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

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FOREWORD

This Foreword is supplied for informational purposes only and is not part of Standard Dimensions for Panel and Rack Mounted Industrial Process Measurement and Control Instruments, PMC28.2 1976.

Standards are adopted in the public interest and are designed to eliminate misunderstandings between the manufacturer and the purchaser and to assist the purchaser in selecting and obtaining without delay the proper product for his particular need. Existence of a standard does not in any respect preclude any member or non-member from manufacturing or selling products not conforming with the standard.

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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 ergonometic 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.
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:


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 1 1/5 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.

   WIDTH = W = n x 12.5 mm
   n is any integer
   MINIMUM CUT-OUT = W - 4.5 mm
   TOLERANCE = +1 mm

4.2 Height Dimensions.

   CUT-OUT

<table>
<thead>
<tr>
<th>SIZE</th>
<th>MINIMUM</th>
<th>TOLERANCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>150</td>
<td>138</td>
<td>+2</td>
</tr>
<tr>
<td>175</td>
<td>162</td>
<td>+2</td>
</tr>
</tbody>
</table>
4. Rack dimensions

Note.—Usual practice: 7.9 ± 0.8 mm; 0.312 ± 0.031 in.

4.1 Tolerance between any two holes within a distance of 1 m: ± 0.4 mm; (39.3 in: ± 0.015 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 x 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 60 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)