

Read before Use

Instruction Manual

Product Name

Model: Type HNS Pressure Controls



1. Preface

Thank you for purchasing Type HNS Pressure Controls (hereinafter referred to as the "pressure switch" or "switch").

Read this instruction manual thoroughly before use, and ensure that the product is used within its rated specifications according to the manual.

This product is supplied with a document containing a QR code for downloading the instruction manual. **Be sure to keep it in an easily accessible place for future reference. Always check the latest version of the instruction manual available on our website via the QR code before each use, paying particular attention to the safety precautions.**

2. Safety Precautions

■ Warning and caution indications

Warnings and cautions in this instruction manual provide **important safety information**.

To protect you and other people against danger or damage caused by improper use of the product, be sure to comply with these indications, as well as international standards (ISO/IEC), Japanese Industrial Standards (JIS)*¹, and other safety regulations*².

*1) ISO 4414: Pneumatic fluid power -General rules and safety requirements for system and their components.

ISO 4413: Hydraulic fluid power -General rules and safety requirements for system and their components.

IEC 60204-1: Safety of machinery -Electrical equipment of machines

IEC 60335-1: Household and similar electrical appliances -Safety-Part1 -General requirements

IEC 60335-2-24: Household and similar electrical appliances -Safety-Part2-24

IEC 60335-2-40: Household and similar electrical appliances -Safety-Part2-40

IEC 60335-2-89: Household and similar electrical appliances -Safety-Part2-89

ISO 5149: Refrigerating systems and heat pumps -Safety and environmental requirements Part 1 to 4, etc.

*2) Industrial Safety and Health Act, High Pressure Gas Safety Act, EU Directives, Occupational Safety and Health Act, etc.



Indicates a hazardous situation that could result in serious injury⁽¹⁾ or death if the product is handled improperly.



Indicates a hazardous situation that could result in injury⁽²⁾ or property damage⁽³⁾ if the product is handled improperly.

(1) **Serious injury** refers to blindness, injury, burn (high-temperature, low-temperature), electric shock, bone fracture, or poisoning that leaves aftereffects and requires hospitalization and/or extended medical treatment.

(2) **Injury** refers to injury, burn, or electric shock that does not require hospitalization or extended medical treatment.

(3) **Property damage** refers to any damage affecting a house, household property, livestock, and/or pets.

Explanations of symbols

Symbol	Description	Example
Prohibition		Indicates prohibited actions when handling the product.
		 General prohibition  Prohibited: Disassembly
Warning		Indicates the hazards and precautions for handling the product.
		 General caution  Caution: Electric shock
Instruction		Indicates the instructions for handling the product.
		 General instruction

 WARNING	
	Be sure to turn off all the power before installation, wiring, maintenance, or inspection. Performing the work with power on may cause accidental contact with the live part, resulting in serious injury or death due to electric shock.
	Properly ground the product before use. Failure to do so may cause electric shock or fire, resulting in serious injury or death. Make sure that the grounding wire is connected correctly as specified in the instruction manual to ensure a safe operating environment.
	Use the product only under the conditions described in the instruction manual. Perform periodic maintenance. Exposure to harsh conditions beyond the operating conditions or prolonged use may degrade the sealing integrity of the product. In addition, leaked refrigerant may cause fire or suffocation.
	Wiring of the product must be performed by personnel with expertise and certification in electrical work. Otherwise, it may cause electric shock or fire due to miswiring or improper installation, resulting in death.
	Before wiring, ensure that no water is present on the product, and perform the work in an environment where the product is not exposed to water, such as rain or condensation. Performing the work with the product wet may cause electric shock, resulting in serious injury or death.
	After the work is completed, be sure to reinstall all the covers and protective parts. Failure to do so may cause electric shock or fire, resulting in serious injury or death. After the work, ensure that all the covers are securely in place.



CAUTION



Install and wire the product in accordance with the Technical Standards for Electrical Equipment and the Interior Wiring Code. Failure to observe these standards may result in fire.



Be sure to tighten the terminal screws with the specified torque. Failure to do so may cause fire or terminal overheating.



Do not disassemble the product. Doing so may cause electric shock, reduced pressure capacity, or failure.

Description of terms

Terms	Description	Related page
A2L refrigerant	Flammable refrigerant with a burning velocity of 10 cm/s or less (also referred to as a mildly flammable refrigerant)	p.8
bar	Pressure unit	—
cmHg	Pressure unit (used as a unit of negative pressure in kgf/cm ²)	—
Diff.	Differential pressure	p.13
IP	Protection level	p.15
kgf/cm ²	Pressure unit	—
MPa	Pressure unit	—
N · m	Torque unit	—
psi	Pressure unit	—
Range	Pressure rise setpoint (range)	p.25
Pressure settings	Cut-in and cut-out pressure settings of the pressure switch	p.24-25
Pressure adjustment range	Cut-in and cut-out pressure setting range of the pressure switch	p.24-25
Differential pressure	Difference in the cut-in and cut-out pressures of the pressure switch	p.24-25
Auto reset	Automatic cut-out or cut-in on pressure rise or pressure drop for the pressure switch	—
Pollution degree	Degree of pollution of the switch operating environment, such as dust	p.8
Mechanical endurance cycles	Maximum number of actuations without leakage	—
Leak test pressure	Maximum allowable pressure to ensure switch performance	—
Cable gland	Device that secures and protects an electrical wire or cable	p.23
Conduit	Device that secures and protects an electrical wire or cable	p.22
Maximum operating pressure	Maximum allowable operating pressure at which the switch operates properly under normal operating conditions	—
Sliding	Frictional sliding between two contacting parts	—
Connecting part	Connecting part (joint) between the product and an external system	p.9
Setpoints	Actuation values for pressure rise and pressure drop, set with the pressure adjusting screw	—
Endurance cycles	Maximum allowable actuations with variations below tolerance	—
Type 1 actuation	Automatic actuation for which no manufacturing variation or drift has been specified for the operating value, time, or sequence, and that is not tested under this standard	p.8
Type 2 actuation	Automatic actuation for which manufacturing variation or drift has been specified for the operating value, time, or sequence, and tested under this standard	p.8

Terms	Description	Related page
Chattering	Phenomenon in which the contact turns on and off repeatedly in a short period due to vibration	—
Trip-free	Automatic actuation with a reset mechanism whose operation and position are structurally independent	—
Factory-set values	Settings of the pressure switch at the time of delivery to your company	—
Manual reset	The pressure switch latches on or off when the inlet pressure rises to or above or drops to or below the set pressure (Whether the switch latches on or off varies depending on the connection terminal). To reset the switch, the abnormal pressure condition must be resolved first, and then a manual reset by the operator is required.	p.13 p.25
Pulsation	Periodic pressure oscillation, different from normal actuations	p. 17 , p.29
Reset button	Button used for manual reset	p.13

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3. Product Overview

- The product features overpressure protection and control functions for the refrigeration system.
- This is a pressure-actuated switch using metal bellows.
Applied pressure is transmitted to the internal mechanism via the bellows and actuates the switch.
- Internal components, including the bellows, cannot be replaced.

4. Specifications

4.1. General specifications

Item	Specification
Product name	Type HNS Pressure Controls
Model	Indicated on the top of the product (See p.13 for the location.)
Purpose of the control device	Operation control device , Protective control device *
Structure of the control device	Embedded
Pressure specifications	See the catalog.
Fluid temperature	-20 to +120 °C (no freezing)
Operating ambient temperature	-20 to +70 °C (no freezing, frosting, or condensation)
Storage ambient temperature	-20 to +70 °C (no freezing, frosting, or condensation)
Dimensions (H x W x D)	See p.10.
Weight	See p.9.
Product installation method	See p.17.
Product grounding method	See p.22.
Operating time limitation	See the rate of pressure change on p.29.
Control device actuation type	Type 1 or Type 2 *
Cut-out reset characteristics	Type 1 or Type 2 *
Product contamination level	3
Rated impulse voltage	2,500 V
Installation environment	Pollution Degree 3, Overvoltage Category II
< For A2L-compatible models > Supported A2L refrigerants (as of May 2025)	R1234yf, R1234ze(E), R454A, R454B, R454C, R455A

*For details, please contact us

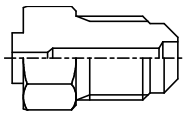
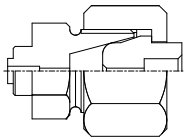
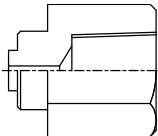
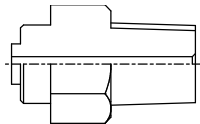
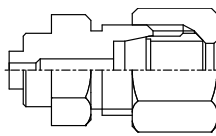
4.2. Wetted part materials

Purpose and part		Material
Standard type	Joint	Brass
	Bellows	Phosphor bronze
	Solder	Pb-free
	Braze	—
Corrosion-resistant type	Joint	Stainless
	Bellows	

No oil-free treatment has been performed on the wetted parts. However, note that no oil was intentionally applied during manufacturing.

4. Specifications

4.3. Joint shape details

Joint type	Shape	Code		Size	Joint code	Mass [kg]*
		Old	New			
Flare joint		—	—	1/4	—	0.28
				φ8	B1	+ 0.07
				3/8	B2	+ 0.07
				φ10	B3	+ 0.07
				φ12	B4	+ 0.10
Union joint (for copper pipe)		—	—	φ6	U1	+ 0.16
				φ8	U2	+ 0.16
				φ10	U	+ 0.16
				φ10.5	U3	+ 0.16
Parallel pipe thread (female)		PT	Rc	1/4	G	+ 0.02
				3/8	G3	+ 0.03
				1/2	G6	+ 0.06
		PF	G	1/4	G1	+ 0.02
				3/8	G4	+ 0.03
				1/2	G7	+ 0.06
		NPT		1/4	G2	+ 0.02
				3/8	G5	+ 0.03
				1/2	G8	+ 0.06
Parallel pipe thread (male)		PT	R	1/4	M02	+ 0.02
				3/8	M01	+ 0.04
				1/2	M07	+ 0.07
		PF	G	1/4	M03	+ 0.02
				3/8	M05	+ 0.04
				1/2	M06	+ 0.04
		NPT		1/4	M04	+ 0.03
				3/8	M06	+ 0.04
				1/2	M09	+ 0.07
Bite-type union		—	—	φ6	K1	+ 0.02
				φ8	K2	+ 0.03
				φ10	K	+ 0.04

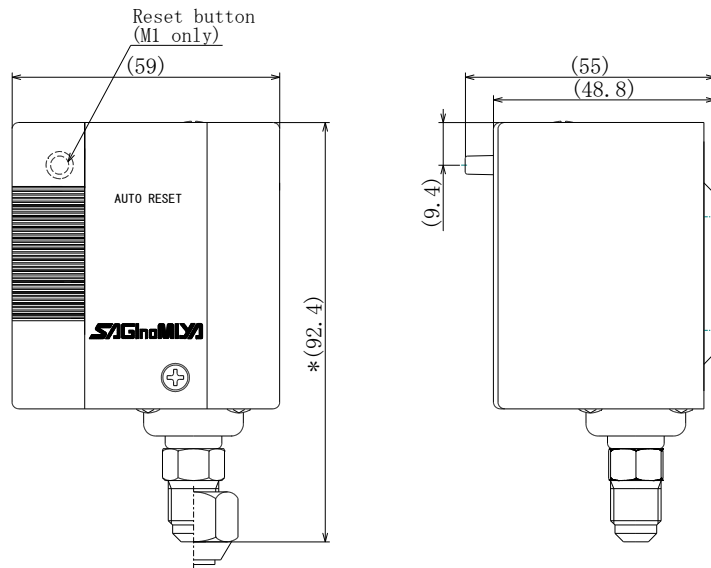
* The mass is indicated as the difference from the 1/4" flare joint. Note that there is a margin of error of approximately 10%.
Special items not included.

4. Specifications

4.4. Package contents

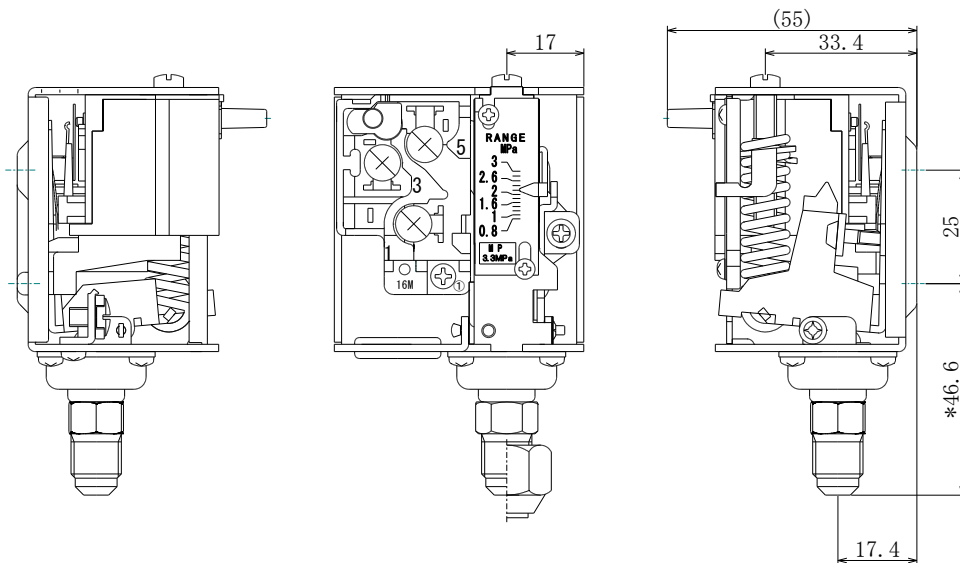
- Main unit
- Instruction manual
- Main unit mounting bracket
- Mounting screws

4.5. External dimensions



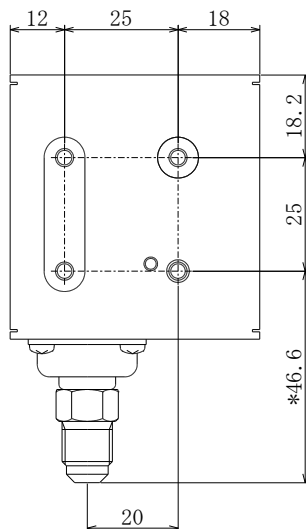
* A2L-incompatible models: 91

4.6. Internal dimensions



* A2L-incompatible models: 45.2

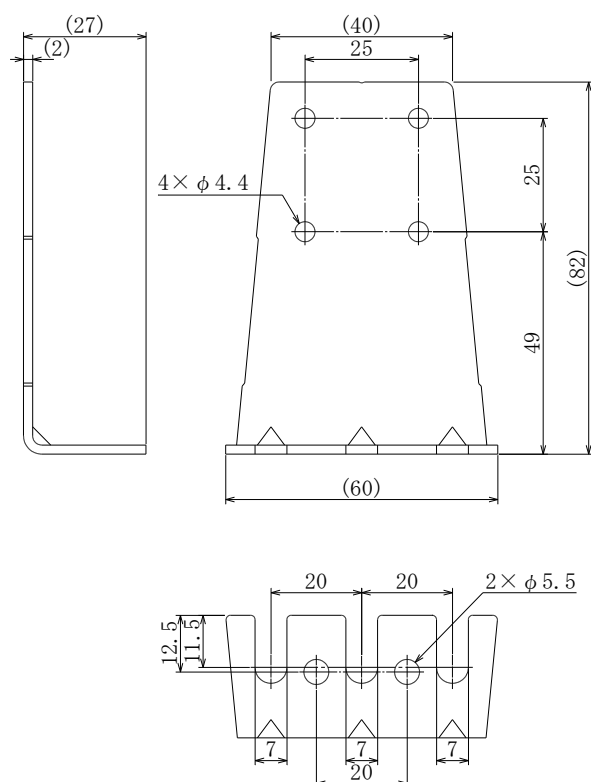
4. Specifications



* A2L-incompatible models: 45.2

4.7. Accessories

SNS-AE01 (standard accessory)

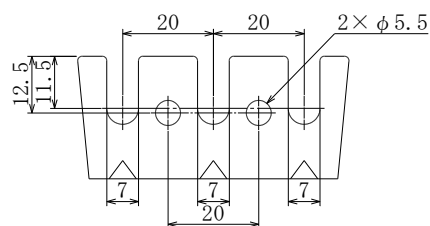
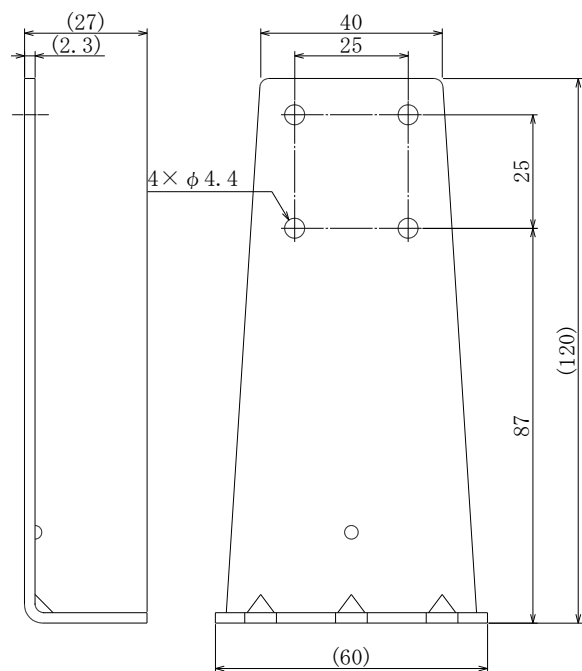


Unless otherwise specified, "SNS-AE01" is provided with the product.

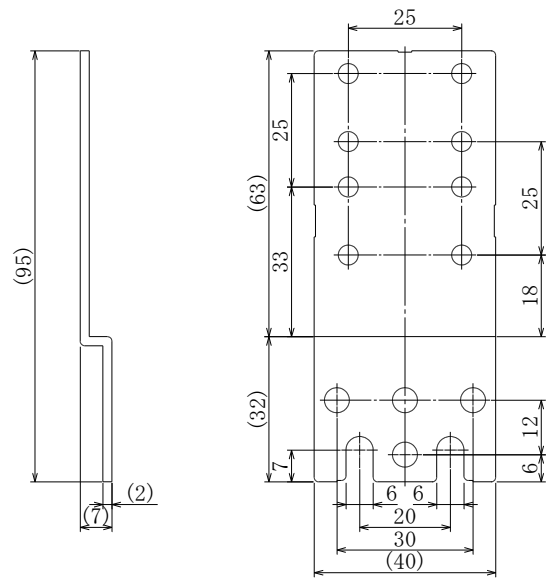
If you need "SNS-AE11" or "SNS-AE02", please contact us.

4. Specifications

SNS-AE11



SNS-AE02



4.8. Part names

4.8.1. Main unit

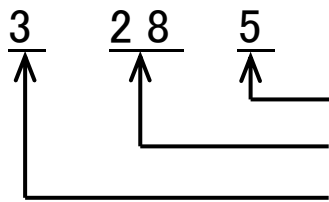


4. Specifications

No.	Name	Description
(1)	Catalog No.	Model number marked using permanent ink
(2)	Manufacturing lot number	Lot number (manufacturing date) marked using permanent ink
(3)	Pressure adjusting screw	Used to set the actuation value for pressure rise. Clockwise: Increases the pressure setting. Counterclockwise: Decreases the pressure setting.
(4)	Pressure setting indicator	Indicates the set pressure.*
(5)	Scale	Indicates the set pressure.*
(6)	Reset button	Resets the protection function for Type M1.
(7)	Cover securing screw	Used to install or remove the cover.
(8)	Cable entry rubber	Cable protection part Make a slit in the center of the rubber before wiring.

* When changing the settings, adjust the values according to the pressure gauge reading. The scale should be used for reference only.

4.8.2. Manufacturing lot number



(M a r c h 2 8 , 2 0 2 5)

Last digit of the year

In the case of special products,
the last two digits of the year may be shown.

Day

Month (October, November, and December

are represented by X, Y, and Z, respectively.)

4. Specifications

4.8.3. Model indication and numbering system

HNS - C1 30 X M1 W G Q ***

Sequential number

Special specification

Joint shape

Water/splash-proof and element material

Reset operation (No code: Automatic reset)

Contact type

Code	Description
C1	
C1-M1	

Pressure range

Code	Description
30	3.0 MPa

Shipping destination

Code	Description
None	Japan
X	Overseas

Description	Code
Flare joint	B
Union joint	U
Parallel pipe or taper	
Female	G
Male	M
Bite-type union	K
Capillary tube	L

For details, see p.9.

Code	Description	Protection level
None	General	IP20
W	Splash-proof	IP62

Code	Description	Material
None	General	Brass, phosphor bronze, etc.
N	Corrosion-resistant	Stainless

Unit types and conversion

MPa	bar	kgf/cm ²	kPa	psi (lbf/in ²)
1	10	10.1972	1,000	145.0380
0.1	1	1.0197	100	14.5038
0.0981	0.9807	1	98.0665	14.2233
0.0010	0.0100	0.0102	1	0.1450
0.0069	0.0689	0.0703	6.8948	1

Code	Description
C1-M1	

Special specification: A2L-compatible models have sequential numbers starting with Q2. (Standard specification Q2000)
(Example) HNS-C130M1Q2000

5. Handling and Storage

 WARNING	
	When transporting a heavy product, wear protective gear, such as safety shoes, to ensure safety. There is a risk of injury, such as a bone fracture, if the product falls or tips over.
	When unpacking or installing the product, wear appropriate protective gear (work gloves, etc.) to ensure safety. There is a risk of injury from the sharp edges of the packaging box, product, or tool.

 CAUTION	
	Do not paint the product. If paint enters the pressure switch or adheres to the sliding part, it may cause failure or malfunction.

★ Observe the following when handling the product:

- Do not drop the product.
Doing so may cause failure, malfunction, or premature failure.
- Do not paint the product.
If paint enters the pressure switch or adheres to the sliding part, it may cause failure or malfunction.
- Do not store the product in locations subject to vibration or impact.
Doing so may cause failure, malfunction, or premature failure.
- Do not store the product with a load applied to the main unit or joint.
Doing so may deform the main unit or joint, resulting in failure, malfunction, or premature failure.
- Avoid direct sunlight and store the product in a well-ventilated place.
Failure to do so may oxidize conductive parts, resulting in pressure switch failure, malfunction, or premature failure.
- Do not turn any screws other than the adjusting screws.
Doing so may cause failure, malfunction, or premature failure.
- Do not turn screws that have been pre-adjusted and locked (bonded) by our factory.
Doing so may cause failure, malfunction, or premature failure.
- Use fluid that does not corrode copper alloys.
Used fluid must not contain chemical- or organic-solvent-containing synthetic oils, salts, or corrosive gases.
Presence of these substances may cause damage or malfunction.
- Use the product at the rated voltage.
Failure to do so may cause failure or malfunction.
- Use the product at the rated operating pressure.
Failure to do so may cause damage, resulting in inaccurate measurement.
- Do not apply voltage or current beyond the maximum load.
Doing so may damage the product or shorten its service life.
- If the product has been stored for more than a year, verify that it actuates properly before use.
After starting to use the product, periodic actuation verification is recommended.
- Secure a maintenance space.
Allow a space for maintenance or inspection.

6. Assembly

 WARNING	
	When transporting a heavy product, wear protective gear, such as safety shoes, to ensure safety. There is a risk of injury if the product falls or tips over.
	When unpacking or installing the product, wear appropriate protective gear (work gloves, protective goggles, etc.) to ensure safety. There is a risk of injury from the sharp edges of the packaging box, product, or tool.
	Installation of the product must be performed by personnel with expertise and certification in electrical work. Otherwise, it may cause electric shock or fire due to miswiring or improper installation, resulting in death.
	When securing the product with flare nuts, use two wrenches: one for fixing the hexagonal part of the main unit and the other (open-end wrench) for tightening the flare nut. Applying torque to the product without observing this instruction may damage the main unit, resulting in blindness or injury from scattered metal pieces or inner gas.
	When performing brazing with nitrogen purging, wear appropriate protective gear (protective goggles, heat-resistant gloves, etc.) and provide a pressure relief zone to prevent an unintentional rise in inner pressure for your safety. Failure to do so may cause blindness, injury, or burn from scattered high-temperature parts, such as flux.
	Do not paint the product. Doing so may degrade insulation, resulting in fire or electric shock due to leakage current.
	Use only the designed method when securing the product. Drilling or modifying the main unit may expose the internal live parts, resulting in death due to short circuit or electric shock.
	When unpacking or installing the product, wear appropriate protective gear (work gloves, etc.) to ensure safety. There is a risk of injury from the sharp edges of the packaging box, product, or tool.
	Perform blazing in a well-ventilated location or using an exhaust system with adequate ventilation. Also, wear appropriate protective gear, such as a mask. Failure to do so may cause inhalation of hazardous substances, such as fumes, resulting in respiratory disorders, or suffocation from leaked gas.

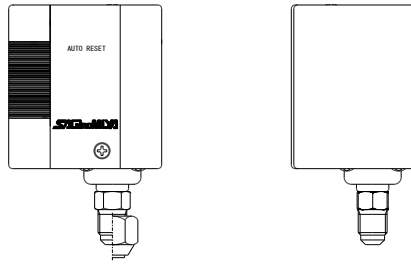
6. Assembly

★ Observe the following when assembling the product:

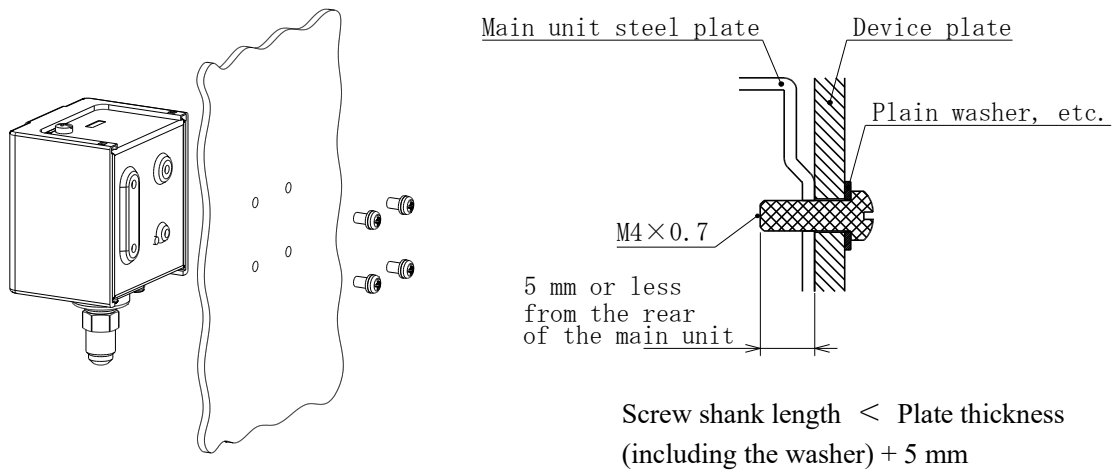
- Before unpacking, ensure that the packaging box is not deformed or damaged.
- During unpacking, ensure that the product is not deformed or damaged.
- After unpacking, ensure that the product meets your requested specifications.
- Do not apply shock to the product during unpacking.
Doing so may cause failure or malfunction. It also results in inaccurate measurement.
- Be sure to remove the dust or foreign matter inside the pipe before installing the product on the piping line.
If foreign matter may be present in the fluid, install or connect a filter to the piping line.
Doing so may cause failure or malfunction. It also results in inaccurate measurement.
- Do not put a thin wire or similar objects into the pressure inlet.
Doing so may damage the internal part, resulting in fluid leakage, failure, or malfunction.
- When using a flare joint, do not scratch the tapered surface of the flare end.
Doing so may cause fluid leakage, failure, or malfunction.
- Do not install the product in a location that may be used as a scaffold.
If excessive force is applied, such as by accidentally standing on or placing a foot on the product, it may cause damage.
- Do not use the product in atmospheres containing corrosive gases, chemical substances, seawater, water, or steam, or locations exposed to them.
Doing so may cause failure or malfunction.
- Do not use the product in locations exposed to oils or chemical substances.
Doing so may cause failure or malfunction.
- Install the product in a location not subject to vibration or impact.
Doing so may cause failure or malfunction.
- Ensure that foreign matter, such as wire scraps, does not enter the product.
Doing so may cause failure or malfunction.
- Do not use the product in an environment with temperature cycles.
If temperature cycles other than normal temperature fluctuations are applied, it may adversely affect the inside of the product.
- Do not use the product under direct sunlight.
If exposed to direct sunlight, block it. Doing so may cause failure or malfunction.
- Use the product within the operating fluid temperature and ambient temperature ranges.
The operating fluid temperature range is -20 to 120 °C, while the ambient temperature range is -20 to 70 °C. If the product is used at low temperatures (5 °C or lower), moisture in the air may freeze, resulting in damage or malfunction.
- Take measures to prevent freezing. It is recommended to install an air dryer to drain or remove moisture.
Also, avoid sudden temperature changes even within the specified temperature range.
- Do not use the product in locations exposed to radiant heat from surrounding heat sources.
Doing so may cause malfunction.
- When installing piping for the product, do not tighten the pipe while holding the main unit, but use an open-end wrench.
Otherwise, it may cause failure or malfunction.
- Do not apply additional machining, such as drilling a mounting hole in the main unit. Doing so may cause failure or malfunction.
When installing the product on the wall or panel board, use the mounting holes (M4 x 0.7) at the rear of the main unit.
- The product can be installed in any orientation, but it is recommended that the product be used with the joint vertically facing downward to prevent dust or foreign matter inside the pipe from entering the product.

6. Assembly

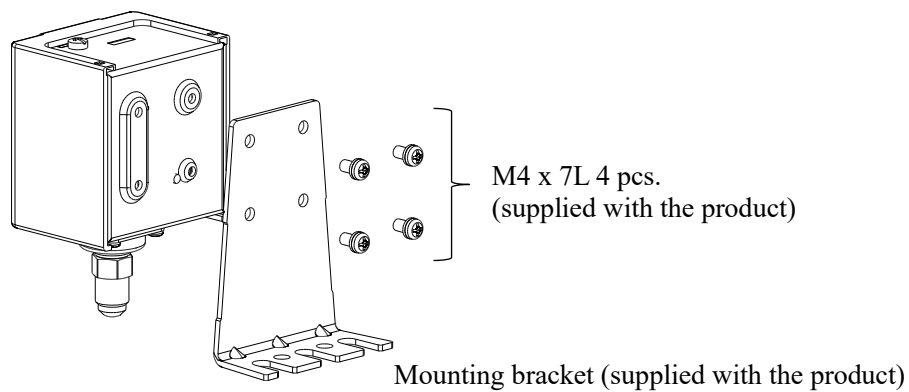
< Orientation that prevents foreign matter from entering the product >



- Use M4 x 0.7 mounting screws with an insertion depth of 5 mm or less from the rear of the main unit.
If the insertion depth is more than 5 mm, it may cause electric shock or malfunction, resulting in damage.



- How to install the main unit mounting bracket
Mount the bracket to the main unit with four mounting screws M4 x 7L.

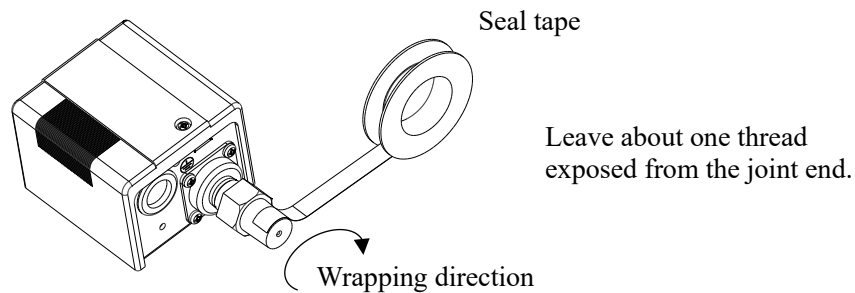


6. Assembly

- How to wrap the seal tape (Tapered pipe thread: joint code: M01, 02, 04, 06, 07, and 09)

When screwing a pipe or joint, ensure that the chips and sealant from the pipe thread do not enter the pipe.

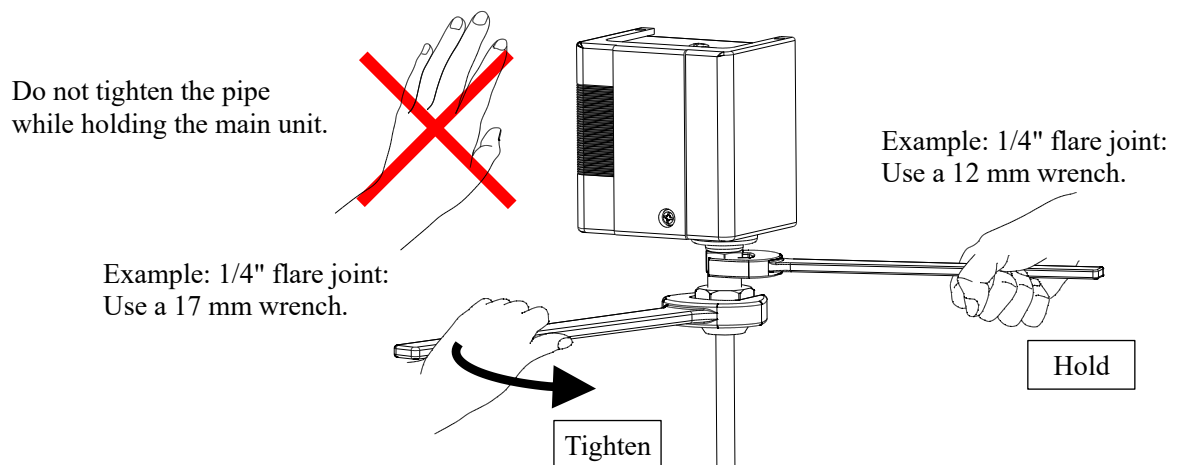
When wrapping the seal tape, be sure to leave about one thread exposed.



- When installing piping for the product, use an open-end wrench. (Example: For a 1/4" flare joint, the recommended tightening torque is 12 to 14 N · m.)

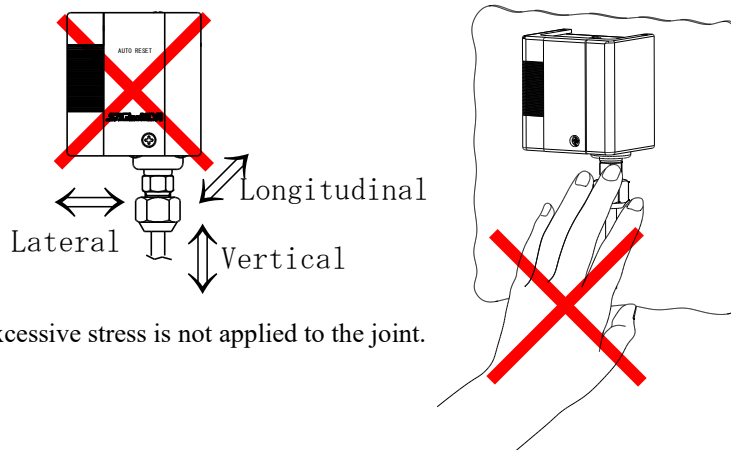
A tightening torque exceeding the above range may damage the mounting screws, mounting fixture, or pressure switch. If the tightening torque is below the above range, it may cause pressure switch misalignment or fluid leakage.

Use an appropriate tightening torque according to the industrial standards of each joint.



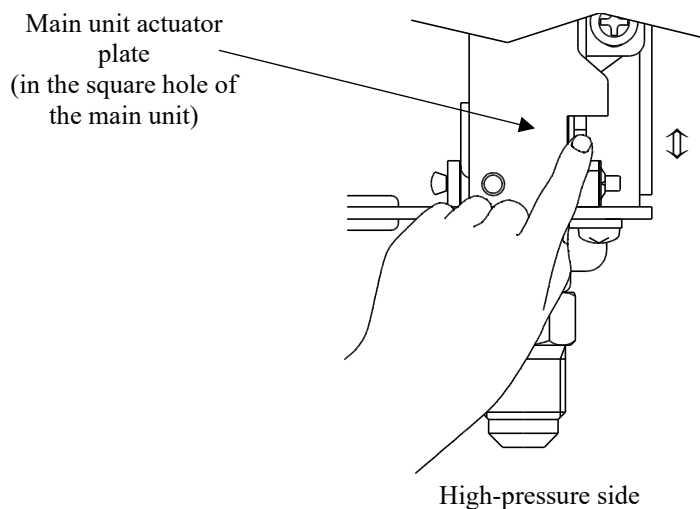
6. Assembly

- During piping installation, arrange the piping layout to prevent excessive stress from being applied to the joint in longitudinal, lateral, or vertical directions. Also, do not hold the pipe to adjust after it is connected.



- ! Use the product under the following conditions. Failure to do so may lead to malfunction or performance degradation.

- Install in locations with vibration levels of 9.8 m/s^2 or less.
 - Use within an ambient temperature range of -20 to 70°C and a fluid temperature range of -20 to 120°C .
 - Do not exceed the maximum operating pressure. (Example: HNS-C130 : 3.3 MPa or less)
- Also, install in locations without impact pressure, excessive pressure changes, or pulsation.
- To check pulsation, check the movement or vibration of the actuator plate in the square hole of the main unit visually or by touching the plate with your finger.



7. Wiring

 WARNING	
	Do not turn on the product with the protection cover for the live part removed. Doing so may cause accidental contact with the live part, resulting in serious injury or death due to electric shock.
	Be sure to turn off all the power before wiring. Performing the work with power on may cause accidental contact with the live part, resulting in serious injury or death due to electric shock.
	Before wiring, ensure that no water is present on the product, and perform the work in an environment where the product is not exposed to water, such as rain or condensation. Performing the work with the product wet may cause electric shock, resulting in serious injury or death.
	Wiring of the product must be performed by personnel with expertise and certification in electrical work. Otherwise, it may cause electric shock or fire due to miswiring or improper installation, resulting in death.
	When wiring the product, wear appropriate protective gear (work gloves, protective goggles, etc.) to ensure safety. There is a risk of injury from the sharp edges of the product or tool, or flying debris. If debris enters your eye, it may result in blindness.
	Rubber grommets for cable entry must be attached during wiring. Also, use conduits if necessary. Failure to observe these instructions may damage cables, resulting in serious injury or death due to electric shock.
	Use only the supplied screws (M4 x 0.7 x 8 mm with washers). Failure to do so may cause the shank length to become excessive. This leads to short circuit due to insufficient insulation distance from the inner part, resulting in serious injury or death due to electric shock.
	Do not tighten the cover securing screw with a torque exceeding 0.3 N·m. If the cover is damaged or comes off due to an excessive tightening torque, the live part may be exposed, resulting in serious injury or death caused when the operator accidentally touches it.

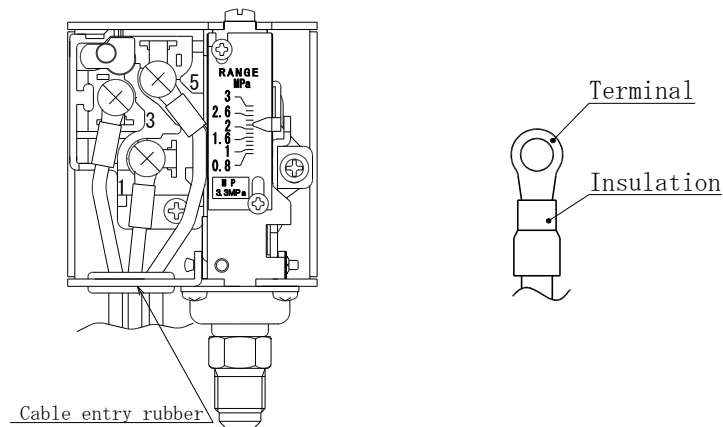
 CAUTION	
	Check safety in the surrounding environment before performing the work.
	Do not paint the product. If paint enters the pressure switch or adheres to the sliding part, it may cause failure or malfunction.

7. Wiring

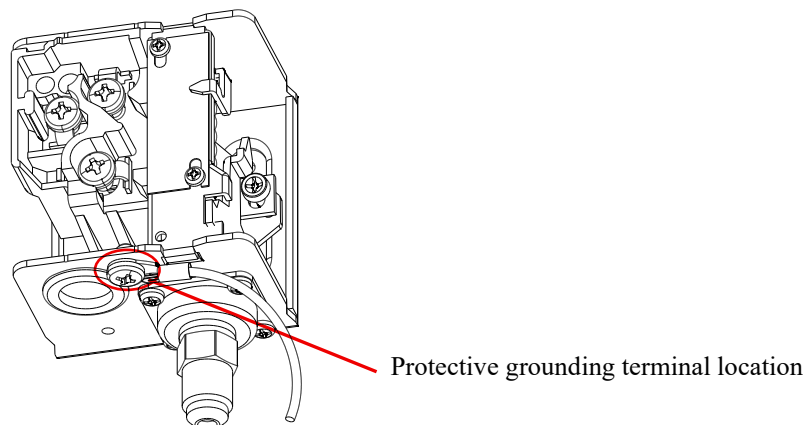
★ Observe the following when wiring the product:

★ The micro switch is equipped with terminal screws, so connect the electrical wires according to the wiring diagram for your intended purpose. Also, note the following:

- Do not turn any screws other than the terminal screws and the grounding screw.
Doing so may cause failure, malfunction, or premature failure.
- Use the product within the electrical ratings. Doing so may damage the product or shorten its service life.
- Do not pull the connected electrical wire forcibly or lift the main unit by holding the wire.
Doing so may damage the micro switch, resulting in failure or malfunction. If the lead wire is damaged, replace it.
- It is recommended to use a cable gland for wiring.
If no cable gland is used, wire the cables with the cable entry rubber attached.
Failure to do so may damage the cables, resulting in electric shock.
Secure the wiring outside the main unit (near the main unit) to prevent its pulling force from being applied directly to the main unit.
- Do not paint the product. If paint enters the pressure switch or adheres to the sliding part, it may cause failure or malfunction.
- Use the installed M4 x 0.7 x 6 mm terminal screws.
Using longer screws may damage the micro switch, resulting in failure or malfunction.
- Do not exceed a torque of 1.2 N · m when tightening the terminal screws.
Doing so may damage the micro switch, resulting in failure or malfunction.
- Use round connectors (insulated) to connect to the terminals.



- Use the M4 x 0.7 screw to connect to the protective grounding terminal.



- Do not exceed a torque of 0.3 N · m when tightening the cover securing screw.
Doing so may cause the cover to be damaged or come off, resulting in electric shock, failure, or malfunction.

8. Settings

 WARNING	
	Be sure to turn off the power before wiring. Performing the work with power on may cause accidental contact with the live part, resulting in serious injury or death due to electric shock.
	Do not turn on the product with the protection cover for the live part removed. Doing so may cause accidental contact with the live part, resulting in serious injury or death due to electric shock.

8.1. Settings

★ Observe the following when setting and adjusting the operating values:

- Do not pull the connected electrical wire forcibly or lift the main unit by holding the wire.
Doing so may damage the micro switch, resulting in failure or malfunction. If the lead wire is damaged, replace it.
- Do not turn any screws other than the adjusting screws.
Doing so may cause failure, malfunction, or premature failure.
- Do not turn screws that have been pre-adjusted and locked (bonded) by our factory.
Doing so may cause failure, malfunction, or premature failure.

< Setting procedure >

Set the actuation value for pressure rise using the pressure adjusting screw.

To increase the pressure setting, turn the pressure adjusting screw clockwise for Type HNS.
Note that the differential pressure is fixed and cannot be adjusted.

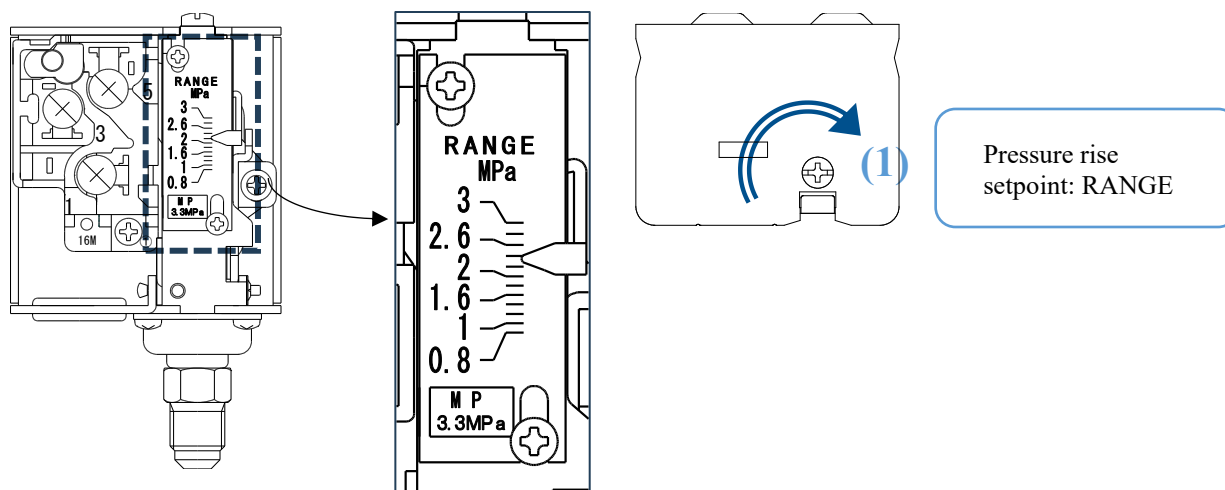
8.2. Setting examples

< Setting example >

- To increase the high-pressure side setting (actuation value for pressure rise): Turn Screw (1) **clockwise.**
- To decrease the setting: Turn Screw (1) **counterclockwise.**

(Example)

The arrows in the figure indicate the screw-turning directions to increase the values.



* Differential pressure adjusting screw is not provided with HNS.

8. Settings

< Setting change >

Adjust the values according to the pressure gauge reading. The scale should be used for reference only.

Note: For the Type HNS, the differential pressure cannot be adjusted, as it is fixed. (No differential pressure adjusting screw is provided.)

Note: For manual reset models, the differential pressure cannot be adjusted as well. To perform a manual reset, press the reset button after the specified pressure drops.

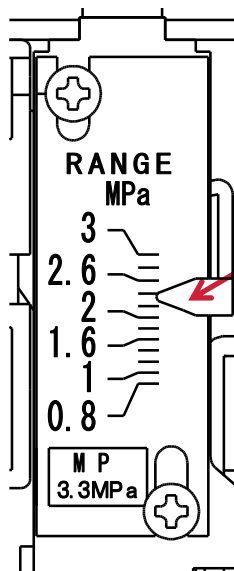
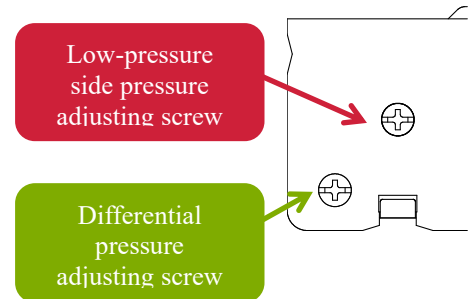
Pressing the reset button before the specified pressure drops may lead to malfunction.

< Setting example >

Desired settings

Setpoint: 2.0 MPa / Differential pressure: Approx. 0.4 MPa

(Actuation value for pressure rise: 2.0 MPa / Actuation value for pressure drop: Approx. 1.6 MPa)



(1) Temporarily set the RANGE indicator to 2.0 MPa or more.

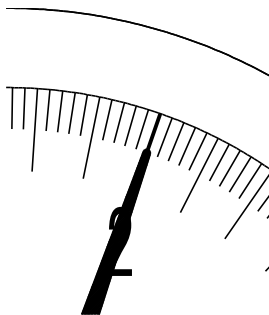
The differential pressure cannot be adjusted, as it is fixed.

(2) Apply a pressure of 2.0 MPa to the product and turn the low-pressure side pressure adjusting screw back slowly until the switch actuates.

Screw-turning
direction

Counterclockwise

Clockwise



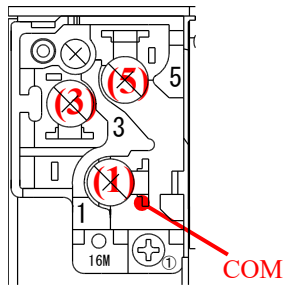
(3) After the adjustment, decrease the pressure to 0 MPa.

(4) Increase and decrease the pressure again to see if the desired settings have been obtained.

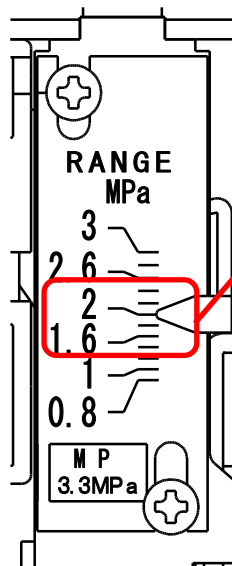
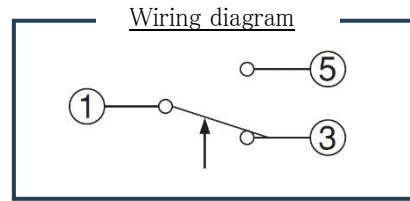
8. Settings

- Output operation

< Type HNS (Auto reset) >

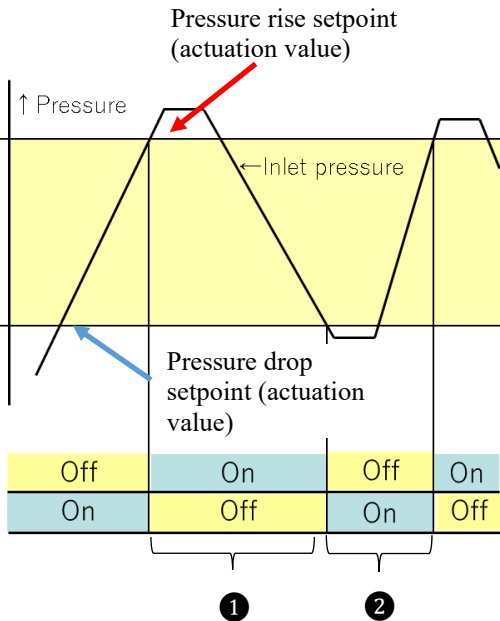


Note: The $\uparrow\downarrow$ arrows represent the behavior of the contacts during pressure rise.



Pressure adjustment value **2.0MPa**

Differential pressure adjustment value
(Cannot be set)
(1.6MPa)



- Settings

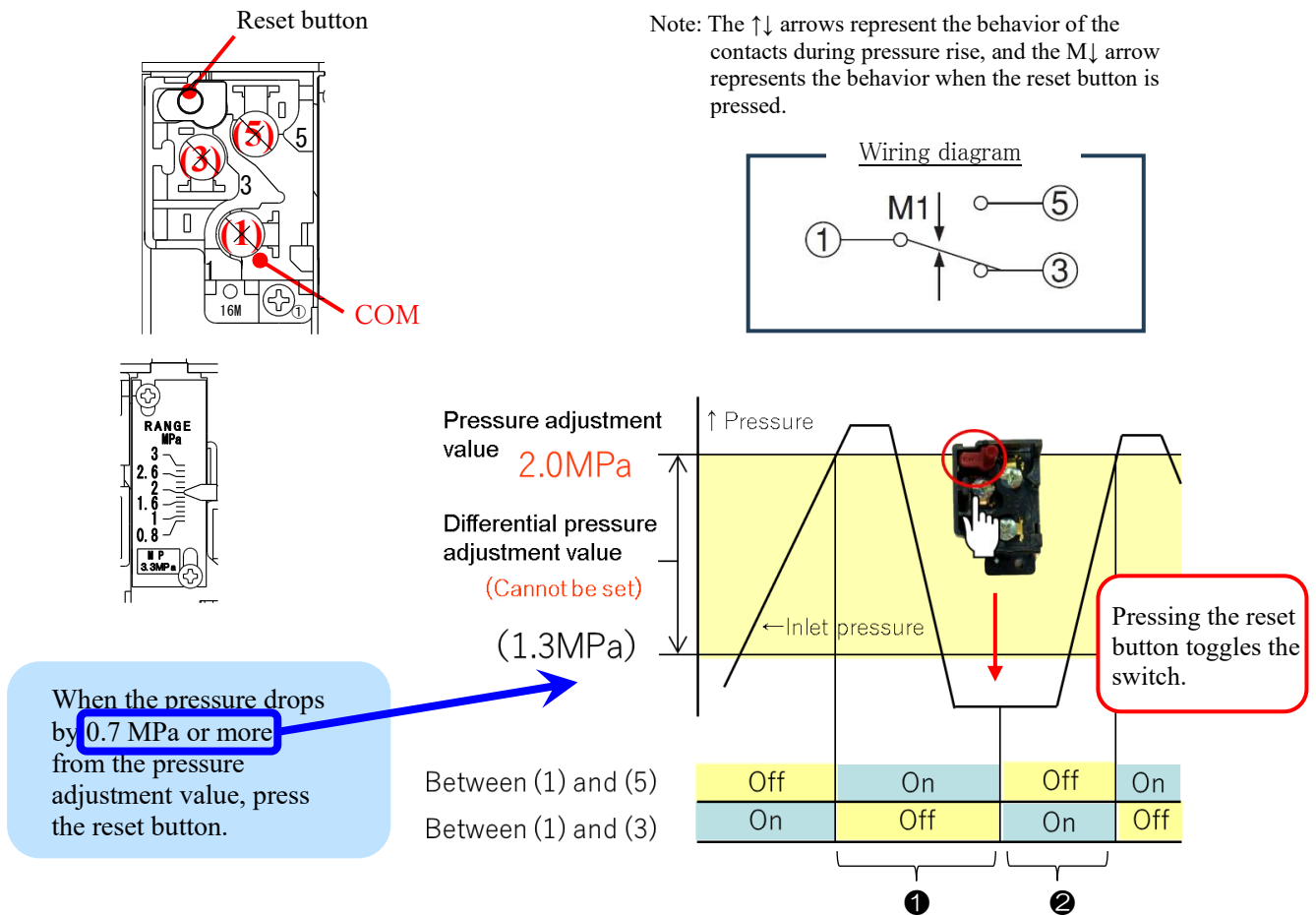
Setting scale: 2.0 MPa

- When the pressure is increased from atmospheric pressure (0 MPa), the switch actuates at 2.0 MPa.
Between Terminals (1) and (5): On / Between Terminals (1) and (3): Off
- When the pressure is decreased, the switch actuates at Approx. 1.6 MPa.
Between Terminals (1) and (5): Off / Between Terminals (1) and (3): On

Note: For the Type HNS, the differential pressure cannot be adjusted, as it is fixed. (No differential pressure adjusting screw is provided.)
The ON/OFF pressure differential, however, varies depending on unit variations and the pressure rise setting, operating within 0.3 to 0.5 MPa.

8. Settings

< Actuation for Type HNS(Manual reset) >



• Settings

High-pressure side setting scale: 2.0 MPa

- 1 When the pressure is increased from atmospheric pressure (0 MPa), the switch actuates at 2.0 MPa.
Between Terminals (1) and (5): On / Between Terminals (1) and (3): Off

When the reset button is not pressed

Even if the pressure is decreased to 1.3 MPa or less, the switch does **not actuate.**

Between Terminals (1) and (5): On / Between Terminal (1) and (3): Off

- 2 When the reset button is pressed after the pressure drops by 0.7 MPa or more from the pressure adjustment value
Between Terminals (1) and (5): Off / Between Terminal (1) and (3): On

< Caution >

When **the pressure drops by 0.7 MPa or more** from the pressure adjustment value, press the reset button.

If you press the reset button before the pressure fully drops, the switch may **not be reset.**

In such cases, press the reset button again after the pressure drops sufficiently.

9. Operation

 WARNING	
	Do not turn on the product with the protection cover for the live part removed. Doing so may cause accidental contact with the live part, resulting in serious injury or death due to electric shock.
	Before wiring, ensure that no water is present on the product, and perform the work in an environment where the product is not exposed to water, such as rain or condensation. Performing the work with the product wet may cause electric shock, resulting in serious injury or death.
	Use the product only under the conditions described in the instruction manual. Perform periodic maintenance. Exposure to harsh conditions beyond the operating conditions or prolonged use may degrade the sealing integrity of the product. In addition, leaked refrigerant may cause fire or suffocation.
	Do not apply excessive external force, such as using the product or joint above the pipe as a climbing scaffolding. Doing so may damage the product or joint, resulting in suffocation or fire due to leaked refrigerant.

9.1. Normal operation

★ Observe the following when operating the product:

- Do not expose the product to vibrations exceeding 9.8 m/s^2 .
- Doing so may cause failure, malfunction, or premature failure.
- Use the product within the operating fluid temperature and ambient temperature ranges.
The operating fluid temperature range is -20 to 120°C , while the ambient temperature range is -20 to 70°C . If the product is used at low temperatures (5°C or lower), moisture in the air may freeze, resulting in damage or malfunction.
- Take measures to prevent freezing. Also, avoid sudden temperature changes even within the specified temperature range.
- Use the product in non-freezing and frost-free environments.
Doing so may cause failure, malfunction, or premature failure.
- Do not use the product in locations exposed to radiant heat from surrounding heat sources.
Doing so may cause malfunction.
- Do not use the product in an environment with temperature cycles.
If temperature cycles other than normal temperature fluctuations are applied, it may adversely affect the inside of the product.
- Do not use the product under direct sunlight.
If exposed to direct sunlight, block it. Doing so may cause failure or malfunction.
- Use the product in an atmosphere that does not corrode copper alloys.
Doing so may cause failure, malfunction, or premature failure.
- Use fluid with a viscosity of $400 \text{ mm}^2/\text{s}$ or less (400 cSt or less).
If the viscosity is high, the pressure may not be transmitted appropriately, resulting in malfunction.
- Be sure to comply with the table below for the rate of pressure change applied to the pressure switch.
Failure to do so may result in the product not actuating as specified.

Rate of pressure change

Catalyst	Time taken (per 0.1 MPa)
Gas	At least 3 seconds
Liquid	At least 10 seconds

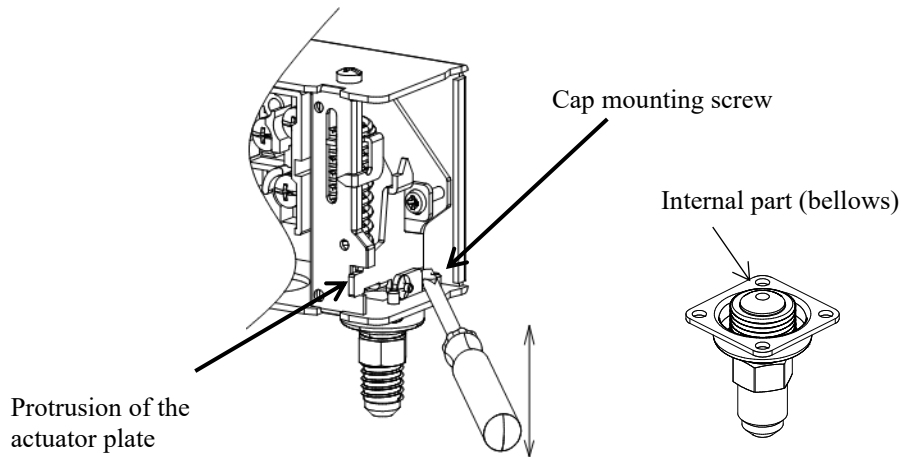
9. Operation

- Do not exceed the maximum operating pressure. Use in locations without impact pressure, excessive pressure changes, or pulsation. To check pulsation, check the movement or vibration of the actuator plate in the square hole of the main unit visually or by touching the plate with your finger or hand.
- Do not use the product in atmospheres containing corrosive gases, chemical substances, seawater, water, or steam, or locations exposed to them.
Doing so may cause failure or malfunction.
- Do not use the product in locations exposed to oils or chemical substances.
Doing so may cause failure or malfunction.
- Install the product in a location not subject to vibration or impact.
Doing so may cause failure or malfunction.
- Ensure that foreign matter, such as wire scraps, does not enter the product.
Doing so may cause failure or malfunction.
- After installing the product appropriately, be sure to perform a trial operation to ensure that all systems fully function before use.
- Configure appropriate settings according to your intended purpose.
Failure to do so may cause malfunction.

9.2. Forced operation

To forcibly actuate the switch for some reasons, perform the following.
However, **exercise extra caution, as it may damage the internal part.**

Insert a flathead screwdriver between the bending section of the actuator plate and the main unit, and use the tip of the cap mounting screw as a fulcrum to actuate the switch. (Do not turn the screwdriver, as it damages the bellows.)
Alternatively, place the screwdriver above the protrusion of the actuator plate on the front of the main unit and apply force in the direction of pushing the plate downward to actuate the switch. You can also actuate the switch in reverse by pushing the plate upward.



10. Maintenance and Inspection

 WARNING	
	Do not turn on the product with the protection cover for the live part removed. Doing so may cause accidental contact with the live part, resulting in serious injury or death due to electric shock.
	Be sure to turn off the power before maintenance or inspection. Performing the work with power on may cause accidental contact with the live part, resulting in serious injury or death due to electric shock.
	Before maintenance, inspection, or replacement, be sure to recover the refrigerant inside the refrigeration system and ensure that no refrigerant remains inside the product. Failure to do so may cause fire or suffocation due to leakage. In addition, it may result in eye or physical injury, or blindness in the worst-case scenario, from escaping refrigerant or flying debris.
	Use the product only under the conditions described in the instruction manual. Perform periodic maintenance. Exposure to harsh conditions beyond the operating conditions or prolonged use may degrade the sealing integrity of the product. In addition, leaked refrigerant may cause fire or suffocation.
	Before maintenance or inspection, ensure that no water is present on the product, and perform the work in an environment where the product is not exposed to water, such as rain or condensation. Performing the work with the product wet may cause electric shock, resulting in serious injury or death.
 CAUTION	
	Before maintenance or inspection, be sure to turn off the power supply, stop the air supply, and release the compressed air inside the pipe to put the product in a vented state. Failure to do so may result in unintended component malfunction.

★ Observe the following when maintaining or inspecting the product:

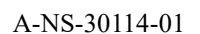
- Do not turn any screws other than the adjusting screws.
Doing so may cause failure, malfunction, or premature failure.
- Do not turn screws that have been pre-adjusted and locked (bonded) by our factory.
Doing so may cause failure, malfunction, or premature failure.
- Periodic actuation verification is recommended.

11. Replacement

 WARNING	
	Do not turn on the product with the protection cover for the live part removed. Doing so may cause accidental contact with the live part, resulting in serious injury or death due to electric shock.
	Before maintenance, inspection, or replacement, be sure to recover the refrigerant inside the refrigeration system and ensure that no refrigerant remains inside the product. Failure to do so may cause fire or suffocation due to leakage. In addition, it may result in eye or physical injury, or blindness in the worst-case scenario, from escaping refrigerant or flying debris.
	Before maintenance or inspection, ensure that no water is present on the product, and perform the work in an environment where the product is not exposed to water, such as rain or condensation. Performing the work with the product wet may cause electric shock, resulting in serious injury or death.

12. Disposal

When you no longer need the product, dispose of it properly in accordance with the laws, regulations, and ordinances of your local government.
Also, do not reuse any part of the product.



14. Troubleshooting List

14. Troubleshooting List

14.1. Frequently asked questions

Phenomenon	Check item	Reference
- The switch does not actuate at the desired setpoint. - There is a deviation in the actuation value. - The value differs from the pressure gauge.	Did you set the value based only on the scale? The scale should be used for reference only. Use the pressure gauge to set the pressure.	Common problems and solutions Item 15
	Are the switch and the pressure gauge located away from each other? A pressure difference may occur due to piping resistance, so move the pressure outlet closer to the switch.	—
	Is a high-viscosity fluid being used? Ensure that the fluid viscosity is 400 mm ² /s (cSt) or less. (If the fluid viscosity is high, a response delay may occur, resulting in inaccurate pressure measurement.)	Common problems and solutions Item 15
	Is the rate of pressure change high? If the rate of pressure change is high, a response delay may occur, resulting in inaccurate pressure measurement.	Common problems and solutions Item 15
	Is excessive pressure being applied to the switch? If excessive pressure is applied, components such as the bellows and the actuator plate may be deformed, affecting the actuation value.	Common problems and solutions Items 6, 7, and 15
- There is a deviation in the settings. - Actuation is unstable.	Is the switch vibrating? The transmitted vibration may cause the adjusting screws to rotate, affecting the settings. (Change the installation location or take measures to prevent vibration.)	Common problems and solutions Items 12 and 13
	Is excessive pressure being applied to the switch? If excessive pressure is applied, components such as the bellows and the actuator plate may be deformed, affecting the actuation value.	Common problems and solutions Items 6, 7, and 15
	Is pressure pulsation being generated? Pulsation may cause the bellows or actuator plate to move, resulting in malfunction.	Common problems and solutions Items 12 and 13
The setpoint cannot be adjusted to the desired one.	Adjust the pressure according to the instruction manual. - Adjust the actuation point for pressure rise with the pressure adjusting screw and the actuation point for pressure drop with the differential pressure adjusting screw. - Adjust the pressure while checking the pressure gauge.	Common problems and solutions Items 12, 13, and 15
	Is the electrical wiring to the micro switch correct? The micro switch is a single-pole double-throw type, so it can be wired to cut in or cut out upon pressure rise. (Check the instruction manual and the wiring diagram on the back of the cover.)	Common problems and solutions Item 10
- The pressure is not controlled. - The switch does not start.	Are the pressure settings configured correctly? Adjust the pressure according to the instruction manual.	—
	Is pressure being transmitted to the switch? Is the pipe or the switch joint clogged? If the switch actuator plate moves in response to a pressure rise or drop, it means that pressure is being transmitted to the switch.	Common problems and solutions Item 3
	Is the electrical wiring to the micro switch correct? The micro switch is a single-pole double-throw type, so it can be wired to cut in or cut out upon pressure rise. (Check the instruction manual and the wiring diagram on the back of the cover.)	Common problems and solutions Item 10
	Are the electrical ratings of the connected switch within the specified ratings? If outside the specified ratings, the switch cannot be properly controlled.	Common problems and solutions Item 14
	Are the electrical ratings of the connected switch within the specified ratings? If outside the specified ratings, the switch cannot be properly controlled.	Common problems and solutions Item 11
The switch does not cut in or cut out even when forcibly actuated.	Is excessive pressure being applied to the switch? If excessive pressure is applied, components such as the bellows and the actuator plate may be deformed, failing to actuate.	Common problems and solutions Items 6, 7, and 15
	Is the electrical wiring to the micro switch correct? The micro switch is a single-pole double-throw type, so it can be wired to cut in or cut out upon pressure rise. (Check the instruction manual and the wiring diagram on the back of the cover.)	Common problems and solutions Item 10
The switch cannot be manually reset.	Has the pressure risen or dropped sufficiently? Ensure that the pressure has fully restored. (Forced operation of the reset button may damage the micro switch.)	—
	Is the electrical wiring to the micro switch correct? The micro switch is a single-pole double-throw type, so it can be wired to cut in or cut out upon pressure rise. (Check the instruction manual and the wiring diagram on the back of the cover.)	Common problems and solutions Item 10
The switch does not actuate.	Is pressure being transmitted to the switch? If the switch actuator plate moves in response to a pressure rise or drop, it means that pressure is being transmitted to the switch.	Common problems and solutions Item 3
	Are the electrical ratings of the connected switch within the specified ratings? If outside the specified ratings, the switch cannot be properly controlled.	Common problems and solutions Item 14
	Is there leakage from the bellows? Replace the switch before the guaranteed number of endurance cycles is exceeded.	Common problems and solutions Items 1 and 9

14. Troubleshooting List

Phenomenon	Check item	Reference
The switch remains actuated.	Is the electrical wiring to the micro switch correct? The micro switch is a single-pole double-throw type, so it can be wired to cut in or cut out upon pressure rise. (Check the instruction manual and the wiring diagram on the back of the cover.)	Common problems and solutions Items 9 and 10
	Is excessive pressure being applied to the switch? If excessive pressure is applied, components such as the bellows and the actuator plate may be deformed, failing to actuate.	Common problems and solutions Items 1, 6, and 7
The continuity to the micro switch (contacts) is unstable.	Are the electrical ratings of the connected switch within the specified ratings? If outside the specified ratings, the switch cannot be properly controlled.	Common problems and solutions Item 11
There is no continuity to the micro switch (contacts).	Is the electrical wiring to the micro switch correct? The micro switch is a single-pole double-throw type, so it can be wired to cut in or cut out upon pressure rise. (Check the instruction manual and the wiring diagram on the back of the cover.)	Common problems and solutions Item 10
	Are the electrical ratings of the connected switch within the specified ratings? If outside the specified ratings, the switch cannot be properly controlled.	Common problems and solutions Item 14
- The micro switch (contacts) does not cut out. - The micro switch (contacts) does not cut in. - The micro switch (contacts) does not toggle.	Is the electrical wiring to the micro switch correct? The micro switch is a single-pole double-throw type, so it can be wired to cut in or cut out upon pressure rise. (Check the instruction manual and the wiring diagram on the back of the cover.)	Common problems and solutions Item 10
	Is excessive pressure being applied to the switch? If excessive pressure is applied, components such as the bellows and the actuator plate may be deformed, failing to actuate.	Common problems and solutions Items 1, 6, and 7
	Are the electrical ratings of the connected switch within the specified ratings? If the switch is outside the specified ratings, it cannot be properly operated.	Common problems and solutions Electrical ratings
External leakage	Is corrosive fluid being used? Use an appropriate bellows according to the control fluid. (An SUS bellows is recommended for water, steam, or seawater.)	Common problems and solutions Item 1
	Is the switch still being used after exceeding the guaranteed number of endurance cycles? Replace before the guaranteed number of endurance cycles is exceeded.	Common problems and solutions Item 1
	Is pressure pulsation being generated? (Pulsation may cause premature failure of the bellows or micro switch.)	Common problems and solutions Item 1
The adjusting screw cannot be operated.	Has the adjusting screw been turned beyond the switch's pressure adjustment range? The micro switch is a single-pole double-throw type, so it can be wired to cut in or cut out upon pressure rise. (The adjusting screw cannot be turned, as it is cross-threaded.)	—
The joint cannot be firmly tightened.	Tighten the joint using an open-end wrench. If an open-end wrench is not used, the cap or main unit may deform, affecting the actuation value.	—

14. Troubleshooting List

14.2. Common problems and solutions

Item	Phenomenon	Possible cause	Check item	Notes	Action
1	Crack in the bellows	Overpressure	Deformation or dent of the bellows	Ensure that the supply pressure is below the sealing pressure.	Replacement
		Pressure pulsation	Presence of pressure pulsation	Use in a location without pressure pulsation. Also, use a capillary tube or damper to reduce pulsation transmitted to the product. Check the presence of pulsation by touching the actuator plate. (If the actuator plate moves even slightly, it means that pulsation is being generated.)	Replacement
		Corrosion	Discoloration of the bellows	An SUS bellows is recommended if corrosive fluid, steam, water, or seawater is used.	Replacement
		Contact with the bellows due to a wrong part (such as a screw longer than the supplied cover securing	Deformation or scratch on the bellows	Use only the supplied cover screw.	Replacement
		Contact with the bellows due to tool insertion	Deformation or scratch on the bellows	Do not perform forced actuation except at the specified location or by the specified method. Check the Forced Actuation Guidelines for the forced actuation procedures.	Replacement
		Exceeded endurance cycles	Endurance cycles	Replace before the guaranteed number of endurance cycles is reached.	Replacement
2	Leakage from the joint	Breakage of the welded or brazed area due to piping stress	Deformation of the joint or main unit	Tighten the joint with an appropriate torque using an open-end wrench. Install the product and connect the piping without applying excessive force to the main unit. Ensure that there is no misalignment between the joint and the pipe.	Replacement
		Breakage of the welded or brazed area due to vibration	Presence of vibration	Install in locations with vibration levels of 9.8 m/s ² or less. Secure the main unit, joint, and pipe to prevent vibration transmission.	Replacement
		Scratch on the sealing surface	Sealing surface condition	Tighten the joint with an appropriate torque using an open-end wrench. (For flare joints, the recommended torque is 12 to 14 N·m) Clean to remove any foreign matter. Check the sealing surface.	Replacement Check
		Foreign matter caught	Sealing surface condition	Clean to remove any foreign matter. Check the sealing surface.	Check
		Misaligned gasket	Sealing surface condition	Position the gasket appropriately. Check the sealing surface and the gasket.	Check
		Low tightening torque	Tightening torque	Tighten the joint with an appropriate torque using an open-end wrench. (For flare joints, the recommended torque is 12 to 14 N·m)	Check
		Corrosion	Discoloration of the joint	An SUS bellows or joint is recommended if corrosive fluid, steam, water, or seawater is used.	Replacement
3	Clogging	Foreign matter	Presence of foreign matter	Clean to remove any foreign matter. Install a filter.	Check
4	Rusted sliding part	The product is operated in a corrosive atmosphere.	Environment	Review and take corrective action on the operating environment (corrosive atmosphere). Consider introducing the waterproof or splash-proof type.	Replacement
5	Insufficient pressure	Insufficient inlet pressure	Inlet pressure	Ensure that the inlet pressure and the supply pressure are above the set values.	Check
6	Deformation of the actuator plate	Overpressure	Supply pressure	Ensure that the supply pressure is below the sealing pressure. Ensure that the refrigerant pressure during operation and stop is below the sealing pressure.	Replacement
		Forced actuation	Deformation of the actuator plate	Do not perform forced actuation except at the specified location or by the specified method.	Replacement
7	Deformation of the bellows	Overpressure	Supply pressure	Ensure that the supply pressure is below the sealing pressure. Ensure that the refrigerant pressure during operation and stop is below the sealing pressure.	Replacement
8	Others	Unknown	-----	Investigate the operating conditions and environment in detail, and contact us.	Investigation required
9	No micro switch actuation sound	The actuation position adjustment (distribution) screw has been moved.	Presence of bonded locking	Do not turn screws that have been pre-adjusted and locked (bonded) by us.	Replacement
		The differential screw of the micro switch has been moved.	—	Do not turn screws that have been pre-adjusted and locked (bonded) by us.	Replacement
		Exceeded endurance cycles	Endurance cycles	Replace before the guaranteed number of endurance cycles is exceeded.	Replacement
		The micro switch came off due to piping stress.	—	Install the product and connect the piping without applying excessive force to the main unit. Ensure that there is no misalignment between the joint and the pipe.	Replacement
		Disassembly (Micro switch misassembly)	Presence of disassembly	Do not disassemble the product.	Replacement
		Long screws other than the supplied terminal screws have been used.	—	Use the supplied micro switch screws or screws with a shank length of 8 mm or less.	Replacement
		(Micro switch internal damage)	—	—	—
		Welded contacts (Inside the micro switch)	—	Check the rush current and ensure that it is below the rated value. Replace before the guaranteed number of endurance cycles is exceeded.	Replacement
		Damage to the contact plate (Inside the micro switch)	—	If pressure pulsation is present, use the product in a location without pulsation, or use a capillary tube or damper to reduce pulsation. Review the operating environment and take corrective action if it is a corrosive atmosphere. Replace before the guaranteed number of endurance cycles is exceeded.	Replacement
	Continue on the next page	Damage to the special spring (Inside the micro switch)	—	If pressure pulsation is present, use the product in a location without pulsation, or use a capillary tube or damper. Review the operating environment and take corrective action if it is a corrosive atmosphere. Replace before the guaranteed number of endurance cycles is exceeded.	Replacement

14. Troubleshooting List

Item	Phenomenon	Possible cause	Check item	Notes	Action
9	No micro switch actuation sound	Long screws other than the supplied main unit mounting screws have been used. (Damage to the micro switch actuator plate)	—	Use the supplied screws. If the supplied screws are not long enough, use screws with insertion depth into the main unit as shown below. NS: 5 mm or less, YS: 4 mm or less	Replacement
10	Miswiring	—	Wiring status	Perform the wiring according to the instruction manual and the wiring diagram on the back of the cover.	Check
11	Others	Mismatched electrical ratings	Switch ratings	Use the product within the electrical ratings.	Check
		Foreign matter caught between the contacts	Operating environment	Review and take corrective action on the operating environment (dust atmosphere). Consider introducing the waterproof or splash-proof type.	Replacement
		Corrosion of the contact surface	Operating environment	Review and take corrective action on the operating environment (corrosive atmosphere, gas). Consider changing the installation location.	Replacement
		Roughness of the contact surface	Switch load current Endurance cycles Operating environment	Check the load current and ensure that it is below the rated value. Replace before the guaranteed number of endurance cycles is exceeded. Review and take corrective action on the operating environment.	Replacement
12	Vibration transmitted	Chattering/bouncing	Pressure vibration	Install in locations with vibration levels of 9.8 m/s^2 or less. Secure the main unit, joint, and pipe to prevent vibration transmission.	Check
13	Pulsation generated	Chattering/bouncing	Pressure pulsation	Use the product in a location without pulsation, or use a capillary tube or damper to reduce pulsation.	Check
14	Others	Mismatched electrical ratings	Switch ratings	Use the product within the electrical ratings.	Check
		Foreign matter caught between the contacts	Operating environment	Review and take corrective action on the operating environment (dust atmosphere). Consider introducing the waterproof or splash-proof type.	Replacement
		Corrosion of the contact surface	Operating environment	Review and take corrective action on the operating environment (corrosive atmosphere, gas). Consider changing the installation location.	Replacement
		Roughness of the contact surface	Switch load current Endurance cycles Operating environment	Check the load current and ensure that it is within the rated range. Replace before the guaranteed number of endurance cycles is exceeded. Review and take corrective action on the operating environment.	Replacement
15	Actuation value deviation	Overpressure	Deformation of the bellows or actuator plate	Do not apply pressure exceeding the sealing pressure.	Replacement
		Forced actuation	Deformation of the bellows or actuator plate	Do not perform forced actuation except at the specified location or by the specified method. Check the Forced Actuation Guidelines for the forced operation procedures.	Replacement
		The actuation position adjustment (distribution) screw has been moved.	Peeling of the bonded locking	Do not turn screws that have been pre-adjusted and locked (bonded) by us.	Replacement
		The differential screw of the micro switch has been moved.	—	Do not turn screws that have been pre-adjusted and locked (bonded) by us.	Replacement
		The actuation value has been adjusted according to the scale.	—	Adjust the pressure appropriately using the pressure gauge. Use the gauge as a guide.	Check
		High rate of pressure change	—	Set the rate as follows: Liquid: At least 10 seconds per 0.1 MPa Gas: At least 3 seconds per 0.1 MPa	Check
		High fluid viscosity	—	Ensure that the fluid viscosity is $400 \text{ mm}^2/\text{s}$ (cSt) or less.	Check
		High base pressure (Differential switch)	—	If the base pressure (normal pressure) is high, the actuation value may fluctuate. For this reason, adjust the actuation value with the base pressure being applied. * If the base pressure is already known, contact us beforehand.	Check
	Others	Setting error	Setpoints	Check if Range has been excessively adjusted (if the scale has been misread). Ensure that Range is greater than DIFF. Check if the Range and DIFF. settings are reversed.	Check

15. Revision History

Revision date	Manual number	Revision details
October 2025	A-NS-30114	First version

CONSENT RELATED TO DISCLAIMERS

We, SAGINOMIYA SEISAKUSHO, INC., (hereinafter referred to as "Saginomiya"), truly appreciate your choosing Saginomiya's product. When using Saginomiya's own products and other products supplied by Saginomiya (hereinafter referred to as the "Product"), this document as provided below shall be applicable except to the extent that there is anything to the contrary in any applicable estimate, agreement, catalogue, specification, etc.

● CONFIRMATION OF OPERATION

All customers using the Product (hereinafter referred to as "Customers") are requested to, after properly installing the Product, test the operation of the Product to confirm that all the systems in connection with the Product fully function.

In order to prevent the occurrence of bodily injury, fire accidents, serious damage, etc., in connection with the Customers' machinery or equipment due to improper installation of the Product, Saginomiya kindly requests the Customers to take the necessary safety measures by preparing safe designs such as a fail-safe design (*1) and a fire spread prevention design, as well as to make the proper adjustments for product reliability necessary for fault-tolerance (*2).

(*1) Fail-safe design: Design to ensure safety in the event of any mechanical failure

(*2) Fault-tolerance: Utilization of redundancy technology

Periodic Inspection of the Product

Be sure to confirm the proper operation of the Product and keep records of such operation at least once a year.

Saginomiya shall be held harmless and be indemnified by the Customers from any damages incurred due to the Customers failing to conduct the above operational procedures, provided, however, that, this shall not apply if the damages which the Customers incurred due to the defect of the Product caused by Saginomiya.

● RESTRICTIONS OF USE

The Product is designed and manufactured for the purpose of using them for cooling and heating and refrigerating appliances and air conditioning equipment or various industrial equipment, but is not designed and manufactured for the purpose of using the Product for any instrument or system related to human life or health purposes.

Therefore, the use of the Product in fields related to items (1) through (3) below is not intended whatsoever.

Saginomiya shall be held harmless and be indemnified from any and all damages incurred by use of the Product under item (3).

- (1) In any field related to nuclear power and radiation;
- (2) In any field related to space or seafloor equipment;
- (3) In any equipment or device requiring a high degree of reliance on such equipment or device with respect to which it is reasonably foreseeable that failure or malfunction of the equipment or device would either directly or indirectly cause serious damage to human life, health or property;

Also, when using the Product under the fields related to items (1) through (10), (except for item (3), in relation to which the Product must never be used), please be sure to notify Saginomiya's contact desk in charge of sales and obtain Saginomiya's prior written approval for such use.

Saginomiya shall be held harmless and be indemnified from any and all damages incurred by use of the Product in relation to these fields if the Customers do not notify Saginomiya's contact desk and obtain Saginomiya's prior written approval.

- (4) Heating, cooling, and refrigeration/air conditioning equipment using flammable and/or toxic refrigerants, excluding A2L refrigerants as defined in ISO 817, or various industrial equipment using flammable and/or toxic fluids, excluding A2L refrigerants as defined in ISO 817;
- (5) Transportation device (railroad, aviation, ship or vessel, vehicle equipment, etc.);
- (6) Disaster prevention or crime prevention device;
- (7) Facility or application directly related to medical equipment, burning appliances, electro thermal equipment, amusement rides and devices, facilities/applications associated directly with billing;
- (8) Equipment requiring high reliance on supply systems such as electricity, gas, water, etc., in large-scale communication system, or in transportation or air traffic control system;
- (9) Facilities that are to comply with regulations of governmental / public agencies or specific industries or
- (10) Other machineries or equipment equivalent to those set forth in the above items (4) to (9) which require for high reliability and safety.
- (11) Machinery and equipment that are intended or expected to be used under conditions other than those specified in the catalogues and instruction manuals;

It is recommended to replace the Product within 5 to 10 years of delivery if no other duration of use is provided in the applicable specifications or instruction manual because the conditions and environment of use also have an impact on the Product.

● SCOPE OF WARRANTY

SAGINOMIYA WILL PROVIDE THE CUSTOMERS WITH REPLACEMENT OR REPAIRED THE PRODUCT DELIVERED, FREE OF COST, ONLY WITHIN ONE YEAR (NOTE 1) OF DELIVERY TO THE CUSTOMER, IF FAILURE OCCURS IN THE CUSTOMERS' EQUIPMENT USING THE PRODUCT DUE TO A DEFECT OF THE PRODUCT; PROVIDED, HOWEVER, THAT IN ANY EVENT THE AMOUNT THAT SAGINOMIYA BEARS FOR THE DAMAGES INCURRED BY THE FAILURE OF THE PRODUCT OR CUSTOMERS' EQUIPMENT SHALL NOT EXCEED THE PRICE OF THE PRODUCT WE DELIVERED. IN ADDITION, SAGINOMIYA SHALL BE HELD HARMLESS AND BE INDEMNIFIED FROM ANY AND ALL DAMAGES INCURRED WHEN THE FAILURE OF THE CUSTOMERS' EQUIPMENT OCCURRED DUE TO ANY CAUSE SET FORTH BELOW.

- (1) WHEN CAUSED BY INAPPROPRIATE HANDLING OR USE OF THE PRODUCT BY THE CUSTOMERS (SUCH AS NOT COMPLYING WITH THE CONDITIONS, ENVIRONMENTAL SPECIFICATIONS OR CAUTIONS INDICATED IN ANY APPLICABLE CATALOGUE, SPECIFICATIONS, INSTRUCTION MANUAL, ETC.);
- (2) WHEN FAILURE OCCURRED DUE TO ANY REASON OTHER THAN THE PRODUCT;
- (3) WHEN CAUSED BY MODIFICATION OR REPAIR OF THE PRODUCT MADE BY ANYONE OTHER THAN SAGINOMIYA OR DESIGNEE OF SAGINOMIYA;
- (4) WHEN CAUSED BY THE USE OF THE PRODUCT IN VIOLATION OF THE ABOVE "RESTRICTIONS OF USE" OR "CONFIRMATION OF OPERATION";
- (5) WHEN SUCH FAILURE WAS NOT REASONABLY FORESEEABLE AT THE TIME OF SAGINOMIYA'S SHIPMENT; OR
- (6) BY ANY OTHER CAUSE NOT ATTRIBUTABLE TO SAGINOMIYA, SUCH AS AN ACT OF GOD, DISASTER, OR ACT OF ANY THIRD PARTY.

PLEASE NOTE THAT THE CUSTOMERS WILL NOT BE ENTITLED TO ANY OF THE ABOVE WARRANTY IF THE CUSTOMERS PURCHASED THE PRODUCT FROM INTERNET AUCTION, ETC.

(NOTE 1): IN THE CASE OF DANFOSS PRODUCTS, WITHIN EIGHTEEN (18) MONTHS FROM THE DATE OF MANUFACTURE.

SAGINOMIYA
SEISAKUSHO, INC.

This document shall apply to any catalogue and instruction manual issued by Saginomiya on or after December 2025.
STF04001 Annex1a 2025.12

The information in this instruction manual is current as of the date of publication and is subject to change without prior notice due to specification changes or improvements to the product.

We have made every effort to ensure its accuracy, but we shall not be responsible for any damages, direct or indirect, arising from errors, omissions, or use of the information.

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