Uniwat®

Concentric Butterfly Valves

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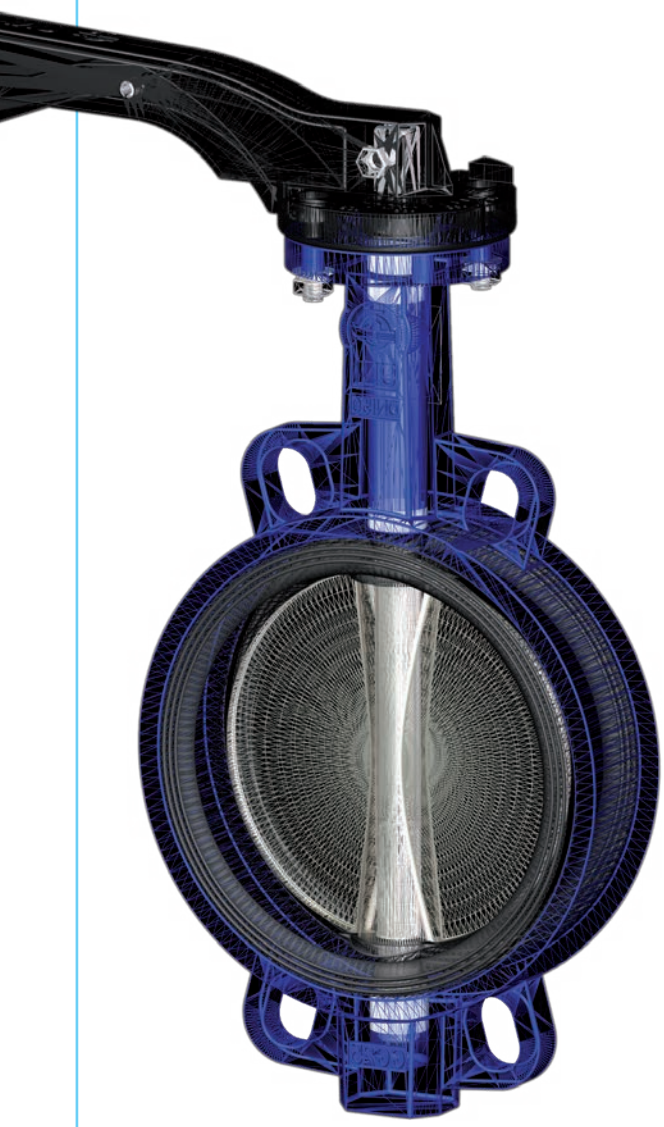
General Design Considerations



A butterfly valve is a type of flow control device, typically used to regulate a fluid flowing through a section of pipe. A flat circular plate (disc) is positioned in the centre of the pipe. The plate has a rod (shaft) through it connected to an actuator on the outside of the valve. Rotating the actuator turns the plate either parallel or perpendicular to the flow. Unlike a ball valve, the plate is always present within the flow, therefore a pressure drop is always induced in the flow regardless of valve position.

A butterfly valve is from a family of valves called quarter turn valves. The “butterfly” is a metal disc mounted on a rod. When the valve is closed, the disc is turned so that it completely blocks off the passageway. When the valve is fully open, the disc is rotated a quarter turn so that it allows unrestricted passage. The valve may also be opened incrementally to regulate flow thanks to the gradual interlocking notch.

Butterfly valves are of simple design, of light weight and volume and very effective on isolating lines for its quick and safe operation. Most of butterfly valves design are flangeless for installation between counter flanges what saves space, costs and maintenance.

There are two kind of flangeless butterfly valves:

Wafer Style Concentric Butterfly Valves: Wafer style is the more common one and is the least expensive one. The Wafer Style Concentric Butterfly valve is just about the standard. It is so common that no one even bothers to use the word “wafer” when ordering a butterfly valve. They take it for granted that if they order a butterfly valve, they will get a wafer style one. Wafer butterfly valves are installed between two flanges using bolts or studs and nuts. This type of installation, of course, makes it impossible to disconnect just one side of the piping system from the valve. That is where the lug style valve comes in.

Lug Style Butterfly Valves: Lug style valves are provided with tapered holes to fix threaded bolts in. This allows them to be installed into a system using two sets of bolts and no nuts. The valve is installed between two flanges using a separate set of bolts for each flange. This set-up permits either side of the piping system to be disconnected without distributing the other side.
Lug Style Butterfly Valves are used in dead end service and generally have a reduced pressure rating.

Valves can also be of dual flanged design; provided with integral flanges that are ready to be installed between flanges of the same standard. These are more bulky valves and usually required for large sizes and other styles of performance by the position of the shaft. (see next paragraph).

Other kind of valves by its nature of shaft design are as follows:

Concentric Design: This is the most common and simple design. The valve shaft is concentric to the disc. It is normally a resilient seated valve. Rotating the handle turns the plate either parallel or perpendicular to the flow of water, shutting off the flow

Double Eccentric Design: This design features a slight offset in the way the disc is positioned, which increases the valve’s sealing ability and decreases its tendency to wear. It is normally used for throttling functions, larger sizes and / or metal seated valves.

Triple Offset Design: This design is the one offering the highest degree of performance. The shaft is totally off set from the central axis thus increasing the ability of the valve disc to close tightly at even high pressure. These valves are usually metal seated thus being used for high temperature too. These valves are usually operated by worm gear to achieve a slow closing.

Codification

Butterfly valve with body material JL1040 (GG25)

V	F	7	0	0	P	G	E	0	0	0	0	5	0

VF : UNIWAT® butterfly valve identification

BUTTERFLY TYPE

7U0	Concentric U type

ACTUATION DEVICE

P	With lever
R	With worm gear
B	Bare shaft
E	Electric actuator

DISC

G	Ductile iron JS1030 (GGG40)
I	St. Steel CF8M (AISI 316)
B	AL-BZ
F	Coated FEP
P	Coated PFA
U	St. Steel 904L

SEAT

E	EPDM
N	NBR
V	Viton
S	Silicon
F	FEP
P	PFA
H	Hypalon

SPECIAL CONNECTION

00	No special connection
16	PN16 for valves >DN300

Only connection, no design

VALVE SIZE

050	DN50
300	DN300

Butterfly valve with other body material

V	F	7	0	0	P	G	G	N	0	0	0	5	0

VF : UNIWAT® butterfly valve identification

BUTTERFLY TYPE

7U0	Concentric U type

ACTUATION DEVICE

P	With lever
R	With worm gear
B	Bare shaft
E	Electric actuator

BODY

G	Ductile iron JS1030 (GGG40)
A	Carbon Steel WCB
I	St. Steel CF8M (AISI 316)
B	AL-BZ
U	St. Steel 904L

DISC

G	Ductile iron JS1030 (GGG40)
I	St. Steel CF8M (AISI 316)
B	AL-BZ
F	Coated FEP
P	Coated PFA
U	St. Steel 904L

SEAT

E	EPDM
N	NBR
V	Viton
S	Silicon
vF	FEP
P	PFA
H	Hypalon

SPECIAL CONNECTION AND DESIGN

00	No special connection
16	PN16 for valves >DN300

VALVE SIZE

050	DN50
300	DN300

Design Attributes

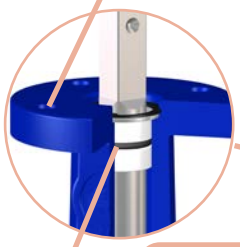
Concentric Butterfly Valves are quarter turn rotary valves, bidirectional, with rubber or fluoropolymer seat, for stopping or regulating the flow of the service fluid when necessary. A metal disc is positioned in the centre of the valve. The plate has a rod (stem) through it connected to an actuator device (handwheel, gear, etc.) on the outside of the valve. The valve closes by turning the disc clockwise and is open when the lever is parallel to the pipe. Valves are provided with epoxy paint against environmental aggression. They are of simple design, light weight and volume and offer a quick operation with full seat tightness, being widely used in many applications with significant savings in space and investment costs for installation.

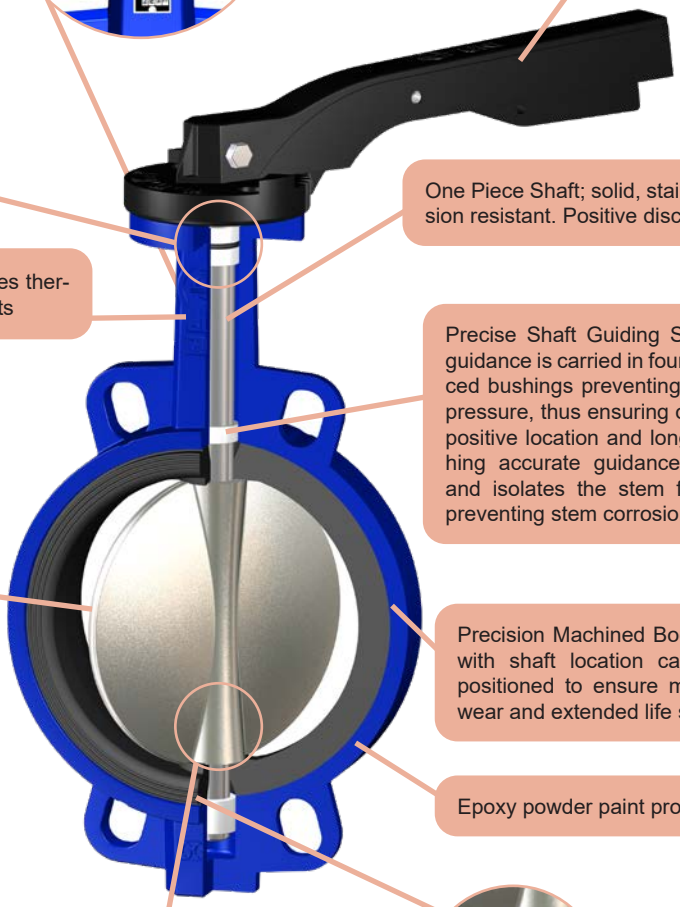
Nameplate incl. batch no. for full traceability

Lever with Notch Plate; with position indicator and locking in intermediate positions when needed.

Worm gear with visual position indication and mechanical adjustment of open and close position, recommended for DN>200

Top Mounting Arrangement; top flange to suit actuators as per ISO 5211 standard, square stem with bevelled edges to ease actuator coupling





One Piece Shaft; solid, stainless steel corrosion resistant. Positive disc positioning

Extended Valve Neck enables thermal isolation in heating plants

Precise Shaft Guiding System; the shaft guidance is carried in four strategically placed bushings preventing deflection under pressure, thus ensuring optimal guidance, positive location and long life. PTFE bushing accurate guidance reduces torque and isolates the stem from valve body, preventing stem corrosion.

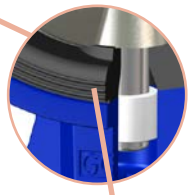
O-ring safety shaft sealing, with retaining washer to ensure proper working under pressure

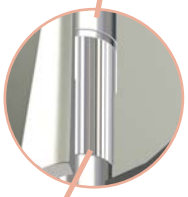
Finely Machined Disc Edges with final polishing, provides tight valve sealing and ensures minimum operating torque and longer duration of the rubber liner

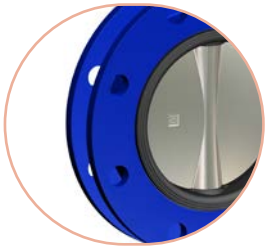
Precision Machined Body; thus the liner with shaft location can be accurately positioned to ensure minimal operation wear and extended life span

Great versatility in connections. Wafer design with centring eyelets; type 700 provide full passing bolts to assemble between counter flanges ISO/DIN/EN 1092 PN10, PN16 and ASA 150 (up to DN600) / or PN10 (DN>600)

Epoxy powder paint protection







Double Flange U-SERIES VF7U0

Shaft-Disc threaded union standard up to DN300: disc offers clean surface against the fluid, without union pins source of corrosion and turbulences in small sizes

Replaceable seat liner with phenolic backed seat, up to DN350-400, aluminium backed seat DN400-450 and above, non-collapsible, stretch resistant, blow out proof, allows softer rubber liners, which ensure longer life span and better tightness. Liner is profiled to ensure a tight shut off sealing when installing between flanges (pressure activated system), thus no need to provide gaskets between valve and counter flanges

SERIES VF7U0

Main Features

Valve design: EN 593, EN 12516 & DIN 3840.
Nominal Pressure: PN16 (DN25-DN300)/ PN10* (DN350-1200). For PTFE seat PN10 (DN40-600)
* Option PN16 (DN350-1200)
Face to face length: EN 558 S20 (DIN 3202 K1) SERIES VF7U0
Valve end connections:
-VF7U0 Flanged to EN 1092-1/2 type 11/B
PN16(DN150-300); PN10 (DN350-1200), option PN16 (DN350-1200)
Top flange: ISO 5211
Marking: EN 19
Pressure Tests: EN 12266-1
Seat leakage rate: Rate A (full seat tightness in both directions)
Outside epoxy coating protection blue color similar to RAL5002. Min. average thickness 150 microns
Product compliant with Directive 2014/68/EU on Pressure Equipment (PED) and Machinery Directive 2006/42/EC

Main Duties / Limits of use

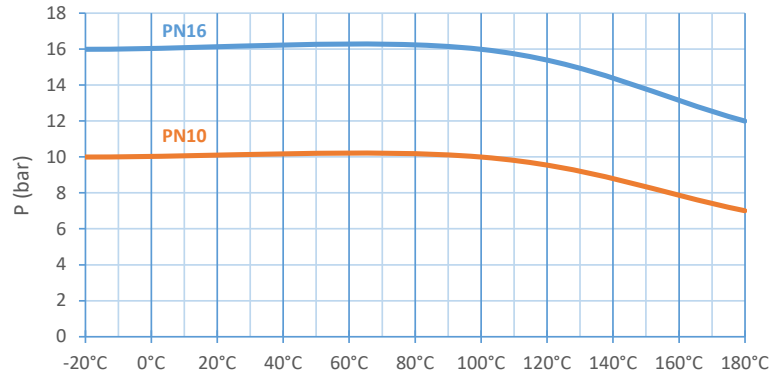
Liquids compatible with materials of construction, acc. to Directive 2014/68/EU, Annex II table 8 (liquids of group 1*) & table 9 (liquids of group 2*) up to category I
Low pressure steam & neutral gases of group 2*, acc. to Directive 2014/68/EU, Annex II table 7 up to category I

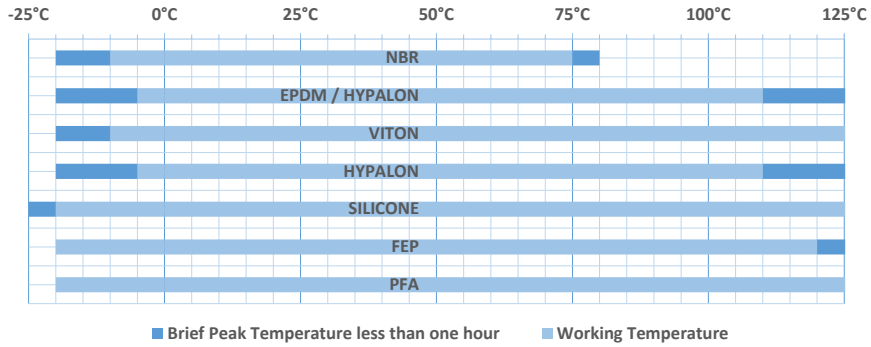
Table 7: PS 16 bar DN25-200 (Art.4-Parr.3 DN25-50)
PS 13 bar DN250
PS 10 bar DN300-350
PS 6 bar DN400-500
PS 2,5 bar DN600-1200

Table 8: PS 16 bar DN25-125 (Art.4-Parr.3)
PS 13 bar DN150
PS 10 bar DN200-1200 (Art.4-Parr.3 DN200)

Table 9: PS 16 bar DN25-300 (Art.4-Parr.3)
- Option DN350-1200
PS 10 bar DN350-1200 (Art.4-Parr.3)

Questions referring to chemical resistance, please consult us
Observe also pressure/temperature limits on diagrams under
**Classification of fluids (group 1 or 2) acc. to Directive 2014/68/EU, Article 13*





We recommend not to exceed maximum velocity as follows:
PN10: 3 m/s
PN16: 4 m/s

TSmax: 80ºC for drinking water

Temperature ranges given just for reference.

Pressure-temperature rating, material compatibility and other parameters also to be considered for rubber selection.

Please consult our Technical Department for a particular application.

Options

Compliance with EN 1074-1/2, higher service pressure ratings and temperatures, other connections, other designs and approvals, limit switches, different actuation. Please consult us

Flow Coefficients Kv Values (m^3/h)

DN	Opening Angle of the Valve								
	10°	20°	30°	40°	50°	60°	70°	80°	90°
25	-	-	1,5	5	8,3	14	22	33	36
32	-	0,8	1,7	5,3	9,5	16	25	37	41
40	-	1,5	3,5	8	14	23	37	55	61
50	-	2,5	7	14	24	40	64	95	105
65	-	5	11	23	40	67	107	159	176
80	-	9	20	35	61	101	161	240	265
100	-	16	38	78	137	226	360	538	594
125	0,5	26	69	129	219	361	576	860	950
150	0,8	44	105	205	373	617	983	1468	1622
200	1,3	82	205	387	680	1124	1792	2676	2957
250	2,1	138	345	669	1084	1791	2855	4262	4711
300	3,7	210	534	1028	1639	2707	4318	6449	7126
350	5,5	305	750	1326	2347	3878	6184	9236	10205
400	7,4	388	935	1813	3208	5301	8454	12625	13950
450	9,7	550	1212	2370	4193	6929	11049	16500	18232
500	13	658	1595	2981	5275	8716	13900	20758	22937
600	20	962	2246	4431	7919	13083	20864	31158	34429
700	55	1233	2725	5105	9022	14906	23770	35499	39225
800	135	1719	3394	6367	10338	17081	27239	40905	44950
900	180	2475	4731	8631	13691	22620	36072	54165	59525
1000	250	3342	6443	11752	18642	30800	49116	73755	81050
1200	320	4715	8643	15155	24198	39980	63757	95741	105210

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A valve flow coefficient represents the standard flow rate which flows through the valve at a given opening, referred to pre-established conditions:

* Kv value is the volume of water at 20ºC, in cubic meters per hour (m3/h), that will flow through the valve at a static pressure drop of 1 bar across the valve.

* Cv value is the volume of water at 60ºF, in gallons per minute (gpm), that will flow through the valve at a static pressure drop of 1 psi across the valve.

Conversion from Kv to Cv can be roughly calculated by means of the following expression:

Cv = Kv x 1,17

Flow rate through the valve with other liquids can be calculated with the following expressions (for gases please consult us):

$Kv = q\ (SG / dp)^{1/2}$ *where*

q = water flow (m3/h)

SG = specific gravity (1 for water)

dp = pressure drop (bar)

$Cv = q\ (SG / dp)^{1/2}$ *where*

q = water flow (US gallons per minute)

SG = specific gravity (1 for water)

dp = pressure drop (psi)

It is common practice to size the valves on the basis of pipe DN for on off application. Nevertheless, Butterfly Valves used for control purpose should be calculated on the basis of operating conditions.

First step is to calculate the Kv values for the different working conditions and then choose the DN with such Kv values in the region of 20º to 70º valve opening angle.

COMEVAL Technical Department is at your disposal to help you sizing your system.

Valve Torques (Nm)

DN	Elastomeric seat		
	PN6	PN10	PN16
25	8*		10
32	8*		10
40	10*		12
50	14*		16
65	22*		26
80	29*		33
100	43*		53
125	66*		81
150	94*		119
200	161*		194
250	256*		308
300	283*	410*	595
350	340*	475	969*
400	500*	746	1307*
450	780*	1112	1787*
500	1120*	1356	2288*
600	2120*	2468	3711*
700	3400*	4908	5350*
800	-	6462	-
900	-	7886	-
1000	-	13389	-
1200	-	18833	-

*Special construction

Remarks for Actuator Sizing:

The torque values given are for water or other non-viscous lubricating liquids at ambient temperature.
Recommended safety factor to be applied:

30-40% for double acting pneumatic actuators
30-50% for single acting pneumatic actuators and electric actuators

There are several factors that can increase above given values and should be taken into account for actuators sizing:

-For gases and dry medium (non lubricating), multiply above values by about 1,25-2 depending on application
-For viscous liquids increase above values depending on the liquid properties
-For service conditions such as likelihood of seat swelling, or low and high temperature seat hardening, an additional safety factor should be considered.

There are three torques to be considered when selecting the proper actuator for a butterfly valve:

1) Seating Torque: The torque to displace a resilient seat and effect shutoff
2) Bearing Torque: The torque required to overcome friction forces on the valve shaft bearing surfaces during valve travel angle (about 30% of seating torque)
3) Dynamic Torque: Due to fluid forces which tend to close the valve when the valve is partially open. This torque is due to the velocity of the fluid created by a differential pressure across the valve. Systems should be projected to avoid high velocities across the valve

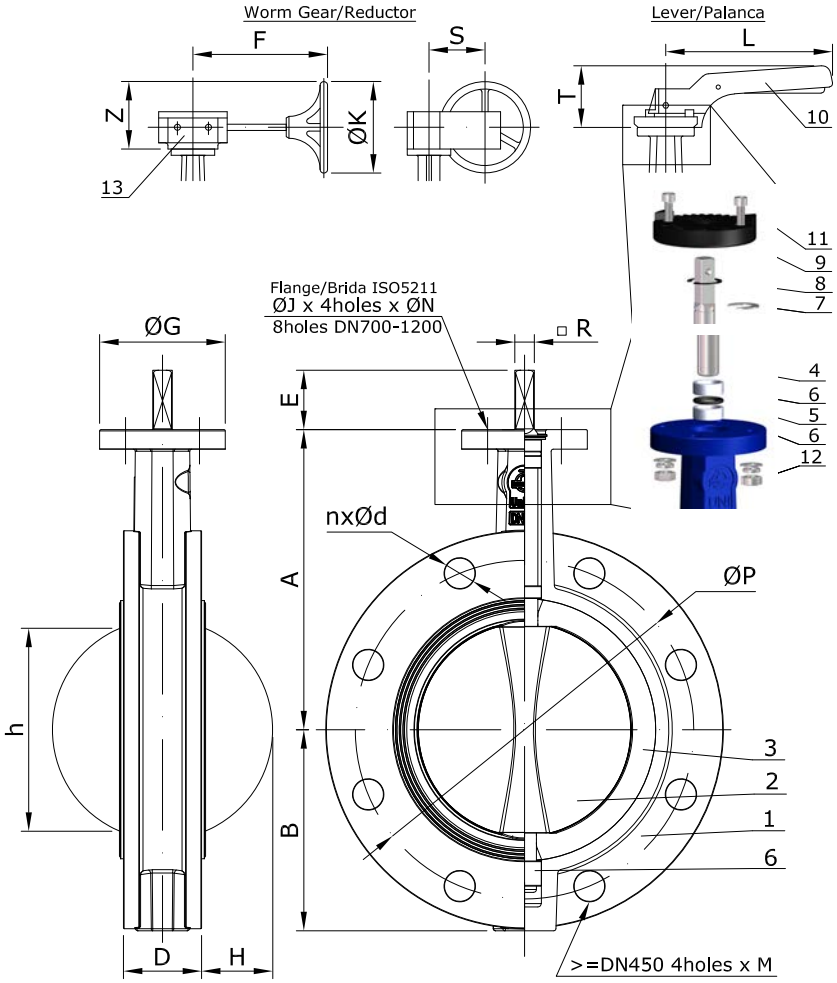
Above given values are inclusive of the 3 torques if max. recommended velocities are not exceeded, the actuator selected must provide the calculated torque over its total opening and closing travel angle.

Information / restriction of technical rules need to be observed!
Installation, Operating and Maintenance Manual can be downloaded at www.comeval.es

The engineer, designing a system or a plant, is responsable for the selection of the correct valve
Product suitability must be verified, contact manufacturer for information

SERIES VF7U0

Main Parts and Materials



NO.	PART	MATERIAL
1	BODY*	Cast iron EN-JL1040 (GG25) Ductile iron EN-JS1030 (GGG40) St. steel CF8M / Steel WCB
2	DISC	Ductile iron EN-JS1030 (GGG40) Ni Plated / St. steel CF8M Al-Bz / St. steel 904L
3	LINER	NBR (VF7U0_N_) EPDM (VF7U0_E_) Viton (VF7U0_V_) Silicon (VF7U0_S_) HYPALON (VF7U0_H_)
4	STEM	St. steel AISI 420 (DN150-300) - St. steel AISI 431 (DN350-1200)
5	O-RING	NBR / EPDM
6	BUSHING	PTFE
7	WASHER	Steel
8	CIRCLIP	Steel
9	NOTCH PLATE	Aluminium
10	HAND LEVER	Aluminium / Ductile iron
11	BOLTS	Steel
12	NUTS	Steel
13	WORM GEAR	Ductile iron

* Body in cast iron JL1040 not suitable for DN350-1200 PN16 construction

Main Valve Parameters

DN			150	200	250	300	350	400	450
MAIN DIMENSIONS		A	215	241,5	280	300	340	360	390
		B	144	171	205	240	260	302	346
		D	56	60	68	78	78	102	114
		h	145	193,3	241,1	291,3	324,5	376,2	425,7
COUPLING DETAIL		ISO 5211	F07	F10	F12	F12	F12	F12	F16
		E	42	30	32	32	45	50	50
		□R	14x14	17x17	22x22	27x27	27x27	27x27	30x30
		ØG	90	125	150	150	150	150	210
		ØJ	70	102	125	125	125	125	165
		ØN	9	11	13	13	14	14	22
VALVE CONNECTION	PN10	ØP	240	295	350	400	460	515	565
		nxØd	8xØ22	8xØ22	12xØ22	12xØ22	16xØ22	16xØ28	16xØ28
		M	-	-	-	-	-	-	24
	PN16	ØP	240	295	355	410	470	525	585
		nxØd	8xØ22	12xØ22	12xØ26	12xØ26	16xØ26	16xØ30	16xØ30
		M	-	-	-	-	-	-	27
LEVER**		T	79	40	40	37	-	-	-
		L	278	355	507	507	-	-	-
		Approx. Weight	19	30	54	68	-	-	-
WORM GEAR		F	156	223	223	223	223	270	270
		S	42	70	70	80	80	114	114
		Z	168	195	195	195	195	208	258
		ØK	250	300	300	300	300	400	400
		Approx. Weight	23,5	38,5	62,5	76,0	106,5	149,0	178,0

** We do not recommend the use of valves with PTFE liner and lever for DN200-DN300
We do not recommend the use of valves with rubber liner an lever for DN300

Dimensions in mm subject to manufacturing tolerance / Weights in kg

Information / restriction of technical rules need to be observed!
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The engineer, designing a system or a plant, is responsable for the selection of the correct valve
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SERIES VF7U0

Main Valve Parameters

DN		500	600	700	800	900	100	1200
MAIN DIMENSIONS	A	420	495	624	672	720	800	940,7
	B	370	465	520	591	656	721	844,1
	D	127	154	163	188	203	216	276
	h	475,1	572,3	675,9	773,4	840,5	938,9	1127,3
COUPLING DETAIL	ISO 5211	F16	F16	F25	F25	F25	F25	F30
	E	65	70	80	80	118	142	150
	□R	36x36	46x46	Ø63.35	Ø63.35	Ø75	Ø85	Ø105
	ØG	210	210	300	300	300	300	350
	ØJ	165	165	254	254	254	254	298
	ØN	22	22	18	18	18	18	22
VALVE CONNECTION PN10	ØP	620	725	840	950	1050	1160	1380
	nxØd	16xØ28	16xØ31	20xØ31	20xØ34	24xØ34	24xØ37	28xØ40
	M	24	27	27	30	30	33	36
VALVE CONNECTION PN16	ØP	650	770	840	950	1050	1170	1390
	nxØd	16xØ33	16xØ36	20xØ36	20xØ39	24xØ39	24xØ42	28xØ49
	M	30	33	33	36	36	39	45
WORM GEAR	F	339	339	339	339	339	339	339
	S	125	125	125	125	125	125	125
	Z	222	222	222	222	222	222	222
	ØK	300	300	300	300	300	300	300
	Approx. Weight	249,0	359,5	465,0	625,0	815,0	935,0	1330,0

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Solutions on Control Accesories and Actuation

UNIWAT butterfly valves can be provided with a wide range of solutions on control accessories and actuation which is all packaged at our works according to customer specifications. The modular system permits to distributors and plant users to assemble or replace the diverse options in site. Virtually most applications that may be encountered on the industry today are covered with the standard range of actuation and accessories, nevertheless, other customer tailored solutions can be provided by our R&D Section.

Position Indication Arrangements on Manual Valves

Special designs of proven reliability have been engineered by our R&D section to provide UNIVAL users with more service options.

Valve with hand lever with electromechanical limit switches

Valve with hand lever with inductive proximity limit switches

Valve with worm gear with electromechanical limit switches

Valve with worm gear with inductive proximity limit switches

Valve with hand lever with limit switches box (metal or plastic)

Valve with worm gear with limit switches box (metal or plastic)

Other options

Stem extensions

Pad Locked lever

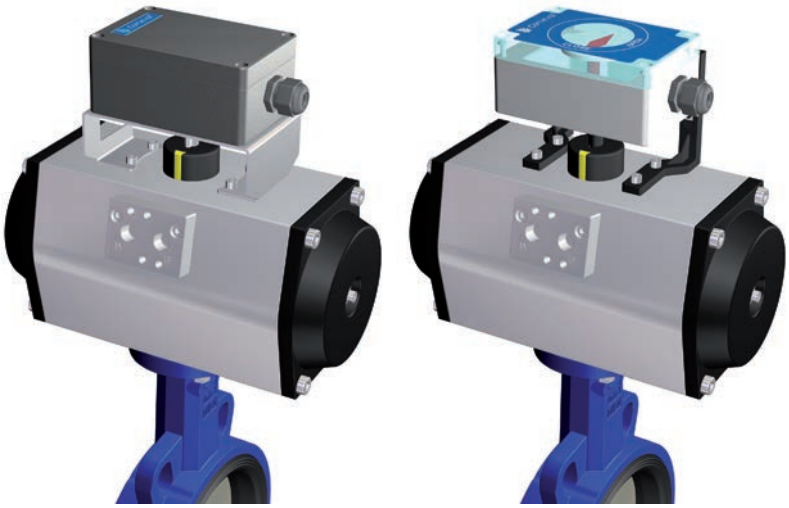
Stem Extensions; either for manual operated valves or actuated ones. The length of extension is made to the customer specification, and provides bolting arrangement on both sides: valve stem and actuator stem side with upper part according to ISO 5211 standard.

Pad Locked lever; this simple system prevents unauthorized operation at the plant. It is arranged on request.

Pneumatic Actuators CMVL T Series - Options and Accesories

Valve position indication can be provided by some arrangements such as Limit Switches that can be mounted either onto the actuator shell or cased into plastic or metal boxes.

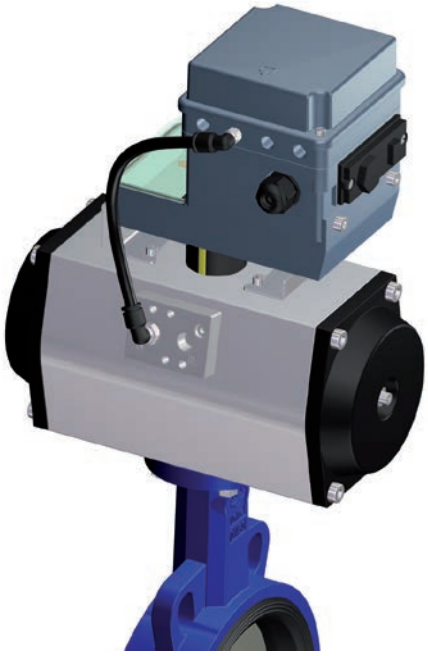
Inductive proximity limit switches



Metal or plastic limit switches boxes

Solenoid Valves in diverse materials and configurations can be provided as the most common accessories on pneumatic actuators. For throttling services a range of standard or smart Positionners can be adapted onto the actuators. Intermediate Gear Boxes can be fitted in all cases for emergency manual actuation.

Solenoid Valves for On/Off control



Pneumatic or Electropneumatic,
Standard or Intelligent Positionners

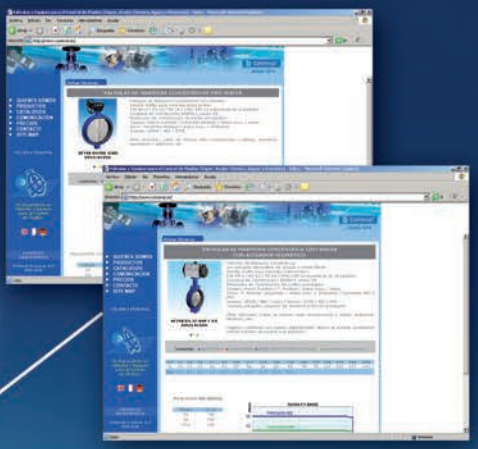
Intermediate Gear Box for
emergency manual actuation

Marketing Tools Available to Distributors

A rich assortment of Uniwat® marketing tools are available to our distributors worldwide, visit our corporate Web site www.comeval.es for more details.

Data Sheets Manual

Comprehensive of all technical and engineering information on the comprehensive portfolio.

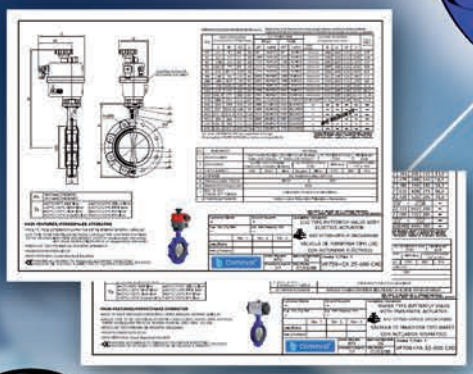


Web Site Product Sheet

Valve description, main dimensions, operating parameters and other links accessible at your finger tips.

Arrangement Drawings

Standardized sectional parts and dimensional drawings for use on engineering projects or enquiries.



Cut way / Demo Samples

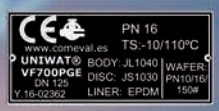
Price Lists

Up dated price book comprehensive of all models including actuated valves.

Join us on the net to start your Uniwat® experience
www.comeval.es

Operating and Maintenance Manuals

Provided along every valve into the sealed plastic bag. Also accessible via Internet at all times



Traceability

Valves are provided with a riveted name plate ensuring traceability, year of manufacture and main parameters. Valves are individually preserved into a sealed air bubble plastic bag and then on sets of some number of valves per cardboard box to assist with handling and storing. Please ask your Uniwat® distributor for packaging details. (no minimum order requirement is imposed).

Excelling the best.

Uniwat®

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