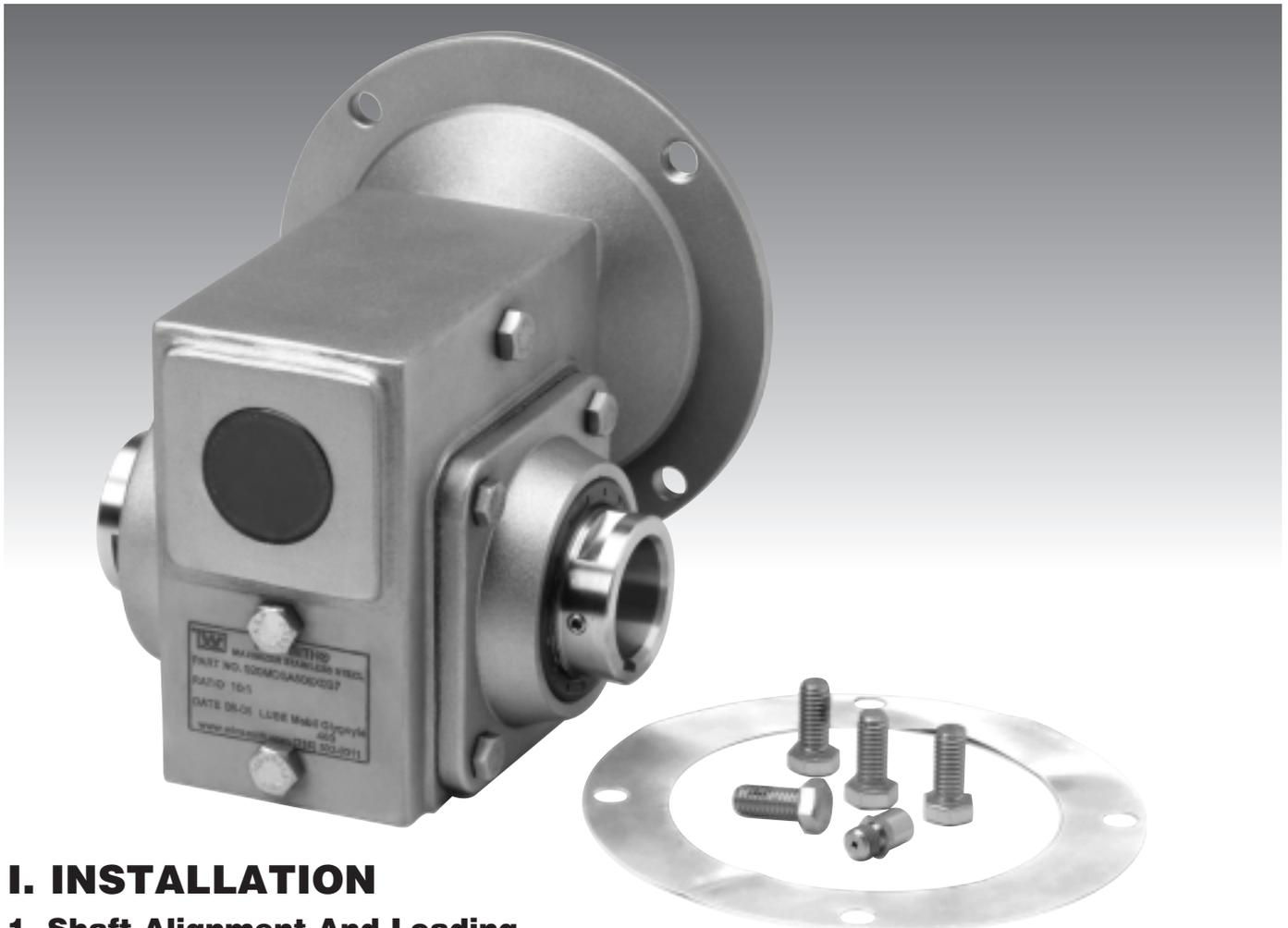


SE Stainless Steel



SE Stainless Steel Installation, Operation and Lubrication Instructions



I. INSTALLATION

1. Shaft Alignment And Loading

- 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 input shaft or if the output shaft is to be directly connected to the driven shaft, flexible couplings should be used. It should be remembered that even flexible couplings have limited ability to accommodate misalignment. Care must be taken at installation to ensure 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.
- 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 minimize 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. Doweling the motor and speed reducer to the base plate will help ensure that alignment is maintained.

- D.** 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.



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2. Mounting Positions

- A.** Single reduction reducers are designed to accommodate most standard mounting positions. To minimize bacteria traps, mounting holes are provided only on the bottom of the housing closest to the output shaft. **Figure 1** illustrates the utility plug locations for each reducer 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 traditional mounting). When this location is used as a drain (as on the DT inverted mounting), 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 a local Winsmith sales representative when input speeds fall below 1160 RPM.
- B.** Double reduction reducers are built to accommodate one mounting position as specified during order entry. Reducers do not have an oil level common to both housings; therefore it is necessary to check the plug location on both housings. The vent plug is also located in both housings. Grease fittings (not shown in **Figure 1**) are used to lubricate bearings when oil splash does not serve this purpose (as with the E35MDSYA upper output bearing). When 2 or 3 reducers are ordered individually but assembled together in the field creating a double or triple reduction reducer, follow **Figure 1** for plug locations depending on the mounting position for each reduction stage. However, depending on ratio, if the input speed to any stage falls below 1160 RPM (see section II #7 Low Input Speeds), oil splash is not sufficient enough to lubricate all the bearings, and grease fittings may be required depending on the mounting position.

3. Venting

During operation, the heat generated by the gearbox will cause the air and lubricant inside the reducer to expand. A vent is used to equalize the resulting pressure, and the location of the vent on the housing depends on the model and mounting position. Before putting the reducer into service, review **Figure 1** and relocate the vent as shown for the appropriate model and mounting position. **To prevent loss of oil during shipment, the vent plug location is blocked with a hex head pipe plug, which must be removed and replaced with the supplied vent prior to operation.** For intermittent duty severe environment applications, where the operating temperature does not rise more than 20 to 40 degrees F, internal pressure build-up is minimal and venting is not necessary. **Caution! Current venting technology may not completely keep out all contaminants, therefore WINSMITH recommends monitoring the condition of the oil and replacing it as necessary** (see section II #4 Oil Changing).

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. **Note:** An input bushing with key may be installed in worm bore to eliminate the possibility of fretting corrosion. Position the motor conduit box as desired. Using the stainless steel fasteners supplied, secure the motor to the reducer. Draw down evenly so as not to bend the motor shaft. Tighten the fasteners to the appropriate torque per the size of the fastener.

B. Mounting Motor to C-Flange Reducer with a Plated 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 each shaft to ensure 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 input 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 input 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 stainless steel fasteners provided (except servo adaptors). Tighten the fasteners to the appropriate torque per the size of the fastener. Using the access hole in the flange, slide the coupling together and tighten the set screws.

- C.** Winsmith stainless steel reducers are designed to utilize a rubber gasket on the flange face between the reducer and the input motor. This gasket is designed for severe environmental conditions and is necessary to minimize the risk of water and/or other contamination within the reducer. This gasket should be replaced whenever the motor is replaced.

5. Primary Helical Or Double Driver Reducer Installation To Primary Housing

Follow the same instructions as if installing a motor to the reducer for double reduction helical worm and double worm reducers if the primary and secondary gearboxes are purchased separately and not assembled at the factory. See **Figure 1** Mounting Positions, for oil and vent plug locations for the primary and secondary gearboxes.



II. LUBRICATION & MAINTENANCE

1. Factory Filling

NOTE: SE Stainless Steel worm gear speed reducers are factory filled with 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.

NOTE: Helical Gear Ratio Multipliers are factory filled with Mobilgear 600 XP 220 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.

2. Ambient Temperature

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

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 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 TR 14521 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.

The oil change procedure for all SE Encore speed reducers is similar. The appropriate oil fill, drain, and level plugs are identified in **Figure 1**. Please note that these locations are unique for each operating position shown. After draining the old lubricant, new lubricant should be added to the appropriate level plug shown.

Mounting Position and Lubricant Levels for Single and Double Reduction Models

Optimal lubricant level information for single and double reduction models is shown in **Figure 1**. Lubricant levels are critical to the proper operation of all speed reducers. If a speed reducer was ordered and supplied for a specific mounting position, it should not be changed without contacting Winsmith. Altering the mounting position from that which was specified may result in inadequate lubrication. Contact a local Winsmith sales representative with questions regarding proper lubricant selection and level.

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 reducer be filled completely with oil to protect interior parts from rust corrosion due to internal condensation. Remember to drain the oil to the proper level before placing the speed reducer in service. A long-term storage option is available on new reducers. Contact a local Winsmith sales representative for details.

6. Grease Fittings

Some reducers 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. WINSMITH uses Mobilgrease FM 222, or equivalent (NLGI #2) grease, approved for incidental food contact, as defined by FDA 21 CFR 178.3570, (formally USDA H1). Bearing greases should be compatible with the type of gear lubricant being used (i.e. mineral, synthetic, food grade, etc.) Caution should be exercised when greasing because excessive grease may reduce the performance of the lubricant.



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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 reducers are considered non-standard and require factory modification. If this low speed operating condition exists and reducers are without the appropriate grease fittings, please contact a local Winsmith sales representative.

8. Oil Temperature

Speed reducers in normal operation can generate temperatures up to 212°F (as measured on the external housing) depending on the type of reducer and the severity of the application (loading, duration of service, ambient temperatures).

Note: Initial operating temperatures may be higher than normal during the break-in period of the gear set. However, continuous operation above 212°F (as measured on the external housing) may cause damage to seals or other components and reduce the reducer operating life. Excessive oil temperatures may be the result of one or more of the following factors:

A. Overloads

Overloads may be due to the original reducer 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 the 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. If possible the use of a fan-cooled motor is recommended to increase airflow.

9. Surface Treatments

Do Not Paint Reducer! All exterior 300 series stainless steel surfaces have been passivated; no further treatment is

required. Washing the reducers can effectively clean the surface. Do not use steel wool pads as they can induce rust. Thorough rinsing to remove any industrial solvent residue is highly recommended. Care should be exercised when rinsing with high-pressure techniques to avoid prolonged washdown of vents and seals. Drying after washdown is recommended to prevent mineral deposits. Abrasive techniques should be avoided especially on the optional #4 pharmaceutical surface finish units.

III. REDUCER ASSEMBLY/ DISASSEMBLY INSTRUCTIONS

1. Motor Disassembly from C-Flange Reducer with Hollow Input Shaft

- Use safe practices when handling, lifting, installing, operating, and maintaining motors and related equipment.
- See motor manufacturer installation instructions for complete information. This applies only to the mechanical removal of the motor from the reducer.
- The reducer C-Face adapters are machined with (2) 1/2-13 tapped holes to aid in motor removal. If necessary use (2) 1/2-13 x 2 1/2" L bolts to evenly jack the motor from the C-Face motor adaptor. Be careful to apply even pressure on face of motor so as not to cock the motor shaft in the input bore. It is not necessary or recommended to try to pry the motor from the reducer.

2. 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 ensure leak-free operation and long seal life.

I. Input Fluoroelastomer Oil Seals

- 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.





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STANDARD MOUNTING POSITIONS SE ENCORE STAINLESS STEEL

BASIC MODEL	STANDARD MOUNTING	INVERTED MOUNTING	ADDITIONAL MOUNTING POSITIONS			
			INPUT SHAFT HORIZONTAL		INPUT SHAFT VERTICAL	
MDBA MDJA NDNA MDTA MDUA						
MDDA						
MDHA					SPECIAL Contact the Factory	
MDSFA						
MDSNA MDSRA MDSUA						
MDSYA		SPECIAL Contact the Factory				

- LEGEND**
- (F) = Filler
 - (V) = Vent
 - (L) = Level
 - (D) = Drain
 - (F&V) = Filler & Vent
 - (GF) = Grease Fitting

Contact the local Winsmith sales representative when input speeds are less than 1160 RPM to ensure proper lubrication.

NOTE: Single Reduction E35 standard models are supplied with grease fittings on the input shaft to ensure bearing lubrication for all mounting positions.

For SSTL. Double Reduction reducers, primary & secondary plug locations are determined individually according to model & orientation per this chart. Grease fittings may be required on the secondary stage.

FIGURE 1



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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