



# Installation Instructions

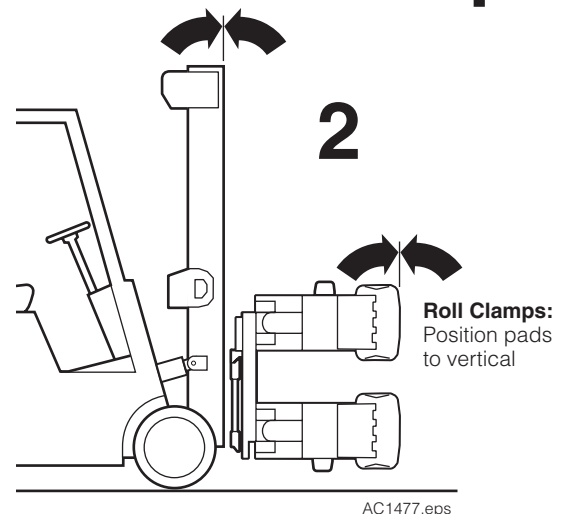
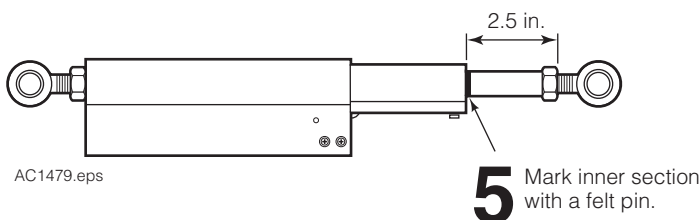
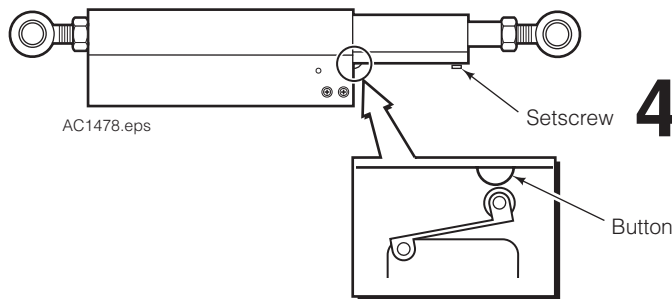
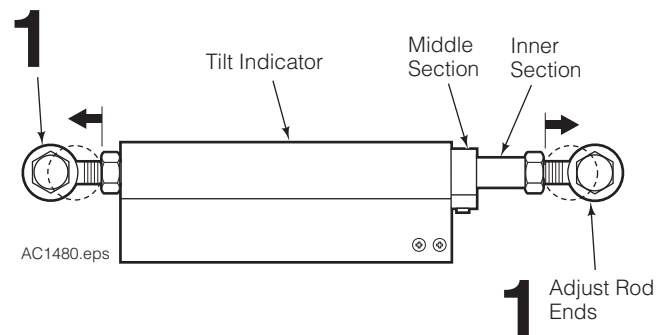
## Single Direction Tilt Control Kits

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.

- 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 Position the middle section to place the button under the switch roller.
- 4 Loosen the setscrew on the tilt indicator middle section. Adjust the inner section to show 2.5 in. of rod. **Tighten the setscrew just enough so the arm will not easily move.**
- 5 With a felt pen, mark the inner section at the middle section, as shown.

Tilt Control Kit	Truck Voltage	Application
6070813	12V	TOYOTA 7F DU 70 – Switched
6071805	12V	HYSTER S-135XL – Switched
		HYSTER S-155XL – Switched
6092296	12V	UNIVERSAL – Switched
6092298	24V	UNIVERSAL – Switched
6092299	48V	UNIVERSAL – Switched
6092301	36V	UNIVERSAL – Switched
6092305	48V	HYSTER ELECTRIC – Switched
6092309	12V	UNIVERSAL – Switched
6092311	12V	EXTENDED TILT ARM – Switched



**cascade**<sup>®</sup>  
corporation

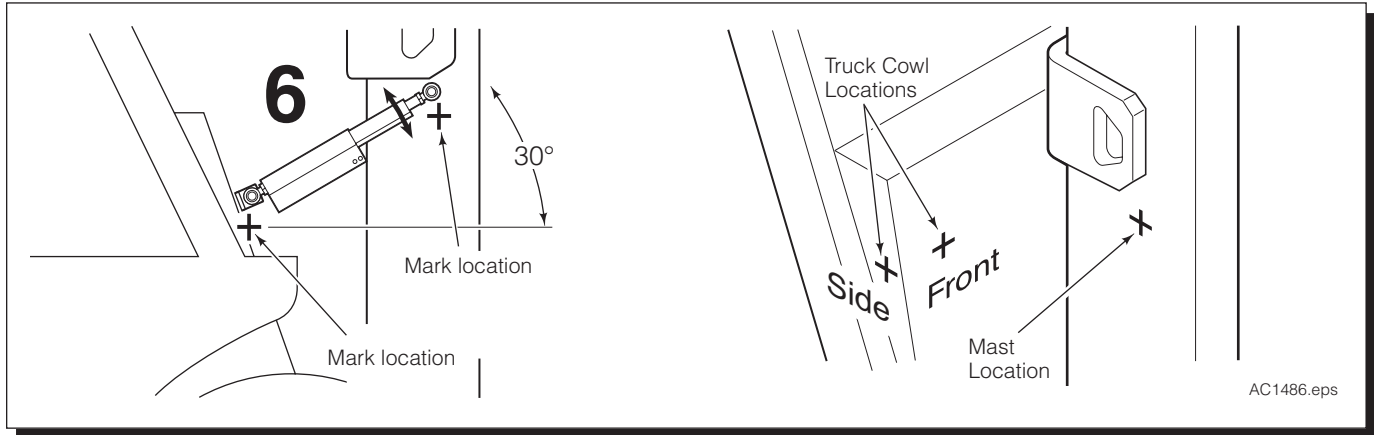
**For Technical Support . . .**

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

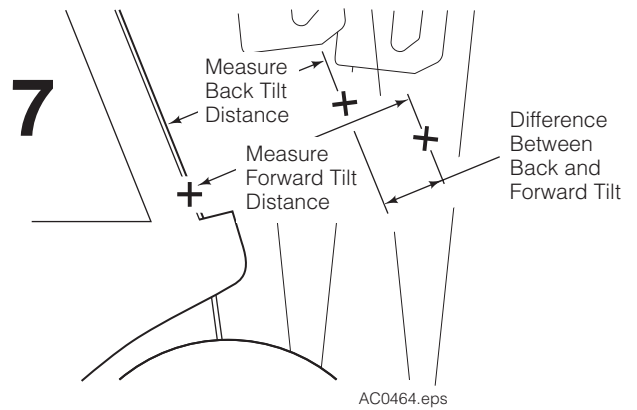
**To Order Parts . . .**

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 Using the tilt indicator and brackets, find a location on the truck cowl (side or face) and the side of the mast. Angle the tilt indicator at approximately 30 degrees from the horizontal of the base end of the bracket. Mark the locations of each end.



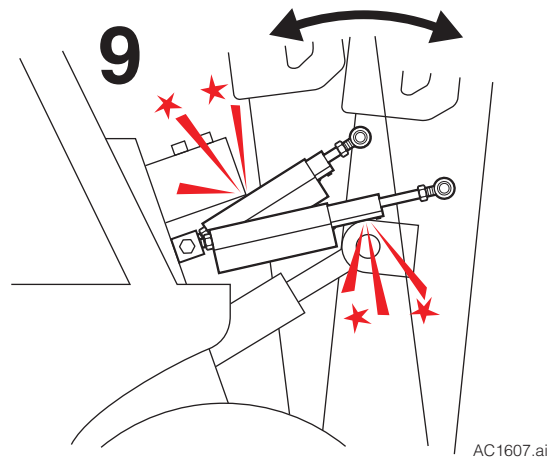
- 7 Tilt fully back and measure the distance between the marks. Tilt fully forward and measure the distance between the marks. If the difference between the two measurements is greater than 5 in., then relocate the tilt indicator with a steeper angle until the difference between the two measurements is less than 5 in.



- 8 Temporarily secure the tilt indicator ends/brackets to the marked locations.

- 9 Tilt the mast fully backward and forward to verify that the tilt indicator will not bind and has no interference with truck and attachment components.

**CAUTION:** Failure to allow for full extension and retraction will damage the tilt indicator.



- 10** 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.

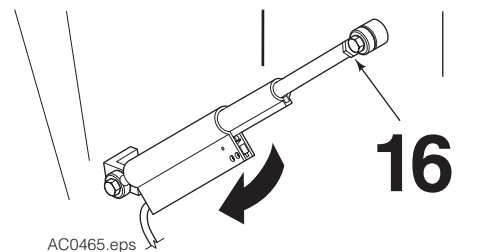
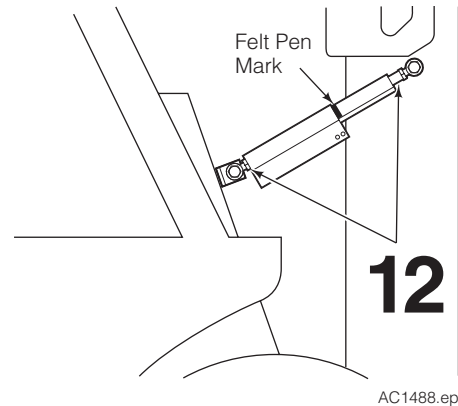
**IMPORTANT:** Remove adhesive residue from hands immediately. Once dry it is permanent to your skin.

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

- 11** Attach the tilt arm assembly to the cowl and mast mounts using the hardware supplied.
- 12** Slowly tilt the mast completely forward and backward. Check the felt pen mark on the inner section to verify it has not moved. If the mark has moved significantly, verify that the setscrew is snug and completely tilt forward and backward to check felt pen mark location.
- 13** For the felt pen mark that moved slightly, 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.


The adjustment should bring the felt pen mark next to the middle section. Tighten the jam nut. Repeat Step 13

- 14** It may be necessary to relocate the button. Position the mast (or roll clamp) to vertical with a level. Mark the middle channel next to the switch roller. Drill a .125 in. (3 mm) hole and relocate the button. Recheck the tilt indicator position. Adjust the rod end as described in Step 13 and 14.
- 15** 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

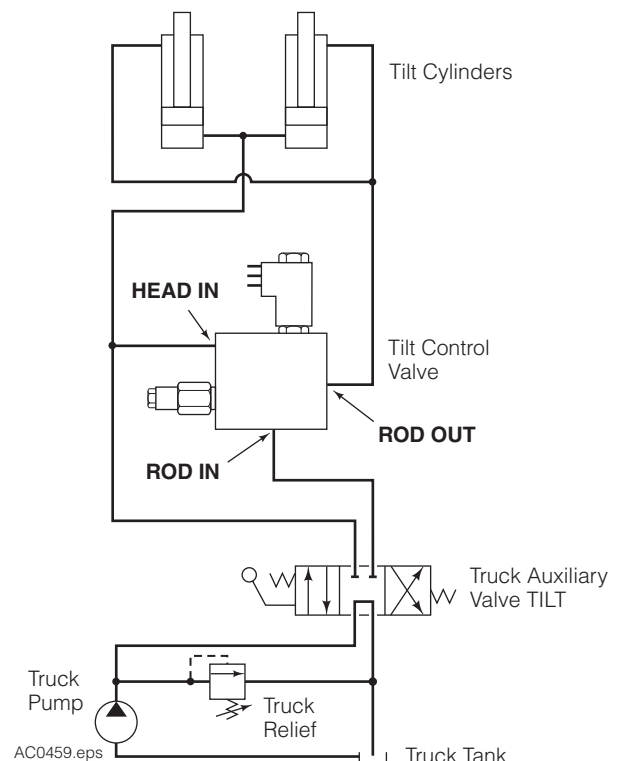
- 1** Determine a location to install the tilt control valve on the cowl or under the floor board. The valve must be plumbed in between the truck TILT auxiliary valve and the tilt cylinders. See the hydraulic schematic.



**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.

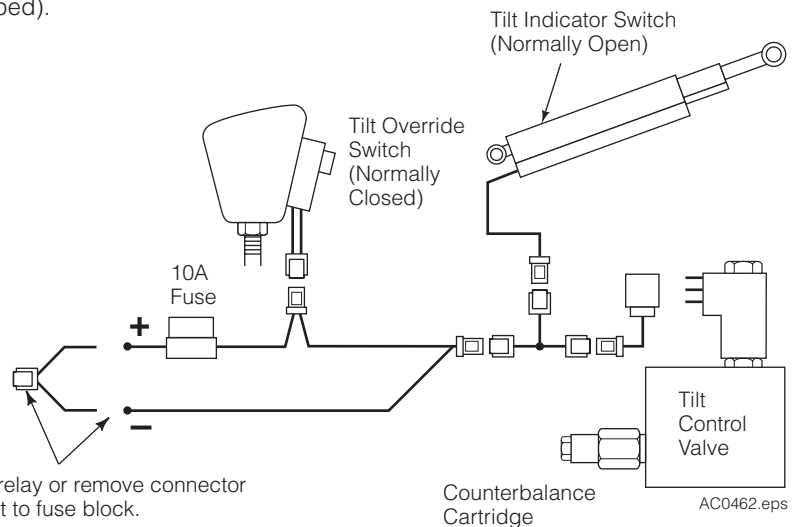
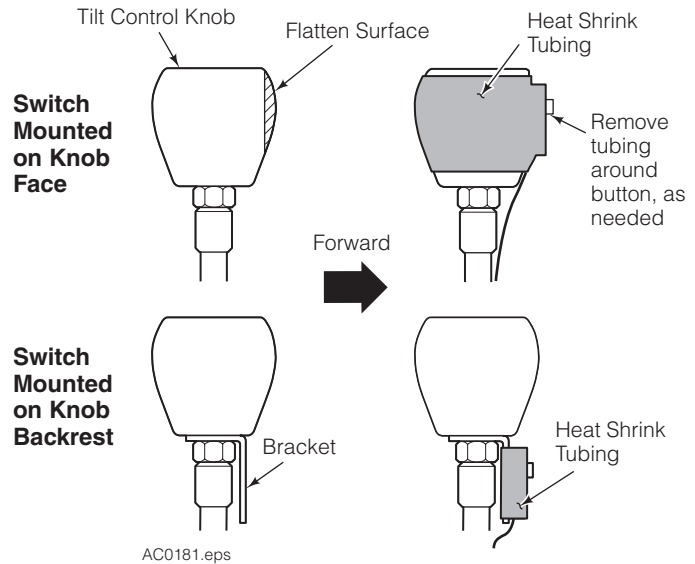
**Switch Mounted on Knob Bracket** – Remove the tilt control knob. Place the bracket on the tilt lever and replace the knob. Position the tilt override switch on the front of the bracket. Over the bracket and switch, place the smallest heat shrink tubing that will fit. Using a heat gun, heat the tubing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

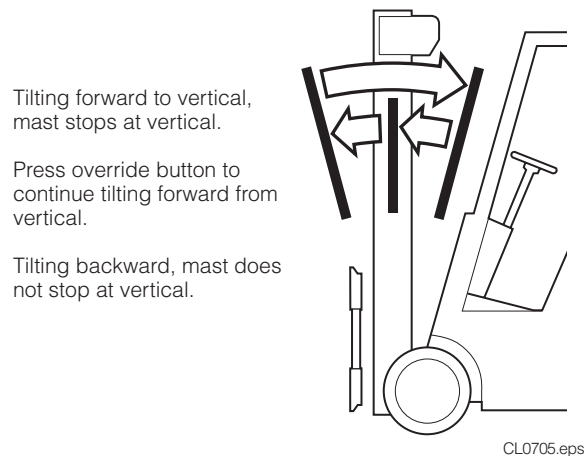
- 1 Test the installation before putting truck in service. Tilting forward, from back tilt, the mast should stop at vertical. When tilting back the mast will not stop at vertical.

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

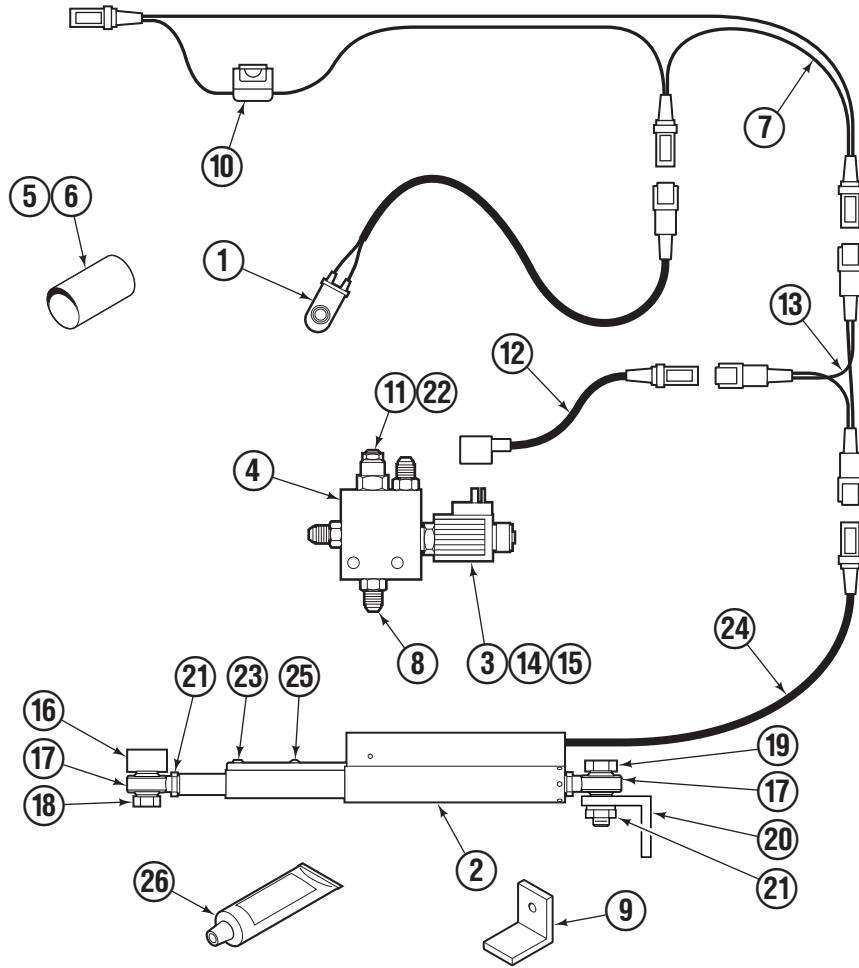
- If mast travel **does not stop** at vertical:
  - A The switch roller should be on the actuator when the mast is at vertical.
  - B Inspect the hose and wiring installation. The light in the solenoid cap should turn on when the mast is at vertical.
  - C If truck relief pressure is higher than 2800 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



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REF	QTY	TOYOTA 7F DU 70	HYSTER S-135XL S-155XL	12V PART NO.	12V PART NO.	EXTENDED TILT ARM	DESCRIPTION
		12V PART NO.	12V PART NO.			12V PART NO.	
		6070813	6071805	6092296 ★	6092309	6092311	Single Direction Tilt Control Kit
1	1	6001663	6001663	6001663	6009994	6001663	Switch Assembly
2	1	6059872	6018483	220013	220013	6018483	Tilt Control Assembly

## Common Parts

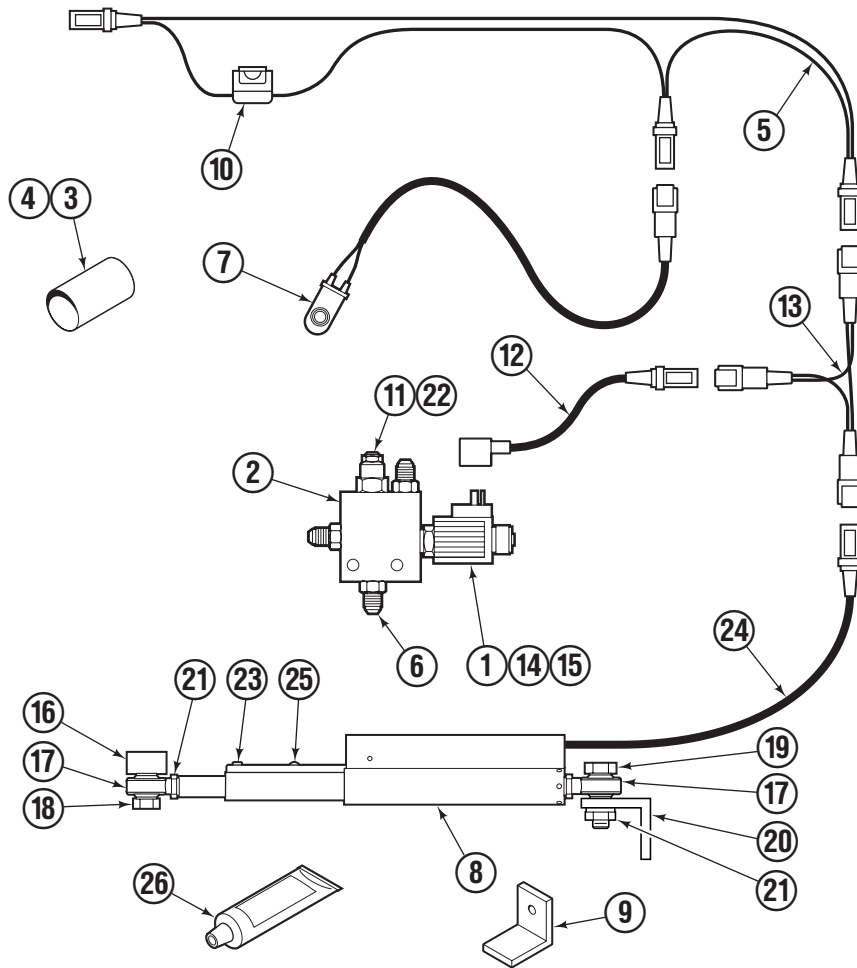
REF	QTY	PART NO.	DESCRIPTION	REF	QTY	PART NO.	DESCRIPTION
3	1	6017518	Solenoid Coil – 12V	15	1	6026712	Service Kit
4	1	6055021	Valve Assembly without Coil	16	1	220330	Anchor
5	1	6026934	Shrink Tube, 2 in. dia.	17	2	221054	Rod End
6	1	6001641	Shrink Tube, 1 in. dia.	18	1	684649	Capscrew, M10 x 25
7	1	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	6024964	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.

★ **NOTE:** Tilt Control Kit 6092296 replaces 6055029.

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



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REF	QTY	24V PART NO.	36V PART NO.	48V PART NO.	HYSTER ELECTRIC		DESCRIPTION
					48V PART NO.		
		6092298	6092301	6092299	6092305		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	6055021	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	1	6024964	Service Kit
10	1	6008233	Fuse, 10 Amp	23	1	768734	Setscrew, M6 x 12
11	1	6026591	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 Limit Switch Service Kit 6092305.