INTERNATIONAL STANDARD

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Pneumatic fluid power — Compressed air pressure regulators and filter-regulators —

Part 1: Main characteristics to be included in literature from suppliers and product-marking requirements

Transmissions pneumatiques — Régulateurs de pression et filtres-régulateurs pour air comprimé —

Partie 1: Principales caractéristiques à inclure dans la documentation des fournisseurs et exigences de marquage du produit

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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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT), see the following URL: Foreword — Supplementary information.

The committee responsible for this document is ISO/TC 131, *Fluid power systems*, Subcommittee SC 5, *Control products and components*.

This third edition cancels and replaces the second edition (ISO 6953-1:2000), which has been technically revised. It also incorporates ISO 6953-1:2000/Cor 1:2006.

ISO 6953 consists of the following parts, under the general title *Pneumatic fluid power — Compressed air pressure regulators and filter-regulators*:

— *Part 1: Main characteristics to be included in the supplier's literature and product-marking requirements*

— *Part 2: Test methods to determine the main characteristics to be included in supplier's literature*

— *Part 3: Alternative test methods for measuring the flow-rate characteristics of pressure regulators*

Introduction

In pneumatic fluid power systems, power is transmitted and controlled through a gas under pressure within a circuit.

When pressure reduction or pressure regulation is required, regulators and filter-regulators are components designed to maintain the pressure of the gas at an approximately constant level.

It is therefore necessary to know some performance characteristics of these components in order to determine their suitability for an application.

Pneumatic fluid power — Compressed air pressure regulators and filter-regulators —

Part 1: Main characteristics to be included in literature from suppliers and product-marking requirements

1 Scope

This part of ISO 6953 specifies which characteristics of compressed air pressure regulators are to be included in literature from their suppliers. It also applies to filter-regulators.

This part of ISO 6953 applies to

— manually controlled direct operated types (with or without relieving mechanism),

— manually controlled internal pilot operating types (e.g. nozzle flapper), and

— external pilot operated types.

In addition, it specifies the product marking requirements for pressure regulators and filter-regulators.

This part of ISO 6953 is applicable to compressed air pressure regulators with a rated inlet pressure of up to 2 500 kPa (25 bar) and an outlet adjustment pressure of up to 1 600 kPa (16 bar); and to filter-regulators with rated inlet and outlet pressures of up to 1 600 kPa (16 bar), in which the major contaminants are removed by mechanical means.

NOTE 1 1 bar = 0,1 MPa = 10^5 Pa; 1 MPa = 1 N/mm^2.

The rated pressure should be selected from the preferred pressures listed in ISO 2944.

NOTE 2 The main characteristics to be included in the supplier's literature related to electrically modulated pneumatic continuous pressure control valves are specified in ISO 10094-1.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 7-1:1994, *Pipe threads where pressure-tight joints are made on the threads — Part 1: Dimensions, tolerances and designation*

ISO 2944, *Fluid power systems and components — Nominal pressures*

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

ISO 5782-2:1997, *Pneumatic fluid power — Compressed-air filters — Part 2: Test methods to determine the main characteristics to be included in supplier's literature*

ISO 6358-1, *Pneumatic fluid power — Determination of flow-rate characteristics of components using compressible fluids — Part 1: General rules and test methods for steady-state flow*

ISO 6953-2:2015, *Pneumatic fluid power — Compressed air pressure regulators and filter-regulators — Part 2: Test methods to determine the main characteristics to be included in literature from suppliers*

ISO 10094-1, *Pneumatic fluid power — Electro-pneumatic pressure control valves — Part 1: Main characteristics to include in the supplier's literature*

ISO 11727, *Pneumatic fluid power — Identification of ports and control mechanisms of control valves and other components*

3 Terms and definitions

For the purposes of this part of ISO 6953, the terms and definitions given in ISO 5598, ISO 6358-1, ISO 10094-1, and the following apply.

3.1
compressed air pressure regulator
component designed to maintain compressed air pressure, approximately constant within an enclosed circuit despite variation in operating flow rate and inlet pressure

3.2
relieving pressure regulator
pressure regulator equipped with an unloading device that opens if the regulated pressure exceeds the original setting by a sufficient degree, and exhausts a limited flow rate of air from the outlet circuit to the atmosphere

3.3
filter-regulator
device that combines the filter and regulator onto one body as a single unit

Note 1 to entry: In such a device, the filter is always on the upstream side of the regulator.

3.4
pilot-operated regulator with air bleed
regulator designed to minimize the variation of regulated pressure from its set point during flow, using a pilot supply that continuously flows through the pilot chamber and is exhausted

3.5
flow-pressure characteristic curve
graphical representation of the relationship between the regulated pressure and the forward flow rate or the relief flow rate while the outlet set pressure and the inlet pressure are maintained constant

3.5.1
forward flow/pressure characteristic curve
flow/pressure characteristic curve in accordance with 3.5 only for the forward flow rate

3.5.2
relief flow/pressure characteristic curve
flow/pressure characteristic curve in accordance with 3.5 only for the relief flow rate

3.6
pressure regulation characteristic curve
graphical representation of regulated pressure variation caused by changes in inlet (supply) pressure, at a constant small air flow rate and low regulated pressure

4 Technical requirements

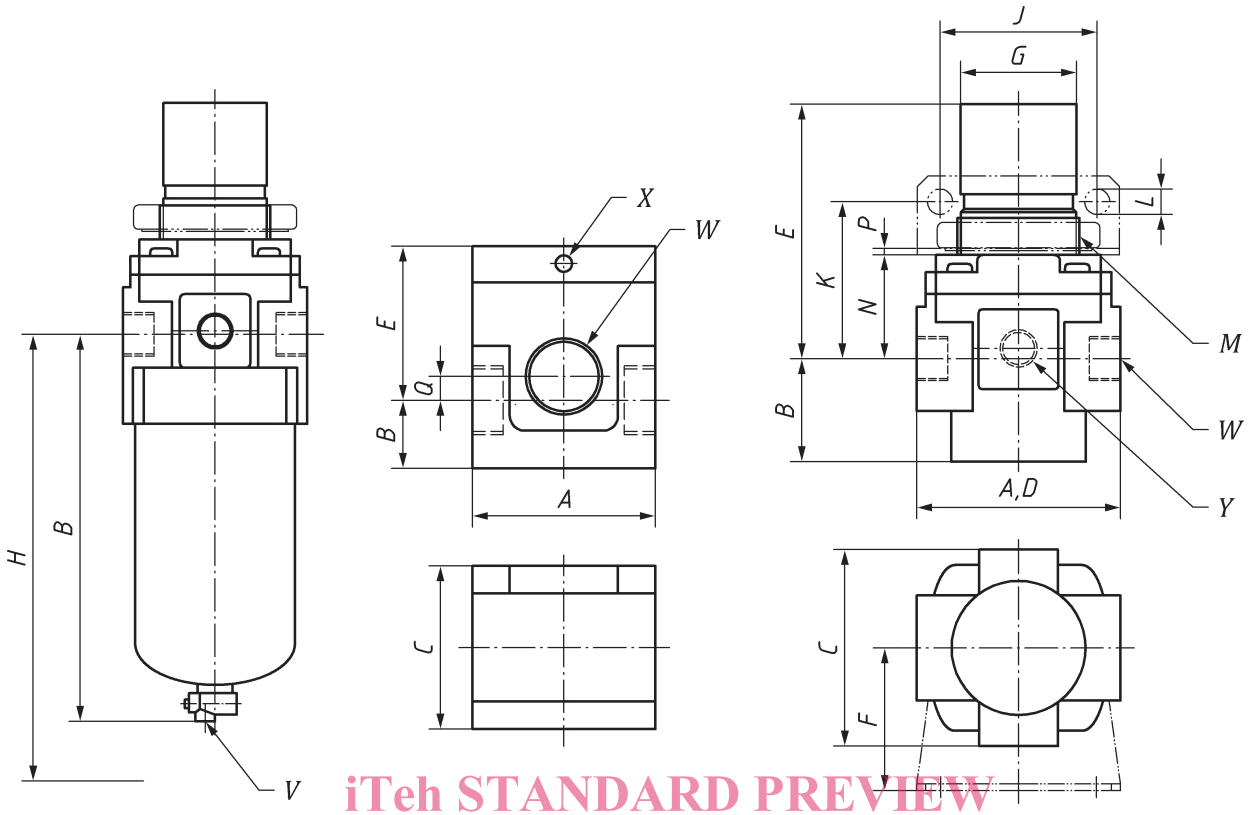
4.1 General

Descriptive literature covering compressed air pressure regulators and filter-regulators shall include the following characteristics given in 4.2 and 4.3.

4.2 General characteristics

4.2.1 General dimensions

The dimensions shown on Figure 1 shall be given in millimetres. For ports, see 4.2.2.



Key

A maximum overall width
B maximum installation height below the port centre line
C maximum overall depth, excluding pressure gauge
D distance between the faces of the compressed air connection (inlet/outlet)
E maximum height above the port centre line
F[a] maximum installation depth from the port centre line
G maximum dimension of the regulated pressure adjusting device
H minimum clearance from the port centre line to permit dismantling
J[a] distance between mounting holes
K[a] distance between the port centre line and mounting holes
L[a] minimum recommended diameter and length of mounting holes
M[a] panel mounting thread
N[a] panel mounting height above the port centre line
P[a] maximum panel thickness
Q[b] distance between the port centre line to gage port
V drain hole description
W port description
X[b] pilot port description
Y pressure gauge port description

NOTE [a] dimensions, *F, J, K, L, M, N,* and *P* shall be indicated only if the device has provisions for mounting;
[b] optional

Figure 1 — Dimensions of compressed air regulators and filter-regulators

4.2.2 Port forms

Port forms should be selected from ISO 16030 or ISO 1179 (all parts) for ports with pipe parallel threads, or from ISO 7-1 for ports with pipe-tapered threads.

The connecting interface for flange-mounted designs can be plain ported and counter bored to accept O-rings.

For certain applications and connections, other port forms can be employed.

NOTE Annex A describes thread forms from the former ISO 1179:1981.

4.2.3 Rated pressure

Compressed air pressure regulators and filter-regulators shall be classified according to their rated pressure, selected from ISO 2944.

The rated pressure shall be verified using the test procedure specified in ISO 6953-2: 2015, Clause 6. This procedure verifies the pressure rating of the pressure-containing envelope but does not cover the limitation that can be imposed by the diaphragm. The range of duties and sensitivities of the diaphragm used vary widely and their strength can be limited to achieve the accuracy required by the application.

4.2.4 Range of operating temperatures

4.2.4.1 The temperature range in which the material and the operation of the pressure regulator and filter-regulator are not impaired shall be stated.

4.2.4.2 Other combinations of pressure and temperature ratings for optional designs that could require a different rating shall be specified.

4.3 Particular requirements

4.3.1 General

The data provided by the supplier shall assist the user in selecting the compressed air pressure regulator and filter-regulator best suited for the particular application.

4.3.2 Adjustable pressure ranges (outlet regulated pressure)

The upper limit of the recommended adjustable pressure range should normally be chosen from the following preferred ranges but not to exceed the inlet rated pressure:

— up to 100 kPa (1 bar);

— up to 200 kPa (2 bar);

— up to 400 kPa (4 bar);

— up to 800 kPa (8 bar);

— up to 1 000 kPa (10 bar);

— up to 1 600 kPa (16 bar).

Special ranges can also be available.

The adjustability of the upper limit of the pressure range is a minimum and the upper limit should not be regarded as a limiting pressure.