

Installation/ Tensioning V-Drives

Martin

Installing A Drive

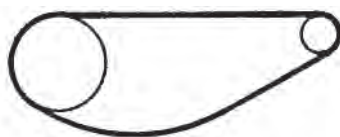
Here are a few suggestions to keep in mind when installing the drive:

1. Use a matched set of belts.
2. Clean oil and grease from the sheaves; remove any rust or burrs from the sheave grooves.
3. Shorten the center distance of the drive until the belts can be put on the sheaves without forcing.
4. Make sure that the sheaves are correctly aligned, that the shafts are parallel, that there is clearance for the drive to run and that the bearings have oil.
5. Work belts around in the groove by hand, so that the slack of **all** belts is on the top, or slack of **all** belts is on the bottom.

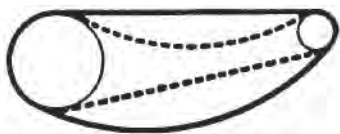
LIKE THIS:
(all slack at top)



OR LIKE THIS:
(all slack at bottom)



DO NOT APPLY THIS WAY:
(with slack at top and bottom)



Do not apply with the slack of some belts on the bottom (see solid line) and the slack of others on the top (see dotted line). Since V-belts will not slide in the groove, belts thus applied will be injured when tightened for operation.

Now tension the drive until only a slight bow appears on the slack side of the belts when they are operating.

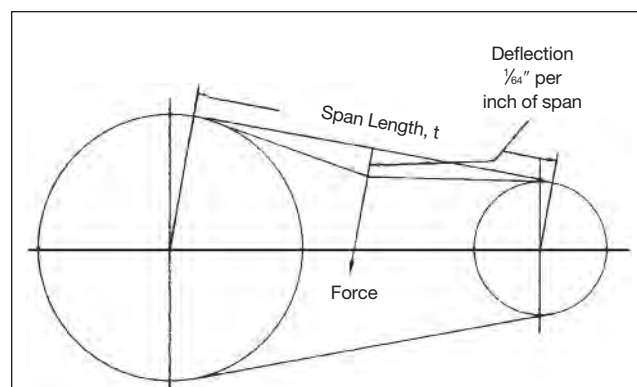
6. In a day or so, when the belts have had time to seat in the grooves, re-tension the belts.

All V-belt drives should be guarded in such a manner as to comply with the Williams-Steiger Occupational Safety and Health Act and with all state and local laws and the American National Standard Institute (ANSI) safety code.

Tensioning The Drive

General Rules of Tensioning:

1. Ideal tension is the lowest tension at which the belt will not slip under peak load conditions.
2. Check tension frequently during the first 24-48 hours of run-in operation.
3. Overtensioning shortens belt and bearing life.
4. Keep belts free from foreign material which may cause slip.
5. Make V-drive inspection on a periodic basis. Tension when slipping.



Test The Tension

If you want to check the tension in a conventional V-belt drive, use the procedure below:

1. Measure the span length, t .
2. At the center of the span (t) apply a force (perpendicular to the span) large enough to deflect the belt $\frac{1}{64}$ " for every inch of span length. For example, the deflection of a 100 inch span would be $\frac{100}{64}$ or $1\frac{1}{16}$ inches.
3. Compare the force you have applied with the values given in Table 12. If the force is between the values for normal tension, and $1\frac{1}{2}$ times normal tension, the drive tension should be satisfactory. A force below the value for normal tension indicates an under-tensioned drive. If the force exceeds the value for $1\frac{1}{2}$ times normal tension, the drive is tighter than it needs to be. A new drive can be tightened initially to two times normal tension to allow for the normal drop in tension during run in.

Installation and Take-up Allowances

After calculating a center distance from a standard pitch length, make provision for adjusting the center distance as in Table 13, to allow for installation of the belts without injury, for tensioning, and for maintenance of proper tension throughout the life of the belt.

Table 12 — Belt Deflection Force

V-Belt Cross Section	Smallest Sheave Diameter Range	RPM Range	Belt Deflection Force			
			A, B, C, D		AX, BX, CX	
			Normal	1½ × Normal	Normal	1½ × Normal
A	3.0-3.6	1000-2500 2501-4000	3.7 2.8	5.5 4.2	4.1 3.4	6.1 5.0
	3.8-4.8	1000-2500 2501-4000	4.5 3.8	6.8 5.7	5.0 4.3	7.4 6.4
	5.0-7.0	1000-2500 2501-4000	5.4 4.7	8.0 7.0	5.7 5.1	9.4 7.6
B	3.4-4.2	860-2500 2501-4000			4.9 4.2	7.2 6.2
	4.4-5.6	860-2500 2501-4000	5.3 4.5	7.9 6.7	7.1 7.1	10.5 9.1
	5.8-8.6	860-2500 2501-4000	6.3 6.0	9.4 8.9	8.5 7.3	12.6 10.9
C	7.0-9.0	500-1740 1741-3000	11.5 9.4	17.0 13.8	14.7 11.9	21.8 17.5
	9.5-16.0	500-1740 1741-3000	14.1 12.5	21.0 18.5	15.9 14.6	23.5 21.6
D	12.0-16.0	200-850 851-1500	24.9 21.2	37.0 31.3		
	18.0-20.0	200-850 851-1500	30.4 25.6	45.2 38.0		

V-Belt Cross Section	Smallest Sheave Diameter Range	RPM Range	Belt Deflection Force			
			3V, 5V, 8V		3VX, 5VX	
			Normal	1½ × Normal	Normal	1½ × Normal
3V	2.2-2.4	1000-2500 2501-4000			3.3 2.9	4.9 4.3
	2.65-3.65	1000-2500 2501-4000	3.6 3.0	5.1 4.4	4.2 3.8	6.2 5.6
	4.12-6.90	1000-2500 2501-4000	4.9 4.4	7.3 6.6	5.3 4.9	7.9 7.3
5V	4.4-6.7	500-1749 1750-3000 3001-4000			10.2 8.8 5.6	15.2 13.2 8.5
	7.1-10.9	500-1740 1741-3000	12.7 11.2	18.9 16.7	14.8 13.7	22.1 20.1
	11.8-16.0	500-1740 1741-3000	15.5 14.6	23.4 21.8	17.1 16.8	25.5 25.0
8V	12.5-17.0	200-850 851-1500	33.0 26.8	49.3 39.9		
	18.0-22.4	200-850 851-1500	39.6 35.3	59.2 52.7		

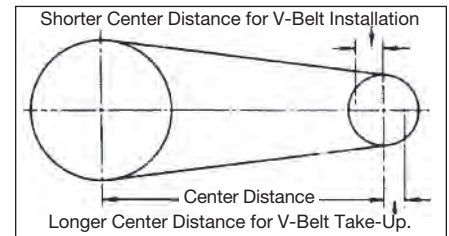


Table 13 — Center distance allowance for installation and take-up

Standard Length Designation	Minimum Allowance Below Standard Center Distance for Installation of Belts (Inches)							Minimum Allowance Above Standard Center Distance for Maintaining Tension (Inches) All Sections
	A, AX	A, AX Joined	B, BX	B, BX Joined	C, CX	C, CX Joined	D	
26 to 37	0.75	1.20	1.00	1.50				1.00
38 to 59	0.75	1.20	1.00	1.50	1.50	2.00		1.50
60 to 89	0.75	1.30	1.25	1.60	1.50	2.00		2.00
90 to 119	1.00	1.30	1.25	1.60	1.50	2.00		2.50
120 to 157	1.00	1.50	1.25	1.80	1.50	2.10	2.00	3.00
158 to 194			1.25	1.80	2.00	2.20	2.00	3.50
195 to 239			1.50	1.90	2.00	2.30	2.00	4.00
240 to 269			1.50	2.00	2.00	2.50	2.50	4.50
270 to 329			1.50	2.20	2.00	2.50	2.50	5.00
330 to 419					2.00	2.70	2.50	6.00
420 and over					2.50	2.90	3.00	1.5% of belt length

Standard Length Designation	Minimum Allowance Below Standard Center Distance for Installation of Belts (Inches)						Minimum Allowance Above Standard Center Distance for Maintaining Tension (Inches) All Cross Sections
	3V, 3VX	3V, 3VX Joined	5V, 5VX	5V, 5VX Joined	8V	8V Joined	
Up to and incl. 475	0.5	1.2					1.0
Over 475 to and incl. 710	0.8	1.4	1.0	2.1			1.2
Over 710 to and incl. 1060	0.8	1.4	1.0	2.1	1.5	3.4	1.5
Over 1060 to and incl. 1250	0.8	1.4	1.0	2.1	1.5	3.4	1.8
Over 1250 to and incl. 1700	0.8	1.4	1.0	2.1	1.5	3.4	2.2
Over 1700 to and incl. 2000			1.0	2.1	1.8	3.6	2.5
Over 2000 to and incl. 2360			1.2	2.4	1.8	3.6	3.0
Over 2360 to and incl. 2650			1.2	2.4	1.8	3.6	3.2
Over 2650 to and incl. 3000			1.2	2.4	1.8	3.6	3.5
Over 3000 to and incl. 3550				2.4	2.0	4.0	4.0
Over 3550 to and incl. 3750					2.0	4.0	4.5
Over 3750 to and incl. 5000					2.0	4.0	5.5

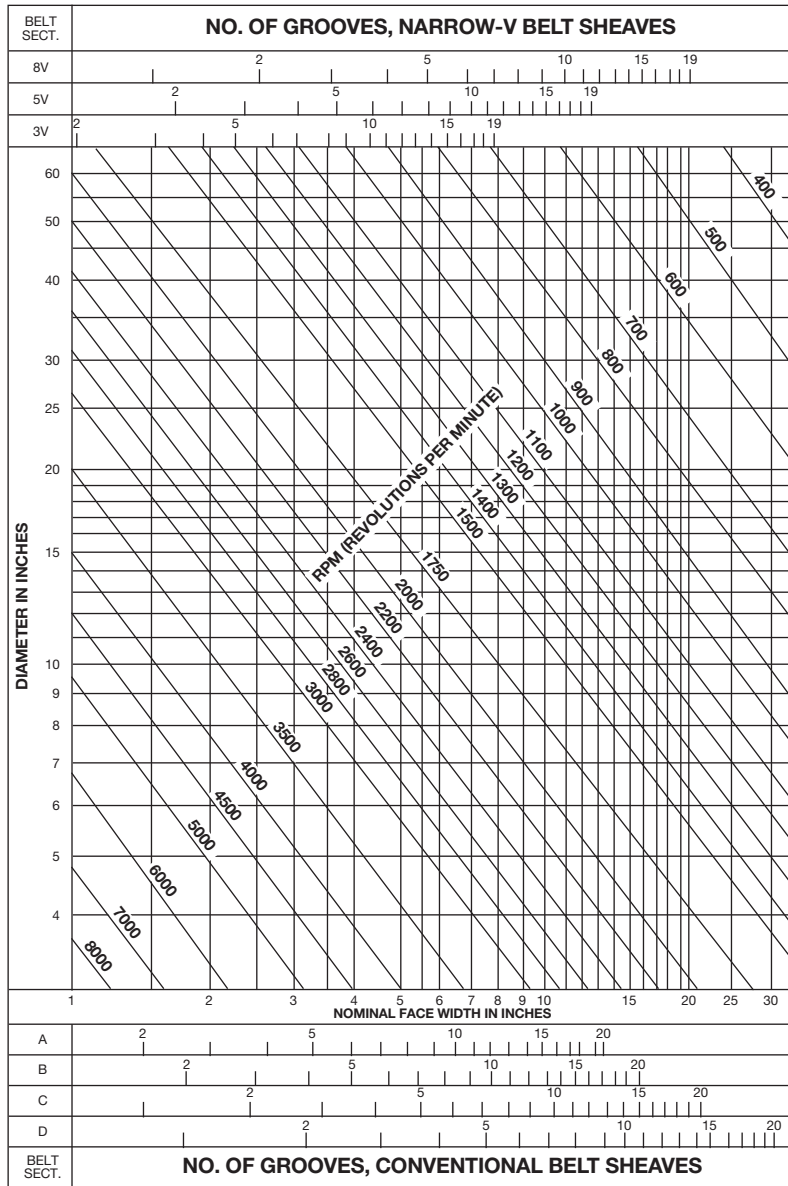


To Determine the Need for Dynamic Balance

STATIC BALANCING – Both stock and Made-to-Order sheaves and pulleys are given a careful static balance for normal speeds. they will operate safely at belt speeds up to 6,500 feet per minute, but at speeds over 5,000 feet per minute and at any speed where vibration is a problem, dynamic balancing is recommended

This chart shows the maximum speed limit (in rpm) for a standard statically balanced sheave by a given diameter and face width. To exceed this speed limit it is recommended the sheave be dynamically balanced. This information can also be used for pulleys.

V-BELT DRIVES



EXAMPLE: A 10" diameter 2" wide sheave or pulley is recommended to be dynamically balanced (balanced in two planes) at 3450 rpm and above. Below 3450 rpm a static balance (balanced in one plane) is sufficient.

WARNING: When belt speeds exceed 6500 feet per minute special materials must be used; consult *Martin* for special design requirements.