

SUMITOMO RECOMMENDED PROCEDURE

SRP SP-F04-037

**INSTALLATION PROCEDURES FOR
STRAIN RELIEF KELLEMS GRIPS**

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1.0 General

1.1 This procedure describes the standard techniques for installing Strain Relief Kellems® Grips to FutureFLEX Air-Blown Fiber (ABF) tube cables in indoor applications only.

1.2 Strain Relief Kellems Grips provide an effective means of securing tube cable ends to indoor TDU entry points. They are not to be used where the TDU is subject to moisture from hosing, splashing, or flooding. Therefore, their use is restricted to indoor applications only.

1.2.1 The wire mesh of the Grip provides tube cable strain relief and prevents kinking of the cable at its entry point.

1.2.2 The wire mesh of the Strain Relief Kellems Grip also aids in protecting the tube cable if the TDU is located in an area susceptible to damage.

Note: *Liquid-Tight Kellems Grips are the recommended fittings to seal and secure ABF tube cables to Tube Distribution Units (TDUs) subject to hosing, splashing, or flooding conditions and where positive anchoring of the tube cable ends is required. Refer to Sumitomo Recommended Procedure, Installation Procedures for Liquid-Tight Kellems® Grips, SRP SP-F04-024.*

2.0 Safety Precautions

2.1 The use of safety equipment (safety glasses, safety shoes, cut-resistant Kevlar gloves) is recommended during this installation procedure.

3.0 Reference Documents

3.1 Sumitomo Recommended Procedure, *FutureFLEX Tube Cable Installation Procedures*, SRP SP-F04-008.

3.2 Sumitomo Recommended Procedure, *FutureFLEX Grounding & Bonding Metallic Tube Cable Procedures*, SRP SP-F04-030.

4.0 Equipment / Tools Required

The following equipment, tools, and materials, are required to complete this procedure:

4.1 **See TABLE 1** for Strain Relief Kellems Grip Part Numbers. Recommended Knockout Hole Sizes are also provided.

4.2 Tube Cable Cutter (BETL03)

4.3 Utility Knife with Hook Blade

4.4 10-inch (or larger) Adjustable Wrenches

4.5 Hammer

4.6 Hole Punch Set for Knockout Holes

4.7 Felt Tip Pen / Marker

4.8 Tape Measure

5.0 Equipment Layout

5.1 **See Fig. 1** for a typical Strain Relief Kellems Grip layout.

6.0 Preparing TDU Enclosure

6.1 **Refer to TABLE 1** and identify Recommended Knockout Hole size based on the Strain Relief Grip to be used.

TABLE 1
Strain Relief Kellems Grips

If Installing Indoor Tube Cable P/N		Use Strain Relief Grip P/N	Recommended Knockout Hole Size (inches)
TC02TP2	TC02TRC	DEDTSR1	1.719 – 1.766
TC04TP2	TC04TRC	DEDTSR1	1.719 – 1.766
TC07TP2	TC07TRC	DEDTSR1	1.719 – 1.766
TC12TP2	TC12TRC	DEDTSR2	1.969 – 2.016
TC19TP2	TC19TRC	DEDTSR4	2.953 – 3.000
	TC24TRC	DEDTSR6	3.000 – 3.045
TC02TP2-1	TC02TRC-1	DEDTSR1	1.719 – 1.766
TC04TP2-1	TC04TRC-1	DEDTSR1	1.719 – 1.766
TC07TP2-1	TC07TRC-1	DEDTSR2	1.969 – 2.016
TC12TP2-1	TC12TRC-1	DEDTSR4	2.953 – 3.000
TC19TP2-1	TC19TRC-1	DEDTSR5	2.953 – 3.000
If Installing Outdoor Tube Cable P/N		Use Strain Relief Grip P/N	Recommended Knockout Hole Size (inches)
TC02TOX TC02MTIO	TC02MSOS	DEDTSR1	1.719 – 1.766
TC04TOD TC04MTIO	TC04MSOS	DEDTSR1	1.719 – 1.766
TC07TOX TC07MTIO	TC07MSOS	DEDTSR1	1.719 – 1.766
TC12TOX	TC12MSOS	DEDTSR	2.953 – 3.000
TC19TOX TC19MTIO	TC19MSOS	DEDTSR4	2.953 – 3.000
TC24TOX		DEDTSR6	3.000 – 3.045
TC02TOX-2	TC02MSOS-2	DEDTSR1	1.719 – 1.766
TC04TOD-2	TC04MSOS-2	DEDTSR2	1.969 – 2.016
TC07TOX-2	TC07MSOS-2	DEDTSR3	2.453 – 2.500
TC12TOX-2		DEDTSR4	2.453 – 2.500
TC19TOX-2	TC19MSOS-2	DEDTSR5	2.953 – 3.000

Notes:

- Based on installation application, if Armored tube cables (Dash -1 or Dash -2) are to enter an enclosure from the top or sides, select the Strain Relief Grip P/N based on the Dash -1 or Dash -2 P/Ns given above.
- Based on installation application, if Armored tube cables are to enter an enclosure from the bottom, the Strain Relief Grip is to be installed on the inner core cable and the outer armoring is to be secured separately with standard clamps or other suitable fasteners. Select the Strain Relief Grip P/N based on the core cable P/N. See Para. 8.0 for the special procedures required for installing Strain Relief Kellems Grips on Armored (Dash -1 and Dash -2) Tube Cables installed in a vertical orientation.

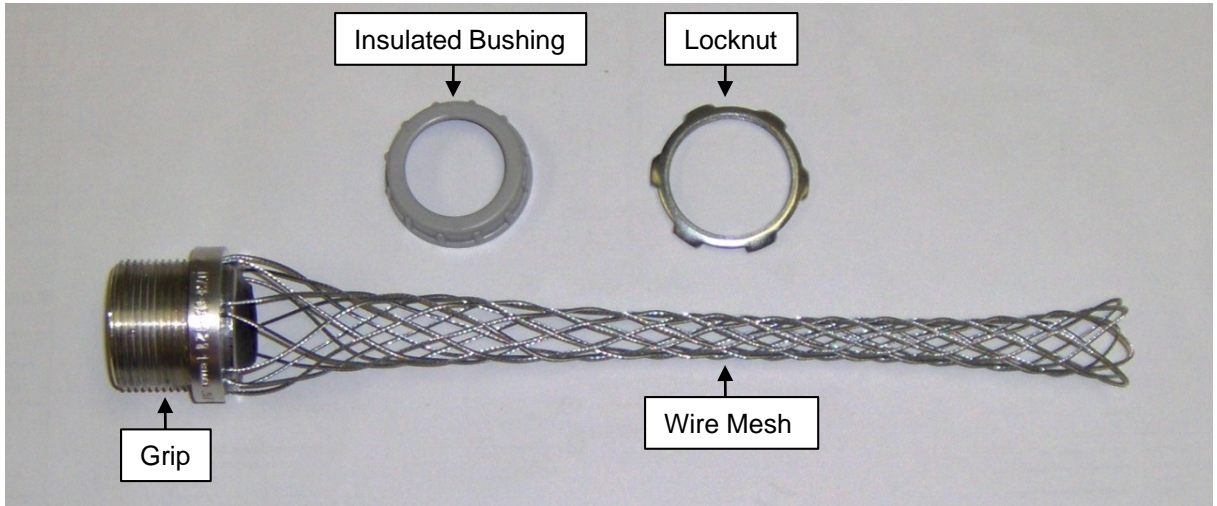


Figure 1
Strain Relief Kellems Grip Layout

6.2 Prepare TDU enclosure by selecting and marking tube cable entry point locations. To best optimize TDU capacity, it is recommended to stagger tube cable entry locations if possible. **See Fig. 2a and Fig. 2b.**

6.3 Use appropriate size hole punch and create opening in TDU.

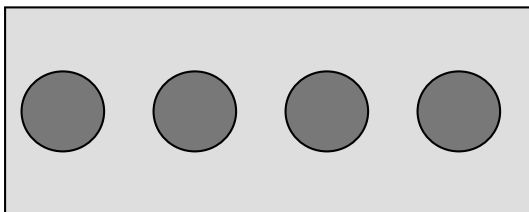


Figure 2a
In-line Tube Cable Entry Locations
Acceptable but Fails to Optimize
TDU Capacity

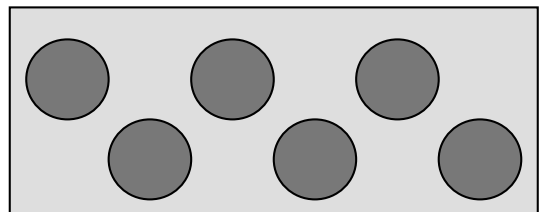


Figure 2b
Staggered Tube Cable Entry Locations
Preferred Method to Optimize
TDU Capacity

7.0 Installing Strain Relief Kellems Grip

7.1 After the appropriate size knockout hole is cut into the TDU enclosure, compress wire mesh and slide Grip onto end of tube cable.

7.2 Insert tube cable and threaded end of Grip into entry hole.

7.3 Slide Locknut over tube cable end and thread onto Grip. Only hand-tighten at this time.

7.4 Compress wire mesh and adjust tube cable length inside TDU as required.

7.5 When tube cable length is adjusted, mark tube cable jacket in preparation for stripping.

7.5.1 Make first mark about 1" beyond threaded end of Grip body. **See Fig. 3.**

7.5.2 Second mark must be determined on-site. Measure distance required to route individual tubes from the 1" mark to the farthest tube connection point inside TDU and make second mark.

7.6 Remove Locknut, Grip, and tube cable from TDU. Compress wire mesh and remove Grip from tube cable.

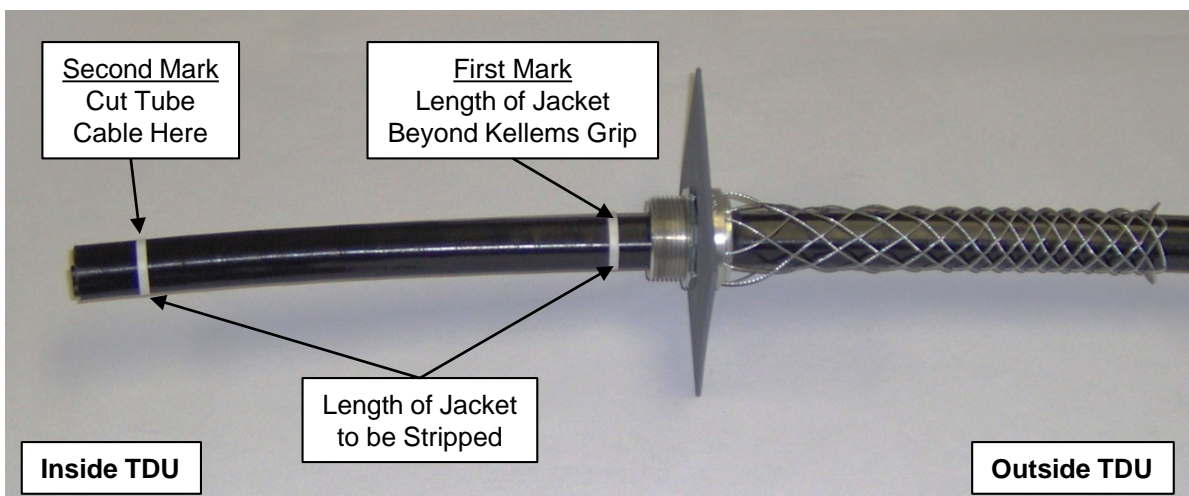


Figure 3
Measuring and Marking Tube Cable

7.7 Use Tube Cable Cutter (BETL03) to cut tube cable at second mark.

7.8 Use Hook Blade Knife to lightly score tube cable jacket at 1" mark. Pull ripcord and strip jacket away to expose individual tubes.

7.9 Compress wire mesh and slide Grip over ends of tubes / tube cable. Adjust tube cable position until there is about 1" of tube cable jacket exposed beyond threaded end of Grip.

7.10 Insert tubes / tube cable and threaded end of Grip into entry hole. Make final adjustments to tube cable length inside TDU as required.

7.11 Slide Locknut over end of tubes / tube cable and thread onto Grip. Wrench-tighten Locknut at this time.

7.12 Slide plastic Insulated Bushing over end of tubes / tube cable, thread onto Grip, and firmly hand-tighten only. **See Fig. 4.**

7.13 Remove any slack from installed wire mesh by smoothing it tight to tube cable to complete the Strain Relief Kellems Grip installation.

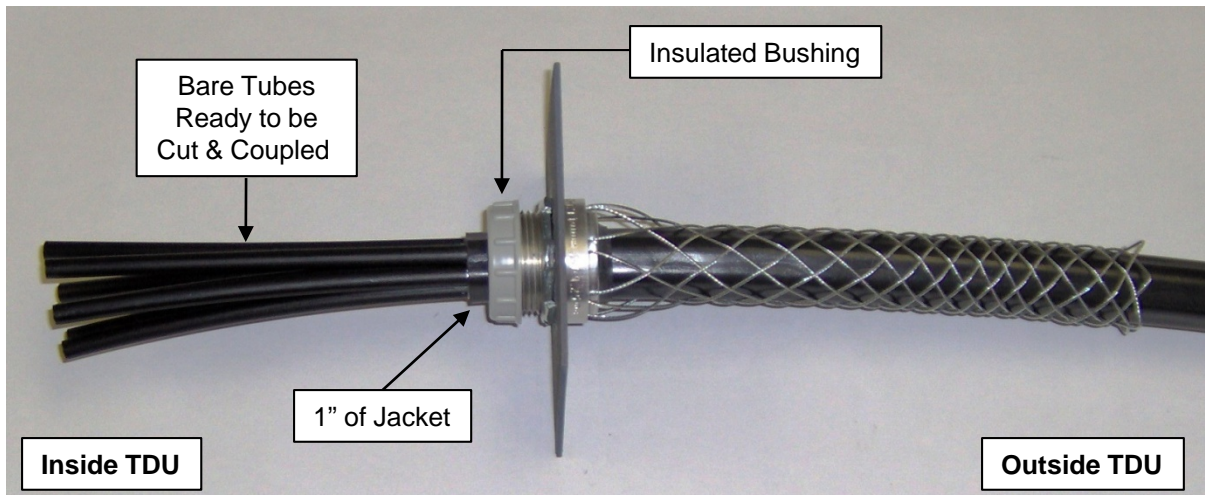


Figure 4
Strain Relief Kellems Grip Installed and Tube Cable Ready for Coupling

8.0 Special Procedure for Armored (Dash -1 and Dash -2) Tube Cables

8.1 The following procedures describe the special techniques required to install Strain Relief Kellems® Grips on Armored (Dash -1 and Dash -2) tube cables if they enter an enclosure from the bottom. The Grips are to be installed on the inner core cable and the outer armoring is to be secured separately with standard clamps or other suitable fasteners.

8.2 Armored tube cables employ a spiral-wrapped Interlocked Galvanized Steel wrap surrounding a core cable to provide an extremely rugged, high crush resistance tube cable design and is available in two (2) configurations.

8.2.1 Dash -1 tube cable Part Numbers identify a tube cable with a ruggedized Interlocked Galvanized Steel wrap without a Polyethylene (PE) outer jacket. The Dash -1 designs are typically used in indoor applications with General Purpose-, Riser-, or Plenum-rated tube cables. **See Fig. 5.**



Figure 5
A Dash -1 Plenum-Rated Tube Cable
(TC07TP2-1 Shown)

8.2.2 Dash -2 tube cable Part Numbers identify a tube cable with a ruggedized Interlocked Galvanized Steel wrap with a Polyethylene (PE) outer jacket. The Dash -2 designs are typically used in outdoor applications with all Dielectric and Metallic tube cable designs. **See Fig. 6.**



Figure 6
A Dash -2 Outdoor Tube Cable
(TC07TOX-2 Shown)

8.3 In both configurations (Dash -1 and Dash -2), the ID of the spiral-wrapped Interlocked Galvanized Steel is slightly larger than the OD of the core tube cable. This results in a somewhat “loose fit” between the armor and core cable and allows the core cable to move if, for example, subjected to thermal expansions / contractions.

8.4 The special technique for securing Dash -1 and Dash-2 armored tube cables to indoor TDUs with Strain Relief Kellems® Grips is that: 1) the Strain Relief Grip is installed on the inner core cable and 2) the outer armoring is secured separately with standard clamps or other suitable fasteners.

8.5 Prepare the tube cable for installation by first removing / unraveling the Interlock Galvanized Steel wrapping back to about 2”-3” longer than the wire basket of the selected Strain Relief Grip. Bend the steel wrap back and forth until it breaks and remove it from around the core cable. These steps expose a length of core cable beyond the armor. **See Fig. 7.**

8.6 Install the Strain Relief Grip onto the core cable and complete the installation as previously described.

8.7 Secure the outer armoring of the tube cable with any suitable clamp or similar fastening hardware.

8.8 Ground & Bond the metallic elements of the armored tube cable. Refer to Sumitomo Recommended Procedure *FutureFLEX Grounding & Bonding Metallic Tube Cable Procedures*, SRP SP-F04-030.

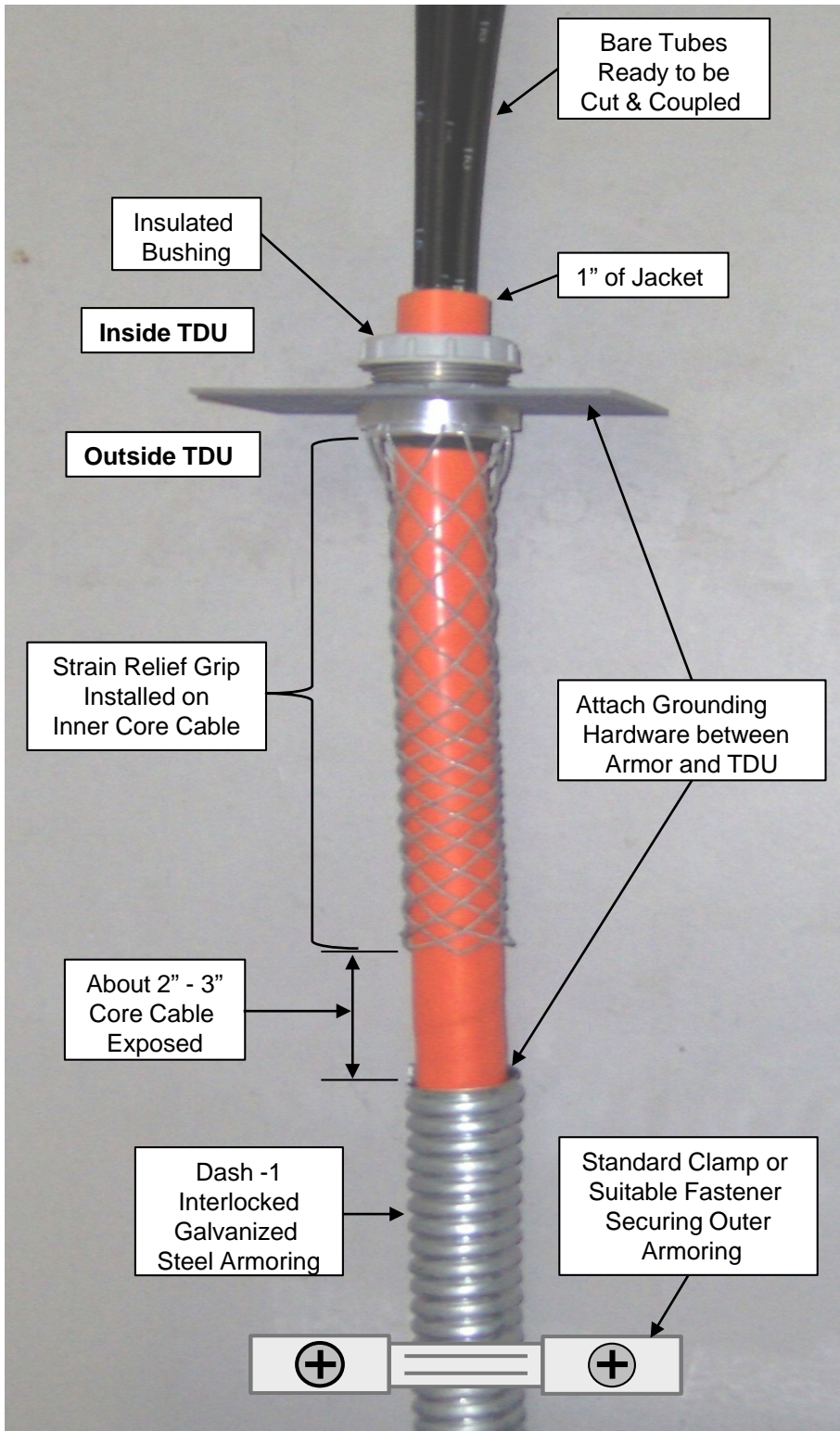


Figure 7
Strain Relief Grip Securing Armored Tube Cables
(Armored Riser Tube Cable Shown)