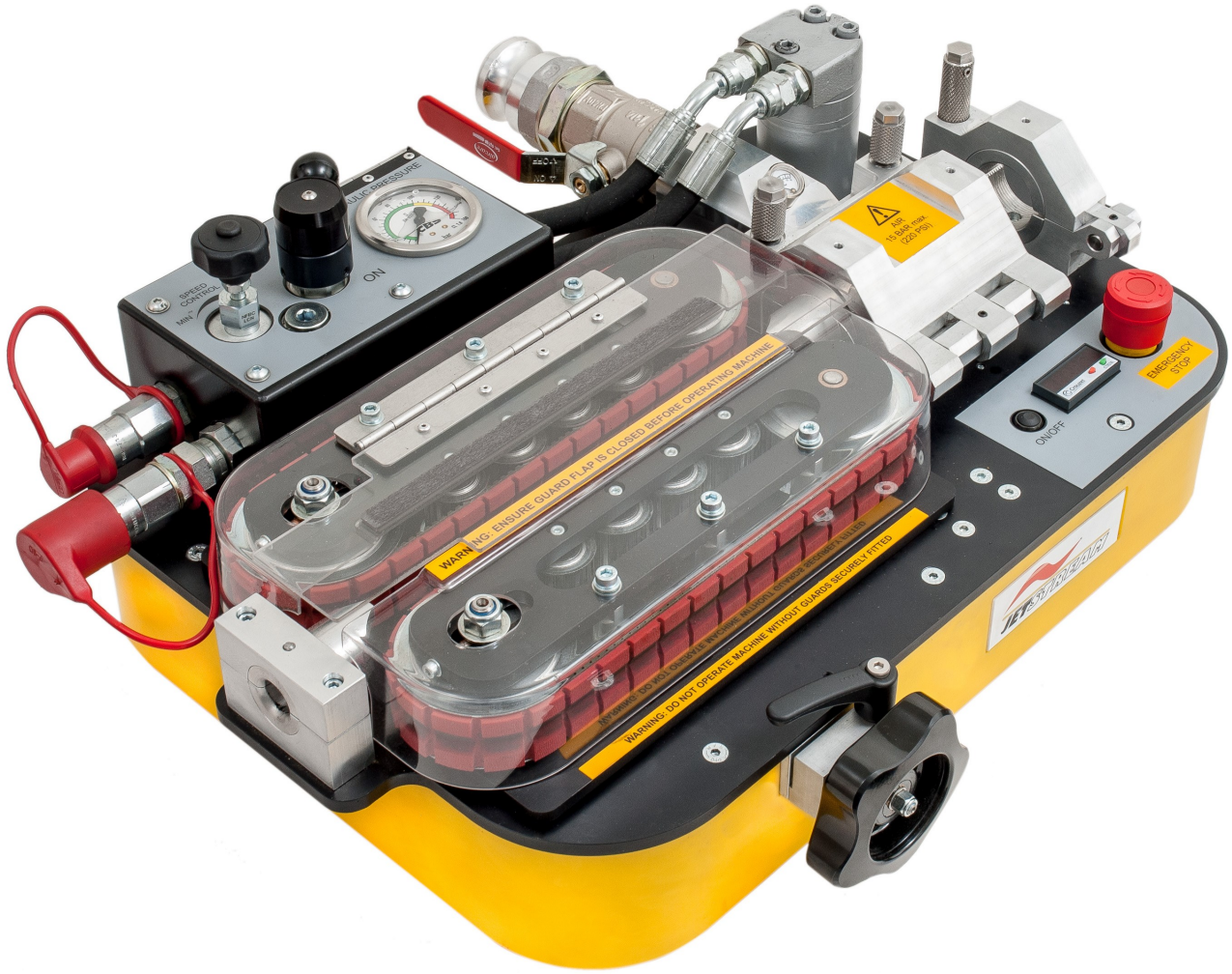
JETSTREAM

CABLE BLOWING MACHINE



Operation and Maintenance
Model 89950

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02	April 21 2014	Reformat for US	A. Konschak
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04	September 16 2015	Cleaned up content Added metric cable options	A. Konschak
04a	October 05 2016	Updated photo to show current air connection Updated toolkit	A. Konschak
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05a	July 17 2017	Change company name	A. Konschak
05b	May 03 2019	Page 33—Configured cable collets and guide inserts as a single number kit	A. Konschak
05c	June 03 2021	Updated supplied tool page to reflect current offerings	A. Konschak

CONTENTS

APPENDICES

1.0 SAFETY INSTRUCTIONS

THIS EQUIPMENT SHOULD BE USED ONLY BY PERSONNEL WHO HAVE BEEN GIVEN THE APPROPRIATE TRAINING, AND WHO ARE COMPETENT TO USE IT.
THESE INSTRUCTIONS ARE TO BE MADE AVAILABLE TO OPERATORS OF THIS EQUIPMENT AT ALL TIMES, FAILURE TO OBSERVE THESE SAFETY INSTRUCTIONS COULD RESULT IN SERIOUS PERSONAL INJURY AND/OR PROPERTY DAMAGE.

WORK AREA AND GENERAL SAFETY

1. Read and understand the operation and maintenance manual supplied with this equipment. Keep it in a convenient place for future reference.
2. Keep children and untrained personnel away from this equipment while in operation.
3. Keep all guards and safety devices in place. Do not operate this equipment with guards removed or damaged.
4. Keep hands, feet and loose clothing away from moving parts, especially at cable entry points.
5. Always stop the machine and isolate compressed air, electrical and hydraulic services to carry out lubrication and servicing.
6. Check machine before starting for worn or damaged parts. Check for signs of loose nuts and bolts etc.
7. If machine is left unattended, ensure that unauthorized use is prevented.
8. Never leave the machine unattended while in use.
9. Consider the use of safety barriers, especially when used in public places; observe all statutory requirements for working environments.
10. Beware of pinch points involved with rotating components,
11. Beware of hot surfaces, machine uses compressed air and hydraulic services.
12. When operating machine always wear appropriate safety clothing, ear defenders, eye protection, hard hat, safety shoes and leather gloves, machine operates with compressed air at up to 220 psi (15 Bar) and hydraulic oil at up to 1015 psi (70 Bar).
13. The main machine assembly is in excess of 25 kg (55 lb). When lifting care must be taken, ensure sufficient man power/lifting gear is available, to prevent personal injury and damage to the machine.
14. Prior to installation ensure the duct route is connected properly.
15. Beware of exposed electrical contacts. Do not touch, or allow metal objects to come into contact.
16. Waste hydraulic oils are to be disposed of via an environmentally acceptable method – e.g. passed on for re-cycling.
17. Machine may cause additional fire hazard if involved in an existing fire due to compressed air and hydraulic oils.
18. No personnel are to be in manholes or ducts when the Cable Blowing Machine is being operated.
19. The machine must be operated on firm ground.
20. Stay clear of cables or lines under tension.
21. Stay clear of pressurised hydraulic lines, air lines and duct.
22. Only use the machine for its intended purpose, do not use the roller drive without the air chamber to push or to retrieve cable, blow air in the far end to help cable recovery.
23. Do not place cable drum too close to the Cable Blowing Machine.
24. Do not tamper with pressure relief valves or pressure reducing valves.
25. The compressed air supply must not be allowed to enter the air chamber or duct before the belts have been closed on to the cable. Do not turn the air on until a reasonable length of cable 300' (50m) has been installed into the duct.
    FAILURE TO DO SO MAY RESULT IN PERSONAL INJURY, AS THE CABLE COULD BE EJECTED FROM THE CABLE BLOWING MACHINE WITH HIGH FORCE AND VELOCITY.
26. Ensure the cable drum rotates freely on its stand; the cable should leave from the top of the drum.
27. The cable should enter the machine in a clean and dry condition. In damp, dusty atmospheres, the cable should be cleaned continuously as it enters the machine.
28. Do not open the air chamber until all the air has been exhausted and the air pressure gauge reads zero.
29. To prevent damage to the hydraulic hoses and the emergency stop cable never leave them on the ground when not in use.

GENERAL HYDRAULIC SAFETY INSTRUCTIONS

The GMP Jetstream Cable Blowing Machine has a high pressure hydraulic drive and control system. Please observe the following precautions when operating the Jetstream Cable Blowing Machine:-

Always connect the power pack hoses to the Jetstream prior to starting the power pack engine. Failure to do this may cause severe overheating of the power pack.

Ensure the 'on/off' control valve on the Jetstream is in the **'off'** position prior to starting the hydraulic power pack to prevent unwanted operation of the machine.

Always ensure the armoured cable to the hydraulic power pack is connected, this provides an essential emergency cut off facility.

Escaping fluids under pressure can penetrate the skin and cause serious personal injury. Observe the following precautions to avoid hydraulic hazards: -

Ensure all hydraulic connections are securely tightened before operating the machine.

Check for leaks with a piece of cardboard. **Do not use your hands!**

Do not exceed working pressure of hydraulic hoses.

Visually inspect hoses regularly and replace if damaged.

GENERAL PNEUMATIC SAFETY INSTRUCTIONS

The GMP Jetstream Cable Blowing Machine is a pneumatic device, using pressurised air to project cable at high velocities. Please observe the following precautions when operating the Cable Blowing Machine:-

Compressed air can cause flying debris. This could cause personal injury. Always wear personal protective equipment.

Ensure no personnel are in the manhole at the far end of the cable run. Severe personal injury may result.

Never open the air chamber when pressurised.

Only AUTHORIZED, fully trained personnel should operate the air compressor.

GENERAL ELECTRICAL SAFETY INSTRUCTIONS

The machine has electrical monitoring and safety circuits. Observe the following precautions to avoid electrical hazards:

Do not operate in water. Do not expose the machine to rain.

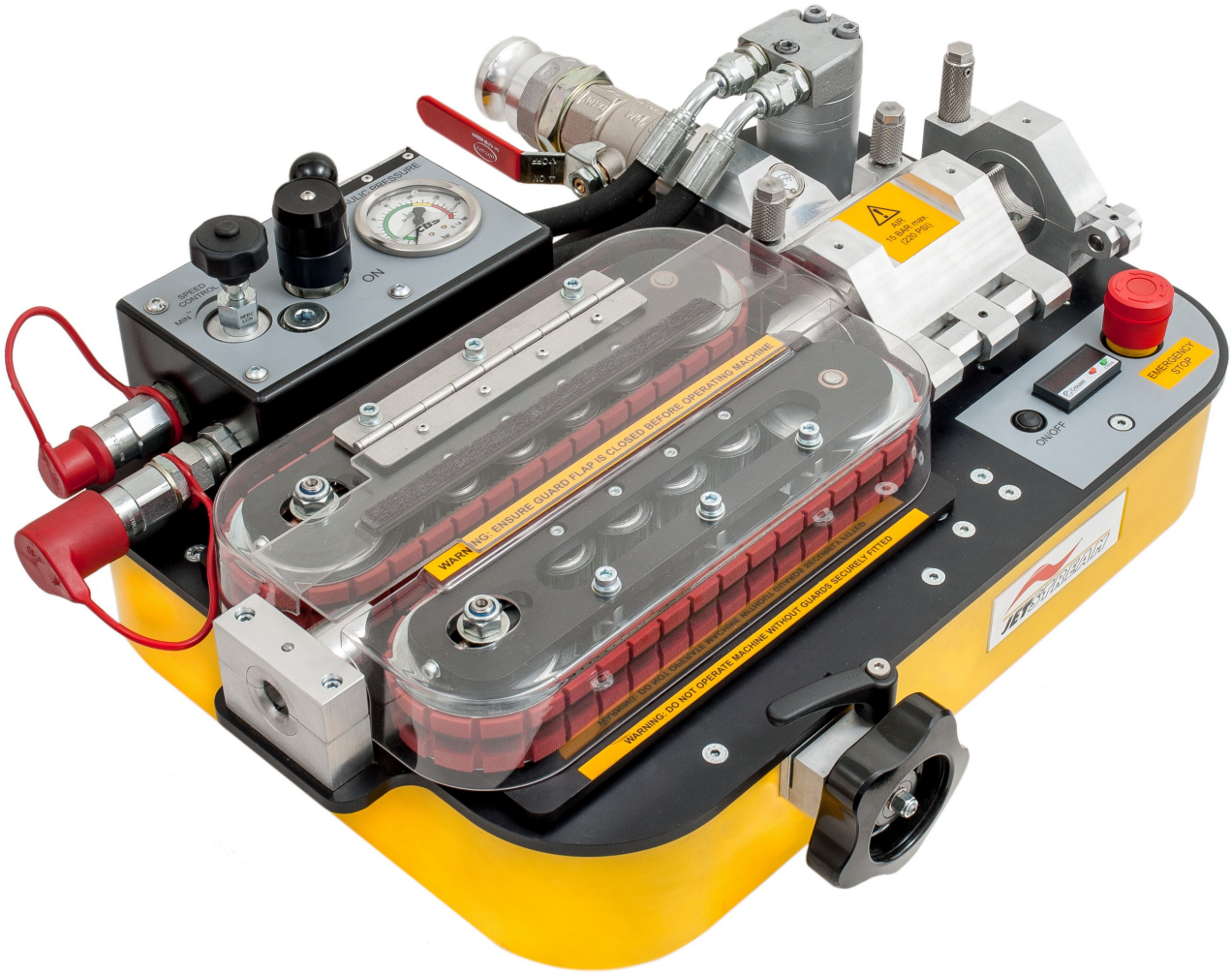
Always ensure the armoured cable to the hydraulic power pack is connected, this provides an essential emergency cut off facility.

2.0 CRITICAL POINTS THAT DRAMATICALLY AFFECT THE OPERATION OF THE CABLE BLOWING MACHINE

- **PRESSURE ON THE CABLE (POSITION OF THE ADJUSTMENT WHEEL) SHOULD BE SET AS PER THE INSTRUCTIONS**
- **BELTS TO BE CLOSED AT ALL TIMES WHEN CABLE IS INSTALLED INTO MACHINE.**
- **CORD SEALS IN AIR CHAMBER IN GOOD CONDITION AND CORRECTLY FITTED TO PROVIDE GOOD SEALING.**
- **CORRECT CABLE SEAL FITTED.**
- **DUCT/INNER-DUCT FULLY CONNECTED AND PRESSURE TESTED.**
- **DUCT AND CONNECTING FITTINGS ARE SUITABLE FOR OPERATING AT 220 psi (15 BAR) AIR PRESSURE.**
- **DUCT CLAMP SECURELY TIGHTENED.**
- **COMPRESSOR CAPACITY SUITABLE FOR DIAMETER OF INNER-DUCT BEING USED (SEE SECTION 4) @ UP TO 220 psi (15 BAR) (HIGHER PRESSURE GIVES BETTER PERFORMANCE).**
- **CABLE DRUM MUST BE LOCATED DIRECTLY BEHIND AND IN LINE WITH THE BLOWING MACHINE.**
- **AIR CHAMBER, DRIVE BELTS AND PULLEYS, CABLE GUIDES, MUST BE CLEAN AND FREE FROM DEBRIS, SLUDGE, DIRT, WATER AND LUBRICANT.**
- **THE CABLE MUST BE HAND GUIDED INTO THE BLOWING MACHINE THROUGH A DRY CLEAN CLOTH BY THE OPERATOR WEARING WORK GLOVES.**
- **ENSURE THE COMPRESSED AIR SUPPLY IS NOT APPLIED TO THE CABLE UNTIL APPROXIMATELY 300' (100 METERS) OF CABLE HAVE BEEN INSTALLED OR THE HYDRAULIC PRESSURE BEGINS TO RISE.**
- **THE HYDRAULIC PRESSURE SHOULD BE BETWEEN 290-435 PSI (20-30 BAR) AT THE START OF A BLOWING INSTALLATION. *IF GREATER DO NOT PROCEED*. CHECK CABLE ADJUSTMENT WHEEL SETTING, INNER-DUCT, CABLE, CABLE SEALS, CABLE COLLET SIZES. RECTIFY BEFORE RE-COMMENCING THE INSTALLATION.**
- **ALWAYS FIT THE HYDRAULIC HOSE DUST CAPS WHEN THE HOSE IS NOT IN USE, CLEAN AND CHECK THE QUICK RELEASE COUPLINGS BEFORE USE.**

DISCLAIMER

General Machine Products takes care in the design of its products to help ensure that the cable is protected during installation. Due to the variety and different methods of cable manufacture the responsibility of checking the cable compatibility with the equipment lies with the operator. Therefore, GMP cannot accept liability for any damage to the cable.



3.0 GENERAL DESCRIPTION

The GMP Jetstream machine is designed to provide an effective and safe method of fiber optic cable installation. The system installs fiber optic cable of 4-20mm outside diameter at up to 280 ft/min (85m/min) into pre-installed inner-ducts, employing the viscous drag compressed air principle.

The machine feeds compressed air into the inner-duct via the air box and uses a hydraulic motor and reduction gearing to drive a pair of compliant belts (both belts are driven). This system is protected by a pre-set pressure relief valve and pre-set pressure sensor. The electronic monitoring system provides read out of speed and distance and automatic protection against duct obstruction.

The belts are covered with a compliant coating to help prevent damage to the cable. The belts offer a large surface area in contact with the cable ensuring high grip with reduced compressive loading.

During installation, the torque applied to the cable by the belts adjusts automatically up to a pre-set maximum value (after which the machine will shut down) to help prevent damage to the cable. A full range of accessories is available to allow the machine to handle a wide range of cables and ducts.

The machine may be placed on the ground or on a support to bring the cable to a suitable height. A separate reinforced transit case is provided; this will help protect the machine from damage during transit and can be used as a support for the machine when being used to install cable.

The unit is CE approved.

4.0 SPECIFICATION

OPERATING CAPACITIES

Cable size:	0.158" to 0.787"	Ø4 to Ø20mm
Duct size: (OD Controlled)	3/4 - 1 1/2" SDR	
Duct size: (OD Metric)		Ø10 to Ø50mm
Cable speed:	0-280 ft/min	0-85m/min.
Maximum pushing force:	132 lbs.	60kg
Ambient Temperature Range	32-104 °F	0-40 °C

HYDRAULIC DRIVE SYSTEM

Maximum operating pressure:		1015 psi	70 Bar
Recommended flow:		4 gal/min (US)	15 l/min
Pressure switch setting:	12-20mm OD Cable	1015 psi	70 Bar
	4 -12mm OD Cable	725 psi	50 Bar
Relief Valve setting	12-20mm OD Cable	1160 psi	80 Bar
	4-12mm OD Cable	870 psi	60 Bar
Initial starting pressure: (if greater the set-up needs checking)		290-435 psi	20-30 Bar

PNEUMATIC SYSTEM

Minimum air hose bore:	1 ¼"	32mm
Maximum air pressure:	210 psi	15 Bar
For Ducts with an Inner Diameter of:	Minimum Flow Acceptable	
up to 25mm	150CFM	4m³/min
26 up to 30mm	185CFM	5m³/min
31 up to 35mm	250CFM	7m³/min
36 up to 40mm	375CFM	10m³/min
41 up to 44mm	450CFM	12m³/min

ELECTRONIC MONITORING SYSTEM

Power requirement:	18 Vdc (2 x 9v cells)
Fuse rating:	315 mA

DIMENSION AND WEIGHTS

Weight	68 lbs. approx.	31kg approx.
Weight including case	132 lbs. approx.	60kg approx.
Dimensions (height x length x width)	9 1/4"x 24 1/2" x 19"	233mm x 620mm x 484mm

5.0 OPERATING PROCEDURE

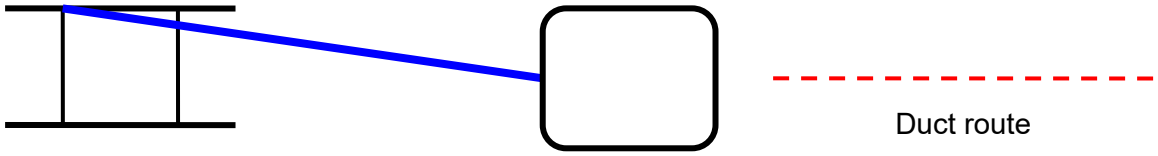
IT IS IMPERATIVE THAT ALL PERSONS USING, OPERATING OR MAINTAINING THIS CABLE BLOWING MACHINE:

- **HAVE RECEIVED COMPREHENSIVE TRAINING IN THE USE OF THIS MACHINE.**
- **ARE COMPETENT TO USE IT,**
- **AUTHORIZED TO USE IT AND**
- **HAVE READ AND UNDERSTOOD THIS MANUAL**

GENERAL MACHINE PRODUCTS CANNOT BE HELD RESPONSIBLE FOR MISUSE OF THIS EQUIPMENT.

Set up for installing cable with the machine mounted above ground:

Position the machine in line with the route of the duct.
Position the cable drum behind the machine and in line with the machine. See sketch below (this shows a plan view of the recommended set up).



Ensure the machine is secure (either on its own stand or a separate suitable stand).
Ensure the machine is fitted with the appropriate guides and collets to suit the cable being installed and ducts into which the cable is to be installed. (See Appendix 1 for details of interchangeable parts and sections 7, 8 & 9 for procedures on how to fit these parts).

To set the machine up to install cable it will be necessary to:
1. Select and set the appropriate pressure switch setting for the cable being installed.
2. Fit the duct into which the cable is to be installed into the air box and duct clamp.
3. Fit the cable through the machine.
4. Connect the air supply to the machine[1].
5. Connect the hydraulic power input to the machine.

[1] use the supplied 4 claw to round adapter if needed

Pressure Switch Setting

Caution

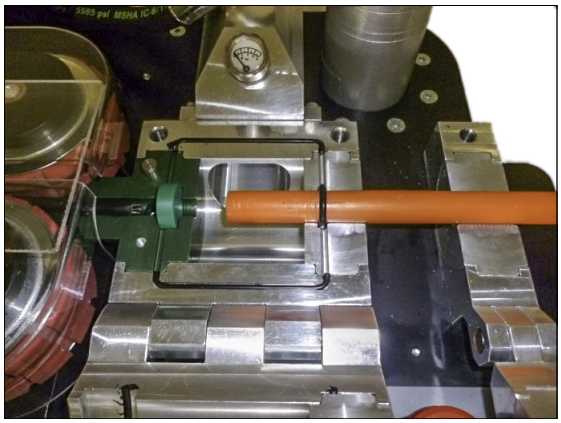
Refer to the section 4 ‘SPECIFICATION’ for the correct pressure settings for the pressure switch and to section 14 ‘PROCEDURE TO SET THE PRESSURE SWITCH’ for the setting procedures.

NOTE: - The cable blowing machine is supplied as standard with the pressure switch set at 1015 psi (70 Bar), these settings are suitable for cables in the range 12-20mm O.D.

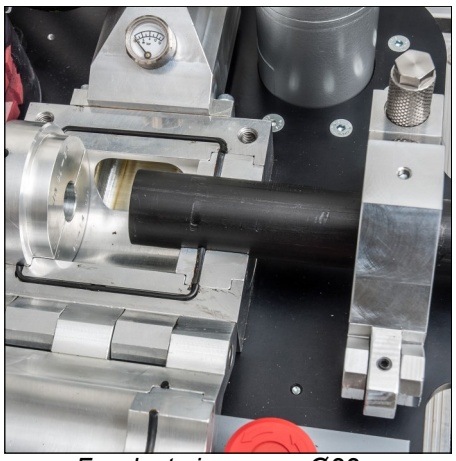
For cables 4 - 12mm O.D. these settings need to be changed, refer to the section 4 ‘SPECIFICATION’ for the correct pressure settings for the pressure switch and to section 14 ‘PROCEDURE TO SET THE PRESSURE SWITCH’ for the pressure setting procedures.

Fit the duct into which the cable is to be installed into the air box and duct clamp.

It is recommended that a length of duct similar in size to the duct into which the cable is to be installed be fitted in the duct clamp. This length of duct may then be connected to the installed duct (the length of duct underground into which the cable is to be installed) using a suitable connector.
For duct sizes Ø12-22mm slide a suitable size O ring over the end of the duct.
Fit the duct into the end of the air box housing so that it protrudes half way into the housing.
For duct sizes Ø12-22mm position the O ring so that it sits against the seal face, as shown in below photo.
For duct sizes over Ø22mm, the seal is permanently located within the seal collet.



For duct sizes Ø12 - 22mm



For duct sizes over Ø22mm

Once the duct has been positioned, the duct clamp may be closed and the locking screw tightened; the duct is now secure.

ENSURE THAT THE INNER-DUCT IS FULLY PREPARED FOR USE, I.E.

a. FULLY CONNECTED
b. PRESSURE TESTED
c. CABLE EXIT RETAINING DEVICE FITTED
d. LUBRICATED

FOR FURTHER DETAILS ON INNER-DUCT LUBRICATION REFER TO SECTION 14.

Fit the cable through the machine.

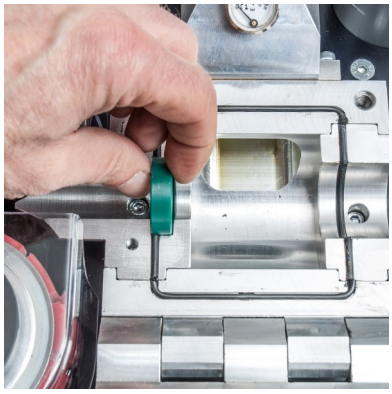
It is possible to insert the cable in the machine in two different ways.

Method 1:

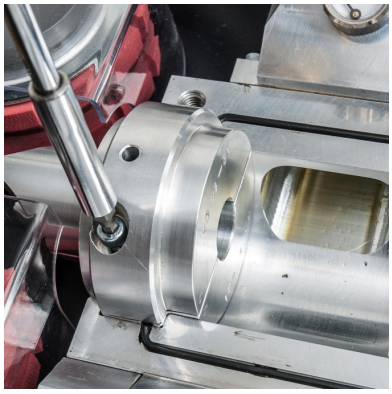
This method is only suitable if the machine has been previously set up with the correct cable guide and cable collets to suit the cable being installed, see sections 8 & 9 for the procedure for changing the guides. Connect the two hydraulic hoses and the emergency stop cable to the power pack or hydraulic power source. Ensure the plug to socket & socket to plug connections are correctly made.

Turn the speed control knob all the way to minimum.

Turn the adjustment wheel fully counter-clockwise to fully open the drive belts



Select the appropriate split cable seal (see appendix 1) and position it in the groove in the cable collet.

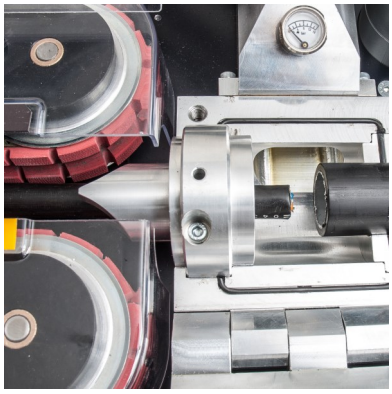


Replace top half of the cable collet

Turn to hydraulic control valve to the ‘ON’ position.

Slowly turn the speed control knob clockwise until the belts are just moving.

Take the cable to be installed and pass it through the cable guide insert so that the end is between the belts.
Close the belts (using the adjustment wheel) gently until the cable is gripped (there is no need to apply the full installation pressure to the cable at this stage)



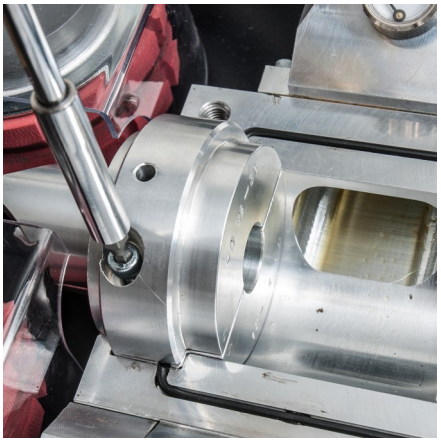
The cable should now feed slowly through the belts, cable seal, air box and into the duct.

Turn to hydraulic control valve to the ‘OFF’ position. Close and tighten the thumb nuts securing the airbox.

Method 2:

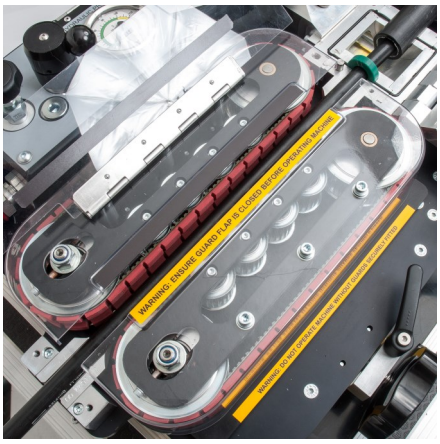
Open the belts fully using the adjustment wheel and lift the magnetically held guard flap.

Remove the top half of the cable guide insert. Ensure the correct cable guide inserts are fitted for the cable (see appendix 1 and section 9).

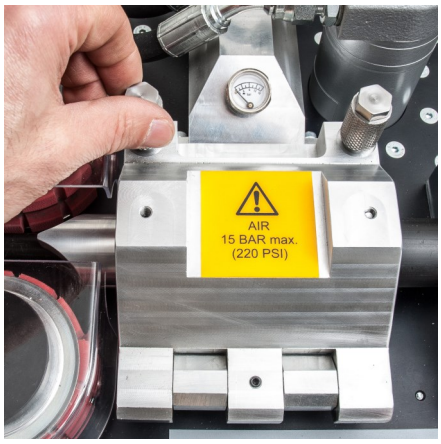


Open the airbox and remove the top half of the cable seal collet. Ensure the correct collets are fitted (see appendix 1 and section 8).

Select the appropriate split cable seal (see appendix 1) and position it around the cable.



Take the cable and simultaneously place it into the duct and into the air box. Thread it between the belts. Ensure the cable seal seats in the appropriate groove in the cable seal collet.



Replace the top halves of the belt infeed guide and cable seal collet. Close the airbox and tighten the thumbnuts.

Setting the clamp force:

Adjustment Wheel

Close the drive roller assembly onto the cable as follows:
Loosen the locking handle by moving it in a counter-clockwise direction. The handle can be indexed to assist in this movement. The adjustment wheel can now be rotated to open or close the belts. Turn the wheel clockwise to close the belts or counter-clockwise to open them.

When preparing the machine to insert the cable, the belts will be fully open (adjustment wheel wound fully counter-clockwise). Once the cable has been positioned in the machine the belts must be closed on the cable in order to drive the cable. The closed belts will also stop the cable being dragged back out of the machine by any tension in the cable.

Turn the adjustment wheel clockwise until the belts close onto the cable. The amount of pressure applied to the cable can be adjusted by turning the adjustment wheel either clockwise or counter-clockwise. Once the desired pressure has been obtained the locking handle should be tightened by turning it in a clockwise motion. The handle can be indexed to assist in this movement.
As more experience is gained using the machine, the amount of compression required will become clear.

Connect the hydraulic supply to the machine.

Note: - Please refer to Section 4.0 Specification for details on recommended flow and pressure requirements.

Ensure that both the hydraulic control lever is in the 'OFF' position and that the speed control knob is in the fully minimum position (fully rotated counter-clockwise). The emergency stop also needs to be set in the upper position, twist counter-clockwise to ensure this is the case.

Connect the two hydraulic hoses and the emergency stop cable to the power pack (or hydraulic power source). Ensure the plug to socket & socket to plug connections are correctly made.

NOTE:
NEVER RUN THE JETSTREAM WITHOUT THE EMERGENCY STOP CABLE BEING CONNECTED. ONLY AUTHORIZED, FULLY TRAINED OPERATORS SHOULD BE ALLOWED TO OPERATE THE HYDRAULIC POWER PACK (OR HYDRAULIC POWER SOURCE).

The machine is now ready to start the cable installation.

Set up for installing cable with the machine mounted below ground:

The set up is similar to the set up for installing cable above ground. Typically this type of installation is used for "series blowing" i.e. when a length of cable is already installed, and the limit of installation distance is reached. In such cases it is customary to couple a "series machine" located down a manhole some distance from the point of main installation. This machine operates in conjunction with the machine located at the main point of installation. The GMP Jetstream machine is capable of this type of operation, it may be coupled with a second machine to increase the distance a single cable can be installed without splices. The only difference between this set up, and the set up for installing cable with the machine above ground, is that there will be no drum stand carrying the cable drum. The cable will be exiting from one side of the manhole and blown into the duct at the other side of the manhole. The machine should be aligned with both the incoming cable and the outgoing duct path, both side to side and up and down.

NOTE: THE MACHINE MUST NOT BE SUBMERGED IN WATER.

If the hole is full of water it must be pumped out before placing the machine on the bottom of the hole.

Installing cable.

The machine is fitted with a range of controls to help the operator to install cable in the minimum time with the least risk of causing damage to the cable or duct.
These controls are identified and their function is described below.

Speed control knob:

This valve controls the motor speed, turn this clockwise to increase the speed of the belts (and the cable). Turn counter counter-clockwise to reduce the speed. This knob can also be used to maintain correct hydraulic pressure (driving force). Should the pressure start to rise towards the cut-off level the operator can reduce the speed of the machine, this will also reduce the hydraulic pressure.

On/Off hydraulic control lever:

This lever controls the flow of the hydraulic oil. Moving the lever to the 'OFF' position bypasses the oil and stops the motor; moving the lever to the 'ON' position allows flow to the motor.

Emergency stop:

In the event that an emergency situation occurs and the machine needs to be stopped and prevented from restarting, this button will ground the spark plug on the engine powering the hydraulic power pack. The power pack can only be restarted once the emergency stop has been reset, by twisting the button counter-clockwise.

Speed/Distance indicator:

This device will measure and display the distance travelled by the cable and also the speed at which the cable is travelling. To toggle between speed and distance press the right-hand 'Green' button twice. Pressing the right hand 'Green' button once shows what is being displayed, either speed or distance. Tacho represents speed, Count represents distance. While displaying the distance only it is possible to reset by pressing the left hand 'Red' button.
Should it be necessary to replace the speed distance measuring device please contact General Machine Products.

To install cable:

With the Jetstream setup as previously described, first ensure that the hydraulic power pack is running. Press the ‘on/off’ button for the counter system; the screen should now power up. As described above adjust the display to show the desired output.
Turn the hydraulic control lever to the ‘ON’ position. Turn the speed control knob clockwise towards ‘max’ until the belts begin to move. The cable will now feed through the machine and into the duct; the speed of the install can be adjusted as required using the speed control knob.
Once a reasonable distance of cable has been installed, typically 300-600 feet (100-200m) or the hydraulic pressure begins to increase, turn on the air feed via the handle on the ball valve. This will assist the machine to feed the cable; verify via the pressure gauge that a reasonable pressure is being held within the air box.
The duct route, through which the cable is to be fed, should be configured in such a way that the cable can feed all the way along the duct and out the other end.
If there is an unexpected obstruction in the duct route the belts will see this as an increase in torque demand and increase the drive system pressure. Assuming the pressure switch has been set at an appropriate level, the hydraulic power pack will cut out and the belts will stop turning before they push the cable so hard as to cause it to buckle. If (due to lack of previous knowledge of the cable characteristics) the pressure switch has been set at a figure which is too small to push the cable the setting may be increased. Bear in mind that this will increase the risk of the cable being damaged by buckling.
It will be necessary to be able to determine when the cable has emerged at the other end of the duct route. A typical way of achieving this aim is to have a colleague positioned at the end of the duct run; in contact with the main installer using a radio transmitter/receiver of some description. In this way the main installer may be advised when the cable has completed the run, the operator can then stop the machine by turning the hydraulic control lever to the ‘OFF’ position.
The speed control knob should then be rotated fully counter-clockwise into the minimum position.
Finally, turn the handle on the ball valve for the air feed into the ‘closed’ position. Please allow several minutes for the air pressure in the duct to dissipate. **Do not open the air box until the air pressure gauge reads zero.**

6.0 Maintenance

The JetStream Cable Blowing Machine has been designed to give reliable, trouble free service over long periods. The machine requires no sophisticated maintenance procedures, simple common sense checks and precautions are all that are needed.
The main source of breakdown and/or malfunction of a machine being used outdoors is contamination by the elements, this contamination may be introduced into the machine in a number of different ways.

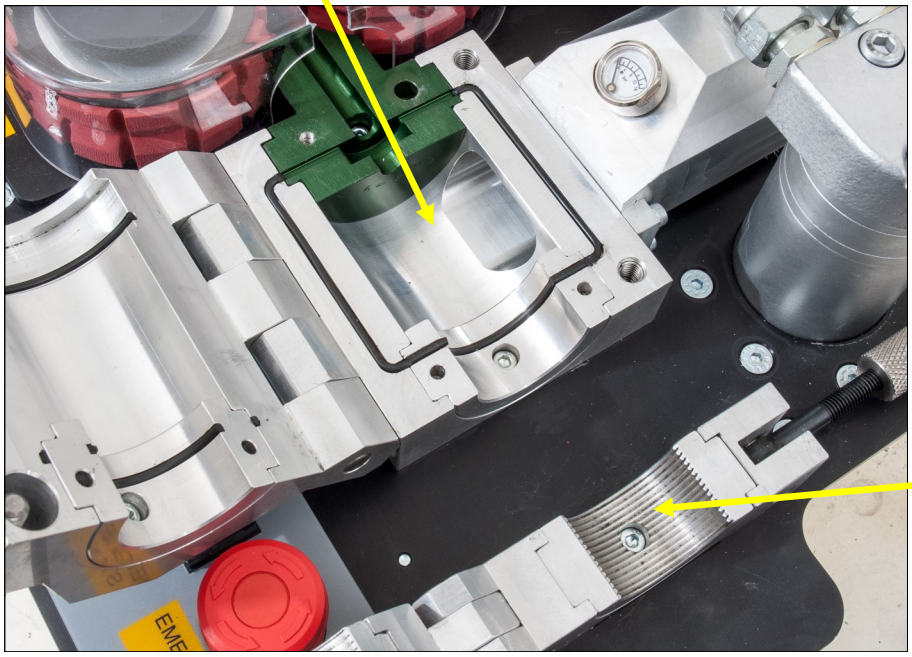
There may be mud, dust or other contaminants carried into the machine on the cable or duct (there may be surface coatings of lubricants or other release type agents on the outer surfaces of the cable and duct, this could build up on the belts and make them slip).

Contamination can also come from a muddy surface, or be splashed by vehicles when it is being used by the roadside.

Please Note: Due to their intended use, cord seals, cable seals, duct clamps, drive belts and cable drive belts are considered consumable items and are therefore not covered by the limited warranty.

It is convenient to consider each function of the machine in turn.

Air box parts: keep clean, build up of moisture and dust will prevent the faces from mating, prevent the housing seal from sealing etc. Use any traditional workshop cleaning agent.



Cable infeed guide: keep clean, build up of moisture and dust may put drag on the cable. Use any traditional workshop cleaning agent.

Duct clamps: keep clean, build up of moisture and dust, particularly in the grooves, will reduce the clamping effect. Use traditional workshop cleaning agent.

As a general rule, every time an interchangeable part is removed and replaced by a part of a different size, shape etc. the part being removed should be thoroughly cleaned before being returned to its box. Similarly the cavity from which it was removed can also be cleaned prior to the assembly of the replacement part.

AIR CHAMBER

The air chamber **should** be inspected after each operation for seal damage or wear. Seal cord **should** be replaced if damaged and secured in position with the adhesive provided.

The cable seals should be checked for damage or wear and replaced with new ones if required. **ALWAYS** apply a smear of silicone grease to the seal bore and lip when installing the seal on to a cable.

ALWAYS clean out any dirt/debris in the air chamber

GENERAL

The machine **should** be stored in the supplied transit case when not in use. The machine should be wiped clean after each time used.

ALWAYS ensure that there are sufficient cable seals, cord seal and cord adhesive available in the toolbox to cover the next installation.

ALWAYS ensure that the service battery and spare battery are have sufficient charge before the cable-blowing machine is to be used.

SERVICE CONNECTIONS

CHECK the condition of the hydraulic hoses each time used and replace if worn or damaged.

CHECK the condition of the emergency stop cable each time used and replace if worn or damaged.

CHECK the condition of the compressed air hose each time and replace if worn or damaged.

The machine should be returned to GMP (or an approved service agent) after every 1000 hours use (or at intervals of 12 months) for a major service.

7.0 Procedure for changing duct clamps

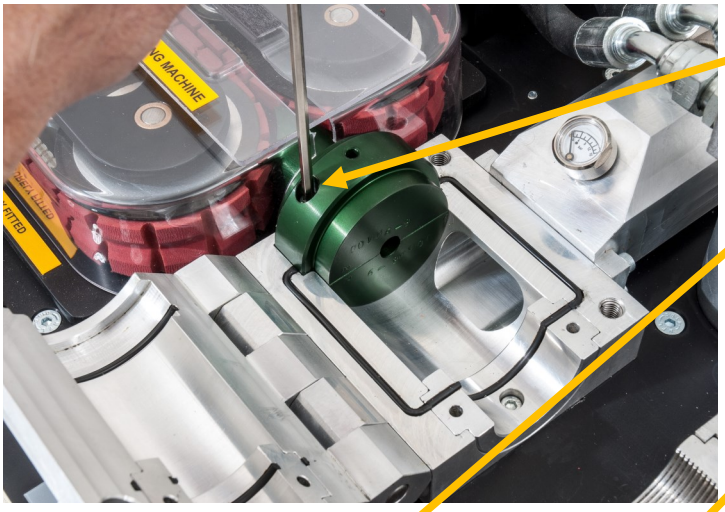
Undo the locking screw and rotate open the duct clamp housing

Loosen and remove the screw (1 per insert). Do not lose this screw; it will be needed for the replacement clamp.

Remove the duct clamp

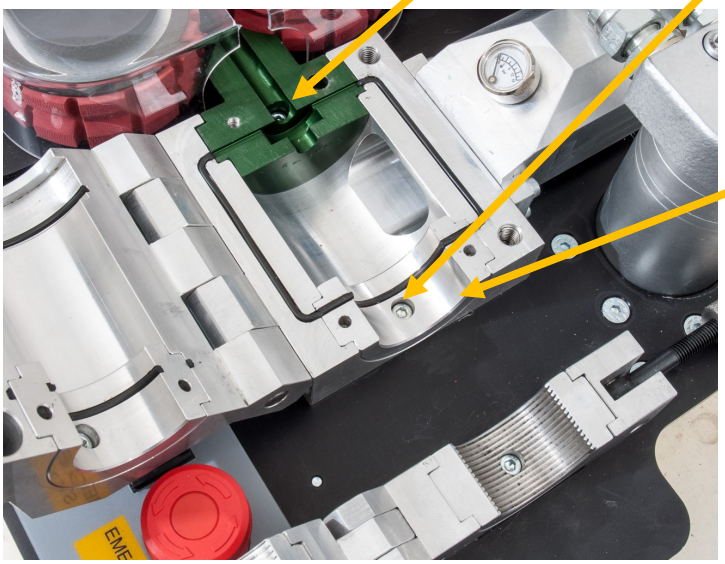
Repeat the process for the duct clamp in the other housing half.
To fit the new duct clamp, reverse the disassembly procedure.

8.0 Procedure for changing cable collets and duct seals in the air box



For cable collets loosen the screw in the upper insert. Remove the upper insert from the lower insert.

Now loosen and remove the screw in the lower cable seal insert. (Do not lose this screw, it will be needed for the replacement insert). Remove the lower cable collet.



For duct seals loosen and remove the screw. (Do not lose this screw, it will be needed for the replacement insert)

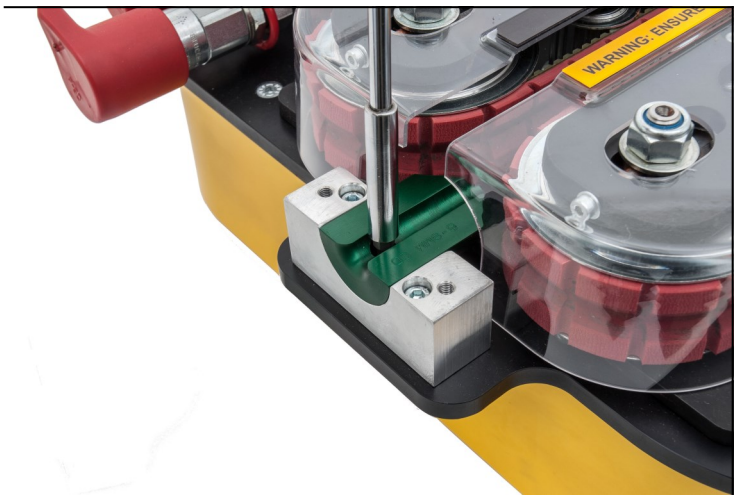
Remove the duct seal

Repeat the process for the duct seal in the other box half

To fit the new inserts, reverse the disassembly procedure.

9.0 Procedure for changing cable guide inserts in infeed

Loosen and remove the screws securing the upper guide housing

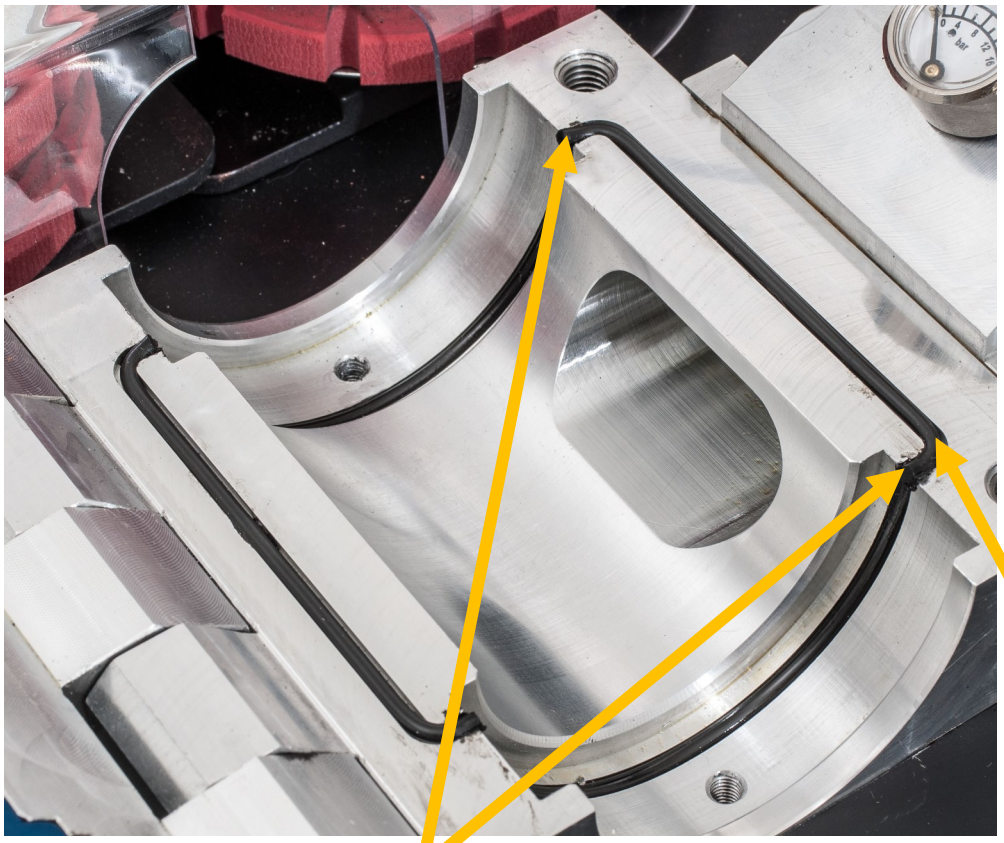


Loosen and remove the screw securing the cable guide insert into the housing

Remove and replace the cable guide insert.

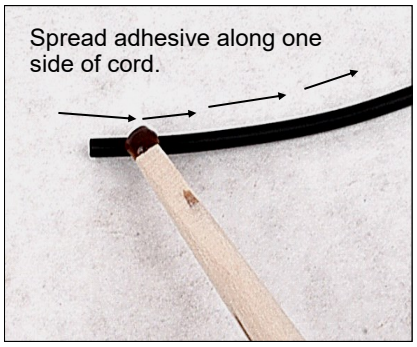
10.0 Procedure for replacing the air box housing seal

Take a length of Ø2.5mm sealing material, line it up at the end of the upper seal groove, and cut it off a little longer than is necessary



Trim the seal with the end of the groove each end. Take care not to damage the seating diameter for the cable seal and the duct seal. Take care to make the cut accurately in line with the end of the groove, the cable seal and duct seal need to make an effective seal against the ends of the housing seal.

Apply a thin coat of 3M Rubber and Gasket Adhesive to the top of the cut sealing material

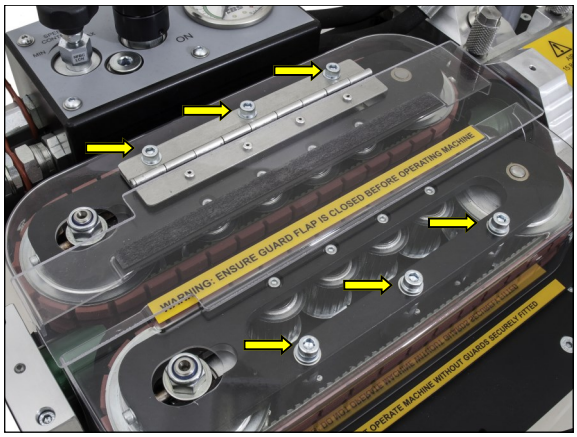


Place the pre-cut length in the groove, with some of the excess length overhanging each end of the groove

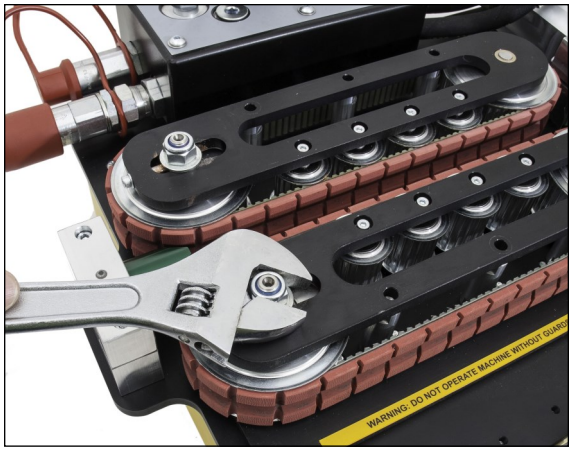
Repeat the procedure for the lower seal groove and the collet seal grooves in the air box lower and lid as indicated.

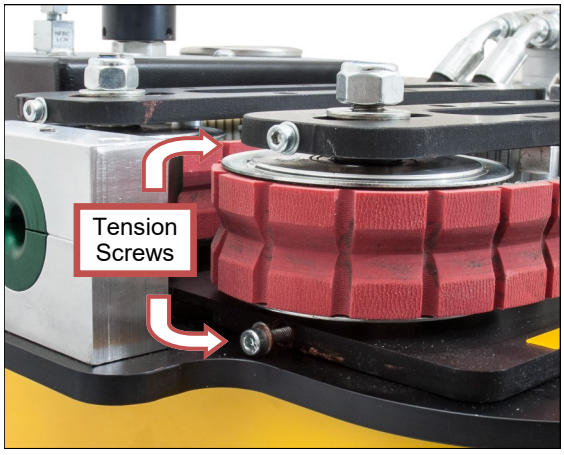
11.0 Procedure for changing the cable drive belts

Remove the 6 screws retaining the belt guards and remove the guards.

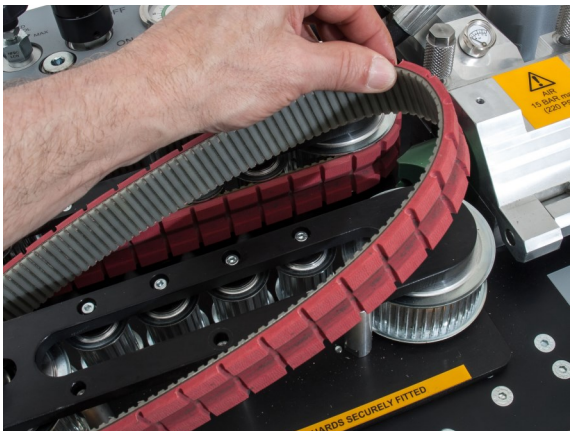


Loosen the tension nut on the large idler pulley. Loosen the tension screws in both the upper and lower drive plate. This should then provide enough slack at the drive pulley side to remove the belt.





Always remove the belt from the drive pulley side first. Replace the drive belt by reversing the disassembly procedure.



NOTE: NEVER POWER THE MACHINE UP OR RUN WITH THE GUARDS REMOVED. DOING SO MAY RESULT IN INJURY TO THE OPERATOR.

12.0 Procedure for tensioning the drive belts

Place the new belt in position as in section 11.0.

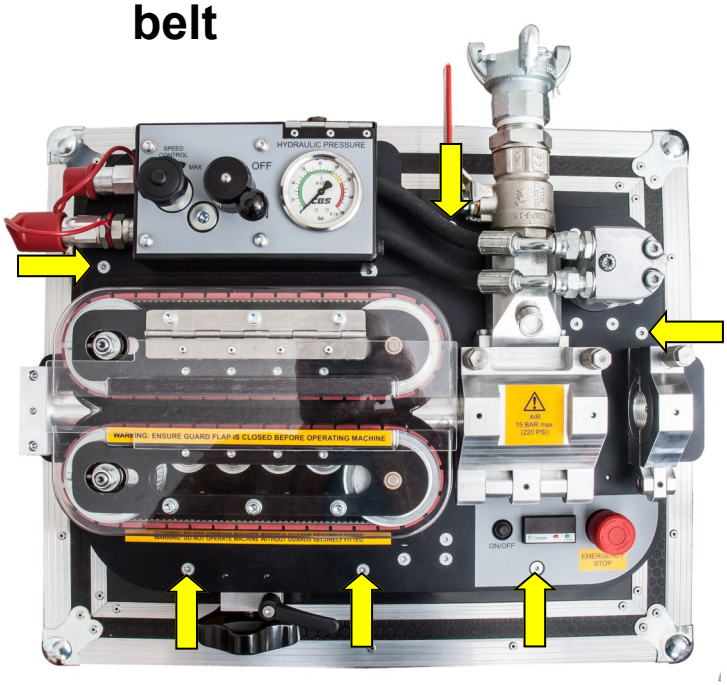
Tighten the tension screws evenly in the upper and lower drive plates with the tension nut slackened off slightly. This will begin to tighten the belt. Once the appropriate tension is reached, tighten the tension nut.

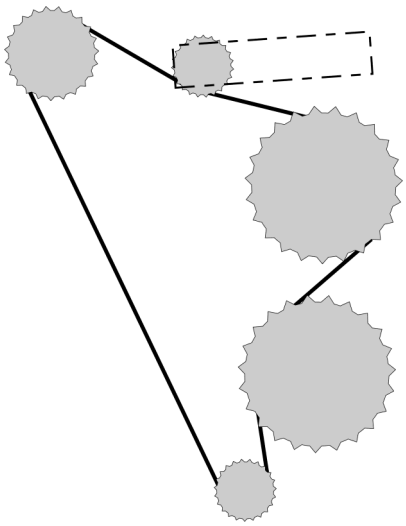
Check the belt tension, this should be approximately 1/4" of slack, if necessary loosen the tension nut and re-adjust the tension screws until the correct tension is achieved, check that the tension nut is tight upon completion.
(Note: The belt tension should be checked periodically)

Replace the drive belt guards and the 6 retaining screws.

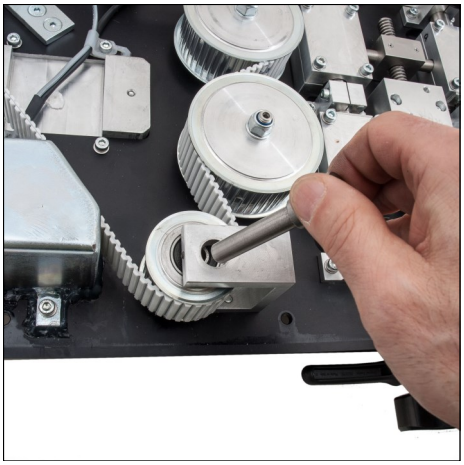
NOTE: NEVER POWER THE MACHINE UP OR RUN WITH THE GUARDS REMOVED. DOING SO MAY RESULT IN INJURY TO THE OPERATOR.

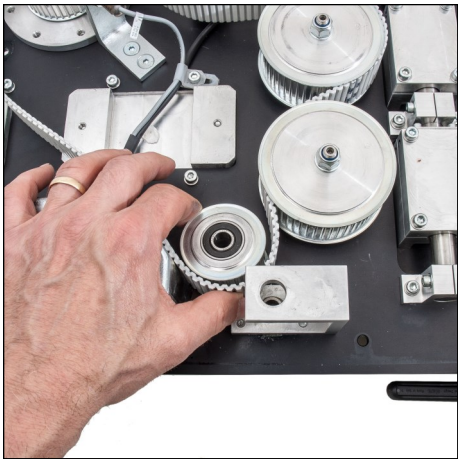
13.0 Procedure for checking and replacing the motor drive belt

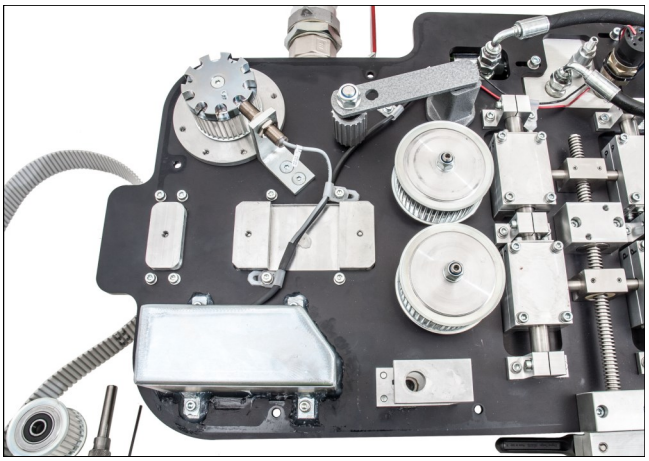




Loosen (6) screws indicated to permit access.







14.0 Procedure to set the Pressure Switch

- Clamp a piece of 1 to 1 1/4" O.D. dowel x 10" long between the drive belts so it butts up to the air chamber mounted collets (in effect placing the motors in stall mode).
- Connect the electric lead to the power pack and blowing machine.
- Ensure the speed control knob is set to minimum (turned fully counter-clockwise).
- Press the on/off button (to turn the electric's on).
- Turn the pressure switch adjusting screw fully in using the 1/8" long series hex key through the hole in the side of the base.
- Start the power pack.
- Turn the hydraulic on/off valve to 'on' position.
- Turn the speed control knob towards 'max' (clockwise) until the pressure gauge reads the required pressure switch setting.

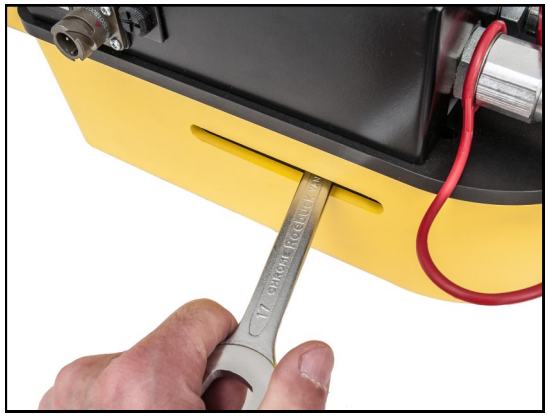
Maximum operating pressure:		1015 psi	70 Bar
Recommended flow:		4 gal/min (US)	15 l/min
Pressure switch setting:	12-20mm OD Cable	1015 psi	70 Bar
	4-12mm OD Cable	725 psi	50 Bar
Initial starting pressure: (if greater the set-up needs checking)		290-435 psi	20-30 Bar

- Turn the pressure switch adjusting screw slowly out until the power pack stops.
- Turn the speed control knob to minimum (turned fully counter-clockwise).
- After 5 seconds has elapsed restart the power pack and turn the speed control knob slowly towards 'max', observe at what pressure the power pack stops, repeat the procedure and fine adjust the pressure switch adjusting screw until the correct setting is achieved..

Pressure switch adjustment access hole found on side of unit

15.0 Procedure to set the Pressure Relief Valve

- Clamp a piece of 1 to 1 1/4" O.D. dowel x 10" long between the drive belts and through the air box so it butts up to the duct clamp collets. The duct clamp collets must be smaller than the dowel/round bar (in effect placing the motors in stall mode). (see page 25)
- Ensure that the electronics are turned off or the electric lead to the power pack is unpluged
- Ensure the speed control knob is set to minimum (turned fully counter-clockwise).
- Loosen the lock nut on pressure relief valve by using a 1/2" open ended wrench in the slot at back of the base. (see below)



Loosen lock nut on pressure relief valve

Using a 5/32" long series hex key adjust the pressure

Pressure Relief Valve setting	12-20mm OD Cable	1160 psi	80 Bar
	4-12mm OD Cable	870 psi	60 Bar

- Using a 5/32" long series hex key adjust the pressure as required. Turn screw counterclockwise to reduce the pressure and clockwise to increase the pressure.
- Tighten pressure relief valve lock nut via the slot in the back of the machine.
- Check pressure setting after tightening the lock nut and repeat if not correct.

16.0 Monthly service – check list

This section is included in the manual for your convenience, there follows a list of suggested checks, it is recommended that these checks be carried out on a regular basis, depending on use. Monthly checks are convenient; a few minutes can be set aside on the same day of each month to complete these simple checks. The next section of this manual is an empty table, the dates when these checks and all other service and repair jobs are completed can be entered into the spaces provided in this table. This will give the user a record of what service has been carried out and when.

1. Check the tool box, ensure all tools and interchangeable parts are present, clean and ready for use.
2. Remove the clear belt guards, clean the outside of the machine and replace.
3. Ensure the slide mechanism operates smoothly, lubricate if necessary with a dry film lubricant.
4. Clean the exposed threads on the swing bolts on the air box and duct clamp assembly together. Add a smear of grease/oil to prevent build up of surface corrosion and to ensure smooth operation of the thumb nuts.
5. Check the cable drive belt tension.

17.0 SERVICE HISTORY RECORD

Service no	Date	Carried out by	Record of service/repair

18.0 Duct Integrity and Duct Lubrication

This is entirely the responsibility of the operator.

To be sure that the duct into which the cable is to be inserted is installed appropriately, it is recommended that its integrity and lubrication be checked.

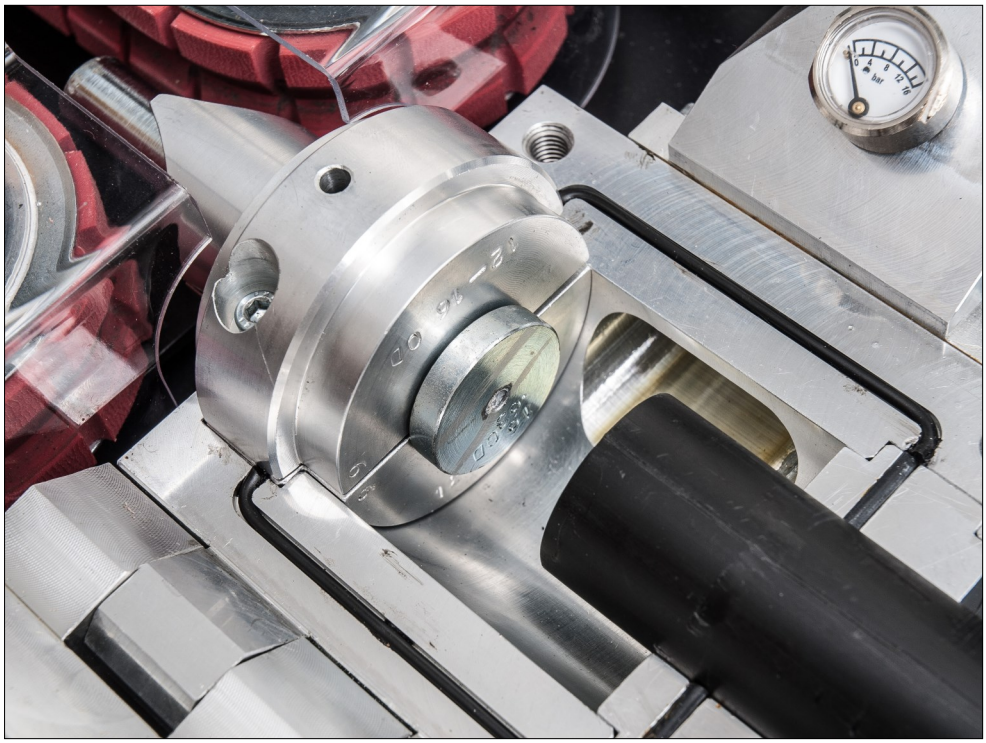
Check that the duct is:

1. Not blocked
2. Not squashed
3. Continuous (i.e. it has not been fractured somewhere along its route and the fractured ends separated)
4. Also check that any joints are pressure tight
5. Finally check that the duct is appropriately lubricated.

The easiest and most straightforward way to complete these checks is to set the machine up for a normal cable insertion but fit a seal plug in place of the cable. The duct can then be pressurised without running the belt drive.

CAUTION: ANY OBJECT INADVERTENTLY LEFT IN THE DUCT DURING THE DUCT LAYING MAY BE EXPELLED FROM THE END OF THE DUCT WITH HIGH FORCE AND VELOCITY. IT IS IMPERATIVE THAT NO PERSONNEL BE IN THE VICINITY OF THE END OF THE DUCT AND THAT A SUITABLE DEVICE IS FITTED TO THE END OF THE DUCT TO ARREST ANY EXPELLED OBJECT.

The checks listed at 1-4 (inclusive) above may all be carried out at the same time using one check. The procedure is outlined below. Set up the air box and duct clamp with plug inserted as shown below and close duct clamp. Tighten the thumbnut. Close the airbox lid and tighten the (2) thumbnuts.



The air box and duct clamp are now set up to blow air through the duct. Connect the air as for normal blowing. Make sure there are personnel at the other end of the duct run, and that they are aware that the air is to be turned on. Make sure that a suitable device is fitted (a catcher is available from General Machine Products; speak to our sales department for details) to help avoid injury should any object be expelled from the far end of the duct.
The far end of the duct run should be monitored; air should be leaving the duct under reasonable pressure. The minimum pressure required will vary with the length of duct in the run, the friction characteristics of the duct and the cable and the lubrication being used. Bear in mind that if the duct run is of considerable distance, it may take a few minutes for the air to reach the far end of the duct.
If after waiting a suitable time there is no air leaving the far end of the duct, this would indicate that there is a blockage or similar obstruction in the duct run, or, that the duct is fractured. In either case the fault must be corrected before any attempt is made to blow cable down the duct.
Once the duct integrity has been confirmed by the method outlined above, the duct may be lubricated.

Open the air box and duct clamp assembly, withdraw the duct and raise it so that the lubricant will pour into it easily and not overflow from the top. Pour lubricant of recommended quality and quantity down the duct.

Insert a suitable foam plug into the duct and put the duct back into the air box and duct clamp. Tighten the thumbnuts of the duct clamp and (2) thumbnuts of the airbox. The air box and duct clamp assembly are now set up to blow the foam plug through the duct, the foam plug will help to deposit an even coating of lubricant to the inside walls of the duct. Connect the air as for normal blowing. Make sure there are personnel at the other end of the duct run, and that they are aware that the air is to be turned on. Make sure that a suitable device is fitted (a catcher is available from General Machine Products; speak to our sales department for details) to help avoid injury should any object be expelled from the far end of the duct. When the foam plug has been expelled from the far end of the duct run, cable can be installed into the duct.

Note: when the air is turned off, after checking the duct integrity and sending the foam plug down the duct to spread the lubricant. It may take some time for the pressure in the duct to dissipate, time must be allowed for the pressure to fall back to low levels before the airbox can be opened.

19.0 Trouble Shooting Guide

AT THE POINT OF STARTING A CABLE INSTALLATION THE HYDRAULIC PRESSURE WILL BE BETWEEN 290-435 PSI (20-30 BAR). IF HIGHER VALUES ARE REACHED **DO NOT CONTINUE**, SEE SECTION **'RUNS AT HIGHER THAN EXPECTED PRESSURE'** TO RECTIFY PROBLEM BEFORE COMMENCING CABLE INSTALLATION.

WILL NOT ACHIEVE MAX PRESSURE

- ON/OFF control valve not open fully
- Faulty power pack (check performance output) **See Jetstream Pressure Test on page 25**
- Cable clamping force not correctly set (Allowing belt slip)
- Worn belts due to cable slip
- Excessive lubrication blowback (on to belts causing belt slip)

RUNS AT HIGHER THEN EXPECTED PRESSURE

- Excessive clamping force on cable.
- Seized bearings
- Over tightening of belt tensioning screws
- Cable drum not rotating freely on shaft
- Poor duct and installation causing high cable frictions
- Insufficient out-put from compressor (See recommendations for duct diameter on page 8)
- Incorrect seal/collet fitted
- Dirt/debris in belt drive

PROVISIONAL BELT ROTATION TEST:- With Hydraulic power pack running and without cable, revolve the Drive Belts and monitor the minimum hydraulic pressure required. This should be around 220-360 psi (15-25) Bar as a benchmark.

CABLE BLOWING MACHINE STOPS SUDDENLY DURING CABLE INSTALLATION

- Maximum Hydraulic pressure achieved
- Obstacle in duct installation
- Power Pack out of fuel
- Emergency button pressed
- Damaged lead between Power Pack and blowing machine

ENGINE DOES NOT STOP AT MAX PRESSURE

- Emergency lead not connected
- Electrical display not switched on
- Batteries low on power
- Fuse blown in control panel
- Incorrect pressure switch setting

EXCESSIVE AIR LEAKAGE FROM AIR CHAMBER

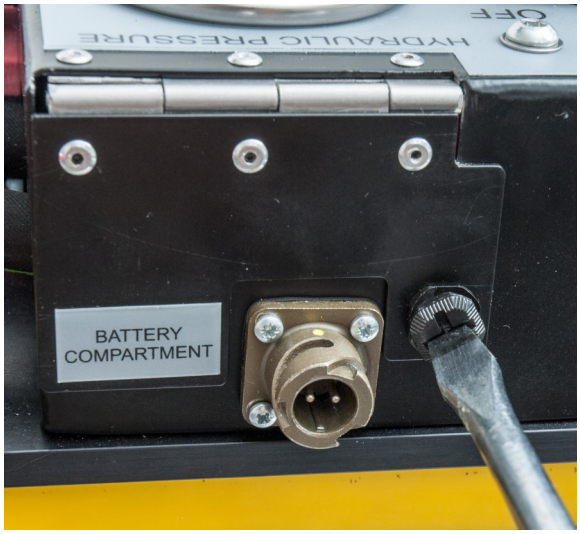
- Damaged cord seal
- Cable seals worn, incorrect size, wrong way round
- Incorrect cable collets

COUNTER NOT READING OR GIVING INCORRECT READINGS

- Batteries low on power
- Counter program has been changed – clear program and re-program as described on page 39

20.0 Battery Replacement

The batteries are located in the battery compartment at the rear of the hydraulic control panel



Install 9 volt lithium batteries for longest service life

21.0 Toolkit Contents

22.0 Spares

Cable Drive Belt:	33772 (2 req)
Motor Drive Belt:	33770

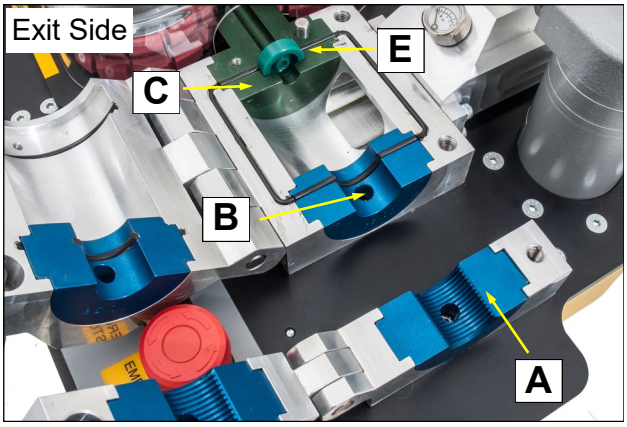
APPENDIX 1

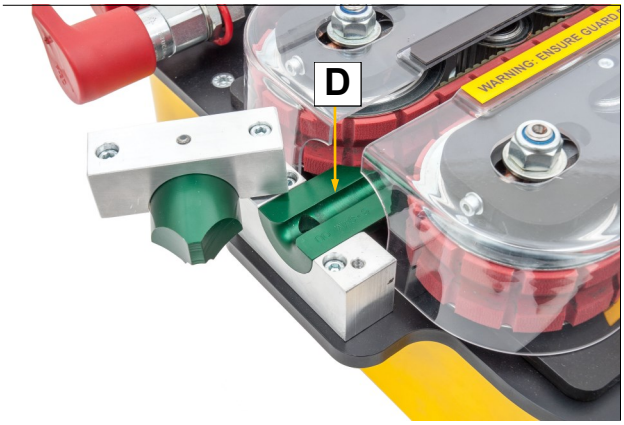
How to configure your JetStream

Let our "Cable Blowing Experts" tailor your configuration. Call **1-800-345-6009** for any questions.

Locator	Description	Qty needed
(A)	Duct Clamp	1 (2 halves)
(B)	Duct Seal	1 (2 halves)
(C)	Cable Collet	1 (2 halves)
(D)	Cable Guide Insert	1 (2 halves)
(E)	Cable Seals	1 (pkg of 10)
(F)	Cable Seal Plug	1 unit

In order to configure your JetStream to work with your specific cable requirements you must select items below that match your duct and cable size. Additional duct clamp and duct seal sizes are available upon request.





How to specify the collets and seals to match your cable and duct size.

Note: *Cables 6-20mm utilize the standard belts (P/N 33772). Cables 4-16mm require optional belts (P/N 89214).*

1. Select one (1) Duct Clamp (locator A) that represents the **size** of the duct that you're using.
2. Select one (1) Duct Seal (locator B) that represents the **size** of the duct that you're using.
3. Select the Cable Collet (locator C) that matches the cable's size.
4. Select the cable guide insert (Locator D) that matches the cable's size.
5. Select the Cable Seals (locator E) that matches your cable's size.
6. Select one (1) Cable Seal Plug (locator F) that matches your cable size.

(Loc A) DUCT CLAMPS (O.D. Controlled)

Imperial		Metric	
P/N	**Size (SDR)**	**P/N**	**Size**
89960	3/4"	**89964**	12mm
89961	1"	**89959**	12.7mm
89962	1.25"	**89965**	16mm
89963	1.50"	**89966**	18mm
		89958	22mm
		89967	25mm
		89968	32mm
		89969	40mm
		89970	50mm

(Loc B) DUCT SEALS (O.D. Controlled)

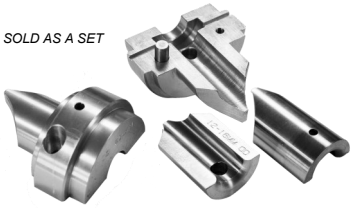
Imperial		Metric		
P/N	**Size (SDR)**	**P/N**	**Size**	**Replacement O Ring Seal (5 pack)**
89972	3/4" *	**89976**	12mm	**89552**
89973	1" *	**89983**	12.7mm	**89552**
89974	1.25" *	**89977**	16mm	**89554**
89975	1.50" *	**89978**	18mm	**89558**
		89971	22mm	**89561**
		89979	25mm *	
		89980	32mm *	
		89981	40mm *	
		89982	50mm *	

* O Ring Seals Not Required

(Loc C & D) CABLE COLLETS ASSEMBLIES

89890	4-6 MM (.16 - 23")
89891	6-9 MM (.23 - .35")
89892	9-12 MM (.35 - .47")
89893	12-16 MM (.47 - .63")
89894	16-20 MM (.63 - .79")

SOLD AS A SET



(Loc E) CABLE SEALS (6-28mm)

89085	6-7.5mm (.23 - .29") 10/PK
89086	7.5-9mm (.29 - .35") 10/PK
89087	9-10.5mm (.35 - .41") 10/PK
89088	10.5-12mm (.41 - .47") 10/PK
89093	12-14mm (.47 - .55") 10/PK
89094	14-16mm (.55 - .63") 10/PK
89095	16-18mm (.63 - .71") 10/PK
89096	18-20mm (.71 - .79") 10/PK

ID COLOR CODES

GREEN 1 LINE
GREEN 2 LINES
PURPLE 1 LINE
PURPLE 2 LINES
SILVER 1 LINE
SILVER 2 LINES
GOLD 1 LINE
GOLD 2 LINES

(Loc F) CABLE SEAL PLUGS (6-28mm)

89125	6-7.5mm (.23 - .29")
89126	7.5-9mm (.29 - .35")
89127	9-10.5mm (.35 - .41")
89128	10.5-12mm (.41 - .47")
89129	12-14mm (.47 - .55")
89130	14-16mm (.55 - .63")
89131	16-18mm (.63 - .71")
89132	18-20mm (.71 - .79")

APPENDIX 2

Crouzet Counter Programming

Programming Parameters

- Press and hold both ◄ and ► buttons.
  - After 5 seconds ‘ProG’ will be displayed. Releasing the buttons will display ‘no’
- Press ►
  - ‘Yes’ is displayed
- Hold ◄ and press ►
  - ‘InPol’ is displayed
- Press ► until ‘nPn’ is displayed
- Hold ◄ and press ►
  - ‘Filter’ is displayed
- Press ► until ‘oFF’ is displayed
- Hold ◄ and press ►
  - ‘InPut’ is displayed
- Press ► until ‘Cnt.dir’ is displayed
- Hold ◄ and press ►
  - ‘FAc.Cnt’ is displayed
- Press ◄
- Enter value **00.0200** for meters, **00.0656** for feet
  - Use ◄ to move to next digit
  - Use ► to increment digit (this instruction applies to all following number inputs)
- Hold ◄ and press ►
  - ‘diV.Cnt’ is displayed
- Press ◄
- Enter value 01.0000
- Hold ◄ and press ►
  - ‘dP.Cnt’ is displayed
- Press ► until ‘0’ is displayed
- Hold ◄ and press ►
  - ‘rES.Cnt’ is displayed
- Press ► until ‘MAnrE’ is displayed
- Hold ◄ and press ►
  - ‘FAc.tAc’ is displayed
- Press ◄
- Enter value **00.0200** for meters, **00.0656** for feet
- Hold ◄ and press ►
  - ‘diV.tAc’ is displayed
- Press ◄
- Enter value 01.0000
- Hold ◄ and press ►
  - ‘dP.tAc’ is displayed
- Press ► until ‘0’ is displayed
- Hold ◄ and press ►
  - ‘disPm’ is displayed
- Press ► until ‘Min-1’ is displayed
- Hold ◄ and press ►
  - ‘Wait0’ is displayed

APPENDIX 2 (con't)

- Press ◄
- Enter value 01.0
- Hold ◄ and press ►
  - 'EndPro' is displayed
- Press ► until 'YES' is displayed
- Hold ◄ and press ►
  Programming completed

OR

- Press ► until 'no' is displayed
- Hold ◄ and press ►
  Programming mode restarted

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