



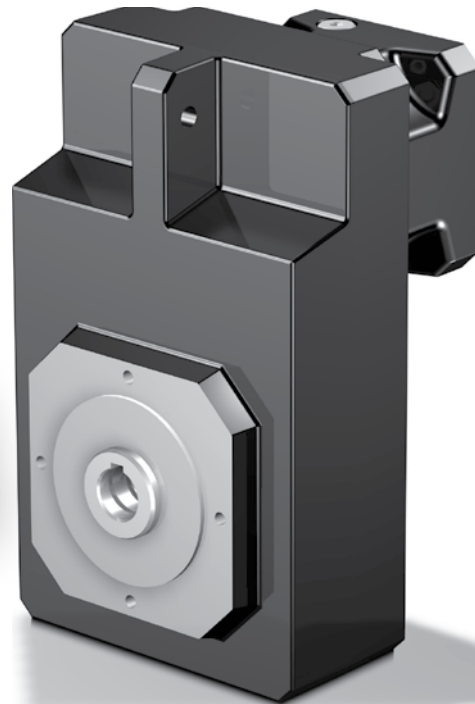
F Series: OFFSET – Solid Shaft/Hollow Output

Compact size and flexibility make these STOBER gear drives a popular choice for applications that require high performance, efficiency, and durability. Series F gear drives, like all SMS units, are available with a wide selection of configurations to match almost any mounting requirement.

F Series Advantages

- ≥95.5% efficiency
- 5 year limited warranty (2 years on bearings, seals, etc.)
- Input RPM up to 6,000
- Assembled in the U.S.A.

**SHIPS in
1 DAY!**
NO EXPEDITE FEE FOR
24 HOUR SERVICE



F Series Features

- 4:1 to 540:1
- Standard backlash is ≤11 arc minutes; reduced backlash is ≤6 arc minutes
- Double lip seals keep oil in and contaminants out. Double seals available for severe duty applications
- High quality helical gearing is case hardened to 58-62 Rockwell C. Precision finished for low noise and long service life
- Magnetic oil filtration
- Most hollow and solid shaft outputs are also available in metric, and in stainless steel for washdown, food, and beverage duty
- Shipped with the proper amount of oil to prevent gear damaging dry start-ups
- One-piece cast iron housing with precision machined bearing supports assure gearset alignment, prolongs bearing life, provides exceptional overhung load capacities, and eliminates leakage problems common to two-piece housings
- Motor plate can easily be changed to fit your choice of motors

F Direction of Rotation

(Viewed looking into output shaft)

CW	CCW
2 Stage F102 F202 F302 F402 F602	3 Stage F203 F303 F403 F603

Optional Features

Diverse Output Styles

- V** Shaft Output
- A** Hollow Output
- S** Shrink Ring
- W** Wobble-Free Bushing

Three Housing Styles

- F** Output flange
- G** Tapped holes
- NG** Foot mounting

Lubrication Options

- Standard or food grade optional

Coating Options

- Beverage Duty (**B** special option)
- Food Duty (**F** special option)

ATEX

- **A**Tmosphere **E**Xplosible — Please allow up to 8 weeks for delivery



Overview

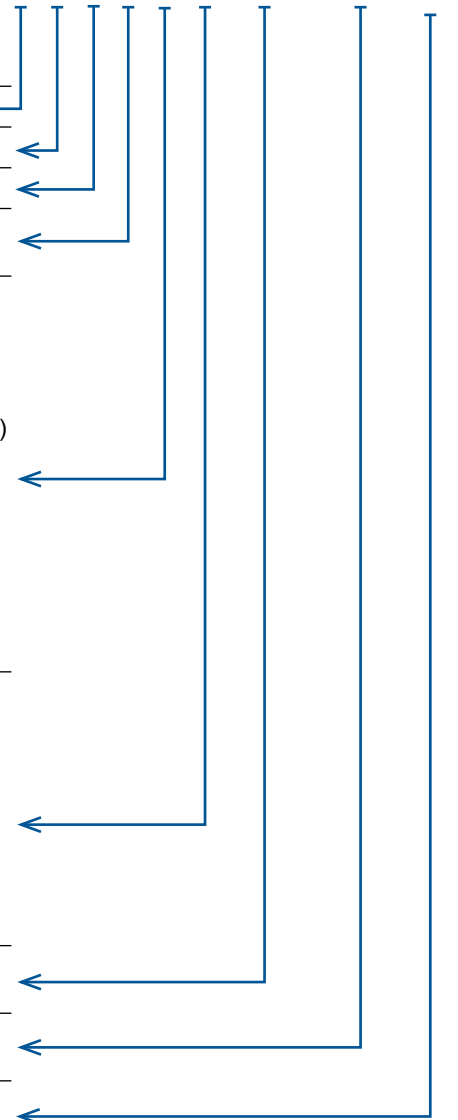
Selection Options *At-a-Glance*

F Series Gearheads are available in a wide range of user-selected design options that tailor the gearhead to your motor choice and exact application requirements. Use the appropriate order codes on the following pages to build a part number for the complete gearhead assembly.

Part Number Example:

F 1 0 2 V F 0043 MT10 B

Design Option	Part Number Code	Description
Series	F	Offset helical
Gearhead Size	1 2 3 4 6	5 sizes of gearhead
Generation	0	Version of gearhead
# of Stages	2 3	Two stage (determined by ratio) Three stage (determined by ratio)
Output	V	Shaft output (only available with housing option "F"; not available with food or beverage duty)
	A	Hollow output (available imperial or metric, stainless steel)
	W	Single or double wobble-free bushing (If single, specify side 5 or 6 only)
	S	Shrink ring
Housing	F	Round output flange
	G	Tapped holes around output
	NG	Foot mounting (with tapped holes for side mounting)
Ratio	0043	Ratios range from 4.3:1 to 552:1 (0043=4.3:1; 0063=6.3:1; 5520=520:1)
Motor Adapter	MT10	4 input sizes (see also motor mounting plate option)
Special Options	B	Add when ordering Beverage Duty
	F	Add when ordering Food Duty



General Specifications

Lubrication	Lubricated for life — Standard: Mobilgear 600XP220 Optional: Food grade (Mobil SHC CIBUS 220) or Synthetic (Mobil SHC630)
Degree of Protection	IP65 standard; IP69K optional
Mounting Position	Must be specified, see page 170
Direction of Rotation	See page 168
Ambient Temperature	0° C to +40°C (104° F) [Unit temperature ≤ 80° C Max.]
Coating	Standard Black (RAL 9005); food option available
Warranty	5 Year Limited (2 years on normal wear items: bearings, seals, etc.)

F Performance Overview

F Series performance is dependent on several factors including duty cycle, bearing design, gearhead size and stage configuration, among others. Use the chart below for preliminary evaluation, then use the following performance chart and selection information on the following pages for specific performance sizing and selection.

Size/Generation		F10	F20		F30		F40		F60		
# of Stages		2	2	3	2	3	2	3	2	3	
Acceleration Torque M_{2BMAX}	Nm	120	270		450		700		1100		
	in.lbs	1063	2392		3986		6201		9744		
Output Torque Nom. M_{2N}	Nm	120	240		400		700		1100		
	in.lbs	1063	2126		3543		6201		9744		
Torsional Stiffness C_2	Nm/arcmin	<7.7	<17.9	<17.9	<21.8	<21.8	<38.6	<38.7	<77.1	<77.3	
	in.lbs/arcmin	<69	<158	<159	<193	<193	<342	<343	<683	<685	
Torsional Backlash ¹⁾ $\Delta\phi$ arcmin	Standard	≤11	≤11	≤11	≤11	≤11	≤10	≤10	≤10	≤10	
	Reduced	≤8	≤8	≤7	≤8	≤7	≤7	≤6	≤7	≤6	
Input Speed Max. n_{1MAX}	Continuous	EL1,2,3,4	4000	3800	4000	4000	4000	3500	3800	3500	3500
		EL5,6	4000	3500	3900	3900	3900	3500	3500	3200	3200
	Cyclic		6000	6000	6000	6000	6000	5000	5500	5000	5000
Efficiency (@nom torque)	%	97	97	96	97	96	97	96	97	96	
Weight	kg	17.2	23.1	29.0	30.4	33.1	38.1	41.2	74.7	80.2	
	lbs	38	51	64	67	73	84	91	165	177	
Noise ²⁾	dB(A)	≤55	≤53		≤53		≤53		≤61		

Size/Generation/# of Stage		F102	F202/F203	F302/F303	F402/F403	F602/F603	
Axial Load Max. ³⁾ F_{2AMAX}	Solid Shaft	N	1100	1400	1900	2350	3100
		lbs	247	351	427	528	697
	Hollow Bore	N	900	1200	1350	1900	2200
		lbs	203	270	304	428	495
Tilting Moment Max. ³⁾ M_{2KMAX}	Solid Shaft	Nm	260	400	600	800	1200
		in.lbs	2301	3540	5310	7080	10,620
	Hollow Bore	Nm	175	250	375	550	800
		in.lbs	1549	2213	3319	4858	7080

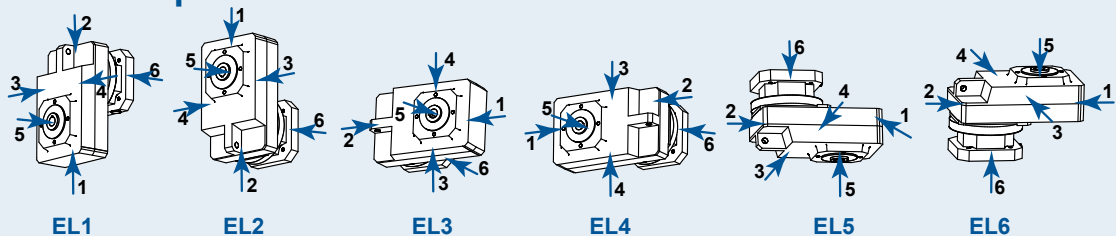
¹⁾ Tested at 1.5% of nominal torque and recorded on the output side of the gearhead. For lower backlash, contact STOBER technical support.

²⁾ Measurement at one (1) meter distance with input speed (n_1) of 2000 RPM.

³⁾ Rating based on output speed (n_2) of 20 RPM. For values at other speeds see page 172

F Mounting Position Options

When ordering, mounting in **Any Position** (EL1, EL2, EL3, EL4, EL5, EL6) **MUST BE SPECIFIED**





Overview

F Series Motor Mounting Plate Option (Motor information required with Motor Adapter option)

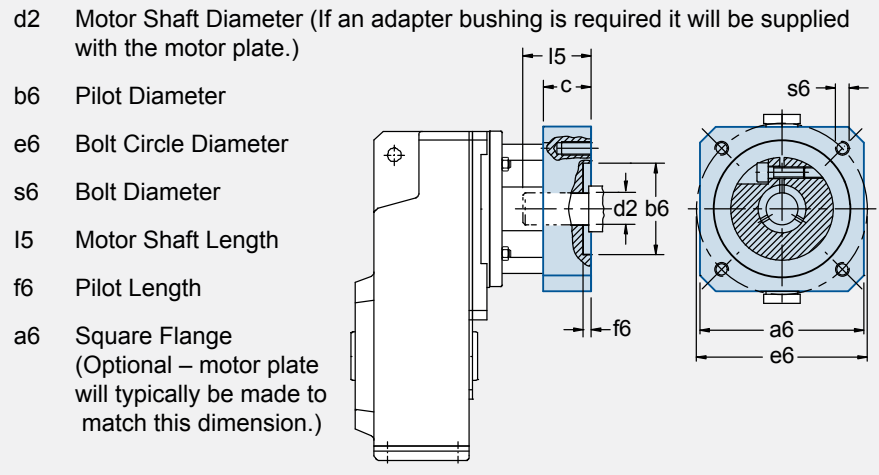
STOBER ServoFit Gearheads fit the motor of your choice with the appropriate motor mounting plate assembled between the motor and the gearhead.

NOTE: When ordering a gearhead:

- Specify the motor manufacturer and part number
- Provide the motor drawing with dimensions, or specify the motor mounting dimensions (per the list shown at right)

For a precise dimension on a specific motor, or for general assistance, we recommend you contact STOBER Technical Support.

Customer Required Dimensions for Properly Sized Motor Mounting Plate



Motor Mounting Plate Dimensions — mm (Gearhead Part Number Specific)

	MT10	MT20	MT30	MT40
Maximum Allowed Motor Shaft Dia. d2	19	24	38	48
Minimum Allowed Motor Plate Thickness c*	21	24	25	33

* Note that the c motor plate thickness is determined by the motor shaft length. The minimum motor plate thickness is the value listed.

F Series Output Options

Diameters in **BOLD BLUE** are configurations readily available from inventory. Contact STOBER for delivery on other output sizes.

			F1	F2	F3	F4	F6
Solid Shaft	Carbon Steel	Inches	1	1-1/4	1-3/8	1-5/8	2-1/8
		Metric	—	—	—	—	—
	Stainless Steel*	Inches	—	—	—	—	—
		Metric	—	—	—	—	—
Hollow Bore	Carbon Steel	Inches	3/4	1	1-1/4	1-1/2	2
		Metric	20	25	30	40	50
	Stainless Steel*	Inches	—	1	1-1/4	1-1/2	—
		Metric	—	—	—	—	—
Wobble Free Bushing (Single & Double Bushings**)	Stainless Steel*	Inches	3/4	1 1-3/16	1 1-3/16 1-1/4 1-3/8 1-7/16 1-1/2	1 1-3/16 1-1/4 1-3/8 1-7/16 1-1/2	1-7/16 1-1/2 1-5/8 1-11/16 1-3/4 1-7/8 1-15/16 2
		Metric	20	30	30 35	40***	40***

* Stainless steel options are ideal for food and beverage or harsh washdown environments.

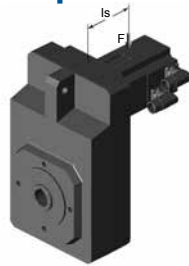
** Double bushings only available with two stage units

*** Double bushing only

F
OFFSET – Solid Shaft/Hollow Output

Permissible Motor Tilting Torque

The permissible tilting torque of the motor attached to the gear unit is a result of the static and dynamic load “F” from the motor weight, mass acceleration, and vibration multiplied by the distance from the center of gravity “l_s” of the motor.



$$M_{1k} = F \times l_s \leq M_{1K}$$

M _{1K}	MT10	MT20	MT30	MT40
Nm	25	60	125	250
in.lbs	221	531	1106	2212

Permissible Output Shaft Load and Tilting Moments*

Unit	V Solid Shaft Output						A, S, W Hollow Output ¹⁾							
	Z ₂		F _{2A}		F _{2R}		M _{2K}		Z ₂		F _{2A}		M _{2K}	
	mm	in	N	lbs.	N	lbs.	Nm	in.lbs	mm	in	N	lbs.	Nm	in.lbs
F102	35	1.38	1100	247	4200	945	260	2301	30	1.18	900	203	175	1549
F202/F203	41	1.61	1400	351	5400	1215	400	3540	33	1.30	1200	270	250	2213
F302/F303	43	1.69	1900	427	7500	1687	600	5310	33	1.30	1350	304	375	3319
F402/F403	44	1.73	2350	528	9250	2081	800	7080	39	1.54	1900	428	550	4858
F602/F603	44	1.73	3100	697	12,500	2812	1200	10,620	45	1.77	2200	495	800	7080

* Refer to illustration and definitions below.

¹⁾ Values shown for “W” Style are for double bushings. For single bushings use value M_{2K} x 0.5 and F_{2A} x 0.5

F Series Load/Life/Speed Calculations

The permissible load and tilting moment values are based on an output speed of 20 RPM. For higher speeds the following applies, where n₂ is the desired speed:

$$F_{2AX} = \frac{F_{2A}}{\sqrt[3]{\frac{n_2}{20}}}, \quad F_{2RX} = \frac{F_{2R}}{\sqrt[3]{\frac{n_2}{20}}}, \quad M_{2KX} = \frac{M_{2K}}{\sqrt[3]{\frac{n_2}{20}}}$$

The application input tilting moment should be determined by the following formula:

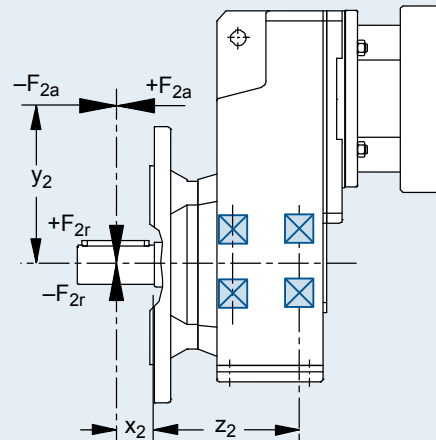
$$M_{2A} = \frac{2 \cdot F_{2a} \cdot y_2 + F_{2rb} \cdot (x_2 + z_2)}{1000} \leq M_{2K}$$

Where:

- F_{2a}** Axial Load at Output Shaft
- F_{2A}** Permissible Axial Load
- F_{2r}** Radial Load at Output Shaft
- F_{2R}** Permissible Radial Load
- F_{2RB}** Acceleration Permissible Radial Load
- M_{2K}** Rated Tilting Torque
- M_{2k}** Equivalent Tilting Load
- M_{2KB}** Acceleration Tilting Torque
- z₂** Distance Factor

All formulas shown are based on METRIC values

Upper case letters are permissible values. Lower case letters are for existing values.





Overview

Overhung Load Calculations

Pulling forces or overhung load of pulleys, sheaves, sprockets, etc. on the reducer output shaft must not exceed the allowable limits shown in the load/life/speed calculations below.

Note: Overhung load is measured at the center of the shaft extension. No overhung load is encountered when a reducer is flange mounted and/or coupling connected to another unit. However, the shafts of all components must be accurately aligned and secured to prevent pre-loading of the bearings and premature bearing failure.

Use the following formula to determine actual overhung load for a given drive:

$$\text{Imperial OHL (lbs)} = \frac{126,000 \times \text{HP} \times \text{K}}{\text{D} \times \text{n}}$$

$$\text{Metric OHL (N)} = \frac{19,100 \times \text{kW} \times \text{K}}{\text{D} \times \text{n}}$$

Where:

- OHL** Overhung load (N or lbs)
- HP** Horsepower
- kW** Transmitted Kilowatt
- D** Pitch Diameter (inches or meters) of Sprocket, Gear, Sheave, Pulley, etc.
- n** Maximum Shaft RPM
- K** 1.00 Single Chain Drive; 1.25 Timing Belt Drive;
1.25 Spur or Helical Gear Drive; 1.50 V-Belt Drive; 2.50 Flat Belt Drive

F Series: OFFSET – Solid Shaft/Hollow Output

Reducer Ratio (i)		Output Torque						Part Number* (Gearhead + Input)	Maximum Input Speed RPM			Backlash ⁴⁾ (arcmins) $\Delta\phi$	Input Inertia J1 kgcm ²	Torsional Stiffness C2 (per arcmin)	
		Nominal ¹⁾ M2N ≤ 2000 RPM		Acceleration M2B		Peak ²⁾ M2PEAK			Continuous		Cyclic			Nm	in. lbs.
Nom.	Exact	Nm	in. lbs.	Nm	in. lbs.	Nm	in. lbs.	EL 1,2,3,4	EL 5,6	All			Nm	in. lbs.	

F102

Two Stage

Noise Level ≤ 55 dB(A)⁴⁾

4.308	56/13	45	396	45	396	56	496	F102_0043 MT10			11/8	2.1	4.0	35
		61	539	84	746	105	933	F102_0043 MT20						
6.462	84/13	64	563	64	563	79	704	F102_0065 MT10			11/8	1.4	5.1	45
		70	617	105	930	150	1326	F102_0065 MT20						
7.156	322/45	69	613	69	613	87	767	F102_0072 MT10			11/8	1.2	5.3	47
		72	639	105	930	163	1444	F102_0072 MT20						
8.948	1029/115	78	688	83	737	104	921	F102_0089 MT10			11/8	1.0	5.7	50
				105	930	196	1734	F102_0089 MT20						
10.92	273/25	83	735	98	868	123	1085	F102_0110 MT10			11/8	0.9	5.9	53
				105	930	200	1772	F102_0110 MT20						
13.59	231/17	89	791	105	930	146	1297	F102_0135 MT10			11/8	0.8	6.1	54
						200	1772	F102_0135 MT20						
18.46	1495/81	99	876	120	1063	223	1978	F102_0185 MT10			11/6	0.9	7.4	66
						240	2126	F102_0185 MT20						
23.08	3185/138	107	944	120	1063	240	2126	F102_0230 MT10			11/6	0.8	7.5	67
								F102_0230 MT20						
28.17	169/6	114	1009	120	1063	240	2126	F102_0280 MT10			11/6	0.8	7.6	67
								F102_0280 MT20						
35.05	3575/102	120	1063	120	1063	240	2126	F102_0350 MT10			11/6	0.7	7.7	68
								F102_0350 MT20						
46.43	325/7	120	1063	120	1063	240	2126	F102_0460 MT10			11/6	0.7	7.7	68
								F102_0460 MT20						
55.97	2015/36	120	1063	120	1063	240	2126	F102_0560 MT10			11/6	0.7	7.7	68
								F102_0560 MT20						
70.06	1261/18	120	1063	120	1063	240	2126	F102_0700 MT10			11/6	0.6	7.7	68
								F102_0700 MT20						
93.63	7865/84	120	1063	120	1063	240	2126	F102_0940 MT10			11/6	0.6	7.7	68
111.9	2015/18	120	1063	120	1063	240	2126	F102_1120 MT10			11/6	0.6	7.7	68
139.8	559/4	120	1063	120	1063	240	2126	F102_1400 MT10			11/6	0.6	7.7	69

¹⁾ Maximum torque for continuous input RPM - horizontal output position.

²⁾ Maximum momentary torque for emergency stops or heavy shock load. (Admissible stops per life of gearhead = 1,000 stops maximum.)

³⁾ Backlash shown standard/reduced

⁴⁾ dB(A) measured at 1 meter distance with 2000 RPM input.

* Motor shaft adapter code (shaft diameter max - mm): MT10 (19), MT20 (24), MT30 (38), MT40 (48)



Selection Data

F
OFFSET – Solid Shaft/Hollow Output

Reducer Ratio (i)		Output Torque						Part Number* (Gearhead + Input)	Maximum Input Speed RPM			Backlash ⁴⁾ (arcmins) $\Delta\phi$	Input Inertia J ₁ kgcm ²	Torsional Stiffness C ₂ (per arcmin)	
		Nominal ¹⁾ M _{2N} ≤ 2000 RPM		Acceleration M _{2B}		Peak ²⁾ M _{2PEAK}			Continuous		Cyclic			Nm	in. lbs.
Nom.	Exact	Nm	in. lbs.	Nm	in. lbs.	Nm	in. lbs.	EL 1,2,3,4	EL 5,6	All					

F202 Two Stage (continued next page) Noise Level ≤ 53 dB(A)⁴⁾

4.680	2616/559	51	452	51	452	64	564	F202_0047 MT10			5000		4.7	6.8	60
		125	1103	200	1769	282	2495	F202_0047 MT20			3100 2600 5000	11/8	5.3	7.2	64
		125	1103	210	1860	282	2495	F202_0047 MT30			4000		10.1	9.1	80
5.552	5341/962	132	1168	210	1860	330	2921	F202_0056 MT20			3100 2600 5000	11/8	4.2	8.5	75
								F202_0056 MT30			4000		9.0	10.3	91
7.167	5777/806	74	653	74	653	92	816	F202_0072 MT10			3600		2.5	10.0	89
		144	1272	210	1860	400	3543	F202_0072 MT20			3500 3100 5000	11/8	3.1	10.4	92
		144	1272	210	1860	400	3543	F202_0072 MT30			3500		7.9	11.9	106
9.006	3161/351	89	793	89	793	112	991	F202_0090 MT10			3600		1.9	11.5	102
		155	1372	210	1860	400	3543	F202_0090 MT20			3500 3100 5000	11/8	2.5	11.8	105
		155	1372	210	1860	400	3543	F202_0090 MT30			3500		7.3	13.0	115
10.80	7303/676	104	917	104	917	129	1147	F202_0110 MT10			3800		1.5	12.5	111
		165	1458	210	1860	400	3543	F202_0110 MT20			3500 3500 5000	11/8	2.1	12.8	113
		165	1458	210	1860	400	3543	F202_0110 MT30			3500		6.9	13.7	121
13.63	109/8	126	1112	126	1112	157	1391	F202_0135 MT10			3800		1.2	13.5	120
		178	1576	210	1860	400	3543	F202_0135 MT20			3500 3500 5000	11/8	1.8	13.7	121
		178	1576	210	1860	400	3543	F202_0135 MT30			3500		6.6	14.3	127
18.65	6360/341	192	1699	192	1699	240	2124	F202_0185 MT10			3600		1.5	16.4	145
		197	1749	270	2392	480	4252	F202_0185 MT20			3500 3100 5000	11/6	2.1	16.5	146
		197	1749	270	2392	480	4252	F202_0185 MT30			3500		6.9	17.0	151
23.43	2320/99			233	2062	291	2578	F202_0230 MT10			3600		1.3	16.9	150
		213	1888	270	2392	480	4252	F202_0230 MT20			3500 3100 5000	11/6	1.9	17.0	151
				270	2392	480	4252	F202_0230 MT30			3500		6.7	17.3	154
28.11	4020/143			269	2387	337	2984	F202_0280 MT10			3800		1.1	17.2	152
		226	2006	270	2392	480	4252	F202_0280 MT20			3500 3500 5000	11/6	1.7	17.3	153
				270	2392	480	4252	F202_0280 MT30			3500		6.5	17.5	155
35.46	390/11					408	3618	F202_0350 MT10			3800		1.0	17.5	155
		240	2126	270	2392	480	4252	F202_0350 MT20			3500 3500 5000	11/6	1.6	17.5	155
						480	4252	F202_0350 MT30			3500		6.4	17.7	156
47.05	1035/22							F202_0470 MT10			4000 3900 6000		0.8	17.7	156
		240	2126	270	2392	480	4252	F202_0470 MT20			3500 3500 5000	11/6	1.4	17.7	157
								F202_0470 MT30			3500 3500 4000		6.2	17.8	157

¹⁾ Maximum torque for continuous input RPM - horizontal output position.

²⁾ Maximum momentary torque for emergency stops or heavy shock load. (Admissible stops per life of gearhead = 1,000 stops maximum.)

³⁾ Backlash shown standard/reduced

⁴⁾ dB(A) measured at 1 meter distance with 2000 RPM input.

* Motor shaft adapter code (shaft diameter max - mm): MT10 (19), MT20 (24), MT30 (38), MT40 (48)

F Series: OFFSET – Solid Shaft/Hollow Output

Reducer Ratio (i)		Output Torque						Maximum Input Speed RPM			Backlash ⁴⁾ (arcmins)	Input Inertia J ₁ kgcm ²	Torsional Stiffness C ₂ (per arcmin)	
		Nominal ¹⁾ M _{2N} ≤ 2000 RPM		Acceleration M _{2B}		Peak ²⁾ M _{2PEAK}		Continuous		Cyclic			Nm	in. lbs.
Nom.	Exact	Nm	in. lbs.	Nm	in. lbs.	Nm	in. lbs.	Part Number* (Gearhead + Input)			Δφ		Nm	in. lbs.
								EL 1,2,3,4	EL 5,6	All				

F202 Two Stage (continued from previous page) Noise Level ≤ 53 dB(A)⁴⁾

56.73	624/11	240	2126	270	2392	480	4252	F202_0570 MT10	4000	3900	6000	11/6	0.8	17.7	157
								F202_0570 MT20	3500	3500	5000		1.4	17.8	157
								F202_0570 MT30	3500	3500	4000		6.2	17.8	158
70.13	5400/77	240	2126	270	2392	480	4252	F202_0700 MT10	4000	3900	6000	11/6	0.7	17.8	
								F202_0700 MT20	3500	3500	5000		1.3	17.8	158
								F202_0700 MT30	3500	3500	4000		6.1	17.9	
93.82	1032/11	240	2126	270	2392	480	4252	F202_0940 MT10	4000	3900	6000	11/6	0.7	17.9	158
								F202_0940 MT20	3500	3500	5000		1.3		
112.7	1240/11	240	2126	270	2392	480	4252	F202_1130 MT10	4000	3900	6000	11/6	0.7	17.9	158
140.9	1550/11	240	2126	270	2392	480	4252	F202_1410 MT10	4000	3900	6000	11/6	0.6	17.9	158

F203 Three Stage Noise Level ≤ 53 dB(A)⁴⁾

184.3	16,215/88	240	2126	270	2392	480	4252	F203_1840 MT10	4000	3900	6000	11/7	0.7	17.9	159
222.2	2444/11	240	2126	270	2392	480	4252	F203_2220 MT10	4000	3900	6000	11/7	0.7	17.9	159
274.7	21,150/77	240	2126	270	2392	480	4252	F203_2750 MT10	4000	3900	6000	11/7	0.7	17.9	159
367.5	4042/11	240	2126	270	2392	480	4252	F203_3670 MT10	4000	3900	6000	11/7	0.7	17.9	159
441.5	14,570/33	240	2126	270	2392	480	4252	F203_4420 MT10	4000	3900	6000	11/7	0.6	17.9	159
551.9	36,425/66	240	2126	270	2392	480	4252	F203_5520 MT10	4000	3900	6000	11/7	0.6	17.9	159

¹⁾ Maximum torque for continuous input RPM - horizontal output position.

²⁾ Maximum momentary torque for emergency stops or heavy shock load. (Admissible stops per life of gearhead = 1,000 stops maximum.)

³⁾ Backlash shown standard/reduced

⁴⁾ dB(A) measured at 1 meter distance with 2000 RPM input.

* Motor shaft adapter code (shaft diameter max - mm): MT10 (19), MT20 (24), MT30 (38), MT40 (48)



Selection Data

F
OFFSET – Solid Shaft/Hollow Output

Reducer Ratio (i)		Output Torque						Part Number* (Gearhead + Input)	Maximum Input Speed RPM			Backlash ⁴⁾ (arcmins) $\Delta\phi$	Input Inertia J ₁ kgcm ²	Torsional Stiffness C ₂ (per arcmin)	
		Nominal ¹⁾ M _{2N} ≤ 2000 RPM		Acceleration M _{2B}		Peak ²⁾ M _{2PEAK}			Continuous		Cyclic			Nm	in. lbs.
Nom.	Exact	Nm	in. lbs.	Nm	in. lbs.	Nm	in. lbs.	EL 1,2,3,4	EL 5,6	All					

F302 Two Stage (continued next page) Noise Level ≤ 53 dB(A)⁴⁾

4.644	4992/1075	180	1596	198	1756	291	2576	F302_0046 MT20			11/8	9.4	8.0	71
		207	1832	349	3094	650	5758	F302_0046 MT30				14.2	10.4	92
5.720	143/25	222	1963	244	2163	346	3069	F302_0057 MT20		4500	11/8	6.9	10.1	89
				277	2455			F302_0057 MT30		4000		11.7	12.5	111
7.172	208/29	239	2117	306	2711	422	3741	F302_0072 MT20		5000	11/8	5.1	12.3	109
						338	2992	422	3741	F302_0072 MT30		4000	9.9	14.5
8.986	5616/625	258	2282	350	3100	510	4516	F302_0090 MT20		5000	11/8	3.8	14.4	128
								F302_0090 MT30		4000		8.6	16.2	144
10.79	1456/135	274	2426	350	3100	590	5225	F302_0110 MT20		5000	11/8	3.1	15.8	140
								F302_0110 MT30		4000		7.9	17.3	153
13.38	7696/575	127	1127	127	1127	159	1409	F302_0135 MT10		5500	11/8	1.9	16.9	149
								F302_0135 MT20		5000		2.5	17.2	152
								F302_0135 MT30		4000		7.3	18.3	162
18.77	4900/261	329	2918	450	3986	800	7086	F302_0190 MT20		5000	11/6	3.1	19.8	175
								F302_0190 MT30		4000		7.9	20.5	182
23.52	588/25	355	3146	450	3986	800	7086	F302_0240 MT20		5000	11/6	2.6	20.5	182
								F302_0240 MT30		4000		7.4	21.0	186
28.23	6860/243	377	3343	450	3986	800	7086	F302_0280 MT20		5000	11/6	2.2	20.9	185
								F302_0280 MT30		4000		7.0	21.2	188
35.03	7252/207	333	2951	333	2951	416	3689	F302_0350 MT10		5500	11/6	1.3	21.1	187
								F302_0350 MT20		5000		1.9	21.2	188
								F302_0350 MT30		4000		6.7	21.4	190
47.19	1274/27	400	3543	422	3738	528	4673	F302_0470 MT10		6000	11/6	1.1	21.4	190
								F302_0470 MT20		5000		1.7	21.5	190
				F302_0470 MT30		4000	6.5	21.6	191					
56.49	4067/72	400	3543	450	3986	800	7086	F302_0560 MT10		6000	11/6	1.0	21.6	191
								F302_0560 MT20		5000		1.6	21.6	191
								F302_0560 MT30		4000		6.4	21.7	192

¹⁾ Maximum torque for continuous input RPM - horizontal output position.

²⁾ Maximum momentary torque for emergency stops or heavy shock load. (Admissible stops per life of gearhead = 1,000 stops maximum.)

³⁾ Backlash shown standard/reduced

⁴⁾ dB(A) measured at 1 meter distance with 2000 RPM input.

* Motor shaft adapter code (shaft diameter max - mm): MT10 (19), MT20 (24), MT30 (38), MT40 (48)

F Series: OFFSET – Solid Shaft/Hollow Output

Reducer Ratio (i)		Output Torque						Maximum Input Speed RPM			Backlash ⁴⁾ (arcmins)	Input Inertia J1 kgcm ²	Torsional Stiffness C2 (per arcmin)	
		Nominal ¹⁾ M2N ≤ 2000 RPM		Acceleration M2B		Peak ²⁾ M2PEAK		Continuous		Cyclic				
Nom.	Exact	Nm	in. lbs.	Nm	in. lbs.	Nm	in. lbs.	Part Number* (Gearhead + Input)			Δφ	Nm	in. lbs.	
								EL	EL	All				
								1,2,3,4	5,6					

F302 Two Stage (continued from previous page) Noise Level ≤ 53 dB(A)⁴⁾

70.36	2744/39	400	3543	450	3986	723	6402	F302_0700 MT10	4000	3900	6000		0.9	21.6
						800	7086	F302_0700 MT20	3500	3500	5000	11/6	1.5	21.7 192
						800	7086	F302_0700 MT30	3500	3500	4000		6.3	21.7
93.64	4214/45	400	3543	450	3986	800	7086	F302_0940 MT10	4000	3900	6000		0.8	21.7 192
								F302_0940 MT20	3500	3500	5000	11/6	1.4	21.7 192
								F302_0940 MT30	3500	3500	4000		6.2	21.8 193
112.8	3724/33	400	3543	450	3986	800	7086	F302_1130 MT10	4000	3900	6000		0.7	21.8 193
								F302_1130 MT20	3500	3500	5000	11/6	1.3	21.8 193
140.6	7595/54	400	3543	450	3986	652	5771	F302_1410 MT10	4000	3900	6000	11/6	0.7	21.8 193

F303 Three Stage Noise Level ≤ 53 dB(A)⁴⁾

182.4	73,892/405	400	3543	450	3986	800	7086	F303_1820 MT20	3500	3500	5000	11/7	1.4	21.8 193
184.8	29,939/162	400	3543	450	3986	800	7086	F303_1850 MT10	4000	3900	6000	11/7	0.7	21.8 193
218.4	11,7943/540	400	3543	450	3986	800	7086	F303_2180 MT20	3500	3500	5000	11/7	1.4	21.8 193
221.2	191,149/864	400	3543	450	3986	800	7086	F303_2210 MT10	4000	3900	6000	11/7	0.7	21.8 193
272.1	159,152/585	400	3543	450	3986	800	7086	F303_2720 MT20	3500	3500	5000	11/7	1.4	21.8 193
275.6	32,242/117	400	3543	450	3986	800	7086	F303_2760 MT10	4000	3900	6000	11/7	0.7	21.8 193
362.1	24,4412/675	400	3543	450	3986	800	7086	F303_3620 MT20	3500	3500	5000	11/7	1.4	21.8 193
366.8	99,029/270	400	3543	450	3986	800	7086	F303_3670 MT10	4000	3900	6000	11/7	0.7	21.8 193
442.0	43,757/99	400	3543	450	3986	800	7086	F303_4420 MT10	4000	3900	6000	11/7	0.7	21.8 193
550.9	356,965/648	400	3543	450	3986	651	5771	F303_5510 MT10	4000	3900	6000	11/7	0.7	21.8 193

¹⁾ Maximum torque for continuous input RPM - horizontal output position.

²⁾ Maximum momentary torque for emergency stops or heavy shock load. (Admissible stops per life of gearhead = 1,000 stops maximum.)

³⁾ Backlash shown standard/reduced

⁴⁾ dB(A) measured at 1 meter distance with 2000 RPM input.

* Motor shaft adapter code (shaft diameter max - mm): MT10 (19), MT20 (24), MT30 (38), MT40 (48)



Selection Data

F
OFFSET – Solid Shaft/Hollow Output

Reducer Ratio (i)		Output Torque						Part Number* (Gearhead + Input)	Maximum Input Speed RPM			Backlash ⁴⁾ (arcmins) $\Delta\phi$	Input Inertia J ₁ kgcm ²	Torsional Stiffness C ₂ (per arcmin)	
		Nominal ¹⁾ M _{2N} ≤ 2000 RPM		Acceleration M _{2B}		Peak ²⁾ M _{2PEAK}			Continuous		Cyclic			Nm	in. lbs.
Nom.	Exact	Nm	in. lbs.	Nm	in. lbs.	Nm	in. lbs.	EL 1,2,3,4	EL 5,6	All					

F402 Two Stage (continued next page) Noise Level ≤ 53 dB(A)⁴⁾

4.678	1408/301	182	1608	200	1769	303	2683	F402_0047 MT20			4000		16.0	9.9	88		
		342	3033	474	4200	781	6921	F402_0047 MT30			2700	2300	4000	10/7	20.8	13.9	123
		342	3033	550	4872	781	6921	F402_0047 MT40					3500		24.8	21.0	186
5.813	3784/651	226	1998	248	2198	366	3238	F402_0058 MT20			4000		11.4	13.4	119		
		368	3260	550	4872	943	8353	F402_0058 MT30			2700	2300	4000	10/7	16.2	17.9	159
		368	3260	550	4872	943	8353	F402_0058 MT40					3500		20.2	25.0	221
7.202	605/84	279	2475	307	2723	436	3864	F402_0072 MT20			3200	4500			8.1	17.4	154
		395	3502	550	4872	1100	9744	F402_0072 MT30			3200	2800	4000	10/7	12.9	22.1	195
		395	3502	550	4872	1100	9744	F402_0072 MT40			3000	3500			16.9	28.5	253
8.980	440/49	348	3086	383	3395	526	4660	F402_0090 MT20			3200	4500			5.9	21.7	192
		425	3769	550	4872	1100	9744	F402_0090 MT30			3200	2800	4000	10/7	10.7	26.1	231
		425	3769	550	4872	1100	9744	F402_0090 MT40			3000	3500			14.7	31.5	279
10.83	682/63	406	3593	462	4092	610	5405	F402_0110 MT20			3500	3100	5000		4.6	25.1	222
		453	4011	550	4872	1100	9744	F402_0110 MT30			3500	3100	4000	10/7	9.4	29.0	257
		453	4011	550	4872	1100	9744	F402_0110 MT40			3000	3000	3500		13.4	33.4	296
13.57	5984/441	445	3941	550	4872	740	6552	F402_0135 MT20			3500	3100	5000		3.5	28.8	255
		488	4325	550	4872	1100	9744	F402_0135 MT30			3500	3100	4000	10/7	8.3	31.9	283
		488	4325	550	4872	1100	9744	F402_0135 MT40			3000	3000	3500		12.3	35.2	311
18.62	3575/192					1128	9990	F402_0185 MT20			3200	4500			4.5	32.7	290
		543	4806	700	6201	1400	12,401	F402_0185 MT30			3200	2800	4000	10/5	9.3	34.8	308
						1400	12,401	F402_0185 MT40			3000	3500			13.3	36.7	325
23.21	325/14					1360	12,046	F402_0230 MT20			3200	4500			3.6	34.6	307
		584	5173	700	6201	1400	12,401	F402_0230 MT30			3200	2800	4000	10/5	8.4	36.1	320
						1400	12,401	F402_0230 MT40			3000	3500			12.4	37.4	331
27.99	2015/72							F402_0280 MT20			3500	3100	5000		3.0	35.8	317
		622	5505	700	6201	1400	12,401	F402_0280 MT30			3500	3100	4000	10/5	7.8	36.9	326
								F402_0280 MT40			3000	3000	3500		11.8	37.8	335
35.08	2210/63							F402_0350 MT20			3500	3100	5000		2.5	36.8	326
		670	5936	700	6201	1400	12,401	F402_0350 MT30			3500	3100	4000	10/5	7.3	37.5	332
								F402_0350 MT40			3000	3000	3500		11.3	38.1	338

¹⁾ Maximum torque for continuous input RPM - horizontal output position.

²⁾ Maximum momentary torque for emergency stops or heavy shock load. (Admissible stops per life of gearhead = 1,000 stops maximum.)

³⁾ Backlash shown standard/reduced

⁴⁾ dB(A) measured at 1 meter distance with 2000 RPM input.

* Motor shaft adapter code (shaft diameter max - mm): MT10 (19), MT20 (24), MT30 (38), MT40 (48)

F Series: OFFSET – Solid Shaft/Hollow Output

Reducer Ratio (i)		Output Torque						Maximum Input Speed RPM			Backlash ⁴⁾ (arcmins)	Input Inertia J1 kgcm ²	Torsional Stiffness C2 (per arcmin)	
		Nominal ¹⁾ M2N ≤ 2000 RPM		Acceleration M2B		Peak ²⁾ M2PEAK		Continuous		Cyclic				
Nom.	Exact	Nm	in. lbs.	Nm	in. lbs.	Nm	in. lbs.	Part Number* (Gearhead + Input)	EL 1,2,3,4	EL 5,6	All	Δφ	Nm	in. lbs.

F402 Two Stage (continued from previous page) Noise Level ≤ 53 dB(A)⁴⁾

46.94	845/18	700	6201	700	6201	1400	12,401	F402_0470 MT20	3500	3500	5000	10/5	2.0	37.6	333
								F402_0470 MT30	3500	3500	4000				
								F402_0470 MT40	3000	3000	3500				
55.97	2015/36	700	6201	700	6201	1400	12,401	F402_0560 MT20	3500	3500	5000	10/5	1.8	37.9	336
								F402_0560 MT30	3500	3500	4000				
								F402_0560 MT40	3000	3000	3500				
70.06	1261/18	700	6201	700	6201	1400	12,401	F402_0700 MT20	3500	3500	5000	10/5	1.6	38.2	338
								F402_0700 MT30	3500	3500	4000				
								F402_0700 MT40	3000	3000	3500				
93.33	280/3	700	6201	700	6201	1400	12,401	F402_0930 MT20	3500	3500	5000	10/5	1.5	38.4	340
								F402_0930 MT30			4000				
112.3	1235/11	700	6201	700	6201	1400	12,401	F402_1120 MT20	3500	3500	5000	10/5	1.4	38.5	341
								F402_1120 MT30			4000				
139.8	559/4	700	6201	700	6201	1271	11,262	F402_1400 MT20	3500	3500	5000	10/5	1.3	38.6	342

F403 Three Stage Noise Level ≤ 53 dB(A)⁴⁾

181.5	4901/27	700	6201	700	6201	1400	12,401	F403_1820 MT20	3500	3500	5000	10/6	1.4	38.6	342
183.9	39,715/216	700	6201	700	6201	941	8334	F403_1840 MT10	3800	3500	5500	10/6	0.7	38.6	342
216.4	11,687/54	700	6201	700	6201	1400	12,401	F403_2160 MT20	3500	3500	5000	10/6	1.4	38.6	342
219.2	94,705/432	700	6201	700	6201	1122	9937	F403_2190 MT10	3800	3500	5500	10/6	0.7	38.6	342
270.9	36569/135	700	6201	700	6201	1400	12,401	F403_2710 MT20	3500	3500	5000	10/6	1.4	38.7	342
274.4	59,267/216	700	6201	700	6201	1400	12,401	F403_2740 MT10	3800	3500	5500	10/6	0.7	38.7	342
360.9	3248/9	700	6201	700	6201	1400	12,401	F403_3610 MT20	3500	3500	5000	10/6	1.4	38.7	343
365.6	3290/9	700	6201	700	6201	1400	12,401	F403_3660 MT10	3800	3500	5500	10/6	0.7	38.7	343
434.1	14,326/33	700	6201	700	6201	1400	12,401	F403_4340 MT20	3500	3500	5000	10/6	1.4	38.7	343
439.7	58,045/132	700	6201	700	6201	1400	12,401	F403_4400 MT10	3800	3500	5500	10/6	0.7	38.7	343
547.4	26,273/48	700	6201	700	6201	1271	11,261	F403_5470 MT10	3800	3500	5500	10/6	0.7	38.7	343

¹⁾ Maximum torque for continuous input RPM - horizontal output position.

²⁾ Maximum momentary torque for emergency stops or heavy shock load. (Admissible stops per life of gearhead = 1,000 stops maximum.)

³⁾ Backlash shown standard/reduced

⁴⁾ dB(A) measured at 1 meter distance with 2000 RPM input.

* Motor shaft adapter code (shaft diameter max - mm): MT10 (19), MT20 (24), MT30 (38), MT40 (48)



Selection Data

F
OFFSET – Solid Shaft/Hollow Output

Reducer Ratio (i)		Output Torque						Part Number* (Gearhead + Input)	Maximum Input Speed RPM			Backlash ⁴⁾ (arcmins) $\Delta\phi$	Input Inertia J ₁ kgcm ²	Torsional Stiffness C ₂ (per arcmin)	
		Nominal ¹⁾ M _{2N} ≤ 2000 RPM		Acceleration M _{2B}		Peak ²⁾ M _{2PEAK}			Continuous		Cyclic			Nm	in. lbs.
Nom.	Exact	Nm	in. lbs.	Nm	in. lbs.	Nm	in. lbs.	EL 1,2,3,4	EL 5,6	All			Nm	in. lbs.	

F602 Two Stage (continued next page) Noise Level ≤ 61 dB(A)⁴⁾

4.546	1273/280	419	3711	461	4082	790	6998	F602_0045 MT30			10/7	42.2	16.0	141			
		567	5020	632	5598			F602_0045 MT40				46.2	27.1	240			
5.673	1407/248	523	4631	575	5094	956	8472	F602_0057 MT30			10/7	30.5	22.2	196			
		610	5405	765	6778			F602_0057 MT40				34.5	34.9	310			
7.159	3551/496	659	5840	726	6428	1161	10,287	F602_0072 MT30			10/7	22.2	29.9	265			
				929	8230			F602_0072 MT40				2900	2500	3500	26.2	43.3	384
8.995	1943/216	349	3091	384	3401	545	4823	F602_0090 MT20			10/7	12.1	29.4	260			
		711	6302	912	8077	1404	12,440	F602_0090 MT30				2900	2500	4000	16.9	38.1	338
		711	6302	1000	8858	1404	12,440	F602_0090 MT40				3500			20.9	50.9	450
10.82	2077/192	420	3718	462	4090	636	5632	F602_0110 MT20			10/7	9.1	36.0	319			
		757	6702	1000	8858	1600	14,173	F602_0110 MT30				3300	2800	4000	13.9	44.7	396
		757	6702	1000	8858	1600	14,173	F602_0110 MT40				3000	3500		17.9	56.1	497
13.61	871/64	502	4451	581	5145	764	6770	F602_0135 MT20			10/7	6.6	44.2	392			
		817	7235	1000	8858	1600	14,173	F602_0135 MT30				3300	2800	4000	11.4	52.1	461
		817	7235	1000	8858	1600	14,173	F602_0135 MT40				3000	3500		15.4	61.2	542
18.52	3445/186	905	8018	1100	9744	2000	17,716	F602_0185 MT30			10/5	13.6	63.0	558			
								F602_0185 MT40				2900	2500	3500	17.6	69.8	619
23.27	1885/81	903	7998	993	8798	1409	12,479	F602_0230 MT20			10/5	6.6	62.7	555			
		977	8652	1100	9744	2000	17,716	F602_0230 MT30				2900	2500	4000	11.4	67.6	599
		977	8652	1100	9744	2000	17,716	F602_0230 MT40				3500			15.4	72.4	642
27.99	2015/72	1039	9200	1100	9744	2000	17,716	F602_0280 MT20			10/5	5.4	66.6	590			
								F602_0280 MT30				3300	2800	4000	10.2	70.4	623
								F602_0280 MT40				3000	3500		14.2	73.9	654
35.21	845/24	1100	9744	1100	9744	2000	17,716	F602_0350 MT20			10/5	4.2	70.2	622			
								F602_0350 MT30				3300	2800	4000	9.0	72.8	645
								F602_0350 MT40				3000	3500		13.0	75.1	666
46.72	1495/32	1100	9744	1100	9744	2000	17,716	F602_0470 MT20			10/5	3.1	73.1	648			
								F602_0470 MT30				3500	3200	4000	7.9	74.7	662
								F602_0470 MT40				3000	3000	3500	11.9	76.1	674
55.71	390/7	1100	9744	1100	9744	2000	17,716	F602_0560 MT20			10/5	2.7	74.3	659			
								F602_0560 MT30				3500	3200	4000	7.5	75.5	669
								F602_0560 MT40				3000	3000	3500	11.5	76.5	677

¹⁾ Maximum torque for continuous input RPM - horizontal output position.
²⁾ Maximum momentary torque for emergency stops or heavy shock load. (Admissible stops per life of gearhead = 1,000 stops maximum.)
³⁾ Backlash shown standard/reduced
⁴⁾ dB(A) measured at 1 meter distance with 2000 RPM input.
 * Motor shaft adapter code (shaft diameter max - mm): MT10 (19), MT20 (24), MT30 (38), MT40 (48)

F Series: OFFSET – Solid Shaft/Hollow Output

Reducer Ratio (i)		Output Torque						Part Number* (Gearhead + Input)	Maximum Input Speed RPM			Backlash ⁴⁾ (arcmins) $\Delta\phi$	Input Inertia J ₁ kgcm ²	Torsional Stiffness C ₂ (per arcmin)	
		Nominal ¹⁾ M _{2N} ≤ 2000 RPM		Acceleration M _{2B}		Peak ²⁾ M _{2PEAK}			Continuous		Cyclic			Nm	in. lbs.
Nom.	Exact	Nm	in. lbs.	Nm	in. lbs.	Nm	in. lbs.	EL 1,2,3,4	EL 5,6	All			Nm	in. lbs.	

F602 Two Stage (continued from previous page) Noise Level ≤ 61 dB(A)⁴⁾

69.64	975/14	1100	9744	1100	9744	2000	17,716	F602_0700 MT20	3500	3200	5000	10/5	2.2	75.4	668
								F602_0700 MT30	3500	3200	4000		7.0	76.2	675
								F602_0700 MT40	3000	3000	3500		11.0	76.8	680
93.33	280/3	1100	9744	1100	9744	2000	17,716	F602_0930 MT20	3500	3200	5000	10/5	1.8	76.3	676
								F602_0930 MT30	3500	3200	4000		6.6	76.7	679
								F602_0930 MT40	3000	3000	3500		10.6	77.1	683
112.2	9425/84	1100	9744	1100	9744	2000	17,716	F602_1120 MT20	3500	3200	5000	10/5	1.6	76.6	679
								F602_1120 MT30			4000		6.4	76.9	681
139.8	559/4	1100	9744	1100	9744	2000	17,716	F602_1400 MT20	3500	3200	5000	10/5	1.5	76.9	681
								F602_1400 MT30			4000		6.3	77.1	683

F603 Three Stage Noise Level ≤ 61 dB(A)⁴⁾

180.6	8671/48	1100	9744	1100	9744	2000	17,716	F603_1810 MT20	3500	3200	5000	10/6	1.5	77.1	683
215.4	1508/7	1100	9744	1100	9744	2000	17,716	F603_2150 MT20	3500	3200	5000	10/6	1.5	77.2	684
269.3	1885/7	1100	9744	1100	9744	2000	17,716	F603_2690 MT20	3500	3200	5000	10/6	1.4	77.2	684
360.9	3248/9	1100	9744	1100	9744	2000	17,716	F603_3610 MT20	3500	3200	5000	10/6	1.4	77.3	685
433.8	54,665/126	1100	9744	1100	9744	2000	17,716	F603_4340 MT20	3500	3200	5000	10/6	1.4	77.3	685
540.4	16,211/30	1100	9744	1100	9744	2000	17,716	F603_5400 MT20	3500	3200	5000	10/6	1.4	77.3	685

¹⁾ Maximum torque for continuous input RPM - horizontal output position.

²⁾ Maximum momentary torque for emergency stops or heavy shock load. (Admissible stops per life of gearhead = 1,000 stops maximum.)

³⁾ Backlash shown standard/reduced

⁴⁾ dB(A) measured at 1 meter distance with 2000 RPM input.

* Motor shaft adapter code (shaft diameter max - mm): MT10 (19), MT20 (24), MT30 (38), MT40 (48)