

X72

External forces and moments

Crankshaft type : Full crank pin

Rating R1+ : 3610 kW/Cyl. / 89 rpm / Standard Tier2-EO Tuning

Engine Type	4X72	5X72	6X72	7X72	8X72
Speed	89 rpm	89 rpm	89 rpm	89 rpm	89 rpm
Power	14440 kW	18050 kW	21660 kW	25270 kW	28880 kW
Crank type	FCV2	FCV2	FCV2	FCV2	FCV1
Massmoments / Forces					
Free Forces					
F1v [±kN]	0	0	0	0	0
F1h [±kN]	0	0	0	0	0
F2v [±kN]	0	0	0	0	0
F4v [±kN]	185	0	0	0	0
External Moments					
M1v [±kNm]	1137	340	0	207	682
M1h [±kNm]	1137	382	0	223	761
M2v [±kNm]	3441	4284	2980	865	0
M2v *) [±kNm]	1173	1513	1392	-	-
M4v [±kNm]	0	27	207	588	239
Lateral H-Moments M_{LH}					
Ord.1 [±kNm]	0	0	0	0	0
Ord.2 [±kNm]	0	0	0	0	0
Ord.3 [±kNm]	0	0	0	0	0
Ord.4 [±kNm]	2094	0	0	0	0
Ord.5 [±kNm]	0	2437	0	0	0
Ord.6 [±kNm]	0	0	1805	0	0
Ord.7 [±kNm]	0	0	0	1437	0
Ord.8 [±kNm]	504	0	0	0	1008
Ord.9 [±kNm]	0	0	0	0	0
Ord.10 [±kNm]	0	221	0	0	0
Ord.11 [±kNm]	0	0	0	0	0
Ord.12 [±kNm]	31	0	47	0	0
Lateral X-Moments M_{LX}					
Ord.1 [±kNm]	846	268	0	160	536
Ord.2 [±kNm]	405	504	351	102	0
Ord.3 [±kNm]	76	268	484	529	679
Ord.4 [±kNm]	0	88	679	1931	784
Ord.5 [±kNm]	210	0	0	149	1872
Ord.6 [±kNm]	317	36	0	21	0
Ord.7 [±kNm]	81	285	0	0	51
Ord.8 [±kNm]	0	165	115	9	0
Ord.9 [±kNm]	27	9	172	19	17
Ord.10 [±kNm]	50	0	43	122	0
Ord.11 [±kNm]	6	2	0	42	54
Ord.12 [±kNm]	0	10	0	2	8
Torque variation [±kNm]	2297	2495	1823	1445	1010

*) with iELBA applied at FE + DE

The values for other engine ratings are available on request

The resulting lateral guide force can be calculated as follows: FL=MLH x 0.215 [kN]

X72**External forces and moments**

Crankshaft type : Full crank pin

Rating R1+ : 3610 kW/Cyl. / 89 rpm / Delta Tier2-EO Tuning

Engine Type	4X72	5X72	6X72	7X72	8X72
Speed	89 rpm	89 rpm	89 rpm	89 rpm	89 rpm
Power	14440 kW	18050 kW	21660 kW	25270 kW	28880 kW
Crank type	FCV2	FCV2	FCV2	FCV2	FCV1
Massmoments / Forces					
Free Forces					
F1v [±kN]	0	0	0	0	0
F1h [±kN]	0	0	0	0	0
F2v [±kN]	0	0	0	0	0
F4v [±kN]	185	0	0	0	0
External Moments					
M1v [±kNm]	1137	340	0	207	682
M1h [±kNm]	1137	382	0	223	761
M2v [±kNm]	3441	4284	2980	865	0
M2v *) [±kNm]	1173	1513	1392	-	-
M4v [±kNm]	0	27	207	588	239
Lateral H-Moments M_{LH}					
Ord.1 [±kNm]	0	0	0	0	0
Ord.2 [±kNm]	0	0	0	0	0
Ord.3 [±kNm]	0	0	0	0	0
Ord.4 [±kNm]	2047	0	0	0	0
Ord.5 [±kNm]	0	2384	0	0	0
Ord.6 [±kNm]	0	0	1760	0	0
Ord.7 [±kNm]	0	0	0	1393	0
Ord.8 [±kNm]	483	0	0	0	967
Ord.9 [±kNm]	0	0	0	0	0
Ord.10 [±kNm]	0	208	0	0	0
Ord.11 [±kNm]	0	0	0	0	0
Ord.12 [±kNm]	25	0	38	0	0
Lateral X-Moments M_{LX}					
Ord.1 [±kNm]	838	266	0	158	531
Ord.2 [±kNm]	431	536	373	108	0
Ord.3 [±kNm]	80	283	511	559	717
Ord.4 [±kNm]	0	87	668	1898	771
Ord.5 [±kNm]	205	0	0	146	1832
Ord.6 [±kNm]	309	35	0	21	0
Ord.7 [±kNm]	79	277	0	0	50
Ord.8 [±kNm]	0	158	110	8	0
Ord.9 [±kNm]	26	8	164	18	16
Ord.10 [±kNm]	47	0	41	115	0
Ord.11 [±kNm]	5	2	0	37	47
Ord.12 [±kNm]	0	8	0	2	7
Torque variation [±kNm]	2243	2440	1779	1401	970

*) with iELBA applied at FE + DE

The values for other engine ratings are available on request

The resulting lateral guide force can be calculated as follows: FL=MLH x 0.215 [kN]

X72**External forces and moments**

Crankshaft type : Full crank pin

Rating R1+ : 3610 kW/Cyl. / 89 rpm / LowLoad Tier2-EO Tuning

Engine Type	4X72	5X72	6X72	7X72	8X72
Speed	89 rpm	89 rpm	89 rpm	89 rpm	89 rpm
Power	14440 kW	18050 kW	21660 kW	25270 kW	28880 kW
Crank type	FCV2	FCV2	FCV2	FCV2	FCV1
Massmoments / Forces					
Free Forces					
F1v [±kN]	0	0	0	0	0
F1h [±kN]	0	0	0	0	0
F2v [±kN]	0	0	0	0	0
F4v [±kN]	185	0	0	0	0
External Moments					
M1v [±kNm]	1137	340	0	207	682
M1h [±kNm]	1137	382	0	223	761
M2v [±kNm]	3441	4284	2980	865	0
M2v *) [±kNm]	1173	1513	1392	-	-
M4v [±kNm]	0	27	207	588	239
Lateral H-Moments M_{LH}					
Ord.1 [±kNm]	0	0	0	0	0
Ord.2 [±kNm]	0	0	0	0	0
Ord.3 [±kNm]	0	0	0	0	0
Ord.4 [±kNm]	2048	0	0	0	0
Ord.5 [±kNm]	0	2384	0	0	0
Ord.6 [±kNm]	0	0	1759	0	0
Ord.7 [±kNm]	0	0	0	1392	0
Ord.8 [±kNm]	483	0	0	0	966
Ord.9 [±kNm]	0	0	0	0	0
Ord.10 [±kNm]	0	207	0	0	0
Ord.11 [±kNm]	0	0	0	0	0
Ord.12 [±kNm]	25	0	38	0	0
Lateral X-Moments M_{LX}					
Ord.1 [±kNm]	839	266	0	158	532
Ord.2 [±kNm]	430	536	373	108	0
Ord.3 [±kNm]	80	283	512	560	717
Ord.4 [±kNm]	0	87	668	1898	771
Ord.5 [±kNm]	205	0	0	146	1832
Ord.6 [±kNm]	309	35	0	21	0
Ord.7 [±kNm]	79	276	0	0	50
Ord.8 [±kNm]	0	157	109	8	0
Ord.9 [±kNm]	26	8	164	18	16
Ord.10 [±kNm]	47	0	40	115	0
Ord.11 [±kNm]	5	2	0	36	47
Ord.12 [±kNm]	0	8	0	2	6
Torque variation [±kNm]	2243	2440	1778	1401	970

*) with iELBA applied at FE + DE

The values for other engine ratings are available on request

The resulting lateral guide force can be calculated as follows: FL=MLH x 0.215 [kN]

X72**External forces and moments**

Crankshaft type : Full crank pin

Rating R1+ : 3610 kW/Cyl. / 89 rpm / DeltaBypass Tier2-EO Tuning

Engine Type	4X72	5X72	6X72	7X72	8X72
Speed	89 rpm	89 rpm	89 rpm	89 rpm	89 rpm
Power	14440 kW	18050 kW	21660 kW	25270 kW	28880 kW
Crank type	FCV2	FCV2	FCV2	FCV2	FCV1
Massmoments / Forces					
Free Forces					
F1v [±kN]	0	0	0	0	0
F1h [±kN]	0	0	0	0	0
F2v [±kN]	0	0	0	0	0
F4v [±kN]	185	0	0	0	0
External Moments					
M1v [±kNm]	1137	340	0	207	682
M1h [±kNm]	1137	382	0	223	761
M2v [±kNm]	3441	4284	2980	865	0
M2v *) [±kNm]	1173	1513	1392	-	-
M4v [±kNm]	0	27	207	588	239
Lateral H-Moments M_{LH}					
Ord.1 [±kNm]	0	0	0	0	0
Ord.2 [±kNm]	0	0	0	0	0
Ord.3 [±kNm]	0	0	0	0	0
Ord.4 [±kNm]	2017	0	0	0	0
Ord.5 [±kNm]	0	2371	0	0	0
Ord.6 [±kNm]	0	0	1763	0	0
Ord.7 [±kNm]	0	0	0	1411	0
Ord.8 [±kNm]	500	0	0	0	1001
Ord.9 [±kNm]	0	0	0	0	0
Ord.10 [±kNm]	0	231	0	0	0
Ord.11 [±kNm]	0	0	0	0	0
Ord.12 [±kNm]	39	0	58	0	0
Lateral X-Moments M_{LX}					
Ord.1 [±kNm]	830	264	0	157	526
Ord.2 [±kNm]	449	559	389	113	0
Ord.3 [±kNm]	79	279	504	551	706
Ord.4 [±kNm]	0	86	661	1879	763
Ord.5 [±kNm]	205	0	0	145	1825
Ord.6 [±kNm]	310	35	0	21	0
Ord.7 [±kNm]	80	280	0	0	50
Ord.8 [±kNm]	0	164	114	9	0
Ord.9 [±kNm]	28	9	175	20	17
Ord.10 [±kNm]	52	0	45	129	0
Ord.11 [±kNm]	7	2	0	50	65
Ord.12 [±kNm]	0	12	0	2	9
Torque variation [±kNm]	2216	2427	1778	1413	996

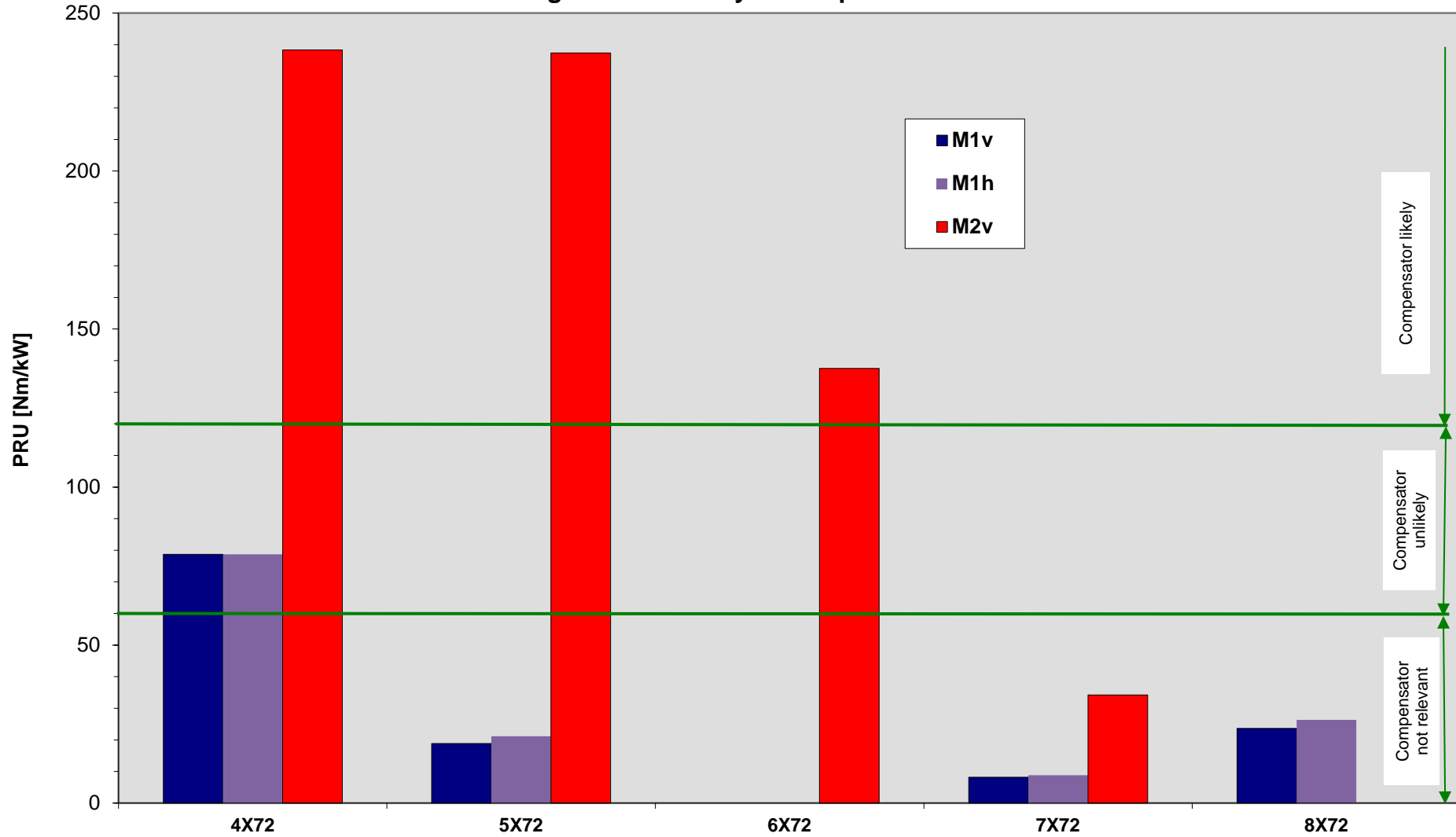
*) with iELBA applied at FE + DE

The values for other engine ratings are available on request

The resulting lateral guide force can be calculated as follows: FL=MLH x 0.215 [kN]

4-8 X72 / Free external mass moments Power Related Unbalance (PRU) Rating R1 3610 kW/Cyl @ 89 rpm

Crankshaft type: Full crank pin



X72**External forces and moments**

Crankshaft type : Full crank pin

Rating R1 : 3610 kW/Cyl. / 84 rpm / Standard Tier2-EO Tuning

Engine Type	4X72	5X72	6X72	7X72	8X72
Speed	84 rpm	84 rpm	84 rpm	84 rpm	84 rpm
Power	14440 kW	18050 kW	21660 kW	25270 kW	28880 kW
Crank type	FCV2	FCV2	FCV2	FCV2	FCV1
Massmoments / Forces					
Free Forces					
F1v [±kN]	0	0	0	0	0
F1h [±kN]	0	0	0	0	0
F2v [±kN]	0	0	0	0	0
F4v [±kN]	165	0	0	0	0
External Moments					
M1v [±kNm]	1013	303	0	184	607
M1h [±kNm]	1013	340	0	199	678
M2v [±kNm]	3066	3816	2655	771	0
M2v *) [±kNm]	1046	1348	1241	-	-
M4v [±kNm]	0	24	184	523	213
Lateral H-Moments M_{LH}					
Ord.1 [±kNm]	0	0	0	0	0
Ord.2 [±kNm]	0	0	0	0	0
Ord.3 [±kNm]	0	0	0	0	0
Ord.4 [±kNm]	2213	0	0	0	0
Ord.5 [±kNm]	0	2445	0	0	0
Ord.6 [±kNm]	0	0	1799	0	0
Ord.7 [±kNm]	0	0	0	1415	0
Ord.8 [±kNm]	487	0	0	0	974
Ord.9 [±kNm]	0	0	0	0	0
Ord.10 [±kNm]	0	200	0	0	0
Ord.11 [±kNm]	0	0	0	0	0
Ord.12 [±kNm]	18	0	27	0	0
Lateral X-Moments M_{LX}					
Ord.1 [±kNm]	838	266	0	158	531
Ord.2 [±kNm]	189	236	164	48	0
Ord.3 [±kNm]	78	273	493	540	692
Ord.4 [±kNm]	0	89	688	1955	794
Ord.5 [±kNm]	208	0	0	148	1854
Ord.6 [±kNm]	314	35	0	21	0
Ord.7 [±kNm]	80	281	0	0	51
Ord.8 [±kNm]	0	160	111	9	0
Ord.9 [±kNm]	25	8	157	18	16
Ord.10 [±kNm]	45	0	39	112	0
Ord.11 [±kNm]	5	2	0	34	44
Ord.12 [±kNm]	0	5	0	1	4
Torque variation [±kNm]	2403	2502	1817	1424	975

*) with iELBA applied at FE + DE

The values for other engine ratings are available on request

The resulting lateral guide force can be calculated as follows: FL=MLH x 0.215 [kN]

X72**External forces and moments**

Crankshaft type : Full crank pin

Rating R1 : 3610 kW/Cyl. / 84 rpm / Delta Tier2-EO Tuning

Engine Type	4X72	5X72	6X72	7X72	8X72
Speed	84 rpm	84 rpm	84 rpm	84 rpm	84 rpm
Power	14440 kW	18050 kW	21660 kW	25270 kW	28880 kW
Crank type	FCV2	FCV2	FCV2	FCV2	FCV1
Massmoments / Forces					
Free Forces					
F1v [±kN]	0	0	0	0	0
F1h [±kN]	0	0	0	0	0
F2v [±kN]	0	0	0	0	0
F4v [±kN]	165	0	0	0	0
External Moments					
M1v [±kNm]	1013	303	0	184	607
M1h [±kNm]	1013	340	0	199	678
M2v [±kNm]	3066	3816	2655	771	0
M2v *) [±kNm]	1046	1348	1241	-	-
M4v [±kNm]	0	24	184	523	213
Lateral H-Moments M_{LH}					
Ord.1 [±kNm]	0	0	0	0	0
Ord.2 [±kNm]	0	0	0	0	0
Ord.3 [±kNm]	0	0	0	0	0
Ord.4 [±kNm]	2165	0	0	0	0
Ord.5 [±kNm]	0	2393	0	0	0
Ord.6 [±kNm]	0	0	1749	0	0
Ord.7 [±kNm]	0	0	0	1368	0
Ord.8 [±kNm]	467	0	0	0	934
Ord.9 [±kNm]	0	0	0	0	0
Ord.10 [±kNm]	0	186	0	0	0
Ord.11 [±kNm]	0	0	0	0	0
Ord.12 [±kNm]	11	0	16	0	0
Lateral X-Moments M_{LX}					
Ord.1 [±kNm]	830	264	0	157	526
Ord.2 [±kNm]	209	261	181	53	0
Ord.3 [±kNm]	79	278	503	550	705
Ord.4 [±kNm]	0	88	675	1919	780
Ord.5 [±kNm]	204	0	0	145	1819
Ord.6 [±kNm]	305	34	0	20	0
Ord.7 [±kNm]	77	272	0	0	49
Ord.8 [±kNm]	0	153	107	8	0
Ord.9 [±kNm]	23	7	146	16	15
Ord.10 [±kNm]	43	0	37	105	0
Ord.11 [±kNm]	4	1	0	31	39
Ord.12 [±kNm]	0	2	0	0	2
Torque variation [±kNm]	2349	2450	1768	1377	936

*) with iELBA applied at FE + DE

The values for other engine ratings are available on request

The resulting lateral guide force can be calculated as follows: FL=MLH x 0.215 [kN]

X72**External forces and moments**

Crankshaft type : Full crank pin

Rating R1 : 3610 kW/Cyl. / 84 rpm / LowLoad Tier2-EO Tuning

Engine Type	4X72	5X72	6X72	7X72	8X72
Speed	84 rpm	84 rpm	84 rpm	84 rpm	84 rpm
Power	14440 kW	18050 kW	21660 kW	25270 kW	28880 kW
Crank type	FCV2	FCV2	FCV2	FCV2	FCV1
Massmoments / Forces					
Free Forces					
F1v [±kN]	0	0	0	0	0
F1h [±kN]	0	0	0	0	0
F2v [±kN]	0	0	0	0	0
F4v [±kN]	165	0	0	0	0
External Moments					
M1v [±kNm]	1013	303	0	184	607
M1h [±kNm]	1013	340	0	199	678
M2v [±kNm]	3066	3816	2655	771	0
M2v *) [±kNm]	1046	1348	1241	-	-
M4v [±kNm]	0	24	184	523	213
Lateral H-Moments M_{LH}					
Ord.1 [±kNm]	0	0	0	0	0
Ord.2 [±kNm]	0	0	0	0	0
Ord.3 [±kNm]	0	0	0	0	0
Ord.4 [±kNm]	2165	0	0	0	0
Ord.5 [±kNm]	0	2394	0	0	0
Ord.6 [±kNm]	0	0	1749	0	0
Ord.7 [±kNm]	0	0	0	1368	0
Ord.8 [±kNm]	467	0	0	0	934
Ord.9 [±kNm]	0	0	0	0	0
Ord.10 [±kNm]	0	186	0	0	0
Ord.11 [±kNm]	0	0	0	0	0
Ord.12 [±kNm]	11	0	16	0	0
Lateral X-Moments M_{LX}					
Ord.1 [±kNm]	831	264	0	157	527
Ord.2 [±kNm]	209	260	181	53	0
Ord.3 [±kNm]	79	278	503	550	705
Ord.4 [±kNm]	0	88	676	1920	780
Ord.5 [±kNm]	204	0	0	145	1819
Ord.6 [±kNm]	305	34	0	20	0
Ord.7 [±kNm]	77	272	0	0	49
Ord.8 [±kNm]	0	153	107	8	0
Ord.9 [±kNm]	23	7	146	16	15
Ord.10 [±kNm]	43	0	37	105	0
Ord.11 [±kNm]	4	1	0	31	39
Ord.12 [±kNm]	0	2	0	0	2
Torque variation [±kNm]	2350	2451	1768	1377	936

*) with iELBA applied at FE + DE

The values for other engine ratings are available on request

The resulting lateral guide force can be calculated as follows: FL=MLH x 0.215 [kN]

X72**External forces and moments**

Crankshaft type : Full crank pin

Rating R1 : 3610 kW/Cyl. / 84 rpm / DeltaBypass Tier2-EO Tuning

Engine Type	4X72	5X72	6X72	7X72	8X72
Speed	84 rpm	84 rpm	84 rpm	84 rpm	84 rpm
Power	14440 kW	18050 kW	21660 kW	25270 kW	28880 kW
Crank type	FCV2	FCV2	FCV2	FCV2	FCV1
Massmoments / Forces					
Free Forces					
F1v [±kN]	0	0	0	0	0
F1h [±kN]	0	0	0	0	0
F2v [±kN]	0	0	0	0	0
F4v [±kN]	165	0	0	0	0
External Moments					
M1v [±kNm]	1013	303	0	184	607
M1h [±kNm]	1013	340	0	199	678
M2v [±kNm]	3066	3816	2655	771	0
M2v *) [±kNm]	1046	1348	1241	-	-
M4v [±kNm]	0	24	184	523	213
Lateral H-Moments M_{LH}					
Ord.1 [±kNm]	0	0	0	0	0
Ord.2 [±kNm]	0	0	0	0	0
Ord.3 [±kNm]	0	0	0	0	0
Ord.4 [±kNm]	2153	0	0	0	0
Ord.5 [±kNm]	0	2396	0	0	0
Ord.6 [±kNm]	0	0	1766	0	0
Ord.7 [±kNm]	0	0	0	1396	0
Ord.8 [±kNm]	485	0	0	0	970
Ord.9 [±kNm]	0	0	0	0	0
Ord.10 [±kNm]	0	208	0	0	0
Ord.11 [±kNm]	0	0	0	0	0
Ord.12 [±kNm]	24	0	36	0	0
Lateral X-Moments M_{LX}					
Ord.1 [±kNm]	825	262	0	156	523
Ord.2 [±kNm]	216	268	187	54	0
Ord.3 [±kNm]	75	266	480	525	673
Ord.4 [±kNm]	0	87	674	1914	778
Ord.5 [±kNm]	204	0	0	145	1820
Ord.6 [±kNm]	309	35	0	21	0
Ord.7 [±kNm]	79	278	0	0	50
Ord.8 [±kNm]	0	159	111	9	0
Ord.9 [±kNm]	25	8	159	18	16
Ord.10 [±kNm]	48	0	41	117	0
Ord.11 [±kNm]	6	2	0	41	53
Ord.12 [±kNm]	0	6	0	1	5
Torque variation [±kNm]	2341	2451	1782	1401	966

*) with iELBA applied at FE + DE

The values for other engine ratings are available on request

The resulting lateral guide force can be calculated as follows: FL=MLH x 0.215 [kN]

4-8 X72 / Free external mass moments Power Related Unbalance (PRU) Rating R1 3610 kW/Cyl @ 84 rpm

Crankshaft type: Full crank pin

