

USER MANUAL

SERIE SUPERCOMBINATA®

BASIC
EASY
SC



 **elisa**®
Super **Xtrafactory** Devices



SUMMARY

SUMMARY

1. Safety warnings & provisions

- 1.1 Introduction
- 1.2 Safekeeping the documentation
- 1.3 Symbols used
- 1.4 Identification plate
- 1.5 General safety provisions
- 1.6 Specific safety provisions
 - 1.6.1 Information on residual risks
 - 1.6.2 Stability during use and transportation
 - 1.6.3 Unblocking the machine in safe conditions
- 1.7 Characteristics of protection and isolation device
- 1.8 Personal protective equipment
- 1.9 Specific safety provisions for welding
- 1.10 Electromagnetic compatibility
- 1.11 Airborne noise emission
- 1.12 Standards of reference

2. Technical features

- 2.1 General
- 2.2 Machine description
- 2.3 Technical and dimensional features
 - 2.3.1 Dimensions
 - 2.3.2 Supercombinata BASIC
 - 2.3.3 Supercombinata EASY
 - 2.3.4 Supercombinata EASY Compact
 - 2.3.5 Supercombinata SC1
 - 2.3.6 Supercombinata SC2
 - 2.3.7 Supercombinata SC2 Compact
 - 2.3.8 Supercombinata SC3
 - 2.3.9 Electric drive

pag.5

- pag.5
- pag.6
- pag.6
- pag.6
- pag.8
- pag.8
- pag.9
- pag.9
- pag.10
- pag.10
- pag.11
- pag.11
- pag.12
- pag.12
- pag.12
- pag.12**
- pag.12
- pag.12
- pag.13
- pag.13
- pag.14
- pag.15
- pag.16
- pag.17
- pag.18
- pag.19
- pag.20
- pag.21

ARY

3 Installation instructions

3.1 General	pag.24
3.2 Installation	pag.24
3.2.1 Shaft centring kit assembly	pag.25
3.2.2 Tool-holder shaft centring	pag.27
3.2.3 Regulation of main supports	pag.30
3.2.4 Fastening of main supports	pag.31
3.2.5 Machine fastening	pag.32
3.2.6 Installation of control unit	pag.33
3.3 Configuration of machine for overlay welding	pag.34
3.3.1 Operations prior to overlay welding phase	pag.35
3.3.2.1 Overlay welding provisions (SC1)	pag.35
3.3.2.2 Overlay welding provisions (SC2 and SC3)	pag.38
3.4 Configuration of machine for boring operations	pag.40
3.5 Manual advancement	pag.42
3.6 Centesimal measurement settings	pag.42
3.7 Centesimal measurement of internal values	pag.43
3.8 Removal of tool-holder shaft	pag.44
3.9.1 Extension of tool-holder shaft (mod. SC1 40/1)	pag.46
3.9.2 Extensions of tool-holder shaft (mod. SC2 60/1 e mod. SC3 60/2)	pag.46
3.10.1 Extension of shaft for increased stroke (SC1)	pag.48
3.10.2 Extension of shaft for increased stroke (SC2 and SC3)	pag.49
3.11 Installation of insert-holder	pag.49
3.12 Centring and assembly for machining on blind holes	pag.51
3.13 Gear insertion rotation motor	pag.52
3.14 Considerations on cutting and welding parameters	pag.53
3.15 Tool-holder extensions	pag.53
4 Maintenance & operating conditions	pag.54
4.1 General	pag.54
4.2 Routine maintenance & operating conditions	pag.54



elsa
www.elsa

ELSA s.r.l. COE01186 Rev. 0

COE00879 R

1. SAFETY WARNINGS & PROVISIONS

Any warranty claims for damage caused to the machine due to failing to abide by the instructions in this technical documentation, shall be denied.

It is prohibited to reproduce this document in part or in whole without prior consent, using any means including photocopies, including for internal or educational use.

The original manual has been published in the Italian language and these instructions are to be considered “original instructions”.

1.1 INTRODUCTION

This technical documentation refers to the portable boring machine, which can be joined to the piece being repaired; the unit has been conceived, patented, designed and built in Italy at the facilities of ELSA s.r.l., in Loc. La Petrizia S.S. 106, 88050 Sellia Marina (CZ) ITALY.

This manual, complete with the attached technical documentation, constitutes an integral part of the equipment to which it refers.

Prior to installation, use or any other type of use of the product, the contents of this manual must be carefully read; if the contents of the document or parts thereof are not sufficiently clear or are incomprehensible for the operator, the company ELSA s.r.l. must be contacted prior to using the product in any way.

The instructions contained in this document are aimed at the operator responsible for the use, installation and maintenance of the boring machine, and are intended to support the user by providing all the information necessary for the correct and safe use of the product; the manual includes all information relative to the technical and functional aspects of the equipment, with reference to maintenance, safety and spare parts.

Any use of the boring machine according to methods not indicated or described in this manual shall be considered improper and incorrect, and the company shall deny all responsibility for any subsequent damage to persons or things.

If necessary, the company reserves the right to make changes, even substantial ones, to the contents of this document and to the technical features of the product, without the obligation to communicate the fact that previous versions have been updated.

Various images, photos and technical drawings contained in this document may be different to the elements forming part of the machine's equipment.

1.2 SAFEKEEPING THE DOCUMENTATION



This manual must be delivered to the user and kept safe in such a way as to allow its consultation at any time when necessary. The use and maintenance instructions must always be kept with the machine.

1.3 SYMBOLS USED

To ensure the correct use and maintenance of the boring machine, the safety warnings contained in these instructions must be followed. Following is a list and explanation of the symbols used throughout the text:



WARNING!

Hazard!

This symbol, accompanied by the writing WARNING, indicates the need to pay particular attention insofar as failure to observe the safety instructions shall place the person's safety at risk.



ATTENTION!

Hazard!

This symbol, accompanied by the writing ATTENTION, indicates the need to pay attention insofar as a real hazard exists. The hazardous situation may cause accidents and serious injury unless the indicated precautions are followed.



DANGER!

Hazard!

This symbol, accompanied by the writing DANGER, indicates the need to pay maximum attention insofar as there is a serious hazard. The hazardous situation may cause accidents, serious injury and death unless the indicated precautions are followed.



Hazard!

Death hazard due to electrical discharge.



Hazard!

Potentially hazardous situations for the product and environment.



Hazard!

Potentially hazardous situations due to noise exposure.



Hazard!

Potentially hazardous situations due to slipping and falls from level surfaces.



Hazard!

Potentially hazardous situations due to mechanical risks, shearing or crushing of body parts due to the presence of moving parts.



Danger!

Potentially hazardous situations due to mechanical risks, projection of splinters.



Danger!

Potentially hazardous situations due to thermal risks, burns and scalds.



Danger!

Potentially hazardous situations due to the presence of open flames, or flames that may produce both electrical and electrostatic sparks. Working in environments with combustible vapours or powders of unstable and reactive substances or with explosive materials. Presence, handling and storage of gas cylinders.



Danger!

In cold or hot works, performed by hand or using special devices, with materials, substances and products that may - either on their own or when combined - lead to the development of gases, vapours, fog, aerosol and similar, damaging to health.



Danger!

This symbol is used when there is a risk of explosion.



Note!

Suggestions and provisions for the user.



Prohibited!

This symbol is used to prohibit an action or behaviour considered improper.

1.4 IDENTIFICATION PLATE

The following is an illustration of the metal identification plate attached to the outside of the machine in a clearly visible position, on the casing of each boring machine produced.



The plate must not be removed or tampered with in any way.

1.5 GENERAL SAFETY PROVISIONS



The information contained in this documentation is intended for qualified personnel and does not in any way substitute specific safety rules and behaviour.

The provisions reported in this documentation must be integrated with the contents of safety regulations and standards, according to legislation currently in force in the countries in which the equipment is used.

Furthermore, the person responsible for safety must guarantee that the equipment itself is stored, installed, maintained and repaired exclusively by qualified personnel, trained for such purpose.

The operator is responsible for assessing whether or not the equipment can be used in a specific plant, environment or area of installation, after having carefully assessed the risks and analysed the presence of hazards in accordance with current laws in force.

1.6 SPECIFIC SAFETY PROVISIONS

- The operator must carefully read the instructions reported in this manual and ensure that nobody uses the equipment without having first read its contents;
- When using the equipment, the operator must position themselves to the side, at a minimum distance of 1 m from the machine, using the relevant control unit equipped with an arm for each regulation operation; it is strictly prohibited to perform any type of inspections, checks and tests on the piece while the machine is in operation;
- The operator must know how to promptly interrupt the machine's operation in the case of an emergency (see paragraph 2.3.7);
- When using the equipment, wear a protective suit or tight-fitting clothing to avoid entanglement with moving parts;
- When using the equipment, do not wear metal objects such as rings, bracelets or similar;
- When using the equipment, it is strictly prohibited to wear loose clothing;
- The user's hair must be either short or tied back in order to avoid the risk of entanglement with moving mechanical parts;
- Wear anti-accident protective clothing, according to the instructions reported in paragraph 1.8;
- Operate in conditions of artificial light with an average minimum value equal to 750 lux at the height of the worktop;
- Keep the equipment clean;
- Ensure that the mechanical mechanisms allowing the equipment to be attached are correctly installed;
- For each maintenance, inspection or other operation, isolate the power supply circuit according to the methods described by current technical regulations;
- Ensure that the equipment is connected to the electrical network with an efficient grounding connection, inserting an isolation and protection device with the characteristics specified in paragraph 1.7;
- Install the equipment at a safe distance from electrical cables and obstacles, carefully assessing the minimum distances that need to be respected;
- Ensure that all mechanical and electrical parts responsible for ensuring protection or safety are checked and efficiently maintained;
- Do not modify or tamper with the settings on the motor drive boards;
- Do not make connections on the terminal blocks other than those specified by the manufacturer;
- Work in an environment complete with fire extinguishers, whose number and technical features are compatible with current legislation;
- The user must assess beforehand whether or not the installation environment is compatible with the protection class of the equipment, or if is classified as a "high-risk environment";
- All interventions on electrical parts must be performed with the equipment's power disconnected.

1.6.1 INFORMATION ON RESIDUAL RISKS



WARNING!

Compliance with the provisions reported in this paragraph and the protective measures integrated into the machine's design, is to be considered necessary, but not sufficient to guarantee safety. Maximum attention is required for potentially **SERIOUS** hazards due to

mechanical risks such as:

- Projection of metal splinters during machining phase;
- Compression due to entanglement with rotating parts;
- Shearing due to entanglement with rotating parts;
- Knocks and bumps;
- Slipping on the floor.

electrical risks such as:

- Electrocutation due to lack of or insufficient protection from indirect contacts.

thermal risks such as:

- Burns and scalds due to contact with hot parts.

1.6.2 STABILITY DURING USE AND TRANSPORTATION



DANGER!

USE

Pay attention when fastening supports onto the selected surface; the connection may need to be made through continuous fillet welding (Eurocode 3) and the fillets will need to be sized based on the shear and bending moment resulting from the weight of the machine and the equipment installed.

The machine has been designed to work on holes and cavities with a horizontal, vertical and in any case inclined axis.

Check that threaded connections are properly tightened.

The fall or accidental detachment of fastening and connection parts may lead to serious injury.

TRANSPORTATION

The SC series boring machine is supplied complete with all included components, with packaging consisting in wooden crates in a variable number from 2-3. The mass of each crate is between 44.5 kg and 96 kg. Inside, the boring machine is positioned on a special rack, which is attached to the crate using fastening screws.

The crates are fitted with wooden supporting feet and must always be handled without being overturned.

As a consequence of the declared weight, the crates must never be manually handled.

Falls from height or knocks during transportation create serious risks.

1.6.3 UNBLOCKING THE MACHINE IN SAFE CONDITIONS

During use, the equipment may become blocked or encounter an unexpected fault, for the following reasons:



Mechanical;

Incorrect cutting parameter settings with respect to the diameter of the component being machined and the mechanical properties of the same, may result in the undesired blocking of the boring machine due to an excessive mechanical load.

In this circumstance the operator must:

- immediately interrupt the equipment's operation using the stop/emergency key;
- isolate the machine's power supply circuit through the device, as per paragraph 1.7;
- start the manual advancement system using the special hand-wheel, to detach the cutter from the piece being machined;

If blocked due to a suspected fault in the mechanical parts inside the machine, proceed as follows:

- Immediately interrupt the equipment's operation using the stop/emergency key;
- Isolate the machine's power supply circuit through the device, as per paragraph 1.7;
- Disconnect the connection cable between the control unit and the terminal block of the boring machine;
- Dismantle the entire machine body to access the mechanical parts inside the shell.

Electrical;

In all circumstances in the following list, it is absolutely prohibited to take any action prior to having isolated the power supply circuit.

- lack of power from power supply network;
- intervention of surge protection;
- fault in electrical part of rotation motor;
- fault in drive system of rotation motor;
- lack of electrical continuity on power circuit due to defective connection;

1.7 CHARACTERISTICS OF PROTECTION AND ISOLATION DEVICE

The isolation device is represented in this case by a plug/socket power combination through a flexible cable. The isolation device must be interlocked with a manoeuvring device consisting of an automatic isolation switch, compliant with IEC 60947-2 and able to guarantee the following protection:

- Surge protection;
- Short-circuit protection;
- Protection from indirect contacts.

A bipolar device must be used (isolation of phase and neutral conductor) with nominal intervention current I_N equal to 16 A, with interruption power PCU no less than the presumed short-circuit current at the point of installation. In regards to protection from indirect contact, the power must be automatically interrupted using a differential current device with $I_{\Delta n}=0.03$ A, able to recognise fault currents with a continuous component (differential type B). The above-mentioned properties of the protection devices refer to a case with power supply from 230 V - 50 Hz, electrical system type TT.

In the case of use with power supply voltage at 110 V - 60 Hz, a device with nominal intervention current I_N equal to 32 A must be used.

1.8 PERSONAL PROTECTIVE EQUIPMENT



ATTENTION!

The operator must wear anti-accident protective clothing, consisting in: Occhiali di protezione a maschera;

- Protective goggles;
- Welding Helmet;
- Safety shoes (steel tip and puncture resistant);
- Protective gloves;
- Face mask;
- Ear muffs or ear monitors;
- Protective, tight-fitting suit.

The user responsible for machining must use the above-mentioned personal protective equipment with a “CE” marking and manufactured in compliance with relative product regulations (ISO, EN).

If the specific machining or environmental conditions so require, the user must assess additional safety measures and wear supplementary protective clothing.



It is strictly prohibited to allow unqualified personnel, or personnel not equipped with the above-mentioned safety devices to approach the machine.

1.9 SPECIFIC SAFETY PROVISIONS FOR WELDING



DANGER!

The overlay operation executed by the equipment exposes the user to serious specific risks.

The eyes must be protected with special welding goggles, fitted with filtering lenses.

The body must be protected with suitable clothing.



Electric shock

- Install and properly ground the machine;
- Pay attention not to enter into contact with live electrical parts;
- Ensure you are isolated from the ground during working phases.



Fumes and gases

- Operate in a well-ventilated environment and use special air extractors to avoid excessive concentrations of gas in the working area



Risk of fire

- Sparks of both an electrical and mechanical origin may be produced. Ensure that the working area is free of flammable materials and wear suitable protective clothing to protect against burns resulting from contact with hot parts.



Risk of explosion

- Ensure that there are no pressurised receptacles, gas or vapours with the risk of explosion in the working area.

1.10 ELECTROMAGNETIC COMPATIBILITY

The device has been designed and constructed in compliance with CEI EN 61000 and is classified as class A - type II. If used in environments other than an industrial one, ELSA s.r.l. shall not assume any responsibility in regards to the product's electromagnetic compatibility requirements.

1.11 AIRBORNE NOISE EMISSION

Pressure and acoustic power levels effectively measured on the machine in question are reported as follows:

- Continuous equivalent a-weighted sound pressure level in workplaces: 87.3 dB(A);
- Maximum value of continuous equivalent weighted sound pressure: 88.3 dB(A);
- Acoustic power level emitted by the machine: 85 dB(A).

1.12 STANDARDS OF REFERENCE

The boring machine has been designed and constructed in its facilities in compliance with the following EU directives on the matter: 2006/42/EC-2004/108/EC-2011/65/EU.

To guarantee conformity, the following harmonised laws have been applied, as well as the standards and provisions that follow: EN60745-1:2009+A11/2010; EN 60745-2-2:2010; EN 55014-1/A2:2011; EN 55014-2/A2:2008.

Following are the technical standards of reference for the design and construction of the product: UNI EN ISO 23125:2012 - UNI ISO 230-5:2010 - UNI ISO 8525:2009 - UNI EN ISO 22829:2008 - CEI EN 60204-1 - CEI EN 61000.

2. TECHNICAL FEATURES

2.1 GENERAL

This section of the manual provides a technical description of the boring machine produced by the ELSA s.r.l.

The product consists in an electrically powered rotating machine, which performs a mechanical machining process to remove shavings and/or execute overlay welding inside axially symmetric cavities, continuously or in sections.

The machine can be equipped with a series of kits which also extend its functions to boring, overlay welding and tapping on shafts, as well as facing on surfaces.

The above-mentioned technological operations may be performed, based on specific demands and needs, with very tight dimensional tolerances (typically H7).

The unique feature of the machine lies in its reduced dimensions, such to facilitate its transportation in order to perform repairs directly on-site;

In earth moving sectors, its most typical application is represented by repairs to mechanical excavators, in particular on the housing holes of bucket pins.

Various images, photos and technical drawings shown below may differ to the elements forming part of the machine's equipment.

2.2 MACHINE DESCRIPTION

The boring machine produced by ELSA s.r.l. is an electrically powered rotating machine; the tool-holder shaft has two grades of freedom, rotation and advancement; the above-mentioned movements are independently managed through the use of two distinct and relative drive motors.

In summary, the machine can be outlined in the following functional groups:

- electric operation;
- advancement system with direct current electric motor;
- rotation motor with 2/4 transmission ratios;
- mechanically powered transmission organs;
- fastening system;
- components supplied for overlay welding;



2.3 TECHNICAL AND DIMENSIONAL FEATURES

Following are the technical features for each model in production.
All dimensions are expressed in millimetres.

2.3.1 DIMENSIONS

Image 2.1 shows the dimensions for each model in production.

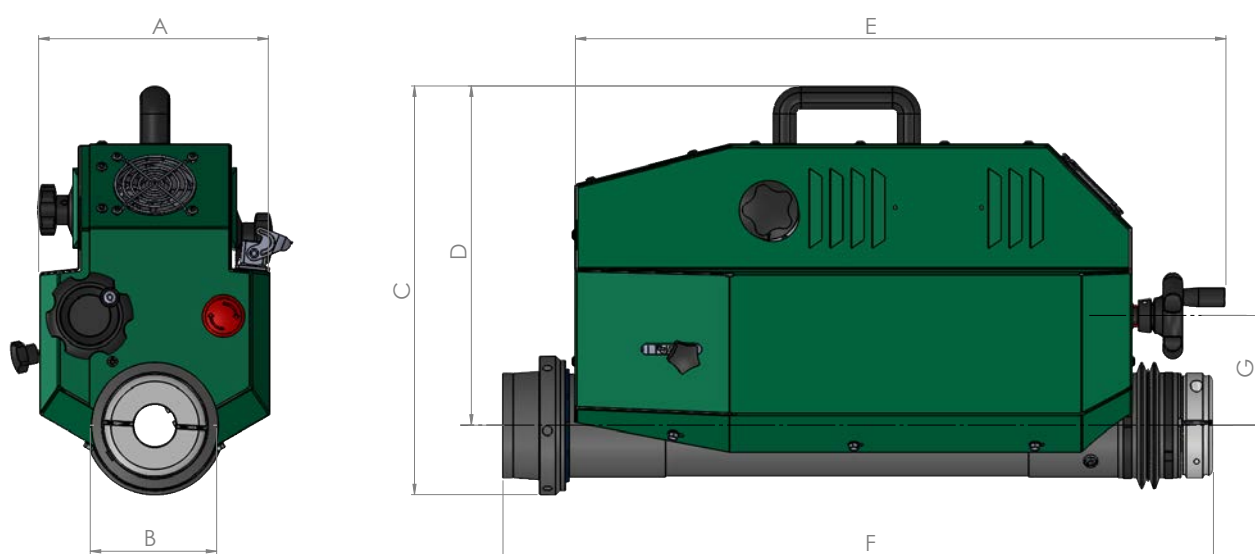


Image 2.1 shows the dimensions for each model in production.

MODEL	DIMENSIONS						
	A	B	C	D	E	F	G
Supercombinata BASIC	240	130	380	320	627	680	108
Supercombinata EASY	240	130	380	320	627	680	108
Supercombinata EASY Compact	240	130	380	320	480	550	108
Supercombinata SC1	240	130	380	320	627	680	108
Supercombinata SC2	240	130	380	320	627	680	108
Supercombinata SC2 Compact	240	130	380	320	480	550	108
Supercombinata SC3	300	130	390	270	627	680	108

TECHNICAL SPECIFICATIONS

DIAMETERS

Boring bar diameter	Ø 20x1800 mm / Ø 40x1500 mm
Line boring	Ø 22 – 120 mm
External turning	Extra kit
Internal welding	Extra kit
Facing of orthogonal planes	Extra kit

ROTATION MOTOR

AC motor	Single phase
Power at rated speed	1800 W
Output torque at the bar	290 Nm with 120 rpm
1° speed	Max 115 rpm (145 Nm)
2° speed	Max 400 rpm (45 Nm)

FEED MOTOR

Gear motor	DC
Power at rated speed	90 W
Max speed	11 rpm
Feed system	Electromechanical
Feed	Manual/Automatic

WELDING TECHNOLOGY (EXTRA KIT)

Spiral	Continuous with variable step
Welding machine	Compatible with MIG/ MAG welder with EURO connector

LONGITUDINAL STROKE

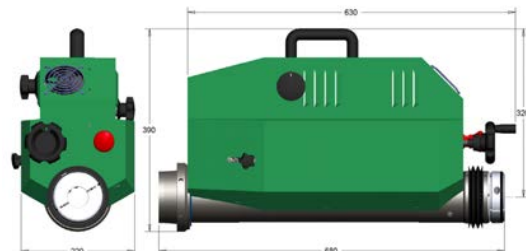
Unlimited	With 350 mm pitch
-----------	-------------------

ELECTRONIC CONTROL PANEL

Voltage	230 V (50Hz)
Main switch	Available
Emergency switch	Available
Inverter feed	RH/LH
Inverter rotation	CW/CCW
Speed regulator	Rotation/Feed
Electrical absorption	2000 W
Control panel 110/120 V	Upon request

DIMENSIONS

Length	680 mm
Width	240 mm
Height	380 mm
Weight central unit	36 kg



STANDARD EQUIPMENT

Quantity	Description
1	Main unit
1	Boring machine stand
1	Electronic control panel
1	Control panel holder
1	Cable control panel/machine
1	Power cable
1	Boring bar Ø 20x1800 mm
1	Boring bar Ø 40x1500 mm
1	Special tool holder right Ø 10x20 mm
1	Tool holder rh Ø 10x30 mm
1	Tool holder lh Ø 12x60 mm
1	Box with 10 cutting inserts
1	Main bar support

1	Additional support
2	Bushing
2	Main reduction bushing
2	Additional reduction bushing
1	Rotation reduction bushing
1	Extension
2	Centring bushing Ø 20 mm
2	Centring bushing Ø 40 mm
6	Centring bracket
6	Centring bolts
1	Wrench
1	Screws and bolts

TECHNICAL SPECIFICATIONS

DIAMETERS

Boring bar diameter	Ø 40x2200 mm
Line boring	Ø 22 - 250 mm
External turning	Extra kit
Internal welding	Ø 42 - 250 mm
Facing of orthogonal planes	Extra kit

ROTATION MOTOR

AC motor	Single phase
Power at rated speed	1800 W
Output torque at the bar	290 Nm with 120 rpm
1° speed	Max 115 rpm (145 Nm)
2° speed	Max 400 rpm (45 Nm)

FEED MOTOR

Gear motor	DC
Power at rated speed	90 W
Max speed	11 rpm
Feed system	Electromechanical
Feed	Manual/Automatic

WELDING TECHNOLOGY

Spiral	Continuous with variable step
Welding machine	Compatible with MIG/MAG welder with Euro connector

LONGITUDINAL STROKE

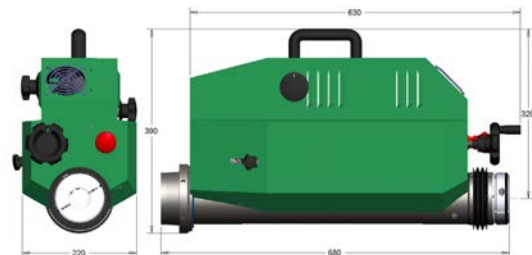
Unlimited	With 350 mm pitch
-----------	-------------------

ELECTRONIC CONTROL PANEL

Voltage	230 V (50 Hz)
Main switch	Available
Emergency switch	Available
Inverter feed	RH/LH
Inverter rotation	CW/CCW
Speed regulator	Rotation/Feed
Electrical absorption	2000 W
Control panel 110/120 V	Upon request

DIMENSIONS

Length	680 mm
Width	240 mm
Height	380 mm
Weight central unit	36 kg



STANDARD EQUIPMENT

Quantity	Description
1	Main unit
1	Boring machine stand
1	Electronic control panel
1	Control panel holder
1	Cable control panel/machine
1	Power cable
1	Boring bar Ø 40x2200 mm
1	Boring bar extension 520 mm
1	Pivot
1	Tool holder for boring d. 100-250 mm
1	Special tool holder LH Ø 12x40 mm
1	Tool holder LH Ø 12x40 mm
1	Tool holder LH Ø 12x60 mm
1	Tool holder RH Ø 12x100 mm
1	Box with 10 cutting inserts
2	Main bar support

2	Additional support
1	Telescopic shaft for welding
5	Diffuser extension 35 mm
4	Long gas nozzle
4	Short gas nozzle
5	Short contact tip Ø 0,8 mm wire
5	Long contact tip Ø 0,8 mm wire
1	O-ring for welding shaft 100x5 mm
1	Centring system for through holes
1	Telescopic gauge up to Ø 250 mm
1	Dial gauge
1	Dial gauge support
1	Set of wrenches
1	Screws and bolts
1	Reduction kit for boring from Ø 22 mm (to choose)
1	Reduction kit for boring from Ø 32 mm (to choose)

TECHNICAL SPECIFICATIONS

DIAMETERS

Boring bar diameter	Ø 40x2200 mm
Line boring	Ø 42 – 250 mm
External turning	Extra kit
Internal welding	Ø 42 – 250 mm
Facing of orthogonal planes	Extra kit

ROTATION MOTOR

AC motor	Single phase
Power at rated speed	1800 W
Output torque at the bar	290 Nm with 120 rpm
1° speed	Max 100 rpm (170 Nm)
2° speed	Max 340 rpm (50 Nm)

FEED MOTOR

Gear motor	DC
Power at rated speed	90 W
Max speed	11 rpm
Feed system	Electromechanical
Feed	Manual/Automatic

WELDING TECHNOLOGY

Spiral	Continuous with variable step
Welding machine	Compatible with MIG/MAG wire with EURO connector

LONGITUDINAL STROKE

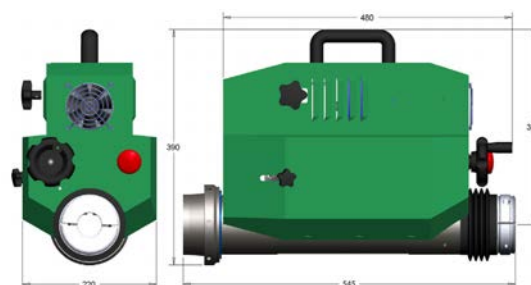
Unlimited	With 250 mm pitch
-----------	-------------------

ELECTRONIC CONTROL PANEL

Voltage	230 V (50Hz)
Main switch	Available
Emergency switch	Available
Inverter feed	RH/LH
Inverter rotation	CW/CCW
Speed regulator	Rotation/Feed
Electrical absorption	2000 W
Control panel 110/120 V	Upon request

DIMENSIONS

Length	545 mm
Width	220 mm
Height	380 mm
Weight central unit	34 kg



STANDARD EQUIPMENT

Quantity	Description
1	Main unit
1	Boring machine stand
1	Electronical control panel
1	Control panel holder
1	Cable control panel /machine
1	Power cable
1	Boring bar Ø 40x2200 mm
1	Boring bar extension 420 mm
1	Pivot
1	Tool holder for boring d. 100-250 mm
1	Special tool holder lh Ø 12x40 mm
1	Tool holder lh Ø 12x40 mm
1	Tool holder lh Ø 12x60 mm
1	Tool holder right rh Ø 12x100 mm
1	Box with 10 cutting inserts

2	Main bar support
2	Additional support
1	Telescopic shaft for welding
5	Diffusor extension 35 mm
4	Short gas nozzle
4	Long gas nozzle
5	Short contact tip Ø 0.8 mm wire
5	Long contact tip Ø 0.8 mm wire
1	O-ring for welding shaft 100x5 mm
1	Centring system for through holes
1	Telescopic gauge up to Ø 250 mm
1	Dial gauge
1	Dial gauge support
1	Set of wrenches
1	Screws and bolts

TECHNICAL SPECIFICATIONS

DIAMETERS

Boring bar diameter	Ø 40x2200 mm
Line boring	Ø 42 - 400 mm
External turning	Extra kit
Internal welding	Ø 42 - 400 mm
External welding	Ø 42 - 400 mm
Drilling	Suitable
Tapping	Suitable
Threading	Extra kit
Facing of orthogonal planes	Extra kit

ROTATION MOTOR

AC motor	Single phase
Power at rated speed	1800 W
Gearbox	4-speed
Output torque at the bar	Up to 400 Nm with 95 rpm

FEED MOTOR

Gear motor	DC
Power at rated speed	90 W
Max Speed	11 rpm
Feed system	Electromechanical
Feed	Manual/Automatic

WELDING TECHNOLOGY

Spiral	Continuous with variable step
Welding machine	Compatible with MIG/MAG welder with EURO connector

LONGITUDINAL STROKE

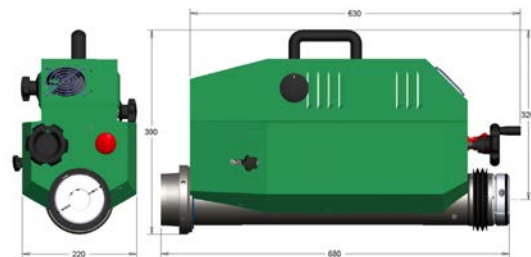
Unlimited	With 350 mm pitch
-----------	-------------------

ELECTRONIC CONTROL PANEL

Voltage	230 V (50 Hz)
Main switch	Available
Emergency switch	Available
Inverter feed	RH/LH
Inverter rotation	CW/CCW
Speed regulator	Rotation/Feed
Electrical absorption	2000 W
Control panel 110/120 V	Upon request
Digital control panel	Upon request

DIMENSIONS

Length	680 mm
Width	240 mm
Height	380 mm
Weight central unit	36 kg



STANDARD EQUIPMENT

Quantity	Description
1	Main unit
1	Boring machine stand
1	Electronic control panel
1	Control panel holder
1	Cable control panel/machine
1	Power cable
1	Boring bar Ø 40x2200 mm
1	Boring bar Ø 40x1100 mm
1	Boring bar extension 520 mm
1	Pivot
1	Tool holder for boring d. 100-400 mm
1	Special tool holder lh Ø 12x40 mm
1	Tool holder lh Ø 12x40 mm
1	Tool holder lh Ø 12x60 mm
1	Tool holder rh Ø 12x100 mm
1	Box with 10 cutting inserts
2	Main bar support
2	Additional support

12	Bracket for flanges
1	Telescopic shaft for welding
5	Diffusor extension 35 mm
1	Diffusor extension 100 mm
4	Short gas nozzle
4	Long gas nozzle
5	Short contact tip Ø 0,8 mm wire
5	Long contact tip Ø 0,8 mm wire
1	O-ring for welding shaft 100x5 mm
1	Terminal lance for external welding
1	Centring system for through holes
1	Centring system for blind holes
1	Telescopic gauge up to Ø 400 mm
1	Dial gauge
1	Dial gauge support
1	Set of wrenches
1	Screws and bolts

TECHNICAL SPECIFICATIONS

DIAMETERS

Boring bar diameter	Ø 60x2200 mm
Line boring	Ø 62 - 600 mm
External turning	Extra kit
Internal welding	Ø 42 - 600 mm
External welding	Ø 42 - 400 mm
Drilling	Optional accessories
Tapping	Optional accessories
Threading	Extra kit
Facing of orthogonal planes	Extra kit

ROTATION MOTOR

AC motor	Single phase
Power at rated speed	1800 W
Gearbox	4-speed
Output torque at the bar	Up to 520 Nm with 65 rpm

FEED MOTOR

Gear motor	DC
Power at rated speed	90 W
Max. speed	11 rpm
Feed system	Electromechanical
Feed	Manual/Automatic

LONGITUDINAL STROKE

Spiral	Continuous with variable step
Welding machine	Compatible with MIG/MAG welder with EURO connector

WELDING TECHNOLOGY

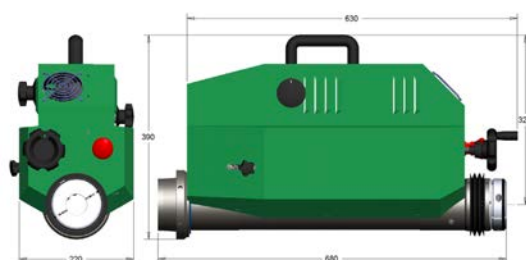
Unlimited	With 350 mm pitch
-----------	-------------------

ELECTRONIC CONTROL PANEL

Voltage	230 V (50 Hz)
Main switch	Available
Emergency switch	Available
Inverter feed	RH/LH
Inverter rotation	CW/CCW
Speed regulator	Rotation/Feed
Electrical absorption	2000 W
Control panel 110/120 V	Upon request
Digital control panel	Upon request

DIMENSIONS

Length	680 mm
Width	240 mm
Height	380 mm
Weight central unit	36 kg



STANDARD EQUIPMENT

Quantity	Description
1	Main unit
1	Boring machine stand
1	Electronic control panel
1	Control panel holder
1	Cable control panel/machine
1	Power cable
1	Boring bar Ø 60x2200 mm
1	Boring bar extension 520 mm
2	Pivot
1	Tool holder for boring d. 120-250 mm
1	Tool holder for boring d. 250-600 mm
1	Tool holder lh Ø 12x50 mm
1	Tool holder lh Ø 12x60 mm
1	Special tool holder lh Ø 12x60 mm
1	Tool holder lh Ø 12x80 mm
1	Tool holder rh Ø 12x100 mm
1	Box with 10 cutting inserts
1	Adjusting plug for tool holder
2	Main bar support
2	Additional support
18	Bracket

4	Flanges support d. 250-600 mm
1	Telescopic shaft for welding
1	Reduction bushing drawing torch
1	Reduction bushing locking torch
5	Diffuser extension 35 mm
3	Diffuser extension 100 mm
4	Short gas nozzle
4	Long gas nozzle
5	Short contact tip Ø 0,8 mm wire
5	Long contact tip Ø 0,8 mm wire
1	O-ring for welding shaft 100x5 mm
1	Terminal lance for external welding
1	Centring system d. 250-600 mm
1	Centring system for through holes
1	Centring system for blind holes
1	Telescopic gauge up to Ø 600 mm
1	Dial gauge
1	Dial gauge support
1	Set of wrenches
1	Screws and bolts

TECHNICAL SPECIFICATIONS

DIAMETERS

Boring bar diameter	Ø 60x2200 mm
Line boring	Ø 62 - 250 mm
External turning	Extra kit
Internal welding	Ø 42 - 250 mm
Facing of orthogonal planes	Extra kit

ROTATION MOTOR

AC motor	Single phase
Power at rated speed	1800 W
Output torque at the bar	350 Nm with 100 rpm
1° speed	max 100 rpm (170 Nm)
2° speed	max 340 rpm (50 Nm)

FEED MOTOR

Gear motor	DC
Power at rated speed	45 W
Max Speed	11 rpm
Feed system	Electromechanical
Feed	Manual/Automatic

WELDING TECHNOLOGY

Spiral	Continuous with variable step
Welding machine	Compatible with MIG/MAG wire with EURO connector

STANDARD EQUIPMENT

Quantity	Description
1	Main unit
1	Boring machine stand
1	Electronical control panel
1	Control panel holder
1	Cable control panel /machine
1	Power cable
1	Boring bar Ø 60x2200 mm
1	Boring bar extension 415 mm
1	Tool holder for boring d. 120-250 mm
1	Box with 10 cutting inserts
2	Main bar support
2	Additional support
1	Telescopic shaft for welding
1	Reduction bushing drawing torch
1	Reduction bushing locking torch
1	Tool holder adjusting bushing

LONGITUDINAL STROKE

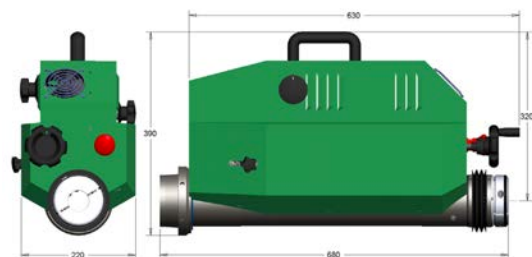
Unlimited	With 250 mm pitch
-----------	-------------------

ELECTRONIC CONTROL PANEL

Voltage	230 V (50Hz)
Main switch	Available
Emergency switch	Available
Inverter feed	RH/LH
Inverter rotation	CW/CCW
Speed regulator	Rotation/Feed
Electrical absorption	2000 W
Control panel 110/120 V	Upon request

DIMENSIONS

Length	545 mm
Width	220 mm
Height	380 mm
Weight central unit	34 kg



5	Diffusor extension 35 mm
4	Short gas nozzle
4	Long gas nozzle
5	Short contact tip Ø 0.8 mm wire
5	Long contact tip Ø 0.8 mm wire
1	O-ring for welding shaft 90x5 mm
1	Terminal lance for external welding
1	Centring system for through holes
1	Centring system for blind holes
1	Telescopic gauge up to Ø 250 mm
1	Dial gauge
1	Dial gauge support
1	Set of wrenches
1	Screws and bolts

TECHNICAL SPECIFICATIONS

DIAMETERS

Boring bar diameter	Ø 60x2200 mm
Line boring	Ø 62 - 800 mm
External turning	Kit Optional
Internal welding	Ø 42 - 800 mm
External welding	Ø 42 - 600 mm
Drilling	Optional accessories
Tapping	Optional accessories
Threading	Extra kit
Facing of orthogonal planes	Extra kit

ROTATION MOTOR

AC motor	Single phase
Power at rated speed	2300 W
Output torque at the bar	902 Nm a 55 rpm
1° speed	max 55 rpm (420 Nm)
2° speed	max 85 rpm (235 Nm)
3° speed	max 240 rpm (85 Nm)
4° speed	max 375 rpm (55 Nm)

FEED MOTOR

Gear motor	DC
Power at rated speed	90 W
Max speed	11 rpm
Feed system	Electromechanical
Feed	Manual/Automatic

STANDARD EQUIPMENT

Quantity	Description
1	Main unit
1	Boring machine stand
1	Electronic control panel
1	Control panel holder
1	Cable control panel/machine
1	Power cable
1	Boring bar Ø 60x2200 mm
1	Boring bar extension 520 mm
2	Pivot
1	Tool holder for boring d. 120-250 mm
1	Tool holder for boring d. 250 - 800 mm
1	Tool holder lh Ø 12x50 mm
1	Tool holder lh Ø 12x60 mm
1	Special tool holder lh Ø 12x60 mm
1	Tool holder lh Ø 12x80 mm
1	Tool holder rh Ø 12x100 mm
1	Box with 10 cutting inserts
1	Adjusting plug for tool holder
2	Main bar support
2	Additional support
18	Bracket for flanges 200 mm
18	Bracket for flanges 275 mm

WELDING TECHNOLOGY

Spiral	Continuous with variable step
Welding machine	Compatible with MIG/MAG welder with EURO connector

LONGITUDINAL STROKE

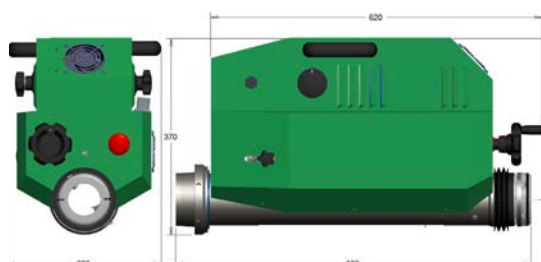
Unlimited	With 350 mm pitch
-----------	-------------------

ELECTRONIC CONTROL PANEL

Voltage	230 V (50 Hz)
Main switch	Available
Emergency switch	Available
Inverter feed	DX/SX
Inverter rotation	CW/CCW
Speed regulator	Rotation/Feed
Electrical absorption	2300 W
Control panel 110/120 V	Upon request
Digital control panel	Upon request

DIMENSIONS

Length	680 mm
Width	300 mm
Height	390 mm
Weight central unit	39 Kg



4	Flanges support d. 250 - 800 mm
1	Telescopic shaft for welding
1	Reduction bushing drawing torch
1	Reduction bushing locking torch
5	Diffusor extension 35 mm
4	Diffusor extension 100 mm
4	Short gas nozzle
4	Long gas nozzle
5	Short contact tip Ø 0,8 mm wire
5	Long contact tip Ø 0,8 mm
1	O-ring for welding shaft 100x5 mm
1	Terminal Lance for external welding
1	Centring system for through holes d. 250-800 mm
1	Centring system for through holes
1	Centring system for blind holes
1	Telescopic gauge up to Ø 800 mm
1	Dial gauge
1	Dial gauge support
1	Set of wrenches
1	Screws and bolts

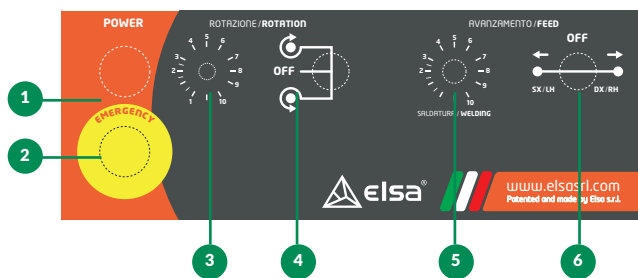
2.3.9 ELECTRIC DRIVE

The advancement motor is guaranteed by an independent direct current, permanent magnet electric motor, driven by a unidirectional converter, which allows rotation speed to be regulated, with variation of the armature voltage. Control is open-loop but the converter allows the motor to be driven with a feedback loop through the use of tachometric dynamo.

The rotation motor is guaranteed by an independent alternate current electric motor, with open cycle drive and frequency control.

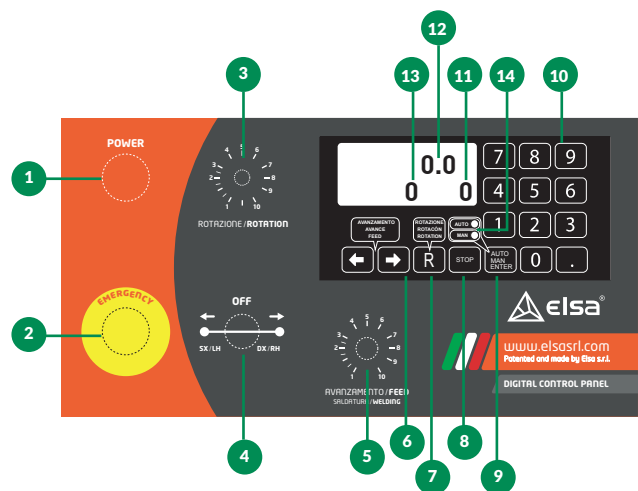
The drive allows the inversion of the rotation direction of both motors through designated switches located on the control panel.

Image 2.2 describes the commands on the front panel.



1	Main switch	
2	Emergency/Stop button	
3	Analogue potentiometer for rotation speed	
4	Analogue direction selector switch/OFF	
5	Analogue potentiometer for feed speed (boring/welding)	
6	Digital feed selector (boring/welding)	
Power supply		230 V ac – 50 Hz
Protection (IP)		IP20
Weight (Kg)		6,0

On request, the boring machine can be fitted with a digital control unit, the characteristics of which are shown below.



1	Main switch
2	Emergency/Stop button
3	Analogue potentiometer for rotation speed
4	Analogue direction selector switch/OFF
5	Analogue potentiometer for feed speed (boring/welding)
6	Digital feed selector (boring/welding)
7	Start button for rotation
8	Manual or automatic position LED
9	Digital stop button
10	Programming button for automatic feed
11	Speed display (rpm)
12	Feed rate indicator (mm)
13	Feed indicator (rpm)
14	Led automatic/manual mode

The front panel, in addition to the ignition and emergency stop command, also contains the following commands:

- rotation speed settings (potentiometric regulation);
- rotation direction;
- advancement speed settings (potentiometric regulation);
- advancement speed display;
- advancement height settings;
- advancement motor direction (symbols 
- rotation motor start-up (R key);
- rotation/advancement motor stop (STOP key);
- keypad for advancement height settings;
- Operation in automatic mode (auto/man/enter key).

Both the analogue and digital control unit require a power supply of 230V - 50 Hz (on request 110 V - 60 Hz) and are built with protection class IP 20.

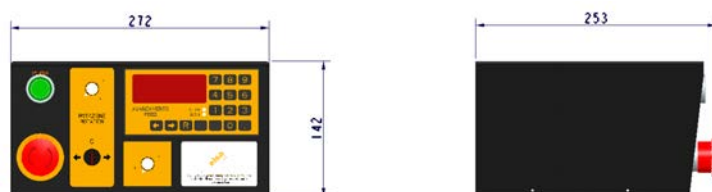
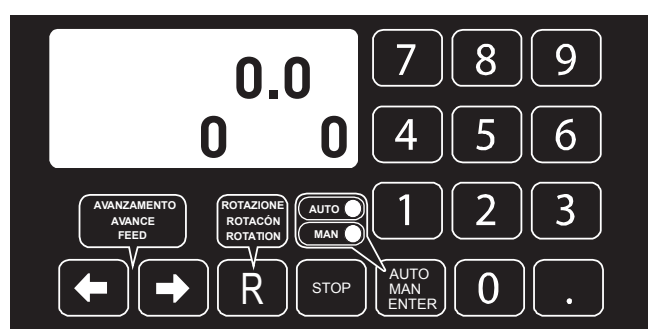


Image 2.4 - Digital control unit dimensions

The digital control unit constitutes a control unit fitted with a microprocessor programmable positioner with relay outputs. The positioner is able to control right/left/stop advancement with positioning at the set height, and the run/stop rotation of the rotation motor. The advancement speed (in mm/min) and the rotation speed (rpm) is displayed. Data is stored even when the machine is off, thanks to an EEPROM non-volatile memory. The instrument is developed in a panel container in line with standard DIN 43700.



power supply	230 V ac – 50 Hz
protection class	IP20
weight	[Kg] 6,0

The positioner allows operation in both MANUAL and AUTOMATIC mode.

Manual mode:

Each time the instrument is turned on, it starts in manual mode and the status is communicated by the lit "MAN" led.

- By pressing the (→) key, the rotation motor will rotate to the right;
- By pressing the (←) key, the rotation motor will rotate to the left;

To stop the movement, press the "STOP" key or one of the above-mentioned arrow keys (←)(→)

- The "R" key starts the rotation motor (but the desired right or left direction must first be manually selected using the special selector); to stop, press and release the "STOP" key.

The motor speed is managed by the potentiometers, which can be manually selected based on needs.

- To reset the height, hold down the "0" (zero) key for two seconds when advancement is still.

Automatic mode:

To switch from manual to automatic mode, press and release the "AUTO/MAN/ENTER" key only when the motors are still. Lit "AUTO" led.

Before starting machining, insert the arrival height in the following way:

- Press and release the AUTO/MAN/ENTER key (the display will flash in the lower right corner), now insert the desired height using the numeric keypad (value expressed in mm); confirm with AUTO/MAN/ENTER
- Select the right-left rotation direction of the shaft (from the selector) and the speed of the two motors through the potentiometer.
- To begin machining, the advancement direction must now be selected using the advancement direction keys Left (←) - (→) Right.

The rotation motor will begin to rotate and after the pre-set delay (which can be set differently in the "T.ROT" settings), the advancement motor will start.

NB: If after machining has begun the instrument fails to read the impulses from the feedback loop, from the speed sensor or from the encoder (present on the motors), all output relays will be deactivated and the writing "NO IMP" will appear on the display. Repeat the operation performing the points described above.

If the "STOP" key is pressed and released during machining, both motors will stop; to start them up again in automatic mode, you need to press the key ← left; right→ depending on the previous selection.

It is also possible to continue working in manual mode.

When the advancement reaches the set length, the advancement motor will stop first, and after a delay (variable in the T.RoT settings), the rotation motor will also stop. After the time set in the "T.r It" settings (factory settings 3 secs), the advancement motor will start up again to return to the starting length, with the rotation motor still. It will return to the starting height at maximum speed, regardless of the position of the potentiometer that normally regulates the value (in order to speed up the subsequent operation).

Once it has returned to the starting length, the work cycle can be considered complete; it is possible to either continue with other operations by setting the desired heights, or perform the same cycle, as the settings will remain stored in the memory. To start the next cycle with the previous length press (←) or (→) depending on the previous choice. To go back to manual mode, press the STOP key and after holding the AUTO/MAN/ENTER key for two seconds, the led will indicate that the manoeuvre has been performed.

Speed display

During machining (in both manual and automatic mode), the advancement speed and rotation of the machine's shaft are displayed. The advancement speed appears on the lower left, and the rotation appears on the lower right.

Setting machine constants

To access the machine constants, hold down the point key (.) for approximately 3 seconds; three zeros will appear, the first of which will flash; insert the number 2 7 3 from the numeric keypad and confirm by pressing AUTO/MAN/ENTER.

- The R key allows the constants to be scrolled without modifying them
- Using the AUTO/MAN/ENTER key, the value of the constant is deleted; to insert the new value, use the numeric keypad and confirm with AUTO/MAN/ENTER.
- To exit the constants settings mode, do not press any keys for approximately 7 seconds and the instrument will return to manual mode.

Values of constants

N.B: The unauthorised modification of the values shown below will result in the incorrect use of the machine

- Pre Stop FACTORY VALUE = 0
- Slow height FACTORY VALUE = 0
- Rotation start delay FACTORY VALUE = 5000
- Return to zero delay FACTORY VALUE = 5000
- Value shown on display for one encoder rotation FACTORY VALUE = 765
- Number of impulses per encoder rotation FACTORY VALUE = 375,000
- Number of decimals FACTORY VALUE = 1
- Minimum limit for heights FACTORY VALUE = 0.0
- Maximum limit for heights FACTORY VALUE = 350.0
- Rotation speed correction value FACTORY VALUE = 1000
- Correction impulses for rotation speed FACTORY VALUE = 583
(BORING MACHINE 2 GEARS) = 683 (BORING MACHINE 4 GEARS)

3 INSTALLATION INSTRUCTIONS

3.1 GENERAL

This section of the manual provides a description of the different phases of the boring machine's installation. The images shown in the following paragraphs refer to the typical case of boring holes in the earthmoving sector; the most typical application is represented by repairs to mechanical excavators, in particular on the housing holes of bucket pins.

In general, the boring machine performs mechanical machining processes for the removal of metal material and/or executes overlay welding inside axially symmetric cavities, continuously or in sections.

Various images, photos and technical drawings shown below may differ to the elements forming part of the machine's equipment.

3.2 INSTALLATION

Following is a description of the different phases of installation for the boring machine.



During installation and while working, the operator must wear anti-accident protective clothing, consisting in:

- Protective goggles;
- Protective helmet;
- Safety shoes (steel tip and puncture resistant);
- Protective gloves;
- Face mask;
- Ear muffs or ear monitors;
- Protective, tight-fitting suit.

The user responsible for machining must use the above-mentioned personal protective devices with a "CE" marking and manufactured in compliance with relative product regulations (ISO, EN).

If the specific machining or environmental conditions so require, the user must assess additional safety measures and wear supplementary protective clothing.



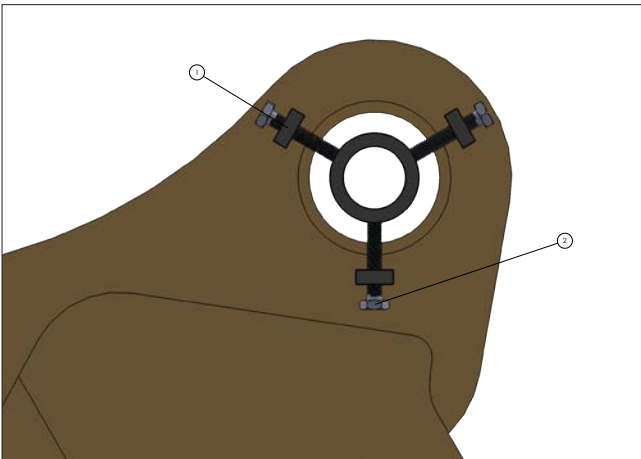
It is strictly prohibited to allow unqualified personnel, or personnel not equipped with the above-mentioned safety devices to approach the machine.



- The operator must carefully read the instructions reported in this manual and ensure that nobody uses the equipment without having first read its contents;
- The operator must know how to promptly interrupt the machine's operation in the case of an emergency;
- When using the equipment, wear a protective suit or tight-fitting clothing to avoid entanglement with moving parts;
- Wear anti-accident protective clothing, according to the instructions reported in paragraph 1.8;
- Operate in conditions of artificial light with an average minimum value equal to 750 lux at the height of the worktop;
- Ensure that the mechanical mechanisms allowing the equipment to be attached are correctly installed;
- For each maintenance, inspection or other operation, isolate the power supply circuit;
- Ensure that the equipment is connected to the electrical network with an efficient grounding connection, inserting an isolation and protection device with the characteristics specified in paragraph 1.7;
- Install the equipment at a safe distance from electrical cables and obstacles, carefully assessing the minimum distances that need to be respected;

- Do not modify or tamper with the settings on the motor drive boards, or make connections on the terminal block different to those indicated by the manufacturer;
- The user must assess beforehand whether or not the installation environment is compatible with the protection class of the equipment, or if it is classified as a “high-risk environment”.
- All interventions on electrical parts must be performed with the equipment’s power disconnected.

3.2.1 SHAFT CENTRING KIT ASSEMBLY



Drw. 1 - Shaft centring kit assembly

- Attach the shaft centring kit through spot welding (part.1 drw. 1);
- Unscrew the bolts from the bushes (part.2 drw. 1).

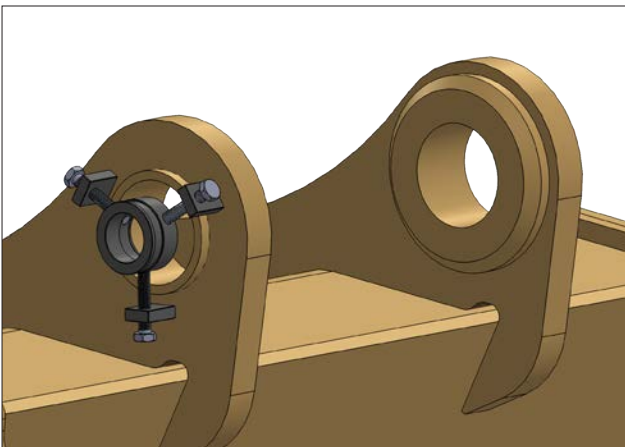


Image 3.1

Image 3.1 shows the bush installation phase.

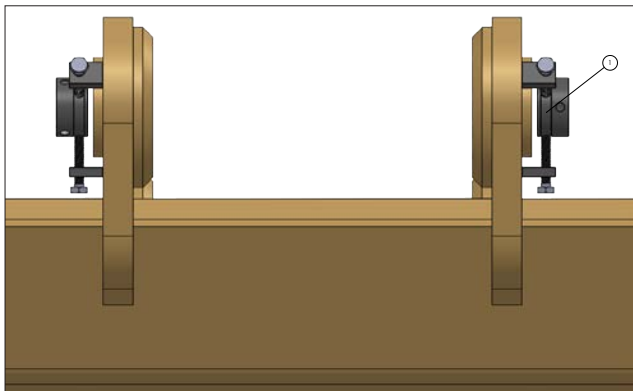
After having rested the supports on the front surface of the hole, fix their position on the plane through a light spot weld. Repeat the same operation on the external surface of the other hole, so as to fix the position of the shaft in two points. The equivalent static scheme is the rest-rest one. Delete the above sentence



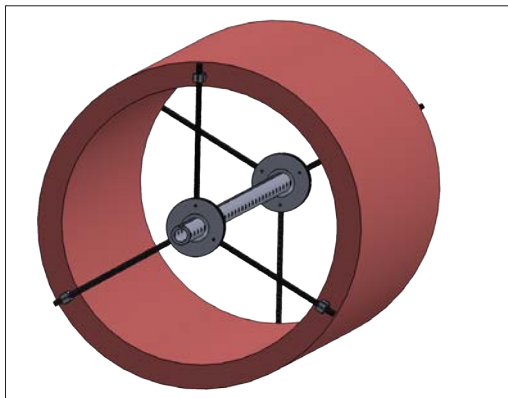
Note!

Suggestion for user!

Where possible and suitable, to facilitate the subsequent steps, position the centring kit in such a way as to obtain a 120° configuration with a bolt along the vertical side i.e “Y” shape. Repeat process on the opposite hole, to obtain an identical configuration.



Drw. 2.1



Drw. 2.2

- Move the bush so that the bolts are housed in the special cavities as shown (see part. 1 drw. 2.1).

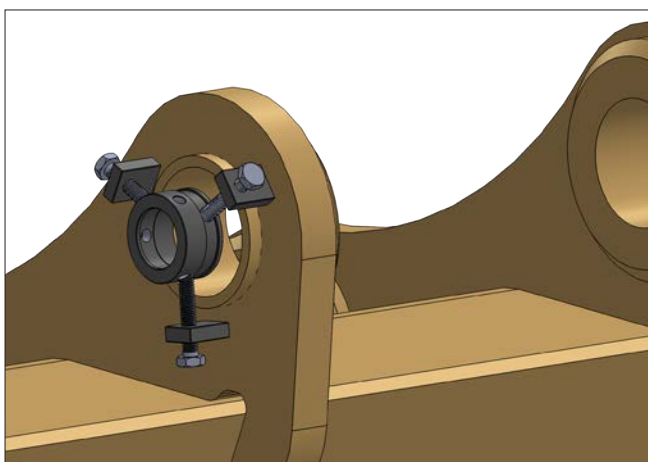
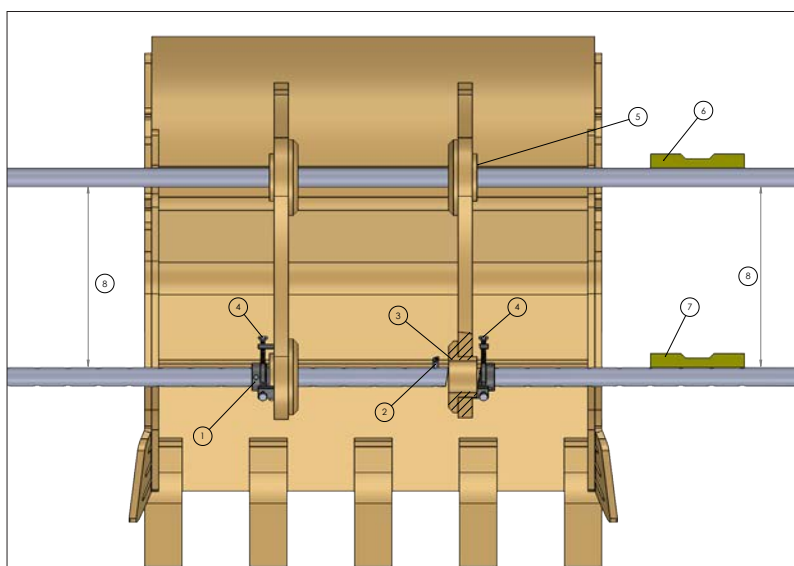


Image 3.2

Image 3.2 demonstrates how the bush looks after the previously described operations have been performed. At this point, the operator is able to preliminarily position the bush itself by regulating the screws. The image drw. 2.2 shows the centring kit for model SC2 60/1 and SC3 60/2.

3.2.2 TOOL-HOLDER SHAFT CENTRING



Drw. 3. Tool-holder shaft centring

- Insert the tool-holder shaft in the special bushes (part.1 drw. 3);
- Fix the tool-holder in the relevant cavities in the shaft (part.2 drw. 3); manually rotate the shaft by lightly touching the walls to be repaired with the upper end of the insert (part.3 drw. 3); for centring, act on the bolts (part. 4 drw. 3), first on one side and then on the other;
- Where possible, use a second shaft by housing it in an integral cavity (part.5 drw.3), lay a level (part.6 drw.3) and check the alignment, for eventual centring corrections act on the bolts (part.4 drw.3);
- Measure the distance between the two shafts, ensuring the same distance on both sides (part.8 drw.3)

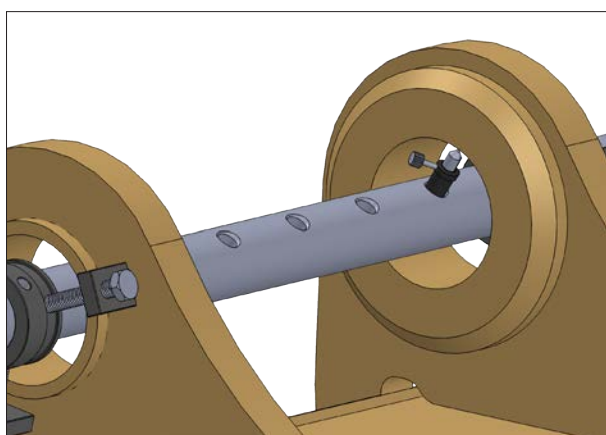


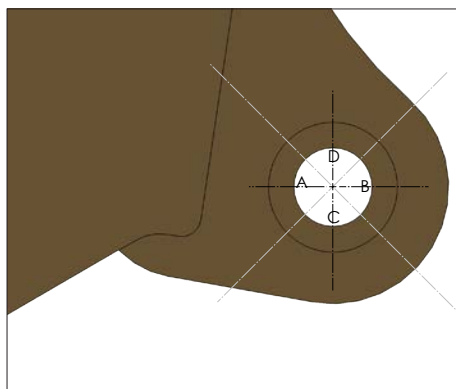
Immagine 3.3

Image 3.3 shows the telescopic gauge installed on the shaft to check the centring phase. In this phase, pay attention to the measurements provided by the telescopic gauge, insofar as the dimensional and geometric tolerances resulting from machining depend on them.

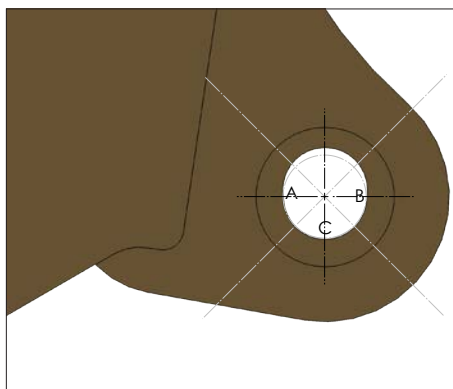


Note!
Determination of original position of centre hole.

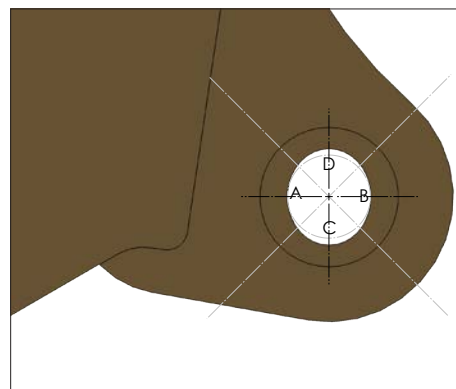
Suggestion for user!



Drw. 4



Drw. 5



Drw. 6

The user may encounter the following cases:

- Consistent hole;
- Asymmetrically ovalised hole;
- Symmetrically ovalised hole.

Consistent hole

Extend the telescopic gauge up to the value corresponding to the point corresponding to the smaller radius (e.g. point A) shown in drw.4

At this point, slide the shaft axially in such a way as to bring the telescopic gauge outside the cavity and manually rotate the shaft 180° in such a way as to bring the telescopic gauge to a diametrically opposite position (point B drw.4).

Re-insert the telescopic gauge into the cavity and measure the radial distance between the upper end of the telescopic gauge and point B as shown in drw.4.

The semi-gap will provide the operator with an indication of the shift that needs to be made, towards point B, using the centring kit's regulation screws.

Beginning from the point corresponding to the smaller radius, repeat the same procedure using the two points located on the perpendicular to the A-B line.

Asymmetrically ovalised hole

Extend the telescopic gauge up to the point corresponding to the smaller radius (e.g. point A) shown in drw.5

At this point, slide the shaft axially in such a way as to bring the telescopic gauge outside the cavity and manually rotate the shaft 180° in such a way as to bring the telescopic gauge to a diametrically opposite position (point B).

Re-insert the telescopic gauge into the cavity and measure the radial distance between the upper end of the telescopic gauge and point B as shown in drw.5.

The semi-gap will provide the operator with an indication of the shift that needs to be made, towards point B, using the centring kit's regulation screws.

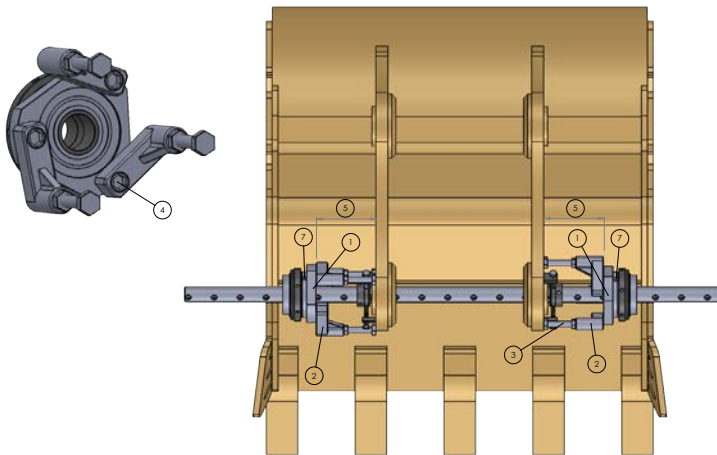
At this point, in the integral zone it is necessary to look for a point located on the perpendicular to the A-B line (in the example of drw.5, point C); using the centring kit's regulation screws, shift the assembly in such a way that the centre is equidistant from A, B and C.

Symmetrically ovalised hole

In this case, it is necessary to use four points separated by 90° in a similar way to that described in case 1).



3.2.3 REGULATION OF MAIN SUPPORTS



Drw. 7. Regulation of main supports

- Insert the supports on the tool-holder shaft from both sides (part.1 drw.7);
- Adjust the opening of the feet to determine the positioning of the bolts (part.2 drw.7), outside the holes needing to be repaired (part.3 drw.7);



The image to the side shows the set-up of the supplied support, obtained by suitably adjusting the opening of the holding feet as shown.

Image 3.4

- Lock the feet (part.2 drw.7) with the bolts (part.4 drw.7);
- Adjust the three bolts (part.3 drw.7), so that they rest on the walls of the holes being repaired, leaving a space between the supports (part.1 drw.7) and the external walls of the holes being repaired (part.5 drw.7) of approximately 90-100 mm;
- Block the lock nuts of the bolts (part.6 drw.7);
- Slightly block the Allen bolts housed inside the supports (part.7 drw.7); in this operation the tool-holder shaft must be manually rotated for the head of the bolts to coincide with the support hole, for the insertion of the supplied hex key.

Images 3.5 - 3.6 - 3.7 illustrate the described steps

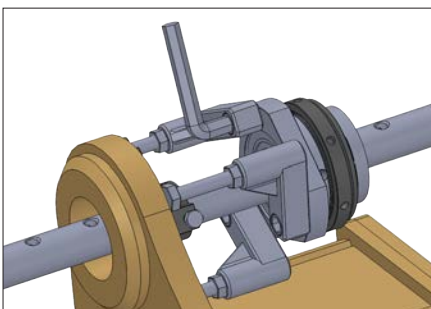


Image 3.5

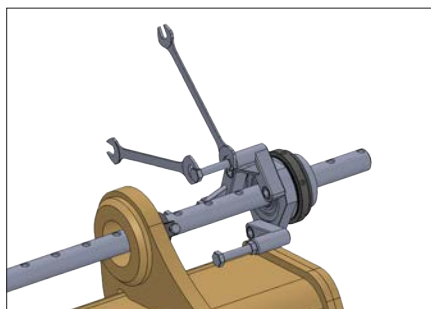


Image 3.6

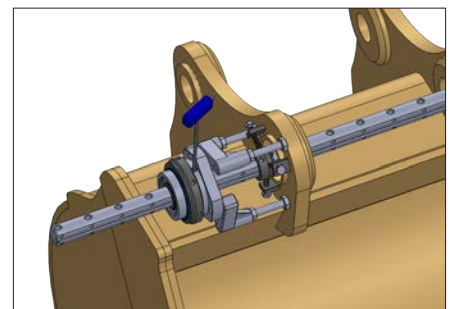
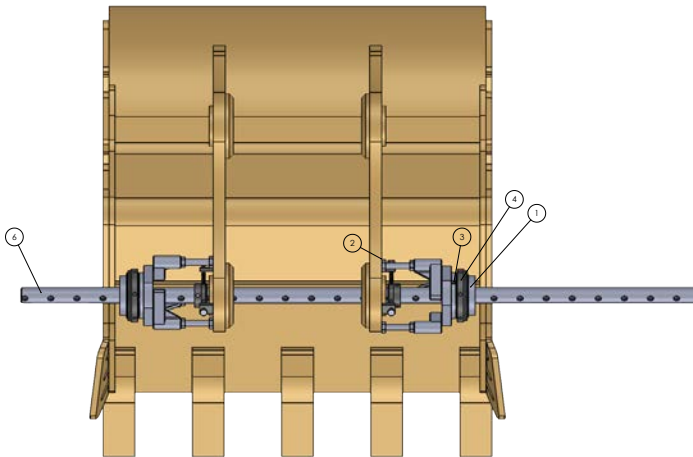


Image 3.7

3.2.4 FASTENING OF MAIN SUPPORTS



Drw. 8. Fastening of main supports



DANGER!

DANGER!

Pay attention when fastening supports onto the selected surface; the connection may need to be made through continuous fillet welding (Eurocode 3) and the fillets will need to be sized based on the shear and bending moment resulting from the weight of the machine and the equipment installed.

Provisionally fix the supports onto the walls of the holes being repaired (part.2 drw.8) with a light spot weld;

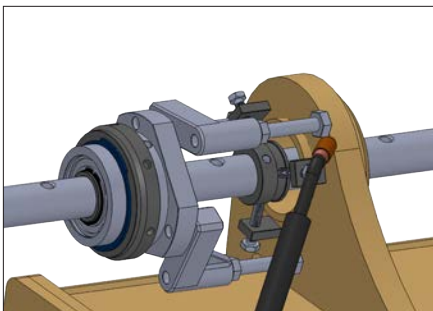


Image 3.8

- Reinforce the same points, with a section of definite welding, ensuring the good fusion between the bolt heads and the walls of the holes to be repaired (part.2 drw.8);
- After fixing the supports to the piece being repaired, unscrew the two Allen screws for 1 rotation at the most, (part.3 drw.8) located inside the two supports (part.1 drw.8);
- Remove the tool-holder shaft (part.6 drw.8) and the centring kit (prt.5 drw.8);
- On the side on which you'd like to install the machine, the rotating part of the support (part.1 drw.8) must be removed by unscrewing the threaded lock nuts (part.4 drw.8).

Images 3.9 - 3.10 - 3.11 - 3.12 illustrate the described steps.

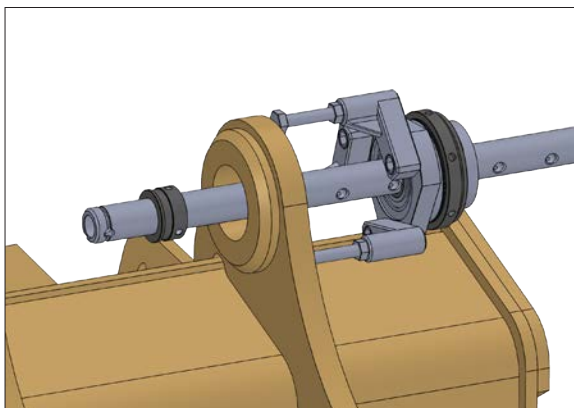


Image 3.9

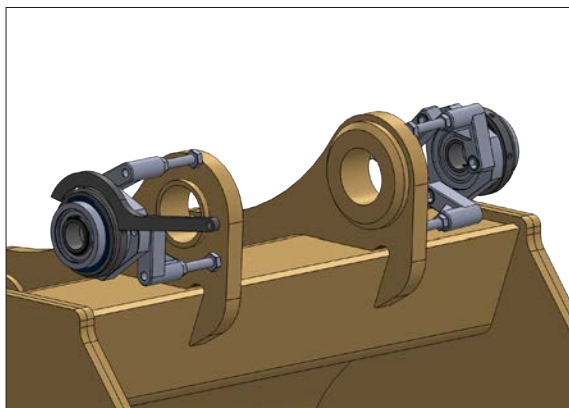


Image 3.10

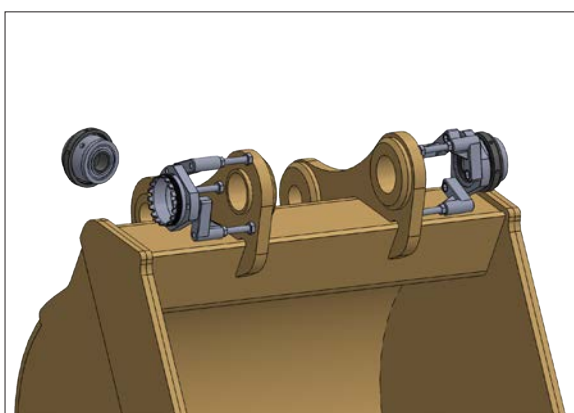


Image 3.11

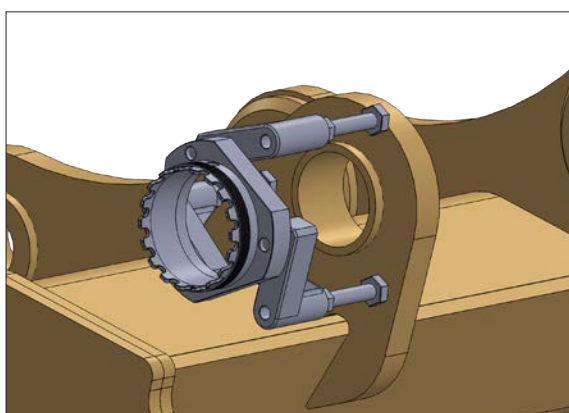
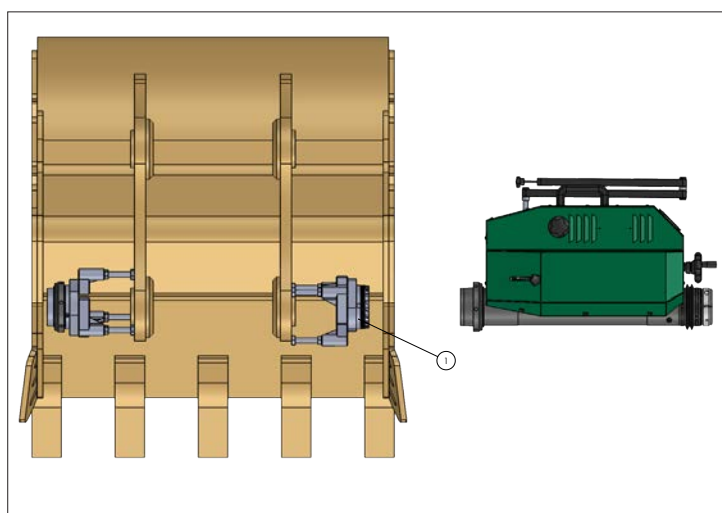


Image 3.12

3.2.5 MACHINE FASTENING



Drw. 9. Machine fastening.

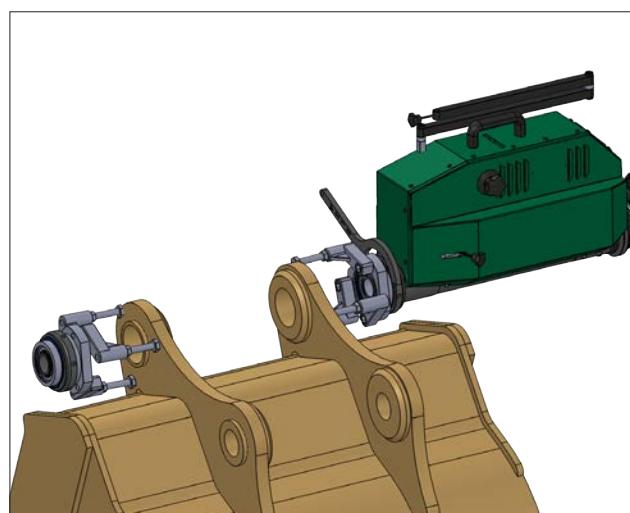
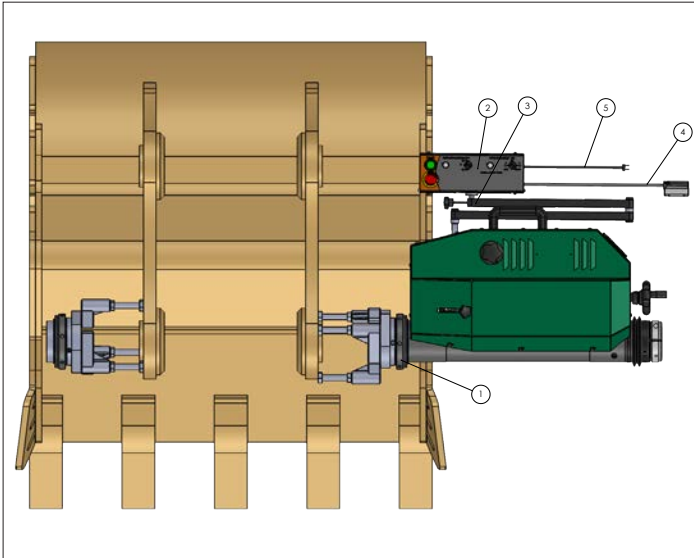


Image 3.13

From the side on which the rotating part of the support was extracted, insert the machine (part.1 drw.9);

- Block the machine on the support with the special threaded lock nut (part.1 drw.9) using the supplied key.

3.2.6 INSTALLATION OF CONTROL UNIT



Drw. 10. Installation of control unit.

- After having assembled the machine on the support (part.1 drw.10), install the control unit (part.2 drw.10) on the special arm (part.3 drw.10);
- Connect the cable (part.4 drw.10) between the machine and the control unit (part.2 drw.10);
- Connect the power supply cable (part.5 drw.10) to the control unit and to the 220V single phase network;

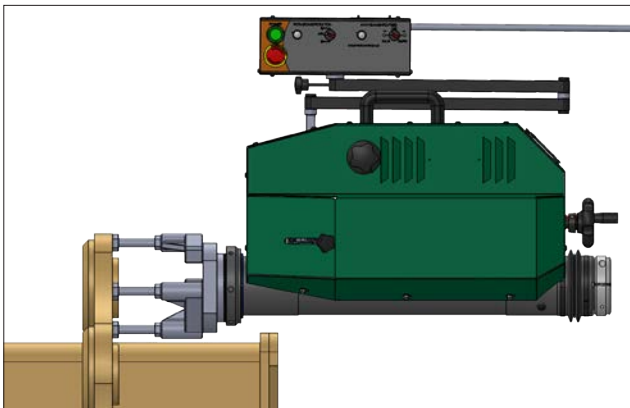


Image 3.14



- Ensure that the mechanical mechanisms allowing the equipment to be attached are correctly installed;
- The power supply circuit must be isolated;
- Ensure that the equipment is connected to the electrical network with an efficient grounding connection, inserting an isolation and protection device with the characteristics specified in paragraph 1.7;
- Install the equipment at a safe distance from electrical cables and obstacles, carefully assessing the minimum distances that need to be respected;
- All interventions on electrical parts must be performed with the equipment's power disconnected.
- The nominal network voltage must be equal to 230V +/- 10%;
- The nominal network frequency must be equal to 50 Hz;
- In countries where the power supply is characterised by different nominal frequency values and voltages, the machine must be fitted with a supplementary transformer.

Picture 3.15 and 3.16 show how to connect the cable between control panel and line boring machine. Pay attention that the connecting pins positioned on the the male cable connector (control panel side) and the machine stay precisely in the corresponding holes. An imperfect connection may cause malfunction and / or short circuit - neutral phase.

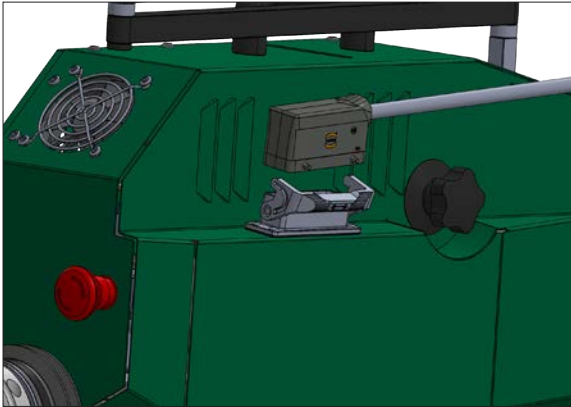


Image 3.15

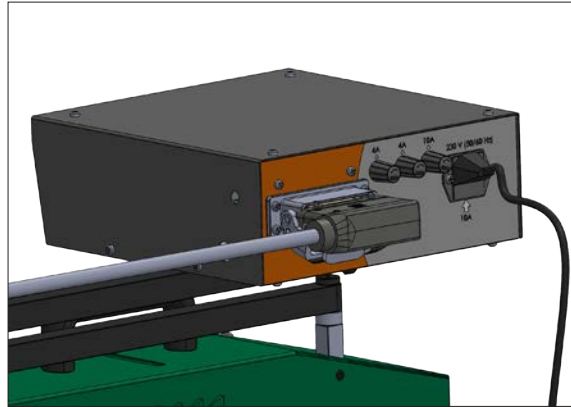


Image 3.16

3.3 CONFIGURATION OF MACHINE FOR OVERLAY WELDING



The welding phase exposes the user to serious specific hazards. The eyes must be protected with special welding goggles, fitted with filtering lenses. The body must be protected with suitable clothing.



Electric shock

- Install and properly ground the machine;
- Pay attention not to enter into contact with live electrical parts;
- Ensure you are isolated from the ground during working phases;
- During all phases of installation, operate with the power off, checking that the boring machine and welder are connected to power supply circuits isolated from the device.



Fumes and gases

- Operate in a well-ventilated environment and use special air extractors to avoid excessive concentrations of gas in the working area



Risk of fire

- Sparks of both an electrical and mechanical origin may be produced. Ensure that the working area is free of flammable materials and wear suitable protective clothing to protect against burns resulting from contact with hot parts.



Risk of explosion

- Ensure that there are no pressurised receptacles, gas or vapours with the risk of explosion in the working area.

3.3.1 OPERATIONS PRIOR TO OVERLAY WELDING PHASE

Prior to beginning overlay welding operations, proceed as follows:

- Clean the surface on which you will weld too, use products that are not greasy or oily;
- Warm up the piece that will be machined to a temperature of approximately 100-150 °C;
- Centre the boring machine as described in the relevant paragraph of this manual;
- Equip the boring machine with a boring bar adapted to the machining diameter and do a round of boring to eliminate any ovalisation and oily material deposits.

At this point the machine can be equipped for the overlay welding.

- Add the supplied spacers to extend the lance;
- Prior to inserting the contact tip on the last section of the lance extension, insert the contact spring inside the extensions, so that it is approximately 1 mm shorter with respect to the end of the contact tip.

N.B. Do not use contact tips and gas seals other than those supplied.

3.3.2.1 OVERLAY WELDING PROVISIONS (SC1)

For overlay welding operations, using both a long and short tip, it is important to ensure that the distance between the contact tip and the wall being machined is equal to:

- 4 mm for overlay welding with wire = 0.8 mm;
- 6 mm for overlay welding with wire = 1 mm;

The above-mentioned distances must be regulated by shifting the lance through the special knuckle-joint. The parameters that need to be set for overlay welding (rotation and advancement speed) strongly depend on the working environment, the composition of the material being machined, the welder and the electrical parameters of the welder itself.

It is recommended to regulate the parameters directly during the machining phase; in this configuration phase, it is wise to use no. 2 operators, so that one can act on the machine's rotation and advancement speed while the other looks after variations to the welder parameters.

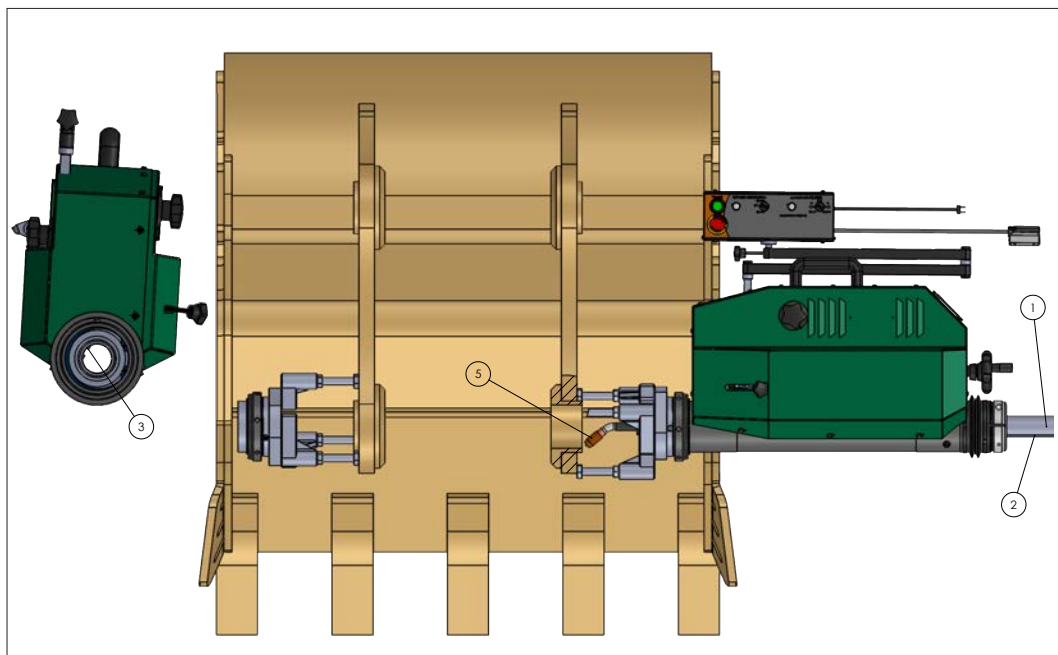
The welding process must be characterised by a regular noise level, without impulsive components; correct welding parameters are considered to have been obtained if there is no crackling or noises typical of unsuitable machining. The rotation speed and subsequently the advancement speed should be regulated when the torch deposits the material in the lower half of the cylindrical cavity.

In order to correctly perform overlay welding, it is strictly necessary to check that during machining, a continuous fillet is developed, without overlapping and discontinuity. To obtain the correct settings, the operator must adjust both the rotation speed and the wire advancement speed.

Prior to performing a second round of overlay welding, the previously machined surface needs to be treated using a rotating steel brush.

It is also strictly necessary for the above-mentioned operations to be performed in a working environment where the electrical parameters (voltage, frequency) of the welder are stable and therefore, where necessary, it is recommended to use a voltage stabiliser with nominal power compatible with the electric load.

Furthermore, if works are not performed with a cored wire, avoid the development of localised air streams that may negatively influence the overlay process.



Drw. 12.

- After inserting one of the gears, insert the torch without contact tip and gas seal, from the rear part of the machine (part.1 drw.12 - image 3.17);

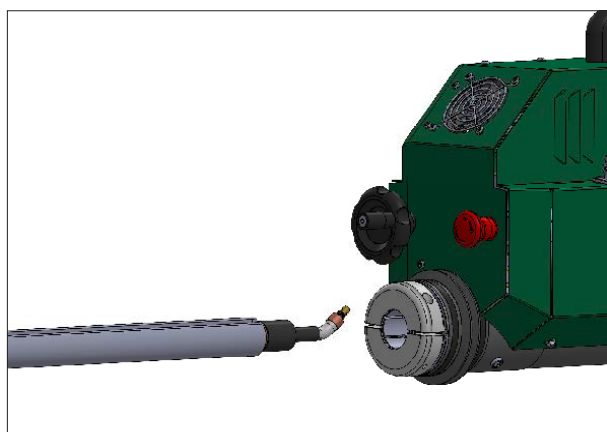


Image 3.17

- Make the torch guide key (part.2 drw.12) coincide with the machine's internal key (part.3 drw.12);
- Block the torch by screwing the relevant lock nut threaded on a normal wire welder, EURO attachment with minimum current equal to 250 Amps (image 3.18);

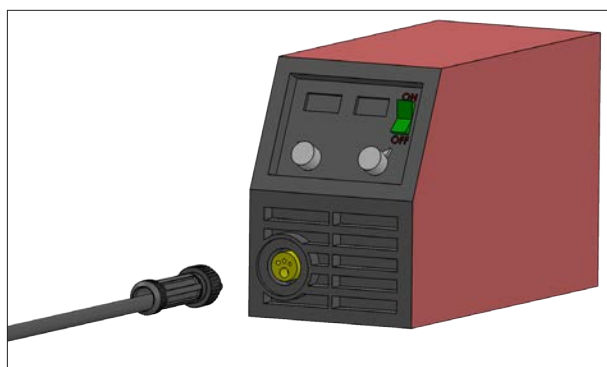


Image 3.18

- Use a wire with $\varnothing 0.8$ to $\varnothing 1$ mm and Argon mix 85% - CO₂ - 15% with pressure from
- 14 - 16 Bar;
- After having checked that the wire protrudes from the end of the lance, and after having screwed on the contact tip and gas seal, position the torch lance, pushing it manually (part.5 drw.12 and image 3.19) into the hole being repaired.

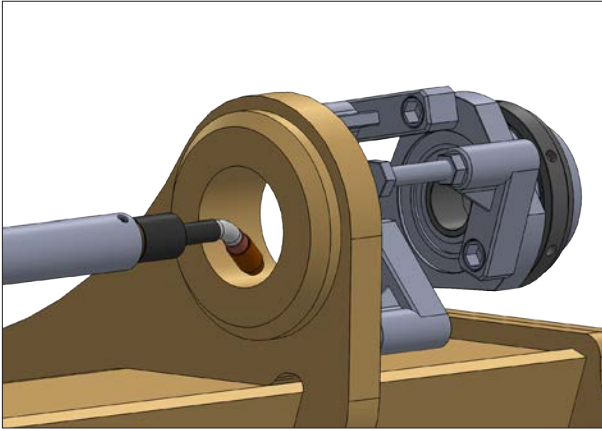
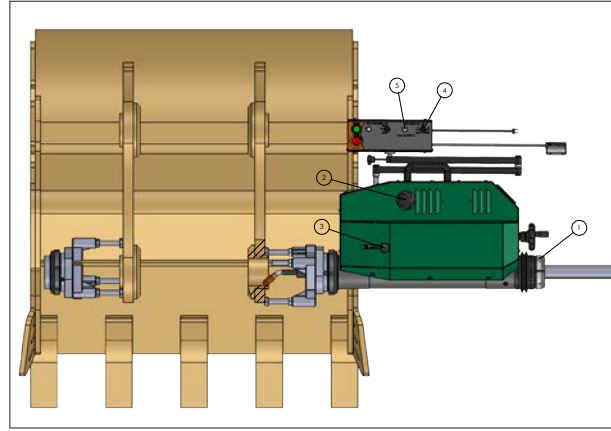


Image 3.19



Drw. 13.

- After having performed the previous operations, block the torch by screwing the two Allen screws (part.1 drw.13 and image 3.20);
- Place in neutral position using the special shaft rotation change lever (part.2 drw.13 and image 3.21);

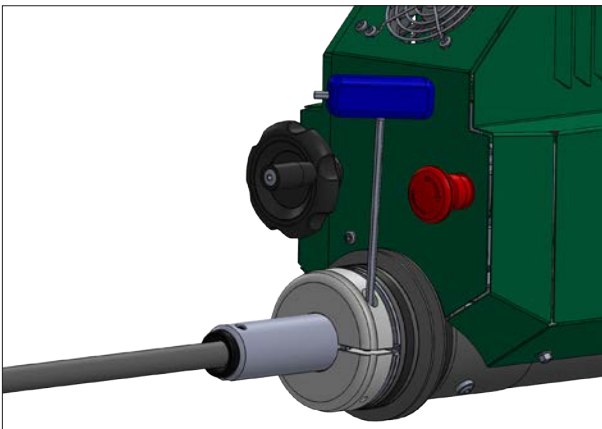
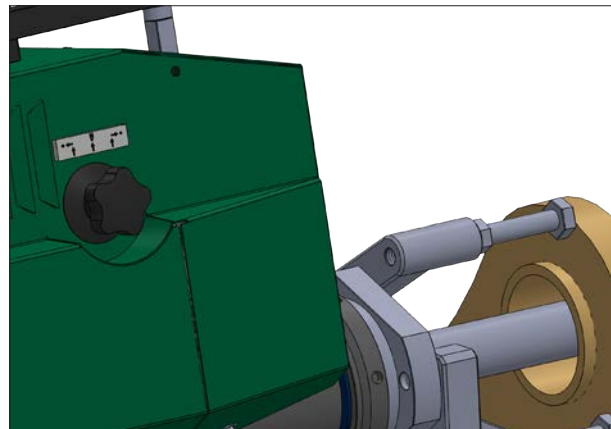


Image 3.20



Drw. 3.21

- Move the torch rotation knob to position 1 (part.3 drw.13); to facilitate the shift, manually rotate the torch shaft;
- Efficiently connect the welder frame to the piece being overlay welded.
- Once the above-mentioned operations have been performed, the machine is ready to execute the overlay weld, suffice it to act on the control unit commands as follows:
- Press the ignition switch;
- Turn the advancement switch towards the right (part.4 drw.13);
- Regulate the advancement and torch rotation speeds, positioning the potentiometer at the required value (part.5 drw.13).
- If machining needs to be stopped, first press the welder ignition/switch-off key and then the emergency switch.
- To extend the torch length, unscrew the screws located at the end of the torch itself for approximately 1-2 rotations, then slowly screw without applying force, lengthening the torch by pushing it until the desired length; then tighten the two screws.

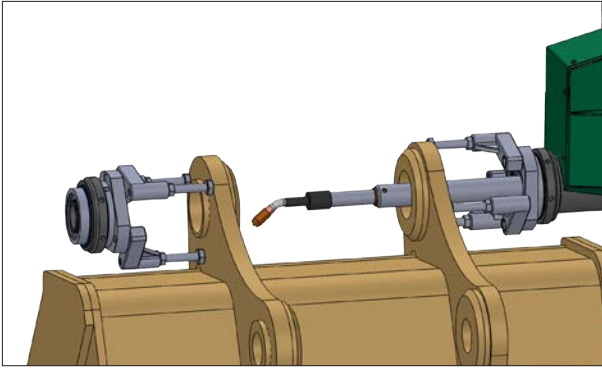


Image 3.22

The image to the side shows how torch regulation operations can be performed in an axial direction. By unscrewing the special grub screw, it is possible to obtain the desired length.

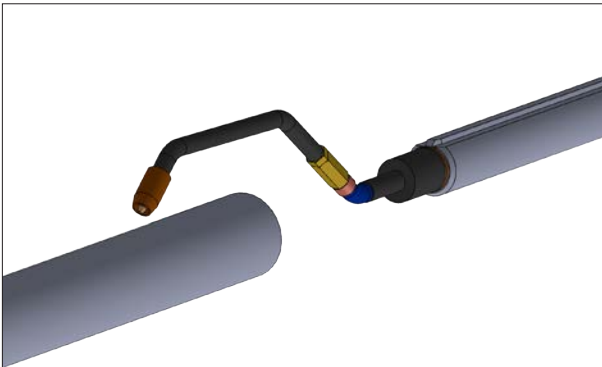
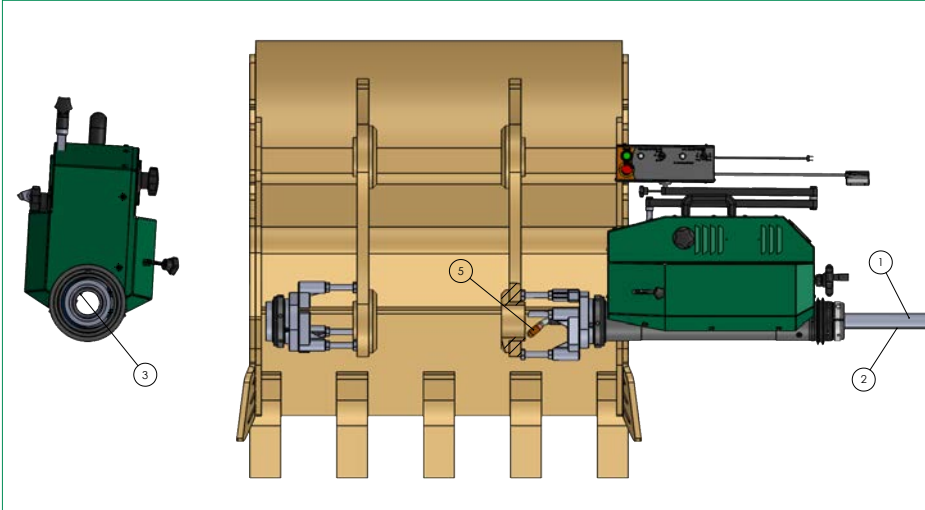


Image 3.23

The image to the side shows the torch used for external overlay welding (on shafts).

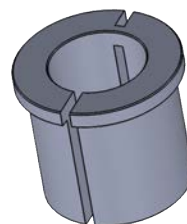
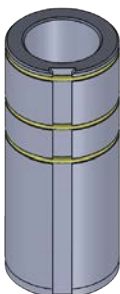
3.3.2.2 OVERLAY WELDING PROVISIONS (SC2 AND SC3)



Drw. 14.a

TORCH TAKE-OFF REDUCTION BUSH | A

TORCH LOCKING REDUCTION BUSH | B



With reference to drawing Drw.14.a:

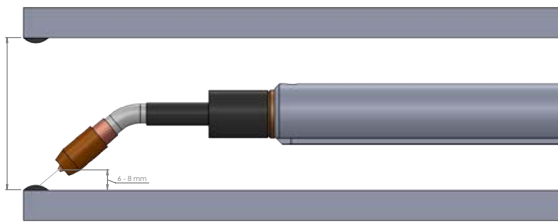
Insert the take-off reduction bush into the machine (part. A)

Make the torch guide key coincide with the machine's internal key (part.3);

- Insert the torch locking reduction bush (part.B), onto the special overlay welding torch.
- Start the welding gear and insert the torch, without contact tip and gas seal, from the rear part of the machine in which the torch take-off reduction bush was previously inserted (part. 1);
- Block the torch by screwing the relevant lock nut threaded on a normal wire welder, EURO attachment with nominal current equal to 250 Amps;
- Use a wire with $\varnothing 0.8$ to $\varnothing 1$ mm and Argon mix 85% - CO₂ - 15% with a pressure of 14/16 Bar;

Part.5 - After having checked that the wire protrudes from the lance, and after having screwed on the contact tip and gas seal, position the torch lance, pushing it manually and delicately into the hole being repaired.

For works with diameter greater than 60 mm, use the long type tip, taking care to leave a space between the contact tip and the wall being overlay welded, of approximately 6 - 8 mm;

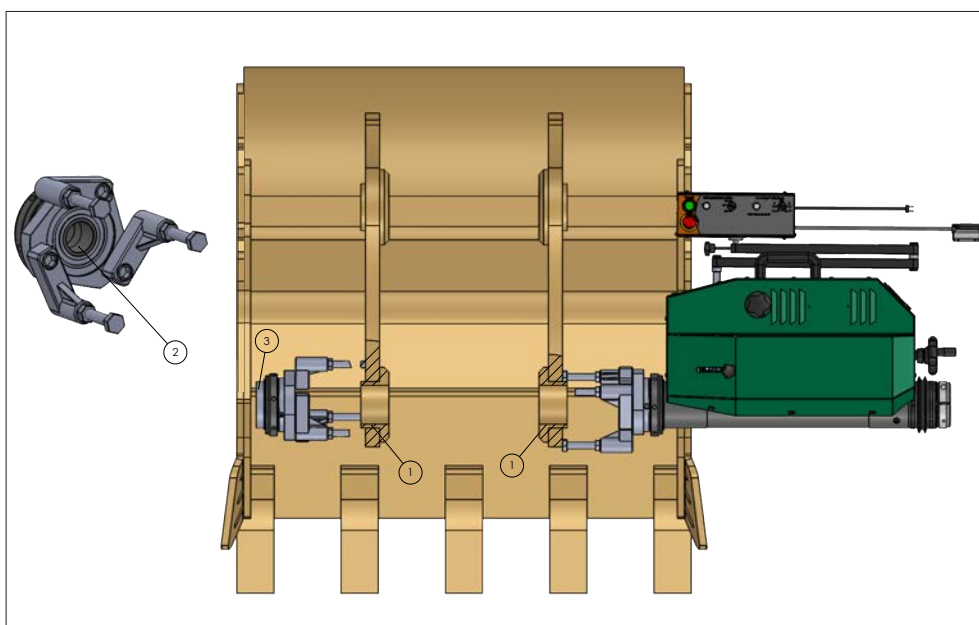


3.4 CONFIGURATION OF MACHINE FOR BORING OPERATIONS



WARNING!

- The operator must carefully read the instructions reported in this manual and ensure that nobody uses the equipment without having first read its contents;
- The operator must know how to promptly interrupt the machine's operation in the case of an emergency;
- When using the equipment, wear a protective suit or tight-fitting clothing to avoid entanglement with moving parts;
- When using the equipment, do not wear metal objects such as rings, bracelets or similar;
- When using the equipment, it is strictly prohibited to wear loose clothing;
- The user's hair must be either short or tied back in order to avoid the risk of entanglement with moving mechanical parts;
- Wear anti-accident protective clothing, according to the instructions reported in paragraph 1.8;
- Operate in conditions of artificial light with an average minimum value equal to 750 lux at the height of the worktop;
- Keep the equipment clean;
- Ensure that the mechanical mechanisms allowing the equipment to be attached are correctly installed;
- For each maintenance, inspection or other operation, isolate the power supply circuit;
- Ensure that the equipment is connected to the electrical network with an efficient grounding connection, inserting an isolation and protection device with the characteristics specified in paragraph 1.7;
- Install the equipment at a safe distance from electrical cables and obstacles, carefully assessing the minimum distances that need to be respected;
- Ensure that all mechanical and electrical parts responsible for ensuring protection or safety are checked and efficiently maintained;
- Do not modify or tamper with the settings on the motor drive boards, or make connections on the terminal block different to those indicated by the manufacturer;
- Work in an environment complete with fire extinguishers, whose number and technical features are compatible with current legislation;
- The user must assess beforehand whether or not the installation environment is compatible with the protection class of the equipment, or if is classified as a "high-risk environment";
- All interventions on electrical parts must be performed with the equipment's power disconnected.



Drw. 14.

After having performed the overlay weld:

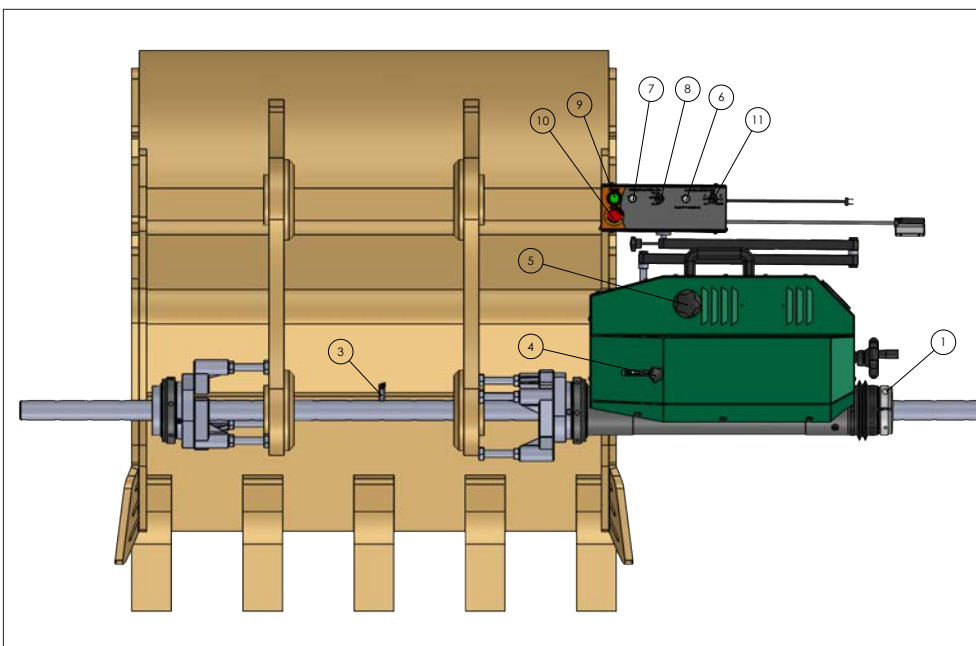
- Remove the torch;
- Lubricate the supports (part.2 drw.14);
- Insert the tool-holder shaft from the rear part of the machine, making the shaft key coincide with the relative housing;
- Insert the shaft into the support (part.3 drws.14),



The machine will stop if the power absorbed under load is greater than the design power; once the motor has reached maximum torque at the set rotation regime, it is protected from mechanical friction and an electronic surge arrestor.

To prevent mechanical damage and/or hazards to the operator, in these cases the following behaviour should be adopted:

- Adjust the force by changing the cutting parameter settings (advancement, number of shaft rotations and depth);
- Alternatively, change the mechanical speed, inserting a new ratio with a lower speed;



Drw. 15.



In all machining operations with tool-holder shafts, remember to remove the tool-holder blocking screws.

- Block the shaft using the two Allen bolts (part.1 drw.15);
- Fix a tool-holder in the relevant holes of the shaft;
- Place the knob in neutral (part.4 drw.15); insert the desired mechanical shaft rotation speed by shifting the knob
- Reset the potentiometer values (part.6 and part. 7 drw.15);
- Rotate the control unit selector in the required rotation direction (part.8 drw.15);
- Activate the general switch;
- If it becomes unexpectedly necessary to stop the machine, press the emergency switch (part.10 drw.15);

3.5 MANUAL ADVANCEMENT

The boring machine allows advancement to be manually controlled using a special supplied hand-wheel, positioned at the rear. The following figures show the phases of assembly and how to use the hand-wheel.

To allow manual advancement, the hand-wheel in figure 3.24 must be pushed in the direction shown by the arrow. The advancement condition with actuator (DC motor) can be restored by pulling the hand-wheel in the opposite direction to that shown in figure 3.24.

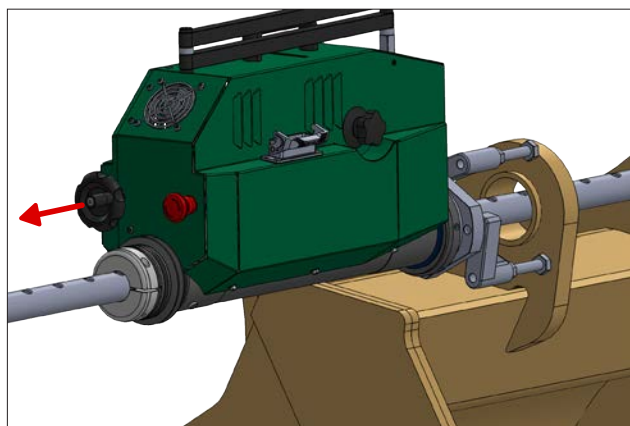


Image 3.24

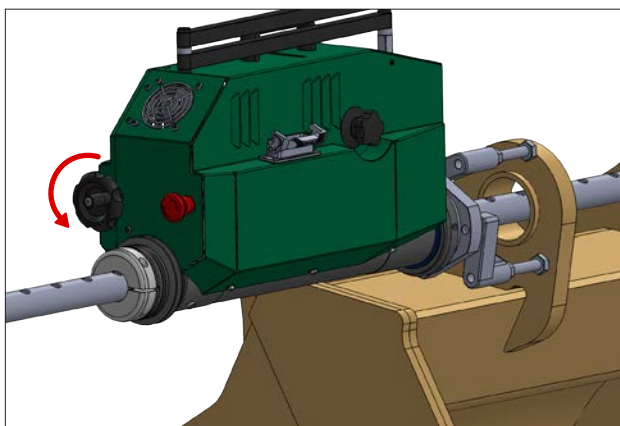


Image 3.25

3.6 CENTESIMAL MEASUREMENT SETTINGS

After having fastened the dial gauge holder, the centesimal regulation in a radial direction of the insert-holder must be performed using the special hex head screw.

Image 3.26.1 shows the dial gauge holder fastened using the holes on the shaft, but other solutions are possible, provided the user checks the geometrical and dimensional tolerances required for machining.

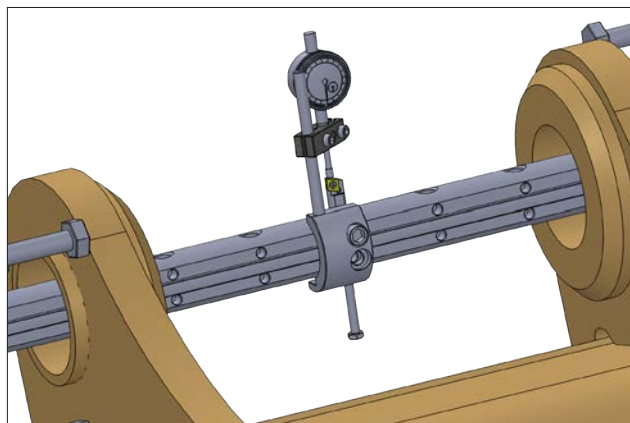
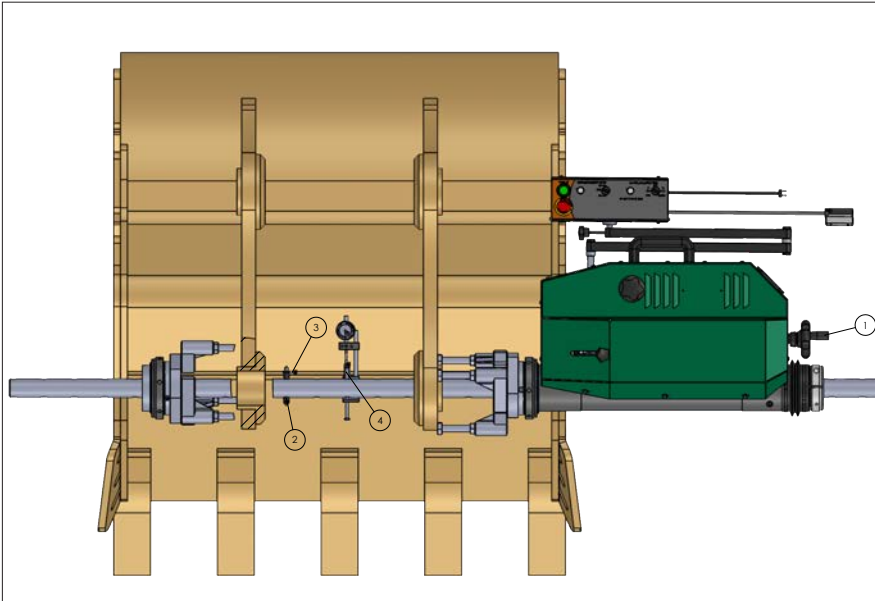


Image 3.26.1

3.7 CENTESIMAL MEASUREMENT OF INTERNAL VALUES



Drw. 16.

For measurements inside holes, it is necessary to use the supplied modular telescopic gauge.

Proceed as follows:

- Move the shaft through advancement (automatic or manual);
- Insert the telescopic gauge in a free shaft hole, such as (part.2 drw. 16 and image 3.27) and position it in the hole needing to be measured, moving the shaft through the advancement system;
- When the telescopic gauge is in the hole, bring the ends into contact with the internal surface of the hole to be measured and block its position;
- Then, start advancement to extract the telescopic gauge and take the measurement with a centesimal gauge (image 3.28.1).

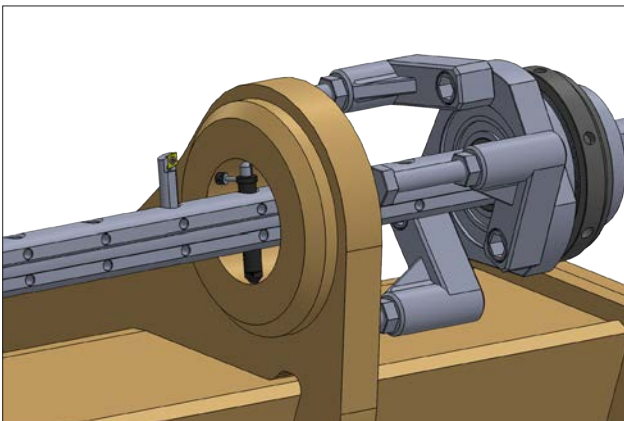


Image 3.27

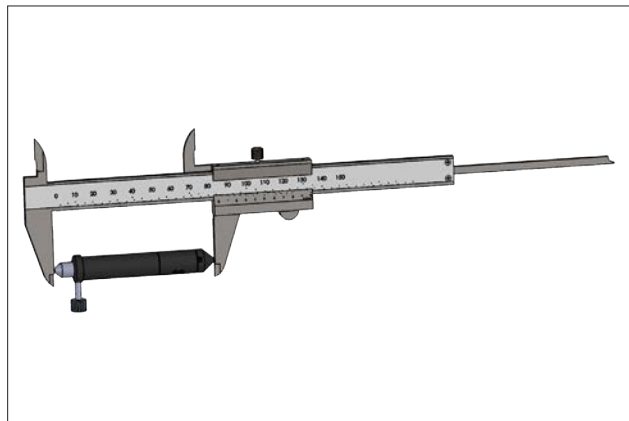


Image 3.28.1

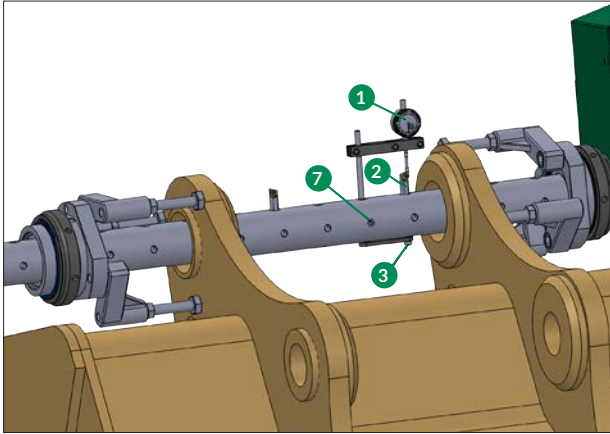


Image 3.28.2

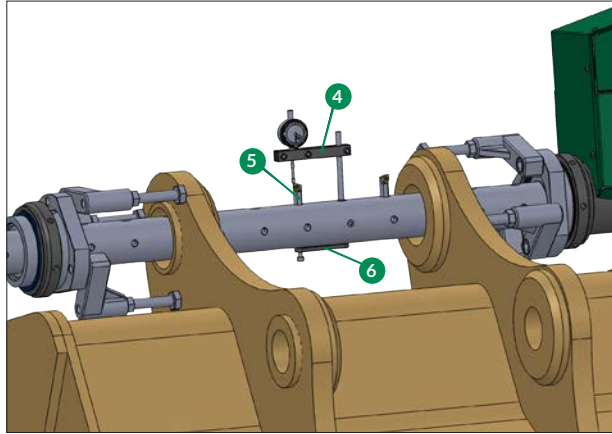


Image 3.28.3

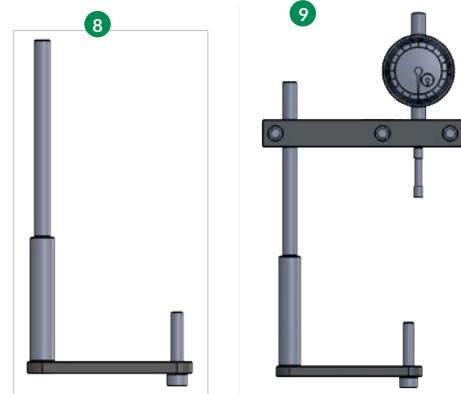
NOTE: Images 3.28.2 and 3.28.3 illustrate how to take respective measurements for right and left tool cases.

RIGHT TOOL MEASUREMENT:

Complete measuring kit (part. 9);

Assemble the kit as follows:

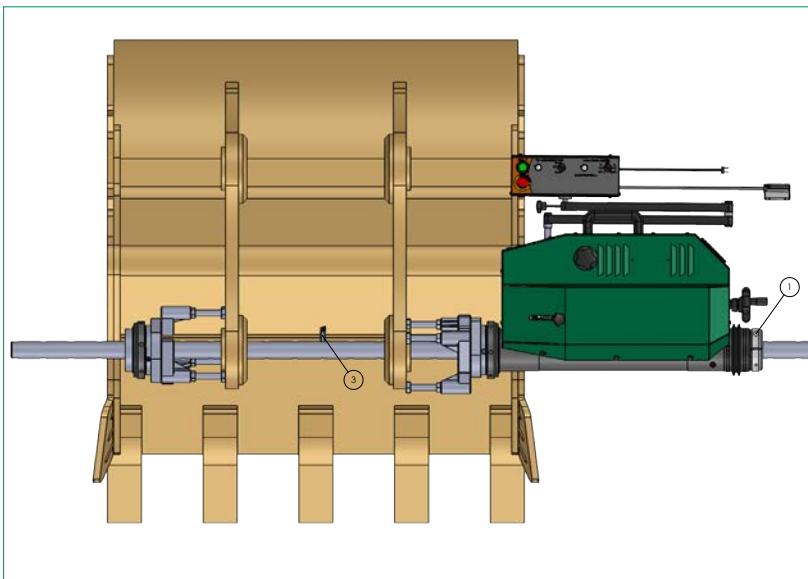
- Insert the body (part.8) into the hole of the relative boring bar, and tighten the grub screw (part.7).
- Insert the dial gauge holder bracket (part.1), begin to tighten the fastening bolts.
- The measurement is taken by screwing the bolt (part.3).



LEFT TOOL MEASUREMENT:

Perform the same operations as those described above, simply turning the dial gauge holder bracket (part.4) and the bracket (part.6) in the opposite direction.

3.8 REMOVAL OF TOOL-HOLDER SHAFT



Drw. 17.



WARNING!

For all maintenance, inspection, kit assembly or other operations, isolate the power supply circuit;

- Extract the tool-holder from the shaft (part.3 drw. 17);
- Unscrew the screws of the locking clamp (part.1 drw. 17 and image 3.29);
- Extract the tool-holder shaft (image 3.30).

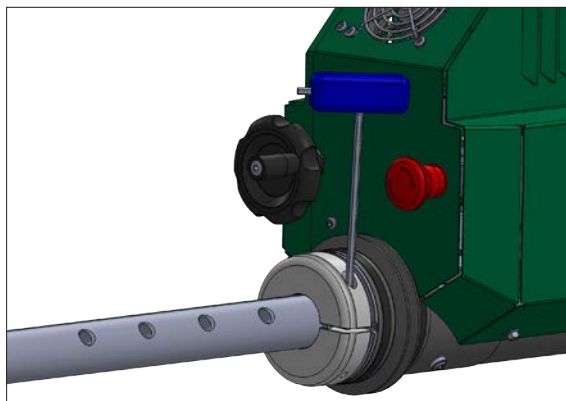


Image 3.29

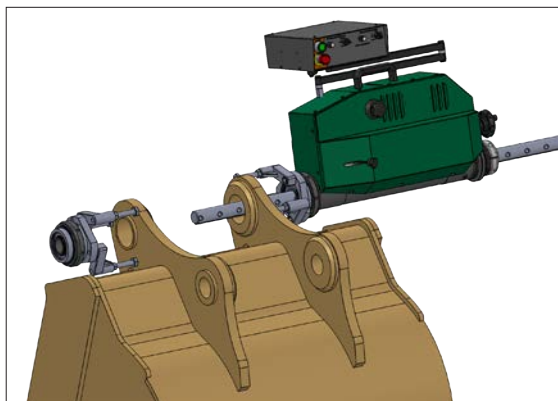


Image 3.30

3.9.1 EXTENSION OF TOOL-HOLDER SHAFT (MOD. SC1 40/1)



Image 3.31

The image to the side and subsequent images illustrate the procedure for the installation of the coupling, necessary to extend the tool-holder shaft.

CAUTION: the shaft must be extended, where necessary, only after the previously described centring phase.



Image 3.32

Attach the coupling to the two ends of the shaft using the supplied hexagonal screws. The screws must be housed in the holes in the shaft, while the mother screw on the coupling allows the threaded connection.

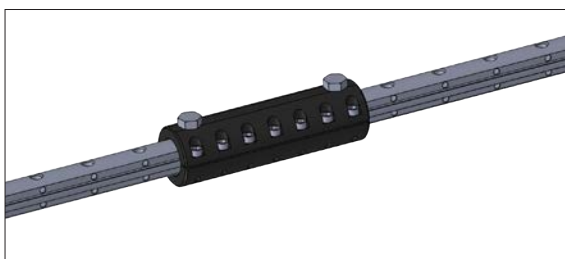


Image 3.33

After having made the above-mentioned connection, ensure that all the Allen screws have been tightened. The image to the side shows the configuration after the connection has been made.

3.9.2 EXTENSIONS OF TOOL-HOLDER SHAFT (MOD. SC2 60/1 E MOD. SC3 60/2)



Image 3.34

The image to the side and subsequent images illustrate the procedure for the installation of the coupling, necessary to extend the tool-holder shaft.

CAUTION: the shaft must be extended, where necessary, only after the previously described centring phase.

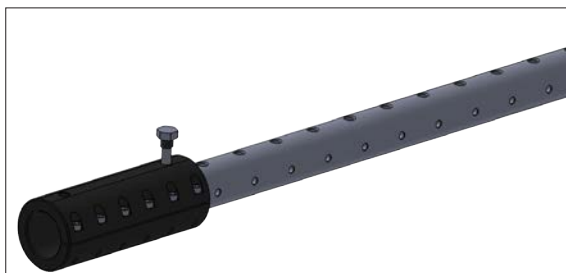


Image 3.35

Attach the coupling to the end of the shaft using the supplied hexagonal screws.

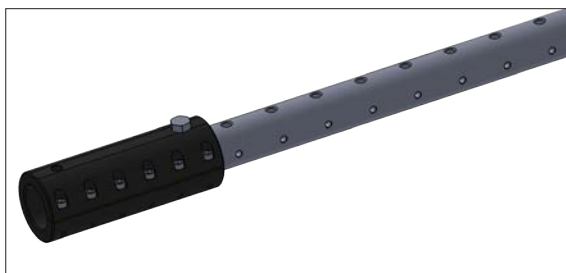


Image 3.36



Image 3.37

Attach the coupling to the end of the other shaft using the supplied hexagonal screws. After having made the above-mentioned connection, ensure that all the Allen screws have been tightened. The image to the side shows the configuration after the connection has been made.

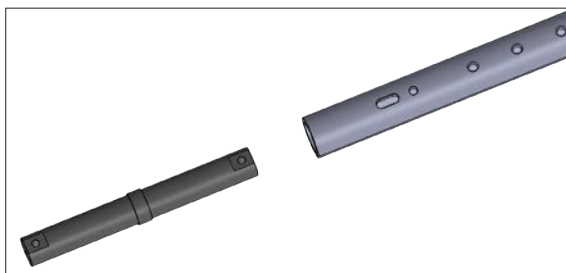


Image 3.38

The image to the side and the following ones (3.39 - 3.41) illustrate the procedure for the installation of the inner coupling.

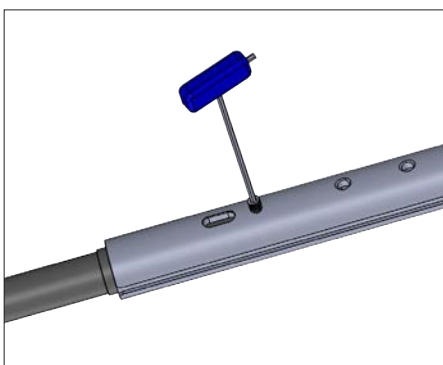


Image 3.39

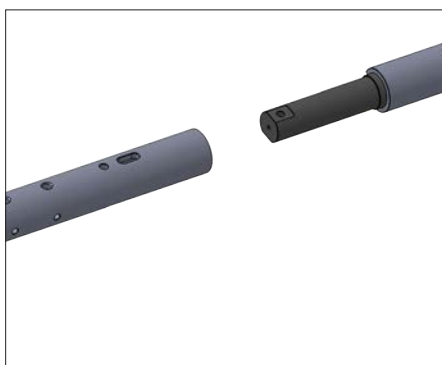


Image 3.40

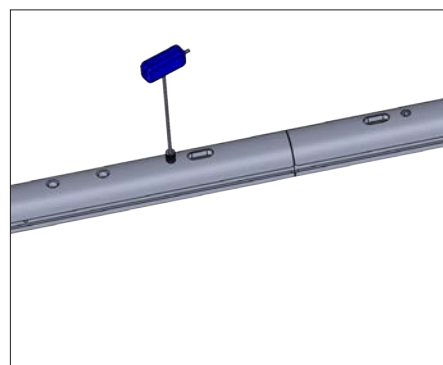


Image 3.41

3.10.1 EXTENSION OF SHAFT FOR INCREASED STROKE (SC1)

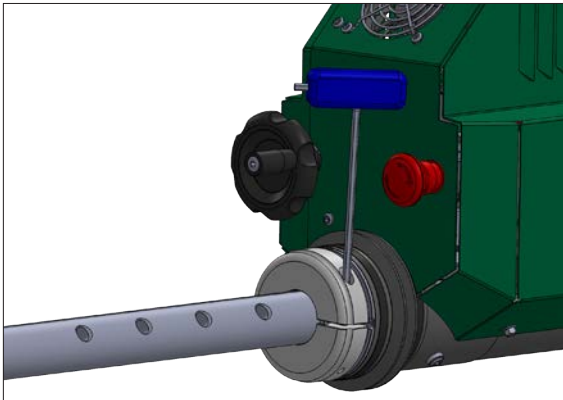


Image 3.42

Where necessary, it is possible to increase the tool stroke, using the supplied extension. Using this component, the stroke is increased by a value of 520 mm.

The image to the side illustrates the installation phase; after having removed the O-ring housed at the back in the special cavity, near the shaft blocking clamp, insert the extension and the blocking plug as shown in image 3.43.

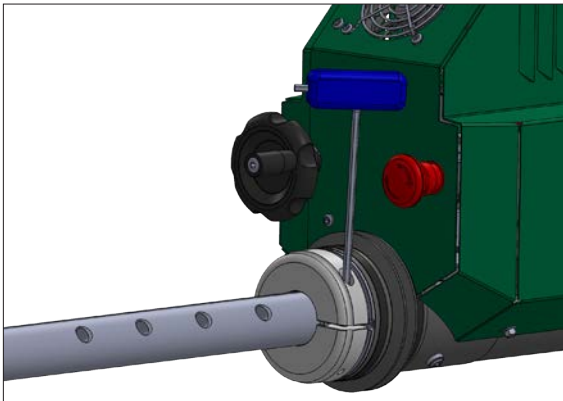


Image 3.43

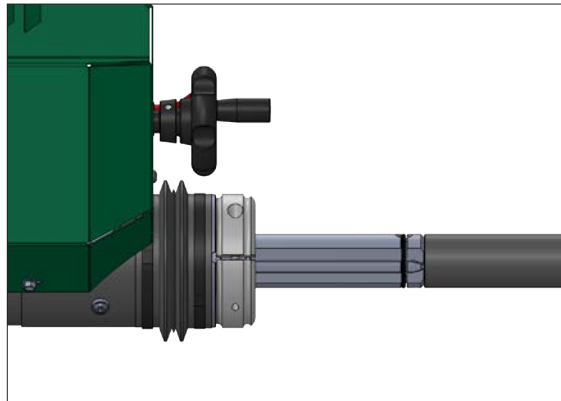


Image 3.44

Position the O-ring in the cavity so as to keep the plug in position. Image 3.45 illustrates the configuration with the extension at the end of its stroke.

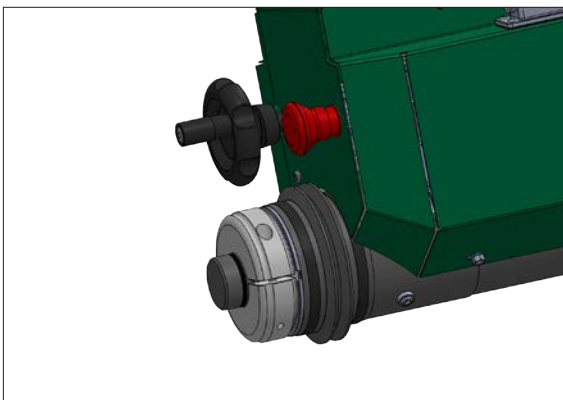


Image 3.45

3.10.2 EXTENSION OF SHAFT FOR INCREASED STROKE (SC2 AND SC3)

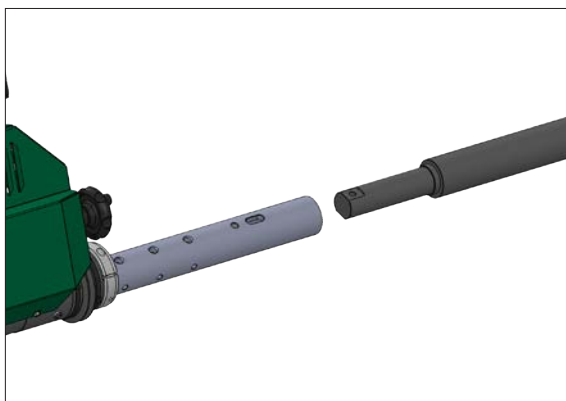


Image 3.46

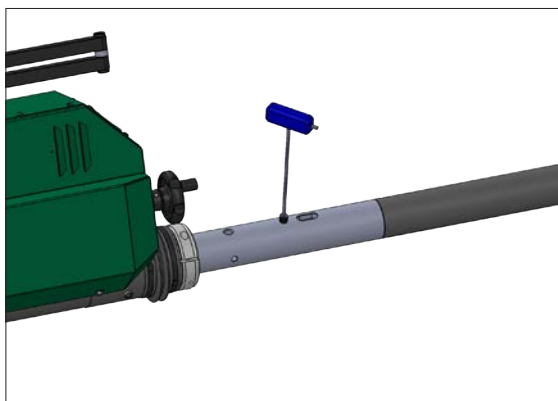


Image 3.47

3.11 INSTALLATION OF INSERT-HOLDER

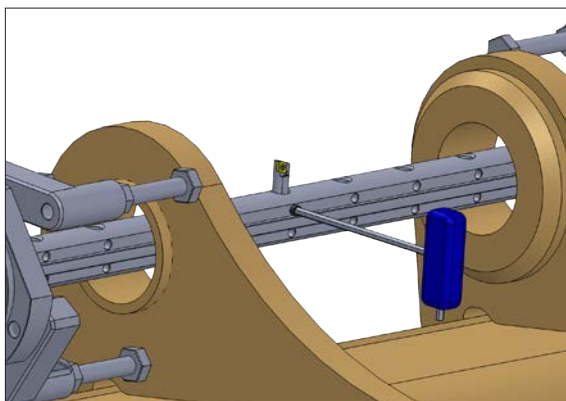


Image 3.48

Positioning of insert-holder:

For machining up to a diameter of $D=150$ mm, the insert-holder can be used directly, inserting it into its housing as shown in the image to the side. After regulating the position in a radial direction, lock it into place using the supplied grub screw, based on the selected working depth.

For diameters $D>150$, extensions will need to be used, the tables for which are provided in the attachment under letter A.

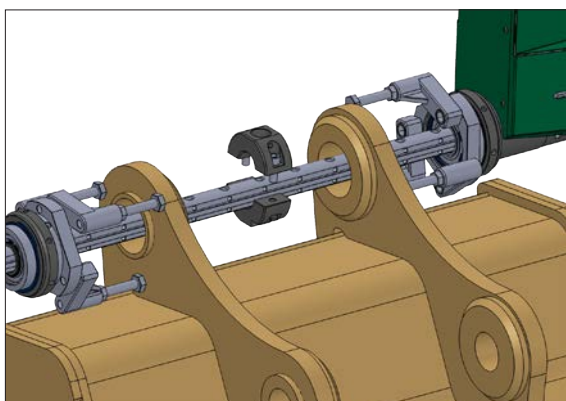


Image 3.49

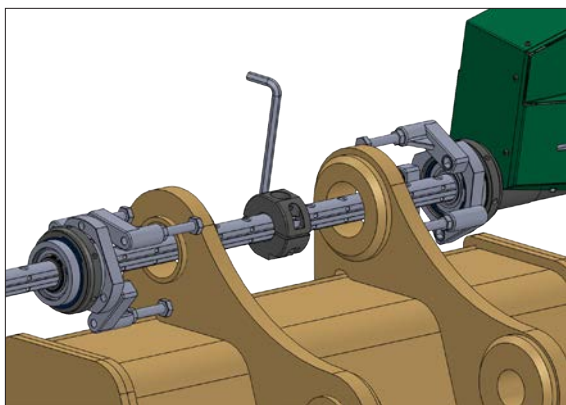


Image 3.50

The image to the side illustrates the installation phase for the tool-holder ring, to be used for machining with diameters $D > 150$ mm. The element is developed in two halves, connected using the supplied Allen screws.



In the absence of the insert holder on the shaft, the user has to pay attention to remove the dowel locking pin from the threaded hole of the shaft.

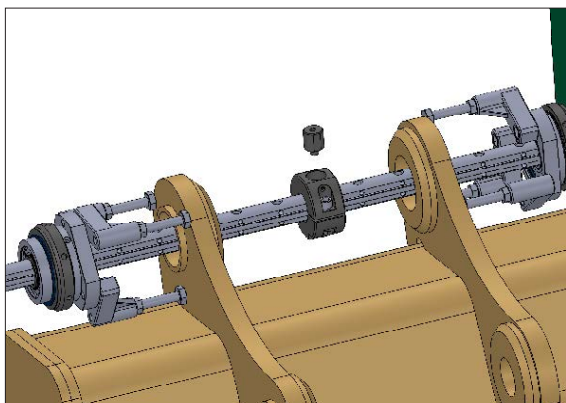


Image 3.51

The image to the side illustrates the procedure for the assembly of the shaft connection key (mod. SC1 40/1), which must be housed in the special tool-holder ring hole. The following images (images 3.53 - 3.55) illustrate the various configurations that can be obtained with the supplied extensions.

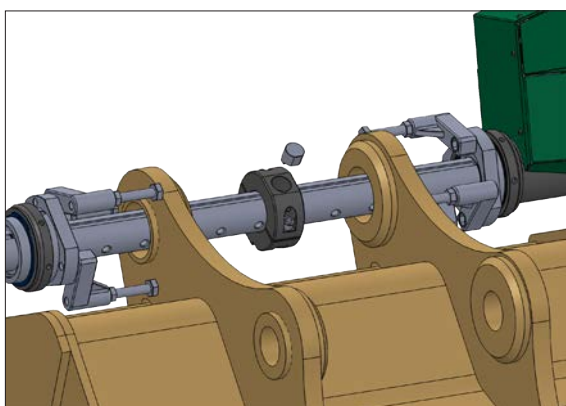


Image 3.52

The image to the side illustrates the procedure for the assembly of the shaft connection key (mod. SC2 60/1 - mod. SC3 60/2), which must be housed in the special tool-holder ring hole. The following images illustrate the various configurations that can be obtained with the supplied extensions.

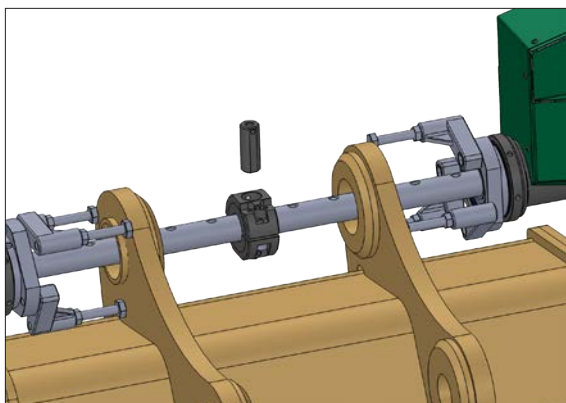


Image 3.53

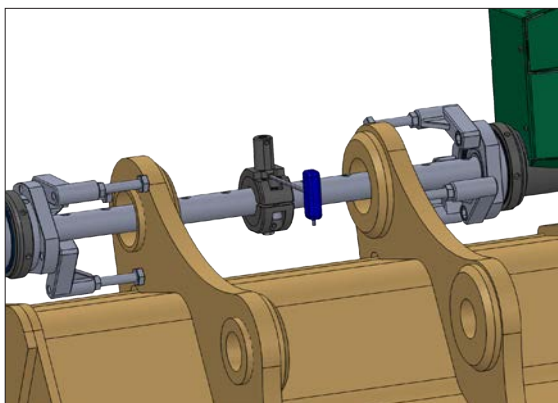


Image 3.54

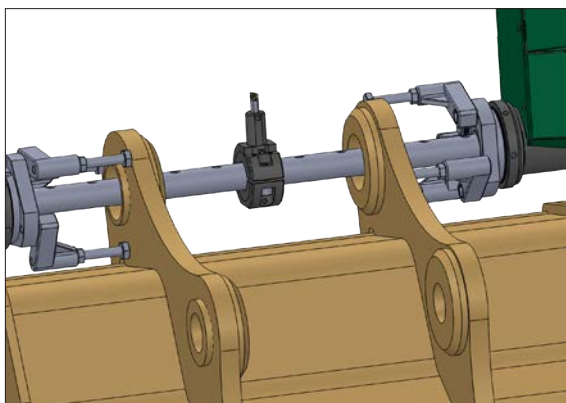
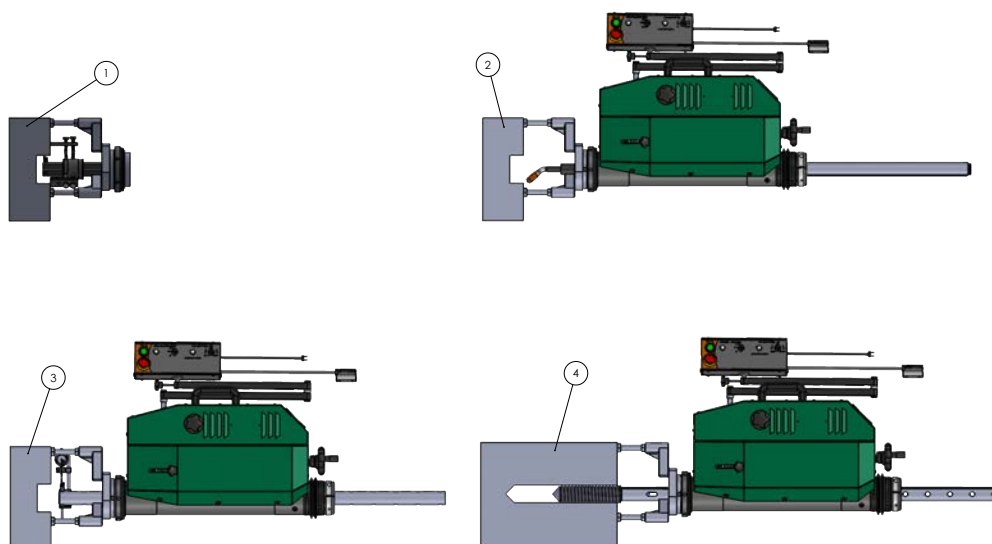


Image 3.55

After regulating the position of the insert-holder in a radial direction, lock it into place using the supplied grub screw, based on the selected working depth.

3.12 CENTRING AND ASSEMBLY FOR MACHINING ON BLIND HOLES



Drw. 18.

For the centring and assembly of the machine, in order to perform boring, overlay welding, drilling and tapping on blind holes, (Part. 1-2-3-4 drw. 18), the same operations need to be performed as those described for through-holes. Using a short type shaft, it is possible to drill and tap, and cantilever boring can also be performed on blind holes; in this case it is necessary to work with a higher number of rotations and minimal advancement.

3.13 GEAR INSERTION ROTATION MOTOR

All machines in the Supercombinata series have a mechanical transmission with gears in oil bath, with 2/4 ratios. The mechanical transmission, combined with speed regulation, obtained thanks to the electric drive, offers the boring machine extraordinary flexibility of use during machining phases.

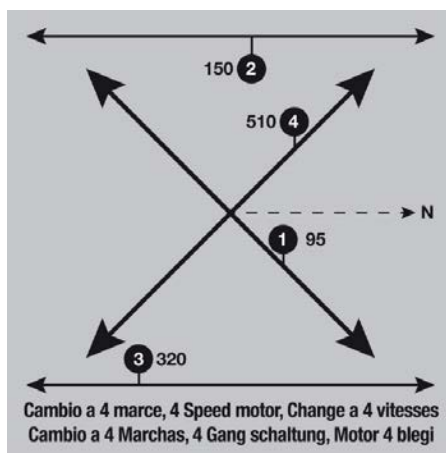
In this sense, boring machines in the SC series can operate with a wide speed range, with shaft torque values that facilitate both roughing and finishing operations.

Following is a description of the operations to be performed to insert the gears.

Taking into consideration the instructions shown on each unit on the special label, insert the desired ratio, taking care to manually rotate the shaft to facilitate insertion.

Images 3.56 and 3.57 respectively show a graphic illustration and the relative gear insertion mode for models SC1 40/1 and SC2 60/1 (NOTE: the rotation speeds shown in the figure are for model SC1 40/1 only).

Images 3.58 and 3.59 refer to model SC3 60/2, for which it is necessary to rotate the special gear knobs.



SX	MAX RPM	DX
●	55	●
● ●	82	●
●	220	● ●
● ●	370	● ●

Caution: Before engaging a gear, make sure that lever DX is NOT in position "N".

Immagine 3.56

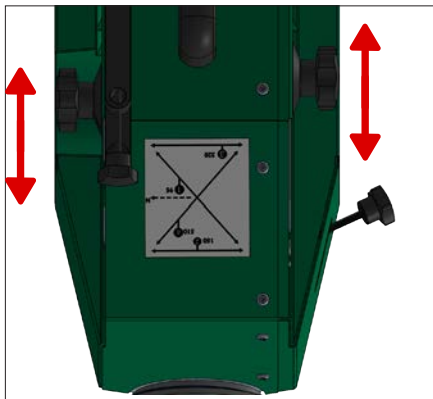


Image 3.57

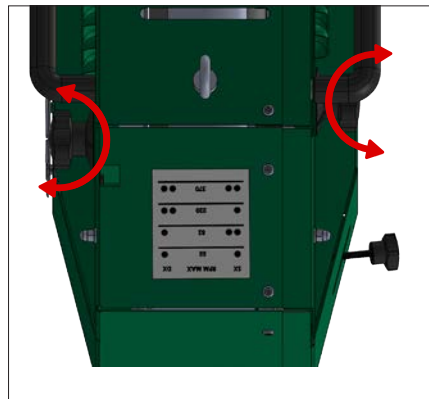


Image 3.58



Image 3.59

3.14 CONSIDERATIONS ON CUTTING AND WELDING PARAMETERS



Suggestions and provisions for the user.

When performing boring works, it is important to consider the problem of dimensional and geometric tolerances, as well as obtainable results in terms of surface roughness.

To obtain high-quality results, it is important to have the following:

- machining allowance of approx. 1 mm;
- new cutting tool;
- operate, compatibly with the available shaft torque values, at the maximum rotation speed;
- advancement speed equal to approx. 2/3 of the full scale;
- in conditions of sufficient lubrication, obtained using specific products.

If sparks form during machining, due to incorrect cutting parameter settings, promptly intervene by adjusting the rotation speed.

During roughing, and compatibly with the available shaft torque values, it is always necessary to work at a high number of rotations, with a working depth equal to 2-3 mm.

The choice of cutting speed essentially depends on the machining diameter; in any case, where possible it is recommended to work by inserting the gear that allows operation with the rotation potentiometer at a maximum.

Where possible, it is recommended to configure boring settings in such a way that the cutting tool advances towards the machine (with the shaft under tension).

In regards to welding, ensure the following welder settings:

160-180 A with wire Ø 0.8 mm

250 A with wire Ø 1 mm

3.15 TOOL-HOLDER EXTENSIONS



Image 3.60

Assemble the modular tool-holder as per the illustration, depending on the work that needs to be performed, inserting and screwing the first extension as shown in images 3.6 and 3.61;

To use multiple extensions, suffice it to use a hex key to screw the two “reduction screws” (image 3.62) in the two holes on the side of the extension.

Block the reduction screws in the hole using the grub screw (Image 3.63).

The following images illustrate the procedure for the installation of additional modules.

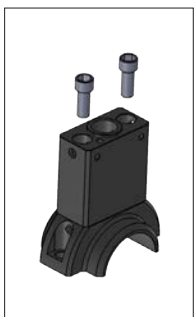


Image 3.61



Image 3.62



Image 3.63



Image 3.64



Image 3.65

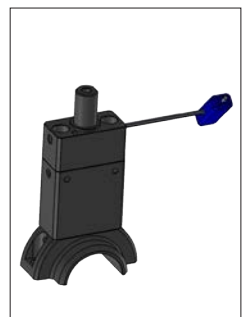


Image 3.66

4 MAINTENANCE & OPERATING CONDITIONS

4.1 GENERAL

SC series boring machines produced by ELSA s.r.l. are designed and built in such a way as to reduce routine maintenance to a minimum.

If the machine is used only rarely, it must be placed into operation at least once every 6 months to check the integrity of all its parts and the efficiency of the command and control devices.

It is recommended to store the machine in a suitable location, free of humidity and far from sources of heat.



DANGER!

Prior to performing any maintenance operations, replacing components or other, ensure that the power is disconnected from the machine by checking that the power cable is disconnected, or by isolating the power supply circuit.

4.2 ROUTINE MAINTENANCE & OPERATING CONDITIONS

Routine maintenance of the machine simply involves the periodic checking of the condition of its wear on the rotation motor brushes, the checking of the efficiency of electrical components and the lubrication of the rotation motor transmission.

Periodically, after approximately 100/120 operating hours or in the case of unexpected loss of power by the motor, the brushes must be checked and eventually replaced.

To access the above-mentioned electrical components, the shell must first be dismantled according to the following procedure:

- dismantle the control unit fastening support;
- dismantle the electrical connection terminal block on the machine, located on the side of the shell;
- extract the manual advancement hand-wheel located at the rear;
- extract the transmission knob; unscrewing the Allen screws and rotating the knob in a clockwise direction, pull towards the outside until extracted;
- dismantle the torch rotation knob, proceeding as follows: bring to neutral position and rotate in counter-clockwise direction until extracted;
- dismantle the shell by removing all connecting screws.

Now, remove the rear motor cover and access the brushes. Replace in the event they have a minimum length of 9 mm.

It is necessary to periodically check the efficiency of mass grounding connections and the grounding of foreign masses developed on the machine; the procedure for checking isolation is critical in order to guarantee electrical safety when using the device, and to guarantee the efficiency of protections against indirect contacts.

It is necessary to periodically check the condition of protection fuses housed in the special bases at the back of the control unit, and the integrity of the network filters.



DANGER!

Fuses may be extracted and/or electrical parts may be checked only after ensuring the equipment is not powered.



Electric shock

Pay attention not to enter into contact with live electrical parts;

It is necessary to periodically check the integrity of cables.

With reference to the mechanical gearbox with grease lubrication, it is necessary to use lithium grease for gears operating effectively in the temperature range from -40°C up to 240°C, while for the mechanical gearbox with oil lubrication, it should be used approximately ½ liter of gear oil 80W90.

Following is a list of the main warnings that need to be considered during ordinary operating conditions:

- The boring machine has been designed and built to be powered with a nominal voltage of 230 V at a frequency of 50 Hz; on request, for each model in production, a version with power at 110 V-60 Hz is produced. In both cases, it is necessary to ensure that the power supply voltage does not deviate from the nominal value with a tolerance of +/- 10%.
- Tolerances equal to +/- 2% are normally possible for the frequency.
- Surges on the power supply network may cause irreversible damage to electronic drive components;
- Ensure that the mechanical mechanisms facilitating the equipment's attachment are correctly installed;
- Ensure that all mechanical and electrical parts responsible for ensuring protection or safety are checked and efficiently maintained.





Super **Xtrafactory** Devices

Elsa Srl
Località La Petrizia - SS 106
88050 Sellia Marina (CZ) - Italia
Tel: (+39) 0961 962854
Fax: (+39) 0961 968716
info@elsasrl.com

www.elsasrl.com