Hello students.

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Goa. Today we'll be covering Unit 2 transducers and the name

of the module is.

Inductive pressure transducer, an capacitive

transducer pressure.

The module number is 12.

The outline of the module is as

follows. Inductive pressure transducer, an capacitive

pressure transducer

Through this module, the students will be able to explain

the working principle of inductive pressure transducer.

And explain the working principle of capacitive

pressure transducer.

So let us begin with the module.

A pressure transducer isa device which converts

and applied pressure into electrical signal.

In the previous module we have learned about pressure resistive

transducer. In this example,when pressure was applied, the

resistance would vary.

The drawback of this particular transducer is

there's a lot of friction,and there's a lot of wear and

tear.

But in an inductive transducer?

That is inductive pressure transducer. It uses the

principle of inductance to convert the flexing of a

diaphragm into linear movement of a ferromagnetic code.

So. inductive transducer consists of three

main parts. It consists of a coil. It consists of a Movable

Magnetic Core and it consists of a

pressure sensitive element.

So over here you have seen it very well that it is a

bellow and the bellow is attached to the spring.

The Movable Magnetic Core moves inside this particular area.

This is a coil of wire which is bounded on this particular

material. What you see over here. This is called as

insulated coil form. You want to prevent any external.

Magnetic field, So what exactly happens when a pressure is

applied? So when pressure is

applied, the Movable magnetic core moves downwards, which increases

the permeability of the core. Why does the permeability of the

core increases because magnetic flux increases so when magnetic flux increases, we know that the inductance of the coil also increases, so the change in inductance is converted into an electrical signal. So the advantage of using a pressure inductor transducer is. It has no moving parts and there's no wear and tear, so it just works on the principle of permeability.

Now over the previous example,what you have notice that the sensitivity is very, very less.So, to increase the sensitivity, instead of using a self inductance, you can use mutual inductance. So this is the modified diagram of a pressure inductive transducer. So the construction is almost similar. The only difference it it has two secondary coils. This is first secondary coil and this is the 2nd. Secondary coil and the primary coil is over here, so the construction is almost similar to LVDT. What we have discussed in the previous module. So what exactly happens when pressure is applied when pressure is applied?

The movable magnetic core. moves downwards, so when the Core at the center that is a null position. The voltage is zero. But When the core is in the upper,

the output voltage is because of the upper secondary winding.

And then the mobile core movie right down the output voltages

because of the lower secondary

winding. So in this way, the sensitivity of pressure in

inductor Transducer is increased by using more than two coils.

To be more precise, exactly 2 coils, so the next topic what

will be covering up is a

capacitive transducer. In Capacitive pressure transducer

there is a change in capacitors with changes in physical

position of the moving element when pressure is changed.

The capacitance is given by C is equal to K into A divided by D K

is called as a dielectric constant of the material and A

is the area between the two

plates. And D is the distance between the two plates, so the

value of capacitance is directly proportional to the area of the

plates and is inversely proportional to the distance

between the two plates.

Capacitance will increase if the dielectric constant is high or

if the area of the plate is high if the distance between both

the plates are less.

But the capacitance will decrease if the direct constant

material is less. If the area is less an if the distance between

both the plates are high. So the working principle of a

a capacitive transducer works on these three factors. That is,

case or dielectric constant. A is the area between the two

plates and D is the distance between the two plates.

Now, in terms of construction of a capacitive transducer,

you need two plates, so the fixed plate is called Static plate

which is stationary and movable plate is called as

which is mechanically coupled to the member under

stress.

As the member moves, the rotor changes his position relative to

the stator, thereby changing the effective area between the

plates and also the distance between the two plates so.

Will come straight away to the diagram of a capacitive pressure

transducer. This entire thing,what you see over here is a

static plate. Between the static plate and the diaphragm

is called as a dielectric constant, so when no pressure

is applied, the one which isn't shown in dash is called

as a static position.

So when pressure is applied, the diaphragm is deflected.

So straight away will come to the working of a capacitive

pressure transducer when pressure is applied, the

metallic diaphragm moves inverse towards the chamber thereby

reducing the distance between the two plates.

And then pressure is removed. It Moves outward, thereby

increasing the distance between the two plates.

So as pressure increases, the distance between the plate

varies, thereby changing the capacitance of the transducer.

So the change in capacitance is converted into an electrical

signal using an AC bridge, so this is how a capacitor pressure

transducer works. And you can use a inductive pressure

transducer as well as a capacitive pressure transducer

to measure pressure.

These are my references and with this we come to the end of our

module. Thank you.