Trusted TMR I/O SmartSlot Slot Cables

Product Overview

This document provides detailed information for the types of Trusted® input/output (I/O) Cables available within the SmartSlot group. These types of cable provide connection facilities between the Trusted analogue and digital input/output modules, and Trusted Field Termination Assemblies (FTAs) or Trusted Versatile Field Termination Assemblies (VFTAs) as required. Cables are also available with a 'flying lead' at one end to allow connection to conditioned terminals.

The types of Trusted I/O SmartSlot Cables currently available are listed in Table 1 on page 4.

The cables are manufactured to user's requirements, therefore length and type of cable insulation must be specified. Length must be specified to the nearest 0.5 m in the format xmx, e.g. 2m0 for a cable length of 2.0 m. This detail must be added to the end of the part number. Note that some cable lengths are preferred options and may be easier to obtain; refer to Rockwell Automation for details. The type of cable insulation forms part of the cable part number and is denoted by 02 for Low Smoke Zero Halogen (LSZH) or 03 for UL Certified cable material. 02 is also flame retardant to IEC 60332-3 Cat A. When ordering cables, it is recommended that the user supplies the details as shown in Table 1.

The maximum recommended I/O cable length is 15 m. Cables longer than this may be specified if necessary but may suffer from voltage drop, offset, crosstalk and noise and will present materials handling problems.

Internal cables are designed for cables where they are terminated in adjacent enclosures. If the cable needs to leave the enclosure environment, the external cable has more protection. Note that the 'external' cables are not armoured and are not suitable for truly external use and must still be treated with care. These cables will need protection when drawn through a cable route, and should also not be pulled by the connector(s). They should enter cabinets through transit/compression blocks and cannot be glanded.

The SmartSlot cables described in this document allow hot-swap modules to be sited in separated slots as required, linked with a SmartSlot jumper cable. For Companion Slot cables, allowing hot-swap modules to be sited in adjacent slots using a double width chassis socket, refer to Trusted I/O Companion Slot Cables, publication ICSTT-RM311 (PD-TC200).

This document describes cables for Triple Modular Redundant (TMR) modules (typically 40 channel). For dual modules (typically 60 channel), refer to Trusted Dual I/O SmartSlot Cables, publication ICSTT-RM314 (PD-TC600) and Trusted Dual I/O Companion Slot Cables, publication ICSTT-RM315 (PD-TC700).

For details of the TC-306, TC-308 and TC-310 jumper cables, refer to Trusted Communications Cables, publication ICSTT-RM312 (PD-TC300).

PREFACE

In no event will Rockwell Automation be responsible or liable for indirect or consequential damages resulting from the use or application of this equipment. The examples given in this manual are included solely for illustrative purposes. Because of the many variables and requirements related to any particular installation, Rockwell Automation does not assume responsibility or reliability for actual use based on the examples and diagrams.

No patent liability is assumed by Rockwell Automation, with respect to use of information, circuits, equipment, or software described in this manual.

Allen-Bradley, LISTEN. THINK. SOLVE., Rockwell Automation, TechConnect, and Trusted are trademarks of Rockwell Automation, Inc.

All trademarks are acknowledged.

DISCLAIMER

It is not intended that the information in this publication covers every possible detail about the construction, operation, or maintenance of a control system installation. You should also refer to your own local (or supplied) system safety manual, installation and operator/maintenance manuals.

REVISION AND UPDATING POLICY

This document is based on information available at the time of its publication. The document contents are subject to change from time to time. The latest versions of the manuals are available at the Rockwell Automation Literature Library under "Product Information" information "Critical Process Control & Safety Systems".

TRUSTED RELEASE

This technical manual was updated for **Trusted Release 4.0**.

LATEST PRODUCT INFORMATION

For the latest information about this product review the Product Notifications and Technical Notes issued by technical support. Product Notifications and product support are available at the Rockwell Automation Support Centre at
http://rockwellautomation.custhelp.com

At the Search Knowledgebase tab select the option "By Product" then scroll down and select the Trusted product.

Some of the Answer ID's in the Knowledge Base require a TechConnect℠ Support Contract. For more information about TechConnect Support Contract Access Level and Features, click on the following link:

https://rockwellautomation.custhelp.com/app/answers/detail/a_id/50871

This will get you to the login page where you must enter your login details.

IMPORTANT	A login is required to access the link. If you do not have an account then you can create one using the "Sign Up" link at the top right of the web page.

DOCUMENTATION FEEDBACK

Your comments will help us serve your documentation needs better. If you have any suggestions on how to improve this document, complete the How Are We Doing? form at http://literature.rockwellautomation.com/idc/groups/literature/documents/du/ra-du002_-en-e.pdf.

SCOPE

This manual specifies the maintenance requirements and describes the procedures to assist troubleshooting and maintenance of a Trusted system.

WHO SHOULD USE THIS MANUAL

This manual is for plant maintenance personnel who are experienced in the operation and maintenance of electronic equipment and are trained to work with safety systems.

SYMBOLS

In this manual we will use these notices to tell you about safety considerations.

	SHOCK HAZARD: Identifies an electrical shock hazard. If a warning label is fitted, it can be on or inside the equipment.
	WARNING: Identifies information about practices or circumstances that can cause an explosion in a hazardous environment, which can cause injury or death, property damage or economic loss.
	ATTENTION: Identifies information about practices or circumstances that can cause injury or death.
	CAUTION: Identifies information about practices or circumstances that can cause property damage or economic loss.
	BURN HAZARD: Identifies where a surface can reach dangerous temperatures. If a warning label is fitted, it can be on or inside the equipment.
	This symbol identifies items which must be thought about and put in place when designing and assembling a Trusted controller for use in a Safety Instrumented Function (SIF). It appears extensively in the Trusted Safety Manual.
IMPORTANT	Identifies information that is critical for successful application and understanding of the product.
NOTE	Provides key information about the product or service.
TIP	Tips give helpful information about using or setting up the equipment.

WARNINGS AND CAUTIONS

WARNING: EXPLOSION RISK

Do not connect or disconnect equipment while the circuit is live or unless the area is known to be free of ignitable concentrations or equivalent

AVERTISSEMENT - RISQUE D'EXPLOSION

Ne pas connecter ou déconnecter l'équipement alors qu'il est sous tension, sauf si l'environnement est exempt de concentrations inflammables ou équivalente

MAINTENANCE

Maintenance must be carried out only by qualified personnel. Failure to follow these instructions may result in personal injury.

CAUTION: RADIO FREQUENCY INTERFERENCE

Most electronic equipment is influenced by Radio Frequency Interference. Caution should be exercised with regard to the use of portable communications equipment around such equipment. Signs should be posted in the vicinity of the equipment cautioning against the use of portable communications equipment.

CAUTION:

The module PCBs contains static sensitive components. Static handling precautions must be observed. DO NOT touch exposed connector pins or attempt to dismantle a module.

ISSUE RECORD

Issue	Date	Comments
7	Sep 05	Format
8	Aug 06	Free wire idents
9	Apr 07	Added TC-521
10	Sep 07	Corrections
11	Dec 07	Flame retardance
12	Aug 08	8424 cables
13	Apr 10	Fig 11 change
14	Apr 16	Rebranded, reformatted and corrected for typographical errors
15	May 18	Updated FTA & IO references, cable drawings for TC509 through TC512. Not published.
16	Aug 18	Removed TC-523 from PD. No longer offered. Not published.
17	Feb 19	Removed information about cables that are no longer offered.Added trademarks statement. Updated document to display Rockwell Automation publication numbers.
18	May 19	Added information about -03 (UL) cables.
19	Jul 19	Updated for the T8425 release.

Page intentionally left blank

Table of Contents

Page intentionally left blank

1. SmartSlot Cable Types and Selection Guides

The types of Trusted I/O SmartSlot Cables currently available are listed in Table 1 below

Cable Type	Description
TC-501-02-xmx	I/O SmartSlot V2 Internal 40 Channel Input to FTA
TC-501-03-xmx	I/O SmartSlot V2 Internal 40 Channel Input to FTA (UL)
TC-502-02-xmx	I/O SmartSlot V2 Internal 40 Channel Input to Flying Lead / Free Wire
TC-502-03-xmx	I/O SmartSlot V2 Internal 40 Channel Input to Flying Lead / Free Wire (UL)
TC-503-02-xmx	I/O SmartSlot V2 External 40 Channel Input to FTA
TC-503-03-xmx	I/O SmartSlot V2 External 40 Channel Input to FTA (UL)
TC-504-02-xmx	I/O SmartSlot V2 External 40 Channel Input to Flying Lead / Free Wire
TC-504-03-xmx	I/O SmartSlot V2 External 40 Channel Input to Flying Lead / Free Wire (UL)
TC-505-02-xmx	I/O SmartSlot V2 Internal 40 Channel Output to FTA
TC-505-03-xmx	I/O SmartSlot V2 Internal 40 Channel Output to FTA (UL)
TC-506-02-xmx	I/O SmartSlot V2 Internal 40 Channel Output to Flying Lead / Free Wire
TC-506-03-xmx	I/O SmartSlot V2 Internal 40 Channel Output to Flying Lead / Free Wire (UL)
TC-507-02-xmx	I/O SmartSlot V2 External 40 Channel Output to FTA
TC-507-03-xmx	I/O SmartSlot V2 External 40 Channel Output to FTA (UL)
TC-508-02-xmx	I/O SmartSlot V2 External 40 Channel Output to Flying Lead / Free Wire
TC-508-03-xmx	I/O SmartSlot V2 External 40 Channel Output to Flying Lead / Free Wire (UL)
TC-509-02-xmx	I/O SmartSlot V2 Internal 40 Channel Output to VFTA
TC-509-03-xmx	I/O SmartSlot V2 Internal 40 Channel Output to VFTA (UL)
TC-510-02-xmx	I/O SmartSlot V2 External 40 Channel Output to VFTA
TC-510-03-xmx	I/O SmartSlot V2 External 40 Channel Output to VFTA (UL)
TC-511-02-xmx	I/O SmartSlot V2 Internal 40 Channel Input to VFTA

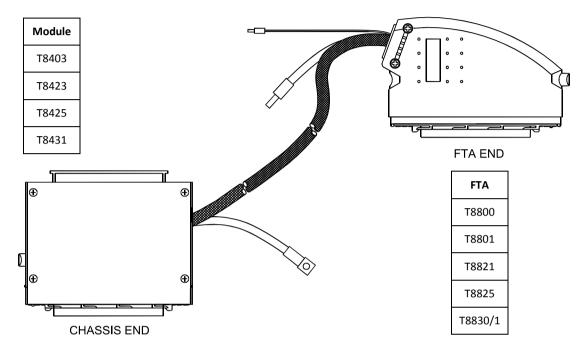| Cable Type	Description
TC-511-03-xmx	I/O SmartSlot V2 Internal 40 Channel Input to VFTA (UL)
TC-512-02-xmx	I/O SmartSlot V2 External 40 Channel Input to VFTA
TC-512-03-xmx	I/O SmartSlot V2 External 40 Channel Input to VFTA (UL)
TC-516-02-xmx	I/O SmartSlot V2 Internal 40 Channel Output to Flying Lead / Free Wire (Integral Power)
TC-516-03-xmx	I/O SmartSlot V2 Internal 40 Channel Output to Flying Lead / Free Wire (Integral Power) (UL)
TC-517-02-xmx	I/O SmartSlot V2 External 40 Channel Output to FTA (Integral Power)
TC-517-03-xmx	I/O SmartSlot V2 External 40 Channel Output to FTA (Integral Power) (UL)
TC-518-02-xmx	I/O SmartSlot V2 External 40 Channel Output to Flying Lead / Free Wire (Integral Power)
TC-518-03-xmx	I/O SmartSlot V2 External 40 Channel Output to Flying Lead / Free Wire (Integral Power) (UL)
TC-521-02-xmx	I/O SmartSlot V2 Internal T8472 16 Channel Output to T8871 FTA
TC-521-03-xmx	I/O SmartSlot V2 Internal T8472 16 Channel Output to T8871 FTA (UL)

Table 1 Trusted I/O SmartSlot Cables

INTERNAL	SMARTSLOT	INPUT		FTA	TC-501-
				VFTA	TC-511-
				Flying Lead	TC-502-
		OUTPUT		FTA	TC-505-
				VFTA	TC-509-
				Flying Lead	TC-506-
			Integral Power	Flying Lead	TC-516-
	COMPANION SLOT	INPUT		FTA	TC-201-
				VFTA	TC-211-
				Flying Lead	TC-202-
		OUTPUT		FTA	TC-205-
				VFTA	TC-209-
				Flying Lead	TC-206-
			Integral Power	FTA	TC-215-
				Flying Lead	TC-216-
EXTERNAL	SMARTSLOT	INPUT		FTA	TC-503-
				VFTA	TC-512-
				Flying Lead	TC-504-
		OUTPUT		FTA	TC-507-
				VFTA	TC-510-
				Flying Lead	TC-508-
			Integral Power	FTA	TC-517-
				Flying Lead	TC-518-
	COMPANION SLOT	INPUT		FTA	TC-203-
				VFTA	TC-212-
				Flying Lead	TC-204-
		OUTPUT		FTA	TC-207-
				VFTA	TC-210-
				Flying Lead	TC-208-
			Integral Power	Flying Lead	TC-218-

Table 2 TMR 40 Channel Standard Cable Selection Guide

INTERNAL	SMARTSLOT	INPUT	FTA	TC-601-
	COMPANION SLOT	INPUT	FTA	TC-701-

Table 3 Dual 60 Channel Standard Cable Selection Guide

The various types of I/O SmartSlot Cables, i.e. TC-501, TC-502 etc. are described separately in the following sections.

2. I/O SmartSlot Cable Type TC-501

This type of cable, and the modules/FTAs it is used with, is shown in Figure 1 below.

Module
T8403
T8423
T8425
T8431

FTA
T8800
T8801
T8821
T8825
T8830/1

FTA END

CHASSIS END

Figure 1 I/O SmartSlot Cable Type TC-501

This type of Trusted I/O SmartSlot Cable is designed for use with analogue or digital input modules and is suitable for connecting input signals from an internal FTA to the module.
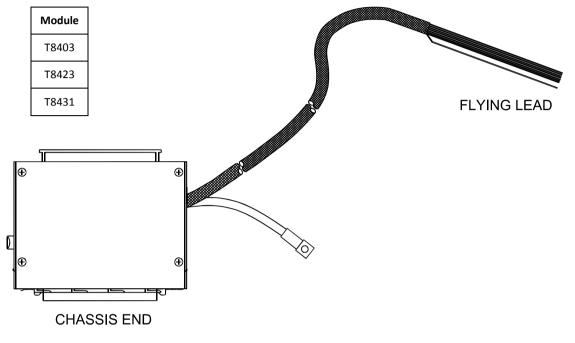
The chassis end of the multi-core cable is fitted with a 96-way type 'C' connector housed in a single-width hood (type TC-500). The other end of the cable is fitted with a 96-way type 'R' connector housed in a single-width hood enabling the cable to be connected to an FTA.

The multi-core cable is stripped back 1.5 m at both ends, then shrouded in nylon Rilgain sheathing. The ends of the sheathing are heated or fitted with over sleeving to help prevent fraying.

At both the chassis and remote end, a sheathed braid allows the connector hood to be wired to safety earth. At the remote end, the multi-core screen drain is wired to a green wire to allow connection to screen earth.

Page intentionally left blank

3. I/O SmartSlot Cable Type TC-502

This type of cable, and the modules it is used with, is shown in Figure 2 below.

Figure 2 I/O SmartSlot Cable Type TC-502

This type of Trusted I/O SmartSlot Cable is designed for use with analogue or digital input modules and is suitable for connecting input signals from internal terminals to the module.

The chassis end of the multi-core cable is fitted with a 96-way type 'C' connector housed in a single-width hood (type TC-500). The other end of the cable is left as a 'flying lead' enabling the cable to be terminated as required, e.g. connected to conditioned field terminals.
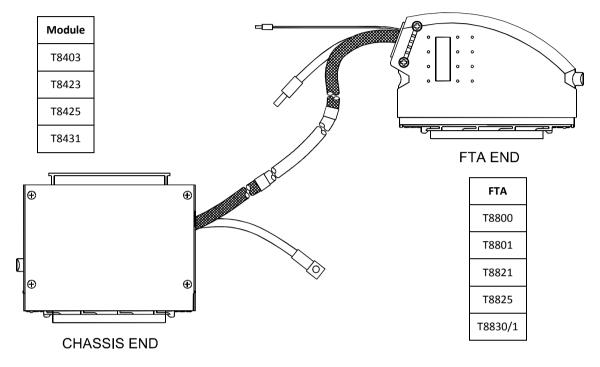
The flying leads are sleeved with identity ferrules marked CH1, CH2, CH3 etc. for channel terminations or 0 V for group reference terminations.

The multi-core cable is stripped back 1.5 m at both ends, then shrouded in nylon Rilgain sheathing. The ends of the sheathing are heated or fitted with over sleeving to help prevent fraying.

At the chassis end, a sheathed braid allows the connector hood to be wired to safety earth. At the remote end, the multi-core screen drain is wired to a green wire to allow connection to screen earth.

NOTE   The TC-502 cable does not support the T8425 module because the T8425 module requires the attenuation found on the T8825 FTA for proper operation.

Page intentionally left blank

4. I/O SmartSlot Cable Type TC-503

This type of cable, and the modules/FTAs it is used with, is shown in Figure 3 below.

Module
T8403
T8423
T8425
T8431

FTA END

CHASSIS END

FTA
T8800
T8801
T8821
T8825
T8830/1

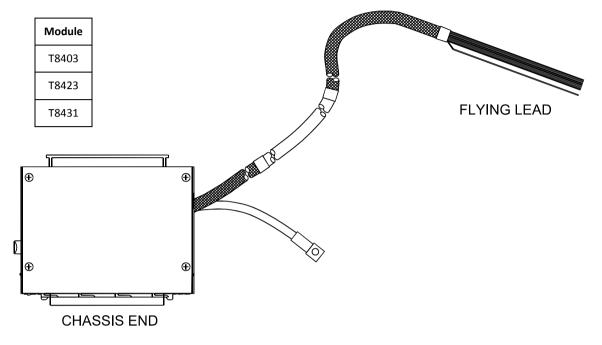**Figure 3 I/O SmartSlot Cable Type TC-503**

This type of Trusted I/O SmartSlot Cable is designed for use with analogue or digital input modules and is suitable for connecting input signals from a remote FTA to the module.

The chassis end of the multi-core cable is fitted with a 96-way type 'C' connector housed in a single-width hood (TC-500). The other end of the cable is fitted with a 96-way type 'R' connector housed in a single-width hood enabling the cable to be connected to an FTA.

The multi-core cable is stripped back 2.0 m at the chassis end and 1.5 m at the FTA end. Both ends are then shrouded in nylon Rilgain sheathing. The Rilgain sheathing is cut with a heat gun to help prevent fraying. Joints between the Rilgain sheathing and the multi-core outer sheath are taped over with 25 mm PVC insulating tape and then covered with heatshrink sleeving.

At both the chassis and remote end, a sheathed braid allows the connector hood to be wired to safety earth. At the remote end, the multi-core screen drain is wired to a green wire to allow connection to screen earth.

Page intentionally left blank

5. I/O SmartSlot Cable Type TC-504

This type of cable, and the modules it is used with, is shown in Figure 4 below.

Module
T8403
T8423
T8431

FLYING LEAD

CHASSIS END

Figure 4 I/O SmartSlot Cable Type TC-504

This type of Trusted I/O SmartSlot Cable is designed for use with analogue or digital input modules and is suitable for connecting input signals from external terminals to the module.

The chassis end of the multi-core cable is fitted with a 96-way type 'C' connector housed in a single-width hood (TC-500). The other end of the cable is left as a 'flying lead' enabling the cable to be terminated as required, e.g. connected to conditioned field terminals.
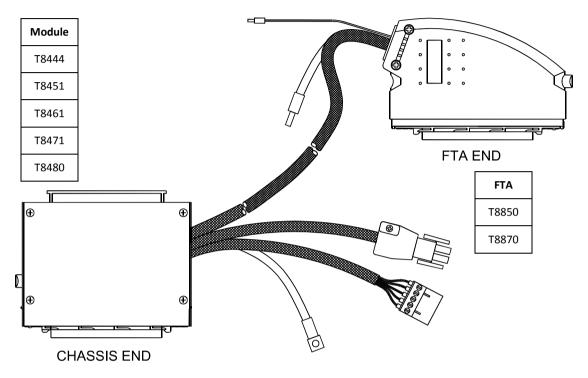
The flying leads are sleeved with identity ferrules marked CH1, CH2, CH3 etc. for channel terminations or 0 V for group reference terminations.

The multi-core cable is stripped back 2.0 m at both ends, then shrouded in nylon Rilgain sheathing. The Rilgain sheathing is cut with a heat gun to help prevent fraying. Joints between the Rilgain sheathing and the multi-core outer sheath are taped over with 25 mm PVC insulating tape and then covered with heatshrink sleeving.

At the chassis end, a sheathed braid allows the connector hood to be wired to safety earth. At the remote end, the multi-core screen drain is wired to a green wire to allow connection to screen earth.

NOTE   The TC-504 cable does not support the T8425 module because the T8425 module requires the attenuation found on the T8825 FTA for proper operation.

Page intentionally left blank

6. I/O SmartSlot Cable Type TC-505

This type of cable, and the modules/FTAs it is used with, is shown in Figure 5 below.

Figure 5 I/O SmartSlot Cable Type TC-505

This type of Trusted I/O SmartSlot Cable is designed for use with digital 24 V/120 Vdc or analogue output modules and is suitable for connecting output signals from the module to an internal FTA.

Three multi-core cables are used for this application. The chassis end of the multi-core cable is fitted with a 96-way type 'C' connector housed in a single-width hood (TC-500). The non-chassis end of multi-core 1 is fitted with a 96-way type 'R' connector housed in a single-width hood enabling connection to an FTA. The non-chassis end of multi-core 2 is fitted with a 5-way Weidmuller BLZF 3.5 series connector enabling the cable to be terminated at a T8290 Output Power Distribution Unit. This cable is used for field power return. The non-chassis end of multi-core 3 is fitted with a 6-way AMP plug used to connect power to the field from a T8290 or T8297 and is made up of five individual 2.5 mm wires contained within Rilgain sleeving.
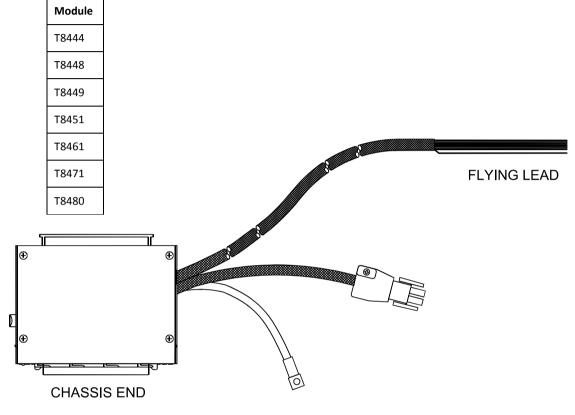
The 0 V connection at the chassis end allows a module reference so that it can measure its output voltage, this must be connected to the field 0 Volts.

The FTA contains isolated power group field 0 Volts which connect to field 0 V supply. Commoning of the reference is obtained by a connection between this field supply and the T8290 Output power distribution unit (TB1 pins 1 and 2).

Multi-core 1 is stripped back 1.5 m at both ends. Multi-cores 1, 2 and 3 are shrouded in nylon Rilgain sheathing. The ends of the sheathing are heated, or over sleeved as required to help prevent fraying.

At both the chassis and remote end, a sheathed braid allows the connector hood to be wired to safety earth. At the remote end, the multi-core screen drain is wired to a green wire to allow connection to screen earth.

7. I/O SmartSlot Cable Type TC-506

This type of cable, and the modules it is used with, is shown in Figure 6 below.

Module
T8444
T8448
T8449
T8451
T8461
T8471
T8480

FLYING LEAD

CHASSIS END

Figure 6 I/O SmartSlot Cable Type TC-506

This type of Trusted I/O SmartSlot Cable is designed for use with digital 24 V/120 Vdc or analogue output modules and is suitable for connecting output signals from the module to internal terminals.

Two multi-core cables are required for this application. The chassis end of the multi-core 1 is fitted with a 96-way type 'C' connector housed in a single-width hood (TC-500). The other end of multi-core 1 is left as a 'flying lead' enabling the cable to be terminated as required, e.g. connected to conditioned field terminals. The non-chassis end of multi-core 2 is fitted with a 6-way AMP plug used to connect power to the field from a T8290 or T8297 and is made up of five individual 2.5 mm wires contained within Rilgain sleeving.

The flying leads are sleeved with identity ferrules marked CH1, CH2, CH3 etc. for channel terminations or V FIELD RTNGRP1 to V FIELD RTNGRP5 for group reference terminations.
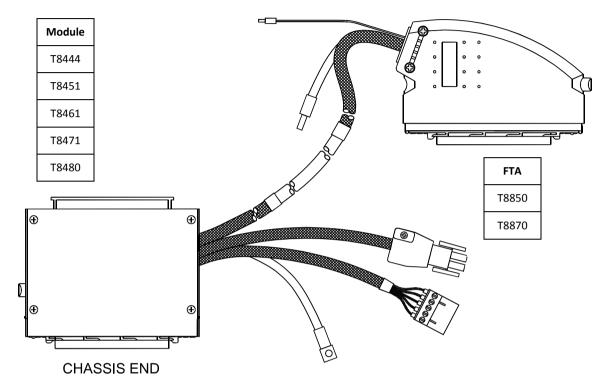
The 0 V connections at the flying leads end allows a module reference so that it can measure its output voltage, these must be connected to the field 0 Volts.

The flying lead multi-core contains isolated power group field 0 Volts which connect to field 0 V supply. Commoning of the reference is obtained by a connection to this field supply.

Multi-core 1 is stripped back 1.5 m at both ends. Multi-cores 1 and 2 are shrouded in nylon Rilgain sheathing. The ends of the sheathing are heated, or over sleeved as required to help prevent fraying.

At the chassis end, a sheathed braid allows the connector hood to be wired to safety earth. At the remote end, the multi-core screen drain is wired to a green wire to allow connection to screen earth.

8. I/O SmartSlot Cable Type TC-507

This type of cable, and the modules/FTAs it is used with, is shown in Figure 7 below.

Module
T8444
T8451
T8461
T8471
T8480

FTA
T8850
T8870

CHASSIS END

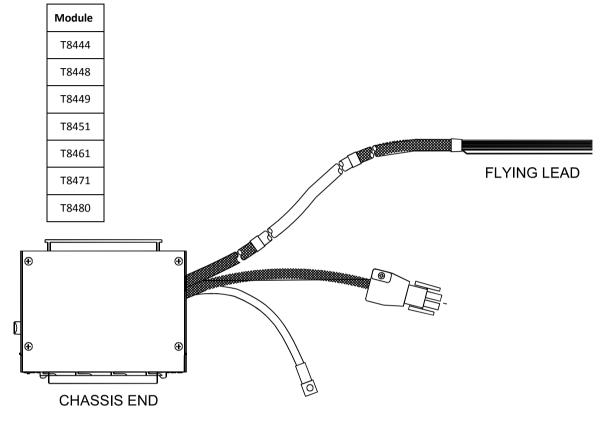**Figure 7 I/O SmartSlot Cable Type TC-507**

This type of Trusted I/O SmartSlot Cable is designed for use with digital 24 V/120 Vdc or analogue output modules and is suitable for connecting output signals from the module to an external FTA.

Three multi-core cables are used for this application. The chassis end of the multi-core cable is fitted with a 96-way type 'C' connector housed in a single-width hood (TC-500). The non-chassis end of multi-core 1 is fitted with a 96-way type 'R' connector housed in a single-width hood enabling connection to an FTA. The non-chassis end of multi-core 2 is fitted with a 5-way Weidmuller BLZF 3.5 series connector enabling the cable to be terminated at a T8290 Output Power Distribution Unit. This cable is used for field power return. The non-chassis end of multi-core 3 is fitted with a 6-way AMP plug used to connect power to the field from a T8290 or T8297 and is made up of five individual 2.5 mm wires contained within Rilgain sleeving.

The 0 V connection at the chassis end allows a module reference so that it can measure its output voltage, this must be connected to the field 0 Volts.

The FTA contains isolated power group field 0 Volts which connect to field 0 V supply. Commoning of the reference is obtained by a connection between this field supply and the T8290 Output power distribution unit (TB1 pins 1 and 2).

Multi-core 1 is stripped back 1.5 m at both ends. Multi-cores 1, 2 and 3 are shrouded in nylon Rilgain sheathing. The ends of the sheathing are heated, or over sleeved as required to help prevent fraying.

At both the chassis and remote end, a sheathed braid allows the connector hood to be wired to safety earth. At the remote end, the multi-core screen drain is wired to a green wire to allow connection to screen earth.

9. I/O SmartSlot Cable Type TC-508

This type of cable, and the modules it is used with, is shown in Figure 8 below.

Module
T8444
T8448
T8449
T8451
T8461
T8471
T8480

FLYING LEAD

CHASSIS END

Figure 8 I/O SmartSlot Cable Type TC-508

This type of Trusted I/O SmartSlot Cable is designed for use with digital 24 V/120 Vdc or analogue output modules and is suitable for connecting output signals from the module to external terminals.

Two multi-core cables are required for this application. The chassis end of the multi-core 1 is fitted with a 96-way type 'C' connector housed in a single-width hood (TC-500). The other end of multi-core 1 is left as a 'flying lead' enabling the cable to be terminated as required, e.g. connected to conditioned field terminals. The non-chassis end of multi-core 2 is fitted with a 6-way AMP plug used to connect power to the field from a T8290 or T8297 and is made up of five individual 2.5 mm wires contained within Rilgain sleeving.

The flying leads are sleeved with identity ferrules marked CH1, CH2, CH3 etc. for channel terminations or V FIELD RTNGRP1 to V FIELD RTNGRP5 for group reference terminations.
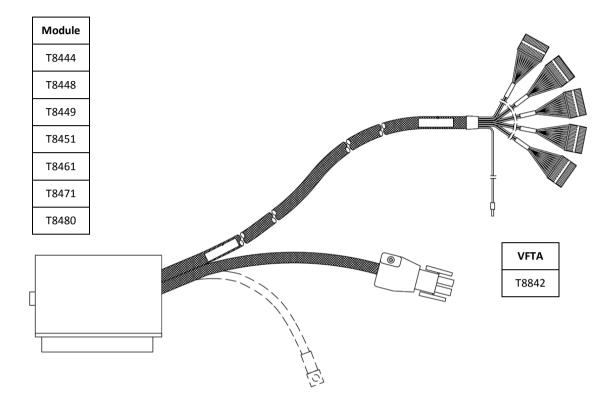
The 0 V connections at the flying leads end allows a module reference so that it can measure its output voltage, these must be connected to the field 0 Volts.

The flying lead multi-core contains isolated power group field 0 Volts which connect to field 0 V supply. Commoning of the reference is obtained by a connection to this field supply.

Multi-core 1 is stripped back 1.5 m at both ends. Multi-cores 1 and 2 are shrouded in nylon Rilgain sheathing. The ends of the sheathing are heated, or over sleeved as required to help prevent fraying.

At the chassis end, a sheathed braid allows the connector hood to be wired to safety earth. At the remote end, the multi-core screen drain is wired to a green wire to allow connection to screen earth.

10. I/O SmartSlot Cable Type TC-509

This type of cable, and the modules/VFTAs it is used with, is shown in Figure 9 below.

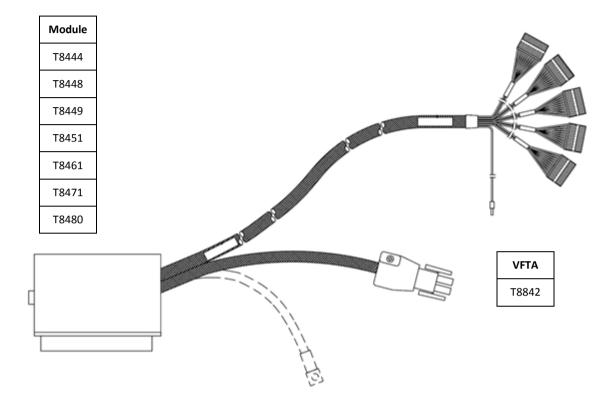| Module |
|--------|
| T8444 |
| T8448 |
| T8449 |
| T8451 |
| T8461 |
| T8471 |
| T8480 |

VFTA
T8842

Figure 9 I/O SmartSlot Cable Type TC-509

This type of Trusted I/O SmartSlot Cable is designed for use with digital 24 V/120 Vdc and analogue output modules and is suitable for connecting output signals from the module to an internal VFTA. For the T8448 and T8449, it is recommended to use the T8842 VFTA. Trusted Versatile FTA, publication ICSTT-RM298 (PD-T8842) describes the possible circuits that may be configured for this VFTA.

Two multi-core cables are required for this application. The chassis end of the multi-core 1 is fitted with a 96-way type 'C' connector housed in a single-width hood (TC-500). The other end of multi-core 1 is fitted with five 10-way Weidmuller BLZF 3.5 series connectors enabling the cable to be terminated at a VFTA. The non-chassis end of multi-core 2 is fitted with a 6-way AMP plug used to connect power to the field from a T8290 or T8297. This cable is made up of five individual 2.5 mm wires contained within Rilgain sleeving. For analogue output or low current digital output modules using this cable, the T8297 is recommended.

The VFTA contains isolated power group field 0 Volts which connect to field 0 V supply. Commoning of the reference is obtained by a connection to this field supply.

Multi-core 1 is stripped back 1.5 m at both ends, then shrouded in nylon Rilgain sheathing. Multi-core 2 is shrouded in nylon Rilgain sheathing. The ends of the sheathing are heated or fitted with over sleeving to help prevent fraying.

At the chassis end, a sheathed braid allows the connector hood to be wired to safety earth. At the remote end, the multi-core screen drain is wired to a green wire to allow connection to screen earth.

11.   I/O SmartSlot Cable Type TC-510

This type of cable, and the modules/VFTAs it is used with, is shown in Figure 10 below.

Module
T8444
T8448
T8449
T8451
T8461
T8471
T8480

VFTA
T8842

Figure 10 I/O SmartSlot Cable Type TC-510

This type of Trusted I/O SmartSlot Cable is designed for use with digital 24 V/120 Vdc and analogue output modules and is suitable for connecting output signals from the module to an external VFTA. For the T8448 and T8449, it is recommended to use the T8842 VFTA. Trusted Versatile FTA, publication ICSTT-RM298 (PD-T8842) describes the possible circuits that may be configured for this VFTA.

Two multi-core cables are required for this application. The chassis end of the multi-core 1 is fitted with a 96-way type 'C' connector housed in a single-width hood (TC-500). The other end of multi-core 1 is fitted with five 10-way Weidmuller BLZF 3.5 series connectors enabling the cable to be terminated at a VFTA. The non-chassis end of multi-core 2 is fitted with a 6-way AMP plug used to connect power to the field from a T8290 or T8297. This cable is made up of five individual 2.5 mm wires contained within Rilgain sleeving. For analogue output or low current digital output modules using this cable, the T8297 is recommended.

The VFTA contains isolated power group field 0 Volts which connect to field 0 V supply. Commoning of the reference is obtained by a connection to this field supply.

Multi-core 1 is stripped back 1.5 m at both ends, then shrouded in nylon Rilgain sheathing. Multi-core 2 is shrouded in nylon Rilgain sheathing. The ends of the sheathing are heated or fitted with over sleeving to help prevent fraying.

At the chassis end, a sheathed braid allows the connector hood to be wired to safety earth. At the remote end, the multi-core screen drain is wired to a green wire to allow connection to screen earth.

12.   I/O SmartSlot Cable Type TC-511

This type of cable, and the modules/VFTAs it is used with, is shown in Figure 11 below.

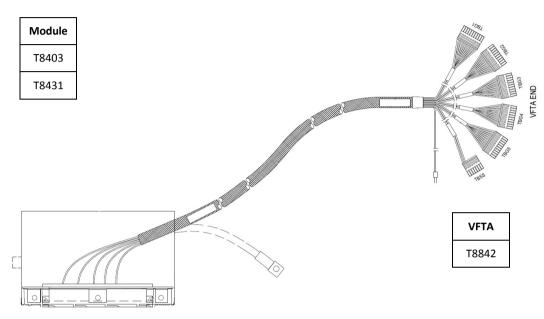| Module |
|--------|
| T8403 |
| T8431 |

VFTA
T8842

Figure 11 I/O SmartSlot Cable Type TC-511

This type of Trusted I/O SmartSlot Cable is designed for use with analogue or digital input modules and is suitable for connecting input signals from an internal VFTA to the module.

The chassis end of the multi-core cable is fitted with a 96-way type 'C' connector housed in a single-width hood (TC-500). The other end of the multi-core is fitted with one 7-way and five 10-way Weidmuller BLZF 3.5 series connectors enabling the cable to be terminated at a VFTA.

The VFTA contains isolated power group field 0 Volts which connect to field 0 V supply. Commoning of the reference is obtained by a connection to this field supply.

The multi-core is stripped back 1.5 m at both ends, then shrouded in nylon Rilgain sheathing. The ends of the sheathing are heated or fitted with over sleeving to help prevent fraying.

At the chassis end, a sheathed braid allows the connector hood to be wired to safety earth. At the remote end, the multi-core screen drain is wired to a green wire to allow connection to screen earth.

Page intentionally left blank

13. I/O SmartSlot Cable Type TC-512

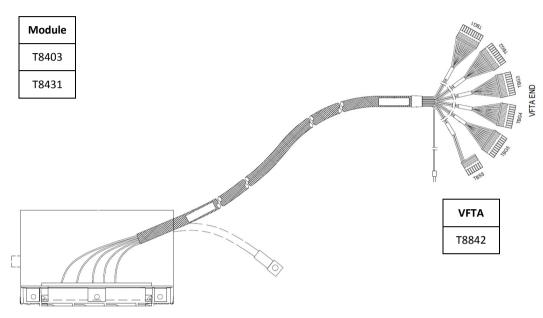This type of cable, and the modules/VFTAs it is used with, is shown in Figure 12 below.

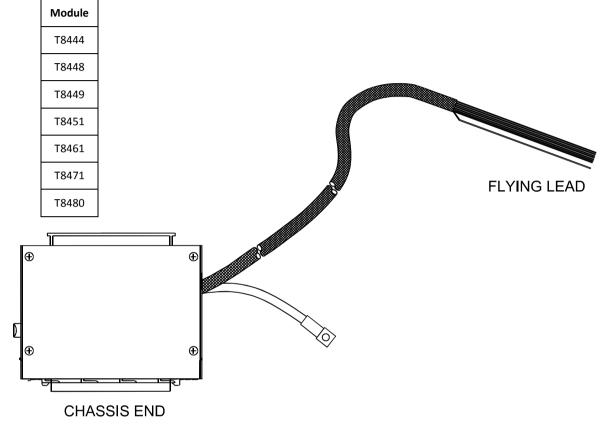**Figure 12 I/O SmartSlot Cable Type TC-512**

This type of Trusted I/O SmartSlot Cable is designed for use with analogue or digital input modules and is suitable for connecting input signals from an external VFTA to the module.

The chassis end of the multi core cable is fitted with a 96 way type 'C' connector housed in a single width hood (TC-500). The other end of the multi core is fitted with one 7-way and five 10-way Weidmuller BLZF 3.5 series connectors enabling the cable to be terminated at a VFTA.

The VFTA contains isolated power group field 0 Volts which connect to field 0 V supply. Commoning of the reference is obtained by a connection to this field supply.

The multi core is stripped back 1.5 m at both ends, then shrouded in nylon Rilgain sheathing. The ends of the sheathing are heated or fitted with over sleeving to help prevent fraying.

At the chassis end, a sheathed braid allows the connector hood to be wired to safety earth. At the remote end, the multi-core screen drain is wired to a green wire to allow connection to screen earth.

Page intentionally left blank

14.   I/O SmartSlot Cable Type TC-516

This type of cable, and the modules it is used with, is shown in Figure 13 below.

Module
T8444
T8448
T8449
T8451
T8461
T8471
T8480

FLYING LEAD

CHASSIS END

Figure 13 I/O SmartSlot Cable Type TC-516

This type of Trusted I/O SmartSlot Cable is designed for use with digital and analogue output modules and is suitable for connecting output signals from the module to internal terminals. Power connections are integral with this type of cable.

The chassis end of the multi-core cable is fitted with a 96-way type 'C' connector housed in a single-width hood (TC-500). The other end of the cable is left as a 'flying lead' enabling the cable to be terminated as required, e.g. connected to conditioned field terminals.

The flying leads are sleeved with identity ferrules marked CH1, CH2, CH3 etc. for channel terminations or V FIELD GRP1 to V FIELD GRP5 for group field supply terminations or V FIELD RTNGRP1 to V FIELD RTNGRP5 for group reference terminations.
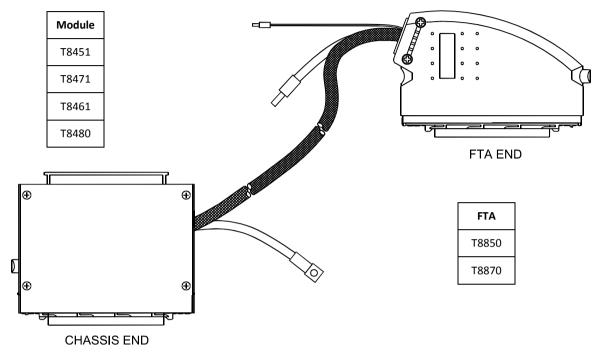
The 0 V connections at the flying lead ends allows a module reference so that it can measure its output voltage, this must be connected to the field 0 Volts.

The flying lead multi-core contains isolated power group field 0 Volts which connect to field 0 V supply. Commoning of the reference is obtained by a connection to this field supply.

The multi-core cable is stripped back 1.5 m at both ends, then shrouded in nylon Rilgain sheathing. The ends of the sheathing are heated or fitted with over sleeving to help prevent fraying.

At the chassis end, a sheathed braid allows the connector hood to be wired to safety earth. At the remote end, the multi-core screen drain is wired to a green wire to allow connection to screen earth.

15.   I/O SmartSlot Cable Type TC-517

This type of cable, and the modules/FTAs it is used with, is shown in Figure 14 below.

Module
T8451
T8471
T8461
T8480

FTA END

FTA
T8850
T8870

CHASSIS END

Figure 14 I/O SmartSlot Cable Type TC-517

This type of Trusted I/O SmartSlot Cable is designed for use with 24 V or 120 Vdc digital output modules and is suitable for connecting output signals from the module to an internal FTA. Power connections are integral with this type of cable.

The chassis end of the multi-core cable is fitted with a 96-way type 'C' connector housed in a single-width hood (TC-500). The other end of the cable is fitted with a 96-way type 'R' connector housed in a single-width hood enabling the cable to be connected to an FTA.

Using this cable, the field power is connected at the FTA, which has indicators for each power group which are voltage sensitive. For this reason, the T8850 FTA should be used with the T8451 and the T8870 with the T8471.
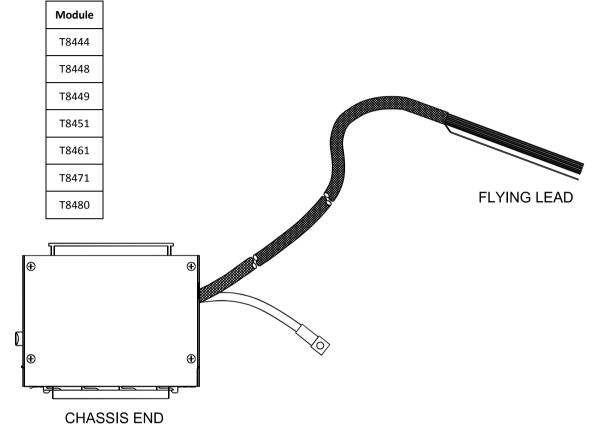
The 0 V connection at the FTA end allows a module reference so that it can measure its output voltage, this must be connected to the field 0 Volts.

The FTA contains isolated power group field 0 Volts which connect to field 0 V supply. Commoning of the reference is obtained by a connection to this field supply.

The multi-core cable is stripped back 1.5 m at both ends, then shrouded in nylon Rilgain sheathing. The ends of the sheathing are heated or fitted with over sleeving to help prevent fraying.

At both the chassis and remote end, a sheathed braid allows the connector hood to be wired to safety earth. At the remote end, the multi-core screen drain is wired to a green wire to allow connection to screen earth.

16.   I/O SmartSlot Cable Type TC-518

This type of cable, and the modules it is used with, is shown in Figure 15 below.

Module
T8444
T8448
T8449
T8451
T8461
T8471
T8480

FLYING LEAD

CHASSIS END

Figure 15 I/O SmartSlot Cable Type TC-518

This type of Trusted I/O SmartSlot Cable is designed for use with digital and analogue output modules and is suitable for connecting output signals from the module to external terminals. Power connections are integral with this type of cable.

The chassis end of the multi-core cable is fitted with a 96-way type 'C' connector housed in a single-width hood (TC-500). The other end of the cable is left as a 'flying lead' enabling the cable to be terminated as required, e.g. connected to conditioned field terminals.

The flying leads are sleeved with identity ferrules marked CH1, CH2, CH3 etc. for channel terminations or V FIELD GRP1 to V FIELD GRP5 for group field supply terminations or V FIELD RTNGRP1 to V FIELD RTNGRP5 for group reference terminations.

The 0 V connections at the flying lead ends allows a module reference so that it can measure its output voltage, this must be connected to the field 0 Volts.

The flying lead multi-core contains isolated power group field 0 Volts which connect to field 0 V supply. Commoning of the reference is obtained by a connection to this field supply.

The multi-core cable is stripped back 1.5 m at both ends, then shrouded in nylon Rilgain sheathing. The ends of the sheathing are heated or fitted with over sleeving to help prevent fraying.

At the chassis end, a sheathed braid allows the connector hood to be wired to safety earth. At the remote end, the multi-core screen drain is wired to a green wire to allow connection to screen earth.

17.   I/O SmartSlot Cable Type TC-521

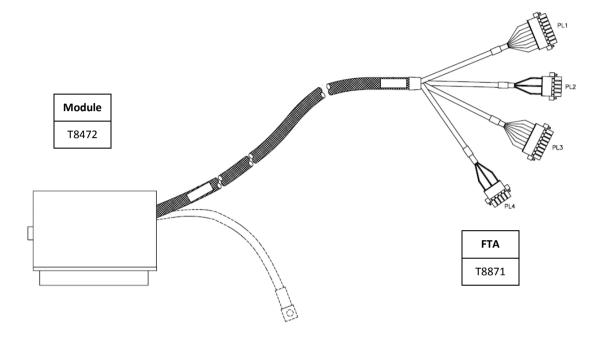This type of cable, and the modules/FTA it is used with, is shown in Figure 16 below.

Figure 16 I/O SmartSlot Cable Type TC-521

This type of Trusted I/O SmartSlot Slot Cable is designed for use with the T8472 120 Vac digital output module only and is suitable for connecting output signals from the module to an internal T8871 FTA. Power connections are integral with this type of cable.

The chassis end of the multi-core cable is fitted with a 32-way type 'D' connector housed in a single-width hood (TC-500). The other end of the cable is fitted with two 8-way and two 5-way Weidmuller BLZF 5 series connectors enabling the cable to be terminated at an T8871 FTA. Both ends are fitted with screw retention. The two 5-way connectors carry AC field power on three of the terminals, which is supplied to the FTA via screw terminals. Each connector powers one group of eight terminals. The AC power cables may also be stripped out of the multi-core sheath and terminated at an AC marshalling panel elsewhere.

The multi-core cable is stripped back 1.5 m at both ends, then shrouded in nylon Rilgain sheathing. The ends of the sheathing are heated or fitted with over sleeving to help prevent fraying.

At the chassis end, a sheathed braid allows the connector hood to be wired to safety earth.