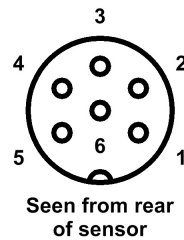


Tan Delta Quick Start Guide

Sensor Set-up

The Tan Delta sensor is designed to be easy to use in a variety of configurations depending on the monitoring equipment to which you would like to interface. It uses a simple four wire connection to connect to its power supply, switch/calibrate input and 4-20mA current sink output, with an additional two wires if you would like to use an RS232 or RS485 (optional) interface to connect to a PC or laptop. The connections and recommended wire colours are as follows:



- Pin 1 - Yellow (4-20mA current sink output)
- Pin 2 - White (switch/calibrate output)
- Pin 3 - Red (+10 to +30V dc power supply)
- Pin 4 - Black (0V and power supply common)
- Pin 5 - Blue (RS232 RXD)
- Pin 6 - Green (RS232 TXD)

The sensor's 4-20mA output is linearly scaled to output between -25% (4mA) and +100% (20mA) oil condition over its range, or similarly between -25C and +100C if outputting temperature. This means that zero oil condition or temperature is represented by 7.2mA current flow. The default output is oil condition, but oil temperature can be selected by taking the switch/calibrate input high (between +5V and +30Vdc) and holding it high. This can be tested by connecting the (white) wire from pin 2 to the +ve supply. The output will revert to oil condition when the input is allowed to return to a low level.

The 4-20mA output sinks the current defined above to its 0V pin, which means that the monitoring circuit must be an active, high-side sensing, or an active, isolated sensing circuit. This means that it must be capable of delivering a current to the sensor from some positive voltage between +5V and +30V, and measuring the current flowing into the sensor. If the sensing resistor is in the 0V side, and the 0V is common to both sensor and measuring circuit, then the resistor will be shorted out by the 0V connection and no measurement will be possible. If the measuring circuit is isolated from the sensor and does not share a 0V connection, then it does not matter where the sensing resistor is located. (Please refer to our drawing which illustrates the recommended monitoring circuit configuration).

The sensor is supplied ready calibrated and zeroed on a sample of typical lubricating oil which may differ from the oil you are using, unless you have pre-arranged for us to use your specific oil type and have supplied us with a sample. If not, for the best accuracy you should zero the sensor on a clean sample of oil before use. If you know that the oil in the application for which you are going to use the sensor is new, clean oil, this can be done in situ; otherwise the sensor should be immersed in a clean container of new oil and tilted to expel any air bubbles which may collect in the sensing gap, and then zeroed using the following procedure. Ideally this should be done while the sensor is fully connected to your measuring circuit.

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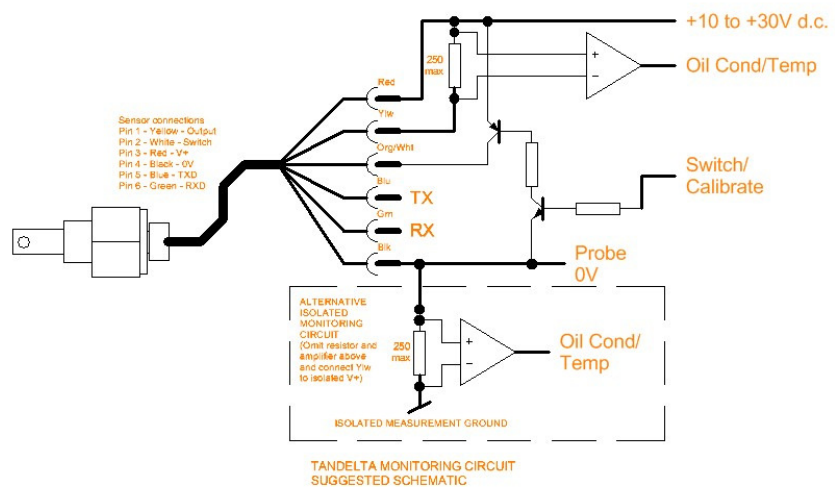
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Tan Delta Quick Start Guide cont

- 1) Power up the sensor using a suitable DC supply of between 10 and 30V d.c., ensuring the correct polarity on pins 3 and 4.
- 2) Use the switching device (e.g. relay) in your monitoring circuit to pulse the voltage on the (white) wire from pin 2 as described below. If the sensor is not yet connected to the monitoring circuit, connect a pushbutton switch between the +ve power supply and the switch/calibrate input, or if this is not possible, the sensor can be zeroed by touching the (white) wire from pin 2 to the +ve supply repeatedly; in this case, make sure that the wire is placed firmly on the +ve and held there for the relevant periods, then removed cleanly without multiple connections and disconnections.
- 3) Note down the current flowing into the sensor using your monitoring circuit, or connect a suitable current meter (e.g. a DMM on 20mA current range) between the +ve supply (+) and the 4-20mA current sink output – the (yellow) wire coming from pin 1. (This is not essential but helps you to track the zeroing process.)
- 4) Pulse the switch/calibrate input high for between 1 and 2 seconds, then low for the same period, then high, then low, then high, then low to make three full high-low cycles with each level lasting between 1 and 2 seconds. This can be done using your monitoring circuit, the pushbutton or by touching the white wire to the +ve supply. You should see the current on the meter or monitoring circuit drop to 0mA, and then increase in 1mA steps to 6mA as you go through the cycles, and then settle at or near the zero oil condition value of 7.2mA.



The oil condition output represents a measure of the lubricating ability of the oil, with 0% (or slightly negative) representing new, clean oil, and the percentage increasing as the oil deteriorates. We would recommend that an acceptable oil quality is taken as being between 0% (7.2mA) and 30% (11mA), after which the oil should be condemned. A useful warning level is normally set at 25% (10.4mA), above which an oil sample should be taken and analysed and the condition monitored carefully for any further increase.