THERMAL DIFFERENTIAL FLOW & LEVEL SWITCHES

Kenco's Thermal Differential Switches are designed for a wide range of flow and level applications. These switches can be used to detect either the overall liquid level or a liquid – liquid interface. They can also be used to detect a specific flow rate or a flow/no flow condition in liquids and gasses.

FEATURES

- Level and Interface detection
- Flow detection for Liquids and Gasses
- Fast Response Time
- No Moving Parts
- Temperature Compensation

APPLICATIONS

- Level detection
- Nitrogen Flow detection
- Low Flow Monitoring
- Liquid-Lquid Interface detection
- Foam-Liquid Interface detection
- Pump Protection
- Flare Systems

INDUSTRIES

- Chemical
- Petroleum
- Water / Wastewater
- Pharmaceutical
- Pulp & Paper
- Power
- Aerospace

PRINCIPLE OF OPERATION

The sensor consists of (2) Resistance Temperature Detectors (RTDs). One RTD measures the temperature of the fluid around the sensor. The other RTD is self-heated. This provides a temperature differential between the two RTDs.

In a Level application, the thermal conductivity of the liquid is higher than the gaseous layer above the liquid. When the RTDs make contact with the liquid, there is a cooling effect with the liquid absorbing the heat from the heated RTD. This reduces the temperature differential between the two RTDs, and causes the relay to change state. When the liquid level drops below the sensor, the temperature differential increases, causing the relay to reset. This will also work in a liquid-liquid interface when the two liquids have different thermal conductivity (ex. oil and water).

In a Flow application, there is a temperature differential during a no-flow or low-flow condition (the actual setpoint is adjusted during the calibration procedure). As the flow rate increases, the temperature differential between the RTDs decreases, causing the relay to change state. When the flow rate decreases, the temperature differential increases, causing the relay to reset.

ORDERING GUIDE

REQUESTED BY: _____   COMPANY: _____

ADDRESS: _____ CITY: _____ STATE: _____ ZIP: _____

PHONE: _____ FAX: _____ EMAIL : _____

☐ — ☐ — ☐ — ☐ —

Model
KTDL = Level Switch
KTDF = Flow Switch

Process Connection
050 = 1/2" NPT
075 = 3/4" NPT
100 = 1" NPT
3A1 = 1 1/2" Sanitary
RA1 = 1" 150# ANSI Flange
RA2 = 2" 150# ANSI Flange
RB1 = 1" 300# ANSI Flange
RB2 = 2" 300# ANSI Flange
LFS = Low Flow Sensor
SPL = Special Connection

Sensor Material
S6 = 316L SS
S4 = 304 SS
SL = 304L
HB = Hastelloy-B
HC = Hastelloy-C
IO = Inconel 600
MN = Monel
A2 = Alloy-20
SM = Special Material

Insertion Length
002.00 = Standard
002.50" - 120.00" = (Optional - KTDL)
002.50" - 012.00" = (Optional - KTDF)

☐ — ☐ — ☐

Input Power
110 = 110Vac
220 = 220Vac
24D = 24Vdc
24A = 24Vac

Configuration
LE = Integral Mounting
RE = Remote Mounting

Options
00 = No Options
RT = RTD Output
LT = Live Tap
CE = CE Approved
EN = Extended Neck
HT = *High Temp (850°F)
MT = *Medium Temp (572°F)

XW = Explosion-proof Window
CA = Additional Cable
VI = Variable Insertion
CB = Factory Calibration
TO = Thermocouple Output
TG = SS Tag
TE = Sensor Installed in Tee
*Remote Mounting Required

**Example Model Designation:** KTDL-050-S6-002.00-110-LE-00

PRODUCT SPECIFICATIONS

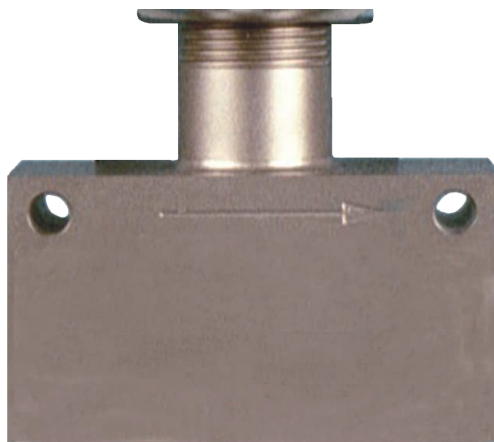| DESCRIPTION		SPECIFICATIONS
Power Supply	AC	110Vac or 220Vac @ 50/60 Hz
	DC	24Vdc
Output	Relay	5A DPDT – Failsafe is field selectable
Temperature Range (Electronics)		-40°F to 140°F (-40°C to 60°C)
Temperature Range (Sensor)	Standard	-100°F to 390°F (-70°C to 200°C)
	Medium Temp.	-100°F to 572°F (-40°C to 300°C)
	High Temp.	-100°F to 850°F (-40°C to 458°C)
Pressure Range		Atmospheric to 3000psig
Operating Range (Flow)	Aqueous Liquids	0.01 to 2.5 feet/second
	Hydrocarbon Liquids	0.01 to 5.0 feet/second
	Gasses	0.1 to 500 feet/second
Response Time		0.5 to 5.0 seconds (media dependent)
Stability		<0.5% from calibrated setpoint over a range of ±50°F
Repeatability		±1.0%

AGENCY APPROVAL

AGENCY	MODELS	PROTECTION METHOD	SPECIFICATIONS
CSA	KTDL-X-X-X-X-X-X KTDF-X-X-X-X-X-X	Explosion-proof	Explosion-proof for: Division 1 Class I - Groups B, C, D; Class II - Groups E, F, G; Class III

APPLICATION EXAMPLES

Gas Vent

High Level Alarm

Interface Level Alarm

Low Level Alarm

**Pump Protection**
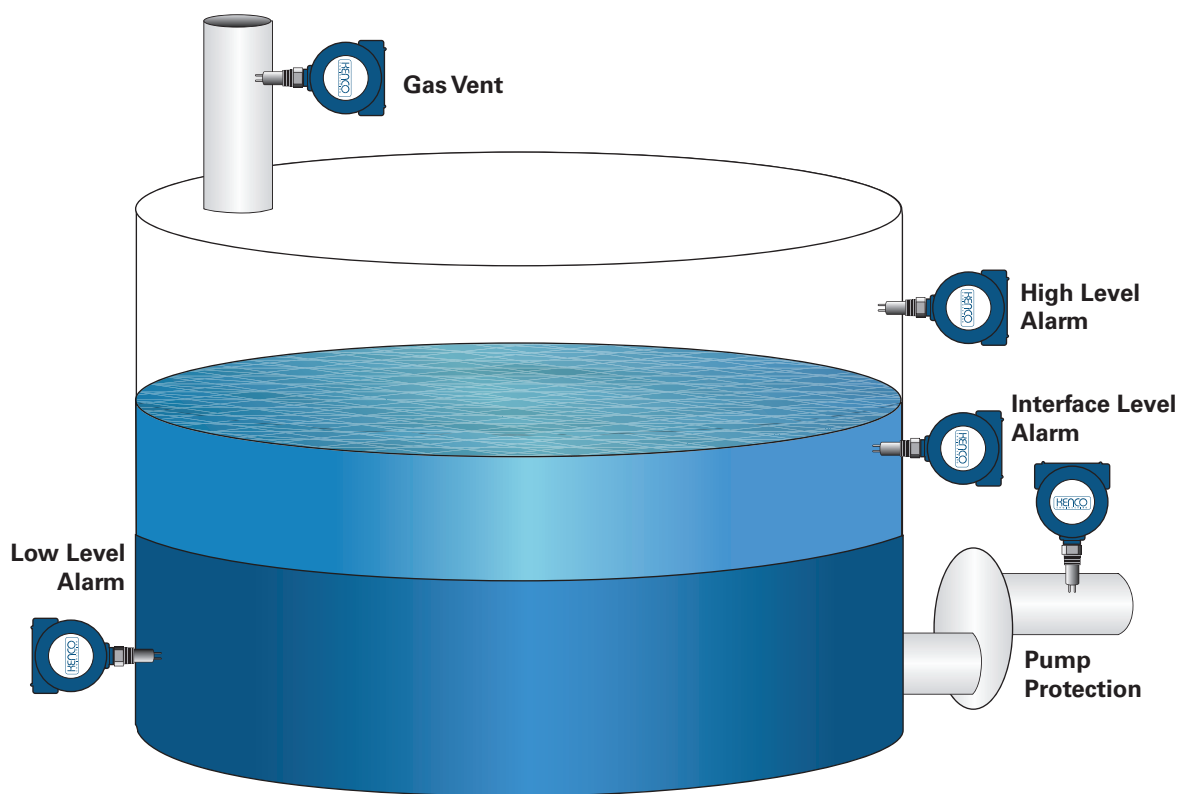
SPECIAL SENSORS

LOW FLOW SENSOR

- Developed for low flow gas and liquid applications where reliability and durability are mandatory
- Very low internal volume so that sample times are short and system response remains fast
- All welded stainless steel construction
- ¼" Female NPT process connections
- Operating temperature range: -100°F to 392°F

SANITARY SENSOR

- 3-A Certified
- Designed for use in food, beverage, dairy, and pharmaceutical applications
- Standard insertion length is 2.5". Contact Kenco for custom lengths.
- Operating Temperature Range: -100°F to 392°F
- Maximum Working Pressure of 1500 psig
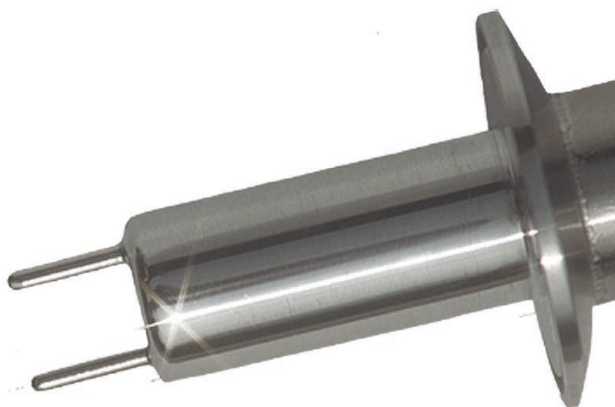
ADDITIONAL APPLICATIONS

Low flow monitoring in food processing plants
different lines are used to blend ingredients. If one of these lines becomes blocked, the product can be ruined. By monitoring the flow in each of the blending lines, a Kenco Model KTDF can prevent product loss.

Monitoring flow through heat exchangers
The Kenco KTDF flow switch can monitor the flow and activate a shutdown at a specific low flow, or no flow condition in the exchanger.

Eye wash station monitoring
The Model KTDF can be used to monitor the condition of an eyewash station. When the station is used, a signal is sent to notify emergency medical personnel.
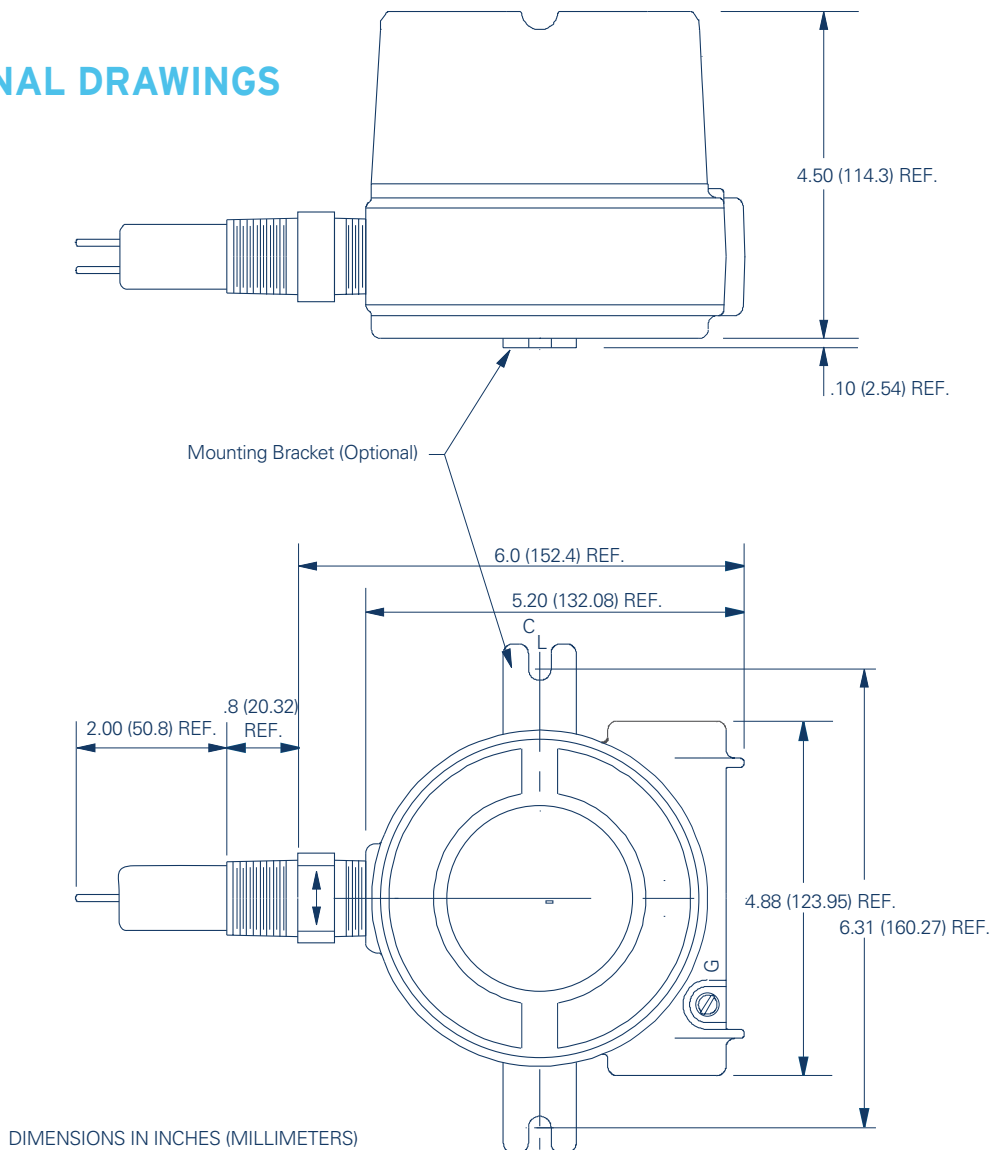
Diesel Fuel / Water Interface Detection
Over time, fuel tanks can accumulate a significant amount of water. This water reduces the capacity of the tank. A Kenco Model KTDL can be used to detect the water, turn on a pump to remove the water and shut off the pump to prevent pumping the diesel fuel.

Flare Systems
A Kenco KTDF flow switch can be used to detect which vessel is emitting to the flare line. It can also be used to activate the flare igniter when gas flow is present, or to detect if the flare does not ignite in the presence of gas flow.

DIMENSIONAL DRAWINGS

4.50 (114.3) REF.

.10 (2.54) REF.

Mounting Bracket (Optional)

6.0 (152.4) REF.

5.20 (132.08) REF.

C

2.00 (50.8) REF.

.8 (20.32) REF.

4.88 (123.95) REF.

6.31 (160.27) REF.

G

DIMENSIONS IN INCHES (MILLIMETERS)