

**Overview**

The Barton TankScan system is uniquely designed for optimizing distributed inventory management. The TankScan W Series product family is comprised of wireless measurement monitors, indicators, communication controllers and a full-featured PC based host software package. The battery-powered TankScan W Series Monitor combines cost effective sensor technologies with bi-directional RF wireless communications. A TankScan WC series controller communicates with up to 30 TankScan WL MIR level monitors, WU ultrasonic level monitors or WA 8-analog input monitors. The WC also exchanges information with WF fill indicators for local operations. Data from the monitors is collected and available to central data processing systems such as Barton's DataScan Plus PC software via telephone link or other means.

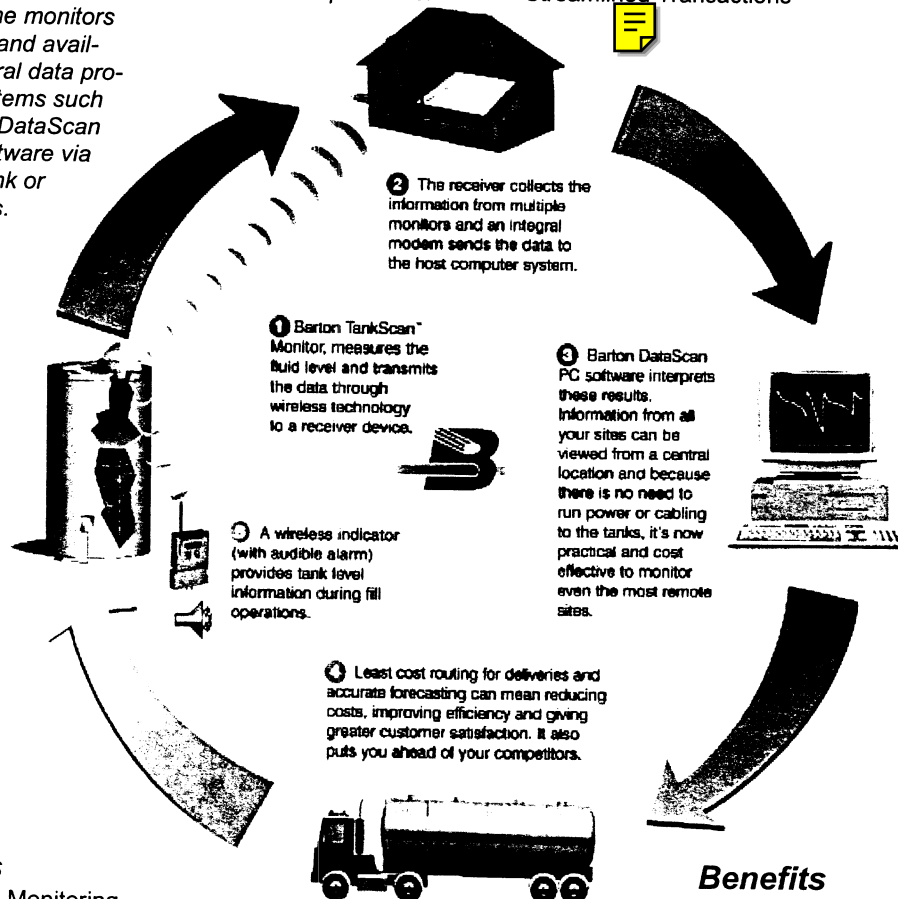
**TankScan™**  
**Wireless Measurement System**  
**for Distributed Inventory Applications**  
W Series: Bi-Directional

PubID:21825

PB-3c(8/00)

**Impact Potential**

- Improved Distribution/Logistics Management
- Optimized Inventory
- Increased Process Throughput
- Enhanced Customer Satisfaction
- Distribution Market Share Growth
- Streamlined Transactions

**Features**

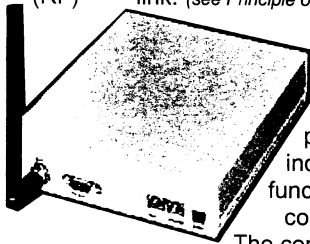
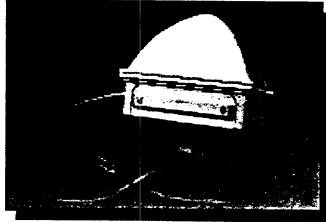
- Wireless Monitoring
- User Adjustable Measurement Intervals
- Bi-directional Communications
- Battery powered instruments
- Choice of level sensor or analog input monitor
- No Moving Parts
- No Calibration after initial setup
- Host Data Exchange via Modem or serial link
- Intrinsically safe for hazardous locations (pending)
- Scheduled or On-demand Data Reports

**Benefits**

- Simplicity
  - ✓ Installs In Minutes
- Affordability
  - ✓ Low deployment cost
  - ✓ Low cost of ownership
- Accuracy
- Dependability
- On-demand Data

## TankScan W Series Components

The **WL-2 TankScan Level Monitor** is an intrinsically safe instrument which consists of a hermetically sealed plastic (PBT) enclosure that houses the MIR impulse generating sensor and RF telemetry circuitry, a battery compartment and a flexible impulse wave-guide (probe). The WL-2 product is suitable for level measurements to approximately 20 feet (6m). Level data is exchanged with the WC-2 TankScan Controller via a wireless radio (RF) link. (see Principle of Operation on next page)

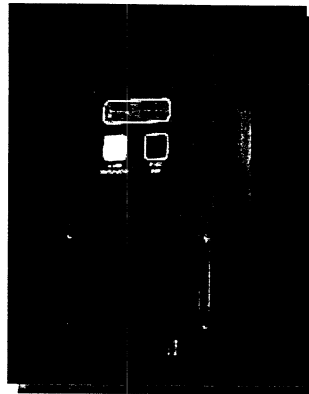


The **WC-2 TankScan Controller** is a general purpose device housed in a plastic enclosure suitable for indoor mounting. Its primary function is to control the local RF communications network.

The controller also stores measurement data in data logs for periodic or on-demand data exchange with the host system via its built-in modem or serial port. Communication between the controller and the host system is normally done on a preset interval. The system may also link to the host system on an emergency (alarm condition) or in response to a host call-in. The TankScan W-series' bi-directional RF network allows for on-demand data collection from the various monitors.

The controller also stores the local monitor network's configuration and this data may be updated directly from the host system. Firmware program updates may also be uploaded from the main host via the modem/serial link. This central configuration control is ideal for widely dispersed TankScan networks.

The **WF-2 TankScan Fill Indicator** is an innovative battery powered RF wireless indicator/high level alarm monitor that lets an operator monitor the product level or volume\* as a delivery is being made to the tank. A fill alarm is triggered when the tank specific fill set point is reached, alerting the operator to stop the fill process. The unit has a built-in 2 line by 16 digit LCD.



\*Volume readings require tank specific strapping

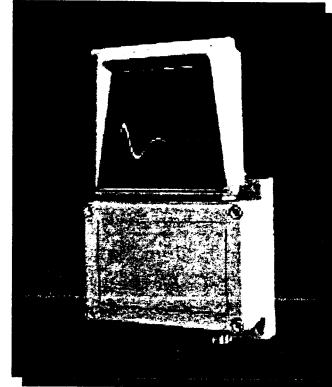
The **WA-2 Analog Input Monitor (AIM)** adds the capability of monitoring 4-20 mA and/or 0-5 VDC input signals through the local battery operated radio network, and seamlessly integrates the data from those inputs into the Host Software.

Each Analog Input Monitor accepts up to 8 analog inputs. The Monitor transmits the value of the measured inputs to the

TankScan System Controller via Barton's unique state-of-the-art battery powered radio network.

The Monitor incorporates an extensive array of features including simple periodic monitoring and reporting, on-demand measurement and reporting and continuous measurement with alarm setpoint comparison and reporting when a setpoint is exceeded. The Analog Input Monitor can also be used along with the Barton

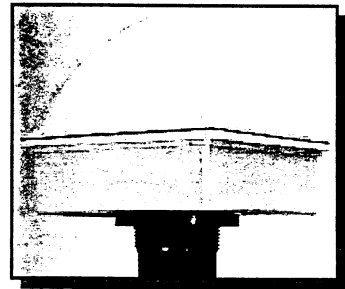
TankScan Fill Monitor during tank filling operations. The 8-input Analog Input Monitor occupies one of the 30 available positions on the radio network. The Analog Input Monitor can be used with the other available TankScan radio-based modules, in any combination, up to a maximum of 30 per System Controller. Additional System Controllers can be added to increase the number of modules that can be used in a single system. For example, one System Controller might handle up to 30 Analog Input Modules to allow monitoring up to 240 Analog Inputs. Multiple slave System Controllers can be added to handle additional inputs (level, 4-20 mA, etc.).



The **WU-2 Ultrasonic Level Monitor** combines the W series battery powered RF communications features with a high

quality ultrasonic level sensor. The monitor circuits are housed in a hermetically sealed plastic (PBT) enclosure. The rugged PVDF sensor assembly is ideally suited to harsh and corrosive tank environments. This

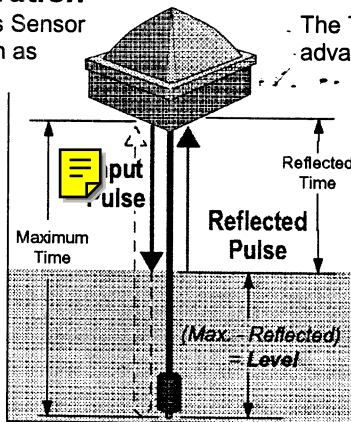
monitor offers accurate and reliable measurement in non-contact applications to 18 feet (5.5m). The WU-2 features an 8-degree signal beam for operation in restricted spaces.



## MIR Level Principle of Operation

The principle behind the WL-2 monitor's Sensor is based on a novel form of radar known as Ultra Wide Band (UWB) Impulse Radar. In operation, a very short, very low energy electromagnetic impulse is propagated from the top-mounted sensor down along a thin waveguide (probe) that is immersed in the measured fluid.

The sudden change in the dielectric at the fluid surface causes some of the impulse energy to be reflected back up the wave guide. The time difference between pulse reflections and the maximum calibrated time delay is proportional to the level of the fluid.



## Applications

### ✓ LIQUID PRODUCTS DISTRIBUTION

From a few tanks to several thousands, TankScan's simple architecture makes it ideal for monitoring inventories throughout your supply chain.

### ✓ VENDOR MANAGED INVENTORY

TankScan's economical, integrated solution reduces the cost of establishing a VMI program through lower capital costs, minimal maintenance and flexible data exchange.

### ✓ FEEDSTOCK USAGE MONITORING

Users can economically monitor their process feedstock supply and provide information directly to their suppliers to reduce expensive run-outs and process stoppages.

## System Features

### ✓ BUILT-IN SECURITY

The W-series can be readily deployed to any number of sites, regardless of their geographic location. Since each controller's configuration is centrally managed, there is no chance that unrecognized monitors can be polled for information. This built-in security feature eliminates any possibility of competitors gaining access to your tank inventory data.

### ✓ CENTRAL DATA MANAGEMENT

The W-series central configuration control also simplifies system maintenance. New tanks, or local tank farm changes can be readily adjusted from your operator workstation. You only have to maintain one database.

### ✓ MULTIPLE HOST ACCESS

Each controller can be set up to dial multiple host systems with multiple retries. This ensures that your data will get through to the host. Pager numbers can also be dialed by the controller on emergencies.

### ✓ DIAGNOSTICS

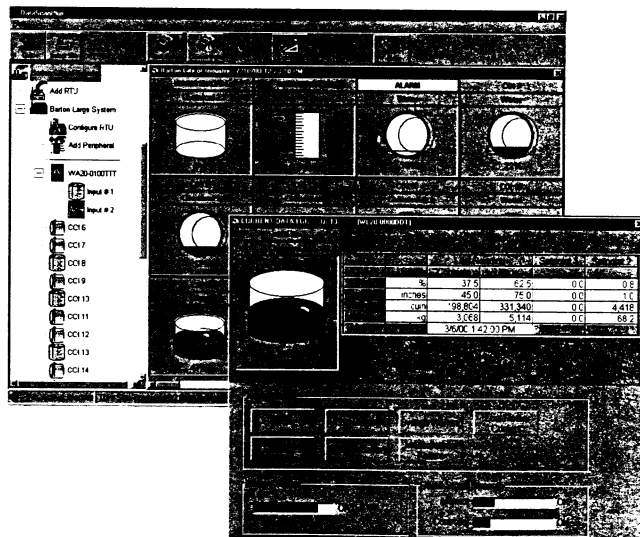
Each part of the system reports internal status, including monitor battery level, controller loss of power and other system checks.

## Wireless Local Network

The TankScan W-series employs a highly advanced bi-directional RF network operating in a license-free band. Since the field units operate at a very low power, and a choice of frequencies are available within each band, you may deploy your units in any application regardless of location or proximity to other radio based devices.

Through an innovative multiplexing scheme, the TankScan W-series devices can exchange information with the controller securely and efficiently. The local network can also automatically recover from power losses.

Each local network is preconfigured centrally using Barton software. The configuration information is downloaded to the WC controller at startup via phone link or serial port. Armed with this information, the controller is now available to communicate with its assigned field instruments based on serial number designations. As those field instruments are powered, the RF link is established and the network is available for data exchange. Periodic time synchronization and status messages assure that all local devices are continually monitored for optimal network performance. Up to 30 monitors or fill indicators can be simultaneously linked to one WC-2 controller.



These screen shots from Barton's DataScan Plus PC software depict some of the TankScan W-Series information available. The software is simple and intuitive, featuring an easy to use icon-based interface.

## Product Specifications

<b>WL-2 Monitor (MIR Sensor)</b>	
<i>Measurement Method</i>	Micropower Impulse Radar, dual waveguide
<i>Measurement Range</i>	Level, per probe length to 250 inches (6.3m) <i>Note: Fluid Dielectric may limit range</i>
<i>Accuracy</i>	±0.3" (8mm) or 0.5% of active probe length (whichever is greater)
<i>Output</i>	ID, level data, battery voltage, radio signal strength and internal status on demand from controller
<i>Radio Communications</i>	Transceiver up to 500' (150 m) line of sight operating in the 902-928 MHz band for North America, (869.7-870 MHz band for Pan European regions pending)
<i>Operating Temperature</i>	-40 °F/°C to +140 °F/+85 °C
<i>Power Requirements</i>	Battery Pack [4-AA Alkaline ] Nominal battery life: 2 yrs.@4 hr.transmit interval
<i>Construction</i>	Weatherproof, non-corrosive, NEMA-4X/IP65, PBT(Polybutylene Terephthalate) Enclosure
<i>Pressure Rating</i>	15 PSI (1 bar)Maximum
<i>Construction Materials</i>	Teflon/Brass or Teflon/SST, Plastic (PBT), Viton and Epoxy
<i>Approvals</i>	IS: North America CI 1, Div 1, Grp C & D (Europe Cenelec IS Zone EEExIIIB T4 and CE pending)
<i>Mounting</i>	2" & 1-1/2" NPT Male (std)

<b>WU-2 Monitor (Ultrasonic Sensor)</b>	
<i>Measurement Method</i>	50 kHz Ultrasonic
<i>Measurement Range</i>	Level, 0.5 to 18 feet (.15 to 5.4 m)
<i>Accuracy (see Notes )</i>	±0.25% of span in air, (6 inch/15cm deadband at sensor)
<i>Output</i>	ID, level data, battery voltage, radio signal strength and internal status on demand from controller
<i>Radio Communications</i>	Transceiver up to 500' (150 m) line of sight operating in the 902-928 MHz band for North America, (869.7-870 MHz band for Pan European regions pending)
<i>Operating Temperature</i>	-40 °F/°C to +140 °F (+85 °C)
<i>Power Requirements</i>	Battery Pack [4-AA Alkaline ] Nominal battery life: 2 yrs.@4 hr.transmit interval
<i>Construction</i>	Enclosure: Weatherproof, non-corrosive, NEMA-4X/IP65, PBT(Polybutylene Terephthalate) Transducer assembly: PVDF
<i>Pressure Rating</i>	15 PSI (1 bar)Maximum
<i>Ultrasonic Beam width</i>	8 degree conical
<i>Approvals (Pending )</i>	IS: North America CI 1, Div 1, Grp C & D
<i>Mounting</i>	2" NPT Male (std)

<b>WF-2 Fill Indicator</b>	
<i>Display</i>	2 line by 16 character LCD
<i>Variables</i>	User Configurable. Level, Volume, Mass & Display Units
<i>Radio Communications</i>	Transceiver up to 500' (150 m) line of sight operating in the 902-928 MHz band for North America, (869.7-870 MHz band for Pan European regions pending)
<i>Output</i>	0, 1 or 2 relay outputs, adjustable level setpoints, internal audible alarm
<i>Operating Temperature</i>	-40 °F/°C to +140 °F (+85 °C)
<i>Power Requirements</i>	Battery Pack [4-C size Alkaline ] Nominal battery life: 2 years in normal use
<i>Electrical Connections</i>	Relay Terminal Block, each relay SPDT, 2A @ 30VDC, 1A @125VAC
<i>Construction</i>	Weatherproof, non-corrosive, NEMA-4X/IP65 ABS Plastic Enclosure
<i>Operator Functions</i>	Start/Stop Transfer, Alarm Acknowledge
<i>Approvals (Pending )</i>	IS; North America CI I, Div 1, Grp C & D/Europe Cenelec Zone EEExIIIB T4: CE
<i>Mounting</i>	Wall (Surface) or Pipe Mount brackets (included)

**WC-2 Controller**

<i>Operating Temperature</i>	32 F to +140 F ( 0 to 60 C)
<i>Enclosure</i>	NEMA 1/IP30 -Indoor Only (optional external antennas available, see accesories)
<i>Power Requirements</i>	110 VAC (60 Hz) or 220VAC (50Hz)
<i>Radio Communications</i>	Internal Transceiver up to 500' (150 m) line of sight operating in the 902-928 MHz band for North America, (869.7-870 MHz band for Pan European regions pending) for use with up to 30 W-series field devices (IE: Monitors, Overfill Indicators)
<i>Phone Modem</i>	Internal w/ RJ11 connection (calls host per schedule or alarm, and accepts calls from host) CTR21, FCC and Industry Canada approved
<i>Approvals</i>	UL950 and IEC (CE pending)
<i>Serial Port</i>	RS232 via 9 pin DIN connector
<i>Data Collection</i>	On demand from host or at user-selectable preset intervals (32K memory available)
<i>Host Software</i>	Barton DataScan-Plus® PC-based application
<i>User Set Parameters</i>	Measure and Datalog Intervals, Alarms (2 level); Dial-out times (up to 6 daily) or interval

**WA-2 Analog Input Monitor**

<i>Accuracy</i>	±0.15% of analog input range at reference conditions
<i>Inputs</i>	Eight (8) 4-20 mA/0-5 VDC Analog Inputs (other ranges possible)
<i>Signal Isolation</i>	Each 8-input Monitor is electrically isolated
<i>Radio Communications</i>	Transceiver up to 500' (150 m) line of sight operating in the 902-928 MHz band for North America, (869.7-870 MHz band for Pan European regions pending)
<i>System Capacity</i>	Each W-Series System Controller can support up to 30 Analog Input Monitors (240 analog inputs)
<i>Operating Temperature</i>	-40 °F to +140 °F (-40 to +60 °C)
<i>Power Requirements</i>	External 24VDC or Battery Pack [4-C size] Nominal battery life: 2 years in normal use
<i>Electrical Connections</i>	14 Terminal Block
<i>Construction</i>	Weatherproof, non-corrosive, NEMA-4X/IP65 ABS Plastic Enclosure
<i>Mounting</i>	Wall (Surface) or Pipe Mount brackets (included)
<i>Approvals</i>	General Purpose (Non-Hazardous)

**DataScan Plus PC Host Computer Requirements**

<i>Recommended</i>	<i>Processor:</i> Pentium II 600 MHz or Pentium III 300 MHz+ <i>Operating System:</i> Windows 98 or NT 4.0 <i>Memory:</i> 128 MB RAM <i>Hard Drive:</i> 1GB available <i>Drives:</i> 3.5 inch disk, CD-ROM <i>Monitor:</i> 17 inch, 1024 by 768 screen resolution, 32000 or more colors <i>Modem(s):</i> Compatible with system <i>Serial Port:</i> Optional for direct connect to controller via cable <i>Note: Serial Port Expansion card needed to support multiple modems</i>
<i>Minimum</i>	<i>Processor:</i> Pentium II 233 MHz <i>Operating System:</i> Windows 95 <i>Memory:</i> 64 MB RAM <i>Hard Drive:</i> 200MB available <i>Drives:</i> 3.5 inch disk, CD-ROM <i>Monitor:</i> 17 inch, 800 by 600 screen resolution, 256 colors <i>Modem(s):</i> Compatible with system <i>Serial Port:</i> Optional for direct connect to controller via cable <i>Note: Serial Port Expansion card needed to support multiple modems</i>

## Ordering Information

Order Code Position	1	2	3	4	5	6	7	8	9	10
<b>TankScan MIR Monitor</b>										
Section	Series	Device	Sensor	Band	Probe Length	Fluid Dielectric	Probe	RF Options	Firmware Version	Rating Classification
Series	TankScan Wireless (2-way) <b>W</b>									
Device	MIR Level Monitor <b>L</b>									
Sensor Series	MIR Dual Wave Guide <b>2</b>									
Bands	North America (902-928MHz) <b>0</b> Europe (869.7-870 MHz) <b>1</b>									
Probe Length	(024 to 250 Inches in 1 inch increments) <b>###</b>									
Fluid Dielectric Range	Low 2 to 31 <b>L</b> High 32 and Higher <b>H</b>									
MIR Probe Construction										
Fluid Dielectric	Wire / Weight Material	Length(Inches)								
Low	SST / Brass 24 to 63" (61-160cm) <b>A</b> Copper / Brass 64 to 240" (162-610cm) <b>B</b> SST / SST 24 to 63" (61-160cm) <b>C</b> Copper / SST 64 to 240" (162-610cm) <b>D</b>									
High	SST / Brass 24 to 140" (61-358cm) <b>A</b> Copper / Brass 141 to 250" (360-635cm) <b>B</b> SST / SST 24 to 140" (61-358cm) <b>C</b> Copper / SST 141 to 250" (360-635cm) <b>D</b>									
RF Communication Options	Standard, Internal Antenna <b>0</b> External Antenna <b>1</b>									
Firmware Version	Standard <b>A</b>									
Rating Classification	North America Hazardous- Intrinsically Safe(CSA C11 Div1Grp C&D) <b>0</b> European Hazardous- Intrinsically safe (Cenelec Zone EExialIB T4) <b>1</b> European Non-Hazardous/General Purpose <b>2</b>									

Order Code Position	1	2	3	4	5	6	7	8	9
<b>Analog Input Monitor</b>									
Section	Series	Device	Version	Band	Input Types	RF Options	Firmware	Power	Rating
Series	TankScan Wireless <b>W</b>								
Device	Analog Input Monitor <b>A</b>								
Version	Analog Monitor 8 Input <b>2</b>								
Bands	North America (902-928MHz) <b>0</b> Europe (869.7-870 MHz) <b>1</b>								
Input Types	4 to 20 mA <b>A</b> 0 to 5 Vdc <b>B</b>								
RF Communication Options	Standard, Internal Antenna <b>1</b>								
Firmware Version	Standard <b>A</b>								
Power Option	Standard 4C Alkaline Battery Pack <b>1</b> 24Vdc External Power <b>2</b>								
Rating Classification	Non-Hazardous/General Purpose <b>A</b>								

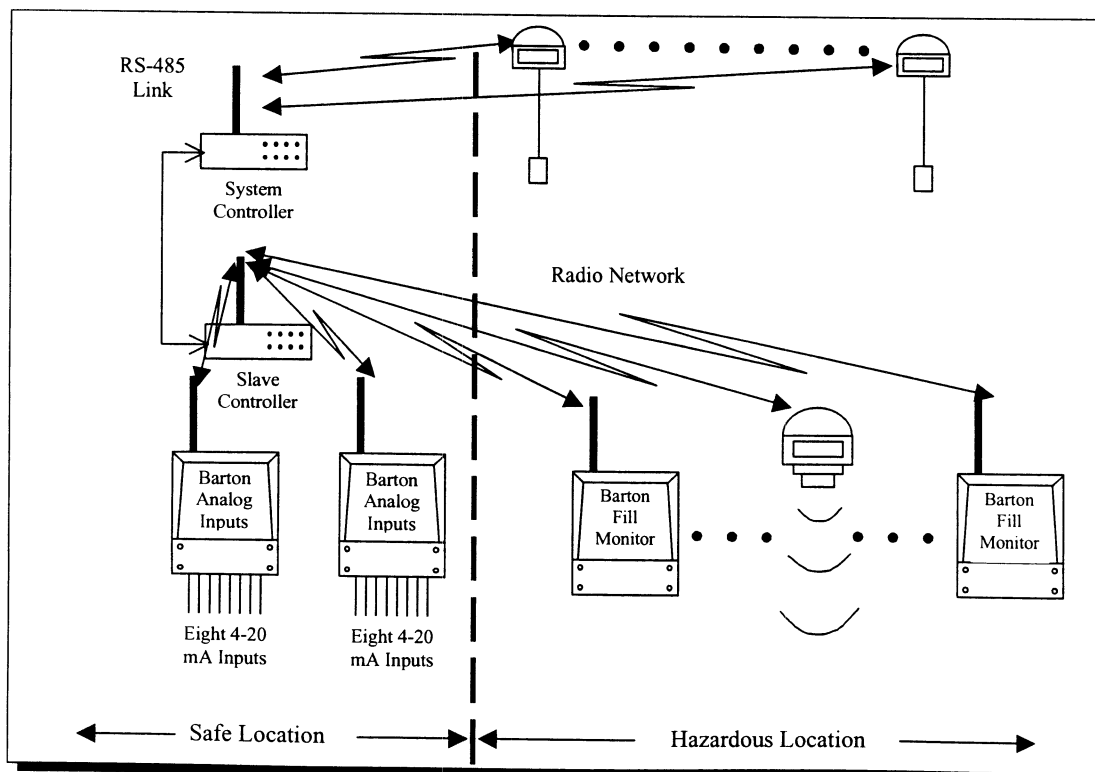
Order Code Position	1	2	3	4	5	6	7	8	9	10
<b>TankScan Ultrasonic Monitor</b>										
Section	Series	Device	Version	Band	Range	Fluid Dielectric	Probe	RF Options	Firmware Version	Rating Classification
Series	TankScan Wireless (2-way) <b>W</b>									
Device	Ultrasonic Level Monitor <b>U</b>									
Version	Standard <b>2</b>									
Bands	North America (902-928MHz) <b>0</b> Europe (869.7-870 MHz) <b>1</b>									
Measurement Range	Medium (50kHz) (to 18ft/approx 5m) <b>B</b>									
Mounting	2" NPT Male Thread <b>3</b> 2" G Thread with Viton Gasket <b>4</b>									
Power	4AA Alkaline battery pack <b>A</b>									
RF Communication Options	Standard, Internal Antenna <b>0</b>									
Firmware Version	Standard <b>A</b>									
Rating Classification	Non-Hazardous/General Purpose <b>2</b>									

## Software and Accessories

Antennas:	Controller Antenna Accessories <ul style="list-style-type: none"> <li>external mount antenna w/15ft(5m) cable</li> <li>external antenna mounting bracket</li> </ul>
Service Tools:	Test Monitor Part no: WL20-TESTA (For site planning and RF diagnostics) Test Controller Part no: WC20-TESTA (For site planning and RF diagnostics)
Spare Parts:	Battery Packs: Monitor (4 AA) P/N 0130-1043T (Cenelec Approved: 0130-1044T) Indicator/overflow (4C) P/N 0130-1045T
PC Software	DataScan Plus PC Software Order Part Number: DS90-00019 (See requirements on page 5)

Order Code Position	1	2	3	4	5	6	7	8	9
<b>TankScan Controller</b>									
Section	Series	Device	Version	Band	Modem	RS485 Serial	Heater	RF Options	Power
Series	TankScan Wireless <b>W</b>								
Device	Controller <b>C</b>								
Version	Master <b>2</b>								
Bands	North America (902-928MHz) <b>0</b> Europe (869.7-870 MHz) <b>1</b>								
Modem Option	North American, Internal <b>1</b> European, Internal (CTR21) <b>2</b>								
RS-485 Serial Interface Option	None <b>X</b> with RS-485 Serial Interface (Future) <b>1</b>								
Heater Option	None <b>0</b> with Heater (Future) <b>1</b>								
RF Communication Option	Standard Controller Antenna <b>A</b>								
Power Transformer Options	110VAC/60Hz North America Plug <b>1</b> 220VAC/50Hz with UK Plug <b>2</b> 220VAC/50Hz with European Plug <b>3</b>								

Order Code Position	1	2	3	4	5	6	7	8	9	10
<b>TankScan Fill Indicator</b>										
Section	Series	Device	Version	Band	RF Options	Firmware	Power	Alarms	Accessories	Rating
Series	TankScan Wireless <b>W</b>									
Device	Fill Indicator <b>F</b>									
Version	Standard <b>2</b>									
Bands	North America (902-928MHz) <b>0</b> Europe (869.7-870 MHz) <b>1</b>									
RF Communication Options	Standard, Internal Antenna <b>A</b>									
Firmware Version	Standard <b>1</b>									
Power Options	Standard (4 C Alkaline battery Pack) <b>A</b>									
Alarm Outputs	No Alarms <b>0</b> One Relay Output <b>1</b> Two Relay Output <b>2</b>									
Accessories	None <b>X</b>									
Rating Classification	Non-Hazardous/General Purpose <b>2</b>									



This illustration depicts a W-Series TankScan local RF network. The WC controller can communicate with up to 30 WL monitors, WF indicators or WA Analog Input Monitors up to 500 feet away. Data is relayed to the Host system via dial-up telephone or other means.

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