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AVS STANDARDS (TENTATIVE)
GRAPHIC SYMBOLS IN VACUUM TECHNOLOGY

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GRAPHIC SYMBOLS IN VACUUM TECHNOLOGY

Finn S. Reinath and James P. Mac Neil

June 15, 1965

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AVS STANDARDS (TENTATIVE)
GRAPHIC SYMBOLS IN VACUUM TECHNOLOGY

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ABSTRACT

A report to the Standards Committee of the American Vacuum Society containing a proposal to standards for graphic symbols in vacuum technology. The proposal includes an introduction, a list of symbols, and examples. The list of symbols is divided into two sections, general symbols for general use if details are unnecessary, and special symbols for detailed description of special features.

INTRODUCTION

Purpose

The purpose of this standard is to establish a uniform system of graphic symbols in vacuum technology.

Definition and Application

The graphic symbols are a shorthand used to show graphically the functioning and interconnections of vacuum components in a single-line schematic or flow diagram.

A single-line diagram is one in which the graphic symbols are shown without regard to the actual physical location, size, or shape of the components.

A symbol shall be considered as the aggregate of all its parts.

The orientation of a symbol on a drawing, including a mirror image presentation, does not alter the meaning of the symbol.

A symbol may be drawn to any scale that suits a particular drawing.

Arrows should be omitted unless necessary for clarification.

Explanation

The graphic symbols are divided into two separate sections, general and special symbols.

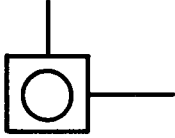
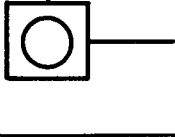
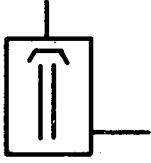
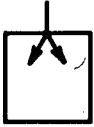


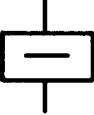
Wherever possible, the general symbol illustrates the function or appearance of a component without regard to special features.

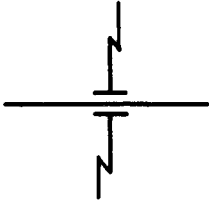
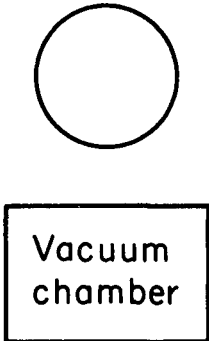
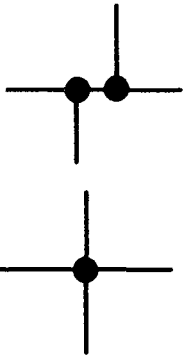
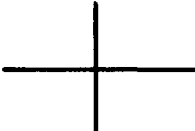
The special symbols elaborate upon the general component categories with individual symbols, which illustrate in detail the special features of the component. Wherever possible, the special symbol utilizes the general symbol outline. Parts from two or more special symbols may be combined as shown among others by valves Item No.'s 6, 8 and 9 in Example No. 3 on p. 17.

For definition of terms used in the description column, see American Vacuum Society, Glossary of Terms used in Vacuum Technology (Pergamon Press, New York, 1958).

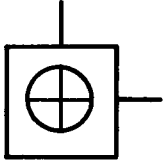
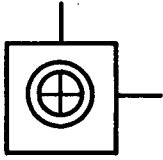


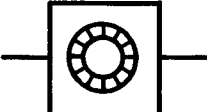
LIST OF SYMBOLS

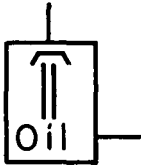
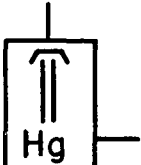
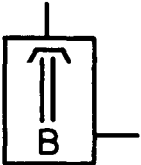
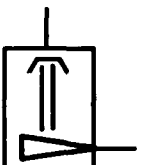
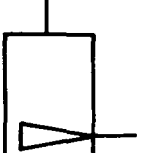
I. General Symbols

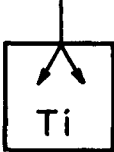
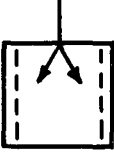
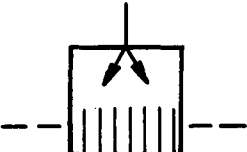

Item	Description	Symbol	Remarks
1	Pump		
1.1	Mechanical		
1.2	Diffusion		
1.3	Sorption		
2	Vacuum gauge		
3	Valve		
4	Baffle		


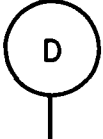
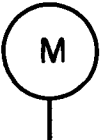
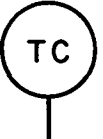
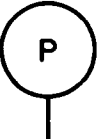
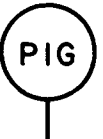
Item	Description	Symbol	Remarks
5	Feed-through		Including rotating, sliding, and fixed
6	Vacuum chamber		
7	Lines		Minimum diameter of dots five times line width
7.2	Not connected		


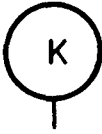



II. Special Symbols

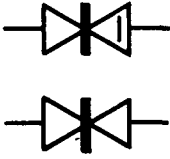




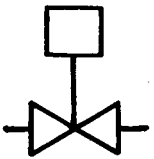
Item	Description	Symbol	Remarks
1.10	<u>Mechanical Pumps</u>		
1.11	Liquid-sealed, single-stage		
1.12	Liquid-sealed, compound		
1.13	Blower, lobe-type single-stage		
1.14	Blower, lobe-type compound		
1.15	Turbomolecular		

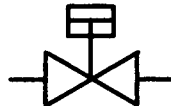



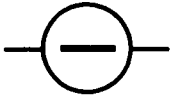

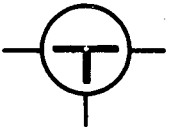
Item	Description	Symbol	Remarks
1.20	<u>Diffusion Pumps</u>		
1.21	Diffusion, oil		Optional: add chemical name of oil below symbol (see p. 17)
1.22	Diffusion, mercury		
1.23	Diffusion, booster		Optional: add chemical name of fluid below symbol.
1.24	Diffusion-ejector		Optional: add chemical name of fluid below symbol.
1.25	Ejector		

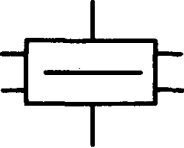
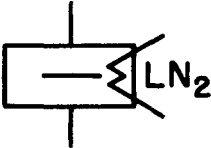
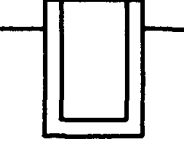
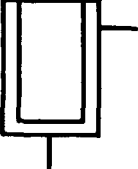
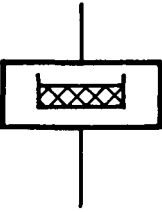
Item	Description	Symbol	Remarks
1.30	<u>Sorption Pumps</u>		
1.31	Getter-evaporation		Use element symbol for designation of getter material.
1.32	Sputter-ion		
1.33	Cryo		Vacuum line (solid) omitted on cryo panels cryogenic lines (dotted) optional
1.34	Cryo-sorbent		

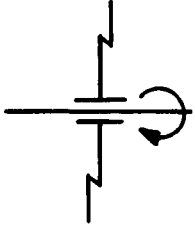
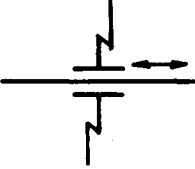
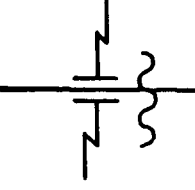
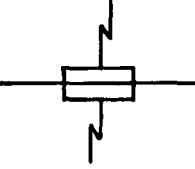
Item	Description	Symbol	Remarks
2.0	<u>Vacuum Gauges</u>		
2.1	Manometer, liquid level		
2.2	Manometer, diaphragm		
2.3	McLeod		
2.4	Thermocouple		
2.5	Pirani		
2.6	Ionization, cold cathode		

Item	Description	Symbol	Remarks
2.7	Ionization, hot cathode		
2.8	Knudsen		
2.9	Residual gas analyzer		
2.10	Radioactive		
2.11	Nude		To specify type of nude gauge, add after N the proper letter or letters from above list.

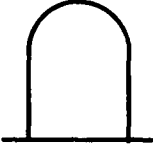


Item	Description	Symbol	Remarks
3.0	<u>Valves</u>		
3.1	Gate or slide		<p>With seat orientation</p> <p>Without seat orientation</p>
3.2	Gate, with bypass port		
3.3	Poppet or globe, in-line or angle		<p>Diameter of dot approximately five times line width</p>
3.4	Ball		
3.5	Butterfly or quarter swing		
3.6	Solenoid		


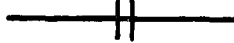
Item	Description	Symbol	Remarks
3.7	Pneumatic		
3.8	Bellows-sealed		
3.9	Throttling or calibrated leak		
3.10	Air admittance		
3.11	Stopcock 2-way, 2-position		
3.12	Stopcock 3-way, 2-position		
3.13	Stopcock 3-way, 3-position		

Item	Description	Symbol	Remarks
4.0	<u>Baffles</u>		
4.1	Ambient		
4.2	Refrigerated		For others substitute LN ₂ with name of coolant or cooling means.
4.3	Thimble trap		
			
4.4	Sorbent		

Item	Description	Symbol	Remarks
5.0	<u>Feed-throughs</u>		
5.1	Rotating		
5.2	Sliding		
5.3	Bellows sealed		
5.4	Electrical		

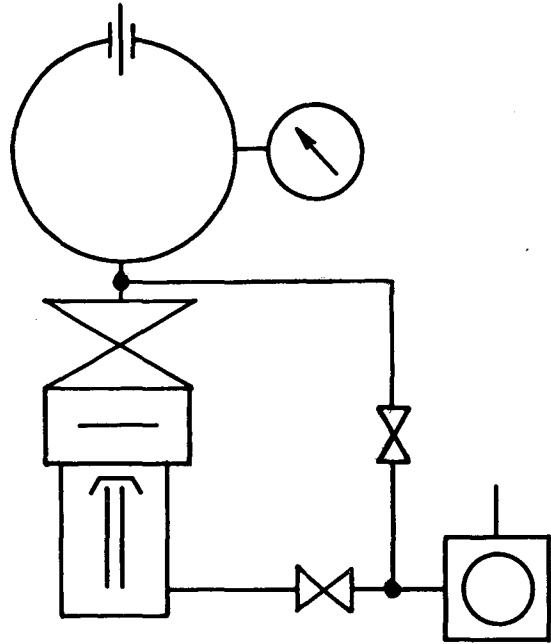
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Item	Description	Symbol	Remarks
6.0	<u>Vacuum Chambers</u> <u>and Accessories</u>		
6.1	Bell jar		
6.2	View port		
6.3	Blind flange port or door		

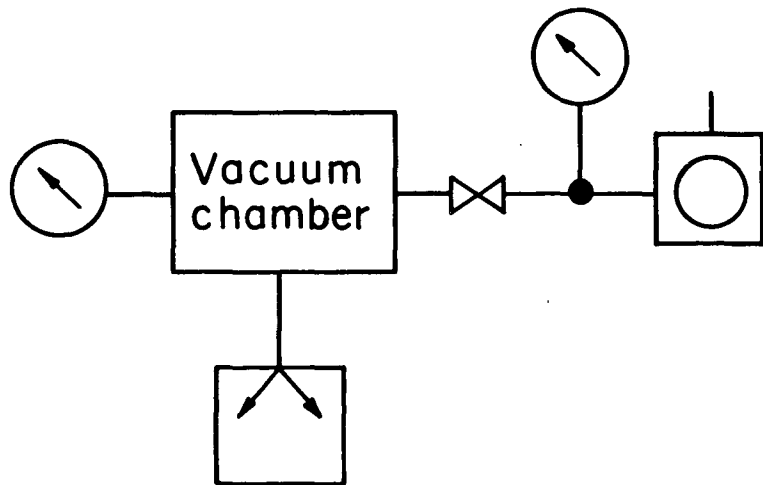
Item	Description	Symbol	Remarks
7.0	<u>Lines and Connections</u>		
7.1	Flexible line,		
7.2	Demountable coupling		

EXAMPLES

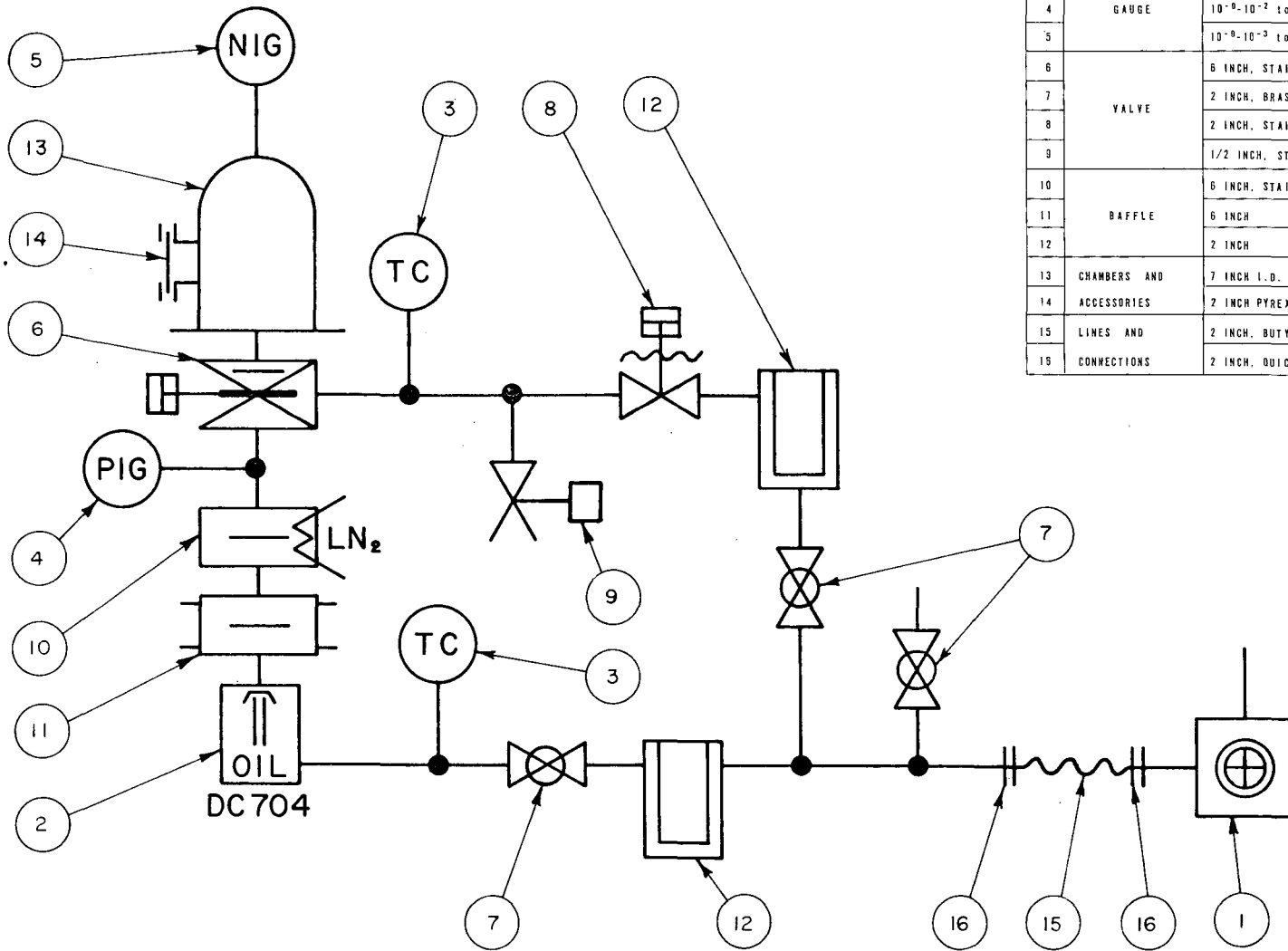
General Symbols



Example No. 1



Example No. 2



LIST OF MATERIALS				
ITEM	TYPE	DESCRIPTION	QUAN.	DWG. NO.
1	MECHANICAL PUMP	15 CFM	1	
2	DIFFUSION PUMP	6 INCH	1	
3	GAUGE	1-1000 mtorr	2	
4		10 ⁻⁹ -10 ⁻² torr	1	
5		10 ⁻⁹ -10 ⁻³ torr	1	
6	VALVE	6 INCH, STAINL. ST'L.	1	
7		2 INCH, BRASS	3	
8		2 INCH, STAINL. ST'L.	1	
9		1/2 INCH, STAINL. ST'L.	1	
10	BAFFLE	6 INCH, STAINL. ST'L.	1	
11		6 INCH	1	
12		2 INCH	2	
13	CHAMBERS AND	7 INCH I.D.	1	XXX
14	ACCESSORIES	2 INCH PYREX	1	XXX
15	LINE AND	2 INCH, BUTYL HOSE	1	
16	CONNECTIONS	2 INCH, QUICK	2	

SCALE NONE			
VACUUM TECHNOLOGY	WORKING ON	DESIGN ACCOUNT NO.	DATE
GRAPHIC SYMBOLS		DESIGNED BY F.S.R	5-14-65
EXAMPLE 3 - SPECIAL SYMBOLS		CHECKED BY	

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