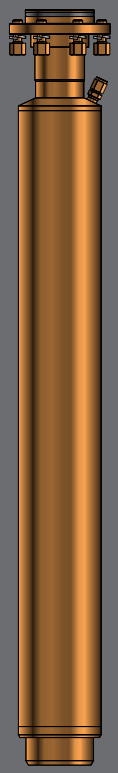


E-SERIES MONITORING SYSTEMS

A Zenith E-Series Sensor is installed on the bottom of an ESP motor using a flange connection. The sensor is connected electrically to the Wye point of the motor. A motor base crossover may be required for some ESP manufacturer's motors — consult Zenith for details.

The sensor is calibrated by Zenith during manufacture and retains its calibration on board. It does not require a dedicated calibration key at surface.

The E-Series sensor is available in multiple specifications to suit the application and economic impact of deploying a monitoring system on your ESP. Parameters can be customised at point of order to provide a level of monitoring to suit your operational and economic requirements. Measurements can be individually selected from the table below.

E-Series sensors are available in two temperature specifications:

1. Standard Temperature: 150°C
2. High Temperature: 175°C

E-Series sensors are available in two pressure specifications:

1. Standard Accuracy: 0.2% of full-scale, 1 psi resolution
2. High Accuracy: 0.1% of full-scale, 0.1 psi resolution

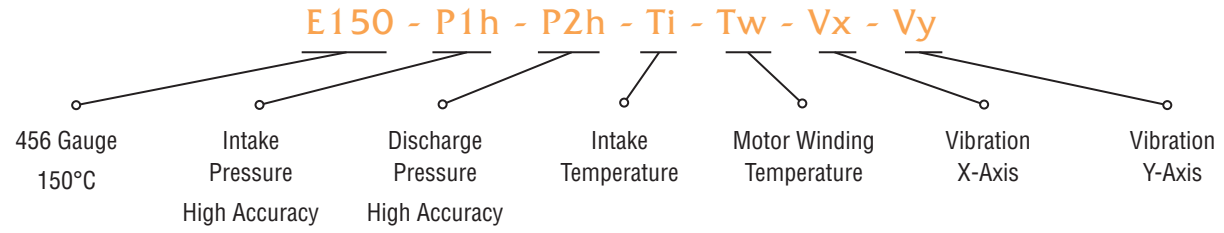
Five-second update of intake pressure with one-second update option available

MEASUREMENT	MONITORING USES	ESP PROTECTION
Intake Pressure	Monitor well draw-down Assess reservoir performance	Protect from pump off Protect from free gas Protect from excessive well draw-down
Discharge Pressure	Monitor pump performance Monitor well production Enable advanced well analysis	Protect from dead heading Protect from incorrect rotation
Intake Temperature	Monitor well fluid temperature	Protect from excessive gauge temperature
Motor Oil Temperature	Monitor motor cooling Poor Flow, overloading, recirculation	Protect from motor overheating
Motor Winding Temperature	Monitor actual motor temperature Poor Flow, overloading, recirculation	Protect from motor overheating
Vibration - X Axis	Monitor ESP string vibration caused by sand, gas, pump wear, pump bend	Early warning of wear, solids & gas Resonant frequency protection
Vibration - Y Axis	Monitor ESP string vibration cause by sand, gas, pump wear, pump bend	Early warning of wear, solids & gas Resonant frequency protection
Current Leakage	Monitor cable integrity	Cable protection

"CALIBRATED DURING MANUFACTURE...
...MULTIPLE SPECIFICATIONS...
... PARAMETERS CAN BE CUSTOMISED"

CONFIGURING YOUR GAUGE

1. Choose temperature rating and gauge size > 2. Select the parameters you require > 3. Create reference (see example)



DESCRIPTION	REF. No.	MAX WORKING PRESSURE (psi)	TEMPERATURE RATING (°C)	MAKE UP LENGTH (ft)	OUTSIDE DIA. (in)
E-Series - Standard Temperature	E150	5,800	150	2.800	4.5
E-Series - High Temperature	E175	5,800	175	2.800	4.5
E-Series - Slimline Standard Temperature	375 E150	5,800	150	2.800	3.75
E-Series - Slimline High Temperature	375 E175	5,800	175	2.800	3.75

PARAMETER OPTIONS	REF. No.	UNITS	RANGE	RESOLUTION	ACCURACY
Intake Pressure (standard accuracy)	P1s	psi/bar	0-5,800 psi	0.1 psi	0.2 %
Intake Pressure (high accuracy) **standard on all 6-7 parameter gauges*	P1h	psi/bar	0-5,800 psi	0.1 psi	0.1 %
Discharge Pressure (standard accuracy)	P2s	psi/bar	0-5,800 psi	0.1 psi	0.2 %
Discharge Pressure (high accuracy) **standard on all 6-7 parameter gauges*	P2h	psi/bar	0-5,800 psi	0.1 psi	0.1 %
Intake Fluid Temperature (standard temperature)	Ti	°C/°F	0-150°C	0.1°C	1°C
Intake Fluid Temperature (high temperature)	Ti	°C/°F	0-175°C	0.1°C	1°C
Motor Oil Temperature	Tm	°C/°F	0-210°C	0.1°C	1°C
Motor Winding Temperature	Tw	°C/°F	0-210°C	0.1°C	1°C
Vibration - x axis	Vx	g	0-5 g	0.003 g	1%
Vibration - y axis	Vy	g	0-5 g	0.003 g	1%
Current Leakage	CI	mA	0-20 mA	0.001 mA	0.05 %

DESCRIPTION	REF. No.	DETAILS
ESP Motor Oil Hook-Up Kit	13460056000	HV boot connector kit and 'O' ring
ESP Motor Oil Hook-Up Kit for slimline sensor	13460084000	HV boot connector kit and 375 'O' ring
ESP Motor Winding Hook-Up Kit	13460086000	HV boot connector kit, 2 x LV boot connectors and 'O' ring
ESP Motor Winding Hook-Up Kit for slimline sensor	13460089000	HV boot connector kit, 2 x LV boot connectors and 375 'O' ring