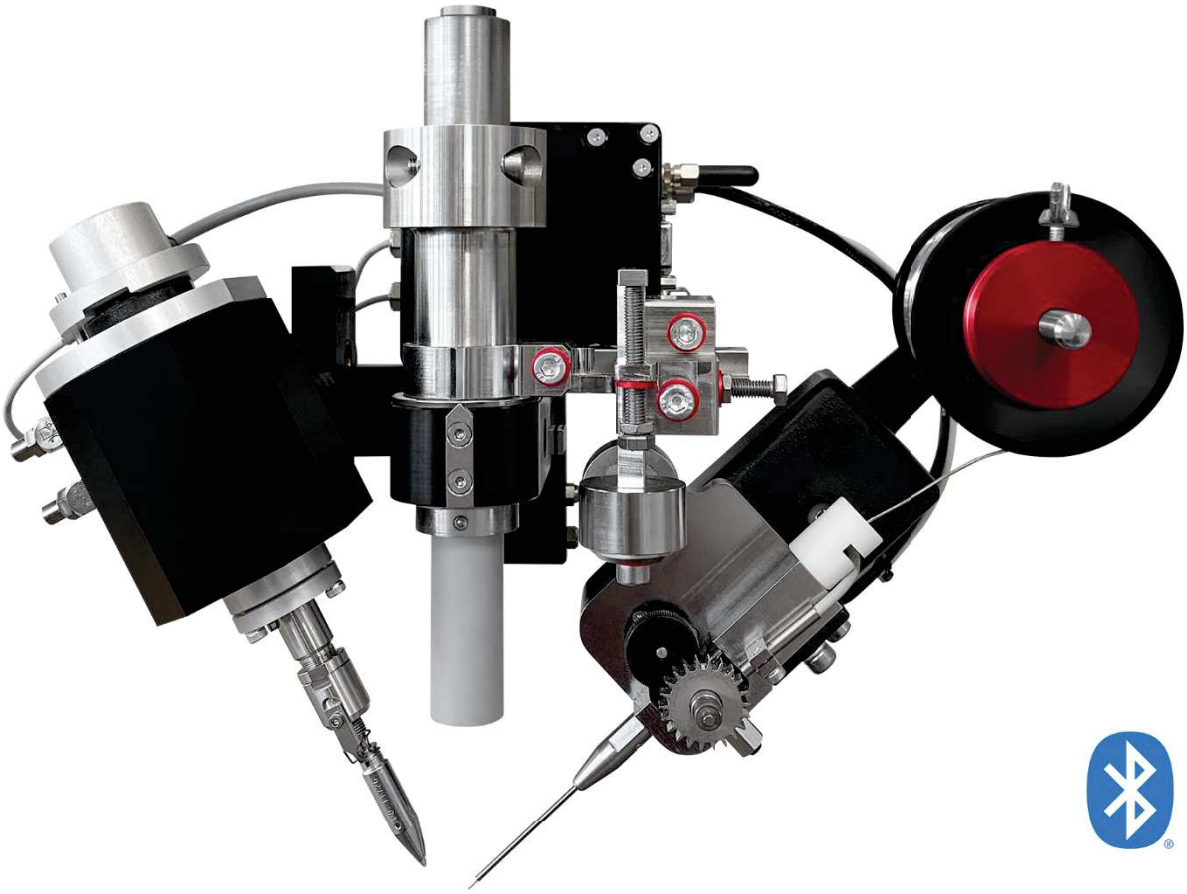
Plug-and-play MSH150 iron soldering head kit



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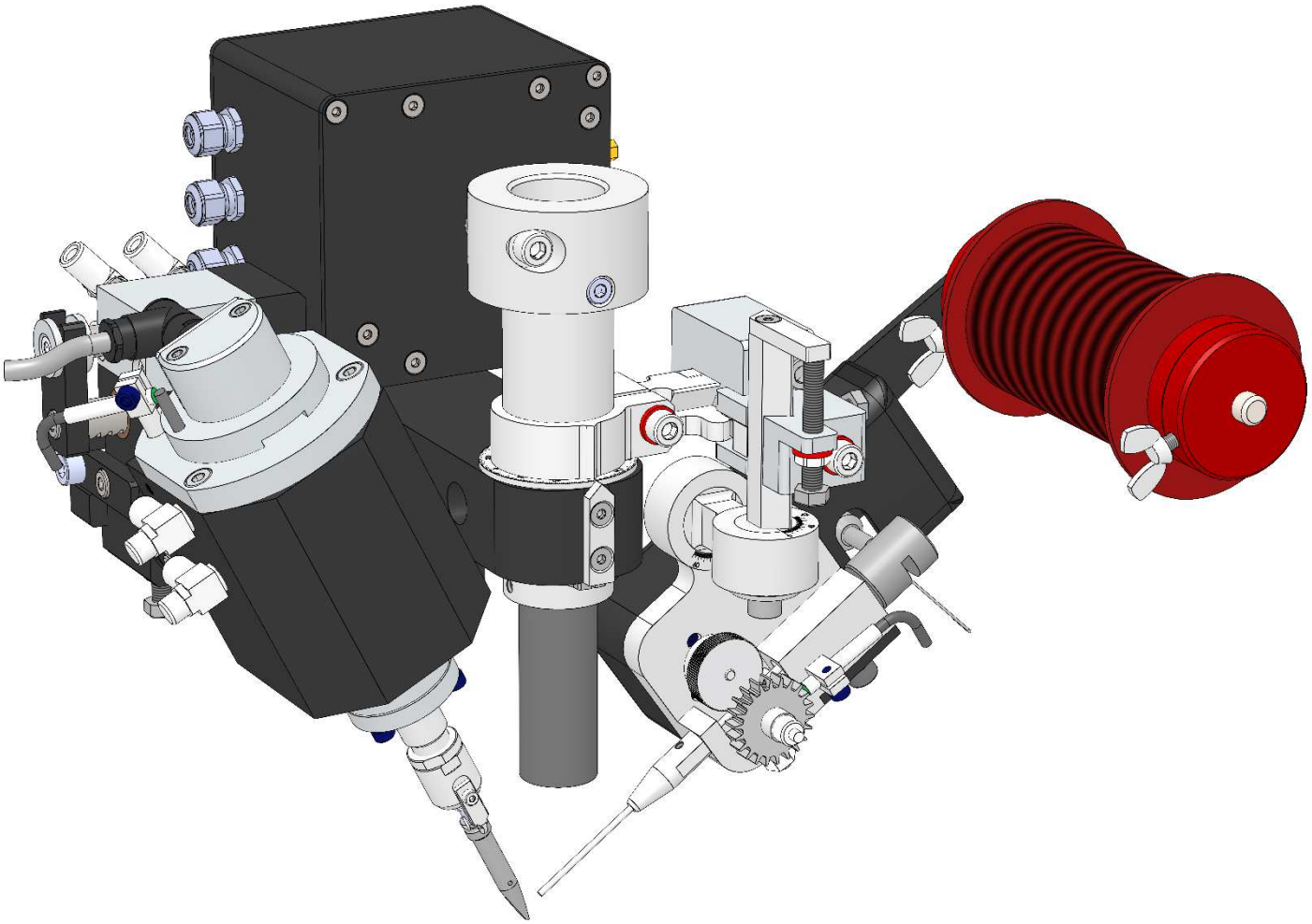
Operating manual

MSH150 IRON SOLDERING HEAD

Modification index

Version	Date	Executed by	Modification
1.0	08.06.2021	OVU	First edition
1.1	30.05.2023	OVU	Update wiring diagram

150W iron



Summary

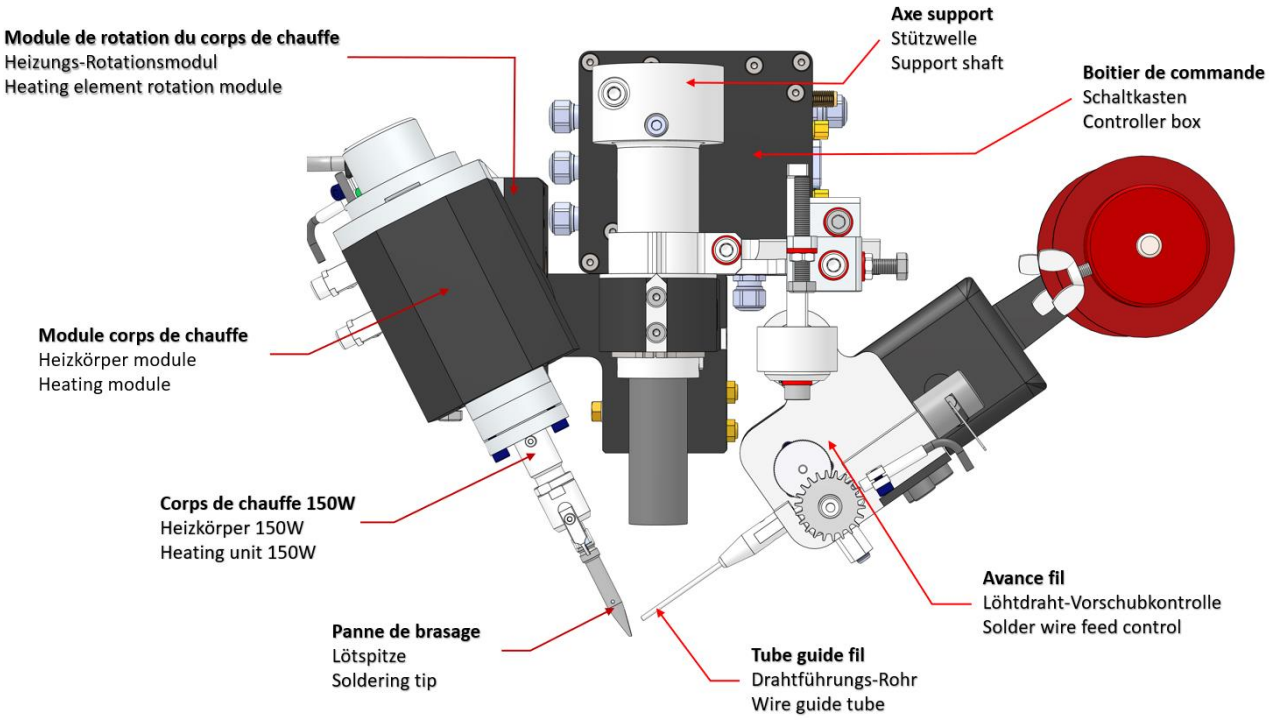
1 Description

1.1 General overview of the 150W iron soldering head

The iron soldering head consists of two main units: the heating unit and the wire feeder. The head is adjustable around an axis and is mounted either on a fixed support or on a rotation unit using a rigid clamp. Thanks to the integrated controller, the soldering head is standalone which makes its integration easy on a robot, for example.

The solder wire guide tube and the soldering tip are carefully chosen in order to best suit the application.

The iron soldering technique requires the use of a tip cleaning unit, fixed or mobile depending on the application.



1.1.1 Description of the heating unit

The heating unit is equipped with a 150W heating element, whose temperature is regulated. The soldering tip is fixed onto the heating element. It has been designed with a fool proofing (a groove), through which the tip can be replaced quickly, guaranteeing the same position and orientation.

The heating unit is mounted on a compensated support using a rotating cylinder, which allows to have a soldering position and a cleaning position.

The position of the soldering tip can be adjusted precisely to the soldering points due to several adjustment possibilities described in this document. Different types of soldering tips are available depending on the application.

1.1.2 Description of the solder wire feeder

Using its support, the robot wire feeder can be positioned according to the requirements of the application.

The wire feeding is made through a wire guide tube by combining the actions of a sliding- wheel and of a driven-wheel. These elements are interchangeable according to the diameter of the soldering wire.

The wire feeder is equipped with a control device for the wire feeding; the regularity of the quantity of solder tin applied to each point can thus be controlled.

2 Service instructions

2.1 Safety instructions

CAUTION

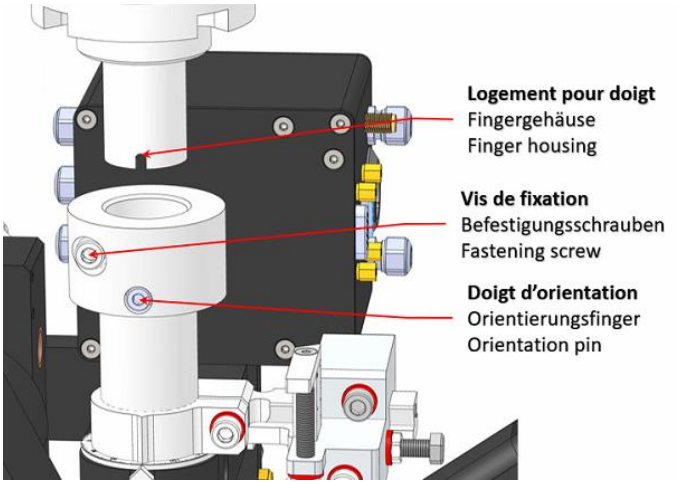
Before beginning work, all qualified personnel instructed to work on the machine must:

- Agree to respect basic instructions concerning safety at work and the prevention of accidents.
- Read the safety instructions found in the technical documentation and apply the recommendations where necessary.

2.2 Mechanical installation

The required condition for the mechanical installation is that the machine is switched off, the power off, and that the person in charge of the mechanical installation can work safely.

The iron head can be mounted on any support or robot provided that its size is suitable to the characteristics of the iron head. Often, when integrating into an anthropomorphic robot, a dedicated fixing flange is provided. The mechanical integration then results in fixing the adapter to the robot wrist using 4 fixing screws. The iron head can then be fixed to the flange as follows:

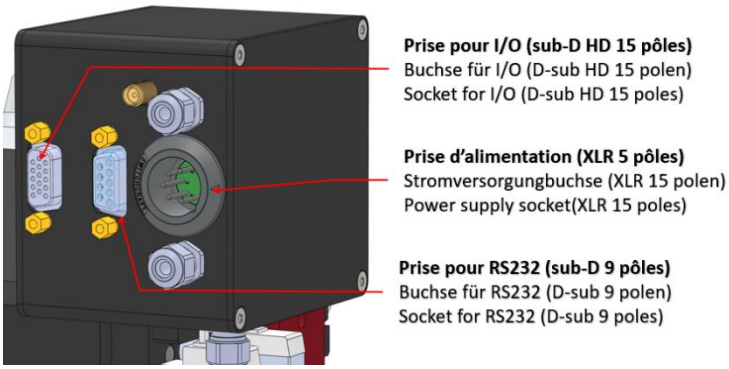


1. Place the head under the fixing part avoiding any impact with other parts. In most cases the fastening part is the fixing flange, which is beforehand screwed to the robot's wrist
2. Lift the head and insert the axis of the flange into its housing on the head, while paying attention to the alignment between the orienting finger and the housing of the finger on the flange
3. Tighten the fixing screw.

2.3 Electrical installation

The required condition for the electrical installation is that the machine is switched off, the power off, and that the person in charge of the electrical installation can work safely.

The iron head controller has 3 connectors. One is dedicated to the power of the controller and the other two to the control mode. The head can be controlled via I/O and/or RS232 (as well as via Bluetooth but only for the configuration).



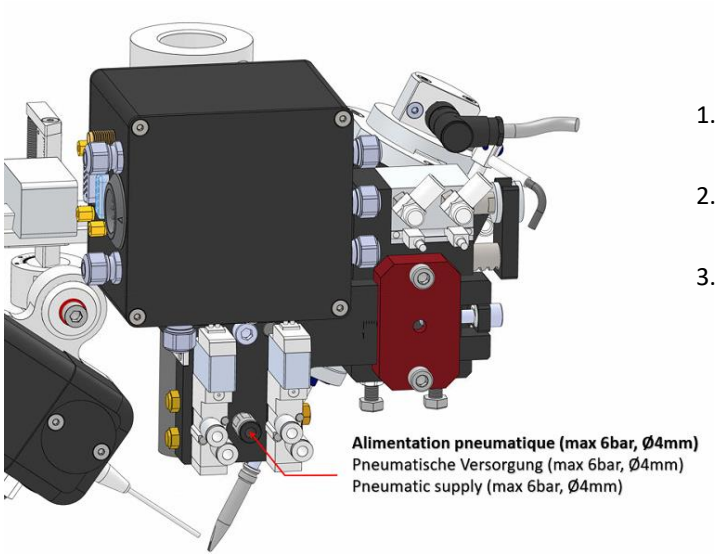
1. Connect the supplied power cable to the power supply socket ensuring that the locking clip of the plug has been properly engaged.
2. For control via RS232, connect the supplied RS232 cable to the RS232 socket and lock its connection using the two locking screws.
3. For control via I/O, connect the supplied I/O cable to the I/O socket and lock its connection using the two locking screws.

The connections of the various cables in the machine's electrical cabinet must be carried out according to the electrical diagrams shown in paragraph 5. Electrical wiring diagram.

2.4 Pneumatic installation

The required condition for the pneumatic installation is that the machine is switched off, the power off, the pneumatic circuit deactivated and that the person in charge of the pneumatic installation can work safely.

A pneumatic supply of dry and clean air at a maximum pressure of 6 bar is necessary to operate the head. This must be carried out via an Ø4mm pneumatic tube, as follows:



1. Place the tube in front of the right hand-side pneumatic supply.
2. Insert the tube into the pneumatic coupling and push it inside.
3. Test that it is holding properly by trying to pull on the tube, which should not remove the tube from the pneumatic coupling.

2.5 Preparation for commissioning

The required condition for the commissioning of the machine is that the machine is ready for work (for example: the electrical and pneumatic connections are finished, the peripheral equipment is connected or that all blocking elements for the transport have been removed).

During the commissioning or during an extended stop, the points described hereunder must be respected before starting up production:

1. Install a soldering tip onto the heating element and clamp it using a holding spring.
2. Check the hold of the soldering tip.
3. Put the appropriate solder wire on the wire feeder.
4. Check that the presence sensor of the wire is armed correctly (lever of the sensor behind the wire).
5. Check that the solder wire, when it touches the soldering tip, overhangs the front tube by approximately 3 times its diameter.
6. Check that the sensor for the control of the wire move-forward is adjusted correctly.
7. If necessary, regulate the required heating temperature on the software.
8. ONLY use distilled or demineralized water to humidify the sponges of the tip-cleaning unit.

3 Inspection and maintenance

WARNING

There is a high risk of burns when changing the soldering tip or when working in its vicinity during production.

Wait until the soldering tip is cold or cool it down.

3.1 Inspection

The soldering tip must be cleaned regularly during the soldering cycle, using our mobile or fixed cleaning unit. The cleaning frequency depends on the number of points soldered as well as on the quantity and the quality of the soldering wire. A dirty soldering tip will lead to low quality soldering results.

With a normal use, the various elements, in particular the mobile elements such as the cylinder shaft, the compensation of the heating element and the rotation system, must be cleaned weekly (or daily if necessary).

It is recommended to remove the wire-guide tube at least every 8 hours and to clean all fluxing agent residues with alcohol.

A weekly check of the wire driven-wheel and of the sliding-wheel has to be made. It must be clean in order to guarantee a good drive of the wire. Depending on its state, it must either be cleaned or replaced.

During production, the state of the sponges must be checked every 4 hours and changed if necessary. With a normal use, a humidification every 8 hours is sufficient.

The tip cleaning unit is equipped with a tray used to recover the solder waste. It must be cleaned every time the soldering tip is changed.

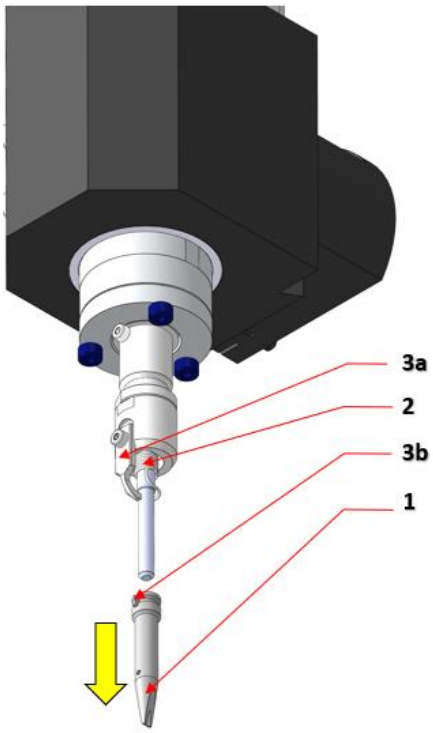
3.2 Cleaning

Regularly clean the different machine elements.

Do not use corrosive materials or materials which are harmful for health and environment such as hydrocarbons. Use only standard machine cleaning solutions.

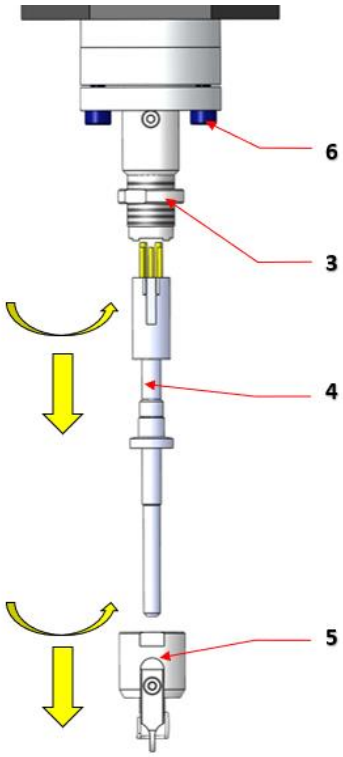
3.3 Maintenance of the heating unit

3.3.1 Replacing the soldering tip



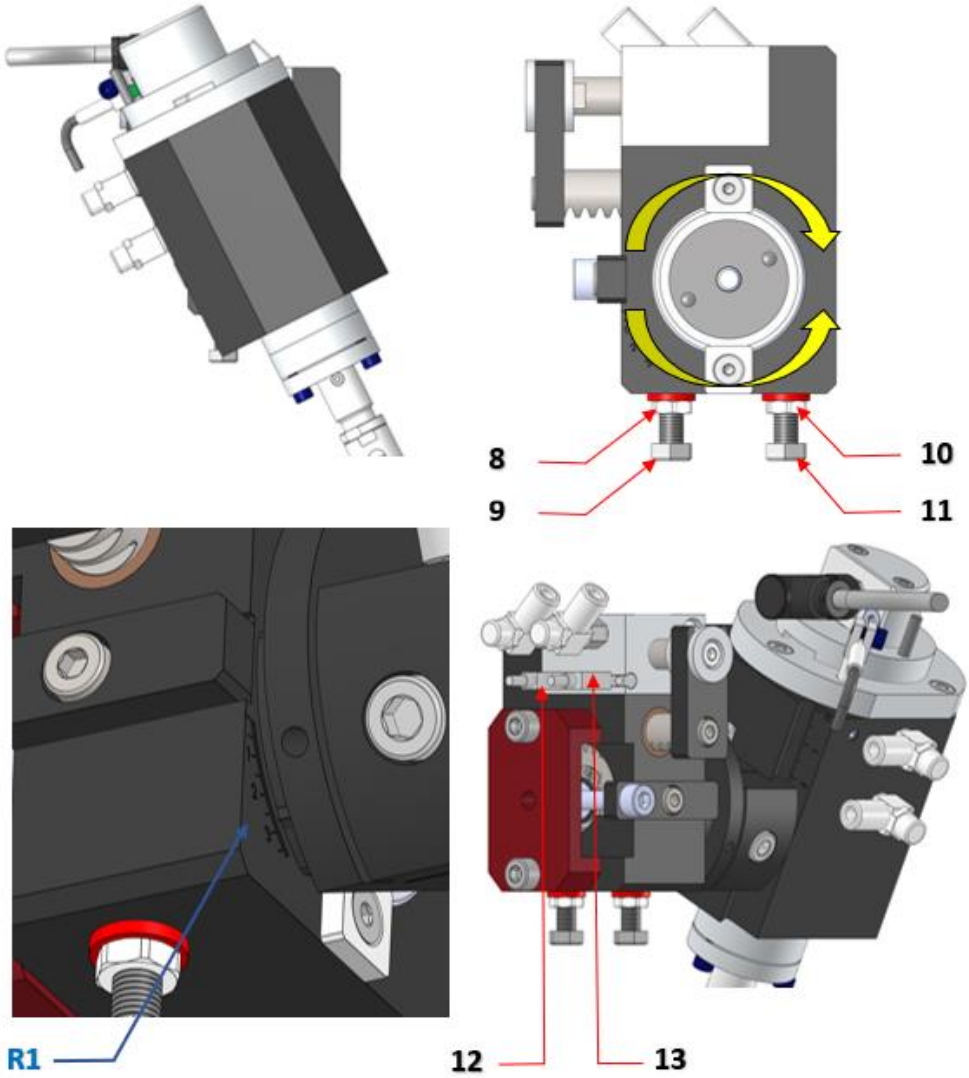
1. Switch off the heating unit.
2. Wait until the soldering tip (1) is cold or cool it down.
3. Place the iron into vertical position (cleaning position).
4. Release the soldering tip by pulling on the holding spring (2) using small pliers.
5. Replace the soldering tip and clamp it using the holding spring, while aligning 3a and 3b. Check if the tip holds correctly.
6. Check the position of the soldering tip in working condition and carry out the necessary adjustments (see cf. §3.3.4 to 3.3.6).
7. Switch the heating unit back on and wait until the set temperature is reached.

3.3.2 Replacing the 150W heating element



1. Switch off the heating unit.
2. Remove the soldering tip (cf. § “3.3.1 Replacing the soldering tip").
3. Unscrew the counter-nut (3).
4. Completely unscrew the holding-nut (5) from the heating element.
5. Replace the heating element (4).
6. Reassemble in the opposite order from the disassembly.
7. To adjust the orientation of the soldering tip, loosen the 3 holding screws (6) of the cover, then orient and tighten.

3.3.3 Adjusting the angle of the soldering tip and the cleaning position



Working position

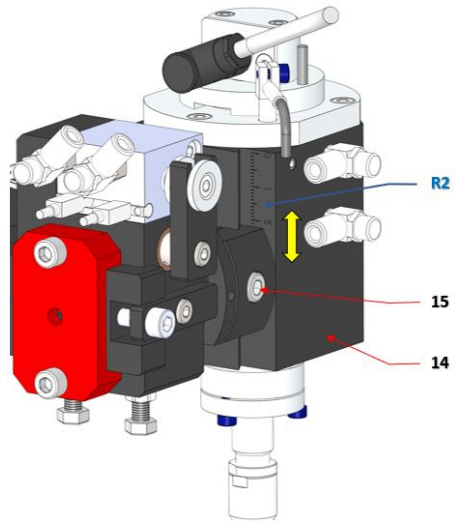
8. Loosen the counter-nut (8) and adjust the angular position of the heating unit by tightening or loosening the stopper screw (9).
9. Tighten the counter-nut (8) of the stopper screw (9) to lock the position.
10. If necessary, adjust the position of the sensor (13) until the red LED light appears.

Cleaning position

11. Loosen the counter-nut (10) and adjust the vertical position of the heating unit by tightening or loosening the stopper screw (11).
12. Tighten the counter-nut (10) of the stopper screw (11) to lock the position.
13. If necessary, adjust the sensor position (12) until the red LED light appears.

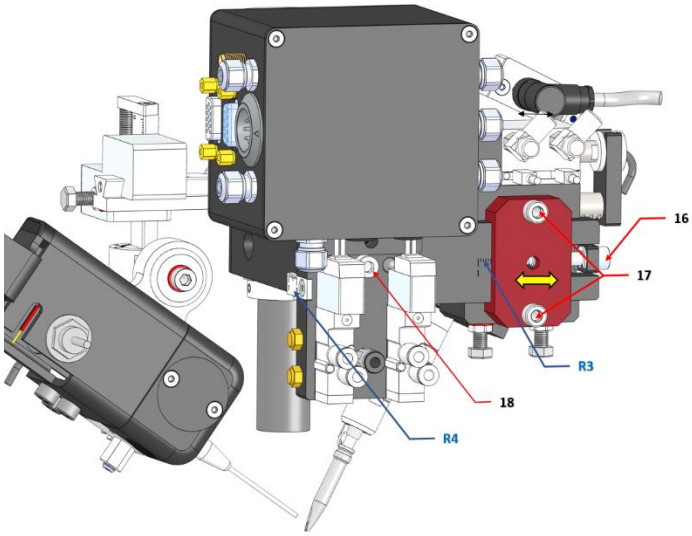
An R1 graduation is used to identify the angular position of the entire heating unit.

3.3.4 Adjusting the vertical position of the soldering tip



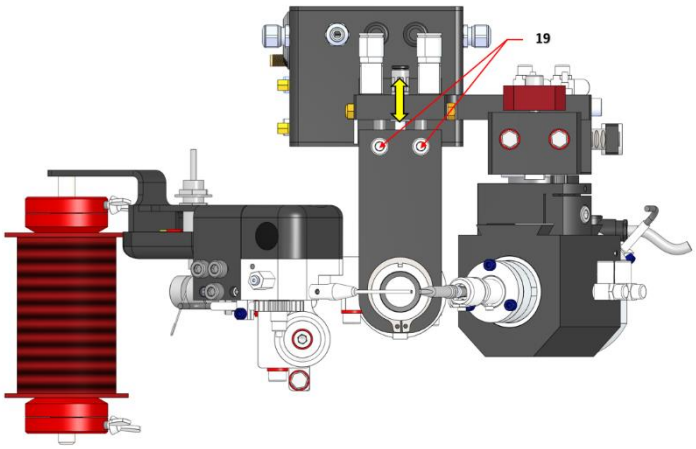
1. Place the soldering tip in working position.
2. Hold the heating unit (14) in place and loosen the fixing screw (15) on the side of the dovetail guide.
3. Adjust the position of the soldering tip by moving the heating element (14) up or down.
4. Lock the position by tightening the fixing screw (15).
5. An R2 graduation identifies the vertical position.

3.3.5 Adjusting the longitudinal position of the soldering tip



1. Place the iron into the working position.
2. Release the two fixing screws (17) to slide the heating unit support.
3. Adjust the position of the soldering tip by screwing or unscrewing the adjustment screw (16).
4. Lock the position by tightening the two screws (17).
5. An R3 graduation identifies the longitudinal position.

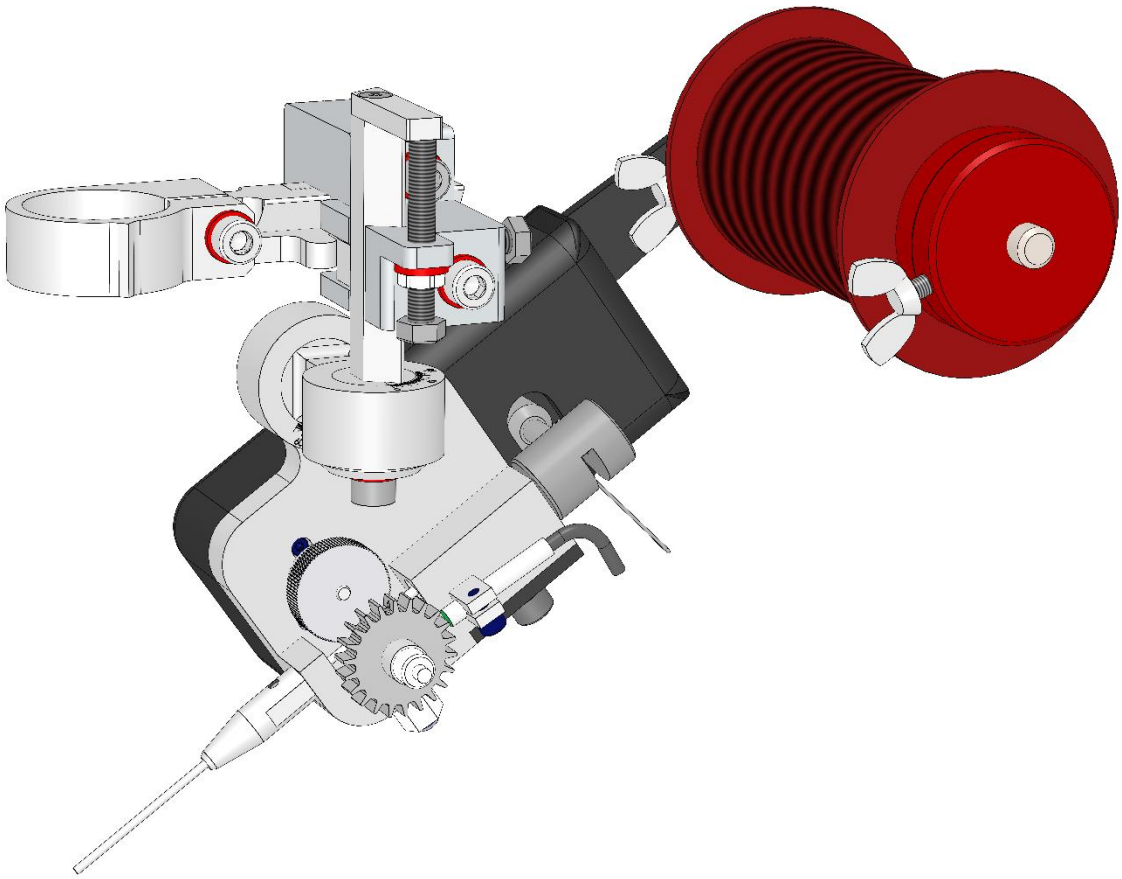
3.3.6 Adjusting the transversal position of the soldering tip



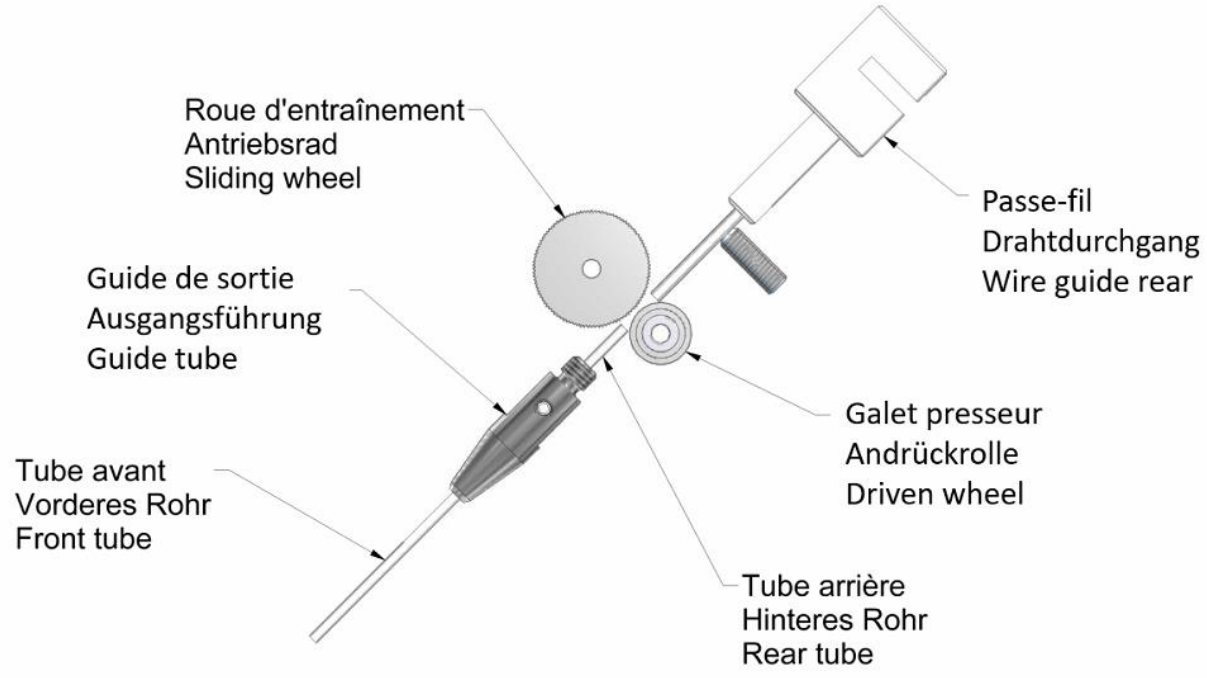
1. Place the iron into working position.
2. Release the two fixing screws (19).
3. Adjust the position of the soldering tip by screwing or unscrewing the adjustment screw (18) see § 3.3.5.
4. Lock the position by tightening the two fixing screws (19).
5. An R4 graduation identifies the transversal position.

3.4 Maintenance of the wire feeder

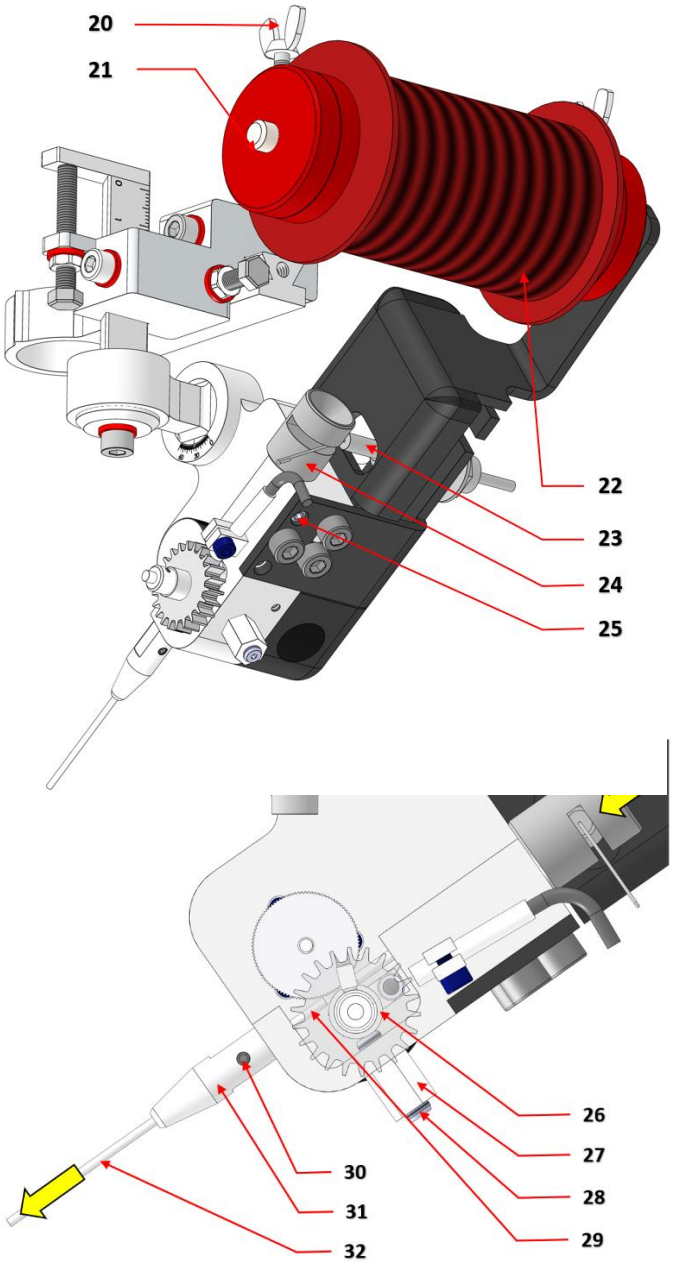
Wire-feeder



Wire-guide kit



3.4.1 Replacing the solder tin spool



1. Loosen the wing screw (20), remove the flange (21) and place the empty spool.
2. If the spool is not empty, cut the wire above the wire-guide rear (24) and engage the wire feeding (see "MSH Configurator software documentation") until the wire is no longer driven and pull it. Remove the waste.
3. Place the new spool on its holder. Replace the flange and tighten the wing screw.
4. Pull the driven-wheel (26) against the adjustment screw for the press pressure (28). Engager the wire in the cone of the wire-guide rear (24), ensuring that the wire presence sensor (23) is engaged (sensor lever in front of the wire), until it is engaged in the rear tube (29). Release the driven-wheel.
5. Start the wire feeding until the wire comes out of the front tube or, without releasing the driven-wheel, continue manually the wire feeding.
6. The solder wire should exit the front tube by approximately 3 times its diameter. Cut any excess length.
7. Adjust the driven-wheel (26), if necessary (see "Adjusting the driven-wheel") by loosening the lock nut (27), and acting on the adjusting screw (28).

3.4.2 Replacing the front tube (cf. § 3.4.1)

1. Unscrew the blocking screw (30) and remove the front tube (32).
2. Clean or replace the front tube.
3. Place the front tube with the engagement cone of the wire inside the guide tube (31). Place the front tube until it stops and tighten moderately the blocking screw.
4. The soldering wire should exit the front tube by approximately 3 times its diameter. Cut any excess length.

3.5 Changing the wire diameter

The components used to bring the soldering wire onto the soldering point are grouped in various kits, which have different diameters or diameter ranges. As standard, the head is delivered with a pre-mounted kit for a wire diameter of 0.8mm which is suitable for most applications. Upon request, we can deliver the wire feeder kit which is best suited to your application.

The procedure to change the different elements of the wire feeder kit are described below.

Once all the components of the new wire feeder kit have been mounted, the wire must be inserted (cf. § 3.4.1 “Replacing the solder wire spool").

The driven-wheel must be adjusted at each change of the wire diameter (cf. § 3.5.3 "Adjusting the driven-wheel").

3.5.1 Replacing the guide tube (cf. § 3.4.1)

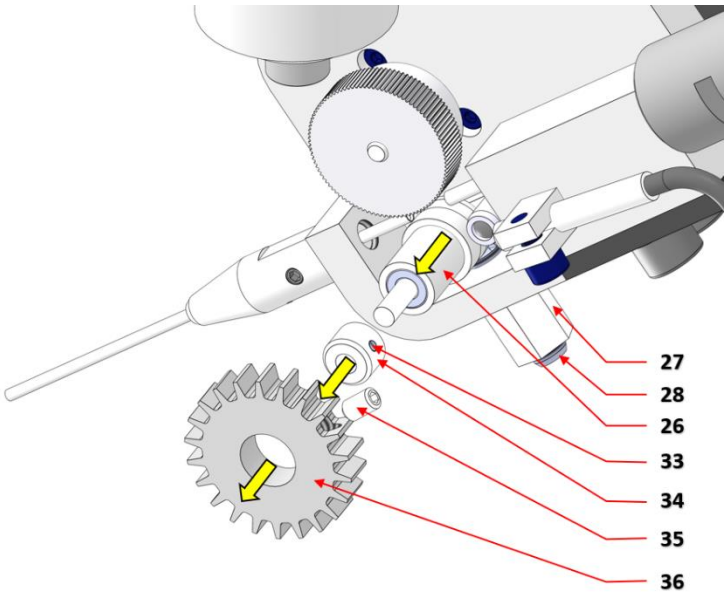
1. Pull the driven-wheel (26) against the adjustment screw (28) and remove the wire from the back of the wire rear (24).
2. Unscrew the blocking screw of the front tube (30) and remove it.
3. Unscrew the guide tube (31).
4. Screw the new guide tube and make sure the solder wire is inserted first.
5. Place the new front tube with the engagement cone of the wire inside the guide tube (31). Place the front tube until it stops and tighten moderately the locking screw.

3.5.2 Replacing the wire-guide rear (cf. § 3.4.1)

The same wire-guide rear can be used for different wire diameters. Check the type of wire-guide rear before replacing it.

1. Pull the driven-wheel (26) against the adjustment screw (28) and wind all the wire around the spool (22).
2. Unscrew the locking screw (25) and remove the wire-guide rear (24). Mind the lever of the sensor (23).
3. Insert the new wire-guide rear by locking its position and tightening moderately the screw (25).
4. Re-insert the wire as described under § 3.4.1.

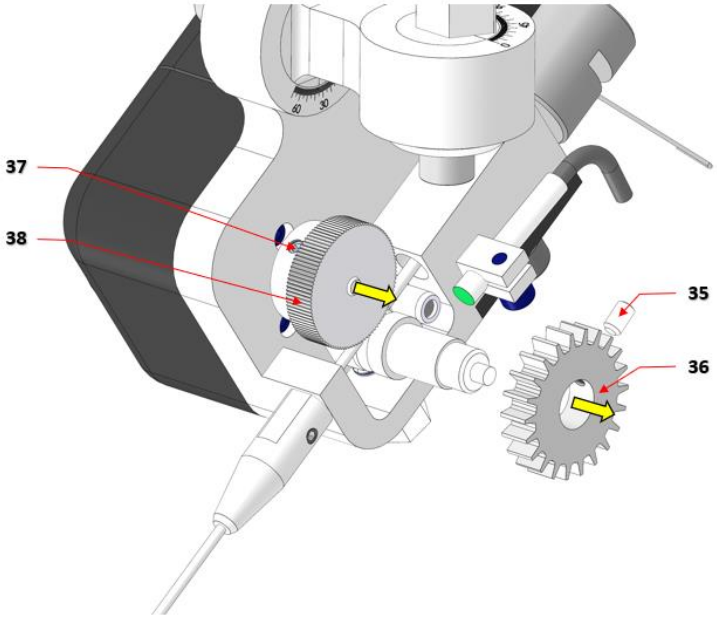
3.5.3 Replacing the driven-wheel



1. Pull the driven-wheel (26) against the adjustment screw for the press pressure (28), and remove the wire-guide rear (24).
2. Loosen the locking screw of the coding wheel (35) and remove the coding wheel (36).
3. Loosen the locking screw (33) and remove the stop ring (34).
4. Remove the driven-wheel (26) from the axis.
5. Place the new driven-wheel (26) and replace the stop ring (leave maximum 0.05mm play with the driven-wheel) and secure with the locking screw (33). The driven-wheel must turn freely.
6. Replace the coding wheel (36) and secure with the locking screw.

3.5.4 Replacing the sliding-wheel

The same sliding-wheel is used for different wire diameters. Check the type of sliding-wheel before changing it.



1. Pull the driven-wheel (26) against the adjustment screw for the press pressure (28), and remove the wire from the back of the wire-guide rear (24).
2. Loosen the coding wheel locking screw (35) and remove the coding wheel(36).
3. Engage the wire feeding (see "MSH Configurator software documentation") until the locking screw (37) of the sliding-wheel is accessible.
4. Loosen the locking screw (37) and remove the sliding-wheel.
5. Place the new sliding-wheel and secure with the locking screw.

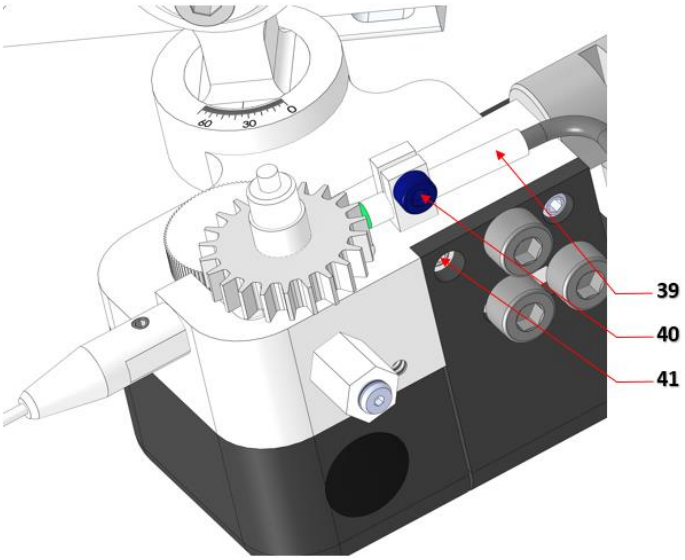
3.5.5 Adjusting the driven-wheel

The pressing force of the driven-wheel depends on the diameter and the quality of the soldering wire. The following conditions must be fulfilled:

- Apply a sufficient force to guarantee a correct drive of the wire.
- Adjust the force to prevent crushing of the wire.

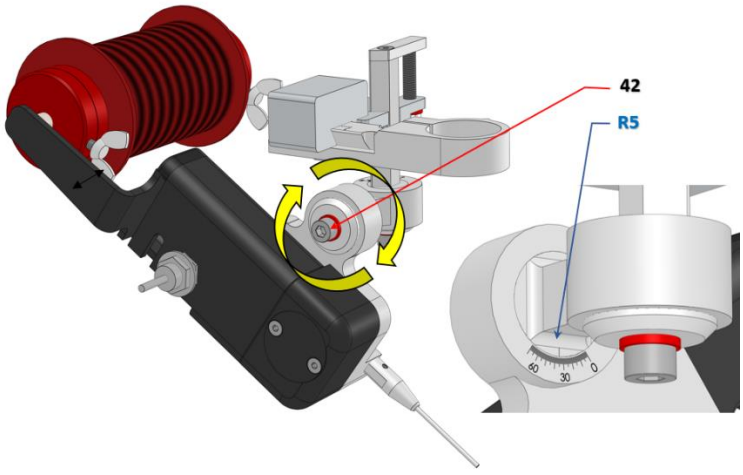
1. Loosen the counter nut (27).
2. Adjust the pressing force of the driven-wheel (26) on the wire using the spring saddle (28).When there is no wire, the driven-wheel must not touch the sliding-wheel, therefore the spring saddle must be secured with the counter nut (27).

3.5.6 Adjusting the control of the wire feeder



1. Loosen the locking screws of the sensor (40) and (41) and adjust it so that it does not touch the coding wheel. Make sure that the distance between the locking screw and the coding wheel guarantees a correct detection. Secure with the locking screw.
2. Manually turn the coding wheel and check that the status of the LED sensor changes at every tooth rotation over at least one complete turn. The status of the I/O can also be checked.

3.5.7 Adjusting the inclined position

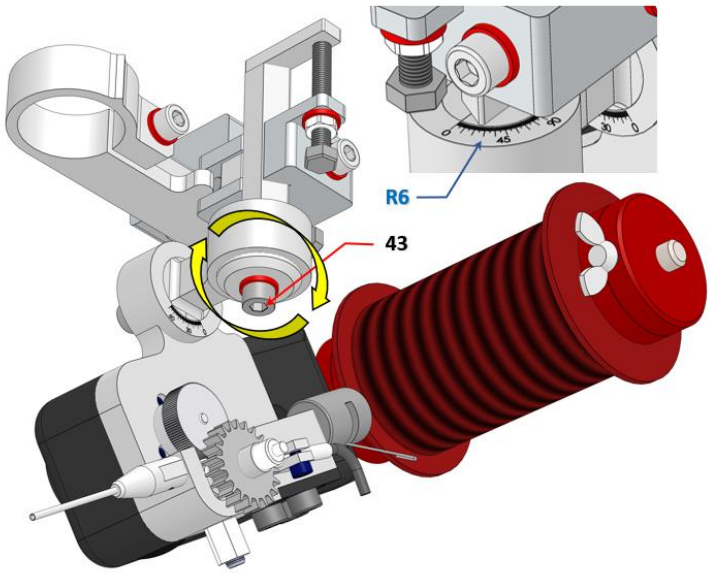


1. To adjust the inclined position, slightly loosen the locking screw (42) while holding the unit into position.
2. Adjust the inclination of the wire-feeder by pivoting the unit and secure with the locking screw (42). An R5 graduation identifies the position.

Comment :

The position of the wire-feeder compared to the soldering head depends on the product and the related application.

3.5.8 Adjust the orientation angle

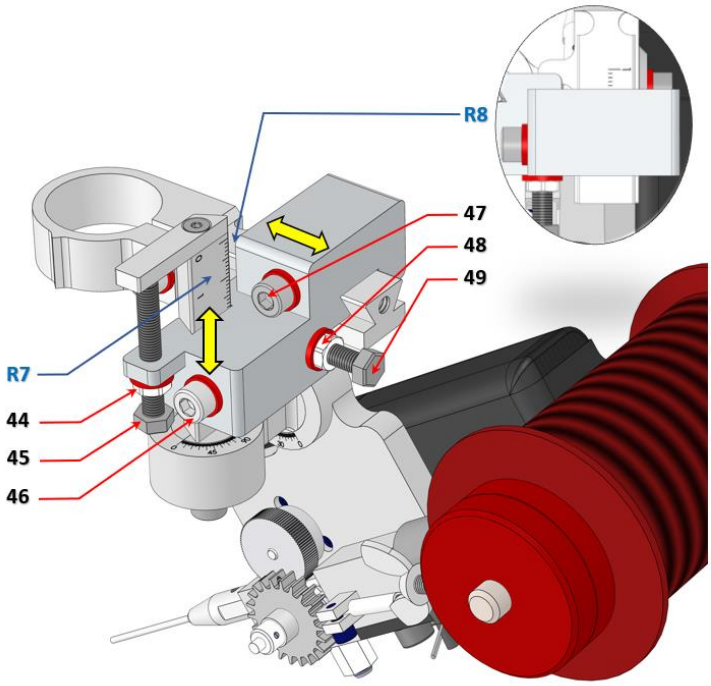


1. To adjust the angle of the wire-feeder, slightly loosen the locking screw (43), while holding the unit into position.
2. Adjust the angle of the wire-feeder by pivoting the unit and secure with the locking screw (43). An R6 graduation identifies the position.

Comment :

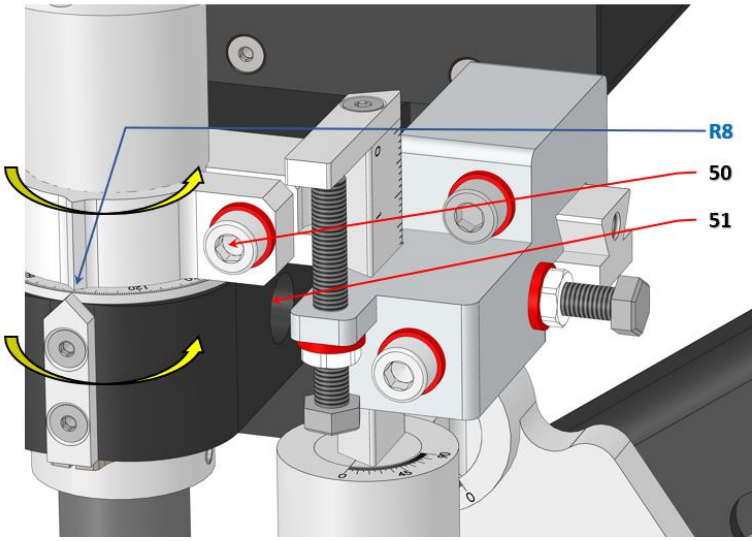
The position of the wire-feeder compared to the soldering head depends on the product and the related application.

3.5.9 Adjusting the vertical and transversal position



1. ***To adjust the vertical position*** loosen the lock nut (44)
2. Loosen the locking screw (46) while maintaining a slight tightening, which will allow to have as little play as possible during the adjustment.
3. Adjust the vertical position using the screw (45) and lock the position with the screw (46) and then with the lock nut (44). An R7 graduation identifies the position.
4. ***To adjust the transversal position,*** loosen the lock nut (48).
5. Loosen the locking screw (47) while maintaining a slight tightening, which will allow the least possible play during the adjustment.
6. Adjust the transversal position using the screw (49) *(or by manually moving the wire-feeder unit)* and lock the position with the screw (47), then with the lock nut (48). An R8 graduation identifies the position.

3.5.10 Adjusting the principal (head) and the secondary (wire-feeder) orientation



1. ***To adjust the main orientation, i.e. the orientation of the head in relation to its axis,*** unscrew the locking screw (51).
2. Rotate the unit to the desired position and secure the position by tightening the screw (51). An R8 graduation allows the position to be identified.
3. ***To adjust the main orientation, i.e. the orientation of the wire-feeder in relation to the axis of the head,*** slightly unscrew the locking screw (50) while maintaining the wire-feeder and turn it to the desired position.
4. Lock the position by tightening the screw (50). The position can be identified on a graduated ring (R8) with the nose of the holder.

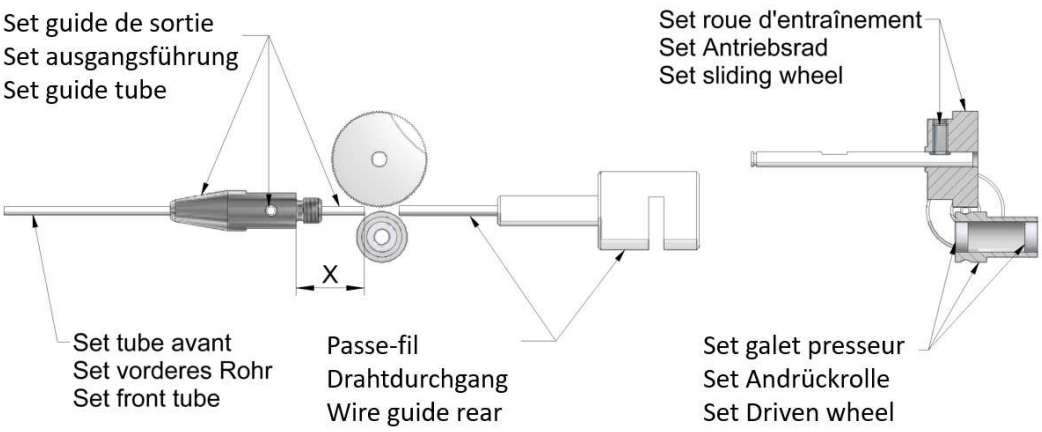
4 Spare parts

The drawings and the spare parts list of the standard MSH150 iron soldering head are on the following pages.

4.1 Spare parts of the wire-guide kits

The reinforced wire-guide kits consist of a set guide tube and tubes with various lengths compared to the standard wire-guide kits.

For certain applications, the use of a special wire-guide kit is necessary. In this case, you will find the corresponding article numbers in the project-specific spare parts list.



Standard wire-guide kits

Ø wire mm	Kit number	Wire-guide rear no.	Set guide tube no.	Set driven-wheel no.	Set sliding-wheel no.	
0.3	5-0048-13-000-30	5-0048-00-600-00	7-0366-00-000-00	7-0327-00-000-00	7-0440-00-000-00	
0.5	5-0048-01-000-30	5-0048-00-100-00	7-0208-00-000-00	7-0209-00-000-00	7-0440-00-000-00	
0.7-0.8	5-0048-02-000-30	5-0048-00-100-00	7-0210-00-000-00	7-0211-00-000-00	7-0442-00-000-00	
0.9-1.0	5-0048-03-000-30	5-0048-00-100-00	7-0212-00-000-00	7-0213-00-000-00	7-0442-00-000-00	
1.2	5-0048-04-000-30	5-0048-00-200-20	7-0214-00-000-00	7-0215-00-000-00	7-0442-00-000-00	
1.5-1.6	5-0048-05-000-30	5-0048-00-200-20	7-0263-00-000-00	7-0264-00-000-00	7-0443-00-000-00	
Ø wire mm	**Set tube 50mm no.**	**Set tube 60mm no.**	**Set tube 70mm no.**		**Ø tube**	**X**
0.3	7-0367-00-000-00	7-0368-00-000-00	7-0369-00-000-00		1.5 / 0.5	12.5
0.5	7-0219-00-000-00	7-0220-00-000-00	7-0221-00-000-00		1.2 / 0.8	13.0
0.7-0.8	7-0222-00-000-00	7-0223-00-000-00	7-0224-00-000-00		1.6 / 1.0	13.5
0.9-1.0	7-0225-00-000-00	7-0226-00-000-00	7-0227-00-000-00		2.0 / 1.3	12.6
1.2	7-0228-00-000-00	7-0229-00-000-00	7-0230-00-000-00		2.0 / 1.6	12.6
1.5-1.6	7-0265-00-000-00	7-0266-00-000-00	7-0267-00-000-00		3.0 / 2.2	11.5

Reinforce wire-guide kits

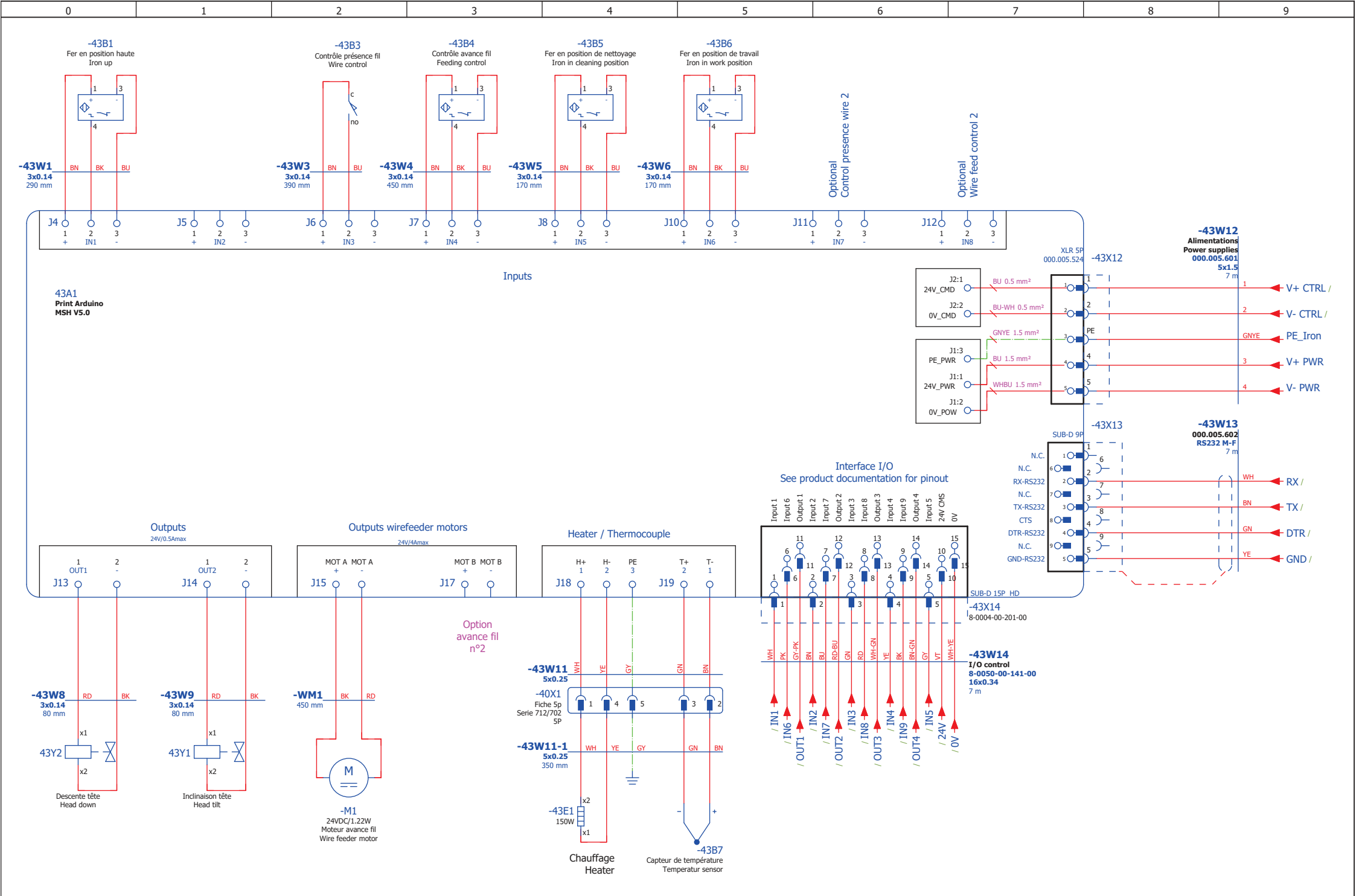
Ø wire mm	Kit number	Wire-guide rear no.	Set guide tube no.	Set driven-wheel no.	Set sliding-wheel no.	
0.3	-	-	-	-	-	
0.5	5-0048-12-000-30	5-0048-00-100-00	7-0364-00-000-00	7-0209-00-000-00	7-0440-00-000-00	
0.7-0.8	5-0048-14-000-30	5-0048-00-100-00	7-0391-00-000-00	7-0211-00-000-00	7-0442-00-000-00	
0.9-1.0	5-0048-15-000-30	5-0048-00-100-00	7-0393-00-000-00	7-0213-00-000-00	7-0442-00-000-00	
1.2	5-0048-16-000-30	5-0048-00-200-20	7-0395-00-000-00	7-0215-00-000-00	7-0442-00-000-00	
1.5-1.6	5-0048-17-000-30	5-0048-00-200-20	7-0397-00-000-00	7-0264-00-000-00	7-0443-00-000-00	
Ø wire mm	**Set tube 80mm no.**	**Set tube 90mm no.**	**Set tube 105mm no.**		**Ø tube**	**X**
0.3	-	-	-		-	-
0.5	7-0365-00-000-00	7-0695-00-000-00	-		1.2 / 0.8	13.0
0.7-0.8	-	7-0392-00-000-00	7-0423-00-000-00		1.6 / 1.0	13.5
0.9-1.0	-	7-0394-00-000-00	7-0421-00-000-00		2.0 / 1.3	12.6
1.2	-	7-0396-00-000-00	-		2.0 / 1.6	12.6
1.5-1.6	-	7-0398-00-000-00	-		3.0 / 2.2	11.5

Soldering tips 150W

5-0005-99-6xx-xx

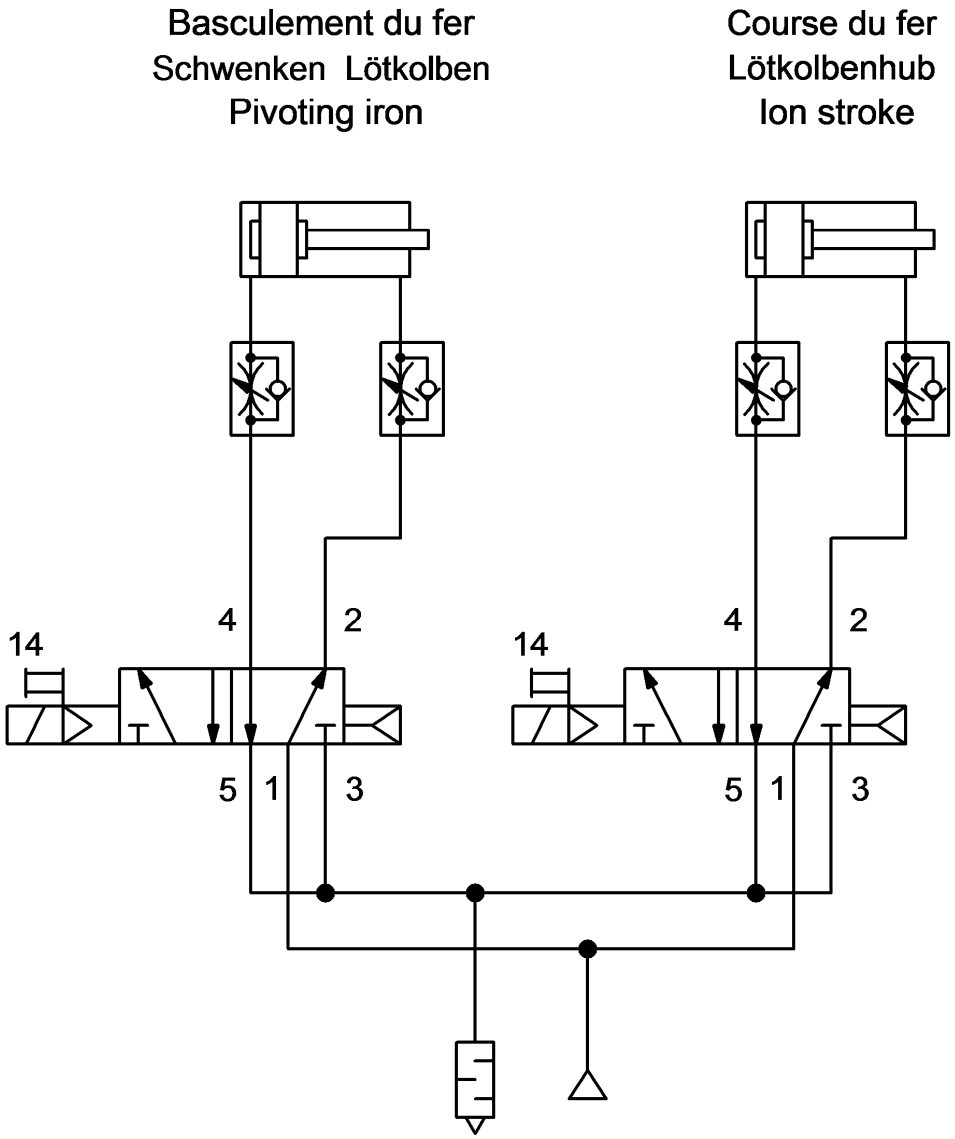
5 Electrical wiring diagrams

The electrical wiring diagrams of the standard MSH150 iron soldering head are on the following pages.



			Créé le	13.10.2020	6D00317 MSH V5	UNITECHNOLOGIES SA	Tête de Brasage		= STANDARD
			Traité par	MOCO	Tête fer MSH V5	mta SOLDERING & DISPENSING			+ BRASAGE
								Cartouche:	Feuille N° 43
Modification	Date	Nom						Formulaire:	Total Feuilles 2

6 Pneumatic diagrams



300717 – Software documentation for MSH150 iron soldering head

Modification index

Documentation version	Date	Executed by	Modification
5.0.1	10.06.2021	KJO	First edition for MSH firmware V5.0
5.0.2	26.10.2021	KJO	Addition of a nota bene on page 5.
5.1.1	18.02.2022	KJO	Correction of RS232 command details and explanation of MSH150 firmware auto update.
5.1.2	03.10.2022	KJO	Correction of “Flag temperature” command description at page 36.
5.2.1	08.03.2023	KJO	Add example of the use of recipe bit input signals at page 33.
5.3.1	25.04.2023	KJO	Add stand-by temperature and time in settings at page 36.

Table of contents

1 Introduction

The process controller is included within the MSH150 iron soldering head itself. The controller can store up to 64 unique recipes. Many joints normally use the same solder recipe, so this provides the capability to solder hundreds of joints across multiple products. Each recipe has parameters such as soldering temperature, preheating time, quantity of solder tin.

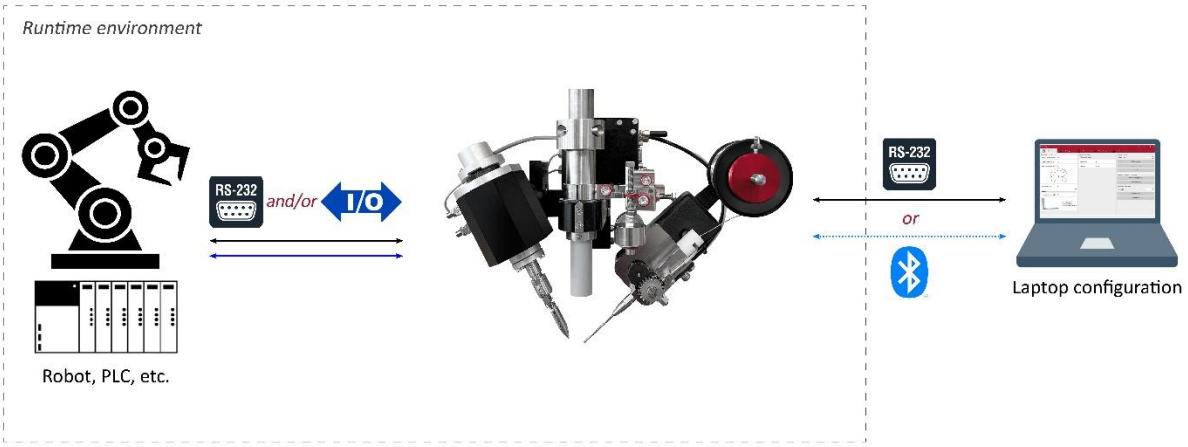
The MSH Configurator software allows to program the head wirelessly via Bluetooth or by RS232 cable from your laptop. Furthermore, we provide a configuration app that is compatible with Windows (>. NET4.5.2). Also, our app uses an intuitive HMI that allows users to easily:

- Set the head without special coding languages
- Monitor the status of the head
- Simulate the cycles

Once configured, the laptop is disconnected, and the soldering head can communicate with your robot/PLC to operate in cycles. For this purpose, two different integrations are available:

- Discrete IO which is very easily programmable and quickly integrated
- RS232 which requires more programming but offers a greater flexibility i.e. possibility to change the recipe values without going back through the configurator

Last but not least, we truly thought of everything needed and made the MSH150 soldering head simple to use, to configure and to integrate.



2 Configuration with MSH Configurator Windows App

2.1 Connectivity of MSH150 soldering head

The MSH soldering head has two standard communication protocols: **RS232** and **Bluetooth**. Both can be used to configure the head with the Windows App called "**MSH Configurator**".

However, to enable the use of Bluetooth, the RS232 has to be used first to prepare the MSH150 soldering head to be ready for Bluetooth. This is described under chapter "*2.5 Bluetooth configuration*".

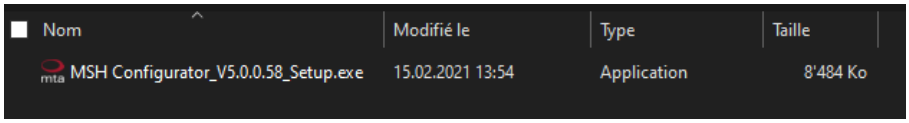
2.2 MSH Configurator setup

The last version of our "MSH Configurator" installer can be found on our Website, under the "Downloads" tab of the "MSH150 soldering head" Webshop product:

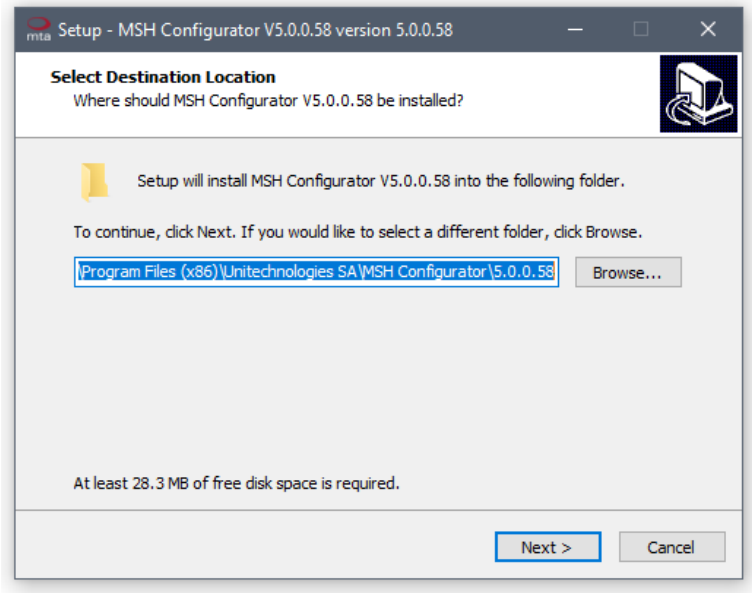
https://mtaautomation.com/msh150-iron-soldering-head/downloads/

N.B. The software can be downloaded only if the MSH150 head has been ordered and if you are logged into our website.

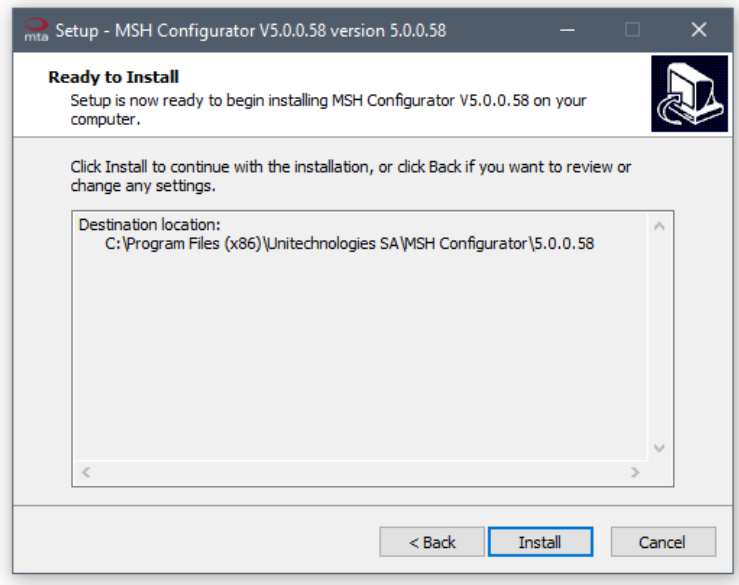
After downloading the installer "MSH Configurator_VX.X.X.X_Setup.exe", it can be easily launched by a double click.



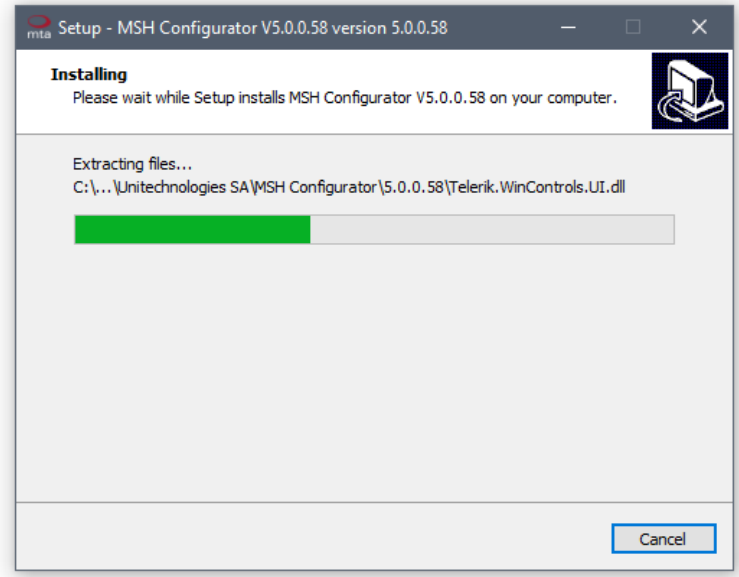
The setup wizard will ask for the installation location folder. This is defined by default under "Program Files" and "Unitechnologies SA" folder.



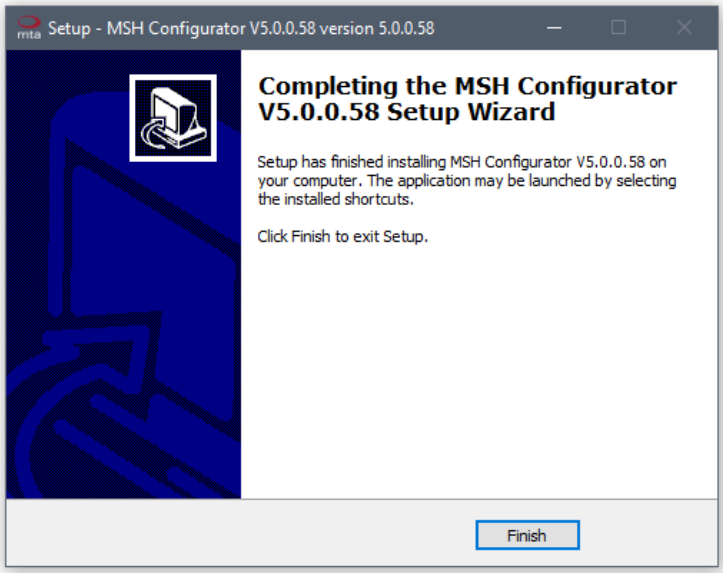
Then, a summary of installation is shown. The installation can be started by clicking on “Install” button.



It can take a few seconds to execute.



Finally, the following window will appear when the installation is finished. It can be closed by clicking on “Finish” button.



2.3 Version compatibility

The MSH150 soldering head has a firmware with a version number defined on two numbers.

i.e. Major.Minor => Example: ***V5.0***

However, the MSH Configurator software has a different version number, which has four numbers.

i.e. Major.Minor.Revision.Build => Example ***V5.0.12.432***

The compatibility between firmware version and configurator version is only dependent on Major and Minor numbers.

In other words, only Major and Minor numbers have to match. For example, an MSH150 soldering head **V5.2** can be connected and configured with MSH Configurator **V5.2.3.456** but also with **V5.2.0.123**.

Therefore, if the wrong MSH Configurator is used, a message will mention what is the compatibility problem and which version of MSH Configurator is required to control the connected MSH150 soldering head.

2.4 Use of MSH Configurator

2.4.1 Connection pop-up

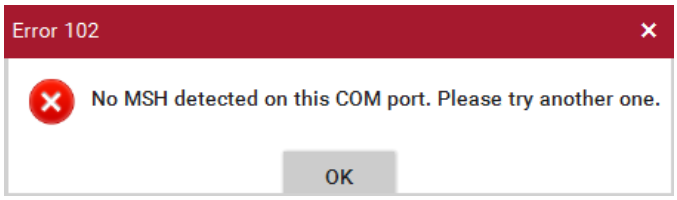
When the MSH Configurator app is started, a pop-up for connection is shown. The right COM port has to be selected and then, the connection button has to be clicked.

Tip: most of the time, serial port COM number are listed as follows:

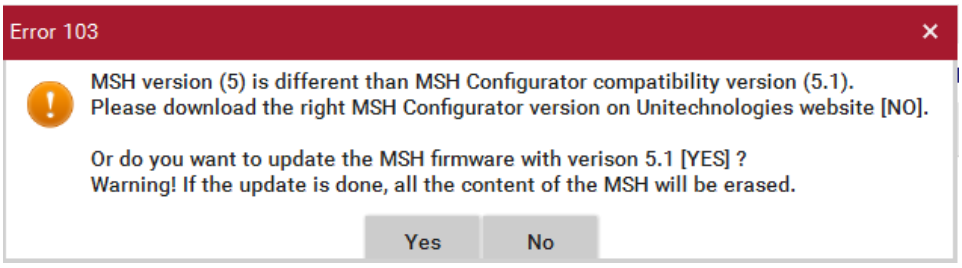
- *Native serials => COM number from 1 to 4*
- *Virtual serials (USB adapter or Bluetooth) => COM number from 5 to more.*

After validating this pop-up, the software will try to connect to the related MSH150 soldering head. If this operation is successful, the above window will be closed and the dashboard will be shown instead *(shown on next page)*.

If it is unsuccessful, this error message will appear. In this case, it means that the MSH150 soldering head is not correctly connected to the PC or not correctly powered up.



It's also possible to have the error 103 which one indicates that the MSH150 version is not compatible with the current MSH Configurator version. However, it is possible to update the MSH150 firmware to match with the MSH Configurator version. To perform the update, the "YES" button has to be clicked. Otherwise, no won't do the update.

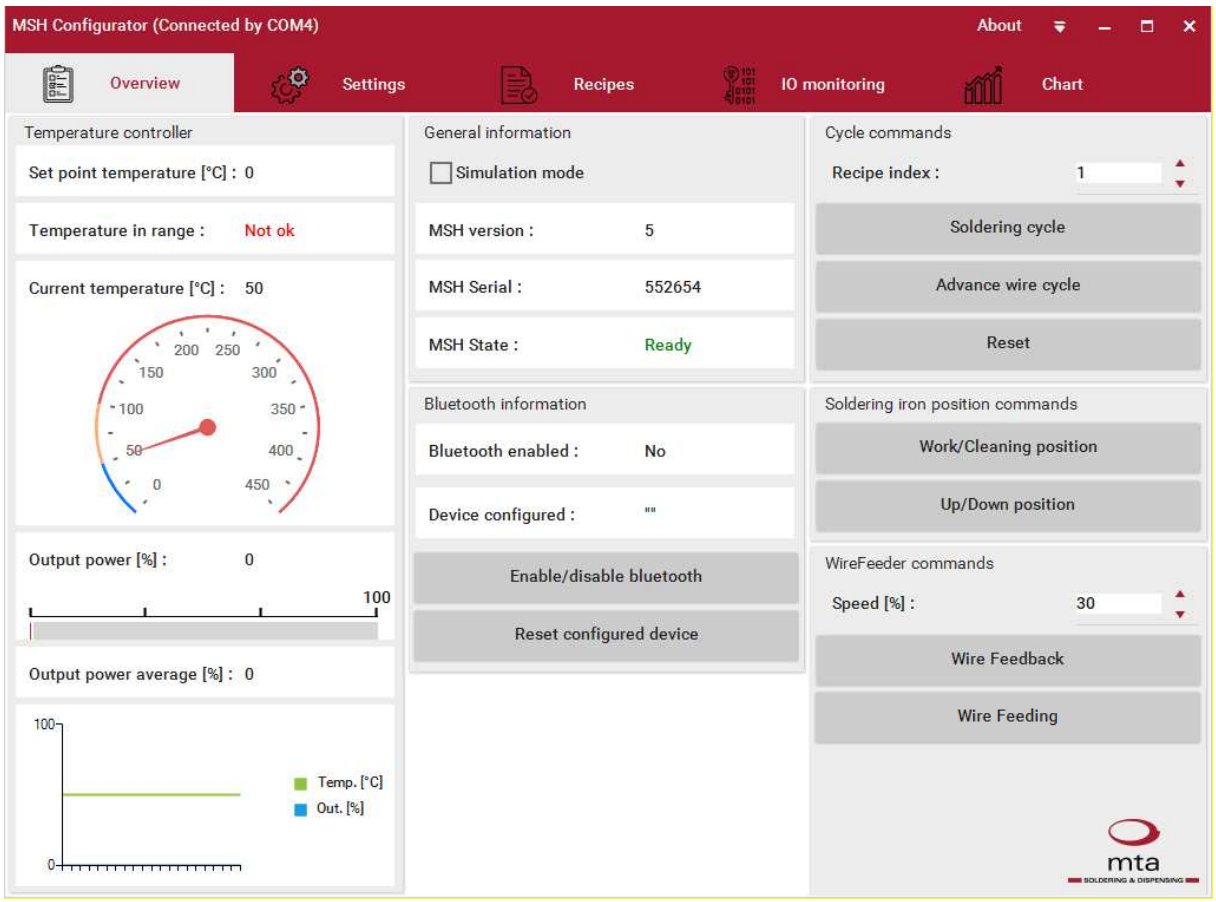


In the case of YES, the update can take up to 2 minutes to be done.

/!\ WARNING /! The connection between the MSH150 and the computer must not be interrupted while the firmware is updating !

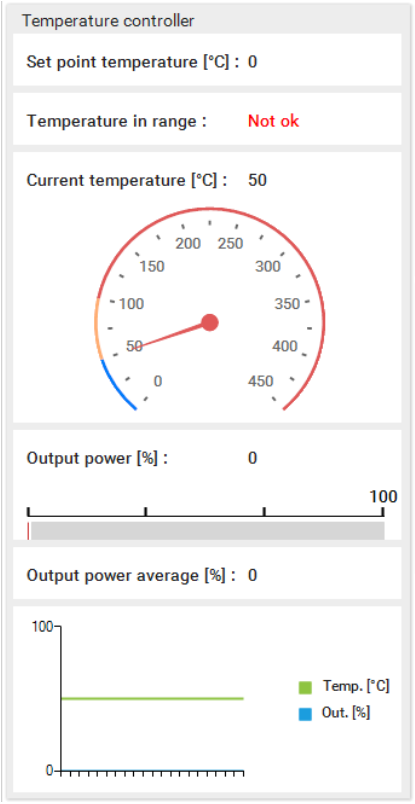
2.4.2 Dashboard

Once connected to the MSH150 soldering head, the dashboard is shown. This window is the first one seen by the user and gathers most of the general information and controls.



2.4.2.1. Temperature controller

The right-hand side column shows data related to the temperature controller.



- Set point temperature: it is the temperature set in the MSH150 soldering head. This is defined when a recipe is loaded.

- Temperature in range: the flag is set to “Ok” when the (measured) temperature is in the tolerance related to the set point. Otherwise, the flag is set to “Not ok”. The tolerance can be defined on the settings page.

- Current temperature: it is read by the MSH150 soldering head.

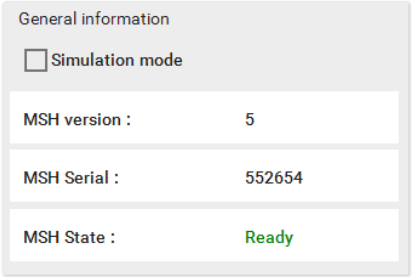
- Output power: it is the power calculated by the PID regulator of the MSH150 soldering head depending on the measured input value and the PID parameters (also defined in the settings page).

- Output power average: this information gives the average of the output power on the last X seconds (X which can be defined in the settings page). This data can be used to define heating stages.

- Finally, a small chart is shown to see on the last 10 seconds the measured temperature and the output power.

2.4.2.2. General information

This right-hand side box shows some general information.



- Simulation mode: when checked, the heating controller and the wire feeder have to be disabled. Cycles can be performed without both of them for simulation.

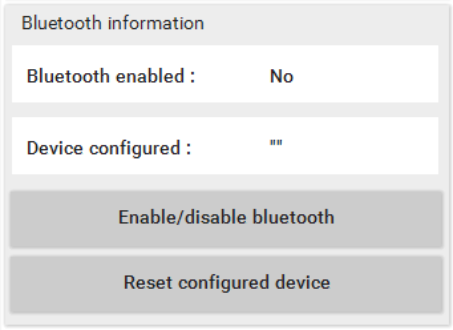
- MSH version: it shows the current version of MSH150 soldering head.

- MSH Serial: it gives the serial number of the MSH150 soldering head. This number is also used in the Bluetooth name of the MSH150 soldering head.

- MSH State: it shows the current state of the MSH150 soldering head. Can be “Ready”, “Busy”, “Error” or “Unknown”.

2.4.2.3. Bluetooth information

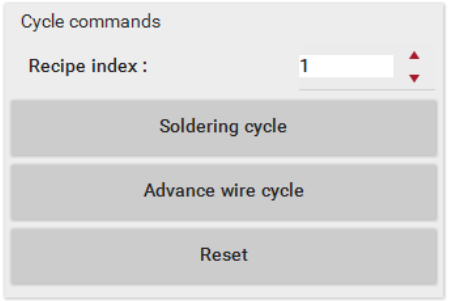
The right-hand side box shows information related to the Bluetooth feature.



- Bluetooth enabled: by default, the Bluetooth is disabled. In this case, the MSH150 soldering head is not visible by the Bluetooth feature.
- Configured device: it is the device (Windows 10 PC) linked to the MSH150 soldering head.
- Enable/Disable Bluetooth: it toggles the state of the Bluetooth. This needs a restart of the MSH150 soldering head.
- Reset configured device: it allows to remove the link with the device (Windows 10 PC) linked to the MSH150 soldering head in order to link another device.

2.4.2.4. Cycle commands

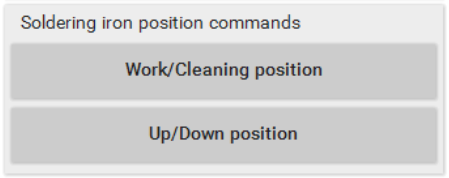
The right-hand side box shows commands related to MSH150 soldering head cycles.



- Recipe index: used recipe when an action (buttons below) is launched.
- Soldering cycle: start a soldering cycle with parameters defined in “Recipe index”.
- Advance wire cycle: perform a wire cycle with parameters (only for wire feeder) defined in “Recipe index”.
- Reset: initialize the MSH150 soldering head and load recipe parameters with “Recipe index”.

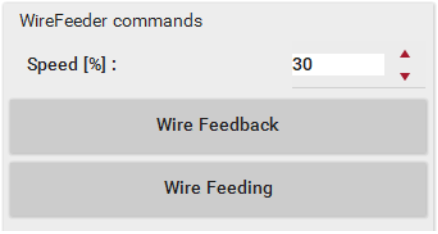
2.4.2.5. Soldering iron position commands

The right-hand side box shows commands related to positions of the soldering iron.



- Work/Cleaning position: toggle the horizontal position of the iron.
- Up/Down position: toggle the vertical position of the iron.

2.4.2.6. Wire feeder commands

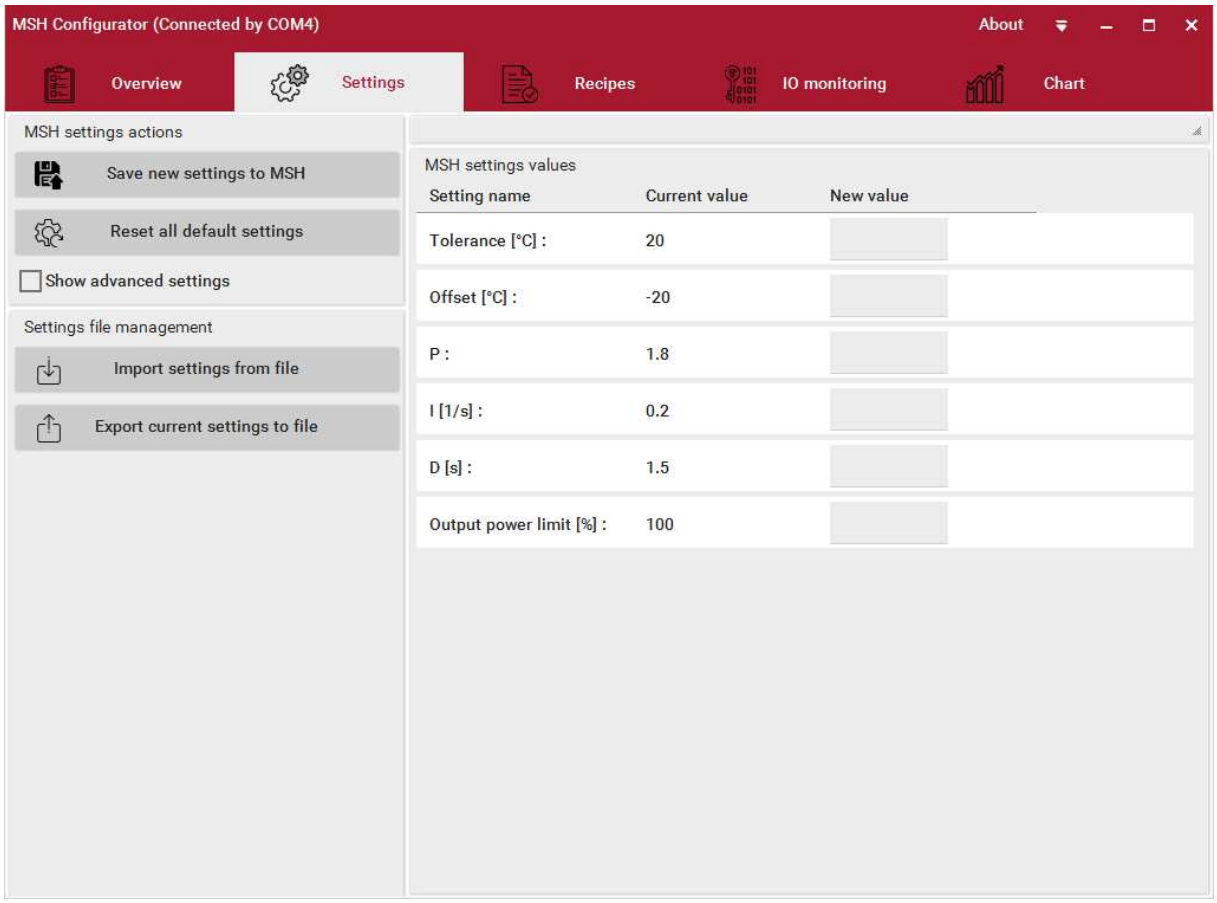


The right-hand side box shows commands related to wire feeder commands.

- Speed: define the speed which will be used by feeding or feedback commands.
- Wire feedback: enable/disable the wire feeder for feedback.
- Wire feeding: enable/disable the wire feeder for feeding.

2.4.3 Settings

The following page shows the MSH150 soldering head settings.



2.4.3.1. Settings actions

- After inserting new values in the field “New value” of each parameter, all new values can be synchronized with the MSH150 soldering head by clicking on the “Save new settings to MSH” button.

- To reset all parameters to default values, the button “Reset all defaults settings” can be used.

- By default, only “Basic settings” are shown. To enable all settings, the checkbox “Show advanced settings” has to be checked.

2.4.3.2. Settings file management

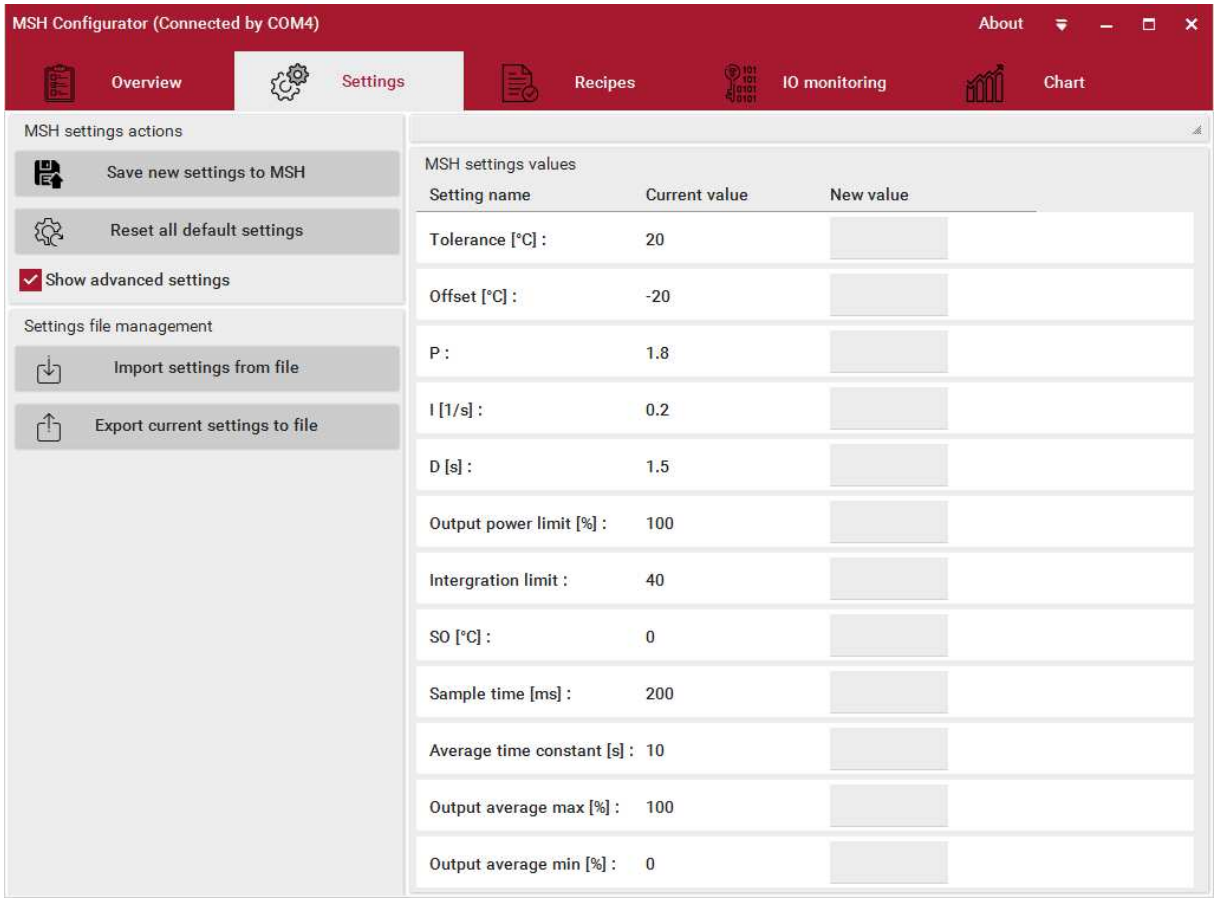
This is a standard menu which allows to import/export settings.

2.4.3.3. Basic settings values

- Tolerance: the tolerance that the MSH150 soldering head considers the temperature is “ok” and allows to solder parts.
- Offset: the value to correct the temperature value.
- P: proportional part of PID calculator.
- I: integral part of PID calculator.
- D: derivative part of PID calculator.
- Output power limit: the output can be limited to the defined value to avoid overheating.

2.4.3.1. Advanced settings values

When advanced settings option is enabled, some other parameters are available for edition.



- Integration limit: the limit of the integral part. This setting avoids to have a too big value of “I” in comparison with “P” and “D”.

- SO: it is the input offset of PID calculator. It can be used if, for example, the MSH150 soldering head is stabilized at 379°C instead of 380°C. However the PID does not need to be changed as it works well in its current status. In this case, the “SO” can be used to shift to 380°C.

- Sample time: this “time” is related to the sampling frequency. At 200ms, the PID calculation will read the “input temperature” and will update the “output power” 5 times per second.

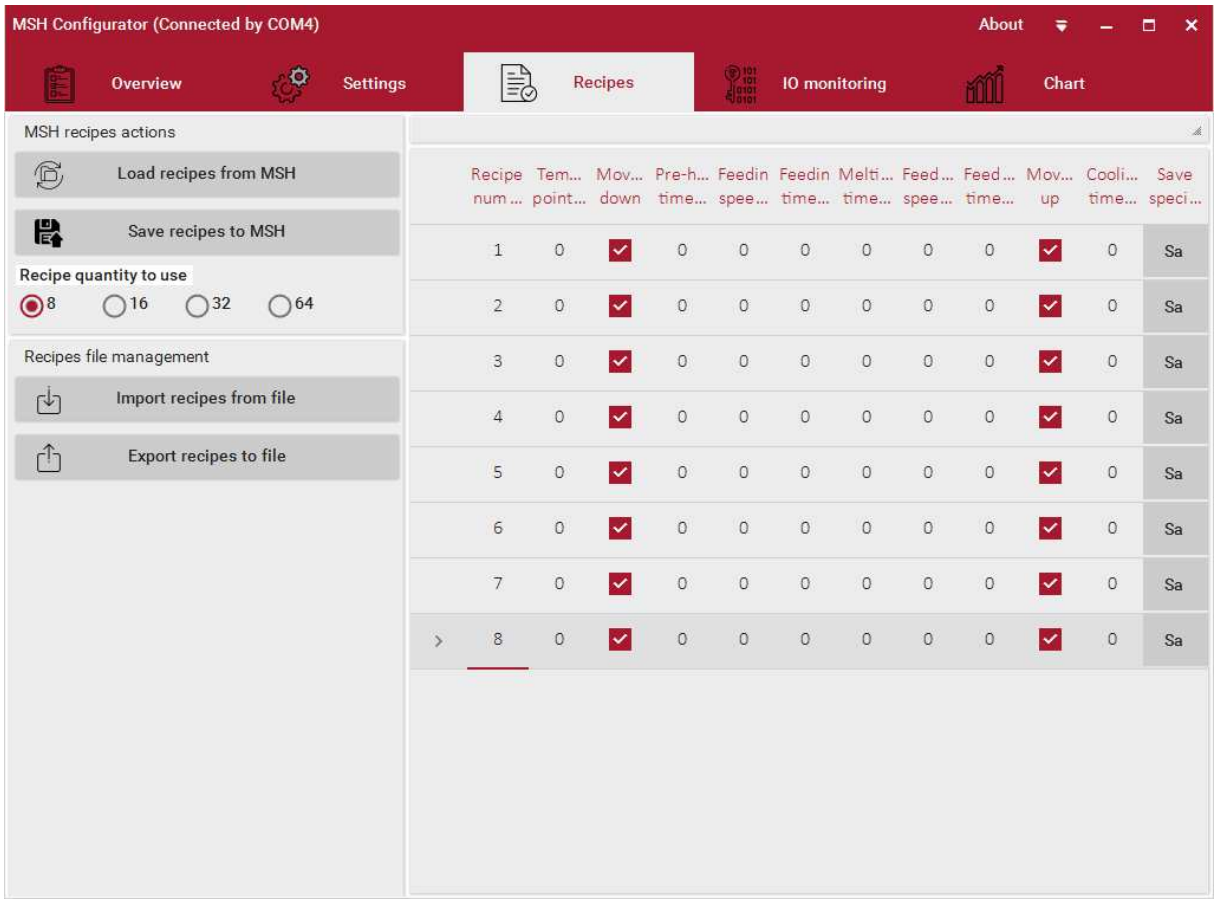
- Average time constant: it is the time window used to calculate the live average output power. Values older than 10 seconds will not be considered anymore in the average calculation.

- Output average max: this setting can be used to stop the heating when the output power average reaches the defined value. Example: “Output average max” defined at 70% means that when the output power average reaches this value, the output power will be forced to 0. To come back to normal heating and release forcing, the “output average min” has to be reached in its turn.

- Output average min: same as previously mentioned, but for the low value as explained.

2.4.4 Recipes

The following page can be used to manage up to 64 recipes inside the MSH150 soldering head.



2.4.4.1. Recipes actions

- Load recipes from MSH: this button will load the quantity defined in the parameter “Recipe quantity to use” from the MSH150 soldering head and will show it into the recipe table *(right panel).*

- Save recipes to MSH: this button will write recipes defined in the recipe table of the MSH150 soldering head depending on the “Recipe quantity to use” value.

- Recipe quantity to use: this radio button will resize the recipe table at the required size. This will impact the “Load” and “Save” functions.

Warning: if, for example, there are 32 defined recipes in the connected MSH150 soldering head and the MSH Configurator shows only 8 recipes, when the button “Load recipes from MSH” will be clicked, only 8 recipes will be read from the MSH150 soldering head.

2.4.4.2. Recipes file management

This is a standard menu allowing to import/export recipes.

2.4.4.3. Recipe table

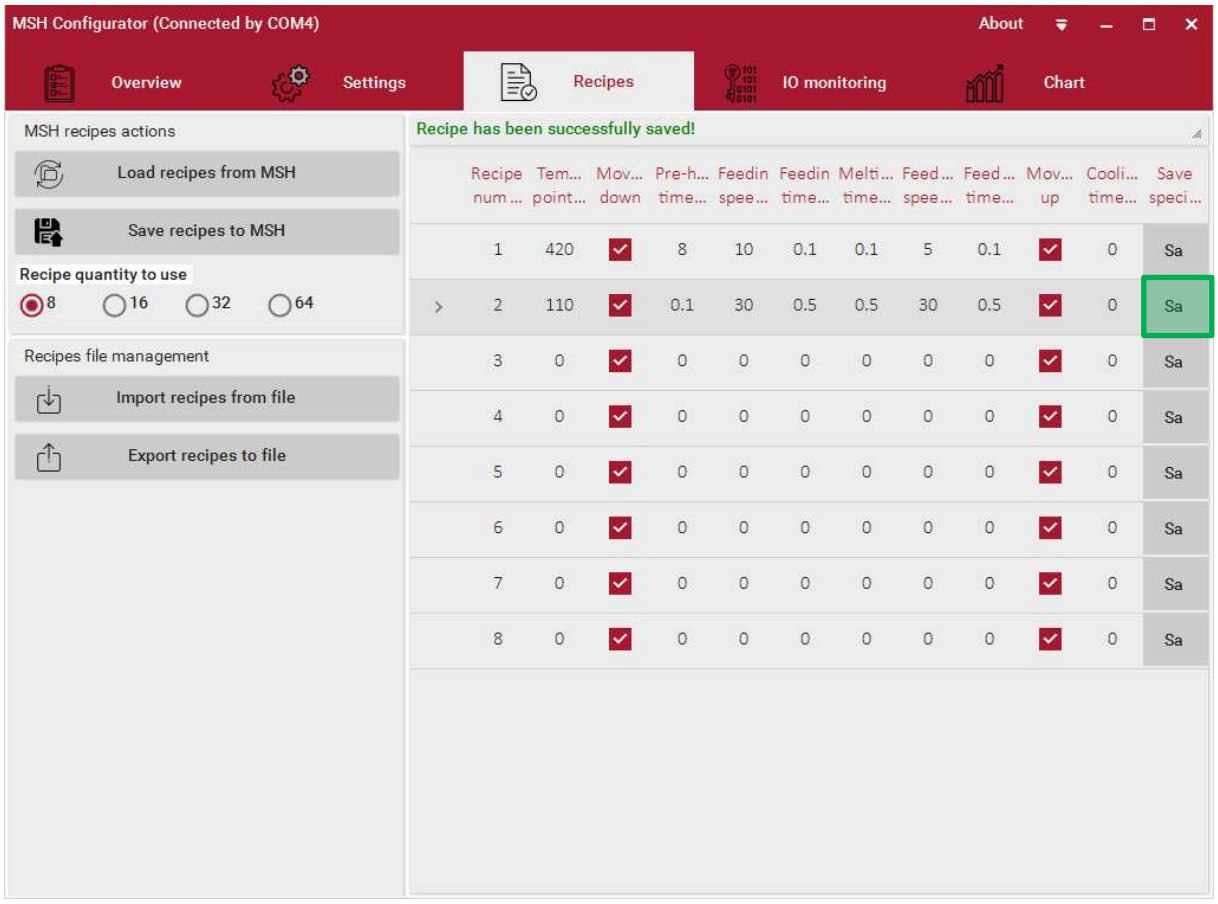
The recipe table allows the user to see and work on recipes. This table has the following head columns:

- Recipe number: the ID of recipe.
- Temperature point [°C]: temperature required for this recipe.
- Move iron down: if the MSH150 soldering head has to move the iron down before soldering.
- Pre-heating time [s]: time the MSH150 soldering head has to wait after the iron moved down and before start feeding.
- Feeding speed [%]: speed of feeding of the wire feeder in percentage.
- Feeding time [s]: time of feeding of the wire feeder at the speed previously defined.
- Melting time [s]: time of melting of the soldering wire after the feeding has finished.
- Feedback speed [%]: speed of feedback of the wire feeder in percentage.
- Feedback time [s]: time of feedback of the wire feeder at the speed previously defined.
- Move iron up: if the MSH150 soldering head has to move the iron up at the end of the soldering process.
- Cooling time [s]: time for cooling down the soldering joint. In fact, this just a temporisation at the end of the soldering process.
- Save specific recipe: button to save only the specific recipes, which is useful to avoid synchronizing each time all recipes with the button “Save recipes to MSH”.

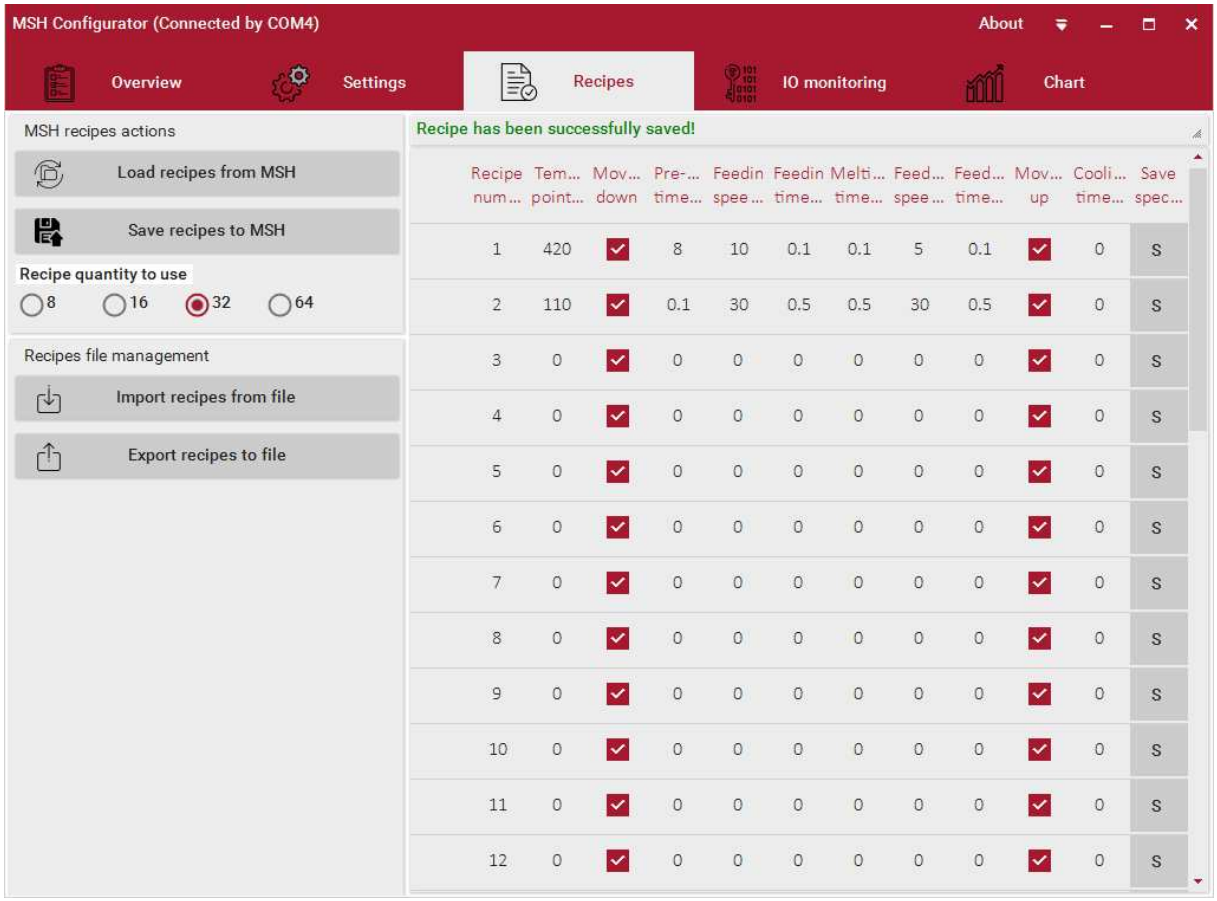
N.B. The “Move iron up” and “Move iron down” recipe parameters can be used, for example, when a soldering joint needs two times a wire feeding. The first recipe will only have the “Move iron down” but not the other one to keep the soldering iron on the pad, even if the recipe is finished. The second recipe will only have the “Move iron up” but not the other one to release the iron head at the end of this recipe. Thus, two recipes can be used on the same point.

The following page shows an example with two defined recipes.

All the recipes can be saved by clicking on “Save recipes to MSH” button. Alternatively individual recipe can also be saved by clicking on the related button as highlighted below in green.



The following page shows an example with the same two previous recipes, but with 32 recipes in total instead of 8, by using the “Recipe quantity to use” option.

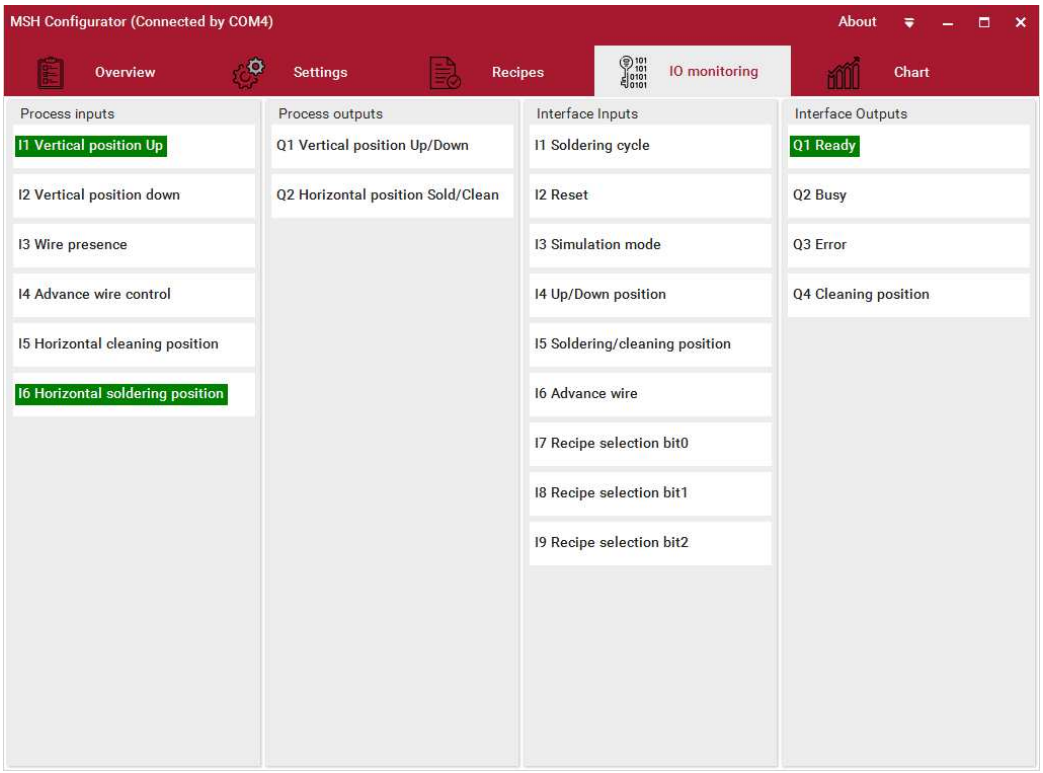


2.4.5 IO Monitoring

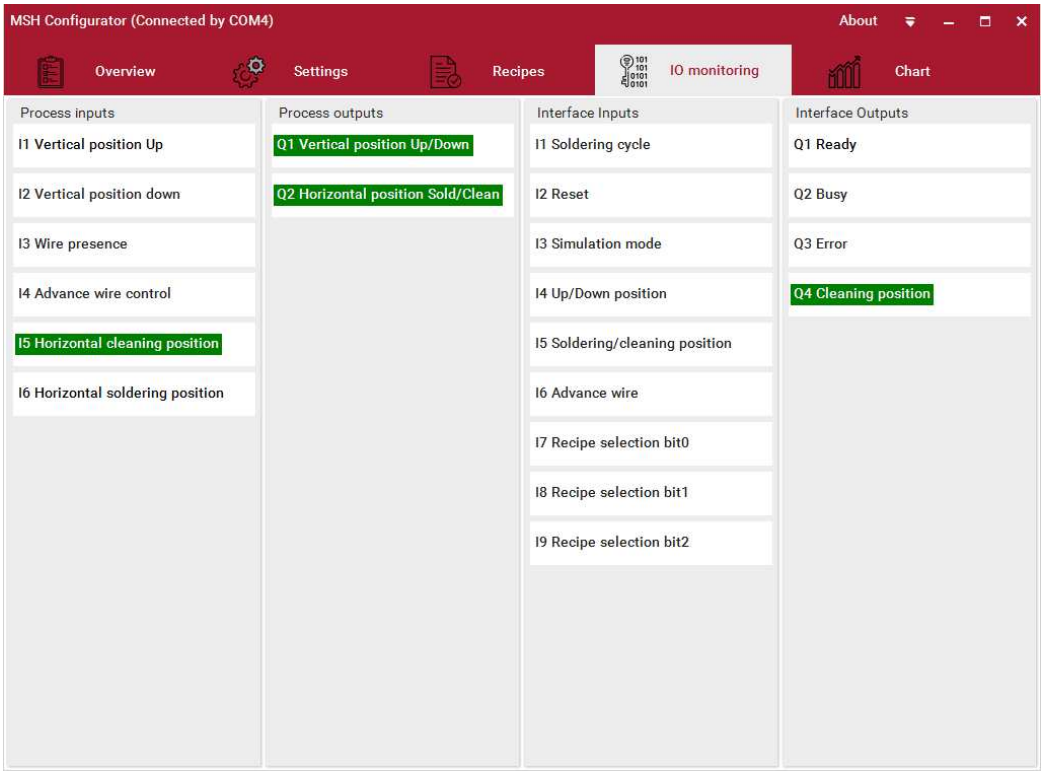
The following page shows the state of all inputs/outputs of the MSH150 soldering head. There are two types of IOs.

- "Process IOs" is related to IOs needed for the functionality of the MSH150 soldering head such as sensors of iron position, wire presence, solenoids and many others.

- "Interface IOs" is related to the customer interface via inputs/outputs. This interface is explained under chapter "32 IO Interface".



In addition to showing the state of all IOs, the following page also allows to force process outputs Q1 and Q2 by double clicking on them.


MSH Configurator (Connected by COM4)
About
Overview
Settings
Recipes
IO monitoring
Chart
Process inputs
I1 Vertical position Up
I2 Vertical position down
I3 Wire presence
I4 Advance wire control
I5 Horizontal cleaning position
I6 Horizontal soldering position
Process outputs
Q1 Vertical position Up/Down
Q2 Horizontal position Sold/Clean
Interface Inputs
I1 Soldering cycle
I2 Reset
I3 Simulation mode
I4 Up/Down position
I5 Soldering/cleaning position
I6 Advance wire
I7 Recipe selection bit0
I8 Recipe selection bit1
I9 Recipe selection bit2
Interface Outputs
Q1 Ready
Q2 Busy
Q3 Error
Q4 Cleaning position

2.4.6 Chart tracing

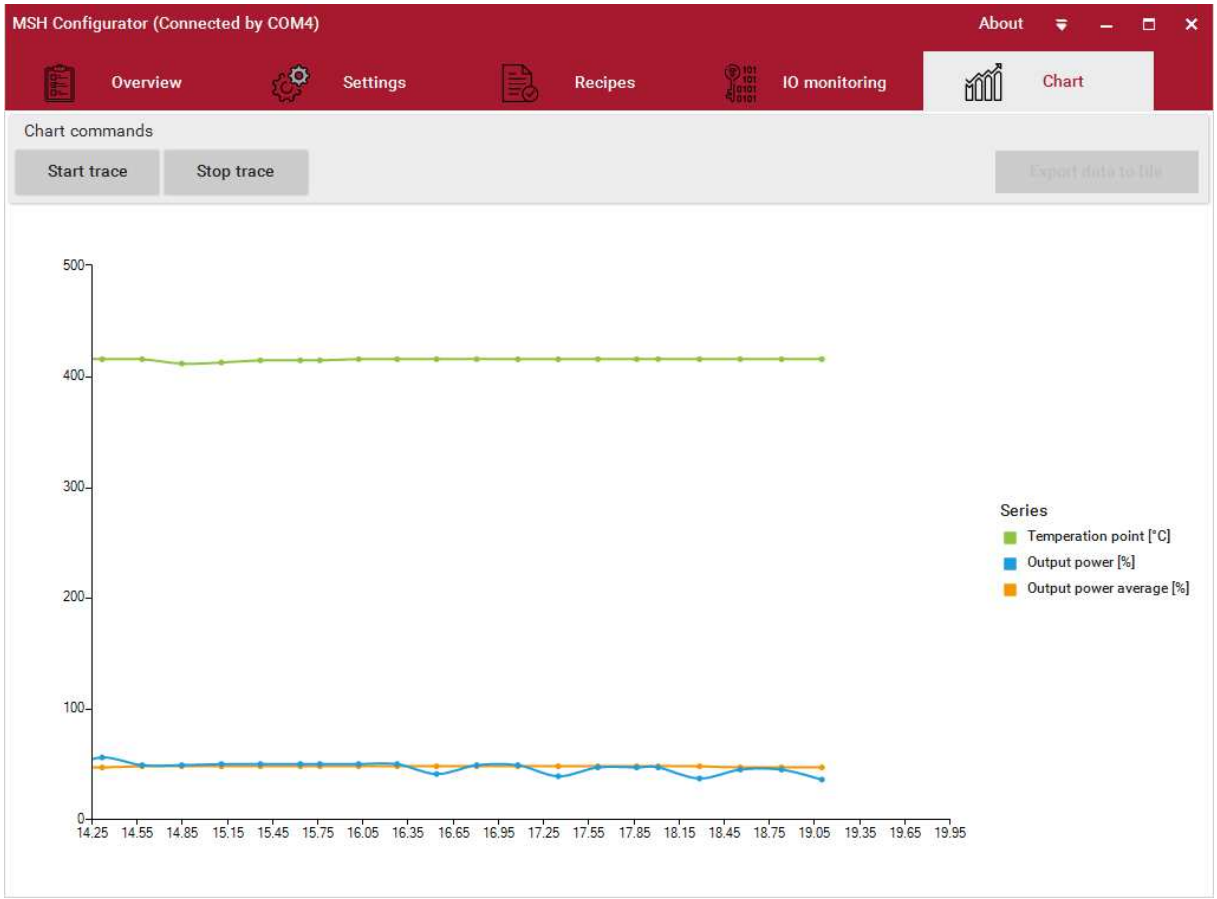
The last following page called “Chart” allows to create a chart with the temperature of the iron (measured), the calculated output power and the output power average.

To start charting, the button “Start trace” has to be clicked. The chart will clear all previous data and add all new values received from the MSH150 soldering head. The charting will stop after the “Stop trace” button is clicked.

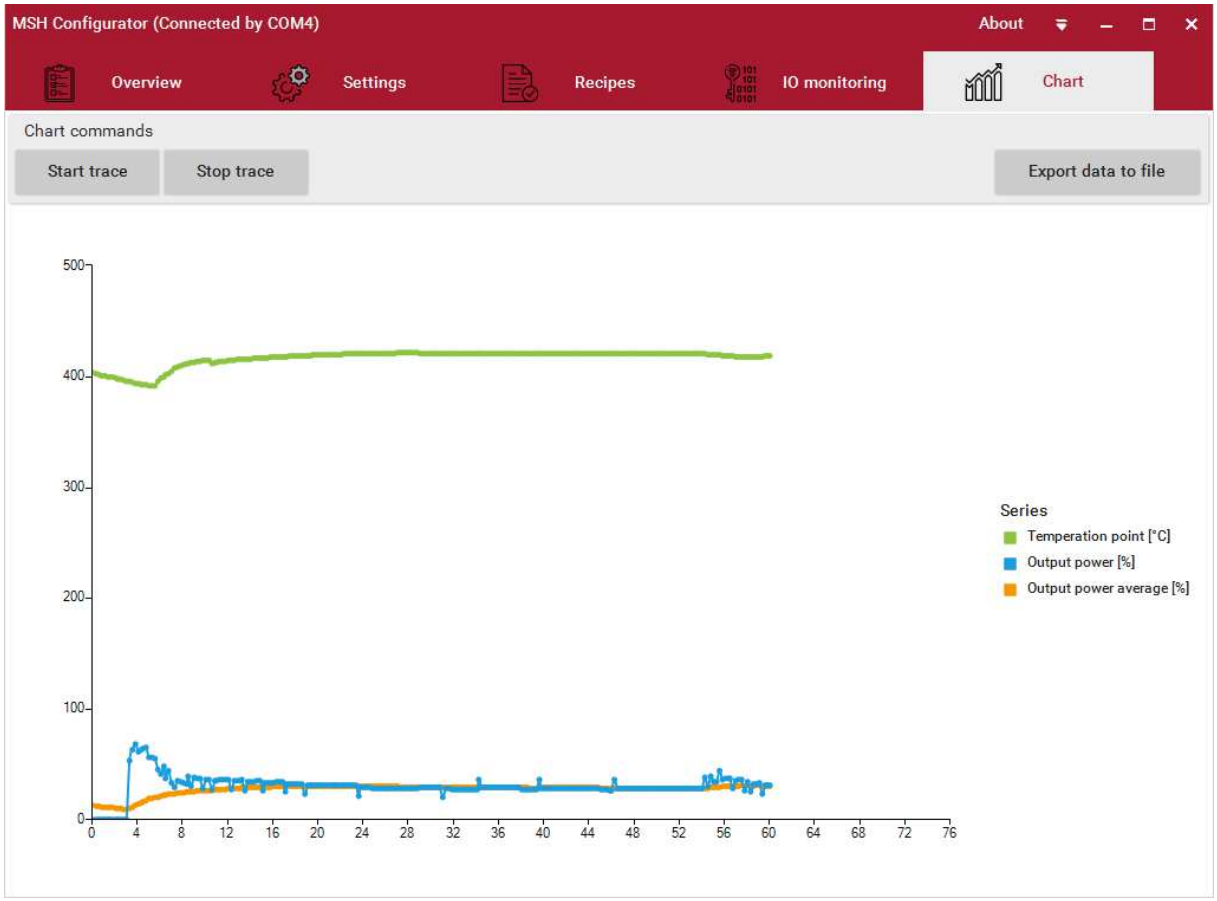
The zoom in/out can be done by clicking on the “CTRL” keyboard button and using the mouse scroll.

When a chart is stopped, a CSV file can be exported by using the button “Export data to file”.

Here is an example of a small chart that has just started after approx. 20 seconds.



Here is another example of a chart with values after one minute.



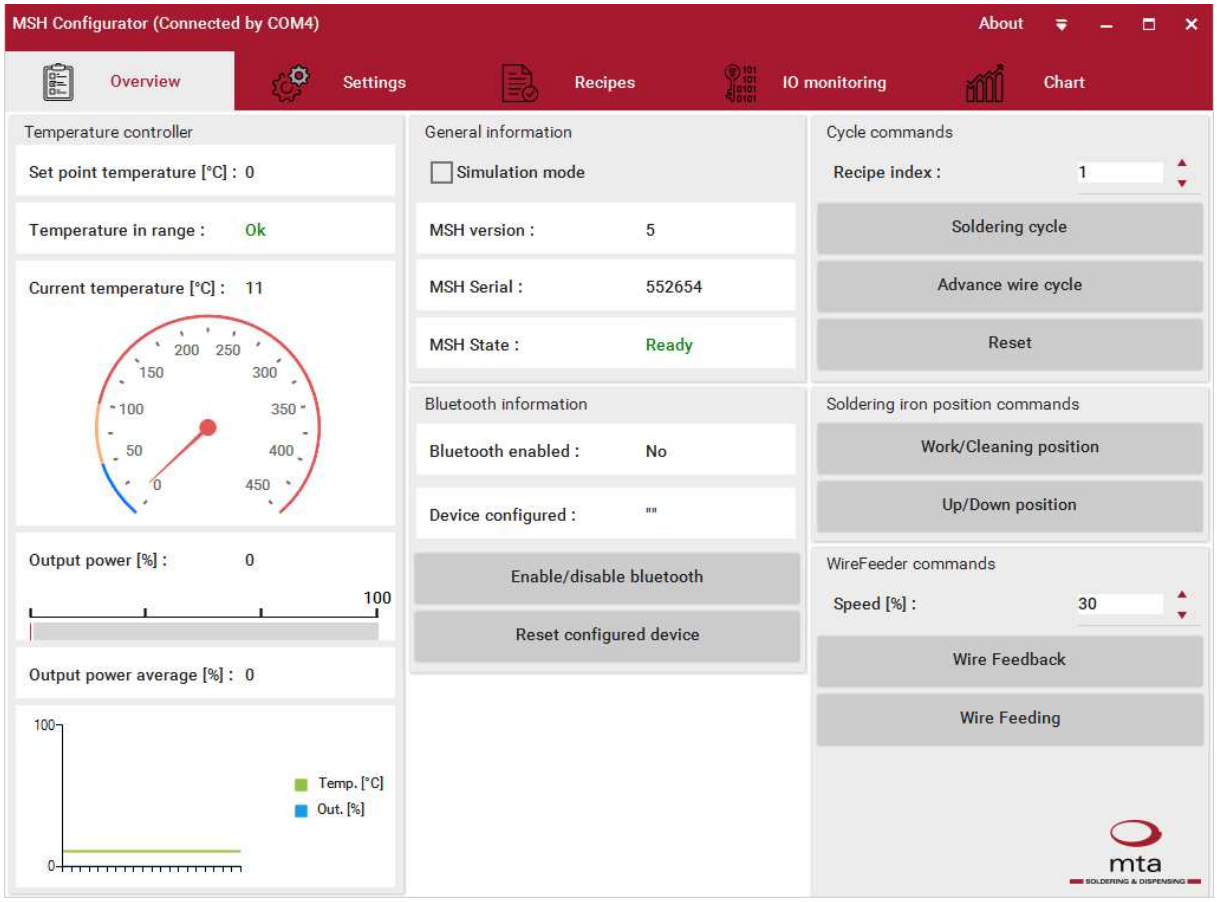
2.5 Bluetooth configuration

2.5.1 Introduction

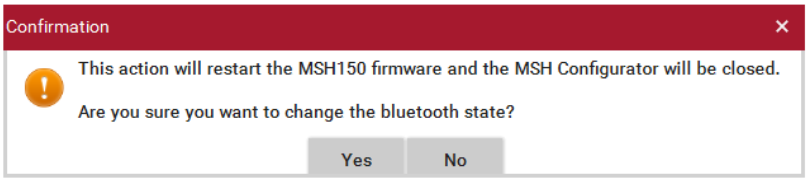
The MSH150 soldering head has a special radio chip which allows Bluetooth connection for communication (recommended for monitoring only). For security reasons, this communication is disabled by default and the Bluetooth of the MSH150 soldering head is not visible. The next chapter explains how to enable the Bluetooth and how to configure the device that will be connected.

2.5.2 Configuration and pairing a device

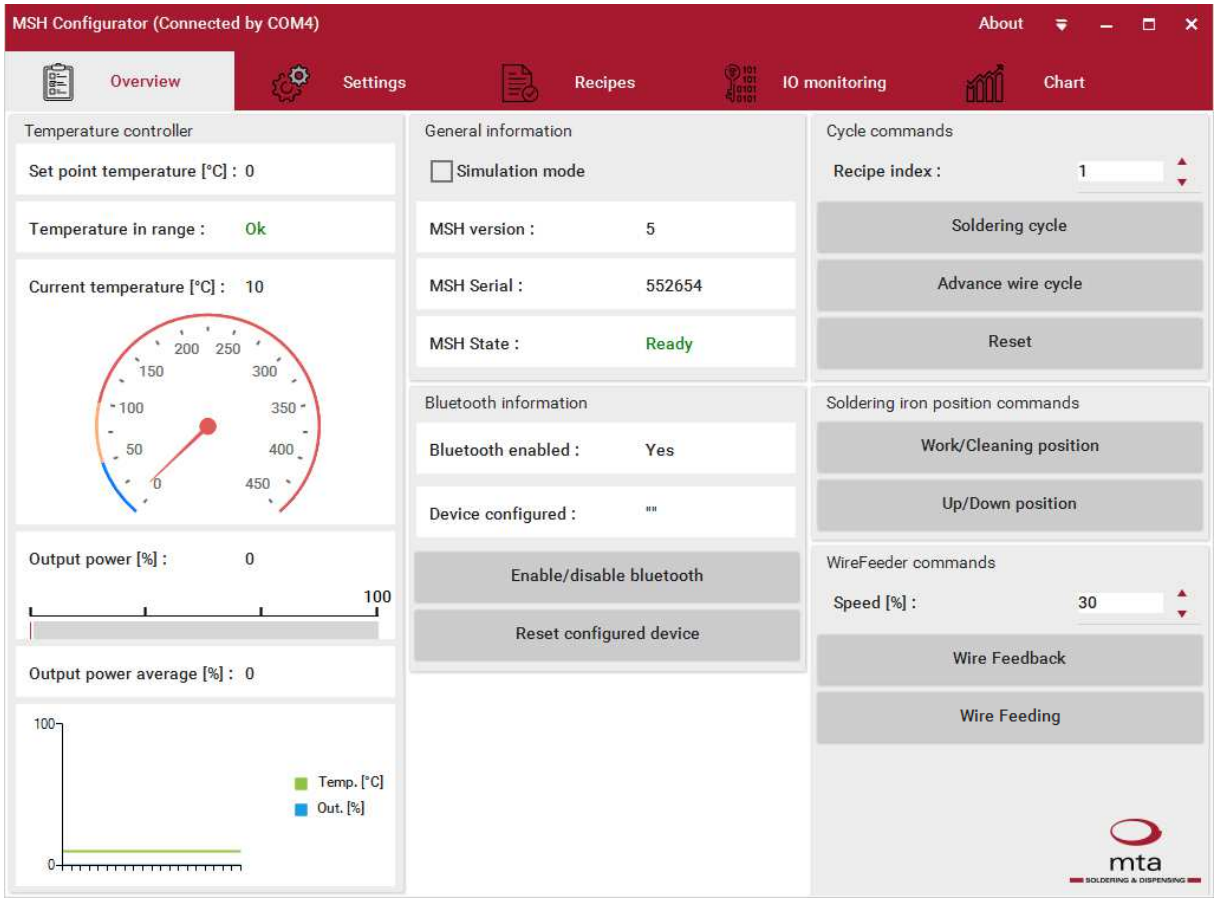
To enable the Bluetooth, an RS232 connection has to be used first.



Once connected to the MSH150 soldering head, the Bluetooth can be enabled by clicking on “Enable/disable Bluetooth” under the “Bluetooth information” group box. This function requires to restart the MSH150 soldering head

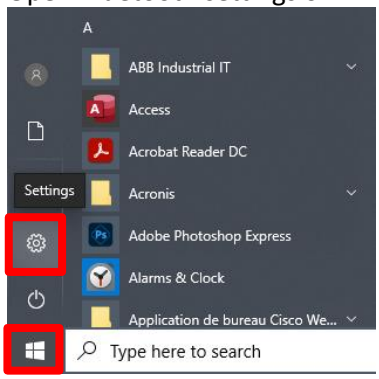


Once the MSH150 soldering head has restarted, the Bluetooth flag has to be to "**Yes**" but without inserting any name in "Device configured".

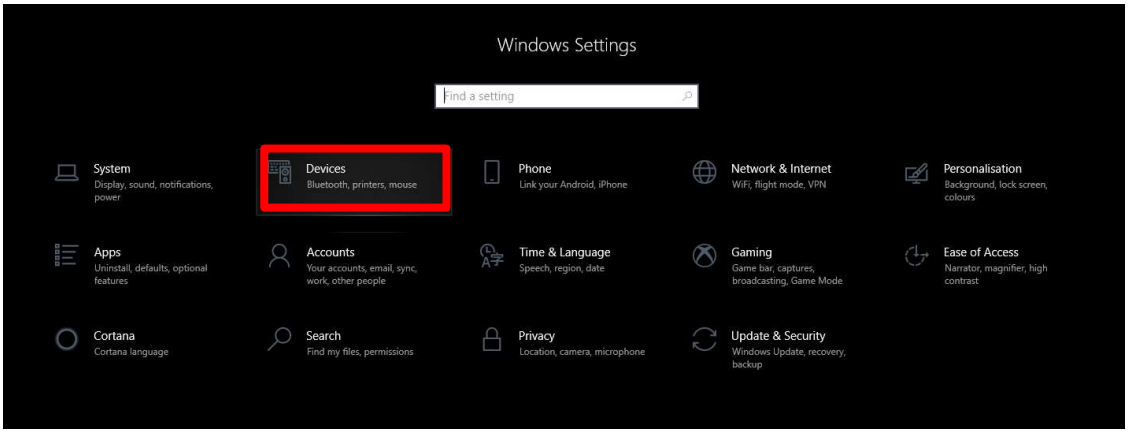


The MSH150 soldering head is now ready to be connected and to communicate via Bluetooth. The PC that will be used with Bluetooth has to be paired with the MSH150 soldering head. The following eight steps have to be carried out:

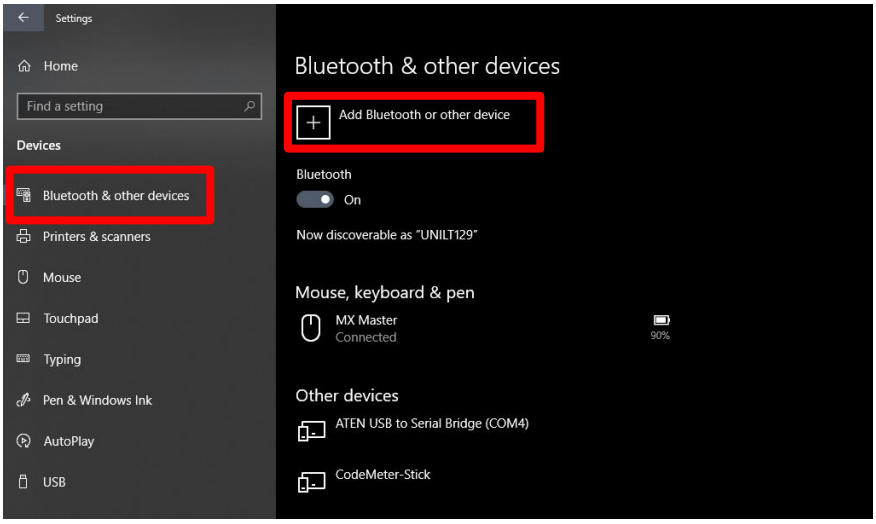
1. Open Bluetooth settings of Windows 10, by clicking on "Windows" => "Settings"



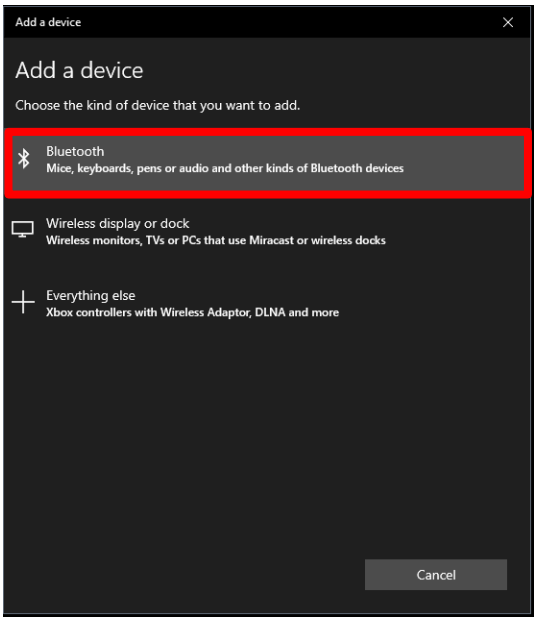
2. Go to “Devices”



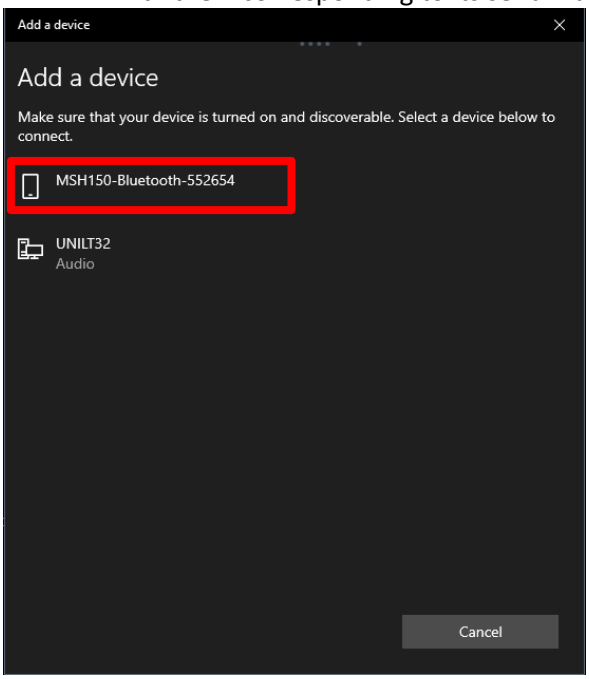
3. Go to “Bluetooth & other devices” and click on “Add Bluetooth or other devices”.



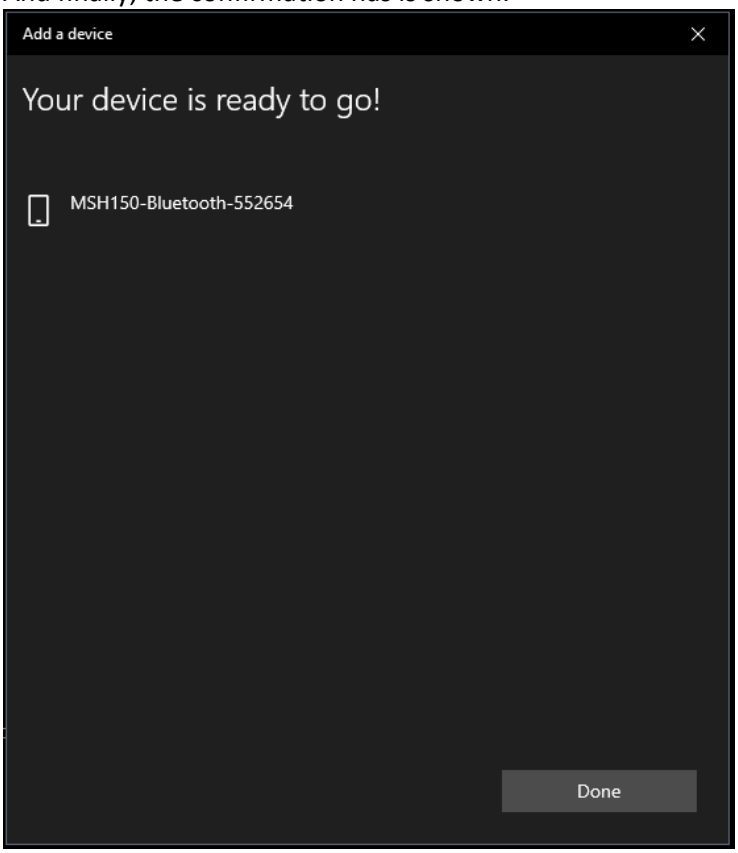
4. Select “Bluetooth”



5. Select the related MSH150 soldering head. Its name will be shown as “MSH150-Bluetooth-XXXXXX” with the X corresponding to its serial number.

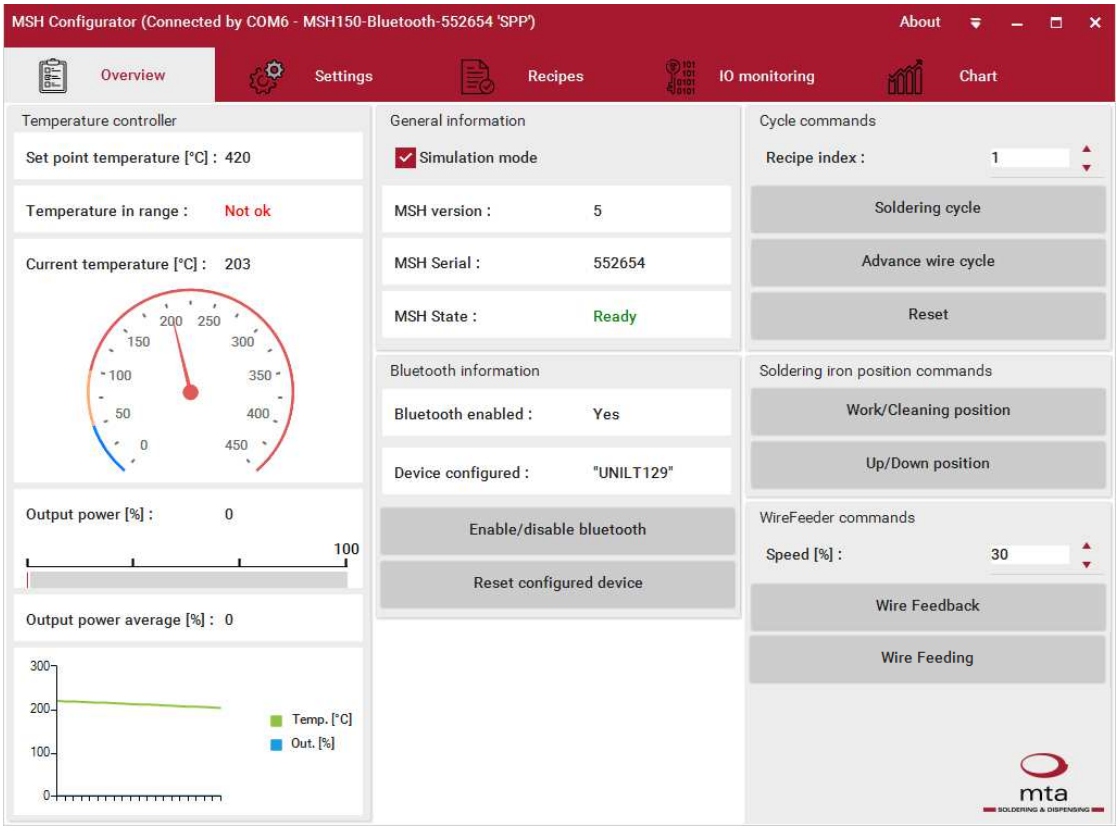


6. And finally, the confirmation has is shown.



7. Now, the MSH Configurator can be opened again, the COM port with the “Bluetooth” name has to be selected and the connection button clicked.

8. If everything is carried out correctly, the dashboard is shown and the name of the connected device is written in the “Device configured” field. The rest of the application remains the same as previously explained for the RS232 connection.



2.5.3 Limitation

Currently, only one device is allowed to communicate via Bluetooth, so it will be limited to the MSH150 soldering head. When this device is configured and even if another device attempts the Bluetooth connection (in Windows settings), the communication will not be allowed for security reasons.

2.5.1 Unpair the configured device and pair another one

If another device wants to communicate with the MSH150 soldering head via Bluetooth (and to be the only new one allowed), the MSH150 soldering head has to release the configured device. This can be done by using “Reset configured device” button. This action can be performed via Bluetooth by the device being currently configured, or via RS232 by any other device. When this action is used, the MSH150 soldering head will restart and the first device previously configured will not be able to communicate anymore. To unpair properly from Windows 10, the Bluetooth pairing can also be removed in “Bluetooth Settings” as previously shown.

3 Integration

3.1 Introduction

This chapter explains the two methods that can be used to integrate the MSH150 soldering head into a machine.

3.1.1 IO Interface

The first method “IO Interface” is the easiest one. Only few IOs, 9 inputs and 4 outputs are needed to control the head via a PLC or a robot controller.

The advantages of an IO interface are as follows:

- Easier integration
- Only few IOs needed
- Can be integrated on any PLC, robot controller, PC, etc.

The inconvenients of an IO interface are as follows:

- MSH Configurator has to be used when a recipe adjustment is needed (for example, to change the “Melting time” of the recipe 5)
- When the MSH150 soldering head is in error, no details are provided except for a Boolean flag (error output) showing that there is an error

3.1.2 RS232 Interface

The second method “RS232 Interface” is the most flexible one.

The advantages of an RS232 interface are as follows:

- Recipe settings can be adjusted directly via the RS232 interface
- Detailed diagnostic is provided when there is an error
- Some data can be logged in live execution (iron temperature for example)
- And many others

In conclusion, whatever can be done via MSH Configurator can also be done via RS232 interface.

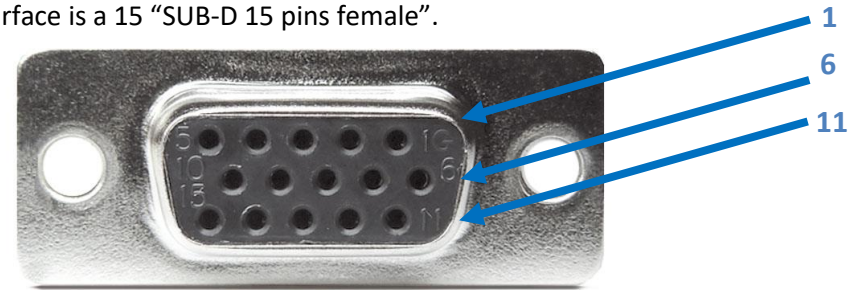
The only inconvenient of an RS232 interface is as follows:

- Integration is more complex than IO due to the syntax of respect for communication

3.2 IO Interface

3.2.1 Connector

The connector of IO interface is a 15 “SUB-D 15 pins female”.



3.2.2 Inputs

N°	Name	Role
1	**Soldering cycle**	Start a soldering cycle with recipe defined by inputs « Recipe bit ».
2	**Reset**	Reinitialize the soldering head in its initial position and acknowledge errors.
3	**Simulation mode**	Disable the heating of soldering iron regardless of the temperature defined in the recipe currently used. In this mode, it is however possible to start a soldering cycle without heating the iron and wire feeder to simulate the process.
4	**Up/down position**	Up/down position toggle of the soldering iron.
5	**Soldering/cleaning position**	Soldering/cleaning position toggle of the soldering iron.
6	**Advance wire**	When this input is at true, the wire start feeding in at speed fixed to 30%. This input has to be false to stop feeding.
7	**Recipe bit 0**	Bit 0 of recipe to load. ⇨ Only read at « Soldering cycle » or « Reset ».
8	**Recipe bit 1**	Bit 1 of recipe to load. ⇨ Only read at « Soldering cycle » or « Reset ».
9	**Recipe bit 2**	Bit 2 of recipe to load. ⇨ Only read at « Soldering cycle » or « Reset ».

Recipe bits coding example:
If the input 7 and 8 are set to TRUE (24 VDC), the 9 to false (0 VDC) and then a soldering cycle is executed with the input 1 (24 VDC), the recipe number 3 will be used for soldering cycle.

Because: $1*2^0+1*2^1+0*2^2 = 3$

Recipes from 1 to 7 can be selected via these input bits. But the recipe code 0 has no effect. This means that if code 0 is set when executing a soldering cycle or a reset, no effect will be applied to the current recipe settings and the previous settings are retained.

Note: The recipe bit inputs must be maintained at the time of the cycle execution via input 1 or reset via input 2.

3.2.3 Outputs

N°	Name	Role
11	**Ready**	Signal indicating that the MSH150 soldering head is in its initial position and waiting to execute a soldering cycle. ⇨ No cycle already in progress, no error, initial position (soldering and up position).
12	**Busy**	Signal indicating that the MSH150 soldering head is busy. ⇨ Cycle in progress (reset, soldering, wire feeding, moving in cleaning position).
13	**Error**	Flag indicating that the MSH150 soldering head is in error. A reset cycle is required to acknowledge errors. ⇨ At least one active error.
14	**Cleaning position**	Signal indicating that the MSH150 soldering head is in cleaning position. ⇨ No cycle in progress, no error, cleaning position (cleaning and down position).

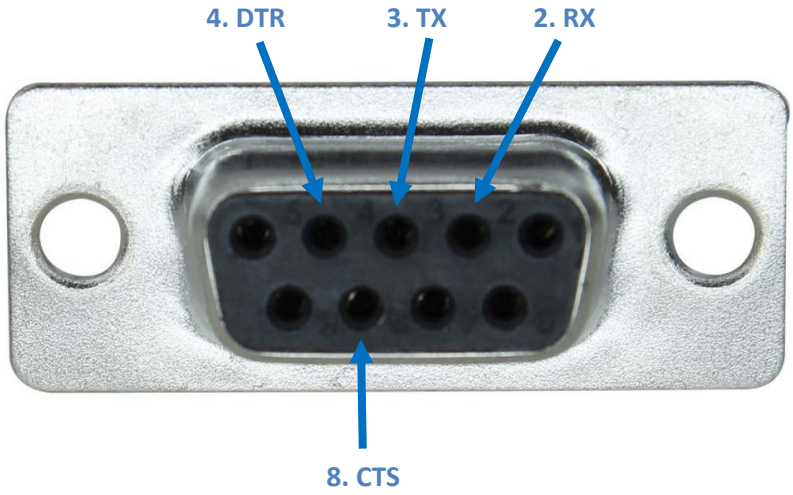
3.2.4 Power

N°	Name	Role
10	**+24VDC**	Same 24VDC as logic 24V provided by the customer.
15	**GND**	Same GND as logic GND provided by the customer.

3.3 RS232 interface

3.3.1 Connector

The connector of the RS232 connection is the standard “SUB-D 9 pins female” with the following connector pinout, where TX and RX are expressed for the master i.e. the PC/PLC that will be connected to the MSH150 soldering head.



3.3.1 Configurations

The parameters of the RS232 connection are as follows:

- Baud rate: 115’200 bit/s
- Data bits: 8 bits
- Parity None
- Stop bit: 1 bit

3.3.2 Communication principles

- The messages exchanged between the MSH150 soldering head and the master device are encoded in "*string*".
- Most of the time, the MSH150 soldering head will answer after a command is sent from the Master. Except in some cases (starting or log data mode), where it will start by "+" char.
- The end of the command must always end by a <CR> (carriage return) character.
- Answers from the MSH150 soldering head always start by the command previously sent, contain the asked value and finish by an acknowledge character "a" (before the <CR>).
- Command names can be made up at least of two letters (2 chars), or of two letters separated by two numbers (4 chars). Example: "Iv" or "C01X".
- There are four types of commands
    - **Action without parameter** => Example: Burn parameters. Action to save parameters (previously written with "Set parameter") as persistent in EEPROM.
    - **Action with parameter** => Example: Start cycle. Action to start a cycle that can be "soldering", "reset", "wire feeder" depending on the parameter.
    - **Get parameter** => Example: Get current temperature.
    - **Set parameter** => Example: Set Kp factor.

3.3.3 Message structure

The sent and received messages are structured as follows:

	Cmd name	Value	Ack. Char	End char
	Variable	*Variable*	*Constant*	*Constant*
	[string]	[string] / [int] / [decimal]	"a"	<CR>
→ Send action	X			X
← Receive action	X		X	X
→ Send action with parameter	X	X		X
← Receive action with parameter	X	X	X	X
→ Send get	X			X
← Receive get	X	X	X	X
→ Send set/reset	X	X		X
← Receive set	X	X	X	X

3.3.4 RS232 Messages

All messages that can be sent to the MSH150 soldering head are shown below. All of them are detailed with: an answer example that will be received, the value type if applicable and a comment.

3.3.4.1. Information

Command	Send	Receive	Value type	Comment
Get software version	Iv<CR>	Iv5.00a<CR>	32bit double, 2 decimals	Software version = V5.00
Get MSH serial number	Ix<CR>	Ix123456a<CR>	32bit long	Serial number = 132456 (6 digits)
Get Temperature Defined	Is<CR>	Is400a<CR>	16bit int	Temperature defined = 400°C
Get Current Temperature	Tg<CR>	Tg200a<CR>	16bit int	Temp at 200°C
Get Flag Temperature	Tf<CR>	Tf0a or Tf1a<CR>	16bit int	Temperature in tolerance or not
Get Output	Tw<CR>	Tw50a<CR>	16bit int	50 % on Output CMD
Get Output Average	Tv<CR>	Tv25a<CR>	16bit int	25 % Output CMD Average

3.3.4.2. Global settings

Command	Send	Receive	Value type	Comment
Set Tolerance %	TT10<CR>	TT10a<CR>	16bit int	Set Tolerance at +/- 10%
Get Tolerance %	Tt<CR>	Tt20a<CR>	16bit int	Tolerance at +/- 20%
Set Offset	TO-2<CR>	TO-2a<CR>	16bit int	Set Offset of -2°C
Get Offset	To<CR>	To4a<CR>	16bit int	Offset of 2°C
Set Stand-by time	TY5<CR>	TY5a<CR>	16bit int	Set Stand-by time at 5min ⇨ 0 = disabled
Get Stand-by time	Ty<CR>	Ty2a<CR>	16bit int	Stand-by time at 2min
Set Stand-by temperature	TC200<CR>	TC200a<CR>	16bit int	Set Stand-by temp. at 200°C
Get Stand-by temperature	Tc<CR>	TC100a<CR>	16bit int	Stand-by temp. at 100°C
Set Sample Time	TM1000<CR>	TM1000a<CR>	16bit int	Set Sample Time at 1 sec
Get Sample Time	Tm<CR>	Tm500a<CR>	16bit int	Sample Time at 0.5 sec
Set SO	TQ2<CR>	TQ2a<CR>	16bit int	Set SO = 2
Get SO	Tq<CR>	Tq3a<CR>	16bit int	SO = 3
Set KP	TP2<CR>	TP2a<CR>	16bit int	Set KP = 2

Get KP	Tp<CR>	Tp3a<CR>	16bit int	KP = 3
Set KI	TI1<CR>	TI1a<CR>	16bit int	Set KI = 1
Get KI	Ti<CR>	Ti3.5a<CR>	16bit int	KI = 3.5
Set KD	TD8<CR>	TD8a<CR>	16bit int	Set KD = 8
Get KD	Td<CR>	Td10a<CR>	16bit int	KD = 10
Set IL	TL128<CR>	TL128a<CR>	16bit int	Set IL = 128
Get IL	Tl<CR>	Tl128a<CR>	16bit int	IL = 128
Set Output Average High limit	TJ28<CR>	TJ28a<CR>	16bit int	Set High Limit = 28 %
Get Output Average High limit	Tj<CR>	Tj28a<CR>	16bit int	High Limit = 28 %
Set Output Average Low limit	TK64<CR>	TK64a<CR>	16bit int	Set Low Limit = 64 %
Get Output Average Low limit	Tk<CR>	Tk64a<CR>	16bit int	Low Limit = 64 %
Set Output Time Constant (ms)	TZ30<CR>	TZ30a<CR>	16bit int	Set Time Constant = 30 s
Get Output Time Constant (ms)	Tz<CR>	Tz30a<CR>	16bit int	Time Constant = 30 s
Set Output Max Output	TE95<CR>	TE95a<CR>	16bit int	Set Max Output = 95 %
Get Output Max Output	Te<CR>	Te100a<CR>	16bit int	Max Output = 100 %
Set Output Min Output	TH15<CR>	TH15a<CR>	16bit int	Set Min Output = 15 %
Get Output Min Output	Th<CR>	Th0a<CR>	16bit int	Min Output = 0 %
Set simulation mode state	TA0<CR>	TA1a or TA0a<CR>	16bit int	Set Enabled or Disabled
Get simulation mode state	Ta<CR>	Ta1a or Ta0a<CR>	16bit int	Enabled or Disable
Set Brake Mode	TS1<CR>	TS1a<CR>	16bit int	Set Brake Mode Enable
Get Brake Mode	Ts<CR>	Ts0a<CR>	16bit int	Brake Mode Disable
Set Offset Feeding Speed	TU10<CR>	TU10a<CR>	16bit int	Set Offset feeding Speed 10%
Get Offset Feeding Speed	Tu<CR>	Tu5a<CR>	16bit int	Offset feeding Speed 5%
Set Offset Feedback Speed	TN8<CR>	TN8a<CR>	16bit int	Set Offset feedback Speed 8%
Get Offset Feedback Speed	Tn<CR>	Tn7a<CR>	16bit int	Offset feedback Speed 7%
Action Burn Parameters	TB<CR>	TBa<CR>	N/A	Save all parameters in EEPROM
Action Reset Parameters	TR<CR>	TRa<CR>	N/A	Reset all parameters by default

3.3.4.3. Recipe parameters

Command	Send	Receive	Value type	Comment
				C**XX => XX** = Recipe number
Set Temperature point	C01H200<CR>	C01H200a<CR>	16bit int	Set Temperature point at 200°C
Get Temperature point	C01h<CR>	C01h400a<CR>	16bit int	Temperature point at 400°C
Set Feeding speed	C01G100<CR>	C01G100a<CR>	16bit int	Set Feeding Speed 100%
Get Feeding speed	C01g<CR>	C01g50a<CR>	16bit int	Feeding Speed 50%
Set Feedback Speed	C01T80<CR>	C01T80a<CR>	16bit int	Set Feedback Speed 80%
Get Feedback Speed	C01t<CR>	C01t70a<CR>	16bit int	Feedback Speed 70%
Set Preheating Time	C01D20<CR>	C01D20a<CR>	16bit int	Set Preheating Time 20 ms
Get Preheating Time	C01d<CR>	C01d50a<CR>	16bit int	Preheating Time 0.05 seconds
Set Feeding Time	C01E2000<CR>	C01E2000a<CR>	16bit int	Set Feeding Time 2 seconds
Get Feeding Time	C01e<CR>	C01e500a<CR>	16bit int	Feeding Time 0.5 seconds
Set Feedback Time	C01V2000<CR>	C01V2000a<CR>	16bit int	Set Feedback Time 2 seconds
Get Feedback Time	C01v<CR>	C01v500a<CR>	16bit int	Feedback Time 0.5 seconds
Set Melting Time	C01W300<CR>	C01W300a<CR>	16bit int	Set Melting Time 0.3 seconds
Get Melting Time	C01w<CR>	C01w500a<CR>	16bit int	Melting Time 0.3 seconds
Set Cooling Time	C01N20<CR>	C01N20a<CR>	16bit int	Set Cooling Time 20 ms
Get Cooling Time	C01n<CR>	C01n50a<CR>	16bit int	Cooling Time 0.05 seconds
Set Move iron up	C01U1<CR>	C01U1a<CR>	16bit int	Enable Move iron up
Get Move iron up	C01u<CR>	C01u0a<CR>	16bit int	Move iron up disabled
Set Move iron down	C01K0<CR>	C01K0a<CR>	16bit int	Disable Move iron down
Get Move iron down	C01k<CR>	C01k1a<CR>	16bit int	Move iron down enabled

3.3.4.4. Start and poll cycles

Command	Send	Receive	Value type	Comment
				C**XX => XX** = Recipe used
Action param. Start Cycle	C01X00<CR>	C01X00a<CR>	16bit int	Start Cycle 00: Soldering 01: Reset 02: Cleaning 03: Advance wire cycle Nothing: RESET
Get Cycle	C01x<CR>	C01x100a<CR>	16bit int	Cycle 100: In Progress 0: Ended without error and ready position 0xx: Ended with error 998: Ended without error and cleaning position 999: Ended without error and unknown position

3.3.4.5. Wire feeder manual mode

Command	Send	Receive	Value type	Comment
				C00 constant
Action Brake CMO 1	C00I<CR>	C00Ia<CR>	N/A	Brake Command CMO 1
Action Brake CMO 2	C00J<CR>	C00Ja<CR>	N/A	Brake Command CMO 2
Action Stop CMO 1	C00L<CR>	C00La<CR>	N/A	Stop Command CMO 1
Action Stop CMO 2	C00M<CR>	C00Ma<CR>	N/A	Stop Command CMO 2
Action param. Start CMO 1	C00O100<CR>	C00O100a<CR>	16bit int	On Command CMO 1 100% CW
Action param. Start CMO 2	C00P50<CR>	C00P50a<CR>	16bit int	On Command CMO 2 50% CCW
Set Wheel Count 1	C00Y3<CR>	C00Y3a<CR>	16bit int	Set Value Wheel 1 Counter to 3
Get Wheel Count 1	C00y<CR>	C00y3a<CR>	16bit int	Get Value Wheel 1 Counter
Set Wheel Count 2	C00Z3<CR>	C00Z3a<CR>	16bit int	Set Value Wheel 2 Counter to 3
Get Wheel Count 2	C00z<CR>	C00z3a<CR>	16bit int	Get Value Wheel 2 Counter

3.3.4.1. I/0 Commands

Command	Send	Receive	Value type	Comment
Set Digital Output Process	XH08<CR>	XH08a<CR>	16bit int	Set Digital Output 08
Reset Digital Output Process	XL10<CR>	XL10a<CR>	16bit int	Reset Digital Output 10
Get Digital Output Process	XO10<CR>	XO100a<CR>	16bit int	Get Digital Output 10 is LOW
Get Digital Input Process	XI03<CR>	XI031a<CR>	16bit int	Get Digital Input 03 is HIGH
Set Digital Output Interface	Xh08<CR>	Xh08a<CR>	16bit int	Set Digital Output 08
Reset Digital Output Interface	Xl10<CR>	Xl10a<CR>	16bit int	Reset Digital Output 10
Get Digital Output Interface	Xo10<CR>	Xo100a<CR>	16bit int	Get Digital Output 10 is LOW
Get Digital Input Interface	Xi03<CR>	Xi031a<CR>	16bit int	Get Digital Input 03 is HIGH

3.3.4.2. Bluetooth commands

Command	Send	Receive	Value type	Comment
Set Bluetooth radio state	BS1<CR> BS0<CR>	BS1a<CR> BS0a<CR>	16bit int	Enable/disable Bluetooth radio *MSH150 soldering head will restart after calling this function!*
Get Bluetooth radio state	Bs<CR>	Bs1a<CR>	16bit int	Get Bluetooth radio state
Get configured peer name	Bp<CR>	Bp”MyPC456”a<CR>	String with “”	Get configured peer name
Action Reset Bluetooth peers	BR<CR>	BRa<CR>	N/A	Reset Bluetooth radio peers *MSH150 soldering head will restart after calling this function!*

3.3.4.3. Miscellaneous commands

These debug modes can be used to log data without needing to “poll” (by get cmd) temperature or wire feeder variables.

Warning: These debug modes are only available through RS232!

Command	Send	Receive	Value type	Comment
				C00 constant
Action WireFeeder Debug Enable	C00F<CR>	C00Fa<CR> +WFA42;WFB0; +WFA12;WFB0; +WFA0;WFB0; …	N/A 16bit int	Debug on (trace) WFA = Wire feeder A WFB = Wire feeder B (if exists) …Continuously until disable
Action WireFeeder Debug Disable	C00S<CR>	C00Sa<CR>	N/A	Debug off (trace)
Action Enable Temperature debug	TX<CR>	TXa<CR> +TMP380;OUT12;OAV5<CR> +TMP378;OUT16;OAV6<CR> +TMP381;OUT5;OAV5<CR> …	N/A 16bit int	Debug temperature ON TMP = Temperature OUT = Out power OAV = Out average power …Continuously until disable
Action Disable Temperature debug	Tx<CR>	Txa<CR>	N/A	Debug temperature OFF

3.3.5 List of alarms

Alarm number	Alarm signification	Alarm resolution
3	Timeout when iron moved to horizontal soldering and up positions.	Check if the iron can move horizontally and vertically correctly and if sensors are okay. MSH Configurator can be used to force actuator positions and check sensor values.
4	Timeout when waiting proper temperature.	Check if the iron can heat by using MSH Configurator software.
6	Timeout when iron moved down.	Check if the iron can move vertically correctly and if sensor is okay. MSH Configurator can be used to force actuator position and check sensor value.
8	Timeout when pre-heating time.	The pre-heating time is maybe too long.
9	Timeout when waiting end of wire feeding.	The feeding time is maybe too long.
10	Timeout when waiting melting time.	The melting time is maybe too long.
11	Timeout when waiting end of wire feedback.	The feedback time is maybe too long.
12	Timeout when waiting end of cooling time.	The cooling time is maybe too long.
51	Timeout when iron moved to horizontal cleaning position.	Check if the iron can move horizontally correctly and if sensor is okay. MSH Configurator can be used to force actuator position and check sensor value.
61	No wire feeder present.	Insert a new tin spool or check if the sensor works and if it is correctly wired.