



D-90 Type SE S-Equalizer



Installation, Operation and Lubrication Instructions

FOR UNITS LUBRICATED WITH **Mobil**® GLYGOYLE 460



D-90 Type SE S-Equalizer
Unique, Powerful Performance



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I. INSTALLATION

1. Shaft Alignment and Loading

- A. Guard against unusual stresses and overloads by accurately aligning the various drive members (motor, speed reducer, coupling, sprocket, sheave, gear, etc.).
- B. Flexible couplings are recommended if a prime mover shaft is to be directly connected to the input shaft or if the output shaft is directly connected to the driven shaft.
Note: Flexible couplings have a limited capacity for misalignment. Ensure that shaft alignments are within the limits recommended by the coupling manufacturer at installation. Even slight misalignments in a rigid mounting system may bring about binding, large vibration forces, or excessive overhung loading; each in itself promoting premature bearing, shaft, or speed reducer failure. Do not excessively force couplings or other connection devices onto either input or output shafts; the result may be permanent bearing damage. Ensure all shaft keys are captive and secured before operation.
- C. A common base plate supporting the motor and reducer will help preserve the original alignment between the reducer and the motor shaft. If a structural steel base is used, the plate should be at least equal in thickness to the diameter of the base plated fastening bolts. In addition, the structure supporting the base plate must be sufficiently rigid that it prevents excessive flexing during normal operation.
- D. Vibration tends to loosen fasteners even if they are initially tight. After the first week or two of operation, all fasteners within the drive assembly should be retightened. Doweling the motor and speed reducer to the base plate will help maintain alignment.
- E. Excessive thrust or overhung loads on the input or output shafts of a gear reducer may cause premature failures of the bearings and/or shafts. Mount gears, pulleys and sprockets as close to the housing as possible to minimize such loads. Do not exceed catalog loads.

2. Mounting Positions

The oil volume in S-EQUALIZER reducers is somewhat greater than that of standard reducers, existing level plug locations are not applicable.

3. C Face Motor Mounting Procedures

A. C Face/Quill Motor Mounting

- 1. Check the motor and reducer mounting registers for nicks that could interfere with assembly; remove if necessary.
- 2. Remove protective plastic from the reducer input shaft. The bore has been coated with an anti-seize compound.
- 3. Align the motor shaft and key with keyway in bore and slide motor up input adaptor.
- 4. Position the motor conduit box as desired.
- 5. Secure the motor to the reducer using the supplied fasteners. Ensure proper motor seating before tightening the fasteners. If the motor does not readily seat itself, check for axial movement of the motor shaft key as this can cause interference. Staking the keyway adjacent to the motor key will help prevent axial movement of the key during the mounting procedure. Draw down evenly on the fasteners to avoid bending the motor shaft and tighten to 200 lbf-in maximum.

B. C Face Coupling Motor Mounting

- 1. Check the motor and reducer mounting registers for nicks that could interfere with assembly. Remove if necessary.
- 2. When assembling the motor and coupling, the coupling halves should be evenly spaced.

4. Speed Reducer Assembly/Disassembly Instructions

Contact Winsmith for detailed assembly/disassembly instructions.

II. LUBRICATION & MAINTENANCE

1. Factory Filling & Oil Type

WINSMITH S-EQUALIZER reducers are factory filled with the proper amount of Mobil Glygoyle 460 (PAG) lubricant. The use of other lubricants may result in substantially lower torque capacity and is not recommended by Winsmith. If other lubricants are used, a thorough flushing procedure is required.



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2. Ambient Temperature

If the ambient temperature during operation is outside of -18 to 130 degrees F, please contact Winsmith.

3. Initial Start-Up

During the initial start-up operation, a break-in period is necessary before the reducer reaches maximum operating efficiency. Winsmith recommends a gradual application of load during the first several hours after start-up. The reducer may run hot during this initial break-in period. This is normal.

4. Oil Change Instructions

When changing the oil for any reason, use only Mobil Glygoyle 460 or other compatible PAG (Polyalkylene glycol) synthetic lubricants. If another oil type is used (PAO, Mineral Oil, etc.), the housing(s) must be drained and thoroughly flushed with a light flushing oil prior to refilling. Do not mix different lubricants in the reducer. Lubricant incompatibility may result in premature failure. **Note:** When changing oil, carefully inspect used oil to be sure there are no metal shavings, fragments and other signs of excessive wear.

The oil level should be checked after a short period of operation and adjusted if necessary. Each housing of a double reduction model should be drained and filled independently when changing the oil. Visit our website, www.WINSMITH.com, for a detailed flushing procedure.

In many light duty, relatively clean ambient conditions, the life of Mobil Glygoyle 460 is extended to the point where a reducer can operate for the AGMA and ISO specified "Normal" reducer life of 25,000 hours without ever changing the lubricant.

Note: The "Normal" reducer life of 25,000 hours specified in AGMA 6034-B92 and ISO TR14521 is highly application dependent. In Winsmith's 100 years of experience, we have found that the actual service life of many of our reducers exceeds 25,000 hours by several multiples.

Under severe conditions (rapid temperature changes, moist, dirty, or corrosive environments) it may be necessary to change the oil at intervals of 1-3 months. Periodic examination of oil samples taken from the reducer will help establish the appropriate interval.

5. Low Input Speeds (Under 1160 RPM)

When input speeds are less than 1160 RPM, grease fittings will be required to lubricate any bearings not partially covered by the normal oil level. If a low speed operating condition exists and the reducers are without the appropriate grease fittings, please contact Winsmith.

6. Oil Temperature

Speed reducers in normal operation can generate temperatures of up to 212 degrees F depending on the type of the reducer and the severity of the application (loading, duration of service, ambient temperatures). Excessive oil temperatures may be the result of one or more of the following factors:

A. Overloads

Overloads may be due to the original model being too small for the application. Overloads can also occur if the speed reducer is properly sized for the application and higher than anticipated loads are experienced. Always check the reducer rating when increasing driven loads or when increasing the horsepower rating of the motor or other prime mover.

Replace damaged components, reassemble the reducer, and fill with lubricant to the appropriate level fill hole.

B. Inadequate Cooling

In order to dissipate internally generated heat, the speed reducer must be installed in such a way that air can circulate freely. Tightly confined areas, (inside cabinets, etc.) should be avoided. If this is not possible, use a separate blower to provide forced air cooling.

7. Oil Seals and Wear Components

Various normal wear components such as oil seals, bearings and gears may need more frequent replacement in severe applications.

Reducer shaft lip seals are all subject to wear. Experience indicates that their useful life is extremely variable, and based primarily on the operating temperature. Other operating factors that influence seal life are high input shaft speeds and environmental factors such as air-borne abrasive particulates. Inspecting the reducer regularly and replacing the shaft seals at the first sign that they are beyond their useful life is the





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only method of ensuring no lubricant leakage. This might be as frequently as 2 years or less in some applications; in others it can be as long as 10 years or more.

Winsmith uses high quality oil seals and precision ground shafts. However, it is possible that damage during shipment or installation can cause oil seal leakage. When replacing a shaft oil seal, the following suggestions will help ensure leak free operation and long seal life:

- A. When installing a new seal, cover the keyway and any other shaft surface discontinuities with smooth tape to protect the seal lip from being damaged.

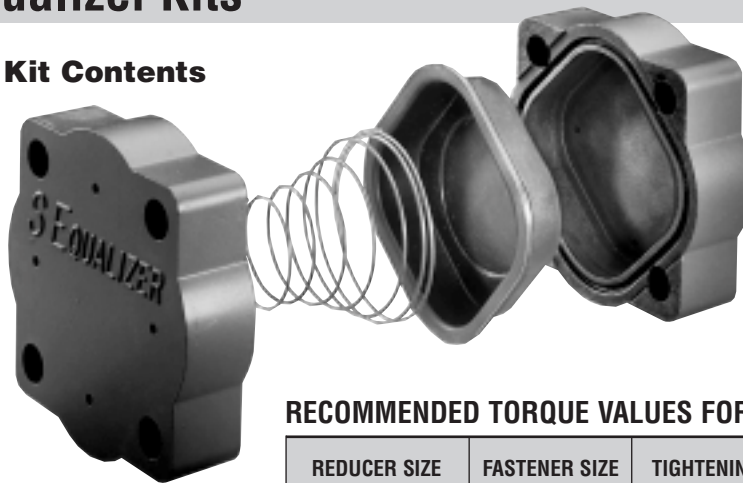
- B. Use a sealant between the OD of the seal and the ID of the bore into which the seal is being installed. The seal bore should also be free of any burrs, nicks, or scratches.
- C. Be sure that the seal is not cocked in the seal bore. The outer face of the seal should be flush with the outer surface of the reducer.

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D-90 Type SE S-Equalizer Kits

D-90 Type SE S-Equalizer Kit Contents

- (2) Expansion Chamber Housings
- (4) Lockwashers
- (4) Mounting Fasteners
- (1) Spring
- (1) Diaphragm
- (1) Gasket Set
- (1) Housing Spacer
- (1) Solid Pipe Plug
- (1) Synthetic Oil
- (1) Assembly Drawing
- (1) Tube Fastener Adhesive



Installation Procedures

- 1 Remove the high speed cap opposite the motor flange or input shaft extension.
- 2 Tip the reducer up to prevent oil spillage.
- 3 Completely remove all gasket material from the housing surface, being careful to keep the bearing cavity clean.
- 4 Temporarily assemble the two housings and spacer to the reducer by applying a very light torque on all fasteners.
- 5 Establish the required thickness of gaskets for proper bearing adjustment by measuring the clearance between the housing and chamber using feeler gauges and add about 30% to allow for gasket compression.
- 6 Reassemble all components including the diaphragm and spring using the lock washer and fastener adhesive provided (see assembly drawing on page 5).
- 7 When tightening the fasteners, use the recommended torque values from table (to right).
- 8 Recheck endplay by applying a torque to the output shaft and feel the axial movement of the worm.

RECOMMENDED TORQUE VALUES FOR FASTENERS

REDUCER SIZE	FASTENER SIZE	TIGHTENING TORQUE (lbf-in)
913	1/4-20	108
917-920	5/16-18	216
924-930	3/8-16	372
935-943	3/8-16	372

Reducers with ball bearings can have near zero endplay. Reducers with tapered roller bearings (935 and larger) should have 0.002 to 0.004 inch endplay. Readjust by adding or removing gaskets as necessary.

- 9 Add the proper amount of synthetic oil by referring to the oil volume chart below. If the original reducer does not have synthetic oil (standard for S-EQUALIZER reducers), the entire reducer must be drained and flushed.
- 10 Re-plug the fill hole.
- 11 DO NOT VENT THE REDUCER. This will defeat the purpose of the S-EQUALIZER feature.
- 12 Review all installation bulletins for operating and maintenance instructions.

NOTE: Some equalizers are one piece with a cover and others are two piece housings.



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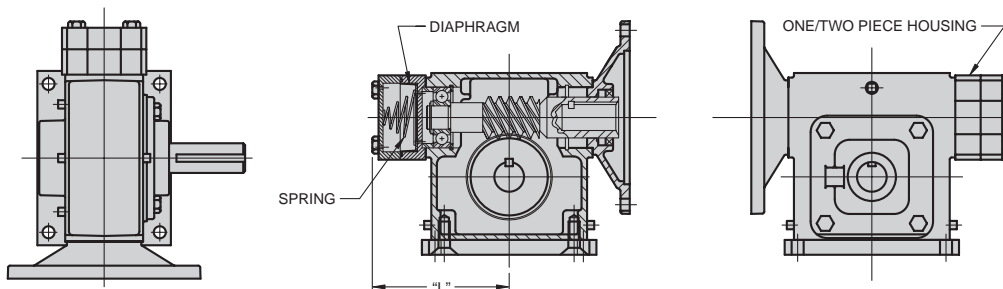


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D-90 Type SE S-Equalizer Kits

ONE/TWO PIECE HOUSING



HIGH SPEED CAP EXTENSION "L" DIMENSION

	913	917	920	924	926	930	935	943
Solid Input "D"	4.11	4.77	4.77	6.50	6.50	6.85	7.14	8.00
Quill Input "MD"	4.11	4.77	4.77	6.50	6.50	6.85	7.91	8.72

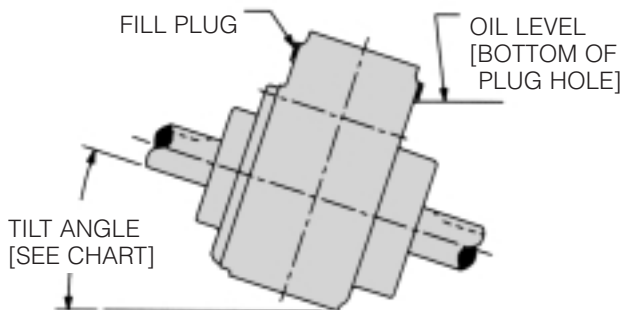
FOR SHC634 LUBE

UNIT	KIT#
913	EK9838035
917/920D/MD	EK9838036
924D/MD	EK9838037
926D/MD	EK9838037
930D/MD	EK9838038
935D	EK9838039
935MD	EK9838040
943D	EK9838041
943MD	EK9838042

FOR PAG460 LUBE

UNIT	KIT#
913	EKE838035
917/920D/MD	EKE838036
924D/MD	EKE838047
926D/MD	EKE838037
930D/MD	EKE838038
935D	EKE838039
935MD	EKE838040
943D	EKE838041
943MD	EKE838042

Correct oil volume can also be established by tipping unit and filling to oil level as shown



OIL VOLUME (FOR REFERENCE ONLY)

SIZE	913	917	920	924	926	930	935	943
Oil Volume (Milliliters)	270	560	620	1180	1450	1770	2575	3540
Oil Volume (Fluid Ounces)	9.13	18.9	21.0	39.9	49.0	59.8	85.3	119.6
Tilt Angle	0	0	0	18	18	37	30	18



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Warnings And Cautions



WARNING

Warnings

Winsmith products, and associated equipment and machinery, are intended for selection and use by trained and skilled persons capable of determining their suitability for the specific application or use. Proper selection, installation, operation and maintenance, including implementation of adequate safety precautions, are the responsibility of the purchaser or user. The following safety precautions, as well as additional safety precautions that may be required for the specific application or use, are the responsibility of the purchaser or user. **FAILURE TO OBSERVE REQUIRED SAFETY PRECAUTIONS COULD RESULT IN SERIOUS INJURY TO PERSONS OR PROPERTY OR OTHER LOSS.**

Lock-out/Tag-out

It is **EXTREMELY IMPORTANT** that equipment or machinery does not unexpectedly start. To prevent this possibility, all electrical or other input power sources must be turned off, and properly locked out. Tag out procedures must be followed before working on or near the reducer or any associated equipment. Loads on the input and output shafts should be disconnected prior to working on any reducer. Failure to observe these precautions may result in serious bodily injury and/or property damage.

Grounding

Be sure the reducer and associated equipment are properly grounded and otherwise installed in accordance with all electrical code requirements.

Protective Guarding / Loose Clothing, etc.

Always insure there is proper protective guarding over all rotating or moving parts. Never allow loose clothing, hair, jewelry and the like to be worn in the vicinity of rotating or moving parts or machinery. The purchaser or user is responsible for complying with all applicable safety codes. Failure to do so may result in serious bodily injury and/or damage to property or other loss.

Selection & Installation

This speed reducer and associated equipment must be selected, installed, adjusted and maintained by qualified personnel who are knowledgeable regarding all equipment in the system and the potential hazards involved.

Consult Catalog Ratings

Load, torque and other requirements must not exceed the published ratings in the current catalog and/or on the speed reducer nameplate. The reducer selected must be consistent with all service factors for the application. See Winsmith catalogs and www.WINSMITH.com.

Brake Torque Loads

Whenever a brake or any other stopping force is involved in an application, braking torque loads imposed on the speed reducer must not exceed the allowable load ratings.

Not a Brake

Speed reducers should never be used to provide the function of a fail safe brake or an assured self locking device. Speed reducers must never be used to replace a brake or a critical braking application function.

Excess Overhung Loads

Excessive overhung loads on the input or output shafts of a speed reducer may cause premature fatigue failures of the bearings and/or shafts. Mount gears, pulleys and sprockets as close to the housing as possible to minimize such loads. Do not exceed catalog ratings.

Excess Thrust Loads

Excessive thrust loads on the input or output shafts of a gear reducer may cause premature failure of bearings. Do not exceed catalog ratings.

Alignment

Properly align any input and output power transfer elements connected to the speed reducer. Even slight misalignments in a rigid mounting system may cause binding, large vibration forces or excessive overhung loads, leading to premature bearing, shaft, or speed reducer failure. Use of flexible couplings that allow the reducer and connected transfer elements to self-align during operation will compensate for minor misalignments.

Not a Support Structure

A speed reducer must never be used as an integral component of a machine superstructure or support frame that would subject it to additional loads other than properly rated loads transmitted through the shafts.

Mounting Position

The speed reducer should be mounted in one of the mounting positions shown in the catalog. Different mounting positions should not be used without contacting Winsmith as this may result in improper lubrication.

Overhead Mounting

Mounting of a speed reducer in overhead positions may be hazardous. Use of external support rails or structure is strongly recommended for any overhead mounting.

Lifting Eyebolts

Any lifting supports or eyebolts provided on the speed reducer are supplied with the purpose of vertically lifting only the speed reducer, without any other attachments or motors. Inspect such supports and bolts before each use.

Properly Secure Mounting Bolts

Proper mounting bolts and proper torques must be applied and maintained to insure the speed reducer is securely mounted to the desired machinery. Inspect regularly as machine vibration may loosen fasteners.

Thread Locking Compound

Proper thread locking compound should be appropriately applied to the cleaned threads of all mounting bolts connecting or securing the speed reducer to equipment and any drive, accessories, or brake components attached to the speed reducer. If, at any time after installation a factory supplied assembly or construction bolt is removed, care must be taken to thoroughly clean off the old thread locking compound and a new appropriate thread locking compound must be applied. Failure to properly apply new thread locking compound on all mounting or reducer construction bolts may result in serious injury or death from falling mechanical components.

Reducer Surface Is Hot

Operating speed reducers generate heat. Surface temperatures may become hot enough to cause severe burns. Proper personal protective equipment should be used.

Noise

Operating speed reducers may generate high noise levels. Use appropriate hearing protection and avoid extended exposure to high noise levels.

Lubricants Hot and Under Pressure

The temperature of lubricants inside a speed reducer may be very high. The reducer should be allowed to cool to ambient temperature before removal of any vent, drain, level, or fill plugs, and before removing seals or bearing covers. Speed reducers without a pressure vent may also be under great internal pressure. Slowly loosen the lubricant fill plug above the lubricant level to vent any internal pressure before further disassembling.

Lubricant Contact

Contact with lubricants can present safety concerns. Proper personal protective equipment should be used whenever handling speed reducer lubricants. Consult the lubricant MSDS sheet which is often available on the lubrication manufacturer's website.

FDA, USDA, and NSF Applications

Factory supplied lubricants may not be suitable or safe for applications involving food, drugs and similar products. This includes applications subject to FDA, USDA, NSF or other regulatory jurisdiction. Consult the lubricant supplier or Winsmith for acceptable lubricants.

Inspection and Lubrication

Ensure proper operation by regularly inspecting the speed reducer and following all maintenance, operation and lubrication guidelines.



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