



DIFFERENTIAL DRAW TRANSMISSIONS

APPLICATIONS

The Specon Mechanical Differential Draw (MDD) Transmission embodies the differential draw principles first conceived and put into limited practice in the 19th century. This concept results in extremely accurate control of speed by compressing the speed range of a relatively wide mechanical variable speed device by appropriate connection to differential gearing. Inherent operating accuracies over 1000 times those of the variable element are attainable. This time-proven concept is combined with the service-proven components of the Specon MDD Transmissions to produce extremely accurate and reliable units with a long service life for:

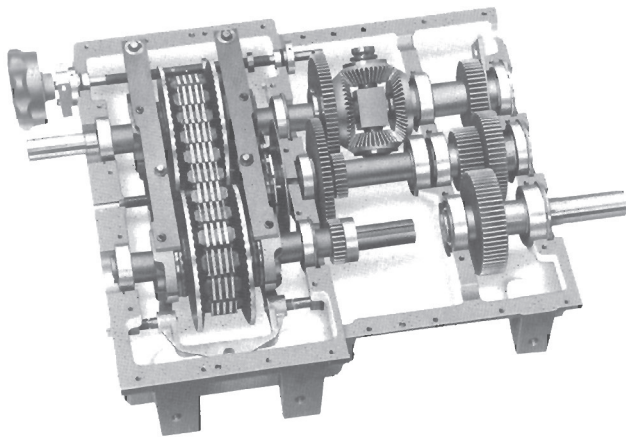
printing presses, paper machinery, film processing, paper cutoff, synthetic fiber, alternator drives, textile machinery, metering pumps and other Trim Speed applications requiring inherently high operating accuracy.

FEATURES

- # Equipped with automatic chain tensioner
- # Requires shutdown only to change oil or replace chain
- # Optional Integral correcting differential available installed in series with draw reduction gearing
- # Infinitely adjustable to any speed setting within rated speed range
- # Self-adjusting variable pitch all metal chain
- # Accurate control screw turns indicator
- # Horizontal or vertical mounting
- # Self-contained splash lubrication
- # All metal construction, cast iron housing
- # Compact design
- # Oil level sight gages
- # Multiple shaft arrangements
- # Gearing, integral motor, Vernier control, remote control options available
- # Split Housing Construction

BENEFITS

- # Maintains proper chain tension through entire chain life. Shutdown not required to check or adjust tension
- # Reduces down time
- # Permits instantaneous phase adjustment of output shaft. Correction can be made intermittently or continuously by manual or other means.
- # Eliminates step adjusting of speed
- # Assures positive power transmission
- # Shows control screw turns; relates input/output speed ratio
- # Allows space conservation
- # Minimum maintenance required
- # Assures long life and higher torque transmission
- # Allows easy mounting on machinery
- # Allows instant determination of oil level
- # Covers most applications of input and output
- # Accommodates special speed requirement, allows finer speed adjustment
- # Facilitates major maintenance



SPECIFICATIONS

Capacities and Ratings

Specon MDD Transmissions are available with an infinite number of output speed ranges. The selection tables list power and speed ranges for the various size units available with output speed or draw range nominally expressed in percent. Draw ranges may be used in various ways: for example, a 10% range may be expressed as ($\pm 5\%$) (-2% to $+8\%$), ($+4\%$ to -6%) or any combination of extremes having the same total percentage range. The tables show standard draw ranges. For example: size 1 shows 3, 4, 5, $7\frac{1}{2}$, 10, 15 and 20% draw. Any specific draw range, whether below the 5% shown or above the 20%, can be supplied.

For most applications, the standard ranges shown in the rating tables will bracket the range required.

Type A units are available in three basic styles and as vertical or horizontal configurations. All have the input and output shafts on opposite sides. Output shafts can be in any of three locations, dependent in part upon the output speed. The designations MDDY, MDDX, and MDDZ refer to the shaft positions. (See transmission style drawings on page 11.)

Units with output shafts at position Y have no output gearing and the output shaft is directly extended from the differential output gear. This unit is designated as an MDDY and the output speed is a function of the draw range. With the output shaft at position "X", single stage output speed-up or reduction gearing is included and unit designation becomes MDDX. Units with the output shaft at position "Z" have double stage output gearing and are referred to as MDDZ transmissions.

The three basic styles are, Style 1, which does not incorporate step-up or reduction input gearing. Style II, which has a single stage input gear set and Style III, which incorporates an integrally mounted synchronous or induction motor.

SPEED ADJUSTMENT

The Specon MDD Transmission is normally provided with a manual handwheel control. The number of control handwheel turns required to adjust the transmission through its entire speed range is listed in the selection tables. Because of the narrow speed range of the MDD unit the ratio of handwheel turns versus output speed in RPMs is ideal. For instance an MDD transmission with a range of 5% when operating at 1000 RPM will only change speed by an **average** of 4 to 5 RPMs for a complete turn of the control handwheel.

Even greater resolution of control can be attained by incorporating a 7.5:1 or 30:1 vernier control in which case the number of handwheel turns listed in the table will be multiplied by 7.5 or 30 to complete a full range speed change. When used, the vernier control is normally supplied as an integral part of the transmission, but the feature can be added to a unit already in the field for a remote vernier control available in either ratio.

Other control arrangements include Mechanical Remote Control, Lever Control, Electric Remote Control and Automatic Hydraulic or Pneumatic Control for use in automated applications. Refer to pages 18 to 20 for additional details on control media.

OPERATING

The Specon MDD units have unsurpassed inherent output speed regulation. The only element which can vary in speed ratio or setting as a result of load changes is the variable pitch chain. The effect of variation in this element is small because only a minor portion of the transmitted power is carried through it. The amount of power carried through the chain is a function of the draw range built into the unit and the narrower the range the less power that is transmitted through the chain.

The inherent output speed regulation of the MDD is further enhanced by the differential draw phenomenon through the bevel gear differential. While the variation within the variable element may be as much as 1% the actual variation at the output of the differential may be only 1/50th of that or .020%. This ratio of relative regulation is also a function of the speed range incorporated into the transmission.

OUTPUT SPEED REGULATION

Speed Range %	Max. Speed Setting %	Min. Speed Setting %
2	.005	.025
5	.01	.07
10	.02	.17
20	.05	.5

The accompanying table Figure 1 lists unit % variation in speed at maximum and minimum output speed settings for various draw ranges and this data is further illustrated in the output speed regulation curves, Figure 2. The inherent improvement in regulation resulting from a narrower draw range is readily apparent with these curves.

It is noted that the operating speed regulation is greater at maximum output draw or speed setting than it is at minimum draw setting. If best regulation is required at minimum output speed an alternate connection to the differential can be made to provide it.

FIGURE 1
OUTPUT SPEED REGULATION

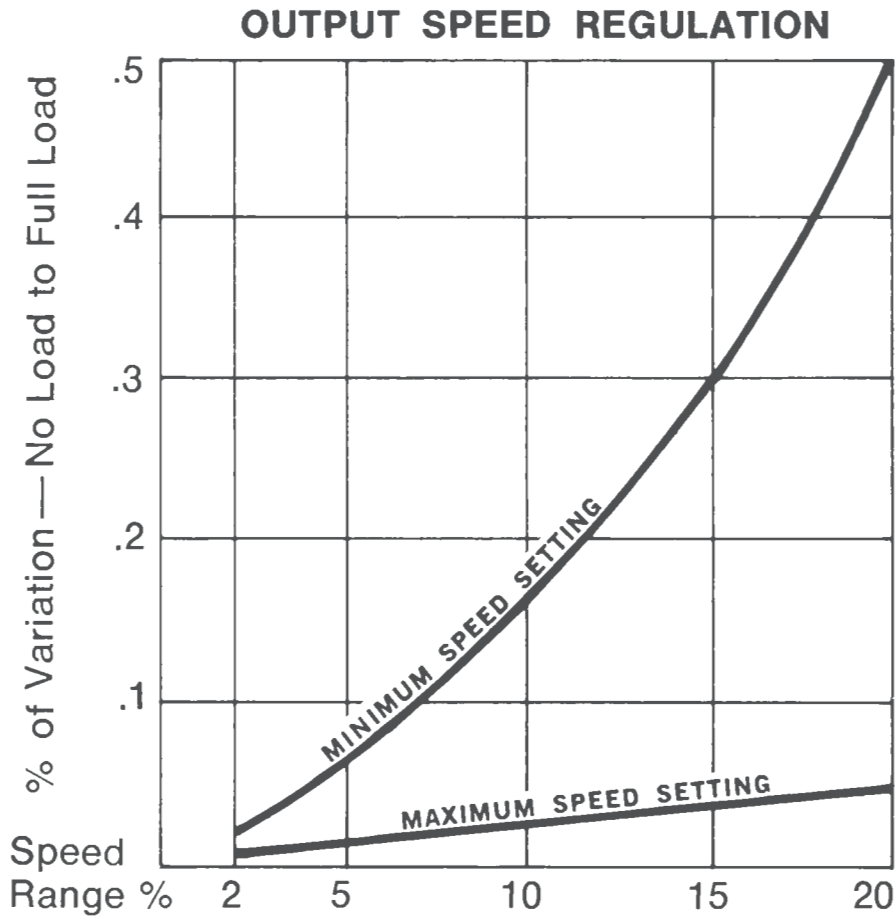


FIGURE 2
SPEED REGULATION CURVES

TORQUE CAPACITY

Specon MDD Transmissions are rated for constant torque capacity throughout the range of draw adjustment. The output torque ratings remain unchanged if the input speeds are less than the maximum listed in the selection tables.

Output torque capacity is a function of unit rated power capacity and output speed built into a specific transmission. The torque capacity for any transmission can be calculated from the equation

$$*T = \frac{HP \ 63,000}{RPM}$$

*T in Pound-inches

(*) LIMITING TORQUE CAPACITY

UNIT SIZE	Output TQ. Range (LB—IN)		RPM Range
	Minimum – At Highest RPM Range Shown in Tabulation	Maximum – Mechanical Limit at RPM Ranges Shown and Slower	
1/2	100	1500	181-187
1	200	2400	203-233
2	375	3000	304-312
3	600	4100	288-345
4	1330	7200	236-246
5	1995	8900	233-243
6	1870	12,500	360-378

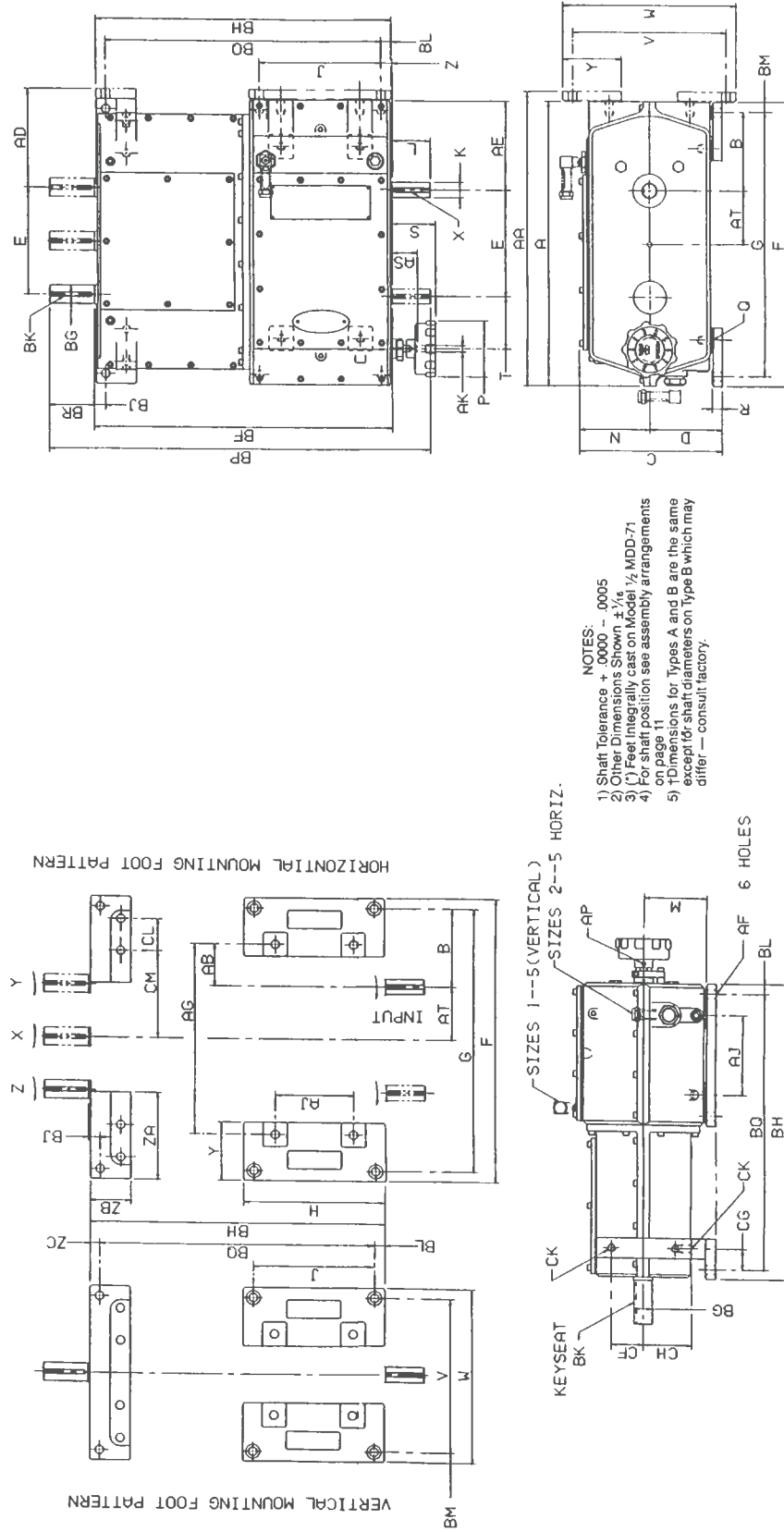
FIGURE 3
LIMITING TORQUE CAPACITY

The standard Specon draw transmission model suffix — 66, 71 and 84 is furnished with the Specon Vari-Chain transmission integrally mounted to the differential housing.

The speed used in this determination should be the maximum of the draw range in the particular application. In no case, however, should the torque capacity exceed that shown in the accompanying table, Figure 3.

Note: For some speed ranges, all combinations of shaft position may not be available. Consult factory.

OUTLINE DIMENSIONS



Drawing No. DSK 1226

Size	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R	S	T	V	W	X	Y	Z	AA	AB	AD	AE
5	39 ¹ / ₂	10 ⁵ / ₈	20	10 ⁷ / ₁₆	16	39 ¹ / ₂	37 ¹ / ₄	19 ⁵ / ₈	17 ¹ / ₂	13 ³ / ₄	4 ¹ / ₂	8 ¹⁵ / ₁₆	9 ³ / ₁₆	6	7 ¹ / ₈ -9	1 ¹ / ₂	3 ³ / ₄	8 ¹ / ₁₆	20 ¹ / ₈	22 ³ / ₈	3 ⁷ / ₈ X 3 ¹ / ₁₆ X 4 ¹ / ₄	7 ³ / ₈	13 ³ / ₁₆	41	6	13 ¹ / ₄	11 ³ / ₄
4	32 ¹ / ₄	8 ¹ / ₂	16 ¹ / ₁₆	8 ¹ / ₄	13	32	30	16	14	19 ¹ / ₁₆	4	7 ¹ / ₄	7 ³ / ₁₆	6	5 ⁵ / ₈ -11	1	3 ¹¹ / ₁₆	6 ¹ / ₂	14 ¹ / ₂	16 ¹ / ₂	3 ⁷ / ₈ X 3 ¹ / ₁₆ X 3 ³ / ₄	6	1 ¹ / ₈	33 ¹ / ₄	5	10 ⁵ / ₈	9 ⁵ / ₈
3	26 ³ / ₈	7 ⁵ / ₈	13 ⁹ / ₁₆	7	10 ¹ / ₄	26 ³ / ₄	25 ¹ / ₂	14 ¹ / ₈	12 ¹ / ₄	15 ¹ / ₁₆	3 ¹ / ₂	6	6 ⁹ / ₁₆	6	1 ² / ₂ -13	1	3 ⁵ / ₈	5 ³ / ₈	14 ⁷ / ₈	16 ¹ / ₈	5 ¹ / ₁₆ X 5 ¹ / ₃₂ X 3 ¹ / ₂	5	1 ⁵ / ₁₆	27 ³ / ₈	4 ³ / ₁₆	9	8
2	22 ³ / ₄	6 ¹ / ₄	11 ⁷ / ₈	6 ³ / ₁₆	8 ⁵ / ₈	22 ³ / ₄	21 ¹ / ₈	12 ¹ / ₄	10 ⁵ / ₈	1 ¹ / ₈	2 ³ / ₄	5 ³ / ₁₆	5 ¹¹ / ₁₆	3 ¹ / ₂	1 ² / ₂ -13	1	2 ⁹ / ₁₆	4 ¹³ / ₃₂	12	13 ⁵ / ₈	1 ⁴ / ₄ X 1 ¹ / ₈ X 2 ⁵ / ₈	4 ³ / ₈	1	23 ³ / ₄	3 ⁹ / ₁₆	8 ¹ / ₁₆	7 ¹ / ₁₆
1	17 ¹ / ₂	4 ⁷ / ₈	8 ⁷ / ₈	4 ¹ / ₂	6 ¹ / ₂	17 ¹ / ₂	16 ¹ / ₄	8 ³ / ₄	7 ¹ / ₂	1 ⁵ / ₁₆	2 ³ / ₈	3 ⁷ / ₈	4 ³ / ₈	3 ¹ / ₂	1 ² / ₂ -13	5 ⁸	2 ¹¹ / ₁₆	3 ¹ / ₄	9 ¹ / ₂	10 ³ / ₄	1 ⁴ / ₄ X 1 ¹ / ₈ X 2 ³ / ₈	3 ⁵ / ₈	1 ¹ / ₁₆	18 ¹ / ₈	2 ⁵ / ₈	6 ¹ / ₈	5 ¹ / ₂
1/2	*	5 ³ / ₈	8 ³ / ₈	4	5 ¹ / ₂	17 ¹ / ₂	16 ¹ / ₄	4 ⁷ / ₈	3 ¹ / ₂	3 ⁴	1 ⁷ / ₈	*	4 ³ / ₈	3 ¹ / ₂	*	7 ⁸	2 ¹ / ₄	3 ¹ / ₈	8 ¹ / ₄	9 ³ / ₄	3 ¹ / ₁₆ X 3 ¹ / ₃₂ X 1 ⁵ / ₈	2 ³ / ₈	1 ¹⁵ / ₁₆	16 ¹ / ₄	*	5 ¹ / ₂	*

Size	AF	AG	AJ	AK	AP	AS	AT	BF	BG	BH	BJ	BK	BL	BM	BP	BQ	BR	CF	CG	CH	CK	CL	CM	ZA	ZB	ZC
5	29 ²⁹ / ₃₂	28	13 ¹ / ₂	.630		1 ¹³ / ₁₆	8	37 ³ / ₁₆	2 ¹ / ₈	37	13 ¹ / ₁₆	1 ² / ₂ X 1 ⁴ / ₄ X 4 ¹ / ₄	1 ¹ / ₁₆	1 ¹ / ₈	46 ³ / ₁₆	34 ¹³ / ₁₆	4 ¹ / ₂	6 ⁵ / ₈	2 ¹ / ₂	7 ¹³ / ₁₆	5 ¹ / ₈ -11	3 ¹ / ₂	11 ¹¹ / ₁₆	11 ³ / ₁₆	4 ⁵ / ₈	1 ¹ / ₈
4	1 ¹ / ₁₆	23	10 ¹ / ₂	.630		1 ⁵ / ₈	6 ¹ / ₂	32 ¹¹ / ₃₂	1 ³ / ₄	32	17 ¹ / ₃₂	1 ² / ₂ X 1 ⁴ / ₄ X 4	1	1	40 ⁵ / ₈	30	49 ³ / ₃₂	5 ¹ / ₄	2 ⁵ / ₃₂	6 ¹ / ₄	1 ² / ₂ -13	3	10	8 ¹ / ₄	4 ⁵ / ₃₂	1
3	17 ¹ / ₃₂	18 ⁵ / ₈	9	.551		1 ¹ / ₂	5 ¹ / ₈	26 ⁷ / ₁₆	1 ³ / ₈	26 ¹ / ₄	1 ⁹ / ₁₆	5 ¹ / ₁₆ X 5 ¹ / ₃₂ X 3 ¹ / ₂	1 ⁵ / ₁₆	5 ⁸	33 ¹³ / ₁₆	24 ⁵ / ₁₆	37 ³ / ₈	3 ¹ / ₂	1 ¹ / ₂	5 ¹ / ₁₆	1 ² / ₂ -13	2 ¹ / ₂	8 ¹³ / ₁₆	8	3 ¹ / ₂	1
2	17 ¹ / ₃₂	15 ³ / ₄	7 ³ / ₄	.551		1 ³ / ₈	4 ⁵ / ₁₆	23 ³ / ₈	1 ³ / ₈	23 ¹ / ₁₆	7 ⁸	5 ¹ / ₁₆ X 5 ¹ / ₃₂ X 2 ³ / ₄	1 ¹³ / ₁₆	1 ¹³ / ₁₆	29 ⁷ / ₈	21 ¹ / ₂	3	2 ⁹ / ₃₂	1 ¹ / ₄	4 ⁹ / ₁₆	1 ² / ₂ -13	2 ¹ / ₃₂	6 ³⁷ / ₃₂	6 ¹³ / ₁₆	2 ¹ / ₂	3 ^{4/₄}
1	17 ¹ / ₃₂	11 ³ / ₄	4 ⁷ / ₈	.394		1 ⁹ / ₁₆	3 ¹ / ₄	18 ⁷ / ₁₆	1 ¹ / ₈	18 ¹ / ₄	3 ⁴	1 ⁴ / ₄ X 1 ¹ / ₈ X 2 ⁵ / ₈	5 ⁸	5 ⁸	23 ⁹ / ₁₆	17	2 ³ / ₄	2	1 ⁹ / ₃₂	3	1 ² / ₂ -13	2	5 ³ / ₈	5 ³ / ₈	2 ¹ / ₂	5 ⁸
1/2	17 ¹ / ₃₂	*	*	.375		1 ¹ / ₈	2 ³ / ₄	14 ¹ / ₂	7 ⁸	12 ⁵ / ₁₆	1 ⁹ / ₁₆	3 ¹ / ₁₆ X 3 ¹ / ₃₂ X 2	1 ¹ / ₁₆	3 ⁴	18 ³ / ₈	11	2	2 ³ / ₈	*	2 ⁵ / ₁₆	1 ² / ₂ -13	1 ⁹ / ₁₆	4 ¹³ / ₁₆	4 ⁷ / ₈	1 ¹ / ₄	5 ⁸

FIGURE 4 OUTLINE DIMENSIONS — STYLE I

OUTLINE DIMENSIONS



FIGURE 5 OUTLINE DIMENSIONS — STYLE II

Size	A	B	C	D	F	G	H	J	M	N	P	Q	R	V	W	Y	AA	AD	AF	AG	AJ	AL	AM	AN	AQ
5	39 1/2	10 5/8	20	10 7/16	39 1/2	37 1/4	19 5/8	17 1/2	8 15/16	9 3/8	6	7/8	1 3/8	20 1/8	22 3/8	7 3/8	41	13 1/4	29 3/32	28	13 1/2	4 1/2	2 1/4	16 1/16	23 1/16
4	32 1/4	8 1/2	16 1/16	8 1/4	32	30	16	14	7 1/4	7 3/4	6	5/8	7/8	14 1/2	16 1/2	6	33 1/4	10 5/8	11 1/16	23	10 1/2	4	1 3/4	13	17 1/8
3	26 3/8	7 5/8	13 9/16	7	26 3/4	25 1/2	14 3/8	12 1/4	6	6 3/8	6	1/2	7/8	14 7/8	16 1/8	5	27 3/8	9	17 3/32	18 5/8	9	3 7/16	1 1/2	10 15/32	3 1/4
2	22 3/4	6 1/4	11 7/8	6 3/16	22 3/4	21 1/8	12 1/4	10 5/8	5 3/16	5 1/2	3 1/2	1/2	7/8	12	13 5/8	4 3/8	23 3/4	8 1/16	17 3/32	15 3/4	7 3/4	2 3/4	1 1/4	8 23/32	1 3/8
1	17 1/2	4 7/8	8 7/8	4 1/2	17 1/2	16 1/4	8 3/4	7 1/2	3 7/8	4 1/4	3 1/2	1/2	9 1/16	9 1/2	10 3/4	3 5/8	18 1/8	6 1/8	17 3/32	11 3/4	4 7/8	2 7/16	1 1/8	6 1/2	1 5/16
1/2	*	5 3/8	8 3/8	4	17 3/4	16 1/4	4 7/8	3 1/2	*	4 3/8	3 1/2	*	7/8	8 1/4	9 3/8	2 3/4	16 1/4	5 1/2	17 3/32	*	*	2	1	5 7/8	19 3/32
Size	AR	AT	AZ	BB	BG	BH	BJ	BK	BL	BM	BQ	BR	BU	BV	BY	CF	CG	CH	CK	AK	ZA	ZB	ZC		
5	1/2 x 1/4 x 4 3/8	8	7 5/16	18 5/8	2 1/8	37	13 1/16	1/2 x 1/4 x 4 1/4	1 1/16	1 1/8	34 13/16	4 1/2	4 1/2	43 5/16	52 5/16	6 5/8	2 1/2	7 13/16	5/8-11	.630	11 3/16	4 5/8	1 1/8		
4	3/8 x 3/16 x 3 5/8	6 1/2	6 1/8	15	1 3/4	32	17 3/32	1/2 x 1/4 x 4	1	1	30	4 9/32	4 1/2	37 11/32	45 5/8	5 1/4	25 3/32	6 1/4	1/2-13	.630	8 1/4	4 5/32	1		
3	3/8 x 3/16 x 3 3/16	5 1/8	5 7/16	12 3/4	1 3/8	26 1/4	13 1/16	5/16 x 5/32 x 2 3/4	1 5/16	5/8	24 5/16	3 7/8	3 7/8	30 15/16	38 1/4	3 1/2	1 1/2	5 1/16	1/2-13	.551	8	3 1/2	1		
2	1/4 x 1/8 x 2 5/8	4 5/16	5 9/16	10 9/16	1 3/8	23 1/16	7/8	5/16 x 5/32 x 2 1/4	1 3/16	13/16	21 1/2	3	3	27 15/16	33 11/16	2 9/32	1 1/4	4 3/16	1/2-13	.551	6 13/16	2 1/2	3/4		
1	1/4 x 1/8 x 2 3/8	3 1/4	4 5/8	8 1/8	1 1/8	18 1/4	3/4	1/4 x 1/8 x 2 5/8	5/8	5/8	17	2 3/4	2 3/4	22 3/8	27 9/16	2	1 9/32	3	1/2-13	.394	5 3/8	2 1/2	19 3/32		
1/2	1/4 x 1/8 x 1 7/8	2 3/4	5 3/4	8 1/8	7/8	12 5/16	19 1/16	3/16 x 3/32 x 2	1 11/16	3/4	11	2	2	18 5/16	22 5/16	2 3/8	*	2 15/16	1/2-13	.375	4 7/8	1 1/4	5/8		

PRINCIPLES OF OPERATION

GENERAL DESCRIPTION

The basic components of the Specon Draw Transmission are a 4:1 infinitely variable all metal chain and pulley combination and a bevel gear differential assembly. The input to the transmission drives the constant speed pulleys of the variable element and one member of the differential. By controlling the speed of a second element of the differential through reduction gearing from the adjustable 4:1 shaft of the variable chain connection, the third or output gear of the differential is controlled within a highly compressed speed range.

The output speed range is a function of the reduction incorporated between the variable speed shaft of the variable element and the variable speed differential gear. The higher the reduction the narrower the speed range and, consequently, the greater the accuracy.

The Specon Draw Transmission is provided as a semi-custom item. Since it also includes an output gear section, output speed ranges and magnitude of output speed can be provided to match exactly the application requirements.

The extreme accuracy and fine control of the Specon MDD transmissions make them excellent in applications such as web control on printing presses, cellophane casting machines, film processing equipment and paper making machines, alternator drives, glass drawing machines, conveyor synchronizing drives, fiber winding and drawing machinery, shingle cut-off machinery, metering pumps and many others.

Three basic types of Specon Draw Transmissions are available.

Type A is similar to the cross section view shown in Fig. 6. Input and output shafts are always on opposite sides.

CROSS SECTIONS

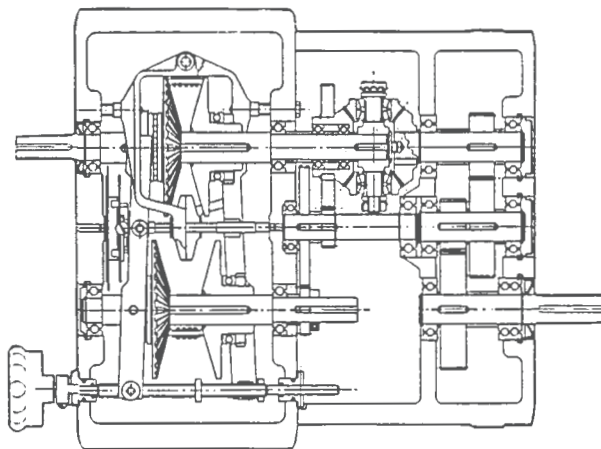


FIGURE 6
CROSS SECTION OF TYPICAL TYPE A
DIFFERENTIAL DRAW TRANSMISSION

Type B units differ in that input and output shafts are both on the same side of the transmission. The internal configuration and the principle of operation are similar to the Type A unit. The input shaft location is always designated as position Y and the output shaft as position Z. (See Figure 7)

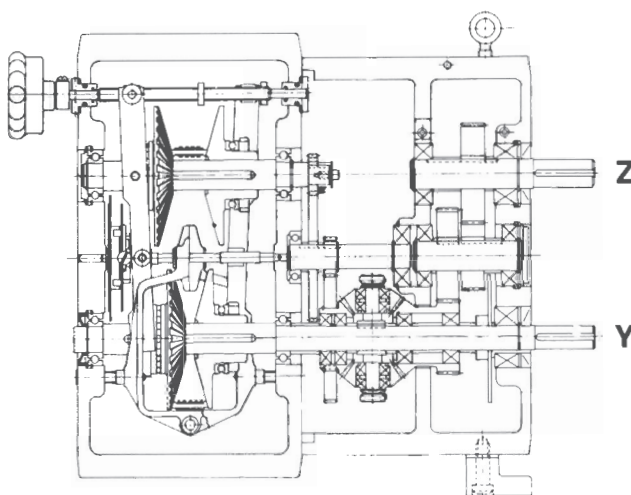


FIGURE 7
TYPE B DIFFERENTIAL DRAW TRANSMISSION

Type C units can be supplied in a multiplicity of arrangements in that the variable speed element and the differential gearing elements are contained in separate housings with external connections between the shafting. This type of unit is supplied as a “piggy-back” arrangement with the input and output shafts on the same or opposite sides as desired. (See Figure 8)

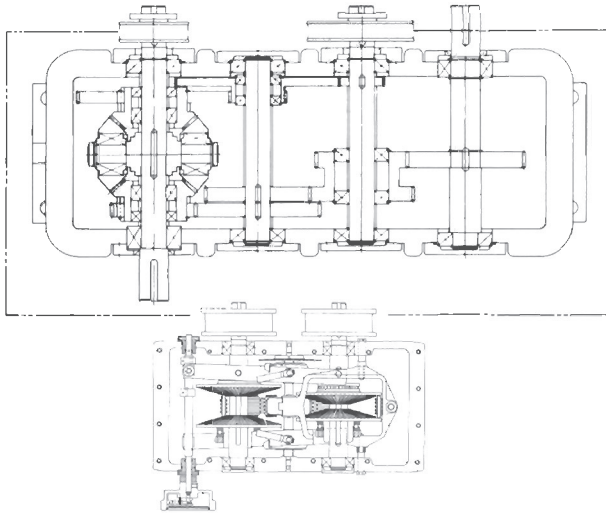


FIGURE 8
TYPE C DIFFERENTIAL DRAW TRANSMISSION

Type A and Type C draw transmissions are available with a built-in auxiliary differential (Figure 8A) for phase shifting and register control applications. Speed and power ratings for the Type A versions are similar to those shown for the Type A MDDY or MDDX transmissions with the output shaft at position Y or position X. The correction shaft is always at the Z position.

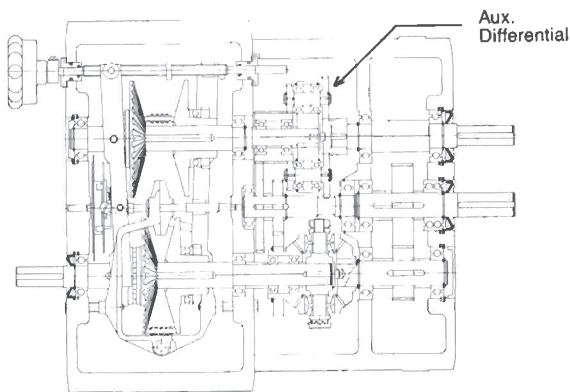


FIGURE 8A

Correction shaft rotation in one direction causes output to speed up while rotation in the opposite direction causes output shaft speed to decrease. The ratio of output shaft rotation to correction shaft rotation will be in the order of 10:1 but will vary as a function of the draw range and output speed specified. Consult the factory for the ratio after the draw range and output speed have been established.

In Type C transmissions, because of their versatility and the various configurations that may be incorporated into a transmission, the control shaft location is not fixed. Consult the factory for approval of a proposed position or for recommendations.

TORQUE MEASUREMENT AND CONTROL

The auxiliary differential which is incorporated into the Type A or Type C units may be used to measure output torque. The torque reflected at the control shaft is directly related to output torque, and by utilizing a torque arm and a force transducer, this torque may be indicated or recorded at the transmission or at a remote position.

With the incorporation of a feedback system to control the variable speed element, the output draw setting, and, consequently, torque flow where torque is a function of output speed, may be controlled.

The factory should be consulted regarding applications proposed for torque measuring or torque control systems.

Following are examples of Style I Type A and B Transmissions. Where it is required that the input and output shafts are on the same side, the Type B transmission unit would be selected.

Style I Type A Assembly D
Output at Z

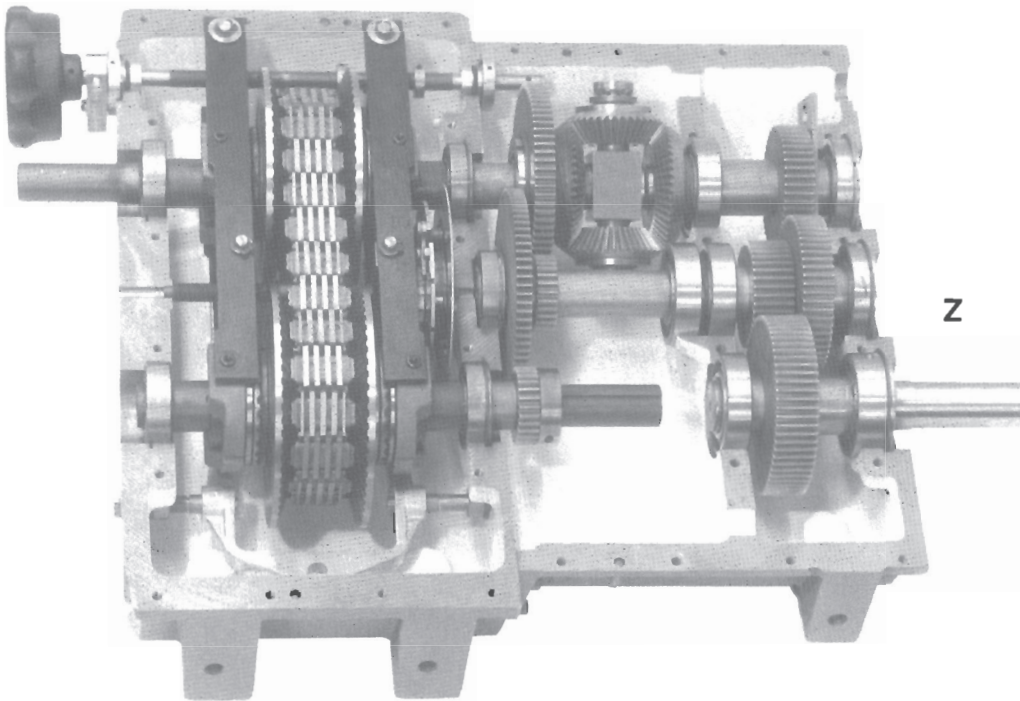
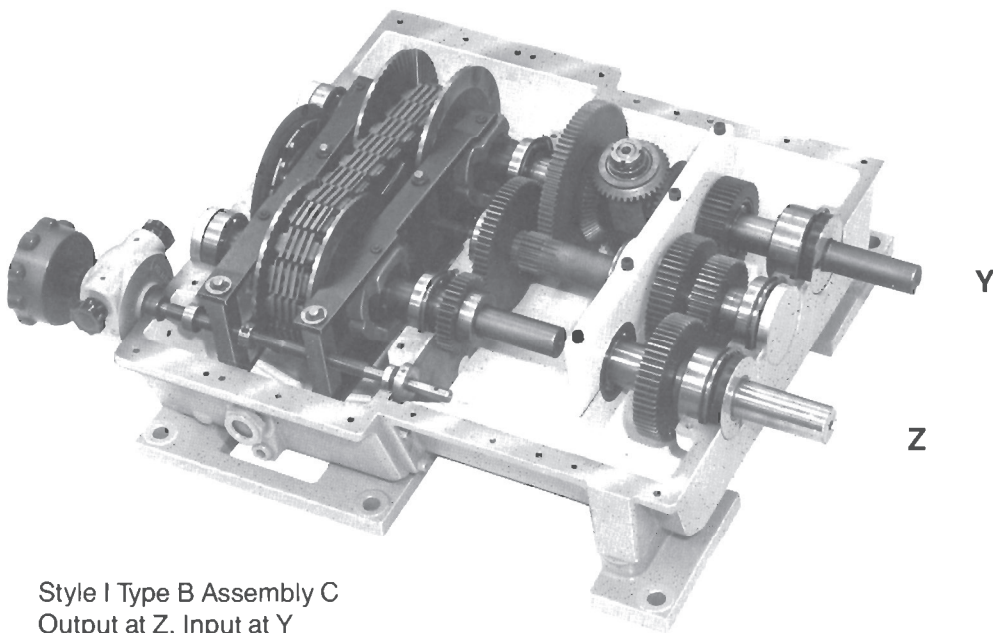


FIGURE 9
STYLE I TYPE A TRANSMISSION



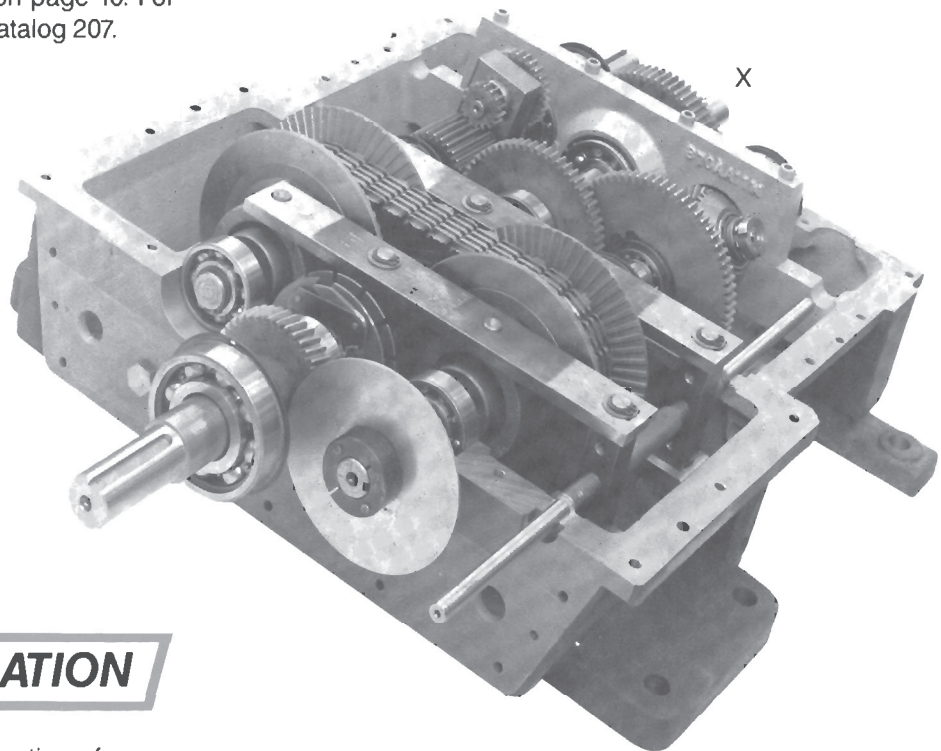
Style I Type B Assembly C
Output at Z, Input at Y
(Input and output on same side)

FIGURE 10
STYLE I TYPE B TRANSMISSION

Style I rated input speed is shown in the various rating tables. For shaft rotation, see table on page 10.

Style II units, with enclosed input gearing, are available for input speeds higher than those listed, or for maximum output at lower input speeds. Style II units are also available for direct coupling to 1750 RPM driving motors. For shaft rotation, see table on page 10. For gear ratios available see Vari-Chain catalog 207.

Note: Unit Pictured Has
Auxiliary Differential
(Page 7)



SERVICE INFORMATION

A list of replacement parts and instructions for servicing the Differential Draw Transmission are available in the Installation, Operating and Maintenance Instructions Bulletin 201 IOM and 207 IOM.

FIGURE 10A
Style II Type A Assembly 5
Output At X

SELECTION AND ORDERING INFORMATION

The accompanying tables are designed to simplify the steps necessary for selection of the Specon Mechanical Differential Draw Transmission required for any specific application within the power ranges shown. For other power outputs, consult the factory. To select a transmission, first, from the application, determine the type — whether Type A, B or C — the assembly configuration — referring to the configuration drawings. Follow the steps listed below, consulting the proper selection table.

POWER RATING

From the characteristics of the driven machine and its application determine the speed and torque requirements to establish the nominal power rating. Considering the intended usage, determine the service factor from the following table.

Operating Hours Per Day	Stops and Starts	Service Factor
8-10	Infrequent	1
8-10	Frequent	1:33
10-24	Infrequent	1:33
10-24	Frequent	1:67

Applying the service factor determine the required power rating; that is, multiply the power needed by the driven machine by the appropriate service factor to arrive at the power requirement of the Specon unit. For example, if the driven machine demands 10 HP and is operated 8 hours per day with frequent stops and starts the transmission required power rating would be 13.3 and a 2MDD transmission should be selected.

(Caution: Do not ignore the service factor requirement.)

SPEED AND RANGE

Determine the exact input speed. It should be within 10% of the rated input speeds indicated in the selection Tables for the transmission being considered for use.

If it is not, consult the factory for alternative options.

The user should determine the maximum no load to full load speed variation that can be tolerated. Consult the Output Speed Regulation Table (Page 2) to determine the acceptable draw range. This may be one of the typical ranges listed or intermediate between those shown.

Determine the nominal output speed required for the application. Using the draw range selected, calculate the minimum and maximum output speeds.

For Example, given a maximum No Load to Full Load requirement of 0.2%, the table on page 2 shows that the required regulation can be achieved with a speed range (draw) of 10%. If the rated input speed is 720 RPM and the nominal output speed requirement is 509 RPM with a +9% and -1% draw, the operating speed range is 504 to 554 RPM.

Having determined the required power rating, consult the appropriate output power capacity selection table and examine the minimum and maximum speeds for the speed range chosen.

Using the example cited, if the power determination has indicated a ½MDD, enter the Type A ½MDD-71 table at 10% speed range and compare minimum and maximum speeds in the table with the operating speed range (504 to 554 rpm). Note that either a ½-MDDX or ½-MDDZ will satisfy the requirement.

If the user application is such that the minimum and maximum speeds lie between adjacent rows in the table, the factory may be able to supply a transmission gear set which will satisfy the requirements. As an additional option, the user may enter the table at 15% speed range and determine if the minimum and maximum speeds are compatible with the transmission speeds shown. In this case, the user should be willing to accept the additional variation in speed from No Load to Full Load conditions.

In the case of Type B, check to assure that the output speed range falls within that shown in the Table. In the case of a Type C, check with factory to determine whether or not the desired combination of shaft positions and output speed can be accommodated.

Proceed to selection of Style and Assembly Configuration.

STYLE AND ASSEMBLY CONFIGURATION

Select a Style I, II or III transmission in accordance with the application speed and power requirements. Select an assembly arrangement according to the physical requirements of the driven machine with respect to input and output shaft locations and control handwheel location. Select horizontal or vertical arrangement.

Power capacities shown are maximum rated and should not be used in all cases as accuracy varies with power requirements, draw range and type of duty.

Style II transmission ratings may be reduced depending upon duty requirements.

	SHAFT POSITIONS	INPUT VS. OUTPUT ROTATION
Style I	Y	Same
	X	Opposite
	Z	Same
Style II	Y	Opposite
	X	Same
	Z	Opposite

In the event that the input speed is NOT within 10% of the rated input speeds indicated in the Selection tables the factory may be able to supply a transmission gear set which can satisfy the torque requirements at the rated speeds.

The user can make some simple calculations to determine if a standard transmission can be supplied, and to note its physical configuration, in order to assist him in preliminary planning. For example, suppose that the user's requirements are as follows:

Input speed	650 rpm
Output speed	725 to 790 rpm
Output Torque	400 # inches minimum
Service Factor	1.25 minimum
Input/output relative direction of rotation.	same

1 – Determine a nominal power rating from the requirements

$$T = \frac{HP \ 63000}{RPM}$$

$$HP = \frac{T \times RPM}{63000} \times SF = 6.27$$

where HP is the output power required, T is 400 # inches, RPM is maximum output speed and SF is service factor.

2 – Using the Rating tables select a transmission which can furnish the required power.

A 1MDD unit will furnish 9 HP at a rated input speed of 900 rpm. Since the input speed will be 650 rpm, the power output will be reduced proportionally.

$$HP = \frac{650}{900} \times 9 = 6.50 \text{ which is adequate for the application}$$

Note that the Draw Range for this requirement is

$$100 \frac{(790-725)}{725} = 0.0897 \times 100 = 8.97\% \text{ approximately } 9\%$$

where Draw Range is the amount the maximum output speed exceeds the minimum output speed

$$\text{Draw Range (\%)} = \frac{100 (RPM \text{ max} - RPM \text{ min})}{RPM \text{ min}}$$

3 – Determine minimum and maximum output speeds of the selected transmission for this draw range.

$$\frac{900}{650} \times 725 = 1003.8 \text{ RPM minimum}$$

$$\frac{900}{650} \times 790 = 1093.8 \text{ RPM maximum}$$

where transmission rated input speed = 900 rpm and transmission operating speed = 650 rpm.

4 – Select closest standard speeds from rating table.

Since the user requires the same relative rotation between input and output shafts a Type A Style 1 transmission with output at Z is indicated. Enter the Type A Style 1 1MDDZ Table page 13 at 10% Draw Range (closest to 9% from step 2), and note that the closest standard minimum and maximum speeds are 999 and 1098 respectively. This means that the unit can supply the necessary torque at

$$\frac{650}{900} \times \text{Speed min (999)} = 721.5 \text{ RPM}$$

$$\frac{650}{900} \times \text{Speed max (1098)} = 793 \text{ RPM}$$

for an input speed of 650 rpm.

Note that the Draw Range is

$$100 \frac{(793-721.5)}{721.5} = 9.9\% \text{ which is slightly higher than the 8.97\% specified originally.}$$

The torque at the maximum speed will be

$$\frac{9 (63000)}{1098} = 516.4 \text{ # inches}$$

To summarize, the preliminary selection will supply

	Max Torque # inches	Min/Max Speed	Draw Range %
Actual	516.4	721.5 793	9.9
Specified	400	725 790	8.97

If absolutely necessary, the factory may be able to supply a non-standard gear set to more closely meet the specified requirements.

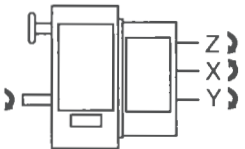
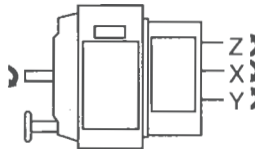
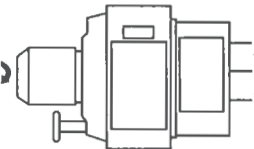
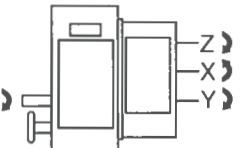
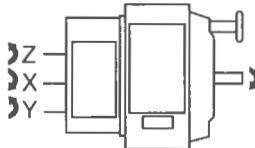
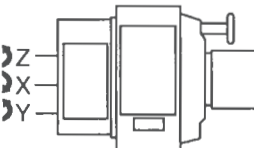
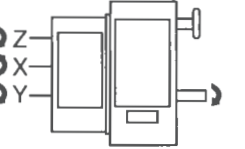
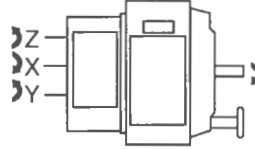
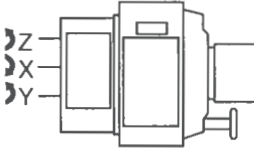
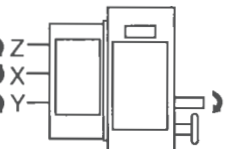
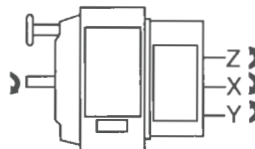
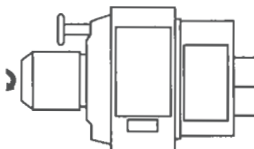
In the case of Type B, check to assure that the output speed range falls within that shown in the Table. In the case of a Type C, check with factory to determine whether or not the desired combination of shaft positions and output speed can be accommodated.

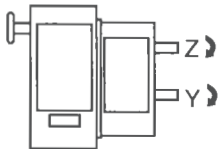
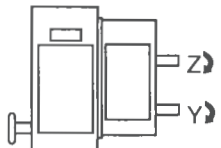
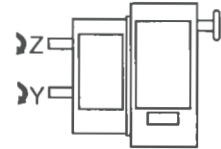
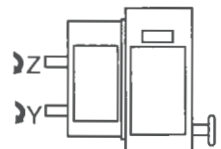
TRANSMISSION STYLES

TYPE "A"
Output @ Y, X or Z
See Model Number in rating table.

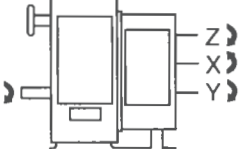
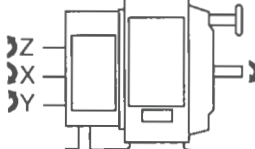
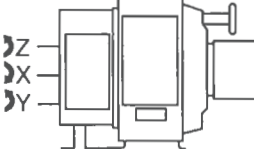
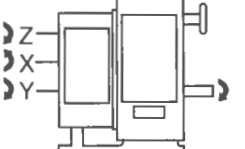
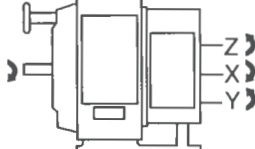
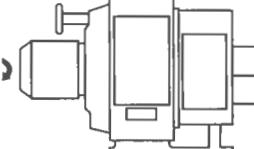
TYPE "B"
Input @ Y, Output @ Z

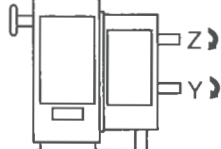
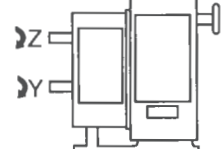
Horizontal Units (Top View)

STYLE I	STYLE II	STYLE III
 ASSEMBLY A	 ASSEMBLY 5	 ASSEMBLY 1
 ASSEMBLY B	 ASSEMBLY 6	 ASSEMBLY 2
 ASSEMBLY C	 ASSEMBLY 7	 ASSEMBLY 3
 ASSEMBLY D	 ASSEMBLY 8	 ASSEMBLY 4

STYLE I
 ASSEMBLY A
 ASSEMBLY B
 ASSEMBLY C
 ASSEMBLY D

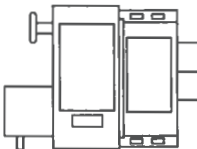
Vertical Units (Side View)

STYLE I	STYLE II	STYLE III
 ASSEMBLY A	 ASSEMBLY 6	 ASSEMBLY 2
 ASSEMBLY C	 ASSEMBLY 8	 ASSEMBLY 4

STYLE I
 ASSEMBLY A
 ASSEMBLY C

Right Angle
Input or Output

Consult
Factory
for Details.



SPECON 1/2 MDD-71 DIFFERENTIAL DRAW TRANSMISSION

OUTPUT POWER CAPACITY 4 1/2 HP MAX.

TYPE A, STYLE I

RATED INPUT SPEED — 720 RPM

CONTROL SCREW TURNS: — 71, 9.5
— 84, 8.8

DRAW OR SPEED RANGE AND OUTPUT RPM														
Model No.	4%		5½%		7½%		10%		15%		20%		Rotation Output vs. Input	Output Shaft Pos.
	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.		
½ MDDY-71	1364	1420	1339	1414	1308	1407	1271	1397	1198	1379	1132	1363	Same	Y
½ MDDX-71	2387	2485	2344	2474	2288	2462	2225	2444	2097	2413	1982	2385	Opp.	X
	1970	2050	1934	2041	1888	2031	1836	2017	1730	1991	1635	1968		
	1564	1628	1535	1621	1499	1613	1457	1602	1373	1581	1298	1563		
	1364	1420	1339	1414	1308	1407	1271	1397	1198	1379	1132	1363		
	1190	1239	1168	1234	1141	1228	1109	1219	1045	1203	988	1189		
	945	983	927	979	906	974	880	967	830	955	784	944		
	780	811	765	808	747	804	726	798	685	788	647	779		
	706	735	693	732	677	728	658	722	620	713	586	705		
	637	663	625	660	610	657	593	652	559	643	528	636		
	541	563	531	561	519	558	504	554	475	547	449	541		
	455	473	447	471	436	468	424	465	400	459	378	454		
½ MDDZ-71	2737	2849	2687	2837	2623	2823	2551	2802	2403	2766	2272	2734	Same	Z
	2301	2395	2259	2384	2205	2373	2144	2356	2020	2326	1910	2298		
	2259	2351	2218	2341	2165	2323	2105	2313	1983	2283	1785	2256		
	2083	2167	2045	2158	1996	2148	1941	2132	1829	2105	1729	2080		
	2058	2142	2020	2133	1973	2122	1918	2107	1807	2080	1708	2056		
	1795	1868	1762	1860	1721	1851	1673	1838	1576	1814	1490	1793		
	1793	1866	1760	1858	1719	1849	1671	1835	1574	1813	1488	1791		
	1719	1789	1688	1781	1648	1772	1602	1760	1510	1738	1427	1717		
	1564	1628	1535	1621	1505	1613	1457	1602	1373	1581	1298	1563		
	1364	1420	1339	1414	1308	1407	1271	1397	1198	1379	1132	1363		
	1190	1239	1168	1234	1141	1228	1109	1219	1045	1203	988	1189		
	1083	1127	1063	1122	1038	1117	1009	1109	951	1094	898	1081		
	1038	1081	1019	1076	995	1071	967	1063	912	1049	861	1037		
	1036	1079	1017	1074	994	1069	966	1062	910	1048	860	1036		
	905	942	887	938	867	933	843	926	794	914	751	904		
	893	930	877	926	857	921	832	915	785	903	741	893		
	823	857	809	854	790	850	768	844	723	833	684	823		
	809	842	794	838	775	834	753	828	710	817	671	808		
	729	760	716	757	700	753	680	747	641	738	606	729		
	718	747	704	744	688	740	669	735	630	725	595	717		
	680	708	667	705	652	701	633	697	597	688	564	679		
	621	646	609	643	595	640	578	636	545	627	515	620		
	616	641	604	638	590	635	574	630	541	622	511	615		
	592	617	581	614	568	611	552	607	520	599	492	592		
	555	578	545	576	533	573	518	569	488	561	461	555		
	541	563	531	561	519	558	504	554	475	547	449	541		
	536	558	526	556	514	553	500	549	471	542	445	536		
	521	542	512	540	500	537	486	534	458	527	433	520		
	484	504	475	501	464	499	451	495	425	489	401	483		
	472	492	463	489	453	487	440	484	415	477	392	472		
	455	473	447	471	436	468	424	465	400	459	378	454		
	411	428	404	426	395	424	383	421	361	416	341	411		
	397	413	390	411	381	409	370	406	349	401	329	396		
	375	390	368	388	360	387	349	384	329	379	311	374		
	346	359	340	358	332	356	322	354	304	349	287	345		
	315	327	309	326	302	324	294	322	277	318	262	314		
	309	322	304	321	297	319	288	317	272	313	257	309		
	280	291	275	290	269	289	261	287	246	283	232	280		
	260	270	255	269	249	267	243	266	229	262	216	259		
	253	263	248	262	243	261	235	259	222	255	210	252		
	236	245	231	243	226	242	220	240	207	237	196	234		
	215	224	211	223	206	222	200	220	189	217	178	215		
	213	221	209	220	204	218	198	217	187	214	177	212		
	181	187	178	187	173	186	169	184	159	182	150	180		
	152	157	149	157	146	156	142	155	134	153	126	151		

* Also available in Type B configuration. NOTE: Ranges shown in shaded area have limited Torque capacity — See Page 4

SPECON 1 MDD-66 DIFFERENTIAL DRAW TRANSMISSION

OUTPUT POWER CAPACITY 9 HP MAX.

TYPE A, STYLE I

RATED INPUT SPEED — 900 RPM

CONTROL SCREW TURNS: — 66, 12.5
— 84, 11.0

DRAW OR SPEED RANGE AND OUTPUT RPM

Model No.	3%		4%		5%		7½ %		10%		15%		20%		Rotation Output vs. Input	Output Shaft Pos.
	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.		
IMDDY-66	1720	1772	1708	1776	1688	1772	1636	1759	1588	1747	1497	1722	1422	1706	Same	Y
IMDDX-66	2169	2234	2154	2239	2129	2239	2063	2218	2003	2203	1888	2171	1793	2151	Opp.	X
	1958	1914	1845	1918	1823	1914	1767	1900	1715	1887	1617	1860	1536	1842		
	1720	1772	1708	1776	1688	1772	1636	1759	1588	1747	1497	1722	1422	1706		
	1593	1641	1582	1644	1563	1641	1515	1629	1471	1617	1386	1594	1317	1580		
	1364	1405	1355	1408	1339	1405	1298	1395	1260	1385	1188	1366	1178	1353		
	1165	1200	1157	1203	1144	1200	1108	1191	1076	1183	1014	1166	964	1155		
	836	861	830	862	820	861	795	854	772	848	727	836	691	828		
	765	788	759	780	750	787	728	782	706	776	666	765	632	758		
	634	653	629	654	622	653	603	648	585	643	552	634	524	628		
	2735	2817	2716	2824	2684	2817	2601	2797	2525	2778	2380	2738	2261	2712		
IMDDZ-66	2622	2700	2603	2706	2573	2700	2494	2681	2420	2662	2282	2624	2167	2600	Same	Z
	2400	2472	2383	2477	2355	2472	2282	2454	2215	2437	2088	2402	1984	2380		
	2357	2422	2335	2428	2308	2422	2236	2405	2171	2388	2047	2354	1944	2332		
	2267	2335	2251	2341	2225	2335	2156	2318	2093	2302	1973	2269	1874	2248		
	2169	2234	2154	2239	2129	2234	2063	2218	2003	2203	1888	2171	1793	2151		
	2075	2137	2060	2142	2036	2137	1973	2121	1915	2107	1806	2076	1715	2057		
	2014	2075	2000	2080	1977	2075	1916	2060	1860	2045	1753	2016	1666	1997		
	2006	2066	1992	2071	1969	2066	1908	2051	1852	2037	1746	2008	1658	1989		
	1880	1937	1867	1941	1845	1937	1788	1922	1736	1909	1636	1882	1555	1864		
	1858	1914	1845	1918	1823	1914	1767	1900	1715	1887	1617	1860	1536	1842		
	1720	1772	1708	1776	1688	1772	1636	1759	1588	1747	1497	1722	1422	1706		
	1593	1640	1582	1644	1563	1640	1515	1628	1470	1617	1386	1594	1317	1579		
	1475	1518	1465	1523	1448	1519	1403	1508	1362	1498	1284	1477	1220	1463		
	1469	1513	1459	1516	1442	1513	1397	1502	1356	1492	1279	1470	1215	1457		
	1364	1405	1355	1408	1339	1405	1298	1395	1260	1385	1188	1365	1128	1353		
	1263	1301	1254	1304	1240	1301	1201	1291	1166	1282	1099	1264	1044	1252		
	1258	1296	1250	1299	1235	1296	1197	1286	1162	1278	1095	1259	1041	1248		
	1165	1200	1157	1203	1144	1200	1108	1191	1076	1183	1014	1166	964	1155		
	1082	1114	1075	1117	1062	1114	1029	1106	999	1098	942	1083	895	1073		
	1079	1111	1071	1114	1059	1111	1027	1103	997	1096	939	1080	893	1070		
	1054	1085	1046	1087	1034	1085	1002	1077	973	1070	917	1054	871	1044		
	964	993	958	995	946	993	917	986	890	979	839	965	797	956		
	924	952	918	954	907	952	879	945	854	938	805	925	764	916		
	903	930	896	932	886	929	859	923	833	916	786	903	746	895		
	836	860	839	862	820	860	795	854	772	848	727	836	691	828		
	826	850	820	852	811	850	786	844	763	838	719	826	683	819		
	800	823	794	825	785	823	761	817	738	812	695	800	661	793		
	790	813	784	815	775	813	751	807	729	802	688	790	653	783		
	774	796	768	798	759	796	736	790	714	785	673	774	640	767		
	765	787	759	789	750	787	728	782	706	776	665	765	632	758		
	708	729	703	731	695	729	674	724	654	718	616	708	586	702		
	685	705	680	706	672	705	651	700	632	695	596	685	566	678		
	662	682	658	684	651	682	631	677	612	673	577	663	548	657		
	634	653	630	654	622	653	603	648	585	643	552	634	524	628		
	606	624	602	626	595	624	577	620	560	616	528	607	502	601		
	587	604	583	606	576	604	559	600	542	596	511	587	486	582		
	565	583	562	584	556	583	539	578	523	575	493	566	468	561		
	518	533	515	534	509	533	493	529	478	526	451	518	429	513		
	503	518	499	519	494	517	478	514	464	510	438	503	416	498		
	429	442	427	443	422	442	409	439	397	436	374	429	355	425		
	406	418	403	419	399	418	386	415	375	412	353	406	336	402		
	371	382	369	383	365	382	353	379	343	377	323	371	307	368		
	340	350	337	351	334	350	323	347	314	345	296	340	281	337		
	308	317	306	317	302	317	293	314	284	312	268	308	255	305		
	282	290	280	291	277	290	268	288	260	286	246	282	233	279		
	234	240	232	241	229	240	222	238	216	237	203	233	193	231		

* Also available in Type B configuration.

NOTE: Ranges shown in shaded area have limited Torque capacity — See Page 4

SPECON 2 MDD-66 DIFFERENTIAL DRAW TRANSMISSION

OUTPUT POWER CAPACITY 15 HP MAX.

TYPE A, STYLE I

RATED INPUT SPEED — 900 RPM

CONTROL SCREW TURNS: — 66, 9.8
— 84, 9.1

DRAW OR SPEED RANGE AND OUTPUT RPM																
Model No.	3%		4%		5%		7½ %		10%		15%		20%		Rotation Output vs. Input	Output Shaft Pos.
	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.		
2MDDY-66	1720	1772	1708	1776	1688	1772	1636	1759	1588	1747	1497	1722	1422	1706	Same	Y
2MDDX-66	1720	1772	1708	1776	1688	1772	1636	1759	1588	1747	1497	1722	1422	1706	Opp.	X
	1577	1624	1566	1627	1548	1624	1500	1612	1456	1601	1372	1578	1304	1563		
	1403	1445	1394	1448	1377	1445	1335	1434	1296	1425	1221	1404	1160	1391		
	1175	1210	1167	1213	1153	1210	1118	1201	1085	1193	1023	1176	972	1165		
	978	1006	971	1009	959	1006	930	999	903	992	851	978	808	969		
	860	886	854	888	844	886	818	879	794	873	749	861	711	853		
	703	723	698	725	689	723	668	718	649	713	611	703	581	696		
	607	625	603	627	596	625	578	621	561	616	529	607	502	602		
	2438	2511	2421	2516	2392	2511	2319	2492	2250	2475	2122	2440	2015	2417		
	2395	2466	2378	2472	2350	2466	2278	2448	2211	2431	2084	2397	1980	2374		
2MDDZ-66	1984	2048	1975	2053	1952	2048	1892	2033	1836	2019	1731	1990	1644	1972	Same	Z
	1954	2013	1941	2017	1918	2013	1859	1998	1804	1984	1701	1956	1616	1938		
	1720	1772	1708	1776	1688	1772	1636	1759	1588	1747	1497	1722	1422	1706		
	1577	1624	1566	1627	1548	1624	1500	1612	1456	1601	1372	1578	1304	1563		
	1530	1576	1520	1580	1502	1576	1456	1565	1413	1554	1332	1532	1265	1517		
	1446	1489	1436	1492	1419	1489	1375	1478	1335	1468	1258	1446	1195	1433		
	1403	1445	1394	1448	1377	1445	1335	1434	1296	1425	1221	1404	1160	1391		
	1286	1324	1277	1327	1262	1324	1223	1314	1187	1305	1119	1287	1063	1275		
	1175	1210	1167	1213	1153	1210	1118	1201	1085	1193	1023	1176	972	1165		
	1145	1179	1137	1181	1123	1179	1089	1170	1057	1162	996	1145	946	1135		
	1077	1109	1070	1112	1057	1109	1025	1101	995	1094	938	1078	891	1068		
	978	1006	971	1009	959	1006	930	999	903	992	851	978	808	969		
	959	987	952	989	941	987	912	980	885	973	834	959	792	950		
	896	922	890	925	879	922	852	916	827	909	780	896	741	888		
	860	886	854	888	844	886	818	879	794	873	749	861	711	853		
	803	826	797	828	788	826	764	820	741	815	699	803	664	796		
	797	821	792	823	783	821	758	815	736	809	694	798	659	790		
	789	812	783	814	774	812	750	806	728	800	686	789	652	781		
	703	723	698	725	689	723	668	718	649	713	611	703	581	696		
	668	687	663	689	655	687	635	682	616	677	581	668	552	662		
	644	663	639	664	632	663	612	658	594	653	560	644	532	638		
	607	625	603	627	596	625	578	621	561	616	529	607	502	602		
	588	605	584	606	577	605	559	600	543	596	512	588	486	582		
	573	589	569	591	562	589	545	585	529	581	499	573	474	568		
	556	572	552	573	545	572	528	567	513	564	484	555	459	550		
	496	510	491	511	486	510	471	506	458	503	431	495	410	491		
	489	503	486	504	480	503	465	499	451	496	426	489	404	484		
	480	494	476	495	471	494	456	490	443	487	418	480	397	475		
	430	443	427	444	422	443	409	439	397	436	375	430	356	426		
	415	427	412	428	407	427	395	424	383	421	361	415	343	411		
	399	411	396	411	392	411	380	408	369	405	347	399	330	395		
	351	361	349	362	345	361	334	359	324	356	306	351	291	348		
	345	355	343	356	339	355	328	352	319	350	301	345	286	342		
	304	312	302	313	298	312	289	310	281	308	265	304	251	301		
	287	295	285	295	282	295	273	293	265	291	250	286	237	284		
	248	255	246	256	244	255	236	253	229	251	216	248	205	245		
	215	220	213	221	211	220	204	219	198	217	187	214	178	212		

*Also available in Type B configuration.

NOTE: Ranges shown in shaded area have limited Torque capacity — See Page 4

SPECON 3 MDD-66 DIFFERENTIAL DRAW TRANSMISSION

OUTPUT POWER CAPACITY 22 1/2 HP MAX.

TYPE A, STYLE I

RATED INPUT SPEED — 900 RPM

CONTROL SCREW TURNS: — 66, 12.4
— 84, 11.7

DRAW OR SPEED RANGE AND OUTPUT RPM																
Model No.	3%		4%		5%		7½ %		10%		15%		20%		Rotation Output vs. Input	Output Shaft Pos.
	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.		
3MDDY-66	1720	1772	1708	1776	1688	1772	1636	1759	1588	1747	1497	1722	1422	1706	Same	Y
3MDDX-66	1720	1772	1708	1776	1688	1772	1636	1759	1588	1747	1497	1722	1422	1706	Opp.	X
	1486	1530	1475	1533	1458	1530	1413	1519	1372	1508	1293	1487	1228	1473		
	1346	1386	1337	1389	1321	1386	1280	1376	1243	1367	1172	1347	1113	1334		
	1159	1193	1150	1196	1137	1193	1102	1184	1070	1176	1008	1159	958	1148		
	892	919	886	921	876	919	849	912	824	906	777	893	738	884		
	754	776	749	778	740	776	718	771	696	765	657	755	624	748		
3MDDZ-66	671	690	666	692	658	690	638	685	619	697	584	671	555	665	Same	Z
	484	498	481	499	475	498	461	494	447	491	421	484	400	479		
	2288	2356	2272	2362	2245	2356	2176	2339	2112	2323	1991	2290	1892	2269		
	2035	2096	2021	2101	1997	2096	1936	2080	1879	2066	1771	2037	1683	2018		
	1720	1772	1708	1776	1688	1772	1636	1759	1588	1747	1497	1722	1422	1706		
	1558	1605	1547	1608	1529	1605	1482	1593	1439	1582	1356	1559	1288	1545		
	1486	1530	1475	1533	1458	1530	1413	1519	1372	1508	1293	1487	1228	1473		
	1346	1386	1337	1389	1321	1386	1280	1376	1243	1367	1172	1347	1113	1334		
	1283	1321	1274	1324	1259	1321	1220	1311	1184	1302	1117	1284	1061	1272		
	1162	1197	1154	1200	1141	1197	1106	1188	1073	1180	1012	1163	961	1152		
	1159	1193	1150	1196	1137	1193	1102	1184	1070	1176	1008	1159	958	1148		
	1054	1085	1046	1087	1034	1085	1002	1077	973	1069	917	1054	871	1044		
	1000	1030	993	1032	982	1030	952	1022	924	1015	871	1001	827	991		
	892	919	886	921	876	919	849	912	824	906	777	893	738	884		
	780	803	775	805	766	803	742	797	720	792	679	781	645	733		
	771	793	765	795	756	793	733	787	711	782	671	771	637	764		
	754	776	749	778	740	776	718	771	696	765	657	755	624	748		
	698	719	693	720	685	719	664	713	645	709	608	698	577	692		
	671	690	666	692	658	690	638	685	619	697	584	671	555	665		
	652	671	647	672	639	671	620	666	602	661	567	652	539	646		
	601	619	597	620	590	619	572	614	555	610	523	601	497	595		
	590	607	586	609	579	607	562	603	545	599	514	590	488	585		
	579	596	575	598	569	596	551	592	535	588	504	579	479	574		
	525	540	521	541	515	540	499	536	485	533	457	525	434	520		
	508	523	505	524	499	523	483	519	469	515	442	508	420	503		
	484	498	481	499	475	498	461	494	447	491	421	484	400	479		
	463	476	460	477	454	476	440	473	428	470	403	463	383	459		
	452	465	449	466	444	465	430	461	417	458	393	452	374	447		
	418	430	415	431	410	430	398	427	386	424	364	418	346	414		
	391	403	389	403	384	403	372	400	361	397	341	391	324	388		
	379	390	376	391	372	390	360	387	350	385	330	379	313	376		
	348	358	346	359	342	358	331	355	321	353	303	348	288	345		
	331	340	329	341	325	340	315	338	306	335	288	331	274	328		
	326	335	324	336	320	335	310	333	301	331	284	326	270	323		
	294	302	292	303	289	302	280	300	272	298	256	294	243	291		
	262	269	260	270	257	269	249	267	242	265	228	261	216	259		
	251	258	250	259	247	258	239	256	232	254	219	251	208	249		
	212	218	211	219	209	218	202	217	196	215	185	212	176	210		
	189	194	188	194	185	194	180	192	174	191	164	188	156	187		
	136	140	135	140	134	140	130	139	126	138	119	136	113	135		

For Type B speeds consult factory.

NOTE: Ranges shown in shaded area have limited Torque capacity — See Page 4

SPECON 3 MDD-66 DIFFERENTIAL DRAW TRANSMISSION OUTPUT POWER CAPACITY 22½ HP MAX.

TYPE B, STYLE I

RATED INPUT SPEED — 900 RPM

CONTROL SCREW TURNS: 66 12.4,
84 11.7

ROTATION: OUTPUT VS INPUT SAME
INPUT SHAFT AT POSITON Y, OUTPUT SHAFT AT POSITION Z

	DRAW OR SPEED RANGE AND OUTPUT RPM													
Model No.	3%		4%		5%		7½%		10%		15%		20%	
	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
3MDD	1554	1601	1543	1604	1522	1599	1478	1588	1431	1576	1352	1555	1283	1539
	1335	1376	1328	1381	1309	1376	1274	1366	1232	1356	1163	1337	1104	1324
	1210	1247	1204	1251	1187	1247	1151	1238	1116	1229	1054	1212	1000	1200
	1046	1077	1039	1080	1025	1077	995	1069	964	1061	910	1047	864	1037
	903	930	898	933	885	930	859	923	832	917	786	904	746	895
	818	843	813	845	802	843	779	837	754	831	712	819	676	811
	704	725	700	728	690	725	670	720	649	715	613	705	582	698
	542	559	539	560	531	558	516	554	500	550	472	543	448	538
	458	472	456	474	449	472	436	469	423	466	399	459	379	455
	408	420	405	421	399	420	388	417	376	414	355	408	337	404
	294	303	292	304	288	303	280	301	271	298	256	294	243	292

SPECON 4 MDD-66 DIFFERENTIAL DRAW TRANSMISSION OUTPUT POWER CAPACITY 30 HP MAX.

TYPE A, STYLE I

RATED INPUT SPEED — 720 RPM

CONTROL SCREW TURNS: 13.9

DRAW OR SPEED RANGE AND OUTPUT RPM																
Model No.	4%		5½ %		7%		10%		13%		16%		25%		Rotation Output vs. Input	Output Shaft Pos.
	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.		
4MDDY-66	1365	1421	1341	1415	1313	1408	1270	1397	1221	1384	1181	1370	1070	1345	Same	Y
4MDDX-66	1365	1421	1341	1415	1313	1408	1270	1397	1221	1384	1181	1370	1070	1345	Opp.	X
	1001	1042	983	1038	963	1033	931	1024	895	1015	866	1005	785	986		
	723	752	710	749	695	745	672	740	646	733	625	725	566	712		
	446	464	438	462	429	460	415	456	399	452	386	447	349	439		
4MDDZ-66	1365	1421	1341	1415	1313	1408	1270	1397	1221	1384	1181	1370	1070	1345	Same	Z
	1001	1042	983	1038	963	1033	931	1024	895	1015	866	1005	785	986		
	985	1026	968	1022	948	1016	917	1009	881	999	853	989	772	971		
	734	764	721	761	706	757	683	751	657	744	635	737	575	723		
	723	752	710	749	695	745	672	740	646	733	625	725	566	712		
	608	633	597	630	585	627	566	622	544	616	526	610	476	599		
	530	552	521	549	510	547	493	542	474	537	458	532	415	522		
	446	464	438	462	429	460	415	456	399	452	386	447	349	439		
	383	398	376	397	368	395	356	392	342	388	331	384	300	377		
	327	340	321	339	314	337	304	335	292	331	283	328	256	322		
	236	246	232	245	227	243	220	241	211	239	204	237	185	233		
	146	152	143	151	140	150	135	149	130	148	126	146	114	143		

For Type B speeds consult factory.

NOTE: Ranges shown in shaded area have limited Torque capacity — See Page 4

SPECON 5 MDD-66 DIFFERENTIAL DRAW TRANSMISSION OUTPUT POWER CAPACITY 45 HP MAX.

TYPE A, STYLE I

RATED INPUT SPEED — 720 RPM

CONTROL SCREW TURNS: 15.5

DRAW OR SPEED RANGE AND OUTPUT RPM																
Model No.	4%		5½ %		7%		10%		13%		16%		25%		Rotation Output vs. Input	Output Shaft Pos.
	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.		
5MDDY-66	1365	1421	1341	1415	1313	1408	1270	1397	1221	1384	1181	1370	1070	1345	Same	Y
5MDDX-66	1365	1421	1341	1415	1313	1408	1270	1397	1221	1384	1181	1370	1070	1345	Opp.	X
	934	972	918	968	898	963	869	956	835	947	808	937	732	920		
	715	744	702	741	688	738	665	732	640	725	619	718	560	705		
	341	355	335	354	328	352	318	349	305	346	295	343	268	336		
5MDDZ-66	1365	1421	1341	1415	1313	1408	1270	1397	1221	1384	1181	1370	1070	1345	Same	Z
	1045	1088	1027	1083	1005	1078	972	1070	935	1060	904	1049	819	1030		
	934	972	918	968	898	963	869	956	835	947	808	937	732	920		
	715	744	702	741	688	738	665	732	640	725	619	718	560	705		
	490	509	481	507	471	504	455	501	438	496	423	491	383	482		
	375	390	368	388	360	386	348	383	335	380	324	376	294	369		
	341	355	335	354	328	352	318	349	305	346	295	343	268	336		
	233	243	229	242	225	241	217	239	209	237	202	234	183	230		
	179	186	176	185	172	184	166	183	160	181	155	179	140	176		
	85	89	84	88	82	88	79	87	76	87	74	86	67	84		

For Type B speeds consult factory.

NOTE: Ranges shown in shaded area have limited Torque capacity — See Page 4

SELECTION TABLE FOR TYPE A SPECON 6MDD TRANSMISSION INPUT AND OUTPUT ON OPPOSITE SIDES

MAX. OUTPUT 75 HP			Nominal Draw and Typical Output Speeds					Rated Input Speed		Control Screw Turns
			5%	7½ %	10%	15%	20%	Style I	Style II	
MODEL 6MDD	Y		934-984	902-975	871-967	809-952	750-938	500	Consult Factory	25.4
	X	Min.	226-237	218-235	210-233	195-230	181-226			
		Max.	2400-2530	2320-2505	2240-2485	2080-2445	1930-2410			
	Z	Min.	54.5-57.0	52.5-57.0	50.5-56.0	47.0-55.5	44.0-54.5			
		Max.	2400-2530	2320-2505	2240-2485	2080-2445	1930-2410			

For Type B speeds consult factory.

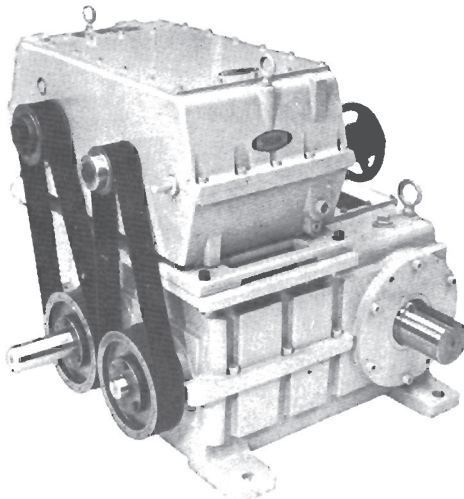
NOTE: See Page 3 for Torque limitations

SELECTION TABLE FOR TYPE C SPECON MDD TRANSMISSIONS [“PIGGY-BACK” ARRANGEMENT] INPUT AND OUTPUT OPTIONAL

MODEL DESIGNATION		Nominal Draw and Output Speed Ranges					Input Speeds
		5%	7½ %	10%	15%	20%	
MAX. OUTPUT 3.5 HP							
½ DD	Min.	238-250	231-250	225-250	212-250	200-250	750
	Max.	2850-3000	2770-3000	2700-3000	2550-3000	2400-3000	2250
MAX. OUTPUT 150 HP							
8DD	Min.	238-250	231-250	225-250	212-250	200-250	600
	Max.	2850-3000	2770-3000	2700-3000	2250-3000	2400-3000	1800

Same Input Speed Ranges, Nominal Draw and Output Speed Ranges as shown for Model ½ DD, 3.5 HP apply to the following:

Model	1DD	2DD	3DD	5DD	6DD
Max. Output HP	6	12	25	50	80



Piggy-Back Arrangement
Typical of Specon Type C
Differential Draw Transmissions

FIGURE 11

OPTIONS

The Specon Transmission is normally supplied with the standard manual control. Other types of control, such as remote, vernier, remote vernier, lever, electrical, pneumatic and hydraulic are available.

MANUAL CONTROL

Specon transmissions are normally supplied with a hand knob on the adjusting screw for normal manual adjustment. The adjusting knob includes an indicator mechanism which accurately indicates turns and parts of turns of the adjusting screw. Output speed setting is a definite function of adjusting screw turns and thus the handwheel indicator accurately reflects output speed setting or ratio.

MECHANICAL REMOTE CONTROL

Mechanical Remote Control is an indicator and hand-wheel assembly which can be remotely mounted from the transmission. It can be connected by roller chain or flexible shafting to the adjusting screw of the transmission. Thus normal manual control can be achieved from a remote position.

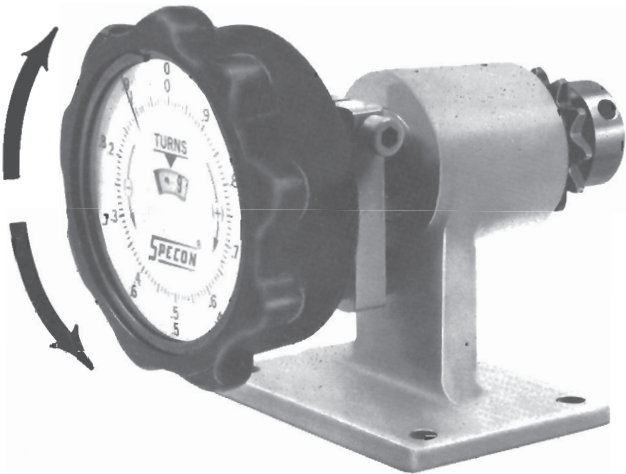


FIGURE 12

VERNIER CONTROL

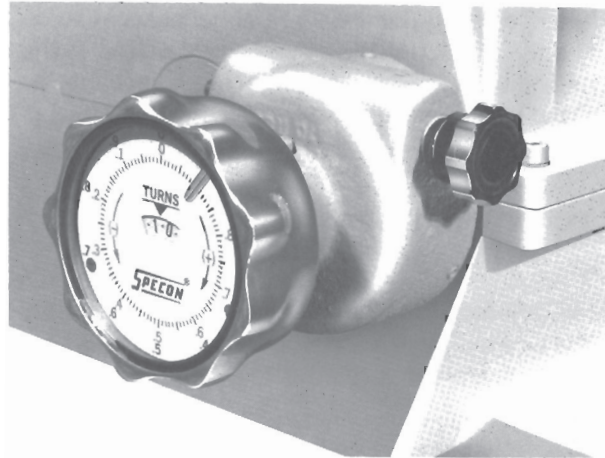


FIGURE 13

Vernier Control consists of a small worm and worm gear package connected to the adjusting screw which permits finer adjusting of output speed per turn of the adjusting hand knob.

The worm gear ratio can be provided either in a $7\frac{1}{2}:1$ or a $30:1$ ratio. The vernier control package contains both a rough and fine adjusting handwheel. This control can be provided as an integral part of the Specon transmission, in which case it is located at the adjusting screw position. The same accurate indicating handwheel as is used on the remote control can be used on the course adjusting shaft of the vernier control. Thus a fine degree of repeatability can be achieved.

REMOTE VERNIER CONTROL

The Remote Vernier control accessory utilizes the same construction and offers the same features as the integral vernier control. It can, however, be remotely mounted from the transmission and connected to the adjusting screw of the transmission by roller chain or flexible shafting. The remote vernier control also has a coarse adjusting handwheel and a fine adjusting handwheel.

PRELOADING

Specon transmissions can, as an option, be provided with preloaded control levers. This preloading feature incorporates a tension or compression spring between the control levers of the transmission which preloads the control mechanism and reduces the play resulting from manufacturing and assembly tolerances.

The overall effect of this feature is to improve the operating accuracy of the transmission under constant load conditions.

When specifying preloading, it is necessary to also define the position of the control screw relative to the constant speed or variable speed shaft and whether the load is a normal driving or overhauling load.

ELECTRIC REMOTE CONTROL

Electric Remote Control can also be made available on the Specon Transmission. The remote control consists of a reversible gear head motor with a very slow output speed.

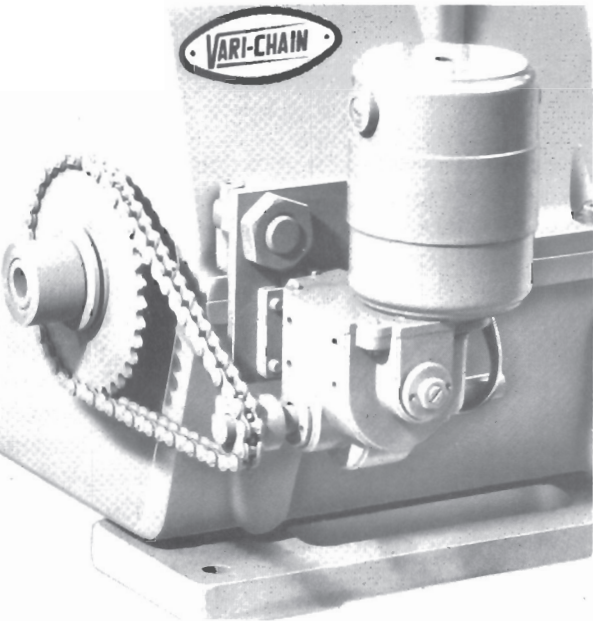
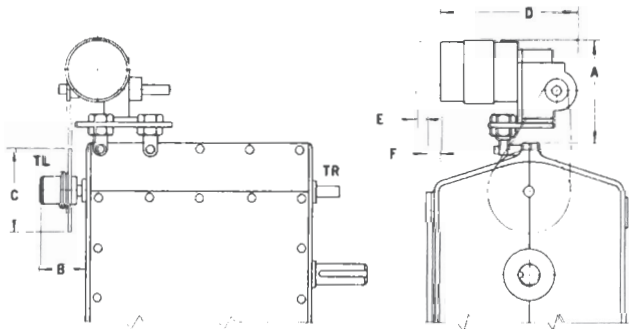


FIGURE 14



Unit Size	A	B	C	D	E	F
0	5 ⁷ / ₁₆	1 ⁷ / ₈	3 ¹⁵ / ₁₆	7 ³ / ₈	1 ¹ / ₂	
1/2	5 ³ / ₈	1 ⁷ / ₈	3 ¹⁵ / ₁₆	7 ³ / ₈	7 ¹ / ₁₆	
1	5 ³ / ₈	2 ¹ / ₂	3 ¹⁵ / ₁₆	7 ³ / ₈	7 ¹ / ₁₆	
2	5 ³ / ₈	2 ¹ / ₂	4 ³³ / ₆₄	7 ³ / ₈		3 ³ / ₄
3	5 ¹ / ₄	2 ¹ / ₂	4 ³³ / ₆₄	7 ³ / ₈		1 ³ / ₈
4	6 ³ / ₄	2 ⁵ / ₈	4 ³³ / ₆₄	13 ¹³ / ₁₆	2 ¹ / ₈	
5	6 ³ / ₄	2 ⁵ / ₈	4 ³³ / ₆₄	13 ¹³ / ₁₆	5 ⁵ / ₈	

FIGURE 15

The output shaft of the gear head motor is connected to the adjusting screw with roller chain. A mechanical slip clutch is included to protect the control and motor when the control levers in the unit have reached the end of travel. Electric service can be 115 or 230V A/C or D/C single phase or 230V to 575V multiphase A/C.

PNEUMATIC CONTROL

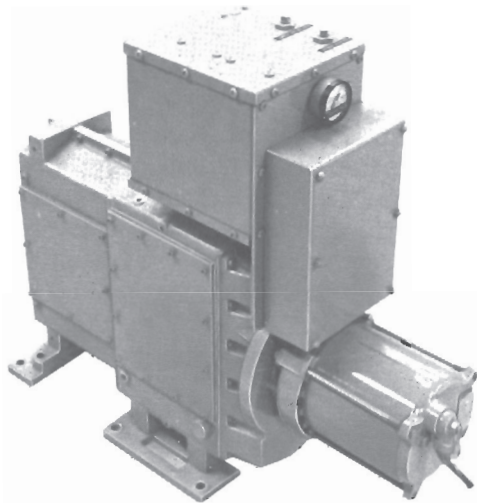


FIGURE 16

Recommended for operation in an explosive atmosphere or on automatic control loops or where rapid response is desirable. Three types of pneumatic controls are available:

1. Reversible air motor with pushbutton station for remote operator control. By appropriate use of pneumatic relays, remote control from several hundred feet can be achieved.
2. Design consisting of an air motor and appropriate interconnected pressure regulators, relays and valves requiring standard signal pressures such as 3-15 PSI to control through full speed range of transmission.
3. Pneumatic cylinder used with right angle lever control for continuous speed range changes. Signal pressure 3-15 PSI.

Systems 2 & 3 are suitable for automatic control systems requiring only 3-15 PSI signal pressure from a process controlling element.

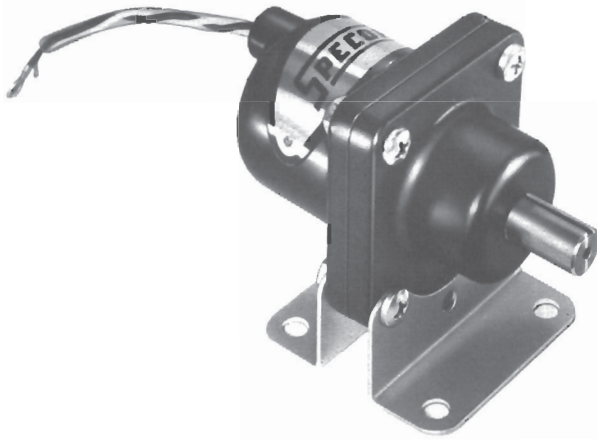


FIGURE 17

The Specon tachometer-generator and readout system is designed for industrial applications. The panel mount indicator may be calibrated in RPM, FPM, or other units. Typical ranges available are 0-100, 0-250, 0-500, 0-1000 and 0-2000 RPM with a calibrated system accuracy within 1% of full scale reading. The generator is enclosed in a weatherproof housing with a 1/2" diameter output shaft extension, bearing mounted and designed for industrial applications.

The generator may be furnished with a bracket for remote mounting or direct flange mounted units are also available when ordered as part of a Specon variable speed transmission.

ORDERING INFORMATION

ORDERING

When ordering, specify: Size and designation, type, style, assembly, type of mounting, speed requirements, draw range, and controls required. (For Style III units specify motor HP and motor electrical characteristics.) For example, to order a Style I:

Specon 5MDDZ-66 Type A Style I, Assembly A,
Horizontal Input speed 720 RPM

Output speed — 665-732 RPM. 10% draw.

Equipped with — (List control required).



ISO 2015 Certified

