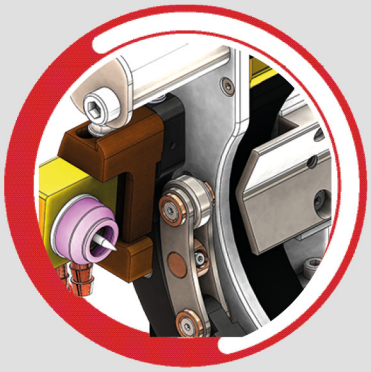
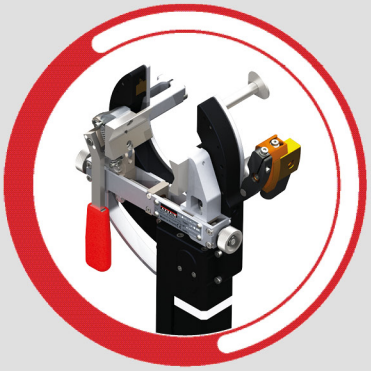
AXXAIR

INNOVATIVE ORBITAL SOLUTIONS

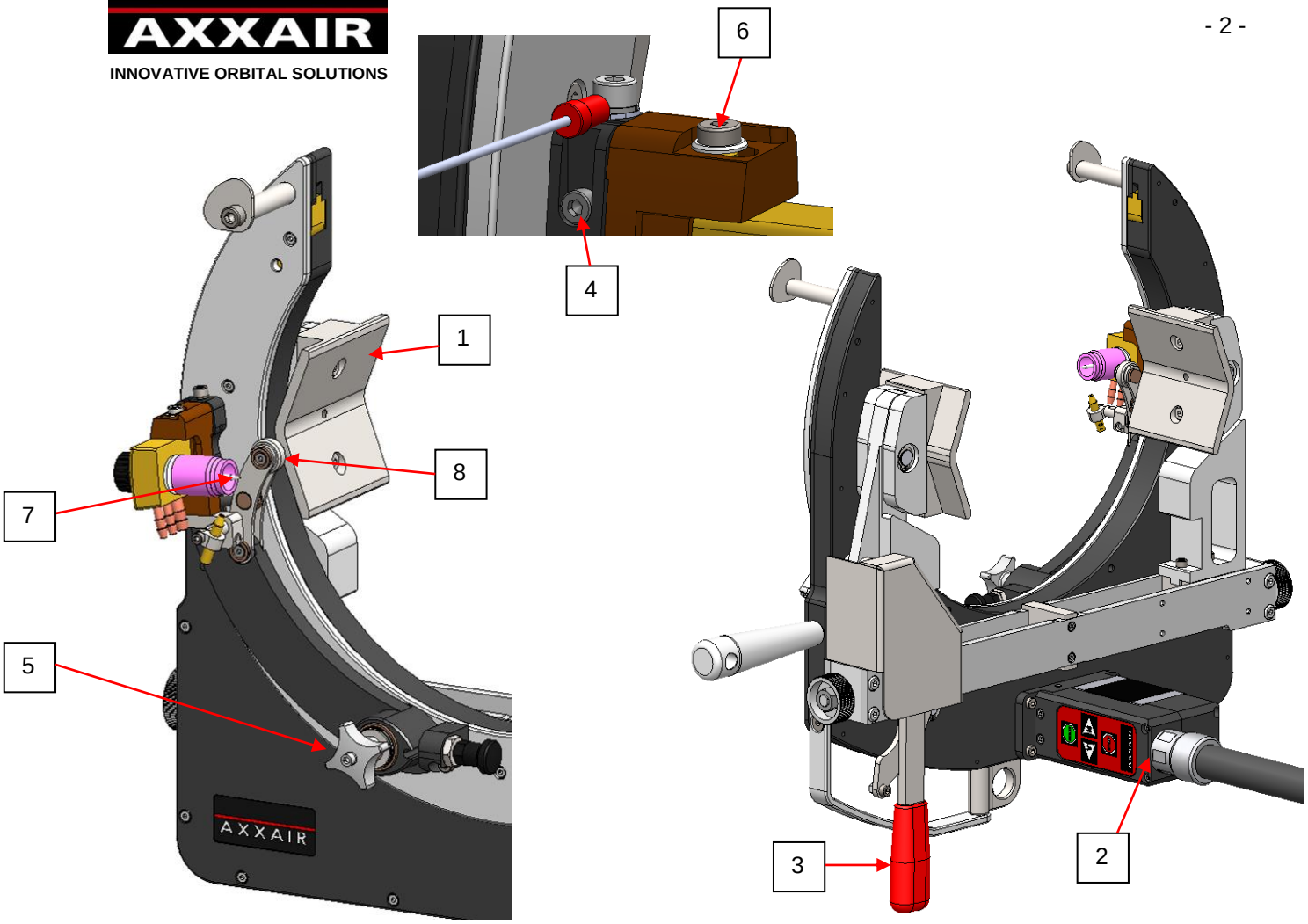
ORBITAL WELDING
OPEN HEAD SATO-220E41 MANUAL





WELDING RANGE

ø 38 - 220 mm
(ø 1.5" - 8.265")



REP	FRANÇAIS	ENGLISH	DEUTSCH	ESPANOL	ITALIANO	PORTUGUES
1	Mors de serrage en acier inoxydable	Stainless steel clamp	Spannbacke aus Edelstahl	Mordaza de apriete de acero inoxidable	Morsa di serraggio in acciaio inossidabile	Mandíbula em Aço Inox
2	Moteur électrique d'avance	Electric feed motor	Elektrischer Vorschubmotor	Motor eléctrico de avance	Motore elettrico di avanzamento	Motor de avanço elétrico
3	Poignée de serrage des mors	Clamping jaw handle	Einstellgriff Spannbacken	Empuñadura de apriete de mordazas	Impugnatura di serraggio delle morse	Alavanca das mandíbulas
4	Réglage du bras en fonction du diamètre à souder	Torch arm weld diameter control	Einstellung des Arms für zu schweißenden Durchmesser	Ajuste del brazo en función del diámetro que hay que soldar	Regolazione del braccio in base al diametro da saldare	Controle do diâmetro de soldagem do braço da tocha
5	Réglage axial de l'électrode	Electrode axial control	Axiale Einstellung der Elektrode	Ajuste axial del electrodo	Regolazione assiale dell'elettrodo	Controle axial do eletrodo
6	Réglage angulaire de l'électrode	Electrode angular control	Winkeleinstellung der Elektrode	Ajuste angular del electrodo	Regolazione angolare dell'elettrodo	Controle angular do eletrodo
7	Electrode diamètre 1.6 ou 2.4	1.6 or 2.4 electrode diameter	Elektrode Durchmesser 1,6 oder 2,4	Electrodo diámetro 1,6 o 2,4	Elettrodo diametro 1,6 o 2,4	Eletrodo de 1,6 ou 2,4 mm de diâmetro
8	Galet de suivi de profil	Profile track roller	Profilführrolle	Rodillo de control de perfil	Rullo di controllo profilo	Seguidor de superfície do tubo

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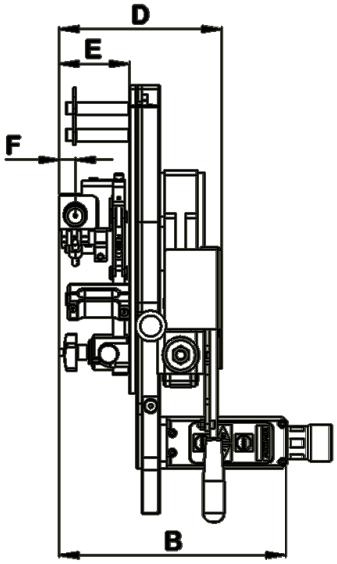
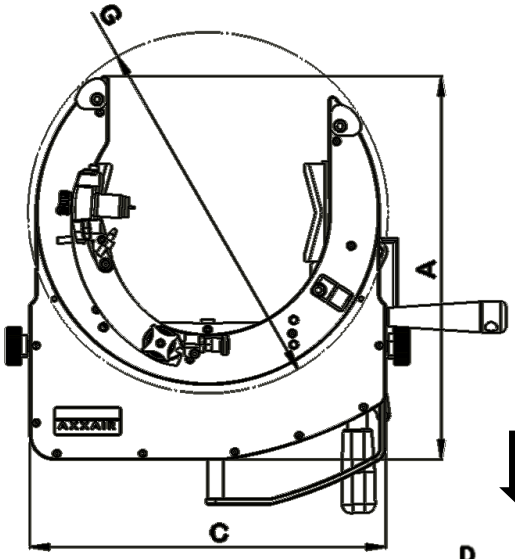
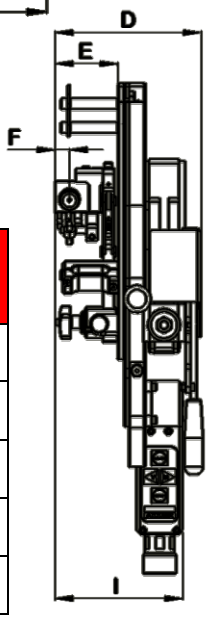
	A mm	B mm	C mm	D mm	E mm	F mm	G mm	H mm	I mm	
SATO-40	169	183 à 191	142	116 à 126	57 à 67	13	Ø140	270	113 à 121	3.8 kg
SATO-80	181	186 à 196	160	116 à 126	57 à 67	13	Ø180	279	113 à 121	4.2 kg
SATO-115	265	186 à 196	230	133 à 143	57 à 67	13	Ø224	363	113 à 121	6.7 kg
SATO-170	312	186 à 196	290	133 à 143	57 à 67	13	Ø294	410	113 à 121	8.0 kg
SATO-220	353	186 à 196	350	133 à 143	57 à 67	13	Ø350	451	113 à 121	9.4 kg

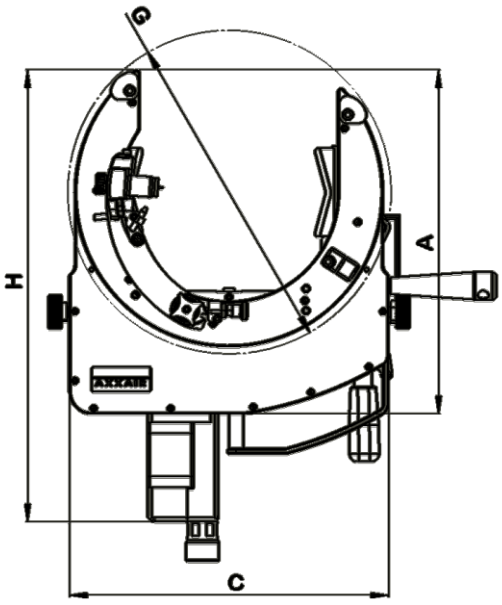




Moteur sortie renvoi d'angle

Moteur sortie droite





	Ø mini (mm)	Ø maxi (mm)
SATO-40	10	40
SATO-80	19	80
SATO-115	19	115
SATO-170	25	170
SATO-220	38	220

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User instructions:

General Safety Instructions:

<u>WARNING!</u> To avoid the risk of electric shock, injury or fire when using electrical equipment, follow the following basic safety instructions. Read and follow these instructions before using the machine. Keep these safety instructions in a safe place!

The operator should ensure his own safety and that of persons nearby when using AXXAIR welding equipment. Consult the regulations relating to operation of this type of equipment and workplace safety so that the appropriate safety measures can be taken.
Only qualified personnel may use this equipment; they must follow the operating instructions. Failure to implement these safety precautions can endanger the operator and damage the equipment.
Before using this type of equipment, the operator must be well-acquainted with turning on and operating this equipment as well as with the welding process. The operator must be aware of safety regulations in force. It is essential that the operator is aware of the location of the emergency shutoff switch.
Prior to each use, the operator must ensure that there are no personnel in the work zone and that all personnel (including the operator) present during arcing are wearing appropriate protective gear: safety goggles or protective helmet, flame-resistant clothing, protective gloves, etc. Avoid wearing loose-fitting clothing or personal accessories that can become tangled in the equipment.
There should be no draughts in the working area. A well-identified fire extinguisher must be located within easy reach of the equipment.
To avoid all risk of fire, do not leave flammable objects or products near the work station.
Before conducting maintenance operations, disconnect the electrical power supply. Maintenance of the electrical system must be performed by specially qualified and trained personnel.
DANGER. To avoid potential electrical shock that could lead to loss of life: obey all rules in force related to the installation and grounding of the equipment. Never touch live parts or electrodes with bare hands or wet gloves. Insulate yourself from the workpiece and from the ground.
Do not inhale gas and fumes emitted by the welding process.
Use ear protection or any other device to protect hearing.
WARN all nearby persons of the potential risks.
The operator must always use the recommended personal protective gear, safety goggles, gloves and flame-resistant clothing.

Warning:

Arc-welding can be dangerous for the operator as well as for all persons in the vicinity. Take all appropriate safety precautions before using the welding machine. Observe and obey the safety procedures imposed by your employer; these procedures should be based on the rules and regulations in force as well as on the manufacturer's recommendations.

<u>Electric Shock = Potential loss of life.</u>

- Install and earth the welding equipment, following the rules and regulations in force.
- Do not touch live parts. Do not touch electrodes with bare hands or wet gloves.
- Insulate yourself from the ground and from the workpiece.
- Ensure that the work position adopted is safe both for the operator and for persons nearby.

<u>Fumes and gas = Potential health hazard:</u>

- Keep your face as far away from welding fumes as possible.
- Provide ventilation and evacuation of welding fumes using a suitable device that provides a safe working environment.

<u>Light rays from the arc = These can damage your eyes and burn your skin.</u>

- Protect your eyes and skin. Use a protective visor and wear safety clothing and protective gloves.
- Protect nearby persons from injury due to welding by providing protective curtains.

In the event of a malfunction, contact qualified service personnel only.

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Contents:

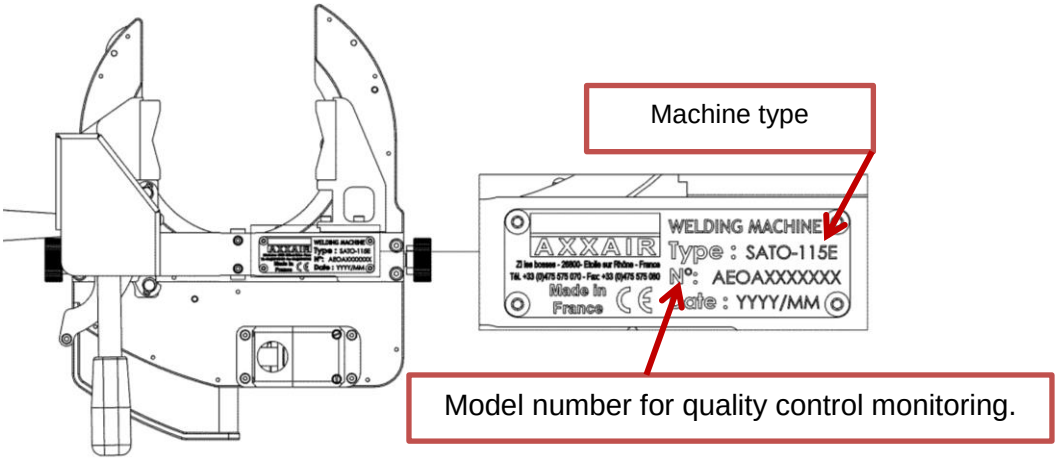
1. Declaration of conformity:

See page 78.

2. Presentation:

These machines are used for open arc TIG welding. This range of products may be used for tube-to-tube, tube-to-elbow, tube-to-ferrule and T-joint welding, as well as SMS connectors and other work pieces.
The weld heads are powered by a **SAXX** welding generator.

	SATO-40E		SATO-80E		SATO-115E		SATO-170E		SATO-220E	
	41/42	43/44	41/42	43/44	41/42	43/44	41/42	43/44	41/42	43/44
Maximum welding current for an operating factor of 100%:	200A	100A	200A	100A	200A	100A	200A	100A	200A	100A
Tube outside diameter:	6 à 40 mm		19 à 80 mm		19 à 115 mm		25 à 170 mm		38 à 220 mm	
Electrode diameters:	1.6 m ou 2.4 mm									
Cooling unit:	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Operating temperature:	Ambient temperature must be within the range of –10°C to +40°C									



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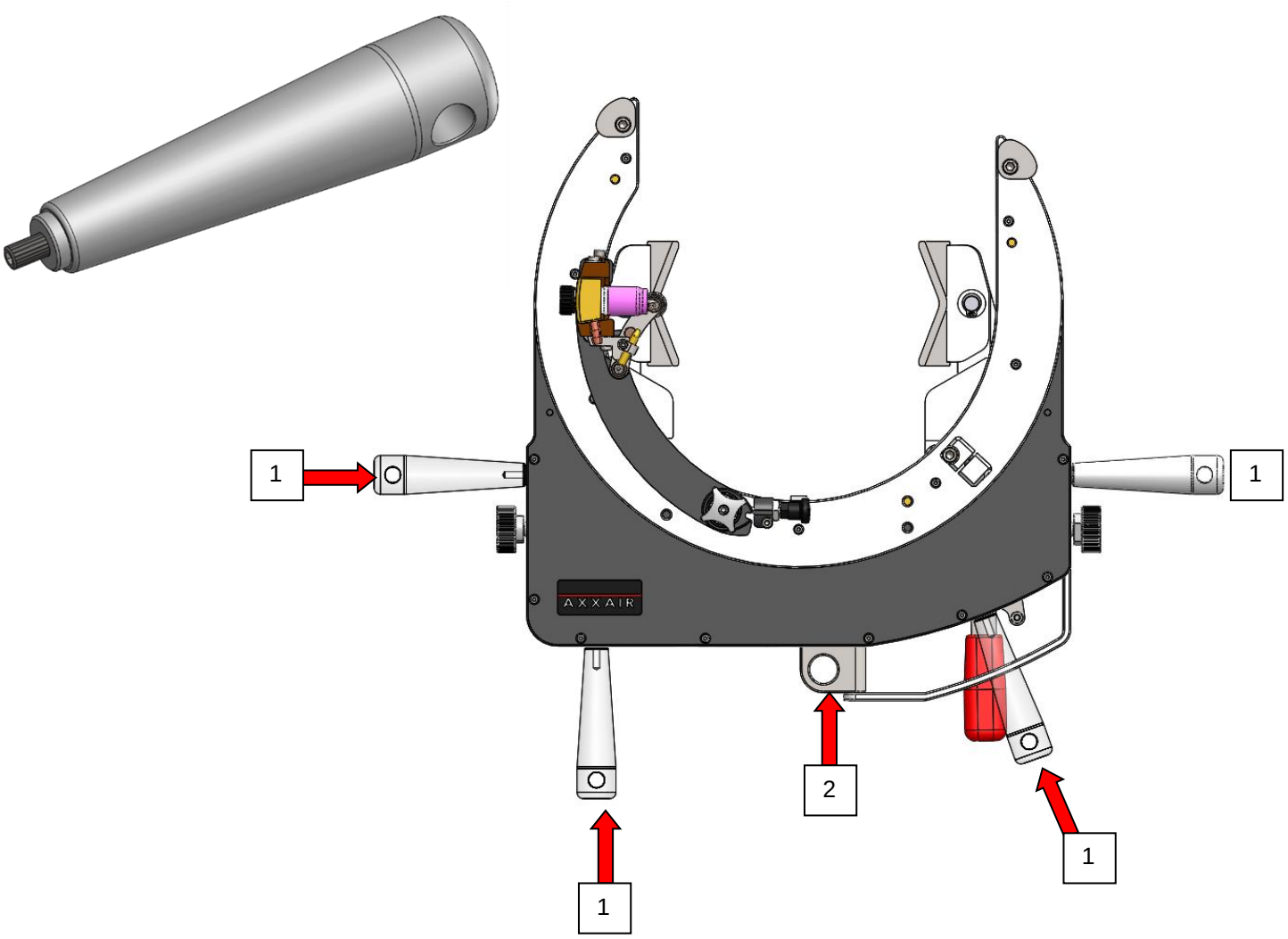
3. Machine handing and storage:

Handling:
SATO welding machines are portable and do not require any special handling.
However, care should be taken so that the torch arm and hose are not damaged when the machine is moved or transported.

1- A removable handle can be positioned in various places around the head, following the preference of the user.
2- A ring of lifting allows you to support the the head (SATO220 only).



Storage:
If the weld head is not to be used for a long time period, store the machine in its original packaging.
Before packaging, clean the weld head and empty any coolant.
Do not expose weld heads to corrosion. Place a desiccant in the storage case if needed.

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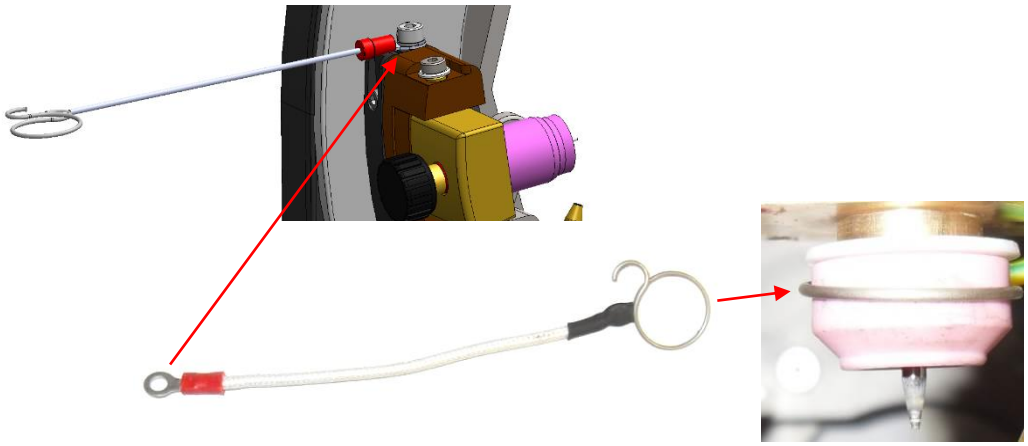
4. HF antenna:

The HF antenna helps the electric arc ignition. If the HF antenna is not well installed, it is possible that the power supply will not be able to create the electric arc. You have to put the spring on the ceramic nozzle and to fix the lug on a part linked to the ground. Pay attention that the electric arc does not ignite between the antenna and a part linked to the electrode.



5. Connecting the weld head:

Ensure that the welding station is not activated before making these connections. SATO weld heads are connected using a hose pack that includes:

- A quick-release gas hose for connection at the front of the welding station.
- Blue colour-coded (cold water) braided hose for the welding current with water coupling.
- A red hose for hot water return.
- A control cable for the feed motor.
- A power cable for the feed motor.
- An earthing cable.

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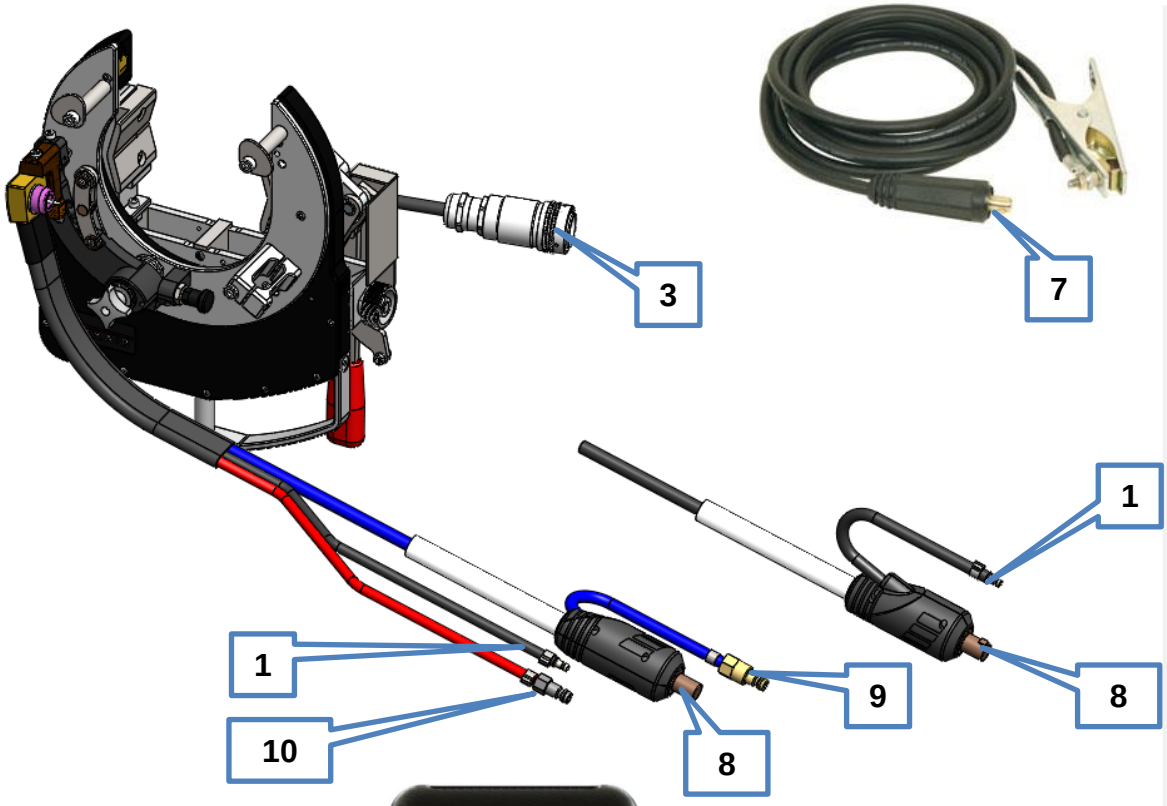

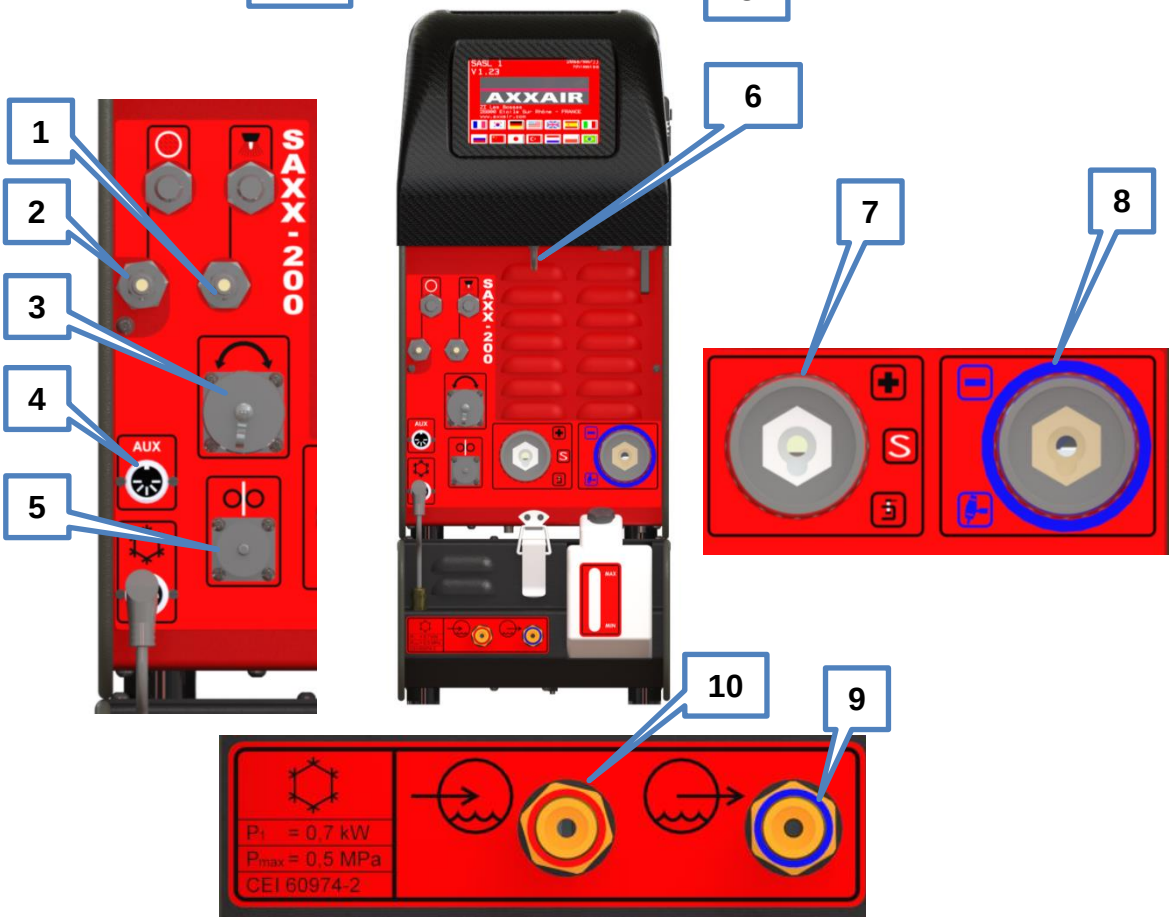

Warning: All connections must be made with the power off, i.e. with the ON/OFF switch set to OFF.

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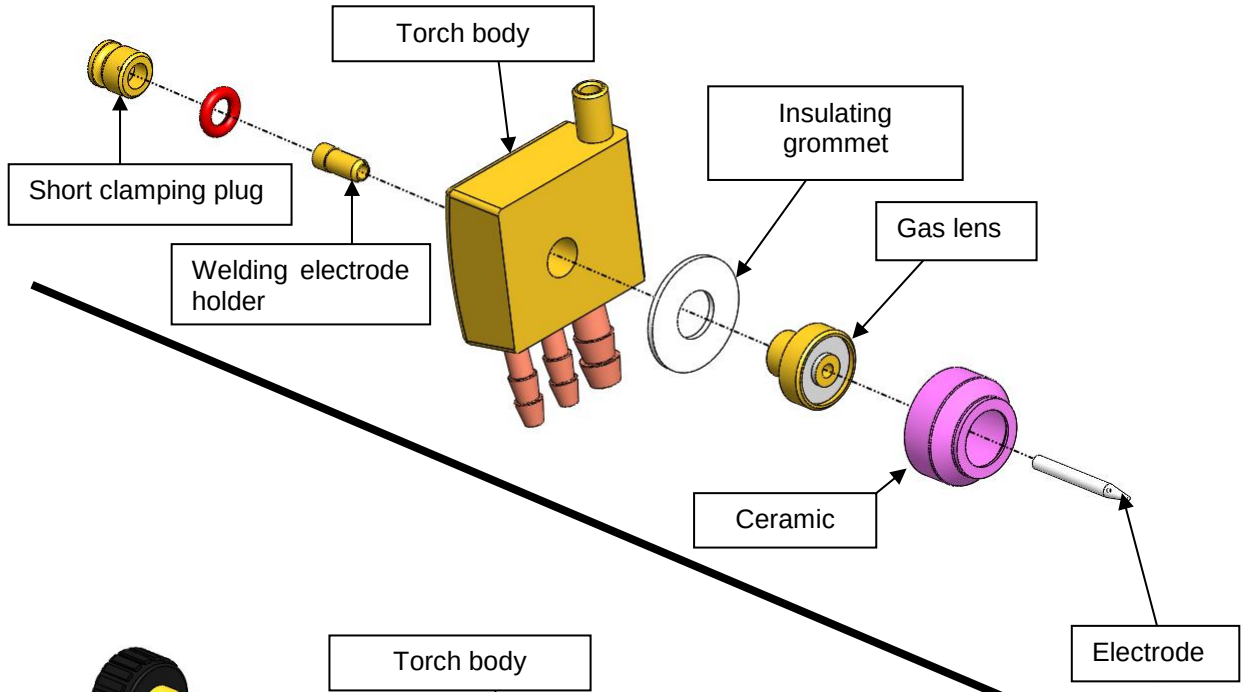
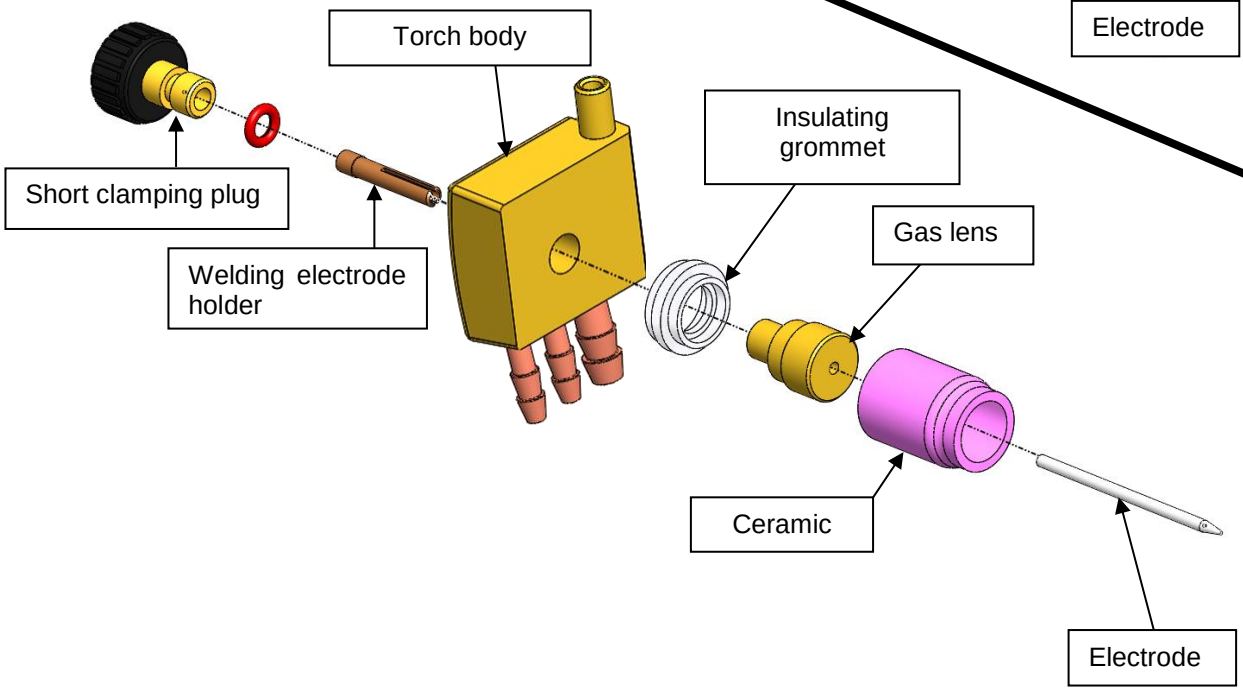
6. Mounting the electrodes:



ASSEMBLY SHORT CERAMIC



ASSEMBLY LONG CERAMIC

- Position the insulating grommet on the torch body.
- Screw the gas lens on the torch body to secure the insulating grommet.
- Screw the welding cup on the gas lens.
- Mount the electrode using the electrode tongs and the short coupling.
- Push the electrode through the gas lens.
- Tighten the short clamping plug to secure the electrode.

Warning, use the proper gas lens and electrode holder depending on the diameter of the electrode

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SATO machines are delivered with a kit of consumables including:

Product references:	Item:
SAGRL-24	11 mm flat wrench
SATMA-Co01	1.6 mm electrode holder, width 25
SATMA-Co02	2.4 mm electrode holder, width 25
SATMA-Co15	Insulating grommet type 9/20
SATMA-Co16	Series 9/20 short clamping plug
SCBC-06	N°4 ceramic cup dia. 6.3 mm
SCBC-08	N° 5 ceramic cup dia. 8 mm
SCBC-09	N° 6 ceramic cup dia.9.5 mm
SCBC-11	N° 7 ceramic cup dia.11
SCBC-12	N° 8 ceramic cup dia. 12.5 mm
SCDA-16	Series 9/20 gas lens dia. 1.6 mm
SCDA-24	Series 9/20 gas lens dia. 1.6 mm
SCE16-50	Box of 10 electrodes dia. 1.6 x 50
SCE24-50	Box of 10 electrodes dia. 2.4 x50
PDIN963-M03X012	DIN9 plastic slotted flat-head screw
SATOB-P110	Electrode clamping plug
SATOB-P111	2.4 mm electrode holder, width 12
SATD-13-01	Silicone O-ring
SATC-Co120	Short ceramic cup Ø12.5mm
SATC-Co121	Insulating grommet for short ceramic
SATC-Co123	Short gas lens Ø 2.4 mm
SCE24-22	Electrode Ø2.4x22 (box of 10)
SATD-12	Insulating grommet
SATC-Co124	Short gas lens Ø 1.6 mm
SATOB-P112	1.6 mm electrode holder, width 12
SATO-OUT1	Hexagonal 2.5mm screwdriver
SCE16-22	Electrode Ø1.6x22 (box of 10)

Note: The electrode selection for orbital welding is essential for the satisfactory performance of equipment. AXXAIR has tested all standard electrodes available on the market and from several suppliers in order to provide the best quality/cost trade-off. It is recommended that you use only AXXAIR electrodes.

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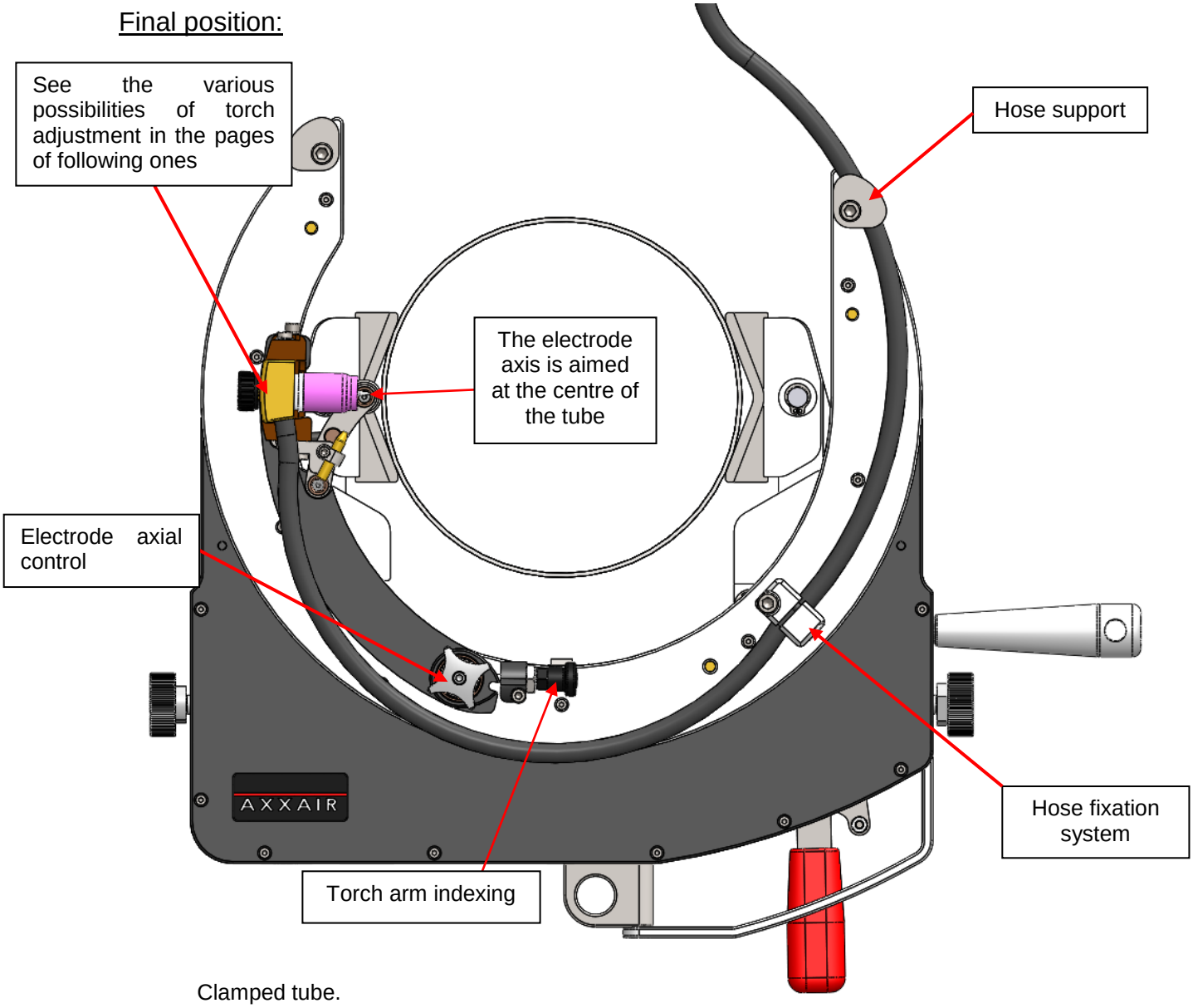
7. Adjusting the machine based on tube diameter:

Final position:



Clamped tube.

The electrode axis aimed at the centre of the pipe.

H = distance between the tube and the electrode

Electrode positioning with reference to the weld joint.

Note: For accurate adjustment, set several parameters simultaneously and repeat the operation if necessary.

IMPORTANT: Arc height adjustment should be carried out with care. In fact, most welded pipes have a slight ovalisation deformity. Depending on the selected tube, make sure the adjustment is done properly so that the electrode does come into contact with the weld pool. If in doubt, increase the tube-electrode distance by a few tenths. The standard adjustment is the wall thickness.
It is easier to make this adjustment more accurately using a spacer between the pipe and the flat end of the electrode.

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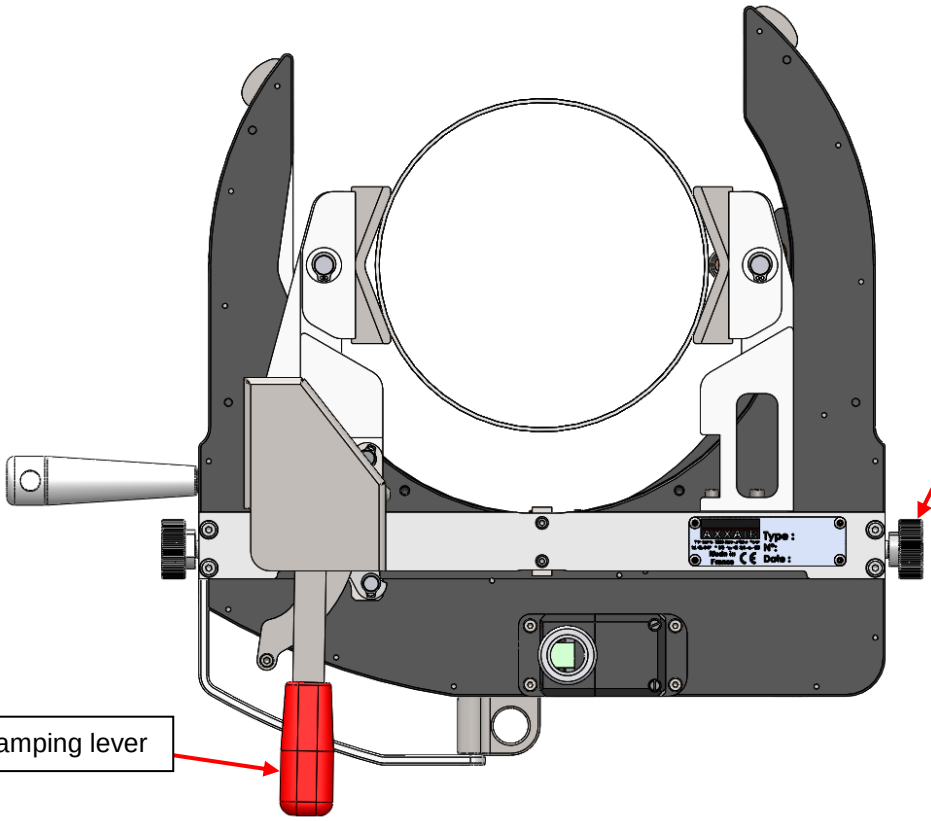

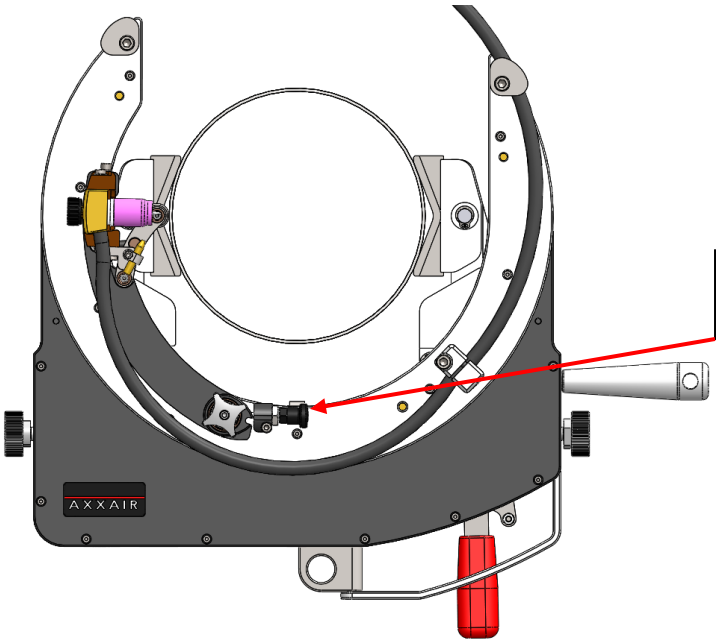

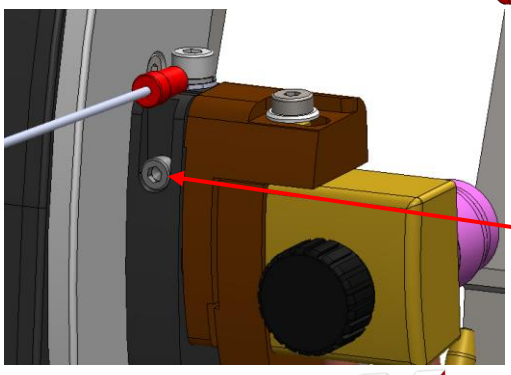

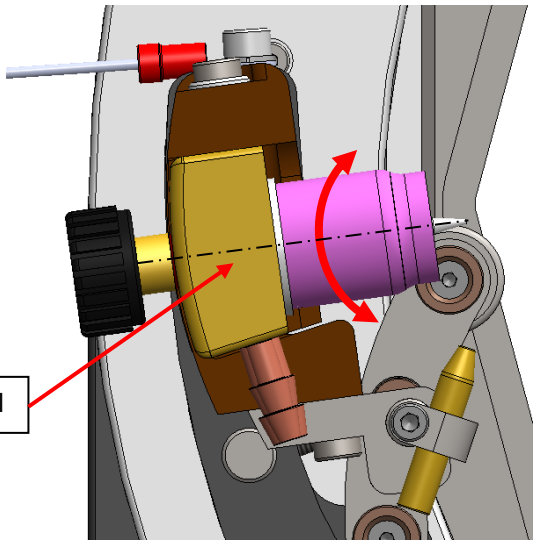

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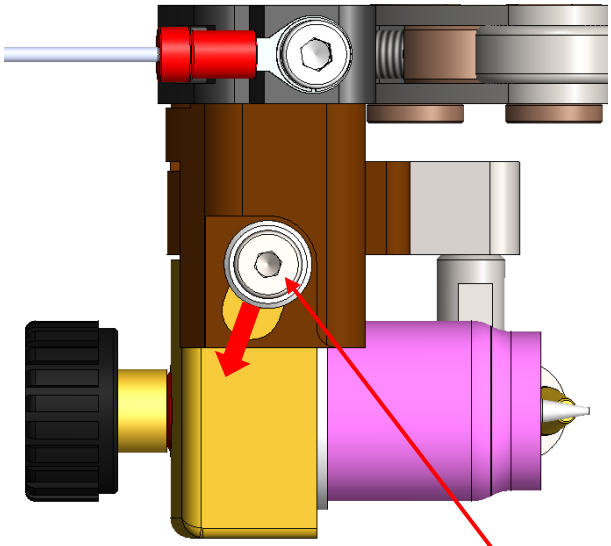
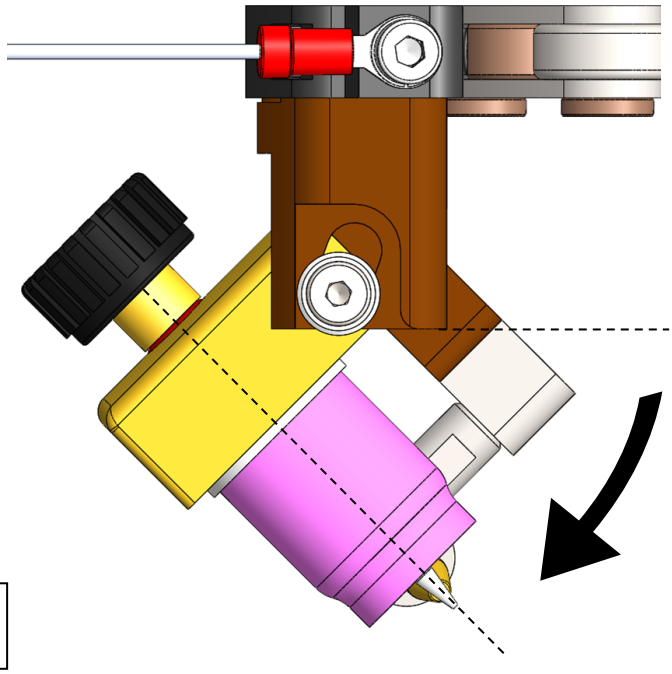
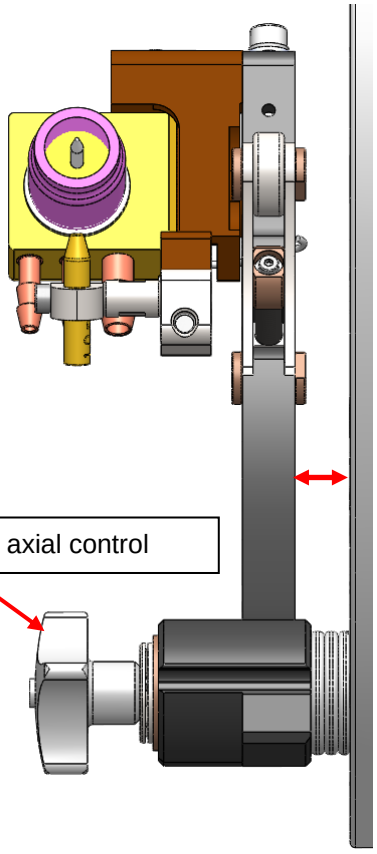
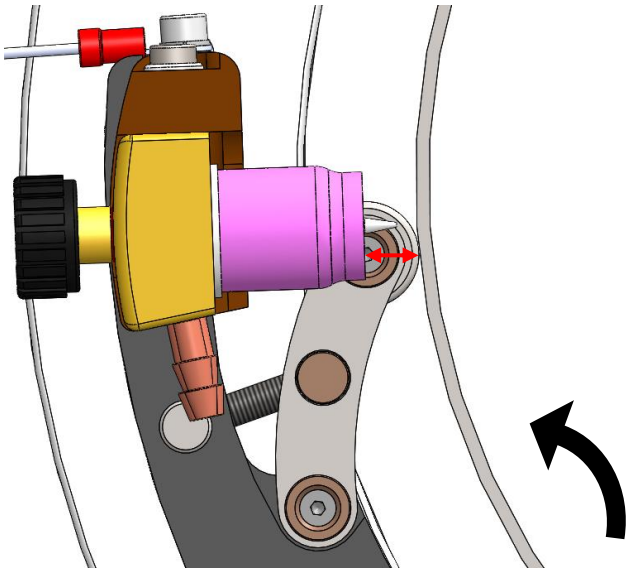


Electrode angular control (45° maximum)

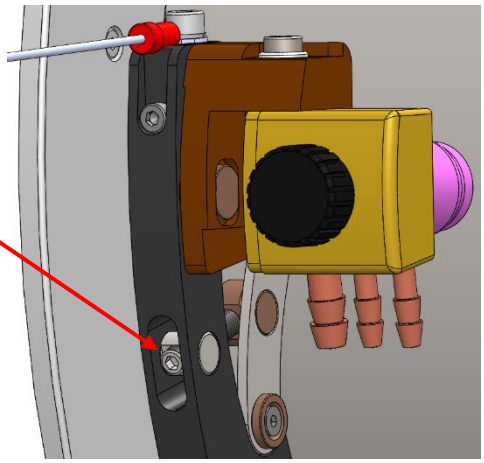




Electrode axial control



Adjustment of the distance between the tube and the electrode : use the screwdriver supplied



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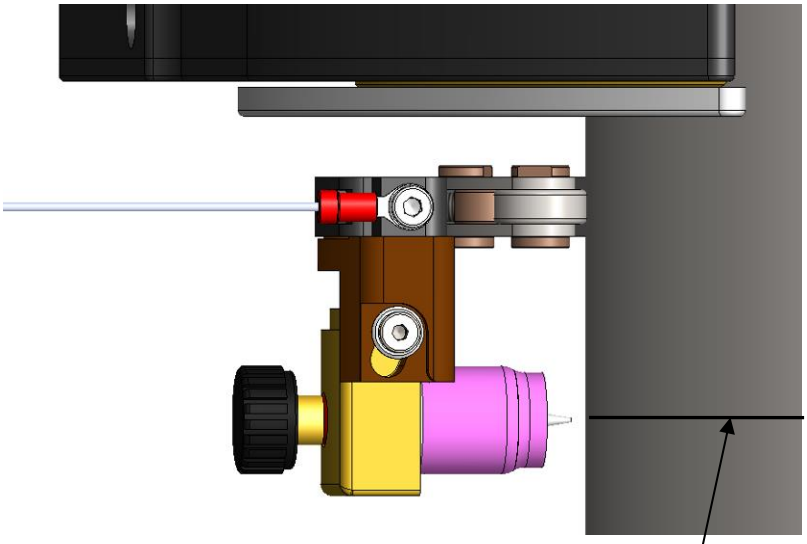
8. Mounting the work piece:

This operation requires aligning the electrode with the surfaces to be welded. This alignment must be done accurately so that the weld can be made in the section of the joint plane.



9. Step-by-step welding:

Preparing for welding:

Preparations for open arc welding are essential to obtain a satisfactory weld. The cut must be perpendicular to the axis. Refer to the CC-series orbital cutting machine.

Depending on the quality required, the surface may be prepared using a form working tool to ensure that the section surface is perfectly smooth and streak-free.

Securing the pipe:

To ensure proper geometric alignment, manually tack weld the work pieces prior to welding using the weld head in tack weld mode.

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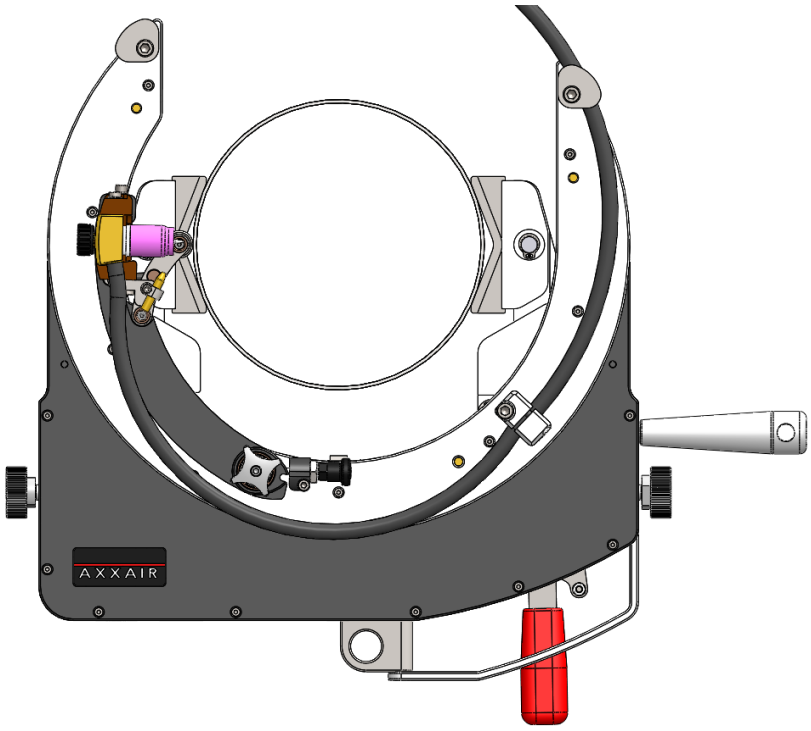
Welding:



Welding is performed as follows:

- Position the tube.
- Position and tack weld on the two elements to be welded.
- Align the surfaces to be welded and the electrode.
- Purge the system to evacuate any oxygen in the hoses and the weld head (perform this step when using the machine for the first time or when the system has not been in service for a long period of time).
- Ensure internal tube inertisation (refer to the systems recommended by AXXAIR).
- The starting position is "the initial position".
- Choose the appropriate welding program.

Welding parameters:

The AXXAIR SAXX series has an automatic welding parameter calculation mode. When choosing the weld head, you must use **SATO-**XXX**E**
Refer to the generator user's manual.

10. Welding machine maintenance:

Prior to each use of the machine, visually inspect the electric/water hose pack. Replace if necessary.

- Maintenance operations should be performed by qualified personnel using original replacement parts.
- Before any maintenance operation, disconnect all power sources.
- Store and transport the machine, including all accessories, using the original shipping case.
- Always keep the machine clean for optimum performance.

Never insert any foreign bodies into the machine rotation system.
Inspect the condition of the rotor contact surface on the horseshoe housing. If needed, clean surfaces using red Scotchbrite™ pads.
It is important to check the condition of the hoses connecting the weld head to the welding station to avoid any water or gas leaks.

WARNING:
Only use coolants recommended by axxair. Never add water to the coolant tank because this may result in chemical reactions that may damage the machine and void the warranty!

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