Instruction manual

Original instructions

Tube end forming machine

SFO-F-A-A, SFO-F-A-A-IOT

To prevent injury and damage, read this instruction manual carefully and attentively and retain it for future reference.

6010014619R06_en, valid from firmware 1.7.x

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Additional instructions in other languages can be downloaded from:
www.stauff.com

Walter Stauffenberg GmbH & Co. KG

Im Ehrenfeld 4

58791 Werdohl, Germany

+49 2392 916-0

sales@stauff.com

www.stauff.com

Table of Contents

1 Information about the manual

This instruction manual includes important instructions and information about the intended use. Keep the instruction manual where it can be accessed by the operating personnel.

1.1 Target group of the instruction manual

The operating personnel tasked with the following work have to read and observe this instruction manual:

- Installation
- Operation
- Fault
- Maintenance

See Personnel qualifications .

1.2 Structure of warnings

Coloured signal word boxes highlight the warnings. Always read the full warning text for effective protection against hazards!

The different colours and signal words of the following boxes designate various hazard levels:

DANGER

Ignoring this warning results in serious or fatal injuries.

WARNING

Ignoring this warning can result in serious or fatal injuries.

CAUTION

Ignoring this warning can result in minor or moderate injuries.

NOTICE

Ignoring this warning can result in property damage.

Warnings always have the same structure. They include the signal word, hazard type and source, consequences of ignoring them and steps to ward off/avoid hazards.

Example:

WARNING

Risk of shearing off and crushing fingers

- ► Ensure before start-up that all safety equipment is properly installed and in working order!
- ► Ensure that your fingers are not in the forming area while the machine functions are executed!

1.3 Structure of the operating instructions

Operating instructions request you to carry out an activity directly. They have an action-oriented structure. Always carry out the individual action steps in the specified order.

Operating instructions are structured as follows and are identified by corresponding symbols:

► Objective of the operating instruction

1. Action step

   ✓ Effect of the action step to check whether it has been carried out correctly.

2. Further action step

☑ Result of the complete operating instruction.

1.4 Structure of the additional information

The texts marked with an information symbol provide additional information and give you tips.

1.5 Structure of references

References are shown in this manual as follows:

Example:

"… only operate the machine as intended ."

2 For your safety

2.1 General safety instructions

Safety instructions help you to avoid injuries and damage. Ensure that you have read and understood all the safety instructions in this instruction manual.

Safe working entails more that just reading the general safety instructions in this chapter. Also read and follow the specific safety instructions in each chapter affecting your work. Also observe information in the referenced product documents.

The following general safety instructions apply to all work undertaken on the machine:

- Observe the applicable national and international health and safety regulations.
- Only operate the machine …
  - in a technically satisfactory condition,
  - taking into account safety and hazards,
  - according to the intended use,
  - in compliance with this instruction manual and
  - with all safety devices unchanged, properly installed and functional.
- Wear the appropriate personal protective equipment for all work undertaken on the machine Personal protective equipment.
- Observe all safety markings affixed to the machine .
- Work on electrical equipment may only be carried out by Walter Stauffenberg GmbH & Co. KG.
- Immediately eliminate any faults which affect your safety or the reliable operation of the machine. Take the machine out of service until the fault is rectified.
- Components – except tools – may only be replaced by Walter Stauffenberg GmbH & Co. KG.
- Keep away from moving parts. Wear close-fitting clothes. Tie long hair back to prevent it from being drawn into the machine. Remove any rings and necklaces before the work.
- Be aware of the presence of residual energies in mechanical, hydraulic and electrical components.

2.2 Intended use

The tube end forming machine is used exclusively for the machine forming of seamlessly drawn tubes according to EN10305-4 made of material E235+N and E355+N as well as SS316Ti according to EN10305-4 and EN10216-5 tolerance class D4/T3 in the delivery condition CFA or CFD with an outside tube diameter of between 6 mm and 42 mm.

The machine is used together with an internal tube support, tube shaper and shaping jaws which are specially designed for the machine forming of tube ends.

The machine may only be used within the specifications prescribed in the chapter Technical data
▸Section 3.2, p. 14 and in compliance
with the maintenance instructions and other information in this manual and in the
referenced documents.

No modifications, attachments or conversions may be carried out without consulting the manufacturer. Such modifications could limit the operating safety of the machine and are considered to be in violation of its intended use.

Any use other than the intended use is not permitted.

2.3 Tasks and duties of the operating company

To ensure safe operation of the machine the operating company has at least the duty …

- to ensure that the machine is only operated according to its intended use, in a proper condition, with completely assembled safety equipment and without damage.
- to define the area of use and draw up corresponding operating instructions (standard operating procedures).
- procure the respective latest version of the regulations concerning operation and to familiarise the operating personnel with these regulations.
- to ensure that the safety markings attached to the machine are always complete and fully legible.
- to provide the operating instructions always legibly and complete near to the operating site.
- Instruct personnel in safe working practices and regularly check that personnel work with an awareness for safety and hazards.
- Provide the personnel with the required personal protective equipment (▸Section 2.5, p. 10).
- to ensure adequate ventilation and illumination of the work areas.

2.4 Personnel qualification

Any work on the machine may only be carried out by qualified and authorised personnel. Personnel instructed, trained or briefed in the work involved are considered to be qualified. This has to be backed up by appropriate certificates and records.

A distinction is made in this manual between the following groups of people:

- **Operating personnel** are those who have been verifiably briefed in the operation and function of the machine. They input the data required for the operation and carry out the required operating steps to operate the machine. They are also responsible for simple maintenance work and troubleshooting as described in and Maintenance.
- **Personnel learning on the job** may only work on the machine under the constant supervision of personnel qualified for this work.

2.5 Personal protective equipment

To limit hazards during work, use the required personal protective equipment:

Personal protective equipment is required for certain activities.

	Wear close-fitting work clothes
	Wear safety shoes

2.6 Safety markings

The following safety markings are attached in a clearly visible way and are legible:

	Warning – dangerous electrical voltage ISO 7010 – W012
	Warning – hand injuries ISO 7010 – W024

2.7 Safety devices

Safety devices protect operating personnel against hazards.

Before each start-up of the machine, all safety devices have to be fitted correctly and in working order.

Safety devices may only be removed when the machine has stopped and is protected against being accidentally switched on again by means of a padlock or similarly suitable measures.

The following safety devices are attached to the machine or have to be fitted by the operating company:

Electrical main switch	The electrical main switch is located at the front of the machine. The electrical main switch de-energises the entire machine (position: 0). The electrical main switch is secured against being switched on again ▸Section 2.8, p. 12.
Emergency stop button	Pressing the emergency stop button triggers an emergency stop during which all machine movements are stopped. In order to be able to start up the machine again, the emergency stop triggered must be unlocked .

1 Electrical main switch
2 Emergency stop button

Fig. 1: Safety devices

2.8 Securing the machine against being switched on again

▶ Secure the machine against being switched on again:

1. Ensure that …

   ✓ a padlock is available for securing the machine against being switched on again (not included in the delivery).

2. Switch off the machine as described in .
3. Secure the electrical main switch with a padlock.

Fig. 2: Electrical main switch protected with a padlock

☑ The machine is secured against being switched on again.

3 Machine description

3.1 Machine overview

Fig. 3: Overview of the operating elements

No.	Designation	Description
1	Grip head	Handling the workpiece
2	Electrical main switch	Switching the machine on/off
3	"Ready/Process runs" lamp	Machine ready for operation, machine running
4	Operating panel	Setting up the machine
5	Acknowledge	Acknowledging a message
6	Emergency stop button	Stopping the machine in an emergency
	RJ45 interface	PC connection; at the back of the machine
	Power supply	At the back of the machine
	Optional foot switch	Connection at the back of the machine
	Antenna	Connection at the back of the machine

3.2 Technical data

General data	
Dimensions (W x D x H)	850 mm x 890 mm x 330 mm
Weight incl. oil:	210 kg

Electrical power	
Electrical connection:	400 V / AC3 / 50 Hz 460 V / AC3 / 60 Hz
Current consumption:	2.55 / 2.5 A

Hydraulic energy	
Oil capacity:	6.1 litres
Max. operating pressure:	700 bar

Installation requirements	
Ambient temperature:	Dry between 15°C and 35°C
Position	Horizontal

Sound pressure level	
In accordance with EN ISO 11202:2009:	68 dB(A)

3.3 Function

The machine forms tube ends to make them suitable for use with fittings according to ISO 8434-1. Seamlessly drawn tubes can be used according to EN10305-4 made of material E235+N and E355+N as well as SS316Ti according to EN10305-4 and EN10216-5 tolerance class D4/T3 in the delivery condition CFA or CFD with an outside tube diameter of between 6 mm and 42 mm.

The machine is used together with an internal tube support, tube shaper and shaping jaws which are specially designed for the machine forming of tube ends.

3.4 Tools and product

The tube end forming machine forms tube ends. These form the basis for connectors, consisting of the standard fitting body according to ISO 8434-1, the standard union nut and the Stauff form ring with an integrated soft seal.

Fig. 4: Product

1 Internal tube support
2 Tube shaper
3 Shaping jaws

Fig. 5: Tools

The lettering on the tube shaper and shaping jaws provide the following information:

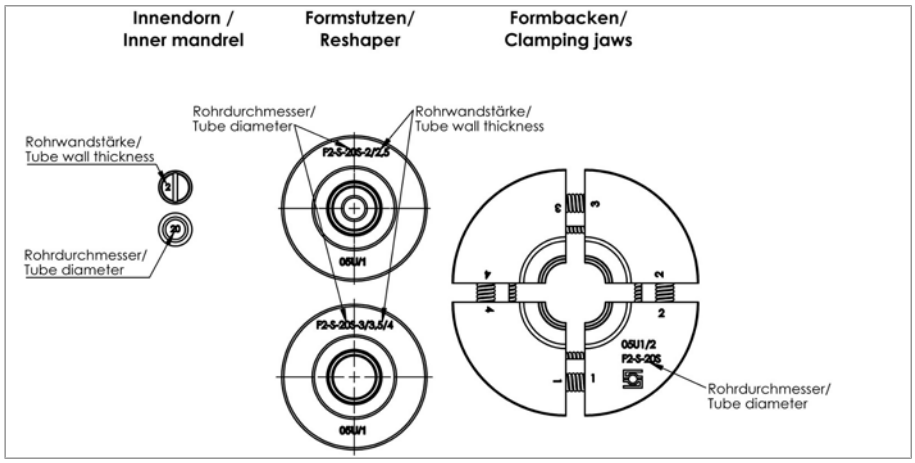

Fig. 6: Size

NOTICE

Damage to the tool due to an incorrect internal tube support

- ► Tube shapers with an internal hole are designed for forming with internal tube supports. Ensure to always use the correct internal tube support for the wall thickness selected as otherwise the tool can be damaged! See ▸Section 6.5.6, p. 40

Additional information on selecting the size can be found in the Stauff product catalogue.

3.5 Type plate

The type plate is located on the side of the machine.

Fig. 7: Type plate

3.6 Serial number

The serial number is stamped into the frame at the front right!

Fig. 8: Serial number

3.7 Spare and wear parts

NOTICE

Replacing components

Machine damage, malfunctions, faults

- ► Any work for which the machine has to be opened may only be carried out by Walter Stauffenberg GmbH & Co. KG!
- ► Maintenance work may only be carried out by authorised set-up and maintenance personnel!
- ► Only use suitable tools in a proper condition!
- ► Replace components only with genuine spare parts or those authorised by the manufacturer!

Lists of authorised spare parts and wear parts can be obtained from Walter Stauffenberg GmbH & Co. KG.

4 Transport and storage

4.1 Transport

Information on dimensions and weight can be found in Section 3.2, p. 14.

Note the following during transport:

- The attachment points are the side bars/grips of the machine.
- Keep the machine horizontal during transport. Note that the centre of gravity is in the assembly area.
- Transport may only be carried out by an authorised specialist company or by qualified personnel.
- Dispose of all packaging material in a proper and environmentally friendly manner after transport.

4.2 Storage

Note the following during storage:

- The storage location has to be clean and dry.
- The ambient temperature has to be at least 5 °C.

5 Installation

5.1 Safety

WARNING

Connecting the machine to the power supply

Severe injury or death due to dangerous voltage

- ► Work on electrical equipment may only be carried out by qualified electricians!
- ► Work on live parts may only be carried out under the supervision of a second person!

5.2 Assembly/Installation

The machine is assembled ready for operation by the manufacturer and delivered with the control unit set up.

Control unit updates can be requested from the manufacturer.

Note the following before the installation:

- Set up the machine on a sturdy base.
- Set up the machine so there is space to work around it.
- Inspect the machine for any signs of damage.

5.3 Attaching supply connections

Attach the machine to the following supply connections:

- Power supply

5.4 Establishing readiness for operation

A visual check and function test has to be carried out on the machine before start-up. It is important to ensure that …

- all components are mounted correctly, undamaged and in full working order,
- all outer fittings are installed and fully tightened, and
- all safety devices work Testing the emergency stop.

6 Operation

To ensure safe operation, the machine may only be used in accordance with its intended use .

WARNING

Reaching into the pressing tool

Shearing or crushing fingers

- ► Ensure before start-up that all safety equipment is properly installed and in working order!
- ► Ensure that your fingers are not in the forming area while the machine functions are executed!

CAUTION

Faulty operation or malfunctions

Injury or machine damage

- ► Read the instruction manual before working on the machine!
- ► Take regularly part in a safety training!

6.1 Switching on the machine

► How to switch on the machines:

1. Turn the electrical main switch to "I / ON".

✓ The message **Release emergency stop and confirm with "Acknowledge"** appears after a few seconds.

Fig. 9: Start screen

✓ The English start screen appears at the first start-up after delivery of the machine.
If you want to keep this language, continue with step 5.

2. Press the **Globe** button to set the language.

✓ The **Language settings** menu opens.

Fig. 10: Menu – Language settings

3. Press the button for the language to be set.

✓ The flag in the upper area of the menu indicates the selected language.

4. Press the **Arrow** button to exit the menu.
5. Pull out the **Emergency stop** button if necessary.
6. Press the **Acknowledge** button.

✓ The **Reference run / material** menu opens.

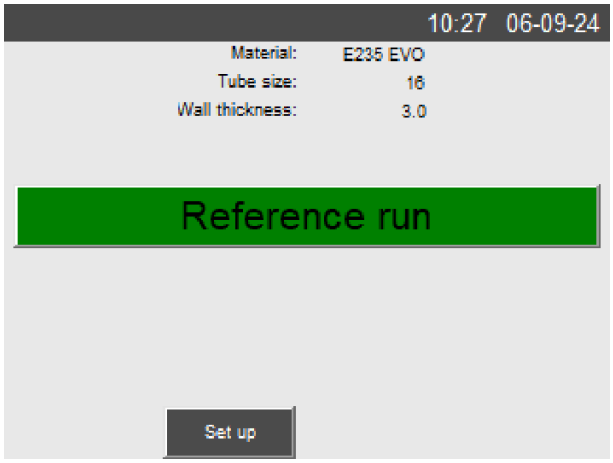

Fig. 11: Menu – Reference run / material

✓ The **Ready/Process runs** lamp flashes.

☑ The machine is ready for operation.

Check whether a tool is installed. If not, set up a new order
▸Section 6.5, p. 35.

If a tool is already installed, you can continue with the existing order. Start the reference run as described on the following pages.

▶ How to carry out the reference run without a tool change:

1. Press the **Reference run** button.

✓ The message **Start reference run** opens.

NOTICE

Incorrectly executed reference run

Machine damage

► Never carry out the reference run with a tube! Do not place a tube into the tool until the reference run is completed!

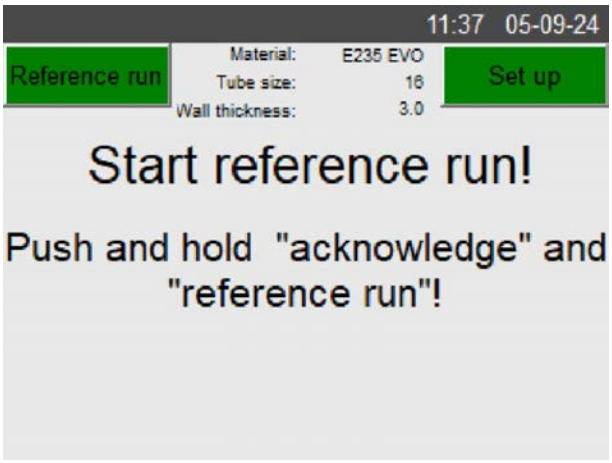

Fig. 12: Starting the reference run

2. Simultaneously press and hold the **Reference run** and **Acknowledge** buttons.

✓ The reference run starts.

✓ The **Ready/Process runs** lamp lights up continuously.

✓ The message **Release grip head** opens.

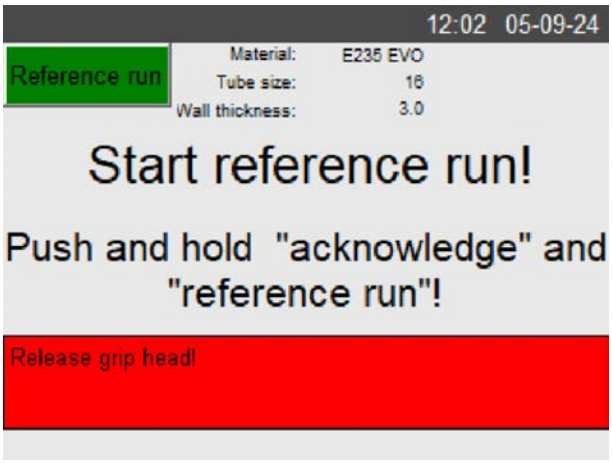

Fig. 13: Releasing the grip head

Fig. 14: Pulling out the grip head

3. Rotate the grip head to the left using the handles provided and pull it out using both hands.

Fig. 15: Releasing and pulling out the grip head

✓ The grip head is released and opened.

4. Check tool and remove any dirt.

NOTICE

Objects in the forming area

Machine damage

► Before starting the reference run, remove auxiliary tools and other objects that are not required for the reference run!

✓ The message **Insert and lock grip head** opens.

Fig. 16: Inserting and locking the grip head

5. Insert the grip head with both hands and turn to the right.

✓ The grip head is locked.

✓ The message **To continue, press and hold "Reference run" and "Acknowledge"!** appears.

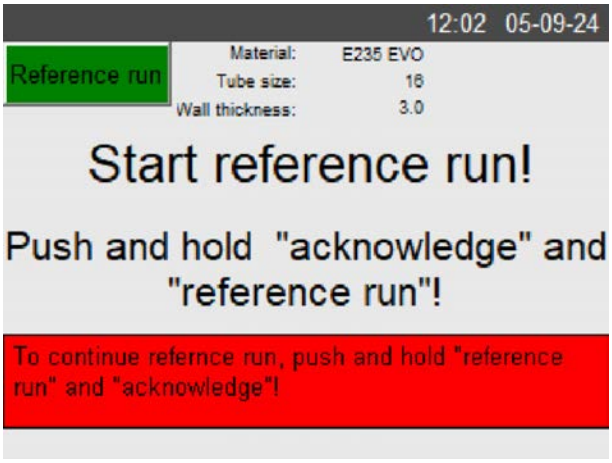

Fig. 17: Starting the reference run

6. Simultaneously press and hold the **Reference run** and **Acknowledge** buttons.

✓ The reference run continues.

✓ The **Start forming process** menu opens after the reference run is completed.

Fig. 18: Start forming process

✓ The **Ready/Process runs** lamp flashes.

☑ The machine is ready for operation.

Please refer to the chapter Section 6.3, p. 27 if the reference run is interrupted.

6.2 Establishing readiness for operation after emergency stop

▶ This is the way to establish readiness for operation after the emergency stop:

1. Eliminate the fault as described in Section 7, p. 53.

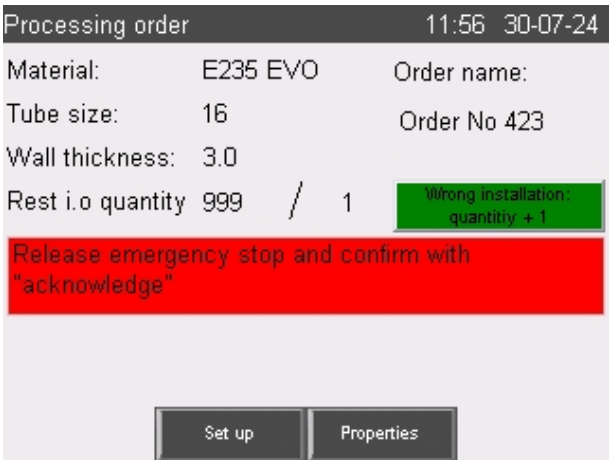

Fig. 19: Emergency stop message

2. Press the **Emergency stop** button.
3. Press the **Acknowledge** button.

✓ The **Reference run / material** menu opens.

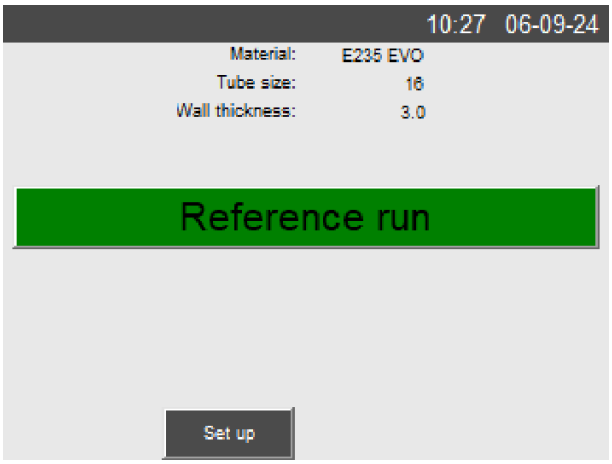

Fig. 20: Menu – Reference run / material

☑ The machine is ready for operation.

NOTICE

Damage to the machine from incorrectly executed reference run

▶ Never carry out the reference run with a tube! Do not place a tube into the tool until the reference run is completed!

6.3 Warm-up program

If the machine independently interrupts the reference run, the message “**Impermissible start-up pressure!** appears! **Confirm with "Acknowledge", remove tube or check tool!** is shown on the screen. It is then possible that the hydraulics temperature of the machine is too low. In this case, the machine has to be warmed up with the warm-up program.

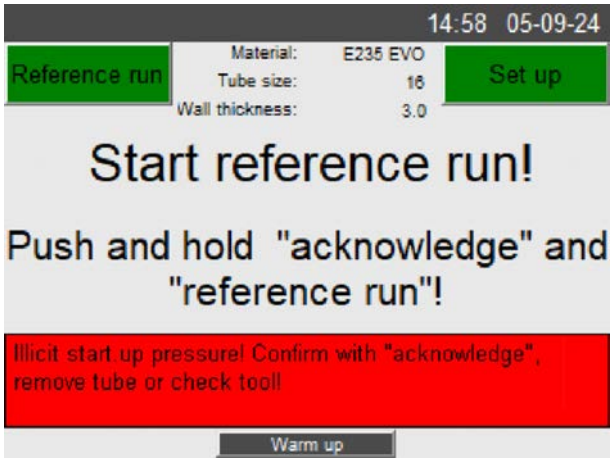

Fig. 21: Impermissible start-up pressure

▶ How to start the warm-up program.

1. Press the **Warm-up** button which is automatically shown when the reference run has been interrupted. The warm-up screen opens.

Fig. 22: Start

2. Do not remove any tools from the machine and do not insert any tools into the machine. Remove all objects as well as your fingers from the assembly area.
3. Press and hold the "Start" button

✓ It takes about 2 minutes to warm up the machine. The warm-up program moves the installation cylinders back and forth several times

WARNING

Fingers in the forming area

Risk of shearing off and crushing fingers

► Ensure that your fingers are not in the forming area while the machine functions are executed!

4. When the warm-up program has been completed, a confirmation is shown on the screen and you can release the button.
5. Press the "Arrow left" button to return to the Reference run menu.

Reference run interrupted again

Repeat the warm-up process for the machine.

6.4 Setting up the machine

6.4.1 Setting the language

▶ How to set the language:

1. Press the **Settings** button in the **Processing order** menu.

Fig. 23: Menu – Processing order

✓ The **Settings level** menu opens.

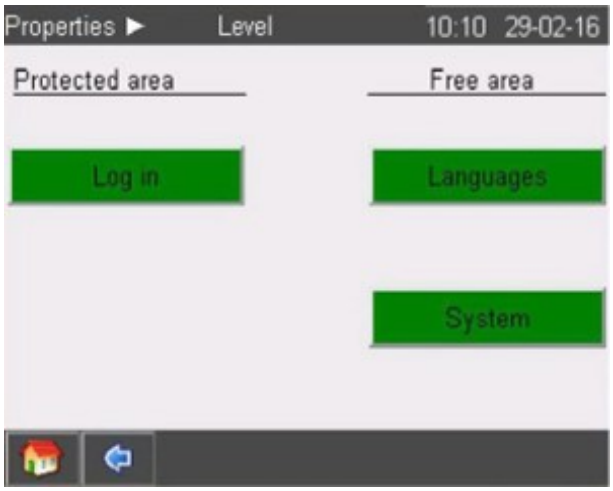

Fig. 24: Menu – Settings level

2. Press the **Languages** button in the **Settings level** menu.

✓ The **Language settings** menu opens.

Fig. 25: Menu – Language settings

3. Press the button for the language to be set.

✓ The flag in the upper area of the menu indicates the selected language. Press the **Arrow** button to exit the menu.

☑ The language is now set.

6.4.2 Setting system properties

▶ How to open the system properties:

1. Press the **Settings** button in the **Main menu**.

✓ The **Settings level** menu opens.

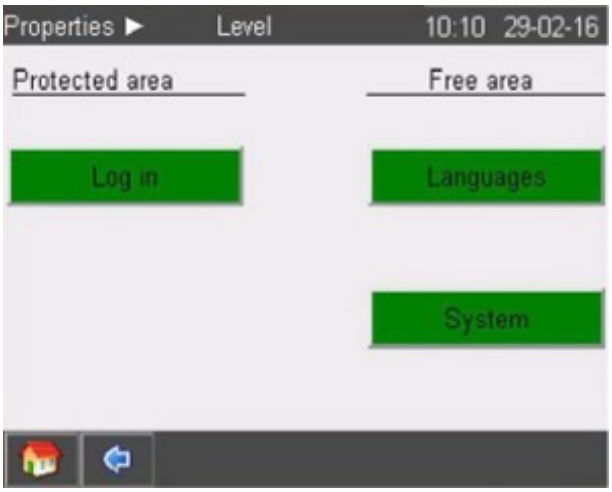

Fig. 26: Menu – Settings level

2. Press the **System** button in the **Settings level** menu.

✓ The **System** menu opens.

Fig. 27: Menu – System

☑ Settings can now be made.

▶ How to set the date and time:

1. Press the **Date/time** display and enter the desired data.

Fig. 28: Menu – Input pad for date and time

2. Confirm your entry by pressing the green tick.

✓ The input pad for **date/time** opens.

☑ The set data is displayed.

▶ How to obtain information on the quantity for each tool size:

1. Press the **Tool counter** button.

Fig. 29: Tool counter

☑ The quantities for each tool size are displayed. Use the **arrow** buttons to scroll.

▶ How to switch off the control panel for cleaning:

1. Press the **Clean screen** button.

☑ The control panel switches itself off for 20 seconds.

▶ How to obtain information on the function of the inputs and outputs:

1. Press the **PLC DI / DO** button.

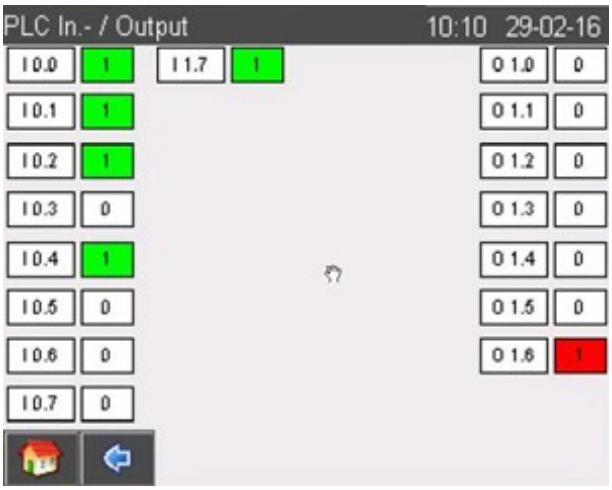

Fig. 30: Overview – Function of the inputs and outputs

☑ The function of the inputs and outputs is displayed.

▶ How to reset the actual production quantity number:

1. Press the **Reset OK quantity** button.

✓ The **Number of pieces** menu opens.

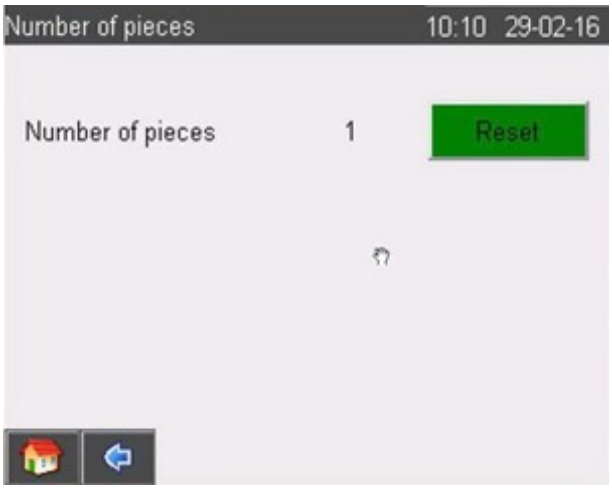

Fig. 31: Menu – Number of pieces

2. Press the **Reset** button.

☑ The actual production quantity number is reset.

▶ How to access the warm-up menu.

1. Press the **Warm-up** button.

✓ The **Warm-up** menu appears.

Fig. 32: Menu – Warm-up

☑ The warm-up process can now be started.

See

▶ How to obtain information about the material quantity.

1. Press the **Material counter** button.

Fig. 33: Menu – Material counter

☑ The material counter menu appears.

6.5 Setting up the order

▶ How to set up the order:

1. Press the `Set-up` button in the **Processing order** menu.

Fig. 34: Menu – Processing order

✓ The **Set up order** menu opens.

Fig. 35: Menu – Set up order

2. Carry out the following steps in the order indicated:

- Setting up the material ▸Section 6.5.1, p. 36.
- Setting up the tube size ▸Section 6.5.2, p. 37.
- Setting up the wall thickness ▸Section 6.5.3, p. 38.
- Setting up the production quantity ▸Section 6.5.4, p. 39.
- Setting up the order name ▸Section 6.5.5, p. 39
- Inserting / changing the tool ▸Section 6.5.6, p. 40.

6.5.1 Setting up the material

▶ How to set up the material:

1. Press the **Material** button in the **Set up order** menu.

✓ The **Set up material** menu opens.

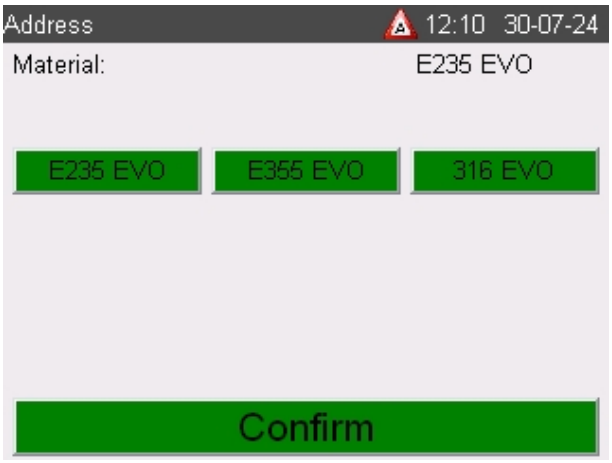

Fig. 36: Menu – Set up material

2. Select the material and press the corresponding button.
3. Confirm the selection with the **Acknowledge** button.

✓ The **Set up order** menu opens.

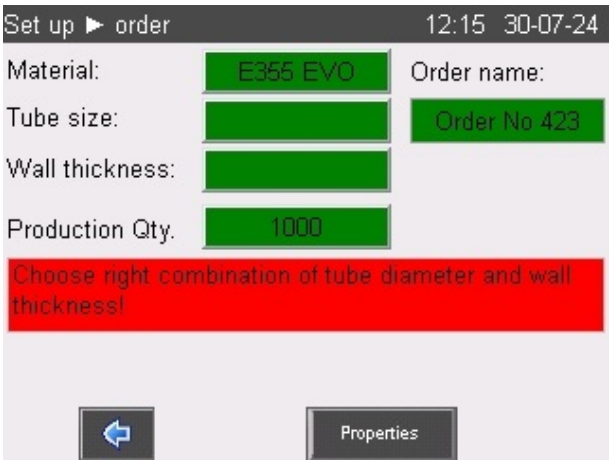

Fig. 37: Menu – Set up order

☑ The selected material is displayed.

6.5.2 Setting up the tube size

▶ How to set up the tube size:

1. Press the **Tube size** button in the **Set up order** menu.

✓ The **Set up tube size** menu opens.

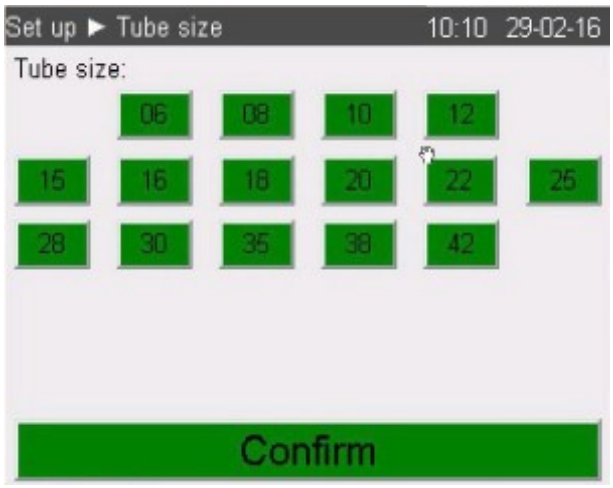

Fig. 38: Menu – Set up tube size

2. Press the button for the desired tube size.

The menu only displays the tube sizes which can be combined with the selected material. If the required tube size is not displayed, change the set parameters or contact Walter Stauffenberg GmbH & Co. KG.

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3. Confirm the selection with the **Acknowledge** button.

✓ The **Set up order** menu opens.

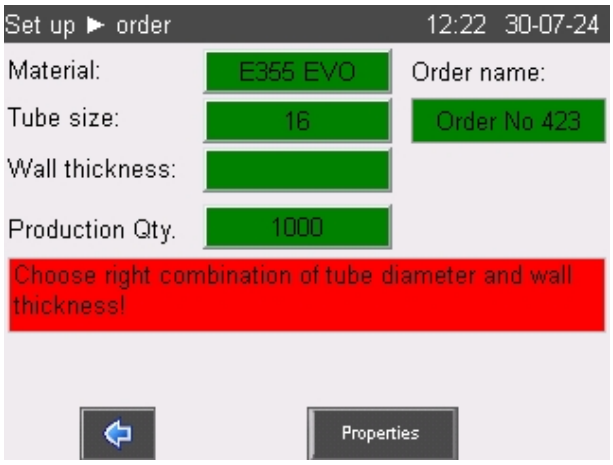

Fig. 39: Menu – Set up order

☑ The selected tube size is displayed.

6.5.3 Setting up the wall thickness

▶ How to set up the wall thickness:

1. Press the **Wall thickness** button in the **Set up wall thickness** menu.

✓ The **Set up wall thickness** menu opens.

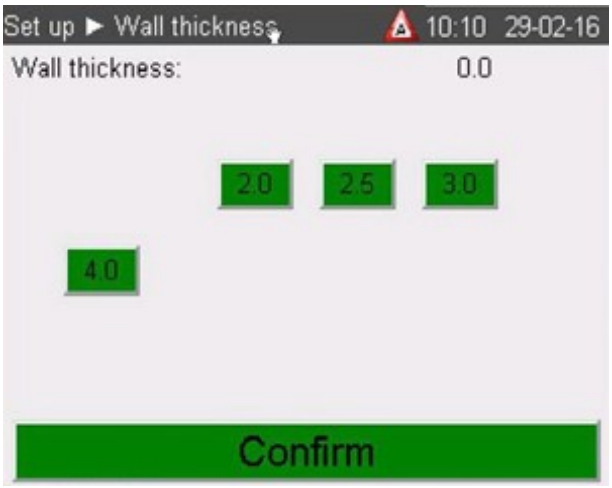

Fig. 40: Menu – Set up wall thickness

2. Press the button for the desired wall thickness.

The menu only displays the wall thicknesses that can be combined with the selected tube size. If the required wall thickness is not displayed, change the set parameters or contact Walter Stauffenberg GmbH & Co. KG.

---

3. Confirm the selection with the **Acknowledge** button.

✓ The **Set up order** menu opens.

☑ The selected wall thickness is displayed.

6.5.4 Setting up the production quantity

> **i** Changing the production quantity automatically resets the OK quantity to 0!

▶ How to set up the production quantity:

1. Press the **Production quantity** button in the **Set up order** menu.

✓ The input pad for entering the quantity opens.

Fig. 41: Menu – Input pad for quantity

2. Enter the quantity.
3. Confirm the quantity by pressing the **green tick**.

✓ The input pad for entering the quantity closes.

☑ The selected production quantity is displayed.

6.5.5 Setting up the order name

▶ How to set up the order name:

1. Press the Order button in the Order menu.

✓ The input menu opens.

Fig. 42: Enter the order name

2. Enter the name of the order (maximum 13 characters).

6.5.6 Inserting / changing the tool

WARNING

Risk of shearing off and crushing fingers

- ► Ensure before start-up that all safety equipment is properly installed and in working order!
- ► Ensure that your fingers are not in the forming area while the machine functions are executed!

► How to set up the tool:

1. In the **Set up order** menu, check the material and adjust it if necessary .

Fig. 43: Menu – Set up order

2. Confirm the selection with the **Acknowledge** button.

✓ The **Tool change** menu opens.

Fig. 44: Checking the tool

3. Rotate the grip head to the left using the handles provided, pull it out and swivel it open.

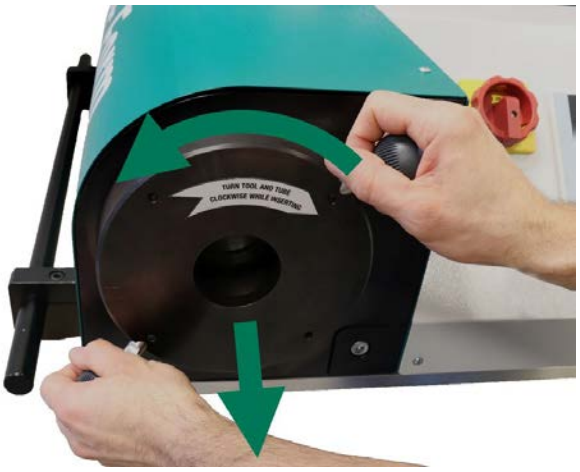

Fig. 45: Releasing and pulling out the grip head

✓ The grip head is released and opened.

✓ The forming cylinder moves out.

NOTICE

Damage to the machine from objects in the forming area

► Before starting the forming process, remove auxiliary tools and other objects that are not required for forming!

4. Check the forming area and remove any dirt.

NOTICE

Damage to the machine due to different tool sizes

► Ensure to use the same sizes for the tube shaper, the shaping jaws and the internal tube support. The use of different tool sizes can result in damage to tools and machine!

5. Select the tube shaper, the shaping jaws and possibly the internal tube support according to the set size.

NOTICE

Damage to the machine due to worn tools

► Ensure that the tools are in perfect technical condition. The use of worn tools can result in damage to the machine!

6. Check that the tools are in technically perfect condition.

NOTICE

Damage to the tool due to an incorrect internal tube support

► Tube shapers with an internal hole are designed for forming with internal tube supports. Ensure to always use the correct internal tube support for the wall thickness selected as otherwise the tool can be damaged!

7. If an internal tube support is required, screw it firmly into the tube shaper.

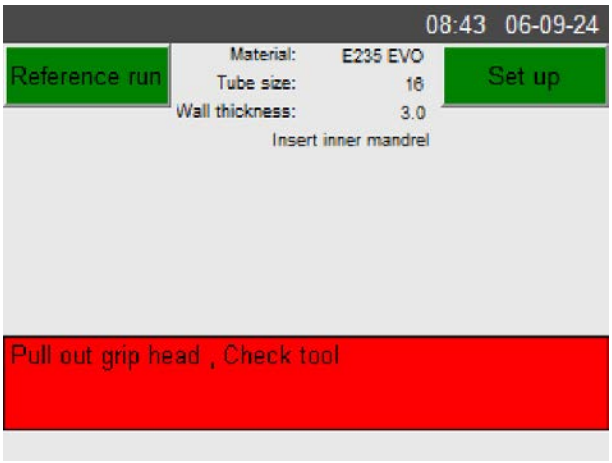

Fig. 46: Reference run with the internal tube support

NOTICE

Incorrectly inserted tube shapers

Damage to the machine due to incorrectly inserted tube shapers.

► Ensure that the tube shaper is turned fully to the right against the stop in the bayonet!

8. Insert the tube shaper into the bayonet lock of the machine.
   To remove the tube shaper, rotate it back to the left by approx. 90°.

Fig. 47: Inserting the tube shaper.

9. Insert the shaping jaws into the grip head of the machine at a slight angle and slide it back to the stop.

Fig. 48: Inserting the shaping jaws

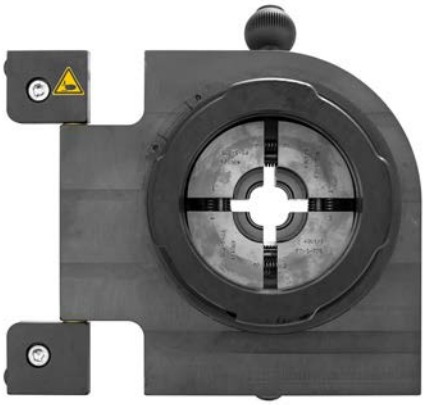

Fig. 49: Shaping jaws inserted

✓ The message **To insert the tool, press “Acknowledge”** opens.

Fig. 50: Inserting the tool

10. To insert the tool, press the **Acknowledge** button.

✓ The message **Insert and lock grip head**! opens.

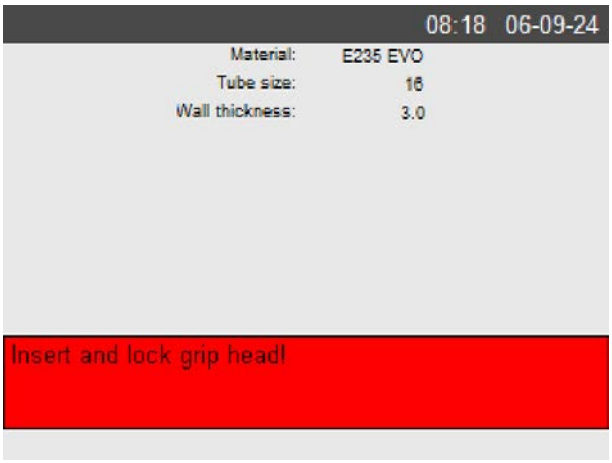

Fig. 51: Inserting the grip head

11. Swivel the grip head to a straight position, push it in with both hands and turn it to the right.
    - ✓ The grip head is locked.
    - ✓ The **Reference run** menu opens.

NOTICE

Damage to the machine due to an incorrectly executed reference run

► Never carry out the reference run with a tube!

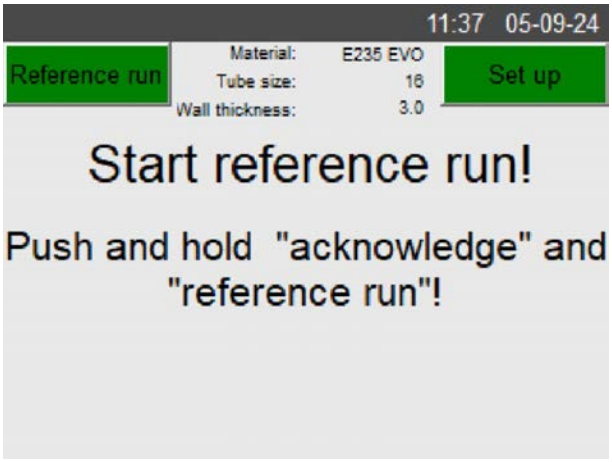

Fig. 52: Starting the reference run

12. Simultaneously press and hold the **Reference run** and **Acknowledge** buttons.
    - ✓ The reference run starts.
    - ✓ The **Ready/Process runs** lamp lights up continuously.
    - ✓ The **Processing order** menu opens after the reference run is completed.
    - ✓ The **Ready/Process runs** lamp flashes.

Fig. 53: Menu – Processing order

☑ The machine is ready for operation.

Please refer to the chapter if the reference run is interrupted.

6.6 Forming tube ends

WARNING

Risk of shearing off and crushing fingers

- ▶ Ensure before start-up that all safety equipment is properly installed and in working order!
- ▶ Ensure that your fingers are not in the forming area while the machine functions are executed!

▶ How to form the tube ends:

1. Ensure that …
   - ✓ the tube has been prepared according to the requirements in the Stauff product catalogue.
   - ✓ The order has been set up as described in .
   - ✓ The **Start up forming process** button is displayed on the control panel.

We recommend lightly oiling the front end of the tube (HLP32, no lubricating grease) to minimise tool wear.

NOTICE

Tool damage when forming stainless steel

The original STAUFF forming oil (type SFO-FO-1L) must be used when forming stainless steel tubes. Otherwise, damage to the tool and the machine can occur!

Fig. 54: Start forming process

1. Slide a suitable union nut onto the tube end.
2. Note the correct alignment:
   - ✓ The union nut head has to point towards the tube end which is to be formed.

Fig. 55: Product with a union nut

3. Slide the tube into the tool up to the stop, ensuring not to twist it to the left.

Fig. 56: Pushing in the tube

4. Press the **Start forming process** button.

✓ The forming process starts.

✓ The **Ready/Process runs** lamp lights up continuously.

5. When the lamp flashes, remove the tube and then press the **Move to start position** button.

Fig. 57: Removing the tube

Information on checking the tube can be found in the Stauff product catalogue.

6. Continue the forming process until the **i.o. quantity** is 0.

✓ The message **Order completed. Continue with set-up** appears.

Fig. 58: Order completed

☑ The order has been processed.

You can not set up another order or witch off the machine
Section 6.10, p. 52.

6.7 Data collection via the IOT Gateway

The pipe end forming machine is optionally equipped with a data gateway with an integrated SIM card, which documents the assembly data. This includes the date and time of the forming, forming settings such as the tube size, wall thickness and tube material, as well as the set order name.

Using the established data connection, it is possible to release and record machine errors or optimisations quickly and easily on site. You can also load other tube forming parameters onto the machine if they are available at Stauff.

Communication and data storage will not begin until the user has registered the machine and agreed to the data protection settings.

For a detailed description of the IOT functionalities, refer to the instructions supplied separately.

Note:

A prerequisite is the availability of a mobile phone connection in order to ensure data transmission. This should be taken into account when setting up the machine.

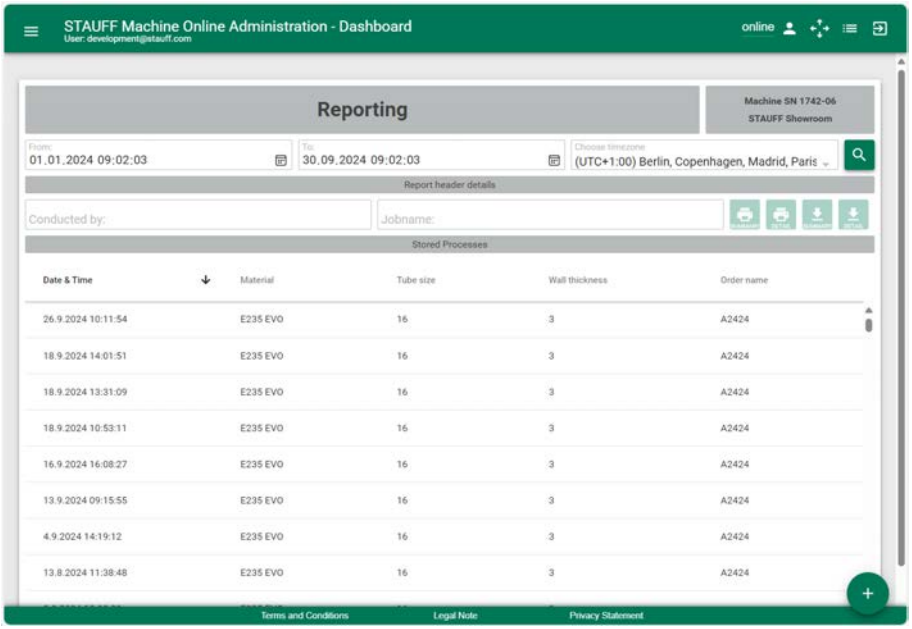

Fig. 59: IOT data collection – overview

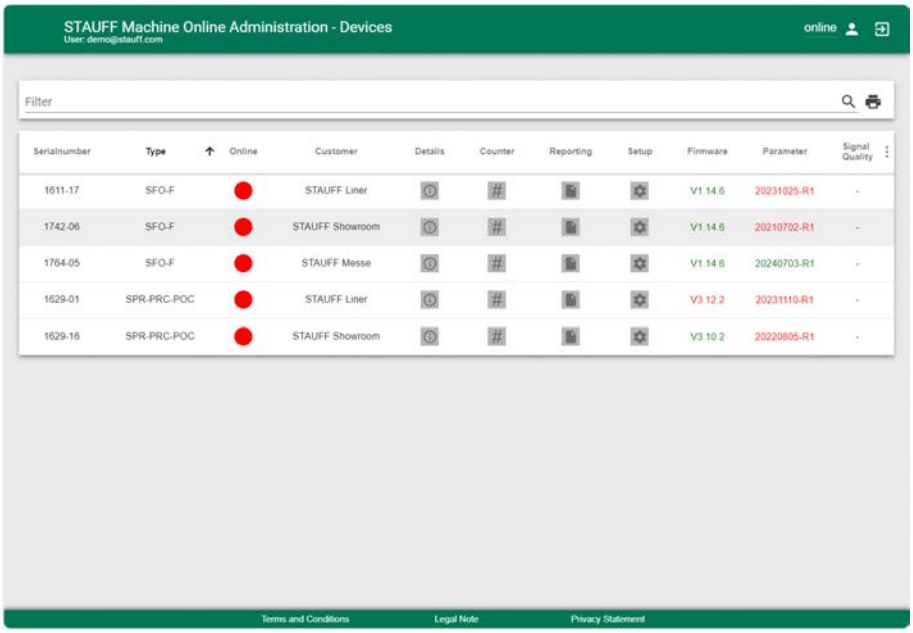

Fig. 60: IOT data collection – devices

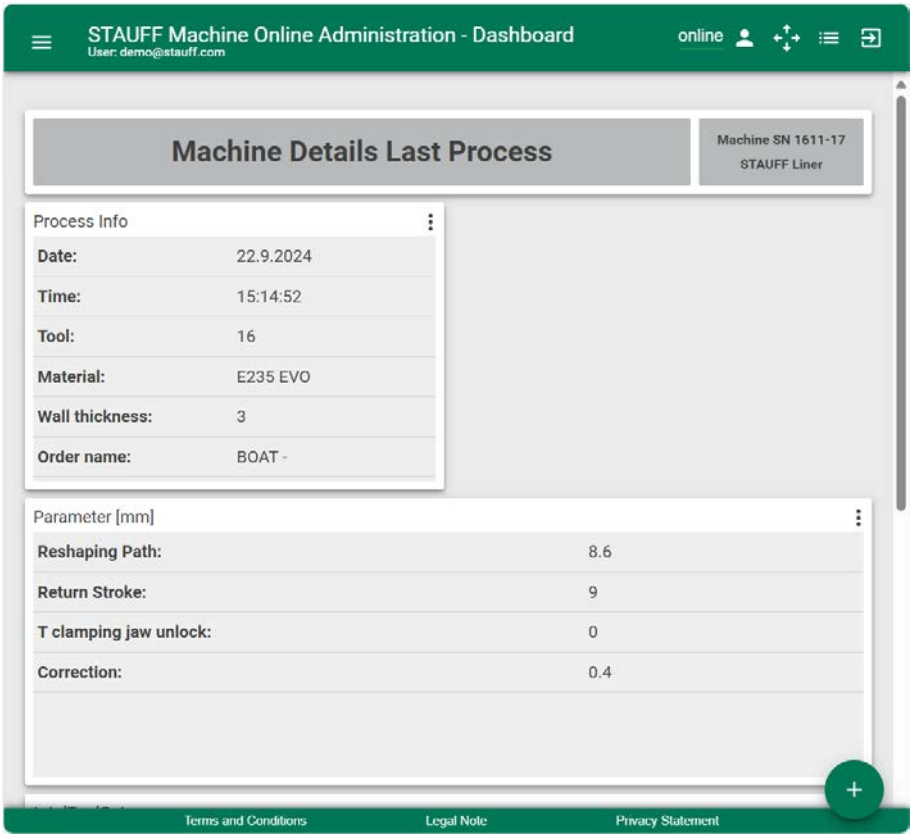

Fig. 61: IOT data collection – process overview

6.8 Foot switch mode

▶ How to activate foot switch mode:

1. Plug the foot switch connector into the appropriate socket at the back of the machine.
2. Open the "**Settings**" menu as described in .
3. When the machine has detected the foot switch, the **Foot switch option – foot switch inactive** button is shown in the "**Properties**" menu.

Fig. 62: Foot switch option – foot switch inactive

4. Press the **Foot switch option – foot switch inactive** button.
5. The PIN prompt opens. Request the PIN code from Stauff.

✓ When the correct PIN code has been entered, the foot switch is active and the button changes to active.

6. Return to the main menu.

▶ Working in foot switch mode

1. Prepare for assembly as described in .
2. In contrast to assembly in button mode, assembly is started by actuating the foot switch.

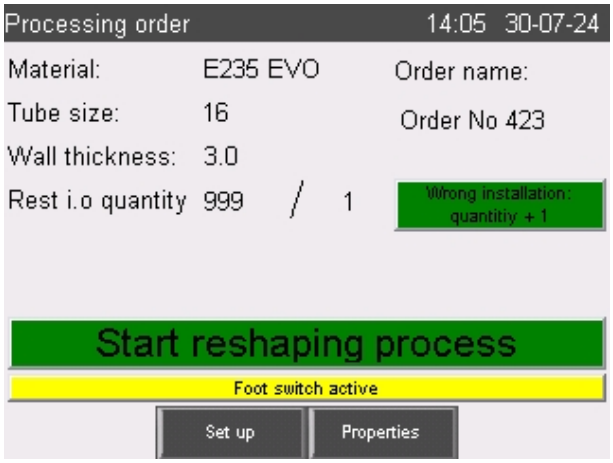

Fig. 63: Foot switch active

3. Rework as well as preparations for further assembly are also carried out as described in .

▶ How to deactivate foot switch mode.

1. The foot switch is deactivated by pulling the connector out of the socket, by deactivating it in the Settings menu or by restarting the machine.

6.9 Cleaning the machine

The machine and its components have to be cleaned after each use.

▶ How to clean the machine:

1. Use a cotton cloth to clean the surfaces.
2. To clean the control panel, switch off the control panel
   .
3. Use water with a grease-dissolving, non-caustic cleaning agent. Do not allow any moisture to get into the cylinders.
4. Remove stubborn dirt with a suitable cleaning agent and apply corrosion protection.

Corrosion protection

After removing stubborn dirt with a
cleaning agent and after an extended downtime,
a light oil film must be applied to the moving machine parts
to provide corrosion protection.

6.10 Switching off the machine

▶ How to switch off the machine:

1. Turn the main switch to "**0 / OFF**".

☑ The machine is switched off and de-energised.

7 Troubleshooting

WARNING

Troubleshooting

Serious injuries or machine damage

- ► Any work for which the machine has to be opened may only be carried out by Walter Stauffenberg GmbH & Co. KG!
- ► The faults described in may only be eliminated by authorised and qualified personnel!
- ► Wear the appropriate personal protective equipment for all work undertaken on the machine!

WARNING

Working on electrical equipment

Serious or fatal injuries from dangerous electrical voltage

- ► Any work for which the machine has to be opened may only be carried out by Walter Stauffenberg GmbH & Co. KG!
- ► Work on electrical appliances may only be carried out by qualified electricians!
- ► Switch off the machine and secure it against being switched on again!
- ► Work on live parts must always be carried out in the presence of a second person!
- ► Check electrical components for any residual charges!

CAUTION

Working on the hydraulic system

Eye injuries from ejected hydraulic oil

- ► Depressurise the machine!
- ► Any work for which the machine has to be opened may only be carried out by Walter Stauffenberg GmbH & Co. KG!
- ► Wear your personal protective equipment including safety goggles for all work undertaken on the hydraulic system!

► How to proceed in case of faults:

1. Determine the reason for the fault.
2. Trace the cause of the fault on the corresponding display element.
3. Eliminate the cause of the fault and replace any defective components, if necessary.
4. If you cannot identify the reason for the fault, contact the manufacturer.

7.1 Forming path

Fig. 64: Forming path not reached

Error message on the machine display:	Possible cause:
Forming path not reached! Acknowledge the message with"Acknowledge".	**The machine does not reach the defined end position** • Incorrect tube material • Incorrect wall thickness • Incorrect tube diameter • Incorrect parameters • Dirty tool **Hydraulics** • Lack of oil • Pump no longer has the required power. Contact the manufacturer.

7.2 Target position

Fig. 65: Target position not reached

Error message on the machine display:	Possible cause:
Target position has not been reached! Confirm the message with "Acknowledge", restart the machine if necessary.	**Control unit** • Control error. Contact the manufacturer.

7.3 Reference run

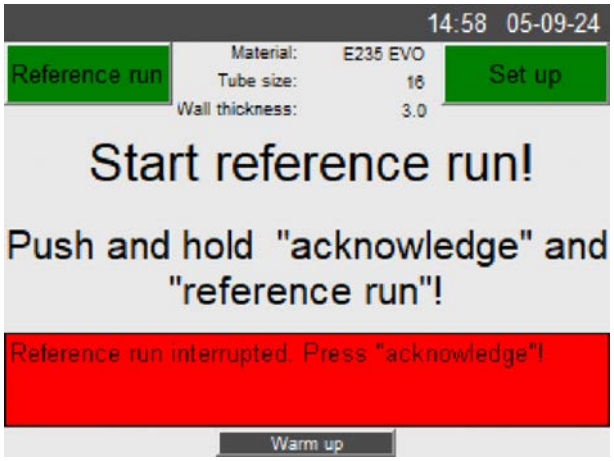

Fig. 66: Reference run interrupted

Error message on the machine display:	Possible cause:
Reference run has been interrupted. Lock the bell for a new run, then press "Acknowledge"!	**Handling** • Buttons were not pressed until the end of the reference run. Execute the reference run again. • Hydraulics too cold. Execute the warm-up program. See
Attention! Reference run with the tube inserted! Remove the tube and press "Acknowledge"	**Handling** • Object detected in the forming jaws during the reference run. Remove the object, press "Acknowledge" and repeat the reference run

7.4 Parameters

Fig. 67: Incorrect parameters

Error message on the machine display:	Possible cause:
Incorrect parameter combination! No shaping path stored.	**Handling** • No parameter set is stored for the selected parameter combination Material / Tube diameter / Wall thickness. Check the parameter combination and change it if necessary. Contact the manufacturer if the desired combination is not available.

7.5 Direction of rotation

Fig. 68: Incorrect direction of rotation

Error message on the machine display:	Possible cause:
Incorrect direction of rotation	• Phase reverser of the connector is set incorrectly. Rotate the phase reverser.

7.6 Motor protection switch

Fig. 69: Motor protection switch triggered

Error message on the machine display:	Possible cause:
Motor protection switch has been triggered	**Hydraulics** • Overloading of the hydraulic system. Leave the machine to cool down, reset the motor protection switch, please contact the manufacturer in this respect

7.7 Assembly

Fig. 70: Tube not inserted correctly

Error message on the machine display:	Possible cause:
Attention! Tube is not inserted correctly! Confirm, remove the tube and repeat the process.	**Operation** • The tube is not inserted into the tool up to the stop. Confirm, remove the tube and repeat the process.

7.8 Moving to the start position

Fig. 71: Impermissible start-up pressure

Error message on the machine display:	Possible cause:
Impermissible start-up pressure! Confirm with "Acknowledge", remove the tube or check the tool	**Operation** • The tube shaper is not in the correct position. Please check the positioning and "Acknowledge"

7.9 Tool

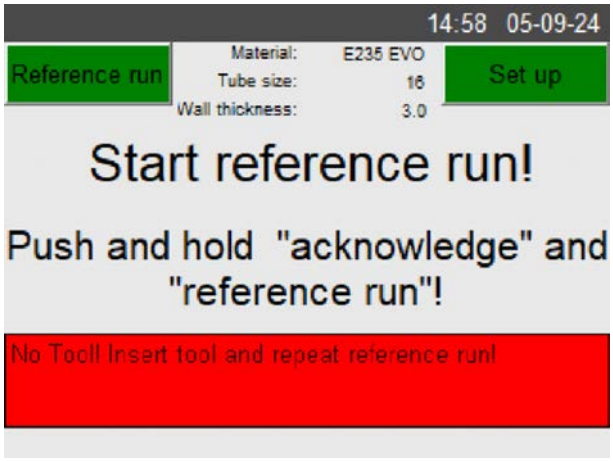

Fig. 72: No tool

Error message on the machine display:	Possible cause:
No tool! Insert the tool and repeat the reference run!	**Tool** • Open the grip head, then change the tool .

7.10 Other errors

Other errors (cannot be integrated into the machine):	Possible cause:
Contour has not been processed correctly Error: Visual check shows an insufficient diameter	**Tool** • Tool wear • Incorrect shaping jaws • Incorrect tube shaper • Incorrect internal tube support **Tube** • Incorrect wall thickness • Tolerance exceeded • Material too hard or too soft • Incorrect preparations **Handling** • Tube not pressed against the tool bottom correctly • Tube bend too close to the forming end
Tube is stuck in the shaper after forming Error: Tube is not pulled out far enough	**Tool** • Tool wear **Tube** • Tube slips in the shaping jaws
Pressing does not start Error: No reaction from the machine	**Machine** • Defective **Control unit** • Defective **Operation** • Machine not at the correct menu item • Production quantity reached
Oil loss Error: Oil leak	**Hydraulics** • Seals defective • Machine tipped too far from the horizontal position • Hose/tube leaking. Contact the manufacturer.
Machine does not start	**Power supply** • Device not connected to the power supply • Power supply not switched on • Cable or connector damage • Screen defective
Tube slips	**Tool** • Shaping jaws dirty • Dirt between the tool segments • Shaping jaws worn
Shaping jaws do not open	**Tool** • Shaping jaws dirty • Dirt between the tool segments • Broken springs
Tube cannot be inserted	**Tool** • Dirty tool • Incorrect shaping jaws • Incorrect tube shaper • Incorrect internal tube support **Tube** • Poor deburring • Incorrect tube • Tube bend too close to the forming end

8 Maintenance

8.1 Safety

WARNING

Carrying out maintenance work

Serious or fatal injuries or machine damage

► Maintenance work may only be carried out by Walter Stauffenberg GmbH & Co. KG!

8.2 Inspection and maintenance

The machine has to be sent to Walter Stauffenberg GmbH & Co. KG for maintenance and an oil change every two years or after 200,000 forming processes.

8.3 Checking the emergency stop

All emergency stop buttons have to be checked regularly to ensure that they are working properly.

► How to check the emergency stop:

1. Switch on and start the machine.
2. Trigger an emergency stop and check whether the machine stops.

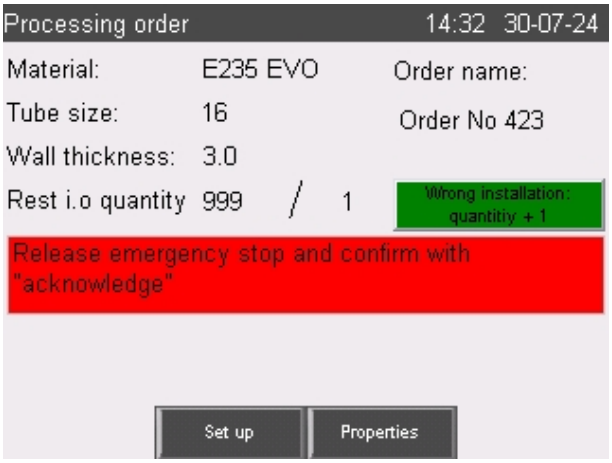

Fig. 73: Emergency stop message

3. Pull out the **Emergency stop** button.
4. Press the **Acknowledge** button.

✓ The **Reference run** menu opens.

✓ The **Ready/Process runs** lamp flashes.

☑ The machine is ready for operation.

9 Decommissioning

9.1 Safety

WARNING

Carrying out dismantling work

Serious or fatal injuries

- ► Dismantling work may only be carried out by authorised qualified personnel!
- ► Only use suitable tools in a proper condition!
- ► Wear your personal protective equipment for all work!

WARNING

Lifting loads

Severe injury or death from falling / oscillating loads

- ► Attach all load moving parts before lifting!
- ► Use only undamaged lifting devices that are approved for the weight of the load to be lifted!
- ► Attach slings only to the designated lifting points!
- ► Do not let loads unattended while suspended from the lifting device!
- ► Never walk under suspended loads!

CAUTION

Working on the hydraulic system

Eye injuries from ejected hydraulic oil

- ► Depressurise the machine!
- ► Any work for which the machine has to be opened may only be carried out by Walter Stauffenberg GmbH & Co. KG!
- ► Wear your personal protective equipment including safety goggles for all work undertaken on the hydraulic system!

9.2 Dismantling

NOTICE

Solvents and lubricants

Environmental contamination of water and soil

- ▶ When dismantling, collect lubricants and cleaning fluids containing solvents and oils in suitable containers!
- ▶ For disposal, note the safety data sheets for the emulsions, cleaning agents and lubricants used.

Collect operating media and cleaning fluids containing solvents in appropriate containers to prevent substances with water toxicity from entering the ground or the sewage system!

▶ Dismantle the machine as follows:

1. Take the machine out of service and disconnect it from the power supply.
2. Dismantle the protective panels and housing.
3. Remove all operating media.
4. Remove cables and leads.
5. Remove seals from the bearings.
6. Remove any lubricant from machine parts.
7. Sort plastic, electrical and metal parts.

9.3 Disposal

Following final dismantling of the machine, the operating company has to dispose of all used materials and components in keeping with the applicable provisions in the country where the machine is operated.

Particular care is required for disposing of materials which are hazardous to the environment, for example:

- Plastic parts
- Rubber parts
- Electrical parts
- Metal parts
- Operating fluids and additives

▶ How to handle substances hazardous to water:

1. Use appropriate containers to collect, store, transport and dispose of substances with water toxicity.
2. Dispose of all parts separated by materials at the appropriate disposal points.
3. Always sort by materials for recycling.

10 EC Declaration of Conformity

EC declaration of conformity

according to the EU Machinery Directive 2006/42/EC, Annex II 1. A

Manufacturer

Walter Stauffenberg GmbH & Co.KG

Im Ehrenfeld 4

DE - 58791 Werdohl

Person established in the Community authorised to compile the relevant technical documentation

Walter Stauffenberg GmbH & Co. KG

Im Ehrenfeld 4

DE - 58791 Werdohl

Description and identification of the machinery

Product / Article	Tube end forming machine SFO
Type	SFO StauffForm, SFO-F-A-A
Serial number	
Function	Tube end forming for use with fittings according to ISO 8434-1

It is expressly declared that the machinery fulfils all relevant provisions of the following EU Directives or Regulations:

2006/42/EG	Directive 2006/42/EC of the European Parliament and of the Council of 17 May 2006 on machinery, and amending Directive 95/16/EC (recast)
2014/30/EU	Directive 2014/30/EU of the European Parliament and of the Council of 26 February 2014 on the harmonisation of the laws of the Member States relating to electromagnetic compatibility (recast)
2014/53/EU	Directive 2014/53/EU of the European Parliament and of the Council of 16 April 2014 on the harmonisation of the laws of the Member States relating to the making available on the market of radio equipment and repealing Directive 1999/5/EC

Reference to the harmonised standards used, as referred to in Article 7 (2):

EN ISO 12100:2010	Safety of machinery - General principles for design - Risk assessment and risk reduction
EN 60204-1:2018	Safety of machinery - Electrical equipment of machines - Part 1: General requirements
EN ISO 14120:2015	Safety of machinery — Guards — General requirements for the design and construction of fixed and movable guards
EN ISO 13849-1:2015	Safety of machinery — Safety-related parts of control systems — Part 1: General principles for design
EN ISO 13857:2019	Safety of machinery — Safety distances to prevent hazard zones being reached by upper and lower limbs
EN 61000-6-4:2007 + A1:2011	Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Immunity for industrial environments
EN 61000-6-2:2005	Electromagnetic compatibility (EMC) - Part 6-4: Generic standards - Emission standard for industrial environments
EN 301 489-1 V2.2.3	Electromagnetic compatibility and Radio spectrum Matters (ERM); ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements

Werdohl, 15.9.2022
Place, Date

C. Hgue
Signature

1/1

11 UKCA

UKCA declaration of conformity

Manufacturer

Walter Stauffenberg GmbH & Co.KG

Im Ehrenfeld 4

DE - 58791 Werdohl

Person established in the Community authorised to compile the relevant technical documentation

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It is expressly declared that the machinery fulfils all relevant provisions of the following Directives or Regulations:

Supply of Machinery (Safety) Regulations 2008, 2008 No. 1597

Electromagnetic Compatibility Regulations 2016, 2016 No. 1091

Radio Equipment Regulations 2017, 2017 No. 1206

Reference to the harmonised standards used:

BS EN ISO 12100:2010	Safety of machinery - General principles for design - Risk assessment and risk reduction
BS EN 60204-1:2018	Safety of machinery - Electrical equipment of machines - Part 1: General requirements
BS EN ISO 14120:2015	Safety of machinery — Guards — General requirements for the design and construction of fixed and movable guards
BS EN ISO 13849:2015	Safety of machinery — Safety-related parts of control systems — Part 1: General principles for design
BS EN ISO 13857:2019	Safety of machinery — Safety distances to prevent hazard zones being reached by upper and lower limbs
BS EN 61000-6-4:2007 + A1:2011	Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Immunity for industrial environments
BS EN 61000-6-2:2005	Electromagnetic compatibility (EMC) - Part 6-4: Generic standards - Emission standard for industrial environments
BS EN 301 489-1 V2.2.3	Electromagnetic compatibility and Radio spectrum Matters (ERM); ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements

Werdohl, 15.9.2022
Place, Date

Signature

1/1

Table of figures

Keyword index

Walter Stauffenberg GmbH & Co. KG
Im Ehrenfeld 4
58791Werdohl, Germany
+49 2392 916-0

If you have any queries, thoughts or criticism about your product or this documentation, please send them to us.