

AXT 301, 311: Thermal actuator for unit valves with stroke indicator

How energy efficiency is improved

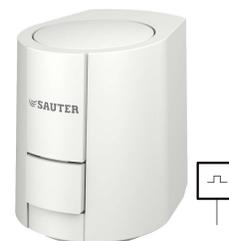
Reliable actuation in efficient control systems

Features

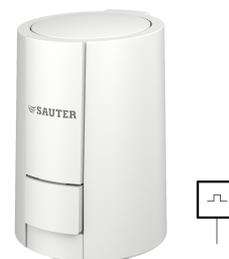
- Actuation of unit valves and valves in surface heating and cooling systems as well as fan coils
- Low-force fitting on the valve using adapter ring
- NC “normally closed” and NO “normally open” versions
- NC version with first-open function
- Adaptation to valve using plastic adapter M30 × 1.5 or M28 × 1.5
- Max. closing force 125 N
- With 230 V or 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 integrated auxiliary contact
- Standard version with 1-metre cable permanently connected
- Version with 2 m or 5 m plug-in cable
- Can be mounted in any position, even suspended under the valve



AXT301F***



AXT301HF11*



AXT311F11*

Technical data

Power supply		
	Power supply 230 VAC	±10% 50...60 Hz
	Power supply 24 VAC/DC	+20%...-10%
	Power consumption during operation ¹⁾	Approx. 1 W
	Start-up current 230 VAC	< 550 mA after max. 100 ms
	Start-up current 24 VAC/DC	< 300 mA after max. 2 min.
AXT301HF110/112		
	Power for auxiliary contacts 230 V	5(1) A, 50/60 Hz
	Power for auxiliary contacts 24 V	3(1) A, 50/60 Hz
	Changeover point of auxiliary contact	For approx. 2 mm stroke
Ambient conditions		
	Ambient temperature	0...60 °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 ²⁾	PVC hose line (H03V2V2-F), Ø 0.75 mm ² , fixed mounting, light grey (RAL 7035)
	Weight	0.1 kg (with 1 m power cable)
Standards, directives		
	Type of protection	IP54
	Protection class 230 V	II (EN 60730-1)
	Protection class 24 V	III (EN 60730-1)
CE/UKCA conformity ³⁾		
	LV-D 2014/35/EU (CE)	EN 60730-1, EN 60730-2-14
	EESR-2016 (UKCA)	EN 60730-1, EN 60730-2-14

¹⁾ Power consumption after expansion element has reached steady temperature state

²⁾ AXT301F100 and F102 without pre-assembled cable

³⁾ Explanation of abbreviations in the “Additional technical information” section of this product data sheet and in the appendix to SAUTER product catalogues



ValveDim app



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	Voltage	Stroke	Closing force	Running time	NC/NO	Cable length	Function
AXT301F110	230 VAC	5.0 mm	100 N	4.0 min	NC	1 m	–
AXT301F112	24 VAC/DC	5.0 mm	100 N	4.0 min	NC	1 m	–
AXT301F210	230 VAC	5.0 mm	100 N	4.0 min	NO	1 m	–
AXT301F212	24 VAC/DC	5.0 mm	100 N	4.0 min	NO	1 m	–
AXT301F100	230 VAC	5.0 mm	100 N	4.0 min	NC	Without cable	–
AXT301F102	24 VAC/DC	5.0 mm	100 N	4.0 min	NC	Without cable	–
AXT301HF110	230 VAC	4.0 mm	100 N	3.5 min	NC	1 m	Auxiliary contacts
AXT301HF112	24 VAC/DC	4.0 mm	100 N	3.5 min	NC	1 m	Auxiliary contacts
AXT311F110	230 VAC	6.5 mm	125 N	4.5 min	NC	1 m	–
AXT311F112	24 VAC/DC	6.5 mm	125 N	4.5 min	NC	1 m	–

💡 AXT301F100/102: Connection cable available as optional accessory

💡 AXT301F*1*: Including adapter ring 0550389K008 M30 × 1.5 for closing dimension 10.5 mm, pack of one

💡 AXT311F11*: Including adapter ring 0550389K008 M30 × 1.5 for closing dimension 8.5 mm in combination with Frese or Siemens PICV valves

Accessories

i Valve adapters: The names of the manufacturers 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, Hycoccon.), 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

Type	Delivery quantity	Description	Closing dimension
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
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, dusty grey, 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	–
0550600202	1x 2 metres	PVC flat cable H03V2V2H2-F, 2-core, 0.75 mm ²	–
0550600212	1x 2 metres	Thermoplastic cable H03Z1Z1-F, 2-core, 0.75 mm ² , halogen-free	–
0550600502	1x 5 metres	PVC flat cable H03V2V2H2-F, 2-core, 0.75 mm ²	–
0550600512	1x 5 metres	Thermoplastic cable H03Z1Z1-F, 2-core, 0.75 mm ² , halogen-free	–

💡 The cables for the AXT301F100 and AXT301F102 actuators must be ordered separately and can be fitted as required on site. It is not possible to install the cables at the factory

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

Description of operation

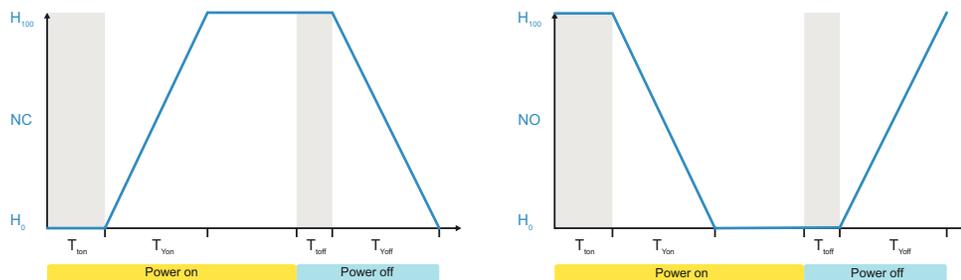
The AXT 301 and 311 thermal actuators are equipped with an electrically heated expansion element and a compression spring. When a voltage is applied, the heating element heats up, the expansion element expands and moves the spindle against the spring force after a warming-up time (T_{ton}). The spindle transfers its stroke directly to the valve of the heating or cooling system. The maximum stroke H_{100} is reached after the time T_{Yon} .

When the heating element is switched off, the expansion element cools down. The stroke on the valve is reduced after the dead time T_{toff} . The valve is completely closed at the end of the actuator running time T_{Yoff} .

Quasi-continuous control is achieved with a "pulse-pause" clock signal on the controller side, which causes the expansion element to heat up and cool down periodically.

The actuators operate quietly and are maintenance-free.

Runtime behaviour at ambient temperature (approx. 25 °C)



- H₀ Valve closed
- H₁₀₀ Stroke at full opening
- T_{ton} Dead time after first switch-on
- T_{Yon} Actuator running time for full stroke
- T_{toff} Dead time after switch-off
- T_{Yoff} Actuator running time after switch-off

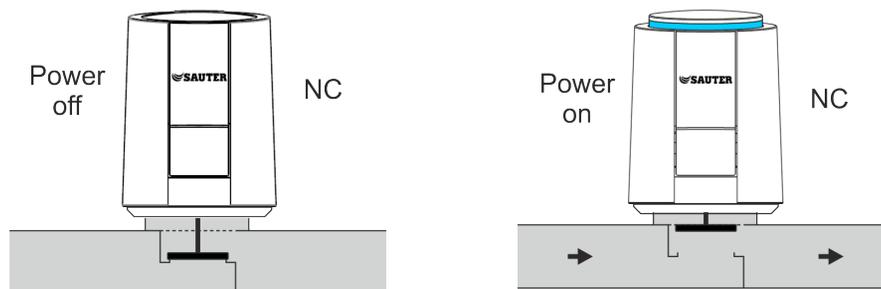
Type	H ₁₀₀	T _{ton}	T _{Yon}	T _{toff}	T _{Yoff}
AXT301HF***	4.0 mm	2.0 min ⁴⁾	3.5 min	0.5 min	3.5 min
AXT301F***	5.0 mm	2.5 min ⁵⁾	4.0 min	0.5 min	4.0 min
AXT311F***	6.5 mm		4.5 min	0.5 min	4.5 min

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.



On delivery, the first-open function is active, which means the actuator is in the open state when deenergised. This means it can be installed without applying much force and the valve remains open. This allows heating operation in the construction phase. The first-open function is deactivated by applying supply voltage for at least 6 minutes and the actuator is fully operational.

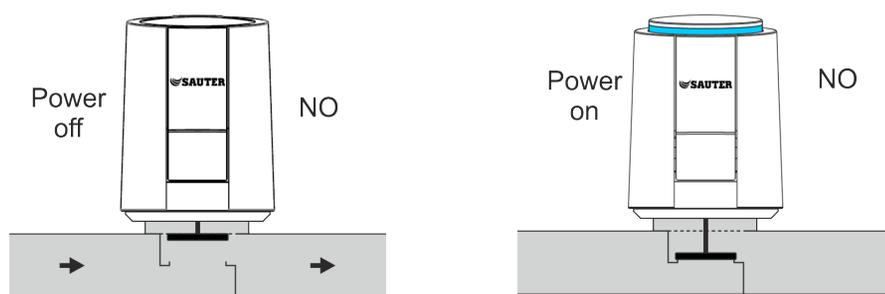
NO version "normally open"

Once the actuator is fitted, the valves are 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.

⁴⁾ 230 V version

⁵⁾ 24 V version



Position indicator

The head of the housing acts as a position indicator. The cylindrical indicator is visible in all directions and can be felt in the dark. On the “normally closed” version, the position indicator is extended and its blue light 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 light 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 AXT 301 and 311 actuators with H03 power cable are classified as light-duty equipment and may not be operated in industrial environments.

The devices may not be relied upon for functional safety and are not fail-safe.

The actuators are 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 containing 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%. For the 230 V version of the actuator, the outer conductor (L, brown) must always be switched. The neutral conductor (N, light blue) must not be switched.

The following cables are recommended for installation:

- Sheathed cable, NYM, 1.5 mm²
- Webbed cable, NYIF, 1.5 mm²

In the 24 V version, either one of the two conductors or both conductors can be switched simultaneously.

The following cables and lengths are recommended:

Cable	Diameter [mm]	Cross-section [mm ²]	Length [m]
J-Y(ST)Y	0.8	–	45
NYM/NYIF	–	1.5	80

For actuators with AC voltage (24 VAC / 230 VAC), use a safety transformer as per EN 61558-2-6.
For actuators 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:

$$P_{\text{Trafo}} = 6 \text{ W} \times n$$

n = number of actuators on a power supply

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 (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 55.102).



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.

Electrical connection

The device may only be connected when the power cable is disconnected from the electrical supply.

Wire stripping length approx. 10 mm.

Protect 230 V actuators and power line against overload or short circuit with an external fuse with a maximum of 6 A. No such fuse is integrated in the device.

Connect 24 V actuators to safety transformers 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 AXT301F100 and F102 actuators are supplied without a power cable. The cables must be ordered separately. The cables are pluggable and can be fitted in the field.



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.

Version with auxiliary contact

The AXT301HF110 and HF112 actuators with integrated auxiliary contact (NO) can be used to switch a circulation pump, for example.

When the actuator opens, the internal contact is closed at a stroke of approx. 2 mm.

The following switch ratings are permitted:

Version	Resistive load	Inductive load
230 VAC	5 A	1 A
24 VAC	3 A	1 A
4...30 VDC	1...100 mA	–
48 VAC	1 A	–

The electrical circuits on the auxiliary contacts and the actuator must be on the same phase. Different circuits, such as low voltage and extra low voltage, must not run on the same cable.

Control with thermal actuator

Controller type

There are basically two options for control with AXT 301 and 311 actuators: quasi-continuous and discontinuous control (2-point controller). The quasi-continuous controller can always be used if the controlled section has linear behaviour, as is usually the case with room temperature control. The control performance using a quasi-continuous controller is better than with a discontinuous controller. Discontinuous controllers (2-point) are recommended for control of non-linear sections. Continuous control is not possible with AXT 301 and 311 actuators. The AXS 315S actuator is suitable for this purpose.

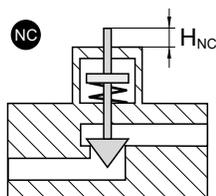
Position control (2-point actuator)

The AXT 301 and 311 actuators cannot be used to move to any particular position. Only the “extended” and “retracted” actuator positions are ensured with a controller.

Definition of valve closing dimension

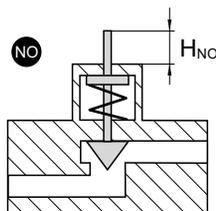
NC version “normally closed”

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 0550389K008 is supplied with the actuator as standard.

Use the following adapters for SAUTER valves in combination with AXT 301:

SAUTER valve type	Closing dimension [mm]	Valve stroke [mm]	Valve adapter
VUT	11.5	3.0	0550389K008
BUT DN10...15	11.5	3.0	0550389K008
BUT DN15F400...DN20 ¹⁾	11.5	4.0	0550389K008
VUL ¹⁾	11.5	4.0	0550389K008
BUL ¹⁾	11.5	3.7	0550389K008
BXL025...040	11.5	2.9	0550389K008
VDL010F200 ¹⁾	10.8	5.0	0550389K010
VDL010F201 ¹⁾	10.8	5.0	0550389K010
VDL010F210	11.4	2.5	0550389K008
VDL010F211	11.4	2.5	0550389K008
VDL015F200	11.4	2.5	0550389K008
VDL015F200H ¹⁾	10.8	5.0	0550389K010
VDL015F201	11.4	2.5	0550389K008
VDL015F201H ¹⁾	10.8	5.0	0550389K010
VDL015F210 ¹⁾	10.8	5.0	0550389K010
VDL015F211 ¹⁾	10.8	5.0	0550389K010
VDL015F220	11.4	2.5	0550389K008
VDL015F221	11.4	2.5	0550389K008
VDL020F200 ¹⁾	10.8	5.0	0550389K010
VDL020F201 ¹⁾	10.8	5.0	0550389K010
VDL020F210 ¹⁾	11.4	4.0	0550389K008
VDL020F210H ¹⁾	10.3	5.5	0550389K010
VDL020F211 ¹⁾	11.4	4.0	0550389K008
VDL020F211H ¹⁾	10.3	5.5	0550389K010
VDL020F220	11.4	2.5	0550389K008
VDL020F221	11.4	2.5	0550389K008
VDL025F200 ¹⁾	10.3	5.5	0550389K010
VDL025F201 ¹⁾	10.3	5.5	0550389K010
VDL025F210 ¹⁾	10.3	5.5	0550389K010
VDL025F211 ¹⁾	10.3	5.5	0550389K010
VDL032F200 ¹⁾	10.3	5.5	0550389K010
VDL032F201 ¹⁾	10.3	5.5	0550389K010

 1) In combination with AXT301HF11*, the valve only opens up to approx. 60%, including a closing safety tolerance of 0.8 mm

Additional technical information

Fitting instructions for AXT301F*1*	P100019922
Fitting instructions for AXT301F10*	P100019940
Fitting instructions for AXT301HF11*	P100019941
Fitting instructions for AXT311F11*	P100019942
Declaration on materials and the environment	MD 55.102

Materials

Component	Designation
Hood	Polyamide
Housing base	Polyamide
Valve adapter	Polyamide
Pressure sleeve	Polyamide
Adapter spindle	Polyamide
Compression spring	Steel

Component	Designation
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 55.102

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



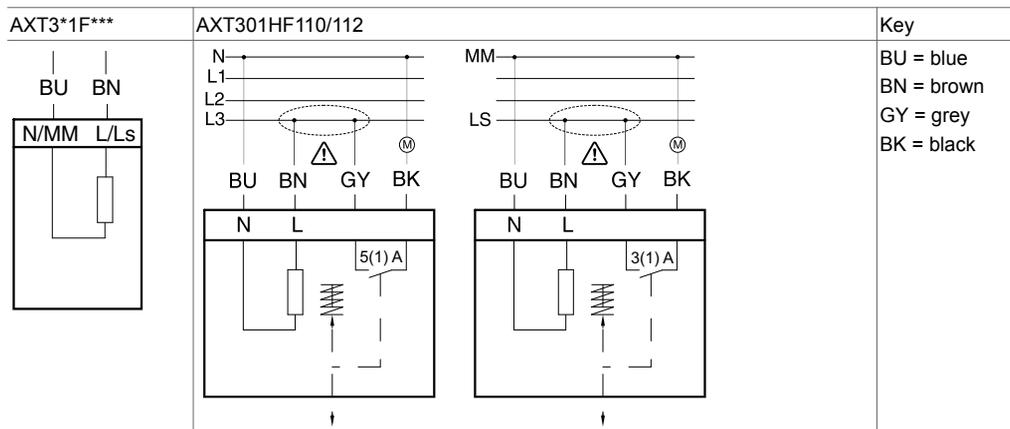
SAUTER provides various tools for valve design and engineering:

- 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



Connection diagram



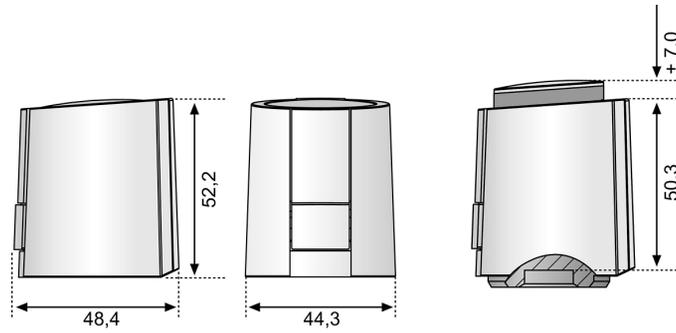
⁶⁾ Brass contains lead

Dimension drawings

All dimensions in mm.

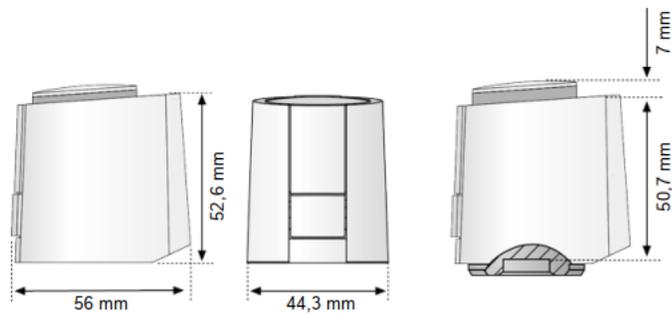
Standard

AXT301F110/112/210/212



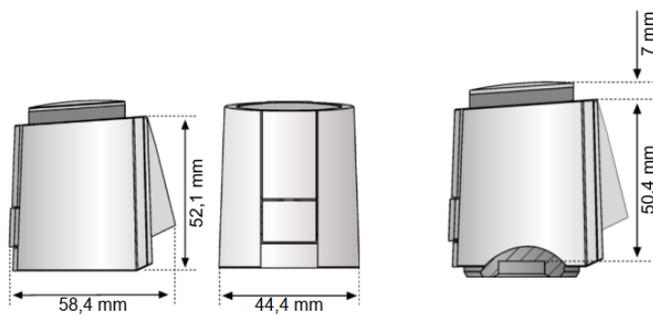
Standard with auxiliary contact

AXT301HF110/112



Standard with plug-in cable

AXT301F100/102



Version with 6.5 mm stroke
AXT311F110/112

