

「 FMR SERIES ROLLER SCREW SERVO ACTUATOR 」

■ Performance FMR :

Load range: From 500kgs - 100 Tons

Stroke Max.4 Meters.

Max. Speed:1m/s; Max. Acceleration: 1g

High Efficiency roller screw, continuously duty cycle.

Positioning Accuracy 0.02mm; Closed loop: 0.01mm

Force Accuracy: closed-loop precision 0.5%; Built-in pressure sensor available

Ultra-long lifespan, 10-15 times longer than similar ball screw electric cylinders.

High protection level IP65, suitable for harsh working environments.

High-performance lubricants, maintenance-free for life.



The difference between planetary roller screws and ball screws

Planetary roller screws and ball screws have similar structures, but the difference lies in the load transfer element, which are threaded rollers, rather than balls. Our main advantage has numerous contact points to support the load.

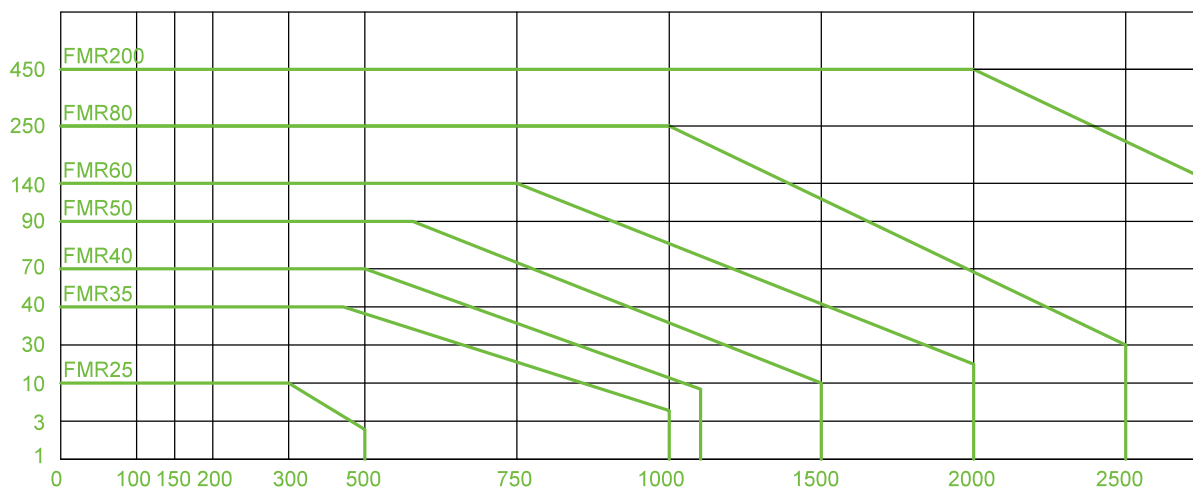
Capacity and lifespan

The advantages of planetary roller screws lie in the ability to provide higher rated dynamic and static load. The use of threaded rollers instead of balls allows the load to be rapidly released through numerous contact points, thereby providing higher impact resistance.



Critical Buckling Force Graphs:

Load /kN



Stable length L mm

Both planetary roller screws and ball screws are suitable for use with Hertz law.

According to Hertz law, the static load capacity of planetary roller screws is 3 times that of ball screws, and their lifespan is 15 times that of ball screws.

Speed and acceleration

Planetary roller screws can provide higher rotational speeds and higher accelerations. RV series planetary roller screws are non-circulating, which allows for double rotational speed compared to ball screws, and accelerations of up to 3g.

Lead and pitch

The lead of planetary roller screws can be smaller than that of ball screws. Since the lead is a function of the pitch of the planetary roller screw, it can be smaller than 0.5mm or even smaller. The lead of planetary roller screws can be designed and calculated as an integer or a decimal (e.g., moving 3.32mm per revolution), there will be no need for reduction gears to match. Changes in lead do not result in any geometric size changes for the screw shaft and nut. The lead of the ball screw is limited by the diameter of the ball, so the lead will be standard.

Rigidity and strength

The numerous contact points of planetary roller screws will significantly increase rigidity and impact resistance.

Performance table:

Model	FMR25			FMR35			FMR40			FMR50			FMR60			FMR80			FMR200		
Screw dia mm	15			25			30			39			48			60			75		
Lead mm	5			5			10			10			20			10			20		
Rated Force KN	7			25			50			70			100			160			250		
Maximum force KN	10			40			70			90			140			250			450		
Max. Speed mm/s	375			500			890			1025			1111			889			711		
Efficiency	0.78			0.75			0.8			0.8			0.8			0.8			0.8		
Torque at Rated Force Nm	7.14			24.88			99.5			139.3			199.04			318.5			497.6		
Dynamic Load of Roller Screw KN	26			72.8			106.3			152.6			231.5			338.6			497.8		
Parallel mounting inertia $\text{kgm}^2 \cdot 10^{-4}$	0.1			5.236			12.413			70.423			80.16			195.362			725.3		
Inline coupling inertia $\text{kgm}^2 \cdot 10^{-4}$	0.08			4.136			6.425			29.369			53.28			143.215			625.1		
Inertia/100mm $\text{kgm}^2 \cdot 10^{-4}$	0.052			1.3			2.1			4.52			10.1			29.36			32.5		
Max. Stroke mm	500			800			1000			1200			1500			2000			2500		
Max. input rpm	4500			6000			5340			4100			3333			2667			2133		
Max. Acceleration m/s^2	6			6			6			6			6			3			3		
Weight (Without motor) kg	6.9			21.6			27.5			70.6			100.2			126.1			165.2		
Weight per 100mm stroke kg	1			1.92			2.35			4.5			6.3			14.6			21.1		
Max.idling angle	± 0.3			± 0.3			± 0.3			± 0.3			± 0.3			± 0.3			± 0.3		
Axial backlash mm	0.05			0.05			0.05			0.05			0.05			0.05			0.05		
Lead Tolerance within 300mm/mm	0.023			0.023			0.023			0.023			0.023			0.023			0.023		
Repeat accuracy mm	0.02			0.02			0.02			0.02			0.02			0.02			0.02		

FMR25 Performance Specification :

Model	Lead mm	Reducer	Ratio	Speed at 1500rpm mm/s	Actual load N										Max.linear speed mm/s	
					7000		6000		5000		3000		1500			
					Power KW	Torque Nm	Power KW	Torque Nm	Power KW	Torque Nm	Power KW	Torque Nm	Power KW	Torque Nm		
FMR25-05	5	Parallel 1:1	NON	125	1.368	8.708	1.172	7.464	0.977	6.220	0.586	3.732	0.293	1.866	375	
			1:3	42	0.480	3.056	0.411	2.619	0.343	2.183	0.206	1.310	0.103	0.655	375	
			1:5	25	0.288	1.833	0.247	1.571	0.206	1.310	0.123	0.786	0.062	0.393	375	
			1:10	13	0.144	0.917	0.123	0.786	0.103	0.655	0.062	0.393	0.031	0.196	375	
		Parallel 2:1	NON	63	0.684	4.354	0.586	3.732	0.488	3.110	0.293	1.866	0.147	0.933	375	
			Inline shaft coupling 1:1	NON	125	1.216	7.741	1.042	6.635	0.868	5.529	0.521	3.317	0.261	1.659	375
				1:3	42	0.427	2.716	0.366	2.328	0.305	1.940	0.183	1.164	0.091	0.582	375
				1:5	25	0.256	1.630	0.219	1.397	0.183	1.164	0.110	0.698	0.055	0.349	375
		1:10		13	0.128	0.815	0.110	0.698	0.091	0.582	0.055	0.349	0.027	0.175	375	

FMR35 Performance Specification

Model	Lead mm	Reducer	Ratio	Speed at 1500rpm mm/s	Actual load N										Max.linear speed mm/s
					25000		20000		15000		10000		6000		
					Power KW	Torque Nm	Power KW	Torque Nm	Power KW	Torque Nm	Power KW	Torque Nm	Power KW	Torque Nm	
FMR35-05	5	Parallel 1:1	NON	125	4.885	31.101	3.908	24.881	2.931	18.660	1.954	12.440	1.172	7.464	500
			1:3	42	1.714	10.913	1.371	8.730	1.028	6.548	0.686	4.365	0.411	2.619	500
			1:5	25	1.028	6.548	0.823	5.238	0.617	3.929	0.411	2.619	0.247	1.571	500
			1:10	13	0.514	3.274	0.411	2.619	0.309	1.964	0.206	1.310	0.123	0.786	500
		Parallel 2:1	NON	63	2.442	15.550	1.954	12.440	1.465	9.330	0.977	6.220	0.586	3.732	500
			NON	125	4.342	27.645	3.474	22.116	2.605	16.587	1.737	11.058	1.042	6.635	500
			1:3	42	1.524	9.700	1.219	7.760	0.914	5.820	0.609	3.880	0.366	2.328	500
			1:5	25	0.914	5.820	0.731	4.656	0.548	3.492	0.366	2.328	0.219	1.397	500
		Inline shaft coupling 1:1	1:10	13	0.457	2.910	0.366	2.328	0.274	1.746	0.183	1.164	0.110	0.698	500
					25000		20000		15000		10000		6000		
FMR35-10	10	Parallel 1:1	NON	250	9.770	62.201	7.816	49.761	5.862	37.321	3.908	24.881	2.345	14.928	1000
			1:3	83	3.428	21.825	2.742	17.460	2.057	13.095	1.371	8.730	0.823	5.238	1000
			1:5	50	2.057	13.095	1.645	10.476	1.234	7.857	0.823	5.238	0.494	3.143	1000
			1:10	25	1.028	6.548	0.823	5.238	0.617	3.929	0.411	2.619	0.247	1.571	1000
		Parallel 2:1	NON	125	4.885	31.101	3.908	24.881	2.931	18.660	1.954	12.440	1.172	7.464	1000
			NON	250	8.684	55.290	6.947	44.232	5.211	33.174	3.474	22.116	2.084	13.270	1000
			1:3	83	3.047	19.400	2.438	15.520	1.828	11.640	1.219	7.760	0.731	4.656	1000
			1:5	50	1.828	11.640	1.463	9.312	1.097	6.984	0.731	4.656	0.439	2.794	1000
		Inline shaft coupling 1:1	1:10	25	0.914	5.820	0.731	4.656	0.548	3.492	0.366	2.328	0.219	1.397	1000

FMR40 Performance Specification

Model	Lead mm	Reducer	Ratio	Speed at 1500rpm mm/s	Actual load N										Max.linear speed mm/s
					50000		40000		30000		20000		10000		
					Power KW	Torque Nm	Power KW	Torque Nm	Power KW	Torque Nm	Power KW	Torque Nm	Power KW	Torque Nm	
FMR40-10	10	Parallel 1:1	NON	250	19,540	124,403	15,632	99,522	11,724	74,642	7,816	49,761	3,908	24,881	890
			1:3	83	6,856	43,650	5,485	34,920	4,114	26,190	2,742	17,460	1,371	8,730	890
			1:5	50	4,114	26,190	3,291	20,952	2,468	15,714	1,645	10,476	0,823	5,238	890
			1:10	25	2,057	13,095	1,645	10,476	1,234	7,857	0,823	5,238	0,411	2,619	890
		Parallel 2:1	NON	125	9,770	62,201	7,816	49,761	5,862	37,321	3,908	24,881	1,954	12,440	890
			NON	250	17,369	110,580	13,895	88,464	10,421	66,348	6,947	44,232	3,474	22,116	890
			1:3	83	6,094	38,800	4,875	31,040	3,657	23,280	2,438	15,520	1,219	7,760	890
			1:5	50	3,657	23,280	2,925	18,624	2,194	13,968	1,463	9,312	0,731	4,656	890
		Inline shaft coupling 1:1	1:10	25	1,828	11,640	1,463	9,312	1,097	6,984	0,731	4,656	0,366	2,328	890
					50000		40000		30000		20000		10000		
FMR40-20	20	Parallel 1:1	NON	500	39,079	248,806	31,264	199,045	23,448	149,283	15,632	99,522	7,816	49,761	1780
			1:3	167	13,712	87,300	10,970	69,840	8,227	52,380	5,485	34,920	2,742	17,460	1780
			1:5	100	8,227	52,380	6,582	41,904	4,936	31,428	3,291	20,952	1,645	10,476	1780
			1:10	50	4,114	26,190	3,291	20,952	2,468	15,714	1,645	10,476	0,823	5,238	1780
		Parallel 2:1	NON	250	19,540	124,403	15,632	99,522	11,724	74,642	7,816	49,761	3,908	24,881	1780
			NON	500	34,737	221,161	27,790	176,929	20,842	132,696	13,895	88,464	6,947	44,232	1780
			1:3	167	12,189	77,600	9,751	62,080	7,313	46,560	4,875	31,040	2,438	15,520	1780
			1:5	100	7,313	46,560	5,850	37,248	4,388	27,936	2,925	18,624	1,463	9,312	1780
		Inline shaft coupling 1:1	1:10	50	3,657	23,280	2,925	18,624	2,194	13,968	1,463	9,312	0,731	4,656	1780

FMR50 Performance Specification

Model	Lead mm	Reducer	Ratio	Speed at 1500rpm mm/s	Actual load N										Max.linear speed mm/s		
					70000		65000		60000		55000		40000				
					Power KW	Torque Nm	Power KW	Torque Nm	Power KW	Torque Nm	Power KW	Torque Nm	Power KW	Torque Nm			
FMR50-10	10	Parallel 1:1	NON	250	27.356	174.164	25.402	161.724	23.448	149.283	21.494	136.843	15.632	99.522	683		
			1:3	83	9.598	61.110	8.913	56.745	8.227	52.380	7.542	48.015	5.485	34.920	683		
			1:5	50	5.759	36.666	5.348	34.047	4.936	31.428	4.525	28.809	3.291	20.952	683		
			1:10	25	2.880	18.333	2.674	17.024	2.468	15.714	2.262	14.405	1.645	10.476	683		
		NON	250	24.316	154.812	22.579	143.754	20.842	132.696	19.106	121.638	13.895	88.464	683			
		1:3	83	8.532	54.320	7.923	50.440	7.313	46.560	6.704	42.680	4.875	31.040	683			
		1:5	50	5.119	32.592	4.754	30.264	4.388	27.936	4.022	25.608	2.925	18.624	683			
							80000	75000	70000	60000	50000						
		FMR50-15	15	Parallel 1:1	NON	375	46.895	298.567	43.964	279.906	41.033	261.246	35.171	223.925	29.310	186.604	1025
1:3	125				16.454	104.760	15.426	98.213	14.398	91.665	12.341	78.570	10.284	65.475	1025		
1:5	75				9.873	62.856	9.256	58.928	8.639	54.999	7.405	47.142	6.170	39.285	1025		
1:10	38				4.936	31.428	4.628	29.464	4.319	27.500	3.702	23.571	3.085	19.643	1025		
NON	375			41.685	265.393	39.079	248.806	36.474	232.219	31.264	199.045	26.053	165.870	1025			
1:3	125			14.626	93.120	13.712	87.300	12.798	81.480	10.970	69.840	9.141	58.200	1025			
1:5	75			8.776	55.872	8.227	52.380	7.679	48.888	6.582	41.904	5.485	34.920	1025			
					70000	65000	60000	55000	40000								
FMR50-20	20			Parallel 1:1	NON	500	54.711	348.328	50.803	323.447	46.895	298.567	42.987	273.686	31.264	199.045	1367
		1:3	167		19.197	122.220	17.826	113.490	16.454	104.760	15.083	96.030	10.970	69.840	1367		
		1:5	100		11.518	73.332	10.695	68.094	9.873	62.856	9.050	57.618	6.582	41.904	1367		
		1:10	50		5.759	36.666	5.348	34.047	4.936	31.428	4.525	28.809	3.291	20.952	1367		
		NON	500	48.632	309.625	45.158	287.509	41.685	265.393	38.211	243.277	27.790	176.929	1367			
		1:3	167	17.064	108.640	15.845	100.880	14.626	93.120	13.407	85.360	9.751	62.080	1367			
		1:5	100	10.238	65.184	9.507	60.528	8.776	55.872	8.044	51.216	5.850	37.248	1367			
							70000	65000	60000	55000	40000						

FMR60 Performance Specification

Model	Lead mm	Reducer	Ratio	Speed at 1500rpm mm/s	Actual load N										Max.linear speed mm/s
					100000		90000		80000		70000		60000		
					Power KW	Torque Nm	Power KW	Torque Nm	Power KW	Torque Nm	Power KW	Torque Nm	Power KW	Torque Nm	
FMR60-10	10	Parallel 1:1	NON	250	39.079	248.806	35.171	223.925	31.264	199.045	27.356	174.164	23.448	149.283	556
			1:3	83	13.712	87.300	12.341	78.570	10.970	69.840	9.598	61.110	8.227	52.380	556
			1:5	50	8.227	52.380	7.405	47.142	6.582	41.904	5.759	36.666	4.936	31.428	556
			1:10	25	4.114	26.190	3.702	23.571	3.291	20.952	2.880	18.333	2.468	15.714	556
			1:20	13	2.171	13.823	1.954	12.440	1.737	11.058	1.520	9.676	1.303	8.294	556
		Parallel 2:1	NON	125	19.540	124.403	17.586	111.963	15.632	99.522	13.678	87.082	11.724	74.642	556
		Inline shaft coupling 1:1	NON	250	34.737	221.161	31.264	199.045	27.790	176.929	24.316	154.812	20.842	132.696	556
			1:3	83	12.189	77.600	10.970	69.840	9.751	62.080	8.532	54.320	7.313	46.560	556
			1:5	50	7.313	46.560	6.582	41.904	5.850	37.248	5.119	32.592	4.388	27.936	556
			1:10	25	3.657	23.280	3.291	20.952	2.925	18.624	2.560	16.296	2.194	13.968	556
1:20	13		1.930	12.287	1.737	11.058	1.544	9.829	1.351	8.601	1.158	7.372	556		
					130000		120000		110000		100000		90000		
FMR60-20	20	Parallel 1:1	NON	500	101.607	646.895	93.791	597.134	85.975	547.373	78.159	497.611	70.343	447.850	1111
			1:3	167	35.651	226.981	32.909	209.521	30.167	192.061	27.424	174.601	24.682	157.140	1111
			1:5	100	21.391	136.188	19.745	125.712	18.100	115.236	16.454	104.760	14.809	94.284	1111
			1:10	50	10.695	68.094	9.873	62.856	9.050	57.618	8.227	52.380	7.405	47.142	1111
			1:20	25	5.645	35.939	5.211	33.174	4.776	30.410	4.342	27.645	3.908	24.881	1111
		Parallel 2:1	NON	250	50.803	323.447	46.895	298.567	42.987	273.686	39.079	248.806	35.171	223.925	1111
		Inline shaft coupling 1:1	NON	500	90.317	575.018	83.369	530.786	76.422	486.553	69.475	442.321	62.527	398.089	1111
			1:3	167	31.690	201.761	29.252	186.241	26.815	170.721	24.377	155.200	21.939	139.680	1111
			1:5	100	19.014	121.056	17.551	111.744	16.089	102.432	14.626	93.120	13.164	83.808	1111
			1:10	50	9.507	60.528	8.776	55.872	8.044	51.216	7.313	46.560	6.582	41.904	1111
			1:20	25	5.018	31.945	4.632	29.488	4.246	27.031	3.860	24.573	3.474	22.116	1111

FMR80 Performance Specification

Model	Lead mm	Reducer	Ratio	Speed at 1500rpm mm/s	Actual load N										Max.linear speed mm/s
					160000		140000		120000		110000		100000		
					Power KW	Torque Nm	Power KW	Torque Nm	Power KW	Torque Nm	Power KW	Torque Nm	Power KW	Torque Nm	
FMR80-10	10	Parallel 1:1	NON	250	62.527	398.089	54.711	348.328	46.895	298.567	42.987	273.686	39.079	248.806	445
			1:3	83	21.939	139.680	19.197	122.220	16.454	104.760	15.083	96.030	13.712	87.300	445
			1:5	50	13.164	83.808	11.518	73.332	9.873	62.856	9.050	57.618	8.227	52.380	445
			1:10	25	6.582	41.904	5.759	36.666	4.936	31.428	4.525	28.809	4.114	26.190	445
			1:20	13	3.474	22.116	3.040	19.352	2.605	16.587	2.388	15.205	2.171	13.823	445
			1:50	5	1.389	8.846	1.216	7.741	1.042	6.635	0.955	6.082	0.868	5.529	445
		Parallel 2:1	NON	125	31.264	199.045	27.356	174.164	23.448	149.283	21.494	136.843	19.540	124.403	445
		Inline shaft coupling 1:1	NON	250	55.580	353.857	48.632	309.625	41.685	265.393	38.211	243.277	34.737	221.161	445
			1:3	83	19.502	124.160	17.064	108.640	14.626	93.120	13.407	85.360	12.189	77.600	445
			1:5	50	11.701	74.496	10.238	65.184	8.776	55.872	8.044	51.216	7.313	46.560	445
			1:10	25	5.850	37.248	5.119	32.592	4.388	27.936	4.022	25.608	3.657	23.280	445
			1:20	13	3.088	19.659	2.702	17.201	2.316	14.744	2.123	13.515	1.930	12.287	445
			1:50	5	1.235	7.863	1.081	6.881	0.926	5.898	0.849	5.406	0.772	4.915	445
					200000	180000	160000	140000	120000						
FMR80-20	20	Parallel 1:1	NON	500	156.318	995.223	140.686	895.701	125.054	796.178	109.422	696.656	93.791	597.134	889
			1:3	167	54.848	349.201	49.363	314.281	43.879	279.361	38.394	244.441	32.909	209.521	889
			1:5	100	32.909	209.521	29.618	188.569	26.327	167.616	23.036	146.664	19.745	125.712	889
			1:10	50	16.454	104.760	14.809	94.284	13.164	83.808	11.518	73.332	9.873	62.856	889
			1:20	25	8.684	55.290	7.816	49.761	6.947	44.232	6.079	38.703	5.211	33.174	889
			1:50	10	3.474	22.116	3.126	19.904	2.779	17.693	2.432	15.481	2.084	13.270	889
		Parallel 2:1	NON	250	78.159	497.611	70.343	447.850	62.527	398.089	54.711	348.328	46.895	298.567	889
		Inline shaft coupling 1:1	NON	500	138.949	884.643	125.054	796.178	111.159	707.714	97.264	619.250	83.369	530.786	889
			1:3	167	48.754	310.401	43.879	279.361	39.003	248.321	34.128	217.281	29.252	186.241	889
			1:5	100	29.252	186.241	26.327	167.616	23.402	148.992	20.477	130.368	17.551	111.744	889
			1:10	50	14.626	93.120	13.164	83.808	11.701	74.496	10.238	65.184	8.776	55.872	889
			1:20	25	7.719	49.147	6.947	44.232	6.176	39.317	5.404	34.403	4.632	29.488	889
			1:50	10	3.088	19.659	2.779	17.693	2.470	15.727	2.161	13.761	1.853	11.795	889

FMR200 Performance Specification

Model	Lead mm	Reducer	Ratio	Speed at 1500rpm mm/s	Actual load N										Max.linear speed mm/s
					250000		220000		200000		180000		160000		
					Power KW	Torque Nm	Power KW	Torque Nm	Power KW	Torque Nm	Power KW	Torque Nm	Power KW	Torque Nm	
FMR200-10	10	Parallel 1:1	NON	250	97.699	622.014	85.975	547.373	78.159	497.611	70.343	447.850	62.527	398.089	356
			1:3	83	34.280	218.251	30.167	192.061	27.424	174.601	24.682	157.140	21.939	139.680	356
			1:5	50	20.568	130.950	18.100	115.236	16.454	104.760	14.809	94.284	13.164	83.808	356
			1:10	25	10.284	65.475	9.050	57.618	8.227	52.380	7.405	47.142	6.582	41.904	356
			1:20	13	5.428	34.556	4.776	30.410	4.342	27.645	3.908	24.881	3.474	22.116	356
			1:50	5	2.171	13.823	1.911	12.164	1.737	11.058	1.563	9.952	1.389	8.846	356
		Parallel 2:1	NON	125	48.849	311.007	42.987	273.686	39.079	248.806	35.171	223.925	31.264	199.045	356
		Inline shaft coupling 1:1	NON	250	86.843	552.902	76.422	486.553	69.475	442.321	62.527	398.089	55.580	353.857	356
			1:3	83	30.471	194.001	26.815	170.721	24.377	155.200	21.939	139.680	19.502	124.160	356
			1:5	50	18.283	116.400	16.089	102.432	14.626	93.120	13.164	83.808	11.701	74.496	356
			1:10	25	9.141	58.200	8.044	51.216	7.313	46.560	6.582	41.904	5.850	37.248	356
			1:20	13	4.825	30.717	4.246	27.031	3.860	24.573	3.474	22.116	3.088	19.659	356
			1:50	5	1.930	12.287	1.698	10.812	1.544	9.829	1.389	8.846	1.235	7.863	356
					350000		330000		310000		290000		270000		
FMR200-20	20	Parallel 1:1	NON	500	273.556	1741.640	257.924	1642.118	242.292	1542.596	226.661	1443.073	211.029	1343.551	711
			1:3	167	95.985	611.102	90.500	576.182	85.015	541.262	79.530	506.341	74.045	471.421	711
			1:5	100	57.591	366.661	54.300	345.709	51.009	324.757	47.718	303.805	44.427	282.853	711
			1:10	50	28.795	183.331	27.150	172.855	25.504	162.378	23.859	151.902	22.214	141.426	711
			1:20	25	15.198	96.758	14.329	91.229	13.461	85.700	12.592	80.171	11.724	74.642	711
			1:50	10	6.079	38.703	5.732	36.492	5.384	34.280	5.037	32.068	4.690	29.857	711
		Parallel 2:1	NON	250	136.778	870.820	128.962	821.059	121.146	771.298	113.330	721.537	105.514	671.775	711
		Inline shaft coupling 1:1	NON	500	243.161	1548.125	229.266	1459.660	215.371	1371.196	201.476	1282.732	187.581	1194.268	711
			1:3	167	85.320	543.202	80.444	512.162	75.569	481.121	70.693	450.081	65.818	419.041	711
			1:5	100	51.192	325.921	48.267	307.297	45.341	288.673	42.416	270.049	39.491	251.425	711
			1:10	50	25.596	162.960	24.133	153.648	22.671	144.336	21.208	135.024	19.745	125.712	711
			1:20	25	13.509	86.007	12.737	81.092	11.965	76.178	11.193	71.263	10.421	66.348	711
			1:50	10	5.404	34.403	5.095	32.437	4.786	30.471	4.477	28.505	4.168	26.539	711