



APPLICATION REPORT Machinery & Apparatus

Temperature control of a hydraulic oil reservoir

- Monitoring temperature to maintain smooth operation of a pump cart
- Installation in a tight space using technology with a built-in signal transmitter
- Disturbance-free transmission of output signal to a wireless control system



1. Background

Puck Custom Enterprises, Inc. (PCE), is a leading supplier of nutrient handling solutions. Based in Manning (IA), USA, the family-owned OEM manufactures a full line of drag hose manure application equipment such as pump carts for the farming industry.

These pump skids are used for a variety of processing and cleaning operations in land applications where stationary units cannot be used. The pump units have a capacity of more than 3000 gal (US) per minute (approx. 11,350 l/min) and are equipped with a great deal of measuring instrumentation that helps maintain smooth operation.

2. Measurement requirements

One measuring parameter to be monitored is the temperature in the cart's hydraulic oil reservoir. The reservoir holds all the hydraulic oil for the pump units. If the fluid heats up under constant operation, it starts to become too thin to operate the system. To ensure that the physical properties of the oil are maintained and that the system continues to function properly, it is important that a specified temperature range is not exceeded.

With this in mind, PCE was searching for a new cost-effective way to equip their carts' hydraulic oil reservoirs with temperature instrumentation. As the temperature has to be controlled by the pump operator at all times, the measured value was to be transmitted to PCE's custom wireless pump control system MobileStar.



PCE pump cart



3. KROHNE solution

As an existing customer of flow and level technologies, PCE provided KROHNE the opportunity to also advise on temperature assemblies. KROHNE recommended using the OPTITEMP TRA-C30 compact sensor. The sensor features a built-in signal transmitter preconfigured to the desired fixed temperature range in the oil reservoir. Thanks to its customized process connection and compact design it fits easily into the tight space of the reservoir.

The 4...20 mA output of the OPTITEMP TRA-C30 ties directly into PCE's MobileStar control system. Whenever the temperature in the reservoirs exceed a defined temperature threshold, the pump control system instantly issues an alarm so that the operator can take counter steps.



Display of pump control system

4. Customer benefits

PCE stands to gain from a reliable compact sensor that ensures smooth operation and integrity of all the pump equipment. As the transmitter of the OPTITEMP TRA-C30 is integrated into the sensor, the sensor's small signal is converted into a standardized output signal which makes it immune to interference. External transmitters or connection heads are eliminated, allowing the sensor to speak with the Mobile-Star system without any wiring. The robust design and reduced housing make the OPTITEMP TRA-C30 also less susceptible to mechanical stress and less prone to accidental damage in the demanding environment of the pump cart's oil reservoir.

With preconfigured temperature ranges, no extra configuration is needed. This way it provides the customer with a ready to use solution. In case the compact sensor has to be replaced one day, maintenance work requires minimal time. The reduced number of parts and compact design cuts installation time significantly.

PCE is very satisfied with the OPTITEMP TRA-C30. The company now considers KROHNE its' main instrument vendor. Given PCE's recent rapid growth, this opens up an opportunity of up to 200 sensors per year.

5. Product used

OPTITEMP TRA-C30

- Compact sensor for measuring gases, liquids and solid matter
- Designed for general applications such as: machine builders, OEM manufacturers, plant engineering
- Operating flawlessly in temperatures from -40 to +85 °C / -40 to +185 °F
- Classed IP67, the sensors are dust tight and can be used in wet outdoor environments
- Short response times (for water $t_{0,5} = 3.2$ s, $t_{0,9} = 9.0$ s)
- Accuracy $\pm 0.15\%$ of the measuring span
- Long-term stability $\pm 0.1\%$ of span per year



Contact

Would you like further information about these or other applications?
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