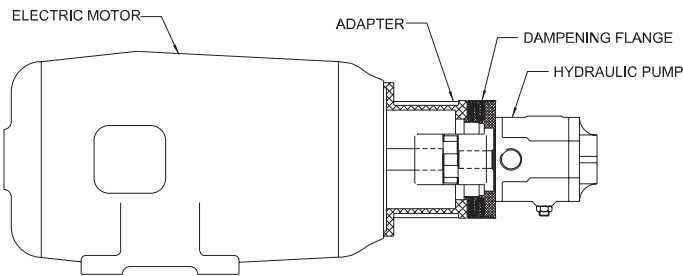




Dampening of Structure Borne Noise



Dampening of structure-borne noise by means of elastic dampening elements

Noise control is still one of the most important tasks in the field of hydraulics. During the past few years there has actually been some progress regarding the reduction of primary noise generation, i.e., the hydraulic pumps have become more quiet, however, the demands for quiet machines have become further intensified and will continue to do so. Thus the mere selection of a quiet hydraulic pump or a quiet electric motor is not sufficient in most cases, but some suitable secondary measures have to be performed in order to optimize the noise behavior of the complete unit.

The measures for the reduction of structure-borne noise form an important part of the noise reduction of hydraulic power units. The hydraulic pump and the electric motor do not just directly dispel airborne noise, but they also transmit structure-borne noise vibrations, which pass through the power unit and are then dispelled as a airborne noise by the surfaces. Thus the reduction of structure-borne noise by means of corresponding members is an effective secondary measure for noise reduction.

Measures for the reduction of structure-borne noise

Depending on the structural shape of the hydraulic power unit the measures for dampening the structure-borne noise are necessary directly at the pump as well as between the pump unit and the hydraulic reservoir.

Dampening Flange

The dampening of structure-borne noise directly at the main noise generator "hydraulic pump" by means of the dampening flange is sure to become the standard in the field of hydraulics. This measure is especially effective, as the dampening flange is positioned in the power flow of the torque and the vibrations produced by the pump, hold a high energy density. The components (pump/motor adapter with dampening flange and electric motor) thus experience a clearly reduced introduction of structure-borne noise and accordingly they dispel less airborne noise.

Successful measures for the reduction of structure-borne and airborne noise show that it is worthwhile to invest some expenditure in tests and thus to optimize the effect of dampening elements. Naturally, the extent of the possible reduction of the airborne noise

is limited. Investigations have revealed that the noise level dispelled by the hydraulic power unit may exceed the values of the sole pump noise by 10 to 12 dB (A). This also depends on the size of the power unit, i.e. on the size of the surfaces dispelling airborne noise. As the complete power unit constitutes an oscillatory formation with many different natural frequencies and surfaces dispelling airborne noise, one can estimate the expected extent of an airborne noise reduction by means of hydraulic elements dampening the structure borne noise, however, it can not be predicted exactly.

Due to substantial investigations and measurements in practical operation the following approximate values can be presumed:

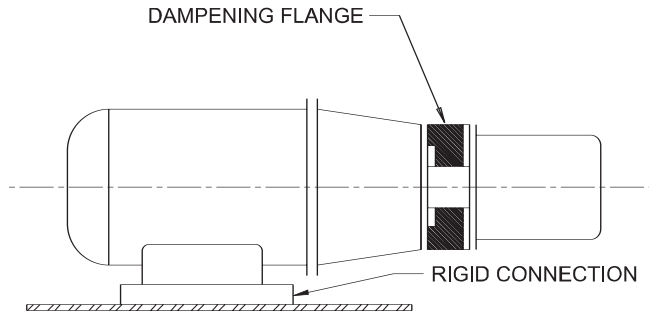
- 1. Pump motor adapter with dampening flange: 3 to 6 db(A)**
- 2. Dampening bar VSM: 3 to 4 db(A)**
- 3. Pump motor adapter with dampening flange and dampening bar VSM: 6 to 8 db(A)**

The maximum values can be achieved when it is possible to reduce the resonances in the power unit with the aid of a damping element, these resonances might arise, because the main exciting frequency of the hydraulic pump corresponds to the natural frequency of machine parts with large surfaces.



DAMPENING FLANGES

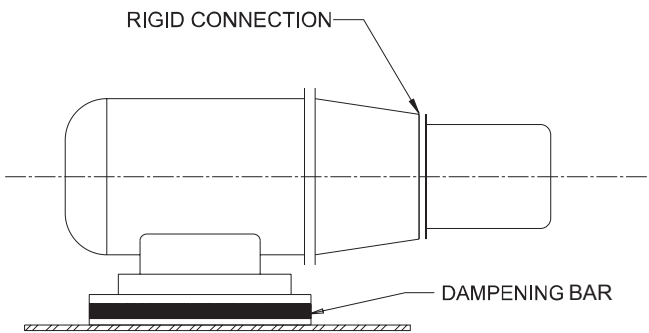
Dampening of Structure Borne Noise



DAMPENING FLANGE

The flexible dampening flange renders possible and efficient structure-borne noise separation directly at the hydraulic pump.

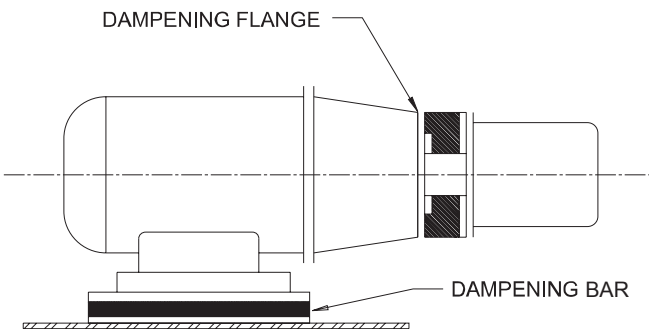
**Average expected reduction of airborne noise
3 - 6 dBA**



DAMPENING BAR

The flexible dampening bar prevents the transmission of structure-borne noise between pump/motor and aggregate.

**Average expected reduction of airborne noise
3 - 4 dBA**



DAMPENING FLANGE and DAMPENING BAR

Both dampening flanges and dampening bars render possible and optimum of structure-borne noise dampening of pump and motor.

**Average expected reduction of airborne noise
6 - 8 dBA**

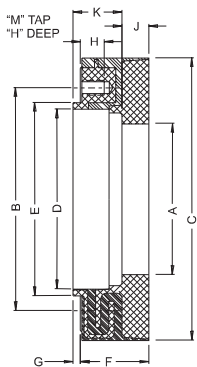


DAMPENING FLANGES

About the Dampening Flange



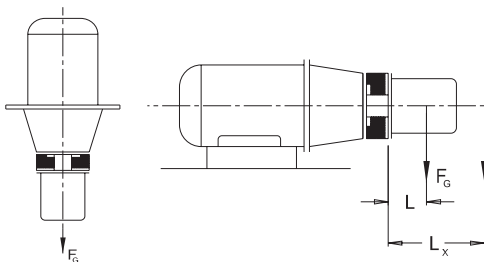
- Locked vulcanized design - not bolted together
- High weight loading possible (with multiple pumps)
- Excellent dampening properties
- Excellent resistance against ozone and oil
- Integral sealing lip - no additional sealing required
- Fully machined to most SAE 2 & 4 bolt and ISO 2 & 4 bolt mounting flanges
- Easily bolts to Vescor Dampening Flange Adapter
- Can be mounted horizontally or vertically
- Furnished as complete assembly only



Dampening Flange	Dimensional Data											Max Clpg. O.D.	
	A		B	C	D	E	F	G	H	J	K		M
	Min	Max											
D150	USA4F17 32mm	SAE A 80mm	4.803 122mm	5.827 148mm	3.268 83mm	3.937 100mm	1.772 45mm	.236 6mm	.590 15mm	.629 16mm	1.377 35mm	M8	3.000
D190	SAE A 32mm	SAE B 112mm	5.906 150mm	7.480 190mm	4.567 116mm	5.119 130mm	1.772 45mm	.236 6mm	.590 15mm	.709 18mm	1.299 33mm	M10	4.375
D230	SAE B 100mm	SAE C 140mm	7.677 195mm	9.212 234mm	5.354 136mm	6.299 160mm	2.322 59mm	.236 6mm	.709 18mm	.906 23mm	1.653 42mm	M12	5.125
D260	SAE B 100mm	SAE D 160mm	8.268 210mm	10.394 264mm	6.142 156mm	7.087 180mm	2.322 59mm	.236 6mm	.787 20mm	.906 23mm	1.653 42mm	M16	6.000

*Special pump and metric flanges also available. Consult factory.

Permissible radial and axial loading of dampening flanges for a working temperature of 140°F (60°C)



Load center distance for radial load L_x (in.)	D150	D190	D230	D260
Perm. weight load $F_{(MAX)}$ (lbs.)	140	425	650	510

For other center distances L_x the permissible load may be calculated

$$F_{(perm)} = \frac{F_{(MAX)} \cdot L}{L_x} \text{ (LB)}$$

The permissible Load $F_{(perm)}$ or $F_{(MAX)}$ must not be exceeded by the applied load $F_{(G)}$ (radially or axially)

EXAMPLE: Dampening Flange Selection

Pump = Rexroth AA4VSG71

Pump Weight = 132 lbs. (F_G)

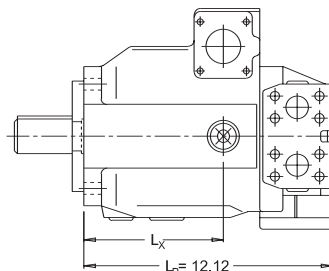
$L(x)$ = Distance of the Center of gravity

$L(p)$ = the length of the pump

$$L(x) = 2/3 \cdot L(p)$$

$$L(x) = 2/3 \cdot 12.12 \text{ inches}$$

$$L(x) = 8.08 \text{ inches}$$



$$F_{(perm)} = \frac{F_{(MAX)} \cdot L}{L_x} = \frac{425 \text{ LB} \cdot 4 \text{ in.}}{8.08 \text{ in.}}$$

$$F_{(perm)} = 210.4 \text{ LBS.}$$

Results:

$F_{(perm)} = 210.4 \text{ LBS} \geq F_{(G)} - 132 \text{ LBS}$
therefore D190 is suitable for this application

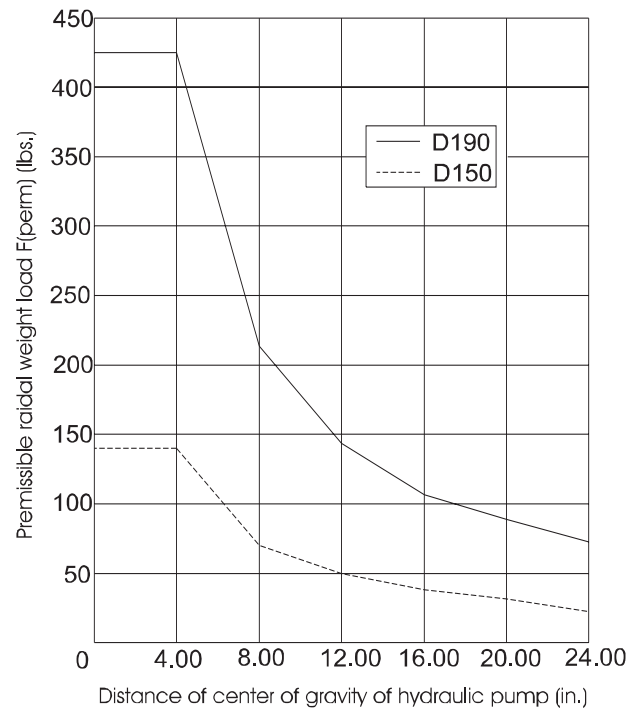
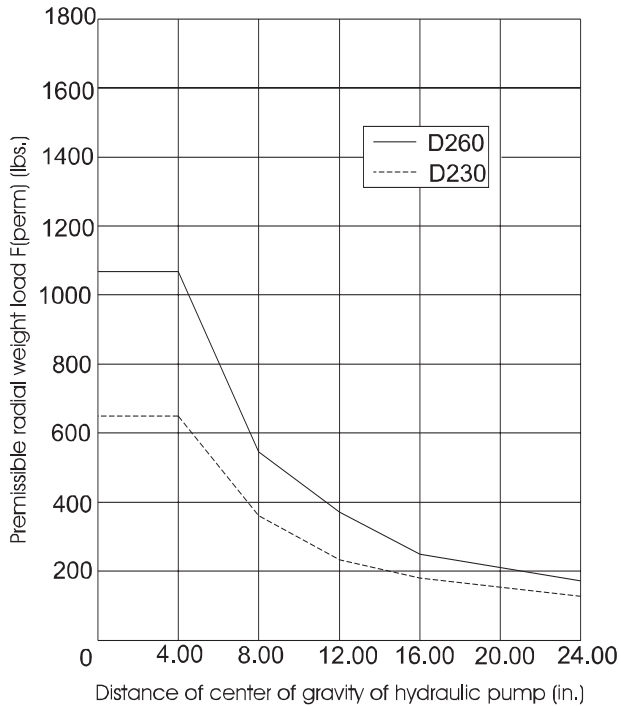


DAMPENING FLANGES

Permissible Radial and Axial Loading

LOAD TYPES	Dampening Flange Size	
	D150	D190
Perm. radial weight load F_r (perm) (lb)	see diagram	
Perm. axial weight load F_a (perm) (lb)	225	238
Perm. nominal torque T_N (perm) (lb in)	2213	4425
Perm. maximum torque T_{max} (perm) (lb in)	638	13275
Radial spring stiffness C_r (lb in)	17132	95940
Angular spring stiffness C_w (lb in/rad)	531000	849600

The stated figures apply for an operation temperature up to 140°F (60°C)



LOAD TYPES	Dampening Flange Size	
	D230	D260
Perm. radial weight load F_r (perm) (lb)	see diagram	
Perm. axial weight load F_a (perm) (lb)	540	861
Perm. nominal torque T_N (perm) (lb in)	7080	9956
Perm. maximum torque T_{max} (perm) (lb in)	21240	29869
Radial spring stiffness C_r (lb in)	100508	191880
Angular spring stiffness C_w (lb in/rad)	991200	2180640

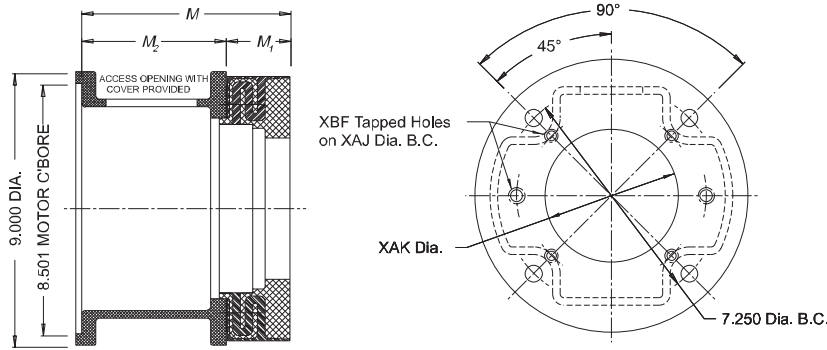
The stated figures apply for an operation temperature up to 140°F (60°C)



DAMPENING FLANGES

182TC thru 256TC

213UC thru 256UC



Dampening Flange D150						
Pump Type	Pump Flange	XAJ Bolt Circle	XAK Pump Pilot	XBF Holes	M ₁ Face to Face	Vescor Part Number
SAE A	2 Bolt	4.187	3.251	3/8-16	1.750	D150-A2

OVERALL Face To Face DIMENSION $M=M_1 + M_2$

Adapter For D150 Dampening Flange			
Motor Frame Size	M ₂ Face to Face	Vescor Part Number	M Face to Face
182/TC	3.500	182-L1	5.250
thru	3.937	182-L2	5.687
256/TC	4.375	182-L3	6.125

Dampening Flange D190						
Pump Type	Pump Flange	XAJ Bolt Circle	XAK Pump Pilot	XBF Holes	M ₁ Face to Face	Vescor Part Number
SAE A	2 Bolt	4.187	3.251	3/8-16	1.750	D190-A2
SAE B	2 Bolt	5.750	4.001	1/2-13	1.750	D190-B2
SAE B	4 Bolt	5.000	4.001	1/2-13	1.750	D190-B4

OVERALL Face To Face DIMENSION $M=M_1 + M_2$

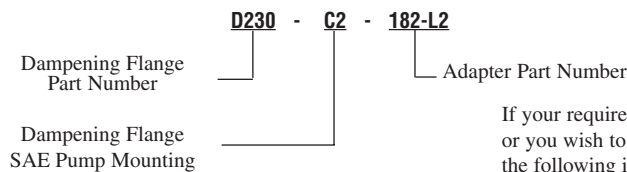
Adapter For D190 Dampening Flange			
Motor Frame Size	M ₂ Face to Face	Vescor Part Number	M Face to Face
182/TC	3.500	182-L1	5.250
thru	3.937	182-L2	5.687
256/TC	4.375	182-L3	6.125

Dampening Flange D230						
Pump Type	Pump Flange	XAJ Bolt Circle	XAK Pump Pilot	XBF Holes	M ₁ Face to Face	Vescor Part Number
SAE B	2 Bolt	5.750	4.001	1/2-13	2.250	D230-B2
SAE B	4 Bolt	5.000	4.001	1/2-13	2.250	D230-B4
SAE C	2 Bolt	7.125	5.001	5/8-11	2.250	D230-C2
SAE C	4 Bolt	6.375	5.001	1/2-13	2.250	D230-C4

OVERALL Face To Face DIMENSION $M=M_1 + M_2$

Adapter For D230 Dampening Flange			
Motor Frame Size	M ₂ Face to Face	Vescor Part Number	M Face to Face
182/TC	3.500	182-L1	5.750
thru	3.937	182-L2	6.187
256/TC	4.375	182-L3	6.625

MODEL CODE – ORDERING INFORMATION FOR COMPLETE ASSEMBLY



If your required model or dampening flange is not known, or you wish to verify your selection, Please provide Vescor with the following information:

1. Motor HP with Frame Size
2. Pump Manufacturer and Complete Model Number
3. Pump Weight
4. Coupling Manufacturer and Model

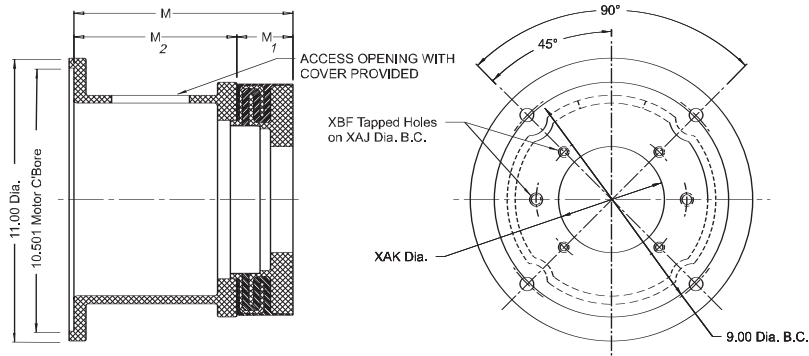
Vescor will then select the correct assembly and provide you with a computer generated drawing for assembling the adapter and coupling.



DAMPENING FLANGES

284 thru 286TC/TSC

284 thru 286UC/USC



Dampening Flange D190						
Pump Type	Pump Flange	XAJ Bolt Circle	XAK Pump Pilot	XBF Holes	M ₁ Face to Face	Vescor Part Number
SAE A	2 Bolt	4.187	3.251	3/8-16	1.750	D190-A2
SAE B	2 Bolt	5.750	4.001	1/2-13	1.750	D190-B2
SAE B	4 Bolt	5.000	4.001	1/2-13	1.750	D190-B4

OVERALL Face To Face DIMENSION $M=M_1 + M_2$

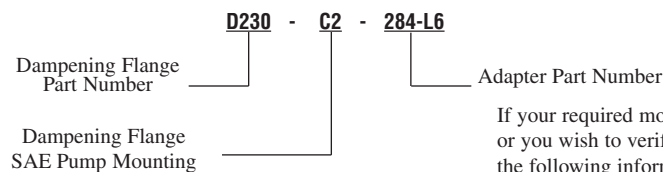
Adapter For D190 Dampening Flange			
Motor Frame Size	M ₂ Face to Face	Vescor Part Number	M Face to Face
	3.625	284-L1	5.375
	4.063	284-L2	5.812
	4.375	284-L3	6.125
284/TC/TSC	4.750	284-L4	6.500
thru	5.063	284-L5	6.812
286/TC/TSC	5.375	284-L6	7.125
	5.750	284-L7	7.500
	6.437	284-L8	8.187
	6.750	284-L9	8.500
	7.000	284-L10	8.750

Dampening Flange D230						
Pump Type	Pump Flange	XAJ Bolt Circle	XAK Pump Pilot	XBF Holes	M ₁ Face to Face	Vescor Part Number
SAE B	2 Bolt	5.750	4.001	1/2-13	2.250	D230-B2
SAE B	4 Bolt	5.000	4.001	1/2-13	2.250	D230-B4
SAE C	2 Bolt	7.125	5.001	5/8-11	2.250	D230-C2
SAE C	4 Bolt	6.375	5.001	1/2-13	2.250	D230-C4

OVERALL Face To Face DIMENSION $M=M_1 + M_2$

Adapter For D230 Dampening Flange			
Motor Frame Size	M ₂ Face to Face	Vescor Part Number	M Face to Face
	3.625	284-L1	5.875
	4.063	284-L2	6.312
	4.375	284-L3	6.625
284/TC/TSC	4.750	284-L4	7.000
thru	5.063	284-L5	7.312
286/TC/TSC	5.375	284-L6	7.625
	5.750	284-L7	8.000
	6.437	284-L8	8.687
	6.750	284-L9	9.000
	7.000	284-L10	9.250

MODEL CODE – ORDERING INFORMATION FOR COMPLETE ASSEMBLY



If your required model or dampening flange is not known, or you wish to verify your selection, please provide Vescor with the following information:

1. Motor HP with Frame Size
2. Pump Manufacturer and Complete Model Number
3. Pump Weight
4. Coupling Manufacturer and Model

Vescor will then select the correct assembly and provide you with a computer generated drawing for assembling the adapter and coupling.

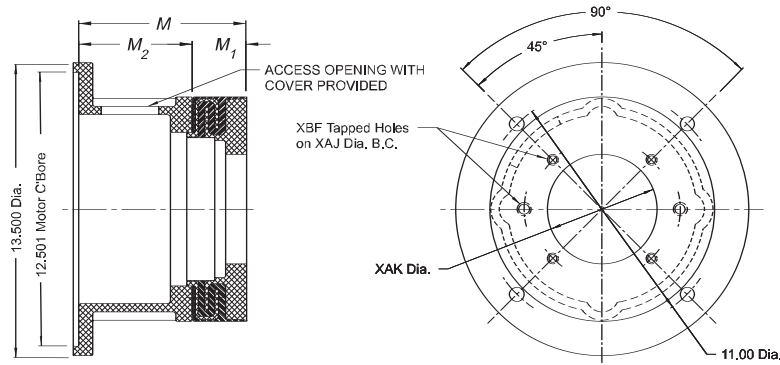
NOTE: WITH VESCORS' POLICY OF CONSTANTLY IMPROVING ITS PRODUCTS, SPECIFICATIONS ARE SUBJECT TO CHANGE WITHOUT NOTICE.



DAMPENING FLANGES

324 thru 405TC/TSC

324 thru 405UC/USC



Dampening Flange D230						
Pump Type	Pump Flange	XAJ Bolt Circle	XAK Pump Pilot	XBF Holes	M ₁ Face to Face	Vescor Part Number
SAE B	2 Bolt	5.750	4.001	1/2-13	2.250	D230-B2
SAE B	4 Bolt	5.000	4.001	1/2-13	2.250	D230-B4
SAE C	2 Bolt	7.125	5.001	5/8-11	2.250	D230-C2
SAE C	4 Bolt	6.375	5.001	1/2-13	2.250	D230-C4

OVERALL Face To Face DIMENSION $M = M_1 + M_2$

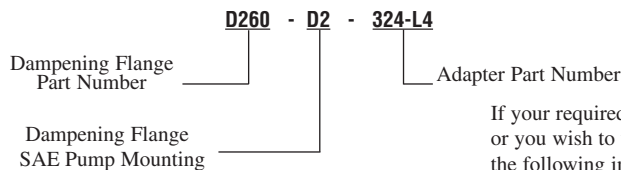
Adapter For D230 Dampening Flange			
Motor Frame Size	M ₂ Face to Face	Vescor Part Number	M Face to Face
	3.812	324-L1	6.063
	4.563	324-L2	6.812
	5.187	324-L3	7.437
324/TC/TSC	5.875	324-L4	8.125
thru	6.250	324-L5	8.500
405/TC/TSC	6.375	324-L6	8.625
	7.125	324-L7	9.375
	7.375	324-L8	9.625
	8.125	324-L9	10.375

Dampening Flange D260						
Pump Type	Pump Flange	XAJ Bolt Circle	XAK Pump Pilot	XBF Holes	M ₁ Face to Face	Vescor Part Number
SAE B	2 Bolt	5.750	4.001	1/2-13	2.250	D260-B2
SAE B	4 Bolt	5.000	4.001	1/2-13	2.250	D260-B4
SAE C	2 Bolt	7.125	5.001	5/8-10	2.250	D260-C2
SAE C	4 Bolt	6.375	5.001	1/2-13	2.250	D260-C4
SAE D	2 Bolt	9.000	6.001	3/4-10	2.250	D260-D2
SAE D	4 Bolt	9.000	6.001	3/4-10	2.250	D260-D4

OVERALL Face To Face DIMENSION $M = M_1 + M_2$

Adapter For D260 Dampening Flange			
Motor Frame Size	M ₂ Face to Face	Vescor Part Number	M Face to Face
	3.812	324-L1	6.063
	4.563	324-L2	6.812
	5.187	324-L3	7.437
324/TC/TSC	5.875	324-L4	8.125
thru	6.250	324-L5	8.500
405/TC/TSC	6.375	324-L6	8.625
	7.125	324-L7	9.375
	7.375	324-L8	9.625
	8.125	324-L9	10.375

MODEL CODE – ORDERING INFORMATION FOR COMPLETE ASSEMBLY



If your required model or dampening flange is not known, or you wish to verify your selection, please provide Vescor with the following information:

1. Motor HP with Frame Size
2. Pump Manufacturer and Complete Model Number
3. Pump Weight
4. Coupling Manufacturer and Model

Vescor will then select the correct assembly and provide you with a computer generated drawing for assembling the adapter and coupling.