



P01

Operating and maintenance manual

PLUMETTAZ S.A.

Zone industrielle "En Vannel C"

CH-1880 BEX

Switzerland

Tel. + 41-24 463 06 06

Fax +41-24 463 06 07

Internet: <http://www.plumettaz.com>

Contents

1. Identification.....	4
1.1 Product mark.....	4
1.2 Machine identification plate	4
1.3 Version	4
1.4 Manufacturer and distributors.....	4
1.5 Convention terms applied in this manual	5
2. Jetting.....	5
2.1 Definition.....	5
2.2 Advantages	5
2.3 On the worksite	5
2.4 Warning signs placed on the machine.....	6
3. Description	7
3.1 General points	7
3.1.1 Cable feeder	8
3.1.2 Entry guide and speed & distance indicator	9
3.1.3 Air inlet unit	9
3.1.4 Motor control device	10
3.2 Dimensions and weight	11
3.3 Regulations conformity	11
3.4 Compressed air supply	11
4. Preparation	12
4.1 Safety.....	12
4.2 Preparing the MiniJet	14
4.2.1 Adapting to duct dimensions.....	14
4.2.2 Installing the jaws.....	14
4.2.3 Adapting to cable dimensions	14
4.2.4 Preparation for mounting the cable and duct inserts	15
4.2.5 Mounting the cable insert and sealing cords.....	15
4.2.6 Mounting the duct insert and sealing cords	16
4.2.7 Changing the belts	16
4.2.8 Cable guide	17
4.2.9 Speed & distance indicator VL20	18
4.2.10 Motor control device	18
5. Putting into operation.....	19
5.1 Before starting.....	19
5.2 Setting up the MiniJet and connecting	19
5.3 Clamping the duct	20
5.4 Introduction of the cable.....	20
5.5 Safety checks	21
5.6 Pressurizing the duct and checking tightness	22
5.7 Starting the cable installation.....	22
5.8 Stopping the cable installation.....	23
5.9 Emergency stop.....	23
6. Transportation and storage.....	24
6.1 Transportation.....	24
6.2 Storage conditions.....	24
7. Maintenance	25
8. Product end of life	25
9. Trouble-diagnosis and Troubleshooting	26

Déclaration CE de conformité
CE declaration of conformity
CE Konformitätserklärung



Le fabricant:
The manufacture:
Der Hersteller:

PLUMETTAZ SA
Fabrique de machines
CH-1880 Bex (Switzerland)

déclare par la présente que les machines décrites ci-après,
thereby declares that the following described machinery,
 erklärt hiermit, dass unten beschriebene Maschinen,

Appareil pour la pose de câbles par "JETTING"
Machine for cable installation using the "JETTING" method
 Gerät für die Kabelverlegung mit "JETTING"

Type: **MINIJET P-01**

N° de série / Serial No. / Serien-Nr.: **80'956**

Année/Year/Jahr: **2010**

satisfont à l'ensemble des dispositions pertinentes
 des directives suivantes:

*fulfil all the relevant provisions of the following
 directives:*

alle einschlägigen Bestimmungen der folgenden
 Richtlinien erfüllen:

2006/42/CE Machines
 2006/42/EC Machinery
 2006/42/EG Maschinen

Normes harmonisées appliquées:

Harmonised standards used:

Angewandte harmonisierte Normen:

EN ISO 12100-1, EN ISO 12100-2, EN ISO 14121-1

Persone autorisée à constituer le dossier
 technique:

Person authorised to compile the technical file:

Person die bevollmächtigt ist, die technischen
 Unterlagen zusammenzustellen:

Michel Cherix
 PLUMETTAZ SA
 CH-1880 Bex (Switzerland)


Bex, 17.09.2010



Jacques Perrin
 Quality System Manager

1. Identification

1.1 Product mark

Logo :	
Reference designation :	MiniJet P01
Article family :	-FJ04xxxxx
Machine type :	Apparatus for installation of cable(s) (fiber optic or conventional) and microduct(s) into (sub)duct using the JETTING or FLOATING method.

1.2 Machine identification plate




A-Type of machine
B- Machine number



1.3 Version

Mode of transmission :	Pneumatic motor
Carrier medium :	Air In this manual as carrier medium into the (sub)duct air is stated. Note that the MiniJet can also operate with water and other carrier fluids or gasses.

1.4 Manufacturer and distributors

Machine mark :	
Address :	Plumettaz SA Zone industrielle En Vannel C CH-1880 BEX Switzerland Tel. +41-24 463 06 06 Fax +41-24 463 06 07 Internet : http://www.plumettaz.com
Distributors and agents :	Complete list under http://www.plumettaz.com

1.5 Convention terms applied in this manual

<p>Safety instructions for the user :</p> <p>Warning message </p> <p>Safety message </p>	<p>Warning, take care</p> <p>DANGER, safety rules, non-compliance of which can result in injury to users and damage to the equipment. Compliance with these instructions is obligatory.</p>
--	--

2. Jetting

2.1 Definition






	<p>JETTING is a method for the installation of microducts, fiber optic - or conventional telecommunication-cables into protecting duct by use of a high speed air flow combined with an additional mechanical pushing force.</p> <p>In this manual the term cable is used/stated. Note that with MiniJet it's also possible to install cable - and microduct - bundles.</p>
--	--

2.2 Advantages

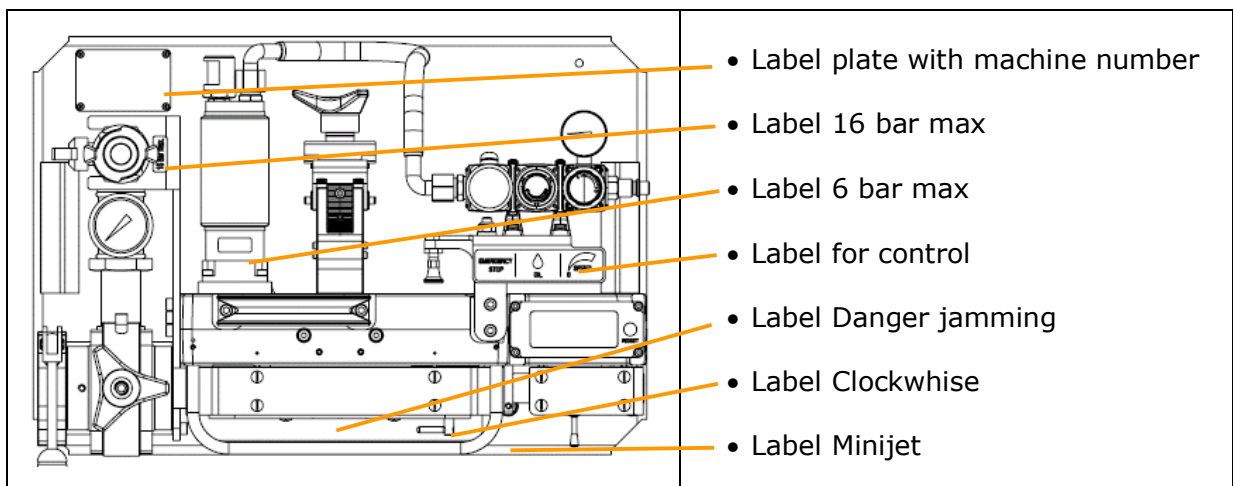
	<ul style="list-style-type: none"> • JETTING permits an even distribution of pushing force along the whole length of the cable. • Due to the absence of traction forces, heavy friction forces occurring in bends with traditional installation methods, are avoided. • Due to its simplicity, maximum safety for both personnel and installed cable are ensured. • The increased daily installation rates create cost savings on infrastructure and work force and reduces the on-site working time.
--	---

2.3 On the worksite

	<ul style="list-style-type: none"> • JETTING permits the installation of very long uninterrupted sections of cable without traction armoring (1000 to 3000 meters) • Cables can be directly installed through several intermediate chambers without manual intervention to the cable itself • The straightness of the duct route is no longer a constraint and the protection duct can be direct buried.
--	---

	<ul style="list-style-type: none"> • Sub-ducting operations and simultaneous installation of several sub-ducts are possible without concern of possible spiralling of the sub-ducts. • A regular daily installation rate can be ensured despite the nature or complexity of the duct route. • A cable can be totally removed and replaced in one operation by simply coupling the new cable to the old one.
Utilization limits of the MiniJet P01Duct dimensions	Outer diameter from 7 to 42 mm
Cable dimensions	Diameter from 4 to 16 mm
	The installation distances achieved with the MiniJet depend on the characteristics of cable and duct. The interactions between weight, dimensions, rigidity and materials used, the complexity and quality of the duct route as well as the characteristics of the compressed air supply must be carefully defined.
	Please consult us before installing cables or using ducts outside above limits.
	For all other applications, do not use MiniJet without our written consent. Please contact our After-Sales Service.
	Any usage of the machine not corresponding to the purpose it was manufactured is considered non-compliant to the intended use by Plumettaz SA, who thus refuses any kind of responsibility for accidents caused by this form of use.
	All signs and indications affixed to the machine must be perfectly legible and comprehensible at all times. If they are not, they must be replaced immediately.

2.4 Warning signs placed on the machine



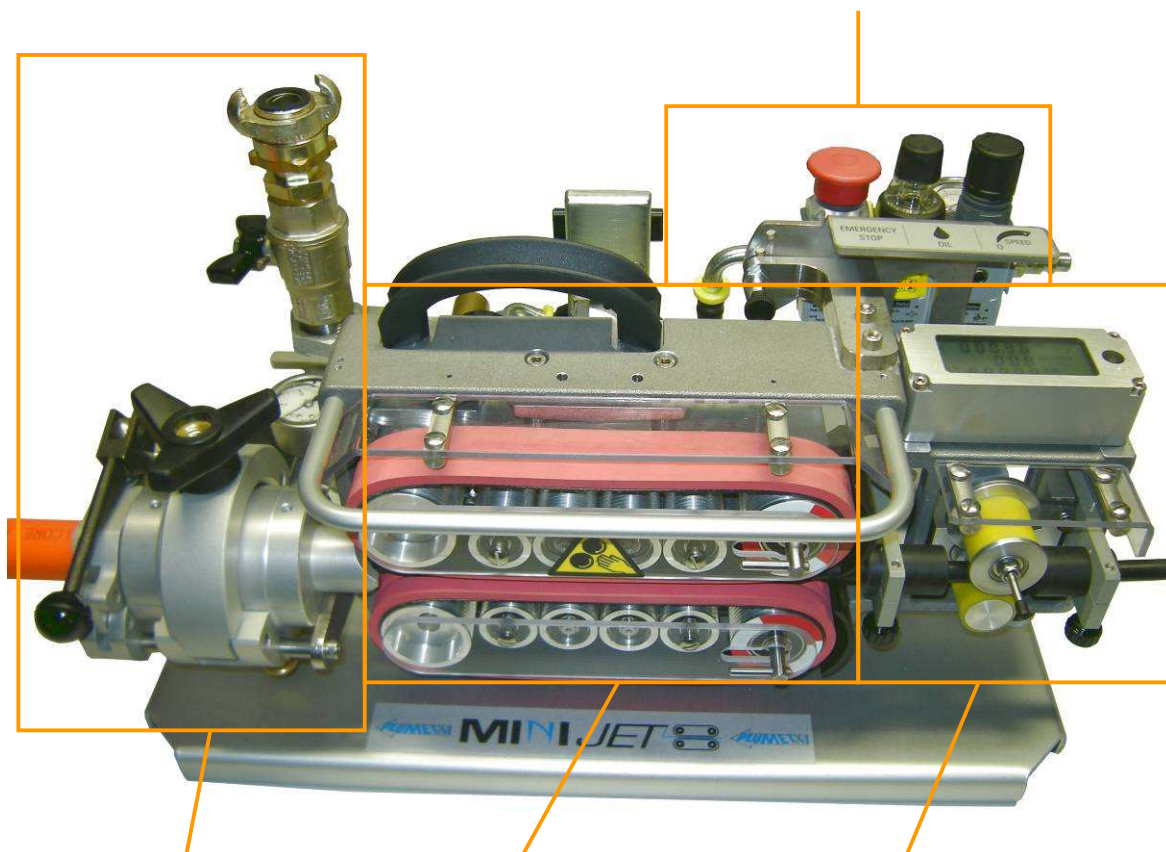
3. Description

3.1 General points

The **MiniJet** is an assembly of four subsystems with very distinct functions :

- 3.1.1** The cable feeder
- 3.1.2** The entry guide and speed & distance indicator
- 3.1.3** The air inlet unit
- 3.1.4** The motor control device

3.1.4 Motor control device

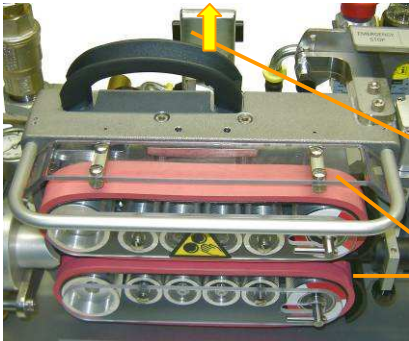
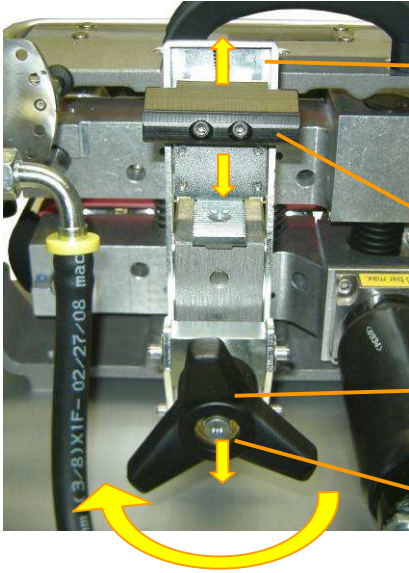



3.1.3 Air inlet unit

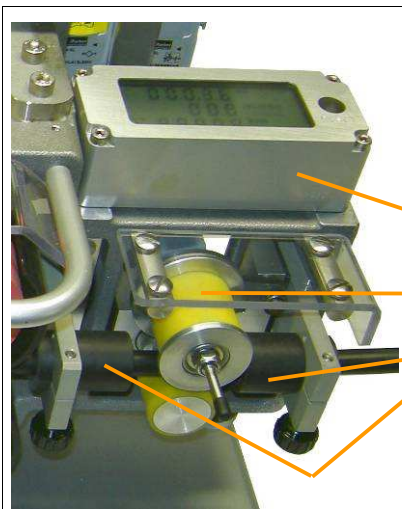
3.1.1 Cable feeder

3.1.2 Entry guide and
speed & distance indicator

3.1.1 Cable feeder

	<p>Function : The cable feeder conveys the pushing force to the cable by way of two belts Poly V® with strong adherence coating. It guides and feeds the cable to the air inlet unit.</p> <p>It comprises :</p> <ul style="list-style-type: none"> the tensioning device allowing to press the belts against the cable. To close the tensioning device the lever must be pushed away. the two belts Poly V® are driven synchronically by the pneumatic motor. Pulleys will pick up the forces exerted by the cable.
	<p>The tensioning device contains following elements :</p> <ul style="list-style-type: none"> an opening and closing lever. To close: the lever must be pushed, To open the lever must be pulled back. Note that the operator is standing at the other side of the machine as shown in the picture. a lock blocking the lever position. To un-lock pull the black plastic handle up, to lock let go of the black plastic handle as it will automatically go down. a hand-wheel to regulate the radial pressure on the cable. To increase the radial pressure, turn the hand-wheel clockwise. a visual indicator of the pressure on the cable. When increasing the radial pressure the central pin will come forward.
	<p>Before opening the tensioning device, release the pressure on the cable by turning the hand-wheel fully anti-clockwise, then pull up the black plastic handle to un-lock and move the level of the tensioning device towards cable feeder.</p>
<p>Characteristics of the cable feeder</p>	<ul style="list-style-type: none"> Radial pressure on cable / duct 0-100 N/cm Pushing force 0-300 N Installation speed 0-100 m/min Maximal working force at a speed of 60 m/min 150 N

3.1.2 Entry guide and speed & distance indicator

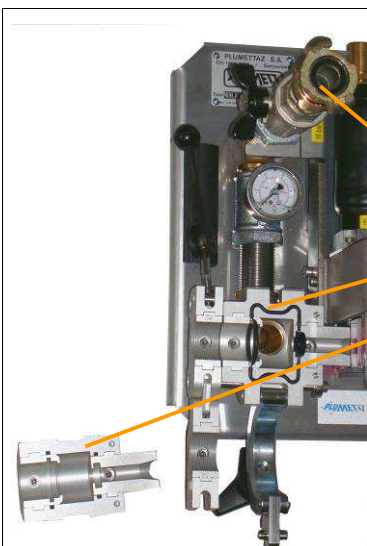


Function : to guide the cable towards the cable feeder and to indicate the cable speed, the installation distance and the accumulative distance installed.

The unit comprises :

- the electronic speed & distance indicator VL20
- the measuring wheel for the VL20
- Two cable entry guide (open/close) to allow the introduction/removal of the cable

3.1.3 Air inlet unit

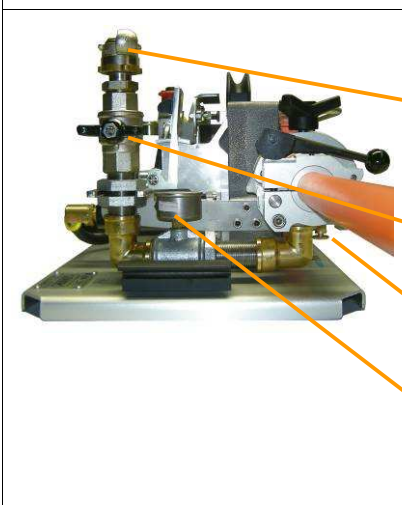


Function : to ensure the clamping of the (sub)duct to the **MiniJet** and to introduce the air whilst maintaining the tightness of the unit.

It includes :

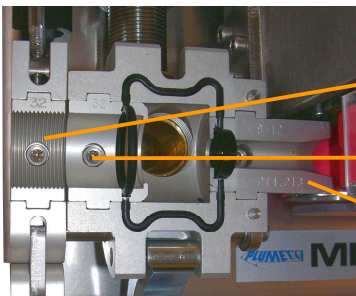
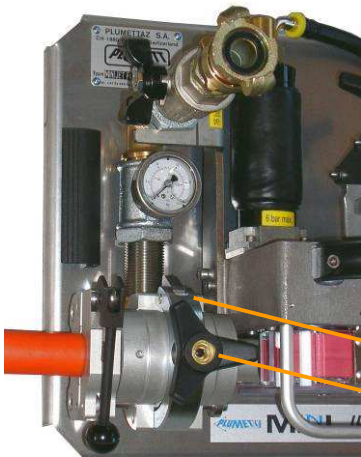

- the air inlet to connect the air hose
- the pressure chamber lower part
- the pressure chamber upper part

The pressure chamber comprises a lower and an upper part to facilitate the removal of the **MiniJet** after the installation and the placing of the jaws, inserts and seals.

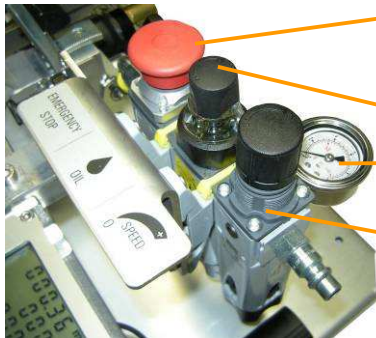


The air inlet includes :


- a bayonet claw coupler 42 mm (MODY SSGA 38 type) with fail-safe assembly to connect the air hose.
- a 1" air inlet valve to regulate the air pressure inside the pressure chamber and the (sub)duct.
- a 1/4" bleed-off valve to allow rapid de-pressurization of the pressure chamber and the (sub)duct.
- a manometer 0 - 25 bar indicating the pressure inside the pressure chamber.

	<p>The pressure chamber includes :</p> <ul style="list-style-type: none"> • a set of 2 duct jaws for clamping and holding the (sub)duct to the MiniJet. • a set of 2 duct inserts with O-ring for sealing-off the (sub)duct inside the pressure chamber. • a set of 2 cable inserts with lip-seal to guide the cable from the cable feeder through the pressure chamber into the (sub)duct and to seal the cable at the entry of the pressure chamber.
	<p>The air inlet unit locks mechanically with a quick clamping device.</p> <p>Allowable operating pressure in the pressure chamber :</p> <ul style="list-style-type: none"> • Air : 16 bar • Water : 25 bar <p>The quick clamping device is made of :</p> <ul style="list-style-type: none"> • a fastening clamp • a hand-wheel for tightening
	<p>It is strictly forbidden to open the inlet unit when under pressure.</p>

3.1.4 Motor control device

	<p>Function : To regulate the speed of the cable installation. It comprises :</p> <ul style="list-style-type: none"> • A block valve which allows to stop the air flow to the pneumatic motor in case of an emergency or failure of the system • a gravity lubricator with lubricant reservoir. • a manometer indicating the pressure to the pneumatic motor. • a speed control knob with locking device and an air filter and water reservoir.
---	--

Characteristics of the motor control device :

Pressure	0-7 bar
Maximal air consumption	0-1,5 m³/min
Motor lubricant	Recommended viscosity class : ISO VG 46
	The pneumatic motor accepts a maximal inlet pressure of 7 bar . To guarantee that no pressure exceeding 7 bar can be supplied to the motor control device and pneumatic motor a pressure restrictor is included in the air hose set. Any modification to the air hose set and/or removal of the pressure restrictor can damage the motor control device and/or pneumatic motor.

3.2 Dimensions and weight

MiniJet alone :	L 520 x l 355 x H 295 mm	Weight 20 kg
MiniJet with case + tools and accessories :	L 600 x l 400 x H 460 mm	Weight 37 kg

3.3 Regulations conformity

Average sound pressure level on work place : L_{pA} : 86 dB(A) L_{WA} : 99 dB(A).

The construction of the apparatus and safety prescriptions are in conformity with EC Machines Directive N° 2006/42/EC


3.4 Compressed air supply

Each MINIJET-P01 must necessarily be supplied with air according to the following characteristics:

Max. pressure : - air 16 bar

Nominal flow :






- | | | |
|----------------------------------|-----|--------|
| - for ducts up to OD 8 mm: | 0.8 | m3/min |
| - for ducts from OD 8 to 12 mm: | 1 | m3/min |
| - for ducts from OD 12 to 15 mm: | 1.5 | m3/min |
| - for ducts from OD 15 to 20 mm: | 3 | m3/min |
| - for ducts from OD 20 to 25 mm: | 4 | m3/min |
| - for ducts from OD 25 to 32 mm: | 5 | m3/min |
| - for ducts from OD 32 to 42 mm: | 7 | m3/min |












	<p>For safety reasons, the compressors having a nominal pressure of over 12 bar should be equipped with a device limiting this pressure to 16 bar.</p>
---	--

4. Preparation


4.1 Safety

Non-compliance with safety instructions described hereafter and in this manual, as well as non-observance of local safety regulations are the sole responsibility of the user.

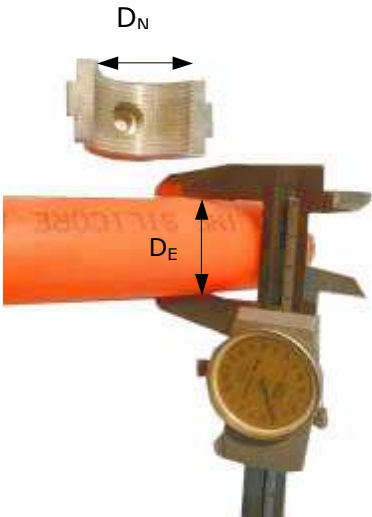

	<p>Prior to any cable installation using MiniJet all persons involved must absolutely be fully trained in the preparation procedures and the cable JETTING operations with MiniJet.</p>
	<p>The comprehension and application of the safety instructions detailed in this manual must be periodically verified by the work site supervisors.</p>
	<p>The different notices and labels provided on the MiniJet must always be perfectly legible and comprehensible. If not, they must be changed.</p>
	<p>This user guide and the materials provided: must be read carefully must be considered as an integral part of the machine must be retained for the entire service life of the machine must be passed on to any subsequent owner or user of the machine.</p>
	<p>The manufacturer refuses any liability for damage incurred by:</p> <ul style="list-style-type: none"> non-compliance with the content of this manual failure to observe local safety regulations in force operation of the machine for purposes other than the intended use operation of the machine by untrained or unauthorised staff modifications or interferences on the machine unauthorised by the manufacturer use of spare parts that are not original or not compatible with the machine repair work not carried out by an expert technician

	<p>Operators must make sure that sufficient surface area is available around the MiniJet to ensure its balance and steadiness, thus preventing any falls or other potential causes of accidents.</p>
	<p>Before pressurization of the equipment or (sub)duct, operators must ascertain that no person not taking part in their activities can hinder their work or, that such persons are kept at a sufficient distance to avoid all risks of injury.</p>
 	<p>Wearing eye and ear protection, a hard hat and protective overalls is obligatory, subject to locally applicable regulations.</p> <p>Depending on the nature of the site, wearing a breathing mask is recommended.</p>
 	<p>Communication between the different working stations must be tested and signals / safety messages such "STOP" and "START" must be clearly understood by the operators.</p> <p>During a cable installation the operator must inform downstream operators before opening the air inlet valve to pressurize the (sub)duct.</p>
	<p>In the event of faults, damage or any other circumstance liable to affect safety, the operator must stop work immediately and inform the supervisor or the manufacturer of the machine</p>
	<p>The MiniJet receives compressed air at an operational pressure of 16 bar maximum. Before any connection or disconnection, the pressure in the supply or exhaust hoses must be lowered to atmospheric pressure level.</p>
	<p>Before progressively opening the compressor valve, carefully check that the MiniJet valves are closed, that all connections are well in place and locked, that the hoses do not present abnormal bends or twists.</p>
	<p>Do not pass or stand in front of the duct exit as long as it is under pressure.</p>
	<p>The presence of any dust or dirt in the MiniJet can hinder its function and is susceptible to damage both cable and MiniJet.</p>

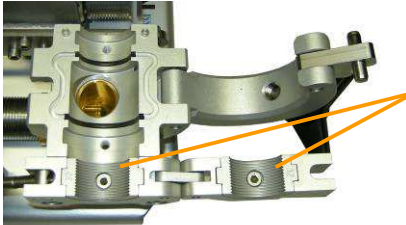
4.2 Preparing the MiniJet

	<p>In order to guarantee best installation results and avoid damage to cables and ducts follow the instructions hereafter carefully.</p>
---	--


4.2.1 Adapting to duct dimensions

	<p>Measure the exterior diameter of duct D_E and select the adequate jaws and duct inserts. The nominal D_N diameter is engraved on the jaws and duct inserts.</p> <p>Utilisation limits : $D_N = D_e \pm 1 \text{ mm}$</p> <p>In case the duct exterior diameter is outside the utilization limit, the correct sized jaws must be ordered.</p>
	<p>Never fit tape over the duct exterior diameter in order to clamp duct with larger jaws, as this will result in insufficient clamping of the duct.</p>

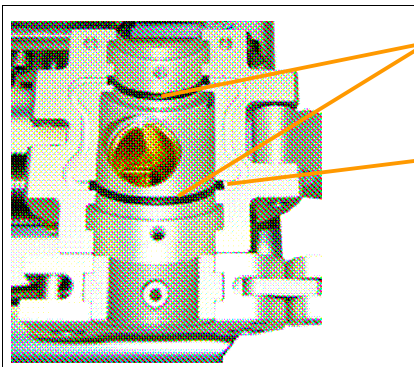
4.2.2 Installing the jaws

	<p>Insert the jaws into the lower and upper jaw holders and tighten with the screw.</p> <p>Bring the flat surface of the jaws in line with housing faces.</p>
---	---

4.2.3 Adapting to cable dimensions

	<p>Measure the diameter of cable D_E and select the adequate set of cable inserts. The cable diameter range is engraved on the inserts.</p> <p>Example : cable $D_E = 5 \text{ mm}$, use cable insert 4-5.</p> <p>In case the cable diameter is more than + 0.3 mm over the highest number engraved on the insert, use the next larger cable insert.</p>
---	--

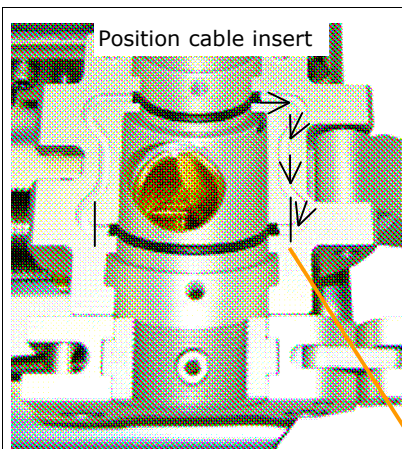
4.2.4 Preparation for mounting the cable and duct inserts



Make sure the inserts lodging and the sealing cord are free of dirt and damage. In case of damage fit a new cord.

At the locations where the sealing cord ends inside the grooves, the cords must have an overlength of approx. 0.5 mm over the groove base. In case these cords are below the groove's base the pressure chamber can not be fully pressurized due to air leakage.

4.2.5 Mounting the cable insert and sealing cords



Lower cable insert.

Place the lower cable insert in its lodging. Take the length of sealing cord supplied with the Minijet inside the tools box. Check that the end of the sealing cord is neatly cut at a 90 degree angle. Tilt the cable insert slightly in order to allow installation of the sealing cord from the right side. To install the sealing cord, the cord is to be pushed until it is in contact with the thin wall barrier. Rotate the cable insert until its flat surface is parallel with the pressure chamber face. Push the sealing cord inside the groove in small steps towards the duct insert, see the black arrows. Do not stretch the cord, as this will decrease the sealing capabilities.

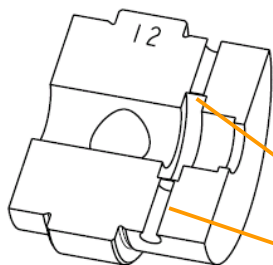
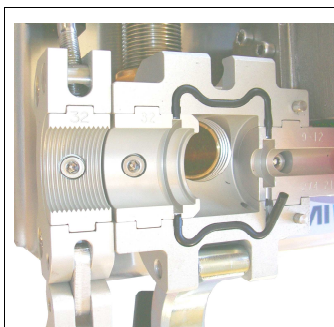
Cut the sealing cord around the location indicated by the **black line**. To fit the sealing cord inside the other side of the cable insert lift the cable insert slightly from its lodging. After the sealing cord is pushed toward the thin wall barrier, proceed as described above for the left side. After the sealing cords are fitted tighten the cable insert into its lodging with the Allen screw. Check that the flat faces of the cable insert are in line with the faces of the pressure chamber lower part.

Mount the upper cable insert into the pressure chamber upper part and tighten it into its lodging with the Allen screw. Check that the flat faces of the cable insert are in line with the faces of the pressure chamber upper part.



Only the lower cable insert has a groove. This groove corresponds to the one in the pressure chamber lower part.

4.2.6 Mounting the duct insert and sealing cords



In order to allow quick change-out of different sized duct inserts by avoiding fitting full length of sealing cords, each lower duct insert half is to be fitted with dedicated lengths of sealing cords. Fit sealing cord from the side into the duct insert until it is in contact with the thin wall barrier. Place the duct insert in its lodging and mark the sealing cord at 0.5 – 1.0 mm over-length to the end of the cord inside the groove according to par. 4.2.5. at the location of the black line.

After cutting push the end of the sealing cord fitted in the duct insert into the groove touching the end of the sealing cord already inside the groove. Push the sealing cord inside the groove in small steps towards the duct insert. Repeat this procedure for the left side.

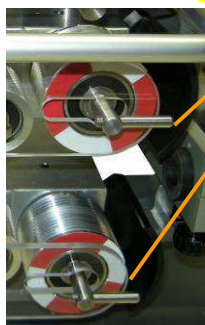
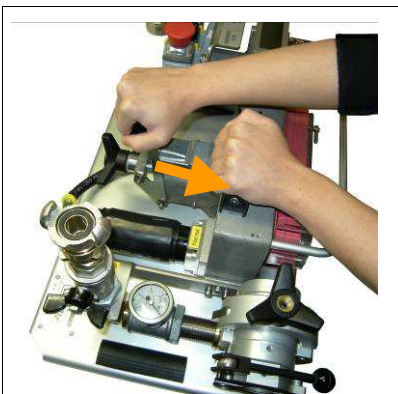
Mount the upper duct insert into the pressure chamber upper part and tighten it into its lodging with the Allen screw. Check that the flat faces of the cable insert are in line with the faces of the pressure chamber upper part.

Thin wall barrier
Cord groove



The quality of the inlet unit air tightness will depend on a meticulous installation of the sealing cords

4.2.7 Changing the belts



Before removing the belts :

- Make sure the cable feeder is open. The tensioning device must be in the position as indicated by the arrow point, near to the cable feeder.
- To release the tension to the belts, turn the belt tension levers as indicated. The levers must point to the right.
- Remove the belt from the V grooved wheels starting from the right hand side.



Mounting the belts :

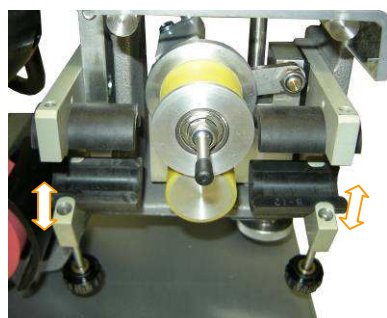
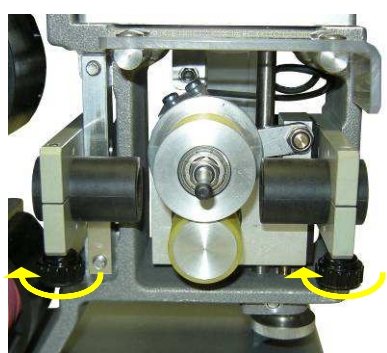
- Fit the belt over the plexy-glass protection onto the left V grooved wheel. The front side of the belt should be face with the front of the wheel covering all V grooves. Then press the belt in the middle slightly in order to get the belt over the right hand side of the plexy- glass protection and onto the right V grooved wheel. Push the belt until the front side of the belt is face with the larger diameter wheel and covering all V grooves.
- Tension the belts by turning the tension levers as indicated. The tension levers must point to the left.



During the manipulation of the belts of the MiniJet, the control system of the pneumatic engine must be disconnected from the circuit of air under pressure.


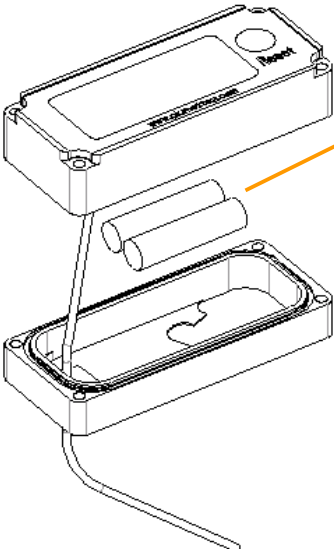
Non-compliance can cause injury and/or damage to the machine should the motor start inadvertently.

4.2.8 Cable guide

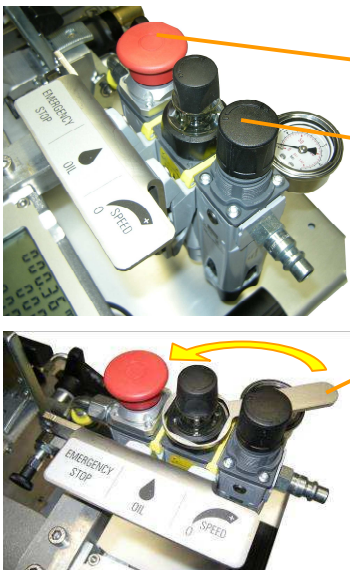


- To open the cable guides, first totally unscrew the bottom screws and pull down the lower lodging.
- Choose the cable guides according to the diameter of the cable : 4 to 8 mm, 8 to 12 mm and 12 to 15 mm.
- Fit the cable guides into the upper and lower lodging.
- Push the lower lodging up and tighten the screws.

4.2.9 Speed & distance indicator VL20



	<p>The MiniJet comes with a electronic speed & distance indicator type VL 20. The VL20 Speed and distance indicator comprises :</p> <ul style="list-style-type: none"> • a display indicating : <ul style="list-style-type: none"> - the installed distance in m or ft, - the installation speed in m/min or ft/min, - the cumulative distance in km or ft x 1000. • an activation and RESET button
<p>Activation of the VL20 Speed and distance indicator</p>	<p>The VL20 is activated the moment the measuring wheel is rotating or the RESET button is pressed. The display switches off automatically after 5 minutes of inactivity.</p>
<p>Resetting the distance indicator</p>	<p>Press the button and hold it during 5 seconds.</p>
	<p>The VL20 Speed and distance indicator works with 2 batteries type :</p> <ul style="list-style-type: none"> • Standard AAA. <p>To change the batteries:</p> <ul style="list-style-type: none"> • Dismantle the VL20 Speed and distance indicator by removing the 4 M4 screws. • Take off the rear cover gently and be sure not to tension the wire ! • Replace the batteries observing the polarity signs. • Close the rear cover and replace the Speed and distance indicator on its support. <p>Note that the VL20 Speed and distance indicator memorizes information, even when the battery is low or removed.</p>

4.2.10 Motor control device

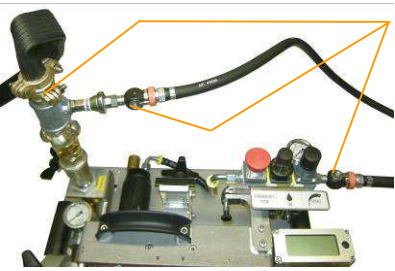
	<p>Before connecting the air hoses, verify that :</p> <ul style="list-style-type: none"> • The emergency stop is closed (push on the red button) • the speed control knob is closed, turned in full anti-clockwise position • the motor control device is clean (manometer glass, oil bowl) • check the oil level in the lubricator bowl. In case level of oil is too low, unscrew the sight/control dome from the lubricator unit using the special key, ¼ turn anti-clockwise, and pour sufficient oil into the lubricator. Screw back the dome in the locked position. The locked and un-locked positions are indicated at the base of the dome. Use the oil supplied with the MiniJet. Admitted viscosity class : ISO VG 46.
---	--

5. Putting into operation

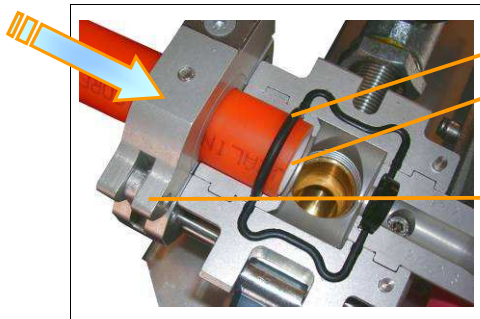

5.1 Before starting

	<p>Before starting a cable or microduct installation with a MiniJet, these important recommendations should be followed :</p> <p>check the location of the (sub)duct route according to the map. Note that changes of directions, directional drills and/or (sub)duct connectors can cause obstructions during the installation.</p> <p>open the hand-holes and remove possible (sub)duct closures.</p> <p>verify that the (sub)duct has been calibrated, clean and without water and that correct sized (sub)duct connectors have been used and correctly fitted.</p>
<p>Software</p> 	<p>To help in the preparation work, the optional "JET PLANNER" software will permit to determine maximal section lengths with regard to terrain, duct, cable, parameters, etc.</p>
<p>Cable preparation</p>	<p>Use the right cable caps</p> <p>Put the cable caps (available as option) that corresponds to the cable Ø</p>

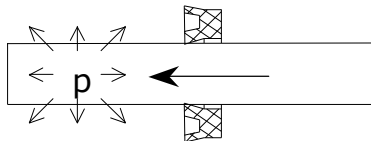
5.2 Setting up the MiniJet and connecting

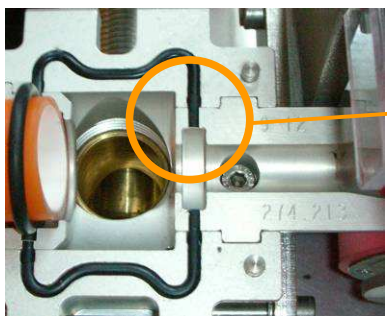
	<p>Position the MiniJet and the cable drum(s) in one line to guarantee an optimal installation result.</p> <p>Be sure to place the MiniJet in a stabile position and make sure that it is accessible from all sides.</p>
	<p>Connect the air hoses to the MiniJet and make sure they are properly locked.</p>

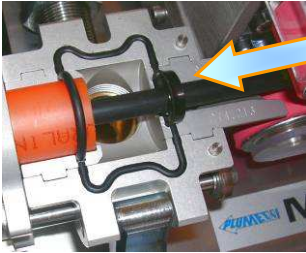
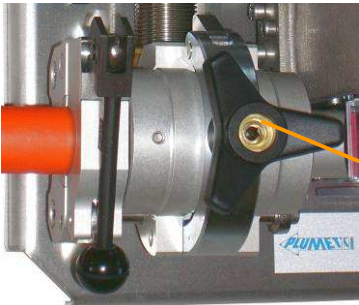

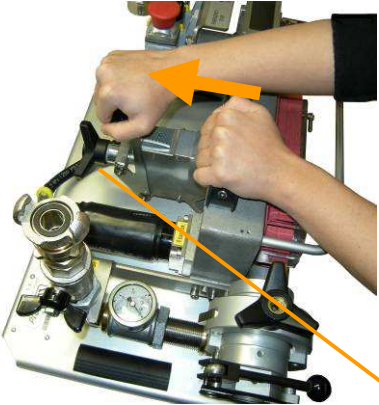
5.3 Clamping the duct

	<ul style="list-style-type: none"> • Fit the O-ring seal around the duct. • Position the duct as far as possible into the duct insert and fit the O-ring into the groove with the cut facing down • Close the upper jaw and lock it by pushing the lever down completely
Cleaning and lubricating the duct	See Instruction MICROJETTING LUBE n° 298.238
	WARNING : do not stand in front of the duct exit as long as it is under pressure.


5.4 Introduction of the cable

	To introduce the cable into the MiniJet , the cable entry guide, the cable guide, the cable feeder and the inlet unit must be open, the measuring wheel of VL20 must be lifted.
Preparing the cable	A cable cap must be fitted to the cable tip. To screw the correct sized cable cap to the cable tip, the protection jacket must be chamfered. A cable cap should not exceed the cable diameter by more than 0.5 mm.
Sealing the cable at the inlet of the pressure chamber	<ul style="list-style-type: none"> • Fit the lip seal over the cable with the lips facing the pressure side. <div data-bbox="853 1429 1225 1568" data-label="Image">  </div> <ul style="list-style-type: none"> • In order to allow removal of the lip seal after the installation cut the lip seal to one side with a sharp knife.


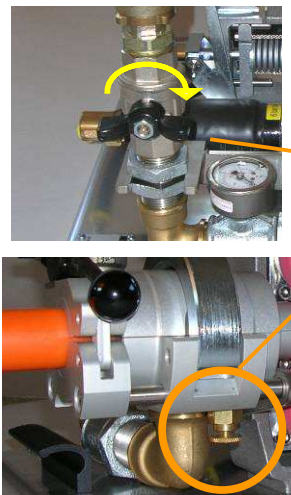
	<ul style="list-style-type: none"> • Position the lip seal over the cable and into the cable insert groove with the cut facing down.
---	--

	<ul style="list-style-type: none"> • Introduce the cable by hand into the duct for a few meters
	<ul style="list-style-type: none"> • Close the upper part of the pressure chamber. Be sure both the O-ring and lip seal are inside the respective grooves. • Put the fastening clamp in place • Turn the hand wheel clockwise to close the pressure chamber.
	<p>Once the pressure chamber is closed, verify manually that the cable can move freely.</p>
	<p>Now close the cable feeder :</p> <ul style="list-style-type: none"> • hold the handle fitted on the cable feeder's frame with your left hand, • with your right hand push the tensioning device lever away from the cable feeder while lifting with your fingers the locking device/black plastic handle fitted to the back side of the tensioning lever • when the tensioning lever can not move further away from the cable feeder, let go of the locking device. The tensioning device is now locked and the cable feeder closed • increase the radial pressure on the cable with the hand wheel. A proper radial pressure has been reached when pulling the cable back out of the cable feeder and both belts move without slippage.


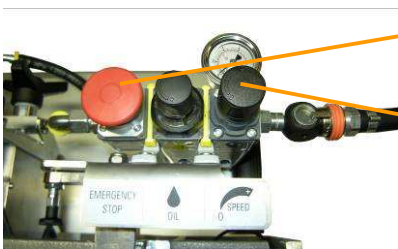

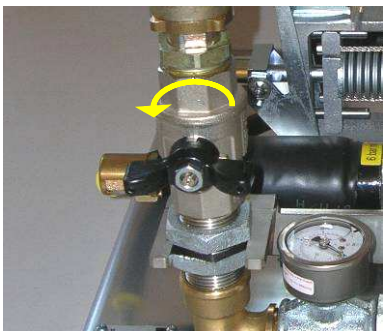
5.5 Safety checks

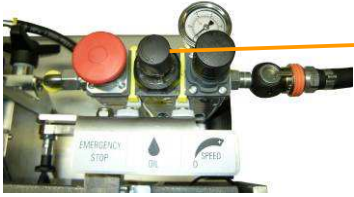
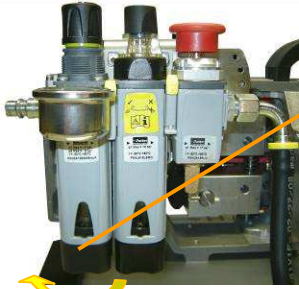
	<p>Before starting the compressor:</p> <ul style="list-style-type: none"> • Make sure all the pneumatic connections are properly fixed and locked. • Make sure all air valves are closed. <p>After compressor has run for some minutes to heat-up:</p> <ul style="list-style-type: none"> • open the all air valves starting with the compressor valve. Always open valves slowly.
---	---

5.6 Pressurizing the duct and checking tightness

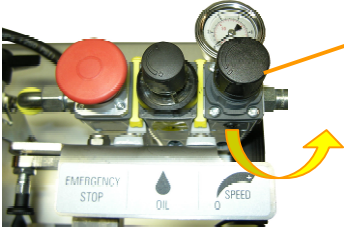

	<p>Before pressurizing the duct, announce the arrival of air by radio or some other available means to the operator(s) at the end of the duct route.</p>
	<p>Check the air tightness of the pressure chamber</p> <p>If tightness appears to be insufficient:</p> <ul style="list-style-type: none"> • Stop the compressor • Close the air inlet valve • Open the bleed-off valve and wait until the pressure chamber is de-pressurized • Check the sealing cords and position of O-ring and lip seal and replace and/or correct position

5.7 Starting the cable installation



	<p>Make sure the speed and distance indicator has been set to zero.</p>
	<ul style="list-style-type: none"> • Open the emergency stop (pull the red button) • Start the installation by turning the motor control knob clock-wise. The knob is fitted with a lock, to allow turning of the knob it must be in the upper position.
	<p>Verify the motor pressure on the manometer</p>
	<ul style="list-style-type: none"> • Introduce the cable without pressurizing the duct until the desired speed is reached. We recommend 40 – 50 m/min. • As soon as the speed decreases, turn the air inlet valve progressively anti-clockwise in order to pressure in the duct. • The pressure to the duct at the start should be 3 – 4 bar. Do not use high pressures at the start of the cable installation • In order to maintain the same speed the pressure to the duct and pressure to the motor are to be increased in small steps. Pressure to duct should be increased in steps of 0.5 to 1 bar, pressure to the motor in steps of 0.2 – 0.4 bar.



	<ul style="list-style-type: none"> Check the setting of the lubricator. The correct setting of the lubricator is min. 1 – 2 drops per minute
	<ul style="list-style-type: none"> Check the water level of the filter unit during the cable installation (don't forget to regularly empty the condensate bowl). To remove the bowl from the filter unit, turn clockwise and pull down.

5.8 Stopping the cable installation

	<ul style="list-style-type: none"> On arrival of the cable tip at the duct route end, let it run until the required over-length has been reached and stop the installation by turning the speed control knob anti-clockwise. Stop the compressor and close the compressor air valve. After the pressure chamber is de-pressurized the air inlet valve can be closed.
	<p>Never attempt to pull the cable by hand, as it may get irretrievably stuck in the duct.</p>

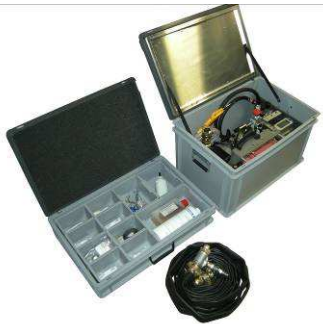
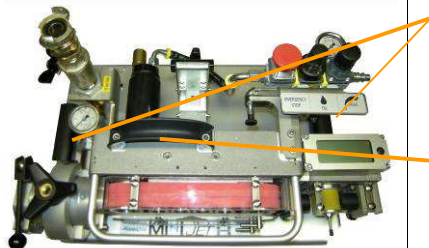
5.9 Emergency stop

	<p>In case of an emergency the cable installation must be stopped by use of the emergency stop :</p> <ul style="list-style-type: none"> Push the red button and turn the motor control knob anti-clockwise to close.
	<p>Not turning back and closing the motor control knob can damage the cable and the pneumatic motor because when re-opening the emergency stop the pneumatic motor will instantly start up again.</p>

 	<p>In case, after an emergency stop or any interruption of the cable installation, it is necessary to also close the air inlet valve, the operator MUST before actually closing the air inlet valve, know and remember the air pressure to the pressure chamber.</p> <p>Before re-starting the cable installation the air pressure to the pressure chamber MUST be the same or 0.5 bar higher, as at the moment the air inlet valve was closed.</p> <p>Only after the air pressure has been stabilized through the duct route, the emergency stop can be pulled up and the motor control knob turned clockwise to continue the cable installation.</p>
---	--

6. Transportation and storage

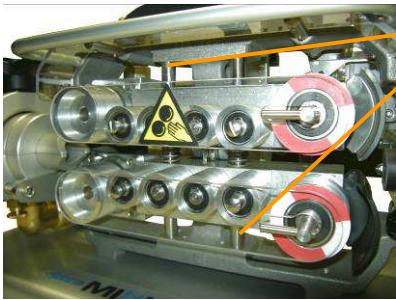

6.1 Transportation

	<p>Every MiniJet is delivered with its transportation case</p> <p>The tools and accessories are delivered in a separate box</p>
	<ul style="list-style-type: none"> • Handles for two hands transport • Single hand transport handle

6.2 Storage conditions

Atmospheric conditions	<p>Storage temperature : -25 .. 70°C</p> <p>Moisture degree : 0 .. 100%</p>
------------------------	---

7. Maintenance

	<p>The MiniJet should be cleaned by use of water and dried by compressed air with use of the airgun delivered with the MiniJet.</p> <p>Frequency: 1x a week</p>
	<ul style="list-style-type: none"> • Clean and grease both guiding supports <p>Grease: AVIACAL 2LD or equivalent</p> <p>Frequency: 1x a month</p>
	<ul style="list-style-type: none"> • Use compressed air for cleaning the pulleys. Take off the belts while performing this. <p>Frequency: 1x a week</p>
	<ul style="list-style-type: none"> • Clean, check and store the various tools used.
	<ul style="list-style-type: none"> • Using the spare parts list, check if some items, such as oil, sealing cord, etc. must be reordered.

8. Product end of life

	<p>This product must not be disposed of with regular domestic waste. When the product arrives at the end of its life or is replaced, it must be recycled safely in accordance with applicable local legislation.</p> <p>By separating waste into recyclable and non-recyclable components, you can help this product be recycled and protect the environment.</p> <p>For more information about disposing of or recycling components from this machine, please contact a specialist company or Plumettaz SA.</p> <p>The electrical and electronic components may contain toxic substances that have harmful effects on the environment or human health and must be recycled.</p>
--	--

9. Trouble-diagnosis and Troubleshooting

Problems	
Possible causes:	Remedies :
<ul style="list-style-type: none"> Pneumatic motor does not start 	
Closed pneumatic circuit Emergency button is pushed Closed motor speed control	Pull the emergency red button. Turn the speed control knob clockwise.
<ul style="list-style-type: none"> Cable does not move forward 	
To small size lip seals used	Change to larger sized lip seals
Obstruction in duct	Clear the obstruction If necessary, repair the duct route
Lubrication absent or insufficient	Lubricate or replenish lubricant (see. 5.3).
Air leak in duct	Check all the duct connectors Repair or replace faulty connectors
Cable-feeder is failing or stuck	Check the pneumatic motor and operation of the pulleys
<ul style="list-style-type: none"> Cable moves too slow 	
Insufficient lubrication	Interrupt the cable installation and add additional lubricant to the duct.
Overheating (exposure to the sun) of the cable, duct or the equipment	Protect cable drum from the sun, let duct and equipment cool down Spray water over cable exposed to the sun Install an air after-cooler Lubricate slightly and restart
Pressure in pressure chamber too low	Check the compressor setting or use a more powerful compressor. Check for air leaks in the complete system.

<ul style="list-style-type: none"> Slipping belts 	
Dirt, parasite lubrication on belts	Remove and clean belts.
Pressure on cable is insufficient	Increase linear pressure on cable by tightening the hand wheel of the cable tensioning device par. 3.1.1

<ul style="list-style-type: none"> Pressure too low or pressure loss in the air inlet unit 	
The compressor is defective	Repair or replace compressor.
Air leakages	Check duct, duct inserts, sealing cord etc. and repair or change failing elements.
Very short duct length compared to a normal jetting length	Attempt an installation if all the other characteristics and settings are adequate.
<ul style="list-style-type: none"> Leaks in the air inlet unit 	
Insufficient tightened or tilted cable and duct inserts	Tighten the inserts into their lodging or check insert faces are in line with the pressure chamber lower or upper part faces
Wrong size duct insert	Verify duct diameter and replace duct insert by the correct sized
Duct diameter lies between two insert sizes :	Choose duct insert of slightly bigger size than duct size, wrap several layers of isolating fabric, scotch tape, or such like, to obtain the desired diameter. Do not apply isolating fabric in areas where the duct is clamped by the jaws.
Sealing elements are incorrectly mounted or worn	Check the condition of the Ø4 mm sealing cords of the pressure chamber Make certain that the ends of the sealing cords seal have slight over-length and no gaps Check the presence and/or condition of the O-ring around the duct Check the presence and/or condition of the lip seal in the cable insert.

<ul style="list-style-type: none"> High pressure in inlet unit and low cable speed or stop 	
Obstruction in duct	Clear the obstruction
Severe reduction in diameter of the duct, duct is folded or crushed	Repair the duct.
Water present in the duct route	Provide an intermediate section to remove water. Blow air through, then send through foam plugs until no more water is left in the duct. Lubricate the duct.
Duct route too long	Check length and provide an intermediate section.



VISION & PERFORMANCE