Thermal actuators

for terminal unit valves VVP47..., VXP47... and VMP47...

STP21…
STP71…

- **STP21… AC 230 V operating voltage, 2-position control signal**
- **STP71... AC/DC 24 V operating voltage, 2-position control signal or PDM (pulse-duration modulation)**
- **Positioning force 105 N**
- **For direct mounting with union nut (no tools required)**
- **Standard versions with 1.2 m or 5 m connecting cables**
- **Two-wire connection**
- **Position indication**
- **Robust construction, quiet operation, no maintenance required**
- **Valves can be opened without positioning signal (for filling the system)**
- **Optional tamper-proof fitting to prevent dismantling (for radiator valves only)**

Use

For water-based control of terminal units, heating and cooling zones

Standard applications (valve closed when actuator de-energized):
- For Siemens small valves types VVP47…, VXP47… and VMP47…
- For retrofitting Siemens small valves 2W…, 3W… und 4W…

Special applications (valve open when actuator de-energized):
- For Siemens radiator valves, MiniCombiValves, small valves and valves from other manufacturers

- DESIGO RX… controllers: Use STP72E – data sheet N4876

Type summary

Type	Operating voltage	Positioning time at 20 °C	Positioning signal	Connecting cable
STP21	AC 230 V	3 min	2-position	1.2 m
STP21/50				5.0 m
STP71	AC / DC 24 V		2-position PDM [1]	1.2 m
STP71/50				5.0 m

[1] pulse-duration modulation

Accessories

Adapter type	For valve makes	Adapter type	For valve makes
AL100	Siemens 2W..., 3W..., 4W...	**AV56**	Giacomini
AV51	Beulco old (M30 x 1.0)	**AV57**	Herz
AV52	Comap	**AV58**	Oventrop old (M30 x 1.0)
AV53	Danfoss RA-N (RA2000)	**AV59**	Vaillant
AV54	Danfoss RAVL	**AV60**	TA [1]
AV55	Danfoss RAV	**AV61**	Markaryd

[1] No adapter required for type TBV-C.

Type	Description
AL41	Tamper-proof fitting to prevent dismantling of actuators (for radiator valves only)

Ordering

When ordering please specify the quantity, product name and type code.

Example: 1 actuator, type STP21 with 1.2 m cable and
1 adapter, type AV53

Delivery: The valves, actuators and accessories are supplied in separate packages.

Equipment combinations

Valve type	Description	k_{vs} [m^3/h]	$\dot{V}$ [l/h]	PN class	Data sheet
VVP47...	2-port valves	0.25...4.0		PN 16	N4847
VXP47...	3-port valves				
VMP47...	3-port valves with T-bypass	0.25...2.5			
2W... [1]	2-port valves	0.6...2.5			N4846
3W... [1]	3-port valves	0.6...4.0			
4W... [1]	3-port valves with T-bypass	0.6...2.5			
V…I46…, V…S46…	Zone valves	2…5			N4842
VDN..., VEN..., VUN...	Radiator valves [2]	0.09…1.41		PN 10	N2105, N2106
VPD..., VPE...	MCV radiator valves [2]		25…483		N2185
VD1…CLC	Small valves	0.25…2.6			N2103

Radiator valves (M30 x 1.5) from other manufacturers, without adapter:

- Heimeier
- Cazzaniga
- Oventrop M30 x 1.5 (from 2001)
- Honeywell-Braukmann
- MNG
- TA-type TBV-C
- Junkers
- Beulco new

For other radiator valves [2] with type AV… adapters, see «Type summary / Accessories»

k_{vs} = Nominal flow rate of cold water (5 to 30 °C) through the fully opened valve (H_{100}) at a differential pressure of 100 kPa (1bar).
$\dot{V}$ = Volumetric flow at a stroke of 0.5 mm

[1] Replacement for thermal actuators STE22 and STE72 (AL100 adapter required).
[2] See «Application note» below

Technical note

NO, NC valves

NO valves	• Valve is open without actuator (normally open). • Valve stem is extended. • Radiator valves like VDN…, VEN…, VUN…, VPD… or VPE… are usually NO valves.
NC valves	• Valve is closed without actuator (normally closed). • Valve stem is extended. • Small valves like V…P47… are usually NC valves.

Valve and actuator combinations

NO function	• Actuator stem is retracted, when de-energized. • NO valve is required.
NC function	• Actuator stem is retracted, when de-energized. • NC valve is required.

Application note

		STA…	STP…
		Actuator de-energized	
Radiator valves	• VDN…, VEN…, VUN… • VPD…, VPE…	closed	open [1)]
Small valves	• V…P47…	A ↔ AB open	A ↔ AB closed
	• VD1…CLC	closed	open
Zone valves	• V…I46…, V…S46…	AB ↔ A closed	AB ↔ A open

[1)] Not applicable with DESIGO RX…

Technical and mechanical design

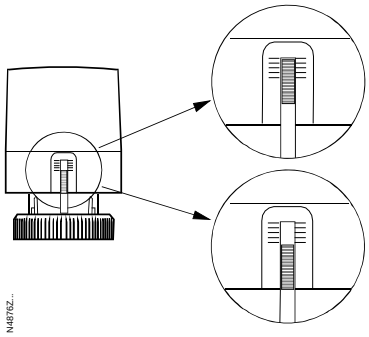
The following description of functions applies to standard applications (valve closed when actuator de-energized) with terminal unit valve types VVP47..., VXP47... and VMP47..., and types 2W..., 3W... and 4W....

Function

When the control signal is applied to the actuator, the temperature of the heating element rises, causing the solid expansion medium to expand. This expansion is converted into a linear movement. The actuator stem is extended and the valve opens. When the actuator is de-energized, the actuator stem retracts and the valve is closed by the force of the spring.
The STP21… and STP71… thermal actuators have no rotating parts. Consequently, they operate quietly and are not subject to wear.

Position indication

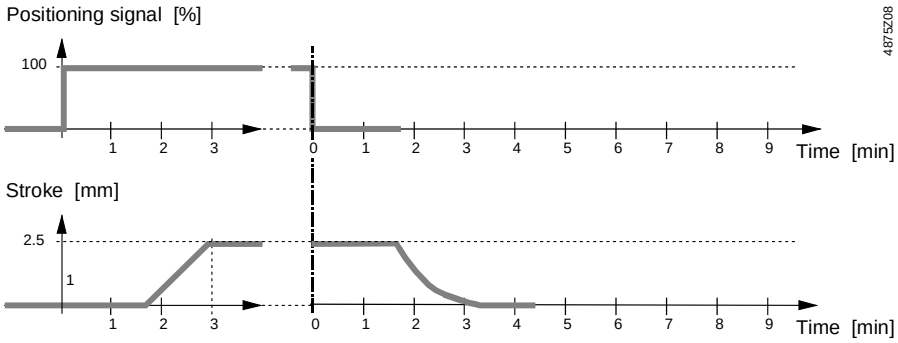
The valve position is indicated by a green bar which moves up and down the actuator stem.



Actuator is de-energized
- The actuator stem is retracted
- The small valve is closed

Actuator has been connected to the power supply for at least three minutes.
- The actuator stem is extended
- The small valve is open

Positioning times opening / closing



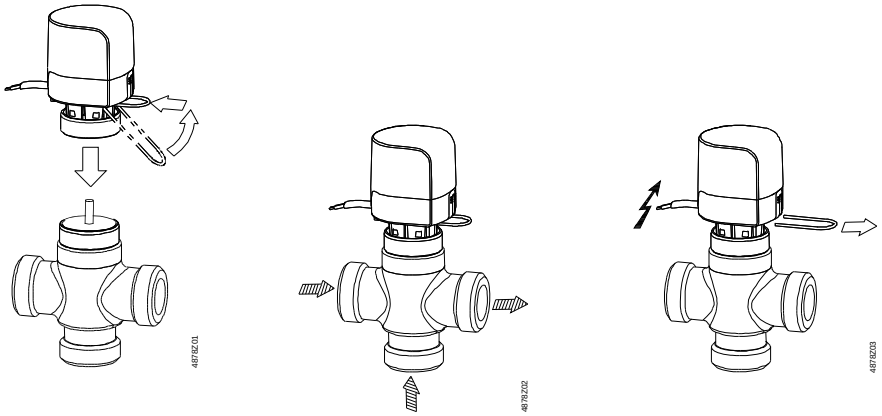
at 20° C ambient temperature

The positioning time depends on the voltage and the ambient temperature.

Duty cycle of the control signal is 100 %

Opening without a positioning signal

With an STP… actuator fitted, the valve can be opened to approximately 50 % of its stroke without a positioning signal. This enables the hydraulic system to be filled with the medium. For this purpose, the U-pin supplied must be inserted between the actuator housing and the stem as shown in the diagram below.

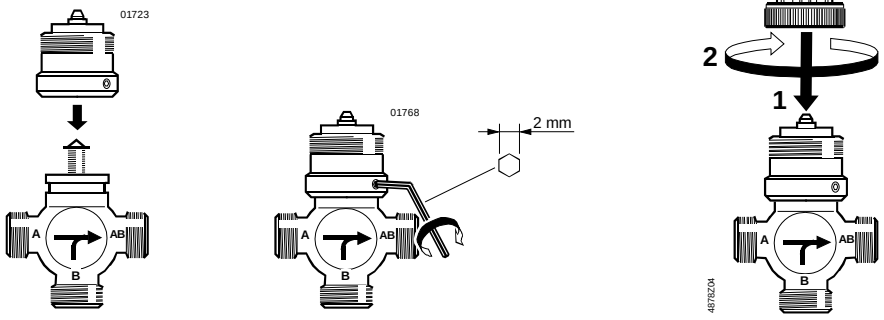


Note Ensure that the U-pin is removed once the system has been filled.

Accessories

AL100 adapter

When retrofitting valve types 2W..., 3W... and 4W... with the STP... actuator, an AL100 adapter is required.

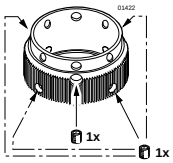


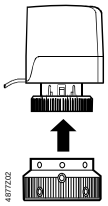
Adapter type AV… for third-party valves

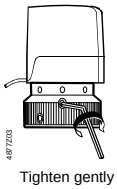
Adapter types AV51 to AV61 are available for mounting the STP… actuators on third-party radiator valves as shown under «Type summary / Accessories», page 2.

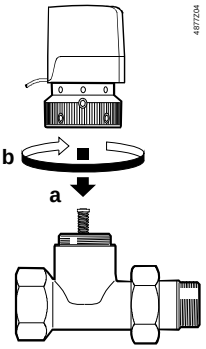
Note In these applications, the valves are open when the actuators are de-energized.

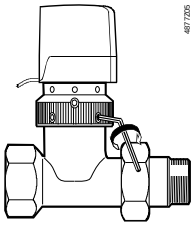
Tamper-proof fitting AL41
(for radiator valves only)











Mounting and installation notes

Mounting instructions are printed on the plastic packaging.

The STP… actuator and valve are delivered as separate units. They are easy to assemble on site shortly before commissioning:

- Remove the protective cover from the valve body
- Put the actuator in position and tighten the union nut manually.

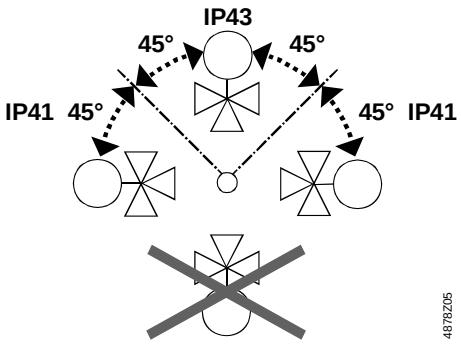
⚠ **Warning** **Do not use pipe wrenches, spanners or similar!**

- The plastic packaging can be used as a temporary cover for protection from dust etc.

Orientation

⚠ **Warning**

The actuators must be installed only in a position from upright to horizontal.
Under no circumstances must the actuator be suspended below the horizontal.



Notes on electrical installation

- Installation must be carried out in compliance with local installation regulations.
- The cable must be connected downwards so that it leads away from the bottom.
- A means of isolation from the power supply must be provided, for example by connecting an automatic circuit breaker or switch fuse upstream of the control unit.

Maintenance

The actuator is maintenance-free.

Repair

The connecting cable must not be replaced by any other cable. Opening the actuator can cause it irreparable damage. The actuator cannot be repaired, it must be replaced as a complete unit.

Disposal

The device must not be disposed of as domestic waste.
Legislation may demand special handling of certain components, or it may be sensible from an ecological point of view.
Current local legislation must be observed.

Warranty

The technical data given for these applications is valid only for valves used in conjunction with the Siemens and third-party actuators listed under «Equipment combinations», page 2.

If the STP… actuators are used with other valves, then the user is responsible for ensuring correct functioning and all claims under Siemens Switzerland Ltd / HVAC Products warranty are invalidated.

Technical data

			STP21, STP21/50	STP71, STP71/50
Power supply	Operating voltage		AC 230 V, 50...60 Hz	Low voltage [1] AC 24 V, 50...60 Hz or DC 24 V
	Voltage tolerance		± 15 %	± 20 %
	Power consumption	Operation	2.5 W	2.5 W
		On power-up	58 VA	6 VA
	Switch-on current (transient)		250 mA	
	Primary fuse		External	
Control	Positioning signal		2-position	2-position PDM (pulse duration modulation)
Operating data	Positioning time at 20°C		3 min	
	Nominal stroke		2.5 mm	
	Positioning force		105 N -4/+20 %	
	Permissible temperature of medium in the connected valve		1…110 °C	
	Manual adjuster		U-pin for use when filling the system	
	Actuator de-energized		Actuator stem retracted	
	Valve types V..P47.., 2W.., 3W.., 4W..		A ↔ AB closed	
	Radiator valves VDN/VEN/VUN..		Open	
	MCV MiniCombiValves VPD/VPE…		Open	
	Small valves VD1…CLC		Open	
	Zone valves V…I46…, V…S46…		AB ↔ A open	
	Maintenance		No maintenance required	
Electrical connection	Connecting cable (integral)		Stranded conductor / 2 x 0.75 mm^2	
	Cable length STP...; STP.../50		1.2 m; 5.0 m	
Mounting	Fixing on valve		Union nut, M30 x 1.5	
	Orientation		Upright to horizontal; do not suspend	
	Use		Suitable for indoor use	
Norms and standards	Meets requirements for CE marking:			
	EMC directive		2004/108/EC	
		Immunity	EN 61000-6-1 Residential	
		Emission	EN 61000-6-3 Residential	
	Low voltage directive		2006/95/EC	
		Electrical safety	SELV-E (PELV to IEC364-4-41)	
	Overvoltage category		Class II to EN 60730	Class III to EN 60730
	Contamination level		Class 2 to EN 60730	
	Protection standard			
	Mounted upright ± 45°		IP 43 to EN 60529	
	Mounted between upright and horizontal		IP 41 to EN 60529	
	Environmental compatibility		ISO 14001 (Environment) ISO 9001 (Quality) SN 36350 (Environmentally compatible products) RL 2002/95/EG (RoHS)	
Dimensions / Weight	Dimensions		See «Dimensions», page 8	
	Weight		0.15 kg (1.2 m) / 0.29 kg (5 m)	
Materials	Cover and base		Polycarbonate	

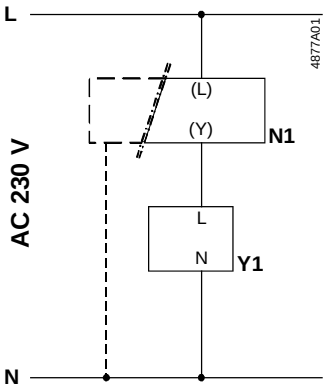
[1] Only admissible with low voltage (SELV or PELV)

General environmental conditions

	Operation EN 60721-3-3	Transport EN 60721-3-2	Storage EN 60721-3-1
Temperature	+5...+50 °C	–20...+60 °C	+5...+50 °C
Humidity	5…85 % r. h.	5…95 % r. h.	5… 95 % r. h.

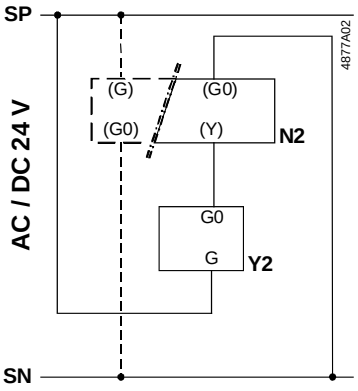
Connection diagrams

STP21, STP21/50



Y	Positioning signal
N1	Controller
Y1	Actuator
L	System potential AC 230 V
N	System neutral

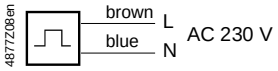
STP71, STP71/50



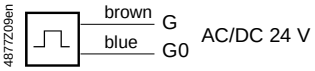
Y	Positioning signal
N2	Controller
Y2	Actuator
SP, G	System potential AC / DC 24 V
SN, G0	System neutral

Connecting cable

STP21, STP21/50

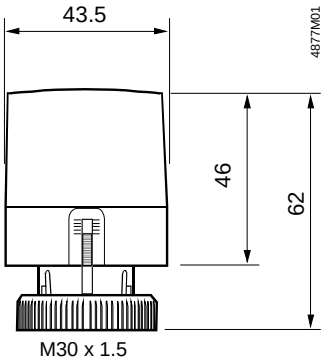


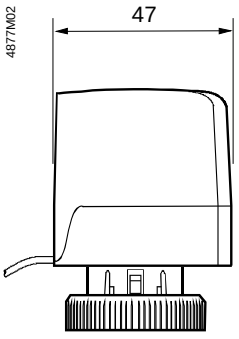
STP71, STP71/50



Dimensions

Dimensions in mm





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