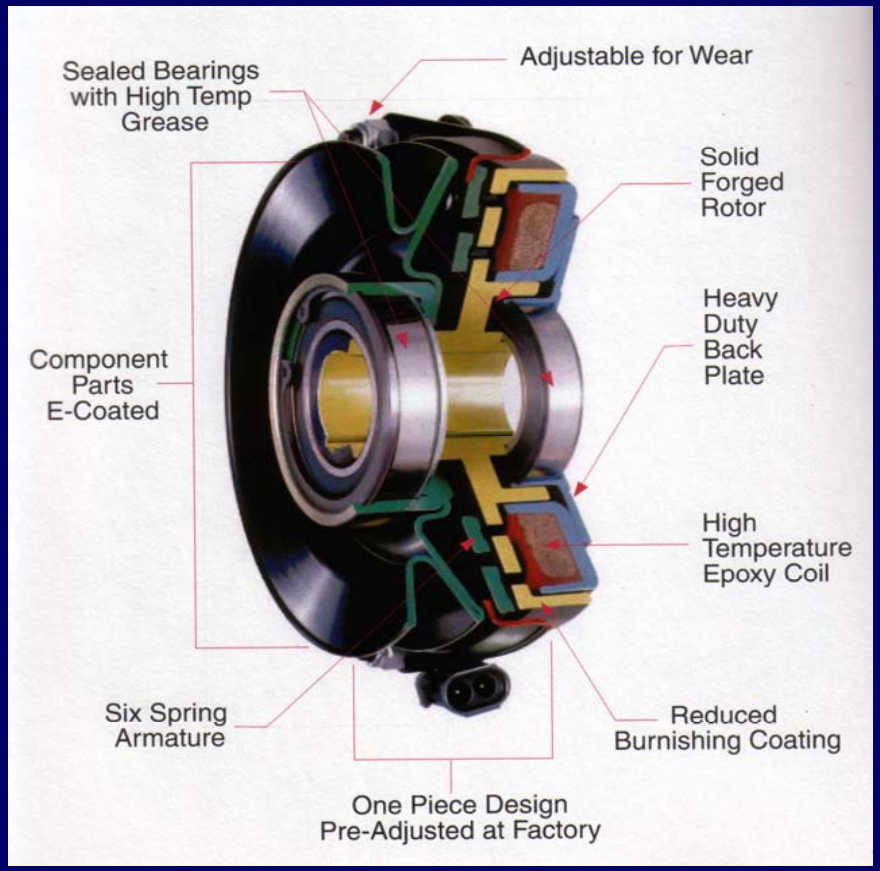
PTO Clutch/Brake

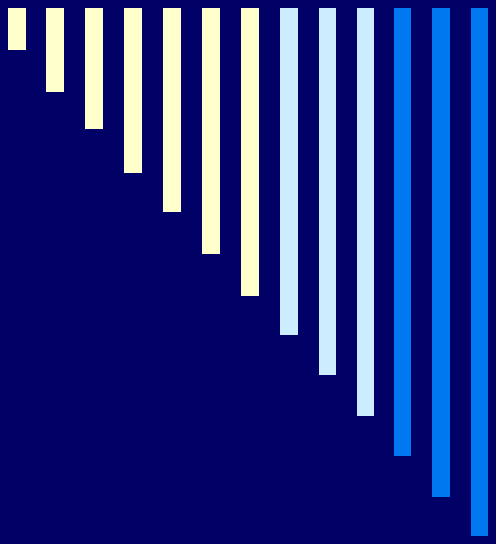
Installation and Maintenance

Ogura Design



Outline

- Pre-Installation
- Installation
- Maintenance



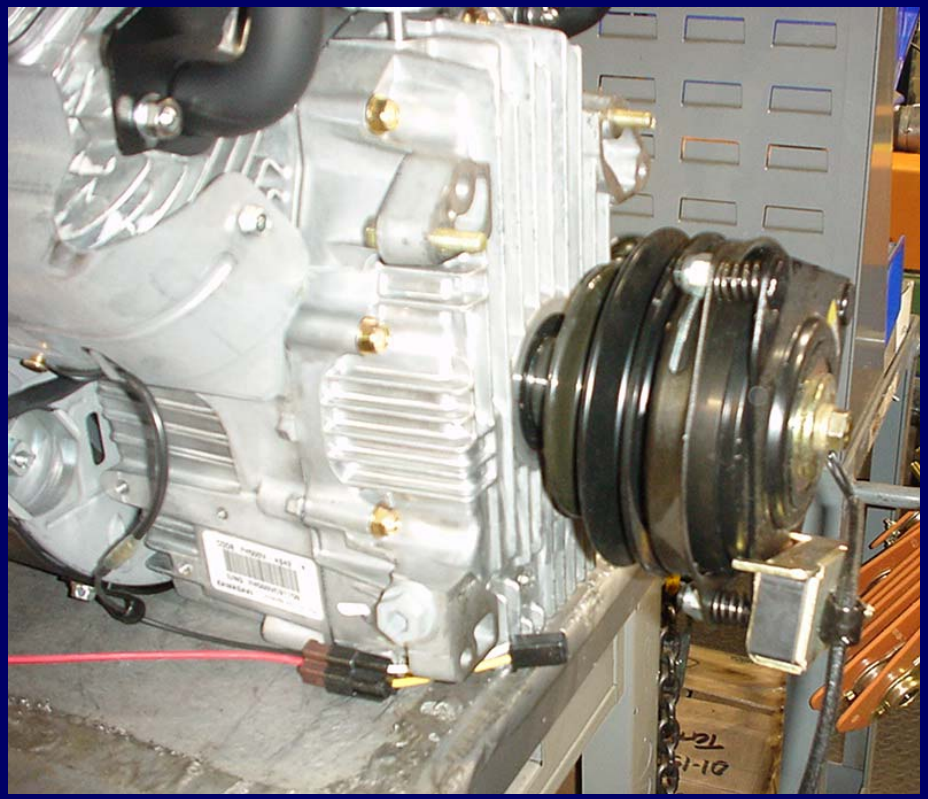
Pre-Installation

Pre-Installation Check

- Engine Shaft
- Key Length and Height
- Direction of Rotation
- Backing Plate Restraint

Pre-Installation Check
Engine Shaft

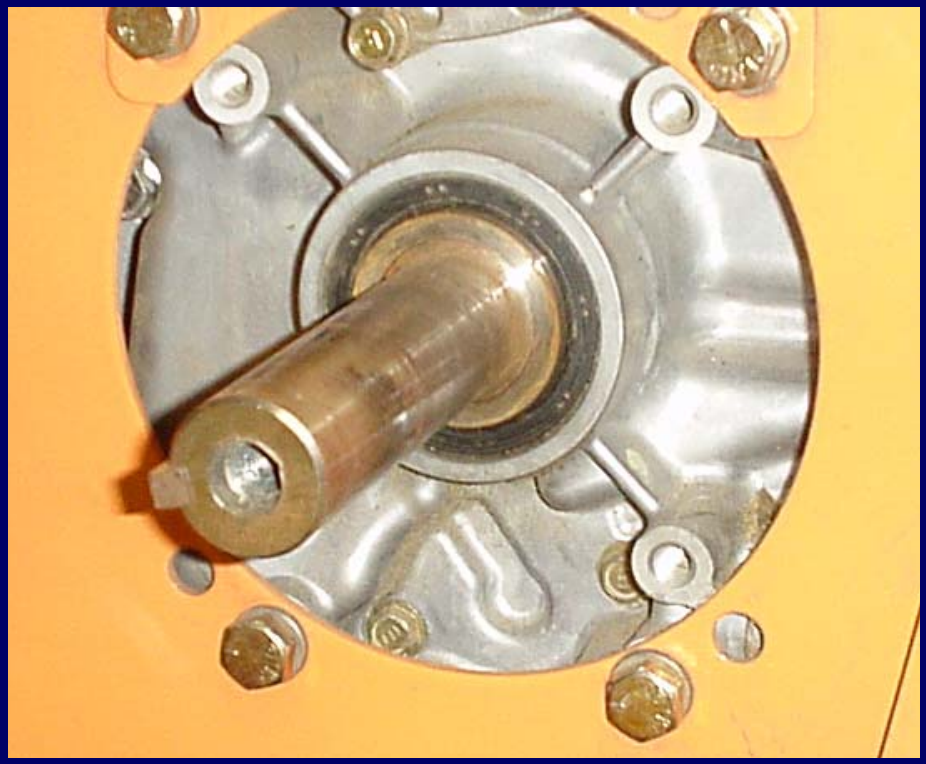
- PTO clutches are almost always mounted on engine shaft



Pre-Installation Check

Engine Shaft

- Shaft should be long enough to support clutch
  - Minimum shaft length = bore diameter



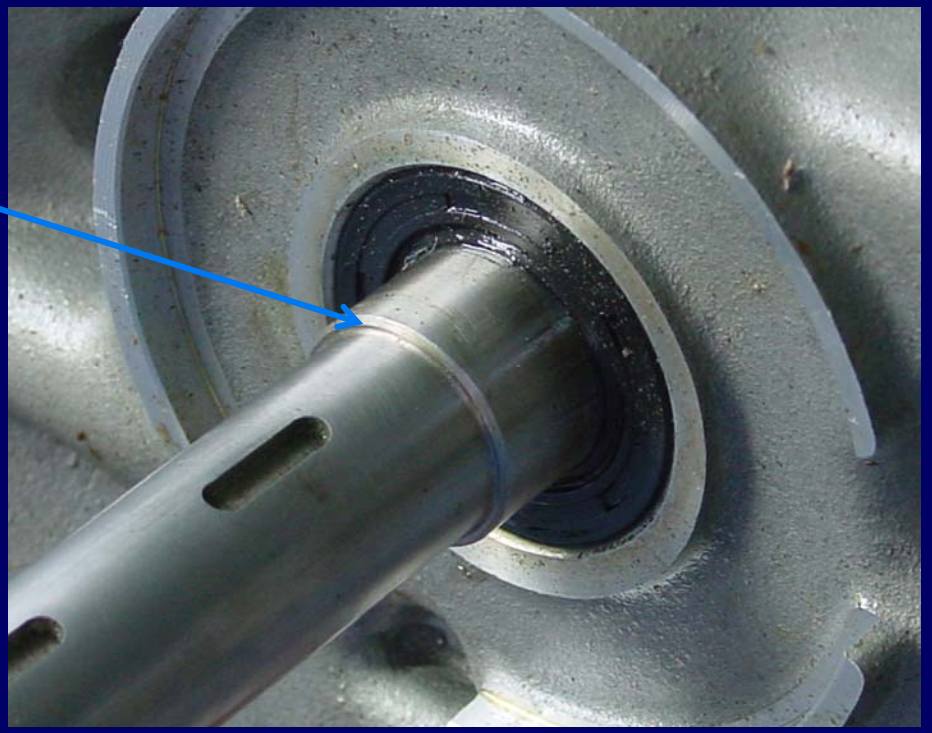
Pre-Installation Check
Engine Shaft

- For two-piece design, both halves need shaft support

Pre-Installation Check

Engine Shaft

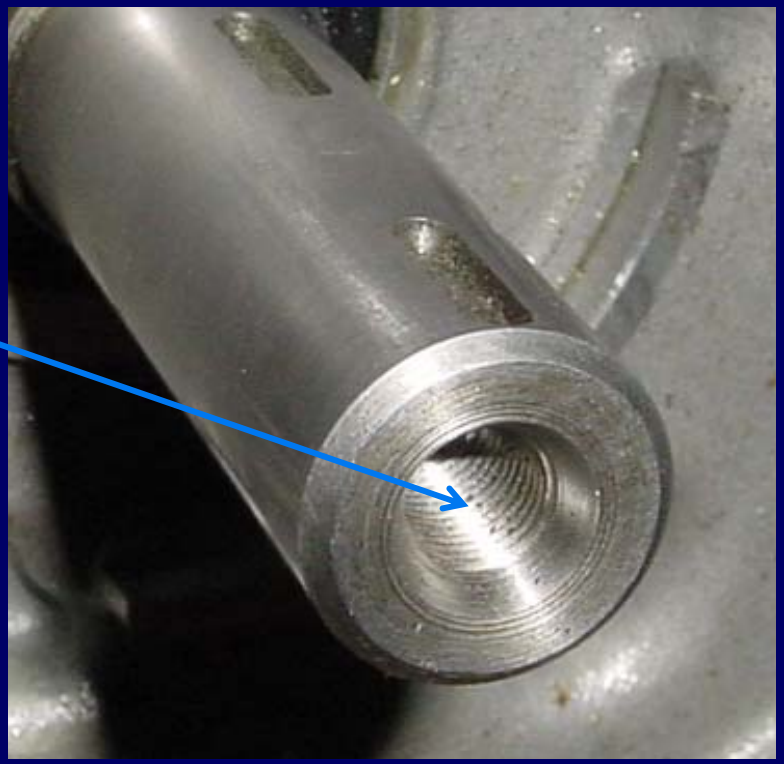
- Engine shaft needs step



Pre-Installation Check

Engine Shaft

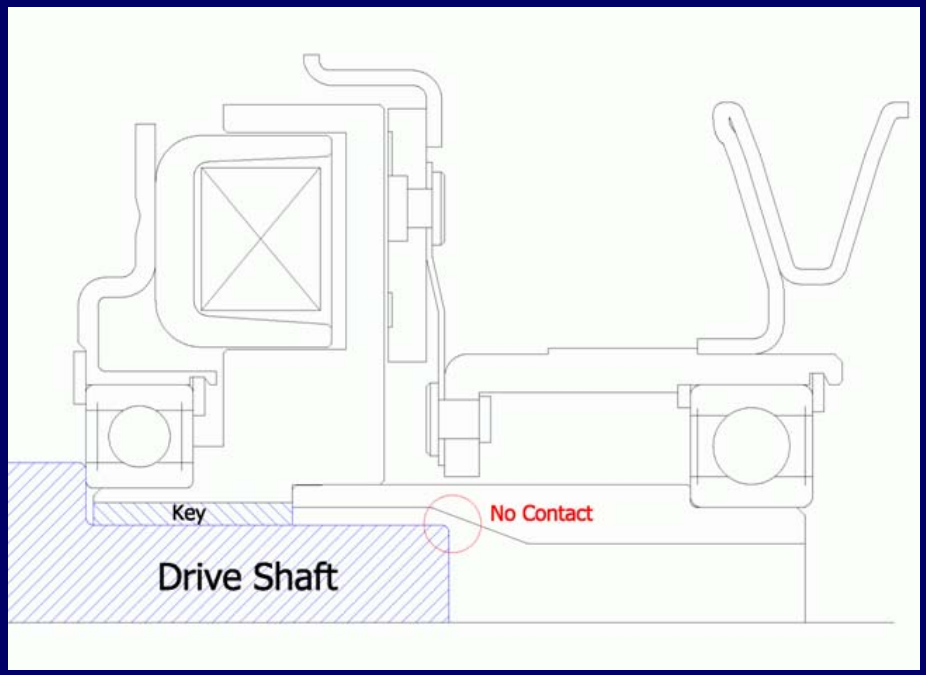
- Engine shaft needs to be tapped



Pre-Installation Check

Key Length and Height

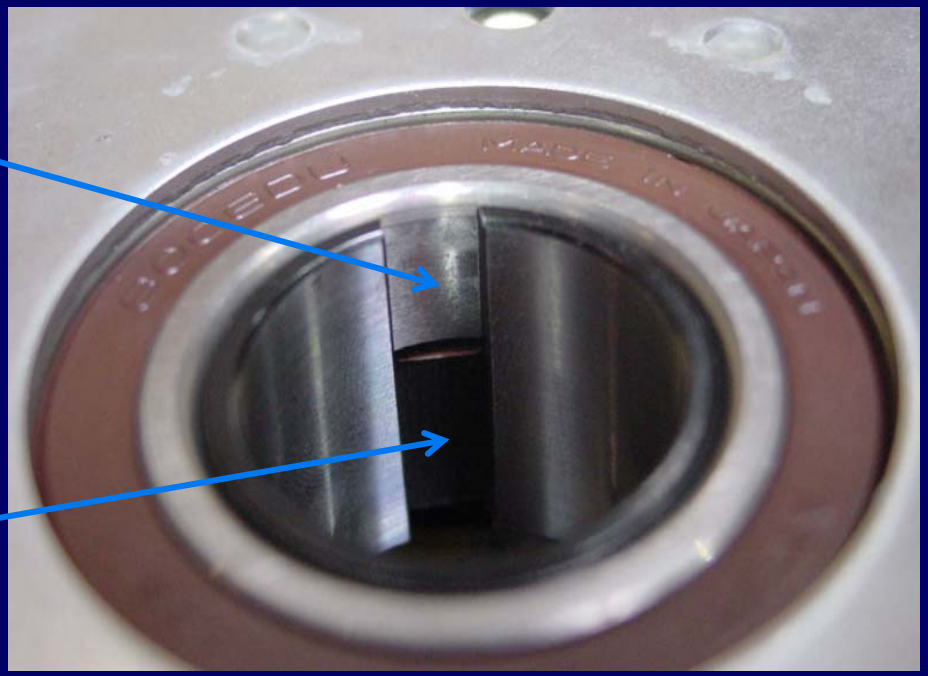
- For clutch without through- keyway (keyway in rotor only), key should be short enough that it will not hit pulley bearing carrier



Pre-Installation Check

Key Length and Height

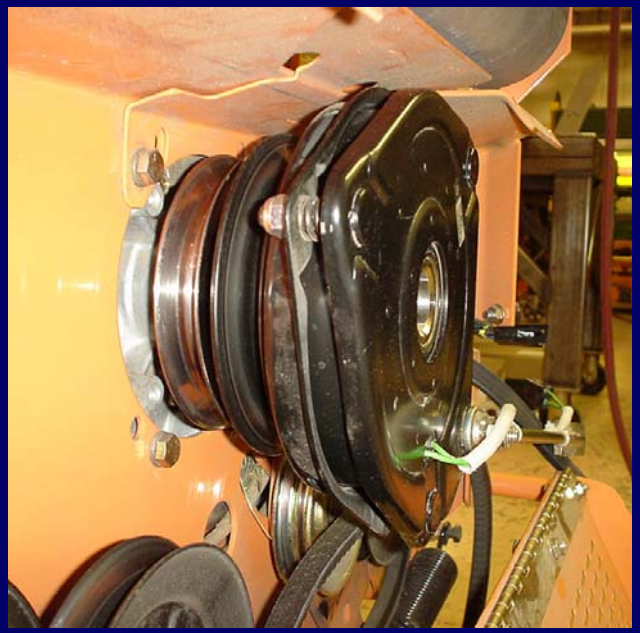
- For clutch with open keyway on field-side bearing race, key may need reduced height

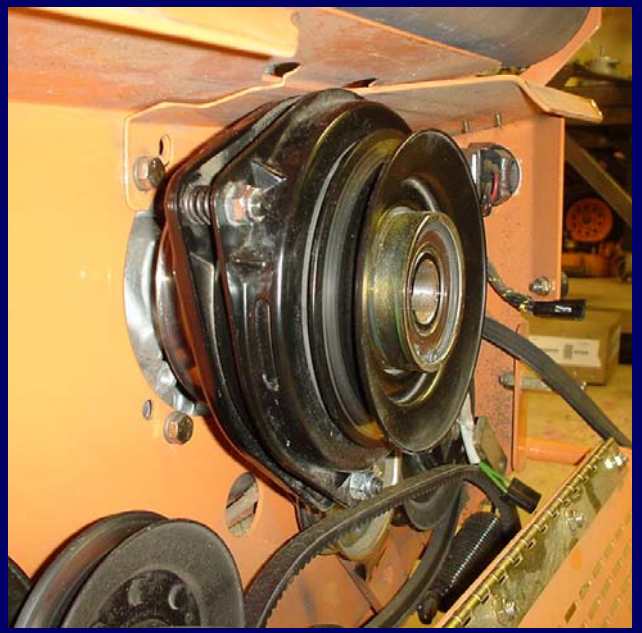


Pre-Installation Check

Direction of Rotation

- Clutches can mount with pulley facing toward or away from engine

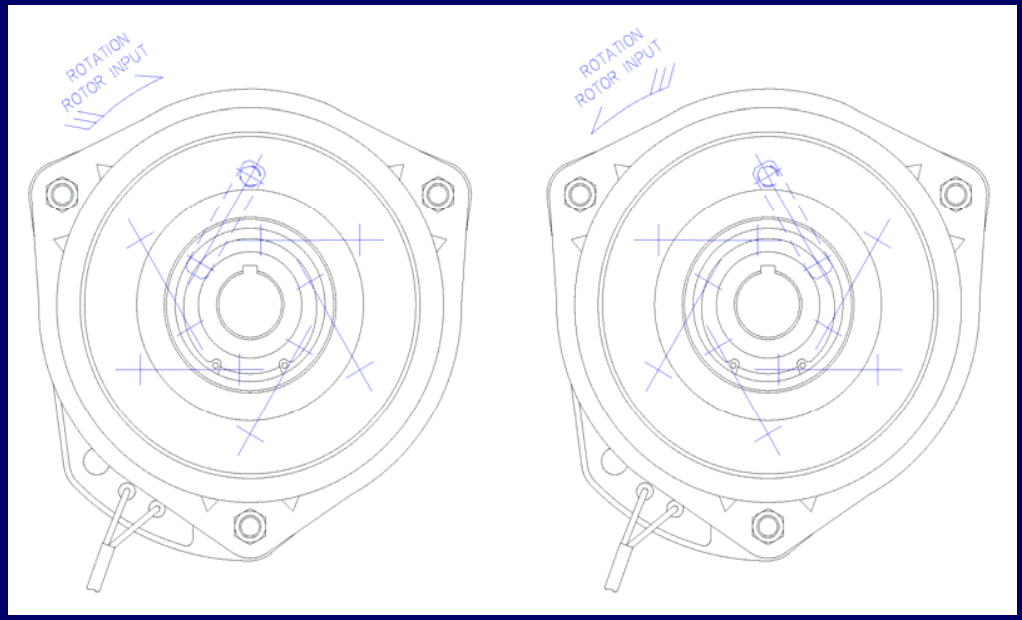




Pre-Installation Check

Direction of Rotation

- Leaf springs are set at factory to run either clockwise or counter-clockwise



Pre-Installation Check

Direction of Rotation

- Check direction of rotation to verify that spring direction is correct
- Springs should operate in tension and not compression
  (most engines rotate counterclockwise)

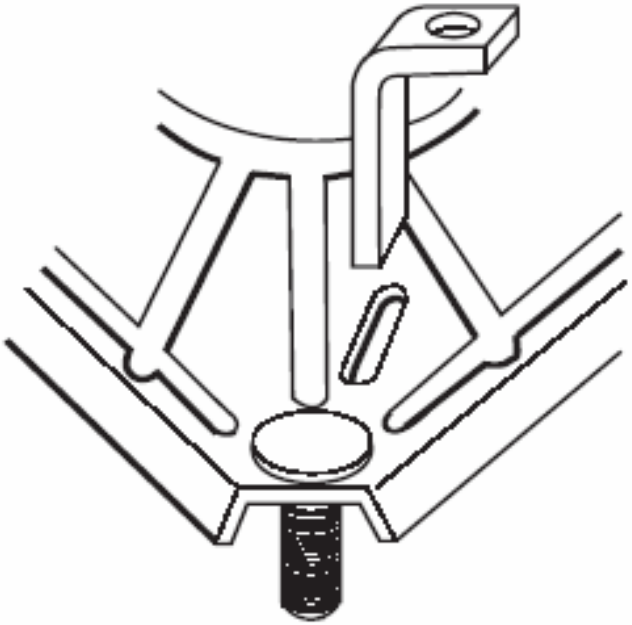
Pre-Installation Check

Backing Plate Restraint

- PTO backing plate only needs to withstand brake force
  - This can be 2 ~ 10 ft-lbs depending on clutch size

Pre-Installation Check

Backing Plate Restraint

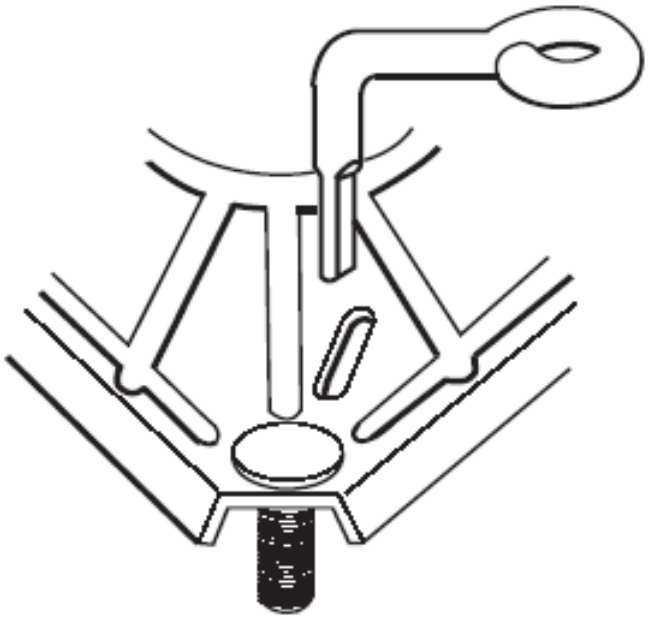


(Figure 11)
1/4" x 5/8" Bent Flat
Steel Field Restraint

- Tab Type

Pre-Installation Check

Backing Plate Restraint

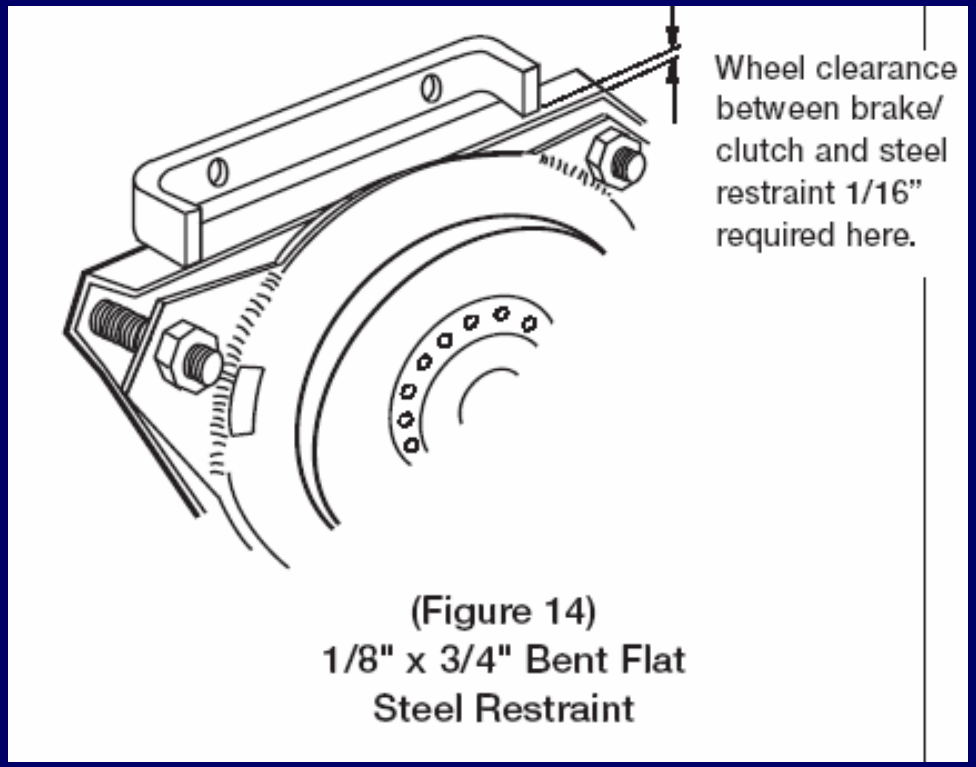


(Figure 12)
5/16" Diameter Bent Steel
Rod Field Restraint

- Rod Type

Pre-Installation Check

Backing Plate Restraint



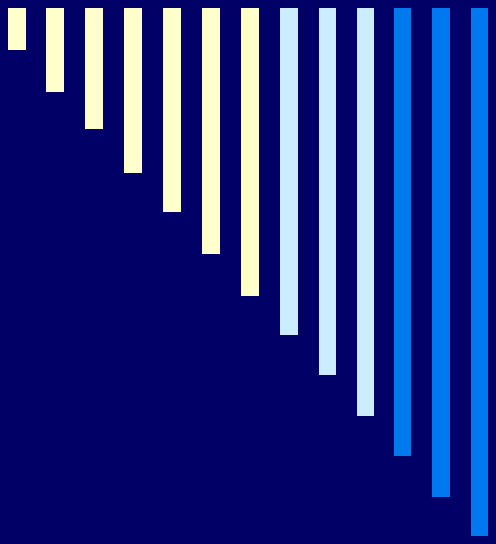
(Figure 14)
1/8" x 3/4" Bent Flat Steel Restraint

- Flat Type

Pre-Installation Check

Backing Plate Restraint

- Rubber Bushing Type



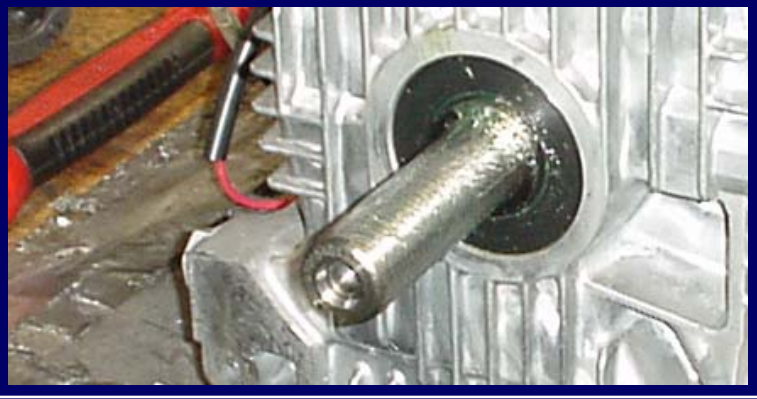
Installation

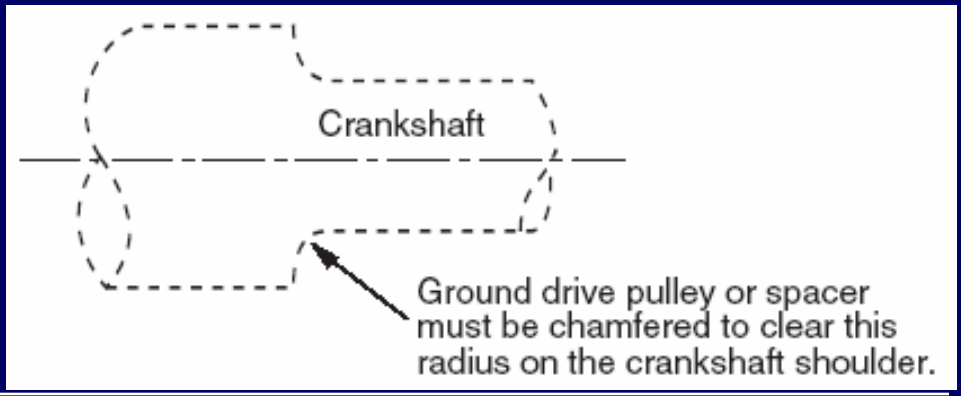
PTO Clutch Installation

① Verify appropriate shaft/pulley for clutch
② Set key in shaft keyway if required (some clutches have internal key)
③ Slide clutch onto shaft
④ Verify good contact with face of bearing inner ring
⑤ Tighten center bolt and washer
⑥ Verify backing plate has slight axial and radial freedom
⑦ Connect power
⑧ Burnish clutch

PTO Clutch Installation #1
Installing Pulley

- Most installations require drive pulley to be installed before clutch
- Pulley must not contact radius of shaft shoulder
  - Pulley must sit against shoulder face, otherwise center bolt could become loose



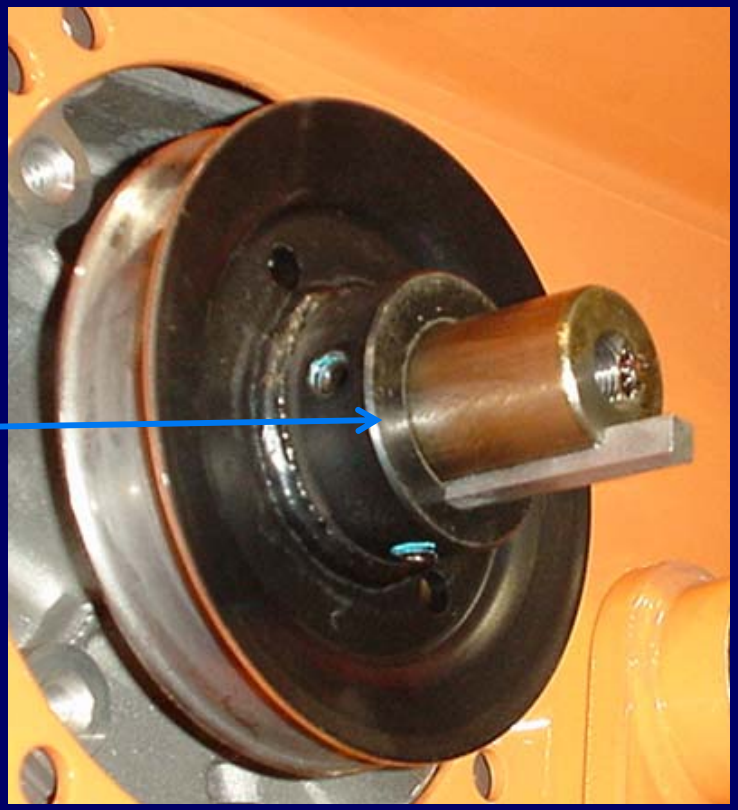


PTO Clutch Installation #2
Installing Key

- If clutch requires key, first set key in key way on shaft, then mount clutch (some clutches have internal key)
- Do not force clutch onto shaft or it will damage bearing races

PTO Clutch Installation #4
Mounting Clutch

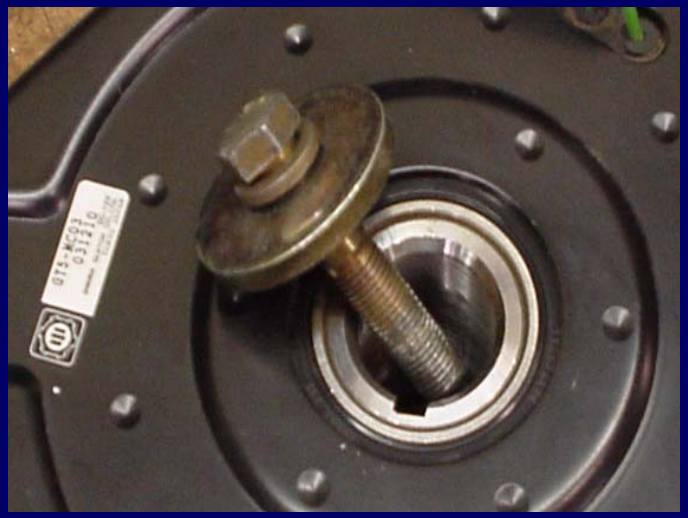
- Clutch should be mounted such that bearing race makes contact with:
  - Shaft step
  - Drive pulley
  - Washer
  - All faces must be normal to shaft within 0.003”



PTO Clutch Installation #5

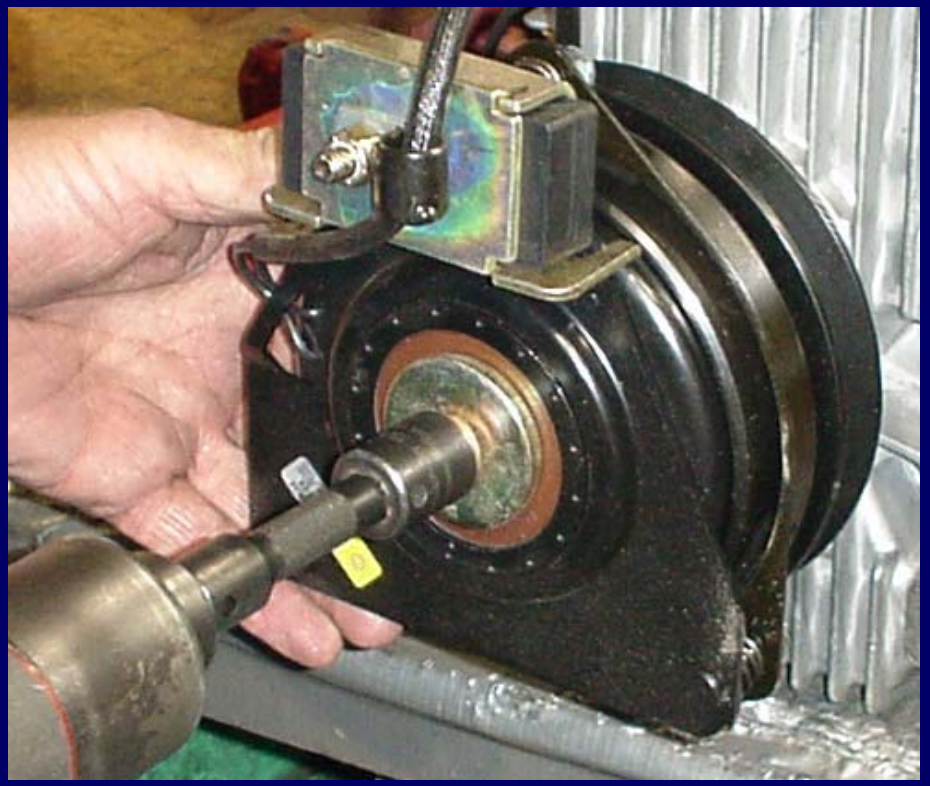
Installing Center Bolt

- Install center bolt and washer on end of tapped shaft
- Washer should be about 0.250” thick with OD ≥ ID of bearing inner ring



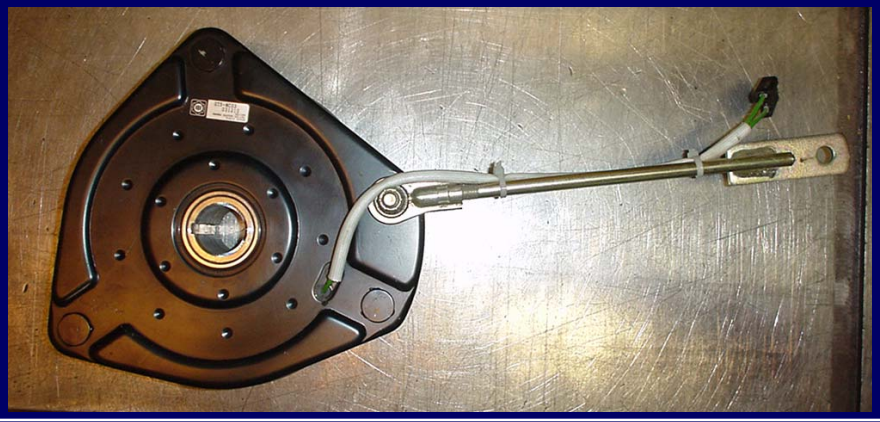
PTO Clutch Installation #5
Installing Center Bolt

- Center bolt tightening torque is based on bolt grade
  - Torque should be about 30 ~ 55 ft-lbs
- In diesel or heavy vibration application, adhesive should be used to lock bolt in place



PTO Clutch Installation #6
Installing Restraint

- Install backing plate restraint
  - If pin or slot type is used, restraint may already be on machine frame or engine face
- After mounting, verify slight axial and radial movement is present ($^1/_{16}$" ~ $^1/_8$")
  (very important to avoid field bearing failure)



PTO Clutch Installation #7
Connecting Power

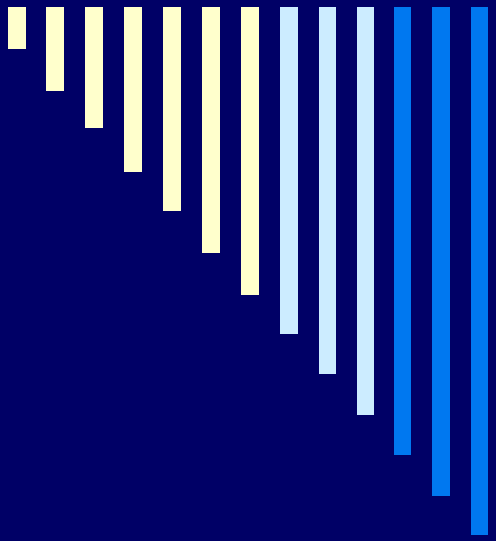
- Attach terminal housing on clutch lead wire to corresponding power terminal
- Turn on electrical power on mower without starting engine if possible
- Turn on PTO switch to verify clutch pulls in
  - Clutch will make “click” sound at engagement

PTO Clutch Installation #8
Burnishing

- What is it?
  - Wearing/mating of armature and rotor surfaces
- Why is it important?
  - To achieve greater initial torque
- How is it done?
  - Cycle clutch 20 ~ 50 times lightly loaded at under 2,000 rpm

Burnishing Recommendations

Deck Size	Cycles	On/Off
32” ~ 42”	25 ~ 50	10 / 5 sec
48” ~ 52”	25 ~ 50	10 / 10 sec
61”	25 ~ 50	10 / 15 sec
72”	25 ~ 50	10 / 20 sec



Maintenance

Maintenance

- Most clutch parts do not require maintenance and can not be replaced
  - Bearings are sealed for life of clutch
  - Armature, rotor, and brake wear evenly and can not be replaced individually
  - Coil can not be removed

Adjustment for Wear

- All Ogura one-piece clutches are adjusted at factory (no initial adjustment required)
- As adjustable clutches wear, they can be re-gapped to extend overall life

Adjustment for Wear

- If clutch fails to pull in or will not continue to pull in when hot, air gap may need adjustment
- To make adjustments, taking PTO off mower may be easier
- Necessary equipment
  - 0.015”~0.022” feeler gauge
  - $^{9}/_{16}$” open-end box wrench

Adjustment for Wear

- Identify clutch model from label located on back of field
- There are three inspection slots on brake shroud
- Place feeler gauge in slot between armature and rotor
- Slowly tighten brake nut until armature and rotor contact feeler gauge

Adjustment for Wear

- Almost all Ogura clutches use 24UNF brake bolt, thus one turn of brake nut equates to approximately 0.04” of axial movement
  (for reference only: feeler gauge is still required)

Adjustment for Wear

Adjustment for Wear

Model Type	Air Gap Range
GT1, GT1A	0.012” ~ 0.024”
GT2, GT2.5	0.015” ~ 0.024”
GT3.5, GT4, GT5	0.016” ~ 0.024”

Adjustment for Wear

- Setting gap towards low range will increase cycle life between adjustments
- Caution: do not set gap below minimum or clutch may be damaged
- Once gap is set, rotate armature and rotor, check gap with feeler gauge, and make adjustments as required

Adjustment for Wear

- Apply full voltage to clutch
- Rotate armature and rotor to verify no contact between armature and brake shroud
- If there is contact, back off brake nuts and retry until there is no contact

Thank You

EVERYTHING ABOUT AN OGURA CLUTCH WORKS

For more information on Ogura clutches, visit us on the web at

www.ogura-clutch.com