SUMITOMO RECOMMENDED PROCEDURE

SRP SP-F04-001

FutureFLEX®

BLOWING HEAD EQUIPMENT SET-UP PROCEDURE

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1.0 General

1.1 This procedure describes the steps necessary to set up the Blowing Head Equipment in preparation for installing FutureFLEX Air-Blown Fiber (ABF) fiber bundles in FutureFLEX tube cables.

1.2 A pressure source (Nitrogen Cylinder, Compressed Air Cylinder, or Air Compressor), a Blowing Head Equipment Kit, and a reel of ABF fiber bundle must be set up at one end of a tube span. The pressure source is connected to the Blowing Head apparatus and the tube span. The Blowing Equipment mounts the ABF fiber reel.

1.3 One person can perform this procedure; two personnel are recommended.

1.4 Various preventive and corrective maintenance procedures associated with the Blowing Head are also described.

2.0 Safety Precautions

2.1 Pressurized Nitrogen – The use of inert (nonflammable) pressurized nitrogen (\(N_2\)) gas presents several safety concerns.

2.1.1 \(N_2\) is a simple asphyxiate. If large amounts of nitrogen are released into a confined area, the nitrogen can displace the amount of oxygen in air necessary to support life. This can result in a loss of balance, dizziness, rapid reduction in the ability to perform movements, reduced consciousness of surroundings, as well as other symptoms that are included in the MSDS (Material Safety Data Sheet) available upon request from the Gas Supplier. It is recommended that pressurized nitrogen only be released into a well-ventilated area.

2.1.2 When using pressurized nitrogen, there are no risks related to fire, reactivity, or other special hazards. Nitrogen is not listed as a carcinogen by NTP, IARC, or OSHA.

2.2 Compressed Air – The use of nonflammable pressurized compressed air (Atmospheric Air), either from a cylinder / bottle or air compressor, presents no safety concerns.

2.2.1 Air is nontoxic and necessary to support life. There are no ventilation concerns.

2.2.2 Compressed Air at high pressures does present an unusual fire and explosive hazard in that it will accelerate the burning of materials to a greater rate than they would burn at normal atmospheric pressure.

2.2.3 When using pressurized air, there are no risks related to fire, reactivity, or other special hazards. Air is not listed as a carcinogen by NTP, IARC, or OSHA. An MSDS (Material Safety Data Sheet) is available upon request from the Gas Supplier.

2.3 Pressurized Gas Cylinders / Bottles – Transporting and handling pressurized gas cylinders presents several safety concerns.

2.3.1 Any pressurized gas cylinder is dangerous if damaged. Gas bottles must be properly capped when being transported and stored. Gas bottles must be secured in a stable pressure bottle dolly or chained to structure when uncapped for use.

2.3.2 A full size 300 cubic foot volume gas bottle weighs approximately 160 lbs. Two personnel should accomplish any manual lifting or moving of a bottle. Exercise care and use proper lifting techniques.

2.4 Blowing Head Equipment Transit Case – Transporting and handling the Blowing Head Equipment Transit Case presents several safety concerns.

2.4.1 The Blowing Head Equipment Transit Case weighs approximately 65 lbs. Normal transport is accomplished by pushing / pulling the Transit Case using its retractable handle and built-in wheels.

2.4.2 It is recommended that two personnel accomplish any manual lifting or moving of the Transit Case. Exercise care and use proper lifting techniques.
3.0 Reference Documents

3.1 Sumitomo Recommended Procedure, FutureFLEX Fiber Bundle Installation Procedure, SRP SP-F04-002.

4.0 Equipment / Tools Required

The following equipment and tools are required to complete this procedure.

4.1 Nitrogen Cylinder (Installer provided)
- Dry Industrial Grade Nitrogen; preferred pressure source
- Inert (nonflammable) gas
- Dry or with no more than 4 ppm moisture content (H₂O)
- Oil / contaminant free output
- 300 cu. ft. (approx.) volume bottle size recommended
- 2000-to-2500 psi (approx.) pressure charge

Note: Typically, one 300 cu. ft. bottle of nitrogen will be required to install (approx.) 3000’ - 4000’ of fiber bundle. This “conservative estimate” can vary depending upon tube route orientation, fiber bundle size, tube cable type, and operating practices.

4.2 Blowing Head Equipment Kit (BE200RM, BE200RS, or BE200RY) includes Transit Case with Blowing Head, Payoff Stand Assembly, and the following items:
- One Pressure Regulator with male quick-release 8mm Tubing Adapter (BEREG01 Two-Stage or BEREG02 Single-Stage)
- One Filter / Regulator Assembly with Payoff Counter
- Two 2-feet lengths (approx.) of Red ¼” tubing
- One 6-feet length (approx.) of White ¼” tubing
- One 1-foot length (approx.) of 8mm Clear Tubing
- One ½” x 14” Steel Shaft (fits large and small fiber reels)
- One Toolbox
- One Motor Rate Control Valve
- One Exhaust Muffler
- Two Reel Payoff Cams (fit large and small fiber reels)
- One Fiber Bundle Guide Assembly (two halves)

- Two red Fiber Bundle Drive Wheels for installing 2mm OD 2-, 4-, and 6-fiber bundles (BE02DW); Consumable Item
- Two black Fiber Bundle Drive Wheels for installing 3mm OD 12-, 18-, and 24-fiber bundles (BE03DW); Consumable Item
- One black Air Seal for installing 2mm OD 2-, 4-, and 6-fiber bundles (BE02SL)
- One black Air Seal for installing 3mm OD 12-, 18-, and 24-fiber bundles (BE03SL)
- One red Fiber Bundle Blowing Tip for installing 2mm OD 2-, 4-, and 6-fiber bundles (BE2MFT)
- One black Fiber Bundle Blowing Tip for installing 3mm OD 12-, 18-, and 24-fiber bundles (BE3MFT)
- One Tubing Cutter (BETC001)
- Two Tee Couplings (DE08MT)
- Two Allen Wrenches (3/32” and 7/64”)
- One bottle Air Motor Cleaner Fluid (1/3 fluid ounce)
- Instructions and inventory sheet included

4.3 Large Adjustable Wrench (Installer provided); at least 10” suggested

4.4 8mm tubing (any type) for miscellaneous connections (Installer provided); 10’ - 20’ suggested

4.5 Tube Couplings (DE08MC2) (Installer provided)

4.6 Pressure Regulator Assembly with 8mm Tubing Adapter (BEREG02) (Installer provided and optional)

4.7 Dual-Tank Isolation Valve Kit (BEISOV1) (Installer provided and optional)

4.8 Cylinder Adapter (BEREGCA) (Installer provided); required if using Compressed Air Cylinders as pressure source.

4.9 Reel of FutureFLEX ABF Fiber Bundle (Installer provided)
4.10 Alternate Pressure Source – Although bottled nitrogen is the preferred pressure source because of its cleanliness, general convenience, inexpensive cost, and ease of portability, compressed air from either a Compressed Air Cylinder or an Air Compressor can be used as an alternate pressure source.

4.11 Compressed Air Cylinder (Installer provided)
- “Dry Grade” Compressed Air
- Nonflammable gas (atmospheric air)
- Dry or with no more than 10 ppm moisture content ($H_2O$)
- Oil / contaminant free
- 300 cu. ft. (approx.) volume bottle size recommended
- 2000-to-2500 psi (approx.) pressure charge

**Note:** Different types or “grades” of Compressed Air are available. The “purer” grades with such names as Zero Grade, Vehicle Emission Grade, Scientific Grade, and Accurate Grade undergo additional refining processes so they contain fewer impurities (hydrocarbons) and have less moisture content. It is not necessary to use these “purer” grades of air for blowing operations.

**Note:** Performance-wise, Compressed Air supplied in a Cylinder performs the same as Nitrogen. There are no differences in the blowability of fiber bundle nor operation of the Blowing Head.

**Note:** Typically, one 300 cu. ft. bottle of Compressed Air will be required to install (approx.) 3000’ - 4000’ of fiber bundle. This “conservative estimate” can vary depending upon tube route orientation, fiber bundle size, tube cable type, and operating practices.

**Important Note:** Compressed Air Cylinders are supplied with a Female left-hand thread Bottle fitting (CGA-590). Pressure Regulators BEREG01 or BEREG02 supplied in the Blowing Head Equipment Kit have a Male right-hand thread Nut (CGA-580). A CGA-590 Industrial Air Cylinder-to-CGA-580 Nitrogen Regulator Cylinder Adapter is therefore required to connect the Pressure Regulators to the Bottle fitting. One (1) Cylinder Adapter is required for each Pressure Regulator used. See Fig. 1 and Fig. 2.

4.12 Air Compressor (Installer provided)
- Output dry or with no more than 10 ppm moisture content ($H_2O$); often requires use of a Secondary Dryer
- Output oil / contaminant free
- Output flow rate (capacity) at least 12 scfm
- Output pressure at least 200 psi

**Note:** If an Air Compressor is to be used, consider the following potential issues first. Power source / requirements? Physical size of Compressor? Portability? Distance Compressor must be set up from Blowing Head? Fittings necessary to connect Compressor output to a Pressure Regulator? Noise if use indoors?
5.0 Equipment Layout

5.1 See Fig. 3 for Blowing Head Equipment layout.

Best practice … always set up Blowing Head Equipment in a neat, organized, and correct manner each and every time
6.0 Transit Case Set-up

6.1 Position Blowing Head Equipment Transit Case in approximate location where fiber bundle installation operations will be performed. See Fig. 4.

6.2 Release two (2) latches and open hinged top of Transit Case. See Fig. 5.

6.3 Remove Inner Case (Payoff Stand and Blowing Head Assembly) by lifting up on two looped handles and set aside. See Fig. 6.

6.4 Remove all items remaining inside Transit Case.

6.5 Close and latch top of Transit Case.

6.6 Set Inner Case (Payoff Stand and Blowing Head Assembly) onto rubber guides located on top of Transit Case to create a convenient work area. Blowing Head should be pointed toward entry point Fiber Termination Unit (FTU). See Fig. 7.
7.0 Pressure Source Set-Up (One Gas Bottle)

7.1 Ensure pressurized gas bottle is securely chained in place and remove safety cap. See Fig. 8.

7.2 Thread Pressure Regulator fitting onto bottle valve housing and tighten with large adjustable wrench. See Fig. 9.

**Note:** Do *not* use serrated jaw tools (e.g.: pipe wrench, vise grips, channel locks, etc.) to tighten brass fitting of Pressure Regulator.

7.3 Open Bottle Supply Valve and check for leakage around fitting. If leakage is detected, close Bottle Supply Valve and see Para. 13.0.

7.4 Close Bottle Supply Valve.

7.5 Install male quick-disconnect 8mm Tubing Adapter into female quick-disconnect fitting on Pressure Regulator. See Fig. 10.

**Note:** If fiber bundle blowing distance will exceed the normal capacity of one 300 cu. ft. bottle of nitrogen (about 1500’ – 2000’), two bottles can be connected together to double the supply volume. See Para. 12.0 for details.

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8.0 Blowing Head Equipment Set-Up

8.1 Raise Payoff Stand fiber reel support legs to vertical position and insert quick-release pins (provided on Payoff Stand) to lock legs in place. See Fig. 11.
8.2 Mount Filter / Regulator Assembly on fiber reel support leg. Locate Assembly on same side of Payoff Stand as Blowing Head Air Motor. See Fig. 12.

8.3 Push-fit Installer-provided length of 8mm tubing between Pressure Regulator’s 8mm Tubing Adapter and “First” Tee Coupling. (3’ - 4’ length suggested.) See Fig. 13.

8.4 Push-fit Installer-provided 8mm tubing between First Tee Coupling and 8mm inlet coupling on Filter / Regulator Assembly. (1’ - 2’ length suggested.) See Fig. 13.

8.5 Push-fit one length of Red ¼” tubing between ¼” outlet coupling on Filter / Regulator Assembly and Motor Rate Control Valve. See Fig. 14.

8.6 Push-fit second length of Red ¼” tubing between Motor Rate Control Valve and “F” / inlet coupling on Blowing Head Air Motor. (F / inlet coupling is typically identified with red paint mark.) See Fig. 15.

8.7 Push-fit White ¼” tubing between “R” / exhaust coupling on Blowing Head Air Motor and Exhaust Muffler. (R / exhaust fitting is not paint marked.) See Fig. 16.

Note: Inspect tubing ends before connecting push-fit couplings. Use Tubing Cutter provided in Blowing Head Equipment Kit to trim tubing ends with straight, clean cut for best seat and seal in push-fit couplings.
**CAUTION:** Failure to connect the Blowing Head Air Motor supply and exhaust lines as described will cause the Air Motor to run in reverse and may result in fiber bundle damage.

8.8 Push-fit Installer-provided length of 8mm tubing between First Tee Coupling and branch leg of “Second” Tee Coupling. (3’ - 4’ suggested.) **See Fig. 17.**

8.9 Push-fit 8mm Clear Tube into one side of Second Tee Coupling. **See Fig. 17.**

8.10 Re-position Transit Case to where it makes the most sense. Two (2) key considerations:
- Easy and convenient access to Blowing Head Equipment and Gas Bottle / Pressure Regulator during blowing operations
- Have no hard or sharp bends in jumper tubing leading to fiber bundle entry point FTU.

8.11 To span distance between Blowing Head and entry point FTU, connect an appropriate length of Installer-provided 8mm jumper tubing and a Tube Coupling between Second Tee Coupling and tube cable scheduled to receive fiber bundle. Jumper tubing length must be determined on site. **See Fig. 18.**
9.0 Fiber Bundle Reel Set-up

9.1 Remove plastic protective cover (clamshell) from fiber reel. Do not cut, damage, or discard protective cover. Save for re-use during fiber reel storage. See Fig. 19.

9.2 Install two Reel Payoff Cams into fiber reel bushings and insert Steel Shaft through center of Payoff Cams. See Fig. 20.

Note: Cam pieces and shaft will fit all ABF fiber reels types; old small, old large, and new large styles.

9.3 Position fiber reel so fiber bundle pays from bottom of reel. Carefully lift reel and guide Steel Shaft ends into Payoff Stand support legs. Ensure Payoff Counter actuating arm / roller on Filter / Regulator Assembly rides on back side of Payoff Cam surface. See Fig. 21.

Note: If Payoff Counter actuating arm / roller fails to contact or only partially contacts Payoff Cam, the fiber reel support legs may have gotten loose and spread apart. Remove fiber reel, tighten nut / bolts on Payoff Stand legs, and, if necessary, carefully “squeeze” support legs inward. Re-seat fiber reel and verify Payoff Counter actuating arm / roller aligns with and rides on Payoff Cam surface.
10.0 Blowing Head Set-up

10.1 Open hinged top of Blowing Head by releasing two latches. See Fig. 22.

10.2 Verify installed Fiber Bundle Drive Wheels are correct type / size for fiber bundle to be installed and inspect for wear. To change / replace Fiber Bundle Drive Wheels, see Para. 13. See Fig. 22.

Note: Red Drive Wheels (small groove) are used to install 2mm OD 2-, 4-, and 6-fiber bundles. Black Drive Wheels (large groove) are used to install 3mm OD 12-, 18-, and 24-fiber bundles.

10.3 Select correct type / size Fiber Bundle Air Seal for fiber bundle to be installed and inspect for wear.

Note: Both Air Seals are black in color and visual inspection is necessary to determine correct size. Air Seal used to install 2mm OD 2-, 4-, and 6-fiber bundles has small opening in front tip end. Air Seal used to install 3mm OD 12-, 18-, and 24-fiber bundles has large opening in front tip end.

CAUTION: Only use correct size Drive Wheels and Air Seals to install different fiber bundle sizes. Do not attempt to install 2mm OD fiber bundle with 3mm OD components and vice versa. Excessive Blowing Head leakage and possible fiber bundle damage may result if incorrect components are used.

11.0 Load Fiber Bundle into Blowing Head

11.1 Remove fiber bundle end from reel.

11.1.1 If fiber bundle end is secured to an H-clip mounted on outside of reel flange, remove fiber bundle from H-clip and pull through hole in reel flange. Cut off (typically) first 6” - 10” to eliminate bends.

11.1.2 If fiber bundle end is secured to reel flange with tape, remove and discard tape. Cut off (typically) first 6” - 10” of fiber bundle to eliminate adhesive contaminated section.
11.2 Screw correct type / size Fiber Bundle Blowing Tip onto end of fiber bundle. Ensure Blowing Tip is threaded on straight and firmly attached. **See Fig. 22.**

**Note:** Red Blowing Tips are used on 2mm OD 2-, 4-, and 6-fiber bundles. Black Blowing Tips are used on 3mm OD 12-, 18-, and 24-fiber bundles.

11.3 Insert fiber bundle through large opening end (back) of Air Seal. Insert small opening end (front tip) of Air Seal into 8mm Clear Tube. Manually feed fiber bundle through tubing until it travels about 1’ - 2’ past Second Tee Coupling. **See Fig. 22.**

![Figure 22](image)

**Figure 22**
Blowing Head Latches Disengaged
Blowing Tip Installed on End of Fiber Bundle,
Fiber Bundle Installed through Air Seal,
Air Seal Mated to 8mm Clear Tube, and
Fiber Bundle Inserted into 8mm Clear Tube
11.4 Carefully place Air Seal and 8mm Clear Tube into front of lower Blowing Head section. Install Air Seal with its slit in vertical plane (slit up or slit down direction). This technique helps reduce any potential air leakage from Blowing Head. See Fig. 23.

![Figure 23](image)

**Figure 23**
Install Air Seal with Slit in Vertical Plane (Either Up or Down Direction)

11.5 Push Air Seal and 8mm Clear Tube forward and away from lower Brass Plate. A “gap” of approximately 1/64” between the back of the Air Seal and the lower Brass Plate should be observed. Hold in place with 8mm Clear Tube. This technique helps prevent damaging / cutting back of Air Seal when top half of Blowing Head is closed. See Fig. 24.

![Figure 24](image)

**Figure 24**
Air Seal and 8mm Clear Tube in Place
Gap Observed Between Air Seal & Brass Plate
Fiber Bundle Centered in Groove

11.6 Verify fiber bundle is centered in lower Brass Plate groove and aligned with lower Fiber Bundle Drive Wheel. See Fig. 24.

![Figure 25](image)

**Figure 25**
Slowly Close Front Latch

11.7 Slowly close upper Blowing Head section being careful to not pinch / damage fiber bundle and Air Seal. With a light pressure, push down on upper Blowing Head section and engage front latch only. See Fig. 25.
12.1 If fiber bundle blowing distance will exceed the normal capacity of one (1) gas bottle, two (2) bottles can be connected together to double the supply volume. Installer-provided equipment required will be two (2) gas bottles, two (2) Pressure Regulators (BEREG01 or BEREG02), and a Dual-Tank Isolation Valve Kit (BEISOV1). See Fig. 27.

**Note:** If using Compressed Air Cylinders instead of Nitrogen Cylinders as pressure source, two (2) Cylinder Adapters will be required to connect the Pressure Regulators to the Compressed Air Cylinder fittings.

11.8 Insert and seat Fiber Bundle Guides into back of Blowing Head. Both Fiber Bundle Guides are identical. Install with their joint in the horizontal plane. Install lower Guide first followed by upper Guide and then engage rear latch. See Fig. 26.

![Figure 26](image)

**Figure 26**
Install Fiber Guides with Joint Horizontal
Engage Rear Latch After
Fiber Guides are in Place

11.9 Carefully remove any fiber bundle slack on reel by rotating it slowly.

11.10 Reset Filter / Regulator Assembly’s Payoff Counter to ZERO (to read all zeros; 00000) by carefully rotating Counter’s Reset Knob.

11.11 This completes the basic Blowing Equipment Set-up process. See Sumitomo Recommended Procedure SRP SP-F04-002 to install fiber bundles.

12.0 Dual Tank Set-up (Two Gas Bottles)

**Note:** Typically, one 300 cu. ft. gas bottle will be required to install (approx.) 3000’ - 4000’ of fiber bundle. This “conservative estimate” can vary depending upon tube route orientation, fiber bundle size, tube cable type, and operating practices.

12.2 Begin set-up by ensuring pressurized gas bottles are securely chained in place and remove valve caps.

12.3 Thread Pressure Regulator fittings into bottle valve housings and tighten with large adjustable wrench.

**Note:** Do not use serrated jaw tools (e.g.: pipe wrench, vise grips, channel locks, etc.) to tighten brass fittings of Pressure Regulators.
12.4 Open each Bottle Supply Valve and check for leakage around fitting. If leakage is detected, close Bottle Supply Valve and see Para. 13.0.

12.5 Close Bottle Supply Valves.

12.6 Install male quick-disconnect 8mm Tubing Adapters into female quick-disconnect fittings on both Pressure Regulators.

12.7 Push-fit Installer-provided lengths of 8mm tubing between Pressure Regulator #1 and #2 8mm Tubing Adapters and the Tee Couplings supplied in the Dual Tank Isolation Valve Kit. (3’ - 4’ length suggested.) See Fig. 28.

12.8 Push-fit Installer-provided length of 8mm tubing between the Tee Couplings supplied in Dual Tank Isolation Valve Kit. (1’ - 2’ length suggested.) See Fig. 28.

12.9 Push-fit Installer-provided length of 8mm tubing between Bottle #2 Tee Coupling and Tube Cap supplied in Dual-Tank Isolation Valve Kit. (3” - 4” suggested.) See Fig. 28.

12.10 Push-fit Installer-provided length of 8mm tubing between Bottle #1 Tee Coupling and the “First” Tee Coupling at the Blowing Head. (3’ –4’ length suggested.) See Fig. 28.

12.11 See Sumitomo Recommended Procedure SP-F04-002 for Dual-Tank operating procedures.

Tip: It is best to set up Dual Tank equipment in configuration / arrangement shown in Fig. 28. Excess tubing lengths are not desired. Keep things organized to improve access to both Isolation Valves later.

![Figure 28](image-url)  
Dual-Tank Isolation Valve Set-up
13.0 Maintenance Procedures

13.1 Blowing Head Cleaning
Perform general cleaning with a soft, clean, dry cloth. Perform routine / more extensive cleaning with a soft, clean cloth and denatured alcohol (i.e.: a damp wipe). Remove Fiber Bundle Drive Wheels to clean inside upper and lower Blowing Head drive mechanism areas. See Fig. 29.

13.2 Blowing Head Air Motor Maintenance
Clean internal mechanism of Air Motor with 1/3 fluid ounce tube of Air Motor Cleaner Fluid provided in Blowing Head Equipment Kit. Do not use any substitute fluid. Contact SEL if replacement fluid is required.

13.2.1 Apply 3 - 4 drops of Cleaner Fluid before every use.

13.2.1.1 If Cleaner Fluid is applied without fiber bundle loaded in the Blowing Head, temporarily block open end of 8mm OD Clear Tube and run Air Motor under low pressure (10 - 20 psi) for about ten (10) seconds.

13.2.1.2 If Cleaner Fluid is applied with fiber bundle loaded in the Blowing Head, simply begin blowing operations per normal procedures.

13.2.2 Air Motor Cleaning Procedure

13.2.2.1 Uncouple Red ¼” tubing on inlet side of Motor Rate Control Valve.

13.2.2.2 Add 3 - 4 drops of Air Motor Cleaner Fluid into open end of Red ¼” tubing and reconnect to Motor Rate Control Valve. See Fig. 30.

13.2.2.3 Open Gas Bottle Supply Valve.

13.2.2.4 Slowly open Motor Rate Control Valve and turn on Air Motor blowing fluid through Air Motor to clean its internal mechanism. Any dirt and debris will be discharged into White ¼” tubing connected to Exhaust Muffler.

Note: If an excessive amount of dirt and debris are blown out of the Air Motor during the initial Cleaner Fluid application, stop operations and apply another 3 – 4 drops. Ideally, fluid discharge from the Air Motor should be clean and clear.
13.3 **Gas Bottle / Pressure Regulator Leakage**

If leakage is detected at the Gas Bottle / Pressure Regulator connection when Bottle Supply Valve is opened, stop operations and repair leakage before proceeding. Typically, the fitting is just not tight enough.

13.3.1 Ensure Bottle Supply Valve is closed.

13.3.2 Vent Pressure Regulator pressure to zero by briefly inserting male quick-disconnect 8mm Tubing Adapter into female quick-disconnect fitting on Pressure Regulator and verify bottle supply gauge reads zero.

**Note:** Do not tighten fitting while it is under pressure.

13.3.3 Firmly re-tighten Pressure Regulator fitting with large adjustable wrench and re-check for leakage.

**Note:** Use of thread sealing tape (e.g.: Teflon tape) is not recommended on High Pressure Brass Fittings.

13.3.4 If leakage continues, inspect contact surfaces on Gas Bottle and Pressure Regulator connection / mating points.

13.4 **Adjust Payoff Counter Actuating Arm**

If required, the Payoff Counter actuating arm on the Filter / Regulator Assembly may be adjusted to obtain proper Payoff Counter operation.

**Note:** Do not bend or twist plastic actuating arm to make any adjustments. It attaches to a metal splined shaft by a clamp-type fit and, if forced, the plastic arm can be easily damaged.

13.4.1 Use small screwdriver (Installer provided) to loosen actuating arm’s clamp screw and slide arm off splined shaft.

13.4.2 Reposition arm on splined shaft, ensure roller is riding on Payoff Cam surface, and re-tighten screw.

13.4.3 Rotate fiber reel and verify Payoff Counter operates properly. Repeat Trial and Error adjustment as necessary.

13.5 **Change Fiber Bundle Drive Wheels**

Fiber Bundle Drive Wheels must be changed whenever their centerline grooves show signs of excessive wear (will cause fiber bundle slip) or when switching from installing one fiber bundle size to another (i.e.: 2mm OD to 3mm OD and vice versa).

13.5.1 **Change Lower Drive Wheel Procedure**

13.5.1.1 Open hinged top of Blowing Head by releasing two latches.

13.5.1.2 Use 3/32" Allen wrench to remove two (2) long machine screws that secure Lower Brass Plate to lower Blowing Head section. See Fig. 31.

Note: Do not tighten fitting while it is under pressure.

Figure 31

Remove 2 Long Machine Screws from Lower Brass Plate
13.5.1.3 Carefully remove Lower Brass Plate. Do not force. If a tight fit is encountered, very gently pry plate out being extremely careful not to gouge brass plate. See Fig. 32.

**Figure 32**
Remove Lower Brass Plate

13.5.1.4 Remove Drive Wheel by peeling it from hub. See Fig. 33.

13.5.1.5 Push replacement Drive Wheel onto hub. See Fig. 34.

**Figure 34**
Install Lower Drive Wheel onto Hub

13.5.1.6 Manually rotate hub / metal gear and continue seating Drive Wheel. Proper wheel fit and fiber bundle groove alignment is obtained when raised piece on inside of Drive Wheel is fully seated in hub groove.

13.5.1.7 Replace Lower Brass Plate and lightly tighten two (2) long machine screws.

**CAUTION:** Use care when installing machine screws. Do not cross-thread. Do not over tighten / over torque. Lightly tighten to a “snug” fit only.

13.5.1.8 When properly assembled, the heads of the two (2) long machine screws that secure Lower Brass Plate to lower Blowing Head section will protrude above brass plate by about 1/16” (i.e.: not be flush with brass plate). This is correct. Do not attempt to tighten machine screws any further. Protruding screw heads fit into recesses located in upper Blowing Head section and act as aligning pins when Blowing Head is closed. See Fig. 35.
13.5.2.2 Carefully remove Upper Brass Plate & Drive Assembly. Do not force. If a tight fit is encountered, very gently pry plate out being extremely careful not to gouge brass plate.

13.5.2.3 Use 3/32” Allen wrench to remove four (4) short machine screws that secure Bearing Hangers. See Fig. 37.

13.5.2 Change Upper Drive Wheel Procedure

13.5.2.1 Use 3/32” Allen wrench to remove two (2) long machine screws that secure Upper Brass Plate & Drive Assembly to upper Blowing Head section. See Fig. 36.

Figure 35
Correct Height for Lower Brass Plate Screws
DO NOT OVERTIGHTEN

Figure 36
Remove 2 Long Machine Screws from Upper Brass Plate

Figure 37
Remove 4 Short Machine Screws from Bearing Hanger Assembly
13.5.2.4 Separate Bearing Hanger Assembly from Upper Brass Plate. See Fig. 38.

13.5.2.6 Slide Gear-side Bearing Hanger off hub shaft. See Fig. 40.

13.5.2.5 Slide Drive Wheel-side Bearing Hanger off hub shaft. See Fig. 39.

13.5.2.7 Remove Upper Drive Wheel by peeling it from hub. See Fig. 41.
13.5.2.8 Push replacement Drive Wheel onto hub. See Fig. 42.

**Figure 42**
Install Upper Drive Wheel onto Hub

13.5.2.9 Manually rotate hub / plastic gear and continue seating Drive Wheel. Proper wheel fit and fiber bundle groove alignment is obtained when raised piece on inside of wheel is fully seated in hub groove.

*Note:* Both Bearing Hangers are identical and interchangeable. However, if not installed correctly, bolt hole alignment will be off between Bearing Hangers and Upper Brass Plate.

13.5.2.10 Slide Drive Wheel-side Bearing Hanger back onto hub shaft with raised Bearing pointing inward toward Drive Wheel. See Fig. 43.

13.5.2.11 Side Plastic Gear-side Bearing Hanger back onto hub shaft with raised Bearing pointing inward toward Gear. See Fig. 44.
13.5.2.12 Replace four (4) short machine screws to secure the Bearing Hanger Assembly to Upper Brass Plate and lightly tighten. When properly assembled, the heads of the four (4) short machine screws will be flush with the Upper Brass Plate. See Fig. 45.

**CAUTION:** Use care when installing machine screws. Do not cross-thread. Do not overtighten / over torque. Lightly tighten to a "snug" fit only.

![Figure 45](image1)

Install 4 Short Machine Screws
DO NOT OVERTIGHTEN

13.5.2.13 Replace two (2) long machine screws to secure Upper Brass Plate and lightly tighten. When properly assembled, the heads of the two (2) long screws will be flush with the Upper Brass Plate. See Fig. 46.

**CAUTION:** Use care when installing machine screws. Do not cross-thread. Do not overtighten / over torque. Lightly tighten to a "snug" fit only.

![Figure 46](image2)

Install 2 Long Machine Screws
DO NOT OVERTIGHTEN

13.6 Replace Plastic Drive Gear
If the teeth on the Plastic Drive Gear in the upper Blowing Head section become worn, field replacement of the gear is authorized. Contact SEL to obtain replacement part.

13.6.1 Remove Upper Brass Plate & Drive Assembly and both Bearing Hangers.

13.6.2 Use 3/32" Allen wrench to remove three (3) machine screws securing Plastic Gear to hub. (Be careful with small washers.)

13.6.3 Install replacement Plastic Gear and re-install three (3) machine screws.

13.6.4 Re-install Bearing Hangers and Upper Brass Plate & Drive Assembly.
13.7 Adjust Fiber Guide Tension Set Screw
The Fiber Guide Tension Set Screw consists of a spring-loaded plunger that applies tension on the installed Fiber Guides. The head of the Tension Set Screw is located on top of upper Blowing Head section. The spring-loaded plunger is located so it comes in contact with the installed Fiber Guides. The screw’s tension is adjusted at the factory. However, field adjustment is authorized if required.

Note: Set screw tension is too loose if Fiber Guide dies fall out when air pressure is applied to tube span / Blowing Head. Set screw tension is too tight if Blowing Head latches are difficult to close and a gap exists between upper and lower Blowing Head sections.

13.7.1 To adjust, use a 1/16” Allen wrench (Installer provided) and turn set screw clockwise (CW) to increase or counterclockwise (CCW) to decrease plunger tension on Fiber Guide dies. See Fig. 47.

13.7.2 Make set screw adjustments in small increments and test-fit Fiber Guides; it is a trial-and-error adjustment. Repeat until desired tension is obtained.

13.8 Tighten Metal Gear / Hub Assembly
A Metal Gear / Hub Assembly is attached to the Air Motor output shaft with a Split-Die Clamp. Should the Clamp become loose, the Metal Gear / Hub Assembly will spin on output shaft and Fiber Bundle Drive Wheels will not function properly.

13.8.1 Use 3/32” Allen wrench to remove two (2) long machine screws that secure Lower Brass Plate to lower Blowing Head section and remove Brass Plate.

13.8.2 Remove Drive Wheel by peeling it from hub.

13.8.3 Use 7/16” Allen wrench to loosen Split Die Clamp machine screw. See Fig. 48.

13.8.4 Slide and hold Metal Gear / Hub Assembly in tight on Air Motor output shaft. This places lower Metal Gear / Hub Assembly in proper alignment with upper drive components (Plastic Gear, Upper Hub, and Upper Drive Wheel).

13.8.5 Use 7/16” Allen wrench to re-tighten Split Die Clamp machine screw; tighten firmly.

13.8.6 Reinstall Drive Wheel and Lower Brass Plate.
13.9 Remove Blowing Head from Payoff Stand
The Blowing Head may be removed from the Payoff Stand Shelf for cleaning or to support fiber bundle installation efforts where it is not practical to set up the Transit Case (e.g.: down in Maintenance Holes, up in ceiling areas, and so forth).

13.9.1 Remove two (2) fasteners (knurled-head bolts) that secure front of Payoff Stand Shelf to Inner Case. Lift hinged Shelf to gain access to two (2) bolts (thumb screws) under Blowing Head. See Fig. 49.

13.9.2 Use pliers or similar tool (Installer provided) to remove bolts and separate Blowing Head from Shelf. See Fig. 50.

13.9.3 Reassemble in reverse order.

Note: When re-installing Blowing Head, ensure it aligns with fiber reel so fiber bundle feeds straight into back of Blowing Head.

13.10 Replace Blowing Head Air Motor
If Blowing Head Air Motor operation becomes erratic or metal Drive Gear cannot be rotated, the Air Motor may have become defective (frozen / seized).

13.10.1 Field replacement of the individual Air Motor is not authorized.

13.10.2 Contact SEL to obtain a replacement Blowing Head / Air Motor Assembly.

Note: The defective Blowing Head Serial Number (metal-stamped number located inside Fiber Guide areas) must be provided to SEL.