

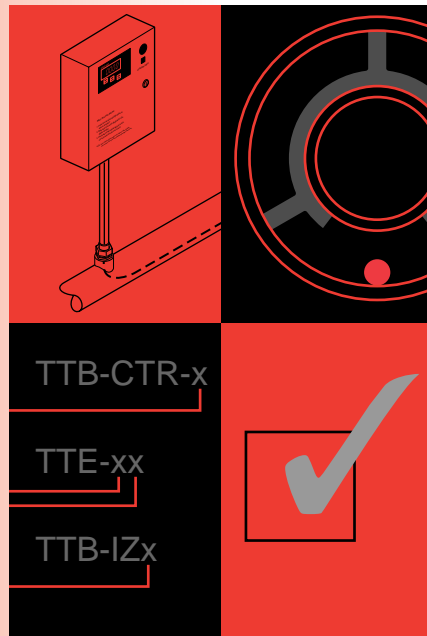
All information, including illustrations, is believed to be reliable. Users, however, should independently evaluate the suitability of each product for their application. Raychem makes no warranties as to the accuracy or completeness of the information, and disclaims any liability regarding its use. Raychem's only obligations are those in the Raychem Standard Terms and Conditions of Sale for this product, and in no case will Raychem be liable for any incidental, indirect, or consequential damages arising from the sale, resale, use, or misuse of the product. Specifications are subject to change without notice. In addition, Raychem reserves the right to make changes—without notification to Buyer—to materials or processing that do not affect compliance with any applicable specification.

Raychem Corporation
TraceTek Products Group
300 Constitution Drive
Menlo Park, California 94025-1164
Tel (800) 545-6528
Fax (415) 361-3904

Raychem Corporation
2015 Spring Road
Suite 700
Oak Brook, IL 60521
Tel (800) 227-0105
Fax (708) 572-1469

TraceTek Products

T
R
A
C
E
T
E
K



Contents

1. How to use this guide	Introduction	1
	System description	1
	Directions for using the guide	1
2. Preselection checklist of key parameters for double containment pipe	Directions for using this section	3
	Clearance	3
	Access points (pull points)	3
	Pull rope	3
	Sealed containment space	3
3. System selection	Directions for using this section	4
	Question 1: Sensor selection	4
	Question 2: Leak detection system selection	4
	Matrix 1: Sensing cable and alarm module selection	4
	Matrix 2: Alarm module selection	5
4. Sample configurations and bills of materials	Directions for using this section	6
	Locating system	6
	Zone system	7
	Nonlocating single-channel system	8
	Nonlocating multiple-channel system	9
5. Product selection and ordering information	Directions for using this section	10
	Locating alarm modules	10
	Zone alarm modules	11
	Nonlocating single-channel alarm modules	11
	Nonlocating multiple-channel alarm modules	12
	Aqueous sensing cables	12
	Fuel hydrocarbon sensing cables	13
	Solvent hydrocarbon sensing cables	13
	Components	14
	Installation tools	16

1. How to use this guide

Introduction

The purpose of this guide is to assist engineers designing TraceTek leak detection systems through the process of configuring an optimal system. For additional design information, please refer to the Design Guide for Double Containment Pipes and Tanks (H54433).

System description

A TraceTek leak detection system has three basic parts:

- Module
- Sensing cable
- Components

This guide will help you select the right product for each of these parts, as well as the tools necessary for a complete installation.

Directions for the guide

The guide has four main sections:

- Preselection checklist (Section 2)
- System selection (Section 3)
- System configurations (Section 4)
- Product selection and ordering information (Section 5)

Use all relevant sections in the process of selecting the products for your system and use the sections sequentially.

Section 2 is applicable if you are selecting product for a double containment pipe system. It helps you verify that your pipe system design and installation complies with the guidelines for installing leak detection cables.

Section 3 helps you decide on the backbone of your system: the module and sensing cable.

Section 4 shows you examples of how your system will look and what products it should have.

Section 5 provides the product and ordering information you need to produce a detailed bill of materials for your complete system.

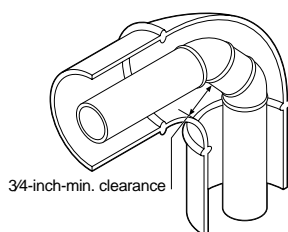
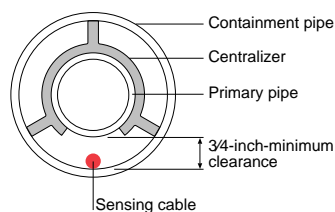
2. Preselection checklist of key parameters for double containment pipe

Directions for using this section

Following are design parameters for key aspects of a double containment pipe application. Verify that your application complies with each parameter and indicate your verification by checking the box beside it. If your application does not comply with one of these parameters, the application must be corrected for that parameter or contact Raychem or your Raychem representative.

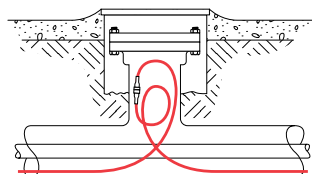
Clearance

- Carrier pipe centralized within secondary containment
- A 3/4-inch clearance at the 6 o'clock position throughout the pipe system, including bends and tees
- Centralizers aligned to within ± 5 degrees
- Centralizers glued or bonded to carrier pipe
- Centralizers sufficiently strong and placed frequently enough to carry fluid load and thermal expansion loads



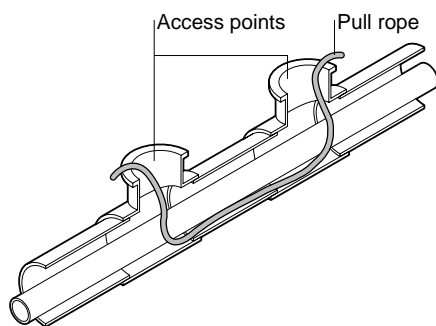
Access points (pull points)

- Minimum 4-inch-diameter tees
- Extended to within 8 to 10 inches of grade
- Protected at grade by flush-mounted valve box with cover (10-inch-diameter minimum)
- When annular clearance is less than 1 inch, positioned after every 180° of horizontal direction change or every 250 feet of straight run
- When annular clearance is greater than 1 inch, positioned after every 360° of pipe bend or every 400 feet of straight run
- Placed at beginning and end of main run and at every branch that is sensed



Pull rope

- 1/4-inch or 3/8-inch hollow braid polypropylene rope
- No tangles, splices, or knots
- No part pinched or glued
- Continuous lengths, tested for smooth pull between each set of access points
- Free moving, loose in pipe



Sealed containment space

- All foreign matter (such as oil, dirt, mud, and ice) removed
- All standing water drained
- All puddles and low points dried
- Access risers, caps, end plates, and all penetrations designed for watertight seal, installed, and pressure checked
- Containment pipe fabricated to be liquidtight and sealed from the environment

3. System selection

Directions for using this section

This section will enable you to select the two most important components of your system: the module and the sensing cable.

First answer Questions 1 and 2 below. Next, pick the cell in Matrix 1 that represents your two answers. This cell shows the sensing cable you need and one or more possible modules.

If Matrix 1 lists two modules for your system, use Matrix 2 to compare information on both modules, then decide which module to order for your application.

Question 1: Sensor selection

What fluid do you want to detect?

- A. Aqueous fluids (water, acids, bases, industrial waste, leachate, etc.)
- B. Solvents (TCE, trichloroethane, toluene, etc.)
- C. Fuels or oils (gasoline, diesel, jet fuel, heating oil, motor oil, hydraulic fluid, etc.)
- D. Other

Question 2: Leak detection system selection

What type of leak detection system do you want?

- A. Locating (locates the precise distance to the leak in feet or meters)
- B. Zone (monitors up to 50 five-foot zone sensors)
- C. Nonlocating single-channel (alarms when a leak is detected)
- D. Nonlocating multiple-channel (alarms and identifies channel(s) where leak occurs)

Matrix 1: Sensing cable and alarm module selection

		Answer to question 2			
		A Locating	B Zone	C Nonlocating single channel	D Nonlocating multiple channel
Answer to question 1					
A. Aqueous	Sensing cable	TT3000	TT3000	TT3000	TT3000
	Alarm module	TTB/TTE	TTB-IZA/TTE-Z	TTA/TTC	TTG
B. Solvents	Sensing cable	TT501	TT501	TT501	TT501
	Alarm module	TTB/TTE	TTB-IZA/TTE-Z	TTA/TTC	TTG
C. Fuels or oils	Sensing cable	TT5000	TT5000	TT5000	TT5000
	Alarm module	TTB/TTE	TTB-IZA/TTE-Z	TTA/TTC	TTG
D. Other		Call Raychem	Call Raychem	Call Raychem	Call Raychem

Matrix 2: Alarm module selection

Answer to question 2				
	A Locating system	B Zone system	C Nonlocating single-channel system	D Nonlocating multiple-channel system
Module Type				
TTB	<ul style="list-style-type: none"> • Metal enclosure • 120/240 Vac • Surface mount • Maximum sensing cable: 2000 ft or 1000 m* 			
TTE	<ul style="list-style-type: none"> • Plastic enclosure • 24 Vac/Vdc • Surface mount or control-panel mount • Maximum sensing cable: 2000 ft or 1000 m* 			
TTB-IZA		<ul style="list-style-type: none"> • Metal enclosure • 120/240 Vac • Surface mount • Up to 50 zones; fixed length: 5 ft/zone 		
TTE-Z		<ul style="list-style-type: none"> • Plastic enclosure • 24 Vac/Vdc • Surface mount or control-panel mount • Up to 50 zones; fixed length: 5 ft/zone 		
TTA			<ul style="list-style-type: none"> • Metal enclosure • 120/240 Vac; 24 Vdc • Surface mount • Maximum sensing cable: 200 ft (60 m) 	
TTC			<ul style="list-style-type: none"> • Plastic enclosure • 12 to 24 Vac; 15 to 24 Vdc • Control-cabinet mount • Maximum sensing cable: 200 ft (60 m) 	
TTG				<ul style="list-style-type: none"> • Metal enclosure • 120/240 Vac • One jumper/channel • Up to 12 channels • Maximum sensing cable: 200 ft (60 m) per channel

* For applications requiring more than 1000 meters of cable, tandem circuits and multipair communication cable may be used. For more information, contact Raychem or your TraceTek representative.

4. Sample configurations and bills of materials

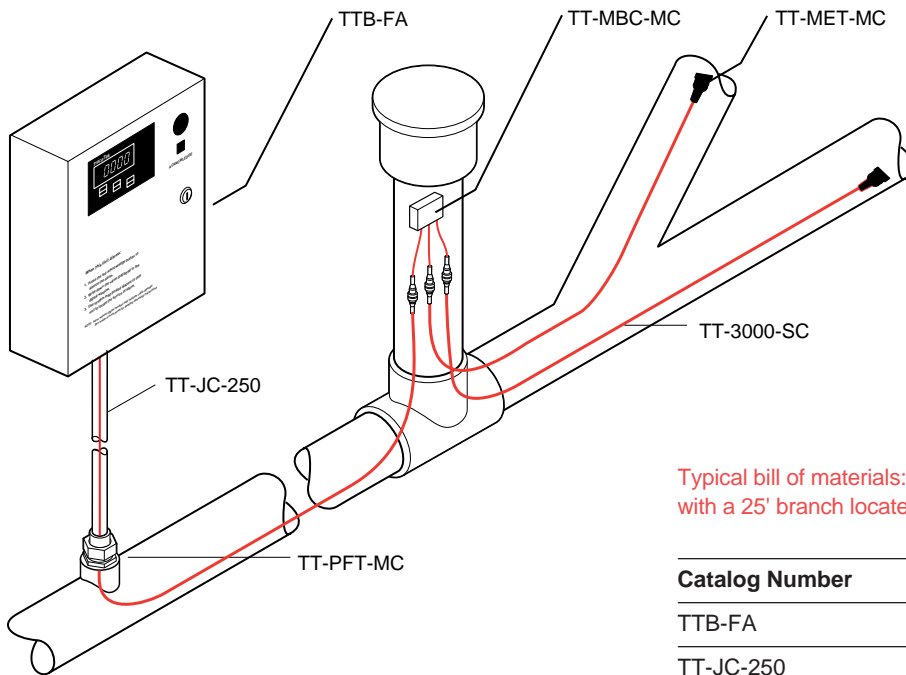
Directions for using this section

This section provides a sample configuration and bill of materials for each of the four types of TraceTek leak detection systems outlined in Section 3.

Find the drawing for the type of system you selected in Section 3. With the drawing you will find a sample bill of materials listing the products necessary for that system and its installation.

Use the sample bill of materials as a guide. You will have to adjust the lengths, quantities, number, and type of fittings to meet your application's specific needs.

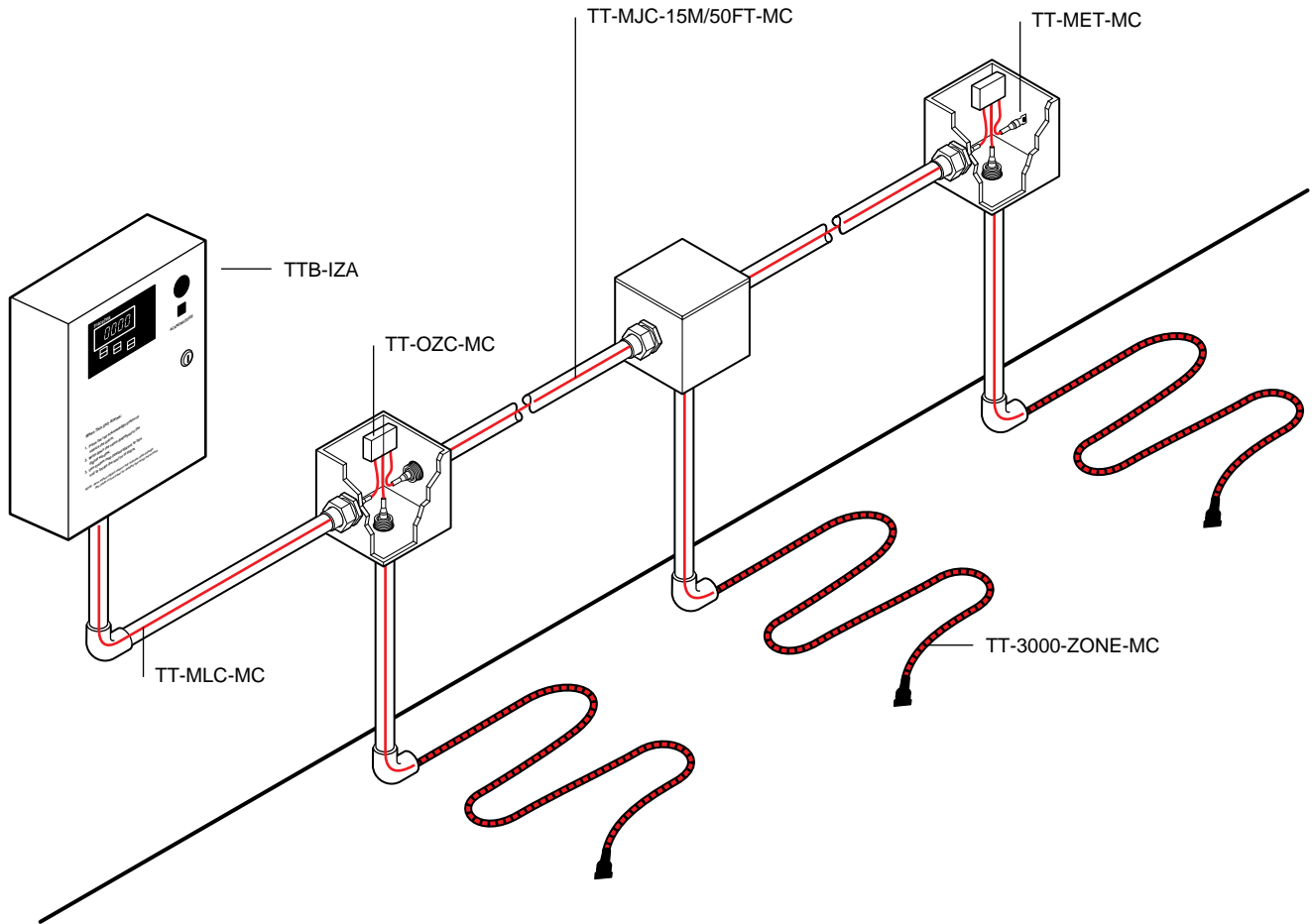
Locating system



Typical bill of materials: Wastewater drain system (1200' main line with a 25' branch located 200 feet from the alarm module)

Catalog Number	Description	Qty
TTB-FA	Locating alarm module	1
TT-JC-250	Jumper cable—bulk	1
TT-JC-CK-MC-F	Metal connector kit	1
TT-PFT-3/4-MC	Pressure feedthrough fitting	1
TT3000-SC	TT3000 cable	1250'
TT-MBC-MC	Modular branch connector	1
TT3000-CK-MC-M/F	Metal connector kit	1
TT-CT-SCT-3000	Crimp tool	1
TT-MET-MC	Modular end termination	2
TT-Kellem Grip	Kellem Grip	1
TT-PR	Pull rope, 500-ft. reel	3
TT-PTB	Portable test box	1
TT-Ultratorch	Ultratorch 200	1

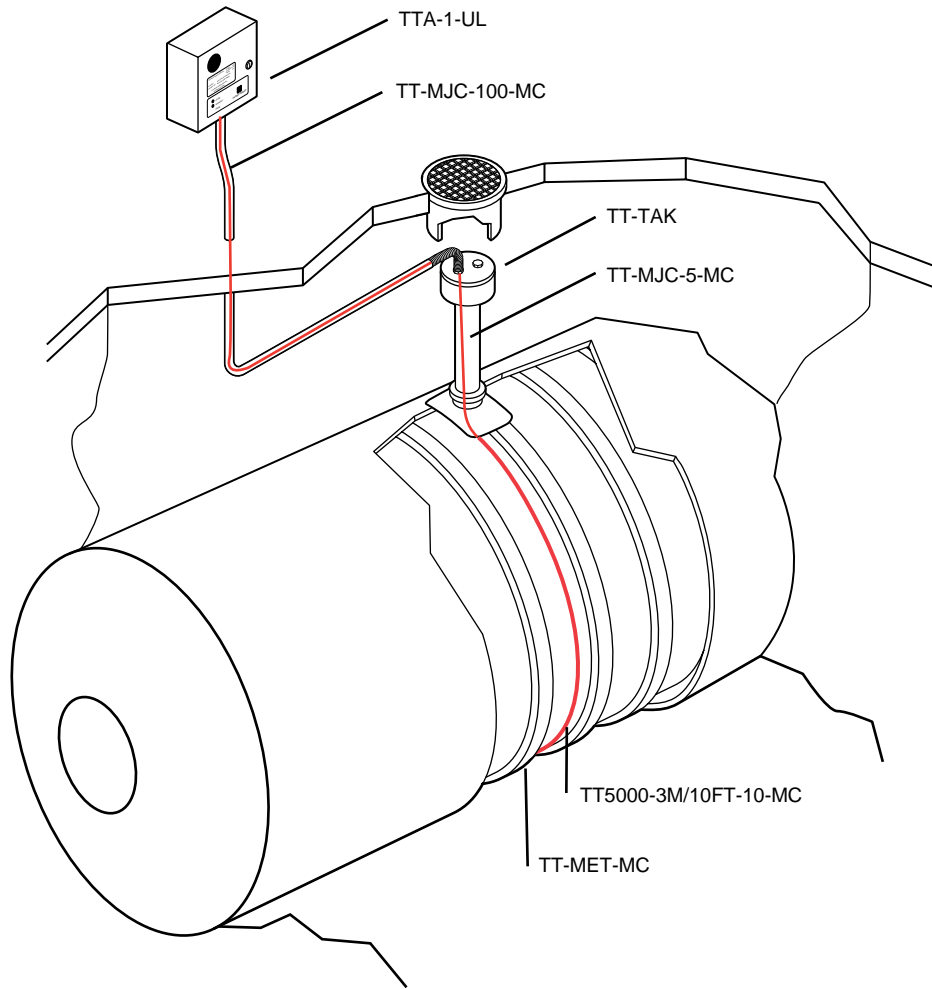
Zone system



Typical bill of materials: Three-zone sump (monitoring watery waste sumps on 50-foot centers with the panel located 10 feet from the first junction box)

Catalog number	Description	Qty
TTB-IZA	Zone alarm module	1
TT-MLC-MC	Modular leader cable	1
TT-OZC-MC	Zone connector	3
TT3000-ZONE-MC	Zone sensing cable	3
TT-MJC-15M/50FT-MC	Modular jumper cable	2
TT-MET-MC	Modular end termination	1

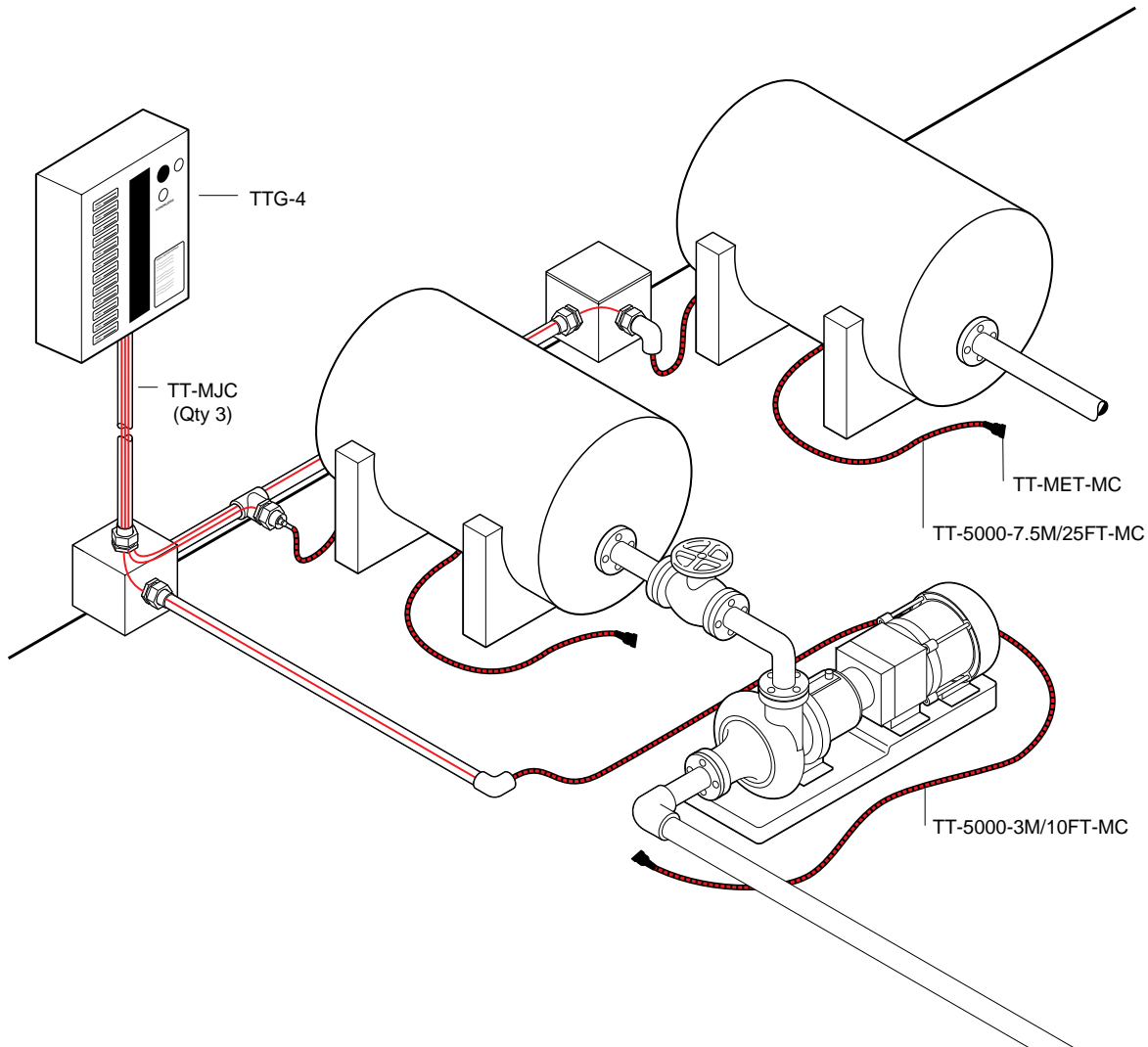
Nonlocating single-channel system



Typical bill of materials: Single-channel underground fuel tank sensor located 100 feet from the alarm module

Catalog number	Description	Qty
TTA-1-UL	Alarm module	1
TT-MJC-100-MC	Modular jumper cable	1
TT-TAK	Tank access kit	1
TT-MJC-5-MC	Modular jumper cable	1
TT5000-3M/10FT-10-MC	Modular sensing cable	1
TT-MET-MC	Modular end termination	1

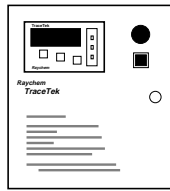
Nonlocating multiple-channel system



Typical bill of materials: Three-channel fuel monitoring system (independently monitors two indoor tanks and a pump)

Catalog number	Description	Qty
TTG-4	Alarm module	1
TT5000-MSC-10-MC	Modular sensing cable	1
TT5000-MSC-25-MC	Modular sensing cable	2
TT-MJC-30M/100FT-MC	Modular jumper cable	3
TT-MET-MC	Modular end termination	3
TT-HDC-1/2-NA-50	Hold-down clips (not shown)	1

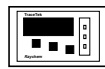
Zone alarm modules



Description

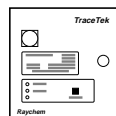
Catalog number

Zone alarm module for all TraceTek sensing cables. Metal enclosure, NEMA Type 1* (IP20)
 Display: 1–50 zones (for use with TT-ZONE sensors only)
 Supply voltage: 120/240 Vac
 Standard relays: SPDT
 Approvals: UL, FM, and CSA
 Optional accessories
 Current transmitter zone system (4–20 mA) TTB-CTR-IZ
 Continuity relay TTB-REL
 Semiflush mounting flange TTB-FLG
 External audible alarm TTE-XAL
 MTL zener barrier kit (optional when intrinsically safe sensor circuits are required; includes two MTL-765 zener safety barriers in one housing) TT-Zener-Barrier-Kit



Zone alarm module for all TraceTek sensing cables. Plastic enclosure, NEMA Type 12 (IP65)
 Display: 1–50 zones (for use with TT-ZONE sensors only)
 Supply voltage: 24 Vac or Vdc
 Enclosure style: _____
 B = semiflush panel mount
 S = surface mount
 Standard relays: DPDT and SPDT
 Approvals: BASEEFA
 Optional accessories
 Current transmitter zone system (4–20 mA) TTE-CTR-IZR
 External audible alarm TTE-XAL
 MTL zener barrier kit (optional when intrinsically safe sensor circuits are required; includes two MTL-765 zener safety barriers in one housing) TT-Zener-Barrier-Kit

Nonlocating single-channel alarm modules



Description

Catalog number

Nonlocating single-channel alarm module. Metal enclosure, NEMA Type 1 (IP20)
 Supply voltage: 120/240 Vac
 Standard relay: SPDT
 Approvals: UL and CSA
 TTA-1-UL

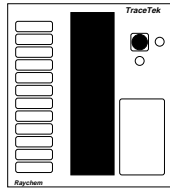


Nonlocating single-channel alarm module with extra relay contacts. Plastic enclosure NEMA Type 1 (IP20)
 Supply voltage: 12–24 Vac/15–24 Vdc
 Standard relay: DPDT and SPDT
 Approvals: UL, CSA, and BASEEFA
 Optional accessories:
 External audible alarm TTE-XAL
 Mounting system for DIN rail TT-DIN-RAIL

Custom leak detection panel, engineered to house multiple TTC modules (contact factory for quote) TT-LDP-2

* For other NEMA-rated enclosures or customer-engineered panels, consult factory.

Nonlocating multiple-channel alarm module

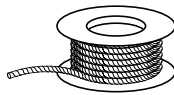


Description	Catalog number
Nonlocating multiple-channel alarm module Metal enclosure, NEMA Type 12/13 (IP65) Alarm channels: _____ 4 = 4 channels 12 = 12 channels Standard relay: SPDT master relay Approvals: UL Supply voltage: 120/240 Vac	TTG-x

Aqueous sensing cables



Description	Catalog number
TT3000 series locating sensing cable with metal connectors for locating conductive fluid Cable length: _____ 0.3 meter/1foot 1.5 meters/5 feet 3 meters/10 feet 4.5 meters/15 feet 7.5 meters/25 feet 15 meters/50 feet 30 meters/100 feet 60 meters/200 feet	TT3000-xM/xFT-MC


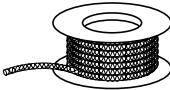





TT3000 series bulk sensing cable for locating conductive fluid Cable length: xxx feet _____ Connectors not included (use with TT3000-CK-MC-M or F connector kits) Reel size: Maximum 1000 feet Minimum order 250 feet	TT3000-SC-xxx
---	---------------


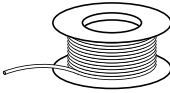
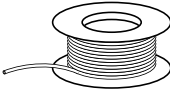


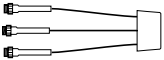

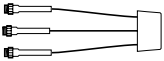




TT3000 series zone sensing cable for detecting conductive fluid Cable length: 5 feet Metal connector and heat-shrink end termination	TT3000-ZONE-MC
--	----------------

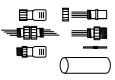
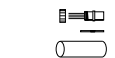
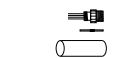
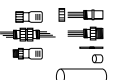
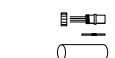
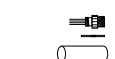
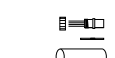


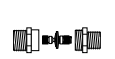

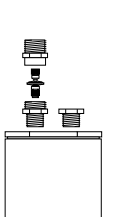
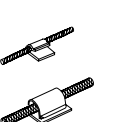
* For other NEMA-rated enclosures or customer engineered panels, consult factory.

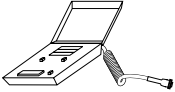
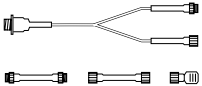
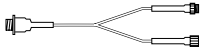
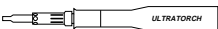
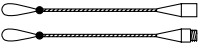
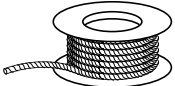

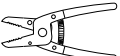
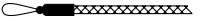
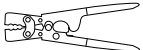
Fuel hydrocarbon sensing cables	Description	Catalog number
	TT5000 series locating sensing cable for locating fuels, with metal connectors Cable length: _____ 0.3 meter/1foot 1.5 meters/5 feet 3 meters/10 feet 4.5 meters/15 feet 7.5 meters/25 feet 15 meters/50 feet 30 meters/100 feet	TT5000-xM/xFT-MC
	TT5000 series bulk sensing cable for locating fuels Cable length: xxx feet _____ Connectors not included (use with TT5000-CK-MC-M or -F connector kits) Reel size: Maximum 425 feet Minimum order 100 feet	TT5000-SC-xxx
	TT5000 series zone sensing cable for detecting fuels Cable length: 5 feet Metal connector and heat-shrink end termination	TT5000-ZONE-MC
Solvent hydrocarbon sensing cables	Description	Catalog number
	TT501 series locating sensing cable for locating solvents, with metal connectors Cable length: _____ 1 foot 5 feet 10 feet 25 feet 50 feet	TT501-MSC-xx-MC
	TT501 series zone sensing cable for detecting solvents Cable length: 5 feet Metal connector with heat-shrink end termination	TT501-ZONE-MC

* For other NEMA-rated enclosures or customer engineered panels, consult factory.

Components	Description	Catalog number
	Modular leader cable Cable length: 12 feet Metal connector at one end	TT-MLC-MC
	Jumper cable Bulk reel Cable length: xxx feet 1000 feet minimum, 2000 feet maximum Connectors not included (use with TT-JC-CK-MC-M or -F)	TT-JC-xxx
	Jumper cable Bulk reel Cable length: 250 feet per reel Connectors not included (use with TT-JC-CK-MC-M or -F)	TT-JC-250
	Modular jumper cable with metal connectors Cable length: 1.5 meters/5 feet 3.0 meters/10 feet 7.5 meters/25 feet 15 meters/50 feet 30 meters/100 feet Metal connectors preinstalled	TT-MJC-xM/xFT-MC
	Modular end termination Metal connector	TT-MET-MC
	Modular branch connector (connects a branch circuit to the main run) Metal connectors	TT-MBC-MC
	Weighted length Simulates 15 feet of sensing cable Metal connectors	TT-WL-4.5 M/15 FT-MC
	Zone connector (connects one zone to the sensing circuit) Metal connectors preinstalled on all legs	TT-OZC-MC
	Field-wired zone connector (connects one zone to the sensing circuit) Lead wire connections with metal connector for center leg only (use with TT-JSK-HS18 and TT-JC bulk jumper wire)	TT-OZC-L
	Splice kit Contains 20 crimps and 5 heat-shrinkable tubes For use with 18-AWG jumper wire only (not appropriate for splicing sensing cables) Requires AD-1522-1-crimping tool	TT-JSK-HS18

Components (continued)

	Description	Catalog number
	Metal connector kit for TT3000 bulk sensing cable Contains five mated pairs. Includes FET-MC, MET-MC, and pin and socket test tools. Requires TT-CT-SCT-3000 crimp tool.	TT3000-CK-MC-M/F
	Metal connector kit for TT3000 bulk sensing cable Contains components for one pin-type connector. Requires TT-CT-SCT-3000 crimp tool.	TT3000-CK-MC-M
	Metal connector kit for TT3000 bulk sensing cable Contains components for one socket-type connector. Requires TT-CT-SCT-3000 crimp tool.	TT3000-CK-MC-F
	Metal connector kit for TT5000 bulk sensing cable Contains five mated pairs. Includes FET-MC, MET-MC, and pin and socket test tools.	TT5000-CK-MC-M/F
	Metal connector kit for TT5000 bulk sensing cable Contains components for one pin-type connector.	TT5000-CK-MC-M
	Metal connector kit for TT5000 bulk sensing cable Contains components for one socket-type connector.	TT5000-CK-MC-F
	Metal connector kit for TT jumper cable Contains components for one pin-type connector.	TT-JC-CK-MC-M
	Metal connector kit for TT jumper cable Contains components for one socket-type connector.	TT-JC-CK-MC-F
	Tool kit for connector kits Contains FET-MC, MET-MC, and pin and socket test tools.	TT-CK-TOOL KIT
	Pressure feedthrough, 3/4-inch NPT brass fitting Metal bulkhead connectors included.	TT-PFT-3/4-MC
	Pressure feedthrough, 3/4-inch NPT stainless steel Metal bulkhead connectors included.	TT-PFT-3/4-SS/MC
	Tank access kit (allows entry of one or two sensing cables into double-wall tanks). If two sensing cables are required, order additional pressure fitting TT-PFT-3/4-MC. Kit includes: 3.5-inch-O.D. PVC coupling Slip cap with two 3/4-inch NPT holes 3/4-inch plug One pressure feedthrough fitting TT-PFT-3/4-MC	TT-TAK
	Hold-down clips with adhesive backs Bag of 50 clips Clip size: _____ 1/4-inch for use with TT3000 sensors 1/2-inch for use with TT501 or TT5000 sensors	TT-HDC-xx

Installation tools	Description	Catalog number
	Portable test box (for installation and maintenance of TraceTek sensing cables) Plastic connector Plastic-to-metal adapter Alligator clips Supply voltage: 9-volt battery	TT-PTB-1000
	Optional adapter kit (includes all adapters necessary for installing and troubleshooting TT3000, TT5000, TT501 cables) Adapter-Y Metal socket to metal socket adapter Metal pin to metal pin adapter Metal socket end termination	TT-Adapter Kit
	Adapter (for connecting portable test box to metal pin connector or metal socket connector)	TT-Adapter-Y
	Ultratorch 200 flameless heating tool (for shrinking tubing over connectors)—alternative to CV5000 heat gun or CV5300 heat gun	TT-Ultratorch
	Cable pulling tool (steel cable—12-inches—with end loop and metal connector) Set of two tools: pin and socket	TT-CPT-MC
	Polypropylene pull rope (1/4-inch hollow braid for pulling sensing cable into double-containment pipe) Reel size: 500 feet	TT-PR
	Crimp tool (for installing all TT3000 CK kits)	TT-CT-SCT-3000
	Green Lee™ stripping tool (for installing JC, TT3000, and TT5000 bulk cables)	TT-Stripper
	Kellem Grip (for pulling TT3000 and TT5000 bulk cables)	TT-Kellemgrip
	Crimp tool for TT-JSK-HS18	AD-1522-1-Crimping Tool

