



# ACTUATOR

## INSTALLATION C-SERIES ENGINES



AI\_C

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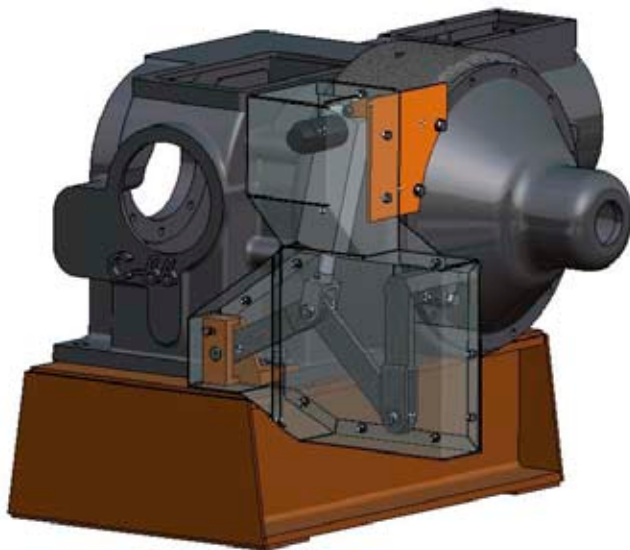




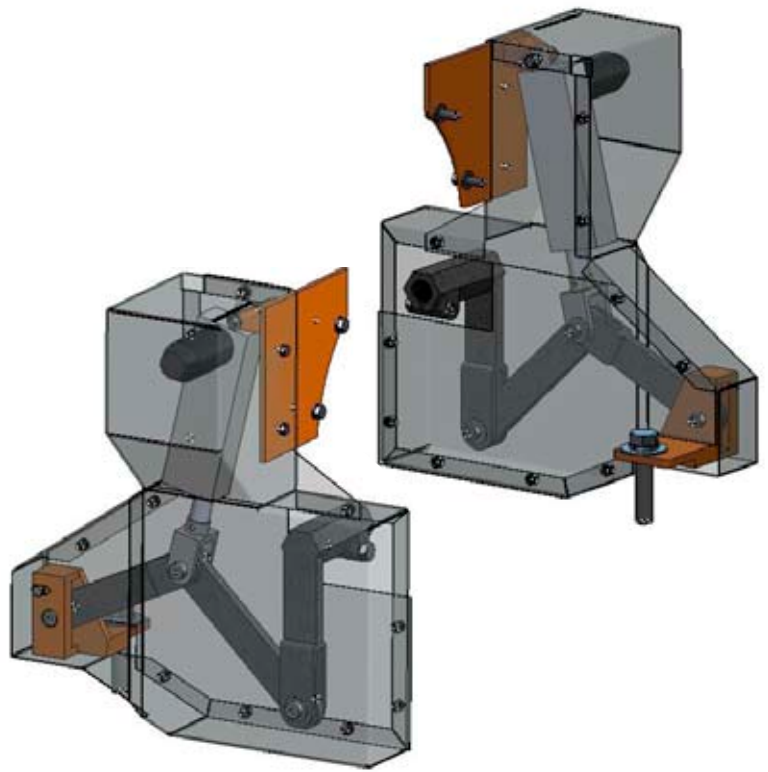


## NEW CLUTCH ACTUATOR ASSEMBLY AND ADJUSTMENT INSTRUCTIONS: C-SERIES ENGINES

Note: Images shown represent a C-66 Engine. All C-series engines have a similar configuration and actuator components will assemble in the same manner for all models.

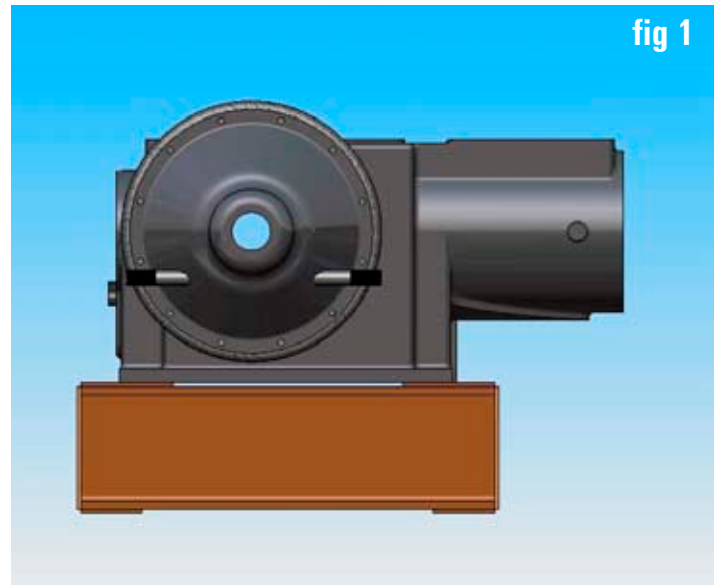


# ASSEMBLY OF KIT ONTO ENGINE



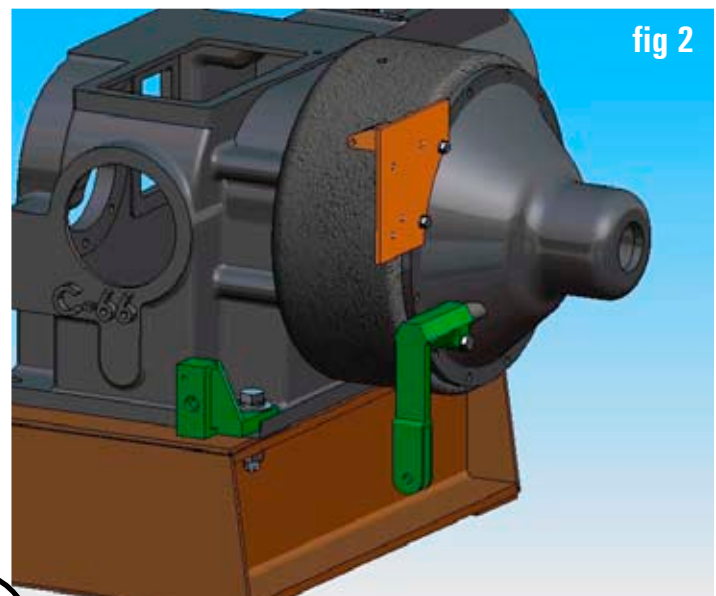
## 1. CLUTCH ORIENTATION

The clutch must be rotated so the operating shaft is oriented horizontally and toward the bottom of the engine as shown (fig 1.) This can be done by removing all of the bolts surrounding the clutch face, rotating the clutch in place, then replacing and retightening the bolts in the new location. Note: the clutch does not need to be removed from the flywheel housing in order to rotate it, only loosened.



## 2. MAIN COMPONENT ATTACHMENT

The top bracket, base bracket and splined lever should be attached to the engine as shown (fig 2.)



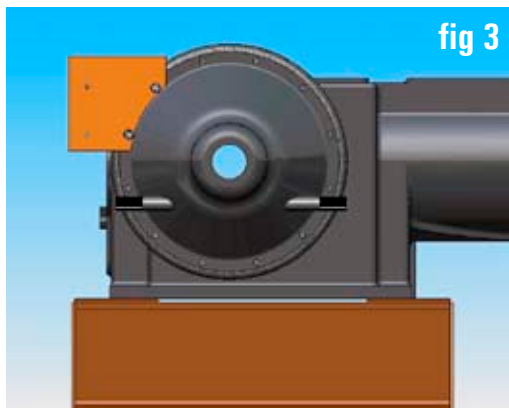


fig 3

The top bracket should be positioned as shown (fig 3,) using 2 (3/8 ID) flat washers between the bracket and the clutch housing for spacing, 2 (3/8 ID) split-lock washers and 2 (3/8-16x1.25) hex bolts as shown (fig 4 & 5.)

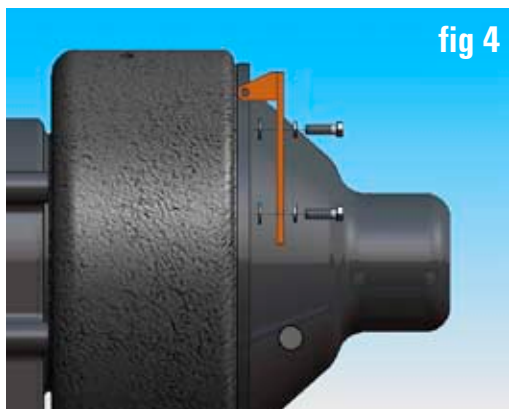


fig 4

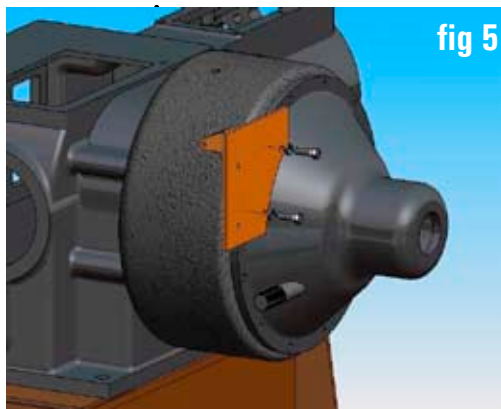


fig 5

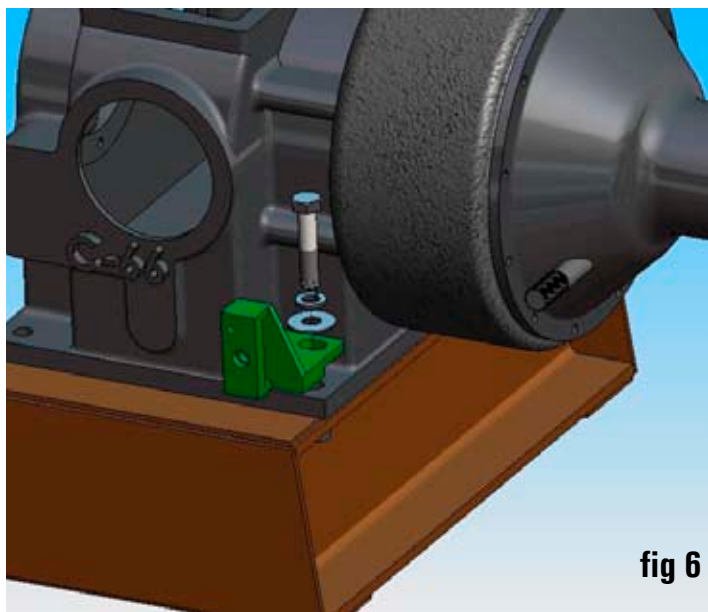
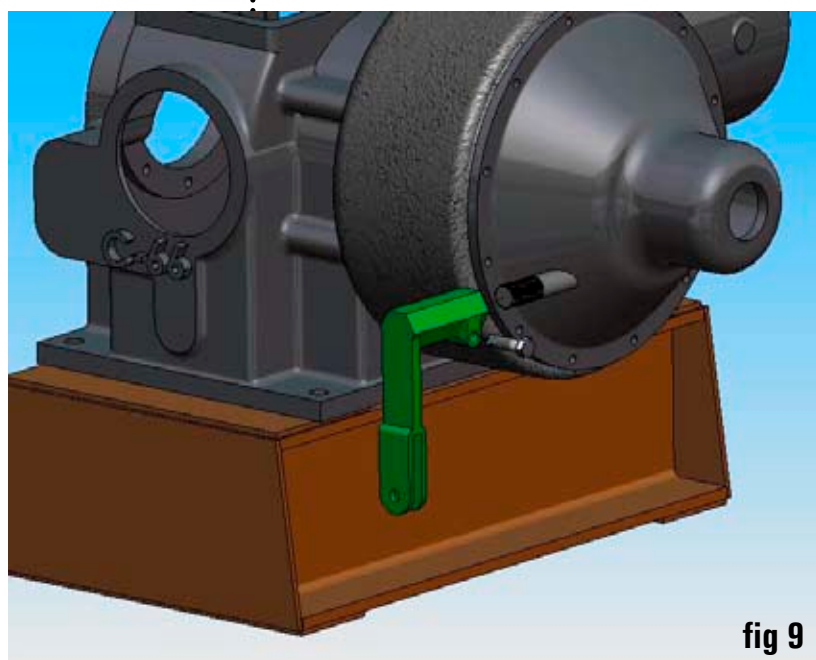
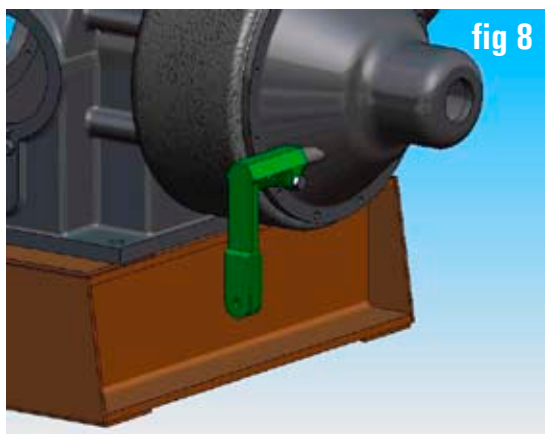
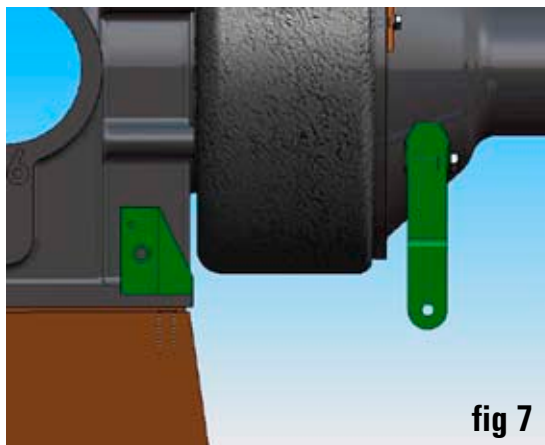


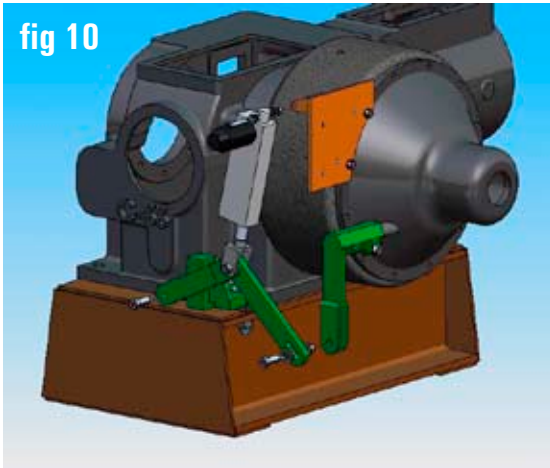
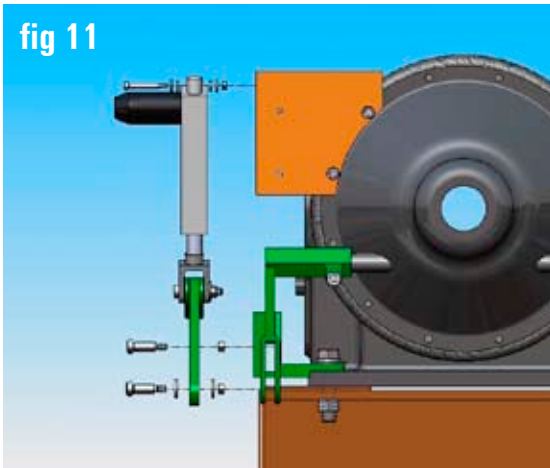
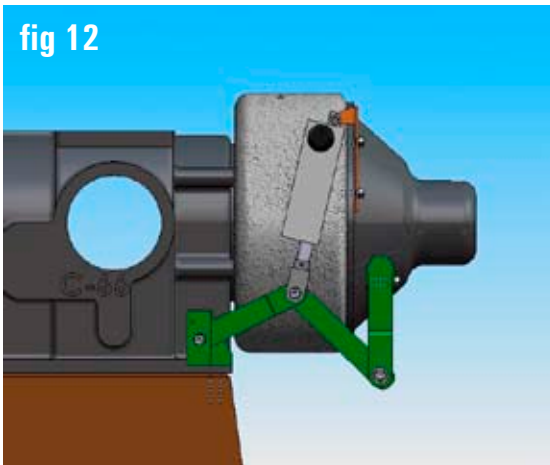
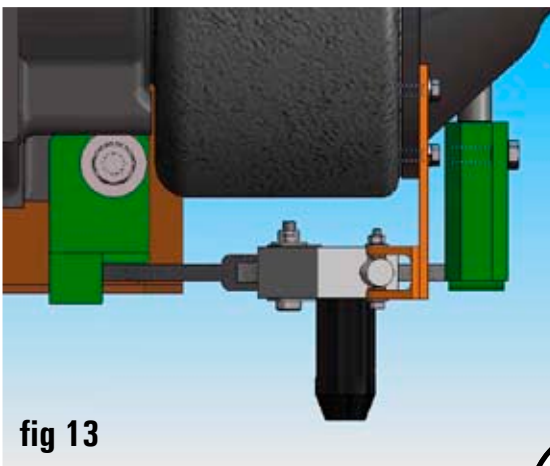
fig 6

The base bracket should be positioned as shown (fig 6.) The existing bolt that secures the engine case to the base should be removed. The base bracket should be attached using 1 flat washer, 1 split-lock washer, and 1 hex bolt. (C46 and C66 engines will use a 3/4-10x3.5 bolt with 3/4 ID washers. C96 and C106 engines will use a 7/8-9x3.5 bolt with 7/8 ID washers.) Do not fully tighten the bracket to the engine base; further adjustment will be necessary.



Slide the splined lever onto the operating shaft and secure in place with a 1/2-13x1.75 hex bolt. Position the lever so that it is as near vertical alignment as possible with the clutch operating shaft in the disengaged position. (Note: The splined lever may later have to be rotated either direction by one spline during adjustment.)



**fig 10****fig 11****fig 12****fig 13**

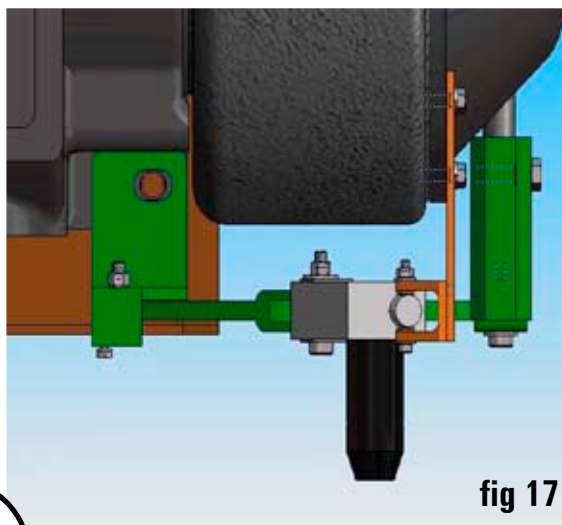
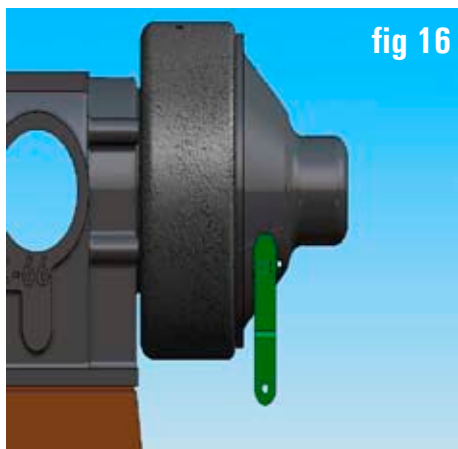
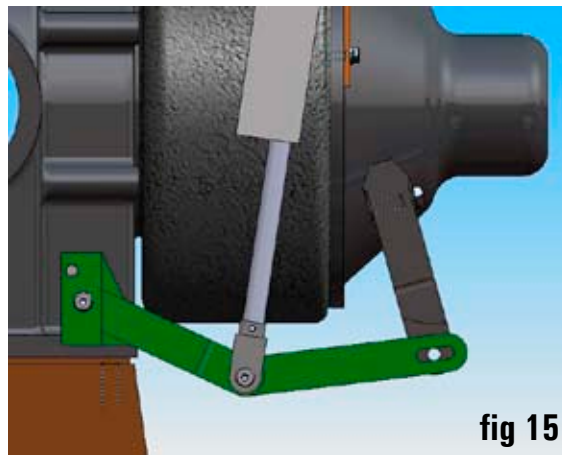
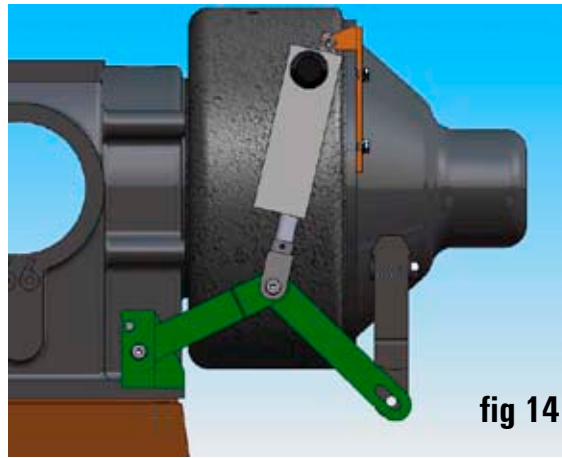
The assembled actuator unit (consisting of the linear actuator, clevis, 6mm rollpin, 1/2x1.75 long shoulder bolt, 1/2 ID flat washer, 3/8-16 locknut, base linkage bar, and slotted linkage bar) will attach to the three locations as shown (fig 10-13.) The linear actuator will attach to the top bracket using one 5/16x1.75 long shoulder bolt, two 5/16 ID flat washers, two 5/16 ID brass spacers, and one 1/4-20 locknut. The base linkage bar will attach to the base bracket using one 1/2x1.25 long shoulder bolt and one 3/8-16 locknut. The slotted linkage bar will attach to the splined lever using one 1/2x1.25 long shoulder bolt, two 1/2 ID flat washers, and one 3/8-16 locknut.

### 3. ADJUSTMENT

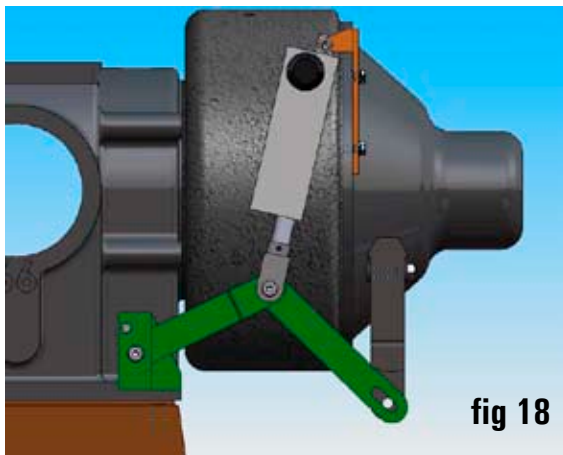
Proper adjustment of the clutch actuator is critical to operation and to ensure longevity of the clutch and actuator. The intent of the design and the goal of the adjustment process is for the clutch to engage when the actuator is on its outward stroke and the two linkage bars become in line with each other. (Excessive binding in the linkage can cause damage to the clutch and/or the actuator.) After the clutch engages, the actuator should continue to travel outward, allowing the slotted linkage to relieve the engagement pressure on the clutch.

While the actuator is in the fully retracted, disengaged position, the shoulder bolt in the splined lever joint should be approximately centered in the slot of the linkage bar (fig 14.) Once the actuator is fully extended and the clutch is in the engaged position, the shoulder bolt in the splined lever joint should, again, be approximately centered in the slot of the linkage bar (such that any force is removed from the clutch shaft) (fig15.)

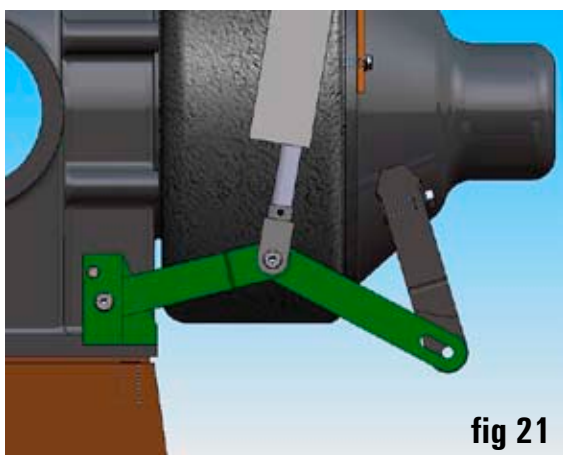
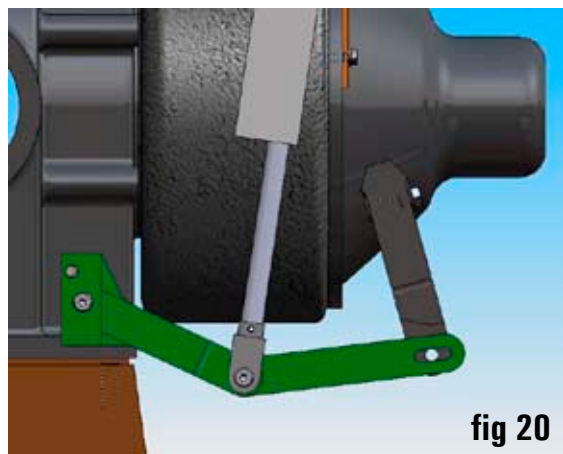
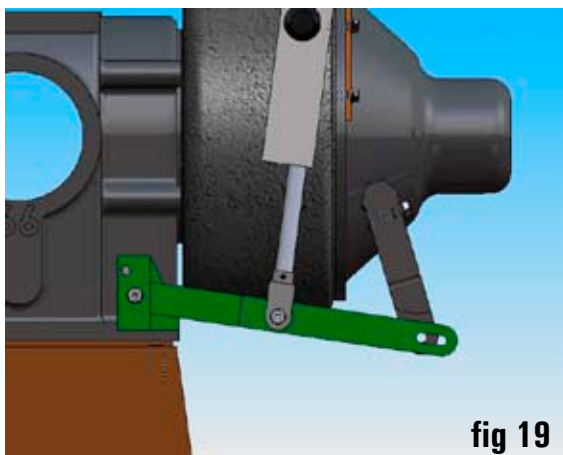
The splined lever should be positioned initially, as near vertical (pointed downward) as possible, with the clutch disengaged (fig 16.) The base bracket should begin with the bolt securing it to the base positioned approximately in the center of the slot and fully tightened so that the base bracket does not move during clutch engagement/disengagement (recommended 180-200 ft-lbs for  $\frac{3}{4}$  grade 5 fasteners; 250-270 ft-lbs for  $\frac{7}{8}$  grade 5 fasteners).





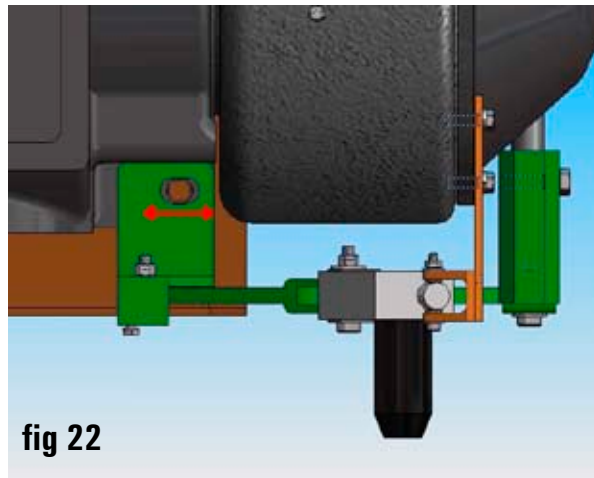


Extend the actuator (confirming that clutch engagement occurs) and check final position of the shoulder bolt in the slot (confirming that it is approximately centered and not applying any pressure to the clutch). fig 18-19-20

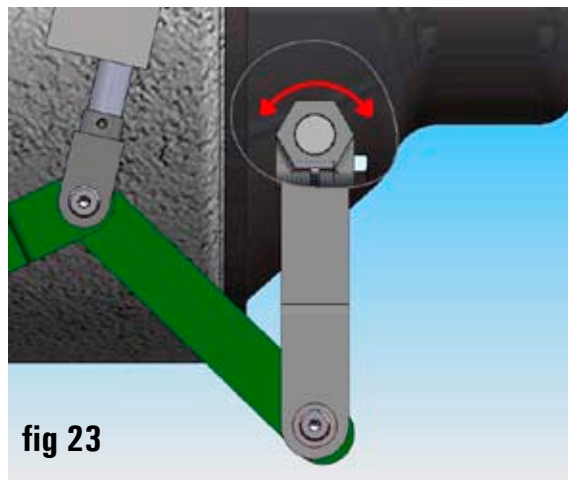


Retract the actuator (by reversing polarity to its leads), confirming that clutch disengagement occurs and the linkage returns to its starting position. fig 20-19-21-18

If during extension or retraction, the clutch is not fully engaged (or disengaged) or the shoulder bolt does not come to rest centered in the linkage bar slot, adjustments must be made as necessary. The two locations for adjustment are the base bracket and the splined lever. The first adjustment that should be made is to move the base bracket one direction or the other within the slot (depending on the direction needed for proper clutch engagement/disengagement) while maintaining a finished position with the bolt centered in the slot (fig 22.)



If proper adjustment cannot be reached by altering the position of the base bracket alone, the splined lever should be removed from the operating shaft and be repositioned, rotating it on the operating shaft by one (1) spline one direction or the other (fig 23.) (Do not rotate the splined lever more than one (1) spline rotation from vertical either direction when in the disengaged clutch position.)



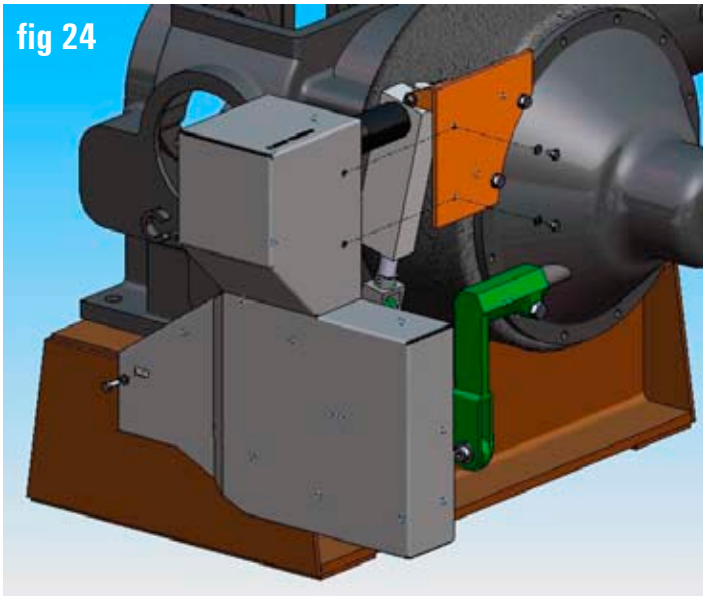
A combination of fine adjustments in these two locations will ultimately, first, allow the clutch actuator system to fully engage the clutch, then release the applied pressure by centering the bolt in the linkage slot; then, second, allow the linkage to disengage the clutch, returning the bolt to the center of the slot in the linkage.

After the clutch has been properly adjusted for operation, all bolts should be checked and tightened as necessary.

If further adjustment assistance is necessary, please contact David Johnson at Arrow Engine Company. 1-800-331-3662.



fig 24

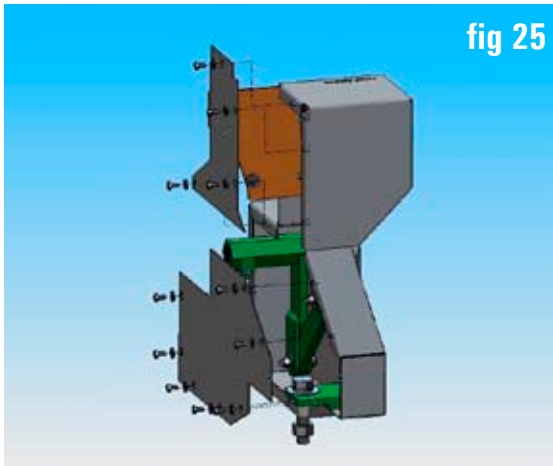


## 4. COVER ATTACHMENT

After the clutch actuator linkage has been adjusted and correct operation has been verified, the protective cover can be attached.

The outer cover should be attached to the top bracket using two  $\frac{1}{4}$  flat washers and two  $\frac{1}{4}$ -20 x .625 bolts as shown. The outer cover should also be attached to the base bracket through the slot in the cover using one  $\frac{5}{16}$  flat washer and one  $\frac{5}{16}$ -18 x .625 bolt as shown (fig 24.)

fig 25



The two-piece shield cover-plates install as shown, using  $\frac{1}{4}$ -20 x .625 bolts and  $\frac{1}{4}$  ID flat washers (fig 25, 26, 27.) The actuator wires should be positioned to exit the cover from the notch in the upper corner.

fig 26

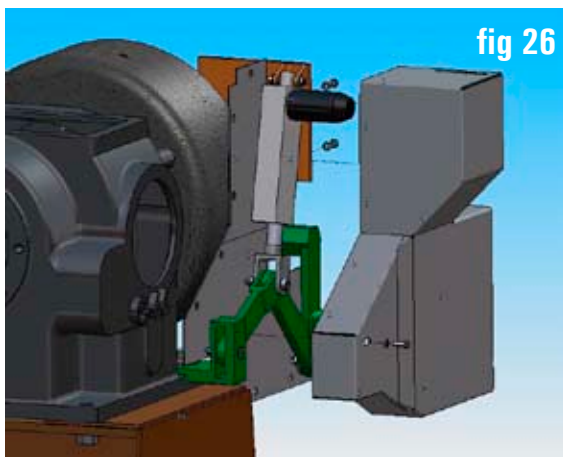
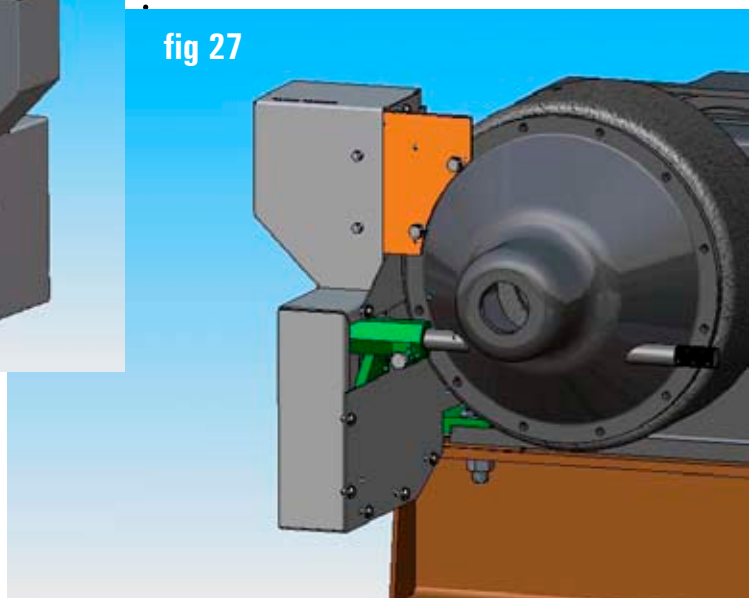


fig 27



# ARROW MANUFACTURED REPLACEMENT PARTS

## Caterpillar® Engines

G379      G3304  
G398      G3306  
            G399

## Ford® Engines

300 Industrial Engine  
Governor

## Waukesha® Engines

F2895      P9390  
F3521      145G/F817  
F5108      140G/F554  
L5790      WAK/1197  
            L7042

## Gemini® Engines

G26      G40  
Compressor Parts

## Fairbanks® Engines

ZC-118      ZC-503  
ZC-208      ZC-739  
            ZC-346

## Ajax® Engines

5 x 6½  
EA-22, 6½ x 8 CMA  
EA-30, 7¼ x 8 CMA  
E-30, 7½ x 10 CMA  
E-42, 8½ x 10 CMA  
DP-60, 9½ x 10 CMA  
DP-70/80/160, 11 x 14 CMA  
DP-115/230, 13¼ x 16

Piston & Rod Assemblies

180  
360  
600  
800

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# OEM

## C-Series

\*C-46      \*C-96  
\*C-66      \*C-106  
\*C-255

## VR-Series

VR-155      VR-310  
VR-220      \*VR-330  
VR-232      \*VR-330CF  
\*VR-260      VR-265  
VR-283      \*VR-380

## A-Series

\*A42      \*A54      \*A62

## \*K6 Slow Speed Engine

## Lufkin Engines

L-333      L-1770  
\*L-795      L-2165

## Witte Engines

98      E15      F32  
B12      E20      F42

## Arrow Chemical Pumps

\*10 Series (beam operated)  
\*12 & 13 Series (pneumatic)  
\*430 Series (electric)  
\*500 & 510 Series (pneumatic)  
\*Solar Chempump

## \*VRC-2 Gas Compressor

## Gas Products

\*Volume Tanks  
\*Vertical & Horizontal  
Separators  
\*Suction Scrubbers  
\*Meter Runs  
\*Coalscers  
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