

GJS-I-8019 Fiber Optical Splice Closure Installation Manual

Version:1.0



1. Scope of application

This Installation Manual suits for one of the Fiber Optic Splice Closure (Hereafter abbreviated as FOSC), as the guidance of proper installation.

The scope of application is: aerial, underground, wall-mounting, handhole-mounting and duct-mounting. The ambient temperature ranges from -40℃ to +65℃.

2. Basic structure and configuration

2.1 Dimension and capacity

| | |
|---------------------------------------|--|
| Outside dimension (Height x Diameter) | 500mm×228mm |
| Weight (excluding outside box) | 3250g—4150g |
| Number of inlet/out ports | 1 large port + 4small port |
| Diameter of fiber cable | Φ7mm~Φ40 mm |
| Capacity of FOSC | Bunchy: 12-192 (cores), Ribbon: up to 288(croes) |

2.2 Main components

| No. | Name of components | Quantity | Usage | Remarks |
|-----|---|---|---|--|
| 1 | FOSC cover | 1 piece | Protecting fiber cable splices in whole | Height x Diameter 400mm x 220mm |
| 2 | Fiber optic splice tray (FOST) | Max. 12 trays (bunchy) Max.4trays (ribbon) | Fixing heat shrinkable protective sleeve and holding fibers | Suitable for: Bunchy: 12, 24 (cores) Ribbon: 6(pieces) |
| 3 | Fiber holding tray | 1 pcs | Holding fiber with protective coat | |
| 4 | Base | 1set | Fixing internal and external structure | |
| 5 | Plastic hoop | 1 set | Fixing between FOSC cover and base | |
| 6 | Gasket ring for Housing | 1 set | Big gasket ring is used to seal FOSC cover and base. | |
| 7 | Seal rings for cable inlet/outlet ports | 7pcs | Single ports Φ 21mm , Φ 30mm seal rings or duplex ports Φ 21mm can be installed in the big cable inlet/outlet port. Φ 21mm, Φ 12.5mm seal rings can be installed in the small cable | Seal rings is used to seal entry/exit tube; Single ports Φ 21mm seal ring can shrink to Φ 13mm; Single ports Φ 30mm seal ring can shrink to Φ |

| | | | | |
|----|--------------------------|-------|---|---|
| | | | inlet/outlet port. | 24mm;duplex ports Φ 21mm seal ring can shrink to Φ 19mm.Single ports Φ 12.5mm seal ring can shrink to Φ 7mm |
| 8 | Plastic gasket | 1 set | Protect elastic seal rings from white ant and corruption | |
| 9 | Pressure testing valve | 1 set | After inject air, it is used for pressure testing and sealing testing | Configuration as per requirement |
| 10 | Earthing deriving device | 1 set | Deriving metallic parts of fiber cables in FOSC for earthing connection | Configuration as per requirement |

2.3 Main accessories and special tools

| No. | Name of accessories | Quantity | Usage | Remarks |
|-----|-----------------------------------|----------------------|---|------------------------------------|
| 1 | Heat shrinkable protective sleeve | | Protecting fiber splices | Configuration as per capacity |
| 2 | Nylon tie | | Fixing fiber with protective coat | Configuration as per capacity |
| 3 | Earthing wire | 1 piece | Putting through between earthing devices | |
| 4 | Abrasive cloth | 1 piece | Scratching fiber cables | |
| 5 | Labeling paper | 1 piece | Labeling fibers | |
| 6 | Special wrench | 3 pieces | Installing and tightening nut of reinforced core and nut (plastic) of entry/exit tube | |
| 7 | Measuring paper | 1 piece | To measure premetre, of which the diameter of fiber cable is enlarged with seal tape | |
| 8 | Seal tape | 1 ring | Enlarging diameter of fiber cable which fits in with gasket ring. | Configuration as per specification |
| 9 | Insulation tape | 1 ring | Enlarging diameter of fiber cable for easy fixing | |
| 10 | Metal hoop | 1 set | For wall mounting and pole hugging | |
| 11 | Buffer tube | decided by customers | Hitched to fibers and fixed with FOST, managing buffer. | Configuration as per requirement |
| 12 | Desiccant | 1bag | Put into FOSC before sealing for desiccating air | |

3. Necessary tools for installation

3.1 Supplementary materials (to be provided by operator)

| Name of materials | Usage |
|-------------------|------------------------------|
| Scotch tape | Labeling, temporarily fixing |
| Ethyl alcohol | Cleaning |
| Gauze | Cleaning |

3.2 Special tools (to be provided by operator)

| Name of tools | Usage |
|----------------|--|
| Fiber cutter | Cutting off fiber cable |
| Fiber stripper | Strip off protective coat of fiber cable |
| Combo tools | Assembling FOSC |

3.3 Universal tools (to be provided by operator)

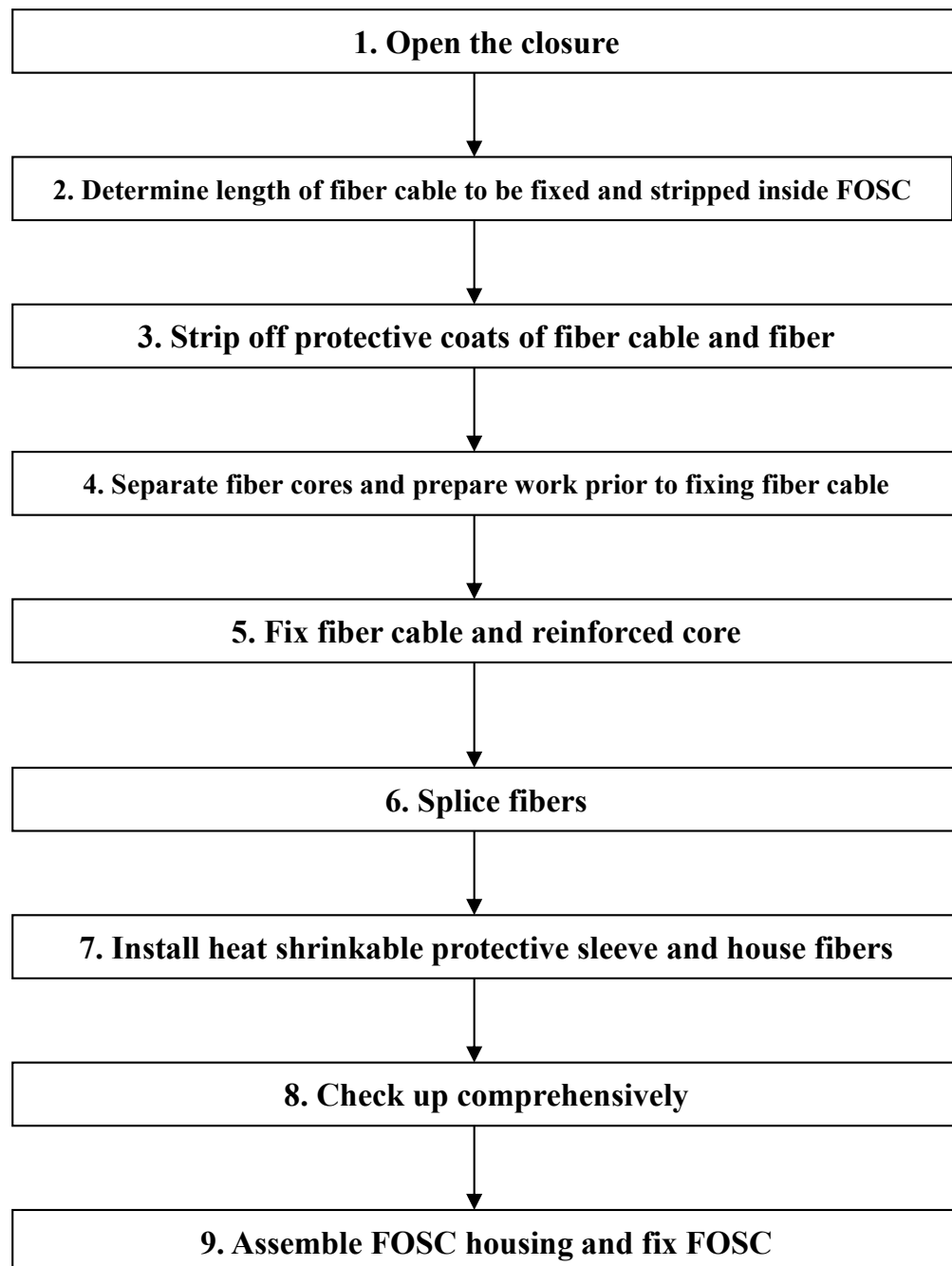
| Name of tools | Usage and specification |
|--------------------|---|
| Band tape | Measuring fiber cable |
| Pipe cutter | Cutting fiber cable |
| Electrical cutter | Take off protective coat of fiber cable |
| Combination pliers | Cutting off reinforced core |
| Screwdriver | Crossing/Paralleling screwdriver |
| Scissor | ---- |
| Waterproof cover | Waterproof, dustproof |
| Metal wrench | Tightening nut of reinforced core |

3.4 Splicing and testing instruments (to be provided by operator)

| Name of instruments | Usage and specification |
|----------------------------|-------------------------|
| Fusion Splicing Machine | Fiber splicing |
| OT DR | Splicing testing |
| Provisional splicing tools | Provisional testing |

Notice: The above-mentioned tools and testing instruments should be provided by the operators themselves.

4. Installation flow chart



5. The process of installing FOSC.

Step one - Open the closure

Cleaning the locale and determine where to install the FOSC and then place fiber cables required.

Check whether the main components and accessories have been well prepared inside the package.

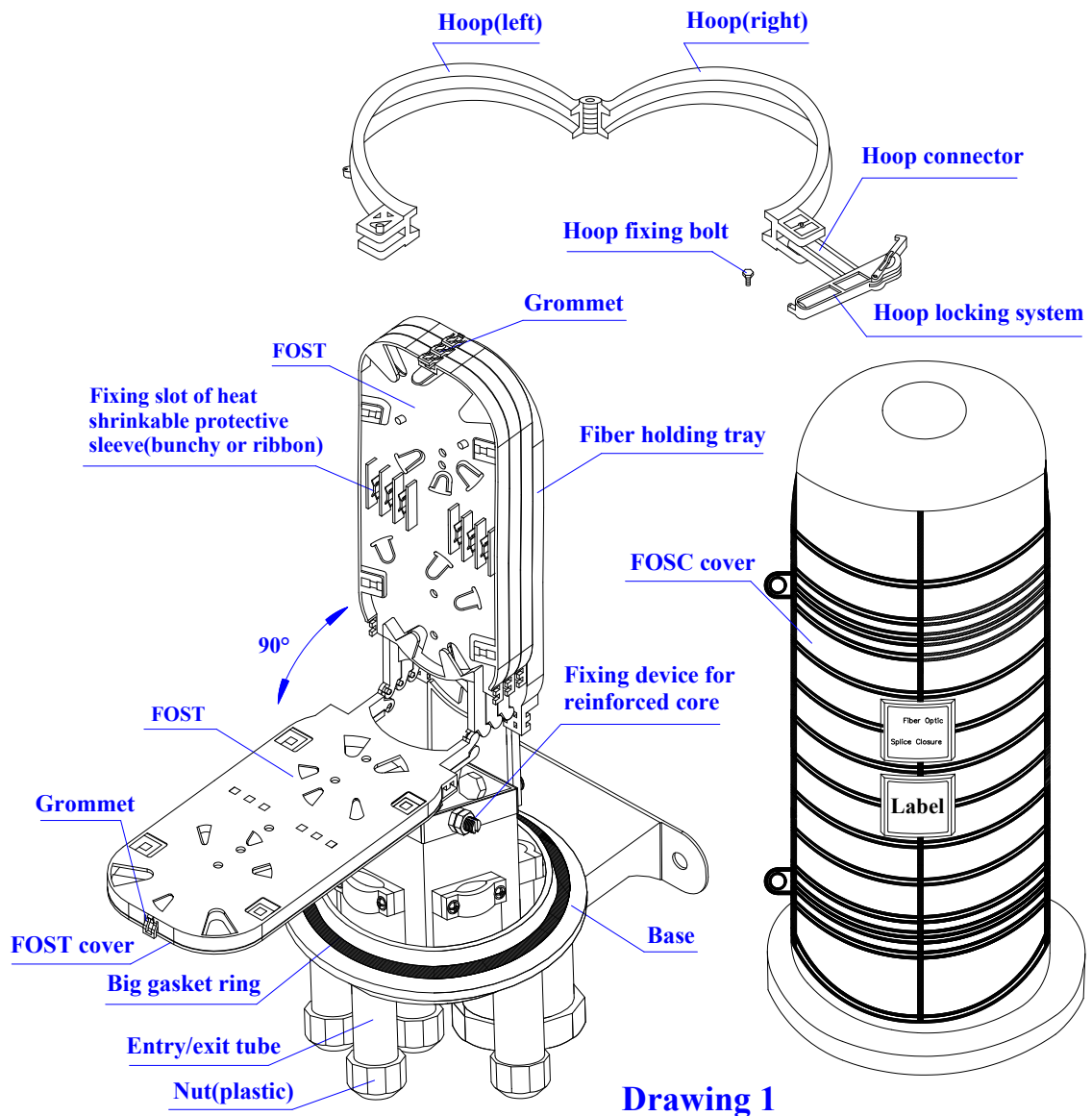
Open the closure

- ① Demount hoop fixing bolt and pull hoop locking system out, then proceed in demounting the hoop.

- ② Pull the FOSC cover upwards out, installation could begin.

See Drawing 1

Important issues: If the weather condition is not good enough, then a tent must be pitched for waterproof and dustproof.

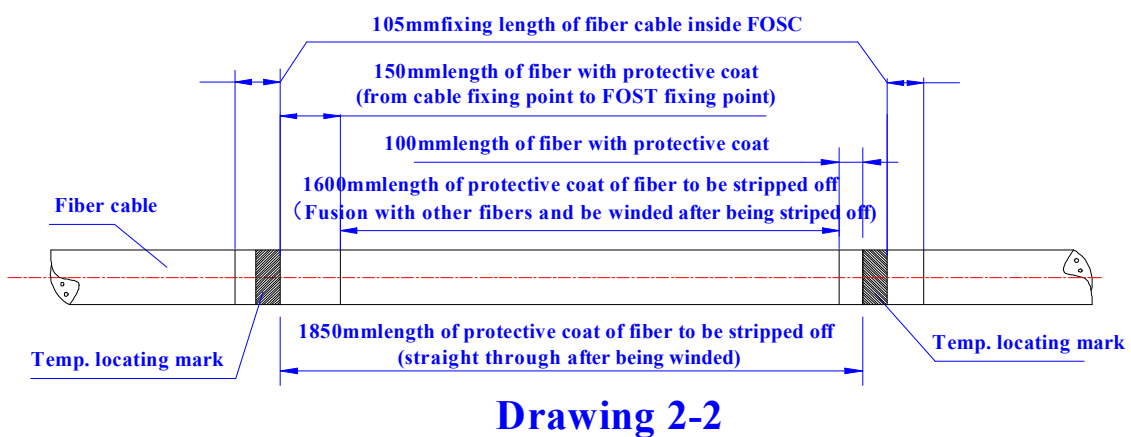
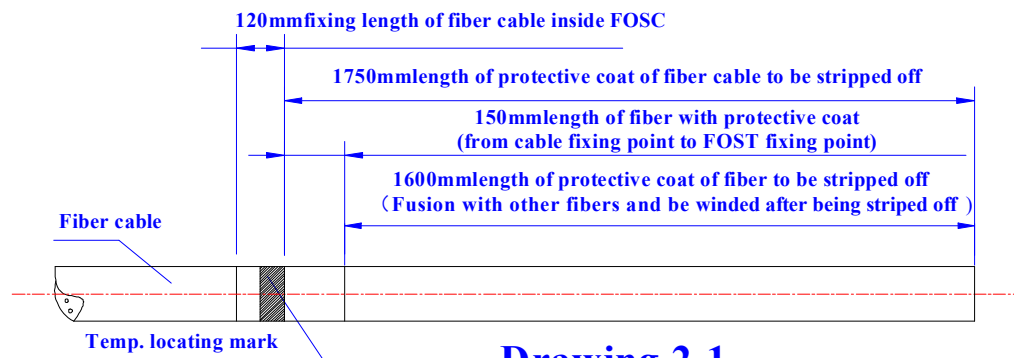


Drawing 1

5.2 Step Two -Determine length of fiber cable to be fixed and stripped inside FOSC

- 5.2.1 ①. Fiber cable in 120mm length: the distance from small gasket ring to fiber cable Pressboard
- ②. Fiber cable in 1750mm length: it is used to be winded and spliced after stripping.
- ③. Fiber with protective coat in 150mm length: the distance from the fixing point of fiber cable to the fixing point of FOST (fiber optic splice tray).
- ④. Fiber in 1600mm length: after stripping off the protective coat, it is to be winded inside the FOST after splicing with other fibers
- 5.2.2 See Drawing 2

- Important issues:**
1. Reserve enough length of fiber cable to be spliced.
 2. Stripping length also could be decided by customers according to Installation requirement

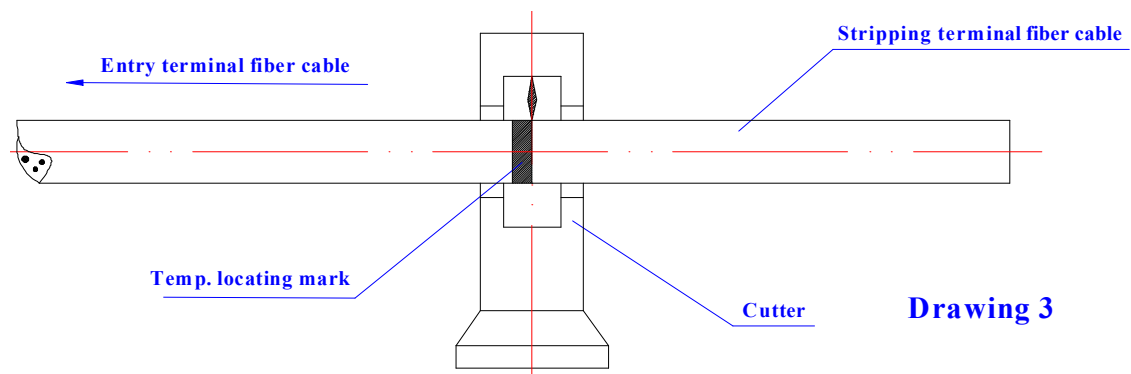


5.3 Step three –Strip off protective coat of fiber cable and fiber

5.3.1 Strip off protective coat of fiber cable from the temp. Locating mark with the cutter and the stripper, please refer to Drawing 2 for stripping length. Stripping length also could be decided according to installation requirement

5.3.2 See Drawing 3.

Important issues: If it is difficult to pull all the protective coat of fiber cable at one time, strip it off section by section to avoid fiber breakage.



Step Four – Separate fiber cores and prepares work prior to fixing fiber cable.

5.4.1 Wind 2 layers of insulation tape on protective coat of fiber core for protection.

Meanwhile, get rid of the stuffing to separate fiber core and clean them. Form a ring

with the diameter of 100mm or so and fix it on the fiber cable temporarily by adhesive tape.

There can be two methods of stripping off protective coat as follows:

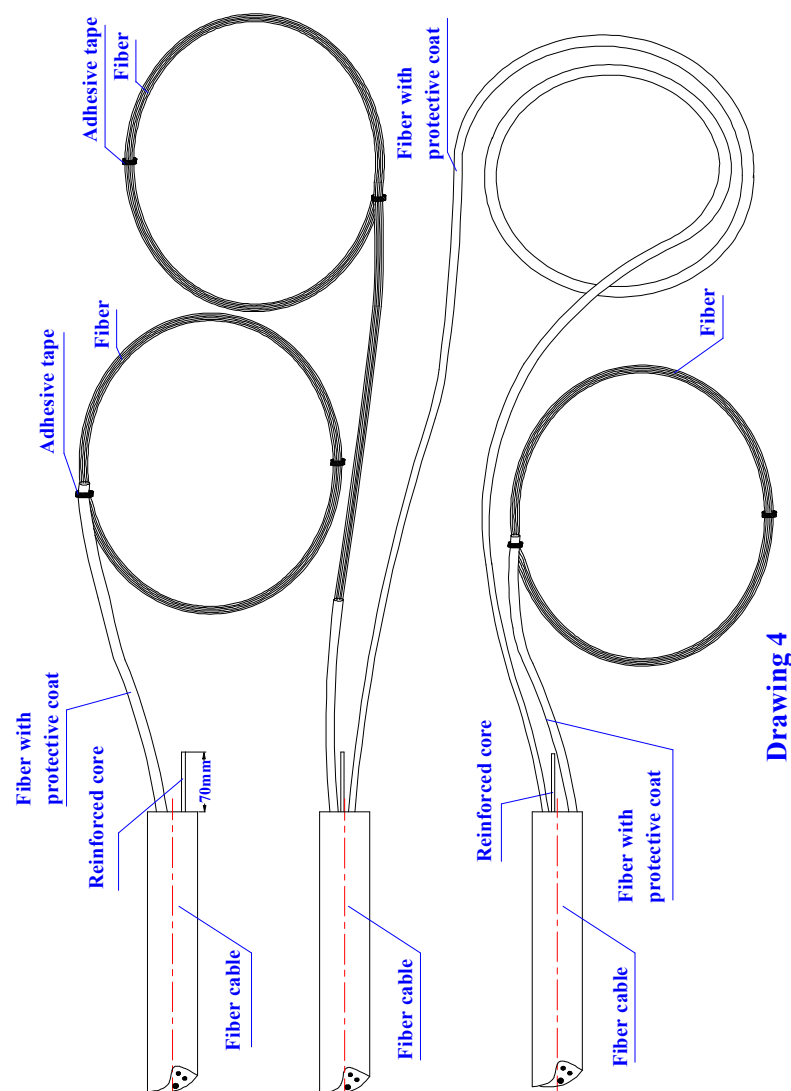
- 1) All optic fiber will be cut off for fusion splicing with fibers of other branching fiber cable;
- 2) Some fibers uncut are for straight-through after being fixed and winded, fibers cut off are for branching after fusion splicing with fibers of other branching fiber cable.

When some fibers uncut are for straight-through, the mass inlet/outlet port should be chosen.

5.4.2 Reserve reinforced core in 70mm length and cut off the unnecessary ones.

5.4.3 See Drawing 4.

Important issues: Entry/exit tubes are to be selected accurately to make it easy for splicing and sealing.



5.5 Fix reinforced core, and pyrocondense, fix and seal fiber cable.

- 5.5.1 For branching fiber cable in small inlet/outlet ports, after deciding number of fiber cable entry/exit, demount the nut, gasket and gasket ring of the corresponding entry/exit tubes according to the diameters of fiber cables actually to be installed, insert them into

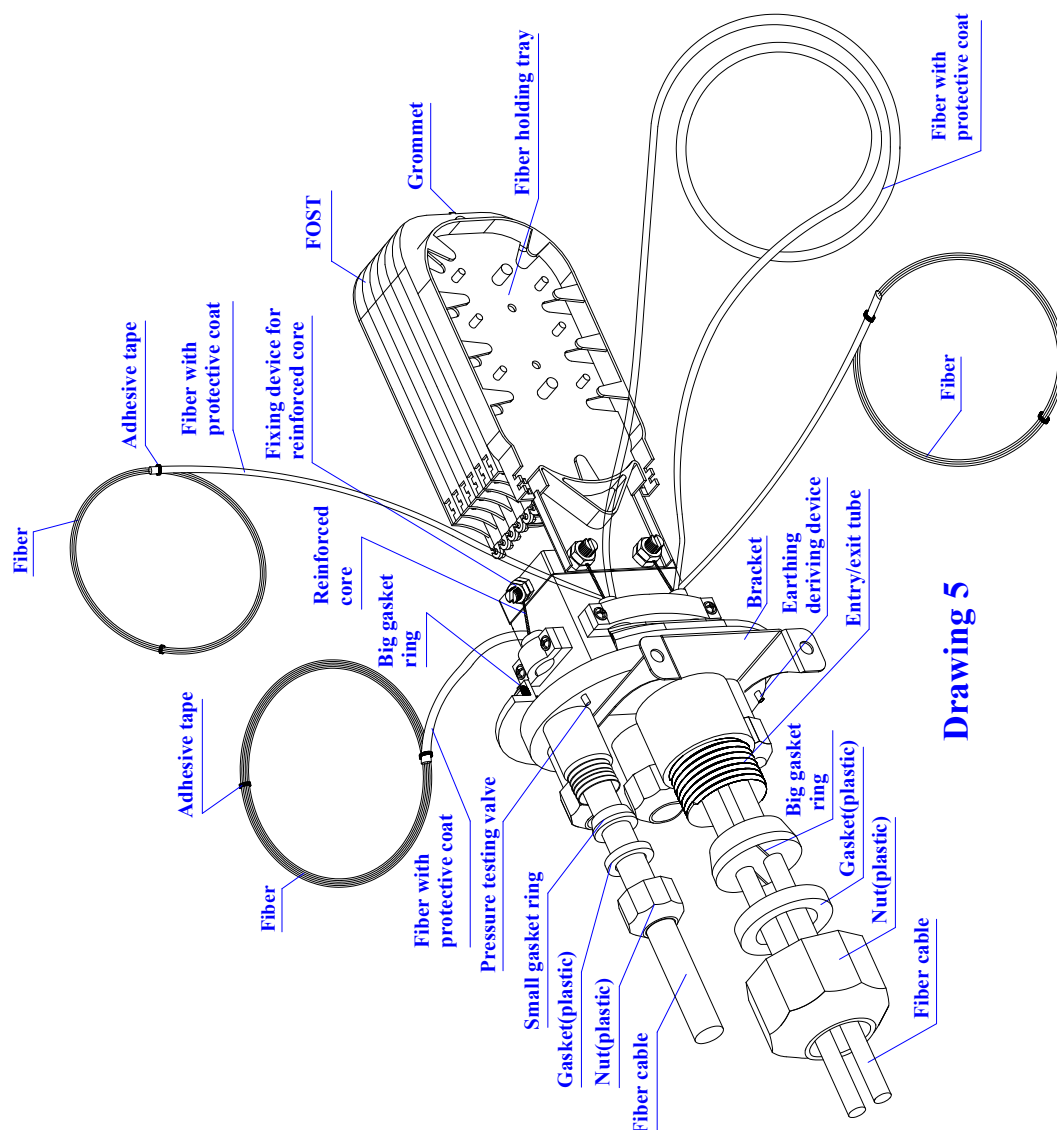
fiber cable in sequence, then insert fiber cables into entry/exit cable, tighten the nut in order to seal properly.

5.5.2 For branching fiber cable in big inlet/outlet ports: I demount the big nut, take out gasket and seal ring; II bend cable with sleeves to U shape and insert it into gasket and nut ;III cut duplex port seal ring obliquely from its outside, lead in straight-through fiber; IV While diameter is not big enough, enlarge the diameter with seal tape to make it same as seal ring, and fix it on duplex port seal fitting; V put the seal ring, gasket and cable together into inlet/outlet port, tighten the nut to ensure good sealing, at the same time ,twist straight-through fiber on the holding tray. VI while one cable is through the big inlet/outlet port, only tightening the nut is ok.

5.5.3 Fix fiber cable to the fixing seat, press it with the pressboard. While diameter is small, enlarges the diameter with insulation tape at the fixing position of fixing seat.

5.5.4 Demount the nut of fixing device of reinforced core with special wrench (plastic one), set reinforced core into fixing slot, tighten the nut, retighten it with metal wrench (metal wrench to be provided by operator).

Important issue: Fixing nut of reinforced core should be tightened. See Drawing 5



Drawing 5

5.6 Step six - Splice fibers

5.6.1 Follow user manual of fusion splicing machine to splice fiber.

Important issue: pay attention to the twist and bend of fiber

5.7 Step Seven -Install heat shrinkable protective sleeve and house fibers.

5.7.1 When having completed splicing the fibers, the first fiber ring should be housed

On the farthest side of FOST, the remaining fiber should be wound, forming a ring

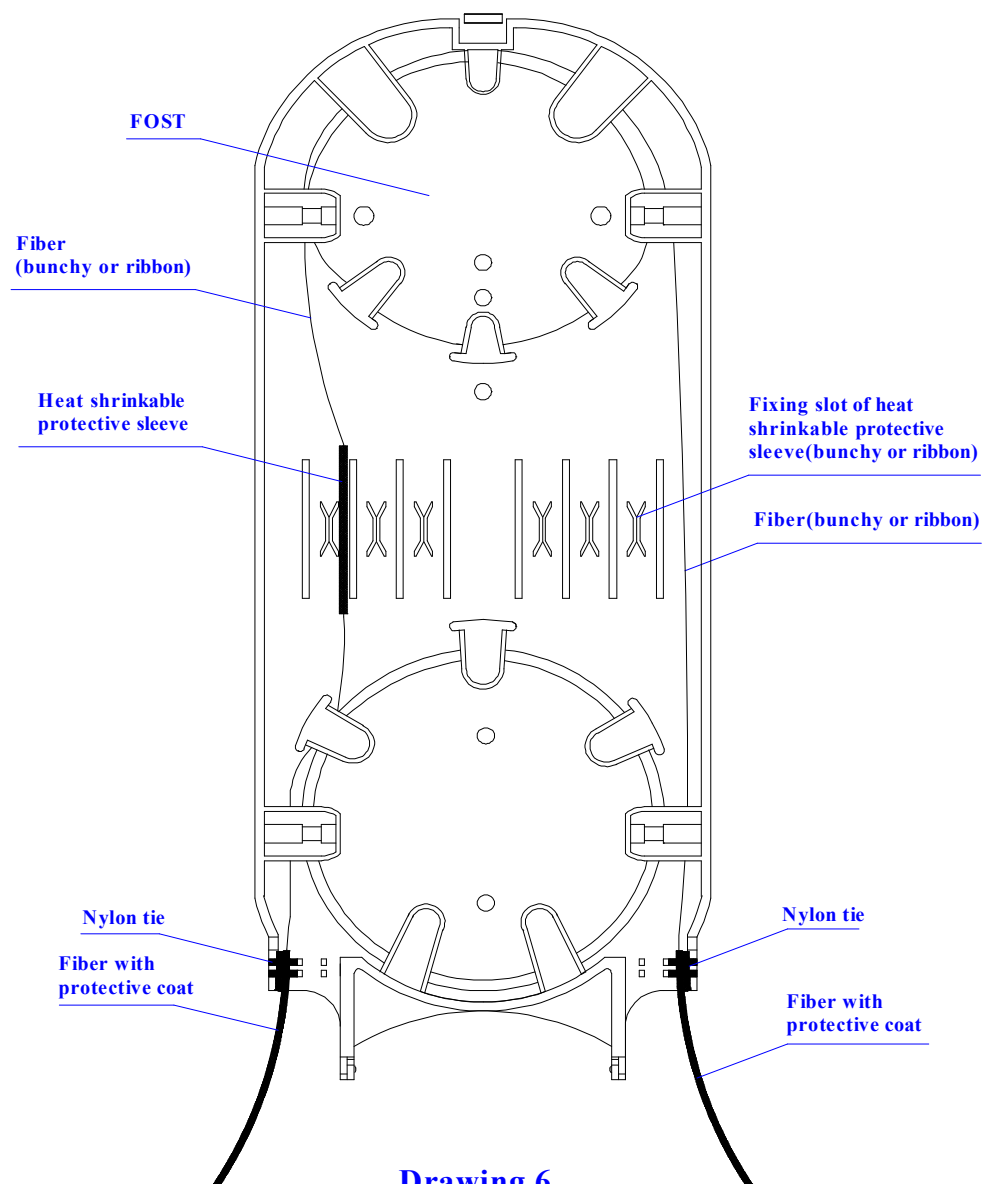
With diameter not less than 60mm. then put it into FOST (Fiber Optic Splice Tray)

Together with heat shrinkable protective sleeve.

(Firstly fix heat shrinkable protective sleeve into the slot, then enlarge the diameter of fiber ring properly.)

5.7.2 See Drawing 6

Important issue: pay attention to the twist and bend of fiber.



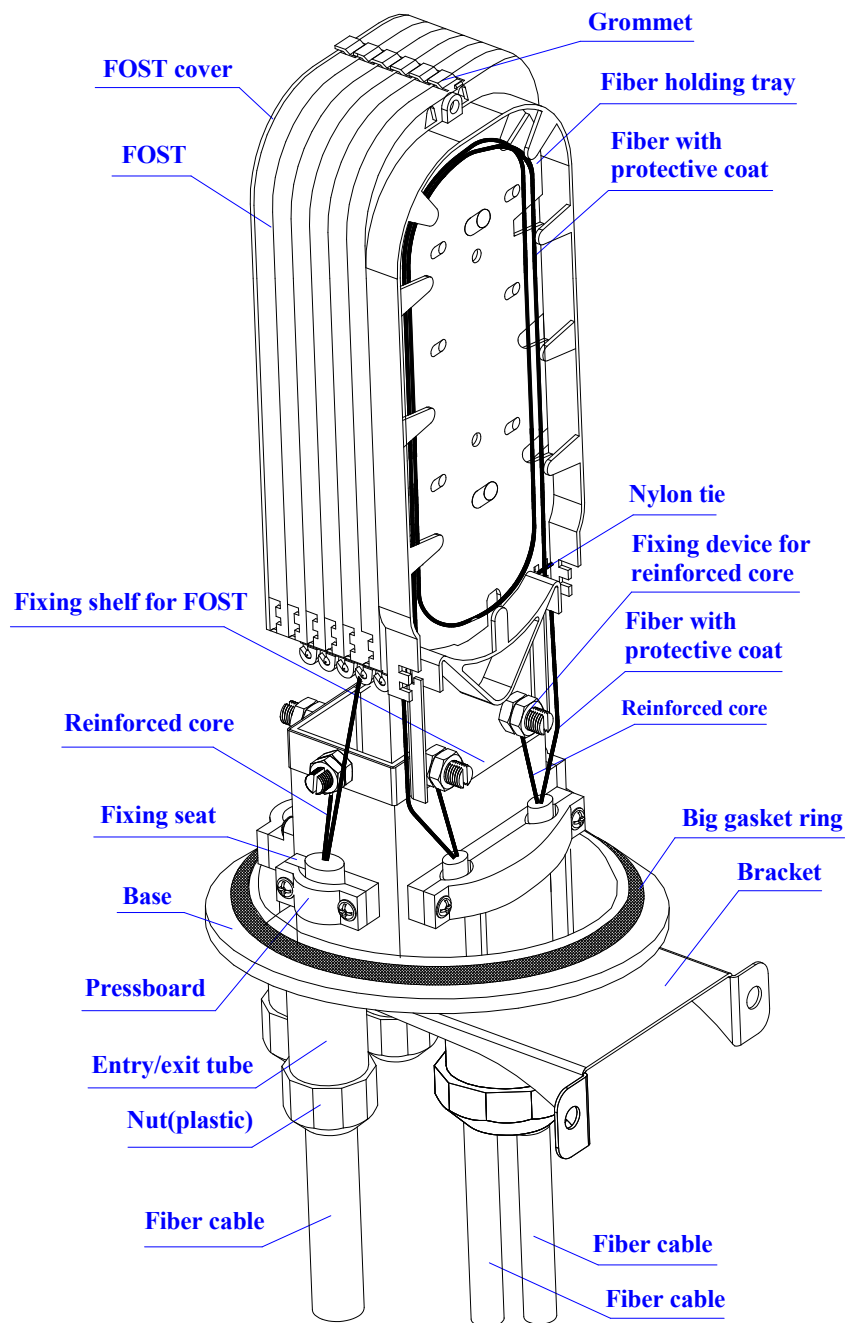
Drawing 6

5.8 Step Eight - Check up comprehensively

To ensure the technical requirements, the following instructions must be followed:

- 5.8.1 Fibers with protective coat are fixed with nylon tie at the entrance of FOST.
- 5.8.2 Grommet should be pressed from inside to outside in order to properly install FOST.
- 5.8.3 If there are fibers with protective coat reserved, wind it into the fiber holding tray.
- 5.8.4 Check whether the internal tighteners and reinforced core are well tightened.
- 5.8.5 Check whether gasket ring is installed neatly and smoothly without any breakage. If not, level it up with seal tape.
- 5.8.6 See Drawing 7.

Important issues: If any problems occur, they should be solved right away.



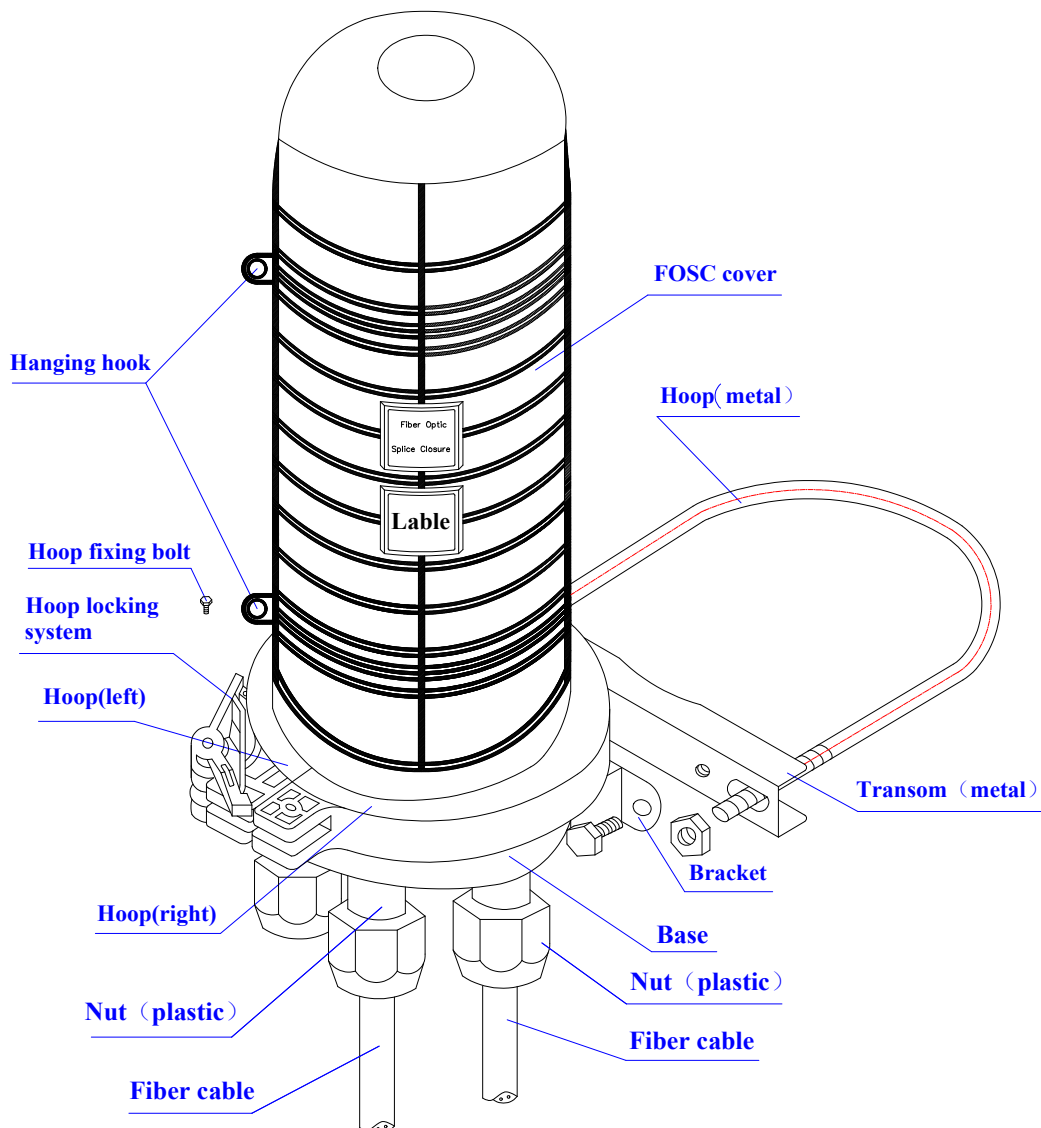
Drawing 7

5.9 Step Nine – Assemble FOSC housing and fix FOSC

- 5.9.1 Put desiccant into FOSC
- 5.9.2 Put FOSC cover on base directly.
- 5.9.3 Install plastic hoop between FOSC cover and the base, tighten hoop locking system, Which is to be fixed by hoop fixing bolt then?
- 5.9.4 All nuts (plastic ones) of base need to be retightened once more.
- 5.9.5 FOSC installation
 - ① Aerial application: Fix metal hoop and transom to the pole. Please refer to Drawing 8
 - ② Wall mounting application: Fix the bracket on the wall with the bolt. (Metal hoop is not required.)
 - ③ Underground application: Metal hoop is not required.
- 5.9.6 See drawing 8

Important issues: 1. Pay attention while installing plastic hoop.

2. The specification of the bolt for wall-mounting is M8.



Drawing 8

6. Fiber Optic Splice Closures (FOSC) inspecting and testing items

| Inspecting item | Technical Requirements | Inspecting type | |
|----------------------------|---|--|-----------------------------------|
| | | Routine test (Before leaving factory) | Type test |
| Package | Each small package contains one fiber optic splice closure, together with its accessories, tools, installation manual and packing list. | full | At least 3 sets sampled each time |
| Appearance | Intact in shape, no burrs, bubbles, chaps, pores, warps, impurities and other defects, all background colors should be even and continual. | | |
| Sign | There is a clear sign on the housing, such as name and model of the product, etc. | | |
| Fiber storage device | The fibers reserved are to be winded in fiber optic splice tray (FOST), the length of fibers housed in FOST is >1.6m, the curved radius is >30mm. During the installation and maintenance, there should be no attenuation on fibers. | At least 3 sets sampled each time | |
| Electrical jointing device | Inside FOSS: metallic components of fiber cables have the functions of electrical putting through, earthing connection and disconnecting. It is possible to install earthing deriving device outside the housing | | |
| Sealing performance | After sealing according to the stipulated operation procedures, the injected air pressure is 100KPa±5Kpa, when immersed in clean water of normal temperature for 15 minutes, there should be no air bubbles, and then observed for 24 hours, there should be no change of air pressure. | | |
| Re-sealing performance | After reopening and resealing according to the stipulated operation procedures, the injected air pressure is 100KPa±5Kpa, when immersed in clean water of normal temperature for 15 minutes, there should be no air bubbles, and then observed for 24 hours, there should be no change of air pressure. | | |
| Pull | Bearing pull is ≥ 800N at axle orientation, there should be no breakage on the housing. | | |
| Punching | Bearing pressure of 2000N/10cm for 1 minutes, there should be no breakage on the housing | | |

| | | | |
|--|---|---|--|
| Impact | Bearing impact energy of 16N•m, 3 times of impacts there should be not breakage on the housing | | |
| Bending | The spot between the FOSC and seal fitting can bear bending tension of 150N at bending angle of $\pm 45^{\circ}$ for 10 circles, there should be no breakage on the housing | At least 3 sets sampled each time | At least 3 sets sampled each time |
| Torsion | Bearing torsion 50N•m, 10 circle at torsion angle $\pm 90^{\circ}$. There should be no breakage on the housing. | | |
| Temperature circle | Injected air pressure of $60\text{KPa} \pm 5\text{ KPa}$, the temperature circle ranging from $-40^{\circ}\text{C} \sim +65^{\circ}\text{C}$, 10 times of the circular tests (one circular consists of high temperature for 2 hours + indoor temperature for 2 hours + low temperature for 2 hours + indoor temperature for 2 hours) when the pressure declines, the amplitude is $\leq 5\text{Kpa}$, immerse the swatch in clean water of normal temperature for 15 minutes, there should be no air bubbles. | | |
| Voltage resistance strength | After sealing the FOSC according to the stipulated operation procedures, immerse it in clean water of normal temperature in 1.5m depth for 24 hours, there should be no breakdown or arc over between the metallic components of the FOSC, between metallic components and the ground at DC 15KV for 1 minutes. | | |
| Isolating resistance | After sealing the FOSC according to stipulated operation procedure, immerse it in clean water in 1.5m depth for 24h, the isolating resistance between the metallic components of the FOSC, between the metallic components and the ground should be $\geq 2 \times 10^4 \text{M} \Omega$. | | |