TBU6 Butterfly Valves

Technical Databook

TRANE®

Butterfly valves and rotary actuators for Open/Close or modulating control

Nylon coated disc (TBU6..series)

Key features

Rated pressure: 1600kPa

Other technical data see page 4...6

k_V [m³/h]		80	170	290	560	870	1340	2690	5540	7540	10300	14300	18900	24200
DN [mm]		50	65	80	100	125	150	200	250	300	350	400	450	500
Type	Wafer	TBU6..	TBU650	TBU665	TBU680	TBU6100	TBU6125	TBU6150	TBU6200	TBU6250	TBU6300	TBU6350	TBU6400	TBU6450	TBU6500

 With Open/Close actuator	IP67	TSY1-230-3-T	TSY2-230-3-T	TSY3..	TSY4..	TSY6..	TSY7..	TSY8..
 With modulating actuator	IP67	TSY1U230-SR-T	TSY2U230-MF-T	TSY3..	TSY4..	TSY6..	TSY7..	TSY8..

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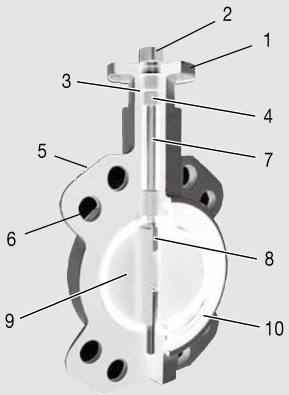
Trane TBU6.. series Butterfly valves are designed to meet the stringent needs of HVAC and commercial applications requiring positive shut-off for liquids.

Valve design features



1. Mounting flange according to ISO 5211.
2. Square stem head for form-fit attachment of the rotary actuator.
3. Stem with EPDM O-ring seal.
4. RPTFE stem bearing.
5. Valve body made of ductile cast iron (DN50...500).
6. Hole pattern for PN 6/10/16 (wafer type).
7. Stem made of stainless steel 416.
8. Double-D-fit attachment of the stem to the throttling element.
9. Throttling element made of stainless steel 316.
10. EPDN seat lining, integrated flange sealing.

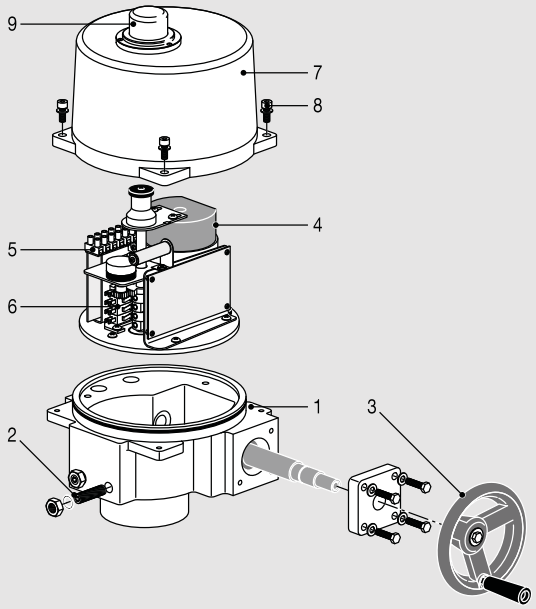
- Double-D-fit of valve stem connecting with the valve disc produces close tolerance, easy disassembly. The disc can be self-adjusting to centralize due to this unique design.

- The integrated flange sealing ensures positive connection of the valve body, seat and disc, and provides complete isolation of the media from the body.It makes field replacement simple and fast, can seal with socket welding or welding neck flanges and without additional gaskets.
- The ball profile style seat eliminates elastomer movement and reduces seat tearing or fatiguing due to bunching.
- Double seals prevent media coming into the valve. The primary seal is achieved by an interference fit of the molded seat flat with the disc hub. The secondary seal is created when the stem diameter is greater than the seat stem hole.
- The disc casting is precision machined, which gives a smooth and close disc-to-seat relationship.

- The three non-corrosive RPTFE (Reinforced Poly Tetra Fluoro Ethylene) bushings completely isolate the valve shaft from the body, resulting in increased control of the valve disc, lower valve seating torque and longer valve life.
- The nylon coated disc features a very good corrosion resistance - superior resistance to a broad range of chemical environments, as well as very low coefficient of friction and excellent resistance to impact and ultra-violet radiation.

Additionally to satisfy higher IP requirement and large size butterfly automation, Trane offers TSY.. series rotary actuators being designed to mate with the TB U 6.. series Butterfly valves and other quarter turn valve applications.

TSY.. actuator design features



1. Gearbox with hardened planetary gear.
2. Two adjusting stop screws for limiting of manual rotation angle.
3. Handwheel that acts directly on the planetary gear.
4. Motor protected by a thermostat.
5. Terminals.
6. Limit switches and two auxiliary switches.
7. Housing made of cast aluminum (IP67).
8. 4 x M5 hexagonal screws for cover of housing.
9. Sight glass for position indicator (rotary cylinder).

- The patented gear drive mechanism provides efficient, smooth operation while allowing easy manual override at any time.

- With IP67 rating, easily visible position indicator, international standard ISO 5211 mounting system, internal thermal motor overload protection, heater, dual auxiliary switches, and easily accessible wiring termination points.

- The units are easily visible in mechanical rooms with their characteristic Belimo orange color. Wiring diagrams included in all printed documentation, are also affixed to the outside of the housing on the permanently attached product label.

- The torque ranges are available from 35 to 3500 Nm.

The sizing of Butterfly valves

Kv Value [m³/h]

Type	Size		90°	80°	70°	60°	50°	40°	30°	20°	10°
TBU650	DN50	2"	80	75	57	39	27	21	16	6.9	1.09
TBU665	DN65	2.5"	170	142	99	64	42	30	19	7.5	5.2
TBU680	DN80	3"	290	278	205	139	87	51	34	21	7.7
TBU6100	DN100	4"	560	404	270	173	105	67	46	26	6.3
TBU6125	DN125	5"	870	744	502	306	186	113	60	33	15.6
TBU6150	DN150	6"	1340	1185	720	472	294	171	94	47	25.9
TBU6200..	DN200	8"	2690	2360	1483	956	617	362	211	88	52.0
TBU6250	DN250	10"	5540	3948	2364	1502	911	588	334	193	84.5
TBU6300	DN300	12"	7540	6147	3607	2083	1229	706	401	164	4.13
TBU6350	DN350	14"	10300	9348	6233	3938	2380	1335	616	291	5.2
TBU6400	DN400	16"	14300	12856	8571	5416	3237	1836	847	400	6.9
TBU6450	DN450	18"	18900	17028	11352	7172	4334	2433	1122	530	9.5
TBU6500	DN500	20"	24200	21893	14596	9222	5573	3128	1443	682	12

The maximum velocity in the butterfly valve is 6m/s (for Open/Close control)

Max. Close-off Pressure ΔPs and linkage – TBU6.. nylon coated disc series

Type	IP67 Actuator						
	TSY1 [35Nm]	**TSY2..** [90Nm]	**TSY3..** [150Nm]	**TSY4..** [400Nm]	**TSY6..** [650Nm]	**TSY7..** [1000Nm]	**TSY8..** [1500Nm]
	ΔPs kPa	ΔPs kPa	ΔPs kPa	ΔPs kPa	ΔPs kPa	ΔPs kPa	ΔPs kPa
TBU650	1200	-	-	-	-	-	-
TBU665	1200	-	-	-	-	-	-
TBU680	1200	-	-	-	-	-	-
TBU6100	1200	-	-	-	-	-	-
TBU6125	-	1200	-	-	-	-	-
TBU6150	-	1200	-	-	-	-	-
TBU6200	-	-	1200	-	-	-	-
TBU6250	-	-	-	1200	-	-	-
TBU6300	-	-	-	1200	-	-	-
TBU6350	-	-	-	-	1200	-	-
TBU6400	-	-	-	-	-	1200	-
TBU6450	-	-	-	-	-	1200	-
TBU6500	-	-	-	-	-	-	1200

2-way Butterfly Valves flanged
DN50...500

For Open/Close or modulating control of cold and hot water.

Applications
Typical applications include chiller isolation, cooling tower isolation, change-over systems, air handling unit, fan coil control, bypass and process control.

Technical data

Flow media	Nylon coated disc: Cold and hot water
Temperature of medium	Nylon-coated disc: 0...+95°C
Nominal pressure	1600kPa (PN16)
Flow characteristic	Modified equal-percentage
Rangeability	10:1 (for 30°...70° range)
Leakage rate	Rate A Bubble Tight (EN12266-1)
Pipe connections	ISO 7005.2, AS2129 Table E PN6/10/16 Table E for wafer (DN50..300) ISO 7005.2 PN16 for wafer (DN350...500)
Max. Close-off pressure	See page 4
Mounting position	Vertical to horizontal
Maintenance	Maintenance-free
Angle of rotation	90° rotation
Materials	
Body	Ductile cast iron GGG40 (DN50...500)
Disc	Nylon coated ductile cast iron disc
Seat	EPDM seat ring
Stem	Stainless steel 416
Bushing	RPTFE

Ordering example

TBU6 125

pattern: default(X)-Wafer, Nylon coated disc

Size: DN125

Butterfly Valve: TBU6 Low torque series

*** For matching, please refer to page 4.**

Mode of operation

The Butterfly Valve is operated by a General Rotary Actuator, Mechanical Fail-Safe Rotary Actuators or TSY Large Torque Multi-function Actuators are available. Select the actuators according to required close-off pressure and HVAC condition of installation. The actuators are controlled by a standard Open/Close or modulating open/close or modulating control system and rotate the disc of the valve to the position dictated by the control signal

Product features

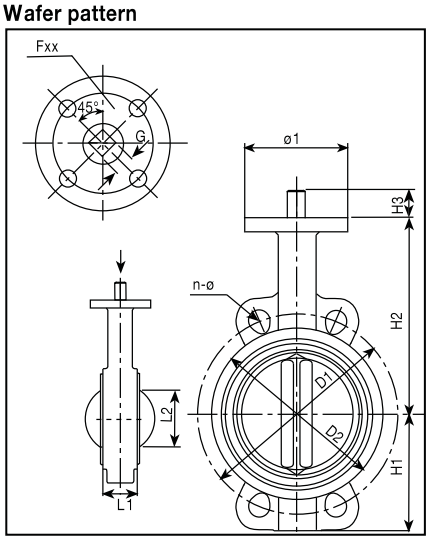
The large Kv values provide an economical control valve solution for larger flow applications.

Manual operation

The valve matched with TSY Large Torque Multi-function actuator can be operated by turnning the wheel of TSY2...8 or via an 8mm wrench (TSY1..).

Dimensions of Butterfly valves

Wafer pattern



Dimensions for PN6/10/16 Table E wafer pattern Butterfly valve

Type	Size DN	Top flange Fxx	D2	L1	L2	H1	H2	H3	G	ø1	PN6		PN10		PN16		Table E		NC Weight (Kg)
											D1	n-ø	D1	n-ø	D1	n-ø	d	n-M	
TBU650	50	F05	93	43	33	70	134	13	14	65	110	4-14	125	4-19	125	4-19	114	4-18	2.3
TBU665	65	F05	107	46	48	76	147	13	14	65	130	4-14	145	4-19	145	4-19	127	4-18	2.8
TBU680	80	F05	123	46	66	89	158	13	14	65	150	4-19	160	4-19	160	4-19	146	4-18	3.5
TBU6100	100	F05	151	52	91	104	173	13	14	65	170	4-19	180	4-19	180	4-19	178	4-18	5.5
TBU6125	125	F07	177	56	115	118	195	19	17	90	200	4-19	210	4-19	210	4-19	210	4-18	7.4
TBU6150	150	F07	204	56	142	132	213	19	17	90	225	4-19	240	4-23	240	4-23	235	4-22	9.0
TBU6200	200	F07	260	60	194	167	247	19	17	125	280	4-19	295	4-23	295	4-23	292	4-22	15.0
TBU6250	250	F10	314	68	245	197	287	38	22	125	335	4-19	350	4-23	355	4-28	356	4-22	21.5
TBU6300	300	F10	370	78	294	239	316	24	22	125	395	4-23	400	4-23	410	4-28	406	4-26	32.3
TBU6350	350	F10	422	79	328	265	345	24	22	125	-	-	-	-	470	4-28	-	-	43.5
TBU6400	400	F14	473	105	374	297	377	38	36	175	-	-	-	-	525	4-31	-	-	64.0
TBU6450	450	F14	526	112	425	331	412	38	36	175	-	-	-	-	585	4-31	-	-	83.3
TBU6500	500	F14	577	129	472	361	440	38	36	210	-	-	-	-	650	4-34	-	-	165.1

TSY.. large torque actuators

- **Non-spring return large torque actuators, for operation of DN50...500 Butterfly valves**
- **Torque 35...1500Nm**
- **Open/Close or 3-point control: TSY...230-3-T**
- **Modulating control: TSY1U230-SR-T / TSY2U230-MF-T...TSY8U230-MF-T**

Technical data

Electric data

Nominal voltage	
TSY... -3-T, TSY... -SR-T, TSY...U-MF-T	AC 230 V ± 10%
Power supply range	
TSY... -3-T, TSY1U-SR-T, TSY...U-MF-T	207... 253 V
Electrical connection	½"cable connector, screw terminals
Overload protection	Thermally protected 135°C cut-out
Motor protection	H class insulation (TSY1-..), F class insulation (TSY2... 8)
Gear train	High alloy steel gear sets
Control signal	Open/close, 3-point control
TSY... -3-T, TSY1U-SR-T, TSY...U-MF-T	2(0)...10 VDC
Sensitivity	200 mV (for TSY1U-SR-T, TSY...U-MF-T)
Feedback signal	2(0)...10 VDC (for TSY1U-SR-T, TSY...U-MF-T)
Angle of rotation range	Electrically limited to 90°, Max. 95° for manual operation
Position indication	Top mounted domed indication
Internal humidity control	Up to 95%, resistive heating element
Auxiliary switches	(2)SPDT, 3 A, AC 230 V (TSY1); 5 A, AC230 V (TSY2...8)
Ambient temperature	- 20°C ... 60°C
Housing type	IP67 / NEMA 4
Housing material	Die cast aluminium alloy
EMC	CE according to 89/336/EEC
Low voltage directive	CE according to 73/23/EEC, 93/68/EEC

Model No.	Torque (Nm)	Motorpower	Running time		Running current	Manual Override	Weight (Kg)	Mounting flange (ISO 5211)
		230V AC	230 V AC		230V AC			
			60Hz	50Hz				
TSY1-..	35	10W	12s	13s	0.3A	by 8mm Wrench	2.0	F05
TSY2-..	90	40W	15s	17s	0.5A	Handwheel	11	F07
TSY3-..	150	40W	22s	26s	0.5A	Handwheel	11	F07
TSY4-..	400	120W	16s	18s	0.6A	Handwheel	22	F10
TSY6-..	650	120W	28s	31s	0.8A	Handwheel	22	F10
TSY7-..	1000	180W	46s	55s	1.6A	Handwheel	36	F14
TSY8-..	1500	220W	46s	55s	2.0A	Handwheel	36	F14

Product features

Electrical connections

All actuator control elements are wired to a terminal strip under the main cover. Remove the cover and insert the cables through the cable connector in order to reach the terminal strip. The connectors should be made according to the diagram. Before beginning this procedure, make sure that the power supply voltage is in accordance with the actuator's nameplate. After the terminal connections have been made, move the actuator manually to the half-open position and make a preliminary check of the wiring.

Manual operation

Turn the handwheel clockwise to close the actuator and counterclockwise to open. This provides a temporary manual operation. For a permanent manual operation, remove the power from the actuator. (Note: Need a 8mm wrench for TSY1..)

Overload protection

If the running torque exceeds the normal torque requirement, then the overload protection will be functioned to prevent the motor overload.

Designation

TSY4 U-230 -MF -T

- With terminal only
- "-MF":Modulating control
- "-3":Open/close or 3-point control
- "U230": 230V nominal voltage (modulating)
- "-230": 230V nominal voltage (open/close, 3-point)
- Model number

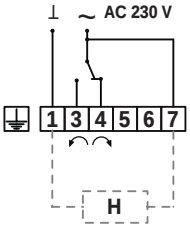
eg. Modulating control
TSY4U230-MF-T
Open/close, 3-point control
TSY4-230-3-T

Wiring diagrams

TSY..-230-3-T Open/Close or 3-point control

Notes

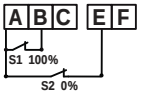
- Caution: Power supply voltage !
- Relays are needed in parallel connection of several actuators
- "L1" cannot be connected to terminal #3 and #4 simultanenously.
- 30% duty cycle.



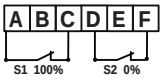
Terminal

#1	Power supply Com/Neutral
#3	Power supply Hot line for Open
#4	Power supply Hot line for Close
#5	Connect to Com/Neutral for fully open indication
#6	Connect to Com/Neutral for fully close indication
#7	Heater

Auxiliary switch



TSY1-230-3-T

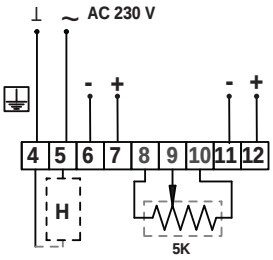


TSY(2...9)-230-3-T

TSY1U230-SR-T Modulating control

Notes

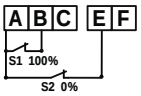
- Caution: Power supply voltage !
- Power supply Com / Neutral and control signal "-" wiring to a common is prohibited.
- The control signal has to be separated from the others and shielded.
- 75% duty cycle.



Terminal

#4	Power supply Com / Neutral
#5	Power supply Hot line
#6	Control signal -
#7	Control signal +
#8	For actuator internal use
#9	For actuator internal use
#10	For actuator internal use
#11	Feedback signal -
#12	Feedback signal +

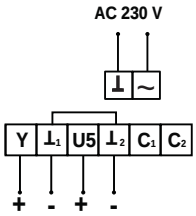
Auxiliary switch



TSY..U230-MF-T Modulating control

Notes

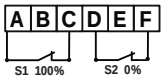
- Caution: Power supply voltage !
- Power supply Com / Neutral and control signal "-" wiring to a common is prohibited.
- The control signal has to be separated from the others and shielded.
- 75% duty cycle*.



Terminal

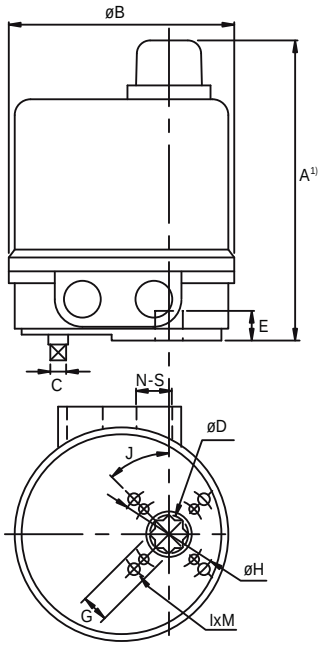
⊥	Power supply Com / Neutral
~	Power supply Hot line
Y	Control signal +
⊥1	Control signal -
U5	Feedback signal +
⊥2	Feedback signal -
C1	leave unconnected
C2	

Auxiliary switch

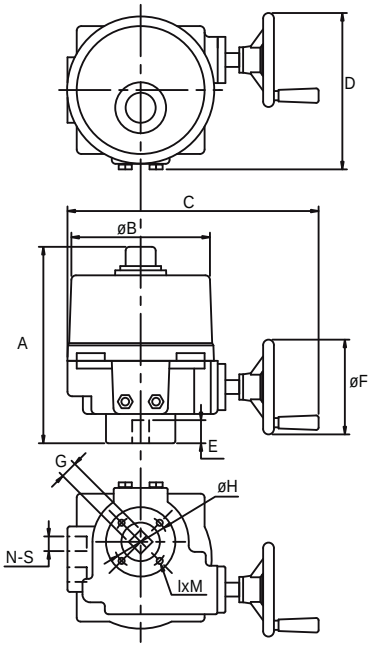


TSY(2...8)U230-SR-T

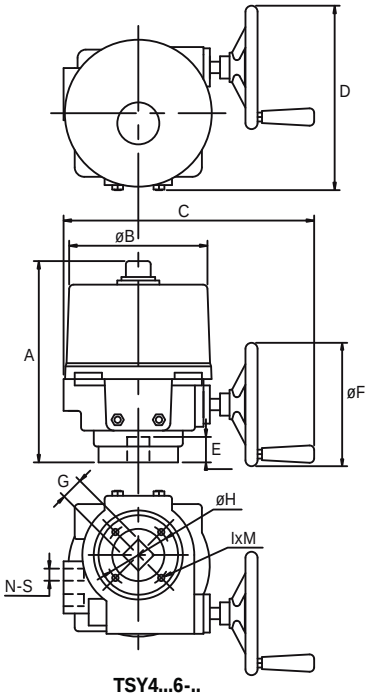
Dimensions Unit [mm]



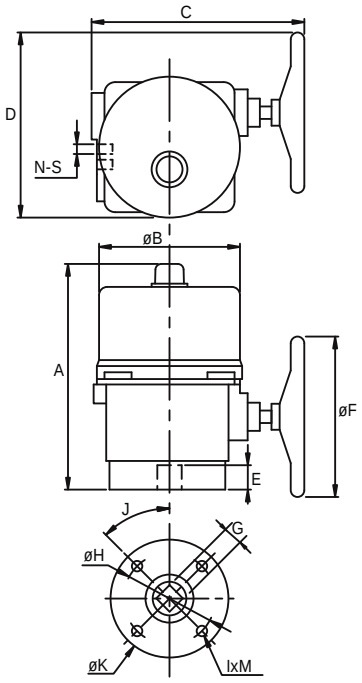
TSY1-..



TSY2/3-..



TSY4...6-..

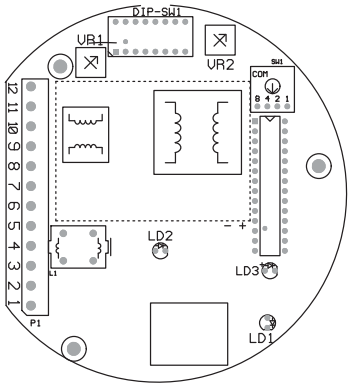


TSY7/8-..

1) For TSY1U230-SR-T, A is 183.

Dim. / Model No.	A	B	C	D	E	øF	G	H	I	J	K	M	N	S	Flange type
TSY1-..	150[1)]	106	8	19	15	-	14	50	4	45°	-	M6	2	1/2 PS	F05
TSY2/3-..	255	181	326	208	30	123	17/22	70	4	-	90	M8	2	1/2 PS	F07
TSY4...6-..	317	217	394	294	40	194	22/35	102	4	-	125	M10	2	1/2 PS	F10
TSY 7/8-..	406	217	347	336	45	295	36	140	4	45°	180	M16	2	1/2 PS	F14

Circuit board set up



TSY1U230-SR-T

⚠ Disconnect power supply before changing the following settings.
The words in Bold are default settings.

- DIP switches setting
  Factory setting

S1, S2 - for Input signal			S3, S4, S5 - for Output signal				S6 - Direction of Travel in response to the control		S7 & S8 - Actuator response to the control signal failure		
Input signal	**S1**	**S2**	**Output signal**	**S3**	**S4**	**S5**	**Symbol**	**S6**	**When signal fails**	**S7**	**S8**
2...10V	**Off**	**On**	**2...10V**	**On**	**Off**	**On**	90° Y	**Off**	Fully closed	Off	On
4...20mA	On	Off	4...20mA	Off	On	Off			Fully open	On	Off
1...5V	Off	Off					90° Y	On	**Stop**	**On**	**On**

- SW1 sensitive switch

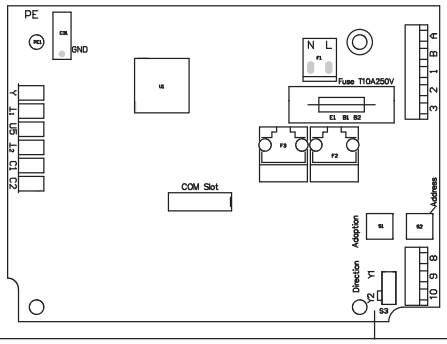
Position "0": Lowest sensitive, 0...90° divided into 17 steps.
Position "1": Highest sensitive, 0...90° divided into 80 steps.
Prior to switch-on, make sure the input signal and voltage wiring are in accordance with the actuator name plate and Dip-switch setting.

(Only available for TSY1U230-SR-T)
When you need to adjust the signal of modulating board, please adjust the VR1 & VR2:

- VR2 adjusts 4mA, 2V, 1V (Fully-close)
- VR1 adjusts 20mA, 10V, 5V (Fully-open)

Please turn the VR2 to the end by clockwise direction and input 4mA to modulating board. Then please slightly turn the VR2 by counter-clockwise direction about 3...6 times until the RED light keeps ON.

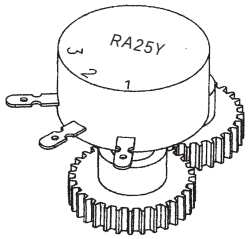
Please turn the VR1 to the end by counter clockwise direction and input 20mA to modulating board. Then please slightly turn the VR1 by clockwise direction about 3...6 times until the GREEN light keeps ON.



TSY(2...8)U230-MF-T

Direction switch
Y2 standard
Factory setting

Position feedback potentionmeter



Potentiometer

For modulating actuators, the potentiometer is a standard part.

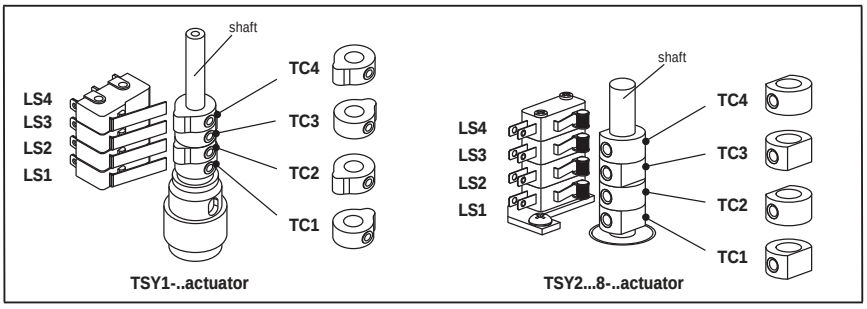
Potentiometer points 1, 2, 3 are wired to terminal blocks 10, 9, 8.

When the actuator is close:	8, 9	1kΩ
	9, 10	0kΩ
When the actuator is open:	8, 9	0kΩ
	9, 10	1kΩ

Travel cams TC..

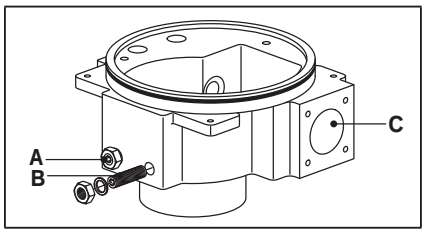
Only authorised and trained persons are allowed to change the settings.

- TC1- for **open** position of limit switch (factory setting 90°).
- TC2 - for **closed** position of limit switch (factory setting 0°).
- TC3 - for **open** position of auxiliary switch (factory setting 87°).
- TC4 - for **closed** position of auxiliary switch (factory setting 3°).



The cams for adjusting the limit and auxiliary switches are accessible if the cover is removed. The LS2/LS1 limit switches interrupt the power supply to the motor and are controlled by means of the TC.. cams which rotate with the shaft. The LS4/LS3 auxiliary switches can optionally be connected for signalisation purposes. The actuator closes the valve when the shaft turns clockwise (CW) and opens the valve when the shaft turns counter clockwise (CCW).

Limiting of manual rotation angle

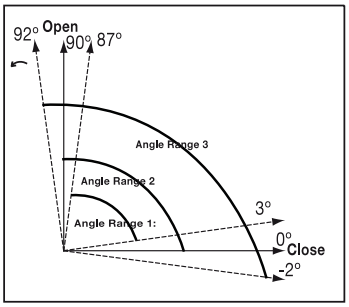


- A stop screw for OPEN limiting
- B stop screw for CLOSED limiting
- C stop screw connection for manual operation

Note: TSY1 without stop screws

The limiting of manual operation is set at -2...92° in the factory. The override handwheel turns the planetary gear by means of a worm wheel. The gear is stopped mechanically by the two stop screws A and B.

Relationship of auxiliary switches, limiting switches and stop screws



Angle Range 1: Two auxiliary switches LS3 and LS4 are set at 3°...87° angle in the factor
Angle Range 2: The two limit switches LS2 and LS1 are set at 0°...90°angle in the factor
Angle Range 3: Two stop screws A and B are set at -2°...92° angle in the factory

Fully Open/Close position setting

Fully Closed position (0%) setting

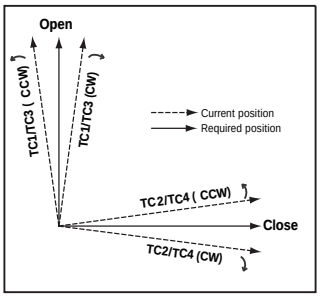
1) Power on. The actuator will drive CW to close position.
2) Check whether disc of valve at fully close position.
3) Adjust travel cams TC2 and stop screws for closed limiting (see “Adjusting travel cams and stop screws”)

Fully Open position (100%) setting

1) Power on. The actuator will drive CCW to open position.
2) Check whether disc of valve is at fully open position.
3) Adjust travel cams TC1 and stop screws for open limiting (see “Adjusting travel cams and stop screws”)

Adjusting the travel cams and stop screws

1. Loosen the corresponding stop screw;
2. Loosen the travel cam to be re-adjusted with a 2.5mm hexagonal key;
3. Turn the travel cam clockwise or counter clockwise with the hexagonal key as shown in the right diagram and inital tighten the cam;
4. Check the full rotation of limit switch with power on;
5. Tighten the travel cam after successful re-adjustment, otherwise repeat to do point 3 and 4 until the travel cam is sucessfully re-adjusted.
6. When the motor stops at fully closed or open position, tighten the corresponding stop screw until it touches the gearbox, turn the stop screw cycle back and lock by an hexagonel key and a wrench (1 turn of the stop screw correspond to 2° angle of rotation around).



- **The LS2/LS1 switches must always switch off the motor before the effect of stop screws.**
- **Perform an adaption after changing the position of the travel cam**

Adaption button

Installation and maintenance

Cautions of installation

- Check power supply befor wiring.
- Cover housing immediatedly after wiring and setting and make sure the seal is well. If water or dust enter, dry and clean thoroughly before covering the housing.
- The motor can not be reversed and the actuator can not be installed upside down.
- Be sure to keep it away from gas; do not use in explosive and chemical district.
- Power off before maintenance purpose.
- The Open/Close frequency of the electric actuator is restricted according to the duty cycle to avoid overheat.

Maintenance

All actuators are lubricated with anti-high temperature lubricant for a long life and therefore require no special maintenance. The condition of the valve stem and its nut must be checked periodically to make sure they are clean and well lubricated. We recommend that a program of periodic maintenance should be drawn up for actuators that are operated infrequently.

Storage

The actuator includes electrical equipment as well as grease lubricated gear stages. Inspite of the weather proof enclosure, oxidation, jamming and other alterations are possible if the acctuator is not correctly stored. The actuator should be stored under a shelter in a clean, dry place and protected from frequent changes in temperature. Avoid placing the actuators directly on the floor. The actuators are equipped with heat resistance, but it’s recommended to connect the actuators to the power supply, especially if the place of the storage is humid. Check that the temporary sealing plug of the cable entries are well in place. Make sure that the covers and boxes are well closed to ensure weather proof sealing.

Trouble shooting

Conditions	Possibilities	Solutions
Motor overheat	Voltage abnormal	Check by multimeter.
	High working frequency	Limit the working frequency.
	Motor spindle is stuck or valve is too tight to move	Replace the stuck assemblies or the valve.
	The gearbox stuck by stop screw	Check and correct travel cam for evidence of loosening; inspect the stop screw setting by operating the handwheel manually.
No operation	Power supply or voltage abnormal	Check the power supply voltage with the identification plate.
	Fuse blown	Check and replace the fuse as required (except for HW-CBPCB)
	Tripping of motor thermal protective device	Check if the motor is hot. The actuator will be available again after the motor has cooled down. Solve the motor overheat problem.
Running motor stops	Power supply has short circuit	Check wiring.
	External object stuck in the pipe	Take off the valve for cleaning.
Unable fully Open/Closed	The fixing screw for travel cam release	Re-adjust and tighten the travel cam.
The actuator couldn’t stop at the right position and hunting	The sensitivity setting is incorrect	Adjust the sensitivity switch SW1 to increase the number.
Occasional fail in motor switched on or off	Power input of "open" and "close" simultaneously	Check if the external control switch is normal; relays are needed in parallel connection of several actuators.

Installation and maintenance instructions

Pre-installation procedure

1) Be certain the adjoining pipeline is free from any foreign material such as rust and pipe scale or welding slag that could damage the seat and disc sealing surfaces.
2) Any actuator should be mounted on the valve prior to installation to facilitate proper alignment of the disc in the valve seat.
3) Check the valve identification tag for materials and operating pressure to ensure they are correct for the application.
4) Check the flange bolts or studs for proper size, threading and length.

Valve installation procedure

Position the connecting pipe flanges in the line to insure proper alignment prior to valve installation in handling the valve so as to prevent possible damage to the disc or seat faces. Spread the pipe flanges apart enough to allow the valve body to be located between the flanges without actually contacting the flange surfaces (see Figure 1). Exercise particular care in handling the valve so as to prevent possible damage to the disc or seat faces.

⚠ WARNING! Personal injury or property damage may result if the valve is installed where service conditions could exceed the valve ratings.

1) For wafer valves: a. Place the valve between the flanges. Install all bolts between the valve and the mating flanges. Hand tighten bolts as necessary.
2) Before completing the tightening of any bolts, the valve should be centered between the flanges and then carefully opened and closed to insure free, unobstructed disc movement (see Figure 2).
3) Tighten the flange bolts evenly to assure uniform compression.
4) If an actuator is to be used, electricity should be connected to the unit as specified by the actuator manufacturer.
5) Cycle the valve to the fully open position, then back to the fully closed position. Check the actuator travel stop settings for proper disc alignment. The valve should be operated to assure that no binding is taking place.
6) The valve is now ready for operation.

Safety precautions

Note: Actuator overload damage may result if the valve is installed without sock weld or welding neck flange.

Before removing the valve from the line or loosening any bolts, it is important to verify the following conditions:

1) Be sure the line is depressurised and drained.
2) Be sure of the pipeline media. Proper care should be taken for protection against toxic and/or flammable fluids.
3) Exercise caution if removing the actuator from the valve when the pipeline is under pressure. The valve disc may move suddenly due to the pressure.
4) Always be sure that the disc is in the close position before removing the valve.

General maintenance

The following periodic preventative maintenance practices are recommended for all Butterfly Valves:

1) Operate the valve from fully open to fully closed to assure operability.
2) Check flange bolting for evidence of loosening and correct.
3) Inspect the valve and surrounding area for previous or existing leakage at flange faces or shaft connections.
4) Check piping and/or wiring to actuators and related equipment for looseness and correct as needed.

Figure 1 Initial installation of valve

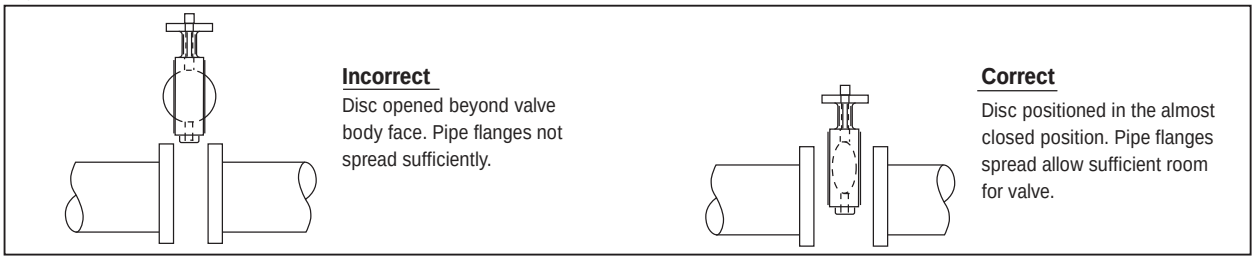


Figure 2 Centering and flanging of valve

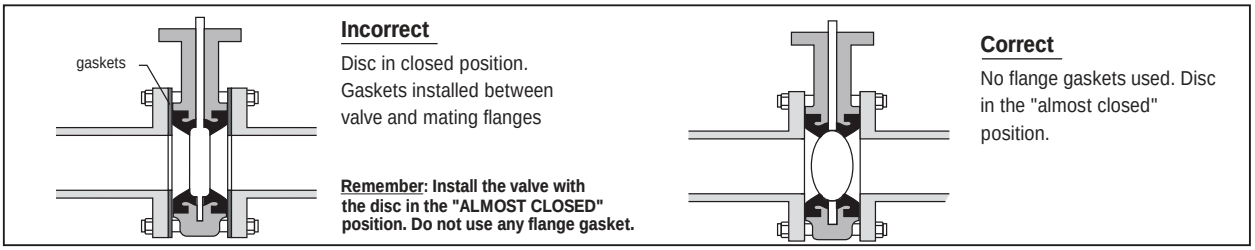
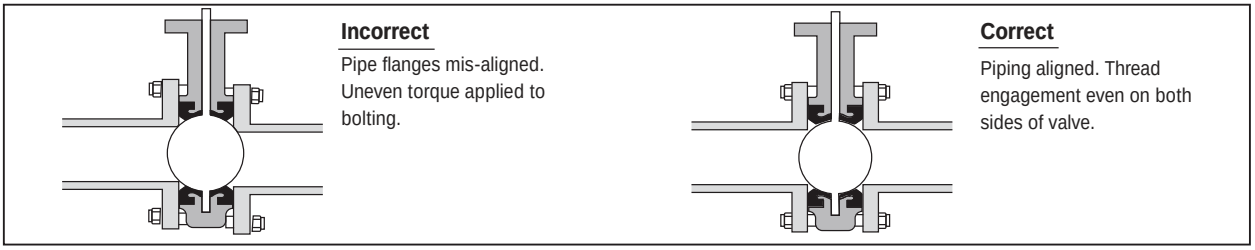
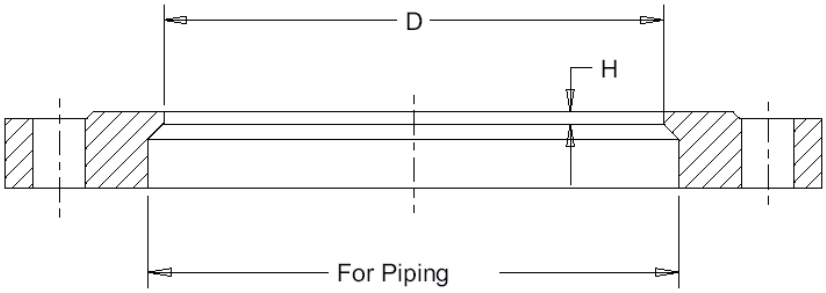


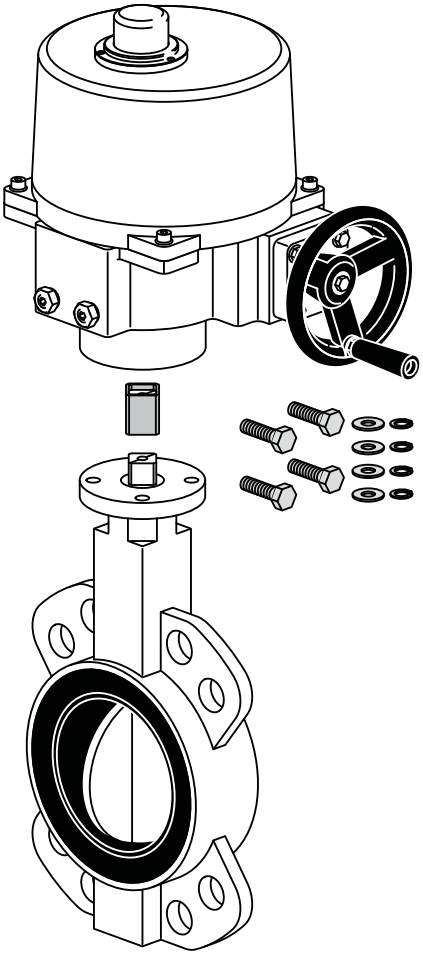
Figure 3 Final valve alignment and tightening of flange bolts



Flange Dimensions Recommended for TBU6.. Butterfly Valve



DN (mm)	D (mm)	H (mm)
50	50	4
65	65	4
80	80	4
100	100	4
125	125	4
150	150	4
200	208	5
250	255	6
300	308	6
350	340	7
400	405	7
450	455	8
500	505	8



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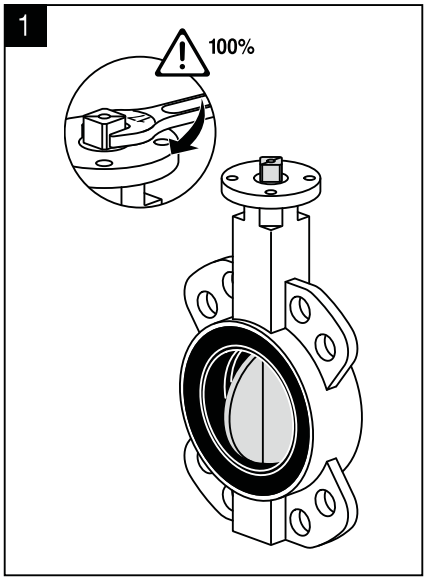

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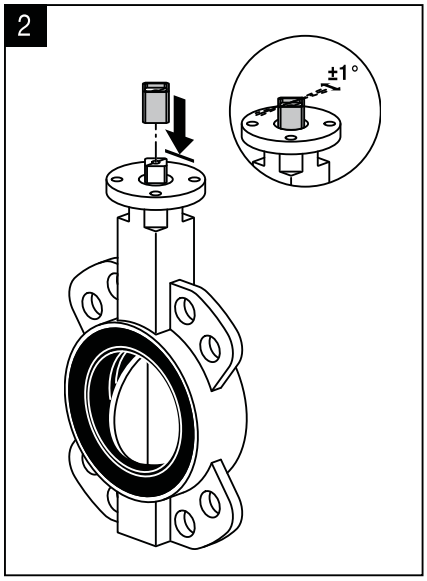

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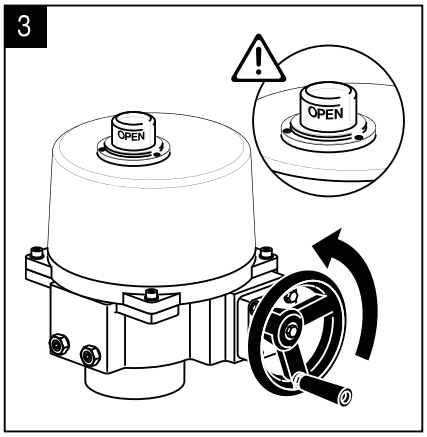

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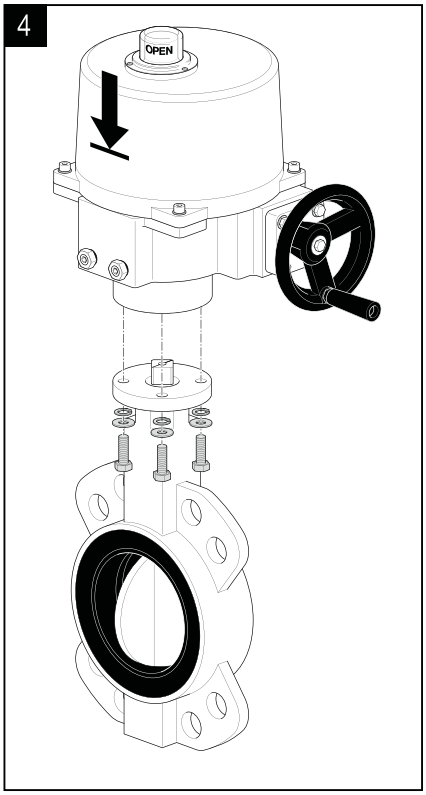

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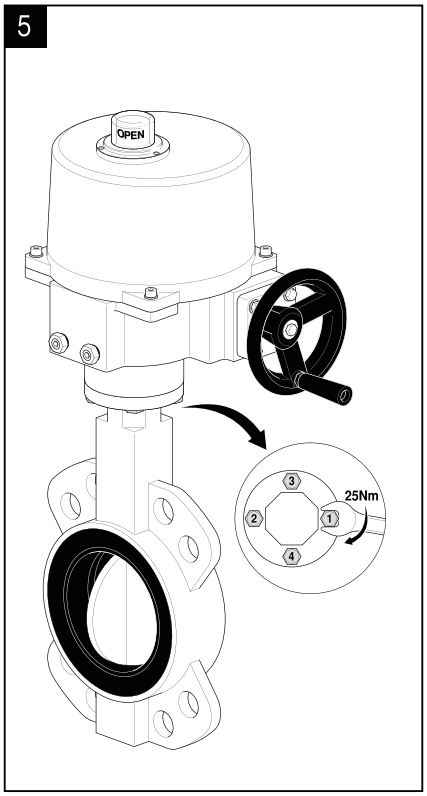

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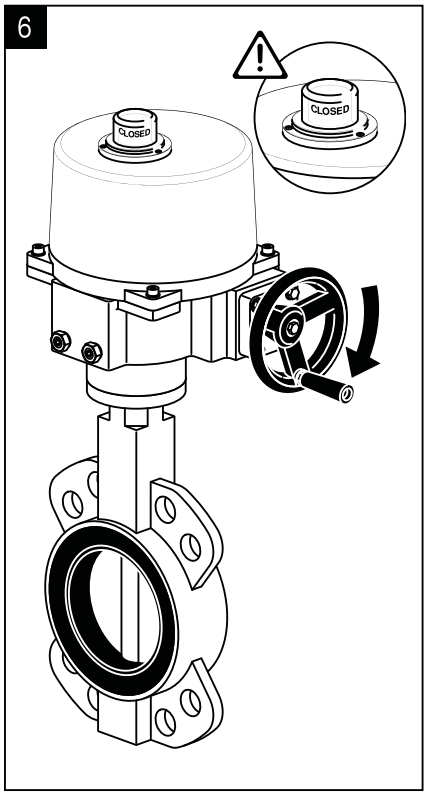

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