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1. GENERAL INTRODUCTION

1.1 Document Purpose
This document provides installation instructions for the Charles Fiber Sealed Drop Closure (FSDC). A typical FSDC is shown in Figure 1.

-NOTE-
Hereafter the Charles Fiber Sealed Drop Closure Series will be referred to as the “FSDC” or “closure.”

1.2 Product Purpose
The FSDC is a sealed splice closure (IP68 rated) used in fiber splicing applications where a single feed fiber must be split into multiple drop connections.

1.3 Product Mounting and Location
The FSDC is a sealed unit that can be aerial strand mounted, pole mounted, or below grade mounted. Brackets for aerial and pole mounting are sold separately.

2. PRODUCT DESCRIPTION
The FSDC is a closure that allows splicing operations for splitting signals and creating branch cable lines. The FSDC includes multiple splicing trays. The tray can be equipped with an optical tap or a fiber splitter, which allows a single feed signal to be split into multiple drop signals.

The FSDC dimensions are shown in Figure 2. The FSDC ships with a number of tools and accessories, shown in Figure 3.
3. **SAFETY PRECAUTIONS**

**WARNING**

Risk of serious eye damage! Never look into the end of a fiber optic line or use a magnifier in the presence of laser light or radiation. Exercise caution when installing, testing or maintaining live circuits. If eyes are exposed to laser light or radiation occurs, immediately seek treatment by a medical professional.

**WARNING**

Cable and fiber cleaning solvents may contain hazardous or harmful materials. Maintain good housekeeping practices and refer to the MSDS when working with cleaning solvents or similar products.

Shards and cleaved glass fibers are very sharp and can easily pierce the skin. Use tweezers to pick up cut glass fibers and place them in a specifically designated container. Do not consume any food products near the cable installation site.

Corrugated metal or armor in feed cables is very sharp when cut or exposed. Exercise extreme caution to prevent personal injury. Use protective work gloves when handling armored cable.

**CAUTION**

Perform all bonding and grounding prior to making any electrical and communications connections.

Be careful not to damage any buried cables or service wires while digging either to expose cables or to prepare a hole or trench, or while driving stakes. Buffer tubes and fibers are sensitive to excessive bending, pulling, and crushing forces. To avoid kinking of buffer tubes and fiber damage or breakage, exercise great care when working with fiber, and do not exceed or violate minimum bend radius requirements for fibers, buffer tubes, and cables.
4. INSTALLATION

Gather the following equipment to perform the FSDC installation.

- Philips and flathead screwdrivers
- 5 mm (or 3/16") Allen wrench
- Measuring tape
- Hose clamps
- Cable marking tool
- Assorted cable ties
- Bag of parts (provided with the FSDC)
- Knife or snips (to cut grommets)
- Buffer tube stripper tool (score/cut buffer tubes)
- Fiber optic stripper tool
- Fiber splicing tools and equipment
- Safety glasses and work gloves

4.1 Route Express Cable Loop into Closure

<table>
<thead>
<tr>
<th>Step Number</th>
<th>Instruction</th>
</tr>
</thead>
</table>
| 1           | Use a flathead screwdriver to pry open the four hinged latches that hold the FSDC closed.  
Note: The accessory bag includes a closure cover stop, which can be placed in the door hinge to hold the door securely open. |
| 2           | Locate the express port (oval port) on the bottom of the FSDC. Use a 5 mm (or 3/16") Allen wrench to remove the sealing components.  
Note: The express port can accommodate cable with OD from 10 to 17.5 mm (0.394 to 0.689 inches). |
| 3           | Slit the rubber middle gasket apart on the outsides.  
Separate the pieces of the plastic inner gasket.  
Set these gaskets aside. |
| 4           | Set aside the screws from the plastic outer gasket.  
Remove the metal compression plate that seals the express loop plug in the port.  
Disassemble the plastic outer gasket and set the components aside. |
<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>Locate the attachment plate in the FSDC closure. There are four brackets for securing a strength member and four slots for attaching a hose clamp. The brackets and slots on the far left and far right are for branch cables. The two in the middle are for the express loop cables.</td>
</tr>
<tr>
<td>6</td>
<td>Pull a 6.5 to 7.0 foot length of unsheathed cable into the express loop hole.</td>
</tr>
<tr>
<td>7</td>
<td>Guide the strength members on each side of the cable loop under the clamps, using a Philips screwdriver to tighten the clamps in place. Use a 6 mm hose clamp on each cable to secure in place (clamps included in the accessory bag).</td>
</tr>
<tr>
<td>8</td>
<td>Take the plastic inner gasket and connect the pieces around the sheathed cables. Push this grommet inward into the express loop port. Fit the rubber middle gasket around the cables. Push this gasket inward into the express loop port.</td>
</tr>
<tr>
<td>9</td>
<td>Reassemble the plastic outer gasket around the cables. Put the metal compression plate back in place and retrieve the express port screws. Use the 5 mm (or 3/16&quot;) Allen wrench to secure the express port sealing components together in the express loop port.</td>
</tr>
</tbody>
</table>
4.2 Branch Cable Installation or Sealing

<table>
<thead>
<tr>
<th>Step Number</th>
<th>Instruction</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Use the branch port wrench from the bag of tools to open the branch port nut.</td>
</tr>
<tr>
<td>2</td>
<td>Select a grommet of the proper size for the branch cable (either the grommet from the branch port or another from the accessory bag). Run the branch cable through this grommet and through the nut. Push branch cable into the FSDC until the cable sheathing is inside. Note: if the cable is not snug, use sealing tape. Push the grommet inward into the branch cable port. Use the branch port wrench to fully tighten the branch port nut into position.</td>
</tr>
<tr>
<td>3</td>
<td>Guide the strength member under the clamps, using a Philips screwdriver to tighten the clamps in place. Use the 6 mm hose clamps included in the accessory bag to secure the cables in place.</td>
</tr>
<tr>
<td>4</td>
<td>Route the buffer tube once around the trays, then route into the tray. Mark the point on the buffer tube where it enters the tray. Use a buffer tube slitting tool to remove the sheathing.</td>
</tr>
</tbody>
</table>
4.3 Route and Splice Fiber Inside Closure

A Charles splitter tray or optical tap tray may be installed into the FSDC version with the Charles hinged tray bracket. Charles splitter trays are available in two sizes: short (4”x6”), and long (4”x9”). Charles optical tap trays are only available in the long size. If using a long tray, it must be installed in the top position of the hinged bracket.

Alternatively, install a loose splitter into the closure’s splice tray. Charles offers loose 1x2, 1x4, 1x8, or 1x16 splitters with fiber stub input and either stub output legs or SC connectorized output legs. These splitters can fit into any of the long, short, or mini splice trays.

When a splitter is installed in the FSDC, route a single buffer tube into the tray. Select a single fiber from this buffer tube to splice to the splitter or tap input (white) fiber. Generally, this input fiber is placed on the left side of the tray. With a connectorized splitter, connect the output legs of the splitter or drop legs of the tap by plugging these connectors into the back side of the adapter panel inside the closure. With fiber stubbed output legs, the fiber must be spliced to the drop cable fiber.

4.3.1 Using the FSDCBT/BS/2S Versions with Charles Hinged Trays

The FSDCBT can accept either two short (4”x6”) splice trays or one long (4”x9”) splice tray in the top position and one short splice tray in the bottom position.

<table>
<thead>
<tr>
<th>Attach trays to the hinge bracket. If using a long tray (second image), then it must be attached at the top position on the hinge.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Route buffer tube in the basket underneath the trays. Buffer tubes must pass under the hinge bracket to avoid kinking.</td>
</tr>
<tr>
<td>Mark the point where the buffer tube will enter and exit the tray using a permanent marker. Strip the buffer tube sheathing between these two points to expose the fibers. Secure the buffer tube at its entry and exit points using felt and cable ties. Ensure that the cable ties are positioned over the ends of the buffer tube sheathing, not over bare fibers.</td>
</tr>
<tr>
<td>Route fibers inside the tray. Perform splicing operations in the tray.</td>
</tr>
</tbody>
</table>
If using connectorized output fibers, then lift the trays out of the way to access the adapter panel below the fiber basket. Connect the SC/APC adapters to the ports on the backside of the adapter panel. Use a piece of Velcro to secure the fibers together in the fiber basket. This helps avoid kinking as the trays are lifted and lowered.

4.3.2 Using the FSDC4T Version with Four Mini (5”x4”) Trays

<table>
<thead>
<tr>
<th>Step Number</th>
<th>Instruction</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Separate a single buffer tube from the cable bundle to be used in splicing operations.</td>
</tr>
<tr>
<td>2</td>
<td>Route this buffer tube into both sides of the splicing tray. Route buffer tube slack into the slack storage area underneath all the splicing trays.</td>
</tr>
<tr>
<td>3</td>
<td>Mark the points of the buffer tube where it enters each side of the splicing tray. Use a buffer tube slitting tool to remove the marked section of sheathing.</td>
</tr>
<tr>
<td></td>
<td>Description</td>
</tr>
<tr>
<td>---</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>4</td>
<td>Route the loose fibers in the splicing tray.</td>
</tr>
<tr>
<td>5</td>
<td>Perform splicing operations to splice the selected fiber to the splitter fiber (splicing not pictured). Place a cover on the splicing tray. At this point, anchor the buffer tubes using cable ties inside the closure.</td>
</tr>
<tr>
<td>6</td>
<td>Connect the splitter fibers to the feed side (top side) of the adapters found under the splicing trays.</td>
</tr>
</tbody>
</table>
### 4.4 Route Drop Cable into Closure

<table>
<thead>
<tr>
<th>Step Number</th>
<th>Instruction</th>
</tr>
</thead>
</table>
| 1           | Locate the drop cable ports on the front of the closure. The FSDC tool bag includes a drop port nut tool specially fit for removing and tightening the nuts that seal these ports.  
For those drop ports that will be used, remove the nut and set it aside.  
Note: all drop ports have a thin membrane inside that helps to seal from environmental intrusion. If a drop port will not be used in the installation, then DO NOT PIERCE this membrane. |
| 2           | The FSDC includes three sizes of drop port grommets: small (for 3-4 mm cable), medium (for 5-6 mm cable), and large (for flat drop cable).  
The standard unit (FSDC4T16S8L8MV) is configured with eight large grommets in the top row of drop ports and eight medium in the bottom row of drop ports. If other drop grommets are needed, order the grommet retrofit kit.  
If using un-connectorized drop cable, then run the cable through the grommet.  
If using preconnectorized drop cable, then cut a slit through the side of the grommet and insert the cable into the grommet. |
| 3           | Route the drop cable through the drop cable port into the FSDC.  
If using unconnectorized cable, terminate a connector onto the end of the cable.  
Plug the connector into the drop side adapter that corresponds to the appropriate feed fiber connection. |
| 4           | Push the grommet into the drop cable port.  
Reattach the drop cable port nut. Use the tightening tool to tighten the nut just until snug. Overtightening may push the nut past its sealing point and possibly damage the threads on the nut.  
Tip: when installation is complete, use Velcro or some other fastener to secure the nut tightening tool inside the closure for future use. |
4.5 Closing the FSDC

When securing the four hinged latches on the cover, it is important to use care to avoid pinching the skin.

USE CAUTION WHEN CLOSING THE HINGED LATCHES.

1. To close the latch, place a hand on the exterior side of the latch. Ensure that the hand is entirely clear of the interior side (Figure 4).
2. Push the latch toward the center of the FSDC until the latch snaps into place (Figure 5).
3. When all latches are closed, use an Allen wrench to tighten the securing screws in the upper right and left corners of the FSDC. This tightens the latches to ensure a proper seal (Figure 6).

Figure 4  Closing the Hinged Latch

Figure 5  Latch After Closing

Figure 6  Tighten Screws
4.6 Mounting the Closure
The FSDC has bolts on the back for attaching mounting brackets for either aerial strand or pole mounting. The mounting bolts are shown in Figure 7.

4.6.1 Aerial Mounting
The FSDC can be mounted on an aerial strand using the mounting kit 97-FSDCARKT, which includes two tap brackets.

4. Attach the tap brackets using the included mounting bolts on the back of the FSDC (Figure 8).
5. Loosen the screws on the tap brackets so that the clamps can be hung over the strand.
6. Tighten the clamps around the strand to suspend the FSDC (Figure 9). The tap brackets can accommodate strands of 1/4” to 3/8” diameter.

4.6.2 Pole Mounting with Bands
To mount the FSDC on a pole with bands, order the pole mounting kit 97-FSDCPLKTA, which includes two mounting brackets and two mounting bands.

1. Attach the pole mounting brackets using the included mounting bolts on the back of the FSDC (Figure 10).
2. Route the two mounting bands through the brackets and around the pole and tighten (Figure 11).
4.6.3 Pole Mounting with Lag Bolts
To mount the FSDC on a pole with lag bolts, order the pole mounting kit 97-FSDCPLKTB, which includes two mounting brackets.

1. Attach the pole mounting brackets using the included mounting bolts on the back of the FSDC.
2. Position the FSDC where it will be mounted and mark the lag bolt positions on the pole for drilling.
3. Drill holes for lag bolts.
4. Use customer supplied lag bolts and washers to secure the FSDC to the pole.

4.6.4 Wall Mounting
The FSDC can be wall mounted using the pole mounting bracket kits. To mount horizontally, use kit 97-FSDCPLKT (Figure 12). To mount vertically, use kit 97-FSDCPLKTB (Figure 13).

The installer must supply corrosion resistant expansion screws or anchors appropriate for the wall type (e.g., concrete, brick, wood).
5. **TECHNICAL ASSISTANCE AND REPAIR SERVICE**

For questions on product repair or if technical assistance is required, contact Charles Technical Support.

847-806-8500  
techserv@charlesindustries.com (email)  
http://www.charlesindustries.com/techserv.htm

6. **MODEL NUMBER INFORMATION**

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>FSDC4T16SA8L8MV</td>
<td>FSDC Closure with four mini 12-fiber splice trays, 16 SC/APC adapters, 8 large and 8 medium drop port grommets, air valve</td>
</tr>
<tr>
<td>FSDCBT16SA8L8MV</td>
<td>FSDC Closure with bracket for Charles hinged trays, 16 SC/APC adapters, 8 large and 8 medium drop port grommets, air valve</td>
</tr>
<tr>
<td>FSDCBS16SA8L8MV</td>
<td>FSDC Closure with bracket for Charles hinged trays 16 SC/APC adapters, 8 large and 8 medium drop port grommets, air valve, includes one 4” x6” hinged splice</td>
</tr>
<tr>
<td>FSDC2S16SA8L8MV</td>
<td>FSDC Closure with bracket for Charles hinged trays 16 SC/APC adapters, 8 large and 8 medium drop port grommets, air valve, includes two 4” x6” hinged splice</td>
</tr>
</tbody>
</table>

**Optional Equipment**

- 97-FSDCPLKTA: Pole mount kit for pole band mounting includes two brackets and two pole bands
- 97-FSDCPLKTB: Pole mount kit for lag bolts includes extended bottom bracket
- 97-FSDCARKT: Aerial mount kit with 2 tap brackets
- 97-FSDCLGR4: Replacement large size drop grommets (four piece kit)
- 97-FSDCMGR4: Replacement medium size drop grommets (four piece kit)
- 97-FSDC-GR4: Replacement small size drop grommets (four piece kit)
- 97-FSDCSN4: Small gap plastic nut screw (four piece kit)
- 97-FSDCLN4: Large gap plastic nut screw (four piece kit)
- 97-FSDCNTOOL: Replacement plastic nut tightening tool
- 97-FSDCLTRAY: FSDC L 12-fiber splice tray and cover kit
- 97-FIBR24HTRAY: 4” x 9” inch Charles A 24-fiber splice tray kit
- 97-SMHTRAY: 4” x 6” inch Charles S 24-fiber splice tray kit