



FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION

RICK SCOTT
GOVERNOR

CARLOS LOPEZ-CANTERA
LT. GOVERNOR

JONATHAN P. STEVERSON
SECRETARY

VIA ELECTRONIC MAIL

CWilliamson@talon-industries.com

Mr. Clyde Williamson
Talon Industries, Inc.
1104 Enterprise Place
Arlington, Texas 76001

Subject: Approval of the Talon Industries, Inc.
TraceTek LDS_LS-3 Float Sensor and TraceTek TTDM-128 Leak Detection Master
Module. File No. EQ-843

Dear Mr. Clyde Williamson:

The Office of District and Business Support has concluded its review of the Equipment Approval request dated January 7, 2015, that was submitted for the Talon Industries, Inc. TraceTek TTDM-128 Leak Detection Master Module with LS-3 Sensor, pursuant to Rules 62-761.640(3)(a)1., 62-761.850(2), 62-762.641(3)(a)1., and 62-762.851(2), Florida Administrative Code (F.A.C.). The applicant has requested that TraceTek LDS_LS-3 Sensor be approved using a product or liquid release detection system within the interstice of secondary containment associated with underground or aboveground storage tank systems. The TraceTek LDS_LS-3 Sensor must be placed at the low point of the secondary containment system being monitored.

Based on the information provided by Talon Industries, Inc. TraceTek TTDM-128 Leak Detection Master Module with LDS_LS-3 Sensor provides environmental protection substantially equivalent to that provided by compliance with the requirements established in Rules 62-761.640(3)(a)1., and 62-762.641(3)(a)1., F.A.C. Either a product or liquid release detection sensor may be used as the TraceTek LDS_LS-3 Sensor within the interstice of secondary containment associated with underground or aboveground storage tank systems. The TraceTek LDS_LS-3 Sensor must be placed at the low point of the secondary containment system being monitored.

Pursuant to Rules 62-761.850(2), and 62-762.851(2), F.A.C., the request for the use of the Talon Industries, Inc. TraceTek TTDM-128 Leak Detection Master Module with LDS_LS-3 Sensor is approved in the State of Florida as an alarm and location reporting module with a product or liquid release detection sensor within the interstice of secondary containment associated with underground or aboveground storage tank systems. The TraceTek LDS_LS-3 Sensor is to be placed at the low point of the secondary containment system being monitored. The installation and operation and maintenance procedures for the TraceTek LDS_LS-3 Sensor shall be made in accordance with the manufacturer's recommendations.

Please be advised that the above referenced DEP rules are subject to change. If the above rule standards are modified in the future, this order may be modified or rescinded for future upgrades and installations. Additionally, if the product(s) show a consistent pattern of failure(s), and therefore does not provide substantially equivalent environmental protection, the Department may rescind this order.

The Department's Order shall become final unless a timely petition for an administrative hearing is filed under sections 120.569 and 120.57, F.S., within **21** days of receipt of this Order. Persons who have filed such a petition may seek to mediate the dispute and choosing mediation will not adversely affect the right to a hearing if mediation does not result in a settlement. The procedures for petitioning a hearing and pursuing mediation are set forth below.

Persons affected by this Order have the following options:

- A. If you choose to accept the Department's decision regarding the Order, you do not have to do anything. This Order is final and effective as of the date it is clerked and filed (see page 4).
- B. If you choose to challenge the decision, you may do the following:
 - 1. File a request for an extension of time to file a petition for hearing with the Department's Agency Clerk in the Office of General Counsel within **21** days of receipt of this Order. This request should be made if you wish to meet with the Department in an attempt to resolve any disputes without first filing a petition for hearing or negotiate an agreement to mediate; or
 - 2. File a petition for administrative hearing with the Department's Agency Clerk in the Office of General Counsel within **21** days of receipt of this Order.

In addition to requesting an administrative hearing, any petitioner may elect to pursue mediation under Section 120.573, F.S., and must negotiate an agreement to mediate within **10** days after the deadline for filing a petition.

How to Request an Extension of Time to File a Petition for Hearing

For good cause shown, pursuant to Rule 62-110.106(4), F.A.C., the Department may grant a request for an extension of time to file a petition for hearing. Such a request must be filed (received) by the Agency Clerk in the Office of General Counsel of the Department at 3900 Commonwealth Boulevard, Mail Station 35, Tallahassee, Florida, 32399-3000, within **21** days of receipt of this Order. Petitioner, if different from the applicant, shall mail a copy of the request to the applicant at the time of filing. Failure to file a petition within this time period shall waive the right of anyone who may request an administrative hearing under Sections 120.569 and 120.57, F.S.

How to File a Petition for Administrative Hearing

A person whose substantial interests are affected by this Order may petition for an administrative proceeding (hearing) under Sections 120.569 and 120.57, F.S. The petition must contain the information set forth below and must be filed (received) by the Agency Clerk in the Office of General Counsel of the Department at 3900 Commonwealth Boulevard, MS 35, Tallahassee, Florida, 32399-3000, within **21** days of receipt of this Order. Petitioner, if different from the applicant shall mail a copy of the petition to the applicant at the time of filing. Failure to file a petition within this time period shall waive the right of anyone who may request an administrative hearing under Sections 120.569 and 120.57, F.S.

Pursuant to Subsection 120.569(2), F.S., and Rule 28-106.201, F.A.C., a petition for administrative hearing shall contain the following information.

- a) The name, address, and telephone number of each petitioner; the name, address, and telephone number of the petitioner's representative, if any, the site owner's name and address, if different from the petitioner, the DEP facility number, and the name and address of the facility;

- b) A statement of when and how the petitioner received notice of the Department's action or proposed action;
- c) An explanation of how each petitioner's substantial interests are or will be affected by the Department's action or proposed action;
- d) A statement of the disputed issues of material fact, or a statement that there are no disputed facts;
- e) A concise statement of the ultimate facts alleged, including a statement of the specific facts the petitioner contends warrant reversal or modification of the Department's action or proposed action;
- f) A statement of the specific rules or statutes the petitioner contends requires reversal or modification of the Department's action or proposed action; and
- g) A statement of the relief sought by the petitioner, stating precisely the action petitioner wishes the Department to take with respect to the Department's action or proposed action.

How to Pursue Mediation

In addition to requesting an administrative hearing, any petitioner may elect to pursue mediation. The election may be accomplished by filing with the Department a mediation agreement with all parties to the proceeding (i.e., the applicant, the Department, and any person who has filed a timely and sufficient petition for hearing). The agreement must contain all the information required by Rule 28-106.404, F.A.C. The agreement, signed by all parties, must be received by the Agency Clerk in the Office of General Counsel of the Department at 3900 Commonwealth Boulevard, Mail Station 35, Tallahassee, Florida, 32399-3000 within **10** days after the deadline for filing a petition, as set forth above. Choosing mediation will not adversely affect the right to a hearing if mediation does not result in a settlement.

Pursuant to Rule 28-106.404, F.A.C., an agreement to mediate must include the following.

- (i) The name, address, and telephone number of the persons who may attend the mediation, (also the DEP facility number, the name and address of the facility if applicable);
- (ii) The name, address, and telephone number of the mediator agreed to by the parties;
- (iii) How the costs and fees associated with the mediation will be allocated (the Department will not pay any of the costs of mediation);
- (iv) The agreement of the parties regarding the confidentiality of discussions and documents introduced during mediation to the extent authorized by law;
- (v) The date, time, and place of the first mediation session;
- (vi) The name of the party's representative who shall have authority to settle or recommend settlement; and
- (vii) The signature of the parties.

As provided in Section 120.573, F.S., the timely agreement of all parties to mediate will toll the time limitations imposed by Sections 120.569 and 120.57, F.S., for holding an administrative hearing and issuing a final order. Unless otherwise agreed by the parties, the mediation must be concluded within sixty days of the execution of the agreement. If mediation results in settlement of the administrative dispute, the Department must enter a final order incorporating the agreement of the parties. Persons seeking to protect their substantial interests that would be affected by such a modified final decision must file their petitions within **21** days of receipt of this notice, or they shall be deemed to have waived their right to a proceeding under Sections 120.569 and 120.57, F.S. If mediation terminates without settlement of the dispute, the Department shall notify all parties in writing that the administrative hearing processes under Sections 120.569 and 120.57, F.S., are resumed.

This Order is final and effective as of the date it is clerked and filed (see page 4). Timely filing a petition for administrative hearing postpones the date this Order takes effect until the Department issues either a final order pursuant to an administrative hearing or mediation settlement.

Judicial Review

Any party to this Order has the right to seek judicial review of it under Section 120.68, F.S., by filing a notice of appeal under Rule 9.110 of the Florida Rules of Appellate Procedure with the Agency Clerk of the Department in the Office of General Counsel, Mail Station 35, 3900 Commonwealth Boulevard, Tallahassee, Florida 32399-3000, and by filing a copy of the notice of appeal accompanied by the applicable filing fees with the appropriate district court of appeal. The notice of appeal must be filed within thirty days after this order is filed with the clerk of the Department (see below).

Questions

Any questions regarding the Department's review of your equipment approval should be directed to John Svec at (850)245-8845. Questions regarding legal issues should be referred to Rebecca Robinette, Office of General Counsel, at (850)245-2242. Contact with any of the above does not constitute a petition for administrative hearing, a request for a time extension to file a petition for hearing or an agreement to mediate.

Sincerely,

3/23/2015

X 

John A. Coates

Signed by: Coates_J

John A. Coates, PE, Assistant Division Director
Division of Waste Management

JAC/js

FILING AND ACKNOWLEDGMENT FILED,
on this date, pursuant to §120.52 Florida Statutes,
with the designated Department Clerk, receipt of
which is hereby acknowledged.

3/23/2015

X 

Judith Pennington

Signed by: Penningto_JA

Clerk
(or Deputy Clerk)

Date

The TraceTek Leak Detection System consists of up to 128 sensor interface modules with up to six product sensitive sensors per module for a total of 768 product sensors. A Model TTDM-128 or TTDM-Plus monitoring Console is used to display the alarm condition and the location of each sensor. The sensors can be installed in sumps or in the low point of the interstice of double wall piping.

The sensors that interface with this system can be of the product or liquid sensitive type (TT5000/TT3000), or can be activated by any liquid in the interstitial sump low point of the piping (LS-3), or a mixture of both types of sensors. Third Party Certification is provided by the attached report for the LS-3 Sensor with the TTDM Module by Carnegie Mellon Research Institute dated September 28, 2001. The LS-3 sensor can be tested annually or on demand simply by removing it from the sump location and inserting it in a liquid. It can then be cleaned and re-installed.

Results of Third Party Standard Evaluation

Point Sensor Liquid Contact Product Detectors

This form documents the performance of the point sensor liquid contact leak detection system described below. The evaluation was conducted by the equipment manufacturer or a consultant to the manufacturer according to the Third Party Procedures developed according to the U.S. EPA's "Standard Test Procedure for Evaluating Leak Detection Methods: Liquid-Phase Out-of-Tank Product Detectors."¹

Tank owners using this leak detection system should keep this form on file to prove compliance with the federal regulations. Tank owners should check with state and local agencies to verify that this form satisfies their requirements.

Method Description

Name TraceTek TTDM-Plus Alarm and Location Module

Version with LS-3 Sensor

Vendor Raychem Corporation, TraceTek Products Group

300 Constitution Drive

(street address)

Menlo Park

CA

94025-1164

(650) 474-7485

(city)

(state)

(zip)

(phone)

Detector output type: ☒ Qualitative Leak location: ☒ Quantitative

Detector operating principle: Electrical Conductivity ☐ Capacitance Change

☐ Interface Probe ☐ Product Permeable ☐ Product Soluble ☐ Thermal Conductivity

☐ Pressure Switch ☐ Magnetic Switch ☒ Other ☐ Float Switch

Detector sampling frequency: ☐ Intermittent ☒ Continuous

Evaluation Results

The detector described above was tested for its ability to detect test liquids in contact with the cable sensor. The following parameters were determined:

- **Detection Accuracy** - The measure of sensor response to the presence of liquids.
- **Bias** - Whether the method consistently over-estimates or under-estimates leak location. Not applicable to qualitative detectors.
- **Response Time** - Amount of time the detector must be exposed to liquid before it responds.
- **Recovery Time** - Amount of time that passes before the detector returns to its baseline reading after the test liquid is removed.
- **Lower Detection Limit** - The smallest liquid concentration that the detector can reliably detect.
- **Maximum Effective Range (MER)** - The longest length of sensor cables that can be connected to form a leak detection network.
- **Precision** - Agreement between multiple measurements of the leak location. Not applicable to qualitative detectors.
- **Product Activation Height** - The height of liquid to cause sensor activation.
- **Relative Accuracy** - A statistical term defining the percent difference between the measured values and the reference values.
- **Specificity** - Indicates the level of response, of the detector, to several different liquids.

¹ Carnegie Mellon Research Institute. Test Procedures for Third Party Evaluation of Leak Detection Methods: Point Sensor Liquid Contact Leak Detection Systems: Final Report - November 11, 1991.

Evaluation Results (continued)

> **Compiled Test Results for Qualitative Detector, Quantitative Leak Location**

Cable Length Maximum Effective Range (MER): 5000 ft (1524 m)

Test Product Flow Rate: 0.347 ± .017 gal/hr.

	Detection Accuracy %	Product Activation Height cm (in)	Response Time at a Flow Rate of 0.347 gal/hr	Recovery Time
Accuracy and Response Time 3 wt% Salt Water (6 tests at each length)				
1/3 MER Sensor Test Length <u>1671 ft</u>	100%	3.08 ± 0.03 cm (1.21 ± 0.01 in)	5.68 ± 0.05 min.	< 1 min.
2/3 MER Sensor Test Length <u>3337 ft</u>	100%	3.02 ± 0.03 cm (1.19 ± 0.01 in)	5.68 ± 0.08 min.	< 1 min.
MER Sensor Test Length <u>4998 ft</u>	100%	3.04 ± 0.05 cm (1.20 ± 0.02 in)	5.87 ± 0.10 min.	< 1 min.
Specificity @ MER (3 tests for each liquid)				
Synthetic Fuel	100%	[117.3%]* 3.57 ± 0.06 cm (1.40 ± 0.02 in)	6.27 ± 0.40 min.	< 1 min.
Diesel Fuel	100%	[109.0%]* 3.32 ± 0.03 cm (1.31 ± 0.01 in)	6.48 ± 0.13 min.	< 1 min.
Motor Oil (10W40)	100%	[120.0%]* 3.65 ± 0.05 cm (1.44 ± 0.02 in)	7.12 ± 0.15 min.	< 1 min.
Water	100%	[95.9%]* 2.92 ± 0.03 cm (1.15 ± 0.01 in)	5.69 ± 0.07 min.	< 1 min.

*Specificity Reference: 3 wt% Salt Water

Test Fuel	Calculated Lower Detection Limit for 95% / 5% Condition Product Activation Height (cm)
3 wt% Salt Water (6 tests)	3.41 cm (1.34 in)

Man Portuff
(signature)

September 28, 2001
(date)

Liquid Contact Product Detector TraceTek TTDM-Plus Alarm and Location Module

Version _____ with LS-3 Sensor _____

Evaluation Results (continued)

> Compiled Test Results for Product Location Measurements.

	Sensor Test Length (1/3 MER) <u>1671 ± 0 ft</u>	Sensor Test Length (2/3 MER) <u>3337 ± 0 ft</u>	Sensor Test Length (MER) <u>4998 ± 0 ft</u>
Product Location Accuracy 3 wt% Salt Water (6 tests at each length)			
Average Observed Value	1671 ft	3337 ft	4998 ft
Standard Deviation	± 1 ft	± 1 ft	± 0 ft
Relative Accuracy (%)	0.05	0.03	0.00
Coefficient of Variation (%)	0.03	0.02	0.00
Bias (%)	0.02	- 0.01	0.00
Specificity (%) @ MER (3 tests for each liquid)			
Synthetic Fuel (Average Observed Value)			[100.0]* 4998 ± 1 ft
Diesel Fuel (Average Observed Value)			[100.0]* 4998 ± 1 ft
Motor Oil (10W40) (Average Observed Value)			[100.0]* 4998 ± 1 ft
Water (Average Observed Value)			[100.0]* 4997 ± 1 ft

* Specificity Reference: 3 wt% Salt Water

> **Safety disclaimer:** This test procedure only addresses the issue of the method's ability to detect the presence of liquid product. It does not test the equipment for safety hazards.

Certification of Results

I certify that the point sensor liquid contact product detector was operated according to the vendor's instructions and that the evaluation was performed according to the Third Party Procedures developed according to the U.S. EPA's "Standard Test Procedure for Evaluating Leak Detection Methods: Liquid-Phase Out-of-Tank Product Detectors."¹ I also certify that the results presented above are those obtained during the evaluation.

Marc Portnoff
(printed name)

Marc Portnoff
(signature)

September 28, 2001
(date)

Carnegie Mellon Research Institute **
(organization performing evaluation)

Pittsburgh, PA 15230
(city, state, zip)

(412) 268-3495
(phone number)

** Consultant to the Manufacturer

Liquid Contact Product Detector TraceTek TTDM-Plus Alarm and Location Module
 Version _____ with LS-3 Sensor _____

At the request of TraceTek additional specificity tests were performed. The results are tabulated below.

Evaluation Results (added tests)

Sensor Cable Maximum Effective Range (MER): 5000 ft (1524 m)

Test Product Flow Rate: 0.347 ± .017 gal/hr.

	Detection Accuracy %	Product Activation Height cm (in)	Response Time at a Flow Rate of 0.347 gal/hr	Recovery Time
Specificity @ MER (3 tests for each liquid)				
5 vol% Oil in 3 wt% Salt Water	100%	[95.9%]* 2.92 ± 0.06 cm (1.15 ± 0.02 in)	5.74 ± 0.29 min.	< 1 min.
10 vol% Oil in 3 wt% Salt Water	100%	[99.7%]* 3.03 ± 0.12 cm (1.19 ± 0.05 in)	5.81 ± 0.24 min.	< 1 min.

* Specificity Reference: 3 wt% Salt Water

Product Location	Sensor Test Length (MER)
	<u>4998 ± 0 ft</u>
Specificity (%) @ MER (3 tests for each liquid)	
5 vol% oil in 3 wt% Salt Water (Average Observed Value)	[100.0]* 4998 ± 1 ft
10 vol% oil in 3 wt% Salt Water (Average Observed Value)	[100.0]* 4998 ± 0 ft

* Specificity Reference: 3 wt% Salt Water

Marc Portnoff
(signature)

September 28, 2001
(date)

Test Procedures for Third Party Evaluation of Leak Detection Methods: Point Sensor Liquid Contact Leak Detection Systems

Subject: **TraceTek TTDM-Plus Alarm and Location Module
 with LS-3 Sensor**

Date: September 28, 2001

Carnegie Mellon Research Institute evaluated the above TraceTek system according to the following test protocol:

CMRI TEST PROCEDURES: Test Procedures for Third Party Evaluation of Leak Detection Methods: Point Sensor Liquid Contact Leak Detection Systems, Carnegie Mellon Research Institute, Final Report, November 11, 1991.

The procedure was modified as listed below to evaluate the LS-3 Sensor:

- 3 wt% salt water, was substituted for unleaded gasoline as the test liquid used for conducting the accuracy and response time tests and the lower detection level tests.
- The following test liquids were added or substituted to the list of specificity tests:
 - * 5 vol% oil in 3 wt% salt water (mixed, not emulsified)
 - * 10 vol% oil in 3 wt% salt water (mixed, not emulsified)
 - * Motor Oil (10W40) was substituted for home heating oil
- The test liquids were delivered at an average rate of 0.347 gal/hr yielding a test liquid rate of rise of 5.25 mm/min.

Carnegie Mellon RESEARCH INSTITUTE

A division of Carnegie Mellon University

Advanced Devices & Materials

700 Technology Drive, Box 2950
Pittsburgh, PA 15230-2950 USA

Carnegie Mellon Research Institute (CMRI) was selected by Raychem Corporation, TraceTek Products Group, to evaluate its Underground Storage Tank Leak Detection Monitoring System. Their system, listed below, was evaluated using an EPA approved equivalent test protocol modified to test the LS-3 Float Switch.

The TraceTek equipment was properly set up, calibrated, and maintained, according to written instructions provided by TraceTek and as required by the test protocols.

TraceTek TTDM-Plus Alarm and Location Module with:

LS-3 Float Switch

Liquid-Contact Protocol

LIQUID-CONTACT TESTING: November 1991, Equivalent test procedure for evaluating leak detection methods for Point Sensor Liquid Contact product detectors [Carnegie Mellon Research Institute. Test Procedures for Third Party Evaluation of Leak Detection Methods: Point Sensor Liquid Contact Leak Detection Systems: Final Report - November 11, 1991.].

Marc Portnoff
(printed name)

Marc Portnoff
(signature)

September 28, 2001
(date)

Carnegie Mellon Research Institute *
(organization performing evaluation)

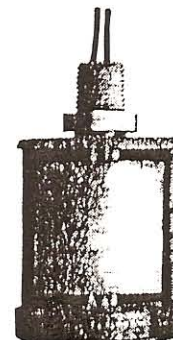
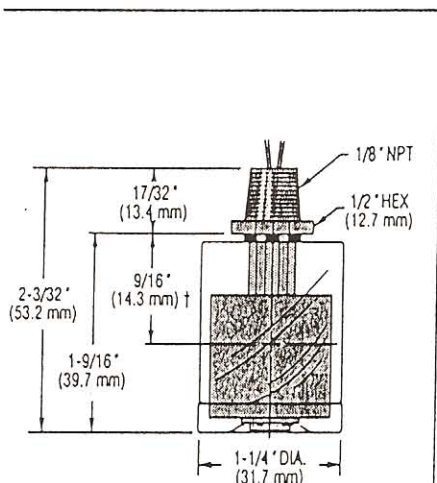
Pittsburgh, PA 15230
(city, state, zip)

412 - 268 - 3495
(phone number)

* Consultant to the Manufacturer

Unique Features Make These LS-3 Models Special
These small switches feature unique configurations for special applications.

Part No. 142545
With Slosh Shield



Cut-away version shown

Compact, all-polypropylene switch with slosh shield is ideal for use with turbulent liquids in small tanks. FDA approved materials.

Order By Part Number	142545 ⚡
Materials	
Stem and Mounting	All Polypropylene (Including Shield††)
Float	Polypropylene (Solid)
Other Wetted	—
Min. Liquid Sp. Gr.	.90
Operating Temperature	-40 F to +150 F (-40 C to +65.6 C)
Pressure, PSI, Max.***	150
Switch*, SPST	20 VA, N.C./N.O. Dry**
Electrical Termination	No. 22 AWG, 22" L., PVC Lead Wires

* See "Electrical Data" on Page A-4 for more information.

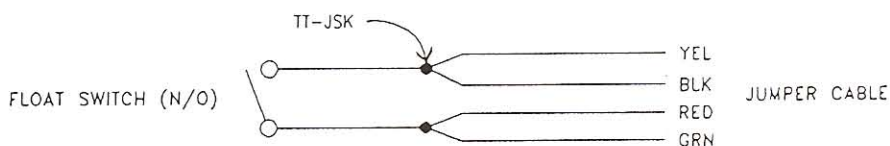
** Switch operation is selectable, N.O. or N.C., by inverting the float on the unit stem.

*** Maximum pressure at 70°F (30°C).

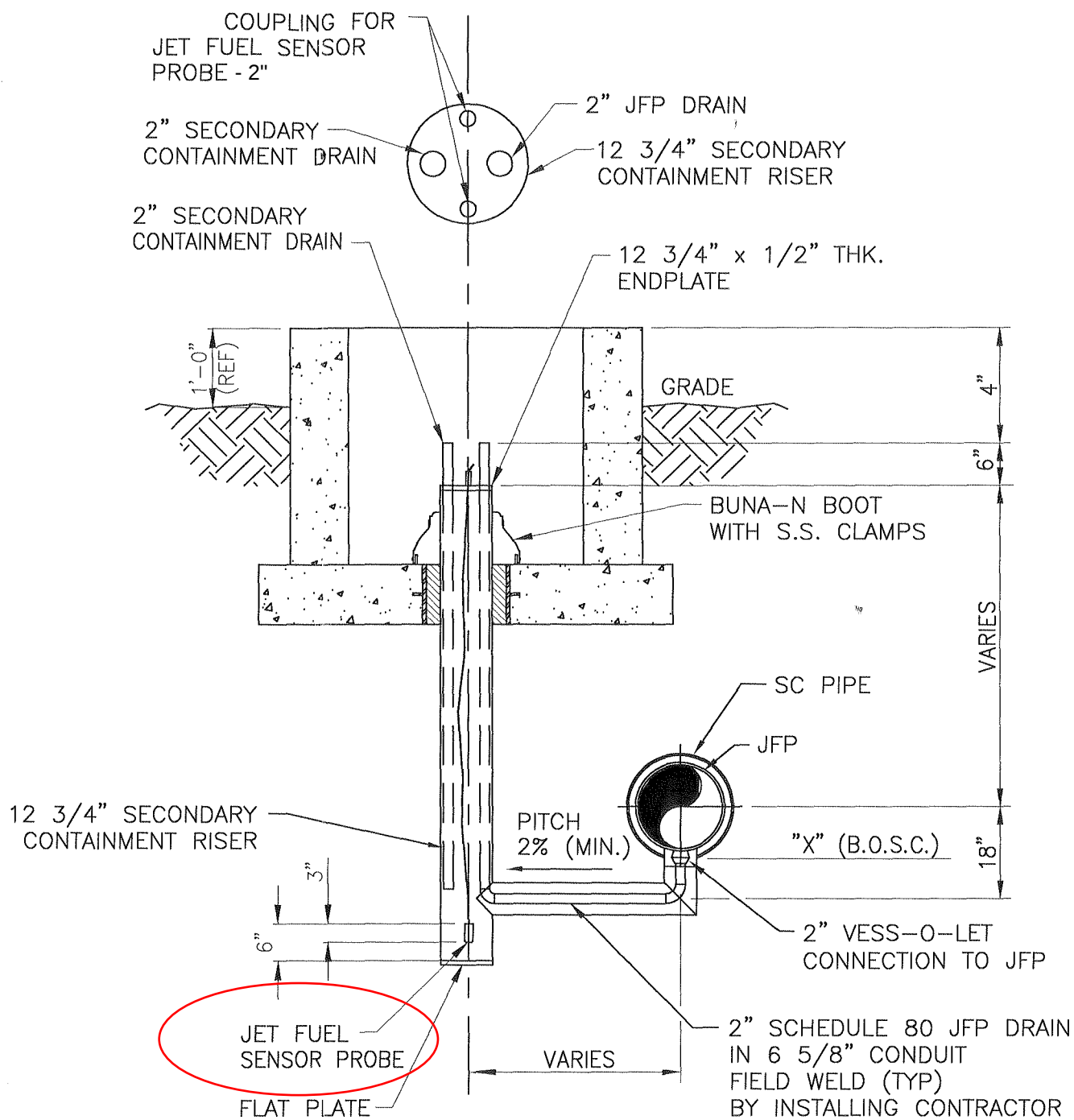
† L_s = Switch actuation level, nominal (based on a specific gravity of 1.0).

†† Consult factory for other available materials.

⚡ - Stock Items.



WIRING DIAGRAM

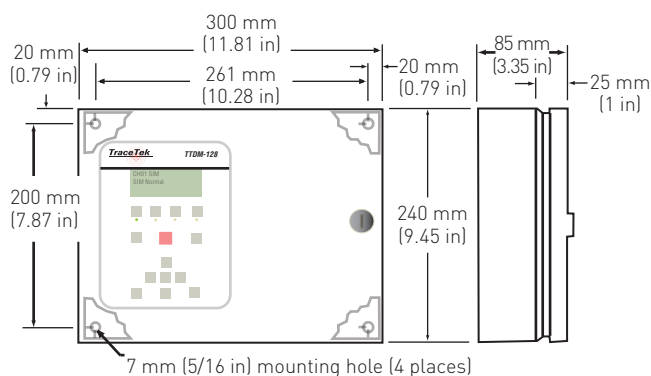
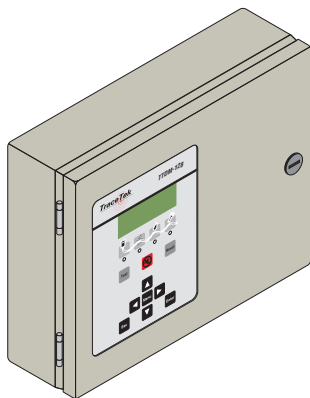


LOW POINT DRAIN PIT (LPD) DETAIL ④

N.T.S.

TRACETEK TTDM-128

LEAK DETECTION MASTER MODULE



PRODUCT OVERVIEW

Easy setup and simple operation

The TTDM-128 module directly monitors up to 1500 m (5000 ft) of leak detection cable and a network of up to 127 remote TraceTek modules. The remote modules may be a combination of sensor interface modules (TTSIM), relay modules (TT-NRM) or additional TTDM-128 modules. With its networking capability, the TTDM-128 provides tremendous flexibility in terms of system layout options and monitoring capability.

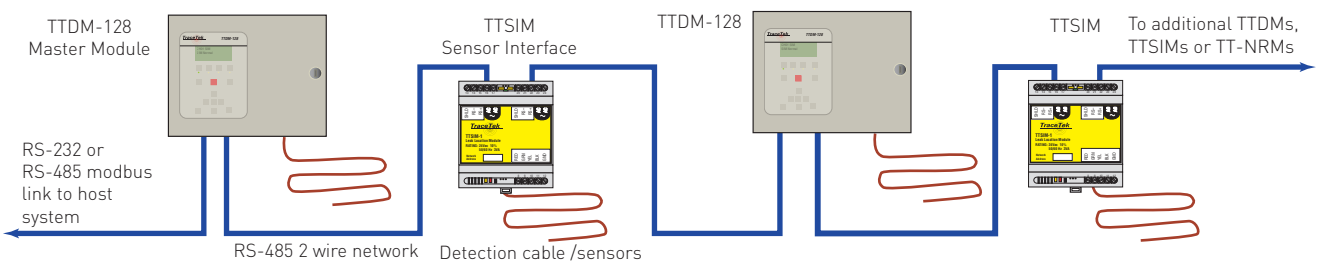
When liquid is detected on any of the sensors, the TTDM-128 sounds an alarm, closes relay contacts, turns on a front panel LED and displays the circuit identification and location of the leak on the alphanumeric display. The leak detection event is logged to a non-volatile event history file. All status and event information is made available via the front panel keyboard or RS232/RS485 modbus digital communication to a host computer, PLC or plant/building automation system.

Each sensor circuit detects, locates and tracks leaks independently from any other circuits connected to the TTDM-128. There is no loss of sensitivity and no re-mapping required after an initial leak is detected. A simple map showing where the sensors are installed is the only field calibration requirement.

Design features

- Multiple event tracking capability for up to 127 independent sensor circuits.
- Summary relay contacts, LED status lights, LCD information display at the TTDM-128 panel.
- Standard external interface modes include: dry contacts, and RS232/RS485 modbus communication. A 4-20 mA analog output option is available.
- Event history accessible from the front panel or via serial port to identify type of event, time, location, and other parameters for all sensor events or user adjustments and interventions.
- Layered password protection for setup changes.
- Adjustable sensitivity and selectable measurement units.
- Universal power supply for 110/220 Vac 50/60 Hz (24 volt option available).
- Non-volatile memory for event history, setup and network configuration.
- Complete remote operation and monitoring through modbus communications or using optional TT-SUPERVISOR Windows software.

TRACETEK NETWORK ARRANGEMENT



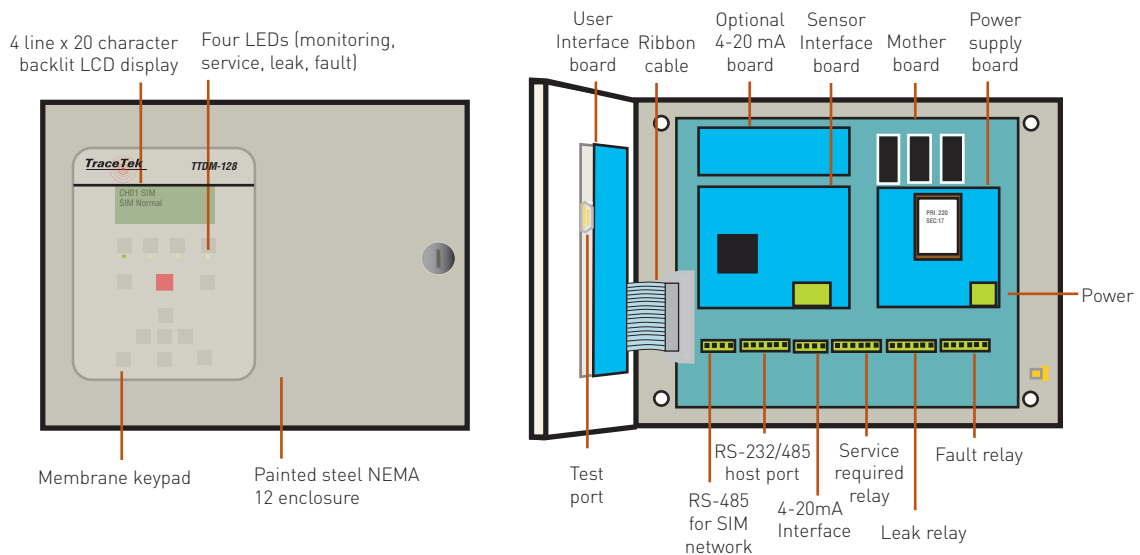
GENERAL FEATURES

Sensor compatibility	All TraceTek sensor cables and point sensors or contact closure devices
Maximum size of network	
Number of TTSIM modules	127 (less number of TT-NRMs installed)
Maximum number of TT-NRM	10
Precision	$\pm 0.1\%$ of circuit length
Units	Feet, meters or zones
Display language	English, French, German, Spanish, Japanese, Italian

ORDERING INFORMATION

	Catalog number	Part number	Description
Supply voltage	TTDM-128	P000000091	115 V + 15%, - 20% ; 230 V $\pm$ 10% ; 50/60 Hz
	TTDM-128-24V	P000000092	24 V AC + 5%, - 35% ; 24 V DC $\pm$ 20%
Accessories	TT-NRM	E03411-000	Network relay module
	TTSIM-1	see H56858	Network sensor interface module
	TTSIM-1A	see H57387	Network sensor interface module with relay
	TTSIM-2	see H57346	Network sensor interface module with relay
	TTDM-4/20	688799-000	4-20 mA analog output board
	TT-SUPERVISOR	591416-000	Windows based PC software

TTDM-128 LEAK DETECTION MASTER MODULE



ENVIRONMENTAL

Storage temperature	-18°C to 60°C (0°F to 140°F)
Operating temperature	0°C to 50°C (32°F to 122°F)
Humidity	5% to 95% non-condensing
Max Altitude	2000 m (6,562 ft)

AUDIBLE ALARM

Piezo electric

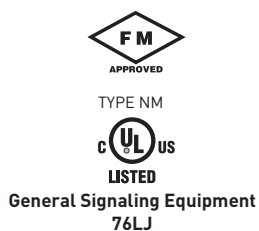
POWER CONSUMPTION

TTDM-128	10 VA
TTDM-128-24V	9 VA

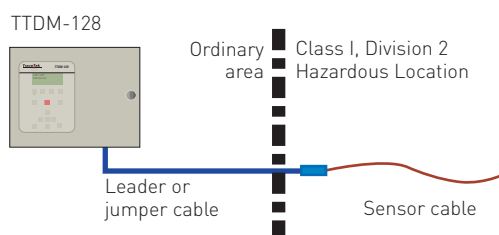
INTERFACES

Relays

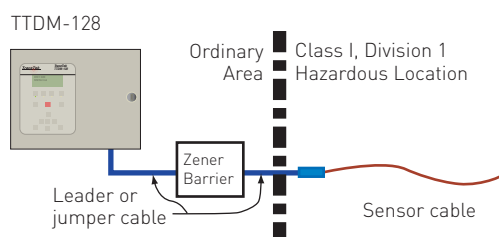
Number	3 (service required, leak, fault)
Type	DPDT
Ratings	5 A at 250 V AC / 24 V DC
TraceTek network port	RS-485 (2 wire)
External serial port (to host)	RS232 (3 or 5 wire) or RS485 (2 wire)

APPROVALS AND CERTIFICATIONS

The TTDM-128 unit is approved for use in ordinary areas. The module must be located in an ordinary area, but may monitor intrinsically safe TraceTek sensors located in hazardous locations, as shown below.



TraceTek sensors in Class I, Division 2, Groups A, B, C, D Hazardous Locations (Zone 2 in Europe).



If protected by an agency approved zener barrier, TraceTek sensors in Class I, Division 1, Groups A, B, C, D Hazardous Locations (Zones 0 and 1 in Europe). Contact Pentair Thermal Management to select proper zener barrier.

The TTDM-128 enclosure is Type 12 (IP 54).



WWW.PENTAIRTHERMAL.COM

NORTH AMERICA

Tel: +1.800.545.6258
Fax: +1.800.527.5703
Tel: +1.650.216.1526
Fax: +1.650.474.7215
thermal.info@pentair.com

EUROPE, MIDDLE EAST, AFRICA

Tel: +32.16.213.511
Fax: +32.16.213.603
thermal.info@pentair.com

ASIA PACIFIC

Tel: +86.21.2412.1688
Fax: +86.21.5426.2917
cn.thermal.info@pentair.com

LATIN AMERICA

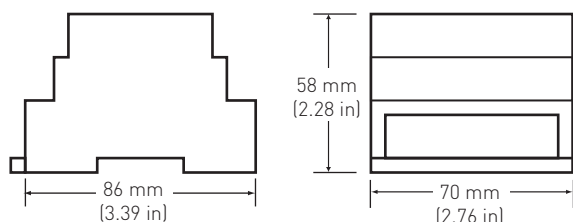
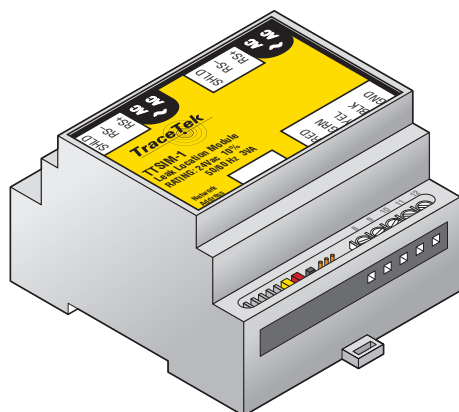
Tel: +713.868.4800
Fax: +713.868.2333
thermal.info@pentair.com

Pentair and TraceTek are owned by Pentair or its global affiliates. All other trademarks are the property of their respective owners. Pentair reserves the right to change specifications without prior notice.

© 2003–2013 Pentair.

TraceTek TTSIM-1

SENSOR INTERFACE MODULE



PRODUCT OVERVIEW

Easy setup and simple operation

The TTSIM-1 is a Sensor Interface Module capable of monitoring up to 1500 meters (5000 feet) of TraceTek sensing cable. When liquid is detected, the TTSIM-1 locates the leak and communicates the leak details to the host monitoring system. The TTSIM-1 can communicate to a variety of host monitoring systems including a TraceTek TTDM-128, a PLC, DCS or Building Management System using standard protocols. No field calibration is required.

The TTSIM-1 is well suited to applications where large areas are being monitored, or long sensor circuit lengths are required. Since it incorporates multiple sensor monitoring algorithms, the TTSIM-1 is capable of performing several specialized leak detection measurements. These algorithms make TTSIM-1 especially well suited to monitoring long circuits of TraceTek hydrocarbon sensing cables that are installed in demanding applications.

Design features

- LEDs to indicate power, status and communication.
- Responsive to a variety of communication protocols. Protocol selection is automatic.
- Simple twisted pair serial RS-485 communications up to 1200 meters (4000 feet) without amplification.
- Operates on 24 Vac 50/60 Hz or 12 Vdc or 24 Vdc power supply.
- Each TTSIM-1 unit has a unique address assigned with software – no switches.
- Special leak detection algorithms provide enhanced capability for difficult applications.
- DIN rail mounted for easy installation.
- Enclosures available for stand-alone indoor or outdoor installations.

GENERAL FEATURES

Sensor compatibility	All TraceTek sensor cables and point sensors or contact closure devices
Maximum length of sensing cable	1500 m (5000 ft)
Precision	0.1% of sensor length

ENVIRONMENTAL RATINGS

Storage temperature	-18°C to 60°C (0°F to 140°F)
Operating temperature	0°C to 50°C (32°F to 122°F)
Humidity	5% to 95% non-condensing

POWER REQUIREMENTS

TTSIM-1	22 to 26 Vac, 50/60 Hz, 3 W (SELV level for Europe)
TTSIM-1-12VDC	12 Vdc +/- 10%, 2 W
TTSIM-1-24VDC	24 Vdc +/- 10%, 2 W
Wire sizes	#22 AWG to #14 AWG (0.5 to 2.5 mm ²)

ORDERING INFORMATION

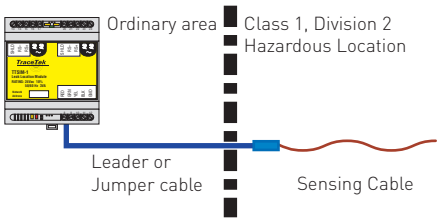
Catalog Number	Part Number	Description
TTSIM-1	518125-000	24 Vac TTSIM-1
TTSIM-1-12VDC	P000000898	12 Vdc TTSIM-1
TTSIM-1-24VDC	P000000905	24 Vdc TTSIM-1

SERIAL INTERFACE

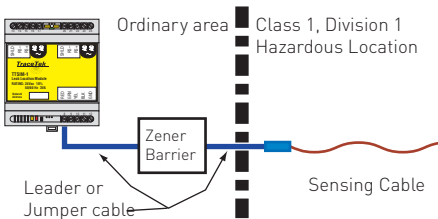
Network configuration	RS-485 two wire network, 9600 baud, addressable from 1 to 127
Communication protocol	Modbus®, OptoMux™ or Johnson Controls Metasys™

APPROVALS AND CERTIFICATIONS

The TTSIM-1 unit is approved for use in ordinary areas. The module must be located in an ordinary area, but may monitor intrinsically safe TraceTek sensors located in hazardous locations, as shown below.



TraceTek sensors in Class I, Division 2, Groups A, B, C, D Hazardous Locations (Zone 2 in Europe).



If protected by an agency approved zener barrier, TraceTek sensors in Class I, Division 1, Groups A, B, C, D Hazardous Locations (Zones 0 and 1 in Europe). Contact Pentair Thermal Management to select proper zener barrier.

Only 24 Vac version is UL listed and VDE Certified.
For DC models use a Listed Class 2 Power Supply.



WWW.THERMAL.PENTAIR.COM

NORTH AMERICA

Tel: +1.800.545.6258
Fax: +1.800.527.5703
Tel: +1.650.216.1526
Fax: +1.650.474.7215
thermal.info@pentair.com

EUROPE, MIDDLE EAST, AFRICA

Tel: +32.16.213.511
Fax: +32.16.213.603
thermal.info@pentair.com

ASIA PACIFIC

Tel: +86.21.2412.1688
Fax: +86.21.5426.2917
cn.thermal.info@pentair.com

LATIN AMERICA

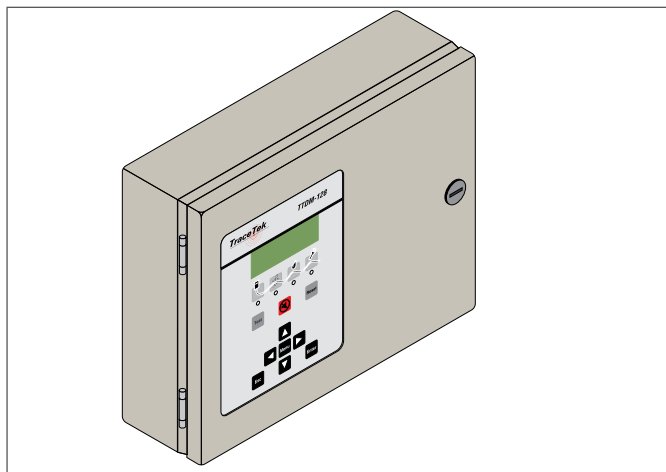
Tel: +55.11.2588.1400
Fax: +55.11.2588.1410
thermal.info@pentair.com

Pentair and TraceTek are owned by Pentair or its global affiliates. All other trademarks are the property of their respective owners. Pentair reserves the right to change specifications without prior notice.

© 2004–2013 Pentair.

TRACETEK TTDM-128

TRACETEK LEAK DETECTION MASTER MODULE INSTALLATION INSTRUCTIONS



APPROVALS AND CERTIFICATIONS

TYPE NM

LISTED
 General Signaling Equipment
 76LJ



EUR • USA • JPN



GENERAL INFORMATION

Please read these instructions carefully and keep them in a safe place (preferably close to the TTDM-128) for future reference. These instructions must be followed carefully to ensure proper operation.

The TTDM-128 Leak Detection Master Module has been designed specifically for use with TraceTek sensing cables, point sensors, sensor interface modules and relay modules. The TTDM-128 can directly monitor up to 1500 m (5000 ft) of sensing cable, and large networks of remote leak detection modules.

An external disconnect device and appropriate branch circuit protection (no more than 20 amp rating) should be provided for the TTDM-128. The disconnect device should be clearly marked as such. Follow all national and local codes and regulations applicable to the installation.

TOOLS REQUIRED

- Drill or hole punch for electrical conduit entries
- Phillips (cross-head) screwdriver
- Small flat-head screwdriver

INSTALLATION ITEMS (NOT SUPPLIED)

- Wall fasteners for surface mounting (four screws)

STORAGE

Keep the module in a dry place prior to installation to avoid possible damage to internal components.

PRODUCT INFORMATION

TTDM-128	115 Vac +15%, -20%; 50/60 Hz 230 Vac ±10%; 50/60 Hz
TTDM-128-24V	24 Vac +5%, -35% 24 Vdc ±20%
Power consumption	10 VA for TTDM-128 9 VA for TTDM-128-24 V
Installation categories	Overvoltage Category II, Pollution Degree 2
Built-in relays	Number: Three (Service, Leak, Fault) Type: DPDT Rating: 5 A at 250 Vac/24 Vdc
Storage temperature	-18°C to 60°C (0°F to 140°F)
Operating temperature	0°C to 50°C (32°F to 122°F)
Enclosure	Type 12; IP 54
Humidity	5% - 95% non-condensing
Max Altitude	2000 m (6,562 ft)

IMPORTANT WARNINGS AND NOTES

The following icons are used extensively throughout this manual to alert you to important warnings ⚠ that affect safety and to important notes ⓘ that affect the proper operation of the unit. Be sure to read and follow them carefully.

SAFETY INSTRUCTIONS

⚠ WARNING:

The installation, adjustment or repair of the TTDM-128 involves risk of contact with potentially lethal voltages and currents. These Installation Instructions are for use by qualified personnel only. To reduce the risk of electric shock, do not perform any servicing other than that specified in the Installation Instructions unless you are qualified to do so.

Refer servicing to qualified personnel.

The enclosure door should remain closed while the TTDM-128 unit is operational. Servicing or adjustments should not be performed while the circuits are energized.

EXPLANATION OF SYMBOLS USED ON THIS EQUIPMENT

The following symbols are used to identify parts and provide warnings for the TTDM-128 unit.



CAUTION: Risk of Electric Shock. Circuits are live. Disconnect unit before servicing. Do not remove cover. Do not open cover while energized. No user serviceable parts inside. Refer servicing to qualified personnel.



GROUND- This symbol identifies the equipment ground points.



Direct Current



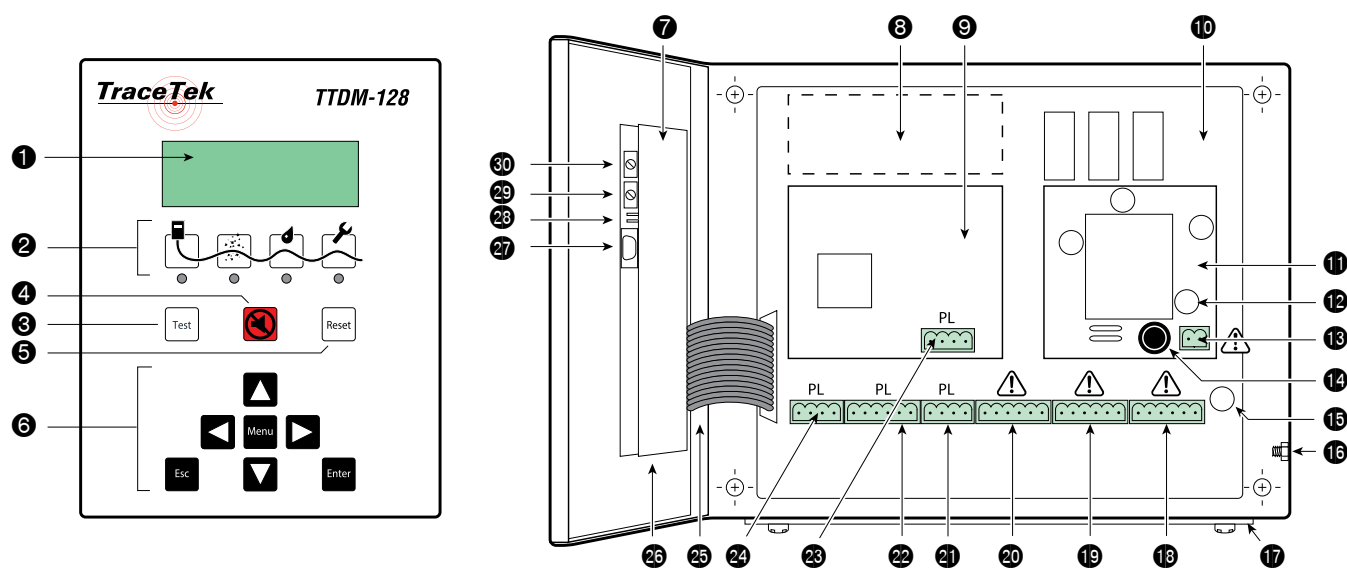
Alternating current



This symbol identifies important safety warnings and notes that affect the proper operation of the unit.

⚠ WARNING:

SHOCK HAZARD. Shut off power before opening enclosure door.



① LCD display

② LEDs with icons

③ Test key

④ Silence key

⑤ Reset key

⑥ Menu keys

⑦ User Interface board

⑧ 4–20 mA board (optional)

⑨ Sensor Interface board

⑩ Motherboard

⑪ Power supply board

⑫ Fuse [500 mA, 250 V, time delay]

⑬ Power cable plug and socket

⑭ Voltage Selector Switch

⑮ Spare fuse

⑯ Ground/earth stud

⑰ Gland plate

⑱ Fault relay cable plug and socket

⑲ Leak relay cable plug and socket

⑳ Service relay cable plug and socket

㉑ 4–20 mA port plug and socket

㉒ RS-232/485 host port plug and socket

㉓ Sensing cable plug and socket

㉔ RS-485 TraceTek Network Plug & Socket

㉕ Ribbon cable

㉖ Host port RS-232/485 selector

㉗ 9 pin RS-232 socket

㉘ Reset pins

㉙ Volume adjustment

㉚ LCD contrast adjustment

PL indicates power limited circuits

INSTALLING THE TTDM-128



IMPORTANT: The TTDM-128 is an electronic unit. During installation, take the following precautions to avoid damage to its electronic components:

- To avoid damage to the unit, store the TTDM-128 module in its cardboard box until construction is complete.
- Handle with care, avoid mechanical damage.
- Keep the electronics dry.
- If handling circuit boards, hold them by their edges to avoid physical contact with electronic components.
- Avoid exposure to static electricity.
- Avoid contamination with metal filings, liquids, or other foreign matter.

Select the mounting position.

Choose a location indoors where the module will be protected from the elements and temperature extremes. Follow all national and local codes and regulations applicable to the installation.

- Remove the module from its carton. Do not remove the protective film from the membrane on the front of the unit.
- Open the enclosure door using a flat-blade screwdriver or a coin.



WARNING:

IGNITION HAZARD. Do not mount the TTDM-128 unit in a hazardous location. Sensing cable connected to the TTDM-128 may (subject to approvals restrictions) be located in hazardous locations, but the module itself must be in an ordinary area.



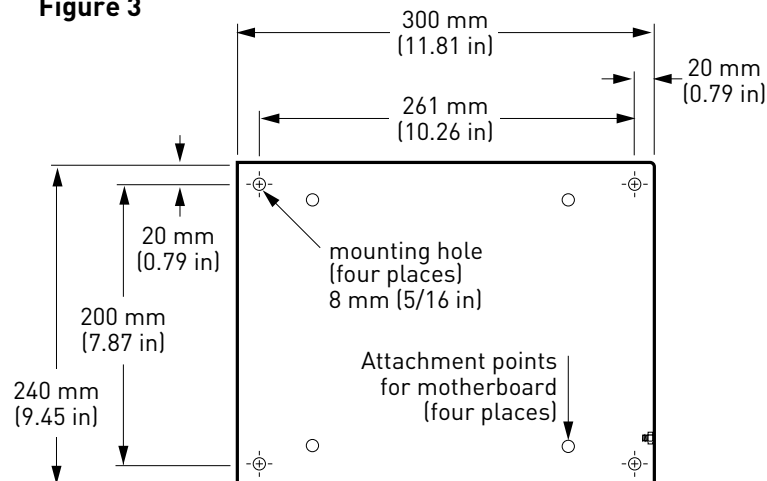
IMPORTANT: The TraceTek sensing circuit is power limited, so the TraceTek leader or jumper cable and the power supply cable must not run in the same conduit.

Mounting the Enclosure

Install the enclosure using four screws (selected by installer) in the prepunched 8 mm (5/16-inch) mounting holes with centers as shown in Figure 3. If plastic plugs are in the mounting holes, remove them.

Make sure the rubber elastomeric washers (provided in the shipping box) are aligned to seal around the mounting screws to maintain the TYPE 12 and IP54 ratings.

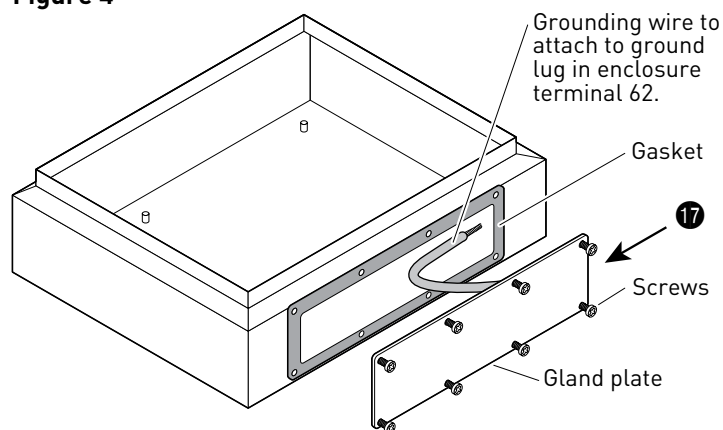
Figure 3



Making Enclosure Entries Using the Removable Gland Plate

The removable gland plate 17 on the bottom edge of the enclosure provides a location to feed wires into the enclosure (Figure 4). The plate is attached with eight screws. Unscrew these to remove the gland plate, then you can drill or punch holes in the gland plate appropriate for your application. There is sufficient width for up to five 1/2-inch or M20 holes. Remove all metal filings and dust from the gland plate before remounting. Take care not to damage the gasket on the gland plate. You must secure the gland plate ground wire to the chassis ground lug after remounting the gland plate.

Figure 4



CONNECTING THE POWER CABLE AND RELAYS

WARNING:

SHOCK HAZARD. Disconnect from live voltage prior to opening enclosure door.

TTDM-128 Power Supply Connection

- Open door of TTDM-128 enclosure.
- For 110/220 Vac power supply: select the appropriate voltage using the voltage selector switch 14.

TTDM-128-24 V Power Supply Connection

 **IMPORTANT:** For proper operation of the TTDM-128-24 V, use a power supply whose output is electrically isolated from the incoming line power and ground.

- Each TTDM-128-24 V requires a separate isolated power supply.

TTDM-128 and TTDM-128-24 V Power Wiring Connection

- There is no internal mechanism for de-energizing the power. Installer must provide individual branch circuit breaker (no more than 20 amp rating and short circuit rating of minimum 5 kVA) within line of sight.
- Pass the power cable through the gland plate adapter/bushing into the enclosure.
- Connect the ground/earth wire to the ground/earth stud **16**.
- The ground/earth stud is marked with this symbol: 



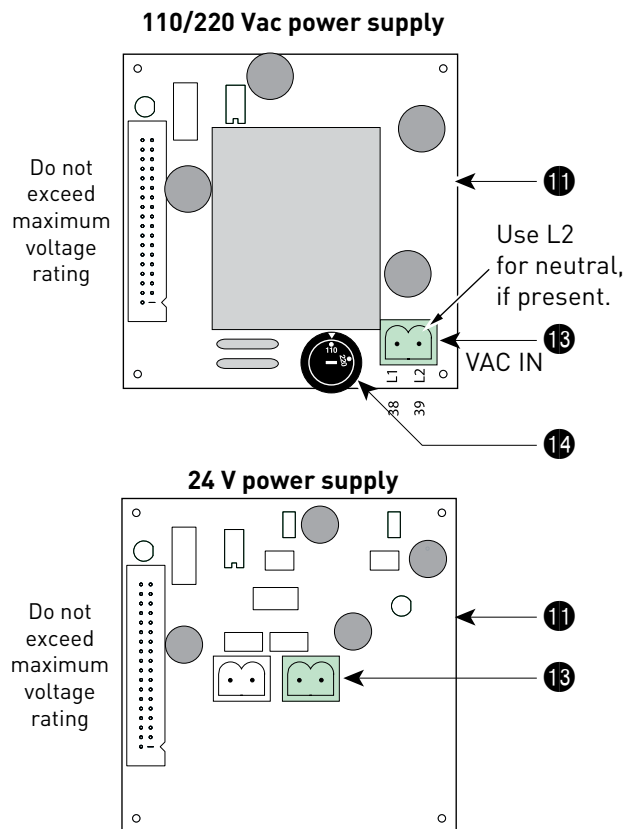
IMPORTANT: Proper grounding/earthing of the TTDM-128 enclosure is important to avoid the possibility of electromagnetic interference.

- Remove the power cable plug from the socket **13** on the power supply board **11**.
- Connect the power supply wires to the power cable plug. Use L2 for neutral, if present.



IMPORTANT: The terminals can accept wires 10 AWG (4.7 sq. mm) or smaller. We recommend 12 AWG (3.0 sq. mm) wires, with branch circuit protection sized accordingly. Cable should have a temperature rating of 65°C minimum.

- Insert the power cable plug back into the socket **13** on the power supply board **11**.



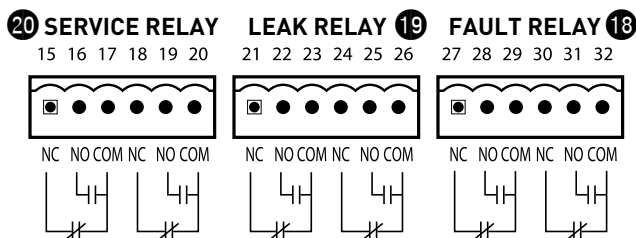
Connect the alarm relays.

The TTDM-128 has three relays, for service 20, leak 19, and fault 18. Each relay provides two Form-C relay contacts, and normally open and normally closed contacts are both provided. The relays are **de-energized to indicate an alarm** condition. The illustration shows the relay status in the alarm (de-energized) state.

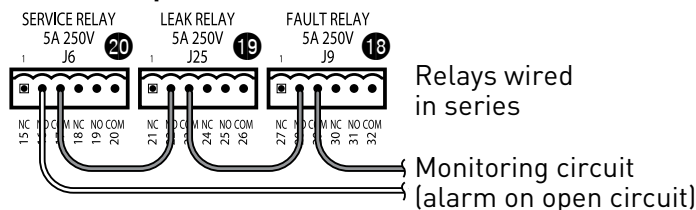
The illustrations that follow show how relays can be jumpered together to allow remote monitoring of the TTDM-128 status with only a single pair of wires. The TTDM-128 **de-energizes** its relays to signal an alarm condition. Therefore, loss of power, as well as any other type of alarm, would signal the remote alarm.

 **IMPORTANT:** The relay plugs can accept wires 10 AWG (4.7 sq. mm) or smaller. We recommend 18 AWG (1.0 sq. mm) wires. Cable should have a temperature rating of 65°C.

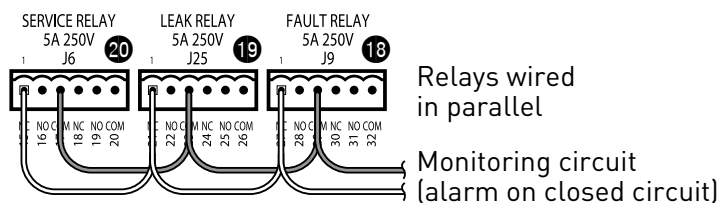
 **IMPORTANT:** Maximum load for relays is 5 A.



Alarm on open circuit



Alarm on closed circuit



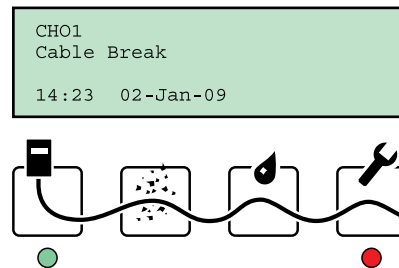
TESTING THE MODULE

Test after supplying power.

- Close and latch the enclosure door.
- Supply power to the unit. When power is supplied, the green LED illuminates, and the unit goes through a series of self-tests. After the start-up sequence is complete, the module should report a fault alarm (this is normal; there is no sensing cable attached). Press the red Silence key to silence the audible alarm. Verify that the display appears similar to the one shown here (the time and date may be different):

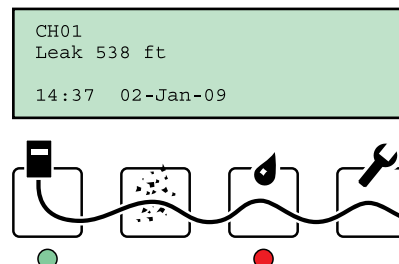
If anything other than the above occurs, check all connections. If unit still does not appear to operate properly, contact a TraceTek representative for assistance.

- Press the Test button. The module conducts a number of self-tests.
- If the tests are successfully completed, record this on the installation record.
- Turn off the power supply to the unit.



Test with TTDM-128 test plug.

- To conduct a more complete test, use the TraceTek TTDM-CTP test plug (packed in a plastic bag in the TTDM packaging). Insert the plug into the sensing cable socket ② on the sensor interface board ⑨.
- Close and latch the enclosure door.
- Supply power to the unit. When power is supplied, the unit will again go through a series of self-tests. If the test plug is in the sensing cable socket, after the module completes the start-up sequence it should sound and display a leak alarm. Press the Silence key to silence the audible alarm. The red Leak LED and green Monitoring LED should both be illuminated, and the screen display should appear similar to the one shown here (depending on the setting).
- If anything other than the above occurs, check all connections. If unit still does not appear to operate properly, contact a TraceTek representative for assistance.
- If the test is successfully completed, record this on the installation record.
- Turn off the power supply to the unit.
- Remove the TTDM-CTP test plug and store it in a secure place for future use.
- If not immediately connecting the sensing cable, or TraceTek network, close and latch the enclosure.



Depending on the units selected, the leak distance should be within the values below:

feet: 527 to 548 ft
meters: 160 to 168
zones: 11

CONNECT THE SENSING CABLE

If the TTDM-128 will be used to monitor a sensor directly, follow these instructions to connect the sensor to the TTDM-128. If the TTDM-128 is being used only as a network master, skip to Connecting the TraceTek Network.

Prepare sensing cable.

Ensure that the sensing cable has been installed and tested in accordance with the instructions provided with the cable.

Make connections.

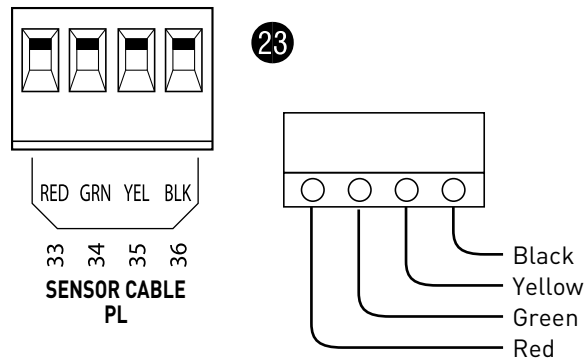
WARNING:

SHOCK HAZARD. Disconnect from live voltage prior to opening enclosure door.

- Confirm that power to the unit has been shut off.
- Open the enclosure door.
- Feed the end of the TraceTek Leader Cable (or Jumper Cable) through the gland plate **17** adapter/bushing into the enclosure.
- Remove the sensor cable plug **23** from the socket on the sensor interface board **9**.
- Connect the four color-coded wires to the Sensor Interface plug.

Important: Observe the color coding. If wires are not connected to the proper terminals, the leak detection system cannot operate properly.

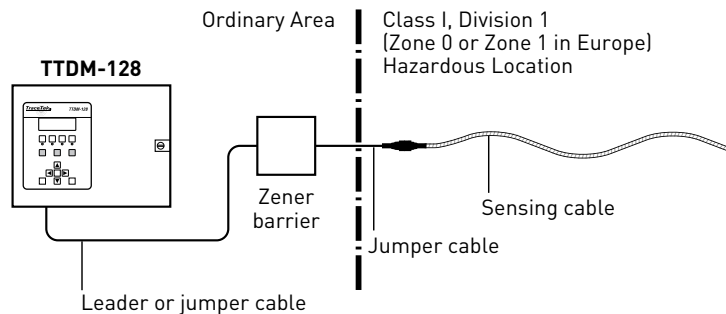
- Insert the sensing cable plug back into the socket on the Sensor Interface Board **9**.



Install zener barrier, if applicable.

When sensing cable will be located in Class I, Division 1 (Zone 0 or Zone 1 in Europe) hazardous locations, approval agencies require that the sensing cable be protected with a zener barrier between the sensing cable and the TTDM-128 module. Contact TraceTek to select the proper zener barrier.

When installing a zener barrier, wire it in accordance with the instructions provided with the kit.



CONNECTING THE TRACETEK NETWORK

If the TTDM-128 will be used as the network master in a TraceTek network, follow these instructions to connect the communication wiring.

 **IMPORTANT:** Some TraceTek network configurations will require different connections for the communication wiring. Please refer to the TTDM-128 User Manual (H56853) for further details.

Prepare communication cable.

Ensure that the communication cable has been installed and tested.

Make connections.

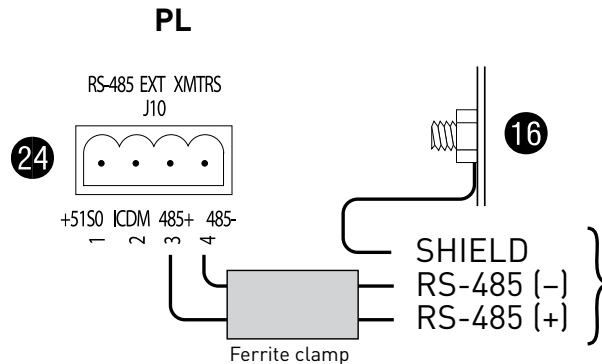
WARNING:

SHOCK HAZARD. Disconnect from live voltage prior to opening enclosure door.

- Confirm that power to the unit has been shut off.
- Open the enclosure door.
- Feed the end of the communication cable through the gland plate  adapter/bushing into the enclosure.
- Remove the J10 cable plug  from the socket.
- Connect the positive wire to terminal 3 (485+) and the negative wire to terminal 4 (485-) of the J10 cable plug.
- Connect the shield wire to the round lug .

 **IMPORTANT:** Observe the polarity. If wires are not connected to the proper terminals, the leak detection system cannot operate properly.

- Insert the J10 cable plug back into the socket .
- Place the positive and negative wire in the Ferrite clamp. Do not place the shield wire inside the clamp. Close the clamp by securing its latch to the snaps.



RS-485 cable to next TraceTek module.

CONNECTING TO A HOST COMPUTER

There are 3 ways to connect the TTDM-128 to a host computer: hard-wired RS-232, hard-wired RS-485, or standard modular RS-232 cable. For permanent installations, the hard-wired method is recommended (either RS-232 or RS-485 as necessary). The modular RS-232 cable should be used only for temporary connections by trained technicians.

Make connections.

WARNING:

SHOCK HAZARD. Disconnect from live voltage prior to opening enclosure door.

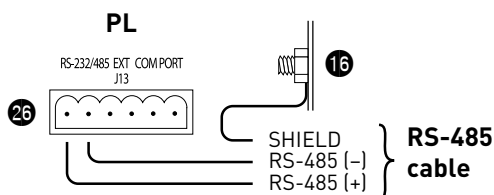
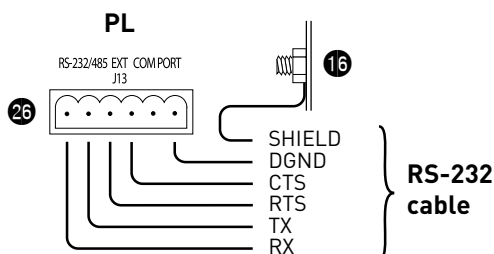
- Confirm that power to the unit has been shut off.
- Open the enclosure door.
- Feed the end of the communication cable through the gland plate **17** adapter/bushing into the enclosure.
- Remove the J13 cable plug **22** from the socket.

For RS-232 connection:

- Connect the RX, TX, RTS, CTS and DGND wire to terminals 5, 6, 7, 8 and 10 respectively.
- Set the host port selector switch **26** on the User Interface board **7** to the RS232 position.

For RS-485 connection:

- Connect the positive wire to terminal 5 (RX/A) and the negative wire to terminal 6 (TX/B).
- Set the host port selector switch **26** on the User Interface board **7** to the RS485 position.
- Connect the shield wire to the grounding lug **16**.
- Insert the J13 cable plug back into the socket **22**.



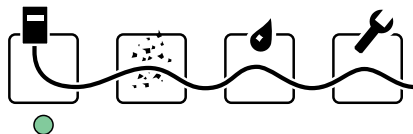
START-UP AND SYSTEM TESTING

Power up the system.

After connections are complete, supply power to the unit. The unit will go through a series of self-tests, and then display the system status. If the sensing circuit is complete and free of leaks or other problems, only the green Monitoring LED will illuminate, and the LCD display will appear similar to that shown at right:

If this is not the case, you can find additional information in the TTDM-128 Operation and Maintenance Manual (H56853) supplied with the module.

```
CH01
SIM Normal
16:23 02-Jan-09
```



Commissioning.

Your system should be commissioned by an authorized TraceTek representative including creation of a System Map. The System Map is a crucial part of a TraceTek locating system. The System Map is normally completed at the time the leak detection system is commissioned. The System Map is defined for each SIM sensor circuit, typically an as-built drawing of the sensor cable/component layout with reference to readily identifiable landmarks, preferably with actual distance measurements every 5m (16ft) throughout the system. The System Map should be constructed with simulated leak events at convenient locations along the leak detection circuit. The reported leak distance (from TTDM-128) is recorded on the System Map for every tested location. The TTDM-128 will give the point along the sensing cable at which liquid has been detected; the map is essential to show its physical location.

 **IMPORTANT:** Store hardware and documentation supplied with the TTDM-128 in a secure place for later use (commissioning, connecting interfaces, operating). If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

 **IMPORTANT:** Before creating a leak alarm for System Mapping purposes, the sensing cable parameters RG Resistance and YB Resistance should be stable and equal +/- 2%, and cable parameter Sense Res should be greater than 10,000 kohms.



WWW.PENTAIRTHERMAL.COM

NORTH AMERICA

Tel: +1.800.545.6258
Fax: +1.800.527.5703
Tel: +1.650.216.1526
Fax: +1.650.474.7215
thermal.info@pentair.com

EUROPE, MIDDLE EAST, AFRICA

Tel: +32.16.213.511
Fax: +32.16.213.603
thermal.info@pentair.com

ASIA PACIFIC

Tel: +86.21.2412.1688
Fax: +86.21.5426.2917
cn.thermal.info@pentair.com

LATIN AMERICA

Tel: +713.868.4800
Fax: +713.868.2333
thermal.info@pentair.com

Pentair and TraceTek are owned by Pentair or its global affiliates. All other trademarks are the property of their respective owners. Pentair reserves the right to change specifications without prior notice.