



HURRICANE

HURRICANE
CABLE BLOWING MACHINE



Operation and Maintenance Model 90000

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1.0 INTRODUCTION



Founded by engineer George M. Pfundt in 1936, GMP started operations in a downtown Philadelphia building as a specialty machine shop doing work for the local Bell Telephone company and for the electric utility company. GMP expanded to a production shop after landing a contract with Western Electric Company and, subsequently,

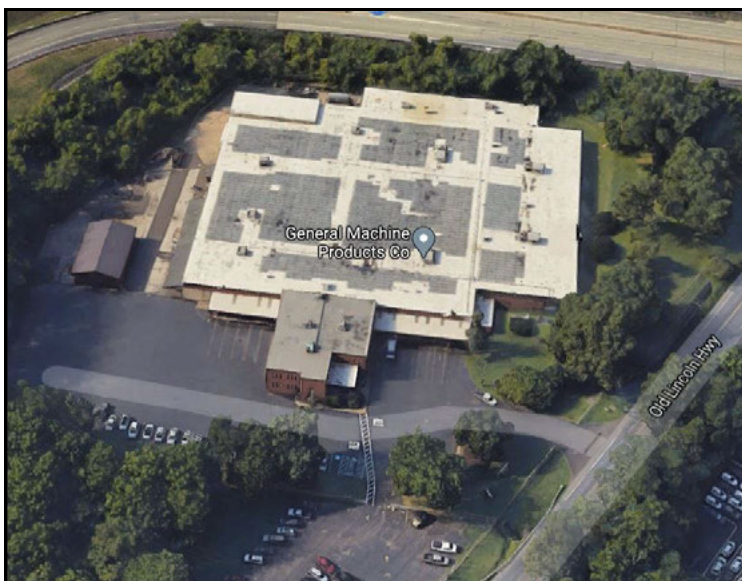
forming a close relationship with Bell Telephone Laboratories in Murray Hill, NJ, which enabled it to manufacture prototypes of products for experimental use within the Bell System.



GMP's 100,000-square-foot manufacturing plant in Trevese is equipped with a full complement of technologically advanced machine tools manned by a well-trained team of craftspeople. Our own engineering staff conduct research & development of GMP's products using computer aided design, a prototype fabrication shop and an on-site testing facility.

In 2004, CBS Products joined forces with GMP to further enhance the global reach and breadth of our outside plant equipment capabilities. As of June 2017 the business of GMP Tools and CBS Products were acquired by Klein Tools of the USA. Renamed GMP Products (KT), LLC, we continue to be the same engineering talent and innovative solution providers.

GMP continues to make investments in new product R&D, state-of-the-art manufacturing, quality assurance, distribution and inventory control techniques, and physical plant, in order to maintain its manufacturing leadership position and its continuing ability to anticipate



and meet the changing needs of work crews in the field who rely on the ruggedness, practicality and safety of GMP equipment. As our quality policy statement affirms: "GMP supplies defect-free products and service, on time, which meet its customers' expectations."

2.0 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.

2.1 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 and electrical 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.
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 15 Bar.
13. Prior to installation ensure the tube route is connected properly.
14. Beware of exposed electrical contacts. Do not touch, or allow metal objects to come into contact.
15. Machine may cause additional fire hazard if involved in an existing fire due to compressed air.
16. No personnel are to be in manholes or ducts when the Cable Blowing Machine is being operated.
17. The machine must be operated on firm ground.
18. Stay clear of cables or lines under tension.
19. Stay clear of pressurized air line and tube.
20. 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.
21. Do not place cable drum too close to the Cable Blowing Machine.

22. The compressed air supply must not be allowed to enter the air chamber or tube before the rollers have been closed on to the cable. Do not turn the air on until a reasonable length of cable 150 ft. (50m) has been installed into the tube.

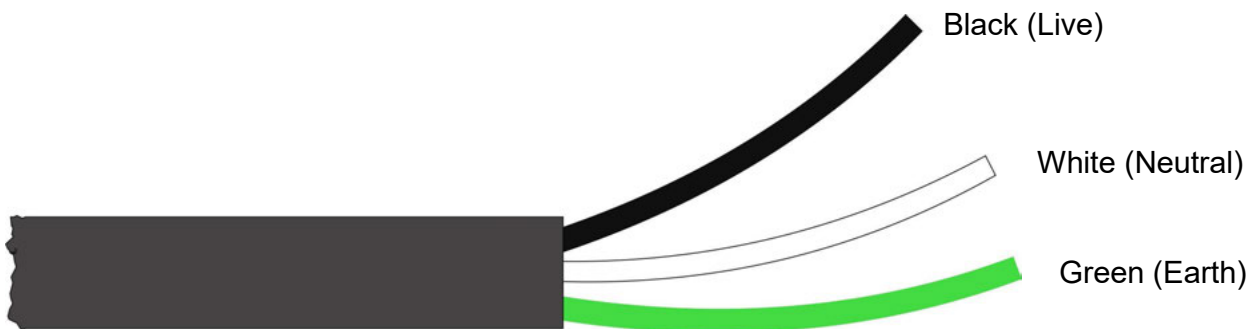
23. Ensure the cable drum rotates freely on its stand, the cable should leave from the top of the drum.

24. 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.

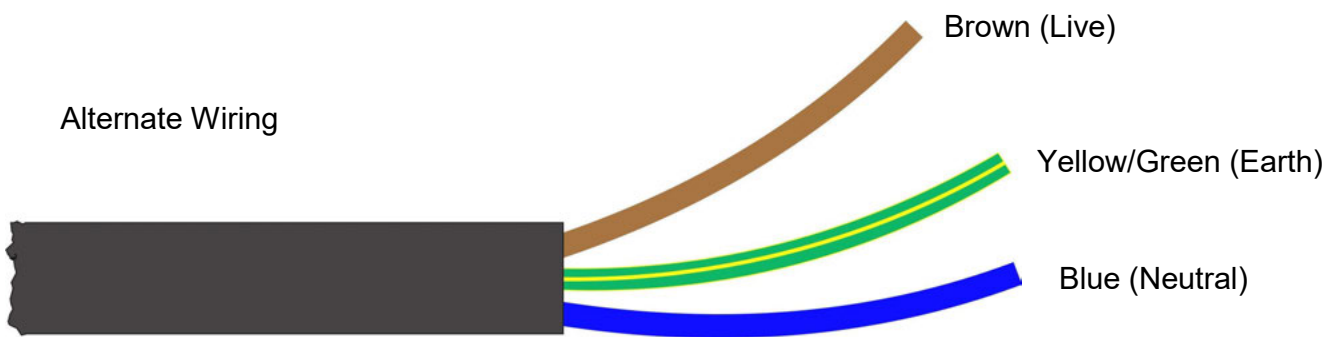
FAILURE TO DO SO MAY RESULT IN PERSONAL INJURY, AS THE CABLE COULD BE EJECTED FROM THE CABLE BLOWING MACHINE WITH HIGH FORCE AND VELOCITY.

If the connecting plug on the power lead to the generator / (or supply) supplied with the Airstream machine is unsuitable and requires replacement, the new plug must be correctly connected observing the color codes as below.

IT IS THE RESPONSIBILITY OF THE USER TO ENSURE THAT THE CONNECTIONS MEET THE ELECTRICAL REGULATIONS FOR THE RELEVANT COUNTRY.



Alternate Wiring



2.2 GENERAL PNEUMATIC SAFETY INSTRUCTIONS

The GMP Jetstream Cable Blowing Machine is a pneumatic device, using pressurized 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 pressurized.

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

2.3 GENERAL ELECTRICAL SAFETY INSTRUCTIONS

The machine has electronic and electrical power and control circuits. Electric shock hazards exist that could result in severe personal injury. Observe the following precautions to avoid electrical hazards:

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

Do not remove cover of electronic control panel or power supply unit. There are no user serviceable parts inside. Refer servicing to qualified service personnel.

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

Below is a list of point what dramatically affect the operation of the cable blowing machine:

1. Pressure on the cable (position of the close arm assembly) should be set as per the instructions.
2. Belts to be closed at all times when cable is installed into machine.
3. Cord seals in air chamber in good condition and correctly fitted to provide good sealing.
4. Correct cable and duct seal fitted.
5. Duct fully connected and pressure tested.
6. Duct and connecting fittings are suitable for operating at 15 Bar air pressure.
7. Duct clamp securely tightened.
8. Compressor capacity 15 Bar and suitable for the size of duct being used.
9. Cable drum must be location directly behind and in line with the cable blowing machine.
10. Air chamber, drive belts, pulleys and cable guides must be clean and free from debris, sludge, dirt, water and lubricant.
11. The cable must be hand guided into the cable blowing machine through a dry clean cloth by the operator wearing suitable work gloves.
12. Ensure the compressed air supply is not applied to the cable until approximately 150 feet of cable has been installed or the motor begins to labor.

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.



The Hurricane comes with a heavy duty case with wheels that doubles as a work table

4.0 GENERAL DESCRIPTION

The Hurricane blowing machine is designed to install small diameter cable into underground ducts.

The machine uses two synchronized motors to drive belts that push the cable into the ducts.

The belts are covered with a compliant coating to prevent damage to the cable. A range of different coatings and profiles are available depending on the surface texture of the cable being installed. 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 drive belts can be adjusted to prevent the cable buckling and to 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 protect the machine from damage during transit and can be used as a support for the machine when being used to install cable.

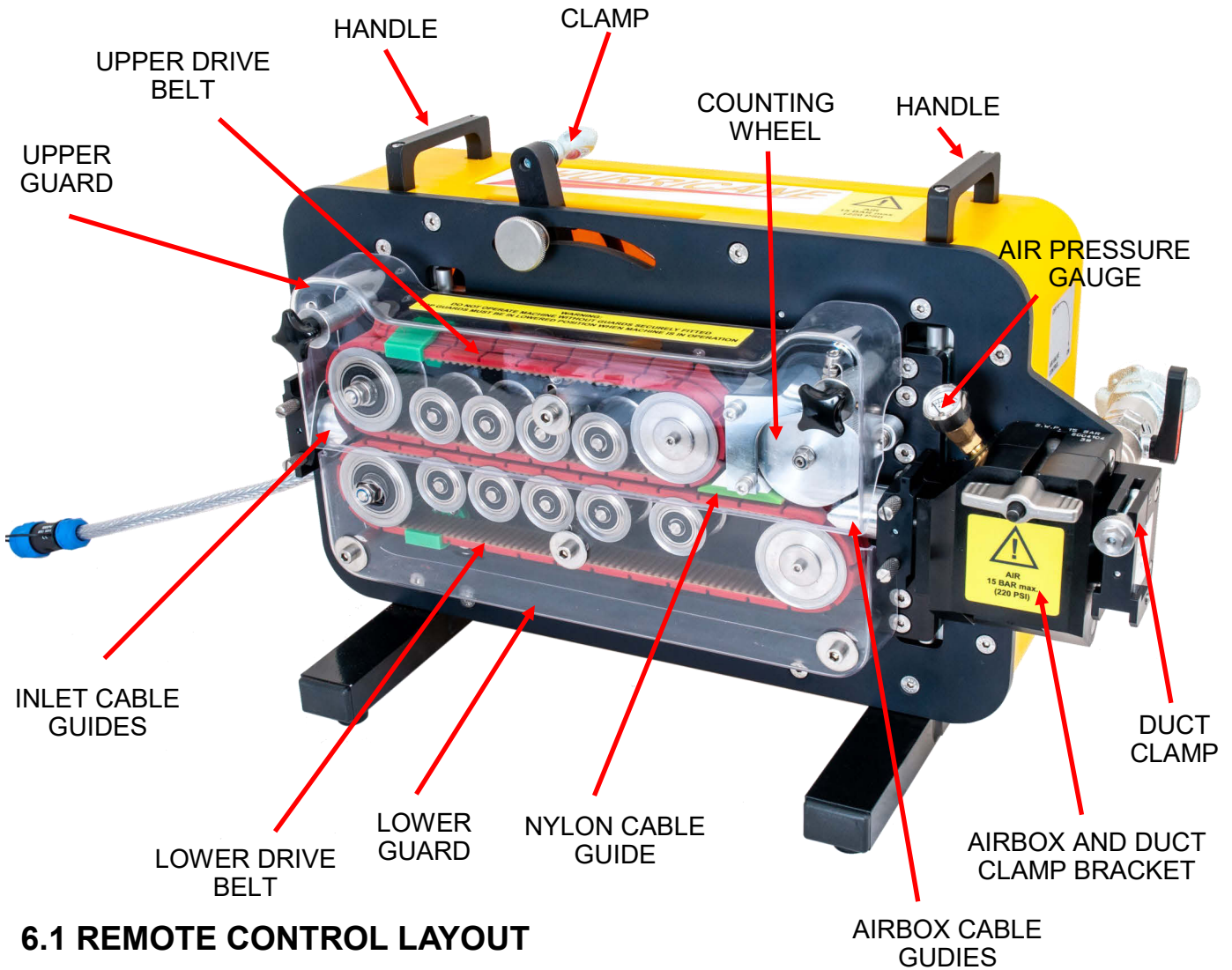
5.0 SPECIFICATION

Cable size:	Ø 2.5 to Ø 14.0mm	0.098" to 0.551"
Duct size: (OD)	Ø 5 to Ø 25.00mm	0.197" to 0.984"
Cable speed:	0 - 85m/min.	0 - 279 ft/min
Maximum pushing force:	43 kg.	95 lb.
Maximum air pressure:	15 bar.	220 psi.
Power requirements*:	90-264Vac 50/60 Hz via supplied power supply 48Vdc, 1008W directly into machine	
Weight	24 kg	53 lbs.
Weight inc. case and power supply	51.5 kg	113.6 lbs.
Dimensions (ht x length x width)	352mm x 556mm x 305mm	13 7/8" x 21 7/8" x 12"
Ambient Temperature Range	0 - 40°C	32 - 104° F

* The sensitive electronics needed to give the desired control over the installation speed and torque require a certain electrical supply quality. Should a generator be necessary GMP recommend the use of an inverter type generator e.g. Honda EU 2200i or equivalent giving a pure sine wave output in order for safe, continued use of the machine. Please contact General Machine Products (KT), LLC should you require further assistance.

6.0 EQUIPMENT LAYOUT

6.1 BLOWING MACHINE LAYOUT



6.1 REMOTE CONTROL LAYOUT



7.0 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
- HAVE READ AND UNDERSTOOD THIS MANUAL

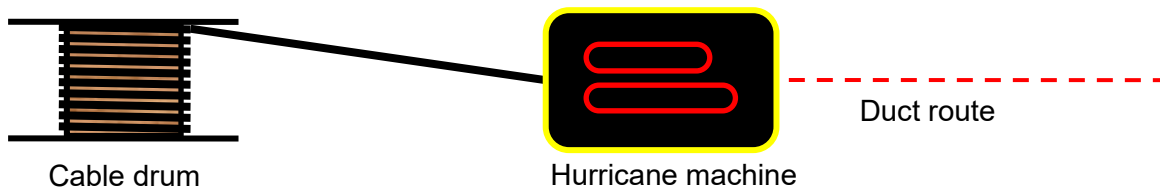
GENERAL MACHINE PRODUCTS (KT), LLC CANNOT BE HELD RESPONSIBLE FOR MISUSE OF THIS EQUIPMENT.

7.1 SETTING UP BLOWING AREA

7.1.1 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:

- Select the appropriate torque setting for the cable being installed, if in doubt start with the low torque setting.
- Fit the duct into which the cable is to be installed into the air box and duct clamp.
- Fit the cable through the machine and around 3 feet into the duct.
- Connect the air supply to the machine.
- Connect the electrical power input to the machine.

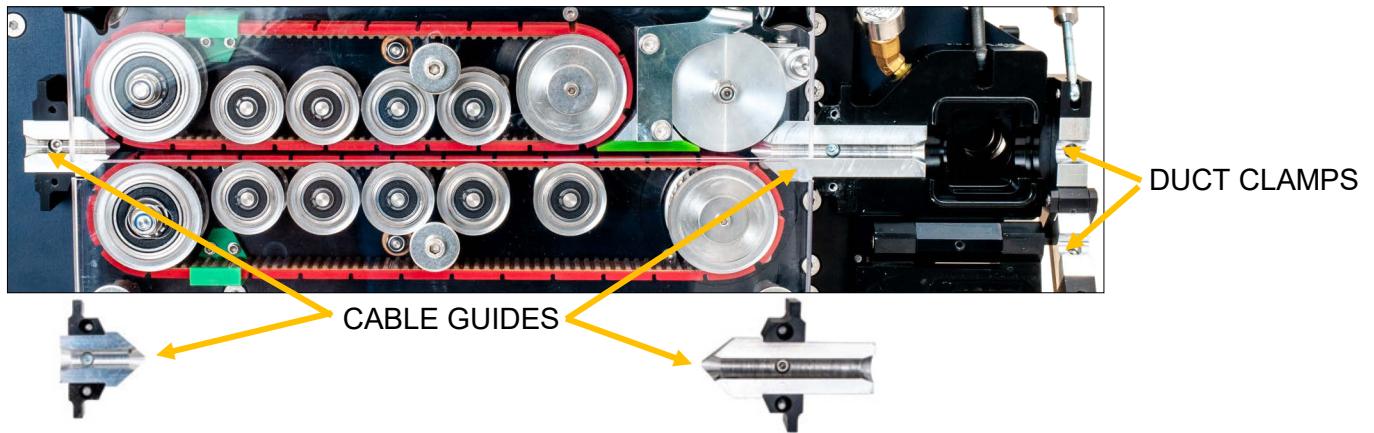
7.1.2 Set up for installing cable with the machine below ground:

The setup is similar to the set up for installing cable above ground, (described above) typically this type of installation is demanded 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” sited down a manhole some distance from the point of main installation. This machine operates in conjunction with the machine sited at the main point of installation. The Hurricane blowing machine is ideally suited to this type of operation, it may be coupled with a second machine to increase the distance a single cable can be installed without joins. 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 manhole is full of water, it must be pumped out before placing the machine on the bottom of the hole.

7.2 CHANGING THE DUCT CLAMPS AND CABLE GUIDES



7.2.1 DUCT CLAMPS

1. Open the duct clamp by unscrewing the wing nut rotating the swing bolt out of the way and opening the clamp bracket.
2. Use a 3mm Allen key to unscrew the cap screw in the duct be clamp halves remove the duct clamp halves

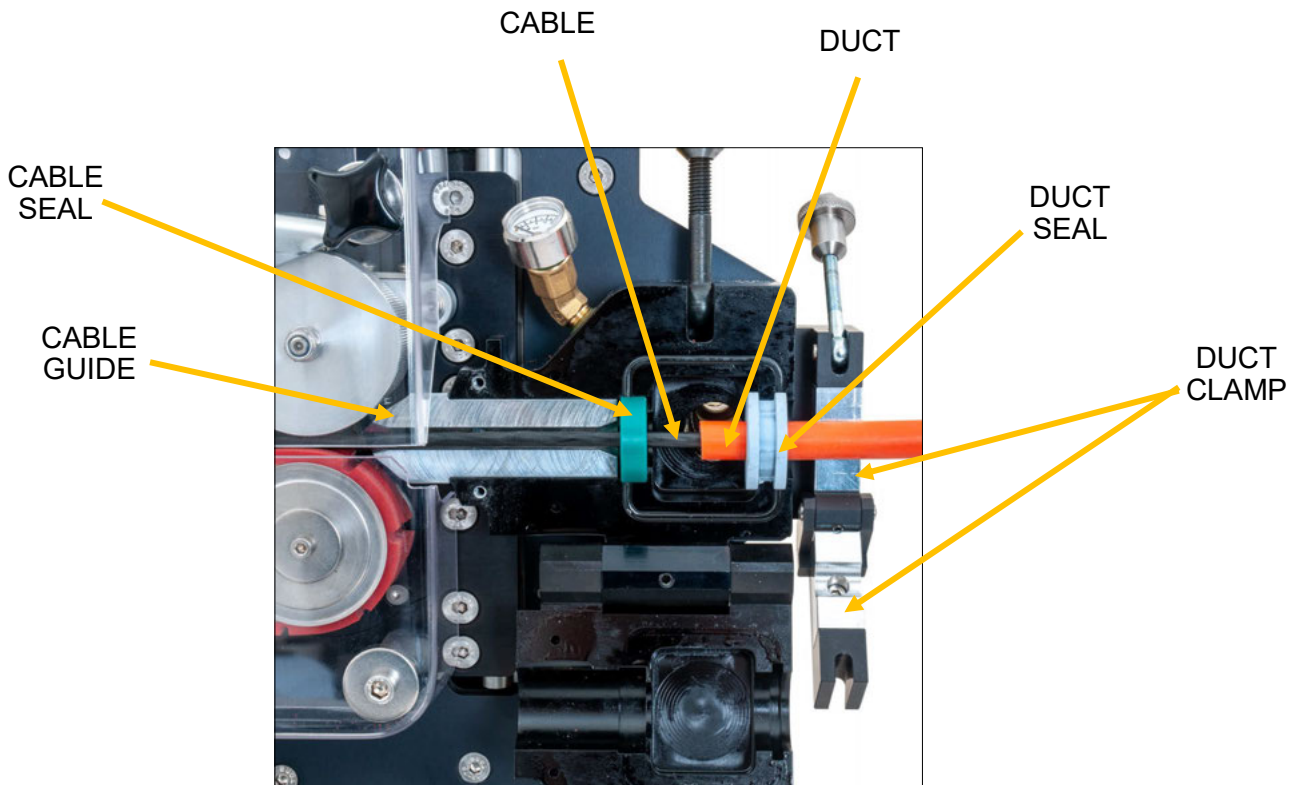
Do the above in reverse to fit the new duct clamp half's

7.2.2 CABLE GUIDES

1. Open the airbox
2. Unscrew both upper guide housings.
3. Use a 3mm Allen key to unscrew cap screw's and remove all four cable guide halves.

Do above in reverse to fit the new cable guides, keeping the shorter guides on the infeed for machine.

7.3 DUCT AND CABLE SET UP



Before starting an installation, the duct and cable need to be connected to the machine. The procedure for changing the duct clamps and cable guides can be seen in section 7.2. Consult Appendix 1 for a list of changeable parts, if sizes are required which are not in the list speak to the GMP sales team who will be happy to help.

Place the duct seal over the end of the duct and insert into machine as shown with duct approximately halfway into the air chamber. If the duct is too close to the cable seal air flow into the duct will be restricted but too far away and the cable has more chance to buckle in the air chamber. Due to this the duct distance will vary slightly depending on duct and cable combination.

Close the duct clamp, position the swing bolt so that the wing nut will tighten clamp and tighten wing nut until the duct is secure.

Ensure the belts are in the open position, to do this loosen thumb nut and move close are assemble towards the airbox.

Place cables seal in groove.

Feed the cable through the short cable guide, belts, long cable guides, cable seals and around 3 foot into the duct, in that order.

Close and set the clamping force of the belts, see section 7.4.

7.4 SETTING THE CLAMP FORCE

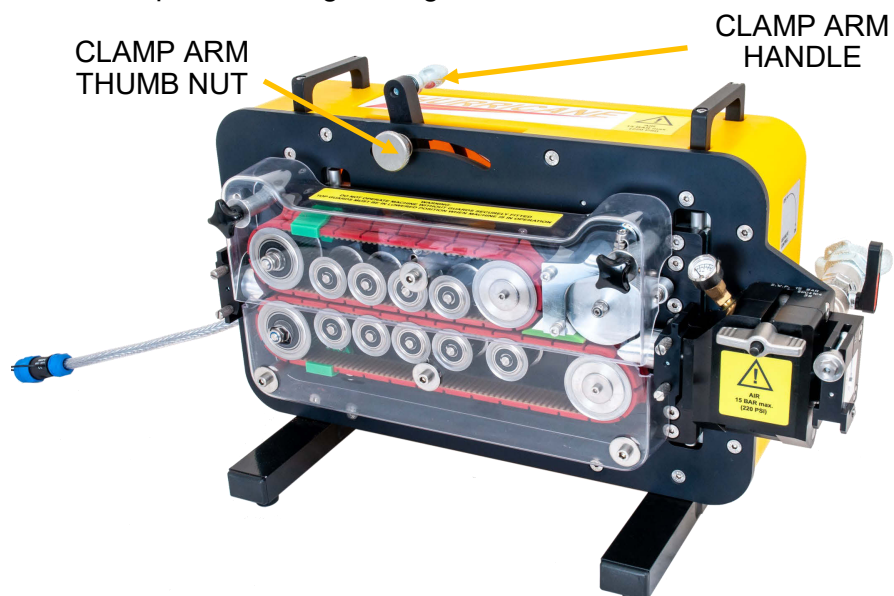
Close the drive roller assembly onto the cable as follows:

- The image above shows the clamp arm which is used to clamp the cable between the belts during install.
- As the clamp arm is moved around the quadrant the belts move together and apart. When the clamp arm is furthest to the right, the gap between the belts is at a maximum and vice versa.
- When preparing the machine to insert the cable, the clamp arm is positioned at its furthest point to the right (rollers open). Once the cable has been positioned in the machine the rollers must be closed on the cable in order to drive the cable. (And to stop the cable being dragged back out of the machine by any tension in the cable).
- The amount of pressure on the cable can be varied simply by loosening the thumb nut, moving the clamp arm lever to the right or left; as required, and tightening the thumbscrew.

As more experience is gained using the machine, the amount of compression required will become clear.

Note:

An alternative method of setting the compression force is detailed in the note at the end of section 7.7.2.



7.5 CONNECT THE AIR SUPPLY TO THE MACHINE

The air inlet to the machine is male via a Chicago coupling on the back of the airbox with an on/off valve fitted to the airbox to provide control of the air supply to the operator. A pressure gauge is fitted to the airbox to indicate airbox pressure. Air pressure is also displayed on the remote when in the pre-installation and installation screen. Maximum safe working pressure is 15 Bar (220 psi).

To fit an air hose to the machine it must have a Chicago coupling and be pressure rated suitably for the output pressure of the compressor. The machine has a maximum safe working pressure of 15 Bar (220 psi), this must **not** be exceeded.

7.6 CONNECTING THE REMOTE AND ELECTRICAL SUPPLY

Note: - Please refer to Section 4.0 Specification for details on power supply quality. General Machine Products (KT), LLC recommends the use of a Honda EU2200i generator.

Follow the steps below for connecting the remote and electrical supply:

1. Ensure the power supply is **not** connected to the machine or power source (i.e. generator) before proceeding.
2. Connect the remote to the machine by pushing the connector into the mating part on the machine, top connector in opposite end of machine to the airbox. Once the connector is pushed in screw the it into the mating part, this prevents the remote accidentally coming out.
3. Once the remote is connected and screwed in it is safe to connect the electrical power supply to the machine, flying lead which is opposite end of the machine to the airbox. This is again done by pushing both sides together and screwing one into the other.
4. Now connect the electrical power supply to the power source, this will vary depending on power source and connector being used. Follow any local standards and advice of the power source.

IT IS THE RESPONSIBILITY OF THE USER TO ENSURE THAT THE CONNECTIONS MEETS THE ELECTRICAL REGULATIONS FOR THE RELEVANT COUNTRY.



7.7 CABLE INSTALLATION

7.7.1 PRE - INSTALLATION REMOTE SETUP

The various main displays on the remote can be seen in Appendix 2, it is advisable that you familiarize yourself with these before proceeding.

To proceed through the various screens, use the blue buttons, the functions for the buttons will be highlighted on the lower part of the screen above the buttons.

The following steps should be taken to get the machine ready to install cable:

1. Before beginning installation ensure sections 7.1 to 7.6 are completed. Once the remote is connected the machines power can be connected. The LCD display on the remote unit will initially say "Please wait" until it is ready to be used, this should take approximately 10 seconds.

Once the remote is ready the display will show the main screen.

2. To proceed with the cable installation, select "start new job" after which the pre-installation screen will be shown.
3. Next the torque needs to be set, and the speed turned to 0 f/min. This is done by adjusting the relevant potentiometer. Set values can be seen on the screen. The torque needs to be set so that the force on the cable won't damage it. For guidance on how to do this see section 7.7.2.

7.7.2 SETTING TORQUE

This section makes recommendations for the initial setting of the torque control potentiometer when installing a cable which has not been installed before, and, whose characteristics are unknown.



The picture above shows the torque and speed control potentiometers on the remote. To set the speed and torque to minimum (zero) turn the potentiometers fully counter clockwise, from this position gradually turn the potentiometer clockwise too increase the values.

There is an alternative way of arriving at the appropriate setting for the torque control potentiometer. Do the following:

1. Pass section of cable to be installed through machine as described in manual.
2. Feed the cable into the beginning of a length of sample duct (approximately 15 feet long)
3. Seal the open end of the duct
4. Set the torque determined by the recommendation in this section
5. Set the speed to maximum
6. Start the machine and drive the cable hard into the sealed end of the sample duct
7. The belts will stop turning as the torque limit has been reached.
8. Repeat the above a few time, increasing the torque a little each time. Eventually the cable will buckle at which point the torque is set a little too high so will need to be turned down slightly.
9. The torque is now set such that the maximum pushing force with damaging the cable can be applied.

Note:

This method may also be used to set the clamping force of the belts on the cable. Initially, the clamp arm lever should be set so that the belts press very lightly onto the cable.

Carry out the test outlined above (drive the cable into the closed end of a sample duct). The belts will slip. Repeat this procedure, each time increasing slightly, the pressure the belts apply to the cable. Eventually the belts will stop turning because the torque limit has been reached. It is worth noting at this stage that this approach may result in a great deal of force being applied to the cable. More than the cable can withstand without sustaining damage, sometimes it may be that the cable may be protected from buckling by a combination of torque control setting and slip. The main purpose of the exercise is to install the cable as far as possible without causing damage to the outer sheath, in some circumstances a compromise may be found that uses a degree of torque control and slip.

7.7.3 CABLE AND DUCT SIZE SETTING ON REMOTE

Next you may want to select the size of the cable and duct, this will be transferred when downloading the install data. Follow the steps below:

1. When in the pre-installation screen press options by using the appropriate blue button
2. Go down to "Cable/Duct" and press select
3. Select "Cable size"
4. Next you will be able to increase the value up .020" (0.5mm) and down .040" (0.1mm) to get to the correct value.

NOTE: if decreasing from 0.0 the value will jump to .551" (14.0mm)

5. Once the correct size is displayed press "BACK" again using the blue buttons. This will take you back to the Cable/Duct size screen and will display the size selected.
6. Go down to "Duct size", press select and repeat steps 4 and 5.
7. Press "BACK" to get back to the "OPTIONS" screen and press "BACK" again to get to the installations screen.

7.7.4 CABLE INSTALLATION

Note:

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. You will need to know when the cable has emerged at the other end of the duct route. A way of achieving this is to have a technician positioned at the end of the duct run, in contact with the main installer via a radio. In this way the main installer should be advised when the cable exits the duct so he can then stop the machine.

If there is an unexpected obstruction in the duct route the rollers will see this as an increase in torque demand, assuming the torque control has been set at an appropriate level, 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 torque control 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.

To install cable, follow the steps below:

1. The machine is now set up and ready for cable installation.
2. Press the start button on the remote and slowly turn the speed up until either the maximum desired speed is reached, or the maximum machine speed is reached.
3. When the cable has travelled a reasonable distance (around 150 to 300 feet), and once the machine starts to slow, turn on the air feed. This will help the machine to install the cable at a quicker speed and longer distances.
It is best to increase the air feed in steps as the machine slows, the steps are seen as pressure increases. Increase the air feed such that the cable install speed remains constant but excessive air pressure isn't seen. The machine has two ways of seeing the pressure, one on the remote and one on the machine.
4. Once the cable has reached the end of the install, press stop. See the notes at the top of this section for information on route setting up and how to tell when the cable has been fully installed.
5. Once you have pressed the stop button you will be asked if you want to finish job
 - a. If you press "YES" the data for this install will be saved and you will be taken to the main screen.
 - b. If you press "NO" the data will not be saved and you will be taken back to the pre-install screen where you can continue the install as required.

7.7.5 WHAT TO DO IF MACHINE LOSES POWER

If the Hurricane loses electrical power for any reason the machine will retain the distance installed up to that point, all other data (i.e. speed, pushing force, GPS etc.) will be lost. To retain the distance, you need to the resume job. Do this by following the steps below:

1. The first to find out why the power has been lost, the most common reasons for this are:
 - a. Generator ran out of gas.
 - b. Electrical connectors no longer connected, this would include the generator to power supply and power supply to machine connectors.
 - c. Damage to a lead and/or connector
2. Once the reason for power loss is found this needs to be rectified.
3. Now that the machine has power again you should see the main screen. To resume the job at the distance where power was lost press "File Storage", "Manage storage" and finally "RESUME".
4. The remote screen should now be on the pre-installation screen with the distance being the distance when power failed.
5. Now proceed using sections 7.71 to 7.7.4.

Note: Do not open the airbox unless the air is dissipated beforehand, failure to do so will likely result in injury.

7.8 OTHER REMOTE FUNCTIONS

7.8.1 GPS LOCATION, TEMPERATURE AND HUMIDITY

The Hurricane machine is fitted with a GPS sensor along with a temperature and humidity sensor. These sensors allow the altitude, longitude, latitude, temperature and humidity to be recorded, this will be saved to the job data which can be downloaded. Information how to view this information can be seen in section 7.9.

7.8.2 SETTING THE DATE AND TIME

The date should be correctly set when the machine is delivered, the time should also be correct, but this may dependant on time zone and daylight savings adjustments.

If the date or time needs correcting go to the main screen and press "Settings", "Set Date/Time"

The date will be the date which the machine thinks it is but in the year 0020. For example, if the machine thinks it is April 3rd 2020 the date will read 04/03/0020, when date format is set to MM/DD/YYYY.

You can increase or decrease the day value, press next. This is then repeated for the month and year.

Once next is selected for the year you will be taken down to the time where you will do the above for the hour, minute and seconds.

If the data is correct you can now save the changes. After this you will be taken back to the settings screen.

7.8.3 CHANGING UNITS OF MEASURE

You can change the date layout and toggle between metric and imperial for the live data and odometer units.

To do this from the main screen and press "Settings" then "Units of Measure" then follow the screen as required.

7.8.4 CHANGING THE LANGUAGE

The remote can be displayed in English, German, French, Spanish, Italian and Portuguese. To do this from the main screen press "Settings" the "Language" and the scroll through and select the language required.

7.9 DATA LOGGING

Install data from the Hurricane can be extracted as a CSV file and imported into a program like “Excel”.

This is done by downloading a data file using a Bluetooth enabled windows PC or Laptop, the file can then be loaded into a specially designed website which will format the data. To download the data you must install the program, for the program please speak to the GMP sales team.

7.9.1 EXTRACTING DATA FILE FROM THE MACHINE

Before extracting the data from the machine, the program which is used to download the data from the machine will need to be installed onto the laptop/computer. Contact the GMP sales team for access to the PC app.

Follow the steps below to extract the install data from the machine to a PC/Laptop:

1. Turn on and log into the PC/Laptop which the data file is to be downloaded too.
2. Turn on machine by connecting the remote, followed by the power supply. Then connect the power supply to the power source.
3. Once the “please wait” screen has gone and the main screen has loaded the machine, if already paired via Bluetooth, should pair to the PC/Laptop. You can check this by following the advice for the PC/Laptop.
 - If this is the first time the machine is connected to the device you will need to connect the machine via Bluetooth. To do this flow the instructions for your PC/Laptop and connect to the device. The device **name will be CBS** followed by a number, the **password is “1234”**.
4. On the remote select “File Storage”
5. The following screen will show how many installs are available for download, the machine can save a maximum of 50 installs with an install being a maximum of 4 km.
6. With the machine and device connected via Bluetooth press “Save to PC”.
7. The remote will then say please wait until the download, the PC app will show the data being extracted and will become stationary when completed.
8. Once the download has completed press “Save”. When a screen will come up where you need to select the desired save location and file name, once complete press “open”. The file will be finished saving once it can be seen to have a size associated to it.
9. The file will now be saved to the location and under the name given.

Please contact the GMP sales team for information on formatting the data logs.

8. MAINTENANCE

8.1 GENERAL

The Hurricane 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 several 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).

The machine may be set down on a muddy surface or be splashed by road going 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 our warranty.

Airbox and changeable items (duct clamp inserts, cable seals and cable infeed and exit guides) need to be kept clean, and build-up of moisture and dust prevented. Build-up of moisture and dust will prevent the joint faces from mating and will prevent the housing seal from sealing. Cleaning can be done using any traditional workshop cleaning agent.

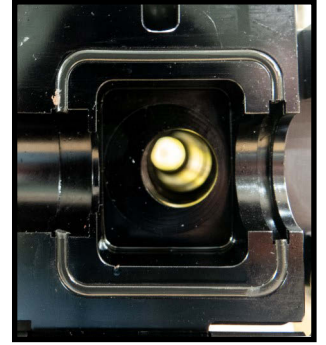
As a general rule, every time an interchangeable part is removed and replaced by a part of a different size, shape etc. the part being removed should be thoroughly cleaned before being returned to its box. Similarly, the cavity from which it was removed can also be cleaned prior to the assembly of the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

- The machine should be returned to the manufacturer after every 1000 hours use or at intervals of 12 months (whichever is first) for a major service.

8.2 REPLACING THE AIRBOX HOUSING SEAL

To replace the airbox housing o ring seal follow the steps below:

1. Open airbox and duct clamp (ensure no air pressure is in the airbox before doing so, opening the airbox under pressure would likely cause injury)
2. Remove the cable guides, cable seals and duct seal as required.
3. Take cord seal out of machine, the cord seal is not glued but may need to be pulled firmly to remove from groove.
4. Cut length of 3mm O-ring seal slightly larger than required.
5. Stretch the seal and push into groove.
6. Let the seal rest for a few minutes, the O-ring will shrink a little in length.
7. Cut the seal ensuring that no gaps will be between the cord seal and cable/duct seals.
8. Repeat steps 3-7 for other half.

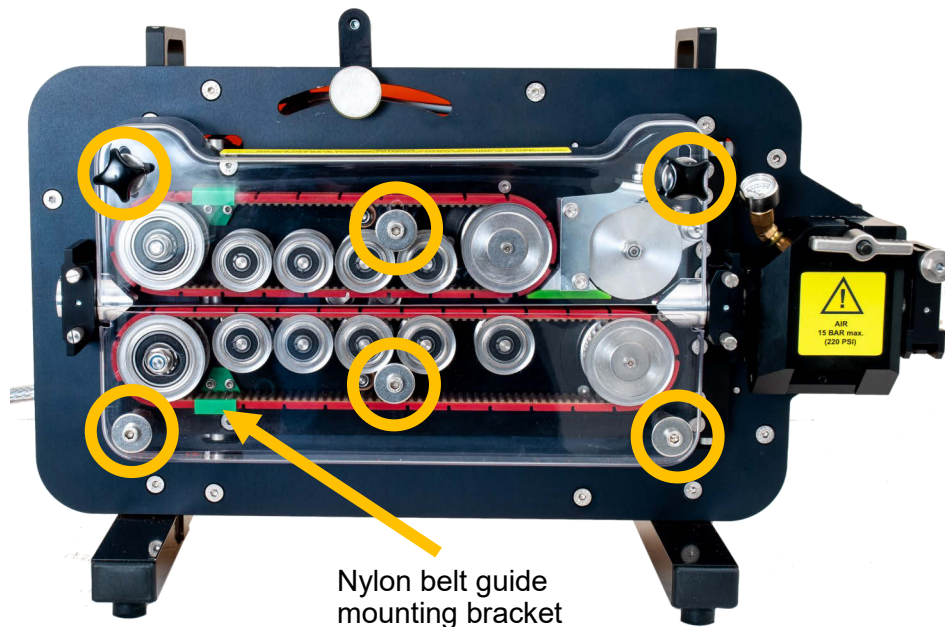


8.3 CHANGING THE CABLE DRIVE BELTS

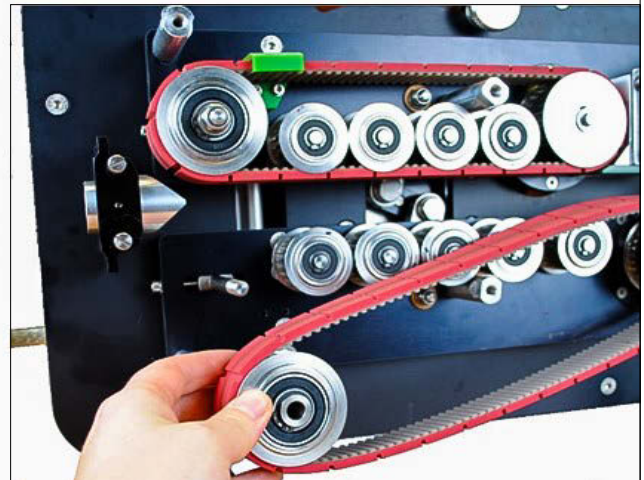
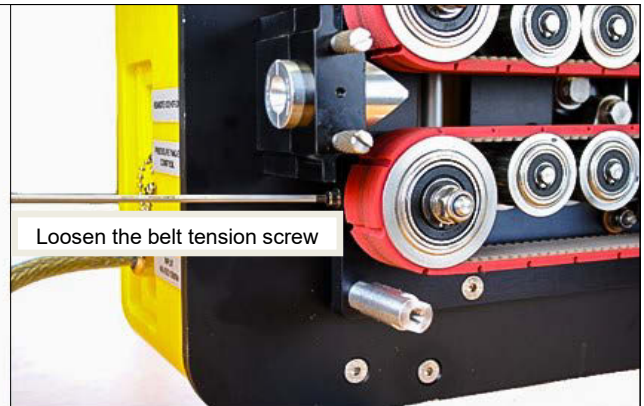
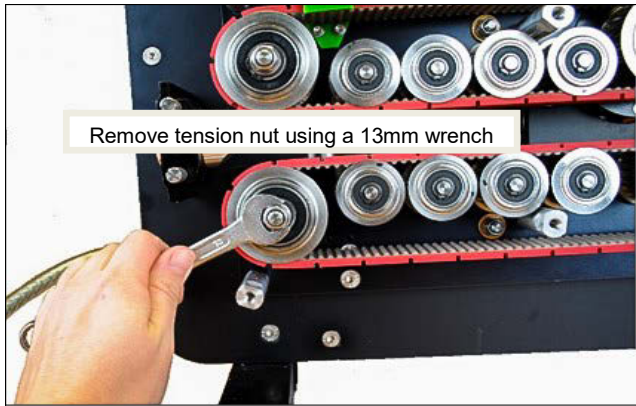
The machine is fitted with standard belts; tests have shown that these belts give a good compromise of life and grip.

There may be circumstances when a belt with much higher grip will be needed. If, for instance it is necessary to install a cable, which will sustain crushing damage when light compression forces are applied to it. It will be necessary to use a belt with a surface coating with high friction characteristics. This will allow the cable to be pushed with high torque while being compressed lightly. Additionally, smaller cables may require a belt with a smaller groove profile to gain the best grip possible. If these types of belt are needed the GMP sales office will be able to advise on part numbers etc. To fit these belts it will be necessary to remove the standard belts, the procedure is as follows:

1. Remove the guards which is done by removing 2 hand knobs and 4 screws and washers retaining the belt guards, see image below.



2. Remove nylon belt guide mounting bracket, see section 8.4.



4. Place the new belt in position on the drive pulley, place the idler pulley around the other end and replace the idler pulley onto the tensioning shaft. Replace the tension nut and then tension as described in section 8.4.

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

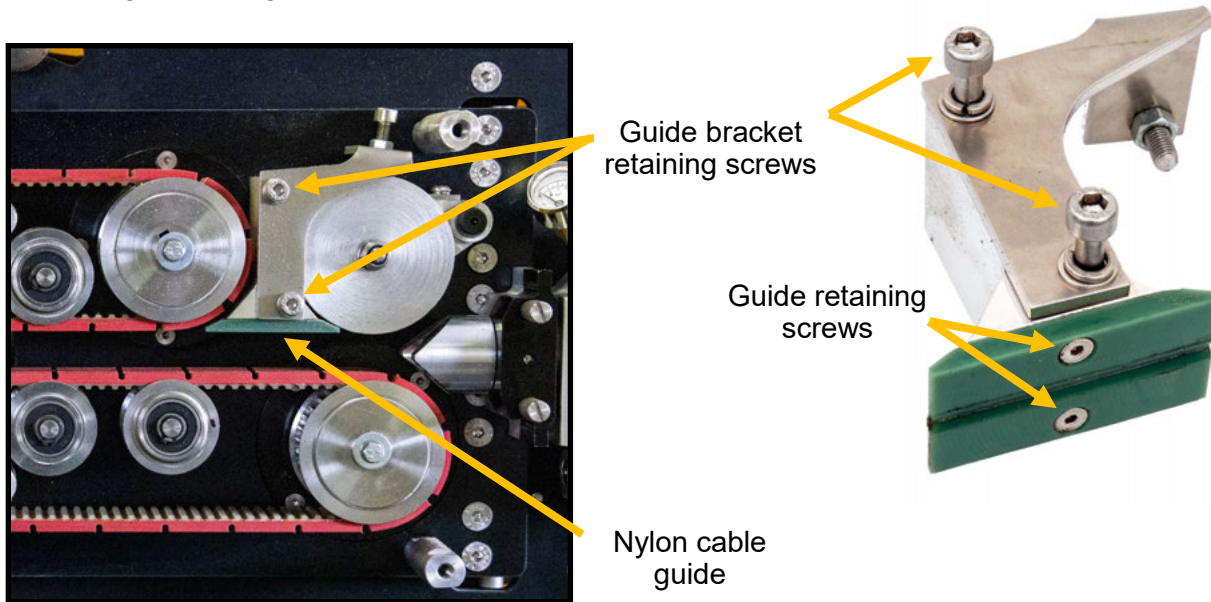
8.4 TENSIONING THE DRIVE BELTS

To tension the drive belts follow the steps below:

1. Place belts in position as in section 8.3 and ensure belt is correctly located in all the pulley grooves.
2. Tighten the tension screw with the tension nut slightly loose. This will begin to tighten the belt. Once the appropriate tension is reached, tighten the tension nut.
 - a. Note tightening the nut will tighten the belt slightly, please set the tension screw to compensate for this.
3. Check the belt tension and adjust the tension as per above as required and check the tension nut is tight upon completion.

8.5 CHANGING THE NYLON CABLE GUIDE

When changing the drive belts the nylon cable guide between the short belt and counting wheel needs replacing. See image below.



To change the nylon cable guide follow the steps below:

1. Remove the top belt guard by removing the 2 hand knobs and 1 button head screw.
2. Loosen and remove 2 screws retaining the guide mounting bracket.
3. Remove 2 countersunk screws retaining the nylon cable guide to the mounting bracket
4. Remove Nylon cable guide from mounting bracket
5. Replace Nylon cable guide by reversing steps 1-4 but replacing the old guide with the new one.

9.0 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 that are completed can be entered into the spaces provided in this table giving the user a record of what service has been carried out and when.

1. Check the toolbox, ensure all tools and interchangeable parts are present, clean and ready for use.
2. Remove the clear belt guards and clean the outside of the machine and replace.
3. Check that the slide mechanism operates smoothly.
4. Clean the exposed threads on the swing bolts that hold 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.

10.0 DUCT INTEGRITY

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.

i.e. check that the duct is:

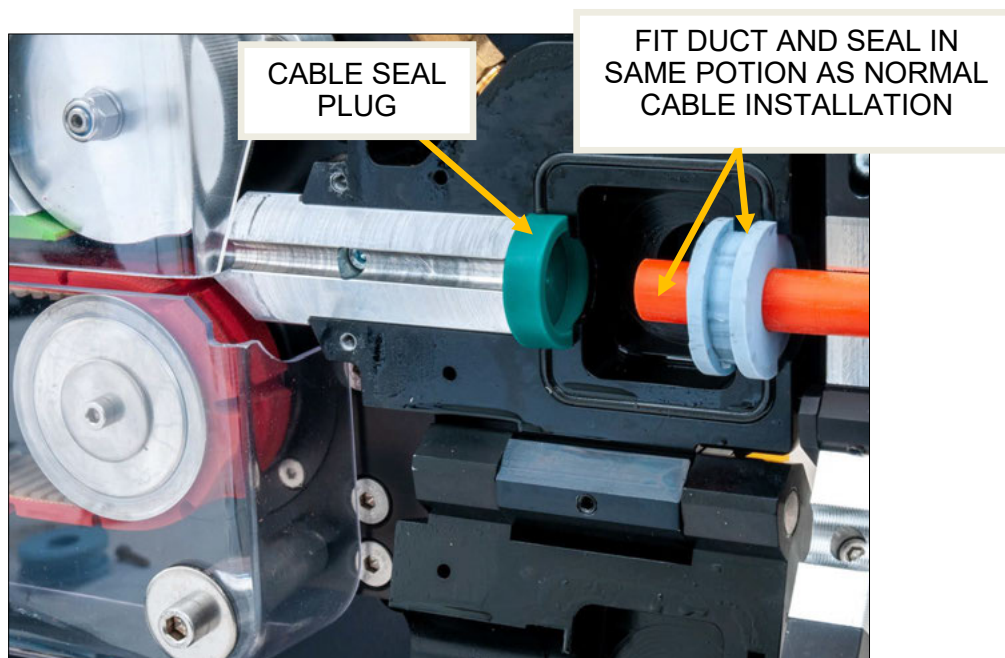
1. Not blocked
2. Not squashed
3. Continuous (i.e. it has not been fractured somewhere along its route and the fractured ends separated)
4. Also check that any joints are pressure tight

There is a seal plug to carry out some simple checks however as the airbox cannot be 100% sealed it cannot be used for a fully integrity test. GMP does offer a Innerduct Pressurization test kit that is used to test the integrity of the duct before the cable is blown in. Order P/N 89641

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 OR 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 as follows.

1. Set up the air box and duct clamp as shown above.
2. When the air box has been set up as shown in the image the air box and duct clamp should be closed as for usual cable installation.
3. 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 to prevent 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. However, as a starting point the air leaving the far end of the duct should be (at least) similar to a light breeze. 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 should 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.

10.1 LUBRICATION

“Polywater Duct Prelube®” lubricant can greatly improve the cable lengths installed if used correctly, therefore the following procedure should be employed.

Warning: Do not exceed the stated volumes as this can reduced the installation lengths

1. The table below indicates the volume of lubricant necessary given common duct sizes and lengths.

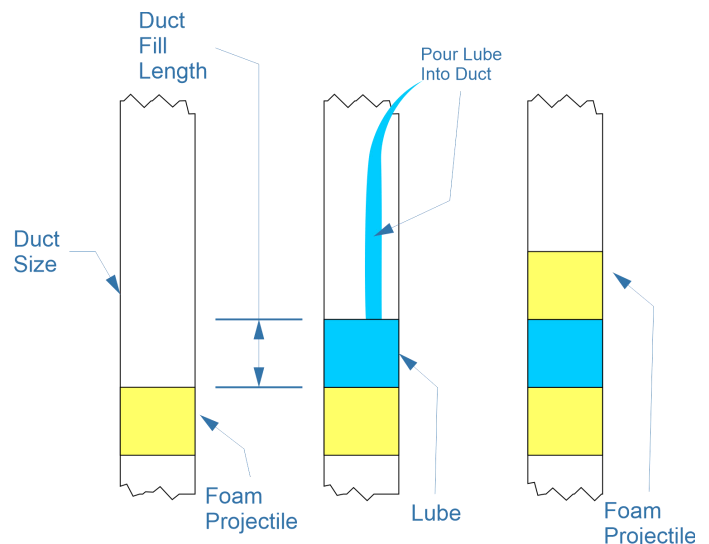
Distance to Blow	500m		1000m		1500m		2000m	
Duct Size	Duct Fill Length (cm)	Duct Fill Volume (mL)	Duct Fill Length (cm)	Duct Fill Volume (mL)	Duct Fill Length (cm)	Duct Fill Volume (mL)	Duct Fill Length (cm)	Duct Fill Volume (mL)
12 x 10mm	4	3.2	8	6.3	12	9.5	16	12.6
10 x 8mm	5	2.6	10	5.1	15	7.6	20	10.1
8 x 6mm	7	2.0	13	3.7	20	5.7	27	7.7
7 x 5.5mm	8	2.0	15	3.6	22	5.3	29	6.9

2. Inset foam projectile into duct a distance lower than the above required fill length. Pour lubricant into duct, fill and fit second foam profile.

3. Install duct into air chamber of Hurricane Cable Blowing Machine; insert seal/plug in chamber; charge system with air.

- 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 to obviate injury should any object be expelled from the far end of the duct.

4. Once both projectiles have exited the duct, the exhaust system. Installation duct is now ready for cable blowing.



• **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.

11.0 RECOMMENDED SPARES LIST



Replacement Cable seals

Consists of 5 cable seals

Part number	Description
See website for latest size options	2.5-3mm CABLE SEALS
	3-4mm CABLE SEALS
	4-5mm CABLE SEALS
	5-6mm CABLE SEALS
	6-7.5mm CABLE SEALS
	7.5-9mm CABLE SEALS
	9-10.5mm CABLE SEALS
	10.5-12mm CABLE SEALS
	12-14mm CABLE SEALS
	14-16mm CABLE SEALS



Replacement Duct Seals

Consists 5 duct seals

Part number	Description
See website for latest size options	5mm DUCT SEALS
	7mm DUCT SEALS
	8mm DUCT SEALS
	8.5mm DUCT SEALS
	10mm DUCT SEALS
	12mm DUCT SEALS
	12.7mm DUCT SEALS
	14mm DUCT SEALS
	16mm DUCT SEALS
	18mm DUCT SEALS
	20mm DUCT SEALS
	* 21.6mm DUCT SEALS
	25mm DUCT SEALS

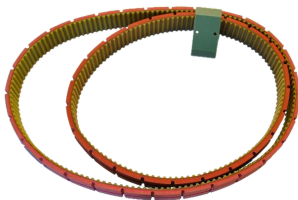
* 21.6mm may be referenced as a 22mm



Replacement Cord Seal

Consists of 10 foot long length of 3.0mm diameter cord seal for replacing airbox cord seal

Part number	Description
89147	SEAL CORD 3.0mm DIAMTER X 10 ft. LONG



DRIVE BELT ASSEMBLIES

Consists of 1 pair of drive belts (1 long and 1 short), 1 Nylon cable guide and replacement screws

Part number	Description
See website for latest size options	2.5-9mm CABLE DRIVE BELT KIT
	3-11mm CABLE DRIVE BELT KIT (standard)
	5-14mm CABLE DRIVE BELT KIT

For spare parts always quote the machine type and serial number and contact:

General Machine Products (KT), LLC
 3111 Old Lincoln Hwy
 Trevose, PA 19053

TEL: 215-357-5500

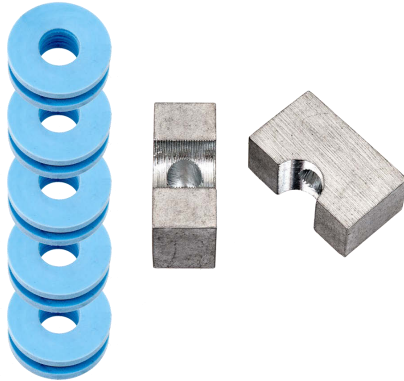
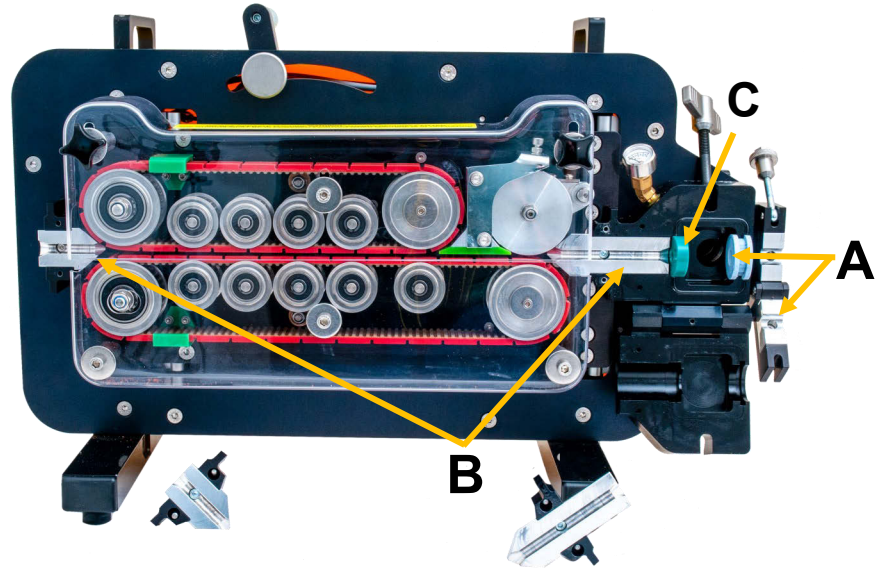
E-MAIL: info@gmptools.com

12.0 APPENDIX 1 - COLLET AND SEAL LIST

This section lists the appropriate inserts collets etc required for a given cable/duct combination.

To outfit your Hurricane for a cable/tube combination

1. Measure your tube O.D. and pick your **duct clamp and seal kit** size from chart **A**
2. Pick your **cable guide** cable range from chart **B**
3. Pick your **cable seal** size range from chart **C**



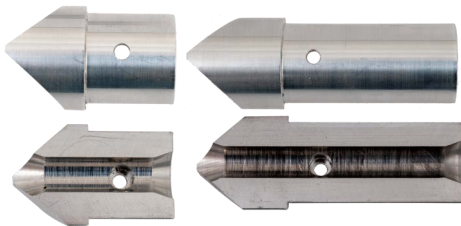
A. DUCT CLAMP AND SEAL KITS

Consists of 1 pair of duct clamp collets, 5 duct seals and replacement screws

Part number	Description
	5mm DUCT CLAMP AND SEAL ASSEMBLY
	7mm DUCT CLAMP AND SEAL ASSEMBLY
	8mm DUCT CLAMP AND SEAL ASSEMBLY
	8.5mm DUCT CLAMP AND SEAL ASSEMBLY
	10mm DUCT CLAMP AND SEAL ASSEMBLY
	12mm DUCT CLAMP AND SEAL ASSEMBLY
	12.7mm DUCT CLAMP AND SEAL ASSEMBLY
	14mm DUCT CLAMP AND SEAL ASSEMBLY
	16mm DUCT CLAMP AND SEAL ASSEMBLY
	18mm DUCT CLAMP AND SEAL ASSEMBLY
	20mm DUCT CLAMP AND SEAL ASSEMBLY
	* 21.6mm DUCT CLAMP AND SEAL ASSEMBLY
	25mm DUCT CLAMP AND SEAL ASSEMBLY

See website for latest size options

* 21.6mm may be referenced as a 22mm



B. CABLE GUIDES

Consists of 1 pair of short and 1 pair of long cable guides along with replacement screws

Part number	Description
	2.5-4mm CABLE GUIDE ASSEMBLY
	4-6mm CABLE GUIDE ASSEMBLY
	6-9mm CABLE GUIDE ASSEMBLY
	9-12mm CABLE GUIDE ASSEMBLY
	12-14mm CABLE GUIDE ASSEMBLY
	14-16mm CABLE GUIDE ASSEMBLY

See website for latest size options



C. Cable seals

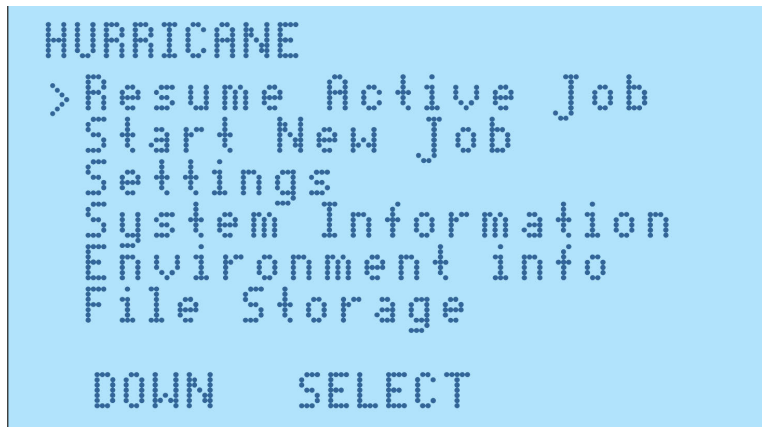
Consists of 5 cable seals

Part number	Description
	2.5-3mm CABLE SEALS
	3-4mm CABLE SEALS
	4-5mm CABLE SEALS
	5-6mm CABLE SEALS
	6-7.5mm CABLE SEALS
	7.5-9mm CABLE SEALS
	9-10.5mm CABLE SEALS
	10.5-12mm CABLE SEALS
	12-14mm CABLE SEALS
	14-16mm CABLE SEALS

See website for latest size options

13.0 APPENDIX 2 - MAIN REMOTE SCREENS

13.1 MAIN SCREEN

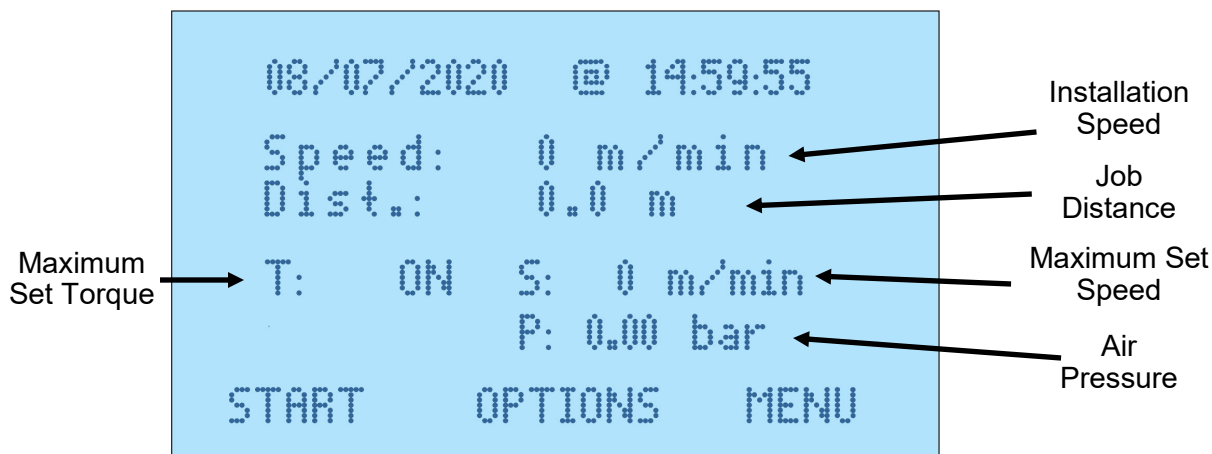


This screen is the first screen on start-up and can be used to access all other screens on the remote.

The options on this screen are:

1. Resume Active Job- this is only shown if an active job is available and take you back to the installation screen.
2. Start New Job- this is used to enter the installation screen
3. Settings- here you can:
 - a. Turn LCD backlight on and off
 - b. Set Date/Time- The date should be correct on delivery, but the time may be wrong due to time zone differences.
 - c. Units of Measure- This is used to change the Date format and toggle between metric and imperial units e.g. mm will convert to inches.
 - d. Language - This is used to change language of the machine. Language options are English, German, French, Spanish, Italian and Portuguese.
4. System Information- This screen shows the odometer, main board and remote identification numbers
5. Environment Info- This shows GPS location (Alt= altitude, Lat= Latitude in minutes, Long= Longitude in minutes and number of satellites), temperature and humidity.
6. File Storage- This is where the Data logs can be managed and saved to PC

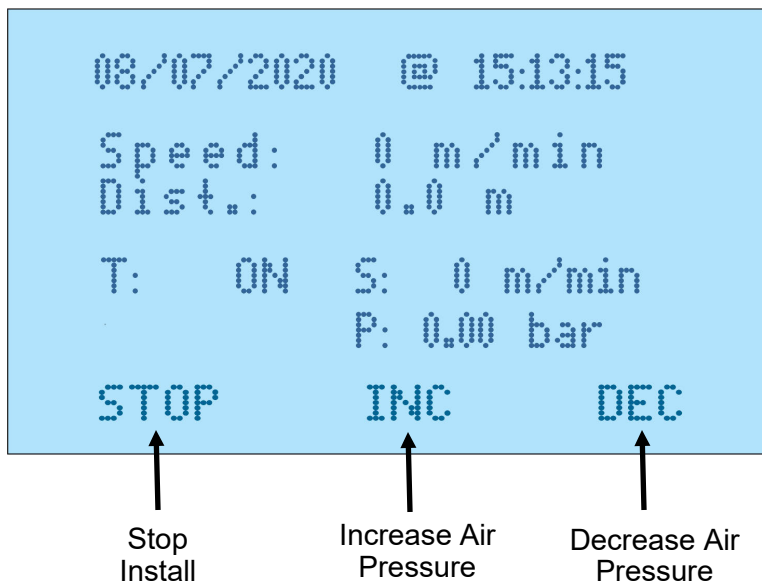
13.2 PRE-INSTALLATION SCREEN



This screen is accessed by pressing either “Resume Active Job” or “Start New Job” from the main screen, it will also be shown if the installation is stopped and not finished.

In this screen you can set the maximum torque and speed, this is via the potentiometers the remote.

13.3 INSTALLATION SCREEN



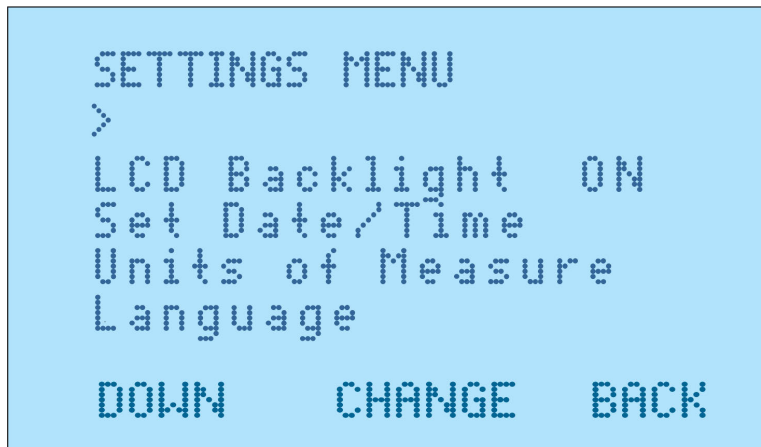
The screen is shown when the machine is installing the cable, i.e. when the Start button is pressed on the Pre-installation screen.

You can press “STOP” to stop the install where you will then be asked if you want to finish job. If you press “Yes” the installation data will be saved and you will be taken to the main menu. If you press “No” you will go to the pre-installation screen where you can resume the install.

If you have the electrical pressure control valve (optional) connected you can adjust the pressure in the air box by pressing “INC” to increase and “DEC” to decrease the air pressure.

All other information is the same as the pre-installation screen. You can adjust the Torque and speed during an install in the same way as when on the pre-installation screen. Care needs to be taken to not damage the cable when doing this.

13.4 SETTINGS SCREEN



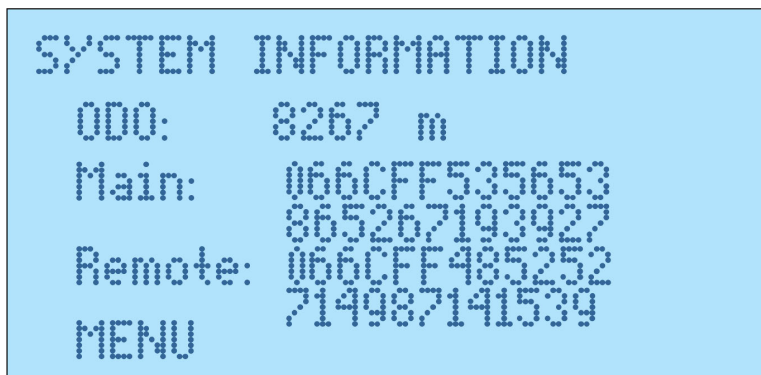
This screen is selected from the main screen by going into “Settings”.

Use the blue buttons to go down the screen options.

If you press the “CHANGE” button when on the “LCD Backlight” it will turn the backlight either on or off.

You will be taken to a separate screen if you select “Set Date/Time”, “Units of Measure” or “Language”. In these screens you can press the blue buttons to make the relevant changes.

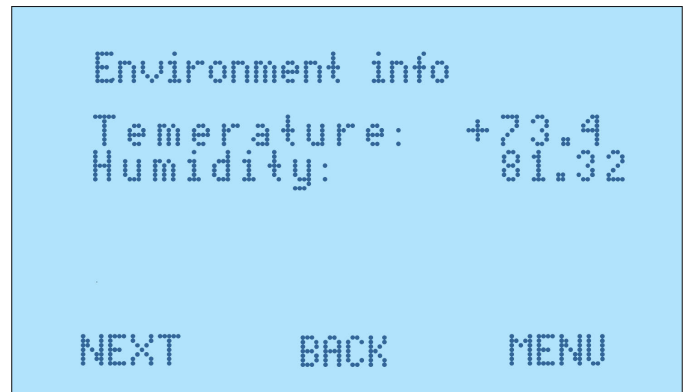
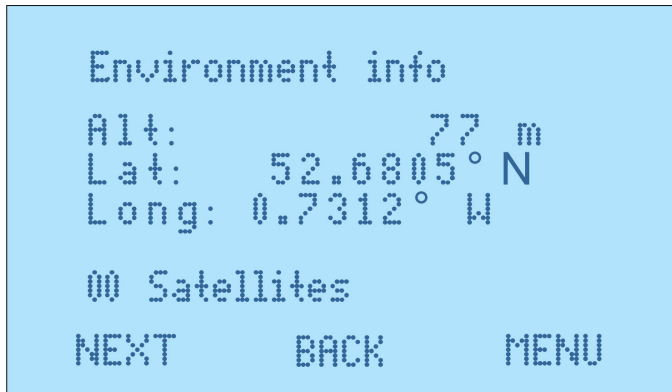
13.5 SYSTEM INFORMATION SCREEN



This screen is selected from the main screen by selecting “System Information”.

The screen shows the machine odometer along with main board and remote board identification numbers.

13.6 ENVIRONMENT SCREENS



This screen is selected from the main screen by selecting “Environment Info”.

The environment info is shown through 2 difference screens. The first screen shows GPS location information, if 0 satellites are found the GPS location will default to the last known location.

13.7 FILE STORAGE SCREEN



This screen is selected from the main screen by selecting “File Storage”.

Under Manage storage you can select the following buttons:

1. “RESUME”- This resumes a job which has stopped due to the machines power cutting out for some reason, for example if the generator runs out of fuel. If this happens the other data that will be retain is the install distance and will resume at this distance.
2. “DEL ALL”- This deletes all jobs on saved to the machine.

Selecting “Save files to PC” will save the data to the PC if the Bluetooth is paired and the PC app is running and connected to the machine, see section 7.9 for more details.

14.0 BLOWING ACCESSORIES

Airstream Compressor

P/N 89011

The Air Compressor is designed specifically for use with our Micro Fiber Cable Blowing Machines. This reliable & efficient screw compressor, powered by a gasoline engine, provides a maximum working pressure of 220 psi (15 bar) with 35.3cfm (1000 litres/m) flow.

The compressor is modified to include an after-cooler and water separator. The output air is filtered and conditioned to optimize the performance of our micro fiber cable blowing machines. The compressor package includes a 50 foot 3/4" diameter air hose for connection to the microfiber cable blowing machine.

Engine: Honda 21 hp Width: 31" (800mm)
Fuel Cap.: 5 gal (20 liters) Height: 30" (780mm)
Length: 42" (1070mm) Weight: 487 lbs. (221kg)



Micro Cable Fleeter

P/N 89002

The Micro Cable Fleeter replaces the manual method of "figure eighting" cable, and provides protection and security for the cable. It has a nominal capacity to store 6500 ft. (2000 meters) of 8.5mm diameter cable.



Mini Cable Fleeter

P/N 89298

The Mini Cable Fleeter replaces the manual method of "figure eighting" cable, and provides protection and security for the cable. It has a nominal capacity to store 6500 ft. (2000 meters) of 11mm diameter cable.



Innerduct Pressurization Test Kit

P/N 89641

The Innerduct Pressurization test kit is used to test the integrity of the duct before the cable is blown in.



Polywater® Prelube 5000™

P/N 89199

Polywater® Prelube 5000™ reduces frictional drag during the blowing of small diameter fiber optic micro-cable into microtube duct.



Polywater® Prelube 2000™

P/N 89141

Polywater® Prelube 2000™ reduces frictional drag during the blowing of outside plant cable into duct.



General Machine Products (KT), LLC • 3111 Old Lincoln Hwy • Trevose, PA 19053 • USA
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