

In such cases, it may be desirable to temporarily Nucor Roll Lock® seam the roof panels with the manual seaming tool. Then, later complete the seaming with the Motorized Seaming Machine.

IMPORTANT: It shall be the erector's responsibility to apply the Nucor Roll Lock™ seaming method in such a way as to ensure that the panels have been adequately secured until the motor seaming can occur.

2.0 IMPORTANCE OF SEAMING/CRIMPING

CFR CRIMPING/SEAMING REQUIREMENTS

THE DESIGN OF THIS STRUCTURE REQUIRES THAT THE FOLLOWING SEAMING METHOD BE UTILIZED:

- 1) NUCOR ROLL LOCK™ SEAM (SEE NOTE 1 AND 2 BELOW)
- 2) MODIFIED NUCOR ROLL LOCK™ SEAM (SEE DETAIL ON FOLLOWING SHEET)
- 3) NUCOR VISE LOCK® SEAM (SEE NOTE 1, 2 AND 3 BELOW)
- 4) NUCOR VISE LOCK 360® SEAM (SEE NOTE 2 AND 3 BELOW)

NOTE 1: ADDITIONAL SEAMING MAY BE NECESSARY AS SPECIFIED BY THE BUILDER.

NOTE 2: MULTIPLE SEAMING TYPES MAY BE REQUIRED. REVIEW THE ROOF SEAMING PLAN CAREFULLY FOR SEAMING REQUIREMENTS.

NOTE 3: NOT ALL ROOF SYSTEMS REQUIRE MECHANICAL SEAMING. THE BUYER, OWNER, OR ARCHITECT MAY ELECT TO SPECIFY A MECHANICALLY SEAMED PANEL. OFTEN, FACTORY MUTUAL RATINGS ALSO REQUIRE A VL360 MECHANICAL SEAMER. SEE THE CFR SEAMING MANUAL FOR IMPORTANT ERECTOR INFO ABOUT VISE LOCK 360 SEAMER REQUIREMENTS.

WHEN TO CRIMP/SEAM

As work progress's, it shall be the erector's responsibility to apply the Nucor Roll Lock hand crimping method in such a way as to ensure that the panels have been adequately secured until mechanical seaming can occur.

Whenever possible, the installed roof panels should be mechanically seamed as work progress's OR at the completion of each day's work. If high winds or rain/snow conditions are imminent, the installed roof panels must be seamed before such conditions occur.

Refer to the project erection drawing Roof Seaming Plan and/or Detail pages to determine what seaming option is required. The above detail conveys the MINIMUM seaming requirements based upon the design of the project. Additional seaming may be necessary as specified by the builder. NOTE: multiple seaming types may be required on a project, review the Roof Seaming Plan and details

3.0 GLOSSARY OF TERMS**3.0 GLOSSARY OF TERMS:**

Below is a list of terms and nomenclature used within this manual to describe hand crimping and seaming operations.

Panel Seam – Male and female panel corrugation properly hooked together within a roof system.

Finished Panel Seam- A seam that has been completely or partly hand crimped OR motored seamed into Roll Lock, Vise Lock OR Vise Lock 360 seam.

Nucor Roll Lock™ Seam- A finished seam that has had a series of *single* hand crimps at the low eave, each clip, endlap and high ridge end of each panel with a Roll Lock/Vise Lock hand crimper. (See Page 10 for profile detail)

Manual Seaming- The crimping of a panel by use of a hand crimper.

Temporary Crimping – A finished **Nucor Roll Lock™ Seam**.

Motor/Mechanical Seaming- Seaming the panel by use of an electric panel seamer.

Nucor Vise Lock® Seam- A finished seam that has been hand crimped *continuously* with a Vise Lock hand crimper **OR** motor seamed with a Vise Lock Seamer. (See Page 10 for profile detail)

VL – Vise Lock

Nucor Vise Lock 360® Seam- A finished seam that has been hand crimped *continuously* with a Vise Lock 360 hand crimper **OR** motor seamed with a Vise Lock 360 Seamer. (See Page 10 for profile detail)

VL- 360- Vise Lock 360

Single pass Vise Lock 360 Seamer Operation- A single seamer that is setup to form a Roll Lock seam into a Vise Lock 360 seam in one pass. (One direction only)

- **'The Answer'** – The seamer companies name for a Single Pass Vise Lock 360 seamer.

Double pass Vise Lock 360 Seamer Operation- Two separate seamers, one is set-up for the Vise Lock Seam and the second seamer is set-up for the Vise Lock 360 seam. (One direction only on the second seamer)

- **Primary Seamer**- This is the first seamer in a double pass seaming operation and is set-up to produce a Vise Lock Seam.
- **Secondary Seamer**- This is the second seamer in a double pass seaming operation and is set-up to produce a Vise Lock 360 Seam.

Single Directional Seamer – A seamer that completes a finished seam in single direction.

Flip-flop Seamer (Bi-Directional)- A seamer that has two sets of tooling that runs two directions.

- This seamer can be set-up to have VL tooling on **both** sides of the machine, allowing it to VL a seam then, be flipped over and placed on the next seam to run back, producing another VL seam.
- This seamer can be set-up to have one side of the tooling set-up for VL and the other side of the tooling set-up for VL 360. This type of seamer will run one direction producing a VL seam then, you flip it over and place it on the *same* VL seam and run it back to the beginning thus producing a VL 360 seam.

4.0 SEAM TYPES**4 FINISHED SEAM TYPES****4.1 GENERAL**

The NBS CFR roof system has three seam type options. The project design and performance requirements govern which finished seam type is required.

Different finished seam types may be required on specific areas of the roof. In all cases, refer to the erection drawings to determine the required seam type and locations.

4.2 NUCOR ROLL LOCK™ SEAM

The Nucor Roll Lock™ seam requires the roof panels be crimped with the manual seaming tools at the panel clips, low eave, high side of the roof panels, and at the end laps.

The single hand crimp, (for this finished seam type) forms the seam into a Nucor Vise Lock® profile.

The Motorized Seaming Machine **is not** required for “Nucor Roll Lock”™ seaming

4.3 NUCOR VISE LOCK® SEAM

The Nucor Vise Lock® seam requires crimping the roof panel with the manual seaming tool at the panel clips, low eave, high side of the roof panels, and at the end laps. Then seaming the full length of the roof panels with the Motorized Seaming Machine.

NOTE:

A Nucor Vise Lock® seam can be *achieved* by **continually** hand crimping the Nucor CFR™ seam with the correct hand crimper.

4.4 NUCOR VISE LOCK 360® SEAMSingle pass Vise Lock 360 Seamer Operation:

This is a single seamer that is setup to form a Roll Lock seam into a Vise Lock 360 seam in one pass.

Double pass Vise Lock 360 Seamer Operation:

The Nucor Vise Lock 360® seam will utilize two seaming tools. The **Primary** seaming tool will form the **Nucor Vise Lock®** seam and the **Secondary** seaming tool will form the **Nucor Vise Lock 360®**.

This Nucor Vise Lock 360® seaming method **requires** that the roof panels be **previously** Nucor Vise Lock® seamed. Then over-seaming the full length of the roof panels with the Motorized Seaming Machine.

To Start the Nucor Vise Lock 360® seamer, the previously Vise Locked panel seam will need to be manually crimped with the 360 roof crimper. (Just to start the seamer) See **pages 27-30** for instructions.

NOTE:

A Nucor Vise Lock 360® seam can be *achieved* by **continually** hand crimping the Nucor Vise Lock® seam with the correct VL 360 hand crimper, in **small** edge and corner zones.

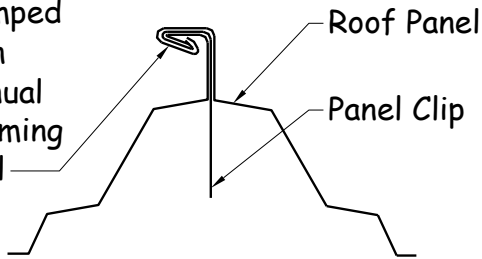
SEE THE FOLLOWING PAGE FOR DETAILS OF ALL THREE SEAM TYPES

4.0 SEAM TYPES

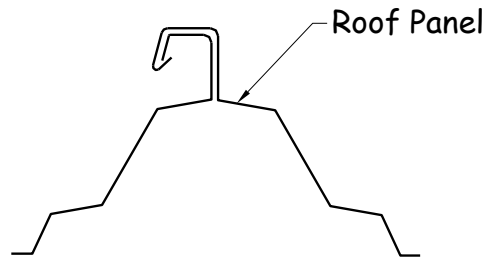
4.5 SEAM TYPE DETAILS

NUCOR ROLL LOCK™ SEAM

Crimped with
Manual
Seaming
Tool

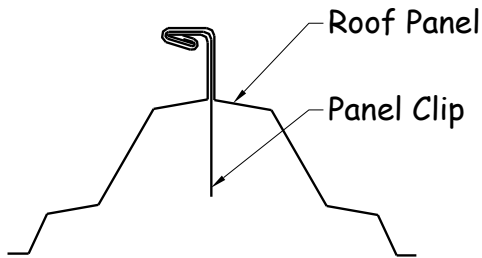


At Panel Clips, Panel Ends & End Laps

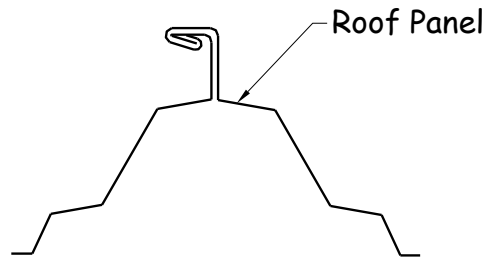


Between Panel Clips

NUCOR VISE LOCK® SEAM



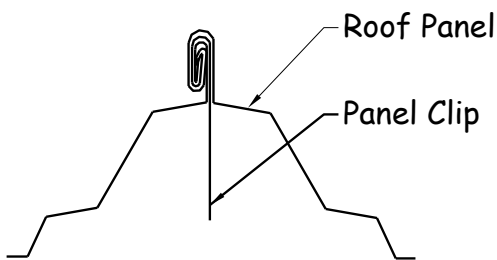
At Panel Clips



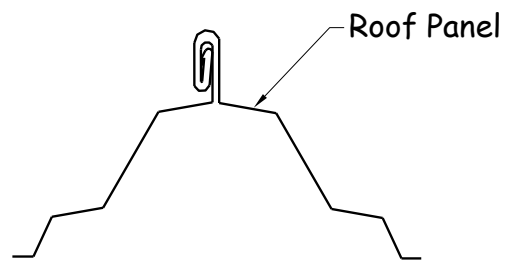
Between Panel Clips

Bi-directional seamer available for this seam option only.

NUCOR VISE LOCK 360® SEAM



At Panel Clips



Between Panel Clips

5.0 SEAMING KIT

5.0 SEAMING KIT

5.1 SPECIALIZED SEAMING TOOLS

The seaming of the NBS CFR roof panels requires special seaming tools that are available only from NBS.

CAUTION: THE USE OF ANY OTHER SEAMING EQUIPMENT WILL RESULT IN FAULTY AND/OR DAMAGED SEAMS AND SHALL INVALIDATE THE ROOF SYSTEM'S MATERIAL AND WEATHERTIGHTNESS WARRANTIES.

5.2 SEAMING TOOL SOURCE

The seaming tools are provided by NBS in accordance with the terms and conditions of the NBS contract documents. Contact the NBS Customer Service Department to arrange the scheduling, delivery and return of the seaming tools.



Shipping Container



Small Vise Lock Hand Crimper (Included in the Seamer Kit)



Small Vise Lock 360 Hand Crimper (Included in the Seamer Kit)

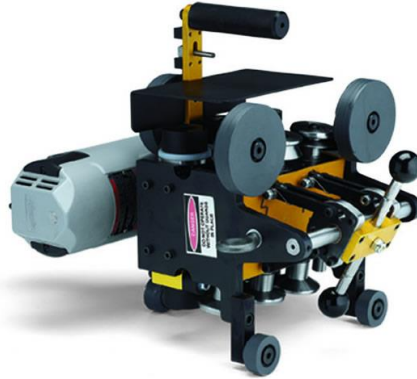
5.3 SEAMING KIT

The seaming equipment will normally be provided as a seaming kit. The seaming kit will include the following:

- a. Seaming Kit Chest (contains and protects the seaming tools during shipment and storage).
- b. Manual Crimping Tool(s)
- c. Motorized Seaming Machine (provided only for Nucor Vise Lock® or Nucor Vise Lock 360® seaming applications).
- d. Seaming Instructions Manual
- e. Return Shipping Documents
- f. Small Yellow Tool Kit Which Includes: Misc. Wrenches, Replacement fiber backer rollers and cam rollers



Single Directional Motorized Seaming Machine - Produces a Nucor Vise Lock® Seam

Seaming Kit Con't

Bi-directional Motorized Seaming Machine. Produces a Nucor Vise Lock® Seam. (Vise Lock Tooling on both sides)



Single Directional Motorized Seaming Machine. Produces a Nucor Vise Lock 360® Seam (For Two Pass Operation)

6.0 CHECK PANEL ASSEMBLY

6 ASSEMBLY

6.1 SIDE LAP FIT-UP

Before seaming, inspect the full length of each roof panel side lap. Check that the lip at the panel's male edge is enclosed by the hook of the adjacent panel's female edge. Refer to the detail below.

Any conditions where the male lip is not positioned inside of the female hook must be corrected before attempting to seam the roof panels.

CAUTION: False seaming may occur where the female lip does not hook the roof panel's male edge. False seamed roof panels cannot provide their designed load and weather resistance.

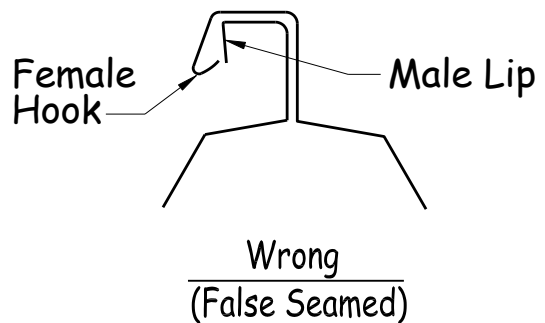
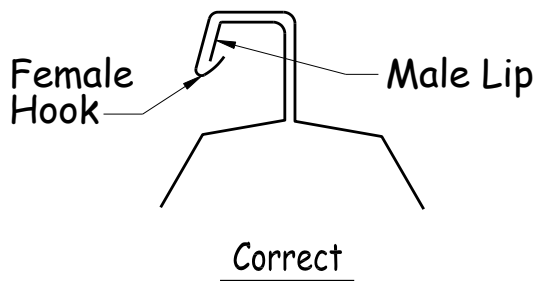
6.2 CLIP ALIGNMENT

Before seaming, check that each roof panel clip is properly seated in the roof side lap assembly. Any displaced clips must be corrected before attempting to seam the roof panels.

CAUTION: Panel clips that are not properly aligned can cause faulty seaming and objectionable seam appearance.

6.3 SEAM DAMAGE

Before seaming, check that the male and female edges do not have kinks or other distortions. Any such distortions must be corrected before attempting to seam the roof panels.



7.0 HAND CRIMPING TOOLS

7 NUCOR ROLL LOCK™ / VISE LOCK® CRIMPER TOOLS (BUYOUT ITEMS)

7.1 STAND-UP ROLL LOCK/ VISE LOCK HAND CRIMPER

Per the order documents your job may have one or more of these crimpers.



**Stand-up Vise Lock Hand Crimper
Part # H8000**

7.2 SMALL ROLL LOCK/VISE LOCK HAND CRIMPER

Per the order documents your job may have one or more of these crimpers. This crimper is useful for the person erecting the low eave, endlap and/or high eave end of the panel.



**Small Vise Lock Hand Crimper
Part # H8100**

8.0 HAND CRIMPING TOOL OPERATION (Small)

8 MANUAL CRIMPING TOOL OPERATION FOR NUCOR ROLL LOCK™/VISE LOCK® (SMALL CRIMPER)

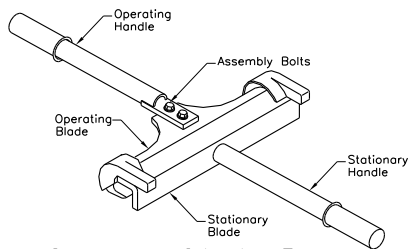
8.1 SMALL HAND CRIMPING TOOL NOMENCLATURE

The detail below identifies the operational parts of the small hand crimping tool.

This hand crimper manually forms a finished Nucor Vise Lock® seam if used continuously.

8.2 ASSEMBLE THE CRIMPING TOOL

When received, the crimping tool may be disassembled. Assemble the handle to the tool body with the provided bolts.



Small Hand Crimping Tool

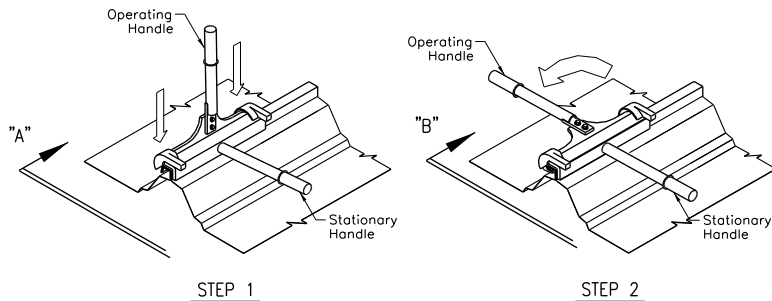
8.3 TOOL ORIENTATION TO SEAM

Orient the tool to fit correctly onto the roof panel seam as shown in **Step 1** below. The stationary handle must be in the horizontal position and the operating handle must be rotated up to the open position.

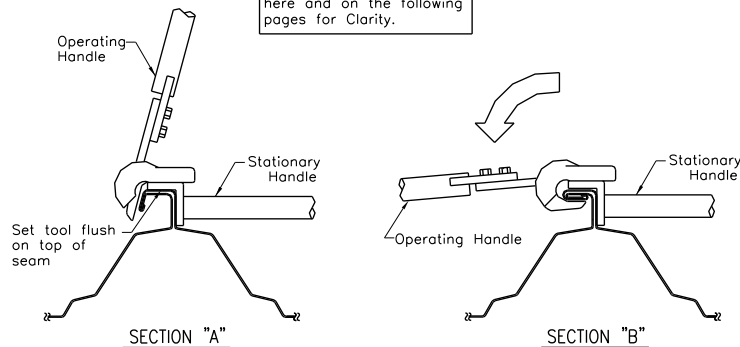
8.4 FORMING THE SEAM

When the tool is correctly positioned on the panel, push the stationary blade solidly against the top of the seam.

While holding the stationary handle in the horizontal position, rotate the operating handle down to the horizontal position as shown in **Step 2**. This will form the seam into a *single* Vise Lock Crimp.



NOTE: A Short-Handled Crimping Tool is shown here and on the following pages for Clarity.



8.0 HAND CRIMPING TOOL OPERATION (Small)

8.5 TOOL POSITION ON THE ROOF PANEL

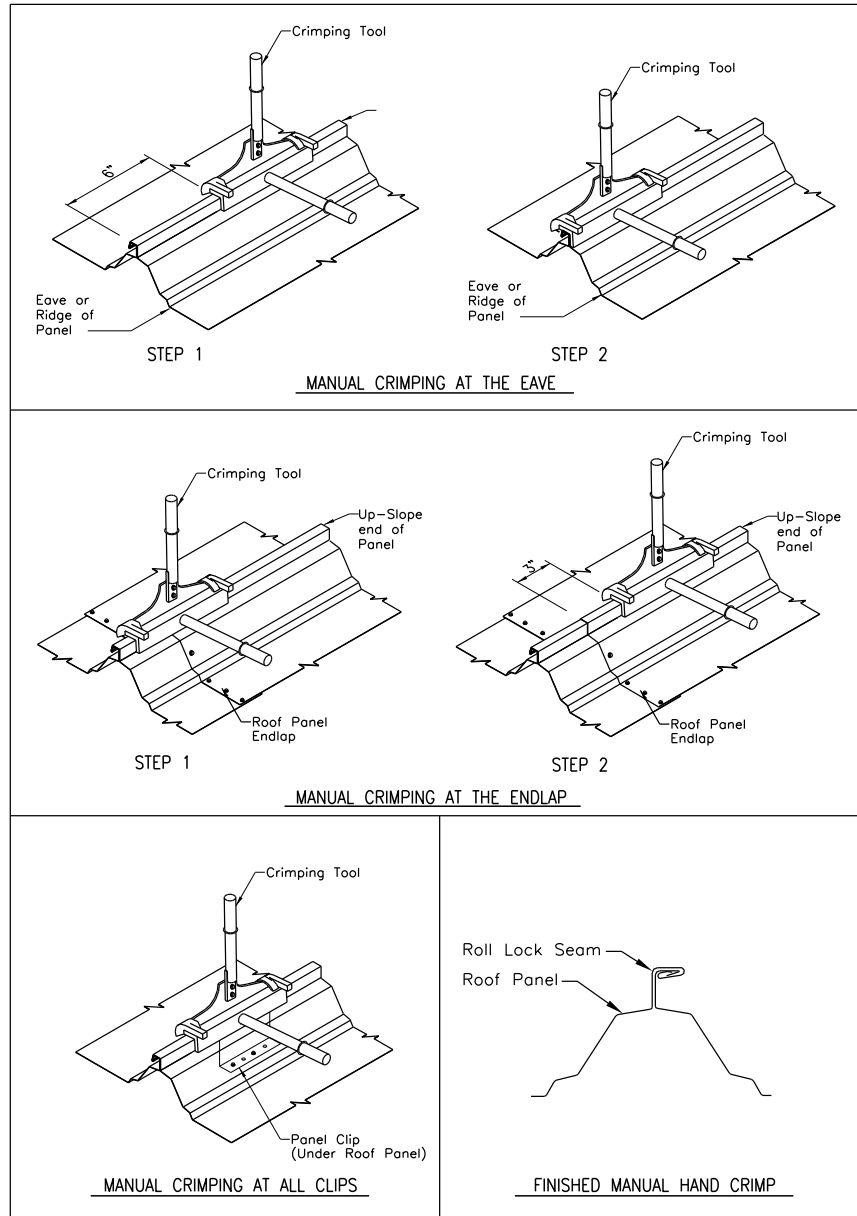
When hand crimping at the low eave, ridge end, end lap and all roof clip locations. The seaming must be done in two steps.

STEP 1: Position the crimping tool as shown below in the various areas of the roof. Rotate the moveable handle down to form a single Nucor Vise Lock® crimp. Release handle.

STEP 2: Re-position the crimping tool as shown below and repeat Step 1.

8.6 CHECKING THE FINISHED SEAM

Rotate the operating handle to the open position, remove the tool and check that the seam is correctly formed, as shown below.



9.0 HAND CRIMPING TOOL OPERATION (Stand-up)

9 MANUAL CRIMPING TOOL OPERATION FOR NUCOR ROLL LOCK™/VISE LOCK® (STAND-UP)

9.1 STAND-UP HAND CRIMPING TOOL NOMENCLATURE

The detail below identifies the operational parts of the stand-up hand crimping tool.

9.2 ASSEMBLE THE STAND-UP CRIMPING TOOL

When received, the crimping tool may be partially disassembled. Assemble the handle to the push rod with the provided lock pins.

9.3 TOOL ORIENTATION TO THE SEAM

Orient the tool to fit correctly onto the roof panel seam as shown in **Step 1** below. The stationary handle must be in the vertical position and the

operating handle must be rotated up to the open position.

9.4 FORMING THE SEAM

The tool is correctly positioned on the panel seam, when the operating handle is UP and the stationary shoe is pushed firmly down against the top of the seam.

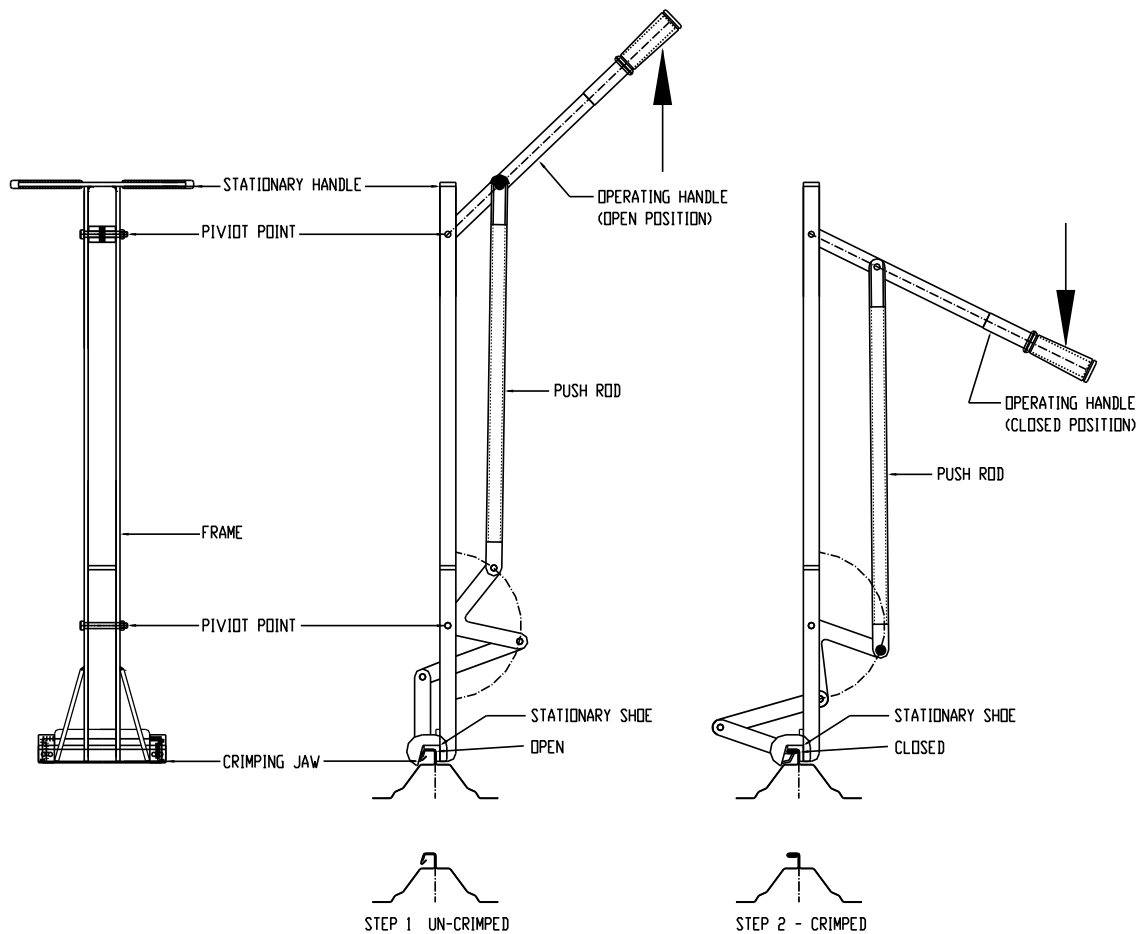
While holding the stationary handle vertical, rotate the operating handle **down** to the position as shown in **Step 2**. This will form the seam into a single Vise Lock shaped *crimp*.

NOTE:

This hand crimper manually forms a finished Nucor Roll Lock™ seam and if used continuously, will form a finished Nucor Vise Lock® seam.

CAUTION:

THE CRIMPER OR SEAM COULD BE DAMAGED, IF THE STATIONARY SHOE **IS NOT COMPLETELY** DOWN ON THE SEAM.



10.0 ROLL LOCK SEAMING DETAILS

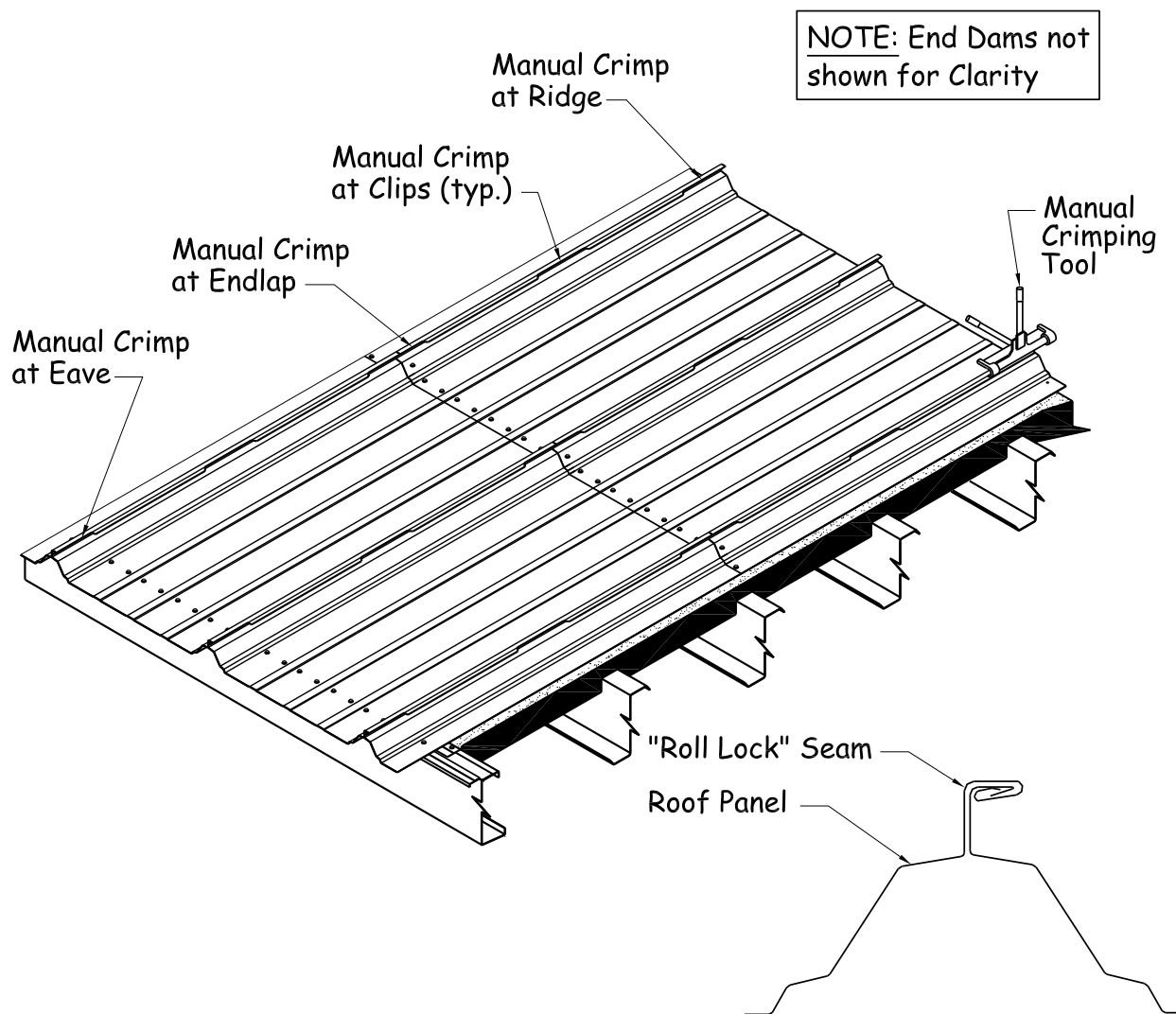
10 NUCOR ROLL LOCK™ SEAMING DETAILS

10.1 MANUAL SEAMING

The Nucor Roll Lock™ seam requires the roof panels be crimped with the manual seaming tools at the panel clips, low eave, high side of the roof panels, and at the end laps.

10.2 FINISHED SEAM DETAIL

Check that the finished seam is correctly formed as shown in the detail below.

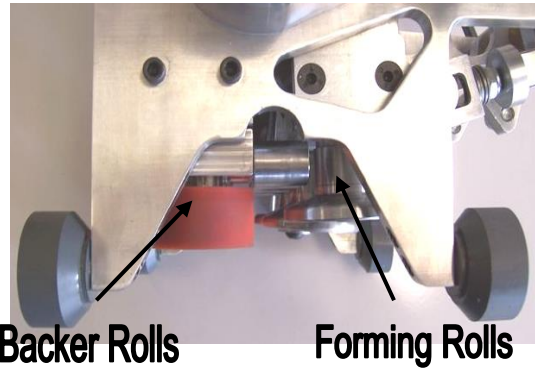


11.0 | MOTORIZED SEAMING (GENERAL INFO)

**11 | BEFORE OPERATING THE
MOTORIZED SEAMING
MACHINE**

**11.1 | SEAMING MACHINE
NOMENCLATURE**

The following pages identify the operational parts of different motorized seaming machines. Familiarize yourself with the supplied seamer prior to operation. Seaming tools may have slight variations from the tools shown in this manual

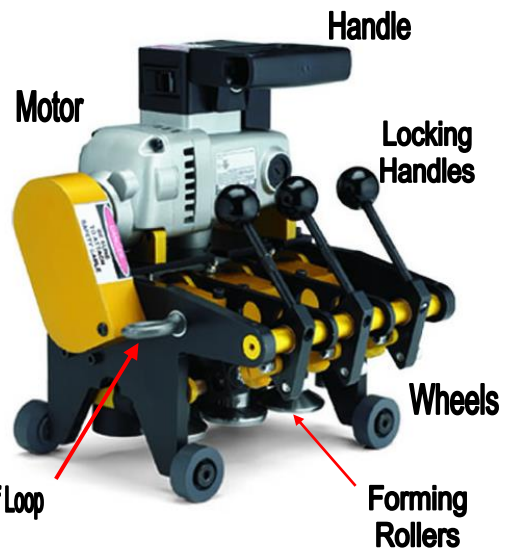


IF excessive picking of the paint or Galvalume coating is occurring, then discontinue seaming and consult with your NBS quality service representative. Failure to contact NBS MAY void your roof warranty.



**11.2 | SINGLE DIRECTION NUCOR VISE LOCK®
SEAMER**

With a single directional Nucor Vise Lock® Seamer, it should be clearly labeled “Primary” on the tool with arrows indicating the direction of travel. (see below)



**Primary Seamer
Produces a Vise Lock Seam**



11.0 | MOTORIZED SEAMING MACHINE (GENERAL INFO)

11.3 FLIP FLOP SEAMER (BI-DIRECTIONAL)

This seaming machine has two sets of forming rollers on one machine. This tool can be started at the peak or the eave. Arrows indicate the direction of travel. Once the seamer machine has finished Vise Locking a seam, un-lock the machine from the seam, then pull up on the release trigger pin located under the handle, rotate the machine, the machine trigger pin will lock in position once the machine has been rotated. Next, lock the seamer on the next seam adjacent to the one that was just finished. **MAKE SURE THAT THE SEAMER ARROW POINTS IN THE DIRECTION OF THE PANEL THAT IS TO BE SEAMED.** Double check that the rolls are properly placed on the panel as shown in sections 12.4-12.6 Seam panel and then repeat the prior steps on the next seam.

11.4 CLEANING THE SEAMS

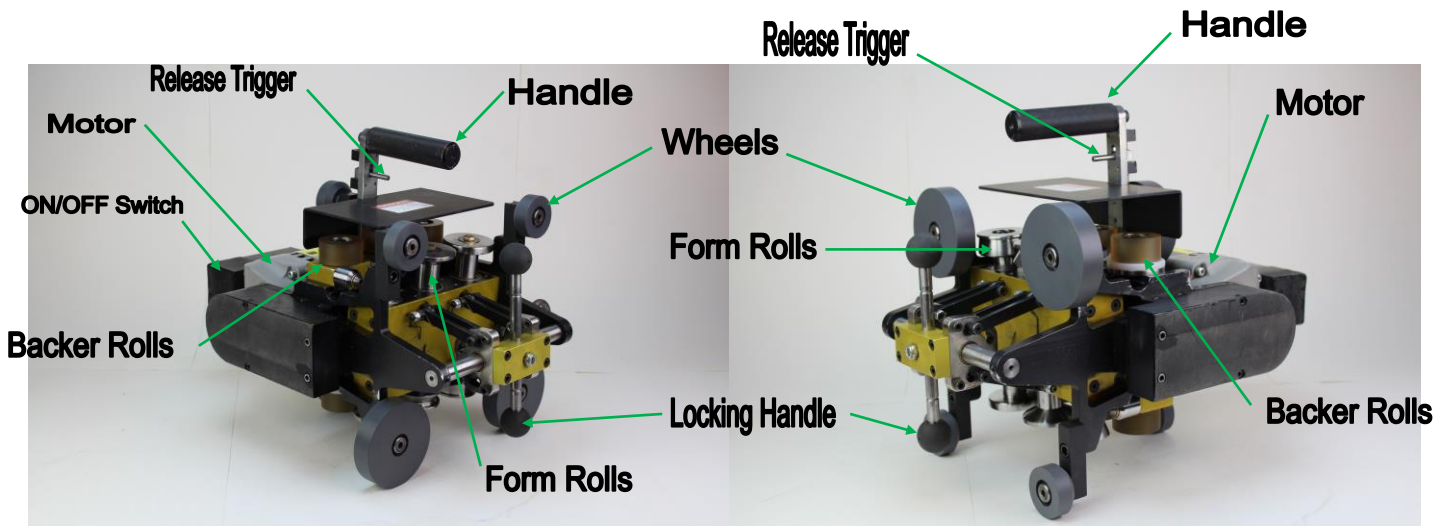
The roof panel seams must be thoroughly cleaned of abrasive dirt or dust that can cause scuffing or scratching of the seam surface. The roof panel seams must be cleaned of grease and all other contaminants that can cause seaming machine slippage and marking of the seam surface.

11.5 STARTING SEAMS

For the Nucor Vise Lock® seaming, the seaming machine must start on a finished Roll Lock seam that has already been crimped with the manual crimping tool. Depending on which direction the seaming machine will be run, form the starting seam at the eave or ridge end of the panels with the manual seaming tool as described previously in sections **7.0-9.0**

NOTE:

IF excessive picking of the paint or Galvalume coating is occurring, then discontinue seaming and consult with your NBS quality service representative. Failure to contact NBS MAY void your roof warranty.



11.0 | MOTORIZED SEAMING MACHINE (GENERAL INFO)**11.6 | SINGLE DIRECTION NUCOR VISE
LOCK 360® SEAMER****Used in the Double pass Vise Lock 360
operation**

The Nucor Vise Lock 360® seam requires one three station OR one four station single direction Motorized Seaming Tool. These tools will be clearly labeled “**Primary**” and “**Secondary**” with arrows indicating the direction of travel. **The Primary seaming tool must be run on all panels before the Secondary seaming tool is operated.**



**Single Directional Motorized Seaming
Machine
Produces a Nucor Vise Lock 360® Seam**

12.0 | MOTORIZED SEAMING MACHINE (Vise Lock)

12 MOTORIZED SEAMING MACHINE (VISE LOCK)

12.1 MANUAL CRIMPING/SEAMING

The Nucor Vise Lock® seam requires prior hand crimping the roof panel with the manual seaming tool at all panel clips, low eave, high side of the roof panels, and at the end laps. Then seaming the full length of the roof panels with the Motorized Seaming Machine.

12.2 MACHINE ORIENTATION TO THE SEAM (SINGLE DIRECTIONAL SEAMER)

On roofs sheeted from left to right, the seaming machine will run from the eave to

the ridge. On roofs sheeted from right to left, the seaming machine will run from ridge to eave.

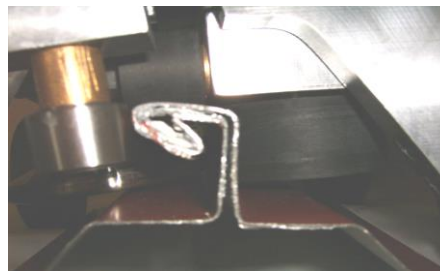
12.3 MACHINE POSITION ON THE ROOF PANEL

NOTE:

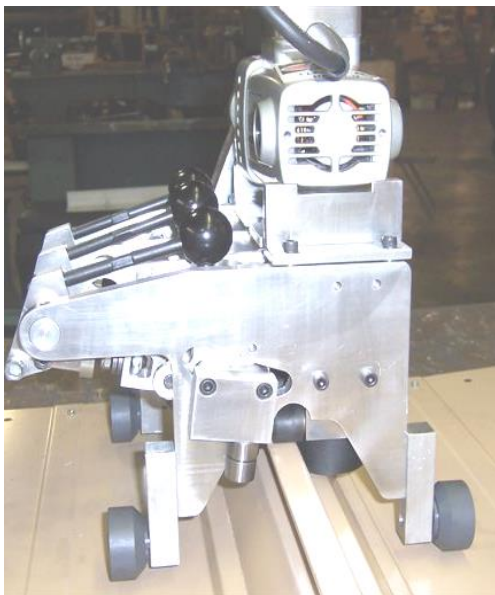
Prior to running the seamer, make sure a safety cable is attached to seamer.

With the locking handles down in the open position, set the seaming machine onto the starting end of the roof panel's seam, over the manually seamed portion of the seam.

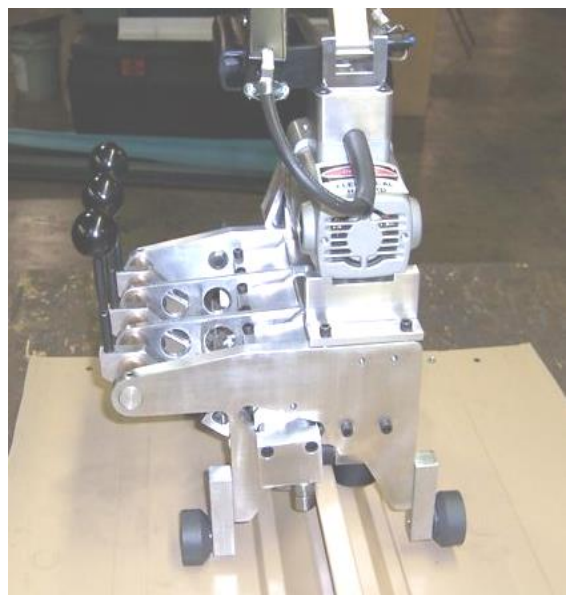
Roll the seaming machine forward to align the front seaming rolls over the unseamed portion of the seam, as shown in the details below.



**Unlocked
Handles Down**



**Locked
Handles Up**



12.0 | MOTORIZED SEAMING MACHINE (Vise Lock)

12.4 MACHINE ORIENTATION TO THE SEAM (BI-DIRECTIONAL SEAMER)

With this example below, the flip-flop seamer produces a Nucor Vise Lock® seam in both directions. When using the Bi-directional seamer, it doesn't matter which direction that the roof was sheeted. The seamer will run from eave to ridge OR ridge to eave. Basically, you

run the seamer up one seam, release the trigger pin next to the handle, rotate the machine, then place it on the adjacent un-seamed seam and run the seamer back.

Seaming Direction is indicated by arrow on motor.



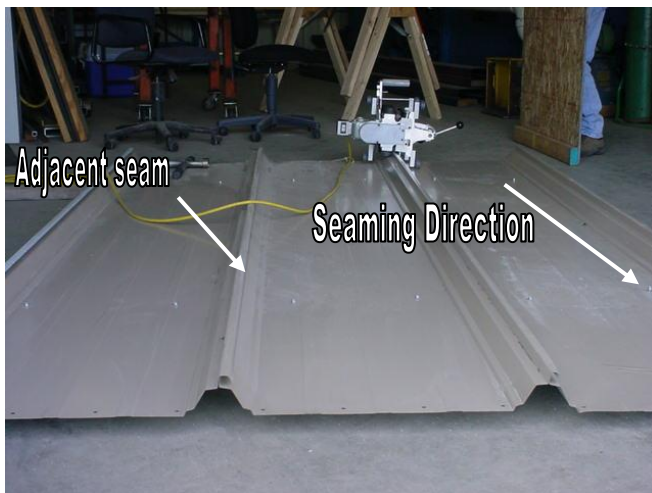
Step #1

With the locking handle held up in the open position, set the seaming machine onto the starting end of the roof panel's seam, over the manually crimped portion of the seam.



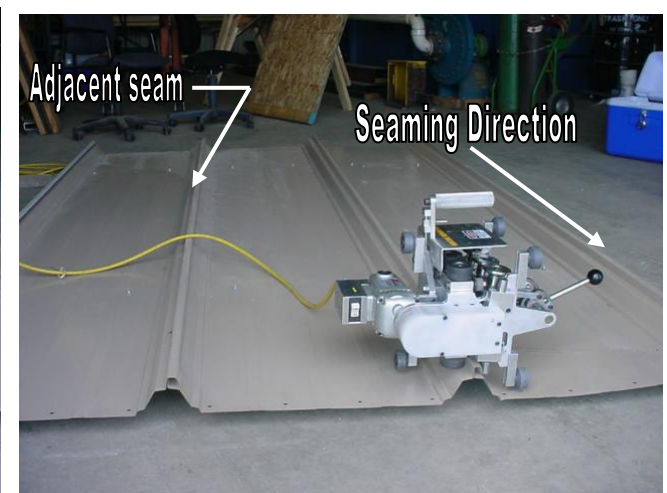
Step #2

Lock the seamer onto the panel by pushing the handle outward.



Step #3

Make sure the arrow on the seamer points in the direction that you are seaming.

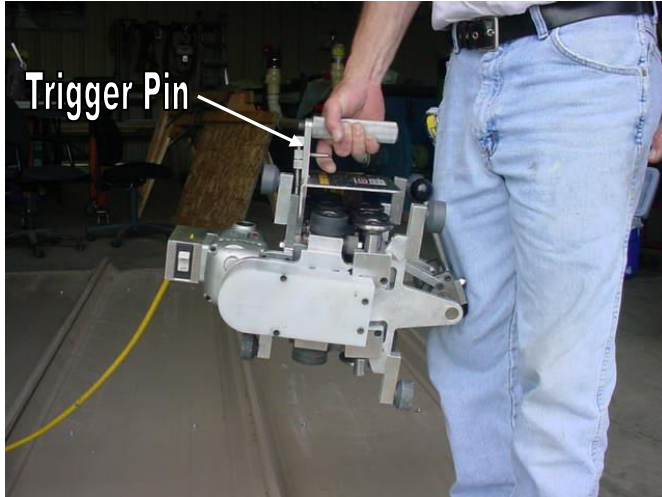


Step #4

Run seamer to the end of the panel.

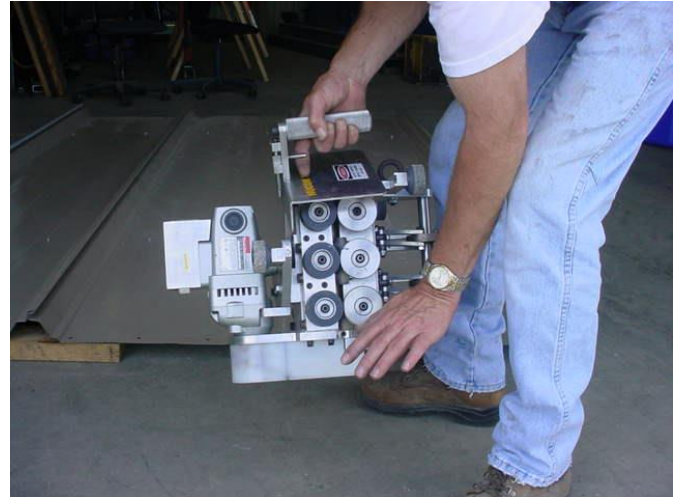
12.0 | MOTORIZED SEAMING MACHINE (Vise Lock)

12.5 | ROTATING THE BI-DIRECTIONAL SEAMER



Step #5

Next, un-lock the seamer from the panel seam. Pull up on the trigger pin next to the handle.



Step #6

Rotate the seamer 180°, allowing the trigger pin to latch.

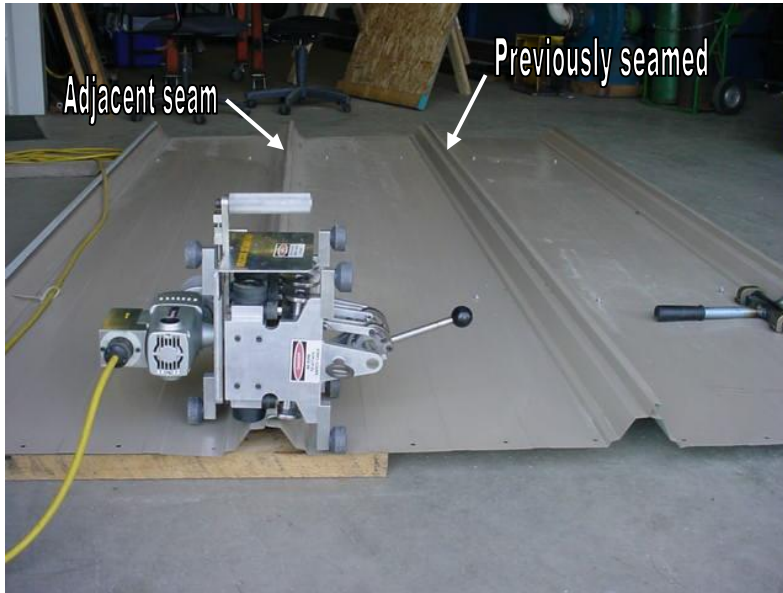


Step #7

The seamer fully rotated.

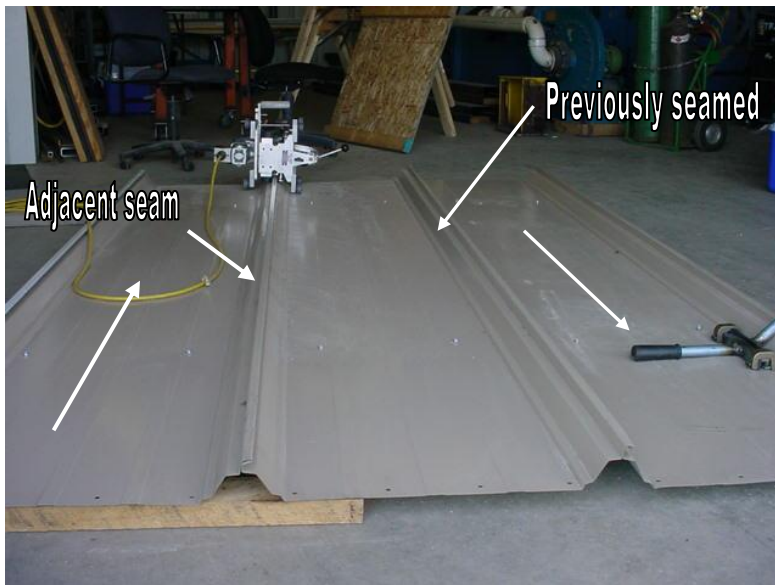
12.0 | MOTORIZED SEAMING MACHINE (Vise Lock)

12.6 MACHINE POSITION ON THE ROOF PANEL



Step #8

Place rotated seamer on the adjacent seam. Lock onto manually crimped area of the panel.



Step #9

Seamer ran back to starting point on the adjacent seam. Repeat steps 1-9 along the panel run

12.0 MOTORIZED SEAMING MACHINE (Vise Lock)

12.7 RUNNING THE MACHINE

Check that the machine's path is clear of power cords, tools, debris, etc.

Start the machine by turning on the machine's toggle switch.

When running the seamer, the operator should look ahead of the seamer for any damaged seams or un-seamed panels. If the operator sees damaged and/or un-seamed panels, then he/she should stop the machine and fix the problem area before continuing. **Failure** to repair such areas and then running the seamer over them could cause the seam to be **un-repairable**.

Watch the machine and the finished seam carefully for any indication of machine malfunction or faulty seaming.

CAUTION:

- Check that all seams have been properly hand crimped *prior* to motor seaming.
- **Stop** the machine immediately, and investigate any indications of machine malfunction or faulty seaming.
- It is recommended **not** to run the seamer over panel endlaps. The endlaps should be hand crimped for proper finished seam.
- **Do not** run the machine into previously installed end dams or other obstructions.
- **Do not** run the machine over damaged seams or un-hooked panels.
- **Do not** walk or stand on the panel next to the machine while it is running.
- The seaming machine must always be in the vertical position while seaming. **Do not** allow the machine to tilt sideways when locking the machine onto the seam or while the machine is running. On roofs with tall clips, walking or standing on the panel next to the machine can deflect the panel and cause the machine to tilt.
- Prior to running the seamer, secure the machine to a proper lanyard and anchoring system.

12.8 UNLOCKING THE MACHINE

After the machine is turned off and has fully stopped, release the locking handle to the open position. With the locking handle released, the machine can be lifted from the seam.

If the machine must be stopped and removed before completing the seam, use a felt marker to mark the position of the machine's front wheel on the panel. The machine can later be repositioned on the mark to complete the seaming.

12.9 STOPPING THE MACHINE

Stop the machine by turning off the machine's toggle switch.

Always allow sufficient space for the machine to coast after turning it off.

12.10 CHECKING THE FINISHED SEAM

At the completion of each seam, check the full length of the seam for any false seaming or distortions. Refer to sections **10.2, 12.3, & 17.4** for details of correctly formed finished seams. **NOTE: Seaming options vary from project to project. Refer to the project erection drawings for specific seaming requirements for your project.**



**Finished Nucor Vise Lock®
Seam**

13.0 ∞ **Nucor Vise Lock 360® MANUAL SEAMING TOOLS**

13 **VISE LOCK 360 CRIMPER TOOLS (BUYOUT ITEMS)**



Small Vise Lock 360 hand crimper

Part # H8150



Stand-Up Vise Lock 360 Crimper

Part # H8200



Open Crimping Jaw of the VL 360 Crimper

15.0 ∞ Nucor Vise Lock 360® MANUAL SEAMING TOOL (Small)

14 MANUAL CRIMPING TOOL OPERATION FOR NUCOR VISE LOCK 360® (SMALL CRIMPER)

14.1 TOOL ORIENTATION TO SEAM

Next is the process of manually crimping the panel rib into a 360° seam. Before you attempt the Nucor Vise Lock 360® hand crimper: check and see if you have a good tight Nucor Vise Lock® seam if not, then go over the area with a Nucor Vise Lock® hand crimper and re-crimp. It is important to manually crimp a single VL360 crimp prior to locking on and running the Nucor Vise Lock 360® seamer.

Start by placing the open 360° crimper on top of the previously Vise Locked CFR panel rib and *between* a roof clip. Make sure that the flat side

of the crimper is on the panel rib shoulder and the crimper hook is under the female lip. (See FIG 32 & 32A). Note the angle of the crimper.

Next, apply outward and downward pressure to the handles to start folding down the top rib. Continue the outward and downward pressure until the panel rib is flat. (see FIG's 32A & 33).

NOTE:

Do not use this crimper to temporarily hand crimp any part of the panel seam.

SMALL VISE LOCK 360 HAND CRIMPER



FIG 32

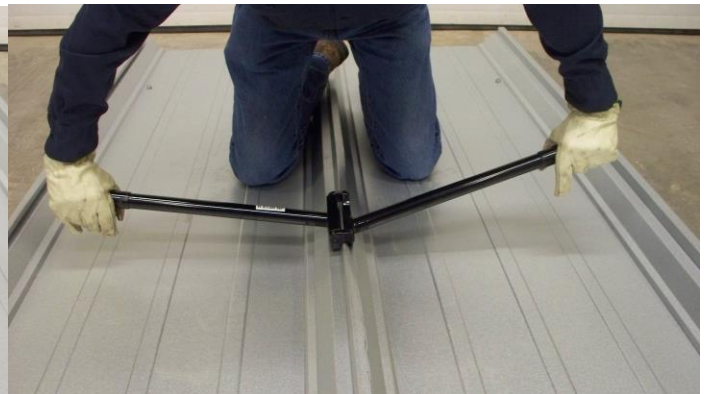


FIG 33

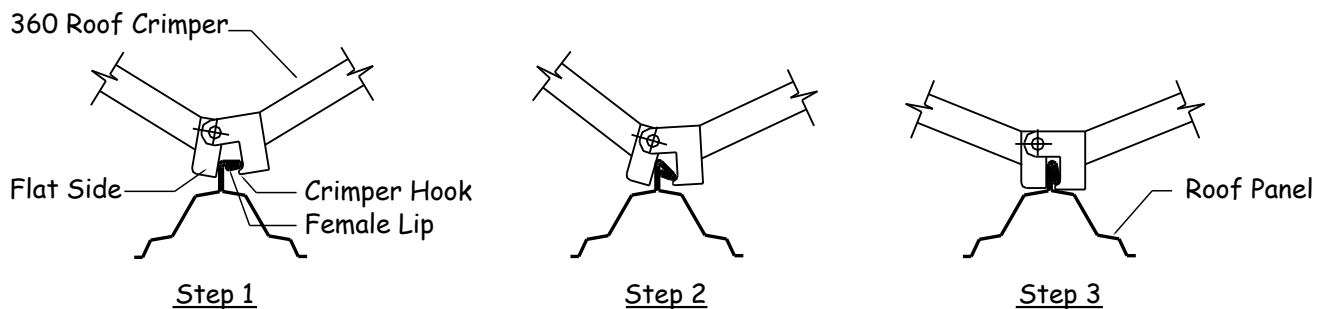


FIG32A

15.0 ∞ Nucor Vise Lock 360® MANUAL SEAMING TOOL (Stand-up)

**15 MANUAL CRIMPING TOOL
OPERATION FOR NUCOR VISE
LOCK 360® (STAND-UP)**

**15.1 STAND-UP HAND CRIMPING TOOL
NOMENCLATURE**

The detail below identifies the operational parts of the stand-up hand crimping tool.

**15.2 ASSEMBLE THE STAND-UP
CRIMPING TOOL**

When received, the crimping tool may be partially disassembled. Assemble the handle to the push rod with the provided lock pins.

15.3 TOOL ORIENTATION TO THE SEAM

Orient the tool to fit correctly onto the roof panel seam as shown in **Step 1** below. The stationary handle must be in the vertical position and the operating handle must be rotated up to the open position.

15.4 FORMING THE SEAM

The tool is correctly positioned on the panel seam, when the operating handle is UP and the stationary shoe is down against the top of the seam.

While holding the stationary handle vertical, rotate the operating handle **down** to the position as shown in **Step 2**. This will form the seam into a **single** Vise Lock 360 shaped *crimp*.

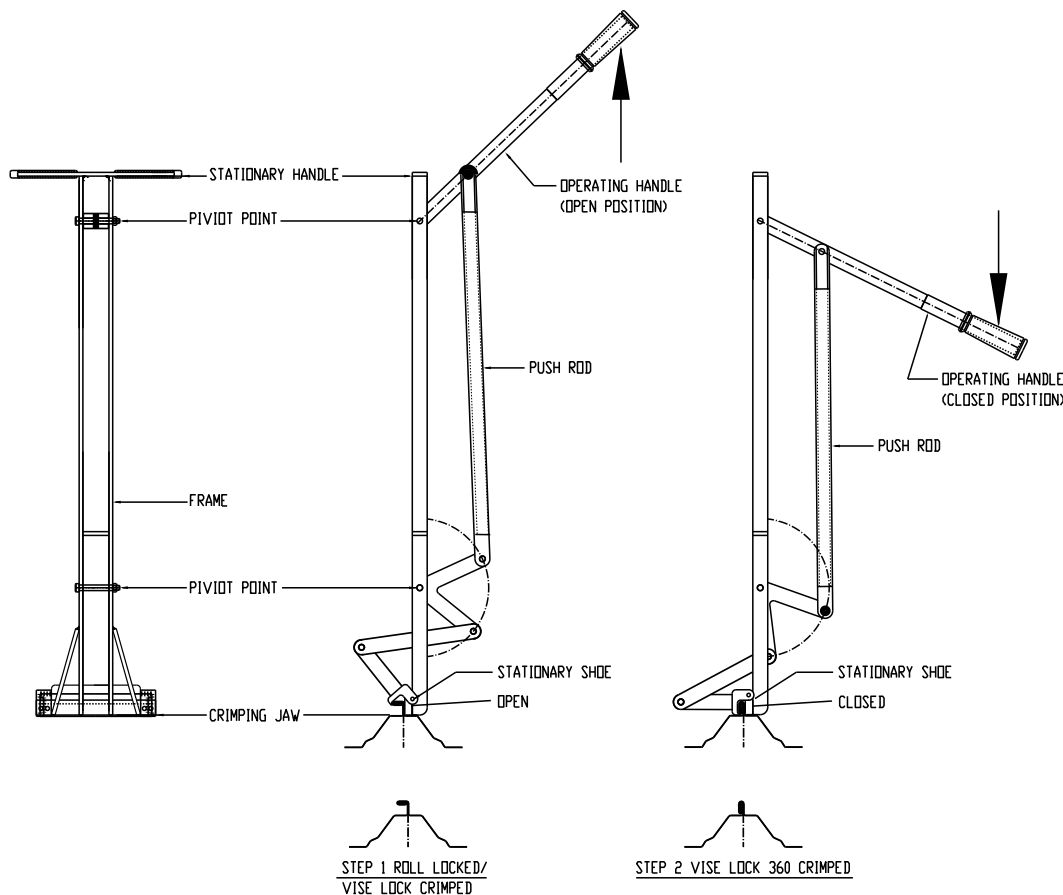
NOTE:

This hand crimper is meant to be used continuously and by doing so, will form a finished Nucor Vise Lock 360 ® seam.

This crimper is for hand crimping small edge and corner zones.

CAUTION:

THE CRIMPER OR SEAM COULD BE DAMAGED, IF THE STATIONARY SHOE **IS NOT COMPLETELY** DOWN ON THE SEAM.



NOTE:

Do not use this crimper to temporarily hand crimp any part of the panel seam.

16.0 Nucor Vise Lock 360® Mechanically Seaming Details

16 NUCOR VISE LOCK 360® SEAMING DETAILS (SINGLE PASS OPERATION)

16.1 LOCKING SEAMER ON PANEL

Prior to running Single Directional Nucor Vise Lock 360® seamer, you must hand crimp the entire roof into a finished Roll Lock seam. To start the VL 360 seamer you need to hand crimp a small area with VL 360 hand crimper (as shown below). After the 360° hand crimping has been completed, place the Nucor Vise Lock 360® seamer on the panel rib, aligning the number four station roll over the previously 360° hand-crimped area. (**Note:** Make sure the arrow on the seamer is pointing in the direction you are seaming). Next lock down the first station handle, followed by the fourth station handle.

Finish by locking down handles 2 & 3. Make sure that the number one station has engaged the panel (As shown below).

16.2 MOTOR SEAMING

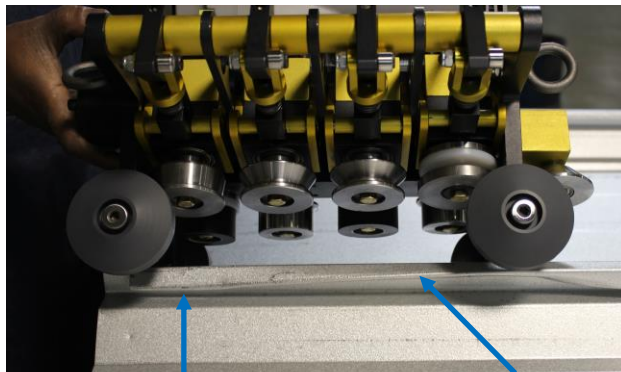
Once the seamer is properly locked on the pre-crimped seam, switch the machine on and seam full length of each roof panel.

The seamer will run from eave to ridge OR ridge to eave, depending on the way the roof panels were installed.

NOTE:

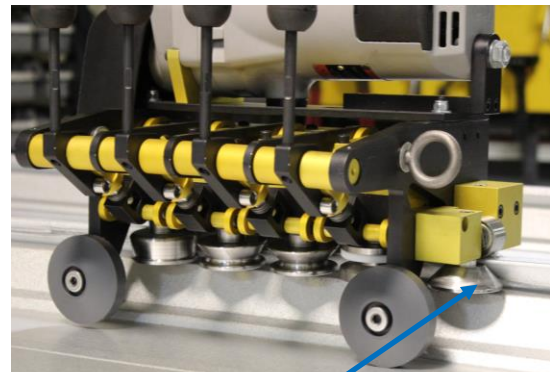
It is recommended **not** to run the seamer over panel endlaps. The endlaps should be hand crimped for proper finished seam.

Single Directional Nucor Vise Lock 360 ® Seamer



Hand crimped Vise Locked 360 seam

Hand crimped Roll Lock seam



Make sure this roller is engaging the panel as shown.

17.0 Nucor Vise Lock 360® Mechanically Seaming Details

17 NUCOR VISE LOCK 360® SEAMING DETAILS (DOUBLE PASS OPERATION)

17.1 PRIOR SEAMING

Prior to Nucor Vise Lock 360® seaming, the roof panels must have been fully Nucor Vise Lock® seamed. This is accomplished with the Primary Motorized three or four Station Seaming Machine. **In order to achieve a good Nucor Vise Lock 360® seam, you must first have a good Nucor Vise Lock® Seam.** Inspect all VL seams prior to running the VL360 seamer. Questionable VL seams should be re-crimped with the hand crimper or motorized seamed again with the “Primary Seamer” (Vise Lock).

17.2 LOCKING SEAMER ON PANEL

Prior to running Nucor Vise Lock 360® seamer, you must hand crimp a small area with Nucor Vise Lock 360® hand crimper as described in **Section 16.0**. After the 360° hand crimping has been completed, place the Nucor Vise Lock 360® seamer on the panel rib, aligning the

number four station roll over the previously 360° hand-crimped area. (**Note:** Make sure the arrow on the seamer is pointing in the direction you are seaming). Next lock down the first station handle, followed by the fourth station handle. Finish by locking down handles 2 & 3. Make sure that the number one station has engaged the panel as shown in Fig 34 below.

17.3 MOTOR SEAMING

Once the seamer is properly locked on the pre-crimped seam, switch the machine on and seam full length of each roof panel.

The seamer will run from eave to ridge OR ridge to eave, depending on the way the roof panels were installed.

NOTE:

It is recommended **not** to run the seamer over panel endlaps. The endlaps should be hand crimped for proper finished seam.

17.4 FINISHED SEAM DETAIL

Check that the finished seam is correctly formed as shown in the detail below.



Fig 34



Finished Nucor Vise Lock 360® Seam



Four Station Vise Lock 360 Seamer (Double Pass Operation)

18.0 Seamer Troubleshooting Guide**18 MOTORIZED SEAMING MACHINE MAINTENANCE****18.1 GENERAL**

The Motorized Seaming Machine is a precision fabricated, high performance, portable roll-forming machine. This relatively lightweight machine does the tough job of forming the extra strong Nucor Vise Lock® and Nucor Vise Lock 360® seams under often rugged field conditions.

Although designed for tough industrial use, the seaming machine requires proper maintenance to assure proper seaming and efficient, trouble-free operation.

CAUTION: Failure to properly maintain the seaming machine, as instructed below, can result in faulty or damaged seams and costly breakdown of the seaming machine.

18.2 SEAMING ROLLS

The seaming rolls require the following regular maintenance:

- a. Assure that the seaming machine's rolls are clear of dirt, grease, sealant, and Galvalume/paint build-up etc. Rollers may be cleaned with mineral spirits. Please follow manufacturer's instructions when using mineral spirits. Make sure rollers are clear of mastic and dry before seaming.
- b. Assure that the seaming machine's rolls are tight on their shafts. Check and tighten the rolls' retainer screws as necessary.

18.3 COOLING VENTS

To prevent motor overheating, the motor has vents and an internal fan to provide a cooling airflow over the internal motor ports.

The cooling vents are located at the front and rear of the motor. At the front of the motor, the vents are the slots between the motor housing and gear box. The rear vents are on the end of the motor housing. Check frequently to assure that these vents are kept clean and clear of debris and string sealant, etc.

While the machine is running, never cover the machine or place it in a position where the cooling airflow to the vents will be restricted.

19.0 Seamer Troubleshooting Guide

19.0 SEAMER TROUBLESHOOTING GUIDE

The chart below is a list of possible problems and solutions. *If you cannot resolve the problem with this chart, **stop** work immediately and contact Nucor building Systems.*

Seaming Problem	Possible Cause	Look For	Recommended Fix
Seaming machine drag, stalling at clips, run intermittently, or won't run.	Extension cord too long and/or not heavy enough gauge.	7+amp at motor with no load (locking handle locked). 10+ amps at motor during seaming (between clips).	Use a shorter and heavier gauge cord.
	Generator not supplying proper amps to seamer.	7+amp at motor with no load (locking handle locked). 10+ amps at motor during seaming (between clips).	Use a larger generator.
	Faulty motor.	7+amp at motor with no load (locking handle locked). 10+ amps at motor during seaming (between clips). Motor won't run.	Notify Nucor Building Systems for a replacement unit.
	Seam IS NOT Crimped	Un-Crimped Areas	Complete a Roll Lock Seam
Seam hook not closed or improper nesting of male to female and/or clip.	Excess panel coverage width (typically 1/2" +).	Cladding or paint deposits on forming rolls.	Ensure correct coverage width at installation.
	Incorrect profile or damaged (deformed) clip or male/female panel leg.	Seam does not appear to be fully engaged.	Correct the profile of the male/female panel leg. If necessary, hand crimp the corrected area.
Creasing, scuffing, etched line along top of seam, and/or deformation of seam.	Cam roller does not turn freely.	Cam roller bearing frozen, or fouled by sealant.	Clean and lubricate or replace cam roller.
Cladding/paint pick-off.	Incorrect profile or damaged (deformed) clip or male/female panel leg.	Seam does not appear to be fully engaged.	Correct the profile of the clip or male/female panel leg. Hand crimp the corrected area.
	Excess panel coverage width (typically 1/2" +).	Cladding or paint deposits on forming rolls.	Ensure correct coverage width during installation.