

# Thermo-electric actuator



## 656. series



01042/17 GB

replaces dp 01042/03 GB



### Function

The thermo-electric actuator, coupled with convertible or thermostatic radiator valves, with distribution manifolds for radiant panel systems and radiators and with zone valves, is controlled by the room thermostat or another electrical switch, shutting off the medium automatically.

### European directive conformity

CE mark in accordance with directives 2014/35/EU and 2014/30/EU



### Reference documentation

- Tech. Brochure 01072 Zone valves 676 series
- Tech. Brochure 01144 Distribution manifolds for radiant panel systems 668...S1 series
- Tech. Brochure 01126 Manifolds in plastic specifically designed for radiant panel systems 670 series.
- Tech. Brochure 01065 Distribution manifolds for radiator systems 663...S1 series
- Tech. Brochure 01009 Convertible radiator 338 - 401 series. Thermostatic controls 200 series
- Tech. Brochure 01034 Thermostatic radiator valves 220 series
- Tech. Brochure 01051 Convertible radiator valve for one-pipe and two-pipe systems 455 series
- Tech. Brochure 01195 Convertible radiator valves with pre-setting 425 - 426 - 421 - 422 series

### Product range

Code 656102	Thermo-electric actuator	electric supply 230 V (ac)
Code 656104	Thermo-electric actuator	electric supply 24 V (ac) or 24 V (dc)
Code 656112	Thermo-electric actuator with auxiliary microswitch	electric supply 230 V
Code 656114	Thermo-electric actuator with auxiliary microswitch	electric supply 24 V (ac) or 24 V (dc)
Code 656002	Thermo-electric actuator with special coupling	electric supply 230 V
Code 656004	Thermo-electric actuator with special coupling	electric supply 24 V (ac) or 24 V (dc)

### Technical specifications

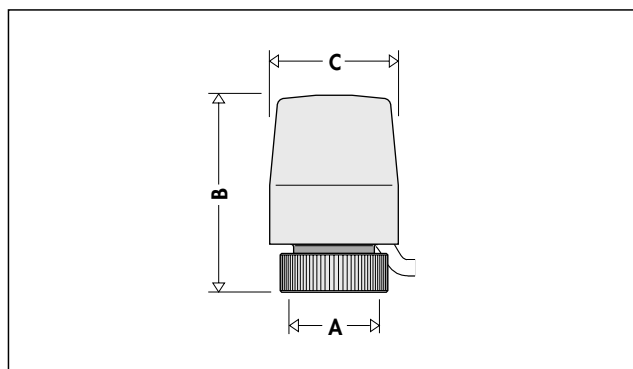
#### Materials:

Protective shell: self-extinguishing polycarbonate  
 Colour: white RAL 9010

#### Performance:

Normally closed  
 Electric supply: 230 V (ac) - 24 V (ac) - 24 V (dc)  
 Starting current:  $\leq 1$  A  
 Running current: 230 V (ac) = 13 mA  
 24 V (ac) - 24 V (dc) = 140 mA  
 Running power consumption: 3 W  
 Auxiliary microswitch contact rating (code 656112/114): 0,8 A (230 V)  
 Protection class: IP 44 (in vertical position)  
 Double insulation construction:  CE  
 Device: type 1 action in accordance with EN 60730-1 par. 2.6  
 Ambient temperature range: 0-50°C  
 Operating time: opening and closing from 120 s to 180 s  
 Length of supply cable: 80 cm

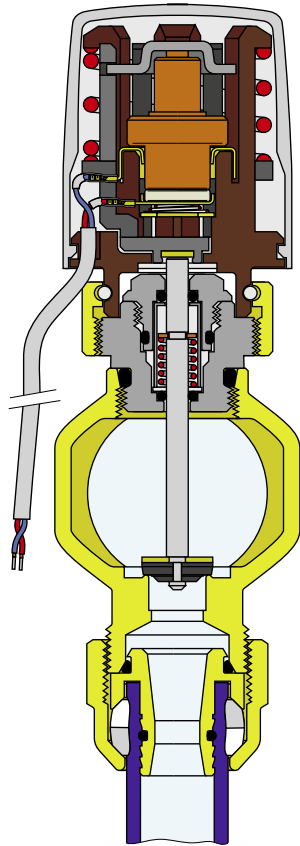
### Dimensions



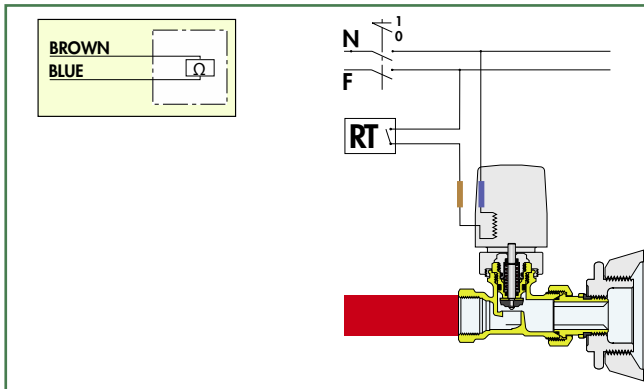
Code	A	B	C	Mass (kg)
656...	M 30 x 1,5	62	41	0.18

### Operating principle

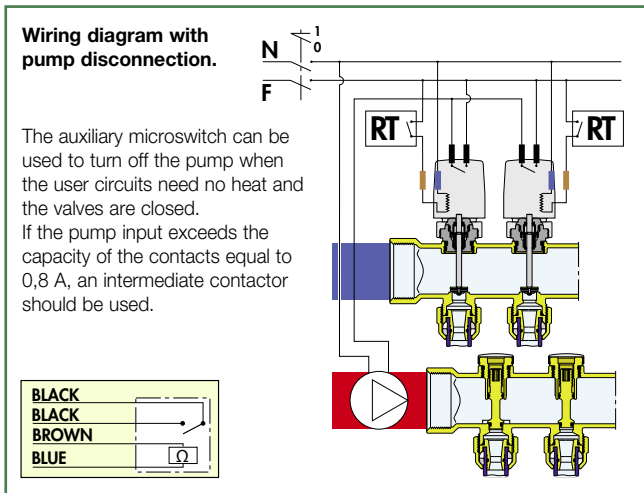
With no power, the device (control + valve) is "normally closed".  
 With power, the valve opens thanks to the action of a wax thermostatic expansion element governed directly by a PTC resistor.



Electrical connections for codes 656102, 656104, 656002 and 656004



Electrical connections for codes 656112 and 656114



### Coupling table

The tables below highlight the couplings between the various types of valve bodies and thermo-electric actuators.

<b>656102</b>	<b>656104</b>	<b>656112</b>	<b>656114</b>	<b>338</b>	<b>339</b>	<b>401</b>	<b>402</b>	<b>455</b>
<b>656102</b>	<b>656104</b>	<b>656112</b>	<b>656114</b>	<b>425</b>	<b>426</b>	<b>421</b>	<b>422</b>	<b>456</b>

<b>656102</b>	<b>656104</b>	<b>656112</b>	<b>656114</b>	<b>220</b>	<b>221</b>	<b>222</b>	<b>223</b>	<b>224</b>	<b>225</b>
<b>656102</b>	<b>656104</b>	<b>656112</b>	<b>656114</b>	<b>226</b>	<b>227</b>	<b>230</b>	<b>231</b>	<b>232</b>	<b>233</b>
<b>656102</b>	<b>656104</b>	<b>656112</b>	<b>656114</b>	<b>234</b>	<b>237</b>	<b>662</b>	<b>663</b>	<b>666...S1</b>	<b>670/671</b>
<b>656102</b>	<b>656104</b>	<b>656112</b>	<b>656114</b>	<b>676</b>	<b>677</b>	<b>678</b>	<b>678</b>	<b>678</b>	

### Special coupling (spare part only)

The different configuration of the headwork of certain series of valves has made it necessary to modify the coupling area of the thermo-electric actuator. Compared with the standard actuators ①, actuators codes 656002 and 656004 are equipped with an "extended" control stem ②.

**Important: actuators codes 656002 and 656004 cannot be coupled with a valve body configured for use with actuators codes 656102, 656104, 656112 and 656114 and vice versa.**

<b>656002</b>	<b>656004</b>	<b>652</b>	<b>6620</b>	<b>6621</b>

## Hydraulic characteristics

Table of hydraulic characteristics of actuator 656. + valve body

656102, 656104, 656112, 656114 +	series	DN	kv <sub>0,01</sub> (l/h)	Μαξ. Δp* (m w.g.)
Angled convertible with pre-setting	421 - 425 422 - 426	3/8"	see technical brochure	25
		1/2"		25
		3/4"		18
Angled convertible	338 - 401	3/8"	185	25
		1/2"	210	25
		3/4"	270	18
		1"	440	12
Straight convertible	339 - 402	3/8"	110	25
		1/2"	145	25
		3/4"	225	18
One-pipe/Two-pipe	455	1"	420	12
		3/8"	200/110	10
		3/4"	200/110	10
One-pipe	456	1/2"	160	10
		3/4"	160	10
		1"	180	10
Angled thermostatic	220 - 222	3/8"	180	25
		1/2"	200	25
		3/4"	255	18
Straight thermostatic	221 - 223	3/8"	100	18
		1/2"	135	25
		3/4"	200	25
Reverse valve	224 - 227	3/8"	80	18
		1/2"	125	25
Angled double thermostatic	225 - 226	3/8"	85	25
		1/2"	125	25
Dynamic thermostatic	230-231 232-233 234-237	3/8"	see technical brochure	25
		1/2"	25	
		3/4"	18	
Manifold for radiant panel systems and radiators	662 (ret.)	1"	410	25
	662 (pre-ass.)	1"	410	25
	663 (ret.)	1 1/4"	287	25
	666S1	1 1/4"	250	25
	668S1 (ret.)	1 1/4"	250	25
	670 - 671	1"	240	25
Zone valve (straight/bypass)	676	1/2" - 1"	370	12
	677	1/2" - 1"	370/100	12
	678	1/2" - 1"	370/100	12

\* Maximum pressure differential assured by the actuator for regular operation

## Installation

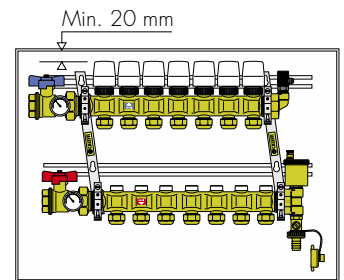
- The thermo-electric actuator should be tightened by hand without the use of tools.
- The thermo-electric actuator should not be dismantled for possible repairs. Its tampering leads to permanent damage.

- The actuator should always be fitted in a horizontal or vertical position, **never upside down**. In chilled water circuits, positions which allow condensation to get into the actuator are not advisable.

- For correct actuator operation, **the electric system must be sized according to the starting current**.

- **If it is necessary to make regulations of several zones by means of actuators in parallel with the same thermostat, an intermediate relay could be needed to avoid electric overloads.**

- When assembling with a zone valve or manifold in a box, leave a gap of at least 20 mm between the thermo-electric actuator and the frame for any replacement or maintenance work.

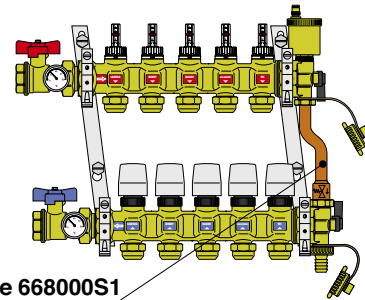


## Recommendations for use

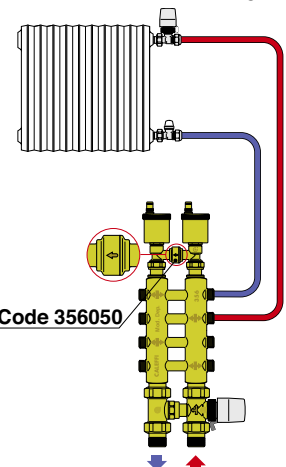
- When the thermo-electric actuators are installed on devices that automatically shut off the heating terminals, it is always advisable to use a differential by-pass to control overpressure in the system during the partial or total closing phase of the circuits.

• For 663 and 668...S1 series pre-assembled manifolds an eccentric by-pass kit is available with fixed setting of 2000 mm w.g. code 663000 and 2500 mm w.g. code 668000S1 respectively.

• For installations with cast monoblock dual distribution manifolds 356



- 357 series, a by-pass is available with a fixed differential setting of 2000 mm w.g. code 356050.

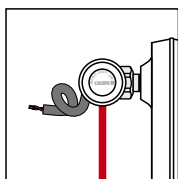


- For centralised installations or installations with risers, a differential by-pass valve is available with an adjustable setting of 1 to 6 m w.g., 519 series.

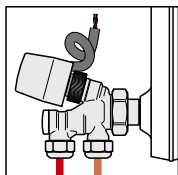
## Applications

### Thermo-electric actuators can be installed:

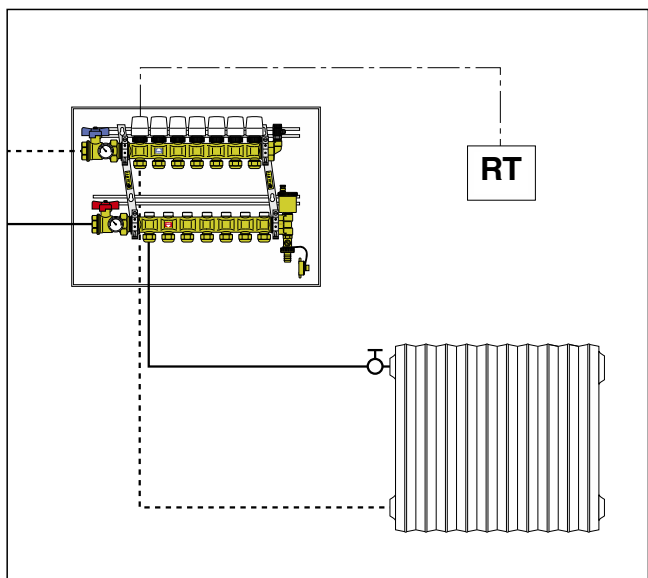
- In individual radiators in place of thermostatic control heads to convert radiator valves from manual to automatic, through use in conjunction with a thermostat for each room or area.



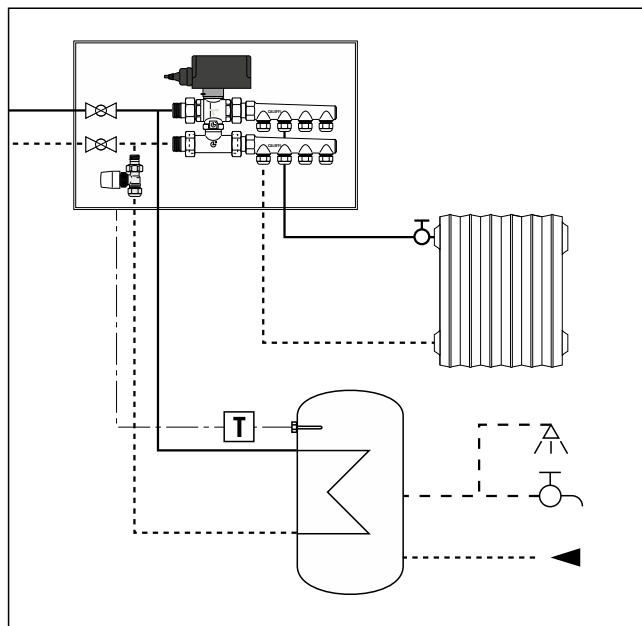
- In loop systems with one-pipe valves (455 series).



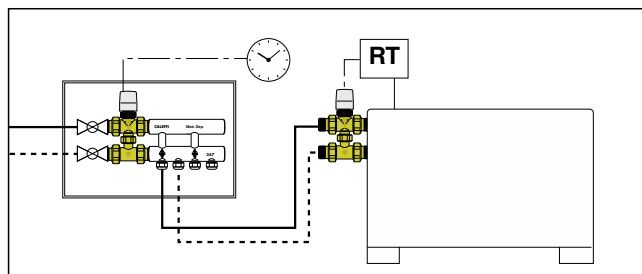
- In radiator systems, when you want automatic shut-off of the radiator directly at the manifold, with a consequent reduction in the labour and cost involved in making the electric connections.



- In heating and domestic hot water systems, for temperature control in hot water storage heaters.



- In fan-coil systems, if they are to be fitted with valves for automatic shut-off of the medium.
- In zone systems, where reduced dimensions and limited flow rate coefficient at the automatic regulating valve are required.



## SPECIFICATION SUMMARY

### Code 656002/004/102/104

Thermo-electric actuator. Normally closed. Electric supply 230 V (ac); 24 V (ac); 24 V (dc). Starting current 1 A. Running current 13 mA (230 V (ac)), 140 mA (24 V (ac) - 24 V (dc)). Running power consumption 3 W. Protection class IP 44 (in vertical position). Ambient temperature range 0–50°C. Operating time from 120 to 180 seconds. Length of supply cable 80 cm.

### 656112/114 series

Thermo-electric actuator. Normally closed with auxiliary microswitch. Electric supply 230 V (ac); 24 V (ac); 24 V (dc). Starting current ≤ 1 A. Running current 13 mA (230 V (ac)), 140 mA (24 V (ac) - 24 V (dc)). Running power consumption 3 W. Protection class IP 44 (in vertical position). Auxiliary microswitch contact rating 0,8 A. Ambient temperature range 0–50°C. Operating time from 120 to 180 seconds. Length of supply cable 80 cm.

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