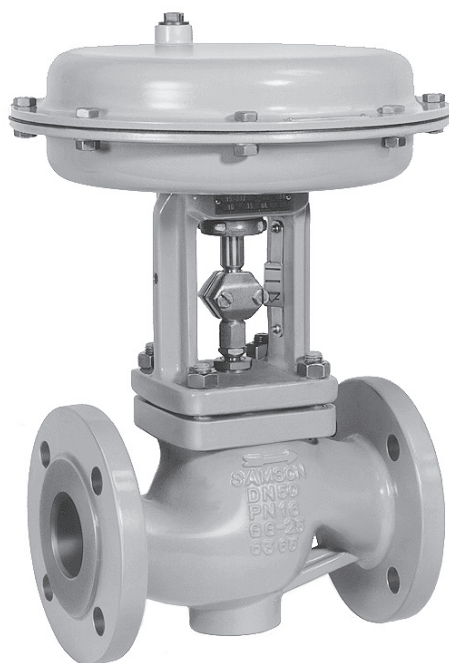


SH 8015 EN

Translation of original instructions



Type 3241 Globe Valve

Definition of signal words

DANGER

Hazardous situations which, if not avoided, will result in death or serious injury

WARNING

Hazardous situations which, if not avoided, could result in death or serious injury

NOTICE

Property damage message or malfunction

Note

Additional information

Tip

Recommended action

Purpose of this manual

The Safety Manual SH 8015 contains information relevant for the use of the Type 3241 Globe Valve in safety-instrumented systems according to IEC 61508 and IEC 61511. The safety manual is intended for planners, constructors, and operators of safety-instrumented systems.

NOTICE

Risk of malfunction due to incorrect installation or start-up of the device.

Refer to the mounting and operating instructions on how to install and start-up the device.

Observe the warnings and safety instructions written in the mounting and operating instructions.

Further documentation

The documents listed below contain descriptions of the start-up, functioning and operation of the valve. You can download these documents from the SAMSON website.

Type 3241 Globe Valve

- ▶ T 8015: Data sheet (DIN)
- ▶ T 8012: Data sheet (ANSI)
- ▶ T 8012-2: Data sheet (JIS)
- ▶ T 8015-1: Data sheet for PSA version (DIN)
- ▶ T 8012-1: Data sheet for PSA version (ANSI)
- ▶ T 8016: Data sheet for version with safety function
- ▶ T 8020-1: Data sheet for Type 3241-Gas (valve class E)
- ▶ T 8020-2: Data sheet for Type 3241-Gas (valve class D)
- ▶ EB 8015: Mounting and operating instructions (DIN)
- ▶ EB 8012: Mounting and operating instructions (ANSI, JIS)
- ▶ EB 8020: Mounting and operating instructions for Type 3241-Gas

Note

In addition to the valve documentation, observe the documentation for the actuator and valve accessories.

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1 Scope

General

The SAMSON Type 3241 Globe Valve in combination with an actuator (e.g. Type 3271 or Type 3277 Pneumatic Actuator) is designed to regulate the flow rate, pressure or temperature of liquids, gases or vapors.

Use in safety-instrumented systems

The valve can be used in safety-instrumented systems according to IEC 61508 and IEC 61511. The valve can be used in safety-instrumented systems up to SIL 2 (single device) and SIL 3 (redundant configuration) on observing the requirements of IEC 61508.

The safety-instrumented function of the valve is to be regarded as a Type A element in accordance with IEC 61508-2.

Note

The architecture and the interval between proof tests must be considered concerning the safety integrity level.

Tip

Through the use of a positioner with diagnostic features on the control valve, the diagnostic coverage can be increased, and, as a result, the probability of failure on demand reduced.

Versions and ordering data

Valve combined with actuators with travel stop and/or handwheel are **not** suitable for use in safety-instrumented systems. All other versions are suitable for use in safety-instrumented systems.

Mounting

The valve and actuator are normally delivered already assembled by SAMSON.

2 Technical data

Table 1: DIN version

Valve size	DN	15 to 250	15 to 150	15 to 300				15 · 25 · 40 · 50 · 80		
Material		Cast iron EN-GJL-250 (EN-JL1040)	Sph. graphite iron EN-GJS-400-18-1T (EN-JS1049)	Cast steel 1.0619	Cast stainless steel 1.4408	Cast steel 1.6220/1.1138	Cast stainless steel 1.4308	Forged steel 1.0460	Cast stainless steel 1.4571	
Nominal pressure	PN	10 · 16	16 · 25	10 · 16 · 25 · 40						
Type of connection	Flanges	All DIN versions								
	Welding ends	–			DIN EN 12627 only for DN 25, 40, 50, 80, 100, 150, 200, 250, 300				–	
Seat-plug seal		Metal seal · Soft seal · High-performance metal seal								
Characteristic		Equal percentage · Linear (according to Information Sheet ► T 8000-3)								
Rangeability		50:1 for DN 15 to 50 · 30:1 for DN 65 to 150 · 50:1 for DN 200 and larger								
Heating jacket	Up to DN 100	PN 25								
	DN 125 and higher	PN 16								
Compliance										
Temperature ranges in °C · Permissible operating pressures acc. to pressure-temperature diagrams (see Information Sheet ► T 8000-2)										
Body without insulating section		–10 to +220								
Body with	Insulating section	Short	–10 to +300	–10 to +350	–10 to +400	–50 to +450	–50 to +300	–50 to +300	–10 to +400	–50 to +450
		Long	–			–196 to +450	–	–196 to +300	–	–196 to +450
	Bellows seal	Short	–10 to +300	–10 to +350	–10 to +400	–50 to +450	–50 to +300	–50 to +300	–10 to +400	–50 to +450
		Long	–			–196 to +450	–	–196 to +300	–	–196 to +450
Valve plug	Standard	Metal seal		–196 to +450						
		Soft seal		–196 to +220						
	Balanced	With PTFE ring		–50 to +220 · Lower temperatures on request						
		With graphite ring		220 to 450						
Leakage class according to IEC 60534-4										
Valve plug	Metal seal		Standard: IV · High-performance metal seal: V							
	Soft seal		VI							
	Balanced	Metal seal	Standard: IV · With PTFE or graphite pressure-balancing ring Special version: V · For high-performance (only with PTFE balancing ring) on request							

 Note

Technical data for the other versions (e.g. PSA, Type 3241-Gas) can be found in the corresponding data sheets. See section Further documentation.

Table 2: ANSI version

Valve size	NPS	1 to 6	½ to 2	½ to 12			½, 1, 1½, 2, 3 2)		
ASTM material		Cast iron A126 B		Cast steel A216 WCC	Cast stainless steel A351 CF8M	Cast steel A352 LCC	Cast stainless steel A351 CF8	Forged steel A105	Forged stain- less steel A182 F316
Pressure rating	Class	125	250	150/300				300	
	Flanges	FF	–	RF ¹⁾				RF ¹⁾	
Type of connection	Welding ends	–	–	DIN EN 12627				–	
	Thread	–	NPT	–				–	
Seat-plug seal	Metal seal · Soft seal · High-performance metal seal								
Characteristic	Equal percentage · Linear (according to Information Sheet ► T 8000-3)								
Rangeability	50:1 for NPS ½ to 2 · 30:1 for NPS 2½ to 6 · 50:1 for NPS 8 and larger								
Heating jacket	Class 150								
Compliance									
Temperature ranges in °C (°F) · Permissible operating pressures according to pressure-temperature diagram (see Information Sheet ► T 8000-2)									
Body without insulating section		–10 to +220 °C (15 to 430 °F)							
Body with	Insulating section	Short in °C (°F)	–29 to +232 (–20 to +449)	–29 to +427 (–20 to +800)	–50 to +450 (–58 to +842)	–46 to +343 (–50 to +650)	–50 to +300 (–58 to +572)	–29 to +427 (–20 to +800)	–50 to +450 (–58 to +842)
		Long in °C (°F)	–	–	–196 to +450 (–325 to +842)	–	–196 to +300 (–325 to +572)	–	–196 to +450 (–325 to +842)
	Bellows seal	Short in °C (°F)	–29 to +232 (–20 to +449)	–29 to +427 (–20 to +800)	–50 to +427 (–58 to +800)	–46 to +343 (–50 to +650)	–50 to +300 (–58 to +572)	–29 to +427 (–20 to +800)	–50 to +450 (–58 to +842)
		Long in °C (°F)	–	–	–196 to +427 (–325 to +800)	–	–196 to +300 (–325 to +572)	–	–196 to +450 (–325 to +842)
Valve plug	Standard	Metal seal	–196 to +450 °C (–325 to +842 °F)						
		Soft seal	–196 to +220 °C (–325 to +428 °F)						
	Balanced	With PTFE ring	–50 to +220 °C (–58 to +428 °F) · Lower temperatures on request						
		With graphite ring	220 to 450 °C (428 to 842 °F)						
Leakage class according to ANSI/FCI 70-2									
Valve plug	Standard	Metal seal	Standard: IV · High-performance metal seal: V						
		Soft seal	VI						
	Balanced	Metal seal	Standard IV · With PTFE or graphite balancing ring Special version V · For high-performance (only with PTFE balancing ring) on request						

¹⁾ Other versions on request

²⁾ NPS 3 only in A 105

3 Safety-related functions

Safety-related fail-safe action

The valve, in combination with a pneumatic actuator, controls the process medium flowing through it. When the signal pressure acting on the actuator is changed, the springs in the actuator move the actuator stem downward or upward to close or open the valve. The fail-safe action is triggered when no signal pressure is applied to the actuator.

Fail-safe action

The signal pressure is normally applied to the actuator. The actuator is vented upon demand of the safety-instrumented function. As soon as the actuator is vented (signal pressure = atmospheric pressure), the spring forces cause the actuator stem to move to the fail-safe position. The valve is completely open or completely closed.

Depending on the actuator's direction of action (see the associated actuator documentation), the valve has one of the following fail-safe positions:

- "Actuator stem extends" fail-safe action: in the event of emergency, the springs move the actuator stem downward and close the valve.
- "Actuator stem retracts" fail-safe action: in the event of emergency, the springs move the actuator stem upward and open the valve.

Protection against unauthorized changes to the configuration

The valve's fail-safe position depends on the mounted actuator's direction of action. The actuator's direction of action can be reversed. However, this is not possible while the process is running.

4 Installation and start-up

The valve is delivered ready to install and can be installed into the pipeline without the need for any additional installation work. Refer to the valve documentation on how to install and start-up the valve.



Tip

We recommend checking the installation and start-up using a checklist. Examples of such checklists are included in VDI 2780-5 and the SAMSON brochure WA 236 (Functional safety of globe valves, rotary plug valves, ball valves and butterfly valves).

5 Required conditions

WARNING

Risk of malfunction due to incorrect selection or wrong installation and operating conditions. Only use valves in safety-instrumented systems after the necessary conditions in the plant have been fulfilled.

Tip

We recommend checking the necessary conditions using a checklist. Examples of such checklists are included in VDI 2780-5 and the SAMSON brochure WA 236 (Functional safety of globe valves, rotary plug valves, ball valves and butterfly valves).

Selection

- ➔ The suitability of the entire control valve assembly (valve, actuator, valve accessories) for the intended use (pressure, temperature) has been checked.
- ➔ The valve materials are suitable for the process medium.
- ➔ The actuator is correctly sized based on the required transit time and thrust.

Mechanical and pneumatic installation

- ➔ The valve is installed properly into the pipeline as described in the mounting and operating instructions and the actuator mounted on it. Valve accessories are mounted correctly.
- ➔ The prescribed direction of flow is observed. The arrow on the valve indicates the direction of flow.
- ➔ The control valve is configured with the correct fail-safe position (stem extends or retracts).
- ➔ The tightening torques (e.g. for the flanged joints) are observed.
- ➔ A strainer must be installed when the process medium contains solids which could block the valve.

WARNING

The flow of the process medium is blocked by the strainer for a valve with "actuator stem retracts" fail-safe action.

Valves with "actuator stem retracts" fail-safe action must not be fitted with a strainer.

Required conditions

Operation

- The plug stem is not blocked.
- The medium flow through the valve is not blocked.
- The valve is only used in applications that meet the specifications used for sizing at the ordering stage.

Maintenance

- Maintenance is only performed by fully trained, qualified operating personnel.
- Only original parts are used for spare parts.
- Maintenance is performed as described in the section on servicing or maintenance in the associated valve documentation.



Tip

Contact SAMSON's After-sales Service department concerning any work not described in the section on servicing or maintenance in the associated valve documentation.

6 Proof testing

The proof test interval and the extent of testing lie within the operator's responsibility. The operator must draw up a test plan, in which the proof tests and the interval between them are specified. We recommend summarizing the requirements of the proof test in a checklist.

WARNING

Risk of dangerous failure due to malfunction in the event of emergency (valve does not move to the fail-safe position).

Only use devices in safety-instrumented systems that have passed the proof test according to the test plan drawn up by the operator.

NOTICE

Malfunction due to a non-observance of the required inspection requirements.

To test the fail-safe action properly, the following requirements must be met:

- Valve and actuator are assembled together properly.*
 - The control valve is installed properly into the plant.*
-

Regularly check the safety-instrumented function of the entire SIS loop. The test intervals are determined, for example on calculating each single SIS loop in a plant (PFD_{avg}).

Tip

We recommend performing the proof tests based on a checklist. An example of such a checklist is included in the SAMSON brochure WA 236 (Functional safety of globe valves, rotary plug valves, ball valves and butterfly valves).

Visual inspection to avoid systematic failure

To avoid systematic failure, inspect the valve regularly. The frequency and the scope of the inspection lie within the operator's responsibility. Take application-specific influences into account, such as:

- Blockage of plug stem
- Corrosion (destruction primarily of metals due to chemical and physical processes)
- Material fatigue
- Wear induced by the process medium
- Abrasion (material removed by solids contained in the process medium)
- Medium deposits
- Aging (damage caused to organic materials, e.g. plastics or elastomer, by exposure to light and heat)
- Chemical attack (organic materials, e.g. plastics or elastomer, which swell, leach out or decompose due to exposure to chemicals)

NOTICE

*Risk of malfunction due to the use of unauthorized parts.
Only use original parts to replace worn parts.*

Function testing

Regularly check the safety function according to the test plan drawn up by the operator.

Note

Record any faults in the valve and inform SAMSON of them in writing.

Safety-related fail-safe action

1. Supply the actuator with the signal pressure to allow the valve to move to the end position (completely open or closed).
2. Disconnect the signal pressure. This must cause the valve to move to its fail-safe position.
3. Check whether the valve reaches the end position within the required time.
4. Check whether the maximum permissible leakage is observed.

Safety-instrumented function of valve accessories

- Check the safety-instrumented function of valve accessories. Refer to the associated safety manuals.

7 Repairs

Only perform the work on the valve described in the valve documentation.

! NOTICE

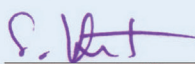
Fail-safe action impaired due to incorrect repair.

Service and repair work must only be performed by trained staff.

Certificate



Nr./No.: 968/V 1046.00/18

Prüfgegenstand Product tested	Durchgangsventile Globe Valves	Zertifikats- inhaber Certificate holder	SAMSON AG Weismüllerstr. 3 60314 Frankfurt / Main Germany
Typbezeichnung Type designation	Series 240 / Type 3241		
Prüfgrundlagen Codes and standards	IEC 61508 Parts 1-2 and 4-7:2010		
Bestimmungsgemäße Verwendung Intended application	Sicherheitsfunktion: Sicheres Verfahren in die Endlage (offen oder geschlossen je nach Anwendungsfall). Die Verfahrbewegung geschieht durch einen federrückgestellten Antrieb (nicht Teil der Bewertung). Die Armaturen sind zur Verwendung in einem sicherheitsgerichteten System bis SIL 2 (Low Demand Mode) geeignet. Unter Berücksichtigung der mindestens erforderlichen Hardware-Fehlertoleranz (HFT=1) können sie in redundanter Ausführung auch bis SIL 3 eingesetzt werden. Safety Function: Safe travel into the end position (open or closed depending on the application). The movement is carried out by a spring return actuator (not part of the evaluation). The valves are suitable for use in a safety instrumented system up to SIL 2 (low demand mode). Under consideration of the minimum required hardware fault tolerance (HFT=1) they may be used in a redundant architecture up to SIL 3.		
Besondere Bedingungen Specific requirements	Die Hinweise in der zugehörigen Installations- und Betriebsanleitung sowie des Sicherheitshandbuchs sind zu beachten. The instructions of the associated Installation, Operating and Safety Manual shall be considered.		
Zusammenfassung der Testergebnisse siehe Rückseite des Zertifikates. Summary of test results see back side of this certificate. Gültig bis / Valid until 2023-03-22 Der Ausstellung dieses Zertifikates liegt eine Prüfung zugrunde, deren Ergebnisse im Bericht Nr. 968/V 1046.00/18 vom 22.03.2018 dokumentiert sind. Dieses Zertifikat ist nur gültig für Erzeugnisse, die mit dem Prüfgegenstand übereinstimmen. The issue of this certificate is based upon an examination, whose results are documented in Report No. 968/V 1046.00/18 dated 2018-03-22. This certificate is valid only for products which are identical with the product tested.			
Köln, 2018-03-22		TÜV Rheinland Industrie Service GmbH Bereich Automation Funktionale Sicherheit Am Grauen Stein, 51105 Köln  Dipl.-Ing. Stephan Häb	
		Certification Body Safety & Security for Automation & Grid	

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Hersteller / Holder: **Samson AG**
Weismüllerstr. 3
60314 Frankfurt am Main

Prüfgegenstand / Product tested: Globe Valve Series 240
Type 3241

Results of Assessment

Route of Assessment		$2_H / 1_S$	
Type of Sub-system		Type A	
Mode of Operation		Low Demand Mode	
Hardware Fault Tolerance	HFT	0	
Lambda Dangerous confidence level of calculation $1-\alpha = 95\%$	λ_D	1.23 E-07 / h	123 FIT
Lambda Dangerous Undetected assumed Diagnostic Coverage DC = 0 %	λ_{DU}	1.23 E-07 / h	123 FIT
Mean Time To Dangerous Failure	MTTF _D	8.16 E+06 h	931 a
Average Probability of Failure on Demand 1oo1 assumed Proof Test Interval $T_1 = 1$ year	PFD_{avg}(T₁)	5.37 E-04	
Average Probability of Failure on Demand 1oo2 assumed Proof Test Interval $T_1 = 1$ year assumed $\beta_{1oo2} = 10\%$	PFD_{avg}(T₁)	5.40 E-05	

Ursprung der Werte / Origin of values

Die angegebenen Werte sind das Ergebnis der Analyse der Feldrückmeldungen der letzten sieben Jahre. Untersucht wurden zufällige und systematische Ausfälle, die in der Verantwortung des Herstellers liegen.

The stated values are the results of the analysis of field feedback of the last seven years. Random and systematic failures which are the responsibility of the manufacturer were examined.

Systematische Sicherheitsintegrität / Systematic Capability

Der Entwicklungs- und Herstellungsprozess sowie das vom Hersteller in den relevanten Lebenszyklusphasen des Produkts angewandte Management der funktionalen Sicherheit wurden auditert und als geeignet für die Herstellung von Produkten für Anwendungen mit einem maximalen Safety Integrity Level von 3 (SC 3) bewertet.

The development and manufacturing process and the functional safety management applied by the manufacturer in the relevant lifecycle phases of the product have been audited and assessed as suitable for the manufacturing of products for use in applications with a maximum Safety Integrity Level of 3 (SC 3).

Wiederkehrende Prüfungen und Wartung / Periodic Tests and Maintenance

Die angegebenen Werte erfordern wiederkehrende Prüfungen und Wartungen, wie sie im Sicherheitshandbuch beschrieben sind. Der Betreiber ist verantwortlich für die Berücksichtigung spezifischer Umgebungsbedingungen (z.B. Sicherstellung der geforderten Medienqualität, max. Temperatur) und adäquater Prüfzyklen.

The given values require periodic tests and maintenance as described in the Safety Manual.

The operator is responsible for the consideration of specific external conditions (e.g. ensuring of required quality of media, max. temperature, time of impact), and adequate test cycles.

TÜV Rheinland Industrie Service GmbH, Am Grauen Stein, 51105 Köln / Germany

SH 8015 EN



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