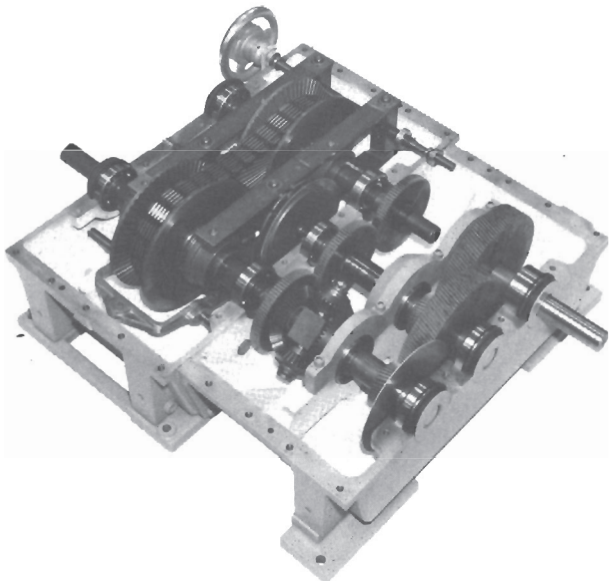
Catalog 202G

CANDY CONTROLS®

SPECON®

MECHANICAL DIFFERENTIAL WIDE SPEED RANGE TRANSMISSIONS



APPLICATIONS

Specon MD variable speed transmissions are complete units consisting of positive-drive variable speed mechanisms in combination with gear boxes which incorporate bevel gear differential assemblies.

for:

- Pump Drives
- Extractor Drives
- Machine Tool Drive
- Screw Conveyors
- Winder Drives

FEATURES

- Smallest size to Horsepower ratio of currently available power transmission devices
- Entirely mechanical, of all metal construction
- Uses unique non slip chain, anti friction bearings and high quality spur and bevel gearing
- Integral design makes use of single or double reduction output gearing
- Transmission contains no friction elements which can slip and wear
- Common reservoir used for splash lubrication of moving parts.

BENEFITS

- Conserves space in industrial processing or manufacturing plants
- Suitable for operation in explosive atmospheres
- Assures positive transmission of power
- Eliminates additional reducers
- Extends life of transmission
- Maintenance limited to gearbox

SPECIFICATIONS

CAPACITIES AND RATINGS

The real advantage of the SPECON MDX and MDY transmission arrangements are in their ultra-wide speed range (infinite including zero speed). Speed range is not limited to 10:1, 100:1, 1000:1 or even 1,000,000:1. Speed adjustment and control down to and including zero RPM is possible. Obviously, the number of applications at zero RPM is limited but applications requiring 20:1, 50:1 and 100:1 speed range are common. Some of the applications in which wide speed ranges are required are Lear drives, conveyors, glass drawing machines, prime movers and winding machines.

On winding applications, the ability to transmit torque at zero speed is advantageous since this permits tension to be maintained on the web when it is stopped.

Maximum output speeds obtainable range from 100 to 7000 rpm and transmissions are available in six sizes from 1 to 10 horsepower capacity. The selection tables list the styles in which horizontal or vertical MD transmissions are available.

The Style I configuration incorporates the basic transmission.

Style II configuration incorporates the basic transmission and one integrally housed gear set. The gearing can be step-up or reduction at the input side of the transmission. Style II units can also be direct coupled to driving motors.

Style III configuration incorporates the basic transmission with an integrally mounted drive motor through an input gear set.

NOTE: Output horsepower and maximum output RPM ratings are based on maximum input speeds for Style I units. For other input speeds, the user should contact Fairchild so that the proper reduction or step-up gearing can be applied to the basic transmission (Style II unit) to meet application requirements.

When transmissions are operated at lower input speeds than those shown for Style I units, the power and output speeds will decrease in direct proportion to input speed reduction.

Speed and torque capacities given in this data sheet refer to the standard gear ratios available. If output speed and/or torque capacities differing from those listed are required, special internal gearing can be incorporated, subject only to the space available within the casing.

SPEED CHARACTERISTICS

Speed adjustment is accomplished by a stepless control screw which allows smooth adjustment of speed throughout the entire range and shockless acceleration from zero.

Remote speed setting, mechanical or electrical is available.

If the spider of the differential was driven at a speed of 720 RPM and one side gear at 360 RPM, the resultant speed at the other side gear would be:

$$2 \times S_s = S_{sG1} + S_{sG2}$$

$$2 \times 720 = 360 + S_{sG2}$$

$$1080 = S_{sG2}$$

By changing the speed at sG1 from 360 to 1440 RPM, the speed at the side gear #2 becomes:

$$2 \times 720 = 1440 + S_{sG2}$$

$$S_{sG^2} = 0 \text{ RPM}$$

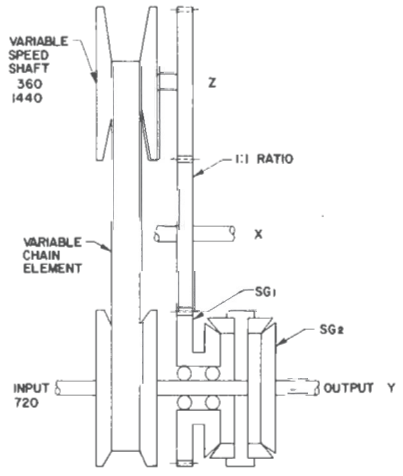


Figure 1
Specon MDX Transmission

The two modes of operation are shown in Figure 2. The nomograph looks like an X and, therefore, the designation MDX transmission.

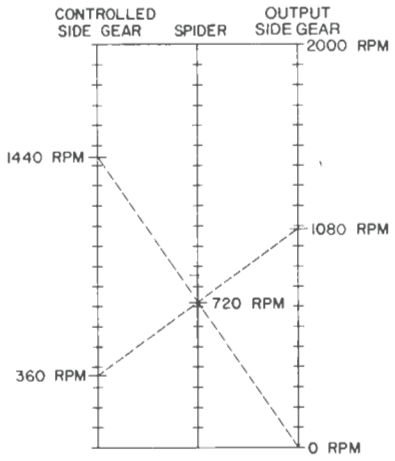


Figure 2
MDX Transmission Nomograph

It is apparent that if the speed at the one side gear can be infinitely adjusted from 360 to 1440 RPM, the speed at the opposite side gear will be controlled through a range from 0 to 1080 RPM. By connecting a differential assembly and a variable belt or chain as shown, the constant speed source and the adjustable speed control at the side gear is achieved. Thus, the secondary input gear is controlled through a 4:1 speed range and the output side gear is consequently adjustable from 1080 RPM to and including 0 RPM. It should be emphasized that at the zero speed condition no slippage is occurring, but rather, this is a natural result of the speed phenomenon of the differential. Except for the output gear and shaft, all other parts of the differential and variable ratio device are operating at a rated speed condition. The transmission could, thus, be operated at the 0 RPM output setting or at any setting near zero for any length of time without causing damage to any component.

If the input is applied to the constant speed shaft the two modes of operation shown in Figure 4 are obtained. The nomograph looks like a Y and, therefore, the designation MDY transmission.

OPERATING ACCURACY — Figure 2A

Variation in speed ratio or setting as the result of load changes is a function of variations within the VARI-CHAIN unit which are reflected directly to the spider by the 1:1 ratio gearing. For the MDY unit, output speed variation from no load to full load will be less than 5% for output speeds greater than 10 percent of rated speed.

For the MDX unit, output speed variation from no load to full load will be less than 10% for output speeds greater than 25% of rated speed. If operation down to or near zero is important with better accuracy, consult factory.

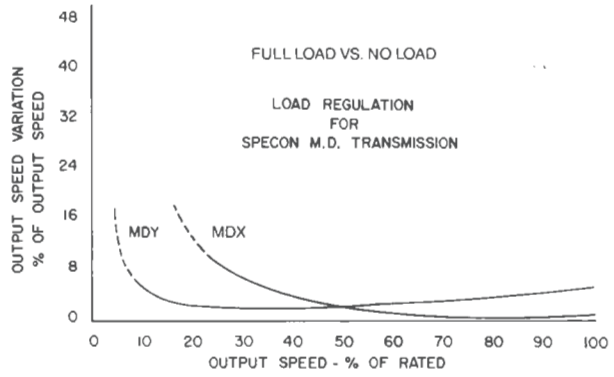


Figure 2A

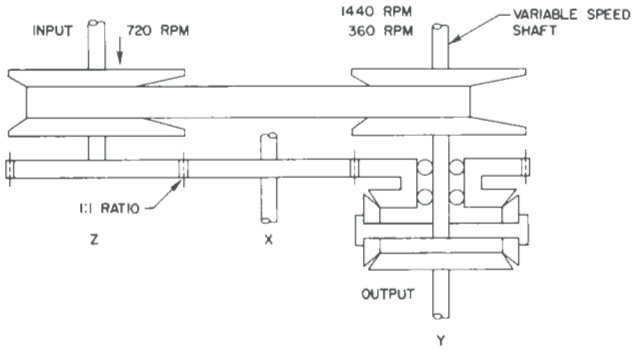


Figure 3
Specon MDY Transmission

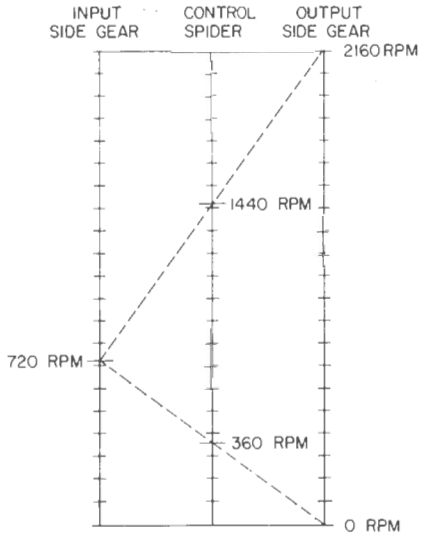


Figure 4
MDY Transmission Nomograph

TORQUE CAPACITY

A unit of this type has torque transmitting capacity throughout its speed range even at zero output speed. It is interesting to determine how this occurs. This can be determined best from working from the known rated torque capacity of the variable chain element. It is typical that a variable pitch chain with a 4:1 ratio such as is used with a differential transmission will have approximately twice the torque capacity at the minimum speed setting at the variable speed shaft than it has at the maximum speed setting. For this analysis

assume that these torque ratings at the variable speed shaft of the variable chain element are 65#" at maximum speed and 140#" at minimum speed. As there is a 1:1 gear connection from this variable speed shaft to the controlled side gear of the differential, the reflected torque capacity to this side gear is 65#" when it is driven at 1440 RPM and 140#" when its speed is 360 RPM. Referring to the previous speed analysis, the output side gear speed is 1080 RPM and the drive controlled side gear speed is 360 RPM. Since the torques at both side gears are always equal, the reflected torque capacity of the variable speed shaft to the output side gear when it is operating at 1080 RPM will be 140#". The reflected torque capacity at the output side gear when it is operating at 0 RPM will be 65#". Knowing these speeds and torques, the power distribution through such a transmission when operating at full rated capacity at each speed extreme is shown on the accompanying sketch as well as being tabulated below.

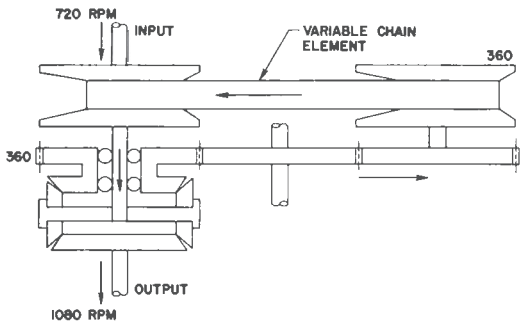


Figure 5
MDX Transmission Power Flow
Maximum Output Speed

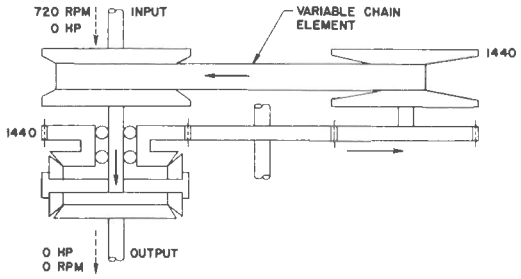


Figure 6
MDX Transmission Power Flow
Zero Output Speed

sion efficiency is assumed, power flow into the transmission under these conditions would also be zero. In actual practice only the small amount of input power required to overcome friction losses is needed. It is apparent therefore, that input power is not a good reference for transmission loading.

The transmission arrangement described above is unique in that output torque capacity decreases from 100% to 50% of maximum rated as output speed deceases from 100% to 0%.

OUTPUT SIDE GEAR			CONTROLLED SIDE GEAR			SPIDER		
RPM	Torque	HP	RPM	Torque	HP	RPM	Torque	HP
1080	140#"	2.4	360	140#"	0.8	720	280#"	3.2
0	65#"	0	1440	65#"	1.5	720	130#"	1.5

Note that in this transmission arrangement the power being circulated through the variable chain element is greater at 0 RPM output than it is at 1080 RPM output. Note further that the power in and out of the differential assembly itself is equal, as well as the power in and out of the complete transmission being equal. Thus, at zero output speed with a torque load of 65#", the power out of the transmission is 0 HP. As power is a direct function of torque and speed and even though there is torque being transmitted, there is no motion and, thus, no output power being transmitted. If 100% transmis-

The opposite effect – that is, torque capacity increasing as output speed decreases – can also be achieved as it is in the Specon MDY wide range transmission. If the differential and variable speed elements are connected such that the spider element is controlled through a 4:1 speed range and one side gear is driven at a constant speed, this torque/speed characteristic is achieved. Such a connection is shown along with power flow through this arrangement. Speeds, torques, and power of the various differential elements are tabulated below.

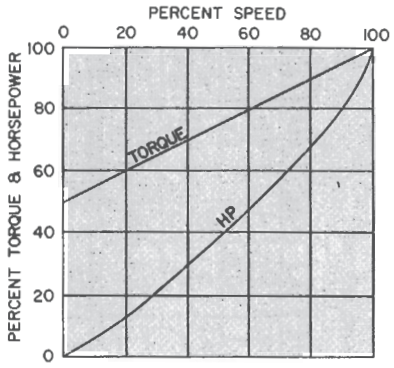


Figure 7
MDX Transmission Speed and Torque

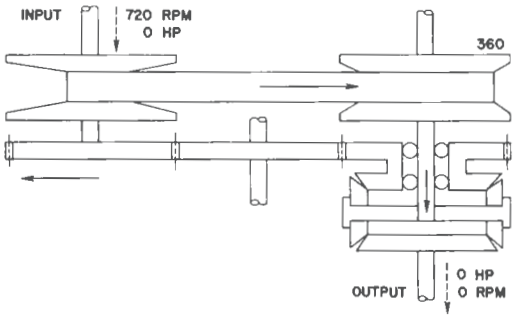


Figure 9
MDY Transmission Power Flow
Zero Output Speed

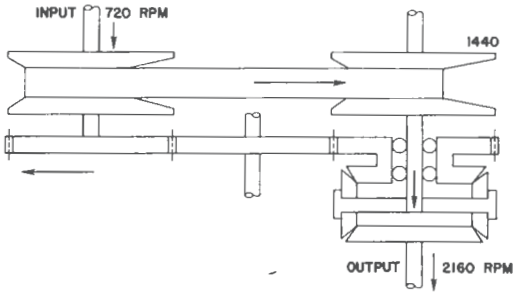


Figure 8
MDY Transmission Power Flow
Maximum Output Speed

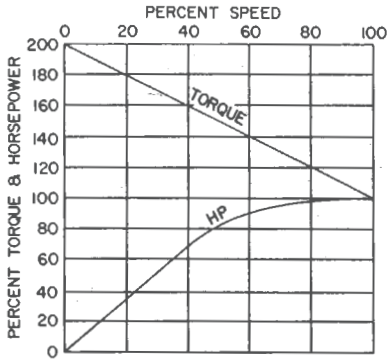
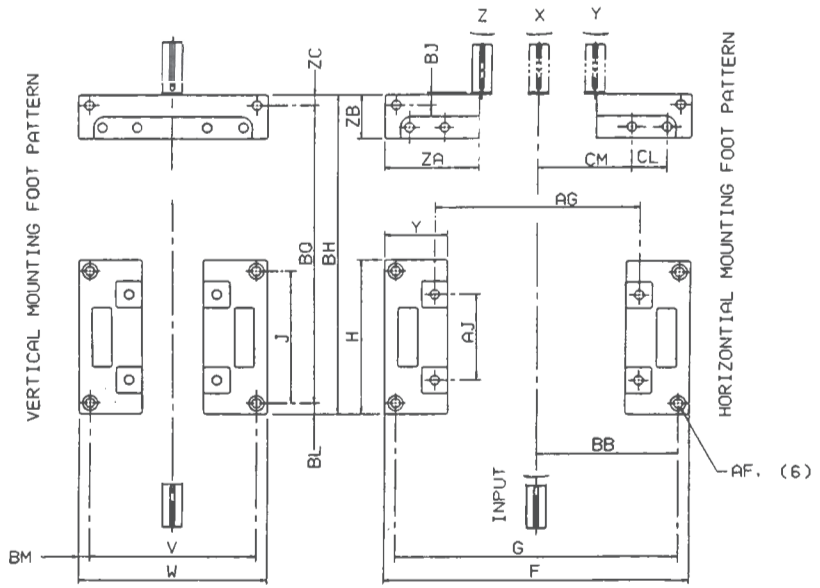


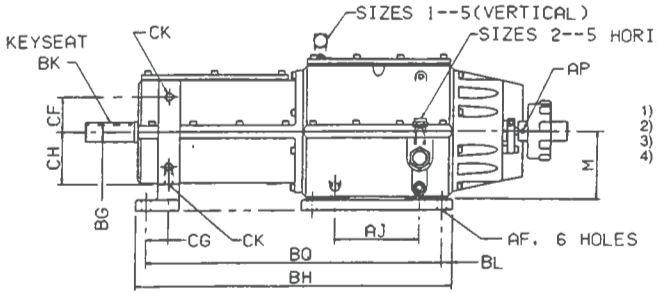
Figure 10
MDY Transmission Speed and Torque

OUTPUT SIDE GEAR			CONTROLLED SIDE GEAR			SPIDER		
RPM	Torque	HP	RPM	Torque	HP	RPM	Torque	HP
2160	32.5#"	1.11	720	32.5#"	0.4	1440	65#"	1.5
0	70#"	0	720	70#"	0.8	360	140#"	0.8

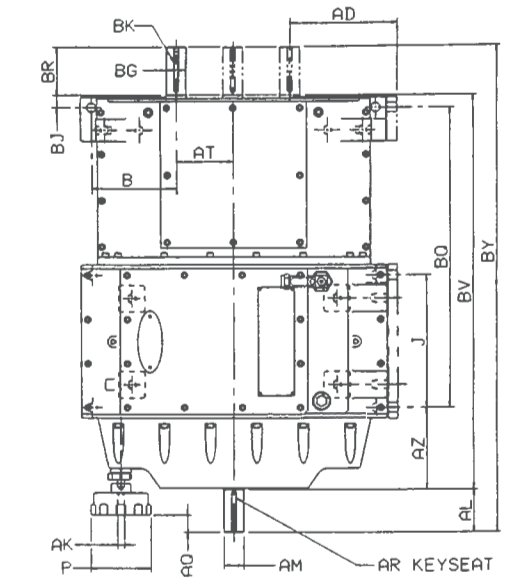
Notice that the power flow through the variable speed chain is the same for both arrangements.

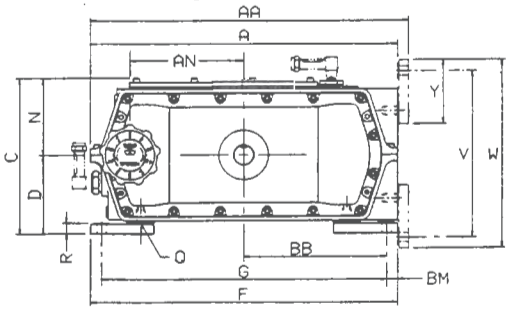
STYLE II MD WIDE SPEED RANGE TRANSMISSIONS





NOTES:
1) Shaft Tolerance + .0000 – .0005
2) Other Dimensions Shown ± 1/16
3) (*) Feet Integrally cast on Model 1/2 MDD-71
4) For shaft position see assembly arrangements on page 11



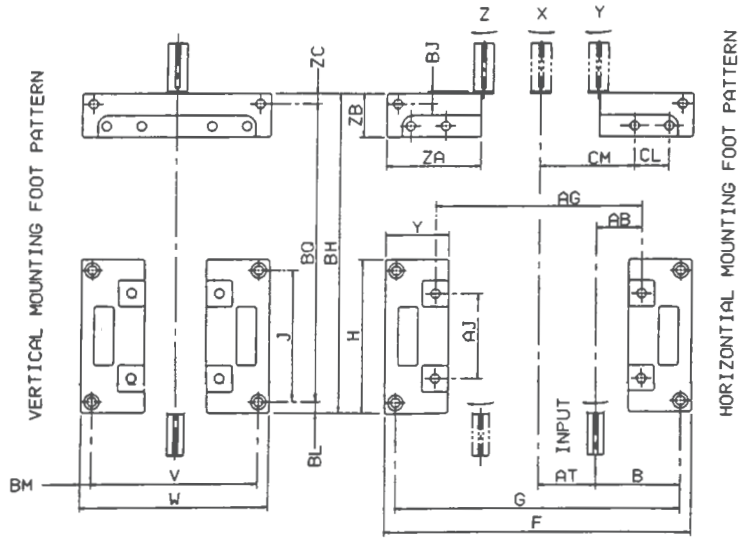


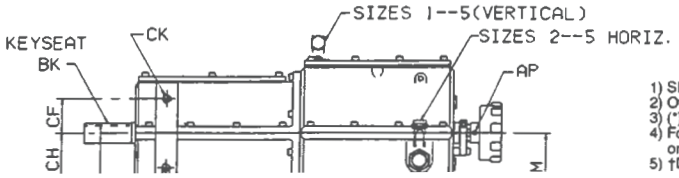
Drawing No. DSK 1227

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
3	26 3/8	7 5/8	13 9/16	7	26 3/4	25 1/2	14 1/8	12 1/4	6	6 3/8	6	1/2	7/8	14 7/8	16 1/8	5	27 3/8	9	17/32	18 5/8	9	3 7/16	1 1/2	10 15/32	3/4
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	17/32	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	9/16	9 1/2	10 3/4	3 5/8	18 1/8	6 1/8	17/32	11 3/4	4 7/8	2 7/16	1 1/8	6 1/2	15/16
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	17/32	*	*	2	1	5 7/8	1 9/32

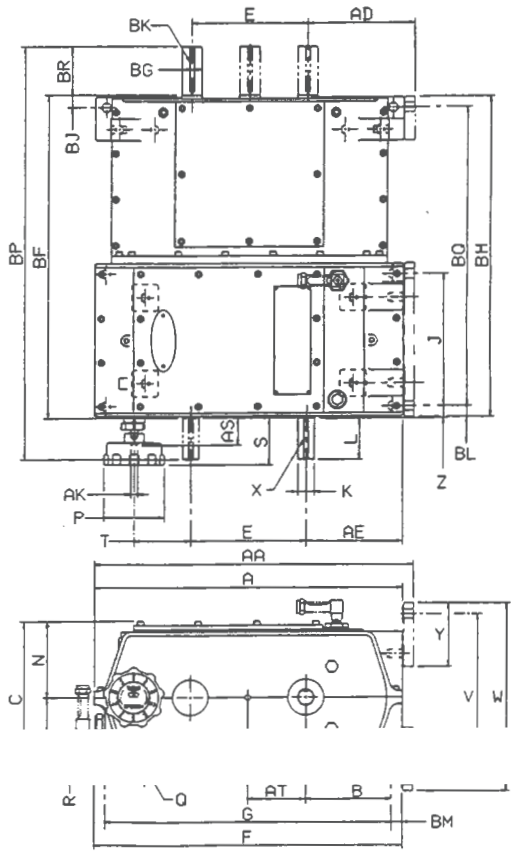
Size	AR	AT	AZ	BB	BG	BH	BJ	BK	BL	BM	BQ	BR	BU	BV	BY	CF	CG	CH	CK	AK	ZA	ZB	ZC
3	3/8 x 3/16 x 3 3/16	5 1/8	5 7/16	12 3/4	1 3/8	26 1/4	1 3/16	5/16 x 5/32 x 3 1/2	15/16	5/8	24 5/16	3 7/8		30 15/16	38 1/4	3 1/2	1 1/2	5 1/16	1/2-13	.551	8	3 1/2	1
2	1/4 x 1/8 x 2 5/8	4 5/16	5 9/16	10 9/16	1 3/8	23 1/16	7/8	5/16 x 5/32 x 2 3/4	13/16	13/16	21 1/2	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		22 3/8	27 9/16	2	1 9/32	3	1/2-13	.394	5 3/8	2 1/2	19/32
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	1 9/16	3/16 x 3/32 x 2	11/16	3/4	11	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

STYLE I MD WIDE SPEED RANGE TRANSMISSIONS





NOTES:
1) Shaft Tolerance + .0000 − .0005
2) Other Dimensions Shown ±1/16
3) (*) Feet Integrally cast on Model ½ MDD-71
4) For shaft position see assembly arrangements on page 11
5) †Dimensions for Types A and B are the same



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
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	1 5/16	3 1/2	6	6 9/16	6	1/2-13	1	3 5/8	5 3/8	14 7/8	16 1/8	5/16 x 5/32 x 3 1/2	5	15/16	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	1/2-13	1	2 9/16	4 13/32	12	13 5/8	1/4 x 1/8 x 2 5/8	4 3/8	1	23 3/4	3 9/16	8 1/16	7 1/16
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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	3/16 x 3/32 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
3	17/32	18 5/8	9	.551	1/4-20 Set Sc	1 1/2	5 1/8	26 7/16	1 3/8	26 1/4	1 3/16	5/16 x 5/32 x 3 1/2	15/16	5/8	33 13/16	24 5/16	3 7/8	3 1/2	1 1/2	5 1/16	1/2-13	2 1/2	8 13/16	8	3 1/2	1
2	17/32	15 3/4	7 3/4	.551		1 3/8	4 5/16	23 3/8	1 3/8	23 1/16	7/8	5/16 x 5/32 x 2 3/4	13/16	13/16	29 1/8	21 1/2	3	2 9/32	1 1/4	4 3/16	1/2-13	2 1/32	6 27/32	6 13/16	2 1/2	3/4
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1/2	17/32	*	*	.375		1 1/8	2 3/4	14 1/2	7/8	12 5/16	1 9/16	3/16 x 3/32 x 2	11/16	3/4	18 3/8	11	2	2 3/8	*	2 15/16	1/2-13	1 9/16	4 13/16	4 7/8	1 1/4	5/8

PRINCIPLES OF OPERATION

The feature which allows the power and speed to be reduced to zero is the bevel gear differential consisting of a spider carrying one or more freely running bevel pinions and two bevel side gears which mesh with the spider pinions with a 1:1 gear connection to the bearing mounted side gear. The spider shaft and both side gears can absorb or deliver power. Principles of SPECON Differential gearing are covered in SPECON Bulletin 204B.

All wide speed range transmissions have input and output shafts on opposite sides with output shaft positions designated as X, Y, and Z. For an MDX configuration (low speed/low torque, high speed/high torque) the input is applied to the differential shaft. This configuration is available with the output shaft at Y position (Fig. 13) for no gear set, output shaft at X position (Fig. 14) for one gear set, and output shaft at Z position (Fig. 15) for 2 gear sets. Gear set ratios are assembled at the factory to meet the requirements shown in the rating tables.

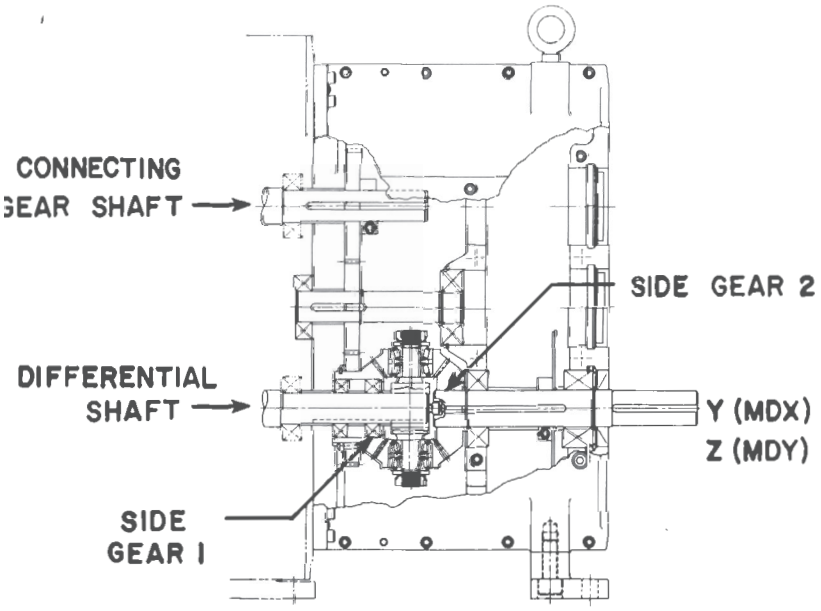


Figure 13

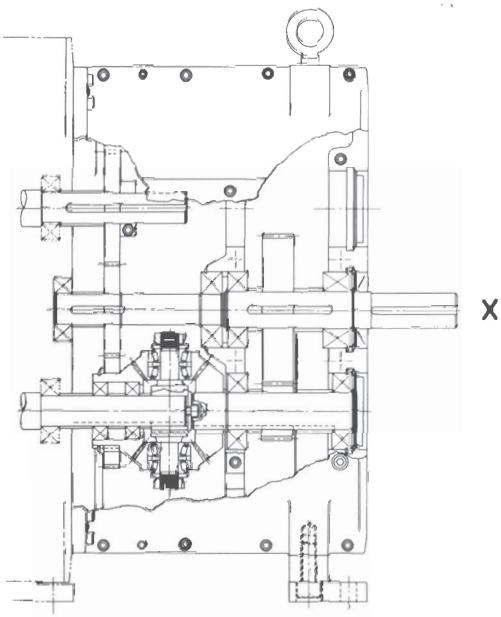


Figure 14

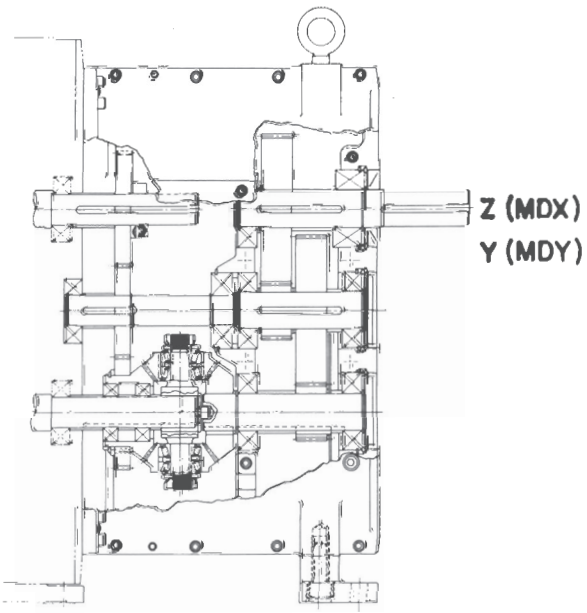


Figure 15

Table I

TYPE	Input applied to	Output shaft for no gear set	Output shaft for one gear set	Output shaft for two gear sets
MDX	Differential shaft	Y Figure 13	X Figure 14	Z Figure 15
MDY	Connecting gear shaft	Z Figure 13	X Figure 14	Y Figure 15

For an MDY configuration (low speed/high torque, high speed/low torque) the input is applied to the connecting gear shaft. This configuration is available with output shaft at Z position (Fig.13)for no gear set, output shaft at X position (Fig.14) for one gear set, and output shaft at Y position (Fig.15) for two gear sets. This is summarized in Table 1.

SHUNT CONNECTED ARRANGEMENT

Operating Principles
(see page 25 for Rating)

For applications requiring ranges of more than 20%, greater power capacity and additional accuracy can be obtained by using a shunt connected differential arrangement. Ranges of from ± 10% to ± 50% can be incorporated into this type of unit.

One particular advantage of the shunt connected arrangement is its ability to provide operating accuracy greater than that available with variable speed elements customarily used to obtain such broad ranges. (See VARI-CHAIN catalog 207.)

The SHUNT CONNECTED arrangement (VCD) consists of a VARI-CHAIN and differential gearing arranged so that the VARI-CHAIN unit is driven from the output shaft. For this arrangement, the input is constant and the output is variable.

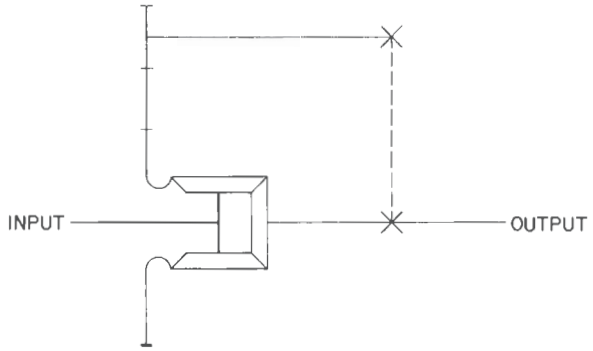


Figure 16

The governing relationship for the shunt connected draw arrangement is

$$\text{Speed output} = \frac{S_{input}(R)}{1+(R)}$$

Where (R) is the ratio of VARI-CHAIN and connecting gears.
Assuming a ratio of 2:1, and input speed of 1350 RPM,

$$\text{Speed output} = \frac{2(1350)2}{1+2} \text{ or 1800 rpm at maximum speed}$$

$$= \frac{2(1350)\frac{1}{2}}{1+\frac{1}{2}} \text{ or 900 rpm at minimum speed}$$

Note that for R high, the output is high and for R low the output speed is low.

For a shunt connected arrangement (Number 3 VARI-CHAIN, 4:1 range) the unit range is 2:1 and:

VARI-CHAIN Torque capacity pound inches	Maximum speed	Minimum speed
	250	495

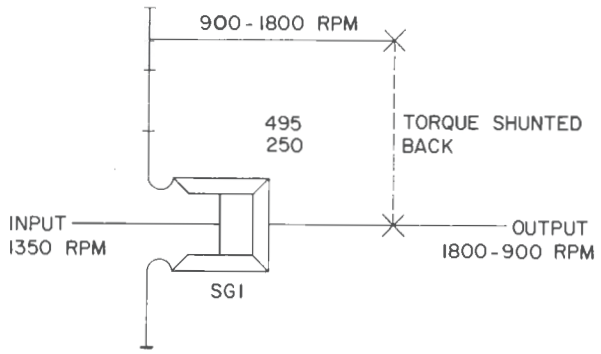


Figure 17

Output Speed	*Side Gear Torque pound inches	Spider Torque pound inches
900	250	500
1800	495	990

*For connecting gear ratio equals 1:1

$$HP_{900} = \frac{500(1350)}{63000} \text{ or } 10.7$$

$$HP_{1800} = \frac{990(1350)}{63000} \text{ or } 21.2$$

For the VARI-CHAIN alone (See Catalog 207), Size 3 Unit

Output Speed	Horsepower
1800	7.1
450	3.6

The VARI-CHAIN range is 450-1800 or 4:1. The shunt connected range is 900-1800 or 2:1. In this case range has been reduced to ½ but the Horsepower capacity has been increased by 3.

	VARI-CHAIN	Shunt Connected
Speed Range	4:1	2:1
HP capacity min speed	3.6	10.7
HP capacity max speed	7.1	21.2

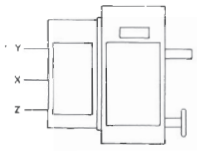
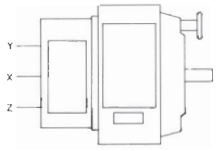
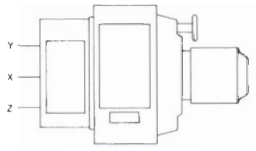
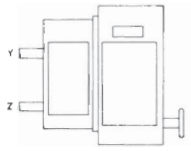
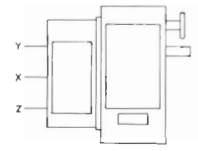
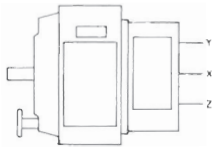
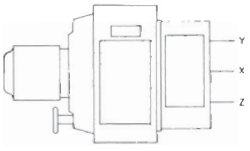
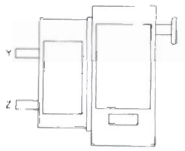
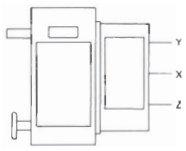
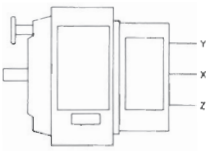
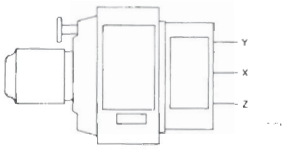
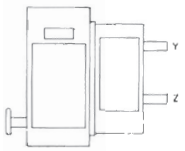
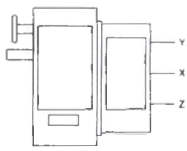
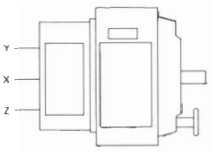
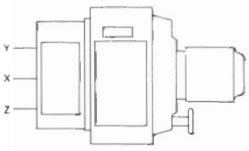
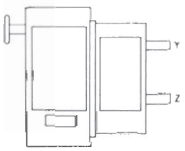
Typically for the size 3 shunt connected arrangement (VCD) the speed ranges that are obtainable are:

		Speed	
Speed Range	% Change	Minimum	Maximum
1.4:1	40	1280	1800
2:1	100	900	1800
2.5:1	150	720	1800

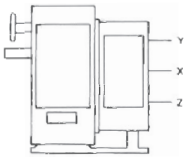
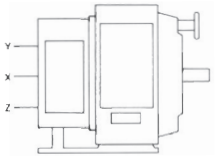
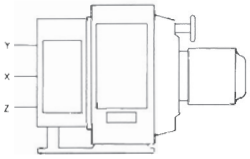
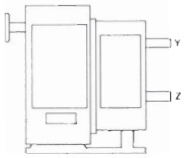
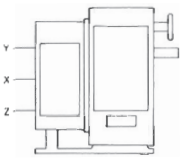
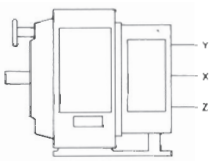
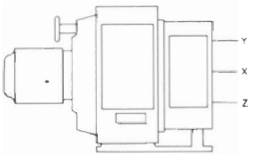
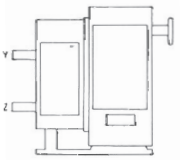
Specifications for the Size 3, 4, and 5 VCD units are included in the rating table for the Mechanical Differential (MD) units, p. 25

MDY Horizontal Units (Top View)

TRANSMISSION STYLES

TYPE "A" Output @ Y, X or Z See Model Number in rating table.			TYPE "B" Input @ Z, Output @ Y (MDY)
STYLE I	STYLE II	STYLE III	STYLE I
 ASSEMBLY A	 ASSEMBLY 5	 ASSEMBLY 1	 ASSEMBLY A
 ASSEMBLY B	 ASSEMBLY 6	 ASSEMBLY 2	 ASSEMBLY B
 ASSEMBLY C	 ASSEMBLY 7	 ASSEMBLY 3	 ASSEMBLY C
 ASSEMBLY D	 ASSEMBLY 8	 ASSEMBLY 4	 ASSEMBLY D

MDY Vertical Units (Front View)

 ASSEMBLY D	 ASSEMBLY 5	 ASSEMBLY 1	 ASSEMBLY D
 ASSEMBLY B	 ASSEMBLY 7	 ASSEMBLY 3	 ASSEMBLY B

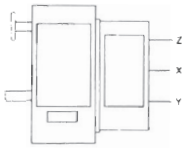
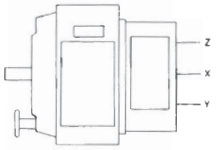
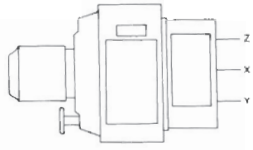
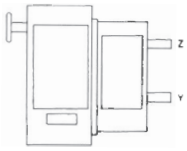
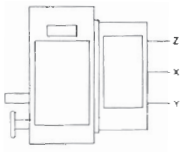
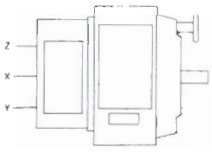
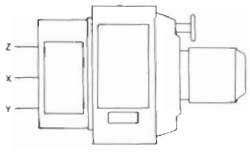
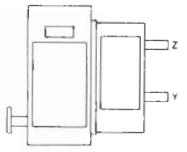
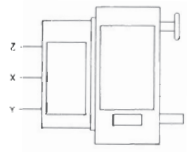
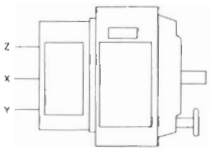
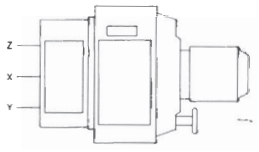
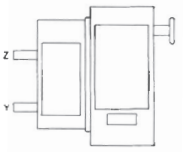
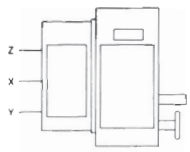
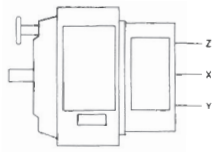
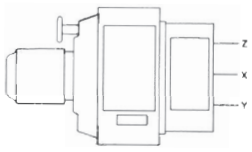
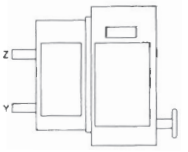
The diagrams show the combinations of shaft and control wheel locations for all standard styles and sizes of MD transmissions; dimensions of the whole range are given on pages 6 and 7.

Optional controls can be supplied. The alternatives include lever control, mechanical remote control, integral and remote vernier control, electrical remote control, and automatic hydraulic and pneumatic controls.

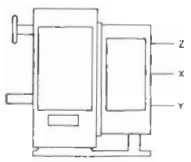
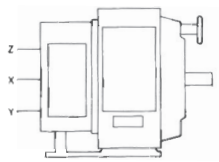
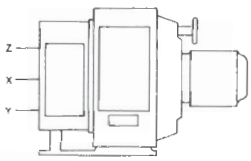
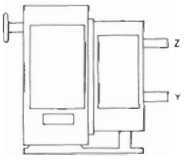
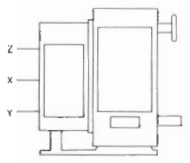
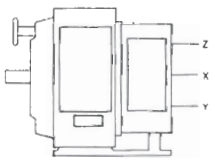
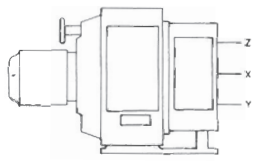
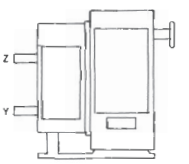
Sales engineers are ready to visit your plant to assist in the selection of the standard unit best suited to your requirements or to investigate modifications or special designs to meet specifications for unusual applications.

Other assemblies not shown are available with special lubrication systems.

MDX Horizontal Units (Top View)

TYPE "A" Output @ Y, X or Z See Model Number in rating table.			TYPE "B" Input @ Y, Output @ Z (MDX)
STYLE I	STYLE II	STYLE III	STYLE I
 ASSEMBLY A	 ASSEMBLY 5	 ASSEMBLY 1	 ASSEMBLY A
 ASSEMBLY B	 ASSEMBLY 6	 ASSEMBLY 2	 ASSEMBLY B
 ASSEMBLY C	 ASSEMBLY 7	 ASSEMBLY 3	 ASSEMBLY C
 ASSEMBLY D	 ASSEMBLY 8	 ASSEMBLY 4	 ASSEMBLY D

MDX Vertical Units (Front View)

 ASSEMBLY A	 ASSEMBLY 6	 ASSEMBLY 2	 ASSEMBLY A
 ASSEMBLY C	 ASSEMBLY 8	 ASSEMBLY 4	 ASSEMBLY C

STYLE AND ASSEMBLY CONFIGURATION

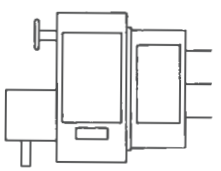
Select a style I, II, or III transmission in accordance with the application speed and power requirements.

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 either a vertical or a horizontal mounting.

Right Angle Input or Output

Consult Factory for Details.



SELECTION

To select a transmission, first, from the application determine the type, the assembly configuration referring to configuration drawing, and then follow the steps below consulting the proper selection table.

POWER RATING

- From the characteristics of the driven machine and its application, determine the power demand at maximum speed.
- Determine the variation of torque demand with speed change of the driven machine. If torque decreases as speed increases select an MDY transmission. If torque increases as speed increases, select an MDX transmission.

Considering the intended usage, determine service factor from the following table.

Application	Service Factor
Normal operation – infrequent starts	1.0
Continuous operation or frequent starts	1.33
Continuous operation and frequent starts	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. For example, if the driven machine requires 10 HP and makes frequent starts, the transmission required power rating would be 1.33 x 10 = 13.3 HP. If torque increases as speed increases a 4MDX-66 transmission (Max. HP 13.89) would be selected.

SPEED AND RANGE

Assuming a 4MDX-66 transmission is selected, determine the rated input speed from the 4MDX-66 table. If the input driving shaft speed is less than 10% or greater than 10% of the rated speed, a Style II transmission will be required to maintain rated horsepower. Check with factory to determine whether the desired combination of shaft position and output speed can be accommodated.

Note that the 4MDX-66 table shows a Y, X and Z output shaft position. The user should determine the relationship between the output and input shaft rotation and make a selection based on this requirement. In addition, only one maximum output speed choice is available for the Y position since for this case the input shaft is coupled directly to the differential (there is no room for intermediate gearing in the VARI-CHAIN unit). Also, there are considerably more choices for the Z output position because of the additional space available for gear sets.

Where maximum output RPM is the same for Z and Y shaft position, choice is made based on the shaft position preference.

Select the transmission maximum output RPM and note the output torque (in/lb) at min. and max. speed. Compare output torques on curve in the section on Torque Capacity for the MDX transmission to machine characteristics at several intermediate points to insure that transmission characteristics are capable of meeting machine requirements. For example, if a 4MDX66-Z with maximum output of 481 RPM has been selected note that output torque in lb./in. at min. and max. speed is 909 lb./in. and 1819 lb. inches respectively. At 50% of rated speed, machine torque requirements should be 1364 lb./in. or less, and at 75% of rated speed,machine torque requirements should be 1591 lb./in. or less.

SERVICE INFORMATION

A list of replacement parts and instructions for servicing the wide speed range transmission are available in the Installation, Operating and Maintenance Instructions Bulletin 202 and Bulletin 207 or 207-84 (as applicable).

RATING TABLE

MAXIMUM OUTPUT POWER CAPACITY 1.11 HP
Control Screw Turns 8.8

RATED INPUT SPEED 720 RPM

MODEL NO.	OUTPUT RPM MIN	OUTPUT RPM MAX	OUTPUT TORQUE LB. IN MIN SPEED	OUTPUT TORQUE LB. IN MAX SPEED	OUTPUT SHAFT POSITION	ROTATION OUTPUT VS INPUT
½MDY71-Z*	0	2160	70	32.5	Z	SAME
all ½MDY71-X	0	3120	48.5	22.5	X	OPPOSITE
	0	2476	61	28		
	0	2160	70	32.5		
	0	1885	80	37		
	0	1496	101	47		
	0	1234	122	57		
	0	1117	135	63		
	0	1008	150	70		
	0	857	176	82		
	0	720	210	97.5		
½MDY71-Y	0	3297	46	21.3	Y	SAME
	0	2721	55.5	26		
	0	2476	61	28		
	0	2160	70	32.5		
	0	1885	80	37		
	0	1714	88	41		
	0	1643	92	43		
	0	1641	92	43		
	0	1432	106	49		
	0	1414	107	50		
	0	1304	116	54		
	0	1280	118	55		
	0	1211	125	58		
	0	1155	131	61		
	0	1136	133	62		
	0	1076	140	65		
	0	982	154	71		
	0	974	155	72		
	0	938	161	75		
	0	879	172	80		
	0	857	176	82		
	0	849	178	83		
	0	825	183	85		
	0	766	197	92		
	0	747	202	94		
	0	720	210	97.5		
	0	651	232	108		
	0	628	241	112		

*CAN BE TYPE B Z and X only — input at Y
Typical for all MDY's

MODEL NO.	OUTPUT RPM MIN	OUTPUT RPM MAX	OUTPUT TORQUE LB. IN MIN SPEED	OUTPUT TORQUE LB. IN MAX SPEED	OUTPUT SHAFT POSITION	ROTATION OUTPUT VS INPUT
½MDY71-Y	0	593	255	118	Y	SAME
	0	547	276	128		
	0	498	303	141		
	0	489	309	143		
	0	443	341	158		
	0	411	368	171		
	0	400	378	175		
	0	372	406	188		
	0	340	444	206		
	0	336	450	209		
	0	285	529	246		
	0	240	630	292		

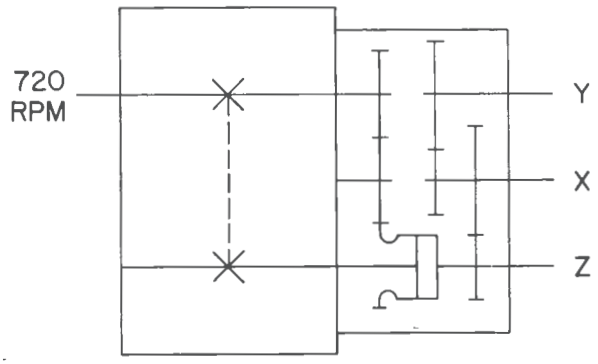


Figure 18

MAXIMUM OUTPUT POWER CAPACITY 2.4 HP
Control Screw Turns 7.1

RATED INPUT SPEED 720 RPM

MODEL NO.	OUTPUT RPM MIN	OUTPUT RPM MAX	OUTPUT TORQUE LB. IN MIN SPEED	OUTPUT TORQUE LB. IN MAX SPEED	OUTPUT SHAFT POSITION	ROTATION OUTPUT VS INPUT
½MDX71-Y	0	1080	65	140	Y	SAME
	0	1890	37	80		
	0	1560	45	97		
	0	1238	56	122		
	0	1080	65	140		
*	0	942	74	160		
½MDX71-X	0	748	94	202	X	OPPOSITE
	0	617	114	245		
	0	559	125	270		
	0	504	139	300		
	0	429	163	352		
	0	360	195	420		
	0	2166	32	70		
*	0	1821	38	93		
	0	1788	39	84		
*	0	1649	42	92		
	0	1629	43	93		
	0	1421	49	106		
	0	1419	49	106		
*	0	1361	51	111		
	0	1238	56	122		
	0	1080	65	140		
*	0	942	74	160		
	0	857	34	176		
*	0	822	85	184		
	0	821	85	184		
	0	716	98	211		
	0	707	99	214		
*	0	652	108	232		
	0	640	110	236		
	0	605	116	250		
	0	578	121	262		
	0	568	124	266		
*	0	538	130	281		
½MDX71-Z	0	491	143	308	Z	SAME
*	0	487	144	310		
	0	469	149	322		
*	0	440	160	344		
	0	428	164	353		

*CAN BE TYPE B

MODEL NO.	OUTPUT RPM MIN	OUTPUT RPM MAX	OUTPUT TORQUE LB. IN MIN SPEED	OUTPUT TORQUE LB. IN MAX SPEED	OUTPUT SHAFT POSITION	ROTATION OUTPUT VS INPUT
	0	424	165	356		
	0	413	170	366		
	0	383	183	395		
*	0	374	188	404		
	0	360	195	420		
	0	326	215	464		
*	0	314	223	481		
	0	297	237	510		
½MDX71-Z	0	274	256	552	Z	SAME
	0	249	282	607		
	0	245	286	617		
	0	222	316	682		
	0	206	341	735		
	0	200	351	756		
	0	186	377	812		
	0	170	413	889		
	0	168	418	900		
	0	144	491	1058		
	0	120	585	1260		

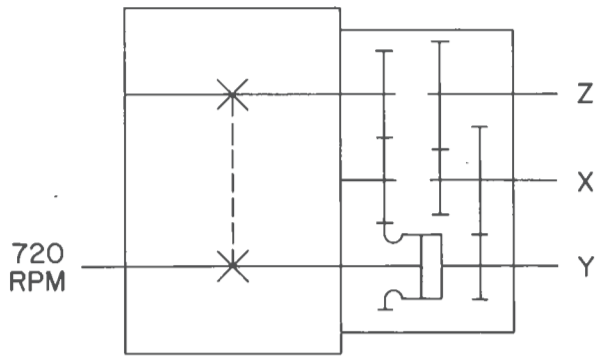


Figure 19

MAXIMUM OUTPUT POWER CAPACITY 2.14 HP
Control Screw Turns 11

RATED INPUT SPEED 900 RPM

MODEL NO.	OUTPUT RPM MIN	OUTPUT RPM MAX	OUTPUT TORQUE LB. IN MIN SPEED	OUTPUT TORQUE LB. IN MAX SPEED	OUTPUT SHAFT POSITION	ROTATION OUTPUT VS INPUT
1MDY66-Z*	0	2700	100	50	Z	SAME
all 1MDY66-X	0	2700	100	50	X	OPPOSITE
	0	2500	108	54		
	0	2141	126	63		
	0	1829	148	74		
	0	1311	206	103		
	0	1200	225	112		
	0	994	271	136		
1MDY66-Y	0	2700	100	50	Y	SAME
	0	2500	108	64		
	0	2314	117	58		
	0	2305	117	58		
	0	2141	126	63		
	0	1982	136	68		
	0	1975	137	68		
	0	1829	148	74		
	0	1698	159	79		
	0	1694	159	80		
	0	1653	163	82		
	0	1513	178	89		
	0	1450	186	93		
	0	1416	190	95		
	0	1311	206	103		
	0	1296	208	104		
	0	1254	215	107		
	0	1239	218	109		
	0	1214	222	111		
	0	1200	225	112		
	0	1111	243	121		
	0	1074	251	125		
	0	1040	260	130		
	0	994	271	136		
	0	951	284	142		
	0	921	293	146		
	0	888	304	152		
	0	813	332	166		
	0	789	342	171		
	0	674	400	200		
	0	636	424	212		

*CAN BE TYPE B Z and X only — input at Y
Typical for all MDY's

MODEL NO.	OUTPUT RPM MIN	OUTPUT RPM MAX	OUTPUT TORQUE LB. IN MIN SPEED	OUTPUT TORQUE LB. IN MAX SPEED	OUTPUT SHAFT POSITION	ROTATION OUTPUT VS INPUT
1MDY66-Y	0	583	463	231	Y	SAME
	0	533	506	253		
	0	483	559	279		
	0	442	617	305		
	0	366	737	368		

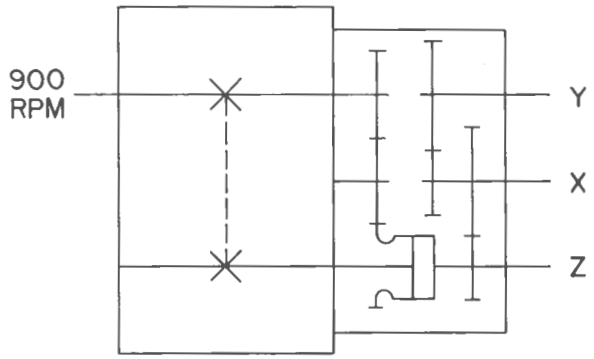


Figure 20

MAXIMUM OUTPUT POWER CAPACITY 4.29 HP
Control Screw Turns 11

RATED INPUT SPEED 900 RPM

MODEL NO.	OUTPUT RPM MIN	OUTPUT RPM MAX	OUTPUT TORQUE LB. IN MIN SPEED	OUTPUT TORQUE LB. IN MAX SPEED	OUTPUT SHAFT POSITION	ROTATION OUTPUT VS INPUT
1MDX66-Y	0	1350	100	200	Y	SAME
	0	1350	100	200		
	0	1250	108	216		
*	0	1070	126	252		
1MDX66-X	0	914	148	296	X	OPPOSITE
	0	655	206	412		
	0	600	225	450		
	0	497	271	542		
	0	1350	100	200		
	0	1250	108	216		
	0	1157	117	234		
	0	1153	117	234		
*	0	1070	176	252		
	0	991	136	272		
	0	987	137	273		
	0	914	148	296		
	0	849	159	318		
*	0	847	159	319		
	0	826	163	326		
	0	756	178	356		
*	0	725	186	372		
	0	708	190	380		
	0	655	206	412		
	0	648	208	416		
	0	627	215	430		
1MDX66-Z	0	619	218	436	Z	SAME
	0	607	222	444		
	0	600	225	450		
	0	555	243	486		
	0	537	251	502		
*	0	520	259	519		
	0	497	271	542		
*	0	475	284	567		
	0	460	293	586		
	0	444	304	608		
	0	406	332	664		
*	0	394	342	684		
	0	337	400	800		
	0	318	424	848		

*CAN BE TYPE B

MODEL NO.	OUTPUT RPM MIN	OUTPUT RPM MAX	OUTPUT TORQUE LB. IN MIN SPEED	OUTPUT TORQUE LB. IN MAX SPEED	OUTPUT SHAFT POSITION	ROTATION OUTPUT VS INPUT
	0	291	463	926		
	0	266	506	1012		
1MDX66-Z	0	241	559	1118	Z	SAME
	0	221	617	1221		
	0	183	737	1473		

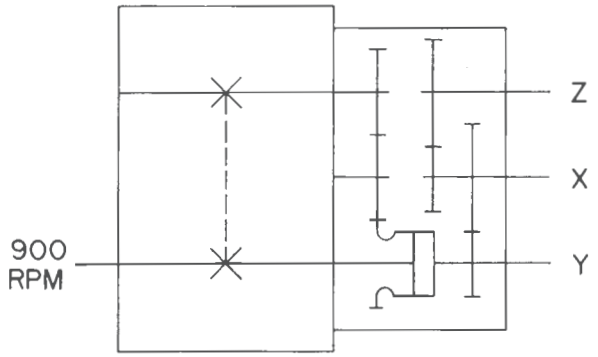


Figure 21

MAXIMUM OUTPUT POWER CAPACITY 3.54 HP
Control Screw Turns 9.1

RATED INPUT SPEED 900 RPM

MODEL NO.	OUTPUT RPM MIN	OUTPUT RPM MAX	OUTPUT TORQUE LB. IN MIN SPEED	OUTPUT TORQUE LB. IN MAX SPEED	OUTPUT SHAFT POSITION	ROTATION OUTPUT VS INPUT
2MDY66-Z*	0	2700	165	82.5	Z	SAME
2MDY66-X	0	2700	165	82.5	X	OPPOSITE
	0	2475	180	90		
	0	2202	202	101		
	0	1844	241	120		
	0	1534	290	145		
	0	1350	330	165		
	0	1102	404	202		
	0	953	467	233		
2MDY66-Y	0	2700	165	82.5	Y	SAME
	0	2475	180	90		
	0	2402	185	93		
	0	2268	196	98		
	0	2202	202	101		
	0	2019	220	110		
	0	1844	241	121		
	0	1796	248	124		
	0	1690	263	131		
	0	1535	290	145		
	0	1504	296	148		
	0	1406	316	158		
	0	1350	330	165		
	0	1259	353	176		
	0	1250	356	178		
	0	1236	360	180		
	0	1102	404	202		
	0	1047	425	212		
	0	1010	441	220		
	0	953	467	233		
	0	921	483	241		
	0	898	495	247		
	0	873	510	255		
	0	777	573	286		
	0	767	580	290		
	0	752	591	296		
	0	675	660	330		
	0	650	684	342		
	0	626	711	355		
	0	551	808	404		

*CAN BE TYPE B Z and X only — input at Y
Typical for all MDY's

MODEL NO.	OUTPUT RPM MIN	OUTPUT RPM MAX	OUTPUT TORQUE LB. IN MIN SPEED	OUTPUT TORQUE LB. IN MAX SPEED	OUTPUT SHAFT POSITION	ROTATION OUTPUT VS INPUT
2MDY66-Y	0	541	822	411	Y	SAME
	0	426	935	462		
	0	449	990	495		
	0	388	1145	572		
	0	336	1324	662		

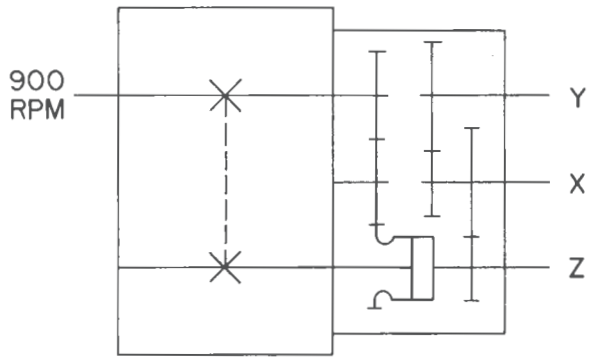


Figure 22

MAXIMUM OUTPUT POWER CAPACITY 7.07 HP
Control Screw Turns 9.1

RATED INPUT SPEED 900 RPM

MODEL NO.	OUTPUT RPM MIN	OUTPUT RPM MAX	OUTPUT TORQUE LB. IN MIN SPEED	OUTPUT TORQUE LB. IN MAX SPEED	OUTPUT SHAFT POSITION	ROTATION OUTPUT VS INPUT
2MDX66-Y	0	1350	165	330	Y	SAME
	0	1350	165	330		
	0	1237	180	360		
*	0	1101	202	404		
2MDX66-X	0	922	241	482	X	OPPOSITE
	0	767	290	580		
	0	675	330	660		
	0	551	404	808		
	0	476	467	935		
	0	1350	165	330		
	0	1237	180	360		
*	0	1201	185	370		
	0	1134	196	392		
*	0	1101	202	404		
*	0	1009	220	440		
	0	922	241	482		
*	0	898	248	496		
	0	845	263	527		
	0	767	290	580		
*	0	752	296	592		
	0	703	316	632		
	0	675	330	660		
	0	629	353	707		
*	0	625	356	712		
	0	618	360	720		
	0	551	404	808		
2MDX66-Z	0	523	425	850	Z	SAME
	0	505	441	882		
	0	476	467	935		
	0	460	483	966		
*	0	449	495	991		
	0	436	510	1020		
*	0	388	573	1146		
	0	383	580	1160		
	0	376	591	1183		
	0	337	660	1320		
	0	325	684	1369		
	0	313	711	1422		
	0	274	808	1617		

*CAN BE TYPE B

MODEL NO.	OUTPUT RPM MIN	OUTPUT RPM MAX	OUTPUT TORQUE LB. IN MIN SPEED	OUTPUT TORQUE LB. IN MAX SPEED	OUTPUT SHAFT POSITION	ROTATION OUTPUT VS INPUT
	0	270	822	1645		
	0	238	935	1870		
2MDX66-Z	0	224	990	1981	Z	SAME
	0	194	1145	2290		
	0	168	1324	2649		

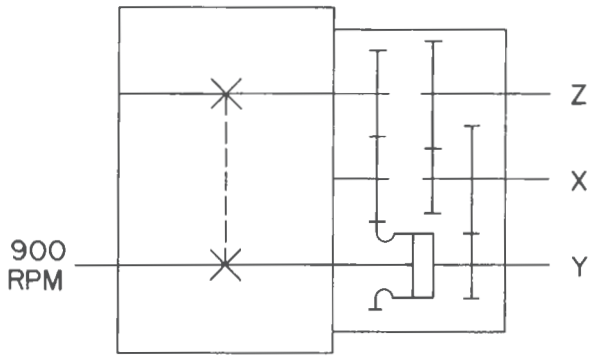


Figure 23

MAXIMUM OUTPUT POWER CAPACITY 5.36 HP
Control Screw Turns 11.7

RATED INPUT SPEED 900 RPM

MODEL NO.	OUTPUT RPM MIN	OUTPUT RPM MAX	OUTPUT TORQUE LB. IN MIN SPEED	OUTPUT TORQUE LB. IN MAX SPEED	OUTPUT SHAFT POSITION	ROTATION OUTPUT VS INPUT
3MDY66-Z*	0	2700	247.5	125	Z	SAME
3MDY66-X	0	2700	247.5	125	X	OPPOSITE
	0	2331	286	145		
	0	2112	316	159		
	0	1818	367	185		
	0	1400	477	241		
	0	1183	564	285		
	0	1052	634	320		
	0	759	880	444		
3MDY66-Y	0	2700	247.5	125	Y	SAME
	0	2445	273	138		
	0	2331	286	145		
	0	2112	316	159		
	0	2013	332	167		
	0	1824	366	185		
	0	1818	367	185		
	0	1653	404	204		
	0	1570	425	214		
	0	1400	477	241		
	0	1224	545	275		
	0	1209	552	279		
	0	1183	564	285		
	0	1095	609	308		
	0	1052	634	320		
	0	1022	653	330		
	0	942	708	358		
	0	926	721	364		
	0	909	735	371		
	0	823	811	409		
	0	797	837	423		
	0	759	880	444		
	0	726	920	464		
	0	708	942	476		
	0	655	1019	514		
	0	614	1088	549		
	0	594	1124	567		
	0	545	1224	618		
	0	519	1286	649		
	0	511	1306	659		

*CAN BE TYPE B Z and X only — input at Y
Typical for all MDY's

MODEL NO.	OUTPUT RPM MIN	OUTPUT RPM MAX	OUTPUT TORQUE LB. IN MIN SPEED	OUTPUT TORQUE LB. IN MAX SPEED	OUTPUT SHAFT POSITION	ROTATION OUTPUT VS INPUT
3MDY66-Y	0	461	1447	731	Y	SAME
	0	410	1628	822		
	0	393	1697	857		
	0	333	2006	1013		
	0	296	2257	1140		
	0	213	3129	1580		

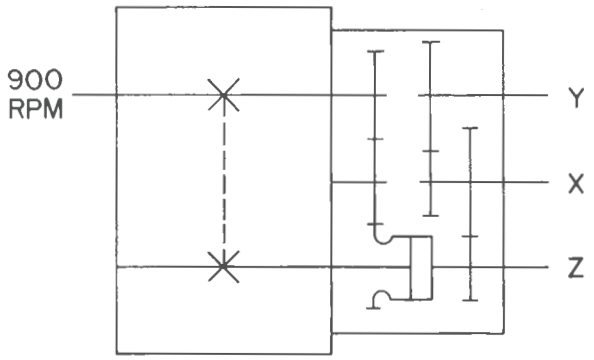


Figure 24

MAXIMUM OUTPUT POWER CAPACITY 10.61 HP
Control Screw Turns 11.7

RATED INPUT SPEED 900 RPM

MODEL NO.	OUTPUT RPM MIN	OUTPUT RPM MAX	OUTPUT TORQUE LB. IN MIN SPEED	OUTPUT TORQUE LB. IN MAX SPEED	OUTPUT SHAFT POSITION	ROTATION OUTPUT VS INPUT
3MDX66-Y	0	1350	250	495	Y	SAME
3MDX66-X	0	1350	250	495	X	OPPOSITE
	0	1165	289	573		
	0	1056	319	632		
	0	909	371	735		
	0	700	482	954		
	0	591	570	1129		
	0	526	641	1269		
	0	379	889	1760		
3MDX66-Z	0	1350	250	495	Z	SAME
	0	1223	276	546		
	0	1165	289	573		
	0	1056	319	632		
	0	1006	335	663		
	0	912	370	732		
	0	909	371	735		
	0	826	408	808		
	0	785	429	850		
	0	700	482	954		
	0	612	551	1091		
	0	604	558	1105		
	0	591	570	1129		
	0	547	616	1219		
	0	526	641	1269		
	0	511	660	1306		
	0	471	716	1417		
	0	463	728	1442		
	0	454	742	1470		
	0	411	819	1622		
	0	398	846	1675		
	0	379	889	1760		
	0	363	929	1840		
	0	354	952	1885		
	0	328	1029	2038		
	0	307	1099	2176		
	0	297	1135	2248		
	0	272	1236	2448		
	0	259	1299	2573		
	0	255	1319	2613		

*CAN BE TYPE B *Consult Factory*

MODEL NO.	OUTPUT RPM MIN	OUTPUT RPM MAX	OUTPUT TORQUE LB. IN MIN SPEED	OUTPUT TORQUE LB. IN MAX SPEED	OUTPUT SHAFT POSITION	ROTATION OUTPUT VS INPUT
3MDX66-Z	0	230	1462	2895	Z	SAME
	0	205	1645	3257		
	0	196	1714	3394		
	0	166	2026	4013		
	0	148	2280	4100		
	0	106	3160	4100		

*CAN BE TYPE B — CONSULT FACTORY FOR SPEEDS

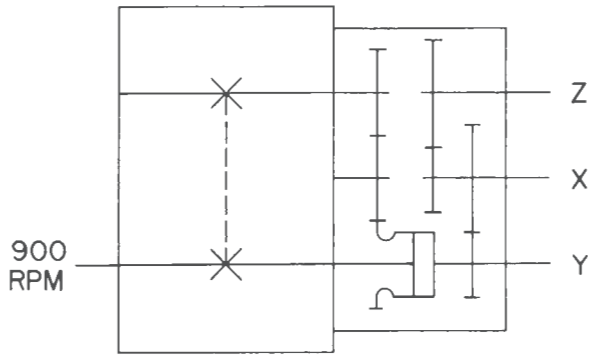


Figure 25

MAXIMUM OUTPUT POWER CAPACITY 6.94 HP
Control Screw Turns 13.9

RATED INPUT SPEED 720 RPM

MODEL NO.	OUTPUT RPM MIN	OUTPUT RPM MAX	OUTPUT TORQUE LB. IN MIN SPEED	OUTPUT TORQUE LB. IN MAX SPEED	OUTPUT SHAFT POSITION	ROTATION OUTPUT VS INPUT
4MDY66-Z*	0	2160	405	202.5	Z	SAME
4MDY66-X	0	2160	405	202.5	X	OPPOSITE
	0	1584	552	276		
	0	1143	765	382		
	0	705	1240	620		
4MDY66-Y	0	2160	405	202.5	Y	SAME
	0	1584	552	276		
	0	1559	561	280		
	0	1161	753	376		
	0	1143	765	382		
	0	962	909	454		
	0	838	1043	521		
	0	705	1240	620		
	0	605	1445	722		
	0	517	1691	845		
	0	373	2342	1171		
	0	230	3798	1899		

*CAN BE TYPE B Z and X only — input at Y
Typical for all MDY's

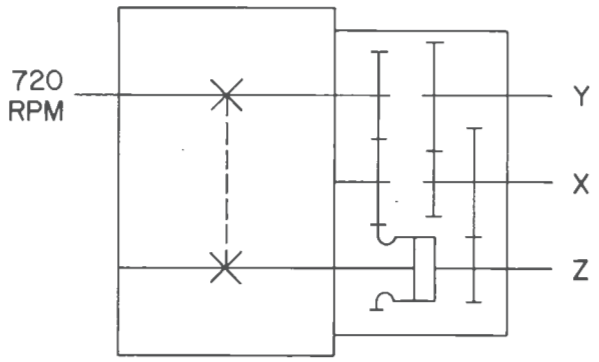


Figure 26

MAXIMUM OUTPUT POWER CAPACITY 13.89 HP
Control Screw Turns 13.9

RATED INPUT SPEED 720 RPM

MODEL NO.	OUTPUT RPM MIN	OUTPUT RPM MAX	OUTPUT TORQUE LB. IN MIN SPEED	OUTPUT TORQUE LB. IN MAX SPEED	OUTPUT SHAFT POSITION	ROTATION OUTPUT VS INPUT
4MDX66-Y	0	1080	405	810	Y	SAME
4MDX66-X	0	1080	405	810	X	OPPOSITE
	0	792	552	1104		
	0	571	765	1530		
	0	352	1240	2480		
4MDX66-Z	0	1080	405	810	Z	SAME
	0	792	552	1104		
*	0	779	561	1122		
	0	580	753	1506		
*	0	571	765	1530		
	0	481	909	1819		
*	0	419	1043	2086		
	0	352	1240	2480		
*	0	302	1445	2890		
	0	258	1691	3382		
	0	186	2342	4685		
	0	115	3798	7200 LIMIT		

*CAN BE TYPE B

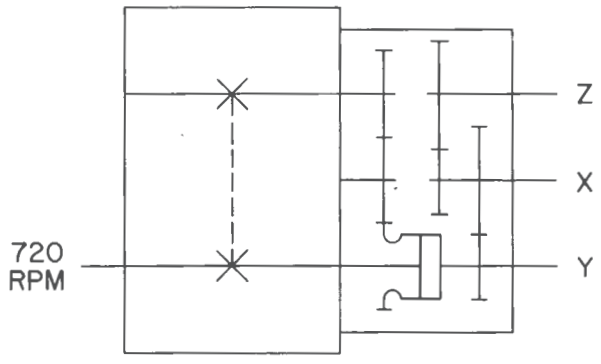


Figure 27

MAXIMUM OUTPUT POWER CAPACITY 11.57 HP
Control Screw Turns 15.5

RATED INPUT SPEED 720 RPM

MODEL NO.	OUTPUT RPM MIN	OUTPUT RPM MAX	OUTPUT TORQUE LB. IN MIN SPEED	OUTPUT TORQUE LB. IN MAX SPEED	OUTPUT SHAFT POSITION	ROTATION OUTPUT VS INPUT
5MDY66-Z*	0	2160	755	337.5	Z	SAME
5MDY66-X	0	2160	755	337.5	X	OPPOSITE
	0	1478	1103	493		
	0	1131	1441	644		
	0	540	3020	1350		
5MDY66-Y	0	2160	755	337.5	Y	SAME
	0	1653	986	441		
	0	1478	1103	493		
	0	1131	1441	644		
	0	774	2106	941		
	0	592	2752	1230		
	0	540	3020	1350		
	0	369	4414	1973		
	0	282	5765	2577		
	0	135	8900 LIMIT	5400		

*CAN BE TYPE B Z and X only — input at Y
Typical for all MDY's

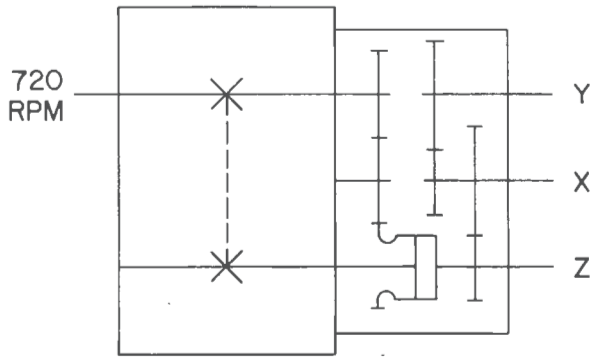


Figure 28

MAXIMUM OUTPUT POWER CAPACITY 25.89 HP
Control Screw Turns 15.5

RATED INPUT SPEED 720 RPM

MODEL NO.	OUTPUT RPM MIN	OUTPUT RPM MAX	OUTPUT TORQUE LB. IN MIN SPEED	OUTPUT TORQUE LB. IN MAX SPEED	OUTPUT SHAFT POSITION	ROTATION OUTPUT VS INPUT
5MDX66-Y	0	1080	675	1510	Y	SAME
5MDX66-X	0	1080	675	1510	X	OPPOSITE
	0	739	986	2207		
	0	565	1288	2882		
	0	270	2700	6040		
5MDX66-Z	0	1080	675	1510	Z	SAME
	0	826	881	1972		
	0	739	986	2207		
	0	565	1288	2882		
	0	387	1883	4213		
	0	296	2460	5503		
	0	270	2700	6040		
	0	184	3946	8828		
	0	141	5154	8900		
	0	67	8900 LIMIT	8900 LIMIT		

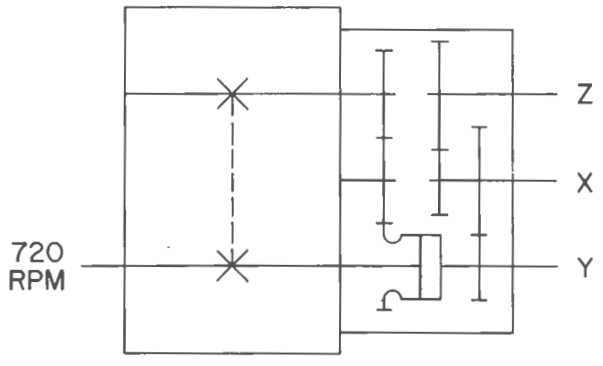


Figure 29

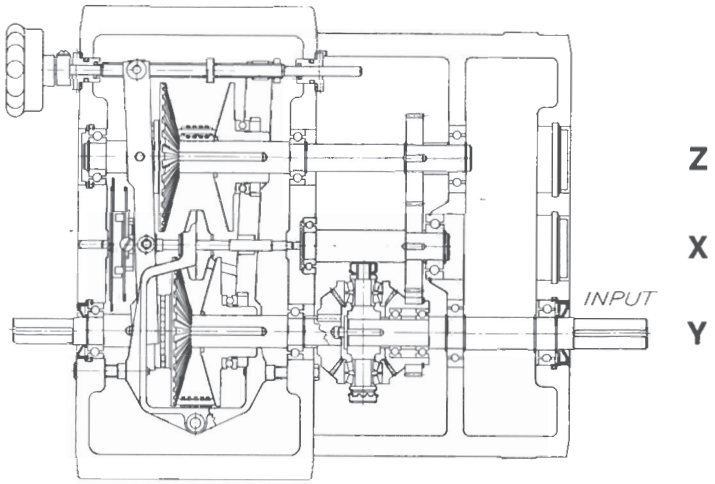
SHUNT CONNECTED DIFFERENTIAL ARRANGEMENT (VCD) RATING (HIGH-POWER VARI-CHAIN)

UNIT SIZE	MODEL NUMBER	SPEED RANGE	CONTROL SCREW TURNS	INPUT R.P.M.	OUTPUT TORQUE* & POWER CAPACITY						CHAIN NUMBER
					AT MAXIMUM SPEED			AT MINIMUM SPEED			
					TORQUE*	R.P.M.	H.P.	TORQUE*	R.P.M.	H.P.	
3	3VCD14	1.4:1	7.1	1540	790	1800	22.5	790	1280	16.1	33237, A337
	3VCD20	2:1	12.4	1350	745	1800	21.3	745	900	10.7	33436, A335
	3VCD25	2.5:1	14.3	1260	625	1800	17.8	625	720	7.2	33635, A334

Cross section of typical
Higher Power Vari-Chain Transmission.
Arrangement shown is assembly A.

The input shaft will always be located at Position "Y" unless input gearing is required. If this is the case, the input shaft may be located at Position "X" or "Z".

The output shaft as a standard will be in line with Position "Y" but on the opposite side of the transmission. As an option, the output shaft can be at Position "Z" or on the opposite side of the transmission from Position "Z".



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 handwheel 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.

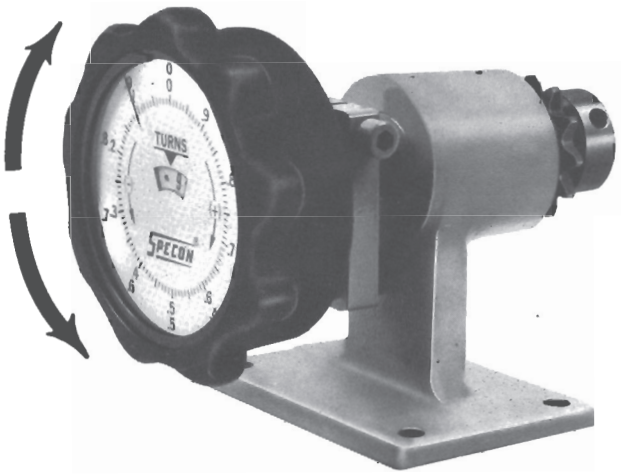


Figure 30

VERNIER CONTROL

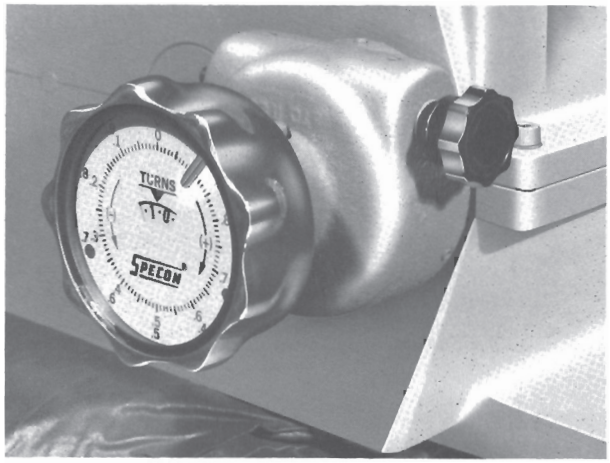


Figure 31

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 7½:1 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.

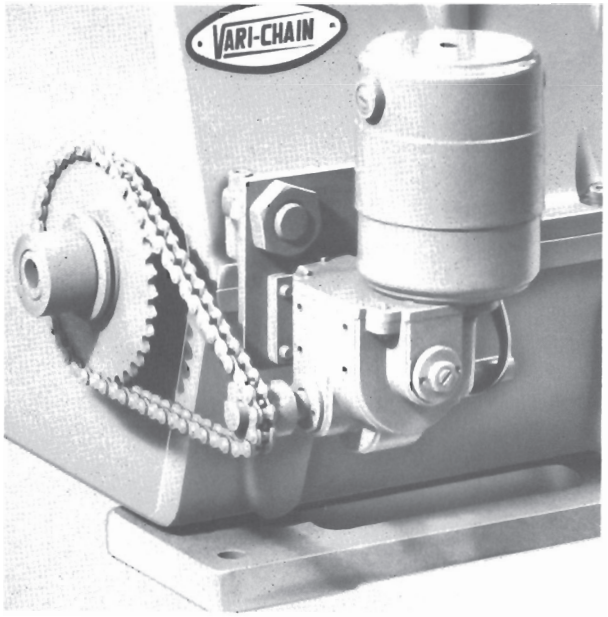
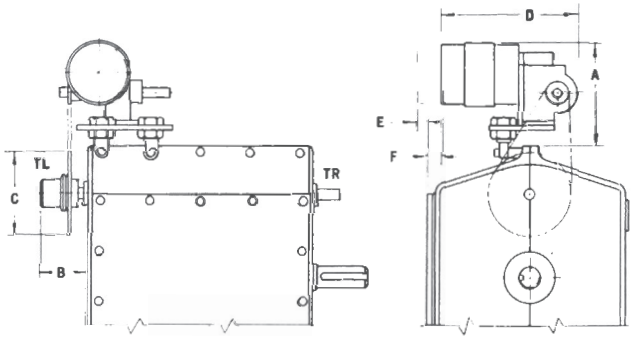


Figure 32



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	7/16	
1	5 3/8	2 1/2	3 15/16	7 3/8	7/16	
2	5 3/8	2 1/2	4 33/64	7 3/8		3/4
3	5 1/4	2 1/2	4 33/64	7 3/8		1 3/8

Figure 33

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

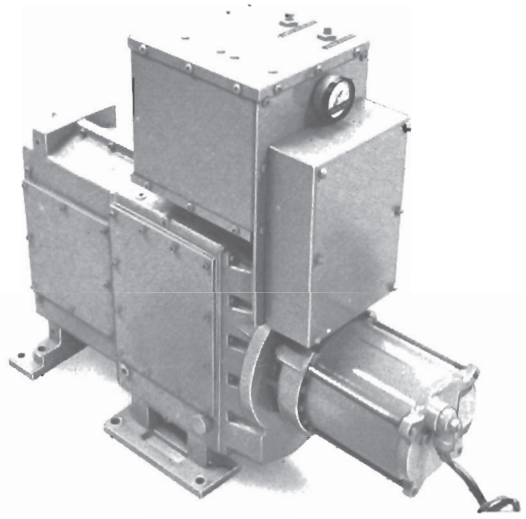


Figure 34

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.

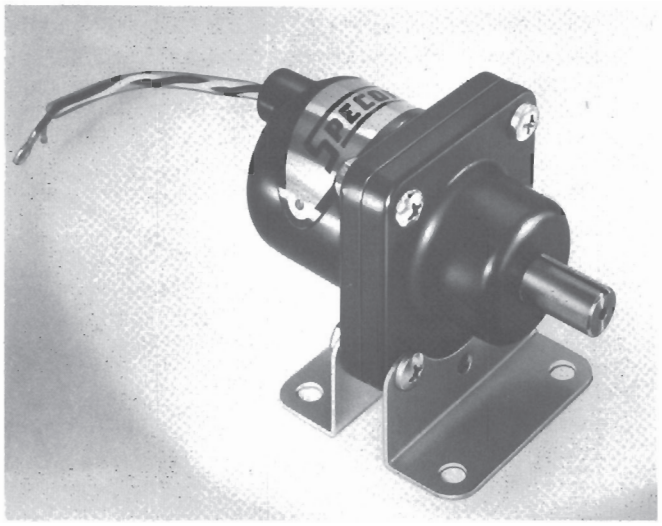


Figure 35

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 ½" 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

When ordering, specify Size and designation, Type, Style assembly, type of mounting, and speed range.

For Style III units specify motor HP and motor electrical characteristics.

For example specify #2 MDY66-Y(0-1690) Style I Assembly C Horizontal

CANDY CONTROLS®

ISO 2015 Certified

MECHANICAL & ELECTRO - MECHANICAL POWER TRANSMISSION EQUIPMENT

SPECON

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