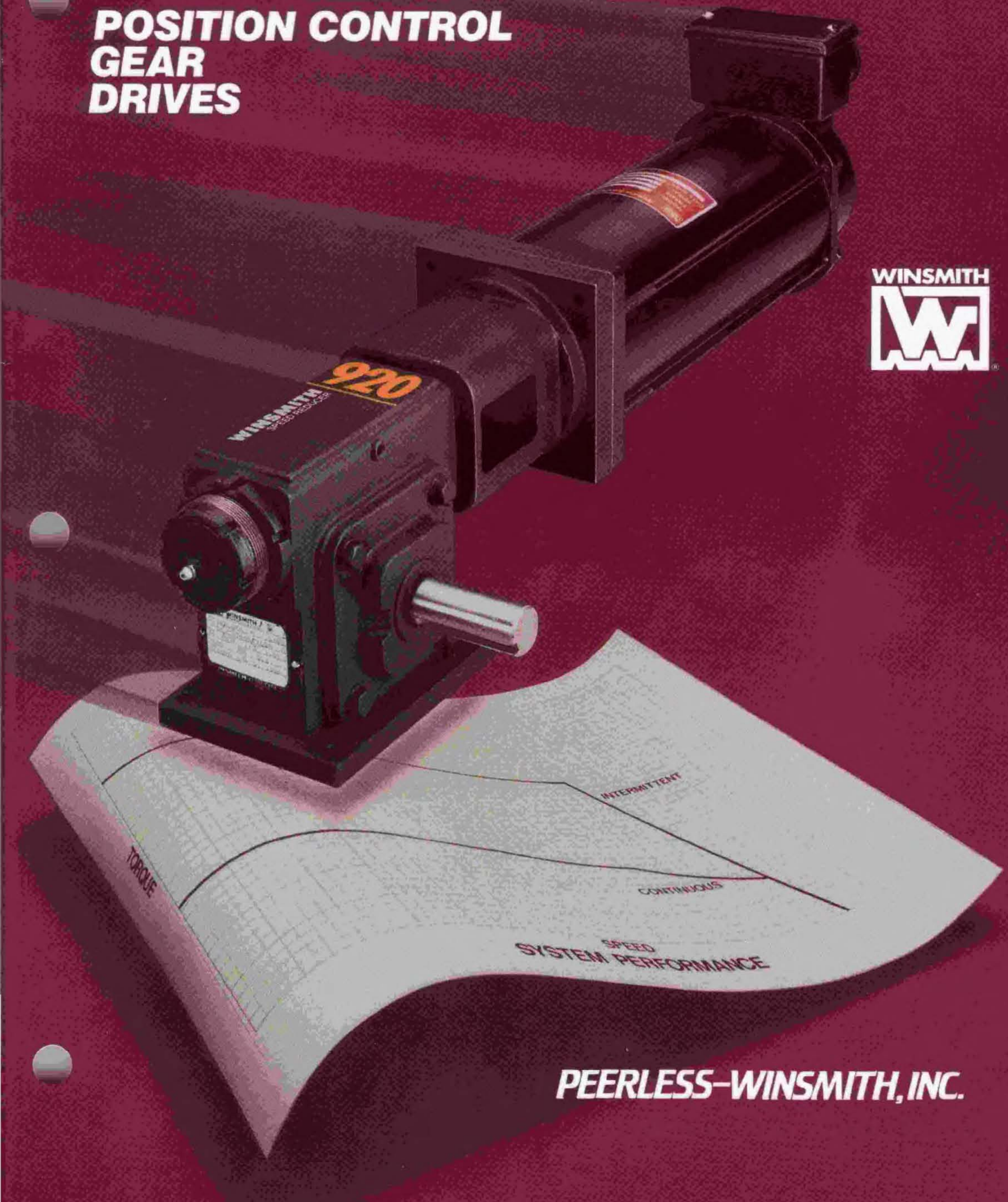
CATALOG 400D

MOTION CONTROL PRODUCTS

POSITION CONTROL
GEAR
DRIVES

WINSMITH



PEERLESS-WINSMITH, INC.

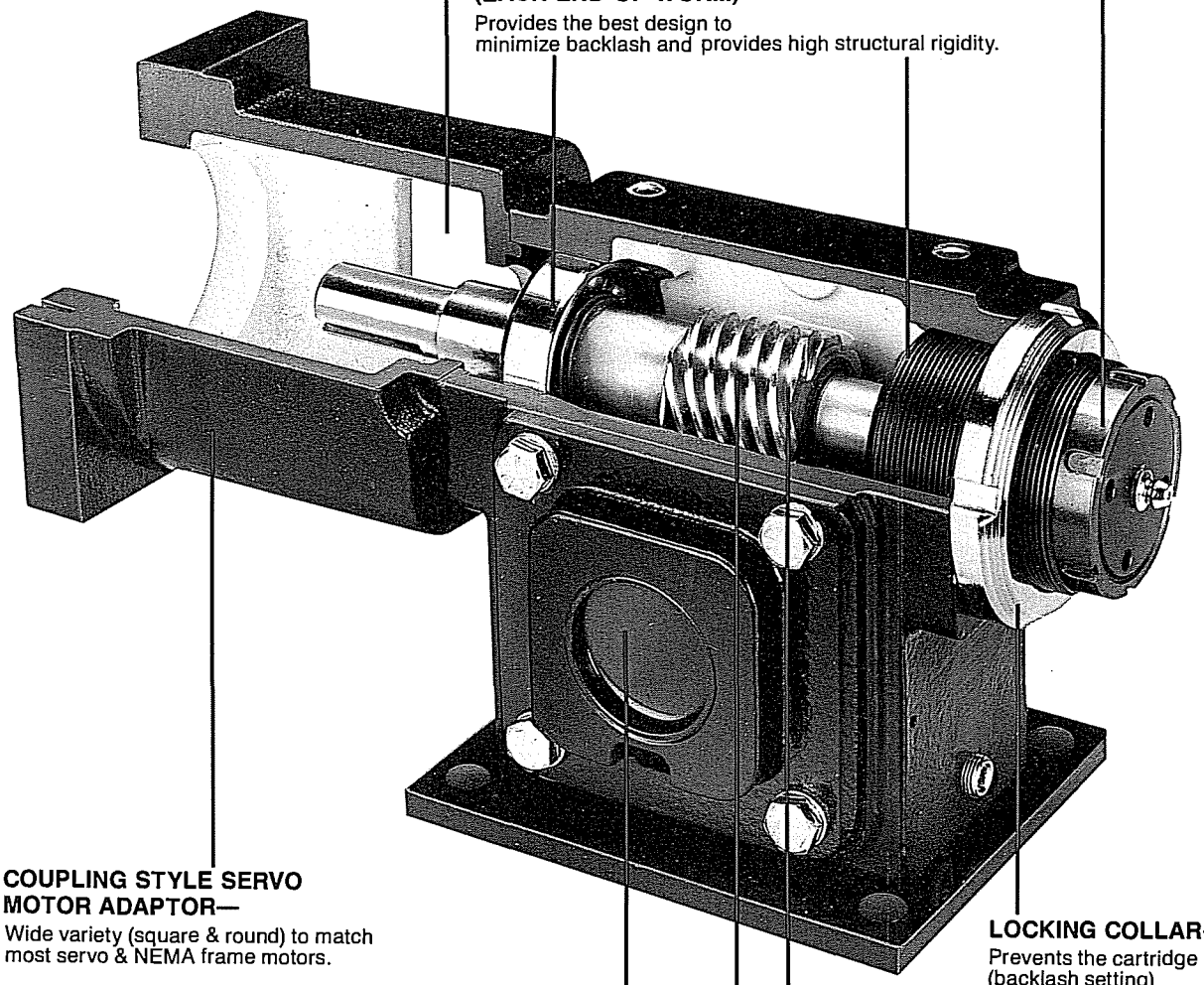
WINSMITH'S "PATENTED" S-ELIMINATOR

A low backlash precision worm gear drive

OVERSIZED COUPLING ACCESS HOLE—
Provides for easy motor & gear drive assembly. (Not shown)

ADJUSTMENT CARTRIDGE—
Fine threaded cartridge with dual angular contact ball bearings which allows precise adjustment of the worm backlash.

BEARING SUPPORT DESIGN (EACH END OF WORM)
Provides the best design to minimize backlash and provides high structural rigidity.



COUPLING STYLE SERVO MOTOR ADAPTOR—
Wide variety (square & round) to match most servo & NEMA frame motors.

LOCKING COLLAR—
Prevents the cartridge (backlash setting) from axial movement.

SPLASH LUBRICATION—
Oil reservoir, for high thermal capacity, filled to operating level with synthetic lubricant for high efficiency and minimum maintenance.

BACKLASH PRECISION—
Factory adjusted for maximum of 2 arc minutes of backlash.

S-ELIMINATOR WORM—
Patented design which allows very low backlash settings.

All of us at WINSMITH® thank you for your interest in our newest catalog. This MOTION CONTROL catalog is our first effort at combining our decades of precision gear design and manufacturing experience with the new patented technology that we developed to offer a wide variety of low backlash products.

This entire catalog is devoted to precision motion control gear reducers. All the gear reducer products covered in this catalog are designed to address requirements beyond the basic reduction of speed and multiplication of torque. This catalog offers products specifically designed to complement position control requirements where servo or stepper motors are used for electro-mechanical conversion.

In position control applications involving high linear or angular velocities and short cycle rates, the primary role of a gear reducer is to optimize overall system performance and cost by matching the inertias between the load and the servo or stepper motor. When relatively low final positioning velocities are required, the torque multiplication function of the gear reducer becomes a major factor in system cost optimization.

Werner Heller
Manager of Engineering

Werner Heller graduated from Mannheim Engineering College and General Motors Institute with a B.S.M.E.

He has worked with: Opel—GM, Ford, Curtis Wright, Warner Electric and joined WINSMITH in 1974.

He has received patents in the areas of: planetary gears, integral bi-directional spring clutches, adjustable lead worm gears and hydraulic ratio control systems and one on low backlash planocentric gears is pending. Werner is also a licensed FAA-ANP and has a multi engine pilot's license.

In any position control application, perhaps the most important consideration from a mechanical component selection standpoint is that no component, including the gear reducer, should negatively affect the precision control of the electrical and electronic components. Since the total control objective is precision, repeatable cycling and positioning of the mechanical output, normal gear reducer transmission errors and backlash often create performance problems.

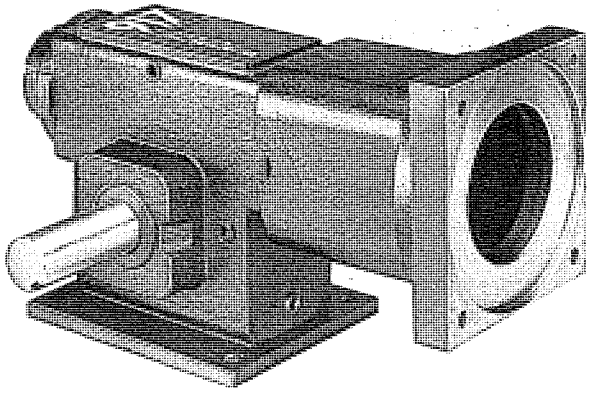
We at WINSMITH have developed a broad technical understanding, expertise and product offering in gear reducers to address the specific needs of position control systems. Specifically, we apply several different approaches to the minimization of backlash.

We realize that a few years ago, most all position control gearboxes utilized a parallel input to output construction, using either: helical, planetary or harmonic gearing. Few manufacturers even offered right angle worm gears for these demanding applications.

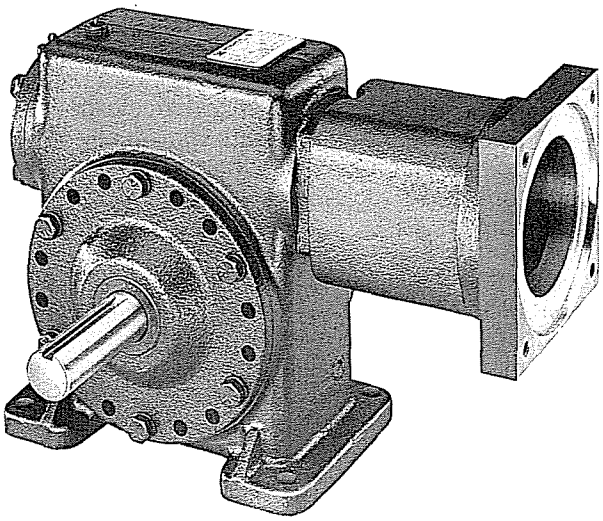
Worm gears specifically designed for position control are now available and they offer some distinct advantages. Worm gears are the most cost effective "mid to high" ratio reducers available. Moving a servo-gear design from a parallel or inline to a right angle configuration will often save space and money. Extremely low backlash (2 arc minutes) worm gears are available. Even field backlash adjustable worm gearboxes are now available. Because of both the "wear-in" characteristics of worm gears after some operations and the new field adjustable capabilities, backlash of arc seconds can be achieved. Worm gear technology advancements continue to reduce gear mesh losses. In low 5:1 and 10:1 ratios gear mesh efficiencies are approaching 92-94%.

Although you may not have considered them in the past, specially designed right angle worm gears deserve serious consideration in any position control application. We hope this catalog helps you realize the advantages of a worm gear alternative. If your requirements exceed the catalog offering, consider our technological expertise and willingness to design and build "modified" and "specials," and call us at WINSMITH.

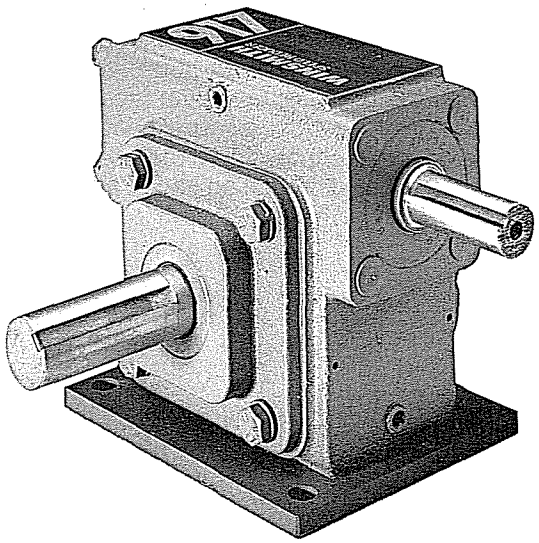
MOTION CONTROL FAMILY OF PRODUCTS



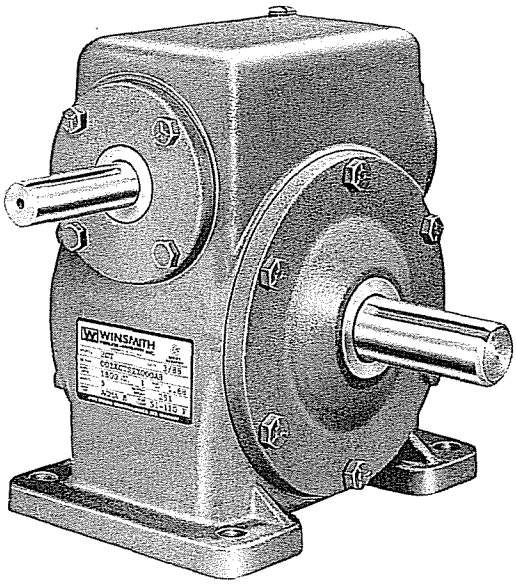
S-ELIMINATOR
(AXIAL ADJUSTABLE WORM)



C-ELIMINATOR
(VARIABLE CENTER DISTANCE)



S-MINIMIZER
(MINIMUM FIXED BACKLASH)



C-MINIMIZER
(MINIMUM FIXED BACKLASH)

TABLE OF CONTENTS

MOTION CONTROL PRODUCT FAMILY

WINSMITH® has provided the industrial power transmission market place with quality enclosed gear products for decades. Products as diverse as differential planetary and worm gears are provided to every segment of the market. Products range from standard off-the-shelf to custom designed gearboxes. As these services have expanded to different market segments, WINSMITH® began to receive many requests from motion control users. The demand for products with a higher level of precision began to drive many product enhancements at WINSMITH to better serve these needs. These enhancements have further led WINSMITH to develop new higher precision products to serve motion control users. The MOTION CONTROL product family brings together these product enhancements and new products in an effort to serve motion control users with the best precision right angle and in-line (under development) gear products available.

The MOTION CONTROL product name was chosen to symbolize the mastery these products will have on motion control gear requirements. The WINSMITH MOTION CONTROL product line sets new standards for cost competitive low backlash products. Since the MOTION CONTROL product line was built around some of our standard products, the MOTION CONTROL products realize some of the cost advantages of our standard industrial products. The use of standard products as a basis for the MOTION CONTROL products also allows the user a wider range of product configurations than all other precision gear products.

The MOTION CONTROL family of products is structured around two approaches for achieving precision backlash control. One approach provides the ability for backlash adjustment over the life of the product. This approach allows for the highest level of precision. Products produced to low backlash levels that are non-adjustable make up the other approach. Backlash levels achieved in this approach are not as low as the adjustable approach but still meet most of the marketplace requirements for precision gear products.

D-90® TYPE SE® MOTION CONTROL PRODUCTS

This part of the MOTION CONTROL family of products is developed around the D-90® TYPE SE® worm gear product. These are:

- ☐ S-ELIMINATOR—This is an adjustable backlash product utilizing a WINSMITH® patented gear technology. A maximum of 2 arc minutes of backlash can be maintained over the life of the product. Adjustment can be made without taking the product out of service.
- ☐ S-MINIMIZER—This is a fixed backlash product shipped from our plant with a maximum of 11 arc minutes of backlash.

Both products are available in a wide range of configurations and sizes. Many motion control accessories have been developed to make these products easy to use.

C-LINE MOTION CONTROL PRODUCTS

This part of the MOTION CONTROL family of products is developed around the C-Line worm gear product. These products are:

- ☐ C-ELIMINATOR—This is an adjustable backlash product utilizing small changes in unit center distance to change the backlash. A maximum of 6 arc minutes of backlash can be maintained.
- ☐ C-MINIMIZER—This is a fixed backlash product shipped from the plant with a maximum of 11 arc minutes of backlash.

Both products are available in a wide range of configurations and sizes.

These MOTION CONTROL products represent a carefully selected group of WINSMITH product and capabilities that specifically serve motion control needs. WINSMITH is pleased to bring this complete family of gear product solutions to the growing world of motion control users. The growing world of motion control should find the wide range of MOTION CONTROL products very useful in discovering solutions to their requirements.

INTRODUCTION TO THE MOTION CONTROL CATALOG

CATALOG ASSISTANCE

When using the MOTION CONTROL products it is important to realize that the segments of WINSMITH® basic products which are compatible to motion control have been preselected to be included in the MOTION CONTROL Catalog. Due to particular product performance requirements of motion control applications, WINSMITH has enhanced key performance issues to create the proper product. The key selection information is presented in the MOTION CONTROL Catalog with supplemental information offered from the standard product catalogs.

PRODUCT SELECTION

The MOTION CONTROL products offer a wide range of motion control solutions. The Preliminary Selection Chart below offers assistance in selecting the product from the MOTION CONTROL product lines which best meet your motion control requirements. Once preliminary product selection is made, the product introduction and capability section for the selected product should be used to confirm that the preliminary product selection is appropriate. Then refer to the MOTION CONTROL Selection Procedures section beginning on page A3 for product size selection. Summary rating information is offered in each product's condensed rating section as well as complete rating information when it differs from the basic product ratings as shown in the appropriate standard product catalog. For those products where external dimensions differ from the basic product dimensions, this catalog will provide dimensional information.

STEPPER/SERVO INTERFACE

The MOTION CONTROL products are developed to have a user friendly mounting interface to the world of stepper and servo motors. There is a family of motor adaptors designed for use on motion control products allowing for easy interface to a wide range of possible motors. Many of the most popular adaptors are inventoried to insure better customer service. These adaptors are available for most products with some limitations in large sizes. The larger sizes are accommodated by using standard NEMA flanges and adaptor rings. The options section describes the motor adaptor options in detail.

OPTIONS

Motion control applications are better served through the use of many special features. WINSMITH® has put together a group of optional features that will make solutions to motion control problems much easier. The options section of this catalog offers critical information on these options. For more information on these and other possible options, please call your WINSMITH® Sales Office or contact your local WINSMITH® representative or distributor.

ENGINEERING

There are many important product and application issues discussed in detail in this section.

PRELIMINARY SELECTION CHART

	MAXIMUM BACKLASH[4]	PRODUCT SIZE RANGE	RATIO RANGE	SERVO ADAPTOR	FIELD ADJUSTABILITY	REFERENCE CATALOGS
S-ELIMINATOR	2 arc min	1.33-3.50" CD[3] 913-935	4:1-60:1	yes[1]	yes	MOTION CONTROL
C-ELIMINATOR	6 arc min	1.33-9.00" CD 1C-15C	4:1-3600:1	yes[2]	yes	MOTION CONTROL & C-Line #100
S-MINIMIZER	11 arc min	1.75-3.00" CD 917-930	5:1-10000:1	yes[1]	no	MOTION CONTROL & D-90® TYPE SE® #290
C-MINIMIZER	11 arc min	1.33-9.00" CD 1C-15C	5:1-3600:1	yes[2]	no	MOTION CONTROL & C-Line #100

1. Easy interface to most servo/stepper motors through the use of a family of user friendly coupling motor adaptors.
2. 1.33"CD-4.50"CD—Easy interface to most servo/stepper motors through the use of user friendly coupling motor adaptors, 5.167"CD-9.00"CD easy interface to most servo/stepper motors through the use of standard NEMA adaptors and adaptor rings.
3. The S-ELIMINATOR Product is available in center distances over 3.50". The basic product would change to the C-Line and can be included in product up to 9.00" center distance. These C-Line based S-ELIMINATOR products require extensive product modification to achieve axial adjustment capability.
4. All backlash specifications are in relation to the output shaft. (See engineering section for complete discussion.)

MOTION CONTROL SELECTION PROCEDURES

INTRODUCTION:

MOTION CONTROL products are designed for use with conventional AC or DC motors as well as with servo motors and stepper motors. The latter two high performance motors can be directed to control speed, torque and position in the typical closed loop motion control drive system. Since this type of application can be very cyclical in nature, traditional speed reducer sizing techniques may fall short of making the proper gear product selection. This section provides three methods for selecting a MOTION CONTROL product as described below.

When selecting a gear product for a motion control application there is a best selection. This best selection meets all of the needs of the application. The real world selection process seldom allows for this best selection to be made in a cost effective manner so some compromises are normally made. The below methods allow for a progressively better selection to be made based on known information. If selection results in too small a unit then gear product life will be reduced. If too large a unit is selected then system performance will be sacrificed.

INPUT SPEED

This catalog provides both mechanical and thermal ratings for continuous operation at input speeds up to 3000 RPM using synthetic oil. The following Selection procedures describe how to apply these ratings to a particular application.

MOTION CONTROL products can be operated at input speeds greater than 3000 RPM if consideration is given to the operating conditions. The following chart can be used as a guide for operating time and unit rating adjustment for input speeds above 3000 RPM.

INPUT RPM	LIMIT THE OPERATING TIME AT THIS RPM TO:	MULTIPLY RATING AT 3000 RPM BY:	
		MECHANICAL	THERMAL*
3500	50%	90%	75%
4000	25%	85%	60%

*Operating load (HP or torque) must not exceed the thermal capacity if operation is continuous for more than ½ hour in a one hour period.

If the application calls for more extreme conditions, a more thorough analysis of the application will be required.

INPUT METHOD:

This method should only be used when a minimum of application data is available. It is based primarily on the capability of the prime mover. This method will result in the most conservative size selection which will have impact on system cost and performance.

Information Required For Input Method:

Duty Cycle: Operating service duration, frequency of peak loads.
Reducer ratio or required output RPM.
Motor capacity: HP or Torque at rated RPM.

OUTPUT METHOD:

The second method should be used when torque requirements at the reducer output shaft are specified and there is a basic understanding of the duty cycle. In this method the additional information allows for a more precise selection based on the needs of the application and reduces the influence of the motor as a factor in the selection.

Information Required For Output Method:

Duty Cycle: Operating service duration, frequency of peak loads.
Reducer ratio or required output RPM.
Operating load: Input HP, Input torque or Output torque.

FULL DUTY CYCLE METHOD:

This method is suited to servo/stepper motor applications involving highly repetitive cycles and should be used only where the load profile is well defined. It allows for a complete analysis of the various load requirements as they compare to the gearbox capabilities to determine if the selected gearbox is the proper size.

Information Required For Full Duty Cycle Method:

Duty Cycle: Operating service duration.
Reducer ratio or required output RPM.
Complete description of load/speed spectrum.
Acceleration/deceleration characteristics.

After reviewing the various methods, if assistance is required, please contact your local authorized WINSMITH® representative or distributor.

MOTION CONTROL SELECTION PROCEDURES
INPUT AND OUTPUT METHODS

INPUT METHOD:
SELECTION BASED ON MOTOR CAPACITY

1. Determine the SERVICE FACTOR from table 1 based on the daily operating service duration and the frequency of peak load conditions. Peak loads can occur at start-up and in cycle. A careful evaluation of the application will be necessary to determine this frequency.

   CAUTION: If, at any time during operation, the actual load is greater than three times the unit mechanical rating, that size unit is unacceptable for the application.

2. Determine the required RATIO. If the application involves a varying motor RPM, determine the ratio at a specific speed condition such as maximum input speed versus maximum output speed.

$$\text{RATIO} = \frac{\text{MOTOR RPM}}{\text{OUTPUT RPM}}$$

3. Calculate the DESIGN INPUT HP or DESIGN INPUT TORQUE by multiplying the motor capacity by the SERVICE FACTOR determined in Step 1. The capacity of AC and DC motors can be taken as the nameplate rating. The capacity of servo/stepper motors can be based on the continuous rating at the specified RPM.

   Determine the UNIT SIZE by referring to the appropriate rating charts based on the product being selected. For the proper RATIO, DESIGN HP or TORQUE and motor RPM applicable to its rating, select the unit size with a MECHANICAL CAPACITY that equals or exceeds the DESIGN HP or TORQUE.

   For your convenience, there are condensed ratings charts in each product section which may also be used if the input RPM is 3000, 1750 or 1160 RPM.

4. If the application involves continuous operation (more than one half hour in a two hour period), verify that the motor rating does not exceed the THERMAL CAPACITY at the specified RPM. If this is the case, a larger unit or a more complete analysis of the application will be required.

5. Check OVERHUNG LOADS on all shafts and/or THRUST LOAD on the output shaft. Refer to the appropriate product catalog for ratings and explanation.

TABLE 1 SERVICE FACTORS

PEAK LOAD FREQUENCY*	DAILY OPERATING SERVICE DURATION			
	UP TO 1 HR	BETWEEN 1 & 3 HR	BETWEEN 3 & 10 HR	BETWEEN 10 & 24 HR
Up to 3 per hour	1.00	1.00	1.15	1.25
Between 4 & 10/hr.	1.00	1.15	1.25	1.50
Between 11 & 30/hr.	1.15	1.25	1.50	1.75
Between 31 & 60/hr.**	1.25	1.50	1.75	2.00

*Peak load duration should not exceed 2 seconds.
**For applications involving more than 60 starts per hour, a more detailed analysis is required.

OUTPUT METHOD:
SELECTION BASED ON OPERATING LOAD

1. Determine the SERVICE FACTOR from table 1 based on the daily operating service duration and the frequency of peak load conditions. Peak loads can occur at start-up and in cycle. A careful evaluation of the application will be necessary to determine this frequency.

2. Determine the required RATIO. If the application involves a varying motor RPM, determine the ratio at a specific speed condition such as maximum input speed versus maximum output speed.

$$\text{RATIO} = \frac{\text{MOTOR RPM}}{\text{OUTPUT RPM}}$$

3. Review the application and determine the operating load. This can be in terms of INPUT HP, INPUT TORQUE or OUTPUT TORQUE. If the operating load is steady or has minimal variation with only brief peak loads, it can be based on the maximum continuous load condition. However, if the application involves fairly rapid repetitive cycles, the operating load should be based on the cycle peak load.

4. Select the unit size. All applicable conditions under 4A, B & C must be met.

4. **A.** Calculate the DESIGN LOAD by multiplying the OPERATING LOAD (from Step 3) by the SERVICE FACTOR determined in Step 1. Determine the UNIT SIZE by referring to the appropriate rating charts based on the product being selected. For the proper RATIO, applicable DESIGN LOAD and RPM, select the UNIT SIZE that has a MECHANICAL CAPACITY equal to or exceeding the DESIGN INPUT HP, DESIGN INPUT TORQUE or DESIGN OUTPUT TORQUE.

   For your convenience, there are condensed ratings charts in each product section which may also be used if the input RPM is 3000, 1750 or 1160 RPM.

4. **B.** If the reducer is subjected to recurring peak loads, the maximum peak should not exceed twice the mechanical rating at that RPM. However, momentary peak loads occurring no more than three times per day can be as much as three times the mechanical rating. If either of these conditions are exceeded, a larger unit or a more complete analysis of the application will be required.

4. **C.** If the application involves continuous operation (more than one half hour in a two hour period), verify that the continuous load does not exceed the THERMAL CAPACITY at the specified RPM. If this is the case, a larger unit or a more complete analysis of the application will be required.

5. Check OVERHUNG LOADS on all shafts and/or THRUST LOAD on the output shaft. Refer to the appropriate product catalog for ratings and explanation.

MOTION CONTROL SELECTION PROCEDURES
DUTY CYCLE METHOD

DUTY CYCLE METHOD:
SELECTION BASED ON LOAD/SPEED CYCLE

This procedure requires a full knowledge of the load spectrum. Because of its length and complexity, the designer should adhere to this step by step sequence. For convenience in using this procedure, sample worksheets are provided on page A8. A typical example follows this procedure.

1. Determine the SHOCK LOAD FACTOR from Table 2 based on the cycle frequency and the type of loading. Moderate shock would reflect applications that use a trapezoidal velocity profile or have instantaneous load spikes (not included as an increment in the load analysis) no greater than 25% above the maximum operating load. Heavy shock would reflect applications that use a triangular velocity profile, hard braking, reversing, high inertia loads or instantaneous load spikes greater than 25% above the maximum operating load.

TABLE 2—SHOCK LOAD FACTOR

	MODERATE SHOCK	HEAVY SHOCK
Less than 1 cycle per minute	1.00	1.20
1 to 20 cycles per minute	1.15	1.35
21 to 60 cycles per minute	1.30	1.50
Over 60 cycles per minute	1.50	1.75

2. Determine the required RATIO. At a defined condition such as maximum operating speed, divide the input RPM by the output RPM.

$$\text{RATIO} = \frac{\text{INPUT RPM}}{\text{OUTPUT RPM}}$$

3. Using the selection worksheet illustrated in Table 3, determine the appropriate unit size by following steps 3A through 3F.

3. **A.** Review the load and speed curves as defined by the application (see Fig. 1 for an example). Separate one complete cycle into convenient increments of time for the various load and speed conditions. As the number of increments increase, the chances of unnecessarily oversizing the selection will be reduced. Record the time interval, maximum OPERATING LOAD and maximum RPM for each increment. The OPERATING LOAD can be in terms of HP or torque. RPM and load must be consistent with the shaft location (reducer input or output shaft.) Calculate and record the DESIGN LOAD by multiplying the OPERATING LOAD by the SHOCK LOAD FACTOR from Step 1.

3. **B.** Refer to the appropriate unit ratings based on the product being selected and make an initial unit selection. This can be approximated from the maximum operating load and appropriate RPM. For the size selected, record the mechanical rating (consistent with the defined load type and shaft location) in the UNIT RATING column in the table for each increment. Straight line interpolation may be used for unlisted speeds.

CAUTION: If, at any time during the load cycle, the OPERATING LOAD is greater than three times the unit rating, that size unit is unacceptable for the application.

3. **C.** Calculate the LOAD RATIO by dividing the DESIGN LOAD by the UNIT RATING and assign the proper load EXPONENT. If the LOAD RATIO is greater than 1, use an EXPONENT of 6.8, if this RATIO is equal to or less than 1, use an EXPONENT of 3. Also calculate the percentage of the total cycle time for each increment by dividing each time increment by the total cycle time which includes any dwell time within the cycle.

3. **D.** Calculate the LIFE ADJUSTMENT FACTOR for each increment by applying the assigned EXPONENT to the LOAD RATIO and multiplying by the percent of CYCLE TIME per the equation below. Sum these values.

$$\text{LIFE ADJUSTMENT FACTOR} = \frac{\%\ \text{CYCLE TIME}}{} \times (\text{LOAD RATIO})^{\text{EXPONENT}}$$

3. **E.** Determine the EXPECTED LIFE in hours by dividing the LIFE ADJUSTMENT FACTOR sum into the design life of 25,000 hours.

$$\frac{25{,}000}{\text{LIFE ADJ. FACTOR SUM}} = \text{Hours EXPECTED LIFE}$$

3. **F.** Compare the EXPECTED LIFE with the desired life. If necessary, convert the desired life to hours based on actual operating time per day and desired calendar life. If the EXPECTED LIFE is too low (or excessively high) select the next larger (or smaller) unit size and repeat Steps 3A through 3F.

TABLE 3—SELECTION WORKSHEET

INCREMENT	TIME INTERVAL	RPM	OPERATING LOAD	DESIGN LOAD	UNIT RATING	LOAD RATIO	EXPONENT	% OF CYCLE TIME	LIFE ADJ. FACTOR

MOTION CONTROL SELECTION PROCEDURES
DUTY CYCLE METHOD AND EXAMPLE

4. Using the Thermal Capacity Worksheet illustrated in Table 4, check the thermal capacity of the unit selected by following steps 4A through 4E.

TABLE 4—THERMAL CAPACITY WORKSHEET

INCREMENT	TIME INTERVAL	RPM	OPER. LOAD	UNIT THERMAL RATING	THERMAL LOAD RATIO	% OF CYCLE TIME	THERMAL CAPACITY FACTOR

4. **A.** Record the TIME INTERVAL, RPM and OPERATING LOAD as taken from the Selection Worksheet.

4. **B.** For the size being reviewed record the unit thermal rating (from the catalog adjacent to the mechanical rating and consistant with the defined load type and shaft location) in the UNIT THERMAL RATING column. Straight line interpolation may be used for unlisted speeds.

   NOTE: When the operating load is less than the UNIT THERMAL RATING for all increments, one can conclude at this point that the thermal capacity is adequate.

4. **C.** Calculate the THERMAL LOAD RATIO by dividing the OPERATING LOAD by the UNIT THERMAL RATING. Record the % of CYCLE TIME as taken from the selection worksheet.

4. **D.** Calculate the THERMAL CAPACITY FACTOR by applying an exponent of 3 to the THERMAL LOAD RATIO and multiplying by the % CYCLE TIME for each increment per the equation below. Sum these values.

$$\text{THERMAL CAPACITY FACTOR} = (\text{THERMAL LOAD RATIO})^3 \times \frac{\%\ \text{CYCLE TIME}}{}$$

4. **E.** If the sum of the THERMAL CAPACITY FACTORS is close to or less than 1, the unit should operate within its thermal capacity. If greater than 1, a larger unit may be necessary.

5. Check OVERHUNG LOADS on all shafts and/or THRUST LOAD on the output shaft. Refer to the appropriate product catalog for ratings and explanation in the Engineering section.

EXAMPLE: DUTY CYCLE METHOD

The following example illustrates the procedure for selecting a WINSMITH® speed reducer using the Duty Cycle Method discussed on Page A5.

A servo motor is used to drive an S-ELIMINATOR with a cyclic load as shown in Figure 1. The drive will operate 10 hrs. per day, 5 days per week. The maximum operating speed of the servo motor is 2000 RPM.

1. From Table 2, the SHOCK LOAD FACTOR is 1.30 based on a trapezoidal velocity profile and 30 cycles per minute.

2. At maximum speed, the motor speed is 2000 RPM and the output speed is 100 RPM.

$$\text{Ratio} = \frac{2000}{100} = 20{:}1$$

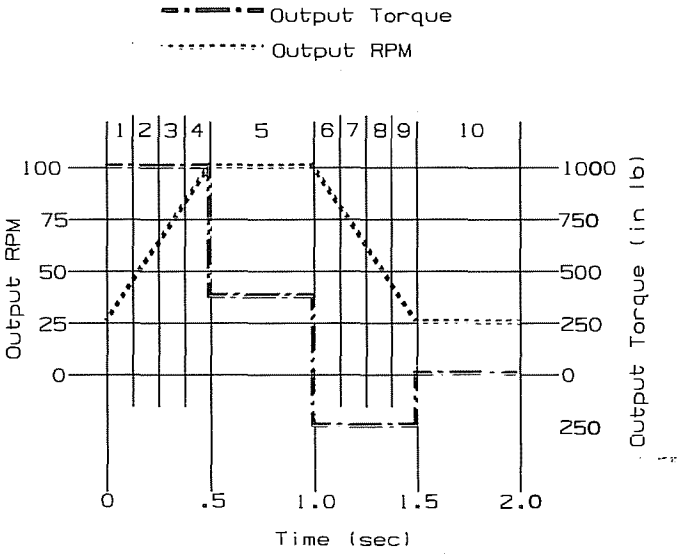


FIGURE 1

3. **A.** Figure 1 has been broken down into 10 increments. For each increment, record the TIME INTERVAL, RPM (output) and OPERATING LOAD (output torque) on the worksheet (see Table 5 on page A7). Calculate and record the DESIGN LOAD by multiplying the OPERATING LOAD by the SHOCK FACTOR.

3. **B.** Using the maximum operating torque as criteria, the Size 926 at 20:1 would be an appropriate initial selection.

   Complete the UNIT RATING column based on rated torque capacity at the specified output RPM. Use straight line interpolation for speeds not listed.

RATIO[1]	INPUT RPM[2]	OUTPUT RPM	MECHANICAL			THERMAL		
			INPUT HP	INPUT TORQUE	OUTPUT TORQUE	INPUT HP	INPUT TORQUE	OUTPUT TORQUE
20 (20)	3000	150	2.63	55	973	2.52	53	931
	2500	125	2.45	62	1080	2.45	62	1080
	1750	88	2.11	76	1310	2.11	76	1310
	1160	58	1.61	87	1475	1.61	87	1475
	600	30	.87	91	1475	.87	91	1475
	100	5.0	.16	102	1475	.16	102	1475

MOTION CONTROL SELECTION PROCEDURES
DUTY CYCLE METHOD—EXAMPLE

TABLE 5—EXAMPLE SELECTION WORKSHEET

INCREMENT	TIME INTERVAL	RPM	OPERATING LOAD	DESIGN LOAD	UNIT RATING	LOAD RATIO	EXPONENT	% OF CYCLE TIME	LIFE ADJ. FACTOR
1	.125	43	1000	1300	1475	.881	3	.063	.043
2	.125	63	1000	1300	1475	.881	3	.063	.043
3	.125	80	1000	1300	1354	.967	3	.063	.057
4	.125	100	1000	1300	1235	1.053	6.8	.063	.090
5	.50	100	375	488	1235	.395	3	.25	.015
6	.125	100	250	325	1235	.263	3	.063	.001
7	.125	80	250	325	1354	.240	3	.063	.001
8	.125	63	250	325	1475	.220	3	.063	.001
9	.125	43	250	325	1475	.220	3	.063	.001
10	.50	25	0	0	1475	0	3	.25	0
									.252

3. **C.** Calculate the LOAD RATIO by dividing the DESIGN LOAD by the UNIT RATING. Assign the proper EXPONENT (per instructions in Step 3C of the procedure) and calculate the % of CYCLE TIME for each increment.

3. **D.** Calculate the LIFE ADJUSTMENT FACTOR for each increment using the equation in Step 3D of the procedure. Sum these values.

3. **E.** Determine the EXPECTED LIFE by dividing the design life of 25,000 hours by the LIFE ADJUSTMENT FACTOR SUM.

$$\text{EXPECTED LIFE} = \frac{25{,}000}{.252} = 99{,}200 \text{ hours.}$$

3. **F.** Compare the EXPECTED LIFE with the desired life. First convert the desired life to hours.

5 yrs. x 52 wks. x 5 days x 10 hrs. = 13,000 hrs. desired life.

Since this is significantly lower than the EXPECTED LIFE, it would be appropriate to consider the next smaller unit size. A similar analysis (not shown) using a Size 920 at 20-1 yields an EXPECTED LIFE of only 820 hours which would be unsuitable for this application.

4. Check the THERMAL CAPACITY using the thermal capacity worksheet and catalog thermal unit ratings (see Table 6).

TABLE 6—EXAMPLE WORKSHEET FOR THERMAL CAPACITY

INCREMENT	TIME INTERVAL	RPM	OPER. LOAD	UNIT THERMAL RATING	THERMAL LOAD RATIO	% OF CYCLE TIME	THERMAL CAPACITY FACTOR
1	.125	43	1000	1475	.678	.063	.020
2	.125	63	1000	1475	.678	.063	.020
3	.125	80	1000	1354	.739	.063	.025
4	.125	100	1000	1325	.739	.063	.025
5	.50	100	375	1325	.283	.50	.011
6	.125	100	250	1325	.189	.063	.000
7	.125	80	250	1354	.189	.063	.000
8	.125	63	250	1475	.169	.063	.000
9	.125	43	250	1475	.169	.063	.000
10	.50	25	0	1475	0	.50	0
							.101

4. **A.** The first three columns of the THERMAL CAPACITY WORKSHEET (TIME INTERVAL, RPM and LOAD) are lifted from the SELECTION WORKSHEET.

4. **B.** The thermal capacity for a 926 at 20:1 is shown (as a reprint from the rating section) at Step 3B of this example. Complete the UNIT THERMAL RATING column using this information. Use straight line interpolation for speeds not listed.

NOTE: Since the OPERATING LOAD is less than the UNIT THERMAL RATING for all increments, it can be concluded that the unit will not be thermally limited. But, for demonstration purposes, we will continue this example through the entire procedure.

4. **C.** Calculate and record the THERMAL LOAD RATIO for each increment per the instructions in Step 4D. Lift the % CYCLE TIME from the selection worksheet.

4. **D.** Calculate and record the THERMAL CAPACITY FACTOR for each increment per the instructions in Step 4D. Sum these values.

4. **E.** Since the sum of the THERMAL CAPACITIES is less than 1, the reducer thermal capacity is adequate.

SELECTION WORKSHEETS

UNIT SELECTION WORKSHEET

INCREMENT	TIME INTERVAL	RPM	LOAD	DESIGN LOAD	UNIT RATING	LOAD RATIO	EXPONENT	% OF CYCLE TIME	LIFE ADJ. FACTOR
1									
2									
3									
4									
5									
6									
7									
8									
9									
10									
								total	

THERMAL SELECTION WORKSHEET

INCREMENT	TIME INTERVAL	RPM	LOAD	UNIT THERMAL RATING	THERMAL LOAD RATIO	% OF CYCLE TIME	THERMAL CAPACITY FACTOR
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
						total	

MOTION CONTROL ORDER FORM

DATE_____

TO_____
FAX NO. 716/592-9546
SOLD TO_____
_____
_____
ATTN:_____
PHONE NO._____
CUSTOMER NO._____
CUSTOMER P.O. NO._____
WINSMITH® SALES OFFICE_____

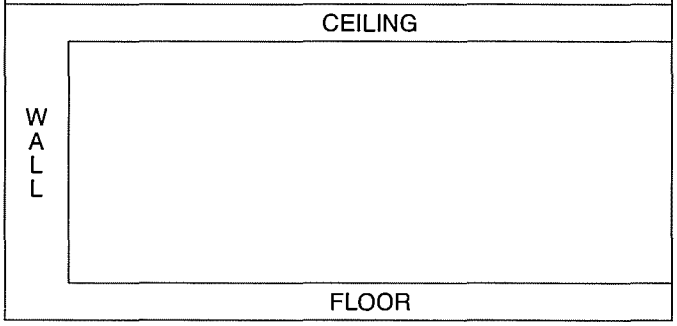
FROM_____
FAX NO._____
SHIP TO_____
_____
_____
ATTN:_____
PHONE NO._____
TAG NO._____
CONTACT_____

PRODUCT DESCRIPTION

SIZE_____
MODEL_____
ASSEMBLY_____
RATIO_____
S. S. BORE_____
QUANTITY_____
DELIVERY REQUIRED_____

MOUNTING POSITION

MOUNTING POSITION SKETCH



SPECIAL FEATURES_____
_____
_____

TYPE OF MOTION CONTROL PRODUCT

Single Reduction or Double Reduction Secondary
(S-ELIMINATOR, S-MINIMIZER, C-ELIMINATOR, C-MINIMIZER) _____

Double Reduction Primary or Double Driver
(S-MINIMIZER, C-MINIMIZER, STANDARD) _____

MOTOR INFORMATION (if required)

Motor Manufacturer _____
Motor Frame Size _____
Motor Identification Number _____
Is a drawing included with the order _____Yes _____No

MOTION CONTROL UNIT PRICE

LIST PRICE_____ UNIT PRICE MULTIPLIER_____ NET PRICE_____

COUPLING (optional)

☐ Furnished by Customer ☐ Furnished by WINSMITH

Coupling Description_____

LIST PRICE_____ UNIT PRICE MULTIPLIER_____ NET PRICE_____

HOW TO ORDER

Use the MOTION CONTROL order form on the opposite page and follow the below instructions.

- Use this form as a fax order and send to the preprinted fax number.
- Fill in all customer related information. Be as complete as possible so subsequent questions can be answered easily.
- If order originates from a WINSMITH® sales office, include the name of the contact most likely to be able to answer questions.
- Select product using one of the three selection procedures on pages A3-A7 and fill in the product description fields that are required. See pages A11-A12 for product nomenclature.
- Indicate quantity and delivery required.
- All MOTION CONTROL products need to have the mounting position described. Supply a small sketch in the space supplied or write in a description of the mounting.
- Describe any special features required.
- Indicate the type of MOTION CONTROL product needed. Include double reduction primary if required.
- Complete the motor information section if motorized.
- If WINSMITH is to supply coupling, please complete coupling section. (See page F7).

PRICING WORKSHEET

SINGLE REDUCTION

	LIST PRICE
Base Unit (MOTION CONTROL)	_____
Options	
1. Servo Coupling Adaptor	_____
2.	_____
Total	_____

DOUBLE REDUCTION— C-ELIMINATOR, C-MINIMIZER, S-MINIMIZER

	LIST PRICE
Standard Double Reduction Unit	_____
MOTION CONTROL Adder Secondary or Primary and Secondary	_____
Options	
1. Servo Coupling Adaptor—Primary	_____
2.	_____
Total	_____

DOUBLE REDUCTION— S-ELIMINATOR

	LIST PRICE
Base Unit—Secondary (S-ELIMINATOR)	_____
S-ELIMINATOR—Adder if above 20:1	_____
56C Servo Adaptor (secondary)—Required	_____
Intermediate Coupling—Required	_____
Servo Driver Unit—Primary	_____
Options	
1. Servo Coupling Adaptor—Primary	_____
2.	_____
Total	_____

PRODUCT IDENTIFICATION
S-ELIMINATOR AND S-MINIMIZER

EXAMPLE: **Catalog Description** D-90® Series, 3.50" Center Distance, Worm on Top, Single Reduction, Double Extended Slow Speed Shaft, 143TC Frame C-Face Input, 30:1 Ratio
Catalog Code 935 MDT, LR, 143TC, 30:1
End Unit Part Number 935MDTS22000EK

9 35 m DT S 2 2 00 0 EK

SERIES

CODE	DESC	EUPN
9	D-90 SERIES	9

CENTER DISTANCE

CODE	DESC	EUPN
10	1.00"	10
13	1.33"	13
17	1.75"	17
20	2.00"	20
24	2.375"	24
26	2.625"	26
30	3.00"	30
35	3.50"	35
43	4.25"	43

INPUT STYLE

CODE	DESC	EUPN
C	C-Flange w/Coupling motor adapter	C
M	C-Flange w/Quill motor adapter	M
(blank)	Non-Motorized	X

BASIC MODEL

CODE	DESC	EUPN
	D-90 SERIES	
DB	Worm on bottom	DB
DT	Worm on top	DT
DV	Vertical output shaft	DV
DL	Drop bearing output	DL
DN	Footless solid output	DN
DJ	Vertical input shaft	DJ
DD	C-flange output (Double Driver)	DD
DSN	Footless hollow shaft output	DS
DSF	Flange mount hollow output	SF
DSR	Torque arm hollow output	SR
DSB	Foot mt.—wos bottom—hollow output	SB
DST	Foot mt.—wos top—hollow output	ST
DVY	Vertical output—drywell	DY
DSFY	Flange mt. hollow out—drywell	SY
DLY	Drop bearing—drywell	LY
WB	Worm on the bottom	WB
WT	Worm on the top	WT
WU	Base top & bottom	WU

REDUCTION STAGES

CODE	DESC	EUPN
S	Single	S
D	Double	D
T	Triple	T
X	Helical primary	X
	Single Reduction Only	
K	S-Eliminator	K
E	S-Equalizer®	E
M	Maximizer® Plus	M
H	Max Plus & S-Equalizer	H

SHAFT ARRANGEMENT

Horizontal Units

CODE	DESC	EUPN
LR	Solid out—double ext	2
R	Solid out—right ext	3
L	Solid out—left ext	4

***Vertical Units**

CODE	DESC	EUPN
RU	S.S. right—S.S. up	2
RD	S.S. right—S.S. down	3
LU	S.S. left—S.S. up	4
LD	S.S. left—S.S. down	5
RUD	S.S. right—S.S. up & down	6
LUD	S.S. left—S.S. up & down	7

Hollow Output

CODE	DESC	EUPN
DR	Driven machine right	3
DL	Driven machine left	4
DLR	Symmetric shaft	5

2-9 & A-V	Double & Triple Reduction check with the factory

*Viewing Input (Motor end) of high speed shaft.

MOTOR FRAME SIZE

CODE/DESC	EUPN
42C	W
48C	V
56C	1
143-145TC	2
182-184TC	3
213-215TC	4
254-256TC	5
284-286TC	A
None (Input Shaft)	X

OUTPUT STYLE

CODE	EUPN
Solid Output Shaft	**00**

Hollow Output Shaft

CODE	DESC	EUPN
1/2	.50" Bore	08
9/16	.563" Bore	09
5/8	.625" Bore	10
	(#—increase EUPN by one for each 1/16" increase in bore size)	
6-3/16	6.1875"	99

Double Driver (basic model equals DD)

CODE/DESC	EUPN
Small Flange/Standard Shaft Diameter	10
Small Flange/Optional 5/8" Shaft Diameter	11
Small Flange/Optional 7/8" Shaft Diameter	12
Large Flange/Standard Shaft Diameter	20
Large Flange/Optional 1-1/8" Shaft Diameter	23
Large Flange/Optional 1-3/8" Shaft Diameter	24

RATIO

CODE	EUPN
4:1	AW
5:1	A8
7.5:1	BT
8:1	BX
10:1	B7
15:1	C1
20:1	DN
25:1	D4
30:1	EK
38:1	E2
40:1	FA
50:1	FT
60:1	GC
75:1	G7
80:1	HC
90:1	HR
100:1	HO
120:1	JM
150:1	J9
180:1	KZ
200:1	LC
250:1	L2
300:1	MM
360:1	M4
500:1	N4
750:1	P5
1000:1	QO
1500:1	R6
2000:1	S1
3000:1	TV
3600:1	T6
4000:1	U8
5000:1	UE
6000:1	UM
8000:1	3M
10000:1	U5
and others	

PRODUCT IDENTIFICATION
C-ELIMINATOR AND C-MINIMIZER

EXAMPLE: **Catalog Description** C-Line Series, 3.50" Center Distance, Worm on Top, Single Reduction, Dual Output Shaft (LR), 140TC Frame, C-Face Input, 30:1 Ratio
Catalog Code 6 MCT, LR, 140TC, 30:1
End Unit Part Number 006MCTS22000EK

0 06 m CT S 2 2 00 0 EK

SERIES

CODE	DESC	EUPN
0	C-Line	0

CENTER DISTANCE

CODE	DESC	EUPN
01	1.33"	01
02	1.75"	02
03	2.00"	03
04	2.625"	04
05	3.00"	05
06	3.50"	06
07	4.00"	07
08	4.60"	08
09	5.167"	09
10	6.00"	10
11	6.50"	11
12	7.00"	12
13	7.625"	13
14	8.125"	14
15	9.00"	15

INPUT STYLE

CODE	OESC	EUPN
C	C-Flange w/Coupling motor adapter	C
M	C-Flange w/Quill motor adapter	M
(blank)	No C-Flange	X

BASIC MODEL

CODE	DESC	EUPN
CB	Worm on bottom	CB
CT	Worm on top	CT
CV	Vertical output shaft	CV
L	Drop bearing output	CL
S	Hollow shaft output	CS
SF	Flange mount hollow output	SF
ST	Torque arm hollow output	SR
SCB	Foot mt.—wos bottom—hollow output	SB
SCT	Foot mt.—wos top—hollow output	ST

REDUCTION STAGES

CODE	DESC	EUPN
S	Single	S
D	Double	D
T	Triple	T
X	Helical primary	X
K	C-Eliminator	K

SHAFT ARRANGEMENT

Horizontal Units

CODE	DESC	EUPN
LR	Solid out—double ext	2
R	Solid out—right ext	3
L	Solid out—left ext	4

***Vertical Units**

CODE	DESC	EUPN
RU	S.S. right—S.S. up	2
RD	S.S. right—S.S. down	3
LU	S.S. left—S.S. up	4
LD	S.S. left—S.S. down	5
RUD	S.S. right—S.S. up & down	6
LUD	S.S. left—S.S. up & down	7

Hollow Output

CODE	DESC	EUPN
DR	Driven machine right	3
DL	Driven machine left	4
DLR	Symmetric Hollow Shaft	5
2-9 & AV	Double & Triple Reduction check with the factory	

*Viewing Input (Motor end) of high speed shaft.

MOTOR FRAME SIZE

CODE/DESC	EUPN
42C	W
48C	V
56C	1
143-145TC	2
182-184TC	3
213-215TC	4
254-256TC	5
284-286TC	A
None (Input Shaft)	X

OUTPUT STYLE

CODE	EUPN
Solid Output Shaft	00

Hollow Output Shaft

CODE	DESC	EUPN
1/2	.50" Bore	08
9/16	.563" Bore	09
5/8	.625" Bore	10
(#—increase EUPN by one for each 1/16" increase in bore size)		
6-3/16	6.1875"	99

RATIO

CODE	EUPN
4:1	AW
5:1	A8
7.5:1	BT
8:1	BX
10:1	B7
15:1	C1
20:1	DN
25:1	D4
30:1	EK
38:1	E2
40:1	FA
50:1	FT
60:1	GC
75:1	G7
80:1	HC
90:1	HR
100:1	HO
120:1	JM
150:1	J9
180:1	KZ
200:1	LC
250:1	L2
300:1	MM
360:1	M4
500:1	N4
750:1	P5
1000:1	QO
1500:1	R6
2000:1	S1
3000:1	TV
3600:1	T6
4000:1	U8
5000:1	UE
6000:1	UM
8000:1	3M
10000:1	U5
and others	

S-ELIMINATOR
PRODUCT INTRODUCTION & CAPABILITIES

The S-ELIMINATOR is a precision worm gear product designed to be a motion control product. The exterior of the S-ELIMINATOR is very similar to the D-90® TYPE SE® product, but that is where the similarity ends. The S-ELIMINATOR uses patented gearing technology to achieve its unique adjustable backlash capability. Backlash is adjustable to a maximum of two arc minutes at the output shaft. This is a level most often associated with robotic applications and is available from only a few manufacturers.

Backlash adjustment on the S-ELIMINATOR is made possible by a unique worm design with a variable thread thickness① which gradually increases over its length. This worm-on-shaft is used with a precision worm gear② to insure the smoothest mesh possible. By moving the worm axially, the clearance between the gear tooth space can be taken up by this gradually increasing thread thickness, thereby reducing backlash.

Two angular contact ball bearings③ are radially and axially clamped to the worm shaft in a cartridge which has a fine thread on the outside diameter. This cartridge④ mates with a like thread in the housing. The cartridge is located opposite the input shaft (as pictured). During initial assembly, the worm is axially positioned⑤ for the least possible backlash condition and locked in place with a locking collar⑥ A non-hardening sealing compound is applied to the threaded surfaces to prevent oil leakage during storage and operation.

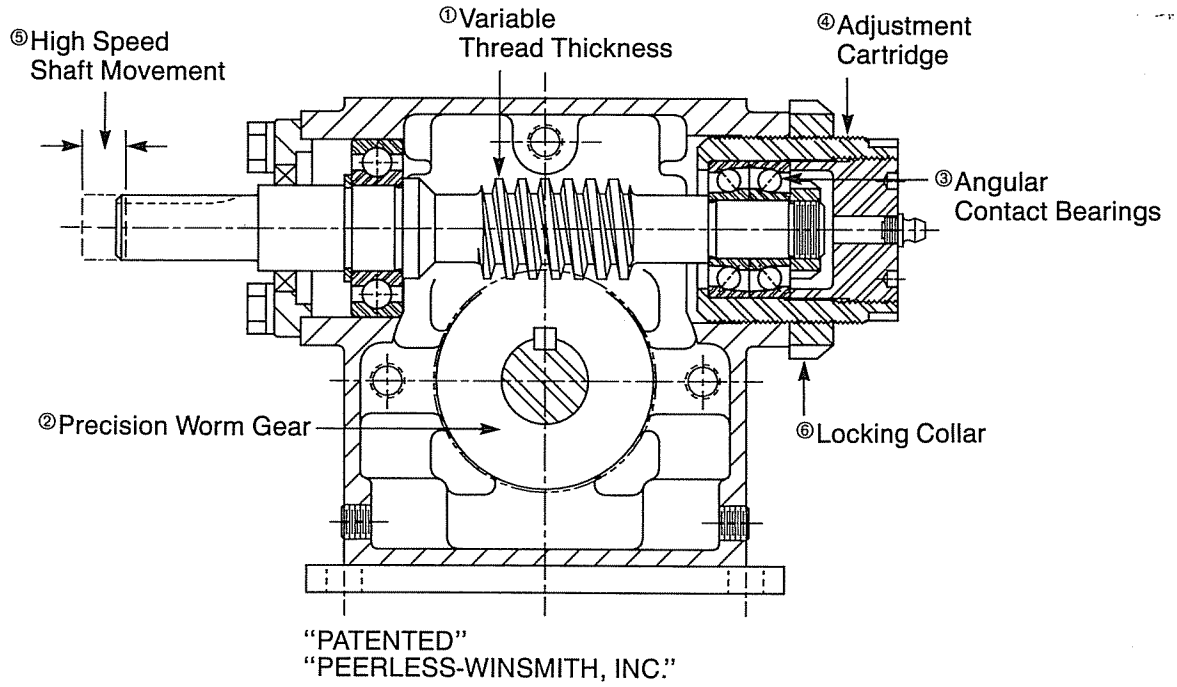
Subsequent adjustment is easily accomplished without disassembly or even removal from the installation. Simply loosen the locking collar, and reposition the worm until the desired backlash is achieved and retighten the collar.

When repositioning the worm, excessive force on the cartridge which could cause binding of the gear mesh and other internal damage must be avoided.

The S-ELIMINATOR is built in the basic D-90 TYPE SE exterior style to allow ease of use for the existing base of WINSMITH® customers. The D-90 TYPE SE exterior is very user friendly and offers a wide selection of product configurations. The unique S-ELIMINATOR design does limit the possible configurations which are defined in the model capabilities paragraph on page B2.

RATINGS & INERTIA

Ratios, ratings, and inertia values for the S-ELIMINATOR products are presented in this catalog on pages B3-B16.



S-ELIMINATOR
PRODUCT INTRODUCTION & CAPABILITIES

COUPLING MOTOR ADAPTORS

Coupling motor adaptors are supplied in standard NEMA dimensions as well as in many variations that easily adapt to servo motors. All coupling style motor adaptors shown in the MOTION CONTROL Catalog will have a large access hole to allow for easy coupling adjustment. See the catalog section covering motor flanges for more details.

OUTPUT REGISTER OPTION

Occasionally there is a need to register the output of a motion control speed reducer to the driven machine. Some solid output models can be supplied with the male register interface on the slow speed side of the unit. See the servo driver discussion on this page for size and model information. Hollow shaft models can be supplied with a register in the output flange. See the Options section of this catalog for dimensional information.

DOUBLE REDUCTION

The S-ELIMINATOR is not designed to be used as an integrally built double reduction product. However, the S-ELIMINATOR models using a coupling style input can be combined with a servo driver (see below) primary stage to create a worm/worm double reduction assembly. This arrangement would be treated as two separate single reduction units assembled at the WINSMITH® plant. Ratio combinations and ratings would be similar to the C-Line. Check with the factory for unit ratings. WINSMITH does not supply a separate helical primary stage gearbox to be used in combination with the S-ELIMINATOR.

The overall backlash of a double reduction unit can be determined by dividing the secondary stage ratio into the backlash of the primary stage and adding the result to the secondary stage backlash.

EXAMPLE:

STAGE	RATIO	BACKLASH BY STAGE	OVERALL BACKLASH
Primary (standard)	10:1	23 arc min	23/20 = 1.2 arc min
Secondary (S-ELIMINATOR)	x 20:1	2 arc min	+ 2.0 arc min
TOTAL	200:1		3.2 arc min

SERVO DRIVER

The servo driver is a single reduction D-90 TYPE SE unit fitted with the male (motor) side of a 56C interface on the slow speed side of the unit. This unit can be coupled to a S-ELIMINATOR to create a double reduction ratio combination. The input of the servo driver can be an input shaft, a coupling style (servo or NEMA) adaptor or a standard NEMA quill type interface. The servo driver is available in the following sizes and models:

SIZE	MODEL
913	DN, MDN, CDN
917	DN, MDN, CDN
920	DN, MDN, CDN

917 and 920 servo drivers are available with the S-MINIMIZER option.

C-LINE AS S-ELIMINATOR

The patented axially adjustable backlash feature used in the S-ELIMINATOR can be used in some C-Line products.

STANDARD MOUNTING POSITIONS

S-ELIMINATOR units must be built for specific mounting positions to provide adequate lubrication for all bearings. The standard mounting position is as pictured on the catalog dimension pages. Deviations from this must be identified at the time of order placement.

LUBRICATION

S-ELIMINATOR units are factory filled with synthetic oil, SHC629 or equal. Synthetic lubricants can be advantageous over mineral oils in that they generally are more stable, improve the operating efficiency, have longer life, and operate over a wider temperature range. These oils are appropriate for any application, but are especially useful when units are subjected to low start-up temperatures or high operating temperatures. Refer to the product installation bulletin shipped with each unit for detailed information on lubrication and maintenance.

MODEL CAPABILITY

The S-ELIMINATOR product is available in six sizes and many of the same standard models offered in the D-90® TYPE SE® product line. The S-ELIMINATOR's axially adjustable technology requires accurate bearing support on both ends of the worm-on-shaft to insure proper control of worm-on-shaft movement. For this reason the S-ELIMINATOR offerings are limited to input shaft and coupling motor adaptor models as shown in the following chart. External dimensions for the S-ELIMINATOR are presented in this catalog on pages B17-B22.

MODEL	SIZE					
	913	917	920	926	930	935
DNK	yes	yes	yes	yes	yes	yes
DTK	yes	yes	yes	yes	yes	yes
DVK	yes	yes	yes	yes	yes	yes
DSNK	no	yes	yes	yes	yes	yes
DSTK	no	yes	yes	yes	yes	yes
DSFK	no	yes	yes	yes	yes	yes
DLK	no	no	no	yes	yes	yes
CDNK	yes	yes	yes	yes	yes	yes
CDTK	yes	yes	yes	yes	yes	yes
CDVK	yes	yes	yes	yes	yes	yes
CDSNK	no	yes	yes	yes	yes	yes
CDSTK	no	yes	yes	yes	yes	yes
CDSFK	no	yes	yes	yes	yes	yes
CDLK	no	no	no	yes	yes	yes

NOTE: Sizes and models other than shown above are not available in S-ELIMINATOR Products.

CONDENSED RATINGS CHART
S-ELIMINATOR—MECHANICAL RATINGS†

1. Before selecting from these tables, refer to the Selection Procedures on pages A3-A7. Using either the INPUT or OUTPUT METHOD, determine the DESIGN HP or TORQUE. Do not use these tables in conjunction with the FULL DUTY CYCLE METHOD.
2. For the applicable RATIO and RPM, read across until the unit rating from the table meets or exceeds the DESIGN LOAD (from Step 1).
3. If the selection falls within a shaded area and the application includes continuous operation (more than

NOMINAL* RATIO	INPUT RPM□	NOMINAL OUTPUT RPM	913				917				920			
			INPUT HP	INPUT TORQUE	OUTPUT TORQUE	EFF	INPUT HP	INPUT TORQUE	OUTPUT TORQUE	EFF	INPUT HP	INPUT TORQUE	OUTPUT TORQUE	EFF
4	3000	750	1.44	30	110	91	2.61	55	204	93	3.84	81	289	94
	1750	438	1.14	41	149	90	2.09	75	277	92	3.07	110	393	94
	1160	290	0.92	50	179	90	1.75	95	347	91	2.57	140	494	93
5	3000	600	1.25	26	118	90	2.26	48	219	92	3.20	67	314	93
	1750	350	0.99	36	159	89	1.77	64	290	91	2.56	92	427	92
	1160	232	0.80	43	190	88	1.51	82	371	90	2.15	117	535	92
7.5	3000	400	1.02	21	141	88	1.93	41	278	91	2.71	57	394	92
	1750	233	0.81	29	190	87	1.54	55	375	90	2.15	78	532	92
	1160	155	0.63	34	219	86	1.23	67	448	89	1.73	94	639	91
10	3000	300	0.80	17	139	83	1.59	33	297	89	2.22	47	424	91
	1750	175	0.63	23	187	82	1.26	46	400	88	1.77	64	572	90
	1160	116	0.51	28	222	80	1.01	55	477	87	1.42	77	683	89
15	3000	200	0.64	14	162	80	1.19	25	318	85	1.63	34	446	87
	1750	117	0.51	18	216	79	0.95	34	429	84	1.31	47	602	85
	1160	77	0.39	21	247	77	0.76	41	509	82	1.07	58	731	84
20	3000	150	0.50	10	151	72	0.95	20	325	81	1.30	27	455	83
	1750	88	0.40	14	203	71	0.76	27	438	80	1.05	38	615	82
	1160	58	0.32	17	241	69	0.61	33	519	78	0.86	47	746	80
25	3000	120	0.44	9	158	69	0.80	17	327	78	1.12	24	474	82
	1750	70	0.35	13	212	67	0.64	23	440	76	0.89	32	634	80
	1160	46	0.28	15	248	65	0.52	28	522	74	0.71	38	740	79
30	3000	100	0.39	8	167	67	0.69	15	328	75	0.95	20	470	79
	1750	58	0.31	11	222	66	0.56	20	441	73	0.76	28	633	77
	1160	39	0.24	13	254	64	0.45	25	523	71	0.62	34	751	75
40	3000	75	0.31	7	150	57	0.56	12	324	69	0.75	16	454	72
	1750	44	0.25	9	202	56	0.45	16	436	67	0.61	22	613	70
	1160	29	0.19	10	215	53	0.36	20	517	65	0.50	27	743	68
50	3000	60	0.26	5	145	50	0.47	10	320	65	0.61	13	445	70
	1750	35	0.18	7	152	47	0.35	13	398	63	0.50	18	610	68
	1160	23	0.13	7	152	43	0.25	13	398	59	0.39	21	708	66
60	3000	50	0.24	5	152	50	0.40	8	299	60	0.53	11	433	65
	1750	29	0.18	6	187	49	0.32	11	400	58	0.42	15	580	63
	1160	19	0.13	7	187	45	0.23	12	400	54	0.33	18	650	61

*See following ratings pages for exact ratios based on unit sizes.
†These ratings are based on using synthetic oil in the unit.
□For input speeds greater than 3000 RPM, see page A3.

CONDENSED RATINGS CHART
S-ELIMINATOR—MECHANICAL RATINGS†

one half hour in a two hour period), refer to the S-ELIMINATOR rating pages B5-B16 and verify that the continuous applied load does not exceed the unit thermal capacity. If so, select the minimum size unit where the THERMAL capacity meets or exceeds the continuous applied load.

4. Check OVERHUNG LOADS on all shafts and/or THRUST LOAD on the output shaft. Refer to the S-ELIMINATOR rating pages B5-B16, for shaft capacities and the Engineering Section for explanation.

NOMINAL* RATIO	INPUT RPM◘	NOMINAL OUTPUT RPM	926				930				935			
			INPUT HP	INPUT TORQUE	OUTPUT TORQUE	EFF	INPUT HP	INPUT TORQUE	OUTPUT TORQUE	EFF	INPUT HP	INPUT TORQUE	OUTPUT TORQUE	EFF
4	3000	750	7.97	167	641	96	11.75	247	947	96	16.70	351	1351	96
	1750	438	6.37	229	872	95	9.38	338	1289	95	13.33	480	1838	96
	1160	290	5.32	289	1090	94	7.70	418	1585	95	11.24	611	2324	95
5	3000	600	6.97	146	696	95	10.21	215	1065	96	14.82	311	1493	96
	1750	350	5.58	201	946	94	8.16	294	1449	95	11.83	426	2031	95
	1160	232	4.68	254	1188	94	6.82	371	1813	94	9.72	528	2497	95
7.5	3000	400	5.42	114	802	94	8.35	175	1198	95	11.24	236	1679	95
	1750	233	4.34	156	1091	93	6.68	241	1630	94	8.99	324	2283	94
	1160	155	3.65	198	1369	92	5.61	305	2047	93	7.46	405	2830	93
10	3000	300	4.51	95	882	93	6.66	140	1314	94	8.87	186	1883	94
	1750	175	3.57	129	1184	92	5.25	189	1759	93	7.11	256	2562	93
	1160	116	2.98	162	1475	91	4.42	240	2212	92	5.96	324	3213	92
15	3000	200	3.26	68	919	90	4.79	101	1426	91	6.72	141	1924	91
	1750	117	2.54	92	1209	88	3.81	137	1915	90	5.41	195	2617	90
	1160	77	2.22	121	1565	87	3.19	173	2390	89	4.53	246	3259	88
20	3000	150	2.63	55	973	88	3.86	81	1456	90	5.43	114	2050	90
	1750	88	2.11	76	1310	86	3.09	111	1966	88	4.23	152	2694	88
	1160	58	1.61	87	1475	85	2.55	139	2410	87	3.69	200	3492	87
25	3000	120	2.17	46	990	87	3.20	67	1460	87	4.30	90	1927	85
	1750	70	1.74	63	1333	85	2.55	92	1949	85	3.49	126	2621	83
	1160	46	1.22	66	1380	83	2.18	119	2467	83	2.92	159	3234	81
30	3000	100	1.84	39	946	82	2.74	58	1470	85	3.75	79	1980	84
	1750	58	1.45	52	1247	79	2.20	79	1977	83	3.05	110	2694	82
	1160	39	1.28	69	1610	77	1.86	101	2462	81	2.58	140	3358	80
40	3000	75	1.46	31	972	79	2.12	44	1459	82	2.96	62	2052	82
	1750	44	1.18	43	1309	77	1.71	62	1971	80	2.34	84	2703	80
	1160	29	0.91	50	1475	74	1.42	77	2408	78	2.05	111	3492	78
50	3000	60	1.18	25	955	77	1.71	36	1416	79	2.40	50	1995	79
	1750	35	0.95	34	1286	75	1.38	50	1914	77	1.91	69	2637	77
	1160	23	0.70	38	1380	72	1.14	62	2310	75	1.49	81	3000	74
60	3000	50	0.97	20	907	74	1.40	29	1343	76	1.98	42	1804	72
	1750	29	0.74	27	1137	71	1.14	41	1813	74	1.62	58	2455	70
	1160	19	0.51	28	1137	68	0.89	48	2056	71	1.30	71	2850	67

*See following ratings pages for exact ratios based on unit sizes.
†These ratings are based on using synthetic oil in the unit.
◘For input speeds greater than 3000 RPM, see page A3.

REDUCER SIZE **913**

S-ELIMINATOR SERIES REDUCER RATINGS

WINSMITH

1.333 CENTER DISTANCE			HORSEPOWER AND TORQUE RATINGS (INCH POUNDS)[3] SYNTHETIC OIL						INERTIA LB. IN. SEC. SQ'D.		OVERHUNG LOAD CAPACITIES[4]						THRUST CAPACITIES		
			MECHANICAL			THERMAL					INPUT SHAFT	OUTPUT SHAFT					OUTPUT SHAFT		
RATIO[1]	INPUT RPM[2]	OUTPUT RPM	INPUT HP	INPUT TORQUE	OUTPUT TORQUE	INPUT HP	INPUT TORQUE	OUTPUT TORQUE	SOLID OUTPUT MODELS	HOLLOW OUTPUT MODELS	ALL[4] MODELS	DB, DT[4, 5]	DV[4] SHAFT UP	DV[4] SHAFT DOWN			DB, DT, DV,		
4 (4)	3000	750	1.44	30	110	1.44	30	110	.00030	—	124	290	290	250			536		
	2500	625	1.34	34	122	1.34	34	122			130	290	290	250			554		
	1750	438	1.14	41	149	1.14	41	149			143	290	290	250			594		
	1160	290	.92	50	179	.92	50	179			155	290	290	250			624		
	600	150	.58	61	213	.58	61	213			155	290	290	250			624		
	100	25	.12	76	248	.12	76	248			155	290	290	250			624		
5 (5)	3000	600	1.25	26	118	1.25	26	118	.00028	—	130	290	290	250			581		
	2500	500	1.12	28	126	1.12	28	126			138	290	290	250			605		
	1750	350	.99	36	159	.99	36	159			151	290	290	250			624		
	1160	232	.80	43	190	.80	43	190			155	290	290	250			624		
	600	120	.50	52	225	.50	52	225			155	290	290	250			624		
	100	20	.10	66	262	.10	66	262			155	290	290	250			624		
7½ (7½)	3000	400	1.02	21	141	1.02	21	141	.00019	—	125	290	290	250			624		
	2500	333	.96	24	159	.96	24	159			131	290	290	250			624		
	1750	233	.81	29	190	.81	29	190			144	290	290	250			624		
	1160	155	.63	34	219	.63	34	219			155	290	290	250			624		
	600	80	.38	40	250	.38	40	250			155	290	290	250			624		
	100	13	.08	49	282	.08	49	282			155	290	290	250			624		
10 (10)	3000	300	.80	17	139	.75	16	130	.00026	—	126	290	290	250			624		
	2500	250	.72	18	150	.72	18	150			134	290	290	250			624		
	1750	175	.63	23	187	.63	23	187			146	290	290	250			624		
	1160	116	.51	28	222	.51	28	222			155	290	290	250			624		
	600	60	.32	34	261	.32	34	261			155	290	290	250			624		
	100	10	.07	44	302	.07	44	302			155	290	290	250			624		
15 (15)	3000	200	.64	14	162	.64	14	162	.00017	—	128	290	290	250			624		
	2500	167	.60	15	182	.60	15	182			135	290	290	250			624		
	1750	117	.51	18	216	.51	18	216			150	290	290	250			624		
	1160	77	.39	21	247	.39	21	247			155	290	290	250			624		
	600	40	.24	25	281	.24	25	281			155	290	290	250			624		
	100	6.7	.05	33	316	.05	33	316			155	290	290	250			624		
20 (20)	3000	150	.50	10	151	.46	10	138	.00025	—	124	290	290	250			624		
	2500	125	.45	11	163	.45	11	163			131	290	290	250			624		
	1750	88	.40	14	203	.40	14	203			143	290	290	250			624		
	1160	58	.32	17	241	.32	17	241			155	290	290	250			624		
	600	30	.21	22	283	.21	22	283			155	290	290	250			624		
	100	5.0	.05	30	327	.05	30	327			155	290	290	250			624		

1. Numbers shown in ( ) are exact ratios.
2. Please specify if input speed is below 1160 RPM to insure proper bearing lubrication. For input speeds greater than 3000 RPM, see page A3.
3. Refer to the MOTION CONTROL Selection Procedures on pages A3-A7 for instructions on the application of these rating tables.
4. Overhung load given at one shaft diameter from housing or mounting flange. All values given in pounds.
5. Overhung load capacities are based on the direction and location of the load as shown in figure 1 on page G2. Consult factory for allowable OHL values if load is applied as shown in figure 2A, B, C or D on page G2.

REDUCER SIZE **913**

S-ELIMINATOR SERIES REDUCER RATINGS

WINSMITH

1.333 CENTER DISTANCE			HORSEPOWER AND TORQUE RATINGS (INCH POUNDS)[3] SYNTHETIC OIL						INERTIA LB. IN. SEC. SQ'D.		OVERHUNG LOAD CAPACITIES[4]						THRUST CAPACITIES		
			MECHANICAL			THERMAL					INPUT SHAFT	OUTPUT SHAFT					OUTPUT SHAFT		
RATIO[1]	INPUT RPM[2]	OUTPUT RPM	INPUT HP	INPUT TORQUE	OUTPUT TORQUE	INPUT HP	INPUT TORQUE	OUTPUT TORQUE	SOLID OUTPUT MODELS	HOLLOW OUTPUT MODELS	ALL[4] MODELS	DB, DT[4, 5]	DV[4] SHAFT UP	DV[4] SHAFT DOWN			DB, DT, DV,		
25 (25)	3000	120	.44	9	158	.41	9	147	.00022	—	119	290	290	250			624		
	2500	100	.40	10	173	.40	10	173			126	290	290	250			624		
	1750	70	.35	13	212	.35	13	212			137	290	290	250			624		
	1160	46	.28	15	248	.28	15	248			155	290	290	250			624		
	600	24	.18	19	288	.18	19	288			155	290	290	250			624		
	100	4.0	.04	26	329	.04	26	329			155	290	290	250			624		
30 (30)	3000	100	.39	8	167	.39	8	167	.00017	—	128	290	290	250			624		
	2500	83	.37	9	187	.37	9	187			135	290	290	250			624		
	1750	58	.31	11	222	.31	11	222			149	290	290	250			624		
	1160	39	.24	13	254	.24	13	254			155	290	290	250			624		
	600	20	.15	16	288	.15	16	288			155	290	290	250			624		
	100	3.3	.03	22	323	.03	22	323			155	290	290	250			624		
40 (40)	3000	75	.31	7	150	.31	6	149	.00023	—	124	290	290	250			624		
	2500	63	.28	7	163	.28	7	163			131	290	290	250			624		
	1750	44	.25	9	202	.25	9	202			144	290	290	250			624		
	1160	29	.19	10	215	.19	10	215			155	290	290	250			624		
	600	15	.11	11	215	.11	11	215			155	290	290	250			624		
	100	2.5	.02	15	215	.02	15	215			155	290	290	250			624		
50 (50)	3000	60	.26	5	135	.26	5	135	.00025	—	124	290	290	250			624		
	2500	50	.24	6	150	.24	6	150			130	290	290	250			624		
	1750	35	.18	7	152	.18	7	152			151	290	290	250			624		
	1160	23	.13	7	152	.13	7	152			155	290	290	250			624		
	600	12	.08	8	152	.08	8	152			155	290	290	250			624		
	100	2.0	.02	11	152	.02	11	152			155	290	290	250			624		
60 (60)	3000	50	.24	5	152	.24	5	152	.00017	—	131	290	290	250			624		
	2500	42	.22	6	170	.22	6	170			137	290	290	250			624		
	1750	29	.18	6	187	.18	6	187			155	290	290	250			624		
	1160	19	.13	7	187	.13	7	187			155	290	290	250			624		
	600	10	.07	8	187	.07	8	187			155	290	290	250			624		
	100	1.7	.02	11	187	.02	11	187			155	290	290	250			624		

1. Numbers shown in ( ) are exact ratios.
2. Please specify if input speed is below 1160 RPM to insure proper bearing lubrication. For input speeds greater than 3000 RPM, see page A3.
3. Refer to the MOTION CONTROL Selection Procedures on pages A3-A7 for instructions on the application of these rating tables.
4. Overhung load given at one shaft diameter from housing or mounting flange. All values given in pounds.
5. Overhung load capacities are based on the direction and location of the load as shown in figure 1 on page G2. Consult factory for allowable OHL values if load is applied as shown in figure 2A, B, C or D on page G2.

REDUCER SIZE **917**

S-ELIMINATOR SERIES REDUCER RATINGS

WINSMITH

1.750 CENTER DISTANCE			HORSEPOWER AND TORQUE RATINGS (INCH POUNDS)[3] SYNTHETIC OIL						INERTIA LB. IN. SEC. SQ'D.		OVERHUNG LOAD CAPACITIES[4]						THRUST CAPACITIES		
			MECHANICAL			THERMAL					INPUT SHAFT	OUTPUT SHAFT[7]					OUTPUT SHAFT		
RATIO[1]	INPUT RPM[2]	OUTPUT RPM	INPUT HP	INPUT TORQUE	OUTPUT TORQUE	INPUT HP	INPUT TORQUE	OUTPUT TORQUE	SOLID OUTPUT MODELS	HOLLOW OUTPUT MODELS	ALL[4] MODELS	DB, DT[4, 5]	OV[4] SHAFT UP	OV[4] SHAFT DOWN	DSF[6] BASE SIDE	OSF[6] COVER SIDE	DB, DT, OV,	DSF TOWARD BASE	OSF AWAY FROM BASE
4 (4)	3000	750	2.61	55	204	2.61	55	204	.00111	.00125	188	521	521	514	497	497	575	990	990
	2500	625	2.42	61	226	2.42	61	226			197	534	534	527	510	510	585	1013	1013
	1750	438	2.09	75	277	2.09	75	277			216	576	576	568	540	540	621	1062	1062
	1160	290	1.75	95	347	1.75	95	347			239	650	650	624	624	624	709	1218	1218
	600	150	1.18	124	445	1.18	124	445			295	650	650	624	700	700	878	1440	1507
	100	25	.26	165	555	.26	165	555			400	650	650	624	700	700	894	1440	1600
5 (5)	3000	600	2.26	48	219	2.26	48	219	.00095	.00107	188	546	546	538	519	519	610	1041	1041
	2500	500	2.10	53	243	2.10	53	243			197	567	567	559	533	533	629	1065	1065
	1750	350	1.77	64	290	1.77	64	290			218	614	614	606	572	572	674	1135	1135
	1160	232	1.51	82	371	1.51	82	371			240	650	650	624	663	663	894	1306	1306
	600	120	1.01	106	467	1.01	106	467			297	650	650	624	700	700	894	1440	1600
	100	20	.22	140	575	.22	140	575			400	650	650	624	700	700	894	1440	1600
7½ (7½)	3000	400	1.93	41	278	1.93	41	278	.00061	.00066	198	605	605	597	559	559	670	1115	1115
	2500	333	1.74	44	298	1.74	44	298			210	630	630	622	583	583	696	1161	1161
	1750	233	1.54	55	375	1.54	55	375			230	650	650	624	631	631	736	1244	1244
	1160	155	1.23	67	448	1.23	67	448			261	650	650	624	700	700	894	1440	1448
	600	80	.77	81	531	.77	81	531			329	650	650	624	700	700	894	1440	1600
	100	13	.16	98	595	.16	98	595			400	650	650	624	700	700	894	1440	1600
10 (10)	3000	300	1.59	33	297	1.59	33	297	.00058	.00061	196	650	650	624	603	603	742	1221	1221
	2500	250	1.44	36	320	1.44	36	320			208	650	650	624	629	629	771	1272	1272
	1750	175	1.26	46	400	1.26	46	400			228	650	650	624	682	682	821	1369	1369
	1160	116	1.01	55	477	1.01	55	477			259	650	650	624	700	700	894	1440	1595
	600	60	.64	67	563	.64	67	563			327	650	650	624	700	700	894	1440	1600
	100	10	.12	77	595	.12	77	595			400	650	650	624	700	700	894	1440	1600
15 (15)	3000	200	1.19	25	318	1.19	25	318	.00056	.00058	194	650	650	624	671	671	848	1379	1379
	2500	167	1.08	27	344	1.08	27	344			205	650	650	624	700	700	882	1437	1437
	1750	117	.95	34	429	.95	34	429			225	650	650	624	700	700	894	1440	1552
	1160	77	.76	41	509	.76	41	509			256	650	650	624	700	700	894	1440	1600
	600	40	.48	50	595	.48	50	595			325	650	650	624	700	700	894	1440	1600
	100	6.7	.09	57	595	.09	57	595			400	650	650	624	700	700	894	1440	1600
20 (20)	3000	150	.95	20	325	.95	20	325	.00054	.00055	194	650	650	624	700	700	894	1440	1499
	2500	125	.87	22	352	.87	22	352			205	650	650	624	700	700	894	1440	1563
	1750	88	.76	27	438	.76	27	438			225	650	650	624	700	700	894	1440	1600
	1160	58	.61	33	519	.61	33	519			255	650	650	624	700	700	894	1440	1600
	600	30	.37	39	573	.37	39	573			328	650	650	624	700	700	894	1440	1600
	100	5.0	.07	45	573	.07	45	573			400	650	650	624	700	700	894	1440	1600

1. Numbers shown in ( ) are exact ratios.
2. Please specify if input speed is below 1160 RPM to insure proper bearing lubrication. For input speeds greater than 3000 RPM, see page A3.
3. Refer to the MOTION CONTROL Selection Procedures on pages A3-A7 for instructions on the application of these rating tables.
4. Overhung load given at one shaft diameter from housing or mounting flange. All values given in pounds.
5. Overhung load capacities are based on the direction and location of the load as shown in figure 1 on page G2. Consult factory for allowable OHL values if load is applied as shown in figure 2A, B, C or D on page G2.
6. Overhung load capacity given at a point located 4.500 inches from centerline of housing. Overhung load based on maximum bore size. Use of smaller driven shaft diameter may limit OHL capacity.
7. For DSN or DST output shaft overhung load capacities, contact the factory.

REDUCER SIZE **917**

S-ELIMINATOR SERIES REDUCER RATINGS

WINSMITH

1.750 CENTER DISTANCE			HORSEPOWER AND TORQUE RATINGS (INCH POUNDS)[3] SYNTHETIC OIL						INERTIA LB. IN. SEC. SQ'D.		OVERHUNG LOAD CAPACITIES[4]						THRUST CAPACITIES		
			MECHANICAL			THERMAL					INPUT SHAFT	OUTPUT SHAFT[7]					OUTPUT SHAFT		
RATIO[1]	INPUT RPM[2]	OUTPUT RPM	INPUT HP	INPUT TORQUE	OUTPUT TORQUE	INPUT HP	INPUT TORQUE	OUTPUT TORQUE	SOLID OUTPUT MODELS	HOLLOW OUTPUT MODELS	ALL[4] MODELS	DB, DT[4, 5]	DV[4] SHAFT UP	DV[4] SHAFT DOWN	DSF[6] BASE SIDE	DSF[6] COVER SIDE	DB, DT, DV,	DSF TOWARD BASE	DSF AWAY FROM BASE
25 (25)	3000	120	.80	17	327	.80	17	327	.00056	.00056	194	650	650	624	700	700	894	1440	1597
	2500	100	.73	18	354	.73	18	354			205	650	650	624	700	700	894	1440	1600
	1750	70	.64	23	440	.64	23	440			225	650	650	624	700	700	894	1440	1600
	1160	46	.52	28	522	.52	28	522			255	650	650	624	700	700	894	1440	1600
	600	24	.33	35	614	.33	35	614			323	650	650	624	700	700	894	1440	1600
	100	4.0	.07	41	621	.07	41	621			400	650	650	624	700	700	894	1440	1600
30 (30)	3000	100	.69	15	328	.69	15	328	.00055	.00055	194	650	650	624	700	700	894	1440	1600
	2500	83	.63	16	355	.63	16	355			205	650	650	624	700	700	894	1440	1600
	1750	58	.56	20	441	.56	20	441			225	650	650	624	700	700	894	1440	1600
	1160	39	.45	25	523	.45	25	523			225	650	650	624	700	700	894	1440	1600
	600	20	.28	30	595	.28	30	595			326	650	650	624	700	700	894	1440	1600
	100	3.3	.06	35	595	.06	35	595			400	650	650	624	700	700	894	1440	1600
40 (40)	3000	75	.56	12	324	.56	12	324	.00053	.00054	194	650	650	624	700	700	894	1440	1600
	2500	63	.51	13	351	.51	13	351			206	650	650	624	700	700	894	1440	1600
	1750	44	.45	16	436	.45	16	436			226	650	650	624	700	700	894	1440	1600
	1160	29	.36	20	517	.36	20	517			257	650	650	624	700	700	894	1440	1600
	600	15	.22	24	573	.22	24	573			329	650	650	624	700	700	894	1440	1600
	100	2.5	.05	29	573	.05	29	573			400	650	650	624	700	700	894	1440	1600
50 (50)	3000	60	.47	10	320	.47	10	320	.00051	.00051	196	650	650	624	700	700	894	1440	1600
	2500	50	.43	11	349	.43	11	349			207	650	650	624	700	700	894	1440	1600
	1750	35	.35	13	398	.35	13	398			233	650	650	624	700	700	894	1440	1600
	1160	23	.25	13	398	.25	13	398			275	650	650	624	700	700	894	1440	1600
	600	12	.14	15	398	.14	15	398			355	650	650	624	700	700	894	1440	1600
	100	2.0	.03	19	398	.03	19	398			400	650	650	624	700	700	894	1440	1600
60 (60)	3000	50	.40	8	299	.40	8	299	.00052	.00052	198	650	650	624	700	700	894	1440	1600
	2500	42	.36	9	324	.36	9	324			209	650	650	624	700	700	894	1440	1600
	1750	29	.32	11	400	.32	11	400			231	650	650	624	700	700	894	1440	1600
	1160	19	.23	12	400	.23	12	400			272	650	650	624	700	700	894	1440	1600
	600	10	.13	14	400	.13	14	400			353	650	650	624	700	700	894	1440	1600
	100	1.7	.03	18	400	.03	18	400			400	650	650	624	700	700	894	1440	1600

1. Numbers shown in ( ) are exact ratios.
2. Please specify if input speed is below 1160 RPM to insure proper bearing lubrication. For input speeds greater than 3000 RPM, see page A3.
3. Refer to the MOTION CONTROL Selection Procedures on pages A3-A7 for instructions on the application of these rating tables.
4. Overhung load given at one shaft diameter from housing or mounting flange. All values given in pounds.
5. Overhung load capacities are based on the direction and location of the load as shown in figure 1 on page G2. Consult factory for allowable OHL values if load is applied as shown in figure 2A, B, C or D on page G2.
6. Overhung load capacity given at a point located 4.500 inches from centerline of housing. Overhung load based on maximum bore size. Use of smaller driven shaft diameter may limit OHL capacity.
7. For DSN or DST output shaft overhung load capacities, contact the factory.

REDUCER SIZE **920**

S-ELIMINATOR SERIES REDUCER RATINGS

WINSMITH

2.000 CENTER DISTANCE			HORSEPOWER AND TORQUE RATINGS (INCH POUNDS)[3] SYNTHETIC OIL						INERTIA LB. IN. SEC. SQ'D.		OVERHUNG LOAD CAPACITIES[4]						THRUST CAPACITIES		
			MECHANICAL			THERMAL					INPUT SHAFT	OUTPUT SHAFT[7]					OUTPUT SHAFT		
RATIO[1]	INPUT RPM[2]	OUTPUT RPM	INPUT HP	INPUT TORQUE	OUTPUT TORQUE	INPUT HP	INPUT TORQUE	OUTPUT TORQUE	SOLID OUTPUT MODELS	HOLLOW OUTPUT MODELS	ALL[4] MODELS	DB, DT[4, 5]	DV[4] SHAFT UP	DV[4] SHAFT DOWN	DSF[6] BASE SIDE	DSF[6] COVER SIDE	DB, DT, DV,	DSF TOWARD BASE	DSF AWAY FROM BASE
4 (4)	3000	750	3.70	78	293	3.11	65	245	.00147	.00234	175	503	503	496	1043	600	529	1440	1890
	2500	625	3.43	87	325	3.12	79	294			183	514	514	507	1074	600	534	1440	1890
	1750	438	2.96	107	398	2.96	107	398			199	551	551	544	1143	600	558	1440	1890
	1160	290	2.48	135	500	2.48	135	500			217	636	636	624	1300	600	630	1440	1890
	600	150	1.70	178	650	1.70	178	650			264	650	650	624	1470	600	768	1440	1890
	100	25	.38	239	821	.38	239	821			400	650	650	624	1470	600	894	1440	1890
5 (5) SOLID OUTPUT SHAFT MODELS ONLY	3000	600	3.20	67	314	2.61	55	254	.00136	—	178	532	532	525			574		
	2500	500	2.97	75	348	2.62	66	306			186	551	551	544			590		
	1750	350	2.56	92	427	2.52	91	420			203	593	593	585			621		
	1160	232	2.15	117	535	2.15	117	535			222	650	650	624			706		
	600	120	1.47	154	690	1.47	154	690			275	650	650	624			883		
	100	20	.33	206	867	.33	206	867			400	650	650	624			894		
5 (4⅔) HOLLOW OUTPUT SHAFT MODELS ONLY	3000	643	3.57	75	329	3.49	73	321	—	.00176	178				1070	600		1440	1890
	2500	536	3.31	83	365	3.31	83	365			186				1102	600		1440	1890
	1750	375	2.80	101	439	2.80	101	439			203				1174	600		1440	1890
	1160	249	2.37	129	556	2.37	129	556			222				1347	600		1440	1890
	600	129	1.56	164	695	1.56	164	695			275				1470	600		1440	1890
	100	21.4	.34	212	849	.34	212	849			400				1470	600		1440	1890
7½ (7½)	3000	400	2.71	57	394	2.45	52	356	.00063	.00084	177	579	579	571	1169	600	617	1440	1890
	2500	333	2.51	63	438	2.45	62	427			185	599	599	591	1204	600	631	1440	1890
	1750	233	2.15	78	532	2.15	78	532			202	644	644	624	1304	600	664	1440	1890
	1160	155	1.73	94	639	1.73	94	639			227	650	650	624	1470	600	766	1440	1890
	600	80	1.09	114	761	1.09	114	761			288	650	650	624	1470	600	894	1440	1890
	100	13	.23	142	888	.23	142	888			400	650	650	624	1470	600	894	1440	1890
10 (10)	3000	300	2.22	47	424	2.03	43	386	.00065	.00076	187	634	634	624	1242	600	698	1440	1890
	2500	250	2.00	50	456	2.00	50	456			198	650	650	624	1297	600	724	1440	1890
	1750	175	1.77	64	572	1.77	64	572			215	650	650	624	1412	600	761	1440	1890
	1160	116	1.42	77	683	1.42	77	683			242	650	650	624	1470	600	894	1440	1890
	600	60	.89	93	808	.89	93	808			307	650	650	624	1470	600	894	1440	1890
	100	10	.17	107	857	.17	107	857			400	650	650	624	1470	600	894	1440	1890
15 (15)	3000	200	1.63	34	446	1.37	29	369	.00058	.00063	180	650	650	624	1379	600	817	1440	1890
	2500	167	1.51	38	495	1.37	34	444			189	650	650	624	1438	600	844	1440	1890
	1750	117	1.31	47	602	1.31	47	602			206	650	650	624	1470	600	894	1440	1890
	1160	77	1.07	58	731	1.07	58	731			231	650	650	624	1470	600	894	1440	1890
	600	40	.67	71	857	.67	71	857			295	650	650	624	1470	600	894	1440	1890
	100	6.7	.13	79	857	.13	79	857			400	650	650	624	1470	600	894	1440	1890
20 (20)	3000	150	1.30	27	455	1.09	23	377	.00061	.00064	180	650	650	624	1470	600	894	1440	1890
	2500	125	1.21	30	505	1.09	28	454			189	650	650	624	1470	600	894	1440	1890
	1750	88	1.05	38	615	1.05	38	615			206	650	650	624	1470	600	894	1440	1890
	1160	58	.86	47	746	.86	47	746			232	650	650	624	1470	600	894	1440	1890
	600	30	.50	53	800	.50	53	800			304	650	650	624	1470	600	894	1440	1890
	100	5.0	.10	60	800	.10	60	800			400	650	650	624	1470	600	894	1440	1890

1. Numbers shown in ( ) are exact ratios.
2. Please specify if input speed is below 1160 RPM to insure proper bearing lubrication. For input speeds greater than 3000 RPM, see page A3.
3. Refer to the MOTION CONTROL Selection Procedures on pages A3-A7 for instructions on the application of these rating tables.
4. Overhung load given at one shaft diameter from housing or mounting flange. All values given in pounds.
5. Overhung load capacities are based on the direction and location of the load as shown in figure 1 on page G2. Consult factory for allowable OHL values if load is applied as shown in figure 2A, B, C or D on page G2.
6. Overhung load capacity given at a point located 4.625 inches from centerline of housing. Overhung load based on maximum bore size. Use of smaller driven shaft diameter may limit OHL capacity.
7. For DSN or DST output shaft overhung load capacities, contact the factory.

REDUCER SIZE **920**

S-ELIMINATOR SERIES REDUCER RATINGS

WINSMITH

2.000 CENTER DISTANCE			HORSEPOWER AND TORQUE RATINGS (INCH POUNDS)[3] SYNTHETIC OIL						INERTIA LB. IN. SEC. SQ'D.		OVERHUNG LOAD CAPACITIES[4]						THRUST CAPACITIES		
			MECHANICAL			THERMAL					INPUT SHAFT	OUTPUT SHAFT[7]					OUTPUT SHAFT		
RATIO[1]	INPUT RPM[2]	OUTPUT RPM	INPUT HP	INPUT TORQUE	OUTPUT TORQUE	INPUT HP	INPUT TORQUE	OUTPUT TORQUE	SOLID OUTPUT MDOELS	HOLLOW OUTPUT MODELS	ALL[4] MODELS	DB, DT[4, 5]	DV[4] SHAFT UP	DV[4] SHAFT DOWN	DSF[6] BASE SIDE	DSF[6] COVER SIDE	DB, DT, DV,	DSF TOWARD BASE	OSF AWAY FROM BASE
25 (24½)	3000	122	1.12	24	474	1.05	22	443	.00052	.00054	186	650	650	624	1470	600	894	1440	1890
	2500	102	1.03	26	517	1.03	26	517			196	650	650	624	1470	600	894	1440	1890
	1750	71	.89	32	634	.89	32	634			215	650	650	624	1470	600	894	1440	1890
	1160	47	.71	38	740	.71	38	740			246	650	650	624	1470	600	894	1440	1890
	600	24	.39	41	740	.39	41	740			326	650	650	624	1470	600	894	1440	1890
	100	4.1	.07	47	740	.07	47	740			400	650	650	624	1470	600	894	1440	1890
30 (30)	3000	100	.95	20	470	.87	18	428	.00056	.00057	184	650	650	624	1470	600	894	1440	1890
	2500	83	.87	22	510	.87	22	510			195	650	650	624	1470	600	894	1440	1890
	1750	58	.76	28	633	.76	28	633			212	650	650	624	1470	600	894	1440	1890
	1160	39	.62	34	751	.62	34	751			240	650	650	624	1470	600	894	1440	1890
	600	20	.38	40	857	.38	40	857			309	650	650	624	1470	600	894	1440	1890
	100	3.3	.08	47	857	.08	47	857			400	650	650	624	1470	600	894	1440	1890
40 (40)	3000	75	.75	16	454	.67	14	400	.00060	.00061	181	650	650	624	1470	600	894	1440	1890
	2500	63	.70	18	503	.67	17	483			190	650	650	624	1470	600	894	1440	1890
	1750	44	.61	22	613	.61	22	613			208	650	650	624	1470	600	894	1440	1890
	1160	29	.50	27	743	.50	27	743			233	650	650	624	1470	600	894	1440	1890
	600	15	.30	32	800	.30	32	800			306	650	650	624	1470	600	894	1440	1890
	100	2.5	.06	38	800	.06	38	800			400	650	650	624	1470	600	894	1440	1890
50 (50)	3000	60	.61	13	445	.61	13	445	.00048	.00049	193	650	650	624	1470	600	894	1440	1890
	2500	50	.58	15	505	.58	15	505			201	650	650	624	1470	600	894	1440	1890
	1750	35	.50	18	610	.50	18	610			222	650	650	624	1470	600	894	1440	1890
	1160	23	.39	21	708	.39	21	708			254	650	650	624	1470	600	894	1440	1890
	600	12	.23	24	740	.23	24	740			331	650	650	624	1470	600	894	1440	1890
	100	2.0	.05	29	740	.05	29	740			400	650	650	624	1470	600	894	1440	1890
60 (60)	3000	50	.53	11	433	.53	11	433	.00051	.00052	190	650	650	624	1470	600	894	1440	1890
	2500	42	.48	12	473	.48	12	473			201	650	650	624	1470	600	894	1440	1890
	1750	29	.42	15	580	.42	15	580			221	650	650	624	1470	600	894	1440	1890
	1160	19	.33	18	650	.33	18	650			255	650	650	624	1470	600	894	1440	1890
	600	10	.19	19	650	.19	19	650			336	650	650	624	1470	600	894	1440	1890
	100	1.7	.04	24	650	.04	24	650			400	650	650	624	1470	600	894	1440	1890

1. Numbers shown in ( ) are exact ratios.
2. Please specify if input speed is below 1160 RPM to insure proper bearing lubrication. For input speeds greater than 3000 RPM, see page A3.
3. Refer to the MOTION CONTROL Selection Procedures on pages A3-A7 for instructions on the application of these rating tables.
4. Overhung load given at one shaft diameter from housing or mounting flange. All values given in pounds.
5. Overhung load capacities are based on the direction and location of the load as shown in figure 1 on page G2. Consult factory for allowable OHL values if load is applied as shown in figure 2A, B, C or D on page G2.
6. Overhung load capacity given at a point located 4.625 inches from centerline of housing. Overhung load based on maximum bore size. Use of smaller driven shaft diameter may limit OHL capacity.
7. For DSN or DST output shaft overhung load capacities, contact the factory.

REDUCER SIZE **926**

S-ELIMINATOR SERIES REDUCER RATINGS

WINSMITH

2.625 CENTER DISTANCE			HORSEPOWER AND TORQUE RATINGS (INCH POUNDS)[3] SYNTHETIC OIL						INERTIA LB. IN. SEC. SQ'D.		OVERHUNG LOAD CAPACITIES[4]						THRUST CAPACITIES		
			MECHANICAL			THERMAL					INPUT SHAFT	OUTPUT SHAFT[7]					OUTPUT SHAFT		
RATIO[1]	INPUT RPM[2]	OUTPUT RPM	INPUT HP	INPUT TORQUE	OUTPUT TORQUE	INPUT HP	INPUT TORQUE	OUTPUT TORQUE	SOLID OUTPUT MODELS	HOLLOW OUTPUT MODELS	ALL[4] MODELS	DB, DT[4, 5]	DV[4] SHAFT UP	DV[4] SHAFT DOWN	DSF[6] BASE SIDE	DSF[6] COVER SIDE	DB, DT, DV,	DSF TOWARD BASE	DSF AWAY FROM BASE
4 (4)	3000	750	7.97	167	641	6.71	141	538	.00484	.00656	343	651	651	711	1081	1081	682	2160	2160
	2500	625	7.38	186	711	6.56	165	631			358	661	661	725	1110	1110	679	2160	2160
	1750	438	6.37	229	872	6.08	219	832			389	688	688	761	1173	1173	677	2160	2160
	1160	290	5.32	289	1090	5.32	289	1090			426	787	787	876	1323	1323	751	2160	2160
	600	150	3.81	401	1489	3.81	401	1489			500	947	947	961	1605	1350	856	2160	2160
	100	25	.88	557	1967	.88	557	1967			500	1025	1025	961	2500	1350	1500	2160	2160
5 (5)	3000	600	6.97	146	696	5.83	122	580	.00376	.00484	349	689	689	750	1135	1135	744	2160	2160
	2500	500	6.46	163	772	5.70	144	679			364	701	701	766	1165	1165	745	2160	2160
	1750	350	5.58	201	946	5.28	190	895			395	745	745	820	1233	1233	767	2160	2160
	1160	232	4.68	254	1188	4.68	254	1188			434	853	853	943	1394	1350	856	2160	2160
	600	120	3.10	326	1494	3.10	326	1494			500	1025	1025	961	1736	1350	1058	2160	2160
	100	20	.55	346	1494	.55	346	1494			500	1025	1025	961	2500	1350	1500	2160	2160
7½ (7½)	3000	400	5.42	114	802	4.92	103	727	.00319	.00366	383	777	777	840	1240	1240	865	2160	2160
	2500	333	5.03	127	890	4.80	121	849			402	803	803	870	1276	1276	885	2160	2160
	1750	233	4.34	156	1091	4.34	156	1091			442	859	859	936	1350	1350	925	2160	2160
	1160	155	3.65	198	1369	3.65	198	1369			492	989	989	961	1574	1350	1044	2160	2160
	600	80	2.48	261	1766	2.48	261	1766			500	1025	1025	961	1956	1350	1321	2160	2160
	100	13	.45	282	1785	.45	282	1785			500	1025	1025	961	2500	1350	1500	2160	2160
10 (10)	3000	300	4.51	95	882	4.42	93	864	.00246	.00278	387	839	839	906	1310	1310	945	2160	2160
	2500	250	4.18	105	979	4.18	105	979			407	868	868	939	1347	1347	968	2160	2160
	1750	175	3.57	129	1184	3.57	129	1184			450	932	932	961	1459	1350	1021	2160	2160
	1160	116	2.98	162	1475	2.98	162	1475			500	1025	1025	961	1698	1350	1169	2160	2160
	600	60	1.58	166	1475	1.58	166	1475			500	1025	1025	961	2162	1350	1500	2160	2160
	100	10	.28	179	1475	.28	179	1475			500	1025	1025	961	2500	1350	1500	2160	2160
15 (15)	3000	200	3.26	68	919	2.80	59	786	.00296	.00308	374	943	943	961	1441	1350	1132	2160	2160
	2500	167	3.03	76	1020	2.73	69	918			393	977	977	961	1501	1350	1167	2160	2160
	1750	117	2.54	92	1209	2.54	92	1209			435	1025	1025	961	1637	1350	1261	2160	2160
	1160	77	2.22	121	1565	2.22	121	1565			481	1025	1025	961	1900	1350	1472	2160	2160
	600	40	1.36	143	1785	1.36	143	1785			500	1025	1025	961	2449	1350	1500	2160	2160
	100	6.7	.25	159	1785	.25	159	1785			500	1025	1025	961	2500	1350	1500	2160	2160
20 (20)	3000	150	2.63	55	973	2.52	53	931	.00235	.00243	383	1025	1025	961	1554	1350	1237	2160	2160
	2500	125	2.45	62	1080	2.45	62	1080			402	1025	1025	961	1619	1350	1277	2160	2160
	1750	88	2.11	76	1310	2.11	76	1310			444	1025	1025	961	1763	1350	1401	2160	2160
	1160	58	1.61	87	1475	1.61	87	1475			500	1025	1025	961	2076	1350	1500	2160	2160
	600	30	.87	91	1475	.87	91	1475			500	1025	1025	961	2500	1350	1500	2160	2160
	100	5.0	.16	102	1475	.16	102	1475			500	1025	1025	961	2500	1350	1500	2160	2160

1. Numbers shown in ( ) are exact ratios.
2. Please specify if input speed is below 1160 RPM to insure proper bearing lubrication. For input speeds greater than 3000 RPM, see page A3.
3. Refer to the MOTION CONTROL Selection Procedures on pages A3-A7 for instructions on the application of these rating tables.
4. Overhung load given at one shaft diameter from housing or mounting flange. All values given in pounds.
5. Overhung load capacities are based on the direction and location of the load as shown in figure 1 on page G2. Consult factory for allowable OHL values if load is applied as shown in figure 2A, B, C or D on page G2.
6. Overhung load capacity given at a point located 5.313 inches from centerline of housing. Overhung load based on maximum bore size. Use of smaller driven shaft diameter may limit OHL capacity.
7. For DSN or DST output shaft overhung load capacities, contact the factory.

REDUCER SIZE **926**

S-ELIMINATOR SERIES REDUCER RATINGS

WINSMITH

2.625 CENTER DISTANCE			HORSEPOWER AND TORQUE RATINGS (INCH POUNDS)[3] SYNTHETIC OIL						INERTIA LB. IN. SEC. SQ'D.		OVERHUNG LOAD CAPACITIES[4]						THRUST CAPACITIES		
			MECHANICAL			THERMAL					INPUT SHAFT	OUTPUT SHAFT[7]					OUTPUT SHAFT		
RATIO[1]	INPUT RPM[2]	OUTPUT RPM	INPUT HP	INPUT TORQUE	OUTPUT TORQUE	INPUT HP	INPUT TORQUE	OUTPUT TORQUE	SOLID OUTPUT MODELS	HOLLOW OUTPUT MODELS	ALL[4] MODELS	DB, DT[4, 5]	DV[4] SHAFT UP	DV[4] SHAFT DOWN	DSF[6] BASE SIDE	DSF[6] COVER SIDE	DB, DT, DV,	DSF TOWARD BASE	DSF AWAY FROM BASE
25 (25)	3000	120	2.17	46	990	2.17	46	990	.00209	.00214	392	1025	1025	961	1647	1350	1326	2160	2160
	2500	100	1.97	50	1071	1.97	50	1071			415	1025	1025	961	1719	1350	1393	2160	2160
	1750	70	1.74	63	1333	1.74	63	1333			458	1025	1025	961	1870	1350	1500	2160	2160
	1160	46	1.22	66	1380	1.22	66	1380			500	1025	1025	961	2241	1350	1500	2160	2160
	600	24	.66	69	1380	.66	69	1380			500	1025	1025	961	2500	1350	1500	2160	2160
	100	4.0	.12	78	1380	.12	78	1380			500	1025	1025	961	2500	1350	1500	2160	2160
30 (30)	3000	100	1.84	39	946	1.62	34	826	.00291	.00294	374	1025	1025	961	1730	1350	1450	2160	2160
	2500	83	1.71	43	1050	1.58	40	967			392	1025	1025	961	1803	1350	1500	2160	2160
	1750	58	1.45	52	1247	1.45	52	1247			435	1025	1025	961	1974	1350	1500	2160	2160
	1160	39	1.28	69	1610	1.28	69	1610			479	1025	1025	961	2352	1350	1500	2160	2160
	600	20	.78	81	1785	.78	81	1785			500	1025	1025	961	2500	1350	1500	2160	2160
	100	3.3	.15	95	1785	.15	95	1785			500	1025	1025	961	2500	1350	1500	2160	2160
40 (40)	3500	75	1.46	31	972	1.46	31	972	.00232	.00234	385	1025	1025	961	1866	1350	1500	2160	2160
	2500	63	1.36	34	1078	1.36	34	1078			405	1025	1025	961	1946	1350	1500	2160	2160
	1750	44	1.18	43	1309	1.18	43	1309			447	1025	1025	961	2164	1350	1500	2160	2160
	1160	29	.91	50	1475	.91	50	1475			500	1025	1025	961	2500	1350	1500	2160	2160
	600	15	.51	53	1475	.51	53	1475			500	1025	1025	961	2500	1350	1500	2160	2160
	100	2.5	.10	63	1475	.10	63	1475			500	1025	1025	961	2500	1350	1500	2160	2160
50 (50)	3000	60	1.18	25	955	1.18	25	955	.00206	.00207	397	1025	1025	961	1983	1350	1500	2160	2160
	2500	50	1.07	27	1035	1.07	27	1035			421	1025	1025	961	2092	1350	1500	2160	2160
	1750	35	.95	34	1286	.95	34	1286			464	1025	1025	961	2328	1350	1500	2160	2160
	1160	23	.70	38	1380	.70	38	1380			500	1025	1025	961	2500	1350	1500	2160	2160
	600	12	.39	41	1380	.39	41	1380			500	1025	1025	961	2500	1350	1500	2160	2160
	100	2.0	.08	49	1380	.08	49	1380			500	1025	1025	961	2500	1350	1500	2160	2160
60 (60)	3000	50	.97	20	907	.97	20	907	.00204	.00205	404	1025	1025	961	2160	1350	1500	2160	2160
	2500	42	.89	22	986	.89	22	986			428	1025	1025	961	2222	1350	1500	2160	2160
	1750	29	.74	27	1137	.74	27	1137			479	1025	1025	961	2481	1350	1500	2160	2160
	1160	19	.51	28	1137	.51	28	1137			500	1025	1025	961	2500	1350	1500	2160	2160
	600	10	.29	30	1137	.29	30	1137			500	1025	1025	961	2500	1350	1500	2160	2160
	100	1.7	.06	37	1137	.06	37	1137			500	1025	1025	961	2500	1350	1500	2160	2160

1. Numbers shown in ( ) are exact ratios.
2. Please specify if input speed is below 1160 RPM to insure proper bearing lubrication. For input speeds greater than 3000 RPM, see page A3.
3. Refer to the MOTION CONTROL Selection Procedures on pages A3-A7 for instructions on the application of these rating tables.
4. Overhung load given at one shaft diameter from housing or mounting flange. All values given in pounds.
5. Overhung load capacities are based on the direction and location of the load as shown in figure 1 on page G2. Consult factory for allowable OHL values if load is applied as shown in figure 2A, B, C or D on page G2.
6. Overhung load capacity given at a point located 5.313 inches from centerline of housing. Overhung load based on maximum bore size. Use of smaller driven shaft diameter may limit OHL capacity.
7. For DSN or DST output shaft overhung load capacities, contact the factory.

REDUCER SIZE **930**

S-ELIMINATOR SERIES REDUCER RATINGS

WINSMITH

3.000 CENTER DISTANCE			HORSEPOWER AND TORQUE RATINGS (INCH POUNDS)[3] SYNTHETIC OIL						INERTIA LB. IN. SEC. SQ'D.		OVERHUNG LOAD CAPACITIES[4]						THRUST CAPACITIES		
			MECHANICAL			THERMAL					INPUT SHAFT	OUTPUT SHAFT[7]					OUTPUT SHAFT		
RATIO[1]	INPUT RPM[2]	OUTPUT RPM	INPUT HP	INPUT TORQUE	OUTPUT TORQUE	INPUT HP	INPUT TORQUE	OUTPUT TORQUE	SOLID OUTPUT MODELS	HOLLOW OUTPUT MODELS	ALL[4] MODELS	DB, DT[4, 5]	OV[4] SHAFT UP	OV[4] SHAFT DOWN	DSF[6] BASE SIDE	DSF[6] COVER SIDE	DB, DT, DV,	DSF TOWARD BASE	DSF AWAY FROM BASE
4 (4)	3000	750	11.75	247	947	9.11	191	732	.00757	.00953	368	953	953	995	983	983	876	2069	2069
	2500	625	10.88	274	1051	8.92	225	860			383	970	970	1016	1007	1007	874	2105	2105
	1750	438	9.38	338	1289	8.28	298	1137			412	1006	1006	1058	1060	1060	864	2180	2180
	1160	290	7.70	418	1585	7.33	398	1509			453	1160	1160	1224	1194	1194	974	2431	2431
	600	150	5.78	608	2268	5.78	608	2268			500	1350	1350	1232	1429	1429	1071	2800	2800
	100	25	1.40	880	3123	1.40	880	3123			500	1350	1350	1232	2350	1800	2187	2800	2800
5 (5⅕)	3000	577	10.21	215	1065	8.20	172	853	.00555	.00672	372	1005	1005	1049	1034	1034	938	2189	2189
	2500	481	9.46	239	1182	8.00	202	998			387	1023	1023	1070	1059	1059	937	2229	2229
	1750	337	8.16	294	1449	7.39	266	1311			418	1083	1083	1139	1115	1115	956	2312	2312
	1160	223	6.82	371	1813	6.54	356	1738			454	1244	1244	1232	1258	1258	1067	2578	2578
	600	115	4.90	515	2476	4.90	515	2476			500	1350	1350	1232	1542	1542	1230	2800	2800
	100	19	1.14	717	3270	1.14	717	3270			500	1350	1350	1232	2350	1800	2400	2800	2800
7½ (7⅕)	3000	417	8.35	175	1198	7.38	155	1057	.00412	.00495	394	1089	1089	1134	1108	1108	1036	2361	2361
	2500	347	7.74	195	1330	7.17	181	1230			412	1125	1125	1173	1137	1137	1055	2407	2407
	1750	243	6.68	241	1630	6.60	238	1609			450	1202	1202	1232	1198	1198	1094	2504	2504
	1160	161	5.61	305	2047	5.61	305	2047			494	1350	1350	1232	1385	1385	1227	2800	2800
	600	83	3.68	386	2545	3.68	386	2545			500	1350	1350	1232	1727	1727	1564	2800	2800
	100	14	.65	410	2545	.65	410	2545			500	1350	1350	1232	2350	1800	2400	2800	2800
10 (10)	3000	300	6.66	140	1314	6.61	139	1304	.00344	.00386	395	1187	1187	1232	1181	1181	1160	2541	2541
	2500	250	6.17	156	1458	6.17	156	1458			412	1227	1227	1232	1212	1212	1186	2594	2594
	1750	175	5.25	189	1759	5.25	189	1759			453	1318	1318	1232	1307	1307	1247	2775	2775
	1160	116	4.42	240	2212	4.42	240	2212			498	1350	1350	1232	1514	1514	1405	2800	2800
	600	60	2.90	305	2749	2.90	305	2749			500	1350	1350	1232	1891	1800	1838	2800	2800
	100	10	.62	393	3338	.62	393	3338			500	1350	1350	1232	2350	1800	2400	2800	2800
15 (15½)	3000	194	4.79	101	1426	4.49	94	1336	.00318	.00337	395	1350	1350	1232	1319	1319	1403	2800	2800
	2500	161	4.45	112	1582	4.36	110	1550			413	1350	1350	1232	1372	1372	1444	2800	2800
	1750	113	3.81	137	1915	3.81	137	1915			453	1350	1350	1232	1488	1488	1535	2800	2800
	1160	75	3.19	173	2390	3.19	173	2390			500	1350	1350	1232	1728	1728	1811	2800	2800
	600	39	2.10	220	2950	2.10	220	2950			500	1350	1350	1232	2220	1800	2363	2800	2800
	100	6.5	.40	254	3132	.40	254	3132			500	1350	1350	1232	2350	1800	2400	2800	2800
20 (20)	3000	150	3.86	81	1456	3.83	80	1445	.00296	.00308	400	1350	1350	1232	1416	1416	1538	2800	2800
	2500	125	3.59	90	1616	3.59	90	1616			419	1350	1350	1232	1473	1473	1587	2800	2800
	1750	88	3.09	111	1966	3.09	111	1966			458	1350	1350	1232	1599	1599	1726	2800	2800
	1160	58	2.55	139	2410	2.55	139	2410			500	1350	1350	1232	1869	1800	2047	2800	2800
	600	30	1.54	161	2715	1.54	161	2715			500	1350	1350	1232	2350	1800	2400	2800	2800
	100	5.0	.28	178	2715	.28	178	2715			500	1350	1350	1232	2350	1800	2400	2800	2800

1. Numbers shown in ( ) are exact ratios.
2. Please specify if input speed is below 1160 RPM to insure proper bearing lubrication. For input speeds greater than 3000 RPM, see page A3.
3. Refer to the MOTION CONTROL Selection Procedures on pages A3-A7 for instructions on the application of these rating tables.
4. Overhung load given at one shaft diameter from housing or mounting flange. All values given in pounds.
5. Overhung load capacities are based on the direction and location of the load as shown in figure 1 on page G2. Consult factory for allowable OHL values if load is applied as shown in figure 2A, B, C or D on page G2.
6. Overhung load capacity given at a point located 6.875 inches from centerline of housing. Overhung load based on maximum bore size. Use of smaller driven shaft diameter may limit OHL capacity.
7. For DSN or DST output shaft overhung load capacities, contact the factory.

REDUCER SIZE **930**

S-ELIMINATOR SERIES REDUCER RATINGS

WINSMITH

3.000 CENTER DISTANCE			HORSEPOWER AND TORQUE RATINGS (INCH POUNDS)[3] SYNTHETIC OIL						INERTIA LB. IN. SEC. SQ'D.		OVERHUNG LOAD CAPACITIES[4]						THRUST CAPACITIES		
			MECHANICAL			THERMAL					INPUT SHAFT	OUTPUT SHAFT[7]					OUTPUT SHAFT		
RATIO[1]	INPUT RPM[2]	OUTPUT RPM	INPUT HP	INPUT TORQUE	OUTPUT TORQUE	INPUT HP	INPUT TORQUE	OUTPUT TORQUE	SOLID OUTPUT MODELS	HOLLOW OUTPUT MODELS	ALL[4] MODELS	OB, OT[4, 5]	OV[4] SHAFT UP	OV[4] SHAFT DOWN	DSF[6] BASE SIDE	DSF[6] COVER SIDE	OB, OT, OV,	DSF TOWARD BASE	DSF AWAY FROM BASE
25 (25)	3000	120	3.20	67	1460	2.89	61	1311	.00334	.00341	389	1350	1350	1232	1506	1506	1681	2800	2800
	2500	100	2.98	75	1620	2.81	71	1526			407	1350	1350	1232	1568	1568	1755	2800	2800
	1750	70	2.55	92	1949	2.55	92	1949			446	1350	1350	1232	1706	1706	1931	2800	2800
	1160	46	2.18	119	2467	2.18	119	2467			489	1350	1350	1232	2015	1800	2278	2800	2800
	600	24	1.47	154	3085	1.47	154	3085			500	1350	1350	1232	2350	1800	2400	2800	2800
	100	4.0	.31	196	3484	.31	196	3484			500	1350	1350	1232	2350	1800	2400	2800	2800
30 (30)	3000	100	2.74	58	1470	2.61	55	1401	.00310	.00315	394	1350	1350	1232	1583	1583	1799	2800	2800
	2500	83	2.55	64	1632	2.55	64	1629			413	1350	1350	1232	1648	1648	1884	2800	2800
	1750	58	2.20	79	1977	2.20	79	1977			452	1350	1350	1232	1799	1799	2074	2800	2800
	1160	39	1.86	101	2462	1.86	101	2462			500	1350	1350	1232	2145	1800	2400	2800	2800
	600	20	1.23	130	3032	1.23	130	3032			500	1350	1350	1232	2350	1800	2400	2800	2800
	100	3.3	.25	155	3189	.25	155	3189			500	1350	1350	1232	2350	1800	2400	2800	2800
40 (40)	3000	75	2.12	44	1459	2.12	44	1459	.00288	.00291	403	1350	1350	1232	1712	1712	2007	2800	2800
	2500	63	1.97	50	1619	1.97	50	1619			422	1350	1350	1232	1784	1784	2105	2800	2800
	1750	44	1.71	62	1971	1.71	62	1971			462	1350	1350	1232	1981	1800	2321	2800	2800
	1160	29	1.42	77	2408	1.42	77	2408			500	1350	1350	1232	2350	1800	2400	2800	2800
	600	15	.87	92	2715	.87	92	2715			500	1350	1350	1232	2350	1800	2400	2800	2800
	100	2.5	.17	106	2715	.17	106	2715			500	1350	1350	1232	2350	1800	2400	2800	2800
50 (50)	3000	60	1.71	36	1416	1.71	36	1416	.00279	.00281	410	1350	1350	1232	1824	1800	2183	2800	2800
	2500	50	1.59	40	1571	1.59	40	1571			431	1350	1350	1232	1921	1800	2292	2800	2800
	1750	35	1.38	50	1914	1.38	50	1914			473	1350	1350	1232	2136	1800	2400	2800	2800
	1160	23	1.14	62	2310	1.14	62	2310			500	1350	1350	1232	2350	1800	2400	2800	2800
	600	12	.64	67	2350	.64	67	2350			500	1350	1350	1232	2350	1800	2400	2800	2800
	100	2.0	.13	79	2350	.13	79	2350			500	1350	1350	1232	2350	1800	2400	2800	2800
60 (60)	3000	50	1.40	29	1343	1.40	29	1343	.00274	.00276	419	1350	1350	1232	1939	1800	2340	2800	2800
	2500	42	1.27	32	1441	1.27	32	1441			444	1350	1350	1232	2046	1800	2400	2800	2800
	1750	29	1.14	41	1813	1.14	41	1813			485	1350	1350	1232	2273	1800	2400	2800	2800
	1160	19	.89	48	2056	.89	48	2056			500	1350	1350	1232	2350	1800	2400	2800	2800
	600	10	.49	52	2056	.49	52	2056			500	1350	1350	1232	2350	1800	2400	2800	2800
	100	1.7	.10	62	2056	.10	62	2056			500	1350	1350	1232	2350	1800	2400	2800	2800

1. Numbers shown in ( ) are exact ratios.
2. Please specify if input speed is below 1160 RPM to insure proper bearing lubrication. For input speeds greater than 3000 RPM, see page A3.
3. Refer to the MOTION CONTROL Selection Procedures on pages A3-A7 for instructions on the application of these rating tables.
4. Overhung load given at one shaft diameter from housing or mounting flange. All values given in pounds.
5. Overhung load capacities are based on the direction and location of the load as shown in figure 1 on page G2. Consult factory for allowable OHL values if load is applied as shown in figure 2A, B, C or D on page G2.
6. Overhung load capacity given at a point located 6.875 inches from centerline of housing. Overhung load based on maximum bore size. Use of smaller driven shaft diameter may limit OHL capacity.
7. For DSN or DST output shaft overhung load capacities, contact the factory.

REDUCER SIZE **935**

S-ELIMINATOR SERIES REDUCER RATINGS

WINSMITH

3.500 CENTER DISTANCE			HORSEPOWER AND TORQUE RATINGS (INCH POUNDS)[3] SYNTHETIC OIL						INERTIA LB. IN. SEC. SQ'D.		OVERHUNG LOAD CAPACITIES[4]						THRUST CAPACITIES		
			MECHANICAL			THERMAL					INPUT SHAFT	OUTPUT SHAFT[7]					OUTPUT SHAFT		
RATIO[1]	INPUT RPM[2]	OUTPUT RPM	INPUT HP	INPUT TORQUE	OUTPUT TORQUE	INPUT HP	INPUT TORQUE	OUTPUT TORQUE	SOLID OUTPUT MODELS	HOLLOW OUTPUT MODELS	ALL[4] MODELS	DB, DT[4, 5]	DV[4] SHAFT UP	DV[4] SHAFT DOWN	DSF[5] BASE SIDE	DSF[5] COVER SIDE	DB, DT, DV,	DSF TOWARD BASE	DSF AWAY FROM BASE
4 (4)	3000	750	16.70	351	1351	14.38	302	1161	.01167	.01499	634	1449	1449	1347	1284	1284	1404	2783	2783
	2500	625	15.47	390	1499	14.11	356	1366			659	1481	1481	1377	1314	1314	1413	2831	2831
	1750	438	13.33	480	1838	13.11	472	1807			710	1549	1549	1440	1380	1380	1427	2931	2931
	1160	290	11.24	611	2324	11.24	611	2324			750	1750	1750	1626	1545	1545	1562	3237	3237
	600	150	8.36	879	3298	8.36	879	3298			750	2109	2109	1847	1823	1823	1777	3722	3722
	100	25	2.10	1323	4730	2.10	1323	4730			750	2130	2130	1847	3143	1900	3340	4000	4000
5 (5)	3000	600	14.82	311	1493	13.32	280	1340	.00908	.01124	627	1507	1507	1400	1336	1336	1480	2916	2916
	2500	500	13.73	346	1657	13.01	328	1569			652	1540	1540	1431	1367	1367	1491	2968	2968
	1750	350	11.83	426	2031	11.83	426	2031			700	1609	1609	1496	1435	1435	1509	3075	3075
	1160	232	9.72	528	2497	9.72	528	2497			750	1860	1860	1728	1615	1615	1715	3430	3430
	600	120	7.30	766	3574	7.30	766	3574			750	2130	2130	1847	1935	1900	1960	4000	4000
	100	20	1.72	1084	4804	1.72	1084	4804			750	2130	2130	1847	3410	1900	3500	4000	4000
7½ (7½)	3000	400	11.24	236	1679	9.21	193	1370	.00762	.00858	673	1680	1680	1561	1484	1484	1724	3291	3291
	2500	333	10.42	263	1863	9.04	228	1612			702	1725	1725	1603	1523	1523	1754	3364	3364
	1750	233	8.99	324	2283	8.42	303	2135			750	1860	1860	1728	1607	1607	1859	3517	3517
	1160	155	7.46	405	2830	7.46	405	2830			750	2130	2130	1847	1848	1848	2129	4000	4000
	600	80	5.52	580	3976	5.52	580	3976			750	2130	2130	1847	1848	1900	2545	4000	4000
	100	13	1.01	635	4075	1.01	635	4075			750	2130	2130	1847	1848	1900	3500	4000	4000
10 (10¾)	3000	279	8.87	186	1883	8.87	186	1883	.00428	.00504	683	1821	1821	1692	1585	1585	1877	3522	3522
	2500	233	8.23	207	2090	8.23	207	2090			714	1889	1889	1756	1627	1627	1933	3599	3599
	1750	163	7.11	256	2562	7.11	256	2562			750	2037	2037	1847	1743	1743	2050	3826	3826
	1160	108	5.96	324	3213	5.96	324	3213			750	2130	2130	1847	2019	1900	2339	4000	4000
	600	56	4.06	427	4147	4.06	427	4147			750	2130	2130	1847	2504	1900	2969	4000	4000
	100	9.3	.84	527	4804	.84	527	4804			750	2130	2130	1847	4400	1900	3500	4000	4000
15 (15)	3000	200	6.72	141	1924	5.21	109	1480	.00662	.00687	660	2008	2008	1847	1714	1714	2186	3908	3908
	2500	167	6.24	157	2135	5.12	129	1741			689	2086	2086	1847	1782	1782	2263	4000	4000
	1750	117	5.41	195	2617	4.79	172	2308			748	2130	2130	1847	1931	1900	2429	4000	4000
	1160	77	4.53	246	3259	4.30	234	3086			750	2130	2130	1847	2243	1900	2829	4000	4000
	600	40	3.03	318	4075	3.03	318	4075			750	2130	2130	1847	2846	1900	3500	4000	4000
	100	6.7	.56	354	4075	.56	354	4075			750	2130	2130	1847	4400	1900	3500	4000	4000
20 (20)	3000	150	5.43	114	2050	4.93	104	1856	.00381	.00403	659	2130	2130	1847	1848	1848	2366	4000	4000
	2500	125	5.04	127	2275	4.81	121	2167			688	2130	2130	1847	1922	1900	2450	4000	4000
	1750	88	4.23	152	2694	4.23	152	2694			750	2130	2130	1847	2091	1900	2649	4000	4000
	1160	58	3.69	200	3492	3.69	200	3492			750	2130	2130	1847	2419	1900	3122	4000	4000
	600	30	2.08	218	3661	2.08	218	3661			750	2130	2130	1847	3179	1900	3500	4000	4000
	100	5.0	.38	242	3661	.38	242	3661			750	2130	2130	1847	4400	1900	3500	4000	4000

1. Numbers shown in ( ) are exact ratios.
2. Please specify if input speed is below 1160 RPM to insure proper bearing lubrication. For input speeds greater than 3000 RPM, see page A3.
3. Refer to the MOTION CONTROL Selection Procedures on pages A3-A7 for instructions on the application of these rating tables.
4. Overhung load given at one shaft diameter from housing or mounting flange. All values given in pounds.
5. Overhung load capacities are based on the direction and location of the load as shown in figure 1 on page G2. Consult factory for allowable OHL values if load is applied as shown in figure 2A, B, C or D on page G2.
6. Overhung load capacity given at a point located 6.668 inches from centerline of housing. Overhung load based on maximum bore size. Use of smaller driven shaft diameter may limit OHL capacity.
7. For DSN or DST output shaft overhung load capacities, contact the factory.

REDUCER SIZE **935**

S-ELIMINATOR SERIES REDUCER RATINGS

WINSMITH

3.500 CENTER DISTANCE			HORSEPOWER AND TORQUE RATINGS (INCH POUNDS)[3] SYNTHETIC OIL						INERTIA LB. IN. SEC. SQ'D.		OVERHUNG LOAD CAPACITIES[4]						THRUST CAPACITIES		
			MECHANICAL			THERMAL					INPUT SHAFT	OUTPUT SHAFT[7]					OUTPUT SHAFT		
RATIO[1]	INPUT RPM[2]	OUTPUT RPM	INPUT HP	INPUT TORQUE	OUTPUT TORQUE	INPUT HP	INPUT TORQUE	OUTPUT TORQUE	SOLID OUTPUT MODELS	HOLLOW OUTPUT MODELS	ALL[4] MODELS	OB, OT[4, 5]	OV[4] SHAFT UP	OV[4] SHAFT DOWN	OSF[6] BASE SIDE	OSF[6] COVER SIDE	OB, OT, OV,	OSF TOWARD BASE	OSF AWAY FROM BASE
25 (25)	3000	120	4.30	90	1927	3.21	67	1418	.00826	.00835	656	2130	2130	1847	1973	1900	2588	4000	4000
	2500	100	4.01	101	2138	3.17	80	1675			685	2130	2130	1847	2054	1900	2688	4000	4000
	1750	70	3.49	126	2621	3.00	108	2237			742	2130	2130	1847	2230	1900	2948	4000	4000
	1160	46	2.92	159	3234	2.73	148	3011			750	2130	2130	1847	2618	1900	3500	4000	4000
	600	24	2.25	236	4593	2.25	236	4593			750	2130	2130	1847	3352	1900	3500	4000	4000
	100	4.0	.45	286	4804	.45	286	4804			750	2130	2130	1847	4400	1900	3500	4000	4000
30 (30)	3000	100	3.75	79	1980	2.97	62	1550	.00638	.00644	656	2130	2130	1847	2067	1900	2720	4000	4000
	2500	83	3.49	88	2197	2.93	74	1827			687	2130	2130	1847	2151	1900	2838	4000	4000
	1750	58	3.05	110	2694	2.77	100	2434			746	2130	2130	1847	2337	1900	3135	4000	4000
	1160	39	2.58	140	3358	2.52	137	3279			750	2130	2130	1847	2771	1900	3500	4000	4000
	600	20	1.71	180	4075	1.71	180	4075			750	2130	2130	1847	3603	1900	3500	4000	4000
	100	3.3	.33	210	4075	.33	210	4075			750	2130	2130	1847	4400	1900	3500	4000	4000
40 (40)	3500	75	2.96	62	2052	2.91	61	2011	.00373	.00378	690	2130	2130	1847	2241	1900	2986	4000	4000
	2500	63	2.76	70	2277	2.76	70	2277			722	2130	2130	1847	2335	1900	3138	4000	4000
	1750	44	2.34	84	2703	2.34	84	2703			750	2130	2130	1847	2575	1900	3484	4000	4000
	1160	29	2.05	111	3492	2.05	111	3492			750	2130	2130	1847	3063	1900	3500	4000	4000
	600	15	1.16	122	3600	1.16	122	3600			750	2130	2130	1847	4024	1900	3500	4000	4000
	100	2.5	.23	142	3600	.23	142	3600			750	2130	2130	1847	4400	1900	3500	4000	4000
50 (50)	3000	60	2.40	50	1995	2.40	50	1995	.00354	.00357	691	2130	2130	1847	2378	1900	3227	4000	4000
	2500	50	2.24	56	2214	2.24	56	2214			724	2130	2130	1847	2487	1900	3394	4000	4000
	1750	35	1.91	69	2637	1.91	69	2637			750	2130	2130	1847	2768	1900	3500	4000	4000
	1160	23	1.49	81	3000	1.49	81	3000			750	2130	2130	1847	3324	1900	3500	4000	4000
	600	12	.82	86	3000	.82	86	3000			750	2130	2130	1847	4360	1900	3500	4000	4000
	100	2.0	.16	103	3000	.16	103	3000			750	2130	2130	1847	4400	1900	3500	4000	4000
60 (60)	3000	50	1.98	42	1804	1.82	38	1649	.00534	.00535	672	2130	2130	1847	2506	1900	3451	4000	4000
	2500	42	1.85	47	2002	1.80	45	1951			702	2130	2130	1847	2639	1900	3500	4000	4000
	1750	29	1.62	58	2455	1.62	58	2455			750	2130	2130	1847	2934	1900	3500	4000	4000
	1160	19	1.30	71	2850	1.30	71	2850			750	2130	2130	1847	3518	1900	3500	4000	4000
	600	10	.73	77	2850	.73	77	2850			750	2130	2130	1847	4400	1900	3500	4000	4000
	100	1.7	.15	96	2850	.15	96	2850			750	2130	2130	1847	4400	1900	3500	4000	4000

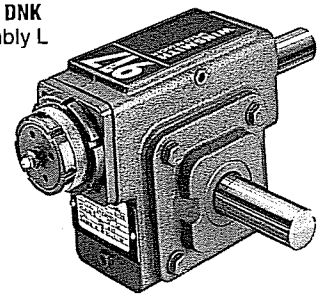
1. Numbers shown in ( ) are exact ratios.
2. Please specify if input speed is below 1160 RPM to insure proper bearing lubrication. For input speeds greater than 3000 RPM, see page A3.
3. Refer to the MOTION CONTROL Selection Procedures on pages A3-A7 for instructions on the application of these rating tables.
4. Overhung load given at one shaft diameter from housing or mounting flange. All values given in pounds.
5. Overhung load capacities are based on the direction and location of the load as shown in figure 1 on page G2. Consult factory for allowable OHL values if load is applied as shown in figure 2A, B, C or D on page G2.
6. Overhung load capacity given at a point located 6.668 inches from centerline of housing. Overhung load based on maximum bore size. Use of smaller driven shaft diameter may limit OHL capacity.
7. For DSN or DST output shaft overhung load capacities, contact the factory.

DNK S-ELIMINATOR

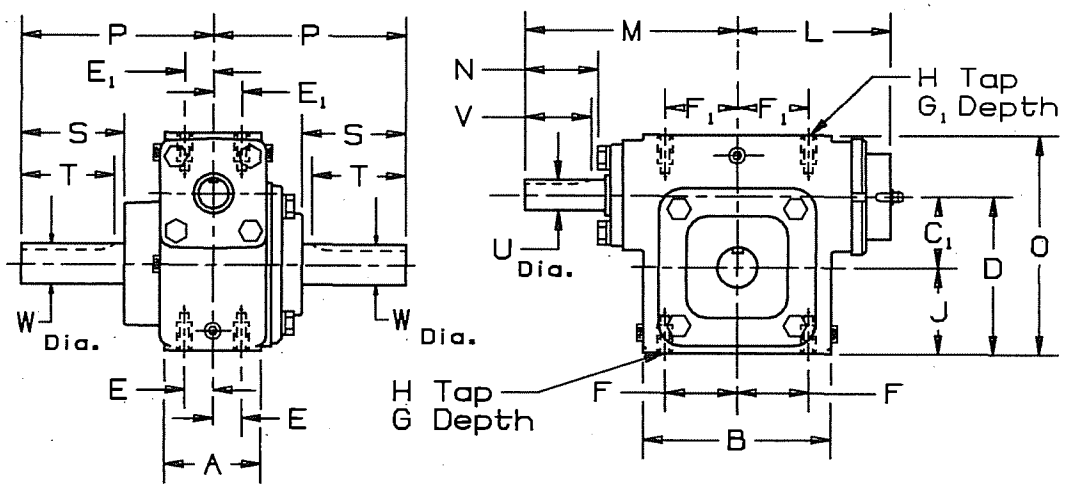
MODEL	913	917	920	926	930	935
SHIPPING WEIGHT* (LBS.)	13	16	20	39	51	72
APPROX. OIL CAPACITY (PINTS)	.2	.5	.5	1.2	1.7	2.3

*Weights are approximate and include shipping carton.

MODEL DNK
Assembly L



DIMENSIONS

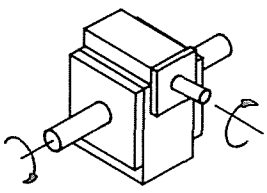


SPEED REDUCER DIMENSIONS (IN INCHES)

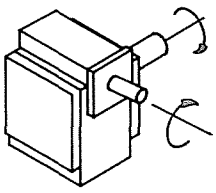
SIZE	A	B	C_1	D	E	E_1	F	F_1	G DEPTH	G_1 DEPTH	H TAP	J	L		M		O	P	HIGH SPEED SHAFT					SLOW SPEED SHAFT				SIZE
													MAX.	MIN.	MAX.	MIN.			U**	N MAX.	N MIN.	V	KEYWAY	W**	S	T	KEYWAY	
913	2.00	3.88	1.333	3.08	.69	.69	1.58	1.19	.56	.41	5/16-18	1.75	3.56	3.06	4.46	3.96	4.33	4.00	.625	1.63	1.13	1.25	.19 x .09	.750	2.06	1.88	.19 x .09	913
917	2.38	4.63	1.750	3.88	.88	.88	1.94	1.69	.56	.53	3/8-16	2.13	4.19	3.69	5.32	4.82	5.38	4.75	.750	1.88	1.38	1.44	.19 x .09	1.000	2.56	2.31	.25 x .13	917
920	2.38	5.25	2.000	4.13	.88	.88	2.19	1.69	.56	.53	3/8-16	2.13	4.30	3.80	5.32	4.82	5.63	4.75	.750	1.88	1.38	1.44	.19 x .09	1.000	2.56	2.31	.25 x .13	920
926	3.13	5.88	2.625	5.75	1.13	1.13	2.44	2.44	.63	.63	1/2-13	3.13	5.38	4.88	6.38	5.88	7.88	5.50	1.000	2.63	2.13	1.69	.25 x .13	1.250	2.81	2.63	.25 x .13	926
930	3.50	6.62	3.000	6.50	1.31	1.31	2.75	2.75	.75	.75	1/2-13	3.50	5.66	5.00	7.13	6.47	9.00	5.88	1.000	2.50	1.84	1.88	.25 x .13	1.375	2.88	2.75	.31 x .16	930
935	3.75	7.69	3.500	7.50	1.31	1.31	3.25	3.25	1.00	.94	5/8-11	4.00	5.88	5.22	8.06	7.40	10.13	7.00	1.000	2.50	1.84	1.88	.25 x .13	1.750	3.75	3.63	.38 x .19	935

**Shaft diameter tolerances +.000 −.001. For construction purposes send for Certified Dimension Sheets.

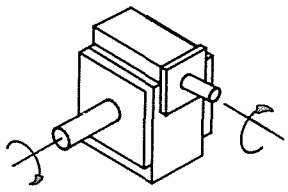
SHAFT ARRANGEMENTS AND RELATIVE SHAFT ROTATIONS



ASSEMBLY LR
OPTIONAL



ASSEMBLY R
STANDARD



ASSEMBLY L
STANDARD

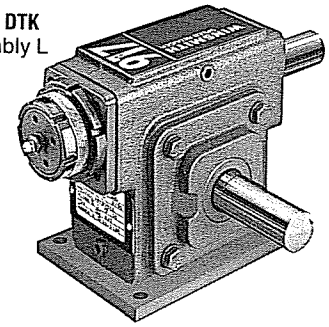
The input shaft may be driven in either direction.
Assembly designations for units with motor adaptors are the same as shown.

DTK S-ELIMINATOR

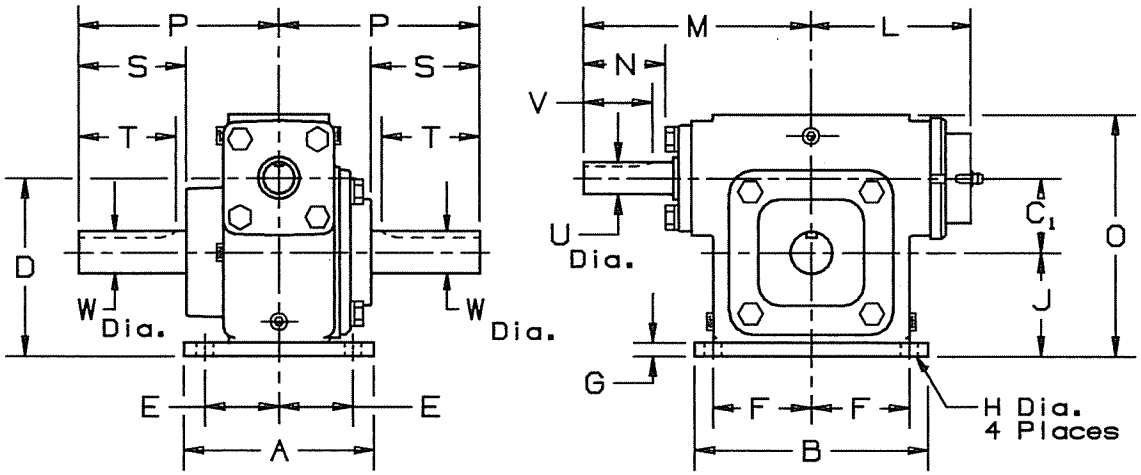
MODEL	913	917	920	926	930	935
SHIPPING WEIGHT* (LBS.)	14	21	23	42	58	82
APPROX. OIL CAPACITY (PINTS)	.2	.5	.5	1.2	1.7	2.3

*Weights are approximate and include shipping carton.

MODEL DTK
Assembly L



DIMENSIONS

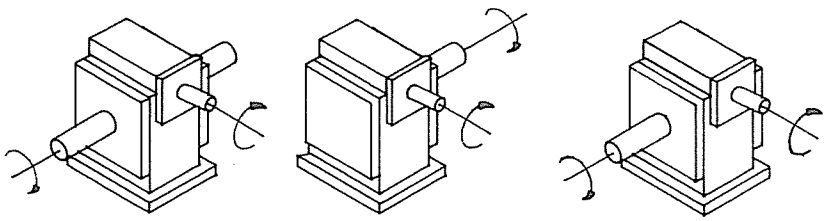


SPEED REDUCER DIMENSIONS (IN INCHES)

SIZE	A	B	C_1	D	E	F	G	H	J	L		M		O	P	HIGH SPEED SHAFT					SLOW SPEED SHAFT				SIZE
										MAX.	MIN.	MAX.	MIN.			U**	N MAX.	N MIN.	V	KEYWAY	W**	S	T	KEYWAY	
913	4.00	5.00	1.333	3.33	1.63	2.13	.25	.281	2.00	3.56	3.06	4.46	3.96	4.58	4.00	.625	1.63	1.13	1.25	.19 x .09	.750	2.06	1.88	.19 x .09	913
917	4.50	5.50	1.750	4.19	1.75	2.31	.31	.406	2.44	4.19	3.69	5.32	4.82	5.69	4.75	.750	1.88	1.38	1.44	.19 x .09	1.000	2.56	2.31	.25 x .13	917
920	4.50	5.88	2.000	4.63	1.88	2.50	.50	.406	2.63	4.30	3.80	5.32	4.82	6.13	4.75	.750	1.88	1.38	1.44	.19 x .09	1.000	2.56	2.31	.25 x .13	920
926	4.50	7.50	2.625	6.13	1.88	3.25	.38	.406	3.50	5.38	4.88	6.38	5.88	8.25	5.50	1.000	2.63	2.13	1.69	.25 x .13	1.250	2.81	2.63	.25 x .13	926
930	6.00	8.00	3.000	7.00	2.38	3.50	.50	.563	4.00	5.66	5.00	7.13	6.47	9.50	5.88	1.000	2.50	1.84	1.88	.25 x .13	1.375	2.88	2.75	.31 x .16	930
935	6.50	10.00	3.500	8.00	2.63	4.13	.50	.563	4.50	5.88	5.22	8.06	7.40	10.63	7.00	1.000	2.50	1.84	1.88	.25 x .13	1.750	3.75	3.63	.38 x .19	935

**Shaft diameter tolerances +.000 −.001. For construction purposes send for Certified Dimension Sheets.

SHAFT ARRANGEMENTS AND RELATIVE SHAFT ROTATIONS



ASSEMBLY LR
OPTIONAL

ASSEMBLY R
STANDARD

ASSEMBLY L
STANDARD

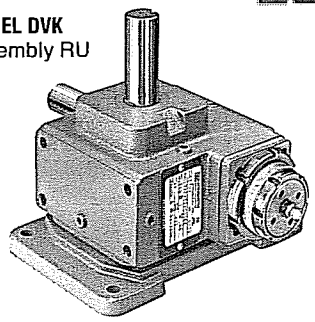
The input shaft may be driven in either direction.
Assembly designations for units with motor adaptors are the same as shown.

DVK S-ELIMINATOR

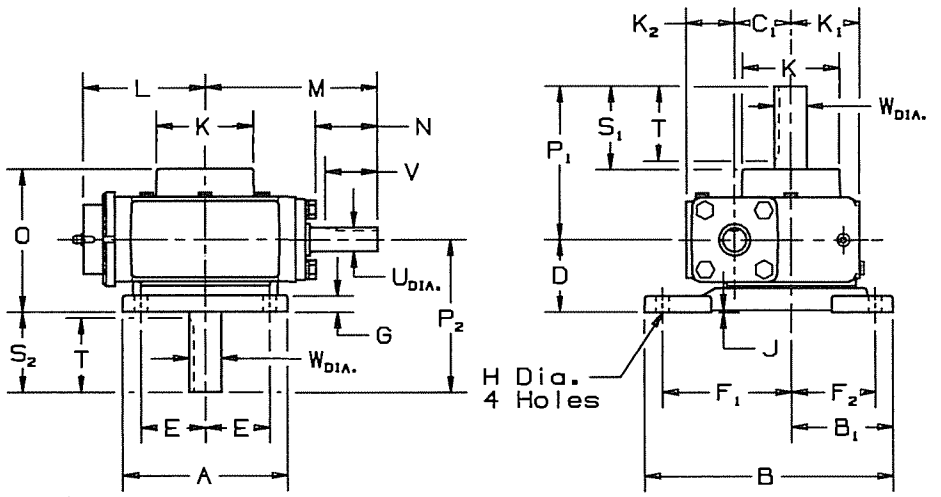
MODEL	913	917	920	926	930	935
SHIPPING WEIGHT* (LBS.)	15	23	24	48	61	88
APPROX. OIL CAPACITY (PINTS)	.3	.6	.7	1.7	2.3	2.9

*Weights are approximate and include shipping carton.

MODEL DVK
Assembly RU



DIMENSIONS

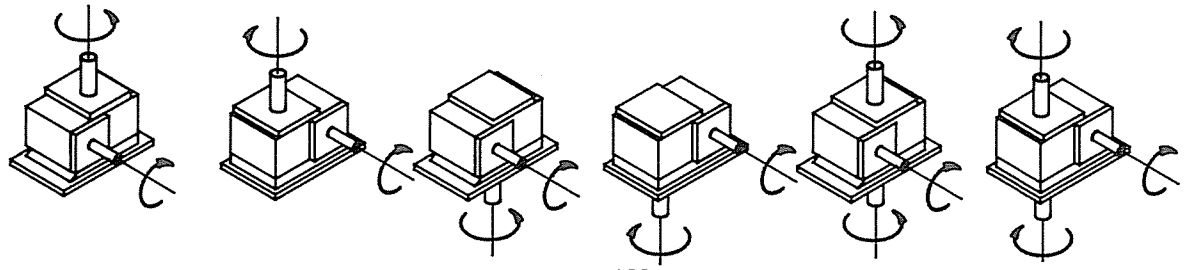


SPEED REDUCER DIMENSIONS (IN INCHES)

SIZE	A	B	B_1	C_1	D	E	F_1	F_2	G	H	J	K	K_1	K_2	L		M		D	P_1	P_2	HIGH SPEED SHAFT					SLOW SPEED SHAFT					SIZE
															MAX.	MIN.	MAX.	MIN.				U**	N MAX.	N MIN.	V	KEYWAY	W**	S_1	S_2	T	KEYWAY	
913	4.25	6.60	2.69	1.333	2.25	1.75	3.53	2.31	.38	.281	.13	2.25	1.75	1.25	3.56	3.06	4.46	3.96	4.19	4.00	4.00	.625	1.63	1.13	1.25	.19 x .09	.750	2.06	1.75	1.88	.19 x .09	913
917	5.13	7.75	3.19	1.750	2.25	2.00	4.00	2.63	.50	.406	.06	2.50	2.13	1.50	4.19	3.69	5.32	4.82	4.44	4.75	4.75	.750	1.88	1.38	1.44	.19 x .09	1.000	2.56	2.50	2.31	.25 x .13	917
920	5.13	8.50	3.56	2.000	2.25	2.00	4.38	3.00	.50	.406	.06	2.50	2.13	1.50	4.30	3.80	5.32	4.82	4.44	4.75	4.75	.750	1.88	1.38	1.44	.19 x .09	1.000	2.56	2.50	2.31	.25 x .13	920
926	6.88	9.44	3.63	2.625	3.63	2.88	5.25	2.88	.50	.406	.13	3.50	3.13	2.13	5.38	4.88	6.38	5.88	6.26	5.63	6.38	1.000	2.63	2.13	1.69	.25 x .13	1.250	3.00	2.75	2.75	.25 x .13	926
930	8.88	10.63	4.25	3.000	3.75	3.81	5.75	3.63	.63	.563	.13	3.50	3.50	2.50	5.66	5.00	7.13	6.47	6.75	6.19	6.75	1.000	2.50	1.84	1.88	.25 x .13	1.375	3.19	3.00	3.06	.31 x .16	930
935	9.75	11.50	5.00	3.500	3.75	4.25	5.88	4.38	.63	.563	.13	4.13	4.00	2.63	5.88	5.22	8.06	7.40	7.00	7.00	7.00	1.000	2.50	1.84	1.88	.25 x .13	1.750	3.75	3.25	3.63	.38 x .19	935

**Shaft diameter tolerances +.000 −.001. For construction purposes send for Certified Dimension Sheets.

SHAFT ARRANGEMENTS AND RELATIVE SHAFT ROTATIONS



ASSEMBLY RU STANDARD | ASSEMBLY LU STANDARD | ASSEMBLY RD STANDARD | ASSEMBLY LD STANDARD | ASSEMBLY RUD OPTIONAL | ASSEMBLY LUD OPTIONAL

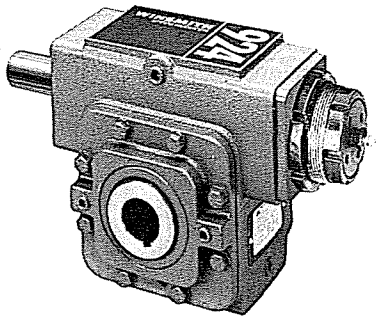
The input shaft may be driven in either direction.
Assembly designations for units with motor adaptors are the same as shown.

DSNK S-ELIMINATOR

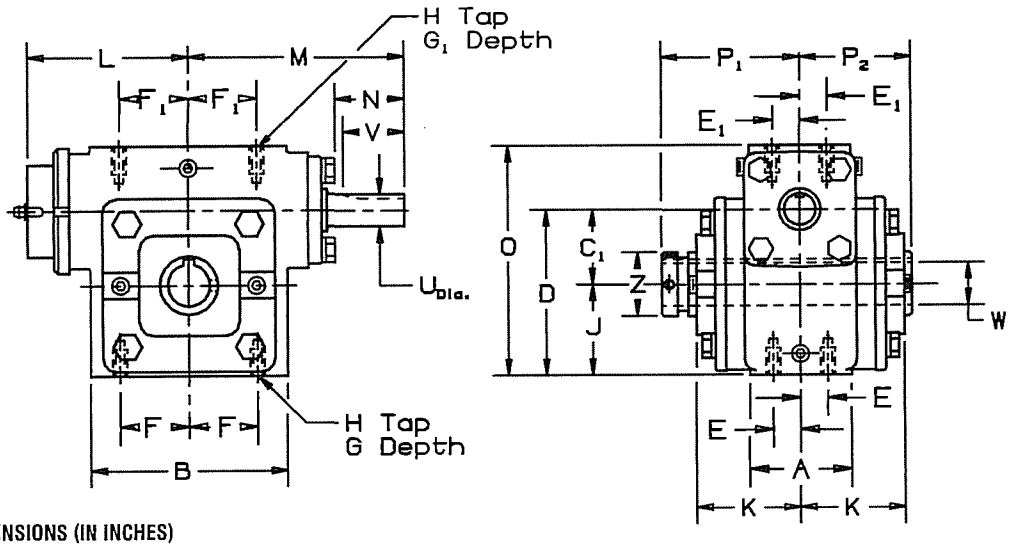
MODEL	917	920	926	930	935
SHIPPING WEIGHT* (LBS.)	16	20	39	51	80
APPROX. OIL CAPACITY (PINTS)	.5	.5	1.2	1.6	2.1

*Weights are approximate and include shipping carton.

MODEL DSNK
Assembly DR



DIMENSIONS

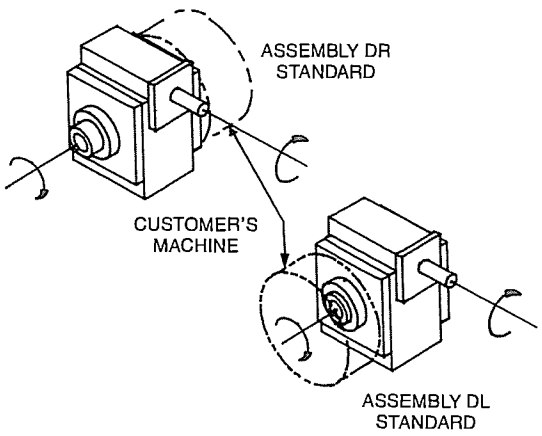


SPEED REDUCER DIMENSIONS (IN INCHES)

SIZE	A	B	C_1	D	E	E_1	F	F_1	G DEPTH	G_1 DEPTH	H TAP	J	K	L		M		O	P_1	P_2	Z	HIGH SPEED SHAFT					SIZE
														MAX.	MIN.	MAX.	MIN.					U**	N		V	KEYWAY	
																							MAX.	MIN.			
917	2.38	4.63	1.750	3.88	.88	.88	1.94	1.69	.56	.53	3/8-16	2.13	2.44	4.19	3.69	5.32	4.82	5.38	3.25	2.63	1.49	.750	1.88	1.38	1.44	.19 x .09	917
920	2.38	5.25	2.000	4.13	.88	.88	2.19	1.69	.56	.53	3/8-16	2.13	2.63	4.30	3.80	5.32	4.82	5.63	3.38	2.88	2.00	.750	1.88	1.38	1.44	.19 x .09	920
926	3.13	5.88	2.625	5.75	1.13	1.13	2.44	2.44	.63	.63	1/2-13	3.13	2.81	5.38	4.88	6.38	5.88	7.88	3.69	3.00	2.50	1.000	2.63	2.13	1.69	.25 x .13	926
930	3.50	6.62	3.000	6.50	1.31	1.31	2.75	2.75	.75	.75	1/2-13	3.50	3.00	5.66	5.00	7.13	6.47	9.00	4.06	3.19	2.63	1.000	2.50	1.84	1.88	.25 x .13	930
935	3.75	7.69	3.500	7.50	1.31	1.31	3.25	3.25	1.00	.94	5/8-11	4.00	3.38	5.88	5.22	8.06	7.40	10.13	4.44	3.56	2.87	1.000	2.50	1.84	1.88	.25 x .13	935

**Shaft diameter tolerances +.000 −.001. For construction purposes send for Certified Dimension Sheets.

SHAFT ARRANGEMENTS AND RELATIVE SHAFT ROTATIONS‡



SLOW SPEED SHAFT BORES[1,2,3,4]

917		920		926		930		935	
W***	KEYWAY	W***	KEYWAY	W***	KEYWAY	W***	KEYWAY	W***	KEYWAY
.625	.19 x .09	**.750**	**.19 x .09**	.938	.25 x .13	1.188	.25 x .13	1.188	.25 x .13
.688	.19 x .09	.813	.19 x .09	1.000	.25 x .13	1.250	.25 x .13	1.250	.25 x .13
.750	**.19 x .09**	**.875**	**.19 x .09**	1.063	.25 x .13	**1.375**	**.31 x .16**	**1.375**	**.31 x .16**
.813	.19 x .09	.938	.25 x .13	1.125	.25 x .13	**1.438**	**.38 x .19**	1.438	.38 x .19
.875	.19 x .09	**1.000**	**.25 x .13**	1.188	.25 x .13	**1.500**	**.38 x .19**	**1.500**	**.38 x .19**
.938	.25 x .13	1.063	.25 x .13	**1.250**	**.25 x .13**	**1.625**	**.38 x .19**	1.625	.38 x .19
1.000	**.25 x .13**	**1.125**	**.25 x .13**	1.375	.31 x .16	1.688	.38 x .19	1.688	.38 x .19
		1.188	.25 x .13	**1.438**	**.38 x .19**	**1.750**	**.38 x .19**	1.750	.38 x .19
		1.250	**.25 x .13**	**1.500**	**.38 x .19**	**1.875**	**.50 x .25**	**1.875**	**.50 x .25**
		1.375	.31 x .16	1.625	.38 x .19	**1.938**	**.50 x .19**	**1.938**	**.50 x .19**
		1.438	**.38 x .13**	**1.688**	**.38 x .19**			**2.000**	**.50 x .25**
								2.188	**.50 x .13**

***Bore tolerances +.000, +.002.
1. Contact factory for other bore sizes.
2. Hollow output shaft bored to size; no bushing kit required.
3. Puller groove on all hollow output shafts.
4. Bores in bold blue type are stock standard sizes.

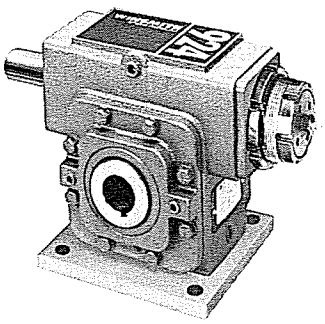
‡The input shaft may be driven in either direction.
Assembly designations for units with motor adaptors are the same as shown.

DSTK S-ELIMINATOR

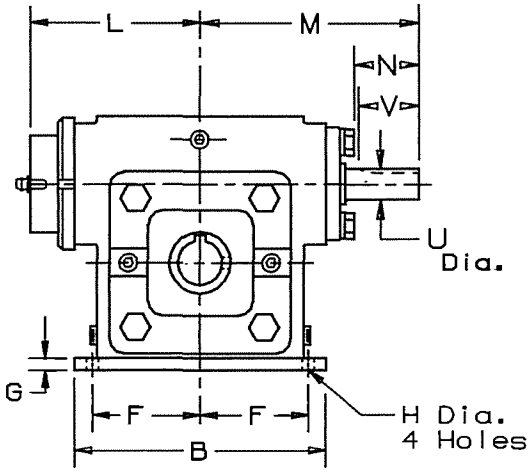
MODEL	917	920	926	930	935
SHIPPING WEIGHT* (LBS.)	21	23	42	58	90
APPROX. OIL CAPACITY (PINTS)	.5	.5	1.2	1.6	2.1

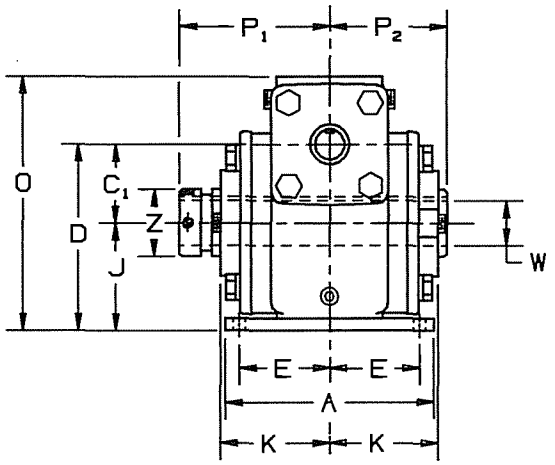
*Weights are approximate and include shipping carton.

MODEL DSTK
Assembly DR



DIMENSIONS



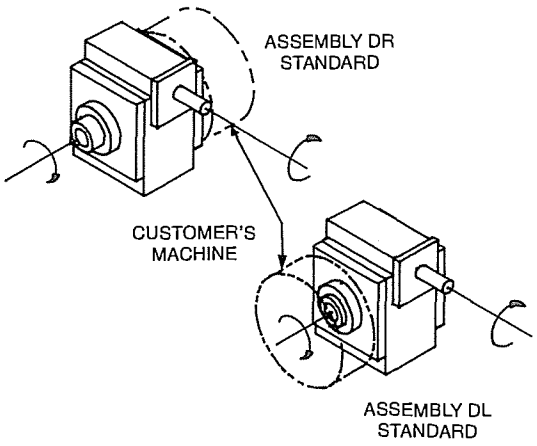


SPEED REDUCER DIMENSIONS (IN INCHES)△

SIZE	A	B	C_1	D	E	F	G	H	J	K	L		M		O	P_1	P_2	Z	HIGH SPEED SHAFT				SIZE
											MAX.	MIN.	MAX.	MIN.					U**	N MAX.	N MIN.	V	KEYWAY	
917	5.50	6.44	1.750	4.25	2.16	2.63	.38	.406	2.50	2.44	4.19	3.69	5.32	4.82	5.75	3.25	2.63	1.49	.750	1.88	1.38	1.44	.19 x .09	917
920	4.50	5.88	2.000	4.63	1.88	2.50	.50	.406	2.63	2.63	4.30	3.80	5.32	4.82	6.13	3.38	2.88	2.00	.750	1.88	1.38	1.44	.19 x .09	920
926	7.00	6.00	2.625	6.13	2.88	2.25	.38	.563	3.50	2.81	5.38	4.88	6.38	5.88	8.25	3.69	3.00	2.50	1.000	2.63	2.13	1.69	.25 x .13	926
930	8.00	6.75	3.000	7.00	3.25	2.63	.50	.563	4.00	3.00	5.66	5.00	7.13	6.47	9.50	4.06	3.19	2.63	1.000	2.50	1.84	1.88	.25 x .13	930
935	6.50	10.00	3.500	8.00	2.63	4.13	.50	.563	4.50	3.38	5.88	5.22	8.06	7.40	10.63	4.44	3.56	2.87	1.000	2.50	1.84	1.88	.25 x .13	935

**Shaft diameter tolerances +.000 −.001. For construction purposes send for Certified Dimension Sheets.
△**CAUTION:** Depending on size, some bases required for the S-Eliminator model, as shown above, will have some dimensional differences from standard D-90 TYPE SE and S-Minimizer models.

SHAFT ARRANGEMENTS AND RELATIVE SHAFT ROTATIONS‡



SLOW SPEED SHAFT BORES[1,2,3,4]

917		920		926		930		935	
W***	KEYWAY	W***	KEYWAY	W***	KEYWAY	W***	KEYWAY	W***	KEYWAY
.625	.19 x .09	**.750**	**.19 x .09**	.938	.25 x .13	1.188	.25 x .13	1.188	.25 x .13
.688	.19 x .09	.813	.19 x .09	1.000	.25 x .13	1.250	.25 x .13	1.250	.25 x .13
.750	**.19 x .09**	**.875**	**.19 x .09**	1.063	.25 x .13	**1.375**	**.31 x .16**	**1.375**	**.31 x .16**
.813	.19 x .09	.938	.25 x .13	1.125	.25 x .13	**1.438**	**.38 x .19**	1.438	.38 x .19
.875	.19 x .09	**1.000**	**.25 x .13**	1.188	.25 x .13	**1.500**	**.38 x .19**	**1.500**	**.38 x .19**
.938	.25 x .13	1.063	.25 x .13	**1.250**	**.25 x .13**	**1.625**	**.38 x .19**	1.625	.38 x .19
1.000	**.25 x .13**	**1.125**	**.25 x .13**	1.375	.31 x .16	1.688	.38 x .19	1.688	.38 x .19
		1.188	.25 x .13	**1.438**	**.38 x .19**	**1.750**	**.38 x .19**	1.750	.38 x .19
		1.250	**.25 x .13**	**1.500**	**.38 x .19**	**1.875**	**.50 x .25**	**1.875**	**.50 x .25**
		1.375	.31 x .16	1.625	.38 x .19	**1.938**	**.50 x .19**	**1.938**	**.50 x .19**
		1.438	**.38 x .13**	**1.688**	**.38 x .19**			**2.000**	**.50 x .25**
								2.188	**.50 x .13**

***Bore tolerances +.000, +.002.
1. Contact factory for other bore sizes.
2. Hollow output shaft bored to size; no bushing kit required.
3. Puller groove on all hollow output shafts.
4. Bores in bold blue type are stock standard sizes.

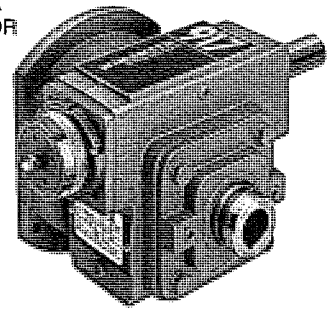
‡The input shaft may be driven in either direction.
Assembly designations for units with motor adaptors are the same as shown.

DSFK S-ELIMINATOR

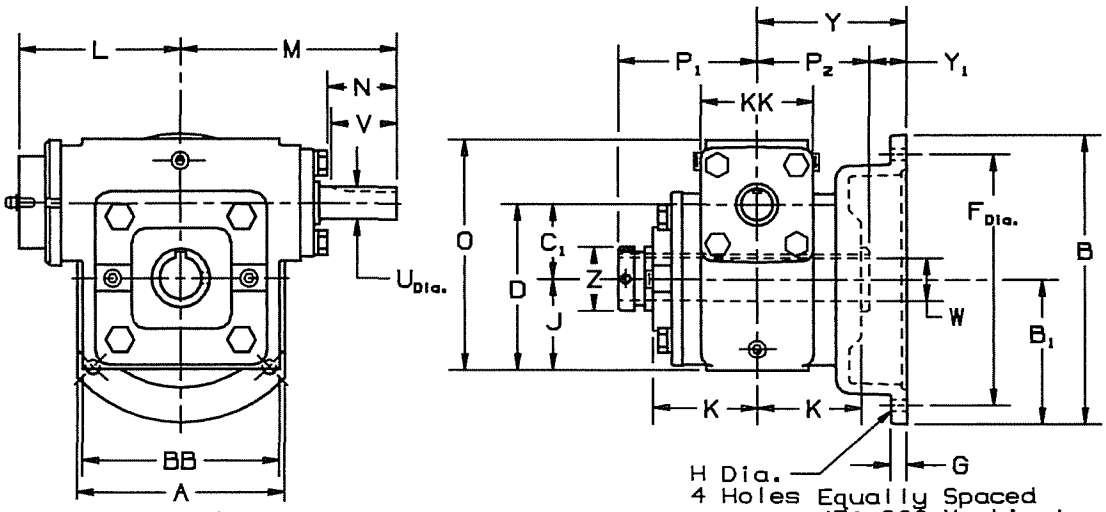
MODEL	917	920	926	930	935
SHIPPING WEIGHT* (LBS.)	25	30	49	69	92
APPROX. OIL CAPACITY (PINTS)	.5	.5	1.2	1.6	2.1

*Weights are approximate and include shipping carton.

MODEL DSFK
Assembly DR



DIMENSIONS

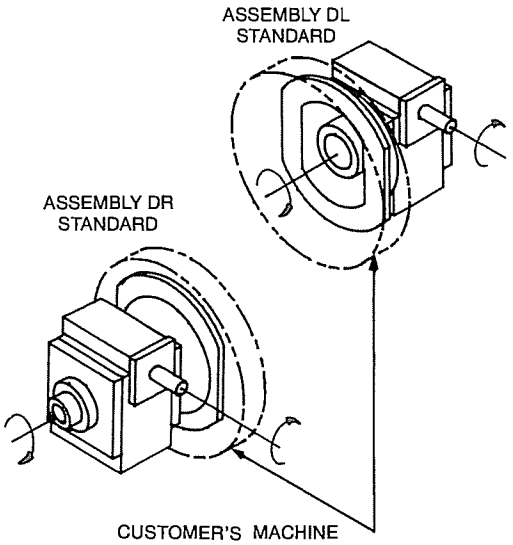


SPEED REDUCER DIMENSIONS (IN INCHES)

SIZE	A	B	B_1	BB	C_1	D	F dia	G	H	J	K	KK	L		M		D	P_1	P_2	Y	Y_1	Z	HIGH SPEED SHAFT				SIZE
													MAX.	MIN.	MAX.	MIN.							U**	N MAX.	N MIN.	V	KEYWAY	
917	4.88	6.75	3.38	4.63	1.750	3.88	5.875	.38	.344	2.13	2.44	2.38	4.19	3.69	5.32	4.82	5.38	3.25	2.63	3.50	.87	1.49	.750	1.88	1.38	1.44	.19 x .09	917
920	6.00	7.63	3.81	5.25	2.000	4.13	6.500	.38	.406	2.13	2.63	2.38	4.30	3.80	5.32	4.82	5.63	3.38	2.88	3.38	.50	2.00	.750	1.88	1.38	1.44	.19 x .09	920
926	7.75	9.13	4.56	5.88	2.625	5.75	8.000	.38	.406	3.13	2.81	3.13	5.38	4.88	6.38	5.88	7.88	3.69	3.00	3.63	.63	2.50	1.000	2.63	2.13	1.69	.25 x .13	926
930	8.00	10.75	5.38	6.62	3.000	6.50	9.250	.50	.563	3.50	3.00	3.50	5.66	5.00	7.13	6.47	9.00	4.06	3.19	5.00	1.81	2.63	1.000	2.50	1.84	1.88	.25 x .13	930
935	9.00	11.00	5.50	7.69	3.500	7.50	10.000	.50	.563	4.00	3.38	3.75	5.88	5.22	8.06	7.40	10.13	4.44	3.56	5.00	1.44	2.87	1.000	2.50	1.84	1.88	.25 x .13	935

**Shaft diameter tolerances +.000 −.001. For construction purposes send for Certified Dimension Sheets.

SHAFT ARRANGEMENTS AND RELATIVE SHAFT ROTATIONS‡



SLOW SPEED SHAFT BORES[1,2,3,4]

917		920		926		930		935	
W***	KEYWAY	W***	KEYWAY	W***	KEYWAY	W***	KEYWAY	W***	KEYWAY
.625	.19 x .09	**.750**	**.19 x .09**	.938	.25 x .13	1.188	.25 x .13	1.188	.25 x .13
.688	.19 x .09	.813	.19 x .09	1.000	.25 x .13	1.250	.25 x .13	1.250	.25 x .13
.750	**.19 x .09**	**.875**	**.19 x .09**	1.063	.25 x .13	**1.375**	**.31 x .16**	**1.375**	**.31 x .16**
.813	.19 x .09	.938	.25 x .13	1.125	.25 x .13	**1.438**	**.38 x .19**	1.438	.38 x .19
.875	.19 x .09	**1.000**	**.25 x .13**	1.188	.25 x .13	**1.500**	**.38 x .19**	**1.500**	**.38 x .19**
.938	.25 x .13	1.063	.25 x .13	**1.250**	**.25 x .13**	**1.625**	**.38 x .19**	1.625	.38 x .19
1.000	**.25 x .13**	**1.125**	**.25 x .13**	1.375	.31 x .16	1.688	.38 x .19	1.688	.38 x .19
		1.188	.25 x .13	**1.438**	**.38 x .19**	**1.750**	**.38 x .19**	1.750	.38 x .19
		1.250	**.25 x .13**	**1.500**	**.38 x .19**	**1.875**	**.50 x .25**	**1.875**	**.50 x .25**
		1.375	.31 x .16	1.625	.38 x .19	**1.938**	**.50 x .19**	**1.938**	**.50 x .19**
		1.438	**.38 x .13**	**1.688**	**.38 x .19**			**2.000**	**.50 x .25**
								2.188	**.50 x .13**

***Bore tolerances +.000, +.002.
1. Contact factory for other bore sizes.
2. Hollow output shaft bored to size; no bushing kit required.
3. Puller groove on all hollow output shafts.
4. Bores in bold blue type are stock standard sizes.

‡The input shaft may be driven in either direction.
Assembly designations for units with motor adaptors are the same as shown.

S-MINIMIZER
PRODUCT INTRODUCTION & CAPABILITIES

The S-MINIMIZER is a precision worm gear product with a fixed backlash designed to be a motion control product. Unlike some worm gear products that accommodate a low fixed backlash simply by tightening up the tolerances the S-MINIMIZER is a special combination of parts designed to achieve a specific backlash level. These parts allow minor adjustments in assembly to insure a minimum level of backlash. The backlash of the S-MINIMIZER is held to a maximum of 11 arc minutes when shipped.

The S-MINIMIZER is based on the D-90® TYPE SE® product line but makes use of two symmetric slow speed covers designed to allow for minor adjustments in the unit center distance and resulting backlash. Solid shaft models of the S-MINIMIZER have external dimensions that are different than the standard D-90 TYPE SE versions. The hollow shaft version of the S-MINIMIZER has the same external dimensions as the equivalent D-90 TYPE SE product, but some base plate dimensions will differ depending on unit size.

The S-MINIMIZER is not available in sizes 910, 913 and 935 where a two cover design is not available. Requirements for 1.33" or 3.50" center distance units may be accommodated using the C-MINIMIZER product. The C-MINIMIZER offers the same backlash performance as the S-MINIMIZER. Refer to the C-MINIMIZER section of this catalog for more information.

RATINGS

Ratios and ratings are summarized in the condensed ratings section in this catalog—Pages C3-C6. Complete ratio availability and ratings are available in the current D-90 TYPE SE catalog (#290).

COUPLING MOTOR ADAPTORS

Coupling motor adaptors are supplied in standard NEMA dimensions as well as in many variations that easily adapt to servo motors. All coupling style motor adaptors shown in the MOTION CONTROL catalog will have a large access hole to allow for easy coupling adjustment. See the catalog section covering motor flanges for more detail.

OUTPUT REGISTER OPTIONS

Occasionally there is a need to register the output of a motion control speed reducer to the driven machine. Some solid output models can be supplied with the male register interface on the slow speed side of the unit. See the double driver discussion on page B2 for size and model information. Hollow shaft models can be supplied with a register in the output flange. See the Options section of this catalog for dimensional information.

DOUBLE REDUCTION

The S-MINIMIZER can be made as a double worm or helical worm double reduction unit. However, this feature is available in the secondary stage only. The ratings for these units are the same as the D-90® TYPE SE® units of the same size and ratio. Refer to the current D-90 TYPE SE catalog for these ratings.

The overall backlash of a double reduction unit can be determined by dividing the ratio of the secondary stage into the backlash of the primary stage and adding the result to the backlash of the secondary stage.

EXAMPLE:

STAGE	RATIO	STAGE BACKLASH	OVERALL BACKLASH
Worm Primary (standard)	10:1	29 arc min	29/20 = 1.5 arc min
Secondary (S-MINIMIZER)	20:1	11 arc min	11.0 arc min
TOTAL	200:1		12.5 arc min

STANDARD MOUNTING POSITIONS

The MINIMIZER is built to accommodate all standard mounting positions as identified in the standard D-90 TYPE SE catalog for the given models. As with the SE product, the factory must be notified when units will be operated intermittently or at input speeds less than 1160 RPM so provisions can be made for bearing lubrication.

LUBRICATION

S-MINIMIZER units are factory filled with the appropriate grade of mineral oil for operation in a 51° F to 110° temperature requirement. Refer to the product installation bulletin shipped with each unit for detailed information on lubrication and maintenance.

Optional synthetic oils are available for applications involving low start-up, higher operating temperatures and where improved efficiency or extended lubricant life is desirable.

INERTIA

Inertia values for S-MINIMIZER products are the same as standard D-90 TYPE SE products and can be found in catalog #290.

S-MINIMIZER
PRODUCT INTRODUCTION & CAPABILITIES

WINSMITH

MODEL CAPABILITY

The S-MINIMIZER product is available in five sizes and many of the standard models offered in the D-90 TYPE SE product line per the chart. Input shaft and coupling style models offer a more effective design for maintaining consistent backlash because the worm shaft is supported between two bearings in the housing. Motorized models with a hollow input shaft can be accommodated, but variations at the motor shaft interface may slightly affect backlash consistency. Complete dimensional information is presented in this catalog, pages C7-C13.

MODEL	SIZE				
	917	920	924	926	930
DN	yes	yes	yes	yes	yes
DT	yes	yes	yes	yes	yes
DV	yes	yes	yes	yes	yes
DSN	yes	yes	yes	yes	yes
DST	yes	yes	yes	yes	yes
DSF	yes	yes	yes	yes	yes
DSR	yes	yes	yes	yes	yes
DL	no	no	no	yes	yes
MDN	yes	yes	yes	yes	yes
MDT	yes	yes	yes	yes	yes
MDV	yes	yes	yes	yes	yes
MDSN	yes	yes	yes	yes	yes
MDST	yes	yes	yes	yes	yes
MDSF	yes	yes	yes	yes	yes
MDSR	yes	yes	yes	yes	yes
MDL	no	no	no	yes	yes
CDN	yes	yes	yes	yes	yes
CDT	yes	yes	yes	yes	yes
CDV	yes	yes	yes	yes	yes
CDSN	yes	yes	yes	yes	yes
CDST	yes	yes	yes	yes	yes
CDSF	yes	yes	yes	yes	yes
CDSR	yes	yes	yes	yes	yes
CDL	no	no	no	yes	yes

NOTE: Sizes and models other than shown above are not available in S-MINIMIZER Product.

CONDENSED RATINGS CHART
S-MINIMIZER—MECHANICAL RATINGS†

1. Before selecting from these tables, refer to the selection Procedures on pages A3-A7. Using either the INPUT or OUTPUT METHOD, determine the DESIGN HP or TORQUE. Do not use these tables in conjunction with the FULL DUTY CYCLE METHOD.
2. For the applicable RATIO and RPM, read across until the unit rating from the table meets or exceeds the DESIGN LOAD (from Step 1).
3. If the selection falls within the shaded area and the application involves continuous operation (more than one half hour in a two hour period), refer to the

NOMINAL* RATIO△	INPUT RPM	NOMINAL OUTPUT RPM	917				920				924			
			INPUT HP	INPUT TORQUE	OUTPUT TORQUE	EFF	INPUT HP	INPUT TORQUE	OUTPUT TORQUE	EFF	INPUT HP	INPUT TORQUE	OUTPUT TORQUE	EFF
5	3000	600	2.52	53	244	92	3.50	74	340	93	5.48	115	534	93
	1750	350	2.01	72	330	91	2.76	99	457	92	4.38	158	726	92
	1160	232	1.64	89	402	90	2.32	126	572	91	3.68	200	911	91
7.5	3000	400	1.91	40	274	91	2.74	58	394	91	4.29	90	618	91
	1750	233	1.55	56	375	90	2.17	78	530	90	3.41	123	834	91
	1160	155	1.21	66	436	89	1.73	94	629	89	2.8	152	1022	90
10	3000	300	1.6	34	300	89	2.18	46	412	90	3.51	74	663	90
	1750	175	1.25	45	396	88	1.75	63	561	89	2.77	100	892	89
	1160	116	0.96	52	451	87	1.36	74	649	88	2.2	120	1057	88
15	3000	200	1.21	25	327	86	1.66	35	451	86	2.65	56	723	87
	1750	117	0.94	34	427	84	1.32	48	606	85	2.1	76	971	86
	1160	77	0.72	39	484	82	1.02	55	697	84	1.67	91	1147	84
20	3000	150	0.97	20	337	82	1.33	28	466	83	2.11	44	741	84
	1750	88	0.75	27	432	81	1.04	37	615	82	1.66	60	988	83
	1160	58	0.57	31	485	79	0.80	43	701	80	1.31	71	1151	81
25	3000	120	0.81	17	340	80	1.11	23	472	81	1.72	36	727	81
	1750	70	0.62	22	431	78	0.86	31	613	79	1.38	50	988	80
	1160	46	0.47	26	481	76	0.66	36	693	77	1.08	59	1143	78
30	3000	100	0.72	15	340	75	0.97	20	469	77	1.55	33	752	77
	1750	58	0.56	20	442	73	0.78	28	630	75	1.24	45	1007	76
	1160	39	0.44	24	500	71	0.61	33	725	72	0.99	54	1184	73
40	3000	75	0.57	12	338	71	0.78	16	468	72	1.19	25	720	72
	1750	44	0.44	16	431	68	0.61	22	617	70	0.97	35	989	71
	1160	29	0.34	18	483	66	0.48	26	702	67	0.77	42	1149	69
50	3000	60	0.47	10	328	66	0.64	13	456	68	0.99	21	705	68
	1750	35	0.37	13	415	64	0.50	18	591	66	0.79	28	949	67
	1160	23	0.28	15	463	61	0.39	21	667	63	0.62	34	1093	64
60	3000	50	0.4	8	311	62	0.54	11	433	64	0.84	18	671	64
	1750	29	0.31	11	391	59	0.42	15	557	62	0.66	24	896	63
	1160	19	0.24	13	435	57	0.32	17	627	59	0.52	28	1027	60

*Refer to the current D-90® TYPE SE® Catalog (#290) for exact ratios based on unit sizes.

△80:1 and 100:1 ratios also available.

†These ratings are based on using mineral oil in the unit.

CONDENSED RATINGS CHART
S-MINIMIZER—MECHANICAL RATINGS†

1. Before selecting from these tables, refer to the selection Procedures on pages A3-A7. Using either the INPUT or OUTPUT METHOD, determine the DESIGN HP or TORQUE. Do not use these tables in conjunction with the FULL DUTY CYCLE METHOD.
2. For the applicable RATIO and RPM, read across until the unit rating from the table meets or exceeds the DESIGN LOAD (from Step 1).
3. If the selection falls within the shaded area and the application involves continuous operation (more than one half hour in a two hour period), refer to the

NOMINAL* RATIO△	INPUT RPM	NOMINAL OUTPUT RPM	917				920				924			
			INPUT HP	INPUT TORQUE	OUTPUT TORQUE	EFF	INPUT HP	INPUT TORQUE	OUTPUT TORQUE	EFF	INPUT HP	INPUT TORQUE	OUTPUT TORQUE	EFF
5	3000	600	2.52	53	244	92	3.50	74	340	93	5.48	115	534	93
	1750	350	2.01	72	330	91	2.76	99	457	92	4.38	158	726	92
	1160	232	1.64	89	402	90	2.32	126	572	91	3.68	200	911	91
7.5	3000	400	1.91	40	274	91	2.74	58	394	91	4.29	90	618	91
	1750	233	1.55	56	375	90	2.17	78	530	90	3.41	123	834	91
	1160	155	1.21	66	436	89	1.73	94	629	89	2.8	152	1022	90
10	3000	300	1.6	34	300	89	2.18	46	412	90	3.51	74	663	90
	1750	175	1.25	45	396	88	1.75	63	561	89	2.77	100	892	89
	1160	116	0.96	52	451	87	1.36	74	649	88	2.2	120	1057	88
15	3000	200	1.21	25	327	86	1.66	35	451	86	2.65	56	723	87
	1750	117	0.94	34	427	84	1.32	48	606	85	2.1	76	971	86
	1160	77	0.72	39	484	82	1.02	55	697	84	1.67	91	1147	84
20	3000	150	0.97	20	337	82	1.33	28	466	83	2.11	44	741	84
	1750	88	0.75	27	432	81	1.04	37	615	82	1.66	60	988	83
	1160	58	0.57	31	485	79	0.80	43	701	80	1.31	71	1151	81
25	3000	120	0.81	17	340	80	1.11	23	472	81	1.72	36	727	81
	1750	70	0.62	22	431	78	0.86	31	613	79	1.38	50	988	80
	1160	46	0.47	26	481	76	0.66	36	693	77	1.08	59	1143	78
30	3000	100	0.72	15	340	75	0.97	20	469	77	1.55	33	752	77
	1750	58	0.56	20	442	73	0.78	28	630	75	1.24	45	1007	76
	1160	39	0.44	24	500	71	0.61	33	725	72	0.99	54	1184	73
40	3000	75	0.57	12	338	71	0.78	16	468	72	1.19	25	720	72
	1750	44	0.44	16	431	68	0.61	22	617	70	0.97	35	989	71
	1160	29	0.34	18	483	66	0.48	26	702	67	0.77	42	1149	69
50	3000	60	0.47	10	328	66	0.64	13	456	68	0.99	21	705	68
	1750	35	0.37	13	415	64	0.50	18	591	66	0.79	28	949	67
	1160	23	0.28	15	463	61	0.39	21	667	63	0.62	34	1093	64
60	3000	50	0.4	8	311	62	0.54	11	433	64	0.84	18	671	64
	1750	29	0.31	11	391	59	0.42	15	557	62	0.66	24	896	63
	1160	19	0.24	13	435	57	0.32	17	627	59	0.52	28	1027	60

*Refer to the current D-90® TYPE SE® Catalog (#290) for exact ratios based on unit sizes.

△80:1 and 100:1 ratios also available.

†These ratings are based on using mineral oil in the unit.

CONDENSED RATINGS CHART
S-MINIMIZER—MECHANICAL RATINGS†

S-MINIMIZER THERMAL RATING chart on pages C5-C6 and verify that the continuous applied load does not exceed the unit THERMAL capacity. If so, select the minimum size unit where the THERMAL capacity meets or exceeds the continuous applied load.

4. Check OVERHUNG LOADS on all shafts and/or THRUST LOAD on the output shaft. Refer to the rating pages in catalog 290 (D-90® TYPE SE® Worm Gear Reducers) for shaft capacities and the Engineering Section for explanation.

NOMINAL* RATIO△	INPUT RPM	NOMINAL OUTPUT RPM	926				930			
			INPUT HP	INPUT TORQUE	OUTPUT TORQUE	EFF	INPUT HP	INPUT TORQUE	OUTPUT TORQUE	EFF
5	3000	600	7.19	151	705	93	10.58	222	1046	94
	1750	350	5.75	207	959	93	8.47	305	1424	93
	1160	232	4.84	263	1205	92	7.09	385	1776	92
7.5	3000	400	5.62	118	816	92	8.25	173	1211	93
	1750	233	4.44	160	1095	91	6.41	231	1595	92
	1160	155	3.73	203	1370	90	5.56	302	2061	91
10	3000	300	4.56	96	873	91	6.71	141	1298	92
	1750	175	3.63	131	1179	90	5.33	192	1748	91
	1160	116	2.93	159	1416	89	4.43	241	2163	90
15	3000	200	3.44	72	953	88	5.03	106	1415	89
	1750	117	2.75	99	1287	87	4.03	145	1910	88
	1160	77	2.22	121	1539	85	3.34	181	2346	86
20	3000	150	2.73	57	977	85	3.97	83	1450	87
	1750	88	2.17	78	1312	84	3.19	115	1959	85
	1160	58	1.73	94	1548	82	2.61	142	2367	83
25	3000	120	2.26	47	983	83	3.28	69	1459	85
	1750	70	1.79	64	1312	81	2.64	95	1968	83
	1160	46	1.42	77	1532	80	2.14	116	2349	81
30	3000	100	1.99	42	993	79	2.88	61	1473	81
	1750	58	1.6	58	1338	77	2.33	84	1989	79
	1160	39	1.3	71	1593	75	1.95	106	2429	77
40	3000	75	1.56	33	982	75	2.24	47	1456	77
	1750	44	1.25	45	1316	73	1.83	66	1967	75
	1160	29	1.01	55	1548	70	1.51	82	2367	72
50	3000	60	1.28	27	951	71	1.82	38	1411	74
	1750	35	1.02	37	1266	69	1.49	54	1902	71
	1160	23	0.82	45	1475	66	1.22	66	2264	68
60	3000	50	1.04	22	875	67	1.51	32	1336	70
	1750	29	0.85	31	1193	65	1.23	44	1796	68
	1160	19	0.68	37	1381	63	1.01	55	2124	65

*Refer to the current D-90® TYPE SE® Catalog (#290) for exact ratios based on unit sizes.
△80:1 and 100:1 ratios also available.
†These ratings are based on using mineral oil in the unit.

CONDENSED RATINGS CHART
S-MINIMIZER—THERMAL RATINGS†

1. See pages C3-C4 for instructions on the use of this chart.
2. Chart provides THERMAL capacities only when less than the MECHANICAL rating. Otherwise, THERMAL and MECHANICAL capacities are equal.

NOMINAL* RATIO△	INPUT RPM	NOMINAL OUTPUT RPM	917			920			924		
			INPUT HP	INPUT TORQUE	OUTPUT TORQUE	INPUT HP	INPUT TORQUE	OUTPUT TORQUE	INPUT HP	INPUT TORQUE	OUTPUT TORQUE
5	3000	600	2.35	227	244	2.68	56	259	3.65	77	352
	1750	350				2.53	91	418	3.72	134	616
	1160	232				2.25	122	554	3.38	184	835
7.5	3000	400				2.31	49	331	3.17	67	451
	1750	233							3.2	115	784
	1160	155									
10	3000	300				2.01	42	379	2.8	59	524
	1750	175									
	1160	116									
15	3000	200				1.49	31	405	2.05	43	552
	1750	117							2.08	75	960
	1160	77									
20	3000	150				1.23	26	430	1.71	36	593
	1750	88									
	1160	58									
25	3000	120				1.07	22	451	1.48	31	620
	1750	70									
	1160	46									
30	3000	100				0.87	18	414	1.22	26	576
	1750	58									
	1160	39									
40	3000	75				0.73	15	438	1.03	22	610
	1750	44									
	1160	29									
50	3000	60							0.91	19	641
	1750	35									
	1160	23									
60	3000	50							0.82	17	656
	1750	29									
	1160	19									

*Refer to the current D-90® TYPE SE® Catalog (#290) for exact ratios based on unit sizes.
△80:1 and 100:1 ratios also available.
†These ratings are based on using mineral oil in the unit.

CONDENSED RATINGS CHART
S-MINIMIZER—THERMAL RATINGS†

1. See pages C3-C4 for instructions on the use of this chart.
2. Chart provides THERMAL capacities only when less than the MECHANICAL rating. Otherwise, THERMAL and MECHANICAL capacities are equal.

NOMINAL* RATIO△	INPUT RPM	NOMINAL OUTPUT RPM	926			930		
			INPUT HP	INPUT TORQUE	OUTPUT TORQUE	INPUT HP	INPUT TORQUE	OUTPUT TORQUE
5	3000	600	3.95	83	382	5.60	118	549
	1750	350	4.00	144	665	5.39	194	902
	1160	232	3.62	197	899	4.80	261	1200
7.5	3000	400	3.43	72	491	4.88	103	708
	1750	233	3.44	124	847	4.63	167	1148
	1160	155	3.13	170	1149	4.13	224	1529
10	3000	300	3.06	64	578	4.33	91	830
	1750	175	3.07	111	995	4.10	148	1339
	1160	116	2.81	153	1359	3.68	200	1791
15	3000	200	2.25	47	612	3.19	67	884
	1750	117	2.26	81	1054	3.02	109	1425
	1160	77	2.08	113	1439	2.72	148	1907
20	3000	150	1.87	39	658	2.65	56	952
	1750	88	1.88	68	1133	2.51	90	1535
	1160	58				2.28	124	2059
25	3000	120	1.63	34	693	2.29	48	1003
	1750	70	1.64	59	1195	2.18	79	1618
	1160	46				1.98	108	2175
30	3000	100	1.32	28	638	1.85	39	924
	1750	58	1.33	48	1099	1.76	63	1490
	1160	39	1.23	67	1502	1.61	87	1996
40	3000	75	1.11	23	676	1.55	33	981
	1750	44	1.12	40	1166	1.48	53	1582
	1160	29				1.36	74	2124
50	3000	60	0.98	21	709	1.36	29	1025
	1750	35	0.99	36	1223	1.30	47	1654
	1160	23				1.20	65	2225
60	3000	50	0.89	19	730	1.22	26	1057
	1750	29				1.17	42	1706
	1160	19						

*Refer to the current D-90® TYPE SE® Catalog (#290) for exact ratios based on unit sizes.
△80:1 and 100:1 ratios also available.
†These ratings are based on using mineral oil in the unit.

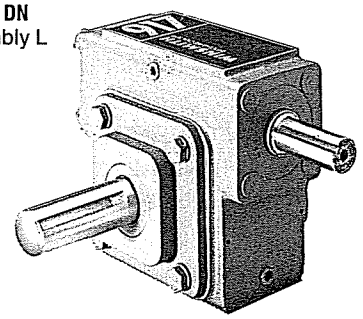
DN S-MINIMIZER

MODEL	917	920	924	926	930
SHIPPING WEIGHT* (LBS.)	15	19	36	38	50
APPROX. OIL CAPACITY (PINTS)	.5	.5	1.0	1.2	1.7

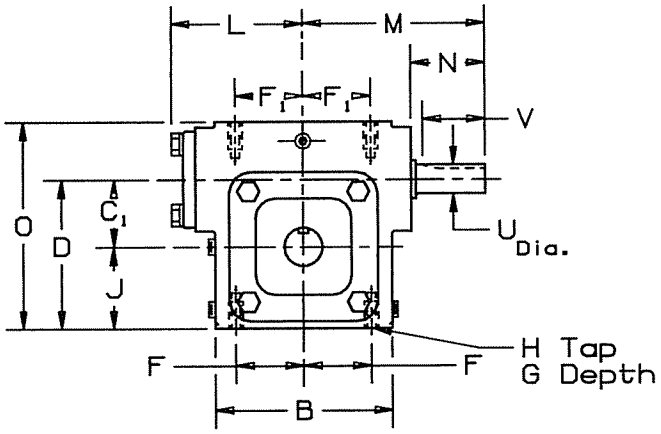
NOMINAL GEAR RATIOS AVAILABLE 5:1 THRU 100:1

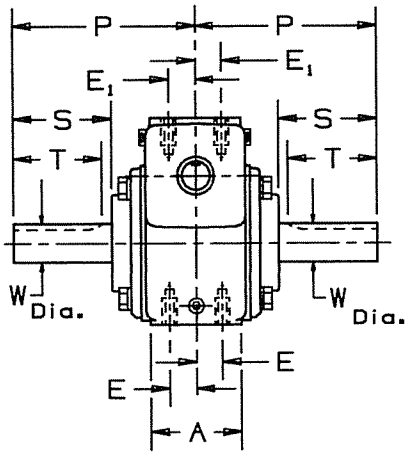
*Weights are approximate and include shipping carton.

MODEL DN
Assembly L



DIMENSIONS



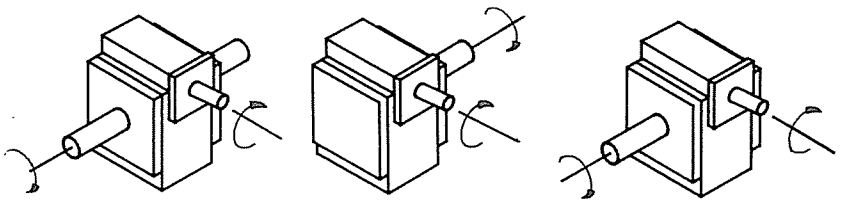


SPEED REDUCER DIMENSIONS (IN INCHES)△

SIZE	A	B	C_1	D	E	E_1	F	F_1	G DEPTH	H TAP	J	L	M	O	P	HIGH SPEED SHAFT				SLOW SPEED SHAFT				SIZE
																U**	N	V	KEYWAY	W**	S	T	KEYWAY	
917	2.38	4.63	1.750	3.88	.88	.88	1.94	1.69	.56	3/8-16	2.13	3.44	4.75	5.38	4.75	.750	1.94	1.69	.19 x .09	1.000	2.27	2.19	.25 x .13	917
920	2.38	5.25	2.000	4.13	.88	.88	2.19	1.69	.56	3/8-16	2.13	3.44	5.00	5.63	4.75	.750	2.19	1.75	.19 x .09	1.000	2.30	2.19	.25 x .13	920
924	3.13	5.38	2.375	5.25	1.13	1.13	2.19	2.19	.63	1/2-13	2.88	4.50	6.50	7.25	5.50	1.000	2.75	2.38	.25 x .13	1.250	2.91	2.63	.25 x .13	924
926	3.13	5.88	2.625	5.75	1.13	1.13	2.44	2.44	.63	1/2-13	3.13	4.50	6.50	7.88	5.50	1.000	2.75	2.38	.25 x .13	1.250	2.87	2.63	.25 x .13	926
930	3.50	6.62	3.000	6.50	1.31	1.31	2.75	2.75	.75	1/2-13	3.50	4.63	7.00	9.00	5.88	1.000	3.06	2.38	.25 x .13	1.375	2.80	2.75	.31 x .16	930

**Shaft diameter tolerances +.000 −.001. For construction purposes send for Certified Dimension Sheets.
△**CAUTION:** The double cover design required for the S-Minimizer model, as shown above, will have some dimensional differences from standard D-90 TYPE SE and S-Eliminator models.

SHAFT ARRANGEMENTS AND RELATIVE SHAFT ROTATIONS



ASSEMBLY LR
OPTIONAL

ASSEMBLY R
STANDARD

ASSEMBLY L
STANDARD

The input shaft may be driven in either direction.
Assembly designations for units with motor adaptors are the same as shown.

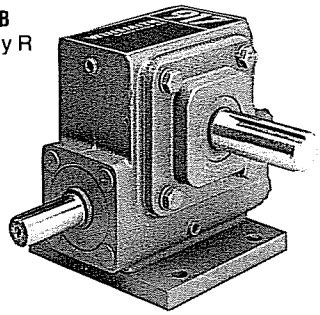
DB S-MINIMIZER

MODEL	917	920	924	926	930
SHIPPING WEIGHT* (LBS.)	21	22	40	41	57
APPROX. OIL CAPACITY (PINTS)	.7	.8	1.8	2.1	2.7

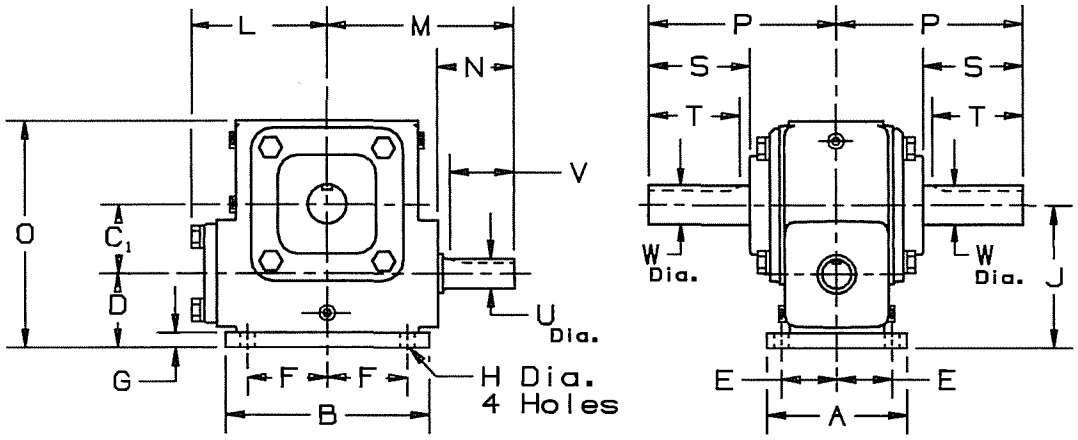
NOMINAL GEAR RATIOS AVAILABLE 5:1 THRU 100:1

*Weights are approximate and include shipping carton.

MODEL DB
Assembly R



DIMENSIONS

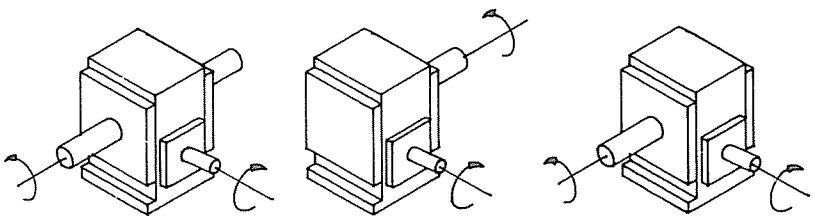


SPEED REDUCER DIMENSIONS (IN INCHES)△

SIZE	A	B	C_1	O	E	F	G	H	J	L	M	O	P	HIGH SPEED SHAFT				SLOW SPEED SHAFT				SIZE
														U**	N	V	KEYWAY	W**	S	T	KEYWAY	
917	5.00	4.63	1.750	2.00	2.06	1.44	.50	.406	3.75	3.44	4.75	5.88	4.75	.750	1.94	1.69	.19 x .09	1.000	2.27	2.19	.25 x .13	917
920	5.00	4.63	2.000	2.00	2.06	1.44	.50	.406	4.00	3.44	5.00	6.13	4.75	.750	2.19	1.75	.19 x .09	1.000	2.30	2.19	.25 x .13	920
924	7.00	5.75	2.375	2.38	2.88	2.25	.38	.563	4.75	4.50	6.50	7.63	5.50	1.000	2.75	2.38	.25 x .13	1.250	2.91	2.63	.25 x .13	924
926	7.00	6.00	2.625	2.50	2.88	2.25	.38	.563	5.13	4.50	6.50	8.25	5.50	1.000	2.75	2.38	.25 x .13	1.250	2.87	2.63	.25 x .13	926
930	8.00	6.75	3.000	3.00	3.25	2.63	.50	.563	6.00	4.63	7.00	9.50	5.88	1.000	3.06	2.38	.25 x .13	1.375	2.80	2.75	.31 x .16	930

**Shaft diameter tolerances +.000 −.001. For construction purposes send for Certified Dimension Sheets.
△**CAUTION:** The double cover design required for the S-Minimizer model, as shown above, will have some dimensional differences from standard D-90 TYPE SE and S-Eliminator models.

SHAFT ARRANGEMENTS AND RELATIVE SHAFT ROTATIONS



ASSEMBLY LR
OPTIONAL

ASSEMBLY R
STANDARD

ASSEMBLY L
STANDARD

The input shaft may be driven in either direction.
Assembly designations for units with motor adaptors are the same as shown.

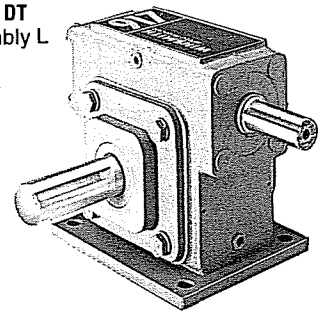
DT S-MINIMIZER

MODEL	917	920	924	926	930
SHIPPING WEIGHT* (LBS.)	20	22	39	41	57
APPROX. OIL CAPACITY (PINTS)	.5	.5	1.0	1.2	1.7

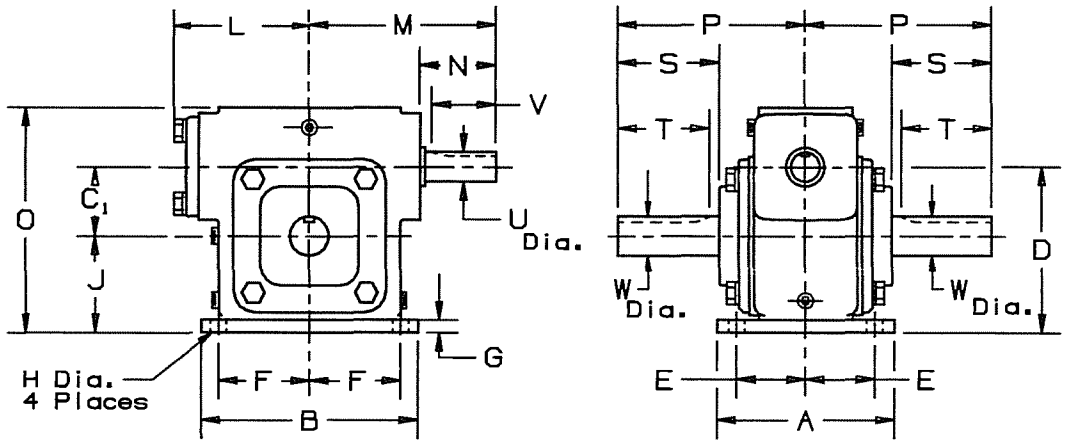
NOMINAL GEAR RATIOS AVAILABLE 5:1 THRU 100:1

*Weights are approximate and include shipping carton.

MODEL DT
Assembly L



DIMENSIONS

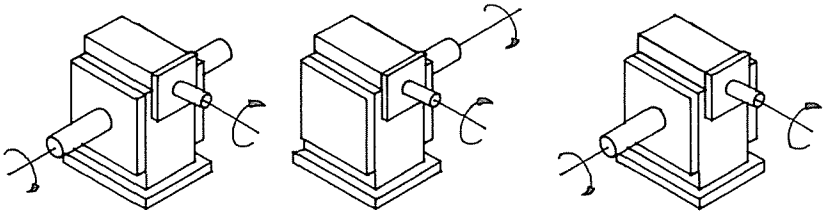


SPEED REDUCER DIMENSIONS (IN INCHES)△

SIZE	A	B	C_1	D	E	F	G	H	J	L	M	O	P	HIGH SPEED SHAFT				SLOW SPEED SHAFT				SIZE
														U**	N	V	KEYWAY	W**	S	T	KEYWAY	
917	5.50	6.44	1.750	4.25	2.16	2.63	.38	.406	2.50	3.44	4.75	5.75	4.75	.750	1.94	1.69	.19 x .09	1.000	2.27	2.19	.25 x .13	917
920	4.50	5.88	2.000	4.63	1.88	2.50	.50	.406	2.63	3.44	5.00	6.13	4.75	.750	2.19	1.75	.19 x .09	1.000	2.30	2.19	.25 x .13	920
924	4.50	7.00	2.375	5.63	1.88	3.13	.38	.406	3.25	4.50	6.50	7.63	5.50	1.000	2.75	2.38	.25 x .13	1.250	2.91	2.63	.25 x .13	924
926	7.00	6.00	2.625	6.13	2.88	2.25	.38	.563	3.50	4.50	6.50	8.25	5.50	1.000	2.75	2.38	.25 x .13	1.250	2.87	2.63	.25 x .13	926
930	8.00	6.75	3.000	7.00	3.25	2.63	.50	.563	4.00	4.63	7.00	9.50	5.88	1.000	3.06	2.38	.25 x .13	1.375	2.80	2.75	.31 x .16	930

**Shaft diameter tolerances +.000 −.001. For construction purposes send for Certified Dimension Sheets.
△**CAUTION:** The double cover design required for the S-Minimizer model, as shown above, will have some dimensional differences from standard D-90 TYPE SE and S-Eliminator models.

SHAFT ARRANGEMENTS AND RELATIVE SHAFT ROTATIONS



ASSEMBLY LR
OPTIONAL

ASSEMBLY R
STANDARD

ASSEMBLY L
STANDARD

The input shaft may be driven in either direction.
Assembly designations for units with motor adaptors are the same as shown.

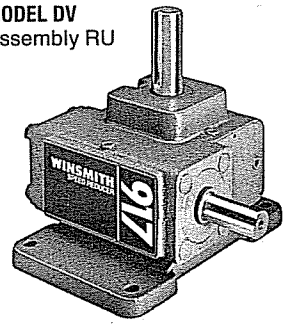
DV S-MINIMIZER

MODEL	917	920	924	926	930
SHIPPING WEIGHT* (LBS.)	24	26	46	51	64
APPROX. OIL CAPACITY (PINTS)	.6	.7	1.4	1.7	2.3

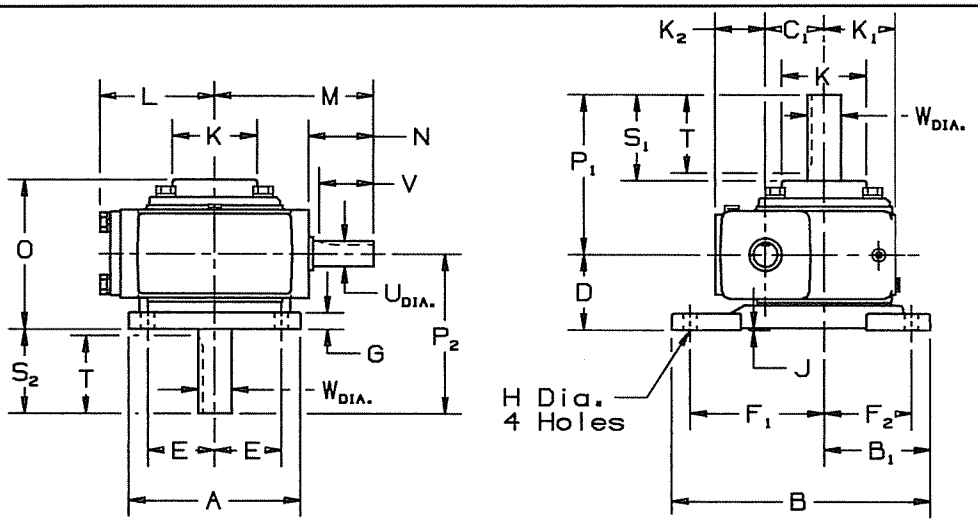
NOMINAL GEAR RATIOS AVAILABLE 5:1 THRU 100:1

*Weights are approximate and include shipping carton.

MODEL DV
Assembly RU



DIMENSIONS

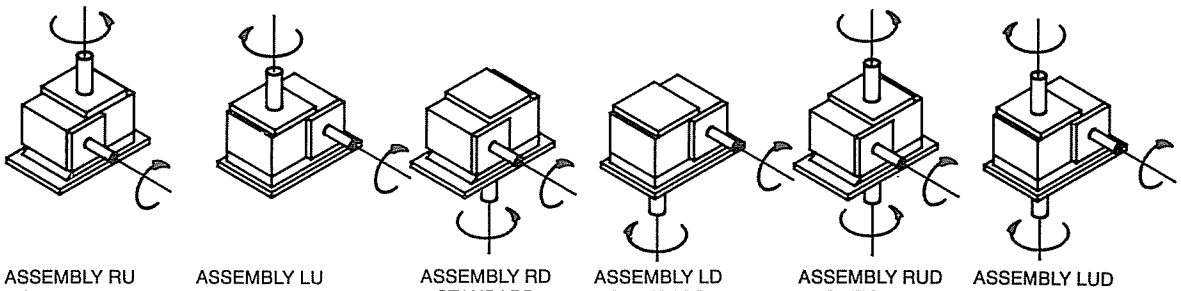


SPEED REDUCER DIMENSIONS (IN INCHES)△

SIZE	A	B	B_1	C_1	D	E	F_1	F_2	G	H	J	K	K_1	K_2	L	M	O	P_1	P_2	HIGH SPEED SHAFT				SLOW SPEED SHAFT					SIZE
																				U**	N	V	KEYWAY	W**	S_1	S_2	T	KEYWAY	
917	5.13	7.75	3.19	1.750	2.56	2.00	4.00	2.63	.50	.406	.06	2.50	2.13	1.50	3.44	4.75	5.05	4.75	4.75	.750	1.94	1.69	.19 x .09	1.000	2.27	2.19	2.19	.25 x .13	917
920	5.13	8.50	3.56	2.000	2.50	2.00	4.38	3.00	.50	.406	.06	2.50	2.13	1.50	3.44	5.00	4.96	4.75	4.75	.750	2.19	1.75	.19 x .09	1.000	2.30	2.25	2.19	.25 x .13	920
924	6.88	8.88	3.44	2.375	3.41	2.88	4.88	2.88	.50	.406	.13	3.25	2.88	2.00	4.50	6.50	6.01	5.75	6.38	1.000	2.75	2.38	.25 x .13	1.250	3.16	2.97	2.75	.25 x .13	924
926	6.88	9.44	3.63	2.625	3.56	2.88	5.25	2.88	.50	.406	.13	3.50	3.13	2.13	4.50	6.50	6.20	5.63	6.38	1.000	2.75	2.38	.25 x .13	1.250	3.12	2.81	2.75	.25 x .13	926
930	8.88	10.63	4.25	3.000	3.81	3.81	5.75	3.63	.63	.563	.13	3.50	3.50	2.50	4.63	7.00	6.89	6.19	6.75	1.000	3.06	2.38	.25 x .13	1.375	3.12	2.94	3.06	.31 x .16	930

**Shaft diameter tolerances +.000 −.001. For construction purposes send for Certified Dimension Sheets.
△**CAUTION:** The double cover design required for the S-Minimizer model, as shown above, will have some dimensional differences from standard D-90 TYPE SE and S-Eliminator models.

SHAFT ARRANGEMENTS AND RELATIVE SHAFT ROTATIONS



ASSEMBLY RU STANDARD | ASSEMBLY LU STANDARD | ASSEMBLY RD STANDARD | ASSEMBLY LD STANDARD | ASSEMBLY RUD OPTIONAL | ASSEMBLY LUD OPTIONAL

The input shaft may be driven in either direction.
Assembly designations for units with motor adaptors are the same as shown.

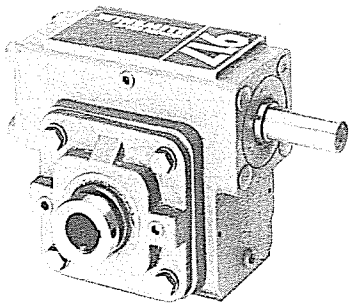
DSN S-MINIMIZER

MODEL	917	920	924	926	930
SHIPPING WEIGHT* (LBS.)	15	19	36	38	50
APPROX. OIL CAPACITY (PINTS)	.5	.5	.9	1.2	1.6

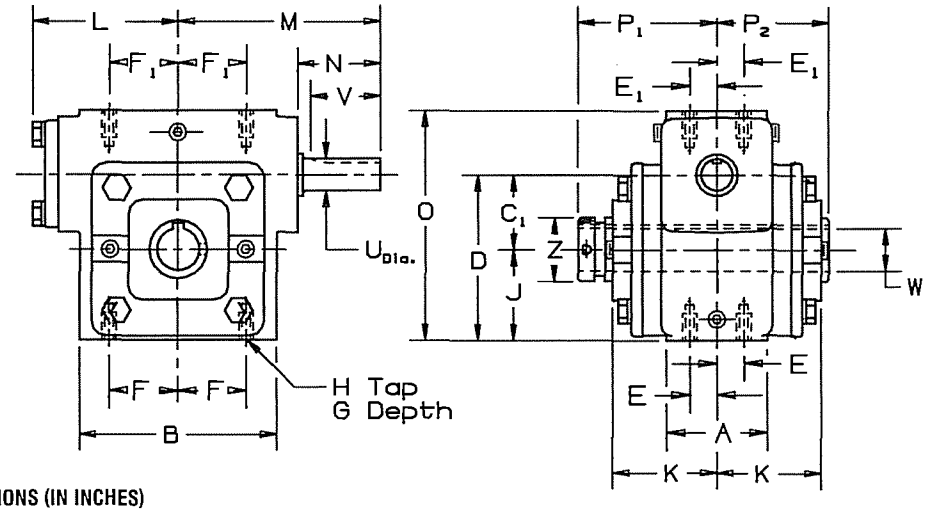
NOMINAL GEAR RATIOS AVAILABLE 5:1 THRU 100:1

*Weights are approximate and include shipping carton.

MODEL DSN
Assembly DR



DIMENSIONS

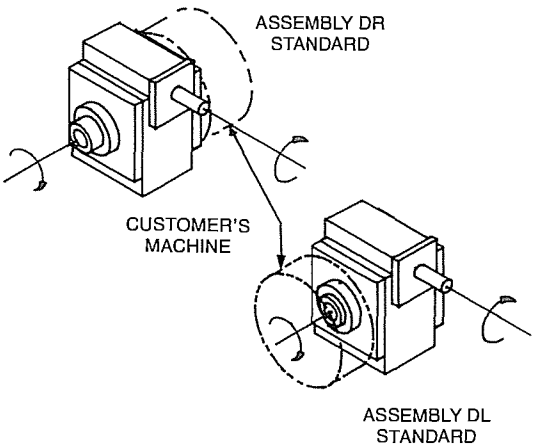


SPEED REDUCER DIMENSIONS (IN INCHES)

SIZE	A	B	C_1	D	E	E_1	F	F_1	G DEPTH	H TAP	J	K	L	M	O	P_1	P_2	Z	HIGH SPEED SHAFT U**	HIGH SPEED SHAFT N	HIGH SPEED SHAFT V	HIGH SPEED SHAFT KEYWAY	SIZE
917	2.38	4.63	1.750	3.88	.88	.88	1.94	1.69	.56	3/8-16	2.13	2.44	3.44	4.75	5.38	3.25	2.63	1.49	.750	1.94	1.69	.19 x .09	917
920	2.38	5.25	2.000	4.13	.88	.88	2.19	1.69	.56	3/8-16	2.13	2.63	3.44	5.00	5.63	3.38	2.88	2.00	.750	2.19	1.75	.19 x .09	920
924	3.13	5.38	2.375	5.25	1.13	1.13	2.19	2.19	.63	1/2-13	2.88	2.75	4.50	6.50	7.25	3.56	2.94	2.25	1.000	2.75	2.38	.25 x .13	924
926	3.13	5.88	2.625	5.75	1.13	1.13	2.44	2.44	.63	1/2-13	3.13	2.81	4.50	6.50	7.88	3.69	3.00	2.50	1.000	2.75	2.38	.25 x .13	926
930	3.50	6.62	3.000	6.50	1.31	1.31	2.75	2.75	.75	1/2-13	3.50	3.00	4.63	7.00	9.00	4.06	3.19	2.63	1.000	3.06	2.38	.25 x .13	930

**Shaft diameter tolerances +.000 −.001. For construction purposes send for Certified Dimension Sheets.

SHAFT ARRANGEMENTS AND RELATIVE SHAFT ROTATIONS‡



SLOW SPEED SHAFT BORES[1,2,3,4]

917		920		924		926		930	
W***	KEYWAY	W***	KEYWAY	W***	KEYWAY	W***	KEYWAY	W***	KEYWAY
.625	.19 x .09	**.750**	**.19 x .09**	.875	.19 x .09	.938	.25 x .13	1.188	.25 x .13
.688	.19 x .09	.813	.19 x .09	.938	.25 x .13	1.000	.25 x .13	1.250	.25 x .13
.750	**.19 x .09**	**.875**	**.19 x .09**	1.000	.25 x .13	1.063	.25 x .13	**1.375**	**.31 x .16**
.813	.19 x .09	.938	.25 x .13	1.063	.25 x .13	1.125	.25 x .13	**1.438**	**.38 x .19**
.875	.19 x .09	**1.000**	**.25 x .13**	**1.125**	**.25 x .13**	1.188	.25 x .13	**1.500**	**.38 x .19**
.938	.25 x .13	1.063	.25 x .13	1.188	.25 x .13	**1.250**	**.25 x .13**	**1.625**	**.38 x .19**
1.000	**.25 x .13**	**1.125**	**.25 x .13**	**1.250**	**.25 x .13**	1.375	.31 x .16	1.688	.38 x .19
		1.188	.25 x .13	1.375	.31 x .16	**1.438**	**.38 x .19**	**1.750**	**.38 x .19**
		1.250	**.25 x .13**	**1.438**	**.38 x .19**	**1.500**	**.38 x .19**	**1.875**	**.50 x .25**
		1.375	.31 x .16	1.500	.38 x .19	1.625	.38 x .19	**1.938**	**.50 x .19**
		1.438	**.38 x .13**			**1.688**	**.38 x .19**		

***Bore tolerances +.000, +.002.
1. Contact factory for other bore sizes.
2. Hollow output shaft bored to size; no bushing kit required.
3. Puller groove on all hollow output shafts.
4. Bores in bold blue type are stock standard sizes.

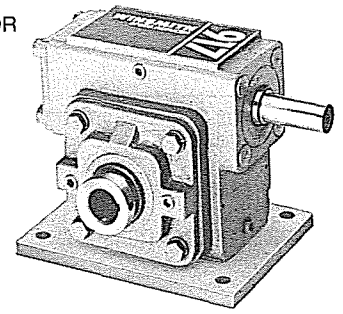
‡The input shaft may be driven in either direction.
Assembly designations for units with motor adaptors are the same as shown.

DST S-MINIMIZER

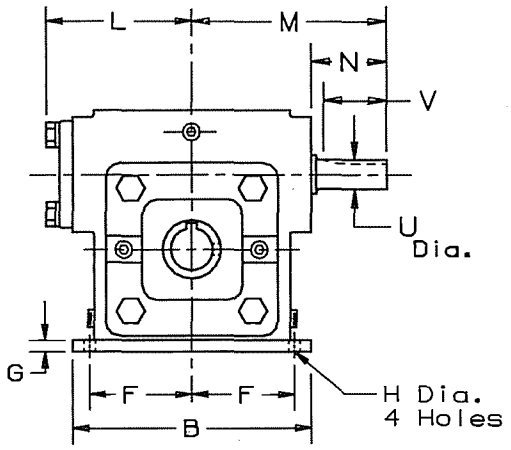
MODEL	917	920	924	926	930
SHIPPING WEIGHT* (LBS.)	20	22	39	41	57
APPROX. OIL CAPACITY (PINTS)	.5	.5	.9	1.2	1.7

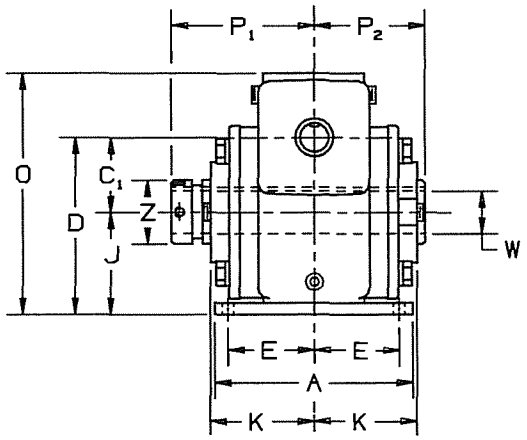
NOMINAL GEAR RATIOS AVAILABLE 5:1 THRU 100:1
TORQUE, HP, OVERHUNG LOAD AND INERTIA RATINGS ..... SEE D-90 TYPE SE CATALOG
CONDENSED RATINGS CHARTS ..... PAGES C3-C6
SELECTION PROCEDURES..... PAGES A3-A7
MOTOR ADAPTOR & OTHER OPTIONS ..... PAGES F1-F7
ENGINEERING SECTION ..... PAGES G1-G8
*Weights are approximate and include shipping carton.

MODEL DST
Assembly DR



DIMENSIONS



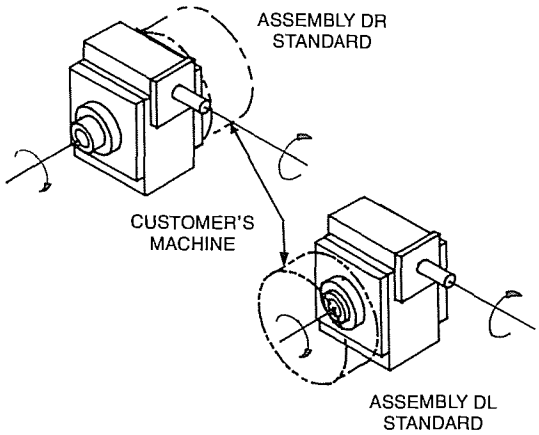


SPEED REDUCER DIMENSIONS (IN INCHES)△

SIZE	A	B	C_1	D	E	F	G	H	J	K	L	O	P_1	P_2	Z	HIGH SPEED SHAFT U**	N	V	KEYWAY	SIZE
917	5.50	6.44	1.750	4.25	2.16	2.63	.38	.406	2.50	2.44	3.44	5.75	3.25	2.63	1.49	.750	1.94	1.69	.19 x .09	917
920	4.50	5.88	2.000	4.63	1.88	2.50	.50	.406	2.63	2.63	3.44	6.13	3.38	2.88	2.00	.750	2.19	1.75	.19 x .09	920
924	4.50	7.00	2.375	5.63	1.88	3.13	.38	.406	3.25	2.75	4.50	7.63	3.56	2.94	2.25	1.000	2.75	2.38	.25 x .13	924
926	7.00	6.00	2.625	6.13	2.88	2.25	.38	.563	3.50	2.81	4.50	8.25	3.69	3.00	2.50	1.000	2.75	2.38	.25 x .13	926
930	8.00	6.75	3.000	7.00	3.25	2.63	.50	.563	4.00	3.00	4.63	9.50	4.06	3.19	2.63	1.000	3.06	2.38	.25 x .13	930

**Shaft diameter tolerances +.000 −.001. For construction purposes send for Certified Dimension Sheets.
△**CAUTION:** Depending on size, some bases required for the S-Minimizer model, as shown above, will have some dimensional differences from standard D-90 TYPE SE and S-Eliminator models.

SHAFT ARRANGEMENTS AND RELATIVE SHAFT ROTATIONS‡



SLOW SPEED SHAFT BORES[1,2,3,4]

917		920		924		926		930	
W***	KEYWAY	W***	KEYWAY	W***	KEYWAY	W***	KEYWAY	W***	KEYWAY
.625	.19 x .09	**.750**	**.19 x .09**	.875	.19 x .09	.938	.25 x .13	1.188	.25 x .13
.688	.19 x .09	.813	.19 x .09	.938	.25 x .13	1.000	.25 x .13	1.250	.25 x .13
.750	**.19 x .09**	**.875**	**.19 x .09**	1.000	.25 x .13	1.063	.25 x .13	**1.375**	**.31 x .16**
.813	.19 x .09	.938	.25 x .13	1.063	.25 x .13	1.125	.25 x .13	**1.438**	**.38 x .19**
.875	.19 x .09	**1.000**	**.25 x .13**	**1.125**	**.25 x .13**	1.188	.25 x .13	**1.500**	**.38 x .19**
.938	.25 x .13	1.063	.25 x .13	1.188	.25 x .13	**1.250**	**.25 x .13**	**1.625**	**.38 x .19**
1.000	**.25 x .13**	**1.125**	**.25 x .13**	**1.250**	**.25 x .13**	1.375	.31 x .16	1.688	.38 x .19
		1.188	.25 x .13	1.375	.31 x .16	**1.438**	**.38 x .19**	**1.750**	**.38 x .19**
		1.250	**.25 x .13**	**1.438**	**.38 x .19**	**1.500**	**.38 x .19**	**1.875**	**.50 x .25**
		1.375	.31 x .16	1.500	.38 x .19	1.625	.38 x .19	**1.938**	**.50 x .19**
		1.438	**.38 x .13**			**1.688**	**.38 x .19**		

***Bore tolerances +.000, +.002.
1. Contact factory for other bore sizes.
2. Hollow output shaft bored to size; no bushing kit required.
3. Puller groove on all hollow output shafts.
4. Bores in bold blue type are stock standard sizes.

‡The input shaft may be driven in either direction.
Assembly designations for units with motor adaptors are the same as shown.

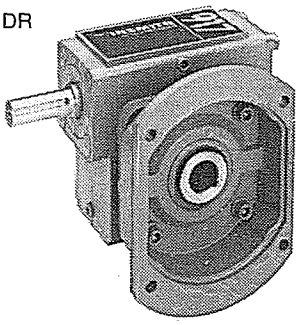
DSF S-MINIMIZER

MODEL	917	920	924	926	930
SHIPPING WEIGHT* (LBS.)	24	29	43	48	68
APPROX. OIL CAPACITY (PINTS)	.5	.5	.9	1.2	1.6

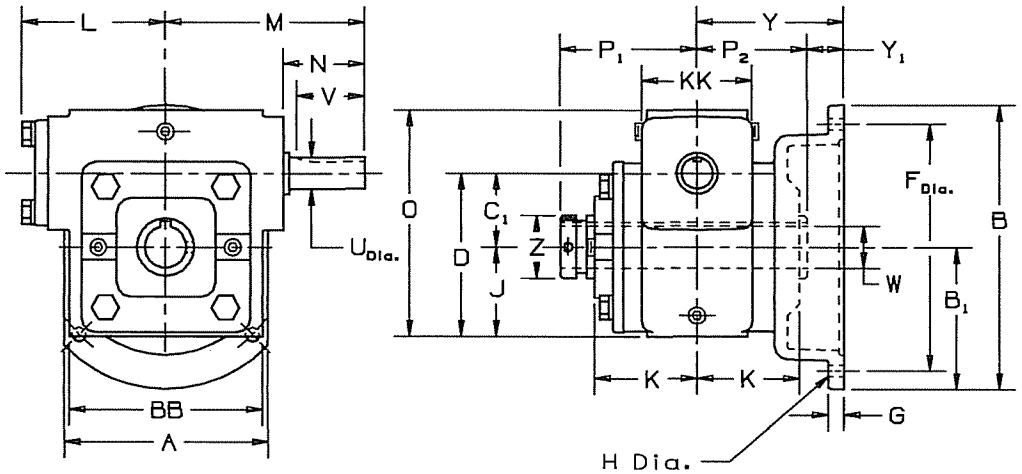
NOMINAL GEAR RATIOS AVAILABLE 5:1 THRU 100:1

*Weights are approximate and include shipping carton.

MODEL DSF
Assembly DR



DIMENSIONS

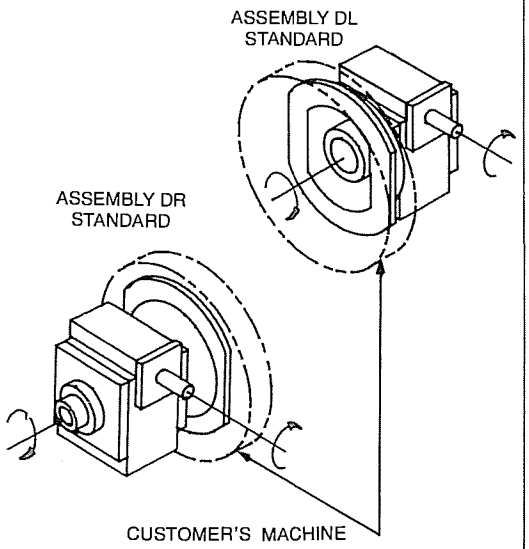


SPEED REDUCER DIMENSIONS (IN INCHES)

SIZE	A	B	B_1	BB	C_1	O	F dia.	G	H	J	K	KK	L	M	O	P_1	P_2	Y	Y_1	Z	HIGH SPEED SHAFT U**	HIGH SPEED SHAFT N	HIGH SPEED SHAFT V	HIGH SPEED SHAFT KEYWAY	SIZE
917	4.88	6.75	3.38	4.63	1.750	3.88	5.875	.38	.344	2.13	2.44	2.38	3.44	4.75	5.38	3.25	2.63	3.50	.87	1.49	.750	1.94	1.69	.19 x .09	917
920	6.00	7.63	3.81	5.25	2.000	4.13	6.500	.38	.406	2.13	2.63	2.38	3.44	5.00	5.63	3.38	2.88	3.38	.50	2.00	.750	2.19	1.75	.19 x .09	920
924	7.38	8.63	4.31	5.38	2.375	5.25	7.500	.38	.406	2.88	2.75	3.13	4.50	6.50	7.25	3.56	2.94	3.50	.56	2.25	1.000	2.75	2.38	.25 x .13	924
926	7.75	9.13	4.56	5.88	2.625	5.75	8.000	.38	.406	3.13	2.81	3.13	4.50	6.50	7.88	3.69	3.00	3.63	.63	2.50	1.000	2.75	2.38	.25 x .13	926
930	8.00	10.75	5.38	6.62	3.000	6.50	9.250	.50	.563	3.50	3.00	3.50	4.63	7.00	9.00	4.06	3.19	5.00	1.81	2.63	1.000	3.06	2.38	.25 x .13	930

**Shaft diameter tolerances +.000 −.001. For construction purposes send for Certified Dimension Sheets.

SHAFT ARRANGEMENTS AND RELATIVE SHAFT ROTATIONS‡



SLOW SPEED SHAFT BORES[1,2,3,4]

917		920		924		926		930	
W***	KEYWAY	W***	KEYWAY	W***	KEYWAY	W***	KEYWAY	W***	KEYWAY
.625	.19 x .09	**.750**	**.19 x .09**	.875	.19 x .09	.938	.25 x .13	1.188	.25 x .13
.688	.19 x .09	.813	.19 x .09	.938	.25 x .13	1.000	.25 x .13	1.250	.25 x .13
.750	**.19 x .09**	**.875**	**.19 x .09**	1.000	.25 x .13	1.063	.25 x .13	**1.375**	**.31 x .16**
.813	.19 x .09	.938	.25 x .13	1.063	.25 x .13	1.125	.25 x .13	**1.438**	**.38 x .19**
.875	.19 x .09	**1.000**	**.25 x .13**	**1.125**	**.25 x .13**	1.188	.25 x .13	**1.500**	**.38 x .19**
.938	.25 x .13	1.063	.25 x .13	1.188	.25 x .13	**1.250**	**.25 x .13**	**1.625**	**.38 x .19**
1.000	**.25 x .13**	**1.125**	**.25 x .13**	**1.250**	**.25 x .13**	1.375	.31 x .16	1.688	.38 x .19
		1.188	.25 x .13	1.375	.31 x .16	**1.438**	**.38 x .19**	**1.750**	**.38 x .19**
		1.250	**.25 x .13**	**1.438**	**.38 x .19**	**1.500**	**.38 x .19**	**1.875**	**.50 x .25**
		1.375	.31 x .16	1.500	.38 x .19	1.625	.38 x .19	**1.938**	**.50 x .19**
		1.438	**.38 x .13**			**1.688**	**.38 x .19**		

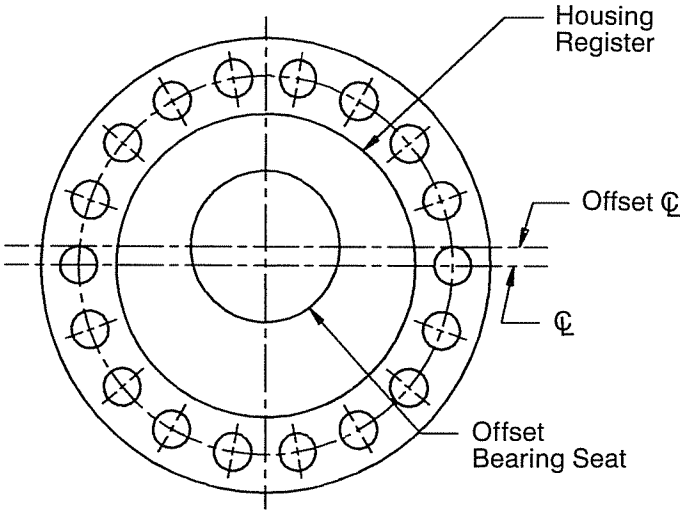
***Bore tolerances +.000, +.002.
1. Contact factory for other bore sizes.
2. Hollow output shaft bored to size; no bushing kit required.
3. Puller groove on all hollow output shafts.
4. Bores in bold blue type are stock standard sizes.

‡The input shaft may be driven in either direction.
Assembly designations for units with motor adaptors are the same as shown.

C-ELIMINATOR
PRODUCT INTRODUCTION & CAPABILITIES

The C-ELIMINATOR is a precision worm gear product that was developed to respond to motion control needs early in the growth of motion control requirements. The C-ELIMINATOR product is an adaptation of the standard C-Line product line.

The C-ELIMINATOR is an adjustable backlash product that can be held to a maximum of six arc minutes of backlash. The product is designed using two symmetric slow speed covers. These covers have a series of mounting holes drilled around the perimeter. The bearing seat center within the cover is offset from the cover register and mounting hole circle. Adjustments are made by removing the mounting bolts on the slow speed covers and rotating the covers simultaneously to a new set of mounting holes. The effect of this is to move the slow speed shaft and gear assembly into a tighter mesh with the worm-on-shaft thus reducing backlash.



This method of backlash adjustment creates an incremental change in backlash based on the distance between holes and the degree of eccentricity in the covers. The C-ELIMINATOR can be readjusted in the field, but generally requires that the unit be removed from service for this purpose.

RATINGS

Ratios and ratings for the C-ELIMINATOR product are found in this catalog on pages D5-D20.

COUPLING MOTOR ADAPTORS

Coupling motor adaptors are supplied in standard NEMA dimensions as well as in many variations that easily adapt to servo motors. All coupling style motor adaptors shown in the MOTION CONTROL Catalog will have a large access hole to allow for easy coupling adjustment. See the catalog section covering servo motor flanges for more details.

DOUBLE REDUCTION

The C-ELIMINATOR can be made as a double reduction unit but, the C-ELIMINATOR product can only be used in the secondary stage. The primary stage can be made with standard backlash or with the C-MINIMIZER option. The output torque ratings for these units are the same as C-Line units of the same size and ratio and the use of synthetic oil will improve the efficiency a small amount. Refer to the current C-Line catalog (#100) for these ratings.

The overall backlash of a double reduction unit can be determined by dividing the ratio of the secondary stage into the backlash of the primary stage and adding the result to the backlash of the secondary stage.

EXAMPLE:

STAGE	RATIO	STAGE BACKLASH	OVERALL BACKLASH
Primary (C-MINIMIZER)	10:1	11 arc min	11/15 = .7 arc min
Secondary (C-ELIMINATOR)	15:1	6 arc min	6.0 arc min
TOTAL	150:1		6.7 arc min

TRIPLE REDUCTION

The C-ELIMINATOR can also be included in triple reduction C-Line products. The C-ELIMINATOR option can only be used in the final stage of gear reduction.

STANDARD MOUNTING POSITIONS

C-ELIMINATOR units must be built for specific mounting positions to provide adequate lubrication for all bearings. The standard mounting position is as pictured on the catalog dimension pages. Deviations from this must be identified at the time of order placement.

LUBRICATION

C-ELIMINATOR units are factory filled with synthetic oil, SHC629 or equal. Synthetic lubricants can be advantageous over mineral oils in that they generally are more stable, improve the operating efficiency, have longer life, and operate over a wider temperature range. These oils are appropriate for any application, but are especially useful when units are subjected to low start-up temperatures or high operating temperatures. Refer to the product installation bulletin shipped with each unit for detailed information on lubrication and maintenance.

INERTIA

Inertia values for basic C-ELIMINATOR models are provided on page E7.

C-ELIMINATOR
PRODUCT INTRODUCTION & CAPABILITIES

WINSMITH

MODEL CAPABILITY

The C-ELIMINATOR product is available in all C-Line sizes. The model availability is limited to those having two symmetric covers for adjustment per the chart below. See the product introduction section for more detail. Input shaft and coupling style models offer a more effective design for maintaining consistent backlash because the worm shaft is supported between two bearings in the housing. Motorized models with a hollow input shaft can be accommodated but variations at the motor shaft interface may slightly affect backlash consistency.

The external dimensions of the C-ELIMINATOR are the same as the standard C-Line product line and can be found in the standard C-Line product catalog (#100).

C-ELIMINATOR CAPABILITY CHART

MODEL	SIZE										
	1	2	3	4	5	6	7	8	9	10 & 12	11, 13-15
CT	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
CB	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
SCT	no	no	yes	yes	yes	yes	yes	yes	yes	yes	no
MCT	yes	yes	yes	yes	yes	yes	yes	yes	no	no	no
MSCT	no	no	yes	yes	yes	yes	yes	yes	no	no	no
CTM	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
SCTM	no	no	yes	yes	yes	yes	yes	yes	yes	yes	no

NOTE: Sizes and models other than shown above are not available in C-ELIMINATOR Product.

CONDENSED RATINGS CHART
C-ELIMINATOR—MECHANICAL RATINGS†

1. Before selecting from these tables, refer to the Selection Procedures on pages A3-A7. Using either the INPUT or OUTPUT METHOD, determine the DESIGN HP or TORQUE. Do not use these tables in conjunction with the FULL DUTY CYCLE METHOD.
2. For the applicable RATIO and RPM, read across until the unit rating from the table meets or exceeds the DESIGN LOAD (from Step 1).
3. If the selection falls within a shaded area and the application includes continuous operation (more than

NOMINAL* RATIO	INPUT RPM	NOMINAL OUTPUT RPM	1C				2C				3C				4C			
			INPUT HP	INPUT TORQUE	OUTPUT TORQUE	EFF	INPUT HP	INPUT TORQUE	OUTPUT TORQUE	EFF	INPUT HP	INPUT TORQUE	OUTPUT TORQUE	EFF	INPUT HP	INPUT TORQUE	OUTPUT TORQUE	EFF
4	3000	750	1.44	30	110	91	2.89	61	209	94	3.84	81	289	94	7.97	167	641	96
	1750	438	1.14	41	149	90	2.26	82	279	93	3.07	110	393	94	6.37	229	872	95
	1160	290	0.92	50	179	90	1.91	104	353	93	2.57	140	494	93	5.32	289	1090	94
5	3000	600	1.25	26	118	90	2.26	48	219	92	3.20	67	314	93	6.97	146	696	95
	1750	350	0.99	36	159	89	1.77	64	290	91	2.56	92	427	92	5.58	201	946	94
	1160	232	0.80	43	190	88	1.51	82	371	90	2.15	117	535	92	4.68	254	1188	94
7.5	3000	400	1.02	21	141	88	1.93	41	278	91	2.71	57	394	92	5.42	114	802	94
	1750	233	0.81	29	190	87	1.54	55	375	90	2.15	78	532	92	4.34	156	1091	93
	1160	155	0.63	34	219	86	1.23	67	448	89	1.73	94	639	91	3.65	198	1369	92
10	3000	300	0.80	17	139	83	1.59	33	297	89	2.22	47	424	91	4.51	95	882	93
	1750	175	0.63	23	187	82	1.26	46	400	88	1.77	64	572	90	3.57	129	1184	92
	1160	116	0.51	28	222	80	1.01	55	477	87	1.42	77	683	89	2.98	162	1475	91
15	3000	200	0.64	14	162	80	1.19	25	318	85	1.63	34	446	87	3.26	68	919	90
	1750	117	0.51	18	216	79	0.95	34	429	84	1.31	47	602	85	2.54	92	1209	88
	1160	77	0.39	21	247	77	0.76	41	509	82	1.07	58	731	84	2.22	121	1565	87
20	3000	150	0.50	10	151	72	0.95	20	325	81	1.30	27	455	83	2.63	55	973	88
	1750	88	0.40	14	203	71	0.76	27	438	80	1.05	38	615	82	2.11	76	1310	86
	1160	58	0.32	17	241	69	0.61	33	519	78	0.86	47	746	80	1.61	87	1475	85
25	3000	120	0.44	9	158	69	0.80	17	327	78	1.12	24	474	82	2.17	46	990	87
	1750	70	0.35	13	212	67	0.64	23	440	76	0.89	32	634	80	1.74	63	1333	85
	1160	46	0.28	15	248	65	0.52	28	522	74	0.71	38	740	79	1.22	66	1380	83
30	3000	100	0.39	8	167	67	0.69	15	328	75	0.95	20	470	79	1.84	39	946	82
	1750	58	0.31	11	222	66	0.56	20	441	73	0.76	28	633	77	1.45	52	1247	79
	1160	39	0.24	13	254	64	0.45	25	523	71	0.62	34	751	75	1.28	69	1610	77
40	3000	75	0.31	7	150	57	0.56	12	324	69	0.75	16	454	72	1.46	31	972	79
	1750	44	0.25	9	202	56	0.45	16	436	67	0.61	22	613	70	1.18	43	1309	77
	1160	29	0.19	10	215	53	0.36	20	517	65	0.50	27	743	68	0.91	50	1475	74
50	3000	60	0.26	5	135	50	0.47	10	320	65	0.61	13	445	70	1.18	25	955	77
	1750	35	0.18	7	152	47	0.35	13	398	63	0.50	18	610	68	0.95	34	1286	75
	1160	23	0.13	7	152	43	0.25	13	398	59	0.39	21	708	66	0.70	38	1380	72
60	3000	50	0.24	5	152	50	0.40	8	299	60	0.53	11	433	65	0.97	20	907	74
	1750	29	0.18	6	187	49	0.32	11	400	58	0.42	15	580	63	0.74	27	1137	71
	1160	19	0.13	7	187	45	0.23	12	400	54	0.33	18	650	61	0.51	28	1137	68

*See following ratings pages for exact ratios based on unit sizes.
†These ratings are based on using synthetic oil in the unit.

CONDENSED RATINGS CHART
C-ELIMINATOR—MECHANICAL RATINGS†

one half hour in a two hour period), refer to the rating pages (D6-D21) and verify that the continuous applied load does not exceed the unit THERMAL capacity. If so, select the minimum size unit where the THERMAL capacity meets or exceeds the continuous applied load.

4. Check OVERHUNG LOADS on all shafts and/or THRUST LOAD on the output shaft. Refer to the rating pages D6-D21, for shaft capacities and the Engineering Section for explanation.
5. For INERTIA VALUES, see page E7.

NOMINAL* RATIO	INPUT RPM	NOMINAL OUTPUT RPM	5C				6C				7C				8C			
			INPUT HP	INPUT TORQUE	OUTPUT TORQUE	EFF	INPUT HP	INPUT TORQUE	OUTPUT TORQUE	EFF	INPUT HP	INPUT TORQUE	OUTPUT TORQUE	EFF	INPUT HP	INPUT TORQUE	OUTPUT TORQUE	EFF
4	3000	750	11.75	247	947	96	16.70	351	1351	96	N/A				N/A			
	1750	438	9.38	338	1289	95	13.33	480	1838	96								
	1160	290	7.70	418	1585	95	11.24	611	2324	95								
5	3000	600	10.21	215	1065	96	14.47	304	1504	96	N/A				N/A			
	1750	350	8.16	294	1449	95	11.55	416	2046	95								
	1160	232	6.82	371	1813	94	9.49	516	2516	95								
7.5	3000	400	8.35	175	1198	95	11.24	236	1679	95	15.56	327	2256	95	20.35	428	3167	96
	1750	233	6.68	241	1630	94	8.99	324	2283	94	12.43	448	3069	95	16.25	585	4309	95
	1160	155	5.61	305	2047	93	7.46	405	2830	93	10.50	571	3882	94	13.31	723	5285	94
10	3000	300	6.49	136	1321	94	8.92	187	1806	93	12.73	267	2467	95	17.14	360	3335	95
	1750	175	5.12	185	1769	93	7.15	258	2456	92	10.19	367	3356	94	13.70	493	4536	94
	1160	116	4.31	234	2225	92	5.96	324	3053	91	8.55	456	4213	93	11.45	622	5676	94
15	3000	200	4.79	101	1426	91	6.72	141	1924	91	9.35	196	2613	92	12.10	254	3623	94
	1750	117	3.81	137	1915	90	5.41	195	2617	90	7.51	270	3555	91	9.69	349	4929	93
	1160	77	3.19	173	2390	89	4.53	246	3259	88	6.22	338	4377	89	8.13	442	6182	92
20	3000	150	3.86	81	1456	90	5.43	114	2050	90	7.27	153	2763	90	9.66	203	3722	92
	1750	88	3.09	111	1966	88	4.23	152	2694	88	5.85	211	3758	89	7.75	279	5063	91
	1160	58	2.55	139	2410	87	3.69	200	3492	87	4.95	269	4721	88	6.52	354	6345	90
25	3000	120	3.20	67	1460	87	4.30	90	1927	85	5.75	121	2790	89	7.93	167	3754	90
	1750	70	2.55	92	1949	85	3.49	126	2621	83	4.49	162	3669	87	6.20	223	4960	89
	1160	46	2.18	119	2467	83	2.92	159	3234	81	3.91	212	4751	86	5.35	291	6381	88
30	3000	100	2.74	58	1470	85	3.75	79	1980	84	5.05	106	2704	85	6.94	146	3804	87
	1750	58	2.20	79	1977	83	3.05	110	2694	82	4.10	148	3678	83	5.60	202	5175	86
	1160	39	1.86	101	2462	81	2.58	140	3358	80	3.43	186	4538	81	4.71	256	6435	84
40	3000	75	2.12	44	1459	82	2.96	62	2052	82	4.04	85	2772	84	5.42	114	3783	85
	1750	44	1.71	62	1971	80	2.34	84	2703	80	3.28	118	3771	82	4.38	158	5146	84
	1160	29	1.42	77	2408	78	2.05	111	3492	78	2.80	152	4737	80	3.72	202	6465	82
50	3000	60	1.71	36	1416	79	2.40	50	1995	79	3.11	65	2679	81	4.21	88	3660	81
	1750	35	1.38	50	1914	77	1.91	69	2637	77	2.45	88	3530	78	3.42	123	4979	79
	1160	23	1.14	62	2310	75	1.49	81	3000	74	2.15	117	4559	77	2.92	158	6253	77
60	3000	50	1.40	29	1343	76	1.98	42	1804	72	2.60	55	2554	78	3.39	71	3441	79
	1750	29	1.14	41	1813	74	1.62	58	2455	70	2.07	74	3377	76	2.68	96	4534	77
	1160	19	0.89	48	2056	71	1.30	71	2850	67	1.80	98	4339	74	2.34	127	5855	76

*See following ratings pages for exact ratios based on unit sizes.
†These ratings are based on using synthetic oil in the unit.

REDUCER SIZE **1**

C-ELIMINATOR SERIES REDUCER RATINGS

WINSMITH

1.333 CENTER DISTANCE			HORSEPOWER AND TORQUE RATINGS (INCH POUNDS)[1,2] SYNTHETIC OIL						OVERHUNG LOAD CAPACITY[4]	
			MECHANICAL			THERMAL			INPUT SHAFT	OUTPUT SHAFT
RATIO[3]	INPUT RPM	OUTPUT RPM	INPUT HP	INPUT TORQUE	OUTPUT TORQUE	INPUT HP	INPUT TORQUE	OUTPUT TORQUE	CB, CT MODELS	CB, CT, MCT MODELS
4 (4)	3000	750	1.44	30	110	1.44	30	110	146	198
	2500	625	1.34	34	122	1.34	34	122	146	198
	1750	437	1.14	41	149	1.14	41	149	146	198
	1160	290	.92	50	179	.92	50	179	146	198
	600	150	.58	61	213	.58	61	213	146	198
	100	25	.12	76	248	.12	76	248	146	198
5 (5)	3000	600	1.25	26	118	1.25	26	118	146	198
	2500	500	1.12	28	126	1.12	28	126	146	198
	1750	350	.99	36	159	.99	36	159	146	198
	1160	232	.80	43	190	.80	43	190	146	198
	600	120	.50	52	225	.50	52	225	146	198
	100	20	.10	66	262	.10	66	262	146	198
7½ (7½)	3000	400	1.02	21	141	1.02	21	141	146	198
	2500	333	.96	24	159	.96	24	159	146	198
	1750	233	.81	29	190	.81	29	190	146	198
	1160	155	.63	34	219	.63	34	219	146	198
	600	80	.38	40	250	.38	40	250	146	198
	100	13	.08	49	282	.08	49	282	146	198
10 (10)	3000	300	.80	17	139	.79	17	137	146	198
	2500	250	.72	18	150	.72	18	150	146	198
	1750	175	.63	23	187	.63	23	187	146	198
	1160	116	.51	28	222	.51	28	222	146	198
	600	60	.32	34	261	.32	34	261	146	198
	100	10	.07	44	302	.07	44	302	146	198
15 (15)	3000	200	.64	14	162	.64	14	162	146	198
	2500	167	.60	15	182	.60	15	182	146	198
	1750	117	.51	18	216	.51	18	216	146	198
	1160	77	.39	21	247	.39	21	247	146	198
	600	40	.24	25	281	.24	25	281	146	198
	100	6.7	.05	33	316	.05	33	316	146	198
20 (20)	3000	150	.50	10	151	.48	10	145	146	198
	2500	125	.45	11	163	.45	11	163	146	198
	1750	88	.40	14	203	.40	14	203	146	198
	1160	58	.32	17	241	.32	17	241	146	198
	600	30	.21	22	283	.21	22	283	146	198
	100	5.0	.05	30	327	.05	30	327	146	198

1. Refer to the MOTION CONTROL Selection Procedures on pages A3-A7 for instructions on the application of these rating tables.
2. See page E7 for reducer inertia values.
3. Numbers shown in ( ) are exact ratios.
4. Overhung load given at one shaft diameter from housing. All values given in pounds.

REDUCER SIZE **1**

C-ELIMINATOR SERIES REDUCER RATINGS

1.333 CENTER DISTANCE			HORSEPOWER AND TORQUE RATINGS (INCH POUNDS)[1,2] SYNTHETIC OIL						OVERHUNG LOAD CAPACITY[4]	
			MECHANICAL			THERMAL			INPUT SHAFT	OUTPUT SHAFT
RATIO[3]	INPUT RPM	OUTPUT RPM	INPUT HP	INPUT TORQUE	OUTPUT TORQUE	INPUT HP	INPUT TORQUE	OUTPUT TORQUE	CB, CT MODELS	CB, CT, MCT MODELS
25 (25)	3000	120	.44	9	158	.43	9	155	146	198
	2500	100	.40	10	173	.40	10	173	146	198
	1750	70	.35	13	212	.35	13	212	146	198
	1160	46	.28	15	248	.28	15	248	146	198
	600	24	.18	19	288	.18	19	288	146	198
	100	4.0	.04	26	329	.04	26	329	146	198
30 (30)	3000	100	.39	8	167	.39	8	167	146	198
	2500	83	.37	9	187	.37	9	187	146	198
	1750	58	.31	11	222	.31	11	222	146	198
	1160	39	.24	13	254	.24	13	254	146	198
	600	20	.15	16	288	.15	16	288	146	198
	100	3.3	.03	22	323	.03	22	323	146	198
40 (40)	3000	75	.31	7	150	.31	7	150	146	198
	2500	63	.28	7	163	.28	7	163	146	198
	1750	44	.25	9	202	.25	9	202	146	198
	1160	29	.19	10	215	.19	10	215	146	198
	600	15	.11	11	215	.11	11	215	146	198
	100	2.5	.02	15	215	.02	15	215	146	198
50 (50)	3000	60	.26	5	135	.26	5	135	146	198
	2500	50	.24	6	150	.24	6	150	146	198
	1750	35	.18	7	152	.18	7	152	146	198
	1160	23	.13	7	152	.13	7	152	146	198
	600	12	.08	8	152	.08	8	152	146	198
	100	2.0	.02	11	152	.02	11	152	146	198
60 (60)	3000	50	.24	5	152	.24	5	152	146	198
	2500	42	.22	6	170	.22	6	170	146	198
	1750	29	.18	6	187	.18	6	187	146	198
	1160	19	.13	7	187	.13	7	187	146	198
	600	10	.07	8	187	.07	8	187	146	198
	100	1.7	.02	11	187	.02	11	187	146	198

1. Refer to the MOTION CONTROL Selection Procedures on pages A3-A7 for instructions on the application of these rating tables.
2. See page E7 for reducer inertia values.
3. Numbers shown in ( ) are exact ratios.
4. Overhung load given at one shaft diameter from housing. All values given in pounds.

REDUCER SIZE **2**

C-ELIMINATOR SERIES REDUCER RATINGS

WINSMITH

1.750 CENTER DISTANCE			HORSEPOWER AND TORQUE RATINGS (INCH POUNDS)[1,2] SYNTHETIC OIL						OVERHUNG LOAD CAPACITY[4]	
			MECHANICAL			THERMAL			INPUT SHAFT	OUTPUT SHAFT
RATIO[3]	INPUT RPM	OUTPUT RPM	INPUT HP	INPUT TORQUE	OUTPUT TORQUE	INPUT HP	INPUT TORQUE	OUTPUT TORQUE	CB, CT MODELS	CB, CT, MCT MODELS
4 (3 2/3)	3000	818	2.89	61	209	2.89	61	209	171	286
	2500	682	2.68	67	232	2.68	67	232	171	286
	1750	477	2.26	82	279	2.26	82	279	171	286
	1160	316	1.91	104	353	1.91	104	353	171	286
	600	164	1.26	132	441	1.26	132	441	171	286
	100	27	.27	171	538	.27	171	538	171	286
5 (5)	3000	600	2.26	48	219	2.26	48	219	171	286
	2500	500	2.10	53	243	2.10	53	243	171	286
	1750	350	1.77	64	290	1.77	64	290	171	286
	1160	232	1.51	82	371	1.51	82	371	171	286
	600	120	1.01	106	467	1.01	106	467	171	286
	100	20	.22	140	575	.22	140	575	171	286
7 1/2 (7 1/2)	3000	400	1.93	41	278	1.93	41	278	171	286
	2500	333	1.74	44	298	1.74	44	298	171	286
	1750	233	1.54	55	375	1.54	55	375	171	286
	1160	155	1.23	67	448	1.23	67	448	171	286
	600	80	.77	81	531	.77	81	531	171	286
	100	13	.16	98	595	.16	98	595	171	286
10 (10)	3000	300	1.59	33	297	1.59	33	297	171	286
	2500	250	1.44	36	320	1.44	36	320	171	286
	1750	175	1.26	46	400	1.26	46	400	171	286
	1160	116	1.01	55	477	1.01	55	477	171	286
	600	60	.64	67	563	.64	67	563	171	286
	100	10	.12	77	595	.12	77	595	171	286
15 (15)	3000	200	1.19	25	318	1.19	25	318	171	286
	2500	167	1.08	27	344	1.08	27	344	171	286
	1750	117	.95	34	429	.95	34	429	171	286
	1160	77	.76	41	509	.76	41	509	171	286
	600	40	.48	50	595	.48	50	595	171	286
	100	6.7	.09	57	595	.09	57	595	171	286
20 (20)	3000	150	.95	20	325	.95	20	325	171	286
	2500	125	.87	22	352	.87	22	352	171	286
	1750	88	.76	27	438	.76	27	438	171	286
	1160	58	.61	33	519	.61	33	519	171	286
	600	30	.37	39	573	.37	39	573	171	286
	100	5.0	.07	45	573	.07	45	573	171	286

1. Refer to the MOTION CONTROL Selection Procedures on pages A3-A7 for instructions on the application of these rating tables.
2. See page E7 for reducer inertia values.
3. Numbers shown in ( ) are exact ratios.
4. Overhung load given at one shaft diameter from housing. All values given in pounds.

REDUCER SIZE **2**

C-ELIMINATOR SERIES REDUCER RATINGS

WINSMITH

1.750 CENTER DISTANCE			HORSEPOWER AND TORQUE RATINGS (INCH POUNDS)[1,2] SYNTHETIC OIL						OVERHUNG LOAD CAPACITY[4]	
			MECHANICAL			THERMAL			INPUT SHAFT	OUTPUT SHAFT
RATIO[3]	INPUT RPM	OUTPUT RPM	INPUT HP	INPUT TORQUE	OUTPUT TORQUE	INPUT HP	INPUT TORQUE	OUTPUT TORQUE	CB, CT MODELS	CB, CT, MCT MODELS
25 (25)	3000	120	.80	17	327	.80	17	327	171	286
	2500	100	.73	18	354	.73	18	354	471	286
	1750	70	.64	23	440	.64	23	440	171	286
	1160	46	.52	28	522	.52	28	522	171	286
	600	24	.33	35	614	.33	35	614	171	286
	100	4.0	.07	41	621	.07	41	621	171	286
30 (30)	3000	100	.69	15	328	.69	15	328	171	286
	2500	83	.63	16	355	.63	16	355	171	286
	1750	58	.56	20	441	.56	20	441	171	286
	1160	39	.45	25	523	.45	25	523	171	286
	600	20	.28	30	595	.28	30	595	171	286
	100	3.3	.06	35	595	.06	35	595	171	286
40 (40)	3000	75	.56	12	324	.56	12	324	171	286
	2500	63	.51	13	351	.51	13	351	171	286
	1750	44	.45	16	436	.45	16	436	171	286
	1160	29	.36	20	517	.36	20	517	171	286
	600	15	.22	24	573	.22	24	573	171	286
	100	2.5	.05	29	573	.05	29	573	171	286
50 (50)	3000	60	.47	10	320	.47	10	320	171	286
	2500	50	.43	11	349	.43	11	349	171	286
	1750	35	.35	13	398	.35	13	398	171	286
	1160	23	.25	13	398	.25	13	398	171	286
	600	12	.14	15	398	.14	15	398	171	286
	100	2.0	.03	19	398	.03	19	398	171	286
60 (60)	3000	50	.40	8	299	.40	8	299	171	286
	2500	42	.36	9	324	.36	9	324	171	286
	1750	29	.32	11	400	.32	11	400	171	286
	1160	19	.23	12	400	.23	12	400	171	286
	600	10	.13	14	400	.13	14	400	171	286
	100	1.7	.03	18	400	.03	18	400	171	286

1. Refer to the MOTION CONTROL Selection Procedures on pages A3-A7 for instructions on the application of these rating tables.
2. See page E7 for reducer inertia values.
3. Numbers shown in ( ) are exact ratios.
4. Overhung load given at one shaft diameter from housing. All values given in pounds.

REDUCER SIZE **3**

C-ELIMINATOR SERIES REDUCER RATINGS

2.000 CENTER DISTANCE			HORSEPOWER AND TORQUE RATINGS (INCH POUNDS)[1,2] SYNTHETIC OIL						OVERHUNG LOAD CAPACITY[4]	
			MECHANICAL			THERMAL			INPUT SHAFT	OUTPUT SHAFT
RATIO[3]	INPUT RPM	OUTPUT RPM	INPUT HP	INPUT TORQUE	OUTPUT TORQUE	INPUT HP	INPUT TORQUE	OUTPUT TORQUE	CB, CT MODELS	CB, CT, MCT MODELS
4 (4)	3000	750	3.70	78	293	3.47	73	274	171	428
	2500	625	3.43	87	325	3.43	87	325	171	428
	1750	438	2.96	107	398	2.96	107	398	171	428
	1160	290	2.48	135	500	2.48	135	500	171	428
	600	150	1.70	178	650	1.70	178	650	171	428
	100	25	.38	239	821	.38	239	821	171	428
5 (5) SOLID OUTPUT SHAFT MODELS ONLY	3000	600	3.20	67	314	3.02	63	295	171	428
	2500	500	2.97	75	348	2.97	75	348	171	428
	1750	350	2.56	92	427	2.56	92	427	171	428
	1160	232	2.15	117	535	2.15	117	535	171	428
	600	120	1.47	154	690	1.47	154	690	171	428
	100	20	.33	206	867	.33	206	867	171	428
5 (42/3) HOLLOW OUTPUT SHAFT MODELS ONLY	3000	643	3.57	75	329	3.49	73	321	171	See C-Line Catalog #100
	2500	536	3.31	83	365	3.31	83	365	171	
	1750	375	2.80	101	439	2.80	101	439	171	
	1160	249	2.37	129	556	2.37	129	556	171	
	600	129	1.56	164	695	1.56	164	695	171	
	100	21.4	.34	212	849	.34	212	849	171	
7½ (7½)	3000	400	2.71	57	394	2.71	57	394	171	428
	2500	333	2.51	63	438	2.51	63	438	171	428
	1750	233	2.15	78	532	2.15	78	532	171	428
	1160	155	1.73	94	639	1.73	94	639	171	428
	600	80	1.09	114	761	1.09	114	761	171	428
	100	13	.23	142	888	.23	142	888	171	428
10 (10)	3000	300	2.22	47	424	2.22	47	424	171	428
	2500	250	2.00	50	456	2.00	50	456	171	428
	1750	175	1.77	64	572	1.77	64	572	171	428
	1160	116	1.42	77	683	1.42	77	683	171	428
	600	60	.89	93	808	.89	93	808	171	428
	100	10	.17	107	857	.17	107	857	171	428
15 (15)	3000	200	1.63	34	446	1.57	33	430	171	428
	2500	167	1.51	38	495	1.51	38	495	171	428
	1750	117	1.31	47	602	1.31	47	602	171	428
	1160	77	1.07	58	731	1.07	58	731	171	428
	600	40	.67	71	857	.67	71	857	171	428
	100	6.7	.13	79	857	.13	79	857	171	428
20 (20)	3000	150	1.30	27	455	1.26	26	439	171	428
	2500	125	1.21	30	505	1.21	30	505	171	428
	1750	88	1.05	38	615	1.05	38	615	171	428
	1160	58	.86	47	746	.86	47	746	171	428
	600	30	.50	53	800	.50	53	800	171	428
	100	5.0	.10	60	800	.10	60	800	171	428

1. Refer to the MOTION CONTROL Selection Procedures on pages A3-A7 for instructions on the application of these rating tables.
2. See page E7 for reducer inertia values.
3. Numbers shown in ( ) are exact ratios.
4. Overhung load given at one shaft diameter from housing. All values given in pounds.

REDUCER SIZE **3**

C-ELIMINATOR SERIES REDUCER RATINGS

WINSMITH

2.000 CENTER DISTANCE			HORSEPOWER AND TORQUE RATINGS (INCH POUNDS)[1,2] SYNTHETIC OIL						OVERHUNG LOAD CAPACITY[4]	
			MECHANICAL			THERMAL			INPUT SHAFT	OUTPUT SHAFT
RATIO[3]	INPUT RPM	OUTPUT RPM	INPUT HP	INPUT TORQUE	OUTPUT TORQUE	INPUT HP	INPUT TORQUE	OUTPUT TORQUE	CB, CT MODELS	CB, CT, MCT MODELS
25 (24½)	3000	122	1.12	24	474	1.12	24	474	171	428
	2500	102	1.03	26	517	1.03	26	517	171	428
	1750	71	.89	32	634	.89	32	634	171	428
	1160	47	.71	38	740	.71	38	740	171	428
	600	24	.39	41	740	.39	41	740	171	428
	100	4.1	.07	47	740	.07	47	740	171	428
30 (30)	3000	100	.95	20	470	.95	20	470	171	428
	2500	83	.87	22	510	.87	22	510	171	428
	1750	58	.76	28	633	.76	28	633	171	428
	1160	39	.62	34	751	.62	34	751	171	428
	600	20	.38	40	857	.38	40	857	171	428
	100	3.3	.08	47	857	.08	47	857	171	428
40 (40)	3000	75	.75	16	454	.75	16	454	171	428
	2500	63	.70	18	503	.70	18	503	171	428
	1750	44	.61	22	613	.61	22	613	171	428
	1160	29	.50	27	743	.50	27	743	171	428
	600	15	.30	32	800	.30	32	800	171	428
	100	2.0	.06	38	800	.06	38	800	171	428
50 (50)	3000	60	.61	13	445	.61	13	445	171	428
	2500	50	.58	15	505	.58	15	505	171	428
	1750	35	.50	18	610	.50	18	610	171	428
	1160	23	.39	21	708	.39	21	708	171	428
	600	12	.23	24	740	.23	24	740	171	428
	100	2.0	.05	29	740	.05	29	740	171	428
60 (60)	3000	50	.53	11	433	.53	11	433	171	428
	2500	42	.48	12	473	.48	12	473	171	428
	1750	29	.42	15	580	.42	15	580	171	428
	1160	19	.33	18	650	.33	18	650	171	428
	600	10	.19	19	650	.19	19	650	171	428
	100	1.7	.04	24	650	.04	24	650	171	428

1. Refer to the MOTION CONTROL Selection Procedures on pages A3-A7 for instructions on the application of these rating tables.
2. See page E7 for reducer inertia values.
3. Numbers shown in ( ) are exact ratios.
4. Overhung load given at one shaft diameter from housing. All values given in pounds.

REDUCER SIZE **4**

C-ELIMINATOR SERIES REDUCER RATINGS

WINSMITH

2.625 CENTER DISTANCE			HORSEPOWER AND TORQUE RATINGS (INCH POUNDS)[1,2] SYNTHETIC OIL						OVERHUNG LOAD CAPACITY[4]	
			MECHANICAL			THERMAL			INPUT SHAFT	OUTPUT SHAFT
RATIO[3]	INPUT RPM	OUTPUT RPM	INPUT HP	INPUT TORQUE	OUTPUT TORQUE	INPUT HP	INPUT TORQUE	OUTPUT TORQUE	CB, CT MODELS	CB, CT, MCT MODELS
4 (4)	3000	750	7.97	167	641	7.20	151	578	349	835
	2500	625	7.38	186	711	7.02	177	675	349	835
	1750	438	6.37	229	872	6.37	229	872	349	835
	1160	290	5.32	289	1090	5.32	289	1090	349	835
	600	150	3.81	401	1489	3.81	401	1489	349	835
	100	25	.88	557	1967	.88	557	1967	349	835
5 (5)	3000	600	6.97	146	696	6.26	131	624	349	835
	2500	500	6.46	163	772	6.09	154	727	349	835
	1750	350	5.58	201	946	5.58	201	946	349	835
	1160	232	4.68	254	1188	4.68	254	1188	349	835
	600	120	3.10	326	1494	3.10	326	1494	349	835
	100	20	.55	346	1494	.55	346	1494	349	835
7½ (7½)	3000	400	5.42	114	802	5.28	111	782	349	835
	2500	333	5.03	127	890	5.03	127	890	349	835
	1750	233	4.34	156	1091	4.34	156	1091	349	835
	1160	155	3.65	198	1369	3.65	198	1369	349	835
	600	80	2.48	261	1766	2.48	261	1766	349	835
	100	13	.45	282	1785	.45	282	1785	349	835
10 (10)	3000	300	4.51	95	882	4.51	95	882	349	835
	2500	250	4.18	105	979	4.18	105	979	349	835
	1750	175	3.57	129	1184	3.57	129	1184	349	835
	1160	116	2.98	162	1475	2.98	162	1475	349	835
	600	60	1.58	166	1475	1.58	166	1475	349	835
	100	10	.28	179	1475	.28	179	1475	349	835
15 (15)	3000	200	3.26	68	919	3.00	63	844	349	835
	2500	167	3.03	76	1020	2.92	74	983	349	835
	1750	117	2.54	92	1209	2.54	92	1209	349	835
	1160	77	2.22	121	1565	2.22	121	1565	349	835
	600	40	1.36	143	1785	1.36	143	1785	349	835
	100	6.7	.25	159	1785	.25	159	1785	349	835
20 (20)	3000	150	2.63	55	973	2.63	55	973	349	835
	2500	125	2.45	62	1080	2.45	62	1080	349	835
	1750	88	2.11	76	1310	2.11	76	1310	349	835
	1160	58	1.61	87	1475	1.61	87	1475	349	835
	600	30	.87	91	1475	.87	91	1475	349	835
	100	5.0	.16	102	1475	.16	102	1475	349	835

1. Refer to the MOTION CONTROL Selection Procedures on pages A3-A7 for instructions on the application of these rating tables.
2. See page E7 for reducer inertia values.
3. Numbers shown in ( ) are exact ratios.
4. Overhung load given at one shaft diameter from housing. All values given in pounds.

REDUCER SIZE **4**

C-ELIMINATOR SERIES REDUCER RATINGS

WINSMITH

2.625 CENTER DISTANCE			HORSEPOWER AND TORQUE RATINGS (INCH POUNDS)[1,2] SYNTHETIC OIL						OVERHUNG LOAD CAPACITY[4]	
			MECHANICAL			THERMAL			INPUT SHAFT	OUTPUT SHAFT
RATIO[3]	INPUT RPM	OUTPUT RPM	INPUT HP	INPUT TORQUE	OUTPUT TORQUE	INPUT HP	INPUT TORQUE	OUTPUT TORQUE	CB, CT MODELS	CB, CT, MCT MODELS
25 (25)	3000	120	2.17	46	990	2.17	46	990	349	835
	2500	100	1.97	50	1071	1.97	50	1071	349	835
	1750	70	1.74	63	1333	1.74	63	1333	349	835
	1160	46	1.22	66	1380	1.22	66	1380	349	835
	600	24	.66	69	1380	.66	69	1380	349	835
	100	4.0	.12	78	1380	.12	78	1380	349	835
30 (30)	3000	100	1.84	39	946	1.73	36	887	349	835
	2500	83	1.71	43	1050	1.69	43	1035	349	835
	1750	58	1.45	52	1247	1.45	52	1247	349	835
	1160	39	1.28	69	1610	1.28	69	1610	349	835
	600	20	.78	81	1785	.78	81	1785	349	835
	100	3.3	.15	95	1785	.15	95	1785	349	835
40 (40)	3000	75	1.46	31	972	1.46	31	972	349	835
	2500	63	1.36	34	1078	1.36	34	1078	349	835
	1750	44	1.18	43	1309	1.18	43	1309	349	835
	1160	29	.91	50	1475	.91	50	1475	349	835
	600	15	.51	53	1475	.51	53	1475	349	835
	100	2.5	.10	63	1475	.10	63	1475	349	835
50 (50)	3000	60	1.18	25	955	1.18	25	955	349	835
	2500	50	1.07	27	1035	1.07	27	1035	349	835
	1750	35	.95	34	1286	.95	34	1286	349	835
	1160	23	.70	38	1380	.70	38	1380	349	835
	600	12	.39	41	1380	.39	41	1380	349	835
	100	2.0	.08	49	1380	.08	49	1380	349	835
60 (60)	3000	50	.97	20	907	.97	20	907	349	835
	2500	42	.89	22	986	.89	22	986	349	835
	1750	29	.74	27	1137	.74	27	1137	349	835
	1160	19	.51	28	1137	.51	28	1137	349	835
	600	10	.29	30	1137	.29	30	1137	349	835
	100	1.7	.06	37	1137	.06	37	1137	349	835

1. Refer to the MOTION CONTROL Selection Procedures on pages A3-A7 for instructions on the application of these rating tables.
2. See page E7 for reducer inertia values.
3. Numbers shown in ( ) are exact ratios.
4. Overhung load given at one shaft diameter from housing. All values given in pounds.

REDUCER SIZE **5**

C-ELIMINATOR SERIES REDUCER RATINGS

WINSMITH

3.000 CENTER DISTANCE			HORSEPOWER AND TORQUE RATINGS (INCH POUNDS)[1,2] SYNTHETIC OIL						OVERHUNG LOAD CAPACITY[4]	
			MECHANICAL			THERMAL			INPUT SHAFT	OUTPUT SHAFT
RATIO[3]	INPUT RPM	OUTPUT RPM	INPUT HP	INPUT TORQUE	OUTPUT TORQUE	INPUT HP	INPUT TORQUE	OUTPUT TORQUE	CB, CT MODELS	CB, CT, MCT MODELS
4 (4)	3000	750	11.75	247	947	9.11	191	732	412	1329
	2500	625	10.88	274	1051	8.92	225	860	412	1329
	1750	438	9.38	338	1289	8.28	298	1137	412	1329
	1160	290	7.70	418	1585	7.33	398	1509	412	1329
	600	150	5.78	608	2268	5.78	608	2268	412	1329
	100	25	1.40	880	3123	1.40	880	3123	412	1329
5 (5 1/5)	3000	577	10.21	215	1065	8.20	172	853	412	1329
	2500	481	9.46	239	1182	8.00	202	998	412	1329
	1750	337	8.16	294	1449	7.39	266	1311	412	1329
	1160	223	6.82	371	1813	6.54	356	1738	412	1329
	600	115	4.90	515	2476	4.90	515	2476	412	1329
	100	19	1.14	717	3270	1.14	717	3270	412	1329
7 1/2 (7 1/5)	3000	417	8.35	175	1198	7.38	155	1057	412	1329
	2500	347	7.74	195	1330	7.17	181	1230	412	1329
	1750	243	6.68	241	1630	6.60	238	1609	412	1329
	1160	161	5.61	305	2047	5.61	305	2047	412	1329
	600	83	3.68	386	2545	3.68	386	2545	412	1329
	100	14	.65	410	2545	.65	410	2545	412	1329
10 (10 1/3)	3000	290	6.49	136	1321	6.19	130	1259	412	1329
	2500	242	6.02	152	1466	6.00	151	1461	412	1329
	1750	169	5.12	185	1769	5.12	185	1769	412	1329
	1160	112	4.31	234	2225	4.31	234	2225	412	1329
	600	58	2.83	297	2765	2.83	297	2765	412	1329
	100	9.7	.57	359	3132	.57	359	3132	412	1329
15 (15 1/2)	3000	194	4.79	101	1426	4.49	94	1336	412	1329
	2500	161	4.45	112	1582	4.36	110	1550	412	1329
	1750	113	3.81	137	1915	3.81	137	1915	412	1329
	1160	75	3.19	173	2390	3.19	173	2390	412	1329
	600	39	2.10	220	2950	2.10	220	2950	412	1329
	100	6.5	.40	254	3132	.40	254	3132	412	1329
20 (20)	3000	150	3.86	81	1456	3.83	80	1445	412	1329
	2500	125	3.59	90	1616	3.59	90	1616	412	1329
	1750	88	3.09	111	1966	3.09	111	1966	412	1329
	1160	58	2.55	139	2410	2.55	139	2410	412	1329
	600	30	1.54	161	2715	1.54	161	2715	412	1329
	100	5.0	.28	178	2715	.28	178	2715	412	1329

1. Refer to the MOTION CONTROL Selection Procedures on pages A3-A7 for instructions on the application of these rating tables.
2. See page E7 for reducer inertia values.
3. Numbers shown in ( ) are exact ratios.
4. Overhung load given at one shaft diameter from housing. All values given in pounds.

REDUCER SIZE **5**

C-ELIMINATOR SERIES REDUCER RATINGS

WINSMITH

3.000 CENTER DISTANCE			HORSEPOWER AND TORQUE RATINGS (INCH POUNDS)[1,2] SYNTHETIC OIL						OVERHUNG LOAD CAPACITY[4]	
			MECHANICAL			THERMAL			INPUT SHAFT	OUTPUT SHAFT
RATIO[3]	INPUT RPM	OUTPUT RPM	INPUT HP	INPUT TORQUE	OUTPUT TORQUE	INPUT HP	INPUT TORQUE	OUTPUT TORQUE	CB, CT MODELS	CB, CT, MCT MODELS
25 (25)	3000	120	3.20	67	1460	2.89	61	1311	412	1329
	2500	100	2.98	75	1620	2.81	71	1526	412	1329
	1750	70	2.55	92	1949	2.55	92	1949	412	1329
	1160	46	2.18	119	2467	2.18	119	2467	412	1329
	600	24	1.47	154	3085	1.47	154	3085	412	1329
	100	4.0	.31	196	3484	.31	196	3484	412	1329
30 (30)	3000	100	2.74	58	1470	2.61	55	1401	412	1329
	2500	83	2.55	64	1632	2.55	64	1629	412	1329
	1750	58	2.20	79	1977	2.20	79	1977	412	1329
	1160	39	1.86	101	2462	1.86	101	2462	412	1329
	600	20	1.23	130	3032	1.23	130	3032	412	1329
	100	3.3	.25	155	3189	.25	155	3189	412	1329
40 (40)	3000	75	2.12	44	1459	2.12	44	1459	412	1329
	2500	63	1.97	50	1619	1.97	50	1619	412	1329
	1750	44	1.71	62	1971	1.71	62	1971	412	1329
	1160	29	1.42	77	2408	1.42	77	2408	412	1329
	600	15	.87	92	2715	.87	92	2715	412	1329
	100	2.5	.17	106	2715	.17	106	2715	412	1329
50 (50)	3000	60	1.71	36	1416	1.71	36	1416	412	1329
	2500	50	1.59	40	1571	1.59	40	1571	412	1329
	1750	35	1.38	50	1914	1.38	50	1914	412	1329
	1160	23	1.14	62	2310	1.14	62	2310	412	1329
	600	12	.64	67	2350	.64	67	2350	412	1329
	100	2.0	.13	79	2350	.13	79	2350	412	1329
60 (60)	3000	50	1.40	29	1343	1.40	29	1343	412	1329
	2500	42	1.27	32	1441	1.27	32	1441	412	1329
	1750	29	1.14	41	1813	1.14	41	1813	412	1329
	1160	19	.89	48	2056	.89	48	2056	412	1329
	600	10	.49	52	2056	.49	52	2056	412	1329
	100	1.7	.10	62	2056	.10	62	2056	412	1329

1. Refer to the MOTION CONTROL Selection Procedures on pages A3-A7 for instructions on the application of these rating tables.
2. See page E7 for reducer inertia values.
3. Numbers shown in ( ) are exact ratios.
4. Overhung load given at one shaft diameter from housing. All values given in pounds.

REDUCER SIZE **6**

C-ELIMINATOR SERIES REDUCER RATINGS

WINSMITH

3.500 CENTER DISTANCE			HORSEPOWER AND TORQUE RATINGS (INCH POUNDS)[1,2] SYNTHETIC OIL						OVERHUNG LOAD CAPACITY[4]	
			MECHANICAL			THERMAL			INPUT SHAFT	OUTPUT SHAFT
RATIO[3]	INPUT RPM	OUTPUT RPM	INPUT HP	INPUT TORQUE	OUTPUT TORQUE	INPUT HP	INPUT TORQUE	OUTPUT TORQUE	CB, CT MODELS	CB, CT, MCT MODELS
4 (4)	3000	750	16.70	351	1351	13.05	274	1053	654	1391
	2500	625	15.47	390	1499	12.86	324	1244	654	1391
	1750	438	13.33	480	1838	12.03	433	1657	654	1391
	1160	290	11.24	611	2324	10.69	581	2208	654	1391
	600	150	8.36	879	3298	8.36	879	3298	654	1391
	100	25	2.10	1323	4730	2.10	1323	4730	654	1391
5 (5⅙)	3000	581	14.47	304	1504	11.73	246	1216	654	1391
	2500	484	13.40	338	1669	11.50	290	1430	654	1391
	1750	339	11.55	416	2046	10.70	385	1893	654	1391
	1160	225	9.49	516	2516	9.49	516	2516	654	1391
	600	116	7.13	749	3600	7.13	749	3600	654	1391
	100	19	1.35	850	3869	1.35	850	3869	654	1391
7½ (7½)	3000	400	11.24	236	1679	9.53	200	1418	654	1391
	2500	333	10.42	263	1863	9.34	235	1666	654	1391
	1750	233	8.99	324	2283	8.67	312	2201	654	1391
	1160	155	7.46	405	2830	7.46	405	2830	654	1391
	600	80	5.52	580	3976	5.52	580	3976	654	1391
	100	13	1.01	635	4075	1.01	635	4075	654	1391
10 (10⅓)	3000	290	8.92	187	1806	7.34	154	1478	654	1391
	2500	242	8.27	209	2004	7.19	181	1736	654	1391
	1750	169	7.15	258	2456	6.69	241	2293	654	1391
	1160	112	5.96	324	3053	5.96	324	3053	654	1391
	600	58	4.22	443	4075	4.22	443	4075	654	1391
	100	9.7	.76	481	4075	.76	481	4075	654	1391
15 (15)	3000	200	6.72	141	1924	5.39	113	1532	654	1391
	2500	167	6.24	157	2135	5.28	133	1799	654	1391
	1750	117	5.41	195	2617	4.93	178	2380	654	1391
	1160	77	4.53	246	3259	4.42	240	3175	654	1391
	600	40	3.03	318	4075	3.03	318	4075	654	1391
	100	6.7	.56	354	4075	.56	354	4075	654	1391
20 (20)	3000	150	5.43	114	2050	5.10	107	1922	654	1391
	2500	125	5.04	127	2275	4.97	125	2240	654	1391
	1750	88	4.23	152	2694	4.23	152	2694	654	1391
	1160	58	3.69	200	3492	3.69	200	3492	654	1391
	600	30	2.08	218	3661	2.08	218	3661	654	1391
	100	5.0	.38	242	3661	.38	242	3661	654	1391

1. Refer to the MOTION CONTROL Selection Procedures on pages A3-A7 for instructions on the application of these rating tables.
2. See page E7 for reducer inertia values.
3. Numbers shown in ( ) are exact ratios.
4. Overhung load given at one shaft diameter from housing. All values given in pounds.

REDUCER SIZE **6**

C-ELIMINATOR SERIES REDUCER RATINGS

WINSMITH

3.500 CENTER DISTANCE			HORSEPOWER AND TORQUE RATINGS (INCH POUNDS)[1,2] SYNTHETIC OIL						OVERHUNG LOAD CAPACITY[4]	
			MECHANICAL			THERMAL			INPUT SHAFT	OUTPUT SHAFT
RATIO[3]	INPUT RPM	OUTPUT RPM	INPUT HP	INPUT TORQUE	OUTPUT TORQUE	INPUT HP	INPUT TORQUE	OUTPUT TORQUE	CB, CT MODELS	CB, CT, MCT MODELS
25 (25)	3000	120	4.30	90	1927	3.32	70	1468	654	1391
	2500	100	4.01	101	2138	3.27	82	1731	654	1391
	1750	70	3.49	126	2621	3.09	111	2306	654	1391
	1160	46	2.92	159	3234	2.81	152	3098	654	1391
	600	24	2.25	236	4593	2.25	236	4593	654	1391
	100	4.0	.45	286	4804	.45	286	4804	654	1391
30 (30)	3000	100	3.75	79	1980	3.07	65	1605	654	1391
	2500	83	3.49	88	2197	3.02	76	1888	654	1391
	1750	58	3.05	110	2694	2.85	103	2510	654	1391
	1160	39	2.58	140	3358	2.58	140	3358	654	1391
	600	20	1.71	180	4075	1.71	180	4075	654	1391
	100	3.3	.33	210	4075	.33	210	4075	654	1391
40 (40)	3000	75	2.96	62	2052	2.96	62	2052	654	1391
	2500	63	2.76	70	2277	2.76	70	2277	654	1391
	1750	44	2.34	84	2703	2.34	84	2703	654	1391
	1160	29	2.05	111	3492	2.05	111	3492	654	1391
	600	15	1.16	122	3600	1.16	122	3600	654	1391
	100	2.5	.23	142	3600	.23	142	3600	654	1391
50 (50)	3000	60	2.40	50	1995	2.40	50	1995	654	1391
	2500	50	2.24	56	2214	2.24	56	2214	654	1391
	1750	35	1.91	69	2637	1.91	69	2637	654	1391
	1160	23	1.49	81	3000	1.49	81	3000	654	1391
	600	12	.82	86	3000	.82	86	3000	654	1391
	100	2.0	.16	103	3000	.16	103	3000	654	1391
60 (60)	3000	50	1.98	42	1804	1.88	39	1707	654	1391
	2500	42	1.85	47	2002	1.85	47	2002	654	1391
	1750	29	1.62	58	2455	1.62	58	2455	654	1391
	1160	19	1.30	71	2850	1.30	71	2850	654	1391
	600	10	.73	77	2850	.73	77	2850	654	1391
	100	1.7	.15	96	2850	.15	96	2850	654	1391

1. Refer to the MOTION CONTROL Selection Procedures on pages A3-A7 for instructions on the application of these rating tables.
2. See page E7 for reducer inertia values.
3. Numbers shown in ( ) are exact ratios.
4. Overhung load given at one shaft diameter from housing. All values given in pounds.

REDUCER SIZE **7**

C-ELIMINATOR SERIES REDUCER RATINGS

WINSMITH

4.000 CENTER DISTANCE			HORSEPOWER AND TORQUE RATINGS (INCH POUNDS)[1,2] SYNTHETIC OIL						OVERHUNG LOAD CAPACITY[4]	
			MECHANICAL			THERMAL			INPUT SHAFT	OUTPUT SHAFT
RATIO[3]	INPUT RPM	OUTPUT RPM	INPUT HP	INPUT TORQUE	OUTPUT TORQUE	INPUT HP	INPUT TORQUE	OUTPUT TORQUE	CB, CT MODELS	CB, CT, MCT MODELS
7½ (7¼)	3000	414	15.56	327	2256	13.17	277	1904	525	1924
	2500	345	14.42	363	2504	12.98	327	2250	525	1924
	1750	241	12.43	448	3069	12.14	437	2997	525	1924
	1160	160	10.50	571	3882	10.50	571	3882	525	1924
	600	83	7.76	815	5451	7.76	815	5451	525	1924
	100	14	1.66	1043	6573	1.66	1043	6573	525	1924
10 (9¾)	3000	308	12.73	267	2467	12.11	254	2345	525	1924
	2500	256	11.80	298	2738	11.80	298	2738	525	1924
	1750	179	10.19	367	3356	10.19	367	3356	525	1924
	1160	119	8.55	465	4213	8.55	465	4213	525	1924
	600	62	6.01	632	5627	6.01	632	5627	525	1924
	100	10	1.16	730	6109	1.16	730	6109	525	1924
15 (14½)	3000	207	9.35	196	2613	7.59	159	2109	525	1924
	2500	172	8.68	219	2900	7.47	188	2488	525	1924
	1750	121	7.51	270	3555	7.01	252	3311	525	1924
	1160	80	6.22	338	4377	6.22	338	4377	525	1924
	600	41	4.71	495	6244	4.71	495	6244	525	1924
	100	6.9	.92	577	6611	.92	577	6611	525	1924
20 (20)	3000	150	7.27	153	2763	6.84	144	2593	525	1924
	2500	125	6.75	170	3066	6.69	169	3036	525	1924
	1750	88	5.85	211	3758	5.85	211	3758	525	1924
	1160	58	4.95	269	4721	4.95	269	4721	525	1924
	600	30	3.43	361	6149	3.43	361	6149	525	1924
	100	5.0	.63	399	6149	.63	399	6149	525	1924
25 (26)	3000	115	5.75	121	2790	5.75	121	2790	525	1924
	2500	96	5.34	135	3096	5.34	135	3096	525	1924
	1750	67	4.49	162	3669	4.49	162	3669	525	1924
	1160	45	3.91	212	4751	3.91	212	4751	525	1924
	600	23	2.23	235	5050	2.23	235	5050	525	1924
	100	3.9	.42	263	5050	.42	263	5050	525	1924
30 (30)	3000	100	5.05	106	2704	4.18	88	2213	525	1924
	2500	83	4.70	119	3000	4.12	104	2615	525	1924
	1750	58	4.10	148	3678	3.90	140	3495	525	1924
	1160	39	3.43	186	4538	3.43	186	4538	525	1924
	600	20	2.64	277	6445	2.64	277	6445	525	1924
	100	3.3	.53	332	6664	.53	332	6664	525	1924

1. Refer to the MOTION CONTROL Selection Procedures on pages A3-A7 for instructions on the application of these rating tables.
2. See page E7 for reducer inertia values.
3. Numbers shown in ( ) are exact ratios.
4. Overhung load given at one shaft diameter from housing. All values given in pounds.

REDUCER SIZE **7**

C-ELIMINATOR SERIES REDUCER RATINGS

WINSMITH

4.000 CENTER DISTANCE			HORSEPOWER AND TORQUE RATINGS (INCH POUNDS)[1,2] SYNTHETIC OIL						OVERHUNG LOAD CAPACITY[4]	
			MECHANICAL			THERMAL			INPUT SHAFT	OUTPUT SHAFT
RATIO[3]	INPUT RPM	OUTPUT RPM	INPUT HP	INPUT TORQUE	OUTPUT TORQUE	INPUT HP	INPUT TORQUE	OUTPUT TORQUE	CB, CT MODELS	CB, CT, MCT MODELS
40 (39)	3000	77	4.04	85	2772	4.04	85	2772	525	1924
	2500	64	3.76	95	3076	3.76	95	3076	525	1924
	1750	45	3.28	118	3771	3.28	118	3771	525	1924
	1160	30	2.80	152	4737	2.80	152	4737	525	1924
	600	15	1.70	179	5293	1.70	179	5293	525	1924
	100	2.6	.33	208	5293	.33	208	5293	525	1924
50 (51)	3000	59	3.11	65	2679	3.11	65	2679	525	1924
	2500	49	2.89	73	2973	2.89	73	2973	525	1924
	1750	34	2.45	88	3530	2.45	88	3530	525	1924
	1160	23	2.15	117	4559	2.15	117	4559	525	1924
	600	12	1.24	130	4770	1.24	130	4770	525	1924
	100	2.0	.24	153	4770	.24	153	4770	525	1924
60 (60)	3000	50	2.60	55	2554	2.60	55	2554	525	1924
	2500	42	2.43	61	2834	2.43	61	2834	525	1924
	1750	29	2.07	74	3377	2.07	74	3377	525	1924
	1160	19	1.80	98	4339	1.80	98	4339	525	1924
	600	10	1.06	112	4635	1.06	112	4635	525	1924
	100	1.7	.21	134	4635	.21	134	4635	525	1924

1. Refer to the MOTION CONTROL Selection Procedures on pages A3-A7 for instructions on the application of these rating tables.
2. See page E7 for reducer inertia values.
3. Numbers shown in ( ) are exact ratios.
4. Overhung load given at one shaft diameter from housing. All values given in pounds.

REDUCER SIZE **8**

C-ELIMINATOR SERIES REDUCER RATINGS

WINSMITH

4.600 CENTER DISTANCE			HORSEPOWER AND TORQUE RATINGS (INCH POUNDS)[1,2] SYNTHETIC OIL						OVERHUNG LOAD CAPACITY[4]	
			MECHANICAL			THERMAL			INPUT SHAFT	OUTPUT SHAFT
RATIO[3]	INPUT RPM	OUTPUT RPM	INPUT HP	INPUT TORQUE	OUTPUT TORQUE	INPUT HP	INPUT TORQUE	OUTPUT TORQUE	CB, CT MODELS	CB, CT, MCT MODELS
7½ (7¾)	3000	387	20.35	428	3167	16.83	354	2611	586	2870
	2500	323	18.85	475	3515	16.70	421	3108	586	2870
	1750	226	16.25	585	4309	15.78	568	4184	586	2870
	1160	150	13.31	723	5285	13.31	723	5285	586	2870
	600	77	10.04	1055	7600	10.04	1055	7600	586	2870
	100	13	2.44	1536	10512	2.44	1536	10512	586	2870
10 (9¾)	3000	308	17.14	360	3335	15.04	316	3335	586	2870
	2500	256	15.89	400	3701	14.85	374	3701	586	2870
	1750	179	13.70	493	4536	13.70	493	4536	586	2870
	1160	119	11.45	622	5676	11.45	622	5676	586	2870
	600	62	8.21	863	7741	8.21	863	7741	586	2870
	100	10	1.62	1019	8622	1.62	1019	8622	586	2870
15 (15¼)	3000	197	12.10	254	3623	12.10	254	3623	586	2870
	2500	164	11.22	283	4021	11.22	283	4021	586	2870
	1750	115	9.69	349	4929	9.69	349	4929	586	2870
	1160	76	8.13	442	6182	8.13	442	6182	586	2870
	600	39	4.54	476	6510	4.54	476	6510	586	2870
	100	6.6	.81	513	6510	.81	513	6510	586	2870
20 (20)	3000	150	9.66	203	3722	9.50	200	3659	586	2870
	2500	125	8.96	226	4130	8.96	226	4130	586	2870
	1750	88	7.75	279	5063	7.75	279	5063	586	2870
	1160	58	6.52	354	6345	6.52	354	6345	586	2870
	600	30	4.44	466	8150	4.44	466	8150	586	2870
	100	5.0	.88	557	8970	.88	557	8970	586	2870
25 (25)	3000	120	7.93	167	3754	7.93	167	3754	586	2870
	2500	100	7.36	186	4166	7.36	186	4166	586	2870
	1750	70	6.20	223	4960	6.20	223	4960	586	2870
	1160	46	5.35	291	6381	5.35	291	6381	586	2870
	600	24	3.53	371	7900	3.53	371	7900	586	2870
	100	4.0	.65	409	7900	.65	409	7900	586	2870
30 (30)	3000	100	6.94	146	3804	5.75	121	3125	586	2870
	2500	83	6.45	163	4222	5.71	144	3717	586	2870
	1750	58	5.60	202	5175	5.43	196	5010	586	2870
	1160	39	4.71	256	6435	4.71	256	6435	586	2870
	600	20	3.52	370	8962	3.52	370	8962	586	2870
	100	3.3	.79	495	10576	.79	495	10576	586	2870

1. Refer to the MOTION CONTROL Selection Procedures on pages A3-A7 for instructions on the application of these rating tables.
2. See page E7 for reducer inertia values.
3. Numbers shown in ( ) are exact ratios.
4. Overhung load given at one shaft diameter from housing. All values given in pounds.

REDUCER SIZE **8**

C-ELIMINATOR SERIES REDUCER RATINGS

WINSMITH

4.600 CENTER DISTANCE			HORSEPOWER AND TORQUE RATINGS (INCH POUNDS)[1,2] SYNTHETIC OIL						OVERHUNG LOAD CAPACITY[4]	
			MECHANICAL			THERMAL			INPUT SHAFT	OUTPUT SHAFT
RATIO[3]	INPUT RPM	OUTPUT RPM	INPUT HP	INPUT TORQUE	OUTPUT TORQUE	INPUT HP	INPUT TORQUE	OUTPUT TORQUE	CB, CT MODELS	CB, CT, MCT MODELS
40 (39)	3000	77	5.42	114	3783	5.34	112	3725	586	2870
	2500	64	5.04	127	4198	5.04	127	4198	586	2870
	1750	45	4.38	158	5146	4.38	158	5146	586	2870
	1160	30	3.72	202	6465	3.72	202	6465	586	2870
	600	15	2.46	258	7900	2.46	258	7900	586	2870
	100	2.6	.47	296	7900	.47	296	7900	586	2870
50 (51)	3000	59	4.21	88	3660	4.19	88	3635	586	2870
	2500	49	3.92	99	4061	3.92	99	4061	586	2870
	1750	34	3.42	123	4979	3.42	123	4979	586	2870
	1160	23	2.92	158	6253	2.92	158	6253	586	2870
	600	12	1.83	193	7180	1.83	193	7180	586	2870
	100	2.0	.36	228	7180	.36	228	7180	586	2870
60 (61)	3000	49	3.39	71	3441	3.39	71	3441	586	2870
	2500	41	3.16	80	3819	3.16	80	3819	586	2870
	1750	29	2.68	96	4534	2.68	96	4534	586	2870
	1160	19	2.34	127	5855	2.34	127	5855	586	2870
	600	10	1.43	150	6510	1.43	150	6510	586	2870
	100	1.6	.28	178	6510	.28	178	6510	586	2870

1. Refer to the MOTION CONTROL Selection Procedures on pages A3-A7 for instructions on the application of these rating tables.
2. See page E7 for reducer inertia values.
3. Numbers shown in ( ) are exact ratios.
4. Overhung load given at one shaft diameter from housing. All values given in pounds.

C-MINIMIZER
PRODUCT INTRODUCTION & CAPABILITIES

The C-MINIMIZER is a precision worm gear product originally designed to fill low backlash requirements in the power transmission market. The precision level of the C-MINIMIZER also satisfies most requirements in the industrial motion control market. The C-MINIMIZER is the result of using special gear making and assembly techniques to create a product with a maximum of 11 arc minutes of backlash. The backlash level of the C-MINIMIZER is fixed at the factory and should be returned to the factory for adjustment.

The C-MINIMIZER not only reflects a higher level of precision when making and assembling key parts, it reflects a backlash guarantee. This is the aspect of WINSMITH® MOTION CONTROL products that separates them from other manufacturer's best efforts to reduce backlash. Motion control applications require more than just a reference to "a lower backlash". These applications require a measurable level of precision that is assured. This requirement is easily satisfied by WINSMITH's C-MINIMIZER.

RATINGS

The C-MINIMIZER's ratios and ratings are the same as the C-Line. They are summarized in the condensed ratings section on pages E3-E4 of this catalog. Refer to the C-Line catalog (#100) for complete information.

COUPLING MOTOR ADAPTORS

Coupling motor adaptors are supplied in standard NEMA dimensions as well as in many variations that easily adapt to servo motors. All coupling style motor adaptors shown in the MOTION CONTROL catalog will have a large access hole to allow for easy coupling adjustment. See the catalog section covering motor flanges for more details.

DOUBLE REDUCTION

The C-MINIMIZER can be made as a double reduction unit with standard primary gearing or with C-MINIMIZER primary gearing depending on the precision level required. The ratings for these units are the same as the C-Line units of the same size and ratio. Refer to the current C-Line catalog (#100) for these ratings.

The overall backlash of a double reduction unit can be determined by dividing the ratio of the secondary stage into the backlash of the primary stage and adding the result to the backlash of the secondary stage.

EXAMPLE:

STAGE	RATIO	STAGE BACKLASH	OVERALL BACKLASH
Primary (C-MINIMIZER)	10:1	11 arc min	11/15 = .7 arc min
Secondary (C-MINIMIZER)	15:1	11 arc min	11.0 arc min
TOTAL	150:1		11.7 arc min

TRIPLE REDUCTION

The C-MINIMIZER can also be included in triple reduction C-Line products.

OUTPUT REGISTER OPTIONS

Occasionally there is a need to register the output of a motion control speed reducer to the driven machine. The flange mounted hollow shaft models of the C-MINIMIZER product can be supplied with a register in the output flange.

STANDARD MOUNTING POSITIONS

C-MINIMIZER units must be built for specific mounting positions to provide adequate lubrication for all bearings. The standard mounting position is as pictured on the C-Line catalog (#100) dimension pages. Deviations from this must be identified at the time of order placement.

LUBRICATION

C-MINIMIZER units are factory filled with the appropriate grade of mineral oil for operation in a 51° F to 110° temperature requirement. Refer to the product installation bulletin shipped with each unit for detailed information on lubrication and maintenance.

Optional synthetic oils are available for applications involving low start-up, higher operating temperatures and where improved efficiency or extended lubricant life is desirable.

INERTIA

Inertia values for basic C-MINIMIZER models are provided on page E7.

C-MINIMIZER
PRODUCT INTRODUCTION & CAPABILITIES

WINSMITH

MODEL CAPABILITY

The C-MINIMIZER product is available in all sizes and models currently available in the C-Line product. Input shaft and coupling style models offer a more effective design for maintaining consistent backlash because the worm shaft is supported between two bearings in the housing. Motorized models with a hollow input shaft can be accommodated, but variations at the motor shaft interface may slightly affect backlash consistency.

The C-MINIMIZER's external dimensions are the same as the C-Line. Refer to the C-Line catalog (#100) for further information.

MODEL	SIZE										
	1	2	3	4	5	6	7	8	9	10 & 12	11, 13-15
CT	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
CB	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
CV	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
ST	no	no	yes	yes	yes	yes	yes	yes	yes	yes	no
SCT	no	no	yes	yes	yes	yes	yes	yes	yes	yes	no
SF	no	no	yes	yes	yes	yes	yes	yes	yes	yes	no
L	no	no	no	yes	yes	yes	yes	yes	yes	yes	no
MCT	yes	yes	yes	yes	yes	yes	yes	yes	no	no	no
MCV	yes	yes	yes	yes	yes	yes	yes	yes	no	no	no
MST	no	no	yes	yes	yes	yes	yes	yes	yes	no	no
MSCT	no	no	yes	yes	yes	yes	yes	yes	no	no	no
MSF	no	no	yes	yes	yes	yes	yes	yes	yes	no	no
ML	no	no	no	yes	yes	yes	yes	yes	yes	no	no
CTM	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
CVM	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
STM	no	no	yes	yes	yes	yes	yes	yes	yes	yes	no
SCTM	no	no	yes	yes	yes	yes	yes	yes	yes	yes	no
SFM	no	no	yes	yes	yes	yes	yes	yes	yes	yes	no
LM	no	no	no	yes	yes	yes	yes	yes	yes	yes	no

CONDENSED RATINGS CHART
C-MINIMIZER—MECHANICAL RATINGS†

1. Before selecting from these tables, refer to the Selection Procedures on pages A3-A7. Using either the INPUT or OUTPUT METHOD, determine the DESIGN HP or TORQUE. Do not use these tables in conjunction with the FULL DUTY CYCLE METHOD.
2. For the applicable RATIO and RPM, read across until the unit rating from the table meets or exceeds the DESIGN LOAD (from Step 1).
3. If the application involves continuous operation (more than one half hour in a two hour period), refer to the

NOMINAL* RATIO	INPUT RPM	NOMINAL OUTPUT RPM	1C				2C				3C				4C			
			INPUT HP	INPUT TORQUE	OUTPUT TORQUE	EFF	INPUT HP	INPUT TORQUE	OUTPUT TORQUE	EFF	INPUT HP	INPUT TORQUE	OUTPUT TORQUE	EFF	INPUT HP	INPUT TORQUE	OUTPUT TORQUE	EFF
5	3000	600	1.33	28	115	83	2.35	49	213	87	3.29	69	306	88	6.94	146	668	92
	1800	360	1.06	37	153	82	1.85	65	277	86	2.66	93	409	88	5.62	197	894	91
	1200	240	0.86	45	183	82	1.59	84	356	85	2.24	118	512	87	4.72	248	1117	90
7.5	3000	400	1.12	24	140	80	2.05	43	275	85	2.75	58	391	90	5.52	116	783	90
	1800	240	0.89	31	186	80	1.64	57	366	85	2.21	77	519	89	4.47	157	1048	89
	1200	160	0.70	37	215	78	1.33	70	440	84	1.80	95	626	88	3.77	198	1311	88
10	3000	300	0.90	19	138	73	1.72	36	297	82	2.37	50	423	85	4.64	97	866	89
	1800	180	0.72	25	184	73	1.38	48	394	82	1.90	67	562	84	3.71	130	1141	88
	1200	120	0.59	31	219	71	1.11	58	471	81	1.54	81	673	83	3.14	165	1432	87
15	3000	200	0.74	16	161	69	1.32	28	317	77	1.79	38	444	79	3.44	72	901	83
	1800	120	0.59	21	213	68	1.06	37	421	76	1.44	50	590	78	2.81	98	1206	82
	1200	80	0.46	24	244	67	0.86	45	502	74	1.19	63	718	77	2.38	125	1507	80
20	3000	150	0.61	13	150	59	1.01	21	324	77	1.46	31	453	74	2.81	59	954	81
	1800	90	0.49	17	199	58	0.82	29	430	75	1.18	41	603	73	2.26	79	1261	80
	1200	60	0.40	21	237	57	0.67	35	512	73	0.98	51	733	71	1.81	95	1475	78
25	3000	120	0.55	12	158	55	0.93	20	327	67	1.27	27	472	72	2.33	49	972	79
	1800	72	0.44	15	209	54	0.76	27	434	66	1.02	36	624	71	1.88	66	1290	78
	1200	48	0.36	19	245	52	0.62	33	516	64	0.82	43	735	69	1.39	73	1380	76
30	3000	100	0.50	11	166	53	0.83	17	327	63	1.11	23	469	67	2.06	43	929	72
	1800	60	0.40	14	219	53	0.67	23	434	61	0.90	32	622	66	1.70	60	1243	70
	1200	40	0.31	16	251	51	0.55	29	516	60	0.73	38	740	64	1.46	77	1553	68
40	3000	75	0.43	9	149	42	0.62	13	323	62	0.92	19	452	59	1.66	35	953	68
	1800	45	0.35	12	198	41	0.51	18	429	60	0.75	26	601	57	1.36	48	1261	66
	1200	30	0.26	14	215	39	0.42	22	510	58	0.63	33	731	55	1.10	58	1475	64
50	3000	60	0.38	8	134	34	0.60	13	317	50	0.75	16	440	56	1.35	28	930	66
	1800	36	0.28	10	152	31	0.47	16	398	49	0.62	22	596	55	1.10	39	1234	64
	1200	24	0.20	11	152	28	0.34	18	398	45	0.50	26	693	53	0.86	45	1380	61
60	3000	50	0.34	7	150	35	0.45	9	296	52	0.68	14	428	50	1.15	24	883	61
	1800	30	0.26	9	187	34	0.44	15	400	50	0.55	19	566	49	0.91	32	1137	59
	1200	20	0.19	10	187	31	0.32	17	400	46	0.44	23	650	47	0.65	34	1137	55

Refer to the current C-Line Catalog (#100) for exact ratios based on unit sizes.

*4:1 Nominal ratio available in some sizes.

†These ratings are based on using mineral oil in the unit.

CONDENSED RATINGS CHART
S-MINIMIZER—MECHANICAL RATINGS†

C-MINIMIZER THERMAL RATING chart on pages E5-E6 and verify that the continuous applied load does not exceed the unit THERMAL capacity. If so, select the minimum size unit where the THERMAL capacity meets or exceeds the continuous applied load.

4. Check OVERHUNG LOADS on all shafts and/or THRUST LOAD on the output shaft. Refer to the rating pages in catalog 100 (C-Line Worm Gear Reducers) for shaft capacities and the Engineering Section for explanation.
5. For INERTIA VALUES, see page E7.

NOMINAL* RATIO△	INPUT RPM	NOMINAL OUTPUT RPM	5C				6C				7C				8C			
			INPUT HP	INPUT TORQUE	OUTPUT TORQUE	EFF	INPUT HP	INPUT TORQUE	OUTPUT TORQUE	EFF	INPUT HP	INPUT TORQUE	OUTPUT TORQUE	EFF	INPUT HP	INPUT TORQUE	OUTPUT TORQUE	EFF
5	3000	600	10.33	217	1045	93	14.56	306	1475	93	N/A				N/A			
	1800	360	8.36	293	1399	92	11.78	412	1975	93								
	1200	240	6.99	367	1739	91	9.66	507	2406	92								
7.5	3000	400	8.67	182	1202	92	11.54	242	1670	92	16.08	338	2247	92	20.97	441	3148	92
	1800	240	7.02	246	1609	91	9.36	328	2235	91	12.98	454	3008	91	16.89	591	4215	92
	1200	160	5.92	311	2015	90	7.76	408	2748	90	10.98	577	3792	91	14.27	749	5313	91
10	3000	300	6.77	142	1322	90	9.30	195	1807	90	13.28	279	2468	91	17.87	375	3336	91
	1800	180	5.39	189	1737	89	7.56	265	2419	88	10.71	375	3304	90	14.39	504	4466	91
	1200	120	4.58	241	2192	88	6.31	331	2984	87	8.99	472	4129	90	12.00	630	5554	90
15	3000	200	5.06	106	1423	86	7.10	149	1922	86	9.95	209	2612	86	12.75	268	3619	89
	1800	120	4.06	142	1877	85	5.80	203	2573	85	8.06	282	3496	85	10.26	359	4845	88
	1200	80	3.44	181	2351	84	4.87	256	3181	83	6.64	349	4265	84	8.62	453	6064	88
20	3000	150	4.12	87	1456	84	5.76	121	2050	85	7.82	164	2762	84	10.33	217	3721	86
	1800	90	3.33	117	1932	83	4.70	165	2744	83	6.33	222	3697	83	8.32	291	4981	85
	1200	60	2.78	146	2376	81	4.00	210	3430	82	5.35	281	4629	82	7.00	368	6231	85
25	3000	120	3.50	74	1462	80	4.72	99	1929	78	6.28	132	2796	82	8.60	181	3759	83
	1800	72	2.81	98	1912	78	3.90	137	2582	76	5.08	178	3743	81	6.71	235	4861	83
	1200	48	2.43	128	2430	76	3.28	172	3157	73	4.29	225	4678	80	5.82	306	6280	82
30	3000	100	3.02	63	1472	77	4.15	87	1982	76	5.68	119	2706	76	7.71	162	3807	78
	1800	60	2.45	86	1942	75	3.43	120	2653	74	4.64	162	3622	74	6.25	219	5096	78
	1200	40	2.09	110	2428	74	2.93	154	3284	71	3.87	203	4429	73	5.23	275	6289	76
40	3000	75	2.39	50	1460	73	3.29	69	2053	74	4.59	96	2771	74	6.12	129	3782	76
	1800	45	1.95	68	1939	71	2.72	95	2748	72	3.73	131	3710	73	4.94	173	5063	75
	1200	30	1.64	86	2377	69	2.34	123	3433	70	3.17	166	4646	71	4.18	220	6340	74
50	3000	60	1.95	41	1407	69	2.71	57	1981	70	3.60	76	2662	69	4.90	103	3637	69
	1800	36	1.60	56	1871	67	2.17	76	2565	67	2.92	102	3564	68	3.96	139	4868	69
	1200	24	1.34	70	2265	64	1.77	93	3000	65	2.48	130	4452	67	3.36	176	6088	68
60	3000	50	1.64	34	1334	65	2.36	50	1792	60	3.09	65	2536	65	4.02	84	3418	66
	1800	30	1.35	47	1773	63	1.98	69	2399	58	2.43	85	3283	64	3.23	113	4575	66
	1200	20	1.09	57	2056	60	1.65	87	2850	55	2.13	112	4237	63	2.73	143	5715	65

Refer to the current C-Line Catalog (#100) for exact ratios based on unit sizes.
△80:1 and 100:1 ratios also available.
*4:1 Nominal ratio available in some sizes.
†These ratings are based on using mineral oil in the unit.

CONDENSED RATINGS CHART
C-MINIMIZER—THERMAL RATINGS†

See pages E3-E4 for instructions on the use of this chart.

NOMINAL* RATIO△	INPUT RPM	NOMINAL OUTPUT RPM	1C			2C			3C			4C		
			INPUT HP	INPUT TORQUE	OUTPUT TORQUE	INPUT HP	INPUT TORQUE	OUTPUT TORQUE	INPUT HP	INPUT TORQUE	OUTPUT TORQUE	INPUT HP	INPUT TORQUE	OUTPUT TORQUE
5	3000	600	1.27	27	108	2.15	45	193	2.90	61	268	5.50	116	525
	1800	360	1.00	35	144	1.68	59	251	2.34	82	358	4.45	156	703
	1200	240	0.81	43	173	1.45	76	322	1.97	103	448	3.74	196	878
7.5	3000	400	1.07	22	131	1.87	39	248	2.41	51	341	4.36	92	612
	1800	240	0.84	29	175	1.49	52	329	2.00	70	453	3.53	124	819
	1200	160	0.66	35	202	1.20	63	395	1.57	82	546	2.97	156	1025
10	3000	300	0.87	18	129	1.57	33	267	2.07	43	366	3.67	77	675
	1800	180	0.68	24	172	1.25	44	353	1.66	58	486	2.92	102	890
	1200	120	0.55	29	205	1.01	53	422	1.34	70	582	2.47	130	1116
15	3000	200	0.71	15	149	1.20	25	282	1.56	33	382	2.70	57	697
	1800	120	0.55	19	197	0.96	34	374	1.26	44	507	2.20	77	932
	1200	80	0.43	23	226	0.77	40	446	1.04	55	618	1.87	98	1165
20	3000	150	0.58	12	138	0.99	21	287	1.27	27	385	2.19	46	729
	1800	90	0.46	16	183	0.79	28	380	1.02	36	512	1.76	62	964
	1200	60	0.37	19	217	0.64	34	453	0.85	45	623	1.49	78	1199
25	3000	120	0.53	11	144	0.84	18	285	1.10	23	399	1.81	38	736
	1800	72	0.41	14	190	0.67	23	378	0.88	31	527	1.46	51	977
	1200	48	0.33	17	223	0.55	29	449	0.71	37	620	1.19	62	1164
30	3000	100	0.48	10	150	0.75	16	282	0.95	20	392	1.59	33	697
	1800	60	0.37	13	197	0.60	21	375	0.77	27	520	1.31	46	933
	1200	40	0.29	15	226	0.49	26	446	0.63	33	618	1.12	59	1166
40	3000	75	0.41	9	131	0.62	13	273	0.78	16	370	1.28	27	700
	1800	45	0.32	11	175	0.49	17	363	0.63	22	492	1.04	36	927
	1200	30	0.26	14	208	0.41	22	431	0.53	28	597	0.88	46	1151
50	3000	60	0.36	8	115	0.53	11	263	0.64	13	353	1.03	22	669
	1800	36	0.28	10	152	0.42	15	348	0.52	18	477	0.83	29	888
	1200	24	0.20	11	152	0.34	18	398	0.42	22	556	0.68	36	1056
60	3000	50	0.33	7	127	0.47	10	240	0.57	12	336	0.87	18	623
	1800	30	0.24	8	167	0.37	13	318	0.46	16	444	0.70	25	826
	1200	20	0.19	10	187	0.31	16	379	0.37	19	522	0.58	30	978

Refer to the current C-Line Catalog (#100) for exact ratios based on unit sizes.
△80:1 and 100:1 ratios also available.
*4:1 Nominal ratio available in some sizes.
†These ratings are based on using mineral oil in the unit.

CONDENSED RATINGS CHART
C-MINIMIZER—THERMAL RATINGS†

See pages E3-E4 for instructions on the use of this chart.

NOMINAL* RATIO	INPUT RPM	NOMINAL OUTPUT RPM	5C			6C			7C			8C		
			INPUT HP	INPUT TORQUE	OUTPUT TORQUE	INPUT HP	INPUT TORQUE	OUTPUT TORQUE	INPUT HP	INPUT TORQUE	OUTPUT TORQUE	INPUT HP	INPUT TORQUE	OUTPUT TORQUE
5	3000	600	7.30	153	732	10.27	216	1033	N/A			N/A		
	1800	360	5.91	207	979	8.31	291	1383						
	1200	240	4.94	259	1217	6.81	358	1684						
7.5	3000	400	6.12	129	839	8.12	171	1162	11.36	239	1566	14.84	312	2198
	1800	240	4.95	173	1123	6.58	230	1556	9.14	320	2097	11.92	417	2942
	1200	160	4.17	219	1406	5.45	286	1913	7.72	405	2643	10.05	528	3708
10	3000	300	4.76	100	915	6.54	137	1254	9.36	197	1713	12.61	265	2315
	1800	180	3.78	132	1202	5.31	186	1679	7.53	264	2293	10.12	354	3100
	1200	120	3.21	169	1517	4.43	233	2071	6.31	331	2866	8.42	442	3854
15	3000	200	3.53	74	972	4.97	104	1323	6.99	147	1794	8.97	188	2486
	1800	120	2.83	99	1282	4.05	142	1770	5.64	197	2402	7.19	252	3329
	1200	80	2.39	126	1606	3.40	179	2189	4.64	244	2930	6.02	316	4166
20	3000	150	2.88	61	990	4.00	84	1392	5.47	115	1878	7.25	152	2534
	1800	90	2.32	81	1314	3.26	114	1864	4.41	154	2514	5.81	203	3392
	1200	60	1.94	102	1616	2.77	145	2330	3.71	195	3147	4.86	255	4243
25	3000	120	2.44	51	985	3.27	69	1300	4.38	92	1879	6.01	126	2529
	1800	72	1.95	68	1289	2.70	95	1740	3.52	123	2515	4.66	163	3271
	1200	48	1.69	89	1638	2.26	119	2128	2.96	155	3143	4.02	211	4227
30	3000	100	2.10	44	983	2.86	60	1324	3.96	83	1807	5.37	113	2543
	1800	60	1.69	59	1297	2.36	83	1772	3.20	112	2419	4.32	151	3404
	1200	40	1.45	76	1622	2.01	106	2194	2.66	140	2959	3.60	189	4201
40	3000	75	1.64	34	955	2.25	47	1343	3.17	67	1815	4.24	89	2477
	1800	45	1.34	47	1268	1.85	65	1797	2.55	89	2430	3.38	118	3316
	1200	30	1.12	59	1554	1.58	83	2245	2.16	113	3043	2.85	150	4152
50	3000	60	1.34	28	900	1.83	38	1268	2.48	52	1701	3.37	71	2320
	1800	36	1.09	38	1197	1.46	51	1641	1.98	69	2271	2.68	94	3106
	1200	24	0.91	48	1450	1.30	68	2118	1.67	88	2845	2.26	119	3884
60	3000	50	1.12	24	838	1.58	33	1125	2.12	45	1593	2.77	58	2143
	1800	30	0.91	32	1113	1.32	46	1507	1.64	57	2062	2.19	77	2869
	1200	20	0.75	39	1338	1.14	60	1866	1.42	75	2661	1.83	96	3584

Refer to the current C-Line Catalog (#100) for exact ratios based on unit sizes.

*4:1 Nominal ratio available in some sizes.

†These ratings are based on using mineral oil in the unit.

C-ELIMINATOR/C-MINIMIZER INERTIA (lb. in. sec²)*

SIZE	NOMINAL RATIO	CB, CT, CV	MCT, MCV			SIZE	NOMINAL RATIO	CB, CT, CV	MCT, MCV		
			56C	143TC-145TC	182TC-184TC				56C	143TC-145TC	182TC-184TC
1	4	.00025	.00048			2	4	.00064	.00112	.00106	
	5	.00024	.00046				5	.00056	.00104	.00098	
	7½	.00022	.00045				7½	.00036	.00095	.00089	
	10	.00022	.00045				10	.00034	.00093	.00087	
	15	.00017	.00039				15	.00033	.00091	.00085	
	20	.00022	.00045				20	.00033	.00092	.00086	
	25	.00020	.00042				25	.00036	.00088	.00082	
	30	.00017	.00039				30	.00032	.00090	.00084	
	40	.00021	.00044				40	.00032	.00091	.00085	
	50	.00023	.00047				50	.00030	.00091	.00084	
	60	.00017	.00040				60	.00033	.00093	.00087	
3	4	.00113	.00159	.00153		4	4	.00190	.00248	.00241	
	5	.00102	.00149	.00142			5	.00164	.00221	.00214	
	7½	.00039	.00090	.00084			7½	.00147	.00191	.00184	
	10	.00041	.00091	.00085			10	.00102	.00156	.00149	
	15	.00040	.00091	.00085			15	.00130	.00174	.00167	
	20	.00040	.00093	.00086			20	.00092	.00146	.00139	
	25	.00030	.00085	.00079			25	.00068	.00111	.00104	
	30	.00037	.00087	.00081			30	.00126	.00169	.00163	
	40	.00039	.00092	.00086			40	.00089	.00143	.00137	
	50	.00028	.00082	.00075			50	.00066	.00109	.00102	
	60	.00030	.00085	.00079			60	.00066	.00110	.00104	
5	4	.00527	.00718	.00711	.00688	6	4	.01138	.01336	.01330	.01316
	5	.00398	.00587	.00580	.00556		5	.00722	.00902	.00895	.00878
	7½	.00265	.00461	.00455	.00431		7½	.00593	.00788	.00781	.00760
	10	.00202	.00407	.00400	.00377		10	.00548	.00739	.00732	.00710
	15	.00183	.00389	.00382	.00359		15	.00516	.00710	.00703	.00681
	20	.00169	.00361	.00354	.00331		20	.00309	.00486	.00479	.00456
	25	.00214	.00390	.00383	.00360		25	.00651	.00848	.00841	.00818
	30	.00173	.00364	.00358	.00334		30	.00497	.00691	.00684	.00661
	40	.00162	.00354	.00347	.00324		40	.00292	.00469	.00462	.00438
	50	.00159	.00352	.00345	.00322		50	.00288	.00474	.00467	.00443
	60	.00158	.00356	.00350	.00326		60	.00454	.00665	.00659	.00635
7	7½	.00909	.01208	.01201	.01176	8	7½	.01455	.01568	.01561	.01538
	10	.00586	.00750	.00743	.00718		10	.00966	.01078	.01071	.01047
	15	.00694	.00988	.00981	.00957		15	.00713	.00815	.00808	.00784
	20	.00467	.00630	.00623	.00599		20	.00647	.00759	.00752	.00729
	25	.00419	.00579	.00571	.00547		25	.00616	.00718	.00711	.00687
	30	.00642	.00937	.00929	.00905		30	.00953	.01067	.01060	.01036
	40	.00439	.00607	.00600	.00576		40	.00657	.00768	.00762	.00738
	50	.00400	.00560	.00553	.00528		50	.00707	.00819	.00812	.00789
	60	.00392	.00557	.00550	.00526		60	.00589	.00690	.00684	.00660

*For conversion to lb.in.², multiply table values by 386.

MOTION CONTROL OPTIONS

The basic MOTION CONTROL models feature: shaft input and solid or hollow output shafts. These basic models can be enhanced with product options that address specific motion control solutions. This section of the MOTION CONTROL catalog offers highlights of many of these options and details on some of the more frequently needed options.

OPTIONS

- Coupling style motor adaptors to accommodate NEMA motor frame sizes. Large access hole to easy access of coupling adjustment—page F2.
- Multiple use round motor adaptor castings to accommodate various servo/stepper motors and IEC-BS motor frame sizes—page F3.
- Multiple use square motor adaptor castings to accommodate various servo/stepper motors—page F4.
- Couplings for motion control applications—page F7.
- Output register for flange mounted hollow shaft units—page F6.
- Keyless hollow output shaft with clamping collar integral to the hollow output shaft—not shown.
- 56C output flange on 913-920 S-ELIMINATOR and S-MINIMIZER solid output shaft units—not shown.
- Double extended high speed and slow speed shafts for use with encoder or resolver feedback loop—not shown.

There are many WINSMITH® standard product options described in standard product catalogs that may also fill needs in motion control applications.

- WINKLEEN®—Food application unit with BISSC certification.—Catalog 290.
- MAXIMIZER® and MAXIMIZER® PLUS—Hazardous duty applications.—Catalog 290.
- Totally enclosed, non-vented S-MINIMIZER (S-EQUALIZER® option).—Catalog 290.
- External expansion chamber added to any product—not shown.
- Special ratios as required—not shown.
- Special lubrication including grease filled—not shown.

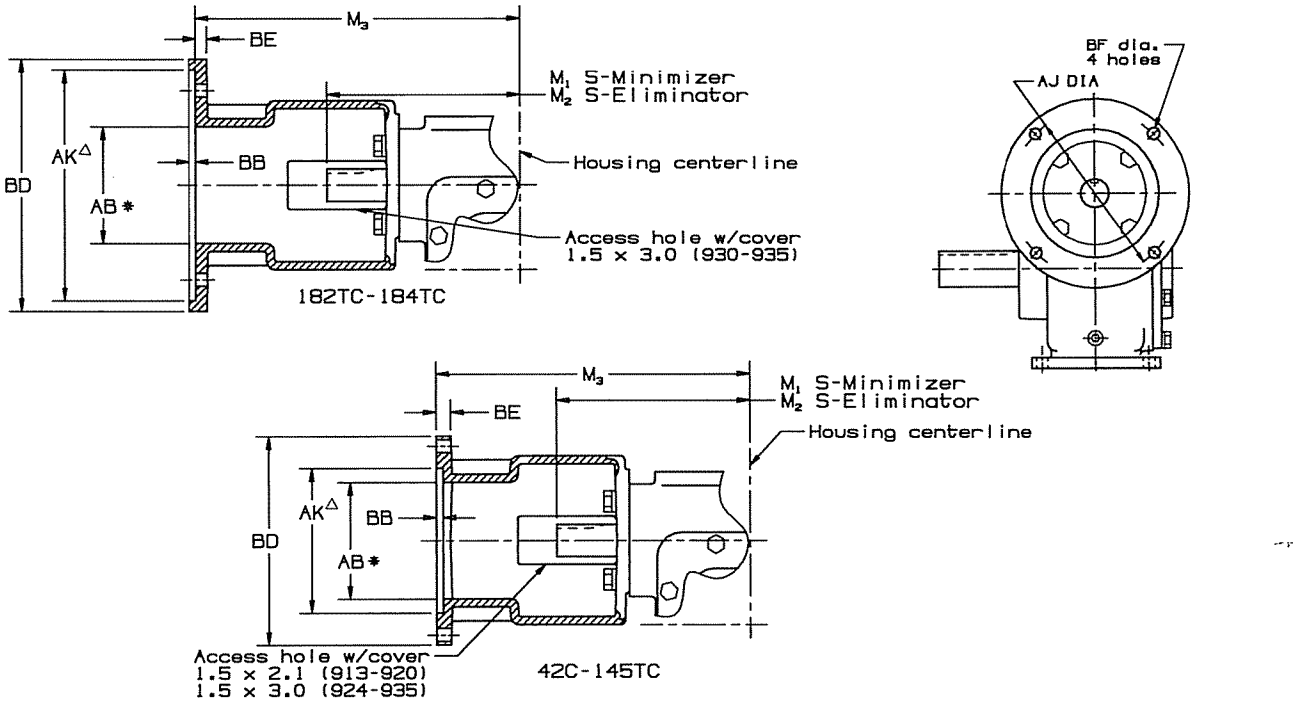
NEMA MOTOR FLANGE CAPABILITY

Flange dimensions by size and model

The wide variety of servo motors in use today presents a unique reducer interface problem. The versatility necessary to accommodate this range of motor sizes lead WINSMITH® to adopt a new series of motor adaptors that were designed to accommodate the widest possible range of NEMA and servo motor requirements.

Motor adaptors designed to interface with motors that conform to standard NEMA mounting dimensions are shown below. Pages F3 & F4 provide dimensional information for these motor adaptors for the purpose of reviewing interface capabilities with various round and square body servo motor flanges. All of these motor adaptors can be modified to fit C-ELIMINATOR and C-MINIMIZER units in sizes 1 through 8.

When ordering units with motor flange dimensions other than the standard NEMA frame sizes shown below, it will be necessary to furnish motor dimensions to insure a proper fit between the motor and reducer.



SPEED REDUCER DIMENSIONS (IN INCHES)
FOR ADDITIONAL DIMENSIONS SEE BASIC PRODUCT PAGES.

SIZE†	FRAME RANGE	AB*	AJ	AK△	BB	BD	BE	BF	M_1	M_2		M_3	SIZE†
										MAX.	MIN.		
913	42C-48C	2.38	3.750	3.00	.19	4.50	.38	.281	N/A	4.46	3.96	6.81	913
	56C-145TC		5.875	4.50		6.50		.406					
917	42C-48C	2.38	3.750	3.00	.19	4.50	.38	.281	4.75	5.32	4.82	7.56	917
	56C-145TC		5.875	4.50	.21	6.50		.406					
920	42C-48C	2.38	3.750	3.00	.19	4.50	.38	.281	5.00	5.32	4.82	7.56	920
	56C-145TC		5.875	4.50	.21	6.50		.406					
924	56C-145TC	3.63	5.875	4.50	.21	6.50	.45	.406	6.50	N/A	N/A	9.75	924
926	56C-145TC	3.63	5.875	4.50	.21	6.50	.45	.406	6.50	6.38	5.88	9.75	926
930	56C-145TC	3.63	5.875	4.50	.19	6.50	.38	.406	7.00	7.13	6.47	10.38	930
	182TC-184TC	4.25	7.250	8.50		9.00	.46	.531				10.81	
935	56C-145TC	3.63	5.875	4.50	.19	6.50	.50	.406	N/A	8.06	7.40	11.31	935
	182TC-184TC	4.25	7.250	8.50		9.00	.46	.531				11.75	

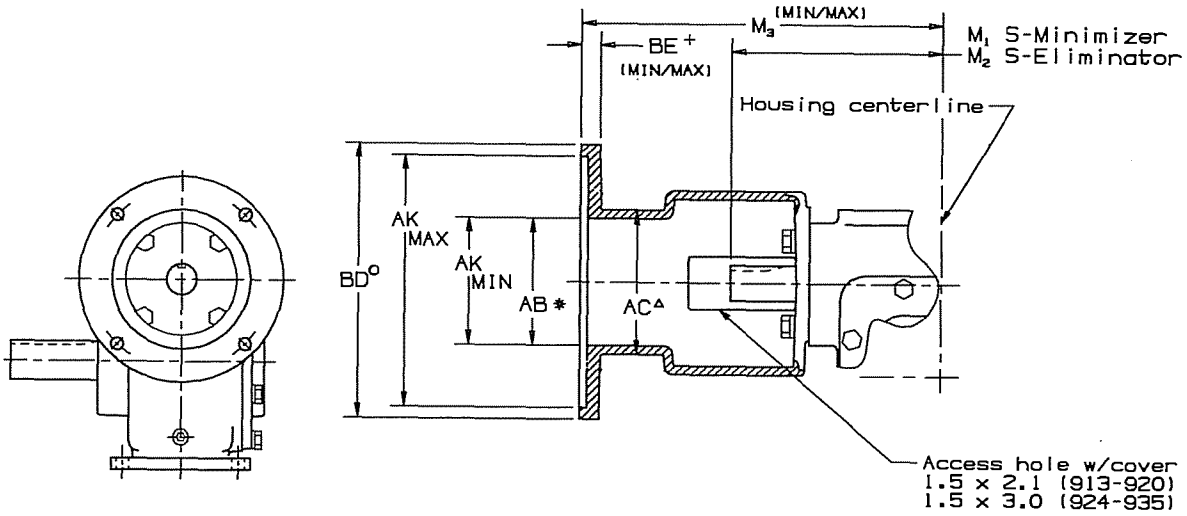
*Coupling OD must be less than this diameter.
△Register tolerance +.0005 +.0025.
†Check product for size capability.

SERVO MOTOR FLANGE CAPABILITY—ROUND BODY

Flange dimensions range by size and model

A family of motor adaptor castings has been developed to accommodate servo motors. This page provides the dimensional information for reviewing their interface capabilities with various round body servo motor flanges. The flange end of the casting is sufficiently large to accommodate the wide range of motor sizes where the minimum size motor is dictated by the inside diameter (AB). The flange diameter (BD) and register (AK) will then be machined to the specific motor interface dimensions. The adaptor length can vary slightly, but in general, the gap between the motor and reducer shafts is taken up by the coupling. The bolt circle diameter limitations (AJ) are not specifically shown, but can be determined from the flange outside diameter (BD) and the casting wall (AC) with due consideration for the motor fastener diameter. When ordering, the actual motor mounting dimensions must be furnished.

Flange requirements beyond this range may be accommodated with an adaptor ring on a special order basis.



ROUND BODY MOTOR ADAPTOR DIMENSION CAPABILITIES, INCHES (DIMENSIONS IN PARENTHESIS ARE MM)□
FOR ADDITIONAL DIMENSIONS SEE BASIC PRODUCT PAGES.

SIZE†	ADAPTOR	AB*	AC△	AK		BD°	BE+		M_1	M_2		M_3		SIZE
				MIN.	MAX.		MIN.	MAX.		MAX.	MIN.	MIN.	MAX.	
913	One adaptor available for each of these sizes	2.38	2.50	2.38 (60)	6.00 (150)	6.50 (165)	.38	.41	N/A	4.46	3.96	6.81	6.84	913
917		2.38	2.50	2.38 (60)	6.00 (150)	6.50 (165)	.38	.41	4.75	5.32	4.82	7.56	7.59	917
920		2.38	2.50	2.38 (60)	6.00 (150)	6.50 (165)	.38	.41	5.00	5.32	4.82	7.56	7.59	920
924		3.63	3.63	3.88 (100)	7.00 (175)	7.50 (190)	.38	.47	6.50	N/A	N/A	9.68	9.77	924
926		3.63	3.63	3.88 (100)	7.00 (175)	7.50 (190)	.38	.47	6.50	6.38	5.88	9.68	9.77	926
930	Small	3.63	3.63	3.88 (100)	6.00 (150)	6.50 (165)	.38	.41	7.00	7.13	6.47	10.38	10.41	930
	Large	4.25	4.25	4.50 (115)	10.50 (265)	11.00 (280)	.38	.66				10.81	10.88	
935	Small	3.63	3.63	3.88 (100)	6.00 (150)	6.50 (165)	.38	.54	N/A	8.06	7.40	11.31	11.34	935
	Large	4.25	4.25	4.50 (115)	10.50 (265)	11.00 (280)	.38	.66				11.75	11.81	

*Coupling OD must be less than this diameter.
△Motor fastener head must clear this diameter.
°OD can be reduced to match motor.
+Allow adequate stock for register depth.
□Adaptor rings can be considered for motors outside this framework. Contact the factory with your requirements.
†Check product for size availability.

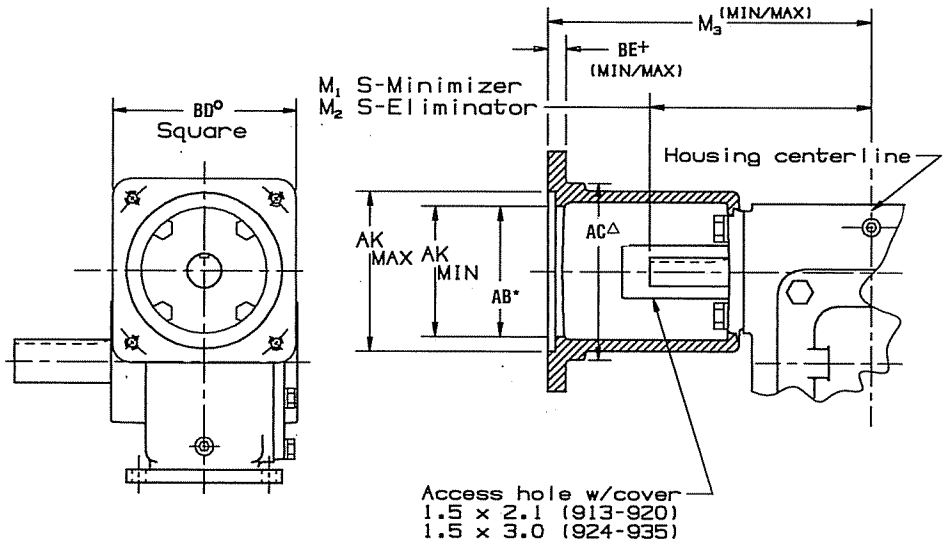
F OPTIONS

SERVO MOTOR FLANGE CAPABILITY—SQUARE BODY

Flange dimensions range by size and model

A family of motor adaptor castings has been developed to accommodate servo motors. This page provides the dimensional information for reviewing their interface capabilities with various square body servo motor flanges. The flange end of the casting is sufficiently large to accommodate the wide range of motor sizes where the minimum size motor is dictated by the inside diameter (AB). The flange perimeter (BD) and register (AK) will then be machined to the specific motor interface dimensions. The adaptor length can vary slightly, but in general, the gap between the motor and reducer shafts is taken up by the coupling. The bolt circle diameter limitations (AJ) are not specifically shown, but can be determined from the flange outside perimeter (BD) and the casting wall (AC) with due consideration for the motor fastener diameter. When ordering, the actual motor mounting dimensions must be furnished.

Flange requirements beyond this range may be accommodated with an adaptor spacer on a special order basis.



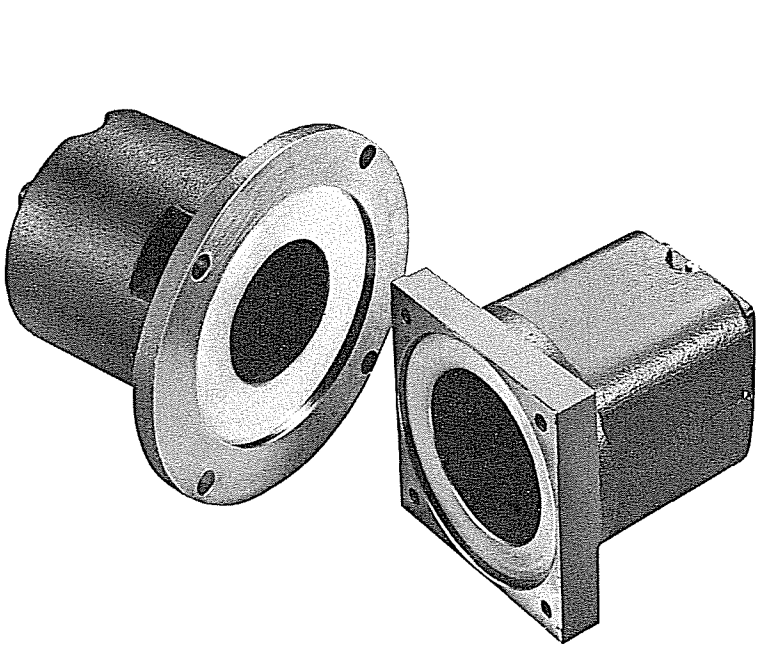
SQUARE BODY MOTOR ADAPTOR DIMENSION CAPABILITIES, INCHES (DIMENSIONS IN PARENTHESIS ARE MM).□ FOR ADDITIONAL DIMENSIONS SEE BASIC PRODUCT PAGES.

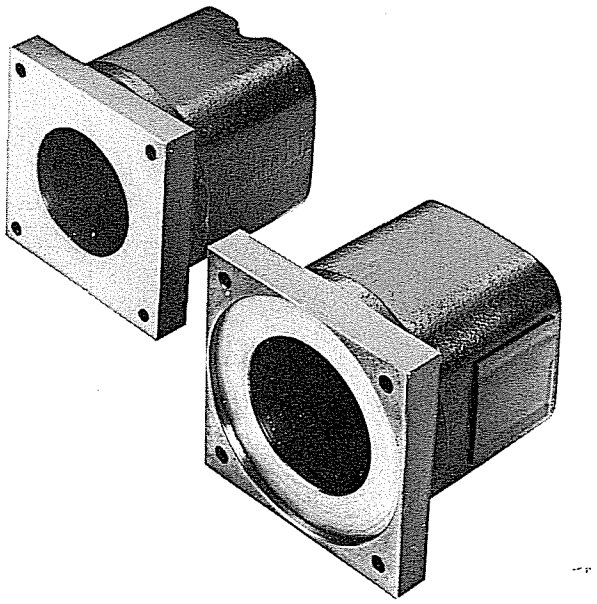
SIZE†	AB*	AC△	AK		BD°	BE+		M_1	M_2		M_3		SIZE
			MIN.	MAX.		MIN.	MAX.		MIN.	MAX.	MIN.	MAX.	
913	2.38	3.96	2.38 (60)	4.50 (115)	4.75 (120)	.38	.75	N/A	3.96	4.46	6.31	6.69	913
917	2.38	4.24	2.38 (60)	5.31 (135)	5.56 (140)	.38	.75	4.75	4.82	5.32	7.19	7.56	917
920	2.38	4.24	2.38 (60)	5.31 (135)	5.56 (140)	.38	.75	5.00	4.82	5.32	7.19	7.56	920
924	3.50	5.24	2.75 (70)	6.25 (160)	6.50 (165)	.38	.75	6.5	N/A	N/A	9.00	9.38	924
926	3.50	5.24	2.75 (70)	6.25 (160)	6.50 (165)	.38	.75	6.50	5.88	6.38	9.00	9.38	926
930	3.63	5.54	3.75 (95)	7.88 (200)	8.13 (205)	.38	.75	7.00	6.47	7.13	9.88	10.25	930
935	3.63	5.64	3.75 (95)	7.88 (200)	8.13 (205)	.38	.75	N/A	7.40	8.06	10.81	11.19	935

*Clearance diameter for coupling inside the adaptor. Coupling OD must also clear the register diameter (AK).
△For thru holes in adaptor, motor fastener head must clear this diameter.
°Square flange can be reduced to match motor. To convert from bolt circle diameter to horizontal or vertical distance between mounting holes, divide by 1.41.
+Allow adequate stock for register depth.
□Adaptor rings can be considered for motors outside this framework. Contact the factory with your requirements.
†Check product for size availability.

SERVO MOTOR FLANGE CAPABILITY

WINSMITH MOTION CONTROL products can be supplied with motor interfaces to accommodate most motors sold by the following servo and stepper motor suppliers. Check with the factory to find the availability of specific motor interface information for your motor supplier. If your motor supplier does not appear in the below list we will create the interface information at your request.



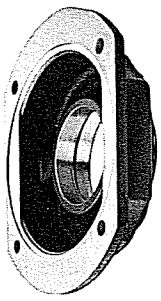


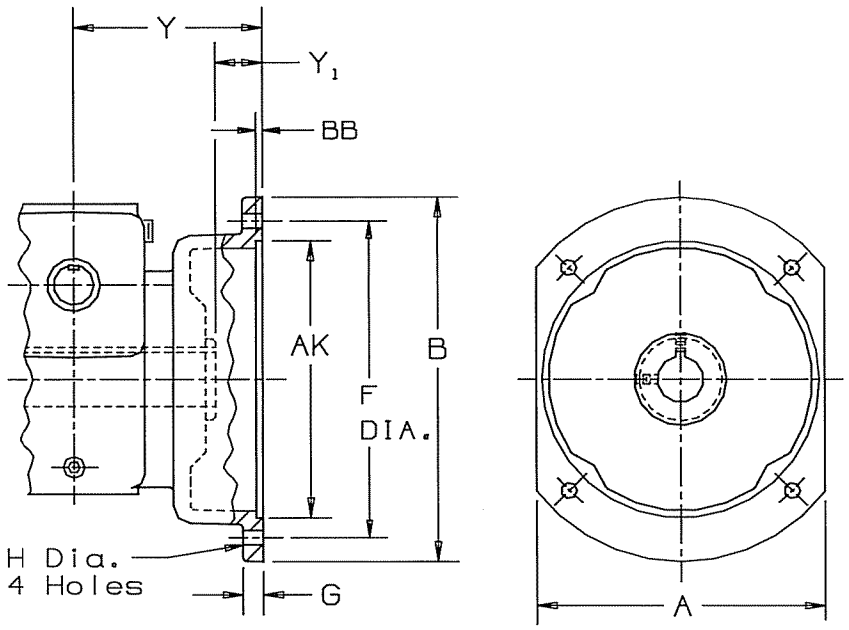
MOTOR SUPPLIERS

AEROTECH	FENNER	MODICON	PMI
ALLEN-BRADLEY	GE FANUC	MOOG	SERVO DYNAMICS
BALDOR	GETTYS	MFM	SIEMENS
BAUMULLER	GIDDINGS & LEWIS	MTS	SUPERIOR
CMC (CLEVELAND)	INDRAMAT	ORMEC	TOSHIBA
COMPUMOTOR	INDUSTRIAL DRIVES	ORIENTAL MOTOR	WHEDCO
CUSTOM SERVO MOTOR	INDUSTRIAL INDEXING	PACIFIC SCIENTIFIC	VICKERS
ELECTRO-CRAFT	INERTIAL MOTORS	PARVEX	YASKAWA
EMERSON	INFRANOR	PEERLESS	

SF FLANGE REGISTER OPTION

Applications requiring close position of the output shaft may require a register on the output side of a gearbox. The flange mounted hollow output shaft version of MOTION CONTROL products can have a register put in them to assist in the control of output shaft position. Below is a tabular drawing showing the flange register in the S-ELIMINATOR and S-MINIMIZER products. If this register is needed in a C-ELIMINATOR or C-MINIMIZER then contact your local WINSMITH representative or distributor.





SLOW SPEED COVER & FLANGE WITH REGISTER DIMENSIONS (IN INCHES)
FOR DIMENSIONS NOT SHOWN REFER TO THE APPROPRIATE DIMENSION PAGES.

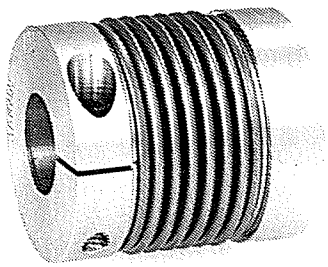
SIZE	A	B	F dia.	G	H	Y	Y_1	AK	BB
917	4.88*	6.75	5.875	.38	.344	3.50	.87	5.375/5.380	.075/.080
920	6.00	7.63	6.500	.38	.406	3.38	.50	5.750/5.755	.075/.080
924	7.38	8.63	7.500	.38	.406	3.50	.56	6.938/6.943	.075/.080
926	7.75	9.13	8.000	.38	.406	3.63	.63	7.370/7.375	.075/.080
930	8.00*	10.75	9.250	.50	.563	5.00	1.81	8.501/8.503	.178/.198
935	9.00*	11.00	10.000	.50	.563	5.00	1.44	9.250/9.255	.180/.200

*Register diameter (AK) is larger than the flange width (A).

KM/D SERIES GAM/JAKOB TORSION RESISTANT ZERO BACKLASH FLEXIBLE COUPLINGS

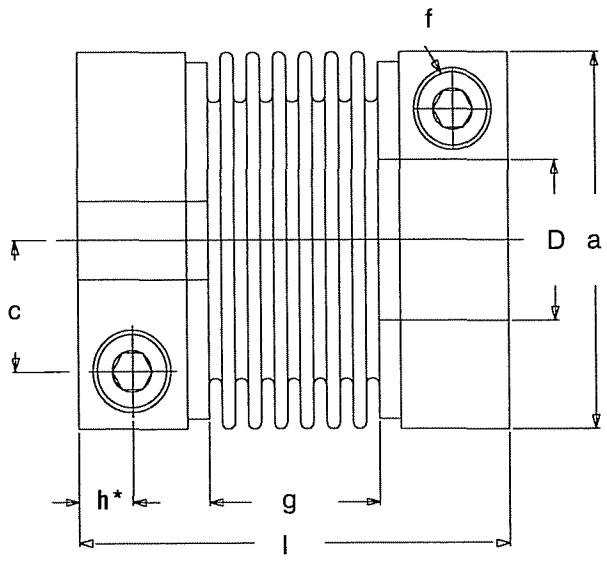
WINSMITH

Couplings of the KM Series feature a Stainless Steel Bellow with (6) corrugations for maximum flexibility. Tightening of only (1) screw per hub locks the coupling free of backlash to the shaft ends, making the coupling especially advantageous for space constrained or blind assembly applications. The clamping hubs allow for a maximum clearance of 0.0008 between shaft and hub bore.



STANDARD FEATURES

- High Torsional Stiffness
- Low Moment of Inertia
- Zero Backlash
- Compensation of Lateral, Axial and Angular Misalignments
- High Torque Transmission
- High Acceleration Capabilities
- Maintenance Free
- Frictional Shaft Hub Connection, No Keyways Required



TECHNICAL DATA

SIZE	NOMINAL TORQUE (LB.-IN.)	MOMENT OF INERTIA (LB.-IN.²)	TORSION RESISTANCE (LB.FT./deg.)	MAX. MISALIGNMENT		LATERAL SPRING RATE (LB.-IN.)	MASS (LBS.)	TORQUE SCREWS (LB.-IN.)
				LATERAL (INCH)	AXIAL (INCH)			
KM/D-20	177	0.48	257	0.008	0.031	1077	0.66	124
KM/D-30	266	0.95	335	0.008	0.039	997	1.10	266
KM/D-60	531	0.99	425	0.008	0.035	1493	1.10	266
KM/D-80	708	2.69	682	0.008	0.051	1619	1.80	443
KM/D-170	1505	2.83	811	0.008	0.047	2696	1.80	575

DIMENSIONS

SIZE	a	c	f	g	h*	l	D MIN.†	D MAX.
KM/D-20	2.205	0.75	M6	1.18	0.30	3.18	0.433	1.181
KM/D-30	2.598	0.87	M8	1.30	0.34	3.42	0.551	1.338
KM/D-60	2.598	0.87	M8	1.30	0.34	3.42	0.709	1.338
KM/D-80	3.228	1.12	M10	1.50	0.41	4.06	0.669	1.693
KM/D-170	3.228	1.12	M10	1.58	0.41	4.06	0.866	1.693

†D MIN dimensions, less than shown, are available but results in lower nominal torque capacity. Contact factory for specific values.

* CAUTION: Shaft engagement equal to two times h dimension is required.

F OPTIONS

HORSEPOWER AND TORQUE

One (1) Horsepower (HP)—33,000 foot pounds of work done in one (1) minute. Note that three (3) factors are involved:

Distance	—Feet
Force—(Push or Pull)	—Pounds
Time	—Minutes

Putting it another way, one (1) HP is equivalent to raising 33,000 pounds, one foot in one minute. Any amount of horsepower can be determined by the following formula:

$$HP = \frac{L \text{ (Load in pounds)} \times \text{Feet per minute}}{33{,}000}$$

To determine the relationship between horsepower and torque let

HP = Horsepower
T = Torque, in foot-pounds
t = Torque, in inch-pounds
N = R.P.M. (Revolutions per minute)

Then, one (1) HP = A Torque Load (Twisting force) of 63,025 inch pounds, turning 1 revolution in 1 minute.

therefore,

$$HP = \frac{t \times N}{63{,}025} \text{ or } \frac{T \times N}{5250}; \quad t = \frac{63{,}025 \times HP}{N} \text{ or } T = \frac{5250 \times HP}{N}$$

EFFICIENCY OF SPEED REDUCERS

The efficiency of a worm gear speed reducer is dependent on the lead angle of the worm, input speed to the unit, operating load, and the type and temperature of lubricant.

The efficiencies in this catalog have been determined in accordance with AGMA Standard 6034-A87 (formerly AGMA 440.03) and are based on rated output torque, an operating temperature reflecting continuous operation and synthetic lubricants. If the operating load is less than the rated torque or operating temperature is not reached (such as with intermittant service) the operating efficiency will be less than rated efficiency.

When the rated efficiency is not listed in the catalog, it may be easily calculated in the following manner:

$$\text{Efficiency} = \frac{\text{Horsepower Output}}{\text{Horsepower Input}}$$

In order to establish the efficiencies of reducers where only the output torque and input horsepower are given, the output torque is converted to output horsepower by the following formula:

$$\text{Horsepower Output} = \frac{\text{Output Torque} \times \text{RPM Output}}{63{,}025}$$

To determine efficiency of the unit, the horsepower output is divided by horsepower input as previously shown. The above method should be used to establish the efficiency of the various reducers listed in this catalog.

SELF-LOCKING SPEED REDUCERS

A worm gear is said to be self-locking or irreversible when the gear cannot drive the worm. This condition is obtained if the lead angle of the worm is less than the friction angle, and as a consequence the efficiency for reversed driving is zero. The friction angle for static conditions will vary with such factors as surface finish and lubrication. Based upon the generally accepted value of static coefficient of friction equal to 0.15, the friction angle would be approximately 8°. However, the friction angle decreases rapidly with the start of motion, also, vibrations from nearby sources quite often upset the static condition of a locked set of gearing a sufficient amount to reduce the friction angle to a point where motion occurs.

The opposite of self-locking is overdriving or backdriving. Here, the slow speed shaft is the driver and the high speed shaft is increased in speed. For this to occur, the lead angle must be greater than the friction angle. Statically, this is generally above 8 degrees. Because the friction angle decreases with motion, gearsets with lower lead angles that are in motion, will backdrive while slowing down. As the speed decreases, the friction angle will eventually drop below the lead angle and the gearset will become self-locking. Because the friction angle is dependent on many factors such as pressure angle, tooth size, material, and lubrication, it is not practical to calculate this angle as it varys with speed.

OVERHUNG LOAD

MAXIMUM ALLOWABLE OVERHUNG LOADS BASED UPON CHAIN PULL

The values given in this catalog are the maximum allowable Overhung Load (or Chain Pull) capacity in pounds and are based upon the load being applied at a point one shaft diameter from the housing or mounting flange. These values are limited by the capacity of the bearings or by the size of the shaft, whichever is less. In either case the allowable overhung load will decrease as the center of the load gets farther from the Reducer. Overhung loads are subject to the same service factors that control the capacity of the Reducer as well as the overhung load factors.

OVERHUNG LOAD FACTORS (From Table I):

With a chain drive the overhung load is equal to the torque divided by the radius of the sprocket. This is because there is practically no pull on the loose side of the chain.

If an overhung gear is used, the load is along the line of action and is greater than that computed from the torque and pitch radius. In this case AGMA recommend that we multiply the net overhung load derived from the torque and pitch radius of the gear by 1¼.

When an overhung "V" belt sheave is specified, there is a pull on the loose side of the belt. In this case the sum of the pull on the tight side and on the loose side is the overhung load. To allow for this loose side tension AGMA recommends that the net overhung load derived from the torque be multiplied by 1½.

A flat belt pulley requires a tension on the loose side to keep it tight. AGMA therefore recommends that the net overhung load derived from the torque be multiplied by 2½.

Variable speed drives with a flat faced pulley on the Reducer and used with a "V" belt derive their variability by changing the tension in the belt. In this case it is well to use a factor over 2½, possibly as much as 3½. These factors are expressed in table I.

TABLE I—OVERHUNG LOAD FACTORS

TYPE OF LOAD	MULTIPLY THE ACTUAL (CALCULATED) OHL BY
For Overhung Chain Sprocket	1
For Overhung Gear	1¼
For Overhung "V" Belt	1½
For Overhung Flat Belt	2½
For Overhung Variable Speed Drive	3½

OVERHUNG POSITION/DIRECTION LIMITATIONS

The overhung load capacities listed in this catalog may be used when the chain pull is directed toward the base or applied parallel to the base on the near side of the sprocket as shown in Figure 1. These illustrations demonstrate the ideal chain pull conditions and should be used whenever possible.

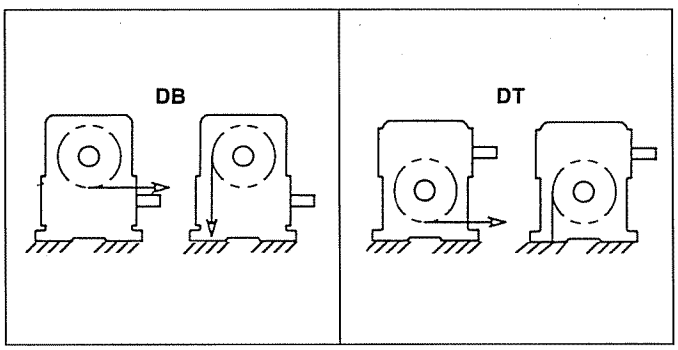


FIGURE 1

When the chain pull is directed away from the base or applied parallel to the base on the far side of the sprocket, as shown in Figure 2, it may be necessary to reduce the allowable overhung load capacity. Refer to the rating pages for each unit size, where a footnote will indicate the need for derating by size and model.

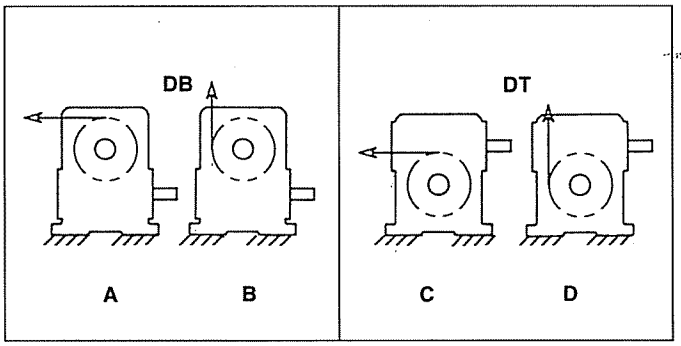


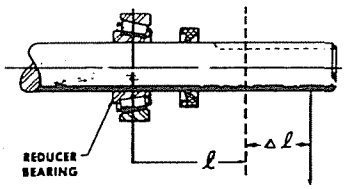
FIGURE 2

OVERHUNG LOAD

LOCATION OF OVERHUNG LOADS

In many cases, the center of the pulley, gear, or sprocket, which determines the location of the overhung load does not coincide with the reference position one shaft diameter from the housing or mounting flange. In this case, if the location of the overhung load is outside this position, then the allowable overhung load is determined by:

$$L_a = L_c \times \frac{\ell}{\ell + \triangle \ell}$$



Where

L_a = Allowable overhung load in pounds.
L_{act} = Actual overhung load in pounds.
L_c = Catalog rating of overhung load in pounds.
ℓ = A factor given in Table II (This is the actual distance from the center of the bearing to the reference location for the catalog OHL capacity).
$\triangle \ell$ = Distance from location of the actual overhung load to a point one shaft diameter from the housing or mounting flange.

TABLE II— VALUES OF "ℓ" FOR S-ELIMINATOR AND S-MINIMIZER SPEED REDUCERS

REDUCER SIZE	INPUT SHAFT	OUTPUT SHAFT		
	ALL MODELS	DB, DN, DNK DT, DTK DV, DVK (top ext.)	DV, DVK (bot. ext.)	DSN, DSNK DST, DSTK DSF, DSFK
913	1.45	1.91	2.22	N/A
917	1.58	2.05	2.11	3.38
920	1.58	2.05	2.11	3.59
924	2.03	2.38	2.67	4.13
926	2.38	2.38	2.67	4.28
930	2.08	2.60	2.85	5.65
935	2.98	3.31	3.85	5.23

EXAMPLE:

A 930DT reducer with a reduction of 25 to 1 is subjected to a torque of 1500 inch pounds on the slow speed shaft. The torque is transmitted through a chain sprocket of ¾ pitch 23 teeth. The centerline of the sprocket is 5.00 inches from the center of the reducer. The service is 24 hours per day, uniform load.

DATA:

Service Factor	= 1.25
Chain Overhung Load Factor	= 1.0
Radius of 23 Tooth ¾" Pitch Chain	= 5.508"/2 = 2.754
Catalog Overhung Load	= 1350
Catalog OHL Location From Center of Housing	= P − S + W
	= 5.88 − 2.80 + 1.375
	= 4.455
Actual OHL Location From Center of Housing	= 5.00
ℓ (from table II)	= 2.600
$\triangle \ell = 5.00 - 4.455$	= .545

$$\text{Design Overhung Load} = \frac{\text{Torque}}{\text{Radius}} \times \text{Service Factor} \times \text{OHL Factor} = \frac{1500}{2.754} \times 1.25 \times 1.00 = 680 \text{ pounds}$$

$$\text{Allowable Overhung Load} = La = Lc \frac{\ell}{\ell + \triangle \ell} = 1350 \frac{2.60}{2.60 + .545} = 1116 \text{ pounds}$$

Since the allowable OHL exceeds the design OHL, the unit can support the load.

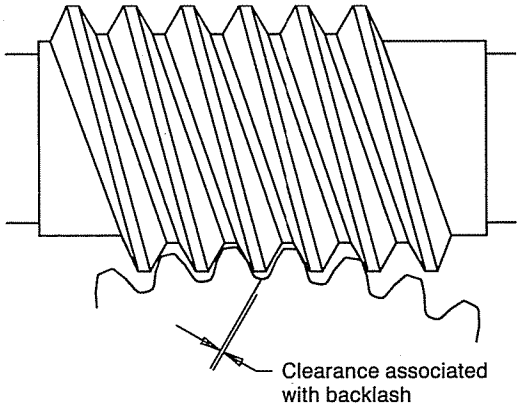
BACKLASH

Backlash is defined as the clearance between adjacent tooth flanks in a pair of mounted gears. In any gearset, some amount of backlash (clearance) is necessary to prevent damage brought about by gear tooth interference. Lack of backlash may cause noise, overloading, overheating of gears and bearings and even seizing and failure.

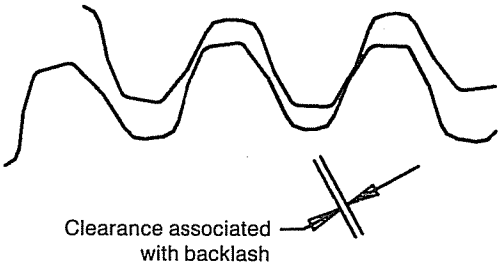
Backlash is measured by restricting the rotation of one member and measuring the rotational (arc) movement of the other component at some reference radius. WINSMITH® has historically used three inches as a reference radius, but any convenient distance is applicable, remembering that greater distances will result in more accurate measurements. Backlash is usually specified in arc degrees or arc minutes. Backlash measurement and conversion from arc movement to arc degrees/minutes/seconds is discussed in detail later in this article.

When measuring the backlash in spur or helical gears, the arc movement of either the pinion or gear can be measured. The result will be identical. When measuring the backlash in worm gear units, the arc movement of the slow speed shaft (gear) is measured while restricting the rotation of the input shaft (worm). It is not correct to measure the worm arc movement while restricting the gear rotation as this result will be much greater and is not indicative of tooth clearance (backlash). Axial clearances in the high speed worm bearings will add to the arc movement of the gear and "appear" to be backlash.

Worm Gear Sets



Helical Gear Sets



This clearance is minimal and for most applications, is of no consequence. However, when close blacklash is required, bearing endplay must be considered and reduced if necessary.

Backlash in a gearset can change during operation. Any wear that occurs will increase the space between the mating components and the resulting backlash. The majority of wear occurs during run-in when asparites are removed or in the case of wormgears, when the gear develops an operating surface consistent with the load. In spur and helical gearsets the wear is minimal especially if the components are hardened. With worm gearing this is more pronounced. As the precision level of the assembly increases, this change will be a greater percent of the initial backlash. For this reason, the S-ELIMINATOR and C-ELIMINATOR products were developed to enable future readjustments as needed.

Tolerance variations in the related components will affect backlash. These include housing center distance variations, gear geometry tolerances and bearing runout. These and other issues must be considered when establishing a design specification for backlash. Closer tolerances in the housing and gear geometry along with higher precision bearings combine to provide closer backlash control, enabling tighter backlash when needed but at a greater cost. Therefore, the maximum allowable backlash for the application should be specified.

Standard backlash (no special requirements) is suitable when units operate continuously in a single direction in the absence of load reversals (ie. when the torque changes direction causing separation and re-engagement of the tooth flanks).

Closer backlash is recommended for applications involving frequent starting and stopping, reverse rotation or where load reversals (explained above) are present. WINSMITH reduced (minimum) backlash specifications (11 arc minutes) have traditionally accommodated these applications. Here, high speed bearing endplay (axial movement) should be kept to a minimum to reduce the impact during stopping or load reversing. WINSMITH S-MINIMIZER or C-MINIMIZER products are recommended for reduced backlash requirements.

For those applications requiring near zero backlash for precise positioning or some other unique situation, special designs which allow for backlash adjustment are necessary. WINSMITH has developed two different designs to accommodate near zero backlash. The C-ELIMINATOR is an adjustable unit that can provide a maximum of 6 arc minutes backlash. If closer backlash is required, the S-ELIMINATOR is adjustable down to 2 arc minutes maximum. These products are discussed in detail in other sections of this catalog.

BACKLASH

BACKLASH MEASUREMENT AND CONVERSION OF TERMS:

Backlash specifications are generally provided in one of three terms: inches of arc movement, degrees or arc minutes. The difference being the unit of measure. Any of these terms can accurately define the backlash, but the choice of term is usually associated with a specific purpose.

Backlash in inches of arc movement is generally associated with the actual backlash measurement. It refers to the arc movement about the center of the subject shaft at some reference radius. There is a quasi-industry standard of three inches for the reference radius. Because the arc movement will vary with the reference radius it is more convenient to convert this measurement to degrees which is independent of the reference radius. And finally, when the level of precision is high, the backlash will often be stated in arc minutes. Below are formulas that can be used to convert from one term to another.

1. Backlash in degrees as measured from some reference radius:

$$\text{Backlash in degrees} = \frac{\text{Backlash in inches} \times 57.296}{\text{Reference Radius (inches)}}$$

2. Backlash in inches at a defined reference radius:

$$\text{Backlash in inches} = \frac{\text{Backlash in degrees} \times \text{Radius (inches)}}{57.296}$$

3. Backlash in arc minutes:

$$\text{Backlash in arc minutes} = \text{Backlash in degrees} \times 60$$

The integer value is the arc minutes. The arc seconds are obtained by multiplying the decimal remainder again by 60.

EXAMPLE:

.18 degrees x 60 = 10.8 arc minutes
.8 remainder x 60 = 48 arc seconds
so .18 degrees = 10 arc minutes and 48 arc seconds

BACKLASH LEVEL FOR WINSMITH® PRODUCTS

IN ARC MINUTES	IN DEGREES*	IN INCHES @ REFERENCE RADIUS			BACKLASH LEVEL FOR WINSMITH PRODUCTS
		3"	12"	48"	
1	.017°	.0009"	.0035"	.0140"	
2	.033°	.0017"	.0070"	.0279"	S-ELIMINATOR
3	.050°	.0026"	.0105"	.0419"	
4	.067°	.0035"	.0140"	.0558"	
5	.083°	.0044"	.0176"	.0704"	
6	.100°	.0052"	.0209"	.0837"	C-ELIMINATOR
7	.117°	.0061"	.0244"	.0977"	
8	.133°	.0070"	.0279"	.1117"	
9	.150°	.0079"	.0314"	.1256"	
10	.167°	.0087"	.0349"	.1396"	
11	.183°	.0096"	.0384"	.1535"	C-MINIMIZER S-MINIMIZER
12	.200°	.0105"	.0419"	.1675"	
13	.217°	.0113"	.0454"	.1814"	
14	.233°	.0122"	.0488"	.1954"	
15	.250°	.0131"	.0523"	.2094"	HELICAL PRIMARY D-90® TYPE SE®
16	.267°	.0140"	.0558"	.2233"	
17	.283°	.0148"	.0593"	.2373"	
18	.300°	.0157"	.0628"	.2512"	
19	.317°	.0166"	.0663"	.2652"	
20	.333°	.0174"	.0698"	.2791"	
21	.350°	.0183"	.0733"	.2931"	
22	.367°	.0192"	.0768"	.3070"	
23	.383°	.0200"	.0803"	.3210"	Std. C-Line
24	.400°	.0209"	.0837"	.3350"	
25	.417°	.0218"	.0872"	.3489"	
26	.433°	.0227"	.0907"	.3629"	
27	.450°	.0236"	.0942"	.3768"	
28	.467°	.0244"	.0977"	.3908"	
29	.483°	.0253"	.1012"	.4047"	Std. D-90® TYPE SE®
30	.500°	.0262"	.1047"	.4187"	

*To convert to radians, divide degrees by 57.3°.

The Figures below illustrate how backlash should be measured.

Figure 1 shows a fixed input shaft while observing the backlash at the output shaft. Figure 2 shows the positioning of the equipment when measuring the arc movement for determining backlash.

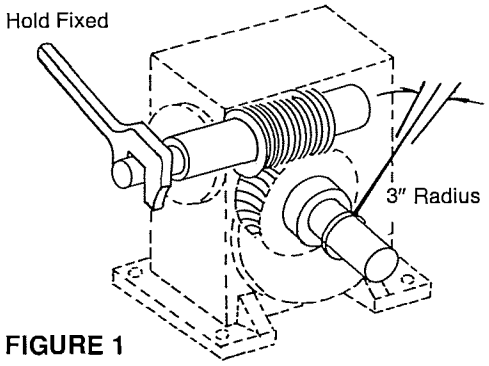


FIGURE 1

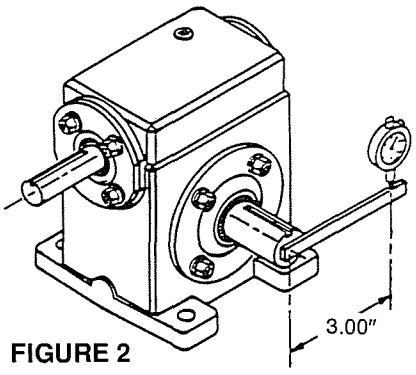


FIGURE 2

1. BACKDRIVING

Most servo motor applications include a rapid acceleration and rapid deceleration during the load cycle. Accelerating a worm drive is no different than accelerating any other type of gear drive. The motor must provide enough torque to overcome the system inertia including the motor and geardrive rotating components, while increasing speed at the desired rate. However, when decelerating, a worm drive may act differently than other drives depending on the driven load inertia and the worm gear geometry.

When the driven load inertia is very low, the servo motor must apply enough opposing torque (reverse torque) to decelerate only the rotating components of the geardrive and motor, at the desired rate. Here the type of gearing has virtually no effect on the application.

When the driven load inertia increases, the servo motor must apply additional reverse torque to decelerate the mass. During deceleration the mass will resist any change in velocity and attempt to drive back through the geardrive. This is where the worm gear geometry becomes a factor. Worm gears will coast as speed decreases until they reach a point where the dynamic friction angle is too low for backdriving. (This is explained in more detail in the Engineering Section under "SELF LOCKING SPEED REDUCERS".) This critical speed is ratio dependent where the lowest ratios achieve the lowest coasting speeds before stopping. During deceleration, if the system stops prematurely, the servo motor may be required to again drive the load to reach the desired position. The infinite combinations of lead angle and inertial effects make it impractical to predict performance and may require some adjustment in the servo motor controls to obtain the optimum deceleration conditions.

2. BACKLASH PRECISION AND GEAR WEAR

When a geared product is used for motion control or positioning, the application is usually sensitive to the level of backlash in the geardrive. Generally, geardrives will have two or three levels of backlash depending on their design. The first level is the original backlash as supplied from the factory where values are well documented in product literature. The second level of backlash stabilizes after the run-in period. This time frame and wear rate in motion control products is very difficult to predict because of the variations in run time and operating loads, but it does occur early in the product life cycle. The third level of backlash, the adjusted level, is available only in a few products designed to accommodate field adjustment. This adjusted level is equivalent to or even below the original backlash level as shipped from the factory.

The type of gearing will have a significant affect on the amount of change in backlash during the run-in period. Helical, spur and bevel gear products generally use hardened steel gears which operate with rolling contact. This combination yields a negligible change in backlash during run-in. Worm gear products operate with sliding contact between a steel worm and a softer bronze gear. This combination will introduce corrective wear until the meshing surfaces stabilize based on the operating load. Tests have shown that following the run-in period further wear becomes negligible.

The adjustable backlash products from WINSMITH® allow the user to maintain lower than original backlash over the life of the product. These adjustable products also will deliver a smoother motion as the product is used and adjusted. Testing indicates that after run in and before adjustment, the S-ELIMINATOR's total measurable backlash is equivalent to the specified backlash in many other precision backlash products.

3. THERMAL CONDITIONS

Enclosed gear drives typically fall into two categories, those designed for general use such as catalog products and those designed for a specific purpose or function such as motion or position control. General use products must operate satisfactorily under varying conditions of load, speed and duration and must be designed to accommodate the extremes of each. This naturally results in gear drives that are larger than those designed for a specific purpose.

Many motion control applications include a rapid acceleration and deceleration followed by a dwell period in each cycle. Historically, this type of application does not involve enough incremental run time to develop significant heat in the gear drive. Enclosed gear drives designed for this type of service will maximize specific components as needed, but will generally be smaller than an equivalent general industrial unit. As motion control applications become more sophisticated and more demanding, the total operating time will increase, requiring more attention to unit thermal capacities. Heat radiation is a function of housing area making smaller gear drives more susceptible to thermal limitations.

WINSMITH® MOTION CONTROL products evolved from our general industrial catalog products. Their larger housings provide adequate surface area for heat radiation. On the other hand, many products created specifically for motion control applications may not address the thermal issue. When selecting products, thermal capacity must be included in the selection criteria to insure proper long term operation. This will become more important as traditional industrial applications are being converted to motion control applications.

USEFUL FORMULAS

REQUIRED	GIVEN	FORMULAS
Velocity or belt speed (V) in FPM	Pitch Diameter of pulley in inches & RPM of shaft	$V = .262 \times P.D. \times RPM$
RPM	Belt speed or Velocity (FPM) P.D. of pulley in inches	$RPM = \frac{V}{.262 \times P.D.}$
P.D. of pulley in inches	Belt speed or Velocity (V) in FPM RPM of shaft	$P.D. = \frac{V}{.262 \times RPM}$
Horsepower (HP)	Force (F) in lbs. Belt speed or Velocity (V) in FPM	$HP = \frac{F \times V}{33{,}000}$
Horsepower (HP)	Torque (T) in inch-lbs. RPM of shaft	$HP = \frac{T \times RPM}{63{,}025}$
Torque (T) in inch-lbs.	Force (F) in lbs. Pulley radius (R) in inches	$T = F \times R$
Torque (T) in inch-lbs.	Horsepower (HP) RPM of shaft	$T = \frac{63{,}025 \times HP}{RPM}$
Torque (T) in ft.-lbs.	Horsepower (HP) RPM of shaft	$T = \frac{5{,}252 \times HP}{RPM}$
Force (F) in lbs.	Horsepower (HP) Belt speed or Velocity (V) in FPM	$F = \frac{33{,}000 \times HP}{V}$
RPM of shaft	Horsepower (HP) Torque (T) in inch-lbs.	$RPM = \frac{63{,}025 \times HP}{T}$
Effective Tension (Te) in lbs.	Torque (T) P.D. of pulley in inches	$Te = \frac{2 \times T}{P.D.}$
Torque (T) in foot-lbs. due to inertia	Inertia (WR^2) in lb-ft.^{2} Initial RPM_1 Final RPM_2 Time in seconds (t)	$T = \frac{(WR^2) \times (RPM_2 - RPM_1)}{307.6 \times t}$
Inertia (J_S) System including Motor and Gear Drive	Motor Inertia (J_M) Ratio of Gear Drive (M_G) Load Inertia (J_L) Gear Drive Inertia (J_G) Related to Input Coupling Inertia (J_C)	$J_S = J_C + J_M + J_G + \frac{1}{M_G^2} J_L$
Inertia Matching	Above	$J_M : J_C + J_G + \frac{1}{M_G^2} J_L$

CONVERSION TABLES

LENGTH/DISTANCE

(To convert from A to B, multiply by entry in table.)

A \ B	in	ft	mm	cm	m
in	1	0.0833	25.4	2.54	0.0254
ft	12	1	304.8	30.48	0.3048
mm	0.03937	0.00328	1	0.1	0.001
cm	0.3937	0.03281	10	1	0.01
m	39.37	3.281	1000	100	1

MASS

(To convert from A to B, multiply by entry in table.)

A \ B	gm	kg	slug	lb(m)	oz(m)
gm	1	.001	6.852×10^{-5}	2.205×10^{-3}	.03527
kg	1000	1	6.852×10^{-2}	2.205	35.274
slug	14590	14.59	1	32.2	514.72
lb(m)	453.6	.45359	.0311	1	16
oz(m)	28.35	.02835	1.94×10^{-3}	.0625	1

FORCE

(To convert from A to B, multiply by entry in table.)

A \ B	lb(f)	N	oz(f)	kg(f)	gm(f)
lb(f)	1	4.4482	16	.45359	453.6
N	.22481	1	3.5967	.10197	—
oz(f)	.0625	.27801	1	.02835	28.35
kg(f)	2.205	9.80665	35.274	1	1000
gm(f)	2.205×10^{-3}	—	.03527	.001	1

Note: lb(f) = 1 slug x 1 ft/s² N = 1 kg x 1 m/s²

MATERIAL DENSITIES

	oz/in³	lb/in³	gm/cm³
Aluminum	1.57	.098	2.72
Brass	4.96	.31	8.6
Bronze	4.72	.295	8.17
Copper	5.15	.322	8.91
Plastic	.64	.04	1.11
Steel	4.48	.28	7.75
Hard Wood	.46	.029	.8
Soft Wood	.28	.018	.48

TEMPERATURE

$F = (1.8 \times C) + 32$

$C = .555 (F - 32)$

GRAVITY

(Acceleration Constant)

$$G = \frac{386.1 \text{ in}}{s^2} = \frac{32.17 \text{ ft}}{s^2} = \frac{9.806 \text{ m}}{s^2}$$

ABBREVIATED TERMS

C	= Celsius	kg(f)	= kilogram force
cm	= centimeter	lb(f)	= pound force
F	= Fahrenheit	lb(m)	= pound mass
ft	= foot	mm	= milimeter
gm	= gram	m	= meter
gm(f)	= gram force	N	= Newton
in	= inch	oz(f)	= ounce force
kg	= kilogram	oz(m)	= ounce mass

TORQUE

(To convert from A to B, multiply by entry in table.)

A \ B	gm-cm	oz-in	kg-cm	lb-in	N-m	lb-ft	kg-m
gm-cm	1	1.388×10^{-2}	10^{-3}	8.679×10^{-4}	9.806×10^{-5}	7.233×10^{-5}	10^{-5}
oz-in	72.007	1	7.200×10^{-2}	6.25×10^{-2}	7.061×10^{-3}	5.208×10^{-3}	7.200×10^{-4}
kg-cm	1000	13.877	1	.8679	9.806×10^{-2}	7.233×10^{-2}	10^{-2}
lb-in	1.152×10^{3}	16	1.152	1	.113	8.333×10^{-2}	1.152×10^{-2}
N-m	1.019×10^{4}	141.612	10.197	8.850	1	.737	.102
lb-ft	1.382×10^{4}	192	13.825	12	1.356	1	.138
kg-m	10^{5}	1.388×10^{3}	100	86.796	9.806	7.233	1

INERTIA (ROTARY)

(To convert from A to B, multiply by entry in table.)

A \ B	gm-cm²	oz-in²	gm-cm-s²	kg-cm²	lb-in²	oz-in-s²	lb-ft²	kg-cm-s²	lb-in-s²	lb-ft-s² or slug-ft-s²
gm-cm²	1	5.46×10^{-3}	1.02×10^{-3}	10^{-3}	3.417×10^{-4}	1.41×10^{-5}	2.37×10^{-6}	1.02×10^{-6}	8.85×10^{-7}	7.38×10^{-8}
oz-in²	182.9	1	.187	.183	.0625	2.59×10^{-3}	4.34×10^{-4}	1.86×10^{-4}	1.61×10^{-4}	1.35×10^{-5}
gm-cm-s²	980.6	5.361	1	.981	.335	1.39×10^{-2}	2.33×10^{-3}	10^{-3}	8.68×10^{-4}	7.23×10^{-5}
kg-cm²	1000	5.467	1.019	1	.342	1.42×10^{-2}	2.37×10^{-3}	1.02×10^{-3}	8.85×10^{-4}	7.38×10^{-5}
lb-in²	2.92×10^{3}	16	2.984	2.925	1	4.14×10^{-2}	6.94×10^{-3}	2.98×10^{-3}	2.59×10^{-3}	2.15×10^{-4}
oz-in-s²	7.06×10^{4}	386.1	72.0	70.62	24.13	1	.168	7.20×10^{-2}	6.25×10^{-2}	5.21×10^{-3}
lb-ft²	4.21×10^{5}	2304	429.4	421.3	144	5.963	1	.430	.373	3.10×10^{-2}
kg-cm-s²	9.81×10^{5}	5.36×10^{3}	1000	980.6	335.1	13.887	2.327	1	.868	7.23×10^{-2}
lb-in-s²	1.129×10^{6}	6.18×10^{3}	1.152×10^{3}	1.13×10^{3}	386.1	16	2.681	1.152	1	8.33×10^{-2}
lb-ft-s² or slug-ft²	1.355×10^{7}	7.42×10^{4}	1.38×10^{4}	1.35×10^{4}	4.64×10^{3}	192	32.17	13.823	12	1

TERMS AND CONDITIONS OF SALE

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WINSMITH DISTRICT OFFICES

ALABAMA
See Georgia

CALIFORNIA
Los Angeles (Buena Park)
▪ **Service Center**
714/739-6950
FAX 714/739-5112
San Francisco
(Brentwood)
925/634-2818
FAX 925/634-4314

COLORADO
Lakewood
303/205-1922
FAX 303/205-1477

FLORIDA
Clermont
352/243-7517
FAX 352/243-3518

GEORGIA
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FAX 770/772-7277

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Chicago (Downers Grove)
▪ **Service Center**
630/629-3434
FAX 630/629-1010

INDIANA
See Cincinnati, OH

KANSAS
Kansas City
816/524-2010
FAX 816/524-2944

KENTUCKY
See Cincinnati, OH

MASSACHUSETTS
See Rhode Island

MICHIGAN
Detroit
313/885-3103
FAX 313/885-3285

MINNESOTA
Plymouth
612/559-1021
FAX 612/559-6552

MISSOURI
Kansas City
816/524-2010
FAX 816/524-2944
St. Louis
636/477-9669
FAX 636/936-1567

NEW JERSEY
See Philadelphia, PA

NEW YORK
Springville (Factory)
Peerless-Winsmith
716/592-9310
FAX 716/592-9546

NEW YORK (cont.)
New York City
See Philadelphia, PA

NORTH CAROLINA
See Georgia

OHIO
Cleveland (Wickliffe)
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FAX 440/585-2122
Cincinnati
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FAX 513/791-4717

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OREGON
Portland
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FAX 503/227-5413

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Harrisburg/Philadelphia
Sales Office
315/684-3553
FAX 315/684-3562
Western PA
Sales Office
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FAX 716/751-4051

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Warwick
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FAX 401/732-4583

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TENNESSEE
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FAX 877/867-5386

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See Colorado

VIRGINIA
Vinton
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FAX 540/890-7855

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Cedarburg
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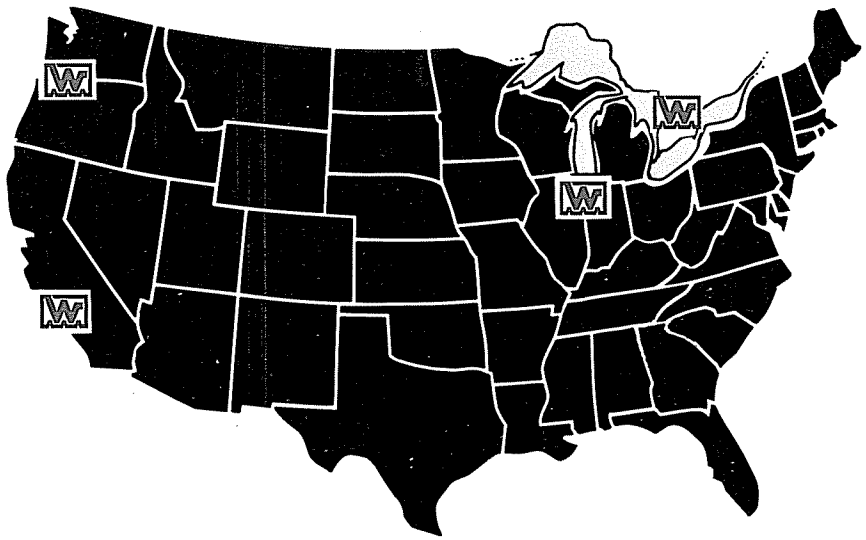
FAX 262/375-4175

BRITISH COLUMBIA
See Springville, NY

ONTARIO
Toronto (Mississauga)
▪ **Service Center**
905/828-1222
FAX 905/828-1225

WINSMITH SERVICE CENTERS

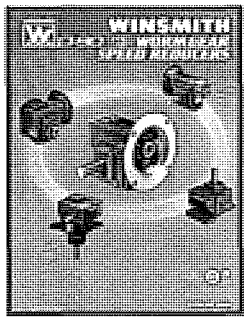
WINSMITH®'s Regional Service Centers, shown on the map, can provide prompt solutions to your unique delivery requirements. Each Service Center is fully stocked with the necessary components and assemblies to provide a wide variety of finished units with the same high quality that you expect from WINSMITH's manufacturing plants.

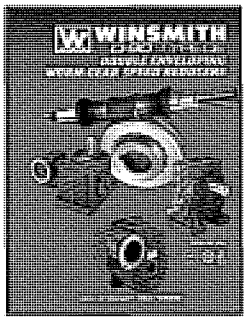


2/02

D-90® TYPE SE®

The D-90 TYPE SE is the latest version of WINSMITH®'s world class single enveloping worm gear reducers. It encompasses our high efficiency gearing with improved flexibility plus many special features and new offerings to provide the most complete selection of worm gear products, ever, from WINSMITH. Available in single and double reduction in all models and now available in a 4.25" center distance unit. Ratios from 4:1 to 10,000:1 and with output torques up to 10,700 inch pounds.
Request Catalog 290



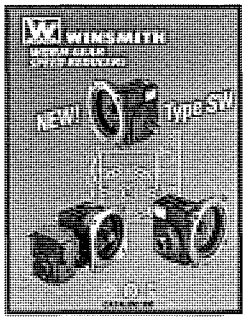


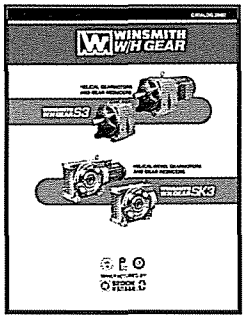
D-90® TYPE DE®

The D-90 TYPE DE uses double enveloping worm gearing thus combining high load capacity with high efficiency to achieve more torque per pound. Available in single and double reductions, it has a combined ratio range from 5:1 to 10,000:1 and output torques up to 93,000 in. lbs.
Request Catalog 190

TYPE SW

The WINSMITH Type SW gear reducer is designed for maximum torque in the smallest possible package. Its compact design results in the "size wise" use of available space in machine design applications. It is available in seven center distance sizes from 1.33" to 3.75", and in single and double reduction ratios, from 5:1 to 3600:1. Eight popular models are cataloged, with output torques up to 6500"#.
Request Catalog 300





W/H GEAR

The W/H Gear Series is available in helical inline units and in a helical-bevel right angle design. The concentric inline units come in 10 sizes with a ratio range from 1.6:1 to 1250:1 with output torques up to 140,000 in. lbs. The helical-bevel right angle units (solid or hollow output shafts) are available in ratios from 12.5:1 to 1250:1 in six (6) sizes with a maximum torque of 49,000 in. lbs. Catalog features selection tables, ratings, and dimensions on both versions of the W/H Gear Series products.
Request Catalog 200

C-LINE

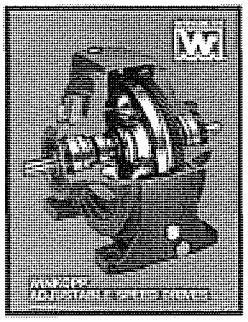
WINSMITH's C-Line worm gear reducer has set the industry standard in versatility, reliability and performance. Single, double and triple reduction units with ratios as high as 180,000:1 and torque ratings up to 65,000 inch pounds.
Request Catalog 100

PLANETARY

WINSMITH planetary reducers combine high load capacity, smooth quiet operation and long operating life in a very compact package. Offers any ratio of reduction from 1.1:1 up to 50,000:1 as standard in a single stage and housing.
Request Catalog 110

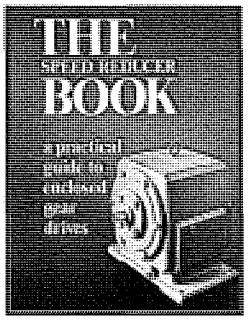
WINKOPP®

A highly efficient and compact mechanical adjustable speed drive. The WINKOPP ball-type traction drive offers frequent, precise and repeatable speed changes by manual or automatic methods. Wide speed ranges at input HP ratings from 0.17 HP to 16.85 HP at speeds from 600-1800 RPM.
Request Catalog 323



THE BOOK

"The Speed Reducer Book" is a practical guide to enclosed gear drives. It covers the history, application, installation and maintenance of all popular types of enclosed gear drives used in industry. Includes guidance in selection, analysis, and trouble shooting.
Request "The Book"



FOR ADDITIONAL INFORMATION ON THESE AND OTHER WINSMITH PRODUCTS
CALL: 716/592-9310 • FAX 716/592-9546
OR WRITE 172 EATON STREET, SPRINGVILLE, NY 14141-1197

WINSMITH®

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PEERLESS-WINSMITH, INC. ISO 9001 CERTIFIED

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http://www.winsmith.com e-mail=winsmith@winsmith.com

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