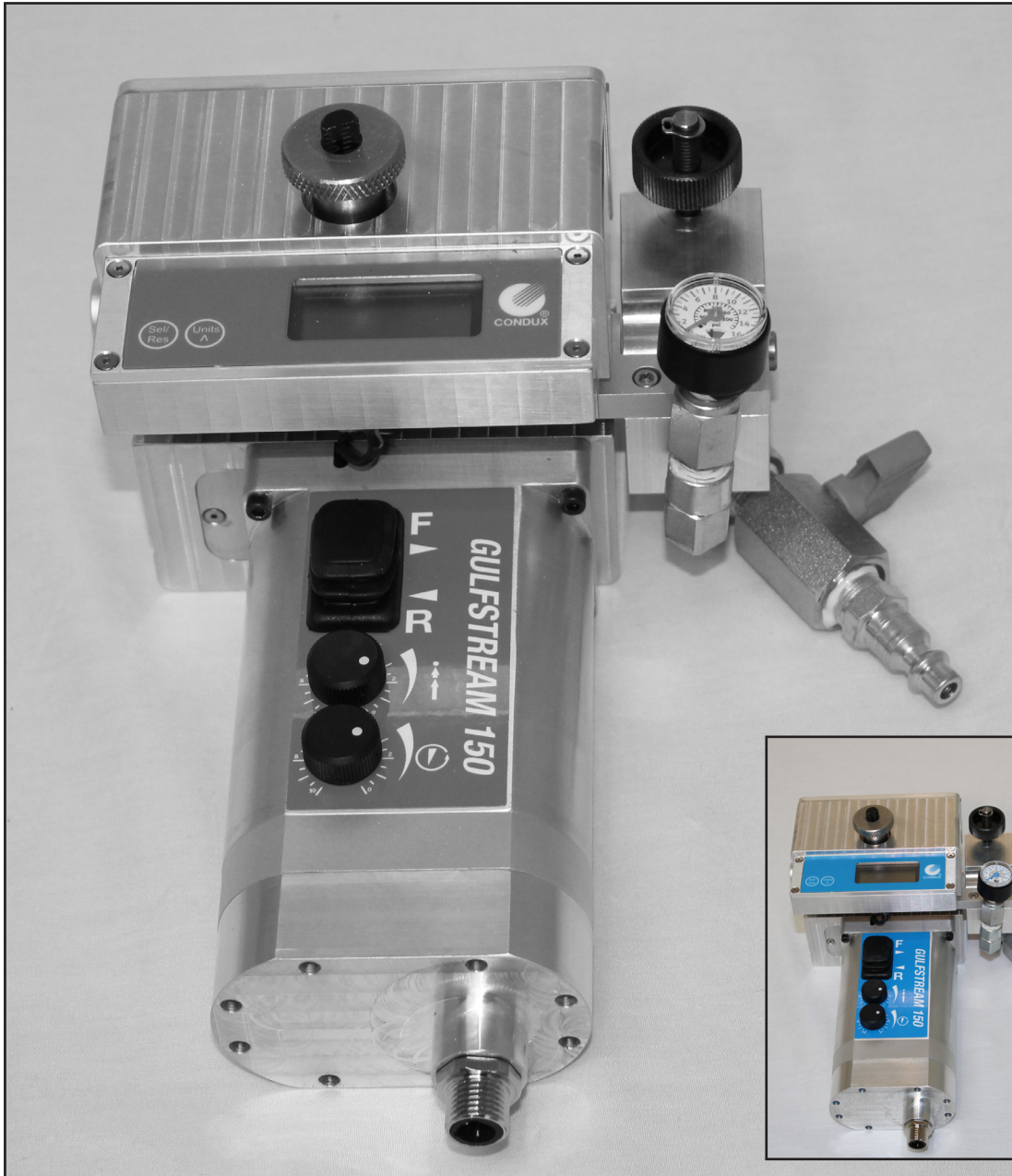


USER'S GUIDE & SAFETY MANUAL

Gulfstream™ 150 Micro Fiber Blower



CONDUX
ISO 9001:2008
CERTIFIED

General Information

1.

The Gulfstream™ 150 is a unique device for installing fiber optic cable directly into conduit. The Gulfstream™ 150 is comprised of an air block and a tractor drive that, when combined with an air compressor and a battery pack, will propel fiber optic cable into an unobstructed, unoccupied, airtight conduit run at speeds of 0 to 375 ft/min (115mm/min). A cable tip may be placed at the front end of the cable (Not Supplied).

The Gulfstream™ 150 greatly reduces pulling stress on the cable. The adjustable push force of the tractor drive will stall the motor if the cable hits an obstruction.

The Gulfstream™ 150 comes standard with a Digital LCD Meter Display, Battery Clip, Duct Packs, Seal Kits in a Hard Side Foam Filled Case with a Tripod that is packaged separately.

These operating instructions contain a full description of the Gulfstream™ 150, which have been designed for the purpose of feeding fiber cable through conduits of uniform cross section. The conduit must have previously been installed underground or overhead to receive the fiber optic cable and must be of sufficient length on exit to be received by the machine. The conduit must be of material with sufficient compression strength for it to be adequately sealed in the duct clamps of the machine. The conduit must be airtight up to a pressure of 200psi (14bar). For this purpose compression type couplers must be used. Conduit(s) sizes range from 5mm-8mm for the GS150. While fiber optic cable(s) range from 1mm-2.5mm for the GS150.

The Gulfstream™ 150 consists of an air block that is made in two halves that clamp together around the duct. The duct clamps hold a seal that the fiber optic cable is fed through before entering the duct. The duct clamps and cable seals can be interchanged to accommodate different conduit and cable sizes. The conduit is mechanically clamped between the duct clamps at the exit of the air block, preventing movement in any direction. Seals conform around the conduit when clamped.

The fiber optic cable is fed through the duct by a combined pulling/pushing force. The pulling force is achieved when pressurized air is fed into the air block and forced into the duct, generating drag on the fiber cable from airflow passing over it. The pushing force is created by engaging the tractor drive system. As the tractor drive feeds fiber cable into the duct, drag force is created by the airflow. The fiber optic cable floats in the conduit, minimizing any resistance to being pushed in by the tractor drive.

The use of the Gulfstream™ 150 for operations other than those described in this manual are considered dangerous and are discouraged. Use of this machine for work other than what is intended, relieves the manufacturer from any responsibility, civil or penal. The manufacturer's responsibility ceases and the warranty is voided when one of the following occurs:

- a. When Gulfstream™ 150 is used for purposes other than what is detailed in this manual.
- b. Tampering and/or modifications carried out without written approval of the manufacturer.
- c. Not using original manufactured replacement parts.
- d. Poor maintenance.
- e. Not using supplied safety devices or equipment.
- f. Connection of this unit to machines and/or parts not produced or authorized in writing by the manufacturer.
- g. The Gulfstream™ 150 should not be used to install any cable other than fiber optic cable specified within the range outlined in this instruction manual.

****Condux is not responsible for injuries incurred as a result of improper use of the Gulfstream™ 150.**

2.

GULFSTREAM™ 150

A. CONDITION OF USE:

1. Temperature from 21° F (-6° C) to 110° F (+43° C)
2. Humidity from 25% to 95%
3. Weather conditions relevant to working conditions
4. Natural and/or artificial lighting of the work site, minimum 200 lux.

B. AIR COMPRESSOR REQUIREMENTS

1. Pneumatic Pressure: 205 psi (15 bar) Maximum
2. Required Air Flow: 5 - 35 CFM (.14 - .99 3m/min)
3. Air Hose Fittings: ¼" Industrial Quick Connect
4. Air Hose Fittings: 1/4" European Quick Connect

C. OPERATIONAL CAPACITIES

1. Pushing Force: 4.5lbs (20N) Max Push Force
2. Pushing Speed: 375 ft/min (115 m/min) Maximum
3. Cable Sizes: 1mm to 2.5mm
4. Conduit Sizes: 5mm, 6mm, 7mm (included) 8.0mm, 8.5mm, 10mm 12mm, 12.7mm (1/2") (Optional)

D. ELECTRICAL REQUIREMENTS:

1. Power Requirements: 12 Volt (10.8V) DC @ 5Amp Max
2. Power Consumption: 60 Watts Maximum
3. Power Connection: Supplied Battery Clip
4. Min 1.5hr battery

E. PHYSICAL SPECIFICATIONS

1. Height 4.6" (117 mm)
2. Length 7.5" (190 mm)
3. Width 6.0" (152 mm)
4. Weight 5.7lbs (2.6 Kg)

F. TRACTOR DRIVE SPECIFICATIONS

1. Pushing Force: 4.5lbs (20N) Max Push Force
2. Pushing Speed: 375ft/min (115m/min) Maximum
3. Maximum Clamping Force: <12 lbf/in (2.1 N/mm)
4. Constant cable centerline design
5. Forward and reverse
6. Independent pushing drive wheels with molded urethane cover profiled for cable 1mm to 2.5mm.
7. Slide guards

G. CONDUIT COUPLING REQUIREMENTS

1. Must withstand maximum air pressure of 215 psi (15 bar)
2. Must withstand axial loading and vibration
3. Must be a compression type coupler
4. Must fit snugly
5. Conduit ends must be cut off squarely and deburred
6. Conduit must be fully seated into the coupler
7. Couplers should be installed in a straight section of conduit
8. Must be same size conduit

Safe Operating Practices

3.

Read and understand all procedures and safety instructions before using the Gulfstream™ 150. Observe all safety information on this page and note specific safety requirements as explained by procedures called out in this manual. Failure to follow these instructions could result in serious personal injury, property damage or death.

A. WORK AREA SAFETY

1. Wear personal protective equipment: hard hat, safety glasses, safety shoes, and light leather work gloves. (OSHA approved or personal protective equipment directive 89/686/EEC compliant)
2. Wear close fitting clothing to avoid clothing getting trapped in tractor drive.
3. Keep long hair tucked back and refrain from wearing any jewelry.
4. The safe operation of this equipment requires that the operators be on stable footing.
5. Stay clear of cables or lines under tension.
6. Stay clear of pressurized line and conduit.
7. Use the blower only for its intended purpose.
8. Do not place cable reel too close to unit. Place the reel far enough away from the unit to ensure proper control.
9. Keep hands away from tractor drive while blower is in operation.

B. PNEUMATIC DEVICES

The Gulfstream™ 150 is a pneumatic device, using pressurized air to project cable at high velocities. Please observe the following precautions when operating the blower:

1. Forced air creates flying debris. Always wear personal protective equipment. Severe personal injury could result.
2. Ensure no personnel are in the destination access vault during the blowing operation. Severe personal injury could result.

C. ELECTRICAL DEVICES

The motor, controller, and digital display are electrical devices. Electrical shock hazards exist that could result in severe personal injury or death. Observe the following precautions to avoid electrical hazards:

1. **Do not operate in or near water. This includes setting the unit on a wet surface or exposing to rain.**
2. Do not operate when there is lightning or extreme weather. An earth stake driven into the ground as added protection is recommended if there is any chance of extreme weather developing.
3. Do not remove the digital display cover. There are no user-serviceable parts inside. Refer servicing to qualified service personnel.
4. The drive switch should be in the neutral "center" position before connecting or disconnecting any cords.

D. WORKING AT NIGHT REQUIREMENTS

1. Operator must provide portable lighting that achieves a light intensity of at least 200 Lux (Lumens/m²)

Misuse will void warranty

Unpacking the Box

4.

GULFSTREAM™ 150

A. BLOWER COMPONENTS

Each Gulfstream™ 150 STD Kit contains the following items:

GS150 Micro Fiber Blower

Power Supply (Optional)

Battery Clip

Tripod

Quick Connect and PSI Gauge

Duct Clamp Insert Assemblies (5mm; 6mm; 7mm; 8mm)

Common Parts Kit Includes:

O-ring Kit; 2 Small Grooved Belts, Hex Key Set; Plastic Case;

Cable Seals Kit: (1.25mm; 1.5mm; 1.75mm; 2.0mm;

2.25mm; 2.5mm; 3.0mm; Blank Seal)

NOTE: If any parts are missing: please contact your Condux representative or call Condux International at 1-800-533-2077 (USA or CANADA), or 1-507-387-6576.

B. Optional Battery and Charger

United States

DeWalt DCB120 Li-Ion Battery -12.0v 1.5Ah

DeWalt DCB101 Li-Ion Charger 12v/20V - 1.3A

International

DeWalt DCB127 Li-Ion Battery - 10.8v 2.0Ah

DeWalt DCB112 Li-Ion Charger 10.8v - 2.0Ah

Set Up the Blower

5.

This manual contains setup and operating instructions for the Gulfstream™ 150 micro fiber blower.

!WARNING: DO NOT CONNECT POWER SUPPLY UNTIL SETUP IS COMPLETE.

A. DETERMINE FIBER SIZE

Determine fiber size to be installed. Utilize the Green belt and orange flat belt for fiber size 1.5mm-2.5mm OD. Utilize the small orange groove belt and the orange flat belt for fiber sizes 1mm-1.5mm. Refer to Section 9 for belt replacement instructions.

B. SELECT CABLE SEALS & DUCT PACK

Choose the correct cable seal and duct pack for the particular application according to duct and cable size. Refer to Cable Seal and Duct Pack selection charts.

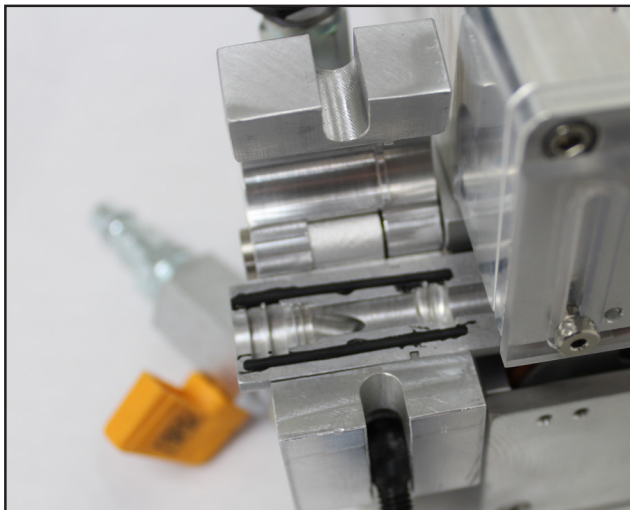
View parts manual for Cable Seals and Duct Packs.

C. INSTALL CABLE SEAL & MICRO FIBER IN DUCT PACK

Install the appropriate cable seal on the micro fiber. Make sure orientation of seal on fiber is correct so that it will seat in the duct pack properly. (See figure 1).

Once the cable seal is positioned properly on the micro fiber, install the cable seal in the bottom half of the appropriate duct pack. (See figure 2).

Note: The bottom half of the duct pack is designated by a small hole on the outside of the unit.



D. INSTALL MICRO DUCT

- Place cable seal over the micro fiber. (See Figure 1)
- Place O-rings around duct (See figure 2)
- Position the micro duct properly in the bottom half of the duct pack. (See figure 3)
- Ensure there is adequate length of micro duct available to avoid unnecessary strain on the duct.
- Place cable into duct, place cable and seal into duct pack. (See figure 4)
- Once the micro duct is in place, secure the configuration by installing the top half of the duct pack and pressing firmly together. (See Figure 5)

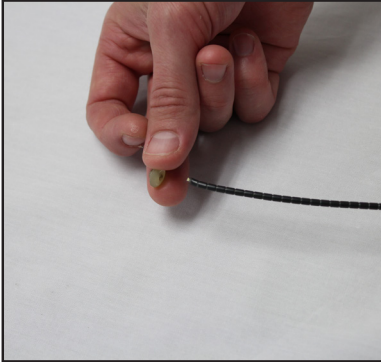


Figure 1. Install Micro Fiber in Cable Seal



Figure 2. Install O-rings Around the Micro Duct



Figure 3. Place Duct in the Bottom Half of the Duct Pack

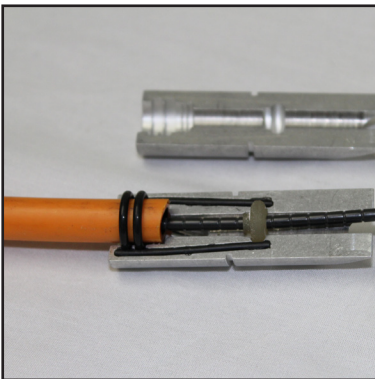


Figure 4. Position Micro Duct Properly in Duct Pack

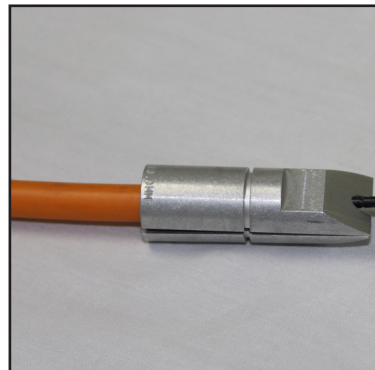


Figure 5. Install Top Half of Duct Pack and Press Together

E. INSTALL DUCT & FIBER IN BLOWER

Loosen the knob on the Air Block assembly. Open the air block cover. Insert the duct pack assembly into the air block as shown. (See figure 6). Close air block cover and hand tighten knob to secure. (See figure 7).

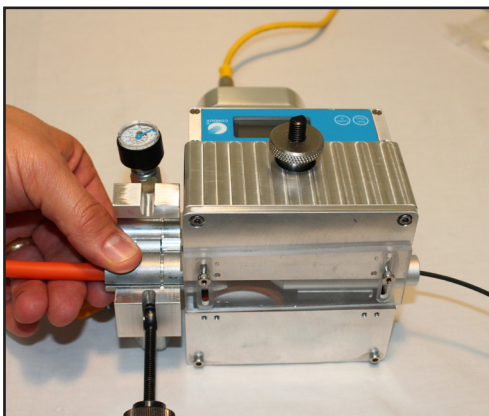


Figure 6. Insert Duct Pack Assembly into Air Block

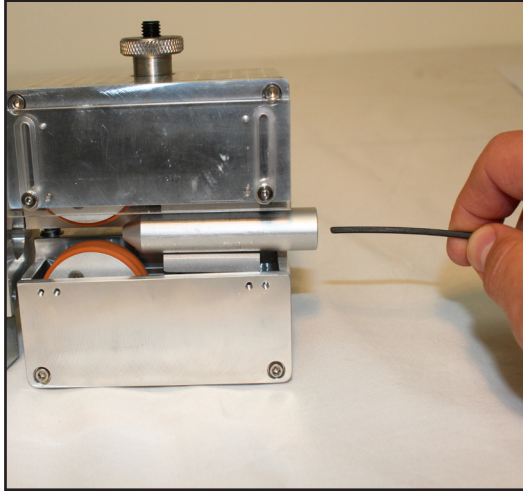


Figure 7. Tighten Knob

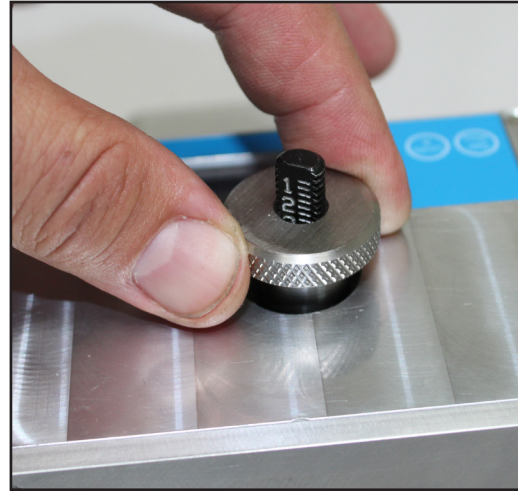
F. INSTALL FIBER IN TRACTOR DRIVE AND TIGHTEN

Feed the micro fiber between tractor drive and through the rear fiber guide. (See figure 8). Tighten tractor drive using the down screw knob to ensure even pressure on the micro fiber. (See figure 9). Tighten down so that the belts no longer slip at the push force setting determined in the crash test procedure (see Chapter 6). Do not over tighten.

Note the incremental shaft value for future reference of the specific fiber and duct clamp setting (see figure 9)



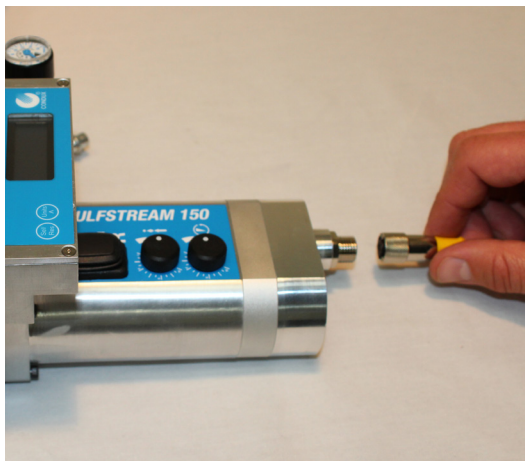
**Figure 8. Feed Micro Fiber
Between Tractor Drive and Rear
Fiber Guide**



**Figure 9. Tighten Tractor Drive Down
Screw**

G. CONNECT POWER TO BLOWER

Attach power supply cable to blower unit and battery clip, tighten connections (See figure 10). Once you have the supply cable connected, install the battery in battery clip as shown (See figure 11).



**Figure 10. Attach Battery Pack Cable to
Blower Unit**



Figure 11. Install Battery

H. CONNECT AIR COMPRESSOR

NOTE: Ensure the air control valve is off before connecting the air hose.

Attach the air compressor hose to the air compressor if necessary. Then connect the compressor hose to the blower unit (See figure 12). The unit uses a standard quick connect air compressor coupling.

NOTE: Route all hoses properly to prevent tripping hazard (See figure 12A).

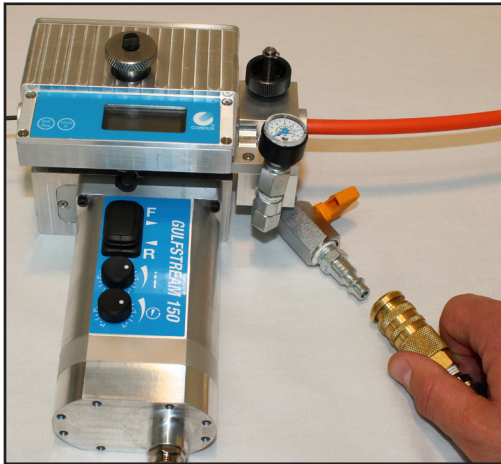


Figure 12. Connect Air Compressor
Hose

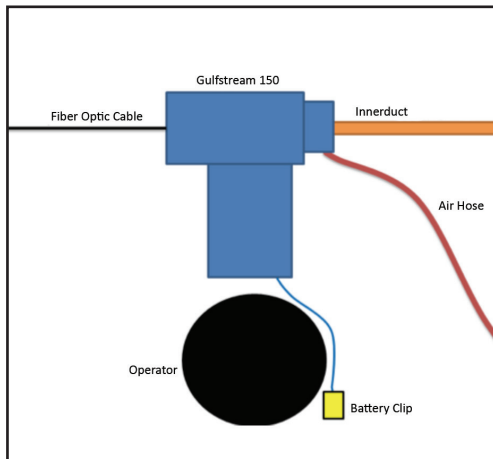


Figure 12A. Typical Setup

!WARNING: To avoid creating a trip hazard always route air hose out of the way and secured to a stable object.

The fiber cable reel should be placed 6ft (2m) or more from the Gulfstream™ 150. The Gulfstream™ 150 must be positioned in-line between the fiber cable to be installed and the micro duct. The fiber should not enter the Gulfstream™ 150 at an angle of more than 10 degrees from the intended axis of travel.

I. MOUNTING THE GULFSTREAM™ 150

1. Mount the Gulfstream™ 150 to the included tripod as shown below (Figures 13-15).
2. If utilization of the included tripod is not desired, the Gulfstream™ 150 must be placed on a flat surface capable of supporting the weight of the Gulfstream and at a working height of 28 to 37 inches (71 to 94 cm) and close to the height of the fiber to be installed into the conduit. The mounting surface should not exceed 10 degrees off the horizontal plane. Continuous handheld operation is not recommended.



Figures 13-15: Attaching GS150 to the stand

Crash Test

Cable Crash Testing is a very quick and easy step to be completed before attempting the installation of cable with the Gulfstream™ 150. This test is necessary to set the electronic push force control of the motor below the point that the Gulfstream™ 150 may cause cable damage as a result of over pushing or encountering an obstruction in the sub-duct system.

Every cable has different pushing values and these values vary depending on duct I.D.

 **!WARNING: Always wear protective equipment: hard hat, safety glasses, safety shoes and work gloves.**

NOTE: The electronic push force adjustment will have little effect on the installation speed of the blowing unit. This is an adjustment to prevent damage to the cable that can be caused by excessive pushing force.

IMPORTANT: For the Crash Test to work properly, use the same size cable and duct that will be used for the job.



Crash Test 1:

For Rigid fiber where push force can be set within the existing limits of the Gulfstream™ 150.

Set the electronic push force adjustment on the Gulfstream™ 150 using the following procedure:

- a. Attach 12' (4 m) of duct to the Gulfstream™ 150 with 15' (5 m) of fiber optic cable (See figures 3-8) using the appropriate duct pack and cable seal.
- b. Set the adjustable push force to about half way of the maximum.
- c. Block the end of the test length of duct.
- d. Install cable slowly until it reaches the end of the duct
- e. Place a mark on the Cable about 1" (25 mm) behind the **Rear Guide**.
- f. From the **Rear Guide**, pull out approximately 8' (2.4 m) of cable from the blower.
- g. Lower the **Tractor Drive**.
- h. Turn on the Tractor Drive in the Forward Direction and allow cable to move at full speed until it stops. Note the push force setting.
- i. If the motor stalls without fiber folding Increase push force slightly using force knob.
- j. Repeat steps d through "h" until the cable folds over or force settings reach maximum push. If the tractor drive belt is slipping on the cable, tighten the tractor drive down screw and repeat steps "d" through "h". You will notice cable fold-over because the line drawn on the cable will disappear inside the machine or duct.
- k. Reduce push force slightly if cable fold-over has occurred and test once more to ensure no fiber fold-over or damage occurs at this setting. This will be maximum push force setting for this application.
- l. Reset the speed to the minimum and remove test fiber and duct.
- m. Test complete.

Crash Test 2:

For non-rigid fiber where push force cannot be set low enough to not fold fiber and/or obtain adequate installation speed.

- a. Set push force to the lowest possible setting that will allow for a desirable installation speed (adequate push force is required to reach max speed of the motor).
- b. Insert the fiber and seal inside the duct pack as it would be for the actual installation.
- c. Install a 4 to 5m test length of duct into the Gulfstream™ 150 duct clamp and insert duct clamp into the air block.
- d. Block the end of the test length of duct.
- e. Tighten down belts on to the fiber with the Tractor Drive engaged in the forward direction until the fiber starts to install.
- f. Ram the fiber into the blocked end of the duct.
- g. Belt slip should occur on the fiber before the fiber folds over.
- h. Tighten down belts on the fiber a half turn.
- i. Repeat step "f" through "h" until the fiber folds. This is your push force slip limit.
- j. Loosen up the belts on the fiber a quarter turn and perform test once more to confirm no fold over has occurred. **KEEP THIS SETTING APPLIED TO THE FIBER FOR ACTUAL INSTALLATION!**
- k. Swap out test length of duct with actual installation duct and proceed to operating the Gulfstream™ 150.
- l. Test Complete

Blower Operations

A. Verify Adjustable Push Force – Verify adjustable push force is set to the established crash test value and the speed is at minimum.

B. Engage Tractor Drive – The tractor drive can be operated in forward and reverse. For installation, engage the tractor drive in forward by depressing the tractor drive control switch to the “F” position as shown. (See figure 16). Install the fiber into the duct using push only until the installation has slowed.

C. Engage Air – Slowly open the air control valve to allow air flow to the air block by turning the control valve knob clockwise. Do not apply maximum air pressure and flow at initial air engagement. Do not open air supply before adequate fiber has been pushed in.

IMPORTANT: Do not exceed 215PSI (15 bar) when operating the unit.

⚠ !WARNING: Forced air creates flying debris. Always wear personal protective equipment.

D. Adjust Speed – Use the Speed control knob to adjust the tractor drive speed to ensure smooth installation and match the amount of air pressure being used so that the forces are working together, not against one another. (See figure 17). Counterclockwise increases speed and clockwise decreases speed.

E. Install Fiber – It may be helpful to guide/apply back tension to the fiber using your hand at the cable entrance of the machine to maintain control over the fiber.

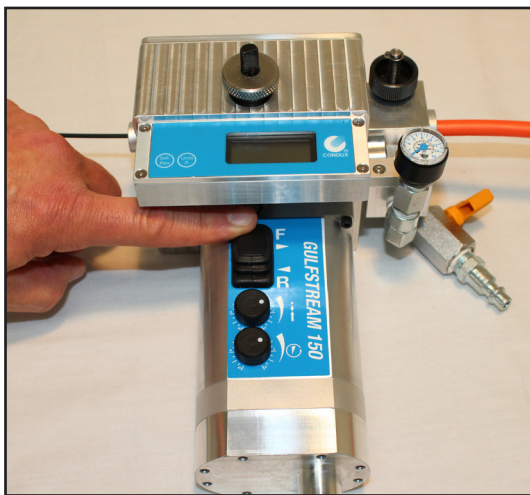


Figure 16. Tractor Drive Forward

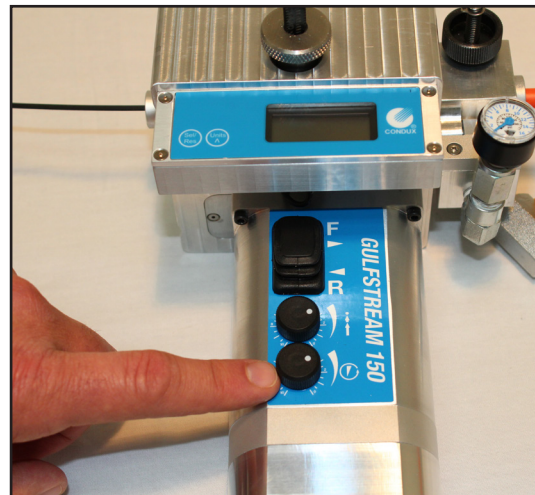


Figure 17. Adjust Speed Control

F. Tractor drive engages forward when the switch is in the 'F' position, reverse in the 'R' position, and neutral in the center position.

Tear Down Procedures

8.

⚠ **!WARNING:** Air Block Assembly contains compressed air when blower is operated. Opening Air Block while under pressure may cause serious personal injury. Ensure blower is depressurized before removing Air Block cover.

A. REMOVE POWER FROM UNIT

1. Stop air by turning the Air Control Value Counter Clockwise (See Figure 18).
2. Remove Air Hose from GS150 (See Figure 19).
3. Depressurize Air Block by turning Air Control Valve to horizontal position >
4. Disconnect Power Supply

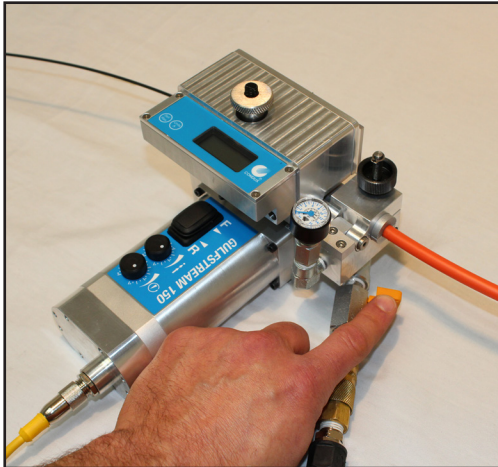


Figure 18. Turn Off Air

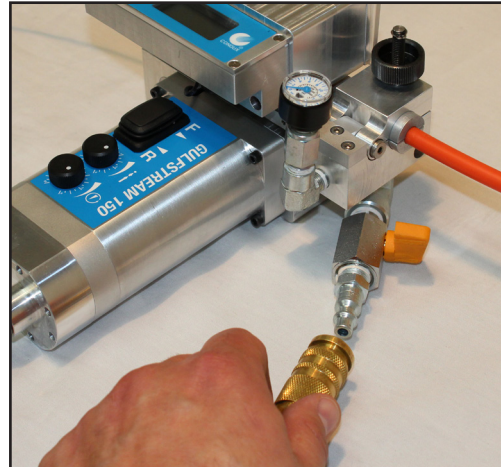


Figure 19. Depressurize Air Block

B. REMOVE FIBER FROM BLOWER

1. Raise tractor drive by loosening tractor drive down knob (See figure 20).
2. Loosen the knob on the Air Block assembly and open the air block (See figure 21).
3. Remove duct pack assembly.
4. Open duct pack assembly and remove the conduit.
5. Store the Gulfstream™ 150 in the horizontal or upright position.

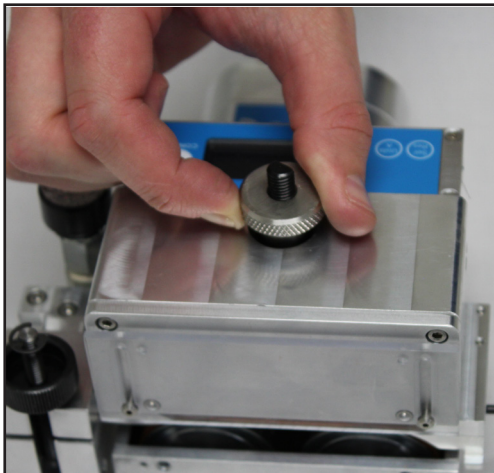


Figure 20. Raise Tractor Drive

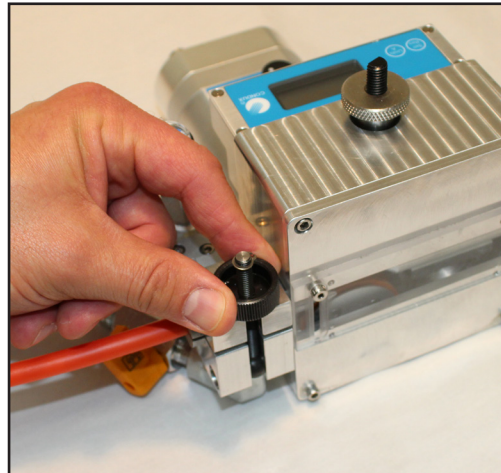


Figure 21. Loosen Knob

Maintenance

9.

Procedure	Daily	Weekly	Monthly	60 Days	90 Days
Clean all assemblies and components thoroughly with dry cloth.			X		
Inspect fasteners and screws.	X				
Check Belt Tension. Replace if excess wear has occurred. Excessive wear has occurred when the belts are no longer able to effectively grip the fiber optic cable.	X				
Duct Pack Seal Replacement					X
Belts Replacement	Every 50Km unless excessive wear is occurring				
Seals Replacement	Every 10km unless excessive wear is occurring				

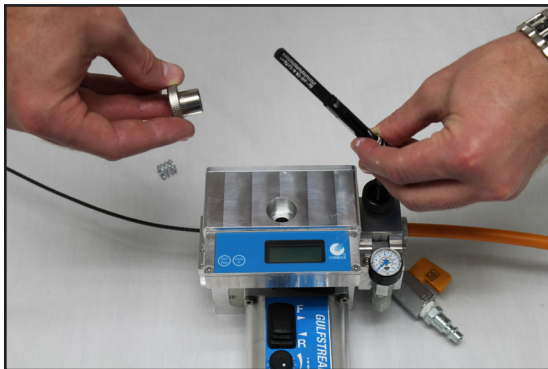


Figure 22. Spine Shaft

!WARNING: AVOID HANDLING LEAKING COUPLINGS, VALVE SEAL OR INADEQUATELY SEALED CONDUIT IN AIR BLOCK.

!DANGER: RISK OF AIR UNDER PRESSURE PENETRATING SKIN

!WARNING: DISCONNECT POWER SUPPLY AND EXHAUST ANY AIR PRESSURE BEFORE SERVICING ANY COMPONENT ON THE GULFSTREAM™ 150.

A. BELT CLEANING AND TIGHTENING

1. Inspect belt before and after each use.
2. Clean after each use, or when necessary. Remove the top assembly to clean thoroughly by:
 - a. Unscrewing tractor down screw all the way.
 - b. Separating the two halves – note parts being disassembled to ease re-assembly.

B. REPLACEMENT OF THE DRIVE BELT

The drive belts need to be replaced when the machine is unable to push the specified range of cable diameters. Only Condux supplied, original equipment should be used; otherwise, the machine may be unsafe and void warranty.

- a. Remove side plates from the GS150 (Figure 23).
- b. Remove the 4 screws on the side plate of the Roller (Figure 24).
- c. Remove belt from GS150 roller (Figure 25).
- d. Place new belt on GS150 roller.
- e. Install and tighten the 4 screws on the side plate of the Rollers (Figure 24).
- f. Reinstall side plates on the GS150 (Figure 23)

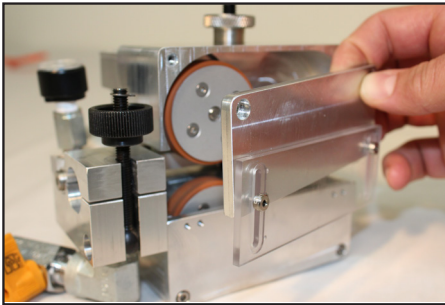


Figure 23. Remove Front Cover Plate

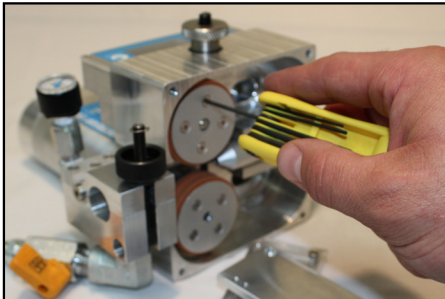


Figure 24. Remove the 4 Screws on the Side Plate of the Rollers

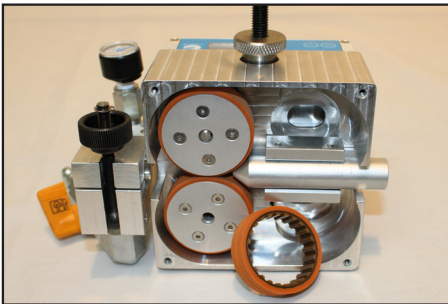


Figure 25. Remove and Replace belt

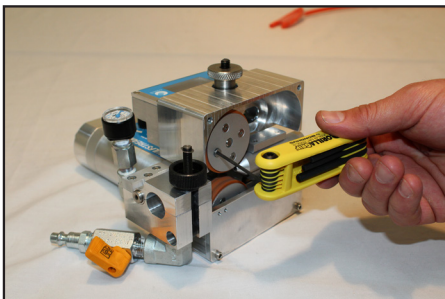


Figure 26. Re-install 4 Screws and Front Cover Plate

Troubleshooting Guide

10.

Problem	Solution
Cable becomes jammed in the conduit system	<ol style="list-style-type: none"> 1. Inform the people at the other end of the conduit that a problem has been experienced and the operator is going to shut down the system. 2. Shut off the pneumatic air supply with the Air Control Valve, allowing the air pressure to be depressurized from the conduit and the air block. 3. Using the counter or the measurement on the cable, determine where the blockage might be located. 4. Notify supervisor about problem and determine a solution accordingly.
Tractor Feed does not pull the cable off the reel.	Assist the reel by pushing it, and/or by pulling the cable off the reel.
The cable run is hard to restart after having stopped.	Put air to the system with the tractor drive tightened down and turned off. The tractor feed can be restarted after the air pressure has increased and stabilized.
Tractor feed doesn't start.	<ol style="list-style-type: none"> 1. Tractor Drive switch is in the neutral "center" position. Select forward or reverse.
Tractor Feed doesn't start but motor is running	Check the pulley set screws and ensure they are tight. Apply thread locker where needed to prevent further complications.
Power Failure	Place switch in neutral position. Check that the battery pack or power supply is properly connected. Recharge battery. Normal startup can be performed after power failure/malfunction has been resolved.
Once any mechanical issues have been resolved, confirm that the Gulfstream™ 150 is operating properly by verifying tractor drive speed and direction, as well as, air block pressure sustainability.	