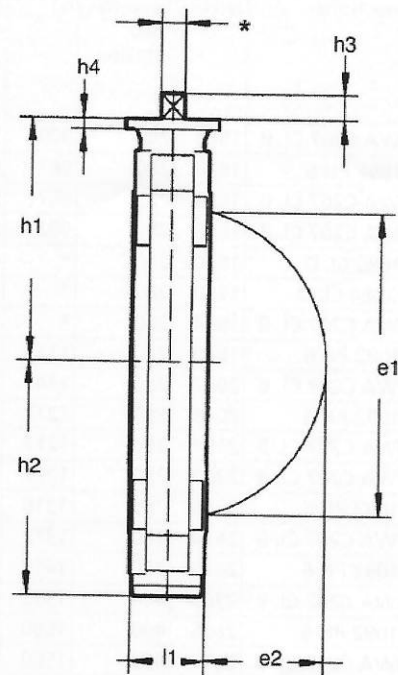
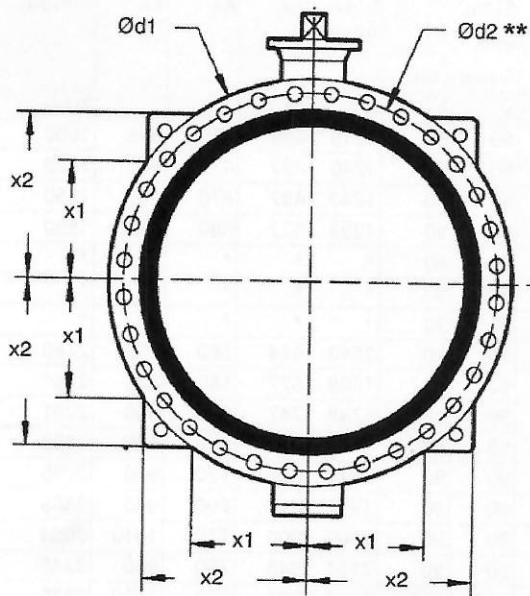


Dimensions

Drawings



* $\varnothing s$

** See "Bolting" table

Dimensions – PN 10

[mm]

DN	NPS	Connections	Ød1	Face-to-face length	h1	h2	Top flange to ISO 5211		Stem end Square end		Valve disc open		x1	x2	Weight kg
				l1			No.	h4	s	h3	e1	e2			
(1050)	42	AWWA C207 Cl. D	1332	216	765	674	F25	30	60	80	1006	405	383	545	850
1100		EN 1092 PN 10	1340	216	790	703	F25	30	60	80	1057	430	386	548	900
	44	AWWA C207 Cl. D	1389	216	790	703	F25	30	60	80	1057	430	403	566	960
1200		EN 1092 PN 10	1455	254	840	756	F25	30	60	80	1152	461	428	588	1090
	48	AWWA C207 Cl. D	1516	254	840	756	F25	30	60	80	1152	461	444	602	1150
(1250)	50	AWWA C207 Cl. D	1568	280	900	790	F30	40	90	90	1210	480	455	638	1600
1300		EN 1092 PN 10	1575	280	967	943	F30	40	90	90	1240	497	470	680	1620
	52	AWWA C207 Cl. D	1625	280	967	943	F30	40	90	90	1240	497	470	680	1650
(1350)	54	AWWA C207 Cl. D	1683	280	992	968	F30	40	90	90	1293	522	480	700	1680
1400		EN 1092 PN 10	1675	280	1017	993	F30	40	90	90	1343	547	480	725	1600
1500		EN 1092 PN 10	1854	280	1067	1043	F30	40	90	90	1455	600	530	765	1800
	60	AWWA C207 Cl. D	1785	280	1067	1043	F30	40	90	90	1455	600	530	765	1800
1600		AWWA C207 Cl. D	1915	280	1115	1093	F30	40	90	90	1540	644	560	790	2440
(1650)	66	EN 1092 PN 10	2032	280	1147	1123	F30	40	90	90	1608	677	580	835	2531
1800		AWWA C207 Cl. D	2115	280	1217	1193	F35	40	90	90	1748	747	620	860	2716
	72	AWWA C207 Cl. D	2197	280	1217	1193	F35	40	90	90	1748	747	650	890	2956
(1950)	78	AWWA C207 Cl. D	2362	280	1297	1273	F35	40	90	90	1911	826	720	950	3073
2000		EN 1092 PN 10	2325	400	1355	1318	F40	45	110	110	1922	780	710	940	3956
(2100)	84	AWWA C207 Cl. D	2534	400	1410	1373	F40	45	110	110	2035	836	770	1010	4831
2200		EN 1092 PN 10	2550	400	1460	1423	F40	45	110	110	2135	885	770	1020	4220
(2250)	90	AWWA C207 Cl. D	2705	400	1505	1468	F40	45	110	110	2227	931	830	1070	4447
2400		EN 1092 PN 10	2760	400	1560	1523	F40	45	110	110	2338	986	830	1090	5025
	96	AWWA C207 Cl. D	2877	400	1560	1523	F40	45	110	110	2338	986	830	1130	5320

Other diameters on request

Dimensions – PN 16

[mm]

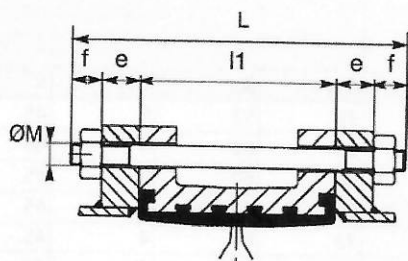
DN	NPS	Connections	Ød1	Face-to-face length	h1	h2	Top flange to ISO 5211		Stem end Square end		Valve disc open		x1	x2	Weight kg
				l1			No.	h4	s	h3	e1	e2			
1100		EN 1092 PN 16	1355	280	867	843	F30	40	90	90	1035	396	333	590	1400
	44	AWWA C207 Cl. E	1405	280	867	843	F30	40	90	90	1035	396	333	590	1600
1200		EN 1092 PN 16	1485	280	917	893	F30	40	90	90	1137	447	450	625	1538
	48	AWWA C207 Cl. E	1511	280	917	893	F30	40	90	90	1137	447	450	625	1538
1300		EN 1092 PN 16	1585	280	967	943	F30	40	90	90	1240	497	470	680	1620
	52	AWWA C207 Cl. E	1626	280	967	943	F30	40	90	90	1240	497	470	680	1620
(1350)	54	AWWA C207 Cl. E	1683	280	992	968	F30	40	90	90	1293	522	480	700	1680
1400		EN 1092 PN 16	1685	280	1017	993	F30	40	90	90	1343	547	480	725	1744
1500		EN 1092 PN 16	1820	280	1067	1043	F30	40	90	90	1455	600	530	765	1950
	60	AWWA C207 Cl. E	1854	280	1067	1043	F30	40	90	90	1455	600	530	765	1950
1600		EN 1092 PN 16	1930	280	1115	1093	F35	40	90	90	1540	644	560	790	2658
(1650)	66	AWWA C207 Cl. E	2032	280	1147	1123	F30	40	90	90	1608	677	580	835	3048
1800		EN 1092 PN 16	2130	400	1255	1218	F35	40	90	90	1718	682	650	690	3295
	72	AWWA C207 Cl. E	2197	400	1255	1218	F35	40	90	90	1718	682	650	690	3753
(1950)	78	AWWA C207 Cl. E	2362	400	1335	1298	F40	45	110	110	1881	762	720	950	4880
2000		EN 1092 PN 16	2345	400	1355	1318	F40	45	110	110	1922	780	710	940	5304
(2100)	84	AWWA C207 Cl. E	2534	400	1410	1373	F40	45	110	110	2035	836	770	1010	4831

Other diameters on request

Bolting

For compliance with the Pressure Equipment Directive, the connecting elements between the valve flanges and the piping flanges must be selected in accordance with the EN 1515-4 standard ("Selection of bolting for equipment subject to the Pressure Equipment Directive 97/23/EC") and any plant regulations governing the application in question.

Wafer-type design



$$\text{Length of tie rod } L = l1 + 2e + 2f$$

L: minimum length of tie rods

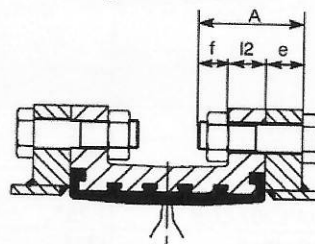
l1: face-to-face length of butterfly valve

e: flange thickness (customer-specific)

f: thickness of nut + standardised overhang of tie rod

Bolting is not included in our standard scope of supply.

Flanged installation



$$\text{Minimum length of bolts } A = l2 + e + f$$

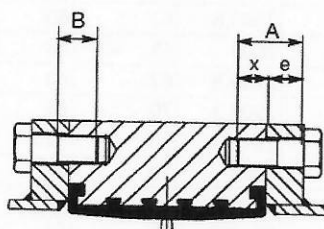
A: minimum length of bolts

l2: valve flange thickness

e: flange thickness (customer-specific)

f: thickness of nut + standardised overhang of bolt

Bolts at stem passage



Bolt length at stem passage

$$A = e + X$$

A: max. length of bolts

X: max. thread engagement depth

e: flange thickness (customer-specific)

B: min. thread length > A-e

PN 10 bolting

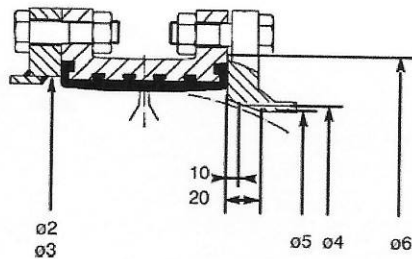
[mm]

DN	NPS	Connection	Bolt Ø	Bolt hole circle	f	Wafer-type design	Flanged installation		Bolts at stem passage	
				Ø d2			Qty*	Qty*	Qty*	x
(1050)	42	AWWA C207 Cl.D	1,5"	1257	45	32	32	42	4	33
1100		EN 1092 PN 10	M33	1270	45	28	28	43	4	40
	44	AWWA C207 Cl.D	1,5"	1314	45	36	36	43	4	38
1200		EN 1092 PN 10	M36	1380	45	28	28	60	4	54
(1250)	48	AWWA C207 Cl.D	1.75"	1479,5	50	36	36	52	8	45
	50	AWWA C207 Cl.D	1,5"	1422	45	40	40	45	4	48
1300		EN 1092 PN10	M39	1490	45	28	28	60	4	45
	52	AWWA C207 Cl.D	1.75"	1537	50	36	36	60	9	45
(1350)	54	AWWA C207 Cl.D	1.75"	1593,8	50	36	36	60	8	45
1500		EN 1092 PN 10	M39	1700	50	32	32	60	4	45
	60	AWWA C207 Cl.D	1.75"	1759	50	44	44	80	8	45
1600		EN 1092 PN 10	M45	1820	50	36	36	60	4	45
(1650)	66	AWWA C207 Cl.D	1.75"	1930,4	50	44	44	65	8	45
1800		EN 1092 PN 10	M45	2020	50	40	40	66	4	50
	72	AWWA C207 Cl.D	1.75"	2095,5	50	52	52	66	8	48
(1950)	78	AWWA C207 Cl.D	2"	2260,6	55	56	56	70	8	45
2000		EN 1092 PN 10	M45	2230	50	40	40	70	8	50
(2100)	84	AWWA C207 Cl.D	2"	2425,7	55	56	56	75	8	65
2200		EN 1092 PN 10	M52	2440	60	44	44	70	8	65
(2250)	90	AWWA C207 Cl.D	2.25"	2590,8	62	60	60	80	8	65
2400		EN 1092 PN 10	M52	2650	60	48	48	70	8	65
	96	AWWA C207 Cl.D	2.25"	2755,9	62	60	60	82,5	8	65
Other diameters on request										

*: Quantity of bolts x 2

Flange dimensions

The valves can be installed between all commercial mating flanges and line connections without requiring any flange gaskets. The elastomer liner alone provides a tight seal at the flange connections. Please verify that the connection meets the requirements given below.



Ø 2: max. permissible flange face diameter
Ø 3: min. permissible flange face diameter

Dimensions table

[mm]

DN	NPS	Max. permissible diameter Ø2		Min. permissible diameter on flange face Ø3		Min. Ø at a distance of 10 mm from the flange face Ø4		Min. Ø at a distance of 20 mm from the flange face Ø5		Min. permissible raised face Ø of flanges with raised faces
		Face-to-face length l1*								
		216	254	216	254	216	254	216	254	
(1050)	42	1067	-	1010	-	1006	-	1001	-	1135
1100	44	1117	-	1063	-	1058	-	1053	-	1187
1200	48	-	1222	-	1158	-	1152	-	1147	1307
		Face-to-face length l1*								Ø6
		280	400	280	400	280	400	280	400	
1100	44	1130	-	1053	-	1045	-	1039	-	1220
1200	48	1226	-	1152	-	1148	-	1143	-	1320
(1250)	50	1300	-	1226	-	1222	-	1217	-	1370
1300	52	1330	-	1259	-	1252	-	1247	-	1420
(1350)	54	1380	-	1310	-	1303	-	1298	-	1470
1400	56	1430	1430	1361	1320	1354	1312	1349	1305	1530
1500	60	1530	1530	1463	1424	1459	1416	1454	1410	1630
1600		1625	-	1560	-	1556	-	1552	-	1730
(1650)	66	1690	-	1626	-	1623	-	1619	-	1810
1800	72	1830	1830	1768	1734	1765	1730	1761	1722	1930
(1950)	78	1990	1990	1930	1898	1926	1894	1923	1889	2090
2000		2034	2034	1974	1943	1971	1935	1968	1931	2130
(2100)	84	2140	2140	2081	2051	2078	2047	2075	2043	2240
2200		2234	2234	2176	2147	2173	2149	2171	2145	2340
(2250)	90	-	2330	-	2244	2244	2240	2221	2235	2430
2400	96	-	2440	-	2356	-	2355	-	2351	2540
(2550)	102		2640		2564		2555		2552	2740
(2700)	108		2740		2665		2658		2654	2890
2800			2840		2766		2760		2756	2940
(2850)	114		2940		2867		2860		2856	3040
3000			3040		2968		2962		2959	3140
	120		3060		2988		2972		2967	3160
Other diameters on request										

* Face-to-face length l1: See Dimensions table

Maximum Stem Capacity

Limitorque Actuation Systems

Output Speed (RPM)	MX-05		MX-10		MX-20		MX-40		MX-85		MX-140		MX-150	
	Rated Output Torque													
	Type A Couplings	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.
Type A1	1.26	32	1.57	40	2.36	60	2.64	67	3.50	88	3.50	88	3.50	88
Type A1E (Extended Nut)	1.26	32	1.57	40	2.36	60	2.64	67	3.50	88	3.50	88	3.50	88
Type B Couplings (Torque Only)?	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm
Type B4	1	25.4	1.25	30	1.94	50	2.2	55	2.88	73	2.88	73	2.625	65
Type B4E (Extended)	0.75	19	0.91	22	1.56	41	1.78	46	2.25	57	2.25	57	2.625	65
Type B1 (Fixed Bore)®	N/A	42	N/A	42	N/A	60	N/A	60	N/A	N/A	N/A	N/A	N/A	N/A
Type BL (Splined)	6 & 38 Splines		6 & 38 Splines		6 & 36 Splines		6 Splines		N/A	N/A	N/A	N/A	N/A	N/A
Maximum Bore and Keyway	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm
Maximum Bore (B4)	1	25	1.25	30	1.94	50	2.2	55	2.88	73	2.88	73	2.625	65
Maximum Keyway	¼ sq.	8 x 7	¼ sq.	10 x 8	½ x ¾	14 x 9	½ x ¾	16 x 10	¾ x ½	20 x 12	¾ x ½	20 x 12	⅝ x ⅞	18 x 11
Maximum Bore (B4E)	.75	18	0.91	22	1.56	41	1.78	46	2.25	56	2.25	56	2.5	65
Maximum Keyway	⅜ Sq.	6 x 6	¼ sq.	8 x 7	¾ sq.	12 x 8	½ x ¾	14 x 9	½ x ¾	16 x 10	½ x ¾	16 x 10	0.625 sq.	18 x 11

	MX-05	MX-10	MX-20	MX-40	MX-85	MX-140	MX-150
Mounting Base (MSS SP-102/ISO 5210)	FA10/F10	FA10/F10	FA14/F14	FA14/F14	FA16/F16	FA25/F25	FA25/F25
Handwheel Ratio (STD/Optional)	Direct	Direct/8:1	Direct/12:1	Direct/24:1	16/48	16/48	16/48
Side-Mounted Handwheel Efficiencies	N/A	52%	54%	51%	53%/51% ¹⁰	53%/51% ¹⁰	53%/51% ¹⁰

Note 1: For 208 Volts, multiply above torque numbers by 0.81. Consult factory for MX-85 and MX-140.

Note 2: All continuous modulating torque numbers are based on 70% of standard rating. Modulating applications at speeds 6, 7 and 8 are not allowed. 1200 starts per hour is suitable for continuous duty as defined by IEC-34, ROTATING ELECTRIC MACHINES (SSMR option required). Not available for MX-85 and MX-140.

* Rating category = S4, 33% 1200 S/H, where

• S4 = intermittent periodic duty, with starting

• 33% = total duration factor of each cycle, i.e., 1 second "ON," 2 seconds "OFF," for 3 seconds total duration factor

Note 3: Maximum motor stall torque is based on 1.5 X motor start torque.

Note 4: 230 Volts - Consult factory for MX-140 & MX-150.

Note 5: For MX-85 and MX-140 only.

Note 6: For 380/50 Volts for MX-85, MX-140 and MX-150 multiply torque values by 0.90.

Note 7: Maximum bores for Type B couplings may require rectangular keys.

Note 8: Available in ISO base only.

Note 9: 380V/60Hz for MX-140 only, multiply torque values by 0.64.

Note 10: Efficiencies for MX-85, MX-140 and 150 are 51% with SGA and 53% without SGA.

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Selection Data for Limitorque MX Actuators

60 Hz – 230V⁴, 380V⁹, 460V, 575V • 50 Hz – 380V⁶, 400V, 415V

LMENSS2333

08/08

MX-05

Output Speed ID	1	2	3	4	5	6	7	8
Ratio	65	65	43	33	22	17	22	17
Start Efficiency	0.34	0.38	0.40	0.46	0.55	0.57	0.57	0.62
Stall Factor	0.41	0.46	0.48	0.55	0.64	0.71	0.75	0.76
Motor Start Torque	ft-lb 3.00	2.50	4.00	4.00	4.00	4.00	3.25	3.25
	Nm 4.09	3.41	5.45	5.45	5.45	5.45	4.43	4.43
Output Torque								
Start	ft-lb 55	55	55	55	48	39	41	34
	Nm 75	75	75	75	65	53	56	46
Stall	ft-lb 83	83	83	83	72	59	62	51
	Nm 112	113	113	113	98	80	84	69
Modulating (Continuous) ²	ft-lb 38	38	38	38	33	-	-	-
	Nm 51	51	51	51	44	-	-	-
Modulating (100 Starts)	ft-lb 49	49	49	49	43	-	-	-
	Nm 66	66	66	66	58	-	-	-

MX-20

Output Speed ID	1	2	3	4	5	6	7	8
Ratio	65	65	43	33	22	17	22	17
Start Efficiency	0.34	0.36	0.42	0.53	0.54	0.58	0.58	0.61
Stall Factor	0.41	0.43	0.50	0.63	0.71	0.73	0.73	0.78
Motor Start Torque	ft-lb 13.00	10.00	15.00	15.00	15.00	15.00	11.00	11.00
	Nm 17.73	13.64	20.45	20.45	20.45	20.45	15.00	15.00
Output Torque								
Start	ft-lb 225	225	225	225	178	148	140	114
	Nm 305	305	305	305	241	201	199	155
Stall	ft-lb 338	338	338	338	267	222	210	171
	Nm 458	458	458	458	362	302	299	233
Modulating (Continuous) ²	ft-lb 157	157	157	157	124	-	-	-
	Nm 212	212	212	212	168	-	-	-
Modulating (100 Starts)	ft-lb 202	202	202	202	160	-	-	-
	Nm 273	273	273	273	216	-	-	-

MX-85

Output Speed ID	2	3	4	5	6	7
Ratio	65	43	33	22	13	10
Start Efficiency	0.34	0.51	0.65	0.72	0.78	0.84
Stall Factor	0.41	0.66	0.84	0.93	1.12	1.09
Motor Start Torque	ft-lb 45	62	62	62	62	62
	Nm 61.06	84.13	84.13	84.13	84.13	84.13
Output Torque						
Start	ft-lb 850	1225	1150	850	600	450
	Nm 1153	1661	1559	1153	814	610
Stall	ft-lb 1275	1838	1725	1275	900	675
	Nm 1730	2493	2341	1730	1221	916
Modulating (Continuous) ²	ft-lb 680	980	920	680	-	-
	Nm 922	1328	1247	922	-	-
Modulating (100 Starts)	ft-lb 765	1102	1035	765	-	-
	Nm 1037	1494	1403	1037	-	-

MX-150

Output Speed ID	6	7
Ratio	13	10
Start Efficiency	0.78	0.84
Stall Factor	1.12	1.09
Motor Start Torque	150	150
Output Torque		
Start	ft-lb 1500	1150
	Nm 2033	1559
Stall	ft-lb 2100	1610
	Nm 2847	2182

MX-10

Output Speed ID	1	2	3	4	5	6	7	8
Ratio	65	65	43	33	22	17	22	17
Start Efficiency	0.32	0.33	0.40	0.53	0.54	0.58	0.58	0.61
Stall Factor	0.38	0.45	0.48	0.63	0.72	0.76	0.77	0.78
Motor Start Torque	ft-lb 7.00	5.70	9.00	9.00	9.00	9.00	7.00	7.00
	Nm 9.55	7.77	12.27	12.27	12.27	12.27	9.55	9.55
Output Torque								
Start	ft-lb 125	125	125	125	107	89	89	73
	Nm 170	170	170	170	145	121	121	99
Stall	ft-lb 188	188	188	188	161	134	134	110
	Nm 255	255	255	255	218	182	182	149
Modulating (Continuous) ²	ft-lb 88	88	88	88	75	-	-	-
	Nm 119	119	119	119	102	-	-	-
Modulating (100 Starts)	ft-lb 112	112	112	112	96	-	-	-
	Nm 151	151	151	151	130	-	-	-

MX-40

Output Speed ID	1	2	3	4	5	6	7	8
Ratio	65	65	43	33	22	17	22	17
Start Efficiency	0.30	0.36	0.40	0.48	0.54	0.58	0.51	0.54
Stall Factor	0.36	0.43	0.48	0.58	0.63	0.68	0.68	0.68
Motor Start Torque	ft-lb 25.00	20.00	29.00	29.00	29.00	29.00	23.00	23.00
	Nm 34.09	27.27	39.55	39.55	39.55	39.55	31.36	31.36
Output Torque								
Start	ft-lb 440	440	440	440	345	286	260	210
	Nm 597	597	597	597	468	388	353	285
Stall	ft-lb 660	660	660	660	518	429	390	315
	Nm 896	896	896	896	702	582	530	428
Modulating (Continuous) ²	ft-lb 308	308	308	308	241	-	-	-
	Nm 417	417	417	417	326	-	-	-
Modulating (100 Starts)	ft-lb 396	396	396	396	310	-	-	-
	Nm 536	536	536	536	420	-	-	-

MX-140

Output Speed ID	2	3	4	5	6	7
Ratio	65	43	33	22	13	10
Start Efficiency	0.34	0.51	0.65	0.72	0.78	0.84
Stall Factor	0.41	0.66	0.84	0.93	1.12	1.09
Motor Start Torque	ft-lb 62	85	85	85	85	85
	Nm 84.13	115.35	115.35	115.35	115.35	115.35
Output Torque						
Start	ft-lb 1500	1700	1600	1200	815	650
	Nm 2034	2305	2169	1627	1105	881
Stall	ft-lb 2250	2550	2400	1800	1223	975
	Nm 3053	3460	3257	2443	1659	1323
Modulating (Continuous) ²	ft-lb 1200	1360	1280	960	-	-
	Nm 1627	1844	1735	1301	-	-
Modulating (100 Starts)	ft-lb 1350	1530	1440	1080	-	-
	Nm 1830	2074	1952	1464	-	-

Output speed ID numbers are defined as follows:

ID Number	1	2	3	4	5	6	7	8
50 Hz	15	22	33	43	65	84 (110 ⁵)	127 (143 ⁵)	165
60 Hz	18	26	40	52	77	100 (131 ⁵)	155 (170 ⁵)	200

Notes indicated above are located on other side.



Limitorque Actuation Systems