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Graphic Symbol Conventions

**NOTE**  Important information, tips, and hints are highlighted by the NOTE graphic.

**CAUTION** messages are highlighted by the CAUTION graphic and contain instructions that must be followed to avoid faulty equipment operation, or hazards. If ignored, equipment damage or personnel injury could result!

**WARNING** messages are highlighted by the WARNING graphic and contain instructions that must be followed to avoid faulty equipment operation, or an explosion or shock hazards. If ignored, severe injury or death may result!

**DANGER** messages are highlighted by the DANGER graphic and contain instructions that must be followed to avoid an explosion or electrical shock hazard. If ignored, severe injury or death will result!

— ❖ —  End of Chapter symbol

**Page Numbering Convention**  — Example:

Page 4 - 1 = Chapter 4 page 1

**Page Layout Convention**  — Example:

Chapter Number & Name (TOP LEFT FIRST PAGE)

Chapter Contents

Manual Name (EVEN NUMBERED PAGES)

Page Number

Chapter Number
Before You Begin – Read This

CAUTION Leaking underground storage tanks (USTs) and fuel lines cause serious environmental and health hazards. The Tank Sentinel® system is designed to detect leaks in tanks by tank tightness/leak testing with liquid level probes, and/or with leak detection sensors. You must follow the instructions in this manual carefully to ensure that the system is programmed properly and is effective in detecting leaks.

— Site Information Required

- Site Plan? — showing the location, size, and model #s of all tanks, probes and sensors
- Dispenser Manufacturer Documentation?
- Pump Manufacturer Documentation? — Type, Model #s, and suction inlet distance off the bottom of each tank (to determine the lowest product level and highest water level)
- Pump Control Required? — enable/disable pumping... TS-IEM Output modules (for TS-2001/508 consoles only), or a TS-ROM1 BriteBox
- Remote Device Control Required? — use TS-IEM (see above), or a TS-ROM2 BriteBox
- Remote Tank Overfill Alarm / Acknowledge Installed? — (TS-RA1 or TS-RA2 / TS-RK) Type, Model, Size and Manufacturer of each Tank
- Tank Manufacturers’ Tank Chart / Strapping Table (s)? — for each tank or the diameter and length of each tank
- Are any tanks identical? — (tanks, probe data, and alarm limits can be copied)
- Standard Probe Data? — (model number, shaft length, gradient, serial number)
- Special Probe Data? — (ie RTD / Temperature sensor locations)
- Tank # & Probe # — model number assignments and input channels for each tank
- Leak Detection Sensors? — installed in or near or associated with each tank including input channel number assignments
- Product? — in each tank (API specific gravity) and the type & number of float(s) / probe
- State and Local Regulations? — (testing requirements, reporting requirements, and hotline numbers, and other information that you and/or the customer will need)

— Other Sources of Information

Use the TOC (Table of Contents) to find information within this manual and see the following INCON documentation:
- Installation Guide
- Operator’s Guide
- TroubleShooting Guide
- Leak Detection Sensor – Installation Guides (one per type / family of sensor)
- Tech Service Bulletins
- Application Bulletins
- Application Notes
Scope of This Manual

This manual shows the setup-programming of Tank Sentinel system. Each Chapter is dedicated to a specific parent menu (see Parent Menus below).

Menu Conventions

The menu structure in this manual is shown in an indented format:

**PARENT MENUs** are above and to the left of **sub-menus** and **SUB-MENUs** are below and to the right of parent menus.

*Default VALUES, SETPOINTS, & LIMITS* are shown first and in *ITALIC* text.

Parent Menus

![Menu Structure Diagram]

**NOTES** Numbers within boxes are Chapter #s. Some parent menus, or sub-menus will not appear unless:

* a related setup menu / feature is selected
** the accessory (hardware) is installed and the system is powered up
*** the appropriate options have been purchased

Key Action

**MENU keys** – use (press) to:

- choose / display other menus or sub-menus or exit SETUP mode
- move the cursor left or right through a text string (M1 = left, M2 = right)
- backspace over / delete a character in a text string (M4 backspaces from the right)

**KEY PAD keys** – use (press):

- ⇐ CANCEL to cancel an input or to exit out of a menu
- ▲ UP or DOWN ▼ to display more menus when (MORE) is shown, or other selections from a sub-menu when (UP/DN) is shown
- Use the ENTER key to accept the displayed choice or value for storage into setup memory
Key Action (continued from previous page...)

- **ACK SHIFT** key is used to change the preconditioned input character type... the display shows either an A...M or the word NUMERIC when an alphanumerical or numeric input is expected. Press the **ACK SHIFT** key **N times** to change the current input character type to another type (look at the upper right corner of display while doing this). See the Operator’s manual about using the **ACK SHIFT** key to silence and acknowledge alarms, and to start an output grace period (programmable length of time).

### Alpha-Numeric Input (example)

The example below is what you would see when programming SYSTEM ID... (press keys: **MENU M1 M2 M2 M1**) to display:

<table>
<thead>
<tr>
<th>LOCATION LINE 1</th>
<th>A...M BACKSPACE</th>
</tr>
</thead>
<tbody>
<tr>
<td>INCON</td>
<td></td>
</tr>
<tr>
<td>M1</td>
<td>M2</td>
</tr>
<tr>
<td>M3</td>
<td>M4</td>
</tr>
</tbody>
</table>

A...M means that the system is conditioned to input the upper left letter of any key (A B C D E F G H I J K L M)... see below:

Press **ACK SHIFT** key once again to display:

<table>
<thead>
<tr>
<th>LOCATION LINE 1</th>
<th>N...Z BACKSPACE</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td></td>
</tr>
<tr>
<td>M1</td>
<td>M2</td>
</tr>
<tr>
<td>M3</td>
<td>M4</td>
</tr>
</tbody>
</table>

N...Z means that the system is conditioned to input the upper left letter of any key (N O P Q R S T U V W X Y Z) — conditions remain until changed — see below:

Press **ACK SHIFT** key once again to display:

<table>
<thead>
<tr>
<th>LOCATION LINE 1</th>
<th>NUMERIC BACKSPACE</th>
</tr>
</thead>
<tbody>
<tr>
<td>AN 0.1</td>
<td></td>
</tr>
<tr>
<td>M1</td>
<td>M2</td>
</tr>
<tr>
<td>M3</td>
<td>M4</td>
</tr>
</tbody>
</table>

NUMERIC means that the system is conditioned to input the lower character of any key (numbers 1 2 3 4 5 6 7 8 9 0 . + / – or a **SPACE**)... see above.

NOTE The shift function will remain in the current input character mode (or position) until the **ACK SHIFT** key is pressed again.
Programming Alarms, Limits, or Inputs to Output Groups

The TS-1001/504 / 2001/508 Tank Sentinels includes a powerful setup feature called – *Output Groups* (OGs). Alarms, limits, and inputs (Aux. or I/O Module inputs) can be assigned/programmed to output groups (OUT GROUP or OG). An output device will turn on or off when an alarm is active in any of its assigned output group(s). Up to 32 output group(s) can be assigned or programmed to any output device... also see Programming Output Devices.

The standard output devices are annunciators and relays. Other *output devices* can be *optionally* added to the system. These are: TS-ROM BriteBox relays, TS-CIM BriteBox output modules, and TS-IEM internal expansion PC Board output modules—for TS-2001/508 consoles only.

**Example:** TANK 1, ALARMS and the H LIM OG (high product level limit) menus:

The HIGH LIM (high product level limit) has an associated H LIM OG – high limit output group near it.

**NOTE** In an 8 tank system there are 8 H LIM OG s (one under each tank menu).

Each limit, alarm or input can be assigned to one of the 34 Output Group choices — GROUP A thru FF & to ALL output GROUPS, or to NONE ( no output group = default ).

Record output group assignments for each alarm, limit, or input in the provided OG Worksheets.
Programming Output Devices:

After assigning alarms and limits to output group(s), program the appropriate output devices to respond to any or all output groups (OGs)

Example Applications:

Turn on external Tank Overfill Alarm & solid console annunciator  
(when a high or high high product level – alarm limit is reached)

Program the (above) alarm limits for each tank. Assign the associated H LIM OG or HH LIM OG output groups to one alarm group (ie GROUP O). Program the solid annunciator (alarm horn) and relay 1 output devices to react to any GROUP O alarm by assignment... change GROUP O – (dash) to a Y. The external TS-RA2 or RA1 alarm unit (wired to relay 1) will turn on / off with relay 1.

This way a high level condition in any tank will activate the solid annunciator and the external alarm connected to relay 1.

To disable a STP & turn on the modulated console annunciator  
(when a low low product or high water – alarm limit is reached)

Program the (above) alarm limits for each tank. Assign the associated LL LIM OG and WL LIM OG output groups to a unique alarm group for each tank (ie GROUP P for TANK 1 & GROUPS for TANK 4). Program the TS-ROM channel relays output device (CHANNEL N — OUT GRPS) to respond to a unique tank alarm GROUP __. The line power, that activates the STP motor relay, is wired between the TS-ROM relay contacts. When these alarms occur, the unique output group activates the appropriate TS-ROM channel relay which interrupts the STP power and disables dispensing.

Program the modulated annunciator (alarm horn) output device to activate and react to any alarm by assignment... change GROUP P Q R S – (dash) to a Y.

Example Output Device – OUTPUT GROUP Assignments (shown filled-in)

<table>
<thead>
<tr>
<th>Output Device — OUTPUT GROUP Assignment</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
</tr>
<tr>
<td>Y</td>
</tr>
</tbody>
</table>

GROUP X  

The 24TH group (Group X) is shown assigned Y

Press:  
M1 to move the cursor left ⇐  
M2 to move the cursor right ⇒  
M4 to backspace (delete) one character to the left ⇐  
UP / DOWN ▲▼ to select (Y for yes assigned, or − (dash) for no not assigned)  
ENTER to store the setup into the system memory
Standard and Optional Output Devices

<table>
<thead>
<tr>
<th>Standard Output Devices:</th>
<th>Optional (TS-CIM / TS-IEM) Output Devices:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Modulated Annunciator</td>
<td>I/O Module Output 1*</td>
</tr>
<tr>
<td>Solid Annunciator</td>
<td>I/O Module Output 2*</td>
</tr>
<tr>
<td>Relay 1</td>
<td>I/O Module Output 3*</td>
</tr>
<tr>
<td>Relay 2</td>
<td>I/O Module Output 4*</td>
</tr>
<tr>
<td><strong>Optional Output Devices:</strong></td>
<td></td>
</tr>
<tr>
<td>TS-ROM Relay 1</td>
<td>I/O Module Output 5*</td>
</tr>
<tr>
<td>TS-ROM Relay 2</td>
<td></td>
</tr>
<tr>
<td>TS-ROM Relay 3</td>
<td>I/O Module Output 6*</td>
</tr>
<tr>
<td>TS-ROM Relay 4</td>
<td>I/O Module Output 7*</td>
</tr>
<tr>
<td>TS-ROM Relay 5</td>
<td></td>
</tr>
<tr>
<td>TS-ROM Relay 6</td>
<td>I/O Module Output 10*</td>
</tr>
<tr>
<td>TS-ROM Relay 7</td>
<td></td>
</tr>
<tr>
<td>TS-ROM Relay 8</td>
<td>I/O Module Output 11*</td>
</tr>
<tr>
<td>Note: The TS-2001 will list the TS-CIM Output Modules as I/O Module - Outputs # 17 through # 24 (if installed).</td>
<td></td>
</tr>
</tbody>
</table>

Programming I/O Module Operation

The TS-CIM/TS-IEM channels * can function either as an input or an output module. The mode menu option allows selection of the channel operation — this must correspond to the type of module that is inserted into the channel. Input mode must be selected for input modules, and output mode must be selected for output modules. Reference the Chapter about IO MODULE setup programming.

**NOTE** Aux. Inputs are always inputs and cannot be changed because the input circuitry is hard-wired. Reference the Chapter about AUX INPUT setup programming.

Interfacing TS-LLD to Tank Gauge

In order to interface the INCON TS-LLD line leak detector(s) to the TS-1001/504 / 2001 / 508 Tank Sentinel consoles —

**Use the TS-LLD interface terminals within the console** (providing RS-485 bidirectional communication). The first TS-LLD is wired to the tank gauge and the others are connected to each other (1 to 2, 2 to 3...). LLD is available with Tank Sentinel software version # 1.10 and higher ( check options – L must be in the part number ).
Leaving (Exit) Setup Programming

There are two ways to leave the setup mode. These are:

1.) Use (press) the CANCEL key until the exit choice appears, then press the M1 key to exit the setup mode.

2.) Wait until the Tank Sentinel console autoexits.

The unit will automatically leave / exit the setup mode (autoexit) after three or four minutes of inactivity (if no key is pressed). This feature prevents the unit from being left in the setup mode for long periods of time... leak testing and leak detection are not active while in the setup mode.

While viewing data in the normal run mode, the display will also revert to the normal display after shorter period of key inactivity (20 or 30 seconds).

After Programming is Done

After the system is custom-programmed and tested, printout or Fax a hard copy of the: system setup report, and a setup report for each tank for your records. Please give a copy of these reports to the customer for his records.

Warranty Reminder

After installation, make sure to sign the completed Warranty Registration form and return it to INCON. This form validates the express warranty stated here!
System Setup Programming

Contents:  
System Menu  
Worksheet 1-1 — System Output  
Groups

See the Table of Contents to find topics in this manual. See the Preface for general information about this manual. See the Installation, Operator’s, TroubleShooting Guides and Application Notes for other reference sources.

System Menu

NOTE

The NO. (of) TANKS set in the system menu is shown in the TANKS, PROBES and PRODUCTS menus!

Remember:

- Use UP or DOWN ▲▼ key to display more menus (MORE shown) or selections (UP/DN shown)
- Press CANCEL to cancel data entry
- Use the ENTER key to accept data

Character input / editing:

- Press M1 to move the cursor left —
- Use M2 to move the cursor right ➤
- Press M4 to backspace (delete) one or more characters to the left ─

PASSWORDS  
(none / empty)  
enter up to 12 characters max.

(Secures access to setup mode or acknowledging alarms and/or starting grace periods. A setup password is recommended for security.)

SETUP  
SETUP PASSWORD

ACK  
ACKNOWLEDGE PASSWORD  
(none / empty)  
(also see ANNUNC [IATOR] menu for time-out)

enter up to 12 characters max.

Press ENTER to accept this data.
SYSTEM Menu (CONTINUED... FROM PREVIOUS PAGE)

SYSTEM ID

(enter new 5 line report header, see below)

Default Report Header

LINE 1
LOCATION LINE 1

INCON

_____ enter up to 24 characters max.

Press ENTER to accept this data.

LINE 2
LOCATION LINE 2

INTELLIGENT CONTROLS

_____ enter up to 24 characters max.

Press ENTER to accept this data.

LINE 3
LOCATION LINE 3

P. O. BOX 638

_____ enter up to 24 characters max.

Press ENTER to accept this data.

LINE 4
LOCATION LINE 4

SACO ME 04072

_____ enter up to 24 characters max.

Press ENTER to accept this data.

LINE 5
LOCATION LINE 5

1-800-984-6266

_____ enter up to 24 characters max.

Press ENTER to accept this data.

UNITS

MEASUREMENT UNITS

VOLUME

VOLUME UNITS

GALLONS

LITERS

LEVEL

LEVEL UNITS

INCHES

CM

TEMP

TEMPERATURE UNITS

FAHRENHEIT

CELSIUS

NO. TANKS

NUMBER OF TANKS

1

_____ enter number of tanks.

Press ENTER to accept this data.

(Units are set in either US Standard or Metric)

(– change if not using the default US units)

(volume measurement units)

Use UP/DOWN ▲▼ keys to choose units.

Press ENTER to accept this data.

(– change if not using the default US units)

(level and length units)

Use UP/DOWN ▲▼ keys to choose.

(Metric - Centimeters)

Press ENTER to accept this data.

(– change if not using the default US units)

(Prints F for Fahrenheit, or C for Celsius on reports)

Use UP/DOWN ▲▼ keys to choose units.

Press ENTER to accept this data.

(enter total number of tanks in the system)
**SYSTEM Menu (CONTINUED... FROM PREVIOUS PAGE)**

**NO. SENSORS**
NUMBER OF SENSORS
- 12 (for TS-1001, 504)
- 24 (for TS-2001, 508)
(enter the number of Leak Detection Sensors)

- (0 thru N) enter the total number of Sensors.
(Also enter all unused channels between the lowest to
highest channel (also see SENSORS menu)
Press ENTER to accept this data.

**NO. METERS**
NUMBER OF METERS
- 0
(devices used with TS-DIM)

- enter number of meters.
Press ENTER to accept this data.

**BUSY ENA**
BUSY ENABLED
- NO
- YES
(dispenser supports ‘busy’ signal to ATG)
Use UP/DOWN ▲▼ keys to choose setting.
Press ENTER to accept this data.

**UTHRESH**
USER THRESHOLD
- +0
(volume allowed pumped before Catastrophic Leak alarm)

- 1 to +9999 volume units.
Press ENTER to accept this data.

**LIMITS**
LIMITS
LEAK LIM
- LEAK LIMIT
  +2.0
(set leak limits for after hours sentinel mode – also see
menu)

- 0.2 to +10.0 volume units.
Use keypad to input sentinel mode leak rate.
Press ENTER to accept this data.

LEAK OG
LEAK LIMIT OUTPUT GROUP
- NONE
- GROUP A thru FF
- ALL GROUPS
(assign leak alarm to an OG (NONE, A to FF, or ALL)
32 OGs available... see Worksheet #1-1)

One OG selected (A = 1ST OG, FF = 32ND OG)
All OGs selected
Use UP/DOWN ▲▼ keys to choose an OG.
Press ENTER to accept this data.

THEFT LIM
THEFT LIMIT
- +10.0
(enter theft limit for all tanks)

- 1 to +9999 volume units.
Press ENTER to accept this data.

THEFT OG
THEFT LIMIT OUTPUT GROUP
- NONE
- GROUP A thru FF
- ALL GROUPS
(assign theft limit alarm to an OG (NONE, A to FF, or ALL
Output Groups)(32 OGs available... see Worksheet #1-1)
Not assigned to an Output Group (OG)
One OG selected (A = 1ST OG, FF = 32ND OG)
All OGs selected
Use UP/DOWN ▲▼ keys to choose an OG.
Press ENTER to accept this data.
SYSTEM Menu (CONTINUED... FROM PREVIOUS PAGE)

SENTINEL
SENTINEL MODE
   MODE
      SENTINEL MODE
         OFF
         SCHEDULED

START TIME
   SENTINEL START TIME
      00.00.00

END TIME
   SENTINEL END TIME
      00.00.00

DEL DELAY
   DELIVERY DELAY
      15 (minutes)

REPORT DELIVERIES
   Use UP/DOWN ▲▼ keys to choose.
   Press ENTER to accept this data.
   ENABLED
   DISABLED

REPORT ALARMS
   Use UP/DOWN ▲▼ keys to choose.
   Press ENTER to accept this data.
   ENABLED
   DISABLED

REPORT LEAK TESTS
   Use UP/DOWN ▲▼ keys to choose.
   Press ENTER to accept this data.
   ENABLED
   DISABLED

REPORT SCALD TEST
   (Appears only if an S is present in the TS Part Number (press CHECK and M4 to view OPTIONS)
   Use UP/DOWN ▲▼ keys to choose.
   Press ENTER to accept this data.
   DISABLED
   ENABLED

(after hours theft monitoring / tank leak detection)

Use UP/DOWN ▲▼ keys to choose mode.
Press ENTER to accept this data.
Select SCHEDULED to enable Sentinel Mode —

Input time in 24 hour format:
00.00.00 = midnight
22.00.00 = 10:00:00 pm
+ 12 (add 12 hours to pm times
from 1 pm to 11:59 pm)
02.05.00 = 2:05:00 am

(delay tank delivery reports by ___ minutes)
___ 1 to 240 minute input range.
Press ENTER to accept this data.

(enabled = yes, report deliveries)
(disabled = no, don’t report deliveries)

(enabled = yes, report leak test results)
(disabled = no, don’t report leak test results)

(disabled = no, don’t report SCALD leak tests)
(enabled = yes, report SCALD leak tests)
### System Menu (Continued... from previous page)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>REP LINES REPORT LINE TESTS</td>
<td>(Appears only if an L is present in the TS Part Number, press CHECK and M4 to view OPTIONS) Use UP/DOWN ▲▼ keys to choose. Press ENTER to accept this data. (enabled = yes, report LINE leak tests) (disabled = no, don’t report LINE leak tests)</td>
</tr>
<tr>
<td>HIST SIZE</td>
<td>(Max. number of alarms in Alarm History Reports) enter range from 1 to 50 alarms shown. Press ENTER to accept this data.</td>
</tr>
<tr>
<td>SYSFLOG SYSTEM FAIL OUTPUT GROUP</td>
<td>(assign system fail warnings to Output Group) (32 OGs available... see Worksheet #1) Not assigned to an Output Group (OG) One OG selected (A = 1ST OG, FF = 32ND OG) All OGs selected Use UP/DOWN ▲▼ keys to choose an OG. Press ENTER to accept this data.</td>
</tr>
<tr>
<td>PRNT INTR STRAPPING TABLE PRINT INTERVAL</td>
<td>(how many intervals to print) enter strapping table print interval, range = 1 to 100.0 level units. Press ENTER to accept this data.</td>
</tr>
<tr>
<td>DATA INTR DATA CAPTURE INTERVAL</td>
<td>(for diagnostic use) data logging interval, range = 1 to 9999. Press ENTER to accept this data.</td>
</tr>
<tr>
<td>DATA TANK TANK TO DATA LOG</td>
<td>(for diagnostic use) tank(s) to data log, range = 1 to NO. of TANKS. Press ENTER to accept this data.</td>
</tr>
<tr>
<td>COLD BOOT IF YOU CONTINUE, ALL SYSTEM PROGRAMMING AND DATA WILL BE LOST...</td>
<td>(Will erase all program data / setup data to the original “factory” default values) Press ENTER to proceed with the ‘COLD BOOT’.</td>
</tr>
</tbody>
</table>

**COLD BOOT**

IF YOU CONTINUE, ALL SYSTEM PROGRAMMING AND DATA WILL BE LOST...

PRESS ENTER IF YOU ARE SURE THAT YOU WANT TO CONTINUE WITH COLD BOOT

ERASING SYSTEM MEMORY...

SYSTEM WILL REBOOT WHEN COMPLETE

(The ATG SETUP programming is returned to the default settings and must be reprogrammed to match the site.)
Worksheet #1-1 – Output Groups – System Limits

Fill-in the work sheet below and compare assignments to uncover conflicts before programming output devices.

<table>
<thead>
<tr>
<th>OG = Output Group</th>
<th>- Output Group Assignment</th>
<th>WORKSHEET Output Group choices</th>
</tr>
</thead>
<tbody>
<tr>
<td>System Limits:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LEAK OG</td>
<td></td>
<td></td>
</tr>
<tr>
<td>THEFT OG</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SYSFL OG</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Example:
- LEAK OG D Activates Modulated Annunciator & Relay 2 (turns on external tank leak light)
- THEFT OG --- Sentinel Mode Theft Limit: **none** assigned
- SYSFL OG A System Fail (software or hardware failures) Activate solid annunciator horn

Output Devices: Modulated Annunciator, Solid Annunciator, Relay 1, Relay 2, I/O Output Module Channel # 1 to # __ (record all OG Assignments in the vertical column)
2 Tanks SETUP PROGRAMMING

Contents:
Tank Data Menu
Tank Alarm Menu
Special Tank Menu
Worksheet 2-1, 2-2
Tank Output Groups

See the Table of Contents to find topics in this manual. See the Preface for general information about this manual. See the Installation, Operator’s, TroubleShooting Guides and Application Notes for other reference sources.

Tanks Menu

 Press this key and follow the highlighted sequence below

TANKS DATA
TANK 1 TANK 2 ...... Select the tank number to program Data.

TANK DATA N
COPY
COPY FROM TANK DATA X TO N
TANK 1
COPY FROM TANK DATA N TO N
PRESS ENTER IF YOU ARE SURE?

NOTE Only the NO. (of) TANKS set under the system menu are shown here!

Remember:
• Use UP or DOWN keys to display more menus (MORE shown) or selections (UP / DN are shown)
• Press CANCEL to cancel data entry
• Use the ENTER key to accept data

Character input / editing:
• Press menu keys (M1 to M4) to access menus.
• Press M4 to backspace (delete) one or more characters to the left
• Use M2 to move the cursor right
• Press M1 to move the cursor left

N refers to / represents a tank number

Tank 1 is shown selected (press M1 key).

Select a tank to copy data from (use M key).

Press ENTER to accept this data.

Use UP/DOWN keys to display tanks 5-8.
Tanks—TANK DATA N Menu (Continued...from previous page)

NAME
TANK NAME N
TANK N

N refers to / represents a tank number
(Use SHIFT to change from A-M to N-Z to NUMERIC.)

_____ enter up to 7 characters max.
Press ENTER to accept this data.
(INCON recommends leaving the tank name as TANK N)

MANIFOLD
MANIFOLD FOR TANK N
NONE
MANIFOLD 1
MANIFOLD 2
:
MANIFOLD 4

(select only when tanks are part of a manifold)

Use UP/DOWN ▲▼ keys to display Manifold 1 thru 4.
Press ENTER to accept this data.

SHAPE
TANK SHAPE 1
HORIZONTAL
VERTICAL
(aboveground storage tank)

(type distinguishes between underground and aboveground)

Use UP/DOWN ▲▼ keys to choose shape.
Press ENTER to accept this data.

TYPE
TANK TYPE N
SPECIAL #

(select STANDARD 1 thru XX... see Appendix A)

Use UP/DOWN ▲▼ keys to choose type.
Press ENTER to accept this data.

(for Standard Tank types, or SPECIAL 1 thru 8 or program
the special tank(s) under the SPECIAL TANK N menu)

PROBE
PROBE FOR TANK N
PROBE #

Use UP/DOWN ▲▼ keys to choose probe#.
Press ENTER to accept this data.

Select the correct Probe channel # for TANK N...

NOTE
Any Probe # (input channel Number) can be used for any Tank.
For example, Probe 8 (the probe that is wired to probe input
channel #8) can be installed in Tank 1....BUT a Probe can not
be used (or programmed or assigned) to more than one
Tank! Assigning the same Probe #N to more than one Tank, will
display an alarm when exiting SETUP (to warn you that more
than one tank is referencing the same probe)! The system will
remain in setup until this problem is fixed.

Set Probe data under the PROBE menu (Chpt. 3.)

PRODUCT
PRODUCT FOR TANK N
PRODUCT #

Use UP/DOWN ▲▼ keys to choose product#.
Press ENTER to accept this data.

(select Product 1 thru 8...the PRODUCT menu is not
present if a Manifold is selected / changed from
NONE) ...Also see PRODUCTS menu for standard
products and Special product programming.)
Tanks – TANK DATA N Menu (CONTINUED... FROM PREVIOUS PAGE)

P OFFSET
PRODUCT OFFSET N
+0.00000

(to compensate product readings from tank tilts)

_____ +20 to -20
Use keypad to input level units.
Press ENTER to accept this data.
(see Installation Manual for offset values)
(Not available if Manifold or Pressure probe selected)

W OFFSET
WATER OFFSET N
+0.00000

(to compensate product readings from tank tilts)

_____ +20 to -20
Use keypad to input level units.
Press ENTER to accept this data.
(see Installation Manual for offset values)
(Not available if Manifold or Pressure probe selected)

DEL THRES
DELIVERY THRESHOLD N
+200.000

(the minimum volume before a delivery is reported)

_____ 1.0 to 99999
Use keypad to input level units.
Press ENTER to accept this data.
(the Delivery Threshold menu is not present if a Manifold is selected / changed from NONE)

Tanks – TANK ALARM N Menu

See Figure 2 - 1 at left for typical alarm limit settings.

NOTES N refers to / represents a tank number

• The alarm copy function copies all alarm limits from Tank X to the current Tank # N. This is a good function to use for identical sized tanks, and may be adequate for similar sized tanks but limit settings may require editing after the copy operation.

• Also note, Water, High and High High limits are set in length units, inches or centimeters — while Low and Low Low limits are set in volume units, gallons or liters.

Figure 2 - 1 Typical Tank Limits

ALARMS
TANK ALARMS
TANK 1
TANK 2
TANK 8

(To set Tank Alarm Limits)
Use M2 key.
Select Tank N to program, using M1 - M4 keys.
Use UP/DOWN ▲▼ keys to display Tanks 5-8.
To select Tank N ...
(COPY is optional) Press the M1 key.
Select a tank to copy data from (use M key).
Use UP/DOWN ▲▼ keys to display tanks 5-8.
(The alarm copy function copies all alarm limits from Tank X to the current Tank # N)
Press ENTER to accept this data.

HIGH LIM
HIGH PRODUCT LEVEL LIMIT N
+96.0000

Use keypad to input limit in inches or centimeters.
Press ENTER to accept this data.

H LIM OG
HIGH PRODUCT OUTPUT GROUP N
NONE
GROUP A-FF
ALL GROUPS

(assign Alarm Limits to Output Group)
(32 OGs available... see Worksheet #2 or #3)
Not assigned to an output Group (OG)
One OG selected ( A = 1ST OG, FF = 32ND OG )
All OGs selected
Use UP/DOWN ▲▼ keys to choose an OG.
Press ENTER to accept this data.

N refers to / represents a tank number

LOW LIM N
LOW PRODUCT VOLUME LIMIT N
+0.0000

Use keypad to input limit in inches or centimeters.
Press ENTER to accept this data.

L LIM OG N
LOW PRODUCT OUTPUT GROUP N
NONE (A to FF, or ALL)
GROUP A-FF
ALL GROUPS

(assign Alarm Limits to Output Group)
(32 OGs available... see Worksheet #2 or #3)
Not assigned to an output Group (OG)
One OG selected ( A = 1ST OG, FF = 32ND OG )
All OGs selected
Use UP/DOWN ▲▼ keys to choose an OG.
Press ENTER to accept this data.
Tanks – TANK ALARM Menu (CONTINUED... FROM PREVIOUS PAGE)

LL LIM OG N
L L PRODUCT OUTPUT GROUP N
NONE
GROUP A-FF
ALL GROUPS

(assign Alarm Limits to Output Group)
(32 OGs available... see Worksheet #2 or #3)
Not assigned to an output Group (OG)
One OG selected (A = 1ST OG, FF = 32ND OG)
All OGs selected

Use UP/DOWN ▲▼ keys to choose an OG.
Press ENTER to accept this data.

WATER LIM N
HIGH WATER LEVEL LIMIT N
+4.0000

0.0 to 9999.0 (enter alarm limit)
Press ENTER to accept this data.

W LIM OG N
HIGH WATER OUTPUT GROUP N
NONE
GROUP A-FF
ALL GROUPS

(assign Alarm Limits to Output Group)
(32 OGs available... see Worksheet #2 or #3)
Not assigned to an output Group (OG)
One OG selected (A = 1ST OG, FF = 32ND OG)
All OGs selected

Use UP/DOWN ▲▼ keys to choose an OG.
Press ENTER to accept this data.

NOTE
WATER LIM N and W LIM OG N are not available for PRESSURE probes, since they do not measure water level.

Tanks – SPECIAL TANK Menu

• If STANDARD tanks are selected, then these menu options will not be available.

• Correction Tables: If the Special Tank is not a perfect cylinder or has a domed end, then you must program a correction table (100 correction points can be programmed). Two values are required per point/position (POS #). These are level and volume, which are found in the manufacturers' tank table/chart, input these accurately. Always input 0 level and 0 volume for the first point, and max. level and max. volume for the last point. The number of points in between determines the accuracy of the strapping table.

• Cylindrical Tanks: Select diameter and input the internal tank diameter value, and set the length to the internal length of the tank (correction tables are usually not needed with cylindrical tanks).

• Vertical or Rectangular tanks: Select diameter and input the internal tank diameter or depth, and set its length to zero (0). Input 0 level and 0 volume for the first point, and max. level and max. volume for the last point.

• Correction Points are automatically sorted from lowest to highest level. The lowest level is closest to the bottom of the tank.

SPECIAL
SPECIAL TANKS
SPECIAL 1
SPECIAL 2
:
SPECIAL 8

Use UP/DOWN ▲▼ keys to display tanks 5-8.
Tanks – SPECIAL TANK N Menu (Continued)

SPECIAL TANK N
COPY
COPY FROM SPECIAL TANK X TO N
SPECIAL 1
COPY SPECIAL TANK N TO N
PRESS ENTER IF YOU ARE SURE?

N refers to / represents a tank number
Press the M1 key.
Select a tank to copy data from (use M key).
Press ENTER to accept this data.

Use UP/DOWN keys to display tanks 5-8.

DIAMETER
TANK DIAMETER N
+96.00

0.0 to 999,999
Use the M4 key to use BACKSPACE.
Use the Keypad to input the special tank diameter.
Press ENTER to accept this data.

LENGTH
TANK LENGTH N
+324.000

0.0 to 999,999
Use the M4 key to use BACKSPACE.
Use the Keypad to input the special tank diameter.
Press ENTER to accept this data. (Correction points can be added between inaccurate level positions.)

NOTE (HEIGHT will replace LENGTH when VERTICAL is selected as the TANK DATA SHAPE)

HEIGHT
TANK HEIGHT N
+324.000

0.0 to 1999.0
Use the M4 key to use BACKSPACE.
Use the Keypad to input the special tank diameter.
Press ENTER to accept this data.

CORR TABL
CORRECTION TABLE N
ADD

Press the M4 key.
(Position (POS #) ...see NOTES in this section)
Press the M1 key. POS 1 is the lowest value tank.
Two values (LEVEL and VOLUME) are required.

LEVEL +0
Use the Keypad to input level of strapping point.
Press ENTER to accept this data.

VOLUME +0
Use the Keypad to input volume at that level point.
Press ENTER to accept this data.
Tanks – SPECIAL TANK N Menu (CONTINUED)

DELETE
SELECT POSITION WITH UP/DN POS #
LEVEL +X VOLUME +Y
ARE YOU SURE?
Select the POS # to delete (UP/DOWN ▲▼).
Press ENTER to accept this data.
Press ENTER to accept this data.

EDIT
SELECT POSITION WITH UP/DN POS #
LEVEL +X VOLUME +Y
Select POS # to edit (UP/DOWN ▲▼).
Press ENTER to accept this data.
(correct the mistake and press ENTER again)

DISPLAY
CORRECTION TABLE N POS N
LEVEL +X VOLUME +Y
Use UP/DOWN ▲▼ keys to scroll thru list.

Worksheet 2-1 and 2-2 are shown on the next two pages
# Worksheet #2-1 – Output Groups – Tanks 1 thru 4

Fill-in the worksheet below and compare assignments with other worksheets to uncover conflicts **before** programming output devices (for ALL ATG types).

<table>
<thead>
<tr>
<th>OG = Output Group</th>
<th>- Output Group Assignment WORKSHEET Output Group choices -</th>
<th>NONE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tank 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>H LIM OG</td>
<td>A</td>
</tr>
<tr>
<td></td>
<td>HH LIM OG</td>
<td>B</td>
</tr>
<tr>
<td></td>
<td>L LIM OG</td>
<td>C</td>
</tr>
<tr>
<td></td>
<td>LL LIM OG</td>
<td>D</td>
</tr>
<tr>
<td></td>
<td>W LIM OG</td>
<td>E</td>
</tr>
<tr>
<td></td>
<td></td>
<td>F</td>
</tr>
<tr>
<td>Tank 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>H LIM OG</td>
<td></td>
</tr>
<tr>
<td></td>
<td>HH LIM OG</td>
<td></td>
</tr>
<tr>
<td></td>
<td>L LIM OG</td>
<td></td>
</tr>
<tr>
<td></td>
<td>LL LIM OG</td>
<td></td>
</tr>
<tr>
<td></td>
<td>W LIM OG</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>G</td>
</tr>
<tr>
<td>Tank 3</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>H LIM OG</td>
<td></td>
</tr>
<tr>
<td></td>
<td>HH LIM OG</td>
<td></td>
</tr>
<tr>
<td></td>
<td>L LIM OG</td>
<td></td>
</tr>
<tr>
<td></td>
<td>LL LIM OG</td>
<td></td>
</tr>
<tr>
<td></td>
<td>W LIM OG</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>H</td>
</tr>
<tr>
<td>Tank 4</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>H LIM OG</td>
<td></td>
</tr>
<tr>
<td></td>
<td>HH LIM OG</td>
<td></td>
</tr>
<tr>
<td></td>
<td>L LIM OG</td>
<td></td>
</tr>
<tr>
<td></td>
<td>LL LIM OG</td>
<td></td>
</tr>
<tr>
<td></td>
<td>W LIM OG</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>I</td>
</tr>
</tbody>
</table>

**Example: Tank #1**

- **H LIM OG C** (High Limit Activates Relay 1 [for programmed timeout] to external Tank Overfill Alarm Acknowledge, & Activates Solid Annunciator)
- **HH LIM OG D** (High High Limit Activates Relay 2 [for programmed timeout] to activate external Tank Overfill Alarm, & Activates Solid Annunciator)
- **L LIM OG R** (Low Limit Activates Output Module 2, turns on Reorder Product Light & Modulated Annunciator)
- **LL Limit OG S** (Low Low Limit Activates TS-ROM Relay 1 to Disable Tank 5 STPump, and Activates Modulated Annunciator)
- **W LIM OG S** (Low Low Limit Activates TS-ROM Relay 1 to Disable Tank 5 STPump, and Activates Modulated Annunciator)
- **SYSFL OG A** (System Fail (software or hardware failures) Activate solid annunciator horn)

**Output Devices:** Modulated Annunciator, Solid Annunciator, Relay 1, Relay 2, I/O Output Module Channel # 1 to __ (record all OG Assignments in the vertical column)
# Worksheet #2-2 – Output Groups – Tanks 5 thru 8

Fill-in the work sheet below and compare assignments with other work-sheets to uncover conflicts before programming output devices (for TS-2001 / 508 only).

<table>
<thead>
<tr>
<th>OG = Output Group</th>
<th>- Output Group Assignment WORKSHEET Output Group choices -</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tank 5 TS-2001 only:</td>
<td>NONE</td>
</tr>
<tr>
<td>H LIM OG</td>
<td>A</td>
</tr>
<tr>
<td>HH LIM OG</td>
<td>B</td>
</tr>
<tr>
<td>L LIM OG</td>
<td>C</td>
</tr>
<tr>
<td>LL LIM OG</td>
<td>D</td>
</tr>
<tr>
<td>W LIM OG</td>
<td>E</td>
</tr>
<tr>
<td>Tank 6 TS-2001 only:</td>
<td>F</td>
</tr>
<tr>
<td>H LIM OG</td>
<td>G</td>
</tr>
<tr>
<td>HH LIM OG</td>
<td>H</td>
</tr>
<tr>
<td>L LIM OG</td>
<td>I</td>
</tr>
<tr>
<td>LL LIM OG</td>
<td>J</td>
</tr>
<tr>
<td>W LIM OG</td>
<td>K</td>
</tr>
<tr>
<td>Tank 7 TS-2001 only:</td>
<td>L</td>
</tr>
<tr>
<td>H LIM OG</td>
<td>M</td>
</tr>
<tr>
<td>HH LIM OG</td>
<td>N</td>
</tr>
<tr>
<td>L LIM OG</td>
<td>O</td>
</tr>
<tr>
<td>LL LIM OG</td>
<td>P</td>
</tr>
<tr>
<td>W LIM OG</td>
<td>Q</td>
</tr>
<tr>
<td>Tank 8 TS-2001 only:</td>
<td>R</td>
</tr>
<tr>
<td>H LIM OG</td>
<td>S</td>
</tr>
<tr>
<td>HH LIM OG</td>
<td>T</td>
</tr>
<tr>
<td>L LIM OG</td>
<td>U</td>
</tr>
<tr>
<td>LL LIM OG</td>
<td>V</td>
</tr>
<tr>
<td>W LIM OG</td>
<td>W</td>
</tr>
</tbody>
</table>

**Example: Tank # 5**

- **H LIM OG C**: High Limit Activates Relay 1 [for programmed timeout] to external Tank Overfill Alarm Acknowledge, & Activates Solid Annunciator
- **HH LIM OG D**: High High Limit Activates Relay 2 [for programmed timeout] to activate external Tank Overfill Alarm, & Activates Solid Annunciator
- **L LIM OG R**: Low Limit Activates Output Module 2, turns on Reorder Product Light & Modulated Annunciator
- **LL LIM OG W**: Low Low Limit Activates TS-ROM Relay 5 to Disable Tank 5 STPump, and Activates Modulated Annunciator
- **W LIM OG W**: Low Low Limit Activates TS-ROM Relay 5 to Disable Tank 5 STPump, and Activates Modulated Annunciator

Output Devices: Modulated Annunciator, Solid Annunciator, Relay 1, Relay 2, I/O Output Module Channel # 1 to # (record all OG Assignments in the vertical column)
3

Lines SETUP PROGRAMMING

Contents:
- Lines Menu
- Line Data Menu

See the Table of Contents to find topics in this manual. See the Preface for general information about this manual. And see the Installation, Operator’s, TroubleShooting Guides, and Application Notes for other reference material.

Lines Menu

NOTE

Only the NO. (of) LINES programmed under the system menu are shown here! This menu applies to consoles that have a L in the part number (LLDI enabled – CHECK OPTIONS).

Disregard this menu when it’s not displayed.

The purpose of this menu is to allow renaming of the line to help identify its location. The new line name will appear on reports and at the local tank gauge display.

Changing the Line Name is optional.

Use the ▲UP or DOWN ▼ key to display LINE 5 through LINE 8.

Use a menu select keys to choose a line.

Remember:
- Use ▲UP or DOWN ▼ key to display more menus or selections (when MORE or UP/DN is shown)
- Press CANCEL to cancel a data entry
- Use the ENTER key to accept data

Character input / editing:
- Press M4 to backspace (delete) one character to the left □
- Use M2 to move the cursor right ⇨
- Press M1 to move the cursor left __

See the Table of Contents to find topics in this manual. See the Preface for general information about this manual. And see the Installation, Operator’s, TroubleShooting Guides, and Application Notes for other reference material.
Line Data Menu

Select a line.

Use UP/DOWN ▲▼ keys to display Lines 5 – 8.

LINE N is shown typical for any line #
Use keypad to input / edit name (9 characters max.).
Press ENTER to accept this data.

— Your Notes —
Probes SETUP PROGRAMMING

Contents:
Probes Menu
Probe Data Menu
Special Probes Menu
TABLE 4.1 Special Probe RTD Positions

See the Table of Contents to find topics in this manual. See the Preface for general information about this manual. And see the Installation, Operator’s, TroubleShooting Guides, and Application Notes for other reference material.

Probes Menu

H U MENU

NOTE

Press this key and follow the highlighted sequence below

SELECT MENU OPTION
SETUP UPGRADE LANGUAGE DATALOG

M1 M2 M3 M4

SETUP MENU
EXIT SYSTEM TANKS (MORE) PROBES

M1 M2 M3 M4

PROBES DATA SPECIAL

M1 M2 M3 M4

N refers to / represents any probe #

PROBE DATA
PROBE 1
PROBE 2
:
PROBE 8

COPY
COPY FROM PROBE DATA X TO N
PROBE 1
PROBE 2
:
PROBE 8
COPY FROM PROBE DATA X TO N
PRESS ENTER IF YOU ARE SURE?

See the Installation Guide – Chapters 6 & 7 for Probe Model & Serial numbers, Gradient values, Float types, and RTD Locations).

Only the NO. (of) TANKS programmed under the system menu are shown here!

Remember:
• Use ▲ UP or DOWN ▼ key to display more menus or selections (MORE or UP/DN shown)
• Press CANCEL to cancel data entry
• Use the ENTER key to accept data

Character input / editing:
• Press M4 to backspace (delete) one character to the left ←
• Use M2 to move the cursor right →
• Press M1 to move the cursor left ←

Press (M) key to select probe # for setup.

Press UP/DOWN ▲ ▼ keys to display probes 5 – 8 (for TS-2001/508 only).

(Optional - used to copy probe data)
Press M1 key.
Press (M) key to select a probe # to copy.

Press UP/DOWN ▲ ▼ keys to display probes 5 – 8 (for TS-2001/508 only).

Press ENTER to accept this data.
Probes—PROBE DATA Menu (Continued…from previous page)

PROBE DATA N

TYPE

PROBE TYPE FOR PROBE N

STD 101
STD 107
STD 113
STD 149
SPEC PROBE 1
SPEC PROBE 2
SPEC PROBE 8

PRESSURE

STD 29
STD 89

GRADIENT

GRADIENT FOR PROBE N

+9.03000

PROBE # N shown typical for any probe # 1 – # 8
Press M2 key.
Press UP/DOWN ▲ ▼ keys to choose.
Press ENTER to accept this data.

STD # probe is a STANDARD probe.
(menus differ depending on choices)

Select SPEC PROBE N (special probe) if it is not a Standard TSP-LL2 model / type of probe listed in this menu…see SPECIAL menu.

Select PRESSURE (pressure probe) when programming TSP-LLP or TSP-LPG probes. See following section on Pressure probes.

(enter the GRADIENT from the probe label)

8 to 9.90000

(See Installation Guide or Probe label for this data. Also see Chapter 2 of this manual for: Probe # — Tank # assignments)

Press ENTER to accept this data.

NO. FLOATS

NUMBER OF FLOATS FOR PROBE

2 FLOATS
1 FLOAT

FLT TYPE

FLOAT TYPE FOR PROBE N

GASOLINE
OIL

Use UP/DOWN ▲ ▼ keys to choose a #.
Press ENTER to accept this data.

Use UP/DOWN ▲ ▼ keys to choose a type.
Press ENTER to accept this data.

<table>
<thead>
<tr>
<th>Probe #</th>
<th>Model</th>
<th>Probe Gradient #</th>
<th>Product in Tank (Float type)</th>
<th>Number of Probe Floats (1 or 2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tank 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tank 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tank 3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tank 4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tank 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tank 6</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tank 7</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tank 8</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**Probes – PRESSURE PROBE DATA Menu**

*NOTE* This grayed out section is a duplicate of the STANDARD menu - use it to assist in following the PRESSURE PROBE DATA MENU.

| PROBE DATA N | PROBE # N shown typical for any probe # 1 – # 8. Press M1 key. |
| PROBE DATA N | PROBE # N shown typical for any probe # 1 – # 8. Press M2 key. |
| TYPE | Press UP/DOWN ▲ ▼ keys to choose probe type. |

**PRESSURE**

Select PRESSURE (pressure probe). when programming TS-ISCB or TSP-LLPT probes.

| MODEL | Press M3 key. (instead of GRADIENT for STANDARD) |
| PROBE MODEL FOR PROBE N | Press UP/DOWN ▲ ▼ keys to choose either (TS-ISCB or TSP-LLPT) |
| SCALE (TS-ISCB) | Press M4 key. (instead of NO.FLOA TS for STANDARD) |
| SCALE N | Use the keypad to enter the PSI as printed on the probe. Press ENTER to accept this data. |
| OFFSET(TSP-ISCB) | Press M1 key. (instead of FLOAT TYPE for STANDARD) |
| PROBE OFFSET N | Use the keypad to enter the OFFSET level. Press ENTER to accept this data. |
| CONFIG (TSP-LLPT) | Press M4 key. (instead of SCALE for ISCB) |
| CONFIGURING PROBE | (ATG will check the addresses for all probes) |
| SCALE (TSP-LLPT) | Press M1 key. (instead of OFFSET for ISCB) |
| SCALE N | Use the keypad to enter the PSI as printed on the probe. Press ENTER to accept this data. |
| ENA TEMP (TSP-LLPT) | Press M2 key. |
| TEMPERATURE ENABLE N | Press UP/DOWN ▲ ▼ keys to choose either (NO or YES) |
| NO | Press ENTER to accept this data. |
| YES | |
| OFFSET(TSP-LLPT) | Press M3 key. |
| PROBE OFFSET N | Use the keypad to enter the OFFSET level. Press ENTER to accept this data. |
Probes – SPECIAL Menu

The SPECIAL menu appears when at least one SPEC PROBE N was selected from the PROBES – DATA – TYPE menu (above).

This menu shows all possible choices BUT only the selected SPECIAL PROBES N are displayed.

**SPECIAL PROBES**
- SPECIAL 1
- SPECIAL 2
- SPECIAL 8
- SPECIAL PROBE N

**COPY**
COPY FROM SPECIAL PROBE X TO N
- PROBE 1
- PROBE 2
- PROBE 8
COPY FROM SPECIAL PROBE X TO N
PRESS ENTER IF YOU ARE SURE?

**LENGTH**
SENSOR LENGTH N
- 53

**RTD POS**
RTD POSITION TABLE N
ADD
RTD POSITION TABLE N
+0

**DELETE**
SELECT POSITION WITH UP/DN POS X
+0NNN or TABLE IS EMPTY
ARE YOU SURE?

**EDIT**
SELECT POSITION WITH UP/DN POS X
+0NNN or TABLE IS EMPTY

**DISPLAY**
RTD POSITION TABLE N POS X
+0NNN or TABLE IS EMPTY

Press (M) key to select a SPECIAL # probe.

N = Special Probe # 1 thru # 8 and may or may not agree with the actual Tank number or Probe input channel number.

(Optional - used to copy probe data)
Select a probe to copy data from (use M key).

Press UP/DOWN ▲▼ keys to choose a probe #.
Press ENTER to accept this data.

Press ENTER to accept this data.
(press CANCEL to prevent copying the POS#)

_____ 0 to 999 (Use keypad to enter probe length.)
Press ENTER to accept this data.

(RTD Temperature sensor positions are printed on the probe label on the probe head)
Press M1 key.

_____ Use the keypad to enter each RTD number.
Press ENTER to accept this data.
(input all 6 RTD positions as printed on the label.)

Press M2 key.
Press UP/DOWN ▲▼ keys to choose a POS #.
Press ENTER to Delete an RTD POS #.
Press ENTER to accept this data.
(press CANCEL to prevent deleting the POS#)

Press M3 key.
Press UP/DOWN ▲▼ keys to choose a POS #.
Press ENTER to reset the POS # to (+0).
Use keypad to EDIT RTD POS#.
Press ENTER to accept this data.

Press M4 key.
Press UP/DOWN ▲▼ keys to scroll POS #.
Press CANCEL to return to the menu.
Steps:
1.) Accurately fill-in **TABLE 4.1**
   (ref. Install. Guide / Probe head / cable)
2.) Add RTD position accurately
3.) Repeat step 2 until all positions are added
4.) Display / check RTD table N positions
5.) Edit / Delete positions as required
6.) Repeat step 5 to confirm accuracy

**TABLE 4.1 SPECIAL PROBE RTD POSITIONS**

<table>
<thead>
<tr>
<th>RTD:</th>
<th>Probe 1</th>
<th>Probe 2</th>
<th>Probe 3</th>
<th>Probe 4</th>
<th>Probe 5</th>
<th>Probe 6</th>
<th>Probe 7</th>
<th>Probe 8</th>
</tr>
</thead>
<tbody>
<tr>
<td>#6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>#5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>#4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>#3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>#2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>#1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Use this menu to specify the product contained in each tank. See Appendix B for API Gravity information – required for Special Products programming. Only the NO. (of) TANKS set under the System menu are shown!

Remember:
- Use **UP** or **DOWN** keys to display more menus (MORE shown) or selections (UP/DN shown)
- Press **CANCEL** to cancel data entry
- Use the **ENTER** key to accept data

Character input / editing:
- Press menu keys (**M1** to **M4**) to access menus.
- Press **M4** to backspace (delete) one character to the left
- Use **M2** to move the cursor right
- Press **M1** to move the cursor left

**N** refers to / represents a product number.
Press **(M)** key to select a PRODUCT #.
Press **UP/DOWN ▲▼** to display product in tanks 5 – 8.
*** Manifold Tanks will share a Product name, which will cause a gap to appear in product #s.

(Optional - used to copy product data)
Press **M1** key.
**Product Data Menu (CONTINUED… FROM PREVIOUS PAGE)**

COPY FROM PRODUCT DATA X TO N
PRODUCT 1
PRODUCT 2
: 
PRODUCT 8
COPY PRODUCT DATA X TO N
PRESS ENTER IF YOU ARE SURE?

 Press \( (M) \) key to select a PRODUCT # to copy.

Press \( \text{UP/DOWN} \) \( \uparrow \downarrow \) to display product in tanks 5 – 8.

Press \( \text{ENTER} \) to accept this data.

( press \( \text{CANCEL} \) to prevent copying product data)

**NAME**

PRODUCT NAME N
PROD N

\( \text{9 characters} \) (ie. 87 Octane/Cetane)

( optional input a new name of the PRODUCT in Tank N)

Use keypad to enter product names.

Press \( \text{ENTER} \) to accept this data.

**TYPE**

PRODUCT TYPE N
UNLEADED REG
UNLEADED PLS
UNLEADED XTR
UNLEADED SUP
DIESEL
KEROSENE
#2 FUEL OIL
ETHANOL
SPECIAL 1
: 
SPECIAL 8
LEADED REG

Press \( \text{M3} \) key.

(Select a Standard or Special product type in tank N)

Press \( \text{UP/DOWN} \) \( \uparrow \downarrow \) to choose a product type.

\( \text{N = tank Number... 5 – 8 for TS-2001/508} \)

Select a special product (SPECIAL N) when the product in the tank does not match choices here.

See SPECIAL PRODUCTS menu for programming.

Press \( \text{ENTER} \) to accept this data.

**SPECIAL PRODUCTS Menu**

Program SPECIAL PRODUCTS when this menu appears (The SPECIAL PRODUCTS menu *appears only after a SPECIAL product TYPE is selected from the Product Data Menu).

To access this menu, go back to the parent PRODUCTS menu, and choose SPECIAL (M2).

SPECIAL PRODUCTS
SPECIAL 1
SPECIAL 2
: 
SPECIAL 8
SPECIAL PRODUCT N COPY
COPY FROM SPECIAL PRODUCT X TO N
SPECIAL 1
SPECIAL 2
: 
SPECIAL 8

Press the \( (M) \) key to select a Special product#.

\( \text{N = 1 – 8... 5 – 8 for TS-2001/508} \)

(Optional - used to copy product data)

Press \( \text{M1} \) key.

Press \( \text{M} \) key to select a product to copy.

Press \( \text{UP/DOWN} \) \( \uparrow \downarrow \) to display special products 5 – 8 (TS-2001/508 only).
COPY SPECIAL PRODUCT X TO N
PRESS ENTER IF YOU ARE SURE?

Press ENTER to accept this data.
(press CANCEL to prevent copying data)

TEMPERATURE COMPENSATION TYPE N
API 6B/54B
API 6C/54C
API 6A/54A

(Temperature Compensation Type) Press M2 key.
Press UP/DOWN ▲▼ to choose a type.

API GRAV
API GRAVITY N
+63.5000

(changes API GRAV to DENSITY)
Press ENTER to accept this data.

API ALPHA
API ALPHA N
+600.000

Use keypad to enter the API alpha.
Press ENTER to accept this data.

NOTE
The following menu items appear only with the optional: SCALD (Statistical Continuous Automatic Leak Detection) tank leak testing program – WHEN – a special product type is selected, otherwise disregard the items below.

VAPOR A
VAPOR A N
+12.1010

Use keypad to enter Vapor A in degrees Rankine.
Press ENTER to accept this data.

VAPOR B
VAPOR B N
+8907.00

Use keypad to enter Vapor B in degrees Rankine.
Press ENTER to accept this data.

MOLE WGHT
MOLE WEIGHT N
+130.000

Use keypad to enter mole weight in degrees Rankine.
Press ENTER to accept this data.
**Manifolds Menu**

- Press this key and follow the highlighted sequence below

```
SELECT MENU OPTION
SETUP UPGRADE LANGUAGE DATALOG
```

- **SETUP MENU (MORE)**
  - EXIT SYSTEM TANKS PROBES

- **SETUP MENU (MORE)**
  - PRODUCTS MANIFOLDS REPORTS (MORE) LKTSTS

- **MANIFOLDS DATA ALARMS**
  - MANIFOLD DATA MAN 1
  - MAN 4 MANIFOLD DATA N COPY
  - COPY FROM MANIFOLD DATA X TO N MAN 1
  - MAN 4 COPY MANIFOLD DATA X TO N

### NOTE

*This menu appears only after a MANIFOLD has been selected from the TANK – DATA – MANIFOLD menu.*

Manifolds are used to physically connect tanks together and to expand the total capacity by the sum of all tanks connected (see next page).

**Tanks that are physically manifolded must:**
1. have identical product (programmed here for manifold tanks)
2. use the same manifold number (1, 2, 3 or 4) ...ref. Chapter 2 (TANKS – DATA – TANK N – MANIFOLD menu).

Manifold numbers must not be reused to connect different (other) tanks & products.

**Example:** Tanks 1, 2 & 3 contain 87 Octane gasoline and are physically manifold together and each are programmed to use Manifold #1. Tanks 4 & 5 store 93 Octane gas and are manifold together with Manifold #2. **All tanks that are physically manifold together must use the same (logical) manifold number.**

Press (M) key to select MAN 1-4 to setup. (manifolds 3 & 4 available with TS-2001/508 only)

N = manifold number (1 or 2, or 1 thru 4) (Optional - used to copy manifold data) Press M1 key.

Press (M) key to select a manifold to copy data from.

Press ENTER to accept this data.
Manifolds Data Menu (CONTINUED... FROM PREVIOUS PAGE)

NAME
MANIFOLD NAME N MAN N
  Press M2 key.
  ______ 9 characters
  Use keypad to input a name for the Manifold.
  Press ENTER to accept this data.

PRODUCT
PRODUCT FOR MANIFOLD N
PRODUCT 1:
PRODUCT 8

DEL THRES
DELIVERY THRESHOLD N
+200.000

Manifolds ALARMS Menu

NOTE Use this menu to input the Manifold Product Volume Limits (optional). Access the ALARMS menu; go back to
the parent menu and then choose ALARMS (press M2).

ALARMS
MANIFOLD ALARMS MANIFOLD
MAN 1:
MAN 4
COPY
COPY MANIFOLD ALARMS X TO N
MAN 1:
MAN 4
COPY MANIFOLD ALARMS X TO N
PRESS ENTER IF YOU ARE SURE?

LOW LIM
LOW PRODUCT VOLUME LIMIT N
+0

L LIM OG
LOW PRODUCT LIMIT OUTPUT GROUP N
NONE
GROUP A-FF
ALL GROUPS

Press M2 key.
Press the (M) key to select the MAN# for alarm setup.
(Manifold # 3 and 4 are for TS-2001/508 only)

(Optionalal - used to copy alarm data) Press M1 key.
Press (M) key to select MAN# to copy alarm data from.

Press ENTER to accept this data.

Press M2 key.
Use keypad to input alarm limits.
Press ENTER to accept this data.

Press M3 key. (Output Group = OG)
Press UP/DOWN ▲▼ to assign alarm to (OG) N
Not assigned to an OG
One OG selected (A=1st OG, FF=32nd OG)
All OGs selected (see WORKSHEET #6-1)
Press ENTER to accept this data.
**Manifolds ALARMS Menu (Continued... from previous page)**

<table>
<thead>
<tr>
<th>LOW LOW</th>
<th>Press <strong>M4</strong> key.</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOW LOW PRODUCT VOLUME LIMIT N +0.0000</td>
<td>_______ + 0 to 50000</td>
</tr>
<tr>
<td>Use keypad to input alarm limits.</td>
<td></td>
</tr>
<tr>
<td>Press <strong>ENTER</strong> to accept this data.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>LL LIM OG</th>
<th>Press <strong>M1</strong> key.</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOW LOW PRODUCT LIMIT OUTPUT GRP</td>
<td>Press <strong>UP/DOWN ▲▼</strong> to assign alarm to (OG) N</td>
</tr>
<tr>
<td>NONE</td>
<td>Not assigned to an OG</td>
</tr>
<tr>
<td>GROUP A-FF</td>
<td>One OG selected (A=1st OG, FF=32nd OG)</td>
</tr>
<tr>
<td>ALL GROUPS</td>
<td>All OGs selected (see WORKSHEET #6-1)</td>
</tr>
<tr>
<td>Press <strong>ENTER</strong> to accept this data.</td>
<td></td>
</tr>
</tbody>
</table>

*Worksheet # 6 - 1 appears on the following page*
#### Worksheet #6-1 – Output Groups – Manifolds 1 thru 4

Fill-in the work sheet below and compare the assignments with other work-sheets to uncover conflicts **before** programming output devices.

<table>
<thead>
<tr>
<th>OG = Output Group</th>
<th>Output Group Assignment</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Manifold 1:</strong></td>
<td></td>
</tr>
<tr>
<td>L LIM OG</td>
<td></td>
</tr>
<tr>
<td>LL LIM OG</td>
<td></td>
</tr>
<tr>
<td><strong>Manifold 2:</strong></td>
<td></td>
</tr>
<tr>
<td>L LIM OG</td>
<td></td>
</tr>
<tr>
<td>LL LIM OG</td>
<td></td>
</tr>
<tr>
<td><strong>Man 3 TS-2001 only:</strong></td>
<td></td>
</tr>
<tr>
<td>L LIM OG</td>
<td></td>
</tr>
<tr>
<td>LL LIM OG</td>
<td></td>
</tr>
<tr>
<td><strong>Man 4 TS-2001 only:</strong></td>
<td></td>
</tr>
<tr>
<td>L LIM OG</td>
<td></td>
</tr>
<tr>
<td>LL LIM OG</td>
<td></td>
</tr>
<tr>
<td><strong>Example: Man # 1</strong></td>
<td></td>
</tr>
<tr>
<td>L LIM OG</td>
<td>R</td>
</tr>
<tr>
<td>LL Limit OG</td>
<td>W</td>
</tr>
</tbody>
</table>

Output Devices: Modulated Annunciator, Solid Annunciator, Relay 1, Relay 2, I/O Output Module Channel # 1 to # ___ (record all OG Assignments in the vertical column)
Reconciliation SETUP PROGRAMMING

Contents:

Reconciliation Menu

See the Table of Contents to find topics in this manual. See the Preface for general information about this manual. And see the Installation, Operator’s, Troubleshooting Guides, and Application Notes for other reference material.

Reconciliation Menu

Press this key and follow the highlighted sequence below

This menu only appears when two conditions exist:
• The ATG configuration displays an ‘R’
• The number of Meters is greater than zero

The ‘R’ stands for ‘Reconciliation’ and is part of the configuration when a TS-DIM unit is interfaced with the ATG. This option is programmed into the ATG at the factory, only when ordered and specially purchased.

The number of Meters is setup under the SYSTEM menu as described in Chapter 1 of this guide.

The purpose of this menu is to setup a schedule to tell the ATG when and at what time to start Reconciliation.

INCON recommends the times coincide with either the time a site closes (end of day) or at the time each shift ends (end of shift).

— Continued on next page —
Reconciliation menu (Continued... FROM PREVIOUS PAGE)

<table>
<thead>
<tr>
<th>RECONCILIATION SCHEDULE</th>
<th>Use <strong>UP/DOWN ▲▼</strong> keys to choose <strong>SHIFT</strong> or <strong>DAILY</strong>.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>NONE</strong></td>
<td>(nothing scheduled)</td>
</tr>
<tr>
<td><strong>SHIFT</strong></td>
<td>(set times for a three-shift working day)</td>
</tr>
<tr>
<td><strong>DAILY</strong></td>
<td>(set the one time during the day to start)</td>
</tr>
</tbody>
</table>

(if SHIFT)

<table>
<thead>
<tr>
<th>RECONCILIATION SCHEDULE</th>
<th>Press <strong>M2</strong> key.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SHIFT 1</strong></td>
<td>(this equals 10 O’clock AM)</td>
</tr>
<tr>
<td>10:00:00</td>
<td>Use keypad to input the <strong>SHIFT 1</strong> start time.</td>
</tr>
<tr>
<td>(24-hour format)</td>
<td>Press <strong>ENTER</strong> to accept this data.</td>
</tr>
</tbody>
</table>

(The Reconciliation Menu is displayed - set **SHIFT 2 and SHIFT 3**)

— Press the **CANCEL** key to display the main SETUP Menu —

(if DAILY)

<table>
<thead>
<tr>
<th>RECONCILIATION SCHEDULE</th>
<th>Press <strong>M2</strong> key.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TIME</strong></td>
<td>(this equals 10 O’clock AM)</td>
</tr>
<tr>
<td>10:00:00</td>
<td>Use keypad to input the start time.</td>
</tr>
<tr>
<td>(24-hour format)</td>
<td>Press <strong>ENTER</strong> to accept this data.</td>
</tr>
</tbody>
</table>

— The Reconciliation Menu is displayed —

— Press the **CANCEL** key to display the main SETUP Menu —

— Your Notes —

---

---

---

---

---

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---

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---

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---
Dispenser Interface Module (DIM) SETUP PROGRAMMING

Contents:
DIM Menu
DIM Notes

See the Table of Contents to find topics in this manual. See the Preface for general information about this manual. And see the Installation, Operator’s, TroubleShooting Guides, and Application Notes for other reference material.

---

DIM Menu

Press this key and follow the highlighted sequence below:

SELECT MENU OPTION
SETUP   UPGRADE   LANGUAGE   DATALOG
M1       M2       M3       M4

SETUP MENU
EXIT SYSTEM TANKS (MORE) PROBES
M1       M2       M3       M4

Press the DOWN key one or two times...

SETUP MENU
PRODUCTS RECONCILE DIM (MORE) REPORTS
M1       M2       M3       M4

DISPENSOR INTERFACE
METERS FUEL PTS DIMS
M1       M2       M3       M4

METERS
METER 1
METER N
FUEL PT

Press M1 key.
Press M1 key.

---

DIM Notes

Reference the TS-DIM Quick Installation Guide (pn: 000-1058); especially use section 6 to assist in generating the data to input into this SETUP menu.

The purpose of this menu is to program the ATG to translate sales information from the TS-DIM unit. This is used to automate the task of Reconciliation.

In order to generate the input data, run the Win Tester Program from a laptop computer and collect the site data. Use the results as displayed as settings for this menu.

---

— Continued on next page —
DIM menu (Continued... FROM PREVIOUS PAGE)

FUEL PT ASSOCIATION N

1 - 16
Enter the fuel point number.
Use keypad to input an Association number.
Press ENTER to accept this data.

GRADE NO.
GRADE NUMBER - METER N

1 - 8
(reference the Win Tester Program display)
Use keypad to input an Association number.
Press ENTER to accept this data.

TANK A
TANK A ASSOCIATION N

1

TANK B
TANK A ASSOCIATION N

0

BLEND
BLENDING RATIO N

100

— Press the CANCEL key to display the METERS Menu —

— Repeat the above setup steps for all Meter Numbers —

— Press the CANCEL key to display the DISPENSER INTERFACE Menu —
DIM menu (Continued... FROM PREVIOUS PAGE)

(In most applications using one TS-DIM unit, keep these default settings)

**FUEL PTS**

FUELING POINTS

FUEL P N

FUELING PT N

DIM UNIT

DIM UNIT NUMBER - FUEL PT N

1

Press M2 key.

Press M1 key.

Press M1 key.

_____ Enter the TS-DIM unit number connected to this fueling point.

Use keypad to input a number.

Press ENTER to accept this data.

— Press the CANCEL key to display the FUELING POINTS Menu —

— Repeat the above setup steps for each FUELING POINT —

— Press the CANCEL key to display the DISPENSER INTERFACE Menu —

**DIMS**

DIMS

DIM N

DIM N

ADDRESS

DIM ADDRESS - DIM N

1

Press M3 key.

Press M1 key.

Press M1 key.

_____ 1 - 8 Enter the same number as the jumper location found inside the TS-DIM unit.

Use keypad to input a number.

Press ENTER to accept this data.

— Press the CANCEL key to display the DIMS Menu —

— Repeat the above setup steps for each DIM number —

— Press the CANCEL key 2 times to display the main SETUP Menu —
Use this menu to program reports to print or FAX automatically on a schedule (faxing requires an optional Fax/Modem device).

See Chapters 1, 10, 11 and 12 about Tank and Line Test Reports & Scheduling.

**TABLE 9.1 –** The SHIFT selection allows 2 or 3 scheduled reports to print or Fax per day ...only one report will print if two report-times are duplicated/identical.

**TABLE 9.2 24 Hour Time Input Format**

\[
\begin{align*}
00:00:00 &= \text{midnight} \\
22:00:00 &= 10 \text{ pm } + 12 \text{ (hours)} \\
&= \text{adding 12 hours to pm times starting at 1 pm to 11:59 pm}
\end{align*}
\]

The asterisked (*) menus are hardware or software dependent and may/may not appear.

Push **UP/DOWN** keys to show more menus or menu selections.

To access menus, press the corresponding (M) key below each menu name.
Reports Schedule Menu

Tank Inventory Detail Report:

TANK INV
TANK INVENTORY DETAIL
SCHEDULE
NONE (select schedule – see TABLE 9.1)
TIME 1
 00.00.00 to 23.59.59 (input time – see TABLE 9.2)
TIME 2
 00.00.00 to 23.59.59 (input shift # 2 time... N/A if not SHIFT)
TIME 3
 00.00.00 to 23.59.59 (input shift # 3 time... N/A if not SHIFT)
FAX
NO or YES (yes requires optional fax / modem)
PRINTER
YES or NO Press ENTER to accept this data.

Tank Inventory Summary Report:

TANK SUM
TANK INVENTORY SUMMARY
SCHEDULE
NONE (select schedule – see TABLE 9.1)
TIME 1
 00.00.00 to 23.59.59 (input time – see TABLE 9.2)
TIME 2
 00.00.00 to 23.59.59 (input shift # 2 time... N/A if not SHIFT)
TIME 3
 00.00.00 to 23.59.59 (input shift # 3 time... N/A if not SHIFT)
FAX
NO or YES (yes requires optional fax / modem)
PRINTER
YES or NO Press ENTER to accept this data.

Product Inventory Detail Report:

PROD INV
PRODUCT INVENTORY DETAIL
SCHEDULE
NONE (select schedule – see TABLE 9.1)
TIME 1
 00.00.00 to 23.59.59 (input time – see TABLE 9.2)
TIME 2
 00.00.00 to 23.59.59 (input shift # 2 time... N/A if not SHIFT)
TIME 3
 00.00.00 to 23.59.59 (input shift # 3 time... N/A if not SHIFT)
FAX
NO or YES (yes requires optional fax / modem)
PRINTER
YES or NO Press ENTER to accept this data.
Reports Schedule Menu (CONTINUED... FROM PREVIOUS PAGE)

Product Inventory Summary Report:

PROD SUM
PRODUCT INVENTORY SUMMARY
SCHEDULE
NONE
TIME 1
00.00.00 ______ to 23.59.59 (input time – see TABLE 9.2)
TIME 2
00.00.00 ______ to 23.59.59 (input shift # 2 time... N/A if not SHIFT)
TIME 3
00.00.00 ______ to 23.59.59 (input shift # 3 time... N/A if not SHIFT)
FAX
NO ______ or YES (yes requires optional fax / modem)
PRINTER
YES ______ or NO Press ENTER to accept this data.

Product Usage Detail Report:

PROD USE
PRODUCT USAGE DETAIL
SCHEDULE
NONE
TIME 1
00.00.00 ______ to 23.59.59 (input time – see TABLE 9.2)
TIME 2
00.00.00 ______ to 23.59.59 (input shift # 2 time... N/A if not SHIFT)
TIME 3
00.00.00 ______ to 23.59.59 (input shift # 3 time... N/A if not SHIFT)
FAX
NO ______ or YES (yes requires optional fax / modem)
PRINTER
YES ______ or NO Press ENTER to accept this data.

Product Usage Summary Report:

USE SUMRY
PRODUCT USAGE SUMMARY
SCHEDULE
NONE
TIME 1
00.00.00 ______ to 23.59.59 (input time – see TABLE 9.2)
TIME 2
00.00.00 ______ to 23.59.59 (input shift # 2 time... N/A if not SHIFT)
TIME 3
00.00.00 ______ to 23.59.59 (input shift # 3 time... N/A if not SHIFT)
FAX
NO ______ or YES (yes requires optional fax / modem)
PRINTER
YES ______ or NO Press ENTER to accept this data.
Reports Schedule Menu (CONTINUED... FROM PREVIOUS PAGE)

Delivery Detail Report:

DEL DETAI
DELIVERY DETAIL
SCHEDULE
NONE
TIME  1
  00.00.00 — to 23.59.59
TIME  2
  00.00.00 — to 23.59.59
TIME  3
  00.00.00 — to 23.59.59
FAX
NO or YES
PRINTER
YES or NO

Use UP/DOWN ▲▼ to show choices.
(select schedule – see TABLE 9.1)
(input time – see TABLE 9.2)
(input shift # 2 time... N/A if not SHIFT)
(input shift # 3 time... N/A if not SHIFT)
(yes requires optional fax / modem)
Press ENTER to accept this data.

Delivery Summary Report:

DEL SUMRY
DELIVERY SUMMARY
SCHEDULE
NONE
TIME  1
  00.00.00 — to 23.59.59
TIME  2
  00.00.00 — to 23.59.59
TIME  3
  00.00.00 — to 23.59.59
FAX
NO or YES
PRINTER
YES or NO

Use UP/DOWN ▲▼ to show choices.
(select schedule – see TABLE 9.1)
(input time – see TABLE 9.2)
(input shift # 2 time... N/A if not SHIFT)
(input shift # 3 time... N/A if not SHIFT)
(yes requires optional fax / modem)
Press ENTER to accept this data.

Delivery History Report:

DELIV HST
DELIVERY HISTORY
SCHEDULE
NONE
TIME  1
  00.00.00 — to 23.59.59
TIME  2
  00.00.00 — to 23.59.59
TIME  3
  00.00.00 — to 23.59.59
FAX
NO or YES
PRINTER
YES or NO

Use UP/DOWN ▲▼ to show choices.
(select schedule – see TABLE 9.1)
(input time – see TABLE 9.2)
(input shift # 2 time... N/A if not SHIFT)
(input shift # 3 time... N/A if not SHIFT)
(yes requires optional fax / modem)
Press ENTER to accept this data.
## Reports Schedule Menu (CONTINUED... FROM PREVIOUS PAGE)

### Active Alarm Report:

**ACT ALRM**

**ACTIVE ALARM**

**SCHEDULE**

NONE

TIME 1

00.00.00 to 23.59.59 (input time – see TABLE 9.2)

TIME 2

00.00.00 to 23.59.59 (input shift # 2 time... N/A if not SHIFT)

TIME 3

00.00.00 to 23.59.59 (input shift # 3 time... N/A if not SHIFT)

**FAX**

NO or YES (yes requires *optional* fax / modem)

**PRINTER**

YES or NO Press ENTER to accept this data.

### Cleared Alarm Report:

**CLR ALRM**

**CLEARED ALARM**

**SCHEDULE**

NONE (select schedule – see TABLE 9.1)

TIME 1

00.00.00 to 23.59.59 (input time – see TABLE 9.2)

TIME 2

00.00.00 to 23.59.59 (input shift # 2 time... N/A if not SHIFT)

TIME 3

00.00.00 to 23.59.59 (input shift # 3 time... N/A if not SHIFT)

**FAX**

NO or YES (yes requires *optional* fax / modem)

**PRINTER**

YES or NO Press ENTER to accept this data.

### Alarm History Report:

**ALARM HST**

**ALARM HISTORY**

**SCHEDULE**

NONE (select schedule – see TABLE 9.1)

TIME 1

00.00.00 to 23.59.59 (input time – see TABLE 9.2)

TIME 2

00.00.00 to 23.59.59 (input shift # 2 time... N/A if not SHIFT)

TIME 3

00.00.00 to 23.59.59 (input shift # 3 time... N/A if not SHIFT)

**FAX**

NO or YES (yes requires *optional* fax / modem)

**PRINTER**

YES or NO Press ENTER to accept this data.
Reports Schedule Menu (CONTINUED... FROM PREVIOUS PAGE)

SCALD Leak Test: Report

SCALD
SCALD TEST *
SCHEDULE
NONE
TIME 1
00.00.00  to 23.59.59 (input time – see TABLE 9.2)
TIME 2
00.00.00  to 23.59.59 (input shift # 2 time... N/A if not SHIFT)
TIME 3
00.00.00  to 23.59.59 (input shift # 3 time... N/A if not SHIFT)
FAX
NO or YES (yes requires optional fax / modem)
PRINTER
YES or NO Press ENTER to accept this data.

Sensor Status Report

SENS STAT *
SENSOR STATUS *
SCHEDULE
NONE
TIME 1
00.00.00  to 23.59.59 (input time – see TABLE 9.2)
TIME 2
00.00.00  to 23.59.59 (input shift # 2 time... N/A if not SHIFT)
TIME 3
00.00.00  to 23.59.59 (input shift # 3 time... N/A if not SHIFT)
FAX
NO or YES (yes requires optional fax / modem)
PRINTER
YES or NO Press ENTER to accept this data.

Vapor Sensor:

VAPOR *
VAPOR SENSOR *
SCHEDULE
NONE
TIME 1
00.00.00  to 23.59.59 (input time – see TABLE 9.2)
TIME 2
00.00.00  to 23.59.59 (input shift # 2 time... N/A if not SHIFT)
TIME 3
00.00.00  to 23.59.59 (input shift # 3 time... N/A if not SHIFT)
FAX
NO or YES (yes requires optional fax / modem)
PRINTER
YES or NO Press ENTER to accept this data.
Reports Schedule Menu (CONTINUED... FROM PREVIOUS PAGE)

Regulatory Report:
REGULATORY
REGULATORY
SCHEDULE
NONE
TIME 1
00.00.00 to 23.59.59
TIME 2
00.00.00 to 23.59.59
TIME 3
00.00.00 to 23.59.59
FAX
NO or YES
PRINTER
YES or NO
Use UP/DOWN ▲▼ to show choices.
(select schedule – see TABLE 9.1)
(input time – see TABLE 9.2)
(input shift # 2 time... N/A if not SHIFT)
(input shift # 3 time... N/A if not SHIFT)
(yes requires optional fax / modem)
Press ENTER to accept this data.

Line Compliance Report:
LINE COMP
LINE COMPLIANCE
SCHEDULE
NONE
TIME 1
00.00.00 to 23.59.59
TIME 2
00.00.00 to 23.59.59
TIME 3
00.00.00 to 23.59.59
FAX
NO or YES
PRINTER
YES or NO
* Only with Line Leak Detector(s)
Use UP/DOWN ▲▼ to show choices.
(select schedule – see TABLE 9.1)
(input time – see TABLE 9.2)
(input shift # 2 time... N/A if not SHIFT)
(input shift # 3 time... N/A if not SHIFT)
(yes requires optional fax / modem)
Press ENTER to accept this data.

Line Diagnostics Report:
LINE DIAG
LINE DIAGNOSTIC
SCHEDULE
NONE
TIME 1
00.00.00 to 23.59.59
TIME 2
00.00.00 to 23.59.59
TIME 3
00.00.00 to 23.59.59
FAX
NO or YES
PRINTER
YES or NO
* Only with Line Leak Detector(s)
Use UP/DOWN ▲▼ to show choices.
(select schedule – see TABLE 9.1)
(input time – see TABLE 9.2)
(input shift # 2 time... N/A if not SHIFT)
(input shift # 3 time... N/A if not SHIFT)
(yes requires optional fax / modem)
Press ENTER to accept this data.
**Reports Schedule Menu (Continued... from previous page)**

### Line Test History Report:

<table>
<thead>
<tr>
<th>LINE HIST</th>
<th>* Only with Line Leak Detector(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>LINE TEST HISTORY</td>
<td>Use <strong>UP/DOWN ▲▼</strong> to show choices.</td>
</tr>
<tr>
<td>SCHEDULE</td>
<td>(select schedule – see <strong>TABLE 9.1</strong>).</td>
</tr>
<tr>
<td>TIME 1</td>
<td>00.00.00</td>
</tr>
<tr>
<td>TIME 2</td>
<td>00.00.00</td>
</tr>
<tr>
<td>TIME 3</td>
<td>00.00.00</td>
</tr>
<tr>
<td>FAX</td>
<td><strong>NO</strong></td>
</tr>
<tr>
<td>PRINTER</td>
<td><strong>YES</strong></td>
</tr>
</tbody>
</table>

### Line Test Report:

<table>
<thead>
<tr>
<th>LINE TEST</th>
<th>* Only with Line Leak Detector(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>LINE TEST</td>
<td>Use <strong>UP/DOWN ▲▼</strong> to show choices.</td>
</tr>
<tr>
<td>SCHEDULE</td>
<td>(select schedule – see <strong>TABLE 9.1</strong>).</td>
</tr>
<tr>
<td>TIME 1</td>
<td>00.00.00</td>
</tr>
<tr>
<td>TIME 2</td>
<td>00.00.00</td>
</tr>
<tr>
<td>TIME 3</td>
<td>00.00.00</td>
</tr>
<tr>
<td>FAX</td>
<td><strong>NO</strong></td>
</tr>
<tr>
<td>PRINTER</td>
<td><strong>YES</strong></td>
</tr>
</tbody>
</table>

### Shift Reconciliation Report:

<table>
<thead>
<tr>
<th>RECONCILE</th>
<th>Press the (M) key below this menu item.</th>
</tr>
</thead>
<tbody>
<tr>
<td>SHIFT REC</td>
<td>* Only with Reconciliation / DIM</td>
</tr>
<tr>
<td>SHIFT RECONCILIATION</td>
<td>Use <strong>UP/DOWN ▲▼</strong> to show choices.</td>
</tr>
<tr>
<td>SCHEDULE</td>
<td>(select schedule – see <strong>TABLE 9.1</strong>).</td>
</tr>
<tr>
<td>TIME 1</td>
<td>00.00.00</td>
</tr>
<tr>
<td>TIME 2</td>
<td>00.00.00</td>
</tr>
<tr>
<td>TIME 3</td>
<td>00.00.00</td>
</tr>
<tr>
<td>FAX</td>
<td><strong>NO</strong></td>
</tr>
<tr>
<td>PRINTER</td>
<td><strong>YES</strong></td>
</tr>
</tbody>
</table>
Reports Schedule Menu (Continued… from previous page)

Daily Reconciliation Report:

DAILY REC
DAILY RECONCILIATION SCHEDULE
NONE
TIME 1
00.00.00 _____ to 23.59.59
TIME 2
00.00.00 _____ to 23.59.59
TIME 3
00.00.00 _____ to 23.59.59
FAX
NO _____ or YES
PRINTER
YES _____ or NO

Monthly Reconciliation Report:

MONTH REC
MONTH RECONCILIATION SCHEDULE
NONE
TIME 1
00.00.00 _____ to 23.59.59
TIME 2
00.00.00 _____ to 23.59.59
TIME 3
00.00.00 _____ to 23.59.59
FAX
NO _____ or YES
PRINTER
YES _____ or NO

Shift Reconciliation History Report:

SHIFT HST
SHIFT RECONCILIATION HISTORY SCHEDULE
NONE
TIME 1
00.00.00 _____ to 23.59.59
TIME 2
00.00.00 _____ to 23.59.59
TIME 3
00.00.00 _____ to 23.59.59
FAX
NO _____ or YES
PRINTER
YES _____ or NO

* Only with Reconciliation / DIM
Use UP/DOWN ▲▼ to show choices.
(Select schedule – see TABLE 9.1)
(input time – see TABLE 9.2)
(input shift # 2 time... N/A if not SHIFT)
(input shift # 3 time... N/A if not SHIFT)
(yes requires optional fax / modem)
Press ENTER to accept this data.
### Reports Schedule Menu (CONTINUED... FROM PREVIOUS PAGE)

#### Daily Reconciliation History Report:

<table>
<thead>
<tr>
<th>Daily HST</th>
<th>DAILY RECONCILIATION HISTORY</th>
<th>SCHEDULE</th>
<th>NONE</th>
<th>TIME 1</th>
<th>00.00.00 to 23.59.59</th>
<th>TIME 2</th>
<th>00.00.00 to 23.59.59</th>
<th>TIME 3</th>
<th>00.00.00 to 23.59.59</th>
<th>FAX</th>
<th>NO</th>
<th>PRINTER</th>
<th>YES</th>
</tr>
</thead>
<tbody>
<tr>
<td>* Only with Reconciliation / DIM</td>
<td>Use <strong>UP/DOWN ▲ ▼</strong> to show choices.</td>
<td>(select schedule – see TABLE 9.1)</td>
<td>(input time – see TABLE 9.2)</td>
<td>(input shift # 2 time... N/A if not SHIFT)</td>
<td>(input shift # 3 time... N/A if not SHIFT)</td>
<td>(yes requires optional fax / modem)</td>
<td>Press <strong>ENTER</strong> to accept this data.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Shift Sales Report:

<table>
<thead>
<tr>
<th>Shift Sales Report</th>
<th>SALES REPORT SCHEDULE</th>
<th>SCHEDULE</th>
<th>NONE</th>
<th>TIME 1</th>
<th>00.00.00 to 23.59.59</th>
<th>TIME 2</th>
<th>00.00.00 to 23.59.59</th>
<th>TIME 3</th>
<th>00.00.00 to 23.59.59</th>
<th>FAX</th>
<th>NO</th>
<th>PRINTER</th>
<th>YES</th>
</tr>
</thead>
<tbody>
<tr>
<td>* Only with Reconciliation / DIM</td>
<td>Use <strong>UP/DOWN ▲ ▼</strong> to show choices.</td>
<td>(select schedule – see TABLE 9.1)</td>
<td>(input time – see TABLE 9.2)</td>
<td>(input shift # 2 time... N/A if not SHIFT)</td>
<td>(input shift # 3 time... N/A if not SHIFT)</td>
<td>(yes requires optional fax / modem)</td>
<td>Press <strong>ENTER</strong> to accept this data.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Daily Sales Report:

| Daily Sales Report | SALES REPORT SCHEDULE | DAILY SAL | SCHEDULE | NONE | TIME 1 | 00.00.00 to 23.59.59 | TIME 2 | 00.00.00 to 23.59.59 | TIME 3 | 00.00.00 to 23.59.59 | FAX | NO | PRINTER | YES |
|--------------------|------------------------|----------|------|--------|---------------------|--------|---------------------|--------|---------------------|-----|-----|----------|------|
| * Only with Reconciliation / DIM | Use **UP/DOWN ▲ ▼** to show choices. | (select schedule – see TABLE 9.1) | (input time – see TABLE 9.2) | (input shift # 2 time... N/A if not SHIFT) | (input shift # 3 time... N/A if not SHIFT) | (yes requires optional fax / modem) | Press **ENTER** to accept this data. |
Monthly Sales Report:

SALES REPORT SCHEDULE
MONTH SAL
SCHEDULE
NONE
TIME 1
00.00.00 ______ to 23.59.59 (input time – see TABLE 9.2)
TIME 2
00.00.00 ______ to 23.59.59 (input shift # 2 time... N/A if not SHIFT)
TIME 3
00.00.00 ______ to 23.59.59 (input shift # 3 time... N/A if not SHIFT)
FAX
NO or YES (yes requires optional fax / modem)
PRINTER
YES or NO Press ENTER to accept this data.

Shift History Report:

SALES REPORT SCHEDULE
SHIFT HST
SCHEDULE
NONE
TIME 1
00.00.00 ______ to 23.59.59 (input time – see TABLE 9.2)
TIME 2
00.00.00 ______ to 23.59.59 (input shift # 2 time... N/A if not SHIFT)
TIME 3
00.00.00 ______ to 23.59.59 (input shift # 3 time... N/A if not SHIFT)
FAX
NO or YES (yes requires optional fax / modem)
PRINTER
YES or NO Press ENTER to accept this data.

Daily History Report:

SALES REPORT SCHEDULE
DAILY HST
SCHEDULE
NONE
TIME 1
00.00.00 ______ to 23.59.59 (input time – see TABLE 9.2)
TIME 2
00.00.00 ______ to 23.59.59 (input shift # 2 time... N/A if not SHIFT)
TIME 3
00.00.00 ______ to 23.59.59 (input shift # 3 time... N/A if not SHIFT)
FAX
NO or YES (yes requires optional fax / modem)
PRINTER
YES or NO Press ENTER to accept this data.
Leak Test  SETUP PROGRAMMING

Contents:
Tank Leak Test Menu
(Standard Static Test)
Output Group Assignments
Worksheet 10-1

See the Table of Contents to find topics in this manual. See the Preface for general information about this manual. And see the Installation, Operator’s, TroubleShooting Guides, and Application Notes for other reference material.

Leak Test Menu (Static Tank)

Press this key and follow the highlighted sequence below

Only the number of tanks that were programmed under the SYSTEM menu will be displayed here (Ø = No tank-related menus).

Static tank leak tests require 2 to 8 hours of uninterrupted quiet-time to finish with no dispensing, deliveries or line leak tests running during the test.

Wait at least 2 hours after a dispense or line leak test, and 6 hours after a delivery for valid test results. The occurrence of any of these events will cause the test to produce failed, or indeterminate test results.

Before programming see State and Local Regulations about leak testing (frequency, minimum volume / capacity, and leak test precision) and reporting requirements... adhere to these requirements.

* Appears only if alarm on = yes (see following page).

Begin programming with the CONFIDENCE menu. Follow the sequences on the next page.
Tank Leak Test Menu

Setup the confidence percentage

N = Tanks 1 – 8 (only the number of tanks programmed in the System menu will appear)

CONFIDENCE
LEAK TEST CONFIDENCE
99.0(%) 90.0% 95.0% 97.5%

Press M1 key.

Use UP/DOWN ▲▼ keys to show choices.
Press ENTER to accept this data.

Setup the precision of the leak test

PRECISION
LEAK TEST PRECISION
TANK 1 TANK 2
TANK 8

LEAK TEST PRECISION
+0.20000

Select tank number using (M) key.

(Note: 5 – 8 TS-2001/508 only)

Use keypad to input a precision number.
Press ENTER to accept this data.

<table>
<thead>
<tr>
<th>Monthly Compliance</th>
<th>Yearly Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Static Leak Test:</td>
<td>0.2 gph</td>
</tr>
<tr>
<td>Precision Tank # 1</td>
<td>0.1 gph</td>
</tr>
<tr>
<td>Precision Tank # 2</td>
<td></td>
</tr>
<tr>
<td>Precision Tank # 3</td>
<td></td>
</tr>
<tr>
<td>Precision Tank # 4</td>
<td></td>
</tr>
<tr>
<td>Precision Tank # 5</td>
<td></td>
</tr>
<tr>
<td>Precision Tank # 6</td>
<td></td>
</tr>
<tr>
<td>Precision Tank # 7</td>
<td></td>
</tr>
<tr>
<td>Precision Tank # 8</td>
<td></td>
</tr>
</tbody>
</table>

Threshold = 1/2 of Leak Test value

Setup a minimum amount of time to test for leaks per local regulations —

MIN LK TM
MINIMUM LEAK TEST TIME
2

Press M3 key.

— 2 to 8.0 hours

Use keypad to input minimum leak test time.
Press ENTER to accept this data.

— Continued next page —
Tank Leak Test Menu (CONTINUED ... FROM PREVIOUS PAGE)

Setup automatic leak test schedules for all tanks —

SCHEDULE
 LEAK TEST SCHEDULE
 TANK 1
 TANK 2
 : TANK 8

LEAK TEST SCHEDULE FOR TANK N
COPY

COPY FROM LEAK SCHEDULE X TO N
 TANK 1
 TANK 2
 : TANK 8

COPY LEAK SCHEDULE X TO N
PRESS ENTER IF YOU ARE SURE?

SCHEDULE
 LEAK TEST SCHEDULE FOR TANK N
 NONE
 : LAST DAY

(Optional - used to copy schedules) Press the M1 key. Press an (M) key to select a tank to schedule.

Press UP/DOWN ▲▼ to display Tanks 5 – 8 for TS-2001/508 only.

Press ENTER to accept this data.

Press the M4 key.

Tab 10.1 TYPICAL TEST SCHEDULE
 NONE (no schedule)
 DAILY 1ST DAY
 MONDAY : 30TH DAY
 SUNDAY LAST DAY
February does not have 30 days.

Tab 10.2 24 Hour Time
Input Format
HH:MM:SS
00:00:00 = midnight
22:00:00 = 10 pm + 12 (hours)
( add 12 hours to pm times starting at
1 pm to 11:59 pm )
02:05:00 = 2:05 am

Start time for Tank N (can be the same for all)

TIME
00:00:00

Press the M3 key.

24 HOUR FORMAT
Use keypad to input time (see TABLE 10.2).
Press ENTER to accept this data.

ALARM ON
 ALARM ON TEST FAIL
 NO
 YES

Press the M3 key.

Use UP/DOWN ▲▼ to show choices.
YES = generate an alarm if a tank leak test fails
Press ENTER to accept this data.
**Tank Leak Test Menu (CONTINUED ... FROM PREVIOUS PAGE)**

(* This menu appears only when YES was selected under the ALARM ON TEST FAIL menu)

<table>
<thead>
<tr>
<th>TST FL OG</th>
<th>TEST FAIL OUTPUT GRP</th>
</tr>
</thead>
<tbody>
<tr>
<td>TEST FAIL</td>
<td>OUTPUT GRP</td>
</tr>
<tr>
<td>TANK 1</td>
<td></td>
</tr>
<tr>
<td>TANK 8</td>
<td></td>
</tr>
</tbody>
</table>

**LEAK TEST FAIL OUTPUT GROUP N**

<table>
<thead>
<tr>
<th>NONE</th>
<th>GROUP A-FF</th>
<th>ALL GROUPS</th>
</tr>
</thead>
<tbody>
<tr>
<td>NONE</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GROUP A-FF</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ALL GROUPS</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Press the **M3** key.
- Press an **(M)** key to select a tank to assign an OG.
- (32 OGs available, see WORKSHEET # 10-1)
  - Not Assigned to an OG.
  - One OG selected (A=1st OG, FF=32nd OG)
  - All OGs selected

Use **UP/DOWN ▲ ▼** to show OG choices.
Press **ENTER** to accept this data.

— Your Notes —
### Worksheet #10-1 – Output Groups – Tank Leak Tests

**for Static & SCALD Tank Leak Tests** Fill-in the worksheet below. Compare assignments with other worksheets to uncover conflicts before programming output devices.

<table>
<thead>
<tr>
<th>OG = Output Group</th>
<th>- Output Group Assignment WORKSHEET Output Group choices -</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Tank Leak Test:</strong></td>
<td></td>
</tr>
<tr>
<td>TST FL OG Tank 1</td>
<td>A</td>
</tr>
<tr>
<td>TST FL OG Tank 2</td>
<td>B</td>
</tr>
<tr>
<td>TST FL OG Tank 3</td>
<td>C</td>
</tr>
<tr>
<td>TST FL OG Tank 4</td>
<td>D</td>
</tr>
<tr>
<td>TST FL OG Tank 5</td>
<td>E</td>
</tr>
<tr>
<td>TST FL OG Tank 6</td>
<td>F</td>
</tr>
<tr>
<td>TST FL OG Tank 7</td>
<td>G</td>
</tr>
<tr>
<td>TST FL OG Tank 8</td>
<td>H</td>
</tr>
<tr>
<td><strong>SCALD Test:</strong></td>
<td>K</td>
</tr>
<tr>
<td>TST FL OG Tank 1</td>
<td>L</td>
</tr>
<tr>
<td>TST FL OG Tank 2</td>
<td>M</td>
</tr>
<tr>
<td>TST FL OG Tank 3</td>
<td>N</td>
</tr>
<tr>
<td>TST FL OG Tank 4</td>
<td>O</td>
</tr>
<tr>
<td>TST FL OG Tank 5</td>
<td>P</td>
</tr>
<tr>
<td>TST FL OG Tank 6</td>
<td>Q</td>
</tr>
<tr>
<td>TST FL OG Tank 7</td>
<td>R</td>
</tr>
<tr>
<td>TST FL OG Tank 8</td>
<td>S</td>
</tr>
</tbody>
</table>

**Example:**

- **Tank Leak Test:**
  - TST FL OG 1 G Activates Modulated Annunciator & Relay 2 (turns on external tank leak light)

- **SCALD Test:**
  - TST FL OG 3 G Activates Modulated Annunciator & Relay 2 (turns on external tank leak light)

**Output Devices:** Modulated Annunciator, Solid Annunciator, Relay 1, Relay 2, I/O Output Module Channel # 1 to # __ (record all OG Assignments in the vertical column)

---

See the Chapter on SCALD tank leak testing...

---

Annunciators or external relay output in this example flag the test fail alarm.
SCALD® Tank Leak Test
SETUP PROGRAMMING

Contents:
SCALD Tank Leak Test Menu
Output Group Assignments
see Worksheet 8-1

See the Table of Contents to find topics in this manual. See the Preface for general information about this manual. And see the Installation, Operator's, Troubleshooting Guides, and Application Notes for other reference material.

SCALD Tank Leak Test Menu

Press this key and follow the highlighted sequence below

SELECT MENU OPTION
SETUP UPGRADE LANGUAGE DATALOG

M1 M2 M3 M4

SETUP MENU (MORE)
EXIT SYSTEM TANKS (MORE) PROBES

SETUP MENU (MORE)
PRODUCTS MANIFOLDS* REPORTS LK TESTS

SETUP MENU (MORE)
SCALD TEST CLK/CAL ANNUNC RELAYS

M1 M2 M3 M4

SCALD TESTS CONFIDENCE PRECISION INTERVAL (MORE) QUALITY

M1 M2 M3 M4

SCALD TESTS ENABLE VAPOR REC ALARM ON TST FL OG*

M1 M2 M3 M4

Disregard this Chapter if the SCLD TEST menu does not appear (the position of this menu can also be displaced by other menus).

SCALD® is an acronym for INCON’s optional Statistical Continuous Automatic Leak Detection program. It runs volumetric leak tests during the quiet-times between dispenses. It is suited for 24 hour dispense sites that are too busy to run static leak tests.

The system is pre-configured with default setup that will give you the best results for most situations — keep the default settings. The exceptions to this are: ENABLE Vapor Recovery when a Stage II Vapor Recovery is used at the site and, when a SCALD leak test failure alarm is needed, program ALARM ON and TST FL OG (test fail output group) menus.

Push the UP/DOWN keys ▲▼ to show more menus or menu selections.

Press menu keys (M1 to M4) to access menus.

Push ENTER to accept a selection or input a value into the setup configuration memory.

* TST FL OG appears only if YES has been programmed for ALARM ON (see next page).

Only the number of tanks that were programmed under the SYSTEM menu will be displayed here (Ø = No tank-related menus).
SCALD (tank leak) Test Menu

SCALD TESTS

CONFIDENCE

SCALD CONFIDENCE

99.0%  Keep the default 99.0% value
90.0%
95.0%
97.5%

Press ENTER to accept this data.

PRECISION

SCALD TEST PRECISION

+0.2  Keep the default 0.2 gph monthly test value

Press ENTER to accept this data.

<table>
<thead>
<tr>
<th>Monthly Compliance</th>
<th>Yearly Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>SCALD Leak Test:</td>
<td>0.2 gph</td>
</tr>
<tr>
<td>Precision:</td>
<td>0.1 gph</td>
</tr>
</tbody>
</table>

Threshold = 1/2 of Leak Test value

INTERVAL

SCALD INTERVAL

18  Keep the default value (18)

Press ENTER to accept this data.

QUALIFY

SCALD VOLUME QUALIFY

+0

(minimum volume percent before starting a test)

0.0 to 99.0%

Use keypad to input a percentage.

Press ENTER to accept this data.

NOTE

Reference Local codes (and/or State/Province/Federal codes) for the minimum percentage of tank-volume-capacity before a leak test results can, or will, be considered acceptable. Input the minimum-acceptable volume based on these regulations.

ENABLE

SCALD ENABLE

TANK 1
TANK 2
:
TANK 8

SCALD ENABLE

ENABLED
DISABLED

(select tanks to be SCALD leak tested)

Keep the default – all tanks ENABLED

TANK 1
TANK 2
:
TANK 8

Use UP/DOWN ▲▼ keys to show more choices.

Press the (M) key to select a TANK #.

Use UP/DOWN ▲▼ keys to change the setting.

Press ENTER to accept this data.

Press the CANCEL key to return to the SCALD TESTS menus.

— CONTINUED ON NEXT PAGE —
**SCALD (tank leak) Test Menu (CONTINUED .... FROM PREVIOUS PAGE)**

<table>
<thead>
<tr>
<th>VAPOR RECOVERY</th>
<th>SCALD VAPOR RECOVERY</th>
</tr>
</thead>
<tbody>
<tr>
<td>DISABLED</td>
<td>(select ENABLED when Vapor Recovery is present)</td>
</tr>
<tr>
<td>ENABLED</td>
<td>Use <strong>UP/DOWN ▲▼</strong> keys to show choices.</td>
</tr>
<tr>
<td></td>
<td>Press <strong>ENTER</strong> to accept this data.</td>
</tr>
<tr>
<td></td>
<td>(Enable for vapor recovery systems)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ALARM ON</th>
<th>SCALD FAIL</th>
</tr>
</thead>
<tbody>
<tr>
<td>ALARM ON SCALD FAIL</td>
<td>(change to YES if you want an alarm when a SCALD leak test fails)</td>
</tr>
<tr>
<td>NO</td>
<td>Use <strong>UP/DOWN ▲▼</strong> keys to show choices.</td>
</tr>
<tr>
<td>YES</td>
<td>Press <strong>ENTER</strong> to accept this data.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TST FL OG</th>
<th>SCALD FAIL OUTPUT GROUP</th>
</tr>
</thead>
<tbody>
<tr>
<td>TANK 1</td>
<td>(32 OGs available ... see WORKSHEET # 8-1.)</td>
</tr>
<tr>
<td>TANK 2</td>
<td>Not assigned to an output group (OG).</td>
</tr>
<tr>
<td>:</td>
<td>One OG selected (A=1st OG, FF=32nd OG)</td>
</tr>
<tr>
<td>TANK 8</td>
<td>All OGs selected</td>
</tr>
<tr>
<td></td>
<td>Use <strong>UP/DOWN ▲▼</strong> keys to show more choices.</td>
</tr>
<tr>
<td><strong>SCALD TEST FAIL OUTPUT GROUP N</strong></td>
<td>Press <strong>ENTER</strong> to accept this data.</td>
</tr>
<tr>
<td>NONE</td>
<td>All Groups</td>
</tr>
<tr>
<td>GROUP A-FF</td>
<td>All Groups</td>
</tr>
<tr>
<td>ALL GROUPS</td>
<td>All Groups</td>
</tr>
</tbody>
</table>

--- Your Notes ---
12 Line Tests
SETUP PROGRAMMING

Contents:
LN (Line) leak Test Menu
Line Leak Test Requirements
TABLE 12.1 Time Input
Output Group Assignments
Worksheet 12 - 1

See the Table of Contents to find topics in this manual. See the Preface for general information about this manual. And see the Installation, Operator’s, TroubleShooting Guides, and Application Notes for other reference material.

LN (Line) Tests Menu

**NOTE**
Disregard this Chapter if the LNTESTS menu does not appear. Note that the position of this menu can be displaced by other menus.

The LN TESTS and LINES menu, only appear if one or more NO. LINES are entered under the SYSTEM setup menu.

The TS-LLD Line Leak Detector automatically performs a 0.2 gph (monthly compliance) test every 24 hours.

With this menu you may control the time this happens or schedule it to happen at a different time or day than tank leak tests run (to avoid affecting tank leak test results).

Character input / editing:
- Push UP/DOWN ▲▼ keys to show more menus or menu selections.
- Use menu keys (M1 to M4) to access menus.
- Press ENTER to accept a selection or input a value into the setup configuration memory.
- Press CANCEL to cancel data entry
- Press M1 to move the cursor left ⇐
- Use M2 to move the cursor right ⇒
- Press M4 to backspace (delete) one character to the left □

— Continued on next page —
Line Leak Test Requirements & Notes:

1) Inform the Site Personnel to: (If the store closes at night - not 24-hour) **Leave the Pump Controllers power on at night with dispenser power off.** The Submerged Turbine Pump (STP) must be able to turn on to run the pressurized line leak tests.

2) It is recommended that Line Leak Tests and Tank Leak Tests should not be scheduled to run at the same time. See Chapter 8 for Tank Leak Test scheduling.

3) **Note:** The 0.2 gph Line Leak Test will normally finish during quiet-times between product dispensing. (The line leak detector may start the pump at any time to run pressurized line leak tests.)

4) **The 0.1 precision line leak test requires 4 hours of quiet-time (after the final dispense) before it will run successfully.** Make sure to take this into account when scheduling a Annual precision 0.1 Line Leak Test.

5) **Note:** See the TS-LLD Manual or consult INCON Technical Service for Special Applications (for example: manifolded lines, nonstandard pumps, etc.).

6) Before programming, reference the State and Local Regulations about line leak testing, type / precision of the tests, test frequency, and reporting requirements... adhere to these requirements.

<table>
<thead>
<tr>
<th>Type / Precision</th>
<th>Monthly Compliance</th>
<th>Annual / Yearly</th>
</tr>
</thead>
<tbody>
<tr>
<td>Line Leak Test</td>
<td>0.2 gph</td>
<td>0.1 gph</td>
</tr>
</tbody>
</table>

---

**TABLE 12.1  24 Hour Time Input Format**

HH:MM:SS

00:00:00 = midnight 22:00:00 = 10 pm + 12 (hours)

( add 12 hours to pm times starting at 1 pm to 11:59 pm )

02:05:00 = 2:05 am

---

— Your Notes —
LN Line (leak) Tests Menu (Continued from page 1)

* Only the No. of lines that are programmed in System menu are displayed

SCHEDULE
SELECT A LINE
LINE 1
LINE 2 *
: *
LINE 8 *

LINE TEST SCHEDULE N

Program a Schedule and Time for each Line#

SCHED 0.1
NONE
DAILY
MONDAY
:
SUNDAY
1 ST DAY
:
30 TH DAY
LAST DAY

TIME 0.1
0.1 GPH LINE TEST TIME N
00:00:00 24 HOUR FORMAT

See Test Requirements and Notes !

NOTE: February does not have 30 days !

Both the 0.1 & 0.2 gph line leak tests can be programmed for a particular Line or all Lines.
But, the schedule and times must be different !
Also see Test Requirements and Notes.

SCHED 0.2
NONE
DAILY
MONDAY
:
SUNDAY
1 ST DAY
:
30 TH DAY
LAST DAY

TIME 0.2
0.1 GPH LINE TEST TIME N
00:00:00 24 HOUR FORMAT

See Test Requirements and Notes !

NOTE: February does not have 30 days !

Both the 0.1 & 0.2 gph line leak tests can be programmed for a particular Line or all Lines.
But, the schedule and times must be different !
Also see Test Requirements and Notes.
**LN Line (leak) Tests Menu (Continued...)**

* Only the No. of lines that are programmed in System menu are displayed

<table>
<thead>
<tr>
<th>FAIL OG</th>
<th>(Will go Active when any (3 gph, 0.2 gph, and 0.1 gph) Line Leak Test fails)</th>
</tr>
</thead>
<tbody>
<tr>
<td>LINE TEST FAIL OUTPUT GROUP</td>
<td>Press (M) key to select a LINE#.</td>
</tr>
<tr>
<td>LINE 1</td>
<td>Use <strong>UP/DOWN ▲ ▼</strong> keys to show more choices.</td>
</tr>
<tr>
<td>LINE 2 *</td>
<td></td>
</tr>
<tr>
<td>: *</td>
<td></td>
</tr>
<tr>
<td>LINE 8 *</td>
<td></td>
</tr>
</tbody>
</table>

| LINE TEST FAIL OUTPUT GROUP N | (32 Output Groups (OGs) available...See Worksheet 12-1) |
| NONE | Not assigned to an Output Group (OG). |
| GROUP A-FF | One OG selected (A=1st OG, FF=32nd OG) |
| ALL GROUPS | All OGs selected |
| Use **UP/DOWN ▲ ▼** keys to choose an OG. |
| Press **ENTER** to accept this data. |

<table>
<thead>
<tr>
<th>FAULT OG</th>
<th>(Will go active when a fault (TS-LLD flashing alarm error-code) occurs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>LINE TEST FAIL OUTPUT GROUP</td>
<td>Press (M) key to select a LINE#.</td>
</tr>
<tr>
<td>LINE 1</td>
<td>Use <strong>UP/DOWN ▲ ▼</strong> keys to show more choices.</td>
</tr>
<tr>
<td>LINE 2 *</td>
<td></td>
</tr>
<tr>
<td>: *</td>
<td></td>
</tr>
<tr>
<td>LINE 8 *</td>
<td></td>
</tr>
</tbody>
</table>

| LINE TEST FAULT OUTPUT GROUP N | (32 Output Groups (OGs) available...See Worksheet 12-1) |
| NONE | Not assigned to an Output Group (OG). |
| GROUP A-FF | One OG selected (A=1st OG, FF=32nd OG) |
| ALL GROUPS | All OGs selected |
| Use **UP/DOWN ▲ ▼** keys to choose an OG. |
| Press **ENTER** to accept this data. |
**Worksheet #12-1 – Output Groups – Line Leak Tests**

Fill-in the worksheet below. Compare assignments with other worksheets to uncover conflicts before programming the output devices.

<table>
<thead>
<tr>
<th>OG = Output Group</th>
<th>- Output Group Assignment WORKSHEET Output Group choices -</th>
<th>NONE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Line Leak Test:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FAIL OG Line 1</td>
<td></td>
<td>A</td>
</tr>
<tr>
<td>FAIL OG Line 2</td>
<td></td>
<td>B</td>
</tr>
<tr>
<td>FAIL OG Line 3</td>
<td></td>
<td>C</td>
</tr>
<tr>
<td>FAIL OG Line 4</td>
<td></td>
<td>D</td>
</tr>
<tr>
<td>FAIL OG Line 5</td>
<td></td>
<td>E</td>
</tr>
<tr>
<td>FAIL OG Line 6</td>
<td></td>
<td>F</td>
</tr>
<tr>
<td>FAIL OG Line 7</td>
<td></td>
<td>G</td>
</tr>
<tr>
<td>FAIL OG Line 8</td>
<td></td>
<td>H</td>
</tr>
<tr>
<td>TS-LLD</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Line Leak Detector:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FAULT OG Line 1</td>
<td></td>
<td>I</td>
</tr>
<tr>
<td>FAULT OG Line 2</td>
<td></td>
<td>J</td>
</tr>
<tr>
<td>FAULT OG Line 3</td>
<td></td>
<td>K</td>
</tr>
<tr>
<td>FAULT OG Line 4</td>
<td></td>
<td>L</td>
</tr>
<tr>
<td>FAULT OG Line 5</td>
<td></td>
<td>M</td>
</tr>
<tr>
<td>FAULT OG Line 6</td>
<td></td>
<td>N</td>
</tr>
<tr>
<td>FAULT OG Line 7</td>
<td></td>
<td>O</td>
</tr>
<tr>
<td>FAULT OG Line 8</td>
<td></td>
<td>P</td>
</tr>
</tbody>
</table>

**Example:**

<table>
<thead>
<tr>
<th>Line Leak Test:</th>
<th></th>
<th>Output Devices: Modulated Annunciator, Solid Annunciator, Relay 1, Relay 2, I/O Output Module Channel # 1 to # (record all OG Assignments in the vertical column)</th>
</tr>
</thead>
<tbody>
<tr>
<td>FAIL OG Line 2</td>
<td>L</td>
<td>Activates Modulated Annunciator &amp; Relay 2 (turns on line leak light)</td>
</tr>
<tr>
<td>FAULT OG Line 2</td>
<td>F</td>
<td>Activates Solid Annunciator (for 20 seconds)</td>
</tr>
</tbody>
</table>

Note: Channel # 1 to # (record all OG Assignments in the vertical column)
The Clock and Calendar menu must be set—DO NOT skip this menu. Program the Date and Time accurately.

Remember:

- Push UP/DOWN keys ▲▼ to show more menus or menu selections.
- Use menu keys (M1 to M4) to access menus.
- Press ENTER to accept a selection or input a value into the setup configuration memory.
- Press CANCEL to cancel data entry.

Character input / editing:

- Press M1 to move the cursor left □←
- Use M2 to move the cursor right □→
- Press M4 to backspace (delete) one character to the left □.erase

Press the (M) key under each of these menu items to enter the proper settings.
Clock / Calendar Menu

CLOCK/CALENDAR

DAY SAV
   DAYLITE SAVINGS
      ENABLED
      DISABLED

Press M1 key.
Use UP/DOWN ▲ ▼ keys to show choices.
Enable = allows daylight savings time changes
Disable = does not
Press ENTER key to accept this data.

TM STYLE

TIME STYLE
   12 HOUR
   24 HOUR

(Select the time style - (12 or 24 hour) for display,
reports and faxes)
Use UP/DOWN ▲ ▼ keys to show choices.
Press ENTER key to accept this data.

DT STYLE

DATE STYLE
   MM/DD/YY
   DD/MM/YY
   YY/MM/DD

(Select the date style - (Month/Day/Year) for display,
reports and faxes.) (YY = Year, MM = Month, DD = Day)
Use UP/DOWN ▲ ▼ keys to show choices.
Press ENTER key to accept this data.

SET TIME

SET SYSTEM TIME
   HH:MM:SS

(Input current time in 24-hour format)
2 digits are required for hours, minutes, seconds –
use leading zeros before single digits,
(for example input ‘05’ not ‘5’)
Use keypad to input time data.
Press ENTER key to accept this data.

TABLE 13.1 24 Hour Time Input Format

<table>
<thead>
<tr>
<th>HH:MM:SS</th>
</tr>
</thead>
<tbody>
<tr>
<td>00:00:00 = midnight</td>
</tr>
<tr>
<td>22:00:00 = 10 pm + 12 ( hours )</td>
</tr>
<tr>
<td>( add 12 hours to pm times starting at 1 pm to 11:59 pm )</td>
</tr>
<tr>
<td>02:05:00 = 2:05 am</td>
</tr>
</tbody>
</table>

SET DATE

SET SYSTEM DATE
   YYYY:MM:DD

(Input current DATE )
(YYYY = year, MM = Month, DD = Day)...
2 digits are required for month and day –
use leading zeros before single digits,
(for example input ‘04’ not ‘4’)
Use keypad to input DATE data.
Press ENTER to accept this data.

SET DAY

SET SYSTEM DAY OF WEEK
   SUNDAY
   MONDAY
   TUESDAY
   WEDNESDAY
   THURSDAY
   FRIDAY
   SATURDAY

(Select the current day of the week)
Use UP/DOWN ▲ ▼ keys to show choices.
Press ENTER to accept this data.
The annunciator menu must be set (DO NOT skip this menu). The annunciator is an Output Device that produces an audible alarm to alert attendants of a problem (flashing warning or alarm lights on the console also provide visual indications).

Two sounds can be produced: a modulated (beeping) or a continuous (solid) tone. Any Alarm Output Group can be programmed to sound the annunciator horn.

See Worksheets for applicable Output Group assignments. Use the Table of Contents (TOC) to locate Worksheets.

Remember:
- Push UP/DOWN ▲ ▼ keys to show more menus or menu selections.
- Use menu keys (M1 to M4) to access menus.
- Press ENTER to accept a selection or input a value into the setup configuration memory.
- Press CANCEL to cancel data entry.

Annunciator Time-out

Input a considerable alarm time-out value (i.e. 10 seconds) – especially if an acknowledge password is required before an alarm can be silenced. Also see the Relays Setup Chapter and input relay time-outs if external alarm annunciators are used.

NOTE

0 to 3600

Use keypad to input a value.
Press ENTER to accept this data.

(Input an automatic time-out / turn-off value in seconds... Ø = no time-out, the attendant must press ACK to silence alarms, 3600 = 60 minutes or 1 hour time-out)
Annunciators Menu (CONTINUED... FROM PREVIOUS PAGE)

Modulated Annunciator Output Group (alarm assignment)

MODULATED
MODULATED Annunciator OUT GRPS – Continued – Select / assign output group(s) to activate the modulated annunciator on alarm.

MODULATED Annunciator OUTPUT GROUPs GROUP

1 32
A B C D E F G H I J K L M N O P Q R S T U V W X Y Z AA BB CC DD EE FF

Fill-in Modulated Annunciator Output – Group Assignments Below:

Example Output Device — OUTPUT GROUP Assignment (shown filled-in)

SOLID Annunciator Output Group (alarm assignment)

SOLID Annunciator TIMEOUT

TIMEOUT

0

(0 to 3600)

(Input an automatic time-out / turn-off value in seconds... 0 = no time-out, the attendant must press ACK to silence alarms, 3600 = 60 minutes or 1 hour time-out)... see note on first page of this chapter.

Solid Annunciator Output Group (alarm assignment)

OUT GRPS

SOLID Annunciator OUTPUT GROUPs GROUP

1 32
A B C D E F G H I J K L M N O P Q R S T U V W X Y Z AA BB CC DD EE FF

Fill-in Solid Annunciator Output – Group Assignments Below:

NOTE

Press: M1 to move the cursor left ↔

M2 to move the cursor right ➔

M4 to backspace (delete) one character to the left ↔

UP / DOWN ▲▼ to select (Y for yes assigned, or – (dash) for no not assigned)

ENTER to store the setup into the system memory

(M2 menu key (under SOLID) to access this menu)
INCON Recommends that you program one of the annunciators to react to system fail warnings and any leak detection sensors and leak test fail alarms.

**Annunciator Testing**

**Test the Modulated ALARM HORN ANNUNCIATOR**

Go back to the ANNUNCIATORS menu and push the M3 menu key (under TEST) to activate the horn. The horn will stop when the modulated annunciator timeout value is reached – or – when any other key is pressed.

**Test the Solid ALARM HORN ANNUNCIATOR**

The solid alarm horn annunciator can be tested from the front panel by exiting SETUP and pressing the ALARM TEST key (only in the normal Run Mode). The horn will stop when the solid annunciator timeout value is reached – or – when any other key is pressed.

— Your Notes —

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Relays SETUP PROGRAMMING

Contents:
- Relay Menu
- Relay Timeout
- Relay 1 & 2 Output Groups
- Alarm Assignments

See the Table of Contents to find topics in this manual. See the Preface for general information about this manual. And see the Installation, Operator’s, TroubleShooting Guides, and Application Notes for other reference material.

Relay Menu

MENU 7

Press this key and follow the highlighted sequence below

SELECT MENU OPTION
SETUP UPGRADE LANGUAGE DATALOG

M1 M2 M3 M4

SETUP MENU (MORE)
EXIT SYSTEM TANKS PROBES

Press the DOWN key once ...

The relay menu provides the means to control external devices, such as a Remote Alarm unit that alerts attendants of a problem (alarm or limit). Two available output relays can be used for this purpose.

The loads will switch on / off in response to alarms that are assigned to output groups (depending on how they are wired)... see the diagram above.

NOTE See Worksheets for applicable Output Group assignments. Use the Table of Contents (TOC) to locate Worksheets.

Character input / editing:
- Push UP/DOWN keys to show more menus or menu selections.
- Use menu keys (M1 to M4) to access menus.
- Press ENTER to accept a selection or input a value into the setup configuration memory.
- Press CANCEL to cancel data entry

Relay Timeout Note #A

Input a considerable automatic relay time-out value – especially when the relay controls an external alarm device.

(Input an automatic relay time-out / switch-off value in seconds... 0 = no time-out, the attendant must press ACK to switch the relay off, 3600 = 60 minutes or 1 hour time-out )

— Continued on next page —
Relay Menu (continued... from previous page)

Relay 1 Output  Group (alarm assignment)
Select / assign output group(s) to activate RELAY 1 on alarm / limit.

RELAY 1
OUT GRPS
RELAY OUTPUT GROUPS 1
-----------
A
1
ABCDEFHJKLMNORSTUVWXYZAAABBCCDDEF

Fill-in RELAY 1 Output – Group Assignments Below:

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z AA BB CC DD EE FF

TEST Relay 1
TESTING...
HIT ANY KEY TO QUIT

Press M3 key.
RELAY switches on and off... listen for clicking sound.
Press any key to stop the test or wait for the time-out to switch the relay off if the time-out value is greater than 0.

Example Output Device — OUTPUT GROUP Assignment (shown filled-in)

| A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T | U | V | W | X | Y | Z | AA | BB | CC | DD | EE | FF |
| Y | Y | Y | Y | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

OUTPUT GROUP

1
ABCDEFHJKLMNORSTUVWXYZAAABBCCDDEF

GROUP X

The 24th group (Group X) is shown assigned Y

Press: M1 to move the cursor left ↔
M2 to move the cursor right ↔
M4 to backspace (delete) one character to the left ↔
Use UP / DOWN ▲▼ to select (Y for yes assigned, or – (dash) for no not assigned).
Press ENTER to store the setup into the system memory.

NOTE

Relay Timeout Note #B

When using a relay output in combination with a TS-RK (Remote alarm Acknowledge unit) and a TS-RA1 or TS-RA2 (Remote Alarm unit) to monitor overfill of multiple tanks, you must set a reasonable relay time-out value. Do this so the relay will react to overfill alarms from each tank without the need for someone to press the ACK key after each overfill.
Relay Menu (CONTINUED... FROM PREVIOUS PAGE)

RELAY 2
TIMEOUT
RELAY TIMEOUT 2
15

Go back to RELAYS menu and push M2 under RELAY 2 to access this menu.

______ 0 to 3600
(Input an automatic relay time-out / switch-off value in seconds... 0 = no time-out, the attendant must press ACK to switch the relay off, 3600 = 60 minutes or 1 hour time-out )... Input a considerable automatic relay time-out value – especially when the relay controls an external alarm device.

Relay 2 Output Group (alarm assignment)

Select / assign output group(s) to activate RELAY 1 on alarm / limit.

OUT GRPS
RELAY OUTPUT GROUPS
GROUP
A
B
C
D
E
F
G
H
I
J
K
L
M
N
O
P
Q
R
S
T
U
V
W
X
Y
Z
AA
BB
CC
DD
EE
FF

Fill–in RELAY 2 Output – Group Assignments Below:

TEST Relay 2
TESTING...
HIT ANY KEY TO QUIT

Press M3 key.

RELAY switches on and off... listen for clicking sound.

Press any key to stop the test or wait for the time-out to switch the relay off if the time-out value is greater than 0.
This menu appears only after the TS-ROM BriteBox™ is installed, and after console power is turned on (disregard this Chapter if a TS-ROM is not installed).

The TS-ROM relay menu provides the means to control external devices (such as STPs). The TS-ROM has 4 or 8 output channel relays that can be used for this purpose.

Channel relays (and the external devices wired to these) will switch on / off in response to alarms that are assigned to the relay output groups.

NOTE The installer must document the use for each channel-relay, the device that each controls, proper action or operation, and the power source.

See Worksheets for applicable Output Group assignments. Use the Table of Contents (TOC) to locate Output Group Worksheets.

Grace Period

Grace Period is an alarm override for a programmed interval of time (in minutes). Input the smallest possible grace period.

Consider the actions for all external devices that are wired to the TS-ROM relays. If one external device cannot have an override grace period, then leave the grace period at 0 for no override.

If used to disable dispensing when product levels are low or water levels high, then be sure to set the grace period to a minimum (to prevent the pump from running dry and overheating, or to prevent pumping water).

Allows normal operation for a short time

0 to 120 minutes

(Input time for relay to remain closed) Pressing ACK starts the grace period and overrides the alarm-lockout on the TS-ROM channel relay.
### Example Output Device — OUTPUT GROUP Assignment (shown filled-in)

| A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T | U | V | W | X | Y | Z | AA | BB | CC | DD | EE | FF |
| Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y |

Output Group

| Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y |

24th group (Group X) is shown assigned **Y**

### TS-ROM Channel 1 Output Group (alarm assignment)

**Channel 1**

TS-ROM CHANNEL 1

OUT GRPS

TS-ROM OUTPUT GROUPS 1

Select / assign output group(s) to activate the TS-ROM Channel Relay 1 on alarm

| A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T | U | V | W | X | Y | Z | AA | BB | CC | DD | EE | FF |
| Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y |

### TS-ROM Channel 2 Output Group (alarm assignment)

**Channel 2**

TS-ROM CHANNEL 2

OUT GRPS

TS-ROM OUTPUT GROUPS 2

Select / assign output group(s) to activate the TS-ROM Channel Relay 2 on alarm

| A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T | U | V | W | X | Y | Z | AA | BB | CC | DD | EE | FF |

### TS-ROM Channel 3 Output Group (alarm assignment)

**Channel 3**

TS-ROM CHANNEL 3

OUT GRPS

TS-ROM OUTPUT GROUPS 3

Select / assign output group(s) to activate the TS-ROM Channel Relay 3 on alarm

| A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T | U | V | W | X | Y | Z | AA | BB | CC | DD | EE | FF |

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**NOTE**

- **M1** to move the cursor left ⇐
- **M2** to move the cursor right ⇒
- **M4** to backspace (delete) one character to the left ⇐
- **UP** / **DOWN** ▲▼ to select (Y for yes assigned, or – (dash) for no not assigned)
- **ENTER** to store the setup into the system memory

---

**Press:**

- **M1** to move the cursor left ⇐
- **M2** to move the cursor right ⇒
- **M4** to backspace (delete) one character to the left ⇐
- **UP** / **DOWN** ▲▼ to select (Y for yes assigned, or – (dash) for no not assigned)
- **ENTER** to store the setup into the system memory
TS-ROM Channel 4  Output Group (alarm assignment)

CHANNEL 4
TS-ROM CHANNEL 4
OUT GRPS
TS-ROM OUTPUT GROUPS 4

Select / assign output group(s) to activate the TS-ROM Channel Relay 4 on alarm

GROUP

A

1

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z AA BB CC DD EE FF

Fill–in TS-ROM Channel Relay 4 Output – Group Assignments Below:

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z AA BB CC DD EE FF

TS-ROM Channel 5  Output Group (alarm assignment)

CHANNEL 5
TS-ROM CHANNEL 5
OUT GRPS
TS-ROM OUTPUT GROUPS 5

Select / assign output group(s) to activate the TS-ROM Channel Relay 5 on alarm

GROUP

A

1

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z AA BB CC DD EE FF

Fill–in TS-ROM Channel Relay 5 Output – Group Assignments Below:

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z AA BB CC DD EE FF

TS-ROM Channel 6  Output Group (alarm assignment)

CHANNEL 6
TS-ROM CHANNEL 6
OUT GRPS
TS-ROM OUTPUT GROUPS 6

Select / assign output group(s) to activate the TS-ROM Channel Relay 6 on alarm

GROUP

A

1

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z AA BB CC DD EE FF

Fill–in TS-ROM Channel Relay 6 Output – Group Assignments Below:

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z AA BB CC DD EE FF

TS-ROM Channel 7  Output Group (alarm assignment)

CHANNEL 7
TS-ROM CHANNEL 7
OUT GRPS
TS-ROM OUTPUT GROUPS 7

Select / assign output group(s) to activate the TS-ROM Channel Relay 7 on alarm

GROUP

A

1

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z AA BB CC DD EE FF

Fill–in TS-ROM Channel Relay 7 Output – Group Assignments Below:

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z AA BB CC DD EE FF
TS-ROM Menu (continued... from previous page)

Example Output Device — OUTPUT GROUP Assignment (shown filled-in)

| A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T | U | V | W | X | Y | Z | AA | BB | CC | DD | EE | FF |
| Y | Y | Y | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |

OUTPUT GROUP

Y — Y Y Y — — — — — — — — — — — — Y

GROUP

X

1

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z AA BB CC DD EE FF

The 24TH group (Group X) is shown assigned Y

Press: M1 to move the cursor left ⇐

M2 to move the cursor right ⇒

M4 to backspace (delete) one character to the left ⇐

UP / DOWN ▲▼ to select (Y for yes assigned, or — (dash) for no not assigned)

ENTER to store the setup into the system memory

TS-ROM Channel 8 Output Group (alarm assignment)

CHANNEL 8

TS-ROM CHANNEL 8

Select / assign output group(s) to activate the TS-ROM Channel Relay 8 on alarm

OUT GRPS

TS-ROM OUTPUT GROUPS 8

GROUP

A

1

32

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z AA BB CC DD EE FF

Fill-in TS-ROM Channel Relay 8 Output — Group Assignments Below:

| A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T | U | V | W | X | Y | Z | AA | BB | CC | DD | EE | FF |

— Your Notes —

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Leak Detection Sensors

**Sensors (Leak Detection)**

**SETUP PROGRAMMING**

**Contents:**
- Sensors Menu
- Naming Sensors
- Standard Sensors (ID)
- BriteSensor (ID)
- Output Groups Assignments
- Worksheets 17-1 & 17-5

See the Table of Contents to find topics in this manual. See the Preface for general information about this manual. And see the Installation, Operator’s, TroubleShooting Guides, and Application Notes for other reference material.

**Sensors Menu**

Internally, the TS-1001/504 has 12 and the TS-2001/508 has 24 IS (intrinsically safe) leak detection sensor input channels. Optionally — with the addition of 1 or 2 external TS-SEM Sensor Expansion Module(s) — the total number of sensors can be increased to 28 for the TS-1001/504 or to 40 for the TS-2001/508.

This menu will appear only when the No. of Sensors is greater than zero (as defined in the system setup menu). The installer must document the type, the location, and the input sensor channel of each leak-detection sensor.

Sensor alarms can be setup to print, or send alarm reports, and to energize output groups that can be programmed to activate annunciator warning horns, indicator lights, relays, or various other external devices.

Fill-in the Worksheets that are provided in this chapter with Output Group assignments for each sensor. Use the Table of Contents (TOC) to locate and compare with other Output Group Worksheets.

**Naming Sensors**

Sensors can be renamed to help identify the location and type on Reports and Displayed Alarms. For example: a TSP-DIS sensor is installed at Tank 1, to sensor channel 3. It was renamed from - SENSOR 3 to - T1 DIS 3.
Sensors Menu (Continued... from previous page)

SENSORS

AUTO CFG

Press \( M \) key.

(Automatically identify the sensors) Press \( M1 \) key.

SENSOR 1

Press \( M \) key.

(SENSORS 13 – 28 are optional with the TS-1001/504)

SENSOR 2

Use \( \text{UP/DOWN} \uparrow \downarrow \) keys to show more choices.

(SENSORS 25 – 40 are optional with the TS-2001/508)

SENSOR 40


NAME

Sensor NAME \( N \) = SENSOR channel Number

___ 9 characters

Use keypad to input / change sensor name (optional)

Press \( \text{ENTER} \) to accept this data.

TYPE

STD

Use \( \text{UP/DOWN} \uparrow \downarrow \) keys to show more choices.

(or TSP-DIS, TSP-DDS, TSP-DTS, TSP-HIS, TSP-MWS, TSP-DVS)

Press \( \text{ENTER} \) to accept this sensor ...

\( \text{do not change any sensor type - use AUTO CFG instead} \)

NOTE

Depending on which sensors are installed will determine which of the following alarm Output Groups (OG) choices will appear. OGs can be assigned to activate annunciators, or control relays / devices on alarm. OGs are sensor and channel dependant. Document the Sensor and Output Group Assignments on the Worksheets provided on the following pages.

STD OG (only for standard sensors)

STANDARD OUTPUT GROUP \( N \)

NONE (A to FF or ALL) assign alarm to Output Group \( N \)

PROD OG (with TSP –DIS, DDS, DTS or MWS sensors)

PRODUCT OUTPUT GROUP \( N \)

NONE (A to FF or ALL) assign alarm to Output Group \( N \)

WATER OG (with TSP–DIS, DDS, DVS or DTS sensors)

WATER OUTPUT GROUP \( N \)

NONE (A to FF or ALL) assign alarm to Output Group \( N \)

SMP FL OG (with TSP–DDS or DTS sensors)

SUMP FULL OUTPUT GROUP \( N \)

NONE (A to FF or ALL) assign alarm to Output Group \( N \)

DRY WL OG (with TSP–MWS sensor)

DRY WELL OUTPUT GROUP \( N \)

NONE (A to FF or ALL) assign alarm to Output Group \( N \)

HGH BR OG (with TSP-HIS sensor)

HIGH BRINE OUTPUT GROUP \( N \)

NONE (A to FF or ALL) assign alarm to Output Group \( N \)

LOW BR OG (with TSP-HIS sensor)

LOW BRINE OUTPUT GROUP \( N \)

NONE (A to FF or ALL) assign alarm to Output Group \( N \)

VAPOR OG (TSP-DVS sensors only... other DVS sensor menus items on next page)

VAPOR OUTPUT GROUP \( N \)

NONE (A to FF or ALL) assign alarm to Output Group \( N \)

Typical Output Group Choices

UP/DN \( \uparrow \downarrow \) to show choices

\( \text{ENTER} \) to select

\( \text{NONE} \)

A B C D E F

G H I J K L

M N O P Q R

R T U V W X

Y Z

AA BB CC DD EE FF

ALL
Special Vapor Sensor Menu (Continued...)

VAP THRSH
SENSOR VAPOR THRESHOLD
+2000.0

(see TSP-DVS install manual)

VAP OFFST
SENSOR VAPOR OFFSET
+0

(see TSP-DVS install manual)

Leak Detection Sensors

Standard Sensors (below... all Alarms = STD N)

1. TSP-EIS Electro-optic Interstitial (3 wire, infrared) Standard Sensor detects liquids in spaces between the walls of DWTs

2. TSP-HLS High product Level (2 wire, float switch) Standard Sensor used inside of tanks as an overfill alarm detector (or in addition to the HIGH, and HIGH HIGH probe limits)

3. TSP-ULS Universal Liquid Sensor (2 wire, float switch) Standard Sensor detects liquids in: spaces between the walls of DWTs or Dispenser sumps

BriteSensors & ALARMS (all 3 wire – below)

4. TSP-DIS Discriminating Interstitial (infrared & conductivity sensor) BriteSensor detects liquid WATER or PRODUCT in spaces between the walls of DWTs

5. TSP-HIS Hydrostatic Interstitial (float switches) BriteSensor detects HIGH BRINE or LOW BRINE levels in hydrostatic reservoirs of DWTs

6. TSP-DDS Discriminating Dispenser Sump (conductivity strip & floats) BriteSensor detects liquid PRODUCT or WATER or SUMP FULL in dispenser sumps

7. TSP-DTS Discriminating Turbine Sump (conductivity strip & floats) BriteSensor detects liquid PRODUCT or WATER or SUMP FULL in STP containment sumps

8. TSP-MWS Discriminating ground water monitoring well (float & conductivity strip) BriteSensor – detects DRY WELL (no water in well) or PRODUCT floating on ground water in monitoring wells

9. TSP-DVS Discriminating Vapor Well (vapor & conductivity strip) BriteSensor detects liquid WATER or product VAPOR in vapor monitoring wells
Worksheet # 17-1 – Output Groups – Sensor Channels 1 to 8

Fill-in the work sheet below and compare assignments with other work-sheets to uncover conflicts before programming output devices.

<table>
<thead>
<tr>
<th>Sensor Chnl #1:</th>
<th>Output Group Assignment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tbody>
</table>

A maximum of 3 alarm Output Groups (OG) can appear per channel #N...

TSP-DDS & TSP-DTS sensors have 3 alarms: water, product & sump full.

Alarm OGs are:
STD (standard)
PROD (product)
WATER OG
SMP FL (sump full)
DRY WL (dry well)
HGH BR (high brine level)
LOW BR (low brine level)
VAPOR OG

Write-in all alarm OGs for each sensor channel #.

<table>
<thead>
<tr>
<th>Sensor Chnl #2:</th>
<th>Output Group Assignment</th>
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</thead>
<tbody>
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<table>
<thead>
<tr>
<th>Sensor Chnl #3:</th>
<th>Output Group Assignment</th>
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</table>

<table>
<thead>
<tr>
<th>Sensor Chnl #4:</th>
<th>Output Group Assignment</th>
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<table>
<thead>
<tr>
<th>Sensor Chnl #5:</th>
<th>Output Group Assignment</th>
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</table>

<table>
<thead>
<tr>
<th>Sensor Chnl #6:</th>
<th>Output Group Assignment</th>
</tr>
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<table>
<thead>
<tr>
<th>Sensor Chnl #7:</th>
<th>Output Group Assignment</th>
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<table>
<thead>
<tr>
<th>Sensor Chnl #8:</th>
<th>Output Group Assignment</th>
</tr>
</thead>
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</tbody>
</table>

example: WATER OG 1 W Could activate the annunciator when water is detected

PROD OG 1 P Could activate the annunciator and a ROM relay (output) to disable dispensing if product is detected (TSP-DIS shown)

Output Devices: Modulated Annunciator, Solid Annunciator, Relay 1, Relay 2, I/O Output Module.

Channel # 1 to # __ (record all OG Assignments in the vertical column)
Worksheet # 17-2 – Output Groups – Sensor Channels 9 to 16

Fill-in the work sheet below and compare assignments with other work-sheets to uncover conflicts before programming output devices.

<table>
<thead>
<tr>
<th>Sensor Chnl #9:</th>
<th>- Output Group Assignment WORKSHEET Output Group choices -</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>NONE</td>
</tr>
</tbody>
</table>

A maximum of 3 alarm Output Groups (OG) can appear per channel # N...

TSP-DDS & TSP-DTS sensors have 3 alarms: water, product & sump full.

Alarm OGs are:
- STD (standard)
- PROD (product)
- WATER OG
- SMP FL (sump full)
- DRY WL (dry well)
- HGH BR (high brine level)
- LOW BR (low brine level)
- VAPOR OG

Write-in all alarm OGs for each sensor channel #.

OG = Output Group

<table>
<thead>
<tr>
<th>Sensor Chnl #10:</th>
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<table>
<thead>
<tr>
<th>Sensor Chnl #11:</th>
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<table>
<thead>
<tr>
<th>Sensor Chnl #12:</th>
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</table>

<table>
<thead>
<tr>
<th>Sensor Chnl #13:</th>
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<table>
<thead>
<tr>
<th>Sensor Chnl #14:</th>
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<table>
<thead>
<tr>
<th>Sensor Chnl #15:</th>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Sensor Chnl #16:</th>
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<tbody>
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<td></td>
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</tbody>
</table>

**example:** WATER OG 10 W Could activate the annunciator when water is detected (TSP-DTS)

PROD OG 10 P Could activate the annunciator and a ROM relay (output) to disable dispensing if product is detected (TSP-DIS shown)

SMP FL OG 10 R Could activate the annunciator and a ROM relay (output) to warn that the sump is full and to be pumped out (into a containment tank)

Output Devices: Modulated Annunciator, Solid Annunciator, Relay 1, Relay 2, I/O Output Module Channel # 1 to # __ (record all OG Assignments in the vertical column)
Worksheet # 17-3 – Output Groups – Sensor Channels 17 to 24

Fill-in the work sheet below and compare assignments with other work-sheets to uncover conflicts before programming output devices.

A maximum of 3 alarm Output Groups (OG) can appear per channel #N...

TSP-DDS & TSP-DTS sensors have 3 alarms: water, product & sump full.

Alarm OGs are:
STD (standard)
PROD (product)
WATER OG
SMP FL (sump full)
DRY WL (dry well)
HGH BR (high brine level)
LOW BR (low brine level)
VAPOR OG

Write-in all alarm OG for each sensor channel #.

OG = Output Group - Output Group Assignment WORKSHEET Output Group choices -

| Sensor Chnl #17: | NONE |
| Sensor Chnl #18: |
| Sensor Chnl #19: |
| Sensor Chnl #20: |
| Sensor Chnl #21: |
| Sensor Chnl #22: |
| Sensor Chnl #23: |
| Sensor Chnl #24: |

example:
STD OG 22 P Could activate the annunciator and a ROM relay (output) to disable dispensing if a liquid is detected (standard sensor shown)

Output Devices: Modulated Annunciator, Solid Annunciator, Relay 1, Relay 2, I/O Output Module Channel # 1 to #_ (record all OG Assignments in the vertical column)
**Worksheet # 17-4 – Output Groups – Sensor Channels 25 to 32**

Fill-in the work sheet below and compare assignments with other work-sheets to uncover conflicts **before** programming output devices. (For TS-2001/508 only).

<table>
<thead>
<tr>
<th>Sensor Chnl #25:</th>
<th>- Output Group Assignment WORKSHEET Output Group choices -</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A B C D E F G H I J K L M N O P Q R S T U V W X Y Z AA BB CC DD EE FF ALL</td>
</tr>
</tbody>
</table>

A maximum of **3 alarm Output Groups** (OG) can appear per channel # N...

- **TSP-DDS & TSP-DTS sensors have 3 alarms:**
  - water,
  - product &
  - sump full.

Alarm OGs are:
- STD (standard)
- PROD (product)
- WATER OG
- SMP FL (sump full)
- DRY WL (dry well)
- HGH BR (high brine level)
- LOW BR (low brine level)
- VAPOR OG

**Write-in all alarm OG for each sensor channel #.**

**example:**

<table>
<thead>
<tr>
<th>Sensor Chnl #26:</th>
<th></th>
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</thead>
<tbody>
<tr>
<td></td>
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</tr>
</tbody>
</table>

Output Devices: Modulated Annunciator, Solid Annunciator, Relay 1, Relay 2, I/O Output Module

Channel # 1 to # __ (record all OG Assignments in the vertical column)
Worksheet # 17-5 – Output Groups – Sensor Channels 33 to 40

Fill-in the work sheet below and compare assignments with other work-sheets to uncover conflicts before programming output devices. (For TS-2001/508 only).

<table>
<thead>
<tr>
<th>Sensor #33 (TS-2001):</th>
<th></th>
<th></th>
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<tbody>
<tr>
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</table>

<table>
<thead>
<tr>
<th>Sensor #34 (TS-2001):</th>
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</table>

<table>
<thead>
<tr>
<th>Sensor #35 (TS-2001):</th>
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<tbody>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Sensor #36 (TS-2001):</th>
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</thead>
<tbody>
<tr>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Sensor #37 (TS-2001):</th>
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</thead>
<tbody>
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</table>

<table>
<thead>
<tr>
<th>Sensor #38 (TS-2001):</th>
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<tbody>
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</table>

<table>
<thead>
<tr>
<th>Sensor #39 (TS-2001):</th>
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<tbody>
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</table>

<table>
<thead>
<tr>
<th>Sensor #40 (TS-2001):</th>
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</tbody>
</table>

A maximum of 3 alarm Output Groups (OG) can appear per channel #N...

TSP-DDS & TSP-DTS sensors have 3 alarms: water, product & sump full.

Alarm OGs are:

- STD (standard)
- PROD (product)
- WATER OG
- SMP FL (sump full)
- DRY WL (dry well)
- HGH BR (high brine level)
- LOW BR (low brine level)
- VAPOR OG

Write-in all alarm OG for each sensor channel.

OG = Output Group

- Output Group Assignment

\[ \text{WORKSHEET} \]

Output Group choices -

\[ \text{NONE} \]

\[ \text{A} \]

\[ \text{B} \]

\[ \text{C} \]

\[ \text{D} \]

\[ \text{E} \]

\[ \text{F} \]

\[ \text{G} \]

\[ \text{H} \]

\[ \text{I} \]

\[ \text{J} \]

\[ \text{K} \]

\[ \text{L} \]

\[ \text{M} \]

\[ \text{N} \]

\[ \text{O} \]

\[ \text{P} \]

\[ \text{Q} \]

\[ \text{R} \]

\[ \text{S} \]

\[ \text{T} \]

\[ \text{U} \]

\[ \text{V} \]

\[ \text{W} \]

\[ \text{X} \]

\[ \text{Y} \]

\[ \text{Z} \]

\[ \text{AA} \]

\[ \text{BB} \]

\[ \text{CC} \]

\[ \text{DD} \]

\[ \text{EE} \]

\[ \text{FF} \]

\[ \text{ALL} \]

\[ \text{ex.}: \text{ HGH BR OG 40 P} \]

Could activate the annunciator when a high brine level is detected … see below also

\[ \text{LOW BR OG 40 P} \]

Could disable product dispensing when a low brine level is detected … see above also (TSP-HIS shown)

Output Devices: Modulated Annunciator, Solid Annunciator, Relay 1, Relay 2, I/O Output Module

Channel # 1 to # ___ (record all OG Assignments in the vertical column)
Internally, the TS-1001/504 and the TS-2001/508 have two non-intrinsically safe, auxiliary alarm input-channels. They are IN 1 and IN 2, and are located inside of the Tank Sentinel console. Both inputs provide +5 Volt DC power and ground (no other power is required... connecting an external power source will damage the unit). The auxiliary inputs are wired to and switched by the dry contacts of the external device to signal an event.

Both of the auxiliary inputs channels can be named and setup to print or send alarm reports and can be assigned to an alarm output group which can activate annunciator warning horns, indicator lights, relays and various other external devices.

Example:

Report and Alarm Display for channel 1 is renamed as OPEN FB 1 (Open For Business channel 1).
Auxiliary Inputs Menu (CONTINUED... FROM PREVIOUS PAGE)

AUXILIARY INPUTS
INPUT 1
INPUT 2
AUXILIARY INPUT 1
 MODE
AUXILIARY INPUT MODE 1
ACTIVE CLOSED
REMOTE ACKNOWLEDGE
CLOSED TO OPEN EDGE
OPEN TO CLOSED EDGE
ACTIVE OPEN

NAME
AUXILIARY INPUT NAME 1
AUXILIARY 1

OUT GROUP
AUXILIARY INPUT OUTPUT GROUP 1
NONE
GROUP A-FF
ALL GROUPS

AUXILIARY INPUT 2
 MODE
AUXILIARY INPUT MODE 2
ACTIVE CLOSED
REMOTE ACKNOWLEDGE
CLOSED TO OPEN EDGE
OPEN TO CLOSED EDGE
ACTIVE OPEN

NAME
AUXILIARY INPUT NAME 2
AUXILIARY 1

OUT GROUP
AUXILIARY INPUT OUTPUT GROUP 2
NONE
GROUP A-FF
ALL GROUPS

Press (M) keys to select INPUT#s.

Press M1 key.

Use UP/DOWN ▲▼ keys to show choices.
(normally open input)

Press ENTER to accept this data.

(normally closed input active on voltage drop)
(normally open input active on rising voltage)
(normally closed input)

Press ENTER to accept this data.

9 characters
Use keypad to input / change sensor name (optional)
Press ENTER to accept this data.

Press M2 key.

(32 OGs available ... see Worksheet # 18-1)
Not assigned to an Output Group (OG)
One OG selected (A=1st OG, FF=32nd OG)
All OGs selected

Use UP/DOWN ▲▼ keys to show choices.
Press ENTER to accept this data.

Press M1 key.

9 characters
Use keypad to input / change sensor name (optional)
Press ENTER to accept this data.

Press M2 key.

(32 OGs available ... see Worksheet # 18-1)
Not assigned to an Output Group (OG)
One OG selected (A=1st OG, FF=32nd OG)
All OGs selected

Use UP/DOWN ▲▼ keys to show choices.
Press ENTER to accept this data.
# Worksheet #18-1 – Output Groups – Aux. Inputs 1 and 2

Output groups (OG / Out Group) can be assigned to activate annunciators, or control relays/devices on alarm. Fill-in the work sheet below and compare the assignments with other work-sheets to uncover conflicts before programming output devices.

<table>
<thead>
<tr>
<th>OG = Output Group</th>
<th>- Output Group Assignment</th>
<th>WORKSHEET Output Group choices</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aux. Inputs:</td>
<td></td>
<td>NONE</td>
</tr>
<tr>
<td>Input #1:</td>
<td></td>
<td>A</td>
</tr>
<tr>
<td>OUT GROUP</td>
<td></td>
<td>B</td>
</tr>
<tr>
<td>Input #2:</td>
<td></td>
<td>C</td>
</tr>
<tr>
<td>OUT GROUP</td>
<td></td>
<td>D</td>
</tr>
<tr>
<td></td>
<td></td>
<td>E</td>
</tr>
<tr>
<td></td>
<td></td>
<td>F</td>
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<td></td>
<td></td>
<td>G</td>
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<td>Y</td>
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<td></td>
<td>Z</td>
</tr>
<tr>
<td>Example –</td>
<td></td>
<td>AA</td>
</tr>
<tr>
<td>Aux. Inputs:</td>
<td></td>
<td>BB</td>
</tr>
<tr>
<td>Input #1:</td>
<td>(Site open for business / front door unlocked):</td>
<td></td>
</tr>
<tr>
<td>OUT GROUP</td>
<td>none assigned Faxed to _________ with other Alarms</td>
<td></td>
</tr>
<tr>
<td>Input #2:</td>
<td>Back door open</td>
<td></td>
</tr>
<tr>
<td>OUT GROUP</td>
<td>A Sound Modulated alarm horn</td>
<td></td>
</tr>
<tr>
<td>Output Devices:</td>
<td>Modulated Annunciator, Solid Annunciator, Relay 1, Relay 2, I/O Output Module</td>
<td></td>
</tr>
<tr>
<td>Channel # 1 to # __ (record all OG Assignments in the vertical column)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
CPM Menu

Remember:
The TS-CPM is programmed from the CPM menu, which is under Setup. To reach this menu, press the Menu key > M1 then the Down key until CPM is displayed.

Press the menu key (M1 thru M4) that is below the text: CPM. Two sub-menus are shown under the Cathodic Protection Menu. Press M1 to access the DATA menu and M2 for the ALARM menu.

Push M1 under the DATA menu and select ENABLE. Then select YES under the CPM ENABLE menu, only when a CPM unit is/will be attached to the Tank Sentinel tank gauge. Press M2 under the ALARM menu and select AMPS.

CPM Menu Notes:
1) Before programming, reference the State and Local Regulations about the interval of Cathodic Protection Monitoring / Survey Reporting and requirements.
2) Enter 80% of the output amperage level that was documented on the last UST 3-6 Month(ly) Survey Report and use this value as the current limit (amp) alarm setpoint.

For Example: 80% of 4.2 amps = 3.36 (used for the current alarm set-point)
CPM Menu (Continued ... FROM PREVIOUS PAGE)

CATHODIC PROTECTION DATA
CATHODIC PROTECTION DATA
ENABLE
CPM ENABLE
NO
YES
ADDRESS
CPM SENSOR ADDRESS
112

CONFIG
CPM SENSOR SETUP
CHECKING ADDRESS ...

Press M1 key.
Press M1 key.
Use UP/DOWN ▲▼ keys to show choices.
(select YES if a TS-CPM unit is installed)
Press ENTER to accept this data.
Press M2 key.
(ACCESSING this menu is not REQUIRED for SETUP)
Keep the default value (112)
Press M3 key.
(ACCESSING this menu is not REQUIRED for SETUP)
(The system is searching for the current address)

— Press the CANCEL key to display the CATHODIC PROTECTION Menu —

ALARM
CATHODIC PROTECTION ALARM AMPS
CPM CURRENT LIMIT
+10.0000

AMPS OG
CPM CURRENT LIMIT OUTPUT GROUP
NONE
GROUP A-FF
ALL GROUPS

Press M2 key. (Input 80% of the output amperage level that was documented on the last UST Survey Report)
Press M1 key. 0.0 to 10 amps
Use keypad to input a current limit number.
Press ENTER to accept this data.
Press M2 key.
(32 OGs available ... see Worksheet #19-1)
Not assigned to an Output Group (OG)
One OG selected (A=1st OG, FF=32nd OG)
All OGs selected
Use UP/DOWN ▲▼ keys to choose an OG.
Press ENTER to accept this data.

— Press the CANCEL key two times to display the SETUP Menu —
Worksheet #19-1 – Output Groups – Line Leak Tests

Fill-in the worksheet below. Compare assignments with other worksheets in the Setup Programming Manual/Addenda to uncover conflicts before programming the output devices.

<table>
<thead>
<tr>
<th>OG = Output Group</th>
<th>- Output Group Assignment WORKSHEET Output Group choices -</th>
</tr>
</thead>
</table>

- **CPM:** NONE
  - AMPS OG (Current Limit OG)

**Example:**

| AMPS OG | A | Activates Solid Annunciator (same as System Fail) |

Output Devices: Modulated Annunciator, Solid Annunciator, Relay 1, Relay 2, I/O Output Module
Channel # 1 to # ___ (record all OG Assignments in the vertical column)
The I/O Module menu appears when an optional 8-channel, external TS-CIM BriteBox™ is connected to the console.

For TS-2001/508 consoles only: an expanded version of this menu can appear if 1 or 2 optional, & internal TS-IEM I/O module PC boards are installed — for an additional 8 or 16 I/O channels.

NOTE: Solid state Input / Output modules can be installed in any channel. The installer must provide you with the module type, mode, name, and purpose of each channel number before you can program it!

Input-alarm can be assigned to activate output groups (and devices such as output modules, annunciators, and relays) and can also be setup to printout or send alarm reports. Output modules (and devices) will turn on/off in reaction to whatever output groups they are programmed to monitor.

NOTE: The External Input alarms are displayed along with SENSOR ALARMS.

Example:

Report and Alarm-display for input channel 4, which was renamed as OPEN BD 4 (BD = Back Door).
IIIIII/O Module Menu (CONTINUED... FROM PREVIOUS PAGE)

I/O MODULES
GRACE PER
I/O MODULE GRACE PERIOD 0 = NO GRACE PERIOD (Outputs ON until alarm clears)

0 to 120 minutes (enter an acceptable alarm-override time).
Pressing ACK will override the alarm-activated output module and start the grace period. An alarm-activated output module will then return to a no-alarm condition for the grace period. After the grace period is over, the module will reactivate if the alarm condition is still present. Set the grace period to a minimum amount of time (that is okay for all devices connected to an output). If no grace period is acceptable even to one device, then enter a 0 for no alarm override).

You must know what type of module is in each channel, what device it’s wired from/to, it’s intended purpose, and what should happen on alarm before you begin to program.

MODULE 1

Choose an I/O module channel (menu key).
Use UP/DOWN ▲ ▼ keys to show choices.

MODULE 8 (Up to 8 I/O MODULEs with TS-CIM BriteBox)

MODULE 9 (For TS-2001/508 only: 8 or 16 internal I/O MODULEs can be optionally added to TS-IEM PC boards)
Press ENTER to accept this data.

MODULE 16

Select I/O Module Mode of Operation
Use UP/DOWN ▲ ▼ keys to show choices.

N = I/O MODULE channel Number

INPUT ACTIVE HIGH
Line Leak Detector (input) DOES NOT appear with TS-LLDI consoles.
( option L in the part number ... press CHECK then M4)

For input modules only
(Change mode if incorrect)

INPUT ACTIVE LOW
Assign alarm to Output Group N.
(optional – input new name)
(document assignments in Worksheet # 20-1)

OUTPUT NORMALLY OPEN
Assign alarm to Output Group N.
(Change mode if incorrect)

OUTPUT NORMALLY CLOSED

LINE LEAK DETECTOR (input)

Assign alarm to Output Group N.
(optional – input new name)
(document assignments in Worksheet # 20-1)

Typical MODE Sub-menu

INPUT ACTIVE HIGH (default)
INPUT ACTIVE LOW
OUTPUT NORMALLY OPEN
OUTPUT NORMALLY CLOSED
LINE LEAK DETECTOR (input)
CAUTION  DO NOT use Leak Detection Sensors (i.e. TSP-ULS) with these assemblies or input modules.  These are not Intrinsically Safe (I.S.) or approved for this use.

3  LINE LEAK DETECTOR
   MODE
   LN NAME N
   LINE N
   FAIL OG
   LINE TEST FAIL OUTPUT GROUP N
   NONE (A to FF or ALL)

   For input modules only
   (Change mode if wrong)
   ___ (input line #)
   (N may not equal the channel number)

   Assign alarm to Output Group N.
   (document the assignment in Worksheet # 20-2)

4  OUTPUT NORMALLY OPEN
   MODE
   OUT GRPS

   I / O MODULE OUTPUT GROUPS N

   1 ___________________________ A
   A B C D E F G H I J K L M N O P Q R S T U V W X Y Z AA BB CC DD EE FF

   Fill-in Output Module Channel N – Alarm Group Assignments in following page(s)

5  OUTPUT NORMALLY CLOSED
   MODE
   OUT GRPS

   I / O MODULE OUTPUT GROUPS N

   1 ___________________________ A
   A B C D E F G H I J K L M N O P Q R S T U V W X Y Z AA BB CC DD EE FF

   Fill-in Output Module Channel N – Alarm Group Assignments in following page(s)

Example  I/O Output Module — OUTPUT GROUP Assignment  (shown filled-in)

| A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T | U | V | W | X | Y | Z | AA | BB | CC | DD | EE | FF |
| Y | Y | Y | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

   I / O MODULE OUTPUT GROUPS N
   Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y X
   1 ___________ 32
   A B C D E F G H I J K L M N O P Q R S T U V W X Y Z AA BB CC DD EE FF

   The 24TH group (Group X) is shown assigned Y

   Press:  M1 to move the cursor left  ⇦
   M2 to move the cursor right  ⇦
   M4 to backspace (delete) one character to the left  ⇦
   UP / DOWN ▲ ▼ to select (Y for yes assigned, or – (dash) for no not assigned)
   ENTER to store the setup into the system memory

— Continued on next page —
# Channel N Output Groups – Output Module Alarm Assignments

**NOTE** For modules assigned as Output Modules (output mode) only. Select / assign output group(s) to activate Channel N output module on alarm.

1. Fill-in Output Module Channel N = ______, Alarm Group Assignments Below:


Fill-in MODE: Output Normally ____________ OPEN or CLOSED (when not in alarm)

2. Fill-in Output Module Channel N = ______, Alarm Group Assignments Below:


Fill-in MODE: Output Normally ____________ OPEN or CLOSED (when not in alarm)

3. Fill-in Output Module Channel N = ______, Alarm Group Assignments Below:


Fill-in MODE: Output Normally ____________ OPEN or CLOSED (when not in alarm)

4. Fill-in Output Module Channel N = ______, Alarm Group Assignments Below:


Fill-in MODE: Output Normally ____________ OPEN or CLOSED (when not in alarm)

5. Fill-in Output Module Channel N = ______, Alarm Group Assignments Below:


Fill-in MODE: Output Normally ____________ OPEN or CLOSED (when not in alarm)

6. Fill-in Output Module Channel N = ______, Alarm Group Assignments Below:


Fill-in MODE: Output Normally ____________ OPEN or CLOSED (when not in alarm)

7. Fill-in Output Module Channel N = ______, Alarm Group Assignments Below:


Fill-in MODE: Output Normally ____________ OPEN or CLOSED (when not in alarm)

8. Fill-in Output Module Channel N = ______, Alarm Group Assignments Below:


Fill-in MODE: Output Normally ____________ OPEN or CLOSED (when not in alarm)
N = Output Module Channel Number (typical both pages)

9 Fill–in Output Module Channel N = ______, Alarm Group Assignments Below:

<table>
<thead>
<tr>
<th>A B C D E F G H I J K L M N O P Q R S T U V W X Y Z</th>
<th>AA BB CC DD EE FF</th>
</tr>
</thead>
</table>

Fill–in MODE: Output Normally ______________ OPEN or CLOSED (when not in alarm)

10 Fill–in Output Module Channel N = ______, Alarm Group Assignments Below:

<table>
<thead>
<tr>
<th>A B C D E F G H I J K L M N O P Q R S T U V W X Y Z</th>
<th>AA BB CC DD EE FF</th>
</tr>
</thead>
</table>

Fill–in MODE: Output Normally ______________ OPEN or CLOSED (when not in alarm)

11 Fill–in Output Module Channel N = ______, Alarm Group Assignments Below:

<table>
<thead>
<tr>
<th>A B C D E F G H I J K L M N O P Q R S T U V W X Y Z</th>
<th>AA BB CC DD EE FF</th>
</tr>
</thead>
</table>

Fill–in MODE: Output Normally ______________ OPEN or CLOSED (when not in alarm)

12 Fill–in Output Module Channel N = ______, Alarm Group Assignments Below:

<table>
<thead>
<tr>
<th>A B C D E F G H I J K L M N O P Q R S T U V W X Y Z</th>
<th>AA BB CC DD EE FF</th>
</tr>
</thead>
</table>

Fill–in MODE: Output Normally ______________ OPEN or CLOSED (when not in alarm)

13 Fill–in Output Module Channel N = ______, Alarm Group Assignments Below:

<table>
<thead>
<tr>
<th>A B C D E F G H I J K L M N O P Q R S T U V W X Y Z</th>
<th>AA BB CC DD EE FF</th>
</tr>
</thead>
</table>

Fill–in MODE: Output Normally ______________ OPEN or CLOSED (when not in alarm)

14 Fill–in Output Module Channel N = ______, Alarm Group Assignments Below:

<table>
<thead>
<tr>
<th>A B C D E F G H I J K L M N O P Q R S T U V W X Y Z</th>
<th>AA BB CC DD EE FF</th>
</tr>
</thead>
</table>

Fill–in MODE: Output Normally ______________ OPEN or CLOSED (when not in alarm)

15 Fill–in Output Module Channel N = ______, Alarm Group Assignments Below:

<table>
<thead>
<tr>
<th>A B C D E F G H I J K L M N O P Q R S T U V W X Y Z</th>
<th>AA BB CC DD EE FF</th>
</tr>
</thead>
</table>

Fill–in MODE: Output Normally ______________ OPEN or CLOSED (when not in alarm)

16 Fill–in Output Module Channel N = ______, Alarm Group Assignments Below:

<table>
<thead>
<tr>
<th>A B C D E F G H I J K L M N O P Q R S T U V W X Y Z</th>
<th>AA BB CC DD EE FF</th>
</tr>
</thead>
</table>

Fill–in MODE: Output Normally ______________ OPEN or CLOSED (when not in alarm)
Worksheet #20-1 – Output Groups – For External Inputs only

Fill-in the work sheet below and compare the assignments with other worksheets to uncover conflicts before programming output devices. (Fill in the Input modules CHANNEL number, MODE: Active HIGH or LOW and output Group assignments below).

<table>
<thead>
<tr>
<th>OG = Output Group</th>
<th>- Output Group Assignment -</th>
<th>WORKSHEET Output Group choices -</th>
</tr>
</thead>
<tbody>
<tr>
<td>IO MODULE (Input</td>
<td>modules only !)...</td>
<td>NONE</td>
</tr>
<tr>
<td>...External Inputs:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chnl #___ OUT GROUP</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chnl #___ OUT GROUP</td>
<td></td>
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</tr>
<tr>
<td>Chnl #___ OUT GROUP</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Example --

I/O Input Modules:

<table>
<thead>
<tr>
<th>Chnl # 3 OUT GROUP</th>
<th>G Could activate the Modulated Annunciator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chnl # 4 OUT GROUP</td>
<td>A Could activate Relay 2</td>
</tr>
</tbody>
</table>

Output Devices: Modulated Annunciator, Solid Annunciator, Relay 1, Relay 2, I/O Output Module Channel # 1 to # __ (record all OG Assignments in the vertical column)
Worksheet #20-2 – Output Groups – Line Inputs only

Fill-in the work sheet below and compare the assignments with other worksheets to uncover conflicts before programming output devices. (Fill in the Input modules CHANNEL number, and LINE number output Group assignments below).

Not with TS-LLD consoles (which have a L in the software part number... Press CHECK + M4 { OPTIONS } )

Output Devices: Modulated Annunciator, Solid Annunciator, Relay 1, Relay 2, I/O Output Module
Channel # 1 to # __ (record all OG Assignments in the vertical column)
Communication Ports Setup

**Contents:**
- Com Ports Menu
- Comm Port 1 Menu
- Comm Port 2 Menu
- Data Mode Menu
- Fax Mode Menu

The Tank Sentinel console can communicate directly to a POS terminal, or with an optional fax/data modem to IBM PCs or Fax machines. See the Installation, Operator’s, TroubleShooting Guides, and Application Notes for other reference material.

---

**Comm Ports Menu**

Press this key and follow the highlighted sequence below

**NOTE**

* The FAX/MODEM menu appears only when the optional hardware is installed and enabled. With the fax/modem feature and a dedicated telephone line, the Tank Sentinel can be programmed to automatically dial and send information off-site. Up to four different numbers can be auto-dialed in response to alarms.

Press **CHECK & M4 OPTIONS** to determine what is enabled or installed. When the data/fax modem is present (‘M’ on the hardware side, ‘D’ or ‘F’ on the sofware side), press **CHECK & M3 DIALTONE** to see if a dial tone is detected. Features can often can be enabled by entering a specific upgrade code(s). (See Chapter 23)

Whenever changing any **COM PORTS** setting/programming to make the new settings current, cycle console power off, and then wait 5 seconds before switching the console power back on.

Use **COMM PORT 1** for local connections to communications software programs on IBM PCs. Follow these steps to setup/program **COMM PORT 1**...

--- CONTINUED ON THE NEXT PAGE ---
COMM PORT 1 Menu (Continued...)

BAUD
BAUD RATE
9600 BAUD
300 BAUD
19,200 BAUD

Press **M2** key.

Use **UP/DOWN ▲ ▼** keys to show choices.

Press **ENTER** to accept this data.

DATA BITS
DATA BITS
8 BITS
7 BITS

Press **M3** key.

Use **UP/DOWN ▲ ▼** keys to show choices.

Press **ENTER** to accept this data.

STOP BITS
STOP BITS
1 STOP BIT
2 STOP BITS

Press **M4** key.

Use **UP/DOWN ▲ ▼** keys to show choices.

Press **ENTER** to accept this data.

— Press **DOWN ▼** key to show more menu items —

PARITY
PARITY
NO PARITY
ODD PARITY
EVEN PARITY

Press **M1** key.

Use **UP/DOWN ▲ ▼** keys to show choices.

Press **ENTER** to accept this data.

ECHO TEST
ECHO TEST ACTIVE...
HIT ANY KEY TO QUIT

Press **M2** key.

SECURITY
SECURITY CODE
(blank)

Press **M3** key.

_____ 6 characters

Use keypad to input a maximum of six characters.

Press **ENTER** to accept this data.

(used to limit access to the Tank Sentinel console (highly recommended)

— CONTINUED ON THE NEXT PAGE ——
**COMM PORT 2 Menu**

**NOTE**

Use COMM PORT 2 for remote connection to a POS terminal, or external modem, or to a Computer system / IBM PCs (this may require a null modem cable).

Go back to display this menu and press **M2** to access the Comm Port 2 menu.

**COMM PORT 2**

MODE
COMMUNICATIONS MODE
NATIVE
VEEDER ROOT

BAUD
BAUD RATE
9600 BAUD
300 BAUD
19,200 BAUD

DATA BITS
DATA BITS
8 BITS
7 BITS

STOP BITS
STOP BITS
1 STOP BIT
2 STOP BITS

PARITY
PARITY
NO PARITY
ODD PARITY
EVEN PARITY

ECHO TEST
ECHO TEST ACTIVE...
HIT ANY KEY TO QUIT

**NOTE**

Cycle console power on and off after programming is done, or after any COMM PORTS setting is changed. Also, when the data / fax modem is present, press **CHECK & M3 DIALTONE** to see if a dial tone is detected.

ACCESS CODE or PHONE No. AT Command

Characters:  
D = ( )  comma = dial delay

--- CONTINUED ON THE NEXT PAGE ---
COMM PORT 2 Menu (Continued...)

AUTODIAL
   COMM 2 AUTODIAL
      NUMBER 1
      NUMBER 2
      NUMBER 3
      NUMBER 4

   COMM 2 NUMBERS N
   ACCESS CD
      ACCESS CODE N
      blank

   PHONE NUM
      PHONE NUMBER N
      blank

(Automatically dials up to 4 numbers when Deliveries, Alarms or Leaks occur)

Program numbers below:

(N = number 1, 2, 3, or 4)

(Use the Access Code field when phone number is longer than 12 characters - see example)

Use keypad to input access code. Press ENTER to accept this data.

(Input the phone number to autodial)

Use keypad to input phone number. Press ENTER to accept this data.

ACCESS CODE or PHONE No. AT Command Characters:

D = (, ) comma = Dial Delay

Example — 88DD88DD912072830156 (20 character phone number)

‘Switching code’=88 Dial Delays=DD
“to dial out”=9 “long distance”=1

Access Code: 88DD88DD91 (10) Phone Number:2072830156 (10)

(Enabled allows re-dialing of the phone number)

Press UP/DOWN ▲▼ keys to show choices

Press ENTER to accept this data.

— Press the CANCEL key to return to the COMM 2 AUTODIAL Menu —
— Press the DOWN ▼ key to show more menu items —

— CONTINUED ON THE NEXT PAGE —
COMM PORT 2 Menu (Continued...)

DELIVERY
DELIVERY DIAL STRING
blank

(Report Deliveries to:)
_____ up to 4 numbers

ALARMS
ALARM DIAL STRING
blank

(Report Alarms to:)
_____ up to 4 numbers

LEAKS
LEAK DIAL STRING
blank

(Report Tank Leaks to:)
_____ up to 4 numbers

LINES
LINE DIAL STRING
blank

(Report Line Leaks to:)
_____ up to 4 numbers

— Press the DOWN ▼ key to show more menu items —

SCALD
SCALD DIAL STRING
blank

(Report SCALD Tank Leaks to:)
_____ up to 4 numbers

SECURITY
SECURITY CODE
blank

(Input a security code to limit access to the Tank Sentinel console data base ...highly recommended)
_____ up to 6 characters

DATA MODE Menu

COMM PORTS
COMM 1   COMM 2   FAX/MODEM *

M1   M2   M3   M4

FAX/MODEM *
DATA MD FAX MODE *

M1   M2   M3   M4

DATA MODE
MODE
COMMUNICATIONS MODE
NATIVE
VEEDER ROOT

Press M1 key.

Use UP/DOWN ▲▼ keys to show choices.
Press ENTER to accept this data.

NOTE
Cycle console power on and off after programming is done, or after any COM PORTS setting is changed. Also, when the data / fax modem is present, press CHECK & M3 DIALTONE to see if a dial tone is detected.

Use the DATA MODE – internal Tank Sentinel modem – for remote connection to IBM PCs.

Go back / display these menus (at left) and press M3 and then M1 to access Data Mode.

— CONTINUED ON THE NEXT PAGE —
DATA MODE Menu (Continued...)

AUTODIAL
DATA AUTODIAL
  NUMBER 1
  NUMBER 2
  NUMBER 3
  NUMBER 4

  DATA NUMBERS N
  ACCESS CD
    ACCESS CODE N
      blank

  PHONE NUM
  PHONE NUMBER N
    blank

Press M2 key.

(Automatically dials up to 4 numbers when Deliveries, Alarms or Leaks occur.)

Program numbers below:

(N = number 1, 2, 3, or 4)

(Use the Access Code field when phone number is longer than 12 characters - see example)

Use keypad to input access code. Press ENTER to accept this data.

Use keypad to input phone number. Press ENTER to accept this data.

ACCESS CODE or PHONE No. AT Command Characters:
  D = ( , ) comma = Dial Delay

Example — 88DD88DD912072830156 (20 character phone number)

'Switching code'= 88 Dial Delays= DD
"to dial out"= 9 "long distance"= 1

Access Code: 88DD88DD91 (10) Phone Number: 2072830156 (10)

REDIAL EN
  REDIAL ENABLE N
    DISABLED
    ENABLED

(ENABLED allows re-dialing of the phone number)

Use UP/DOWN ▲ ▼ to show choices.

Press ENTER to accept this data.

— Press the CANCEL key to return to the DATA AUTODIAL Menu —
— Press the DOWN ▼ key to show more menu items —

— continued on the next page —
DATA MODE Menu (Continued...)

DELIVERY
DELIVERY DIAL STRING
    blank
    (Report Deliveries to:)
    _____ up to 4 numbers
    Use keypad to input string.
    Press ENTER to accept this data.

ALARMS
ALARMS DIAL STRING
    blank
    (Report Alarms to:)
    _____ up to 4 numbers
    Use keypad to input string.
    Press ENTER to accept this data.

LEAKS
LEAK DIAL STRING
    blank
    (Report Tank Leaks to:)
    _____ up to 4 numbers
    Use keypad to input string.
    Press ENTER to accept this data.

LINES
LINE DIAL STRING
    blank
    (Report Line Leaks to:)
    _____ up to 4 numbers
    Use keypad to input string.
    Press ENTER to accept this data.

SCALD
SCALD DIAL STRING
    blank
    (Report SCALD Tank Leaks to:)
    _____ up to 4 numbers
    Use keypad to input string.
    Press ENTER to accept this data.

SECURITY
SECURITY CODE
    blank
    (Input a security code)
    _____ up to 6 characters
    Use keypad to input security code.
    Press ENTER to accept this data.
    (access code – limit – access to the Tank Sentinel console data base ...this is highly recommended)

AUTO ANS
NUMBER OF RINGS TO AUTO ANSWER
    1
    (Input a number of rings to try before hang up)
    _____ 1 - 9 rings
    Use keypad to input a number.
    Press ENTER to accept this data.

--- FAX MODE Menu on next page ---
FAX MODE Menu

Use the optional internal fax/modem to send reports to remote Fax machines.

Go back / display this menu (at left) and press M3 and M2 to access these menus.

Automatically FAX up to 4 numbers when Deliveries, Alarms, Reports, Line Tests or Leak Test occur

(N = number 1, 2, 3, or 4)

(Use the Access Code field when phone number is longer than 12 characters - see example)

Use keypad to input access code. Press ENTER to accept this data.

(Input a FAX phone number)

Use keypad to input FAX number. Press ENTER to accept this data.

(Fax/Modem retries several times when busy)

Access Code or PHONE No. AT Command Characters:

D = ( , ) comma = Dial Delay

Example — 88DD88DD912072830156 (20 character phone number)

‘Switching code’=8 8 Dial Delays=DD
“to dial out”=9 "long distance”=1

Access Code: 88DD88DD91 (10) Phone Number: 2072830156 (10)
FAXMODE Autodial menu (CONTINUED...)

— Press the CANCEL key to return to the FAX AUTODIAL Menu —

— Press DOWN ▼ key to show more menu items —

DELIVERY
DELIVERY FAX STRING

(Fax Deliveries to)

_____ up to 4 numbers
Use keypad to input a FAX string.
Press ENTER to accept this data.

ALARM
ALARM FAX STRING

(Fax Alarms to)

_____ up to 4 numbers
Use keypad to input a FAX string.
Press ENTER to accept this data.

LEAK
LEAK FAX STRING

(Fax Tank Leaks to)

_____ up to 4 numbers
Use keypad to input a FAX string.
Press ENTER to accept this data.

LINE
LINE FAX STRING

(Fax Line Leaks to)

_____ up to 4 numbers
Use keypad to input a FAX string.
Press ENTER to accept this data.

SCALD
SCALD FAX STRING

(Fax SCALD Tank Leaks to)

_____ up to 4 numbers
Use keypad to input a FAX string.
Press ENTER to accept this data.

REPORTS
REPORT FAX STRING

(Send Manual Reports – from the keypad – or Automatic Scheduled Reports to)

_____ up to 4 numbers
Use keypad to input a FAX string.
Press ENTER to accept this data.

___ FAX Strings reference sets of remote access and phone numbers (NUMBERS 1 thru 4) that are programmed in the AUTODIAL menu. For example: Input a 1 2 to automatically FAX to phone numbers 1 and 2. Duplicates (ie 11) are not allowed.

— Press DOWN ▼ key to show more menu items —

— Press the CANCEL key 4 times to return to the main SETUP Menu —
### Compliance Via Sensors (CVS)

#### SETUP PROGRAMMING

**Contents:**
- CVS Menu
- Before Programming
- CVS Tanks Menu
- CVS Lines Menu

See the Table of Contents to find topics in this manual. See the Preface for general information about this manual. And see the Installation, Operator’s, TroubleShooting Guides, and Application Notes for other reference material.

---

**CVS Menu**

![Menu Options]

Press the **DOWN** key until **CVS** is displayed - alignment with menu keys depends on the programming of other features.

**Before Programming:**

- Have the power switched ON at the Tank Sentinel Console and at the power panel.
- Reference the INCON CVS Manual (INCON PN: 000-1095) for details about this feature.
- From the SETUP>SYSTEM menu – program the units of measure, correct number of tanks, and correct number of leak detection sensors. Also, program the: sentinel mode limits, delivery delay, report delivery and alarm, and the max size of the historical records that will used in reports.

**Character input / editing:**

- Push **UP/DOWN** keys ▲▼ to show more menus or menu selections.
- Use menu keys (**M1** to **M4**) to access menus.
- Press **ENTER** to accept a selection or input a value into the setup configuration memory.
- Press **CANCEL** to cancel data entry.
- Press **M1** to move the cursor left ▼←
- Use **M2** to move the cursor right →
- Press **M4** to backspace (delete) one character to the left ▼←

---

CVS TANKS

TANK 1

Press the **M1** key.

--- CONTINUED ON NEXT PAGE ---
CVS Tanks Menu

After programming the maximum number of sensors from the SYSTEM menu, access the CVS Tanks menu and program each sensor to associate it with a particular tank.

- The default programming is 0 (no sensor is associated with a Tank)
- SCALD or Standard Monthly tank leak testing is not disabled by CVS for tanks
- A sensor can be associated with single or multiple (compartmental) CVS tank(s)
- The maximum number of sensors is determined by No. Sensors (number of sensors) specified-programmed in the SYSTEM menu
- A sensor that is associated to a CVS tank must be physically present (wired to the Tank Sentinel Console — at sensor channel number N). See the console I.S. Sensor PC Board to verify which channels are used/wired-to, and TABLE 2 at the back of this manual...
- A sensor cannot be associated to both a line and tank (sensors must be associated to either a Tank or Line)
- A SENSOR UNAVAILABLE error message is displayed if any of the above error conditions (italic) are present

Press the MENU key and press:

SETUP  Press the M1 key under the word SETUP
Press the M key under the word CVS
Press the M1 key under the word TANKS at the Compliance Via Sensors menu

CVS TANKS (MORE)

TANK 1  TANK 2  TANK 3  TANK 4  First display menu
TANK 5  TANK 6  TANK 7  TANK 8  Second display menu

Press the Menu Select key under the Tank N, or press the DOWN Key if (MORE) is shown in the second display menu for TANKS 5 to 8 (only on consoles that accept more than 4 tanks)

COMPLIANCE SENSOR CVS TANK N (N = Tank number)

0  1 - 32

Use keypad to input the sensor number that is associated with this particular tank.
Press ENTER to accept this data.

NOTE  A sensor may be enabled for more than one tank. The CVS feature is enabled when a sensor is associated with a CVS tank or line under the CVS menu.

— Repeat for each TANK number —

— Press the CANCEL key to return to the previous menu —
CVS Lines Menu

After programming the maximum number of sensors from the SYSTEM menu, access the CVS Lines menu and program each sensor to associate it with a particular line.

- The default programming is 0 (no sensor is associated with a Line)
- The TS-LLD (line leak detector) is not disabled by CVS for lines
- Up to 4 different sensors (Sensor A – D) can be associated with a single line
- Sensors can only be associated to one line
- The maximum sensor number is determined by No. Sensors (number of sensors) under the SYSTEM menu
- A sensor that is associated to a CVS line must be physically present (wired to the Tank Sentinel Console – at sensor channel number N). See the console I.S. Sensor PC Board to verify which channels are used/wired-to
- A sensor cannot be associated to both a Tank and Line
- A SENSOR UNAVAILABLE error message is displayed if any of the above error conditions (italic) are present

Press the MENU key and press:

SETUP  Press the M1 key under the word SETUP
       Press the M key under the word CVS
       Press the M2 key under the word LINES at the Compliance Via Sensors menu

CVS LINES

<table>
<thead>
<tr>
<th>LINE 1</th>
<th>LINE 2</th>
<th>LINE 3</th>
<th>LINE 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>LINE 5</td>
<td>LINE 6</td>
<td>LINE 7</td>
<td>LINE 8</td>
</tr>
</tbody>
</table>

First display menu

Second display menu

Press the Menu Select key under the LINE N, or press the DOWN Key if (MORE) is shown in the second display menu for LINES 5 to 8 (only on consoles that accept more than 4 lines)

COMPLIANCE SENSOR CVS LINE N (N = Line number)
SENSORS A, B, C, D...

COMPLIANCE SENSOR A  Press the M1 key.
COMPLIANCE SENSOR A CVS LINE 1

Use keypad to input the sensor number that is associated with this particular line.
Press ENTER to accept this data.

— Repeat for each SENSOR letter and for each Line number —

— Press the CANCEL key to return to the previous menu —
Prior to Enabling TPI, the System configuration for Number of Tanks is required.

Character input / editing:
- Use \( \uparrow \) \( \downarrow \) \( \uparrow \) \( \downarrow \) keys to display more menus - (MORE) or selections (UP /DN)
- Press the CANCEL key to cancel data entry
- Press the ENTER key to accept data entry
- Press menu keys (M1 to M4) to access menus.
- Press M4 to backspace (delete) one or more characters to the left

TPI ENABLE (user entry)

TPI may be aligned with any of the menu keys (M1 — M4), depending on what other features are programmed or enabled. For this example, TPI is aligned with the M1 key....

Press the M1 key to display the TPI menu.

Here is the main TPI menu display.

Press the M1 key to display the TPI ENABLE user entry field. The default selection is NO.

Use the UP / DOWN \( \uparrow \) \( \downarrow \) keys to change the selection to YES. Choose YES to enable TPI programming and subsequent menus.

Press the ENTER key to accept data entry. The display returns to the TPI menu, which now shows the PUMP and GROUP menus.
TPI PUMP Menu(s)

- AUTO CFG (user entry)
- NO. PUMPS “READ ONLY”
- PUMP N Menu(s) (both)

AUTO CFG (user entry)

The main TPI menu shows ENABLE, PUMP and GROUP ....

Press the M2 key to display the PUMP menu.

The TPI PUMP menu only shows AUTO CFG ....

Press the M1 key to start the AUTO CFG process.

The TPI PUMP menu now shows AUTO CFG, PUMP 1, PUMP 2, ....

---

AUTO-COMFIGURATION NOTE

The AUTO CFG function is used to invoke the routines which query the TPI for the number of pump controllers attached to the TPI and other controller and pump related information.

When AUTO CFG is started, the tank gauge to scans the TPI for all pump controllers attached to the TPI. For each controller found, a corresponding pump number will be displayed (e.g. if the TS-TPI finds two controllers, there will be a Pump 1 and a Pump 2). Their types will be stored in the TYPE menu configuration variable and the number of controllers will be stored in the NO. PUMPS configuration variable.

The Auto-Configuration process will automatically update the following READ ONLY configuration settings:

- NO. PUMPS (in System Menu)
- PUMP TYPE
- PUMP GROUP
- PUMP ADDRESS
- GROUP TYPE

---

— Please confirm the system recognized the correct number of pumps —

— Press the CANCEL key three times to return to the System Menu —

— Use the “Number of Pumps” menu, which is described on the next page —
**Number of Pumps Menu**

The number of pumps information is displayed under the SYSTEM menu. Return to the main SETUP MENU display, which shows ....

**READONLYNOTE**

Fields that display the words “READ ONLY” in the upper right corner have been automatically updated by the Auto-Configuration process. These fields are not editable. The next Auto-Configuration process will over-write these fields and values.

**NO. PUMPS “READONLY”**

Here is the main SETUP MENU display.

Press the M2 key to display the SYSTEM menu.

Press the DOWN ▼ key to until NO.PUMPS is displayed ....

Here is the SETUP INFO display.

Press the M3 key to display the number of pumps information ....

The number displayed represents the number of pump controllers that the TPI device has detected, therefore, it is also the number of pumps.

The data on display ("2") was generated from Auto-Configuration. This is a "READ ONLY" field. The data cannot be edited.

— Press the CANCEL key twice, to return to the SETUP MENU menu —

— Proceed to the Pump N Menu(s) section, which is described on the next page —
Pump N Menu(s)

- NAME (user entry)
- TYPE “READ ONLY”
- GROUP “READ ONLY”
- ADDRESS “READ ONLY”
- TANK (user entry)
- HEIGHT (user entry)

NOTE

READ ONLY NOTE

Fields that display the words “READ ONLY” in the upper right corner have been automatically updated in by the Auto-Configuration process. These fields are not editable. The next Auto-Configuration process will over-write these fields and values.

In the following examples, “N” represents any pump number - 1, 2, 3 and so on.

NAME (user entry)

The PUMP N menu displays six subsequent fields, including TANK and HEIGHT (scroll down)....

Press the M1 key to display the NAME PUMP N user entry field ....

The default name of ‘PUMP 1’ is displayed ....

Press the M4 key to backspace and erase the ‘PUMP 1’ default name.

Use the keypad to enter a unique name for each pump, up to 8 characters long.

Remember:

- Use the SHIFT key to change the keypad from A...M to N...Z and to (numeric) 1-9, 0, , +/-, and SPACE (a blank space)

Press the ENTER key to accept data entry.

The display returns to the PUMP N menu.
Repeat these steps for each pump.

— Proceed to the next menu - TYPE —
— PUMP N Menu continued —

**TYPE “READ ONLY”**

Here is the PUMP N menu.

Press the M2 key to display the TYPE PUMP N “READ ONLY” field ....

In this example, type ‘VFC’ is displayed .... There are five types of controllers- VFC, SC, SCIII, SCI and VFCIV.

— Press the CANCEL key to return to the PUMP N menu —

— Proceed to the next menu - GROUP —

**GROUP “READ ONLY”**

Here is the PUMP N menu.

Press the M3 key to display the GROUP PUMP N “READ ONLY” field ....

In this example, group “2” is displayed .... The group value may be 1 to 4. This menu item defines which group or TS-TPI port number is attached to which pump. A value of 1, 2, 3 or 4 will indicate that the controller is on that port. Any Line Leak Detectors will be on Group 1, therefore the first pump group is 2.

— Press the CANCEL key to return to the PUMP N menu —

— Proceed to the next menu - ADDRESS —
This will allow a pump to be associated with a tank. If the pump is not associated with a tank (i.e. for level monitoring by the tank gauge), then NONE may be chosen, but this will disable some features of the pump controller interface for that controller. If a tank has multiple pumps in it, more than one controller may be associated with the tank.

--- PUMP N Menu continued ---

ADDRESS "READ ONLY"

The PUMP N menu shows NAME, TYPE, GROUP and ADDRESS menus....

Press the M4 key to display the ADDRESS PUMP N "READ ONLY" field ....

In this example, address "0" is displayed .... The address range is from 0-31.

--- Press the CANCEL key to return to the PUMP N menu ---

--- Proceed to the next menu - TANK ---

--- Press the DOWN ▼ key to display the TANK and HEIGHT user entry menus ---

TANK (user entry)

Here is the PUMP N menu, showing TANK and HEIGHT menus....

Press the M1 key to display the TANK ASSOCIATION PUMP N user entry field ....

The default TANK ASSOCIATION number ‘0’ is displayed ....

The user selects the tank number associated with PUMP N. The values range from 0 - 8 (0=none, or the maximum number of tanks available for this ATG type).

Use the keypad to enter the tank number.

Press the ENTER key to accept data entry.

The display returns to the PUMP N menu. Repeat the user entry steps for each tank.

--- Proceed to the next menu - HEIGHT ---
Here is the PUMP N menu, showing TANK and HEIGHT menus....

Press the M2 key to display the HEIGHT PUMP N user entry field....

The default HEIGHT of ‘+7.0’ (inches) is displayed....

Press the M4 key to backspace and erase the ‘+7.00000’ default height number.

Use the keypad to enter the height value.

Press the ENTER key to accept data entry.

The display returns to the PUMP N menu showing TANK and HEIGHT.

To repeat these steps for the next pump:

- Press the CANCEL key to display the TPI PUMP menu, which displays AUTO CFG, PUMP 1, PUMP 2 ....
- Repeat each Pump N Menu step for every PUMP number.

When these entries are completed....

- Press the CANCEL key to display the main TPI menu, which displays ENABLE, PUMP and GROUP.

— Proceed to the next menu - TPI Group —
**TPI Group Menu**

- **TYPE** “READ ONLY”
- **MODE** (user entry)
- **RESERVE** (user entry)

**TYPE **“READ ONLY”

The main TPI menu displays ENABLE, PUMP and GROUP ....

Press the **M3** key to display the TPI GROUP menu ....

Here is the TPI GROUP menu displaying GROUP numbers 1 to 4 ....

Press the (M ) key of the group number to be displayed. For this example, press **M2** to display the GROUP 2 menu ....

Here is the GROUP 2 menu displaying TYPE and MODE ....

Press the **M1** key to display the TYPE of group as detected during Auto-Configuration. This is a READ ONLY field.

In this example, the type ‘MAST SLAV’ is displayed ....

Press the **CANCEL** key to return to the GROUP 2 menu.

To repeat the user entry steps for each group, press **CANCEL** again to display the TPI GROUP menu.

— Proceed to the next menu - **MODE** —

**NOTE** Please read the Notes on the following page to gain a better understanding of the Mode and Reserve features.
**Mode “User Entry” Note**

MODE allows the operator to select which Level Management mode to use for a particular group. The choices are NONE, LEVELING, and PRIORITY:

- Selecting NONE sets NO level management mode for the Group. (no Reserve to enter) This is used for Stand Alone Groups.
- Selecting the LEVELING mode seeks to maintain an equal level of fuel in each tank by placing pump controllers associated with the tank containing the most amount of fuel to a high priority. This will force the pump with the highest level of fuel to activate when the dispenser switch is activated. (no Reserve to enter)
- Selecting the PRIORITY option enables a mode that seeks to drain one tank before the other tank(s). Only when the PRIORITY mode is selected will the RESERVE menu appear.

**Reserve Configuration Note**

RESERVE is set after choosing the PRIORITY MODE. This entry sets the reserve level of fuel remaining in the tank. The programming defines this percentage as an ‘empty’ tank and is programmed in % full.

For example, setting the Reserve to 20% means, when the tank is 20% full it is considered ‘empty’. This will trigger two events; the ATG will command a different pump to start pumping fuel from a different tank and disables the pump in the tank that has reached its Reserve. This helps to prevent the faults Dry Run and Pump in Water.

**Mode Type and Reserve Note**

The STND ALON “type” designates the GROUP as a Stand Alone Group without any Master/Slave associations. The group consists of only one pump and one controller. The menus MODE and RESERVE are not enabled for Stand Alone TYPE. This completes Setup Programming for this type.

The MAST SLAV “type” designates the GROUP as a Master/Slave configuration. The group consists of more than one pump controller. This “type” is further defined by the kind of Level Management “mode” - either Leveling or Priority. If Priority is selected, the user is required to enter a value for RESERVE.
MODE (user entry)

Here is the MODE GROUP 2 user entry field display. NONE is the default setting ....

Use the UP / DOWN ▲▼ keys to change the default mode and scroll through the other modes - LEVELING and PRIORITY ....

Press the ENTER key to accept data entry. This entry returns the display to the GROUP N menu.

If PRIORITY is selected, Proceed to the RESERVE menu, which is described next ....

RESERVE (user entry)

Here is the GROUP 2 main menu, displaying TYPE, MODE and RESERVE ....

Press the M3 key to display the RESERVE menu ....

The RESERVE user entry field displays the “percent full” value for GROUP 2 (in Priority mode). The default setting is 20.

Press the M4 key to backspace and erase the default percent value. This will clear the field.

— continued on the next page —
— RESERVE Group N Menu continued —

Use the keypad to enter a percent value for each group.

Press the **ENTER** key to accept data entry.
This entry returns the display to the GROUP N menu, displaying TYPE, MODE and RESERVE.

Press the **CANCEL** key to return to the TPI GROUP menu, displaying GROUP 1 to GROUP 4.

Proceed to the next group number menu.
Repeat the steps above to set the reserve percent for each group that is in Priority Mode.

When setup programming is completed, follow the Exiting Setup Mode steps (next) to return the Tank Sentinel back to the Run Mode.

**Exiting Setup Mode**

EXIT SETUP (user entry)

Press the **CANCEL** key to return to the main TPI menu, which displays ENABLE, PUMP and GROUP.

This completes the Setup Programming for the TPI device.

Press the **CANCEL** key to return to the TPI SETUP MENU menu, which displays TPI.

Press the **CANCEL** key to return to the main SETUP MENU menu, which displays EXIT, SYSTEM, TANKS and PROBES.

Press the **M1** key under the word EXIT to return the Tank Sentinel to RUN MODE.
Additional hardware and/or software features can be added to the Tank Sentinel system by ordering a **TS-UPGRADE**. Read this entire chapter before attempting to upgrade the Tank Sentinel system. Setup programming is required after the upgrade is performed.

**WARNINGS —**
- Do not attempt an upgrade without the correct upgrade password and 3 upgrade strings (codes)!
- Repeated upgrade attempts that fail will damage the equipment!
- Avoid unauthorized upgrade attempts!
- Upgrade codes can be used only once!

Exact instructions and a unique upgrade password and upgrade strings will be sent to you on receipt of:
1) Your Purchase Order number
2) Console Serial Number (verify that it is correct)
3) Hardware requirement(s)
4) Software requirement(s)
5) Your Name and Shipping Address
   A FAX-transmittal can be sent upon request... provide your Fax number

*The upgrade instructions that are sent to you are both console and serial-number specific. The upgrade will, therefore, not work with any other console!*

*Verify that the input password is correct before pressing the ENTER key.*
See the next page for a keypad key review.
Press the **ACK SHIFT** Key to toggle between input character type (#1) & (#3) then press the Key of choice.

- **#1**: input a letter
- **#2**: N...Z
- **#3**: input a number or a special character

**NOTE**

Typical Key

Keypad Key Use – Review:
- Press **CANCEL** to cancel an input
- Press **M4** to backspace over / delete one character to the left of the cursor ⇐
- Press **M2** to move the cursor right ⇒
- Press **M1** to move the cursor left ⇐
- Use the **ENTER** key to accept / enter data
- Press the **ACK SHIFT** key to toggle between the input types: an A...M letter (#1) and numeric (#3). Hexadecimal letters A thru F – or – numeric inputs 0 thru 9 are allowed. (0 = zero).

Upgrade Menu

**WARNING – ILLEGAL UPGRADE ATTEMPTS WILL DAMAGE THE SYSTEM!**

Upgrade Steps:

1. Use the keypad to input and enter the upgrade password that was provided.

( **Note:** spaces are inserted automatically )

See this example at left, and the next display (if an upgrade code is incorrect)
This message will be displayed if an incorrect password was entered.

See the WARNING on page 1 of this Chapter ...verify that the upgrade password is entered correctly before you press the ENTER key!

This message is displayed when the upgrade password was entered correctly, and after each upgrade string is entered.

System Upgrade Function

**String 1** ............................................................
Press M1 to input upgrade string # 1
(see example below-left)

**String 2** ............................................................
Press M2 to input upgrade string # 2

**String 3** ............................................................
Press M3 to input upgrade string # 3

5) Press the M1, M2 & M3 keys again and verify that all of the upgrade strings are correct before you press M4 under RUN. Correct any upgrade string as necessary.

6) Press M4 under RUN choice to “run” the upgrade after all of the strings have been verified correct.

When the upgrade is successful, the Tank Sentinel console will display this fact. It will then reboot and enter the setup mode automatically...

7) Access the new / expanded menu(s) and program the console to operate with these new upgrade features.

If an upgrade is not successful, this message is displayed (setup data is illegal).

A Transient Watchdog Time-out Warning will appear. Press the ACK key to acknowledge the warning and it will clear.
Language Menu

Contents:
Language Selection Menu
Language Selection Notes

See the Table of Contents to find topics in this manual. See the Preface for general information about this manual. See the Installation, Operator’s, TroubleShooting Guides and Application Notes for other reference sources.

Language Menu

Press this key and follow the highlighted sequence below

SELECT MENU OPTION
SETUP UPGRADE LANGUAGE DATALOG

M1 M2 M3 M4

SELECT LANGUAGE
ENGLISH FRENCH SPANISH PORTUGUESE

M1 M2 M3 M4

ENGLISH SELECTED

FRENCH SELECTED

SPANISH SELECTED

PORTUGUESE SELECTED

Language Notes

- English is the Factory Default language for the Tank Sentinel® system.
- Press a menu key M1 — M4 to select another language for the system to use.
- The System language is used for all Reports, Faxes, and Displays.
- A language selection is used immediately by the system.
- To change the Language used by the system back again, access this menu and press the appropriate menu key M1 — M4 (the position of the languages are fixed... English is above the M1 menu key).
Data Log Menu

Contents:
Data Log Menu
Data Logging Notes

See the Table of Contents to find topics in this manual. See the Preface for general information about this manual. See the Installation, Operator’s, TroubleShooting Guides and Application Notes for other reference sources.

Data Log Menu

Press this key and follow the highlighted sequence below

Data Logging Notes

This menu can be ignored unless diagnostic tank data is required.

- In order to access this menu: a 9 pin communications cable must be plugged into Comm Port 1 or Comm Port 2 at the Tank Sentinel console (the other end plugs into a serial communications port of a IBM compatible computer).

  This must be done with power off at the computer and Tank Sentinel console.

- Instructions and requirements about this feature will be supplied by INCON Technical Service.

Press a menu select key (M1 thru M4) to choose a tank. Use UP / DOWN for more tanks (TS-2001/508 consoles can monitor up to 8 tanks).
Display Menu

**NOTE**  The **DISPLAY** menu appears only when one or more of the following optional features is enabled: CPM, AST, SCALD, TPI and/or AL-LLD.

---

**Navigation**

Follow these navigation steps to show the **DISPLAY** menu of your choice:

Press the **DOWN ▼** key once ....

Press the **(M)** key below the word **DISPLAY** to show enabled menu options: CPM, AST, SCALD, PUMPS and/or AL-LLD. (each menu appears only when an individual feature is enabled ** **) 

Press the **M1 - M4** key under any of these menu options to display the data and information you are seeking.

---

**Display Notes**

- The **DISPLAY** menu shows a variety of updated information, which may be viewed at any time
- The information is used to assist technicians and INCON Tech Services in diagnosing problems
- **DISPLAY** information may also be found on reports
- The **DISPLAY** menu only appears if one or more listed individual features is enabled
- ** ** Enabled individual features are:
  - CPM - enable CPM under the SETUP MENU, enter “YES”
  - AST - enable one or more Pressure probes under the PROBES menu
  - SCALD - enabled by I.D. Chip as a software option (see “S” in part number)
  - PUMPS - enable TPI and perform AUTO CFG to “find” one or more pumps
  - AL-LLD - enable LLD under the SYSTEM menu, enter one or more “NO. LINES” and enable TPI

---

**— continued on the next page —**
DISPLAY Navigation/Descriptions (CONTINUED... FROM PREVIOUS PAGE)

Descriptions —

Please read the following descriptions of each DISPLAY menu:

**CPM** — shows the current state of the system: VOLTS, AMPS and STATUS

```
CPM  VOLTS  AMPS  STATUS
     15.4    8.7    OK
```

**AST** — shows current pressure reading for each pressure probe: PSI

```
AST  PROBE N  PSI
     0.54
```

**SCALD** — shows the current status and algorithm version

```
SCALD  TANK1  TANK2
       0.02    0.02
```

**PUMPS** — shows many readings from a Turbine Pump Controller

Special PUMPS navigation —

• Press the (M) key aligned below the word PUMPS,

```
SETUP MENU OPTION
  SCALD  PUMPS
    M1    M2    M3    M4
```

• Press the (M) key under each pump number,

```
SELECT PUMP
  PUMP 1  PUMP 2  PUMP 3  (MORE)
    M1    M2    M3    M4
```

(In this example, press the M1 key for PUMP 1 data)
**Pump DISPLAY examples:**

Each controller type will vary in the available data that can be displayed. The example below is for the SCI controller. Here is the first display of three possible (typical) data displays...

<table>
<thead>
<tr>
<th>PUMP 1</th>
<th>STATUS</th>
<th>FAULT</th>
<th>VOLTS</th>
<th>CVOLTS1</th>
</tr>
</thead>
<tbody>
<tr>
<td>PUMP N</td>
<td>0071</td>
<td>00</td>
<td>204</td>
<td>201</td>
</tr>
</tbody>
</table>

- Press the **DOWN▼** key to scroll through the data displays.

<table>
<thead>
<tr>
<th>PUMP 1</th>
<th>AMPS1</th>
<th>C AMPS1</th>
<th>WATTS</th>
<th>C WATTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>PUMP N</td>
<td>6.5</td>
<td>6.5</td>
<td>1140</td>
<td>1140</td>
</tr>
</tbody>
</table>

- Press the **DOWN▼** key to scroll through the data displays.

<table>
<thead>
<tr>
<th>PUMP 1</th>
<th>DIPSW</th>
<th>SREV</th>
</tr>
</thead>
<tbody>
<tr>
<td>PUMP N</td>
<td>FFFB</td>
<td>103</td>
</tr>
</tbody>
</table>

- Press the **CANCEL** key to return to the SELECT PUMP menu.

See Appendix E for detailed explanations of this data.

--- continued on the next page ---
**DISPLAY Navigation/Descriptions (CONTINUED... FROM PREVIOUS PAGE)**

**AL-LLD** — shows the current status of the line leak sensing units via the LS 300

Special AL-LLD navigation —

- Press the (M) key aligned below AL-LLD,

- Press the (M) key under each LINE number,

  ![Select Menu Option](image)

  ![Select Line](image)

  (In this example, press the M1 key for LINE 1 data)

**AL-LLD DISPLAY example:**

Each controller type will vary in the available data that can be displayed. The example below is for the SCI controller. Here is typical information displayed for each line number....

<table>
<thead>
<tr>
<th>LINE 1</th>
<th>STATUS</th>
<th>PRESSURE</th>
<th>TEST</th>
<th>STATUS</th>
</tr>
</thead>
<tbody>
<tr>
<td>LINE 1</td>
<td>OK</td>
<td>30.5</td>
<td>0015</td>
<td>0800</td>
</tr>
</tbody>
</table>

See Appendix E for detailed explanations of this data.

— Proceed to Chapter 28 - DIAG Menu —
The DIAG menu appears only when the optional feature TPI is enabled and AUTO CFG has been performed.

**DIAG Navigation & Descriptions**

Follow these navigation steps to display the DIAG menu:

1. Press the DOWN ▼ key once.
2. Press the M2 key below DIAG to show the PUMPS menu.
3. Press the M1 key under PUMPS to display the SELECT PUMP menu.
4. The SELECT PUMP menu displays all of the pump numbers that are communicating with the Tank Sentinel.
   - Press the (M) key under each pump number to display the SELECT DIAGNOSTIC OPTION menu.
   - In this example, press the M1 key for the PUMP 1 options.
5. Here is the DIAGNOSTIC OPTION menu showing menu names for the three available functions.

---

**TPI Diagnostic Function Notes**

---
TPI Diagnostic Function Notes

The diagnostic function allows the user to command the pump controllers from the Tank Sentinel console. The user is able to issue resets to clear faults, override dipswitch values to help diagnose problems with the controllers, and enable calibration.

To access this function, the user first presses the MENU key, then DIAG, then PUMPS and then PUMP #. The tank gauge allows the user to select a pump number and will then display the diagnostic function keys RESET, DIPSW, and CALIBRT.

---

**DANGER!**
The potential for electric shock exists! Verify the site is safe! — before proceeding with a Reset operation.

---

If the user selects the RESET function, the Tank Sentinel will ask, “ARE YOU SURE?” and if the user presses the ENTER key, then the reset will be performed. Pressing ENTER in response to the question will issue the reset to the controller. If the user is not sure about the reset, perhaps due to a safety concern, then the user should press the CANCEL key to abort this operation.

If the user selects the DIPS function, then the display shows DIP SWITCH OVERRIDE and allows the user to enter a 4 digit hexadecimal value. When the value is entered and the user presses ENTER, the new value is sent to the selected controller. This value is not saved in the programming. It will be lost to power cycles, and is simply used for diagnostic purposes.

If the user selects the CALIBRT function, the Tank Sentinel asks “ARE YOU SURE?” and if the user presses ENTER, calibration is enabled on the selected pump controller. When calibration is enabled, all three LEDs on the controller will blink. The hook signal needs to be turned on for greater than 16 seconds to trigger automatic calibration. After 16 seconds, the controller will take a snap shot of the voltage, current and power (i.e. these are the Calibrated status values) seen in the Display feature mentioned earlier. Once complete the LEDs will stop flashing and the Green light should remain flashing. The hook can then be turned off.

---

— Proceed to the next DIAG Menu section - **RESET Menu** —
RESET Menu

DANGER!
The potential for electric shock exists! Verify the site is safe! — before proceeding with a Reset operation.

RESET

Here is the SELECT DIAGNOSTIC OPTION menu displaying RESET, DIPSW and CALIBRT menu names.

Press the M1 key under the word RESET.

The RESET PUMP 1 display asks if the user is sure before resetting a pump controller; giving the user a chance to press CANCEL to abort the reset operation.

Press the ENTER key to reset the pump controller.

DANGER!
The potential for electric shock exists! Verify the site is safe! — before proceeding with a Reset operation.

(Press the CANCEL key to abort the reset operation.)

After entering a reset, the display will flash the word DONE ... for a few seconds and then it will automatically return to the SELECT DIAGNOSTIC OPTION menu, displaying RESET, DIPSW and CALIBRT.

— Proceed to the next DIAG Menu section - DIPSW Menu —
DIPSW Menu

CAUTION!
Changing Dipswitch settings should be used for diagnostic purposes only. Consult controller manuals for switch settings and their meanings.

DIPSW

Here is the SELECT DIAGNOSTIC OPTION menu displaying RESET, DIPSW and CALIBRT menu names.

Press the M2 key under the selection DIPSW.

Here is the default DIPSWITCH OVERIDE display ....

Press the M4 key to backspace and erase the ‘1B8C’ default setting.

Use the keypad to enter a particular Dip Switch setting.

Remember:
• Use the SHIFT key to change the keypad from A...M to N...Z and to (numeric) 1-9, 0, ., +/-, and SPACE (a blank space)
• Press the ENTER key to accept data entry.

The display returns to the SELECT DIAGNOSTIC OPTION menu.

Repeat the user interface steps for each pump.

— Proceed to the next DIAG Menu section - CALIBRT Menu —
CALIBRT Menu

NOTE: In the following examples, “N” represents any pump number - 1, 2, 3 and so on.

CALIBRT

Here is the SELECT DIAGNOSTIC OPTION menu displaying RESET, DIPSW and CALIBRT menu names.

Press the M3 key under CALIBRT.

The CALIBRATE PUMP 1 display asks if the user is sure before enabling automatic calibration for a particular pump controller; giving the user a chance to press CANCEL to abort the calibration process.

Press the ENTER key to enable calibration for the pump controller.

(Press the CANCEL key to abort the process.)

After enabling calibration, the display will flash the word DONE ... for a few seconds and then it will automatically return to the SELECT DIAGNOSTIC OPTION menu, displaying RESET, DIPSW and CALIBRT.

Calibration Procedure

When calibration is enabled, all three LEDs on the pump controller are blinking ....

1.) Verify this condition.

2.) Turn on the hook signal for greater than 16 seconds to trigger automatic calibration.

After 16 seconds, the controller will take a snap shot of the voltage, current and power (i.e. these are the Calibrated status values) seen in the Display feature mentioned earlier.

Once complete, the LEDs stop flashing and the Green light remains flashing.

3.) Verify this condition.

4.) Turn off the hook.

5.) Verify that the Tank Sentinel display has returned to the RUN MODE, showing SYSTEM, TANK, SENSOR, etc. are all OKAY.

— Proceed to Chapter 29 - Problem Solving —
# Problem Solving (Alarms & Errors)

## Contents:
- Problem Solving
- Outputs DON'T Turn On When Expected

See the Table of Contents to find topics in this manual. See the Preface for general information about this manual. Also see the Installation, Operator’s, Troubleshooting Guides, and Application Notes for other reference sources.

## Problem Solving

The following table lists alarms and errors in alphabetical order. Notice they are grouped by ‘Alarm Type’ in the middle section. Contact INCON for more help.

<table>
<thead>
<tr>
<th>#</th>
<th>Printed / Faxxed / Displayed Alarm / Warning Text:</th>
<th>Alarm Type:</th>
<th>System WARNING / Error Descriptions and ALARM Descriptions (actions to take)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.1 GPH LINE LEAK DETECTED</td>
<td>LINE</td>
<td>For LINE # N: Line Leak Detected / Leak Test Failed 1. Inspect dispense area for leaks 2. Retest if no leaks seen 3. Shut off pump / dispenser power</td>
</tr>
<tr>
<td>2</td>
<td>0.1 GPH ABORT (DISPENSE)</td>
<td>LINE</td>
<td>Attempted dispense causes the annual line leak test to aborted (dispensing is not allowed during this test). <strong>To allow dispensing:</strong> push the RESET / TEST button on the TS-LLD Control Unit that is flashing the 80 alarm-error-code. See the TS-LLD Quick Reference Guide about the 0.1 gph Annual Test and requirements.</td>
</tr>
<tr>
<td>3</td>
<td>0.1 GPH LINE LEAK (Continued… )</td>
<td>LINE</td>
<td>4. Second failure: Call Service provider / local Regulatory Agency / Manager per policy procedure at your site).</td>
</tr>
<tr>
<td>4</td>
<td>0.1 GPH LINE TEST ABORTED</td>
<td>LINE</td>
<td>The annual precision line leak test was intentionally canceled / aborted from the Tank Guage or from the TS-LLD control unit.</td>
</tr>
<tr>
<td>5</td>
<td>0.2 GPH LINE LEAK</td>
<td>LINE</td>
<td>Follow the steps detailed above for 0.1 gph Line Leak Detected</td>
</tr>
<tr>
<td>6</td>
<td>3 GPH LINE LEAK</td>
<td>LINE</td>
<td>LINE # N - Line Leak Detected / test failed Large / gross leak (see above 0.2 gph line leak &amp; follow steps 3, 1, and 4 in this order).</td>
</tr>
<tr>
<td>7</td>
<td>BLK TUB/LSU BLOCKED TUBE</td>
<td>LINE</td>
<td>(Push RESET / TEST button on the TS-LLD control unit that is flashing an 81 Alarm-error code and call for cleaning service)</td>
</tr>
<tr>
<td>8</td>
<td>CU COMM/CU COMM FAILURE</td>
<td>LINE</td>
<td>Communications was lost between the Tank Sentinel console and TS-LLD Control Unit …(call for service).</td>
</tr>
<tr>
<td>#</td>
<td>Printed / Faxed / Displayed Alarm / Warning Text:</td>
<td>Alarm Type:</td>
<td>System WARNING / Error Descriptions and ALARM Descriptions (actions to take)</td>
</tr>
<tr>
<td>----</td>
<td>-----------------------------------------------</td>
<td>-------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>8</td>
<td>LINE OUT OF COMPLIANCE</td>
<td>LINE</td>
<td>33 or more days have passed since a 0.2 gph line leak test has finished and passed (prevent dispense attempts until the monthly test passes)</td>
</tr>
<tr>
<td>9</td>
<td>LSU COMM/LSU COMM FAILURE</td>
<td>LINE</td>
<td>(Push RESET / TEST button on the TS-LLD control unit that is flashing an 83 Alarm-error code and call for service).</td>
</tr>
<tr>
<td>10</td>
<td>LSU FAIL/LEAK SENSING UNIT FAIL</td>
<td>LINE</td>
<td>(Push RESET / TEST button on the TS-LLD control unit that is flashing an 81 Alarm-error code and call for service).</td>
</tr>
<tr>
<td>11</td>
<td>ACKNOWLEDGED</td>
<td>message</td>
<td>A warning or alarm has been ACKNOWLEDGED</td>
</tr>
<tr>
<td>12</td>
<td>ACTIVE</td>
<td>message</td>
<td>An ACTIVE Alarm or Warning exists</td>
</tr>
<tr>
<td>13</td>
<td>CLEARED</td>
<td>message</td>
<td>Formerly active Alarm or Warning has cleared</td>
</tr>
<tr>
<td>14</td>
<td>LEAK TEST: ABORTED RESULT</td>
<td>message</td>
<td>Leak Test was aborted for Tank N</td>
</tr>
<tr>
<td>15</td>
<td>LEAK TEST: FAILED RESULT</td>
<td>message</td>
<td>- Slope is less / more negative than the leak threshold for Tank N (see LEAK above - Retest &amp; See Chapter 3 &amp; 4)</td>
</tr>
<tr>
<td>16</td>
<td>LEAK TEST: INCREASE RESULT</td>
<td>message</td>
<td>+Slope is more positive than the leak threshold value (= leak test/2) for Tank N (see LEAK, Retest and See Chapter 3 &amp; 4)</td>
</tr>
<tr>
<td>17</td>
<td>LEAK TEST: PASSED RESULT</td>
<td>message</td>
<td>Slope is less than leak threshold for Tank N</td>
</tr>
<tr>
<td>18</td>
<td>LEAK TEST: INDETERMIN RESULT (indeterminate)</td>
<td>message</td>
<td>The leak test ran 8 hours but still can't determine a result for Tank N (some disturbance affected the test... try again but wait 2 hours after the last dispense, or 6 hours after the last delivery).</td>
</tr>
<tr>
<td>19</td>
<td>SENSOR FAIL / SNS FAIL / SEN FAL</td>
<td>message</td>
<td>Proceeds Sensor Fail Alarm reports</td>
</tr>
<tr>
<td>20</td>
<td>SYSTEM FAIL</td>
<td>message</td>
<td>Proceeds System Alarm Warning reports</td>
</tr>
<tr>
<td>21</td>
<td>TEST FAILED</td>
<td>message</td>
<td>A Leak Test Failed result - for Tank and/or Line N alarm report</td>
</tr>
<tr>
<td>22</td>
<td>TRANSIENT</td>
<td>message</td>
<td>Brief Alarm or Warning that clears quickly / automatically</td>
</tr>
<tr>
<td>23</td>
<td>AUXILIARY INPUT</td>
<td>SENSOR</td>
<td>Auxiliary input detected on channel 1 or 2 (follow policy procedure at your site).</td>
</tr>
<tr>
<td>24</td>
<td>CPM LOW CURRENT</td>
<td>SENSOR</td>
<td>Current of Rectifier dropped below the threshold value (a Tank Sentinel setting) (follow policy procedure at your site)</td>
</tr>
<tr>
<td>#</td>
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<tr>
<td>----</td>
<td>--------------------------------------------------</td>
<td>------------</td>
<td>--------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>25</td>
<td>DRY WELL</td>
<td>SENSOR</td>
<td>TSP-MWS ground water Monitoring Well BriteSensor is not submerged in water @ Channel #N (it cannot detect a product leak unless it's submerged in ground water... the well may not be deep enough or the sensor long enough... contact service provider)</td>
</tr>
<tr>
<td>26</td>
<td>EXTERNAL INPUT</td>
<td>SENSOR</td>
<td>External N input module has detected an input signal (follow policy procedure at your site).</td>
</tr>
<tr>
<td>27</td>
<td>HIGH BRINE</td>
<td>SENSOR</td>
<td>TSP-HIS BriteSensor @ Channel #N detected a High Brine level (Call service provider [to confirm leak] and call your local Regulatory agency. Shut down pump &amp; dispenser if a leak test has failed on that tank and see procedures at your site.)</td>
</tr>
<tr>
<td>28</td>
<td>LIQUID DETECTED / LIQUID</td>
<td>SENSOR</td>
<td>Standard Sensor @ Channel #N detected a liquid (run a tank leak test [depending on the sensor location] and call service provider to identify the liquid and retest sensor)</td>
</tr>
<tr>
<td>29</td>
<td>LOW BRINE</td>
<td>SENSOR</td>
<td>TSP-HIS BriteSensor @ Channel #N detected a Low Brine level (Call service provider [to confirm leak] and call your local Regulatory agency. Shut down pump &amp; dispenser if a leak test has failed on that tank and see procedures at your site.)</td>
</tr>
<tr>
<td>30</td>
<td>PRODUCT PRESENT / PRODUCT DETECTED</td>
<td>SENSOR</td>
<td>TSP-DIS, DDS, DTS, MWS BriteSensor @ Channel #N detected Product / leak (Call service provider [confirm leak] call the local Regulatory agency. Shut down pump &amp; dispenser for that tank and see procedures at your site. [replace sensor])</td>
</tr>
<tr>
<td>31</td>
<td>STANDARD ALARM / STANDARD INPUT</td>
<td>SENSOR</td>
<td>A Standard Sensor (type TSP-EIS, HLS, ULS) @ Channel #N has detected liquid (run a tank leak test [depending on the sensor location] and call service provider to identify the liquid and retest sensor)</td>
</tr>
<tr>
<td>32</td>
<td>SUMP FULL</td>
<td>SENSOR</td>
<td>TSP-DDS, DTS BriteSensor @ Channel #N liquid... Sump Full alarm (see site policy about pumping containment sump waste water)</td>
</tr>
<tr>
<td>33</td>
<td>VAPOR DETECTED / VAPOR</td>
<td>SENSOR</td>
<td>TSP-DVS BriteSensor @ Channel #N detected product Vapor in the vapor monitoring well (Call service provider [to analyze the leak], call your local Regulatory agency, and see procedures at your site.)</td>
</tr>
<tr>
<td>34</td>
<td>WATER DETECTED</td>
<td>SENSOR</td>
<td>TSP-DIS*, DDS, DTS, DVS* BriteSensor @ Channel #N detected Water, some sensors* may not be able to detect product when water is present (see procedures at your site)</td>
</tr>
</tbody>
</table>
### Tank Sentinel Setup Programming Guide

<table>
<thead>
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<tbody>
<tr>
<td>35</td>
<td>ALPHA ERROR / ALPHA ERR / ALPHA V</td>
<td>SYSTEM</td>
<td>Error in API temperature compensation calculating ALPHA (check any Special Products -- reprogram temperature compensation type &amp; API ALPHA value).</td>
</tr>
<tr>
<td>36</td>
<td>API ERROR / API VOL</td>
<td>SYSTEM</td>
<td>Error in API temperature compensation routine (check any Special Products -- reprogram temperature compensation type).</td>
</tr>
<tr>
<td>37</td>
<td>CPM FAILURE</td>
<td>SYSTEM</td>
<td>No Power / Power is below 5 VDC - Check Power Supply / Increase Voltage (if possible)</td>
</tr>
<tr>
<td>38</td>
<td>CPU CRASH</td>
<td>SYSTEM</td>
<td>WARNING - Central Processing Unit / hardware failure / power quality problem</td>
</tr>
<tr>
<td>39</td>
<td>DATA ERROR / DIM</td>
<td>SYSTEM</td>
<td>Transient communication error between the Tank Sentinel and TS-DIM unit. This alarm/error will clear itself automatically.</td>
</tr>
<tr>
<td>40</td>
<td>DATA NOT AVAILABLE / DIM</td>
<td>SYSTEM</td>
<td>Transient alarm/error caused when TS-DIM unit is 'busy' performing another task and cannot make the requested data available until it is not 'busy'. This alarm/error will clear itself automatically.</td>
</tr>
<tr>
<td>41</td>
<td>DIM COMM FAILURE</td>
<td>SYSTEM</td>
<td>Tank Sentinel has lost communications with the TS-DIM unit. Verify power to the DIM / Verify proper connection between DIM and console.</td>
</tr>
<tr>
<td>42</td>
<td>F14 OPEN / F14 FUS</td>
<td>SYSTEM</td>
<td>WARNING - FUSE F14 is blown... no 5 VDC Sensor Supply Power. Leak detection sensors are not working and cannot work without power (call service provider immediately to replace F14)</td>
</tr>
<tr>
<td>43</td>
<td>FAX HARDWARE FAILURE / FAX HW FAIL / FAX FAL</td>
<td>SYSTEM</td>
<td>WARNING - Fax Hardware Failure... alarms &amp; compliance faxes cannot be sent (call service provider ASAP)</td>
</tr>
<tr>
<td>44</td>
<td>FAX SND FAIL / FAX SND</td>
<td>SYSTEM</td>
<td>WARNING - Fax Send Failure... (check Dial tone, cable, call service provider... are the fax phone numbers correct ?)</td>
</tr>
<tr>
<td>45</td>
<td>FLOAT HEIGHT / FLOAT HT / FLT HT</td>
<td>SYSTEM</td>
<td>WARNING - Float Height - calculation Error (setup program error... call service provider)</td>
</tr>
<tr>
<td>46</td>
<td>FLOAT MISSING / FLT MISSNG / FLT MIS</td>
<td>SYSTEM</td>
<td>WARNING - diagnostic warning Float Missing (call service provider)</td>
</tr>
<tr>
<td>47</td>
<td>LEAK</td>
<td>SYSTEM</td>
<td>WARNING - a Leak detected @ Tank N during the after hours Sentinel mode (shut down dispensing, see procedures at your site... 1. Shut off pump / dispenser power 2. Retest / start a Standard 0.2 gph tank test for Tank N, 2 hours after the last dispense 3. Retest &amp; See Chapters 3 &amp; 4</td>
</tr>
</tbody>
</table>

**NOTE:** Diagnostic text in the left column, is shown **bolded** (become alarms if active for 48 hours)
<table>
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<tr>
<th>#</th>
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</thead>
<tbody>
<tr>
<td>48</td>
<td>LEVEL ERROR / LEVEL ERR / LVL ERR</td>
<td>SYSTEM</td>
<td>WARNING - product Level - calculation Error (call service provider to fix this problem)</td>
</tr>
<tr>
<td>49</td>
<td>MEMORY ERROR / MEM ERR</td>
<td>SYSTEM</td>
<td>WARNING - Memory Error (power quality problem, or memory-backup battery is dead... have service provider check / replace battery and verify that unit works correctly as originally programmed)</td>
</tr>
<tr>
<td>50</td>
<td>NO PROBE / NO PROB</td>
<td>SYSTEM</td>
<td>Diagnostic WARNING - No Probe Detected NO PROB (call service provider to correct this problem)</td>
</tr>
<tr>
<td>51</td>
<td>PAPER OUT</td>
<td>SYSTEM</td>
<td>The printer is out of paper (add new roll of TS-TP2 thermal paper)</td>
</tr>
<tr>
<td>52</td>
<td>POWER DOWN</td>
<td>SYSTEM</td>
<td>WARNING - Power Down (time that the unit lost power or was turned off)</td>
</tr>
<tr>
<td>53</td>
<td>POWER UP</td>
<td>SYSTEM</td>
<td>WARNING - Power Up (time that the unit was powered up / regained power)</td>
</tr>
<tr>
<td>54</td>
<td>PROBE SYNC / PRB SYC</td>
<td>SYSTEM</td>
<td>Diagnostic WARNING - signal lost from Probe (PRB SYC call service provider if continuous)</td>
</tr>
<tr>
<td>55</td>
<td>RTC FAILURE</td>
<td>SYSTEM</td>
<td>Real Time Clock has failed. Clock and Calendar settings are affected. Verify date and time are correct (use CHECK key). Change settings as needed. Cycle power. Verify settings (use CHECK key).</td>
</tr>
<tr>
<td>56</td>
<td>RTD TABLE ERROR / RTD TBL ER / RTD TBL</td>
<td>SYSTEM</td>
<td>WARNING - Number of RTDs Error does not match actual / setup - programmed value (call service provider to correct this problem)</td>
</tr>
<tr>
<td>57</td>
<td>SCALD TEST FAILED / SCALD DETECTED LEAK</td>
<td>SYSTEM</td>
<td>WARNING - SCALD Leak Test Failed alarm report for Tank N (run a Standard leak test for that tank... See LEAK)</td>
</tr>
<tr>
<td>58</td>
<td>SEN DAT / SENS DATA / SENSOR DATA ERROR</td>
<td>SYSTEM</td>
<td>WARNING - a BriteSensor @ Channel #N is sending data errors (call service provider ASAP)</td>
</tr>
<tr>
<td>59</td>
<td>SENS LOSS OF SIGNAL / SIG LOST / SEN SIG</td>
<td>SYSTEM</td>
<td>WARNING - no data sent / signal lost from BriteSensor @ Channel #N (call service provider ASAP to correct this)</td>
</tr>
<tr>
<td>60</td>
<td>SENSOR ID ERROR / SENSOR ID / SENS ID</td>
<td>SYSTEM</td>
<td>WARNING - a Standard sensor or BriteSensor was incorrectly typed / identified (call your service provider to correct this)</td>
</tr>
</tbody>
</table>
### Diagnostic text

In the left column, is shown **bolded** (become alarms if active for 48 hours)

<table>
<thead>
<tr>
<th>#</th>
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</thead>
<tbody>
<tr>
<td>61</td>
<td>SENSOR SYNC ERROR / SENSOR SYNC / SEN SYN</td>
<td>SYSTEM</td>
<td>WARNING - data signals not synchronous from BriteSensor @ Channel #N (call service provider ASAP to correct this)</td>
</tr>
<tr>
<td>62</td>
<td>CORRECTION (STRAPPING) TABLE ERROR / TBL ERR</td>
<td>SYSTEM</td>
<td>WARNING - Tank Strapping Chart or Table... setup Error (call service provider to correct)</td>
</tr>
<tr>
<td>63</td>
<td>TEMPERATURE ERROR / TEMP ERR / TMP ERR</td>
<td>SYSTEM</td>
<td>WARNING - probe/product Temperature - calculation Error (TMP ERR call service provider to correct this problem)</td>
</tr>
<tr>
<td>64</td>
<td>THEFT DETECTED / THEFT LIMIT</td>
<td>SYSTEM</td>
<td>WARNING - Sentinel Mode: Theft Detected (the amount of product missing reached the Theft Limit) alarm report for Tank N</td>
</tr>
<tr>
<td>65</td>
<td>TS-SEM FUSE OPEN / SEM FUS / SEM FUSE</td>
<td>SYSTEM</td>
<td>WARNING - TS-SEM FUSE OPEN @ BriteBox #1 or #2... [#1 is closest to the console] there is no 5 VDC ...Leak Detection Sensors wired to the BriteBox won’t function! (call service provider to troubleshoot/replace TS-SEM FUSE F1)</td>
</tr>
<tr>
<td>66</td>
<td>UNSTABLE PROBE / UNST PB / UNST PB</td>
<td>SYSTEM</td>
<td>WARNING - the signal from Probe N has become Unstable (call service provider to correct)</td>
</tr>
<tr>
<td>67</td>
<td>VOLUME ERROR / VOL ERR (also see level, net, ullage, water error)</td>
<td>SYSTEM</td>
<td>WARNING - product - Volume calculation error (Error in programming: tank shape / probe type / special probe - OR - no level signal from probe. Call service provider to correct this.)</td>
</tr>
<tr>
<td>68</td>
<td>WATCHDOG TIMEOUT / WD TIMEOUT</td>
<td>SYSTEM</td>
<td>WARNING - the console self-monitoring program has detected a software or power quality problem (this error may happen after hardware upgrades)</td>
</tr>
<tr>
<td>69</td>
<td>WATER VOLUME ERROR / WTR VOL ER / WTR VOL</td>
<td>SYSTEM</td>
<td>WARNING - Water Volume calculation error (Error in tank shape / probe type or special probe data - OR - no water float / level signal from probe. Call service provider to correct this.)</td>
</tr>
<tr>
<td>70</td>
<td>HIGH HIGH / HIGH HIGH LIMIT</td>
<td>TANK</td>
<td>High High product level Limit @ Tank N (see procedures at your site about this alarm / overfill)</td>
</tr>
<tr>
<td>71</td>
<td>HIGH LIMIT</td>
<td>TANK</td>
<td>High product level Limit @ Tank N (see procedures at your site about this alarm / overfill)</td>
</tr>
<tr>
<td>72</td>
<td>LARGE THEFT</td>
<td>TANK</td>
<td>Generated by TS-DIM unit. The amount of product dispensed exceeded the programmed User Threshold value, and/or exceeded the number of Dispensers in use. Also caused by a Catastrophic Leak. (see policy procedures at your site)</td>
</tr>
<tr>
<td>73</td>
<td>LOW LIMIT</td>
<td>TANK</td>
<td>Low product level Limit @ Tank N (see policy procedures at your site)</td>
</tr>
</tbody>
</table>
### Outputs DON’T Turn On When Expected

- Printout setup report(s)
- Check Worksheets for alarm-limit or alarm Output Group assignments
- Check output device (Annunciators / Relays / Output modules) for alarm group assignments.
- Correct programming assignments as necessary and retest operation

---

**NOTE:** Diagnostic text in the left column, is shown **bolded** (become alarms if active for 48 hours)

<table>
<thead>
<tr>
<th>#</th>
<th>Printed / Faxed / Displayed Alarm / Warning Text:</th>
<th>Alarm Type:</th>
<th>System WARNING / Error Descriptions and ALARM Descriptions (actions to take)</th>
</tr>
</thead>
<tbody>
<tr>
<td>74</td>
<td>LOW LOW LIMIT / LOW LOW</td>
<td>TANK</td>
<td>Low Low product level Limit @ Tank N <em>(see policy procedures at your site)</em></td>
</tr>
<tr>
<td>75</td>
<td>OVERFILL</td>
<td>TANK</td>
<td>The overfill limit has been reached or exceeded. Stop filling tank / Lower the product level.(see policy procedures at your site)</td>
</tr>
<tr>
<td>76</td>
<td>WATER LIMIT (or HIGH WATER)</td>
<td>TANK</td>
<td>The high Water level Limit has been reached or exceeded @ Tank N <em>(see procedures at your site about this alarm, is a Grace Period allowed ? how many ?)</em></td>
</tr>
</tbody>
</table>

**NOTE:** See the Operators Guide for other error messages that are listed by type.
### Appendix A

**Standard Tanks**

**O/C = Owens Corning / FC Fluid Containment**

*D = Diameter (Dia.)
L = Length
S = Single Wall
DW = Double Wall Tank (DWT)*

<table>
<thead>
<tr>
<th>TYPE #</th>
<th>MANUFACTURER</th>
<th>MODEL</th>
<th>CAPACITY (GALLONS)</th>
<th>DIMENSIONS D x L (INCHES)</th>
<th>S / DW WALL</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>O/C TANKS</td>
<td>D5</td>
<td>550</td>
<td>48 x 78</td>
<td>S</td>
</tr>
<tr>
<td></td>
<td></td>
<td>DWT-4 (4)</td>
<td>550</td>
<td>51 x 83</td>
<td></td>
</tr>
<tr>
<td>02</td>
<td>O/C TANKS</td>
<td>D-5</td>
<td>1,000</td>
<td>50 x 132</td>
<td>S</td>
</tr>
<tr>
<td></td>
<td></td>
<td>DWT-4 (4)</td>
<td>1,000</td>
<td>53 x 138</td>
<td></td>
</tr>
<tr>
<td>03</td>
<td>O/C TANKS</td>
<td>D-2B</td>
<td>2,000</td>
<td>74 x 133</td>
<td>S</td>
</tr>
<tr>
<td></td>
<td></td>
<td>D-6</td>
<td>2,000</td>
<td>74 x 133</td>
<td>S</td>
</tr>
<tr>
<td>04</td>
<td>O/C TANKS</td>
<td>DWT-2 (6)</td>
<td>2,500</td>
<td>75 x 151</td>
<td>D</td>
</tr>
<tr>
<td>05</td>
<td>O/C TANKS</td>
<td>D-6</td>
<td>4,000</td>
<td>74 x 236</td>
<td>S</td>
</tr>
<tr>
<td></td>
<td></td>
<td>DWT-2 (6)</td>
<td>4,000</td>
<td>75 x 239</td>
<td>D</td>
</tr>
<tr>
<td>06</td>
<td>O/C TANKS</td>
<td>G-5</td>
<td>4,000</td>
<td>92 x 167</td>
<td>S</td>
</tr>
<tr>
<td></td>
<td></td>
<td>G-6</td>
<td>4,000</td>
<td>95 x 167</td>
<td>S</td>
</tr>
<tr>
<td>07</td>
<td>O/C TANKS</td>
<td>G-3</td>
<td>4,000</td>
<td>92 x 165</td>
<td>S</td>
</tr>
<tr>
<td>08</td>
<td>O/C TANKS</td>
<td>D-6</td>
<td>6,000</td>
<td>74 x 354</td>
<td>S</td>
</tr>
<tr>
<td></td>
<td></td>
<td>DWT-2 (6)</td>
<td>6,000</td>
<td>75 x 357</td>
<td>D</td>
</tr>
<tr>
<td>09</td>
<td>O/C TANKS</td>
<td>G-3</td>
<td>6,000</td>
<td>92 x 231</td>
<td>S</td>
</tr>
<tr>
<td>10</td>
<td>O/C TANKS</td>
<td>DWT-2 (8)</td>
<td>6,000</td>
<td>95 x 237</td>
<td>D</td>
</tr>
<tr>
<td>11</td>
<td>O/C TANKS</td>
<td>G-3</td>
<td>8,000</td>
<td>92 x 300</td>
<td>S</td>
</tr>
<tr>
<td>12</td>
<td>O/C TANKS</td>
<td>G-5</td>
<td>8,000</td>
<td>92 x 299</td>
<td>S</td>
</tr>
<tr>
<td></td>
<td></td>
<td>G-6</td>
<td>8,000</td>
<td>95 x 299</td>
<td>S</td>
</tr>
<tr>
<td></td>
<td></td>
<td>DWT-2 (8)</td>
<td>8,000</td>
<td>95 x 303</td>
<td>D</td>
</tr>
<tr>
<td>13</td>
<td>O/C TANKS</td>
<td>DWT-2 (6)</td>
<td>8,000</td>
<td>75 x 472</td>
<td>D</td>
</tr>
<tr>
<td>14</td>
<td>O/C TANKS</td>
<td>G-3</td>
<td>10,000</td>
<td>92 x 362</td>
<td>S</td>
</tr>
<tr>
<td>15</td>
<td>O/C TANKS</td>
<td>G-5</td>
<td>10,000</td>
<td>92 x 365</td>
<td>S</td>
</tr>
<tr>
<td></td>
<td></td>
<td>G-6</td>
<td>10,000</td>
<td>95 x 365</td>
<td>S</td>
</tr>
<tr>
<td>16</td>
<td>O/C TANKS</td>
<td>D-6</td>
<td>10,000</td>
<td>120 x 245</td>
<td>S</td>
</tr>
<tr>
<td>17</td>
<td>O/C TANKS</td>
<td>DWT-2(6)</td>
<td>10,000</td>
<td>75 x 570</td>
<td>D</td>
</tr>
<tr>
<td>18</td>
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<td>G-3</td>
<td>12,000</td>
<td>92 x 432</td>
<td>S</td>
</tr>
<tr>
<td>19</td>
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<td>12,000</td>
<td>92 x 431</td>
<td>S</td>
</tr>
<tr>
<td></td>
<td></td>
<td>G-6</td>
<td>12,000</td>
<td>95 x 431</td>
<td>S</td>
</tr>
<tr>
<td></td>
<td></td>
<td>DWT-2(8)</td>
<td>12,000</td>
<td>95 x 435</td>
<td>D</td>
</tr>
<tr>
<td>20</td>
<td>O/C TANKS</td>
<td>DWT-2(10)</td>
<td>15,000</td>
<td>124 x 348</td>
<td>D</td>
</tr>
<tr>
<td>21</td>
<td>O/C TANKS</td>
<td>DWT-2(10)</td>
<td>20,000</td>
<td>124 x 458</td>
<td>D</td>
</tr>
<tr>
<td>22</td>
<td>O/C TANKS</td>
<td>DWT-2(10)</td>
<td>25,000</td>
<td>125 x 554</td>
<td>D</td>
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<tr>
<td>#</td>
<td>MANUFACTURER</td>
<td>MODEL</td>
<td>CAPACITY (GALLONS)</td>
<td>DIMENSIONS D X L (INCHES)</td>
<td>S / DW WALL</td>
</tr>
<tr>
<td>----</td>
<td>--------------</td>
<td>----------</td>
<td>--------------------</td>
<td>---------------------------</td>
<td>-------------</td>
</tr>
<tr>
<td>23</td>
<td>O/C TANKS</td>
<td>DWT-2(10)</td>
<td>30,000</td>
<td>124 X 656</td>
<td>D</td>
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<tr>
<td>24</td>
<td>XERXES</td>
<td>—</td>
<td>2,000</td>
<td>96 X 108</td>
<td>S</td>
</tr>
<tr>
<td>25</td>
<td>XERXES</td>
<td>—</td>
<td>2,000</td>
<td>76 X 166</td>
<td>D</td>
</tr>
<tr>
<td>26</td>
<td>XERXES</td>
<td>—</td>
<td>2,000</td>
<td>75 X 144</td>
<td>S</td>
</tr>
<tr>
<td>27</td>
<td>XERXES</td>
<td>—</td>
<td>3,000</td>
<td>96 X 147</td>
<td>S</td>
</tr>
<tr>
<td>28</td>
<td>XERXES</td>
<td>—</td>
<td>4,000</td>
<td>75 X 263</td>
<td>S</td>
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<td>29</td>
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<td>—</td>
<td>4,000</td>
<td>96 X 180</td>
<td>S</td>
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<tr>
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<td>—</td>
<td>4,000</td>
<td>76 X 252</td>
<td>D</td>
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<td>31</td>
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<td>—</td>
<td>6,000</td>
<td>75 X 353</td>
<td>S</td>
</tr>
<tr>
<td>32</td>
<td>XERXES</td>
<td>—</td>
<td>6,000</td>
<td>96 X 246</td>
<td>S</td>
</tr>
<tr>
<td></td>
<td></td>
<td>—</td>
<td>6,000</td>
<td>97 X 251</td>
<td>D</td>
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<tr>
<td>33</td>
<td>XERXES</td>
<td>—</td>
<td>8,000</td>
<td>96 X 312</td>
<td>S</td>
</tr>
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<td></td>
<td></td>
<td>—</td>
<td>8,000</td>
<td>97 X 317</td>
<td>D</td>
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<tr>
<td>34</td>
<td>XERXES</td>
<td>—</td>
<td>10,000</td>
<td>96 X 378</td>
<td>S</td>
</tr>
<tr>
<td></td>
<td></td>
<td>—</td>
<td>10,000</td>
<td>97 X 383</td>
<td>D</td>
</tr>
<tr>
<td>35</td>
<td>XERXES</td>
<td>—</td>
<td>10,000</td>
<td>124 X 257</td>
<td>S</td>
</tr>
<tr>
<td></td>
<td></td>
<td>—</td>
<td>10,000</td>
<td>125 X 262</td>
<td>D</td>
</tr>
<tr>
<td>36</td>
<td>XERXES</td>
<td>—</td>
<td>12,000</td>
<td>96 X 444</td>
<td>S</td>
</tr>
<tr>
<td></td>
<td></td>
<td>—</td>
<td>12,000</td>
<td>97 X 449</td>
<td>D</td>
</tr>
<tr>
<td>37</td>
<td>XERXES</td>
<td>—</td>
<td>12,000</td>
<td>124 X 288</td>
<td>S</td>
</tr>
<tr>
<td></td>
<td></td>
<td>—</td>
<td>12,000</td>
<td>125 X 293</td>
<td>D</td>
</tr>
<tr>
<td>38</td>
<td>XERXES</td>
<td>—</td>
<td>15,000</td>
<td>124 X 353</td>
<td>S</td>
</tr>
<tr>
<td></td>
<td></td>
<td>—</td>
<td>15,000</td>
<td>125 X 359</td>
<td>D</td>
</tr>
<tr>
<td>39</td>
<td>XERXES</td>
<td>—</td>
<td>20,000</td>
<td>124 X 452</td>
<td>S</td>
</tr>
<tr>
<td></td>
<td></td>
<td>—</td>
<td>20,000</td>
<td>125 X 458</td>
<td>D</td>
</tr>
<tr>
<td>40</td>
<td>CORESPAN</td>
<td>—</td>
<td>4,000</td>
<td>99 X 162</td>
<td>D</td>
</tr>
<tr>
<td>41</td>
<td>CORESPAN</td>
<td>—</td>
<td>5,000</td>
<td>99 X 192</td>
<td>D</td>
</tr>
<tr>
<td>42</td>
<td>CORESPAN</td>
<td>—</td>
<td>6,000</td>
<td>99 X 216</td>
<td>D</td>
</tr>
<tr>
<td>43</td>
<td>CORESPAN</td>
<td>—</td>
<td>8,000</td>
<td>99 X 282</td>
<td>D</td>
</tr>
<tr>
<td>44</td>
<td>CORESPAN</td>
<td>—</td>
<td>10,000</td>
<td>99 X 342</td>
<td>D</td>
</tr>
<tr>
<td>45</td>
<td>CORESPAN</td>
<td>—</td>
<td>12,000</td>
<td>99 X 402</td>
<td>D</td>
</tr>
<tr>
<td>46</td>
<td>CORESPAN</td>
<td>—</td>
<td>15,000</td>
<td>99 X 576</td>
<td>D</td>
</tr>
<tr>
<td>47</td>
<td>—</td>
<td>—</td>
<td>275</td>
<td>44 Vertical</td>
<td>S</td>
</tr>
<tr>
<td>48</td>
<td>—</td>
<td>—</td>
<td>550</td>
<td>44 Vertical (Dual 275 gal.)</td>
<td>S</td>
</tr>
<tr>
<td>49</td>
<td>—</td>
<td>—</td>
<td>275</td>
<td>44 Horizontal</td>
<td>S</td>
</tr>
</tbody>
</table>
# Standard Products

<table>
<thead>
<tr>
<th>PRODUCT NAME</th>
<th>API GRAVITY (6B Compensation)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leaded Regular</td>
<td>63.5</td>
</tr>
<tr>
<td>Unleaded Regular</td>
<td>63.5</td>
</tr>
<tr>
<td>Unleaded Plus</td>
<td>62.8</td>
</tr>
<tr>
<td>Unleaded Extra</td>
<td>62.8</td>
</tr>
<tr>
<td>Unleaded Super</td>
<td>51.3</td>
</tr>
<tr>
<td>Diesel</td>
<td>32.8</td>
</tr>
<tr>
<td>Kerosene</td>
<td>41.8</td>
</tr>
<tr>
<td>#2 Fuel Oil</td>
<td>32.8</td>
</tr>
</tbody>
</table>
### Typical Tank Leak Test Times

**For 7 Tank Sizes at Half Capacity** (Worst Case is 50% Full)

<table>
<thead>
<tr>
<th>Tank Size in Gallons</th>
<th>Typical - Tank Leak Test Times (to Finish)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4,000</td>
<td>2.0 hours</td>
</tr>
<tr>
<td>6,000</td>
<td>3.0 hours</td>
</tr>
<tr>
<td>8,000</td>
<td>4.0 hours</td>
</tr>
<tr>
<td>10,000</td>
<td>5.0 hours</td>
</tr>
<tr>
<td>12,000</td>
<td>6.0 hours</td>
</tr>
<tr>
<td>15,000</td>
<td>7.5 hours</td>
</tr>
<tr>
<td>20,000</td>
<td>8.0 hours</td>
</tr>
</tbody>
</table>

**NOTE** The Leak Threshold value is one half of the Leak Test value. See the Operator’s Guide for example reports and explanations.
Tank Sentinel Part Numbering

The Tank Sentinel tank gauges and leak detection systems are available in many different configurations. You can determine what features a particular console has by its part number... press *CHECK* then *M4* to display the part number code.

**Example Part Numbers**

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>T1P/0</td>
<td>TS-1001 with Printer / Ø tanks (Ø tank defines a Leak Detection Monitoring System or LDS). <em>NOTE: The T in the part number represents a standard power configuration (Single pole 120 V AC, Neutral and Ground)</em></td>
</tr>
<tr>
<td>T1PM/2SFLR</td>
<td>TS-1001 ATG with Printer, Modem / 2 tank, SCALD, Fax and Data (modem), TS-LLD (RS-485 Line Leak Detector) and Reconciliation</td>
</tr>
<tr>
<td>T1P/4GC</td>
<td>TS-1001 ATG with Printer / 4 tank, Generator (interface - this type of system is primarily used with Backup Generator applications) Canadian (export only)</td>
</tr>
<tr>
<td>V1PM/4FL</td>
<td>Export only... single pole 240 VAC, Neutral and Ground power configuration, TS-1001 with Printer, Modem / 4 tank, Fax and Data (modem), with TS-LLD (RS-485 Line Leak Detector)</td>
</tr>
<tr>
<td>T504PM/4F</td>
<td>TS-504 with Printer, Modem / 4 tank, Fax and Data (modem)</td>
</tr>
<tr>
<td>T504P/4CR</td>
<td>TS-504 with Printer / 4 tank, Canadian, Reconciliation</td>
</tr>
</tbody>
</table>

— Continued on next page —
T2PM/8SDCL = TS-2001 with Printer, Modem / 8 tank, SCALD, Data (modem), Canadian, TS-LLD (RS-485 Line Leak Detector Interface)
(T) = standard 120 V AC

V2P1/8GR = Export single pole 240 V AC, Neutral & Ground power configuration, TS-2001 with Printer, 1 Internal Expansion Module (IEM) / 8 tank, Generator, Reconciliation

T508P/8 = TS-508 with Printer / 8 tank

T508PM/8FCR = TS-508 with Printer, Modem / 8 tanks, Fax and Data (modem), Canadian, Reconciliation

Part Number Codes & Meaning

The following options are available:

<table>
<thead>
<tr>
<th>Part Number Codes</th>
<th>Part Number Code Descriptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>T or V 1 2 504 508</td>
<td>T = Standard voltage 120 VAC or V = Export voltage 240 VAC</td>
</tr>
<tr>
<td>P M 1 or 2 / 0 2 or 4 8 S or G D or F C L R</td>
<td>1 = TS-1001 (All Options except TS-IEM) 2 = TS-2001 (All Options) 504 = TS-504 (No SCALD, LLD, Generator - No Tank Testing) 508 = TS-508 (No SCALD, LLD, Generator - No Tank Testing) P = Printer M = Modem 1 or 2 / ...separates part number fields... 0 = zero tank L.D.S. (Leak Detection System) 2 or 4 = 2 tank or 4 = 4 tank A.T.G. + L.D.S. 8 = 8 tank A.T.G. + L.D.S. S or G = SCALD or G = Generator D or F = Data modem or F = Fax / Data modem C = Canadian / Export Tank Sentinel L = Line Leak Detector Interface (RS-485 in console) R = Reconciliation, used with TS-DIM</td>
</tr>
</tbody>
</table>

NOTE: See the Chapter in this manual about Upgrading the Tank Sentinel system with optional add-on features.
Please print these two pages and fill out information about yourself and the products you have received. Use black ink and print clearly. Next, circle a ‘rating’ number for each statement. Finally, write in your own comments and suggestions. Thank You!

Your Name (and Position): ________________________________

Company Name: _______________________________________

Street Address: _______________________________________

State and ZIP Code: ____________________________________

Documentation & Manual Names: __________________________

Document & Manual Part Numbers: _________________________

Product - Model and Serial Numbers: ______________________

Documentation and Manual rating: _________________________

Please circle (1 = no / poor, 2 = fair, 3 = okay, 4 = good, 5 = yes / excellent, N = don’t know)

The documentation is easy to use 1 2 3 4 5 N
Information is easy to find 1 2 3 4 5 N
The Table of Contents is useful to find data 1 2 3 4 5 N
Information is well organized 1 2 3 4 5 N
Information is clear and easy to understand 1 2 3 4 5 N
Information is complete and accurate 1 2 3 4 5 N
The illustrations are clear and easy to follow 1 2 3 4 5 N
The number of illustrations are adequate 1 2 3 4 5 N

Comments & Suggestions? (please be specific) ____________________________

_____________________________________________________________________

_____________________________________________________________________

_____________________________________________________________________

_____________________________________________________________________

_____________________________________________________________________

_____________________________________________________________________

_____________________________________________________________________

_____________________________________________________________________

_____________________________________________________________________

_____________________________________________________________________

_____________________________________________________________________

_____________________________________________________________________

_____________________________________________________________________

INCON TECHNICAL SERVICES
74 INDUSTRIAL PARK ROAD
SACO ME 04072 USA
FAX#: 207-282-9002
Sale and Supply Orders:

Please circle (1 = no / poor, 2 = fair, 3 = okay, 4 = good, 5 = yes / excellent, N = don’t know)

Your order was processed quickly 1 2 3 4 5 N
You were treated professionally & with respect 1 2 3 4 5 N
You received what you ordered on time 1 2 3 4 5 N

Sales Suggestions
________________________________________________________________________________
________________________________________________________________________________
________________________________________________________________________________

Technical Service / Support (Name of the service organization that you contacted?):
________________________________________________________________________________

Please circle (1 = no / poor, 2 = fair, 3 = okay, 4 = good, 5 = yes / excellent, N = don’t know)

Your call was processed quickly 1 2 3 4 5 N
Help and advice was professional & accurate 1 2 3 4 5 N
You were not kept on hold (for a long time) 1 2 3 4 5 N

Service / Support Suggestions
________________________________________________________________________________
________________________________________________________________________________
________________________________________________________________________________

Your INCON system or product:

Please circle (1 = no / poor, 2 = fair, 3 = okay, 4 = good, 5 = yes / excellent, N = don’t know)

Operates well and as expected 1 2 3 4 5 N
You are pleased with your purchase 1 2 3 4 5 N
You would buy / recommend INCON products 1 2 3 4 5 N

Product Comments & Suggestions
________________________________________________________________________________
________________________________________________________________________________
________________________________________________________________________________

Thanks for your help & advice!
Overall Information & Requirements

This equipment complies with Part 68 of the FCC Rules. On the bottom of the equipment exterior, near the telephone and serial ports, there is a label that contains, among other information, the FCC Registration Number and the Ringer Equivalence Number (REN) for this equipment. You must, upon request, provide this information to your telephone company.

The REN is useful to determine the quantity of devices you may connect to your telephone line and still have all those devices ring when your telephone numbers are called. In most, but not all areas, the sum of the REN’s of all devices connected to one line should not exceed five. To be certain of the number of devices you may connect to your line, as determined by the REN, you should contact your telephone company to determine the maximum REN for your calling area.

If your telephone equipment causes harm to the telephone network, your telephone company may discontinue your service temporarily. If possible, they will notify you in advance. But if advance notice is not practical, you will be notified as soon as possible. You will be informed of your right to file a complaint with the FCC.

Your telephone company may make changes in its facilities, equipment, operations or procedures that could affect the proper functioning of your equipment. If they do, you will be notified in advance to give you an opportunity to maintain uninterrupted telephone service.

Should you experience trouble with this equipment, TS-1001/504 / TS-2001/508, please contact INCON Technical Service, in the U.S.A., for repair or warranty information, at 1-800-98INCON. If the equipment is causing harm to the telephone network, the telephone company may request that you disconnect the equipment.

Only INCON certified technicians may make repairs to this equipment, TS-1001/504 / TS-2001/508. Please call your local distributor for service or INCON Technical Service for assistance.

This equipment cannot be used on a public coin phone service provided by the telephone company. Connection to a party line service is subject to state tariffs. (Contact the state public utility commission, public service commission or corporation commission for information.)
INDUSTRY CANADA   Information & Requirements

CP-01 Issue 8, Part I, Section 14.1

“NOTICE: The Industry Canada Label identifies certified equipment. This certification means that the equipment meets certain telecommunications network protective, operational and safety requirements as prescribed in the appropriate Terminal Equipment Technical Requirements document(s). The Department does not guarantee the equipment will operate to the user’s satisfaction.

Before installing this equipment, users should ensure that it is permissible to be connected to the facilities of the local telecommunications company. The equipment must also be installed using an acceptable method of connection. The customer should be aware that compliance with the above conditions may not prevent degradation of service in some situations.

Repairs to certified equipment should be coordinated by a representative designated by the supplier. Any repairs or alterations made by the user to this equipment, or equipment malfunctions, may give the telecommunications company cause to request the user to disconnect the equipment.

Users should ensure for their own protection that the electrical ground connections of the power utility, telephone lines and internal metallic water pipe system, if present, are connected together. This precaution may be particularly important in rural areas.

CAUTION Users should not attempt to make such connections themselves, but should contact the appropriate electric inspection authority, or electrician, as appropriate.”

CP-01, Issue 8, Part I, Section 14.2

“NOTICE: The Ringer Equivalence Number (REN) assigned to each terminal device provides an indication of the maximum number of terminals allowed to be connected to a telephone interface. The termination on an interface may consist of any combination of devices subject only to the requirement that the sum of the Ringer Equivalence Numbers of all the devices does not exceed 5.”