

MOUNTING AND OPERATING INSTRUCTIONS



EB 2090 EN

Translation of original instructions



Type 2040 Safety Temperature Monitor (STM) Self-operated Regulators

Edition October 2024



Note on these mounting and operating instructions

These mounting and operating instructions assist you in mounting and operating the device safely. The instructions are binding for handling SAMSON devices. The images shown in these instructions are for illustration purposes only. The actual product may vary.

- For the safe and proper use of these instructions, read them carefully and keep them for later reference.
- If you have any questions about these instructions, contact SAMSON's After-sales Service (aftersaleservice@samsongroup.com).



The mounting and operating instructions for the devices are included in the scope of delivery. The latest documentation is available on our website at www.samsongroup.com > **Downloads** > **Documentation**.

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

1	Safety instructions and measures	1-1
1.1	Notes on possible severe personal injury	1-5
1.2	Notes on possible personal injury	1-6
1.3	Notes on possible property damage	1-7
2	Inscription on the regulator	2-1
2.1	Inscriptions on the regulator	2-1
2.2	Material identification number	2-2
3	Design and principle of operation	3-1
3.1	Additional fittings	3-3
3.2	Technical data	3-4
4	Shipment and on-site transport	4-1
4.1	Accepting the delivered goods	4-1
4.2	Removing the packaging from the regulator	4-1
4.3	Transporting and lifting the regulator	4-1
4.4	Storing the regulator	4-2
5	Installation	5-1
5.1	Installation conditions	5-1
5.2	Preparation for installation	5-2
5.3	Installation	5-3
5.3.1	Installing the regulator	5-4
5.3.2	Cleaning the pipeline	5-4
5.4	Testing the regulator	5-4
5.4.1	Leakage	5-5
5.4.2	Pressure test	5-6
5.5	Insulation	5-6
6	Start-up	6-1
6.1	Start-up and putting the device back into operation	6-2
7	Operation	7-1
7.1	Adjusting the temperature limit	7-1
7.2	New adjustment	7-2
7.3	Adjustment based on limit marking	7-3
8	Malfunctions	8-1
8.1	Troubleshooting	8-1
8.2	Emergency action	8-2

Contents

9	Servicing.....	9-1
9.1	Preparing the valve for service work	9-4
9.2	Installing the regulator after service work	9-4
9.3	Service work.....	9-4
9.4	Ordering spare parts and operating supplies	9-4
10	Decommissioning	10-1
11	Removal	11-1
11.1	Removing the regulator from the pipeline	11-1
12	Repairs	12-1
12.1	Returning devices to SAMSON	12-1
13	Disposal.....	13-1
14	Certificates.....	14-1
15	Appendix.....	15-1
15.1	Tightening torques.....	15-1
15.2	Accessories (optional).....	15-1
15.3	Tools	15-1
15.4	Lubricants.....	15-1
15.5	Spare parts	15-1
15.6	After-sales service	15-2

1 Safety instructions and measures

Intended use

The Type 2040 Regulator is a safety temperature monitor (STM).

The self-operated regulator is used to safeguard the temperature in the plant to an adjusted limit. Cryogenic gases as well as liquids, gases and vapors in industrial plants can be controlled by the Type 2040 Regulator.

The regulator is designed to operate under exactly defined conditions (e.g. operating pressure, process medium, temperature). Therefore, operators must ensure that the regulator is only used in operating conditions that meet the specifications used for sizing the regulator at the ordering stage. In case operators intend to use the controllers in applications or conditions other than those specified, contact SAMSON.

SAMSON does not assume any liability for damage resulting from the failure to use the device for its intended purpose or for damage caused by external forces or any other external factors.

➔ Refer to the technical data and nameplate for limits and fields of application as well as possible uses.

Reasonably foreseeable misuse

The regulator is not suitable for the following applications:

- Use outside the limits defined during sizing and by the technical data
- Use outside the limits defined by the additional fittings mounted on the regulator

Furthermore, the following activities do not comply with the intended use:

- Use of non-original spare parts
- Modification of parts as well as service or repair work on the TÜV-tested Type 2040

Safety features

The Type 2040 Safety Temperature Monitor is a safety device to monitor the temperature limit.

Qualifications of operating personnel

The regulator must be mounted, started up, serviced and repaired by fully trained and qualified personnel only; the accepted industry codes and practices must be observed. According to these mounting and operating instructions, trained personnel refers to individuals who are able to judge the work they are assigned to and recognize possible hazards due to their spe-

Safety instructions and measures

cialized training, their knowledge and experience as well as their knowledge of the applicable standards.

Personal protective equipment

SAMSON recommends checking the hazards posed by the process medium being used (e.g. ► GESTIS (CLP) hazardous substances database). Depending on the process medium and/or the activity, the protective equipment required includes:

- ➔ Protective clothing, safety gloves and eye protection in applications with hot, cold and/or corrosive media
- ➔ Wear hearing protection when working near the valve. Follow the instructions given by the plant operator.
- ➔ Check with the plant operator for details on further protective equipment.

Revisions and other modifications

Revisions, conversions or other modifications of the product are not authorized by SAMSON. They are performed at the user's own risk and may lead to safety hazards, for example. Furthermore, the product may no longer meet the requirements for its intended use.

Warning against residual hazards

To avoid personal injury or property damage, plant operators and operating personnel must prevent hazards that could be caused in the regulator by the process medium, the operating pressure or by moving parts by taking appropriate precautions. Plant operators and operating personnel must observe all hazard statements, warnings and caution notes in these mounting and operating instructions.

Hazards resulting from the special working conditions at the installation site of the regulator must be identified in a risk assessment and prevented through the corresponding safety instructions drawn up by the operator.

SAMSON also recommends checking the hazards posed by the process medium being used (e.g. ► GESTIS (CLP) hazardous substances database).

- ➔ Observe safety measures for handling the device as well as fire prevention and explosion protection measures.

These mounting and operating instructions cover the standard version of the devices and the standard mounting parts. Components that differ to those described in this document can be added or removed. Refer to the mounting and operating instructions of the components not covered in this document for the safety instructions and measures that need to be observed.

Responsibilities of the operator

Operators are responsible for proper use and compliance with the safety regulations. Operators are obliged to provide these mounting and operating instructions as well as the referenced documents to the operating personnel and to instruct them in proper operation. Furthermore, operators must ensure that operating personnel or third parties are not exposed to any danger.

Operators are additionally responsible for ensuring that the limits for the product defined in the technical data are observed. This also applies to the start-up and shutdown procedures. Start-up and shutdown procedures fall within the scope of the operator's duties and, as such, are not part of these mounting and operating instructions. SAMSON is unable to make any statements about these procedures since the operative details (e.g. differential pressures and temperatures) vary in each individual case and are only known to the operator.

Responsibilities of operating personnel

Operating personnel must read and understand these mounting and operating instructions as well as the referenced documents and observe the specified hazard statements, warnings and caution notes. Furthermore, operating personnel must be familiar with the applicable health, safety and accident prevention regulations and comply with them.

Referenced standards, directives and regulations

The regulators comply with the requirements of the European Pressure Equipment Directive 2014/68/EU. Regulators with a CE marking have an EU declaration of conformity, which includes information about the applied conformity assessment procedure. The EU declaration of conformity is included in the 'Certificates' chapter.

According to the ignition hazard assessment performed in accordance with Clause 5.2 of ISO 80079-36, the non-electrical regulators do not have their own potential ignition source even in the rare incident of an operating fault. As a result, they do not fall within the scope of Directive 2014/34/EU.

➔ For connection to the equipotential bonding system, observe the requirements specified in Clause 6.4 of EN 60079-14 (VDE 0165-1).

Safety instructions and measures

Referenced documents

The following documents apply in addition to these mounting and operating instructions:

- Manuals
 - Oxygen** ▶ H 01
- Data sheets for
 - e.g. **Spare parts · Self-operated regulators for cryogenic media** ▶ T 2570
- Mounting and operating instructions as well as data sheets for additional fittings (e.g. shut-off valves, pressure gauges etc.).

1.1 Notes on possible severe personal injury

DANGER

Risk of injury due to incorrect handling of oxygen or cryogenic gases in applications.

The regulator can be used for oxygen service or applications with cryogenic gases. Oxygen is a hazardous substance, which reacts quickly, leading to combustion and explosions. Contact with cryogenic gases causes severe frostbite and cold burns (cryogenic burns). Operating personnel must be trained for these applications. Unqualified operating personnel expose themselves and others to an increased risk of injury.

- Operating personnel must be sufficiently trained and be made aware of the hazards in applications involving oxygen or cryogenic gases.
- Instructions and information on how to safely handle devices for oxygen service can be found in the Manual ► H 01.

Risk of bursting in the regulator.

Regulators and pipelines are pressure equipment. Impermissible pressure or improper opening can lead to regulator components bursting.

- Observe the maximum permissible pressure for regulator and plant.
- Before starting any work on the regulator, depressurize all plant sections affected as well as the regulator.
- Drain the process medium from the plant sections affected as well as from the regulator.
- If necessary, a suitable overpressure protection must be installed in the plant section.
- Wear personal protective equipment.

1.2 Notes on possible personal injury

⚠ WARNING

Damage to health relating to the REACH regulation.

If a SAMSON device contains a substance listed as a substance of very high concern on the candidate list of the REACH regulation, this is indicated on the SAMSON delivery note.

- Information on the safe use of the part affected. ► <https://www.samsongroup.com/en/about-samson/environment-social-governance/material-compliance/reach-regulation/>

Risk of personal injury due to incorrect operation, use or installation as a result of information on the regulator being illegible.

Over time, markings, labels and nameplates on the regulator may become covered with dirt or become illegible in some other way. As a result, hazards may go unnoticed and the necessary instructions not followed. There is a risk of personal injury.

- Keep all relevant markings and inscriptions on the regulator in a constantly legible state.
- Immediately renew damaged, missing or incorrect nameplates or labels.

Risk of burn injuries due to hot or cold components and pipelines.

Depending on the process medium, regulator components and pipelines may get very hot or cold and cause burn injuries.

- Allow components and pipelines to cool down or warm up to the ambient temperature.
- Wear protective clothing and safety gloves.

Risk of personal injury due to residual process medium in the regulator.

While working on the regulator, residual process medium can escape and, depending on its properties, may lead to personal injury, e.g. (chemical) burns.

- If possible, drain the process medium from the plant sections affected and from the regulator.
- Wear protective clothing, safety gloves and eye protection.

⚠ WARNING

Risk of hearing loss or deafness due to loud noise.

The noise emissions depend on the valve version, plant facilities and process medium.

- Wear hearing protection when working near the valve. Follow the instructions given by the plant operator.

1.3 Notes on possible property damage

⚠ NOTICE

Risk of regulator damage due to incorrectly attached slings.

- Do not attach load-bearing slings to the regulator.

Risk of regulator damage due to unsuitable medium properties.

The regulator is designed for a process medium with defined properties.

- Only use the process medium specified for sizing the equipment.

Risk of regulator damage due to contamination (e.g. solid particles) in the pipeline.

The plant operator is responsible for cleaning the pipelines in the plant.

- Flush the pipelines before start-up.

Risk of regulator damage due to the use of unsuitable lubricants.

The lubricants to be used depend on the regulator material. Unsuitable lubricants may corrode and damage surfaces.

- Only use lubricants approved by SAMSON.
When in doubt, consult SAMSON.

! NOTICE

Risk of leakage and regulator damage due to over- or under-torquing.

Observe the specified torques when tightening regulator components. Excessive tightening torques lead to parts wearing out more quickly. Parts that are too loose may cause leakage.

- Observe the specified tightening torques (see the 'Tightening torques' chapter in the Appendix).

Risk of excess pressure damaging plant #s due to construction-related seat leakage through the regulator.

- Always install a safety device (e.g. safety excess pressure valve or safety relief valve) in the plant.

Risk of regulator damage due to the use of unsuitable tools.

Certain tools are required to work on the regulator.

- Only use tools approved by SAMSON.
When in doubt, consult SAMSON.

Risk of the process medium being contaminated through the use of unsuitable lubricants and/or contaminated tools and components.

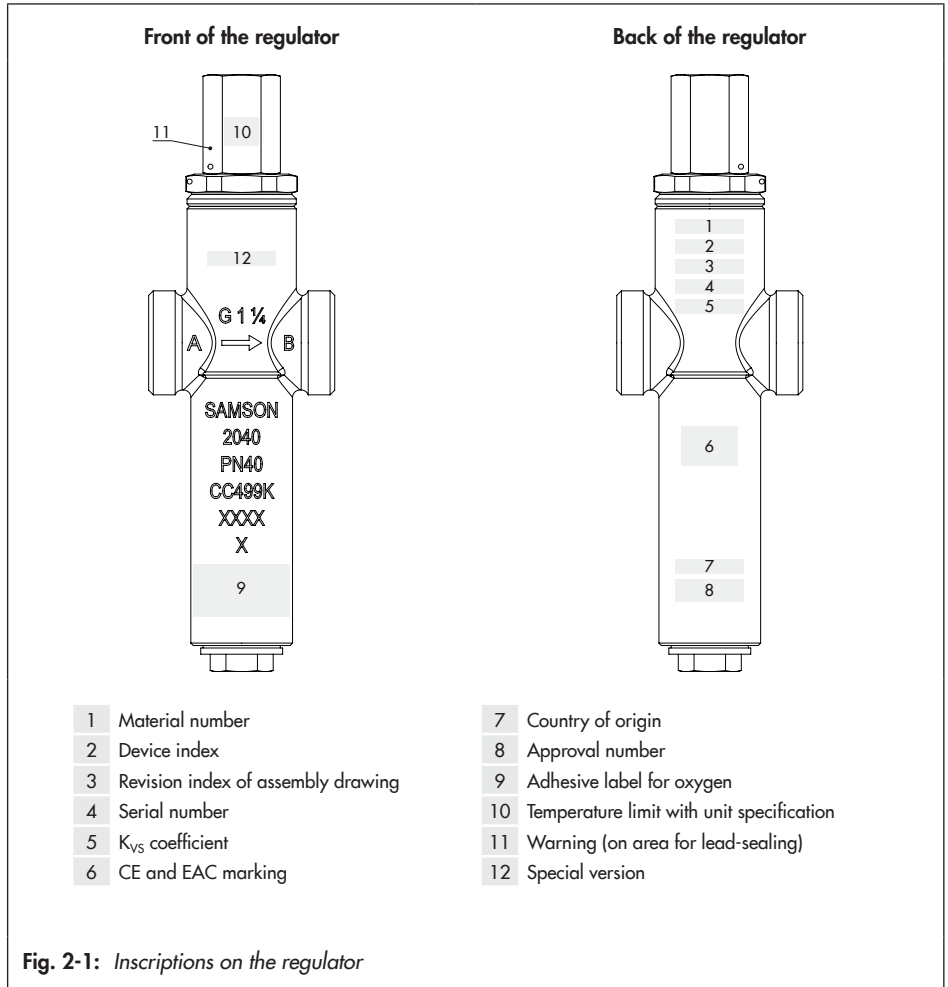
- Keep the regulator and the tools used free from solvents and grease.
- Make sure that only suitable lubricants are used.

i Note

SAMSON's After-sales Service can support you concerning lubricant, tightening torques and tools approved by SAMSON.

2 Inscription on the regulator

2.1 Inscriptions on the regulator



2.2 Material identification number

The material is indicated on the body. Specifying the material number, you can contact us to find out more details. The material number is included in the inscription ("Material number", 1).

For more details on the inscription (see Chapter 2.1).

3 Design and principle of operation

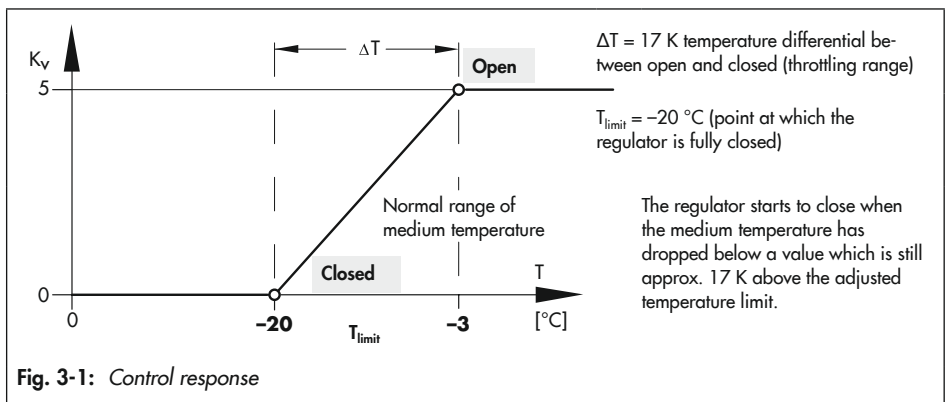
→ See Fig. 3-2

The Type 2040 Safety Temperature Monitor protects downstream plants against excessively low temperatures in applications involving the storage of cryogenic media as well as other liquids, gases and vapors. The regulator closes when the medium temperature falls below the adjusted limit to prevent too cold control medium entering the downstream consumers. It is only used in combination with vaporizers operated with ambient air.

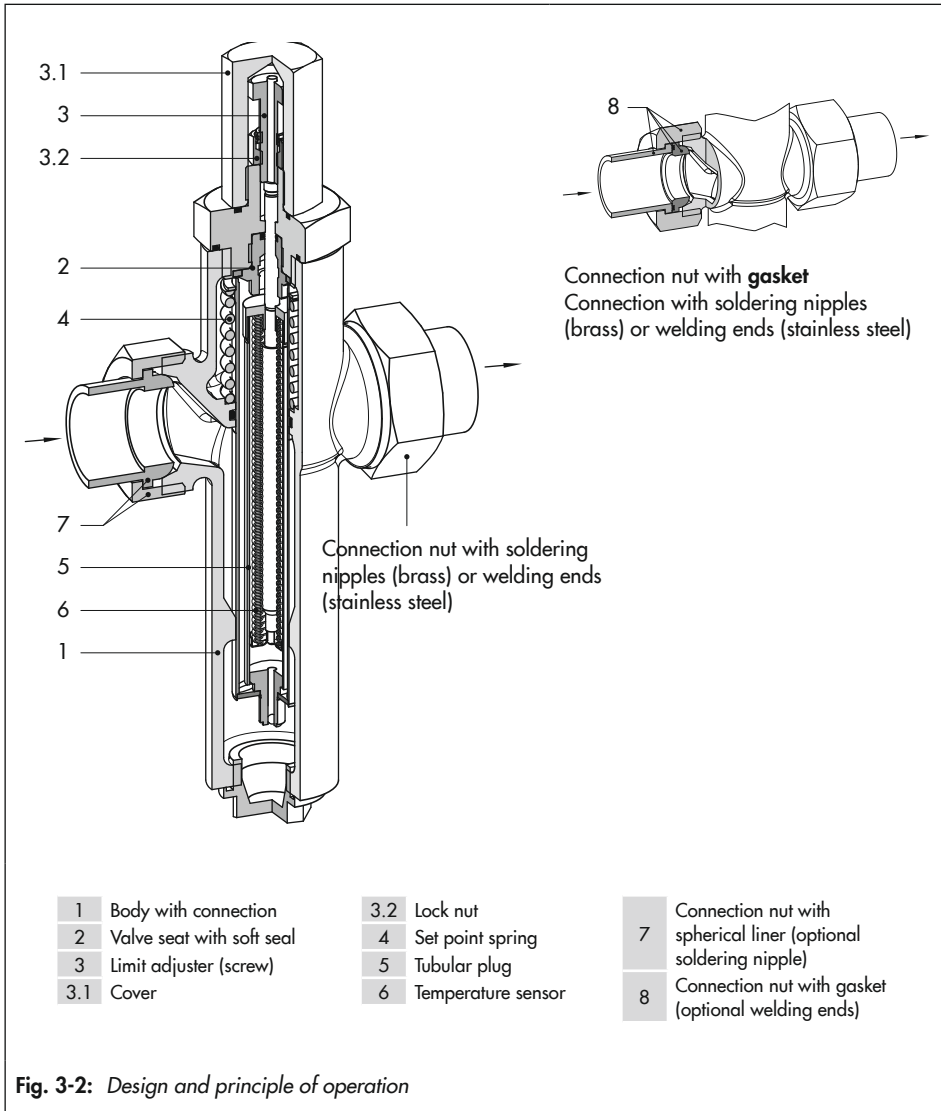
The safety temperature monitor consists of the body (1) with integrated temperature sensor (6) and limit adjuster (3). It operates according to the liquid expansion principle. The volume of the temperature-sensitive filling medium confined in the integrated temperature sensor (6) expands as the temperature rises and contracts again as the temperature falls. The valve is normally open. If excessively cold medium reaches the tem-

perature sensor (6), the liquid inside the sensor contracts and the tubular plug (5) is pushed by the positioning springs (4) against the soft-sealed seat (2). The valve plug starts to close to restrict the medium flow when the medium temperature falls. If the medium temperature continues to fall, the valve fully closes as soon as the adjusted limit temperature is reached. The limit temperature and the throttling range in front of it can be adjusted within the limit range. The regulator first opens again when the medium temperature has exceeded the adjusted limit by 2 K. The temperature span between the adjusted temperature limit (T_{limit}) and the point at which the regulator starts to close is 17 K. The valve is fully open ($K_v = 5$) at a medium temperature of $>T_{limit} + 17$ K. At a medium temperature less than $T_{limit} + 17$ K the medium flow is already throttled and the K_v coefficient gets smaller.

The regulator closes (fail-safe position) in the event of a **malfunction in the sensor system**.



Design and principle of operation



3.1 Additional fittings

→ See Fig. 3-3

Thermometer

Install a thermometer downstream of the regulator to monitor the temperature prevailing in the plant.

Shut-off valves

We recommend installing a shut-off valve both upstream of the strainer and downstream of the regulator for service or repair work.

Insulation

Regulators can be insulated to reduce heat energy transfer.

Refer to the instructions in the 'Installation' chapter.

Strainer

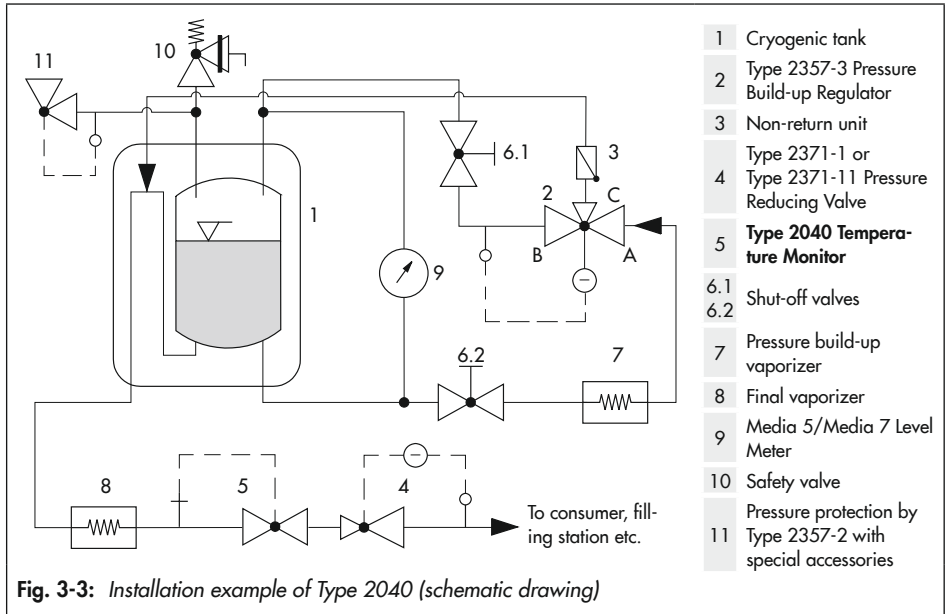
We recommend installing a SAMSON strainer upstream of the valve. It prevents solid particles in the process medium from damaging the regulator.

→ Do not use the strainer to permanently filter the process medium.

→ Select a strainer (mesh size) suitable for the process medium.

i Note

Any impurities carried along by the process medium may impair the proper functioning of the regulator. We recommend installing a strainer (e.g. SAMSON Type 1 NI) upstream of the regulator (▶ EB 1010).



3.2 Technical data

The regulator nameplate provides information on the regulator version (see the 'Markings on the regulator' chapter).

i Note

More information is available in Data Sheet T 2090.

Process medium and scope of application

The Type 2040 Safety Temperature Monitor is used to protect downstream plants against excessively low temperatures in applications involving the storage of cryogenic media as well as other liquids, gases and vapors.

Process medium and scope of application

- Suitable for **cryogenic media as well as other liquids, gases and vapors**
- Limit ranges **from -45 to $+10$ °C**
- Temperature range **from -60 to $+60$ °C**
- Max. operating pressure **40 bar**

The regulator closes in the event of a **mal-function in the sensor system**.

Conformity

The Type 2040 Regulator bears both the CE and EAC marks of conformity.

CE

EAC



Testing according to DIN EN

The **Type 2040** Safety Temperature Monitor is tested by the German Technical Inspectorate (TÜV) according to DIN EN 14597 under the type designation 2040. The registration number is available on request.

Noise emissions

SAMSON is unable to make general statements about noise emissions. The noise emissions depend on the regulator version, plant facilities, process medium and operating conditions.


Dimensions and weights

Table 3-3 and Table 3-4 provide an overview of the dimensions and weights. The lengths and heights in the dimensional drawings are shown on page 3-6.

Table 3-1: Materials · Material numbers according to DIN EN

Type 2040 Safety Temperature Monitor	
Body	Red brass CC499K
Bellows	CW453K
Spring	1.4310
O-ring	NBR
Seat	Limit range -30 to +10 °C: brass CW617N/NBR Limit range -45 to -10 °C: brass CW617N/PTFE
Tubular plug	Stainless steel 1.4401/1.4404

Table 3-2: Technical data · All pressures in bar (gauge)

Type 2040 Safety Temperature Monitor	
Body connection	G 1¼ (see Fig. 3-4 for connecting parts)
K_{VS} coefficient	5.0
Limit ranges ¹⁾	-30 to +10 °C · -45 to -10 °C
Max. permissible operating pressure	40 bar
Max. permissible differential pressure	25 bar
Leakage class according to IEC 60534-4	≤0.05 % of K_{VS} with limit range -30 to +10 °C ≤0.1 % of K_{VS} with limit range -45 to 10 °C
Hysteresis	2 K
Accuracy	Approx. 1 K
Permissible storage temperature	-60 to +60 °C
Temperature differential (open/closed)	17 K
Conformity	

¹⁾ Temperature limit adjustable within the specified limit range. To adjust the limit properly, the ambient temperature must be at least 15 K above the temperature limit to be adjusted.

Table 3-3: Dimensions in mm and weights in kg

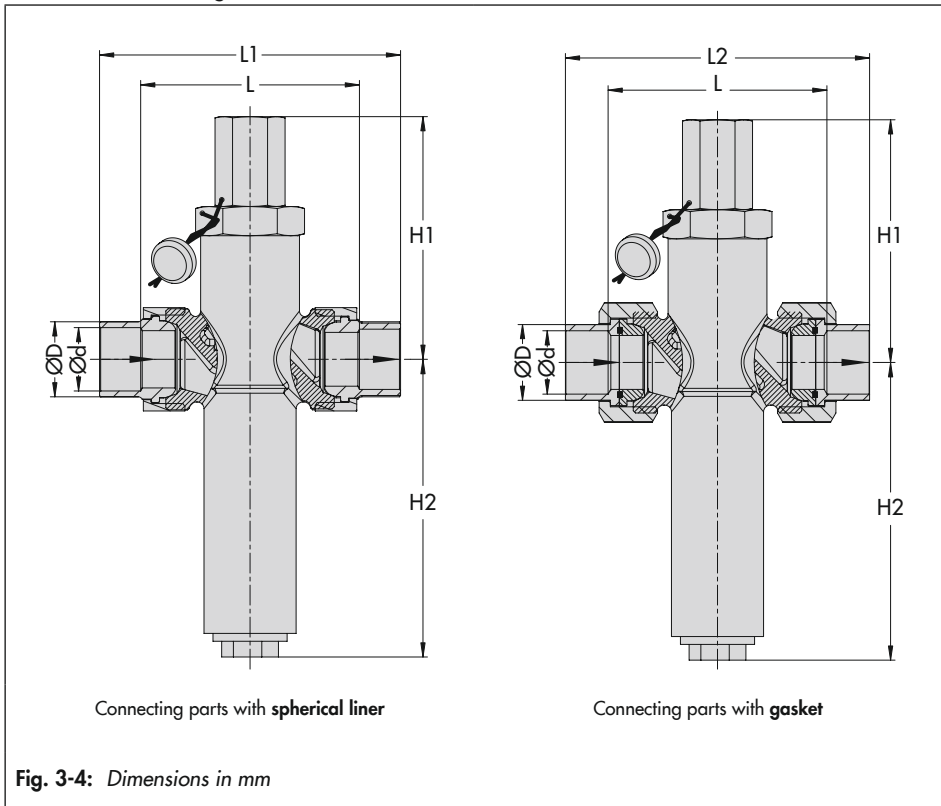
Type 2040 Safety Temperature Monitor		Nominal size	
		DN 15	DN 25
Height H1	Without limit reading	108 ± 1	
	Without limit reading	106 ± 1	
Height H2		133 ± 1	
Weight in approx. kg (without connecting parts)		1.8	

Design and principle of operation

Table 3-4: Dimensions with accessories in mm

Connection with soldering nipple (brass)		
Length L	100 ±3	
Pipe Ød	16	25
Connection with welding ends (stainless steel)		
Length L1, with spherical liner	155 ±1	
Length L2, with gasket	165 ±1	
Pipe Ød	16.1	28.5
Pipe ØD	21.3	33.7

Dimensional drawings



4 Shipment and on-site transport

The work described in this chapter is only to be performed by personnel appropriately qualified to carry out such tasks.

4.1 Accepting the delivered goods

After receiving the shipment, proceed as follows:

1. Check the scope of delivery. Check that the specifications on the nameplate and on the regulator itself match the specifications in the delivery note. See the 'Markings on the regulator' chapter for nameplate details.
2. Check the shipment for transportation damage. Report any damage to SAMSON and the forwarding agent (refer to delivery note).
3. Determine the weight and dimensions of the units to be lifted and transported in order to select the appropriate lifting equipment and lifting accessories. Refer to the transport documents and the 'Design and principle of operation' chapter.

4.2 Removing the packaging from the regulator

The regulator is delivered as a single unit.

- Do not open or remove the packaging until immediately before lifting to install the regulator into the pipeline.
- Leave the regulator in its transport container or on the pallet to transport it on site.
- Do not remove the protective packaging from the regulator until immediately before installing it into the pipeline. This packaging prevents the regulator from becoming contaminated and moisture or foreign particles from entering.
- Dispose and recycle the packaging in accordance with the local regulations.

4.3 Transporting and lifting the regulator

Due to the low service weight, lifting equipment is not required to lift and transport the regulator (e.g. to install it into the pipeline).

- Leave the regulator in its transport container or on the pallet to transport it.
- Observe the transport instructions.

Transport instructions

- Protect the regulator against external influences (e.g. impact).
- Do not damage the protective packaging.

Shipment and on-site transport

- Protect the regulator against moisture and dirt.
- The permissible ambient temperature of standard regulators is -196 to $+200$ °C.

4.4 Storing the regulator

NOTICE

Risk of regulator damage due to improper storage.

- *Observe the storage instructions.*
- *Avoid long storage times.*
- *Contact SAMSON in case of different storage conditions or longer storage times.*

Storage instructions

- Protect the regulator against external influences (e.g. impact).
- Secure the regulator in the stored position against slipping or tipping over.
- Do not damage the protective packaging.
- Protect the regulator against moisture and dirt. Store it at a relative humidity of less than 75 %. In damp spaces, prevent condensation. If necessary, use a drying agent or heating.
- Make sure that the ambient air is free of acids or other corrosive media.
- The permissible storage temperature of standard regulators is -60 to $+60$ °C.
- Do not place any objects on the regulator.

Note

We recommend regularly checking the regulator and the prevailing storage conditions during long storage periods.

Special storage instructions for elastomers

Elastomer, e.g. O-rings

- We recommend a storage temperature of 15 °C for elastomers.
- Store elastomers away from lubricants, chemicals, solutions and fuels.

Tip

SAMSON's After-sales Service can provide more detailed storage instructions on request.

5 Installation

The work described in this chapter is to be performed only by personnel appropriately qualified to carry out such tasks.

5.1 Installation conditions

! NOTICE

The Type 2040 Safety Temperature Monitor must only be used in combination with vaporizers operated by ambient air and not powered externally.

i Note

Do not install the regulator directly next to the air vaporizer. Otherwise, the regulator might close due to the low outdoor temperature. The closing function of the regulator works regardless whether the sensor temperature is determined by the ambient air or the process medium.

Work position

The work position for the regulator is the front view onto all operating controls on the regulator (including any additional fittings) seen from the position of operating personnel.

Plant operators must ensure that, after installation of the regulator, the operating personnel can perform all necessary work safely and easily access the regulator from the work position.

Pipeline routing

The inlet and outlet lengths vary depending on several variables and process conditions and are intended as recommendations. Contact SAMSON if the lengths are significantly shorter than the recommended lengths.

To ensure that the regulator functions properly, proceed as follows:

- ➔ Observe the inlet and outlet lengths (see Table 5-1). Contact SAMSON if the regulator conditions or state of the medium process deviate.
- ➔ Install the regulator free of stress and with the least amount of vibrations as possible. Read information under "Mounting position" in this chapter.
- ➔ Install the regulator allowing sufficient space to remove it or to perform service work on it.

Mounting position

To ensure that the regulator functions properly, proceed as follows:

- ➔ The valve can be mounted in any desired position.
- ➔ Make sure the direction of flow matches the direction indicated by the arrow on the body.
- ➔ Contact SAMSON if the mounting position is not as specified above.

When installing the regulator outdoors, we recommend an adjusted temperature limit of -37°C with the point at which the regulator starts to close at -20°C (limit range from -45 to -10°C).

Support or suspension

i Note

The plant engineering company is responsible for selecting and implementing a suitable support or suspension of the installed regulator and the pipeline.

Depending on the regulator version and mounting position, the regulator and pipeline must be supported or suspended.

! NOTICE

Do not attach supports directly to the regulator.

5.2 Preparation for installation

Before mounting, make sure the following conditions are met:

- The regulator is clean.
- The regulator is not damaged.
- The regulator data (type designation, nominal size, material, pressure rating and temperature range) match the plant conditions (nominal size and pressure rating of the pipeline, medium temperature etc.). See the 'Markings on the regulator' chapter for nameplate details.
- The requested or required additional fittings (see the 'Design and principle of operation' chapter) have been installed or prepared as necessary before installing the regulator.

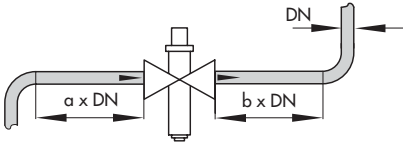
Proceed as follows:

- ➔ Lay out the necessary material and tools to have them ready during installation work.
- ➔ Flush the pipeline **before** installing the regulator.
The plant operator is responsible for cleaning the pipelines in the plant.
- ➔ Check any mounted thermometers to make sure they function properly.

i Note

The plant operator is responsible for cleaning the pipelines in the plant.

Table 5-1: Inlet and outlet lengths



a Inlet length
b Outlet length

State of process medium	Valve conditions	Inlet length a	Outlet length b
Gas	$Ma \leq 0.3$	2	4
Vapors ¹⁾	$Ma \leq 0.3$	2	4
Liquid	Free of cavitation/ $w < 3 \text{ m/s}$	2	4
	Cavitation producing noise/ $w \leq 3 \text{ m/s}$	2	4

5.3 Installation

In the delivered state, the regulator is packed to be free of oil and grease for oxygen service as a ready-to-install assembly. The activities listed below are necessary for installation and before start-up of the regulator.

NOTICE

Risk of regulator damage due to over- or under-torquing.

Observe the specified torques when tightening regulator components. Excessive tightening torques lead to parts wearing out more quickly. Parts that are too loose may cause leakage.

→ Observe the specified tightening torques (see the 'Tightening torques' chapter in the Appendix).

NOTICE

Risk of regulator damage due to the use of unsuitable tools.

→ Only use tools approved by SAMSON (see the 'Tools' chapter in the Appendix).

NOTICE

Risk of regulator damage due to the use of unsuitable lubricants.

→ Only use lubricants approved by SAMSON (see the 'Lubricants' chapter in the Appendix).

5.3.1 Installing the regulator

1. Close the shut-off valves upstream and downstream of the regulator while the regulator is being installed.
2. Do not remove the protective packaging until immediately before installation.
3. Make sure the direction of flow matches the direction indicated by the arrow on the body.
4. Make sure that the correct gaskets are used.
5. Bolt the pipe to the valve free of stress.
6. Slowly open the shut-off valves in the pipeline after the regulator has been installed.

5.3.2 Cleaning the pipeline

SAMSON recommends additionally flushing the pipeline without the installed regulator before start-up. In this case, install a suitable length of pipe into the pipeline in place of the regulator.

- Observe the mesh size of the upstream strainer for the maximum particle size. Use strainers to suit the process medium.
- Check the strainer for dirt each time the pipeline is flushed and clean it, if necessary.

5.4 Testing the regulator

⚠ DANGER***Risk of bursting due to incorrect opening of pressurized equipment or components.***

Regulators and pipelines are pressure equipment that may burst when handled incorrectly. Flying projectile fragments or the release of process medium under pressure can cause serious injury or even death.

Before working on the regulator:

- *Depressurize all plant sections concerned and the regulator.*
 - *Drain the process medium from the plant sections affected as well as from the valve.*
-

⚠ DANGER***Risk of personal injury due to process medium escaping.***

- *Do not start up the regulator until all parts have been mounted.*
-

⚠ DANGER***Use of oil and grease in oxygen atmospheres!***

Risk of explosion!

- *Make sure that the regulator is absolutely clean and free of oil and grease on installing it.*
-

⚠ WARNING

Risk of hearing loss or deafness due to loud noise.

Noise emission (e.g. cavitation or flashing) may occur during operation caused by the process medium and the operating conditions.

→ Wear hearing protection when working near the valve. Follow the instructions given by the plant operator.

⚠ WARNING

Risk of burn injuries due to hot or very cold components and pipelines.

Depending on the process medium, the regulator and pipelines may get very hot or cold and cause burn injuries.

→ Wear protective clothing and safety gloves.

SAMSON regulators are delivered ready for use. To test the regulator functioning before start-up or putting back the regulator into operation, perform the following tests:

5.4.1 Leakage

The plant operator is responsible for performing the leak test and selecting the test method. The leak test must comply with the requirements of the national and international standards that apply at the site of installation.

💡 Tip

SAMSON's After-sales Service can support you to plan and perform a leak test for your plant.

1. Slowly open the shut-off valve installed upstream of the regulator.
2. Apply the required test pressure.
3. Check the regulator for leakage to the atmosphere.
4. Check the screw gland of the sensor or thermowell for leakage.
5. Depressurize the pipeline section and regulator.
6. Rework any parts that leak and repeat the leak test.

5.4.2 Pressure test

i Note

The plant operator is responsible for performing the pressure test. SAMSON's After-sales Service can support you to plan and perform a pressure test for your plant.

⚠ NOTICE

Risk of regulator damage due to a sudden pressure increase and resulting high flow velocities.

→ *Slowly open the shut-off valves.*

During the pressure test, make sure the following conditions are met:

- Do not allow the pressure to exceed the 1.5 times the pressure rating of the valve body.
- Make sure that the pressure rises simultaneously upstream and downstream of the regulator to avoid damaging the valve.

5.5 Insulation

To insulate cold systems, SAMSON recommends first filling the plant and carefully rinsing it. The regulator must not yet be insulated at this stage.

1. Start up the plant and adjust the limit (see the 'Start-up' chapter).
2. Shut down the plant again and let it heat up until the condensation water has dried off.
3. Insulate the regulator and pipes conveying the process medium using insulation material with a water vapor barrier. The insulation thickness depends on the medium temperature and the ambient conditions. 50 mm is a typical thickness.

6 Start-up

In the delivered state, the regulator is packed to be free of oil and grease for oxygen service as a ready-to-install assembly. The work described in this chapter is only to be performed by personnel appropriately qualified to carry out such tasks.

⚠ DANGER

Risk of personal injury due to process medium escaping.

→ Do not start up the regulator until all parts have been mounted.

⚠ DANGER

Use of oil and grease in oxygen atmospheres!

Risk of explosion!

→ Make sure that the regulator is absolutely clean and free of oil and grease on installing it.

⚠ WARNING

Risk of burn injuries due to hot or cold components and pipeline.

Regulator components and the pipeline may become very hot or cold. Risk of burn injuries.

- Allow components and pipelines to cool down or warm up to the ambient temperature.
- Wear protective clothing and safety gloves.

⚠ WARNING

Risk of hearing loss or deafness due to loud noise.

Noise emission (e.g. cavitation or flashing) may occur during operation caused by the process medium and the operating conditions.

→ Wear hearing protection when working near the valve. Follow the instructions given by the plant operator.

ⓘ NOTICE

Risk of impaired functioning of the regulator and leakage at the joint due to installation under tension.

- Bolt the regulator to the pipeline free of stress.
- If necessary, support the pipelines near to the connections.
- Do not attach supports directly to the valve or control thermostat.

Before start-up or putting the device back into service, make sure the following conditions are met:

- The regulator is properly installed into the pipeline (see the 'Installation' chapter).
- The leak and function tests have been completed successfully (see the 'Testing the regulator' chapter).
- The prevailing conditions in the plant section concerned meet the regulator sizing requirements (see information under 'Intended use' in the 'Safety instructions and measures' chapter).

6.1 Start-up and putting the device back into operation

1. Depending on the field of application, allow the regulator to cool down or warm up to reach ambient temperature before start up.
2. Fill the plant **slowly** with the process medium. Avoid pressure surges.
3. Open the shut-off valves slowly preferably starting from the upstream pressure side. Open all valves downstream of the regulator. Slowly opening these valves prevents a sudden surge in pressure and high flow velocities which can damage the regulator. Make sure that the pressure rises simultaneously upstream and downstream of the regulator to avoid damaging it.
4. Check the adjusted temperature at the thermometer installed near the temperature sensor.
5. Check the regulator to ensure it functions properly.

7 Operation

Immediately after completing start-up or placing the regulator back into service (see the 'Start-up' chapter), the regulator is ready for use.

⚠ WARNING

Risk of burn injuries due to hot or cold components and pipeline.

Regulator components and the pipeline may become very hot or cold. Risk of burn injuries.

- Allow components and pipelines to cool down or warm up to the ambient temperature.
- Wear protective clothing and safety gloves.

⚠ WARNING

Risk of hearing loss or deafness due to loud noise.

Noise emission (e.g. cavitation or flashing) may occur during operation caused by the process medium and the operating conditions.

- Wear hearing protection when working near the valve. Follow the instructions given by the plant operator.

7.1 Adjusting the temperature limit

i Note

The safety temperature monitor is adjusted either to a temperature limit of $T_{limit} = -10\text{ °C}$ (limit range -30 to $+10\text{ °C}$) or $T_{limit} = -37\text{ °C}$ (limit range -45 to -10 °C). Other temperature limits are possible and must be specified in the order.

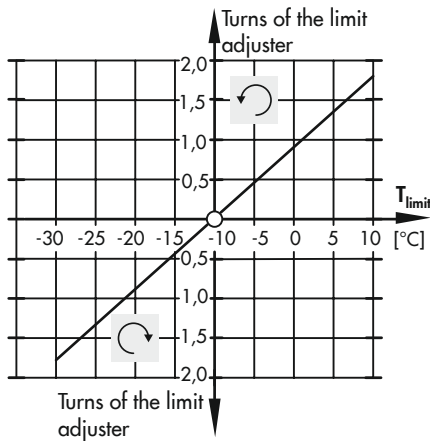
Adjusting the required limit

1. Unscrew the cap (3.1).
 2. Undo the lock nut (3.2).
 3. Use an open-end wrench (size 14) to turn the limit adjuster (3).
Use the adjustment diagram as a guide to adjust the selected limit (see Fig. 7-1).
- Turn the limit adjuster clockwise (↻) to increase the temperature limit.
 - Turn the limit adjuster counterclockwise (↺) to reduce the temperature limit.

The thermometer installed on site allows the adjusted temperature to be monitored.

The closing function works regardless whether the sensor temperature is determined by the ambient air or the process medium.

To adjust the limit properly, the ambient temperature must be at least 15 K above the temperature limit to be adjusted.



One turn of the limit adjuster corresponds to an **approx. 11 K** change of the limit temperature.

Fig. 7-1: Adjustment diagrams of Type 2040, with temperature limit $T_{limit} = -10$ °C (point at which the regulator is fully closed)

7.2 New adjustment

Adjusting the temperature limit starting from an unknown setting:

i Note

To adjust the limit properly, the ambient temperature must be at least 15 K above the temperature limit to be adjusted. Wait at least 90 minutes after operation.

1. Unscrew the cap (3.1).
2. Undo the lock nut (3.2).
3. Turn the limit adjuster (3) counterclockwise until no resistance can no longer be felt. Turn the adjuster one half turn more (regulator fully closed).
4. Calculate the temperature difference between prevailing ambient temperature and required temperature to be adjusted (T_{limit}).
5. Divide the calculated temperature difference by 11 to determine how many times the limit screw must be turned to adjust the temperature limit (see Fig. 7-1).
6. Turn the limit adjuster (3) clockwise until resistance can be felt. Turn the limit adjuster clockwise by the calculated number of turns.

For example:

Ambient temperature: +29 °C

Required limit: -15 °C

$\Delta T = (29\text{ °C}) - (-15\text{ °C}) = \mathbf{44\text{ °C}}$

Turns = 44 °C/11 = **4**

7. Secure limit adjuster (3) with the lock nut (3.2).
8. Screw cap (3.1) back on.
9. If necessary, secure the setting by inserting a wire for lead sealing through the holes in the cap and body.

7.3 Adjustment based on limit marking

In a special version, the limit adjuster has a marking ring indicating a temperature difference of approx. 10 K (10 °C) from one end to the other.

8 Malfunctions

8.1 Troubleshooting

Malfunction	Possible reasons	Recommended action
The temperature in the plant exceeds the adjusted limit.	Foreign particles blocking the plug	→ Remove foreign particles. → Contact SAMSON's After-sales Service.
	Seat and plug are worn or leak.	→ Clean the seat and plug. → Contact SAMSON's After-sales Service.
Increased flow through closed valve (seat leakage).	Foreign particles blocking the plug	→ Remove foreign particles. → Contact SAMSON's After-sales Service.
	Valve trim is worn out.	→ Contact SAMSON's After-sales Service.
Temperature in the plant not reached.	The safety temperature monitor is defective and has moved to the fail-safe position.	→ Check the plant and replace the safety temperature monitor, if necessary.
	Safety temperature monitor installed against the flow.	→ Install the safety temperature monitor so that the direction of flow matches the direction indicated by the arrow on the body.
	Foreign particles blocking the plug	→ Remove foreign particles. → Contact SAMSON's After-sales Service.
	Strainer blocked	→ Clean the strainer.
Loud flow-induced noise	High flow velocity, cavitation.	→ Check the sizing. → Contact SAMSON's After-sales Service.

i Note

Contact SAMSON's After-sales Service for malfunctions not listed in the table.

The malfunctions listed in Chapter 8.1 are caused by mechanical faults and incorrect regulator sizing. In the simplest case, the functioning can be restored following the recommended action. Special tools may be required to rectify the fault.

Exceptional operating and installation conditions may lead to changed situations that may affect the control response and lead to malfunctions. For troubleshooting, the conditions, such as installation, process medium, temperature and pressure conditions, must be taken into account.

**Tip**

SAMSON's After-sales Service can support you in drawing up an inspection and test plan for your plant.

8.2 Emergency action

Plant operators are responsible for emergency action to be taken in the plant.

We recommend removing the regulator from the pipeline before repairing it.

In the event of a regulator malfunction:

1. Close the shut-off valves upstream and downstream of the regulator to stop the process medium from flowing through the regulator.
2. Perform troubleshooting (see Chapter 8.1).
3. Rectify those malfunctions that can be remedied based on the instructions provided here. Contact SAMSON's After-sales Service in all other cases.

Putting the regulator back into operation after a malfunction

See the 'Start-up' chapter.

9 Servicing

The regulator does not require any maintenance. Nevertheless, it is subject to natural wear, particularly at the seat, plug and integrated temperature sensor. Depending on the operating conditions, check the regulator at regular intervals to avoid possible malfunctions. Plant operators are responsible for drawing up an inspection and test plan. Details on faults and how to remedy them can be found in the 'Malfunctions' chapter.

The work described in this chapter is only to be performed by personnel appropriately qualified to carry out such tasks.

We recommend removing the regulator from the pipeline before performing any maintenance or service work.

⚠ DANGER

Use of oil and grease in oxygen atmospheres!

Risk of explosion!

- ➔ *Make sure that the regulator is absolutely clean and free of oil and grease on installing it.*
-

⚠ WARNING

Risk of burn injuries due to hot or cold components and pipeline.

Regulator components and the pipeline may become very hot or cold. Risk of burn injuries.

- ➔ *Allow components and pipelines to cool down or warm up to the ambient temperature.*
 - ➔ *Wear protective clothing and safety gloves.*
-

⚠ WARNING

Risk of personal injury due to residual process medium in the regulator.

While working on the regulator, residual process medium can escape and, depending on its properties, may lead to personal injury, e.g. (chemical) burns.

- ➔ *Wear protective clothing, safety gloves and eye protection.*
-

ⓘ NOTICE

Risk of regulator damage due to excessively high or low tightening torques.

Observe the specified torques when tightening regulator components. Excessive tightening torques lead to parts wearing out more quickly. Parts that are too loose may cause leakage.

- ➔ *Observe the specified tightening torques (see 'the Tightening torques' chapter in the Appendix).*
-

NOTICE

Risk of regulator damage due to the use of unsuitable tools.

→ Only use tools approved by SAMSON (see the 'Tools' chapter in the Appendix).

NOTICE

Risk of regulator damage due to the use of unsuitable lubricants.

→ Only use lubricants approved by SAMSON (see the 'Lubricants' chapter in the Appendix).

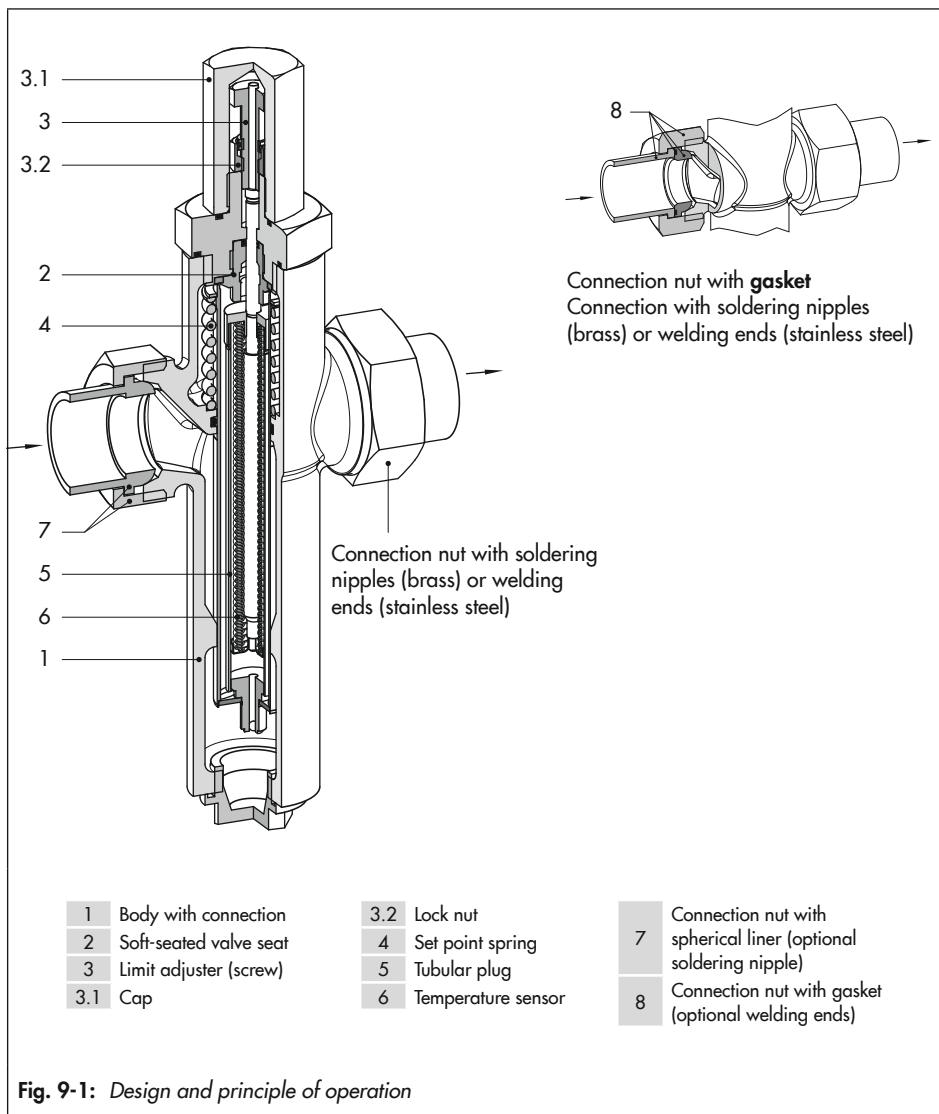
Note

The regulator was checked by SAMSON before it left the factory.

- Certain test results certified by SAMSON lose their validity when the regulator is opened. Such testing includes seat leakage and leak tests.
 - The product warranty becomes void if service or repair work not described in these instructions is performed without prior agreement by SAMSON's After-sales Service.
 - Only use original spare parts by SAMSON, which comply with the original specifications.
-

Tip

SAMSON's After-sales Service can support you in drawing up an inspection and test plan for your plant.



9.1 Preparing the valve for service work

1. Lay out the necessary material and tools to have them ready for the service work.
2. Put the regulator out of operation (see the 'Decommissioning' chapter).



Tip

We recommend removing the regulator from the pipeline before performing any service work (see the 'Removing the regulator from the pipeline' chapter).

9.2 Installing the regulator after service work

- Put the regulator back into operation (see the 'Start-up' chapter). Make sure the requirements and conditions for start-up or putting the valve back into operation are met.

9.3 Service work

- Before performing any service work, preparations must be made to the regulator (see Chapter 9.1).
- After all service work is completed, check the regulator before putting it back into operation (see section 'Testing the regulator' in the 'Installation' chapter).

9.4 Ordering spare parts and operating supplies

Contact your nearest SAMSON subsidiary or SAMSON's After-sales Service for information on spare parts, lubricants and tools.

Spare parts

No spare parts are available for the Type 2040 Regulator.

Lubricants

Contact SAMSON's After-sales Service for more information on lubricants.

Tools

Contact SAMSON's After-sales Service for more information on tools.

10 Decommissioning

The work described in this chapter is only to be performed by personnel appropriately qualified to carry out such tasks.

⚠ DANGER

Risk of bursting due to incorrect opening of pressurized equipment or components.

Regulators and pipelines are pressure equipment that may burst when handled incorrectly. Flying projectile fragments or the release of process medium under pressure can cause serious injury or even death.

Before working on the regulator:

- Depressurize all plant sections concerned and the regulator.
- Drain the process medium from all the plant sections affected as well as the regulator.

⚠ DANGER

Use of oil and grease in oxygen atmospheres!

Risk of explosion!

- Make sure that the regulator is absolutely clean and free of oil and grease on installing it.

⚠ WARNING

Risk of burn injuries due to hot or cold components and pipeline.

Regulator components and the pipeline may become very hot or cold. Risk of burn injuries.

- Allow components and pipelines to cool down or warm up to the ambient temperature.
- Wear protective clothing and safety gloves.

⚠ WARNING

Risk of hearing loss or deafness due to loud noise.

Noise emission (e.g. cavitation or flashing) may occur during operation caused by the process medium and the operating conditions.

- Wear hearing protection when working near the valve. Follow the instructions given by the plant operator.

⚠ WARNING

Risk of personal injury due to residual process medium in the regulator.

While working on the regulator, residual process medium can escape and, depending on its properties, may lead to personal injury, e.g. (chemical) burns.

- Wear protective clothing, safety gloves and eye protection.

Decommissioning

To decommission the regulator for service work or disassembly, proceed as follows:

1. Close the shut-off valves on the downstream and upstream side of the regulator.
2. Completely drain the pipelines and regulator.
3. Depressurize the plant.
4. If necessary, allow the pipeline and regulator components to cool down or warm up to the ambient temperature.

11 Removal

The work described in this chapter is to be performed only by personnel appropriately qualified to carry out such tasks.

⚠ DANGER

Use of oil and grease in oxygen atmospheres!

Risk of explosion!

→ *Make sure that the regulator is absolutely clean and free of oil and grease on installing it.*

⚠ WARNING

Risk of burn injuries due to hot or cold components and pipeline.

Regulator components and the pipeline may become very hot or cold. Risk of burn injuries.

- *Allow components and pipelines to cool down or warm up to the ambient temperature.*
- *Wear protective clothing and safety gloves.*

⚠ WARNING

Risk of personal injury due to residual process medium in the regulator.

While working on the regulator, residual process medium can escape and, depending on its properties, may lead to personal injury, e.g. (chemical) burns.

- *Wear protective clothing, safety gloves and eye protection.*

Before removing the valve, make sure the following conditions are met:

- The regulator is put out of operation (see the 'Decommissioning' chapter).

11.1 Removing the regulator from the pipeline

1. Support the safety temperature monitor to hold it in place when separated from the pipeline (see the 'Shipment and on-site transport' chapter).
2. Undo the pipe connections.
3. Remove the regulator from the pipeline (see the 'Shipment and on-site transport' chapter).

12 Repairs

If the regulator does not function properly according to how it was originally sized or does not function at all, it is defective and must be repaired or exchanged.

! NOTICE

Risk of regulator damage due to incorrect service or repair work.

- Do not perform any repair work on your own.
- Contact SAMSON's After-sales Service for service and repair work.

12.1 Returning devices to SAMSON

Defective devices can be returned to SAMSON for repair. Proceed as follows to return devices to SAMSON:

1. Put the regulator out of operation (see the 'Decommissioning' chapter).
2. Decontaminate the valve. Remove any residual process medium.
3. Fill in the Declaration on Contamination. The declaration form can be downloaded from our website at
▶ www.samsongroup.com > SERVICE > After Sales Service.
4. Continue as described on our website at
▶ www.samsongroup.com > SERVICE > After-sales Service > Returning goods.

When returning devices for oxygen service for repair, the sender assumes full responsibility that the devices are handled to meet all requirements stipulated by VBG 62 or similar regulations until they are handed over to SAMSON. Otherwise, SAMSON does not accept any responsibility.

13 Disposal

- Observe local, national and international refuse regulations.
- Do not dispose of components, lubricants and hazardous substances together with your household waste.

14 Certificates

The EU declarations of conformity are included on the next pages:

- EU declaration of conformity in compliance with Pressure Equipment Directive 2014/68/EU on page 14-2.

SAMSON REGULATION S.A.S.



**DECLARATION UE DE CONFORMITE
EU DECLARATION OF CONFORMITY**

1/1

**Module B & Module D / Modul B & Modul D
N°/ Nr CE-0062-PED-D-SAM 001-23-FRA**

**DC011
2023-06**

Par la présente, SAMSON REGULATION SAS déclare sous sa seule responsabilité pour le produit suivant :
For the following product, SAMSON REGULATION SAS hereby declares under its sole responsibility:

Appareils / Devices	Type	Exécution / Version	Matériel du corps / body Material	Fluides / fluids
Thermostat de sécurité / Temperature Monitor /	2040	DN 15-25 PN 40 plage de réglage / set point range : [-30°C ; +10°C] ou/or [-45°C ; -10°C]	Cuivre rouge / red copper	Tous fluides / all fluids

la conformité avec le règlement suivant : / the conformity with the following requirement:

La Directive du Parlement Européen et du Conseil d'harmonisation des lois des Etats Membres concernant la mise à disposition sur le marché d'équipements sous pression / Directive of the European Parliament and of the Council on the harmonization of the laws of the Member States relating to the making available on the market of pressure equipment /	2014/68/UE 2014/68/UE	Du / of / vom 15.05.2014
Attestation d'examen UE de type – type de fabrication EU-Type examination certificate – production type	Module / Modul B	Certificat n° 01 202 973 / B-17 0004 (report n° T57 2017 B13)
Procédure d'évaluation de la conformité appliquée pour accessoire de sécurité visé à l'article 4 point 1.d) Applied conformity assessment procedure for Safety accessory defined in article 4 section 1.d)	Module / Modul D	Certificat n° CE-0062-PED-D-SAM 001-23-FRA

La conception est basée sur les procédures spécifiées dans les normes suivantes :
The design is based on the procedures specified in the following standards

DIN EN 14597, DIN EN 12516-3
ASME B16.24

Le système de contrôle Qualité du fabricant est effectué par l'organisme de certification suivant :
The manufacturer's quality management system is monitored by the following notified body:

**Bureau Veritas Services SAS N°/Nr 0062, 8 Cours du Triangle, 92800 PUTEAUX - LA DEFENSE
Fabricant / manufacturer : Samson Régulation SAS, 1, rue Jean Corona, FR-69120 VAULX-EN-VELIN**

Vaulx-en-Velin, le 02/06/23

Bruno Soulas
Directeur Général / General Director
Directeur Stratégie et Développement / Head of Strategy and Development

Joséphine Signoles-Fontaine
Responsable du service QSE / Head of QSE department

15 Appendix

15.1 Tightening torques

Part	Width across flats	Nominal size	Tightening torque in Nm
Coupling nut (40)	A/F 36	All	20

15.2 Accessories (optional)

Connection	Connecting parts	Material no.
Conical seal	Solder nipple (red brass), DN 25	1400-6840
	Solder nipple (brass), DN 15	1400-9182
	Welding ends (stainless steel), DN 25	1400-9129
	Welding ends (stainless steel), DN 15	1400-9183
Flat seal	Solder nipple (brass), DN 25	1400-9131
	Solder nipple (brass), DN 15	1400-9130
	Welding ends (stainless steel), DN 25	1400-9181
	Welding ends (stainless steel), DN 15	1400-9180

15.3 Tools

No special tools are required to work on the Type 2040 Regulator.

15.4 Lubricants

SAMSON's After-sales Service can support you concerning lubricants and sealants approved by SAMSON.

15.5 Spare parts

No spare parts are available for the Type 2040 Regulator.

15.6 After-sales service

Contact SAMSON's After-sales Service for support concerning service or repair work or when malfunctions or defects arise.

E-mail address

You can reach our after-sales service at aftersalesservice@samsongroup.com.

Addresses of SAMSON AG and its subsidiaries

The addresses of SAMSON, its subsidiaries, representatives and service facilities worldwide can be found on our website (▶ www.samsongroup.com) or in all SAMSON product catalogs.

Required specifications

Please submit the following details:

- Regulator type and nominal size
- Process medium
- Temperature limit range
- Serial number 3- ...
- Type designation with index
- Model number or material number
- Upstream and downstream pressure
- Flow rate in m³/h
- Is a strainer installed?
- Installation drawing showing the exact location of the regulator and all the additionally installed components (shut-off valves, pressure gauge etc.)



SAMSON AKTIENGESELLSCHAFT
Weismüllerstraße 3 · 60314 Frankfurt am Main, Germany
Phone: +49 69 4009-0 · Fax: +49 69 4009-1507
samson@samsongroup.com · www.samsongroup.com