



PROTEM

A CUT ABOVE THE REST

Operating and Maintenance Manual

PROTEM US40

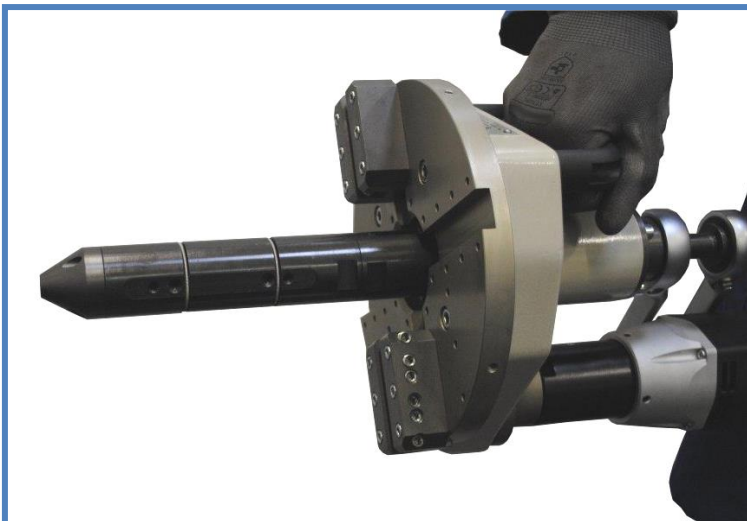


Table of Contents

A. ENGLISH	3
A.1 SAFETY INSTRUCTIONS	3
A.2 DESCRIPTION.....	6
A.2.1 OUTSIDE DIMENSIONS	6
A.2.2 MACHINING FUNCTIONS	6
A.2.3 TECHNICAL SPECIFICATIONS.....	7
A.3 OPERATION.....	8
A.3.1 OPERATING INSTRUCTIONS.....	8
A.4 INFORMATION ON THE FILTER LUBRICATOR	9
A.5 MAINTENANCE.....	10
A.5.1 AIR MOTOR.....	11
A.5.2 ELECTRIC MOTOR.....	11
A.5.3 GEAR DRIVES	11
A.6 TROUBLE SHOOTING.....	12
A.6.1 AIR MOTOR.....	12
A.6.2 ELECTRIC MOTOR.....	12
A.6.3 HYDRAULIC MOTOR.....	12
A.7 STANDARD TOOL BITS.....	13
A.7.1 POSITIONING TOOLS.....	14
A.8 LAYING-UP EXPANSION BLADES	15
A.9 EXPLODED VIEW OF THE MACHINE: 12/14.....	17
A.10 EXPLODED VIEW OF MOTOR.....	22
A.10.1 AIR MOTOR: 11/14	22
A.10.2 AIR MOTOR PARTS LIST: 11/14	23
A.10.3 ELECTRIC MOTOR: 04/07	24
A.10.4 ELECTRIC MOTOR PARTS LIST: 04/07	25
A.11 EXTRA EQUIPMENT AND OPTIONS	26
A.11.1 OPTIONS.....	26
A.12 NOTES.....	47

A. ENGLISH

The equipment described in this operating and maintenance manual contains information that is liable to be modified without prior notice. This is because the equipment's technical characteristics may be improved or be subject to new developments and/or updates.

This document belongs to PROTEM. It may not be modified, duplicated or transmitted to third parties without PROTEM's prior written consent.

The purpose of this document is to provide non-exhaustive details on a number of elementary safety regulations to be put into application every time the unit is used. The contents of this document do not replace Labor Code regulations, which must be observed by all operators.

A.1 SAFETY INSTRUCTIONS



WARNING

INCORRECT or INAPPROPRIATE use of this machine may lead to serious bodily injury!

This operating manual contains important information on the safety regulations that have to be observed. Please read this manual carefully BEFORE using the machine. Keep this manual available for other users so that they may also familiarize themselves with its contents before using the machine. This manual must be kept in an accessible place close to the equipment concerned.

SAFETY INSTRUCTIONS

BEFORE THE EQUIPMENT IS STARTED UP, CLEANED OR SERVICED, PLEASE READ ALL THE PRECAUTIONS AND INSTRUCTIONS CONTAINED IN THIS MANUAL.

WARNING:

Take all necessary precautions for avoiding any risks of shocks or physical injury.

Comply systematically with the following safety instructions:

1. Make sure that your work environment is tidy and has been made safe.
2. **ALWAYS REMOVES ANY WRENCHES OR SPANNERS BEFORE STARTING THE MACHINE**
Always check that any spanners have been removed from the tool before starting it.
3. **ALWAYS KEEP THE WORK STATION AND WORK AREA CLEAN.** To avoid any risk of injury, never leave equipment close to the workstation, on the bench or anywhere in the vicinity of the machine.
4. **NEVER USE THE MACHINE IN A DANGEROUS ENVIRONMENT.** Never use the machine in damp or wet conditions and never expose it to rain.
5. **NEVER LET CHILDREN OR UNAUTHORIZED THIRD PARTIES APPROACH THE WORK AREA** Prevent any person not concerned by the operations to be carried out from entering the work area (especially children). Always disconnect the machine before going away from it and make sure that no-one can enter the work area.
6. **NEVER FORCE THE MACHINE.** Your machine will operate much more efficiently and with a higher machining quality if you use it under the conditions and for the operations for which it was designed.
7. **ALWAYS USE SUITABLE TOOLING.** Never use a tool or an accessory for doing a job for which it has not been designed.



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US40 – Rev Z - 110915			4/47

8. **WEAR SUITABLE CLOTHING.** Never wear loose-fitting clothing or clothing that is too big for you. Never wear a tie, rings, bracelets or any other jewelry. They may get caught up in rotating parts. Always wear protective footwear with steel soles and toe-caps. Wear a safety helmet capable of covering long hair and protecting your head.
9. **ALWAYS WEAR SAFETY GLASSES TO AVOID ANY RISK OF EYE INJURY.** Ordinary glasses do not provide sufficient protection. Also, wear a face-mask for improving safety conditions and an anti-dust mask if the work area is exposed to dust, sand or any other element liable to create discomfort for the operator.
10. **NEVER OVERREACH** Always keep your footing and remain in a stable, well-balanced position when you are using the machine.
11. **ALWAYS SERVICE MACHINES WITH CARE.** Keep tools sharp and clean for maintaining optimal work conditions and operator safety. Always comply with instructions for lubricating and for replacing accessories or spare parts.
12. **ALWAYS DISCONNECT THE MACHINE** before carrying out any maintenance operation or when changing cutting tools or other parts or accessories.
13. **NEVER RISK ANY ACCIDENTAL START-UP WHEN PLUGGING IN THE MACHINE.** Always check that the ON-OFF switch is in the OFF position before connecting the plug to the mains supply.
14. **ONLY USE ACCESSORIES THAT ARE RECOMMENDED FOR THE MACHINE.** Consult the manual for descriptions of recommended tooling. To avoid any risk of injury, only use accessories recommended for this machine.
15. **NEVER STAND ON THE MACHINE** To avoid any risk of serious injury, do not tilt the machine and make sure that you do not touch the cutting tool by accident.
16. **ALWAYS CHECK FOR DAMAGED PARTS ON THE MACHINE BEFORE USING IT.** Always check that all the elements comprising the machine are not damaged before using it. Always check that moving parts are in line, that they are not out of true and that they do not suffer from any other problem liable to prevent them from operating correctly. Always repair or replace any other damaged parts before using the machine.
17. **ALWAYS CHECK THAT THE TOOL HOLDER ROTATES THE RIGHT WAY BEFORE USING THE MACHINE**
18. **NEVER LEAVE THE MACHINE UNATTENDED WHEN IT IS RUNNING. SWITCH THE MACHINE OFF.** Never leave the machine before it has come to a complete standstill. Always disconnect power cables when you are not using the machine.
19. The machine is not designed for doing production runs.
20. Only use PROTEM approved spare parts for carrying out repairs.
21. Always use the right voltage supply for your machine. Incorrect voltage or power supply may cause your machine to operate poorly and cause physical injury or serious material damage.
22. Never try to touch carriages and/or cutting tools before the machine has come to a complete standstill and all energy supplies have been cut off and/or stopped using the emergency stop button (depending on models).
23. **WEARING GLOVES IS COMPULSORY. READ AND COMPLY FULLY WITH THE FOLLOWING INSTRUCTIONS:**
 - Even if you are wearing protective gloves, touching the sharp edge of the cutting tools is strictly prohibited under all circumstances.
 - Even if you are wearing protective gloves, removing chips by hand is strictly prohibited (chips are sharp and burning hot). Use a suitable claw or chip hook for removing chips. Do not forget that you must only remove chips when the machine is at a complete standstill.
24. Always use adequate supports for making sure that long and/or heavy parts are firmly held in a stable position.

Special safety instructions for this machine:

1. Read this manual carefully and familiarize yourself with safety and operating instructions before using the machine.
2. Always wear well-fitting clothing, safety footwear with steel soles, protective glasses and a safety helmet.
3. Always handle the machine with care. If the machine falls or strikes a hard object, it may be distorted or cracked or be damaged in other ways.

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4. Stop the machine immediately if ever you notice anything abnormal.
5. Always check that parts are correctly mounted and clamped in position before using the machine.
6. Always switch the machine off and wait until the cutting tool has stopped rotating before carrying out any replacement, adjustment or other intervention on the machine.
7. Always make a trial run before using the machine on a new type of machining operation.
8. Always handle the machine with care when dismantling or reassembling.
9. Always keep your hands away from the cutting tool.
10. Inspect the machine regularly.
11. If necessary, check that the right cables are used for power supply connections before starting the machine.
12. Warning: Always use suitable means of handling. Using the machine for handling other parts (such as pipes or any other element) is strictly forbidden.

WHAT NOT TO DO

TO GUARANTEE THAT YOUR UNIT IS USED IN COMPLETE SAFETY – COMPLY SYSTEMATICALLY WITH THE FOLLOWING INSTRUCTIONS

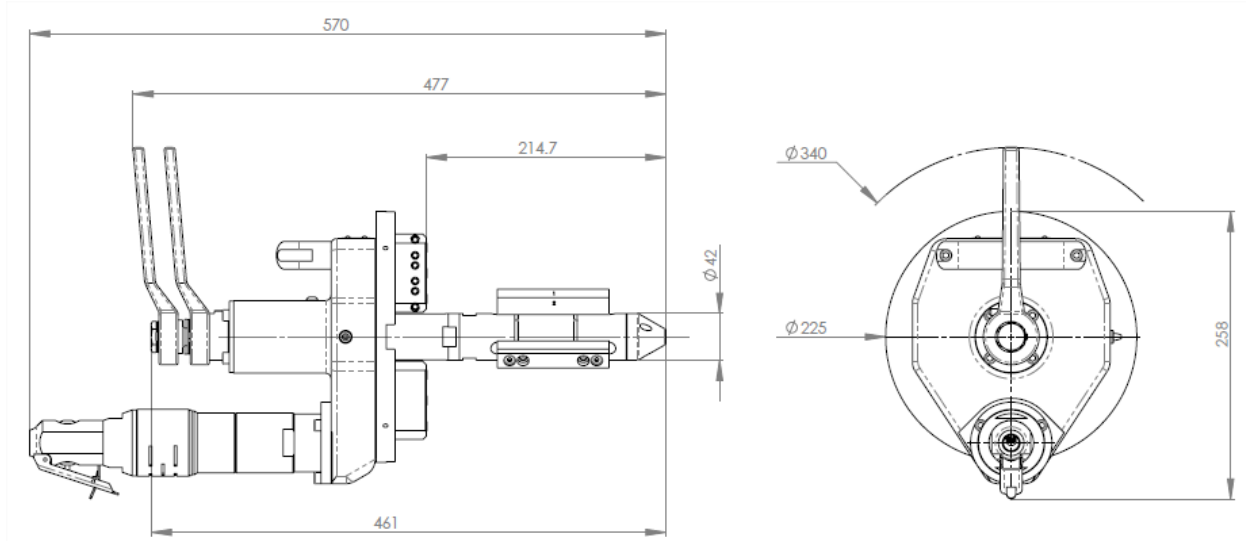
1. Never use the machine before you are sure that the contents of this manual have been understood.
2. Never leave the machine unattended without disconnecting its power supply cable.
3. Never use the machine if you are tired, if you have taken any medical drugs or if you have consumed alcohol.
4. Never use the machine for applications that are not specified in this manual.
5. Never operate the machine when you are wearing loose fitting clothing or clothing that is too large, a tie or jewelry, or without wearing a safety helmet.
6. Never let your hands get close to the cutting tool.
7. Never touch any moving parts, including cutting tools, when the machine is running.
8. Never remove safety devices.
9. Never damage power supply connection cables.
10. When the machine is connected, never try to move it with your finger on the ON-OFF switch.
11. Never use the machine if the ON-OFF switch does not operate correctly.

**KEEP THESE INSTRUCTIONS
AND
MAKE THEM AVAILABLE TO OTHER USERS!**

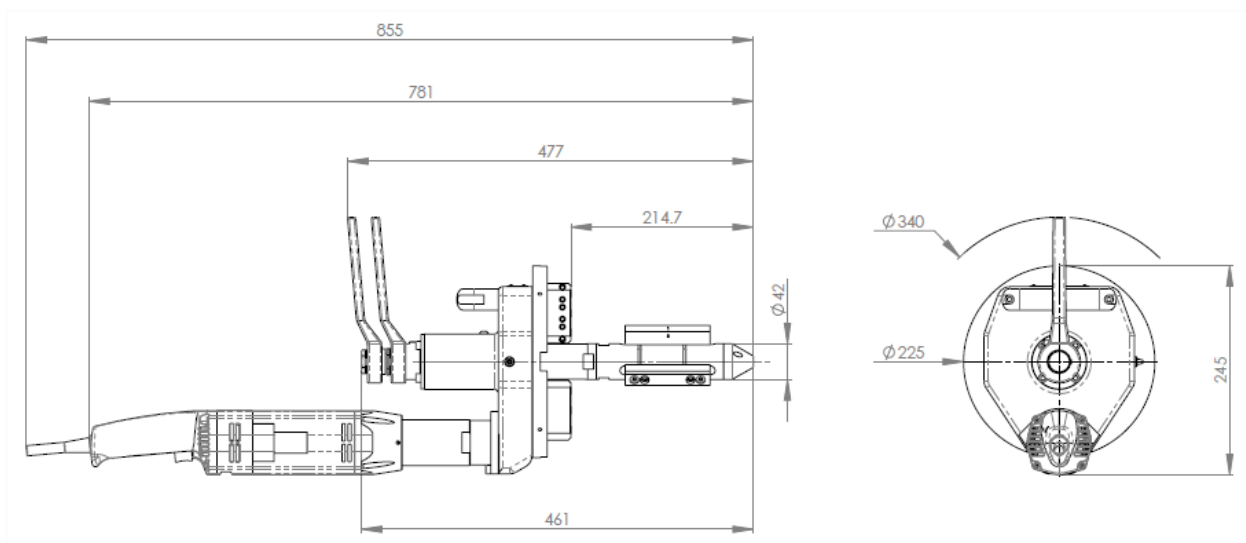
A.2 DESCRIPTION

A.2.1 Outside dimensions

Machine with air motor



Machine with electric motor



A.2.2 Machining functions

This machine is used for pipes in all grades of steel, more especially for:

- Facing
- Beveling:
- Counter-boring
- Deburring
- All types of machining (please consult us)

A.2.3 Technical Specifications

- Weight: Approx. 15 Kg
- Motor: Vane-type air motor
- Power: 0.98 HP (0.73 kW)
- Service pressure: 6 bars **Warning: Never exceed 7 bars!**
- Consumption: 1400 L per min per motor
- Clamping: Manual expansion clamping
- Expansion: 15 mm on the diameter
- Tool holder plate rotation speed:
 - Maximum speed in no-load status: 34 rpm (engine set at 26 rpm in our works).
- Feed movement: 50 mm, manual
- Cutting torque control integrated into the machine
- Length of insertion into the pipe: 157 mm
- Machining capacity: > Ø 43 mm to Ø 219 mm

A.3 OPERATION

A.3.1 Operating instructions



Warning: Important for the warranty to be taken into account

Return the enclosed form (questionnaire) within 30 days of receiving your machine. The warranty can only be applied if this form is returned fully completed.

When machining pipes with thick walls, always position tools on the tool-holder plate opposite each other, so that cutting loads are evenly distributed.

- Check the ID of the pipe to be sure that you are using the right machine.
- Adjust the position of the tool-holders on the plate depending on the diameter of the pipe to be machined. (4 tool-holders at the most on option).
- Choose the right set of expansion blades (see blade laying-up chart).



Warning: Never allow aluminum blades to come into contact with the pipe I.D.

- Place the machine inside the pipe and tighten it in position using the clamping wrench (See photos below).
- Assemble, adjust and fit the tools for the machining operation to be carried out.

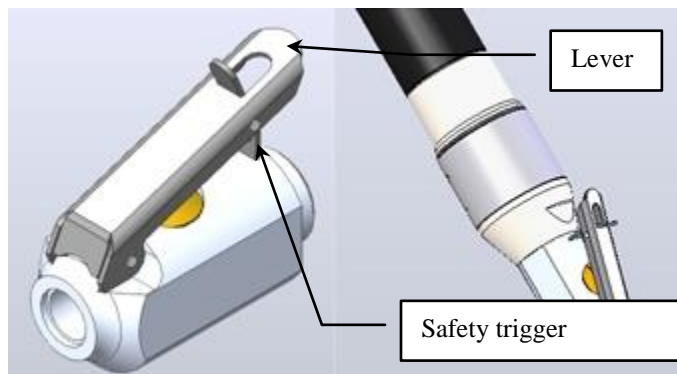


Warning: Always leave clearance between the tool bit(s) and the pipe to avoid causing any damage.

- Connect the machine to a compressed air supply with a pressure of 6 bars and a flow of 1400 liters per min.
- The tools will start rotating by using:
 - For an air motor: the “dead-man” handle fitted on the end of the motor.

Reminder:

The trigger handle is a safety device. The safety trigger is used to prevent any unintended starting of the machine. To start the pneumatic motor(s), unlock the safety trigger and press on the lever. It is strictly forbidden to misuse this device or to remove it and use a different powering device.



- For an electric motor: The start/stop button and the speed adjustment knob for finding the right machining speed.
- Machining can now begin by turning the feed screw using the feed wrench (See photos below).

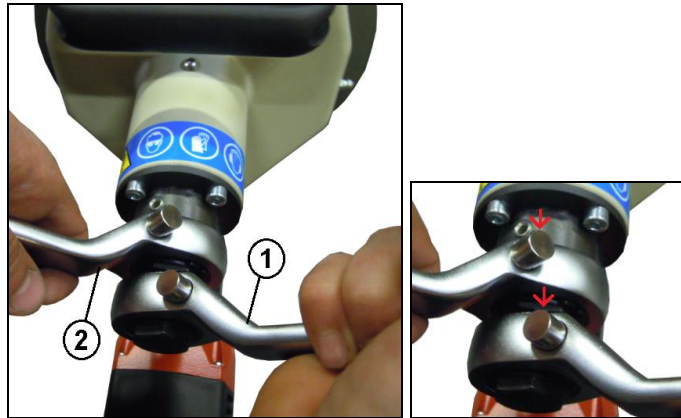


Warning: When machining thick-walled pipes (e.g. 25.4 mm or over) and / or pipes made from hard material (e.g. superduplex, duplex, inconel), the operator must work in several passes and adapt the feed speed to the machine's reactions.

US40: Principles of operation for feed and clamping movements

Position for clamping blades / Position for retracting tools:

- To clamp the machine inside the pipe, turn the clamping wrench (1) clockwise, holding the feed wrench (2) in position at the same time.
- For retracting tool-bits, turn the feed wrench anti-clockwise.



Position for unclamping blades / Position for feeding in tools:

- To unclamp the machine, turn the clamping wrench (1) anticlockwise, holding the feed wrench in position at the same time.
- For feeding in tool-bits (machining) turn the feed wrench clockwise.



A.4 INFORMATION ON THE FILTER LUBRICATOR

The oil level in the filter lubricator must be checked regularly. Before filling with oil, the air supply and air-pressure must be cut off from the filter.

Recommended oil:

- **PROTEM:** Oil for filter lubricator (Ref. F-Lub-0,5-L)
- **TOTAL:** AZOLLA ZS-22
- **ESSO:** ESSTIC 42
- **SHELL:** TELLUS 27
- **BP:** ENERGOL HL 85

The quantity of oil is adjusted by means of the drip-feed unit. We recommend using 3 to 5 drops per minute.

The water separator must be checked regularly and be emptied using the draining system.

Oil and water bowls are to be cleaned with soap and water only. Then, they must be dried with compressed air. Solvents or abrasive cleaning products must not be used as they may lead to bowls being irreparably damaged.

A.5 MAINTENANCE

AFTER SALES SERVICE AND REPAIRS:

Even when used normally, this equipment is liable to require for certain spare or wear parts to be repaired or replaced. To guarantee that only original approved spare parts are used, we invite you to entrust your maintenance operations (other than routine servicing) exclusively to PROTEM.

For all repairs and maintenance operations, only use constructor approved and supplied spare parts.

Note:

The information, specifications and recommendations contained in this manual are liable to be modified without prior notice. Therefore, we invite you to contact our services at least once a year for receiving any manuals that may have been updated or modified.

Systematically clean the machine after every machining operation.

Grease the following parts once a week if the machine is used intensively, or after every 100 hours of operation:

- The machine feed screw,
- The feed nut,
- The crown gear and drive pinion

Recommended grease:

- Esso Beacon EP 2 or equivalent

The machine and its accessories must always be stored and transported in the original crate supplied by PROTEM.

Use of improperly designed tool bits or tool bits that are not manufactured by PROTEM may not only significantly reduce machine performance, but also damage the machine and thereby annul the PROTEM manufacturer's warranty.

The machine's service life may be significantly shortened, if any chips and/or other foreign objects liable to enter inside the machine during machining are not removed by careful cleaning beforehand (with a brush).

A.5.1 Air motor

- Check equipment for the compressed air supply.
- Check that the supply pressure is correct, with a minimum pressure of 6 bars. Otherwise adjust it with the pressure regulator and make sure that the flow is equal to 1400 L per min. per motor.
- Check the oil-level in the lubricator. Top up with special "Pneumatic tooling" oil if necessary.



Note: For the best possible lubrication, make sure that the filter is placed less than 5 meters away from the machine.

If the machine is to remain unused for 24 hours or more after being run on 'wet' air, it is advisable to squirt oil directly into the air motor inlet and run the motor for a few seconds.

This will prevent the rotor blades to become damaged.



IMPORTANT : Using our filter-lubricators is essential for the warranty to be applicable.

The warranty for the motor is null and void if any damage occurs as a result of exposure to unclean air or insufficient lubrication.

A.5.2 Electric motor

- Check the voltage: 110V – 220V.
- Check the connections and the power supply cable.

A.5.3 Gear drives

The planetary gear unit and the right-angle transmission unit are greased in our works with:

ORAPI - CTDMEP2 / 606

3606 S1

High pressure grease

Color: Blue

Note: The planetary gear is lubricated for life and no further greasing is required except in the case of repair. The right-angle gear may need to be lubricated from time to time. It must be remembered that using too much grease causes motor temperatures to rise during machining operations.

If the unit is used every day, the right-angle gearing should be lubricated once a fortnight.

For re-lubricating, the following grease should be used:

ORAPI - CT 46 08 - MoS₂

3608 S1

-30°C / 165°C

Color: Black

A.6 TROUBLE SHOOTING

A.6.1 Air motor

If MO10 motors do not rotate when connected to the compressed air supply:

- Check that the machine is connected to the energy supply,
- Remove the dead-man handle, make the rotor turn using a 4 mm Allen key on the roundhead screw (check that nothing can prevent the tool-holder from turning).



If the motor does not rotate correctly, check the air supply flow and pressure:

- 1400 L per min for an MO10,
- Pressure: 6 bars.
- Check the diameter of the compressed air supply piping: 3/4" or 1".

A.6.2 Electric motor

- Check that the plug is live.
- Check the voltage/amperage available.
- Check that the motor cable is not cut.
- Check that nothing prevents the tool-holder plate from rotating.

A.6.3 Hydraulic motor

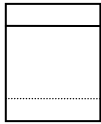
- Check that couplings are correctly connected to the motor and the power pack.
- Check that the power pack has been switched on.

If the problem persists, please contact us.

A.7 STANDARD TOOL BITS

Tool width 25 mm; depth 9 mm

Facing: A1
O-US-A1-9-H-27



Facing: A2 – A3
O-US-A2-9-H-26



30°

O-US-A3-9-H-28



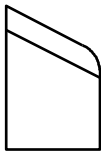
37°30

J beveling: C5 - C6 - C9

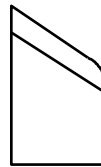
O-US-C5-9-H-63

O-US-C6-9-H-65

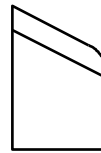
O-US-C9-9-H-29



7° (r=6)



12°5 (r=6)



10° (r=1.5)

Counter-Boring: A4 – B11

O-US-A4-9-H-25

O-US-B11-9-H-15



15°



15°

Tooling for small spaces:

Facing: B6
O-US-B6-9-H-54



Facing: B7 – B8
O-US-B7-9-H-56

O-US-B8-9-H-59



30°

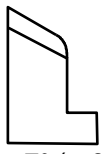


37°30

J beveling: C7 – C8

O-US-C7-9-H-67

O-US-C8-9-H-69



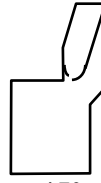
7° (r=6)



12°5 (r=6)

Counter-Boring: B9

O-US-B9-9-H-61

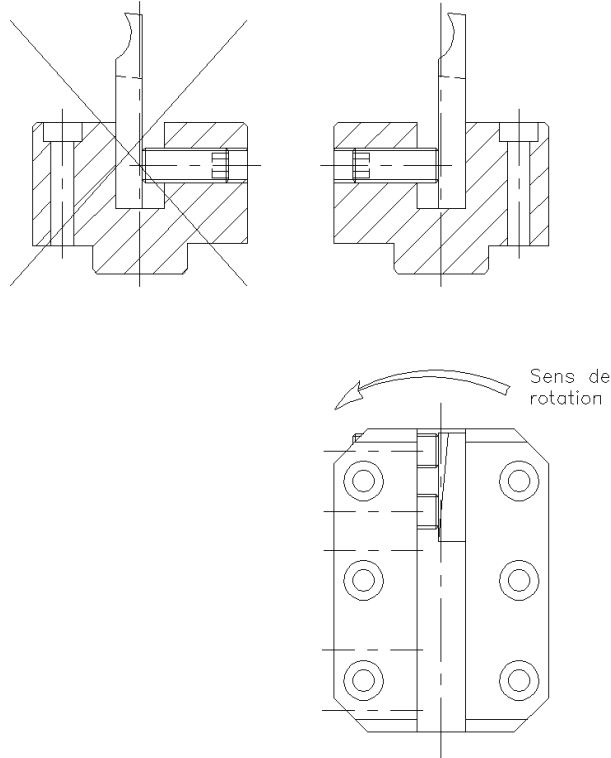


15°

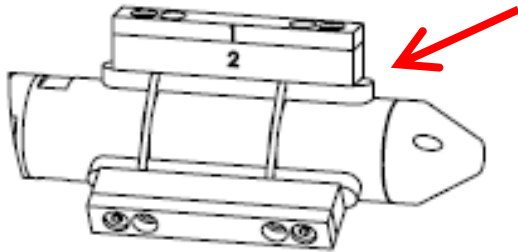
Note: All these tool bits are available with a depth of 6 or 9 mm.

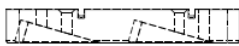
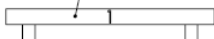
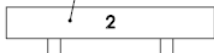
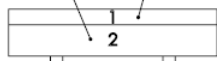
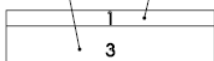
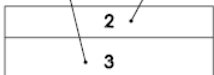
A.7.1 Positioning tools

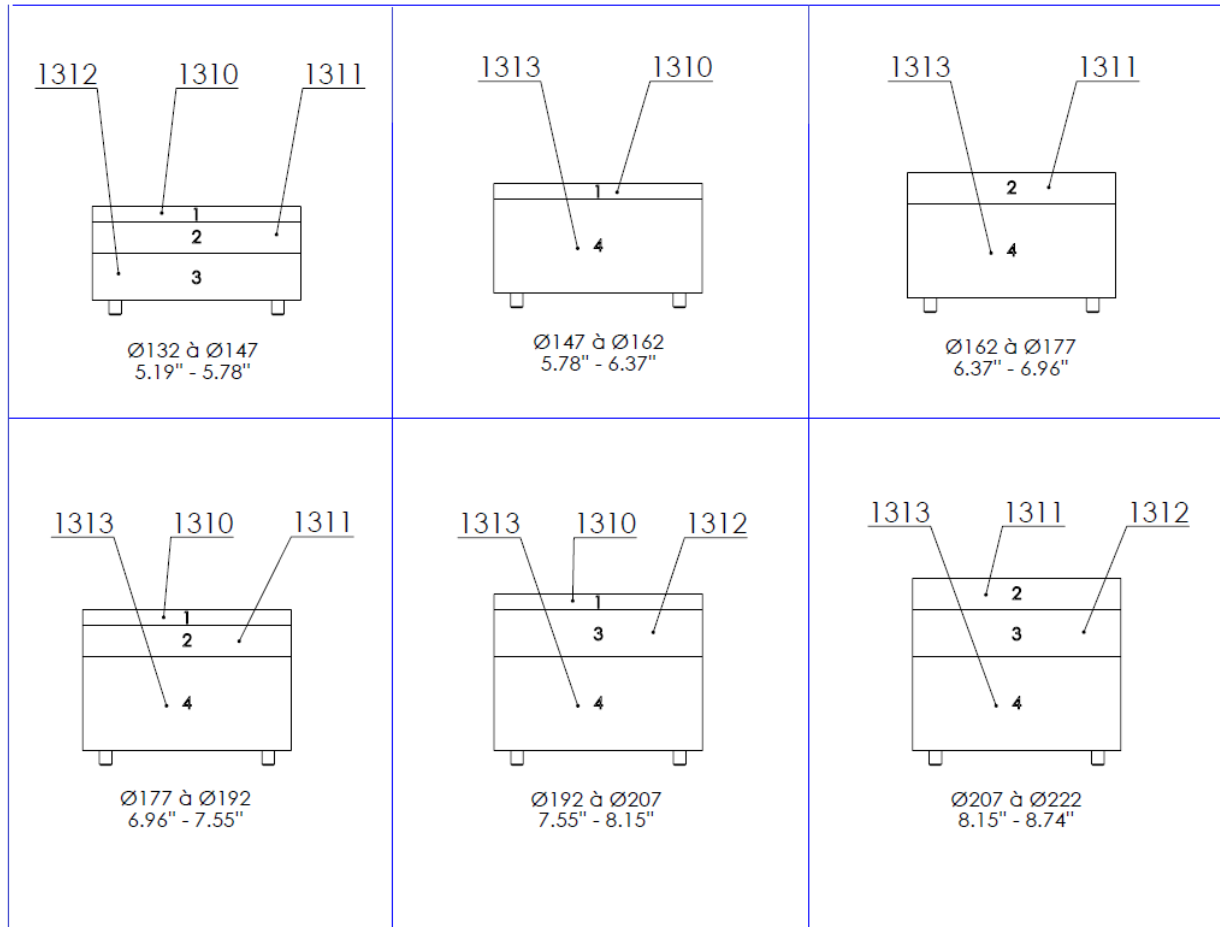
Warning: To avoid tools being broken, they must be in the right position.



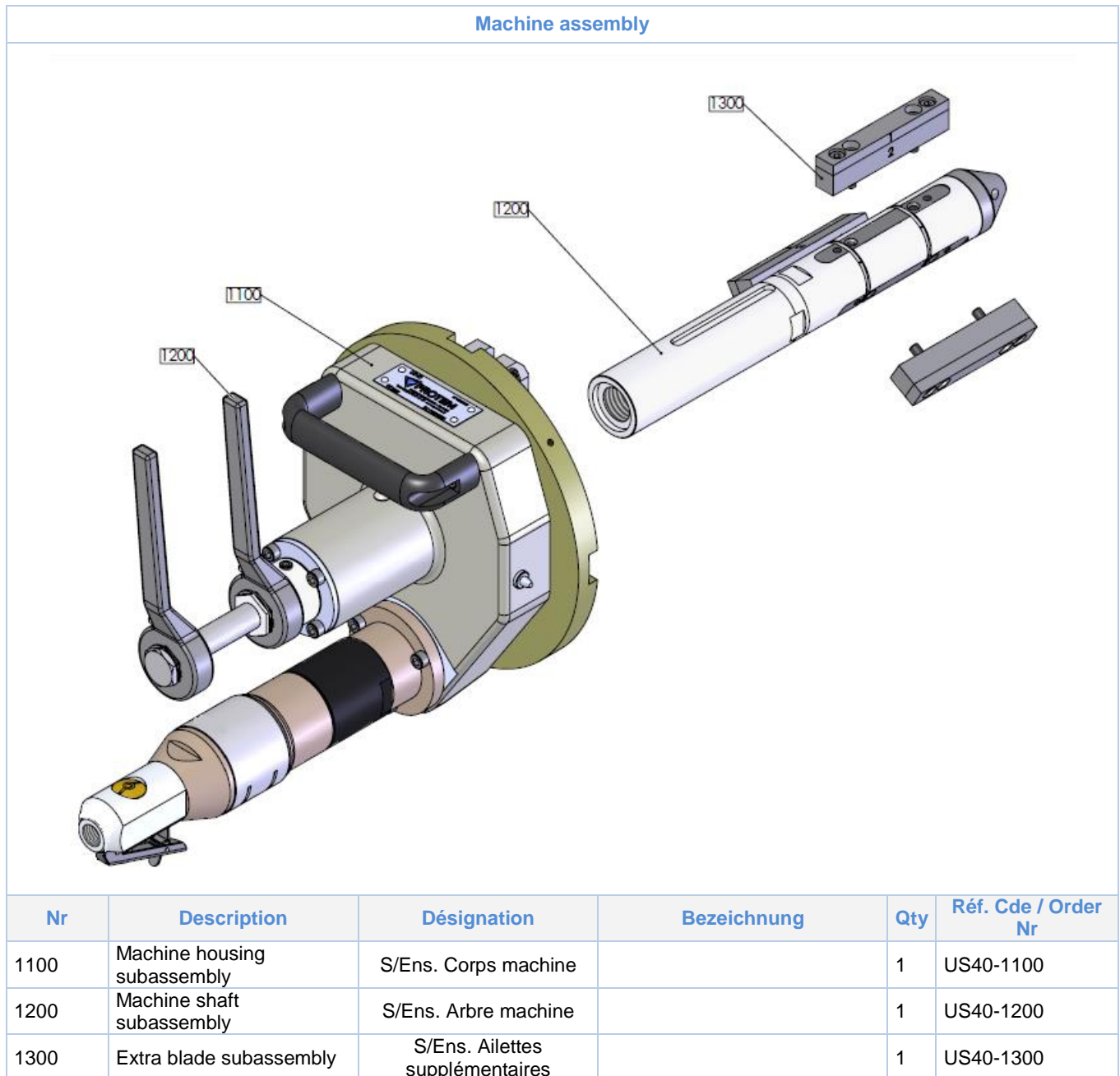
A.8 LAYING-UP EXPANSION BLADES



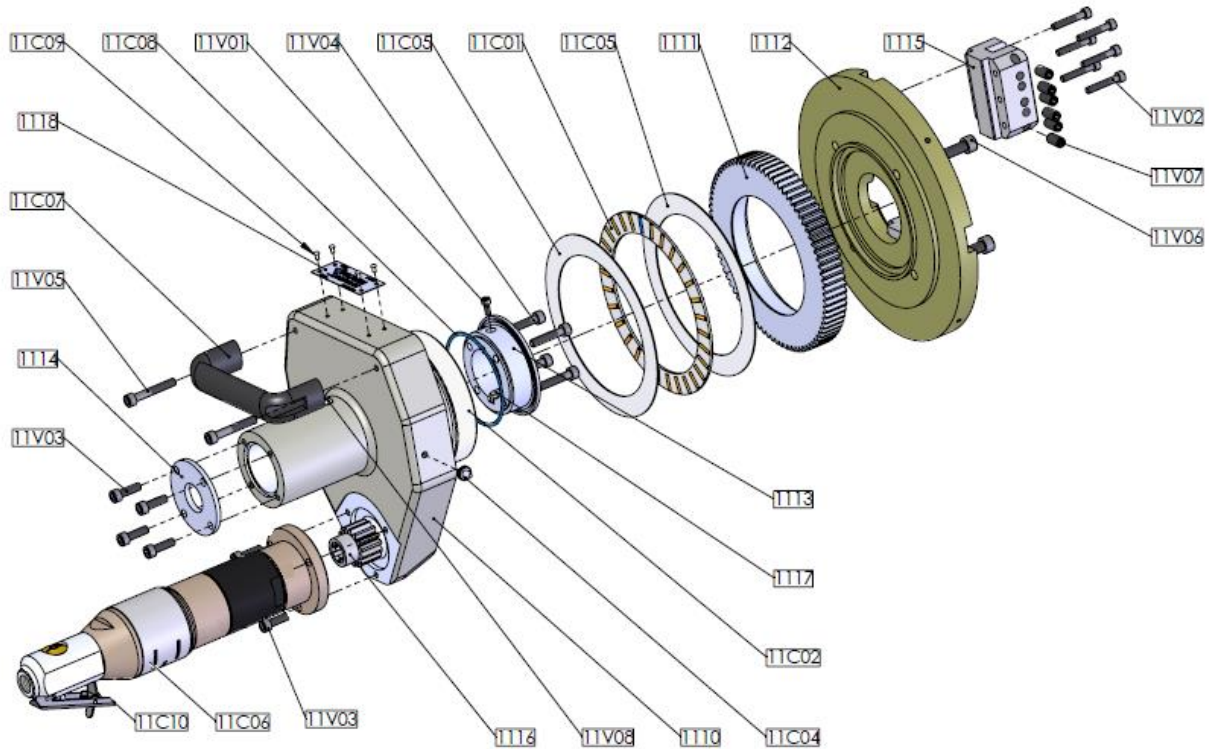
<p>Ailette de base seule</p>  <p>Ø42 à Ø57 1.65" - 2.24"</p>	<p>1310</p>  <p>Ø57 à Ø72 2.24" - 2.83"</p>	<p>1311</p>  <p>Ø72 à Ø87 2.83" - 3.42"</p>
<p>1311 1310</p>  <p>Ø87 à Ø102 3.42" - 4.01"</p>	<p>1312 1310</p>  <p>Ø102 à Ø117 4.01" - 4.6"</p>	<p>1312 1311</p>  <p>Ø117 à Ø132 4.6" - 5.19"</p>



A.9 EXPLODED VIEW OF THE MACHINE: 12/14



1100: Machine housing sub-assembly

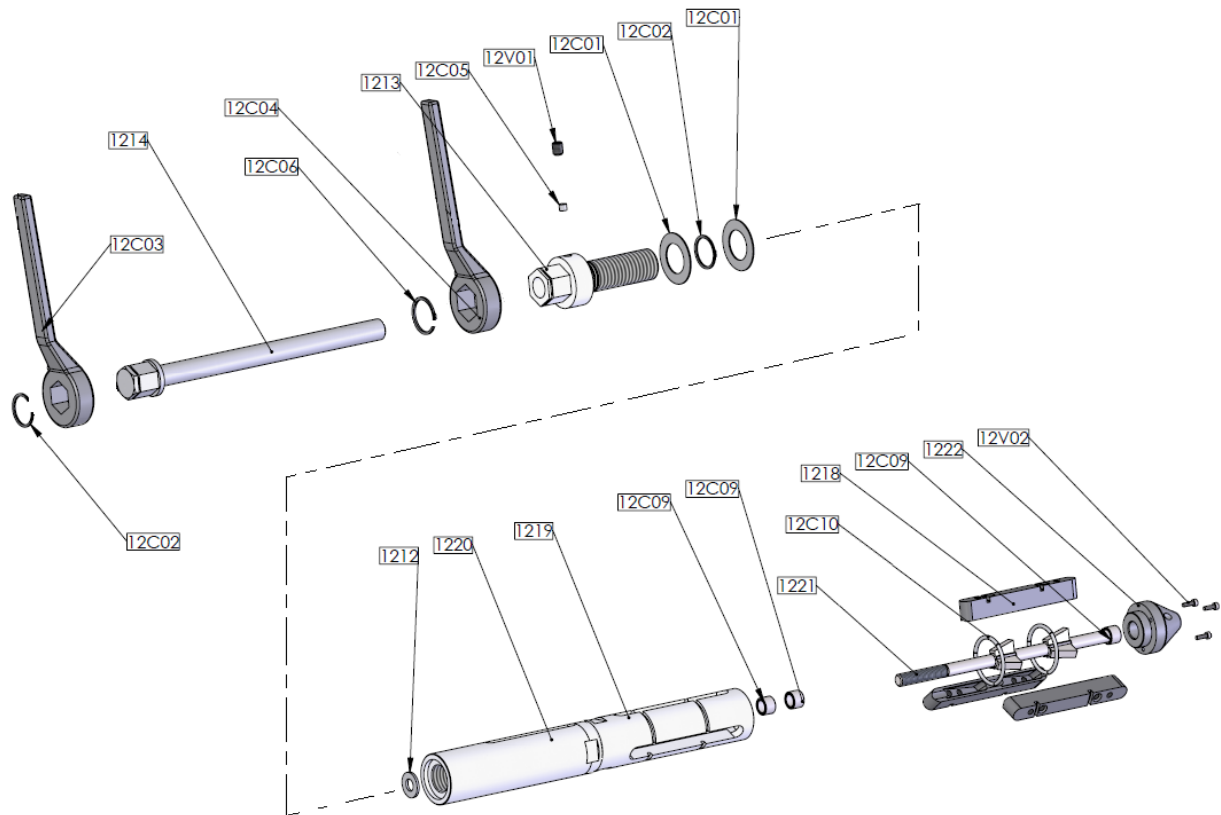


Nr	Description	Désignation	Bezeichnung	Qty	Réf. Cde / Order Nr
1110	Housing	Corps machine	Maschinen-Gehäuse	1	US40-10
1111	Crown gear	Couronne dentée	Kranz	1	US40-12
1112	Standard tool holder plate	Plateau P.O. standard	Werkzeughalter	1	US40-11
1113	Clamping ring	Bague de serrage	Spannring	1	US40-13
1114	Washer	Rondelle	Scheibe	1	US40-23
1115	Tool holder	Porte-outil (P.O)	Messerhalter	2	US-PO-36
1116	15-tooth gear	Pignon 15 dents	Ritzel (15 Zähne)	1	US40-18
1117	Key	Clavette	Keil	2	US40-13-1 *
1118	Manufacturer's plate	Plaque constructeur	Typenschild	1	US40-75
11C01	Needle stop	Butée à aiguilles	Nadelhülse	1	US40-Co17
11C02	Ball bearing	Roulement à bille	Lager	1	US40-Co01
11C04	Greaser	Graisseur	Schmierer	1	US40-Co04
11C05	Washer Ø120	Rondelle Ø120	Scheibe Ø 120	2	US40-Co06
11C07	Handle	Poignée de manutention	Handgriff	1	US40-Co18
11C08	'O' ring cord	Corde torique	O-Ring-Schnur	1	US40-Co09
11C09	Rivet	Rivet à frapper		4	ACC-RIVET
11C06	Motor	Moteur	Motor	1	MO10-G1-B-CAN.CT-P POIGNEE_GAC HETTE
11C10	Dead-man handle	Poignée gâchette	Sicherheitsventil	1	
11V01	M4x10 CHC screw	Vis CHc M4x10	Schraube CHc M4x10	2	US40-Co23 *
11V02	M5x30 CHC screw	Vis CHc M5x30	Schraube CHc M5x30	12	US40-Co29
11V03	M6x20 CHC screw	Vis CHc M6x20	Schraube CHc M6x20	7	US40-Co28

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US40 – Rev Z - 110915			19/47

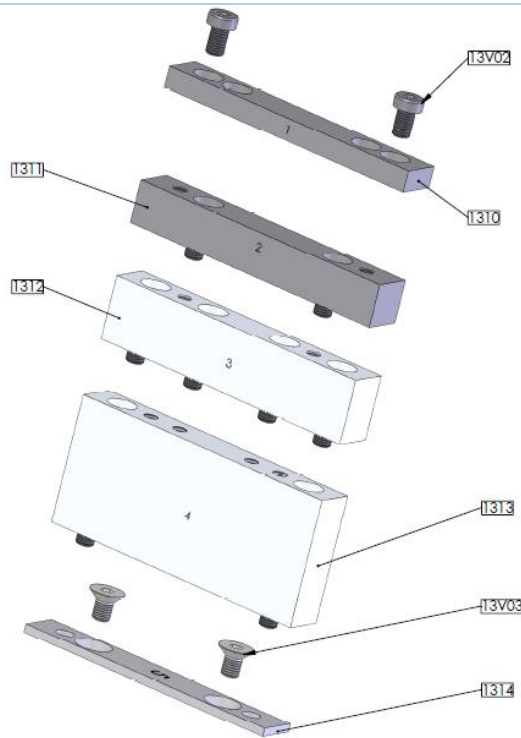
11V04	M6x30 CHC screw	Vis CHc M6x30	Schraube CHc M6x30	4	US40-Co25
11V05	M6x40 CHC screw	Vis CHc M6x40	Schraube CHc M6x40	2	US40-Co24
11V06	M8x25 CHC screw	Vis CHc M8x25	Schraube CHc M8x25	4	US40-Co26
11V07	M8x16 HC screw	Vis Hc M8x16 bout plat	Schraube Hc M8x16	12	US40-Co21
11V08	M6x10 CHC screw	Vis CHc tête bombée M6x10	Schraube CHc M6x10	1	US40-Co22

1200: Machine shaft sub-assembly



Nr	Description	Désignation	Bezeichnung	Qty	Réf. Cde / Order Nr
1212	Stop washer	Rondelle de blocage	Blockierscheibe	1	US40-38
1213	Feed screw	Vis d'avance	Vorschubschraube	1	US40-15-CLE
1214	Clamping nut	Ecrou de blocage	Klemmmutter	1	US40-17-CLE
1218	Standard expansion blade	Ailettes de base	Grundspannbacken	3	US40-1218
1219	Front shaft	Arbre avant		1	US40-1219
1220	Rear shaft	Arbre arriere		1	US40-1220
1221	Expansion shaft	Arbre d'expansion	Ausdehnungswelle	1	US40-1221
1222	end cone	Cône d'extrémité		1	US40-1222
12C01	Washer Ø25	Rondelle Ø25	Scheibe Ø 25	2	US40-Co05
12C02	Circlip	Circlips	Sicherungsring	2	US40-Co16
12C03	Ratchet wrench Ø24	Clé à cliquet de 24	Ratsche (Ø 24)	1	US40-Co15
12C04	Ratchet wrench Ø27	Clé à cliquet de 27	Ratsche (Ø 27)	1	US40-Co13
12C05	Plastic part	Grain plastique	Gummistück	1	US40-Co14
12C06	Circlip	Circlips	Sicherungsring	1	US40-Co12
12C09	Cylindrical self-lubricating bearing	Coussinet		3	US40-12C09
12C10	Spring	Ressort		2	US40-12C10
12V01	M8x10 HC screw	Vis Hc M8x10	Schraube Hc M8x10	1	US40-Co20
12V02	M3x10 CHC screw	Vis CHc M3x10	Schraube CHc M3x10	3	US40-12V02

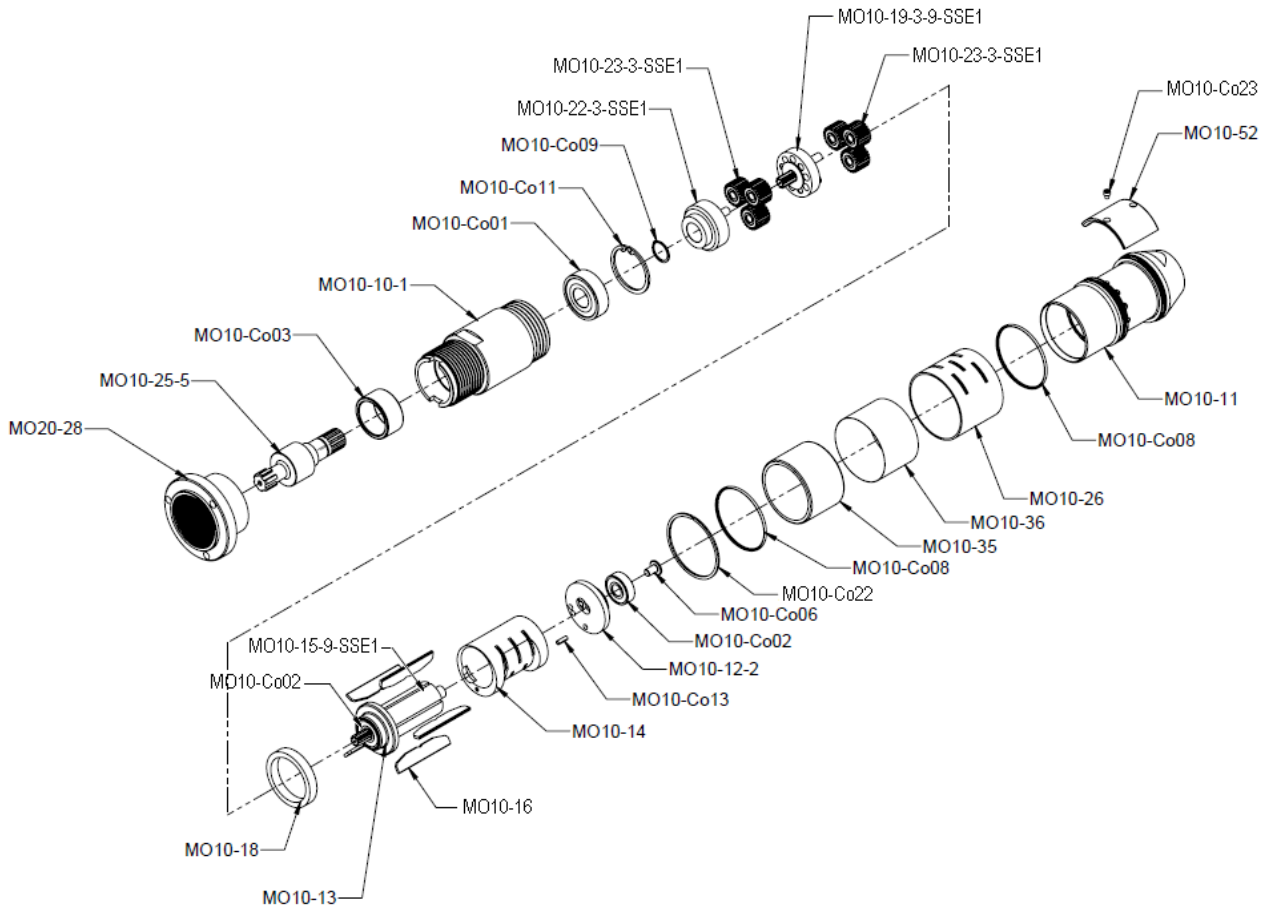
1300: Extra blade sub-assembly




Nr	Description	Désignation	Bezeichnung	Qty	Réf. Cde / Order Nr
1310	Steel blade H=7,5	Ailettes acier H=7.5	Spannbacke (H=7,5)	3	US40-24
1311	Steel blade H=15	Ailettes acier H=15	Spannbacke (H=15)	3	US40-25
1312	Aluminum blade H=22,5	Ailettes aluminium H=22.5	Spannbacke (H=22,5)	3	US40-26
1313	Aluminum blade H=45	Ailettes aluminium H=45	Spannbacke (H=45)	3	US40-27
1314	Steel blade H=3	Ailettes acier H=3	Spannbacke (H=3)	3	US40-36
13V02	M6x10 CHC screw	Vis CHC M6x10 tête basse	Schraube CHC M6x10	6	US40-Co27
13V03	M6x10 FHC screw	Vis FHC M6x10	Schraube FHC M6x10	6	US40-Co37

A.10 EXPLODED VIEW OF MOTOR

A.10.1 Air motor: 11/14



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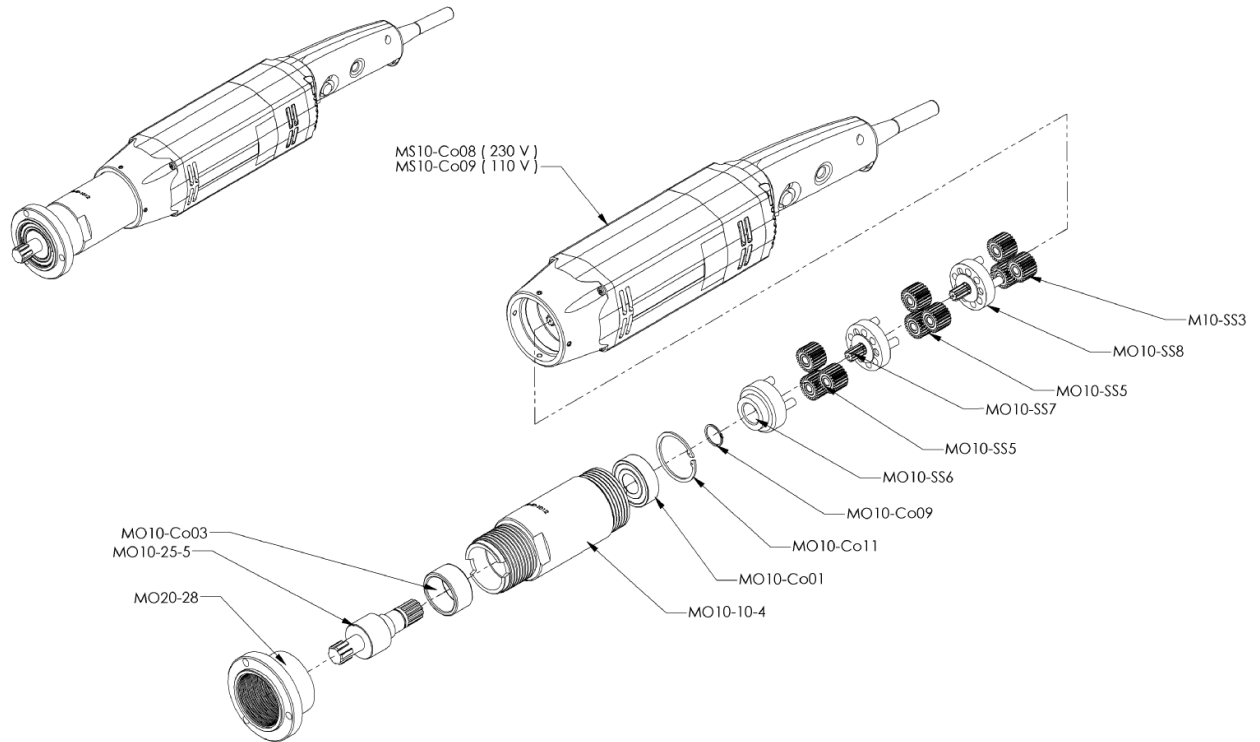
A.10.2 Air motor parts list: 11/14

US40 / MO10 9/9 reduction with controlled exhaust				
Description:	Désignation :	Beschreibung	Qty.:	Reference:
Court fluted output shaft	Axe de sortie cannelé court	Ausgangsachse	1	Mo10-25-5
Needle bearing	Douille à aiguilles	Nadelhülse	1	Mo10-Co03
Motor flange	Bride moteur	Motorflansch	1	MO20-28
2 levels reduction body	Carter de réduction 2 étages	Vorderes Gehäuse	1	Mo10-10-1
Ball bearing	Roulement à billes	Kugellager	1	Mo10-Co01
Circlips	Circlips extérieur	Sicherungsring, außen	1	Mo10-Co09
Countersunk screw M3x4	Vis tête fraisée M3x4	Senkschraube M3x4	1	Mo10-CO23
Controlled exhaust cover	Capot échappement régulé	Abdeckung regulierte Entlüftung	1	Mo10-52
Circlips	Circlips intérieur	Sicherungsring, innen	1	Mo10-Co11
Rear housing	Carter pneumatique	Hinteres Gehäuse	1	Mo10-11
O-Ring	Joint torique	O-Ring	2	Mo10-Co08
Felt	Feutre de silencieux	Filz	1	Mo10-35
Sieve	Tamis pour silencieux	Sieb	1	Mo10-36
Silencer body	Corps de silencieux	Schalldämpfergehäuse	1	Mo10-26
Retaining ring	Segment d'arrêt	Sicherungsring	1	Mo10-Co22
Round headed bolt M6x8	Vis tête bombée à embase M6x8	ULF-Schraube M6x10	1	Mo10-Co06
Ball bearing	Roulement à billes	Kugellager	1	Mo10-Co02
Rear shield (left rotation)	Flasque rotation à gauche	Hinterer Flansch, Rotation nach links	1	Mo10-12-2
Elastic pin	Goupille mécanindus	Stift	1	Mo10-Co13
Stator	Stator	Stator	1	Mo10-14
Rotor blade	Palette	Rotorlamellen	5	Mo10-16
Bolster	Cale	Ring	1	Mo10-18
Front planetary gear-set with 3 pins	Sous-ensemble train planétaire avant + 3 goupilles	Teilsystem Antriebswellenrad vorne + 3 Stifte	1	Mo10-22-3-SSE1
23-tooth satellite gear + needle roller bearings	Sous-ensemble satellite 23 dents + douilles à aiguilles	Teilsystem 23-Zähne-Satellitenrad + Nadelbüchse	6	Mo10-23-3-SSE1
Rear planetary gear-set + 9-tooth gear + washer + 3 pins	Sous-ensemble train planétaire arrière + pignon 9 dents + rondelle + 3 goupilles	Teilsystem Antriebswellenrad hinten + 9-Zähne-Ritzel + Scheibe + 3 Stifte	1	Mo10-19-3-9-SSE1
Rotor + 9-tooth gear sub-assembly	Sous-ensemble rotor + pignon 9 dents	Teilsystem Rotor + 9-Zähne-Ritzel	1	MO10-15-9-SSE1
Ball bearing	Roulement à billes	Kugellager	1	MO10-Co02
End shield	Flasque avant	Vorderflansch	1	MO10-13

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A.10.3 Electric motor: 04/07



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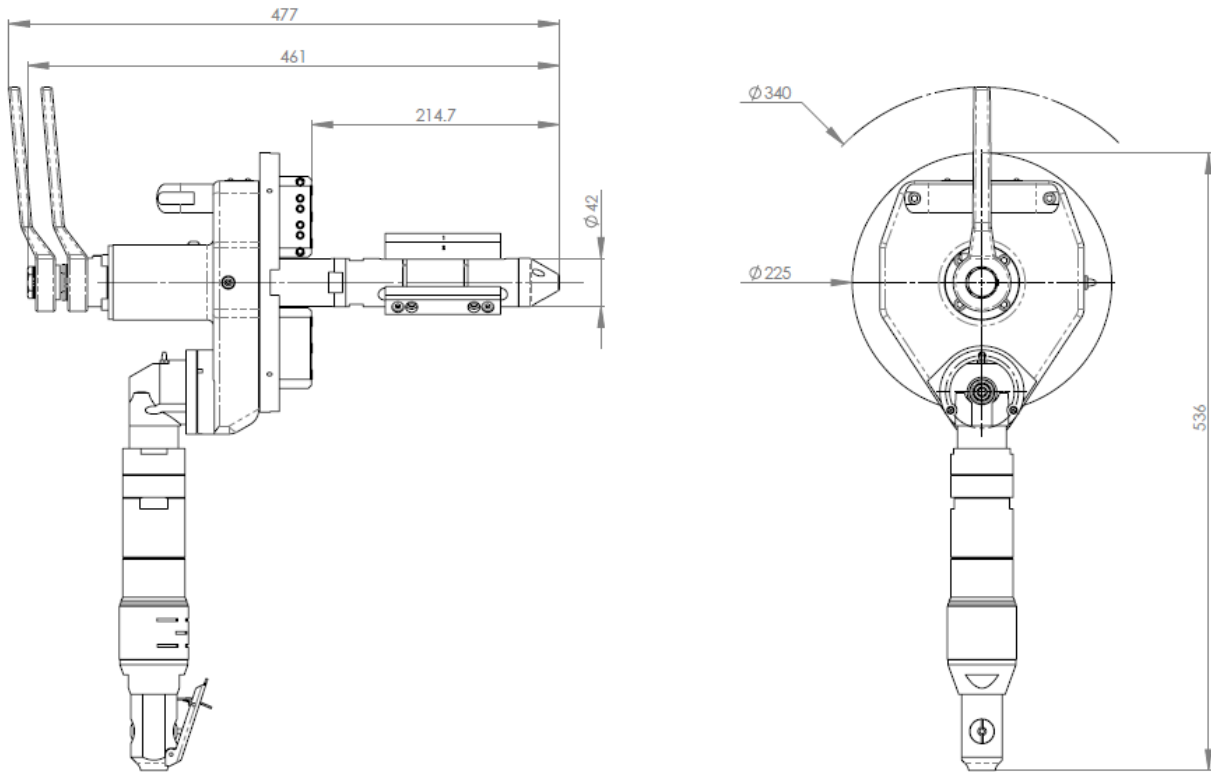
A.10.4 Electric motor parts list: 04/07

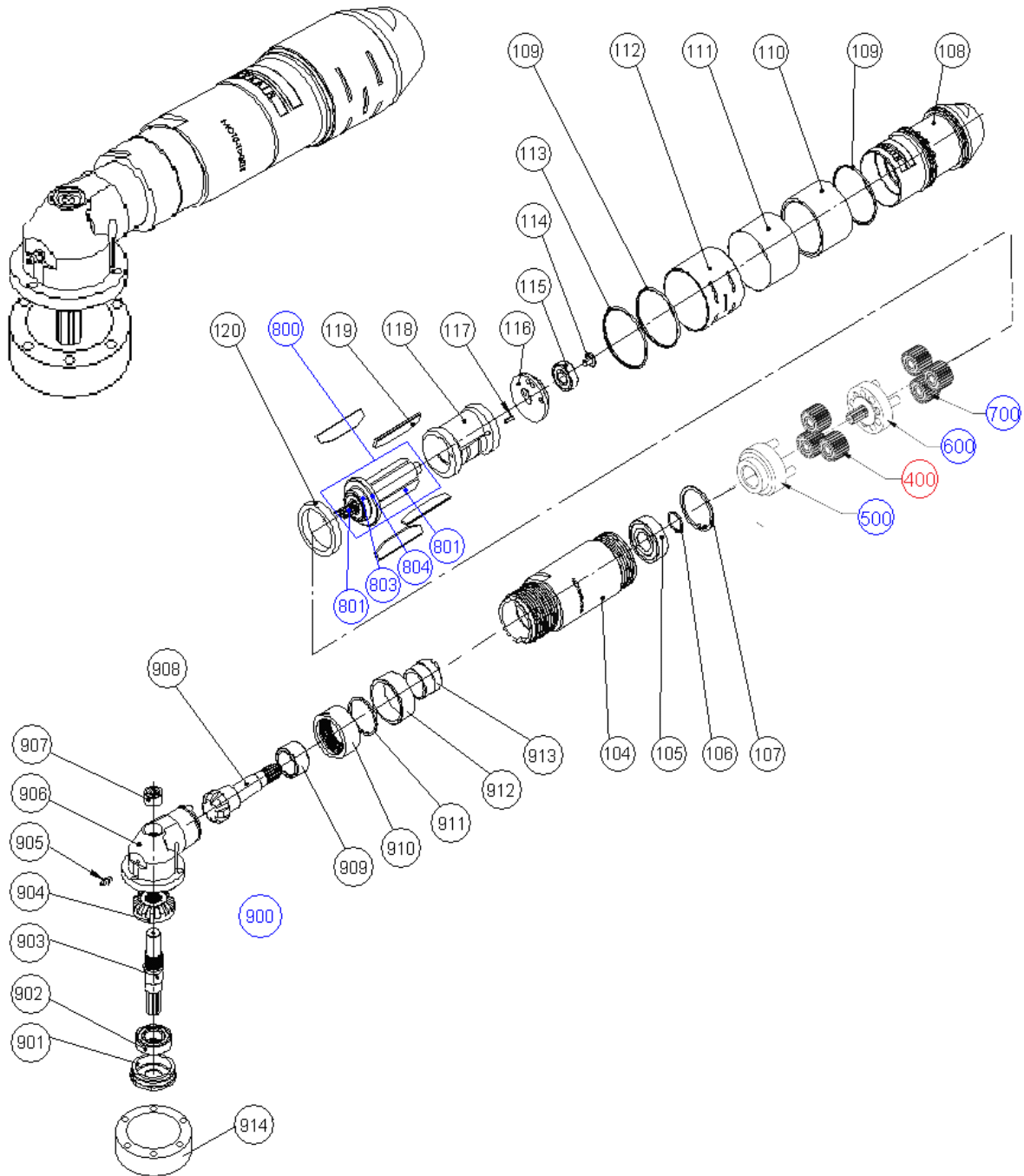
MS10-US40-1 or MS10-US40-2				R=9/15/15
Description:	Désignation :	Beschreibung	Qty	Reference:
Motor flange	Bride moteur	Motorflansch	1	Mo20-28
Short splined output shaft	Axe de sortie cannelé court	Ausgangswelle	1	Mo10-25-5
Needle bearing	Douille à aiguille	Nadelhülse	1	Mo10-Co03
3 gear housing	Carter de réduction 3 étages	Vorderes Gehäuse für 3 Getriebestufen	1	Mo10-10-4
Ball bearing	Roulement à billes	Kugellager	1	Mo10-Co01
Inner circlip	Circlips intérieur	Sicherungsring für Bohrungen	1	Mo10-Co11
Outer circlip	Circlips extérieur	Sicherungsring für Welle	1	Mo10-Co09
MS10 110V motor	Moteur MS10 110V	Motor MS10 (110 V)	1	MS10-US40-1
MS10 230V motor	Moteur MS10 230V	Motor MS10 (230 V)		MS10-US40-2
Front planetary assembly - Ensemble planétaire avant - Baugruppe vorderer Planetengetriebezug				MO10-SS6
Front planetary gear train	Train planétaire avant	Vorderer Planetengetriebezug	1	* Mo10-22-3
Cylindrical pin	Axe de satellite*	Stift	3	* Mo10-Co19
* pins positioned for 15-tooth gear * goupilles positionnées pour recevoir un pignon 15 dents * Stifte positioniert für Ritzel 15 Zähne				
Rear planetary assembly - Ensemble planétaire arrière - Baugruppe hinterer Planetengetriebezug				MO10-SS7
Rear planetary gear train	Train planétaire arrière	Hinterer Planetengetriebezug	1	* Mo10-19-3
Washer	Rondelle	Ring	1	* Mo10-Co21
15-tooth gear	Pignon 15 dents	Ritzel (15 Zähne)	1	* Mo10-20-5
Cylindrical pin	Axe de satellite*	Stift	3	* Mo10-Co19
* pins positioned for 15-tooth gear * goupilles positionnées pour recevoir un pignon 15 dents * Stifte positioniert für Ritzel 15 Zähne				
Rear planetary assembly - Ensemble planétaire arrière - Baugruppe hinterer Planetengetriebezug				MO10-SS8
Rear planetary gear train	Train planétaire arrière	Hinterer Planetengetriebezug	1	** Mo10-19-3
Washer	Rondelle	Ring	1	** Mo10-Co21
15-tooth gear	Pignon 15 dents	Ritzel (15 Zähne)	1	** Mo10-20-5
Cylindrical pin	Axe de satellite*	Stift	3	** Mo10-Co19
* pins positioned for 9-tooth gear * goupilles positionnées pour recevoir un pignon 9 dents * Stifte positioniert für Ritzel 9 Zähne				
Satellite assembly - Ensemble satellite - Baugruppe Satellit				MO10-SS5
20-tooth satellite	Satellite 20 dents	Satellit (20 Zähne)	6	* Mo10-23-5
Needle bush	Douille à aiguille	Nadelhülse	6	* Mo10-Co12
Satellite assembly - Ensemble satellite - Baugruppe Satellit				MO10-SS3
23-tooth satellite	Satellite 23 dents	Satellit (23 Zähne)	6	** Mo10-23-3
Needle bush	Douille à aiguille	Nadelhülse	6	** Mo10-Co12
* Pre-assembled together * Montés ensemble obligatoirement * vormontiert geliefert				

A.11 EXTRA EQUIPMENT AND OPTIONS

A.11.1 Options

US40RA: MO10 right-angle drive air motor (05/14)

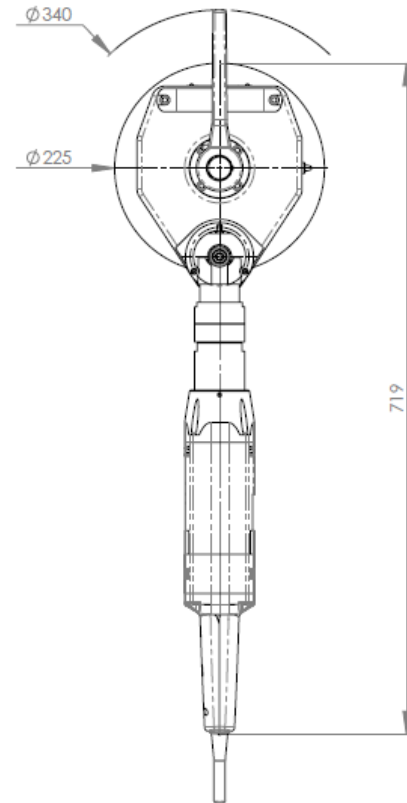
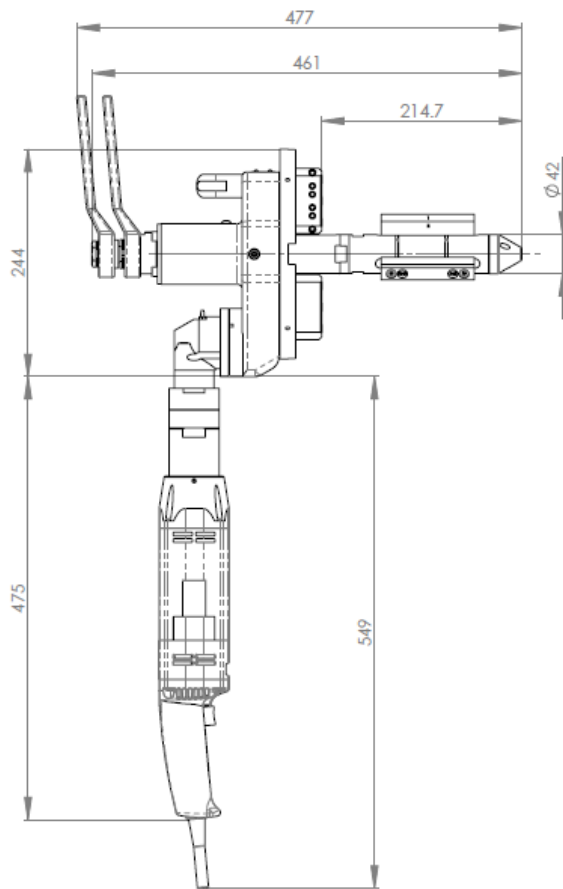


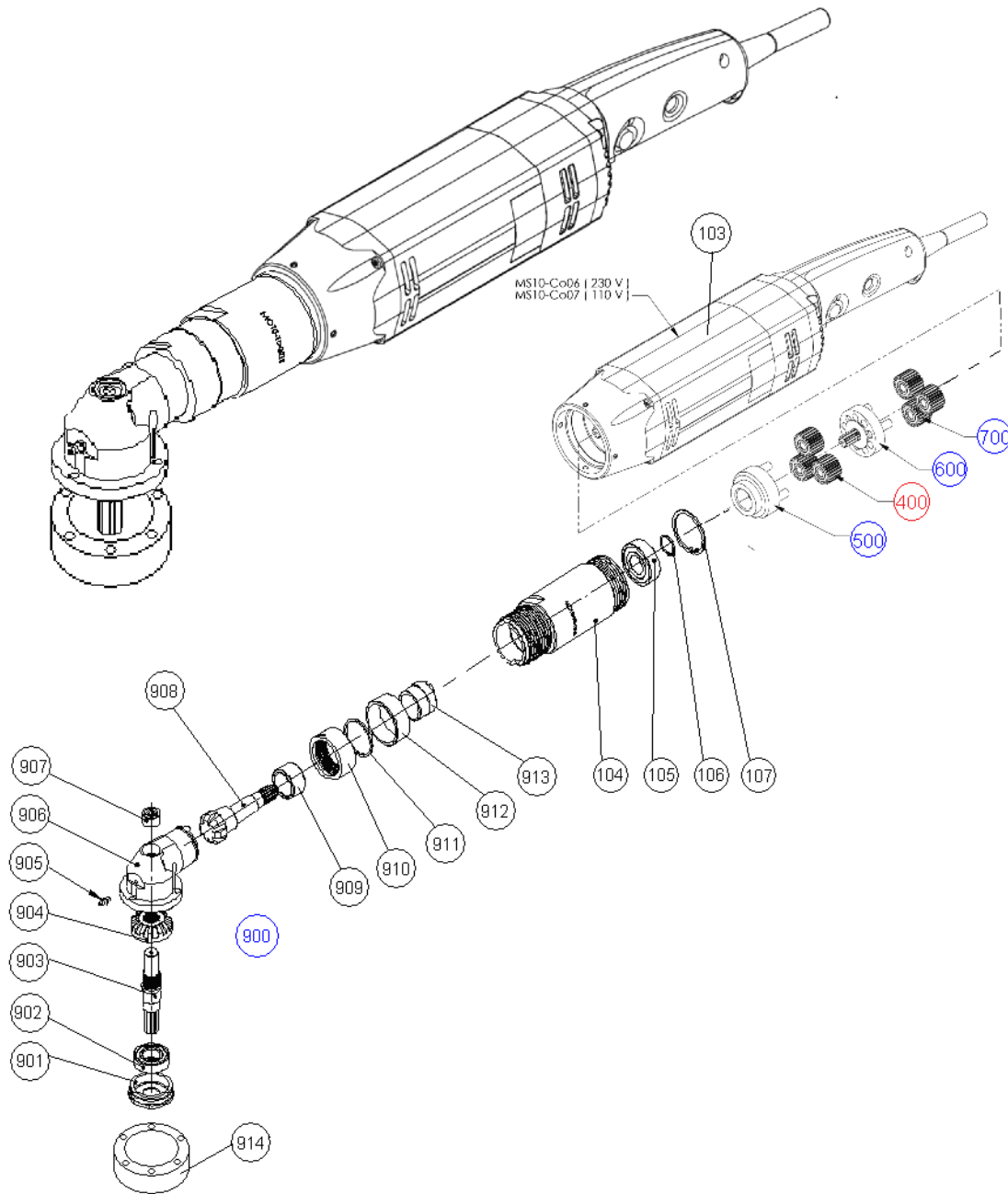


MO10 R=9/12 + RA20				US40	
N°	Description:	Désignation :	Beschreibung	Qty.:	Reference:
104	Front housing	Carter avant	Vorderes Gehäuse	1	Mo10-10-1-D
105	Ball bearing	Roulement à billes	Kugellager	1	Mo10-Co01
106	Circlips	Circlips extérieur	Außensicherungsring	1	Mo10-Co09
107	Circlips	Circlips intérieur	Innensicherungsring	1	Mo10-Co11
108	Rear housing	Carter pneumatique	Hinteres Gehäuse	1	Mo10-11
109	O-Ring	Joint torique	O-Ring	2	Mo10-Co08
110	Felt	Feutre de silencieux	Filz	1	Mo10-35
111	Filter screen	Tamis pour silencieux	Sieb	1	Mo10-36
112	Exhaust deflector	Corps de silencieux	Schalldämpfergehäuse	1	Mo10-26
113	O-Ring	Joint torique	O-Ring	1	Mo10-Co14
114	Round headed bolt M6x8	Vis tête bombée à embase M6x10	Rundkopfschraube M6x8	1	Mo10-Co06
115	Ball bearing	Roulement à billes	Kugellager	1	Mo10-Co02
116	Rear flange	Flasque arrière	Hinterer Flansch	1	Mo10-12-1
117	Pin	Goupille mécanindus	Stift	1	Mo10-Co13
118	Stator	Stator	Stator	1	Mo10-14
119	Rotor blade	Palette moteur	Rotorlamellen	5	Mo10-16
120	Washer	Cale	Scheibe	1	Mo10-18
Rotor assembly - Ensemble rotor - Baugruppe Rotor (800)					
801	Sub-assembly rotor + 9 teeth pinion	Sous-ensemble rotor+pignon 9dts	Rotor + Ritzel 9 Zähne	1	MO10-15-9-SSE1
803	Ball bearing	Roulement à billes	Kugellager	1	Mo10-Co02
804	Front flange	Flasque avant	Vorderflansch	1	Mo10-13
Front planetary assembly - Ensemble planétaire avant - Baugruppe vorderer Planetengetriebezug (500)					
MO10-22-3-SSE2					
	Front planetary gear train	Train planétaire avant	Vorderer Planetengetriebezug	1	* Mo10-22-3
	Cylindrical pin	Axe de satellite*	Stift	3	* Mo10-Co19
Rear planetary assembly - Ensemble planétaire arrière - Baugruppe hinterer Planetengetriebezug (600)					
MO10-19-3-12-SSE1					
	Rear planetary gear train	Train planétaire arrière	Mittlerer Planetengetriebezug	1	* Mo10-19-3
	Washer	Rondelle	Stift	1	* Mo10-Co21
	12 teeth pinion	Pignon 12 dents	Ritzel 12 Zähne	1	* Mo10-20-4
	pin	Axe de satellite*	Ring	3	* Mo10-Co19
Satellite assembly - Ensemble satellite 23 dts - Baugruppe Satellit (700)					
MO10- 23-3-SSE1					
	23 teeth satellite	Satellite 23 dents	Satellit 23 Zähne	3	* Mo10-23-3
	Needle bush	Douille à aiguille	Nadelhülse	3	* Mo10-Co12
Satellite assembly - Ensemble satellite 22 dts - Baugruppe Satellit (400)					
MO10- 23-4-SSE1					
	22 teeth satellite	Satellite 22 dents	Satellit 22 Zähne	3	* Mo10-23-4
	Needle bush	Douille à aiguille	Nadelhülse	3	* Mo10-Co12

Sub-Assembly for right angle RA20 (900) Ensemble renvoi d'angle RA20 Sub (900) Baugruppe Winkelgetriebe RA20 (900)					RA20-US80
901	Bearing cap	Chapeau de roulement	Lagerkappe	1	RA20-06
902	Ball Bearing	Roulement à billes	Kugellager	1	RA20-Co03
903	motor shaft	Axe de sortie cannelé court	Motorwelle	1	US80-35
904	Crown gear	Couronne	Kronenzahnrad	1	RA20-03
905	Greaser M6x100	Graisseur droit	Schmierer M6x100	1	RA20-CO06
906	Right angle body	Corps de renvoi d'angle	Gehäuse	1	RA20-02
907	Joint needle bearing	Douille à aiguilles avec fond	Nadellager mit Boden	1	RA20-Co01
908	shaft pinion	Pignon arbré	Wellenritzel	1	RA20-05
909	Needle bearing	Douille à aiguilles sans fond	Nadellager ohne Boden	1	RA20-Co02
910	Nut	Erou pour renvoi d'angle	Mutter	1	RA20-07
911	Half spacer	Demi-lune	Halbscheibe	2	RA20-09
912	Spacer	Entretoise extérieure	Außenring	1	RA20-08
913	Inside spacer	Entretoise intérieure	Innenring	1	RA20-10
914	Shim for right angle	Entretoise renvoi d'angle	Zwischenflansch	1	US30-29
* Assembled together - * vendu assemblé - * Als Baugruppe geliefert					

US40E-RA: MS10 electric motor with right-angle drive (05/14)





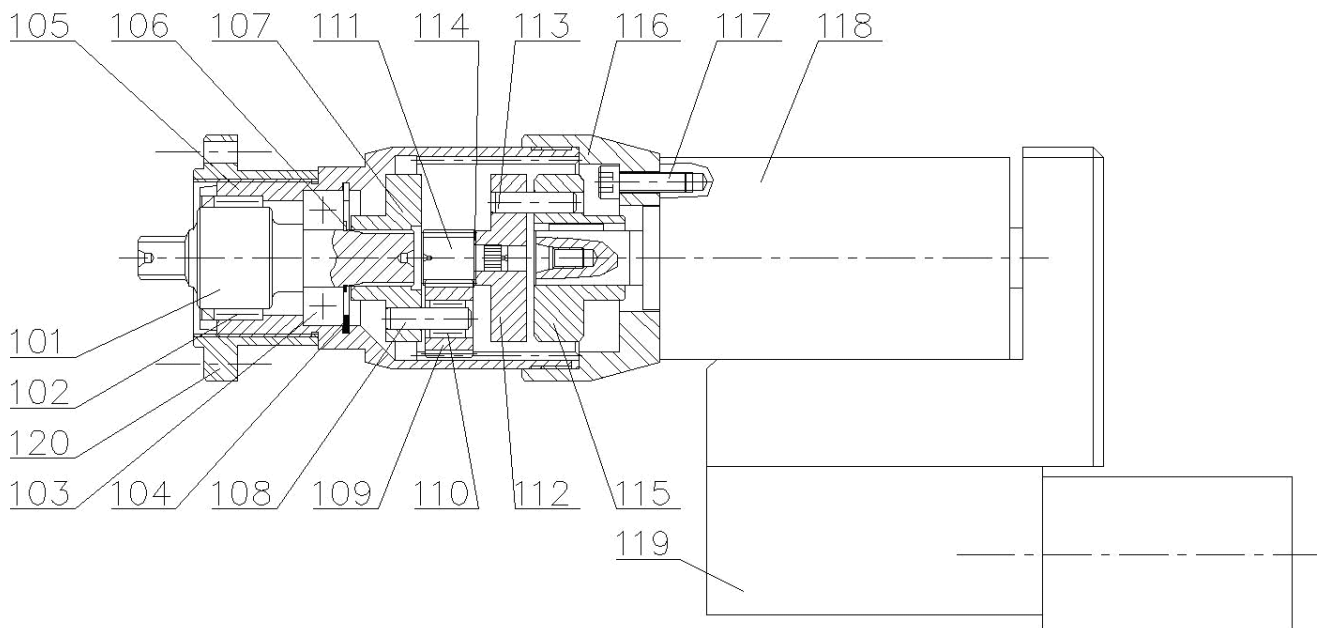
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US40 – Rev Z - 110915			32/47

MS10 R=9/12 + RA20					US40
N°	Description:	Désignation :	Beschreibung	Qty.:	Reference:
103	MS10 110V motor	Moteur MS10 110V	Motor MS10 mit 110 V	1	ME-MS10-CO07
	MS10 230V motor	Moteur MS10 230V	Motor MS10 mit 230 V		ME-MS10-CO06
104	Front housing	Carter avant	Vorderes Gehäuse	1	Mo10-10-1-D
105	Ball bearing	Roulement à billes	Kugellager	1	Mo10-Co01
106	Circlips	Circlips extérieur	Außensicherungsring	1	Mo10-Co09
107	Circlips	Circlips intérieur	Innensicherungsring	1	Mo10-Co11
Front planetary assembly - Ensemble planétaire avant - Baugruppe vorderer Planetengetriebezug (500)					MO10-22-3-SSE2
	Front planetary gear train	Train planétaire avant	Vorderer Planetengetriebezug	1	* Mo10-22-3
	Cylindrical pin	Axe de satellite*	Stift	3	* Mo10-Co19
Rear planetary assembly - Ensemble planétaire arrière - Baugruppe hinterer Planetengetriebezug (600)					MO10-19-3-12-SSE1
	Rear planetary gear train	Train planétaire arrière	Mittlerer Planetengetriebezug	1	* Mo10-19-3
	Washer	Rondelle	Stift	1	* Mo10-Co21
	12 teeth pinion	Pignon 12 dents	Ritzel 12 Zähne	1	* Mo10-20-4
	pin	Axe de satellite*	Ring	3	* Mo10-Co19
Satellite assembly - Ensemble satellite 23 dts - Baugruppe Satellit (700)					MO10-23-3-SSE1
	23 teeth satellite	Satellite 23 dents	Satellit 23 Zähne	3	* Mo10-23-3
	Needle bush	Douille à aiguille	Nadelhülse	3	* Mo10-Co12
Satellite assembly - Ensemble satellite 22 dts - Baugruppe Satellit (400)					MO10-23-4-SSE1
	22 teeth satellite	Satellite 22 dents	Satellit 22 Zähne	3	* Mo10-23-4
	Needle bush	Douille à aiguille	Nadelhülse	3	* Mo10-Co12
Sub-Assembly for right angle RA20 (900) Ensemble renvoi d'angle RA20 Sub (900) Baugruppe Winkelgetriebe RA20 (900)					RA20-US80
901	Bearing cap	Chapeau de roulement	Lagerkappe	1	RA20-06
902	Ball Bearing	Roulement à billes	Kugellager	1	RA20-Co03
903	motor shaft	Axe de sortie cannelé court	Motorwelle	1	US80-35
904	Crown gear	Couronne	Kronenzahnrad	1	RA20-03
905	Greaser M6x100	Graisseur droit	Schmierer M6x100	1	RA20-CO06
906	Right angle body	Corps de renvoi d'angle	Gehäuse	1	RA20-02
907	Joint needle bearing	Douille à aiguilles avec fond	Nadellager mit Boden	1	RA20-Co01
908	shaft pinion	Pignon arbré	Wellenritzel	1	RA20-05
909	Needle bearing	Douille à aiguilles sans fond	Nadellager ohne Boden	1	RA20-Co02
910	Nut	Ecrou pour renvoi d'angle	Mutter	1	RA20-07
911	Half spacer	Demi-lune	Halbscheibe	2	RA20-09
912	Spacer	Entretoise extérieure	Außenring	1	RA20-08
913	Inside spacer	Entretoise intérieure	Innenring	1	RA20-10
914	Shim for right angle	Entretoise renvoi d'angle	Zwischenflansch	1	US30-29
* Assembled together - * vendu assemblé - * Als Baugruppe geliefert					

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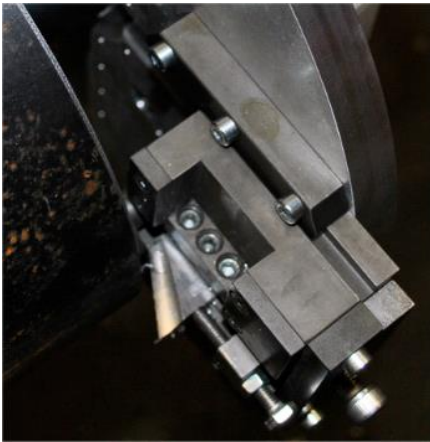
US40HY: hydraulic motor (10/13)



MH20 – OMM 40 – R=4.8					US30 / US40
N°	Description:	Désignation :	Beschreibung	Qty	Reference:
101	Short splined output shaft	Axe de sortie cannelé court	Ausgangsachse	1	Mo10-25-5
102	Needle bearing	Douille à aiguilles	Nadelhülse	1	Mo10-Co03
103	Ball bearing	Roulement à billes	Kugellager	1	Mo10-Co01
104	Circlip	Circlips intérieur	Sicherungsring, innen	1	Mo10-Co11
105	2-step gear housing	Carter de réduction deux étages	Gehäuse für 2 Getriebestufen	1	Mo20-10
106	Outer circlip	Circlips extérieur	Sicherungsring, außen	1	Mo10-Co09
107	Front planetary gear train	Train planétaire avant	Vorderer Planetengetriebezug	1	* Mo20-22-3
108	Cylindrical pin	Axe de satellite	Zylinderstift	3	* Mo20-Co17
109	Satellite R=4.8	Satellite R=4.8	Satellit R=4.8	3	* Mo20-21-5
110	Needle bearing	Douille à aiguilles	Nadelhülse	3	* Mo10-Co12
111	15-tooth gear	Pignon 15 dents	Ritzel	1	* Mo20-27-5
112	Planetary gear train	Train planétaire	Planetengetriebezug	1	* Mo20-19-3
113	Cylindrical pin	Axe de satellite	Zylinderstift	3	* Mo20-Co17
114	Washer	Rondelle	Scheibe	1	* Mo10-Co21
115	Hub	Moyeu de liaison	Nabe	1	MH20-10
116	Flange	Flasque	Flansch	1	MH20-11
117	Screw	Vis CH M6x20	Schraube CH M6x20	3	US40-CO28
118	OMM 40 hydraulic motor	Moteur hydraulique type OMM 40	Hydraulischer Motor OMM 40	1	MH-MH40
119	Manifold kit	Kit manifold	Verbindungsstange	1	MH-1500
120	Motor flange	Bride moteur	Motorflansch	1	MO20-28

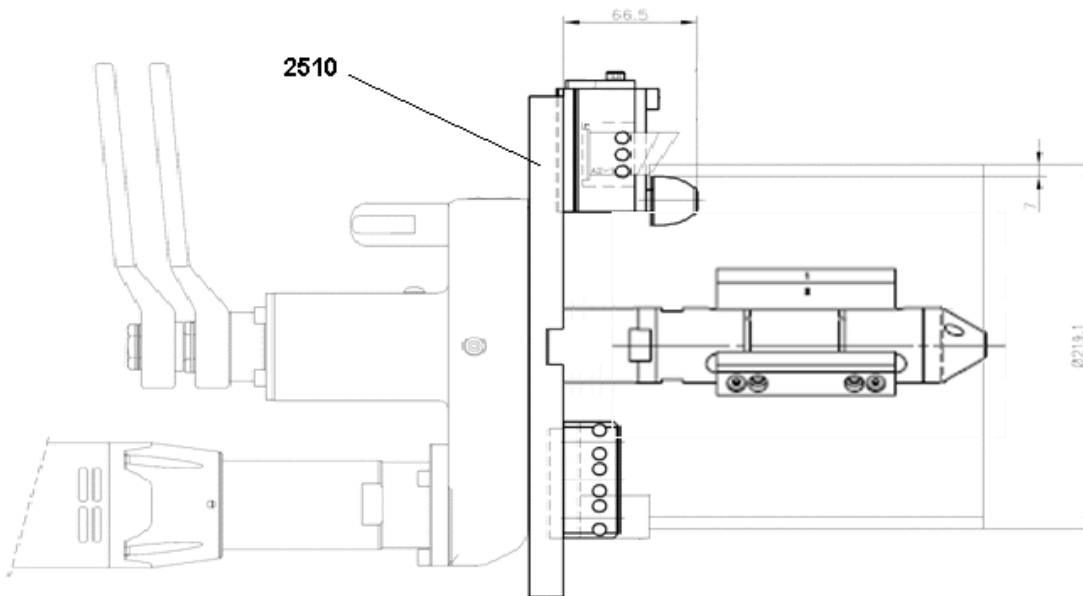
* Pre-assembled together * Montés ensemble obligatoirement * Vormontiert geliefert

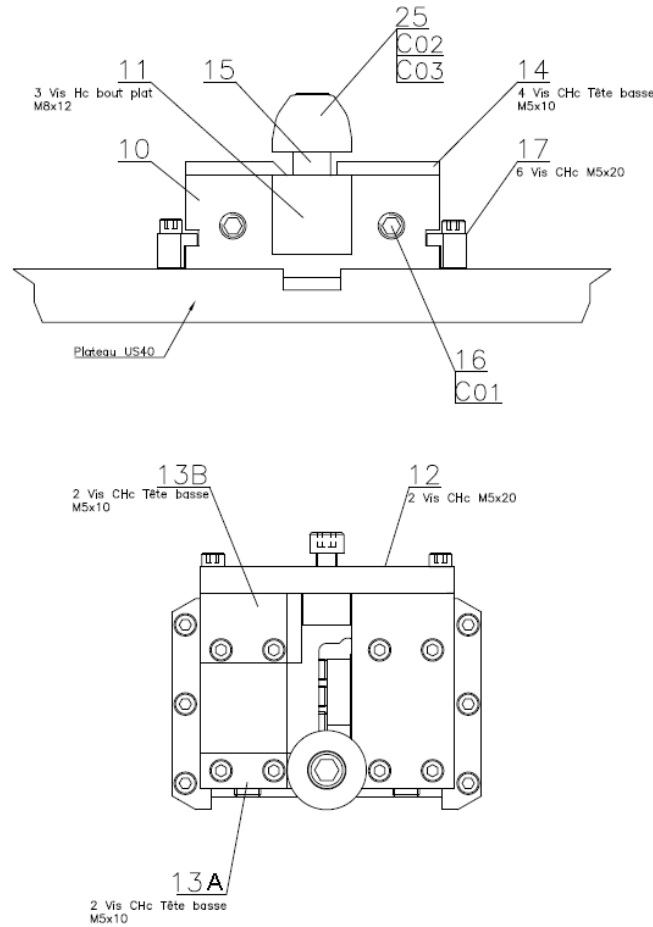
Profile tracker, 9mm stroke



Warning : With the inside profile tracker option the machining capacity is limited. The minimum inside diameter of the pipe to be machined is 120mm
 For any question, please contact PROTEM Marketing Department

EXPLODED VIEW AND PARTS LIST:





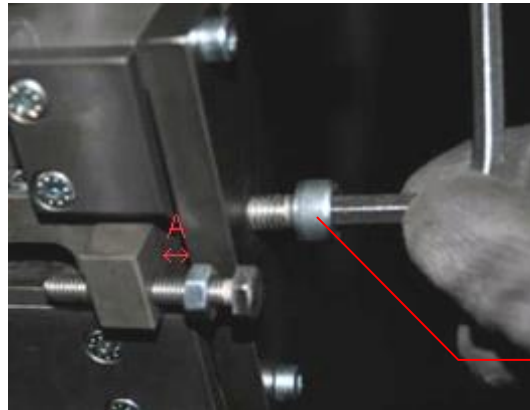
US 40 – Optional Inner profile tracker carriage with 9mm stroke				
Description:	Désignation:	Beschreibung	Qty.:	Reference:
Carriage	Chariot		1	US-SUIVI-INT-10
Tool-holder tracker carriage	Chariot de suivi porte-outil		1	US-SUIVI-INT-11
Lower tool-bit	Plaquette inférieure		1	US-SUIVI-INT-12
RH carriage bar	Barrette chariot droite		1	US-SUIVI-INT-13A
RH carriage bar	Barrette chariot droite		1	US-SUIVI-INT-13B
LH carriage bar	Barrette chariot gauche		1	US-SUIVI-INT-14
Spacer H = 9mm	Entretoise hauteur 9mm		1	US-SUIVI-INT-15
Pressure shaft	Axe de pression		2	US-SUIVI-INT-16
Tool-holder clamp	Bride porte outil		2	US-SUIVI-INT-17
Tracking cam Ø30mm	Galet de suivi Ø30mm		1	US-SUIVI-INT-25
Compression spring	Ressort de compression		2	US-SUIVI-INT-C01
Ball bearing	Roulement à billes		2	US-SUIVI-INT-C02
Hexagonal socket washer-head screw	Vis épaulée à 6 pans creux		1	US-SUIVI-INT-C03
Tool-holder plate, diameter 300 mm	Plateau PO Ø300mm		1	US40-2510

Procedure for using the profile tracker:



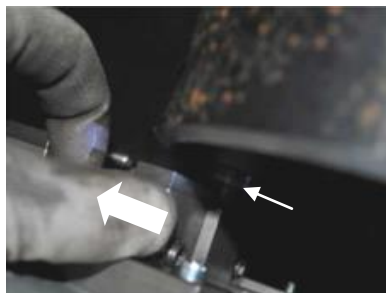
Reminder: All power supply sources must be switched off during installation and setting operations.

- Turn the carriage adjustment screw so that the mobile section of the carriage is in the center of its stroke:
 - For a carriage with a 9mm stroke: Distance A=4.5mm



Carriage adjustment screw

- Pre-position the profile tracker on the machine tool-holder plate.
- Clamp the machine on the pipe to be machined (see blade laying-up chart).
- Position the carriage so that the cylindrical part of the tracking cam makes contact with the ID of the pipe to be machined.
- Clamp the tracking carriage in position by means of the two holding plates.

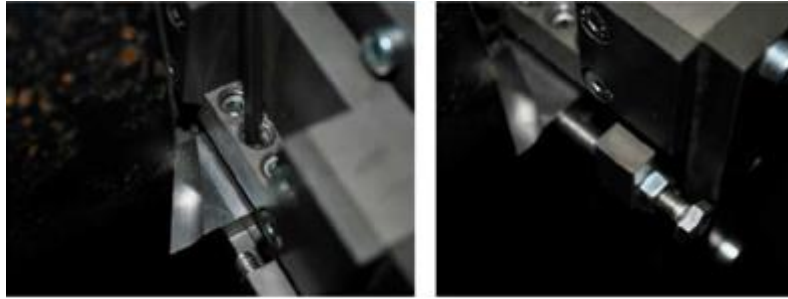


Holding plates

- Turn the carriage adjustment screw for freeing the tracking cam and then withdraw the machine using the feed key.

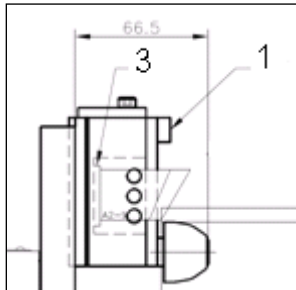


- Place the beveling tool in the profile tracker and clamp in position.



- Place the facing tool A1-9 in the tool-holder opposite the tool-tracker carriage and clamp in position.

Warning: Depending on the required profile of the bevel, a shim may need to be placed under the beveling tool. For a standard 30° or 37.5° bevel with a land of 1 to 3mm, a 3mm thick shim (Item.3) must be placed under the beveling tool. Please contact PROTEM's commercial department for other machining configurations.



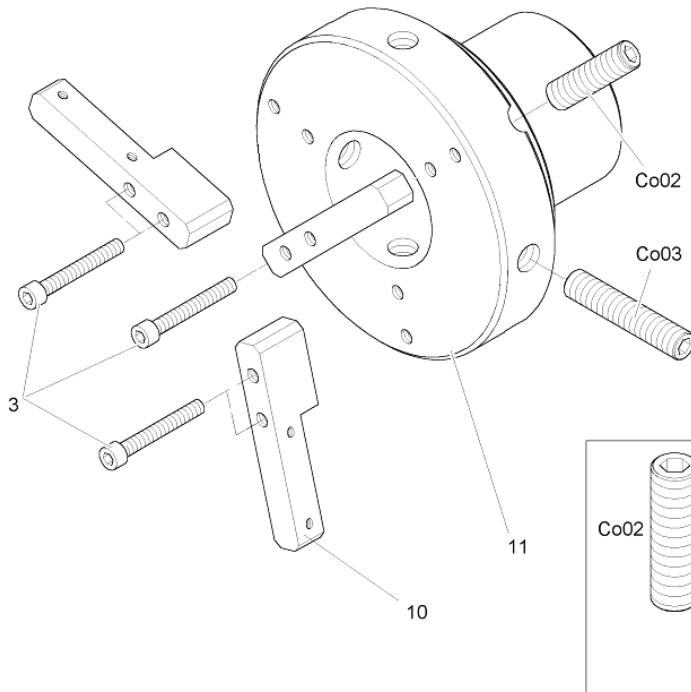
- Approach the tools close to the surface to be machined, leaving a slight gap between the pipe and the tools so as to avoid damaging them.
- Completely unscrew the carriage adjustment screw so the tracking cam makes contact with the ID of the pipe to be machined.



- Carry out the machining operation.
- If necessary, adjust the position of the beveling tool for obtaining the land thickness required.



Préhension pour coudes US40 (Arbre N° 1)



	Coude	Tube
Préhension coudes US40 (Arbre N°1)	∅144.6 int ∅ 219 int	∅140 int ∅ 219 int
∅ mini-∅ maxi	Vis	
∅140 -∅180	8 vis HC M12x40	
∅179 -∅219	8 vis HC M12x60	

US40 Elbow Mandrel Assembly N° 1 Préhension pour coudes US40 (Arbre N° 1) US40 Rohrbogenspannvorrichtung Nr. 1					
N°	Description:	Désignation	Beschreibung	Qty.:	Reference:
3	M6x30 CHC screw	Vis CHc M6x30	Inbusschraube M6x30	6	US40-CO-VISSERIE
10	Concentricity adjustment stop	Butée de réglage concentricité	Anschlag	3	US40PR/C-10
11	Ring for US 40	Anneau pour US 40	US 40 Ring	1	US40PR/C-11
Co01	Pin	Goupille	Zylinderstift	3	US40PR/C-CO01
Co02	M12 HC Screw	Vis HC M12	Gewindestift M12x40	8	US40PR/C-CO02
Co03	M12 HC screw	Vis Hc M12	Gewindestift M12x60	8	US40PR/C-CO03

Procedure for using the elbow mandrel assembly (Ø 145 to Ø 219 mm)

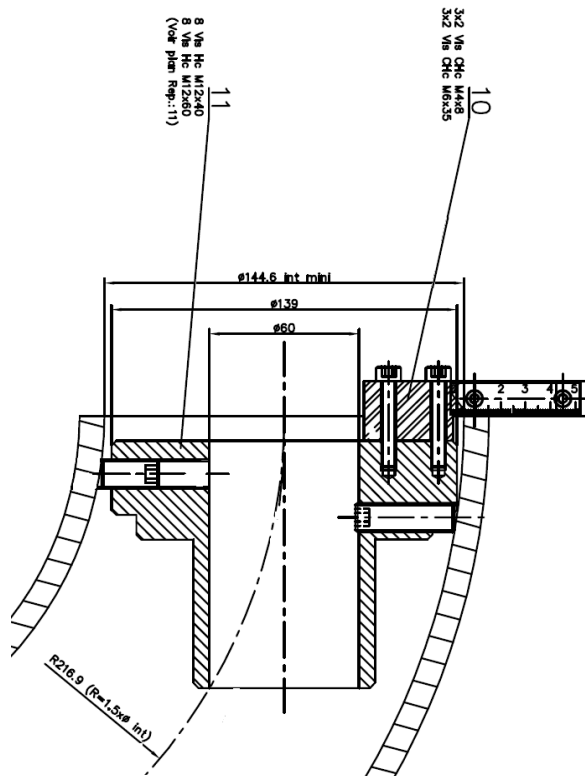
Fitting the mandrel assembly for elbow n°1

Select the eight M12 clamping screws depending on the ID of the pipe or the elbow to be machined (See table opposite).

	CoUDE	Tube
Préhension coudes US40 (Arbre N°1)	Ø 144.6 int à Ø 219 int	Ø 140 int à Ø 219 int

Ø mini-Ø maxi	Vis
Ø 140 - Ø 180	8 vis HC M12x40
Ø 179 - Ø 219	8 vis HC M12x60

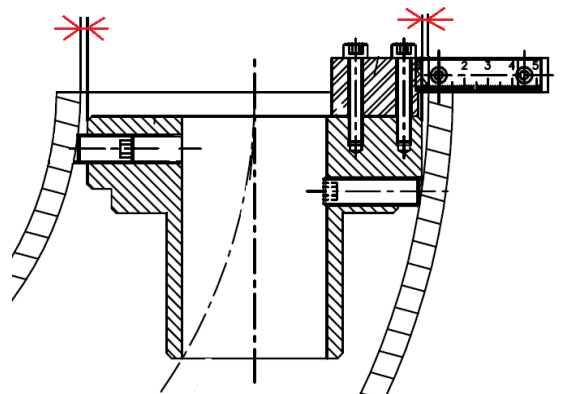
Pre-position the 8 screws in the ring, Item 13, and fit the three concentricity adjustment stops on the ring (3 M6x35 CHC screws).



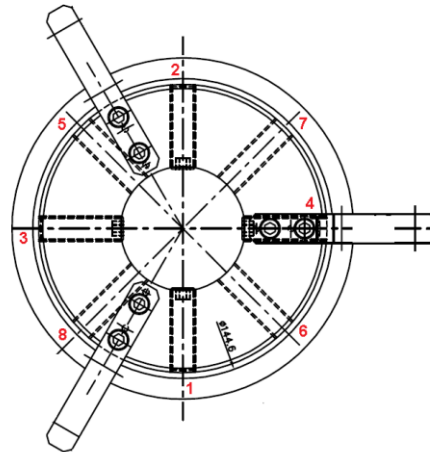
Place the ring inside the pipe or the elbow to be machined, by laying the three stops flat against the front face

Adjust the concentricity of the ring by means of the rules located on the stops.

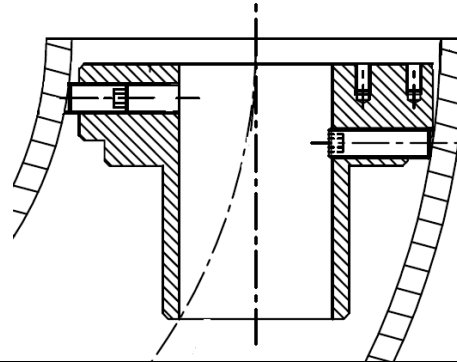
Put the eight M12 clamping screws into contact against the ID.



Re-check the concentricity of the ring before fully tightening the 8 clamping screws. For clamping correctly, tighten the screws in a cross-pattern (see the order of tightening on the diagram opposite).

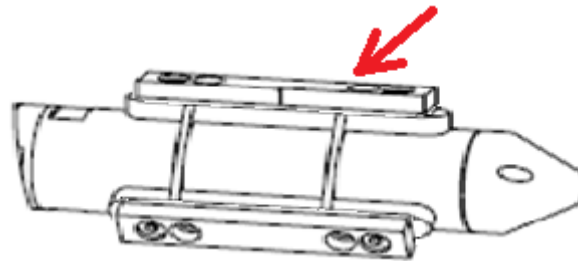


When the ring is locked in position, remove the three stops.



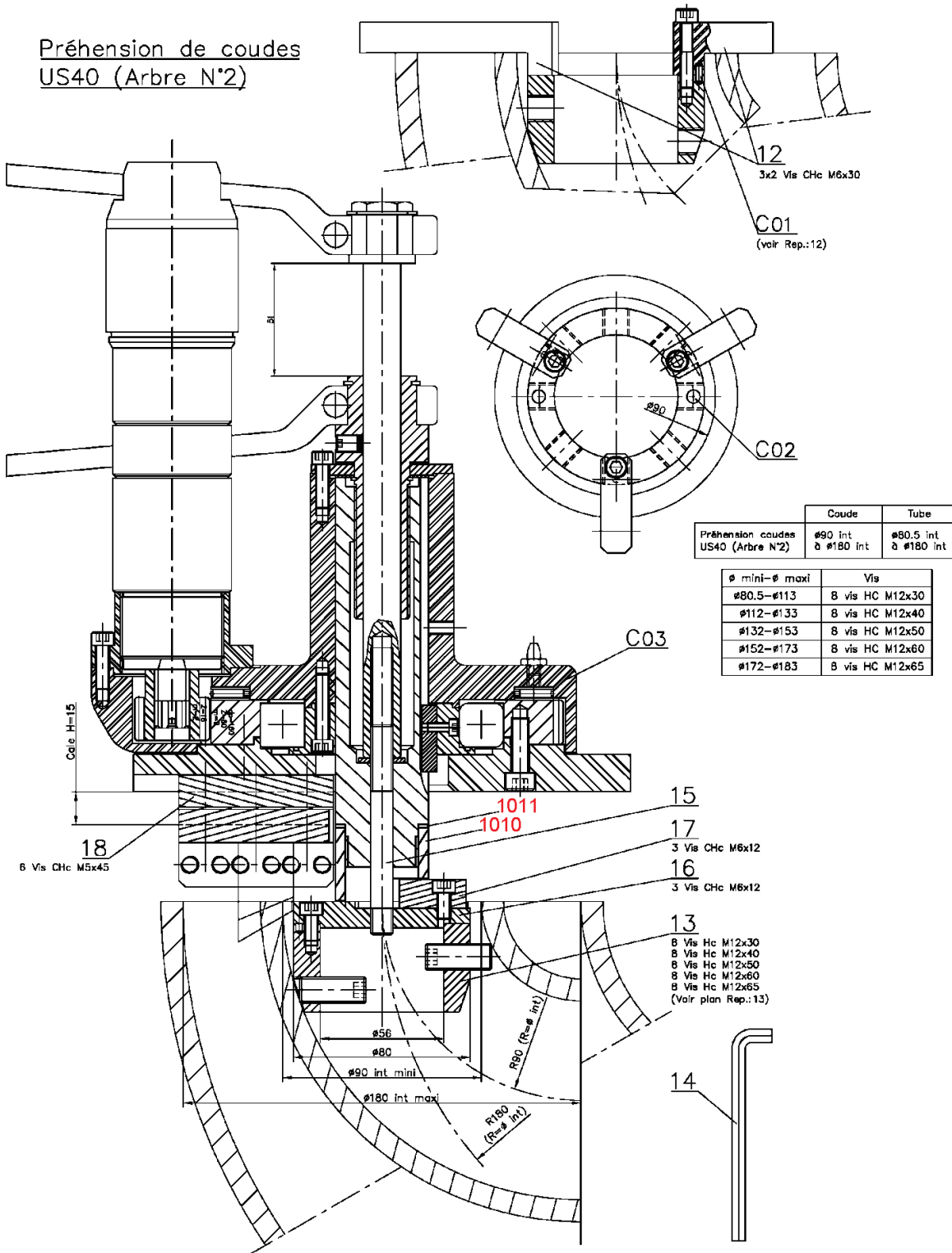
Place the N°1 expansion blades, 7.5mm thick, on the shaft and then place the machine on the ring and clamp it in position using the ratchet wrench.

Select the tools required for the machining operation and fit them in place.



Préhension pour coudes US40 (Arbre N° 2)

Préhension de coudes
 US40 (Arbre N°2)



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US40 – Rev Z - 110915			42/47

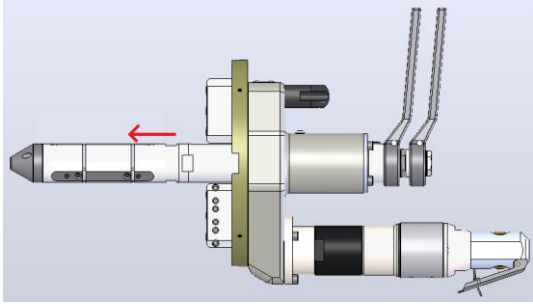
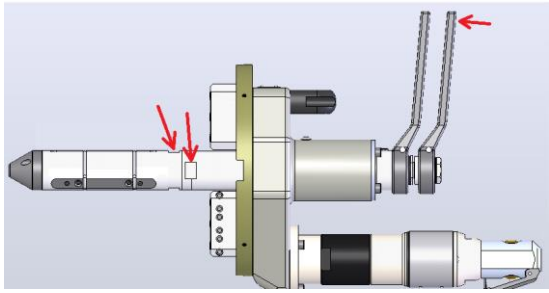
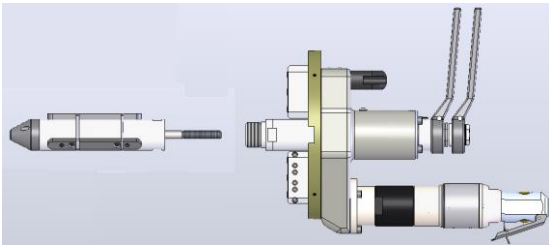
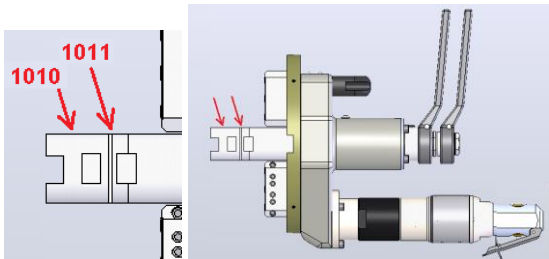
US40 Elbow Mandrel Assembly N° 2
Préhension pour coudes US40 (Arbre N° 2)
US40 Rohrbogenspannvorrichtung Nr. 2

N°	Description:	Désignation	Beschreibung	Qty.:	Reference:
12	Concentricity adjustment stop	Butée de réglage concentricité	Anschlag	3	US40PR/C-12
13	Ring	Anneau	Ring	1	US40PR/C-11
15	Inner rod	Tige intérieur	Innerer Dorn	1	US40PR/C-15
16	Cover	Couvercle	Abdeckung	1	US40PR/C-16
17	Key	Clavette	Passfeder	3	US40PR/C-17
18	Shim H = 15	Cale H = 15	Beilage H = 15	2	US40PR/C-18
CO01	Pin type A3x8	Goupille type A3x8	Zylinderstift A3x8	3	US40PR/C-CO01
1010	Adaptor for new US40 shaft	Pièce d'adaptation pour le nouvel arbre US40		1	US40PR/C-1010
1011	Aluminum spacing washer	Rondelle intermédiaire en aluminium		1	US40PR/C-1011

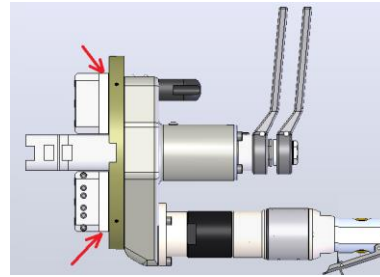
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Procedure for using the elbow mandrel assembly n°2 (Ø 80 to Ø 180 mm)

Preparing the machine shaft	
<p>Fit the shaft in position with it protruding out as far as possible</p>	
<p>Use two 38mm flat wrenches for separating the front part of the shaft. Warning: The thread is left-hand, turn clockwise to unscrew. Should you have any difficulty, fit an extension to the wrench. When the shaft comes free, unscrew it completely and unscrew the machine-clamping ratchet wrench at the same time.</p>	
<p>Remove the front part of the shaft.</p>	
<p>Place an aluminum spacing washer Item 1011 in position, clean the thread with compressed air, grease it and screw the adaptor part, Item 1010, into position.</p>	

Place the two aluminum riser blocks, Item 18, under the two tool-holder carriages (M5x45 CHC screw).



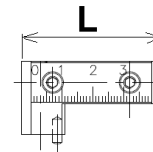
Fitting the mandrel assembly for elbow n°2

Select the eight M12 clamping screws depending on the ID of the pipe or the elbow to be machined (See table opposite).

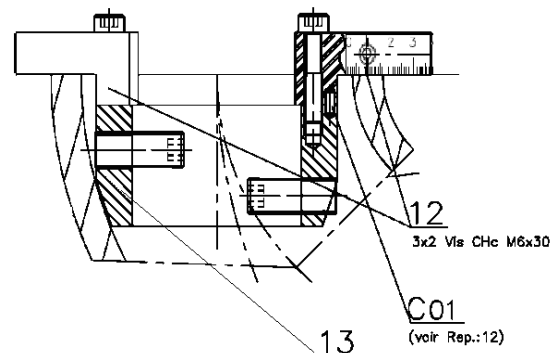
Select the three concentricity adjustment stops depending on the diameter of the pipe of elbow to be machined.

	Coque	Tube
Préhension caoudes US40 (Arbre N°2)	ø90 int à ø180 int	ø80.5 int à ø180 int

ø mini-ø maxi	Vis
ø80.5-ø113	8 vis HC M12x30
ø112-ø133	8 vis HC M12x40
ø132-ø153	8 vis HC M12x50
ø152-ø173	8 vis HC M12x60
ø172-ø183	8 vis HC M12x65



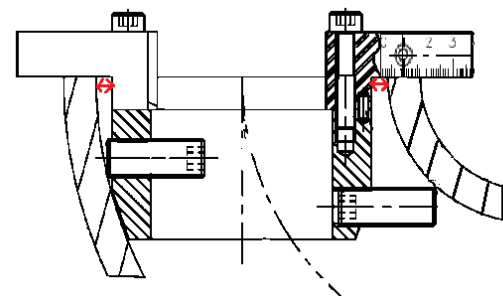
Pre-position the 8 screws in the ring Item 13 and fit the three concentricity adjustment stops on the ring (3 CHC screws M6x35).



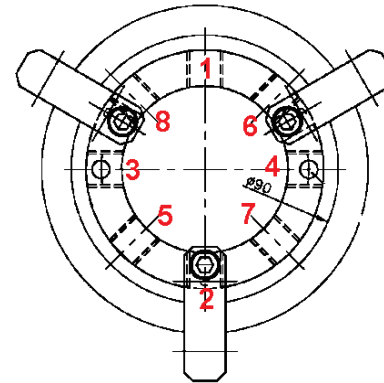
Position the ring inside the pipe or the elbow to be machined by laying the three stops flat against the front face.

Adjust the concentricity of the ring by means of the rules located on the stops.

Put the eight M12 clamping screws into contact with the ID.

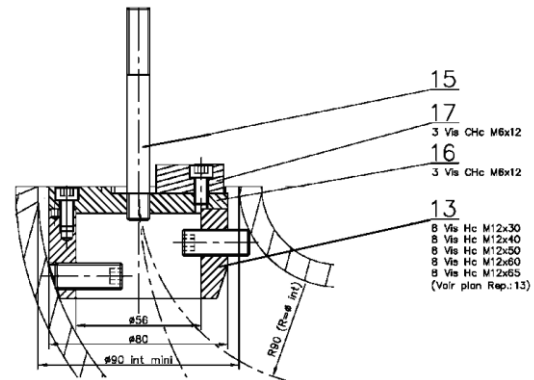


Re-check the concentricity of the ring before fully tightening the 8 clamping screws. For clamping correctly, tighten the screws in a cross-pattern (see the order of tightening on the diagram opposite).



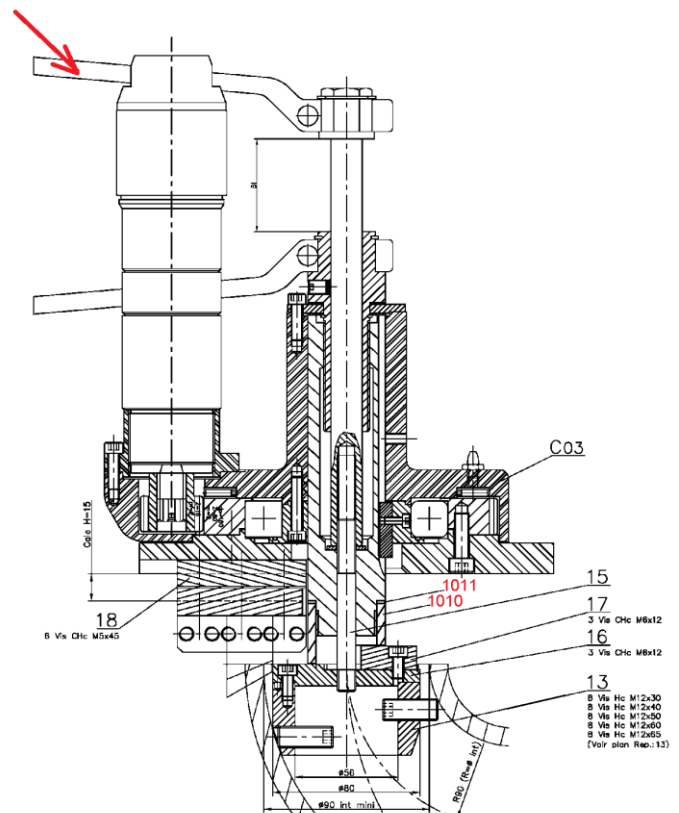
When the ring is locked in position, remove the three stops and fit the cover, Item 16, on the ring (3 M6x12 CHC screws).

Before assembling, the cover must be fitted with three keys, Item 17 and the clamping rod, Item 15.

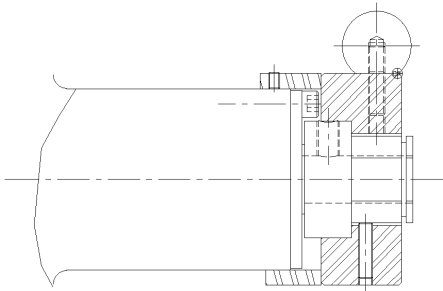


Place the machine on the ring and clamp it in position using the clamping ratchet wrench.

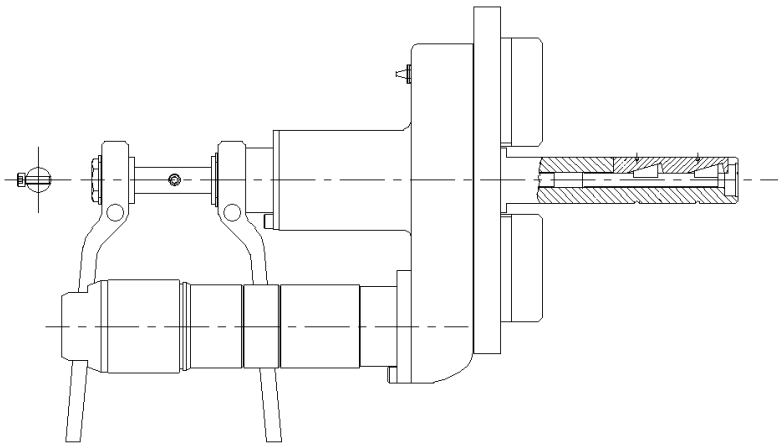
Select the tools required for the machining operation and fit them in place.



OPTION: FEED WITH GRADUATED DIAL



OPTION: SHAFT Ø 30 mm



A.12 NOTES

Dotted lines for notes.