

Robertshaw

DESCRIPTION

Dynamometer tests by a major diesel engine manufacturer have proven that SUDDEN LOSS OF COOLANT CAN DESTROY YOUR ENGINE IN 50 SECONDS and it will do so before an overtemperature signal is received. Overtemperature sensors are only capable of sensing excessive coolant temperature caused by clogged radiators, malfunctioning thermostats, failed water pumps, or any other "circulation" problem. Upon loss of coolant, however, these temperature sensors must try to respond to hot air which, being a poor thermal conductor, results in signals that arrive only after the engine is severely damaged.

By monitoring the coolant level in the upper radiator reservoir, the Robertshaw Mini-Tek Model 613 provides a WARNING IN TIME that coolant is being lost and allows corrective action to be taken before overheating and damage can occur.

In like manner, under leaking oil conditions low oil pressure signals are not obtained until the oil pump is starved for oil. Since the oil pump draws liquid from the very bottom of the crankcase pan, these signals arrive only after virtually all oil has been lost. Again! – the damage has already occurred.

By monitoring the oil level with a Robertshaw Mini-Tek Model 624 at approximately the 50% level, a WARNING IN TIME can be obtained and corrective action taken before the damage is done

PRINCIPLE OF OPERATION

Unlike conductivity type coolant level sensors, the Robertshaw Mini-Tek operates on the electrostatic or "capacitance" sensing principle. The probe portion of the unit, extending into the liquid, produces a change in electrical "capacitance" when liquid displaces the air immediately surrounding the probe. The electrical capacitance change is then converted within the unit into an ON-OFF solid-state switch closure to indicate the absence (or presence) of liquid around the probe.

The probe rod of the unit is electrically insulated. This provides a slick, non-fouling surface as well as good electrical characteristics to prevent electric current flow through the liquid. Thus the operation of the Mini-Tek does not depend upon the liquid properties of specific gravity, temperature, or conductivity.

The Models 614 and 624, which are intended for use in lubricating oils or fuels, have a concentric tube or coil surrounding the insulated probe rod to increase the capacitance change generated by the probe. This is necessary because of the smaller capacitance produced by liquid hydrocarbons as they displace the air around the probe. The open spaces in the coil encourage the rapid draining of heavier oils.

PRODUCT SPECIFICATION

Mini-Tek Miniature Liquid-Level Detector Models 613/614/624



FEATURES AND BENEFITS

- **All Solid-State with no moving parts** – Assures long trouble free operation with no moving parts to wear out.
- **Capacitance Actuated** – Operation is not dependent on specific gravity, temperature, or conductivity of the liquid. Cannot cause electrolysis as in conductivity type sensors.
- **Completely Self-Contained** – Simplified installation. No external black boxes to mount.
- **Self-Test Capability** – Permits easy test of entire unit including load circuit.
- **Rugged Construction** – Fully encapsulated electronics withstand shock, vibration, and moisture.
- **Voltage Protected** – Built-in transient overvoltage protection.
- **Convenient Connections** – Spade lug connections are positioned to accept sealed-beam headlight connectors.
- **Reverse Polarity Protection** – Not damaged by inadvertent battery reversal.

SPECIFICATIONS

ELECTRICAL

Supply Voltage.....10-32VDC
 Supply Current Draw.....0.01 Amps
 Output (Solid-State Switch):
 Current Rating1.0 Amp Maximum
 Leakage Current
 with switch open.....1 ma Max
 Voltage Drop.....2.0 Volt Maximum
 Transient Overvoltage Limits.....+/-125V for 100 MS
 Maximum, at 0.1% Duty Cycle
 Response Time.....Less than 1.0 Second Typical
 (Limited by Viscosity)
 Typical Trip Point Level:
 Horizontal Mounted Probe.....+/-1/8" at mid-
 point of Probe
 Time Delay (Optional)12 Sec. +/- 3 Sec.

ENVIRONMENTAL

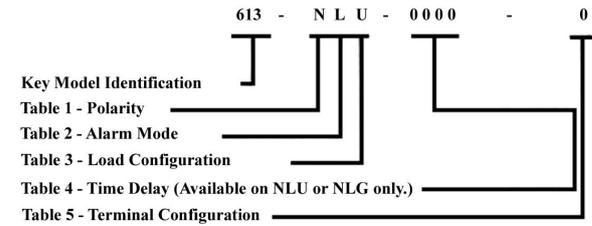
Operating Temperature Limits.....-40°F to +250°F
 Storage Temperature Limits.....-55°F to +275°F
 Probe Pressure Rating.....100PSI
 Vibration Limits.....+/-30g, Any Axis, 10-500Hz

PHYSICAL

Mounting.....Model 613 & 614 - 1/4" -18NPTF
 Model 624 - 3/8" -18NPTF
 SAE Dry Seal Threads
 Metric Threads On Request.
 Terminal Mating
 Connector.....Standard Head Connector
 Housing Material.....Brass

ORDERING INFORMATION

*Recommended version for most applications.



KEY MODEL NUMBER

Model No.	Description
613	Coolant Level Detector
614	Hydraulic Oil or Fuel Detector
624	Motor or Gear Oil Detector

TABLE 1 - POLARITY

Designation	Description
*N	Negative Ground System

TABLE 2 - ALARM MODE

Designation	Description
*L	Low Liquid Level Alarm (solid-state switch closes when level is low).
H	High Liquid Level Alarm (solid-state switch closes when level is high).

TABLE 3 - LOAD CONFIGURATION

Designation	Description
*U	Ungrounded Load (neither side of load connected to GND).
G	Grounded Load (one side of load connected to GND)

TABLE 4 - TIME DELAY**

Designation	Description
0000	No Time Delay
TD12	12 Second Time Delay (Standard Delay)
TD07	7 Second Time Delay ****
TD10	10 Second Time Delay ****

** Time Delay, Nonintegrating delays "turn ON"

Available only on Designations NLU and NLG. Not available on Designation "H" Table 2.

**** Special Delay times possible with Extended Delivery.

TABLE 5 - TERMINAL CONFIGURATION

Designation	Description
0	Three Spade Terminals; +, SIG, TEST(no isolation)
B	Four Spade Terminals; +, -, SIG, TEST (DC isolation is provided between the body and circuit).
C	Four Wire Leads ***#16 AWG; +, -, SIG, TEST (DC isolation is provided between the body and circuit).
D	Four Wire Leads (6") with SURE-SEAL connector; +, -, SIG, TEST (DC isolation is provided between the body and circuit).

***If no length is specified, the length will be 6"

Note: Shaded areas are non-stock special order only

OPTIONAL FEATURES AVAILABLE

- ### Time Delay

Time Delay is available on designations NLU or NLG only. (Not available with Designation "H").

Incorporated within the same housing, this non-integrating time delay circuit provides a nominal 12 second, ± 3 seconds, time delay. This feature prevents actuation of alarms due to temporary liquid sloshing that may occur during severe vehicle attitude changes or turning sharp corners.

To order, simply add - TD12 to the Model Number of the MINI-TEK desired.

Example: 613-NLU-TD12-0

- ### Isolated Models

The standard Mini-Tek obtains the grounded battery connection through the sensor mounting pipe threads. If a Mini-Tek is to be installed in a non-metallic vessel or if the battery system is isolated (i.e. not grounded to the chassis), then a 4th electrical connection is required.

- ### Four Spade Lugs

Designation "B" on Table 5 (see Ordering Information on page 2) may be specified when ordering to obtain a unit with 4 spade connections. NOTE: 4 individual spade lugs on 4 individual wire leads must be used for this option and care must be exercised to insure the correct wire is installed on the correct terminal. Colour coded wires are recommended to aid in proper installation and wiring.

- ### Four Wire Leads

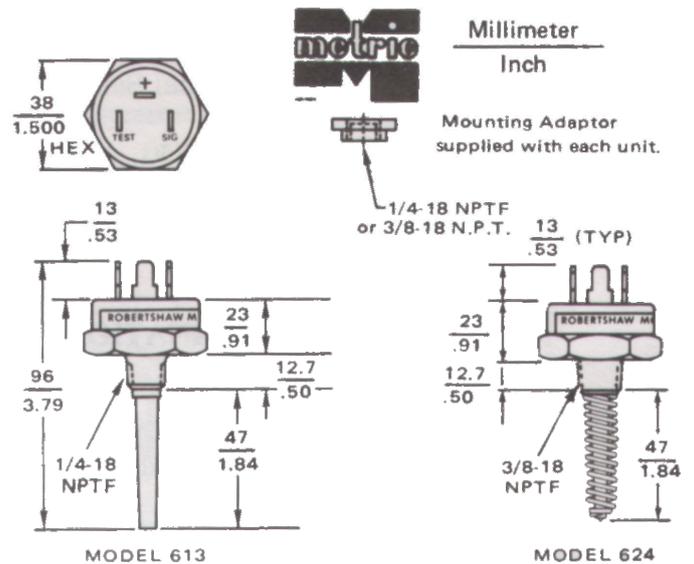
A second alternative for Mini-Teks intended for use in non-metallic vessels or non-grounded electrical systems is available as Option "C" (Table 5). The unit consists of a neoprene grommet built into the top of the sensor. Four # 16 AWG colour coded and insulated (cross linked Polyethelene) wire leads are then brought through this grommet, which provides a weatherproof assembly. Unless otherwise specified, the wire leads are 6" in length.

- ### Four Wire Leads Plus SURE-SEAL Connector (O.E.M. applications only)

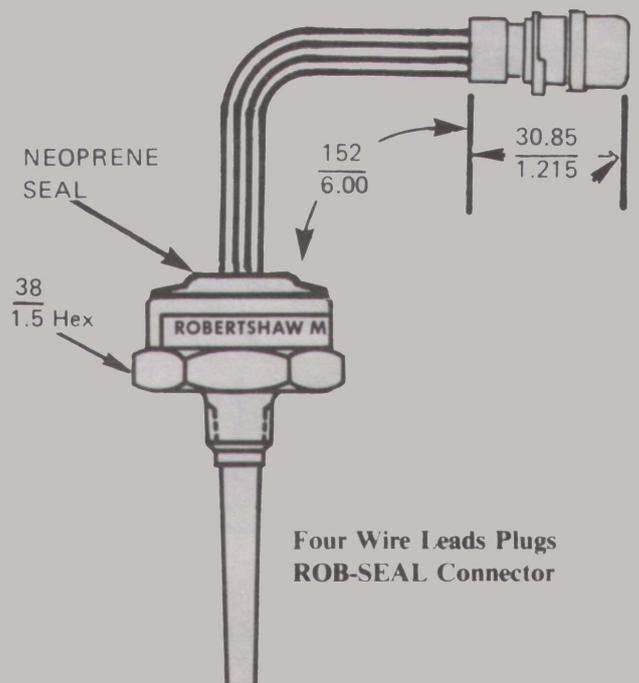
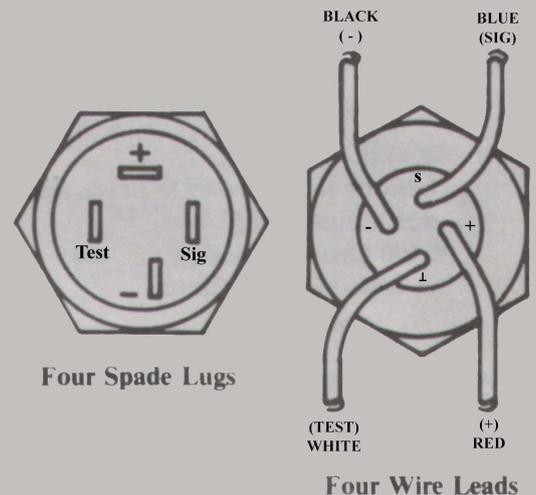
Option "D" (Table 5) is identical to Option "C" described above, except that the 4 wires terminate in a Model SS4P Sure-Seal weatherproof plug. The mating Sure-Seal receptacle is not provided, since this must be installed by the O.E.M. on the mating vehicle harness assembly.

Alternate connectors may be specified by O.E.M. accounts. Specify manufacturer and complete model number.

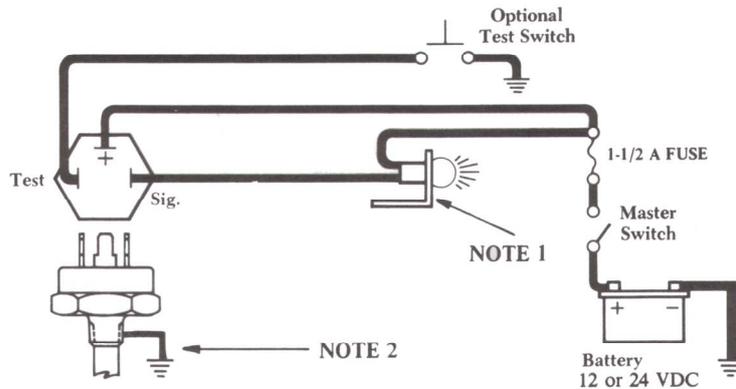
DIMENSIONAL DATA



TERMINAL OPTIONS

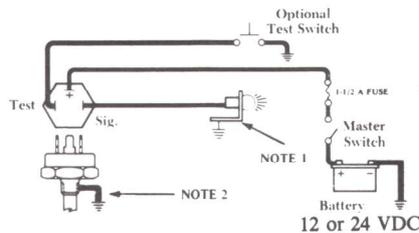


**WIRING DETAILS
FOR STANDARD MODELS 613-N()U OR 624-N()U**



Wiring connections for standard Model 613/624 N()U negative ground vehicles ungrounded loads.

WIRING CONNECTIONS FOR ALTERNATE MODELS



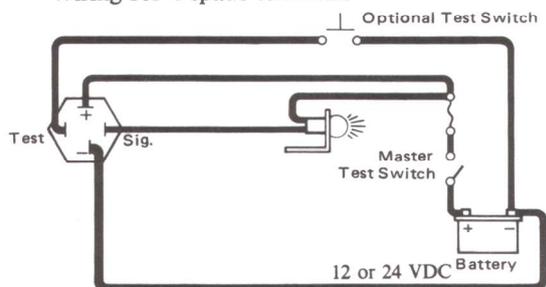
613/624-N()G negative ground vehicles grounded loads.

NOTE 1 — LOADS may be lights, solenoids, relays, buzzers, etc. Current limit 1 AMP.

NOTE 2 — IMPORTANT: Threads **MUST** be grounded to chassis. **DO NOT** use Teflon tape or other insulating materials on threads. If thread lube is desired, use electrically conductive material.

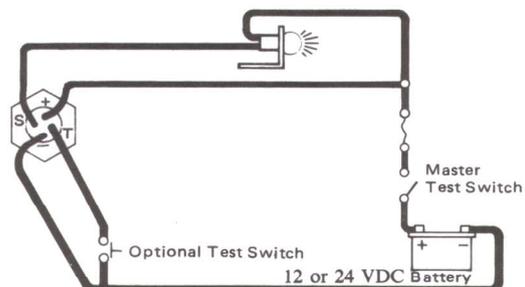
This note is **NOT** applicable for units with 4 terminals or 4 wire leads.

Wiring for 4 spade terminals



Models 613/624-N()U-() () () () -B

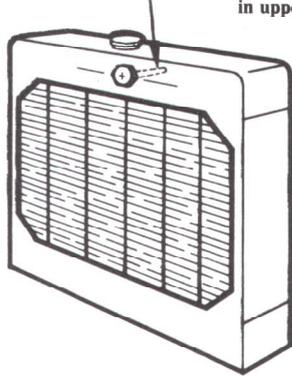
Wiring for 4 wire leads



Models 613/624-N()U-() () () () -C

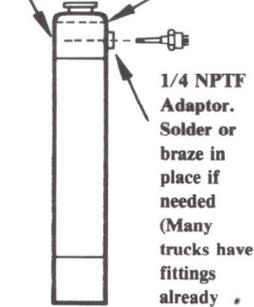
TYPICAL INSTALLATIONS

Locate near center to eliminate effects of side to side liquid sloshing.



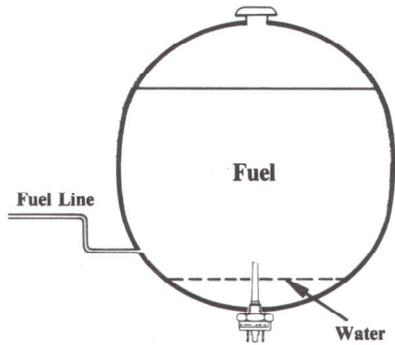
Mount as low as practical in upper reservoir

Normal coolant level

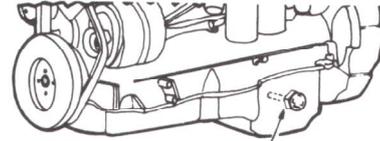


1/4 NPTF Adaptor. Solder or braze in place if needed (Many trucks have fittings already available).

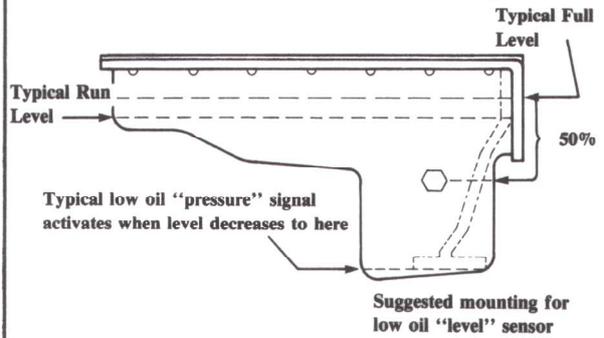
COOLANT LEVEL DETECTION
MODEL 613



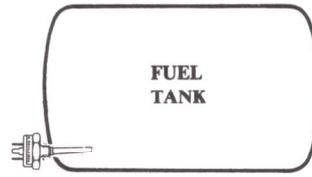
TO DETECT WATER IN FUEL TANKS USE
MODEL 613 () H ()



3/8 NPTF Adapter solder or braze in place



LUBE OIL LEVEL DETECTION
MODEL 624



FUEL LEVEL DETECTION
MODEL 624

Typical applications include unattended diesel engines to prevent run-dry and subsequent fuel line purging.