Waste Water Industry Applications

- Pump Protection
- Clarifier Tank/Drag Chain Protection
- Sludge Removal Conveyors: Slow-Down Detection
- Intake/Head Works Screening
- Rotary Distributor Protection
- Flocculator Speed Detection

Waste water treatment plants provide a harsh environment and have a wide variety of machinery that requires proactive monitoring for efficient operation and the safety of plant personnel. Electro-Sensors range of shaft speed switches, sensors, and ratemeters are all designed to be industrial-duty and operate reliably in these conditions. Shaft speed switches provide protection for drag and sludge removal conveyors preventing damage and shutdowns caused by debris, worn parts or machinery breakdowns. Ratemeters and reverse rotation detectors protect machinery such as rotary distributors and pumps from costly damage due to reverse rotation. Electro-Sensors manufactures a wide range of industrial-duty products to protect your operations and operators.

Waste Water Treatment Plant

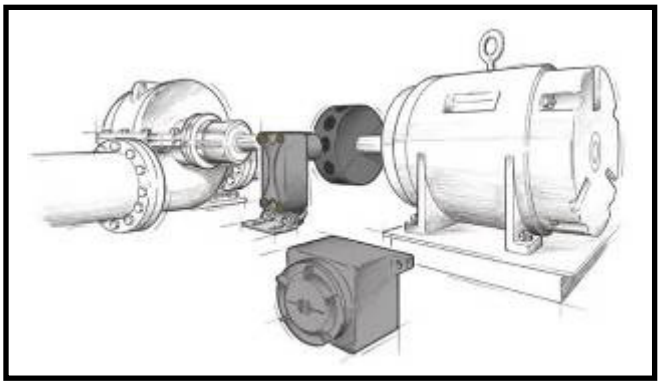
Water Utility - Reverse Rotation Detection High Service Pumps

ESI Product: UDS1000 Unidirectional Speed Switch with 907-B Sensor and Wrap

Application: Monitor high service pump shaft to protect against reverse rotation

Why: High service pumps are widely used at thousands of water utilities worldwide. These pumps typically have enormous pumping capacity and are driven with high horsepower motors. While they normally operate reliably, unchecked backpressure can lead to severe pump damage when a pump is started during a reverse rotation condition. Catastrophic damage such as breakage of the pump shaft can occur, leading to significant downtime and considerable repair expenses before normal operation can be resumed.

How it works: The UDS1000 is a failsafe reversal detection switch that constantly monitors a shaft to ensure that it is turning in the correct rotational direction. Relay contacts in the unit can be used to electrically lock out the starting circuit of the pump to prevent accidental start up during a condition of reverse rotation. The system is supplied with a rugged XP sensor and a split collar pulser wrap custom made for the shaft being monitored. The UDS1000 continuously monitors incoming pulses from the sensor and magnetic wrap. A failsafe relay output is electrically interlocked directly to the motor starter circuit for the pump. If the slightest reverse rotation of the pump shaft is detected it disables the pump starting circuit thus preventing catastrophic damage caused by start-up during reverse rotation.



UDS1000 with 907-B Sensor and Split Collar Pulser Wrap

Benefits:

- UL & CE Listed
- Rugged and Reliable System
- Suitable for Hazardous Locations
- Simple to Install and Calibrate
- Proactive Machinery Protection

Waste Water Treatment - Clarifier Tank/Sludge Removal

Clarifier Tank – Sludge Removal – Chain & Flight Drags

ESI Product Solution: SS110 Slow Speed Switch, 906 Sensor & 255 Pulser Disc

Application: Detect slow-down/stoppage of very slow speed shaft of chain/flight drives, caused by debris.

Why? Provide fast & accurate detection of shaft slow-down of rotating flighted drag chain used to scrape the bottom of clarifier tanks to prevent conveyor damage or stoppage leading to costly downtime and repairs.

How it works: Flighted chain scrapers, continuously dredge settled sludge off the bottom of clarifier tanks. The flights & chains are known to become clogged by debris, such as branches and garbage that float into the water stream, which can damage the rotating shafts, chain & flights. The SS110 will provide immediate warning of slow-down, prior to any damage of chain & flights.

Benefits:

- Rugged & reliable shaft speed slow-down detection
- Prolong the life of the drag system chain & flights
- Prevent costly downtime and repairs

SS110 Speed Switch, 906 sensor & 255 Pulser Disc

Waste Water Treatment - Sludge Removal Conveyor Protection

<u>ESI Product:</u> SCP1000 Shaft Speed Switch with 255 Pulser Disc

<u>Application:</u> Monitor tail pulley for slowdown due to belt slippage, belt breakage or overloading.

<u>Why:</u> Unwanted slowdown or stoppage of a sludge conveyor can result in costly machine damage, process downtime and unsafe working conditions. Sludge can be damp or wet – adding significant weight to the conveyor belt leading to belt slippage or slowdown. Conveyor belts can break due to overload, wear and tear, or motor burnout. Shaft speed switches detect these conditions and alert the operator *before* a crisis becomes a catastrophe.

<u>How it works:</u> The SCP1000 shaft speed switch monitors the rotation of the non-driven tail pulley, receiving a digital pulse train from the 255 magnetic pulser disc. The SCP1000 decodes this frequency signal to determine shaft speed and then compares this to the pre-adjusted set point. In the event of a fault condition such as belt slippage or product overload, the relay, pre-calibrated by the operator and can be used to provide an alarm or equipment shutdown, assuring machine protection and process integrity.

Benefits:

- **Economical 2 piece system**
- **Rugged and field-tested**
- **UL & CE listed**
- **Simple to install and calibrate**
- **Suitable for hazardous locations**
- **Proactive machinery protection**

SCP1000 and 255 Pulser Disc

SCP1000 and 255 Disc mounted on a shaft

Waste Water Treatment - Intake - Channel Screeners

Channel Screeners

ESI Product Solution: DR1000 Speed Switch, 906 Sensor, and Split Collar Pulser Wrap

Application: Detect slow-down/stoppage of screener shaft, caused by debris.

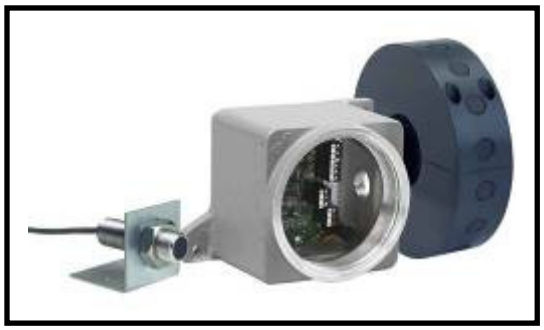
Why: Provide fast & accurate detection of shaft slow-down of rotating conveyor screens, caused by debris clogged screens. Debris clogging can lead to system damage.

How it works: Water passes through a continuous perforated conveyorized screen. The screener acts as an inverted conveyor, and the screening medium removes grit and debris from a flow of channel water. Debris can clog the screeners, which slows the rotating drive shaft. The DR1000 will provide immediate warning of slow-down, prior to any damage of screener.

Benefits:

- Rugged & reliable shaft speed slow-down detection
- Prolonged life of screening systems
- Prevents costly downtime and repairs

DR1000, 906 Sensor, and Pulser Wrap



DR1000, 906 Sensor, and Pulser Wrap

Waste Water Treament – Speed & Direction Sensing on a Rotary Distributor

Rotary Distributor

ESI Product Solution: TR400 Meter, 906-Bi-Directional Sensor & 255 Disc

Application: Monitor critical speed & direction of slow moving Rotary Distributor

Why: TR400 & 906-B sensor provides precise digital feedback of the main distributor shaft. The TR400 meter gives an early warning of shaft stoppage or a change of direction, which will damage the distributor resulting in costly downtime and repairs.

How it works: The TR400 receives digital pulses from the 906-B/255 target mounted on the main shaft of the Rotary Distributor shaft. The TR400 meter displays shaft speed, and offers the user up to 6 programmable relays and/or 4-20 mA output. The TR400 meter will provide early warning if the distributor slows, stops, or has a catastrophic reversal of shaft direction.

Benefits:

- Optimize distributor performance
- Rugged shaft speed/direction monitoring
- Early warning of distributor stoppage
- Avoid costly breakage caused by reversal

TR400 Ratemeter, 906 Bi-Directional Sensor & 255 Pulser Disc

Waste Water Treatment – Shaft Slowdown on a Vertical Flocculator

Vertical Flocculator Shaft & Motor

ESI Product Solution: LRB1000 Speed Switch, 906 Sensor & Split Collar Pulser Wrap

Application: Monitor critical shaft speed of slow moving vertical flocculator

Why? The LRB1000 has a programmable relay setpoint to provide an early warning of shaft slowdown or stoppage, which could result in costly downtime and repairs as the waste water treatment process is halted.

How it works: The LRB1000 receives a frequency from the 906 as it reads the magnets on the Pulser Wrap, clamped around the flocculator shaft. The LRB1000 compares this frequency to the preset setpoint and will provide an early warning if the shaft slows down below the setpoint due to motor failure, shaft breakage, or some other catastrophic occurrence.

Benefits:

- Optimize flocculator performance
- Rugged shaft speed monitoring
- Early warning of flocculator stoppage
- Avoid costly process downtime

LRB1000 with 906 Sensor & Split Collar Pulser Wrap