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**Vernier, dial and digital depth
gauges**

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Foreword

This Japanese Industrial Standard has been revised by the Minister of Economy, Trade and Industry through deliberations at the Japanese Industrial Standards Committee as the result of proposal for revision of Japanese Industrial Standard submitted by Japan Precision Measuring Instruments Manufacturers Association (JMA)/Japanese Standards Association (JSA) with the draft being attached, based on the provision of Article 12 Clause 1 of the Industrial Standardization Law applicable to the case of revision by the provision of Article 14.

Consequently **JIS B 7518**:1993 is replaced with this Standard.

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Attention is drawn to the possibility that some parts of this Standard may conflict with patent rights, applications for a patent after opening to the public or utility model rights. The relevant Minister and the Japanese Industrial Standards Committee are not responsible for identifying any of such patent rights, applications for a patent after opening to the public or utility model rights.

Vernier, dial and digital depth gauges

Introduction

This Japanese Industrial Standard has been prepared based on **ISO 13385-2:2011**, Edition 1, with some modifications of the technical contents to correspond to the actual situations of manufacturing industries and application.

The vertical lines on both sides and dotted underlines indicate changes from the corresponding International Standard. A list of modifications with the explanations is given in Annex JB.

1 Scope

This Standard specifies calliper depth gauges with analogue indication: vernier scale or circular scale (dial), and those with digital indication.

NOTE : The International Standard corresponding to this Standard and the symbol of degree of correspondence are as follows.

ISO 13385-2:2011 *Geometrical product specifications (GPS)—Dimensional measuring equipment—Part 2: Calliper depth gauges; Design and metrological characteristics* (MOD)

In addition, symbols which denote the degree of correspondence in the contents between the relevant International Standard and **JIS** are IDT (identical), MOD (modified) and NEQ (not equivalent) according to **ISO/IEC Guide 21-1**.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this Standard. The most recent editions of the standards (including amendments) indicated below shall be applied.

JIS B 0641-1 *Geometrical Product Specifications (GPS)—Inspection by measurement of workpieces and measuring equipment—Part 1: Decision rules for proving conformance or nonconformance with specifications*

NOTE : Corresponding International Standard: ISO 14253-1 *Geometrical Product Specifications (GPS)—Inspection by measurement of workpieces and measuring equipment—Part 1: Decision rules for proving conformance or non-conformance with specifications*

JIS B 0642 *Geometrical product specifications (GPS)—General concepts and requirements for GPS measuring equipment*

NOTE : Corresponding International Standard: ISO 14978 *Geometrical Product Specifications (GPS)—General concepts and requirements for GPS measuring equipment*

JIS B 0680 *Geometrical Product Specifications (GPS)—Standard reference temperature for geometrical product specification and verification*

JIS B 7503 *Mechanical dial gauges*

JIS B 7506 Gauge blocks

JIS B 7513 Precision surface plates

JIS B 7533 Dial test indicators (lever type)

JIS C 0920 Degrees of protection provided by enclosures (IP Code)

NOTE : Corresponding International Standard: IEC 60529 *Degrees of protection provided by enclosures (IP Code)*

JIS Z 8103 Glossary of terms used in measurement

3 Terms and definitions

For the purpose of this Standard, the terms and definitions given in **JIS B 0641-1**, **JIS B 0642** and **JIS Z 8103** together with the following apply.

3.1 calliper depth gauge

measuring instrument which gives the evaluation of a dimensional quantity of a step or depth of a feature corresponding to the distance between the end of a beam and the face of a measuring base on the basis of the movement of a slider, moving relative to a measuring scale on a rigid beam

NOTE : The indication may be either analogue (vernier or circular scale) or digital.

3.2 partial measuring face contact

contact between a partial area of the measuring face and a feature of a workpiece

3.3 error of indication

indication of calliper depth gauge minus a true value of the corresponding input quantity

NOTE : The conventional true value is used because it is impracticable to determine a true value.

4 Design specification (design characteristics)

4.1 General

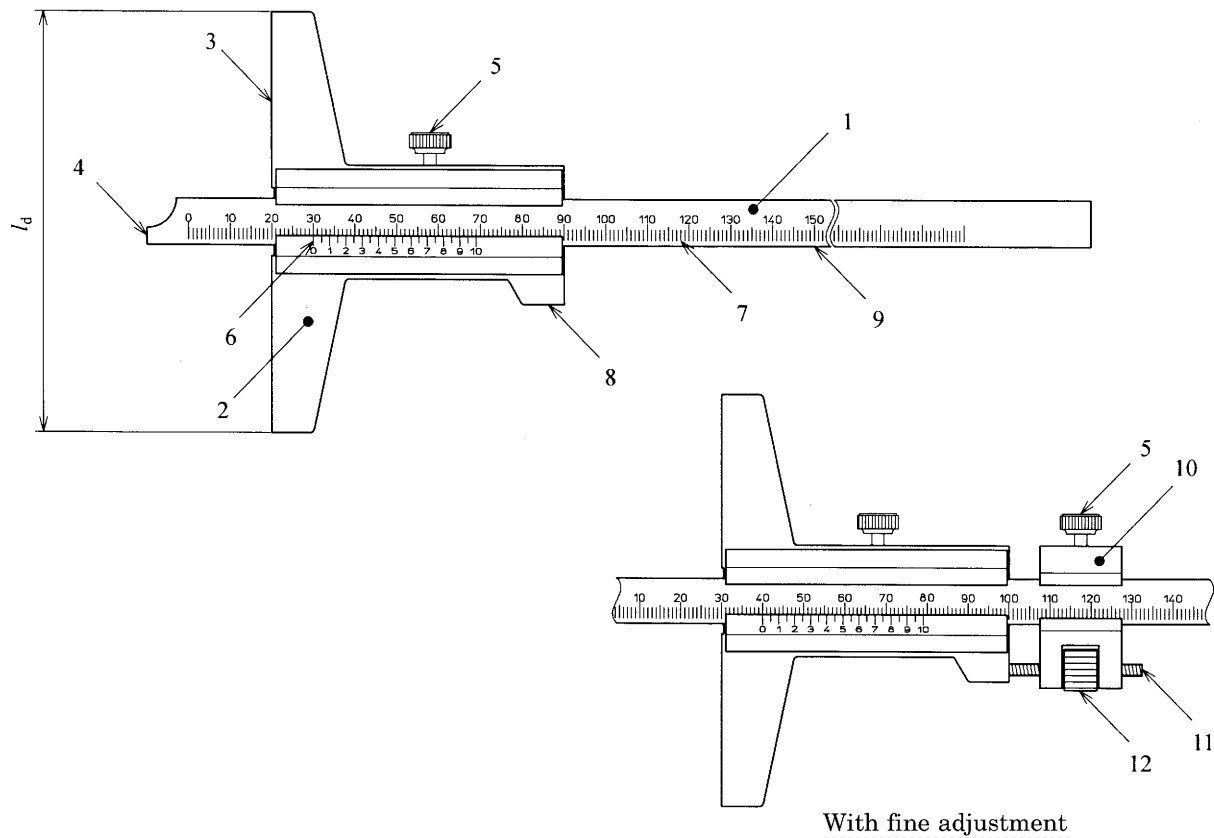
The general design specification (design characteristics) of the calliper depth gauge shall be such that its metrological characteristics comply with the requirements of this Standard under all operational orientations, unless otherwise specified by the manufacturer or supplier.

Typical data sheet in the case of giving the dimensions of calliper depth gauge to the user as product information is given in Annex B.

4.2 Names of main parts

Names of main parts are as given in Figure 1.

The figures are intended to indicate the names but not intended to give the design details.



- | | | |
|-----------------------|-----------------|---------------------------------|
| 1 beam | 5 locking screw | 9 beam guiding face |
| 2 measuring base | 6 vernier scale | 10 fine adjustment |
| 3 measuring face | 7 main scale | 11 fine adjustment screw thread |
| 4 beam measuring face | 8 finger rest | 12 fine adjustment wheel |
| | | l_d length of measuring base |

Figure 1 Example and nomenclature of calliper depth gauge with vernier scale

4.3 Dimensions

Dimensions shall be as follows.

- a) The dimensions of each part which are given in Table 1 are typical dimensions.

Table 1 Dimensions of calliper depth gauge

Unit: mm

Maximum measuring length ^{a)}	Length of measuring base l_d
150	100
200	100
250	100
300	100 to 150
350	100 to 150
500	150 to 250
600	150 to 250
The dimensions of each part in the case of applying the maximum measuring length other than those of this Table shall be agreed between the purchaser and supplier.	
Note ^{a)} The maximum measuring length is for depth measurement.	

- b) For calliper depth gauges with changeable bases, the following base lengths are preferred: 180 mm, 260 mm, 320 mm.
- c) The individual dimensions of indication shall be as given in **4.4**.

4.4 Types of indicating devices

4.4.1 General

Types of indicating devices are analogue indicating devices with a vernier scale or circular scale, or digital indicating devices with digital display.

On calliper depth gauges with analogue indicating devices, the scale interval or the minimum reading, and its unit shall be labelled.

On calliper depth gauges with digital indicating devices, the unit of the indication shall be labelled.

4.4.2 Analogue indicating devices

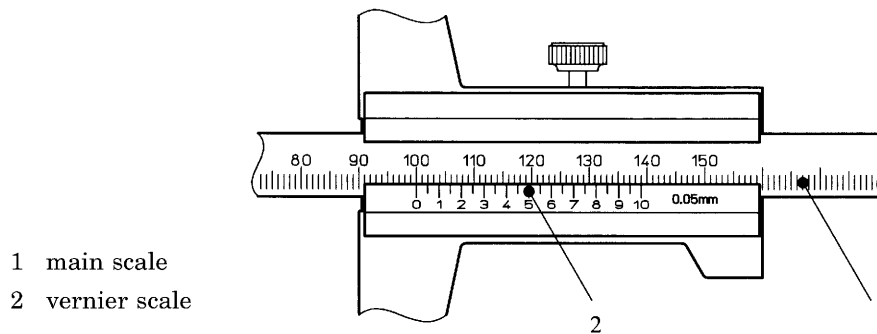
4.4.2.1 General

In the case of instruments with vernier scale, the scale interval on the beam shall be 1 mm. The main scale shall be longer, by at least one vernier scale length, than the measuring range of the instrument.

In the case of instruments with circular scale, the scale interval on the beam should be 1 mm or 2 mm.

4.4.2.2 Vernier scale and main scale

The minimum reading of the instrument with vernier scale shall be 0.05 mm or 0.02 mm. The example is shown in Figure 2.



NOTE : The actual reading in this Figure is 100.00 mm.

Figure 2 Analogue indication with vernier scale

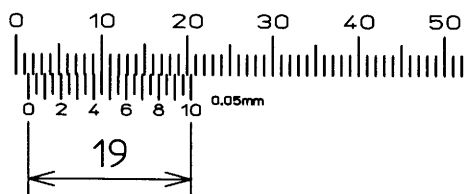
4.4.2.3 Design of vernier scale

The graduating method of verniers is shown in Table 2. Examples corresponding to the graduating method of vernier scale of Table 2 are shown in Figures 3 to 5.

Table 2 Graduating method of verniers

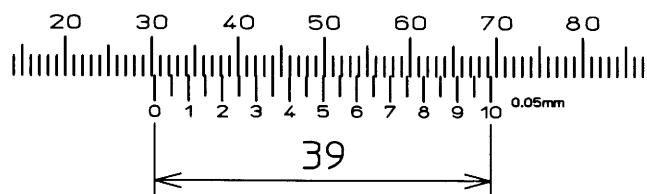
Unit: mm

Main scale interval	Graduating method of vernier	Minimum reading	Explanatory figure
1	Divide 19 mm into 20 equal parts	0.05	Figure 3
	Divide 39 mm into 20 equal parts		Figure 4
	Divide 49 mm into 50 equal parts	0.02	Figure 5



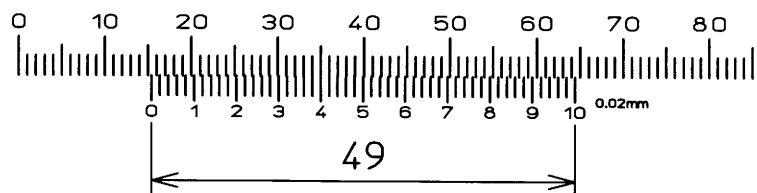
NOTE : The actual reading in this Figure is 1.45 mm.

Figure 3 0.05 mm vernier scale (divide 19 mm into 20 equal parts)



NOTE : The actual reading in this Figure is 30.35 mm.

Figure 4 0.05 mm vernier scale (divide 39 mm into 20 equal parts)



NOTE : The actual reading in this Figure is 15.40 mm.

Figure 5 Minimum reading 0.02 mm (divide 49 mm into 50 equal parts)