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SETUP AND OPERATION MANUAL

SUS: Pipe-seaming machine

Type: 4M

Serial nr.:

Build year:

Buyer:

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1.) WARNINGS AND SAFETY MEASURES

ATTENTION POINTS

When working on the machine, wear work gloves if possible!
When working with steel sheets, wear cut resistant work gloves!

When transporting the machine, wear steel cap safety boots!

ONLY ONE PERSON, that is sufficiently trained and instructed, is permitted to work on the machine!
Other people should stay at a safe distance of 1m away from the machine!
When woeking with seaming machines with over 3m long pipes, another person may be called in for assistance in compliance with the safety instructions.

DRAW-IN HAZARD! The operator must not wear any loose clothes, jewelry, or have his hair free!

Existing safety devices must not be switched off!

When connecting the machine to the power supply. The connection values on the labels and specifications must be observed!

Before switching the machine ON, check that there is no danger to people and objects!

If errors or damage are present on the machine, turn it off immediately so as not to endanger people or property! The operation should be continued only after the machine has been properly repaired!

Work on the electrical equipment of the machine may be carried out only by a qualified electrician!

In case of a longer downtime, the safety installations must be checked, and, if niecessary, repaired before operating!

Wear safety shoes with steel caps!

Wear cut resistant safety gloves!

Indication of a danger spot!

Indication of electrical hazards!

Hand risk or injury indication!

Read the instructions before use!

2.) SPECIFICATIONS

The machine is used to seam pre-shaped round or square steel sheets, from 0,6 up to 8m in length, depending on the machine type. Longer lengths (up to 8m) are available from the manufacturer.

The machine type SUS can be equipped for pipe diameters ranging from 70mm, up to 300mm. Other diameters, as well as sleeves for conical pipes, are available on request from manufacturer.

GENERAL SPECIFICATIONS
Operating voltage: 400V
Frequency: 50Hz
Power consumption: 1,1kW
cos ρ: 0,78

Weight: 280kg
Dimensions (Length x Width x Height): 4900mm x 700mm x 1200mm

Output capacity: approx. 1000m/h pre-shaped pipes

Finish: Industrial paint anthracite gray (RAL 7016)

3.) UNLOADING AND MOVING

The machine can be unloaded or moved by both a forklift and crane.
In both cases the carriage with the seaming head needs to be **FIXED IN THE MIDDLE OF THE MACHINE**, and the engine gearbox locking lever needs to be **FIXED IN THE VERTICAL POSITION**. The connection cable must be coiled up and mounted on the seaming head. If lifting using a forklift, **MAKE SURE THE CABLE IS NOT PINCHED BY THE FORKLIFT FORKS!** If using a crane, attach the ropes at both sides of the carriage by hooking them around the T-profile, equidistant from the carriage. **CHAINS HAVE TO BE USED**!

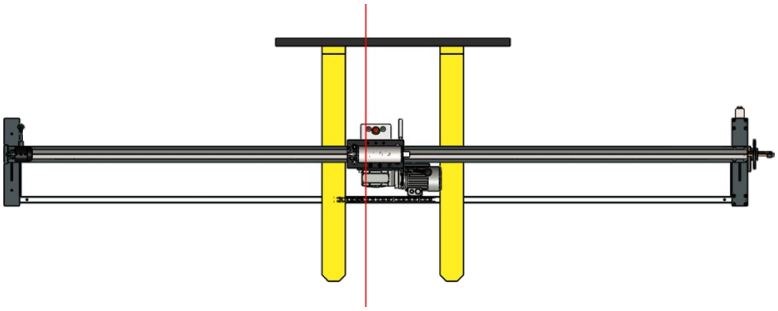

Fig. 1: Position of forklift forks for machine transport, with the carriage cewntered, and the gearbox locking lever in vertical position. Center of mass marked.

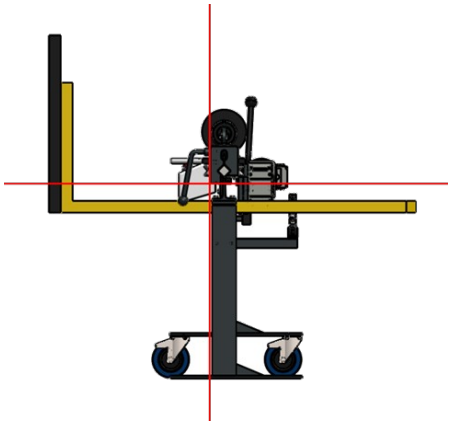

Fig. 2: Side view of fork positions. Center of mass marked.

CAUTION! DO NOT PRESS THE SNAP-IN HANDLE AWAY FROM VERTICAL POSITION!

If moving smaller distance, the machine can be moved by hand with a minimum of 2 people. In this case move the center carriage all the way to the side with the wheels, lift the opposite end, and push the machine to the desired location. **CAUTION! RISK OF TIPPING OVER!**

4.) LEVELING

The machine must be installed on a leveled surface with a safety distance of at least **1 metre on all sides**. The wheels must be secured with wheel brakes. The other foot of the machine must be bolted to the floor (holes are present on the foot). The connection line must be installed from the ceiling, be careful not to get the supply cable entangled with other objects in the vicinity.

5.) POWER UP

CAUTION! RISK OF SQUEEZING

Ensure correct installation of the machine.
Plug in the electrical cable to a 380/400V 50Hz power grid.
Turn the **MAIN SWITCH** to **ON (1)**. The machine is ready for operation.
Leave the locking lever in the left or right position.
Move the carriage with the side handles to **0,5m** in front of the retaining claw.
Turn the locking lever into vertical position. If the sprocket does not engage in the rack, move the carriage until it clicks into place.
Press the **ON** button. The carriage must move constantly to the stop plate now. If not, and the carriage is moving in the opposite direction, **TURN THE MACHINE OFF** and have an electrician to switch the phases in the electrical connector.
Let the carriage slide to the stop plate. In the end check the mechanical disengagement of the racks gear box.
Press the **OFF** button. The motor stops but is still operational.
Repeat the steps and check the functionality of the emergency shutdown switch, while moving the carriage.
Turn the **MAIN SWITCH** into **OFF** position. It should be secured with a lock to prevent unauthorized use of the machine.

6.) SHEET ROUNDING

Sheet rounding:
The sheet metal strips should correspond to the required developed width of the desired pipe diameter (e.g. for a 100mm pipe diameter, a 333mm developed width plate is needed). Small tolerances (±1mm) can be set by using the wing nuts on the guide sleeve. The metal strips must be cut on both sides **UNDER A RIGHT ANGLE** to the desired length (min 0,6mm).

The ideal shape of the sheet should be such, that the edges of the metal sheet overlap by about 20 to 25mm. The maximum open gap between the metal sheet edges should not exceed one half of the pipe diameter (e.g. 50mm gap for a 100mm diameter pipe).

For conical pipes the sheet must be cut conically. On each side the sheet has to be about 3 to 4mm narrower than the original width. For conical pipes, a special conical guide sleeve has to be used. It is also necessary to use an experimental pipe to achieve desired pipe shape.

7.) SEAMING OF PRE-SHAPED PIPES

ATTENTION! Pipes up to 3m in length may be seamed by one person. For longer pipes an assistant can be called to help the operator. Previous reader of the safety notes is required.

Move the carriage to the right end, holding it by the front handle. An initial stiffness is normal at the beginning.

Hold the pre-shaped pipe so that the higher end is on the engine side, and the lower end on the operator side.

Fig. 3: The correct position of pre-shaped pipe ends, with the end on the side of the engine being higher. This way the pipe will be seamed correctly.

Fig. 4: If the ends of the pipe are position incorrectly, with the higher end opposite of the engine, the seam will eventually cross itself, breaking the pipe.

Move the end of the pipe into the two guide slots and guide sleeve until you feel it stop (approx. 70mm).

Using both hands, press the pre-shaped pipe evenly so that the longitudinal edges touch the inner walls of the guide slot of the crimping head.

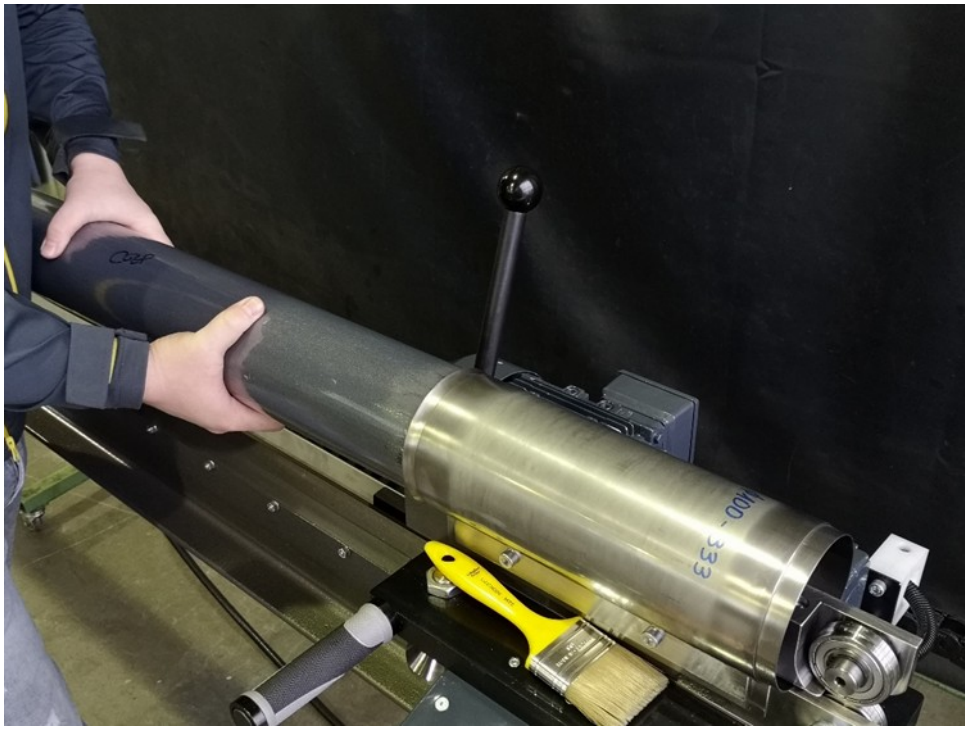

Fig. 5: While positioning the pipe, make sure that the gearbox lever is in vertical position (the center carriage is locked in place)

Tighten the guide sleeves evenly with the wing nuts, until you feel a slight resistance when entering the crimping head.Move the inserted pipe (using torsional strength) back and forth, until the overlap, without excess. The pipe should be centered and parallel to the guide rail. Move the carriage and the inserted pipe all the way to the left, up to the stop plate.

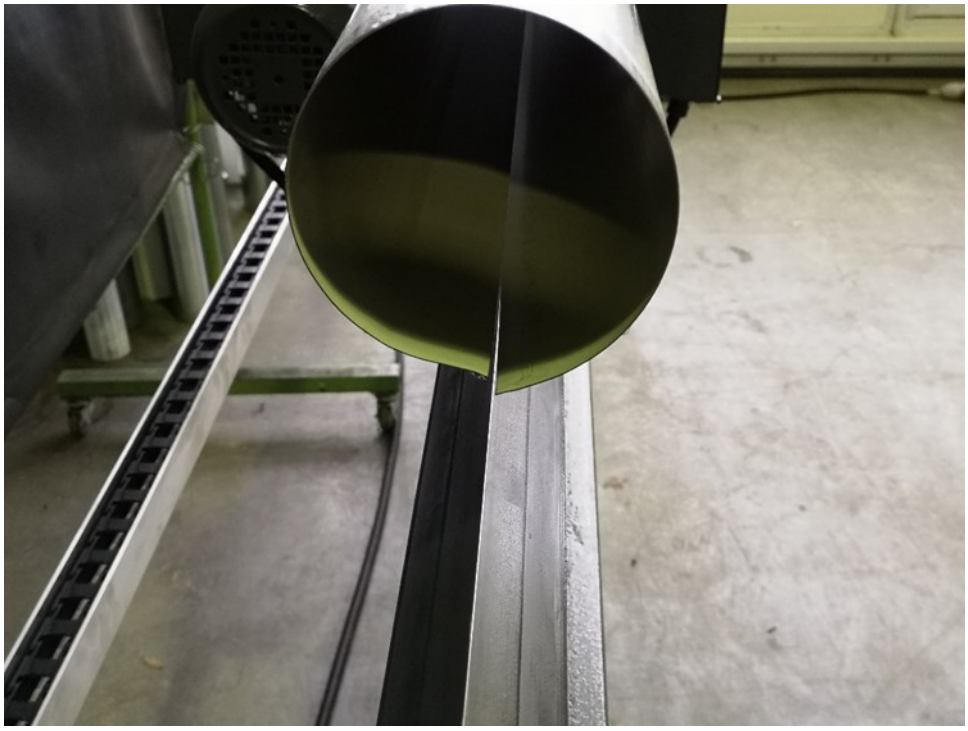

Fig. 6: The correct pipe placement over the guide rail, with the overlapping pre-shaped pipe edges being directly above the guide rail top edge.

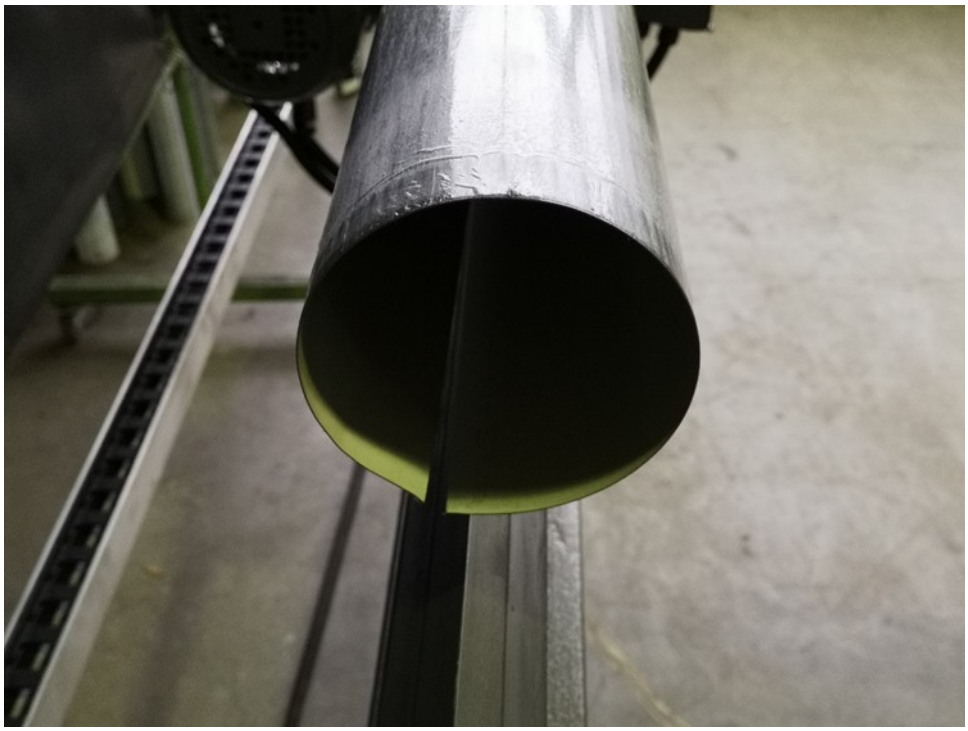

Fig. 7: Incorrect pre-shaped pipe placement. If the overlapping edges aren't directly above the guide rail top edge, the pipe will twist while seaming.

Use your left hand to keep the pipe straight. Use your right hand to turn the engagement lever into vertical position, so that the drive sprocket engages the rack.

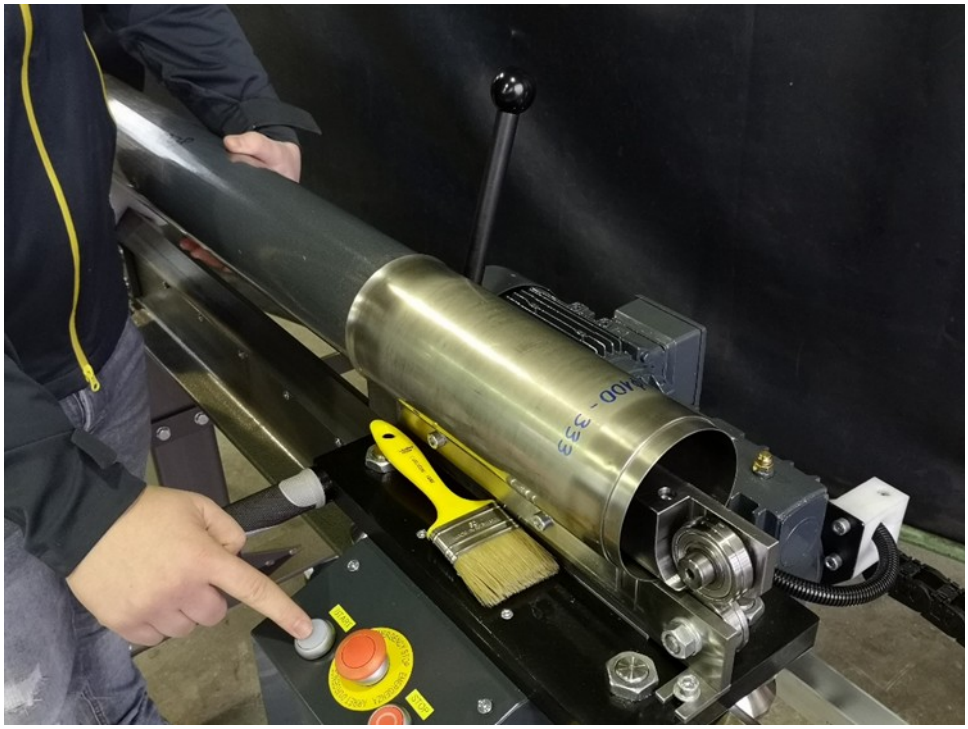

Fig. 8: Press the button to engage the drive sprocket. Note that the lever is positioned vertically, meaning the drive sprocket is engaged with the rack.

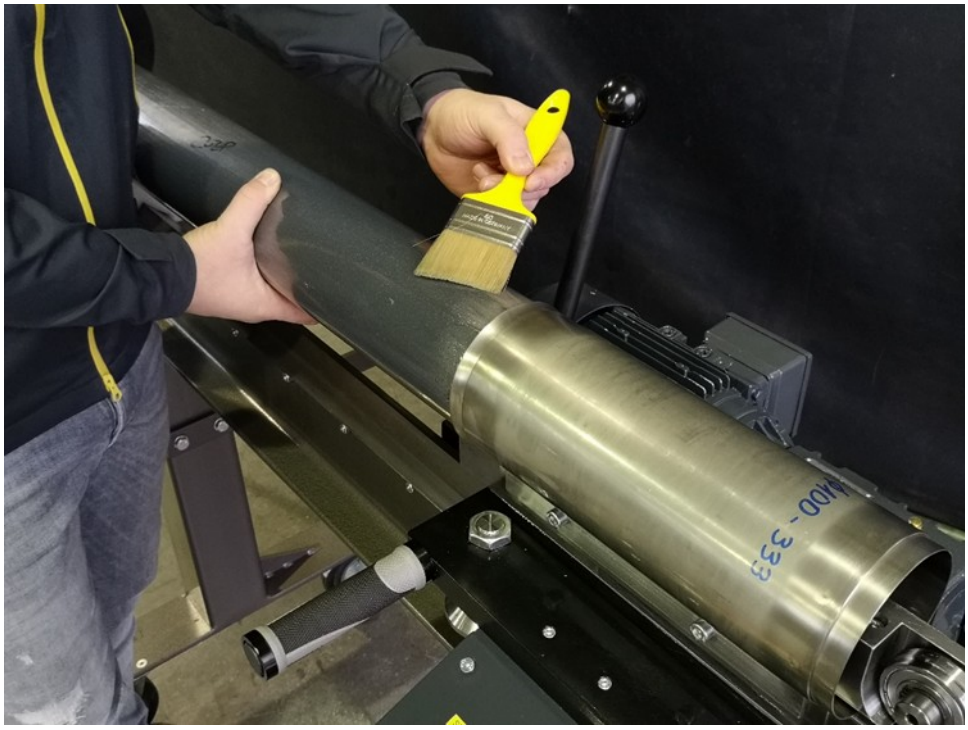

Fig. 9: Apply oil as the pipe enters the seaming head.

Press the **START** button. The carriage moves to the left and presses the end of the pipe against the stop plate. Make sure to hold the ends of the pipe centered at the middle of the stop plate and parallel to the guide rail.

After switching on and pressing the pipe, squeeze the pipe together, holding it at the lower part about 0,5m in front of the crimping head. Hold it steadily while it approaches the crimping head.

When about **20 to 30cm** of the seamed pipe exits the guide sleeve. Turn the machine off.

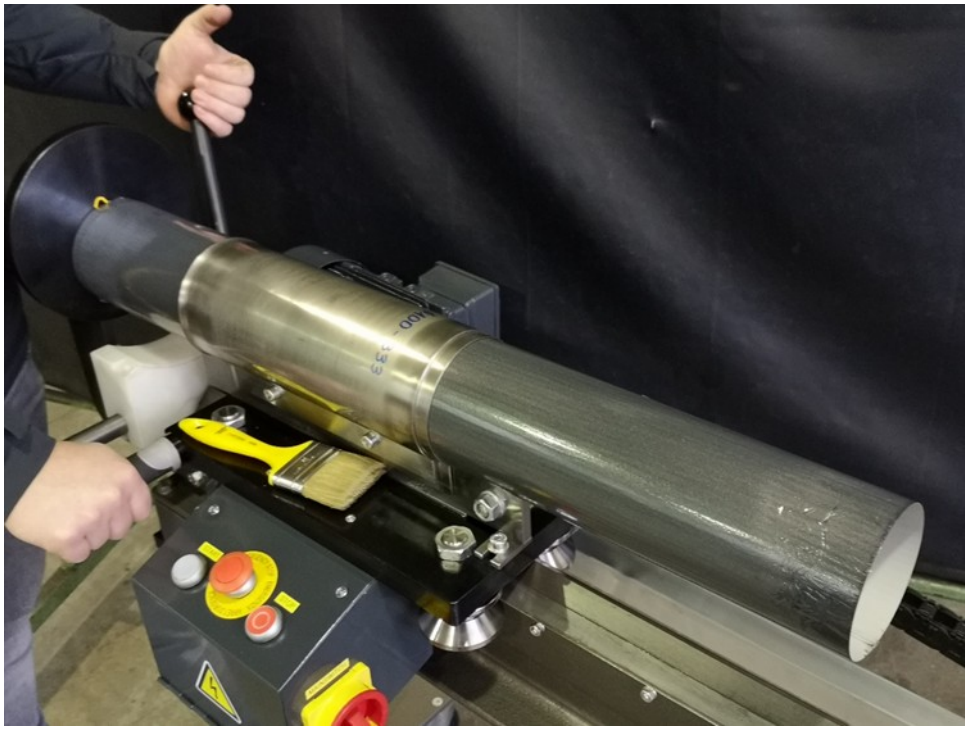

Fig. 10: Disengage the drive sprocket by turning the lever towards the endplate.

Turn the engagement lever to the side and move the carriage with the seamed pipe part to the right until it is fully inserted into the clamping device.

Fig. 11: Pipe clamped in the clamping device.

Turn the release lever into vertical position and switch the machine **ON**. The carriage moves to the left and crimps the rest of the pipe.

Fig. 12: Press the START button again after the pipe has been clamped to finish the pipe.

Fig. 13: Keep oiling the pipe for smoother seaming.

During this operation, press the ends of the pipe constantly, about **50 to 70cm** in front of the seaming head to get an ideal shape for the crimping process.

Before the entire pipe is seamed, move to the right and hold the pipe with your left hand from underneath, and grab the strap of the clamping device with your right hand. The carriage stops by itself after reaching the end left position. The drive sprocket moves away from the rack due to an automatic shifting mechanism.

The finished pipe can be taken out by opening the clamping device. Other pipes are produced in the same work cycle. With **conical pipes**, the smaller diameter end must be inserted into the crimping head.

Fig. 14: Finished pipe.

8.) FAULTS AND ERRORS

The pre-shaped pipe is difficult to insert

1. The material strip was cut too wide
2. The guide sleeve is tightened too much
3. The ends of the longitudinal edge are formed in a bad angle (not round)
4. There is a bend at the beginning of the inserted pipe part
5. Faulty shape or surface (inner) of the guide sleeve

The carriage has difficulty moving while crimping

1. The guide sleeve is tightened too much, so that unequal sheet widths can't be compensated by the springs
2. Large masses of the metal shavings which can block the crimping canal and the chamfering roll

The beginning is well crimped, but the rest of the pipe is too narrow/wide

1. The end of the pipe was not centered and parallel to the carriage guide (at the pressure plate)
2. The edges of the pipe ends don't overlap parallelly

The longitudinal seam is not pressed enough

One of the pressure rolls (the last pair of rolls at the outlet side) has come loose. This usually doesn't happen because the pressure rolls are properly adjusted and tightened at the factory. **It is strongly prohibited** to change the adjustment, otherwise the pipe may no longer move rectilinear. The pair of rolls must be adjusted by an expert.

The pipe is bent (twisted)

1. The end of the pipe was not centered and parallel to the carriage guide (at the pressure plate)
2. The edges of the pipe ends don't overlap parallel

The seamed pipe has scratch marks on the outside

Aggregates of material particles in the guide sleeve. The aggregates can be removed from the tool gently, with sandpaper for wet sanding (400 P)

There are no other known errors in operating the machine. If you can't remove the cause of the error, please consult the manufacturer.

9.) MAINTENANCE AND LUBRICATION

During the first run the guide slots and the inside of the seaming rolls of the seaming head must be oiled (good machine oil), where accessible.
Before mounting, the guide sleeve must be oiled on the inside with a rag. The carriage rail must occasionally be oiled with a thin fil of oil.
The space between the steel plates, where the engine is mounted, must be oiled occasionally. The rack must be lubricated occasionally with multipurpose grease.

MAKE SURE THAT THE MACHINE DOES NOT RUN DRY!

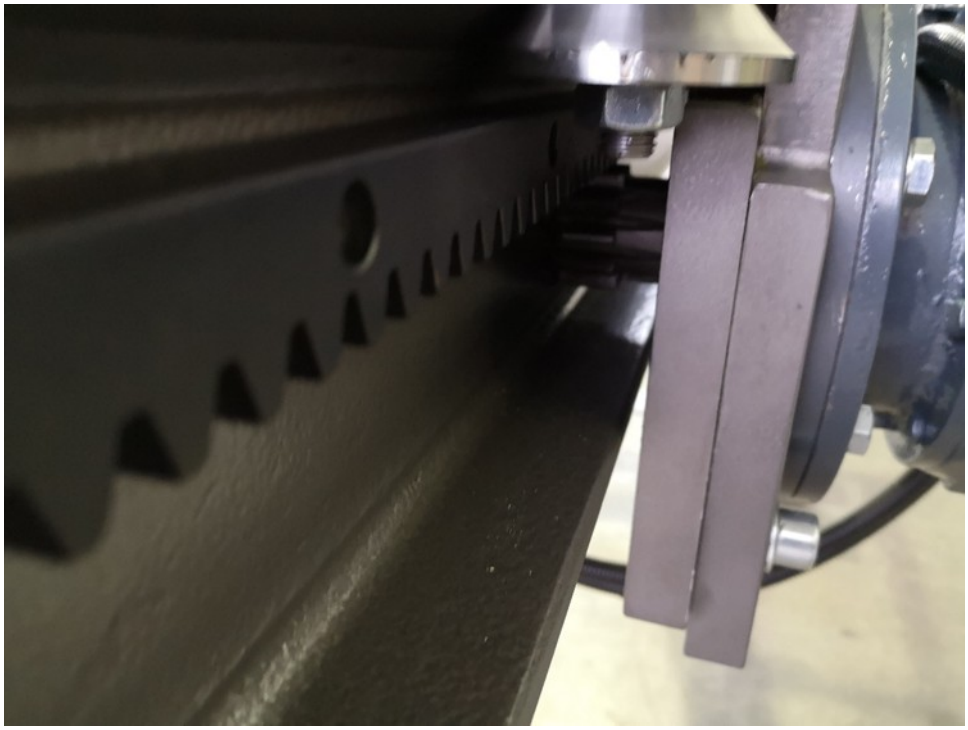

Fig. 15: Oil between the 2 plates shown, and use grease on the rack and pinion.

Lubrication during seaming

Make sure the inside of the seaming head is lubricated. After inserting the pre-shaped pipe, and pressing it against the stop plate on the left side, spray the whole outer part of the pipe (e.g. with a sprayer or a brush) which enters the guide sleeve (e.g. with an emulsion Biolmol 1 : 3 or WD40). This thin film of grease distributes is distributed evenly over the whole pipe while seaming.

If you are using long pipes, spray at several different places.

The guide slots and the inner rolls must be oiled regularly so they don’t run dry. The interval of oil depends on the material used. It must be oiled every 10-15m or as necessary.

10.) SEAMING HEAD MAINTENANCE

Depending on the material and quality, you can't avoid grit on the inside of the crimping head. The seaming head must be checked regularly and blown out with compressed air, or brushed out with a brush, at the latest when the carriage moves with difficulty.

11.) GUIDE SLEEVE REPLACEMENT

Fix the carriage with the release lever in the vertical position.

Loosen the wing nuts and remove the screws with springs. Lift the guide sleeve to the left and out. Insert the new guide sleeve to the right and mount it. Insert the screws with springs back, and adjust the pressure with the wing nuts to the new pre-shaped pipes.

12.) CLAMPING HEAD REPLACEMENT

Fig. 16: Replacing the clamping head.

Make sure that the clamping lever is not tightened, and is in the position shown in the picture above.
Unscrew the middle screw completely, since only the middle screw is used for clamping head tightening. The two outer screws are only used for positioning, and the clamping head only has centering slots under them.
Slide the clamping head out from the holder, put the desired head in and tighten the middle screw. Use the outer screws to position the clamping head so that it is horizontally level.

Fig. 17: The clamping head holder without the clamping head attached. Visible in the lower left is the clamping attachement for non-round pipes.

13.) CLAMPING HEAD POSITIONING

The clamping head assembly can be moved along the guide rail, so it is possible to seam pipes of varying lengths.
To move the clamping head first loosen the bottom screw so that the head comes out of the socket completely, but make sure to not unscrew it so that it comes out of the thread.
Next loosen the top screw so that the assembly can be moved along the guide rail without difficulties.
Move it into position to one of the holes along the T-profile (1m apart from each other), and tighten the upper screw, and screw in the lower screw.

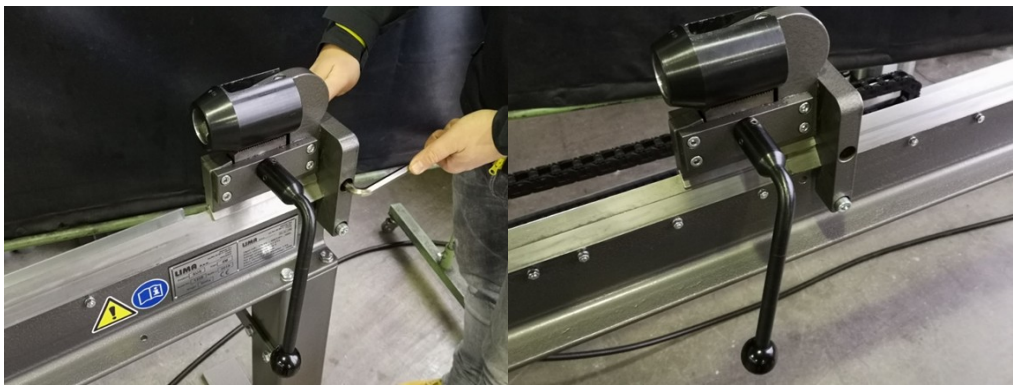

Fig. 18: Mounting the clamping head.

14.) NOTES