INTERNATIONAL STANDARD

ISO 14617-10

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Graphical symbols for diagrams —

Part 10: Fluid power converters

Symboles graphiques pour schémas —

Partie 10: Convertisseurs pour transmissions hydrauliques et pneumatiques

Reference number
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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this part of ISO 14617 may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 14617-10 was prepared by Technical Committee ISO/TC 10, *Technical product documentation*, Subcommittee SC 10, *Process plant documentation and tpd-symbols*.

ISO 14617 consists of the following parts, under the general title *Graphical symbols for diagrams*:

— *Part 1: General information and indexes*

— *Part 2: Symbols having general application*

— *Part 3: Connections and related devices*

— *Part 4: Actuators and related devices*

— *Part 5: Measurement and control devices*

— *Part 6: Measurement and control functions*

— *Part 7: Basic mechanical components*

— *Part 8: Valves and dampers*

— *Part 9: Pumps, compressors and fans*

— *Part 10: Fluid power converters*

— *Part 11: Devices for heat transfer and heat engines*

— *Part 12: Devices for separating, purification and mixing*

— *Part 15: Installation diagrams and network maps*

Other parts are under preparation.

Introduction

The purpose of ISO 14617 in its final form is the creation of a library of harmonized graphical symbols for diagrams used in technical applications. This work has been, and will be, performed in close cooperation between ISO and IEC. The ultimate result is intended to be published as a standard common to ISO and IEC, which their technical committees responsible for specific application fields can use in preparing International Standards and manuals.

Graphical symbols for diagrams —

Part 10:
Fluid power converters

1 Scope

This part of ISO 14617 specifies graphical symbols for fluid power conversion units such as pumps and motors in diagrams (for pumps used mainly for transportation, see ISO 14617-9).

For the fundamental rules of creation and application of graphical symbols in diagrams, see ISO 81714-1.

For an overview of ISO 14617, information on the creation and use of registration numbers for identifying graphical symbols used in diagrams, rules for the presentation and application of these symbols, and examples of their use and application, see ISO 14617-1.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of ISO 14617. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this part of ISO 14617 are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

ISO 5598:1985, *Fluid power systems and components — Vocabulary*

ISO 14617-1:2002, *Graphical symbols for diagrams — Part 1: General information and indexes*

ISO 14617-2:2002, *Graphical symbols for diagrams — Part 2: Symbols having general application*

ISO 81714-1:1999, *Design of graphical symbols for use in the technical documentation of products — Part 1: Basic rules*

3 Terms and definitions

For the purposes of this part of ISO 14617, the following terms and definitions apply.

NOTE The list has been restricted to terms whose meaning is not obvious and which have not been defined elsewhere in an International Standard, or which have been defined in various ways in different standards. In preparing these definitions, ISO and IEC standards on terminology have been consulted; see the references in parentheses. However, most of the definitions in those standards were prepared by different technical committees within a restricted scope. This means that many terms so defined have to be given more general or neutral definitions when applied in the context of graphical symbols.

3.1
(positive) displacement pump
pump in which the fluid energy is increased in a working chamber that increases and decreases in volume

[ISO 5598]

3.2
rotodynamic pump
pump in which the fluid energy is increased by a rotating impeller

[ISO 5598]

NOTE The term “centrifugal pump” is sometimes used instead, but that term corresponds to a rotodynamic pump with radial liquid flow.

3.3
capacity
displacement
swept volume
volume absorbed or displaced per stroke or cycle

[ISO 5598]

3.4
over-centre pump
pump in which the direction of flow may be reversed without changing the direction of rotation of the drive shaft

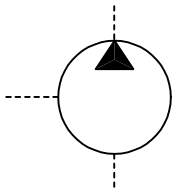
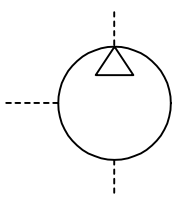
[ISO 5598]

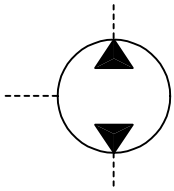
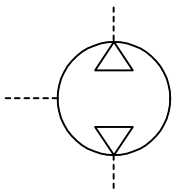
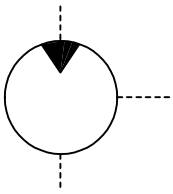
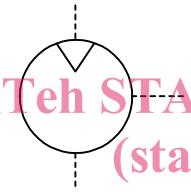
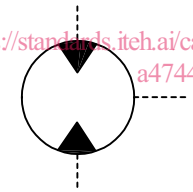
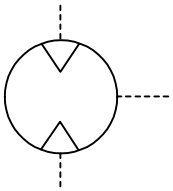
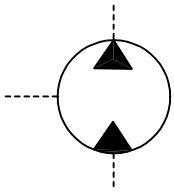
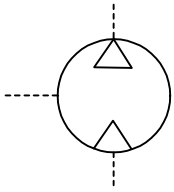
3.5
uni-flow pump
pump in which the direction of flow is independent of the direction of rotation of the drive shaft

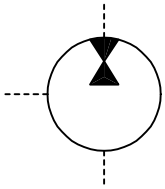
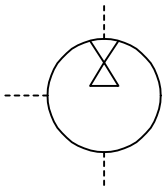
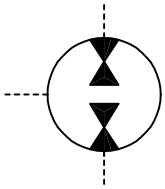
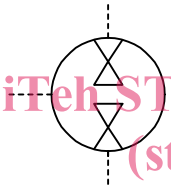
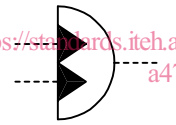
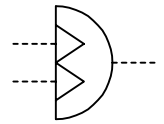
[ISO 5598]

4 Devices for conversion of mechanical energy to fluid energy or vice versa

4.1 Symbols of a basic nature

4.1.1	**2401**		Hydraulic pump
4.1.2	**2402**		Pneumatic pump, compressor

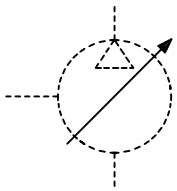
4.1.3	**2403**		Hydraulic pump with alternative directions of flow
4.1.4	**2404**		Pneumatic pump, compressor with alternative directions of flow
4.1.5	**2405**		Hydraulic motor
4.1.6	**2406**		Pneumatic motor
4.1.7	**2407**		Hydraulic motor with alternative directions of flow
4.1.8	**2408**		Pneumatic motor with alternative directions of flow
4.1.9	**2409**		Hydraulic pump/motor The device can act as a pump or as a motor.
4.1.10	**2410**		Pneumatic pump/motor The device can act as a pump or a motor with the same direction of flow.

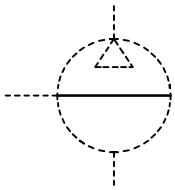
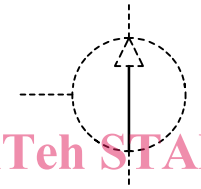
4.1.11	**2411**		Hydraulic pump/motor acting as pump in one direction of flow and as motor in other direction of flow
4.1.12	**2412**		Pneumatic pump/motor acting as pump in one direction of flow and motor in other direction of flow
4.1.13	**2413**		Hydraulic pump/motor acting as pump with alternative directions of flow or motor with alternative directions of flow
4.1.14	**2414**		Pneumatic pump/motor acting as pump with alternative directions of flow or motor with alternative directions of flow
4.1.15	**2415**		Hydraulic semi-rotary motor
4.1.16	**2416**		Pneumatic semi-rotary motor

4.2 Application rule for the symbols in 4.1

None.

4.3 Symbols giving supplementary information

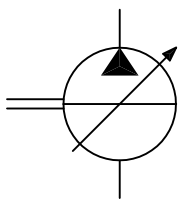
4.3.1	**201**		Adjustability See R201 (4.4.1) and R2311 (4.4.3).
4.3.2	**203**		Pre-set adjustability See R201 (4.4.1) and R2311 (4.4.3).

4.3.3	**221**	Form 1	Constant force, motion or flow See R221 (4.4.2).
4.3.4	**222**	Form 2	
4.3.5	**224**		Sinusoidal force, motion or flow
4.3.6	**225**		Pulse-shaped force, motion or flow
4.3.7	**233**		Stepping function
4.3.8	**2321**		Positive displacement type
4.3.9	**2322**		Rotodynamic type

4.4 Application rules for the symbols in 4.3

4.4.1	**R201**	The symbol should cross the centre of the symbol to which it is added. For examples, see X201 (2-5.5.1) to X206 (2-2.5.6) and X2401 (4.5.1) and X2402 (4.5.2). If the symbol consists of an outline in the form of a square, rectangle or circle and a symbol inside indicating the function, another location could be more appropriate. For an example, see X207 (2-5.5.7).
4.4.2	**R221**	Form 2 may be used if confusion is unlikely.
4.4.3	**R2311**	Applied to symbols for pumps and compressors, the symbol indicates adjustability of capacity as defined in ISO 5598, if not otherwise indicated.

4.5 Application examples

4.5.1	**X2401**	 201, 402, 2321, 2401	Hydraulic pump of positive displacement type with adjustable capacity