

Bray[®]

SERIES 20/21 Wafer/Lug
25mm-500mm (1" - 20")

BUTTERFLY VALVES
SANITARY AND CHEMICAL / RESILIENT SEATED

SERIES 20

25mm–500mm (1"–20")

Bray Controls is proud to offer a high quality line of butterfly valves to meet the stringent requirements of today's applications. The Series 20/21 valve not only surpasses the high standards required in sanitary valve applications, but it also has unique inherent flow characteristics and capabilities. For High Performance in butterfly valve flow control, choose Bray.

DISC / STEM (A) One-piece design. The disc edge is spherically machined and hand polished to produce a bubble-tight shut off, minimum torque, and longer seat life. The disc/stem is 316 Stainless Steel and PTFE or elastomer moulded 316 Stainless Steel, and has a smooth finish free of porosity, voids and cracks. The disc/stem design inherently provides complete protection from particle entrapment and bacterial decay, protection that is required for sanitary performance. For superior erosion and abrasion resistance, the one-piece disc/stem is fully encased in either EPDM or Buna-N. These rubber-lined surfaces protect all metal surfaces from abrasive particles in the line media. The thin disc profile provides a much higher C_v (up to 50% greater than most through-stem designs) and greater pressure recovery, thus resulting in lower pressure drops and a more energy-efficient valve. The disc/stem is available in a variety of standard materials to ensure maximum performance and service life to customers for their sanitary, corrosion or erosion applications.

STEM BUSHING (B) Non-corrosive, heavy duty acetal bushing absorbs actuator side thrusts.

STEM SEAL (C) Double "U" cup seal design is self-adjusting and gives positive sealing in both directions. Prevents external substances from entering the stem bore.

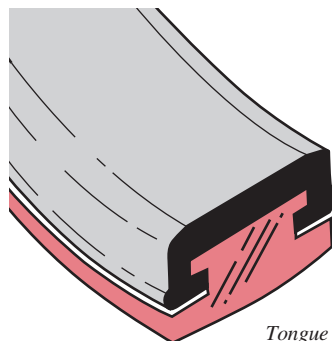
NECK (D) Extended neck length allows for 50mm of piping insulation and is easily accessible for mounting actuators.



BRAY UNIQUE SEAT DESIGN (E)

One of the valve's key elements is Bray's unique *tongue and groove* seat design. This resilient seat features lower torque than many valves on the market today and provides complete isolation of flowing media from the body.

The tongue-and-groove seat to body retention method is superior to traditional designs, making field replacement simple and fast. The seat is specifically designed to seal with slip-on or weld-neck flanges. The seat



Tongue and Groove Design

features a moulded O-ring which eliminates the use of flange gaskets. An important maintenance feature is that all resilient seats for Bray® butterfly valves Series 20, 21, 30, 31 and 34 are completely interchangeable.

PRIMARY AND SECONDARY SEALS (F)

The Primary Seal is achieved by an interference fit of the moulded seat flat with the disc hub. The Secondary Seal is created as a result of the stem diameter being greater than the diameter of the seat stem hole. These seals prevent line media from coming in contact with the valve stem or body.

BODY (G) Two-piece wafer or lug style allows for ease of assembly and maintenance. Nylon 11 coating for excellent corrosion resistance is standard for 25mm-200mm valves and available on larger sizes upon request. Polyester coating is standard for 250mm-500mm bodies. All valve bodies meet 10 bar pressure ratings for hydrostatic shell test requirements.

BODY BOLTS (H) Standard material is 316 Stainless Steel.

ACTUATOR MOUNTING FLANGE AND STEM CONNECTION (I)

Universally designed to ISO 5211 for direct mounting of Bray® power actuators and manual operators.

FLANGE LOCATING HOLES (J)

Provide quick and proper alignment during installation.

DESIGN FEATURES

Bray's Series 20 valve is a wafer version with flange locating holes, and the Series 21 is the companion lug version for dead-end service and other flange requirements. All Bray valves are tested in accordance with BS EN 12266.

A major design advantage of the Bray product line is international compatibility. The same valve is compatible with most world flange standards –ANSI Class 125/150, BS 10 Tables D and E, BS 4504 NP10/16, DIN ND 10/16, AS 2129 and JIS 10. In addition the valves are designed to comply with ISO 5752 face to face and ISO 5211 actuator mounting flanges. Therefore, one valve design can be used in many different world markets.

Bray interchangeability and compatibility offers you the best in uniformity of products and low-cost performance in the industry today.

Due to the modular concept of design, all Bray handles, manual gear operators, and pneumatic or electric actuators mount directly to Bray valves. No brackets or adapters are required.



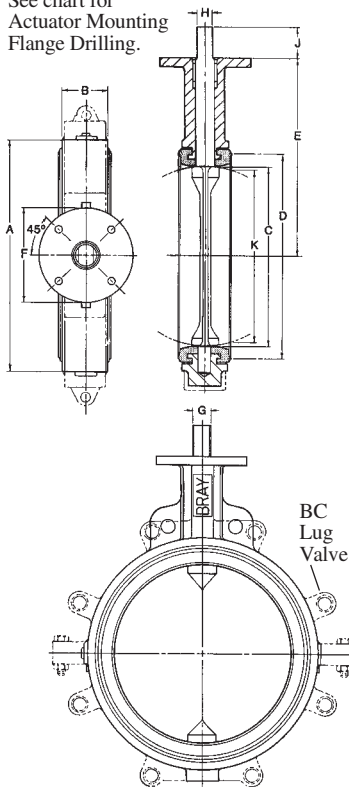
For severe corrosive applications the one-piece disc/stem and seat are offered in PTFE with a standard Nylon 11 coated body. The basic seat design is PTFE bonded to EPDM and incorporates a unique primary/secondary sealing design. This PTFE valve provides excellent internal and external corrosion protection. Refer to Bray Technical Bulletin and brochure on PTFE, Nylon 11, and elastomer-covered Series 20/21 for further details and design features.

NYLON 11 COATING

CORROSION PROTECTION Bray's standard product offers valve bodies 25mm-200mm with a Nylon 11 coating, providing excellent corrosion and wear resistance to the valve's surface – the weakest part of most metal components. Nylon 11 is a thermoplastic produced from a vegetable base rather than a petroleum base. Nylon 11 advantages include:

- 1) Excellent Corrosion Resistance – Resists a broad range of chemical environments such as salt solutions, salt water, marine atmospheres, oils, greases and petroleum products. Salt spray tested in excess of 2,000 hours and seawater immersion tested for over 10 years without corrosion to metal substrates.
- 2) Abrasion Resistance – very low coefficient of friction, resulting in longer service life and increased performance.
- 3) Sanitary Applications – inert to fungus growth and moulds, highly stain resistant, *USDA Approved*, as well as certified to ANSI/NSF 61 for water service.
- 4) Outdoor Weathering – resistant to ultra-violet radiation.
- 5) Impact Resistant – tests have been performed without any peeling of coating.
- 6) Electrical properties – excellent dielectric properties.
- 7) Temperature Range –
Max: continuous service 93°C (+200°F)
intermittent service up to 121°C (+250°F)
Min: -29°C (-20°F)

See chart for Actuator Mounting Flange Drilling.



DIMENSIONS SERIES 20 Wafer

Valve Size mm ins	A	B	C	D	E	F	Mounting Flange Drig.			G	H	J	K
							BC	No. Holes	Hole Dia.				
25 1	60	30	32	44	90	65	50	4	7	10	8	25	11
40 1½	80	32	47	64	105	65	50	4	7	10	8	25	34
50 2	94	41	51	72	140	90	70	4	9.5	14	10	32	34
65 2½	106	44	64	85	152	90	70	4	9.5	14	10	32	49
80 3	124	44	76	102	159	90	70	4	9.5	14	10	32	65
100 4	154	51	102	131	178	90	70	4	9.5	16	11	32	91
125 5	181	54	127	156	191	90	70	4	9.5	19	13	32	118
150 6	206	54	146	178	203	90	70	4	9.5	19	13	32	138
200 8	267	64	197	241	241	150	125	4	14	22	16	32	189
250 10	324	64	248	291	273	150	125	4	14	30	22	51	242
300 12	378	76	298	342	311	150	125	4	14	30	22	51	291

SERIES 21 Lug

Lug Bolting Data*		
BC	No. Holes	Threads UNC-2B
—	—	—
—	—	—
125	4	M16
145	4	M16
160	8	M16
180	8	M16
210	8	M16
240	8	M20
295	8	M20
350	12	M20
400	12	M20

Valve Size mm ins	A	B	C	D	E	F	Mounting Flange Drig.			G	J	KEY SIZE	K
							BC	No. Holes	Hole Dia.				
350 14	433	76	337	388	346	150	125	4	14	35	51	10x10	331
400 16	488	102	387	442	375	150	125	4	14	35	51	10x10	377
450 18	536	108	438	495	406	210	165	4	21	50	64	10x12	428
500 20	591	127	489	548	438	210	165	4	21	50	64	10x12	476

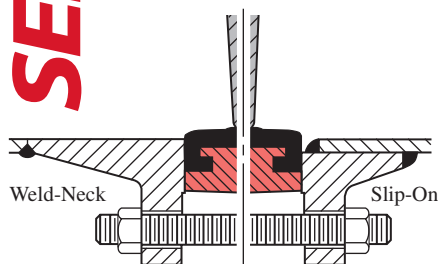
Lug Bolting Data*		
BC	No. Holes	Threads UNC-2B
460	16	M20
515	16	M24
565	16	M24
620	20	M24

Actuator mounting flange ISO recess dimensions:
 25mm & 40mm valves F05
 50mm - 150mm valves F07
 200mm - 400mm valves F12
 450mm - 500mm valves F16

* NOTE: Lug bolting data for PN10 rated valves. For PN16 ratings, please consult factory.

FLANGE REQUIREMENTS

Bray valves are designed for installation between ANSI Class 125/150 lb. weld-neck or slip-on flanges, BS 10 Tables D & E, BS 4504 NP10/16, DIN ND 10/16, AS 2129 and JIS 10, either flat faced or raised faced. While weld-neck flanges are recommended, Bray has specifically designed its valve seat to work with slip-on flanges, thus eliminating common failures of other butterfly valve designs. When using raised face flanges be sure to properly align valve and flange. Type C stub-end flanges are not recommended.



PRESSURE RATINGS*

When valve is placed between the flanges for bi-directional bubble-tight shut off, disc in closed position:

Disc/Stems for Resilient Seated Valves

316 Stainless Steel and Hastelloy® C:

25mm-500mm 10 bar

EPDM and Buna-N Moulded:

50mm-500mm 7 bar

Disc/Stems for PTFE Seated Valves

316 Stainless Steel and Hastelloy® C:

50mm-300mm 10 bar

PTFE Moulded:

50mm-300mm 7 bar

For Dead-end Service Applications:

With *downstream flanges installed*, the dead-end pressure ratings are equal to valves bi-directional ratings as stated above. With no downstream flanges, the dead-end pressure ratings for 50mm-300mm (2"-12") valves is 5 bar (75 psi) for 350mm-500mm (14"-20") valves, 3.5 bar (50 psi).

*Pressure Ratings are based on standard disc diameters. For low pressure application, Bray offers a standard reduced disc diameter to decrease seating torques and to extend seat life, thus increasing the valve's performance and reducing actuator costs for the customer.

VELOCITY LIMITS For On/Off Services

Fluids – 9m/s

Gases – 54m/s

C_v VALUES – VALVE SIZING COEFFICIENT

Valve Size		Disc Position (degrees)								
mm	ins	90°	80°	70°	60°	50°	40°	30°	20°	10°
25	1	61	56	36	21	11	5.6	2.7	.97	.07
40	1½	147	129	87	50	26	12.8	5.9	1.7	.25
50	2	244	172	123	73	45	27	16	7	.89
65	2½	439	310	201	115	71	43	25	11	1.4
80	3	691	488	290	165	102	62	35	16	2.0
100	4	1282	906	515	294	182	110	63	28	3.6
125	5	2070	1416	805	459	284	172	98	44	6
150	6	2786	1873	1065	607	376	227	130	59	7
200	8	5191	3402	1935	1147	714	427	244	106	13
250	10	8238	5385	3062	1815	1130	675	387	168	21
300	12	12102	7820	4448	2636	1642	981	562	245	31
350	14	15210	9829	5590	3313	2064	1234	706	307	40
400	16	19940	12885	7328	4343	2706	1617	925	403	52
450	18	26150	16898	9610	5695	3549	2121	1213	528	68
500	20	32690	21124	12014	7120	4436	2651	1517	660	85

C_v is defined as the volume of water in U.S.G.P.M. that will flow through a given restriction or valve opening with a pressure drop of one (1) p.s.i. at room temperature. Recommended control angles are between 25°–70° open. Preferred angle for control valve sizing is 60°–65° open.

EXPECTED SEATING/UNSEATING TORQUES (Nm)

Valve Size		Full-Rated Pressure Valves				Reduced Disc Diameter
mm	ins	Δ P (Nm)				Δ P (Nm)
		3.5	7	10	12	3.5
25	1	7	8	9	9	7
40	1½	11	11	12	12	11
50	2	14	15	15	16	14
65	2½	22	23	24	25	22
80	3	29	31	33	34	29
100	4	45	48	51	52	30
125	5	69	76	82	85	46
150	6	88	98	108	113	61
200	8	167	186	206	216	111
250	10	253	285	316	332	169
300	12	386	437	488	514	258
350	14	559	644	729	—	373
400	16	723	870	1017	—	482
450	18	887	1113	1339	—	595
500	20	1164	1458	1751	—	776

Valve Torque Rating – Bray has classified valve torque ratings according to 3 types: non-corrosive lubricating service, general service, and severe service. Torques listed above are for general services. Consult Bray for torque information corresponding to specific application.

TO USE TORQUE CHART, NOTE THE FOLLOWING:

- 1) For Bray valves, Series 20, 21, 30, 31 and 34.
- 2) Review Technical Bulletin No. 1001, Expected Seating/Unseating Torques, for explanation of the 3 service classes and their related seating/unseating torque values for given pressure differentials of Full-Rated and Reduced Disc Diameter valves.
- 3) Dynamic Torque values are not considered. See Technical Bulletin No. 1002 for

- 4) Do not apply a safety factor to above torque values when determining actuator output torque requirement.
- 5) For 3 way assemblies where one valve is opening and other is closing, multiply torque by 1.5 factor.

SPECIFICATIONS

RECOMMENDED SPECIFICATIONS FOR BRAY® SERIES 20/21 SHALL BE:

- Two-piece cast iron, wafer or lug bodies, Nylon 11 coated 25mm-200mm, polyester coated 250mm-500mm.
- With flange locating holes that meet ANSI Class 125/150 (or BS 10 Tables D and E, BS 4504 NP10/16, DIN ND 10/16, AS 2129 and JIS 10) drillings.
- Disc/Stem of one-piece, high capacity design. If PTFE or rubber-covered disc/stem required, entire disc base material must be encapsulated and expose no part of stem or body to line media.
- Tongue-and-groove seat design with primary hub seal and a moulded O-ring suitable for weld-neck and slip-on

flanges. Seat totally encapsulates the body without flange gaskets.

- Spherically machined, hand polished disc edge and hub for minimum torque and maximum sealing capability.
- Equipped with non-corrosive bushing and self-adjusting stem seal.
- Bi-directional and tested in accordance with BS EN 12266.
- Bi-directional pressure ratings of 316SS, Hastelloy C disc/stem with resilient seat: 25mm-500mm valves: 10 bar
- EPDM or Buna-N moulded disc/stem with resilient seat: 50mm-500mm valves: 10 bar
- 316SS, Hastelloy C disc/stem, PTFE seat: 50mm-300mm valves: 10 bar
- PTFE moulded disc/stem with PTFE seat: 50mm-300mm valves: 7 bar
- Lug bodies for dead-end service: With downstream flanges pressure ratings are equal to bi-directional ratings as stated above. With no downstream flanges: 50mm-300mm valves: 5 bar 350mm-500mm valves: 3.5 bar
- No field adjustment necessary to maintain optimum field performance.
- The valve shall be Bray® Series 20 wafer / 21 lug or equal.

TEMPERATURE RANGE OF SEATS

Type	Maximum	Minimum
EPDM	121°C(+250°F)	-40°C(-40°F)
Buna-N	100°C(+212°F)	-18°C(0°F)
FKM*	204°C(+400°F)	-18°C(0°F)
PTFE-Lined EPDM	121°C(+250°F)	-29°C(-20°F)

*FKM is the ASTM D1418 designation for Fluorinated Hydrocarbon Elastomers (also called Fluoroelastomers).

MATERIALS SELECTION

25mm–500mm (1"–20")

BODY:

- Cast Iron ASTM A126 Class B
- Ductile Iron ASTM A395
- 316 Stainless Steel ASTM A351 CF8M
- Aluminum ASTM B26 Class B

SEAT:

- Buna-N – Food Grade
- EPDM – Food Grade
- FKM*
- White Buna-N – Food Grade
- PTFE-Lined EPDM

DISC/STEM:

All Metal

- 25mm-300mm One Piece (Investment Cast)
- 316 Stainless Steel per ASTM A351 Type CF8M
- Hastelloy® C-22 per ASTM B494 Type CX2MW

350mm-500mm (Fabricated)

- Disc 316 Stainless Steel per ASTM A240
- Stem 316 Stainless Steel per ASTM A276
- Disc Hastelloy® C-276 ASTM B575 Alloy N10276
- Stem Hastelloy® C-276 ASTM B575 Alloy N10276

Rubber Moulded

50mm-300mm Material moulded over One Piece Stainless Steel insert (Investment Cast)

- EPDM – 17-4 ph Stainless Steel per ASTM A747 Type CB7Cu-1 Heat Treated
- Buna-N – 17-4 ph Stainless Steel per ASTM A747 Type CB7Cu-1 Heat Treated

350mm-500mm Material moulded over Stainless Steel insert (Fabricated)

- Disc EPDM – 316 Stainless Steel per ASTM A240
- Stem EPDM – 17-4 ph Stainless Steel per ASTM A564 Type 630 Heat Treated
- Disc Buna-N – 316 Stainless Steel per ASTM A240
- Stem Buna-N – 17-4 ph Stainless Steel per ASTM A564 Type 630 Heat Treated

PTFE Moulded

50mm-500mm PTFE moulded over One Piece Stainless Steel insert (Investment Cast)
17-4 ph Stainless Steel per ASTM A747 Type CB7Cu-1 Heat Treated

Note: not all materials are available in all valve sizes.

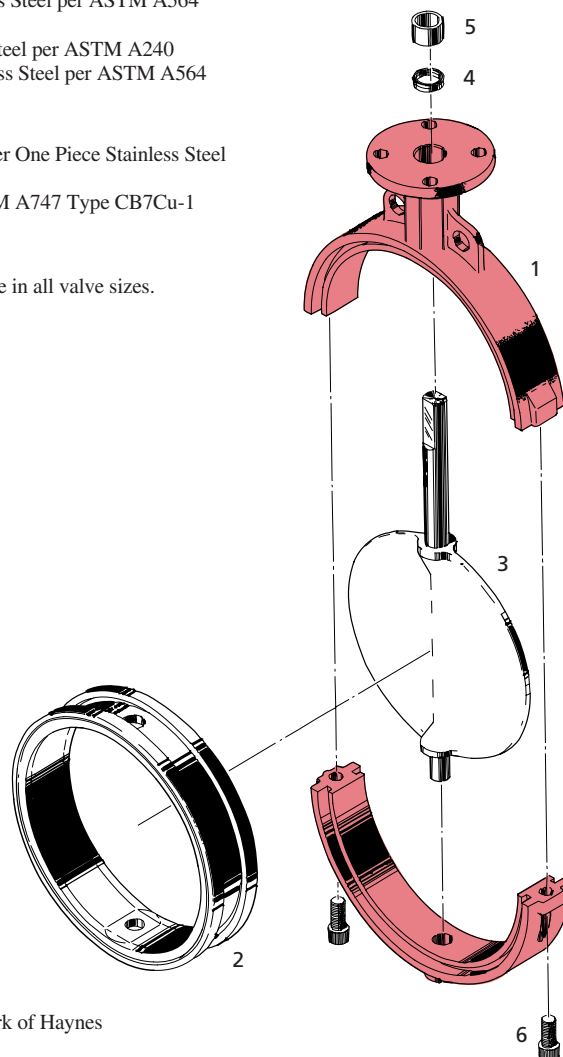
COMPONENTS

No.	Qty.	Description
1	1	Body
2	1	Seat
3	1	Disc/Stem
4	1	Stem Seal
5	1	Stem Bushing
6	2	Body Bolt

WEIGHTS

Valve Size mm	ins	Series	Series
		20	21
25	1	1	—
40	1½	1	—
50	2	2	3
65	2½	3	4
80	3	3	4
100	4	5	7
125	5	6	10
150	6	8	11
200	8	14	20
250	10	21	30
300	12	31	46
350	14	44	54
400	16	61	78
450	18	92	107
500	20	120	141

Weights are in kgs.



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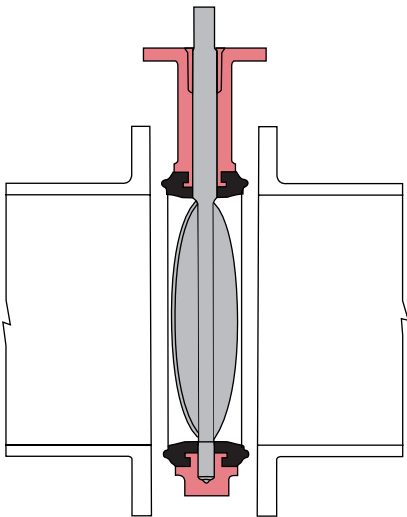
ASSEMBLY

INSTALLATION

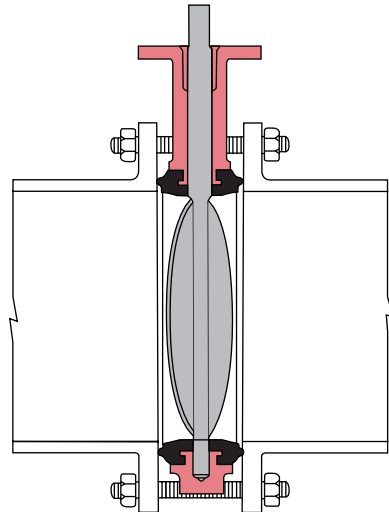
Position the disc in the partially open position, maintaining the disc within the body face-to-face. Place the body between the flanges and install flange bolts. *Do not use flange gaskets.* Before tightening flange bolts, carefully open the disc to the full open position to ensure proper alignment and clearance of the disc O.D. with the adjacent pipe I.D. Leave disc in the full open position and tighten flange bolts per required specification. Once bolts are tightened, carefully rotate disc to closed position to ensure disc O.D. clearance.

MAINTENANCE AND REPAIR

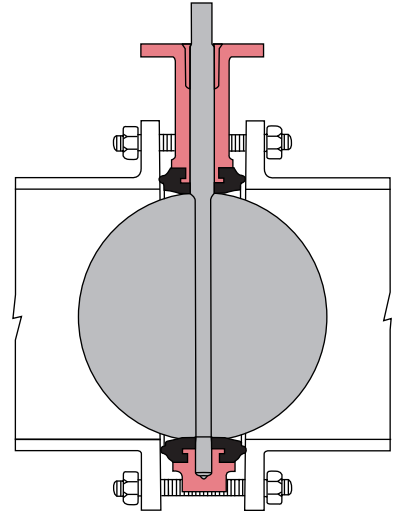
The many Bray features minimize wear and maintenance requirements. No routine lubrication is required. All components – stem, disc, seat, bushing, stem seal, etc., are field replaceable, no adjustment is needed. If components require replacement, remove the valve from the line by placing the disc near the closed position, spread the flanges, support the valve, then remove the flange bolts. No valve maintenance, including removal of manual or power actuators, should be performed until the piping system is completely depressurized.



Disc in the Near Closed Position



Disc in the Partially Open Position



Disc in the Full Open Position

DISASSEMBLY

Remove the handle, manual gear box or actuator from actuator mounting flange. Remove the body bolts and pull the lower body half away from the seat. Pull the seat and disc/stem from the upper body half. Remove bushing and seal from the upper body. Push the seat into an oval shape and remove the disc/stem by withdrawing the short stem end first.

ASSEMBLY

For aid in installing the disc/stem into the seat, install a light coat of silicone oil, food grade, onto the top and bottom stem and around the I.D. of the seat. (For silicone free applications use soap and water.) Push the long stem end of

the disc/stem into the seat, then push seat over the disc/stem short stem. Place the disc/stem and seat into the upper body half. Align the lower body bolt lugs with the upper body lugs and position lower body in the seat. Replace the body bolts and tighten. Install the stem seal, then the stem bushing. Replace handle, manual gear box or actuator on actuator mounting flange. Note: The body halves have a matching casting node on one side only to ensure correct assembly of body halves.

DISTRIBUTOR

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Bray® CONTROLS (UK)

A Subsidiary of BRAY INTERNATIONAL, Inc.
16-18 Fountain Crescent, Inchinnan Business Park
Inchinnan PA4 9RE Scotland

Tel: +44(0)141 812 5199 Fax: +44(0)141 812 6199 www.bray.com
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