

# TLS-350PLUS Automatic Tank Gauge

Console Description	The TLS-350PLUS Automatic Tar the benefits of in-tank inventory, lea compliance. It is intended for retail operations.	k detection, and	TLS=350			
	Part # & Description		Software Enhancement Modules			
TLS-350PLUS Consoles, Standard Hardware & Software	1. 848290-022 TLS-350PLUS Console with Integral Printer - 120V UL/cUL 2. 848290-002 TLS-350PLUS Console without Integral Printer - 120V UL/cUL		1. 330160-002 Continuous Statistical Leak Detection (CSLD) for TLS-350 Series Consoles 2. 330160-003 Fuel Manager for TLS-350 Series Consoles 3. 330160-010 Ultimate Testing: Pressurized Line Leak Detection (PLLD) for TLS-350 Series Consoles 4. 330160-060 Risk Management: Wireless/Pressurized Line Leak Detection (PLLD) for TLS-350 Series Consoles 5. 330160-050 Base Compliance: Wireless/Pressurized Line Leak Detection (PLLD) for TLS-350 Series Consoles 6. 330160-004 In-Station Diagnostics (ISD): for TLS-350 Series Consoles			
		partment Interfac				
	· · ·	ole unless otherw	<u>,                                      </u>	(Limit 8 per console unless other		
	Description	Part #	Interfacing Device Part #'s	Description	Part #	
TLS-350PLUS Device Modules	Four-Input Probe Module	329356-002	Used for interface to all Mag Probes	Four-Relay Output Module – Provides dry contact switch for 120 VAC source (used for positive shutdown or external alarms)	329359-001	
	Eight-Input Smart Sensor Module	329356-004	Used to Interface with Mag Sump Sensors only	Two-Input/Two-Relay Output Interface — 2 inputs provide 12VDC - 35VDC rated input, outputs rated 120V for Generator applications and Pump Sensing	329360-001	
	Vacuum Sensor Module, Seven- Input Smart Sensor w/ Embedded Pressure Sensor Interface for Vac Sensor Monitoring & ISD (min. 1 req'd for Vac Sensor Monitoring)	332250-001	Used to Interface with vacuum sensors and Mag Sump Sensors	Four-Input Pump Sense Module (1 per 4 STPs req'd for Continuous STP Run Monitor feature with software V27 or higher) — Used with Continuous STP run Monitory and CSLD, 120V	329999-001	
	Eight-Input Interstitial/Liquid Sensor Module for use with Series 7943 Liquid Sensors	329358-001	Series 7943 Liquid Sensors include 794380- 322/352, 794380- 209/209/323/333, 794390- 409/420/430/460,794380- 301/303/304, 794690-xxx	Pump Relay Monitor Module (1 per 4 STPs req'd for Continuous STP Run Monitor feature with software V27 or higher). Rated for 240V – Designed to detect faulty STP control relay	847490-504	
	Five-Input Vapor Sensor Module for use with Series 7943 Vapor Sensors	329357-001	Series 7943 Vapor sensors include 794390-700	Dispenser Controller Module – 10 amp relay, 120V – controls dispenser power for shut down purposes	331408-001	
	Five-Input Groundwater Sensor Module for use with Series 7943 Groundwater Sensors	329399-001	Series 7943 Groundwater Sensors include 794380- 621/622/624	Three-Output Pressurized Line Leak Controller (Max 2/console for use w/ PLLD) – Provides dispenser handle inputs and high power output to STP control relays – 120V	330374-001	
	Eight-Input Type A Sensor Module for use with Series 7943 Non- Discriminating Dispenser Pan & Containment Sump Sensors	329956-001	Series 7943 Non- Discriminating Dispenser Pan & Containment Sump Sensors include 794380-321/351,794380- 343/344/345			
	Six-Input Type B Sensor Module for use with Series 7943 Discriminating Dispenser Pan & Containment Sump Sensors	329950-001	Series 7943 Discriminating Dispenser Pan & Containment Sump Sensors include 794380-320/350			
TLS-350PLUS Communications & Memory Expansion Modules	Communication Compartment Modules (Limit 4 per console unless otherwise noted)			Memory Expansion Modules		
	Description Part #			Description	Part #	
	RS-232 Interface Module with Auxiliary Port		330148-001	Memory Expansion Module for ECPU1 board, 1 MEG	333760-102	



## TLS-350PLUS Automatic Tank Gauge

December   Post   Pos		Comi	munication Compartment Modules (limit 4 per console unless oth	Memory Expansion Modules		
RS-227 Interface Module (Max 3/ronsole)  RS-228 Interface Module (Max 3/ronsole)  RS-229 Satellite Module  RS-229 Satelli			Description	Part #	Description	Part #
RE-322 Sardline Module  RE-322 Serial Satelline Module  RE-322 Serial Satelline Module  RE-322 Serial Satelline Module  RE-322 Serial Satelline Module  RE-322 Single Port Module, BDS, w/ Maintenance Tracker ID Resistor  Dual Port Rescote Display Module Satelline RS-323  Dual Port RS-350PLUS  Dual Port RS-438 Module/Serial Satelline RS-323  Serial Satelline RS-323  Dual Port RS-438 Module/Serial Satelline RS-32	TLS-350PLUS Communications & Memory Expansion Modules (Continued)	RS-23	2 Interface Module (Max 3/console)	329362-001	ECPU2 board, 1 MEG (req'd for version 27 or higher on > 8 tanks or	333760-201
Communications & Memory Expansion   Module Gentinued   Module (Continued   Module (Continued   Module (Continued   Module Seather Face (only used in Comm. Siots 3 & 4)   30386-011   Dual Port Remote Display Module Satellite R5-848 (Amoco)   30386-015   Dual Port Remote Display Module Satellite R5-848 (Amoco)   30386-015   Dual Port R8-485 Module Satellite R5-848 (Amoco)   30386-015   Dual Port R8-485 Module Satellite R5-848 (Amoco)   30386-015   Dual Port R8-485 Module Satellite (Shell)   30386-015   Dual Port R8-485 Module Sate		RS-23	2 Satellite Module	329362-003	ECPU2 board, 2 MEG (req'd for ISD	333760-203
Memory Expansion Modules (Continued)  Dual Port Remote Display Module Satellite Rev 222 33056-011  Dual Port Remote Display Module Satellite Rev 485 (Amoco) 330586-015  Dual Port Remote Display Module Satellite Rev 485 (Amoco) 330586-015  Dual Port Remote Display Module Satellite Rev 485 (Amoco) 330586-015  Dual Port Rev 522/ES-485 Module/Serial Satellite (Shell) 330586-015  Dual Port Rev 522/ES-485 Module/Serial Satellite (Shell) 330586-015  Resistor (only used in Comm Slots 3 & 4) 300586-017  Resistor		RS-23	2 Serial Satellite Module	329362-004	System Compatibilities Guide	
Modules (Continued) Dual Port Resource Display Module Satellite Res 2322 33086-0011 Dual Port Remote Display Module Satellite Res 2322 33086-011 Dual Port Remote Display Module Satellite Res 2322 33086-015 Dual Port Remote Display Module Satellite Res 486 (Amoon) 33086-017 Resistor (only used in Comm Solids Satellite Res 486 (Amoon) 33086-017 Resistor (only used in Comm Solids Satellite Res 486 (Amoon) 33086-017 Resistor (only used in Comm Solids Satellite Res 486 (Amoon) 33086-017 Resistor (only used in Comm Solids Satellite Res 486 (Amoon) 33086-017 Resistor (only used in Comm Solids Satellite Res 486 (Amoon) 33086-017 Resistor (only used in Comm Solids Satellite Res 486 (Amoon) 33086-017 Resistor (only used in Comm Solids Satellite Res 486 (Amoon) 33086-017 Resistor (only used in Comm Solids Satellite Res 486 (Amoon) 33086-017 Resistor (only used in Comm Solids Satellite Res 2227 (Amoon Solids Port Communications Module Dis vision Satellite (Res 247 (Amoon Solids Port Communications Module Solids Satellite Res 247 (Amoon Solids Satelli		RS-23	2 Single Port Module, DB25, w/ Maintenance Tracker ID Resistor	329362-005	Feature/Console PC	TI C 250D
Dual Port Remote Display Module Satellite RS-232 [33058-011] Dual Port Remote Display Module Satellite RS-232 [33058-011] Dual Port RS-485 Module/Point Statellite (Shell) [33058-015] Dual Port RS-485 Module/Display Module Satellite RS-485 (Anoco) [34058-015] Dual Port RS-485 Module/Display Module Satellite (Shell) [33058-016] Resistor (only used in Commod Stories 3 & 4) [33058-017] Site-Fax.* Module 300.71200/2400-Baud Fax/Modern Interface (Max 3/ console, phone cable included) [330020-425] Specifications  Specifications  Operating Temperature [422 to +118°F (0 to +45°C)] Complete Trop/IP Communications Module [330020-425] Storage Temperature [422 to +118°F (0 to +45°C)] Retained Individual Indi		Dual F	Port RS-232/RS-485 Module Interface (only used in Comm. Slots 3 & 4)	330586-001		PC-350R
Dual Port RS-485 Module/Serial Satellite (Shell)  Pual Port RS-232/RS-485 Module DB9 with Maintenance Tracker ID Resistor Confuy used in Corms Notos 3 & 4)  SiteFax* Module 300/1200/2400-Baud Fax/Modem Interface (Max 3/ console, phone cable included)  Specifications  Specifications  Operating Temperature  Poperating Temperature  +32 to +118*F (0 to +45*C)  Storage Temperature  +32 to +118*F (0 to +74*C)  Indidors, climate-controlled space  Residue Humidity  O-90% (non-condensing)  External Dimensions  19.75* x 11.25* x 7.1875* (50.165cm x 28.575cm x 18.26cm)  Console Power Wiring  Requirements  AC Power Wiring — Wires carrying 120 or 240 VAC from power panel to the console should be #14.AWG (or larger) wire for line, neutral & chassis ground (3); and 4 s.g. mm, rated for at least 90C for barrier ground.  AC Power Wiring — Wires carrying 120 or 240 VAC from power panel to the console should be #14.AWG (or larger) wire for line, neutral & chassis ground (3); and 4 s.g. mm, rated for at least 90C for barrier ground.  AC Power Wiring — Wires carrying 120 or 240 VAC from power panel to the console should be #14.AWG (or larger) wire for line, neutral & chassis ground (3); and 4 s.g. mm, rated for at least 90C for barrier ground.  AC Power Wiring — Wires carrying 120 or 240 VAC from power panel to the console should be #14.AWG (or larger) wire for line, neutral & chassis ground (3); and 4 s.g. mm, rated for at least 90C for barrier ground.  AC Power Wiring — Wires carrying 120 or 240 VAC from power panel to the console should be #14.AWG (or larger) wire for line, neutral & chassis ground (3); and 4 s.g. mm, rated for at least 90C for barrier ground.  1. Wire Type — Shielded cable required ragardless of conduit material or simplication. It must be rated less than 100 pioclared per fit manufactured with a situable material such as Carol C2534 or Beldem 8076, 9760, or 8770.  1. Wire Legal h — Maximum 1,000f (30A 8m).  3. Wire Gauges — Color coded — shielded cable usequired large large large large large large large large		Dual F	Port Remote Display Module Satellite RS-232	330586-011		
Dual Port R8-232/RS-485 Module D89 with Maintenance Tracker ID Riselator (only used in Comm Sicts 3 & 4) Riselator (only used in Comm Sicts 3 & 4) Riselator (only used in Comm Sicts 3 & 4) Riselator (only used in Comm Sicts 3 & 4) Riselator (only used in Comm Sicts 3 & 4) Riselator (only used in Comm Sicts 3 & 4) Riselator (only used in Comm Sicts 3 & 4) Riselator (only used in Comm Sicts 3 & 4) Riselator (only used in Comm Sicts 3 & 4) Riselator (only used in Comm Sicts 3 & 4) Riselator (only used in Comm Sicts 3 & 4) Riselator (only used in Comm Sicts 3 & 4) Riselator (only used in Comm Sicts 3 & 4) Riselator (only used in Comm Sicts 3 & 4) Riselator (only used in Comm Sicts 3 & 4) Riselator (only used in Comm Sicts 3 & 4) Riselator (only used in Comm Sicts 3 & 4) Riselator (only used in Comm Sicts 3 & 4) Riselator (only used in Country (only used in Riselator 1) Riselator (only used in Comm Sicts 3 & 4) Riselator (only used in Country (only used in Riselator 1) Riselator (only used in Country (only used in Riselator 1) Riselator (only used in Country (only used in Riselator 1) Riselator (only used in Country (only used in Riselator 1) Riselator (only used in Country (only used in Riselator 1) Riselator (only used in Country (only used in Riselator 1) Riselator (only used in Country (only used in Riselator 1) Riselator (only used in Country (only used in Riselator 1) Riselator (only used in R		Dual F	Port Remote Display Module Satellite RS-485 (Amoco)	330586-015	CONSOLE DESIGN	
Dual Fort RS-322/RS-485 Module DBM with Maintenance Iracker ID Resistor (only used in Cormin Stots 2 & 4.)   SiteFax** Module 3001/1200/2400-Baud Fax/Modem Interface (Max 3/ 30014-9002   Ethernet TCP/IP Communications Module		Dual F	Port RS-485 Module/Serial Satellite (Shell)	330586-016	· · · · · · · · · · · · · · · · · · ·	•
Stefax* Module 300/1200/2400-Baud Fax/Modem Interface (Max 3/ 30149-002				330586-017		Optional
Console, phone cable included    Ethemet TCP/IP Communications Module   330020-425						
Specifications  Operating Temperature  +32 to +118 IF (0 to +45°C)  Storage Temperature  -40 to +162°F (-40 to +74°C)  Installation Location  Relative Humidity  0-99% (non-condensing)  External Dimensions  19.75° x 11.25° x 7.1875° (50.165cm x 28.575cm x 18.26cm)  Construction  16GA (0.060 in/0.1524 cm) powder coated steel  AC Power Wirring Accomments  AC Power Wirring - Wires carrying 120 or 240 VAC from power panel to the console should be #14 AWG (or larger) wire for line, neutral & chassis ground (3); and 4 sq. mm, rated for at least 90C for barrier ground.  AC Power Wirring - Wires carrying 120 or 240 VAC from power panel to the console should be #14 AWG (or larger) wire for line, neutral & chassis ground (3); and 4 sq. mm, rated for at least 90C for barrier ground.  1. Wire Type - Shielded cable required regardless of conduit material or application. It must be rated less than 100 picofarad per ft manufactured with a uitable material such as Carol C2534 or Belden 8876, 876, 00 ref vol.  2. Wire Length - Maximum 1,000ft (304 8m), to meet intrinsic safety requirements. Improper system operation could result for runs over 1,000ft (304 8m).  2. Wire Gauges - Color coded - shielded cable used in all installations. Wires should be #14 #18 AWG stranded copper wire and installed as Class 2 circuits. As an alternate method when approved by the local authority having jurisdiction, #22 AWG wire such as 88761 may be suitable with the following requirements: wire run is less than 750ft (228 Amg. Capacitance does not exceed 100 pF/ft; Inductance does not exceed 0.2 uH/ft.  System Power Requirements  Universal AC power supply: 100 to 249VAC, 50/60Hz, 2A max.  Display Specifications  20 character liquid crystal display  Custom User Access  Front Panel Display control through user specific log-in  Third Party Evaluations  http://www.nwglde.org/evals/veeder_root_xf.html				330149-002	Business Inventory Reconciliation	-
Complete Inventory Reports		Etherr	net TCP/IP Communications Module	330020-425	<del>                                   </del>	
Programmable Auto Report Times  \$	0				<u> </u>	- 1
Operating Temperature  -40 to +18°F (0 to +48°C)  Inventory Increase Report  -40 to +162°F (-40 to +74°C)  Installation Location  Relative Humidity  0-90% (non-condensing)  External Dimensions  19.75° x 11.25° x 71.875° (50.165cm x 28.875cm x 18.26cm)  Construction  16GA (0.060 in/0.1524 cm) powder coated steel  AC Power Wiring Requirements  AC Power Wiring — Wires carrying 120 or 240 VAC from power panel to the console should be #14 AWG (or larger) wire for line, neutral & chassis ground (3); and 4 sq. mm, rated for at least 90°C for barrier ground.  AC Power Wiring — Wires carrying 120 or 240 VAC from power panel to the console should be #14 AWG (or larger) wire for line, neutral & chassis ground (3); and 4 sq. mm, rated for at least 90°C for barrier ground.  1. Wire Type — Shielded cable required regardless of conduit material or application. It must be rated less than 100 picofarad per ft manufactured with a suitable material such as Carol C2534 or Belden 83°Gb, 8760, or 8770.  2. Wire Length — Maximum 1,000ft (304.8m) to meet intrinsic safety requirements. Improper system operation could result for runs over 1,000ft (304.8m).  3. Wire Gauges — Color coded — shielded cable used in all installations. Wires should be #14 #18 AWG stranded copper wire and installed as Class 2 circuits. As an alternate method when approved by the local authority having jurisdiction, 822 AWG wire such as 83°f1 may be suitable with the following requirements: wire run is less than 750ft (228 6m); Capacitance does not exceed 100 pF/ft; inductance does not exceed 0.2 uH/ft.  System Power Requirements Display Specifications  Universal AC power supply: 100 to 249VAC, 50/60Hz, 2A max.  Display Specifications  Universal AC power supply: 100 to 249VAC, 50/60Hz, 2A max.  Display Specifications  Universal AC power supply: 100 to 249VAC, 50/60Hz, 2A max.  Display Specifications  Universal AC power supply: 100 to 249VAC, 50/60Hz, 2A max.  Display Specifications  Universal AC power supply: 100 to 249VAC, 50/60Hz, 2A max.  Display Specificatio	Specifications				l <del>-                                   </del>	
Installation Location Indoors, climate-controlled space Relative Humidity  0-90% (non-condensing)  19.75" x 11.25" x 7.1875" (50.165cm x 28.575cm x 18.26cm)  Construction  16GA (0.060 in/0.1524 cm) powder coated steel  AC Power Wiring - Wires carrying 120 or 240 VAC from power panel to the console should be #14 AWG (or larger) wire for line, neutral & chassis ground (3); and 4 sq. mm, rated for at least 90C for barrier ground.  AC Power Wiring - Wires carrying 120 or 240 VAC from power panel to the console should be #14 AWG (or larger) wire for line, neutral & chassis ground (3); and 4 sq. mm, rated for at least 90C for barrier ground.  1. Wire Type - Shielded cable required regardless of conduit material or application. It must be rated less than 100 picofarad per ft manufactured with a suitable material such as Carol C253A or Belden 88760, 8760, or 8770. 2. Wire Length - Maximum 1,000ft (304.8m) to meet intrinsic safety requirements. Improper system operation could result for runs over 1,000ft (304.8m) to meet intrinsic safety requirements. Improper system operation could result for runs over 1,000ft (304.8m) to meet intrinsic safety requirements. Improper system operation could result for runs over 1,000ft (304.8m) to meet intrinsic safety requirements. Improper system operation could result for runs over 1,000ft (304.8m).  3. Wire Gauges — Color coded — shielded cable used in all installations. Wires should be #14 #18 AWG stranded copper wire and installed as Class 2 circuits. As an alternate method when approved by the local authority having inradiction, #22 AWG wire such as 8875 in may be suitable with the following requirements: wire run is less than 750ft (228.6m); Capacitance does not exceed 100 pF/ft; Inductance does not exceed 0.2 uH/ft.  System Power Requirements  Display Specifications  20 character liquid crystal display  Custom User Access  Front Panel Display control through user specific log-in  Approvals  Ut. cUt., ATEX, IECEX  Third Party Evaluations  http://www.nwglde.org/evals/veeder.root.z	Operating Temperature		+32 to +118°F (0 to +45°C)		-	•
Relative Humidity  0-90% (non-condensing)  External Dimensions  19.75° x 11.25° x 7.1875° (50.165cm x 28.575cm x 18.26cm)  Construction  16.GA (0.060 in/0.1524 cm) powder coated steel  AC Power Wiring Requirements  AC Power Wiring – Wires carrying 120 or 240 VAC from power panel to the console should be #14 AWG (or larger) wire for line, neutral & chassis ground (3); and 4 sq. mm, rated for at least 90C for barrier ground.  1. Wire Type – Shielded cable required regardless of conduit material or application. It must be rated less than 100 picofarad per if tmanufactured with a suitable material such as Carol C2534 or Belden 88760, 8760, or 8770.  2. Wire Length – Maximum 1,000ft (304.8m) to meet intrinsic safety requirements. Improper system operation could result for runs over 1,000ft (304.8m).  3. Wire Gauges – Color coded – shielded cable used in all installations. Wires should be #14 -#18 AWG stranded copper wire and installed as Class 2 circuits. As an alternate method when approved by the local authority having prequirements: wire run is less than 750ft (228.6m); Capacitance does not exceed 100 pF/ft; Inductance does not exceed 0.2 uH/ft.  System Power Requirements  Universal AC power supply: 100 to 249VAC, 50/60Hz, 2A max.  Display Specifications  20 character liquid crystal display  Custom User Access  Front Panel Display control through user specific log-in  Third Party Evaluations  119.75° x 11.25° x 7.1875° (50.165cm x 28.575cm x 18.26cm)  129.75° x 11.25° x 7.1875° (50.165cm x 28.575cm x 18.26cm)  139.75° x 11.25° x 7.1875° (50.165cm x 28.575cm x 18.26cm)  140.75° x 11.25° x 7.1875° (50.165cm x 28.575cm x 18.26cm)  150.86ectable Test Rates  150.26ectable Test Rates  150.26ectable Test Rates  160.26ectable Test Rates  170.26ectable Test Rates  180.26ectable Test Rates  180.26ectable Test Rates  180.26ectable Test Rates  180.26ectable Test Rates  18	Storage Temperature		-40 to +162°F (-40 to +74°C)		IN-TANK LEAK TEST	
Decision	Installation Location		Indoors, climate-controlled space		0.1 GPH Tank Tightness Testing	•
Detection   Detection   Detection   Detection   Detection   Construction   16GA (0.060 in/0.1524 cm) powder coated steel   Selectable Test Rates   Programmable Automatic Test Schedules   PASS, FAIL, or INVALID Indicators   Console Power Wiring Requirements   AC Power Wiring — Wires carrying 120 or 240 VAC from power panel to the console should be #14 AWG (or larger) wire for line, neutral & chassis ground (3); and 4 sq. mm, rated for at least 90°C for barrier ground.   ILNE LEAK DETECTION   Integral Line Leak Detector   Optional Programmable Line Test Features   Optional Integral Line Leak Detector   Optional Programmable Line Test Features   Optional Integral Line Leak Detector   Optional Integral Line Leak	Relative Humidity		0-90% (non-condensing)			•
Selectable Test Rates   Construction   16GA (0.060 in/0.1524 cm) powder coated steel			19.75" x 11.25" x 7.1875" (50.165cm x 28.575cm x 18.26		Optional	
AC Power Wiring Requirements  AC Power Wiring - Wires carrying 120 or 240 VAC from power panel to the console should be #14 AWG (or larger) wire for line, neutral & chassis ground (3); and 4 sq. mm, rated for at least 90C for barrier ground.  1. Wire Type - Shielded cable required regardless of conduit material or application. It must be rated less than 100 picofarad per ft manufactured with a suitable material such as Carol (2534 or Belden 88760, 8760, or 870.  2. Wire Length - Maximum 1,000ft (304.8m) to meet intrinsic safety requirements. Improper system operation could result for runs over 1,000ft (304.8m).  3. Wire Gauges - Color coded - shielded cable used in all installations. Wires should be #14 - #18 AWG stranded copper wire and installed as Class 2 circuits. As an alternate method when approved by the local authority having jurisdiction, #22 AWG wire such as 88761 may be suitable with the following requirements: wire run is less than 750ft (22.8m); Capacitance does not exceed 100 pF/ft; Inductance does not exceed 0.2 uH/ft.  System Power Requirements  Universal AC power supply: 100 to 249VAC, 50/60Hz, 2A max.  Display Specifications  20 character liquid crystal display  Custom User Access  Front Panel Display control through user specific log-in  UL cUL, ATEX, IECEX  http://www.nwglde.org/evals/veeder_rool_zf.html  Schodules  PASS, FAIL, or INVALID Indicators  LINE LEAK DETECTION  Integral Line Leak Detector Optional  Integral Line Leak Detec	Construction		16GA (0.060 in/0.1524 cm) powder coated steel		•	
A C Power Wiring Requirements  A C Power Wiring - Wires carrying 120 or 240 VAC from power panel to the console should be #14 AWG (or larger) wire for line, neutral & chassis ground (3); and 4 sq. mm, rated for at least 90°C for barrier ground.  1. Wire Type - Shielded cable required regardless of conduit material or application. It must be rated less than 100 picofarad per ft manufactured with a suitable material such as Carol C2534 or Belden 88760, 8760, or 8770.  2. Wire Length - Maximum 1,000ft (304.8m) to meet intrinsic safety requirements. Improper system operation could result for runs over 1,000ft (304.8m).  3. Wire Gauges - Color coded - shielded cable used in all installations. Wires should be #14 -#18 AWG stranded copper wire and installed as Class 2 circuits. As an alternate method when approved by the local authority having jurisdiction, #22 AWG wire such as 88761 may be suitable with the following requirements: wire run is less than 750ft (228.6m); Capacitance does not exceed 100 pF/ft; Inductance does not exceed 0.2 uH/ft.  System Power Requirements  Universal AC power supply: 100 to 249VAC, 50/60Hz, 2A max.  Display Specifications  20 character liquid crystal display  Custom User Access  Front Panel Display control through user specific log-in  Line LEAK DETECTION  Integral Line Leak Detector Optional  NTERSTITIAL/SUMP LEAK SENSING  Tank Annulus  • Sump  Symp  Dispenser Pan  Mag Sump  • Sensor Location Identifiers  VAPOR WELL MONITORING  Hydrocarbon Vapor Detection  • High Water Level Alarm  • GROUNDWATER MONITORING  Hydrocarbon Liquid Detection  • Low Water Alarm  • SECONDARY CONTAINMENT VACUUM SENSING SYSTEM (SCVS)  Vacuum Sensors  • AIR VAPOR MONITORING  In Station Diagnostics (ISD)  Optional  Vapor Pressure Sensor  Optional  Vapor Pressure Sensor  Optional				Schedules	•	
Requirements    Console should be #14 AWG (of larger) Wire for line, neutral & chassis ground (3); and 4 sq. mm, rated for at least 90C for barrier ground.    Integral Line Leak Detector   Optional Programmable Line Test Features   Optional Integral Line Leak Detector   Optional Programmable Line Test Features   Optional Integral Line Leak Detector   Optional Programmable Line Test Features   Optional Integral Line Leak Detector   Optional Programmable Line Test Features   Optional Integral Line Leak Detector   Optional Programmable Line Test Features   Optional Integral Line Leak Detector   Optional Programmable Line Test Features   Optional Integral Line Leak Detector   Optional Programmable Line Test Features   Optional Integral Line Leak Detector   Optional Programmable Line Test Features   Optional Integral Line Leak Detector   Optional Programmable Line Test Features   Optional Integral Line Leak Detector   Optional Programmable Line Test Features   Optional Integral Line Leak Detector   Optional Programmable Line Test Features   Optional Integral Line Leak Detector   Optional Programmable Line Test Features   Optional Integral Line Leak Detector   Optional Programmable Line Test Features   Optional Integral Line Leak Detector   Optional Integral Line Leak Detector   Optional   Integral Line Leak Detector   Optional   Integral Line Leak Detector   Optional   Integral Line Leak Detector   Optional   Integral Line Leak Detector   Optional   Integral Line Leak Detector   Optional   Integral Line Leak Detector   Optional   Integral Line Leak Detector   Optional   Integral Line Leak Detector   Optional   Integral Line Leak Detector   Optional   Integral Line Leak Detector   Optional   Integral Line Leak Detector   Optional   Integral Line Leak Detector   Optional   Integral Line Leak Detector   Optional   Integral Line Leak Detector   Optional   Integral Line Leak Detector   Optional   Integral Line Leak Detector   Optional   Integral Line Leak Detector   Optional   Integral Line Leak Detector   Optional   Int	Console Power Wiring					
Programmable Line Test Features Optional INTERSTITIAL/SUMP LEAK SENSING  1. Wire Type — Shielded cable required regardless of conduit material or application. It must be rated less than 100 picofarad per ft manufactured with a suitable material such as Carol C2534 or Belden 88760, 8760, or 8770.  2. Wire Length — Maximum 1,000ft (304.8m) to meet intrinsic safety requirements. Improper system operation could result for runs over 1,000ft (304.8m).  3. Wire Gauges — Color coded — shielded cable used in all installations. Wires should be #14 +#18 AWG stranded copper wire and installed as Class 2 circuits. As an alternate method when approved by the local authority having jurisdiction, #22 AWG wire such as 88761 may be suitable with the following requirements: wire run is less than 750ft (228.6m); Capacitance does not exceed 100 pF/ft; Inductance does not exceed 0.2 uH/ft.  System Power Requirements  Universal AC power supply: 100 to 249VAC, 50/60Hz, 2A max.  Display Specifications  20 character liquid crystal display  Custom User Access  Front Panel Display control through user specific log-in  Approvals  UL cUL, ATEX, IECEX  http://www.nwglde.org/evals/veeder_root_zf.html  Programmable Line Test Features Optional INTERSTITIAL/SUMP LEAK SENSING  Tank Annulus  Sump  Dispenser Pan  Mag Sump  Sensor Location Identifiers  VAPOR WELL MONITORING  Hydrocarbon Vapor Detection  High Water Level Alarm  • SECONDARY CONTAINMENT VACUUM SENSING SYSTEM (SCVS)  Vacuum Sensors  • Low Water Alarm  • SECONDARY CONTAINMENT VACUUM SENSING SYSTEM (SCVS)  Vacuum Sensors  • AIR VAPOR MONITORING  In-Station Diagnostics (ISD) Optional  Vapor Pressure Sensor Optional					Optional	
1. Wire Type − Shielded cable required regardless of conduit material or application. It must be rated less than 100 picofarad per ft manufactured with a suitable material such as Carol C2534 or Belden 88760, 8760, or 8770.  2. Wire Length − Maximum 1,000ft (304.8m) to meet intrinsic safety requirements. Improper system operation could result for runs over 1,000ft (304.8m).  3. Wire Gauges − Color coded − shielded cable used in all installations. Wires should be #14 - #18 AWG stranded copper wire and installed as Class 2 circuits. As an alternate method when approved by the local authority having jurisdiction, #22 AWG wire such as 88761 may be suitable with the following requirements: wire run is less than 750ft (228.6m); Capacitance does not exceed 100 pF/ft; Inductance does not exceed 0.2 uH/ft.  System Power Requirements  Universal AC power supply: 100 to 249VAC, 50/60Hz, 2A max.  Display Specifications  20 character liquid crystal display  Custom User Access  Front Panel Display control through user specific log-in  Approvals  UL cUL, ATEX, IECEX  Third Party Evaluations  1. Wire Type − Shielded cable required regardless of conduit material or application as 8760, 8760, or 8770.  Sump  1. Max Annulus  1. Mire Type − Shielded cable required regardles 8760, 8760, or 8770.  2. Wire Length − Maximum 1,000ft (304.8m) to meet intrinsic safety requirements over 1,000ft (304.8m).  2. Wire Length − Maximum 1,000ft (304.8m) to meet intrinsic safety requirements over 1,000ft (304.8m).  4. Wapor Well MoniToring  Front Panel Display control through user specific log-in  4. WaPor MoniToring  In-Station Diagnostics (ISD)  Optional  Vapor Pressure Sensor  Optional  Vapor Flowmeter  Optional			and 4 sq. min, rated for at least 200 for barrier ground.	<u> </u>	_	
1. Wire Type – Shielded cable required regardless of conduit material or application. It must be rated less than 100 picofarad per ft manufactured with a suitable material such as Carol C2534 or Belden 88760, 8760, or 8770.  2. Wire Length – Maximum 1,000ft (304.8m) to meet intrinsic safety requirements. Improper system operation could result for runs over 1,000ft (304.8m).  3. Wire Gauges – Color coded – shielded cable used in all installations. Wires should be #14 -#18 AWG stranded copper wire and installed as Class 2 circuits. As an alternate method when approved by the local authority having jurisdiction, #22 AWG wire such as 88761 may be suitable with the following requirements: wire run is less than 750ft (228.6m); Capacitance does not exceed 100 pF/ft; Inductance does not exceed 0.2 uH/ft.  System Power Requirements  Universal AC power supply: 100 to 249VAC, 50/60Hz, 2A max.  Display Specifications  20 character liquid crystal display  Custom User Access  Front Panel Display control through user specific log-in  Approvals  UL cUL, ATEX, IECEX  Third Party Evaluations  1. Wire Type – Shielded cable used in 10 picofarad per ft manufactured with a suitable with a suitable with a sefety requirements. Improper system operation could result for runs over 1,000ft (304.8m).  Sump  Dispenser Pan  Mag Sump  Sensor Location Identifiers  VAPOR WELL MONITORING  Hydrocarbon Vapor Detection  • High Water Level Alarm  • GROUNDWATER MONITORING  Hydrocarbon Liquid Detection  • Low Water Alarm  • SECONDARY CONTAINMENT VACUUM SENSING SYSTEM (SCVS)  Vacuum Sensors  • AIR VAPOR MONITORING  In-Station Diagnostics (ISD)  Optional  Vapor Pressure Sensor  Optional  Vapor Pressure Sensor  Optional				INTERSTITIAL/SUMP LEAK SENSI	NG	
application. It must be rated less than 100 picofarad per ft manufactured with a suitable material such as Carol C2534 or Belden 88760, 8760, or 8770.  2. Wire Length — Maximum 1,000ft (304.8m) to meet intrinsic safety requirements. Improper system operation could result for runs over 1,000ft (304.8m).  3. Wire Gauges — Color coded — shielded cable used in all installations. Wires should be #14 -#18 AWG stranded copper wire and installed as Class 2 circuits. As an alternate method when approved by the local authority having jurisdiction, #22 AWG wire such as 88761 may be suitable with the following requirements: wire run is less than 750ft (228.6m); Capacitance does not exceed 100 pF/ft; Inductance does not exceed 0.2 uH/ft.  System Power Requirements  Universal AC power supply: 100 to 249VAC, 50/60Hz, 2A max.  Display Specifications  20 character liquid crystal display  Custom User Access  Front Panel Display control through user specific log-in  Approvals  UL cul., ATEX, IECEX  Third Party Evaluations  Displaction. It must be rated less 48760, 87670.  Mag Sump  Sensor Location Identifiers  VAPOR WELL MONITORING  Hydrocarbon Vapor Detection  © RROUNDWATER MONITORING  Hydrocarbon Liquid Detection  © RROUNDWATER MONITORING  Hydrocarbon Liquid Detection  © SECONDARY CONTAINMENT VACUUM SENSING SYSTEM (SCVS)  Vacuum Sensors  © AIR VAPOR MONITORING  In-Station Diagnostics (ISD)  Optional  Vapor Pressure Sensor  Optional  Vapor Pressure Sensor  Optional				Tank Annulus	•	
Suitable material such as Carol C2534 or Belden 88760, 8760, or 8770.  2. Wire Length — Maximum 1,000ft (304.8m) to meet intrinsic safety requirements. Improper system operation could result for runs over 1,000ft (304.8m).  3. Wire Gauges — Color coded — shielded cable used in all installations. Wires should be #14 - #18 AWG stranded copper wire and installed as Class 2 circuits. As an alternate method when approved by the local authority having jurisdiction, #22 AWG wire such as 88761 may be suitable with the following requirements: wire run is less than 750ft (228.6m); Capacitance does not exceed 100 pF/ft; Inductance does not exceed 0.2 uH/ft.  System Power Requirements  Universal AC power supply: 100 to 249VAC, 50/60Hz, 2A max.  Display Specifications  20 character liquid crystal display  Custom User Access  Front Panel Display control through user specific log-in  Approvals  UL cUL, ATEX, IECEx  http://www.nwglde.org/evals/veeder_root_zf.html  Mag Sump Sensor Location Identifiers  • VAPOR WELL MONITORING  Hydrocarbon Vapor Detection  • High Water Level Alarm • GROUNDWATER MONITORING  Hydrocarbon Liquid Detection • Low Water Alarm • SECONDARY CONTAINMENT VACUUM SENSING SYSTEM (SCVS)  Vacuum Sensors • AIR VAPOR MONITORING  In-Station Diagnostics (ISD)  Optional  Vapor Pressure Sensor  Optional					<del></del>	•
2. Wire Length – Maximum 1,000ft (304.8m) to meet intrinsic safety requirements. Improper system operation could result for runs over 1,000ft (304.8m).  3. Wire Gauges – Color coded – shielded cable used in all installations. Wires should be #14 -#18 AWG stranded copper wire and installed as Class 2 circuits. As an alternate method when approved by the local authority having jurisdiction, #22 AWG wire such as 88761 may be suitable with the following requirements: wire run is less than 750ft (228.6m); Capacitance does not exceed 100 pF/ft; Inductance does not exceed 0.2 uH/ft.  System Power Requirements  Universal AC power supply: 100 to 249VAC, 50/60Hz, 2A max.  Display Specifications  20 character liquid crystal display  Custom User Access  Front Panel Display control through user specific log-in  Approvals  UL cUL, ATEX, IECEX  Third Party Evaluations  1.000ft (304.8m) to meet intrinsic safety requirements over 1,000ft (304.8m). The meet intrinsic safety requirements over 1,000ft (304.8m).  Sensor Location Identifiers  VAPOR WELL MONITORING  Hydrocarbon Vapor Detection  • WAPOR WELL MONITORING  Hydrocarbon Vapor Detection  • GROUNDWATER MONITORING  Hydrocarbon Liquid Detection  • Low Water Alarm  • SECONDARY CONTAINMENT VACUUM SENSING SYSTEM (SCVS)  Vacuum Sensors  • AIR VAPOR MONITORING  In-Station Diagnostics (ISD)  Optional  Vapor Pressure Sensor  Optional  Vapor Pressure Sensor  Optional				<del>- '</del>	•	
Probe & Sensor to Console Wiring Requirements    1,000ft (304.8m).			2. Wire Length – Maximum 1,000ft (304.8m) to meet intrinsic safet	<del></del>		
Wiring Requirements  3. Wire Gauges − Color coded − shielded cable used in all installations. Wires should be #14 - #18 AWG stranded copper wire and installed as Class 2 circuits. As an alternate method when approved by the local authority having jurisdiction, #22 AWG wire such as 88761 may be suitable with the following requirements: wire run is less than 750ft (228.6m); Capacitance does not exceed 100 pF/ft; Inductance does not exceed 0.2 uH/ft.  System Power Requirements  Universal AC power supply: 100 to 249VAC, 50/60Hz, 2A max.  Display Specifications  Custom User Access  Front Panel Display control through user specific log-in  Approvals  UL cUL, ATEX, IECEX  http://www.nwglde.org/evals/veeder_root_zf.html  Hydrocarbon Vapor Detection  High Water Level Alarm  GROUNDWATER MONITORING  Hydrocarbon Liquid Detection  Low Water Alarm  SECONDARY CONTAINMENT VACUUM SENSING SYSTEM (SCVS)  Vacuum Sensors  AIR VAPOR MONITORING  In-Station Diagnostics (ISD)  Optional  Vapor Pressure Sensor  Optional  Vapor Flowmeter  Optional	Droba & Canaar ta Cana	solo.	' ' ' ' '		•	
should be #14 -#18 AWG stranded copper wire and installed as Class 2 circuits. As an alternate method when approved by the local authority having jurisdiction, #22 AWG wire such as 88761 may be suitable with the following requirements: wire run is less than 750ft (228.6m); Capacitance does not exceed 100 pF/ft; Inductance does not exceed 0.2 uH/ft.  System Power Requirements  Universal AC power supply: 100 to 249VAC, 50/60Hz, 2A max.  Display Specifications  20 character liquid crystal display  Custom User Access  Front Panel Display control through user specific log-in  Approvals  UL cUL, ATEX, IECEx  Third Party Evaluations  http://www.nwglde.org/evals/veeder_root_zf.html  High Water Level Alarm  GROUNDWATER MONITORING  Hydrocarbon Liquid Detection  • Low Water Alarm  • SECONDARY CONTAINMENT VACUUM SENSING SYSTEM (SCVS)  Vacuum Sensors  • AIR VAPOR MONITORING  In-Station Diagnostics (ISD)  Carbon Canister Vapor Polisher  Optional  Vapor Pressure Sensor  Optional  Vapor Flowmeter  Optional		oole				
Circuits. As an alternate method when approved by the local authority naving jurisdiction, #22 AWG wire such as 88761 may be suitable with the following requirements: wire run is less than 750ft (228.6m); Capacitance does not exceed 100 pF/ft; Inductance does not exceed 0.2 uH/ft.  Secondary Containment Vacuum Sensing System Power Requirements  Universal AC power supply: 100 to 249VAC, 50/60Hz, 2A max.  Display Specifications  20 character liquid crystal display  Custom User Access  Front Panel Display control through user specific log-in  Approvals  UL cUL, ATEX, IECEx  Third Party Evaluations  Circuits. As an alternate method when approved by the local authority naving jurisdiction, #22 AWG wire such as 88761 may be suitable with the following Hydrocarbon Liquid Detection  ■ Secondary Containment Vacuum Sensing System (scvs)  Vacuum Sensors  ■ AIR VAPOR MONITORING  In-Station Diagnostics (ISD)  Optional  Carbon Canister Vapor Polisher  Optional  Vapor Pressure Sensor  Optional			should be #14 -#18 AWG stranded copper wire and installed as C	<del>  '                                 </del>		
Frequirements: wire run is less than 750ft (228.6m); Capacitance does not exceed 100 pF/ft; Inductance does not exceed 0.2 uH/ft.   Hydrocarbon Liquid Detection   Low Water Alarm   Low Water Alarm   Low Water Alarm   SECONDARY CONTAINMENT VACUUM SENSING SYSTEM (SCVS)						
System Power Requirements Universal AC power supply: 100 to 249VAC, 50/60Hz, 2A max.  Display Specifications 20 character liquid crystal display  Custom User Access Front Panel Display control through user specific log-in  Approvals UL cUL, ATEX, IECEx  Third Party Evaluations http://www.nwglde.org/evals/veeder_root_zf.html  ECON Water Alarm  SECONDARY CONTAINMENT VACUUM SENSING SYSTEM (SCVS)  Vacuum Sensors  AIR VAPOR MONITORING  In-Station Diagnostics (ISD) Optional  Carbon Canister Vapor Polisher Optional  Vapor Pressure Sensor Optional  Vapor Flowmeter Optional			requirements: wire run is less than 750ft (228.6m); Capacitance	<del> </del>	•	
System Power Requirements Universal AC power supply: 100 to 249VAC, 50/60Hz, 2A max.  Display Specifications 20 character liquid crystal display AIR VAPOR MONITORING  Custom User Access Front Panel Display control through user specific log-in  Approvals UL cUL, ATEX, IECEX  Third Party Evaluations http://www.nwglde.org/evals/veeder_root_zf.html  SYSTEM (SCVS)  Vacuum Sensors AIR VAPOR MONITORING  In-Station Diagnostics (ISD) Optional  Carbon Canister Vapor Polisher Optional  Vapor Pressure Sensor Optional  Vapor Flowmeter Optional			exceed 100 pF/ft; Inductance does not exceed 0.2 uH/ft.	Low Water Alarm	•	
System Power Requirements Universal AC power supply: 100 to 249VAC, 50/60Hz, 2A max.  Display Specifications 20 character liquid crystal display  Custom User Access Front Panel Display control through user specific log-in  Approvals UL cUL, ATEX, IECEx  Third Party Evaluations http://www.nwglde.org/evals/veeder_root_zf.html  Vacuum Sensors   Vacuum Sensors   In-Station Diagnostics (ISD) Optional  Carbon Canister Vapor Polisher Optional  Vapor Pressure Sensor Optional  Vapor Flowmeter Optional						
Custom User Access Front Panel Display control through user specific log-in  Approvals  UL cUL, ATEX, IECEx  Third Party Evaluations  Third Party Evaluations  Third Party Evaluations  Third Party Evaluations  Trivate Access Front Panel Display control through user specific log-in  In-Station Diagnostics (ISD)  Carbon Canister Vapor Polisher  Vapor Pressure Sensor  Optional  Vapor Flowmeter  Optional	System Power Requiren	ments Universal AC power supply: 100 to 249VAC, 50/60Hz, 2A max.			<u> </u>	
Approvals  UL cUL, ATEX, IECEX  Third Party Evaluations  UL cUL, ATEX, IECEX  http://www.nwglde.org/evals/veeder_root_zf.html  Carbon Canister Vapor Polisher  Vapor Pressure Sensor  Optional  Vapor Flowmeter  Optional	Display Specifications 20 character liquid crystal display			<u> </u>		
Third Party Evaluations http://www.nwglde.org/evals/veeder_root_zf.html Vapor Flowmeter Optional	Custom User Access		Front Panel Display control through user specific log-in		In-Station Diagnostics (ISD)	Optional
Third Party Evaluations <a href="http://www.nwglde.org/evals/veeder_root_zf.html">http://www.nwglde.org/evals/veeder_root_zf.html</a> Vapor Flowmeter Optional	Approvals		UL cUL, ATEX, IECEx		<del>                                   </del>	
	Third Party Evaluations		http://www.nwglde.org/evals/veeder_root_zf.html		<del>- '</del>	
Product Installation Guide https://www.veeder.com/us/technical-document-library * Standard in TLS-350R, Upgradeable in TLS-350PLUS	Product Installation Gui	ide	https://www.veeder.com/us/technical-document-library		<del>-                                   </del>	<u> </u>

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### **Example Illustrations**

Illustrations used in this guide for example sensor installations may contain components that are customer supplied and not included with the sensor. Please check with your Veeder-Root Distributor for recommended installation accessories.

### **Third Party Evaluations**

Third party evaluations of the Veeder-Root sensors contained in this application guide can be found under the Veeder-Root vendor name on the National Work Group on Leak Detection Evaluations (NWGLDE) website:

http://www.nwglde.org