

HydroRanger Plus

**DESIGNED TO EXCEED THE DEMANDING
NEEDS OF THE WASTEWATER INDUSTRY**



Please also reference
HydroRanger Plus 3-in-1 Brochure
(available in English only).

 **MILLTRONICS**

HydroRanger Plus

The cost effective solution for lift/pump station and reservoir automation

When it comes to running an efficient wastewater system these days, meeting rigorous environmental regulations is a major concern. So is the return on every penny spent. That business minded attitude especially applies to the equipment you use for critical controls.

Before you replace any of your existing equipment, you need to know whether the system you choose will pay its way

- It will control up to 5 pumps.
- It will control rakes on a bar screen and flow in channels through gates and penstocks.
- It will totalize open channel flow and control storm pumps, aeration pumps and flush valves.
- It will reduce energy costs.

Outputs are available for alarms, chart recorders, controllers and existing system integration.



Reliable, precise and 100% maintenance free, the HydroRanger Plus offers multiple pump control in the most rigorous wastewater environments.

and still conform to escalating environmental controls. What will it save in power consumption, routine maintenance costs, downtime and labour? Is it designed to last and will it perform reliably? These are just some of the questions you, and your counterparts in the industrial sector, are asking.

That's why everyone at Milltronics is doing a lot of listening these days. And we're responding by enhancing the capabilities of our ultrasonic level measurement and control equipment to meet the demands of wastewater process monitoring now and in the future.

Flow and Pump Controls in One System

Our new HydroRanger Plus is the most advanced system we have ever offered...and we've been continually providing solutions in wastewater environments for over 20 years. It has the versatility for complete lift/pump station control without needing a PLC.

Reliable Technology – Application Versatility

The HydroRanger Plus uses Milltronics non-contacting ultrasonic echo ranging technology and Sonic Intelligence™ software to monitor water and wastewater of any consistency up to 15 metres (50 feet) in depth. The system is effective in wet wells, weirs and flumes where foam and turbulence is a typical operating condition. It can be customized to meet your specific application needs – from measuring flow rate in a narrow flume to volume in a ferric chloride storage tank.

The system consists of the electronics housed in a wall, rack or panel mounted enclosure and a hermetically sealed, corrosion resistant Echomax® transducer. These components can be separated by up to 360m (1200 ft.).

A low maintenance system you can depend on, even in flood conditions

Build up on conventional conductivity probes and floats can cause unreliable pump switching resulting in malfunctions in the system, emergency service calls, and potential environmental contamination.

Milltronics' ultrasonic Echomax® transducers are self-cleaning and non-contacting so the opportunity for build

Only Milltronics offers these new, innovative pumping control programs

- ✓ Energy saving with a built-in real time clock
- ✓ Combined storm water and sewage overflow control
- ✓ Rate of pump down control
- ✓ Anti-grease ring/tide mark build up
- ✓ Storm pump control



Wall mounted
HydroRanger Plus

up is limited. Hermetically sealed in Kynar®, they're custom made to perform reliably in the hostile, corrosive conditions associated with sewage handling and industrial waste systems. And because these transducers have no moving parts, wear and tear is minimal. Maintenance problems are a thing of the past. You save on the headaches and the overheads.

Optional submergence shields ensure consistent operation in wet wells where the transducer may be submerged during flooding from rainfall or a power outage. Milltronics' patented detection software can differentiate between a submerged condition and a high level.

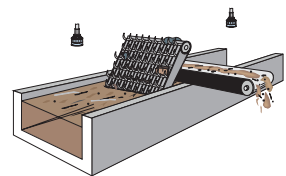
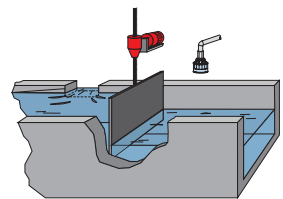
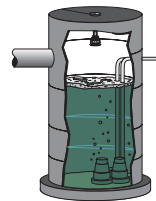
Built-in temperature compensation

Not only does the HydroRanger Plus offer more pump control programs than any other system on the market today, for additional dependability – at no extra cost – Echomax® transducers feature built-in temperature

compensation. The transducer transmits, receives and even detects temperature using a 2 wire system as opposed to 3 or 4 wires with other transducers. Combined with our Sonic Intelligence™ software running on a 32 bit microprocessor, you can be sure of fast, dependable echo processing for repeatable, precise level volume and flow calculations.

Service Support Worldwide

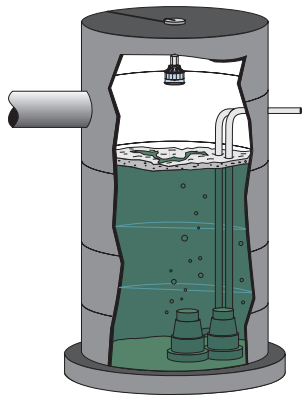
We know yours is not a 9 to 5 operation. Your equipment has to run 24 hours a day. So if you need assistance, Milltronics assures you of expert technical support as close as the telephone. Our technical people are level specialists. After all, we pioneered the industrial application of low cost, high performance ultrasonic level measurement. This support is provided by Milltronics' worldwide sales and service network and our products are backed with a 2-year warranty. That's our long term commitment to you.



Full flexibility. Fit it and forget it.

Maximum Control

At the critical stages of your operation, HydroRanger Plus measures up



Start-up is easy with pre-programming of 10 vessel configurations.

The economical answer to pump/lift station automation

The HydroRanger Plus combines more innovative, multiple choice pumping control programs with superior reliability than any other system, virtually eliminating the need for PLC's.

Pumping when it's cheaper to pump

Save on power with the built-in real time clock that can alter pumping set points to take advantage of low electricity rates. The unit can pump down the system to a low level when power is cheapest and maintain higher levels when power rates are at a premium. This innovation makes the use of central control (SCADA) on PLC's unnecessary, and takes advantage of time-of-day dependent electrical power rates.

Combined storm water and sewage overflow control

An open channel flow monitoring feature works in tandem with pumping controls to measure the amount of storm water over a weir that may be bypassing the sewage treatment system, a serious regulatory concern.

Rate of pump down control

The unit can be programmed to work on level rate of change operating only enough pumps to ensure the level is dropping at the required rate. This maximizes the storage capability of the well and minimizes pump starts, reducing energy and maintenance costs.

More Control Features

- Total volume pumped
- Rate of level change control
- Record of pump hours run and number of starts for each pump
- Variable duty pump control by percentage of running time
- Customized sequencing of up to five working pumps

Tide Mark/Grease Ring Reduction

Pump start and stop points randomly change within a selectable range to minimize build up of grease and other material.

Storm Control

When inflow exceeds pumping capacity, the HydroRanger Plus can be programmed to automatically start pumping storm water to a reservoir and temporarily shut off normal pumps if required.

Pump Exercise Prolongs life

Pumps may be programmed to start when they have been idle for too long preventing blockage and drying out of seals.

Aeration Control

Start up of an aeration compressor can be preset to prevent build-up of explosive gases and odour.

Flush Valve Control

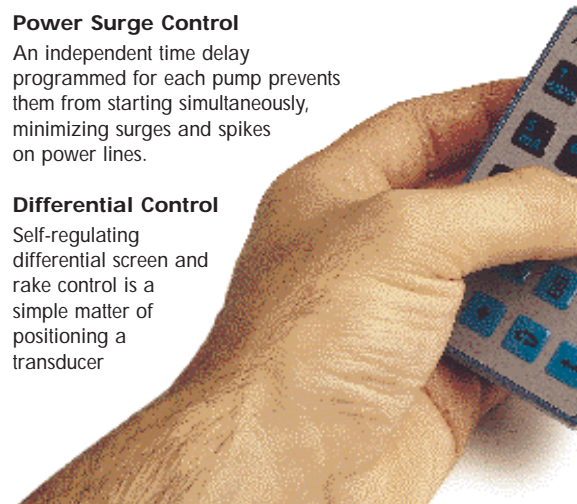
A flush valve can be operated on selected pumps to stir up sediment and ensure efficient pumping of solid waste.

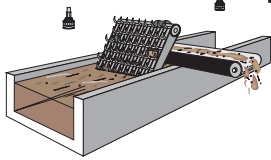
Power Surge Control

An independent time delay programmed for each pump prevents them from starting simultaneously, minimizing surges and spikes on power lines.

Differential Control

Self-regulating differential screen and rake control is a simple matter of positioning a transducer





HydroRanger Plus Rack Mount unit with a Dolphin communications link.



HydroRanger Plus Panel Mount unit.

above each of the two different levels. This information provides remote level readings, operates all control relays and alarms automatically without operator intervention.

Full Linearization Control

Eight pre-programmed tank options and two customized tank shapes make set up easier. Thirty-two point piece wise linear approximation or cubic spline curve fitting choices give you the most precise height to volume conversion possible in any shaped vessel or non-standard flume or weir.

COMPACT RACK AND PANEL MOUNT UNITS

Economizing on space in crowded control rooms is possible with the versatile mounting configurations and streamlined size of either the rack or panel mount HydroRanger Plus.

The DIN 3U/14 HP plug-in **Rack Mount model** is easily installed with five other units in an industry standard 3U high 19" sub rack.

Alternatively, the **Panel Mount model** can be individually mounted for operator convenience and easy viewing of display data. Information is right where you need it.

Both units have a push button switch to turn the receiver for the handheld programmer on and off. This prevents accidental programming of an adjacent unit.

Advanced Flexibility

All HydroRanger Plus models are simple to operate and easy to install yet offer comprehensive

programming options to suit the most demanding applications.

The transceivers' 32 bit, 16.7 MHz processor monitors and displays up to 10 times faster than conventional systems. All data is available in both numeric and icon formats, continuously displayed on the easy to read LCD.

"Quick Start" Programming

To make start-up as simple as possible, every HydroRanger Plus unit is shipped with "Quick Start" templates, pre-calibrated to satisfy typical wastewater applications. Readouts are available for open channel flow rate as well as total flow volume. Just select the template for your application, enter a few dimensions and the unit is up and running.

What's more, even fine tuning is simplified. For example, just one entry adjusts the tracking speed for changing liquid, semi-solid or solid levels in any vessel. All values can be viewed during both set up and operation so you don't have to shut down your process or switch display modes. There is also full adjustability for difficult applications.

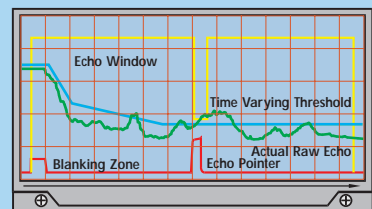
These set up routines are made easy using the infrared remote programmer. All parameters are stored in non-volatile memory to prevent data loss during a power failure. After initial set up, Sonic Intelligence™ software constantly optimizes the most effective echo processing algorithms to ensure reliable, continuous operation.

All versions have integral self-selecting AC/DC voltage power supply that switches over to DC automatically if the AC fails. A fully isolated mA output and 5 relays for alarm or control complete the package.

SONIC INTELLIGENCE™

The success of Milltronics' ultrasonic techniques to solve level measurement problems is recognized in the most demanding applications. By measuring the time delay between transmitted and reflected pulses, the echo from the material surface in constantly changing solid and liquid processes with steam, turbulence and foam, is reliably processed.

Sonic Intelligence™ software is the electronic brain that drives the exceptional echo analysis performance of the HydroRanger Plus. It employs complex, field proven echo processing algorithms to digitize the sonic echo profile of the vessel, differentiating between the "true" echo and false echoes reflected from obstructions in a wetwell or vessel, and acoustical or electrical noise.



This graph shows the actual raw echoes and the time varying threshold used to select the true echo.

These algorithms include curve shaping, statistical analysis, echo reform and digital filters to remove electrical interference and narrow false echoes.

With the sophistication of Sonic Intelligence™ harnessed to the power of Milltronics' new Echomax® transducers, the door has opened to measurement applications previously beyond the scope of any ultrasonics.

HydroRanger Plus can be conveniently set up using the infrared handheld programmer eliminating the need to expose the electronics. The programmer can be removed for security.



Total Solutions

Echomax[®] Transducers... only from Milltronics

XPS Series

Temperature Rating: -40° to 95°C (-40° to 203°F)

XPS 10: 0.3 m to 10 m range*
1 ft. to 33 ft.

XPS 15: 0.3 m to 15 m range*
1 ft. to 50 ft.

Excellent chemical immunity

XCT Series

Temperature Rating: -40° to 145°C (-40° to 293°F)

XCT 8: 0.45 m to 8 m range*
1.5 ft. to 26 ft.

XCT 12: 0.45 m to 12 m range*
1.5 ft. to 40 ft.

Reliable in extremely hot, corrosive environments.

**Dependent on application.*

ECHOMAX[®]
ULTRASONIC
TRANSDUCERS

Major advances in product design have dramatically increased the acoustic power and sensitivity of Milltronics new generation of Echomax[®] transducers.

The patented unidriver transmits a powerful, well defined, uniform pulse that reflects efficiently from liquid and solid materials in a broad range of applications - from plastic powders with high angles of repose to hot tar and liquid sulphur. The echo is maximized with perfect transmit and receive matching and processed with the exceptional capabilities of patented Sonic Intelligence™ software.

Built-in temperature compensation automatically adjusts for velocity variations caused by air temperature changes in the vessel ensuring optimal

accuracy while simplifying installation and reducing wiring costs.

Hermetically Sealed - An Industry First

XPS and XCT Echomax[®] transducers, housed in chemically resistant Kynar[®], are designed for use in water/wastewater applications with the HydroRanger Plus system. Hermetically sealed versions are effective in harsh, corrosive environments. Condensation is atomized on contact with the highly active transducer face rendering them virtually immune to build-up. They require little or no maintenance after installation and are resistant to dust, moisture, corrosives, vibration and flooding. They can be used with safety and confidence in temperatures ranging from -40° to 145°C (-40° to 293°F).

With the effective monitoring range extended to 15m (50 ft.), it is now possible to mount the transducer higher in a wet well and eliminate the problem of "confined space entry regulations" for transducer access.



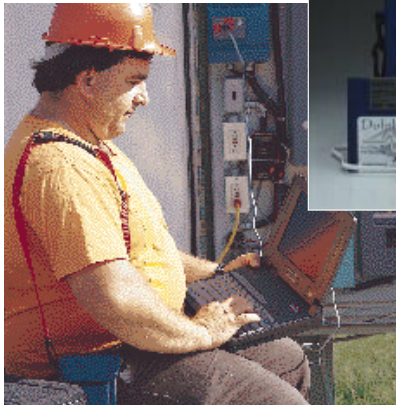
Milltronics Application Solutions

Innovative Leadership

The HydroRanger Plus offers more control features than any other stand-alone level monitor in the world. It adds another dimension to Milltronics recognized leadership in the development of versatile, reliable, easy-to-use level measurement instrumentation for liquids and bulk solids.

Serving many industries

Our ultrasonics are proven in over 200,000 applications in 85 countries. They're essential to the efficient operation of virtually all primary and secondary industrial processes and are used in the mining and food industries, in chemical, manufacturing and cement plants, in bulk storage terminals and in water/wastewater installations that treat millions of gallons of raw sewage every day. They work.



The Dolphin System Converter infrared device communicates with the HydroRanger Plus. No hard wire link or plug is necessary.

Laptop Programming with Dolphin

Dolphin represents a true innovation in operator efficiency. It is a Windows™-based software program that facilitates programming, via a laptop or PC, of a growing number of Milltronics products, including the HydroRanger Plus.

Dolphin's complete parameter descriptions and on-line HELP make programming simple, even for first-time users. It recognizes the product it is

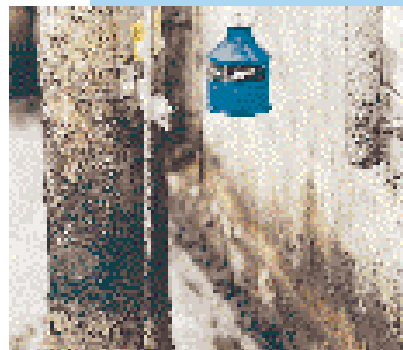
communicating with and acts as an intermediary, prompting the user with all the relevant parameters and data necessary to quickly configure the host unit.

This software allows the complete parameter set for each unit to be saved to disk and restored from disk. Duplicating a set-up is fast and easy and your records can be paperless.

Milltronics' ultrasonic system monitoring in a tannery collector sump with foam and suspended solids.



Measuring holding tank level at a vegetable processing plant.



Specifications

Operations

Modes of operations	Level, space, distance, differential level, average level, total pumped volume, open channel flow (OCM)
Range	From 0.3m (1 ft.) to 15m (50 ft.), dependent on transducer used.
Repeatability	0.25% of range or 6 mm (0.24"), whichever is greater.
Resolution	0.1% of range or 2mm (.08"), whichever is greater
Echo Processing	Patented SONIC INTELLIGENCE™ software.
Transducer Support	XPS 10, XPS 15, XCT 8, XCT 12 Echomax® Transducers. ST25, ST50, STH.
Processor Speed	16/32 bit microprocessor at 16.7 MHz clock speed

Display

Panel	Custom Graphics LCD. Wall mount: 100 x 40 mm (3.9 x 1.6 in.). Rack/Panel mount: 20 x 75 mm (0.8 x 3.0 in.).
Measurement Readings	Level, space, distance, volume and remaining capacity. Differential level, average level.
Units of measure	m, cm, mm, ft, in, %.
Pump Readings	Pumped volume, pump starts, pump running hours.
OCM Readings	Head, flow and cumulative totalized flow.

Programming

Via keypad programmer or Dolphin interface package.	
Programmer	Hand-held, 20 keys. Removable for security.
Parameter Retention	Stored in EEPROM memory. Non-volatile, immune to power failure. No battery back-up.
Volume Conversion	8 pre-programmed tank shapes, 2 universal tank shape programming methods. Up to 32 point linearizer.
Open Channel Flow	5 pre-programmed flumes or weirs and universal curve shaper.
Dolphin Compatible	Requires RS 232C interface on PC. Windows™ 3.1, 500K hard drive space

Relay Outputs

5 Form "C" rated 5A/250 VAC non-inductive.	
Relay Functions	Choice of 6 alarm, 7 pump, 5 control or 2 totalization functions.
Analog Output	mA output scalable 0/4-20mA into 1000 OHMS, isolated 300VAC continuous.
Analog Input	mA input scalable 0/4-20mA input for use with alternative level monitoring device.

Installation

Power supply	100/115/200/230 V± 15% (50/60 Hz), switch selectable 15 VA. Auto select or 9-30V DC, 8VA on AC failure
Wall mounted unit	Chemical resistant polypropylene alloy: 195 x 180 x 75 mm (7.7 x 7.1 x 3 in.). IP65 NEMA 4X.
Rack mounted unit	Standard DIN 3U/14 HP, 4 rail plug in unit. Fits standard 84 HP (19") sub rack.
Panel mounted unit	Standard DIN 43700 72 x 144. Std. panel cut out. IP54 seal on front panel.
Transducer cable Extensions	Up to 360m (1200 ft.) max., use RG-62A/U coaxial cable.
Ambient Temperature	-20°C to 50°C (-5°F to 122°F) for the electronics.
Process Temperature	-40°C to 145°C (-40°F to 293°F) depending on the transducer used.

Process Temperature Compensation Built-in temperature sensor in transducer and optional TS3 temperature sensor.

Weight Wall Mount	1.5 Kg (3.4 Lbs.).
Rack Mount	870 g (1.9 Lbs.).
Panel Mount	1.1 Kg (2.4 Lbs.).

Approvals CE97. CSA_{NRTL/C}. FM

Specifications are subject to change without notice

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