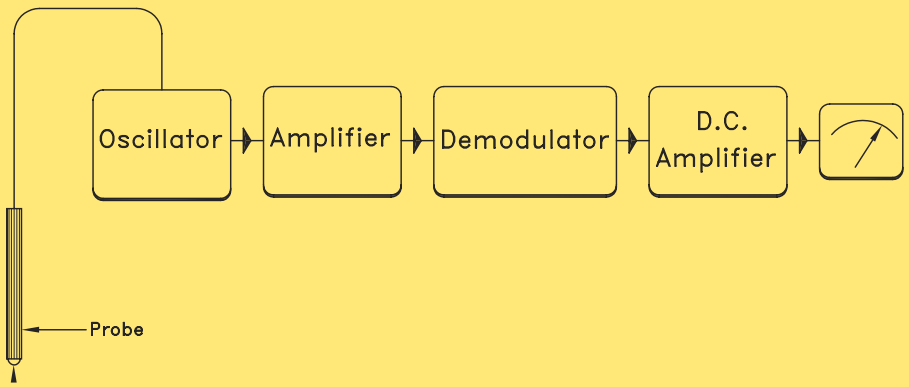


Electronic Gauge

WORKING PRINCIPLE

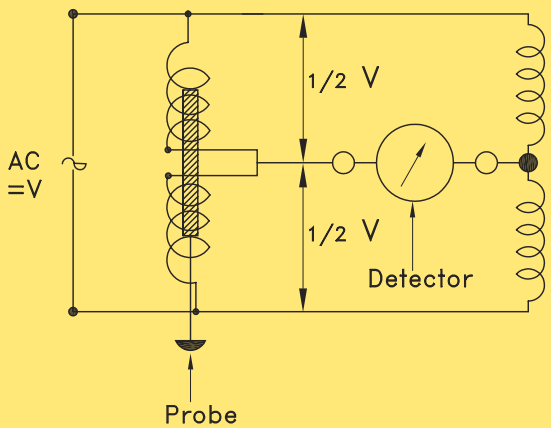
Electronic gauges are basically comparative in function i.e. the measurements are made in comparison to a calibrated setting master. A transducer commonly termed as 'PROBE', senses variations in the dimension of component under measurement. The movement of the plunger is converted to an electrical output which is processed by an Electronic circuit, this in turn drives a display in a form appropriate to the application.





The gauge unit consists of a highly stable oscillator which applies the voltage to the Wheatstone bridge. The small amplitude output A.C. signal generated by the bridge due to the unbalanced condition caused by the linear displacement of the armature during measurement, is amplified by an A.C. amplifier.
The demodulator then converts this amplified A.C. output into a D.C. signal which is then amplified by a variable gain D.C. amplifier that provides range selection. The output of this amplifier operates a display which can be in the form of a moving coil meter, digital display or bar graph column.

WHEATSTONE BRIDGE



A piece of magnetic material called 'armature' attached to the probe plunger is located between two coils. The position of the armature in the coils is such that if the armature is more inside one coil, it is less in the other coil. The plunger, the armature and the coil are housed in a metallic shell.
The two coils in the probe combined with two more coils inside the gauge unit form a Wheatstone bridge which is fed by an A.C. power source. The bridge is said to be balanced when the armature is exactly halfway between the coils windings. The axial movement of the probe which in turn moves the armature, causes a change in the inductance. This generates a small signal which is processed and finally displayed by the gauge unit.

Electronic Gauge



PROBE COMBINATIONS

Multiple probe & polarity combinations are possible to achieve relation gauging as shown below:

Probe arrangement	Probe Socket Connections	Probe Tip Movement A Probe	Probe Tip Movement B Probe	Display Movement	Units of Display Movement per Unit Tip Movement
1 Probe only Probe A	A+				+1
II	A+				-1
II	A-				-1
II	A-				+1
2 Probes A and B	A+ B+				+2
II	A+ B+				-2
II	A+ B+				0
II	A+ B+				0
II	A- B+				0
II	A- B+				0
II	A- B+				+2
II	A- B+				-2
II	A+ B-				0
II	A+ B-				0
II	A+ B-				-2
II	A+ B-				+2
II	A- B-				-2
II	A- B-				+2
II	A- B-				0
II	A- B-				0

APPLICATIONS

THICKNESS HEIGHT	+A	INTERNAL DIAMETER	−A, −B
DIAMETER CYLINDRICITY	+A	WALL THICKNESS	+A, +B
CONCENTRICITY TO DATUM CENTRE	+A	SQUARENESS	+A, −B
DIAMETER LOBING	+A, +B	CONCENTRICITY DIAMETERS TO CENTRE	+A, −B
STRAIGHTNESS	+A	TWO DIAMETERS	+A, +B
CONTINUOUS THICKNESS	+A	TAPER	+A, −B
INTERNAL DIAMETER	−A	POSITION	−A, +B
INTERNAL DIAMETER	−A	RUN-OUT TO DATUM CENTRE	+A, −B
FLOATING DIAMETER	+A, +B	POSITION	B−C, C+D−D+E, B, C, D, A, E, A−B, OVER ALL:A+E