CLEANING OF THE MACHINE AND THE SURROUNDINGS

File Nº	PM_000_004	**Reference Drawings**	-
Mechanical Personnel	1	**Electrical Personnel**	0
Duration	60’	**Frequency**	Monthly
Machine Status	OFF	**Interruptible Task**	YES
Specific Tools	Maintenance Equipment		

ISO Safety Symbols


Safety Padlock


Safety Shoes


Safety Glasses


Safety Gloves


Safety Vest


Safety Earmuffs


Safety Clothes

1. SUMMARY

Step	Description
1	Machine Disconnection
2	General Machine Cleaning
3	Machine Connection

2. PRECAUTIONS

BEFORE STARTING ANY MAINTENANCE OPERATION ON THE MACHINE, BEAR IN MIND ALL THE SAFETY INDICATIONS DESCRIBED ON THE **SERVICE MANUAL AND THE ECPL PLACARD**

WHENEVER A MAINTENANCE TASK NEEDS TO BE CONDUCTED, THE OPERATOR OR THE MAINTENANCE PERSONNEL MUST ENSURE THAT ONLY THEM CAN OPERATE THE MACHINE IN ACCORDANCE TO THE SAFETY STANDARDS AND APPROVED WORK PROCEDURES

ENSURE THAT ALL THE MATERIALS AND SPARE PARTS ARE THROWN AWAY WITH SAFETY AND RESPECTFULLY WITH THE ENVIRONMENT

STRICTLY OBSERVE THE ENVIRONMENTAL PROTECTION RULES AND STANDARDS ESTABLISHED BY THE LAW BEFORE ELIMINATING USED OR SPILLED OIL

TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS SUCH AS:

- CUTS PRODUCES BY SHARP EDGES OR CHIPS
- PROJECTION OF PARTICLES
- BURNS FROM HOT COMPONENTS
- FALLS AT THE SAME / DIFFERENT LEVEL
- POSSIBLE FALLS OF HEAVY LOADS IN SUSPENSION

3. MACHINE DISCONNECTION

1	Clean and prepare the area where the maintenance task is going to take place.
2	Unlock and open the safety door to Access the machine. (Refer to the Service Manual)
3	Switch off the machine (Refer to the Service Manual).

WHENEVER A MAINTENANCE TASK NEEDS TO BE CONDUCTED, THE OPERATOR OR THE MAINTENANCE PERSONNEL MUST ENSURE THAT ONLY THEM CAN OPERATE THE MACHINE IN ACCORDANCE TO THE SAFETY STANDARDS AND APPROVED WORK PROCEDURES

AFTER DISCONNECTING THE MAIN POWER SWITCH, WAIT AT LEAST 5 MINUTES BEFORE CARRYING ANY MAINTENANCE WORK ON THE ELECTRICAL SYSTEM AND CHECK THAT THERE IS NO RESIDUAL PRESSURE ON THE FLUID LINES CHECKING THE PRESSURE GAUGES AND PRESSURE SWITCHES.

4. PROCEDURE DESCRIPTION: GENERAL MACHINE CLEANING

DO NOT USE ANY ABRASIVE PRODUCTS OR PRODUCTS THAT CAN BE DANGEROUS FOR THE HEALTH DURING THE CLEANING TASK.

DO NOT USE HIGH PRESSURE CLEANING MACHINES DURING THE CLEANING TASK OF THE MACHINE.

BEFORE ANY CLEANING TASK, BEAR IN MIND THE COMPONENTS THAT CAN SUFFER DAMAGES DURING THE CLEANING AND PROTECT THEM SUITABLY. AFTER FINISHING THE CLEANING TASK, REMEMBER TO TAKE OUT ANY PROTECTIONS FOR COMPONENTS AND CLEANING MATERIALS FROM THE MACHINE BEFORE STARTING IT UP.

4	Access the Manipulator area or the 3 Axis Module area.
5	Clean all the elements of the area using Cleaning Cloth and Non-abrasive Detergent.
6	After cleaning all the elements of the area, clean the floors and the areas where oil spillages can be found.

CUTS PRODUCES BY SHARP EDGES OR CHIPS MAY OCCUR. TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS

PROJECTION OF PARTICLES MAY OCCUR. TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS

CLEANING OF THE MACHINE AND THE SURROUNDINGS

BURNS FROM HOT COMPONENTS MAY OCCUR. TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS

FALLS AT THE SAME / DIFFERENT LEVEL MAY OCCUR. TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS

5. MACHINE CONNECTION / AXIS REFERENCE PROCEDURES

7	Switch on the machine (Refer to the Service Manual).
8	Close and lock the safety door to access the machine. (Refer to the Service Manual)

CONTROL MACHINE PIPES AND HOSES CONNECTIONS

File Nº	PM_000_005	**Reference Drawings**	-
Mechanical Personnel	1	**Electrical Personnel**	0
Duration	60’	**Frequency**	Monthly
Machine Status	OFF	**Interruptible Task**	YES
Specific Tools	Maintenance Equipment		

ISO Safety Symbols


Safety Padlock


Safety Shoes


Safety Glasses


Safety Gloves


Safety Vest


Safety Earmuffs


Safety Clothes

1. SUMMARY

Step	Description
1	Machine Disconnection
2	Machine Pipes and Hoses Connections Control
3	Machine Connection

2. PRECAUTIONS

BEFORE STARTING ANY MAINTENANCE OPERATION ON THE MACHINE, BEAR IN MIND ALL THE SAFETY INDICATIONS DESCRIBED ON THE **SERVICE MANUAL AND THE ECPL PLACARD**

WHENEVER A MAINTENANCE TASK NEEDS TO BE CONDUCTED, THE OPERATOR OR THE MAINTENANCE PERSONNEL MUST ENSURE THAT ONLY THEM CAN OPERATE THE MACHINE IN ACCORDANCE TO THE SAFETY STANDARDS AND APPROVED WORK PROCEDURES

ENSURE THAT ALL THE MATERIALS AND SPARE PARTS ARE THROWN AWAY WITH SAFETY AND RESPECTFULLY WITH THE ENVIRONMENT

STRICTLY OBSERVE THE ENVIRONMENTAL PROTECTION RULES AND STANDARDS ESTABLISHED BY THE LAW BEFORE ELIMINATING USED OR SPILLED OIL

TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS SUCH AS:

- CUTS PRODUCES BY SHARP EDGES OR CHIPS
- PROJECTION OF PARTICLES
- BURNS FROM HOT COMPONENTS
- FALLS AT THE SAME / DIFFERENT LEVEL
- POSSIBLE FALLS OF HEAVY LOADS IN SUSPENSION

3. MACHINE DISCONNECTION

1	Clean and prepare the area where the maintenance task is going to take place.
2	Unlock and open the safety door to Access the machine. (Refer to the Service Manual)
3	Switch off the machine (Refer to the Service Manual).

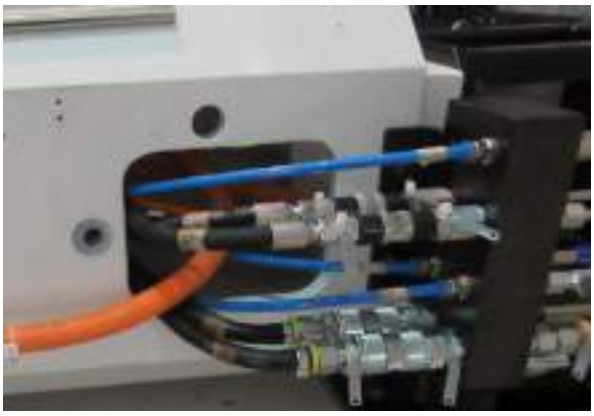
WHENEVER A MAINTENANCE TASK NEEDS TO BE CONDUCTED, THE OPERATOR OR THE MAINTENANCE PERSONNEL MUST ENSURE THAT ONLY THEM CAN OPERATE THE MACHINE IN ACCORDANCE TO THE SAFETY STANDARDS AND APPROVED WORK PROCEDURES

AFTER DISCONNECTING THE MAIN POWER SWITCH, WAIT AT LEAST 5 MINUTES BEFORE CARRYING ANY MAINTENANCE WORK ON THE ELECTRICAL SYSTEM AND CHECK THAT THERE IS NO RESIDUAL PRESSURE ON THE FLUID LINES CHECKING THE PRESSURE GAUGES AND PRESSURE SWITCHES.

4. PROCEDURE DESCRIPTION: MACHINE PIPES AND HOSES CONNECTIONS CONTROL

4	Access the Manipulator area or the 3 Axis Module area.

5	Check that the Pipes and Hoses Connections are in good conditions and no leaks are present.
6	If the Connections are damaged or leaks are detected, replace the damaged Pipes, Hoses and Connections for new ones.



CUTS PRODUCES BY SHARP EDGES OR CHIPS MAY OCCUR. TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS

BURNS FROM HOT COMPONENTS MAY OCCUR. TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS

FALLS AT THE SAME / DIFFERENT LEVEL MAY OCCUR. TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS

5. MACHINE CONNECTION / AXIS REFERENCE PROCEDURES

7	Switch on the machine (Refer to the Service Manual).
8	Close and lock the safety door to access the machine. (Refer to the Service Manual)

CONTROL “Y” AXIS BALL SCREW WEAR

File Nº	TW_PM_042_001	**Reference Drawings**	XXXX042 / XXXX043
Mechanical Personnel	1	**Electrical Personnel**	0
Duration	10’	**Frequency**	Yearly
Machine Status	OFF	**Interruptible Task**	NO
Specific Tools	Maintenance Equipment		

ISO Safety Symbols


Safety Padlock


Safety Shoes


Safety Glasses


Safety Gloves


Safety Vest


Safety Clothes

1. SUMMARY

Step	Description
1	Machine Disconnection
2	“Y” Axis Ball Screw Control
3	Machine Connection

2. PRECAUTIONS

BEFORE STARTING ANY MAINTENANCE OPERATION ON THE MACHINE, BEAR IN MIND ALL THE SAFETY INDICATIONS DESCRIBED ON THE **SERVICE MANUAL AND THE ECPL PLACARD**

WHENEVER A MAINTENANCE TASK NEEDS TO BE CONDUCTED, THE OPERATOR OR THE MAINTENANCE PERSONNEL MUST ENSURE THAT ONLY THEM CAN OPERATE THE MACHINE IN ACCORDANCE TO THE SAFETY STANDARDS AND APPROVED WORK PROCEDURES

ENSURE THAT ALL THE MATERIALS AND SPARE PARTS ARE THROWN AWAY WITH SAFETY AND RESPECTFULLY WITH THE ENVIRONMENT

STRICTLY OBSERVE THE ENVIRONMENTAL PROTECTION RULES AND STANDARDS ESTABLISHED BY THE LAW BEFORE ELIMINATING USED OR SPILLED OIL

TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS SUCH AS:

- CUTS PRODUCES BY SHARP EDGES OR CHIPS
- PROJECTION OF PARTICLES
- BURNS FROM HOT COMPONENTS
- FALLS AT THE SAME / DIFFERENT LEVEL
- POSSIBLE FALLS OF HEAVY LOADS IN SUSPENSION

3. MACHINE DISCONNECTION

1	Clean and prepare the area where the maintenance task is going to take place.
2	Unlock and open the safety door to Access the machine. (Refer to the Service Manual)
3	Switch off the machine (Refer to the Service Manual).

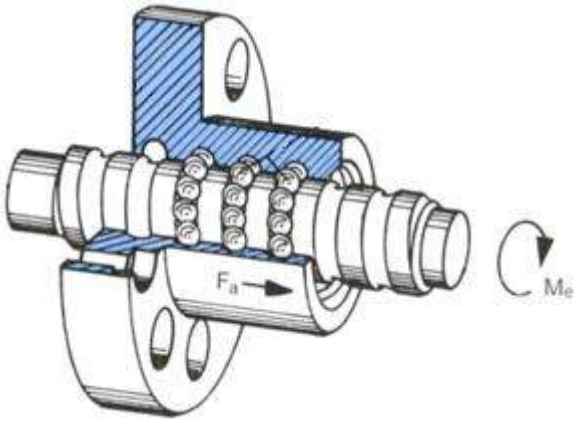
WHENEVER A MAINTENANCE TASK NEEDS TO BE CONDUCTED, THE OPERATOR OR THE MAINTENANCE PERSONNEL MUST ENSURE THAT ONLY THEM CAN OPERATE THE MACHINE IN ACCORDANCE TO THE SAFETY STANDARDS AND APPROVED WORK PROCEDURES

AFTER DISCONNECTING THE MAIN POWER SWITCH, WAIT AT LEAST 5 MINUTES BEFORE CARRYING ANY MAINTENANCE WORK ON THE ELECTRICAL SYSTEM AND CHECK THAT THERE IS NO RESIDUAL PRESSURE ON THE FLUID LINES CHECKING THE PRESSURE GAUGES AND PRESSURE SWITCHES.

4. PROCEDURE DESCRIPTION: “Y” AXIS BALL SCREW CONTROL

4	Open the 3 Axis panel door to access to the “Y” Axis Ball Screw.

5	Check the condition of the “Y” Axis Ball Screw ensuring there is no wear signs on it.
6	If there is any sign of wear, replace it for a new one.



5. MACHINE CONNECTION / AXIS REFERENCE PROCEDURES

7	Switch on the machine (Refer to the Service Manual).
8	Close and lock the safety door to access the machine. (Refer to the Service Manual)

CONTROL “Z” AXIS BALL SCREW WEAR

File Nº	TW_PM_044_001	**Reference Drawings**	XXXX044
Mechanical Personnel	1	**Electrical Personnel**	0
Duration	10’	**Frequency**	Yearly
Machine Status	OFF	**Interruptible Task**	NO
Specific Tools	Maintenance Equipment		

ISO Safety Symbols


Safety Padlock


Safety Shoes


Safety Glasses


Safety Gloves


Safety Vest


Safety Clothes

1. SUMMARY

Step	Description
1	Machine Disconnection
2	“Z” Axis Ball Screw Control
3	Machine Connection

2. PRECAUTIONS

BEFORE STARTING ANY MAINTENANCE OPERATION ON THE MACHINE, BEAR IN MIND ALL THE SAFETY INDICATIONS DESCRIBED ON THE **SERVICE MANUAL AND THE ECPL PLACARD**

WHENEVER A MAINTENANCE TASK NEEDS TO BE CONDUCTED, THE OPERATOR OR THE MAINTENANCE PERSONNEL MUST ENSURE THAT ONLY THEM CAN OPERATE THE MACHINE IN ACCORDANCE TO THE SAFETY STANDARDS AND APPROVED WORK PROCEDURES

ENSURE THAT ALL THE MATERIALS AND SPARE PARTS ARE THROWN AWAY WITH SAFETY AND RESPECTFULLY WITH THE ENVIRONMENT

STRICTLY OBSERVE THE ENVIRONMENTAL PROTECTION RULES AND STANDARDS ESTABLISHED BY THE LAW BEFORE ELIMINATING USED OR SPILLED OIL

TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS SUCH AS:

- CUTS PRODUCES BY SHARP EDGES OR CHIPS
- PROJECTION OF PARTICLES
- BURNS FROM HOT COMPONENTS
- FALLS AT THE SAME / DIFFERENT LEVEL
- POSSIBLE FALLS OF HEAVY LOADS IN SUSPENSION

3. MACHINE DISCONNECTION

1	Clean and prepare the area where the maintenance task is going to take place.
2	Unlock and open the safety door to Access the machine. (Refer to the Service Manual)
3	Switch off the machine (Refer to the Service Manual).

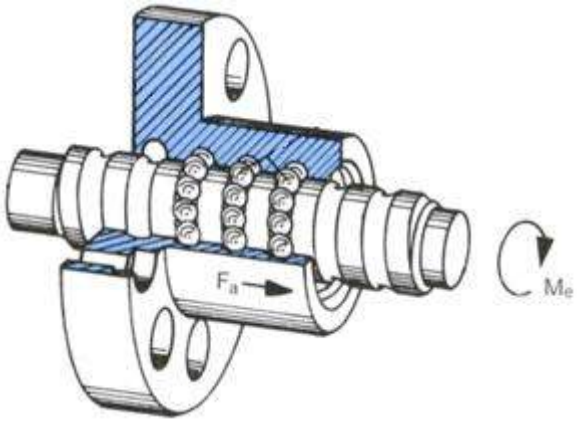
WHENEVER A MAINTENANCE TASK NEEDS TO BE CONDUCTED, THE OPERATOR OR THE MAINTENANCE PERSONNEL MUST ENSURE THAT ONLY THEM CAN OPERATE THE MACHINE IN ACCORDANCE TO THE SAFETY STANDARDS AND APPROVED WORK PROCEDURES

AFTER DISCONNECTING THE MAIN POWER SWITCH, WAIT AT LEAST 5 MINUTES BEFORE CARRYING ANY MAINTENANCE WORK ON THE ELECTRICAL SYSTEM AND CHECK THAT THERE IS NO RESIDUAL PRESSURE ON THE FLUID LINES CHECKING THE PRESSURE GAUGES AND PRESSURE SWITCHES.

4. PROCEDURE DESCRIPTION: “Z” AXIS BALL SCREW CONTROL

4	Open the 3 Axis panel door to access to the “Z” Axis Ball Screw.

5	Check the condition of the “Z” Axis Ball Screw ensuring there is no wear signs on it.
6	If there is any sign of wear, replace it for a new one.



5. MACHINE CONNECTION / AXIS REFERENCE PROCEDURES

7	Switch on the machine (Refer to the Service Manual).
8	Close and lock the safety door to access the machine. (Refer to the Service Manual)

CLEANING AND INSPECTION OF THE “A” AXIS INSTALLATION

File Nº	TW_PM_260_001	**Reference Drawings**	XXXX260
Mechanical Personnel	1	**Electrical Personnel**	0
Duration	30’	**Frequency**	3 Months
Machine Status	OFF	**Interruptible Task**	YES
Specific Tools	Maintenance Equipment, Cleaning Equipment		

ISO Safety Symbols


Safety Padlock


Safety Shoes


Safety Glasses


Safety Gloves


Safety Vest


Safety Clothes

1. SUMMARY

Step	Description
1	Machine Disconnection
2	Cleaning and Inspection of the “A” Axis
3	Machine Connection

2. PRECAUTIONS

BEFORE STARTING ANY MAINTENANCE OPERATION ON THE MACHINE, BEAR IN MIND ALL THE SAFETY INDICATIONS DESCRIBED ON THE **SERVICE MANUAL AND THE ECPL PLACARD**

WHENEVER A MAINTENANCE TASK NEEDS TO BE CONDUCTED, THE OPERATOR OR THE MAINTENANCE PERSONNEL MUST ENSURE THAT ONLY THEM CAN OPERATE THE MACHINE IN ACCORDANCE TO THE SAFETY STANDARDS AND APPROVED WORK PROCEDURES

ENSURE THAT ALL THE MATERIALS AND SPARE PARTS ARE THROWN AWAY WITH SAFETY AND RESPECTFULLY WITH THE ENVIRONMENT

STRICTLY OBSERVE THE ENVIRONMENTAL PROTECTION RULES AND STANDARDS ESTABLISHED BY THE LAW BEFORE ELIMINATING USED OR SPILLED OIL

TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS SUCH AS:

- CUTS PRODUCES BY SHARP EDGES OR CHIPS
- PROJECTION OF PARTICLES
- BURNS FROM HOT COMPONENTS
- FALLS AT THE SAME / DIFFERENT LEVEL
- POSSIBLE FALLS OF HEAVY LOADS IN SUSPENSION

3. MACHINE DISCONNECTION

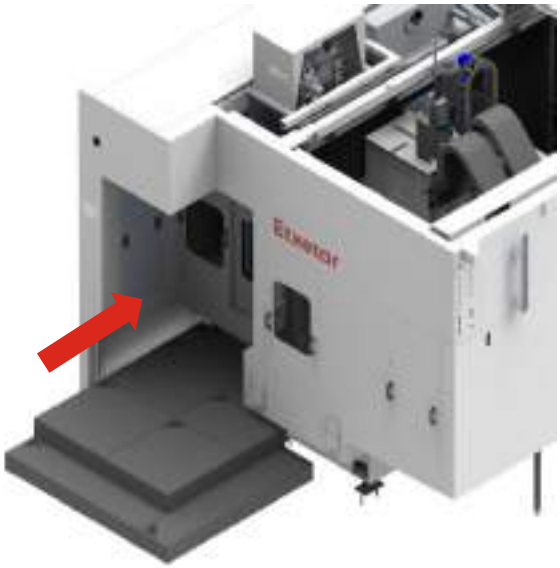
1	Clean and prepare the area where the maintenance task is going to take place.
2	Unlock and open the safety door to Access the machine. (Refer to the Service Manual)
3	Switch off the machine (Refer to the Service Manual).

WHENEVER A MAINTENANCE TASK NEEDS TO BE CONDUCTED, THE OPERATOR OR THE MAINTENANCE PERSONNEL MUST ENSURE THAT ONLY THEM CAN OPERATE THE MACHINE IN ACCORDANCE TO THE SAFETY STANDARDS AND APPROVED WORK PROCEDURES

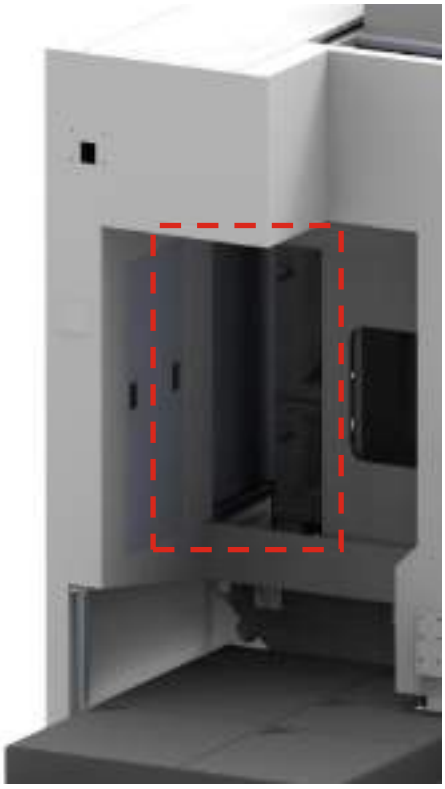
AFTER DISCONNECTING THE MAIN POWER SWITCH, WAIT AT LEAST 5 MINUTES BEFORE CARRYING ANY MAINTENANCE WORK ON THE ELECTRICAL SYSTEM AND CHECK THAT THERE IS NO RESIDUAL PRESSURE ON THE FLUID LINES CHECKING THE PRESSURE GAUGES AND PRESSURE SWITCHES.

4. PROCEDURE DESCRIPTION: CLEANING AND INSPECTION OF THE “A” AXIS

4	Access the Tool Magazine Safety Door area.



5	Disassemble the cover to access the “A” Axis Drive servomotor and connections.



6	In order to maintain the devices, chips and dirt must be cleaned off the servomotor and wiring. In addition, the lines and plug contacts on pneumatics, electrics and hydraulics must be checked for damage.

CUTS PRODUCES BY SHARP EDGES OR CHIPS MAY OCCUR. TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS

BURNS FROM HOT COMPONENTS MAY OCCUR. TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS

FALLS AT THE SAME / DIFFERENT LEVEL MAY OCCUR. TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS

7	Reassemble the previously disassembled access cover.

5. MACHINE CONNECTION / AXIS REFERENCE PROCEDURES

8	Switch on the machine (Refer to the Service Manual).
9	Close and lock the safety door to access the machine. (Refer to the Service Manual)

INSPECTION AND ADJUSTMENT OF THE “A” AXIS BACKLASH

File Nº	TW_PM_260_002	**Reference Drawings**	XXXX260
Mechanical Personnel	1	**Electrical Personnel**	0
Duration	60’	**Frequency**	Yearly
Machine Status	OFF	**Interruptible Task**	NO
Specific Tools	Maintenance Equipment, Dial Gauge, Toque Wrench		

ISO Safety Symbols


Safety Padlock


Safety Shoes


Safety Gloves


Safety Vest


Safety Clothes

1. SUMMARY

Step	Description
1	Machine Disconnection
2	“A” Axis Protections Disassembly
3	“A” Axis Drive System Disassembly
3	“A” Axis Backlash Check
4	“A” Axis Backlash Setting
5	“A” Axis Torque Measurement
6	Machine Connection

2. PRECAUTIONS

BEFORE STARTING ANY MAINTENANCE OPERATION ON THE MACHINE, BEAR IN MIND ALL THE SAFETY INDICATIONS DESCRIBED ON THE **SERVICE MANUAL AND THE ECPL PLACARD**

WHENEVER A MAINTENANCE TASK NEEDS TO BE CONDUCTED, THE OPERATOR OR THE MAINTENANCE PERSONNEL MUST ENSURE THAT ONLY THEM CAN OPERATE THE MACHINE IN ACCORDANCE TO THE SAFETY STANDARDS AND APPROVED WORK PROCEDURES

ENSURE THAT ALL THE MATERIALS AND SPARE PARTS ARE THROWN AWAY WITH SAFETY AND RESPECTFULLY WITH THE ENVIRONMENT

STRICTLY OBSERVE THE ENVIRONMENTAL PROTECTION RULES AND STANDARDS ESTABLISHED BY THE LAW BEFORE ELIMINATING USED OR SPILLED OIL

TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS SUCH AS:

- CUTS PRODUCES BY SHARP EDGES OR CHIPS
- PROJECTION OF PARTICLES
- BURNS FROM HOT COMPONENTS
- FALLS AT THE SAME / DIFFERENT LEVEL
- POSSIBLE FALLS OF HEAVY LOADS IN SUSPENSION

3. MACHINE DISCONNECTION

1	Clean and prepare the area where the maintenance task is going to take place.
2	Using the Main Panel of the machine, open the Load / Unload Automatic Door.

3	Using the Robot, disassemble the Clamping Fixture from the machine.
4	Unlock and open the safety door to Access the machine. (Refer to the Service Manual)
5	Switch off the machine (Refer to the Service Manual).

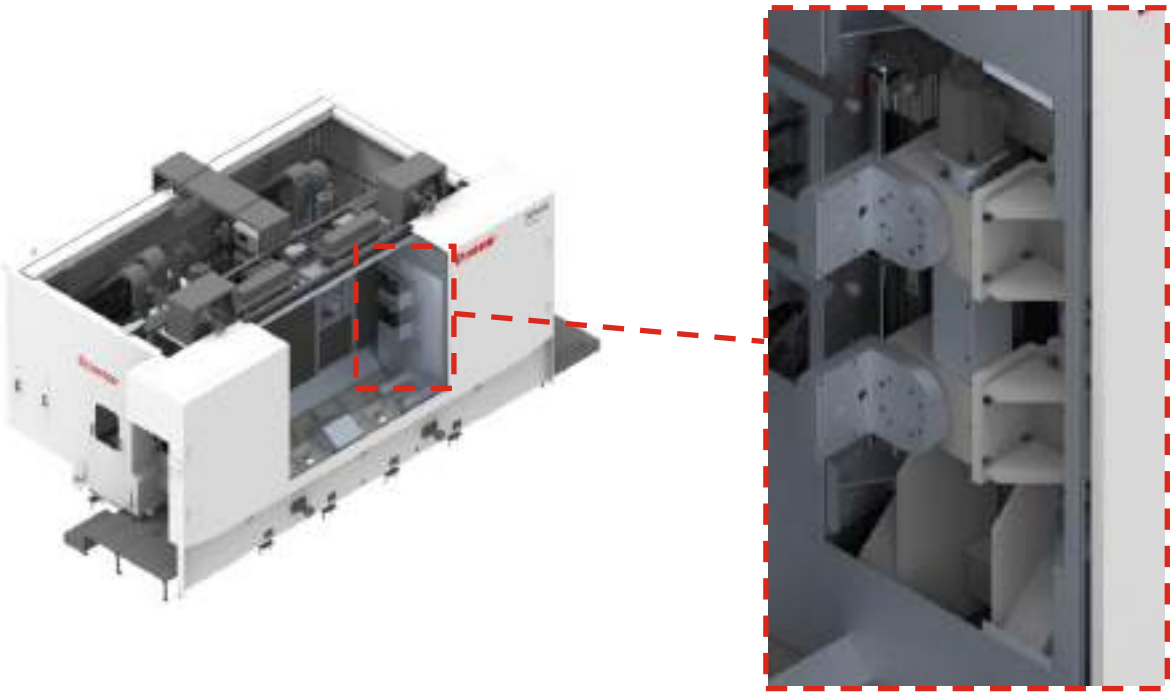
WHENEVER A MAINTENANCE TASK NEEDS TO BE CONDUCTED, THE OPERATOR OR THE MAINTENANCE PERSONNEL MUST ENSURE THAT ONLY THEM CAN OPERATE THE MACHINE IN ACCORDANCE TO THE SAFETY STANDARDS AND APPROVED WORK PROCEDURES

AFTER DISCONNECTING THE MAIN POWER SWITCH, WAIT AT LEAST 5 MINUTES BEFORE CARRYING ANY MAINTENANCE WORK ON THE ELECTRICAL SYSTEM AND CHECK THAT THERE IS NO RESIDUAL PRESSURE ON THE FLUID LINES CHECKING THE PRESSURE GAUGES AND PRESSURE SWITCHES.

4. PROCEDURE DESCRIPTION: “A” AXIS PROTECTION DISASSEMBLY

6	Access the Clamping Fixture area.

7	Disassemble the “A” Axis Protections from both sides of the machine.



CUTS PRODUCES BY SHARP EDGES OR CHIPS MAY OCCUR. TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS

FALLS AT THE SAME / DIFFERENT LEVEL MAY OCCUR. TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS

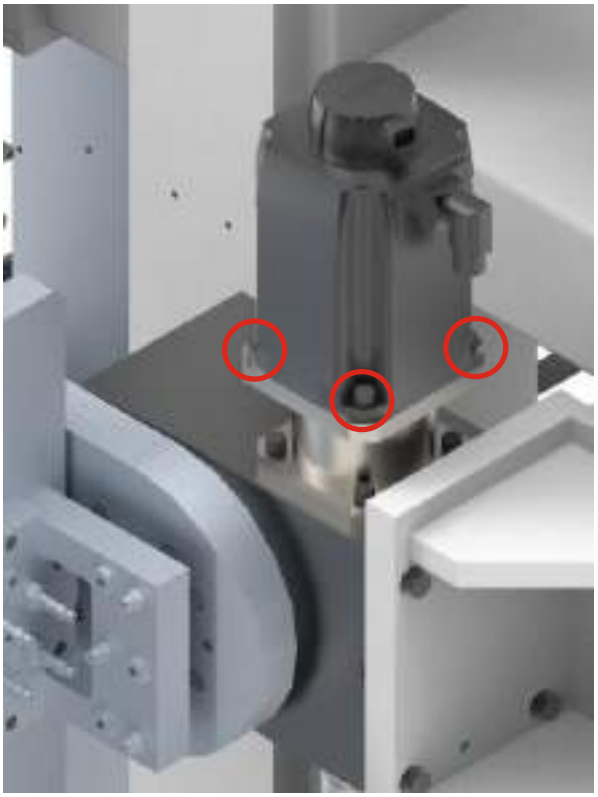
5. PROCEDURE DESCRIPTION: “A” AXIS DRIVE SYSTEM DISASSEMBLY

8	Disassemble the “A” Axis Servomotor electrical connections.

BURNS FROM HOT COMPONENTS MAY OCCUR. TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS

9	Secure the servomotor with the crane and slings before proceeding to disassemble the servomotor.

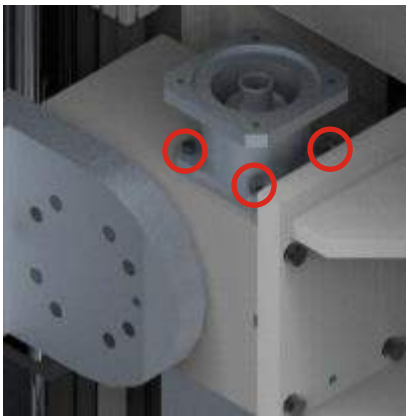
10	Disassemble the 4 screws fixing the Servomotor and extract it.



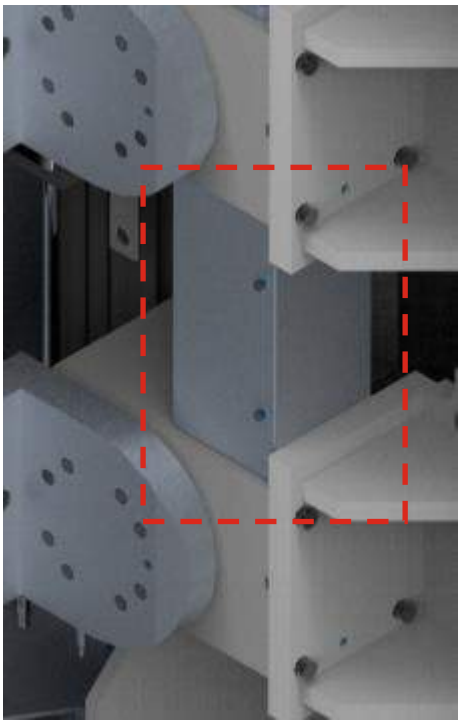
POSSIBLE FALLS OF HEAVY LOADS IN SUSPENSION MAY OCCUR. TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS

11	Extract the Elastic Coupling of the servomotor.

12	Disassemble the 4 screws fixing the Servomotor Support and extract it.

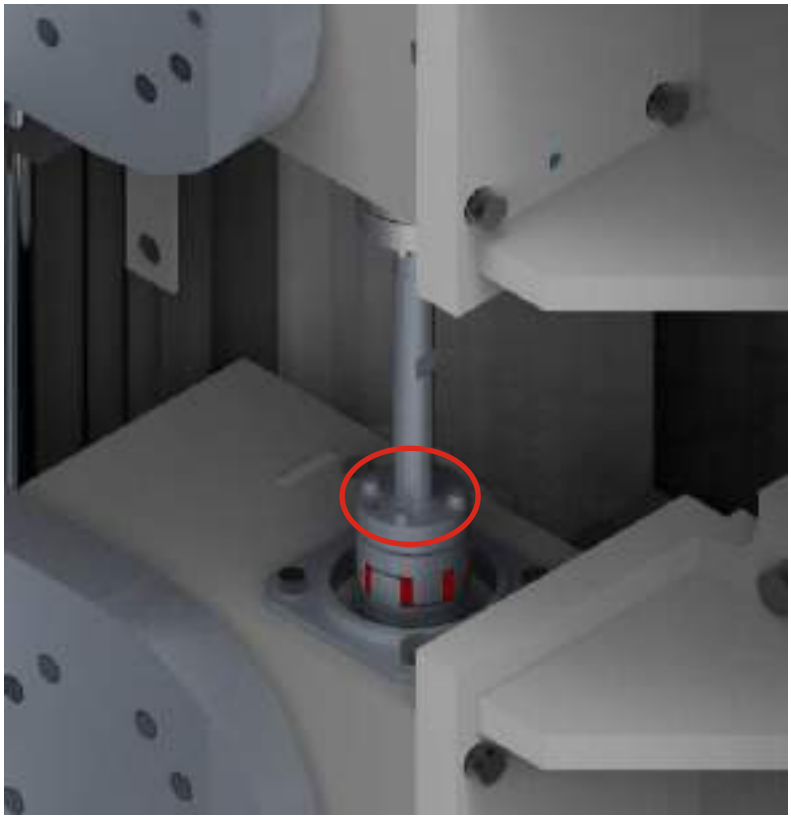


13	Disassemble plates covering the transmission system.



CUTS PRODUCES BY SHARP EDGES OR CHIPS MAY OCCUR. TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS

14	Disassemble screws of the drive coupling on both sides of the transmission shaft and extract it.

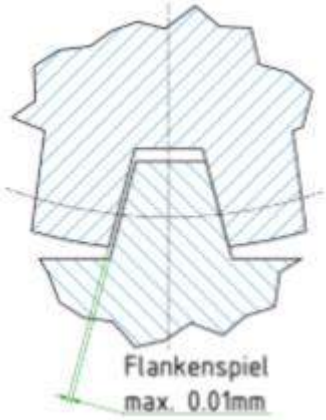


CUTS PRODUCES BY SHARP EDGES OR CHIPS MAY OCCUR. TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS

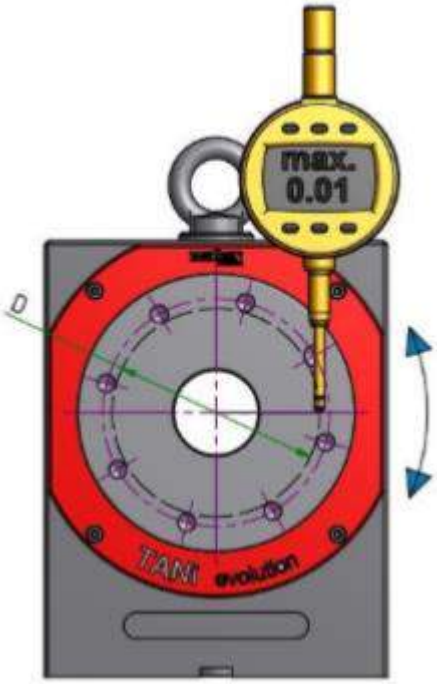
FALLS AT THE SAME / DIFFERENT LEVEL MAY OCCUR. TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS

6. PROCEDURE DESCRIPTION: “A” AXIS BACKLASH CHECK

15	The screw drive consist of a case-hardened and ground screw shaft with the corresponding bronze screw wheel. It is optimally set to backlash (max. 0.01 mm) in the factory, but after some operation period, it is necessary for the backlash to be checked and reset.



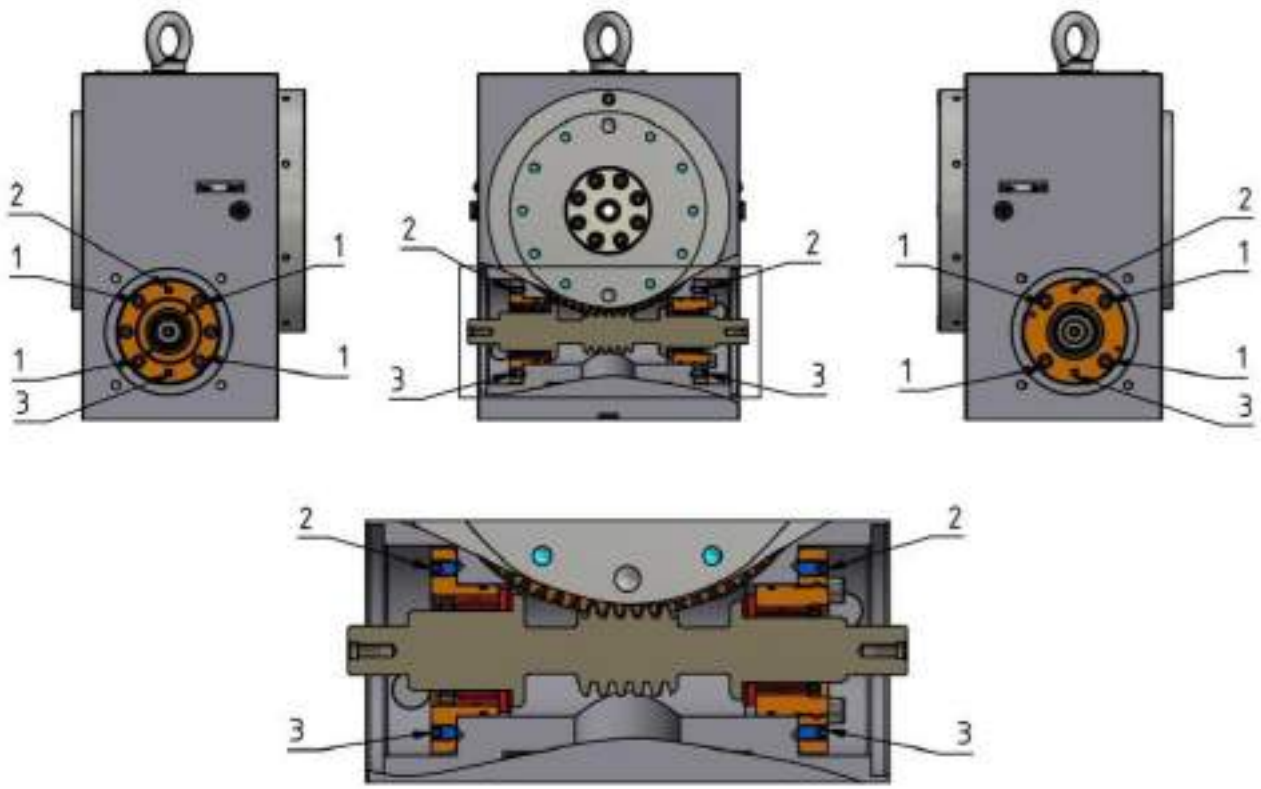
16	A dial gauge is applied to the Dividing Head spindle with the 160mm diameter to determine the backlash.



17	If the maximum tolerance of 0.01mm is not met, proceed to adjust the backlash of the “A” Axis.

7. PROCEDURE DESCRIPTION: “A” AXIS BACKLASH ADJUSTMENT

18	Loosen thread pins (Pos.2 & Pos.3)
19	Loosen cylinder screws (Pos.1)
20	The screw shaft is moved radially upwards to the screw wheel by tightening the upper thread pins (Pos.2). This reduces the backlash. The backlash can be increased again by tightening the lower thread pins (Pos.3). When adjusting the screw shaft, it must be ensured that they are aligned parallel to the floor. The heights at both measuring points should be measured.
21	Rechecking the backlash
22	The cylinder head screws (Pos.1) are tightened again once the backlash is set correctly.



CUTS PRODUCES BY SHARP EDGES OR CHIPS MAY OCCUR. TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS

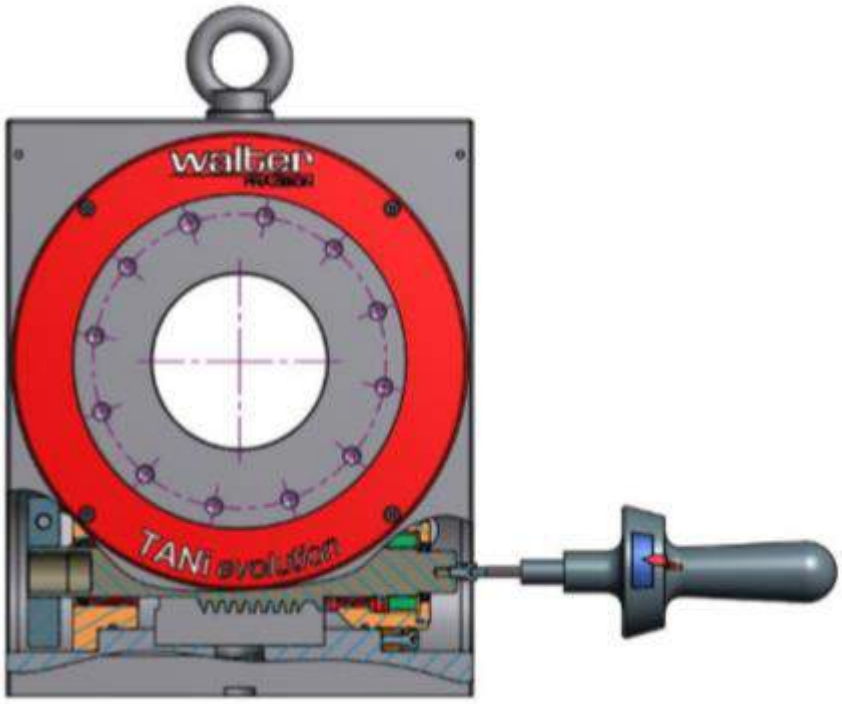
BURNS FROM HOT COMPONENTS MAY OCCUR. TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS

FALLS AT THE SAME / DIFFERENT LEVEL MAY OCCUR. TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS

POSSIBLE FALLS OF HEAVY LOADS IN SUSPENSION MAY OCCUR. TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS

8. PROCEDURE DESCRIPTION: “A” AXIS BACKLASH ADJUSTMENT

23	The Dividing Head is checked for loss of torque upon delivery, which is should be between 60-80 Ncm.
24	The torque may need to be remeasured in practical use. This can be measured on the screw shaft with a torque wrench.



BURNS FROM HOT COMPONENTS MAY OCCUR. TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS

FALLS AT THE SAME / DIFFERENT LEVEL MAY OCCUR. TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS

9. PROCEDURE DESCRIPTION: ASSEMBLY

25	To assemble the “A” Axis Drive, follow the disassembly steps in reverse order.

10. MASCHINENSTART / AXIS REFERENCE PROCEDURES

26	Switch on the machine (Refer to the Service Manual).
27	Close and lock the safety door to access the machine. (Refer to the Service Manual)
28	Carry out the alignment and “0” reference of the “A” Axis.

CHECK THE MACHINE AXIS ALIGNMENT PROCEDURES DESCRIBED IN THE SERVICE MANUAL

File Nº	TW_PM_261_001	**Reference Drawings**	XXXX261
Mechanical Personnel	1	**Electrical Personnel**	0
Duration	10’	**Frequency**	Daily
Machine Status	ON	**Interruptible Task**	YES
Specific Tools	Maintenance Equipment		

ISO Safety Symbols


Safety Padlock


Safety Shoes


Safety Glasses


Safety Gloves


Safety Vest


Safety Earmuffs


Safety Clothes

1. SUMMARY

Step	Description
1	Cleaning the Clamping Fixture

2. PRECAUTIONS

BEFORE STARTING ANY MAINTENANCE OPERATION ON THE MACHINE, BEAR IN MIND ALL THE SAFETY INDICATIONS DESCRIBED ON THE **SERVICE MANUAL AND THE ECPL PLACARD**

WHENEVER A MAINTENANCE TASK NEEDS TO BE CONDUCTED, THE OPERATOR OR THE MAINTENANCE PERSONNEL MUST ENSURE THAT ONLY THEM CAN OPERATE THE MACHINE IN ACCORDANCE TO THE SAFETY STANDARDS AND APPROVED WORK PROCEDURES

ENSURE THAT ALL THE MATERIALS AND SPARE PARTS ARE THROWN AWAY WITH SAFETY AND RESPECTFULLY WITH THE ENVIRONMENT

STRICTLY OBSERVE THE ENVIRONMENTAL PROTECTION RULES AND STANDARDS ESTABLISHED BY THE LAW BEFORE ELIMINATING USED OR SPILLED OIL

TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS SUCH AS:

- CUTS PRODUCES BY SHARP EDGES OR CHIPS
- PROJECTION OF PARTICLES
- BURNS FROM HOT COMPONENTS
- FALLS AT THE SAME / DIFFERENT LEVEL
- POSSIBLE FALLS OF HEAVY LOADS IN SUSPENSION

3. PROCEDURE DESCRIPTION: CLEANING THE CLAMPING FIXTURE

1	Clean and prepare the area where the maintenance task is going to take place.
2	Using the Main Panel of the machine, open the Load / Unload Automatic Door.

3	Unlock and open the safety door to Access the machine. (Refer to the Service Manual)
4	Using the coolant flush pistol or some cleaning rags, clean the Clamping Fixture contact parts and built up dirt to avoid clamping issues during the machining.

CUTS PRODUCES BY SHARP EDGES OR CHIPS MAY OCCUR. TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS

PROJECTION OF PARTICLES MAY OCCUR. TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS

5	Close and lock the safety door to access the machine. (Refer to the Service Manual)

REPLACEMENT OF THE CLAMPING FIXTURE CONTACT PARTS

File Nº	TW_PM_261_004	**Reference Drawings**	XXXX261 / XXXX262 XXXX263 / XXXX264 XXXX265 / XXXX266
Mechanical Personnel	1	**Electrical Personnel**	0
Duration	30’	**Frequency**	On Demand
Machine Status	OFF	**Interruptible Task**	NO
Specific Tools	Maintenance Equipment		

ISO Safety Symbols


Safety Padlock


Safety Shoes


Safety Gloves


Safety Vest


Safety Clothes

1. SUMMARY

Step	Description
1	Machine Disconnection
2	Clamping Fixture Contact Parts Disassembly
3	Element Replacement and Assembly
4	Machine Connection

2. PRECAUTIONS

BEFORE STARTING ANY MAINTENANCE OPERATION ON THE MACHINE, BEAR IN MIND ALL THE SAFETY INDICATIONS DESCRIBED ON THE **SERVICE MANUAL AND THE ECPL PLACARD**

WHENEVER A MAINTENANCE TASK NEEDS TO BE CONDUCTED, THE OPERATOR OR THE MAINTENANCE PERSONNEL MUST ENSURE THAT ONLY THEM CAN OPERATE THE MACHINE IN ACCORDANCE TO THE SAFETY STANDARDS AND APPROVED WORK PROCEDURES

ENSURE THAT ALL THE MATERIALS AND SPARE PARTS ARE THROWN AWAY WITH SAFETY AND RESPECTFULLY WITH THE ENVIRONMENT

STRICTLY OBSERVE THE ENVIRONMENTAL PROTECTION RULES AND STANDARDS ESTABLISHED BY THE LAW BEFORE ELIMINATING USED OR SPILLED OIL

TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS SUCH AS:

- CUTS PRODUCES BY SHARP EDGES OR CHIPS
- PROJECTION OF PARTICLES
- BURNS FROM HOT COMPONENTS
- FALLS AT THE SAME / DIFFERENT LEVEL
- POSSIBLE FALLS OF HEAVY LOADS IN SUSPENSION

3. MACHINE DISCONNECTION

1	Clean and prepare the area where the maintenance task is going to take place.
2	Using the Main Panel of the machine, open the Load / Unload Automatic Door.

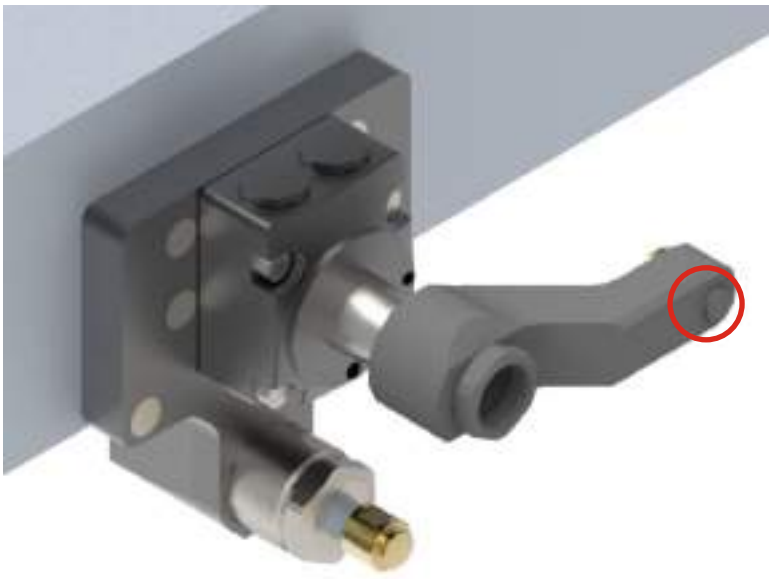
3	Using the Robot, disassemble the Clamping Fixture from the machine.
4	Unlock and open the safety door to Access the machine. (Refer to the Service Manual)
5	Switch off the machine (Refer to the Service Manual).

WHENEVER A MAINTENANCE TASK NEEDS TO BE CONDUCTED, THE OPERATOR OR THE MAINTENANCE PERSONNEL MUST ENSURE THAT ONLY THEM CAN OPERATE THE MACHINE IN ACCORDANCE TO THE SAFETY STANDARDS AND APPROVED WORK PROCEDURES

AFTER DISCONNECTING THE MAIN POWER SWITCH, WAIT AT LEAST 5 MINUTES BEFORE CARRYING ANY MAINTENANCE WORK ON THE ELECTRICAL SYSTEM AND CHECK THAT THERE IS NO RESIDUAL PRESSURE ON THE FLUID LINES CHECKING THE PRESSURE GAUGES AND PRESSURE SWITCHES.

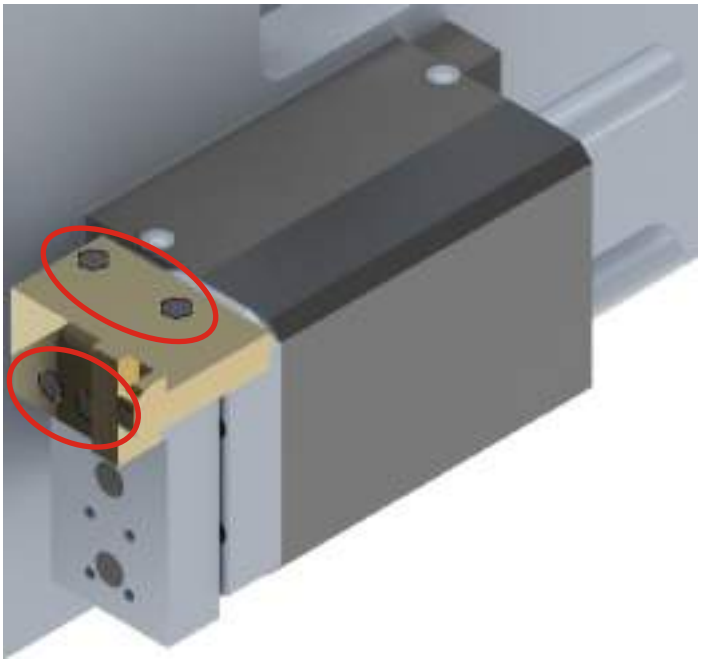
4. PROCEDURE DESCRIPTION: DISASSEMBLY

6	Access to the disassembled Clamping Fixture and locate all the Contact Parts to disassemble and replace.
7	Disassemble the screw fixing the Contact Part of the Clamping Jaw and extract it.

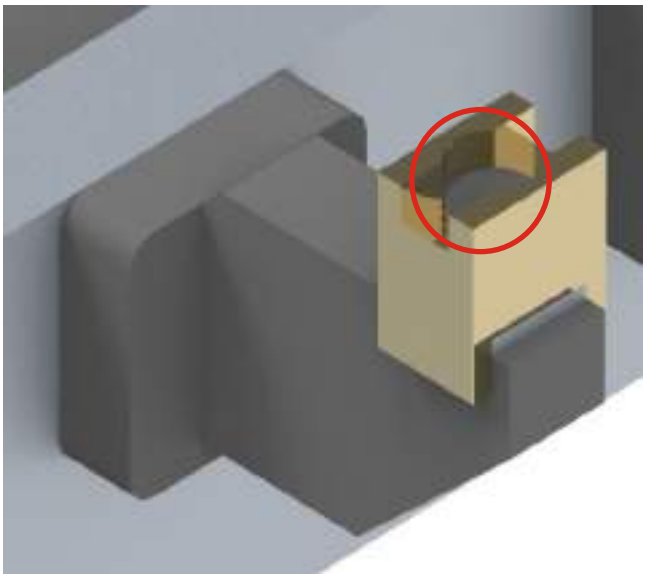


8	Disassemble the Vibration Dumper Contact Part and extract it.

9	Disassemble the 4 screws of the Axial Pusher Contact Part and extract it.



10	Disassemble the screw of the Support Contact Part and extract it.



CUTS PRODUCES BY SHARP EDGES OR CHIPS MAY OCCUR. TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS

5. PROCEDURE DESCRIPTION: ELEMENT REPLACEMENT AND ASSEMBLY

11	Replace the Contac Parts for new ones.
12	To assemble the Contac Parts, follow the disassembly steps in reverse order.

6. CONSIDERATIONS FOR ASSEMBLY

ALWAYS USE 12.9 QUALITY BOLTS AND APPLY THE ADVISED TORQUE ATTACHED ON THE FOLLOWING TABLE.

SCREW TORQUE VALUES		
METRIC	**STEEL**	**ALUMINUM**
M4	3,9 Nm	3 Nm
M5	7,8 Nm	6 Nm
M6	13 Nm	10 Nm
M8	32 Nm	25 Nm
M10	63 Nm	49 Nm
M12	105 Nm	73,5 Nm
M14	167 Nm	117 Nm
M16	260 Nm	182 Nm
M18	365 Nm	255 Nm
M20	518 Nm	362 Nm

7. MACHINE CONNECTION / AXIS REFERENCE PROCEDURES

13	Switch on the machine (Refer to the Service Manual).
14	Close and lock the safety door to access the machine. (Refer to the Service Manual)

CONTROL WORK SPINDLE ROTARY JOINT LEAKS

File Nº	TW_PM_320_001	**Reference Drawings**	XXXX320
Mechanical Personnel	1	**Electrical Personnel**	0
Duration	5’	**Frequency**	Weekly
Machine Status	OFF	**Interruptible Task**	NO
Specific Tools	Maintenance Equipment		

ISO Safety Symbols


Safety Padlock


Safety Shoes


Safety Glasses


Safety Gloves


Safety Vest


Safety Clothes

1. SUMMARY

Step	Description
1	Machine Disconnection
2	Control Work Spindle Rotary Joint Leaks
3	Machine Connection

2. PRECAUTIONS

BEFORE STARTING ANY MAINTENANCE OPERATION ON THE MACHINE, BEAR IN MIND ALL THE SAFETY INDICATIONS DESCRIBED ON THE **SERVICE MANUAL AND THE ECPL PLACARD**

WHENEVER A MAINTENANCE TASK NEEDS TO BE CONDUCTED, THE OPERATOR OR THE MAINTENANCE PERSONNEL MUST ENSURE THAT ONLY THEM CAN OPERATE THE MACHINE IN ACCORDANCE TO THE SAFETY STANDARDS AND APPROVED WORK PROCEDURES

ENSURE THAT ALL THE MATERIALS AND SPARE PARTS ARE THROWN AWAY WITH SAFETY AND RESPECTFULLY WITH THE ENVIRONMENT

STRICTLY OBSERVE THE ENVIRONMENTAL PROTECTION RULES AND STANDARDS ESTABLISHED BY THE LAW BEFORE ELIMINATING USED OR SPILLED OIL

TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS SUCH AS:

- CUTS PRODUCES BY SHARP EDGES OR CHIPS
- PROJECTION OF PARTICLES
- BURNS FROM HOT COMPONENTS
- FALLS AT THE SAME / DIFFERENT LEVEL
- POSSIBLE FALLS OF HEAVY LOADS IN SUSPENSION

3. MACHINE DISCONNECTION

1	Clean and prepare the area where the maintenance task is going to take place.
2	Unlock and open the safety door to Access the machine. (Refer to the Service Manual)
3	Switch off the machine (Refer to the Service Manual).

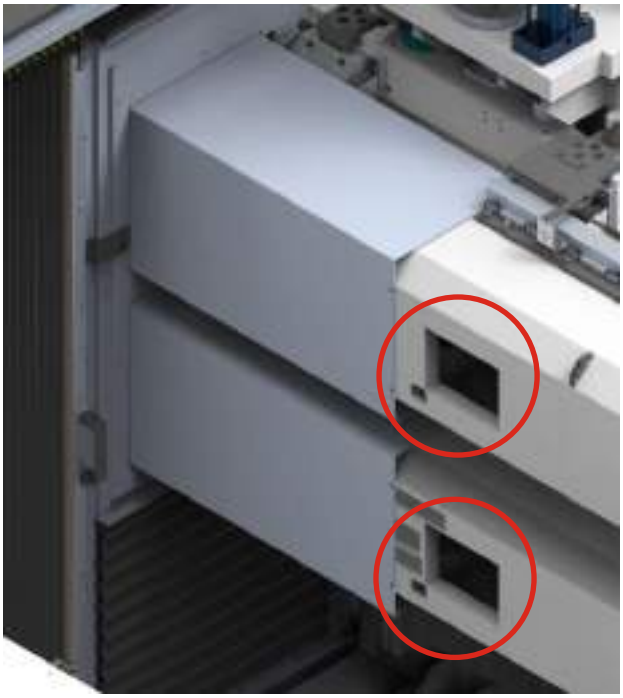
WHENEVER A MAINTENANCE TASK NEEDS TO BE CONDUCTED, THE OPERATOR OR THE MAINTENANCE PERSONNEL MUST ENSURE THAT ONLY THEM CAN OPERATE THE MACHINE IN ACCORDANCE TO THE SAFETY STANDARDS AND APPROVED WORK PROCEDURES

AFTER DISCONNECTING THE MAIN POWER SWITCH, WAIT AT LEAST 5 MINUTES BEFORE CARRYING ANY MAINTENANCE WORK ON THE ELECTRICAL SYSTEM AND CHECK THAT THERE IS NO RESIDUAL PRESSURE ON THE FLUID LINES CHECKING THE PRESSURE GAUGES AND PRESSURE SWITCHES.

4. PROCEDURE DESCRIPTION: CONTROL WORK SPINDLE ROTARY JOINT LEAKS

4	Open the 3 Axis panel door to access to the Work Spindle.

5	Access the Work Spindle Rotary Joint.



6	Check that there are no leaks on the surroundings of the Rotary Joint.
7	If leaks are detected, change the Rotary Joint for a new one.

BURNS FROM HOT COMPONENTS MAY OCCUR. TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS

5. MACHINE CONNECTION / AXIS REFERENCE PROCEDURES

8	Switch on the machine (Refer to the Service Manual).
9	Close and lock the safety door to access the machine. (Refer to the Service Manual)

CONTROL OF THE WORK SPINDLE COLLET CHUCK

File Nº	TW_PM_320_002	**Reference Drawings**	XXXX320
Mechanical Personnel	1	**Electrical Personnel**	0
Duration	10’	**Frequency**	Weekly
Machine Status	OFF	**Interruptible Task**	YES
Specific Tools	Maintenance Equipment		

ISO Safety Symbols


Safety Padlock


Safety Shoes


Safety Glasses


Safety Gloves


Safety Vest


Safety Clothes

1. SUMMARY

Step	Description
1	Machine Disconnection
2	Cleaning the Work Spindle Collet Chuck
3	Control the Work Spindle Collet Chuck
4	Machine Connection

2. PRECAUTIONS

BEFORE STARTING ANY MAINTENANCE OPERATION ON THE MACHINE, BEAR IN MIND ALL THE SAFETY INDICATIONS DESCRIBED ON THE **SERVICE MANUAL AND THE ECPL PLACARD**

WHENEVER A MAINTENANCE TASK NEEDS TO BE CONDUCTED, THE OPERATOR OR THE MAINTENANCE PERSONNEL MUST ENSURE THAT ONLY THEM CAN OPERATE THE MACHINE IN ACCORDANCE TO THE SAFETY STANDARDS AND APPROVED WORK PROCEDURES

ENSURE THAT ALL THE MATERIALS AND SPARE PARTS ARE THROWN AWAY WITH SAFETY AND RESPECTFULLY WITH THE ENVIRONMENT

STRICTLY OBSERVE THE ENVIRONMENTAL PROTECTION RULES AND STANDARDS ESTABLISHED BY THE LAW BEFORE ELIMINATING USED OR SPILLED OIL

TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS SUCH AS:

- CUTS PRODUCES BY SHARP EDGES OR CHIPS
- PROJECTION OF PARTICLES
- BURNS FROM HOT COMPONENTS
- FALLS AT THE SAME / DIFFERENT LEVEL
- POSSIBLE FALLS OF HEAVY LOADS IN SUSPENSION

3. MACHINE DISCONNECTION

1	Clean and prepare the area where the maintenance task is going to take place.
2	Using the Main Panel of the machine, open the Load / Unload Automatic Door.

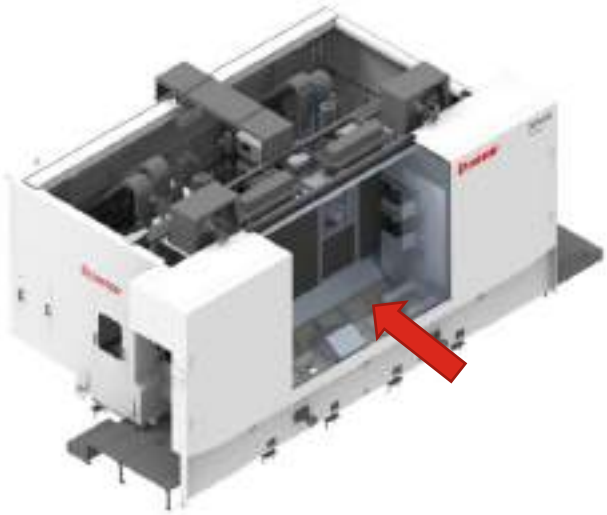
3	Using the Robot, disassemble the Clamping Fixture from the machine.
4	Unlock and open the safety door to Access the machine. (Refer to the Service Manual)
5	Switch off the machine (Refer to the Service Manual).

WHENEVER A MAINTENANCE TASK NEEDS TO BE CONDUCTED, THE OPERATOR OR THE MAINTENANCE PERSONNEL MUST ENSURE THAT ONLY THEM CAN OPERATE THE MACHINE IN ACCORDANCE TO THE SAFETY STANDARDS AND APPROVED WORK PROCEDURES

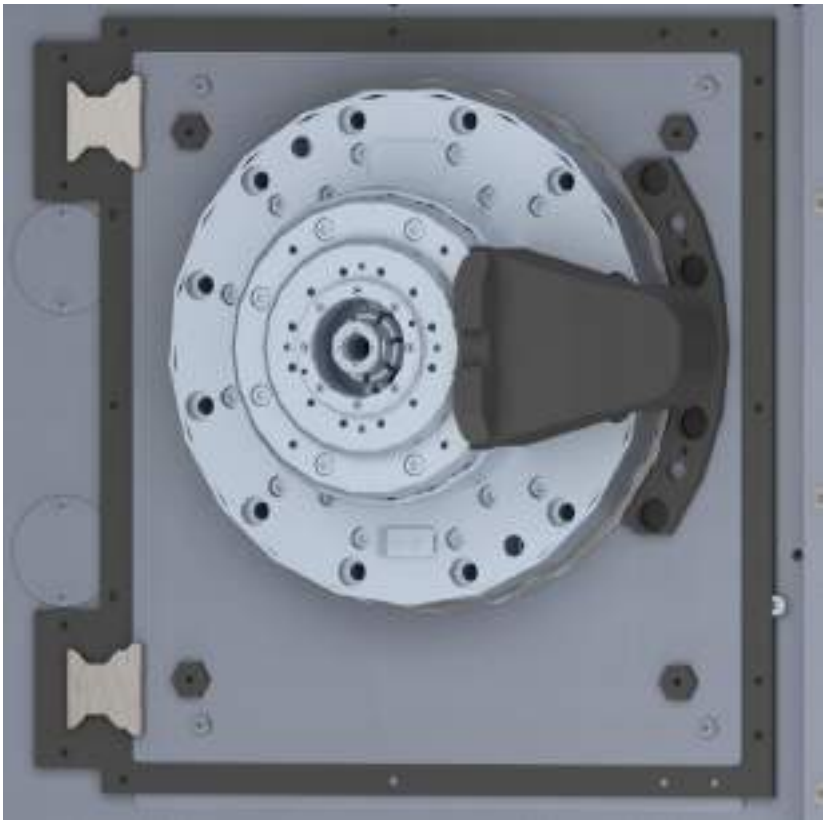
AFTER DISCONNECTING THE MAIN POWER SWITCH, WAIT AT LEAST 5 MINUTES BEFORE CARRYING ANY MAINTENANCE WORK ON THE ELECTRICAL SYSTEM AND CHECK THAT THERE IS NO RESIDUAL PRESSURE ON THE FLUID LINES CHECKING THE PRESSURE GAUGES AND PRESSURE SWITCHES.

4. PROCEDURE DESCRIPTION: CLEANING THE WORK SPINDLE COLLET CHUCK

6	Access the Clamping Fixture area.



7	Using a cleaning cloth, clean the Work Spindle and the Collet Chuck.



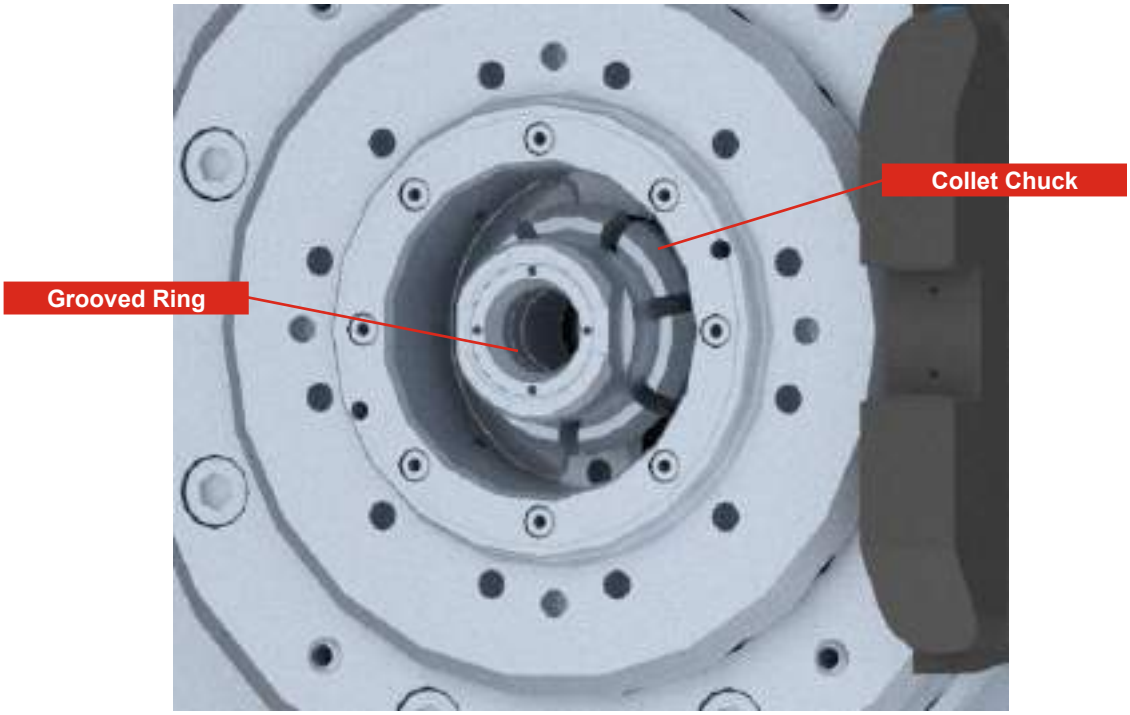
CUTS PRODUCES BY SHARP EDGES OR CHIPS MAY OCCUR. TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS

BURNS FROM HOT COMPONENTS MAY OCCUR. TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS

FALLS AT THE SAME / DIFFERENT LEVEL MAY OCCUR. TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS

5. PROCEDURE DESCRIPTION: CONTROL THE WORK SPINDLE COLLET CHUCK

8	Check the Collet Chuck and ensure that it not damaged in any way. If there is any kind of damage, replace it for a new one.
9	Check that the Collet Chuck is properly lubricated and clean. If there is not enough lubrication, re-grease the Collet Chuck.
10	Check the Collet Chuck Grooved Ring and ensure that there is no damage on it. If there is any kind of damage, replace it for a new one.



CUTS PRODUCES BY SHARP EDGES OR CHIPS MAY OCCUR. TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS

BURNS FROM HOT COMPONENTS MAY OCCUR. TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS

FALLS AT THE SAME / DIFFERENT LEVEL MAY OCCUR. TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS

6. MACHINE CONNECTION / AXIS REFERENCE PROCEDURES

11	Switch on the machine (Refer to the Service Manual).
12	Close and lock the safety door to access the machine. (Refer to the Service Manual)

LUBRICATION OF THE WORK SPINDLE COLLET CHUCK

File Nº	TW_PM_320_003	**Reference Drawings**	XXXX320
Mechanical Personnel	1	**Electrical Personnel**	0
Duration	45’	**Frequency**	On Demand
Machine Status	ON	**Interruptible Task**	NO
Specific Tools	Maintenance Equipment		

ISO Safety Symbols


Safety Padlock


Safety Shoes


Safety Glasses


Safety Gloves


Safety Vest


Safety Clothes

1. SUMMARY

Step	Description
1	Work Spindle Collet Chuck Disassembly
2	Work Spindle Collet Chuck Lubrication
3	Work Spindle Collet Chuck Assembly
4	Work Spindle Collet Chuck Clamping Strength Control
5	Machine Connection

2. PRECAUTIONS

BEFORE STARTING ANY MAINTENANCE OPERATION ON THE MACHINE, BEAR IN MIND ALL THE SAFETY INDICATIONS DESCRIBED ON THE **SERVICE MANUAL AND THE ECPL PLACARD**

WHENEVER A MAINTENANCE TASK NEEDS TO BE CONDUCTED, THE OPERATOR OR THE MAINTENANCE PERSONNEL MUST ENSURE THAT ONLY THEM CAN OPERATE THE MACHINE IN ACCORDANCE TO THE SAFETY STANDARDS AND APPROVED WORK PROCEDURES

ENSURE THAT ALL THE MATERIALS AND SPARE PARTS ARE THROWN AWAY WITH SAFETY AND RESPECTFULLY WITH THE ENVIRONMENT

STRICTLY OBSERVE THE ENVIRONMENTAL PROTECTION RULES AND STANDARDS ESTABLISHED BY THE LAW BEFORE ELIMINATING USED OR SPILLED OIL

TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS SUCH AS:

- CUTS PRODUCES BY SHARP EDGES OR CHIPS
- PROJECTION OF PARTICLES
- BURNS FROM HOT COMPONENTS
- FALLS AT THE SAME / DIFFERENT LEVEL
- POSSIBLE FALLS OF HEAVY LOADS IN SUSPENSION

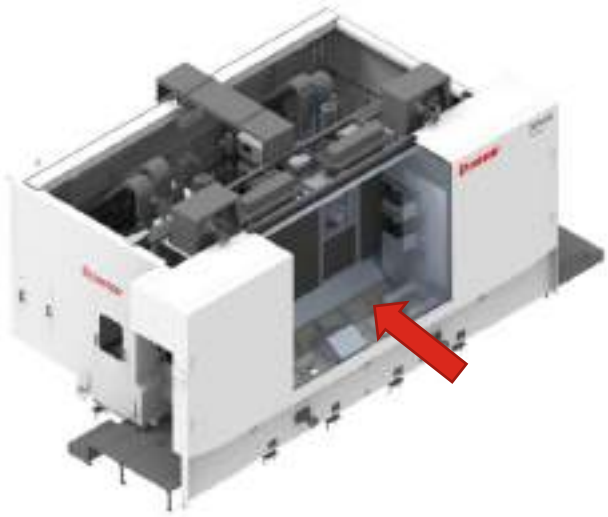
3. PROCEDURE DESCRIPTION: WORK SPINDLE COLLET CHUCK DISASSEMBLY

1	Clean and prepare the area where the maintenance task is going to take place.
2	Using the Main Panel of the machine, open the Load / Unload Automatic Door.

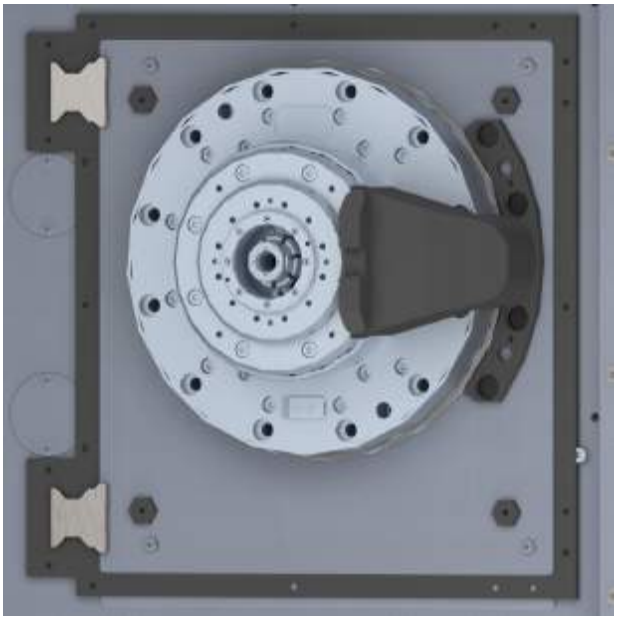
3	Unload to the Tool Magazine the tools located on the Work Spindle.
4	Unclamp the Work Spindle Collet Chuck.
5	Using the Robot, disassemble the Clamping Fixture from the machine.
6	Unlock and open the safety door to Access the machine. (Refer to the Service Manual)
7	Connect the Handheld Unit. (Refer to the Service Manual)

WHENEVER A MAINTENANCE TASK NEEDS TO BE CONDUCTED, THE OPERATOR OR THE MAINTENANCE PERSONNEL MUST ENSURE THAT ONLY THEM CAN OPERATE THE MACHINE IN ACCORDANCE TO THE SAFETY STANDARDS AND APPROVED WORK PROCEDURES

8	Access the Clamping Fixture area.



9	Using a cleaning cloth, clean the Work Spindle and the Collet Chuck.



CUTS PRODUCES BY SHARP EDGES OR CHIPS MAY OCCUR. TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS

BURNS FROM HOT COMPONENTS MAY OCCUR. TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS

FALLS AT THE SAME / DIFFERENT LEVEL MAY OCCUR. TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS

IF THE WORK SPINDLE HAS AN INTERNAL COOLANT SPEAR, SPECIAL TOOLING WILL BE NEEDED TO CARRY THIS PROCEDURE. TO ACCESS THE INTERNAL NUT OF THE COLLET CHUCK, A SPECIAL ALLEN KEY WITH A THOUGH HOLE WILL BE NEEDED IN ORDER TO AVOID / NOT TOUCH THE INTERNAL COOLANT SPEAR.

10	When the Collet Chuck is in the unclamped position, use a M4/6/8 Allen Key (or special Allen Key in case of having coolant spear) to disassemble the Collet Chuck Cone.

11	Extract the Collet Chuck Cone

12	Using pliers, extract the Collet Chuck Grippers one by one.

13	Using a cleaning cloth, clean the cavity where the Collet Chuck Grippers where.

4. PROCEDURE DESCRIPTION: WORK SPINDLE COLLET CHUCK LUBRICATION

14	Clean the Collet Chuck Grippers and the Collet Chuck Cone thoroughly before re-greasing them.
15	The grease to be used for this procedures are the next ones: ▪ METAFLUX-Paste Nr. 70-8508. Size: 400ml ▪ KLÜBER-Paste ME 31-52. Size: 400ml

ENSURE THAT THE COLLET CHUCK GRIPPERS AND THE COLLET CHUCK CONE ARE THOROUGHLY CLEANED BEFORE APPLYING THE NEW GREASE.

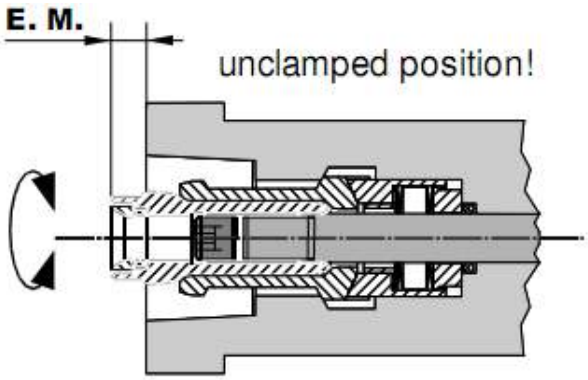
DO NOT MIXT THE DIFFERENT TYPES OF GREASE DURING THE GREASING PROCESS.

5. PROCEDURE DESCRIPTION: WORK SPINDLE COLLET CHUCK ASSEMBLY

16	Using pliers, assemble the Collet Chuck Grippers one by one.

17	Assemble the Collet Chuck Cone

18	Adjust the depth of the Collet Chuck Cone until it meets the EM dimension advised by the supplier.
19	The EM dimension to be used for this procedures are the next ones: ▪ HSK63->10,5mm ▪ HSK80->13mm ▪ HSK100->13mm



20	Use a M4/6/8 Allen Key (or special Allen Key in case of having coolant spear) to fix the Collet Chuck Cone in position using the advised torque.
21	The torques to be used for this procedures are the next ones: ▪ HSK63->30Nm ▪ HSK80->30Nm ▪ HSK100->50Nm

6. PROCEDURE DESCRIPTION: WORK SPINDLE COLLET CHUCK CLAMPING STRENGTH CONTROL

22	Using the Handheld Unit, Clamp / Unclamp the Work Spindle Collet Chuck 100 time to spread the grease evenly.
23	While the Work Spindle Collet Chuck is unclamped, insert the clamping strength measuring unit.

24	Clamp the Work Spindle Collet Chuck and measure the clamping strength.
25	The clamping strength to be displayed for this procedures are the next ones: ▪ HSK63->18kN ▪ HSK80->28kN ▪ HSK100->45kN

IF THE DISPLAYED CLAMPING STRENGTH IS UNDER THE 50%, REPLACE THE WORK SPINDLE COLLET CHUCK FOR A NEW ONE.

7. MACHINE CONNECTION / AXIS REFERENCE PROCEDURES

26	Close and lock the safety door to access the machine. (Refer to the Service Manual)

CONTROL OF THE WORK SPINDLE COLLECT CHUCK LOCKNUT TORQUE

File Nº	TW_PM_320_004	**Reference Drawings**	XXXX320
Mechanical Personnel	1	**Electrical Personnel**	0
Duration	10’	**Frequency**	Monthly
Machine Status	ON	**Interruptible Task**	YES
Specific Tools	Maintenance Equipment		

ISO Safety Symbols


Safety Padlock


Safety Shoes


Safety Glasses


Safety Gloves


Safety Vest


Safety Clothes

1. SUMMARY

Step	Description
1	Work Spindle Collet Chuck Locknut Torque Control

2. PRECAUTIONS

BEFORE STARTING ANY MAINTENANCE OPERATION ON THE MACHINE, BEAR IN MIND ALL THE SAFETY INDICATIONS DESCRIBED ON THE **SERVICE MANUAL AND THE ECPL PLACARD**

WHENEVER A MAINTENANCE TASK NEEDS TO BE CONDUCTED, THE OPERATOR OR THE MAINTENANCE PERSONNEL MUST ENSURE THAT ONLY THEM CAN OPERATE THE MACHINE IN ACCORDANCE TO THE SAFETY STANDARDS AND APPROVED WORK PROCEDURES

ENSURE THAT ALL THE MATERIALS AND SPARE PARTS ARE THROWN AWAY WITH SAFETY AND RESPECTFULLY WITH THE ENVIRONMENT

STRICTLY OBSERVE THE ENVIRONMENTAL PROTECTION RULES AND STANDARDS ESTABLISHED BY THE LAW BEFORE ELIMINATING USED OR SPILLED OIL

TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS SUCH AS:

- CUTS PRODUCES BY SHARP EDGES OR CHIPS
- PROJECTION OF PARTICLES
- BURNS FROM HOT COMPONENTS
- FALLS AT THE SAME / DIFFERENT LEVEL
- POSSIBLE FALLS OF HEAVY LOADS IN SUSPENSION

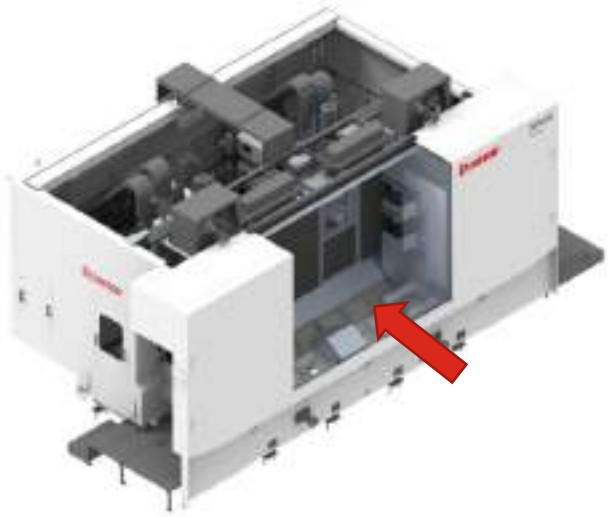
3. PROCEDURE DESCRIPTION: WORK SPINDLE COLLET CHUCK LOCKNUT TORQUE CONTROL

1	Clean and prepare the area where the maintenance task is going to take place.
2	Using the Main Panel of the machine, open the Load / Unload Automatic Door.

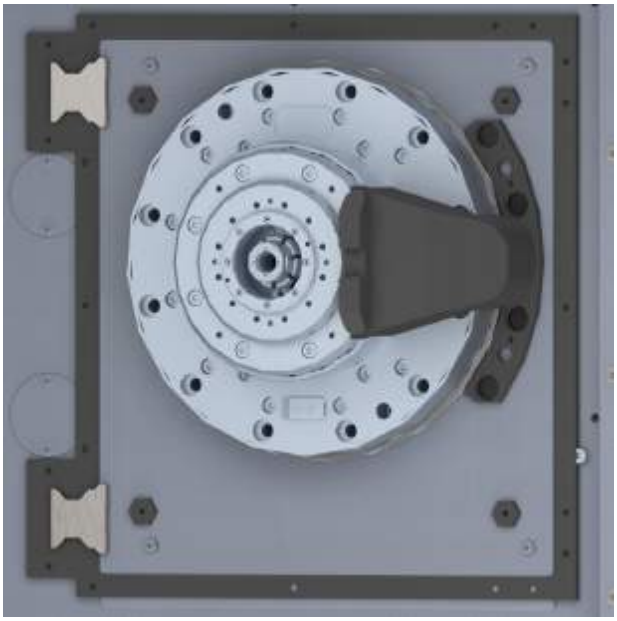
3	Unload to the Tool Magazine the tools located on the Work Spindle.
4	Unclamp the Work Spindle Collet Chuck.
5	Using the Robot, disassemble the Clamping Fixture from the machine.
6	Unlock and open the safety door to Access the machine. (Refer to the Service Manual)
7	Connect the Handheld Unit. (Refer to the Service Manual)

WHENEVER A MAINTENANCE TASK NEEDS TO BE CONDUCTED, THE OPERATOR OR THE MAINTENANCE PERSONNEL MUST ENSURE THAT ONLY THEM CAN OPERATE THE MACHINE IN ACCORDANCE TO THE SAFETY STANDARDS AND APPROVED WORK PROCEDURES

8	Access the Clamping Fixture area.



9	Using a cleaning cloth, clean the Work Spindle and the Collet Chuck.



CUTS PRODUCES BY SHARP EDGES OR CHIPS MAY OCCUR. TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS

BURNS FROM HOT COMPONENTS MAY OCCUR. TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS

CONTROL OF THE WORK SPINDLE COLLECT CHUCK LOCKNUT TORQUE

FALLS AT THE SAME / DIFFERENT LEVEL MAY OCCUR. TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS

IF THE WORK SPINDLE HAS AN INTERNAL COOLANT SPEAR, SPECIAL TOOLING WILL BE NEEDED TO CARRY THIS PROCEDURE. TO ACCESS THE INTERNAL NUT OF THE COLLET CHUCK, A SPECIAL ALLEN KEY WITH A THOUGH HOLE WILL BE NEEDED IN ORDER TO AVOID / NOT TOUCH THE INTERNAL COOLANT SPEAR.

10	When the Collet Chuck is in the unclamped position, use a M4/6/8 Allen Key (or special Allen Key in case of having coolant spear) to check the Collet Chuck Locknut torque.
11	If the torque is not correct, adjust the torque of the Collet Chuck Locknut.
12	The torques to be used for this procedures are the next ones: ▪ HSK63->30Nm ▪ HSK80->30Nm ▪ HSK100->50Nm

13	Close and lock the safety door to access the machine. (Refer to the Service Manual)

CONTROL THE EM DIMENSION OF THE WORK SPINDLE COLLET CHUCK

File Nº	TW_PM_320_005	**Reference Drawings**	XXXX320
Mechanical Personnel	1	**Electrical Personnel**	0
Duration	20’	**Frequency**	Monthly
Machine Status	ON	**Interruptible Task**	NO
Specific Tools	Maintenance Equipment		

ISO Safety Symbols


Safety Padlock


Safety Shoes


Safety Glasses


Safety Gloves


Safety Vest


Safety Clothes

1. SUMMARY

Step	Description
1	Work Spindle Collet Chuck EM Dimension Control

2. PRECAUTIONS

BEFORE STARTING ANY MAINTENANCE OPERATION ON THE MACHINE, BEAR IN MIND ALL THE SAFETY INDICATIONS DESCRIBED ON THE **SERVICE MANUAL AND THE ECPL PLACARD**

WHENEVER A MAINTENANCE TASK NEEDS TO BE CONDUCTED, THE OPERATOR OR THE MAINTENANCE PERSONNEL MUST ENSURE THAT ONLY THEM CAN OPERATE THE MACHINE IN ACCORDANCE TO THE SAFETY STANDARDS AND APPROVED WORK PROCEDURES

ENSURE THAT ALL THE MATERIALS AND SPARE PARTS ARE THROWN AWAY WITH SAFETY AND RESPECTFULLY WITH THE ENVIRONMENT

STRICTLY OBSERVE THE ENVIRONMENTAL PROTECTION RULES AND STANDARDS ESTABLISHED BY THE LAW BEFORE ELIMINATING USED OR SPILLED OIL

TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS SUCH AS:

- CUTS PRODUCES BY SHARP EDGES OR CHIPS
- PROJECTION OF PARTICLES
- BURNS FROM HOT COMPONENTS
- FALLS AT THE SAME / DIFFERENT LEVEL
- POSSIBLE FALLS OF HEAVY LOADS IN SUSPENSION

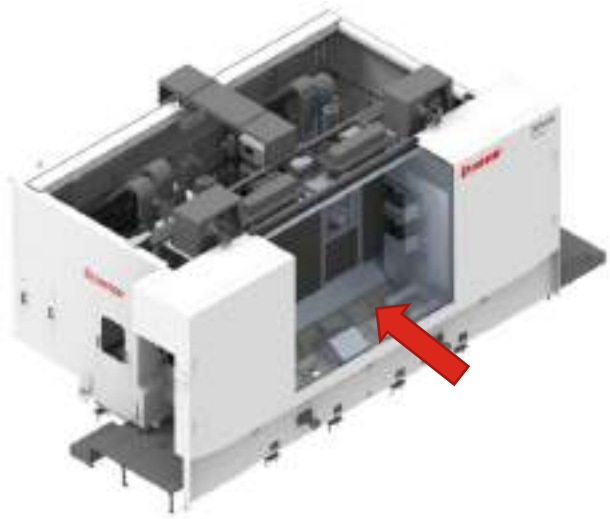
3. PROCEDURE DESCRIPTION: WORK SPINDLE COLLET CHUCK EM DIMENSION CONTROL

1	Clean and prepare the area where the maintenance task is going to take place.
2	Using the Main Panel of the machine, open the Load / Unload Automatic Door.

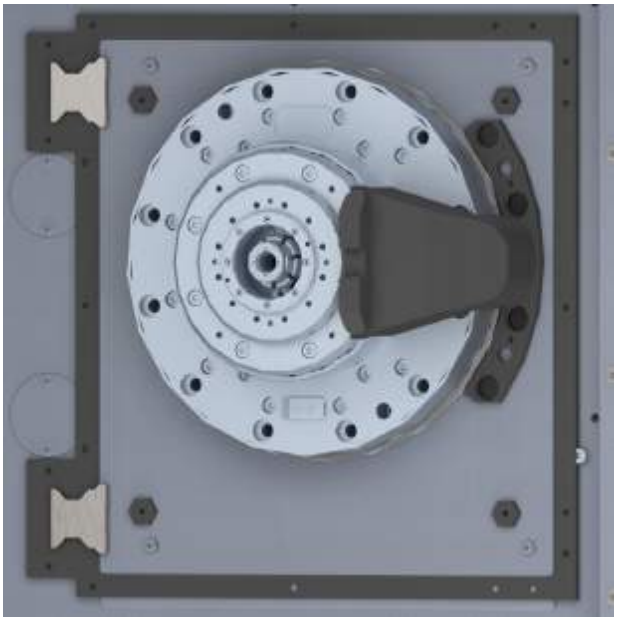
3	Unload to the Tool Magazine the tools located on the Work Spindle.
4	Unclamp the Work Spindle Collet Chuck.
5	Using the Robot, disassemble the Clamping Fixture from the machine.
6	Unlock and open the safety door to Access the machine. (Refer to the Service Manual)
7	Connect the Handheld Unit. (Refer to the Service Manual)

WHENEVER A MAINTENANCE TASK NEEDS TO BE CONDUCTED, THE OPERATOR OR THE MAINTENANCE PERSONNEL MUST ENSURE THAT ONLY THEM CAN OPERATE THE MACHINE IN ACCORDANCE TO THE SAFETY STANDARDS AND APPROVED WORK PROCEDURES

8	Access the Clamping Fixture area.



9	Using a cleaning cloth, clean the Work Spindle and the Collet Chuck.



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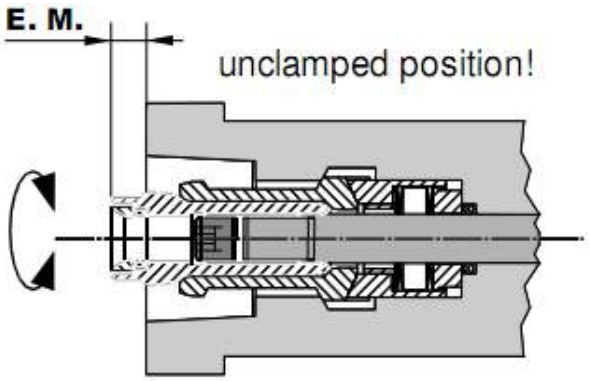
BURNS FROM HOT COMPONENTS MAY OCCUR. TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS

FALLS AT THE SAME / DIFFERENT LEVEL MAY OCCUR. TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS

IF THE WORK SPINDLE HAS AN INTERNAL COOLANT SPEAR, SPECIAL TOOLING WILL BE NEEDED TO CARRY THIS PROCEDURE. TO ACCESS THE INTERNAL NUT OF THE COLLET CHUCK, A SPECIAL ALLEN KEY WITH A THOUGH HOLE WILL BE NEEDED IN ORDER TO AVOID / NOT TOUCH THE INTERNAL COOLANT SPEAR.

10	When the Collet Chuck is in the unclamped position, check the EM Dimension of the Collet Chuck.
11	The EM dimension to be used for this procedures are the next ones: ▪ HSK63->10,5mm ▪ HSK80->13mm ▪ HSK100->13mm

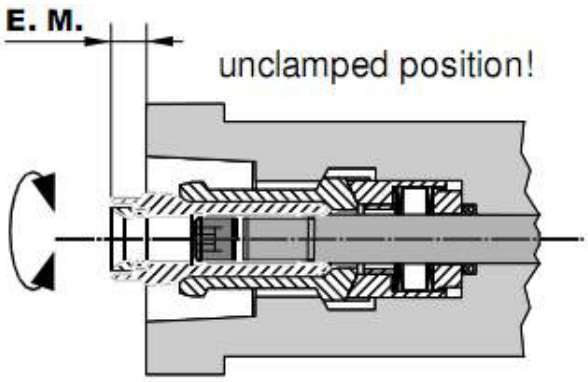


12	If the Dimension is not correct, adjust the Collet Chuck EM Dimension following the next steps.

IF THE WORK SPINDLE HAS AN INTERNAL COOLANT SPEAR, SPECIAL TOOLING WILL BE NEEDED TO CARRY THIS PROCEDURE. TO ACCESS THE INTERNAL NUT OF THE COLLET CHUCK, A SPECIAL ALLEN KEY WITH A THOUGH HOLE WILL BE NEEDED IN ORDER TO AVOID / NOT TOUCH THE INTERNAL COOLANT SPEAR.

13	When the Collet Chuck is in the unclamped position, use a M4/6/8 Allen Key (or special Allen Key in case of having coolant spear) to untighten the Collet Chuck Locknut.

14	Adjust the depth of the Collet Chuck Cone until it meets the EM dimension advised by the supplier.
15	The EM dimension to be used for this procedures are the next ones: ▪ HSK63->10,5mm ▪ HSK80->13mm ▪ HSK100->13mm



16	Use a M4/6/8 Allen Key (or special Allen Key in case of having coolant spear) to fix the Collet Chuck Locknut in position using the advised torque.
17	The torques to be used for this procedures are the next ones: ▪ HSK63->30Nm ▪ HSK80->30Nm ▪ HSK100->50Nm

18	Close and lock the safety door to access the machine. (Refer to the Service Manual)

CONTROL WORK SPINDLE COLLET CHUCK CLAMPING STRENGTH

File Nº	TW_PM_320_006	**Reference Drawings**	XXXX320
Mechanical Personnel	1	**Electrical Personnel**	0
Duration	10’	**Frequency**	Monthly
Machine Status	ON	**Interruptible Task**	YES
Specific Tools	Maintenance Equipment		

ISO Safety Symbols


Safety Padlock


Safety Shoes


Safety Glasses


Safety Gloves


Safety Vest


Safety Clothes

1. SUMMARY

Step	Description
1	Work Spindle Collet Chuck Clamping Strength Control

2. PRECAUTIONS

BEFORE STARTING ANY MAINTENANCE OPERATION ON THE MACHINE, BEAR IN MIND ALL THE SAFETY INDICATIONS DESCRIBED ON THE **SERVICE MANUAL AND THE ECPL PLACARD**

WHENEVER A MAINTENANCE TASK NEEDS TO BE CONDUCTED, THE OPERATOR OR THE MAINTENANCE PERSONNEL MUST ENSURE THAT ONLY THEM CAN OPERATE THE MACHINE IN ACCORDANCE TO THE SAFETY STANDARDS AND APPROVED WORK PROCEDURES

ENSURE THAT ALL THE MATERIALS AND SPARE PARTS ARE THROWN AWAY WITH SAFETY AND RESPECTFULLY WITH THE ENVIRONMENT

STRICTLY OBSERVE THE ENVIRONMENTAL PROTECTION RULES AND STANDARDS ESTABLISHED BY THE LAW BEFORE ELIMINATING USED OR SPILLED OIL

TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS SUCH AS:

- CUTS PRODUCES BY SHARP EDGES OR CHIPS
- PROJECTION OF PARTICLES
- BURNS FROM HOT COMPONENTS
- FALLS AT THE SAME / DIFFERENT LEVEL
- POSSIBLE FALLS OF HEAVY LOADS IN SUSPENSION

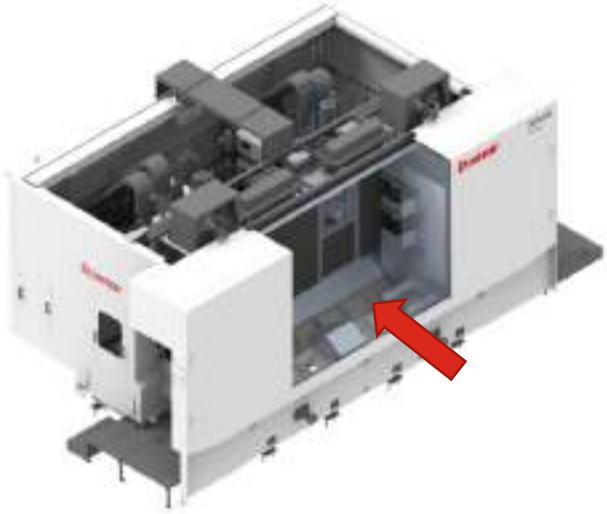
3. PROCEDURE DESCRIPTION: WORK SPINDLE COLLET CHUCK CLAMPING STRENGTH CONTROL

1	Clean and prepare the area where the maintenance task is going to take place.
2	Using the Main Panel of the machine, open the Load / Unload Automatic Door.

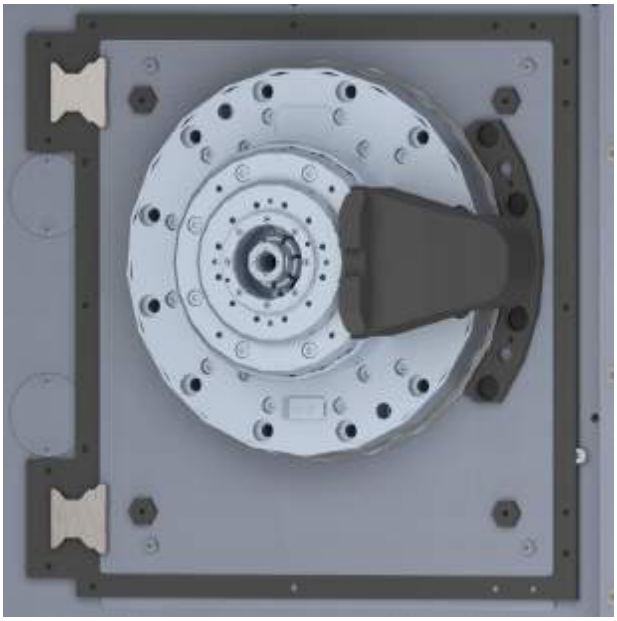
3	Unload to the Tool Magazine the tools located on the Work Spindle.
4	Unclamp the Work Spindle Collet Chuck.
5	Using the Robot, disassemble the Clamping Fixture from the machine.
6	Unlock and open the safety door to Access the machine. (Refer to the Service Manual)
7	Connect the Handheld Unit. (Refer to the Service Manual)

WHENEVER A MAINTENANCE TASK NEEDS TO BE CONDUCTED, THE OPERATOR OR THE MAINTENANCE PERSONNEL MUST ENSURE THAT ONLY THEM CAN OPERATE THE MACHINE IN ACCORDANCE TO THE SAFETY STANDARDS AND APPROVED WORK PROCEDURES

8	Access the Clamping Fixture area.



9	Using a cleaning cloth, clean the Work Spindle and the Collet Chuck.



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BURNS FROM HOT COMPONENTS MAY OCCUR. TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS

FALLS AT THE SAME / DIFFERENT LEVEL MAY OCCUR. TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS

10	While the Work Spindle Collet Chuck is unclamped, insert the clamping strength measuring unit.

11	Clamp the Work Spindle Collet Chuck and measure the clamping strength.
12	The clamping strength to be displayed for this procedures are the next ones: ▪ HSK63->18kN ▪ HSK80->28kN ▪ HSK100->45kN

IF THE DISPLAYED CLAMPING STRENGTH IS UNDER THE 70%, RE-GREASE THE WORK SPINDLE COLLET CHUCK AND CHECK AGAIN THE CLAMPING STRENGTH.

IF THE DISPLAYED CLAMPING STRENGTH IS UNDER THE 50%, REPLACE THE WORK SPINDLE COLLET CHUCK FOR A NEW ONE.

13	Close and lock the safety door to access the machine. (Refer to the Service Manual)

File Nº	TW_PM_320_008	**Reference Drawings**	XXXX320
Mechanical Personnel	1	**Electrical Personnel**	0
Duration	60’	**Frequency**	Yearly
Machine Status	ON	**Interruptible Task**	YES
Specific Tools	Maintenance Equipment		

ISO Safety Symbols


Safety Padlock


Safety Shoes


Safety Glasses


Safety Gloves


Safety Vest


Safety Clothes

1. SUMMARY

Step	Description
1	Work Spindle Run Out Test

2. PRECAUTIONS

BEFORE STARTING ANY MAINTENANCE OPERATION ON THE MACHINE, BEAR IN MIND ALL THE SAFETY INDICATIONS DESCRIBED ON THE **SERVICE MANUAL AND THE ECPL PLACARD**

WHENEVER A MAINTENANCE TASK NEEDS TO BE CONDUCTED, THE OPERATOR OR THE MAINTENANCE PERSONNEL MUST ENSURE THAT ONLY THEM CAN OPERATE THE MACHINE IN ACCORDANCE TO THE SAFETY STANDARDS AND APPROVED WORK PROCEDURES

ENSURE THAT ALL THE MATERIALS AND SPARE PARTS ARE THROWN AWAY WITH SAFETY AND RESPECTFULLY WITH THE ENVIRONMENT

STRICTLY OBSERVE THE ENVIRONMENTAL PROTECTION RULES AND STANDARDS ESTABLISHED BY THE LAW BEFORE ELIMINATING USED OR SPILLED OIL

TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS SUCH AS:

- CUTS PRODUCES BY SHARP EDGES OR CHIPS
- PROJECTION OF PARTICLES
- BURNS FROM HOT COMPONENTS
- FALLS AT THE SAME / DIFFERENT LEVEL
- POSSIBLE FALLS OF HEAVY LOADS IN SUSPENSION

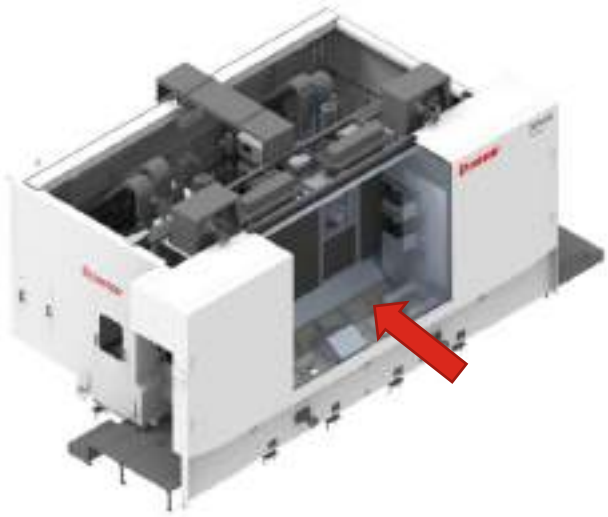
3. PROCEDURE DESCRIPTION: WORK SPINDLE RUN OUT TEST

1	Clean and prepare the area where the maintenance task is going to take place.
2	Using the Main Panel of the machine, open the Load / Unload Automatic Door.

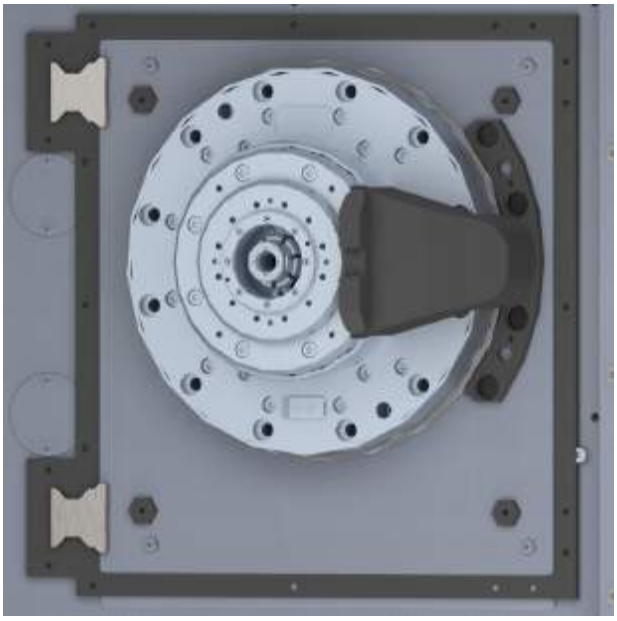
3	Unload to the Tool Magazine the tools located on the Work Spindle.
4	Unclamp the Work Spindle Collet Chuck.
5	Using the Robot, disassemble the Clamping Fixture from the machine.
6	Unlock and open the safety door to Access the machine. (Refer to the Service Manual)
7	Connect the Handheld Unit. (Refer to the Service Manual)

WHENEVER A MAINTENANCE TASK NEEDS TO BE CONDUCTED, THE OPERATOR OR THE MAINTENANCE PERSONNEL MUST ENSURE THAT ONLY THEM CAN OPERATE THE MACHINE IN ACCORDANCE TO THE SAFETY STANDARDS AND APPROVED WORK PROCEDURES

8	Access the Clamping Fixture area.



9	Using a cleaning cloth, clean the Work Spindle and the Collet Chuck.



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BURNS FROM HOT COMPONENTS MAY OCCUR. TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS

FALLS AT THE SAME / DIFFERENT LEVEL MAY OCCUR. TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS

10	Place the Measuring Mandrel on the Work Spindle and Clamp it.

11	Place the Magnetic Base with a Dial Gauge on the “A” Axis Drive and move the 3 Axis Module near it.
12	Place the Dial Gauge on top of the Mandrel.

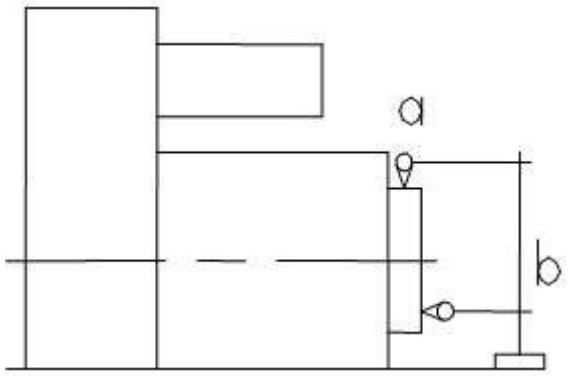
13	Moving the “Z” Axis, run the Dial Gauge over the top of the Mandrel and take note of the measurement difference.
14	Repeat the same process on the side of the Mandrel and take note of the measurement difference.

15	Place the Dial Gauge on top of the Mandrel, near the front side of the Work Spindle.
16	Using the Handheld Unit, enable the movement of the Work Spindle to be able to rotate it manually.
17	Rotating the Work Spindle manually, check the run out in 4 different positions. (0º, 90º, 180º, 270º)
18	Repeat the same procedure on the front of the Mandrel.

4. CONSIDERATIONS FOR ASSEMBLY

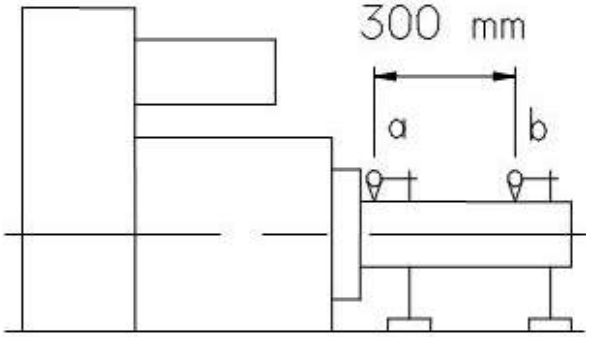
CHECKS TO BE CARRIED OUT WITHOUT THE MANDREL

TOLERANCE	CHECK
↗ 0,01 A	Work Spindle Radial Jump
↗ 0,01 B	Work Spindle Axial Jump



CHECKS TO BE CARRIED OUT WITH THE MANDREL

TOLERANCE	CHECK
↗ 0,01 A	Mandrel Radial Jump. Nearest position to the Work Spindle
↗ 0,02 B	Mandrel Radial Jump. 300mm further from the nearest position to the Work Spindle



5. MACHINE CONNECTION / AXIS REFERENCE PROCEDURES

19	Close and lock the safety door to access the machine. (Refer to the Service Manual)

CONTROL OF THE WORK SPINDLE COOLING LINE FLOW

File Nº	TW_PM_320_009	**Reference Drawings**	XXXX320
Mechanical Personnel	1	**Electrical Personnel**	0
Duration	20’	**Frequency**	Weekly
Machine Status	ON	**Interruptible Task**	YES
Specific Tools	Maintenance Equipment		

ISO Safety Symbols


Safety Padlock


Safety Shoes


Safety Glasses


Safety Gloves


Safety Vest


Safety Clothes

1. SUMMARY

Step	Description
1	Work Spindle Cooling Line Flow Control

2. PRECAUTIONS

BEFORE STARTING ANY MAINTENANCE OPERATION ON THE MACHINE, BEAR IN MIND ALL THE SAFETY INDICATIONS DESCRIBED ON THE **SERVICE MANUAL AND THE ECPL PLACARD**

WHENEVER A MAINTENANCE TASK NEEDS TO BE CONDUCTED, THE OPERATOR OR THE MAINTENANCE PERSONNEL MUST ENSURE THAT ONLY THEM CAN OPERATE THE MACHINE IN ACCORDANCE TO THE SAFETY STANDARDS AND APPROVED WORK PROCEDURES

ENSURE THAT ALL THE MATERIALS AND SPARE PARTS ARE THROWN AWAY WITH SAFETY AND RESPECTFULLY WITH THE ENVIRONMENT

STRICTLY OBSERVE THE ENVIRONMENTAL PROTECTION RULES AND STANDARDS ESTABLISHED BY THE LAW BEFORE ELIMINATING USED OR SPILLED OIL

TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS SUCH AS:

- CUTS PRODUCES BY SHARP EDGES OR CHIPS
- PROJECTION OF PARTICLES
- BURNS FROM HOT COMPONENTS
- FALLS AT THE SAME / DIFFERENT LEVEL
- POSSIBLE FALLS OF HEAVY LOADS IN SUSPENSION

3. PROCEDURE DESCRIPTION: WORK SPINDLE COOLING LINE FLOW CONTROL

1	Clean and prepare the area where the maintenance task is going to take place.
2	Unlock and open the safety door to Access the machine. (Refer to the Service Manual)
3	Connect the Handheld Unit. (Refer to the Service Manual)

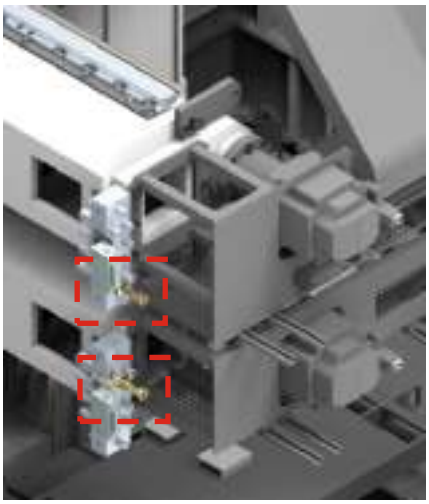
WHENEVER A MAINTENANCE TASK NEEDS TO BE CONDUCTED, THE OPERATOR OR THE MAINTENANCE PERSONNEL MUST ENSURE THAT ONLY THEM CAN OPERATE THE MACHINE IN ACCORDANCE TO THE SAFETY STANDARDS AND APPROVED WORK PROCEDURES

4	Access the Fluid Panel and locate the Cooling Line Flowmeters.

5	Check the Flowmeter and adjust the value if necessary.

6	Open the 3 Axis Module panel door to access to the rear side of the 3 Axis Module.

7	Access the 3 Axis Module and locate the Cooling Line Flowmeters.



8	Check the Flowmeters and adjust the value if necessary.

4. MACHINE CONNECTION / AXIS REFERENCE PROCEDURES

9	Close and lock the safety door to access the machine. (Refer to the Service Manual)

File Nº	TW_PM_320_010	**Reference Drawings**	XXXX320
Mechanical Personnel	2	**Electrical Personnel**	0
Duration	480’	**Frequency**	3 Year / 20000 Hours
Machine Status	OFF	**Interruptible Task**	NO
Specific Tools	Maintenance Equipment, Crane, Slings		

ISO Safety Symbols


Safety Padlock


Safety Shoes


Safety Glasses


Safety Gloves


Safety Vest


Safety Helmet


Safety Clothes

1. SUMMARY

Step	Description
1	Machine Disconnection
2	Machine Fairing Disassembly
3	Work Spindle Disassembly
4	Element Replacement and Assembly
5	Machine Connection

2. PRECAUTIONS

BEFORE STARTING ANY MAINTENANCE OPERATION ON THE MACHINE, BEAR IN MIND ALL THE SAFETY INDICATIONS DESCRIBED ON THE **SERVICE MANUAL AND THE ECPL PLACARD**

WHENEVER A MAINTENANCE TASK NEEDS TO BE CONDUCTED, THE OPERATOR OR THE MAINTENANCE PERSONNEL MUST ENSURE THAT ONLY THEM CAN OPERATE THE MACHINE IN ACCORDANCE TO THE SAFETY STANDARDS AND APPROVED WORK PROCEDURES

ENSURE THAT ALL THE MATERIALS AND SPARE PARTS ARE THROWN AWAY WITH SAFETY AND RESPECTFULLY WITH THE ENVIRONMENT

STRICTLY OBSERVE THE ENVIRONMENTAL PROTECTION RULES AND STANDARDS ESTABLISHED BY THE LAW BEFORE ELIMINATING USED OR SPILLED OIL

TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS SUCH AS:

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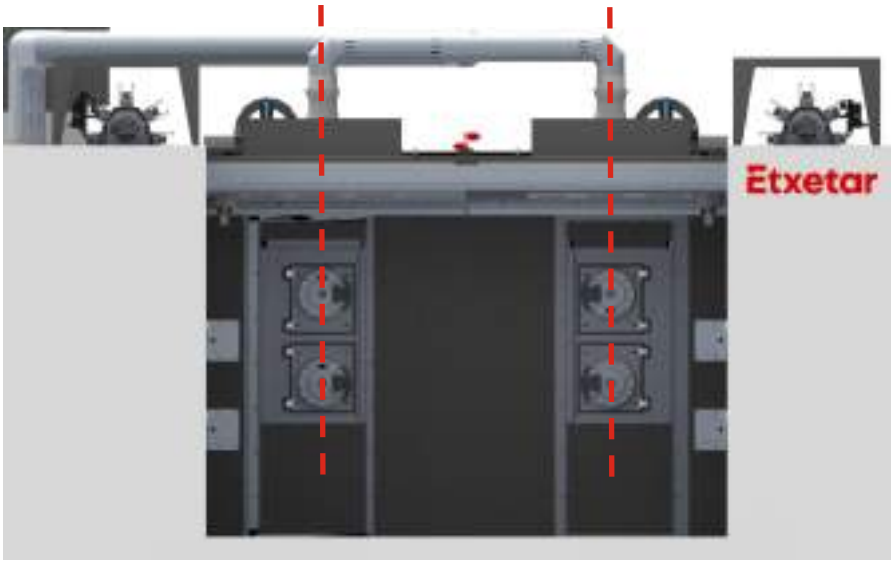
- PROJECTION OF PARTICLES
- BURNS FROM HOT COMPONENTS
- FALLS AT THE SAME / DIFFERENT LEVEL
- POSSIBLE FALLS OF HEAVY LOADS IN SUSPENSION

3. MACHINE DISCONNECTION

1	Clean and prepare the area where the maintenance task is going to take place.
2	Using the Main Panel of the machine, open the Load / Unload Automatic Door.

3	Using the Robot, disassemble the Clamping Fixture from the machine.
4	Position the “X” Axis below the Mist Extraction Connection to the machine.



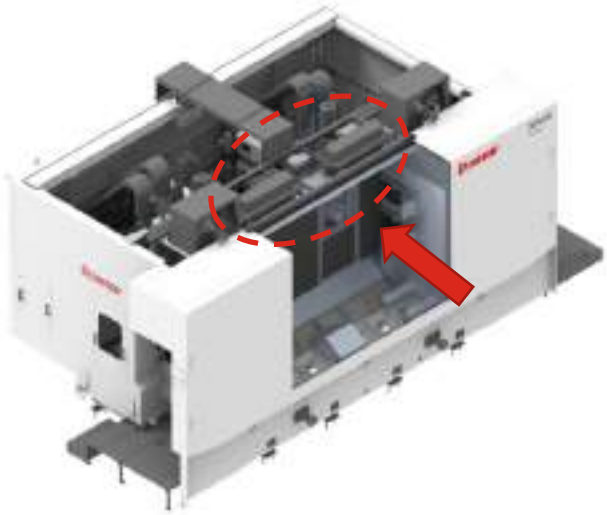
5	Unlock and open the safety door to Access the machine. (Refer to the Service Manual)
6	Switch off the machine (Refer to the Service Manual).

WHENEVER A MAINTENANCE TASK NEEDS TO BE CONDUCTED, THE OPERATOR OR THE MAINTENANCE PERSONNEL MUST ENSURE THAT ONLY THEM CAN OPERATE THE MACHINE IN ACCORDANCE TO THE SAFETY STANDARDS AND APPROVED WORK PROCEDURES

AFTER DISCONNECTING THE MAIN POWER SWITCH, WAIT AT LEAST 5 MINUTES BEFORE CARRYING ANY MAINTENANCE WORK ON THE ELECTRICAL SYSTEM AND CHECK THAT THERE IS NO RESIDUAL PRESSURE ON THE FLUID LINES CHECKING THE PRESSURE GAUGES AND PRESSURE SWITCHES.

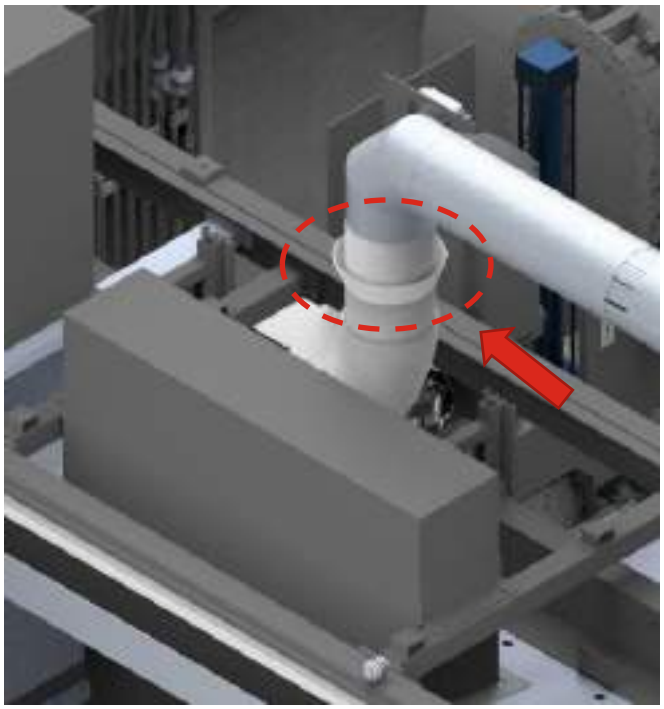
4. PROCEDURE DESCRIPTION: MACHINE FAIRING DISASSEMBLY

7	Access the Mist Extraction are on the top of the machine.



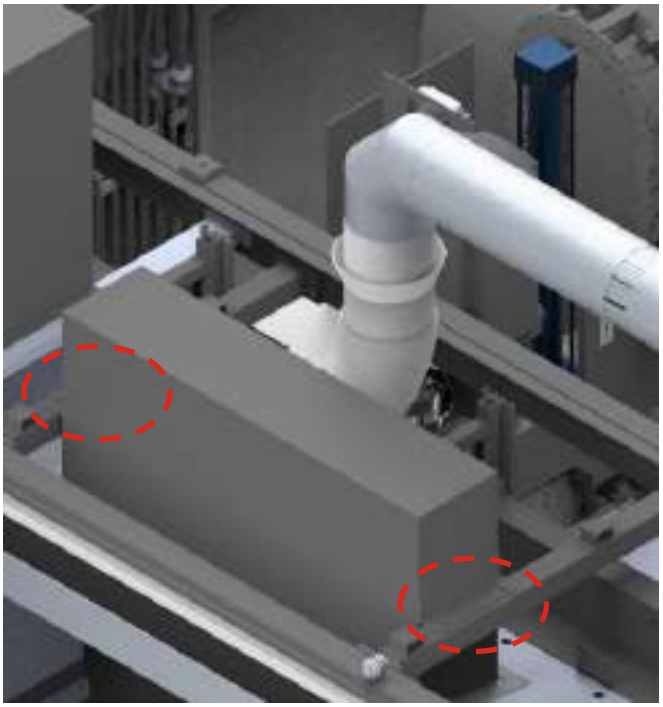
FALLS AT THE SAME / DIFFERENT LEVEL MAY OCCUR. TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS

8	Disassemble the pipe from the Mist Extraction.



CUTS PRODUCES BY SHARP EDGES OR CHIPS MAY OCCUR. TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS

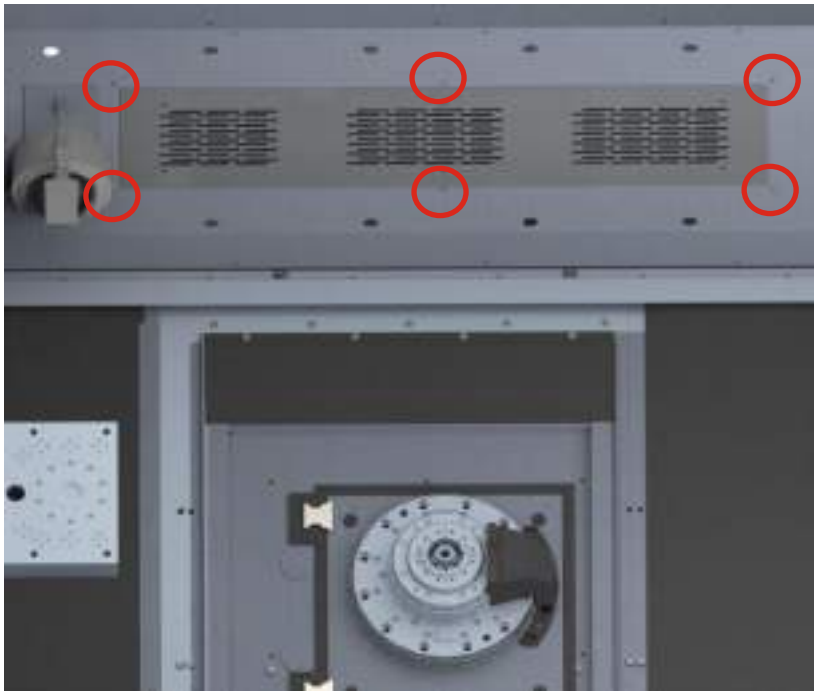
9	Disassemble the Mist Extraction machine connection from the machine frame.



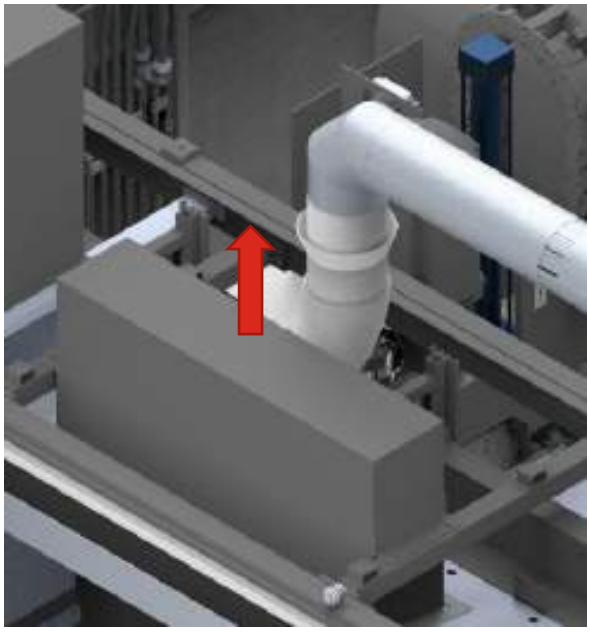
10	Access the Clamping Fixture area.

FALLS AT THE SAME / DIFFERENT LEVEL MAY OCCUR. TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS

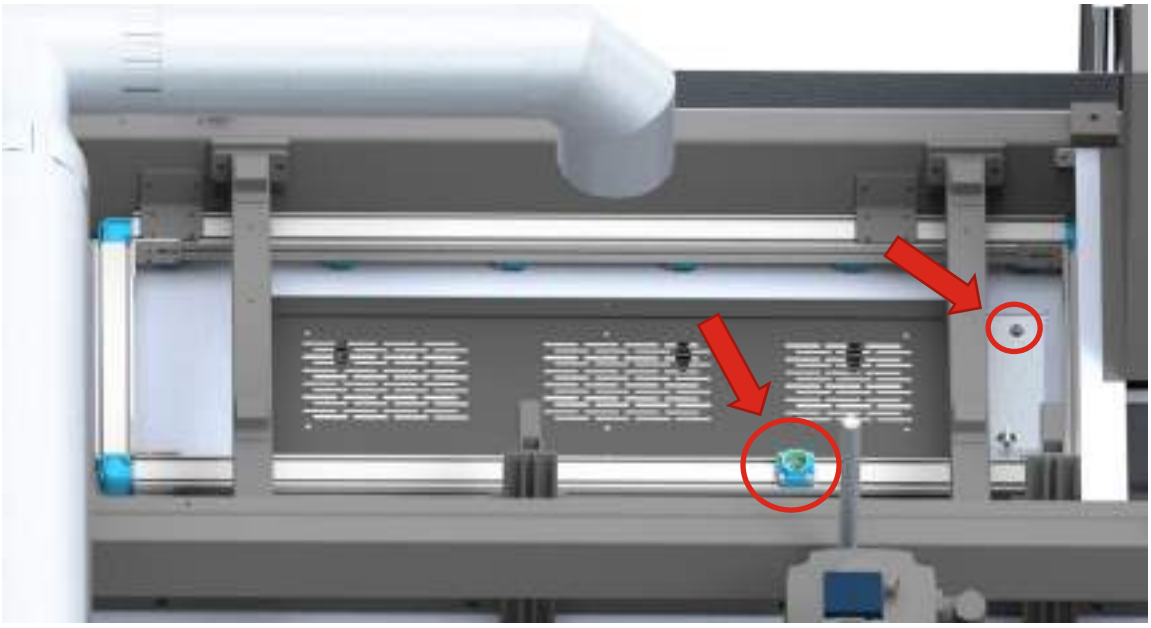
11	On the machine interior ceiling, disassemble the screws fixing the Mist Extraction Connection.



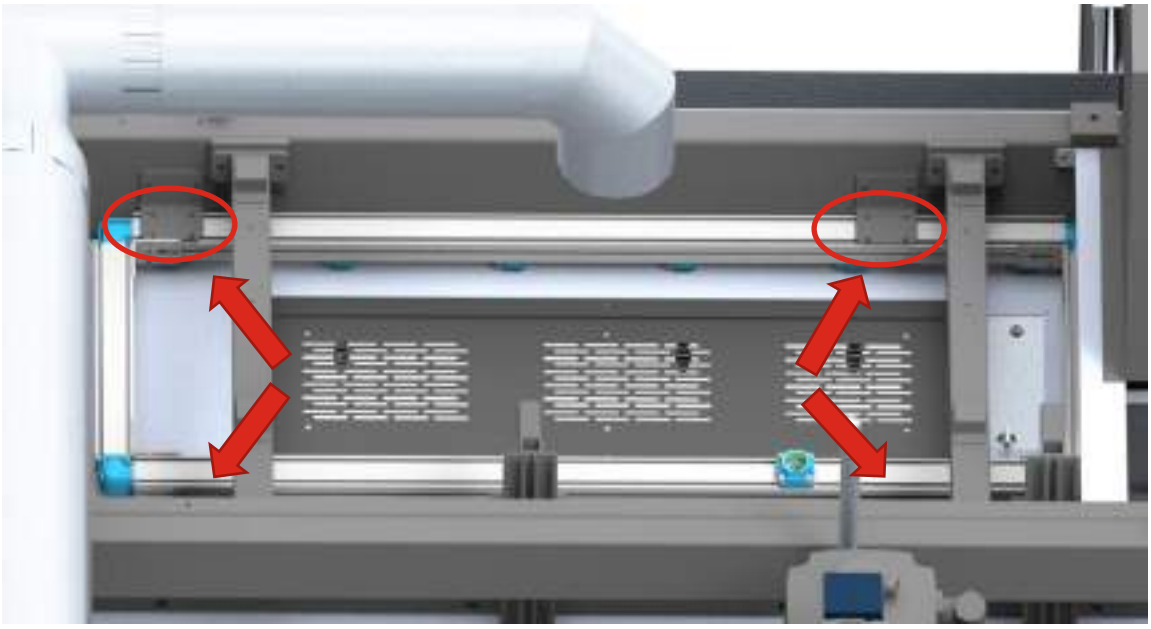
12	Extract the Mist Extraction machine connection.



13	Disassemble the Coolant Cleaning Device Connection and the Camera Cleaning Connection.



14	Detach the Coolant Cleaning Device from the machine fairing.



FALLS AT THE SAME / DIFFERENT LEVEL MAY OCCUR. TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS

15	Access the Clamping Fixture area.

FALLS AT THE SAME / DIFFERENT LEVEL MAY OCCUR. TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS

16	On the machine interior ceiling, disassemble the screw fixing the Camera to it base.

17	Disassemble the Camera from the base and disconnect the wires attached to it.

18	Disassemble the Ceiling Panel with the Coolant Cleaning Device.

POSSIBLE FALLS OF HEAVY LOADS IN SUSPENSION MAY OCCUR. TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS

5. PROCEDURE DESCRIPTION: WORK SPINDLE DISASSEMBLY

19	Open the 3 Axis Module panel door to access to the Work Spindle.

FALLS AT THE SAME / DIFFERENT LEVEL MAY OCCUR. TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS

20	Disassemble all the Fluid and Electrical connections of the Work Spindle.

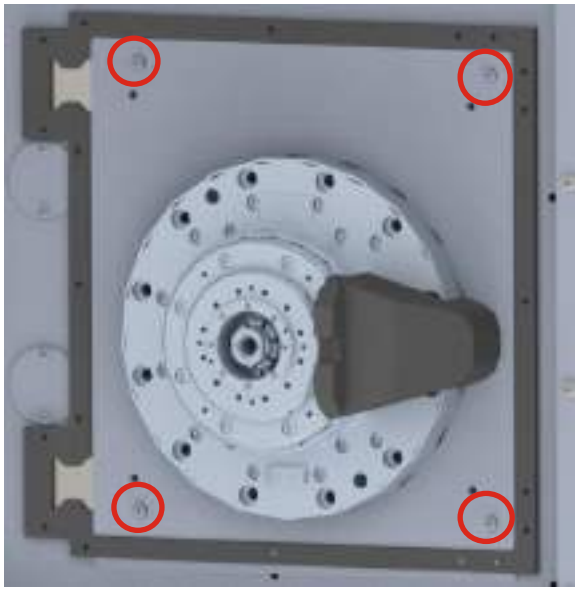
21	Disassemble the Work Spindle Draining Pipes.

22	Protect the Connectors of the work spindle and pack all the wires and hoses tightly using duct tape.

23	Access the Clamping Fixture area.

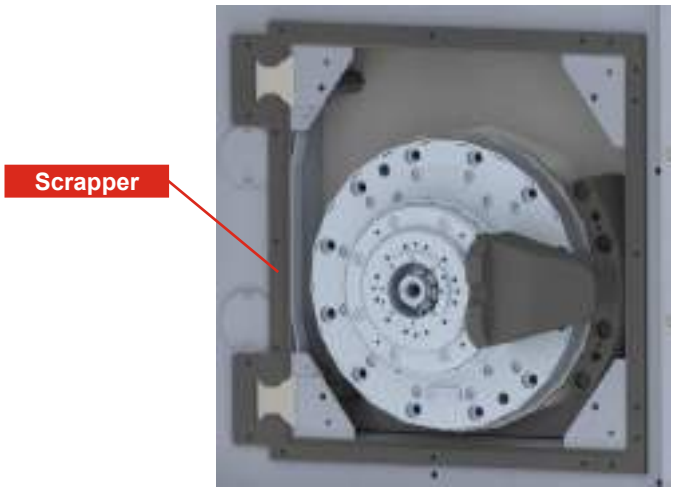
FALLS AT THE SAME / DIFFERENT LEVEL MAY OCCUR. TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS

24	Disassemble the frontal protection of the Work Spindle.

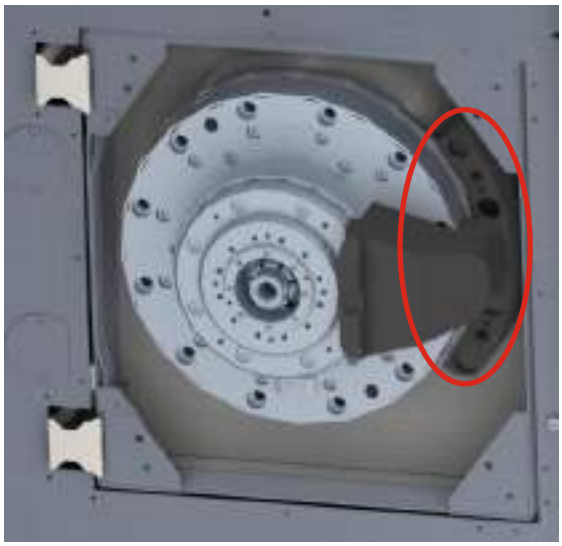


CUTS PRODUCES BY SHARP EDGES OR CHIPS MAY OCCUR. TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS

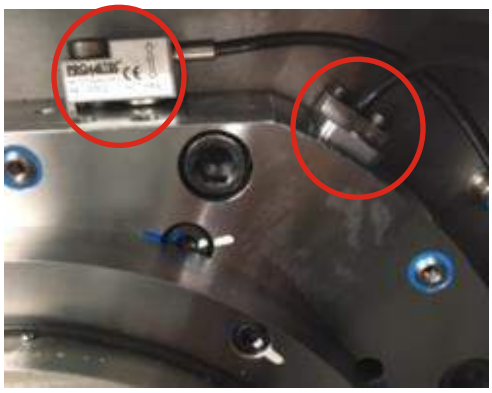
25	Disassemble “Z” Axis Protection Scrapper.



26	Disassemble the screws and pins fixing the Tools Support and extract it.

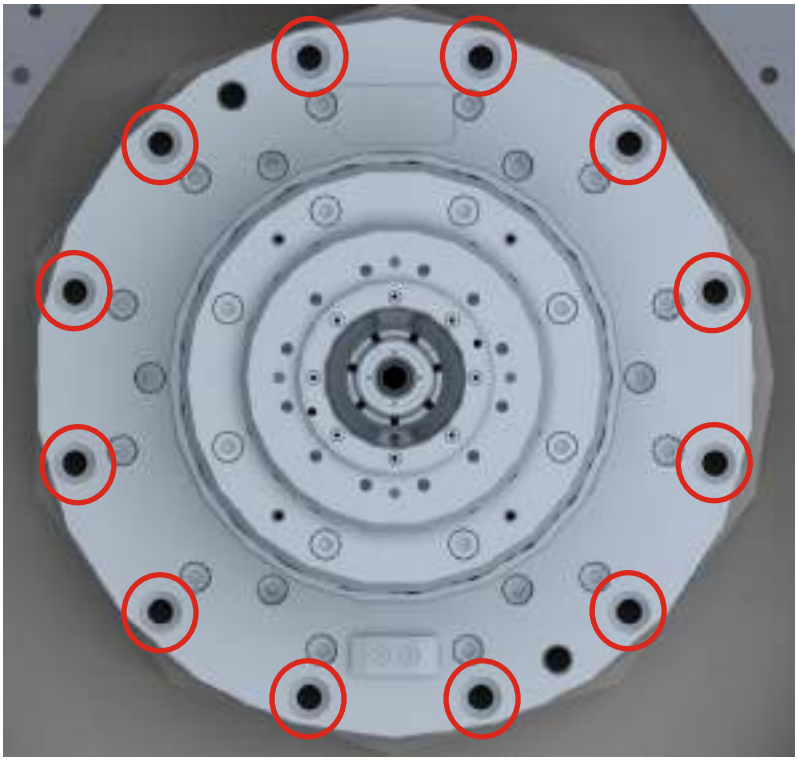


27	Disassemble the Vibration Sensor and the Thermoresistance from the front of the Work Spindle. (Not all the Work Spindles have this elements. If that is the case, skip this step.)

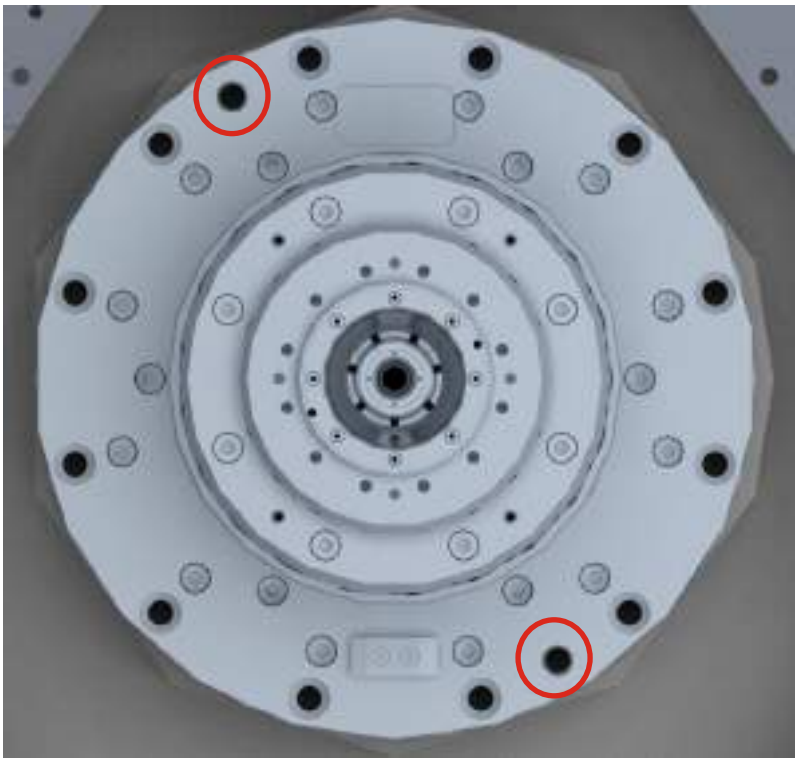


BURNS FROM HOT COMPONENTS MAY OCCUR. TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS

28	Disassemble the screws fixing the Work Spindle.



29	Assemble two screws on the threaded holes and pull the Work Spindle apart from the frame.



30	Extract the Adjustment Wedges from the back of the Work Spindle and mark their position in order to avoid errors during the Assembly.
31	Bear in mind the O-ring placed between the Work Spindle and the Adjustment Wedges.

32	Assemble an eyebolt on the Works Spindle and tie it to the crane through a sling.

BURNS FROM HOT COMPONENTS MAY OCCUR. TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS

33	Extract the Work Spindle until a second threaded hole is visible on the top of the Work Spindle.
34	Assemble a second eyebolt on the Works Spindle and tie it to the crane through a sling.

DURING THE EXTRACTION PROCESS, KEEP THE WORK SPINDLE HORIZONTAL

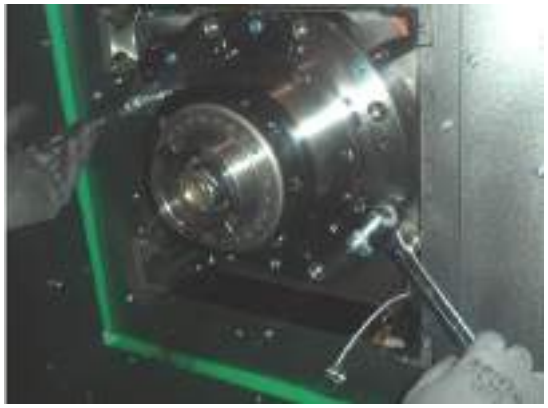
35	Extract the Work Spindle with its Electrical and Fluid Connections.

POSSIBLE FALLS OF HEAVY LOADS IN SUSPENSION MAY OCCUR. TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS

6. PROCEDURE DESCRIPTION: WORK SPINDLE ASSEMBLY

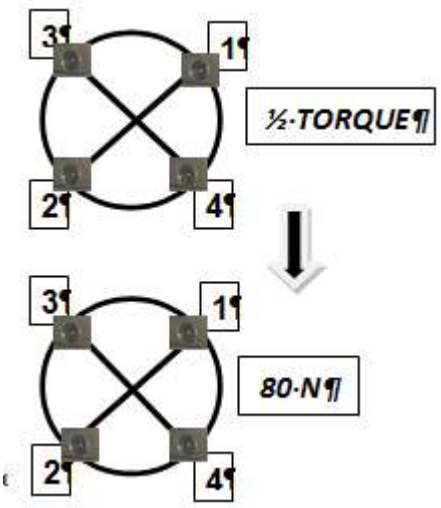
36	Replace the Work Spindle for a new one.
37	Clean and lubricate with grease the Work Spindle housing and the Work Spindle itself before starting the assembly.

38	Insert the Work Spindle into position.



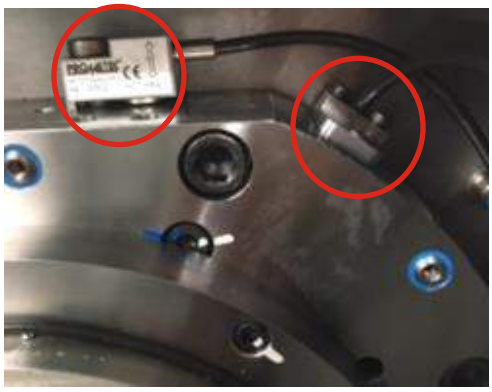
39	Place the Adjustment Wedges with the O-ring in position.

40	Assemble the screws using the following method. (Screw Torque 80Nm)

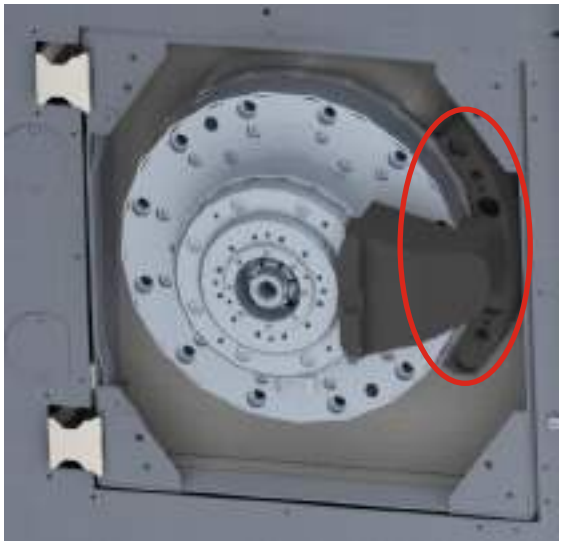


THE TORQUE TO BE APPLIED TO THE SCREWS CLAMPING THE WORK SPINDLE AGAINST THE "Z" AXIS RAM IS 80NM

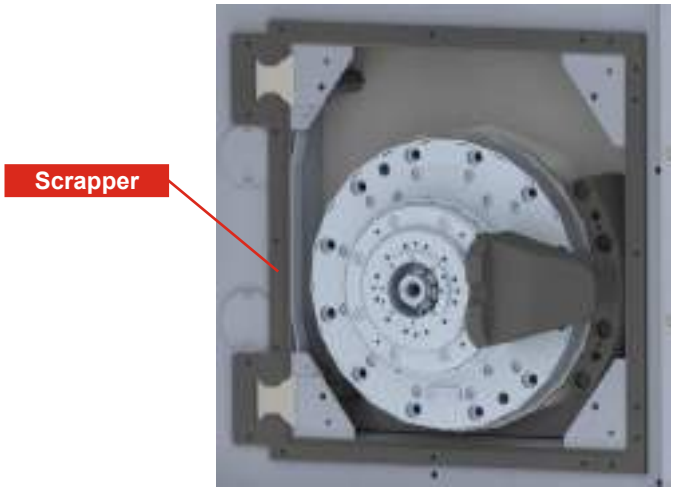
41	Assemble the Vibration Sensor and the Thermoresistance from the front of the Work Spindle. (Not all the Work Spindles have this elements. If that is the case, skip this step.)



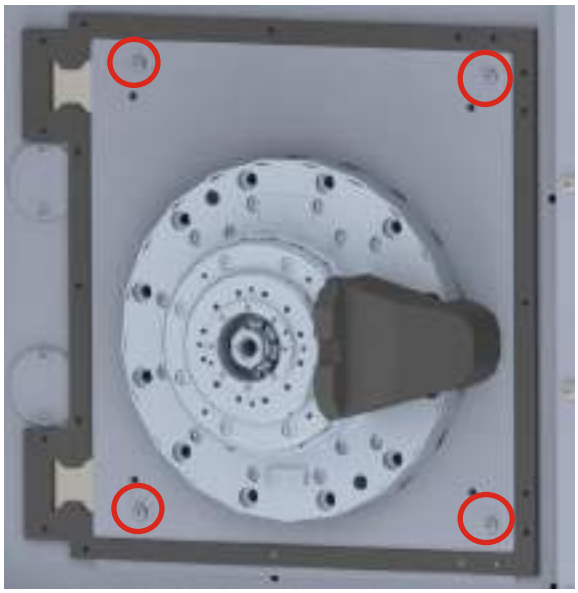
42	Assemble the screws and pins fixing the Tools Support.



43	Assemble the “Z” Axis Protection Scrapper.



44	Assemble the frontal protection of the Work Spindle.



CUTS PRODUCES BY SHARP EDGES OR CHIPS MAY OCCUR. TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS

45	Assemble all the Fluid and Electrical connections of the Work Spindle.

46	Close the 3 Axis Module panel door.

FALLS AT THE SAME / DIFFERENT LEVEL MAY OCCUR. TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS

47	To assemble the Machine Fairing, follow the disassembly steps in reverse order.

7. CONSIDERATIONS FOR ASSEMBLY

THE TORQUE TO BE APPLIED TO THE SCREWS CLAMPING THE WORK SPINDLE AGAINST THE "Z" AXIS RAM IS 80NM

ALWAYS USE 12.9 QUALITY BOLTS AND APPLY THE ADVISED TORQUE ATTACHED ON THE FOLLOWING TABLE.

SCREW TORQUE VALUES		
METRIC	STEEL	ALUMINUM
M4	3,9 Nm	3 Nm
M5	7,8 Nm	6 Nm
M6	13 Nm	10 Nm
M8	32 Nm	25 Nm
M10	63 Nm	49 Nm
M12	105 Nm	73,5 Nm
M14	167 Nm	117 Nm
M16	260 Nm	182 Nm
M18	365 Nm	255 Nm
M20	518 Nm	362 Nm

8. MACHINE CONNECTION / AXIS REFERENCE PROCEDURES

48	Switch on the machine (Refer to the Service Manual).
49	Close and lock the safety door to access the machine. (Refer to the Service Manual)
50	Carry out the alignment and "0" reference of the "SP" Axis.

CHECK THE MACHINE AXIS ALIGNMENT PROCEDURES DESCRIBED IN THE SERVICE MANUAL

CLEANING OF THE INTERIOR CAMERA

File Nº	TW_PM_609_001	**Reference Drawings**	XXXX609
Mechanical Personnel	1	**Electrical Personnel**	0
Duration	10’	**Frequency**	Weekly
Machine Status	OFF	**Interruptible Task**	YES
Specific Tools	Maintenance Equipment, Cleaning Detergent, Cleaning Cloth		

ISO Safety Symbols


Safety Padlock


Safety Shoes


Safety Glasses


Safety Gloves


Safety Vest


Safety Earmuffs


Safety Clothes

1. SUMMARY

Step	Description
1	Machine Disconnection
2	Cleaning of the Interior Camera
3	Machine Connection

2. PRECAUTIONS

BEFORE STARTING ANY MAINTENANCE OPERATION ON THE MACHINE, BEAR IN MIND ALL THE SAFETY INDICATIONS DESCRIBED ON THE **SERVICE MANUAL AND THE ECPL PLACARD**

WHENEVER A MAINTENANCE TASK NEEDS TO BE CONDUCTED, THE OPERATOR OR THE MAINTENANCE PERSONNEL MUST ENSURE THAT ONLY THEM CAN OPERATE THE MACHINE IN ACCORDANCE TO THE SAFETY STANDARDS AND APPROVED WORK PROCEDURES

ENSURE THAT ALL THE MATERIALS AND SPARE PARTS ARE THROWN AWAY WITH SAFETY AND RESPECTFULLY WITH THE ENVIRONMENT

STRICTLY OBSERVE THE ENVIRONMENTAL PROTECTION RULES AND STANDARDS ESTABLISHED BY THE LAW BEFORE ELIMINATING USED OR SPILLED OIL

TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS SUCH AS:

- CUTS PRODUCES BY SHARP EDGES OR CHIPS
- PROJECTION OF PARTICLES
- BURNS FROM HOT COMPONENTS
- FALLS AT THE SAME / DIFFERENT LEVEL
- POSSIBLE FALLS OF HEAVY LOADS IN SUSPENSION

3. MACHINE DISCONNECTION

1	Clean and prepare the area where the maintenance task is going to take place.
2	Using the Main Panel of the machine, open the Load / Unload Automatic Door.

3	Using the Robot, disassemble the Clamping Fixture from the machine.
4	Unlock and open the safety door to Access the machine. (Refer to the Service Manual)
5	Switch off the machine (Refer to the Service Manual).

WHENEVER A MAINTENANCE TASK NEEDS TO BE CONDUCTED, THE OPERATOR OR THE MAINTENANCE PERSONNEL MUST ENSURE THAT ONLY THEM CAN OPERATE THE MACHINE IN ACCORDANCE TO THE SAFETY STANDARDS AND APPROVED WORK PROCEDURES

AFTER DISCONNECTING THE MAIN POWER SWITCH, WAIT AT LEAST 5 MINUTES BEFORE CARRYING ANY MAINTENANCE WORK ON THE ELECTRICAL SYSTEM AND CHECK THAT THERE IS NO RESIDUAL PRESSURE ON THE FLUID LINES CHECKING THE PRESSURE GAUGES AND PRESSURE SWITCHES.

4. PROCEDURE DESCRIPTION: CLEANING OF THE INTERIOR CAMERA

6	Access the Clamping Fixture area of the machine.

FALLS AT THE SAME / DIFFERENT LEVEL MAY OCCUR. TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS

7	Connect the air flush gun to the closest air connection of the area were the intervention is going to be carried out.

8	Using the air flush gun, clean the swarf bits attached to the Camera.
9	Using a cleaning cloth and a nonabrasive cleaning detergent, clean the Camera from any dirt.

PROJECTION OF PARTICLES MAY OCCUR. TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS

DUE TO THE GLASS MATERIAL (POLICARBONATE), NONABRASIVE DETERGENTS MUST BE USED EVERY TIME. DO NOT USE TOOL THAT CAN SCRATCH THE GLASS. DO NOT CLEAN THE GLASS UNDER THE DIRECT SUNLIGHT OR HIGH TEMPERATURES.

5. MACHINE CONNECTION / AXIS REFERENCE PROCEDURES

10	Switch on the machine (Refer to the Service Manual).
11	Close and lock the safety door to access the machine. (Refer to the Service Manual)

INSPECTION AND CLEANING THE TOOL HOLDER GRIPPERS

File Nº	TW_PM_645_001	**Reference Drawings**	XXXX645 / XXXX646
Mechanical Personnel	1	**Electrical Personnel**	0
Duration	30’	**Frequency**	Weekly
Machine Status	ON	**Interruptible Task**	YES
Specific Tools	Maintenance Equipment		

ISO Safety Symbols


Safety Padlock


Safety Shoes


Safety Glasses


Safety Gloves


Safety Vest


Safety Earmuffs


Safety Clothes

1. SUMMARY

Step	Description
1	Tool Holder Grippers Cleaning
2	Tool Holder Grippers Inspection

2. PRECAUTIONS

BEFORE STARTING ANY MAINTENANCE OPERATION ON THE MACHINE, BEAR IN MIND ALL THE SAFETY INDICATIONS DESCRIBED ON THE **SERVICE MANUAL AND THE ECPL PLACARD**

WHENEVER A MAINTENANCE TASK NEEDS TO BE CONDUCTED, THE OPERATOR OR THE MAINTENANCE PERSONNEL MUST ENSURE THAT ONLY THEM CAN OPERATE THE MACHINE IN ACCORDANCE TO THE SAFETY STANDARDS AND APPROVED WORK PROCEDURES

ENSURE THAT ALL THE MATERIALS AND SPARE PARTS ARE THROWN AWAY WITH SAFETY AND RESPECTFULLY WITH THE ENVIRONMENT

STRICTLY OBSERVE THE ENVIRONMENTAL PROTECTION RULES AND STANDARDS ESTABLISHED BY THE LAW BEFORE ELIMINATING USED OR SPILLED OIL

TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS SUCH AS:

- CUTS PRODUCES BY SHARP EDGES OR CHIPS
- PROJECTION OF PARTICLES
- BURNS FROM HOT COMPONENTS
- FALLS AT THE SAME / DIFFERENT LEVEL
- POSSIBLE FALLS OF HEAVY LOADS IN SUSPENSION

3. PROCEDURE DESCRIPTION: TOOL HOLDER GRIPPERS CLEANING

1	Connect the air flush gun to the closest air connection of the area were the intervention is going to be carried out.

2	Using the Main Panel or the Handheld Unit, move the Tool Holder Gripper into the manual tool change position.

3	Unlock and open the safety door to access the machine. (Refer to the Service Manual)

4	Use the air flush gun to clean the Tool Holder Gripper and the Tools.

PROJECTION OF PARTICLES MAY OCCUR. TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS

5	Close and lock the safety door to access the machine. (Refer to the Service Manual)
6	Repeat the process as many times as needed until all the Tool Holder Grippers and Tools are clean.

4. PROCEDURE DESCRIPTION: TOOL HOLDER GRIPPER INSPECTION

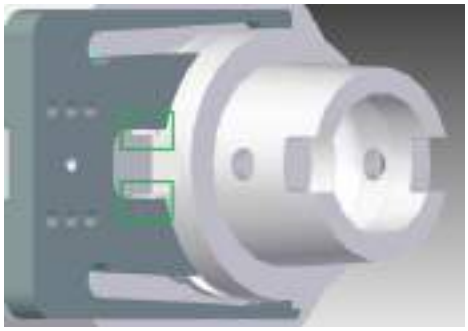
7	Using the Main Panel or the Handheld Unit, move the Tool Holder Gripper into the manual tool change position.

8	Unlock and open the safety door to access the machine. (Refer to the Service Manual)
9	Remove the Tool from the Tool Holder Gripper.

CUTS PRODUCES BY SHARP EDGES OR CHIPS MAY OCCUR. TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS

THE TOOL HOLDER GRIPPER MUST SHOW SOME RESISTANCE AGAINST THE EXTRACTION OF THE TOOL. IF NO RESISTANCE IS DISPLAYED, IT CAN BE CONSIDERED A SIGN OF WEAR ON THE TOOL HOLDER GRIPPER

10	Inspect the contact surfaces between the Tool and its Tool Holder Gripper.



11	Contact surface between the Tool and its Tool Holder Gripper.

Gripper in Good Condition

Worn Out Gripper

12	Contact surface between the Tool and its Tool Holder Gripper.

Gripper in Good Condition

Worn Out Gripper

13	Contact surface between the Tool and its Tool Holder Gripper.

Gripper in Good Condition

Worn Out Gripper

14	Contact surface between the Tool and its Tool Holder Gripper.

Gripper in Good Condition

Worn Out Gripper

15	If any of the Grippers show any kind of wear, proceed to replace them following the CM_645_001 procedure.
16	Close and lock the safety door to access the machine. (Refer to the Service Manual)
17	Repeat the process as many times as needed until all the Tool Holder Grippers have been checked.

File Nº	TW_PM_645_002	**Reference Drawings**	XXXX645 / XXXX646
Mechanical Personnel	1	**Electrical Personnel**	0
Duration	30’	**Frequency**	Weekly
Machine Status	ON	**Interruptible Task**	YES
Specific Tools	Maintenance Equipment		

ISO Safety Symbols


Safety Padlock


Safety Shoes


Safety Glasses


Safety Gloves


Safety Vest


Safety Earmuffs


Safety Clothes

1. SUMMARY

Step	Description
1	Tool Cleaning
2	Tool Inspection

2. PRECAUTIONS

BEFORE STARTING ANY MAINTENANCE OPERATION ON THE MACHINE, BEAR IN MIND ALL THE SAFETY INDICATIONS DESCRIBED ON THE **SERVICE MANUAL AND THE ECPL PLACARD**

WHENEVER A MAINTENANCE TASK NEEDS TO BE CONDUCTED, THE OPERATOR OR THE MAINTENANCE PERSONNEL MUST ENSURE THAT ONLY THEM CAN OPERATE THE MACHINE IN ACCORDANCE TO THE SAFETY STANDARDS AND APPROVED WORK PROCEDURES

ENSURE THAT ALL THE MATERIALS AND SPARE PARTS ARE THROWN AWAY WITH SAFETY AND RESPECTFULLY WITH THE ENVIRONMENT

STRICTLY OBSERVE THE ENVIRONMENTAL PROTECTION RULES AND STANDARDS ESTABLISHED BY THE LAW BEFORE ELIMINATING USED OR SPILLED OIL

TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS SUCH AS:

- CUTS PRODUCES BY SHARP EDGES OR CHIPS
- PROJECTION OF PARTICLES
- BURNS FROM HOT COMPONENTS
- FALLS AT THE SAME / DIFFERENT LEVEL
- POSSIBLE FALLS OF HEAVY LOADS IN SUSPENSION

3. PROCEDURE DESCRIPTION: TOOL CLEANING

1	Connect the air flush gun to the closest air connection of the area were the intervention is going to be carried out.

2	Using the Main Panel or the Handheld Unit, move the Tool into the manual tool change position.

3	Unlock and open the safety door to access the machine. (Refer to the Service Manual)

4	Use the air flush gun to clean the Tool Holder Gripper and the Tools.

PROJECTION OF PARTICLES MAY OCCUR. TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS

5	Close and lock the safety door to access the machine. (Refer to the Service Manual)
6	Repeat the process as many times as needed until all the Tool Holder Grippers and Tools are clean.

4. PROCEDURE DESCRIPTION: TOOL INSPECTION

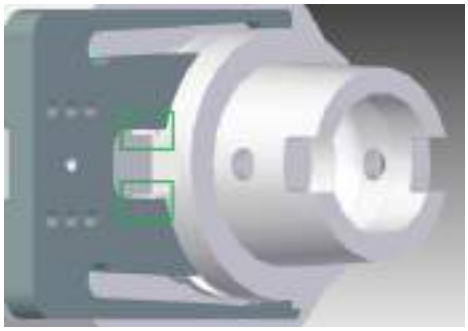
7	Using the Main Panel or the Handheld Unit, move the Tool into the manual tool change position.

8	Unlock and open the safety door to access the machine. (Refer to the Service Manual)
9	Remove the Tool from the Tool Holder Gripper.

CUTS PRODUCES BY SHARP EDGES OR CHIPS MAY OCCUR. TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS

THE TOOL HOLDER GRIPPER MUST SHOW SOME RESISTANCE AGAINST THE EXTRACTION OF THE TOOL. IF NO RESISTANCE IS DISPLAYED, IT CAN BE CONSIDERED A SIGN OF WEAR ON THE TOOL HOLDER GRIPPER

10	Inspect the contact surfaces between the Tool and its Tool Holder Gripper.



11	Contact surface between the Tool and its Tool Holder Gripper.

Gripper in Good Condition

Worn Out Gripper

12	Contact surface between the Tool and its Tool Holder Gripper.

Gripper in Good Condition

Worn Out Gripper

13	Contact surface between the Tool and its Tool Holder Gripper.

Gripper in Good Condition

Worn Out Gripper

14	Contact surface between the Tool and its Tool Holder Gripper.

Gripper in Good Condition

Worn Out Gripper

15	If any of the Grippers show any kind of wear, proceed to replace them following the CM_645_001 procedure.
16	Close and lock the safety door to access the machine. (Refer to the Service Manual)
17	Repeat the process as many times as needed until all the Tool Holder Grippers have been checked.

TENSION ADJUSTMENT OF THE TOOL MAGAZINE CHAIN

File Nº	TW_PM_645_003	**Reference Drawings**	XXXX645 / XXXX646
Mechanical Personnel	1	**Electrical Personnel**	0
Duration	90’	**Frequency**	500h
Machine Status	OFF	**Interruptible Task**	NO
Specific Tools	Maintenance Equipment		

ISO Safety Symbols


Safety Padlock


Safety Shoes


Safety Gloves


Safety Vest


Safety Clothes

1. SUMMARY

Step	Description
1	Machine Disconnection
2	Tension Adjustment of the Tool Magazine Chain
3	Machine Connection

2. PRECAUTIONS

BEFORE STARTING ANY MAINTENANCE OPERATION ON THE MACHINE, BEAR IN MIND ALL THE SAFETY INDICATIONS DESCRIBED ON THE **SERVICE MANUAL AND THE ECPL PLACARD**

WHENEVER A MAINTENANCE TASK NEEDS TO BE CONDUCTED, THE OPERATOR OR THE MAINTENANCE PERSONNEL MUST ENSURE THAT ONLY THEM CAN OPERATE THE MACHINE IN ACCORDANCE TO THE SAFETY STANDARDS AND APPROVED WORK PROCEDURES

ENSURE THAT ALL THE MATERIALS AND SPARE PARTS ARE THROWN AWAY WITH SAFETY AND RESPECTFULLY WITH THE ENVIRONMENT

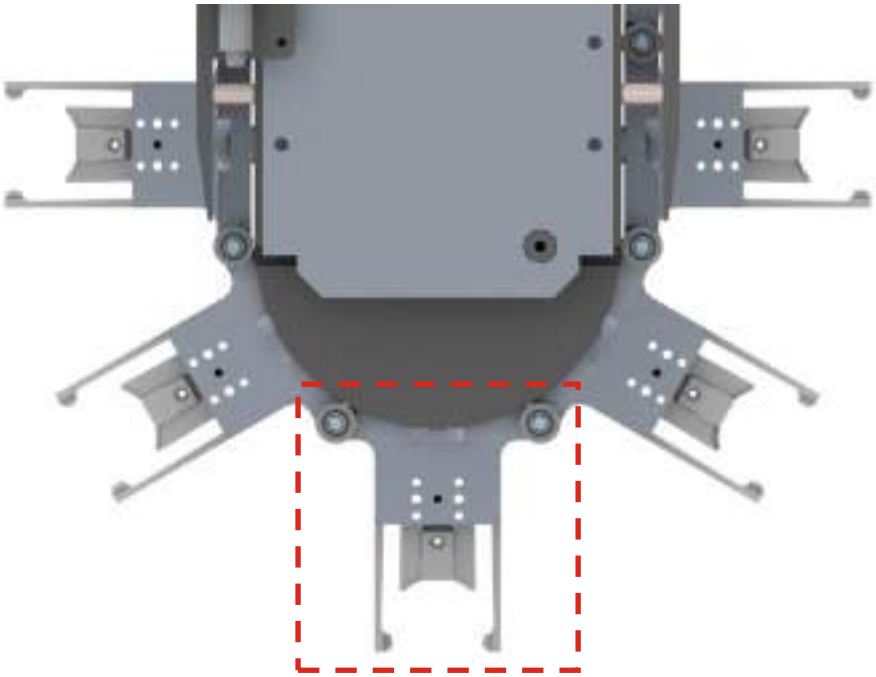
STRICTLY OBSERVE THE ENVIRONMENTAL PROTECTION RULES AND STANDARDS ESTABLISHED BY THE LAW BEFORE ELIMINATING USED OR SPILLED OIL

TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS SUCH AS:

- CUTS PRODUCES BY SHARP EDGES OR CHIPS
- PROJECTION OF PARTICLES
- BURNS FROM HOT COMPONENTS
- FALLS AT THE SAME / DIFFERENT LEVEL
- POSSIBLE FALLS OF HEAVY LOADS IN SUSPENSION

3. MACHINE DISCONNECTION

1	Clean and prepare the area where the maintenance task is going to take place.
2	Using the Main Panel or the Handheld Unit, move the Tool Holder Gripper into the position where the Tool Magazine Chain is least tensioned.



3	Unlock and open the safety door to Access the machine. (Refer to the Service Manual)
4	Switch off the machine (Refer to the Service Manual).

WHENEVER A MAINTENANCE TASK NEEDS TO BE CONDUCTED, THE OPERATOR OR THE MAINTENANCE PERSONNEL MUST ENSURE THAT ONLY THEM CAN OPERATE THE MACHINE IN ACCORDANCE TO THE SAFETY STANDARDS AND APPROVED WORK PROCEDURES

AFTER DISCONNECTING THE MAIN POWER SWITCH, WAIT AT LEAST 5 MINUTES BEFORE CARRYING ANY MAINTENANCE WORK ON THE ELECTRICAL SYSTEM AND CHECK THAT THERE IS NO RESIDUAL PRESSURE ON THE FLUID LINES CHECKING THE PRESSURE GAUGES AND PRESSURE SWITCHES.

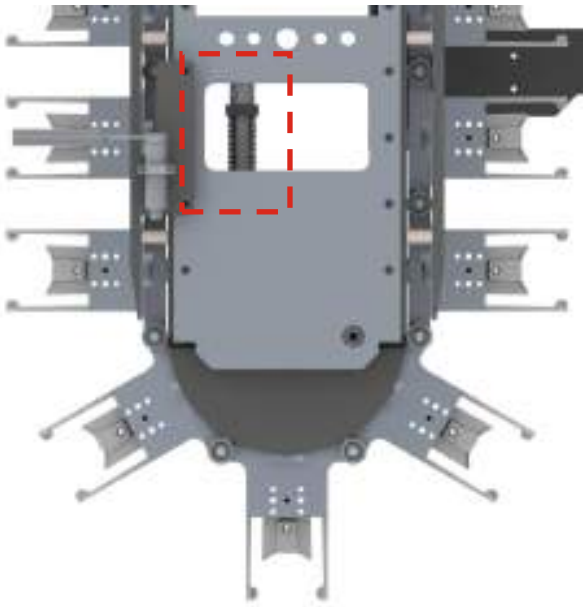
4. PROCEDURE DESCRIPTION: TENSION ADJUSTMENT OF THE TOOL MAGAZINE CHAIN

5	Access the Tool Magazine Safety Door area.

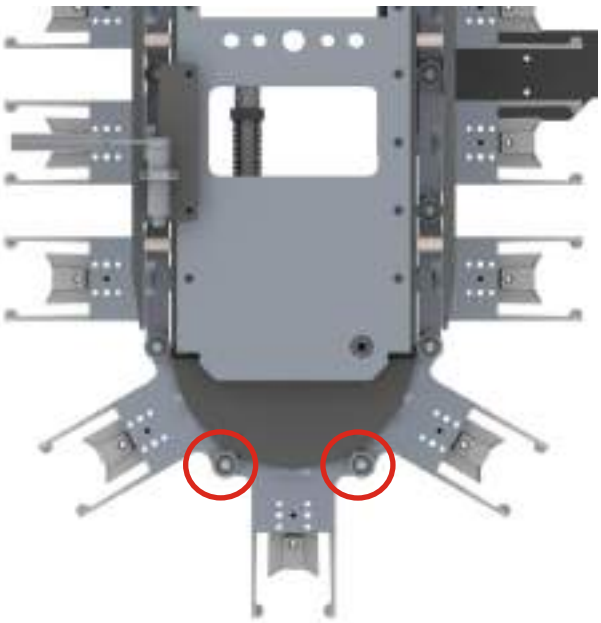
6	Disassemble the Tool Magazine guarding to access the chain tension system.

CUTS PRODUCES BY SHARP EDGES OR CHIPS MAY OCCUR. TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS

7	Using a dynamometric wrench, adjust the tension of the nuts providing the tension to the chain to 1,5Nm.



8	Once adjusted, ensure that the bearings on both ends of the Tool Magazine make contact with the track and they can't spin freely.
9	If this condition is not met, increase the tension of the chain little by little until the bearings make contact with the track.



10	Assemble the Tool Magazine guarding to access the chain tension system.

CUTS PRODUCES BY SHARP EDGES OR CHIPS MAY OCCUR. TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS

5. MACHINE CONNECTION / AXIS REFERENCE PROCEDURES

11	Switch on the machine (Refer to the Service Manual).
12	Close and lock the safety door to access the machine. (Refer to the Service Manual)

File Nº	TW_PM_645_004	**Reference Drawings**	XXXX645 / XXXX646
Mechanical Personnel	1	**Electrical Personnel**	0
Duration	180’	**Frequency**	10 Years
Machine Status	OFF	**Interruptible Task**	NO
Specific Tools	Maintenance Equipment		

ISO Safety Symbols


Safety Padlock


Safety Shoes


Safety Gloves


Safety Vest


Safety Helmet


Safety Clothes

1. SUMMARY

Step	Description
1	Machine Disconnection
2	Tool Magazine Protections Disassembly
3	Tool Cleaning Device Disassembly
4	Tool Magazine Disassembly
5	Tool Magazine Chain Disassembly
6	Tool Identification Device Disassembly
7	Tool Magazine Servomotor Disassembly
8	Tool Magazine Gearbox Disassembly
9	Tool Magazine Bearing Disassembly
10	Tool Magazine Bearing Replacement and Assembly
11	Machine Connection

2. PRECAUTIONS

BEFORE STARTING ANY MAINTENANCE OPERATION ON THE MACHINE, BEAR IN MIND ALL THE SAFETY INDICATIONS DESCRIBED ON THE **SERVICE MANUAL AND THE ECPL PLACARD**

WHENEVER A MAINTENANCE TASK NEEDS TO BE CONDUCTED, THE OPERATOR OR THE MAINTENANCE PERSONNEL MUST ENSURE THAT ONLY THEM CAN OPERATE THE MACHINE IN ACCORDANCE TO THE SAFETY STANDARDS AND APPROVED WORK PROCEDURES

ENSURE THAT ALL THE MATERIALS AND SPARE PARTS ARE THROWN AWAY WITH SAFETY AND RESPECTFULLY WITH THE ENVIRONMENT

STRICTLY OBSERVE THE ENVIRONMENTAL PROTECTION RULES AND STANDARDS ESTABLISHED BY THE LAW BEFORE ELIMINATING USED OR SPILLED OIL

TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS SUCH AS:

- CUTS PRODUCES BY SHARP EDGES OR CHIPS
- PROJECTION OF PARTICLES
- BURNS FROM HOT COMPONENTS
- FALLS AT THE SAME / DIFFERENT LEVEL
- POSSIBLE FALLS OF HEAVY LOADS IN SUSPENSION

3. MACHINE DISCONNECTION

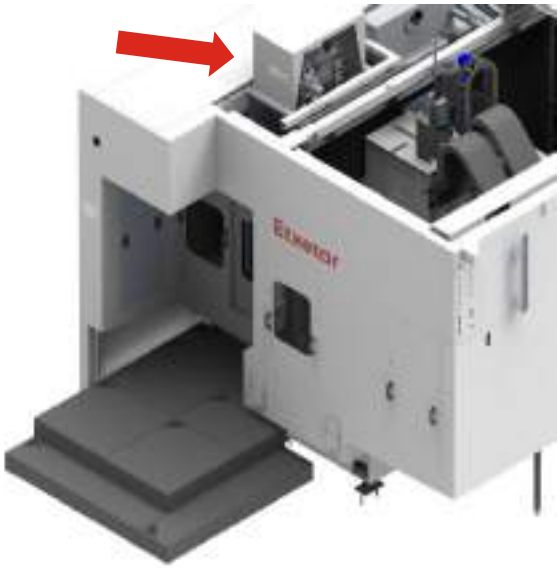
1	Clean and prepare the area where the maintenance task is going to take place.
2	Extract all the Tools from the Tool Magazine.
3	Unlock and open the safety door to Access the machine. (Refer to the Service Manual)
4	Switch off the machine (Refer to the Service Manual).

WHENEVER A MAINTENANCE TASK NEEDS TO BE CONDUCTED, THE OPERATOR OR THE MAINTENANCE PERSONNEL MUST ENSURE THAT ONLY THEM CAN OPERATE THE MACHINE IN ACCORDANCE TO THE SAFETY STANDARDS AND APPROVED WORK PROCEDURES

AFTER DISCONNECTING THE MAIN POWER SWITCH, WAIT AT LEAST 5 MINUTES BEFORE CARRYING ANY MAINTENANCE WORK ON THE ELECTRICAL SYSTEM AND CHECK THAT THERE IS NO RESIDUAL PRESSURE ON THE FLUID LINES CHECKING THE PRESSURE GAUGES AND PRESSURE SWITCHES.

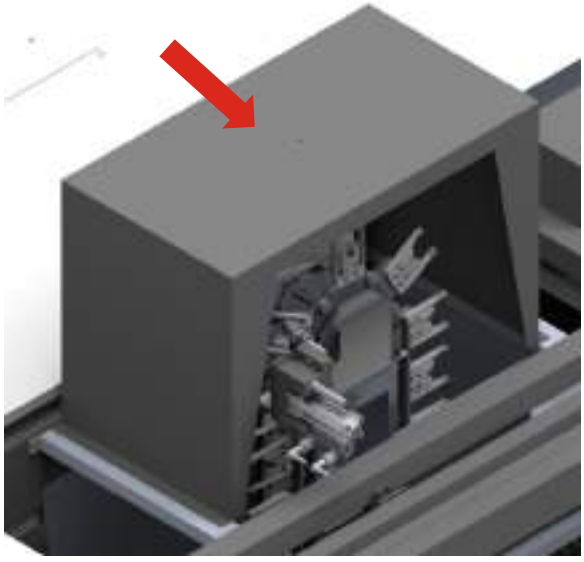
4. PROCEDURE DESCRIPTION: TOOL MAGAZINE PROTECTIONS DISASSEMBLY

5	Access the upper part of the machine.



FALLS AT THE SAME / DIFFERENT LEVEL MAY OCCUR. TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS

6	Disassemble the Upper Protection of the Tool Magazine.



CUTS PRODUCES BY SHARP EDGES OR CHIPS MAY OCCUR. TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS

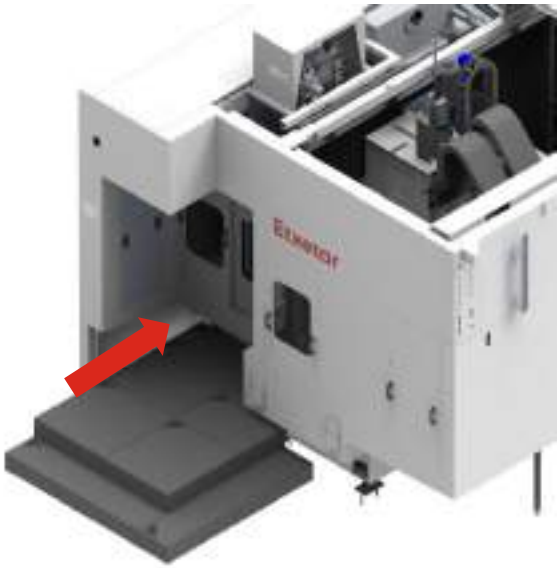
7	Disassemble the “Q” Axis Servomotor electrical connections.

BURNS FROM HOT COMPONENTS MAY OCCUR. TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS

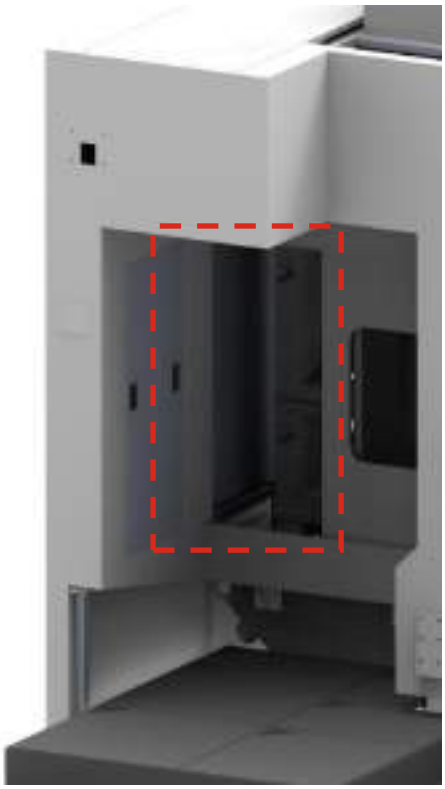
8	Secure the Tool Magazine using a crane and slings.

POSSIBLE FALLS OF HEAVY LOADS IN SUSPENSION MAY OCCUR. TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS

9	Access the Tool Magazine Safety Door area.



10	Disassemble the cover to access the Tool Magazine.



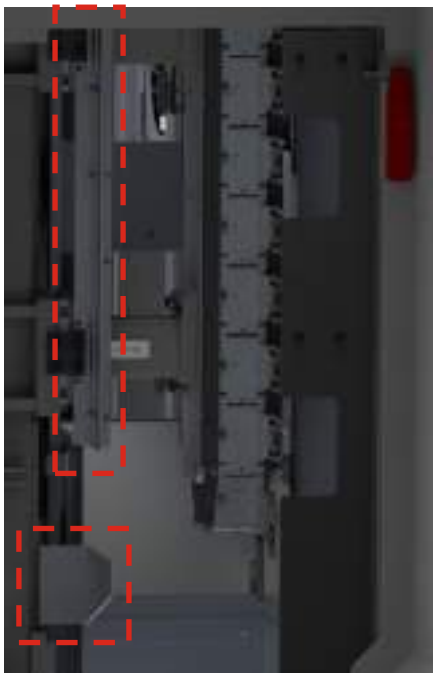
11	Disassemble the Tool Magazine guarding.

12	Disassemble the Tool Magazine side protection to access the arms supporting the Tool Magazine.

CUTS PRODUCES BY SHARP EDGES OR CHIPS MAY OCCUR. TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS

13	Disassemble the Tool Magazine side protection to access the arms supporting the Tool Magazine.

14	Disassemble the Tool Magazine side protection supports.

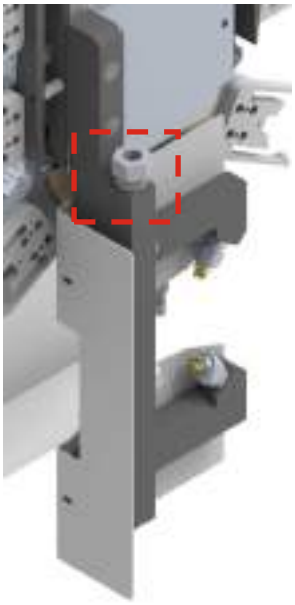


CUTS PRODUCES BY SHARP EDGES OR CHIPS MAY OCCUR. TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS

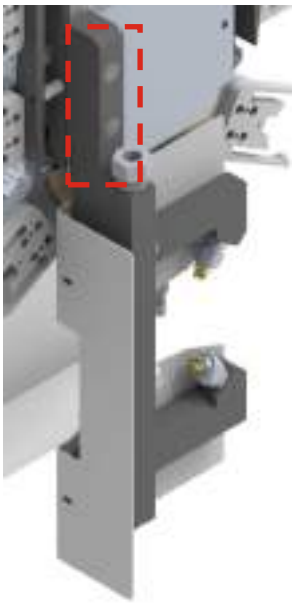
5. PROCEDURE DESCRIPTION: TOOL CLEANING DEVICE DISASSEMBLY

15	Disassemble the Tool Magazine frontal protection.

16	Disassemble the Tool Cleaning Device fluid connections.



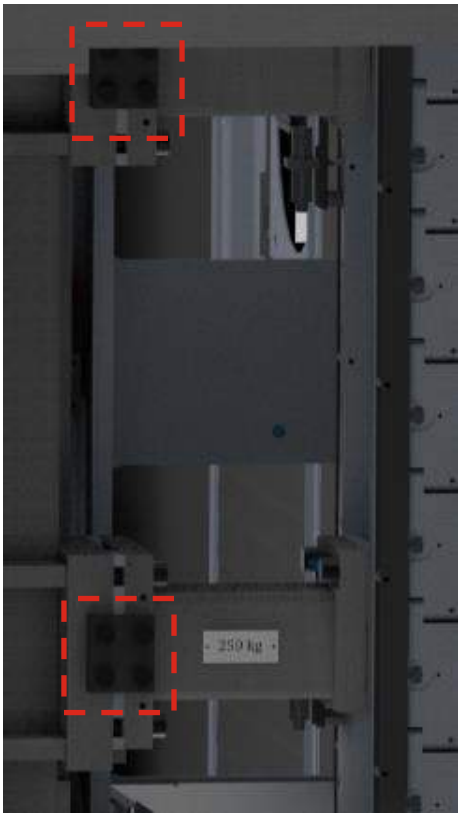
17	Disassemble the screws fixing the Tool Cleaning Device to the Tool Magazine and extract it.



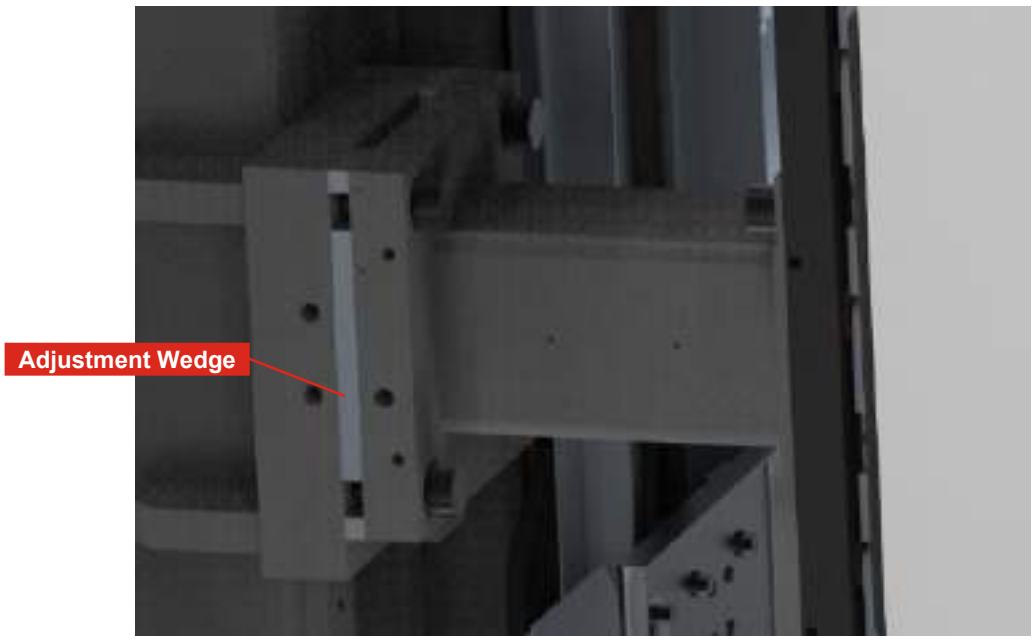
6. PROCEDURE DESCRIPTION: TOOL MAGAZINE DISASSEMBLY

18	Disassemble all the electrical and fluids connections from the Tool Magazine, Tool Holder Identification and Tool Holder Cleaning Device.

19	Disassemble the 4 screws of each positioning blocks and extract them with their corresponding adjustment wedges.



20	Untighten the screws of the Tool Magazine arm supports and extract the adjustment wedges.
21	To extract the wedges, assemble a screw on the threaded hole present on the wedges and pull them out.



22	Disassemble the screws of the Tool Magazine arm supports and extract the Tool Magazine.

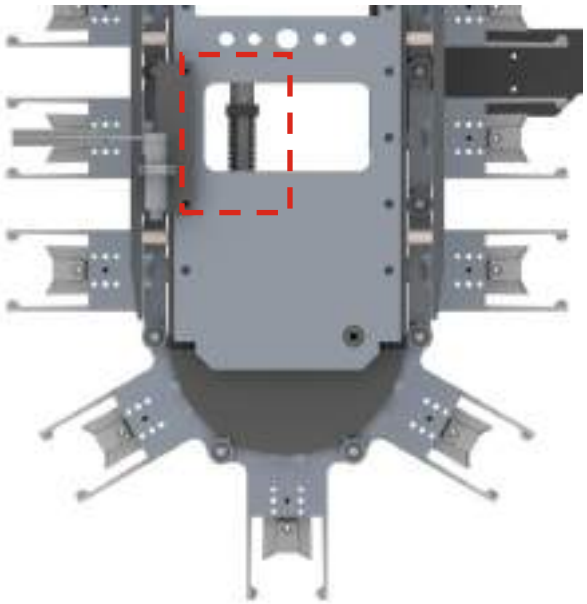
POSSIBLE FALLS OF HEAVY LOADS IN SUSPENSION MAY OCCUR. TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS

7. PROCEDURE DESCRIPTION: TOOL MAGAZINE CHAIN DISASSEMBLY

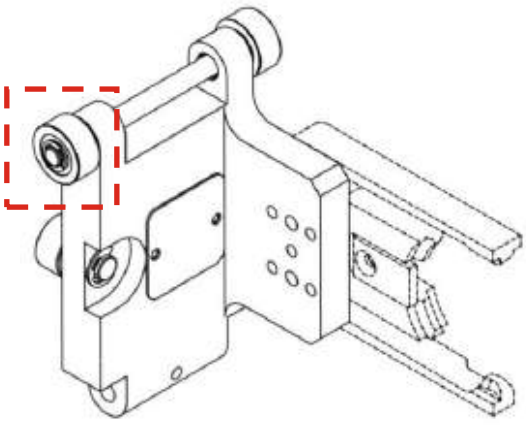
23	Place the Tool Magazine on a flat surface with the bearing extraction side looking up and secure it. (The side looking up is the opposite to the servomotor and gearbox)

⚠ POSSIBLE FALLS OF HEAVY LOADS IN SUSPENSION MAY OCCUR. TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS

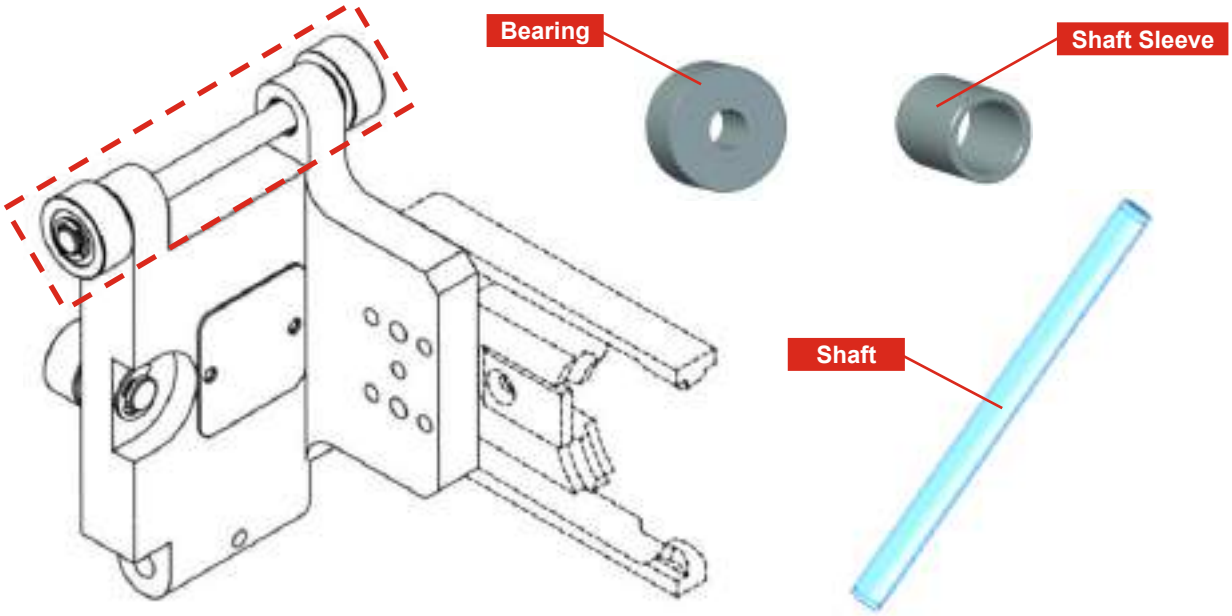
24	Set the chain of the Tool Magazine loose adjusting the tension of the nuts.



25	Disassemble the Retaining Ring holding the movement of the shaft and the bearings.



26	Disassemble the Bearings, the Shaft Sleeves and the Shaft.



27	Extract the Tool Magazine Chain completely.

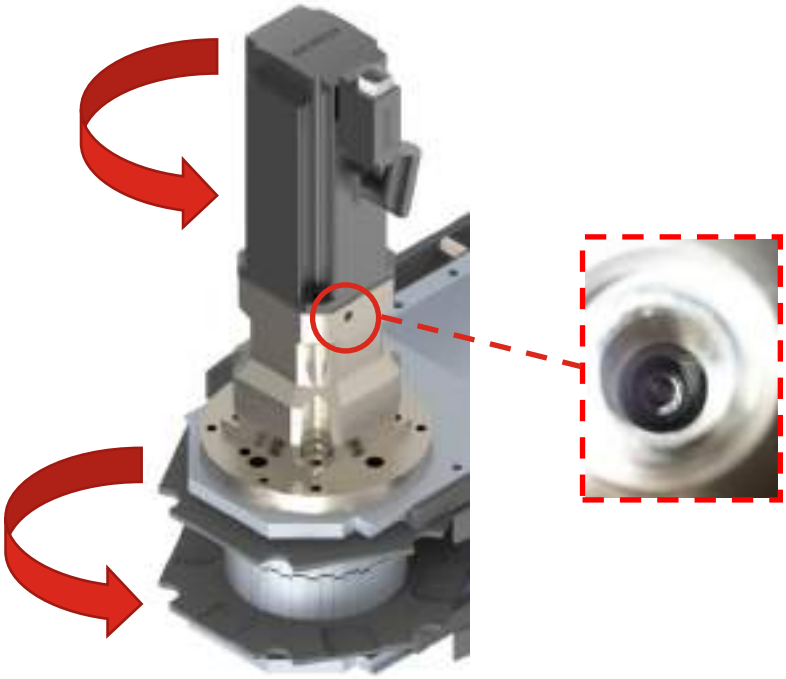
8. PROCEDURE DESCRIPTION: TOOL IDENTIFICATION DEVICE DISASSEMBLY

28	Disassemble the 4 screws fixing the Tool Identification Device to the Tool Magazine and extract it.

9. PROCEDURE DESCRIPTION: TOOL MAGAZINE SERVOMOTOR DISASSEMBLY

29	Disassemble the 4 screws fixing the Servomotor to the Gearbox.

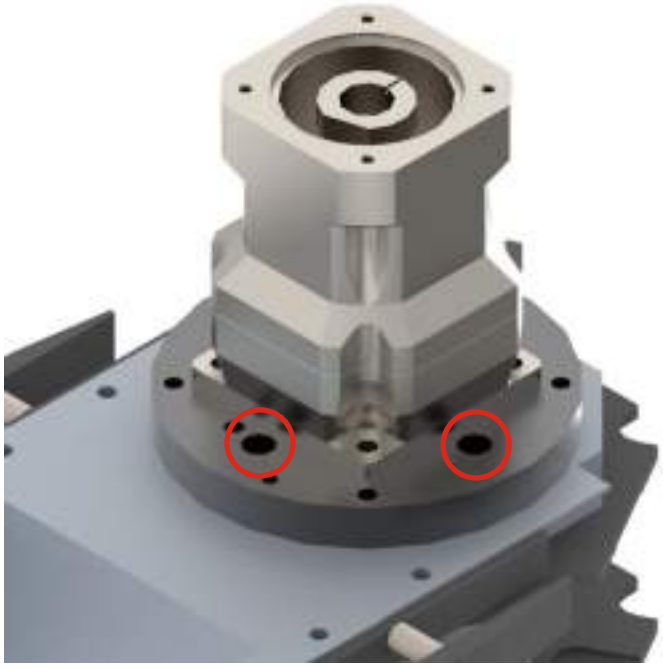
30	Rotate the Servomotor along with the Tool Magazine Drum until the screw coupling the Servomotor and the Gearbox is aligned.with the hole on the Gearbox side.



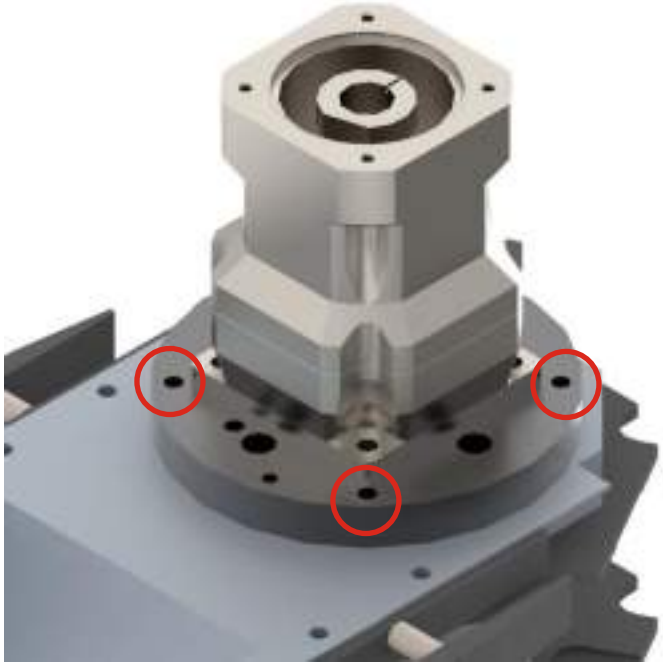
31	Untighten the Servomotor and Gearbox coupling screw and extract the Servomotor.

10. PROCEDURE DESCRIPTION: TOOL MAGAZINE GEARBOX DISASSEMBLY

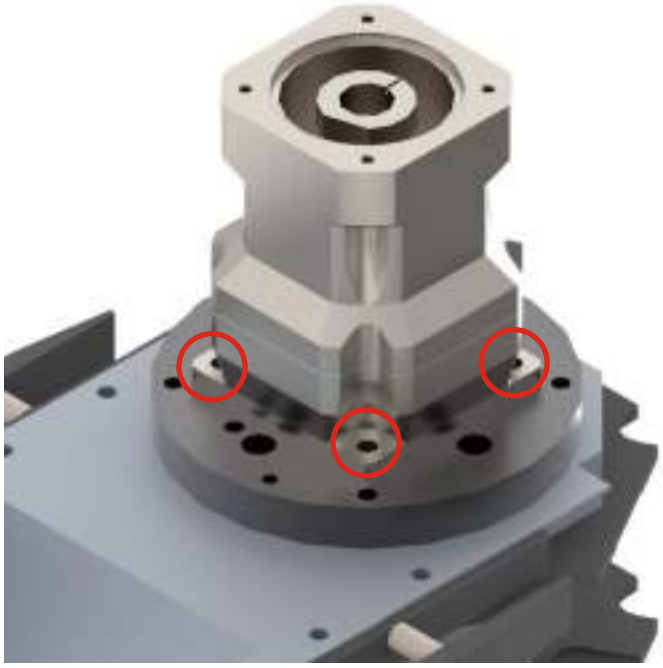
32	Disassemble the 4 screws fixing the Magazine Drum to the Gearbox.



33	Disassemble the 4 screws coupling the Gearbox Fixing Plate to the Tool Magazine.



34	Disassemble the 4 screw fixing the Gearbox to the Gearbox Fixing Plate.

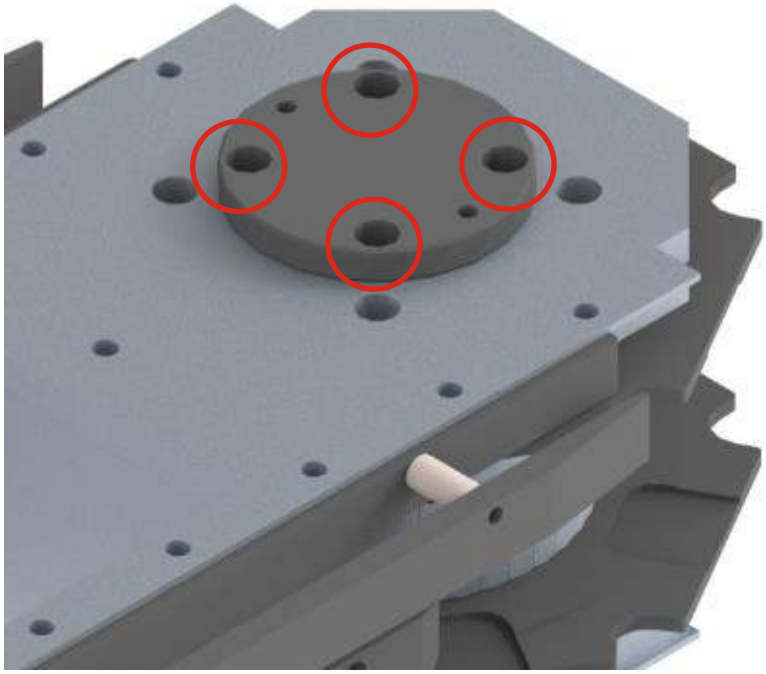


35	Assemble 2 screws on the Magazine Drum threaded holes and extract the Gearbox and the Fixing Plate.

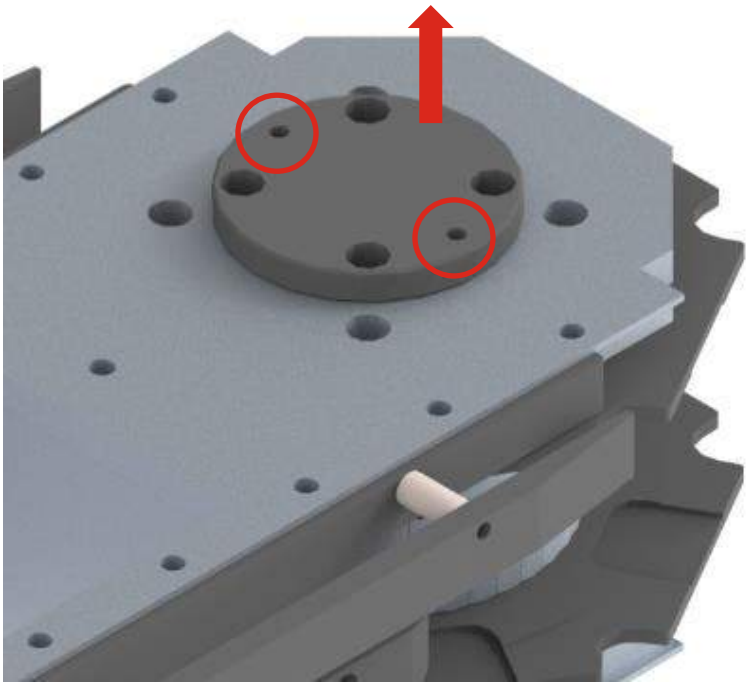
36	Disassemble the screws and extract the Gearbox.

11. PROCEDURE DESCRIPTION: TOOL MAGAZINE BEARING DISASSEMBLY

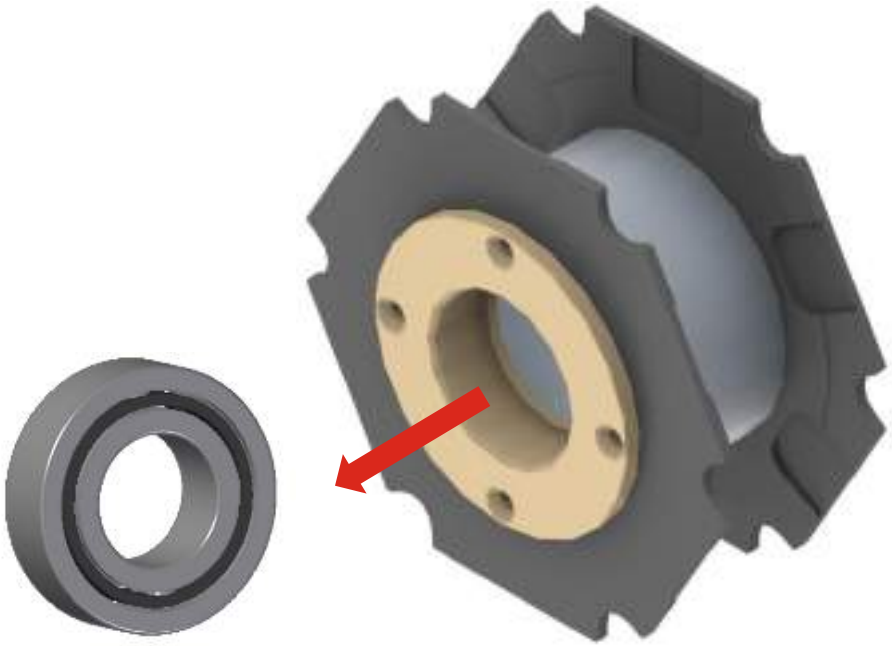
37	Disassemble the 4 screws fixing the Bearing Cover.



38	Assemble 2 screws on the Bearing Cover threaded holes and extract it.



39	Extract the Tool Magazine Drum.
40	Extract the Bearing from the Tool Magazine Drum.



12. PROCEDURE DESCRIPTION: TOOL MAGAZINE BEARING ASSEMBLY

41	Replace the Tool Magazine Bearing for new one.
42	To assemble the Tool Magazine, follow the disassembly steps in reverse order.

13. CONSIDERATIONS FOR ASSEMBLY

ALWAYS USE 12.9 QUALITY BOLTS AND APPLY THE ADVISED TORQUE ATTACHED ON THE FOLLOWING TABLE.

SCREW TORQUE VALUES

METRIC	STEEL	ALUMINUM
M4	3,9 Nm	3 Nm
M5	7,8 Nm	6 Nm
M6	13 Nm	10 Nm
M8	32 Nm	25 Nm
M10	63 Nm	49 Nm
M12	105 Nm	73,5 Nm
M14	167 Nm	117 Nm
M16	260 Nm	182 Nm
M18	365 Nm	255 Nm
M20	518 Nm	362 Nm

14. MACHINE CONNECTION / AXIS REFERENCE PROCEDURES

43	Switch on the machine (Refer to the Service Manual).
44	Close and lock the safety door to access the machine. (Refer to the Service Manual)
45	Carry out the alignment and “0” reference of the “X - Z” Axis.

CHECK THE MACHINE AXIS ALIGNMENT PROCEDURES DESCRIBED IN THE SERVICE MANUAL

REPLACEMENT OF THE MACHINE ACCESS DOOR SAFETY GLASS

File Nº	TW_PM_730_001	**Reference Drawings**	XXXX730
Mechanical Personnel	1	**Electrical Personnel**	0
Duration	30’	**Frequency**	5 Years
Machine Status	OFF	**Interruptible Task**	NO
Specific Tools	Maintenance Equipment		

ISO Safety Symbols


Safety Padlock


Safety Shoes


Safety Glasses


Safety Gloves


Safety Vest


Safety Clothes

1. SUMMARY

Step	Description
1	Machine Disconnection
2	Machine Access Door Glass Disassembly
3	Machine Access Door Glass Replacement and Assembly
4	Machine Connection

2. PRECAUTIONS

BEFORE STARTING ANY MAINTENANCE OPERATION ON THE MACHINE, BEAR IN MIND ALL THE SAFETY INDICATIONS DESCRIBED ON THE **SERVICE MANUAL AND THE ECPL PLACARD**

WHENEVER A MAINTENANCE TASK NEEDS TO BE CONDUCTED, THE OPERATOR OR THE MAINTENANCE PERSONNEL MUST ENSURE THAT ONLY THEM CAN OPERATE THE MACHINE IN ACCORDANCE TO THE SAFETY STANDARDS AND APPROVED WORK PROCEDURES

ENSURE THAT ALL THE MATERIALS AND SPARE PARTS ARE THROWN AWAY WITH SAFETY AND RESPECTFULLY WITH THE ENVIRONMENT

STRICTLY OBSERVE THE ENVIRONMENTAL PROTECTION RULES AND STANDARDS ESTABLISHED BY THE LAW BEFORE ELIMINATING USED OR SPILLED OIL

TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS SUCH AS:

- CUTS PRODUCES BY SHARP EDGES OR CHIPS
- PROJECTION OF PARTICLES
- BURNS FROM HOT COMPONENTS
- FALLS AT THE SAME / DIFFERENT LEVEL
- POSSIBLE FALLS OF HEAVY LOADS IN SUSPENSION

3. MACHINE DISCONNECTION

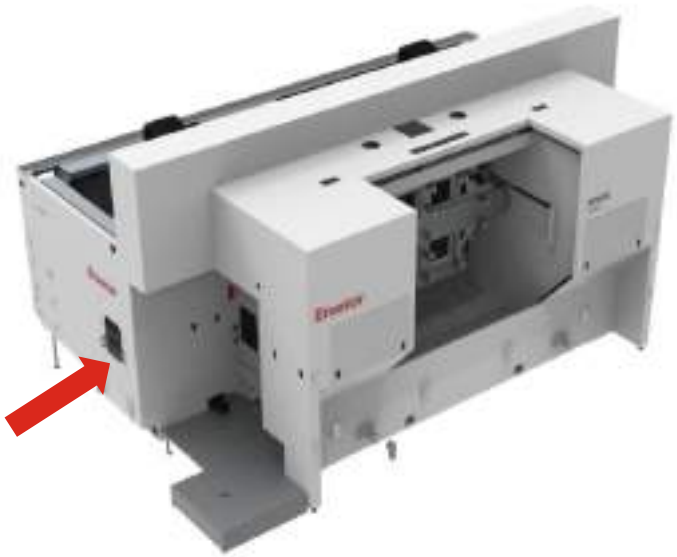
1	Clean and prepare the area where the maintenance task is going to take place.
2	Unlock and open the safety door to Access the machine. (Refer to the Service Manual)
3	Switch off the machine (Refer to the Service Manual).

WHENEVER A MAINTENANCE TASK NEEDS TO BE CONDUCTED, THE OPERATOR OR THE MAINTENANCE PERSONNEL MUST ENSURE THAT ONLY THEM CAN OPERATE THE MACHINE IN ACCORDANCE TO THE SAFETY STANDARDS AND APPROVED WORK PROCEDURES

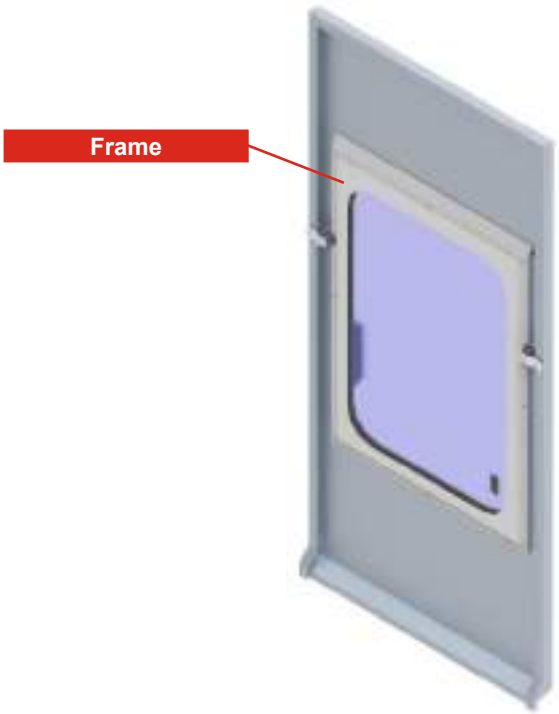
AFTER DISCONNECTING THE MAIN POWER SWITCH, WAIT AT LEAST 5 MINUTES BEFORE CARRYING ANY MAINTENANCE WORK ON THE ELECTRICAL SYSTEM AND CHECK THAT THERE IS NO RESIDUAL PRESSURE ON THE FLUID LINES CHECKING THE PRESSURE GAUGES AND PRESSURE SWITCHES.

4. PROCEDURE DESCRIPTION: MACHINE ACCESS DOOR GLASS DISASSEMBLY

4	Locate the Access Door Glass to be replaced.
5	Disassemble the Access Door.



6	Disassemble the Frame supporting the Glass in position and extract the Glass.



5. PROCEDURE DESCRIPTION: ASSEMBLY

7	Replace the Machine Access Door Glass for new one.
8	To assemble the Machine Access Door Glass, follow the disassembly steps in reverse order.

6. MACHINE CONNECTION / AXIS REFERENCE PROCEDURES

9	Switch on the machine (Refer to the Service Manual).
10	Close and lock the safety door to access the machine. (Refer to the Service Manual)

CLEANING OF THE MACHINE ACCESS DOOR SAFETY GLASS

File Nº	TW_PM_730_002	**Reference Drawings**	XXXX730
Mechanical Personnel	1	**Electrical Personnel**	0
Duration	30’	**Frequency**	Weekly / On Demand
Machine Status	OFF	**Interruptible Task**	YES
Specific Tools	Maintenance Equipment, Cleaning Detergent, Cleaning Cloth		

ISO Safety Symbols


Safety Padlock


Safety Shoes


Safety Glasses


Safety Gloves


Safety Vest


Safety Earmuffs


Safety Clothes

1. SUMMARY

Step	Description
1	Machine Disconnection
2	Machine Safety Door Glass Cleaning
3	Machine Access Door Glass Cleaning
4	Access Door Assembly
5	Machine Connection

2. PRECAUTIONS

BEFORE STARTING ANY MAINTENANCE OPERATION ON THE MACHINE, BEAR IN MIND ALL THE SAFETY INDICATIONS DESCRIBED ON THE **SERVICE MANUAL AND THE ECPL PLACARD**

WHENEVER A MAINTENANCE TASK NEEDS TO BE CONDUCTED, THE OPERATOR OR THE MAINTENANCE PERSONNEL MUST ENSURE THAT ONLY THEM CAN OPERATE THE MACHINE IN ACCORDANCE TO THE SAFETY STANDARDS AND APPROVED WORK PROCEDURES

ENSURE THAT ALL THE MATERIALS AND SPARE PARTS ARE THROWN AWAY WITH SAFETY AND RESPECTFULLY WITH THE ENVIRONMENT

STRICTLY OBSERVE THE ENVIRONMENTAL PROTECTION RULES AND STANDARDS ESTABLISHED BY THE LAW BEFORE ELIMINATING USED OR SPILLED OIL

TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS SUCH AS:

- CUTS PRODUCES BY SHARP EDGES OR CHIPS
- PROJECTION OF PARTICLES
- BURNS FROM HOT COMPONENTS
- FALLS AT THE SAME / DIFFERENT LEVEL
- POSSIBLE FALLS OF HEAVY LOADS IN SUSPENSION

3. MACHINE DISCONNECTION

1	Clean and prepare the area where the maintenance task is going to take place.
2	Unlock and open the safety door to Access the machine. (Refer to the Service Manual)
3	Switch off the machine (Refer to the Service Manual).

WHENEVER A MAINTENANCE TASK NEEDS TO BE CONDUCTED, THE OPERATOR OR THE MAINTENANCE PERSONNEL MUST ENSURE THAT ONLY THEM CAN OPERATE THE MACHINE IN ACCORDANCE TO THE SAFETY STANDARDS AND APPROVED WORK PROCEDURES

AFTER DISCONNECTING THE MAIN POWER SWITCH, WAIT AT LEAST 5 MINUTES BEFORE CARRYING ANY MAINTENANCE WORK ON THE ELECTRICAL SYSTEM AND CHECK THAT THERE IS NO RESIDUAL PRESSURE ON THE FLUID LINES CHECKING THE PRESSURE GAUGES AND PRESSURE SWITCHES.

4. PROCEDURE DESCRIPTION: MACHINE SAFETY DOOR GLASS CLEANING

4	Access the area where the machine safety door needs to be cleaned.

5	Connect the air flush gun to the closest air connection of the area were the intervention is going to be carried out.

6	Open the Safety Door and position it into a comfortable position for its cleaning.

7	Using the air flush gun, clean the swarf bits attached to the window.

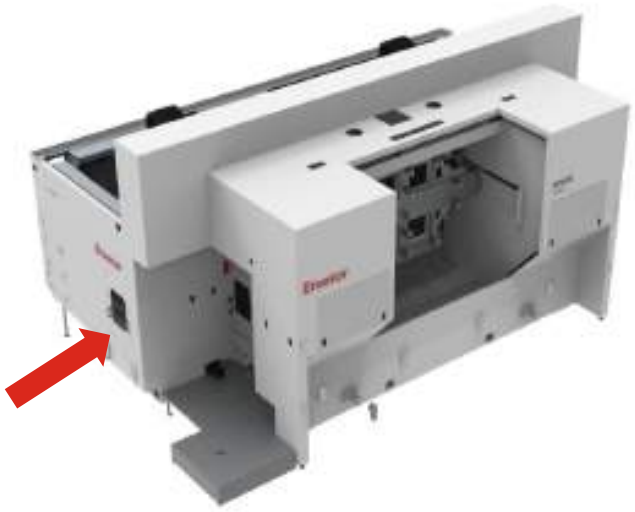
PROJECTION OF PARTICLES MAY OCCUR. TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS

8	Using a cleaning cloth and a nonabrasive cleaning detergent, clean the glass from any dirt.

DUE TO THE GLASS MATERIAL (POLICARBONATE), NONABRASIVE DETERGENTS MUST BE USED EVERY TIME. DO NOT USE TOOL THAT CAN SCRATCH THE GLASS. DO NOT CLEAN THE GLASS UNDER THE DIRECT SUNLIGHT OR HIGH TEMPERATURES.

5. PROCEDURE DESCRIPTION: MACHINE ACCESS DOOR GLASS CLEANING

9	Access the area where the machine panel door needs to be cleaned.



10	Connect the air flush gun to the closest air connection of the area were the intervention is going to be carried out.

11	Disassemble the Panel Door and position it into a comfortable position for its cleaning.

12	Using the air flush gun, clean the swarf bits attached to the window.

PROJECTION OF PARTICLES MAY OCCUR. TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS

13	Using a cleaning cloth and a nonabrasive cleaning detergent, clean the glass from any dirt.

DUE TO THE GLASS MATERIAL (POLICARBONATE), NONABRASIVE DETERGENTS MUST BE USED EVERY TIME. DO NOT USE TOOL THAT CAN SCRATCH THE GLASS. DO NOT CLEAN THE GLASS UNDER THE DIRECT SUNLIGHT OR HIGH TEMPERATURES.

6. PROCEDURE DESCRIPTION: MACHINE ACCESS DOOR ASSEMBLY

14	Assemble all the disassembled Panel Doors after cleaning them.

7. MACHINE CONNECTION / AXIS REFERENCE PROCEDURES

15	Switch on the machine (Refer to the Service Manual).
16	Close and lock the safety doors to access the machine. (Refer to the Service Manual)

CLEANING THE 3 AXIS MODULE PROTECTIONS

File Nº	TW_PM_731_001	**Reference Drawings**	XXXX731
Mechanical Personnel	1	**Electrical Personnel**	0
Duration	15’	**Frequency**	Monthly
Machine Status	OFF	**Interruptible Task**	YES
Specific Tools	Maintenance Equipment		

ISO Safety Symbols


Safety Padlock


Safety Shoes


Safety Glasses


Safety Gloves


Safety Vest


Safety Earmuffs


Safety Clothes

1. SUMMARY

Step	Description
1	Machine Disconnection
2	3 Axis Module Protections Cleaning
3	Machine Connection

2. PRECAUTIONS

BEFORE STARTING ANY MAINTENANCE OPERATION ON THE MACHINE, BEAR IN MIND ALL THE SAFETY INDICATIONS DESCRIBED ON THE **SERVICE MANUAL AND THE ECPL PLACARD**

WHENEVER A MAINTENANCE TASK NEEDS TO BE CONDUCTED, THE OPERATOR OR THE MAINTENANCE PERSONNEL MUST ENSURE THAT ONLY THEM CAN OPERATE THE MACHINE IN ACCORDANCE TO THE SAFETY STANDARDS AND APPROVED WORK PROCEDURES

ENSURE THAT ALL THE MATERIALS AND SPARE PARTS ARE THROWN AWAY WITH SAFETY AND RESPECTFULLY WITH THE ENVIRONMENT

STRICTLY OBSERVE THE ENVIRONMENTAL PROTECTION RULES AND STANDARDS ESTABLISHED BY THE LAW BEFORE ELIMINATING USED OR SPILLED OIL

TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS SUCH AS:

- CUTS PRODUCES BY SHARP EDGES OR CHIPS
- PROJECTION OF PARTICLES
- BURNS FROM HOT COMPONENTS
- FALLS AT THE SAME / DIFFERENT LEVEL
- POSSIBLE FALLS OF HEAVY LOADS IN SUSPENSION

3. MACHINE DISCONNECTION

1	Clean and prepare the area where the maintenance task is going to take place.
2	Unlock and open the safety door to Access the machine. (Refer to the Service Manual)
3	Switch off the machine (Refer to the Service Manual).

WHENEVER A MAINTENANCE TASK NEEDS TO BE CONDUCTED, THE OPERATOR OR THE MAINTENANCE PERSONNEL MUST ENSURE THAT ONLY THEM CAN OPERATE THE MACHINE IN ACCORDANCE TO THE SAFETY STANDARDS AND APPROVED WORK PROCEDURES

AFTER DISCONNECTING THE MAIN POWER SWITCH, WAIT AT LEAST 5 MINUTES BEFORE CARRYING ANY MAINTENANCE WORK ON THE ELECTRICAL SYSTEM AND CHECK THAT THERE IS NO RESIDUAL PRESSURE ON THE FLUID LINES CHECKING THE PRESSURE GAUGES AND PRESSURE SWITCHES.

4. PROCEDURE DESCRIPTION: 3 AXIS MODULE PROTECTIONS CLEANING

4	Open the 3 Axis Module panel door to access to the rear side of the 3 Axis Module Protections.

FALLS AT THE SAME / DIFFERENT LEVEL MAY OCCUR. TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS

5	Connect the air flush gun to the closest air connection of the area were the intervention is going to be carried out.

6	Using the air flush gun, clean the Telescopic Curtain of the 3 Axis Module.

PROJECTION OF PARTICLES MAY OCCUR. TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS

7	Clean the Telescopic Curtain Drain Canal of the 3 Axis Module.

CUTS PRODUCES BY SHARP EDGES OR CHIPS MAY OCCUR. TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS

8	Close the 3 Axis Module panel door.

5. MACHINE CONNECTION / AXIS REFERENCE PROCEDURES

9	Switch on the machine (Refer to the Service Manual).
10	Close and lock the safety door to access the machine. (Refer to the Service Manual)

REPLACEMENT OF THE 3 AXIS MODULE SPINDLE COVER SCRAPPERS

File Nº	TW_PM_731_005	**Reference Drawings**	XXXX731
Mechanical Personnel	1	**Electrical Personnel**	0
Duration	30’	**Frequency**	6 Month
Machine Status	OFF	**Interruptible Task**	NO
Specific Tools	Maintenance Equipment		

ISO Safety Symbols


Safety Padlock


Safety Shoes


Safety Glasses


Safety Gloves


Safety Vest


Safety Earmuffs


Safety Clothes

1. SUMMARY

Step	Description
1	Machine Disconnection
2	3 Axis Module Spindle Cover Scrappers Disassembly
3	3 Axis Module Spindle Cover Scrappers Replacement and Assembly
4	Machine Connection

2. PRECAUTIONS

BEFORE STARTING ANY MAINTENANCE OPERATION ON THE MACHINE, BEAR IN MIND ALL THE SAFETY INDICATIONS DESCRIBED ON THE **SERVICE MANUAL AND THE ECPL PLACARD**

WHENEVER A MAINTENANCE TASK NEEDS TO BE CONDUCTED, THE OPERATOR OR THE MAINTENANCE PERSONNEL MUST ENSURE THAT ONLY THEM CAN OPERATE THE MACHINE IN ACCORDANCE TO THE SAFETY STANDARDS AND APPROVED WORK PROCEDURES

ENSURE THAT ALL THE MATERIALS AND SPARE PARTS ARE THROWN AWAY WITH SAFETY AND RESPECTFULLY WITH THE ENVIRONMENT

STRICTLY OBSERVE THE ENVIRONMENTAL PROTECTION RULES AND STANDARDS ESTABLISHED BY THE LAW BEFORE ELIMINATING USED OR SPILLED OIL

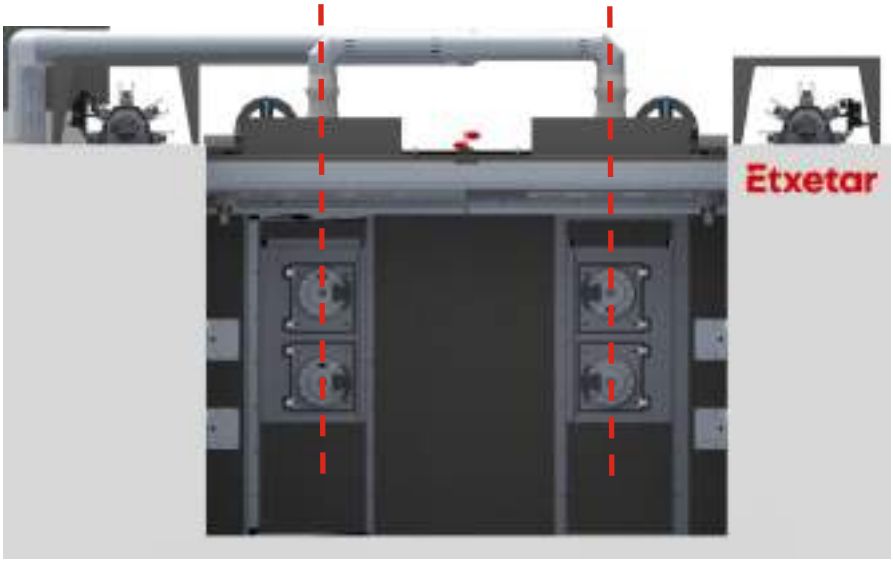
TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS SUCH AS:

- CUTS PRODUCES BY SHARP EDGES OR CHIPS
- PROJECTION OF PARTICLES
- BURNS FROM HOT COMPONENTS
- FALLS AT THE SAME / DIFFERENT LEVEL
- POSSIBLE FALLS OF HEAVY LOADS IN SUSPENSION

3. MACHINE DISCONNECTION

1	Clean and prepare the area where the maintenance task is going to take place.
2	Using the Main Panel of the machine, open the Load / Unload Automatic Door.

3	Using the Robot, disassemble the Clamping Fixture from the machine.
4	Position the “X” Axis below the Mist Extraction Connection to the machine.
5	Advance the “Z” Axis about half of its course.



6	Unlock and open the safety door to Access the machine. (Refer to the Service Manual)
7	Switch off the machine (Refer to the Service Manual).

WHENEVER A MAINTENANCE TASK NEEDS TO BE CONDUCTED, THE OPERATOR OR THE MAINTENANCE PERSONNEL MUST ENSURE THAT ONLY THEM CAN OPERATE THE MACHINE IN ACCORDANCE TO THE SAFETY STANDARDS AND APPROVED WORK PROCEDURES

AFTER DISCONNECTING THE MAIN POWER SWITCH, WAIT AT LEAST 5 MINUTES BEFORE CARRYING ANY MAINTENANCE WORK ON THE ELECTRICAL SYSTEM AND CHECK THAT THERE IS NO RESIDUAL PRESSURE ON THE FLUID LINES CHECKING THE PRESSURE GAUGES AND PRESSURE SWITCHES.

4. PROCEDURE DESCRIPTION: 3 AXIS MODULE SPINDLE COVER SCRAPPERS DISASSEMBLY

8	Access the Clamping Fixture area.

FALLS AT THE SAME / DIFFERENT LEVEL MAY OCCUR. TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS

9	Connect the air flush gun to the closest air connection of the area were the intervention is going to be carried out.

10	Using the air flush gun, clean the Work Spindle and the Spindle Cover.

PROJECTION OF PARTICLES MAY OCCUR. TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS

11	Disassemble Spindle Cover Scrapper.

5. PROCEDURE DESCRIPTION: 3 AXIS MODULE SPINDLE COVER SCRAPPERS REPLACEMENT AND ASSEMBLY

12	Replace 3 Axis Module Spindle Cover Scrappers for new ones.
13	Using the air flush gun, clean the Spindle Cover Scrapper fixing position.
14	Using a cleaning cloth and some nonabrasive detergent, clean the Spindle Cover from any dirt and grease.

PROJECTION OF PARTICLES MAY OCCUR. TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS

CUTS PRODUCES BY SHARP EDGES OR CHIPS MAY OCCUR. TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS

15	Open the 3 Axis panel door to access to Spindle Cover.

FALLS AT THE SAME / DIFFERENT LEVEL MAY OCCUR. TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS

16	Using a cleaning cloth and some nonabrasive detergent, clean the Spindle Cover from any dirt and grease.

CUTS PRODUCES BY SHARP EDGES OR CHIPS MAY OCCUR. TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS

17	After cleaning the Spindle Cover, apply some grease / oil on the Spindle Cover to prevent an excessive friction between the new Scrappers and the Spindle Cover surface.

18	Close the 3 Axis panel door.

19	Access the Clamping Fixture area.

FALLS AT THE SAME / DIFFERENT LEVEL MAY OCCUR. TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS

20	Before assembling the new Scrappers, apply some grease / oil on the Spindle Cover to prevent an excessive friction between the new Scrappers and the Spindle Cover surface.

21	Assemble the “Z” Axis Guides Scrappers.

22	Assemble the rest of the Scrappers.

ALWAYS USE 10.9 QUALITY ISO7380 M4X10 OR 10.9 QUALITY DIN125 M4X10 BOLTS

6. MACHINE CONNECTION / AXIS REFERENCE PROCEDURES

23	Switch on the machine (Refer to the Service Manual).
24	Close and lock the safety door to access the machine. (Refer to the Service Manual)

CONTROL COOLANT SYSTEM PRESSURE

File Nº	PM_800_001	**Reference Drawings**	XXXX800
Mechanical Personnel	1	**Electrical Personnel**	0
Duration	5’	**Frequency**	Daily
Machine Status	ON	**Interruptible Task**	YES
Specific Tools	Maintenance Equipment		

ISO Safety Symbols


Safety Padlock


Safety Shoes


Safety Glasses


Safety Gloves


Safety Vest


Safety Clothes

1. SUMMARY

Step	Description
1	Coolant System Pressure Control

2. PRECAUTIONS

BEFORE STARTING ANY MAINTENANCE OPERATION ON THE MACHINE, BEAR IN MIND ALL THE SAFETY INDICATIONS DESCRIBED ON THE **SERVICE MANUAL AND THE ECPL PLACARD**

WHENEVER A MAINTENANCE TASK NEEDS TO BE CONDUCTED, THE OPERATOR OR THE MAINTENANCE PERSONNEL MUST ENSURE THAT ONLY THEM CAN OPERATE THE MACHINE IN ACCORDANCE TO THE SAFETY STANDARDS AND APPROVED WORK PROCEDURES

ENSURE THAT ALL THE MATERIALS AND SPARE PARTS ARE THROWN AWAY WITH SAFETY AND RESPECTFULLY WITH THE ENVIRONMENT

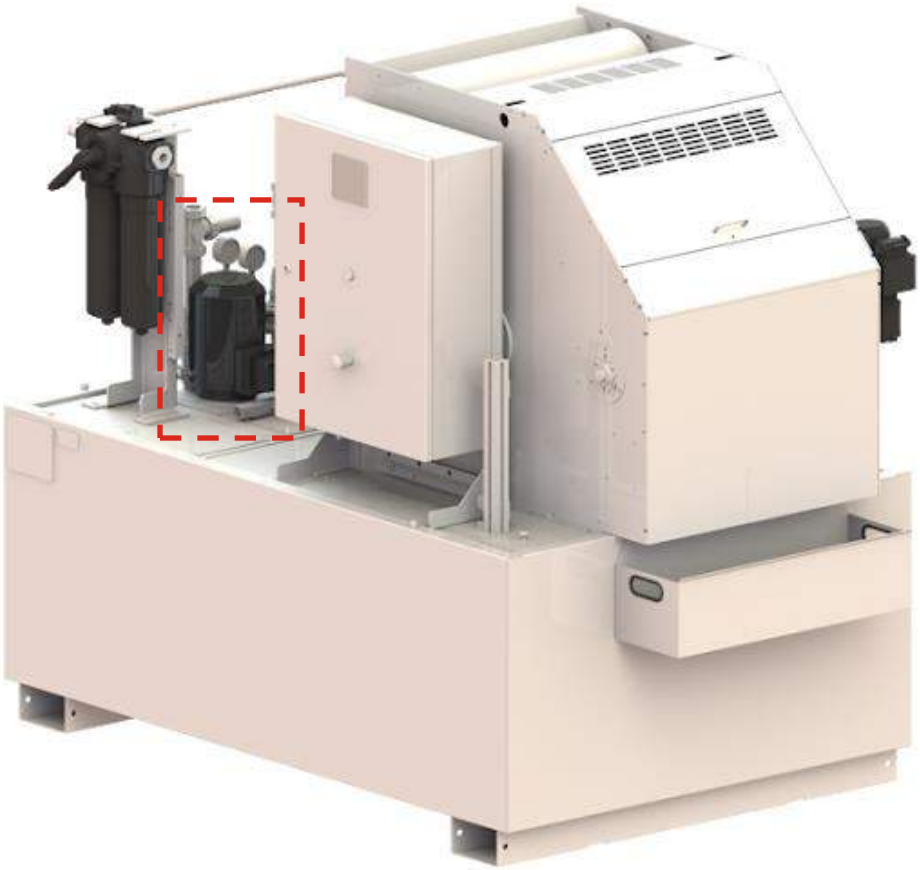
STRICTLY OBSERVE THE ENVIRONMENTAL PROTECTION RULES AND STANDARDS ESTABLISHED BY THE LAW BEFORE ELIMINATING USED OR SPILLED OIL

TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS SUCH AS:

- CUTS PRODUCES BY SHARP EDGES OR CHIPS
- PROJECTION OF PARTICLES
- BURNS FROM HOT COMPONENTS
- FALLS AT THE SAME / DIFFERENT LEVEL
- POSSIBLE FALLS OF HEAVY LOADS IN SUSPENSION

3. PROCEDURE DESCRIPTION: COOLANT SYSTEM PRESSURE CONTROL

1	Clean and prepare the area where the maintenance task is going to take place.
2	Check the Coolant System pressure is within the range described in the Fluid Diagrams or machine labels.
3	If the pressure is not within the range described in the Fluid Diagrams or machine labels, adjust the pressure (if possible) or replace the pump.



FOR MORE INFORMATION ABOUT THE DISASSEMBLY OF THE PUMP, CHECK THE COOLANT TANK SUPPLIER MANUAL

FOR MORE INFORMATION ABOUT OIL AND GREASE REFERENCES TO BE USED IN THE MACHINE, TOGETHER WITH DIFFERENT MANUFACTURERS AND EQUIVALENCES BETWEEN THEM, REFER TO THE ATTACHMENT FOLDER

CONTROL COOLANT SYSTEM TEMPERATURE

File Nº	PM_800_002	**Reference Drawings**	XXXX800
Mechanical Personnel	1	**Electrical Personnel**	0
Duration	5’	**Frequency**	Daily
Machine Status	ON	**Interruptible Task**	YES
Specific Tools	Maintenance Equipment		

ISO Safety Symbols


Safety Padlock


Safety Shoes


Safety Glasses


Safety Gloves


Safety Vest


Safety Clothes

1. SUMMARY

Step	Description
1	Coolant System Temperature Control

2. PRECAUTIONS

BEFORE STARTING ANY MAINTENANCE OPERATION ON THE MACHINE, BEAR IN MIND ALL THE SAFETY INDICATIONS DESCRIBED ON THE **SERVICE MANUAL AND THE ECPL PLACARD**

WHENEVER A MAINTENANCE TASK NEEDS TO BE CONDUCTED, THE OPERATOR OR THE MAINTENANCE PERSONNEL MUST ENSURE THAT ONLY THEM CAN OPERATE THE MACHINE IN ACCORDANCE TO THE SAFETY STANDARDS AND APPROVED WORK PROCEDURES

ENSURE THAT ALL THE MATERIALS AND SPARE PARTS ARE THROWN AWAY WITH SAFETY AND RESPECTFULLY WITH THE ENVIRONMENT

STRICTLY OBSERVE THE ENVIRONMENTAL PROTECTION RULES AND STANDARDS ESTABLISHED BY THE LAW BEFORE ELIMINATING USED OR SPILLED OIL

TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS SUCH AS:

- CUTS PRODUCES BY SHARP EDGES OR CHIPS
- PROJECTION OF PARTICLES
- BURNS FROM HOT COMPONENTS
- FALLS AT THE SAME / DIFFERENT LEVEL
- POSSIBLE FALLS OF HEAVY LOADS IN SUSPENSION

3. PROCEDURE DESCRIPTION: COOLANT SYSTEM TEMPERATURE CONTROL

1	Clean and prepare the area where the maintenance task is going to take place.
2	Check the Coolant System temperature is within the range described in the Fluid Diagrams.
3	If the temperature is not within the range described in the Fluid Diagrams, adjust the cooling unit in order to get the needed temperature range.

FOR MORE INFORMATION ABOUT THE ADJUSTMENT OF THE CHILLER, CHECK THE CHILLER SUPPLIER MANUAL

FOR MORE INFORMATION ABOUT OIL AND GREASE REFERENCES TO BE USED IN THE MACHINE, TOGETHER WITH DIFFERENT MANUFACTURERS AND EQUIVALENCES BETWEEN THEM, REFER TO THE ATTACHMENT FOLDER

REPLACEMENT OF THE COOLANT SYSTEM SELF-CLEANING FILTER

File Nº	PM_780_005	**Reference Drawings**	XXXX780
Mechanical Personnel	1	**Electrical Personnel**	0
Duration	60’	**Frequency**	On Demand
Machine Status	OFF	**Interruptible Task**	NO
Specific Tools	Maintenance Equipment		

ISO Safety Symbols


Safety Padlock


Safety Shoes


Safety Glasses


Safety Gloves


Safety Vest


Safety Clothes

1. SUMMARY

Step	Description
1	Machine Disconnection
2	Coolant System Self-Cleaning Filter Disassembly (BOLLFILTER)
3	Coolant System Self-Cleaning Filter Replacement and Assembly
4	Machine Connection

2. PRECAUTIONS

BEFORE STARTING ANY MAINTENANCE OPERATION ON THE MACHINE, BEAR IN MIND ALL THE SAFETY INDICATIONS DESCRIBED ON THE **SERVICE MANUAL AND THE ECPL PLACARD**

WHENEVER A MAINTENANCE TASK NEEDS TO BE CONDUCTED, THE OPERATOR OR THE MAINTENANCE PERSONNEL MUST ENSURE THAT ONLY THEM CAN OPERATE THE MACHINE IN ACCORDANCE TO THE SAFETY STANDARDS AND APPROVED WORK PROCEDURES

ENSURE THAT ALL THE MATERIALS AND SPARE PARTS ARE THROWN AWAY WITH SAFETY AND RESPECTFULLY WITH THE ENVIRONMENT

STRICTLY OBSERVE THE ENVIRONMENTAL PROTECTION RULES AND STANDARDS ESTABLISHED BY THE LAW BEFORE ELIMINATING USED OR SPILLED OIL

TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS SUCH AS:

- CUTS PRODUCES BY SHARP EDGES OR CHIPS
- PROJECTION OF PARTICLES
- BURNS FROM HOT COMPONENTS
- FALLS AT THE SAME / DIFFERENT LEVEL
- POSSIBLE FALLS OF HEAVY LOADS IN SUSPENSION

3. MACHINE DISCONNECTION

1	Clean and prepare the area where the maintenance task is going to take place.
2	Unlock and open the safety door to Access the machine. (Refer to the Service Manual)
3	Switch off the machine (Refer to the Service Manual).

WHENEVER A MAINTENANCE TASK NEEDS TO BE CONDUCTED, THE OPERATOR OR THE MAINTENANCE PERSONNEL MUST ENSURE THAT ONLY THEM CAN OPERATE THE MACHINE IN ACCORDANCE TO THE SAFETY STANDARDS AND APPROVED WORK PROCEDURES

AFTER DISCONNECTING THE MAIN POWER SWITCH, WAIT AT LEAST 5 MINUTES BEFORE CARRYING ANY MAINTENANCE WORK ON THE ELECTRICAL SYSTEM AND CHECK THAT THERE IS NO RESIDUAL PRESSURE ON THE FLUID LINES CHECKING THE PRESSURE GAUGES AND PRESSURE SWITCHES.

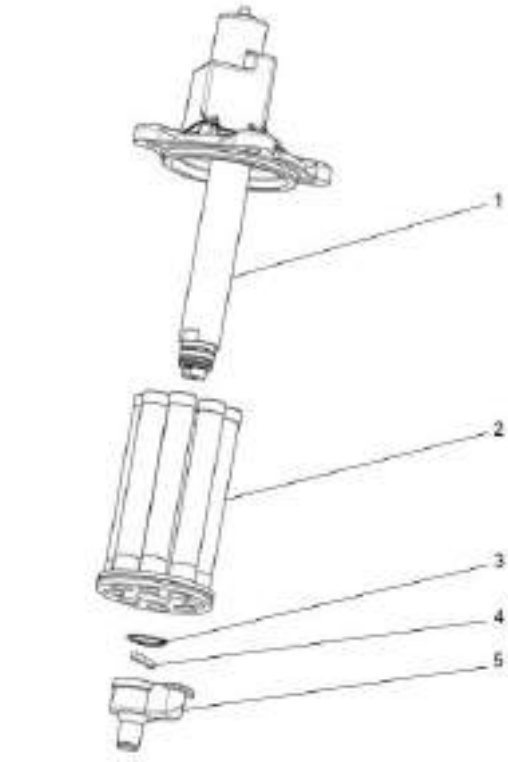
4. PROCEDURE DESCRIPTION: COOLANT SYSTEM SELF-CLEANING FILTER DISASSEMBLY

4	Isolate the Machine from the Coolant Circuit.
5	Isolate the Self-Cleaning Filter from the Coolant Circuit.
6	Before starting the disassembly of the Self-Cleaning Filter, ensure that it is depressurized and depressurize it if needed.

BURNS FROM HOT COMPONENTS MAY OCCUR. TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS

PROJECTION OF PARTICLES MAY OCCUR. TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS

7	Disassemble the Electrical Connections of the Self-Cleaning Filter.
8	Disassemble the Screws of the Filter Top Cover.
9	Disassemble the Top Cover along with the Filter Insert.
10	Disassemble the Flushing Arm from the Tube.
11	Remove the Driver and the Retaining Ring.
12	Disassemble the Filter Insert from the Tube.
13	Disassemble the damaged Filter from the Filter Holder



1 Tube
2 Filter insert
3 Retaining ring
4 Driver
5 Flushing arm

CUTS PRODUCES BY SHARP EDGES OR CHIPS MAY OCCUR. TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS

5. PROCEDURE DESCRIPTION: COOLANT SYSTEM SELF-CLEANING FILTER REPLACEMENT AND ASSEMBLY

14	Replace the Self-Cleaning Filter for new one.
15	Check all the Seals looking for any possible damage and replace them if necessary.
16	Check that all the Filters are properly screwed in the Filter Holder before starting the assembly.
17	To assemble the Coolant System Self-Cleaning Filter, follow the disassembly steps in reverse order.

6. CONSIDERATIONS FOR ASSEMBLY

THE RECOMMENDED TIGHTENING TORQUE VALUES FOR FILTER CANDLES: 20 NM FOR FILTER CANDLES WITH A CANDLE DIAMETER OF 28 MM OR 50 MM.

FOR MORE INFORMATION ABOUT THE SELF-CLEANING FILTER, REFER TO THE BOLL & KIRCH MANUAL

BOLLFILTER
Protection Systems

In order to make sure the filter continues to operate properly, observe the following points for maintenance:

- Regularly check:
  - the differential pressure,
  - the leak tightness of the filter, especially all connections and seals and
  - the filter for corrosion and other damage,
  - the condition of all lines,
  - the condition of all screw connections and whether they are firmly tightened.
- Check the following at least 1x per year:
  - the condition of all seals,
  - the condition of the filter elements,
  - the condition of the bearing seat in the tube and drive shaft,
  - the condition of the intermediate piece with the flushing arm,
  - the condition of the flushing arm and
  - the condition of the potential equalisation and its fastening.
- Replace any damaged components.
- The filter must be inspected annually for leaks.
- When opening, check the filter for corrosion and any medium contamination caused by material abrasion at least once a year.
- Replace all seals when overhauling the filter.

NOTE

The filter elements are subject to wear from two-way strain. It is therefore recommendable to keep a complete set of filter elements or a complete functional unit in stock.

Die BOLL & KIRCH Filterbau GmbH recommends that you keep a clean fully assembled functional unit ready for the purpose of maintenance and repair work. A simple and quick recommissioning is enabled by replacing the functional unit on-site.

Cleaning and repair work to the functional unit on-site is therefore no longer required and can be carried out in peace and quite at another location.

BOLLFILTER
Protection Systems

8.6 Remedying faults

NOTE

In case of any faults or repairs which are not listed here, contact the BOLL & KIRCH customer services department.

8.6.1 Trouble shooting

Fault	Possible cause	Remedy
Flushing performed often	High level of soiling in the medium	Determine the cause of soiling in the plant
	Filter elements blocked	Change / clean the filter elements
The gear motor does not turn	Flushing arm blocked	Open the filter and remove the cause of the blockage
	No power supply	Check the power supply
	Controller is set incorrectly or is faulty	Correct the setting or replace the controller
Differential pressure will not reduce	Filter elements blocked	Change / clean the filter elements
	The pressure downstream of the filter is too low or the backflushing quantity is too low	Set the pressure, increase the backflushing quantity
	Flushing valve does not open	Check function / clean / replace
Motor/flushing arm is not rotating	Flushing arm/motor is faulty	Check flushing arm/ motor, change, if necessary
No differential pressure indicator	Differential pressure monitoring system faulty	Check/replace the differential pressure monitoring system
Flushing valve does not switch	No power supply	Check the power supply
	Controller is set incorrectly or is faulty	Correct the setting or replace the controller

7. MACHINE CONNECTION / AXIS REFERENCE PROCEDURES

18	Switch on the machine (Refer to the Service Manual).
19	Close and lock the safety door to access the machine. (Refer to the Service Manual)

CONTROL OF THE CHILLER LEVEL AND TEMPERATURE

File Nº	PM_785_001	**Reference Drawings**	XXXX785
Mechanical Personnel	1	**Electrical Personnel**	0
Duration	5’	**Frequency**	Daily
Machine Status	ON	**Interruptible Task**	YES
Specific Tools	-		

ISO Safety Symbols


Safety Shoes


Safety Glasses


Safety Gloves


Safety Vest


Safety Clothes

1. SUMMARY

Step	Description
1	Chiller Level and Temperature Check

2. PRECAUTIONS

BEFORE STARTING ANY MAINTENANCE OPERATION ON THE MACHINE, BEAR IN MIND ALL THE SAFETY INDICATIONS DESCRIBED ON THE **SERVICE MANUAL AND THE ECPL PLACARD**

WHENEVER A MAINTENANCE TASK NEEDS TO BE CONDUCTED, THE OPERATOR OR THE MAINTENANCE PERSONNEL MUST ENSURE THAT ONLY THEM CAN OPERATE THE MACHINE IN ACCORDANCE TO THE SAFETY STANDARDS AND APPROVED WORK PROCEDURES

ENSURE THAT ALL THE MATERIALS AND SPARE PARTS ARE THROWN AWAY WITH SAFETY AND RESPECTFULLY WITH THE ENVIRONMENT

STRICTLY OBSERVE THE ENVIRONMENTAL PROTECTION RULES AND STANDARDS ESTABLISHED BY THE LAW BEFORE ELIMINATING USED OR SPILLED OIL

TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS SUCH AS:

- CUTS PRODUCES BY SHARP EDGES OR CHIPS
- PROJECTION OF PARTICLES
- BURNS FROM HOT COMPONENTS
- FALLS AT THE SAME / DIFFERENT LEVEL
- POSSIBLE FALLS OF HEAVY LOADS IN SUSPENSION

3. PROCEDURE DESCRIPTION: CHILLER LEVEL AND TEMPERATURE CHECK

1	Check the Chiller fluid level (Pos.1), ensuring that the minimum level is not reached.
2	If necessary, fill the Chiller tank with Water + Glycol (Check the ratio on the Fluid Drawings) though the filling plug (Pos.2). (Do not exceed the maximum level)
3	Check the Chiller temperature in the thermostat (Pos.3).

FOR MORE INFORMATION ABOUT OIL AND GREASE REFERENCES TO BE USED IN THE MACHINE, TOGETHER WITH DIFFERENT MANUFACTURERS AND EQUIVALENCES BETWEEN THEM, REFER TO THE ATTACHMENT FOLDER

CONTROL OF THE CHILLER PRESSURE

File Nº	PM_785_002	**Reference Drawings**	XXXX785
Mechanical Personnel	1	**Electrical Personnel**	0
Duration	5’	**Frequency**	Daily
Machine Status	ON	**Interruptible Task**	YES
Specific Tools	-		

ISO Safety Symbols


Safety Shoes


Safety Glasses


Safety Gloves


Safety Vest


Safety Clothes

1. SUMMARY

Step	Description
1	Chiller Pressure Check

2. PRECAUTIONS

BEFORE STARTING ANY MAINTENANCE OPERATION ON THE MACHINE, BEAR IN MIND ALL THE SAFETY INDICATIONS DESCRIBED ON THE **SERVICE MANUAL AND THE ECPL PLACARD**

WHENEVER A MAINTENANCE TASK NEEDS TO BE CONDUCTED, THE OPERATOR OR THE MAINTENANCE PERSONNEL MUST ENSURE THAT ONLY THEM CAN OPERATE THE MACHINE IN ACCORDANCE TO THE SAFETY STANDARDS AND APPROVED WORK PROCEDURES

ENSURE THAT ALL THE MATERIALS AND SPARE PARTS ARE THROWN AWAY WITH SAFETY AND RESPECTFULLY WITH THE ENVIRONMENT

STRICTLY OBSERVE THE ENVIRONMENTAL PROTECTION RULES AND STANDARDS ESTABLISHED BY THE LAW BEFORE ELIMINATING USED OR SPILLED OIL

TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS SUCH AS:

- CUTS PRODUCES BY SHARP EDGES OR CHIPS
- PROJECTION OF PARTICLES
- BURNS FROM HOT COMPONENTS
- FALLS AT THE SAME / DIFFERENT LEVEL
- POSSIBLE FALLS OF HEAVY LOADS IN SUSPENSION

3. PROCEDURE DESCRIPTION: CHILLER PRESSURE CHECK

1	Clean and prepare the area where the maintenance task is going to take place.
2	Check the Pressure Gauge on the Chiller.

3	If the pressure is under / over the specified on the fluid diagrams, check the different elements that can be the root cause of the incorrect pressure: ▪ Leaks ▪ Chiller machine not working properly ▪ Dirty cooling fluid

FOR MORE INFORMATION ABOUT OIL AND GREASE REFERENCES TO BE USED IN THE MACHINE, TOGETHER WITH DIFFERENT MANUFACTURERS AND EQUIVALENCES BETWEEN THEM, REFER TO THE ATTACHMENT FOLDER

CHILLER TANK CLEANING AND COOLING FLUID CHANGE

File Nº	PM_785_003	**Reference Drawings**	XXXX785
Mechanical Personnel	1	**Electrical Personnel**	0
Duration	60’	**Frequency**	Yearly
Machine Status	OFF	**Interruptible Task**	NO
Specific Tools	Maintenance Equipment, Suction Pump		

ISO Safety Symbols


Safety Padlock


Safety Shoes


Safety Glasses


Safety Gloves


Safety Vest


Safety Clothes

1. SUMMARY

Step	Description
1	Machine Disconnection
2	Chiller Tank Emptying and Cleaning
3	Chiller Tank Filling
4	Machine Connection

2. PRECAUTIONS

BEFORE STARTING ANY MAINTENANCE OPERATION ON THE MACHINE, BEAR IN MIND ALL THE SAFETY INDICATIONS DESCRIBED ON THE **SERVICE MANUAL AND THE ECPL PLACARD**

WHENEVER A MAINTENANCE TASK NEEDS TO BE CONDUCTED, THE OPERATOR OR THE MAINTENANCE PERSONNEL MUST ENSURE THAT ONLY THEM CAN OPERATE THE MACHINE IN ACCORDANCE TO THE SAFETY STANDARDS AND APPROVED WORK PROCEDURES

ENSURE THAT ALL THE MATERIALS AND SPARE PARTS ARE THROWN AWAY WITH SAFETY AND RESPECTFULLY WITH THE ENVIRONMENT

STRICTLY OBSERVE THE ENVIRONMENTAL PROTECTION RULES AND STANDARDS ESTABLISHED BY THE LAW BEFORE ELIMINATING USED OR SPILLED OIL

TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS SUCH AS:

- CUTS PRODUCES BY SHARP EDGES OR CHIPS
- PROJECTION OF PARTICLES
- BURNS FROM HOT COMPONENTS
- FALLS AT THE SAME / DIFFERENT LEVEL
- POSSIBLE FALLS OF HEAVY LOADS IN SUSPENSION

3. MACHINE DISCONNECTION

1	Clean and prepare the area where the maintenance task is going to take place.
2	Switch off the machine (Refer to the Service Manual).

WHENEVER A MAINTENANCE TASK NEEDS TO BE CONDUCTED, THE OPERATOR OR THE MAINTENANCE PERSONNEL MUST ENSURE THAT ONLY THEM CAN OPERATE THE MACHINE IN ACCORDANCE TO THE SAFETY STANDARDS AND APPROVED WORK PROCEDURES

AFTER DISCONNECTING THE MAIN POWER SWITCH, WAIT AT LEAST 5 MINUTES BEFORE CARRYING ANY MAINTENANCE WORK ON THE ELECTRICAL SYSTEM AND CHECK THAT THERE IS NO RESIDUAL PRESSURE ON THE FLUID LINES CHECKING THE PRESSURE GAUGES AND PRESSURE SWITCHES.

4. PROCEDURE DESCRIPTION: CHILLER TANK EMPTYING AND CLEANING

3	Disassemble the Emptying Plug and empty the Chiller.
4	Clean the Chiller Tank if possible.
5	Assemble the Emptying Plug into place.

BURNS FROM HOT COMPONENTS MAY OCCUR. TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS

5. PROCEDURE DESCRIPTION: CHILLER TANK FILLING

6	Fill the Chiller with Water + Glycol (Check the ratio on the Fluid Drawings) through the filling plug (Pos.1). (Do not exceed the maximum level)

FOR MORE INFORMATION ABOUT OIL AND GREASE REFERENCES TO BE USED IN THE MACHINE, TOGETHER WITH DIFFERENT MANUFACTURERS AND EQUIVALENCES BETWEEN THEM, REFER TO THE ATTACHMENT FOLDER

6. MACHINE CONNECTION

7	Switch on the machine (Refer to the Service Manual).

CLEANING OF THE COOLING SYSTEM PIPE FILTER

File Nº	PM_785_004	**Reference Drawings**	XXXX785
Mechanical Personnel	1	**Electrical Personnel**	0
Duration	10’	**Frequency**	Yearly
Machine Status	OFF	**Interruptible Task**	NO
Specific Tools	Maintenance Equipment		

ISO Safety Symbols


Safety Padlock


Safety Shoes


Safety Glasses


Safety Gloves


Safety Vest


Safety Clothes

1. SUMMARY

Step	Description
1	Machine Disconnection
2	Cooling System Pipe Filter Cleaning
3	Machine Connection

2. PRECAUTIONS

BEFORE STARTING ANY MAINTENANCE OPERATION ON THE MACHINE, BEAR IN MIND ALL THE SAFETY INDICATIONS DESCRIBED ON THE **SERVICE MANUAL AND THE ECPL PLACARD**

WHENEVER A MAINTENANCE TASK NEEDS TO BE CONDUCTED, THE OPERATOR OR THE MAINTENANCE PERSONNEL MUST ENSURE THAT ONLY THEM CAN OPERATE THE MACHINE IN ACCORDANCE TO THE SAFETY STANDARDS AND APPROVED WORK PROCEDURES

ENSURE THAT ALL THE MATERIALS AND SPARE PARTS ARE THROWN AWAY WITH SAFETY AND RESPECTFULLY WITH THE ENVIRONMENT

STRICTLY OBSERVE THE ENVIRONMENTAL PROTECTION RULES AND STANDARDS ESTABLISHED BY THE LAW BEFORE ELIMINATING USED OR SPILLED OIL

TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS SUCH AS:

- CUTS PRODUCES BY SHARP EDGES OR CHIPS
- PROJECTION OF PARTICLES
- BURNS FROM HOT COMPONENTS
- FALLS AT THE SAME / DIFFERENT LEVEL
- POSSIBLE FALLS OF HEAVY LOADS IN SUSPENSION

3. MACHINE DISCONNECTION

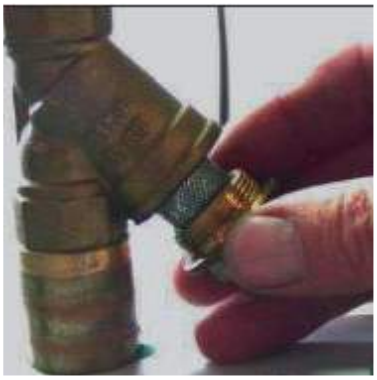
1	Clean and prepare the area where the maintenance task is going to take place.
2	Switch off the machine (Refer to the Service Manual).

WHENEVER A MAINTENANCE TASK NEEDS TO BE CONDUCTED, THE OPERATOR OR THE MAINTENANCE PERSONNEL MUST ENSURE THAT ONLY THEM CAN OPERATE THE MACHINE IN ACCORDANCE TO THE SAFETY STANDARDS AND APPROVED WORK PROCEDURES

AFTER DISCONNECTING THE MAIN POWER SWITCH, WAIT AT LEAST 5 MINUTES BEFORE CARRYING ANY MAINTENANCE WORK ON THE ELECTRICAL SYSTEM AND CHECK THAT THERE IS NO RESIDUAL PRESSURE ON THE FLUID LINES CHECKING THE PRESSURE GAUGES AND PRESSURE SWITCHES.

4. PROCEDURE DESCRIPTION: ELEMENT CLEANING

3	Place a container under the filter to prevent spilling the cooling fluid.
4	Unscrew the tube filter.
5	Remove the tube filter and clean it thoroughly.
6	Once cleaned, assemble the filter into its initial position.



CUTS PRODUCES BY SHARP EDGES OR CHIPS MAY OCCUR. TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS

BURNS FROM HOT COMPONENTS MAY OCCUR. TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS

FOR MORE INFORMATION ABOUT OIL AND GREASE REFERENCES TO BE USED IN THE MACHINE, TOGETHER WITH DIFFERENT MANUFACTURERS AND EQUIVALENCES BETWEEN THEM, REFER TO THE ATTACHMENT FOLDER

5. MACHINE CONNECTION / AXIS REFERENCE PROCEDURES

7	Switch on the machine (Refer to the Service Manual).

CONTROL OF THE COOLING SYSTEM FLOW REGULATORS

File Nº	PM_785_005	**Reference Drawings**	XXXX785
Mechanical Personnel	1	**Electrical Personnel**	0
Duration	15’	**Frequency**	Weekly
Machine Status	ON	**Interruptible Task**	YES
Specific Tools	-		

ISO Safety Symbols


Safety Padlock


Safety Shoes


Safety Glasses


Safety Gloves


Safety Vest


Safety Clothes

1. SUMMARY

Step	Description
1	Cooling System Flow Regulator Control

2. PRECAUTIONS

BEFORE STARTING ANY MAINTENANCE OPERATION ON THE MACHINE, BEAR IN MIND ALL THE SAFETY INDICATIONS DESCRIBED ON THE **SERVICE MANUAL AND THE ECPL PLACARD**

WHENEVER A MAINTENANCE TASK NEEDS TO BE CONDUCTED, THE OPERATOR OR THE MAINTENANCE PERSONNEL MUST ENSURE THAT ONLY THEM CAN OPERATE THE MACHINE IN ACCORDANCE TO THE SAFETY STANDARDS AND APPROVED WORK PROCEDURES

ENSURE THAT ALL THE MATERIALS AND SPARE PARTS ARE THROWN AWAY WITH SAFETY AND RESPECTFULLY WITH THE ENVIRONMENT

STRICTLY OBSERVE THE ENVIRONMENTAL PROTECTION RULES AND STANDARDS ESTABLISHED BY THE LAW BEFORE ELIMINATING USED OR SPILLED OIL

TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS SUCH AS:

- CUTS PRODUCES BY SHARP EDGES OR CHIPS
- PROJECTION OF PARTICLES
- BURNS FROM HOT COMPONENTS
- FALLS AT THE SAME / DIFFERENT LEVEL
- POSSIBLE FALLS OF HEAVY LOADS IN SUSPENSION

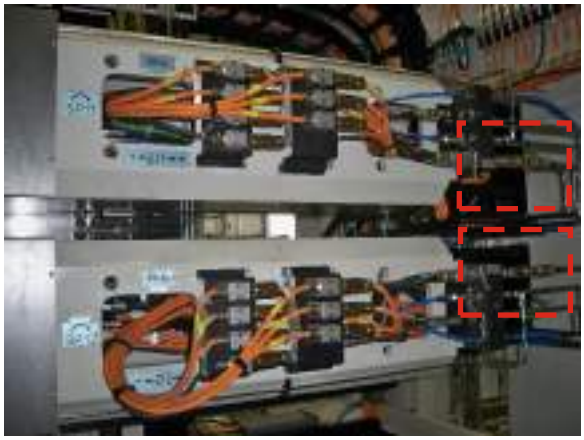
3. PROCEDURE DESCRIPTION: COOLING SYSTEM FLOW REGULATOR CONTROL

1	Clean and prepare the area where the maintenance task is going to take place.
2	Unlock and open the safety door to Access the machine. (Refer to the Service Manual)

WHENEVER A MAINTENANCE TASK NEEDS TO BE CONDUCTED, THE OPERATOR OR THE MAINTENANCE PERSONNEL MUST ENSURE THAT ONLY THEM CAN OPERATE THE MACHINE IN ACCORDANCE TO THE SAFETY LEVELS AND WORK PROCEDURES APPROVED (BA).

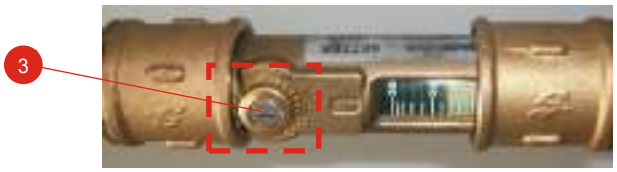
3	Locate the General Line Cooling System Flow Regulator.

4	Locate the Cooling System Flow Regulators on the 3 Axis Module.



5	Locate the Cooling System Flow Regulators on the Hydraulic Unit and the Cooling Unit.

6	Check the Cooling Fluid Flow.
7	If the Flow is not correct, adjust the flow using the Regulation Screw (Pos.3) according to the Fluid Labels or Fluid Diagrams until the flow rate is correct.



BURNS FROM HOT COMPONENTS MAY OCCUR. TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS

8	Close and lock the safety door to access the machine. (Refer to the Service Manual)

CLEANING OF THE HYDRAULIC TANK AND HYDRAULIC OIL CHANGE

File Nº	PM_880_001	**Reference Drawings**	XXXX880
Mechanical Personnel	2	**Electrical Personnel**	0
Duration	60’	**Frequency**	Yearly
Machine Status	OFF	**Interruptible Task**	NO
Specific Tools	Cleaning Cloths, Suction Pump		

ISO Safety Symbols


Safety Padlock


Safety Shoes


Safety Glasses


Safety Gloves


Safety Vest


Safety Clothes

1. SUMMARY

Step	Description
1	Machine Disconnection
2	Hydraulic Tank Emptying and Cleaning (Aluminium Tank)
3	Hydraulic Tank Emptying and Cleaning (Steel Tank)
4	Hydraulic Tank Filling
5	Machine Connection

2. PRECAUTIONS

BEFORE STARTING ANY MAINTENANCE OPERATION ON THE MACHINE, BEAR IN MIND ALL THE SAFETY INDICATIONS DESCRIBED ON THE **SERVICE MANUAL AND THE ECPL PLACARD**

WHENEVER A MAINTENANCE TASK NEEDS TO BE CONDUCTED, THE OPERATOR OR THE MAINTENANCE PERSONNEL MUST ENSURE THAT ONLY THEM CAN OPERATE THE MACHINE IN ACCORDANCE TO THE SAFETY STANDARDS AND APPROVED WORK PROCEDURES

ENSURE THAT ALL THE MATERIALS AND SPARE PARTS ARE THROWN AWAY WITH SAFETY AND RESPECTFULLY WITH THE ENVIRONMENT

STRICTLY OBSERVE THE ENVIRONMENTAL PROTECTION RULES AND STANDARDS ESTABLISHED BY THE LAW BEFORE ELIMINATING USED OR SPILLED OIL

TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS SUCH AS:

- CUTS PRODUCES BY SHARP EDGES OR CHIPS
- PROJECTION OF PARTICLES
- BURNS FROM HOT COMPONENTS
- FALLS AT THE SAME / DIFFERENT LEVEL
- POSSIBLE FALLS OF HEAVY LOADS IN SUSPENSION

3. MACHINE DISCONNECTION

1	Clean and prepare the area where the maintenance task is going to take place.
2	Switch off the machine (Refer to the Service Manual).

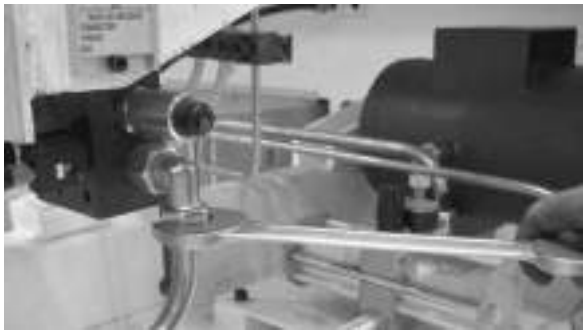
WHENEVER A MAINTENANCE TASK NEEDS TO BE CONDUCTED, THE OPERATOR OR THE MAINTENANCE PERSONNEL MUST ENSURE THAT ONLY THEM CAN OPERATE THE MACHINE IN ACCORDANCE TO THE SAFETY STANDARDS AND APPROVED WORK PROCEDURES

AFTER DISCONNECTING THE MAIN POWER SWITCH, WAIT AT LEAST 5 MINUTES BEFORE CARRYING ANY MAINTENANCE WORK ON THE ELECTRICAL SYSTEM AND CHECK THAT THERE IS NO RESIDUAL PRESSURE ON THE FLUID LINES CHECKING THE PRESSURE GAUGES AND PRESSURE SWITCHES.

4. PROCEDURE DESCRIPTION: HYDRAULIC TANK EMPTYING AND CLEANING (ALUMINIUM TANK)

3	Empty the hydraulic tank from the drain coupling (Pos.1)

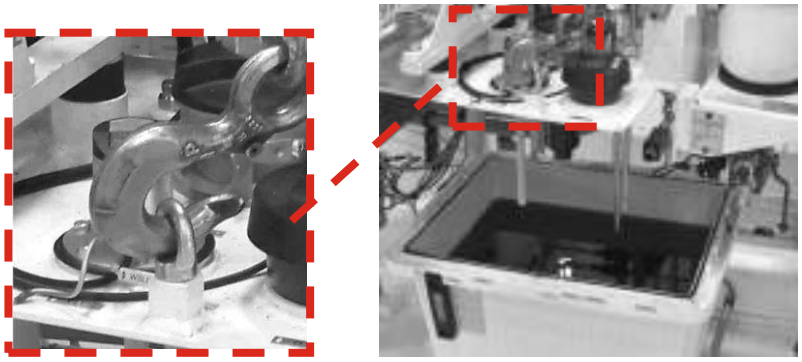
4	Loosen all the hydraulic and electric connections.



CUTS PRODUCES BY SHARP EDGES OR CHIPS MAY OCCUR. TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS

BURNS FROM HOT COMPONENTS MAY OCCUR. TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS

5	Loosen and remove the top cover

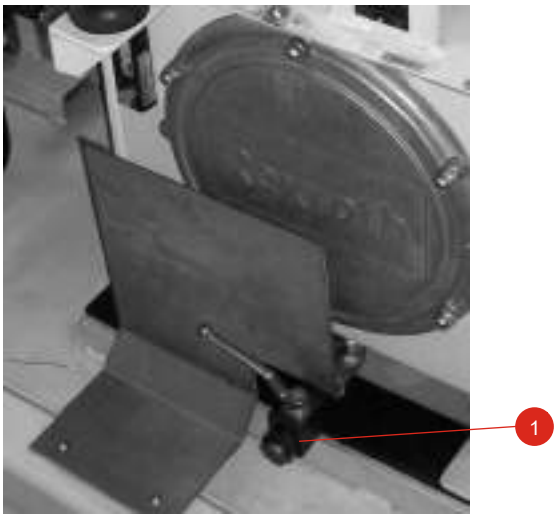


POSSIBLE FALLS OF HEAVY LOADS IN SUSPENSION MAY OCCUR. TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS

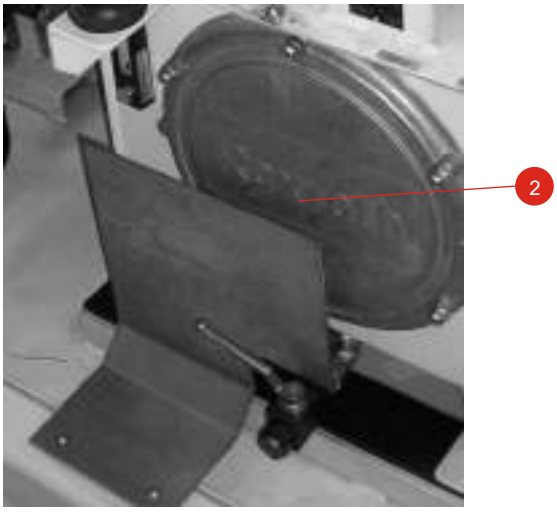
6	Clean the hydraulic tank using the cleaning cloths and the suction pump.

5. PROCEDURE DESCRIPTION: HYDRAULIC TANK EMPTYING AND CLEANING (STEEL TANK)

7	Empty the hydraulic tank from the drain coupling (Pos.1)



8	Remove cover (Pos.2) and clean the hydraulic tank using the cleaning cloths and the suction pump.



CUTS PRODUCES BY SHARP EDGES OR CHIPS MAY OCCUR. TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS

BURNS FROM HOT COMPONENTS MAY OCCUR. TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS

6. PROCEDURE DESCRIPTION: HYDRAULIC TANK FILLING

9	To assemble the Hydraulic Tank, follow the disassembly steps in reverse order.
10	Fill the hydraulic tank with new oil through the fill coupling (Pos.3). (Do not go over the maximum level).

FOR MORE INFORMATION ABOUT OIL AND GREASE REFERENCES TO BE USED IN THE MACHINE, TOGETHER WITH DIFFERENT MANUFACTURERS AND EQUIVALENCES BETWEEN THEM, REFER TO THE ATTACHMENT FOLDER

7. MACHINE CONNECTION

11	Switch on the machine (Refer to the Service Manual).

CONTROL OF THE HYDRAULIC TANK OIL LEVEL AND TEMPERATURE

File Nº	PM_880_003	**Reference Drawings**	XXXX880
Mechanical Personnel	1	**Electrical Personnel**	0
Duration	5’	**Frequency**	Daily
Machine Status	ON	**Interruptible Task**	YES
Specific Tools	-		

ISO Safety Symbols


Safety Padlock


Safety Shoes


Safety Glasses


Safety Gloves


Safety Vest


Safety Clothes

1. SUMMARY

Step	Description
1	Hydraulic Tank Oil Level and Temperature Control

2. PRECAUTIONS

BEFORE STARTING ANY MAINTENANCE OPERATION ON THE MACHINE, BEAR IN MIND ALL THE SAFETY INDICATIONS DESCRIBED ON THE **SERVICE MANUAL AND THE ECPL PLACARD**

WHENEVER A MAINTENANCE TASK NEEDS TO BE CONDUCTED, THE OPERATOR OR THE MAINTENANCE PERSONNEL MUST ENSURE THAT ONLY THEM CAN OPERATE THE MACHINE IN ACCORDANCE TO THE SAFETY STANDARDS AND APPROVED WORK PROCEDURES

ENSURE THAT ALL THE MATERIALS AND SPARE PARTS ARE THROWN AWAY WITH SAFETY AND RESPECTFULLY WITH THE ENVIRONMENT

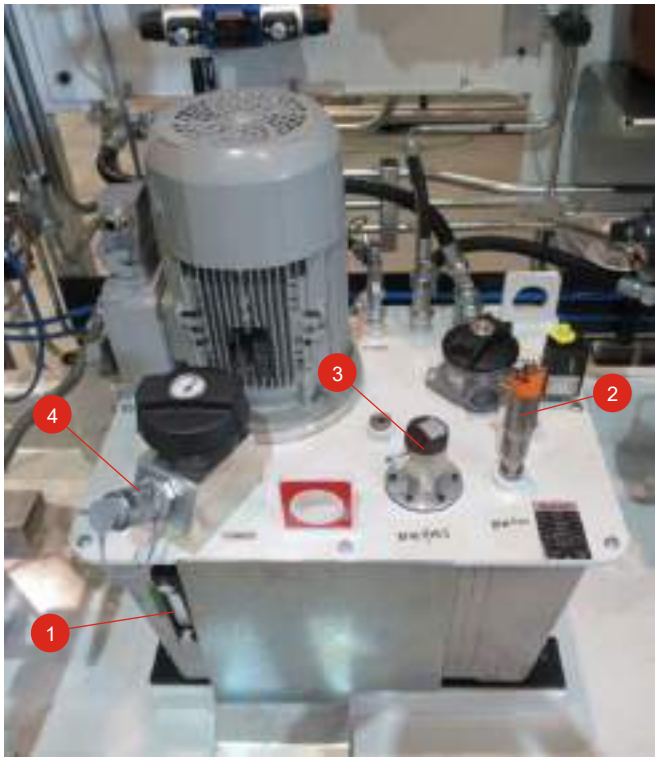
STRICTLY OBSERVE THE ENVIRONMENTAL PROTECTION RULES AND STANDARDS ESTABLISHED BY THE LAW BEFORE ELIMINATING USED OR SPILLED OIL

TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS SUCH AS:

- CUTS PRODUCES BY SHARP EDGES OR CHIPS
- PROJECTION OF PARTICLES
- BURNS FROM HOT COMPONENTS
- FALLS AT THE SAME / DIFFERENT LEVEL
- POSSIBLE FALLS OF HEAVY LOADS IN SUSPENSION

3. PROCEDURE DESCRIPTION: HYDRAULIC TANK OIL LEVEL AND TEMPERATURE CONTROL

1	Check the Hydraulic Tank oil level and temperature on the Oil level Sight (Pos.1), the Level Sensor (pos.3) and the Temperature Sensor (Pos.2).
2	Make sure that the Hydraulic Tank minimum level is not reached while the machine is running.
3	If necessary, fill the Hydraulic Tank trough the Filling Plug (Pos.4) when the machine is stopped. (Do not exceed the Maximum Level).
4	Make sure that the Hydraulic Tank temperature is between 40ºC – 50ºC While the machine is running.



FOR MORE INFORMATION ABOUT OIL AND GREASE REFERENCES TO BE USED IN THE MACHINE, TOGETHER WITH DIFFERENT MANUFACTURERS AND EQUIVALENCES BETWEEN THEM, REFER TO THE ATTACHMENT FOLDER

CONTROL OF THE HYDRAULIC LINE PRESSURE

File Nº	PM_880_004	**Reference Drawings**	XXXX880
Mechanical Personnel	1	**Electrical Personnel**	0
Duration	5’	**Frequency**	Daily
Machine Status	ON	**Interruptible Task**	YES
Specific Tools	-		

ISO Safety Symbols


Safety Shoes


Safety Glasses


Safety Gloves


Safety Vest


Safety Clothes

1. SUMMARY

Step	Description
1	Hydraulic Line Pressure Control

2. PRECAUTIONS

BEFORE STARTING ANY MAINTENANCE OPERATION ON THE MACHINE, BEAR IN MIND ALL THE SAFETY INDICATIONS DESCRIBED ON THE **SERVICE MANUAL AND THE ECPL PLACARD**

WHENEVER A MAINTENANCE TASK NEEDS TO BE CONDUCTED, THE OPERATOR OR THE MAINTENANCE PERSONNEL MUST ENSURE THAT ONLY THEM CAN OPERATE THE MACHINE IN ACCORDANCE TO THE SAFETY STANDARDS AND APPROVED WORK PROCEDURES

ENSURE THAT ALL THE MATERIALS AND SPARE PARTS ARE THROWN AWAY WITH SAFETY AND RESPECTFULLY WITH THE ENVIRONMENT

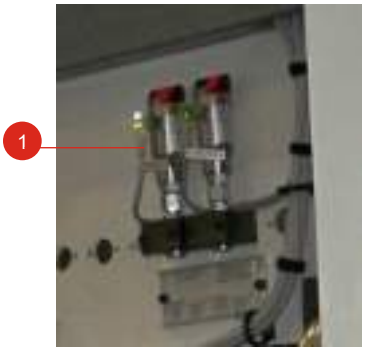
STRICTLY OBSERVE THE ENVIRONMENTAL PROTECTION RULES AND STANDARDS ESTABLISHED BY THE LAW BEFORE ELIMINATING USED OR SPILLED OIL

TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS SUCH AS:

- CUTS PRODUCES BY SHARP EDGES OR CHIPS
- PROJECTION OF PARTICLES
- BURNS FROM HOT COMPONENTS
- FALLS AT THE SAME / DIFFERENT LEVEL
- POSSIBLE FALLS OF HEAVY LOADS IN SUSPENSION

3. PROCEDURE DESCRIPTION: HYDRAULIC LINE PRESSURE CONTROL

1	Clean and prepare the area where the maintenance task is going to take place.
2	Control the Hydraulic Line pressure on the Pressure Switches on the Hydraulic Panel.



3	If the pressure is under / over the specified on the fluid diagrams, check the different elements that can be the root cause of the incorrect pressure: ▪ Leaks ▪ Hydraulic pump not working properly ▪ Dirty oil

FOR MORE INFORMATION ABOUT OIL AND GREASE REFERENCES TO BE USED IN THE MACHINE, TOGETHER WITH DIFFERENT MANUFACTURERS AND EQUIVALENCES BETWEEN THEM, REFER TO THE ATTACHMENT FOLDER

REPLACEMENT OF THE HYDRAULIC FILTER

File Nº	PM_880_005	**Reference Drawings**	XXXX880
Mechanical Personnel	1	**Electrical Personnel**	0
Duration	5’	**Frequency**	3000 Hours
Machine Status	OFF	**Interruptible Task**	NO
Specific Tools	Maintenance Equipment		

ISO Safety Symbols


Safety Padlock


Safety Shoes


Safety Glasses


Safety Gloves


Safety Vest


Safety Clothes

1. SUMMARY

Step	Description
1	Machine Disconnection
2	Hydraulic Filter Element Disassembly
3	Hydraulic Filter Element Assembly
4	Machine Connection

2. PRECAUTIONS

BEFORE STARTING ANY MAINTENANCE OPERATION ON THE MACHINE, BEAR IN MIND ALL THE SAFETY INDICATIONS DESCRIBED ON THE **SERVICE MANUAL AND THE ECPL PLACARD**

WHENEVER A MAINTENANCE TASK NEEDS TO BE CONDUCTED, THE OPERATOR OR THE MAINTENANCE PERSONNEL MUST ENSURE THAT ONLY THEM CAN OPERATE THE MACHINE IN ACCORDANCE TO THE SAFETY STANDARDS AND APPROVED WORK PROCEDURES

ENSURE THAT ALL THE MATERIALS AND SPARE PARTS ARE THROWN AWAY WITH SAFETY AND RESPECTFULLY WITH THE ENVIRONMENT

STRICTLY OBSERVE THE ENVIRONMENTAL PROTECTION RULES AND STANDARDS ESTABLISHED BY THE LAW BEFORE ELIMINATING USED OR SPILLED OIL

TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS SUCH AS:

- CUTS PRODUCES BY SHARP EDGES OR CHIPS
- PROJECTION OF PARTICLES
- BURNS FROM HOT COMPONENTS
- FALLS AT THE SAME / DIFFERENT LEVEL
- POSSIBLE FALLS OF HEAVY LOADS IN SUSPENSION

3. MACHINE DISCONNECTION

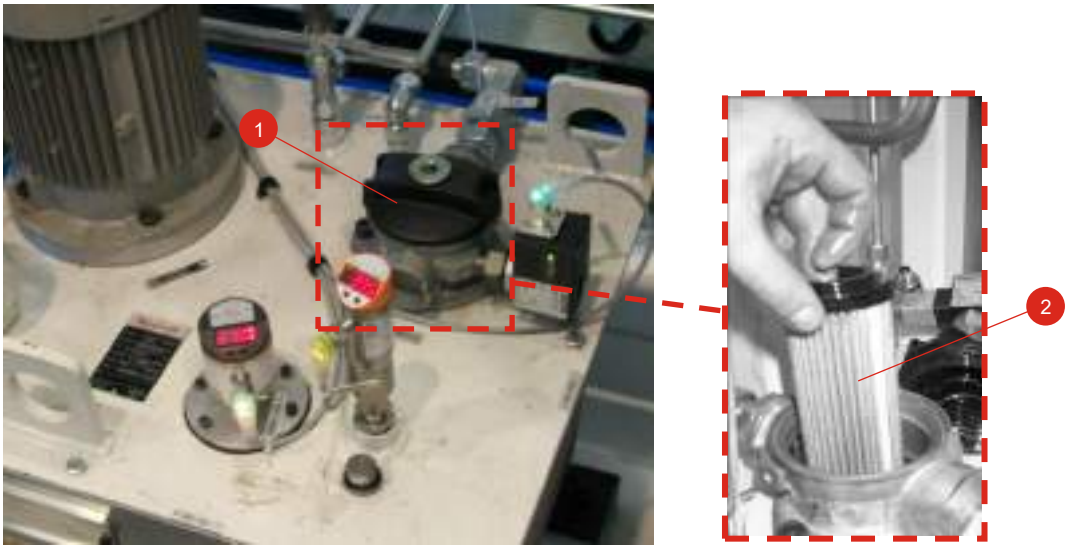
1	Clean and prepare the area where the maintenance task is going to take place.
2	Switch off the machine (Refer to the Service Manual).

WHENEVER A MAINTENANCE TASK NEEDS TO BE CONDUCTED, THE OPERATOR OR THE MAINTENANCE PERSONNEL MUST ENSURE THAT ONLY THEM CAN OPERATE THE MACHINE IN ACCORDANCE TO THE SAFETY STANDARDS AND APPROVED WORK PROCEDURES

AFTER DISCONNECTING THE MAIN POWER SWITCH, WAIT AT LEAST 5 MINUTES BEFORE CARRYING ANY MAINTENANCE WORK ON THE ELECTRICAL SYSTEM AND CHECK THAT THERE IS NO RESIDUAL PRESSURE ON THE FLUID LINES CHECKING THE PRESSURE GAUGES AND PRESSURE SWITCHES.

4. PROCEDURE DESCRIPTION: HYDRAULIC FILTER ELEMENT DISASSEMBLY (40L)

3	Disassemble the Electrical Connections of the Hydraulic Filter.
4	Disassemble the Filter Cover (Pos.1).
5	Disassemble the Filtering Element (Pos. 2)



CUTS PRODUCES BY SHARP EDGES OR CHIPS MAY OCCUR. TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS

BURNS FROM HOT COMPONENTS MAY OCCUR. TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS

5. PROCEDURE DESCRIPTION: HYDRAULIC FILTER ELEMENT ASSEMBLY

6	Replace the Hydraulic Filter Element for new one.
7	To assemble the Hydraulic Filter Element, follow the disassembly steps in reverse order.

6. MACHINE CONNECTION

8	Switch on the machine (Refer to the Service Manual).

REPLACEMENT OF THE HYDRAULIC TANK BREATHER FILTER

File Nº	PM_880_006	**Reference Drawings**	XXXX880
Mechanical Personnel	1	**Electrical Personnel**	0
Duration	15’	**Frequency**	Yearly
Machine Status	OFF	**Interruptible Task**	NO
Specific Tools	Maintenance Equipment		

ISO Safety Symbols


Safety Padlock


Safety Shoes


Safety Glasses


Safety Gloves


Safety Vest


Safety Clothes

1. SUMMARY

Step	Description
1	Machine Disconnection
2	Hydraulic Breather Filter Disassembly
3	Hydraulic Breather Filter Replacement and Assembly
4	Machine Connection

2. PRECAUTIONS

BEFORE STARTING ANY MAINTENANCE OPERATION ON THE MACHINE, BEAR IN MIND ALL THE SAFETY INDICATIONS DESCRIBED ON THE **SERVICE MANUAL AND THE ECPL PLACARD**

WHENEVER A MAINTENANCE TASK NEEDS TO BE CONDUCTED, THE OPERATOR OR THE MAINTENANCE PERSONNEL MUST ENSURE THAT ONLY THEM CAN OPERATE THE MACHINE IN ACCORDANCE TO THE SAFETY STANDARDS AND APPROVED WORK PROCEDURES

ENSURE THAT ALL THE MATERIALS AND SPARE PARTS ARE THROWN AWAY WITH SAFETY AND RESPECTFULLY WITH THE ENVIRONMENT

STRICTLY OBSERVE THE ENVIRONMENTAL PROTECTION RULES AND STANDARDS ESTABLISHED BY THE LAW BEFORE ELIMINATING USED OR SPILLED OIL

TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS SUCH AS:

- CUTS PRODUCES BY SHARP EDGES OR CHIPS
- PROJECTION OF PARTICLES
- BURNS FROM HOT COMPONENTS
- FALLS AT THE SAME / DIFFERENT LEVEL
- POSSIBLE FALLS OF HEAVY LOADS IN SUSPENSION

3. MACHINE DISCONNECTION

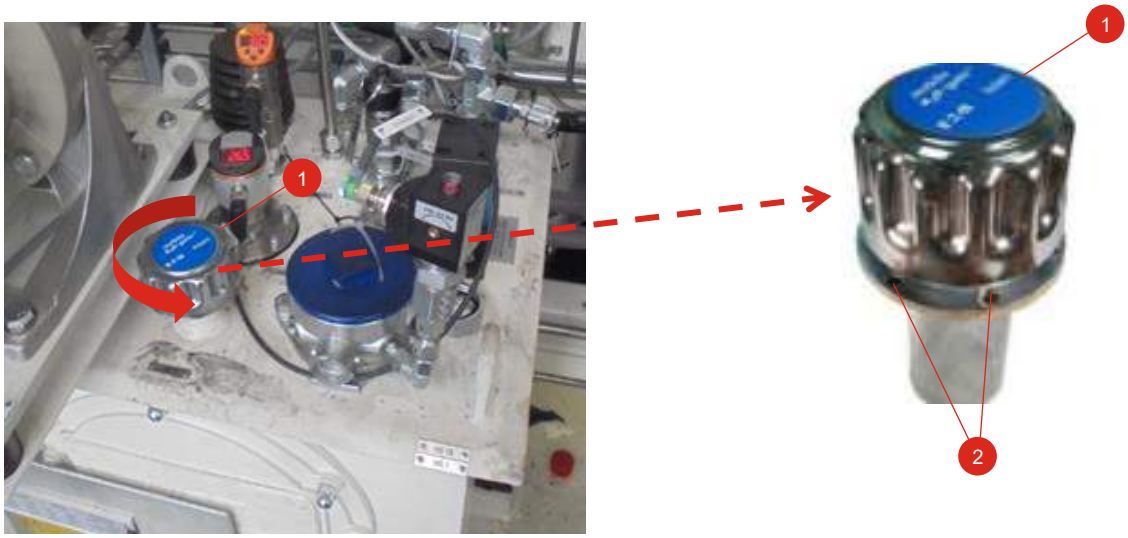
1	Clean and prepare the area where the maintenance task is going to take place.
2	Switch off the machine (Refer to the Service Manual).

WHENEVER A MAINTENANCE TASK NEEDS TO BE CONDUCTED, THE OPERATOR OR THE MAINTENANCE PERSONNEL MUST ENSURE THAT ONLY THEM CAN OPERATE THE MACHINE IN ACCORDANCE TO THE SAFETY STANDARDS AND APPROVED WORK PROCEDURES

AFTER DISCONNECTING THE MAIN POWER SWITCH, WAIT AT LEAST 5 MINUTES BEFORE CARRYING ANY MAINTENANCE WORK ON THE ELECTRICAL SYSTEM AND CHECK THAT THERE IS NO RESIDUAL PRESSURE ON THE FLUID LINES CHECKING THE PRESSURE GAUGES AND PRESSURE SWITCHES.

4. PROCEDURE DESCRIPTION: HYDRAULIC BREATHER FILTER DISASSEMBLY

3	Disassemble the Screws fixing the Breather Filter to the Hydraulic Tank (Pos.2).
4	Turn the Breather Filter and disassemble it (Pos. 1).



CUTS PRODUCES BY SHARP EDGES OR CHIPS MAY OCCUR. TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS

BURNS FROM HOT COMPONENTS MAY OCCUR. TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS

5. PROCEDURE DESCRIPTION: HYDRAULIC BREATHER FILTER REPLACEMENT AND ASSEMBLY

5	Replace the Hydraulic Breather Filter for new one.
6	To assemble the Hydraulic Breather Filter, follow the disassembly steps in reverse order.

6. MACHINE CONNECTION

7	Switch on the machine (Refer to the Service Manual).

CONTROL OF THE PNEUMATIC GENERAL LINE PRESSURE

File Nº	PM_950_001	**Reference Drawings**	XXXX950
Mechanical Personnel	1	**Electrical Personnel**	0
Duration	5’	**Frequency**	Weekly
Machine Status	ON	**Interruptible Task**	YES
Specific Tools	-		

ISO Safety Symbols


Safety Shoes


Safety Glasses


Safety Gloves


Safety Vest


Safety Clothes

1. SUMMARY

Step	Description
1	Pneumatic General Line Pressure Check (FESTO)
2	Pneumatic General Line Pressure Check (SMC)

2. PRECAUTIONS

BEFORE STARTING ANY MAINTENANCE OPERATION ON THE MACHINE, BEAR IN MIND ALL THE SAFETY INDICATIONS DESCRIBED ON THE **SERVICE MANUAL AND THE ECPL PLACARD**

WHENEVER A MAINTENANCE TASK NEEDS TO BE CONDUCTED, THE OPERATOR OR THE MAINTENANCE PERSONNEL MUST ENSURE THAT ONLY THEM CAN OPERATE THE MACHINE IN ACCORDANCE TO THE SAFETY STANDARDS AND APPROVED WORK PROCEDURES

ENSURE THAT ALL THE MATERIALS AND SPARE PARTS ARE THROWN AWAY WITH SAFETY AND RESPECTFULLY WITH THE ENVIRONMENT

STRICTLY OBSERVE THE ENVIRONMENTAL PROTECTION RULES AND STANDARDS ESTABLISHED BY THE LAW BEFORE ELIMINATING USED OR SPILLED OIL

TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS SUCH AS:

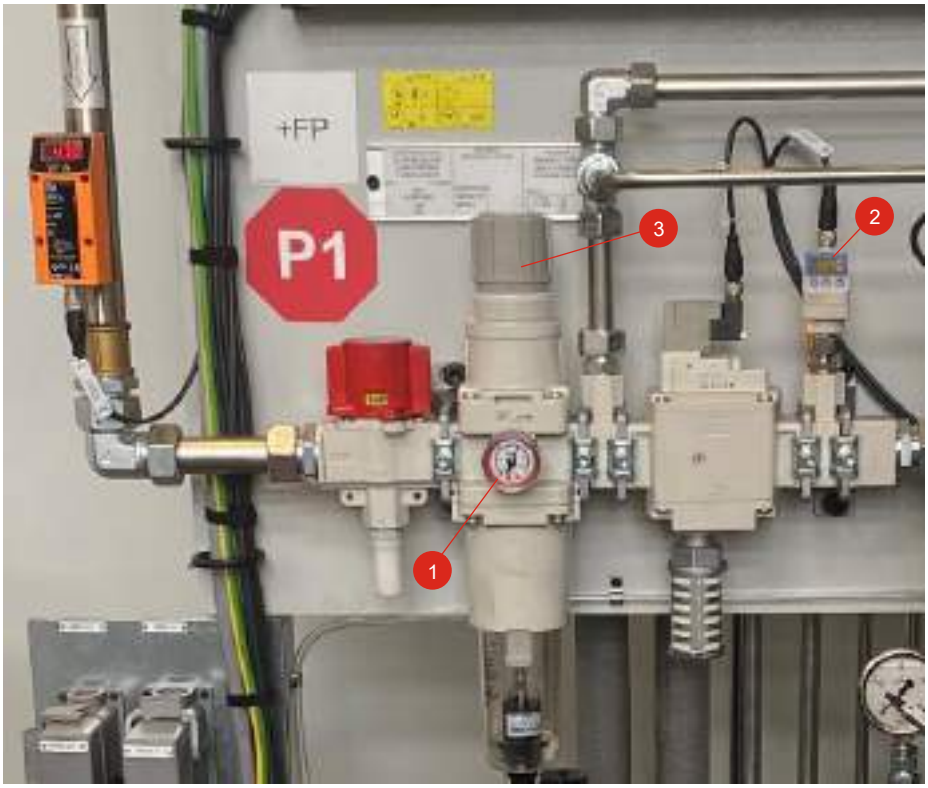
- CUTS PRODUCES BY SHARP EDGES OR CHIPS
- PROJECTION OF PARTICLES
- BURNS FROM HOT COMPONENTS
- FALLS AT THE SAME / DIFFERENT LEVEL
- POSSIBLE FALLS OF HEAVY LOADS IN SUSPENSION

3. PROCEDURE DESCRIPTION: PNEUMATIC GENERAL LINE PRESSURE CHECK (FESTO)

1	Clean and prepare the area where the maintenance task is going to take place.
2	Check the pressure in the Pneumatic System with the pressure gauge (Pos. 1) or pressure switch.(Pos. 2)
3	If the pressure is under / over the specified pressure, adjust it with the Regulator (Pos.3)

4. PROCEDURE DESCRIPTION: PNEUMATIC GENERAL LINE PRESSURE CHECK (SMC)

4	Clean and prepare the area where the maintenance task is going to take place.
5	Check the pressure in the Pneumatic System with the pressure gauge (Pos. 1) or pressure switch.(Pos. 2)
6	If the pressure is under / over the specified pressure, adjust it with the Regulator (Pos.3)



CONTROL OF THE PNEUMATIC PRESSURISATION LINE PRESSURE

File Nº	PM_950_002	**Reference Drawings**	XXXX950
Mechanical Personnel	1	**Electrical Personnel**	0
Duration	5’	**Frequency**	Weekly
Machine Status	ON	**Interruptible Task**	YES
Specific Tools	-		

ISO Safety Symbols


Safety Shoes


Safety Glasses


Safety Gloves


Safety Vest


Safety Clothes

1. SUMMARY

Step	Description
1	Pneumatic Pressurization Line Pressure Check (FESTO)
2	Pneumatic Pressurization Line Pressure Check (SMC)

2. PRECAUTIONS

BEFORE STARTING ANY MAINTENANCE OPERATION ON THE MACHINE, BEAR IN MIND ALL THE SAFETY INDICATIONS DESCRIBED ON THE **SERVICE MANUAL AND THE ECPL PLACARD**

WHENEVER A MAINTENANCE TASK NEEDS TO BE CONDUCTED, THE OPERATOR OR THE MAINTENANCE PERSONNEL MUST ENSURE THAT ONLY THEM CAN OPERATE THE MACHINE IN ACCORDANCE TO THE SAFETY STANDARDS AND APPROVED WORK PROCEDURES

ENSURE THAT ALL THE MATERIALS AND SPARE PARTS ARE THROWN AWAY WITH SAFETY AND RESPECTFULLY WITH THE ENVIRONMENT

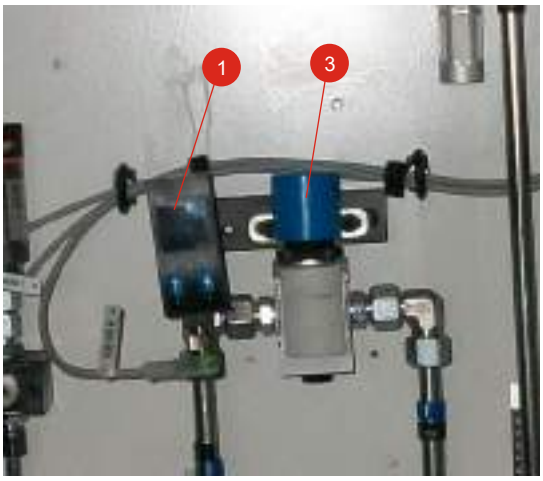
STRICTLY OBSERVE THE ENVIRONMENTAL PROTECTION RULES AND STANDARDS ESTABLISHED BY THE LAW BEFORE ELIMINATING USED OR SPILLED OIL

TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS SUCH AS:

- CUTS PRODUCES BY SHARP EDGES OR CHIPS
- PROJECTION OF PARTICLES
- BURNS FROM HOT COMPONENTS
- FALLS AT THE SAME / DIFFERENT LEVEL
- POSSIBLE FALLS OF HEAVY LOADS IN SUSPENSION

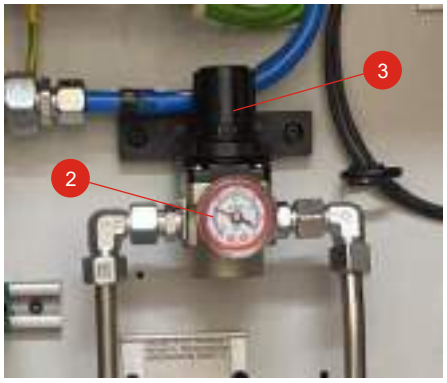
3. PROCEDURE DESCRIPTION: PNEUMATIC PRESSURIZATION LINE PRESSURE CHECK (FESTO)

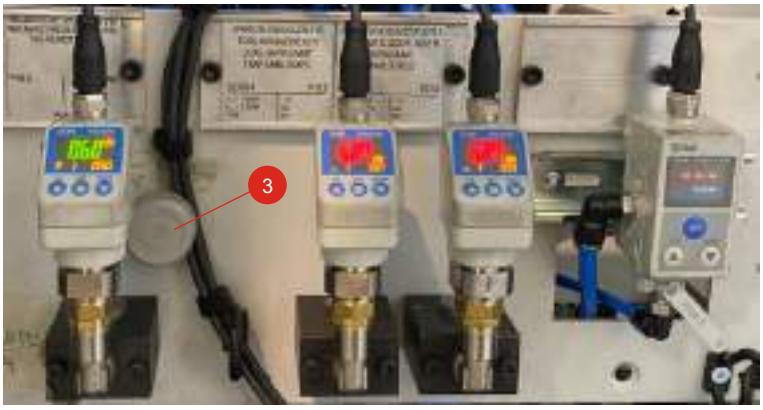
1	Clean and prepare the area where the maintenance task is going to take place.
2	Check the pressure on the Pressure Switches (Pos.1) or Pressure Gauges (Pos.2) for the following Pneumatic Lines: ▪ Rotary Indexing Table ▪ Linear Scale ▪ Work Spindle
3	If the pressure is under / over the specified pressure for the line, adjust it with the Regulator (Pos.3)



4. PROCEDURE DESCRIPTION: PNEUMATIC PRESSURIZATION LINE PRESSURE CHECK (SMC)

4	Clean and prepare the area where the maintenance task is going to take place.
5	Check the pressure on the Pressure Switches (Pos.1) or Pressure Gauges (Pos.2) for the following Pneumatic Lines: ▪ Rotary Indexing Table ▪ Linear Scale ▪ Work Spindle
6	If the pressure is under / over the specified pressure for the line, adjust it with the Regulator (Pos.3)





REPLACEMENT OF THE PNEUMATIC LINE FILTER

File Nº	PM_950_003	**Reference Drawings**	XXXX950
Mechanical Personnel	1	**Electrical Personnel**	0
Duration	15’	**Frequency**	3000 Hours
Machine Status	OFF	**Interruptible Task**	NO
Specific Tools	Maintenance Equipment		

ISO Safety Symbols


Safety Padlock


Safety Shoes


Safety Glasses


Safety Gloves


Safety Vest


Safety Clothes

1. SUMMARY

Step	Description
1	Machine Disconnection
2	Pneumatic Line Filter Disassembly (FESTO)
3	Pneumatic Line Filter Disassembly (SMC)
4	Pneumatic Line Filter Replacement and Assembly
5	Machine Connection

2. PRECAUTIONS

BEFORE STARTING ANY MAINTENANCE OPERATION ON THE MACHINE, BEAR IN MIND ALL THE SAFETY INDICATIONS DESCRIBED ON THE **SERVICE MANUAL AND THE ECPL PLACARD**

WHENEVER A MAINTENANCE TASK NEEDS TO BE CONDUCTED, THE OPERATOR OR THE MAINTENANCE PERSONNEL MUST ENSURE THAT ONLY THEM CAN OPERATE THE MACHINE IN ACCORDANCE TO THE SAFETY STANDARDS AND APPROVED WORK PROCEDURES

ENSURE THAT ALL THE MATERIALS AND SPARE PARTS ARE THROWN AWAY WITH SAFETY AND RESPECTFULLY WITH THE ENVIRONMENT

STRICTLY OBSERVE THE ENVIRONMENTAL PROTECTION RULES AND STANDARDS ESTABLISHED BY THE LAW BEFORE ELIMINATING USED OR SPILLED OIL

TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS SUCH AS:

- CUTS PRODUCES BY SHARP EDGES OR CHIPS
- PROJECTION OF PARTICLES
- BURNS FROM HOT COMPONENTS
- FALLS AT THE SAME / DIFFERENT LEVEL
- POSSIBLE FALLS OF HEAVY LOADS IN SUSPENSION

3. MACHINE DISCONNECTION

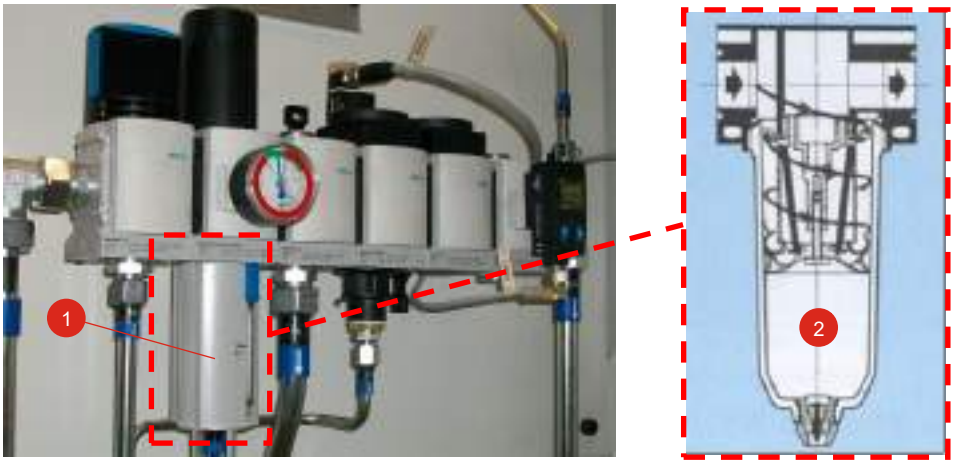
1	Clean and prepare the area where the maintenance task is going to take place.
2	Switch off the machine (Refer to the Service Manual).

WHENEVER A MAINTENANCE TASK NEEDS TO BE CONDUCTED, THE OPERATOR OR THE MAINTENANCE PERSONNEL MUST ENSURE THAT ONLY THEM CAN OPERATE THE MACHINE IN ACCORDANCE TO THE SAFETY STANDARDS AND APPROVED WORK PROCEDURES

AFTER DISCONNECTING THE MAIN POWER SWITCH, WAIT AT LEAST 5 MINUTES BEFORE CARRYING ANY MAINTENANCE WORK ON THE ELECTRICAL SYSTEM AND CHECK THAT THERE IS NO RESIDUAL PRESSURE ON THE FLUID LINES CHECKING THE PRESSURE GAUGES AND PRESSURE SWITCHES.

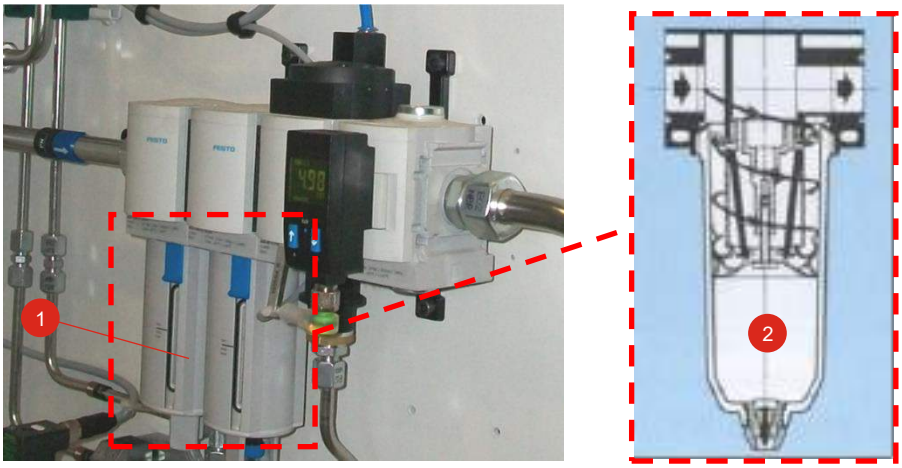
4. PROCEDURE DESCRIPTION: PNEUMATIC LINE FILTER DISASSEMBLY (FESTO)

3	Unscrew the filter cartridge (Pos.1).
4	Disassemble the Filter Element (Pos.2)



CUTS PRODUCES BY SHARP EDGES OR CHIPS MAY OCCUR. TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS

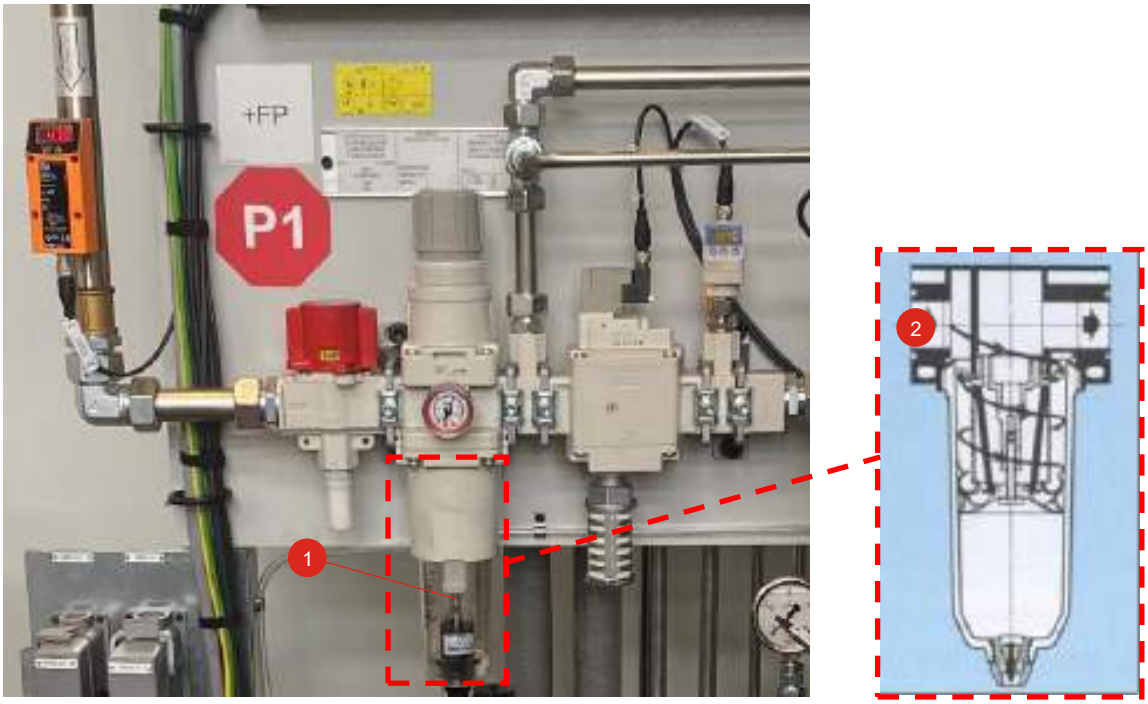
5	Unscrew the filter cartridge (Pos.1).
6	Disassemble the Filter Element (Pos.2)



CUTS PRODUCES BY SHARP EDGES OR CHIPS MAY OCCUR. TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS

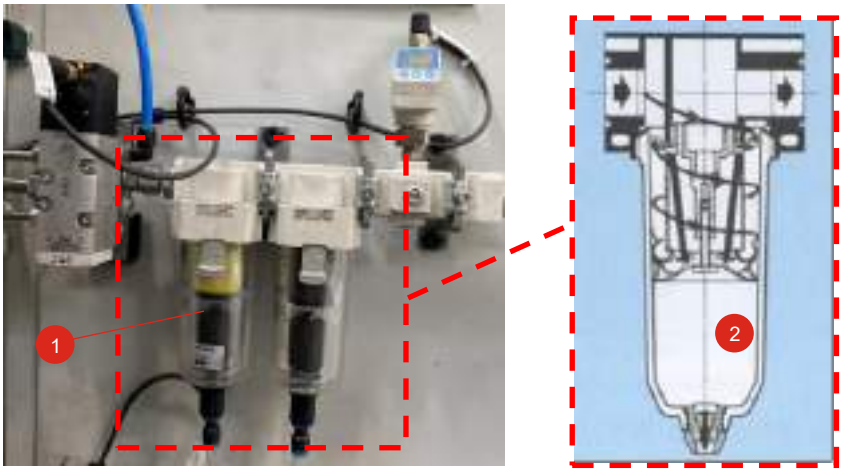
5. PROCEDURE DESCRIPTION: PNEUMATIC LINE FILTER DISASSEMBLY (SMC)

7	Unscrew the filter cartridge (Pos.1).
8	Disassemble the Filter Element (Pos.2)



CUTS PRODUCES BY SHARP EDGES OR CHIPS MAY OCCUR. TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS

9	Unscrew the filter cartridge (Pos.1).
10	Disassemble the Filter Element (Pos.2)



CUTS PRODUCES BY SHARP EDGES OR CHIPS MAY OCCUR. TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS

6. PROCEDURE DESCRIPTION: PNEUMATIC LINE FILTER REPLACEMENT AND ASSEMBLY

11	Replace the Pneumatic Line Filters for new ones.
12	To assemble the Pneumatic Line Filters, follow the disassembly steps in reverse order.

7. MACHINE CONNECTION

13	Switch on the machine (Refer to the Service Manual).

CONTROL OF THE PNEUMATIC SYSTEM FLOW

File Nº	PM_950_004	**Reference Drawings**	XXXX950
Mechanical Personnel	1	**Electrical Personnel**	0
Duration	2’	**Frequency**	Weekly
Machine Status	ON	**Interruptible Task**	YES
Specific Tools	-		

ISO Safety Symbols


Safety Shoes


Safety Glasses


Safety Gloves


Safety Vest


Safety Clothes

1. SUMMARY

Step	Description
1	Pneumatic System Flow Control

2. PRECAUTIONS

BEFORE STARTING ANY MAINTENANCE OPERATION ON THE MACHINE, BEAR IN MIND ALL THE SAFETY INDICATIONS DESCRIBED ON THE **SERVICE MANUAL AND THE ECPL PLACARD**

WHENEVER A MAINTENANCE TASK NEEDS TO BE CONDUCTED, THE OPERATOR OR THE MAINTENANCE PERSONNEL MUST ENSURE THAT ONLY THEM CAN OPERATE THE MACHINE IN ACCORDANCE TO THE SAFETY STANDARDS AND APPROVED WORK PROCEDURES

ENSURE THAT ALL THE MATERIALS AND SPARE PARTS ARE THROWN AWAY WITH SAFETY AND RESPECTFULLY WITH THE ENVIRONMENT

STRICTLY OBSERVE THE ENVIRONMENTAL PROTECTION RULES AND STANDARDS ESTABLISHED BY THE LAW BEFORE ELIMINATING USED OR SPILLED OIL

TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS SUCH AS:

- CUTS PRODUCES BY SHARP EDGES OR CHIPS
- PROJECTION OF PARTICLES
- BURNS FROM HOT COMPONENTS
- FALLS AT THE SAME / DIFFERENT LEVEL
- POSSIBLE FALLS OF HEAVY LOADS IN SUSPENSION

3. PROCEDURE DESCRIPTION: PNEUMATIC SYSTEM FLOW CONTROL

1	Check the flow to pneumatic line with the flowmeter. The flow indicated should be between the values defined in the Pneumatic diagrams.

IN CASE THE FLOW VALUE DIFFERS FROM THE ONE STABLISHED

2	▪ Check that don't have leaks in pneumatic line. ▪ Check that the air pressure is enough. ▪ Check that the flow sensor is not damaged.

CONTROL OF THE CENTRALIZED LUBRICATION SYSTEM PRESSURE

File Nº	PM_980_001	**Reference Drawings**	XXXX980
Mechanical Personnel	1	**Electrical Personnel**	0
Duration	5’	**Frequency**	Daily
Machine Status	ON	**Interruptible Task**	YES
Specific Tools	-		

ISO Safety Symbols


Safety Shoes


Safety Glasses


Safety Gloves


Safety Vest


Safety Clothes

1. SUMMARY

Step	Description
1	Lubrication Line Pressure Check

2. PRECAUTIONS

BEFORE STARTING ANY MAINTENANCE OPERATION ON THE MACHINE, BEAR IN MIND ALL THE SAFETY INDICATIONS DESCRIBED ON THE **SERVICE MANUAL AND THE ECPL PLACARD**

WHENEVER A MAINTENANCE TASK NEEDS TO BE CONDUCTED, THE OPERATOR OR THE MAINTENANCE PERSONNEL MUST ENSURE THAT ONLY THEM CAN OPERATE THE MACHINE IN ACCORDANCE TO THE SAFETY STANDARDS AND APPROVED WORK PROCEDURES

ENSURE THAT ALL THE MATERIALS AND SPARE PARTS ARE THROWN AWAY WITH SAFETY AND RESPECTFULLY WITH THE ENVIRONMENT

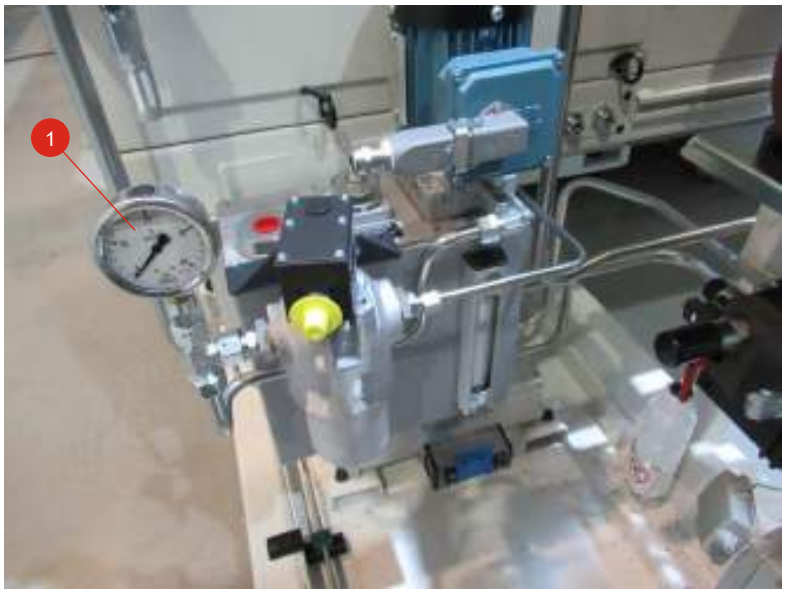
STRICTLY OBSERVE THE ENVIRONMENTAL PROTECTION RULES AND STANDARDS ESTABLISHED BY THE LAW BEFORE ELIMINATING USED OR SPILLED OIL

TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS SUCH AS:

- CUTS PRODUCES BY SHARP EDGES OR CHIPS
- PROJECTION OF PARTICLES
- BURNS FROM HOT COMPONENTS
- FALLS AT THE SAME / DIFFERENT LEVEL
- POSSIBLE FALLS OF HEAVY LOADS IN SUSPENSION

3. PROCEDURE DESCRIPTION: LUBRICATION LINE PRESSURE CHECK

1	Clean and prepare the area where the maintenance task is going to take place.
2	Check the pressure in the Lubrication System with the Pressure Gauge (Pos. 1) or Pressure Switch.(Pos. 2)



CONTROL OF THE CENTRALIZED LUBRICATION SYSTEM TANK OIL LEVEL

File Nº	PM_980_002	**Reference Drawings**	XXXX980
Mechanical Personnel	1	**Electrical Personnel**	0
Duration	15’	**Frequency**	200 Hours
Machine Status	OFF	**Interruptible Task**	NO
Specific Tools	Maintenance Equipment		

ISO Safety Symbols


Safety Padlock


Safety Shoes


Safety Glasses


Safety Gloves


Safety Vest


Safety Clothes

1. SUMMARY

Step	Description
1	Centralized Lubrication System Tank Oil Level Control
2	Refill Centralized Lubrication System Tank

2. PRECAUTIONS

BEFORE STARTING ANY MAINTENANCE OPERATION ON THE MACHINE, BEAR IN MIND ALL THE SAFETY INDICATIONS DESCRIBED ON THE **SERVICE MANUAL AND THE ECPL PLACARD**

WHENEVER A MAINTENANCE TASK NEEDS TO BE CONDUCTED, THE OPERATOR OR THE MAINTENANCE PERSONNEL MUST ENSURE THAT ONLY THEM CAN OPERATE THE MACHINE IN ACCORDANCE TO THE SAFETY STANDARDS AND APPROVED WORK PROCEDURES

ENSURE THAT ALL THE MATERIALS AND SPARE PARTS ARE THROWN AWAY WITH SAFETY AND RESPECTFULLY WITH THE ENVIRONMENT

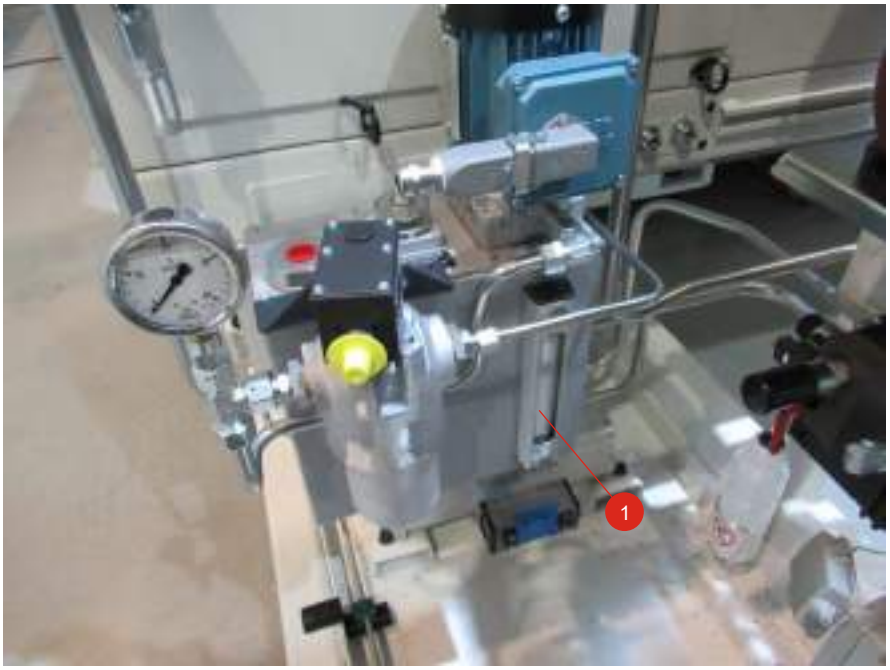
STRICTLY OBSERVE THE ENVIRONMENTAL PROTECTION RULES AND STANDARDS ESTABLISHED BY THE LAW BEFORE ELIMINATING USED OR SPILLED OIL

TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS SUCH AS:

- CUTS PRODUCES BY SHARP EDGES OR CHIPS
- PROJECTION OF PARTICLES
- BURNS FROM HOT COMPONENTS
- FALLS AT THE SAME / DIFFERENT LEVEL
- POSSIBLE FALLS OF HEAVY LOADS IN SUSPENSION

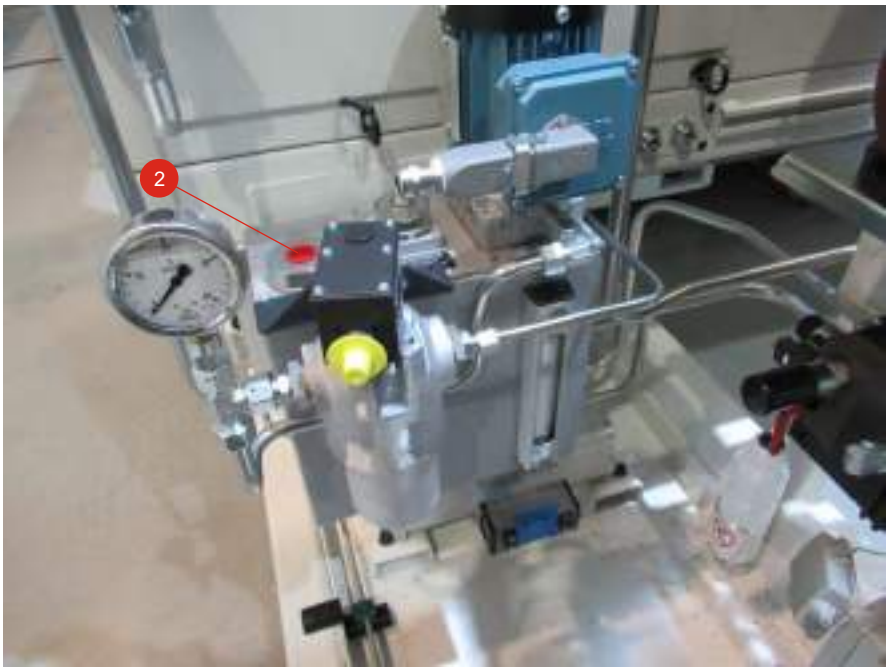
3. PROCEDURE DESCRIPTION: CENTRALIZED LUBRICATION SYSTEM TANK OIL LEVEL CONTROL

1	Clean and prepare the area where the maintenance task is going to take place.
2	Check the Centralized Lubrication oil level in the Level Gauge (Pos.1) and make sure that is not below the minimum level.
3	If the Centralized Lubrication Tank level is low, proceed with the steps below.



4. PROCEDURE DESCRIPTION: REFILL CENTRALISED LUBRICATION SYSTEM TANK

4	Fill the Centralized Lubrication Tank with new oil through the Filling Coupling (Pos.2). (Do not go over the maximum level).



FOR MORE INFORMATION ABOUT OIL AND GREASE REFERENCES TO BE USED IN THE MACHINE, TOGETHER WITH DIFFERENT MANUFACTURERS AND EQUIVALENCES BETWEEN THEM, REFER TO THE ATTACHMENT FOLDER

CLEANING OF THE CENTRALIZED LUBRICATION TANK

File Nº	PM_980_003	**Reference Drawings**	XXXX980
Mechanical Personnel	1	**Electrical Personnel**	0
Duration	60’	**Frequency**	Yearly
Machine Status	OFF	**Interruptible Task**	NO
Specific Tools	Maintenance Equipment		

ISO Safety Symbols


Safety Padlock


Safety Shoes


Safety Glasses


Safety Gloves


Safety Vest


Safety Clothes

1. SUMMARY

Step	Description
1	Machine Disconnection
2	Centralized Lubrication Tank Disassembly and Cleaning
3	Centralized Lubrication Tank Assembly
4	Machine Connection

2. PRECAUTIONS

BEFORE STARTING ANY MAINTENANCE OPERATION ON THE MACHINE, BEAR IN MIND ALL THE SAFETY INDICATIONS DESCRIBED ON THE **SERVICE MANUAL AND THE ECPL PLACARD**

WHENEVER A MAINTENANCE TASK NEEDS TO BE CONDUCTED, THE OPERATOR OR THE MAINTENANCE PERSONNEL MUST ENSURE THAT ONLY THEM CAN OPERATE THE MACHINE IN ACCORDANCE TO THE SAFETY STANDARDS AND APPROVED WORK PROCEDURES

ENSURE THAT ALL THE MATERIALS AND SPARE PARTS ARE THROWN AWAY WITH SAFETY AND RESPECTFULLY WITH THE ENVIRONMENT

STRICTLY OBSERVE THE ENVIRONMENTAL PROTECTION RULES AND STANDARDS ESTABLISHED BY THE LAW BEFORE ELIMINATING USED OR SPILLED OIL

TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS SUCH AS:

- CUTS PRODUCES BY SHARP EDGES OR CHIPS
- PROJECTION OF PARTICLES
- BURNS FROM HOT COMPONENTS
- FALLS AT THE SAME / DIFFERENT LEVEL
- POSSIBLE FALLS OF HEAVY LOADS IN SUSPENSION

3. MACHINE DISCONNECTION

1	Clean and prepare the area where the maintenance task is going to take place.
2	Switch off the machine (Refer to the Service Manual).

WHENEVER A MAINTENANCE TASK NEEDS TO BE CONDUCTED, THE OPERATOR OR THE MAINTENANCE PERSONNEL MUST ENSURE THAT ONLY THEM CAN OPERATE THE MACHINE IN ACCORDANCE TO THE SAFETY STANDARDS AND APPROVED WORK PROCEDURES

AFTER DISCONNECTING THE MAIN POWER SWITCH, WAIT AT LEAST 5 MINUTES BEFORE CARRYING ANY MAINTENANCE WORK ON THE ELECTRICAL SYSTEM AND CHECK THAT THERE IS NO RESIDUAL PRESSURE ON THE FLUID LINES CHECKING THE PRESSURE GAUGES AND PRESSURE SWITCHES.

4. PROCEDURE DESCRIPTION: CENTRALIZED LUBRICATION TANK DISASSEMBLY AND CLEANING

3	Disassemble the Electrical and Fluid Connections from the Centralized Lubrication Tank
4	Secure the Centralized Lubrication Tank before the disassembly.
5	Disassemble the Screws (Pos.2) fixing the Centralized Lubrication Tank to the Machine Fairing.
6	Disassemble the Centralized Lubrication Tank.
7	Disassemble the screws of the Tank Cover (Pos.1)
8	Proceed to clean the tank and ensure that there is not residue left.

BURNS FROM HOT COMPONENTS MAY OCCUR. TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS

POSSIBLE FALLS OF HEAVY LOADS IN SUSPENSION MAY OCCUR. TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS

5. PROCEDURE DESCRIPTION: CENTRALIZED LUBRICATION TANK ASSEMBLY

9	To assemble the Centralized Lubrication Tank, follow the disassembly steps in reverse order.
10	Fill the Centralized Lubrication Tank with new oil through the Filling Coupling. (Do not go over the maximum level).

FOR MORE INFORMATION ABOUT OIL AND GREASE REFERENCES TO BE USED IN THE MACHINE, TOGETHER WITH DIFFERENT MANUFACTURERS AND EQUIVALENCES BETWEEN THEM, REFER TO THE ATTACHMENT FOLDER

6. MACHINE CONNECTION / AXIS REFERENCE PROCEDURES

11	Switch on the machine (Refer to the Service Manual).

CONTROL OF THE CENTRALIZED LUBRICATION PISTON DISTRIBUTORS

File Nº	PM_980_004	**Reference Drawings**	XXXX980
Mechanical Personnel	1	**Electrical Personnel**	0
Duration	30’	**Frequency**	Yearly
Machine Status	OFF	**Interruptible Task**	NO
Specific Tools	-		

ISO Safety Symbols


Safety Padlock


Safety Shoes


Safety Glasses


Safety Gloves


Safety Vest


Safety Clothes

1. SUMMARY

Step	Description
1	Instructions to ensure the correct operation of the distributors
2	Machine Disconnection
3	Centralized Lubrication Piston Distributor Control
4	Machine Connection

2. PRECAUTIONS

BEFORE STARTING ANY MAINTENANCE OPERATION ON THE MACHINE, BEAR IN MIND ALL THE SAFETY INDICATIONS DESCRIBED ON THE **SERVICE MANUAL AND THE ECPL PLACARD**

WHENEVER A MAINTENANCE TASK NEEDS TO BE CONDUCTED, THE OPERATOR OR THE MAINTENANCE PERSONNEL MUST ENSURE THAT ONLY THEM CAN OPERATE THE MACHINE IN ACCORDANCE TO THE SAFETY STANDARDS AND APPROVED WORK PROCEDURES

ENSURE THAT ALL THE MATERIALS AND SPARE PARTS ARE THROWN AWAY WITH SAFETY AND RESPECTFULLY WITH THE ENVIRONMENT

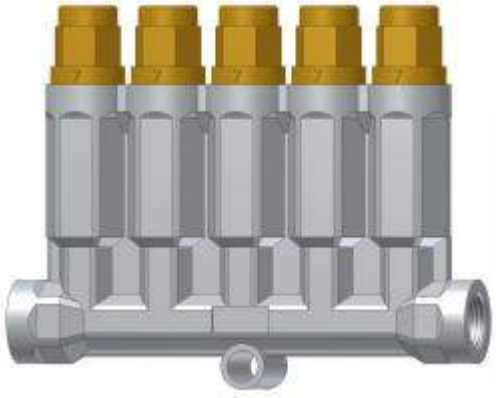
STRICTLY OBSERVE THE ENVIRONMENTAL PROTECTION RULES AND STANDARDS ESTABLISHED BY THE LAW BEFORE ELIMINATING USED OR SPILLED OIL

TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS SUCH AS:

- CUTS PRODUCES BY SHARP EDGES OR CHIPS
- PROJECTION OF PARTICLES
- BURNS FROM HOT COMPONENTS
- FALLS AT THE SAME / DIFFERENT LEVEL
- POSSIBLE FALLS OF HEAVY LOADS IN SUSPENSION

3. PROCEDURE DESCRIPTION: INSTRUCTIONS TO ENSURE THE CORRECT OPERATION OF THE DISTRIBUTORS

1	Change the Centralized Lubrication Filter every 6 month or with a signal of dirty filter.
2	Clean the tank every year.
3	Purge the lubrication line to ensure the liberation of the air that might have got into it while cleaning. To do so, follow the next steps: ▪ Turn on the pump ▪ Remove the air by loosening the end of line pressure switch fitting (The fittings are located on the column panel and on the clamping fixture)
4	Change the distributors every 5 years.



4. MACHINE DISCONNECTION

5	Clean and prepare the area where the maintenance task is going to take place.
6	Unlock and open the safety door to Access the machine. (Refer to the Service Manual)
7	Switch off the machine (Refer to the Service Manual).

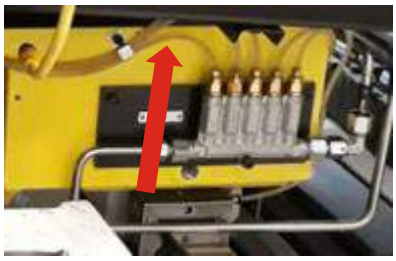
WHENEVER A MAINTENANCE TASK NEEDS TO BE CONDUCTED, THE OPERATOR OR THE MAINTENANCE PERSONNEL MUST ENSURE THAT ONLY THEM CAN OPERATE THE MACHINE IN ACCORDANCE TO THE SAFETY STANDARDS AND APPROVED WORK PROCEDURES

AFTER DISCONNECTING THE MAIN POWER SWITCH, WAIT AT LEAST 5 MINUTES BEFORE CARRYING ANY MAINTENANCE WORK ON THE ELECTRICAL SYSTEM AND CHECK THAT THERE IS NO RESIDUAL PRESSURE ON THE FLUID LINES CHECKING THE PRESSURE GAUGES AND PRESSURE SWITCHES.

5. PROCEDURE DESCRIPTION: CENTRALIZED LUBRICATION PISTON DISTRIBUTOR CONTROL

8	Check all the Piston Distributor connections are tight and there are no leaks.
9	If necessary, adjust the fitting.

10	Ensure that all the distributor hoses are filled with oil and they reach the element to be lubricated.
11	If there is an empty or half-filled hose, replace the distributor for a new one and check the element that has not been lubricated.



6. MACHINE CONNECTION / AXIS REFERENCE PROCEDURES

12	Switch on the machine (Refer to the Service Manual).
13	Close and lock the safety door to access the machine. (Refer to the Service Manual)
14	Carry out greasing cycles.

FOR MORE INFORMATION ABOUT OIL AND GREASE REFERENCES TO BE USED IN THE MACHINE, TOGETHER WITH DIFFERENT MANUFACTURERS AND EQUIVALENCES BETWEEN THEM, REFER TO THE ATTACHMENT FOLDER

REPLACEMENT OF THE CENTRALIZED LUBRICATION SYSTEM FILTER

File Nº	PM_980_005	**Reference Drawings**	XXXX980
Mechanical Personnel	1	**Electrical Personnel**	0
Duration	30’	**Frequency**	3000 Hours
Machine Status	OFF	**Interruptible Task**	NO
Specific Tools	Maintenance Equipment		

ISO Safety Symbols


Safety Padlock


Safety Shoes


Safety Glasses


Safety Gloves


Safety Vest


Safety Clothes

1. SUMMARY

Step	Description
1	Machine Disconnection
2	Centralized Lubrication System Filter Disassembly
3	Centralized Lubrication System Filter Replacement and Assembly
4	Machine Connection

2. PRECAUTIONS

BEFORE STARTING ANY MAINTENANCE OPERATION ON THE MACHINE, BEAR IN MIND ALL THE SAFETY INDICATIONS DESCRIBED ON THE **SERVICE MANUAL AND THE ECPL PLACARD**

WHENEVER A MAINTENANCE TASK NEEDS TO BE CONDUCTED, THE OPERATOR OR THE MAINTENANCE PERSONNEL MUST ENSURE THAT ONLY THEM CAN OPERATE THE MACHINE IN ACCORDANCE TO THE SAFETY STANDARDS AND APPROVED WORK PROCEDURES

ENSURE THAT ALL THE MATERIALS AND SPARE PARTS ARE THROWN AWAY WITH SAFETY AND RESPECTFULLY WITH THE ENVIRONMENT

STRICTLY OBSERVE THE ENVIRONMENTAL PROTECTION RULES AND STANDARDS ESTABLISHED BY THE LAW BEFORE ELIMINATING USED OR SPILLED OIL

TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS SUCH AS:

- CUTS PRODUCES BY SHARP EDGES OR CHIPS
- PROJECTION OF PARTICLES
- BURNS FROM HOT COMPONENTS
- FALLS AT THE SAME / DIFFERENT LEVEL
- POSSIBLE FALLS OF HEAVY LOADS IN SUSPENSION

3. MACHINE DISCONNECTION

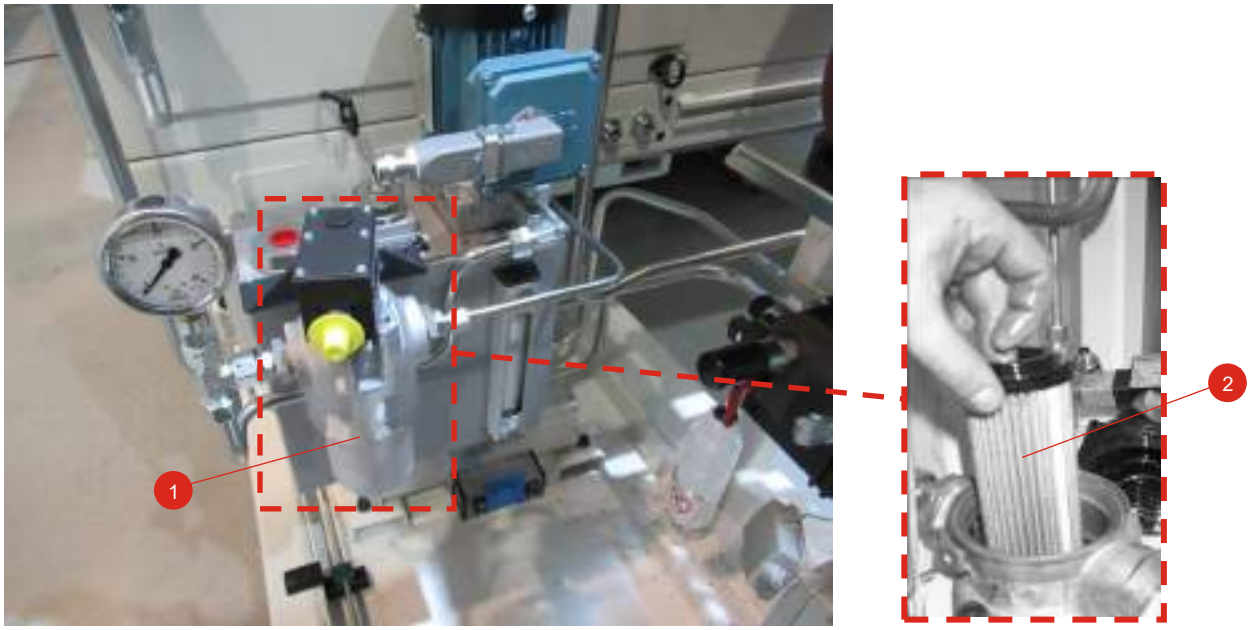
1	Clean and prepare the area where the maintenance task is going to take place.
2	Switch off the machine (Refer to the Service Manual).

WHENEVER A MAINTENANCE TASK NEEDS TO BE CONDUCTED, THE OPERATOR OR THE MAINTENANCE PERSONNEL MUST ENSURE THAT ONLY THEM CAN OPERATE THE MACHINE IN ACCORDANCE TO THE SAFETY STANDARDS AND APPROVED WORK PROCEDURES

AFTER DISCONNECTING THE MAIN POWER SWITCH, WAIT AT LEAST 5 MINUTES BEFORE CARRYING ANY MAINTENANCE WORK ON THE ELECTRICAL SYSTEM AND CHECK THAT THERE IS NO RESIDUAL PRESSURE ON THE FLUID LINES CHECKING THE PRESSURE GAUGES AND PRESSURE SWITCHES.

4. PROCEDURE DESCRIPTION: CENTRALIZED LUBRICATION SYSTEM FILTER DISASSEMBLY

3	Disassemble the Electrical Connections of the Centralized Lubrication Filter.
4	Disassemble the Filter Cover (Pos.1).
5	Extract the Filter Element (Pos.2)



CUTS PRODUCES BY SHARP EDGES OR CHIPS MAY OCCUR. TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS

BURNS FROM HOT COMPONENTS MAY OCCUR. TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS

5. PROCEDURE DESCRIPTION: CENTRALIZED LUBRICATION SYSTEM FILTER REPLACEMENT AND ASSEMBLY

6	Replace the Centralized Lubrication System Filter for a new one.
7	To assemble the Centralized Lubrication System Filter, follow the disassembly steps in reverse order.

6. MACHINE CONNECTION / AXIS REFERENCE PROCEDURES

8	Switch on the machine (Refer to the Service Manual).

CLEANING OF THE ELECTRICAL CABINET FILTER AND CHILLER HEAT EXCHANGER

File Nº	PM_840_001	**Reference Drawings**	XXXX840
Mechanical Personnel	0	**Electrical Personnel**	1
Duration	10’	**Frequency**	Yearly
Machine Status	OFF	**Interruptible Task**	NO
Specific Tools			

ISO Safety Symbols


Safety padlock


Safety shoes


Safety glasses


Safety Gloves


Safety Vest


Safety Clothes

1. SUMMARY

Step	Description
1	Machine Disconnection
2	Electrical Cabinet Filter and Chiller Heat Exchanger Cleaning
3	Machine Connection

2. PRECAUTIONS

BEFORE STARTING ANY MAINTENANCE OPERATION ON THE MACHINE, BEAR IN MIND ALL THE SAFETY INDICATIONS DESCRIBED ON THE **SERVICE MANUAL AND THE ECPL PLACARD**

WHENEVER A MAINTENANCE TASK NEEDS TO BE CONDUCTED, THE OPERATOR OR THE MAINTENANCE PERSONNEL MUST ENSURE THAT ONLY THEM CAN OPERATE THE MACHINE IN ACCORDANCE TO THE SAFETY STANDARDS AND APPROVED WORK PROCEDURES

ENSURE THAT ALL THE MATERIALS AND SPARE PARTS ARE THROWN AWAY WITH SAFETY AND RESPECTFULLY WITH THE ENVIRONMENT

STRICTLY OBSERVE THE ENVIRONMENTAL PROTECTION RULES AND STANDARDS ESTABLISHED BY THE LAW BEFORE ELIMINATING USED OR SPILLED OIL

TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS SUCH AS:

- CUTS PRODUCES BY SHARP EDGES OR CHIPS
- PROJECTION OF PARTICLES
- BURNS FROM HOT COMPONENTS
- FALLS AT THE SAME / DIFFERENT LEVEL
- POSSIBLE FALLS OF HEAVY LOADS IN SUSPENSION

3. MACHINE DISCONNECTION

1	Clean and prepare the area where the maintenance task is going to take place.
2	Unlock and open the safety door to Access the machine. (Refer to the Service Manual)
3	Switch off the machine (Refer to the Service Manual).

WHENEVER A MAINTENANCE TASK NEEDS TO BE CONDUCTED, THE OPERATOR OR THE MAINTENANCE PERSONNEL MUST ENSURE THAT ONLY THEM CAN OPERATE THE MACHINE IN ACCORDANCE TO THE SAFETY LEVELS AND WORK PROCEDURES APPROVED (BA).

AFTER DISCONNECTING THE MAIN POWER SWITCH, WAIT AT LEAST 5 MINUTES BEFORE CARRYING ANY MAINTENANCE WORK ON THE ELECTRICAL SYSTEM AND CHECK THAT THERE IS NO RESIDUAL PRESSURE ON THE FLUID LINES CHECKING THE PRESSURE GAUGES AND PRESSURE SWITCHES.

4. PROCEDURE DESCRIPTION: ELECTRICAL CABINET FILTER AND CHILLER HEAT EXCHANGER CLEANING

4	Access electrical cabinet.
5	Untighten screws at top of housing.

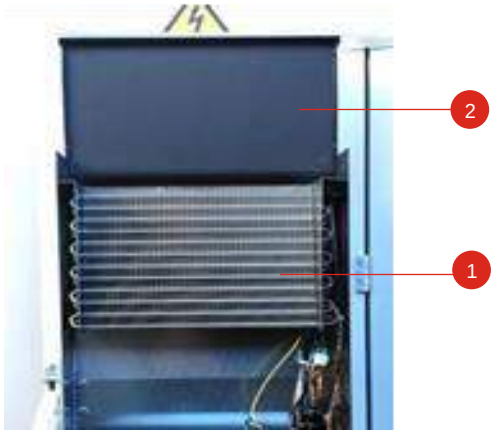
BURNS FROM HOT COMPONENTS MAY OCCUR. TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS

6	Tilt cover enough to access heat exchanger. Do not remove it, to avoid damaging grounding cable and cable of display unit of electrical cabinet.

7	Remove grounding cable and cable of display unit inside cabinet door.

8	Untighten screws at bottom of electrical cabinet, raise cover approx. 15 mm and pull out of slots of base plate.

9	Clean chiller / heat exchanger using a soft brush or compressed air. (Pos.1)
10	Clean filter with water at 40ºC and soft commercial detergent. If filter is dirty with grease or oil, replace it. (pos. 2)



CUTS PRODUCES BY SHARP EDGES OR CHIPS MAY OCCUR. TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS

11	Reassemble cables and hoses and tighten housing.

5. MACHINE CONNECTION / AXIS REFERENCE PROCEDURES

12	Switch on the machine (Refer to the Service Manual).
13	Close and lock the safety door to access the machine. (Refer to the Service Manual)

CLEANING OF THE MOTOR CASING AND FAN

File Nº	PM_840_002	**Reference Drawings**	XXXX840
Mechanical Personnel	0	**Electrical Personnel**	1
Duration	10’	**Frequency**	Yearly
Machine Status	OFF	**Interruptible Task**	NO
Specific Tools			

ISO Safety Symbols


Safety Padlock


Safety Shoes


Safety glasses


Safety Gloves


Safety Vest


Safety Clothes

1. SUMMARY

Step	Description
1	Machine Disconnection
2	Cleaning of the Motor Casing and Fan
3	Machine Connection

2. PRECAUTIONS

BEFORE STARTING ANY MAINTENANCE OPERATION ON THE MACHINE, BEAR IN MIND ALL THE SAFETY INDICATIONS DESCRIBED ON THE **SERVICE MANUAL AND THE ECPL PLACARD**

WHENEVER A MAINTENANCE TASK NEEDS TO BE CONDUCTED, THE OPERATOR OR THE MAINTENANCE PERSONNEL MUST ENSURE THAT ONLY THEM CAN OPERATE THE MACHINE IN ACCORDANCE TO THE SAFETY STANDARDS AND APPROVED WORK PROCEDURES

ENSURE THAT ALL THE MATERIALS AND SPARE PARTS ARE THROWN AWAY WITH SAFETY AND RESPECTFULLY WITH THE ENVIRONMENT

STRICTLY OBSERVE THE ENVIRONMENTAL PROTECTION RULES AND STANDARDS ESTABLISHED BY THE LAW BEFORE ELIMINATING USED OR SPILLED OIL

TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS SUCH AS:

- CUTS PRODUCES BY SHARP EDGES OR CHIPS
- PROJECTION OF PARTICLES
- BURNS FROM HOT COMPONENTS
- FALLS AT THE SAME / DIFFERENT LEVEL
- POSSIBLE FALLS OF HEAVY LOADS IN SUSPENSION

3. MACHINE DISCONNECTION

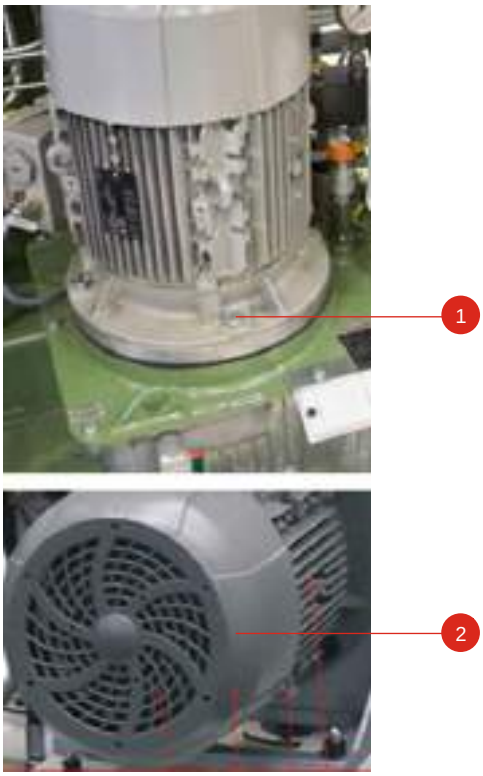
1	Clean and prepare the area where the maintenance task is going to take place.
2	Unlock and open the safety door to Access the machine. (Refer to the Service Manual)
3	Switch off the machine (Refer to the Service Manual).

WHENEVER A MAINTENANCE TASK NEEDS TO BE CONDUCTED, THE OPERATOR OR THE MAINTENANCE PERSONNEL MUST ENSURE THAT ONLY THEM CAN OPERATE THE MACHINE IN ACCORDANCE TO THE SAFETY LEVELS AND WORK PROCEDURES APPROVED (BA).

AFTER DISCONNECTING THE MAIN POWER SWITCH, WAIT AT LEAST 5 MINUTES BEFORE CARRYING ANY MAINTENANCE WORK ON THE ELECTRICAL SYSTEM AND CHECK THAT THERE IS NO RESIDUAL PRESSURE ON THE FLUID LINES CHECKING THE PRESSURE GAUGES AND PRESSURE SWITCHES.

4. PROCEDURE DESCRIPTION: CLEANING OF THE MOTOR CASING AND FAN

4	Check that the openings (air inlets) for ventilation air flow are not clogged in following motors: ▪ Hydraulic motor pump ▪ Lubrication motor pump ▪ Cooling motor pump ▪ Chip conveyor motor.
5	Otherwise, unscrew the fastening screws of the motor housing and remove the housing. (Pos.1)
6	Wash the housing using suitable detergent, dry it and clean the fan. (Pos.2)
7	Clean thoroughly the surface of motor frame as to avoid that any dirt can cause the temperature to increase inside the motors. (Pos.2)
8	Reassemble the housing of the fan. (Pos.1)



BURNS FROM HOT COMPONENTS MAY OCCUR. TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS

CUTS PRODUCES BY SHARP EDGES OR CHIPS MAY OCCUR. TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS

5. MACHINE CONNECTION / AXIS REFERENCE PROCEDURES

9	Switch on the machine (Refer to the Service Manual).
10	Close and lock the safety door to access the machine. (Refer to the Service Manual)

File Nº	PM_840_003	**Reference Drawings**	XXXX840
Mechanical Personnel	0	**Electrical Personnel**	1
Duration	60’	**Frequency**	Yearly
Machine Status	OFF	**Interruptible Task**	NO
Specific Tools			

ISO Safety Symbols


Safety Padlock


Safety Shoes


Safety Gloves


Safety Vest


Safety Clothes

1. SUMMARY

Step	Description of job step
1	Check the Electrical System
2	Machine Disconnection
3	Control of the Electrical Wires
4	Machine Connection

2. PRECAUTIONS

BEFORE STARTING ANY MAINTENANCE OPERATION ON THE MACHINE, BEAR IN MIND ALL THE SAFETY INDICATIONS DESCRIBED ON THE **SERVICE MANUAL AND THE ECPL PLACARD**

WHENEVER A MAINTENANCE TASK NEEDS TO BE CONDUCTED, THE OPERATOR OR THE MAINTENANCE PERSONNEL MUST ENSURE THAT ONLY THEM CAN OPERATE THE MACHINE IN ACCORDANCE TO THE SAFETY STANDARDS AND APPROVED WORK PROCEDURES

ENSURE THAT ALL THE MATERIALS AND SPARE PARTS ARE THROWN AWAY WITH SAFETY AND RESPECTFULLY WITH THE ENVIRONMENT

STRICTLY OBSERVE THE ENVIRONMENTAL PROTECTION RULES AND STANDARDS ESTABLISHED BY THE LAW BEFORE ELIMINATING USED OR SPILLED OIL

TAKE THE NECESSARY PRECAUTIONS TO AVOID RISKS SUCH AS:

- CUTS PRODUCES BY SHARP EDGES OR CHIPS
- PROJECTION OF PARTICLES
- BURNS FROM HOT COMPONENTS
- FALLS AT THE SAME / DIFFERENT LEVEL
- POSSIBLE FALLS OF HEAVY LOADS IN SUSPENSION

3. PROCEDURE DESCRIPTION: CHECK THE ELECTRICAL SYSTEM

1	With machine in normal production cycle, check visually for correct operation of stack light.

2	Execute run-out cycle on HMI screen and wait until end of cycle.
3	Start dry cycle.
4	With machine in dry cycle mode check correct operation of all emergency pushbuttons. Each pushbutton must execute emergency stop correctly.

4. MACHINE DISCONNECTION

5	Clean and prepare the area where the maintenance task is going to take place.
6	Unlock and open the safety door to Access the machine. (Refer to the Service Manual)
7	Switch off the machine (Refer to the Service Manual).

WHENEVER A MAINTENANCE TASK NEEDS TO BE CONDUCTED, THE OPERATOR OR THE MAINTENANCE PERSONNEL MUST ENSURE THAT ONLY THEM CAN OPERATE THE MACHINE IN ACCORDANCE TO THE SAFETY STANDARDS AND APPROVED WORK PROCEDURES

AFTER DISCONNECTING THE MAIN POWER SWITCH, WAIT AT LEAST 5 MINUTES BEFORE CARRYING ANY MAINTENANCE WORK ON THE ELECTRICAL SYSTEM AND CHECK THAT THERE IS NO RESIDUAL PRESSURE ON THE FLUID LINES CHECKING THE PRESSURE GAUGES AND PRESSURE SWITCHES.

5. PROCEDURE DESCRIPTION: CONTROL OF THE ELECTRICAL WIRES

8	Check correct position and flexibility of cables in the cable tray.
9	Check that all the wires are correctly grouped in the cable tray.
10	Check that the coolant or other liquids do not reach the wires.
11	Check the wire connections torque is correct.

9	Switch on machine as per reverse instructions on ECPL placard and lock safety doors.

6. MACHINE CONNECTION / AXIS REFERENCE PROCEDURES

12	Switch on the machine (Refer to the Service Manual).
13	Close and lock the safety door to access the machine. (Refer to the Service Manual)