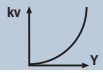
Characterized Control Valves Actuators

Technical Databook

TRANE®

Characterized control valves and rotary actuatiors for modulating control



Flow characteristics of characterized control valves
Characteristic: equal percentage

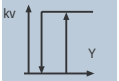
Rated pressure:
2 way, 2500 kPa (DN15...50), 1600 kPa (DN65...150)

Connection	Internal thread						Flange PN 16				
Kvs [m³/h]	4.0	6.3	10.0	16.0	25.0	40.0	63	100	140	230	320
DN [mm]	15	20	25	32	40	50	65	80	100	125	150
2-way	TBR213AC	TBR218AC	TBR223AC	TBR231AC	TBR239AC	TBR249AC	TBR664AC	TBR679AC	TBR6099AC	TBR6124AC	TBR6149AC

Modulating DC 2(0)...10 V

TTR24-SR	TLRU24-SR	TNRU24-SR	TSRU24-SR	TGRU24-SR	AC/DC 24 V

Open-close ball valves and rotary actuators for shut-off or change-over functions



Flow characteristics of open/close ball valves

Rated pressure: 2-way, 2500kPa (DN15...50), 1600kPa (DN65...150)

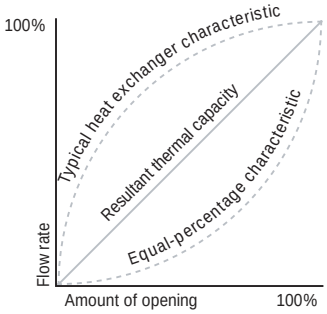
Connection	Internal thread						Flange PN 16				
Kvs [m³/h]	8.6	13	18	31	40	65	120	180	230	230	320
DN [mm]	15	20	25	32	40	50	65	80	100	125	150
2-way	TBR215AC	TBR220AC	TBR225AC	TBR232AC	TBR240AC	TBR250AC	TBR665AC	TBR680AC	TBR6100AC	TBR6124AC	TBR6149AC

Open /Close

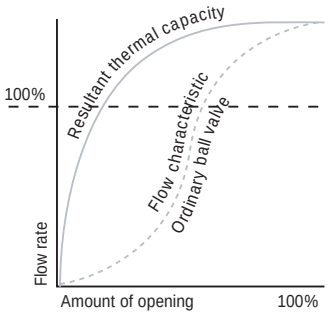
TTR230-3	TLRU230	TNRU230	TSRU230	TGRU230	AC/DC 24 V

Characterized control valve

An ordinary ball valve is unsuitable as a control device



Characteristic of an ideal control valve



Characteristic of an ordinary ball valve

In order to ensure good stability of control, a control valve must have a flow characteristic that complements the nonlinear characteristic of the heat exchanger in the HVAC system.

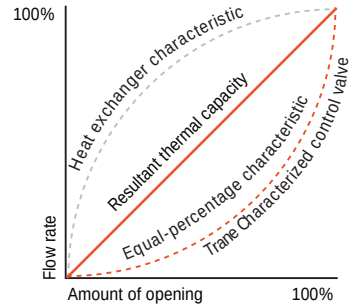
An equal-percentage valve characteristic is desirable in order to produce a linear relationship between the thermal output and the amount of opening of the control device. This means that the flow rate increases slowly as the valve begins to open. Characteristic in ordinary ball valves is severely distorted.

The reason for this is that an ordinary ball valve has an extremely high flow coefficient (Kvs value) compared with its nominal size, several times that of a comparable globe valve.

Therefore, an ordinary ball valve is not very suitable for performing control functions:

- Quick-opening flow characteristic
- Flow coefficient excessive due to the design
- Flow control inadequate in the part-load range

Added "control" to the ball valve

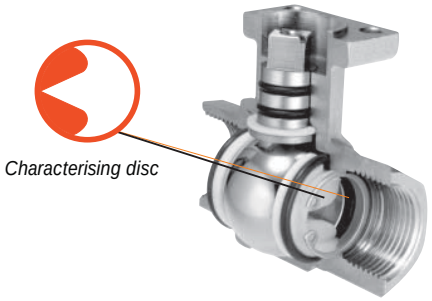


Characteristic of the Trane Ball valve

It has succeeded in solving the problem of the distorted flow characteristic of ordinary ball valves. A so-called "characterising disc" in the inlet of the characterized control valve converts the valve's characteristic to the equal-percentage kind. The side of the characterizing disc facing the ball is concave and is in contact with the surface of the ball. Thus, the actual flow is regulated by the hole in the ball and by the V-shaped aperture in the characterizing disc.

The Kvs value is reduced and corresponds approximately to that of a globe valve of comparable size. In order to avoid having to fit pipe reducers in the majority of cases, each size of valve is also available with wide choices of different Kvs values.

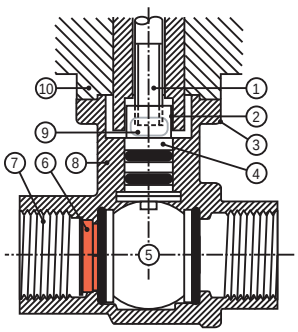
Advantages of the Trane Characterized Control Valve



- Equal-percentage characteristic
- No initial jump in flow on opening
- Excellent stability of control thanks to the characterizing disc
- Kvs values comparable with those of globe valves of comparable size
- Fewer pipe reducers needed
- High rangeability
- High close-off pressure
- Tight-sealing

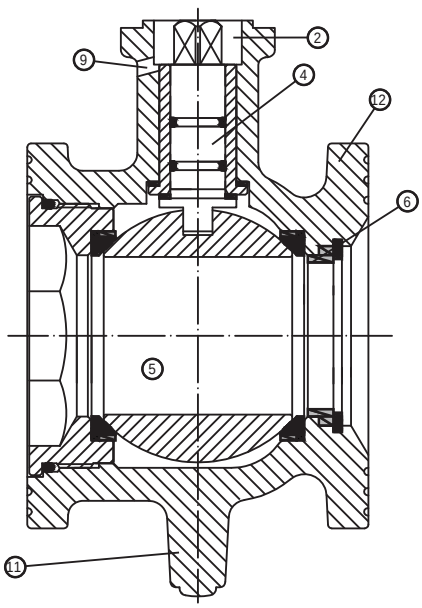
The elements of the Characterized Control Valve

TBR2..AC



1. Simple direct attachment with a central screw
2. Square spindle head for form-fit attachment of the rotary actuator
3. Identical mounting flange for all sizes
4. Spindle with two O-rings for long service life
5. Ball and spindle made of stainless steel
6. Characterizing disc produces equal-percentage flow characteristic
7. Internal screw connection (ISO7/1)
8. Forged fitting, nickel-plated brass body
9. Vent part to prevent the accumulation of condensation
10. Thermal decoupling of actuator from valve
11. Flange (ISO7005-2)
12. GG25, polyester coated body

TBR6..AC



Optimum choice of kvs valves of identical size

- Better controllability
- Lower installation costs

The Trane range of characterized control valves includes 2-way types that are available in a variety of sizes and with a choice of Kvs value. A characterized control valve is normally supplied as a unit complete with a suitable Trane rotary actuator

Notes

- The control devices described in this publication are intended for use in the closed water circuits of heating, ventilating and air-conditioning system. Use of the contro devices in conjunction with other liquid or gaseous fluids is on request
- Select the characterized control valve according to the valve sizing diagram: page 6
- Please pay attention to the notes on operation, mounting, commissioning, maintenance and project design: page 21,22

Ordering

Ordering example *(with TLRU24-SR)

a) TLRU24 rotary actuator with TBR..valve fitted**
   -Order code: TBR..+TLRU24-SR
b) TLRU24 rotary actuator and TBR.. valve supplied separately
   -Order code: TBR../TLRU24-SR
c) TLRU24 rotary actuator packed loose
   -Order code: TLRU24-SR

*An order for a TBR..valve usually includes an actuator

**Except for the DN65 and above sizes

Sizing diagram for characterized control valves

Legend

——— Δp_{max}
Maximum permitted pressure difference for long service life across control path A-AB referred to the whole range of opening

—·—·— Δp_{max} for low-noise operation

Δp_{v100}
Pressure difference with ball valve fully open

$\dot{V}_{100}$ Nominal flow rate at Δp_{v100}

Formula for k_{vs}

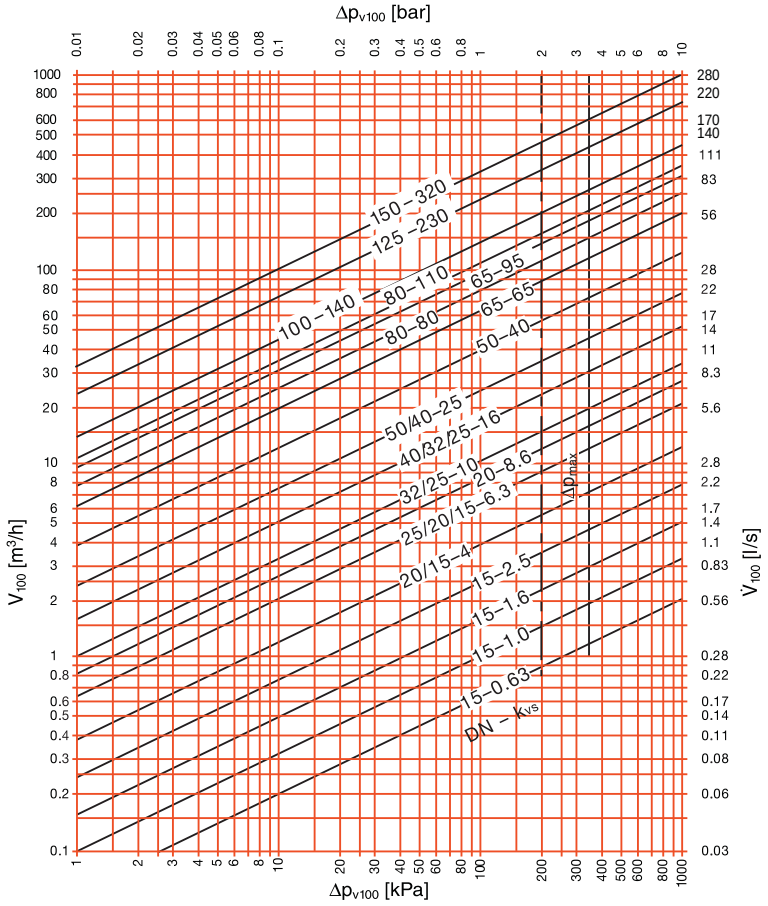
$$k_{vs} = \dot{V}_{100} \sqrt{\frac{\Delta p_{v100}}{100}}$$

$\dot{V}_{100}$ [m³/h]

Δp_{v100} [kPa]

Definition of Δps

Differential pressure at which the actuator can still seal the valve tightly allowing for the appropriate leakage rate



Sizing table for characterized control ball valves

Kvs [m³/h]	4	6.3	10	16	25	40	63	100	140	230	320
DN [mm]	15	20	25	32	40	50	65	80	100	125	150
2-Way	TBR213AC	TBR218AC	TBR223AC	TBR231AC	TBR239AC	TBR249AC	TBR664AC	TBR679AC	TBR6099AC	TBR6124AC	TBR6149AC

Sizing table for Open/Close ball valves

Δp_{v100} [kPa] / Flow $\dot{V}_{100}$ [m³/h]	0.1	1	3	10	**Kvs** [m³/h]	**DN** [mm]	2-way
	0.27	0.86	1.49	2.27	8.6	15	TBR215AC
	0.41	1.3	2.3	4.1	13	20	TBR220AC
	0.57	1.8	3.1	5.7	18	25	TBR225AC
	0.98	3.1	5.4	9.8	31	32	TBR232AC
	1.26	4.0	6.9	12.6	40	40	TBR240AC
	2.06	6.5	11.3	20.6	65	50	TBR250AC
	3.79	12	20.8	37.9	120	65	TBR665AC
	5.70	18	31.2	56.9	180	80	TBR680AC
	7.27	23	39.8	72.2	230	100	TBR6100AC

2-way low torque characterized control valves DN 15...50

Equal-percentage characteristics for modulating control of cold and hot water

Applications

- Water-side control of air handling unit in air conditioning systems
- Water-side control in heating systems

Technical data

Flow medium	Cold and hot water, water with max. 50% volume of glycol
Temperature of medium	-5°C...100°C
Rated pressure	2500 kPa
Flow characteristic	equal percentage
Rangeability	DN15* Sv>50 DN15...50** Sv>100
Leakage rate	0~0.01% kvs(ANSI Class IV) (No leakage when ex-factory)
Pipe connector	Internal thread to ISO7/1
Differential pressure Δ pmax Closing pressure Δps	350 kPa (200 kPa for low-noise operation) 1400 kPa
Angle of rotation	90°C
Installation position	Upright to horizontal (inrelation to the stem)
Maintenace	Maintenace-free
Materials	
Body	Forged, nickel-plated brass body
Ball	Stainless steel
Seat	RPTFE
Stem	Stainless steel
O-ring	EPDM
Characterizing disk	PPA

*= Kvs up to 2.5 ;
**= DN15 Kvs $\geqslant$ 4

Product features

Mode of operation The characterized control valve is operated by a rotary actuator. The actuator is controlled by a standard modulating or 3-point control system and drives the ball of the valve - the throttling device - to the opening position dictated by the control signal.

Equal-percentage characteristic Equal-percentage characteristic of the flow rate ensured by the integral characterizing disc

Manual operation Please refer to page 11...20.

TBR6..AC Characterized control valves, 2-way

2-way characterized control valves
DN 65...150

Equal-percentage characteristics for modulating control of cold and hot water

Applications

- Water-side control of air handling unit in air conditioning systems
- Water-side control in heating systems

Technical data

Flow medium	Cold and hot water, water with max. 50% volume of glycol
Temperature of medium	-5°C...100°C
Rated pressure	1600 kPa
Flow characteristic	equal percentage
Rangeability	DN65...80 Sv>100 DN100...150 Sv>150
Leakage rate	0~0.01% of Kvs (ANSI Class IV) (No leakage when ex-factory)
Pipe connector	Flanged ISO7005-2 PN16
Differential pressure Δ pmax Closing pressure Δ ps	350 kPa (200 kPa for low-noise operation) DN65...125 700 kPa DN150 400 kPa
Angle of rotation	90°C
Installation position	Upright to horizontal (in relation to the stem)
Maintenace	Maintenace-free
Materials	
Body	GG25,Polyester coated
Ball	Stainless steel
Seat	RPTFE
Stem	Stainless steel
O-ring	EPDM
Characterizing disk	Stainless steel

Product features

- Simplified installation procedure
- Light weight comparing with same DN size valves
- Anti-corrosion treatment inside of the valve
- Solid linkage in insulation design

Mode of operation The characterized control valve is operated by a rotary actuator. The actuator is controlled by a standard modulating or 3-point control system and drives the ball of the valve - the throttling device - to the opening position dictated by the control signal.

Equal-percentage characteristic Equal-percentage characteristic of the flow rate ensured by the integral characterizing disc.

Manual operation Please refer to page 11...20.

2-way Open/Close Ball Valves
DN15...150

Shut-off function and 2-point control in cold and hot water circuits

Applications
For shutting off cold and hot water circuits in heating and ventilation systems on the water side or for 2-point control of these circuits

TBR2..AC Technical data (for DN 15... 50)

Flow medium	Cold and hot water, water with max. 50% volume of glycol
Temperature of medium	-5...100°C
Rated pressure	2500kPa
Leakage rate	0...0.01% of Kvs (ANSI Class IV) (No leakage when ex-factory)
Pipe connector	Internal thread to ISO 7/1
Differential pressure Δpmax	1000kPa (200kPa for low-noise operation)
Close-off pressure Δps	1400kPa
Angle of rotation	90°
Installation position	Upright to horizontal (in relation to the stem)
Maintenance	Maintenance free
Materials	
Body	Forged, nickel-plated brass body
Ball	Stainless steel
Seat	RPTFE
Stem	Stainless steel
O-ring	EPDM

TBR6..AC Technical data (for DN 65...150)

Flow medium	Cold and hot water, water with max. 50% volume of glycol
Temperature of medium	-5...100°C
Rated pressure	1600kPa
Leakage rate	0...0.01% of Kvs (ANSI Class IV) (No leakage when ex-factory)
Pipe connector	Flanged ISO 7005-2, PN16
Differential pressure Δpmax	1000kPa (200kPa for low-noise operation)
Close-off pressure Δps	700kPa (DN65...125), 400kPa (DN150)
Angle of rotation	90°
Installation position	Upright to horizontal (in relation to the stem)
Maintenance	Maintenance free
Materials	
Body	GG25, Polyester coated
Ball	Stainless steel
Seat	RPTFE
Stem	Stainless steel
O-ring	EPDM

Product features

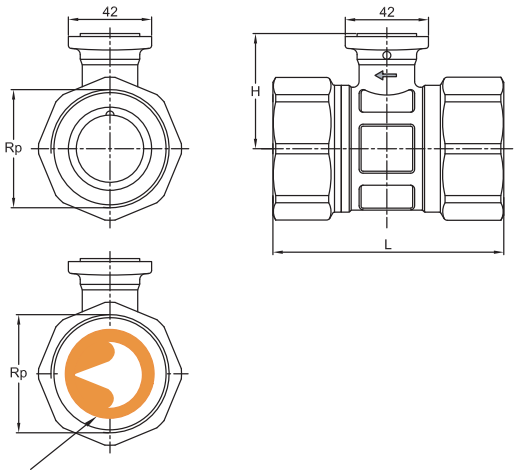
Mode of operation The Open/Close Ball Valve is operated by a Rotary Actuator. The Rotary Actuator is controlled by an Open/Close signal.

Manual operation Please refer to page 11...20.

Dimensions

TBR2..AC 2-way Ball Valves

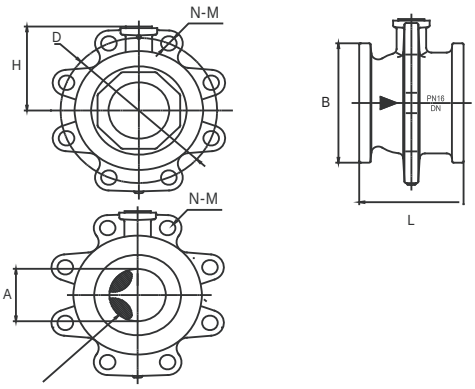
	DN		Thread	Dimensions [mm]		Weight [Kg]
	mm	Imp	Rp	L	H	
TBR213AC/TBR215AC	15	½"	½	70	43.5	0.38
TBR218AC/TBR220AC	20	¾"	¾	77	46	0.48
TBR223AC/TBR225AC	25	1"	1	85	47.6	0.63
TBR231AC/TBR232AC	32	1¼"	1¼	94	51	0.84
TBR239AC/TBR240AC	40	1½"	1½	104	53.5	1.1
TBR249AC/TBR250AC	50	2"	2	116.5	58.1	1.6



Disc for Characterised Control Valve

TBR6..AC 2-way ball valves

Valve type	DN		Dimensions [mm]							Weight [kg]
	mm	Imp.	A	B	D	L	H	N	M	
TBR664AC/TBR665AC	65	2.5"	ø 44	ø101	ø145	93	86	4	ø 18	4.3
TBR679AC/TBR680AC	80	3"	ø 55	ø125	ø160	108	94.5	8	ø 18	6.5
TBR6099AC/TBR6100AC	100	4"	ø 64	ø148	ø180	120	104	8	ø 18	10.5
TBR6124AC	125	5"	ø 77	ø174	ø210	142	118	8	ø 18	13.0
TBR6149AC	150	6"	ø 96	ø204	ø240	170	136.5	8	ø 22	19.5



Disc for characterized control valve

- **Non-spring return rotary actuators: for 2 way ball valves DN 15...25**
- **Torque: 2 Nm**
- **Modulating control: TTR24-SR (AC/DC 24 V)**
- **Open/Close and floating control: TTR230-3 (AC 230V)**

Technical data

Basic technical data	Connection cable	1m, 0.75mm²
	Torque	2Nm
	Angle of rotation	95°
	Sound power level	35dB(A)
	Degree of protection	IP40
	EMC	CE according to 89/336/EEC
	Ambient temperature Non-operating temperature Temperature of medium	-5...+50°C -5...+80°C -5...+100°C
	Humidity test	To EN 60730-1
	Maintenance	Maintenance free
TTR24-SR	Power supply range	AC 19.2...28.8V; DC 21.6...28.8V
	Power consumption	1.0W
	Transformer sizing	1.0VA
	Control signal	DC 2(0)...10V @ 100kΩ input impedance
	Protection class	III (safety low voltage)
	Running time	90s
	Weight	0.3Kg
TTR230-3	Power supply range	AC 198...264V (50Hz)
	Power consumption	1.0W
	Transformer sizing	1.0VA
	Low voltage directive	CE according to 73/23/EEC
	Protection class	II (Totally insulated)⧈
	Running time	105s
	Weight	0.3Kg

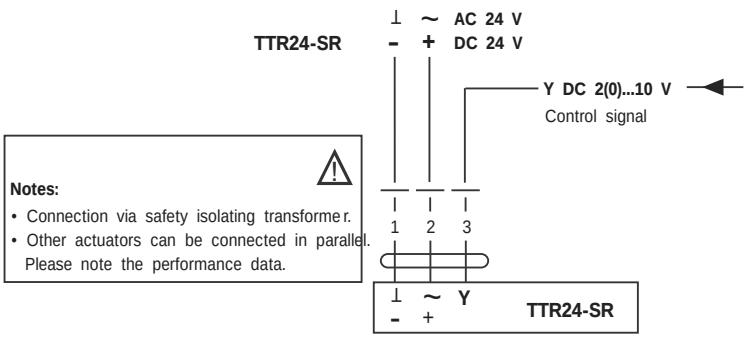
Product features

Simple direct mounting Simple direct mounting on the ball valve using only one screw.

Manual operation Manual operation by lever (the gearing latch remains disengaged as long as the self-resetting lever is pressed).

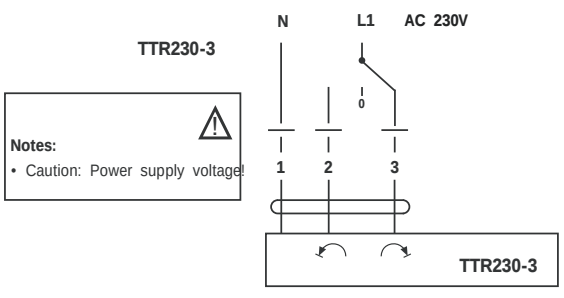
Wirings

Modulating control



Notes:
- Connection via safety isolating transformer.
- Other actuators can be connected in parallel. Please note the performance data.

Open/Close and Floating control



Notes:
- Caution: Power supply voltage!

TLRU.. series rotary actuators

- **Non-spring return rotary actuators: for 2 way ball valves DN32...40**
- **Torque 5 Nm**
- **Modulating control** **TLRU24-SR (AC/DC 24 V)**
- **Open/Close and floating control** **TLRU230 (AC 100...240 V)**

Technical data

Basic Technical data	Connection cable	1m, 0.75mm²
	Torque	5 Nm
	Angle of rotation	90°
	Running time	90s
	Sound power level	Max. 35 dB (A)
	Position indication	Mechanical
	Direction of rotation	Selectable by switch (covered): Factory preset ↘ change to ↗ to reverse the direction of rotation
	Degree of protection	IP54 in any direction
	EMC	CE according to 89/336/EEC
	Ambient temperature range	-5... +50°C
	Non-operation temperature	-5... +80°C
	Temperature of medium	-5... +100°C
	Humidity test	EN 60730-1
	Maintenance	Maintenance free
TLRU24-SR	Nominal voltage range	AC/DC 19.2... 28.8 V
	Power consumption	1.5 W @running / 0.4 W @ holding
	Transformer sizing	3 VA
	Control Signal	DC2(0)...10 V (input impedance) 100k Ω
	Feedback signal	DC2...10 V, Max. 1 mA
	Protection class	III (safety low voltage)
	Weight	0.55 kg
TLRU230	Nominal voltage range	AC 85 ... 265 V
	Power consumption	2.0 W @ running / 0.5 W @ holding
	Transformer sizing	4 VA
	Low voltage directive	CE according to 73/23/EEC
	Protection class	II (Totally insulated)⧈
	Weight	0.60 kg

Product features

Simple direct mounting Simple direct mounting on the ball valve using only one screw.

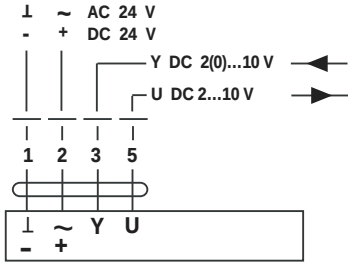
Manual operation Manual operation by pushbutton when necessary.

High function reliability The actuator is overload-proof, needs no limit switches, stops automatically at the end stops.

Wirings

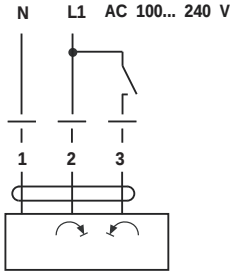
Notes:
- Connection via safety isolating transformer.
- Other actuators can be connected in parallel. Please note the performance data.

Modulating control

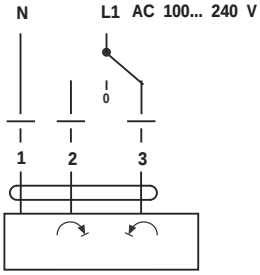


TLRU24-SR

Open/close control



Floating control



TLRU230

- **Non-spring return rotary actuators: for 2 way ball valves DN50**
- **Torque 10 Nm**
- **Modulating control** **TNRU24-SR (AC/DC 24 V)**
- **Open/Close and floating control** **TNRU230 (AC 100...240 V)**

Technical data

Basic Technical data	Connection cable	1m, 0.75mm²
	Torque	10Nm
	Angle of rotation	90°
	Running time	90s
	Sound power level	Max. 45d(A)
	Position indication	Mechanical
	Direction of rotation	Selectable by switch (covered): Factory preset ◔
		change to ◕ to reverse the direction of rotation
	Degree of protection	IP54 in any direction
	EMC	CE according to 89/336/EEC
	Ambient temperature range	-5...+50°C
	Non-operation temperature	-5...+80°C
	Temperature of medium	-5...+100°C
	Humidity test	EN 60730-1
	Maintenance	Maintenance free
TNRU24-SR	Nominal voltage range	AC/DC 19.2... 28.8V
	Power consumption	2.5W @ running/0.4W @ holding
	Transformer sizing	5VA
	Control Signal	DC 2(0)...10V (input impedance) 100k Ω
	Feedback signal	DC 2...10V, Max.1mA
	Protection class	III (safety low voltage)
	Weight	0.85kg
TNRU230	Nominal voltage range	AC 85...265V
	Power consumption	3.0W @ running/0.6W @ holding
	Transformer sizing	7VA
	Low voltage directive	CE according to 73/23/EEC
	Protection class	II (Totally insulated) ⧈
	Weight	0.90kg

Product features

Simple direct mounting Simple direct mounting on the ball valve using only one screw.

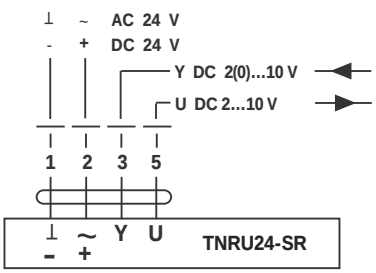
Manual operation Manual operation pushbutton when necessary.

High function reliability The actuator is overload-proof, needs no limit switches, stops automatically at the end stops.

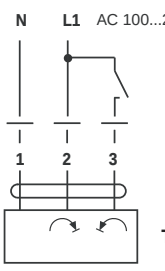
Wirings

Notes:
- Connection via safety isolating transforme
- Other actuators can be connected in parallel. Please note the performance data.

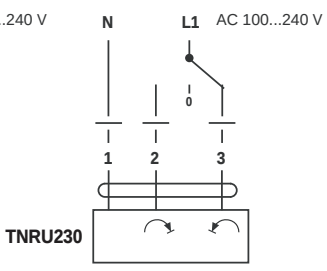
Modulating contol



Open/Close control



Floating control



TSRU.. series rotary actuators

- **Non-spring return rotary actuators: for 2 way ball valves DN65...80**
- **Torque 20 Nm**
- **Modulating control** **TSRU24-SR (AC/DC 24 V)**
- **Open/Close and floating control** **TSRU230 (AC 230 V)**

Technical data

Basic Technical data	Connection cable	1m, 0.75mm²
	Torque	20Nm
	Angle of rotation	90°
	Running time	90s
	Sound power level	Max. 45dB(A)
	Position indication	Mechanical
	Direction of rotation	Selectable by switch (covered): Factory preset ↘ change to ↗ to reverse the direction of rotation
	Degree of protection	IP54 in any direction
	EMC	CE according to 89/336/EEC
	Ambient temperature range	-5...+50°C
	Non-operation temperature	-5...+80°C
	Temperature of medium	-5...+100°C
	Humidity test	EN 60730-1
	Maintenance	Maintenance free
TSRU24-SR	Nominal voltage range	AC/DC 19.2...28.8V
	Power consumption	2.5W @ running/0.4W @ holding
	Transformer sizing	5VA
	Control Signal	DC 2(0)...10V (input impedance) 100k Ω
	Feedback signal	DC 2...10V, Max. 1mA
	Protection class	III (safety low voltage)
	Weight	1.0kg
TSRU230	Nominal voltage range	AC 85...265V
	Power consumption	3.0W @ running/0.6W @ holding
	Transformer sizing	7VA
	Low voltage directive	CE according to 73/23/EEC
	Protection class	II (Totally insulated) ⧈
	Weight	1.05kg

Product features

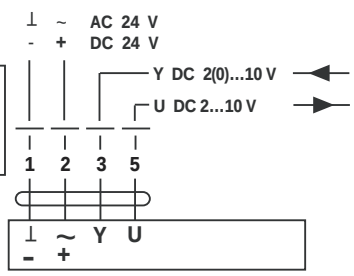
Simple direct mounting Simple direct mounting on the ball valve using only one screw.

Manual operation Manual operation by pushbutton when necessary.

High function reliability The actuator is overload-proof, needs no limit switches, stops automatically at the end stops.

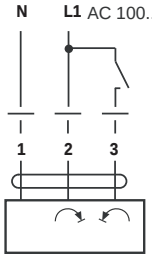
Wirings

TSRU24-SR Modulating contol

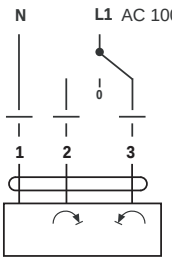


Notes:
- Connection via safety isolating transforme
- Other actuators can be connected in parallel. Please note the performance data.

Open/Close control



Floating control



TSRU230

- **Non-spring return rotary actuators: for ball valves DN100...150**
- **Torque 40 Nm**
- **Modulating control TGRU24-SR (AC/DC 24 V)**
- **Open/Close control TGRU230 (AC 100...240 V)**

Technical data

Basic Technical data	Connection cable	1m, 0.75mm²
	Torque	40Nm
	Angle of rotation	90°
	Running time	150s
	Sound power level	Max. 45dB(A)
	Position indication	Mechanical
	Direction of rotation	Selectable by switch (covered): Factory preset ↘ change to ↗ to reverse the direction of rotation
	Degree of protection	IP54 in any direction
	EMC	CE according to 89/336/EEC
	Ambient temperature range	-5...+50°C
	Non-operation temperature	-5...+80°C
	Temperature of medium	-5...+100°C
	Humidity test	EN 60730-1
	Maintenance	Maintenance free
TGRU24-SR	Nominal voltage range	AC/DC 19.2... 28.8V
	Power consumption	4.5W @ running/2W @ holding
	Transformer sizing	6.5VA
	Control Signal	DC 2(0)...10V (imput impedance) 100kΩ
	Feedback signal	DC 2...10V, Max. 1mA
	Protection class	III (safety low voltage)
	Weight	2.0kg
TGRU230	Nominal voltage range	AC 85...265V
	Power consumption	5W @ running/2.5W @ holding
	Transformer sizing	9VA
	Low voltage directive	CE according to 73/23/EEC
	Protection class	II (Totally insulated)⧈
	Weight	2.05kg

Product features

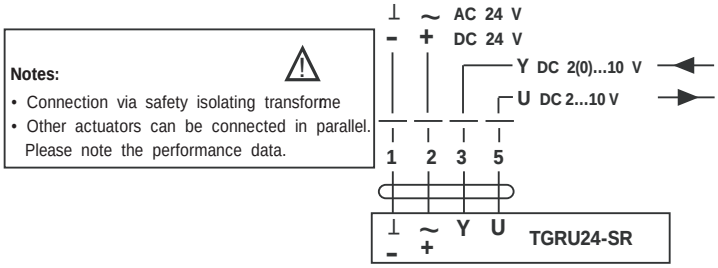
Simple direct mounting Simple direct mounting on the ball valve using only one screw.

Manual operation Manual operation by pushbutton when necessary.

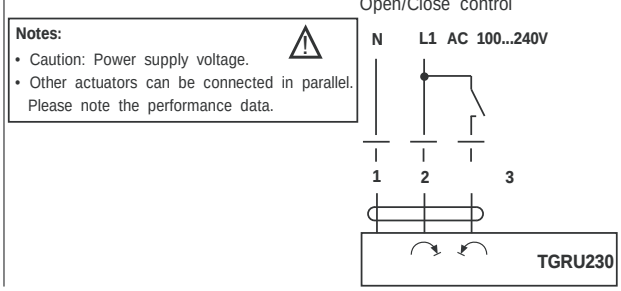
High function reliability The actuator is overload-proof, needs no limit switches, stops automatically at the end stops.

Wirings

Modulating control



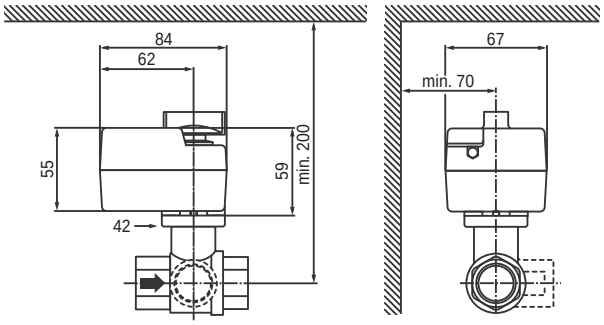
Open/Close control



Dimensions of non-spring return actuators

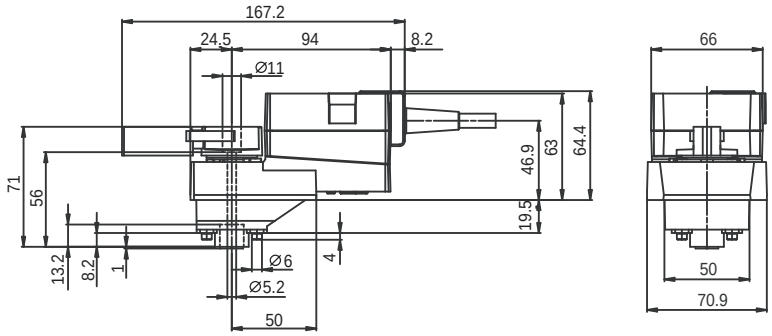
Dimensions: TTR..

Measurement [mm]



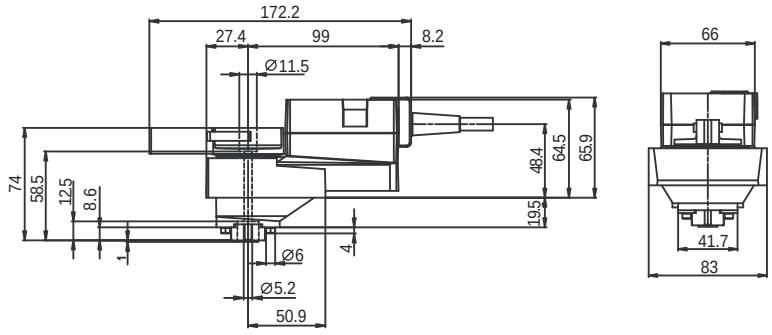
Dimensions: TLRU..

Measurement [mm]



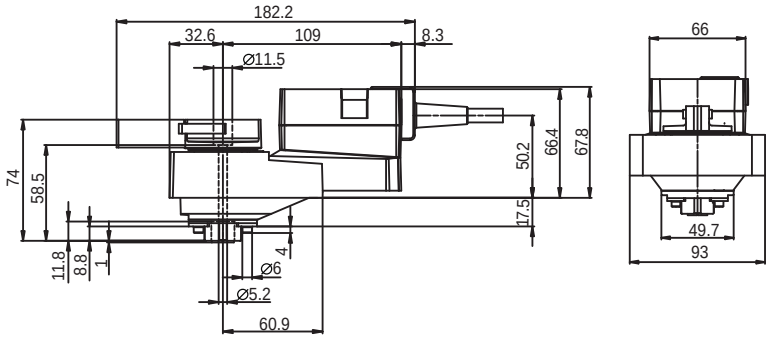
Dimensions: TNRU..

Measurement [mm]



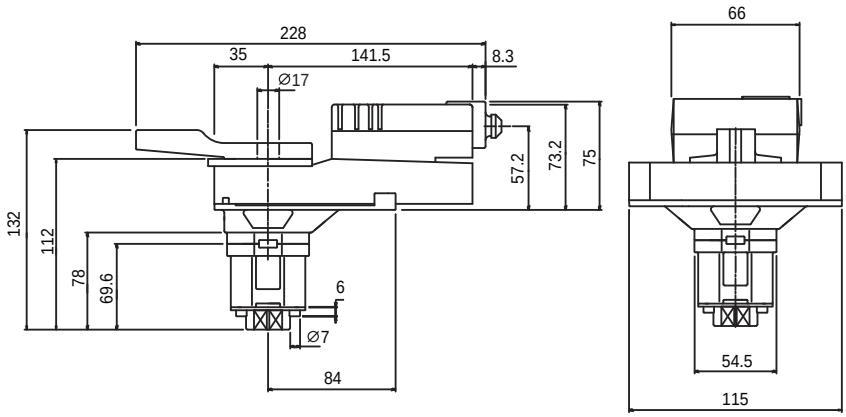
Dimensions: TSRU..

Measurement [mm]

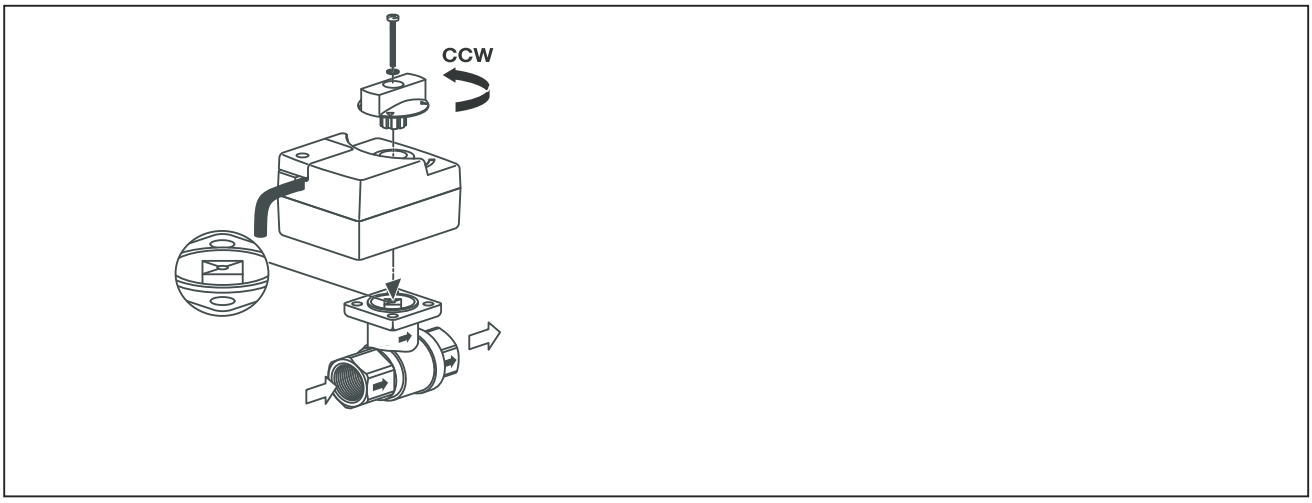


Dimensions: TGRU..

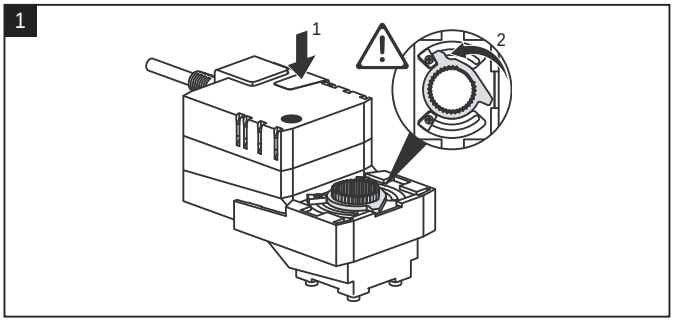
Measurement [mm]

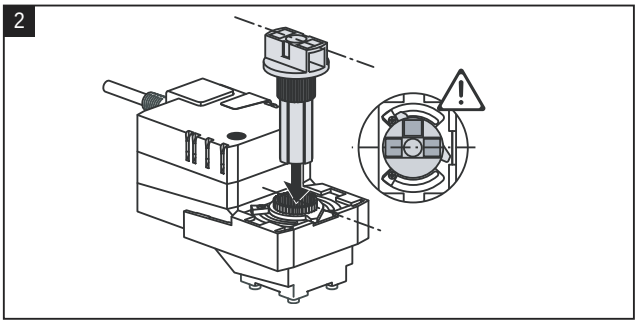


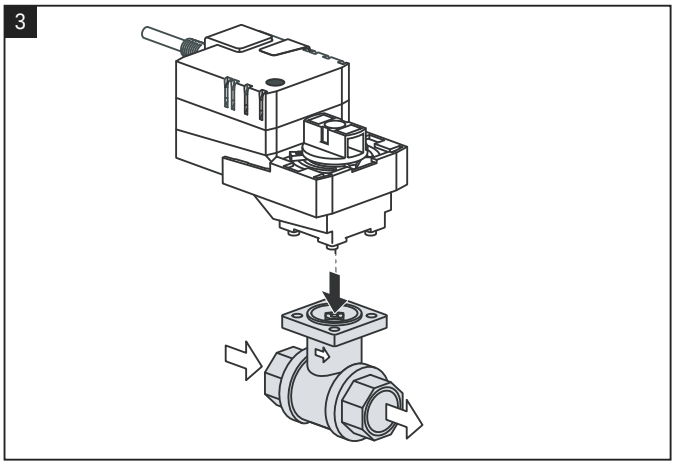
Installation procedures: TTR..

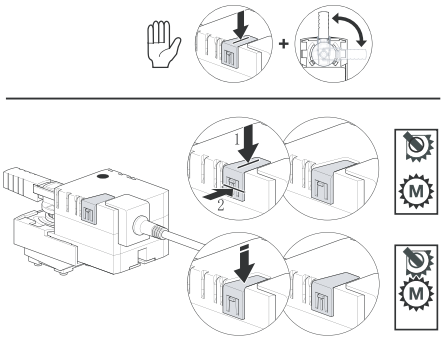


Installation procedures: TLRU../TNRU.. (DN15...50)

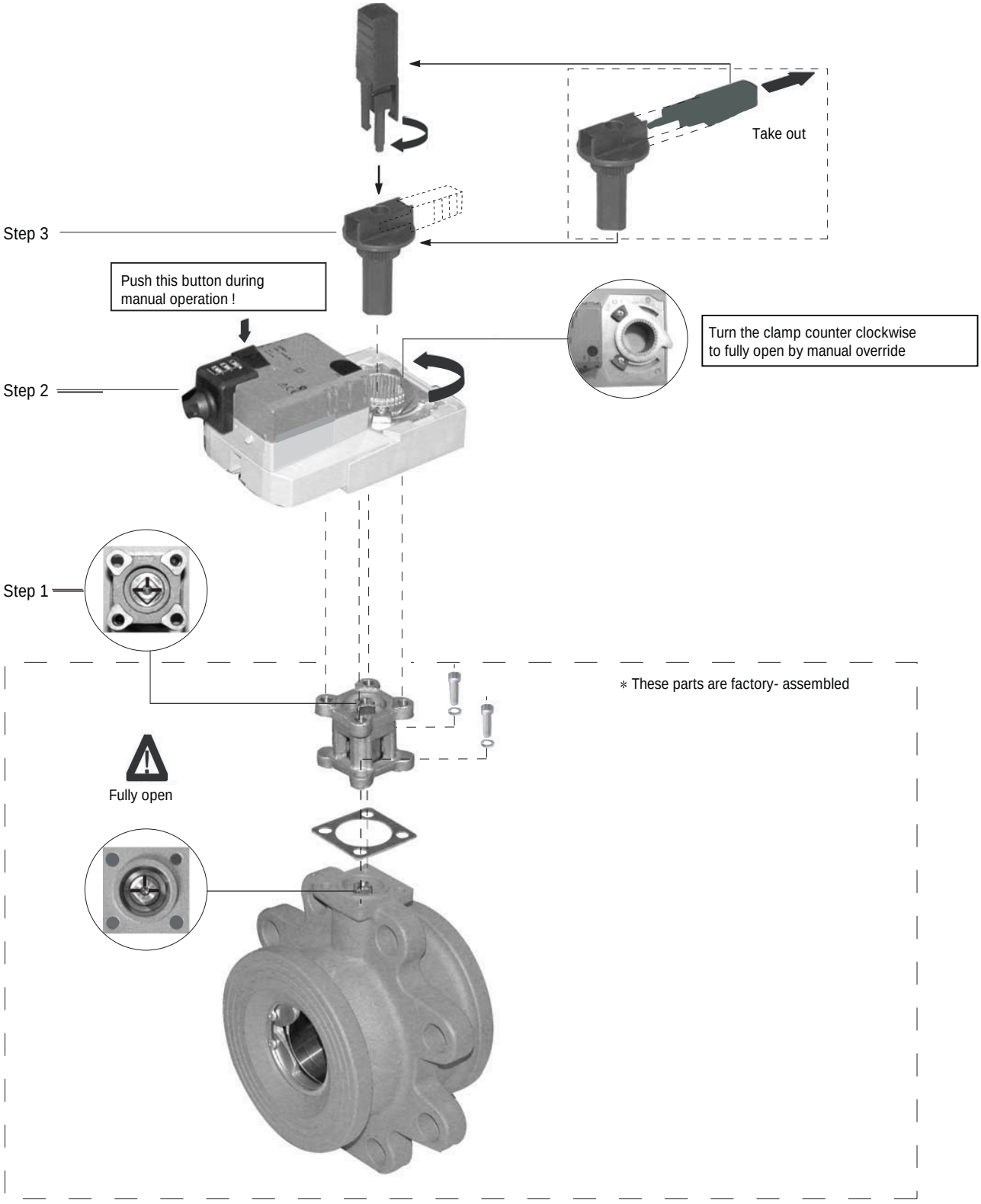




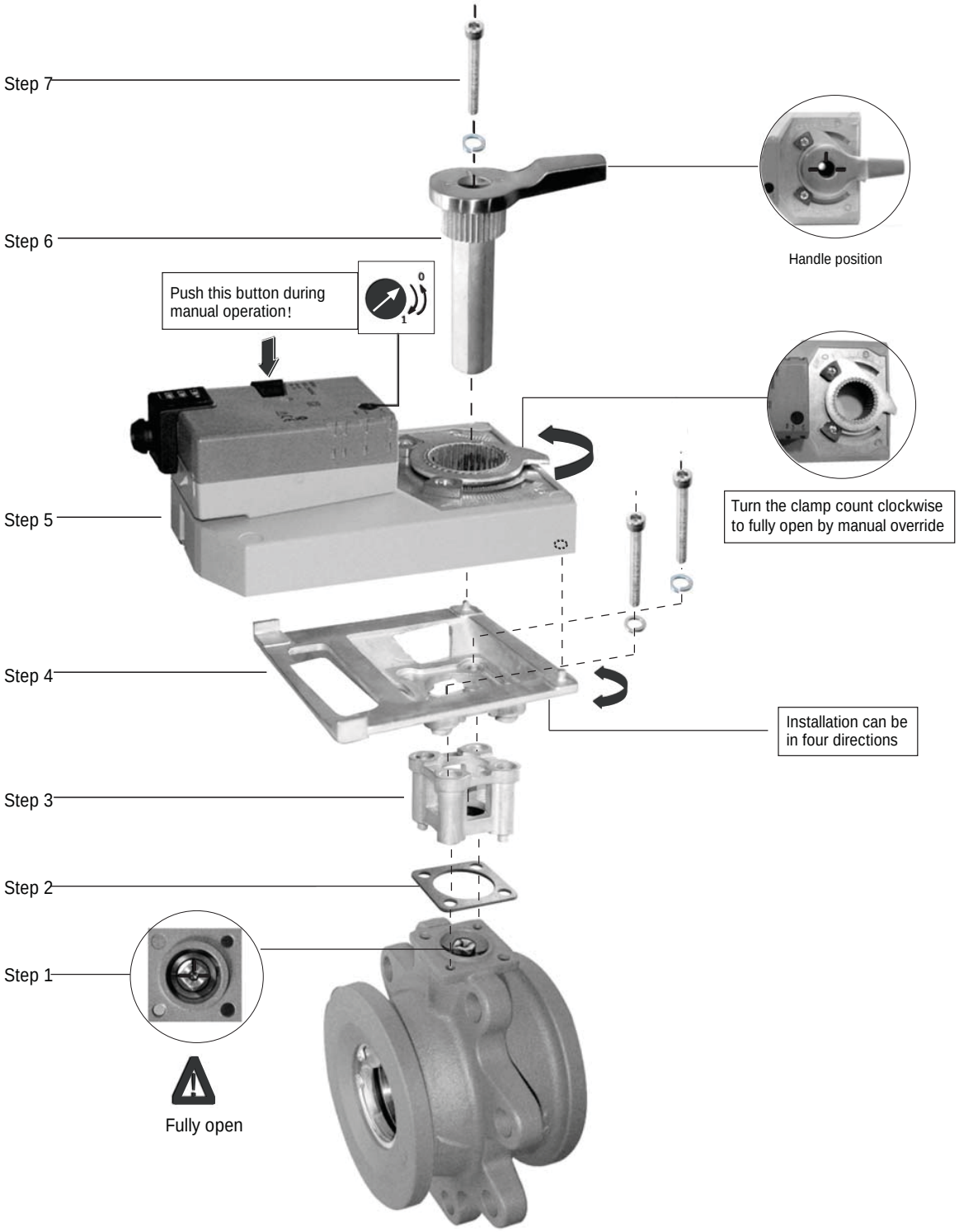




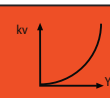
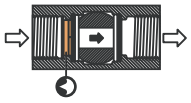
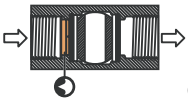
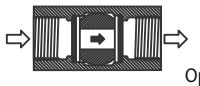
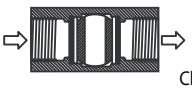
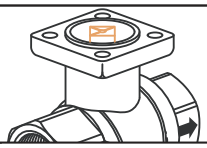
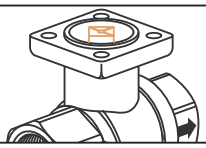
Installation procedure: TSRU.. + DN65...80 Ball valves



Installation procedure: TGRU.. + DN100...150 Ball valves

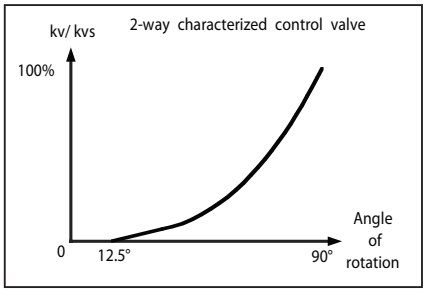


Standard directions of flow

 characterized control valves 	 Open	 Closed	2-way TBR2..AC, TBR6..AC
 Open/Close ball valves 	 Open	 Closed	2-way TBR2...AC, TBR6...AC
Spindle position for corresponding valve flow			For 2-way ball valve
Actuator position corresponding to ball valve flow direction			

Flow characteristics of characterized control valves

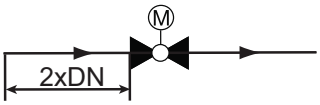
Between 0° and 12.5° angle of rotation, 2-way characterized control valves function as tight-sealing shut-off devices. Between 12.5 ° and 90° angle of rotation, control ball valves.



Mounting, installation and commissioning

Separate supply
When Ball Valve and Rotary Actuator are supplied separately, they can be assembled on-site.

Recommended straight pipe installation
It is a general recommendation to keep minimum 2xDN of straight piping distance before the CCV installation in the pipe, to perform the best control function.
No requirements for after the valve.



Recommended mounting positions
The Ball Valves maybe mounted vertical (Fig. 1) or horizontal (Fig. 2). However, mounting the Ball Valves with the spindle pointing downwards, i.e. upside down (Fig. 3), is not recommended.

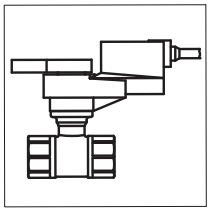


Fig.1

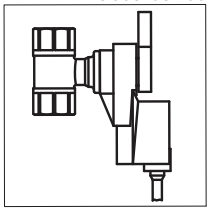


Fig.2

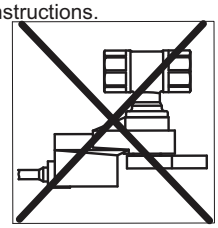


Fig.3

No special tools are needed for assembly. Instructions will be found packed with the valve and actuator.

Commissioning
Must not be carried out until the Ball Valve and Rotary Actuator have been assembled in accordance with the instructions.

Maintenance

- Ball valves and rotary actuators are both main - tenance free.
- Before any kind of service work is carried out on control devices of this type, it is essential to isolate the actuator from the power supply (by unplugging the power lead). Any pumps in the particular part of the piping system concerned must also be switched off and the appropriate isolating fittings closed (also allow everything to cool down first if necessary and reduce the pressure in the system to atmospheric).
- The system must not be returned to service until the ball valve and the actuator have been properly re-installed and connected and the pipe work has been refilled in the propermanner.

Subsequent removal
In the case of applications where subsequent removal of ball valve will be necessary, it is advisable to make appropriate preparations before hand.

Disposal
When a control device (ball valve and actuator) has come to the end of its service life, the two part must be dismantled and sorted into different materials before being disposed of.

Project design

Installing TBR2..AC/TBR6..AC ball valves, 2-way
The TBR2.. characterized control valve is a throttling device, installed in the return line of systems in order to ensure less thermal stress on the seals of the device. The direction of flow specified must be adhered to.

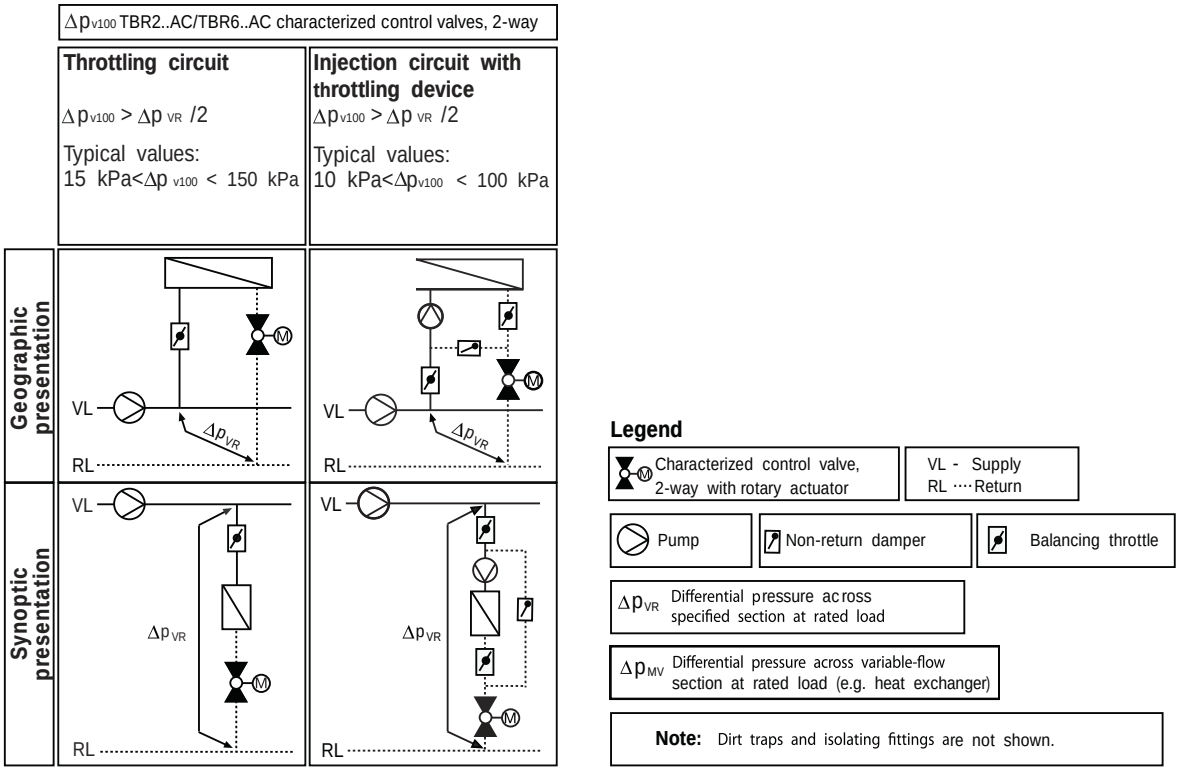
Water quality requirements
The water quality requirements specified in VDI2035 must be adhered to.

Dirt filters recommended
Characterized control valves are relatively sensive control devices, and in order to ensure that they give long service life, the fitting of dirt filters is recom- mended.

Sufficient isolating valves
It is essential to ensure that sufficient isolating valves are provided.

Correct rating and sizing
In order to ensure that the control devise (characterized control valve and rotary actuator) achieves a long service life, it is essential for the valve to be rated for the correct differential pressure Δp_{v100} across the valve, i.e. with adequate valve authrity (Pv>0.5). The differential pressure Δpv_{100} depends on the type of hydraulic circuitin which the valve is being used.

Differential pressures Δp_{v100} with characterized control valves full open



	Literature Number	TD-PRC003-EN
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	Stocking	Asia Parts