



STH WELDING EQUIPMENT

Operating Instructions / Warranty Certificate

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1. Introduction

Dear customer,

The equipment you have just bought was manufactured by DYTRON Company, a world-wide recognized manufacturer of plastic welding equipment. We believe you would be satisfied with its quality and reliability.

Prior to commissioning the equipment for the first time, please read these operating instructions thoroughly. This manual contains important information for safe and proper use and maintenance of the STH welding equipment.

2. Basic Characteristics

The STH welding equipment is designed for butt-welding of polyolephine pipes, using the hydraulic feed.

3. Description

3.1 Complete description

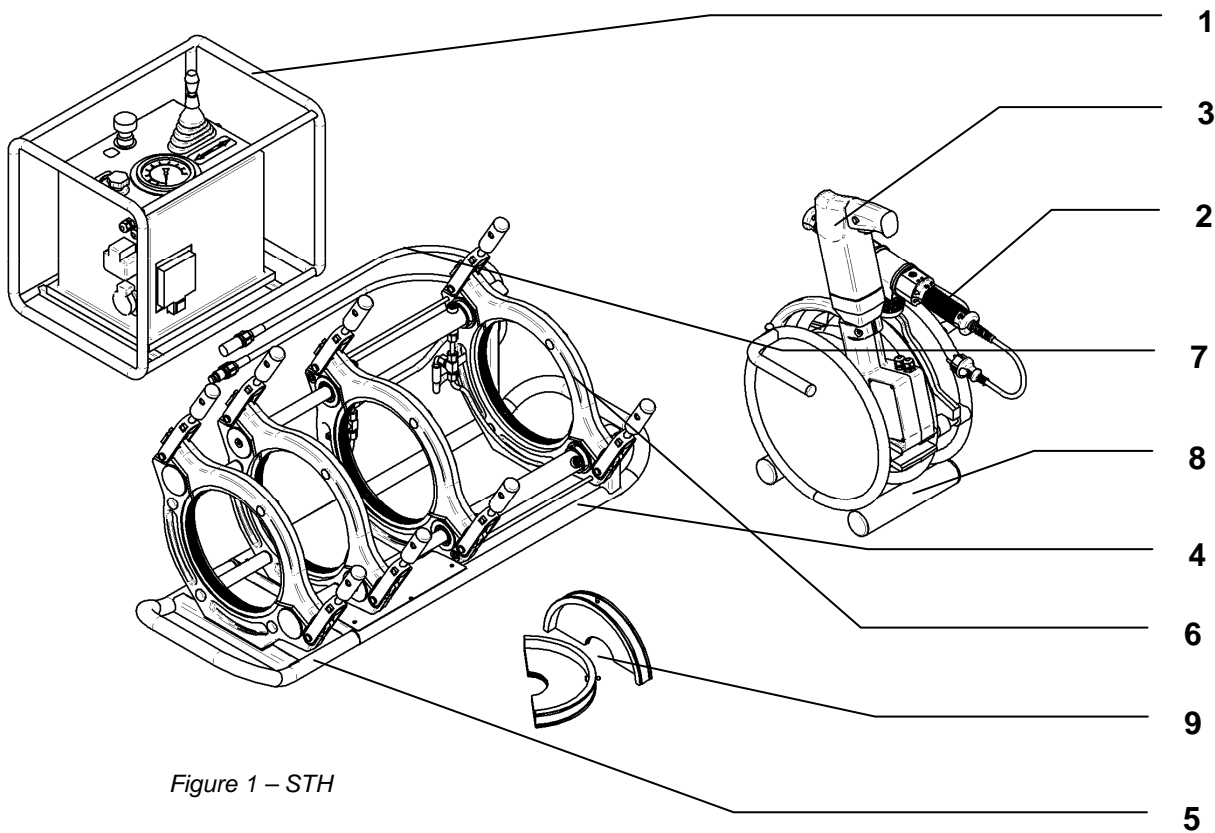


Figure 1 – STH

- 1 – hydraulic unit with controller
- 2 – welding mirror
- 3 – bench plane
- 4 – mounting slides
- 5 – fourth jaw - separable
- 6 - clamping jaws
- 7 – pressure hoses
- 8 – plane and mirror stand
- 9 - set of replaceable inserts

Hydraulic unit with a controller (1) is a self-contained compact unit which drives the mounting slides (4).

STH is equipped with POLYS P-4a welding machine (manually controlled, with needle pressure indicator) or with adjusted welding machine POLYS P-4c (manually controlled, with digital pressure indicator), with electronic temperature control – welding mirror (2).

The bench plane (3) serves for planar alignment/levelling of the welded pipe front faces perpendicular to the pipe longitudinal axis, and for removal of oxidized or contaminated front faces.

The mounting slides (4) are used for handling the pipe being welded. The mounting slides are fitted with jaws (6) which provide for firm and concentric fixing of the pipes being welded. The mounting slide jaws are shifted and moved by means of hydraulic unit (1), which is connected via pressure hoses (7) equipped with leak-proof quick-couplers. The mounting slides also house the bench plane (3) and welding mirror (2).

The equipment also has a separable (fourth) jaw (5) designed for the welding of shaped/adapting pipes.

The stand (8) provides for safe positioning of plane and mirror whenever they are not used in the mounting slides.

The replaceable fillings (9) in the clamping jaws, supplied optionally, allows for fixing the small sized pipes.

For safety reasons, the equipment is normally fitted with a protective switch to improve personnel occupational safety.

4. Operation Description

THIS BRIEF DESCRIPTION DOES NOT REPLACE THE NECESSARY TRAINING OF WELDERS AND OTHER PERSONNEL. THE EQUIPMENT MAY ONLY BE OPERATED BY HOLDERS OF THE RELEVANT WELDING LICENCE ISSUED BY THE COMPETENT INSTITUTE!

Important notice: Prior to work, it is always necessary to check the *oil level in unpressurised conditions*.

The oil level should range between its minimum and maximum limits. The minimum limit is determined by the bottom of the oil dipstick, whereas the maximum limit is indicated by the dipstick mark.

4.1 Manual control with needle pressure indicator (Classic)

4.1.1 Operation

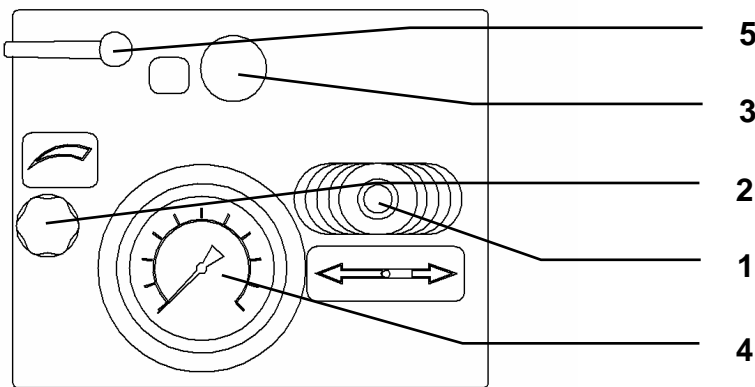


Figure 2 – Unit Control Panel

To shift the jaws on the mounting slides, use the control lever (1) which enables you to draw the pipes together or apart and to release the jaws.

The control panel also houses a pressure reducing valve (2) which regulates the pressure in the unit, and a plugged hole for oil re-filling (3).

The pressure gauge (4) indicates the current oil pressure.

The pressure-relief valve (5) serves for reduced pressure discharge at the passive resistance limit.

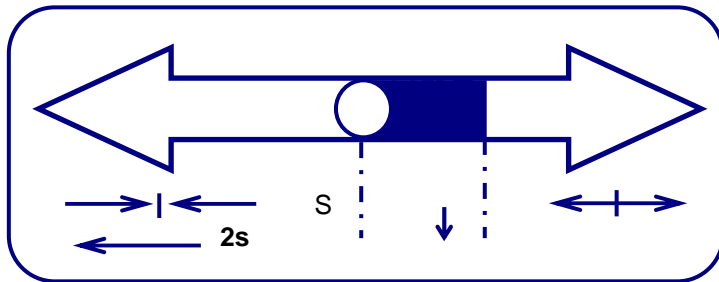
Warning: The oil level should be maintained in between the MIN and MAX marks on the dipstick.

4.1.2 Control Lever and Pressure-Relief Valve Operation

Warning: Prior to commencing the work, it is always necessary to close the pressure-relief valve.

The control lever is used for shifting the jaws on the mounting slides. The control lever enables you to draw the pipes together ($\rightarrow\leftarrow$) and apart ($\leftarrow\rightarrow$).

When discharging the pressure, at the end of welding process, the lever should be moved apart ($\leftarrow\rightarrow$), but it is necessary to limit its movement to the black fields of the double arrow – see Figure.



Discharging the pressure via pressure-relief valve:

- Turn the lever to the left (anticlockwise)
- Pressure within the assembly begins to decrease,
- As you achieve the pressure at the level of passive resistance, close the valve to the right (clockwise)

Warning: The pressure-relief valve must always be used at the final stage of collar!

Warning: If you move the lever apart too rapidly (to the range of " $\leftarrow\rightarrow$ "), especially at the stage of making the collar, the pipes may tear, resulting in complete damage of the entire weld.

Warning: When you need to increase the pressure within the hydraulic assembly, move the lever from the "O" position to "→←". However, the lever should be moved **SMOOTHLY!** The move should take approximately 2 seconds. Otherwise, a short-term pressure drop may appear within the assembly.

4.1.3 Determining the Passive Resistance Value

The pressure required for welding is a compound of the pressure value indicated in the relevant spreadsheets and the passive resistance (i.e. pressure necessary to overcome the resistance caused by the external influences, such as friction of the mechanism or the resistance of the pipe being welded).

To determine the passive resistance value:

- Set the pressure reducing valve to its minimum value.
- Switch the control lever to the "→←" position, so that the jaws move to each other.
- Turn the pressure reducing valve to the right.
- The pressure on the scale is now increasing. At the very moment when the jaws move, read the displayed value which represents the passive resistance.

Hint: When setting the prescribed pressure, it is necessary to **add the passive resistance pressure to the value of the required pressure!**

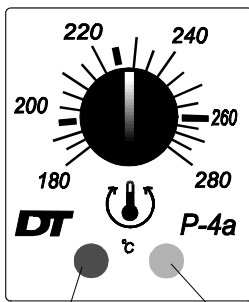
Warning: The passive resistance pressure is different for each welding process! It depends on many factors, especially on the diameter and length of the pipe to be welded.

Hint: To ensure proper functionality, primarily for welding longer pipes, the supporting rollers should be installed to achieve the minimum passive resistance.

4.1.4 Setting the Welding Machine Temperature

4.1.4.1 STH 160 - 315

To set the working temperature, within the range of 180 - 280°C, use the control knob.



Indication:

Red LED indicates power connection.

Green LED informs of the mirror warming stage.

Continuous light – the mirror temperature is below preset value. Do not use the welding mirror until the green LED starts to flash.

Flashing light – the mirror temperature equals the preset value, ready for use.

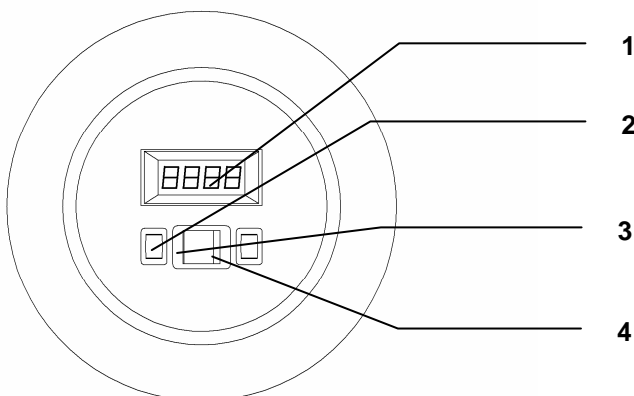
No light - the heating element temperature is too high. Wait until the green LED starts to flash.

Red LED

Green LED

The set temperature should be measured by appropriate contact- or contactless thermometer.
Mirror surface emissivity: **0.93**

4.1.4.2 STH 500 - 630



Use the switch (2) to turn the equipment on. Current temperature of the welding mirror will appear on the display (1).

The required temperature of the welding mirror can be set by means of buttons (3, 4).

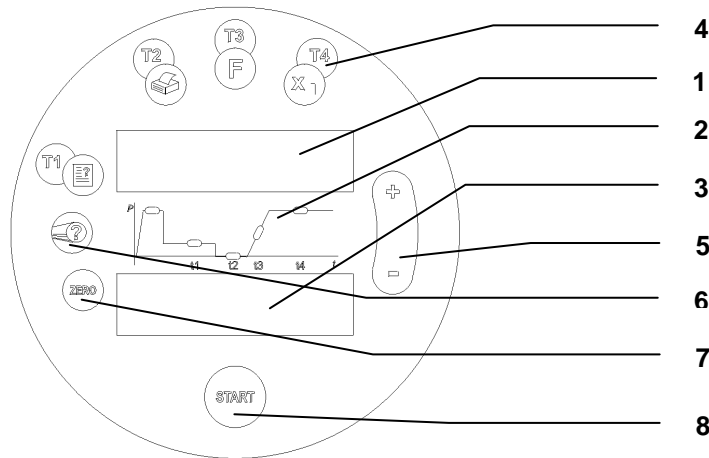
Procedure: Push the left button (3) – to decrease the required temperature, or left button (4) – to increase the required temperature. The most recent preset temperature appears on the display.

Hint: If one of the buttons is held depressed for approx. 3 sec, the indication of the required temperature accelerates.

Warning: Please note that the permanently displayed temperature is the current temperature! To identify the required temperature, push one of the buttons shortly (3 or 4).

4.2 Manual control with digital pressure indicator (TraceWeld)

This model, with integrated digital indicator, offers digital displaying of pressure, time and stages of the welding process along with LED indication. Here, the needle indicator is replaced with digital – see Figure.



- 1 ... upper display – indicating the welding mirror temperature and time of the welding process
- 2 ... LED's – indicate the stages of the welding process
- 3 ... upper display – indicates the pressure within the hydraulic unit
- 4 ... buttons "t1" to "t4" – set and control the welding process times
- 5 ... buttons "+" and "-" – set the observed parameters (pressure, temperature, time)
- 6 ... button "?" – sets and displays the temperature
- 7 ... button "ZERO" – reset the passive resistance (if the button is depressed shortly, an acoustic signal will be emitted and the current value of passive resistance will appear on the display; if the button is held depressed, another acoustic signal will be emitted and the recorded value of passive resistance will change – for setup, see Chapter 4.2.2)
- 8 ... button "START" – initiate the indication of the welding process

4.2.1 Setting the Welding Machine Temperature

When the equipment is connected to the power line, the lower display shows the current pressure within the hydraulic unit (in bars), whereas the upper display shows the actual temperature of the welding mirror (in °C) (assuming that the equipment is supplied with the welding mirror).

Use the "?" (6), "+" and "-" buttons on the control panel to set the required temperature of the welding mirror.

Procedure: Press the "?" (6) button. The most recent preset temperature of the mirror appears on the lower display. To adjust or change the preset temperature, use the "+" button for increasing, or "-" button for decreasing.

Hint: If one of the buttons ("+" or "-") is held depressed for approx. 3 sec, the indication of the required temperature accelerates.

Warning: Please note that the permanently displayed temperature is the current temperature!

4.2.2 Displaying the Ambient Temperature

Press the "-" button shortly to display the ambient temperature. The upper display will show the "OTEP" symbol, and the lower display shows the current ambient temperature in the preset units.

To exit this screen, push the "t4" or "START" button.

4.2.3 Determining the Passive Resistance Value

The pressure required for welding is a compound of the pressure value indicated in the relevant spreadsheets and the passive resistance (i.e. pressure necessary to overcome the resistance caused by the external influences, such as friction of the mechanism or the resistance of the pipe being welded).

To determine the passive resistance value:

- Press the "ZERO" button shortly, the upper display will show the "PAS" symbol, and the lower display shows the most recent value of the passive resistance.
- Switch the control lever to the "←→" position, so that the jaws move apart from each other.
- Set the pressure reducing valve to its minimum value.
- Switch the control lever to the "→←" position, so that the jaws move to each other.
- Turn the pressure reducing valve to the right.
- The pressure on the display is now increasing. At the very moment when the jaws move, read the displayed value which represents the passive resistance.

- When the jaws approach each other, set the value of the passive resistance by holding the "ZERO" button depressed (until the second acoustic signal comes out). The lower display now shows the value of passive resistance which has just been measured.
- If you agree with the value shown, press the "START" button to confirm and enter the value to the memory.

Warning: The passive resistance pressure is different for each welding process! It depends on many factors, especially on the diameter and length of the pipe to be welded.

Hint: To ensure proper functionality, primarily for welding longer pipes, the supporting rollers should be installed to achieve the minimum passive resistance.

4.2.4 Setting the Times of Process Stages

To set the required technological times for the welding process, use the "t1" to "t4" buttons and "+" "-" buttons. The following table gives description of individual times:

Time	Process stage	Setting	Indication
t0	Collar creation	Not applicable	First LED
t1	Warming up	"t1" button	LED t1
t2	Rearrangement	"t2" button	LED t2
t3	Pressure build-up	"t3" button	LED t3
t4	Cooling	"t4" button	LED t4

Procedure: Push the "t1" button. The most recent preset time value "t1" will appear on the lower display. To adjust/change the preset time, use "+" button to increase or "-" button to decrease the value. The "t2" to "t4" times are set similarly via "t1" to "t3" buttons.

Hint: To save the preset time value, wait for approx. 3 sec. or push the "t1" to "t4" buttons again.

4.2.5 Welding Process Stages

To set the required temperature and technological times, you may find helpful to use the sophisticated indication of the welding process.

The indication is initiated by pushing the "START" button. You may press the "START" button after the pressure has built up (switch the control lever to "→←" position) during creation of the collar.

Collar creation Stage (1st LED lights)

- Press the "START" button to initiate the indication.
- The upper display now shows the current temperature of the welding mirror, whereas the lower display shows the current pressure within the unit.

Warming up Stage (2nd LED lights)

- After creating the prescribed collar, discharge pressure via relief valve at the limit of the passive resistance (see Chapter 4.1.2), 2nd LED lights up.
- The upper display shows the remaining time of the warming-up stage.
- 4 seconds before the end of warming-up, you will be notified by the acoustic signal.

Re-arrangement Stage (3rd LED lights)

- As the warming-up elapsed, switch the control lever to "←→" position, so that the jaws move apart from each other.
- Now the 3rd LED lights up and the upper display shows the remaining time of the re-arrangement stage.
- Remove the welding mirror.
- Switch the control lever to the "→←" position, so that the jaws move to each other.

Pressure build-up Stage (4th LED lights)

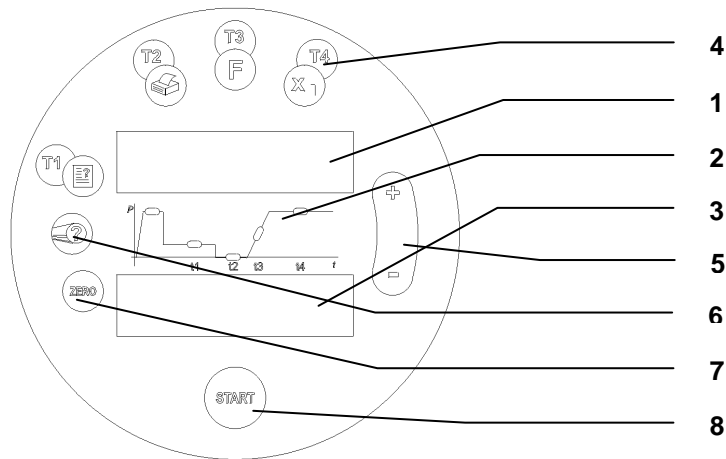
- After reaching both ends of the welded pipes, the 4th LED lights up to inform you of the pressure build-up stage.
- The upper display shows the remaining time of the pressure build-up stage.

Cooling Stage (5th LED lights)

- When the required pressure is achieved, the 5th LED will light up indicating the cooling stage.
- During the cooling stage, the acoustic signal may warn you of pressure decrease in the unit and the upper display may accordingly show the required pressure. In such case, you should switch the control lever to the "→←" position to recover the necessary pressure value.
- With the cooling stage finished, you will be informed by the acoustic signal that the welding process has been completed.
- All LED's start to flash and the "dobr" symbol appears on the lower display, which means that the weld has been completed.

4.3 Manual Control with Digital Pressure Indicator and Plotter (TraceWeld Plus)

This model, with integrated digital indicator and plotter, offers digital indication of pressure, time and stages of the welding process along with LED indication. It also records the entire welding process and allows the user to print out reports on the completed welds. The control panel is delineated in the following figure.



- 1 ... upper display
- 2 ... LED's – indicate the stages of the welding process
- 3 ... upper display – indicates the pressure within the hydraulic unit
- 4 ... buttons “t1” to “t4” – for special functions
 - t4 – Back
 - t3 – to enter special menu (time and date setting)
 - t2 – to print the reports on completed welds
 - t1 – welder, job and supervisor personal setting
- 5 ... buttons “+” and “-” – for setting the observed parameters (pressure, temperature, time)
- 6 ... button “?” – for setting and selection of materials
- 7 ... button “ZERO” – control button – for its functions, see below
- 8 ... button “START” – initiates the welding process and confirms the preset values

Hint: The equipment may be switched to TraceWeld Plus and TraceWeld modes. In TraceWeld mode, the equipment works as described in Chapter 4.2.

Warning: The equipment modes may not be changed/switched over during the welding process.

To switch over among the modes:

- Make sure the equipment is in its starting position, i.e. after the equipment is turned on
- Press the "+" a "t4" buttons simultaneously; a permanent acoustic signal comes out. First, the current operation mode is displayed. After approx. 2 sec., the mode will change.
- If in TraceWeld mode, the "Manual Mode" symbol appears on the upper display.
- If in TraceWeld Plus mode, the "Record/Print Mode" symbol appears on the upper display.

4.3.1 Starting the Equipment

When the equipment is connected to power line, the upper display will show the "STH" symbol and the lower display will show the number of model. After approx. 2 seconds, time will appear on the upper display and date on the lower display.

After another 5 seconds, the lower display shows the current pressure within the hydraulic unit (in bars), whereas the upper display shows the current temperature of the welding mirror (in °C) (assuming that the equipment is supplied with the welding mirror). If the mirror is not connected or if it is switched off, the "Mirror not connected" message will appear on the lower display.

4.3.2 Displaying the ambient temperature

Press the "-" button shortly to display the ambient temperature. The upper display will show the "Ambient Temperature" symbol, and the lower display shows the current ambient temperature in the preset units.

To exit this screen, push the "t4" or "START" button.

4.3.3 Setting the Welding Machine Temperature

To set the temperature, it is vital that welding mirror is connected to the unit and the main control switch is in "ON" position.

Use the "?" (6), "+" and "-" buttons on the control panel to set the required temperature of the welding mirror.

Procedure:

- Press the "?"(6) button.
- The upper display will show "Material" symbol, while the lower display will show particular types of material.
- Use "+" and "-" buttons to select the proper material and confirm the same with "START" button.
- The upper display will show "Dimension" symbol, while the lower display will show particular permissible dimensions.
- Use "+" and "-" buttons to select the proper dimension and confirm the same with "START" button.

- The upper display will show "Thickness" symbol, while the lower display will show particular permissible thicknesses of pipe.
- Use "+" and "-" buttons to select the proper thickness and confirm the same with "START" button.

Warning: Please note that the permanently displayed temperature is the current temperature!

Warning: After switching the mirror on, it is warmed up to the last previously selected material.

Hint: The welding machine temperature may be set up either before the welding process starts (which can spare some time) or during the process itself (however, in the latter case, you should wait until the welding mirror achieves the required temperature to proceed with the welding process)

4.3.4 Determining the Passive Resistance Value

The pressure required for welding is a compound of the pressure value indicated in the relevant spreadsheets and the passive resistance (i.e. pressure necessary to overcome the resistance caused by the external influences, such as friction of the mechanism or the resistance of the pipe being welded).

To determine the passive resistance value:

- Press the "ZERO" button shortly, the upper display will show the "PASSIVE RESISTANCE" symbol, and the lower display shows the most recent value of the passive resistance.
- Switch the control lever to the "←→" position, so that the jaws move apart from each other.
- Set the pressure reducing valve to its minimum value.
- Switch the control lever to the "→←" position, so that the jaws move to each other.
- Turn the pressure reducing valve to the right.
- The pressure on the display is now increasing. At the very moment when the jaws move, read the displayed value which represents the passive resistance.
- When the jaws approach each other, set the value of the passive resistance by holding the "ZERO" button depressed (until the second acoustic signal comes out). The lower display now shows the value of passive resistance which has just been measured.
- If you agree with the value shown, press the "START" button to confirm and enter the value to the memory.

Warning: The passive resistance pressure is different for each welding process! It depends on many factors, especially on the diameter and length of the pipe to be welded.

Hint: To ensure proper functionality, primarily for welding longer pipes, the supporting rollers should be installed to achieve the minimum passive resistance.

4.3.5 Printing the Reports

The equipment allows you to print out the reports on the completed welds. These reports are printed using the "t2" button. Individual reports are always assigned to a particular construction site. This function requires a printer with V.24 interface, 24 characters per line.

Procedure:

- Press the "t2" button, the display will show the ref.no. of the construction site.
- Use the "+" and "-" buttons to select the required site and confirm the selection with "START" button.
- Now, use the "+" and "-" buttons to select the required report and confirm your selection with "START" button.

Hint: In the menu, you can use the "t4" button to return to the previous level. Example: If you are on the "Report Selection" screen, press the "t4" button to return to the "Construction Site Selection" screen.

Hint: By pressing the "ZERO" button you can easily exit the entire menu.

4.3.6 Date and Time Setting

Date and time setting is performed by means of "t3" button.

Procedure:

- Press the "t3" button
- The display will show the following data: minutes, hours, day, month, and year
- Set the individual data by means of "+" and "-" button. Press "START" button to confirm your selection.

Hint: In the menu, you can use the "t4" button to return to the previous level. Example: If you are on the "Day Setting" screen, press the "t4" button to return to the "Hour Setting" screen.

Hint: By pressing the "ZERO" button you can easily exit this "Date and Time" menu without saving the changes.

4.3.7 Displaying the Free Memory

The equipment memory is able to hold approx. 500 reports on the completed welds. Press "+" button to display data about free capacity of the memory.

To exit this screen, push the "t4" or "START" button.

4.3.8 Welding Process

The welding process is initiated by pressing the "START" button and takes place as follows:

Procedure:

- Press "START" button.

- Select the welded material, dimension and wall thickness in a step-by-step manner. Use the "+" and "-" buttons to select the required item and confirm your selection with "START" button.

Hint: If you have selected the material, dimension and wall thickness earlier (see Chapter XXX), these values are stored in the memory and you should only confirm the displayed data by pressing the "START" button.

- Enter the welder, supervisor and construction site id. numbers. Use the "+" and "-" buttons to select and the "START" button to confirm your selection.
- Now, the passive resistance should be measured (for detailed description, see Chapter 4.3.2)

Hint: If you have already measured the passive resistance before commencing the welding process, this step is automatically skipped.

- Enter the ID. number of the weld The ID.No. of the last weld + 1 is always offered as default. The required value can be changed by pressing the "+" and "-" buttons and subsequently confirmed with the "START" button.
- Enter the additional no. of the weld. This number is not filled as default. If you decide to use it, press "+" and "-" buttons to set required value and confirm your selection with "START" button.
- Gradually enter the conditions of the weld (weather, protective devices and position) as per the following table: Use "+" and "-" buttons to select the proper value and confirm the same with "START" button.

Weather	0.. not specified 1.. wind 2.. sun 3.. sun + wind 4.. drought 5.. drought + wind 6.. drought + sun 7.. drought + sun + wind 8.. rain or snow 9.. rain or snow + wind
Protective devices	0.. not specified 1.. no protection required 2.. sunshade 3.. tent 4.. heating + tent
Position	0.. surface 1.. below surface

- Now, the upper display shows the pressure value which should be set. Setting is performed by means of the pressure reducing valve. Switch the control lever to the "→←" position, so that the jaws move to each other. As soon as they approach each other, move the reducing valve to the right until the desired pressure appears on the display.
- Confirm the pressure value with "START" button.
- The display now shows the animation which advises you to move the slides from each other.
- As the jaws recede and the desired temperature of the welding mirror is achieved, an acoustic signal will come out, 1st LED starts to flash and the upper display will show the required downforce pressure (based on pipes being welded). The lower display will show the current pressure in the unit (when the jaws stop moving, the pressure should be zero or close to zero). You cannot proceed with the welding process as long as the welding mirror does not achieve the required temperature (the current temperature value flashes on the upper display, whereas the required temperature value flashes on the lower display).
- Insert the welding mirror.
- Switch the control lever to the "→←" position, so that the jaws move to each other.
- When they reach the welding mirror, the pressure should reach the preset value (both displays should now show identical values)
- When these values are evaluated (they must be identical for at least one second), 1st LED will light permanently.

Collar creation Stage (1st LED lights)

- The upper display now shows the collar size (in mm), whereas the lower display still shows the current pressure within the unit.

Warming up Stage (2nd LED lights)

- When the correct collar has been created, discharge pressure via relief valve (see Chapter 4.1.2), 2nd LED lights up.
- The upper display shows the remaining time of the warming-up stage.
- 4 seconds before the end of warming-up, you will be notified by the acoustic signal.

Re-arrangement Stage (3rd LED lights)

- As the warming-up elapsed, switch the control lever to "←→" position, so that the jaws move apart from each other.
- Now the 3rd LED lights up and the upper display shows the remaining time of the re-arrangement stage.

- Remove the welding mirror.
- Switch the control lever to the "→←" position, so that the jaws move to each other.

Pressure build-up Stage (4th LED lights)

- After reaching both ends of the welded pipes, the 4th LED lights up to inform you of the pressure build-up stage.
- The upper display shows the remaining time of the pressure build-up stage.

Cooling Stage (5th LED lights)

- When the required pressure is achieved, the 5th LED will light up indicating the cooling stage.
- During the cooling stage, the acoustic signal may warn you of pressure decrease in the unit and the upper display may accordingly show the required pressure. In such case, you should switch the control lever to the "→←" position to recover the necessary pressure value.
- With the cooling stage finished, you will be informed by the acoustic signal that the welding process has been completed.
- All LED's start to flash and the "OK" symbol (weld is OK) or "SPAt" symbol (weld not OK) appears on the lower display.

4.3.9 Switching off the Welding Mirror

The welding mirror may be switched off by means of control switch located above the mirror handle.

Hint: This control switch may also be used between individual welds when the cooling period is so long that it might be uneconomic to leave the mirror warmed for the entire period, or at cooling stage of the very last weld when there is no need for keeping the mirror warm.

Warning: Please note that the welding mirror will reach the required temperature in approx. 20 – 30 minutes, depending on its size.

4.3.10 Matching the Mirror with Mounting Frame

Warning: The mounting slides serial number is an integral part of the report on the completed weld. This number is also indicated in the welding machine nameplate. For this reason, it is vital that the welding process employs only the welding mirror the serial number of which is indicated on the mounting slides!

4.4 Welding Process with the Equipment

4.4.1 Preparation of the Equipment

Prior to the welding process, it is necessary to stabilize the equipment on a solid base. Under severe atmospheric conditions, the weld should be protected with appropriate shield (e.g. protective tent, umbrella, etc.) and the outside ends of the pipes being welded should be blinded to prevent the plate from being cooled by air streams.

Subsequently, take the following steps:

- Position the welding mirror and bench plane in the stand.
- Plug in the hydraulic unit to the power line.
- Connect the hydraulic unit with a controller to the mounting slides via hydraulic hoses (the connection uses leak-proof quick-couplers and hydraulic hoses. The entire equipment is designed and arranged in order to avoid confusion of the hydraulic hoses).

Warning: Keep the leak-proof quick-couplers clean! For handling, fit the hoses with protective covers.

- Connect the bench plane and welding mirror to the sockets on the hydraulic unit and on STH 500 and 630 units, turn on the welding mirror switch,
- connect the crane to the to the socket on the hydraulic unit and tilt out the support (1) to ensure stability - see Figure (for STH 500 and STH 630 only)
- Shim the support and fix it so that it lies closely on a solid base to prevent turning up of the equipment during the rotation of the crane.

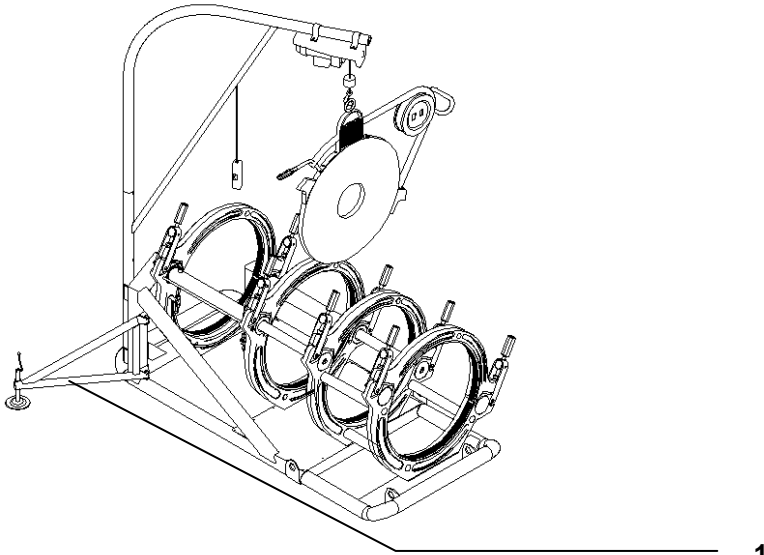


Figure 3 – STH with support ejected

4.4.2 Bench Plane Drive Setting and Control

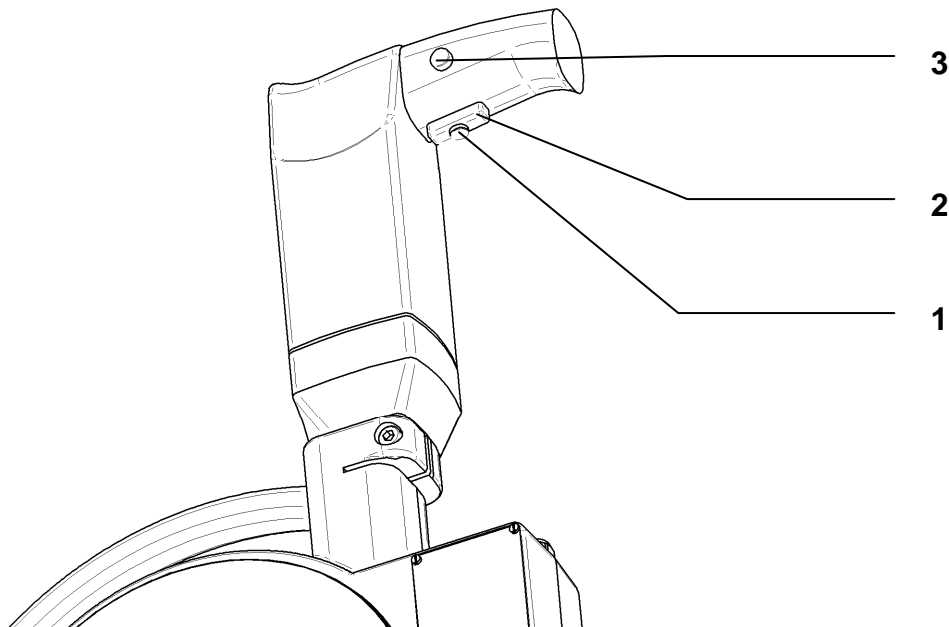


Figure 4 – Bench plane operation

The bench plane rotation control is set up by means of control knob (1) located on the control switch.

Hint: It is possible to carry out the infinitely variable rotation control even during the operation; however, the equipment must be in idle run!

Warning: Do not reduce the rotation value to a minimum! You can damage the driving unit!

The bench plane itself is switched on by the button located on the driving unit handle. By pressing the button (2) slightly you can easily and smoothly control the bench plane start-up. By increasing the press on the button, the motor revolutions will increase accordingly until the knob (1) preset value is reached.

Press the lock-button (3) to arrest the desired revolutions.

The bench plane is switched off by pressing and releasing the button.

Warning: Do not change the default position of the changeover switch I/II from 0-3000 r.p.m. or that of the revolution direction changeover switch! You can damage the driving unit!

4.4.3 Fixing the Pipes to the Jaws

Installation of the replaceable inserts Fit the replaceable inserts, with their size corresponding to the pipe diameter, to each jaw by means of Allen wrench No. 5.

Positioning the welded pipe

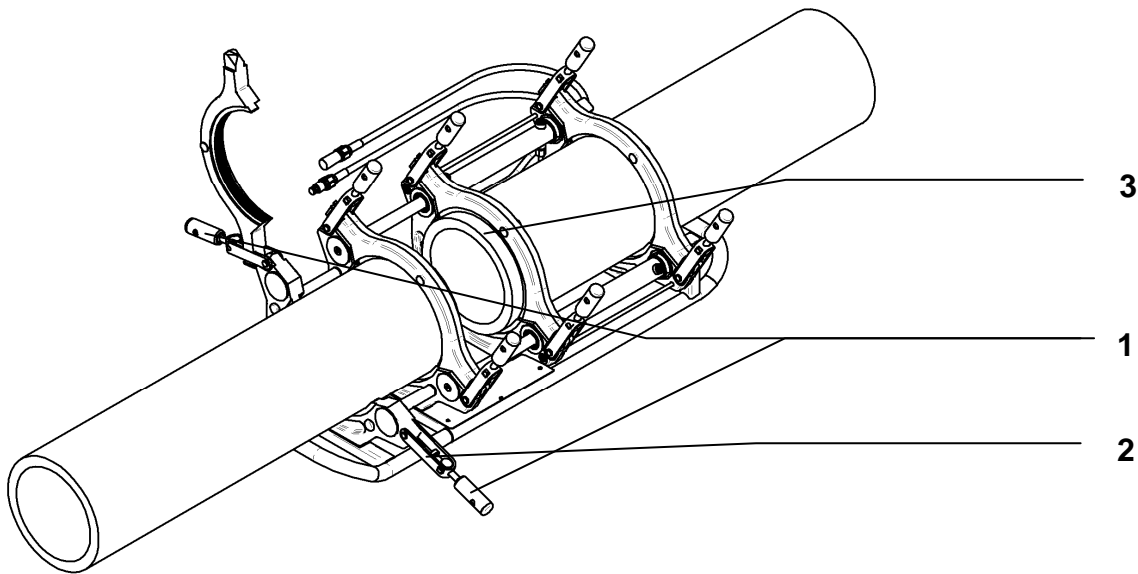


Figure 9 - Positioning the pipe

- Simultaneously slacken both bolts on the clamps (1)
- At STH 160 – 315, release the front clamps (2) **and lift up the upper part of the jaw.**
- At STH 500 – 630, release the front and rear clamps **and remove the entire upper jaw.**
- Use the same procedure for the remaining jaws.
- Insert the pipe ends to the opened jaws of the mounting slides so that the ends protrude from the insert inner edges (3) by approx. 25 mm on each side.

Demounting the fourth jaw:

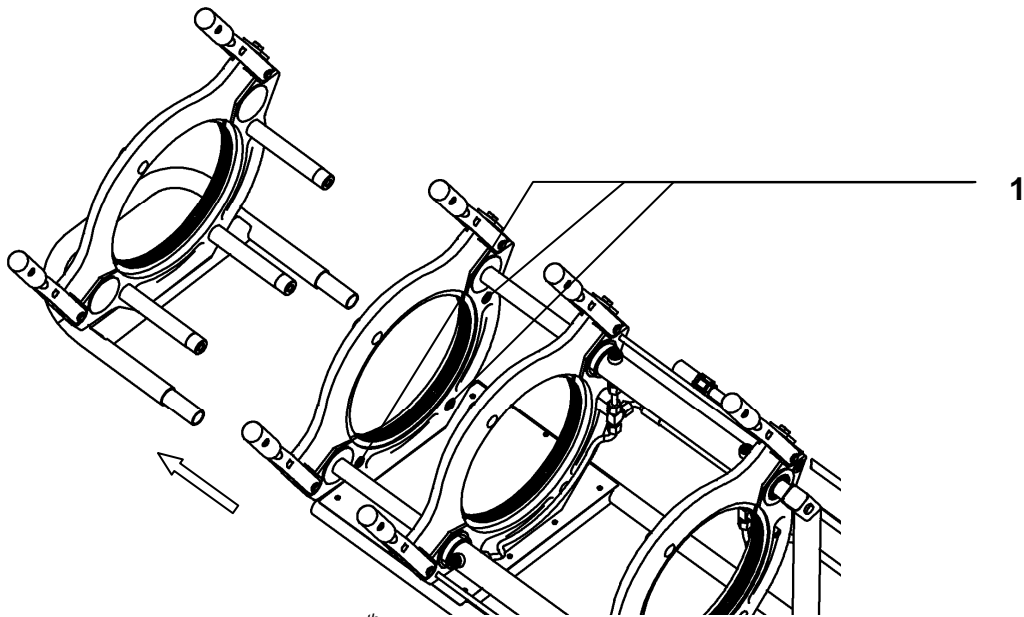


Figure 5 – Demounting the 4th jaw

- Using the Allen wrench No. 8, simultaneously unscrew the bolts (1) from the third jaw. Leave the released bolts in the jaw!
- Remove the fourth jaw as described in the figure above.

Mounting the upper jaws:

- Lower all the upper straps (along with the installed replaceable inserts) to the pipe to be welded. Slide on the front clamp and tighten both bolts simultaneously until the pipe gets firmly fixed.

Note: At STH 500 and STH 630, place the upper straps on the pipe, slide on both clamps, and tighten both bolts simultaneously until the pipe gets firmly fixed.

4.4.4 Equipment Commissioning and Setting

Prior to the welding process, it is advisable to test functionality of the pipe movement. The control lever, located on the hydraulic unit control panel, is used for handling the jaw with the pipe being welded.

4.4.5 Aligning the Pipe Front Faces

With the pipe positioned in the jaws (see Chapter 4.4.2) and the passive resistance identified (based on the equipment model – see above), replace the bench plane and **secure it with a clamping lever (1).**

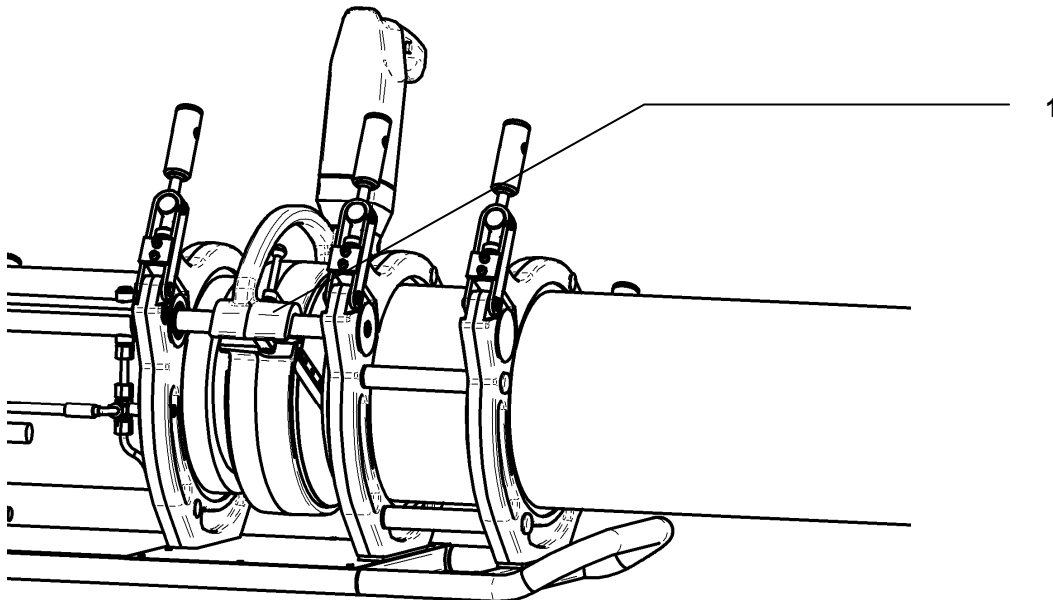


Figure 6 – Bench Plane in the Equipment

Move the jaws to each other by means of the control lever so that the pipe ends touch the bench plane feet.

Set and start the bench plane (see Chapter 4.4.2).

Align/level the front faces of both pipes by means of the bench plane.

Warning: When milling the pipe front faces, the pressure should be maintained by a maximum of 10 bars higher than the passive resistance pressure. At higher pressure, the bench plane motor may get overloaded.

Hint: After removing the bench plane, make sure the pipe front faces are machined properly (i.e. they fit against each other closely).

Note: At STH 500 and STH 630, the bench plane and welding machine are positioned by means of a crane – see Figure No. 4. The control panel, providing for up and down movements of a burden (welding machine or bench plane), is suspended on the crane arm.

4.4.6 Welding Process

Fit the welding mirror, warmed up to the required temperature, warm up the pipe under preset pressure (see Welding Spreadsheet).

Prior to the welding, the mirror working surface, pipe circumference and welding surfaces should be cleaned by adequate detergent or agent - see Chapter 9 - Maintenance.

Note: At STH 500 and STH 630, the welding mirror is positioned by means of a crane – see Figure No. 4.

When you achieve the proper collar around the entire circumference of the pipe, decrease the pressure in the unit by switching the control lever to its "P↓" position and reheat for prescribed period.

When the pipes are welded, remove the mirror and weld both ends of the pipe under prescribe pressure and for prescribed period.

Warning: The re-arrangement time (i.e. time needed to remove the mirror and to join two welded pipes) must be equal to or shorter than the value given in the Welding Spreadsheets.

When the cooling time has elapsed, decrease the pressure and release the pipe from the jaws.

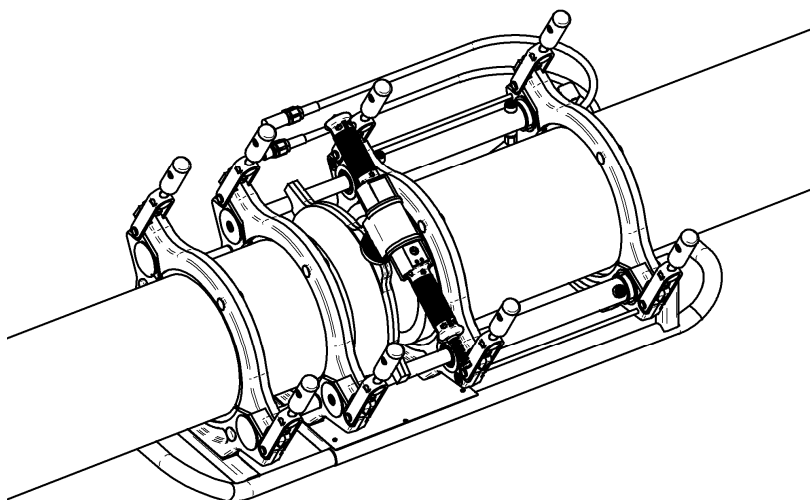


Figure 7 – Welding Mirror in the Equipment

5. Technical Data

Equipment model:	STH 160	STH 250	STH 315	STH 500	STH 630	STH 900
Voltage type:	230 V, 50 Hz one-phase			400 V, 50 Hz three-phase		
Fuses:	10 A	16 A	16 A	3x 16 A	3x 16 A	3x 32 A
Coverage:	IP 30					
Max. pressure MPa/bar:	10 / 100	10 / 100	10 / 100	10 / 100	10 / 100	10 / 100
Operating temperature:	-5 to +40°C					
Operating humidity:	< 75%					
Storage temperature:	-5 to +50°C					
Storage humidity:	< 75%					
Noise level [dB]:	Acoustic pressure level at working site not to exceed La 90 dB (A)					
Overall power input [W]:	2020	2720	3520	7400	9400	17670
hydraulic unit [W]:	370	370	370	370	370	370
bench plane [W]:	850	850	850	1500	1500	1500
welding mirror [W]:	800	1500	2300	5000	7000	15000
crane (motor) [W]:	---	---	---	530	530	800
Hydraulic generator:	Geared; 1,6 l*min					
Hydraulic fluid:	Mogul HM 46, volume 1 l					
Pipe ranges [mm]:	50 - 160	75 - 250	90 - 315	200 - 500	315 - 630	500 - 900
Set of replaceable inserts:	50, 63, 75, 90, 110, 125, 140	75, 90, 110, 125, 140, 160, 180, 200, 225	90, 110, 125, 140, 160, 180, 200, 225, 250, 280	200, 225, 250, 280, 315, 355, 400, 450	315, 355, 400, 450, 500, 560	500, 560, 630, 710, 800
Working stroke [mm]:	95	200	150	370	370	370
Welding plate temperature range [°C]:	180 – 280					
Bench plane revolutions [n*min-1]	55	40	28	12	7,5	7,5
Total weight [kg]:	75	98	134	331	447	740
hydraulic unit [kg]:	28					30
welding mirror [kg]:	4	6	11	29	40	60
bench plane [kg]:	10	14	21	50	55	160
mounting slides [kg]:	29	44	66	194	289	430
mirror and plane stand [kg]:	4	6	8	30	35	70
Crane max. load capacity [kg]:	---	---	---	75	95	200
Dimensions [mm], l x w x h						
hydraulic unit [mm]:	550x360x500					550x550x500
welding mirror [mm]:	460x65x405	460x65x500	580x65x560	850x80x580	1000x80x680	1400x120x1250
bench plane [mm]:	320x90x600	400x90x680	500x90x740	850x130x820	972x130x940	1200x130x970
mounting slides [mm]:	900x440x450	1060x530x520	1130x600x600	950x1800x950	1030x2000x1030	1500x2160x1350
mirror and plane stand [mm]:	270x400x280	380x400x390	460x410x470	---	---	---
bench plane stand [mm]:	---	---	---	1000x250x1000	1100x250x1100	1130x390x1150
welding mirror stand [mm]:	---	---	---	1000x250x1000	1100x250x1100	1130x320x1150

6. ACCESSORIES

Allen wrench No. 5
 Allen wrench No. 8
 Welding spreadsheets
 Instruction manual / Warranty Certificate

7. Safety instructions

All products by Dytron s.r.o. were certified by the Czech National Testing Laboratory as safe. They are provided with Declaration of Conformity as per all technical requirements set out in EU directives 89/392 EEC, EU 73/23 EEC, EU 89/336 EEC.

The following safety instructions should be unconditionally observed during work on/with the equipment:

- STH equipment is exclusively designed to butt-weld the thermoplastic pipes. It may not be used for any other purposes.
- **If is forbidden:**
 - To put the equipment into operation whenever it is damaged.

- To shut down or restrict the functionality of the integrated safety and protective devices.
- To weld other materials than thermoplastics.
- To use the bench plane for machining other materials than thermoplastics.
- To use the welding machine for warming and heating other materials than thermoplastics.
- To use the hydraulic slides for bonding, pressing or any activity other than shifting and arresting of the thermoplastic pipes.
- The following protective devices and gadgets should be used during work on/with the equipment:
 - protective goggles,
 - insulation pads,
 - dielectric footwear,
 - dielectric working gloves,
 - insulating transformer (for field work only)
- The equipment must not:
 - Come into contact with water.
 - Come into contact with flammable or explosive substances.
 - Be handled by unauthorised persons.
 - Be used in the rain without protective devices or in extremely humid environment.
 - Be used outside the scope of its intended use.
 - Be left unattended while running.
- the hydraulic unit must not deviate from the vertical line by more than 40° (otherwise, the oil may leak out of the unit jeopardizing the personal health and environment)
- The equipment may only be operated by persons acquainted with the occupational safety instructions in accordance with the local legislation of the country where it is to be installed and operated.
- The equipment may only be operated by persons properly trained in welding of plastic materials, i.e. by holders of the relevant welding licence issued in accordance with the local legislation of the country where the equipment is to be installed and operated.
- The operating personnel should ensure that no person at the working site may be injured by moving parts of the welding equipment.
- If the power supply cable to or any other electrical wiring in this equipment is damaged it must be replaced by the Manufacturer or its authorised service centre, or by any qualified person, in order to avoid dangerous situations.
- The equipment must be placed on non-flammable base.
- Do not touch the welding mirror even if it is disconnected from power supply – risk of burn
- The bench plane may only be started in secured position, with the pipes firmly clamped.
- After finishing the work, disconnect the equipment from power supply.
- Do not attempt to disassemble the equipment!
- **Keep clear of the area under the crane with suspended burden (applies to STH 500 and STH 630)**

Warning: When stored, the equipment should not be exposed to (severe) weather effects!

For symbols and labels used and posted on the equipment, see Annex No. 1.

8. Reviews

The initial review is carried out at the Manufacturer's site. The User is obliged to carry out inspections and reviews at the intervals prescribed by the applicable legislation of the User's country.

The Manufacturer recommends performing a periodical functionality review at least once a year. This review may also be carried out at the DYTRON s.r.o. authorised service centre or at any other company with similar accreditation issued in compliance with the applicable legislation of the User's country.

ATTENTION! If an extension cord is used for connecting the equipment to power source, this cord should be reviewed as per EN 60 335-1 along with the equipment itself.

Reviews and regular inspections are recorded in the table on the following page.

Review Records

Date of review	Next review	Review carried out by	Signature

Regular Inspection Records

Date of inspection	Next inspection	Inspection carried out by	Signature
1. inspection			
2. inspection			
3. inspection			
4. inspection			
5. inspection			

9. Maintenance

Warning: Prior to disconnecting the hydraulic hoses, make sure to discharge the pressure by switching the control lever to the "P↓" position or by opening the pressure-relief valve.

Warning: When the equipment is disconnected from the power source, the pressure will still remain in the system!

To ensure troublefree functioning of all parts, the following steps should be taken regularly:

- To observe the oil level in the hydraulic unit (dipstick) and refill if necessary.
- To vent the hydraulic system.
- To check the electrical conductors and wires for proper functioning and damages.

In addition, the following should be ensured:

- To protect the terminals of the leak-proof quick-couplers against contamination, pollution and damage.
- To keep the bench plane motor ventilation holes clean.
- To keep the bench plane clean for aligning the pipe front faces.
- To keep the welding mirror operating surface clean (do not use abrasive materials which may damage the mirror surface). We recommend using the cleaning tissues for plastic materials, and/or liquid detergents for plastic materials.

If damaged, the equipment must not be put into operation!

Any intervention or repair of STH may only be provided by the authorised service centre of DYTRON,

s.r.o.

Recommended hydraulic fluid: MOGUL HM 46, produced by: Koramo a.s., Kolín, Czech Republic

10. Decommissioning

When the STH operation lifetime expires or when it suffers serious damage, it is necessary to decommission the entire equipment or any part thereof. As the equipment contains hydraulic fluid and nonferrous metals, the equipment or any part thereof may only be disposed of by the STH Supplier or any company established for such purposes in compliance with the local legislation of the User's country. If you decide to dispose of the equipment at your own expense, the Manufacturer will be released from his responsibility for the method of such disposal and/or possible environmental damage related thereto.

11. Emergency

In case of fire, always disconnect the equipment from the power source. If it is not possible and the equipment is still powered, use appropriate fire extinguishers (e.g. dry powder extinguisher)! In no case should the electrically conductive materials be used for fire extinction, e.g. water.

The hydraulic fluid used in the equipment is environmentally friendly. If the hydraulic fluid leaks from the equipment, it should be absorbed by appropriate device (e.g. Vapex or similar absorption material).

12. Warranty Conditions

- DYTRON s.r.o. is in no case responsible for loss of profits, reputation or customers, or for any incidental, extraordinary or indirect damages which may be incurred in relation to the use of or impossibility to use this product.
- The Manufacturer is responsible for quality and possible failures of the welding equipment throughout the period specified in the attached warranty certificate, provided that the equipment is used and operated in compliance with the provisions and instructions stated herein.
- Within the guarantee period, we will remove and repair free of charge all failures and defects which were evidently caused by material or product faults.
- The guarantee period will be automatically extended by the time of such guarantee repair.
- This warranty does not apply or cover the following failures:
 - caused by improper use or operation,
 - failure to observe the technical conditions and provisions for operation of the equipment,
 - fair wear and tear,
 - wilful damage to property,
 - when the lead seals have been broken,
 - damages caused by unavoidable accident or force majeure circumstances (fire, flood, theft, violent damage, etc.)
- The warranty is considered null and void if the warranty certificate is not properly completed by the Seller.
- The warranty certificate forms an integral part of the equipment.

13. Authorised Service Centres

Czech Republic:

DYTRON s.r.o.
Toužimská 943/24a
197 00 Praha 9 - Kbely
Phone: +420-2-66190031
Fax: +420-2-66190038

Slovak Republic:

DYTRON s.r.o.
Líštie údolie 74
841 05 Bratislava
Phone: +421-2-65426821
Fax: +421-2-65425164

Repairs Recorded

Date of acceptance:		Guarantee period extended to:	Failure/defect description	Signature
Guarantee	Post-guarantee			

Annex No. 1 - Symbols and labels used and posted on the equipment



Refer to the Operating Instructions



Attention, hydraulic slides moving



Attention, risk of burn. The welding mirror temperature may reach 280°C



Attention, sharp edges rotating (risk of injury by the milling machine)