

Dimensions for Panel and Rack Mounted Industrial Process Measurement and Control Instruments

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The Measurement, Control & Automation Association
P.O. Box 3698, Williamsburg, VA 23187
Voice and Fax: (757) 258-3100 – mcaa@measure.org
Visit our Website at <http://www.measure.org>

FOREWORD

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DIMENSIONS FOR PANEL AND RACK MOUNTED INDUSTRIAL PROCESS MEASUREMENT AND CONTROL INSTRUMENTS

FUNDAMENTAL CONSIDERATIONS

The dimensions should permit the design of equipment to provide the optimum operator-equipment interface based upon ergonomic and anthropotechnical principles for a variety of industrial process measurement and control configurations in a wide variety of industries.

The dimensions should be reasonably simple and practical for future consideration—not a list of the great variety of dimensions and proportions currently manufactured.

The dimensions should allow for changes in technology which may affect the format and information presentation of industrial process instruments.

The panel space dimensions should be compatible with those of other instruments not covered by this standard which may frequently be used in a control system along with industrial process measurement and control instruments. (i.e., Dimensions for panel mounted indicating and recording electrical measuring instruments, IEC Publication 473, which specifies a 12.5 mm module for instrument size values.)

The dimensions should permit effective utilization of panel space.

The proposed standard should provide for individual mounting or multiple mounting of permanently mounted or pull-out instruments. The same case dimensions should be possible for all of these arrangements.

The same cut-out dimensions should be specified for either type of mounting; and the same panel space occupied by either.

For flexibility the front and cut-out dimensions should allow any combination of instruments of one height to be substituted for any other combination having the same summation of sizes.

The dimensions should be compatible with different mechanical panel construction techniques.

The dimensions should recognize the existing 19 inch rack (482.6 mm) dimensional system as established in IEC Publication 297.

1. SCOPE AND PURPOSE

1.1 This document defines a system of dimensions for a particular class of (array mount) industrial process measurement and control instruments to be mounted on **panels** and **relay racks**.

1.2 The purpose of this standard is to provide a system of **size** and **cut-out** dimensions which will facilitate:

1.2.1 The planning of the layout of **panels** and **racks** equipped with industrial process measurement and control instruments.

1.2.2 The design of industrial process measurement and control instruments to fit into this system.

2. DEFINITIONS, SOURCES AND REFERENCES

2.1 Definitions

Size

The dimensions of the area on a **panel**, defined by its width and height, which is allocated to an instrument or an array of instruments.

Panel

A unit of one or more sections of flat material and/or structure suitable for mounting of instruments. It may be part of a desk or cabinet.

Rack

A particular mechanical configuration primarily designed for and capable of supporting equipment. Its dimensions shall be in accord with IEC Publication 297. (Appendix A).

Instrument Front

The portion of an instrument or array located in front of the **panel** and not passed through the **cut-out**. **Flanges** are considered to be part of the **instrument front**.

Case

The portion of the instrument which passes through the **panel**.

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Flange

The portion of the **front** extending beyond the **case**. It may be an integral part of the **instrument front** or a lip which is a part of the **case**. The **flange** may include a separable trim strip.

Cut-Out

The opening in a **panel** or **rack** to allow the **mounting** of an instrument or an array of instruments.

Individual Mounting

A method of **mounting** an instrument by attaching or clamping it to a **panel**. Several instruments can be **individually mounted** in a common **cut-out**.

Support Mounting

A method of **mounting** an instrument or an array of instruments with a **support structure** attached to the **panel**.

Support Structure

Such **structure** in addition to the **case** as may be required to **mount** or **support** the instrument or array of instruments.

2.2 Sources and References. In the preparation of this standard, standards and related publications issued by technical societies and organizations were reviewed. The documents pertaining to this standard are referenced below:

International Electrotechnical Commission (IEC) Publication 297 2nd Edition, 1975, Dimensions of Panels and Racks

International Electrotechnical Commission (IEC) Publication 473 1st Edition, 1974, Dimensions for Panel Mounted Indicating and Recording Electrical Measuring Instruments

Copies of the IEC Publications referred to above may be purchased from the American National Standards Institute, 1430 Broadway, New York, N.Y. 10018

3. PRINCIPLES

3.1 The **size** values are based upon a dimension module of 12.5 mm.

3.2 Horizontally, the overall **front** dimension and the corresponding instrument dimension behind the **panel** including **case** fixing means and **support structure** shall be at least 0.5 mm less than the **size** value.

3.3 Vertically, the overall **front** dimensions shall be at least 0.5 mm less than the **size** value (175 mm or 150 mm).

3.4 When an instrument or array of instruments requires additional **support structure** or if the instrument or array behind the **panel** is not held within the perpendicular projection of the **front**, this requirement or condition shall be specified by the manufacturer because it may influence the use of the **panel** area beyond the **size**.

3.5 Vertical instrument and **cut-out** dimensions are to be the same as specified in IEC Publication 473 (Appendix B) for all instruments.

3.6 A particular class of Industrial Process Measurement and Control Instruments is designated as having vertical dimensions of 150 or 175 mm and instrument or array widths of any multiple of 12.5 mm.

3.7 The side **flanges** shall be a minimum practical width to allow the maximum use of the space behind the **panel** and shall be the same for all instrument **front** widths.

3.8 In this class of instruments, the minimum horizontal **cut-out** for a single instrument or an array of instruments will be the nominal width (**size** or sum of **sizes**) minus 4.5 mm regardless of the width.

3.9 An array of instruments mounted on a common support is to be regarded as a single instrument with respect to this standard. The "**size**" of the group is equal to the sum of the **sizes** of the instruments in the group.

3.10 Instrument **size** values for width shall be determined from the equation in 4.1 and those for height from the table in 4.2. In specifying an instrument **size**, the first denominated value shall be regarded as the width, the second as the height.

Example: 75 x 175 means an instrument with a nominal width of 75 mm and a nominal height of 175 mm.

4. SIZE AND CUT-OUT VALUES

(All in mm)

4.1 Width Dimensions.

$$\text{WIDTH} = W = n \times 12.5 \text{ mm}$$

n is any integer

$$\text{MINIMUM CUT-OUT} = W - 4.5 \text{ mm}$$

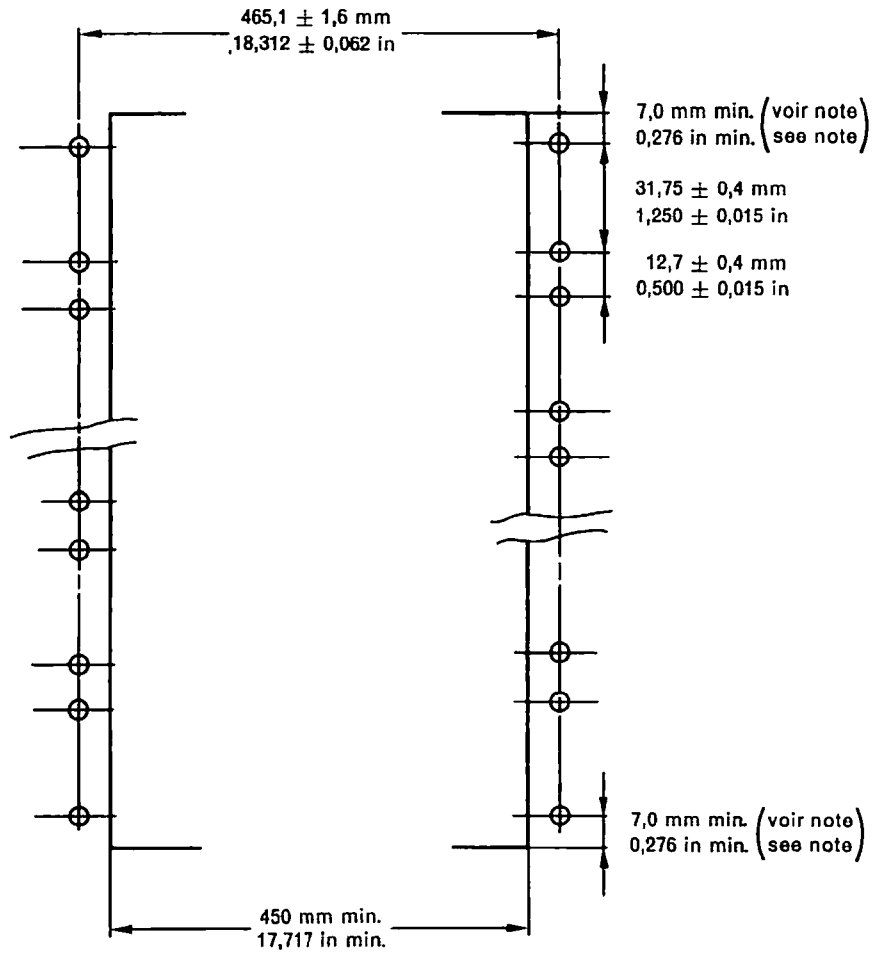
$$\text{TOLERANCE} = +1 \text{ mm}$$

4.2 Height Dimensions.

SIZE	CUT-OUT	
	MINIMUM	TOLERANCE
150	138	+2
175	162	+2

APPENDIX A

4. Rack dimensions



Note.—Usual practice: $7.9 \pm 0.8 \text{ mm}$; $0.312 \pm 0.031 \text{ in}$.

4.1 Tolerance between any two holes within a distance of 1 m: $\pm 0.4 \text{ mm}$; ($39.3 \text{ in: } \pm 0.015 \text{ in}$).

4.2 Additional holes are permitted.

APPENDIX B

4. Sizes

All dimensions are given in millimetres.

The basis for standardized values of size is the modular system of $N \times 12.5$ mm where N is a whole number.

The value of 12.5 mm has been selected as the basis of this modular system. One reason for this choice is that a standard 19 in panel having a free space of 450 mm may be conveniently used for instruments of sizes 50 mm, 75 mm, 112.5 mm, 150 mm and 225 mm.

In the tables and drawings, the following symbols are used:

- A1 x A2 = size (width x height),
- B = cutout diameter,
- B1 x B2 = cutout dimensions (width x height),
- C1 x C2 = distance between fixing holes (horizontal X vertical),
- D = diameter of fixing holes.

The first dimension of the size is the width and the second is the height.

If only two panel fixing holes are used, the upper left and the lower right holes as seen from the front are used.

Tolerances for C1 and C2 are under consideration.

(Extract—Page 9
IEC Publication 473)