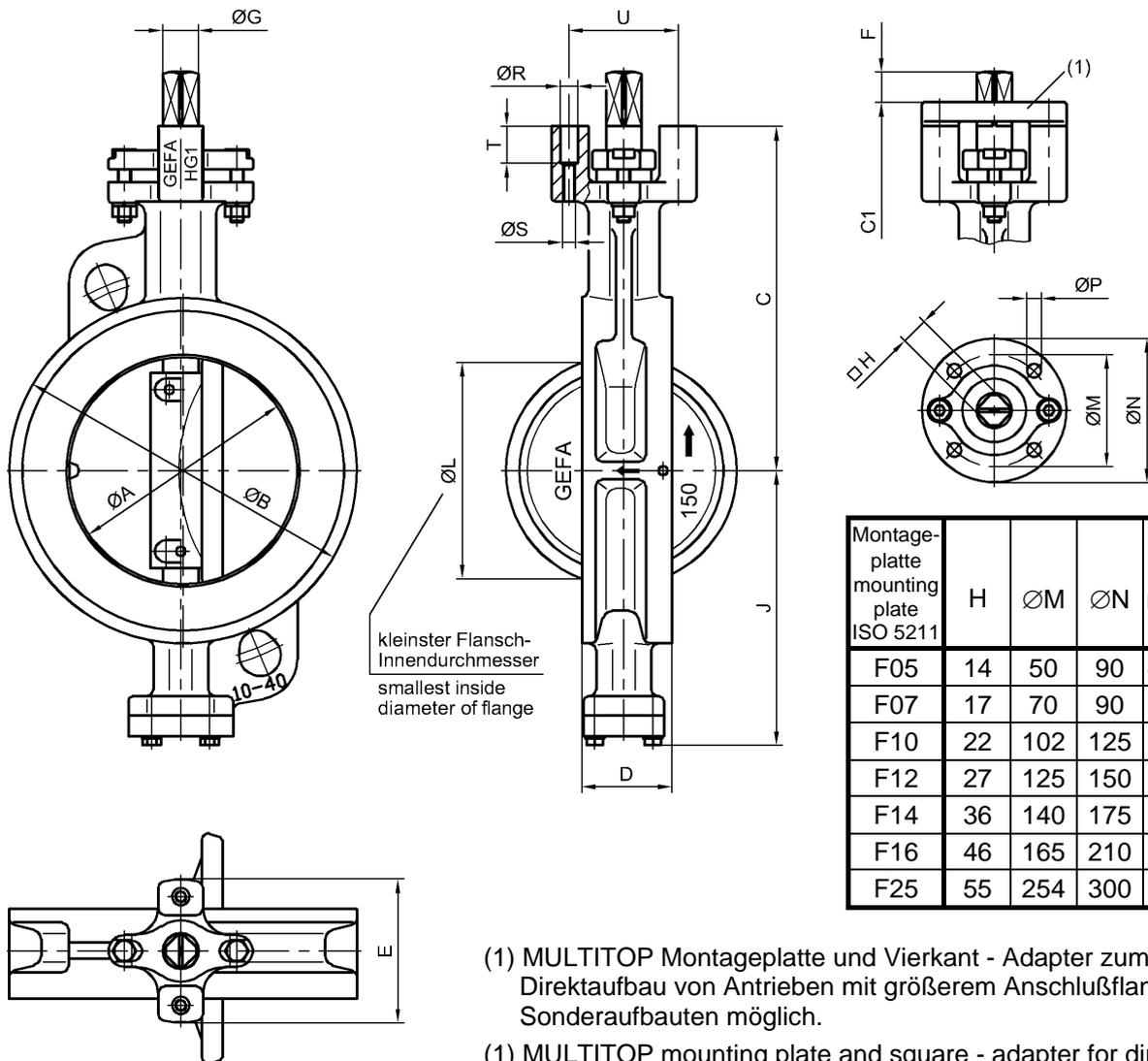


Baulänge: EN 558-1 Reihe 20 (DIN 3202-K1) Face to face dimension: EN 558-1 line 20 (DIN 3202-K1)



Montageplatte mounting plate ISO 5211	H	ØM	ØN	nxØP
F05	14	50	90	4x6,6
F07	17	70	90	4x9
F10	22	102	125	4x11
F12	27	125	150	4x14
F14	36	140	175	4x18
F16	46	165	210	4x22
F25	55	254	300	8x18

- (1) MULTITOP Montageplatte und Vierkant - Adapter zum Direktaufbau von Antrieben mit größerem Anschlußflansch. Sonderaufbauten möglich.
- (1) MULTITOP mounting plate and square - adapter for direct mounting of actuators with larger connection flange. Special designs possible.

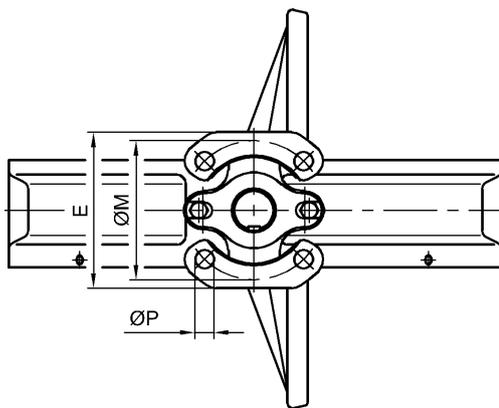
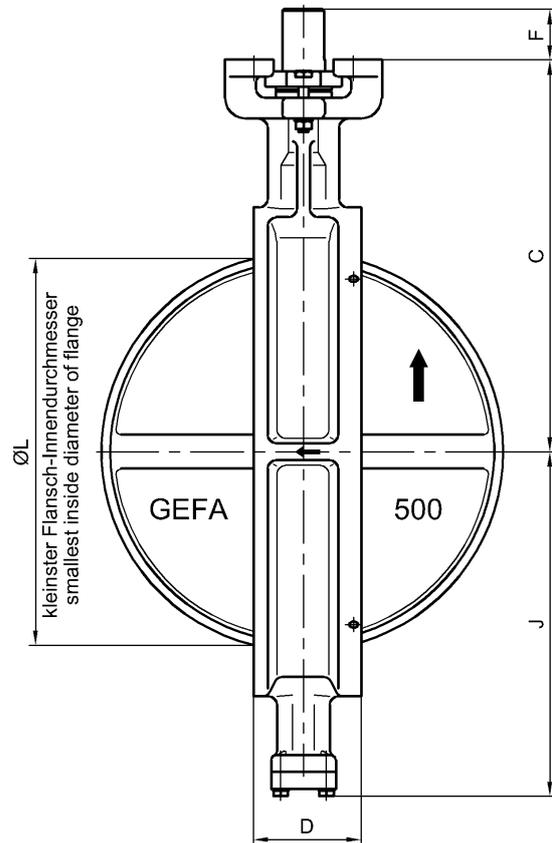
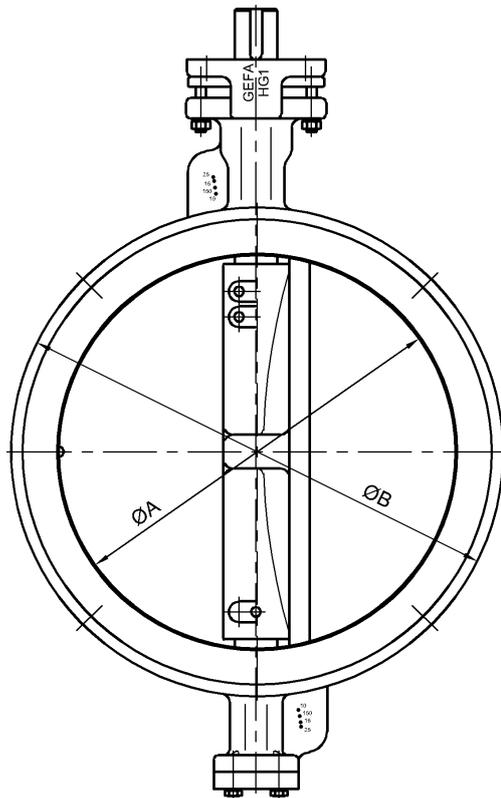
DN	NPS	ØA	ØB	C	C1	D	E	F	G	J	ØL	ØR	ØS	T	U	kg	kleinster Anschluß min. mounting plate DIN 3337/ISO 5211
50	2"	47	102	142	157	43	90	16	18	103	46	11	M8	23	68	3,9	F05
65	2 1/2"	64	122	154	169	46	90	16	18	115	59	11	M8	23	68	4,7	F05
80	3"	76	133	162	177	46	90	16	18	122	76	11	M8	23	68	5,2	F05
100	4"	98	156	179	194	52	90	16	18	135	93	11	M8	23	68	6,7	F05
125	5"	119	188	197	212	56	90	19	22	152	118	11	M8	23	68	9,6	F07
150	6"	140	216	215	230	56	90	19	22	174	139	11	M8	23	68	11,7	F07
200	8"	190	268	262	280	60	125	24	28	216	190	13	M10	23	95	19,6	F10
250	10"	237	323	292	310	68	125	24	28	248	238	13	M10	23	95	28,0	F10
300	12"	280	375	336	356	78	150	29	36	283	281	16	M12	22	115	40,0	F12

Gewicht ohne Montageplatte  
 Weight without mounting plate

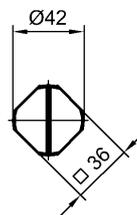
Änderungen vorbehalten  
 subject to changes

Baulänge: EN 558-1 Reihe 20 (DIN 3202-K1)  
 Kopfflansch: ISO 5211

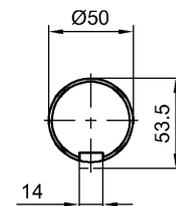
Face to face dimension: EN 558-1 line 20 (DIN 3202-K1)  
 Mounting plate: ISO 5211



DN 350



DN 400 / DN 500

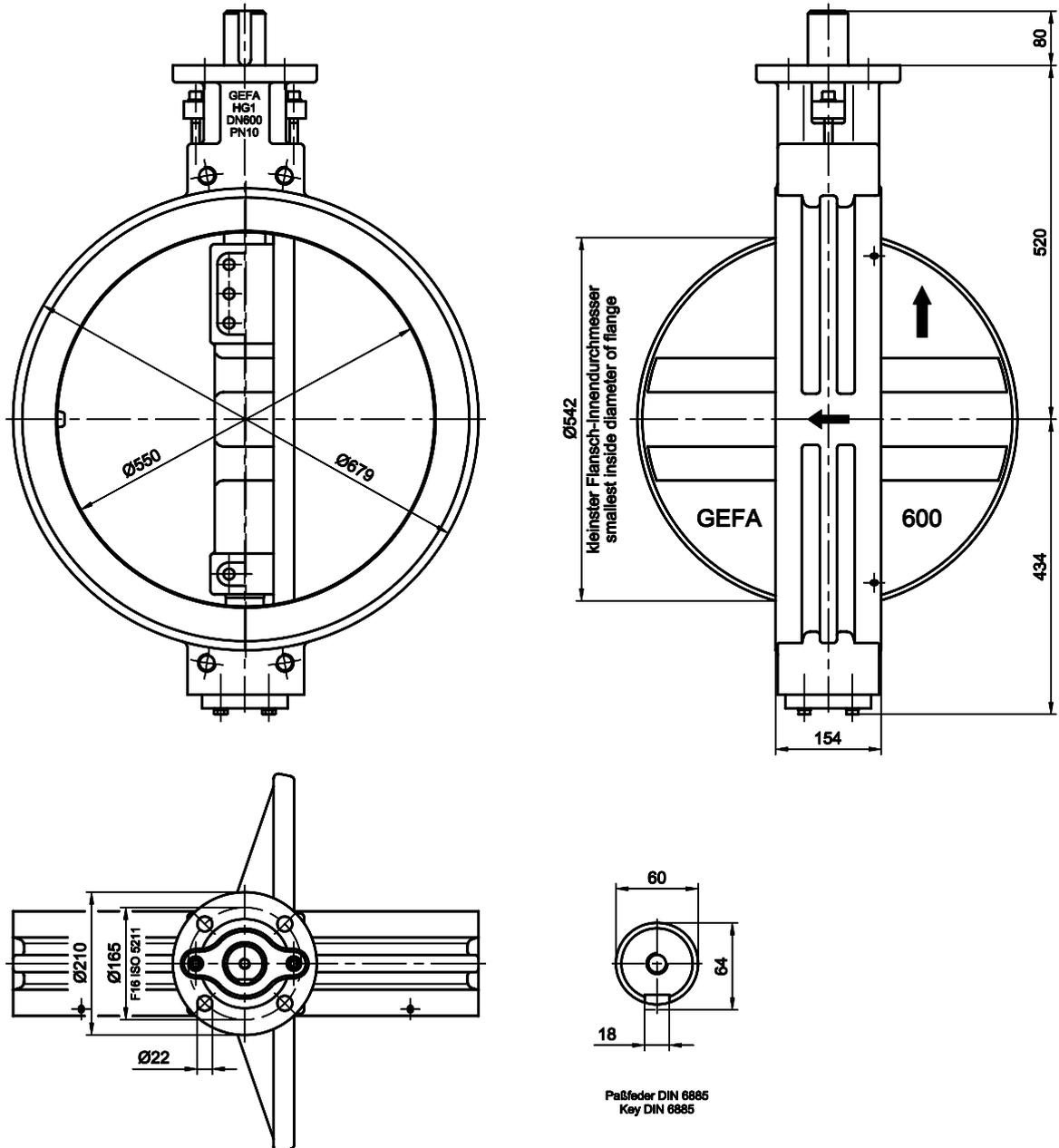


Passfeder DIN 6885  
 Key DIN 6885

DN	NPS	$\varnothing A$	$\varnothing B$	C	D	E	F	J	$\varnothing L$	M	$n \times \varnothing P$	Kopfflansch Mounting plate ISO 5211	kg
350	14"	318	415	365	78	145	38	312	321	140	4x18	F 14	51
400	16"	362	470	405	102	185	60	351	363	165	4x22	F 16	79
500	20"	467	580	465	127	185	60	409	468	165	4x22	F 16	118

Baulänge: EN 558-1 Reihe 20 (DIN 3202-K1)  
 Kopfflansch: F16 nach ISO 5211

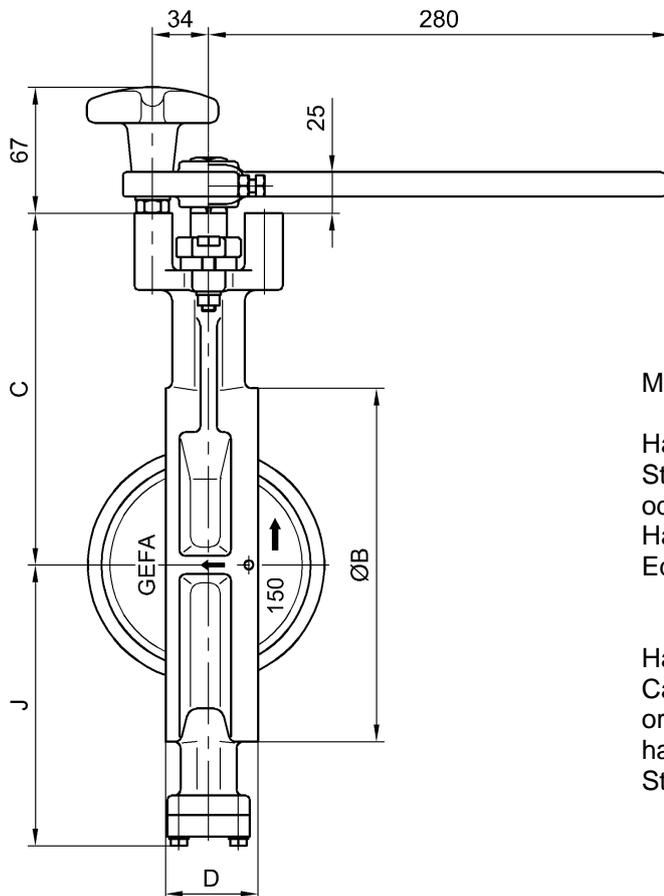
Face to face dimension: EN 558-1 line 20 (DIN 3202-K1)  
 Mounting plate: F16 acc. to ISO 5211



Gewicht / weight: 225 kg

# Hochleistungs- Serie HG1 mit Handhebel

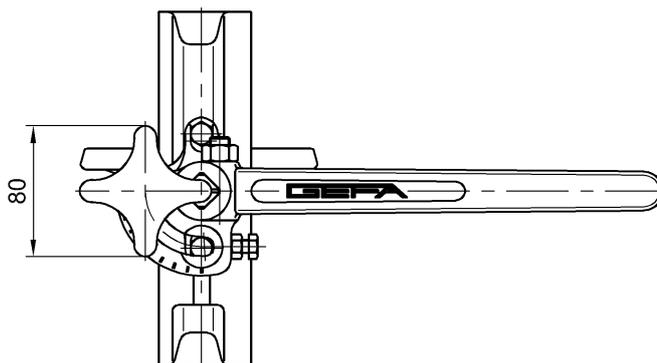
## High performance butterfly valve series HG1 with hand lever



### Material

Handhebel:  
 Stahlguss galvanisch chromatiert  
 oder Edelstahl  
 Handhebel-Zubehör:  
 Edelstahl

Hand lever:  
 Carbon steel galvanized chromated  
 or stainless steel  
 hand lever accessories:  
 Stainless steel

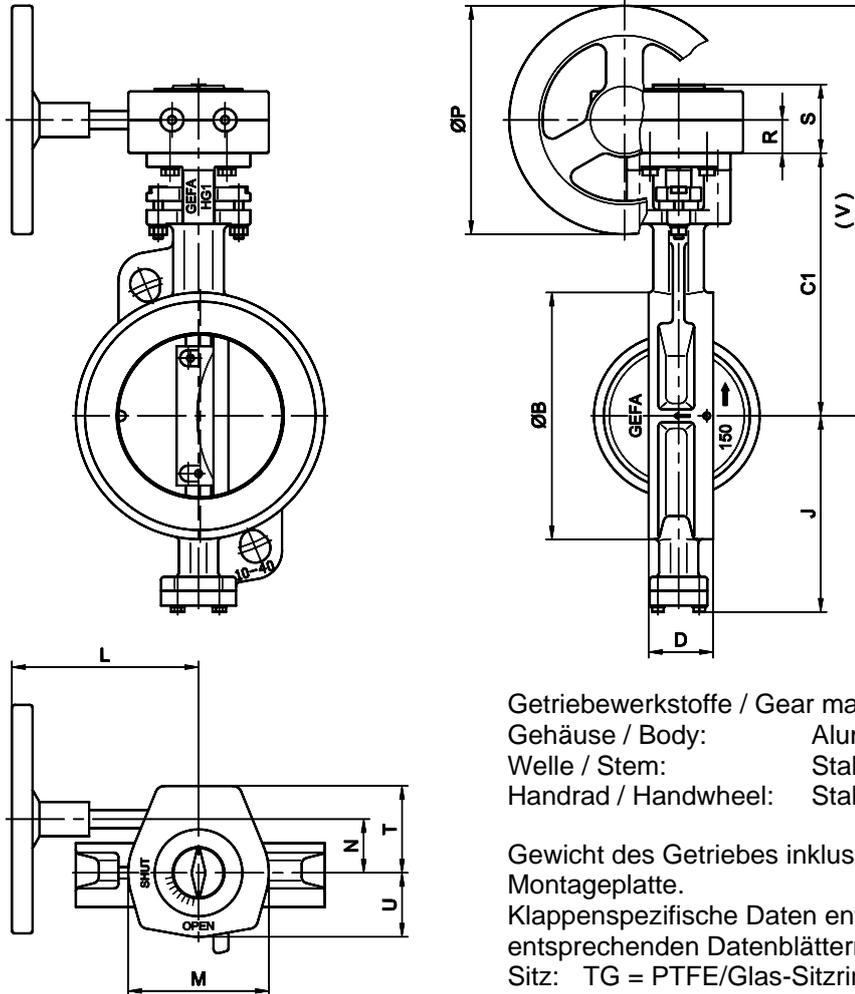


DN	NPS	ØB	C	D	J
50	2"	102	142	43	103
65	2 1/2"	122	154	46	115
80	3"	133	162	46	122
100	4"	156	179	52	135
125	5"	188	197	56	152
150	6"	216	215	56	174

Gewicht Handhebel inklusive Zubehör: 1,5 kg  
 Weight of hand lever including accessories: 1,5 kg

Änderungen vorbehalten  
 subject to changes

## HG1 mit Aluminium Getriebe HG1 with aluminium gear operator DN 50 - DN 300



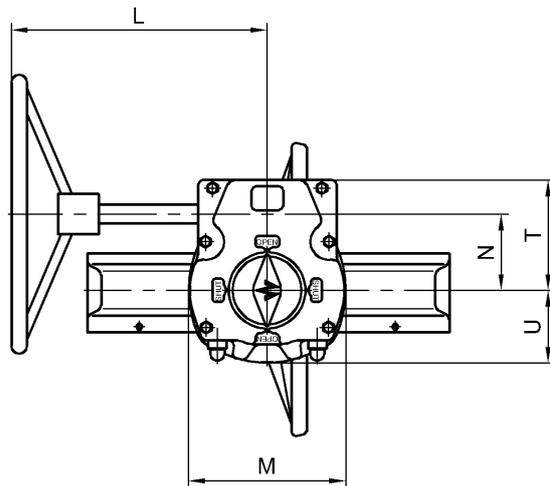
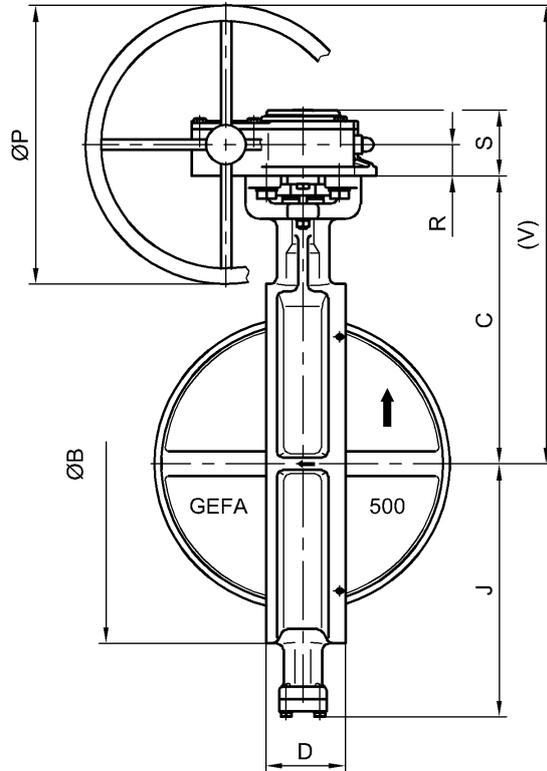
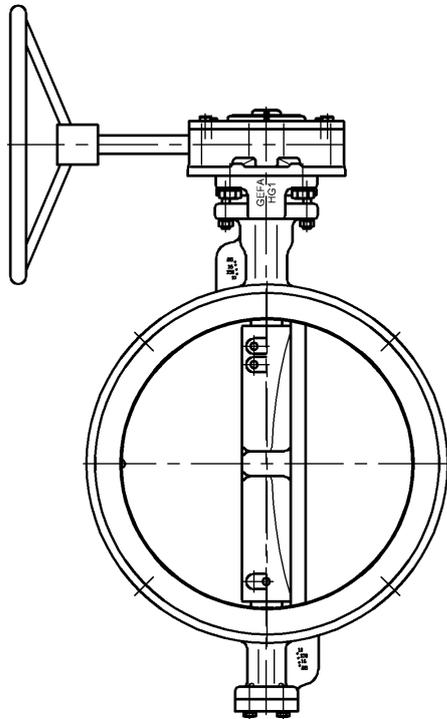
Getriebewerkstoffe / Gear materials  
 Gehäuse / Body: Aluminium / aluminium  
 Welle / Stem: Stahl / steel  
 Handrad / Handwheel: Stahl / steel

Gewicht des Getriebes inklusive Handrad und Montageplatte.  
 Klappenspezifische Daten entnehmen Sie bitte den entsprechenden Datenblättern.  
 Sitz: TG = PTFE/Glas-Sitzring / M = Metall-Sitzring

Weight of gear operator including handwheel and mounting plate.  
 Regarding valve data please refer to relevant data sheets.  
 Seat: TG = PTFE/glass-seat / M = metal seat

DN	NPS	Sitz Seat	Getriebe Typ Gear type	ØB	C1	D	J	L	M	N	ØP	R	S	T	U	V	kg
50	2"	TG/M	BGM98114	102	157	43	103	150	113	39	125	31	71	64	56	251	2,0
65	2 1/2"	TG/M	BGM98114	122	169	46	115	150	113	39	125	31	71	64	56	263	2,0
80	3"	TG/M	BGM98114	133	177	46	122	150	113	39	125	31	71	64	56	271	2,0
100	4"	TG/M	BGM98114	156	194	52	135	150	113	39	125	31	71	64	56	288	2,0
125	5"	TG/M	BGM98117	188	212	56	152	187	113	39	200	31	71	64	56	343	2,5
150	6"	TG/M	BGM98117	216	230	56	174	187	113	39	200	31	71	64	56	361	2,5
200	8"	TG/M	BGM98422	268	280	60	216	197	130	52	200	32	73	83	65	412	3,3
250	10"	TG/M	BGM98422	323	310	68	248	197	130	52	200	32	73	83	65	442	3,3
300	12"	TG/M	BGM98727	375	356	78	283	246	164	67	315	38	86	109	82	552	7,7

## Hochleistungsclappe Serie HG1 mit Grauguss Getriebe High performance butterfly valve series HG1 with cast iron gear operator DN 350 - DN 600



Getriebewerkstoffe / Gear materials

Gehäuse / Body: Grauguss / cast iron

Welle/Stem: Stahl / steel

Handrad / Handwheel: Stahl / steel

Auf Wunsch ist ein Kettenrad lieferbar.

Gewicht des Getriebes inklusive Handrad.

Klappenspezifische Daten entnehmen Sie bitte den entsprechenden Datenblättern.

Sitz: TG = PTFE/Glas-Sitzring / M = Metall-Sitzring

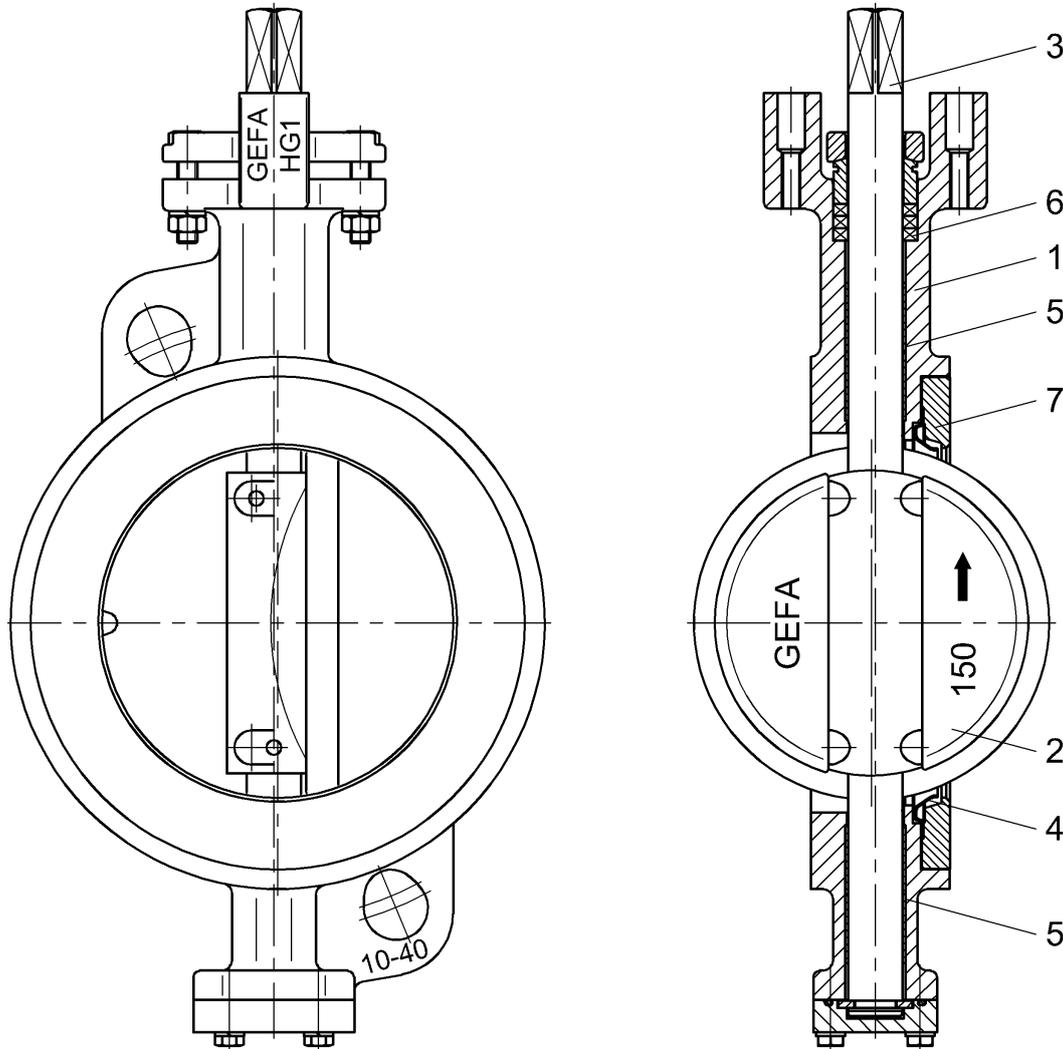
Upon request chain wheel can be supplied.

Weight of gear operator including handwheel.

Regarding valve data please refer to relevant data sheets.

Seat: TG = PTFE/glass-seat / M = metal seat

DN	NPS	Sitz Seat	Getriebe Typ Gear type	ØB	C	D	J	L	M	N	ØP	R	S	T	U	V	kg
350	14"	TG/M	BGMM1436	415	365	78	312	358	198	90	450	50	94	131	96	640	18,5
400	16"	TG/M	BGMM14	470	405	102	351	358	198	90	450	50	94	131	96	680	18,5
500	20"	TG	BGMM14	580	465	127	409	358	198	90	450	50	94	131	96	740	18,5
500	20"	M	BGMM1550	580	465	127	409	410	252	123	450	50	106	178	118	740	31,5
600	24"	TG/M	BGMM1560	679	520	154	434	410	252	123	450	50	106	178	118	795	31,5



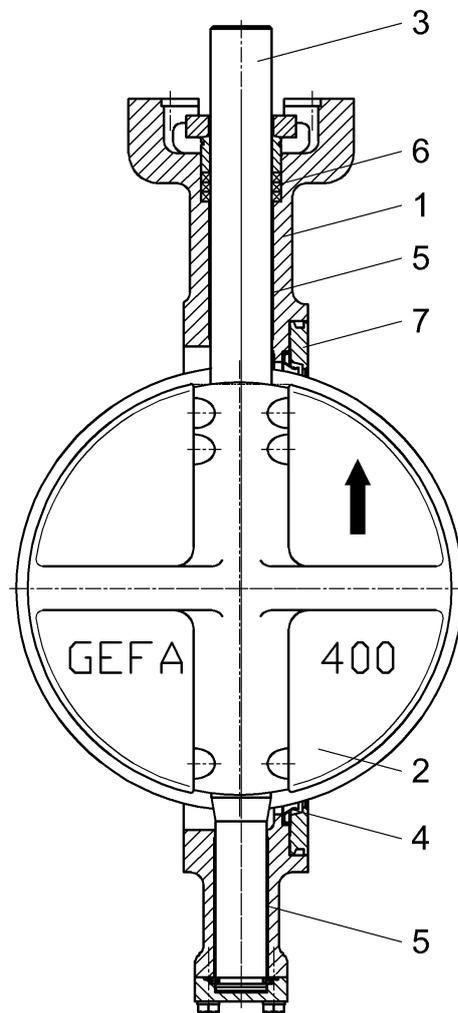
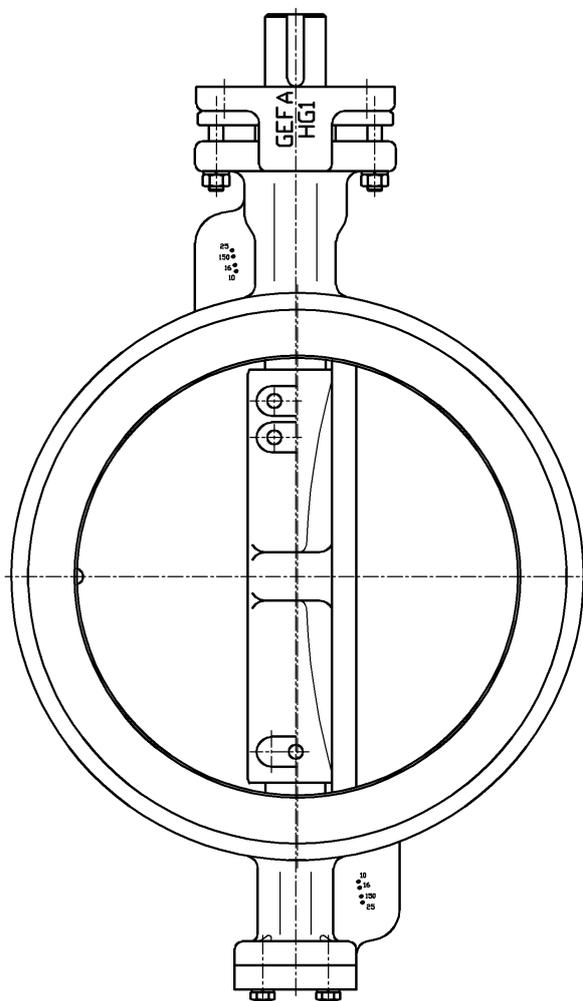
Teil Nr. Part No.	Bezeichnung Description	Material					
		HG14466TG	HG16666TG	HG14466M	HG16666M	HG14466HM	HG16666HM
	max. Betriebstemperatur ** max. working temperature **	+ 220 °C		+ 220 °C		+ 450 °C	
1	Gehäuse Body	GS-C25	1.4408	GS-C25	1.4408	GS-C25	1.4408
2	Klappenscheibe Disc	1.4408	1.4408	1.4408 nitriert/nitrated	1.4408 nitriert/nitrated	1.4408 nitriert/nitrated	1.4408 nitriert/nitrated
3	Welle Stem	1.4571	1.4571	1.4571	1.4571	1.4571	1.4571
4*	Sitzring Seat	PTFE/Glas PTFE/glass	PTFE/Glas PTFE/glass	1.4571 nitriert/nitrated	1.4571 nitriert/nitrated	1.4571 nitriert/nitrated	1.4571 nitriert/nitrated
5	Lagerbuchse Bearing	1.4401 PTFE	1.4401 PTFE	1.4401 PTFE	1.4401 PTFE	1.4401 nitriert/nitrated	1.4401 nitriert/nitrated
6*	Packung Gland packing	PTFE	PTFE	PTFE	PTFE	Graphit graphite	Graphit graphite
7	Klemmring Insert ring	C-Stahl Carbon steel	1.4408	C-Stahl Carbon steel	1.4408	C-Stahl Carbon steel	1.4408

\* = Verschleißteile / Wearing parts

\*\* = In Abhängigkeit vom Druck / depending on working pressure

**Wahlweise andere Werkstoffe lieferbar / Other materials available**

Änderungen vorbehalten  
subject to changes



Teil Nr. Part No.	Bezeichnung Description	Material					
		HG14444TG	HG16666TG	HG14444M	HG16666M	HG14444HM	HG16666HM
	max. Betriebstemperatur ** max. working temperature **	+ 220 °C		+ 220 °C		+ 450 °C	
1	Gehäuse Body	GS-C25	1.4408	GS-C25	1.4408	GS-C25	1.4408
2	Klappenscheibe Disc	GS-C25 vernickelt/ nickel-plated	1.4408	GS-C25 vernickelt/ nickel-plated	1.4408 nitriert/nitrated	GS-C25 vernickelt/ nickel-plated	1.4408 nitriert/nitrated
3	Welle Stem	1.4021	1.4571	1.4021	1.4571	1.4021	1.4571
4*	Sitzring Seat	PTFE/Glas PTFE/glass	PTFE/Glas PTFE/glass	1.4571 nitriert/nitrated	1.4571 nitriert/nitrated	1.4571 nitriert/nitrated	1.4571 nitriert/nitrated
5	Lagerbuchse Bearing	1.4401 PTFE	1.4401 PTFE	1.4401 PTFE	1.4401 PTFE	1.4401 nitriert/nitrated	1.4401 nitriert/nitrated
6*	Packung Gland packing	PTFE	PTFE	PTFE	PTFE	Graphit graphite	Graphit graphite
7	Klemmring Insert ring	C-Stahl Carbon steel	1.4571	C-Stahl Carbon steel	1.4571	C-Stahl Carbon steel	1.4571

\* = Verschleißteile / Wearing parts

\*\* = In Abhängigkeit vom Druck / depending on working pressure

**Wahlweise andere Werkstoffe lieferbar / Other materials available**

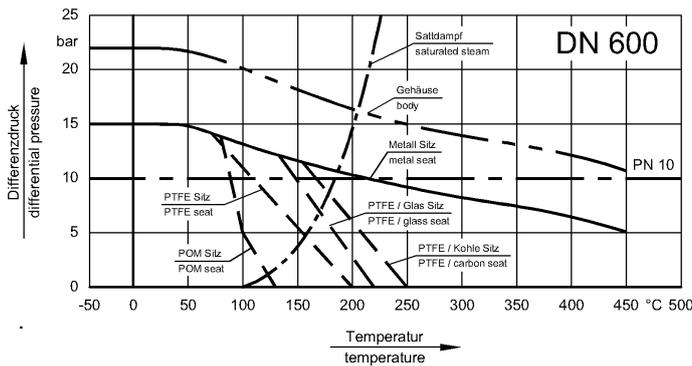
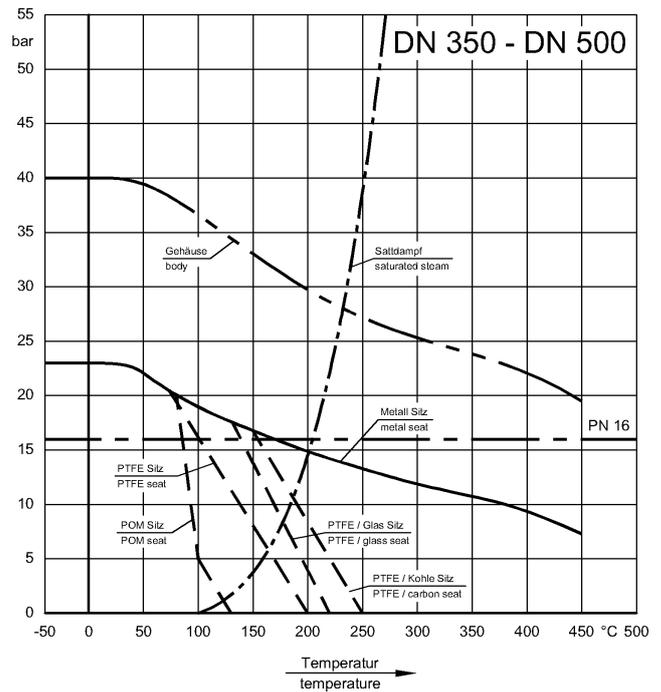
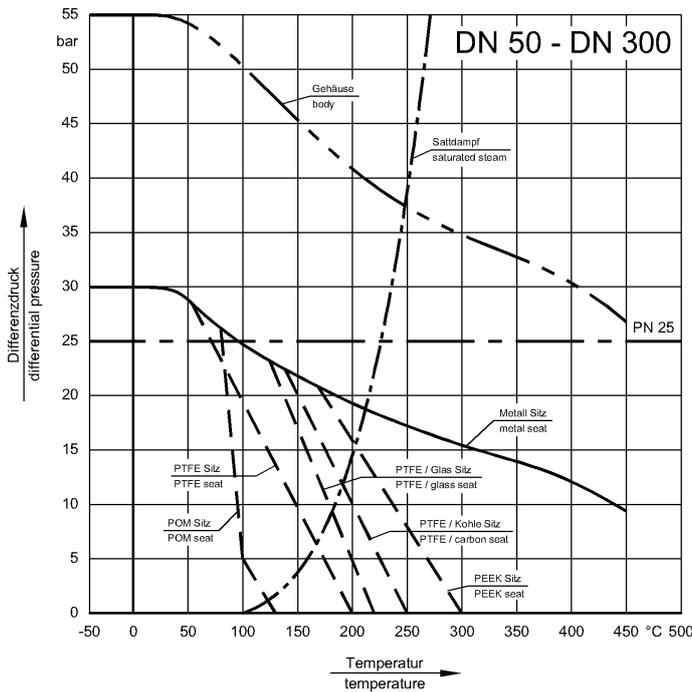
Änderungen vorbehalten  
subject to changes

## Introduction

The following information and instructions are important for perfect installation and safe operation of the valve. Prior to installation and initial use of the valve, the qualified staff in charge of installing and operating the valve has to be instructed according to this information.

## Proper use

The high performance butterfly valve series HG may only be used to stop, throttle and control media flows within the permissible pressure/temperature limits.



Metal seat:  
 Temperature: > 280 °C  
 Seat Leakage: DIN 3230-BO > 2  
 EN 12266-P12 > B

The maximum differential pressure for PEEK or POM seats is 5 bar if the valve is used against the recommended flow direction.

The suitability of the product-related parts used and their chemical resistance properties have to be clarified before start-up of the plant.

The usual flow rate must not be exceeded.

Vibrations, water hammers and cavitation as well as abrasive components result in damage of the valve and affect its service life.

Valves must not be used to support the pipeline nor as a step-up.

This includes the different kinds of operation like hand levers, gear operators, actuators, feedback and control systems.

When using a hand lever, handwheel and manual emergency operation, take care that there is enough space for a proper operation.

## Earthing the valve

If the high performance butterfly valve is supplied with anti-static device and used in potentially explosive zones, the body of the valve must be connected effectively at site with the potential compensation cable before the valve is put into operation.

## Transport and storage

The valve must be transported and stored dry and clean.

In humid rooms, a drying material or heating must be used to avoid condensation.

During transport and intermediate storage the high performance butterfly valve should not be outside a temperature range of  $-15^{\circ}\text{C}$  and  $+30^{\circ}\text{C}$ .

The transport packaging protects the valve against soiling and damage. Impact and vibrations must be avoided.

If the valves are painted (coated) on the outside, this coating must remain without damage, otherwise the faulty spots must be repaired immediately.

The factory-adjusted basic setting (position of the disc at delivery) must not be changed.

## Conditions for mounting the valve

The high performance butterfly valve series HG is installed between pipeline flanges acc. to DIN 2501 or ANSI B16.5.

It should be taken into account, that a valve which is designed for a particular flange standard cannot be normally used for other flanges. If pipeline flanges are to be used which are not in accordance with the specifications of the order, the manufacturer is to be consulted.

Pipelines always have to be run in such a way that damaging shear and bending stresses cannot act on the valve body.

The surfaces of the pipeline flanges between which the valve is installed have to be parallel to one another, the sealing surfaces must be clean and without damage. No cross marks may be visible.

Do not carry out welding work on the flanges and pipelines when the high performance valve has been installed, as this could cause damage to the valve.

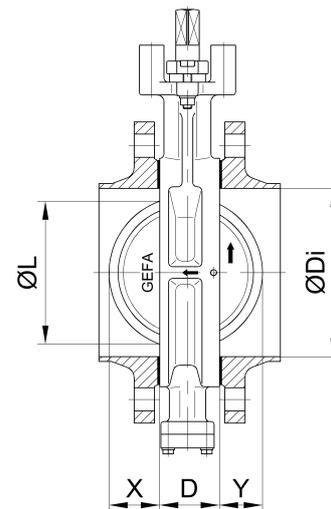
The high performance butterfly valve is clamped between two pipeline flanges using two suitable seals.

Screws, nuts and seals are not included in the manufacturer's scope of supply.

All the usual flange seals can be used.

The "clearance" of the mating flanges - including inner coating - has to be sufficient to allow the disc to be fully opened without touching ( $\text{ØDi} \geq \text{ØL} + 6 \text{ mm}$ ). This must be checked before the valve is installed and compared with the space necessary for the valve according to the table.

DN	D	ØL	X	Y
50	43	46	8	2
65	46	59	13	10
80	46	76	21	15
100	52	93	26	24
125	56	118	38	31
150	56	139	48	41
200	60	190	71	62
250	68	238	93	80
300	78	281	110	95
350	78	321	130	115
400	102	363	139	128
500	127	468	180	168
600	154	542	202	199



## Transport packaging

Transport packaging protects the interior of the valve from soiling and damage.

Do not remove the packaging until the valve is going to be installed.

## Installation position

Basically the high performance butterfly valve series HG can be installed in any position.

If the concentration of suspended matter is high (e.g. media which are very viscous), it is recommended to mount the high performance butterfly valve with valve shaft in horizontal position and stop boss facing upwards.

For nominal sizes  $>\text{DN}300$  it is generally recommended to mount the valve with valve shaft in horizontal position.

The recommended pressure direction (direction of the arrow on the body) guarantees the highest level of tightness.

The GEFA high performance butterfly valve also provides a reliable seal when it is used against the recommended pressure direction.

Consult the manufacturer if the valve is to be used for applications with a frequent change of pressure direction.

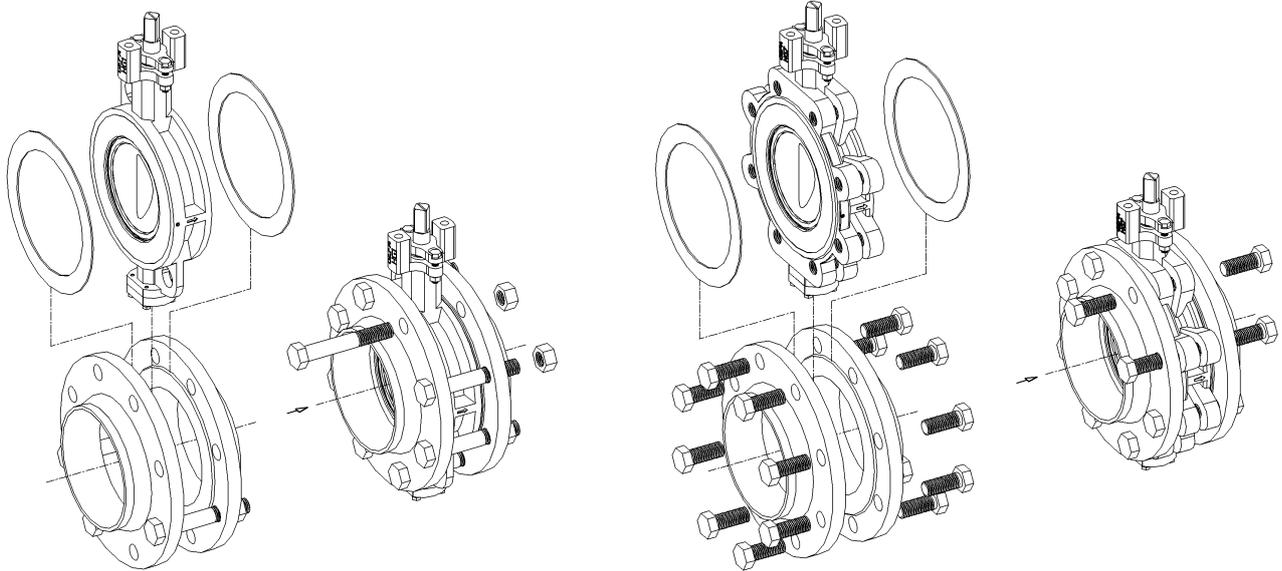
## Installation

- Prior to the mounting of the valve, flush the pipeline to remove all traces of soiling, welding residues, etc.
- Remove the transport packaging and check whether the flange connections are without damage and clean.
- Check whether the flange clearance is in accordance with the face-to-face dimension of the high performance butterfly valve.
- Before mounting the valve, the flanges are to be sufficiently spread using a suitable tool.
- The valve must be **completely closed**.
- In order to intercept the valve between the flanges during the mounting process, we recommend (depending on the mounting position) to insert the lower flange screws without tightening them. The screw is not to be initially inserted in the centring aid area (rib).

- Insert the high performance valve and the seals between the flanges.
- Insert the flange screws.
- Remove the spreader and hand-tighten the screws.
- Check whether the valve, the seals and the counter-flanges are in true alignment.
- Carefully open and close the valve in order to ensure that the valve disc is not getting in touch with the pipeline. Check that the disc has adequate clearance.
- With the valve disc completely closed, tighten the flange screws crosswise using the stipulated torque. The tightening torque depends on the seals chosen.

If no specifications are given, the following standard values can be used:

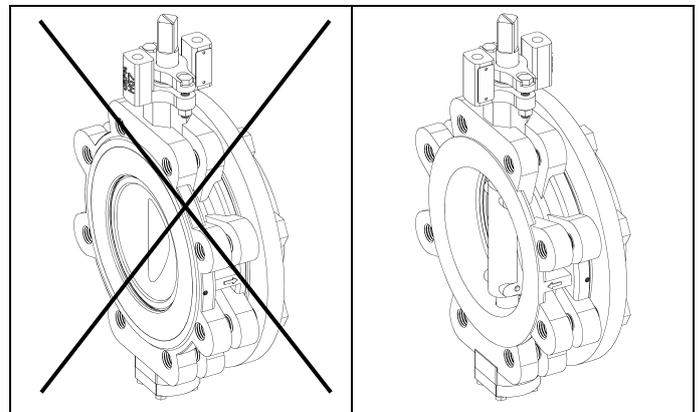
M16 = 85 Nm    M20 = 165 Nm    M24 = 285 Nm    M27 = 425 Nm    M30 = 570 Nm    M33 = 780 Nm



**DANGER:** When installing the butterfly valve with flanged body used in an end-of-line function, the free connection side must be additionally secured by a blind flange or (only for short-term use) the valve must be locked tightly in the "CLOSED" position. The following safety instructions must be heeded:

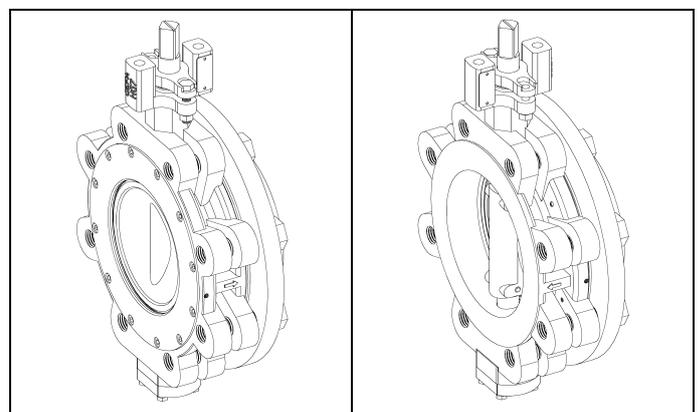
Version "Valve to be flanged off at one side":

**DANGER:** The valve may be under pressure when the flange in pressure direction is missing. The valve must not be under pressure when the flange on the insert ring side is missing. The arrow showing the pressure direction and the plate marking the side where the flange can be taken off must always be heeded. If the marking is not clear, none of the pipeline flanges may be removed with the system under pressure. If a pipeline flange is removed, make sure that no damage can be caused by medium spraying out due to a leak in the sealing system.



Version "Valve to be flanged off at both sides":

**DANGER:** The valve may be under maximum pressure when the flange in pressure direction is missing. When the flange on the insert ring side is missing, note that the pressure is reduced. The arrow showing the pressure direction and the plate showing the side where the flange can be taken off must always be heeded. If the marking is not clear, none of the pipeline flanges may be removed with the system under pressure. If a pipeline flange is removed, make sure that no damage can be caused by medium spraying out due to a leak in the sealing system.



reduced pressure		max. pressure	
DN 50 – DN 300:	16 bar	DN 50 – DN 300:	25 bar
DN 350 – DN 500:	10 bar	DN 350 – DN 500:	16 bar
DN 600:	6 bar	DN 600:	10 bar

## Mounting of operating elements

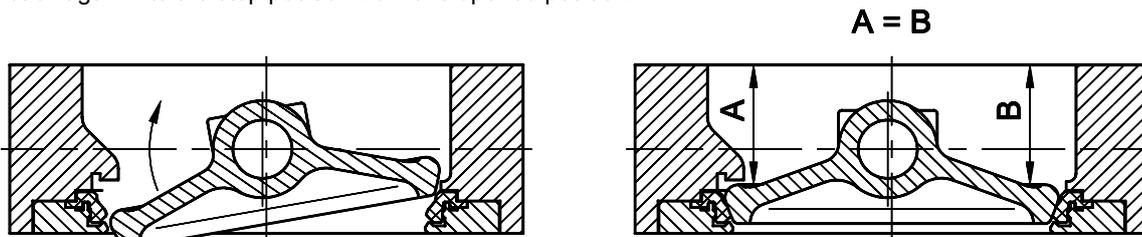
The highest level of tightness can only be achieved when the valve disc is completely closed. In case operating elements (hand levers, gear operators, actuators, etc.) are mounted, the stop position must be exactly adjusted. The stop boss does not serve the purpose of a limit stop, but merely as an override safety device which ensures that the seat ring is not damaged. The highest level of tightness of the valve is achieved ca. 1°-2° before the stop boss is reached.

If the valve is not installed in the pipeline, the exact stop position can be checked as follows:

The distance from the edge of the body to the valve disc must be measured on both sides at a position offset 90° to the valve shaft. If the distances are identical, the valve is closed exactly.

Care must be taken that the valve is always moved to the stop position from the opened position. This is the only way to guarantee that any play from the actuator (e.g. gear) has no influence on the stop position.

If the exact stop position has been overridden, the valve must be returned to the opened or partly opened position, then moved back again into the stop position from this opened position.



It must be ensured that the actuator is centred on the valve shaft.

The weight of a mounted actuator must not place a one-sided load on the valve shaft.

For this reason, actuators must be supported if necessary - without fixation.

External loads must not be applied to actuators, this can damage or destroy the valve.

If the valve is mounted in the recommended pressure direction, the opening movement of the valve disc is supported by the pressure of the medium, this being design-related (double-eccentric design).

For this reason, when carrying out switching operations using a hand lever, the lever is to be held secure when the star knob is being loosened.

After the switching operation has been completed, the position of the hand lever is to be secured by tightening the star knob.

## Initial operation

The high performance butterfly valve has been tested for leakage using air or water. Residues of the test medium may still be on the contact surfaces of the valve. Possible reactions with the operating medium must be observed.

Prior to initial operation, the pipeline must be flushed effectively with the valve fully opened to eliminate soiling and to avoid damage to the sealing surfaces. The valve must not be switched during the flushing process.

During a system pressure test the following pressures must not be exceeded:

1,5 x PN with disc in open position

1,1 x PN with disc in closed position

## Impermissible operation

Never operate the butterfly valve without actuating devices and/or locking of the shaft.

Do not operate the valve in the cavitation area.

Do not exceed the pressure/temperature range.

Avoid all foreign particles on the sealing surfaces.

## Removing the valve

Before removing the high performance butterfly valve make sure that the pipe section is depressurised and evacuated.

In case of toxic, caustic and other outgassing media the pipe section must also be ventilated.

Safety classification is the responsibility of the system operator.

The high performance butterfly valve is removed by loosening the flange screws and sufficient spreading of the mating flanges.

The valve disc must be closed at an angle within the face-to-face dimension of the valve to prevent damage to the disc.

The position mark on the narrow end of the shaft square or the keyway is parallel to the valve disc.

Actuators either have to be dismantled before the valve is removed or they have to be secured against unauthorized or unintentional operation.

## Disposal / repair of the valve

After having removed the valve it has to be disassembled and cleaned to prevent injuries caused by residues of the medium.

If the valve is returned to the manufacturer, a safety data sheet relating to the media must be included.

Subject to modifications without notice.

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## General information

A routine maintenance or lubrication of the high performance butterfly valve is not necessary.

Should a leakage occur at the gland packing, retighten the gland nut (20). Take care that the gland nut is not tightened too much. Normally the leakage can be stopped by simply turning the nut by a quarter.

## Replacing the Gland Packing

If the leakage cannot be stopped using the above method, the gland packing must be replaced.

For replacing the gland packing the valve needs not to be removed from the pipeline.

- Check whether the pipeline has been rendered depressurized and is empty.
- Remove the operating element.
- Loosen the fixing devices (18, 19, 20) of the gland flange and lift off the gland flange (9).
- Remove the gland (8). A groove in the upper part of the gland makes the removal easier.
- Remove the packing rings (6) and thoroughly clean the packing area.
- Insert a new packing set, whereby it is to be ensured that the correct packing material is used.
- Insert the gland, place the gland flange on top and fix it using the screws, nuts and split washers. Tighten the nuts reciprocally so that the gland flange is not tilted. Only slightly tighten the nuts until the leakage is stopped.

## Replacing the Seat

The valve must be taken out of the pipeline for replacing the seat.

- Ensure that the pipeline is rendered depressurized and is empty.
- Completely close the valve, loosen the flange screws and remove them so far that the valve can be taken out.
- Lay the valve down with the insert ring (7) facing upwards.
- Loosen the set screws (15a) or cylinder screws (15b) and remove the insert ring.
- Remove the old seat (4). Clean the body and insert ring in the area of the seat-engaging surface.
- Lateral screw connection (15a): Open the valve. Install the new seat with the insert ring. Screw in the set screws (15a) in such a way that the insert ring can be moved but not lifted out. Close the valve to centre the insert ring and the seat. Tighten the set screws reciprocally (fingertight fastening) to fix the insert ring.
- Axial screw connection (15b): Close the valve completely. Install the new seat with the insert ring and tighten the cylinder screws (15b) reciprocally.

## Mounting of the Hand Lever

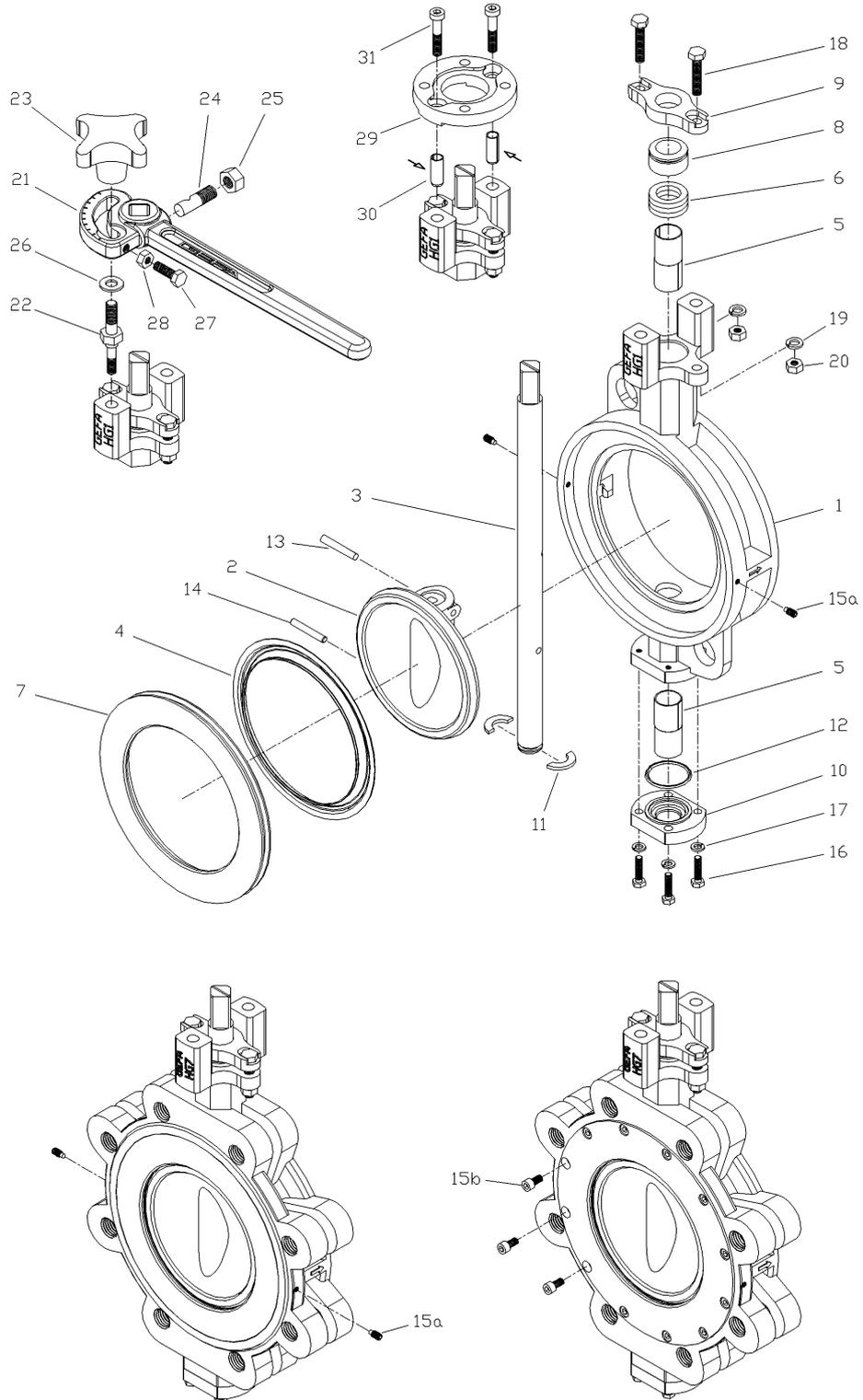
- Screw the stud bolt (22) into the body and put the washer (26) on it.
- Insert the clamping bolt (24) into the hand lever (21) in such a way that the slit in the clamping bolt is aligned with the square in the hand lever.
- Place the hand lever on the shaft (3). The hand lever must lie on top of the washer (26).
- Tighten the clamping bolt with nut (25), thus fixing the hand lever to the shaft.
- Close the valve and adjust the stop position using the screw (27). Secure the screw with a nut (28).
- Screw the star knob (23) onto the stud bolt. For operating the valve loosen the star knob and retighten afterwards.

## Mounting of the Mounting Plate

- Insert the spring dowel sleeves (30) into the body. The slit in the split taper sleeve must be facing in the force direction (see arrow in the mounting drawing) to reach a rigid connection. Do not insert the mounting plate without using spring dowel sleeves as the transverse forces cannot be taken on by the screws.
- Place the mounting plate (29) in position and fix it by tightening the cylinder screws (31).
- If required, push the square adapter onto the shaft. If necessary, use adequate means to ensure that the square adapter will not slip off the shaft.

## Mounting of actuators

- The mounted actuator must not cause a thrust load on the valve shaft. If necessary the actuator must be fastened / supported. NOTE: In case of moving pipelines the fastening of the actuator must not be rigid.



- |                 |                          |                  |                        |
|-----------------|--------------------------|------------------|------------------------|
| 1 Body          | 9 Gland flange           | 16 Hexagon screw | 24 Clamping bolt       |
| 2 Disc          | 10 Bottom flange         | 17 Split washer  | 25 Haxagon nut         |
| 3 Stem          | 11 Axial securing device | 18 Hexagon screw | 26 Washer              |
| 4 Seat          | 12 Bottom flange seal    | 19 Split washer  | 27 Hexagon screw       |
| 5 Bearing       | 13 Tapered pin           | 20 Hexagon nut   | 28 Hexagon nut         |
| 6 Gland packing | 14 Straight pin          | 21 Hand lever    | 29 Mounting plate      |
| 7 Insert ring   | 15a Set screw            | 22 Stud bolt     | 30 Spring dowel sleeve |
| 8 Gland         | 15b Cylinder screw       | 23 Star knob     | 31 Cylinder screw      |