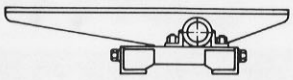
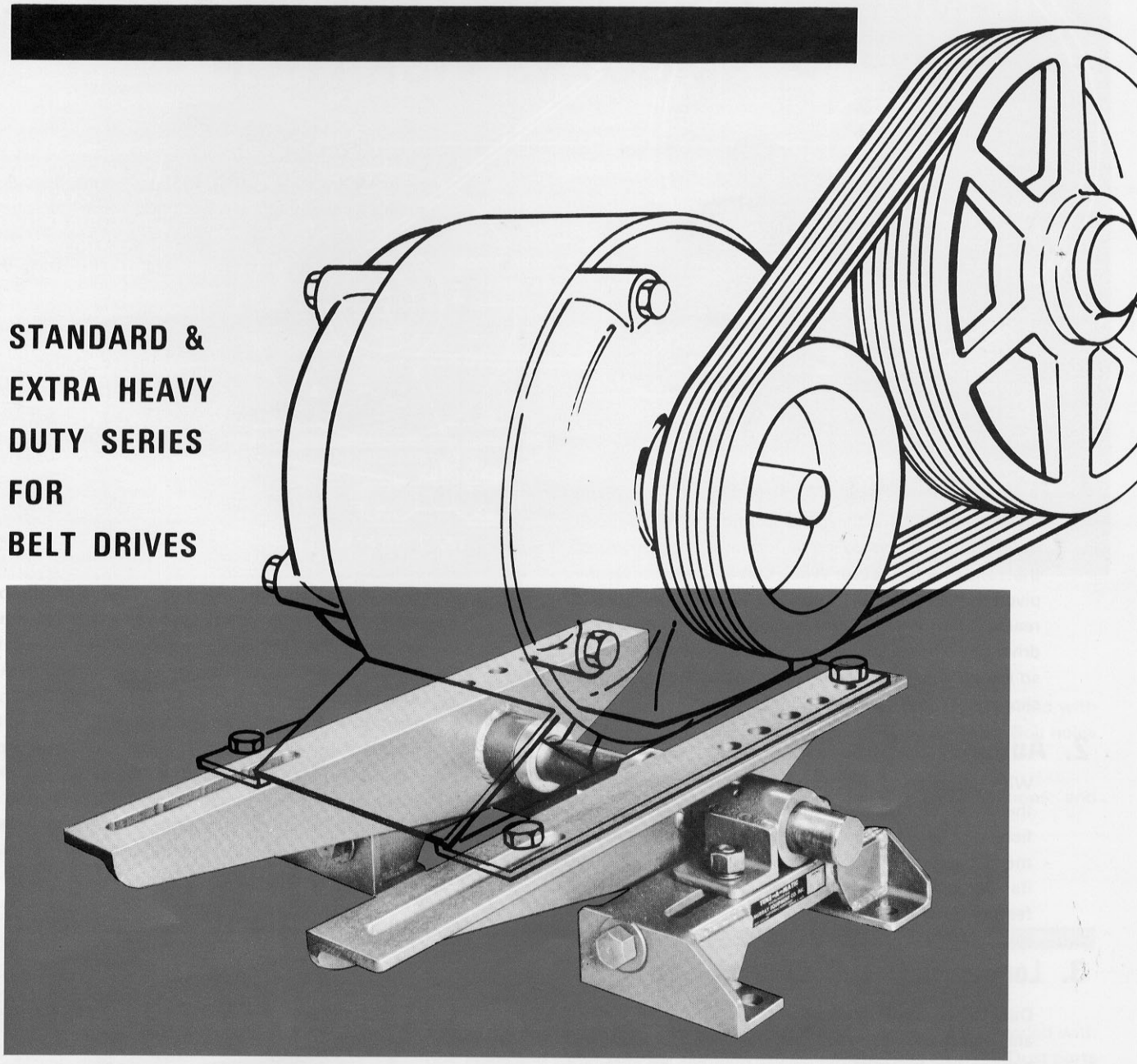
TENS-A-MATIC



PIVOTED MOTOR BASES

STANDARD & EXTRA HEAVY DUTY SERIES FOR BELT DRIVES



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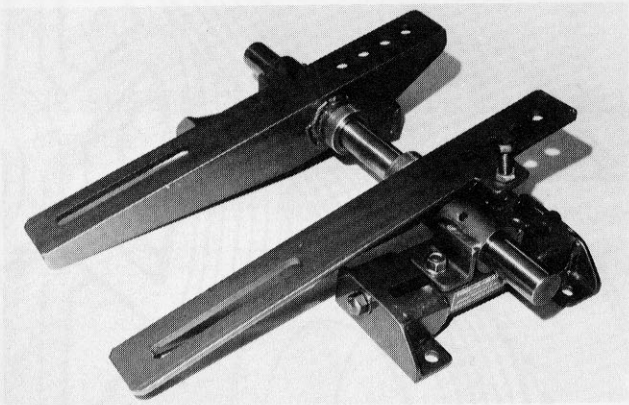
TENS-A-MATIC Pivoted Motor Base

- **AUTOMATICALLY CONTROLS BELT TENSION**
- **PROVIDES AUTOMATIC BELT TAKE-UP**
- **LENGTHENS BELT LIFE**
- **MINIMIZES SLIP**
- **SMOOTHS VIBRATION**



1. Automatic Tension Control

The belt tension of the drive is matched to the load requirement by the reaction torque characteristic of the Tens-A-Matic Base. When belt loads increase, the pivoted motor support arms are forced down by the reaction torque of the motor. This action increases the drive center distance, which increases the belt tension so the belts can pull the increased load with minimum slippage.

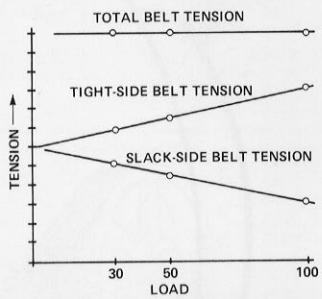
2. Automatic Belt Take-Up

With a portion of the motor weight offset away from the driven unit on the pivoted arms in an amount sufficient to provide for the initial belt tension requirement, the force of gravity gives the Tens-A-Matic Base its automatic and continual belt stretch take-up feature. This keeps drive maintenance to an absolute minimum.

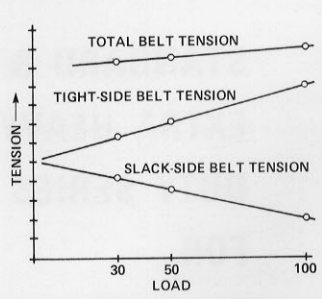
3. Longer Belt and Bearing Life

Due to the application of automatic tension control and automatic belt take-up to the drive, both belt and bearing life are normally longer than can be obtained with hand adjustable bases. The virtual elimination of belt slippage, combined with the constant belt alignment (motor relocation is unnecessary, therefore, the initial alignment never changes), are two of the three major factors that help improve belt and bearing life. The other component of this benefit (longer life) is the automatic tension control feature. This factor allows the drive to normally operate at minimum belt tension which decreases all loads throughout the belt drive system. The following sketches show the changes that occur in belt tensions from "no-load" to "peak-load" (peak load equals 100%). The peak loads, speeds, and pulley arrangement are assumed to be the same for both cases.

With Sliding Base

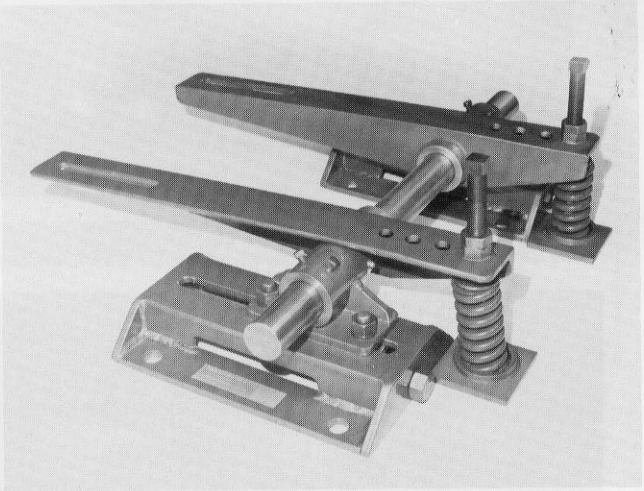


With Tens-A-Matic Base



4. Smooths Vibration

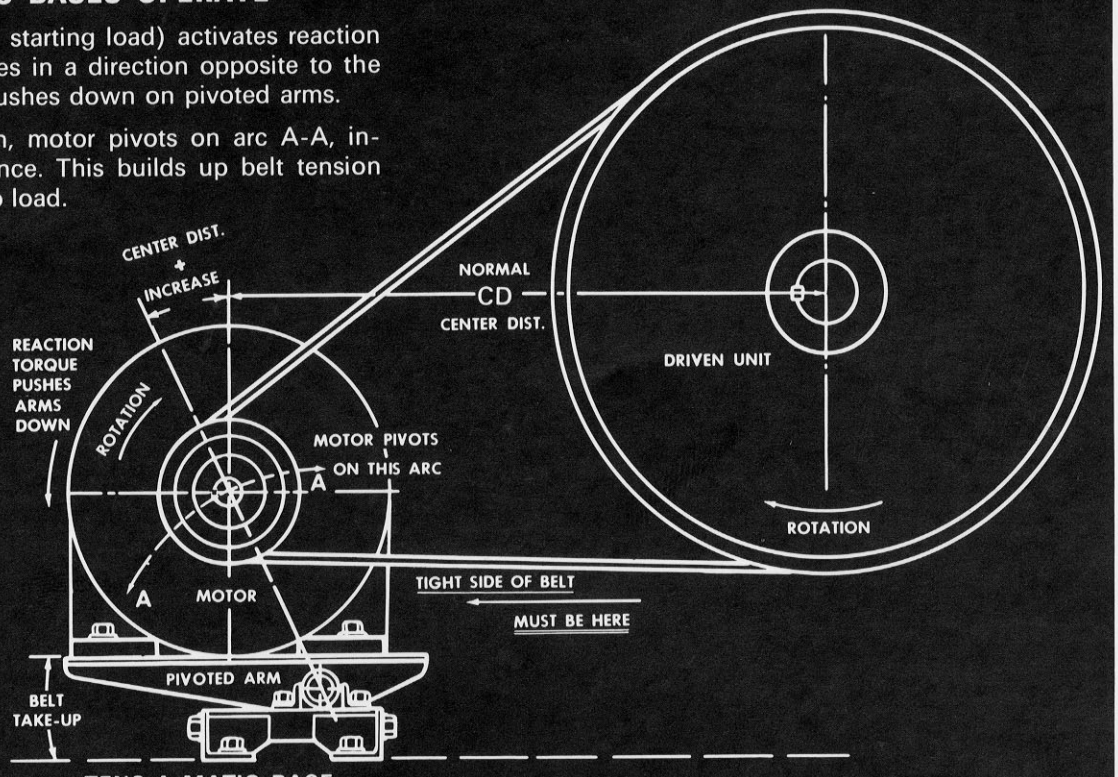
Due to the fact that the motor "floats on the belts", many types of minor vibration are effectively smoothed out by the Tens-A-Matic Base. When system vibration is large or regular (such as a vibrating conveyor) and cannot be dampened by the normal floating action, springs or shock absorbers can be attached to the standard base to reduce the vibration to acceptable limits. The fact that the motor floats on the pivoted arms has another benefit. Belt replacement is easy. Just raise the arms, change belts, and then lower the arms to the original position and the drive is ready to operate as before.



OPERATING CHARACTERISTICS

HOW TENS-A-MATIC BASES OPERATE

1. Increase in load (e.g. starting load) activates reaction torque, which operates in a direction opposite to the rotation. This force pushes down on pivoted arms.
2. As arms swing down, motor pivots on arc A-A, increasing center distance. This builds up belt tension in direct proportion to load.
3. When drive is at full speed, load drops back to normal, reaction torque disappears, arms swing back up, decreasing CD, and belt tension returns to normal operating condition.
4. Belt stretch is automatically taken up by weight of motor, which is offset from base pivot shaft.



TENS-A-MATIC BASE

GENERAL SPECIFICATIONS STANDARD SERIES

1. Motor support arms are sized to motor frames shown, and are provided with bolt holes and slots so motor position can be adjusted and secured. Bolt holes in arms correspond to those in motor feet.
2. Base feet are fabricated from adequate channel and angle sections; and include locking bolts and adjusting screw.

GENERAL SPECIFICATIONS EXTRA HEAVY DUTY SERIES

1. Motor support arms are sized to motor frames shown, and are provided with bolt holes and slots so motor position can be adjusted and secured. Dust ports are provided in pivot arms.
2. Base feet are fabricated from heavy channel and plate sections, then Blanchard-ground for flatness. Heavy adjusting screws have Acme threads. Adequate clean-out holes are provided. Locking bolts are high tensile. All locking screws are over-size square head.

TENS-A-MATIC MOTOR BASE SELECTION PROCEDURE

1. To Determine the Basic Motor Base Size:

A. Determine the motor frame number, motor weight, and general motor dimensions.

B. Select the base style - Standard or Extra Heavy Duty. The extra heavy duty base is used with heavy vibrating loads such as encountered in a casting facility.

C. Check the mounting position and motor rotation. Horizontal mounting with the tight side of the belt on the bottom is normal, but other mounting positions such as wall and ceiling mount and reverse rotation can be used under certain circumstances.

D. Verify that the tight side of the belt is located between the motor shaft and the base pivot shaft. This arrangement MUST be used or the motor rotation torque will cause the base to rise up and throw the belts off the pulleys.

E. Refer to the proper selection table (Standard or Extra Heavy Duty) and select the base in accordance with the motor frame number, providing that all of the above conditions have been met.

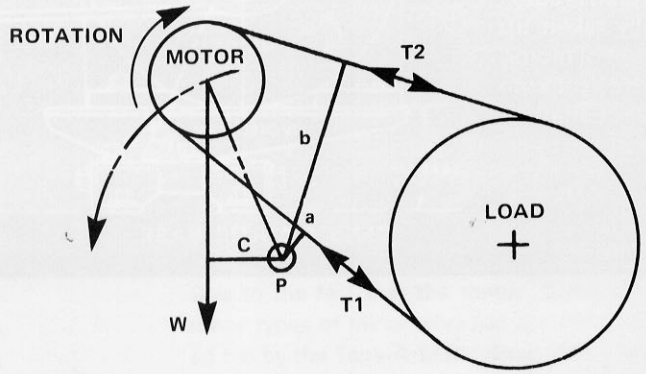
2. Verify That the Selected Base Will Provide the Proper Belt Tension:

Calculating Motor Off-Center Dimension

The "C" dimension (the distance that the motor is off-center from the pivot shaft) must be large enough to carry the starting and peak loads, yet be as small as possible for maximum belt and bearing life. By using the formula shown at the right, the proper value of "C" can be determined.

In this formula, since "C" is directly proportional to the term "Ra+b", the smaller the value of "a", the smaller the resultant value of "C". However, these values have a practical minimum limit, since it is necessary to provide some initial tension to operate the drive. Thus it is recommended that the pivot point be placed as close as possible to the line of the tight side tension. This makes the "C" dimension just large enough to handle starting and peak loads. Any belt stretch will tend to move the pivot slightly to the inside of the tight side line, where "C" will become even more effective.

If the calculated "C" dimension exceeds the limits shown in Table 1, the spring modification (see opposite page) must be added to the base to obtain the required belt tension.



T_1 = Tight Side Tension
T_2 = Slack Side Tension
W = Weight of Motor
P = Pivot Point of Base
a = T_1 Moment Arm
b = T_2 Moment Arm
c = Weight Moment Arm
T_e = Effective Tension
DHP = Design HP of Drive
RPM = Revolutions per minute
P.D. = Motor Pulley Pitch Diameter
R = Tension Ratio (4 to 5 is normal)

$$T_e = \frac{DHP \times 33{,}000}{RPM \times .262 \times PD}$$

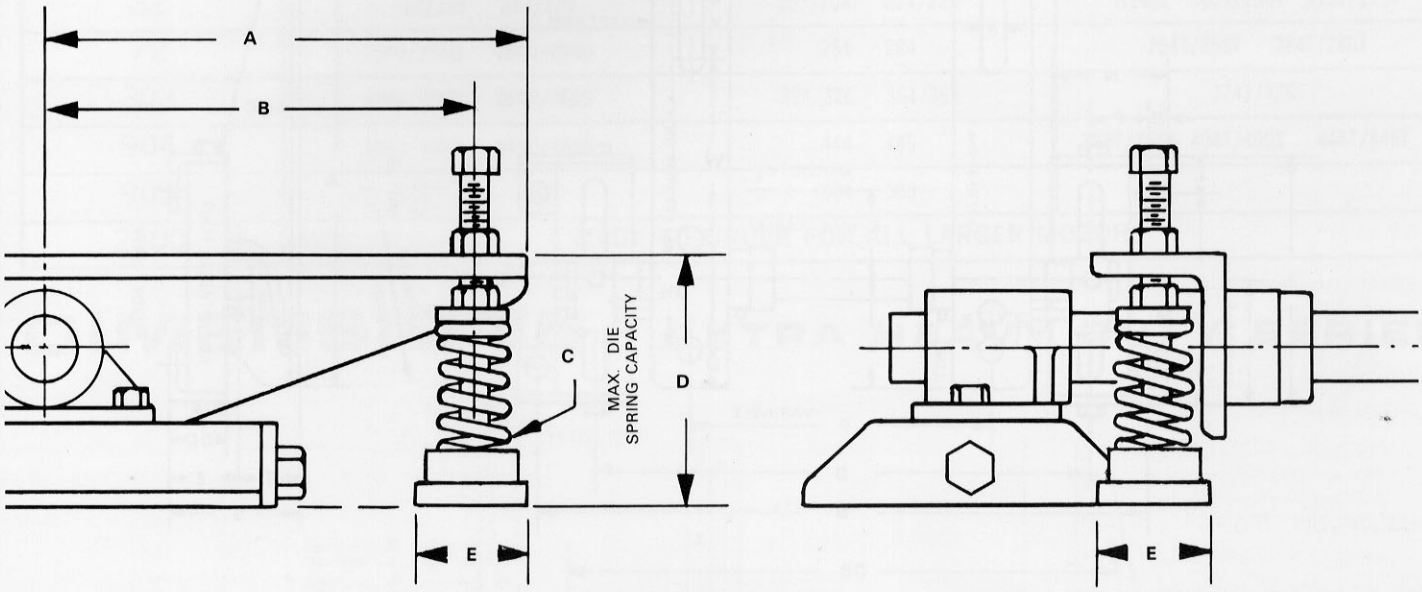
Since $T_e = T_1 - T_2$, and $Wc = T_1a + T_2b$, and $R = \frac{T_1}{T_2}$, it can be shown that $C = \frac{(Ra + b)Te}{(R - 1)W}$

TABLE 1 "C" DIMENSIONS — MAXIMUM AND MINIMUM (IN INCHES)

STD. BASE	NEMA MOTOR FRAME SIZES																							
	143 / 145		182 / 184		213 / 215		203 / 204		224 / 225		254 / 256		284 / 286		324 / 326		364 / 365		404 / 405		444 / 445		504 / 505	
SIZE	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
32	4 3/8		2		2 1/2		2 1/4		2 3/4															
150	- 3/4	2 1/4	1/4	3 1/4	3/4	3 3/4	1 1/2	4 1/2	2	5	1 1/2	4 1/2												
72											2 1/2		3											
303															1	4 3/4	1 3/4	5 1/2						
350											- 1/4	3 1/2	1/4	4	1	4 3/4	1 3/4	5 1/2						
904																	- 1/4	4 1/4	3/4	5 1/4	1 3/4	6 1/4		
905																							7 3/8	7 1/2
950																	- 1 1/2	4 1/2	- 1/2	5 1/2	1/2	6 1/2	1 1/2	7 1/2

SPRING-LOADED BASE MODIFICATION

ADAPTATION AVAILABLE FOR ALL STANDARD BASES



FOR HEAVY VIBRATING LOADS

SIDE VIEW

END VIEW

DIMENSIONS (Inches)

BASE SIZE	A	B	C Spring Force (Total)	D	E
303	10	8-1/2	2300 lb	4-13/16	3
904	12	10-1/2	3000 lb	7-1/4	3
905	13-1/2	12	3000 lb	7-1/4	3
150	7-1/4	5-3/4	1400 lb	5	3
350	9-3/4	8-1/2	2300 lb	5-3/4	3
950	13-1/2	12	3000 lb	6-3/4	3

SPECIFICATIONS & INSTALLATION

1. SPECIFICATIONS:

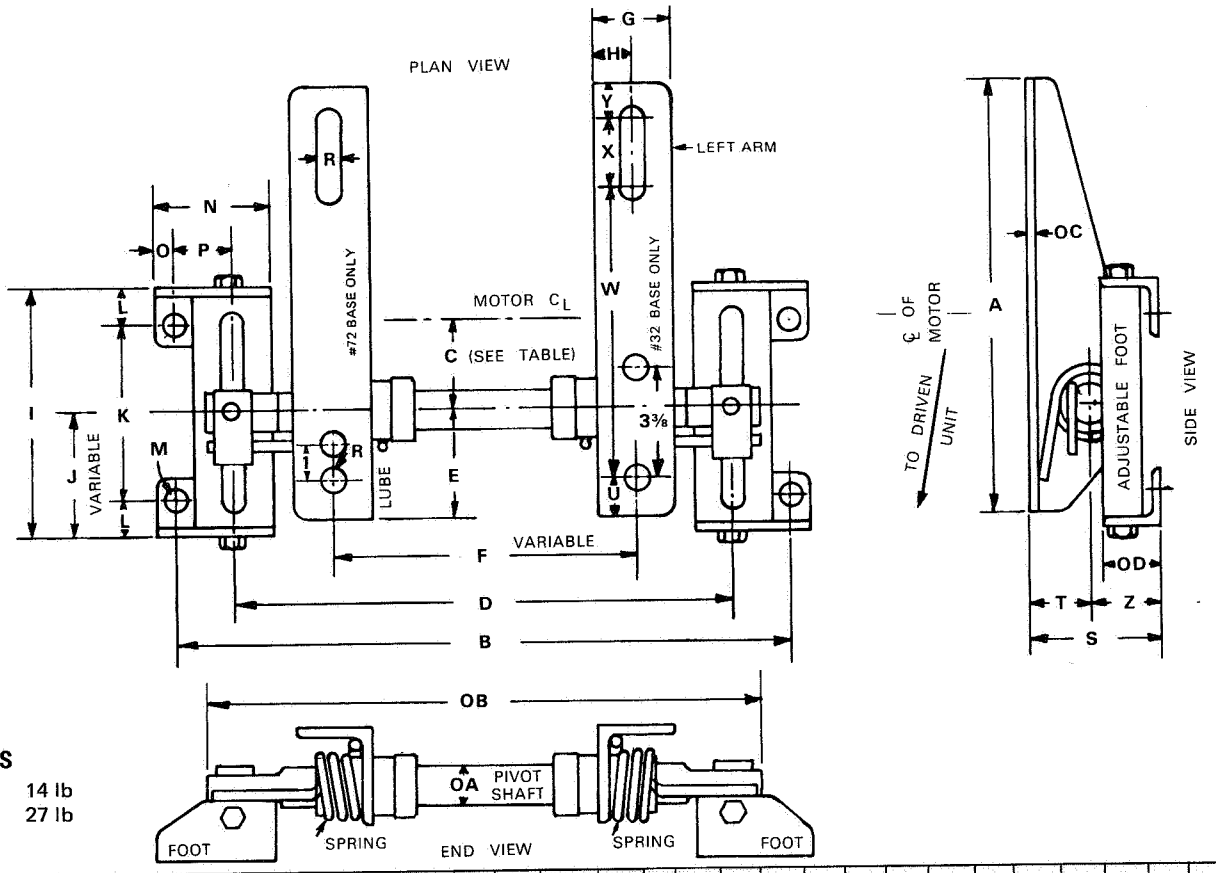
This Modification is intended to be used on applications where either a vibrating or heavy starting load is present. The springs being utilized are extra heavy duty die springs capable of absorbing continual vibratory loads. These springs are capable of being preloaded to within 75% of maximum capability. If the load requirements of the drive would normally cause the motor to be offset from the pivot shaft by more than the maximum "C" dimension shown in Table 1, the springs can be preloaded to compensate for this moment arm deficiency.

2. INSTALLATION:

A. Make certain that the springs are seated on the screw type retainer plugs and that the spring retainer plate is centered on the spring and flat on the floor. This plate can be welded to the base supporting structure if necessary.

B. Adjust the spring loading screw and locking nut to compress the springs to the proper preload as indicated by the formula on page 4. Make certain that the locking nut is securely tightened to prevent the spring loading screw from backing off under load.

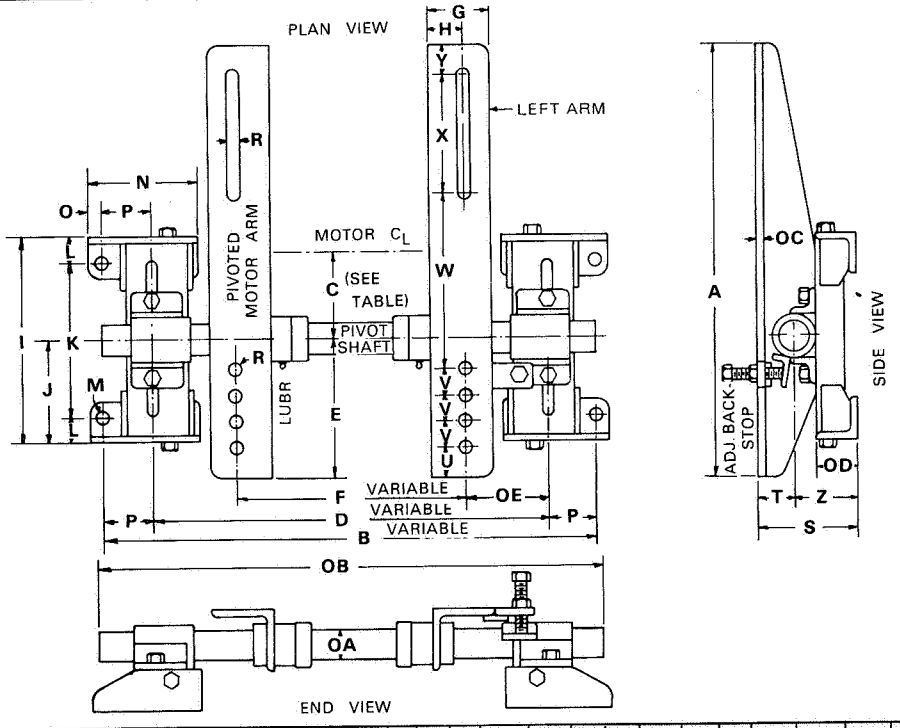
DIMENSIONS...STANDARD SERIES



WEIGHTS

Size 32: 14 lb
Size 72: 27 lb

Base Size	A	B	D	E	F		G	H	I	J		K	L	M	N	O	P	R	S	T	U	W	X	Y	Z	OA	OB	OC	OD	Foot Channel
					Min.	Max.				Min.	Max.																				
32	11	14¼	11¾	2¾	4½	7	2	1	6⅜	15/16	5 7/16	4½	15/16	13/32	3	½	1½	13/32	3¼	1½	1	7⅜	1¾	⅞	1¾	1	12¾	3/16	1½	2 x 1 x ⅛
72	13¾	21	16¼	3⅞	8¼	11	2	1⅛	8½	1¼	7¼	6	1¼	17/32	4½	5/8	2⅜	17/32	4 3/32	1¾	1⅜	9¾	1½	1⅛	2 11/32	1 3/16	17¾	¼	2	3 x 4.1 lb.



WEIGHTS

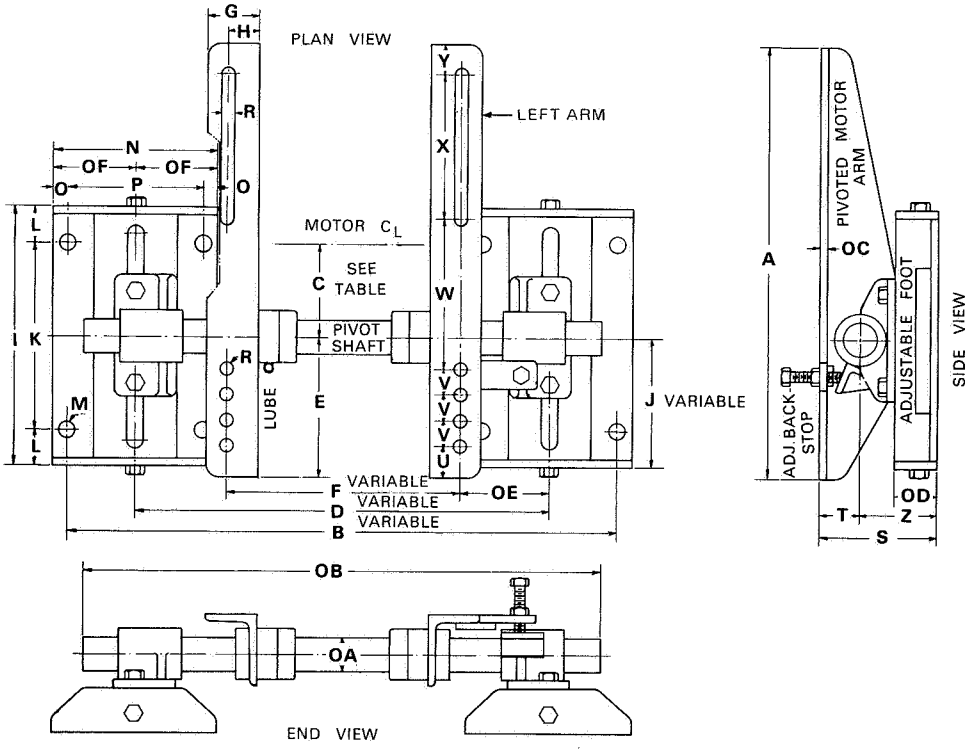
Size 303: 52 lb
Size 904: 140 lb
Size 905: 165 lb

Base Size	A	B		D		E	F		G	H	I	J		K	L	M	N	O	P	R	S	T	U	V	W	X	Y	Z	OA	OB	OC	OD	OE		Foot Channel
		Min.	Max.	Min.	Max.		Min.	Max.				Min.	Max.																					Min.	Max.	
303	21	22	23¾	17½	19¼	6¾	10½	12¼	2½	1⅜	10	3 1/16	6 15/16	7½	1¼	9/16	5¼	⅝	2¼	21/32	4 13/16	1¾	1½	1¼	8½	5¾	1½	3 1/16	1 7/16	21½	5/16	2	2¾	4	3" x 4.1 lb.
904	26	26¾	32	21	26¼	8¾	11¼	16½	3½	2	13	4½	8½	9	2	13/16	7	⅞	2⅞	13/16	7¼	2¾	1½	1½	11¼	7	1¾	4½	1 15/16	29	½	3	4	6	4" x 7¼ lb.
905	29¾	31½	39	25¾	33¼	10	16	23½	3½	1⅞	13	4½	8½	9	2	13/16	7	⅞	2⅞	15/16	7¼	2¾	1½	2	12	8¼	2	4½	1 15/16	36	¾	3	4	6	4" x 7¼ lb.
2100						MADE TO ORDER FOR NON-NEMA FRAMES																			MADE TO ORDER FOR NON-NEMA FRAMES											

SELECTION TABLE FOR STANDARD SERIES

STANDARD SERIES TENS-A-MATIC BASE SIZE	MOTOR FRAME SIZES		
	RE-RATED NEMA FRAMES	OLD STD. NEMA FRAMES	NEW RE-RATED FRAMES
32	182/184 213/215	203/204 224/225	H145T 182T/184T 213T/215T
72	254U/256U 284U/286U	254 284	254T/256T 284T/286T
303	324U/326U 364U/365U	324/326 364/365	324T/326T
904	404U/405U 444U/445U	444 445	364T/365T 404T/405T 444T/445T
905	504 505 507	504 505	
2100	MADE TO ORDER FOR ALL LARGER MOTORS		

DIMENSIONS...EXTRA HEAVY DUTY SERIES



WEIGHTS

Size 150: 55 lb
Size 350: 84 lb
Size 950: 160 lb

Base Size	A	B		D		E	F		G	H	I	J		K	L	M	N	O	P	R	S	T	U	V	W	X	Y	Z	OA	OB	OC	OD	OE		OF	Foot Channel
		Min.	Max.	Min.	Max.		Min.	Max.				Min.	Max																					Min.	Max.	
150	15¼	17	22½	11½	17	4½	4½	10	2½	1¼	12½	3½	9	9	1¾	9/16	7	¾	5½	9/16	5	1⅝	1	1	4⅜	6	⅞	3⅜	17/16	20	5/16	1 13/16	2¼	3½	3½	3" x 5 lb.
350	21	22½	26½	16	20	6¾	8¼	12¼	3	1½	12½	3½	9	9	1¾	13/16	8	¾	6½	21/32	5¾	2	1½	1¼	7¼	7	1½	3¾	1 11/16	25	⅜	2⅛	3	4½	4	4" x 7¼ lb.
950	29¾	24¾	31½	17¼	24	10	11¼	18	3½	1⅞	12½	3½	9	9	1¾	15/16	9	¾	7½	15/16	6¾	2¾	1½	2	12	8¼	2	4	1 15/16	31	¾	2¼	3½	5½	4½	5" x 9 lb.

SELECTION TABLE FOR EXTRA HEAVY DUTY SERIES

EXTRA HEAVY DUTY SERIES TENS-A-MATIC BASE SIZE	MOTOR FRAME SIZES		
	RE-RATED NEMA FRAMES	OLD HEAVY DUTY NEMA FRAMES	NEW RE-RATED FRAMES
150	182*/184 213/215 254U/256U	203/204 224/225 254	H145T* 182T*/184T 213T/215T
350	284U/286U 324U/326U 364U/365U	284 324/326 364/365	254T/256T 284T/286T 324T/326T
950	404U/405U 444U/445U	404/405 444/445 504/505	364T/365T 404T/405T 444T/445T
2100	MADE TO ORDER FOR ALL LARGER MOTORS		

*SET COLLARS MUST BE PLACED OUTSIDE OF ARMS FOR THESE FRAME SIZES

GENERAL INSTALLATION INSTRUCTIONS

1. **PULLING SIDE OF BELT** must come between motor shaft and pivot shaft of Tens-A-Matic base.

2. **INSTALL MOTOR ON PIVOTED ARMS** so motor overhangs base pivot shaft on side away from driven unit. Place motor enough off-center (see Table 1, Page 4) so weight of motor will prevent belt slippage under normal running load.

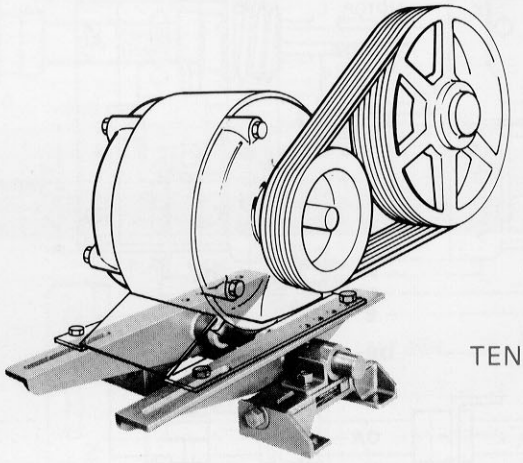
3. **BE SURE MOTOR SHAFT,** pivot shaft and driven shaft are parallel.

4. **AFTER INSTALLING MOTOR,** use adjusting screws in base feet to level motor support arms. These should be horizontal to slightly less than horizontal (—10°).

5. **"BACK-LASH" BOLT ON PIVOTED ARM** should be adjusted (and locked in place) so the Arm will not rise above horizontal position.

6. **MOTOR BASE SHOULD BE FIRMLY BOLTED** to a solid foundation. Vibration bases may be used with careful installation.

7. **MOTOR SUPPORT ARMS SHOULD BE LUBRICATED.** Grease fittings are supplied for this purpose.



TENS-A-MATIC PIVOTED MOTOR BASE

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