

## Hollow Shaft



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# 200 Series Optimount® Product Reference Guide

## F200 Series Optimount® Helical Gear Flanged Reducers

**Ordering Information** – Pages 249-251

**Selection/Rating Information** – Pages 253-256

**Lubrication** – Pages 267-268

**Motor Selection** – Pages 334, 337-341



**Basic Model**  
Dimensions – Page 259



**F200H Series**  
**Horizontal Base Model**  
Dimensions – Page 260



**F200V Series**  
**Vertical Base Model**  
Dimensions – Page 260

## 200 Series Optimount® Helical Gear Non-Flanged Reducers

**Ordering Information** – Pages 249-251

**Selection/Rating Information** – Pages 253-256

**Lubrication** – Pages 267-268

**Motor Selection** – Pages 334, 337-341



**Basic Model**  
Dimensions – Pages 261



**200H Series**  
**Horizontal Base Model**  
Dimensions – Page 262



**200V Series**  
**Vertical Base Model**  
Dimensions – Page 262

## 200 Series Optimount® Helical Gear Accessories and Options

**Ordering Information** – Page 249



**Shaft Kits / Reaction Rods**  
Dimensions – Pages 264



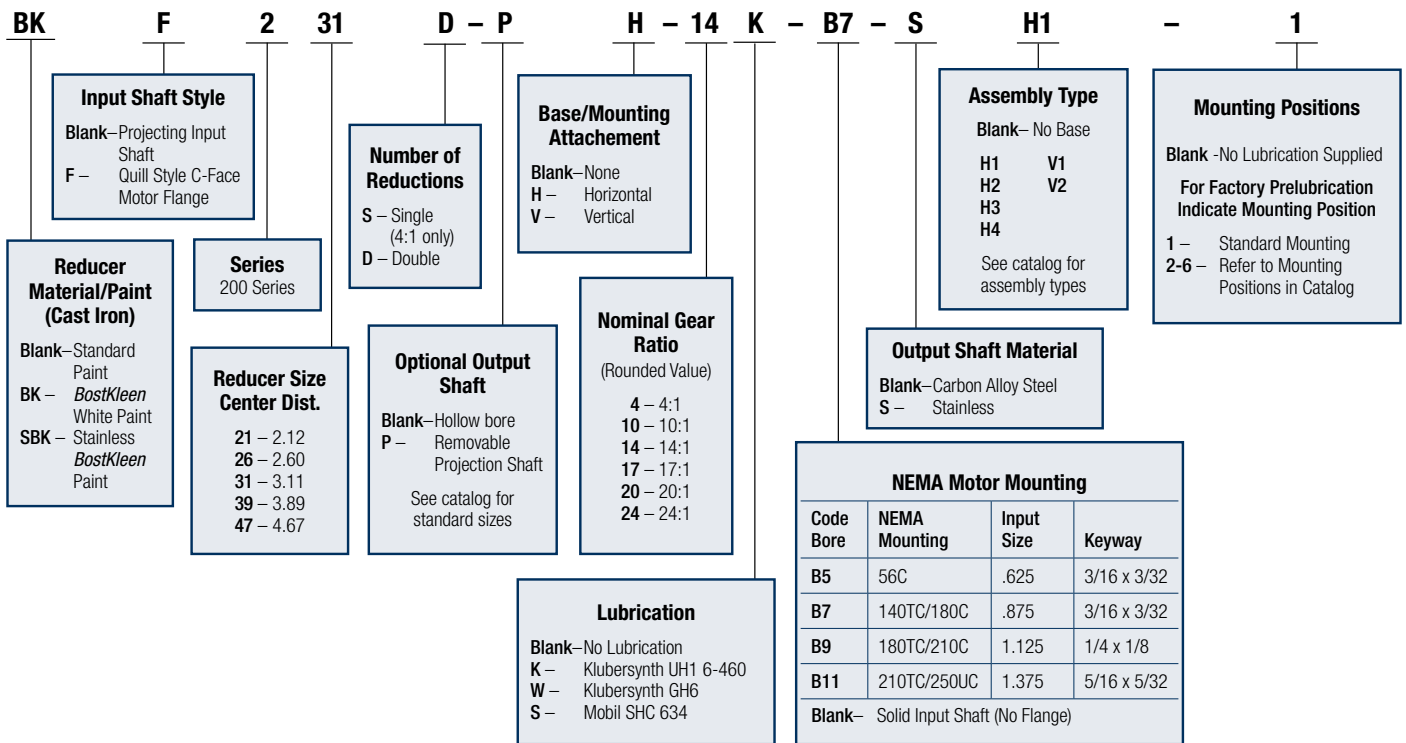
**Base Kits**  
**Vertical/Horizontal**  
Dimensions – Page 265

# 200 Series Optimount® Numbering System / How to Order

## Catalog Numbering System

When ordering please note the complete catalog number and/or the (5-digit) item code. With either of these two numbers your local Boston Distributor will have several alternatives to enter your order into the Boston Gear system.

### 200 Series Catalog Number



## How to Order

Specify Model Number (Basic Hollow Output Shaft Reducer), Ratio, Input Bore Code, Horizontal or Vertical Base Kit and Output Shaft Kit.

### EXAMPLE:

F239DPH-14-B9\*\*

### Order:

1 Pc. F239D-14-B9 (Basic Flanged Reducer) (39272)

1 Pc. X239-3PK (Output Shaft Kit) (23904)

1 Pc. X239-11HK (Horizontal Base Kit) (68658)

\*Shipped separately unless otherwise specified.

\*\*If components are to be factory assembled, specify Assembly Type and Mounting Position, see Page 240

# 200 Series Optimount® Helical Gear Speed Reducers

To properly select a speed reducer, the following application information should be known.

1. Service Factor or AGMA Service Class.
2. Output Horsepower or Torque
3. Output RPM or Ratio

## Non-Motorized Speed Reducer

1. Determine application service factor from table 1 or from application classification tables on pages 348-349.
2. Determine design Horsepower or Torque.
  - Design HP = Application HP x S.F.
  - Design Torque = Application Torque x S.F.
3. Select a Speed reducer that satisfies output RPM, service class and/or output torque requirement. Ref. rating tables pages 257-258.
4. Overhung shaft load should be checked when belt or chain drives are used, to prevent premature shaft or bearing failure. Reference page 251 for calculations.

## Example

Select a parallel shaft helical speed reducer for a uniformly loaded assembly belt conveyor to operate 12 hrs/day, to be driven at 1150 RPM input. Output RPM Approx. 80, Torque requirement is 2200 lb-in.

1. Application Service Factor = 1.25
2. Design Torque = 2200 x 1.25 = 2750 LB-IN.
3. Select at speed and torque level of at least 2750 LB-IN or greater
4. Order 239D-14 (Item Code 39052)

**NOTE:** The use of an auxiliary drive between the speed reducer and the driven machine reduces the torque required at the output shaft in direct proportion to the auxiliary drive ratio.

A 3:1 chain ratio would reduce the torque requirement at the output shaft of the reducer to one-third, resulting in a smaller unit size selection.

## Service Factor Table

AGMA CLASS OF SERVICE	SERVICE FACTOR	OPERATING CONDITIONS
I	1.00	Moderate Shock-not more than 15 minutes in 2 hours. Uniform Load-not more than 10 hours per day.
II	1.25	Moderate Shock-not more than 10 hours per day. Uniform Load-more than 10 hours per day.
	1.50	Heavy Shock-not more than 15 minutes in 2 hours. Moderate Shock-more than 10 hours per day.
III	1.75	Heavy Shock-not more than 10 hours per day.
	2.00	Heavy Shock-more than 10 hours per day.

For complete AGMA Service Factors and Load Classifications, see Engineering Pages 348-349.

# 200 Series Ratio and Capacity Selection Tables

## (Service Factor 1.0)

Catalog Number	Item Code	INPUT RPM								Gear Ratio	O.H.L. (LB.)*	Weight (Lb.)
		1750				1150						
		O/P RPM	Output Torque (LB-IN)	HP		O/P RPM	Output Torque (LB-IN)	HP				
				Input	Output			Input	Output			
221D-14	39004	121	403	0.80	0.77	80	403	0.53	0.51	14.45	490	23
226D-14	39020		711	1.43	1.37		772	1.02	0.97		660	38
231D-14	39036		1500	3.00	2.88		1781	2.34	2.25		780	57
239D-14	39052		2842	5.69	5.46		3168	4.17	4.00		875	96
247D-14	39068		4736	9.48	9.10		5662	7.45	7.15		1070	140
221D-17	39006	101	410	0.69	0.66	67	410	0.45	0.43	17.28	500	23
226D-17	39022		754	1.26	1.21		805	0.89	0.85		675	38
231D-17	39038		1644	2.75	2.64		1857	2.04	1.96		800	57
239D-17	39054		2959	5.00	4.80		3219	3.54	3.40		900	96
247D-17	39070		5071	8.49	8.15		5775	6.34	6.10		1100	135

Ref. Page 257



# 200 Series Optimount® Helical Gear Speed Reducers

## Motorized Speed Reducer

1. Determine application service factor from the table on page 250 or from pages 348-349.
2. Determine output speed required.
3. Determine HP or output torque requirement.
4. Select based on output speed and horsepower requirement for given service class.
5. Check overhung load Ref. calculation.

### Example

Select a Parallel Shaft Helical Gear Flanged Speed Reducer and motor to drive a uniformly loaded line shaft 12 hours/day, requiring approximately 1 1/2 HP at 100 RPM.

Power Requirement  
 230/460 volt  
 3 phase  
 60 Hz

1. Select service factor class from pages 348-349 or from Table 1.  
 Service class = II
2. Output RPM = 100
3. 1 1/2 HP
4. Select a 1 1/2 HP drive that will satisfy service class II.
5. O.H.L = 800 LBS. Ref. pg. 257
6. Order: 1 – F231D-17-B7 (39250)  
 1 – JUTF Motor Ref. page 339 for specific manufacturer.

## Overhung Load

If the output shaft of a speed reducer is connected to the driven machine by other than a flexible coupling, an overhung load is imposed on the shaft. This load may be calculated as follows:

$$OHL = \frac{2 TK}{D}$$

- OHL = Overhung Load (LB.)
- T = Shaft Torque (LB.-INS.)
- D = PD of Sprocket, Pinion or Pulley (IN.)
- K = Load Connection Factor

## Load Connection Factor (K)

Sprocket or Timing Belt .....	1.00
Pinion and Gear Drive .....	1.25
Pulley and V-Belt Drive.....	1.50
Pulley and Flat Belt Drive.....	2.50

An overhung load greater than permissible load value may be reduced to an acceptable value by the use of a sprocket, pinion or pulley of a larger PD. Relocation of the load closer to the center of reducer will also increase OHL capacity.

Permissible Overhung Loads and Output Shaft Thrust Loads are listed for each reducer in the Tables on Pages 257-258.

## 200 Series Output RPM and Capacity Selection Tables

@ 1750 RPM Input

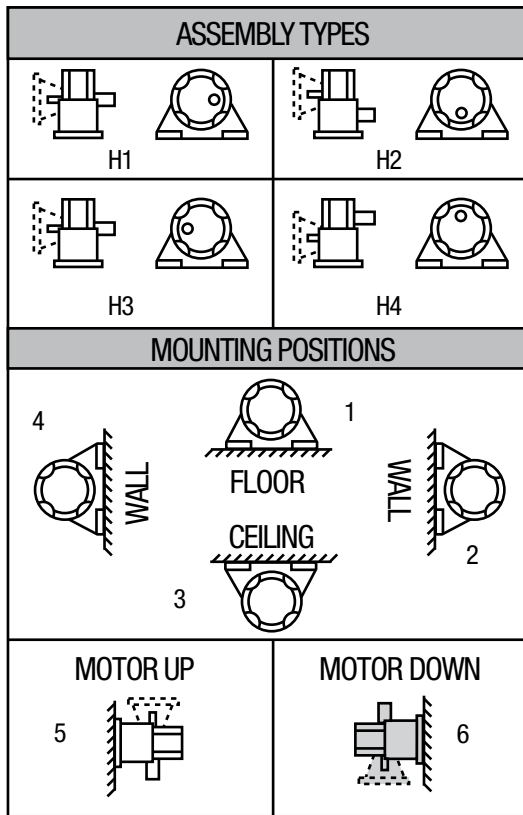
Output RPM	Ratio	Non-Flanged Reducers					Flanged Reducers (Gearmotors)					AC Motor†	DC Motor††		
		Gear Capacity			Catalog Number	Item Code	Ratings			Catalog Number	Item Code				
		Output Torque (LB-IN.)	HP				Motor HP	Output Torque (LB-IN.)	Service Class						
		Input	Output												
101 (Cont.)	17.28	1644	2.75	2.64	231D-17	39038	3	*1644	*	F231D-17-B9	47227	LUTF	PM18300		
							2	1194	I	F231D-17-B7	39250	KUTF JUTF	PM18200 PM18150		
							1 1/2	896	II						
				2959	4.96	4.76	239D-17	39054	1	597	III	F231D-17-B5	39246	HUTF-5/8	PM9100 5/8 PM18100 5/8
		5	*2956						*	F239D-17-B9	39276	MUTF LUTF	PM18500 PM18300		
		3	1498						II						
		2	1194						III	F239D-17-B7	39274	KUTF	PM18200		
							7 1/2	4478	I	F247D-17-B11	47233	NUTF	—		

Reference Page 255



# 200 Series Optimount® Mounting Positions

## 200 SERIES—HORIZONTAL BASE



**NOTE:** Shaded positions are not recommended when used as a motorized reducer and should be avoided if possible.

Mountings are designated by combining identification for assembly type and mounting position (Example Mtg. H1).

**Mounting H1 is standard and will be furnished unless otherwise specified.**

### SIZES 221 TO 247

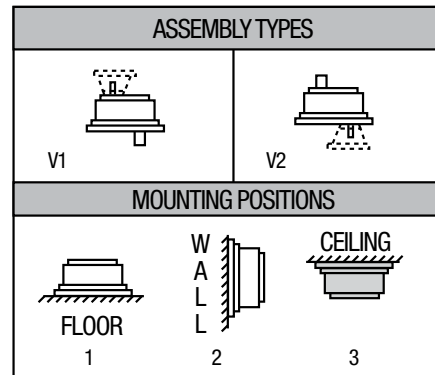
All other assemblies are available at no additional charge. The assembly types shown indicate the four possible arrangements of the Reductor in the base.

Any of these assemblies may be installed in the various floor sidewall or ceiling mounting positions shown by relocating oil plugs in proper positions. *Reference pages 267-268.*

### CAUTION

Mounting of speed reducers in overhead positions may be hazardous. Use of external guides or supports is strongly recommended for overhead mounting.

## 200 SERIES—VERTICAL BASE



Mountings are designated by combining identification for assembly type and mounting position (Example Mtg. V1).

Mounting V1 is standard and will be furnished unless otherwise specified. All other mountings are available at no additional charge.

### SIZES 221 TO 247

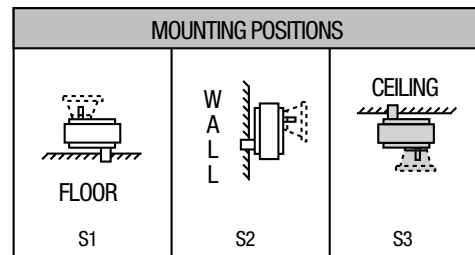
Assemblies V1 & V2 may be installed in the various floor, side-wall or ceiling mounting positions shown.

Sidewall Mounted Reducers must be located with one edge of the base parallel to the floor so that oil plugs can be properly located.

Mounting designations other than standard must be included with each Reductor order.

## 200 SERIES

### SHAFT MOUNTING



Mounting S2 is standard and will be furnished unless otherwise specified. Mountings S1 & S3 are available at a slight additional charge.

### SIZES 221 TO 247

Shaft Mounted Reducers may be installed in floor, sidewall or ceiling mounting positions by proper relocation of oil plugs. *Reference to pages 267-268.*

# 200 Series Output RPM and Capacity Selection Tables

@ 1750 RPM Input

FOR RATINGS AT OTHER INPUT SPEEDS, SEE TABLES ON PAGES 257-258  
ORDER BY CATALOG NUMBER OR ITEM CODE

Output RPM	Ratio	Non-Flanged Reducers					Flanged Reducers (Gearmotors)					AC Motors†	DC Motors††	
		Gear Capacity			Catalog Number	Item Code	Ratings			Catalog Number	Item Code			
		Output Torque (LB-IN.)	HP				Motor HP	Output Torque (LB-IN.)	Service Class					
			Input	Output										
431	4.06	289	2.02	1.98	221S-4	39012	1	142	III	F221S-4-B5	39214	HUTF-5/8	PM9100 5/8 PM18100 5/8	
							3/4	106	III			GUTF	PM975	
		455	3.17	3.11	226S-4	39028	2	284	II	F226S-4-B7	39236	KUTF	PM18200	
							1 1/2	213	III			JUTF	PM18150	
		950	6.63	6.50	231S-4	39044	5	716	I	F231S-4-B9	39264	MUTF	PM18500	
							3	423	III			LUTF	PM18300	
		1900	13.26	12.99	239S-4	39060	10	1432	I	F239S-4-B11	39290	PUTF	—	
							7 1/2	1074	II			NUTF	—	
		2851	19.90	19.50	247S-4	39076	5	716	III	F239S-4-B9	39288	MUTF	PM18500	
							10	1432	II			PUTF	—	
								7 1/2	1074	III	F247S-4-B11	39308	NUTF	—
178	9.84	390	1.15	1.10	221D-10	39002	1	340	I	F221D-10-B5	39202	HUTF-5/8	PM9100 5/8 PM18100 5/8	
							3/4	255	II			GUTF	PM975	
							1/2	170	III			FUTF	PM950	
		672	2.00	1.90	226D-10	39018	2	660	I	F226D-10-B7	39220	KUTF	PM18200	
							1 1/2	510	I			JUTF	PM18150	
							1	340	II	F226D-10-B5	39218	HUTF-5/8	PM9100 5/8 PM18100 5/8	
		3/4	255	III	GUTF	PM975 PM1875								
		1322	3.89	3.73	231D-10	39034	3	1020	I	F231D-10-B9	39242	LUTF	PM18300	
							2	680	II	F231D-10-B7	39240	KUTF	PM18200	
							1 1/2	510	III			JUTF	PM18150	
		2426	7.12	6.84	239D-10	39050	5	1700	I	F239D-10-B9	39268	MUTF	PM18500	
							3	1020	III			LUTF	PM18300	

Class I (S.F. = 1.00) Class II (S.F. = 1.50) Class III (S.F. = 2.00)

† AC Motors – 230/460-3-60 TEFC, for specific motor manufacturers and 5 digit item code refer to pages 337-339.

††DC Motors – 90 VDC or 180 VDC where applicable, for specific motor manufacturers and 5 digit item code ref. pages 340 and 341.

# 200 Series Output RPM and Capacity Selection Tables

## @ 1750 RPM Input

FOR RATINGS AT OTHER INPUT SPEEDS, SEE TABLES ON PAGES 245-246  
ORDER BY CATALOG NUMBER OR ITEM CODE

Output RPM	Ratio	Non-Flanged Reducers					Flanged Reducers (Gearmotors)					AC Motors†	DC Motors††					
		Gear Capacity			Catalog Number	Item Code	Ratings			Catalog Number	Item Code							
		Output Torque (LB-IN.)	HP				Motor HP	Output Torque (LB-IN.)	Service Class									
			Input	Output														
178 (Cont.)	9.84	4641	13.64	13.09	247D-10	39066	10	3400	I	F247D-10-B11	39296	PUTF NUTF	—					
							7 1/2	2550	II				—					
121	14.45	403	.80	.77	221D-14	39004	3/4	374	I	F221D-14-B5	39204	GUTF FUTF EUTF	PM975 PM950 PM933					
							1/2	250	II									
							1/3	166	III									
							711	1.43	1.37	226D-14	39020	1 1/2	*711	*	F226D-14-B7	39224	JUTF	PM18150
												1	500	I	F226D-14-B5	39222	HUTF-5/8 GUTF FUTF	PM9100 5/8 PM18100 5/8 PM975 PM950
							3/4	374	II									
							1/2	250	III									
							1500	3.00	2.88	231D-14	39036	3	1500	I	F231D-14-B9	47226	LUTF	PM18300
												2	998	II	F231D-14-B7	39248	KUTF JUTF	PM18200 PM18150
												1 1/2	750	III				
												1	500	III	F231D-14-B5	39244	HUTF-5/8	PM9100 5/8 PM18100 5/8
												2842	5.69	5.46	239D-14	39052	5	2497
3	1498	II																
4736	9.48	9.10	247D-14	39068	10	*4736	*	F247D-14-B11	47232	PUTF NUTF MUTF	— — PM18500							
					7 1/2	3745	I											
					5	2497	II											
3	1498	III	F247D-14-B9	39298	LUTF	PM18300												
					3	1498	III	F247D-14-B9	39298	LUTF	PM18300							
101	17.28	410	.69	.66	221D-17	39006	3/4	*410	*	F221D-17-B5	39206	GUTF FUTF EUTF	PM975 PM950 PM933					
							1/2	298	I									
							1/3	199	III									
							1 1/2	*754	*	F226D-17-B7	47220	JUTF	PM18150					
754	1.26	1.21	226D-17	39022	1	597	I	F226D-17-B5	39226	HUTF-5/8 GUTF FUTF	PM9100 5/8 PM18100 5/8 PM975 PM950							
					3/4	448	II											
					1/2	298	III											

Class I (S.F. = 1.00) Class II (S.F. = 1.50) Class III (S.F. = 2.00)

† AC Motors – 230/460-3-60 TEFC, for specific motor manufacturers and 5 digit item code refer to pages 337-339.

†† DC Motors – 90 VDC or 180 VDC where applicable, for specific motor manufacturers and 5 digit item code ref. pages 340 and 341.

\*Rating Limited to Gear Capacity.

# 200 Series Output RPM and Capacity Selection Tables

@ 1750 RPM Input

FOR RATINGS AT OTHER INPUT SPEEDS, SEE TABLES ON PAGES 245-246  
ORDER BY CATALOG NUMBER OR ITEM CODE

Output RPM	Ratio	Non-Flanged Reducers					Flanged Reducers (Gearmotors)					AC Motors†	DC Motors‡
		Gear Capacity			Catalog Number	Item Code	Ratings			Catalog Number	Item Code		
		Output Torque (LB-IN.)	HP				Motor HP	Output Torque (LB-IN.)	Service Class				
			Input	Output									
101 (Cont.)	17.28	1644	2.75	2.64	231D-17	39038	3	*1644	*	F231D-17-B9	47227	LUTF	PM18300
							2	1194	I	F231D-17-B7	39250	KUTF JUTF	PM18200 PM18150
							1 1/2	896	II				
		2959	4.96	4.76	239D-17	39054	1	597	III	F231D-17-B5	39246	HUTF-5/8	PM9100 5/8 PM18100 5/8
							5	*2956	*	F239D-17-B9	39276	MUTF LUTF	PM18500 PM18300
							3	1498	II				
							2	1194	III	F239D-17-B7	39274	KUTF	PM18200
							7 1/2	4478	I	F247D-17-B11	47233	NUTF	—
5071	8.49	8.15	247D-17	39070	5	2986	II	F247D-17-B9	39300	MUTF LUTF	PM18500 PM18300		
					3	1791	III						
87.4	20.03	398	.57	.55	221D-20	39008	1/2	346	I	F221D-20-B5	39208	FUTF	PM950
							1/3	230	II			EUTF	PM933
							1/4	173	III			DUTF	PM925
		758	1.09	1.05	226D-20	39024	1	692	I	F226D-20-B5	39228	HUTF-5/8	PM9100 5/8
							3/4	519	II			GUTF	PM18100 5/8
							1/2	346	III			FUTF	PM975 PM950
		1679	2.43	2.33	231D-20	39040	3	*1679	*	F231D-20-B9	47228	LUTF	PM18300
							2	1384	I	F231D-20-B7	39254	KUTF JUTF	PM18200 PM18150
							1 1/2	1038	II				
		3022	4.36	4.19	239D-20	39056	1	692	III	F231D-20-B5	39252	HUTF-5/8	PM9100 5/8 PM18100 5/8
							5	*3022	*	F239D-20-B9	39280	MUTF LUTF	PM18500 PM18300
							3	2076	I				
		5198	7.51	7.21	247D-20	39072	2	1384	III	F239D-20-B7	39278	KUTF	PM18200
							7 1/2	5192	I	F247D-20-B11	47234	NUTF	—
5	3461						II	F247D-20-B9	39302	MUTF LUTF	PM18500 PM18300		
3	2076						III						

Class I (S.F. = 1.00) Class II (S.F. = 1.50) Class III (S.F. = 2.00)

† AC Motors – 230/460-3-60 TEFC, for specific motor manufacturers and 5 digit item code refer to pages 337-339.

‡ DC Motors – 90 VDC or 180 VDC where applicable, for specific motor manufacturers and 5 digit item code ref. pages 340 and 341.

\*Rating Limited to Gear Capacity.

# 200 Series Output RPM and Capacity Selection Tables

## @ 1750 RPM Input

FOR RATINGS AT OTHER INPUT SPEEDS, SEE TABLES ON PAGES 245-246  
ORDER BY CATALOG NUMBER OR ITEM CODE

Output RPM	Ratio	Non-Flanged Reducers					Flanged Reducers (Gearmotors)					AC Motors†	DC Motors††
		Gear Capacity			Catalog Number	Item Code	Ratings			Catalog Number	Item Code		
		Output Torque (LB-IN.)	HP				Motor HP	Output Torque (LB-IN.)	Service Class				
			Input	Output									
73	23.95	414	.50	.48	221D-24	39010	1/2	414	I	F221D-24-B5	39210	FUTF	PM950
							1/3	275	I			EUTF	PM933
							1/4	206	III			DUTF	PM925
		809	.98	.94	226D-24	39026	1	809	I	F226D-24-B5	39230	HUTF-5/8	PM9100 5/8 PM18100 5/8
							3/4	620	II			GUTF	PM975
							1/2	414	III			FUTF	PM950
		1791	2.17	2.08	231D-24	39042	2	1655	I	F231D-24-B7	39258	KUTF	PM18200
							1 1/2	1242	II			JUTF	PM18150
							1	828	III			F231D-24-B5	39256
		3175	3.83	3.68	239D-24	39058	5	*3175	*	F239D-24-B9	39284	MUTF	PM18500
							3	2483	I			LUTF	PM18300
							2	1655	II	F239D-24-B7	39282	KUTF	PM18200
												1 1/2	1241
		5478	6.61	6.35	247D-24	39074	7 1/2	*5478	*	F247D-24-B11	47235	NUTF	—
							5	4138	I	F247D-24-B9	39304	MUTF	PM18500
							3	2483	III			LUTF	PM18300

Class I (S.F. = 1.00) Class II (S.F. = 1.50) Class III (S.F. = 2.00)

† AC Motors – 230/460-3-60 TEFC, for specific motor manufacturers and 5 digit item code refer to pages 337-339.

†† DC Motors – 90 VDC or 180 VDC where applicable, for specific motor manufacturers and 5 digit item code ref. pages 340 and 341.

\* Rating Limited to Gear Capacity.

# 200 Series Ratio and Capacity Selection Tables

## Non-Flanged Reducers; Input Speeds 1750 and 1150 RPM

Service Factor 1.0

ORDER BY CATALOG NUMBER OR ITEM CODE

Catalog Number	Item Code	INPUT RPM								Gear Ratio	O.H.L. (LB.)*	Weight (Lb.)
		1750				1150						
		O/P RPM	Output Torque (LB-IN)	HP		O/P RPM	Output Torque (LB-IN)	HP				
				Input	Output			Input	Output			
<b>221S-4</b>	39012	431	289	2.02	1.98	283	300	1.38	1.35	4.06	350	25
<b>226S-4</b>	39028		455	3.17	3.11		552	2.53	2.48		475	40
<b>231S-4</b>	39044		959	6.63	6.56		1144	5.24	5.14		575	58
<b>239S-4</b>	39060		1900	13.26	12.99		2545	11.67	11.44		650	96
<b>247S-4</b>	39076		2851	19.90	19.50		3557	16.32	15.99		800	137
<b>221D-10</b>	39002	178	390	1.15	1.10	117	404	0.78	0.75	9.84	460	23
<b>226D-10</b>	39018		672	2.90	1.90		723	1.40	1.34		615	38
<b>231D-10</b>	39034		1322	3.89	3.73		1581	3.05	2.93		720	60
<b>239D-10</b>	39050		2426	7.12	6.85		2860	5.52	5.30		800	99
<b>247D-10</b>	39066		4641	13.64	13.10		5071	9.79	9.40		980	140
<b>221D-14</b>	39004	121	403	0.80	0.77	80	403	0.53	0.51	14.45	490	23
<b>226D-14</b>	39020		711	1.43	1.37		772	1.02	0.97		660	38
<b>231D-14</b>	39036		1500	3.00	2.88		1781	2.34	2.25		780	57
<b>239D-14</b>	39052		2842	5.69	5.46		3168	4.17	4.00		875	96
<b>247D-14</b>	39068		4736	9.48	9.10		5662	7.45	7.15		1070	140
<b>221D-17</b>	39006	101	410	0.69	0.66	67	410	0.45	0.43	17.28	500	23
<b>226D-17</b>	39022		754	1.26	1.21		805	0.89	0.85		675	38
<b>231D-17</b>	39038		1644	2.75	2.64		1857	2.04	1.96		800	57
<b>239D-17</b>	39054		2959	5.00	4.80		3219	3.54	3.40		900	96
<b>247D-17</b>	39070		5071	8.49	8.15		5775	6.34	6.10		1100	135
<b>221D-20</b>	39008	87	398	0.57	0.55	57	411	0.39	0.37	20.03	510	23
<b>226D-20</b>	39024		758	1.09	1.05		838	0.79	0.76		695	38
<b>231D-20</b>	39040		1679	2.43	2.33		1916	1.81	1.75		825	57
<b>239D-20</b>	39056		3022	4.36	4.19		3299	3.12	3.01		925	96
<b>247D-20</b>	39072		5198	7.51	7.21		5862	5.56	5.34		1125	135
<b>221D-24</b>	39010	73	414	0.50	0.48	48	404	0.31	0.31	23.95	525	23
<b>226D-24</b>	39026		809	0.98	0.94		819	0.65	0.62		715	38
<b>231D-24</b>	39042		1791	2.17	2.08		1886	1.50	1.44		850	57
<b>239D-24</b>	39058		3175	3.83	3.68		3353	2.66	2.55		950	96
<b>247D-24</b>	39074		5478	6.61	6.35		5760	4.57	4.39		1150	135

\* Overhung Load (O.H.L.) in (LB's) is at center of Output Shaft Extension and with no Thrust Load.

Size	Shaft Dia. (Ins.)	Input Shaft		Output Shaft
		Allowable Overhung Load in Lbs. (No Thrust) at 1 and 2 Shaft diameters from Oil Seal		Allowable Thrust Load In Lbs. (No Overhung Load)
		1	2	
221	1/2	80	60	700
226	5/8	100	80	1000
231	15/16	160	120	1100
239	1-3/8	325	225	1200
247	1-9/16	400	300	1300



# 200 Series Ratio and Capacity Selection Tables

## Non-Flanged Reducers; Input Speeds 690 and 100 RPM

Service Factor 1.0

ORDER BY CATALOG NUMBER OR ITEM CODE

Catalog Number	Item Code	INPUT RPM								Gear Ratio	O.H.L. (LB.)*	Weight (Lb.)
		690				100						
		O/P RPM	Output Torque (LB-IN)	HP		O/P RPM	Output Torque (LB-IN)	HP				
				Input	Output			Input	Output			
<b>221S-4</b>	39012	170	313	.86	0.84	25	343	0.14	0.13	4.06	465	25
<b>226S-4</b>	39028		624	1.71	1.68		682	0.28	0.27		620	40
<b>231S-4</b>	39044		1275	3.51	3.44		1417	0.56	0.55		730	58
<b>239S-4</b>	39060		2795	7.69	7.54		3113	1.24	1.22		810	96
<b>247S-4</b>	39076		4045	11.14	10.91		4670	1.86	1.83		995	137
<b>221D-10</b>	39002	70	405	.47	0.45	10	426	0.07	0.07	9.84	530	23
<b>226D-10</b>	39018		798	.93	0.89		985	0.17	0.16		720	38
<b>231D-10</b>	39034		1834	2.12	2.04		2140	0.36	0.35		860	60
<b>239D-10</b>	39050		3202	3.71	3.56		3624	0.61	0.58		860	99
<b>247D-10</b>	39066		5605	6.49	6.24		6012	1.01	0.97		1160	140
<b>221D-14</b>	39004	48	413	.32	0.31	7	431	0.50	0.05	14.45	550	23
<b>226D-14</b>	39020		821	.65	0.62		1051	0.13	0.12		750	38
<b>231D-14</b>	39036		1898	1.50	1.44		2148	0.25	0.24		900	57
<b>239D-14</b>	39052		3360	2.66	2.55		3780	0.43	0.42		1000	96
<b>247D-14</b>	39068		5868	4.64	4.45		6060	0.69	0.67		1200	140
<b>221D-17</b>	39006	40	403	.27	0.26	6	432	0.04	0.04	17.28	550	23
<b>226D-17</b>	39022		834	.56	0.53		1068	0.10	0.10		750	38
<b>231D-17</b>	39038		1986	1.30	1.26		2153	0.21	0.20		900	57
<b>239D-17</b>	39054		3421	2.26	2.17		3790	0.36	0.35		1000	96
<b>247D-17</b>	39070		5904	3.90	3.74		6076	0.58	0.56		1200	135
<b>221D-20</b>	39008	34	406	.23	0.22	5	434	0.03	0.03	20.03	550	23
<b>226D-20</b>	39024		878	.50	0.48		1072	0.09	0.08		750	38
<b>231D-20</b>	39040		2005	1.14	1.10		2158	0.18	0.17		900	57
<b>239D-20</b>	39056		3446	1.96	1.88		3800	0.31	0.30		1000	96
<b>247D-20</b>	39072		5958	3.39	3.26		6094	0.50	0.48		1200	135
<b>221D-24</b>	39010	29	409	.20	0.19	4	436	0.03	0.03	23.95	550	23
<b>226D-24</b>	39026		893	.43	0.41		1080	0.08	0.07		750	38
<b>231D-24</b>	39042		2046	.97	0.94		2162	0.15	0.14		900	57
<b>239D-24</b>	39058		3492	1.67	1.60		3811	0.26	0.25		1000	96
<b>247D-24</b>	39074		5988	2.85	2.74		6109	0.43	0.40		1200	135

\* Overhung Load (O.H.L.) in (LB's) is at center of Output Shaft Extension and with no Thrust Load.

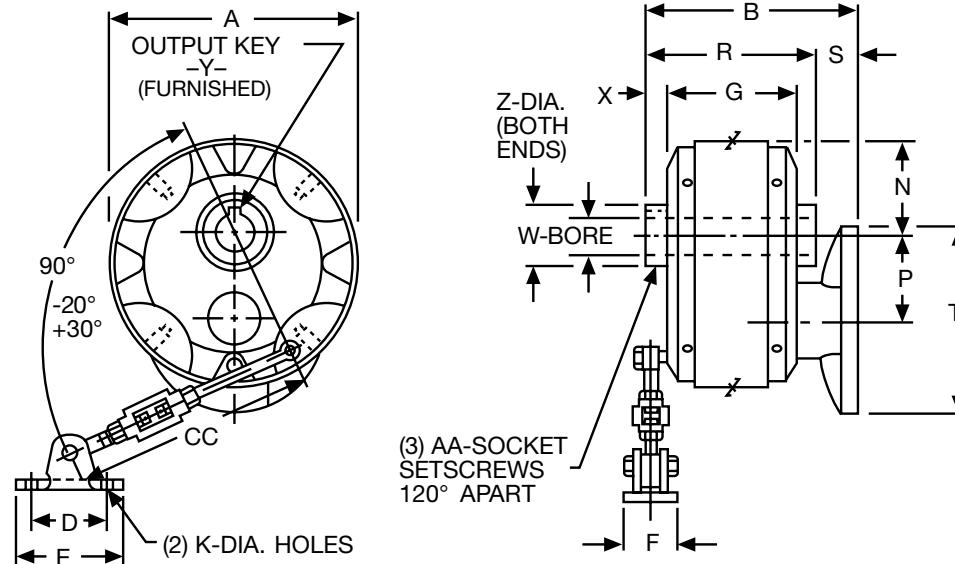
Size	Shaft Dia. (Ins.)	Input Shaft		Output Shaft
		Allowable Overhung Load in Lbs. (No Thrust) at 1 and 2 Shaft diameters from Oil Seal		Allowable Thrust Load In Lbs. (No Overhung Load)
		1	2	
221	1/2	80	60	700
226	5/8	100	80	1000
231	15/16	160	120	1100
239	1-3/8	325	225	1200
247	1-9/16	400	300	1300



# 200 Series Flanged Reducer Dimensions

## F200 Series; F221-247 Sizes Hollow Shaft

For ordering information See Page 249.



ALL DIMENSIONS IN INCHES

Size	A	B			D	E	F	G	K	N	P	R	S		
		NEMA Mounting											NEMA Mounting		
		56C 140TC	180TC	210TC									56C 140TC	180TC	210TC
221	6.19	6.13	—	—	2.25	3.31	1.06	3.31	.41	2.19	2.12	4.31	1.81	—	—
226	7.50	6.69	—	—	2.25	3.31	1.06	4.06	.41	2.81	2.60	5.19	1.50	—	—
231	8.88	7.19	8.06	—	2.63	3.69	1.06	4.75	.41	3.44	3.11	5.88	1.31	2.19	—
239	11.19	7.94	9.06	9.06	2.63	3.69	1.06	5.44	.41	4.03	3.89	6.69	1.25	2.38	2.38
247	12.88	—	9.56	10.31	3.00	4.31	1.31	5.94	.94	4.88	4.67	7.31	—	2.25	3.00

Size	T			W +.001 -.000	Output			Z	AA	CC	Optional Reaction Rod Kit	
	NEMA Mounting				X	Y					Item Catalog #	Code
	56C 140TC	180TC	210TC			Sq.	LGTH.					
221	6.56	—	—	1.0000	.50	1/4 x 7/32	1-3/8	1.3750	10-32	18-12	X221-76K	24188
226	6.56	—	—	1.2500	.56	1/4 x 7/32	1-1/2	1.7702	1/4-28	30-24	X226-76K	24190
231	6.56	9.25	—	1.4375	.56	3/8 x 5/16	1-3/4	2.1638	1/4-28	30-24	X231-76K	24192
239	6.56	9.25	10.13	1.9375	.63	1/2 x 3/8	2	2.5575	5/16-24	30-24	X239-76K	24194
247	—	9.25	10.13	2.1875	.69	1/2 x 3/8	2-1/4	2.9512	3/8-24	30-24	X247-76K	24196

Refer to Page 264 for Shaft Kit and for Reaction Rod Kit.  
**Note:** For external reference surfaces, refer to page 265.

J

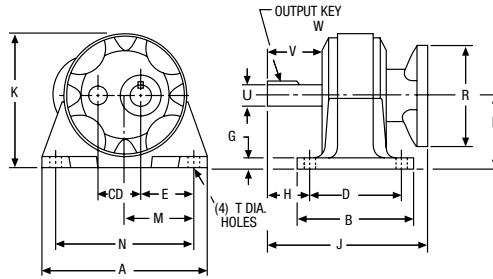
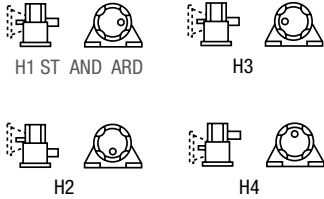
# 200 Series Flanged Reducer Dimensions

## F200 Series; Horizontal Base Projecting Shaft

For ordering information See Page 249.

### Parallel Shafts

ASSEMBLY TYPES\*



ALL DIMENSIONS IN INCHES

NEMA Mounting	Input	
	Bore +.0015 -.0000	Keyway
56C	.625	3/16 x 3/32
140TC	.875	3/16 x 3/32
180TC	1.125	1/4 x 1/8
210TC	1.375	5/16 x 5/32

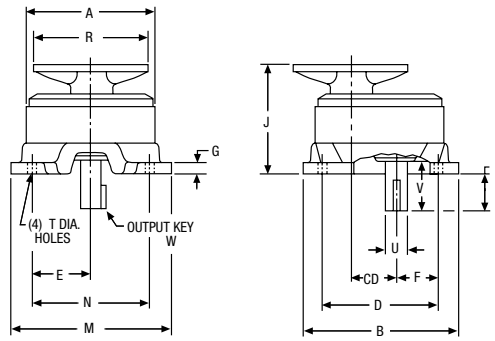
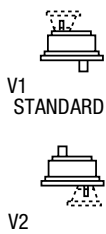
Size	C.D.	A	B	D	E	G	H	J				K	M	N
								NEMA Mounting						
								56C	140TC	180TC	210TC			
221	2.12	8.75	6.00	4.75	2.72	.50	2.16	8.50	—	—	—	6.84	3.63	7.25
226	2.60	11.00	7.38	5.75	3.56	.63	2.59	9.56	9.56	—	—	8.38	4.50	9.00
231	3.11	12.50	8.50	6.75	4.13	.75	2.72	10.34	10.84	11.22	—	9.88	5.13	10.25
239	3.89	15.50	9.75	7.75	4.94	.88	3.38	—	11.84	12.97	12.97	12.34	6.50	13.00
247	4.67	17.50	10.75	8.50	5.94	1.00	3.81	—	13.97	13.53	14.72	14.19	7.50	15.00

Size	P	R				T Holes	Low Speed Shaft				Approx. Weight (Lbs.)	Optional	
		NEMA Mounting					U +.000 -.001	V	W-Key			Base Kit No. (Ref. Pg 249)	Output Shaft Kit (Ref. Pg 248)
		56C	140TC	180TC	210TC				Sq.	LENGTH			
221	3.75	6.56	—	—	—	13/32	1.0000	2.25	1/4	1-1/4	28	X221-11HK	X221-3PK
226	4.62	6.56	6.56	—	—	15/32	1.2500	2.75	1/4	1-5/8	43	X226-11HK	X226-3PK
231	5.44	6.56	6.56	9.25	—	17/32	1.3750	3.00	5/16	1-3/4	69	X231-11HK	X231-3PK
239	6.75	—	6.96	9.25	10.13	19/32	1.8750	3.75	1/2	2	124	X239-11HK	X239-3PK
247	7.75	—	9.25	10.13	10.13	21/32	2.1250	4.25	1/2	2-1/2	166	X247-11HK	X247-3PK

## F200 Series; Vertical Base Projecting Shaft

### Parallel Shafts

ASSEMBLY TYPES\*



ALL DIMENSIONS IN INCHES

NEMA Mounting	Input	
	Bore +.0015 -.0000	Keyway
56C	.625	3/16 x 3/32
140TC	.875	3/16 x 3/32
180TC	1.125	1/4 x 1/8
210TC	1.375	5/16 x 5/32

Size	C.D.	A	B	D	E	F	G	J				M	N
								NEMA Mounting					
								56C	140TC	180TC	210TC		
221	2.12	6.19	8.00	5.75	2.88	1.97	.50	6.53	—	—	—	8.25	5.75
226	2.60	7.50	9.63	7.00	3.50	2.56	.63	7.13	7.13	—	—	9.88	7.00
231	3.11	8.88	11.00	8.25	4.13	3.13	.75	7.69	8.19	8.88	—	11.25	8.25
239	3.89	11.19	13.63	10.25	5.13	3.56	.88	—	8.75	9.88	9.88	13.88	10.25
247	4.67	12.88	15.50	11.75	5.88	4.31	1.00	—	—	10.31	9.88	16.00	11.75

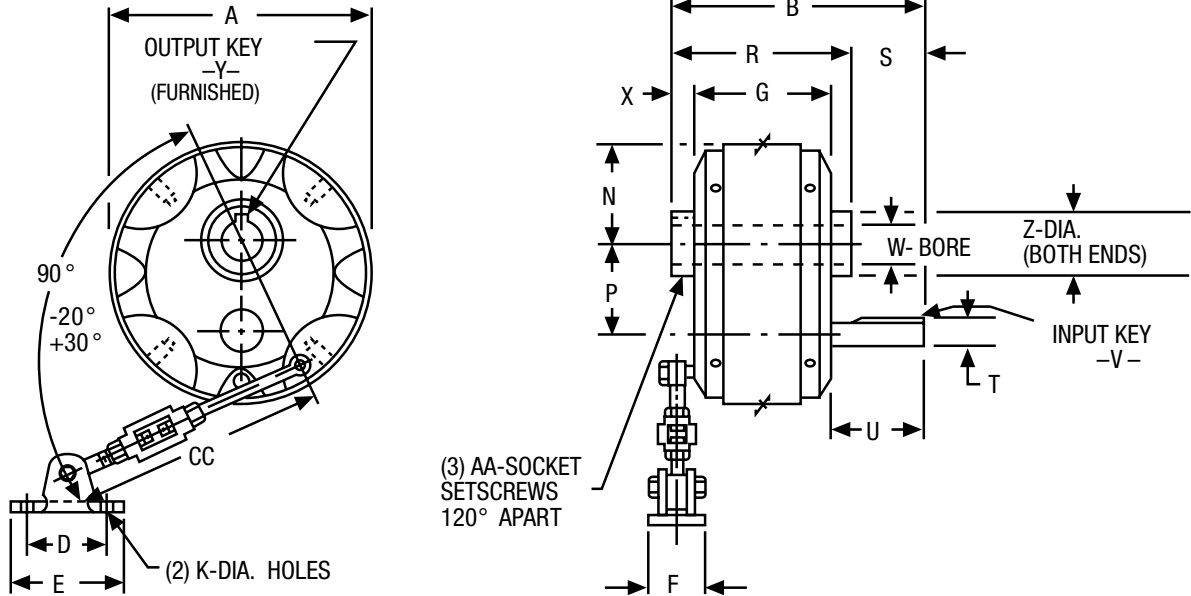
Size	P	R				T Holes	Low Speed Shaft				Approx. Weight (Lbs.)	Optional	
		NEMA Mounting					U +.000 -.001	V	W-Key			Base Kit No. (Ref. Pg 249)	Output Shaft Kit (Ref. Pg 248)
		56C	140TC	180TC	210TC				Sq.	LENGTH			
221	1.97	6.56	—	—	—	13/32	1.0000	2.25	1/4	1-1/4	28	X221-11VK	X221-3PK
226	2.44	6.56	6.56	—	—	15/32	1.2500	2.75	1/4	1-5/8	43	X226-11VK	X226-3PK
231	2.66	6.56	6.56	9.25	—	17/32	1.3750	3.00	5/16	1-3/4	69	X231-11VK	X231-3PK
239	3.09	—	6.96	9.25	10.13	19/32	1.8750	3.75	1/2	2	124	X239-11VK	X239-3PK
247	3.66	—	9.25	10.13	10.13	21/32	2.1250	4.25	1/2	2-1/2	166	X247-11VK	X247-3PK

\*Assemblies define output (slow speed) shaft projection with respect to input (high speed) shaft and mounting surface, viewed from end of output shaft. Input may be rotated clockwise or counterclockwise. Input and Output shafts of Single reduction (S) units rotate in opposite directions, Double reduction (D) units in the same direction.

# 200 Series Non-Flanged Reducer Dimensions

## 200 Series; 221-247 Sizes Hollow Shaft

For ordering information See Page 249.



ALL DIMENSIONS IN INCHES

Size	A	B	D	E	F	G	K	N	P	R	S
221	6.19	5.88	2.25	3.31	1.06	3.31	.41	2.19	2.12	4.31	1.50
226	7.50	7.50	2.25	3.31	1.06	4.06	.41	2.19	2.60	5.18	2.31
231	8.88	8.37	2.62	3.69	1.06	4.75	.41	3.44	3.11	5.88	2.50
239	11.19	10.25	2.62	3.69	1.06	5.44	.41	4.03	3.89	6.69	3.56
247	12.88	10.88	3.00	4.31	1.31	5.94	.41	4.88	4.67	7.31	3.56

Size	High Speed Shaft				Low Speed Shaft				Z	AA	CC Max-Min	Optional* Reaction Rod Kit	
	T +.000 -.001	U	V		W +.001 -.000	X	Y					Catalog Number	Item Code
			Sq.	Lgth.			Sq.	Lgth.					
221	.5000	2.00	1/8	7/8	1.0000	.50	1/4 x 7/32	1-3/8	1.3750	#10-32	18-12	X221-76K	24188
226	.6250	2.88	3/16	1	1.2500	.56	1/4 x 7/32	1-1/2	1.7702	1/4-28	30-24	X226-76K	24190
231	.9375	3.06	1/4	1-1/4	1.4375	.56	3/8 x 5/16	1-3/4	2.1638	1/4-28	30-24	X231-76K	24192
239	1.3750	4.19	5/16	2-7/16	1.9375	.62	1/2 x 3/8	2	2.5575	5/16-24	30-24	X239-76K	24194
247	1.5675	4.25	3/8	2-1/4	2.1875	.69	1/2 x 3/8	2-1/4	2.9512	3/8-24	30-24	X247-76K	24196

\* See page 264 for dimensions



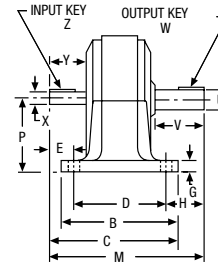
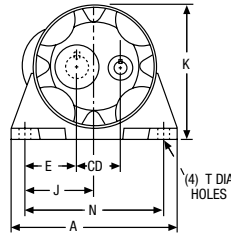
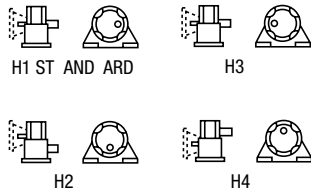
# 200 Series Non-Flanged Reducer Dimensions

## 200 Series; Horizontal Base Projecting Shaft

For ordering information See Page 249.

### Parallel Shafts

ASSEMBLY TYPES\*



ALL DIMENSIONS IN INCHES

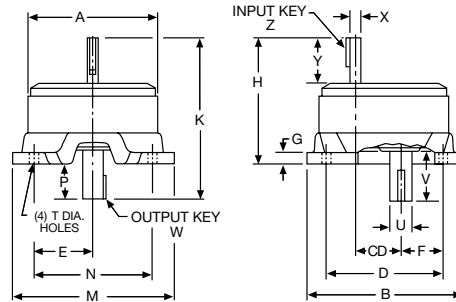
Size	C.D.	A	B	C	D	E	G	H	J	K	M	N	P
221	2.12	8.75	6.00	6.72	4.75	2.72	.50	2.16	3.63	6.84	8.25	7.25	3.75
226	2.60	11.00	7.38	8.59	5.75	3.56	.63	2.59	4.50	8.38	10.38	9.00	4.62
231	3.11	12.50	8.50	9.69	6.75	4.13	.75	2.72	5.13	9.88	11.53	10.25	5.44
239	3.89	15.50	9.75	11.78	7.75	4.94	.88	3.38	6.50	12.34	14.16	13.00	6.75
247	4.67	17.50	10.75	12.59	8.50	5.94	1.00	3.81	7.50	14.19	15.28	15.00	7.75

Size	C.D.	T Holes	Low Speed Shaft				High Speed Shaft				Approx. Weight (Lbs.)	Optional	
			U +.000 -.001	V	W-Key		X +.000 -.001	Y	Z-Key			Base Kit No. (Ref. page 251)	Output Shaft Kit No. (Ref. page 250)
					Sq.	Lgth.			Sq.	Lgth.			
221	2.12	13/32	1.0000	2.25	1/4	1-1/4	.5000	2.06	1/8	7/8	22	X221-11HK	X221-3PK
226	2.60	15/32	1.2500	2.75	1/4	1-1/4	.6250	2.88	3/16	1	39	X226-11HK	X226-3PK
231	3.11	17/32	1.3750	3.00	5/16	1-3/4	.9375	3.06	1/4	1-1/4	60	X231-11HK	X231-3PK
239	3.89	19/32	1.8750	3.75	1/2	2	1.3750	4.19	5/16	2-7/16	104	X239-11HK	X239-3PK
247	4.67	21/32	2.1250	4.25	1/2	2-1/2	1.5625	4.25	3/8	2-1/4	148	X247-11HK	X247-3PK

## 200 Series; Vertical Base Projecting Shaft

### Parallel Shafts

ASSEMBLY TYPES\*



ALL DIMENSIONS IN INCHES

Size	C.D.	A	B	D	E	F	G	H	K	M	N	P
221	2.12	6.19	8.00	5.75	2.88	1.97	.50	6.28	8.25	8.25	5.75	1.97
226	2.60	7.50	9.63	7.00	3.50	2.56	.63	7.94	10.38	9.88	7.00	2.44
231	3.11	8.88	11.00	8.25	4.13	3.13	.75	8.88	11.53	11.25	8.25	2.66
239	3.89	11.19	13.63	10.25	5.13	3.56	.88	11.06	14.16	13.88	10.25	3.09
247	4.67	12.88	15.50	11.75	5.88	4.31	1.00	11.63	15.28	16.00	11.75	3.66

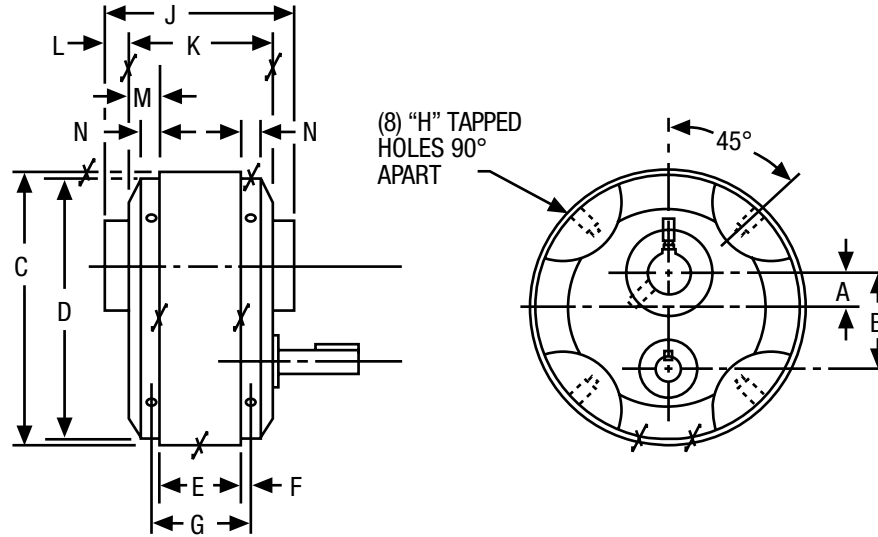
Size	C.D.	T Holes	Low Speed Shaft				High Speed Shaft				Approx. Weight (Lbs.)	Optional	
			U +.000 -.001	V	W-Key		X +.000 -.001	Y	Z-Key			Base Kit No. (Ref. page 251)	Output Shaft Kit No. (Ref. page 250)
					Sq.	Lgth.			Sq.	Lgth.			
221	2.12	13/32	1.0000	2.25	1/4	1-1/4	.5000	2.06	1/8	7/8	22	X221-11VK	X221-3PK
226	2.60	15/32	1.2500	2.75	1/4	1-1/4	.6250	2.88	3/16	1	39	X226-11VK	X226-3PK
231	3.11	17/32	1.3750	3.00	5/16	1-3/4	.9375	3.06	1/4	1-1/4	60	X231-11VK	X231-3PK
239	3.89	19/32	1.8750	3.75	1/2	2	1.3750	4.19	5/16	2-7/16	104	X239-11VK	X239-3PK
247	4.67	21/32	2.1250	4.25	1/2	2-1/2	1.5625	4.25	3/8	2-1/4	148	X247-11VK	X247-3PK

\* Assemblies define output (slow speed) shaft projection with respect to input (high speed) shaft and mounting surface, viewed from end of output shaft. Input may be rotated clockwise or counterclockwise.

• Input and Output shafts of Single reduction (S) units rotate in opposite directions, Double reduction (D) units in the same direction.

# 200 Series Optimount® Dimensions

## 200 Series; 221-247 Sizes External Reference Surfaces



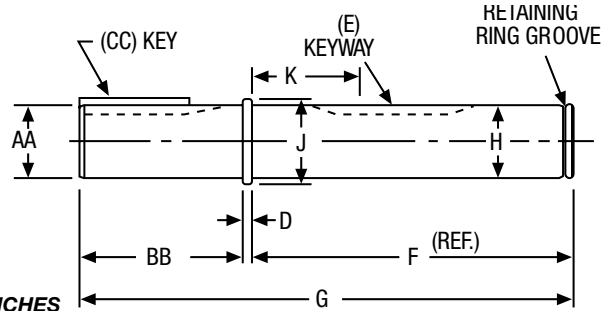
ALL DIMENSIONS IN INCHES

Size	A ±.005	B +.002 -.000	C* +.000 -.010	D* +.000 -.003	E* +.000 -.004	F	G	H		J	K	L	M	N
								Size	Depth					
221	.904	2.123	6.193	5.998	2.000	.19	2.38	1/4-20	9/16	4.31	3.31	.50	.66	.44
226	.936	2.595	7.495	7.248	2.062	.38	2.81	5/16-18	5/8	5.19	4.06	.56	1.00	.69
231	1.000	3.114	8.870	8.624	2.625	.34	3.31	3/8-16	3/4	5.88	4.75	.56	1.06	.69
239	1.560	3.893	11.182	10.936	3.312	.34	4.00	3/8-16	3/4	6.69	5.44	.62	1.06	.69
247	1.560	4.671	12.870	12.624	3.687	.38	4.44	7/16-14	7/8	7.31	5.94	.69	1.12	.75

\*Tolerance on Dimensions Apply Only to Housing before Painting.

# 200 Series Shaft Kits / Reaction Rod Kits

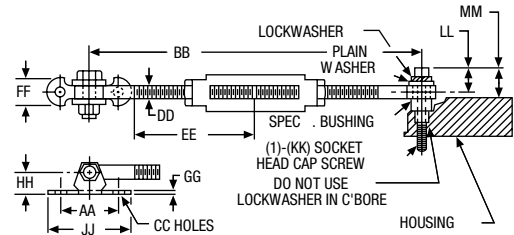
## Steel Projecting Output Shafts (Insertable)



ALL DIMENSIONS IN INCHES  
ORDER BY CATALOG NUMBER OR ITEM CODE

Size	AA	BB	CC		D	E	F	G	H	J	K	Kit Catalog Number	Item Code
			Sq.	Lgth.									
221	.9995 .9985	2-1/4	1/4	1-1/4	.12	1/4 x 1/8 x 1-13/32	4.47	6.84	.9998 .9988	1.16	1.45	X221-3PK	23888
226	1.2495 1.2485	2-3/4	1/4	1-1/4	.12	1/4 x 1/8 x 1-17/32	5.38	8.25	1.2498 1.2488	1.41	1.83	X226-3PK	23892
231	1.3745 1.3735	3	5/16	1-3/4	.16	3/8 x 3/16 x 1-25/32	6.09	9.25	1.4373 1.4363	1.62	2.75	X231A-3PK	63124
239	1.8745 1.8735	3-3/4	1/2	2	.16	1/2 x 1/4 x 2-1/32	7.00	10.91	1.9373 1.9363	2.12	2.33	X239-3PK	23904
247	2.1245 2.1235	4-1/4	1/2	2-1/2	.16	1/2 x 1/4 x 2-9/32	7.26	12.03	2.1873 2.1863	2.44	2.51	X247-3PK	23910

## Reaction Rod Kits



ALL DIMENSIONS IN INCHES  
ORDER BY CATALOG NUMBER OR ITEM CODE

Size	AA	BB*		CC	DD	EE	FF	GG	HH	JJ	KK	LL	MM	Kit Catalog Number	Item Code
		Max.	Min.												
221	2.25	18	12	.41	.38	4.50	1.06	.16	.78	3.31	1/4-20 x 1-3/4 lg.	.62	.64	X221-76K	24188
226	2.25	30	24	.41	.50	10	1.06	.16	.78	3.31	1/4-20 x 2-1/4 lg.	.66	.94	X226-76K	24190
231	2.62	30	24	.41	.62	10	1.06	.19	.94	3.69	5/16-18 x 2-1/2 lg.	.81	1.12	X231-76K	24192
239	2.62	30	24	.41	.62	10	1.06	.19	.94	3.69	3/8-16 x 2-3/4 lg.	.91	1.44	X239-76K	24194
247	3.00	30	24	.47	.75	10	1.31	.21	1.12	4.21	7/16-14 x 3 lg.	1.03	1.41	X247-76K	24196

\* BB dimension can be reduced by cutting off threaded rods.

## INSTALLATION INFORMATION

The ideal position of the reaction rod is at 90° from a line drawn through the center of the hollow shaft and the point where reaction rod is attached to the housing or bracket.

This is illustrated in Figure 1, along with allowable angular deviations.

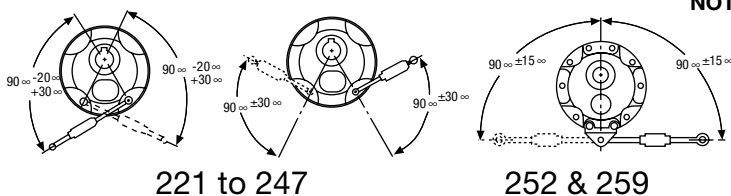
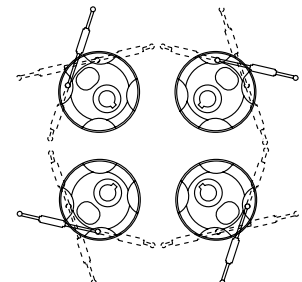


Figure 1

Figure 2 illustrates in a typical manner the possible reaction rod positions for shaft mounted reducers in horizontal or vertical positions.

**NOTE:** The reaction rod must be attached to the housing only at the screw locations identified by the spot faced surfaces or to the reaction rod bracket attached to the housing.

Figure 2



# 200 Series Base Kits

## Base Kits (Cast Iron)



**HORIZONTAL**

Kit Catalog No.	Item Code
X221-11HK	68643
X226-11HK	68654
X231-11HK	68656
X239-11HK	68658
X247-11HK	68660



**VERTICAL**

Kit Catalog No.	Item Code
X221-11VK	68644
X226-11VK	68655
X231-11VK	68657
X239-11VK	68659
X247-11VK	68661



# 200 Series Optimount® Washdown Duty



## 200 SERIES – BOST-KLEEN™

- Washable and Scrubbable
- Durable, Non-Absorbent, Non-Toxic White Epoxy Finish, USDA Approved
- Corrosion Resistant
- 1/4 to 20 Horsepower Range
- Single and Double Reducton Rations – 4:1 to 24:1
- Standard NEMA C-Face and Projecting Input Shaft Configurations
- Parallel Shafts
- Horizontal and Vertical Mounting Kits
- Projecting and Hollow Output Shafts

## STAINLESS BOST-KLEEN™

- Includes all features of the Standard WHITE BOST-KLEEN Reducers
- U.S.D.A. Approved for use in Food Processing and Handling Industry where incidental food contact may occur
- Durable Stainless Steel Epoxy Coating System Utilizes a unique #316L Stainless Steel Leafing Pigment. This catalyzed system creates a HARD, NON-TOXIC METALLIC FINISH

BISSC Certified Basic Model Numbers, Dimensions And Available Ratios

White BOST-KLEEN		Stainless BOST-KLEEN		Center Distance	NEMA Mounting	Input Shaft Dia. +.000 -.001	Output Shaft Dia. +.000 -.001	Available Ratios
NON-FLANGED Type	Quill Type	NON-FLANGED Type	Quill Type					
BK221	BKF221	SBK221	SBKF221	2.12	56C	.500	1.000	4,10,14,17,20,24
BK226	BKF226	SBK226	SBKF226	2.60	56C,140TC	.625	1.2500	4,10,14,17,20,24
BK231	BKF231	SBK231	SBKF231	3.11	56C,140TC,180TC	.9375	1.3750	4,10,14,17,20,24
BK239	BKF239	SBK239	SBKF239	3.89	140TC,180TC, 210TC	1.375	1.8750	4,10,14,17,20,24
BK247	BKF247	SBK247	SBKF247	4.67	180TC,210TC	1.5625	2.1250	4,10,14,17,20,24

J



**Warning:** Boston Gear speed reducers are normally shipped without lubricant. They must be filled to the proper level with the recommended lubricant before operation.

### CAUTION

- For safe operation of any gear drive, all rotating shafts and auxiliary components must be shielded to conform with applicable safety standards. You must consider overall operational system safety at all times.
- When using a gear drive to raise or lower a load, such as in hoisting applications, provision must be made for external braking. Under no conditions should a speed reducer be considered self-locking.
- Mounting of speed reducers in overhead positions may be hazardous. Use of external guides or supports is strongly recommended for overhead mounting.

### General Instructions

1. When mounting, use maximum possible bolt size and secure gear drive to a rigid foundation. Periodic inspection of all bolts is recommended.
2. Align all shafts accurately. Improper alignment can result in failure. Use of flexible couplings is recommended to compensate for slight misalignment.
3. Arrange the drain and breather plug per your mounting position as indicated on page 268. The breather plug should also be located in the *Fill* position.
4. Auxiliary drive components (such as sprockets, gears and pulleys) should be mounted on the shafts as close as possible to the housing to minimize effects of overhung loads. Avoid force fits that might damage bearings or gears.
5. Gear drives are nameplated for 1750 RPM Input Speed and Class I Service. For lower Input Speeds and other Service Class, refer to catalog rating information.
6. Input Speeds of 1750 and lower are shown in catalog rating tables for speed reducing applications. This does not represent the maximum speed. Since speed limitation is based on pitching velocity and varies with size and ratio.

### Shaft Mounted Installation

Mount reducer on the shaft to be driven, as close to the supporting bearing as possible, and tighten end setscrews. For installations requiring an adapter bushing, the setscrews must pass through clearance holes in the bushing. For severe applications, the driven shaft should be spot drilled for these setscrews.

### Instructions for Flanged Models

#### F200 (Quill Type Input)

1. Assemble the key to the motor shaft and coat the shaft with anti-seize compound. Insert the motor shaft into the reducer input shaft.
2. Rotate the motor to proper position and firmly secure to flange with four hex-head cap screws.

**CAUTION** - If the motor does not readily seat itself, check to determine if key has moved axially along motor shaft, causing interference. Staking of the keyway adjacent to the motor key will facilitate this procedure.

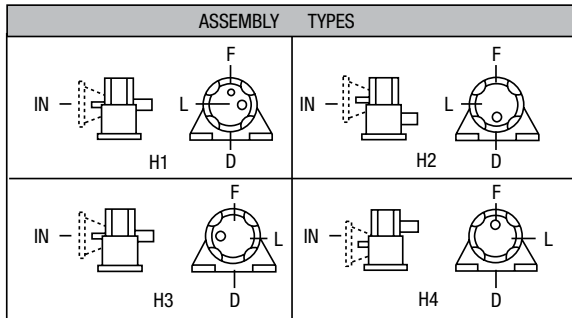
### Location of Filler, Level and Drain Plugs

Optimount reducers may be mounted in any position shown with the following exceptions:

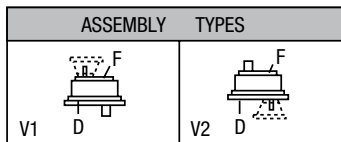
Filler, level and drain plugs are completely interchangeable and should be arranged to suit the required mounting positions. Four (4) pipe tapped holes for these plugs are located on the input shaft side of the housing and one (1) on the opposite side.

# 200 Series Optimount® Assembly Types & Lubrication

## 200 SERIES HORIZONTAL BASE



## 200 SERIES VERTICAL BASE



## Recommended Lubricants

The following tables indicate the type and viscosity of lubricant suitable for reducers operating at various temperatures.

Lubrication and maintenance instructions are provided with each speed reducer. These instructions should be followed for best results. It is important that the proper type of oil be used since many oils are not suitable for the lubrication of gears. Various types of gearing require different types of lubricants.

The lubricant must remain free from oxidation and contamination by water or debris since only a very thin film of oil stands between efficient operation and failure. To assure long service life, the reducer should be periodically drained (preferably while warm) and refilled to the proper level with a recommended gear oil. Under normal environmental conditions oil changes, are suggested after the initial 250 hours of operation, and thereafter, at regular intervals of 2500 hours or every 6 months. Synthetic lubricants will allow extended lubrication intervals due to its increased resistance to thermal and oxidation degradation. It is suggested that the initial oil change be made at 1500 hours and, thereafter, at 5000 hour intervals.

During the initial period of operation, higher than normal operating temperatures may be seen. This is due to the initial break-in of the gear set. The temperature of Helical Gear Reducers may reach 160°F.

## Enclosed Helical

Ambient (Room) Temperature	Recommended Oil (or equivalent)	Viscosity Range S&S @ 100°F	Oil Type	ISO Viscosity Grade No.
-20° to 225°F ‡ (-29°C to 107°C)	Klubersynth* UH1 6-460	1950/2500	PAG	460
-30° to 225°F ‡ (-34°C to 107°C)	Mobile SHC634	1950/2500	PAO	320 / 460

Recommended Lubricant	Boston Gear Item Code Quart
Klubersynth UH1 6-460	65159
Mobile SHC634	51493

**CAUTION:** Relubricate more frequently, if drive is operated in high ambient temperatures or unusually contaminated atmospheres. High loads and operating temperatures will also require more frequent relubrication.  
\* Synthetic recommendation is exclusively for Klubersynth UH1 6-460.  
‡ The UH1 6-460 lubricant will perform at temperatures considerably higher than 225°F. However, the factory should always be consulted prior to operating at higher temperatures, as damage may occur to oil seals and other components.

**Drain Plug** must be installed in the lower most location of the housing. This plug will be on the input shaft side of the housing for positions H1, H3, H4 and V2. The opposite for position V1 and may be either side for H2.

The **Vented Filler Plug** should be installed in the uppermost location. This plug will be on the input shaft side for positions H1, H2, or H3, on either side for H4 and must be tightened into position with the arrow pointing upward.

For vertical mounting (V1 and V2), this plug must be tightened with arrow pointing toward the center.

**Level Plug** position will be as indicated for horizontal positions. For vertical positions the oil level is established by an oil level distance measured from the outer surface of the housing from the oil filler hole.

Size	Single Reduction		Double Reduction	
	Oil Dist. (Inches)	Capacity (Qts)	Oil Dist. (Inches)	Capacity (Qts)
221	1.25	.38	1.00	.50
226	1.62	.75	1.38	1.00
231	2.00	1.25	1.62	1.50
239	2.12	2.75	1.88	3.00
247	2.25	4.00	1.88	4.25