

Winch Drives

Classification of crane

		Hoisting	Slewing	Boom Activation	Trolley Travelling	Crane Travelling
Erection cranes		M 2 - M 3	M 2 - M 3	M 1 - M 2	M 1 - M 2	M 2 - M 3
Loading bridges	hook	M 5 - M 6	M 4	–	M 4 - M 5	M 5 - M 6
Loading bridges	grab or magnet	M 7 - M 8	M 6	–	M 6 - M 7	M 7 - M 8
Workshop cranes		M 6	M 4	–	M 4	M 5
Overhead travelling cranes, ram cranes, scrap yard cranes	grab or magnet	M 8	M 6	–	M 6 - M 7	M 7 - M 8
Unloading bridges, container gantry cranes	hook or spreader	M 6 - M 7	M 5 - M 6	M 3 - M 4	M 6 - M 7	M 4 - M 5
Other gantry cranes (with trolley and/or live ring)	hook	M 4 - M 5	M 4 - M 5	–	M 4 - M 5	M 4 - M 5
Unloading bridges, container gantry cranes (with trolley and/or live ring)	grab or magnet	M 8	M 5 - M 6	M 3 - M 4	M 7 - M 8	M 4 - M 5
Berth cranes, shipyard cranes, dismantling cranes	hook	M 5 - M 6	M 4 - M 5	M 4 - M 5	M 4 - M 5	M 5 - M 6
Dockside cranes (sleuable, gantry type, ...), floating cranes, floating sheerlegs	hook	M 6 - M 7	M 5 - M 6	M 5 - M 6	–	M 3 - M 4
Dockside cranes (sleuable, gantry type, ...), floating cranes, floating sheerlegs	grab or magnet	M 7 - M 8	M 6 - M 7	M 6 - M 7	–	M 4 - M 5
Floating cranes and floating sheerlegs for very high loads (normally above 100 t)		M 3 - M 4	M 3 - M 4	M 3 - M 4	–	–
Shipboard cranes	hook	M 4	M 3 - M 4	M 3 - M 4	M 2	M 3
Shipboard cranes	grab or magnet	M 5 - M 6	M 3 - M 4	M 3 - M 4	M 4 - M 5	M 3 - M 4
Tower cranes for construction sites		M 4	M 5	M 4	M 3	M 3
Derrick tower gantry		M 2 - M 3	M 1 - M 2	M 1 - M 2	–	–
Railroad cranes, approved for service in trains		M 3 - M 4	M 2 - M 3	M 2 - M 3	–	–
Vehicle-mounted cranes	hook	M 3 - M 4	M 2 - M 3	M 2 - M 3	–	–

Torque conversion factors k according to FEM 1.001 3rd edition, Section 1

	T2	T3	T4	T5	T6	T7	T8
Average usage per day [h]	0.25 - 0.5	0.5 - 1	1 - 2	2 - 4	4 - 8	8 - 16	about 16
Total service life [h]	400 - 800	800 - 1600	1600 - 3200	3200 - 6300	6300 - 12500	12500 - 25000	25000 - 50000
DUTY CYCLE LOAD CLASS	MACHINE CLASS & TORQUE CONVERSION FACTOR K						
L1 light	M 1 1.24	M 2 1.24	M 3 1.11	M 4 1.11	M 5 0.95	M 6 0.91	M 7 0.85
L2 medium	M 2 1.24	M 3 1.24	M 4 1.08	M 5 1	M 6 0.87	M 7 0.80	M 8 0.67
L3 heavy	M 3 0.98	M 4 0.95	M 5 0.91	M 6 0.80	M 7 0.71	M 8 0.59	M 8 0.56
L4 extremely heavy	M 4 0.80	M 5 0.75	M 6 0.71	M 7 0.63	M 8 0.56	M 8 0.5	M 8 0.44

Definition of Nominal Torque T_{Nom}

- Drum output speed 25 rpm
- FEM class M5 / T5 / L2

Torque calculation T_{eff} for alternative FEM - class

$$T_{eff} = K \times T_{Nom}$$

K: torque conversion factor

Additional check - conditions

- 1- For all machine classes > M5 (M6-M8): to be checked, whether drum output speed 25rpm must be reduced. Refer to Carraro Sales or Application engineering.
- 2- Brake torque safety must be checked upon formula :

$$v = \frac{T_{Brake} \times i}{T_{eff}} > 1.6$$

T_{Brake} : brake torque at drive input

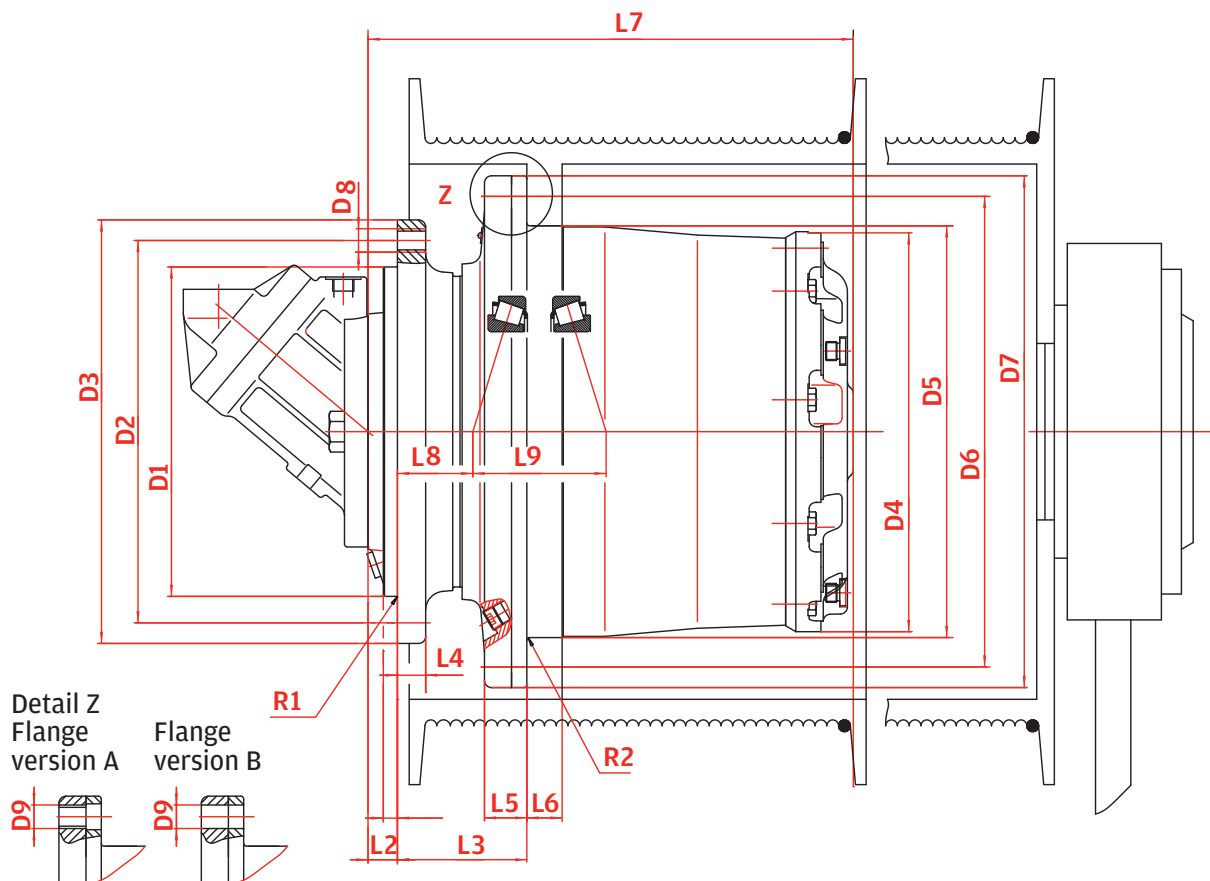
i: drive ratio

If brake safety < 1.6 refer to Carraro Sales or Application engineering.

Winch Drives

Standard features

- › Compact structure
- › Robust layout of planetary gear unit
- › Robust taper roller bearings for drum support and cable pull
- › Integrated disc-brake
- › Easy oil change from front side
- › Easy drum mounting
- › High variety of ratios and hydraulic motors



		FW 10	FW 13	FW 30	FW 30K
Nominal torque T_{Nom} (M5 / T5 / L2)	kNm	5.4	7.25	17.6	17.6
Ratio ¹	i	35 51	93 108 122 140 178 229	61 66 81 90 101 114 121 137 171 228 305	61 66 81 90 101 114 121 137 171 228 305
CAPACITY OF BEARING					
C-dynamic	kN	132	132	132/194	132/194
Co-static	kN	255	255	255/325	255/325
Weight ²	kg	45	50	94	94
MULTI-DISK BRAKE					
Locking torque version ³	Nm	200	200	300 / 400	300 / 400
Release pressure min.	bar	17	17	16 / 22	16 / 22
HYDRAULIC MOTOR					
plug in fixed	ccm	28	28	40	28
		30	30	45	30
		32	32	56	32
				60	
				63	
plug in variable	ccm	28	28	55	28
		45	45	60	
DIMENSIONS					
L 1	mm	10	10	13	13
L 2	mm	30	30	25	22
L 3	mm	72	72	75	75
L 4	mm	13.5	13.5	15	15
L 5	mm	15	15	29	29
L 6	mm	16	16	25	25
L 7	mm	230	255	323	320
L 8	mm	28	28	28.5	28.5
L 9	mm	79	79	89	89
R 1	mm	0.6	0.6	2.5	2.5
R 2	mm	0.6	0.6	2.5	2.5
D 1	mm	190	190	240	240
D 2	mm	230	230	275	275
D 3	mm	256	256	304	304
D 4	mm	216	216	269	269
D 5	mm	220	220	270	270
D 6	mm	260	260	305	305
D 7	mm	290	290	335	335
D 8	M	16	16	16	16
D 9 Version A	M	16	16	16	16
D 9 Version B	mm	17	17	17	17
Qty. D 8 / D 9		12/8	12/8	18/18	18/18

1) Other ratios on demand

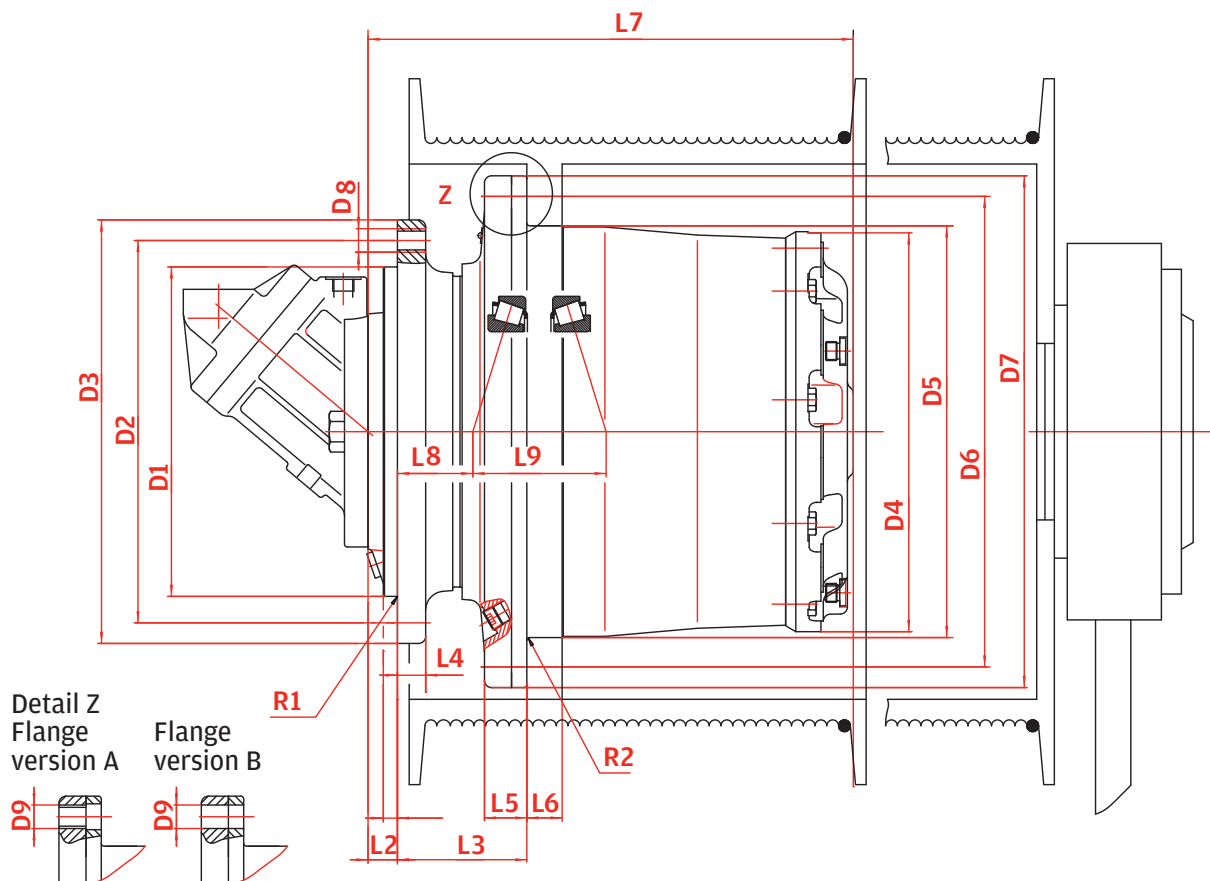
2) Without Hydraulic motor

3) Optional brake torques on demand

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		FW 40	FW 40A	FW 55	FW 55A	FW 55B	FW 80	FW 80A	FW 80B
Nominal torque T _{Nom} (M5 / T5 / L2)	kNm	20	20	25.4	25.4	25.4	42.8	42.8	42.8
Ratio ¹	i	61	61	63	63	63	61	61	61
		66	66	68	68	68	81	81	81
		81	81	87	87	87	101	101	101
		85	85	94	94	94	114	114	114
		101	101	117	117	117	121	121	121
		110	110	124	124	124	137	137	137
		117	117	137	137	137	147	147	147
		124	124	148	148	148	171	171	171
		142	142	185	185	185	187	187	187
		181	181				206	206	206
CAPACITY OF BEARING									
C-dynamic	kN	224	224	224	224	224	300	300	300
Co-static	kN	405	405	405	405	405	570	570	570
Weight ²	kg	115	123	165	177	181	215	227	228
MULTI-DISK BRAKE									
Locking torque version ³	Nm	420	420	420 / 500	420 / 500	420 / 500	600 / 1000	600 / 1000	600 / 1000
Release pressure min.	bar	18	18	15 / 21	15 / 21	15 / 21	18 / 28	18 / 28	18 / 28
HYDRAULIC MOTOR									
plug in fixed	ccm	40	80	80	40		107	80	160
		45	90	90	45		110	90	180
		56			56		125		
		60			60				
		63			63				
plug in variable	ccm	55	80	80	55	107	107	80	160
		60			60	110	110		
DIMENSIONS									
L 1	mm	16	13	12	20	12	20	20	20
L 2	mm	16	35	25	30	37	35	35	35
L 3	mm	91	91	110	91	110	90	90	90
L 4	mm	21	21	24	24	24	22	22	22
L 5	mm	34	34	36	36	36	37	37	37
L 6	mm	26	26	30	30	30	24	24	24
L 7	mm	338	357	413	399	425	415	415	415
L 8	mm	38	38	64	45	64	34	34	34
L 9	mm	100	100	113	113	113	123	123	123
R 1	mm	2.5	2.5	1	4	1	4	4	4
R 2	mm	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
D 1	mm	240	270	280	240	290	330	330	330
D 2	mm	285	310	325	285	335	370	370	370
D 3	mm	320	345	360	320	370	410	410	410
D 4	mm	294	294	340	340	340	374	374	374
D 5	mm	295	295	350	350	350	400	400	400
D 6	mm	335	335	400	400	400	450	450	450
D 7	mm	370	370	435	435	435	490	490	490
D 8	M	16x1.5	16x1.5	20x1.5	20x1.5	20x1.5	24x2	24x2	24x2
D 9 Version A	M	16x1.5	16x1.5	20x1.5	20x1.5	20x1.5	24x2	24x2	24x2
D 9 Version B	mm	17.5	17.5	22	22	22	26	26	26
Qty. D 8 / D 9		20/20	16/20	24/20	20/20	20/20	20/20	20/20	20/20

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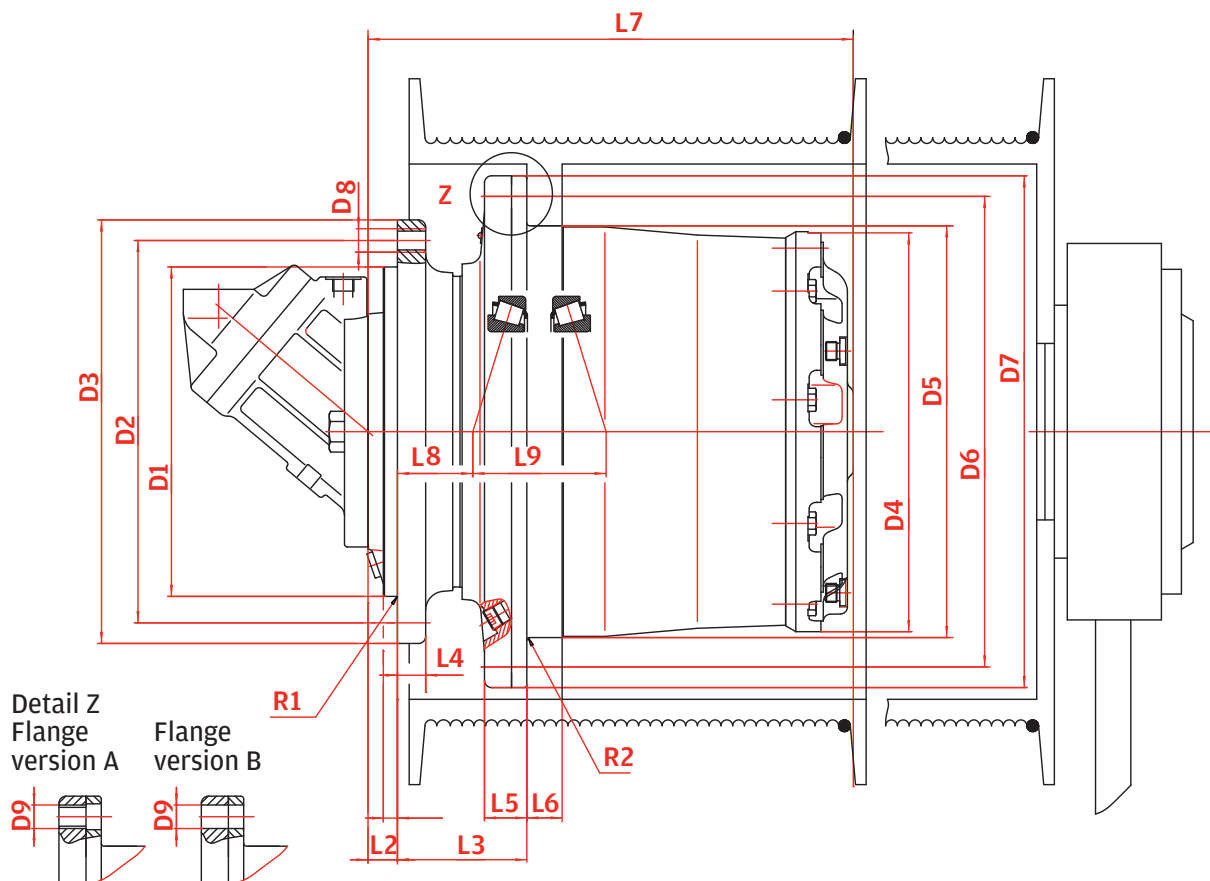
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		FW 100	FW 100B	FW 130	FW 180	FW 220	FW 260	FW 360
Nominal torque T_{Nom} (M5 / T5 / L2)	kNm	53.5	53.5	78.5	112.5	140	175	210
Ratio ¹	i	77 84 95 121 142 175 192 226	77 84 95 121 142 175 192 226	81 85 115 159 167 180 206	206 281	97 119 190 248 290 345	69 97 245 345	94 128 223 257 490
CAPACITY OF BEARING								
C-dynamic	kN	498	498	523	787	765	750	1 040
Co-static	kN	1010	1010	980	1650	1660	1560	2450
Weight ²	kg	325	338	452	636	740	865	1080
MULTI-DISK BRAKE								
Locking torque version ³	Nm	600 / 900	600 / 900	750	1200	1200	1000	1700
Release pressure min.	bar	13	13	17	35	15	15	12
HYDRAULIC MOTOR								
plug in fixed	ccm	107 125	160 180	107 125 160 180	180	107 180		355
plug in variable	ccm	107 110	160	107 160		160 200 250	355 250	355
DIMENSIONS								
L 1	mm	35	37	45	30	18	21	100
L 2	mm	35	37	45	30	52	45	100
L 3	mm	165	165	190	168	166.5	170	130
L 4	mm	28	28	35	40	40	40	40
L 5	mm	53	53	58	56	61	48	60
L 6	mm	43	43	45	21.5	35	60	80
L 7	mm	461	463	530	534.5	580.5	579	658
L 8	mm	32	32	50.5	50.3	16	18.5	-25
L 9	mm	139	139	147	141.4	187.5	189.5	215
R 1	mm	10/60	12/60	25	4	35°/16/16	2	18°/100/16
R 2	mm	5	5	4	3	4	/	10
D 1	mm	390	390	390	450	460	460	580
D 2	mm	460	460	500	510	600	520	680
D 3	mm	500	500	550	560	650	570	735
D 4	mm	407	407	449	528	540	608	649
D 5	mm	408	408	450	535	542	610	650
D 6	mm	460	460	500	600	600	680	720
D 7	mm	500	500	550	650	650	735	775
D 8	M	24x2	24x2	24x2	24x2	24x2	30x2	30
D 9 Version A	M	24x2	24x2	24x2	24x2	24x2	30x2	30
D 9 Version B	mm	26	26	26	26	26	32	32
Qty. D 8 / D 9		30/24	30/24	32/32	30/30	38/38	24/24	30/30

1) Other ratios on demand

2) Without Hydraulic motor

3) Optional brake torques on demand