VITALink® 2-Hour Fire Resistive Circuit Integrity Cable with Hose Stream

INSTALLATION GUIDE
For 18, 16, 14 & 12 AWG
2-Hour Rated Fire Resistive Applications

UL 105°C Listed Type FPLR-CI-LS, CMR-CI-LS, CL3R-CI-LS or FPLR-LS, CMR-LS, CL3R-LS
CSA FAS105
For use in Electrical Circuit Integrity System FHIT.40A & FHIT7.40A
R27557, (72v)

Installation Guide Dated December 2018
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SCOPE

VITALink® 2-Hour Fire Resistive Circuit Integrity Cable is a unique cable which offers superior fire endurance capabilities along with the well-established benefits & features associated with NEC Type FPLR-CI-LS, CMR-CI-LS, CL3R-CI-LS and CEC CSA Type FAS105 cable designs. This cable is specifically designed to meet the circuit integrity requirements in NFPA 72 National Fire Alarm and Signaling Code, CSA C22.2 No. 208-14 Fire Alarm and Signal Cable as well as other low voltage critical circuits in NFPA 70 National Electrical Code.

INTRODUCTION

The following instructions are for the VITALink® 2-Hour Fire Resistive Circuit Integrity Cables for UL 2196 and ULC-S139 Electrical Circuit Integrity System No. FHIT.40A & FHIT7.40A, with Hose Stream Test. The National Electrical Code, Canadian Electrical Code, and all applicable rules and regulations, including federal, state, or provincial, local, and, municipal or territorial laws should be followed.

ELECTRICAL CIRCUIT INTEGRITY SYSTEM FHIT.40A and FHIT7.40A

Electrical Circuit Integrity Systems consist of components and materials that are intended to provide protection for specific fire alarm and control wiring systems with respect to the circuit integrity upon exterior fire exposure. The specifications for Electrical Circuit Integrity System No. FHIT.40A and FHIT7.40A and its assembly are all important details in the development of the ratings.

Ratings apply only to the entire integrity system assembly, constructed using the combination of components specified in the system. Individual components and materials are designated for use in a specific system(s) for which corresponding ratings have been developed, and are not intended to be interchanged between systems. Ratings are not assigned to individual system components or materials.

The Electrical Circuit Integrity System No. FHIT.40A and FHIT7.40A must be fastened to a concrete or masonry wall or a concrete floor-ceiling assembly. The fire rating of wall or floor-ceiling assembly must be equal to or greater than the rating of the electrical circuit integrity system. This is to ensure that the complete electrical circuit integrity system will survive during the fire and hose stream exposure.

The Electrical Circuit Integrity System No. FHIT.40A and FHIT7.40A is evaluated by the fire exposure and water hose stream test as described in the Standards ANSI/UL 2196 and CAN/ULC-S139. The system contains the construction details of the tested configuration. The conductor size, cable type, and voltage rating, etc. are construction details that are also provided. Cables are listed to NEC and CEC Types and constructed to:

- UL - Type FPLR-CI-LS, FPLR-LS to UL 1424, CL3R-CI-LS, CL3R-LS to UL 13, and CMR-CI-LS, CMR-LS to UL 444/CSA 22.2 No. 214
- CSA – FAS105 to C22.2 No. 208
The Electrical Circuit Integrity System No. FHIT.40A and FHIT7.40A is tested as a complete system and includes the type of raceway, raceway support, couplings, pulling lubricants, and cable or raceway supports needed to hold the cable in place during the fire and hose stream. The hardware, clamps, struts, etc., unless otherwise noted, are to be made of steel so that these components do not melt in fire.

Systems that require a raceway are to be evaluated for use with the type and size of raceway and couplings with the maximum numbers of cables per diameter raceway trade size. Only the type of raceway and number of cables installed in the raceway per the UL/ULC Certification shall be acceptable.

The raceway must be connected together using the coupling type listed in the system, such as steel compression or set screw. No other coupling shall be used unless noted in the specific system.

The supports are an important part of The Electrical Circuit Integrity System No. FHIT.40A and FHIT7.40A, with Hose Stream Test. The maximum distance between the supports is listed in the system and should not be exceeded. The type of support and the distance between the steel supports is unique to that specific system and is for all sizes/types of cable unless otherwise noted in a specific system.

VITALink® Cable was tested in both horizontal with offsets configurations and vertical configurations and the support mechanisms are detailed in the system.

Compatibility of support materials used in Electrical Circuit Integrity System No. FHIT.40A and FHIT7.40A is also a concern. Bare copper should not be in contact with hot dip galvanized cable tray or supports.

These systems shall be installed in accordance with all provisions of the National Electric Code and/or the Canadian Electric Code, as applicable to location, and as amended by the details of each individual system (such as type of supports and distance between supports).

NOTE: Authorities having jurisdiction (AHJ) should be consulted in all cases as to the specific requirements covering the installation and use of these classified systems.
The following instructions are for the VITALink® 2-Hour Electrical Circuit Integrity System No. FHIT.40A and FHIT7.40A. These requirements must be followed to maintain the 2-Hour rating in a fire rated area. It is assumed that the cable has been properly sized and the installation properly designed. Comtran Engineering support should be contacted for questions not addressed in the instructions.

DESIGN/SYSTEM/CONSTRUCTION/ASSEMBLY USAGE DISCLAIMER

- Authorities Having Jurisdiction (AHJ) should be consulted prior to construction and in all cases as to the particular requirements covering the installation and use of UL certified products, equipment, system, devices, and materials.
- Fire resistance assemblies and products are developed by the design submitter and have been investigated by UL for compliance with applicable requirements. The published information cannot always address every construction nuance encountered in the field.
- When field issues arise, it is recommended the first contact for assistance be the technical service staff provided by the product manufacturer noted for the design. Users of fire resistance assemblies are advised to consult the general Guide Information for each product category and each group of assemblies.
- Only products which bear UL/CSA Marks are considered certified.

The following cables are approved for use in Electrical Circuit Integrity System No. FHIT.40A and FHIT7.40A.

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>36397</td>
<td>2C18 SBC Shld FPLR-CI-ST/CMR-CI-LS/CL3R-CI-LS/CSA/FAS105/FT4/ST1</td>
</tr>
<tr>
<td>35785</td>
<td>2C16 SBC Shld FPLR-CI-LS/CMR-CI-LS/CL3R-CI-LS/CSA/FAS105/FT4/ST1</td>
</tr>
<tr>
<td>36316</td>
<td>2C14 SBC Shld FPLR-CI-LS/CMR-CI-LS/CL3R-CI-LS/CSA/FAS105/FT4/ST1</td>
</tr>
<tr>
<td>36337</td>
<td>2C18 SBC FPLR-CI-LS/CMR-CI-LS/CL3R-CI-LS/CSA/FAS105</td>
</tr>
<tr>
<td>35777</td>
<td>2C16 SBC FPLR-CI-LS/CMR-CI-LS/CL3R-CI-LS/CSA/FAS105</td>
</tr>
<tr>
<td>36341</td>
<td>2C16 (7/24) BC FPLR-CI-LS/CMR-CI-LS/CL3R-CI-LS/CSA/FAS105</td>
</tr>
<tr>
<td>36338</td>
<td>2C14 SBC FPLR-CI-LS/CMR-CI-LS/CL3R-CI-LS/CSA/FAS105</td>
</tr>
<tr>
<td>36340</td>
<td>2C14 (7/0242) BC FPLR-CI-LS/CMR-CI-LS/CL3R-CI-LS/CSA/FAS105</td>
</tr>
<tr>
<td>36342</td>
<td>2C12 SBC FPLR-CI-LS/CMR-CI-LS/CL3R-CI-LS/CSA/FAS105</td>
</tr>
<tr>
<td>36339</td>
<td>2C12 (197.0185) BC FPLR-CI-LS/CMR-CI-LS/CL3R-CI-LS/CSA/FAS105</td>
</tr>
<tr>
<td>36512*</td>
<td>2P18 SBC Shielded CMR-LS/FPLR-LS/CL3R-LS/CSA/FAS105/FT4/ST1</td>
</tr>
<tr>
<td>36530*</td>
<td>3P18 SBC Shielded CMR-LS/FPLR-LS/CL3R-LS/CSA/FAS105/FT4/ST1</td>
</tr>
<tr>
<td>36513*</td>
<td>4P18 SBC Shielded CMR-LS/FPLR-LS/CL3R-LS/CSA/FAS105/FT4/ST1</td>
</tr>
</tbody>
</table>

* Patent Pending
INSTALLATION DETAILS
For cables installed outside of Canada, in non-fire rated areas install per the NEC. For cables installed in fire rated areas, see limits for UL System 40A.

1. WALL OR FLOOR ASSEMBLY*:
Minimum 2-hour rated concrete or masonry wall or concrete floor. Opening in wall or floor through which raceway passes is to be sized to closely follow the contour of the raceway. Through opening in wall or floor shall be fire stopped using an approved firestop system. See Through-penetration Firestop Systems (XHEZ) for presently certified firestop systems.

2. RACEWAY* – Horizontal and Vertical Installation:
Type EMT – ALLIED TUBE & CONDUIT CORP & Columbia-MBF - E-Z Pull™ Brand or WHEATLAND/WESTERN TUBE CO
Type IMC – ALLIED TUBE & CONDUIT CORP or WHEATLAND/WESTERN TUBE CO -- (Type IMC is not for use in Canada)

### Vertical & Horizontal – Shielded 2 Conductor Constructions

<table>
<thead>
<tr>
<th>Raceway/Conduit Size</th>
<th>Max # of 14 AWG (solid) in Conduit</th>
<th>Max # of 16 AWG (solid) in Conduit</th>
<th>Max # of 18 AWG (solid) in Conduit</th>
</tr>
</thead>
<tbody>
<tr>
<td>½”</td>
<td>N/A</td>
<td>N/A</td>
<td>1</td>
</tr>
<tr>
<td>¾”</td>
<td>N/A</td>
<td>N/A</td>
<td>2</td>
</tr>
<tr>
<td>1”</td>
<td>3</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>1 ¼”</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>1 ½”</td>
<td>6</td>
<td>8</td>
<td>7</td>
</tr>
<tr>
<td>2”</td>
<td>10</td>
<td>10</td>
<td>7</td>
</tr>
</tbody>
</table>

**Vertical & Horizontal – Non-Shielded 2 Conductor Constructions**

<table>
<thead>
<tr>
<th>Raceway/Conduit Size</th>
<th>Max # of 12 AWG (stranded/solid) in Conduit</th>
<th>Max # of 14 AWG (stranded) in Conduit</th>
<th>Max # of 14 AWG (solid) in Conduit</th>
<th>Max # of 16 AWG (stranded) in Conduit</th>
<th>Max # of 16 AWG (solid) in Conduit</th>
<th>Max # of 18 AWG (solid) in Conduit</th>
</tr>
</thead>
<tbody>
<tr>
<td>½”</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>¾”</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>1”</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>1 ¼”</td>
<td>4</td>
<td>4</td>
<td>5</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>1 ½”</td>
<td>6</td>
<td>6</td>
<td>7</td>
<td>7</td>
<td>8</td>
<td>7</td>
</tr>
<tr>
<td>2”</td>
<td>9</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>7</td>
</tr>
</tbody>
</table>

① EMT Only, not IMC

*Listed and labeled to meet the requirements of the NEC/CEC
Note - VITALink® 2 Conductor cables, shielded and unshielded, may be installed within the same raceway when not exceeding the maximum number of cables associated with any of the cable sizes installed within the common raceway. i.e. 12 AWG and 18 AWG cables installed in the same 2-inch raceway are limited to a maximum of 7 cables.

VERTICAL & HORIZONTAL – SHIELDED MULTI-CONDUCTOR CONSTRUCTIONS

<table>
<thead>
<tr>
<th>Raceway/Conduit Size – EMT &amp; IMC</th>
<th>Max # of 36512 in Conduit</th>
<th>Max # of 36530 in Conduit</th>
<th>Max # of 36513 in Conduit</th>
</tr>
</thead>
<tbody>
<tr>
<td>3/4”</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

2A. Raceway Coupling* - (Not Shown).

- **EMT** - Thomas & Betts Corp. - Steel (all components) EMT Compression Couplings. Trade size to correspond with the raceway size.
- **RACO** – Steel (all components) EMT Compression (1/2 – 2 inch) or Set Screw (3/4 – 2 inch) Couplings. Trade size to correspond with the raceway size.
- **IMC** – (Type IMC is not for use in Canada)
- **Allied or Wheatland/Western** Steel Threaded Couplings. Trade size to correspond with the raceway size.

3. FIRE RESISTIVE CABLE:
The 2-hour fire rating applies to cable passing completely through a fire zone and terminating a minimum of 12 inches beyond the fire rated wall or floor bounding the fire zone. The cables, as identified below, may be installed in the vertical or horizontal orientation.

**COMTRAN** - VITALink® Type FPLR-CI-LS/CMR-CI-LS/CL3R-CI-LS & FAS 105 shielded and Type FPLR-CI-LS/CMR-CI-LS/CL3R-CI-LS & FAS 105 non-shielded cables. To be installed as described herein and in accordance with the manufacturer’s installation instructions dated December, 2018, R27557.

*Listed and labeled to meet the requirements of the NEC/CEC*
4. SUPPORTS:

Supports - Min 12-gauge, by 1-1/2-inch-wide or 1-5/8-inch-wide, painted or unpainted, slotted steel channels with hemmed flange edges. Channel bottom with or without holes. Lengths of slotted steel channels 5 feet and less shall be secured to the wall or floor with a min of two 1/4-inch diameter (or larger) by 2-1/4-inch min long concrete screws, or 1/4-inch diameter (or larger) by 1-3/4-inch-long min steel masonry anchors. One screw or anchor to be located at each end of the slotted steel channel. Lengths of slotted steel channel in excess of 5 feet require a min of three screws or anchors, one at each end of the channel and one centrally located within the length of the channel.

A. Trapeze-type Supports – When the cable is installed on/from trapeze-type supports, the trapeze-type supports shall be secured from the surface of the floor. The supports shall be spaced a maximum of 5 feet on center.

5. CLAMPS:

Two-piece single-bolt pipe clamps or one-piece saddle type pipe clamps (not shown), manufactured of min 16-gauge steel, measuring 1-1/4 inch-wide, and trade size to correspond with the outside diameter of the raceway.

6. PULLING LUBRICANT*:

When installing the cable into the raceways, the cables shall be coated with American Polywater Type LZ pulling lubricant.

7. ENCLOSURES (Pull Boxes) *:

Wiegmann NEMA-1 Steel Enclosures with steel EMT compression or set screw connectors (RACO or Thomas & Betts Corp) or steel IMC threaded or set screw connectors (RACO) can be used in both the horizontal and vertical installations.

*Listed and labeled to meet the requirements of the NEC/CEC

330A Turner Street, Attleboro, MA 02703 • (P) 800-842-7809 • (F) 508-399-7004 • www.comtrancorp.com
Horizontal Installation - (Figure 3) - Horizontal runs may utilize an enclosure (pull box) within the system.

The enclosures shall have minimum height and depth and maximum width as follows:

<table>
<thead>
<tr>
<th>Raceway Size</th>
<th>Enclosure Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>½” - 1”</td>
<td>4” x 4” x 12”</td>
</tr>
<tr>
<td>1 ¼” - 1 ½”</td>
<td>6” x 6” x 12”</td>
</tr>
<tr>
<td>2”</td>
<td>6” x 6” x 16”</td>
</tr>
</tbody>
</table>

Vertical Installation – (Figure 4) – Vertical runs require an enclosure (pull box) be installed at the bottom of the raceway. The bottom raceway must exit through either the back or side wall of the enclosure. Vertical runs may utilize an enclosure (pull box) elsewhere within the system. The cable(s) shall enter and exit through the top and bottom of the enclosure.

For 0.5, 0.75 & 1-inch raceway the enclosure shall have a minimum dimension of 4 x 4 x 12 inches. For 1.25 & 1.5-inch raceway the enclosure shall have a minimum dimension of 6 x 6 x 12 inches. For 2-inch raceway the enclosure shall have a minimum dimension of 6 x 6 x 16 inches. The bottom raceway must exit through either the back or side wall of the enclosure not less than six times the diameter of the Raceway (See Figure 5).

For Reference:

<table>
<thead>
<tr>
<th>Raceway Size</th>
<th>Enclosure Size (Min)</th>
<th>Exit From Top (Min)</th>
</tr>
</thead>
<tbody>
<tr>
<td>½” - 1”</td>
<td>4” x 4” x 12”</td>
<td>6”</td>
</tr>
<tr>
<td>1 ¼” - 1 ½”</td>
<td>6” x 6” x 12”</td>
<td>9”</td>
</tr>
<tr>
<td>2”</td>
<td>6” x 6” x 16”</td>
<td>12”</td>
</tr>
</tbody>
</table>

NOTE: When installing 12 AWG, 14 AWG and 16 AWG cable(s) in vertical runs, the maximum distance of unsupported cable shall not exceed 45 feet between vertical cable supports. 18 AWG Cable shall not exceed 30 feet between vertical cable supports. (See Section 8).
8. **Vertical Cable Supports** – (Figure 6). Vertical runs beyond the maximum distances described in Section 7 require the cables to be supported using an AMTEC stainless steel wire mesh support grip within a vertical enclosure.

The grip must be suspended from a steel bolt or steel hook fastened to the back or side wall of the enclosure (see Figure 7). Make sure the head of the fastener does not block the opening of the raceway or interfere with the cables. For 0.5 – 1.5-inch raceway the enclosure shall have a minimum dimension of 4 x 4 x 12 inches. For 2-inch Raceway the enclosure shall have a minimum dimension of 6 x 6 x 16 inches.

9. **Splices** (For 2 conductor cables only)— (Optional, Not Shown) – The cables may be installed with a pig tail crimp taped splice using components specified in the Manufacturer's VITALink® Taped Splice Pigtail Crimp Instructions dated May 2017. The instructions are a component of the VITALink® Taped Splice Kits available from Comtran. For more information or to order a kit please contact Comtran at 508-399-7004.
Description
The VITALink® Taped Splice Kit contains components and instructions for assembling a 2 hour fire-rated splice on VITALink® 2 Hour Fire Resistive Integrity Cables.

Read instructions completely before starting.
For technical support, call Comtran Cable LLC at 508-399-7004

Tools Required:

- Crimping Tool
- Needle Nose Pliers
- Utility Knife
- Cable Cutter

Materials Provided: (Comtran Cable part# 6047)

- 2 Rolls of Item A: Self Sealing Silicone Rubber Electrical Tape
- 1 Roll of Item B: Fiberglass Tape

IMPORTANT: Installation Guidelines

- To ensure this kit is installed correctly, read and follow all the safety warnings and instructions contained in this document.
- Only steel enclosures may be used.
- The installation must comply with all national and local electrical codes and all the requirements of the UL Electrical Circuit Integrity System listing (UL Category FHIT System #40A and FHIT7 System #40A) requirements, and carefully follow the installation instructions.

Additional Materials Required & Not supplied:

- NEMA-1 Steel Enclosure with Hinge Cover
- Bare Copper compression splice caps

WARNING:
The VITALink® 2 Hour Splice Kit system must be installed by qualified personnel familiar with generally accepted construction techniques and safe electrical practices.

Take all appropriate precautions when installing splices, including following OSHA and other applicable regulations.
GENERAL

The VITALink® CIC cable must be installed per the installation instructions for system 40A using the proper EMT and steel connectors. The splices shall be made in a painted steel enclosure with a minimum NEMA 1. The enclosure shall be sized in accordance with the National Electric Code (NEC) but in no case shall the width be greater than Table 1 below. **There shall be a maximum of 3 cables splices per enclosure.** The splices can be installed in both horizontal and vertical mounted enclosures. Do not introduce any materials into splice box that are not described within this installation guide.

<table>
<thead>
<tr>
<th>EMT Size</th>
<th>Enclosure Size H X D X W</th>
</tr>
</thead>
<tbody>
<tr>
<td>½” - 1”</td>
<td>4” x 4” x 12”</td>
</tr>
<tr>
<td>1 ¼” - 1 ½”</td>
<td>6” x 6” x 12”</td>
</tr>
<tr>
<td>2”</td>
<td>6” x 6” x 16”</td>
</tr>
</tbody>
</table>

**TAPE SPLICE – Read Section Completely before Beginning Installation**

1 Splice Preparation

- Make sure there are no sharp edges inside the enclosure and the enclosure is properly supported per the FHIT 40A Guidelines
- Allow approximately 6 inches of each cable to adequately perform the splice procedure.
- If there is more than one cable splice in the enclosure make sure you properly mark the cables so they will not be mixed up during splicing.

2 Remove Jacket

Taking care not to nick or cut the insulation, carefully remove approximately 3 to 4 inches of the jacket material to allow for the splice operation.
3 Splice Layout and Crimp

• Cut the ends of the cable square and carefully remove approximately ½ inch of insulation and tape wrap to expose conductors for length of splice cap.

• Connect the conductors together using the appropriate bare copper compression splice cap and crimping tool. Verify crimp is not loose.
• Trim ends of wire so they are flush with end of compression splice cap.
• Make sure there are no sharp edges or points on the end of the splice cap. Smooth or file the edges as necessary.
4 Silicone Tape

• The first tape to apply is the gray colored self-fusing silicone rubber (Item A) supplied in the splice kit. Take care to keep tape clean. Dirty tape shall be discarded. It is critical that the silicone tape stays clean.

• Start the tape approximately ½ inch back from the end of insulation and tape over the conductor insulation. Begin to wrap helically towards crimp.

• 50% overlap is required. Extend tape overlap ¼ inch past the end of the crimp. Be sure to cover the tip of the crimp by folding the tape over the end. Press down to avoid the tape end lifting before fusion takes place.
**5 Glass Protective Tape**

- The second tape to apply is the white fiberglass tape (Item B) supplied in the splice kit.
- The tape should be cut at a length sufficient to fully cover the silicone tape wrap and extend ¼” beyond the end. Length will vary by cable size.

- Start taping ½ inch past the end of the first layer of the silicone tape. Tape helically towards crimp. 50% overlap is required. Cover all surfaces of the silicone tape.
- Extend tape overlap ¼ inch past the end of the crimp. Be sure to cover the tip of the crimp by folding the tape over the end.
- Use hand and apply pressure around crimp to ensure tape is adhering well.

**6 Second Layer of Tapes**

- After applying the first layer of silicone and fiberglass tapes, apply a second layer of both tapes following the steps outlined in Sections 4 and 5.
7 Train Cables

- Train the cables neatly so that they are close to the center of the enclosure and not drooping or touching the enclosure. Avoid contact with the sides of the enclosure. Maintain at least a ½ inch spacing between the splices and any surface of the enclosure.

- Tape the splice along the cables to hold in a straight line as shown above.

8 Clean Up, Final Inspection, Close Box

- Remove any loose debris from inside the box.
- Inspect the box and cover for any damage and wipe clean if necessary.
- Fasten enclosure.