



# Installation Instructions

## Single Direction Tilt Control Kits

This sheet provides installation instructions for Cascade Single Direction Tilt Control. The tilt control positions the mast at true vertical from back tilt for precision handling of paper rolls and other applications such as rack storage.

Consult Cascade about the availability of custom installation kits for the truck being fitted.

### Tilt Control Kits 12V

221047, 6045592  
and 6061149

### 24V

222018

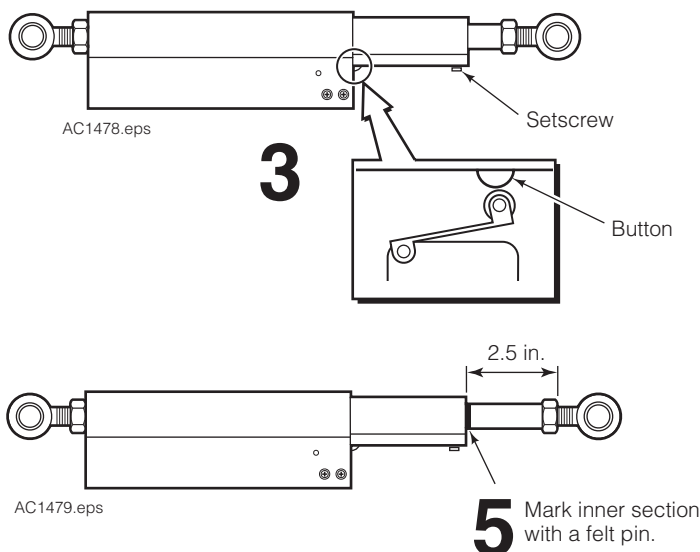
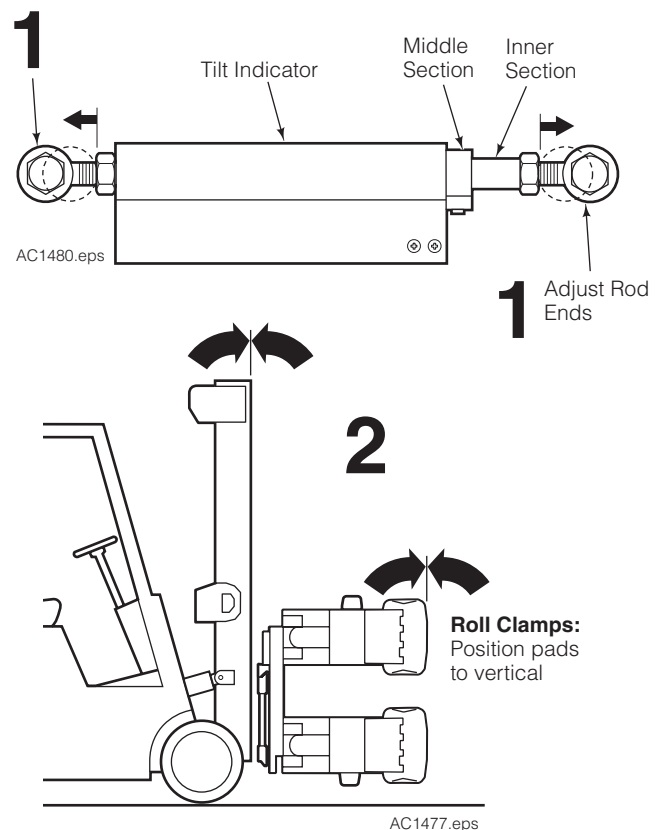
### 36V

223616

### 48V

222269 and 6022268

- 1 Loosen jam nuts and adjust rod ends of the tilt indicator to midpoint. Tighten jam nuts.
- 2 Position the mast at vertical using a level. **For Roll Clamps position the pads at vertical.**
- 3 Loosen the setscrew on the tilt indicator middle section. Position the middle section to place the button under the switch roller. **Tighten the setscrew just enough so the arm will not easily move.**
- 4 Adjust the inner section to show 2.5 in. of rod.
- 5 With a felt pen, mark the inner section at the middle section, as shown.



# cascade® corporation

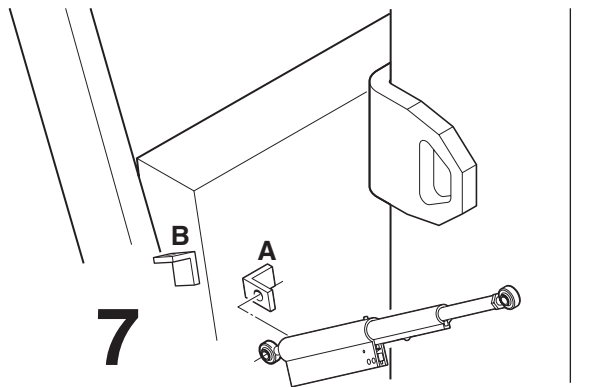
#### For Technical Support . . .

Call: 1-800-227-2233 Fax: 1-888-329-8207  
Internet: [www.cascorp.com](http://www.cascorp.com)  
Write: Cascade Corporation, PO Box 20187, Portland, OR 97294

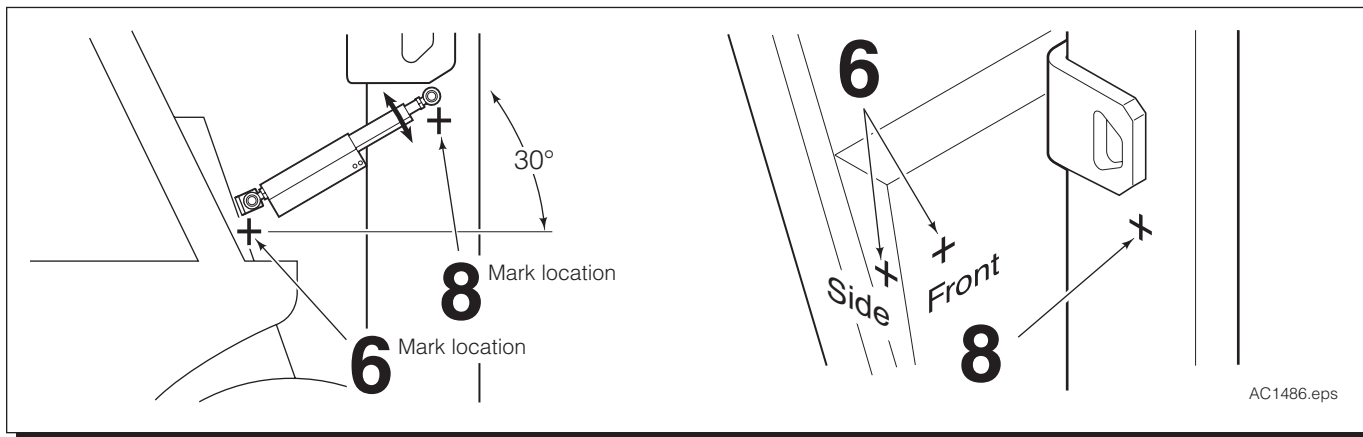
#### To Order Parts . . .

Call: 1-888-227-2233 Fax: 1-888-329-0234  
Internet: [www.cascorp.com](http://www.cascorp.com)  
Write: Cascade Corporation, 2501 Sheridan Ave., Springfield, OH 45505

- 6 Find a location on the truck cowl to potentially mount the bracket. Mark the location.
- 7 Attach the mounting bracket to the base end of the tilt indicator. Be sure to position the bracket in a suitable direction with the cowl.
- 8 Use the tilt indicator to determine a location on the side of the mast. The angle must be approximately 30 degrees from the horizontal of the base end bracket. Mark the location.
- 9 Temporarily secure the base end and rod end to the marked locations.

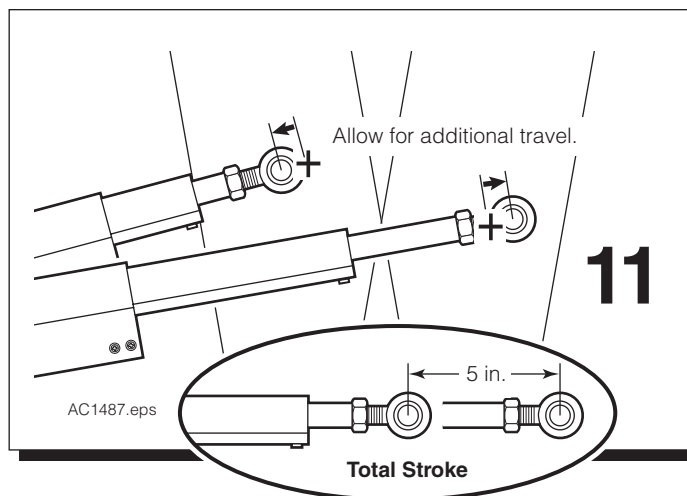
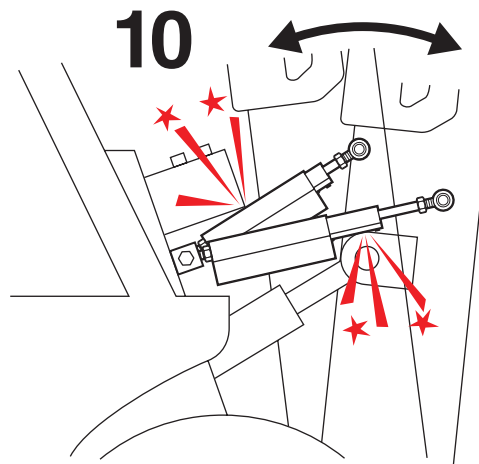


AC1485.eps



AC1486.eps

- 10 Verify that the tilt indicator has no interference with truck and attachment components by tilting the mast fully forward and back.
  - 11 Tilt the mast back to verify that the indicator rod can move further back. Tilt the mast forward to verify that the indicator rod can extend further. The tilt indicator can have a total stroke of 5 in with the mast fully forward and fully back.
- CAUTION:** Failure to allow for full extension and retraction will damage the tilt indicator.



AC1487.eps

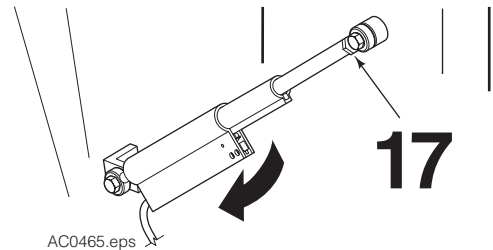
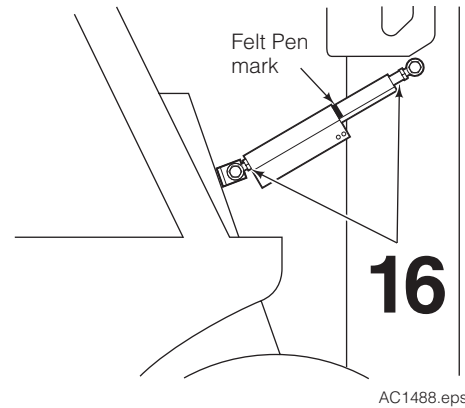
- 12** Secure the brackets to the marked locations on the truck cowl and mast. If using an adhesive, mix and apply adhesive (user supplied) to attach the brackets to the truck cowl and mast. Adhesives approved for this installation:
- Loctite 332 with Activator 7380
  - Devcon S-220 two part epoxy
  - Devcon Plastic Welder 14320
  - JB Weld 8265-S

Apply per manufacturer's instructions.

**IMPORTANT:** Remove adhesive residue from hands immediately. Once dry it is permanent to your skin.


**CAUTION:** Weld only with permission of the mast OEM and only in a location authorized by the mast OEM.

- 13** Position the mast or Roll Clamp pads to vertical.
- 14** Attach the tilt arm assembly to the cowl and mast mounts using the hardware supplied.
- 15** Slowly tilt the mast completely forward and backward. Check the felt pen mark on the inner section to make sure it has not moved into or out of the middle section. If the mark has moved significantly go back to Step 2.
- 16** For the felt pen mark that moved slightly (less than .5 in), loosen the jam nut on a rod end. If the mark is inside the middle tilt indicator section, turn the rod end clockwise. If the mark has moved outward from the middle section, turn the rod end counterclockwise. Tighten the jam nut.
- 17** Verify that the indicator is clear from mast. To adjust, loosen the rod end jam nut of the tilt indicator and rotate the tilt arm away from the mast.



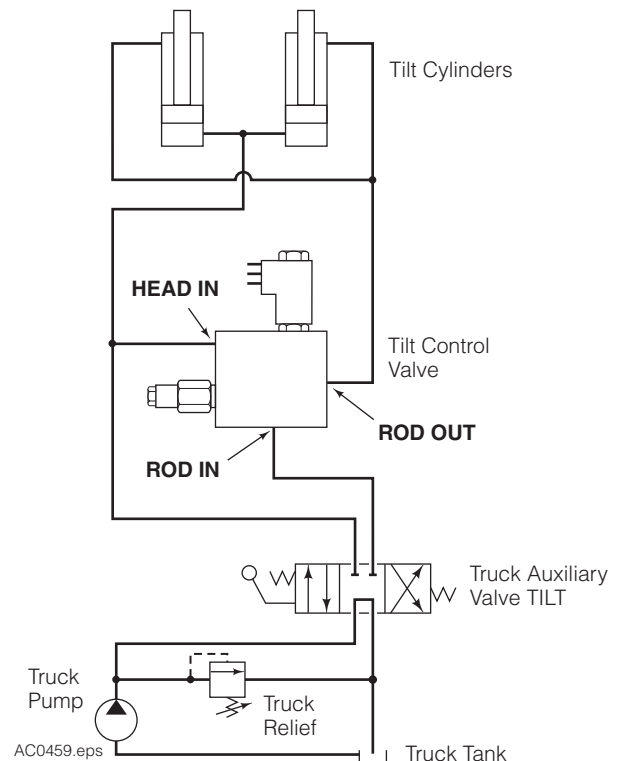
## Tilt Control Valve Installation

- 1** Determine a location to install the tilt control valve on the cowl or under the floor board. The valve must be plumbed in between the truck TILT auxiliary valve and the tilt cylinders. See the hydraulic schematic.



**WARNING:** Tilt the mast completely forward before disconnecting hoses to install the tilt control valve. This will minimize oil loss.

- 2** Mount the valve and install the hoses. Valve port **HEAD IN** must be connected to the tilt cylinder head ends. See hydraulic schematic.
- IMPORTANT:** The hoses must be installed consistent with the operation of the tilt cylinders. To reduce restriction, minimize the use of additional fittings.



## Wiring Installation

- 1 Install the tilt override switch to the tilt control knob using one of the following methods:

**Switch Mounted on Knob Face** – Position the tilt override switch on the front of the tilt control knob in a location that is easy to press the button and move the handle. File or carve a flat surface on the front of the knob if needed to keep the switch from rocking. Over the knob and switch place the smallest heat shrink tubing that will fit. Using a heat gun, heat the tubing to secure the switch to the knob.

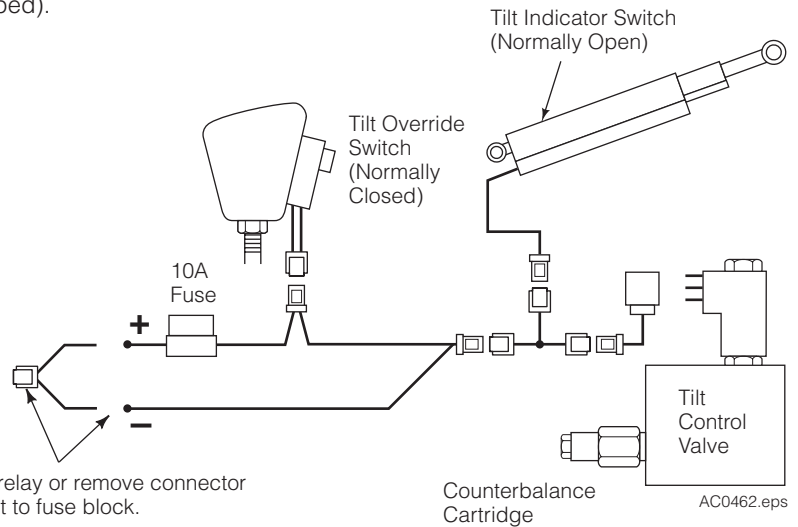
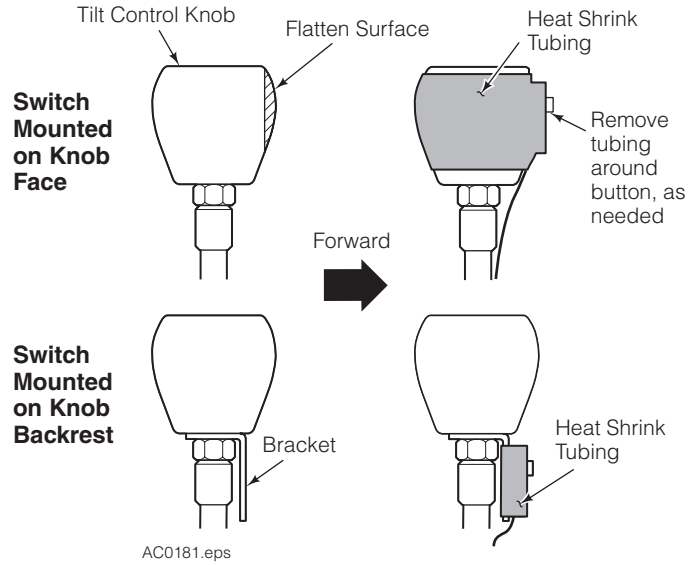
**Switch Mounted on Knob Bracket** – Remove the tilt control knob. Place the bracket on the tilt lever and replace the knob. Position the tilt override switch on the front of the bracket. Over the bracket and switch, place the smallest heat shrink tubing that will fit. Using a heat gun, heat the tubing to secure the switch to the bracket.

- 2 If it is difficult to feel or operate the override switch button through the heat shrink tube, carefully cut a circle out of the tubing around the button.

- 3 Connect cables as marked. Feed the override switch wires down the control handle and under the boot (if equipped). Check the cable routing for pinch points, chafing and clearance. Use wire ties as needed.

**NOTE:** The connector for power is plug compatible with a Cascade Relay. When not using a relay, remove the connector and wire directly to a fuse bank.

- 4 Check the wiring with the key or power on. Depress the switch roller with a small screwdriver - the light in the solenoid cap should turn on. Simultaneously pressing the tilt override switch will turn the light off.



## Tilt Control Operation

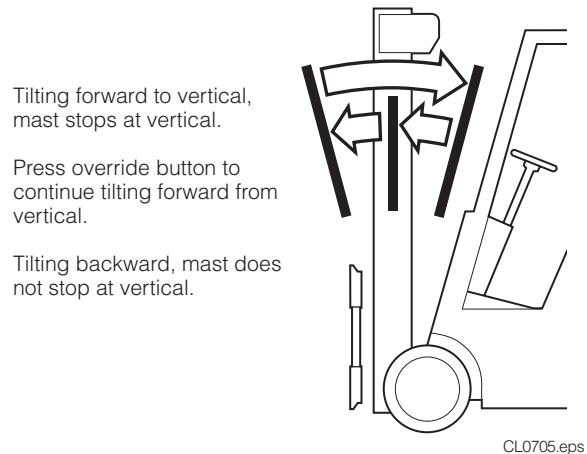
- 1 Test the installation before putting truck in service. Tilting forward, from back tilt, the mast should stop at vertical. When tilting back the mast will not stop at vertical.

Tilt the mast fully backward, then tilt forward to vertical. The mast should stop at vertical.

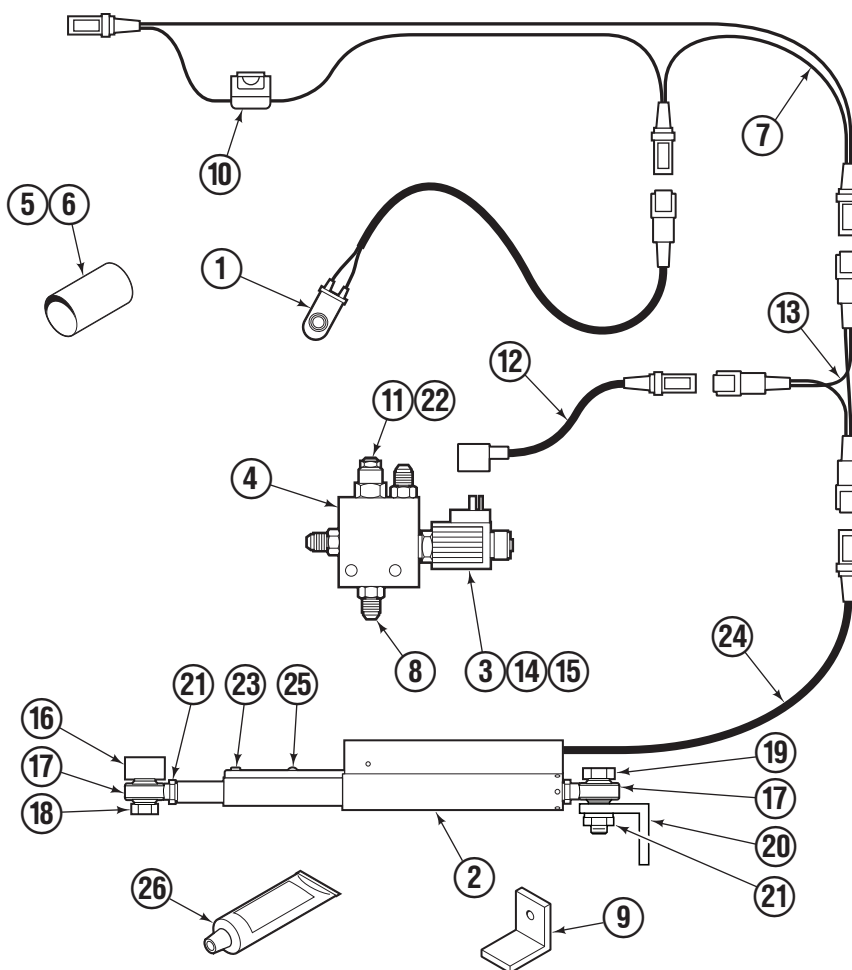
- If mast travel **does not stop** at vertical:
  - A The switch roller should be on the actuator when the mast is at vertical.
  - B Inspect the hose and wiring installation. The light in the solenoid cap should turn on when the mast is at vertical.
  - C If truck relief pressure is higher than 2800 psi and the mast slows down but does not stop at vertical when tilting, it may be necessary to adjust the counterbalance cartridge. Turn the cartridge adjustment screw CCW until the mast stops at vertical.

- 2 To tilt forward from vertical, the tilt override switch must be pressed before the mast can move.

To tilt forward through vertical without stopping, press the override button.



# Single Direction Tilt Control 12V Kits



AC1599.ai

REF	QTY	12V PART NO.	12V PART NO.	12V PART NO.	DESCRIPTION
		221047	6045592	6061149	Single Direction Tilt Control Kit
1	1	6001663	6001663	6009994	Switch Assembly
2	1	220013	6018483	220013	Tilt Control Assembly

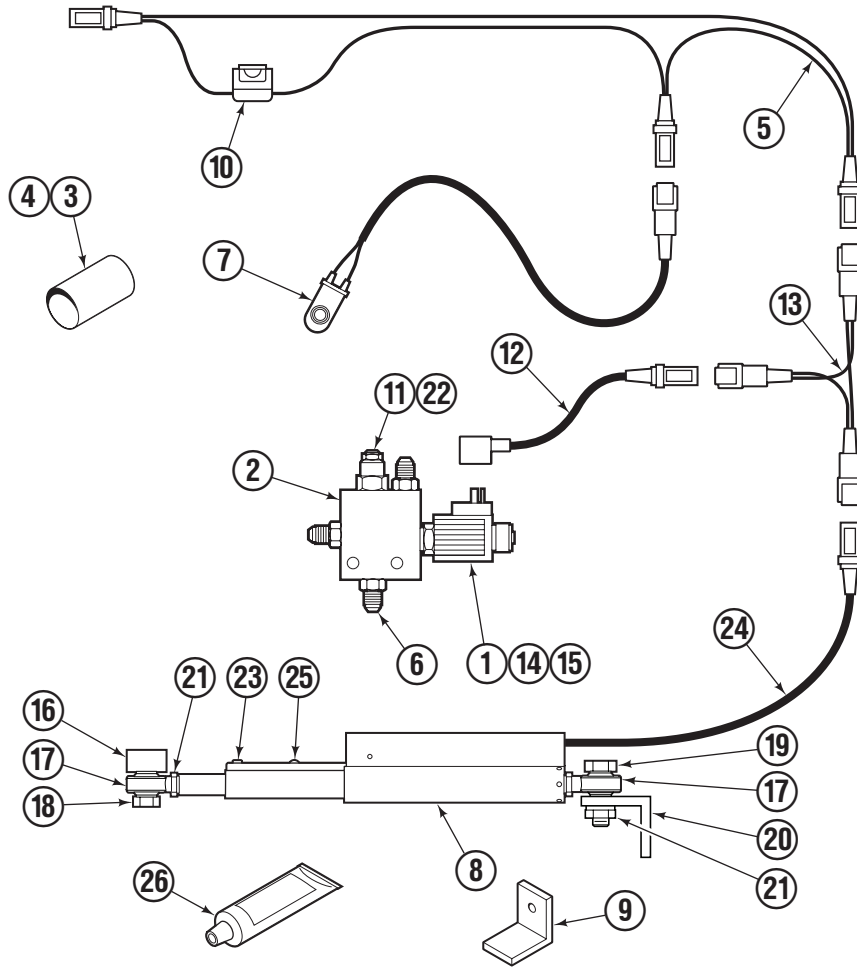
## Common Parts

REF	QTY	PART NO.	DESCRIPTION	REF	QTY	PART NO.	DESCRIPTION
3	1	6017518	12V Solenoid Coil	15	1	6026712	Service Kit
4	1	6017515	Valve Assembly without Coil	16	1	220330	Anchor
5	1	6026934	Shrink Tube, 2 in. dia.	17	2	221054	Rod End
6	1	6001641	Shrink Tube, 1 in. dia.	18	1	684649	Capscrew, M10 x 25
7	1	219398	Wire Harness – Power	19	1	768538	Capscrew, M10 x 30
8	3	604511	Fitting, 6-6	20	1	220525	Bracket
9	1	222009	Knob Bracket	21	3	209152	Jam Nut, M10
10	1	6008233	Fuse, 10 Amp	22	1	667516	Service Kit
11	1	6026587	Counterbalance Valve Cartridge	23	1	768734	Setscrew, M6 x 12
12	1	6017665	Wire Harness – Solenoid	24	1	220313	Wire Harness – Tilt Switch ●
13	1	6017037	Wire Harness – Junction	25	1	220328	Button ◆
14	1	6026588	Solenoid Cartridge	26	1	6017272	Silicone, RTV ●

● Included in Limit Switch Service Kit 6017267.

◆ For replacement, refer to kit 6801758

# Single Direction Tilt Control 24V, 36V & 48V Kits



AC1495.eps

REF	QTY	24V PART NO.	36V PART NO.	48V PART NO.	48V PART NO.	DESCRIPTION
		222018	223616	222269	6022268	Single Direction Tilt Control Kit
1	1	6017519	6071520	6017521	6017521	Solenoid Coil

## Common Parts

REF	QTY	PART NO.	DESCRIPTION	REF	QTY	PART NO.	DESCRIPTION
2	1	6017515	Valve Assembly without Coil	15	1	6026712	Service Kit
3	1	6026934	Shrink Tube, 2 in. dia. ■	16	1	220330	Anchor
4	1	6001641	Shrink Tube, 1 in. dia. ■	17	2	221054	Rod End
5	1	219398	Wire Harness – Power	18	1	684649	Capscrew, M10 x 25
6	3	604511	Fitting, 6-6	19	1	768538	Capscrew, M10 x 30
7	1	6001663	Switch Assembly (NC) ■	20	1	220525	Bracket
8	1	220013	Tilt Control Arm Assembly	21	3	209152	Jam Nut, M10
9	1	222009	Knob Bracket ■	22	2	667516	Service Kit
10	1	6008233	Fuse, 10 Amp	23	1	768734	Setscrew, M6 x 12
11	1	6026587	Counterbalance Valve Cartridge	24	1	220313	Wire Harness – Tilt Switch ●
12	1	6017665	Wire Harness – Solenoid	25	1	220328	Button ◆
13	1	6017037	Wire Harness – Junction	26	1	6017272	Silicone, RTV ●
14	1	6026588	Solenoid Cartridge				

● Included in Limit Switch Service Kit 6017267.

◆ For replacement, refer to kit 6801758

■ Not included in Tilt Control Kit 6022268.