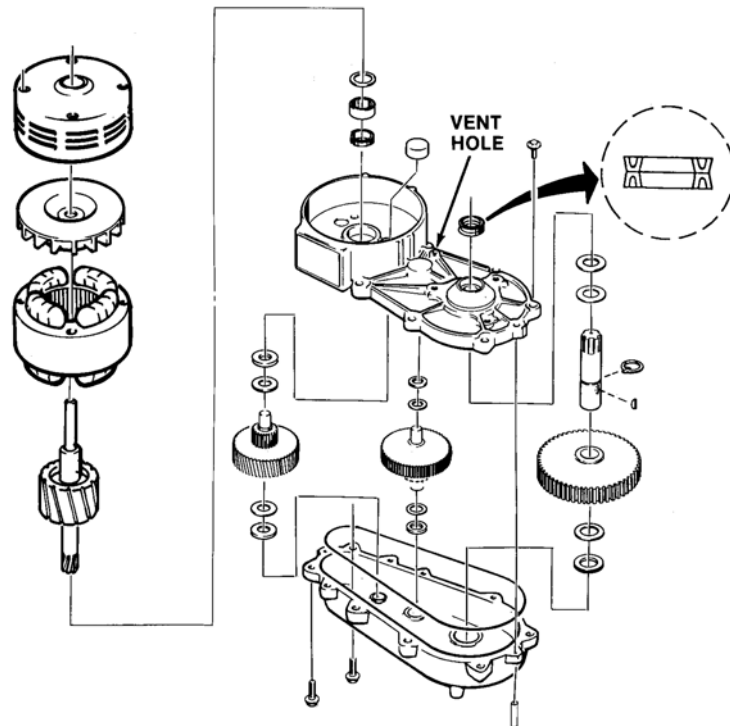


# Scotsman®

## Direct Drive Gear Reducers

### Technical Updates and Service Information



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## 1/10 HP Gear Reducer

Scotsman's versatile 1/10 HP gear reducer has been used on a variety of flakers for many years. Like the larger 1/4 HP gear reducer, it is an externally meshed compound gear system.

### Components:

- Motor: 1/10 HP shaded pole motor. Rotor supported by bronze bushing in the motor cover and ball bearing on bottom; changed to ball bearing in motor cover mid-2004
- Gear cases: Aluminum die cast with needle bearings. Revised gear reducer has ball bearings supporting output shaft.
- First gear: Phenolic for noise suppression.
- Second gear: steel
- Third gear: steel
- Output shaft: splined engagement to auger coupling
- Input (motor shaft) seal: single lip
- Output shaft seals: Bottom lip seal faces down; top lip seal faces up.
- Oil type: Citgo Pacemaker 320 grade. Viscosity Index 95.  
Note: prior lube was Mobil 600 W Cylinder Oil (not a 600 wt oil!) Viscosity Index 95
- Oil amount: 5 ounces.

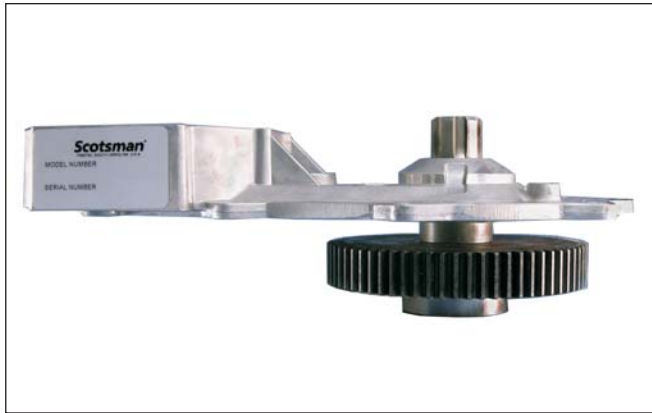
### Service Parts:

All internal parts are available to repair the current and recent 1/10 HP gear reducer. Complete gear reducers are also available, either with or without a motor. Motors sold as a kit including rotor, winding and housing.

- 1/10 HP gear reducers built prior to 1978 are not recommended for repair.
- Gear reducer case revised in 2007
- 115 volt, 60 Hz motor kits include rotor and mounting bolts
- Switch kit includes mounting components and actuator
- Gearcase cover includes bearings and seals
- Current gear case cover includes output gear and shaft
  - Gearcase includes bearings
  - Other parts are available separately



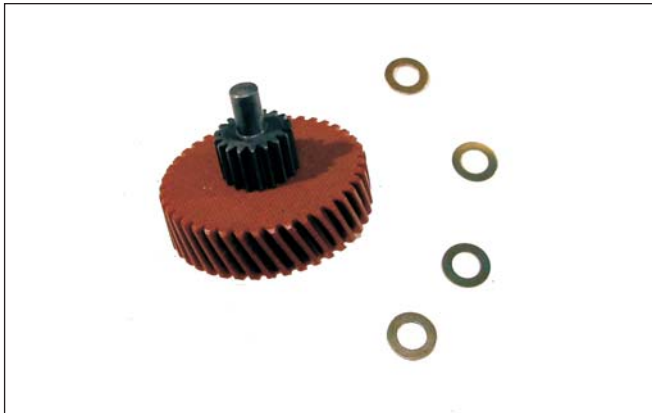
# Main Service Parts 1/10 HP



Current Gear Case Cover with Output Gear & Shaft



Prior Gear Case Cover



First Gear, Washers and Spacers



Prior Gear Case



Second Gear, Washers and Spacers



Prior Output Gear, Shaft, Key, Snap Ring, Washers and Spacers

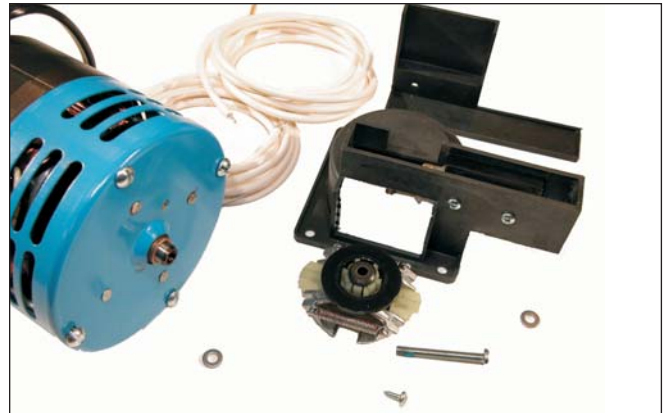
## Motor - 1/10 HP

Motor Kit: Individual rotor or winding no longer available. Kit includes winding, motor cover and rotor.



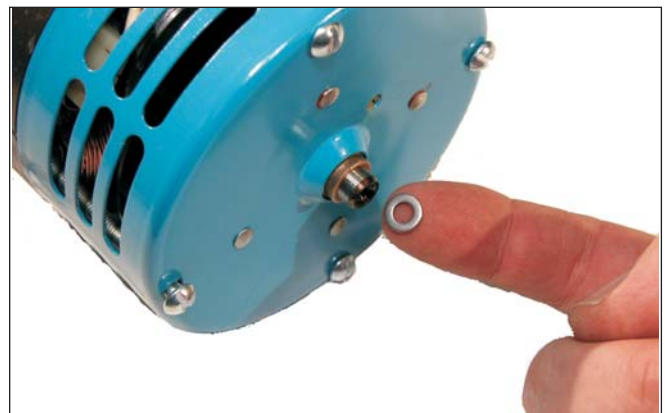
**Motor Kit**

Switch Kit: Includes housing, actuator mechanism, switch and wires



**Motor with Switch Kit**

Spacer or shim between rotor and actuator changed thickness in 2003 to bring actuator closer to switch arm for more positive shut off of compressor.



**Note Spacer, mounts between rotor and actuator mechanism - included with motor AND switch kit. Use only one.**

## Related Parts - 1/10 HP



Output Shaft Water Shed



Input or Motor Shaft Seal



Auger Drive Coupling



Adapter Stand. Note machined surfaces.



Motor Housing Kit

Motor Housing Kit, part number A38487-001, is shown to the left.

The kit includes motor housings for the prior bushing design (blue) and for the current ball bearing design (green).

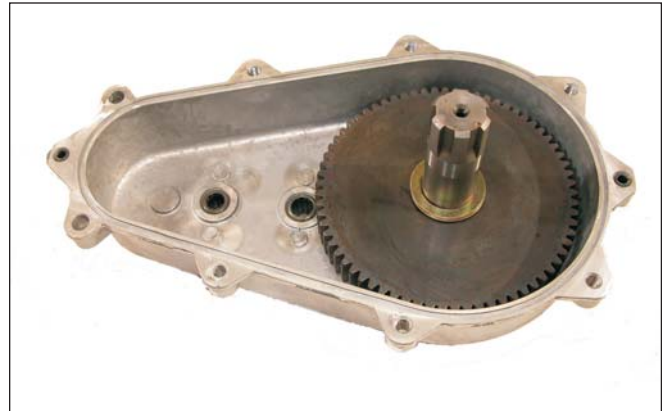
The loose parts are for the current design. The spring washer goes between the ball bearing and the housing, the small washer goes between the ball bearing and the rotor shaft.



## **Service - 1/10 HP - Refer to parts list for washer positions and initial count**

Prior Gear Reducer: Output gear and shaft. Assemble output gear, key and shaft. Place washers in gear case and insert gear and shaft.

Current Gear Reducer: Output gear, bearings and shaft are an assembly and are part of gear reducer cover. Remove from cover and insert into case.



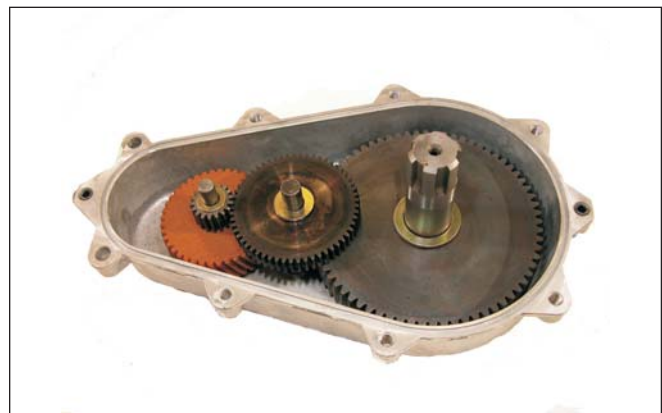
**Prior gear case with output gear installed**

First Gear. Place washers in gear case and insert first gear into bearing.



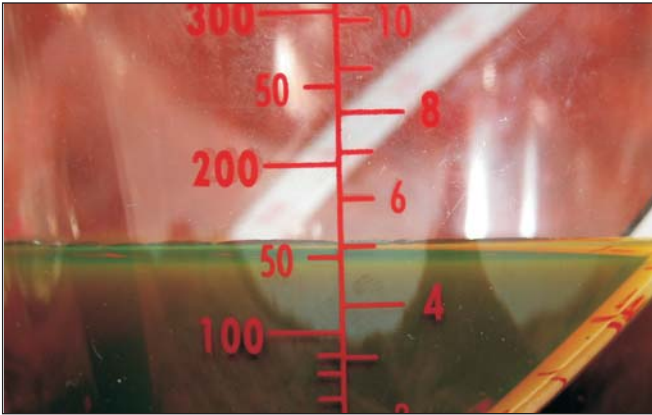
**First gear and output gear installed**

Second Gear. Place washers and shims in gear case, and insert second gear. Be sure second gear does not rub output gear. If it does add more shims (thin washers). Do not add too many or second gear will bind when the cover is put on. Add washers to top of gear shafts.

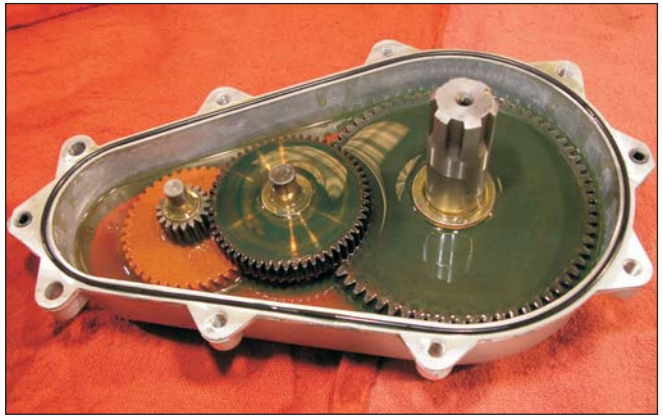


**All gears installed**

# 1/10 HP - Gear oil and case assembly



Measure 5 oz of gear oil



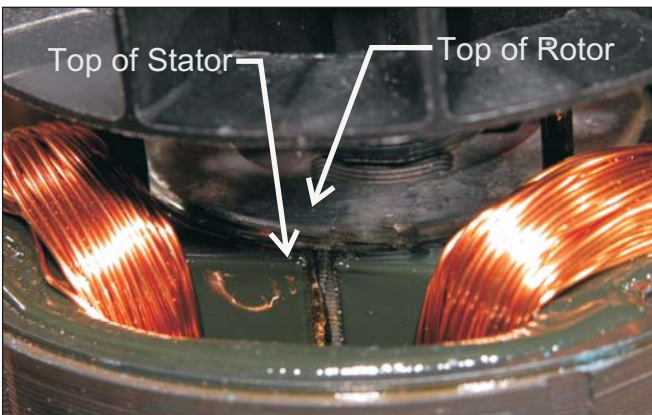
Add o-ring. Pour in oil, note level



Proper oil level - just below top of output gear



Place cover on gear box. Drive in alignment pins before inserting & tightening screws.



Place rotor & stator on case cover. Be sure rotor bearing is completely seated in cover



Put cover on motor



# Final Assembly - 1/10 HP



Add switch actuator.



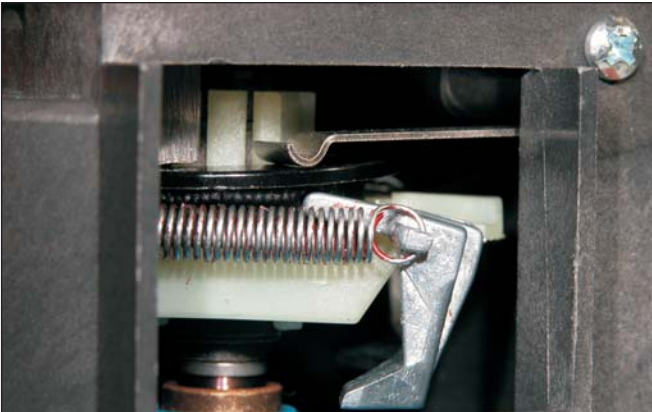
At rest, switch must be open



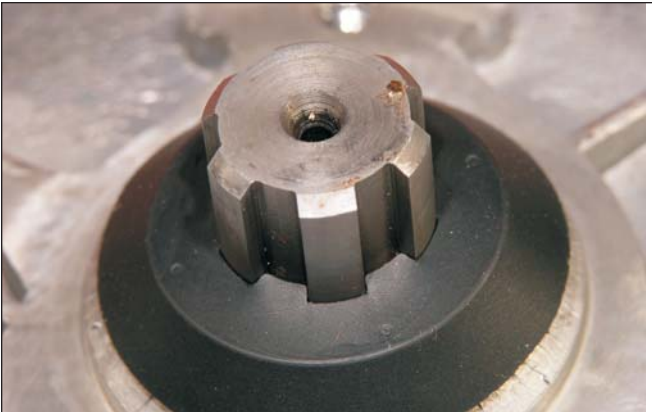
Add switch cover, secure motor & cover to gear reducer



Check assembly, be sure alignment pins are in and bolts tight.



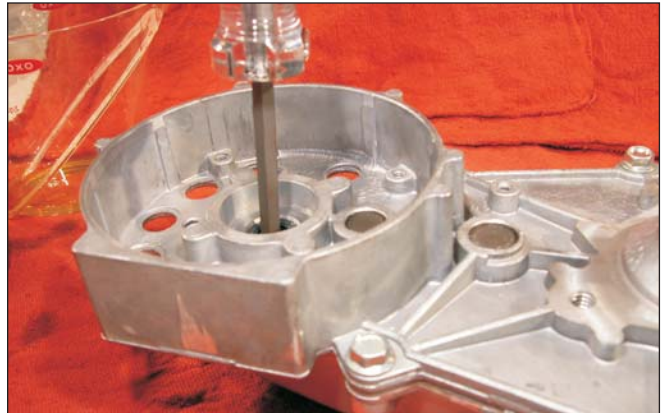
Check switch actuation, switch must close but arm must not ride on actuator when its fully down.



Add water shed. Put liberal amount of grease under water shed.

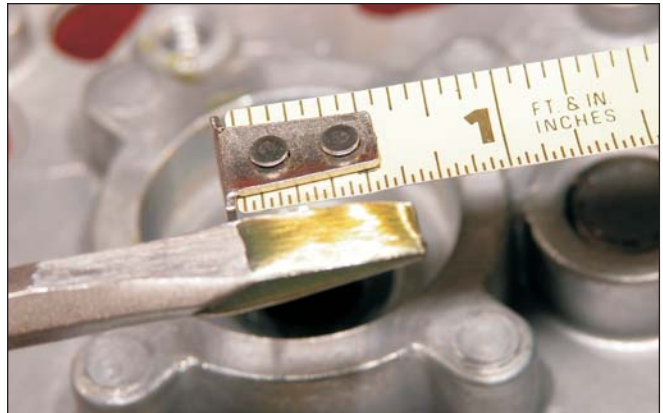
## Service Information - 1/10 HP

The motor must be removed to check the oil level. The gear case cover must be removed to check the gear bearings.



**Check Oil Level. Remove motor, insert clean screwdriver.**

Water in the gear reducer will raise the oil level and change the look of the liquid. If there is water, it entered the gear reducer by going through the output shaft seal and bearing. Due to likely bearing and shaft damage, the gear reducer should be replaced when water is found in the gear reducer.



**Proper oil level, about 5/8" deep. If overfilled, remove and replace oil Check bearings for water damage.**

Noise: A clicking noise that sounds like it is coming from the evaporator is typically caused by a mis-alignment of the gear reducer output shaft and the auger. Test by adding lubricant to the top of the coupling. If the noise goes away, the alignment is at fault. Replace the adapter stand, coupling and gear case cover.



**Adapter stand on gear case cover**

## 1/4 HP Gear Reducer

The 1/4 HP gear reducer is used on all of Scotsman's current Nugget ice machines. It is also used to drive the augers of the flaked ice versions of those models.

### Components

- Motor: 115 volt or 230 volt versions. 1/4 HP split phase.
- Gear Case: Aluminum die cast, no bearings
- First gear: Phenolic for noise suppression. Pressed on ball bearing.
- Second gear: Steel. Pressed on ball bearing.
- Output gear: Steel, pressed shaft and bearings. Supplied with gear case cover.
- Output shaft. Provides engagement to auger, uses centering pin for auger alignment. Supplied with gear case cover.
- Input or motor shaft seal. Labyrinth type with o-ring to seal rotor bearing to cover.
- Output shaft seal. Lip seal, supplied with gear case cover.

### Service Parts

- Output shaft, bearings, seal and gear supplied assembled to case cover
- Gear reducer kit available complete without motor
- Motor supplied with end bell and start switch
- Start switch and rotor bearing available separately, but parts are motor brand specific
- First and second gears supplied with ball bearings attached





# Main Service Parts - 1/4 HP



**Motor with bearings**



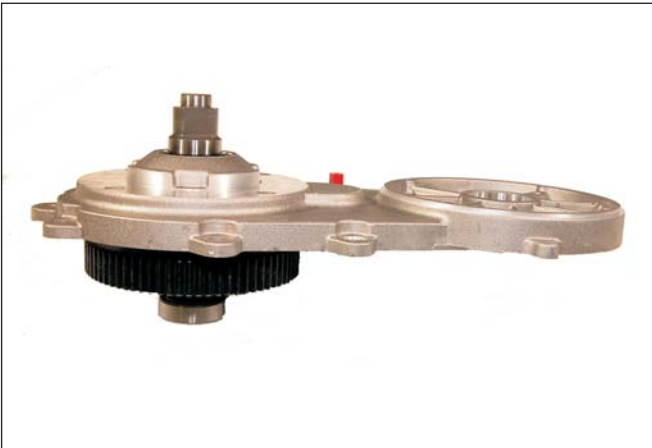
**Replacement Lube**



**First gear and bearings**



**Gear reducer kit, no motor**



**Case cover, includes output shaft, gear, shaft seal and bearings**



**Gear case**

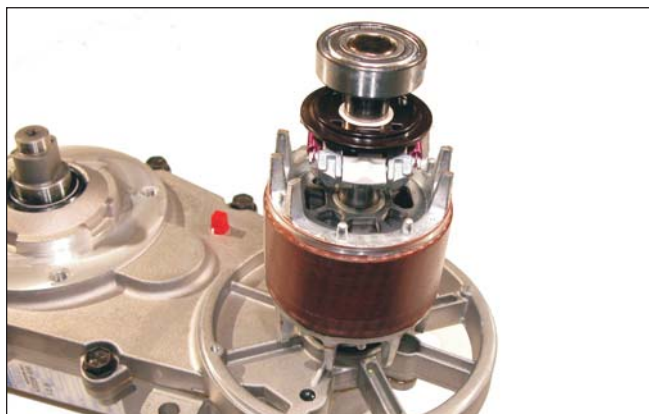
## Motor - 1/4 HP

The motor of the gear reducer is available for replacement. It comes complete, ready to be placed on the gear reducer.



**Auger drive motor**

Begin by placing the rotor in the gear case cover.



**Rotor installation**

Be sure the rotor bearing is fully seated into the gear case. Then assemble the motor stator or winding onto the gear case cover.



**Rotor bearing seated properly**



## Related Parts - 1/4 HP

The 1/4 HP gear reducers use a labyrinth seal on the input side. The o-ring seals the outer race of the drive motor's lower bearing to the case cover.



**Labyrinth Seal & Bearing O-Ring**

The water shed fits over the output shaft and acts as a deflecting mechanism for any water that may get past the evaporator water seal.



**Output Shaft and Water Shed**

## Service - 1/4 HP

Oil Level. The oil level can be checked by removing the drive motor and inserting a clean screwdriver into the hole. Because of a shelf under the motor hole, only about 3/16 of oil should be on the tip of the screwdriver blade. Any more and there may be water in the gear case, any less and it may be low. The correct oil charge is 14 ounces.



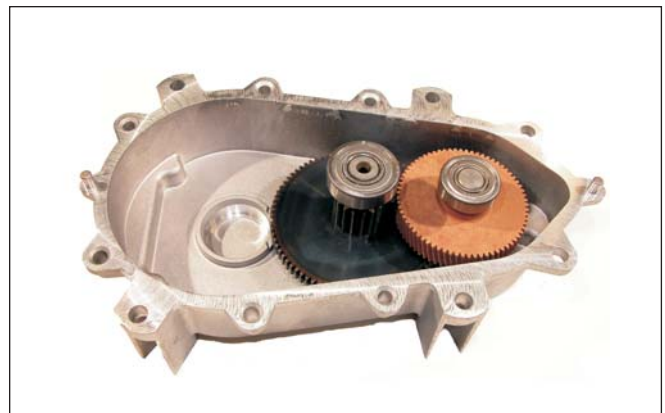
**Normal Oil Level**

Replacement gears come with new bearings pressed onto their shafts.



**First Gear**

The first and intermediate gears goes in together,



**Gear case with first and second gears installed**

## Service - 1/4 HP

The gear case cover may be assembled onto the gears & case. Be sure to use a new gasket.

Use the alignment pins to line up the two cases.

The bolts that hold the cases together are self threading.



Side view of gear case cover

An option for rebuilding the gear reducer is to use a gear case kit. It is complete with all new cases, bearings, gears, gasket and includes an oil charge in a separate container.



Gear reducer kit, no motor

In either case, the next step is to add the oil charge and install the drive motor (see page 13). After that, bench test the gear reducer.

Add a layer of grease to the output shaft area and install the water shed onto the shaft & grease.



Output shaft with water shed