AXS 315S: Continuous thermal actuator for unit valves with stroke indicator

AXS315SF*02

How energy efficiency is improved

Reliable actuation in efficient control systems

Features

- Actuation of unit valves and valves in surface heating and cooling systems as well as fan coils
- First-open function for low-force fitting on the valve using adapter ring
- NC “normally closed” and NO “normally open” versions
- NC version with first-open function
- Adaptation to valve using plastic adapter M30 × 1.5 or M28 × 1.5
- Max. closing force 125 N
- With 24 V thermal expansion element
- Large visible and tactile position indicator
- Low-noise and maintenance-free
- Contemporary design
- High functional quality and service life
- Version with 1m, 2m or 5m plug-in cable
- PVC or halogen-free cable, with or without position feedback, available as an accessory
- Can be mounted in any position, even suspended under the valve

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ValveDim app

Technical data

Power supply		
	Power supply 24 VAC	−10%, +20%, 50...60 Hz
	Power supply 24 VDC	−20%…+20%
	Power consumption during operation[1)]	1.2 W
	Start-up current	< 320 mA after max. 2 minutes
Parameters		
	Stroke[2)]	6.5 mm
	Closing force	125 N +5%
	Running time[3)]	30 s/mm
	Control signal	0…10 V
	Control signal input resistance	100 kΩ
	Position feedback signal	0...10 V (0.1 V resolution)
	Position feedback signal output impedance	10 kΩ
	Position feedback signal output current	0.1 mA (1 mA if shorted)
	Output load impedance	100 kΩ…1000 kΩ
Ambient conditions		
	Ambient temperature	0...50 °C
	Storage and transport temperature	−25…60 °C
	Operating temperature at valve	Max. 100 °C
	Humidity	< 85% rh, no condensation
Construction		
	Housing	White (RAL 9003), surface structured according to VDI 3400 Ref. 27
	Housing material	Polyamide
	Power cable[4)]	Ø 0.22 mm², 3- or 4-core, signal white (RAL 9003)
	Weight	0.15 kg (without power cable)

1) *Power consumption after expansion element has reached steady temperature state*
2) *Stroke, including 0.5 mm overstroke range; see “Adaptation and valve path detection”*
3) *Running time, see “Runtime behaviour”*
4) *Order the power cable separately*

Standards, directives

	Type of protection	IP54
CE/UKCA conformity[5)]	LV-D 2014/35/EU (CE)	EN 60730-1, EN 60730-2-14
	EESR-2016 (UKCA)	EN 60730-1, EN 60730-2-14
	EMC-D 2014/30/EU (CE)	EN 60730-1/-2/-14 (mode of operation 1, residential premises)
	EMC-2016 (UKCA)	EN 60730-1/-2/-14 (mode of operation 1, residential premises)
	RoHS-D 2011/65/EU & 2015/863/EU (CE)	EN IEC 63000
	RoHS-2012 (UKCA)	EN IEC 63000

Overview of types

Type	NC/NO	Features
AXS315SF102	NC	Without power cable, with adapter ring 0550389K010
AXS315SF202	NO	Without power cable, with adapter ring 0550389K010

Power cable must be ordered separately as an accessory

Accessories

The names of the manufacturers in the following list are provided for information purposes. Manufacturers may change the closing dimensions without prior notice.

Type	Delivery quantity	Description	Closing dimension
0550389K001	Set of 5	VA 10 adapter, plastic, light grey, M30 × 1.5 Suitable for: Dumser, Beulco (from 2005), Purmo, Strawa, Oventrop (also Cocon, Cocon 4, Hycocon,), Oventrop stainless steel distributor, Vescal (Metaplast), Cronatherm, eht Siegmund, Gampper, KaMo (H) before Sept. 2005, Aquatherm (brass distributor), Valvex brass distributor, Viega stainless steel distributor (Fonterra & pro Radiant), Thermotech, KaMo INOX distributor, Bianchi valves (series 401T & 403T) and brass distributor (series 332T), Unipipe (ECO distributor), CronaTech, Fränkische, Zehnder, ATS stainless steel distributor, Frese Optima (2.5 mm), Hesag/Herb (Profi-Line distributor), Luxor (CD distributor), TECE stainless steel (Strawa), Watts brass distributor (HKV-T), Tiemme valves, Watts (Vogel & Noot, Cosmo Objektline), Acome (Strawa), Multibeton HKV (Oventrop)	11 mm
0550389K101	Set of 100	Adapter like 0550389K001	11 mm
0550389K002	Set of 5	VA 16 adapter, plastic, red, M28 × 1.5 Suitable for: Polytherm (H), Buderus, Thermoval, KAN-Therm (brass distributor)	8.25 mm
0550389K102	Set of 100	Adapter like 0550389K002	8.25 mm
0550389K003	Set of 5	VA 17 adapter, plastic, dusty grey, M28 × 1.5 Suitable for: MMA (EDVH 25, FVXR 15, VXR 20), ICMA (BAS), industry technology Italy (DB VZ2)	11.5 mm
0550389K103	Set of 100	Adapter like 0550389K003	11.5 mm
0550389K004	Set of 5	VA 26 adapter, plastic, dusty grey, M30 × 1.5 Suitable for: Giacomini	4 mm
0550389K104	Set of 100	Adapter like 0550389K004	4 mm
0550389K005	Set of 5	VA 50 adapter, plastic, dark grey, M30 × 1.5 Suitable for: Honeywell & Braukmann, Broen (type: Ballorex Dynamic), Böhnisch/SBK (before 1998), Cazzaniga, Reich, MNG (before 1998), Frese, Schütz, Seppelfricke, Cufix, KaMo (from Sept. 2005), FAR (from 2007), Pantherm, Unicor, emcal (stainless steel from March 2013), Comap HKV module, black (H)	10 mm
0550389K105	Set of 100	Adapter like 0550389K005	10 mm
0550389K006	Set of 5	VA 64 adapter, plastic, pure white Suitable for: Pettinaroli	17.8 mm
0550389K106	Set of 100	Adapter like 0550389K006	17.8 mm
0550389K007	Set of 5	VA 78 adapter, plastic, pure white Suitable for: Danfoss RA, Oventrop type: V3D, GD & GDF, Jaga	28.8 mm

5) *Explanation of abbreviations in the "Additional technical information" section of this product data sheet and in the appendix to SAUTER product catalogues*

Type	Delivery quantity	Description	Closing dimension
0550389K107	Set of 100	Adapter like 0550389K007	28.8 mm
0550389K008	Set of 5	VA 80 adapter, plastic, pure white, M30 × 1.5 Suitable for: Heimeier, Herb, Onda, IVAR, Thermoval, Schlösser (from 1993), Kermi, Cazzaniga, Oventrop, Multiblock (from 1997), Frank (from 2003), Athe-Therm (brass up to Feb. 2005), Athe-Therm (stainless steel), BHS distributor, Jupiter, Böhnisch/SBK (from 1998), Simplex, RBM, Emmeti, Cosmo, Watts, Roth, Delphis-Therm, GC distributor, Cuprotherm, Caleffi distributor series 670 (plastic), Wieland, Caleffi, SKV distributor, Aquatechnik Italy (Multirapid, before 2007, from 2009), Brugman, TKM, Bianchi, Jaga, Gomacal, Nereus angle valve DN 10, Strasshofer, Taco (Vogel & Noot, Cosmo stainless steel and CMV module distributor), Caleffi (with thread ring on manufacturer side), Watts, Vogel & Noot (Cosmo brass distributor), RDZ (brass distributor), VIR (series 9520), Herz regulating valve and distributor	10.5 mm
0550389K108	Set of 100	Adapter like 0550389K008	10.5 mm
0550389K009	Set of 5	VA 90 adapter, plastic, crimson, M30 × 1.5 Suitable for: Chemidro, TECE (plastic distributor), KWH Pipe, Prandelli (brass HKV), Athe-Therm (brass from Feb. 2005), Roth DE (H) (type: Universal HK2), Uponor stainless steel distributor, Reliance stainless steel, SAS brass distributor, Luxor, Tiemme brass distributor (series: 'Floor'), Honeywell VSMF, Afriso pro Calida EF1 (plastic)	11.5 mm
0550389K109	Set of 100	Adapter like 0550389K009	11.5 mm
0550389K010	Set of 5	VA 41 adapter, plastic, dark green, M30 × 1.5 Suitable for: Danfoss AB-QM (DN 10–DN 20) (4 mm actuator), Danfoss AB-QM (DN 25–DN 32) (5 mm actuator), RDZ (plastic distributor), Vescal (Cazzaniga), Frese Optima Compact and EVA (from 2016) + 5 mm actuator	9.5 mm
0550389K110	Set of 100	Adapter like 0550389K010	–
0550600103	1x 1 metre	Power cable, 0…10 V, 3-core, 0.22 mm², type LiYY, PVC	–
0550600203	1x 2 metres	Power cable, 0…10 V, 3-core, 0.22 mm², type LiYY, PVC	–
0550600503	1x 5 metres	Power cable, 0…10 V, 3-core, 0.22 mm², type LiYY, PVC	–
0550600113	1x 1 metre	Power cable, 0…10 V, 3-core, 0.22 mm², type LiZ1Z1, halogen-free	–
0550600213	1x 2 metres	Power cable, 0…10 V, 3-core, 0.22 mm², type LiZ1Z1, halogen-free	–
0550600513	1x 5 metres	Power cable, 0…10 V, 3-core, 0.22 mm², type LiZ1Z1, halogen-free	–
0550600114	1x 1 metre	Power cable, 0…10 V, 4-core, 0.22 mm², type LiZ1Z1, halogen-free, position feedback	–
0550600214	1x 2 metres	Power cable, 0…10 V, 4-core, 0.22 mm², type LiZ1Z1, halogen-free, position feedback	–
0550600514	1x 5 metres	Power cable, 0…10 V, 4-core, 0.22 mm², type LiZ1Z1, halogen-free, position feedback	–

Special covers to prevent theft or vandalism, for example, are available on request

Description of operation

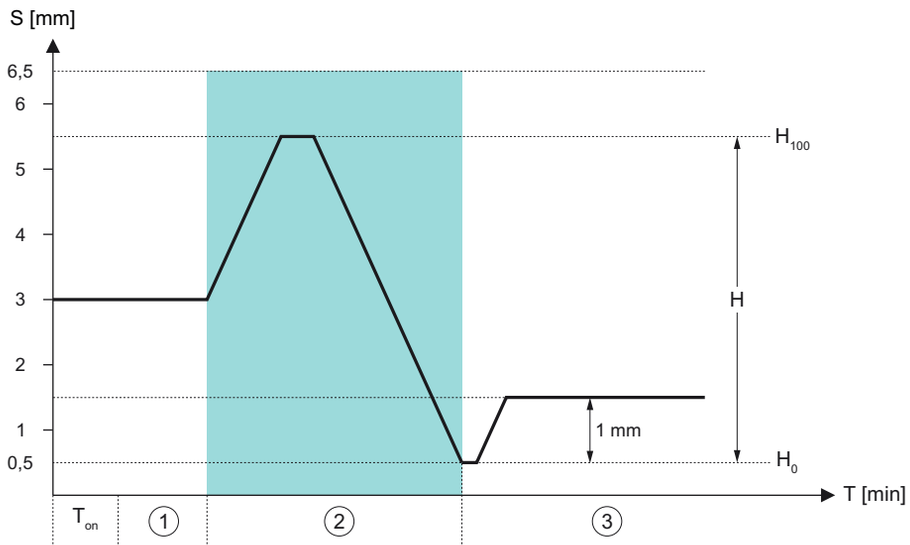
The AXS 315S thermal actuator has an electrically heated expansion element and a compression spring. When a voltage and a 0…10 V positioning signal are applied, the heating element is heated to the temperature necessary for the travel range. The expansion element expands (NC) or contracts (NO) and moves the spindle against or with the spring force accordingly.
The spindle transfers its stroke directly to the valve of the heating or cooling system. The temperature necessary for the travel range is determined by the internal, wear-free position detection system. From 0 to 0.5 V (NC) or 10 to 9.5 V (NO) the actuator remains idle.
The actuator operates quietly and is maintenance-free.

First-open function

On delivery, the AXS315SF102 actuator (NC version) is locked by the first-open function at approx. 3 mm actuator stroke when de-energised. This allows the actuator to be fitted on the valve without

requiring much force and allows heating without a power supply and positioning signal during the construction phase.
During initial commissioning, when the operating voltage is applied, the first-open function is automatically unlocked after about 6 minutes. After this, valve path detection takes place.
The first-open function cannot be reactivated in the field.

Example initialisation, valve with 5 mm stroke, ambient temperature approx. 25 °C

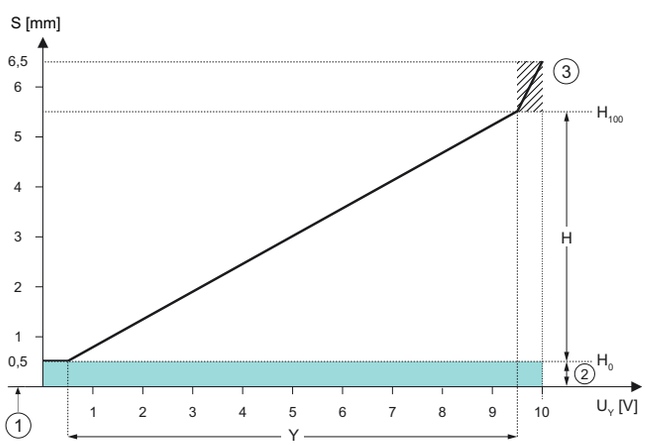


T_{on}	Dead time after first switching on approx. 3.5 minutes	(1)	First-open function triggered after approx. 6 minutes
(2)	Approaching and measuring valve limit stops approx. 19 minutes	(3)	Positioning signal at 20% valve opening = 1.8 V (corresponds to 1 mm stroke)
H_{100}	Valve stroke at full opening	H_0	Valve closed
S	Actuator stroke in millimetres	T	Time in minutes

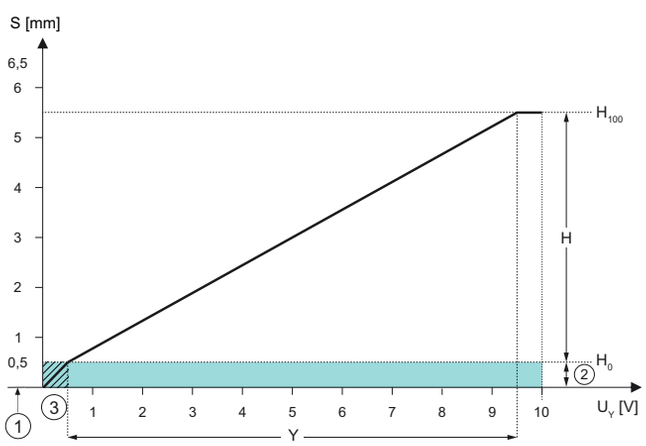
Initialisation

Valve path detection takes place automatically after the first-open function and takes about 19 minutes. The valve limit stops are approached and the control signal and position feedback signal are adapted to the measured valve stroke. The actuator saves these values permanently as soon as the operating voltage is present for longer than 8 hours. If the operating voltage is interrupted before the 8 hours have passed, valve path detection starts again when the power supply returns.

Example NC, valve with 5 mm stroke



Example NO, valve with 5 mm stroke



S	Actuator stroke in millimetres	(1)	Valve adapter edge
H_0	Valve closed	(2)	Overstroke range

H_{100}	Valve stroke at full opening	(3)	Remaining actuator stroke range
U_Y	Control signal in volts	Y	Control signal (active range)

The overstroke range (2) evens out manufacturing tolerances and ensures that the valve reliably closes

Note

Valve path detection can be forced manually if the actuator is fitted on a valve. To do this, the control voltage must be set as follows:

- NC version: 1 hour at 0 V, then 1 hour at 10 V
- NO version: 1 hour at 10 V, then 1 hour at 0 V

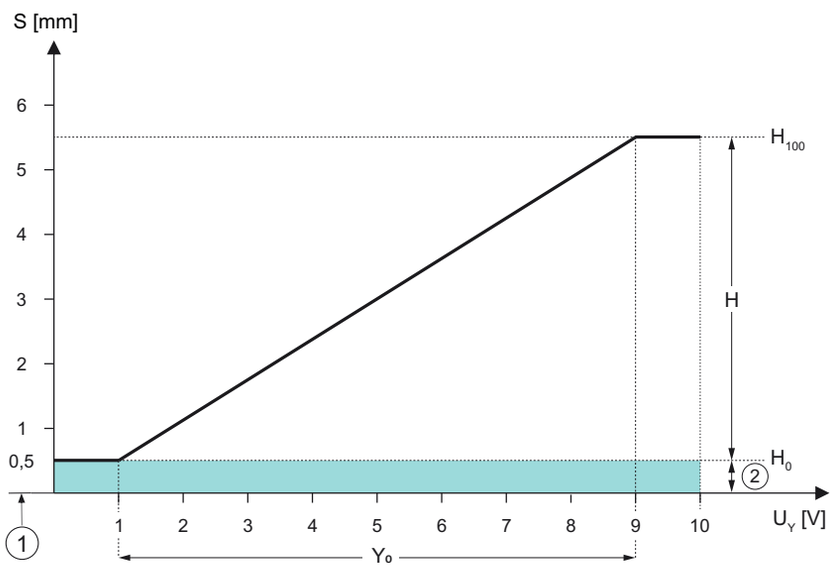
Specifying the control voltage causes the actuator to move to both end positions. After this, the actuator must be supplied with voltage for at least another 8 hours so that the opening and closing points of the valve are permanently saved.

The data remains stored even if the power fails.

Position feedback signal

If the 4-core power cable (0550600*14) is used, a 0…10 V position feedback signal is available, allowing the actuator position to be fed back directly to the controller. The position feedback signal is proportional to the adapted valve stroke.

Example, valve with 5 mm stroke



S	Actuator stroke in millimetres	(1)	Valve adapter edge
H_0	Valve closed	(2)	Overstroke range
H_{100}	Adapted valve stroke at full opening	Y_0	Feedback signal (see table)
U_Y	Control signal in volts		

The overstroke range (2) evens out manufacturing tolerances and ensures that the valve reliably closes

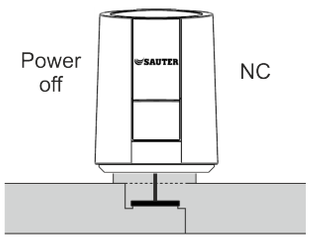
Feedback signal (Y_0)	Function
< 0.5 V	No function or contact
1 V	Valve closed (NC unheated, NO heated)
1…9 V	Position feedback signal proportional to the adapted valve path
9 V	Valve open (NC unheated, NO heated)
> 9.5 V	Internal error
5 V	Voltage during initialisation

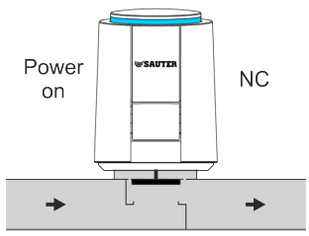
Definition of NC/NO

NC version “normally closed”

The valve is closed in the idle state and when the actuator’s first-open function has been deactivated. When voltage is applied to the actuator, the actuator spindle retracts, causing the valve spindle to extend. The valve is opened.

Valve state with actuator de-energised: Closed.

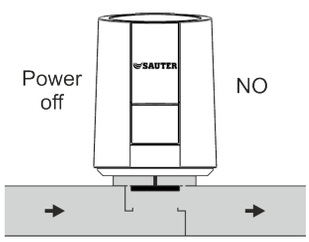


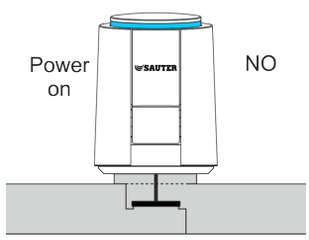


NO version “normally open”

After the actuator is fitted, the valve is open in the idle state. When voltage is applied to the actuator, the actuator spindle extends and pushes the valve spindle. The valve is closed.

Valve state with actuator de-energised: Open.





Position indicator

The head of the housing acts as a position indicator. The cylindrical blue indicator is visible in all directions and can be felt in the dark. On the normally closed version, the position indicator is extended and the blue ring is visible. At full stroke, the position indicator is up to 7 mm above the outer edge of the housing.

On the normally open version, the position indicator is retracted and the blue ring is not visible. The position indicator is at the same height as the edge of the housing.

Intended use

These devices may only be used in private and commercial, non-industrial areas.

The devices are suitable for controlling inert systems, such as surface heating and cooling systems or thermo-active building systems (TABS), as well as for controlling medium-inertia systems, such as radiators or chilled beams.

The section “Description of operation” and all product instructions in this data sheet must be observed.

Modifying or converting the product is not admissible.

Improper use

The AXS 315S actuator is classified as light-duty equipment and may not be operated in industrial environments.

The device may not be relied upon for functional safety and is not fail-safe.

The actuator is not suitable for:

- Safety applications
- Use outdoors and in areas where there is a risk of condensation

Engineering and fitting notes

NOTICE!
Connection and fitting may only be carried out by an authorised electrician. The regulations and rules of electrical installation must be observed.

Product contains leaded brass. Observe the local laws regarding information obligations, such as CalPro65, TSCA and REACH.
When selecting the switching contacts and the mains fuses, the start-up current of the heating element must be considered. To comply with the specified technical data, the voltage loss due to the electric lines must not exceed 10%.
The following cables and lengths are recommended:

Cable	Cross-section [mm²]	Length [m]
J-Y(ST)Y	0.22	20
J-Y(ST)Y	0.5	45
NYM/NYIF	1.5	80

For operation with AC voltage (24 VAC), use a safety transformer as per EN 61558-2-6.
For operation with DC voltage (24 VDC), use a switched-mode power supply unit as per EN 61558-2-16.
The choice of power supply is determined by the starting power of the actuator.
Formula for calculating the starting power:
$P_{Transformer}$ = 6 W × n
n = number of actuators on a power supply

Note
These actuators are in installation class 1 according to EN 61000-4-5.
Any pulse voltages in the systems may not exceed 500 Vp or must be attenuated using additional protective elements.

Fitting

The actuator is fitted to the valve with little force by attaching the actuator to the adapter. First the adapter must be screwed onto the valve and tightened by hand to about 2 Nm.
On delivery, the actuator is open when deenergised (NC: first-open function).
The device can be mounted in any position. We recommend positioning the valve vertically above the valve or horizontally to the valve.
Damaged actuators must not be installed, or must be disconnected from the mains immediately.

NOTICE!
Risk of damage to the actuator.
►Only operate the actuator if it is mounted on the valve.
►Observe the fitting instructions.

Dismantling and disposal

1. Disconnect the actuator from the power supply.
2. Press the rectangular button on the housing.
3. Remove the actuator from the valve adapter.

When disposing of this product, observe local and current legislation and the declaration on materials and the environment for this product (MD 55.105).

WARNING!
Eye injury due to spring escaping.
►Wear safety goggles when opening and disassembling the device. The built-in spring is pre-loaded with approx. 100 N.

Note
If reinstalling an unlocked actuator, make sure that it is not attached at an angle.

Removal protection
The actuator is protected against removal. After removing the locking button on the front, the actuator can no longer be removed. To remove it, the locking button must be attached again.

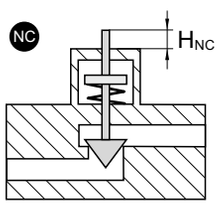
Electrical connection
The device may only be connected when the power cable is disconnected from the electrical supply.
Wire stripping length approx. 10 mm.
Connect the actuator to a safety transformer with a maximum of 100 W (SELV-, PELV- circuit).
Water pipes must be earthed in accordance with local regulations.

Version with plug-in power cable
The device is supplied without a power cable. The cable must be ordered separately. It is a plug-in cable and must be connected before the actuator is fitted to the valve.

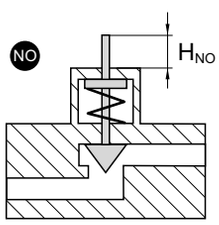
Note
The actuator must not be supplied with power until the power cable has been fitted.
Plug-in power cables must not be used as isolating devices.

Definition of valve closing dimension

NC version "normally closed"
The closing dimension H_{NC} is the distance between the spindle head and the contact surface of the valve thread when the spindle is pushed in with a preload of max. 100 N. The valve adapter sits on the contact surface of the valve thread.



NO version "normally open"
The closing dimension H_{NO} is the distance between the spindle head and the contact surface of the valve thread when the spindle is not pressed in. The valve adapter sits on the contact surface of the valve thread.



Valve adapter

To mount the actuator on the existing valve, select the appropriate valve adapter. The valve adapter ensures mechanical compatibility in terms of the closing dimension and attachment on the valve body. The valve adapter 0550389K010 is supplied with the actuator as standard.

Note
All SAUTER unit valves (VUT, BUT, VUL, BUL, BXL and VDL) can be used directly in combination with the AXS 315S and the supplied valve adapter.

Additional technical information

Fitting instructions for AXS315SF*02	P100019937
Declaration on materials and the environment	MD 55.105

Materials

Component	Designation
Hood	Polyamide
Housing base	Polyamide
Valve adapter	Polyamide
Pressure sleeve	Polyamide
Adapter spindle	Polyamide
Compression spring	Steel
PTC stroke element	CuZn (brass) [6]
Moulded seal	EPDM
O-ring	EPDM

For further information on materials, see declaration on materials and the environment MD 55.105

Abbreviations used

CE	Manufacturer’s Declaration of Conformity for the European Union (EU)
EESR-2016	Electrical Equipment (Safety) Regulations 2016 (UK)
EMC-2016	Electromagnetic Compatibility Regulations 2016 (UK)
EMC-D	Electromagnetic Compatibility Directive 2014/30/EU
LV-D	Low Voltage Directive 2014/35/EU
RoHS-D	Restriction of Hazardous Substances in Electrical and Electronic Equipment Directives 2011/65/EU & 2015/863/EU
RoHS-2012	Restriction of Hazardous Substances (RoHS) Regulations 2012 (UK)
UKCA	Manufacturer’s Declaration of Conformity for the United Kingdom of Great Britain and Northern Ireland (UK)

Valve design

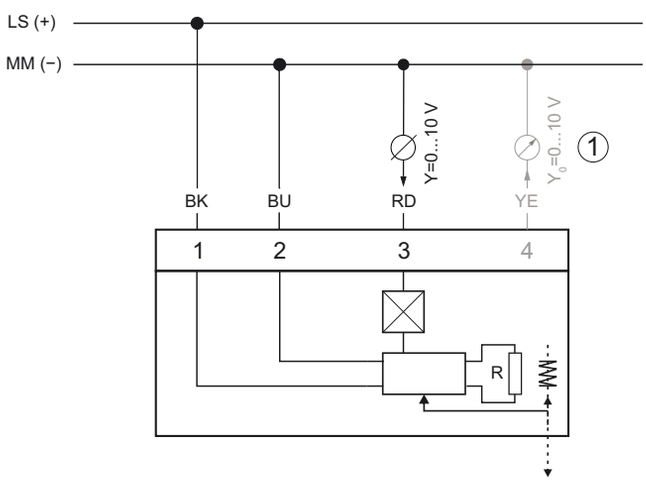
SAUTER provides various tools for valve design and engineering:

- ValveDim smartphone app
- ValveDim PC program
- ValveDim slide rule

You can find the tools under the link www.sauter-controls.com/en/performance/valve-calculation/ or scan the QR code

[6] *Brass contains lead*

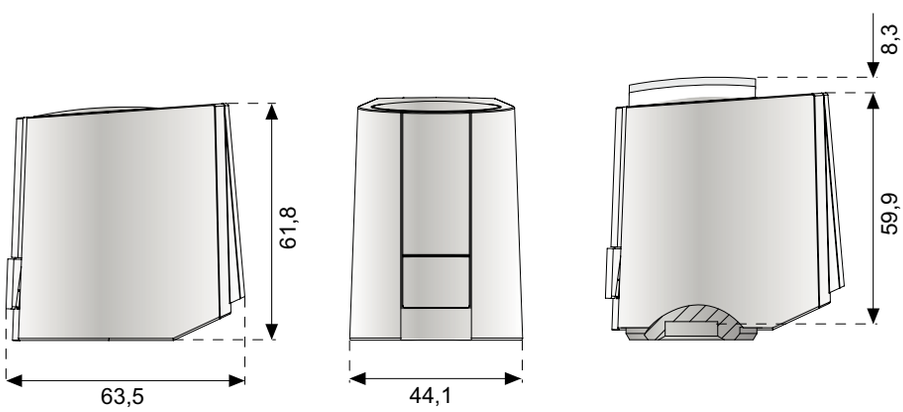
Connection diagram

AXS315SF*02	Key
	BK = black BU = blue RD = red YE = yellow

(1) Position feedback signal (Y_0) only with cable 0550600*14

Dimension drawings

All dimensions in mm.



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