

# Design and Manufacturing of Inspection Gauge

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**Abstract:** A gauges is a tool which is used in various industries for checking the shape, size of components which are against it allowed geometrical tolerance or size tolerance. There are various method of inspection of components are CMM (Coordinate Measuring Machine) and various types of gauges. This Project leads to focus on making an inspection gauge for Koeastartor motors components.(Manufacturer Name)By making inspection gauge we have to inspect the internal holes of the components which are present in given tolerance amount provided.An inspection is determined quickly whether or not the dimensions of the checking parts with in their specified limit.

**Keywords:** Inspection Gauge, Geometrical shape, Koeastartor motors components

## I. INTRODUCTION

A Gauge is a tool which is used to determine the exact dimensions, capacity, quantity and to appraise or judge. [1] A wide variety of inspection gauges and tools exist which serve such functions, ranging from simple pieces of material against which sizes can be measured to complex pieces of machinery. There are basically two types of gauges standard and limit gauges. [2] Our gauge will come under limit gauges. We make an Inspection Gauge is specially designed and manufactured for inspection purpose for koeastartor motor component. The koeastartor motor is a part of two wheelers and present at the casing of startor motor. The koeastartor motor is an aluminum casted product. We manufactured inspection gauge is only valid for koeastartor motor. The main purpose of the inspection gauge is to inspect the three internal holes of component of size diameters 14mm, 6.2mm, and 7mm. This inspection gauge is used in metrology lab and also used in production floor which is used to inspect components in mass production. Inspection Gauge gives the workers conformation to inspect components of internal holes without using plug gauges. Inspection gauges are used industry where mass production occurs for inspecting particular job. In this inspection gauge sliding pins provide major role in inspecting internal holes. The sliding pin has given bilateral tolerances. Also nesting plate is manufactured for supporting a component. The complete inspection of component is done when the component is stay in nesting plate and sliding pins are going through holes.

## II. DESIGN

On the basis of koeastartor motor components drawing firstly we draw a 2D drawing of component and whole inspection gauge and according to drawing we manufactured an inspection gauge. The following are the figure 1 shows a manufacturing drawing and detailed design drawing of inspection gauge.

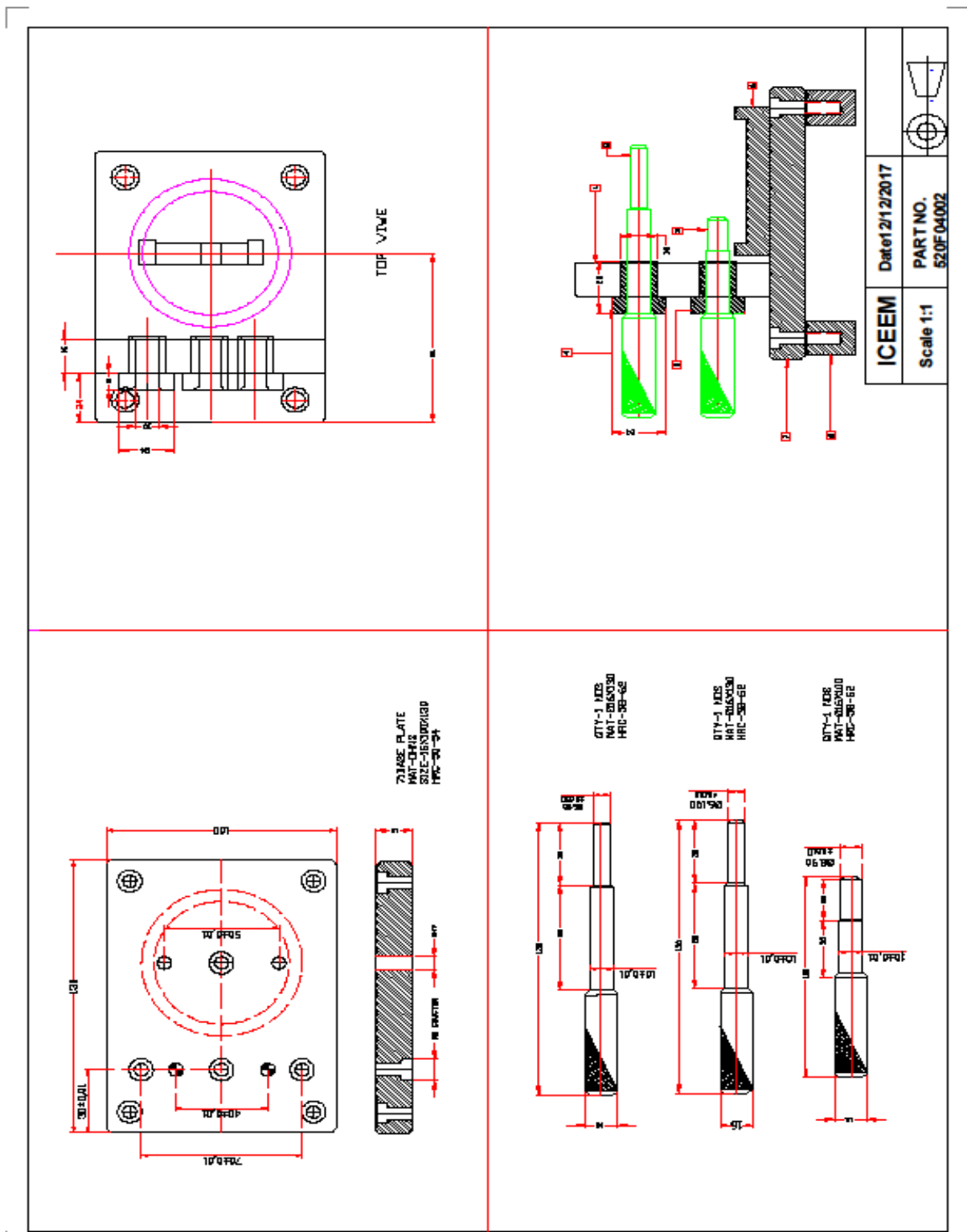


Fig.1:- Manufacturing Drawing of Inspection Gauge

### III. MANUFACTURING

For making an inspection gauge firstly we select Oil Hardened Non Striking Steel because these materials possess all the physical and chemical property which is required to resist the wear. After

selecting raw material we perform a mechanical operation on gauge. For making base plate firstly we carried out milling operation further drilling, tapping and surface grinding. After we manufactured a sliding pin and bush. we manufactured a sliding pin with respect to internal holes size of component also on sliding pin facing, turning operations carried out according to drawing also gives a bilateral tolerances  $+0.01\text{mm}$ . After for required finishing we carried out cylindrical grinding. After for better finishing of tapped and drilled holes wire cut mechanism carried out. After the wire cut the blacodizing is carried out. For increasing hardness case hardening or heat treatment process carried out on gauge. Figure 2 shows a front view of manufacturing drawing of inspection gauge with component.

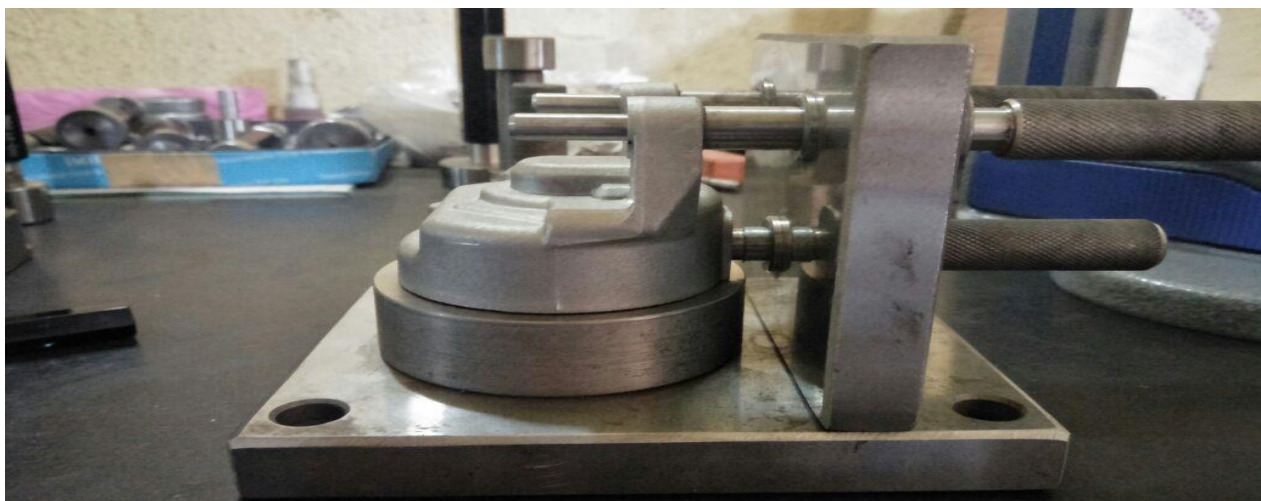


Fig.2:- Front view of inspection gauge with sliding pin



Fig.3:- Top view of Inspection Gauge with Component

#### IV. PROCEDURE

- Set the inspection gauge on reference plane.
- Place the job on inspection gauge on nesting plate.
- Insert the sliding pins in vertical plate.
- Pass the sliding pins from components.

- Inspect the holes and also determine outer holes.
- Sliding pins pass then component are in given tolerances while otherwise component is not in required tolerances. [3]

## V. ADVANTAGES

Following are the advantages of inspection gauge using Sliding pins.

- Easy to use by unskilled workers.
- Less cost.
- Small moving parts.
- Easy to handle.
- Very rapid inspection and requires less time for inspection as compared to other methods of inspection.

## VI. RESULT AND DISCUSSION

The inspection gauge is inspected on coordinate measuring machine and from inspection report certification all the tolerances and deviations are in acceptable range. Following are the inspection report of inspection gauge which is carried out in metrology lab. (Measurewel Technologies).

	Nom	Act	Dev	UpTol	LoTol	OTol
<b>CIRCLE CR3</b>						
Y	-0.0000	-0.0000	0.0000	0.0000	0.0000	----*++++
Dia	14.0380	14.0380	0.0000	0.0000	0.0000	----*++++
<b>CIRCLE CR1_P</b>						
Y	-19.7000	-19.7229	-0.0229	0.0200	-0.0200	-0.0029
Dia	6.1900	6.1902	0.0002	0.0200	-0.0200	---- *+++
<b>CIRCLE CR2_P</b>						
Y	27.5000	27.5003	0.0003	0.0200	-0.0200	---- *+++
Dia	6.9900	6.9866	-0.0034	0.0200	-0.0200	---* ++++
<b>PLANE PL2</b>						
Z	11.3000	11.2932	-0.0068	0.0200	-0.0200	--* ++++
<b>CYLNR CY1</b>						
Dia	13.9000	13.9104	0.0104	0.0200	-0.0200	---- ++*+

Fig.4:- Inspection Report

## VII. CONCLUSION

We check a components on inspection gauge we conclude that the gauge is an accurately work and higher accuracy. When Sliding pins goes inside holes then component is acceptable and sliding pins does not goes inside internal holes then component rejected. The gauge can increase the productivity. It is a one type of go no gauges.

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**Ethical statement:** The authors declare that they have followed ethical responsibilities.

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