

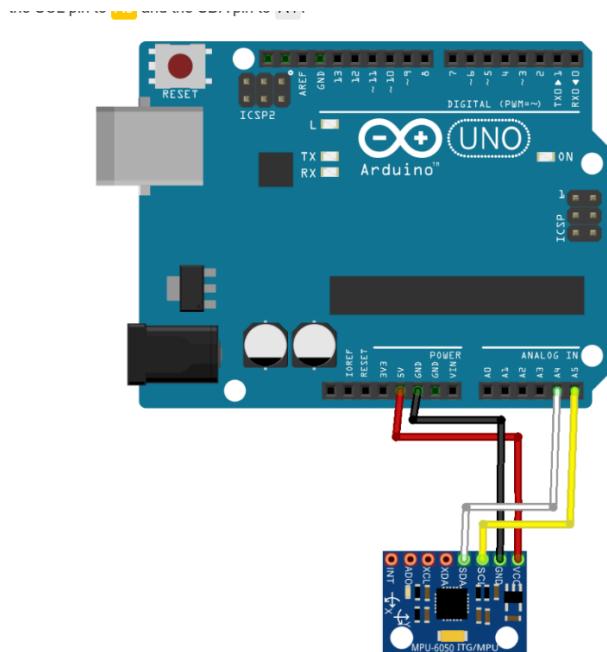
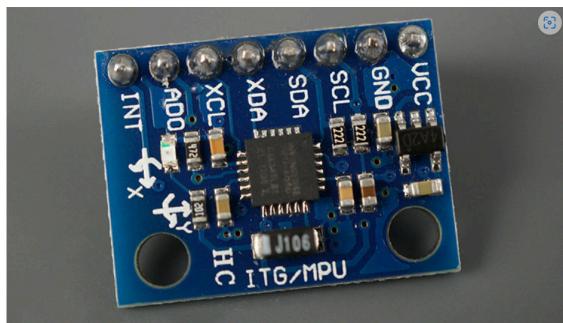
LV REPORT ON DAQ SYSTEM

SUSPENSION

Wheel angle & Steer Angle:

MPU6050 3 axis Accelerometer Gyroscope

It is used to gather real-time data about the vehicle's orientation, wheel angle, steer angle and acceleration during its operation while used along with Arduino/STM.



CODE:

```
#include <Adafruit_MPU6050.h>

//Measure Angle with a MPU-6050(GY-521)

#include <Wire.h>

const int MPU_addr = 0x68;
int16_t AcX, AcY, AcZ, Tmp, GyX, GyY, GyZ;

int minVal = 265;
int maxVal = 402;

double x;
double y;
double z;

// Function to reset the angles to zero
void resetAngles() {
    x = 0.0;
    y = 0.0;
    z = 0.0;
}

void setup() {
    Wire.begin();
    Wire.beginTransmission(MPU_addr);
    Wire.write(0x6B);
    Wire.write(0);
    Wire.endTransmission(true);
    Serial.begin(9600);

    // Call the resetAngles function to reset the angles to zero
    resetAngles();
}

void loop() {
    Wire.beginTransmission(MPU_addr);
    Wire.write(0x3B);
    Wire.endTransmission(false);
```

```
Wire.requestFrom(MPU_addr, 14, true);
AcX = Wire.read() << 8 | Wire.read();
AcY = Wire.read() << 8 | Wire.read();
AcZ = Wire.read() << 8 | Wire.read();
int xAng = map(AcX, minVal, maxVal, -90, 90);
int yAng = map(AcY, minVal, maxVal, -90, 90);
int zAng = map(AcZ, minVal, maxVal, -90, 90);

x = RAD_TO_DEG * (atan2(-yAng, -zAng) + PI);
y = RAD_TO_DEG * (atan2(-xAng, -zAng) + PI);
z = RAD_TO_DEG * (atan2(-yAng, -xAng) + PI);

Serial.print("AngleX= ");
Serial.println(x);

Serial.print("AngleY= ");
Serial.println(y);

Serial.print("AngleZ= ");
Serial.println(z-218);
Serial.println("-----");
delay(400);
}
```

Rack Travel:

Linear Potentiometer

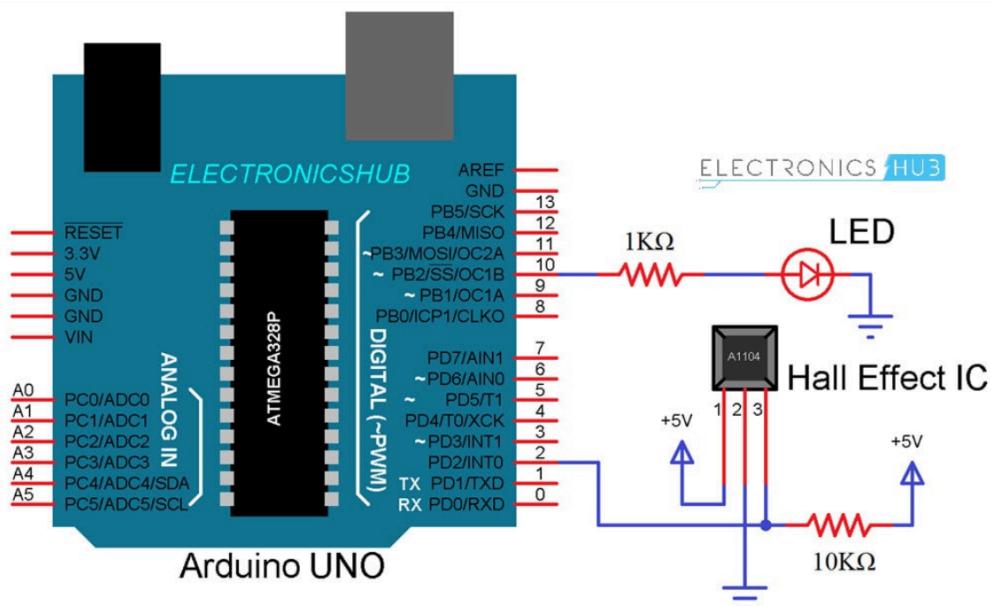
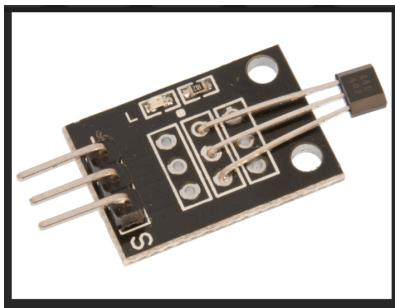
It is an electronic component used to vary the resistance along a linear path. By attaching the linear potentiometer to the rack in a way that the wiper(terminal) moves along with the rack's movement, the resistance between the two fixed terminals changes based on the rack's position.



Plunge of Damper(Linear Travel of Damper(shock absorber)):

Hall Effect Sensor

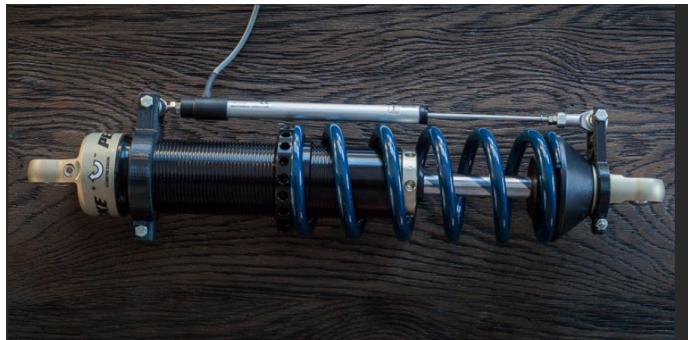
It is a transducer that detects changes in magnetic fields and converts them into electrical signals. When integrated into a damper system, the Hall effect sensor can accurately measure the displacement of the damper's piston or rod, providing valuable feedback for control and monitoring purposes.



(or)

Linear Potentiometer:

A linear potentiometer can be integrated into the damper system to measure linear displacement plunge depth in ampersand provide position feedback for mechanical systems.



POWERTRAIN

RPM:

Omron E3F3-D32 Photo Electric Sensor

This sensor utilizes Infrared Light to sense the rotational movement of a target object.

It detects wheel rotations using photoelectric principles, such as interruption or reflection of a light beam by the wheel's spokes or marks.

For motor rpm, it's placed near the motor (somewhere where the rotation is easily accessible) or near the inboard brake.



BRAKE AND WHEEL

Brake Forces:

Force Sensor-0.5" Force Sensitive Resistor

It is a sensor that changes resistance based on applied pressure and is used for measuring force based on the principle of 'Contact Resistance'.

It provides real-time feedback for brake performance analysis and optimization allowing accurate detection of pressure on brake pedals.

It is placed on the brake pedal and is a sensitive sensor so a protector layer is to be placed like foam paper/sponge.



FSR05CE

Force Sensitive Resistor, Round, FSR Series, 30 g to 5 kg, Connector Housing



Manufacturer:	OHMITE
Manufacturer Part No:	FSR05CE
Order Code:	4015796
Product Range	FSR Series

Add to compare

Image is for illustrative purposes only. Please refer to product description.

Product Overview

FSR05CE is a FSR series force sensing resistor. It exhibits the unique characteristic of dynamic resistance related to the amount of applied force. When more force applied to the surface of the sensor, it lower the resistance. The resistance change is inversely proportional to the applied force. This force-sensing resistor is characterized for Human machine interface (HMI) or Machine-machine interface (MMI) applications. Specific device characteristics will depend on the size, shape and materials used in construction. Force-sensing resistors are intended for applications where a delta in applied force is to be detected. They are not intended for high accuracy or specific weight measurement applications.

- Actuation force is <30g (force to reach 10Mohm, average of 100 samples)
- Long term drift is < 2% (1kg for 48hrs, per log time)
- Single part repeatability is 2% (100 actuations of 1kg, 1 standard deviation/mean)
- Part to part repeatability is $\pm 4\%$ (100 sensors same batch, 1 standard deviation/mean)
- Operational temperature range is -20°C to +85°C (100 cycles at 0.5kg)
- Hysteresis is 5% (100 actuations of 1kg, Avg. change in res. of 100 samples)
- Lifecycle durability is 7% ((10M)1kg force at 3Hz, Avg.change in resistor of 4 sensors)
- Connector housing (female, equivalent to Nicomatic 14106-12 and OF-02) terminal
- High humidity storage is 8% (+85°C/85%RH for 250hrs, Avg. change in res.of 5 sensors)
- ø5.60mm active area, 7.62mm round and 38.1mm length format

210 In stock [Need more?](#)

210 UK stock available for 4-6 business days delivery

Rs.617.01
Price for: **Each**
Multiple: **1** Minimum: **1**

Quantity	Price
1+	Rs.617.01
10+	Rs.484.33
100+	Rs.389.09
250+	Rs.344.32
500+	Rs.332.93
1000+	Rs.319.09

[Request a quote for higher quantities](#)

FSR04CE

Force Sensitive Resistor, Round, FSR Series, 20 g to 5 kg, Connector Housing



Manufacturer:	OHMITE
Manufacturer Part No:	FSR04CE
Order Code:	4015793
Product Range <small>i</small>	FSR Series

Add to compare

Image is for illustrative purposes only. Please refer to product description.

Product Overview

FSR04CE is a FSR series force sensing resistor. It exhibits the unique characteristic of dynamic resistance related to the amount of applied force. When more force applied to the surface of the sensor, it lower the resistance. The resistance change is inversely proportional to the applied force. This force-sensing resistor is characterized for Human machine interface (HMI) or Machine-machine interface (MMI) applications. Specific device characteristics will depend on the size, shape and materials used in construction. Force-sensing resistors are intended for applications where a delta in applied force is to be detected. They are not intended for high accuracy or specific weight measurement applications.

- Actuation force is <20g (force to reach 10Mohm, average of 100 samples)
- Long term drift is < 2% (1kg for 48hrs, per log time)
- Single part repeatability is 2% (100 actuations of 1kg, 1 standard deviation/mean)
- Part to part repeatability is $\pm 4\%$ (100 sensors same batch, 1 standard deviation/mean)
- Operational temperature range is -20°C to +85°C (100 cycles at 0.5kg)
- Hysteresis is 5% (100 actuations of 1kg, Avg. change in res. of 100 samples)
- Lifecycle durability is 7% ((10M)1kg force at 3Hz, Avg.change in resistor of 4 sensor)
- Connector housing (female, equivalent to Nicomatic 14106-12 and OF-02) terminal
- High humidity storage is 8% (+85°C/85%RH for 250hrs, Avg. change in res.of 5 sensors)
- $\varnothing 5.60\text{mm}$ active area, 7.62mm round and 15.8mm length format

230 In stock [Need more?](#)

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Rs.621.08

Price for: **Each**

Multiple: **1** Minimum: **1**

Quantity	Price
1+	Rs.621.08
10+	Rs.488.40
100+	Rs.390.72
250+	Rs.354.90
500+	Rs.344.32
1000+	Rs.321.53

Brake Disc Temperature Validation:

- Thermocouple, Durable PFA, 1 x 0.2mm, K, -75 °C, 250 °C, 40 ", 1 m

Z2-K-1.0-1/0.2-MP-ANSI

Thermocouple, Durable PFA, 1 x 0.2mm, K, -75 °C, 250 °C, 40 ", 1 m



Add to compare

LABFACILITY

Manufacturer:	LABFACILITY
Manufacturer Part No.:	Z2-K-1.0-1/0.2-MP-ANSI
Order Code:	2443720
Product Range	Z2-K Series
Also Known As:	Z2-K-1.0-1/0.2-MP-ANSI
Technical Datasheet:	Z2-K-1.0-1/0.2-MP-ANSI Datasheet

[See all Technical Docs](#)

Image is for illustrative purposes only. Please refer to product description.

Product Overview

The Z2-K-1.0-1/0.2-MP-ANSI is a Durable PFA Exposed Welded Tip Thermocouple. Fast response, welded exposed junction. PTFE PFA insulated twin-twisted lead. Miniature plug termination. Ideal for test and development application.

- K-type Thermocouple
- -75 to 250°C Operating temperature

Applications

Sensing & Instrumentation

127 In stock Need more?								
30 SG stock available for 3-5 business days delivery								
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Price for: Each								
Multiple: 1 Minimum: 1								
<table><thead><tr><th>Quantity</th><th>Price</th></tr></thead><tbody><tr><td>1+</td><td>Rs.889.61</td></tr><tr><td>5+</td><td>Rs.864.39</td></tr><tr><td>10+</td><td>Rs.818.16</td></tr></tbody></table>	Quantity	Price	1+	Rs.889.61	5+	Rs.864.39	10+	Rs.818.16
Quantity	Price							
1+	Rs.889.61							
5+	Rs.864.39							
10+	Rs.818.16							

THERMOCOUPLE

RL0503-27.53K-120-MS

THERMOCOUPLE



Amphenol Sensors

Manufacturer: AMPHENOL ADVANCED SENSORS

Manufacturer Part No: RL0503-27.53K-120-MS

Order Code: 2103825

Technical Datasheet:  [RL0503-27.53K-120-MS Datasheet](#)

[See all Technical Docs](#)

 [Add to compare](#)

Image is for illustrative purposes only. Please refer to product description.

Product Information

- Zero Power Resistance at 25°C:** 50kohm
- Product Range:** RL0503 Series
- Thermistor Mounting:** Through Hole
- Beta Value (K):** -

- Thermistor Case Style:** -
- Thermistor Terminals:** Wire Leaded
- Operating Temperature Min:** -50°C
- Operating Temperature Max:** 150°C
- Automotive Qualification Standard:** -

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313 US stock available for 5-7 business days delivery

Rs.93.15

Price for: **Each**

Multiple: **1** Minimum: **1**

Quantity	Price
1+	Rs.93.15
10+	Rs.91.72

[Request a quote for higher quantities](#)

0

It is used to detect and measure temperature variations, commonly used in non-contact temperature sensing applications. It measures infrared radiation

emitted from brake discs, validating their temperature. Enables monitoring and control of braking systems for enhanced safety and performance

ZTP-135SR.

THERMOPILE IR SENSOR, -20 DEGREE TO +100DEG, TO-46

Image is for illustrative purposes only. Please refer to product description.



Add to compare

Amphenol Sensors

Manufacturer: AMPHENOL ADVANCED SENSORS

Manufacturer Part No: ZTP-135SR.

Order Code: 2506255

Technical Datasheet: [ZTP-135SR. Datasheet](#)

[See all Technical Docs](#)



Product Information

Supply Voltage:

-

Operating Temperature Max:

100°C

Operating Temperature Min:

-20°C

Product Range:

Thermometrics ZTP Series



10,942 In stock [Need more?](#)

10,942 US stock available for 5-7 business days delivery

Rs.131.72

Price for: Each

Multiple: 1 Minimum: 1

Quantity	Price
1+	Rs.131.72
10+	Rs.129.79

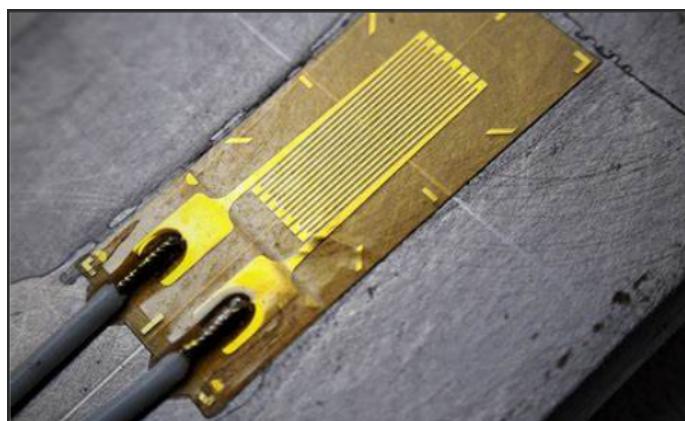
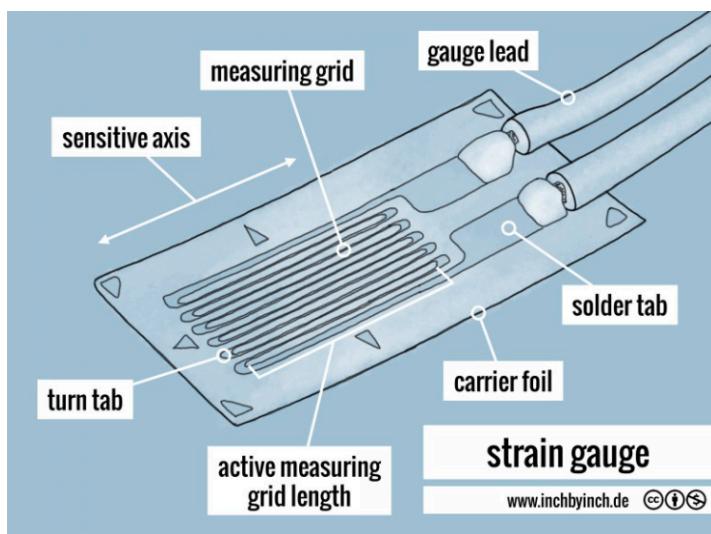
Dynamic Brake Test:

There is no specific sensor. We need to combine data from other sensors (Wheel speed and brake pressure) and use.

Pedal Deformation & Upright Deformation:

Strain Gauge

Any small change in the material under the strain gauge results in a change in the resistance of the strain gauge as it deforms with the material. This causes the bridge to be thrown out of balance, resulting in a change in the output voltage



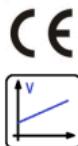
<input type="checkbox"/>	KFH-6-120-C1 -11L1M2R		3866843 Data Sheet 	Strain Gauge, 120 ohm, 2 mm, 6 mm, 2x 1m Leads, 50000 µm, Linear, 8 Vrms OMEGA	 6 available for 4 - 6 business days delivery	Pack of 10	1+ Rs.9,726.89	<input type="button" value="1"/> Add Min: 1 Mult: 1	120ohm	2mm
<input type="checkbox"/>	KFH-6-120-C1 -11L1M2R		4064470 	STRAIN GAUGE, 6MM, 120 OHM, 50000UM OMEGA	 1 available for 5 - 7 business days delivery	Each	1+ Rs.9,728.44	<input type="button" value="1"/> Add Min: 1 Mult: 1	120ohm	2mm
<input type="checkbox"/>	KFH-3-120-C1 -11L1M2R.		3931342 	STRAIN GAUGE, 3MM, 120 OHM, 50000UM OMEGA	 5 available for 5 - 7 business days delivery	Pack of 10	1+ Rs.11,542.69	<input type="button" value="1"/> Add Min: 1 Mult: 1	120ohm	2mm

Pressure Sensor:

FP1124 High Temperature Pressure Transducer

IT is a device used to measure pressure in various applications. It converts the applied pressure into an electrical signal, typically a voltage or current output, proportional to the pressure.

It is used to measure pressure losses in brake.



FEATURES

- Heavy duty design
- Stainless Steel
- IP67 rating

APPLICATIONS

- On-board equipment
- Endurance test benches
- Hydraulic Pressures
- Breaking system laboratory research

FP1124

High Temperature Pressure Transducer

SPECIFICATIONS

- Easy installation
- Built-in amplifier
- With bleeder screw
- Rugged construction
- High temperature

The **FP1124** Series of pressure transducers is designed specifically to measure pressure on the brake circuit, including ABS brake systems.

With its rugged design and excellent thermal characteristics, the **FP1124** is built to withstand high temperatures to fit most brake test applications. Additional IP67 protection and a bleeder screw ensure ease of use and long life even under severe environmental conditions. The sensor can be powered by a car battery and delivers direct high-level 0.5 to 5.5 Vdc output signal.

TE CONNECTIVITY has many years of experience as a designer and manufacturer of sensing solutions to the automotive industry and can supply standard or custom sensors for specific uses and testing environments.

PERFORMANCE SPECIFICATIONS (typical values at temperature 23±3°C)

Parameters	
Operating Temperature Range (OTR)	-20 to 100°C [-4 to 266°F]
Compensated Temperature Range (CTR)	20 to 80°C [-4 to 248°F]
Thermal Zero Shift in CTR	<2% / 50°C [100°F]
Thermal Sensitivity Shift in CTR	<2% of reading / 50 °C [100° F]
Range (FS)	30, 100, 200 and 350 bar
Over-Range	
Without Damage	1.5 x F.S.
Without Destruction	3 x F.S.
Accuracy	
Combined Non-Linearity & Hysteresis	≤±0.3% F.S.

Electrical Characteristics

Model	FP1124
Supply Voltage	10 to 36Vdc
Sensitivity "FSO"	5V ±0.2V
Zero Offset	0.5V ±0.2V
Input Impedance/Consumption	<50mA
Output Impedance	<10Ω
Insulation under 50Vdc	≥100 MΩ

Notes

1. Electrical Termination: 2m Shielded Cable
2. Material: Stainless steel
3. Protection Index: IP67



Pressure Transducer Senso Pressure Gauge Transduce Input 5V Output 0.5 to 4.5V 0 to 5V for Water Gas Oil Analog Sensor (0-100PSI)

Brand: Walfront

4.1 ★★★★☆ 37 ratings

₹3,912

Inclusive of all taxes
EMI starts at ₹188. No Cost EMI available [EMI options](#)

Offers

- Bank Offer** Upto ₹500.00 discount on SBI Credit Cards 4 offers >
- No Cost EMI** Upto ₹176.15 EMI interest savings on Amazon Pay ICICI... 1 offer >
- Partner Offers** Get GST invoice and save up to 28% on business purchases. 1 offer >

Quantity: 1

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Product description

Specification:

Material:Stainless steel

Output Signal Type: Analog sensor

Accuracy: 1%FS

Thread:G1/4

Wire:Red: power, black: ground, green: signal

Size:Shown as picture

Weight:Approx. 74g/2.6oz

Pressure Range (Optional) Output Signal Power Supply

0-10PSI 0.5--4.5V/0--5V 5V

0-30PSI 0.5--4.5V/0--5V 5V

0-80PSI 0.5--4.5V/0--5V 5V

0-100PSI 0.5--4.5V/0--5V 5V

0-150PSI 0.5--4.5V/0--5V 5V

0-200PSI 0.5--4.5V/0--5V 5V

0-300PSI 0.5--4.5V/0--5V 5V

0-500PSI 0.5--4.5V/0--5V 5V

Package list:

1 * PressureTransducer

- Thread:G1/4. Wire:Red: power, black: ground, green: signal
- Stainless Steel Body: It has complete surge voltage protection function. Light weight and small volume, easy to install and operate
- Small Error: 0.5%FS small output error, including nonlinear, hysteresis error and repeatability
- Widely Used: Widely used in oil , gas and to detect oil, fuel, , gas and water
- Stable And Reliable: Adopt compensation technology and sensitive components