

## Installation, Operation and Maintenance Manual

These instructions apply to the internal or external field replacement of mounting hardware for direct drive actuators (Belimo [except EFB series] and Honeywell [except MS7505 and MS8105 series] ) on Greenheck control dampers when they are duct mounted or sleeved.

### Warning

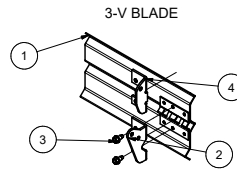
Equipment Damage or Electrical Power Hazard.  
 Line voltage can cause death or serious injury and short circuit equipment. Disconnect power supply before installation.

### Tools required

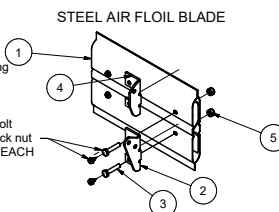
Wrenches: (1) 7/16 in., (1) 3/8 in., (1) 9/16 in.  
 (1) Ratchet with 3/8, 7/16, 9/16 in. deepwell socket  
 (1) 1/8 in. Allen wrench  
 (1) Drill with 3/8 in. and 9/32 in. nut driver  
 (1) .203 dia. drill bit

### Part No. 872700: Internal Mount - 1/2 in. pin or jackshaft

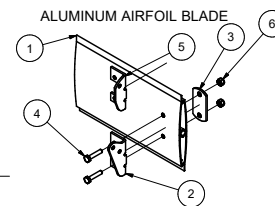
| ITEM | QTY | PART NUMBER | DESCRIPTION                              |
|------|-----|-------------|--|
| 5    | 1   | 723981      | BRKT, INT ACT, 0.5IN JS, GALV, G1L/G2R   |
| 3    | 1   | 370159      | BRG, 5,WEIMER,8L2-FF,NYLN LNR            |
| 16   | 2   | 415264      | TCS 23 1/4-20X1/2 HWH MZP                |
| 1    | 1   | 829206      | ASM_CRANKARM,90? LINKAGE,1/2",GALV       |
| 2    | 1   | 839475      | 839475                                   |
| 9    | 2   | 451588      | E-RING 1/4" ZP                           |
| 13   | 1   | 416179      | RTNR,PUSHON, 5,ZP                        |
| 10   | 1   | 593831      | JACKSHAFT-INT MT ACTS-6.5"/VCD           |
| 14   | 1   | 417279      | STUD,MNTG,#10-24X1.068,ZP                |
| 11   | 2   | 415934      | NUT,#10-24 HH NYLOC ZP                   |
| 4    | 1   | 360627      | BRG, 1/2IN ID,NYLINER 8L1-FF             |
| 12   | 4   | 415455      | NUT,SPNLK 1/4-20ZP                       |
| 15   | 4   | 415609      | STUD,PRESS-IN,1/4-20X1/2,YELLOW ZNC      |
| 6    | 1   | 723987      | BRKT,ANTI-RTN,INT,0.5JS LRG,GALV,G1L/G2R |
| 8    | 1   | 416048      | CS,SH,#10-24X.375,GR2,ZP/BAKE            |
| 7    | 1   | 451786      | CLAMP,HOSE,#HC-8 1/2"DIA (WIRE)          |
| 25   | 1   | 717000      | BRKT, BL, EXTD AF, 6/7, GALV, G1L/G2R    |



| ITEM | QTY | PART NUMBER | DESCRIPTION                           |
|------|-----|-------------|---------------------------------------|
| 1    | 1   | N/A         | 3V BLADE & AXLE BRKT ASM              |
| 2    | 1   | 714548      | BRKT, BL, 3V, 6/7, GALV, G1L/G2R      |
| 3    | 2   | 415264      | TCS 23 1/4-20X1/2 HWH MZP             |
| 4    | 1   | 716999      | BRKT, BL, EXTD AF, 4/5, GALV, G1L/G2R |



| ITEM | QTY | PART NUMBER | DESCRIPTION                           |
|------|-----|-------------|---------------------------------------|
| 1    | 1   | N/A         | STEEL AIRFOIL BLADE                   |
| 2    | 1   | 716323      | BRKT, BL, AF, 6/7, GALV, G1L/G2R      |
| 3    | 2   | 415490      | CS,1/4-20x1.25 HH,ZP                  |
| 4    | 1   | 716999      | BRKT, BL, EXTD AF, 4/5, GALV, G1L/G2R |
| 5    | 2   | 415516      | NUT,1/4-20 HEX ZP NYLOCK              |



| ITEM | QTY | PART NUMBER | DESCRIPTION                           |
|------|-----|-------------|---------------------------------------|
| 1    | 1   | N/A         | ALUMINUM AIRFOIL BLADE                |
| 2    | 1   | 717000      | BRKT, BL, EXTD AF, 6/7, GALV, G1L/G2R |
| 3    | 1   | 507532      | REINFORCING STRAP                     |
| 4    | 2   | 415490      | CS,1/4-20x1.25 HH,ZP                  |
| 5    | 1   | 716999      | BRKT, BL, EXTD AF, 4/5, GALV, G1L/G2R |
| 6    | 2   | 415516      | NUT,1/4-20 HEX ZP NYLOCK              |

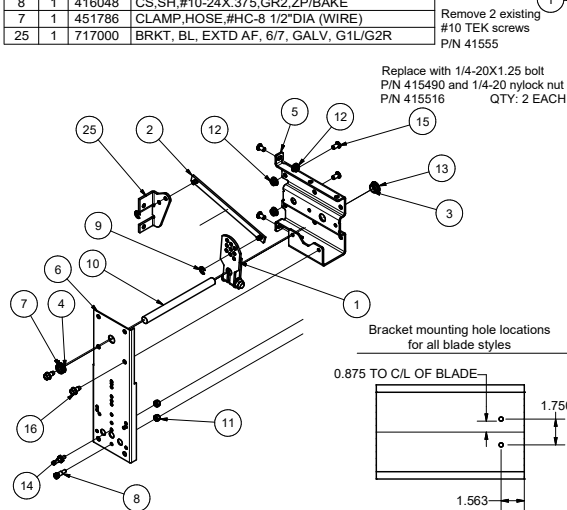


Figure 1

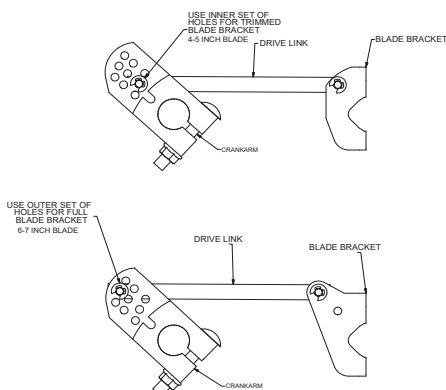


Figure 2: Drive Link Placement on Crankarm

### Instructions

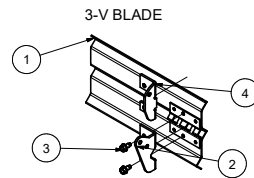
1. Have damper in its closed position.
2. Drill (2) 0.203 inch holes in the first blade (when one or two blade damper) or third blade (more than a two blade damper) at a location as shown above for the blade type you have (see **Figure 1**).
3. Attach blade drive lever (item #13) using two fasteners (see list above based on blade type).
4. Snap the bearing (item # 12) into the actuator bracket (item # 1). Install (2) 1/4 -20 x 1/2 studs (item #15) and nuts (item #14) through holes in damper frame and attach the

## Part no. 872700 instructions cont...

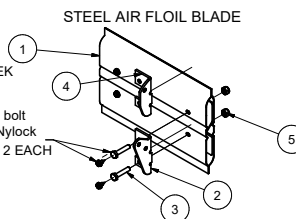
- actuator bracket (item #1). Fasten actuator bracket to the left jamb of damper frame using (1) thread cutting screw in top tab of bracket (0.203 in. hole is required). Note bottom tab does not get a fastener.
- Secure the drive link (item #2) to the blade drive lever (item #13) using the e-clip (item #6) to lock it in place. Slide ½ in. diameter shaft (item #4) through the crankarm (item #3) with the bolt facing outward from the damper. Slide the shaft through the bearing on the actuator bracket (item #1). Install the drive link (item #2) to the crankarm (item #3) using an e-clip. See **Figure 2** to determine the hole to attach the drive link.
  - Make sure the drive link is vertical and tighten the crankarm to the shaft. Snap the bearing (item #17) into the anti-rotation bracket (item #5) and slide onto the shaft. Tighten the anti-rotation bracket (item #5) to the actuator bracket (item #1) using thread cutting screws.
  - Slide the actuator onto the shaft and install the shoulder bolt (item #8 or 10) to the anti-rotation bracket (item #5) using nut (item #9 or 11). Bolt location will vary depending on the actuator model. Tighten the actuator onto the shaft (item #4).
  - Connect all electrical leads to the actuator. Apply power to the actuator. The damper blades should rotate to the power position and return to the fail position when power is disconnected.

## Part no. 872701: Internal Mount for 1 in. jackshaft

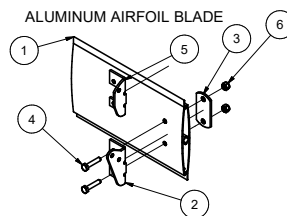
| ITEM | QTY | PART NUMBER | DESCRIPTION   |
|------|-----|-------------|---|
| 1    | 1   | 728330      | Internal actuator bracket, 1 in., galv              |
| 2    | 1   | 839475      | Drive link  |
| 3    | 1   | 829205      | Crankarm, 90° linkage, 1 in., galv                  |
| 4    | 1   | REF         | 1 in. Jackshaft                                     |
| 5    | 1   | 846484      | Internal anti-rotation bracket, large, 1" jackshaft |
| 6    | 2   | 451588      | e-ring 1/4 in., ZP                                  |
| 7    | 4   | 415264      | TCS 23 1/4-20X1/2 HWH M ZP                          |
| 8    | 1   | 416048      | CS, SHD. SOC. #10-24x.375, ZPBAKE                   |
| 9    | 2   | 415934      | Nut, #10-24 HH nylock ZP                            |
| 10   | 1   | 417279      | Mounting stud, #10-24X1.068, ZP                     |
| 11   | 1   | 714548      | Blade bracket, 3V, 6/7, GALV                        |
| 12   | 2   | 415455      | Nut, spinlock 1/4-20 ZP                             |
| 13   | 2   | 415609      | Stud, press-in, 1/4-20X1/2                          |



| ITEM | QTY | PART NUMBER | DESCRIPTION                           |
|------|-----|-------------|---------------------------------------|
| 1    | 1   | N/A         | 3V BLADE & AXLE BRKT ASM              |
| 2    | 1   | 714548      | BRKT, BL, 3V, 6/7, GALV, G1L/G2R      |
| 3    | 2   | 415264      | TCS 23 1/4-20X1/2 HWH MZP             |
| 4    | 1   | 716999      | BRKT, BL, EXTD AF, 4/5, GALV, G1L/G2R |



| ITEM | QTY | PART NUMBER | DESCRIPTION                           |
|------|-----|-------------|---------------------------------------|
| 1    | 1   | N/A         | STEEL AIRFOIL BLADE                   |
| 2    | 1   | 716323      | BRKT, BL, AF, 6/7, GALV, G1L/G2R      |
| 3    | 2   | 415490      | CS, 1/4-20x1.25 HH, ZP                |
| 4    | 1   | 716999      | BRKT, BL, EXTD AF, 4/5, GALV, G1L/G2R |
| 5    | 2   | 415516      | NUT, 1/4-20 HEX ZP NYLOCK             |



| ITEM | QTY | PART NUMBER | DESCRIPTION                           |
|------|-----|-------------|---------------------------------------|
| 1    | 1   | N/A         | ALUMINUM AIRFOIL BLADE                |
| 2    | 1   | 717000      | BRKT, BL, EXTD AF, 6/7, GALV, G1L/G2R |
| 3    | 1   | 507532      | REINFORCING STRAP                     |
| 4    | 2   | 415490      | CS, 1/4-20x1.25 HH, ZP                |
| 5    | 1   | 716999      | BRKT, BL, EXTD AF, 4/5, GALV, G1L/G2R |
| 6    | 2   | 415516      | NUT, 1/4-20 HEX ZP NYLOCK             |

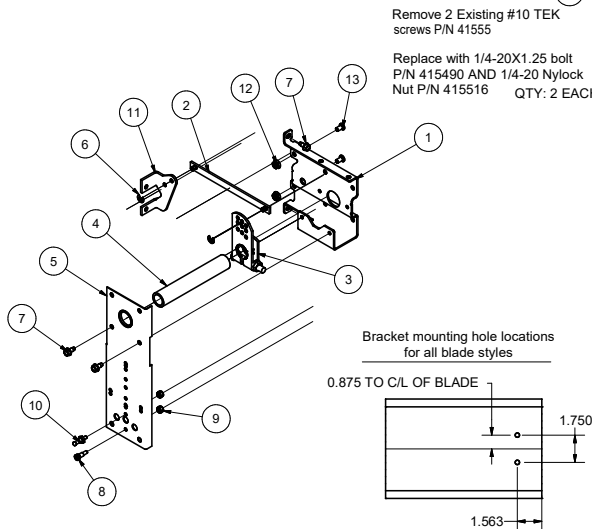


Figure 3 Mounting Kit

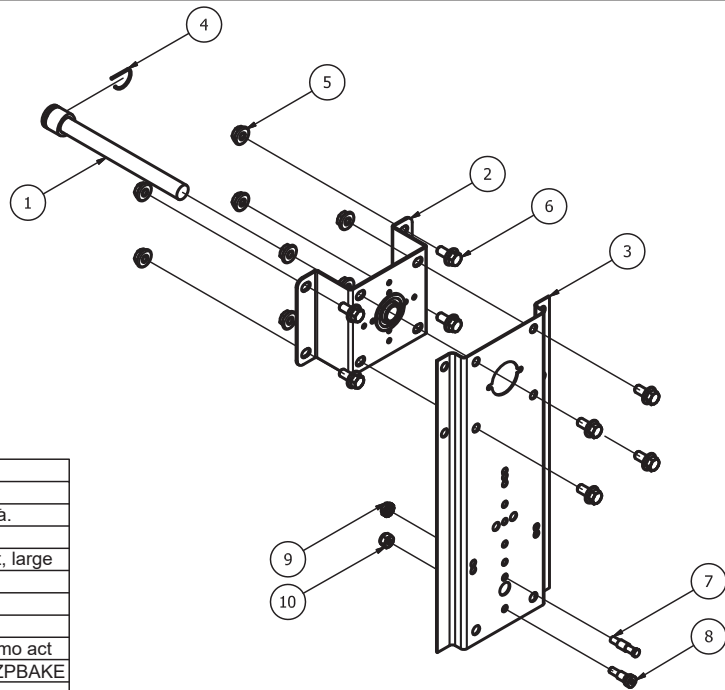
## Instructions

- Have damper in its closed position.
- Drill (2) 0.203 inch holes in the first blade (when one or two blade damper) or third blade (more than a two blade damper) at a location as shown above for the blade type you have (see **Figure 3**).
- Attach blade drive lever (item #12) using two fasteners (see list above based on blade type).
- Install (2) ¼ -20 x ½ studs (item #14) and nuts (item #13) through holes in damper frame and attach the actuator bracket (item #1). Fasten actuator bracket to the left jamb of damper frame using (1) thread cutting screw in top tab of bracket (0.203 in. hole is required). Note bottom tab does not get a fastener.
- Secure the drive link (item # 2) to the blade drive lever (item #12) using the e-clip (item #6) to lock it in place. Slide 1 in. diameter shaft (item #4) through the crankarm (item #5) with the bolt facing outward from the damper. Slide the shaft through the actuator bracket (item #1). Install the drive link (item #2) to the crankarm (item #3) using an e-clip. See **Figure 2** to determine the hole to attach the drive link.

## Part no. 872701: Internal Mount for 1 in. jackshaft cont...

6. Make sure the drive link is vertical and tighten the crankarm to the shaft. Snap the bearing (item #16) into the anti-rotation bracket (item #5) and slide onto the shaft. Tighten the anti-rotation bracket (item #5) to the actuator bracket (item #1) using thread cutting screws.
7. Slide the actuator onto the shaft and install the shoulder bolt (item #8 or 10) to the anti-rotation bracket (item #5) using nut (item #9 or 11). Bolt location will vary depending on the actuator model. Tighten the actuator onto the shaft (item #4).
8. Connect all electrical leads to the actuator. Apply power to the actuator. The damper blades should rotate to the power position and return to the fail position when power is disconnected.

## Part no. 872907: External mount direct drive



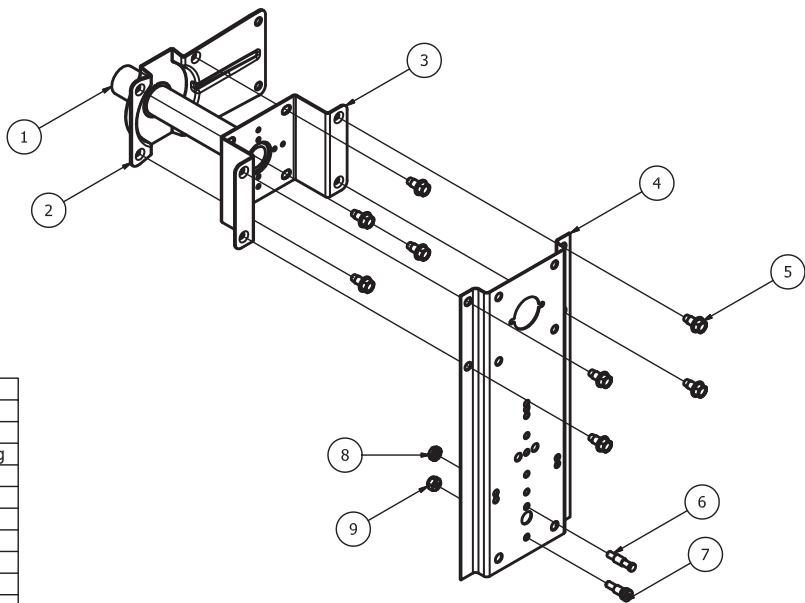
| PARTS LIST |     |             |  |
|------------|-----|-------------|--|
| ITEM       | QTY | PART NUMBER | DESCRIPTION                            |
| 1          | 1   | 452509      | Extension pin, 3/8 sq. to 1/2 dia.     |
| 2          | 1   | 815027      | Extension pin support bracket          |
| 3          | 1   | 723089      | Ext mount anti-rotation bracket, large |
| 4          | 1   | 451738      | Retaining clip, 1/2 in.                |
| 5          | 8   | 415455      | Spinlock nut, 1/4-20 ZP                |
| 6          | 8   | 415475      | Spinlock bolt, 1/4-20x1/2 ZP           |
| 7          | 1   | 416122      | Threaded mounting stud - Belimo act    |
| 8          | 1   | 416048      | CS, SHD SOC, #10-24x.375, ZPBAKE       |
| 9          | 1   | 415385      | Nut, #10-32 HX Keps ZP                 |
| 10         | 1   | 415934      | Nut, #10-24 HH Nylock ZP               |

Figure 4 External Mounting Kit

## Instructions

1. Have damper in its closed position.
2. Install clip (item #4) into extension pin (item #1). Push extension pin onto drive blade (bottom blade for dampers with one or two blades) or third blade (when damper has more than two blades).
3. Mount the stand-off bracket (item #2) over the extension pin (item #1) spanning across the damper frame. Fasten to the damper frame with bolts and nuts (items 5 & 6).
4. Fasten the actuator bracket (item #3) to the standoff bracket using bolts and nuts (items #5 & 6).
5. Install shoulder bolt (item #7 or 8) to the anti-rotation bracket (item #3) using nut (item #9 or 10). Bolt location will vary depending on the actuator model.
6. For fail close, position the blades in the closed position and the actuator in its fail position. For fail open, position the blades in the open position and the actuator in its fail position. Tighten the actuator clamp to the damper pin (item #1).
7. Attach actuator to anti-rotation bracket assembly (item #3). Tighten the actuator onto the shaft (item #1).
8. Connect all electrical leads to the actuator. Apply power to the actuator. The damper blades should rotate to the power position and return to the fail position when power is disconnected.

## Part no. 872908: External Mount Jackshafted



| Parts List |     |             |  |
|------------|-----|-------------|--|
| Item       | Qty | Part Number | Description                                |
| 1          | 1   | Reference   | 1 in. jackshaft                            |
| 2          | 1   | Reference   | 1 in. jackshaft bracket w/ nyliner bearing |
| 3          | 1   | 702973      | Standoff bracket with extruded holes       |
| 4          | 1   | 723089      | Ext mount anti-rotation bracket, large     |
| 5          | 8   | 415264      | TCS 23 1/4-20x1/2 HWH MZP                  |
| 6          | 1   | 416122      | Threaded mounting stud - Belimo act        |
| 7          | 1   | 416048      | CS, SHD SOC, #10-24x.375, ZPBAKE           |
| 8          | 1   | 415385      | Nut, #10-32 HX Keps ZP                     |
| 9          | 1   | 415934      | Nut, #10-24 HH Nylock ZP                   |

### Instructions

1. Have damper in its closed position.
2. Jackshaft supplied is 1 in. (25 mm) diameter or ½ in. (13 mm) diameter. Mount the stand-off bracket (item #3) with thread cutting screws (item #5). Orient the stand-off bracket (item #3) so the hole is centered on the jackshaft.
3. Fasten the actuator bracket (item #4) to the stand-off bracket using thread cutting screws (item #5). Use outer four holes of the actuator bracket.
5. Install shoulder bolt (item #6 or 7) to the anti-rotation bracket (item #3) using nut (item #8 or 9). Bolt location will vary depending on the actuator model.
4. For fail close, position the blades in the closed position and the actuator in its fail position. For fail open, position the blades in the open position and the actuator in its fail position. Tighten the actuator clamp to the jackshaft (item #1).
5. Attach actuator to anti-rotation bracket assembly (item #4). Tighten the actuator onto the shaft (item #1).
6. Connect all electrical leads to the actuator. Apply power to the actuator. The damper blades should rotate to the power position and return to the fail position when power is disconnected.



Link to video on External to Internal Actuator Conversion

### Our Commitment

As a result of our commitment to continuous improvement, Greenheck reserves the right to change specifications without notice.

Product warranties can be found online at Greenheck.com, either on the specific product page or in the literature section of the website at Greenheck.com/Resources/Library/Literature.

