

■ valves ■ globe- / throttle- and check valves

■ 200AE/AJ/BE/BJ/AN/BN

■ 240 MT /ME ■ PN 10 - 160 ■ DN 10 - 200

tightening torques

section 1

tightening torques for cover nuts (position 170 / 190)						
nominal diameter	nominal pressure	body material	gasket dimen. o.d. / i.d.	torque	bolt quantity	bolt material
<b>DN 10 - 25</b>	PN 10 - 40	1.0460; 1.5415; 1.7335 1.4571; 1.0566	45 / 36	10 Nm	4 * M10	1.1181; 1.7709 A4-70
	PN 63 - 160		49 / 36	50 - 65 Nm	4 * M16	1.7709; 1.4923 A4-70
<b>DN 32 - 40</b>	PN 10 - 40	1.0460; 1.5415; 1.7335 1.4571; 1.0566	68 / 55	32 - 38 Nm	4 * M14	1.1181; 1.7709 A4-70
	PN 63 - 160		83 / 66	160 - 205 Nm	4 * M20	1.7709; 1.4923 A4-70
<b>DN 50</b>	PN 10 - 40	1.0460; 1.5415; 1.7335 1.4571; 1.0566	78 / 66	37 - 48 Nm	4 * M16	1.1181; 1.7709 A4-70
	PN 63 - 160		83 / 66	160 - 205 Nm	4 * M20	1.7709; 1.4923 A4-70
<b>DN 65</b>	PN 10 - 40	1.0619; 1.5419; 1.7357 1.7221; 1.4581; 1.4308	95 / 80	75 - 95 Nm	4 * M18	1.1181; 1.7709 A4-70
	PN 63 - 160		102 / 86	135 - 175 Nm	6 * M18	1.7709; 1.4923 A4-70
<b>DN 80</b>	PN 10 - 40	1.0619; 1.5419; 1.7357 1.7221; 1.4581; 1.4308	110 / 95	60 - 75 Nm	6 * M18	1.1181; 1.7709 A4-70
	PN 63 - 160		125 / 105	150 - 190 Nm	8 * M20	1.7709; 1.4923 A4-70
<b>DN 100</b>	PN 10 - 40	1.0619; 1.5419; 1.7357 1.7221; 1.4581; 1.4308	135 / 117	90 - 115 Nm	6 * M20	1.1181; 1.7709 A4-70
	PN 63 - 160		148 / 128	230 - 295 Nm	8 * M24	1.7709; 1.4923 A4-70
<b>DN 125</b>	PN 10 - 40	1.0619; 1.5419; 1.7357 1.7221; 1.4581; 1.4308	170 / 145	102 - 130 Nm	8 * M20	1.1181; 1.7709 A4-70
	PN 63 - 160		170 / 145	230 - 295 Nm	8 * M27	1.7709; 1.4923 A4-70
<b>DN 150</b>	PN 10 - 40	1.0619; 1.5419; 1.7357 1.7221; 1.4581; 1.4308	200 / 172	135 - 170 Nm	8 * M24	1.1181; 1.7709 A4-70
	PN 63 - 160		200 / 172	200 - 254 Nm	12 * M27	1.7709; 1.4923 A4-70
<b>DN 200</b>	PN 10 - 40	1.0619; 1.5419; 1.7357 1.7221; 1.4581; 1.4308	255 / 226	155 - 195 Nm	10 * M24	1.1181; 1.7709 A4-70

Attention! Above mentioned tightening torques are valid for assembling at room temperature. Tightening torques for retightening at operating conditions must be requested at PERSTA. It is recommended to use calibrated torque wrenches. Bolt- and nut threads as well as the contact surfaces of flat washers have to be lubricated. For calculation of the tightening torques the following friction factors are selected: 0,12 for threads 0,15 contact surfaces.

■ valves ■ globe- / throttle- and check valves ■ 200AE/AJ/BE/BJ/AN/BN

■ 240 MT/ME ■ PN 10 - 160 ■ DN 10 - 200

tightening torques

section 2

tightening torques of gland stud (position 462 / 464)					
nominal diameter and pressure level	torque gasket seating	torque	bolt quantity	bolt material	gasket dimen. o.d. / i.d.
DN 10 - 40 PN 10 - 40	11 Nm	6 Nm	2 * M10	1.1181 / 1.4571	24 / 16
DN 10 - 25 PN 63 - 160	15 Nm	8 Nm	2 * M10		24 / 16
DN 50 PN 10 - 40	30 Nm	8 Nm	2 * M12		32 / 20
DN 32 - 50 PN 63 - 160	33 Nm	16 Nm	2 * M12		32 / 20
DN 65 PN 10 - 40	30 Nm	8 Nm	2 * M12	1.1181 / 1.4571	32 / 20
DN 65 PN 63 - 160	65 Nm	25 Nm	2 * M16		36 / 24
DN 80 PN 10 - 40	33 Nm	8 Nm	2 * M12		36 / 24
DN 100 PN 10 - 40	33 Nm	8 Nm	2 * M16		36 / 24
DN 80 - 100 PN 63 - 160	75 Nm	30 Nm	2 * M16		39 / 26
DN 125 PN 10 - 40	51 Nm	12 Nm	2 * M16		40 / 28
DN 150 PN 10 - 40	80 Nm	15 Nm	2 * M16		48 / 32
DN 125 - 150 PN 63 - 160	140 Nm	40 Nm	2 * M20		48 / 32
DN 200 PN 10 - 40	80 Nm	15 Nm	2 * M16		48 / 32

torque: required torque at the end dismantling gasket seating.

Attention! Above mentioned tightening torques are valid for assembling at room temperature. Tightening torques for retightening at operating conditions must be requested at PERSTA. It is recommended to use calibrated torque wrenches. Bolt- and nut threads as well as the contact surfaces of flat washers have to be lubricated. For calculation of the tightening torques the following friction factors are selected: 0,12 for threads 0,15 contact surfaces.

■ valves ■ high pressure globe valves DVA 25.1 ■ 200 BZ ■ PD 25 ■ DN 80 - 250

**tightening torques**

section 1

screw for tempering pressure seal bonnet (position 171)					
nominal diameter	torque	torque at the end of pressure test	bolt quantity and size	bolt material	gasket dimen. o.d. / i.d.
DN 80	40 Nm	12 Nm	4 * M10	<b>8.8</b>	105mm / 125 mm
DN 100	60 Nm	15 Nm	4 * M12		130mm / 150 mm
DN 125	115 Nm	20 Nm	4 * M16		155mm / 180 mm
DN 150	170 Nm	20 Nm	4 * M16		190mm / 220 mm
DN 200	290 Nm	25 Nm	4 * M20		225mm / 260 mm
DN 250	450 Nm	25 Nm	4 * M20		275mm / 320 mm

tightening torques for cover nuts (position 170 / 190)				
nominal diameter	body material	torque	bolt quantity and size	bolt material
<b>DN 80</b>	1.4901; 1.4903; 1.6368	45 Nm	<b>6 * M12</b>	<b>1.7709</b>
	1.7383; 1.7335; 1.5415; 1.0460	40 Nm		
<b>DN 100</b>	1.4901; 1.4903; 1.6368	85 Nm	<b>6 * M16</b>	
	1.7383; 1.7335; 1.5415; 1.0460	80 Nm		
<b>DN 125</b>	1.4901; 1.4903; 1.6368	110 Nm	<b>8 * M16</b>	
	1.7383; 1.7335; 1.5415; 1.0460	105 Nm		
<b>DN 150</b>	1.4901; 1.4903; 1.6368	210 Nm	<b>8 * M20</b>	
	1.7383; 1.7335; 1.5415; 1.0460	200 Nm		
<b>DN 200</b>	1.4901; 1.4903; 1.6368; 1.7383; 1.7335	400 Nm	<b>8 * M24</b>	
	1.5415; 1.0460	370 Nm		
<b>DN 250</b>	1.4901; 1.4903; 1.6368	820 Nm	<b>8 * M30</b>	
	1.7383; 1.7335	770 Nm		
	1.5415	720 Nm		
	1.0460	640 Nm		

tightening torques of gland stud (position 462 / 464)					
nominal diameter	pressure range	torque	bolt quantity and size	bolt material	gasket dimen. o.d. / i.d.
<b>DN 80</b>	300 bar <p<= 320 bar	75 Nm	<b>2 * M14</b>	<b>1.4923</b>	<b>39 / 26</b>
	250 bar <p<= 300 bar	70 Nm		1.4923 / 1.7709	
	200 bar <p<= 250 bar	60 Nm		1.4923 / 1.7709	
	150 bar <p<= 200 bar	46 Nm		1.4923 / 1.7709	
	100 bar <p<= 150 bar	36 Nm		1.4923 / 1.7709	
	0 bar <p<=100 bar	26 Nm		1.4923 / 1.7709	
	<b>DN 100</b>	300 bar <p<= 320 bar		100 Nm	
250 bar <p<= 300 bar	95 Nm	1.4923 / 1.7709			
200 bar <p<= 250 bar	80 Nm	1.4923 / 1.7709			
150 bar <p<= 200 bar	65 Nm	1.4923 / 1.7709			
100 bar <p<= 150 bar	50 Nm	1.4923 / 1.7709			
0 bar <p<=100 bar	35 Nm	1.4923 / 1.7709			

Attention! Above mentioned tightening torques are valid for assembling at room temperature. Tightening torques for retightening at operating conditions must be requested at PERSTA. It is recommended to use calibrated torque wrenches. Bolt- and nut threads as well as the contact surfaces of flat washers have to be lubricated. For calculation of the tightening torques the following friction factors are selected: 0,12 for threads 0,15 contact surfaces.

Rev.: 01.12022016

■ valves ■ high pressure globe valves DVA 25.1 ■ 200 BZ ■ PD 25 ■ DN 80 - 250

**tightening torques**

section 2

tightening torques of gland stud (position 462 / 464)					
nominal diameter	pressure range	torque	bolt quantity and size	bolt material	gasket dimen. o.d. / i.d.
<b>DN 125</b>	300 bar <p<= 320 bar	145 Nm	<b>2 * M20</b>	1.4923	<b>52 / 36</b>
	250 bar <p<= 300 bar	130 Nm		1.4923 / 1.7709	
	200 bar <p<= 250 bar	115 Nm			
	150 bar <p<= 200 bar	90 Nm			
	100 bar <p<= 150 bar	70 Nm			
	0 bar <p<=100 bar	50 Nm			
<b>DN 150</b>	300 bar <p<= 320 bar	250 Nm	<b>2 * M24</b>	1.4923	<b>62 / 42</b>
	250 bar <p<= 300 bar	232 Nm		1.4923 / 1.7709	
	200 bar <p<= 250 bar	200 Nm			
	150 bar <p<= 200 bar	165 Nm			
	100 bar <p<= 150 bar	125 Nm			
	0 bar <p<=100 bar	85 Nm			
<b>DN 200</b>	300 bar <p<= 320 bar	330 Nm	<b>2 * M27</b>	1.4923	<b>75 / 55</b>
	250 bar <p<= 300 bar	310 Nm		1.4923 / 1.7709	
	200 bar <p<= 250 bar	270 Nm			
	150 bar <p<= 200 bar	230 Nm			
	100 bar <p<= 150 bar	170 Nm			
	0 bar <p<=100 bar	125 Nm			
<b>DN 250</b>	300 bar <p<= 320 bar	425 Nm	<b>2 * M27</b>	1.4923	<b>90 / 70</b>
	250 bar <p<= 300 bar	400 Nm		1.4923 / 1.7709	
	200 bar <p<= 250 bar	340 Nm			
	150 bar <p<= 200 bar	275 Nm			
	100 bar <p<= 150 bar	215 Nm			
	0 bar <p<=100 bar	145 Nm			

Attention! Above mentioned tightening torques are valid for assembling at room temperature. Tightening torques for retightening at operating conditions must be requested at PERSTA. It is recommended to use calibrated torque wrenches. Bolt- and nut threads as well as the contact surfaces of flat washers have to be lubricated. For calculation of the tightening torques the following friction factors are selected: 0,12 for threads 0,15 contact surfaces.

Rev.: 01.12022016

■ valves ■ high pressure globe valves DVA 40.1 ■ 200 BZ ■ PD 40 ■ DN 65 - 200

**tightening torques**

section 1

screw for tempering pressure seal bonnet (position 171)					
nominal diameter	torque	torque at the end of pressure test	bolt quantity and size	bolt material	gasket dimen. o.d. / i.d.
DN 65	40 Nm	12 Nm	4 * M10	<b>8.8</b>	87mm / 110 mm
DN 80	60 Nm	15 Nm	4 * M12		100mm / 125 mm
DN 100	90 Nm	15 Nm	4 * M12		119mm / 150 mm
DN 125	150 Nm	20 Nm	4 * M16		135mm / 170 mm
DN 150	165 Nm	20 Nm	4 * M16		170mm / 215 mm
DN 200	310 Nm	25 Nm	6 * M20		205mm / 260 mm

tightening torques for cover nuts (position 170 / 190)					
nominal diameter	body material	torque	bolt quantity and size	bolt material	
<b>DN 65</b>	1.4901; 1.4903; 1.6368	65 Nm	<b>6 * M12</b>	1.4923	
	1.7383; 1.7335; 1.5415; 1.0460	40 Nm		1.7709	
<b>DN 80</b>	1.4901; 1.4903; 1.6368	90 Nm	<b>6 * M16</b>	1.4923	
	1.7383; 1.7335; 1.5415; 1.0460	80 Nm		1.7709	
<b>DN 100</b>	1.4901; 1.4903; 1.6368	110 Nm	<b>8 * M16</b>	1.4923	
	1.7383; 1.7335; 1.5415; 1.0460	100 Nm		1.7709	
<b>DN 125</b>	1.4901; 1.4903; 1.6368	190 Nm	<b>8 * M20</b>	1.4923	
	1.7383; 1.7335; 1.5415; 1.0460	120 Nm		1.7709	
<b>DN 150</b>	1.4901; 1.4903; 1.6368	410 Nm	<b>8 * M24</b>	1.4923	
	1.7383; 1.7335; 1.5415	300 Nm		<b>1.7709</b>	
	1.0460	170 Nm			
<b>DN 200</b>	1.4901; 1.4903; 1.6368	750 Nm	<b>8 * M30</b>	1.4923	
	1.7383; 1.7335; 1.5415	670 Nm		<b>1.7709</b>	
	1.0460	360 Nm			

tightening torques of gland stud (position 462 / 464)					
nominal diameter	pressure range	torque	bolt quantity and size	bolt material	gasket dimen. o.d. / i.d.
<b>DN 65</b>	650 bar <p<= 680 bar	66 Nm	<b>4 * M12</b>	<b>1.4965</b>	<b>41 / 28</b>
	600 bar <p<= 650 bar	64 Nm			
	550 bar <p<= 600 bar	60 Nm			
	500 bar <p<= 550 bar	55 Nm			
	450 bar <p<= 500 bar	50 Nm			
	400 bar <p<= 450 bar	45 Nm			
	350 bar <p<= 400 bar	40 Nm			
	300 bar <p<= 350 bar	35 Nm			
	250 bar <p<= 300 bar	30 Nm			
	200 bar <p<= 250 bar	26 Nm			
	150 bar <p<= 200 bar	21 Nm			
	100 bar <p<= 150 bar	16 Nm			
	50 bar <p<= 100 bar	12 Nm			
0 bar <p<= 50 bar	12 Nm				
<b>DN 80</b>	650 bar <p<= 680 bar	106 Nm	<b>4 * M14</b>	<b>1.4965</b>	<b>48 / 32</b>
	600 bar <p<= 650 bar	103 Nm			

Attention! Above mentioned tightening torques are valid for assembling at room temperature. Tightening torques for retightening at operating conditions must be requested at PERSTA. It is recommended to use calibrated torque wrenches. Bolt- and nut threads as well as the contact surfaces of flat washers have to be lubricated. For calculation of the tightening torques the following friction factors are selected: 0,12 for threads 0,15 contact surfaces.

Rev.: 01.12022016

■ valves ■ high pressure globe valves DVA 40.1 ■ 200 BZ ■ PD 40 ■ DN 65 - 200

**tightening torques**

section 2

tightening torques of gland stud (position 462 / 464)						
nominal diameter	pressure range	torque	bolt quantity and size	bolt material	gasket dimen. o.d. / i.d.	
<b>DN 80</b>	550 bar <p<= 600 bar	95 Nm	<b>4 * M14</b>	<b>1.4965 / 1.4923</b>	<b>48 / 32</b>	
	500 bar <p<= 550 bar	90 Nm		<b>1.4923 / 1.7709</b>		
	450 bar <p<= 500 bar	80 Nm				
	400 bar <p<= 450 bar	72 Nm				
	350 bar <p<= 400 bar	65 Nm				
	300 bar <p<= 350 bar	57 Nm				
	250 bar <p<= 300 bar	50 Nm				
	200 bar <p<= 250 bar	42 Nm				
	150 bar <p<= 200 bar	33 Nm				
	100 bar <p<= 150 bar	25 Nm				
	50 bar <p<= 100 bar	18 Nm				
	0 bar <p<= 50 bar	12 Nm				
	<b>DN 100</b>	650 bar <p<= 680 bar				136 Nm
600 bar <p<= 650 bar		130 Nm	<b>1.4965 / 1.4923</b>			
550 bar <p<= 600 bar		120 Nm				
500 bar <p<= 550 bar		111 Nm				
450 bar <p<= 500 bar		102 Nm		<b>1.4923 / 1.7709</b>		
400 bar <p<= 450 bar		91 Nm				
350 bar <p<= 400 bar		82 Nm				
300 bar <p<= 350 bar		71 Nm				
250 bar <p<= 300 bar		62 Nm				
200 bar <p<= 250 bar		53 Nm				
150 bar <p<= 200 bar		42 Nm				
100 bar <p<= 150 bar		32 Nm				
50 bar <p<= 100 bar		24 Nm				
0 bar <p<= 50 bar	22 Nm					
<b>DN 125</b>	650 bar <p<= 680 bar	260 Nm	<b>4 * M20</b>		<b>1.4965</b>	<b>64 / 44</b>
	600 bar <p<= 650 bar	250 Nm		<b>1.4965 / 1.4923</b>		
	550 bar <p<= 600 bar	230 Nm				
	500 bar <p<= 550 bar	215 Nm				
	450 bar <p<= 500 bar	195 Nm			<b>1.4923 / 1.7709</b>	
	400 bar <p<= 450 bar	175 Nm				
	350 bar <p<= 400 bar	155 Nm				
	300 bar <p<= 350 bar	140 Nm				
	250 bar <p<= 300 bar	120 Nm				
	200 bar <p<= 250 bar	100 Nm				
	150 bar <p<= 200 bar	80 Nm				
	100 bar <p<= 150 bar	60 Nm				
	50 bar <p<= 100 bar	45 Nm				
0 bar <p<= 50 bar	30 Nm					
<b>DN 150</b>	650 bar <p<= 680 bar	290 Nm	<b>4 * M20</b>	<b>1.4965</b>		<b>70 / 50</b>
	600 bar <p<= 650 bar	280 Nm		<b>1.4965 / 1.4923</b>		
	550 bar <p<= 600 bar	255 Nm				
	500 bar <p<= 550 bar	235 Nm				
	450 bar <p<= 500 bar	215 Nm			<b>1.4923 / 1.7709</b>	

Attention! Above mentioned tightening torques are valid for assembling at room temperature. Tightening torques for retightening at operating conditions must be requested at PERSTA. It is recommended to use calibrated torque wrenches. Bolt- and nut threads as well as the contact surfaces of flat washers have to be lubricated. For calculation of the tightening torques the following friction factors are selected: 0,12 for threads 0,15 contact surfaces.

Rev.: 01.12022016

■ valves ■ high pressure globe valves DVA 40.1 ■ 200 BZ ■ PD 40 ■ DN 65 - 200

**tightening torques**

section 3

<b>tightening torques of gland stud (position 462 / 464)</b>					
nominal diameter	pressure range	torque	bolt quantity and size	bolt material	gasket dimen. o.d. / i.d.
<b>DN 150</b>	400 bar <p<= 450 bar	195 Nm	<b>4 * M20</b>	<b>1.4923 / 1.7709</b>	<b>70 / 50</b>
	350 bar <p<= 400 bar	175 Nm			
	300 bar <p<= 350 bar	155 Nm			
	250 bar <p<= 300 bar	130 Nm			
	200 bar <p<= 250 bar	110 Nm			
	150 bar <p<= 200 bar	90 Nm			
	100 bar <p<= 150 bar	67 Nm			
	50 bar <p<= 100 bar	48 Nm			
	0 bar <p<= 50 bar	30 Nm			
<b>DN 200</b>	650 bar <p<= 680 bar	404 Nm	<b>4 * M24</b>	<b>1.4965</b>	<b>80 / 60</b>
	600 bar <p<= 650 bar	390 Nm			
	550 bar <p<= 600 bar	355 Nm			
	500 bar <p<= 550 bar	330 Nm			
	450 bar <p<= 500 bar	300 Nm			
	400 bar <p<= 450 bar	270 Nm			
	350 bar <p<= 400 bar	245 Nm			
	300 bar <p<= 350 bar	215 Nm			
	250 bar <p<= 300 bar	185 Nm			
	200 bar <p<= 250 bar	155 Nm			
	150 bar <p<= 200 bar	125 Nm			
	100 bar <p<= 150 bar	95 Nm			
	50 bar <p<= 100 bar	70 Nm			
	0 bar <p<= 50 bar	45 Nm			
<b>DN 250</b>	650 bar <p<= 680 bar	490 Nm	<b>4 * M24</b>	<b>1.4965</b>	<b>95 / 75</b>
	600 bar <p<= 650 bar	470 Nm			
	550 bar <p<= 600 bar	430 Nm			
	500 bar <p<= 550 bar	400 Nm			
	450 bar <p<= 500 bar	360 Nm			
	400 bar <p<= 450 bar	325 Nm			
	350 bar <p<= 400 bar	290 Nm			
	300 bar <p<= 350 bar	255 Nm			
	250 bar <p<= 300 bar	220 Nm			
	200 bar <p<= 250 bar	185 Nm			
	150 bar <p<= 200 bar	150 Nm			
	100 bar <p<= 150 bar	110 Nm			
	50 bar <p<= 100 bar	80 Nm			
	0 bar <p<= 50 bar	50 Nm			

Attention! Above mentioned tightening torques are valid for assembling at room temperature. Tightening torques for retightening at operating conditions must be requested at PERSTA. It is recommended to use calibrated torque wrenches. Bolt- and nut threads as well as the contact surfaces of flat washers have to be lubricated. For calculation of the tightening torques the following friction factors are selected: 0,12 for threads 0,15 contact surfaces.

Rev.: 01.12022016

- valves ■ high pressure globe valves HD 91 ■ 200 JM ■ PN 160-320 ■ DN 10-65  
 tightening torques until year of manufacture 2009

tightening torques for cover nuts (position 172 / 192)				
nominal diameter	body material	torque	bolt quantity and size	bolt material
DN 10 / 15	1.7383; 1.7335; 1.5415; 1.0460	7 Nm	4 * M8	1.7709
DN 20 / 25		16 Nm	4 * M10	
DN 32 / 40 / 50		70 Nm	4 * M16	
DN 65		150 Nm	4 * M20	

tightening torques of gland stud (position 462 / 464) tightening in 2 steps					
nominal diameter	bolt quantity and size	first step valve opened	second step valve closed	bolt material	gasket dimen. o.d. / i.d.
DN 10 / 15	2 * M10	10 Nm	15 Nm	1.7709	24 / 16
DN 20 / 25	2 * M12	20 Nm	30 Nm		32 / 20
DN 32 / 40 / 50	2 * M20	70 Nm	105 Nm		48 / 32
DN 65	2 * M24	140 Nm	210 Nm		64 / 44

Attention! Above mentioned tightening torques are valid for assembling at room temperature. Tightening torques for retightening at operating conditions must be requested at PERSTA. It is recommended to use calibrated torque wrenches. Bolt- and nut threads as well as the contact surfaces of flat washers have to be lubricated. For calculation of the tightening torques the following friction factors are selected: 0,12 for threads 0,15 contact surfaces.

Rev.: 01.12022016

■ valves ■ high pressure globe valves HD 91.1 ■ 200 JM ■ PN 160-320 ■ DN 10-50(65)

**tightening torques**

from year of manufacture 2010

tightening torques for cover nuts (position 170 / 190)				
nominal diameter	body material	torque	bolt quantity and size	bolt material
DN 10 / 15	1.7383; 1.7335; 1.5415; 1.0460	12 Nm	4 * M10	1.7709
DN 20 / 25		22 Nm	4 * M12	
DN 32 / 40 / 50		85 Nm	4 * M16	

tightening torques of gland stud (position 462 / 464) tightening in 2 steps			
nominal diameter	bolt quantity and size	first step torque gasket seating	gasket dimen. o.d. / i.d.
DN 10 / 15	2 * M10	= torque second step	24 / 16
DN 20 / 25	2 * M12		28 / 18
DN 32 - 50	2 * M20		48 / 32

second step valve closed					
nominal diameter	pressure range	torque	bolt quantity and size	bolt material	gasket dimen. o.d. / i.d.
DN 10 / 15	200 bar <p<= 320 bar	15 Nm	2 * M10	1.7709	24 / 16
	100 bar <p<= 200 bar	10 Nm			
	0 bar <p<= 100 bar	7 Nm			
DN 20 / 25	200 bar <p<= 320 bar	23 Nm	2 * M12	1.7709	28 / 18
	100 bar <p<= 200 bar	15 Nm			
	0 bar <p<= 100 bar	12 Nm			
DN 32 - 50	200 bar <p<= 320 bar	105 Nm	2 * M20	1.7709	48 / 32
	100 bar <p<= 200 bar	65 Nm			
	0 bar <p<= 100 bar	55 Nm			

Attention! Above mentioned tightening torques are valid for assembling at room temperature. Tightening torques for retightening at operating conditions must be requested at PERSTA. It is recommended to use calibrated torque wrenches. Bolt- and nut threads as well as the contact surfaces of flat washers have to be lubricated. For calculation of the tightening torques the following friction factors are selected: 0,12 for threads 0,15 contact surfaces.

Rev.: 03.24052019

- valves ■ high pressure globe valves HD 92 ■ 200 BM ■ PN 250 - 630 ■ DN 10 - 50(65)

### tightening torques

tightening torques for cover nuts (position 172 / 192)				
nominal diameter	body material	torque	bolt quantity and size	bolt material
DN 10 / 15	1.7383; 1.7335; 1.5415; 1.4903; 1.4571	12 Nm	4 * M10	<b>1.4923 / 1.7709</b>
DN 20 / 25		30 Nm	4 * M12	
DN 32 / 40		75 Nm	4 * M16	
DN 50		170 Nm	4 * M20	

tightening torques of gland stud (position 462 / 464) tightening in 2 steps					
nominal diameter	bolt quantity and size	first step valve opened	second step valve closed	bolt material	gasket dimen. o.d. / i.d.
DN 10 / 15	2 * M12	15 Nm	25 Nm	<b>1.7709</b>	24 / 16
DN 20 / 25	2 * M16	45 Nm	70 Nm		32 / 20
DN 32 / 40	2 * M20	75 Nm	115 Nm		39 / 26
DN 50	2 * M24	155 Nm	235 Nm		52 / 36

Attention! Above mentioned tightening torques are valid for assembling at room temperature. Tightening torques for retightening at operating conditions must be requested at PERSTA. It is recommended to use calibrated torque wrenches. Bolt- and nut threads as well as the contact surfaces of flat washers have to be lubricated. For calculation of the tightening torques the following friction factors are selected: 0,12 for threads 0,15 contact surfaces.

Rev.: 01.12022016

■ valves ■ high pressure globe valves HD 2000 ■ 200 LM ■ PN 500 ■ DN 10 - 65

**tightening torques**

tightening torques for cover nuts (position 172 / 192)				
nominal diameter	pressure range	torque	bolt quantity and size	bolt material
DN 10 / 15	370 bar <p<= 550 bar	22 Nm	4 * M10	1.4923; 1.7709
	0 bar <p<= 370 bar	15 Nm		
DN 20 / 25	480 bar <p<= 550 bar	40 Nm	4 * M12	1.4923; 1.7709
	320 bar <p<= 480 bar	35 Nm		
	0 bar <p<= 320 bar	25 Nm		
DN 32 - 50	480 bar <p<= 550 bar	200 Nm	4 * M20	1.4923; 1.7709
	320 bar <p<= 480 bar	175 Nm		
	0 bar <p<= 320 bar	125 Nm		
DN 65	510 bar <p<= 550 bar	400 Nm	4 * M24	1.4923; 1.7709
	440 bar <p<= 510 bar	375 Nm		
	390 bar <p<= 440 bar	330 Nm		
	320 bar <p<= 390 bar	300 Nm		
	260 bar <p<= 320 bar	255 Nm		
	0 bar <p<= 260 bar	220 Nm		

tightening torques of gland stud (position 462 / 464) tightening in 2 steps			
nominal diameter	bolt quantity and size	first step torque gasket seating	gasket dimen. o.d. / i.d.
DN 10 / 15	2 * M10	= torque second step	24 / 16
DN 20 / 25	2 * M12		28 / 18
DN 32 - 50	2 * M20		48 / 32
DN 65	4 * M18		64 / 44

second step valve closed					
nominal diameter	pressure range	torque	bolt quantity and size	bolt material	gasket dimen. o.d. / i.d.
DN 10 / 15	500 bar <p<= 550 bar	25 Nm	2 * M10	1.4980 1.4923 / 1.7709	24 / 16
	400 bar <p<= 500 bar	21 Nm			
	300 bar <p<= 400 bar	17 Nm			
	200 bar <p<= 300 bar	13 Nm			
	100 bar <p<= 200 bar	10 Nm			
	0 bar <p<= 100 bar	6 Nm			
DN 20 / 25	500 bar <p<= 550 bar	40 Nm	2 * M12	1.4980 1.4923 / 1.7709	28 / 18
	400 bar <p<= 500 bar	36 Nm			
	300 bar <p<= 400 bar	30 Nm			
	200 bar <p<= 300 bar	22 Nm			
	100 bar <p<= 200 bar	15 Nm			
	0 bar <p<= 100 bar	10 Nm			
DN 32 - 50	500 bar <p<= 550 bar	180 Nm	2 * M20	1.4980 1.4923 / 1.7709	48 / 32
	400 bar <p<= 500 bar	162 Nm			
	300 bar <p<= 400 bar	130 Nm			
	200 bar <p<= 300 bar	100 Nm			
	100 bar <p<= 200 bar	65 Nm			
	0 bar <p<= 100 bar	40 Nm			
DN 65	500 bar <p<= 550 bar	140 Nm	4 * M18	1.4980 1.4923 / 1.7709	64 / 44
	400 bar <p<= 500 bar	125 Nm			
	300 bar <p<= 400 bar	100 Nm			
	200 bar <p<= 300 bar	75 Nm			
	100 bar <p<= 200 bar	50 Nm			
	0 bar <p<= 100 bar	30 Nm			

Achtung! Alle Anzugsmomente gelten für die Montage bei Raumtemperatur. Momente für das Nachziehen der Schrauben unter Betriebsbedingungen müssen bei PERSTA angefragt werden! Es wird die Verwendung geeichter Drehmomentschlüssel empfohlen. Gewinde, Muttern, Unterlegscheiben und alle kraftübertragenden Oberflächen sind zu schmieren. Am Gewinde wurde ein Reibwert von 0,12, an der Auflage von 0,15, und der Faktor 1,4 für das Anziehverfahren berücksichtigt.

- check valve                      ■ strainer                                      ■ high pressure check valve ■ HD 2000
- 240 MT / 990 ST ■ PN 500 ■ DN 10-65

### tightening torques

tightening torques for cover nuts (position 172 / 192)					
nominal diameter	body material	torque	gasket dimen. o.d. / i.d.	bolt quantity and size	bolt material
DN 10/15	1.7383; 1.7335; 1.5415; 1.4903 1.0460	40 Nm 35 Nm	32 / 24	6 * M12	1.4923/ 1.4980 1.7711
DN 20/25	1.7383; 1.7335; 1.5415; 1.4903; 1.0460	95 Nm	39 / 29	5 * M16	1.4923/ 1.4980 / 1.7711
DN 32/40/50	1.7383; 1.7335; 1.5415; 1.4903; 1.0460	275 Nm	56 / 45	5 * M24	1.4923/ 1.4980 / 1.7711
DN 65	1.7383; 1.7335; 1.5415; 1.4903; 1.0460	625 Nm	83 / 65	6 * M30	1.4923/ 1.4980 / 1.7711

Attention! Above mentioned tightening torques are valid for assembling at room temperature. Tightening torques for retightening at operating conditions must be requested at PERSTA. It is recommended to use calibrated torque wrenches. Bolt- and nut threads as well as the contact surfaces of flat washers have to be lubricated. For calculation of the tightening torques the following friction factors are selected: 0,12 for threads 0,15 contact surfaces.

■ gate valve ■ gate valve ■ 700 JJ/ HJ ■ PN 10 - 100 ■ DN 50 - 150

**tightening torques** gate valve 2000 until year of manufacture 2022

tightening torques for cover nuts (position 170 / 190)					
nominal diameter	nominal pressure	body material	torque	bolt quantity and size	bolt material
<b>DN 50</b>	PN 10-40	1.7383; 1.7335; 1.5415; 1.0460; 1.0566; 1.0619	20 Nm	8 * M12	<b>1.7709 / A4-70</b>
	PN 63-100	1.7383; 1.7335; 1.5415; 1.0460; 1.0566	23 Nm	8 * M12	
<b>DN 80</b>	PN 10-40	1.7383; 1.7335; 1.5415; 1.0460; 1.0566; 1.0619	55 Nm	6 * M16	<b>1.7709 / A4-70</b>
	PN 63-100	1.7383; 1.7335; 1.5415; 1.0460; 1.0566	50 Nm	12 * M16	
<b>DN 100</b>	PN 10-40	1.7383; 1.7335; 1.5415; 1.0460; 1.0566; 1.0619	78 Nm	6 * M16	<b>1.7709 / A4-70</b>
	PN 63-100	1.7383; 1.7335; 1.5415; 1.0460; 1.0566	90 Nm	12 * M16	
<b>DN 150</b>	PN 10-40	1.7383; 1.7335; 1.5415; 1.0460; 1.0566; 1.0619	100 Nm	8 * M16	<b>1.7709 / A4-70</b>
	PN 63-100	1.7383; 1.7335; 1.5415; 1.0460; 1.0566	255 Nm	10 * M24	

tightening torques of gland stud (position 462 / 464)					
nominal diameter and pressure level	pressure range	torque	bolt quantity and size	bolt material	gasket dimen. o.d. / i.d.
DN50 PN10-40 DN50 PN63-100	10 bar <p<= 40 bar	12 Nm	<b>2 * M10</b>	<b>1.1181 / A4-50</b>	<b>24 / 16</b>
	41 bar <p<= 120 bar	15 Nm			
DN80 PN10-40 DN80 PN63-100	10 bar <p<= 40 bar	12 Nm	<b>2 * M12</b>	<b>1.1181 / A4-50</b>	<b>32 / 20</b>
	41 bar <p<= 120 bar	18 Nm			
	10 bar <p<= 40 bar	12 Nm			
DN100 PN10-40 DN100 PN63-100	10 bar <p<= 40 bar	12 Nm	<b>2 * M12</b>	<b>1.1181 / A4-50</b>	<b>32 / 20</b>
	41 bar <p<= 120 bar	20 Nm			
	10 bar <p<= 40 bar	16 Nm			
DN150 PN10-40 DN150 PN63-100	10 bar <p<= 40 bar	15 Nm	<b>2 * M16</b>	<b>1.1181 / A4-50</b>	<b>36 / 24</b>
	81 bar <p<= 120 bar	34 Nm			
	41 bar <p<= 80 bar	25 Nm			
	10 bar <p<= 40 bar	18 Nm			

Attention! Above mentioned tightening torques are valid for assembling at room temperature. Tightening torques for retightening at operating conditions must be requested at PERSTA. It is recommended to use calibrated torque wrenches. Bolt- and nut threads as well as the contact surfaces of flat washers have to be lubricated. For calculation of the tightening torques the following friction factors are selected: 0,12 for threads 0,15 contact surfaces.

Rev.: 01.07012018

■ gate valve ■ gate valve

■ 700 JJ/ HJ ■ PN 10 - 100 ■ DN 50 - 150

tightening torques

gate valve 2000

from year of manufacture 2023

tightening torques for cover nuts (position 170 / 190)					
nominal diameter	nominal pressure	body material	torque	bolt quantity and size	bolt material
<b>DN 50</b>	PN 10-40	1.7383; 1.7335; 1.5415; 1.0460; 1.0571; 1.0619	20 Nm	8 * M12	1.7709 / 1.7225 / 1.4923 / A4-70
	PN 63-100	1.7383; 1.7335; 1.5415; 1.0460; 1.0571	43 Nm	10 * M12	1.7709 / 1.7225 / 1.4923 / A4-70
<b>DN 80</b>	PN 10-40	1.7383; 1.7335; 1.5415; 1.0460; 1.0571; 1.0619	55 Nm	6 * M16	1.7709 / 1.7225 / 1.4923 / A4-70
	PN 63-100	1.7383; 1.7335; 1.5415; 1.0460; 1.0571	86 Nm	12 * M16	1.7709 / 1.7225 / 1.4923 / A4-70
<b>DN 100</b>	PN 10-40	1.7383; 1.7335; 1.5415; 1.0460; 1.0571; 1.0619	94 Nm	6 * M16	1.7709 / 1.7225 / 1.4923 / A4-70
	PN 63-100	1.7383; 1.7335; 1.5415; 1.0460; 1.0571	100 Nm	14 * M16	1.7709 / 1.7225 / 1.4923 / A4-70
<b>DN 150</b>	PN 10-40	1.7383; 1.7335; 1.5415; 1.0460; 1.0571; 1.0619	100 Nm	10 * M16	1.7709 / 1.7225 / 1.4923 / A4-70
	PN 63-100	1.7383; 1.7335; 1.5415; 1.0460; 1.0571	335 Nm	12 * M24	1.7709 / 1.7225 / 1.4923 / A4-70

tightening torques of gland stud (position 462 / 464)					
nominal diameter and pressure level	pressure range	torque	bolt quantity and size	bolt material	gasket dimen. o.d. / i.d.
DN50 PN10-40 DN50 PN63-100	10 bar <p<= 40 bar	5 Nm	2 * M10	1.1181 / A4-50	24 / 16
	41 bar <p<= 120 bar	8 Nm			
DN80 PN10-40 DN80 PN63-100	10 bar <p<= 40 bar	5 Nm	2 * M12	1.1181 / A4-50	32 / 20
	41 bar <p<= 120 bar	7 Nm			
	10 bar <p<= 40 bar	13 Nm			
DN100 PN10-40 DN100 PN63-100	10 bar <p<= 40 bar	7 Nm	2 * M12	1.1181 / A4-50	32 / 20
	41 bar <p<= 120 bar	7 Nm			
	10 bar <p<= 40 bar	16 Nm			
DN150 PN10-40 DN150 PN63-100	10 bar <p<= 40 bar	11 Nm	2 * M16	1.1181 / A4-50	36 / 24
	81 bar <p<= 120 bar	34 Nm			
	41 bar <p<= 80 bar	25 Nm			
	10 bar <p<= 40 bar	18 Nm			

Attention! Above mentioned tightening torques are valid for assembling at room temperature. Tightening torques for retightening at operating conditions must be requested at PERSTA. It is recommended to use calibrated torque wrenches. Bolt- and nut threads as well as the contact surfaces of flat washers have to be lubricated. For calculation of the tightening torques the following friction factors are selected: 0,12 for threads 0,15 contact surfaces.

Rev.: 02.24032023

■ gate valve ■ gate valve - casting

■ 700 JJ/ HJ ■ PN 40 ■ DN 50 - 300

**tightening torques**

**section 2**

tightening torques for cover nuts (position 170 / 190)							
nominal diameter	nominal pressure level	body material	gasket dimen. o.d. / i.d.		torque	bolt quantity and size	bolt material
DN 50	40	1.4581	105	93	35 Nm	12 * M12	A4-70
DN 80			145	129	38 Nm	12 * M14	
DN 100			172	154	50 Nm	12 * M24	
DN 150			230	210	56 Nm	16 * M16	
DN 200			290	266	105 Nm	16 * M20	
DN 250			350	322	100 Nm	24 * M20	
DN 300	25		414	378	74 Nm	24 * M16	

tightening torques of gland stud (position 462 / 464)						
nominal diameter and pressure level	pressure range	torque	bolt quantity and size	bolt material	gasket dimen. o.d. / i.d.	
DN 50 / PN 40	1 bar <p<= 40 bar	10 Nm	2 * M10	1.4571	24 / 16	
DN 80 / PN 40		10 Nm	2 * M10		32 / 20	
DN 100 / PN 40		10 Nm	2 * M10		32 / 20	
DN 150 / PN 40		12 Nm	2 * M12		36 / 24	
DN 200 / PN 40		15 Nm	2 * M16		48 / 32	
DN 250 / PN 40		15 Nm	2 * M16		51 / 36	
DN 300 / PN 25	1 bar <p<= 25 bar	15 Nm	2 * M16		51 / 36	

Attention! Above mentioned tightening torques are valid for assembling at room temperature. Tightening torques for retightening at operating conditions must be requested at PERSTA. It is recommended to use calibrated torque wrenches. Bolt- and nut threads as well as the contact surfaces of flat washers have to be lubricated. For calculation of the tightening torques the following friction factors are selected: 0,12 for threads 0,15 contact surfaces.

■ gate valve ■ gate valve ■ 400 JJ ■ PN 63 - 100 ■ DN 350 - 500

**tightening torques**

tightening torques for cover nuts (position 170 / 190)					
nominal diameter	nominal pressure	body material	torque	bolt quantity and size	bolt material
<b>DN 350</b>	PN 63	1.0460; 1.5415	525 Nm	20 * M27	<b>1.7709</b>
	PN 63	1.7383; 1.7335	580 Nm	20 * M27	<b>1.4923</b>
	PN 100	1.0460; 1.5415	635 Nm	26 * M27	<b>1.7709</b>
	PN 100	1.7383; 1.7335	710 Nm	26 * M27	<b>1.4923</b>
<b>DN 400</b>	PN 63	1.0460; 1.5415	925 Nm	18 * M33	<b>1.7709</b>
	PN 63	1.7383; 1.7335	1030 Nm	18 * M33	<b>1.4923</b>
	PN 100	1.0460; 1.5415	1200 Nm	22 * M33	<b>1.7709</b>
	PN 100	1.7383; 1.7335	1330 Nm	22 * M33	<b>1.4923</b>
<b>DN 450</b>	PN 63	1.0460; 1.5415	1240 Nm	18 * M36	<b>1.7709</b>
	PN 63	1.7383; 1.7335	1380 Nm	18 * M36	<b>1.4923</b>
	PN 100	1.0460; 1.5415	1250 Nm	26 * M33	<b>1.7709</b>
	PN 100	1.7383; 1.7335	1380 Nm	26 * M33	<b>1.4923</b>
<b>DN 450</b>	PN 63	1.0460; 1.5415	1900 Nm	16 * M39	<b>1.7709</b>
	PN 63	1.7383; 1.7335	2100 Nm	16 * M39	<b>1.4923</b>
	PN 100	1.0460; 1.5415	2000 Nm	24 * M39	<b>1.7709</b>
	PN 100	1.7383; 1.7335	2220 Nm	24 * M39	<b>1.4923</b>

tightening torques of gland stud (position 462 / 464)					
nominal diameter and pressure level	pressure range	torque	bolt quantity and size	bolt material	gasket dimen. o.d. / i.d.
<b>DN 350</b>	PN 63	45 Nm	<b>2 * M20</b>	<b>1.7709</b>	<b>70 / 51</b>
	PN 100	75 Nm			<b>70 / 51</b>
<b>DN 400</b>	PN 63	50 Nm	<b>2 * M20</b>	<b>1.7709</b>	<b>72 / 53</b>
	PN 100	85 Nm			<b>80 / 61</b>
<b>DN 450</b>	PN 63	55 Nm	<b>2 * M20</b>	<b>1.7709</b>	<b>80 / 61</b>
	PN 100	90 Nm			<b>85 / 66</b>
<b>DN 500</b>	PN 63	72 Nm	<b>2 * M24</b>	<b>1.7709</b>	<b>90 / 71</b>
	PN 100	115 Nm			<b>90 / 71</b>

Attention! Above mentioned tightening torques are valid for assembling at room temperature. Tightening torques for retightening at operating conditions must be requested at PERSTA. It is recommended to use calibrated torque wrenches. Bolt- and nut threads as well as the contact surfaces of flat washers have to be lubricated. For calculation of the tightening torques the following friction factors are selected: 0,12 for threads 0,15 contact surfaces.

Rev.: 04.002025

■ gate valve ■ gate valve Valtra ■ 700 JJ ■ PN 10 - 40 ■ DN 300 - 900

**tightening torques**                      **standard design**

<b>tightening torques for cover nuts (position 170 / 190)</b>					
nominal diameter	nominal pressure	body material	torque	bolt quantity and size	bolt material
<b>DN 300</b>	10	<b>1.0425</b>	105Nm	16 * M24	<b>1.1181</b>
	16		145 Nm	16 * M24	
	25		230 Nm	16 * M27	
	40		310 Nm	20 * M30	
<b>DN 350</b>	10	<b>1.0425</b>	110 Nm	16 * M24	<b>1.1181</b>
	16		155 Nm	16 * M24	
	25		240 Nm	16 * M27	
	40		280 Nm	24 * M30	
<b>DN 400</b>	10	<b>1.0425</b>	105 Nm	24 * M24	<b>1.1181</b>
	16		145 Nm	24 * M24	
	25		240 Nm	24 * M27	
	40		530 Nm	24 * M33	
<b>DN 450</b>	10	<b>1.0425</b>	105 Nm	24 * M24	<b>1.1181</b>
	16		145 Nm	24 * M24	
	25		240 Nm	24 * M27	
	40		530 Nm	24 * M33	
<b>DN 500</b>	10	<b>1.0425</b>	135 Nm	24 * M24	<b>1.1181</b>
	16		200 Nm	24 * M24	
	25		320 Nm	24 * M27	
	40		600 Nm	24 * M33	
<b>DN 600</b>	10	<b>1.0425</b>	170 Nm	24 * M24	<b>1.1181</b>
	16		253 Nm	24 * M24	
	25		410 Nm	24 * M27	
	40				
<b>DN 700</b>	10	<b>1.0425</b>	250 Nm	24 * M27	<b>1.1181</b>
	16		360 Nm	24 * M27	
	25		600 Nm	24 * M30	
	40			32 * M36	
<b>DN 800</b>	10	<b>1.0425</b>	270 Nm	28 * M27	<b>1.7709</b>
	16		410 Nm	28 * M27	
	25				
	40				
<b>DN 900</b>	10	<b>1.0425</b>			<b>1.7709</b>
	16		380 Nm	28 * M27	

Attention! Above mentioned tightening torques are valid for assembling at room temperature. Tightening torques for retightening at operating conditions must be requested at PERSTA. It is recommended to use calibrated torque wrenches. Bolt- and nut threads as well as the contact surfaces of flat washers have to be lubricated. For calculation of the tightening torques the following friction factors are selected: 0,12 for threads 0,15 contact surfaces.

Rev.: 01.12022016

■ gate valve ■ gate valve Valtra ■ 700 JJ ■ PN 10 - 40 ■ DN 300 - 900

**tightening torques TRD design**

tightening torques for cover nuts (position 170 / 190)					
nominal diameter	nominal pressure	body material	torque	bolt quantity and size	bolt material
<b>DN 300</b>	10	<b>1.0425</b>	100 Nm	16 * M24	<b>1.7709</b>
	16		140 Nm	16 * M24	
	25		225 Nm	16 * M27	
	40		310 Nm	20 * M30	
<b>DN 350</b>	10	<b>1.0425</b>	100 Nm	16 * M24	<b>1.7709</b>
	16		145 Nm	16 * M24	
	25		180 Nm	20 * M27	
	40		310 Nm	20 * M30	
<b>DN 400</b>	10	<b>1.0425</b>	100 Nm	24 * M24	<b>1.7709</b>
	16		145 Nm	24 * M24	
	25		230 Nm	24 * M27	
	40		530 Nm	24 * M33	
<b>DN 450</b>	10	<b>1.0425</b>	100 Nm	24 * M24	<b>1.7709</b>
	16		145 Nm	24 * M24	
	25		230 Nm	24 * M27	
	40		530 Nm	24 * M33	
<b>DN 500</b>	10	<b>1.0425</b>	145 Nm	24 * M27	<b>1.7709</b>
	16		210 Nm	24 * M27	
	25		350 Nm	24 * M30	
	40		810 Nm	24 * M33	
<b>DN 600</b>	10	<b>1.0425</b>	200 Nm	24 * M30	<b>1.7709</b>
	16		290 Nm	24 * M30	
	25		475 Nm	24 * M33	
	40		890 Nm	28 * M33	
<b>DN 700</b>	10	<b>1.0425</b>	242 Nm	24 * M27	<b>1.7709</b>
	16		365 Nm	24 * M27	
	25				
	40				
<b>DN 800</b>	10	<b>1.0425</b>	270 Nm	28 * M27	<b>1.7709</b>
	16		410 Nm	28 * M27	
	25		890 Nm	32 * M39	
	40		1370 Nm	32 * M39	
<b>DN 900</b>	10				
	16				

Attention! Above mentioned tightening torques are valid for assembling at room temperature. Tightening torques for retightening at operating conditions must be requested at PERSTA. It is recommended to use calibrated torque wrenches. Bolt- and nut threads as well as the contact surfaces of flat washers have to be lubricated. For calculation of the tightening torques the following friction factors are selected: 0,12 for threads 0,15 contact surfaces.

Rev.: 01.12022016

■ gate valve ■ gate valve ■ 700 JJ ■ PN 160 / PD 18 ■ DN 50 - 250(300)

**tightening torques**

**section 1**

tightening torques for cover nuts (position 170 / 190)						
nominal diameter	nominal pressure level	body material	gasket dimen. o.d. / i.d.	torque	bolt quantity and size	bolt material
<b>DN 50 (65)</b>	PN 160 PD 18	<b>1.5415; 1.7335; 1.7383</b>	<b>135 / 121</b>	70 Nm 105 Nm	<b>14 * M16</b>	<b>1.7709</b>
<b>DN 80</b>	PN 160 PD 18	<b>1.5415; 1.7335; 1.7383</b>	<b>170 / 154</b>	135 Nm 210 Nm	<b>14 * M20</b>	<b>1.7709</b>
<b>DN 100</b>	PN 160 PD 18	<b>1.5415; 1.7335; 1.7383</b>	<b>190 / 172</b>	245 Nm 365 Nm	<b>12 * M24</b>	<b>1.7709</b>
<b>DN 150</b>	PN 160 PD 18	<b>1.5415; 1.7335; 1.7383</b>	<b>255 / 231</b>	470 Nm 710 Nm	<b>14 * M30</b>	<b>1.7709</b>
<b>DN 200</b>	PN 160 PD 18	<b>1.5415; 1.7335; 1.7383</b>	<b>327 / 297</b>	805 Nm 1210 Nm	<b>16 * M36</b>	<b>1.7709</b>
<b>DN 250</b>	PN 160 PD 18	<b>1.5415; 1.7335; 1.7383</b>	<b>414 / 378</b>	1300 Nm 1960 Nm	<b>18 * M42</b>	<b>1.7709</b>

tightening torques of gland stud (position 462 / 464)						
nominal diameter and	pressure range	torque	bolt quantity and size	bolt material	gasket dimen. o.d. / i.d.	
<b>DN 50 (65)</b>	195 bar <p<= 258 bar	35 Nm	<b>2 * M12</b>	<b>1.7709 / 1.4923</b>	<b>36 / 24</b>	
	140 bar <p<= 195 bar	30 Nm				
	110 bar <p<= 140 bar	25 Nm				
	80 bar <p<= 110 bar	20 Nm				
	50 bar <p<= 80 bar	15 Nm				
	1 bar <p<= 50 bar	10 Nm				
<b>DN 80</b>	195 bar <p<= 258 bar	80 Nm	<b>2 * M16</b>	<b>1.7709 / 1.4923</b>	<b>48 / 32</b>	
	140 bar <p<= 195 bar	70 Nm				
	110 bar <p<= 140 bar	60 Nm				
	80 bar <p<= 110 bar	50 Nm				
	50 bar <p<= 80 bar	40 Nm				
	1 bar <p<= 50 bar	25 Nm				
<b>DN 100</b>	195 bar <p<= 258 bar	85 Nm	<b>2 * M16</b>	<b>1.7709 / 1.4923</b>	<b>48 / 32</b>	
	140 bar <p<= 195 bar	70 Nm				
	110 bar <p<= 140 bar	60 Nm				
	80 bar <p<= 110 bar	50 Nm				
	50 bar <p<= 80 bar	40 Nm				
	1 bar <p<= 50 bar	25 Nm				
<b>DN 150</b>	195 bar <p<= 258 bar	182 Nm	<b>2 * M20</b>	<b>1.7709 / 1.4923</b>	<b>68 / 48</b>	
	140 bar <p<= 195 bar	155 Nm				
	110 bar <p<= 140 bar	130 Nm				
	80 bar <p<= 110 bar	105 Nm				
	50 bar <p<= 80 bar	80 Nm				
	1 bar <p<= 50 bar	55 Nm				

Attention! Above mentioned tightening torques are valid for assembling at room temperature. Tightening torques for retightening at operating conditions must be requested at PERSTA. It is recommended to use calibrated torque wrenches. Bolt- and nut threads as well as the contact surfaces of flat washers have to be lubricated. For calculation of the tightening torques the following friction factors are selected: 0,12 for threads 0,15 contact surfaces.

Rev.: 01.12022016

■ gate valve ■ gate valve

■ 700 JJ ■ PN 160 / PD 18 ■ DN 50 - 250(300)

**tightening torques**

**section 2**

tightening torques of gland stud (position 462 / 464)					
nominal diameter and pressure level	pressure range	torque	bolt quantity and size	bolt material	gasket dimen. o.d. / i.d.
<b>DN 200 / 250</b>	220 bar <p<= 258 bar	265 Nm	<b>2 * M24</b>	<b>1.7709 / 1.4923</b>	<b>80 / 60</b>
	195 bar <p<= 220 bar	240 Nm			
	160 bar <p<= 195 bar	225 Nm			
	140 bar <p<= 160 bar	205 Nm			
	110 bar <p<= 140 bar	185 Nm			
	90 bar <p<= 110 bar	150 Nm			
	80 bar <p<= 90 bar	125 Nm			
	50 bar <p<= 80 bar	115 Nm			
	1 bar <p<= 50 bar	80 Nm			

Attention! Above mentioned tightening torques are valid for assembling at room temperature. Tightening torques for retightening at operating conditions must be requested at PERSTA. It is recommended to use calibrated torque wrenches. Bolt- and nut threads as well as the contact surfaces of flat washers have to be lubricated. For calculation of the tightening torques the following friction factors are selected: 0,12 for threads 0,15 contact surfaces.

Rev.: 01.12022016

■ gate valve ■ high pressure gate valve DSK 10 ■ 700 JT ■ PD 10 ■ DN 80 - 300

### tightening torques

section 1

screws for tempering pressure seal bonnet (position 171 / 194)					
nominal diameter	torque	torque at the end of pressure test	bolt quantity and size	bolt material	gasket dimen. o.d. / i.d.
DN 80	23 Nm	12 Nm	4 * M10	1.7709	130 mm / 120 mm
DN 100	45 Nm	15 Nm	4 * M12		150 mm / 135 mm
DN 150	120 Nm	20 Nm	4 * M16		220 mm / 200 mm
DN 200	135 Nm	20 Nm	4 * M16		260 mm / 240 mm
DN 250	270 Nm	25 Nm	4 * M20		370 mm / 340 mm
DN 300	255 Nm	25 Nm	6 * M20		400 mm / 370 mm

tightening torques for cover nuts (position 170 / 190)				
nominal diameter	body material	torque	bolt quantity and size	bolt material
DN 80	1.7383; 1.7335; 1.5415; 1.0460	15 Nm	6 * M10	1.7709
DN 100		20 Nm	6 * M12	
DN 150		30 Nm	8 * M12	
DN 200		50 Nm	8 * M16	
DN 250		110 Nm	8 * M20	
DN 300		120 Nm	12 * M20	

tightening torques of gland stud (position 462 / 464)					
nominal diameter	pressure range	torque	bolt quantity and size	bolt material	gasket dimen. o.d. / i.d.
<b>DN 80</b>	100 bar <p<= 120 bar	18 Nm	<b>2 * M12</b>	<b>1.7709</b>	<b>32 / 20</b>
	80 bar <p<= 100 bar	16 Nm			
	60 bar <p<= 80 bar	14 Nm			
	40 bar <p<= 60 bar	12 Nm			
<b>DN 100</b>	100 bar <p<= 120 bar	20 Nm	<b>2 * M12</b>	<b>1.7709</b>	<b>39 / 26</b>
	80 bar <p<= 100 bar	18 Nm			
	60 bar <p<= 80 bar	17 Nm			
	40 bar <p<= 50 bar	16 Nm			
<b>DN 150</b>	100 bar <p<= 120 bar	34 Nm	<b>2 * M16</b>	<b>1.7709</b>	<b>48 / 32</b>
	80 bar <p<= 100 bar	30 Nm			
	60 bar <p<= 80 bar	25 Nm			
	40 bar <p<= 60 bar	18 Nm			
<b>DN 200</b>	100 bar <p<= 120 bar	45 Nm	<b>2 * M16</b>	<b>1.7709</b>	<b>51 / 36</b>
	80 bar <p<= 100 bar	40 Nm			
	60 bar <p<= 80 bar	35 Nm			
	40 bar <p<= 60 bar	30 Nm			
	20 bar <p<= 40 bar	25 Nm			
<b>DN 250</b>	100 bar <p<= 120 bar	70 Nm	<b>2 * M16</b>	<b>1.7709</b>	<b>61 / 40</b>
	80 bar <p<= 100 bar	60 Nm			
	60 bar <p<= 80 bar	50 Nm			
	40 bar <p<= 60 bar	40 Nm			
	20 bar <p<= 40 bar	30 Nm			

Attention! Above mentioned tightening torques are valid for assembling at room temperature. Tightening torques for retightening at operating conditions must be requested at PERSTA. It is recommended to use calibrated torque wrenches. Bolt- and nut threads as well as the contact surfaces of flat washers have to be lubricated. For calculation of the tightening torques the following friction factors are selected: 0,12 for threads 0,15 contact surfaces.

■ gate valve ■ high pressure gate valve DSK 10 ■ 700 JT ■ PD 10 ■ DN 80 - 300

tightening torques

section 2

tightening torques of gland stud (position 462 / 464)					
nominal diameter	pressure range	torque	bolt quantity and size	bolt material	gasket dimen. o.d. / i.d.
<b>DN 300</b>	100 bar <p<= 120 bar	80 Nm	<b>2 * M16</b>	<b>1.7709</b>	<b>68 / 48</b>
	80 bar <p<= 100 bar	60 Nm			
	60 bar <p<= 80 bar	50 Nm			
	40 bar <p<= 60 bar	40 Nm			
	20 bar <p<= 40 bar	30 Nm			

Attention! Above mentioned tightening torques are valid for assembling at room temperature. Tightening torques for retightening at operating conditions must be requested at PERSTA. It is recommended to use calibrated torque wrenches. Bolt- and nut threads as well as the contact surfaces of flat washers have to be lubricated. For calculation of the tightening torques the following friction factors are selected: 0,12 for threads 0,15 contact surfaces.

Rev.: 01.12022016

■ gate valve ■ high pressure gate valve DSK 10 ■ 700 JT ■ PD 10 ■ DN 350 - 700

### tightening torques

section 3

screws for tempering pressure seal bonnet (position 171 / 194)					
nominal diameter	torque	torque at the end of pressure test	bolt quantity and size	bolt material	gasket dimen. o.d. / i.d.
DN 350	270 Nm	25 Nm	6 * M20	<b>1.7709</b>	420 mm / 390 mm
DN 400	250 Nm	25 Nm	6 * M20		470 mm / 445 mm
DN 450	260 Nm	25 Nm	8 * M20		525 mm / 495 mm
DN 500	285 Nm	25 Nm	8 * M20		590 mm / 560 mm
DN 600	490 Nm	30 Nm	8 * M24		705 mm / 665 mm
DN 700	660 Nm	35 Nm	8 * M27		775 mm / 735 mm

tightening torques for cover nuts (position 170 / 190)				
nominal diameter	body material	torque	bolt quantity and size	bolt material
<b>DN 350</b>	1.7383; 1.7335; 1.5415; 1.0460	140 Nm	<b>8 * M20</b>	<b>1.7709</b>
	1.6368; 1.4903	160 Nm		
<b>DN 400</b>	1.7383; 1.7335; 1.5415; 1.0460	180 Nm	<b>8 * M20</b>	<b>1.7709</b>
	1.6368; 1.4903	210 Nm		
<b>DN 450</b>	1.7383; 1.7335; 1.5415; 1.0460	150 Nm	<b>12 * M20</b>	<b>1.7709</b>
	1.6368; 1.4903	170 Nm		
<b>DN 500</b>	1.7383; 1.7335; 1.5415; 1.0460	180 Nm	<b>12 * M20</b>	<b>1.7709</b>
	1.6368; 1.4903	200 Nm		
<b>DN 600</b>	1.7383; 1.7335; 1.5415; 1.0460	310 Nm	<b>12 * M24</b>	<b>1.7709</b>
	1.6368; 1.4903	340 Nm		
<b>DN 700</b>	1.7383; 1.7335; 1.5415; 1.0461	380 Nm	<b>12 * M30</b>	<b>1.7709</b>
	1.6368; 1.4903	400 Nm		

tightening torques of gland stud (position 462 / 464)					
nominal diameter	pressure range	torque	bolt quantity and size	bolt material	gasket dimen. o.d. / i.d.
<b>DN 350</b>	120 bar <p<= 170 bar	155 Nm	<b>2 * M20</b>	<b>1.4923</b>	<b>70 / 51</b>
	100 bar <p<= 120 bar	100 Nm		1.4923 / 1.7709	
	80 bar <p<= 100 bar	90 Nm		1.4923 / 1.7709	
	60 bar <p<= 80 bar	75 Nm		1.4923 / 1.7709	
	40 bar <p<= 60 bar	65 Nm		1.4923 / 1.7709	
<b>DN 400</b>	120 bar <p<= 170 bar	180 Nm	<b>2 * M20</b>	<b>1.4923</b>	<b>80 / 61</b>
	100 bar <p<= 120 bar	120 Nm		1.4923 / 1.7709	
	80 bar <p<= 100 bar	105 Nm		1.4923 / 1.7709	
	60 bar <p<= 80 bar	85 Nm		1.4923 / 1.7709	
	40 bar <p<= 60 bar	65 Nm		1.4923 / 1.7709	
<b>DN 450</b>	120 bar <p<= 170 bar	200 Nm	<b>2 * M20</b>	<b>1.4923</b>	<b>85 / 66</b>
	100 bar <p<= 120 bar	130 Nm		1.4923 / 1.7709	
	80 bar <p<= 100 bar	115 Nm		1.4923 / 1.7709	
	60 bar <p<= 80 bar	95 Nm		1.4923 / 1.7709	
	40 bar <p<= 60 bar	70 Nm		1.4923 / 1.7709	

Attention! Above mentioned tightening torques are valid for assembling at room temperature. Tightening torques for retightening at operating conditions must be requested at PERSTA. It is recommended to use calibrated torque wrenches. Bolt- and nut threads as well as the contact surfaces of flat washers have to be lubricated. For calculation of the tightening torques the following friction factors are selected: 0,12 for threads 0,15 contact surfaces.

Rev.: 01.12022016

■ gate valve ■ high pressure gate valve DSK 10 ■ 700 JT ■ PD 10 ■ DN 350 - 700

**tightening torques**

**section 4**

<b>tightening torques of gland stud (position 462 / 464)</b>					
nominal diameter	pressure range	torque	bolt quantity and size	bolt material	gasket dimen. o.d. / i.d.
<b>DN 500</b>	120 bar <p<= 170 bar	210 Nm	<b>2 * M20</b>	1.4923	<b>90 / 71</b>
	100 bar <p<= 120 bar	140 Nm		1.4923 / 1.7709	
	80 bar <p<= 100 bar	120 Nm		1.4923 / 1.7709	
	60 bar <p<= 80 bar	100 Nm		1.4923 / 1.7709	
	40 bar <p<= 60 bar	75 Nm		1.4923 / 1.7709	
<b>DN 600/700</b>	120 bar <p<= 170 bar	370 Nm	<b>2 * M24</b>	1.4923	<b>110 / 87</b>
	100 bar <p<= 120 bar	235 Nm		1.4923 / 1.7709	
	80 bar <p<= 100 bar	210 Nm		1.4923 / 1.7709	
	60 bar <p<= 80 bar	175 Nm		1.4923 / 1.7709	
	40 bar <p<= 60 bar	125 Nm		1.4923 / 1.7709	

Attention! Above mentioned tightening torques are valid for assembling at room temperature. Tightening torques for retightening at operating conditions must be requested at PERSTA. It is recommended to use calibrated torque wrenches. Bolt- and nut threads as well as the contact surfaces of flat washers have to be lubricated. For calculation of the tightening torques the following friction factors are selected: 0,12 for threads 0,15 contact surfaces.

Rev.: 01.12022016

■ gate valve ■ high pressure gate valve DSK 16 ■ 700JT ■ PD16 ■ DN 350 + 450

**tightening torques**

screw for tempering pressure seal bonnet (position 171)					
nominal diameter	torque	torque at the end of pressure test	bolt quantity and size	bolt material	gasket dimen. o.d. / i.d.
DN 350	320 Nm	25 Nm	6 * M20	1.7709	420 mm / 390 mm
DN 450	300 Nm	25 Nm	8 * M20	1.7709	520 mm / 490 mm

tightening torques for cover nuts (position 170 / 190)				
nominal diameter	body material	torque	bolt quantity and size	bolt material
DN 350	1.7383; 1.7335; 1.5415; 1.0460	705 Nm	6 * M27	1.7709
	1.6368; 1.4903	705 Nm		
DN 450	1.7383; 1.7335; 1.5415; 1.0460	890 Nm	8 * M33	1.7709
	1.6368; 1.4903	960 Nm		

tightening torques of gland stud (position 462 / 464)					
nominal diameter	pressure range	torque	bolt quantity and size	bolt material	gasket dimen. o.d. / i.d.
DN 350	250 bar <p<= 272 bar	560 Nm	2 * M27	1.4923	105 / 82
	220 bar <p<= 250 bar	510 Nm		1.4923	
	192 bar <p<= 220 bar	430 Nm		1.4923	
	170 bar <p<= 192 bar	410 Nm		1.4923 / 1.7709	
	150 bar <p<= 170 bar	360 Nm			
	130 bar <p<= 150 bar	325 Nm			
	110 bar <p<= 130 bar	265 Nm			
	90 bar <p<= 110 bar	235 Nm			
	70 bar <p<= 90 bar	185 Nm			
	p<= 70 bar	155 Nm			
DN 450	250 bar <p<= 272 bar	645 Nm	2 * M30	1.4923	115 / 92
	220 bar <p<= 250 bar	590 Nm		1.4923	
	192 bar <p<= 220 bar	535 Nm		1.4923	
	170 bar <p<= 192 bar	490 Nm		1.4923 / 1.7709	
	150 bar <p<= 170 bar	410 Nm			
	130 bar <p<= 150 bar	365 Nm			
	110 bar <p<= 130 bar	300 Nm			
	90 bar <p<= 110 bar	270 Nm			
	70 bar <p<= 90 bar	210 Nm			
	p<= 70 bar	160 Nm			

Attention! Above mentioned tightening torques are valid for assembling at room temperature. Tightening torques for retightening at operating conditions must be requested at PERSTA. It is recommended to use calibrated torque wrenches. Bolt- and nut threads as well as the contact surfaces of flat washers have to be lubricated. For calculation of the tightening torques the following friction factors are selected: 0,12 for threads 0,15 contact surfaces.

**■ gate valve ■ high pressure gate valve DSK 26.25**
**■ 700JT ■ PD25 ■ DN 80-300**
**tightening torques**
**section 1**

<b>screw for tempering pressure seal bonnet (position 171)</b>					
nominal diameter	torque	torque at the end of pressure test	bolt quantity and size	bolt material	gasket dimen. o.d. / i.d.
DN 80	41 Nm	12 Nm	4 * M10	8.8	125mm / 105 mm
DN 100	58 Nm	15 Nm	4 * M12	8.8	150mm / 130 mm
DN 125	114 Nm	20 Nm	4 * M16	8.8	180mm / 155 mm
DN 150	168 Nm	20 Nm	4 * M16	8.8	220mm / 190 mm
DN 200	289 Nm	25 Nm	4 * M20	8.8	260mm / 225 mm
DN 250	452 Nm	25 Nm	4 * M20	8.8	320mm / 275 mm
DN 300	722 Nm	30 Nm	4 * M24	8.8	380mm / 330 mm

<b>tightening torques for cover nuts (position 170 / 190)</b>				
nominal diameter	body material	torque	bolt quantity and size	bolt material
<b>DN 80</b>	1.4901; 1.4903; 1.6368	45 Nm	<b>6 * M12</b>	<b>1.7709</b>
	1.7383; 1.7335; 1.5415; 1.0460	35 Nm		
<b>DN 100</b>	1.4901; 1.4903; 1.6368	100 Nm	<b>6 * M16</b>	
	1.7383; 1.7335; 1.5415; 1.0460	80 Nm		
<b>DN 125</b>	1.4901; 1.4903; 1.6368	110 Nm	<b>6 * M16</b>	
	1.7383; 1.7335; 1.5415; 1.0460	90 Nm		
<b>DN 150</b>	1.4901; 1.4903; 1.6368	200 Nm	<b>6 * M20</b>	
	1.7383; 1.7335; 1.5415; 1.0460	160 Nm		
<b>DN 200</b>	1.4901; 1.4903; 1.6368	370 Nm	<b>6 * M24</b>	
	1.7383; 1.7335; 1.5415; 1.0460	290 Nm		
<b>DN 250</b>	1.4901; 1.4903; 1.6368	640 Nm	<b>6 * M30</b>	
	1.7383; 1.7335; 1.5415; 1.0460	510 Nm		
<b>DN 300</b>	1.4901; 1.4903; 1.6368	710 Nm	<b>8 * M30</b>	
	1.7383; 1.7335; 1.5415; 1.0460	580 Nm		

<b>tightening torques of gland stud (position 462 / 464)</b>					
nominal diameter	pressure range	torque	bolt quantity and size	bolt material	gasket dimen. o.d. / i.d.
<b>DN 80</b>	400 bar <p<= 425 bar	95 Nm	<b>2 * M14</b>	1.4923	<b>39 / 26</b>
	350 bar <p<= 400 bar	90 Nm		1.4923	
	300 bar <p<= 350 bar	80 Nm		1.4923	
	250 bar <p<= 300 bar	65 Nm		<b>1.4923 / 1.7709</b>	
	200 bar <p<= 250 bar	60 Nm			
	150 bar <p<= 200 bar	50 Nm			
	100 bar <p<= 150 bar	35 Nm			
	50 bar <p<= 100 bar	30 Nm			
	0 bar <p<= 50 bar	25 Nm			
	<b>DN 100</b>	400 bar <p<= 425 bar		155 Nm	
350 bar <p<= 400 bar		150 Nm	1.4923		
300 bar <p<= 350 bar		135 Nm	1.4923		
250 bar <p<= 300 bar		105 Nm	<b>1.4923 / 1.7709</b>		
200 bar <p<= 250 bar		100 Nm			
150 bar <p<= 200 bar		80 Nm			
100 bar <p<= 150 bar		60 Nm			
50 bar <p<= 100 bar		45 Nm			
0 bar <p<= 50 bar		30 Nm			

Attention! Above mentioned tightening torques are valid for assembling at room temperature. Tightening torques for retightening at operating conditions must be requested at PERSTA. It is recommended to use calibrated torque wrenches. Bolt- and nut threads as well as the contact surfaces of flat washers have to be lubricated. For calculation of the tightening torques the following friction factors are selected: 0,12 for threads 0,15 contact surfaces.

## tightening torques

## section 2

tightening torques of gland stud (position 462 / 464)					
nominal diameter	pressure range	torque	bolt quantity and size	bolt material	gasket dimen. o.d. / i.d.
<b>DN 125</b>	400 bar <p<= 425 bar	210 Nm	<b>2 * M20</b>	1.4923	<b>52 / 36</b>
	350 bar <p<= 400 bar	205 Nm		1.4923	
	300 bar <p<= 350 bar	190 Nm		1.4923	
	250 bar <p<= 300 bar	165 Nm		<b>1.4923 / 1.7709</b>	
	200 bar <p<= 250 bar	140 Nm			
	150 bar <p<= 200 bar	115 Nm			
	100 bar <p<= 150 bar	85 Nm			
	50 bar <p<= 100 bar	60 Nm			
0 bar <p<= 50 bar	40 Nm				
<b>DN 150</b>	400 bar <p<= 425 bar	375 Nm	<b>2 * M24</b>	1.4923	<b>62 / 42</b>
	350 bar <p<= 400 bar	370 Nm		1.4923	
	300 bar <p<= 350 bar	335 Nm		1.4923	
	250 bar <p<= 300 bar	260 Nm		<b>1.4923 / 1.7709</b>	
	200 bar <p<= 250 bar	240 Nm			
	150 bar <p<= 200 bar	195 Nm			
	100 bar <p<= 150 bar	150 Nm			
	50 bar <p<= 100 bar	100 Nm			
0 bar <p<= 50 bar	60 Nm				
<b>DN 200</b>	400 bar <p<= 425 bar	480 Nm	<b>2 * M27</b>	1.4923	<b>70 / 50</b>
	350 bar <p<= 400 bar	475 Nm		1.4923	
	300 bar <p<= 350 bar	425 Nm		1.4923	
	250 bar <p<= 300 bar	365 Nm		<b>1.4923 / 1.7709</b>	
	200 bar <p<= 250 bar	310 Nm			
	150 bar <p<= 200 bar	255 Nm			
	100 bar <p<= 150 bar	190 Nm			
	50 bar <p<= 100 bar	130 Nm			
0 bar <p<= 50 bar	75 Nm				
<b>DN 250</b>	400 bar <p<= 425 bar	560 Nm	<b>2 * M27</b>	1.4923	<b>80 / 60</b>
	350 bar <p<= 400 bar	550 Nm		1.4923	
	300 bar <p<= 350 bar	500 Nm		1.4923	
	250 bar <p<= 300 bar	430 Nm		<b>1.4923 / 1.7709</b>	
	200 bar <p<= 250 bar	365 Nm			
	150 bar <p<= 200 bar	295 Nm			
	100 bar <p<= 150 bar	220 Nm			
	50 bar <p<= 100 bar	150 Nm			
0 bar <p<= 50 bar	90 Nm				
<b>DN 300</b>	400 bar <p<= 425 bar	715 Nm	<b>2 * M30</b>	1.4923	<b>90 / 70</b>
	350 bar <p<= 400 bar	705 Nm		1.4923	
	300 bar <p<= 350 bar	640 Nm		1.4923	
	250 bar <p<= 300 bar	550 Nm		<b>1.4923 / 1.7709</b>	
	200 bar <p<= 250 bar	460 Nm			
	150 bar <p<= 200 bar	375 Nm			
	100 bar <p<= 150 bar	280 Nm			
	50 bar <p<= 100 bar	190 Nm			
0 bar <p<= 50 bar	110 Nm				

Attention! Above mentioned tightening torques are valid for assembling at room temperature. Tightening torques for retightening at operating conditions must be requested at PERSTA. It is recommended to use calibrated torque wrenches. Bolt- and nut threads as well as the contact surfaces of flat washers have to be lubricated. For calculation of the tightening torques the following friction factors are selected: 0,12 for threads 0,15 contact surfaces.

■ gate valve ■ high pressure gate valve DSK 25 ■ 700 JT ■ PD 25 ■ DN 350 + 400

### tightening torques

screw for tempering pressure seal bonnet (position 171)					
nominal diameter	torque	torque at the end of pressure test	bolt quantity and size	bolt material	gasket dimen. o.d. / i.d.
DN 350	280 Nm	25 Nm	8 * M20	1.7709	440 mm / 400 mm
DN 400	460 Nm	30 Nm	10 * M24	1.7709	500 mm / 450 mm

tightening torques for cover nuts (position 170 / 190)				
nominal diameter	body material	torque	bolt quantity and size	bolt material
DN 350	1.7383; 1.7335; 1.5415; 1.0460	650 Nm	8 * M30	1.7709
	1.6368; 1.4903	720 Nm		
DN 400	1.7383; 1.7335; 1.5415; 1.0460	880 Nm	8 * M36	1.7709
	1.6368; 1.4903	1070 Nm		

tightening torques of gland stud (position 462 / 464)					
nominal diameter	pressure range	torque	bolt quantity and size	bolt material	gasket dimen. o.d. / i.d.
DN 350	410 bar <p<= 425 bar	960 Nm	2 * M30	1.4923	115 / 92
	360 bar <p<= 410 bar	870 Nm		1.4923	
	320 bar <p<= 360 bar	810 Nm		1.4923	
	300 bar <p<= 320 bar	730 Nm		1.4923	
	260 bar <p<= 300 bar	670 Nm		1.4923 / 1.7709	
	230 bar <p<= 260 bar	610 Nm			
	200 bar <p<= 230 bar	540 Nm			
	170 bar <p<= 200 bar	480 Nm			
	140 bar <p<= 170 bar	410 Nm			
	110 bar <p<= 140 bar	330 Nm			
	90 bar <p<= 110 bar	270 Nm			
	70 bar <p<= 90 bar	220 Nm			
	50 bar <p<= 70 bar	180 Nm			
	p<= 50 bar	130 Nm			
DN 450	410 bar <p<= 425 bar	1170 Nm	2 * M36	1.4923	125 / 102
	370 bar <p<= 410 bar	1130 Nm		1.4923	
	340 bar <p<= 370 bar	1020 Nm		1.4923	
	310 bar <p<= 340 bar	950 Nm		1.4923	
	280 bar <p<= 310 bar	870 Nm		1.4923 / 1.7709	
	250 bar <p<= 280 bar	790 Nm			
	220 bar <p<= 250 bar	710 Nm			
	190 bar <p<= 220 bar	630 Nm			
	160 bar <p<= 190 bar	550 Nm			
	130 bar <p<= 160 bar	470 Nm			
	100 bar <p<= 130 bar	390 Nm			
	70 bar <p<= 100 bar	300 Nm			
	40 bar <p<= 70 bar	230 Nm			
	p<= 40 bar	130 Nm			

Attention! Above mentioned tightening torques are valid for assembling at room temperature. Tightening torques for retightening at operating conditions must be requested at PERSTA. It is recommended to use calibrated torque wrenches. Bolt- and nut threads as well as the contact surfaces of flat washers have to be lubricated. For calculation of the tightening torques the following friction factors are selected: 0,12 for threads 0,15 contact surfaces.

■ gate valve ■ high pressure gate valve DSK 32 ■ 700JT ■ PD32 ■ DN 225-350

### tightening torques

section 1

screw for tempering pressure seal bonnet (position 171)					
nominal diameter	torque	torque at the end of pressure test	bolt quantity and size	bolt material	gasket dimen. o.d. / i.d.
DN 225	400 Nm	25 Nm	6 * M20	1.7709	380 mm / 330 mm
DN 250	350 Nm	25 Nm	6 * M20		360 mm / 320 mm
DN 300	350 Nm	25 Nm	8 * M20		410 mm / 348 mm
DN 350	560 Nm	30 Nm	8 * M24		490 mm / 430 mm

tightening torques for cover nuts (position 170 / 190)				
nominal diameter	body material	torque	bolt quantity and size	bolt material
DN 225	1.7383; 1.7335; 1.5415; 1.0460	550 Nm	6 * M27	1.7709
	1.6368; 1.4903	720 Nm		
DN 250 (clamping flange)	1.7383; 1.7335; 1.5415; 1.0460	400 Nm	2 * M24	1.7709
	1.6368; 1.4903	400 Nm		
DN 300	1.7383; 1.7335; 1.5415; 1.0460	800 Nm	8 * M30	1.7709
	1.6368; 1.4903	800 Nm		
DN 350	1.7383; 1.7335; 1.5415; 1.0460	910 Nm	10 * M33	1.7709
	1.6368; 1.4903	930 Nm		

tightening torques of gland stud (position 462 / 464)					
nominal diameter	pressure range	torque	bolt quantity and size	bolt material	gasket dimen. o.d. / i.d.
DN 225	500 bar <p<= 544 bar	750 Nm	2 * M30	1.4923 1.4923 1.4923 1.4923 / 1.7709	90 / 71
	450 bar <p<= 500 bar	690 Nm			
	400 bar <p<= 450 bar	620 Nm			
	350 bar <p<= 400 bar	570 Nm			
	300 bar <p<= 350 bar	480 Nm			
	250 bar <p<= 300 bar	400 Nm			
	200 bar <p<= 250 bar	360 Nm			
	150 bar <p<= 200 bar	280 Nm			
	100 bar <p<= 150 bar	210 Nm			
	50 bar <p<= 100 bar	140 Nm			
	p<= 50 bar	75 Nm			
DN 250	500 bar <p<= 544 bar	880 Nm	2 * M30	1.4923 1.4923 1.4923 1.4923 / 1.7709	95 / 76
	450 bar <p<= 500 bar	820 Nm			
	400 bar <p<= 450 bar	740 Nm			
	350 bar <p<= 400 bar	660 Nm			
	300 bar <p<= 350 bar	590 Nm			
	250 bar <p<= 300 bar	500 Nm			
	200 bar <p<= 250 bar	420 Nm			
	150 bar <p<= 200 bar	340 Nm			
	100 bar <p<= 150 bar	260 Nm			
	50 bar <p<= 100 bar	180 Nm			
	p<= 50 bar	90 Nm			

Attention! Above mentioned tightening torques are valid for assembling at room temperature. Tightening torques for retightening at operating conditions must be requested at PERSTA. It is recommended to use calibrated torque wrenches. Bolt- and nut threads as well as the contact surfaces of flat washers have to be lubricated. For calculation of the tightening torques the following friction factors are selected: 0,12 for threads 0,15 contact surfaces.

Rev.: 01.12022016

tightening torques

section 2

tightening torques of gland stud (position 462 / 464)					
nominal diameter	pressure range	torque	bolt quantity and size	bolt material	gasket dimen. o.d. / i.d.
<b>DN 300</b>	520 bar <p<= 544 bar	510 Nm	<b>4 * M24</b>	1.4923	<b>115 / 92</b>
	500 bar <p<= 520 bar	495 Nm		1.4923	
	480 bar <p<= 500 bar	475 Nm		1.4923	
	450 bar <p<= 480 bar	460 Nm		1.4923	
	400 bar <p<= 450 bar	430 Nm		1.4923	
	350 bar <p<= 400 bar	385 Nm		<b>1.4923 / 1.7709</b>	
	300 bar <p<= 350 bar	340 Nm			
	250 bar <p<= 300 bar	295 Nm			
	200 bar <p<= 250 bar	250 Nm			
	150 bar <p<= 200 bar	200 Nm			
	100 bar <p<= 150 bar	155 Nm			
	50 bar <p<= 100 bar	105 Nm			
	p<= 50 bar	60 Nm			
<b>DN 350</b>	520 bar <p<= 544 bar	1385 Nm	<b>2 * M36</b>	1.4923	<b>115 / 92</b>
	500 bar <p<= 520 bar	1340 Nm		1.4923	
	480 bar <p<= 500 bar	1285 Nm		1.4923	
	450 bar <p<= 480 bar	1240 Nm		1.4923	
	400 bar <p<= 450 bar	1170 Nm		<b>1.4923 / 1.7709</b>	
	350 bar <p<= 400 bar	1050 Nm			
	300 bar <p<= 350 bar	930 Nm			
	250 bar <p<= 300 bar	800 Nm			
	200 bar <p<= 250 bar	675 Nm			
	150 bar <p<= 200 bar	550 Nm			
	100 bar <p<= 150 bar	420 Nm			
	50 bar <p<= 100 bar	300 Nm			
	p<= 50 bar	160 Nm			

Attention! Above mentioned tightening torques are valid for assembling at room temperature. Tightening torques for retightening at operating conditions must be requested at PERSTA. It is recommended to use calibrated torque wrenches. Bolt- and nut threads as well as the contact surfaces of flat washers have to be lubricated. For calculation of the tightening torques the following friction factors are selected: 0,12 for threads 0,15 contact surfaces.

**tightening torques**

**section 1**

screw for tempering pressure seal bonnet (position 171)					
nominal diameter	torque	torque at the end of pressure test	bolt quantity and size	bolt material	gasket dimen. o.d. / i.d.
DN 65	41 Nm	12 Nm	4 * M10	8.8	87mm / 110 mm
DN 80	61 Nm	15 Nm	4 * M12		100mm / 125 mm
DN 100	90 Nm	20 Nm	4 * M12		119mm / 150 mm
DN 125	151 Nm	20 Nm	4 * M16		135mm / 170 mm
DN 150	164 Nm	25 Nm	4 * M16		170mm / 215 mm
DN 200	303 Nm	25 Nm	4 * M20		205mm / 260 mm
DN 250	433 Nm	25 Nm	4 * M20		250mm / 315 mm

tightening torques for cover nuts (position 170 / 190)				
nominal diameter	body material	torque	bolt quantity and size	bolt material
DN 65	1.4901; 1.4903; 1.6368	70 Nm	6 * M14	1.7709
	1.7383; 1.7335; 1.5415; 1.0460	50 Nm		
DN 80	1.4901; 1.4903; 1.6368	110 Nm	6 * M16	
	1.7383; 1.7335; 1.5415; 1.0460	80 Nm		
DN 100	1.4901; 1.4903; 1.6368	120 Nm	6 * M16	
	1.7383; 1.7335; 1.5415; 1.0460	100 Nm		
DN 125	1.4901; 1.4903; 1.6368	240 Nm	6 * M20	
	1.7383; 1.7335; 1.5415; 1.0460	160 Nm		
DN 150	1.4901; 1.4903; 1.6368	390 Nm	6 * M24	
	1.7383; 1.7335; 1.5415; 1.0460	290 Nm		
DN 200	1.4901; 1.4903; 1.6368	710 Nm	6 * M30	
	1.7383; 1.7335; 1.5415; 1.0460	590 Nm		
DN 250	1.4901; 1.4903; 1.6368	920 Nm	8 * M30	
	1.7383; 1.7335; 1.5415; 1.0460	720 Nm		

tightening torques of gland stud (position 462 / 464)					
nominal diameter	pressure range	torque	bolt quantity and size	bolt material	gasket dimen. o.d. / i.d.
DN 65	550 bar <p<= 680 bar	65 Nm	4 * M12	1.4980	41 / 28
	500 bar <p<= 550 bar	55 Nm		1.4980 / 1.4923	
	450 bar <p<= 500 bar	50 Nm		1.4923 / 1.7709	
	400 bar <p<= 450 bar	45 Nm			
	350 bar <p<= 400 bar	40 Nm			
	300 bar <p<= 350 bar	35 Nm			
	250 bar <p<= 300 bar	30 Nm			
	200 bar <p<= 250 bar	26 Nm			
	150 bar <p<= 200 bar	21 Nm			
	100 bar <p<= 150 bar	16 Nm			
	50 bar <p<= 100 bar	15 Nm			
	0 bar <p<= 50 bar	15 Nm			
	DN 80	550 bar <p<= 680 bar		105 Nm	
500 bar <p<= 550 bar		90 Nm	1.4980 / 1.4923		
450 bar <p<= 500 bar		80 Nm	1.4923 / 1.7709		
400 bar <p<= 450 bar		72 Nm			
350 bar <p<= 400 bar		65 Nm			
300 bar <p<= 350 bar		57 Nm			

Attention! Above mentioned tightening torques are valid for assembling at room temperature. Tightening torques for retightening at operating conditions must be requested at PERSTA. It is recommended to use calibrated torque wrenches. Bolt- and nut threads as well as the contact surfaces of flat washers have to be lubricated. For calculation of the tightening torques the following friction factors are selected: 0,12 for threads 0,15 contact surfaces.

tightening torques

section 2

tightening torques of gland stud (position 462 / 464)					
nominal diameter	pressure range	torque	bolt quantity and size	bolt material	gasket dimen. o.d. / i.d.
<b>DN 80</b>	250 bar <p≤ 300 bar	50 Nm	<b>4 * M14</b>	<b>1.4923 / 1.7709</b>	<b>48 / 32</b>
	200 bar <p≤ 250 bar	42 Nm			
	150 bar <p≤ 200 bar	33 Nm			
	100 bar <p≤ 150 bar	25 Nm			
	50 bar <p≤ 100 bar	18 Nm			
	0 bar <p≤ 50 bar	15 Nm			
<b>DN 100</b>	550 bar <p≤ 680 bar	135 Nm	<b>4 * M16</b>	<b>1.4980 / 1.4923 / 1.4923 / 1.7709</b>	<b>52 / 36</b>
	500 bar <p≤ 550 bar	110 Nm			
	450 bar <p≤ 500 bar	100 Nm			
	400 bar <p≤ 450 bar	90 Nm			
	350 bar <p≤ 400 bar	82 Nm			
	300 bar <p≤ 350 bar	70 Nm			
	250 bar <p≤ 300 bar	62 Nm			
	200 bar <p≤ 250 bar	53 Nm			
	150 bar <p≤ 200 bar	42 Nm			
	100 bar <p≤ 150 bar	32 Nm			
	50 bar <p≤ 100 bar	24 Nm			
	0 bar <p≤ 50 bar	22 Nm			
<b>DN 125</b>	550 bar <p≤ 680 bar	260 Nm	<b>4 * M20</b>	<b>1.4980 / 1.4923 / 1.4923 / 1.7709</b>	<b>64 / 44</b>
	500 bar <p≤ 550 bar	215 Nm			
	450 bar <p≤ 500 bar	195 Nm			
	400 bar <p≤ 450 bar	175 Nm			
	350 bar <p≤ 400 bar	155 Nm			
	300 bar <p≤ 350 bar	140 Nm			
	250 bar <p≤ 300 bar	120 Nm			
	200 bar <p≤ 250 bar	100 Nm			
	150 bar <p≤ 200 bar	80 Nm			
	100 bar <p≤ 150 bar	60 Nm			
50 bar <p≤ 100 bar	45 Nm				
0 bar <p≤ 50 bar	30 Nm				
<b>DN 150</b>	550 bar <p≤ 680 bar	290 Nm	<b>4 * M20</b>	<b>1.4980 / 1.4923 / 1.4923 / 1.7709</b>	<b>70 / 50</b>
	500 bar <p≤ 550 bar	235 Nm			
	450 bar <p≤ 500 bar	215 Nm			
	400 bar <p≤ 450 bar	195 Nm			
	350 bar <p≤ 400 bar	175 Nm			
	300 bar <p≤ 350 bar	155 Nm			
	250 bar <p≤ 300 bar	130 Nm			
	200 bar <p≤ 250 bar	110 Nm			
	150 bar <p≤ 200 bar	90 Nm			
	100 bar <p≤ 150 bar	67 Nm			
	50 bar <p≤ 100 bar	50 Nm			
	0 bar <p≤ 50 bar	30 Nm			

Attention! Above mentioned tightening torques are valid for assembling at room temperature. Tightening torques for retightening at operating conditions must be requested at PERSTA. It is recommended to use calibrated torque wrenches. Bolt- and nut threads as well as the contact surfaces of flat washers have to be lubricated. For calculation of the tightening torques the following friction factors are selected: 0,12 for threads 0,15 contact surfaces.

**tightening torques**
**section 3**

tightening torques of gland stud (position 462 / 464)					
nominal diameter	pressure range	torque	bolt quantity and size	bolt material	gasket dimen. o.d. / i.d.
<b>DN 200</b>	550 bar <p<= 680 bar	405 Nm	<b>4 * M24</b>	1.4980	<b>80 / 60</b>
	500 bar <p<= 550 bar	330 Nm		1.4980 / 1.4923	
	450 bar <p<= 500 bar	300 Nm		<b>1.4923 / 1.7709</b>	
	400 bar <p<= 450 bar	270 Nm			
	350 bar <p<= 400 bar	245 Nm			
	300 bar <p<= 350 bar	215 Nm			
	250 bar <p<= 300 bar	185 Nm			
	200 bar <p<= 250 bar	155 Nm			
	150 bar <p<= 200 bar	125 Nm			
	100 bar <p<= 150 bar	95 Nm			
	50 bar <p<= 100 bar	70 Nm			
	0 bar <p<= 50 bar	45 Nm			
	<b>DN 250</b>	550 bar <p<= 680 bar		490 Nm	
500 bar <p<= 550 bar		400 Nm	1.4980 / 1.4923		
450 bar <p<= 500 bar		360 Nm	<b>1.4923 / 1.7709</b>		
400 bar <p<= 450 bar		325 Nm			
350 bar <p<= 400 bar		290 Nm			
300 bar <p<= 350 bar		255 Nm			
250 bar <p<= 300 bar		220 Nm			
200 bar <p<= 250 bar		185 Nm			
150 bar <p<= 200 bar		150 Nm			
100 bar <p<= 150 bar		110 Nm			
50 bar <p<= 100 bar		80 Nm			
0 bar <p<= 50 bar		50 Nm			

Attention! Above mentioned tightening torques are valid for assembling at room temperature. Tightening torques for retightening at operating conditions must be requested at PERSTA. It is recommended to use calibrated torque wrenches. Bolt- and nut threads as well as the contact surfaces of flat washers have to be lubricated. For calculation of the tightening torques the following friction factors are selected: 0,12 for threads 0,15 contact surfaces.

■ check valve    ■ swing check valve    ■ 640AA ■ PN10-40 ■ DN 50-250

### tightening torques

tightening torques for cover nuts (position 170 / 190)						
nominal diameter	nominal pressure	body material	gasket dimen. o.d. / i.d.	torque	bolt quantity and size	bolt material
DN 50	10 - 40	1.0619	102 / 86	15 Nm	8 * M12	1.1181
DN 65			115 / 102	15 Nm	8 * M12	
DN 80			135 / 117	31 Nm	8 * M16	
DN 100			160 / 142	28 Nm	12 * M16	
DN 125			200 / 178	50 Nm	12 * M16	
DN 150			215 / 197	40 Nm	16 * M20	
DN 200			270 / 246	85 Nm	16 * M20	
DN 250			312 / 285	120 Nm	16 * M24	

Attention! Above mentioned tightening torques are valid for assembling at room temperature. Tightening torques for retightening at operating conditions must be requested at PERSTA. It is recommended to use calibrated torque wrenches. Bolt- and nut threads as well as the contact surfaces of flat washers have to be lubricated. For calculation of the tightening torques the following friction factors are selected: 0,12 for threads 0,15 contact surfaces.

■ check valve    ■ swing check valve    ■ 640AA ■ PN63-160 (PD 18) ■ DN 50-250(300)

### tightening torques

tightening torques for cover nuts (position 170 / 190)						
nominal diameter	nominal pressure level	body material	gasket dimen. o.d. / i.d.	torque	bolt quantity and size	bolt material
<b>DN 50 (65)</b>	PN 160 PD 18	<b>1.5415; 1.7335; 1.7383</b>	<b>135 / 121</b>	70 Nm 105 Nm	<b>14 * M16</b>	<b>1.7709</b>
<b>DN 80</b>	PN 160 PD 18	<b>1.5415; 1.7335; 1.7383</b>	<b>170 / 154</b>	135 Nm 210 Nm	<b>14 * M20</b>	<b>1.7709</b>
<b>DN 100</b>	PN 160 PD 18	<b>1.5415; 1.7335; 1.7383</b>	<b>190 / 172</b>	245 Nm 365 Nm	<b>12 * M24</b>	<b>1.7709</b>
<b>DN 150</b>	PN 160 PD 18	<b>1.5415; 1.7335; 1.7383</b>	<b>255 / 231</b>	470 Nm 710 Nm	<b>14 * M30</b>	<b>1.7709</b>
<b>DN 200</b>	PN 160 PD 18	<b>1.5415; 1.7335; 1.7383</b>	<b>327 / 297</b>	805 Nm 1210 Nm	<b>16 * M36</b>	<b>1.7709</b>
<b>DN 250</b>	PN 160 PD 18	<b>1.5415; 1.7335; 1.7383</b>	<b>414 / 378</b>	1300 Nm 1960 Nm	<b>18 * M42</b>	<b>1.7709</b>

Attention! Above mentioned tightening torques are valid for assembling at room temperature. Tightening torques for retightening at operating conditions must be requested at PERSTA. It is recommended to use calibrated torque wrenches. Bolt- and nut threads as well as the contact surfaces of flat washers have to be lubricated. For calculation of the tightening torques the following friction factors are selected: 0,12 for threads 0,15 contact surfaces.

Rev.: 01.12022016

- high pressure swing check valve ■ DRI 10 - 40 ■ 640 AB ■ PD 10 - 40 ■ DN 65 - 550  
tightening torques

**screw for tempering pressure seal bonnet (position 171)**

**DRI 10**

nominal diameter	torque	torque at the end of pressure test	bolt quantity and size	bolt material	gasket dimen. o.d. / i.d.
DN600/550(495)	480 Nm	30 Nm	8 * M24	1.7709	630 mm / 590 mm

**DRI 16**

nominal diameter	torque	torque at the end of pressure test	bolt quantity and size	bolt material	gasket dimen. o.d. / i.d.
DN 250 (225)	300 Nm	25 Nm	4 * M20	1.7709	315 mm / 285 mm
DN 350 (315)	320 Nm	30 Nm	6 * M24		420 mm / 390 mm

**DRI 25**

nominal diameter	torque	torque at the end of pressure test	bolt quantity and size	bolt material	gasket dimen. o.d. / i.d.
DN 65 (59)	55 Nm	15 Nm	4 * M12	1.7709	130 mm / 110 mm
DN 80 (72)	90 Nm	20 Nm	4 * M16		149 mm / 127 mm
DN 100 (90)	110 Nm	20 Nm	4 * M16		180 mm / 157 mm
DN 150 (135)	470 Nm	30 Nm	4 * M24		258 mm / 210 mm
DN 200 (180)	260 Nm	25 Nm	4 * M20		264 mm / 234 mm
DN 250 (225)	440 Nm	30 Nm	4 * M24		330 mm / 295 mm
DN 300 (270)	410 Nm	30 Nm	6 * M24		400 mm / 360 mm
DN 350 (315)	450 Nm	30 Nm	6 * M24		440 mm / 400 mm
DN 400 (360)	700 Nm	35 Nm	6 * M27		500 mm / 450 mm

**DRI 32**

nominal diameter	torque	torque at the end of pressure test	bolt quantity and size	bolt material	gasket dimen. o.d. / i.d.
DN 125 (112,5)	270 Nm	25 Nm	4 * M20	1.7709	215 mm / 175 mm
DN 150 (135)	470 Nm	30 Nm	4 * M24		258 mm / 210 mm
DN 200 (180)	410 Nm	30 Nm	4 * M24		265 mm / 225 mm
DN 250 (225)	700 Nm	35 Nm	4 * M27		330 mm / 280 mm
DN 350 (315)	560 Nm	30 Nm	8 * M24		490 mm / 430 mm

**DRI 40**

nominal diameter	torque	torque at the end of pressure test	bolt quantity and size	bolt material	gasket dimen. o.d. / i.d.
DN 65 (59)	55 Nm	15 Nm	4 * M12	1.7709	130 mm / 110 mm
DN 100 (90)	110 Nm	20 Nm	4 * M16		180 mm / 157 mm

Attention! Above mentioned tightening torques are valid for assembling at room temperature. Tightening torques for retightening at operating conditions must be requested at PERSTA. It is recommended to use calibrated torque wrenches. Bolt- and nut threads as well as the contact surfaces of flat washers have to be lubricated. For calculation of the tightening torques the following friction factors are selected: 0,12 for threads 0,15 contact surfaces.

- high pressure swing check valve    ■ DRI 26.25/ 26.40    ■ 640 AB    ■ PD 25 / PD 40
- DN 65/80 - 250/300

### tightening torques

**screw for tempering pressure seal bonnet (position 171)**

#### DRI 26.25

nominal diameter	torque	torque at the end of pressure test	bolt quantity and size	bolt material	gasket dimen. o.d. / i.d.
DN 80	40 Nm	12 Nm	4 * M10	<b>A 193B7 / 1.7225</b>	125 mm / 105 mm
DN 100	60 Nm	15 Nm	4 * M12		150 mm / 130 mm
DN 125	115 Nm	20 Nm	4 * M16		180 mm / 155 mm
DN 150	170 Nm	20 Nm	4 * M16		220 mm / 190 mm
DN 200	290 Nm	25 Nm	4 * M20		260 mm / 225 mm
DN 250	455 Nm	25 Nm	4 * M20		320 mm / 275 mm
DN 300	720 Nm	30 Nm	4 * M24		350 mm / 330 mm

#### DRI 26.40

nominal diameter	torque	torque at the end of pressure test	bolt quantity and size	bolt material	gasket dimen. o.d. / i.d.
DN 65	40 Nm	12 Nm	4 * M10	<b>A 193B7 / 1.7225</b>	87 mm / 110 mm
DN 80	60 Nm	15 Nm	4 * M12		100 mm / 125 mm
DN 100	90 Nm	15 Nm	4 * M12		119 mm / 150 mm
DN 125	155 Nm	20 Nm	4 * M16		135 mm / 170 mm
DN 150	165 Nm	20 Nm	4 * M16		170 mm / 215 mm
DN 200	300 Nm	25 Nm	6 * M20		205 mm / 260 mm
DN 250	780 Nm	25 Nm	6 * M20		250 mm / 315 mm

Attention! Above mentioned tightening torques are valid for assembling at room temperature. Tightening torques for retightening at operating conditions must be requested at PERSTA. It is recommended to use calibrated torque wrenches. Bolt- and nut threads as well as the contact surfaces of flat washers have to be lubricated. For calculation of the tightening torques the following friction factors are selected: 0,12 for threads 0,15 contact surfaces.

Rev.: 01.12022016

■ swing check valve

■ 640 AA / AE / DJ ■ PN 100 ■ DN 300 - 500

tightening torques

section 1

tightening torques for cover nuts (position 170 / 190)						
nominal diameter	nominal pressure level	body material	gasket dimen. o.d. / i.d.	torque	bolt quantity and size	bolt material
DN 300	PN100	1.0460	368 / 400	260 Nm 190 Nm 150 Nm 100 Nm	24 * M27	1.7711
		< 400°C				
		400°C bis 425°C				
		425°C bis 450°C				
450°C bis 480°C						
DN 300	PN100	1.5415	368 / 400	300Nm	24 * M27	1.7711
DN 300	PN100	1.7335 / 1.7383	368 / 400	330 Nm 200 Nm 140 Nm	24 * M27	1.7711
		< 500°C				
		500°C bis 515°C				
		515°C bis 530°C				
DN 300	PN100	1.4903	368 / 400	680 Nm	24 * M27	1.4980
		<600°C				
DN 350	PN100	1.0460	411 / 439	300 Nm 230 Nm 120 Nm	24 * M30	1.7711
		< 400°C				
		400°C bis 450°C				
		450°C bis 480°C				
DN 350	PN100	1.5415	411 / 439	390Nm	24 * M30	1.7711
		<500°C				
DN 350	PN100	1.7335 / 1.7383	411 / 439	390 Nm 240 Nm 160 Nm	24 * M30	1.7711
		< 500°C				
		500°C bis 515°C				
		515°C bis 530°C				
DN 350	PN100	1.4903	411 / 439	850 Nm	24 * M30	1.4980
		<600°C				
DN 400	PN100	1.0460	465 / 500	460 Nm 390 Nm 290 Nm 170 Nm	24 * M33	1.7711
		< 400°C				
		400°C bis 425°C				
		425°C bis 450°C				
		450°C bis 480°C				
DN 400	PN100	1.5415	465 / 500	460 Nm	24 * M33	1.7711
		<500°C				
DN 400	PN100	1.7335 / 1.7383	465 / 500	560 Nm 380 Nm 250 Nm	24 * M33	1.7711
		< 500°C				
		500°C bis 515°C				
		515°C bis 530°C				
DN 400	PN100	1.4903	465 / 500	1240 Nm	24 * M33	1.4980
		<600°C				

Attention! Above mentioned tightening torques are valid for assembling at room temperature. Tightening torques for retightening at operating conditions must be requested at PERSTA. It is recommended to use calibrated torque wrenches. Bolt- and nut threads as well as the contact surfaces of flat washers have to be lubricated. For calculation of the tightening torques the following friction factors are selected: 0,12 for threads 0,15 contact surfaces.

Rev.: 01.22112016

■ swing check valve

■ 640 AA / AE / DJ ■ PN 100 ■ DN 300 - 500

tightening torques

section 2

tightening torques for cover nuts (position 170 / 190)						
nominal diameter	nominal pressure level	body material	gasket dimen. o.d. / i.d.	torque	bolt quantity and size	bolt material
DN 450	PN100	1.0460	520 / 556	650 Nm	24 * M36	1.7711
		< 300°C		600 Nm		
		300°C bis 400°C		350 Nm		
		400°C bis 425°C		250 Nm		
		425°C bis 450°C		140 Nm		
450°C bis 480°C						
DN 450	PN100	1.5415	520 / 556	690 Nm	24 * M36	1.7711
DN 450	PN100	1.7335 / 1.7383	520 / 556	760 Nm	24 * M36	1.7711
		< 515°C		500 Nm		
		515°C bis 520°C		320 Nm		
		520°C bis 530°C				
DN 450	PN100	1.4903	520 / 556	1560 Nm	24 * M36	1.4980
DN 500	PN100	1.0460	580 / 622	950 Nm	26 * M39	1.7711
		< 300°C		600 Nm		
		300°C bis 400°C		540 Nm		
		400°C bis 425°C		380 Nm		
		425°C bis 450°C		200 Nm		
450°C bis 480°C						
DN 500	PN100	1.5415	580 / 622	950 Nm	26 * M39	1.7711
DN 500	PN100	1.7335 / 1.7383	580 / 622	1100 Nm	26 * M39	1.7711
		< 450°C		1000 Nm		
		450°C bis 500°C		660 Nm		
		500°C bis 515°C		530 Nm		
		515°C bis 530°C				
DN 500	PN100	1.4903	580 / 622	2100 Nm	26 * M39	1.4980
		<600°C				

tightening torques of gland stud (position 462 / 464)						
nominal diameter and	pressure range	torque	bolt quantity and size	bolt material	gasket dimen. o.d. / i.d.	
DN 350 - 500 640 AE	83 bar <p<= 100 bar	300 Nm	M90 x 2	1.0050	60 / 40	
	67 bar <p<= 83 bar	250 Nm				
	50 bar <p<= 67 bar	200 Nm				
	33 bar <p<= 50 bar	150 Nm				
	0 bar <p<= 33 bar	100 Nm				
DN 350 - 500 640 DJ	70 bar <p<= 100 bar	40 Nm	4 * M16/	1.7709	68 / 48	
	50 bar <p<= 70 bar	30 Nm	8 * M16			
	0 bar <p<= 50 bar	20 Nm				

Attention! Above mentioned tightening torques are valid for assembling at room temperature. Tightening torques for retightening at operating conditions must be requested at PERSTA. It is recommended to use calibrated torque wrenches. Bolt- and nut threads as well as the contact surfaces of flat washers have to be lubricated. For calculation of the tightening torques the following friction factors are selected: 0,12 for threads 0,15 contact surfaces.

■ small globe valve - header small valves ■ 200 AB ■ PN630 / 400 / 250 / 160

tightening torques

■ 1.4104

section 1

tightening torques of gland stud (position 462 / 464)					
nominal diameter	pressure range	torque	bolt quantity and size	bolt material	gasket dimen. o.d. / i.d.
<b>DN 3 - 12 (16)</b>  <b>PN 630</b>	640 bar <p<= 600 bar	70 Nm	<b>1 * G 7/8</b>	<b>1.0460</b>	<b>19 / 11</b>
	599 bar <p<= 500 bar	65 Nm			
	499 bar <p<= 400 bar	55 Nm			
	399 bar <p<= 300 bar	55 Nm			
	299 bar <p<= 200 bar	50 Nm			
	199 bar <p<= 000 bar	45 Nm			
<b>PN 400</b>	400 bar <p<= 350 bar	60 Nm	<b>1 * G 7/8</b>	<b>1.0460</b>	<b>19 / 11</b>
	349 bar <p<= 300 bar	55 Nm			
	299 bar <p<= 250 bar	50 Nm			
	249 bar <p<= 200 bar	40 Nm			
	199 bar <p<= 160 bar	35 Nm			
	159 bar <p<= 001 bar	35 Nm			
<b>PN 160</b>	160 bar <p<= 140 bar	30 Nm	<b>1 * G 7/8</b>	<b>1.0460</b>	<b>19 / 11</b>
	139 bar <p<= 100 bar	26 Nm			
	99 bar <p<= 70 bar	20 Nm			
	69 bar <p<= 1 bar	15 Nm			
<b>DN 20 + 25</b>  <b>PN 250</b>	250 bar <p<= 200 bar	45 Nm	<b>1 * G 7/8</b>	<b>1.0460</b>	<b>20,5 / 12,5</b>
	199 bar <p<= 156 bar	35 Nm			
	155 bar <p<= 100 bar	35 Nm			
	99 bar <p<= 70 bar	25 Nm			
	69 bar <p<= 001 bar	20 Nm			
<b>DN 32</b>  <b>PN 250</b>	250 bar <p<= 200 bar	70 Nm	<b>1 * G 1 1/8</b>	<b>1.0460</b>	<b>24 / 16</b>
	199 bar <p<= 156 bar	60 Nm			
	155 bar <p<= 100 bar	50 Nm			
	99 bar <p<= 70 bar	35 Nm			
	69 bar <p<= 001 bar	25 Nm			

tightening torques for cover nuts (position 170 / 190)						
nominal diameter	nominal pressure level	body material	gasket dimen. o.d. / i.d.	torque	bolt quantity and size	bolt material
<b>DN 3-12(16)</b>	PN 630	<b>1.4104</b>	<b>27 / 34</b>	280Nm	<b>G3/4 SW30</b>	<b>1.0460</b>
<b>DN 20-25</b>	PN 630	<b>1.4104</b>	<b>31 / 40</b>	320Nm	<b>G7/8 SW32</b>	<b>1.0460</b>

Attention! Above mentioned tightening torques are valid for assembling at room temperature. Tightening torques for retightening at operating conditions must be requested at PERSTA. It is recommended to use calibrated torque wrenches. Bolt- and nut threads as well as the contact surfaces of flat washers have to be lubricated. For calculation of the tightening torques the following friction factors are selected: 0,12 for threads 0,15 contact surfaces.

■ small globe valve - top piece small valves ■ 200 AF ■ PN 400 / 250 ■

tightening torques

■ 1.4571

section 2

tightening torques of gland stud (position 462 / 464)					
nominal diameter	pressure range	torque	bolt quantity and size	bolt material	gasket dimen. o.d. / i.d.
<b>DN 3 - 15 (16)</b>  <b>PN 400</b>	400 bar <p≤ 380 bar	60 Nm	<b>1 * G1</b>	<b>1.4571</b>	<b>18 / 12</b>
	379 bar <p≤ 300 bar	55 Nm			
	299 bar <p≤ 250 bar	55 Nm			
	249 bar <p≤ 200 bar	40 Nm			
	199 bar <p≤ 156 bar	35 Nm			
	155 bar <p≤ 105 bar	30 Nm			
	104 bar <p≤ 90 bar	20 Nm			
89 bar <p≤ 1 bar	20 Nm				
<b>DN 20</b>  <b>PN 250</b>	250 bar <p≤ 211 bar	40 Nm	<b>1 * G1</b>	<b>1.4571</b>	<b>18 / 12</b>
	210 bar <p≤ 156 bar	35 Nm			
	155 bar <p≤ 98 bar	30 Nm			
	97 bar <p≤ 75 bar	20 Nm			
	74 bar <p≤ 1 bar	15 Nm			

tightening torques for cover nuts (position 170 / 190)						
nominal diameter	nominal pressure level	body material	gasket dimen. o.d. / i.d.	torque	bolt quantity and size	bolt material
<b>DN 3-12(16)</b>	PN 400	<b>1.4571</b>	<b>27 / 34</b>	320Nm	<b>G3/4 SW30</b>	<b>1.4571</b>
<b>DN 20-25</b>	PN 400	<b>1.4571</b>	<b>31 / 40</b>	350Nm	<b>G7/8 SW32</b>	<b>1.4571</b>

Attention! Above mentioned tightening torques are valid for assembling at room temperature. Tightening torques for retightening at operating conditions must be requested at PERSTA. It is recommended to use calibrated torque wrenches. Bolt- and nut threads as well as the contact surfaces of flat washers have to be lubricated. For calculation of the tightening torques the following friction factors are selected: 0,12 for threads 0,15 contact surfaces.

**System for tightening bolts**

- Lubricate the thread and nut contact surface
- The bolts must be

1. pre-assemble by hand.
2. tighten crosswise as shown in the illustration to 30% of the specified tightening torque.
3. analogous to 2. tighten to 60% of the nominal tightening torque.
4. analogous to 2. tighten to 100% of the target tightening torque.
5. retighten all round with the full target tightening torque. Repeat this procedure until the nuts no longer turn.

