



FINAL DRAFT International Standard

ISO/FDIS 23555-3

Gas pressure safety and control devices for use in gas transmission, distribution and installations for inlet pressures up to and including 10 MPa —

Part 3: Safety shut-off devices

ISO/TC 161

Secretariat: **DIN**

Voting begins on:
2024-03-20

Voting terminates on:
2024-05-15

[ISO/FDIS 23555-3](https://standards.iteh.ai/catalog/standards/iso/ef1906d3-86f1-4c04-8df3-11f861d5dd39/iso-fdis-23555-3)

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Published in Switzerland

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Foreword

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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 document 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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This document was prepared by Technical Committee ISO/TC 161, *Controls and protective devices for gaseous and liquid fuels*.

A list of all parts in the ISO 23555 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

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Introduction

This document is designed to be used in combination with ISO 23555-1 and it applies to the specific control covered by this document.

Where necessary, this document builds on the provisions of ISO 23555-1 by stating in the corresponding clause:

- “with the following modification”;
- “with the following addition”;
- “is replaced by the following”; or
- “is not applicable”.

In order to identify requirements that are specific to this document and that are not already covered by ISO 23555-1, this document contains certain clauses or subclauses that are additional to the structure of ISO 23555-1. These subclauses are indicated by the introductory sentence: “Subclause (or Annex) specific to this document.”.

To ensure the global relevance of this document, the differing requirements resulting from practical experience and installation practices in various regions of the world have been taken into account.

This document is intended to provide a basic framework of requirements.

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Gas pressure safety and control devices for use in gas transmission, distribution and installations for inlet pressures up to and including 10 MPa —

Part 3: Safety shut-off devices

1 Scope

This document specifies safety, constructional, performance, testing and documentation requirements of gas safety shut-off devices (SSDs).

This document is applicable to SSDs with operating pressures greater than 500 kPa (5 bar¹⁾) up to 10 MPa (100 bar) of nominal connection sizes up to and including DN 400 for use with fuel gases such as natural gas, manufactured gas, biomethane or liquefied petroleum gas (LPG) in commercial industrial installations, including fuel gas infrastructures.

This document is applicable to SSDs for an operating temperature range from -20 °C to +60 °C;

This document is applicable to:

- test methods which are intended for product type tests, routine tests and batch surveillance tests;
- SSDs which use the pipeline gas as a source of control energy unassisted by any external power source;
- SSDs integrating on the same body a second SSD, conforming to the requirements in this document;
- SSDs integrating a gas pressure regulator conforming to ISO 23555-2.
- SSDs incorporating a creep (venting) relief device and/or a vent limiter conforming to the requirements in this document;

This document does not apply to:

- SSDs upstream from/on/in domestic gas-consuming appliances which are installed downstream of domestic gas meters;
- SSDs designed to be incorporated into pressure control systems used in service lines (pipework from the main pipework in a gas infrastructure to the point of delivery of the gas) with declared volumetric flow rate $\leq 200 \text{ m}^3/\text{h}$ (n);
- industrial process control valves on/off type (see IEC 60534 for information on the design, classification and tests for this type of valve);

NOTE Such valves cannot be declared conformant to this document.

- SSDs used in sour gas environments (gas environments containing water and H₂S are considered sour) or corrosive conditions;
- SSDs in service conditions with waste gases (e.g. biogas etc.), if additional information is not provided (e.g. contaminant, liquid etc.).

1) 1 bar = 0,1 MPa = 10⁵ Pa; 1 MPa = 1 N/mm².

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 23555-1,, *Gas pressure safety and control devices for use in gas transmission, distribution and installations for inlet pressures up to and including 10 MPa — Part 1: General requirements*

IEC 60534-2-3, *Industrial-process control valves – Part 2-3: Flow capacity – Test procedures*

IEC 60534-4:2006, *Industrial-process control valves - Part 4: Inspection and routine testing*

3 Terms, definitions and symbols

For the purposes of this document, the terms and definitions given in ISO 23555-1 and the following apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <https://www.electropedia.org/>

3.1 Terms and definitions

3.1.1 Terms related to safety shut-off devices in general

3.1.1.1

gas safety shut-off device

device whose function is to stay in the open position under normal operating conditions and to shut-off the gas flow automatically and completely when the monitored pressure exceeds the pre-set values (over-pressure monitoring and/or under-pressure monitoring)

3.1.1.2

direct acting gas safety shut-off device

safety shut-off device (SSD) in which the pressure-detecting element is directly connected to the trip mechanism

Note 1 to entry: See [Figure 1](#).

3.1.1.3

indirect acting gas safety shut-off device

safety shut-off device (SSD) without mechanical connection between the pressure detecting element and the trip mechanism and where (pressure) energy from an internal or external source is used for activating the trip mechanism and moving the closing element

Note 1 to entry: See [Figures 2, 3](#) and [4](#).

3.1.1.4

gas cut-off device

safety shut-off device (SSD) designed to shut off the gas flow, which responds dynamically slower than a slam shut device when the monitored pressure exceeds the pre-set values

3.1.1.5

gas slam shut device

safety shut-off device (SSD) designed to quickly shut off the gas flow when the monitored pressure exceeds the pre-set values

EXAMPLE Spring or weight-loaded SSD.

3.1.1.6

auxiliary pressure source

energy coming from pressure of the system (internal energy) or from any external source (compressed air or gas)

3.1.2 Terms related to components of safety shut-off devices

3.1.2.1

closing member

part which shuts off the gas flow completely

3.1.2.2

trip mechanism

mechanism which releases the closing member when activated by the controller

3.1.2.3

actuator

device activated by the trip mechanism which shuts the closing member

3.1.2.4

relatching device

device which enables the complete opening of the safety shut-off device (SSD)

3.1.2.5

controller

device which includes:

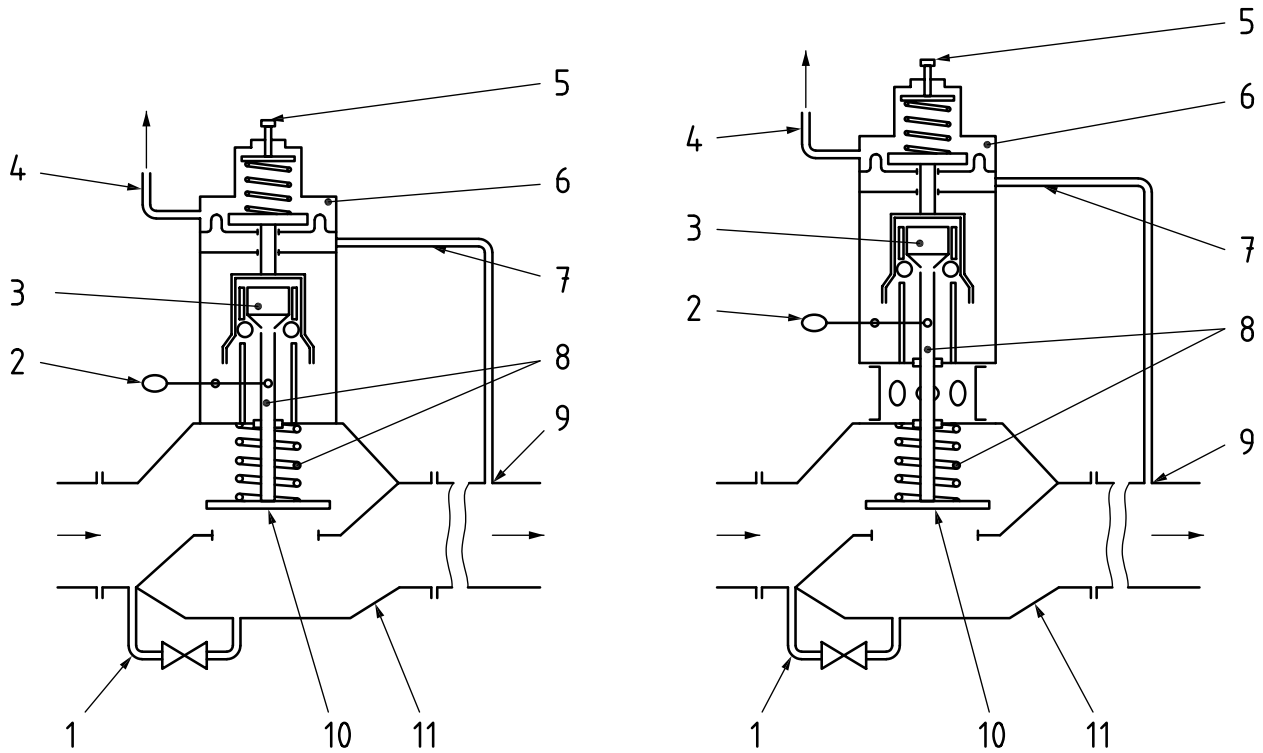
- a setting element to adjust the set value of the trip pressure;
- a pressure-detecting element which has the function to detect the feedback of the monitored pressure (e.g. a diaphragm);
- a unit which compares the set value of the trip pressure with the monitored pressure;
- a system which gives the energy to operate the trip mechanism

3.1.2.6

bypass

device permitting manual equalization of pressure across a closed safety shut-off device (SSD)

Note 1 to entry: See examples in [Figure 1](#) to [Figure 4](#).



a) Pressure-containing parts group 2
(ISO 23555-1:2022, 6.3.2)

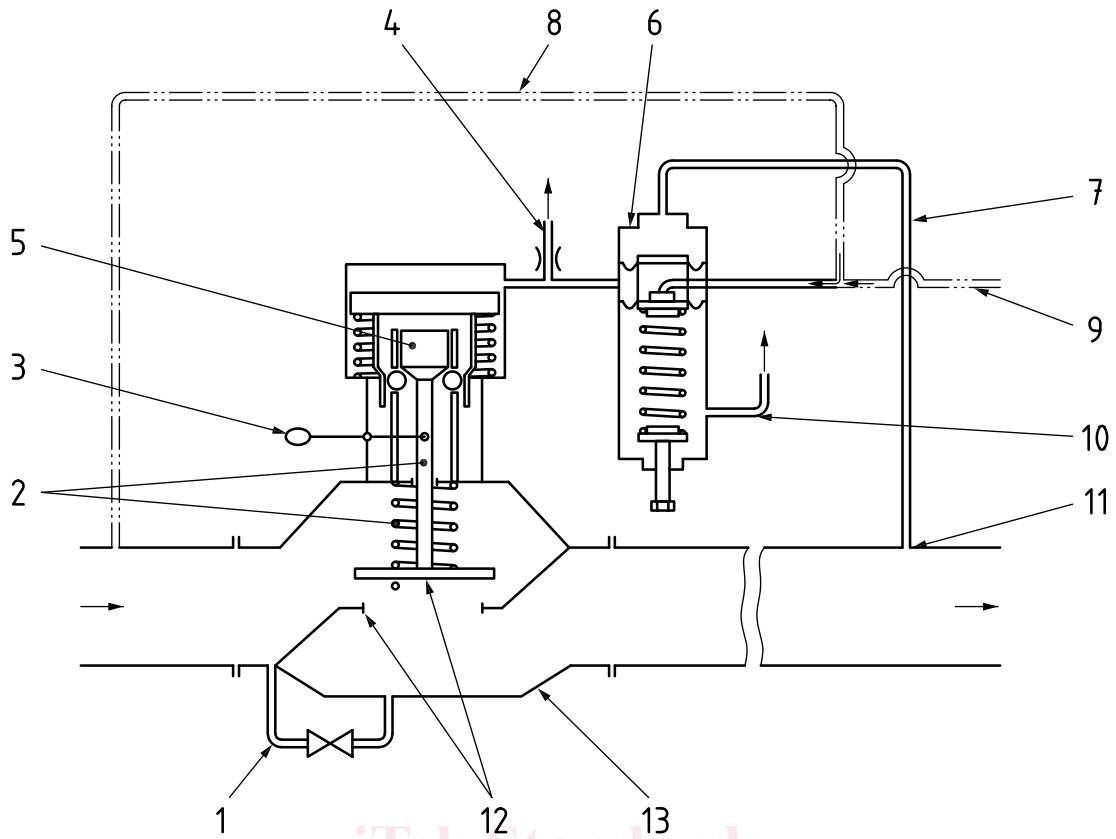
b) Pressure-containing parts group 3
(ISO 23555-1:2022, 6.3.2)

Key

- | | | | |
|---|-------------------|----|---|
| 1 | bypass | 7 | sensing line |
| 2 | relatching device | 8 | actuator |
| 3 | trip mechanism | 9 | sensing point at the location to be monitored |
| 4 | breather line | 10 | closing member |
| 5 | setting element | 11 | SSD body |

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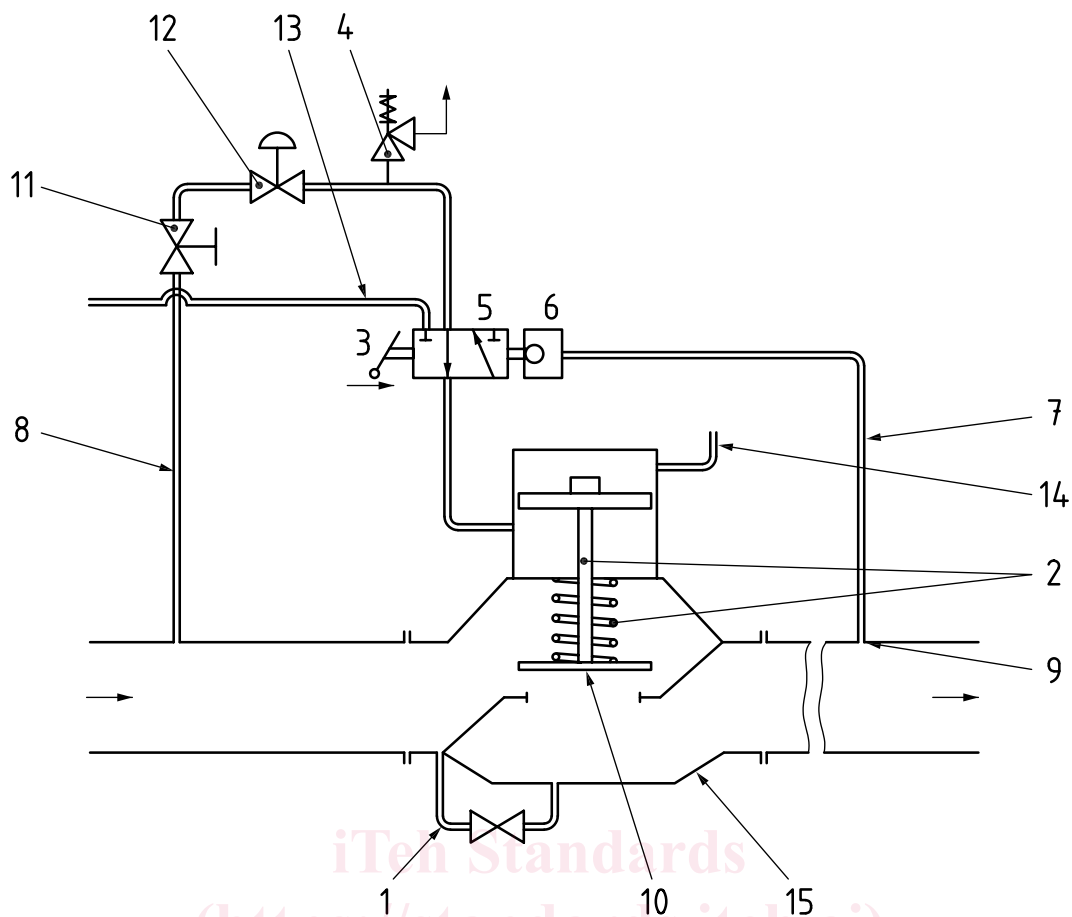
Figure 1 — Example of direct acting gas safety shut-off devices



Key

- | | | | |
|---|-------------------|----|---|
| 1 | bypass | 8 | loading pressure line (from internal auxiliary pressure source) |
| 2 | actuator | 9 | loading pressure line (from external auxiliary pressure source) |
| 3 | relatching device | 10 | breather/exhaust line |
| 4 | exhaust line | 11 | sensing point |
| 5 | trip mechanism | 12 | closing member |
| 6 | controller | 13 | SSD body |
| 7 | sensing line | | |

Figure 2 — Example No. 1 of an indirect acting gas safety shut-off device



Key

- | | | | |
|---|---|----|--------------------|
| 1 | bypass | 9 | sensing point |
| 2 | actuator | 10 | closing member |
| 3 | relatching device | 11 | isolating valve |
| 4 | safety relief valve | 12 | pressure regulator |
| 5 | trip mechanism (directional control valve) | 13 | exhaust line |
| 6 | controller | 14 | breather line |
| 7 | sensing line | 15 | SSD body |
| 8 | loading pressure line (from internal auxiliary pressure source) | | |

Figure 3 — Example No. 2 of an indirect acting gas safety shut-off device