



BELT-DRIVE TUMBLER

Model TBD15

Item #149886 / Item #149887 / Item #149888
Item #149889 / Item #149890 / Item #149891

INSTRUCTION MANUAL



November 2016
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INSERT

Safety Cage Drawing
Gear Reducer Manual
3EA #110562 Safety Sign

SAFETY SUMMARY

This manual uses the following words to show different levels of danger:

DANGER means that you are very likely to be killed or injured if you don't take the needed steps to avoid the hazard. This is the highest level of warning.

WARNING is for a situation where you could be killed or injured if you don't avoid the hazard.

CAUTION means you could receive moderate or minor injuries, or equipment could be damaged if you don't avoid the hazard.

The following are some general alerts that apply to this machine:

DANGER

LIVE ELECTRIC PARTS
could cause DEATH or SHOCK.

Lock out and tag out power
before doing service.

WARNING

IMPROPER CONTROLS
could cause
DEATH or INJURY.

Install proper electrical
controls.

WARNING

ROTATING PARTS could cause
DEATH or INJURY.

Install tumbler in closed
SAFETY CAGE.

Shut off main power
before you enter cage.

Follow manual to install,
use or service.

WARNING

CHANGES TO MACHINE
could cause
DEATH, INJURY or DAMAGE.

Do not modify machine
without approval from IMS
Company.



SPECIFICATIONS

Motor	1-1/2 hp, TEFC
Voltage	208/240/480 V, 60 Hz, 3-phase
Amperage	5.1 @ 208V 4.8 @ 240V 2.4 @ 480V
Motor Speed	1750 rpm
Gear Reducer	Right-angle, self-locking, 60:1 ratio, 1750 rpm input, 29 rpm output
Tumbling Speed	18 rpm
Drive Sprocket	24 teeth, 1-3/4"-ID bushing
Driven Sprocket	40 teeth, 2-3/16"-bore
Drive Belt	HTD (Heavy Torque Drive)
Bearings	2-3/16" ID pillow block ball bearing
Operating Space	96" directly out from corner (to line drawn between points on both walls, 11' 3" from corner)
Weight (crated)	685 lbs

Capacity

Style 1 Drum Holder	225 lbs, including drum (30 gal)
Style 2 Drum Holder	280 lbs, including drum (55 gal)

Drum Sizes:

Style 1

Max Height.....	34"
Min Height.....	30"
Max Diameter.....	22"
Min Diameter.....	20"

Style 2

Max Height.....	37"
Min Height.....	33"
Max Diameter.....	25"
Min Diameter.....	21-1/2"



DESCRIPTION

The IMS Belt-Drive Drum Tumbler is a mixer for drums of plastic material and its colorants and additives. The drums mount at an angle on a motor-driven, horizontal shaft. As the drums rotate, the material inside tumbles and is mixed.

The 20° angle of drum-mounting and the 18 rpm speed of rotation have been selected for most effective tumbling action. Drums mix most efficiently when 75% full.

This tumbler is designed to tumble a single drum, or two drums if optional leg set and additional holder are obtained. Because of its unique geometry, a single drum style can be placed in a corner.

INSTALLATION

1. Inspect Shipment

Unpack tumbler and inspect for damage. Report any damage to shipper; save packaging for shipper's inspection.

2. Prepare Location

Set up a safety-caged location for the tumbler according to the *Typical Safety Cage Layout* drawing (150365) in back of this manual. Install signs provided in this manual on safety cage.

3. Bolt Tumbler in Place

- a. Set tumbler in cage-protected location. Mark holes on floor, through tumbler mounting holes. Move tumbler aside.

If you have purchased a tumbler designed to tumble 2 drums, bolt the "V" shaped leg to the base of the tumbler frame using the single bolt, two washers, lock washer and nut provided.

- b. Drill 2-1/2"-deep holes for #135703 lag bolts, which are included with tumbler shipment.

Single drum tumblers require that 3 floor anchor bolts be used. Two drum tumblers can only be used with the "V" shaped added leg set, and require 4 floor anchor bolts.

- (1) Use 3/4" diameter, carbide-tipped drill bit manufactured to ANSI B94 standard tolerances on the tip end.

A hammer drill is best suited for drilling into concrete.

WARNING

ROTATING PARTS could cause DEATH or INJURY.

Install tumbler in closed SAFETY CAGE.

Shut off main power before you enter cage.

Follow manual to install, use or service.

INSTALLATION (CONTINUED)

- (2) Do not use worn drill bit.
- (3) Keep drill perpendicular to floor while drilling.
- (4) Let drill do work. Do not use more pressure than necessary.
- (5) Lift drill up and down several times to remove dust and reduce binding.
- (6) Clean hole to increase holding power. Use vacuum to clean.
- (7) Place tumbler in position. With at least a full thread of nut showing above end of bolt, gently tap assembled nut, washer and lag bolt into hole until washer rests against tumbler frame.
- (8) Tighten nut three to four turns past hand-tight position.

NOTE

If tumbler ever has to be moved, simply remove nut and washer, and drive bolts flush with floor.

4. Install Drum Holder/s

Install drum holder/s on shaft. Fasten with bolts, washers and lockwashers that are included for the purpose. Tighten nuts securely.

Single drum tumblers are to be tumbled at shaft end nearest the motor and reducer.

5. Prepare Gear Reducer

Read through the gear reducer manual included with this manual.

- a. Open the vent at the top of gear reducer.
- b. Check oil according to gear-reducer manual included with this manual.



INSTALLATION (CONTINUED)

6. Connect Wiring

Because user has to mount controls outside a safety cage, the tumbler is shipped with no electrical controls. You must install controls outside the safety cage.

They must include a fused disconnect, an ON/OFF switch, a motor starter with overload protection, and an interlock system for all gates and doors in the protected area. It must also meet all local, national and OSHA codes for design, construction and location.

IMS stocks Tumbler Electrical Control Panels for this purpose. They include a cycle timer, a cycle-end signal, a JOG switch and an ammeter.

The part numbers are 146621 (for 208 to 240 volts) and 146622 (for 480 volts).

- a. Install safety interlock switch on all gates and doors of safety area to shut off power to tumbler if someone opens door or gate.

Wire interlocks into control system. Control and interlock system must not allow tumbler to start up simply because the door or gate closes.

- b. Connect controls to motor. It can be wired to run in either direction. Use connection diagram on motor. Motor is multiple voltage; be sure to follow diagram for voltage you will be using.
- c. Before turning on power to circuit, connect control system to power circuit.

7. Inspect After First 10 Hours

Assign someone to do an inspection after first 10 hours of use. See page 6 for procedure.

WARNING

IMPROPER CONTROLS
could cause
DEATH or INJURY.

Install proper controls.

DANGER

LIVE ELECTRIC PARTS
could cause DEATH or SHOCK.

Lock out and tag out power
before wiring tumbler.

OPERATION

1. Jog Machine

Before entering cage, jog tumbler until drum holder is upright.

2. Fill Drum

Drum must be made for use in tumblers -- metal, high-strength plastic or dry, fiber-type. It must be in good condition, with no damage.

Both polyethylene and stainless steel drum assemblies are available from IMS stock. See *Accessories* on page 10 of this manual.

- Leave drum 1/4 empty for fastest and most efficient mixing action. A full drum will not let the material mix.
- Do not go over 225 lbs per Style 1 (30 gal) drum holder or 280 lbs per Style 2 (55 gal), including weight of drum.
- Firmly attach lid to drum.

3. Install Drum (See photo on page 11).

- a. Make sure threads on screw are clean and lubricated. Set drum in drum holder.

Loading the drum onto the holder must be done by personnel physically fit enough to roll the drum into position. With the holder jogged to the upright vertical position, tip the drum back toward you. Set the far bottom edge of the drum on the base of the drum holder, then push the top of the drum back into the holder.

- b. Turn handwheel to lower clamp, which consists of the V-bracket and cleats. Set cleats to hold drum securely. Tighten nuts on cleats to lock clamp positions.

WARNING

ROTATING PARTS could cause DEATH or INJURY.

Shut off tumbler and let it stop before you enter cage.

WARNING

ROTATING DRUMS could cause DEATH or INJURY.

Clamp drums tightly.

Do not over-fill drums:

280 lbs gross
per drum

OPERATION (CONTINUED)

- c. Secure drum with safety belt. Tighten belt.
- d. Without overtightening, turn handwheel until clamp holds drum tightly. Do not collapse sides of drum.

By hand only, tighten locknut handle to lock clamp position.
- e. If drum is too short for drum holder; a longer, 20" (nominal) handwheel screw can be used in place of the standard, 12" screw.

If drum cannot be clamped fully with longer handwheel screw, use larger drum.

NOTE

Always use safety belt to help hold drum in place.

Do not use blocks or spacers to make up for undersized drum. Only a drum clamped into an IMS drum holder in accordance with the design of the drum holder is safe for use with this drum tumbler.

4. Do A Safety Check

- a. Drum holder must be tightly bolted to shaft. Drum must be tightly clamped in drum holder.
Safety belt must be tightly wrapped around drum.
- b. Make sure there is nobody in safety cage.
- c. Hardware and drum-lid must be tight. Shaft, drum holder and drum must be clear of tools, rags, etc.
- d. Close safety gate.

5. Power Up

6. Let Tumble

- a. Let tumbler run for amount of time estimated to be needed to mix material. Contact material supplier for mixing information.
- b. After shutdown (step 7 on next page), inspect material in drum. Tumble longer if necessary.

OPERATION (CONTINUED)

7. Shut Down

- a. Shut off tumbler.
- b. Jog machine until drum is upright.
- c. Loosen drum clamp.
Disconnect safety belt and remove drum.

If needed, reload new drum and tighten clamp. Latch safety belt whether or not you load a new drum.

- d. Leave safety area; close safety gate.
- e. For safety, lock out power while drum tumbler is not in use.

8. Inspect after 1ST 10 hours of operation:

- Check tightness of all components.
- Check oil level in reducer.
- Check bearings; there should be a little grease coming out between the shaft and the bearing grease seal. If there is not, grease the bearing, following the instructions on pages 7 and 8.

WARNING

ROTATING PARTS could cause DEATH or INJURY.

Shut off tumbler and let it stop before you enter cage.

MAINTENANCE

1. Gear Reducer

a. Oil Check

Check oil level in gear reducer before using drum tumbler. Follow instructions in gear reducer manual.

2. Pillow-Block Bearings

- a. Pillow-block bearings are greased at factory, so do not need to be greased before use.
- b. Grease them after 10 hours and every 2 to 6 months, depending on temperature, dust, and frequency of use
- c. Clean grease fitting to avoid getting dirt into bearing. Use a lithium-based, NLG1, grade 2 grease. Each bearing holds about 1-1/4 oz of grease.

CAUTION

MIXING GREASE-TYPES
could DAMAGE BEARINGS.

Do not mix lithium-based
grease and polyurea-based
grease.

MAINTENANCE (continued)

3. Motor Bearings

In most cases, motor bearings will not need to be greased more than once a year. If in constant use in dirty, wet or corrosive atmospheres, grease every 3 months.

Clean grease fittings to avoid getting dirt into bearings. Add 1/4 oz of grease per bearing. Use a rust-inhibitive, NLG1, grade 2 grease.

4. Belt

The belt does not need maintenance.



REPLACEMENT PARTS

Description	Part Number
Motor	163800
Reducer	122100
Main Shaft & Key	144306
Pillow Block Bearing	107901
Drive Sprocket	107872
Drive Bushing	124225
Driven Sprocket	107948
Driven Bushing	106738
Belt	107923
Style 1 Drum Holder Assembly (Includes Hubs) For tumbling 30 gallon drums	107873
Style 2 Drum Holder Assembly (Includes Hubs) For tumbling 55 gallon drums	107857

See page 11 for Drum Holder parts list

Lag Bolt	135703
Safety Signs	
Rotating-Drums Sign	110577



ACCESSORIES

Safety Control Panel:

240 volt 146621
480 volt 146622

Polyethylene Drums: (include lid, gasket and clamp ring)

30 gallon 125596
55 gallon 125796

Stainless Steel Drums: (include lid, gasket and clamp ring)

30 gallon 105574
55 gallon 105569

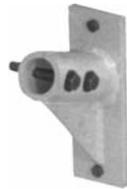
Drum Cart 105597
(for safe, easy
drum handling)

Tumbling Magnets: (for tramp metal)

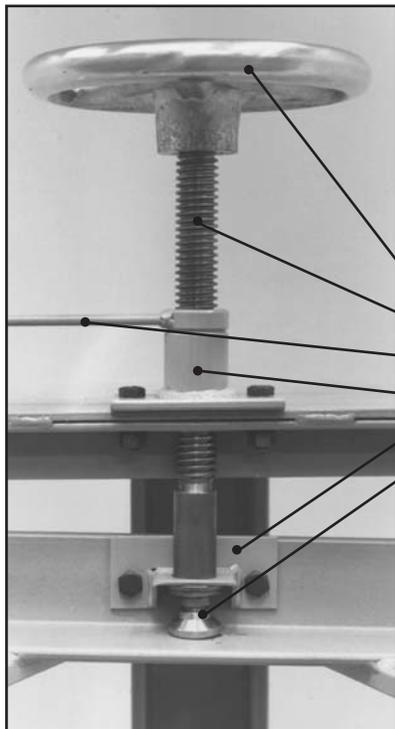
8-1/2" 105359
12" 105358

- Bright yellow finish
- 2" wide nylon, quick-release safety belt
- Welded steel construction

**ONLY
FROM
IMS**



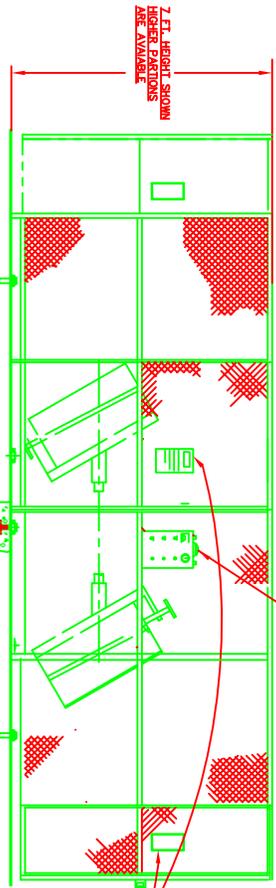
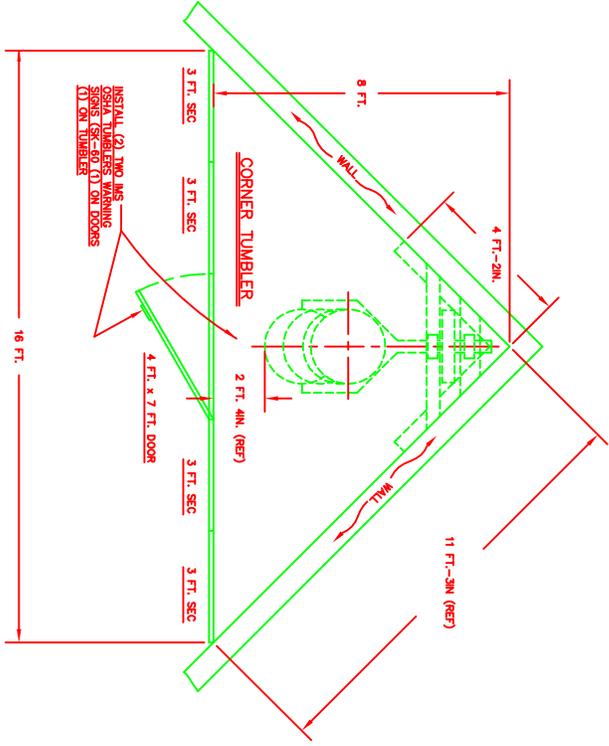
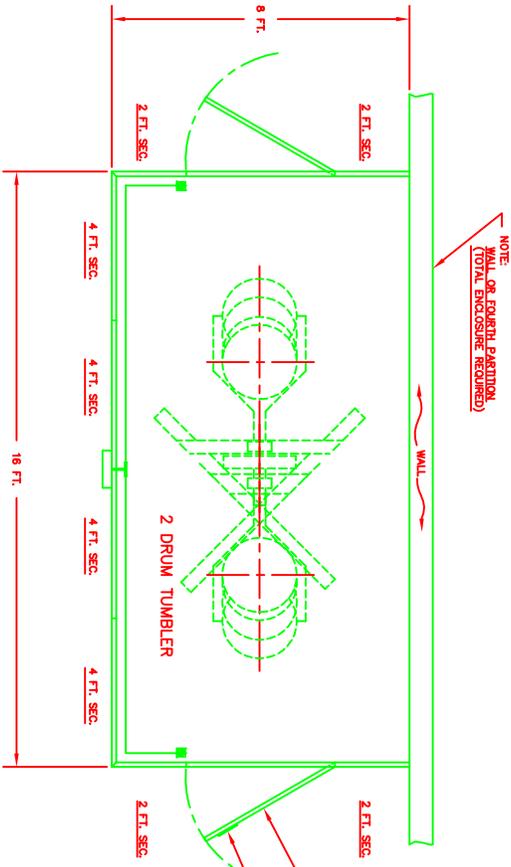
Style 1
Hub Assembly



Item #	Description
107873	Style 1 (fits 30-gal. drums) with 20" screw
107857	Style 2 (fits 55-gal. drums) with 12" screw
Spare Parts	
109141	Spare handwheel assembly with 12" screw and swivel base (includes #107853, #107916, #107909, #108777 and #108776)
107853	8" diameter handwheel
108776	1"-6 acme 12" screw with swivel base for Style 2
107909	1"-6 acme lock nut and handle
107916	1"-6 acme threaded nut with bracket
108777	Sleeve assembly for 12" and 20" screws
109386	Complete leveling pad assembly
109420	1"-6 acme 20" screw with swivel base for Style 1
109419	Spare handwheel assembly with 20" screw and swivel base (includes #107853, #107916, #107909, #108777 and #109420)
107955	Style 1 Hub Assembly for 30-gal. drum
107887	Style 2 Hub Assembly for 55-gal. drum
107874	2" wide nylon quick release safety belt
107855	V-bracket with left and right cleat
107938	Left-hand aluminum cleat
107917	Right-hand aluminum cleat



MAINTENANCE RECORD AND NOTES



MNS DRUM TUMBLER CONTROL BOX-# 146821 (230 V)
 OR CONTROL BOX-# 146822 (480 V)
 LOCATE ON WIRE PARTITION
 OUTSIDE OF WIRE PARTITION
 CONTAINING ALL WIRING
 TUMBLER LOG AND LOG
 INDICATOR
 IF TUMBLER HAS STARTER MOUNTED ON IT, STARTER MUST
 BE SHOWN. IT IS OSHA 1910.179 ECONOMIC TO TUMBLER
 THE CONTROL BOX FROM TUMBLER CONTROL BOX AS IT
 IS DESIGNED TO BE A COMPLETELY EQUIPPED OSHA
 INSTALL (O) TUMBLER PROTECTIVE ENCLOSURE
 DISCONNECT SWITCH AT EACH DOOR
 CONNECTED TO TUMBLER CONTROL BOX

TUMBLER WARNING SIGNS # 110882
 (1) ON FACE OF CAGE

NOTE:
 THIS DRAWING IS A GUIDE ONLY TO INSTALLATION
 OF WIRE SAFETY PARTITIONS, FOR MNS DRUM TUMBLERS,
 MOUNTING TUMBLER OPERATING SPACE WITH
 WIRE SAFETY PARTITIONS, FOR MNS DRUM TUMBLERS,
 OSHA TECHNIQUES PROTECTIVE ENCLOSURES
 BE INSTALLED BY THE USER FOR TO
 THE HAZARDS OF ROTATING DRUMS.

REV	DATE	DESCRIPTION	BY	CHKD BY

OWMS
 Company

TUMBLER ENCLOSURES

MODEL # **230V**
 MODEL # **480V**
 MODEL # **1/2" 1"**
 MODEL # **INDU TUMBLER**

DATE: 10/20/2010
 DRAWN BY: [Name]
 CHECKED BY: [Name]
 APPROVED BY: [Name]



D-90 Type SE Speed Reducers



Installation, Operation and Lubrication Instructions



I. SELECTION

The selection of the appropriate speed reducer for a given application requires that all factors affecting the operation of the unit be given careful consideration. Service factors must be applied to catalog ratings depending on the type of prime mover used, severity of the application and duration of daily service. If you have any questions relative to the suitability of your WINSMITH® speed reducer for your particular application, refer to the selection section of the appropriate WINSMITH catalog, or contact your WINSMITH representative or distributor.

II. INSTALLATION

1. Shaft Alignment

- A. The various drive members (motor, speed reducer, couplings, sprockets, sheaves, gears, etc.) should be aligned as accurately as possible to guard against unusual stresses and overloads imposed by misalignment.
- B. If a prime mover shaft is to be directly connected to the high speed (input) shaft or if the slow speed (output) shaft is to be directly connected to the driven shaft, flexible couplings should be used.





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It should be remembered that even flexible couplings have limited ability to accommodate misalignment. Care must be taken at installation to insure that shaft alignments are within the limits recommended by the coupling manufacturer. Use of a rigid coupling to connect speed reducer shafts to other drive components is not recommended as it is almost impossible to obtain exact alignment between two shafts.

- C. A common base plate supporting the motor and reducer will help preserve the original alignment between reducer and motor shafts. If a structural steel base is used, the plate should be at least equal in thickness to the diameter of the bolts used to fasten the speed reducer to the base plate. Also, for sufficient rigidity, the design in general including angle or channel members should be substantial enough to prevent flexing under vibration. After the first week or two of operation all of the bolts and nuts used to fasten the reducer and motor, pedestal, etc., to the base plate should be retightened. Vibration tends to loosen the nuts even if tight initially. Dowelling the motor and speed reducer to the base plate will help insure that alignment is maintained.

2. Mounting Positions

- A. Single reduction units are designed to accommodate most standard mounting positions. Figure 1 illustrates the utility plug locations for each based on model. All standard single reduction models are equipped with an internal splash shield located near the worm. This shield deflects the oil from the vent, preventing leakage when the vent plug is adjacent to the worm (as on the DT or DV standard mounting). When this location is used as a drain (as on the DV sidewall, worm under), drainage will be better facilitated if done at or near the operating temperature. Filling from this location is not recommended, as the shield will impede the oil flow rate. Bearings are splash lubricated provided the input speed is 1160 RPM or greater. Contact the factory when input speeds fall below this.
- B. Double reduction models are built to accommodate one mounting position as specified during order entry. Standard mounting positions, furnished unless otherwise specified, are shown in Figure 2 which also illustrates the utility plug locations. Note that the mounting position relates to the main housing orientation. Standard units have an oil level common to both housings and do not use an intermediate oil seal. The vent plug is located in the main housing where the slower worm speed eliminates the need for a vent shield. Grease fittings (not shown in Figure 2) are used to

lubricate bearings when oil splash does not serve this purpose (as with the DV or DL upper slow speed bearing).

3. Venting

During operation, the heat generated by the gearbox will cause the air and lubricant inside the unit to expand. A vent plug is used to equalize the resulting pressure, the location of which is dependent on the model and mounting position. Winsmith gearboxes are supplied with a new plastic vent plug that should be installed based on a review of the application mounting position. This vent is designed to operate in an open mode or a closed mode. The mode of operation can be set by rotating the top of the vent based on the direction arrow. Counter clockwise movement will open the vent and clockwise movement will close the vent. The vent should be operated in the open position in most applications. Before putting the unit into service, review Figures 1 and 2 and relocate the vent plug (if necessary) as shown for the appropriate model and mounting position. Double reduction models (Figure 2) are vented in the main housing only. For intermittent duty applications, where the operating temperature does not rise more than about 20 degrees F, internal pressure build-up is minimal and venting is not necessary.

4. C-Flange Motor Mounting Procedures

A. Mounting Motor to C-Flange Reducer With Hollow Input Shaft

Check motor and reducer mounting registers for nicks that would interfere with assembly. Remove if necessary.

Remove protective plastic plug from reducer input shaft. The bore has been coated with an anti-seize compound.

Align the motor shaft and key with keyway in bore and slide motor up to flange.

Position the motor conduit box as desired.

Using the fasteners supplied, secure the motor to the reducer. Draw down evenly so as not to bend the motor shaft. Tighten fasteners to 200 inch pounds.

B. Mounting Motor to C-Flange Reducer With Coupling Adaptor

Check motor and reducer mounting registers for nicks that would interfere with assembly. Remove if necessary.

When assembling the motor and coupling, the coupling halves should be equally spaced on



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each shaft to insure adequate engagement. The following describes a method for doing this.

First determine the assembled shaft clearance by measuring the distance from the C-Flange face to the reducer shaft end and subtracting the motor shaft length. Mount and secure the motor shaft coupling half with the spider end extending one half the clearance distance beyond the motor shaft. Mount the reducer coupling half and coupling spider on reducer shaft in its approximate position but do not secure.

Locate the motor conduit box in the desired position and secure the motor to the reducer flange using the fasteners provided. Tighten to about 200 inch pounds.

Using the access hole in the flange, slide the coupling together and tighten the set screw.

5. Unit Assembly/Disassembly Instructions

Contact the factory for an instruction manual.

III. LUBRICATION & MAINTENANCE

1. Factory Filling

WINSMITH speed reducers are oil filled at the factory to the proper level for the standard mounting position as shown in Figures 1 or 2. **The oil level should be checked and adjusted (if necessary) prior to operation, using the oil level plug provided and while the unit is oriented in its operating position.**

2. Initial Start-Up

During the initial start-up operation, a break-in period is necessary before the reducer reaches a maximum operating efficiency. It may run hot for the first several hours after start-up, and it may also be possible for a few drops of oil to be purged from the lip seals during the break-in period. After a short period of operation, clean off any excess oil around the shaft seals, and recheck the oil level and adjust, if necessary.

3. Ambient Temperature

If the operating ambient temperature is other than 51-95°F, then refer to lubrication chart and refill the unit with the correct grade based on actual ambient temperatures and operating speed. See item 4 for additional information regarding oil changes.

4. Oil Changing

When changing oil for any reason, it should be remembered that oils of various types may not be

compatible. Therefore, when changing to a different oil, it is recommended that the housing be completely drained and thoroughly flushed with a light flushing oil prior to refilling with the appropriate lubricant. The oil level should be rechecked after a short period of operation and adjusted, if necessary. When changing double reduction models, each housing should be drained and filled independently, even though there may be a common level.

A. Initial Oil Change

The oil in a new speed reducer should be changed at the end of 250 hours of operation. (30 days for 8 hour per day service, 15 days for 16 hour service, 10 days for 24 hour service).

B. Subsequent Oil Changes

Under normal conditions, after the initial oil change, the oil should be changed after every 2500 hours of operation, or every six months, whichever occurs first. Under severe conditions (rapid temperature changes, moist, dirty or corrosive environment) it may be necessary to change oil at intervals of one to three months. Periodic examination of oil samples taken from the unit will help establish the appropriate interval.

C. Synthetic Oils

Synthetic lubricants can be advantageous over mineral oils in that they generally are more stable, have a 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. However, continuous operation above 225°F may cause damage to seals or other components. It is recommended that the initial oil be changed or filtered after the first 1500 hours of operation to remove metal particles that accumulate during break-in. Subsequent oil changes should be made after 5000 hours operation if units are operating in a clean environment. This can be extended to 10,000 hours if using new reformulated Mobil SHC lubricants (orange in color) and the lubricant remains free of contamination over this period. See comments under 4B for more severe ambient conditions.

5. Long Term Storage or Infrequent Operation

If a speed reducer is to stand idle for an extended period of time, either prior to installation or during use, it is recommended that the unit be filled completely with oil to protect interior parts from rust corrosion due to internal condensation. Be sure to drain the oil to the proper level before placing the speed reducer in service. A long term storage option is available on new units. Contact us for details.



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6. Grease Fittings

Some units are equipped with grease fittings to lubricate bearings not adequately lubricated by the oil splash. These fittings must be lubricated every 3-6 months depending on operating conditions. Bearing greases must be compatible with the type of gear lubricant being used (ie. mineral, synthetic, food grade, etc.) For mineral oils, use a high quality lithium base NLGI #2 bearing grease. For synthetic oils, use a synthetic bearing grease such as Mobil Synthetic Universal grease, Mobilith SHC 100 or a suitable equivalent. For food grade lubricants, use Chevron FM grease, NLGI 2, or equivalent.

7. 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. Such units are considered non-standard and necessitate factory modification. If this low speed operating condition exists and units are without the appropriate grease fittings, please contact the factory.

8. Oil Temperature

Speed reducers in normal operation can generate temperatures up to 200°F depending on the type of 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 unit selection being too small for the application, or increased loads on the speed reducer to a point where its rating is exceeded after it has been in service for a period of time. Always check the speed reducer rating when increasing driven loads or increasing the horsepower rating of the motor or other prime mover.

B. Overfilling or Underfilling

If a speed reducer is overfilled with oil, the energy used in churning the excessive oil can result in overheating. If this occurs, shut down the drive, remove the oil level plug and allow oil to drain until oil ceases to drain from the level hole, reinstall the oil level plug and restart the drive. If the speed reducer is underfilled, the resultant friction can cause overheating and possible damage. If this occurs, fill the speed reducer to the oil level plug hole and check the gearing for excessive wear.

C. 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, forced air cooling by means of a separate blower should be used.

9. Oil Seals

Although WINSMITH uses high quality oil seals and precision ground shafts to provide a superior seal contact surface, it is possible that circumstances beyond WINSMITH's control can cause oil seal leakage (damage during shipment or installation, etc.). When replacing a shaft oil seal, using the following suggestions will help to insure leak-free operation and long seal life.

- A. When installing a new seal, cover the keyway and any other surface discontinuity with smooth tape to protect the seal lip from being damaged.
- B. A sealant should be used between the O.D. of the seal and the I.D. of the bore into which the seal is 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 surface into which it is mounted.

Lubricants

Worm Gear Reducers

For special applications that involve severe ambient temperature extremes or a seasonal oil requirement, WINSMITH, based on extensive testing and field experience, recommends the use of Mobil SHC synthetic lubricants.

Ambient Temperature	-30 to 15°F	16 to 50°F	51 to 95°F	51 to 95°F	96 to 131°F	96 to 131°F
ISO Viscosity Grade	220	460	680	460	680	460*
AGMA Lubricant No.	5S**	#7 Compounded***	#8 Compounded***	#7 Compounded***	8 S**	7S**

Mobil	SHC 630	600W Super Cylinder	Extra Hecla Super	600W Super Cylinder	SHC 636	SHC 634
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**synthetic oil

***3% to 10% fatty or synthetic oils or mild EP additives

Viscosity grades are based on Lubrication Standard ANSI/AGMA 9005-D94.



STANDARD MOUNTING POSITIONS *D-90* TYPE SE

BASIC MODEL	TRADITIONAL MOUNTING	INVERTED MOUNTING	ADDITIONAL MOUNTING POSITIONS			
			INPUT SHAFT HORIZONTAL		INPUT SHAFT VERTICAL	
DB DD DJ DN DT DU WB WT WU						
DV						
DL		SPECIAL Contact the Factory				
DSF			SPECIAL Contact the Factory			
DSN DSR DSU						

Note: Single Reduction 935 and 943 standard models are supplied with grease fittings on the input shaft to insure bearing lubrication for all mounting positions.

(F) = Fill Plug

(V) = Vent Plug

(L) = Level Plug

(D) = Drain Plug

(GF) = Grease Fitting

Figure 1. Single Reduction Models

DOUBLE REDUCTION* WORM/WORM			DOUBLE REDUCTION* HELICAL/WORM		
OTHER ATTACHMENT HOUSING POSITIONS			OTHER ATTACHMENT HOUSING POSITIONS		

Plug locations apply to motorized units also.

Contact the factory when input speeds are less than 1160 RPM to insure proper lubrication.

*Double Reduction units are not universal mounting. Mountings other than standard require a special outline.

Figure 2. Double Reduction Models

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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