AUTOMATIC SLUDGE LEVEL DETECTOR

THE MARKLAND ADVANTAGE:

**Maintain preferred sludge depth**
- Control the sludge blanket, automatically.
  Avoid overflows and process problems.

**Optimize water removal to reduce costly additional processing (belt presses, digesters, centrifuges, etc.)**
- Maximize sludge density automatically.
  Avoid pumping large volumes of thin sludge or water.

**Optimize energy usage**
- Automate your desludge pumping, pump when you need to.

**Maximize operators' time and energy**
- Installs quickly and easily, no need to calibrate.
  Simplify operation with a reliable and durable instrument.

**Reduce costs associated with inaccurate chemical dosing**
- Optimize flocculent/coagulant dosage control and process adjustment.

**Reduce wear and tear on pumps**
- Pump only when necessary.

**Get answers when you have questions**
- Technical assistance is direct from the designers and manufacturers.

MARKLAND
Specialty Engineering Ltd.
Reducing the waste in waste management since 1967
www.sludgecontrols.com
APPLICATIONS:

CIRCULAR CLARIFIER
Note: See Also Probe Tip-Up Detail
Alternate Probe location between Scum Baffle & Weir

Markland #602
Meter

Rotating Scraper
Sludge

RECTANGULAR CLARIFIER

Markland #602
Meter

Handrail & Bracket

Traveling Bridge

LIQUID

Traveling Scraper

Sludge

INCLINED PLATE SEPARATOR
Markland probe can either be slid down the incline as shown or, a standpipe can be installed for vertical probe installation.

Alternate probe location

4" (100mm) Standpipe

Markland #602
Meter

Pipe mast

IN

OUT

L I Q U I D

Probe gap faces down

SLUDGE

Sludge

To remove probe, lower to bottom of tank, rotate 90°, & lift up & out.

Set Offset Into Meter

Meter reads Sludge depth directly

Skimmer

SLUDGE

L I Q U I D

PRESSURIZED VESSEL

Pipe mast

Mating flanges

Slip joint

Markland #602
Meter

L I Q U I D

Probe gap faces away from inlet

SLUDGE

Sludge

DECANT CONTROL
Liquid surface & floating raft move lower during decant & 602-UD meter monitors liquid surface approaching sludge blanket to stop decanting.

Markland #602-UD
Meter

Raft Tether

Mounting Clamps

Floating Raft

Liquid Surface

Meter reads location of sludge blanket down from the liquid surface
FEATURES:
- LED beam automatically adjusts its intensity to detect levels in thick or thin sludges, or in light flocs
- Detection is not distorted by the curved walls of lamellar® tanks
- Advanced self-diagnostics
- Ultra high intensity infrared beams
- Automatic beam intensity control
- 4 – 20 ma output linear with sludge depth
- High & low sludge depth set-point relays

HOW IT WORKS:
A vertical Probe, submerged in the tank, contains 64 infrared high intensity LEDs stacked vertically, which shine horizontally across a probe gap to 64 phototransistor detectors. This gap contains either liquid or sludge. The 64 pairs are sequentially scanned to locate the sludge bed. Beam power intensity is automatically adjusted to accommodate different sludge and overlying liquid concentrations. At its highest power level, the beam will shoot through your hand, you could count the bones, but there is not hazard since the beam is only on for a few microseconds. This high intensity beam easily penetrates fouling on the probe’s windows, and as long as the solids in the probe gap are high relative to the solids in the scum layers on the windows, the meter continues to read correctly. Eventually, the probe has to be removed and given a wipe with a soft cloth.

PROCESS CONTROL
Automatic desludging yields thicker sludge than timers or manual methods, and reduces sludge disposal or processing cost. A desludge pump can be operated automatically from the Low Set-Point Relay along with a Pump Run Interval Timer, and the High Set-Point used as an alarm for excessive sludge depth. Alternatively, the desludge pump can be turned ON at the High Set-Point and OFF at the Low Set-Point, or the 4-20 ma output can be used for continuous variable speed drawoff. The 4-20 ma output can link the meter to your computer for centralized process control.

Batch Mix/Settle Process
Pause feature is used to disable Markland Meter during mixing. Contacts reopen when mixer stops, enabling meter to read blanket level as sludge settles.

Probe Tip-Up Feature
Pause Switch Terminals in meter accept contact closure & freeze meter reading while probe tipped up.

Pause Switch Uses
An externally located switch, with a pair of Normally Open contacts, can be connected to act as a “Pause Switch”. When these contacts close, the Markland meter freezes its last reading, and the LCD displays “METER DISABLED HOLDING LAST READING”. This feature is used for a batch mix process to disable the meter during mixing. It is also used to lock out the meter, when the probe is tipped up by a traveling scraper. Both of these uses are illustrated in the accompanying diagrams. When the pause switch reopens its contacts, the meter waits 30 seconds for the sludge to settle down before resuming normal operation.
## TECHNICAL SPECIFICATIONS:

| Materials                  | Probe - PVC  
|                           | Mast - PVC Pipe  
|                           | Clamp - Stainless Steel & Polypropylene  
|                           | Cable - Vinyl Jacketed  
|                           | Enclosure - Fiberglass Body & Clear Plastic Cover  
| Dimensions                | Probe: Overall Length 1330 mm (52 3/4 in.)  
|                           | Active Element Length 1219 mm (48 in.)  
|                           | Cross Section 64 mm (2 1/2 in.) x 38 mm (1 1/2 in.)  
|                           | Gap - 25 mm (1 in.)  
|                           | Mast - 3 1/2 meters (12 ft.), 1 in. Sch. 80, shipped in 3 pieces with fittings  
|                           | Enclosure: Width 343 mm (13 3/4'') · Height 229 mm (9'') · Depth 200 mm (77/8'')  
| Cable Length               | 15 meters (50 ft.) pigtail supplied (measured from top of Probe). Maximum cable length 150 meters (500 ft).  
|                           | Order extra cable separately if pigtail length not sufficient  
| Active Element Spacing     | 64 pairs infrared LED/Phototransistor, spaced vertically on 19 mm (3/4 in.) centers. Dual Model has 128 pairs  
| Accuracy                   | ± 2cm (± 1 in.)  
| Bottom Offset              | Adjustable, 0-700 cm or in. (NOTE: For `-DAF' & `-UD' types this is Top Offset)  
| Depth Units                | Selectable, inches or centimeters  
| Temperature                | Maximum 50°C (120°F)  
| Power                      | 110/220 VAC, 220/240 VAC, 50/60 Hz (advise with order). 10 watts  
| Outputs                    | · Liquid Crystal display (LCD) 2x20 Digit Alphanumeric  
|                           | · 4 - 20 ma output signal, linear with sludge depth  
|                           | · Two DPDT, 5 Amp, Relays, independently adjustable set-points  
|                           | · RS - 232 Serial Port  
|                           | · RS - 485 Serial Port (Optional)  
| Models                     | 602 - Reads sludge depth UP from tank bottom  
|                           | 602 - UD - Reads sludge blanket location DOWN from liquid surface  
|                           | 602 - DAF - Reads sludge/liquid interface in Dissolved Air Flotation thickeners  
|                           | 602 - LP - Special model for Drinking Water Plant upflow clarifiers where overlying water is very clear & sludge is thin (consult factory for further details)  
|                           | 602 Dual & 602-DUAL-UD- - Uses 2 probes, one mounted 48 in. (122 cm) above the other to give 96 in. (244 cm) continuous span  
| Approvals                  | CSA Approved and CE Conformance  

## OTHER MARKLAND SYSTEMS

Markland's portable sludge level detector, the SLUDGE GUN®, is a valuable operating tool for manual sludge bed detection. Markland also manufactures Suspended Solids Meters that use ultrasonic attenuation to measure concentration in sludges and slurries that are too thick for optical methods. Markland Automatic Duckbill® Samplers operate without mechanical moving parts for reduced maintenance and high reliability. Contact us for a complete catalog of Markland products.

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