CORNING

Fiber Optic Splice Closure

2178-L/S Series with Gasket

P/N 78-8130-1910-2
Issue 9

related literature | Search corning.com/opcomm. Click on "Resources/Standard Recommended Procedures."

INSTRUCTIONS FOR:

Fiber Optic Splice Closures 2178-L/S Series

Flame Retardant Fiber Optic Splice Closures 2178-L/S/FR

Cable Addition Kit 2181-L/S

Flame Retardant Cable Addition Kit 2181-L/S/FR

CONTENTS

1.0 GENERAL

1.1 This instruction bulletin details the installation of the Fiber Optic Splice Closures 2178-L/S Series.

1.2 The L closures consist of two series: the 2178-LS Series closure for outside plant applications and the 2178-LS/FR Series closure for inside building applications (See below for application details). The product can be used for butt, inline or branch splicing configurations.

T2178-LS Series		Closure Locations
2178-S	Small fiber optic splice closure	
2178-LS	Large fiber optic splice closure	
2178-LL	Extra large fiber optic splice closure	**Black closures for outdoor applications: underground (manhole, handhole), buried (pedestal), direct buried and aerial.**
2178-SL	Small fiber optic closure with extra storage area	
2181-LS	Cable addition kit	
2178-LS/FR Series		
2178-S/FR	Small flame-retardant fiber optic splice closure	
2178-LS/FR	Large flame-retardant fiber optic splice closure	**Gray closures for indoor flame retardant applications: vault and building ONLY.**
2178-LL/FR	Extra-large flame-retardant fiber optic splice closure	
2181-LS/FR	Flame retardant cable addition kit	

2.0 SPECIFICATIONS FOR 2178-LS CLOSURES SERIES

Maximum cable diameter	1.0" (25 mm)
Minimum cable diameter	0.2" (5 mm)
Closure length	21.9" (55.7 cm)
2178-S closure height	4.7" (11.9 cm)
2178-LS closure height	8.0" (20.3 cm)
2178-LL closure height	11.3" (28.7 cm)
2178-SL closure height	8.0" (20.3 cm)
Available splice chamber space: length	16.4" (41.6 cm)
Available splice chamber space: width	5.5" (14 cm)
2178-S height	1.2" (3 cm)
2178-LS and 2178-LL height	3.7" (9.4 cm)
2181-LS height (1)	1.5" (3.8 cm)
2181-LS height (2)	3.0" (7.6 cm)
2181-LS height (3)	4.5" (11.4 cm)
2181-SL height	1.2" (3 cm)

2.1 Fiber Optic Splice Tray Capacities

2524 Splice Tray 2524-FT Splice Tray	24 Fibrlok® Splices 24 Fusion Splices (3.0 mm x 60 mm Heat Shrink Sleeves)
2523 Splice Tray	24 Fibrlok Splices 12 Fibrlok Multi-Fiber Splices* (12 fibers each) 48 Discrete Fusion Splices (3.0 mm x 60 mm Heat Shrink Sleeves) 12 Mass Fusion Splices (12 fibers each)
2522 Splice Tray	12 Fibrlok Splices 8 Fibrlok Multi-Fiber Splices* (12 fibers each) 24 Discrete Fusion Splices (3.0 mm x 60 mm Heat Shrink Sleeves) 10 Mass Fusion Splices (12 fibers each)
2543 Splice Tray	24 Discrete Fusion Splices (2.4 mm x 60 mm Heat Shrink Sleeves) 24 Discrete Fusion Splices (3.0 mm x 60 mm Heat Shrink Sleeves) 18 Mass Fusion Splices (12 fibers each)
2527-48-DF Splice Tray	48 Discrete Fusion Splices (3.0 mm x 60 mm Heat Shrink Sleeves)
2527 Splice Tray	12 Fibrlok Splices 24 Discrete Fusion Splices (3.0 mm x 60 mm Heat Shrink Sleeves) 12 Mass Fusion Splices (12 fibers each)

*Varies with ribbon size

3.0 FIBER OPTIC SPLICE CLOSURE CONFIGURATIONS AND CAPACITY FOR 2178-L/S SERIES

3.1 Port Configurations.

Closure	Size (L x W x H)	Splice Application	Max Cable Entry Ports	
			Main	**Branch**
2178-S	21.9" x 8.5" x 4.7" (556 x 216 x 119 mm)	Butt or Inline	2 Butt/2 Inline	0 Butt/2 Inline
2178-S with one 2181-LS	21.9" x 8.5" x 6.2" (556 x 216 x 157 mm)		2 Butt/2 Inline	2 Butt/6 Inline
2178-S with two 2181-LS	21.9" x 8.5" x 7.7" (556 x 216 x 196 mm)		2 Butt/2 Inline	4 Butt/10 Inline
2178-S with three 2181-LS	21.9" x 8.5" x 9.2" (556 x 216 x 234 mm)		2 Butt/2 Inline	6 Butt/14 Inline
2178-LS	21.9" x 8.5" x 8.0" (556 x 216 x 203 mm)		2 Butt/2 Inline	0 Butt/2 Inline
2178-LS with one 2181-LS	21.9" x 8.5" x 9.5" (556 x 216 x 241 mm)		2 Butt/2 Inline	2 Butt/6 Inline
2178-LS with two 2181-LS	21.9" x 8.5" x 11.0" (556 x 216 x 279 mm)		2 Butt/2 Inline	4 Butt/10 Inline
2178-LS with three 2181-LS	21.9" x 8.5" x 12.5" (556 x 216 x 318 mm)		2 Butt/4 Inline	6 Butt/14 Inline
2178-LL	21.9" x 8.5" x 11.3" (556 x 216 x 287 mm)		2 Butt/2 Inline	0 Butt/2 Inline
2178-LL with one 2181-LS	21.9" x 8.5" x 12.8" (556 x 216 x 325 mm)		2 Butt/2 Inline	2 Butt/6 Inline
2178-LL with two 2181-LS	21.9" x 8.5" x 14.3" (556 x 216 x 363 mm)		2 Butt/2 Inline	4 Butt/10 Inline
2178-LL with three 2181-LS	21.9" x 8.5" x 15.8" (556 x 216 x 401 mm)		2 Butt/4 Inline	6 Butt/14 Inline
2178-SL	Same as LS		2 Butt/2 Inline	0 Butt/2 Inline

*Note: 2181-LS cable addition kits may be added to increase cable entry ports OR splice capacity.

4.0 KIT CONTENTS

Note: Fiber Optic Splice Closure 2178 L/S-FR Series is gray in color.

4.1 Fiber Optic Splice Closure 2178-S and 2178-S/FR Kit Contents (Figure 1):

4.2 Fiber Optic Splice Closure 2178-LS and 2178-LS/FR Kit Contents (Figure 2):

4.3 Fiber Optic Splice Closure 2178-LL and 2178-LL/FR Kit Contents (Figure 3):

A. Closure assembly includes tray support, gasket, air valve, bolts, and cable strain relief

B. Sealing washer trees.............................6 ea.

C. Plugs...2 ea.

D. Cable ties, blue and green...................4 ea.

E. Sheath scuff..1

F. Hose clamp...3 ea.

G. Linerless Rubber
Splicing Tape..1 roll

H. Silicone grease (5 cc tube)....................2 ea.

I. Small allen wrench.................................1

J. Reclosable Fasteners
(for tray support)....................................4

K. Brass nut and washer...........................2 ea. (varies)

L. Tape collar gauge....................................1

M. Tray strap...1

N. Back cover clip..4 ea.

O. K-connector (large)..................................3 ea.

P. Screw (large)..3 ea.

Q. K-connector (small)................................3 ea.

R. Screw (small)..3 ea.

Transition tube tie-down bracket
(not shown)..1

Figure 1

Figure 2

Figure 3

4.4 Splice Closure 2178-S +81 Kit Contents (Figure 4):

4.5 Splice Closure 2178-LS +81 and 2178-LS/FR +81 Kit Contents (Figure 5):

A. Closure assembly includes tray support, gasket, air valve, bolts, and cable strain relief

B. Sealing washer trees.............................6 ea.

C. Plugs...2 ea.

D. Cable ties, blue and green...................4 ea.

E. Sheath scuff...1

F. Hose clamp..3 ea.

G. Linerless Rubber Splicing Tape............................1 roll

H. Silicone grease (5 cc tube)....................2 ea.

I. Small allen wrench................................1

J. Reclosable Fasteners (for tray support).....................................4

K. Brass nut and washer...........................2 ea. (varies)

L. Tape collar gauge....................................1

M. Tray strap...1

N. Back cover clip...4 ea.

O. K-connector (large)................................3 ea.

P. Screw (large)...3 ea.

Q. K-connector (small)...............................3 ea.

R. Screw (small)..3 ea.

S. Cable Addition Kit 2181........................1

Transition tube tie-down bracket (not shown)..1
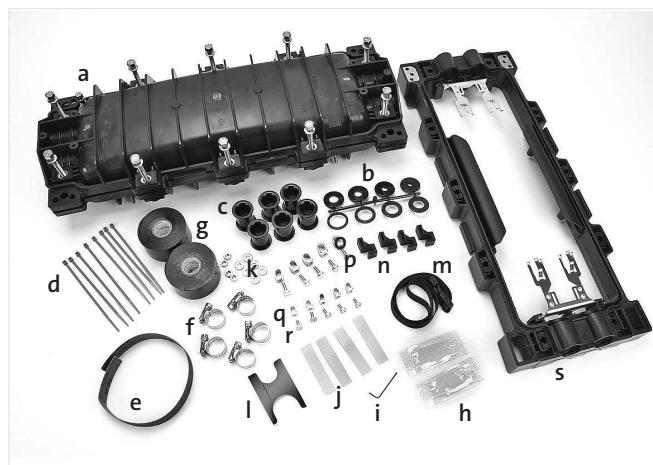
Figure 4

Figure 5

4.6 Cable Addition Kit 2181-LS and 2181-LS/FR Contents (Figure 6):

A. Adapter with gasket..............................1

B. Sealing washer trees............................6 ea.

C. Plugs...4 ea.

D. Cable ties, blue and green...................4 ea.

E. Sheath scuff...1

F. Linerless Rubber Splicing Tape..............................1 roll

G. Silicone grease (5 cc tube)....................2 ea.

H. Small allen wrench................................1

I. Bolts..10 ea

J. Tape collar gauge....................................1

K. K-connector (large)................................2 ea.

L. Screw (large)..2 ea.

M. K-connector (small)...............................2 ea.

N. Screw (small)...2 ea.

O. Buffer tube retention...........................2
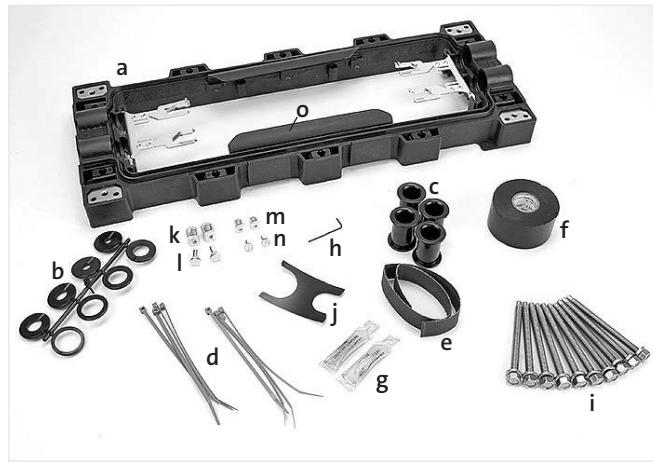
Figure 6

Note: Fiber Optic Splice Closure L/S-FR Series is gray in color.

4.7 Additional Materials Required:

- Cable Cleaner 4415
- #6 AWG ground wire or equivalent
- Splice tray/organizer
- Scotchlok™ Shield Bond Connector
- 4460-D or 4460-D/FO, if using shielded cables
- Cable ties

4.8 Tools Required for Closure Assembly

- 3/8" (10 mm) hex driver
- 1/2" (13 mm) hex driver
- 7/16" (12 mm) hex driver
- Snips
- Torque wrench
- Phillips-head screwdriver

4.9 Tools Required for Cable Preparation

- Tape measure
- Electrician's pliers
- Snips
- Splicer's knife

5.0 CABLE PREPARATION

Note: For clarity, the Fiber Optic Splice Closure 2178-S has been shown. Installation procedures are the same for all combinations of the 2178-L/S series of splice closures.

Note: When removing cable sheathing, do not cut, kink or damage underlying layers. If damage occurs, cut back sheath to adequately inspect and repair.

5.1 Remove 96" (244 cm) of outer cable sheath (and shield or armor, if present). Remove successive sheath layers and wrapping to expose buffer tubes protecting fibers. Stagger layers as recommended by cable manufacturer or per standard practice.

5.2 Remove all cable grease. Clean all buffer tubes and dielectric strands with approved cleaner.

Note: Carefully follow safety, health, and environmental information given on product label or the Safety Data Sheet (SDS).

5.3 Trim off any solid filler tubes and discard.

Note: Strength member may be trimmed back to no less than 3" (76 mm).

5.4 Scuff 5" (127 mm) of each cable sheath end using the supplied sheath scuff.

Note: All cables must be scuffed.

Figure 7

6.0 REMOVE THE TRAY SUPPORT

6.1 Remove the tray support by loosening the captive screws, then sliding the tray forward and lifting straight up from closure base. There is no need to fully remove the screws.

Figure 8

Figure 9
Tray support in Fiber Optic Splice Closure 2178-S & 2178-SL

7.0 CABLE INSTALLATION

7.1 Take the cable and place it into the cable port, aligning the end of the cable sheath with the cable strain relief bracket as shown. The cable sheath should end approximately 1/4" (6 mm) beyond the hose clamp tied-down.

Figure 10
Tray support in Fiber Optic Splice Closure 2178-LS & 2178-LL
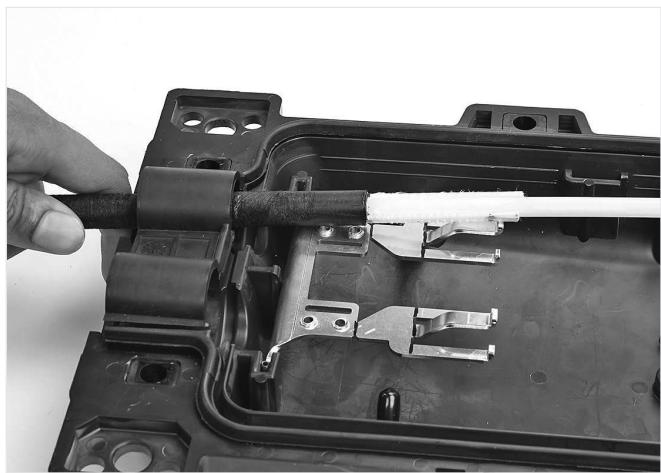
Figure 11

7.2 Mark both the cutoffs on the strain relief bracket and the placement of the washers.

Figure 12

Figure 13

7.3 Cut the strength members.

7.4 Select the sealing washers. Use the smallest inside diameter sealing washer that will fit onto the cable.

← Proper size washer
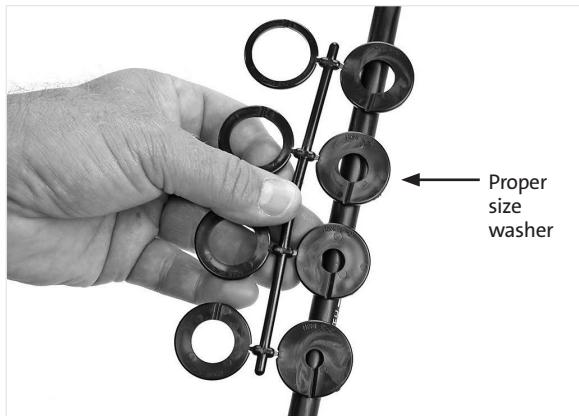
Figure 14

7.5 For midspan, express or loop-through applications, split the washer using snips and place on the cable.

Figure 15

7.6 The set screws which hold the cable tie down brackets are factory installed. One set screw may be removed. Remove the cable strain relief bracket using the allen wrench included in the kit. It is recommended to tape the allen wrench to the inside of the closure for later use.

Figure 16

For Dielectric Cables:

7.7 For cables with no central strength member:
Bend down or break off the center leg and tie town outside strength members as shown.

Slide strength members under retention lugs and tighten bolts to 40 in./lbs. ± 5 in./lbs. (4.6 N•m ± 0.6 N•m).

Install hose clamp around cable and through slot in strain relief bracket. Tighten to 40 in./lbs. ± 5 in./lbs. (4.6 N•m ± 0.6 N•m).

Note: Tighten first then remove prongs

7.8 For cables with central strength member:
Assemble strength member clamp onto strain relief bracket as shown. Mark and cut the central strength member at end of strength member clamp. Bend down or break off outside legs.

Slide central strength member under retention lug and tighten bolt to 40 in./lbs. ± 5 in./lbs. (4.6 N•m ± 0.6 N•m).

Install hose clamp around cable and through slot in strain relief bracket. Tighten to 40 in./ lbs. ± 5 in./lbs. (4.6 N•m ± 0.6 N•m).

Figure 17

Figure 18

Figure 19: Prongs being bent
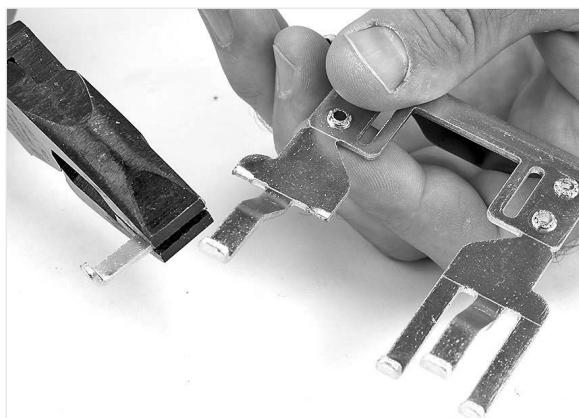
Figure 20: Prongs being broken off

7.9 If securing the strength member is not required, the front half of the sheath retention insert can be removed as shown.

7.10 Reinstall set screws.

Note: SET SCREWS MUST NOT EXTEND ABOVE PLASTIC "U" CHANNEL. INSTALL ONLY UNTIL FLUSH WITH "U" CHANNEL.
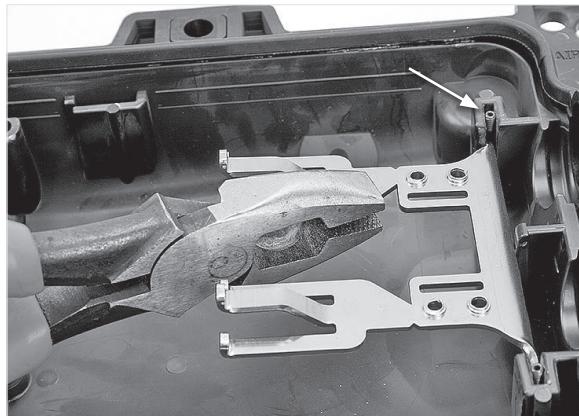

Figure 21
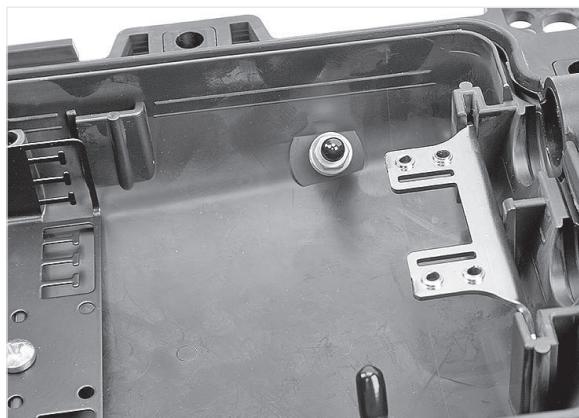
Figure 22

For Armored Cables:

7.11 Install a Scotchlok™ Shield Bond Connector 4460-D under cable shield per company practice. Install ground braid per company practice.

Note: Refer to vendor instructions for shield bond connector installation.

7.12 Install one green cable tie on the "Feeder Cable" and trim. Install one blue cable tie on each "Distribution Cable" and trim.
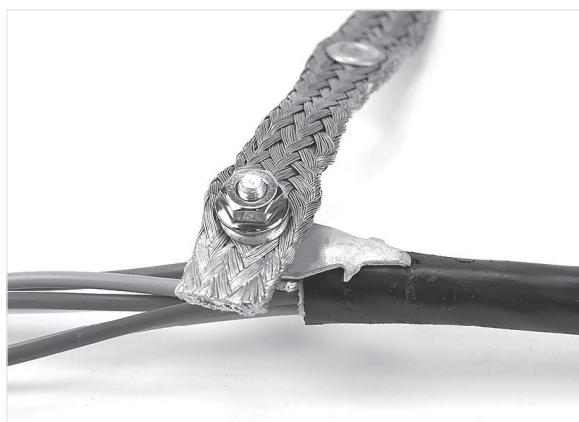
Figure 23

8.0 CABLE/PORT SEAL ASSEMBLY

Note: For installation into Multiport Grommet, use the instructions provided in grommet kit.

8.1 The rubber gasket is factory installed in all Fiber Optic Splice Closures 2178-L/S Series.

If the gasket becomes damaged, replace using the Gasket Kit 2178-LS/GSKT.

Figure 24

8.2 Use the Linerless Rubber Splicing Tape included with the closure to build the cable seals. Check the placement of the tape by positioning the strength member clamp where it will be anchored.

Figure 25

8.3 Wrap the tape around the cable, ensuring that the edges stay even and flush with the sealing washers.

Figure 26

8.4 The tape should be wrapped to 1.00" (25 mm) outside diameter. Use the tape collar gauge to determine tape wrap. Tape wrap should not be smaller than the left side of the gauge and not larger than the right side of the gauge.

TAPE COLLAR GAUGE

NO SMALLER THAN   NO LARGER THAN
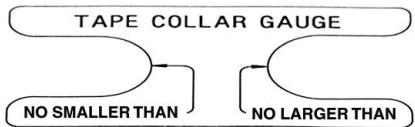
Figure 27

8.5 Apply a thin layer of the supplied silicone grease to the bottom side of the gasket in the port area.

Figure 28

8.6 Apply silicone grease to the outside of the port area on the gasket, the area between the ports, and to the top of the gasket along the sides of the closure.

Note: Carefully follow safety, health, and environmental information given on product label or the Safety Data Sheet (SDS).

Figure 29

8.7 Apply silicone grease to the split or cut edge of the gasket.

Note: Reinstall bracket with assembled cables using set screws.

Note: SET SCREWS MUST NOT EXTEND ABOVE PLASTIC "U" CHANNEL. INSTALL ONLY UNTIL FLUSH WITH "U" CHANNEL.

Note: Carefully follow safety, health, and environmental information given on product label or the Safety Data Sheet (SDS).

8.8 Apply the silicone grease to the tape collar between the washers and to the outside of the sealing plugs, if any.

Plugs should be placed inside gasket at the unused entry ports.

Note: The grease allows the cables and gasket to slide into place and helps seal the cable port area.

Note: Carefully follow safety, health, and environmental information given on product label or the Safety Data Sheet (SDS).

8.9 Place cables inside the port area on the gasket. Ensure that the rubber tape seals are inside the gasket ports.

The two washers should be placed in the port grooves on the closure with one washer on each side of the gasket.

Note: Be sure that both washers are perpendicular (90°) to cable.

8.10 Apply a thin coat of the grease to the top of the gasket around the entire closure perimeter.

8.11 Install back cover clips with cable ties (not provided) until snug.

Figure 30

Figure 31

Figure 32

9.0 BUFFER TUBE/FIBER MANAGEMENT

9.1 Gather all buffer tubes from "Feeder Cable" and install one green cable tie. Install one blue cable tie on the "Distribution Cable" buffer tubes. Install two blue cable ties on "Branch Cable" buffer tubes.

9.2 Coil buffer tube bundles inside closure base per company standard.

9.3 For ribbon transition to tray applications, secure the transition tube to the bracket mounted in the base as shown.

Figure 33

9.4 Install tray support into slots on the closure base, slide into place, and tighten screws until snug.

9.5 Install splice trays and splices per company standard and installation instructions.

Figure 34

9.6 When the tray support and tray are in place, mount the other end of the transition tube to the tray. Ensure buffers or transition tubes keep the largest possibe bend radius when routed in the closure.

Note: Fiber Optic Splice Tray 2543 shown for illustration purposes. Refer to individual tray instructions for more information.

Figure 35

10.0 SPLICE CLOSURE ASSEMBLY

10.1 Before placing the closure cover on either the closure base or the Cable Addition Kit 2181-LS or 2181-LS/FR (top adapter), ensure that the air valve matches up with **"AIR VALVE END"** note on the base or top adapter.

10.2 Screw all bolts until they have been threaded several complete turns into threaded inserts.

Note: If the Universal Aerial Hanger Bracket 2183 or 2197 is to be used, follow its practice prior to splice closure assembly.

10.3 Hand-tighten ten bolts in sequence shown.

Note: See numbers on splice closure.

Final tightening should be done with a torque wrench in sequence to 240 in/lbs. (27.12 N•m) torque. **Closure leakage may occur if procedure is not followed.**

10.4 To check for leaks, flash test the splice closure by applying air to 5 psi (0.34 bar) **MAXIMUM, THEN RELEASE PRESSURE.**

Note: Use only clean, dry air or nitrogen from your company-approved source.

Note: Use only E-pressure testing solution or diluted dish washing soap for flash testing.
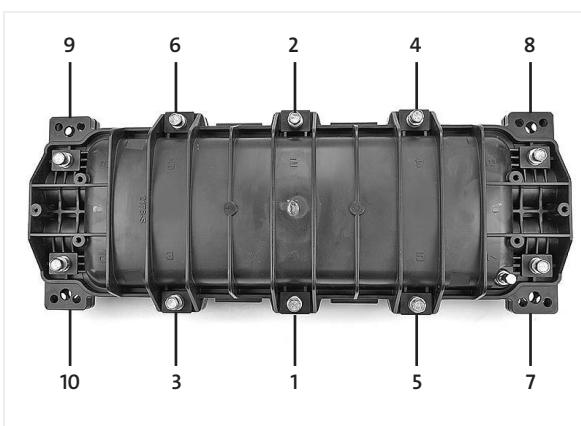
FIBER OPTIC SPLICE CLOSURE 2178-L/S SERIES NOTES

Note: Information on accessories available for the 2178-L/S and FR Series closures can be found in the back of this instruction document.

Note: If wall mount bracket is required for the Fiber Optic Splice Closure 2178-S, 2178-S/FR, 2178-LS or 2178-LS/FR use the Mounting Bracket Kit 2198. Attach brackets to base (as shown) prior to cable preparation.

Tighten bracket screws securely.

Figure 36

Figure 37

Figure 38

Note: If wall mount bracket is required for the Fiber Optic Splice Closure 2178-LL, 2178-LL/FR, 2178-S, 2178-S/FR, 2178-LS or 2178-LS/FR, use the Mounting Bracket Kit 2199. Attach brackets to base (as shown) prior to cable preparation.


Figure 39

Tighten bracket screws securely.

Figure 40

Note: Proper sealing of the Fiber Optic Splice Closure 2178-L/S and 2178-L/S-FR Series depends on strict adherence to these instructions and the use of specified materials. Deviations can cause leakage or closure damage. Maintain clean sealing surfaces to ensure proper sealing.

11.0 SPLICE CLOSURE REENTRY

11.1 Remove the ten bolts holding the splice closure halves together. The cover can easily be separated from the base by hand.

11.2 When resealing the closure, reapply silicone grease to the gasket.

11.3 Follow steps 10.3–10.4 to reseal closure.

12.0 CABLE ADDITION KIT 2181-LS AND 2181-LS/FR INSTALLATION

12.1 Installation procedures for the 2181-LS cable additon kit are the same as the 2178-L/S series splice closures with the following exceptions:

For **SINGLE** cable additon kit installation, replace all ten bolts inserted in the closure cover with the ten bolts supplied with the 2181-LS or 2181-LS/FR cable addition kit.

For **DOUBLE** cable additon kit installation, replace all ten bolts inserted in the closure cover with the ten longer bolts supplied with the **Double Adapter Bolt Kit 2181-B**.

For **TRIPLE** cable additon kit installation, replace all ten bolts inserted in the closure cover with the ten longer bolts supplied with the **Triple Adapter Bolt Kit 2181-C**.

Note: The 2181-B and the 2181-C kits contain only the longer bolts. These are needed for two and three cable addition kits repectively.

12.2 The tray support can be installed in the closure base or any of the cable addition kits. Install the tray support onto the desired level by placing it into the slots on closure base or adapter, and tightening the screws until snug.

12.3 The following steps are for all adapters installed:

A. To prevent buffer tubes and fibers from being damaged or pinched between adapters and the closure, the adapters must be pulled down into place before the closure cover is installed.

Figure 41

B. Add buffer tube retention into each adapter being installed.

C. For double and triple applications, remove all corner inserts on the lower level adapter(s). A screwdriver can be used to take out the corner inserts.

Figure 42

D. The threaded inserts should be in the four corners on the top portion of the top adapter only.

E. Prior to placing an adapter on the closure base, ensure that the note **"AIR VALVE END"** on the adapter is aligned with the **"AIR VALVE END"** note on the gaskets and the closure base.

F. If placing one adapter on another adapter, make certain the note **"AIR VALVE END"** lines up for all adapters, gasket and the closure base.

G. Set adapter, with the word **"BOTTOM"** facing down, on top of the closure.

Figure 43

Note: It is important to orient the gaskets correctly on each level of the assembly (see Section 6.2 and 6.3).

H. Continue assembly for each level, following the instructions from Section 4.0 to 8.0.

I. After cables have been installed on the lower levels and top adapter is in place, insert the bolts from underneath into the four corner inserts. Screw the four bolts until they have been threaded several complete turns into the corner inserts.
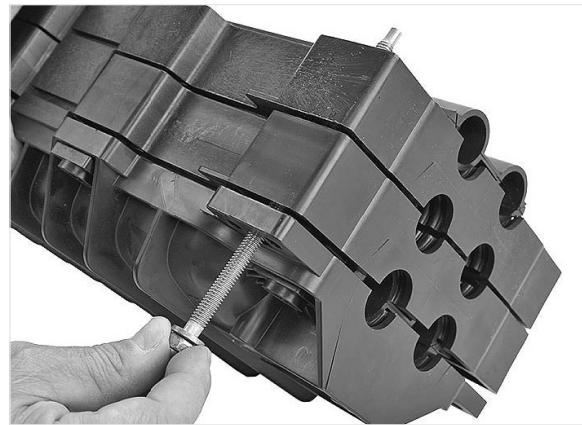
Figure 44

J. Slowly bring adapters down by working from corner to corner (as shown) until snug. Ensure no buffer tubes have been pinched between the adapters and the closure base.
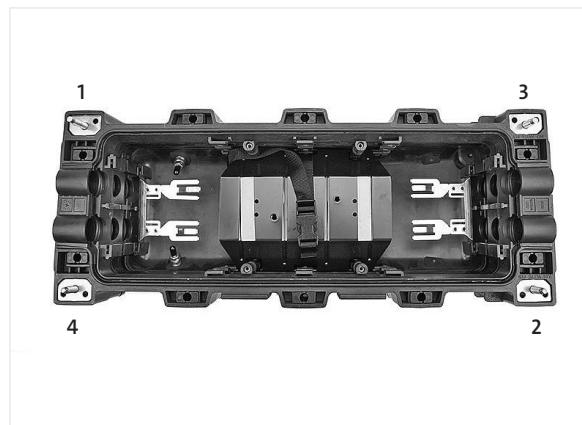

Figure 45

12.4 After assembly is complete, follow the instructions in 9.0 except only tighten bolts 1 to 6 in the sequence shown. After cover has been installed with six bolts, remove the four corner bolts. Use these four bolts for the remaining cover bolts, using the sequence shown. Final tightening should be done with a hand wrench to 240 in.-lbs. (27.12 N.m) torque. **Torque -FR Closures to 50 in.-lbs. (5.6 N.m). Closure leakage may occur if procedure is not followed.**

To check for leaks, flash test splice closure by applying air to 5 psi (0.34 bar) **MAXIMUM,** <u>**THEN RELEASE PRESSURE.**</u>

Note: Use only clean, dry air or nitrogen from your company-approved source.

*Note: Use only E-pressure testing solution or diluted dish washing soap for flash testing.*
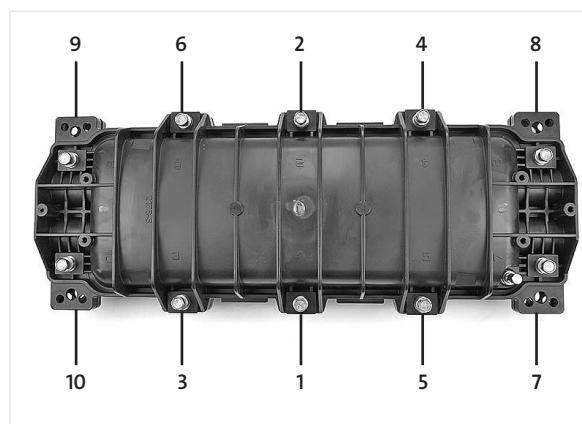
Figure 46

13.0 FIBER OPTIC SPLICE CLOSURE RE-ENTRY WITH ADAPTERS

13.1 Remove bolts 7, 8, 9 and 10. Install these four bolts from underneath into the four corner inserts. Tighten until snug. Remove remaining bolts. The cover can then be easily removed by hand. This procedure will keep the adapters in place while the cover is removed.

14.0 CLOSURE ACCESSORIES

Ground Isolation Kit 2178-EGI-External

Wall Mount Bracket 2199
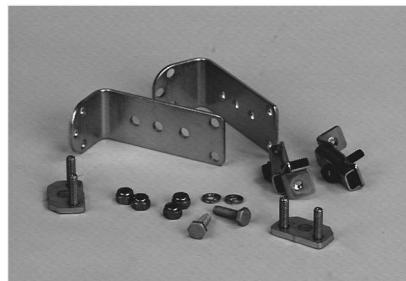
Aerial Hanger Kit 2183
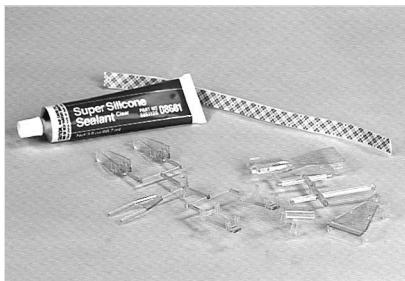
Cable Fanout Kit 2519 and 2519-X

Mounting Bracket Kit 2198

Aerial Hanger/Hinge Kit 2197
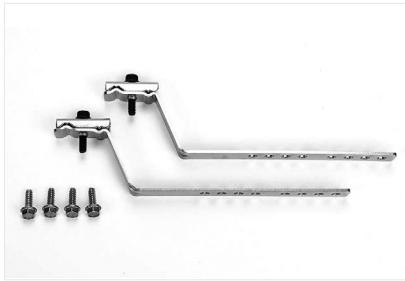
Adjustable Aerial Hanger Bracket Kit 2184

Multiport Grommet 1.0" O.D. 4-port flat drop

Gasket Kit 2178-LS/GSKT

Cable Cleaner 4415

Fiber Optic Splice Tray 2543

Scotchlok™ Shield Bond Connector 4460-D

Multiport Grommet 1.0" O.D. 2178-4PGR-0.28" dia. 4-port round drop