DATA SHEET

T 5757 EN

TROVIS 5757-3 Electric Actuator with Process Controller

for domestic hot water heating

CE

Application

Electric actuator with process controller for local heat supply and district heating networks

Special features

The electric actuator with process controller is an electric actuator combined with an integrated digital controller used to position valves (DN 15 to 25). It is used to control domestic hot water heating in instantaneous heating systems used in small to medium-sized buildings connected to a district heating or local heat supply network. It is particularly suitable for mounting to SAMSON Types 3222, 3222 N and 2488 Valves as well as to special versions of Type 3226 and Type 3260 Valves.

- Control using two different set points, e.g. DHW temperature and DHW temperature for thermal disinfection. A binary input is used to switch between the set points.
- Function to maintain water temperature constant, preventing the heat exchanger from cooling down between tapping
- Direction of action reversible
  - Globe valve opens when the actuator stem retracts (increasing/increasing)
  - Three-way mixing valve mixes/diverts the flow(s) when the actuator stem extends (increasing/decreasing)
- Limit value monitoring:
  - The valve is closed by the actuator when the maximum adjustable limit is exceeded
  - The frost protection function is started when the temperature falls below the minimum adjustable limit
- Configuration, parameterization, diagnostic function and online connection for monitoring using the TROVIS-VIEW software
  - Direct data transmission using a connecting cable (direct connection to computer)
  - Data transmission over a memory pen
- No maintenance
- Special valve version available for small tapping amounts

Fig. 1: *TROVIS 5757-3 Electric Actuator with Process Controller*

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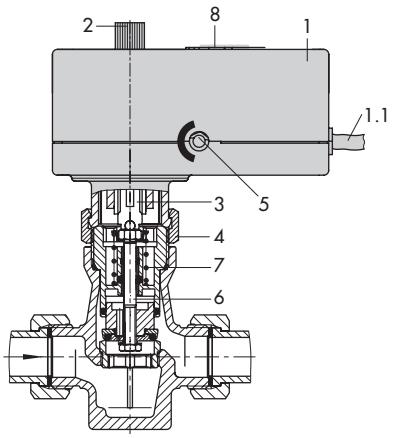
Design and principle of operation



1 Electric actuator with process controller
1.1 Connecting cable
2 Handwheel
3 Actuator stem
4 Coupling nut
5 Travel indicator
6 Plug stem
7 Valve spring
8 Serial interface

Fig. 2: *Valve and TROVIS 5757-3 Electric Actuator with Process Controller*

The digital controller is connected to a temperature sensor on the input side which can be optionally upgraded by a flow rate sensor or a flow switch.
The set points W1 and W2 of the digital controller are set to 60 and 70 °C respectively and can be changed like all other settings using the TROVIS-VIEW software. The binary input can be used to change between the two set points W1 and W2.

The output signal of the digital controller functions as a three-step signal on the synchronous motor of the actuator and is transferred over the connected gear to the actuator stem (3 in Fig. 2) and used as the positioning force.

The motor is switched off by torque switches when an end position is reached or in case the motor is overloaded.

When the actuator stem extends, the valve is closed, opposing the force of the valve spring (7 in Fig. 2). When the actuator stem retracts, the valve is opened as the plug stem (6 in Fig. 2) follows the motion of the return spring.

Electrical equipment

– **Inputs**

In addition to the temperature sensor input, the digital controller has a 0/4 to 20 mA current input. This can be used either instead of the temperature sensor or to connect an external reference variable.

The actuator requires a Pt1000 temperature sensor (e.g. Type 5207-0060) to be connected for it to function. The fast-response Pt1000 sensor allows the temperature to be controlled to the corresponding set point almost immediately.

The use of the Type 5207-0060 Pt1000 Sensor is recommended in conjunction with a sensor pocket to provide optimal positioning of the temperature sensor at the heat exchanger. The 0/4 to 20 mA current input can be used in place of the Pt1000 sensor for control purposes or as the reference variable.

In addition, a water flow sensor or a flow switch can be connected to quickly recognize when hot water is being tapped or to improve the control accuracy even further. Fig. 4 shows a sample application.

– **Output**

The switching output can be configured as either a pump output (circulation pump for the DHW circuit or heating circuit), a fault alarm output or an output to report when hot water is tapped.

Mounting

The electric actuator with process controller is mounted onto the valve using a coupling nut (4). Before mounting the actuator on the valve, retract the actuator stem. Hold the actuator stem in this position, while tightening the coupling nut with 20 Nm at the maximum.
Any mounting position may be used, however, the actuator may not be installed in a suspended position.

Any wires of the connecting cable that are not used need to be insulated.

Manual override

The valve can be moved to any position in the de-energized state by the handwheel (2 in Fig. 2). Travel and direction of action can be read off the travel indicator (5 in Fig. 2) on the side of the actuator housing.

Operation

– **Without circulation pipe**

We recommend installing the heat exchanger in a horizontal position with the connections at the side to protect the hot water system against hot water accumulation when operated from standstill and to prevent limescale in the heat exchanger.

First consult the heat exchanger manufacturer concerning this mounting position and the intended effect.

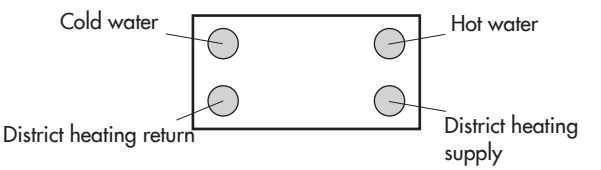


Fig. 3: *Heat exchanger*

– **Tapping small amounts of hot water**

A special version of Type 3222/5757-3 (DN 25, K_{VS} = 2.5, with Type 3222 N K_{VS} = 2) with a special plug design is available for small installations (apartment or house). As a result, even small tapping amounts can be controlled optimally.

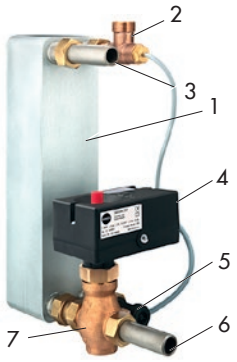
Digital controller settings

The digital controller settings can be changed in the TROVIS-VIEW software.

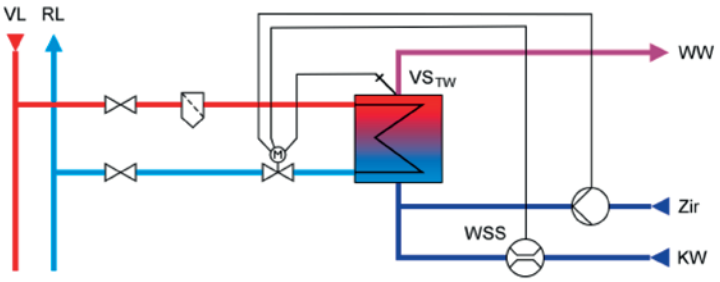
Configuration		Default setting
F 01 –	DHW tapping recognition 0: Continuous control 1: Flow rate sensor active	1
F 02 –	Flow rate sensor 0: Flow switch 1: Water flow sensor	1
F 03 –	Adaptation 0: Not active 1: Active (with water flow sensor)	1
F 04 –	Direction of action 0: >> (increasing/increasing) 1: <> (increasing/decreasing)	0
F 05 –	Current input 0: Not active (binary input) 1: Active	0
F 06 –	Function of current input 0: Actual value 1: Set point	0
F 07 –	Measuring range of current input 0: 0 – 20 mA 1: 4 – 20 mA	0
F 08 –	Function of binary input 0: Termination of maintaining heat exchanger at constant temperature 1: Switchover between internal set points	0
F 09 –	Maintain heat exchanger at constant temperature 0: Time adjustable 1: Continuous	0
F 10 –	Upper limit (GWH) 0: No limitation 1: Exceeding GWH causes switch-off	0
F 11 –	Lower limit (GWL) 0: No frost protection 1: Violation of GWL causes frost protection to start	0
F 16 –	Function of switching output 1: Not active 2: Fault alarm 3: Circulation pump (DHW) 4: Circulation pump (heating) 5: Tapping 6: Circulation pump (heating) reversed	1
F 17 –	Pump protection 0: Not active 1: Active	1

Parameters		Default setting
P 01 –	Set point W1 0.0 to 100.0 °C	60.0 °C
P 02 –	Set point W2 0.0 to 100.0 °C	70.0 °C
P 03 –	Lower measuring range value Xmin –50.0 to 90.0 °C	0.0 °C
P 04 –	Upper measuring range value Xmax 10.0 to 150.0 °C	100.0 °C
P 05 –	Upper limit (GWH) 0.0 to 100.0 °C	95.0 °C
P 06 –	Lower limit (GWL) 0.0 to 20.0 °C	5.0 °C
P 07 –	Proportional-action coefficient KP 0.1 to 50.0 °C	0.8 °C
P 08 –	Reset time Tn 0 to 999 s	15 s
P 09 –	Derivative-action time Tv 0 to 999 s	0 s
P 10 –	Actuator transit time Ty 10 to 240 s	25 s
P 11 –	Set-back difference 0 to 30 K	8 K
P 12 –	Heating period to maintain heat exchanger at constant temperature 0 to 25.5 h	24.0 h

Application



1 Heat exchanger
2 Temperature sensor including sensor pocket (VS_{TW})
3 Supply from district heating network (VL)
4 TROVIS 5757-3 Electric Actuator with Process Controller
5 Water flow sensor with connecting cable
6 Return flow to district heating network (RL)
7 Valve, e.g. Type 3222

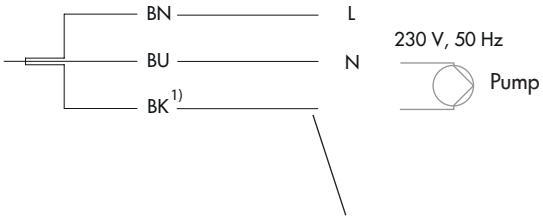


VS Flow pipe
RL Return flow pipe
WW Hot water
KW Cold water
VS_{TW} Flow sensor
WSS Water flow sensor

Fig. 4: *Sample application: domestic hot water heating with Pt1000 sensor and water flow sensor*

Electrical connection

Supply line



BN Brown
BU Blue
BK Black

⚠ DANGER
Live wires
➔ *Do not touch wire ends.*

1) Switched output

Fig. 5: *Electrical connection · Supply line*

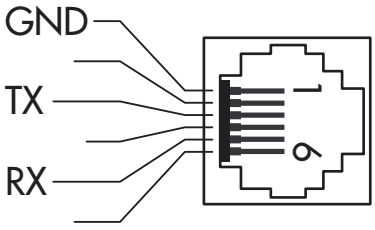
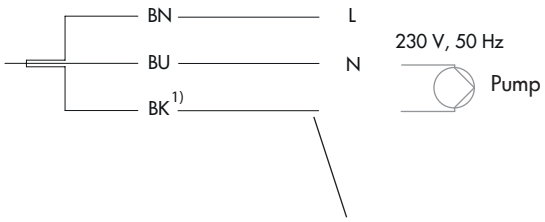


Fig. 6: *Terminal assignment of RJ-12 jack*

Supply line



BN Brown
BU Blue
BK Black

⚠ DANGER

Live wires

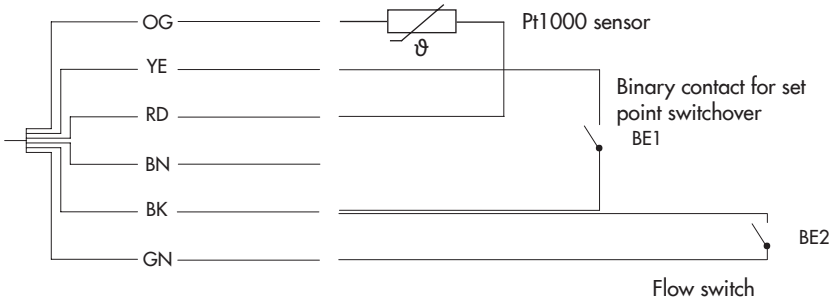
➔ *Do not touch wire ends.*

1) Switched output

Fig. 7: *Electrical connection · Supply line*

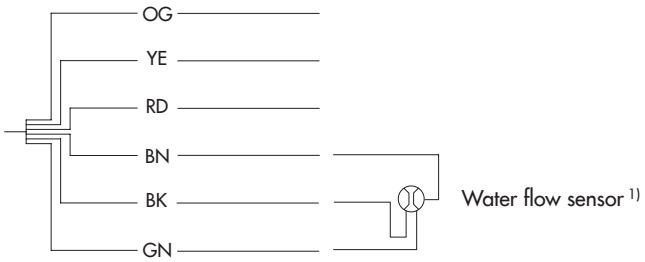
Control line

Temperature sensor and binary inputs

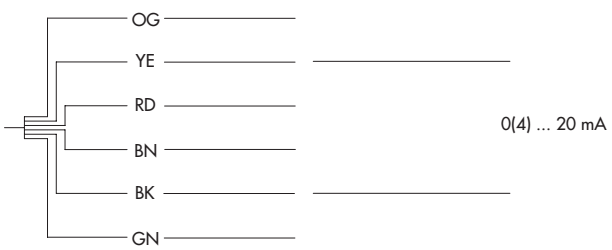


Water flow sensor

1) Information on connection of water flow sensor (see Fig. 9).



Current input for set point or measured value



OG Orange
YE Yellow
RD Red
BN Brown
BK Black
GN Green

Fig. 8: *Electrical connection of TROVIS 5757-3 · Control line*

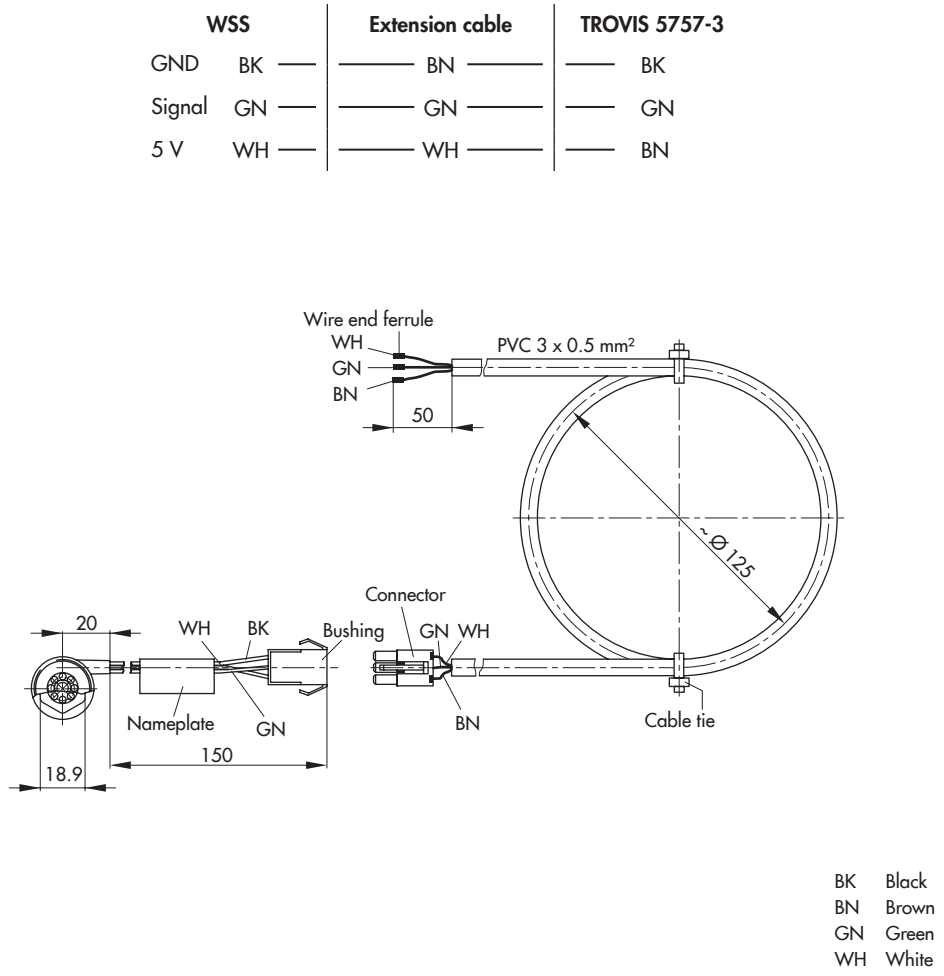


Fig. 9: *Electrical connection of TROVIS 5757-3 · Water flow sensor (WSS)*

Technical data

Table 1: *Technical data · TROVIS 5757-3 Electric Actuator with Process Controller*

TROVIS 5757-3	
Connection to valve	Force-locking
Rated travel	6 mm
Manual override	Yes
Transit time for rated travel	20 s
Thrust	300 N
Supply voltage	230 V (±10 %), 50 Hz
Power consumption	Approx. 4 VA
Sensor input	Pt1000
Current input	0/4 to 20 mA
Binary input BI1 [1]	Set point switchover (W1 and W2)
Binary input BI2 [1]	Flow switch
Input for water flow sensor	530 pulses/l, measuring range 1 to 30 l/min
Switching output	230 V, 50 Hz, max. 1 A
Electrical connection	Wire end ferrules required [2]
Number of connecting cables	2
Connecting cable length	1 m or 2.5 m
Permissible temperature ranges [3]	
Ambient	0 to 50 °C
Storage	–20 to +70 °C
Degree of protection	IP 42 according to EN 60529
Class of protection	II according to EN 61140
Device safety	According to EN 61010-1
Noise immunity	According to EN 61000-6-2 and EN 61326-1
Noise emission	According to EN 61000-6-3 and EN 61326-1
Conformity	CE
Materials	
Housing	Plastic (PPO with glass fiber reinforcement)
Coupling nut M32x1.5	Brass
Weight	Approx. 0.7 kg

1) Recommendation: use devices with gold contacts when using relays.
2) Insulate any wires that are not used.
3) The permissible medium temperature depends on the valve on which the electric actuator with process controller is mounted. The limits in the valve documentation apply.

Table 2: *Technical data · Accessories*

Type 5207-0060 Pt1000 Sensor	
Optimized temperature sensor with fast response which is simple to install	
Electrical connection	Wire ends fitted with wire end ferrules including plastic sleeves
Connecting cable	PVC, 2000 mm long
Permissible ambient temperature	–5 to +80 °C
Perm. medium temperature	–5 to +90 °C
Mechanical connection	Stainless steel 1.4404
Protective tubing	Stainless steel 1.4404
Time response	$t_{0.5} < 1$ s · $t_{0.9} < 3$ s, 0.4 m/s in water
Thread length	52 mm
Pressure rating	PN 16
Sensor pocket	
For Type 5207-0060 Pt1000 Sensor for mounting to heat exchangers for optimal positioning instantaneous heating systems	
Material	Red brass CC491K (2.1096.01)
Mechanical connection	G ¾ male thread G ¼ female thread G ¾ coupling nut
Pressure rating	PN 16
Water flow sensor with extension cable	
Axial turbine flowmeter for liquids	
Measuring range	1 to 30 l/min
Measuring accuracy	1 % of the upper measuring range value
Mechanical connection	G ¾ male thread
Valve size	DN 10
Pressure rating	PN 10
Max. medium temperature	70 °C, briefly 90 °C
Supply voltage	4.5 to 24 V DC
Degree of protection	IP 54 according to EN 60529
Electrical connection	3 single wires with connector (JST) approx. 150 mm long
Sensor	Hall effect sensor
Pressure loss	0.25 bar at 15 l/min
Pipe socket/vane wheel	PPO Noryl

Dimensions

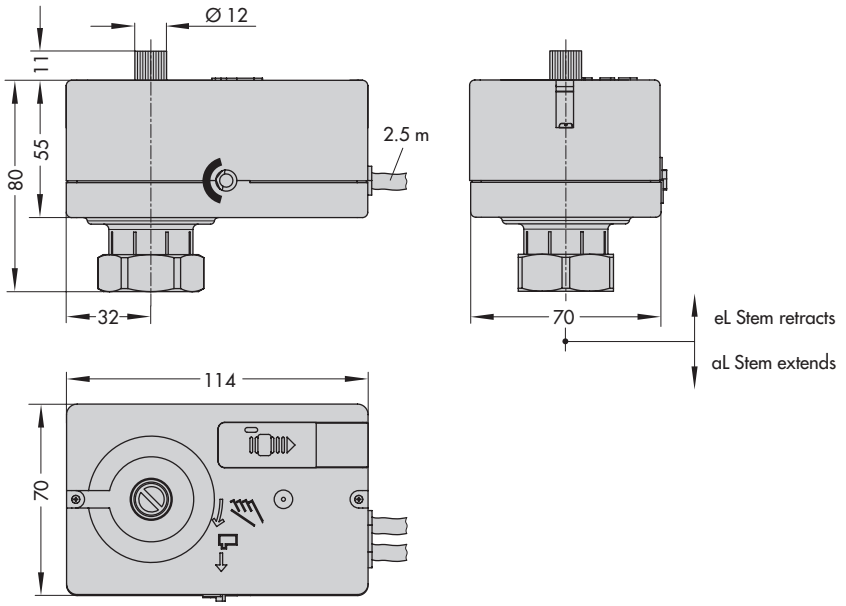
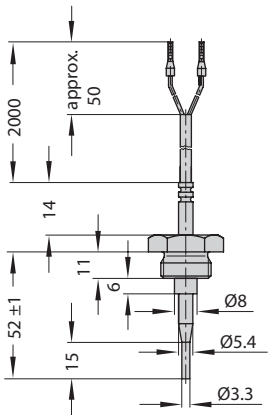
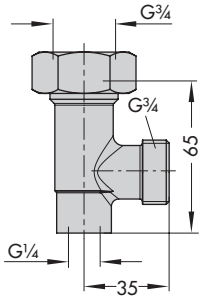


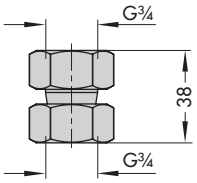
Fig. 10: *Dimensions in mm · TROVIS 5757-3 Electric Actuator with Process Controller*



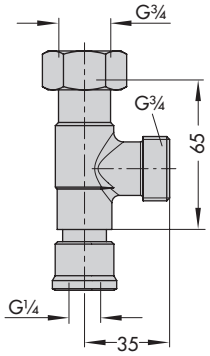
Temperature sensor (Pt1000)



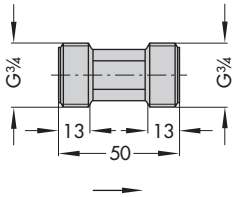
Sensor pocket (including gasket) for heat exchanger with G ¾



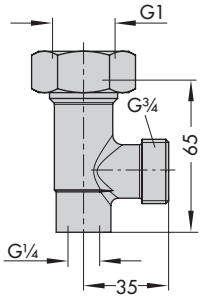
Connecting piece (including gasket) for valve G ¾



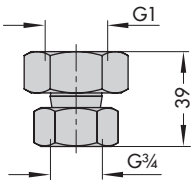
Circulation pipe connection (including gasket)



Water flow sensor with extension cable



Sensor pocket (including gasket) for heat exchanger with G 1



Connecting piece (including gasket) for valve G 1

Fig. 11: *Dimensions in mm · Accessories*

Accessories

Communication	
Memory pen-64	Order no. 1400-9753
Connecting cable RJ-12/D-sub, 9 pin	Order no. 1400-7699
Modular adapter D-sub 9-pin/RJ-12 for memory pen	Order no. 1400-7698
Hardware package consisting of: – Memory pen-64 – Connecting cable – Modular adapter	Order no. 1400-9998
USB to RS232 adapter	Order no. 8812-2001
Software	
TROVIS-VIEW (free of charge)	▶ www.samsongroup.com > Service & Support > Downloads > TROVIS-VIEW
Sensors	
Water flow sensor (WSS)	Order no. 1400-9246
Pt1000 sensor (fast response)	Type 5207-0060
Pipeline	
Sensor pocket for heat exchanger G ¾	Order no. 1400-9249
Sensor pocket for heat exchanger G 1	Order no. 1400-9252
Connecting piece for valve G ¾	Order no. 1402-0061
Connecting piece for valve G 1	Order no. 1402-0062
Circulation pipe connection	Order no. 1400-9232

Ordering text

TROVIS 5757-3 Electric Actuator with Process Controller

- With switching output
- Connecting cable 1 m/2.5 m

Associated mounting and operating instructions

– TROVIS 5757-3 Electric Actuator with Process Controller	▶ **EB 5757**

Associated Configuration Manual

– TROVIS 5757-3 Electric Actuator with Process Controller	▶ **KH 5757**

Associated Data Sheets

– Type 5207-0060 Pt1000 Sensor (fast response)	▶ **T 5222**
– Type 3222 Valve	▶ **T 5866**
– Type 3222 N Valve	▶ **T 5867**
– Type 3226 Valve	▶ **T 5863**
– Type 3260 Valve	▶ **T 5861**