Accu-Pulse

LASER BASED LEVEL AND POSITION INDICATOR

Continuous, Non-Contact Level Monitor (Solids or Liquids)

The Accu-Pulse series of continuous non-contact level monitors is used to monitor material levels under a wide range of process conditions, from the simplest bin to the most demanding vessel application. Designed to remain non-intrusive, the Accu-Pulse series offers a viable alternative in demanding applications where other technologies fail.

Theory of Operation

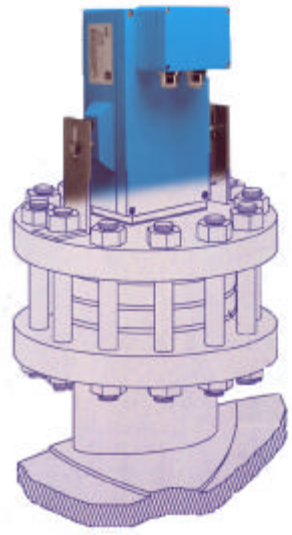
The time-of-flight of infrared laser pulses are measured with a precision interval timer; multiple readings are averaged then output, resulting in high-accuracy level measurements even under the most demanding conditions. Rapid, accurate readings are possible because the unique properties of laser are unaffected by conditions such as pressure, vacuum, temperature, vapor, stratified off-gases, tank geometry, obstacles or off-center mounting.

Liquids
Thermo MeasureTech Flange Accessories

Designed for integration to standard 4" or 6" flanges (raised or flat face). Standard sight-glass components are designed for operation from vacuum to ANSI 600 class. High temperature (>300°C) sightglasses are available through special order (specify pressure and temperature). At all-times, the entire instrument remains non-intrusive, allowing easy maintenance and trouble-shooting without having to remove the vessel from service.

High Temperature Configurations

The Accu-Pulse configuration affords all the same features, with the ability to operate in settings where the ambient temperature at the instrument is between 50-100°C, and the process (target) temperature can be upwards of 2000°C.



Features and Benefits

Liquid

- High accuracy for inventory control without density correction
- Turbulent or agitated slurries monitored even when mounted at high incident angles.
- Windowing software ignores agitator blades and other obstacles

Solids

- Ability to measure varying angles of repose. Convex or Concave profiles.
- Measures reflective and non-reflective surfaces
- Unaffected by dielectric of materials
- Advanced software for superior performance through dust, steam and other environements

Typical Applications

- Tank gauging for inventory control on a variety of low dielectric crude and refined products.
- Level indication of liquid asphalt
- Level of polymerization reactor vessels (under high pressure)
- Level of devoluminizing reactor vessels (under vacuum)
- Level monitoring of molten glass as well as ferrous and non-ferrous metals and alloys.



Solids
Bin Geometry

Virtually any bin or silo configuration can be monitored as long as there is a clear line of sight to the target. The instrument is ideally suited for use in tall narrow bins, or “tricky” geometry where internal structures and construction impede the performance of other noncontact technologies. The extremely small beam divergence allows for the precise location and alignment of the sensor, aiming past internal objects.

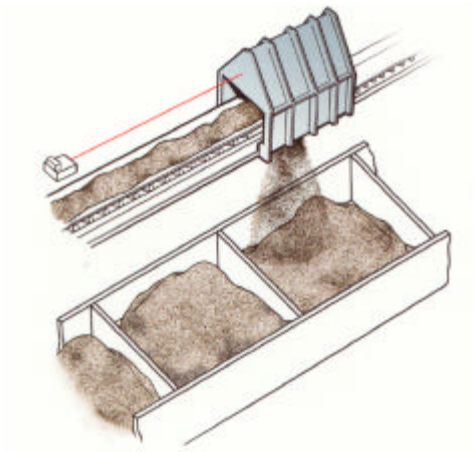
Typical Applications

- Level of polystyrene, nylon and PVC pellets
- Level of talc and lime powders
- Level of ore and muck in ore passes
- Level of wet or dry wood chips
- Level of stockpiled coal

Non Contact Object Positioner

The Accu-Pulse Positioner series of non-contact positioners shares the same properties as the Accu-Pulse level monitor, but is optimized for performance over longer ranges. It has been designed to replace traditional contact sensors (multiple limit switches, wheel encoders, etc.), as well as poorly performing non-contact devices where the range is great or interference severe.

An installation requires only one field cable termination point, regardless of the measurement range. Articulating brackets are available to simplify mounting and alignment, and retro-reflective arrays typically extend the range of the instruments to over 1000 m. The reflective arrays is easiyl cleaned and ensures performance under the heaviest dust conditions. The basic property of lasers enable fast data output (up to 20 readings per second) for accurate positioning requirements over long ranges to fast-moving objects. Optional outputs available through special order include velocity and acceleration.



Typical Applications

Positions a variety of bulk material handling equipment including:

- Tripper cars
- Plough feeders
- Stacker/reclaimers
- Torpedo cars
- Cranes

Also positions:

- Dimensional timber
- Billets and slabs
- Anode/cathodes

Standard Output

- RS-232C For locally programming all user parameters and checking instrument output. Easily accessed via a nine-pin serial port at the field interface board, and addressed by using either Thermo MeasureTech’s handheld display keypad, or any Windows 95® PC using Hyperterminal (no special software required).
- RS-422 For transmitting serial data to customer’s control system where digital data is preferred or required due to high data output rate.
- 4-20 mA output Allows integration with traditional control systems operating on the analog standard. Fully isolated and designed to drive loads up to 1200 ohms. Zero and span settings are easily programmed via a serial port to any value desired. Once the instrument is installed and aligned at maximum range, calibration can be made with equipment locked out, simply by entering the desired range to correspond with 4 and 20 mA. Complete isolation between setpoints means that the procedure never requires repetition due to interaction or drift, resulting in improved efficiency during commissioning.

Specifications

Accu-Pulse[1]

To grey surface:	0.2 m - 250 m
(20% reflective target):	0.2 m to > 250 m
To white wall:	0.2 m to > 500 m
To reflector:	0.2 m to > 1500 m

Laser Characteristics

Beam divergence:	5 mrad (0.28°)
Laser spot size:	4 cm + (0.005 x distance in cm)
Laser wavelength:	905 nm (IR measuring beam) 635 nm (visible pointer)

Performance

Absolute accuracy[2]:	within 2 cm
Operating accuracy[3]:	within 5 mm
Repeatability[4]:	within 3 mm
Resolution:	1 mm

Outputs (1000 VDC isolation)

Measurement rate:	Programmable from one reading every 5 sec to 20 reading/sec
Units of measurement:	Meters or feet
Analog current loop5:	4-20 mA; max. 1200 ohms programmable zero/max
Digital data:	Serial RS-422

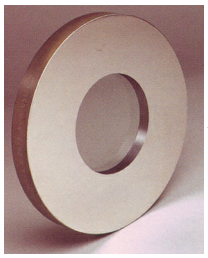
Local Setup/Text

RS-232C port

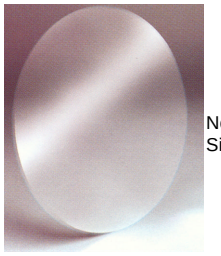
Power (1000 VDC isolation)

Consumption:	36 W max. @ 24 VDC
Input voltage:	24 VDC nominal (10.5 - 30 VDC)
Operating Temp[6]:	-40C to + 50C

Accessories



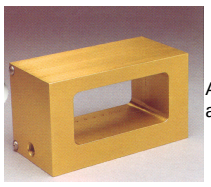
Sightglass:
Flange mounting to tanks
Full ANSI rating



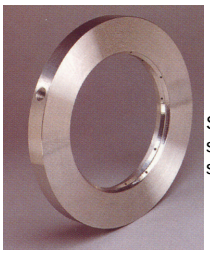
Non-Pressurized Lexan Sightglass:



Articulating bracket: To facilitate alignment in two axes



Air curtain:For clean, dry air to keep window clean



Spray ring:For keeping sightglass inside the vessel clean



High Temp Configuration



Handheld Key pad. interfaces with on-board RS-232C for set-up and configuration.

Upgrade for purging: Allows user-supplied equipment to purge enclosure, achieving operation in a Class 1, Div 1, Group CD hazardous environment

Options

AC/DC Power Supply

Input voltage:	120 VAC, 20 VA; 50-60 Hz
Operating Temp.:	-10°C to +50°C

AC Heater[7]

Input voltage:	120 V, 100 W
Operating temp.:	-40°C to +50°C

Handheld Remote/Display Programmer

Display:	Four lines by 20 characters LCD
Case:	Moulded, high-impact ABS
Operating temp.:	0°C to +50°C
Storage temp.:	-20°C to +70°C

FMRC & CSA rated for use with Accu-Pulse unit

Enclosures

Accu-Pulse Standard

Enclosure:	FMRC and CSA 4X, 6 IP67 FMRC, CSA Class 1, Div 2, Group ABCD FMRC, CSA Class 2, Group EFG Size in mm: 280L x 205 W x 155 D Weight: 7 kg

Accu-Pulse High Temperature

Accu-Pulse High-

Temp Enclosure:	FMRC and CSA 4X, 6 IP67 FMRC, CSA Class 1, Div 2, Group ABCD FMRC, CSA Class 2, Group EFG Size in mm: 280L x 205 W x 155 D Weight: 7 kg

Environmental

Operating temp.:	-10°C to +50°C (-40°C to +50°C with heater[6])
High Temp.:	-10 C to +100C (-40 C to +100C with heater)
Storage temp.:	-40°C to +70°C

Eye Safety

IR (infrared) laser:	Class 1 (U.S. FDA 21 CFR 1040
Visible pointer:	Class 2I (U.S. FDA 21 CFR 1040

NOTES

1. Maximum ranges are typical and depend on target reflectance, vessel conditions (i.e., dust), background radiation and sight-glass rating. Consult factory for details.
2. At a measurement rate of 1/sec, the specified accuracy is absolute over full temperature range, a variety of materials, and any distance, with one standard deviation.
3. At a measurement rate of 1/sec, this accuracy depends on limited variations in temperature, material and distance associated with the installation.
4. At a measurement rate of 1/sec, under steady state conditions, and one standard deviation.
5. Analog accuracy is equal to absolute or operating accuracy ±0.1% of range.
6. For 24 VDC operation, heater included.
7. For AC operation down to -40°C. Includes AC power supply.

All information is subject to change without notice.

FM APPROVED



This product is eyesafe without viewing aids under normal operation.

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