



PERMALERT

Environmental Specialty Products, Inc.

PAL-AT® AT20C/50C PAL-AT® AT40K/20K/80K Microprocessor Based Leak Detection / Location Monitoring Unit Product Data



PRODUCT FEATURES

- Locates multiple leaks without loss of accuracy or sensitivity
- Locates breaks and shorts
- Stores information with time and date
- User-friendly
- RS-232 serial port
- Accepts probe and cable sensors in one sensor string
- One cable for all liquids or multiple cables for differentiation (user's option)
- AT40K and AT80K monitor up to eight separate cable strings when equipped with Cable Expansion Modules
- UL Listed and FM Approved to provide intrinsically safe sensor cable output circuits for Class 1, Division 1, Groups C & D Hazardous Locations
- Modbus RTU Interface Available
- Optional Output Relay System

PRINCIPLE OF OPERATION

PAL-AT®'s technology operates similar to radar. Thousands of times each minute, safe energy pulses are sent out on sensor cables. As these energy pulses travel down the cable, reflections are returned to the monitoring unit and a "map" of the reflected energy from the cable is stored in memory. The presence of liquids on the sensor cable, in sufficient quantities to "wet" the cable, will alter its electrical properties. This alteration will cause a change of the reflection at that location. When the PAL-AT recognizes a change, it enters into alarm mode and displays the location of the liquid. After the leak alarm is acknowledged, the current condition of the cable is stored in memory as a new map. This becomes the base line for the system, allowing PAL-AT to continue monitoring the cable for new leaks, breaks and/or faults.

SECURITY SYSTEM

PAL-AT requires a security code entry before accepting an alarm acknowledgment and writing or erasing data from memory. This feature limits access to only those employees who have been authorized to perform the advanced functions.

SYSTEM ARCHIVES

Date and time history of all significant events including power failure, cable leak/fault/break and alarm silencing are permanently stored in nonvolatile memory providing a documented record of system alarms and operator interfaces.

OUTPUT RELAYS

Two SPDT output relays rated for 10 A @ 250 VAC, are activated when a fault occurs. This permits remote annunciation of alarms or activation of control devices wired to the monitoring unit.

INTELLIGENT INTERFACES

PAL-AT has a standard, RS-232 serial interface which provides intelligent communication to computers using PALCOM® Communication Software. Refer to the Communication Options Data Sheet or the Modbus RTU Interface Option for detailed information. ASCII commands can allow other monitoring systems to interface to the PAL-AT system.

OUTPUT RELAY SYSTEM

The optional Output Relay System provides 4 to 60 additional alarm relays. Each relay can be assigned to activate if a leak is detected in a specific section of cable. This provides precise control when a single cable string monitors several pipes or sensitive areas.

Model Number	Part Number	Cable Capacity	Maximum Cable Range* Feet	(Meters)
AT20C	8027550	1	2,000	(600)
AT50C	8027555	1	5,000	(1,500)
AT40K	8027560	8	5,000	(1,500)
AT20K	8027558	2	7,500	(2,300)
AT80K	8027563	8	7,500	(2,300)

* Refer to Sensor Cables Product Data for details



Approved by the New York City Board of Standards and Appeals under calendar number 17-90-SA.

SPECIFICATIONS

The Leak Detection/Location System shall consist of a microprocessor based panel capable of continuous monitoring of a sensor string for leaks, breaks and shorts. The unit shall have a sensing range of [2,000] [5,000] [7,500] feet per cable [with up to eight cables per panel]. The alarm unit(s) shall operate on the principle of pulsed energy reflection and be capable of mapping the entire length of the sensor cable and storing the digitized system map in nonvolatile memory. The alarm unit(s) shall provide continuous indication that the sensor cable is being monitored.

After proper acknowledgment of a minor leak, the Leak Detection/Location System shall be capable of monitoring the entire sensing string for additional leaks even if they are smaller than the leak previously acknowledged. The system shall be capable of accounting for minor installation irregularities, static moisture and puddles (such as condensation) with no loss in accuracy or sensitivity. The system shall locate the point of origin of the first water leak or fault (break/short) within $\pm 0.1\%$ ($\pm 0.2\%$ for hydrocarbons) of the sensor string length or ± 5 ft whichever is greater. The monitoring unit shall report and record, to non-volatile memory, the type of fault (leak/break/short/probe), distance, date and time of an alarm.

Tests shall be performed to demonstrate the ability of the system to detect and locate breaks, shorts and probes on the sensor string. Leak testing shall be done per the following procedure to verify operation and ability to work with condensation pools or other static moisture:

- 1) Break the cable at a connector and verify alarm type and location.
- 2) Short the cable at a connector and verify alarm type and location.
- 3) Wet the sensor cable near the start of the sensor string and acknowledge the detection/location alarm and remap the system.
- 4) Wet the sensor cable near the end of the sensor string with the first location still wetted and acknowledge the detection/location alarm and remap the system.
- 5) Wet the sensor in three additional locations between the first and second leak locations with each detection/location alarm being acknowledged and all prior leak locations still wetted. Prepare and submit a report verifying the performance of the system.

The system manufacturer shall have at least ten years of experience with leak detection/location sensor cable technology and provide a factory trained representative at two on-site meetings for pre-construction and sensor/electronics installation.

The system shall have multilevel security passwords for access to operating functions with recording of all password entries to nonvolatile memory.

The alarm unit(s) shall be enclosed in a modified NEMA 12 enclosure and have a two line by forty character display providing status and alarm data. The monitoring unit(s) [shall be field connected to an] [shall have a factory mounted] alarm horn. The unit(s) shall have a red LED optical alarm that is illuminated when any cable is in alarm. The monitoring unit shall be UL Listed and FM Approved to provide connections for intrinsically safe sensor circuits for use in Class 1, Division 1, Group C and D Hazardous Locations.

The system shall be tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC rules and so labeled.

The system shall be evaluated by an independent third party 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". The evaluation results shall verify the system manufacturer's claims regarding sensitivity, range and other performance data.

Ability to locate a leak shall not depend on battery backed-up functions. In the event of power failure, system conditions and parameters shall be stored in nonvolatile memory allowing the units to automatically resume monitoring without resetting, upon restoration of power.

The monitoring unit(s) power requirements shall be 120/240 VAC, 100 VA, 50/60 Hz, single phase. Monitoring units shall be equipped with an RS-232 communication port and a common alarm relay for the panel and one relay per cable. SPDT relays are rated for 10 A @ 250 VAC.

The sensor cable, connectors, [probes] and jumpers shall be supplied by the manufacturer of the monitoring unit(s). The cable sensing principle shall provide for continuous monitoring while short lengths of the cable are in contact with liquids, without altering the system's sensitivity and/or accuracy.

Software will be available that allows the manufacturer to remotely or on-site interface thru the RS-232 serial port for troubleshooting and diagnostics. Software shall have the ability to operate the PAL-AT monitoring units and retrieve each of the stored reference maps and current condition TDR traces. Software shall also be available for the customer to purchase including the above features and also having Graphic Locator System (GLS) and continuous monitoring. The GLS will allow a stored CAD site drawing to be recalled with a flashing icon at the trouble location on the cable.

DESCRIPTION

- Unit Dimensions:
 - AT20C/50C/20K - 14" H x 12" W x 7" D (360 mm x 305 mm x 180 mm)
 - AT40K/80K - 18" H x 16" W x 7" D (460 mm x 410 mm x 180 mm)
- Power:
 - AT20C/50C/20K - 120/240 VAC, 50/60 Hz, 50 VA
 - AT40K/80K - 120/240 VAC, 50/60Hz, 100 VA
- Unit Weight:
 - AT20C/50C/20K - 25 lb (12kg)
 - AT40K/80K - 40 lb (18 kg)
- Ambient Operating Range: 0°F to 120°F (-18°C to 50°C)

ALARM OUTPUTS

- Fault Conditions: Leak, Break, Short or Probe Activation
- Distance to Fault Location
- Activation of Output Relays
- Date and Time of Fault
- Red LED Optical Alarm

The information contained in this document is subject to change without notice. PermaAlert Environmental Specialty Products, Inc. believes the information contained herein to be reliable, but makes no representations as to accuracy or completeness.

PermaAlert ESP, Inc. offers a sole and exclusive one year warranty from date of shipment as is stated in the Standard Terms and Conditions of Sale for these products. In no event will PermaAlert ESP, Inc. be liable for any indirect, incidental, or consequential damages.

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