



# VMC - Hydraulic Counterbalance - Replacement

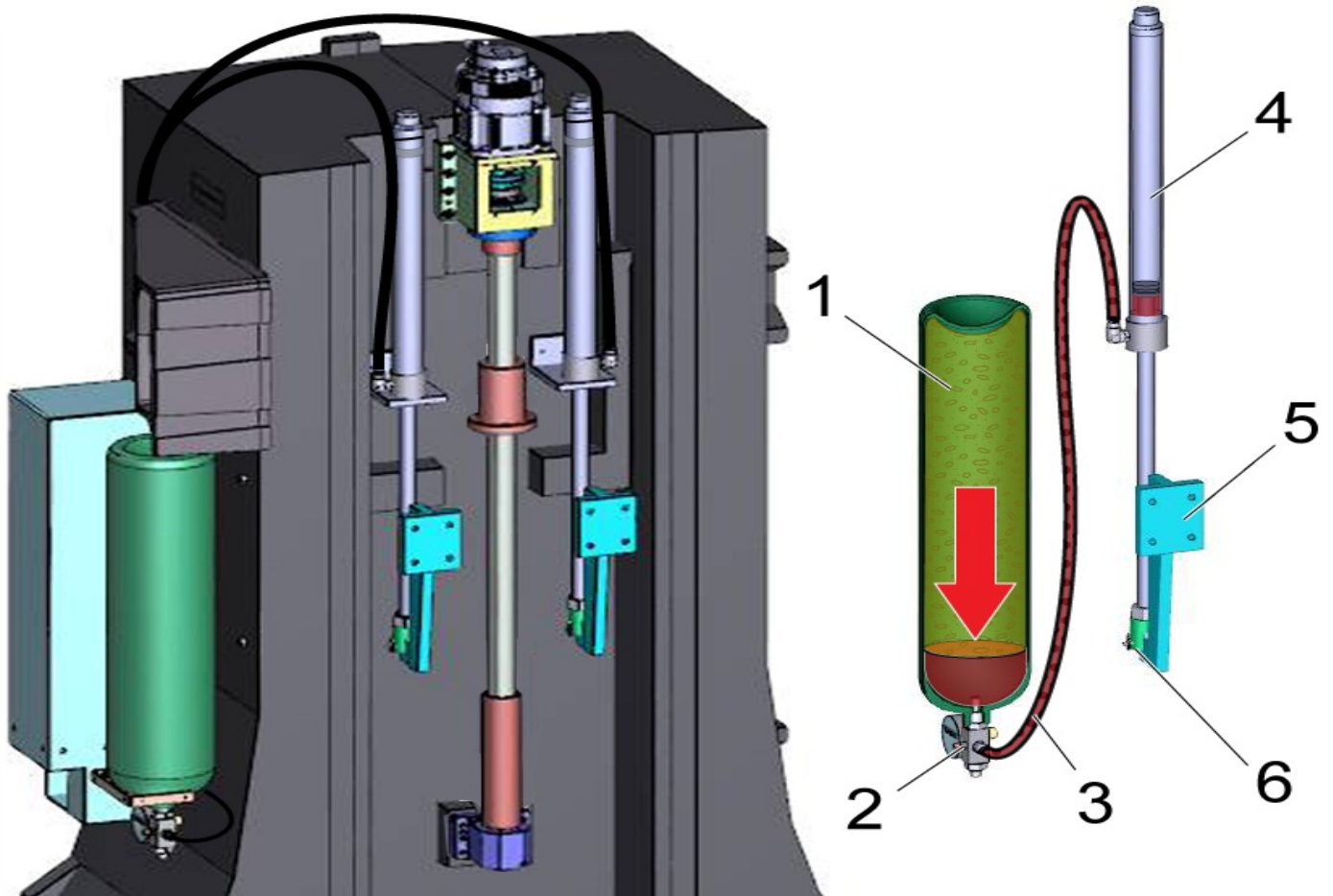
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Translation Available

## VMC - Hydraulic Counterbalance - Replacement - Introduction

Always replace the cylinder and the tank together as a set. If you replace one of these parts without the other, this voids the warranty on the replaced part.




1. Hydraulic fluid tank	4. Hydraulic cylinder
2. Schrader valve	5. Bracket for the spindle head casting
3. Hose	6. Clevis pin and cotter pin

 **Caution:** When you do maintenance or repair on CNC machines and their components, you must always follow basic safety precautions. This decreases the risk of injury and mechanical damage.

Do these steps before you do work in the machine or in the control cabinet:


- Set the main circuit breaker to the **[OFF]** position.
- Use an approved lock with an approved safety tag. Always follow lock-out procedures in accordance to local government rules.
- After turning off the machine, wait at least 5 minutes before working in the control cabinet, to allow power to dissipate. Wait for the voltage indicator LED on the vector drive to go off completely.
- Always turn off the main air supply when you work on any part of the pneumatic system.
- Make sure to rest the spindle head on a block of wood when work is done on a vertical axis. This will prevent any unintended movement that could result in the axis falling.
- Never alter any safety circuits on the machine.

You should not do machine repair or service procedures unless you are qualified and knowledgeable about the processes. Serious damage to the machine components can result in costly repairs. The service technicians at your Haas Factory Outlet (HFO) have the training and experience, and are certified to do these tasks safely and correctly. The repair and service work performed by your HFO is protected with a limited warranty.

 **Danger:** Some service procedures can be dangerous or life-threatening. DO NOT attempt a procedure that you do not fully understand. If you have any doubts about doing a procedure contact your Haas Factory Outlet (HFO) and schedule a service visit.

## Prerequisites

### Parts Required:

 **Note:** Note: Each kit contains (1) hydraulic cylinder [ **A** ] and (1) hydraulic tank [ **B** ], and (1) of the (2) cables listed in **Parts Included**.



**[A]** Hydraulic cylinder with hose



**[B]** Hydraulic tank with DTE-24 oil

## Parts Included



**[C]** 33-0772 QTY: 1  
CABLE, 770A HYDRAULIC PRESSURE  
SENSOR TO I/O PCB (1 TANK)



**[D]** 33-6772 QTY: 1  
CABLE, 770A HYDRAULIC PRESSURE  
SENSOR TO I/O PCB (2 TANKS)

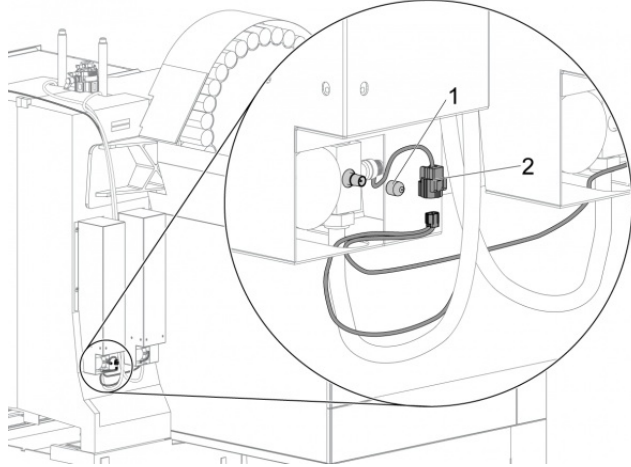
## Tools Required



Charge/Discharge Kit

# VMC - Hydraulic Counterbalance - System Discharge

## STEP 1



Jog the spindle head to 14.5" (36.8 cm) above the table.

Put a wood block on the table. Lower the spindle-head casting onto it.



**Note:** Do not lower the spindle onto the block.



Push **[POWER OFF]**.

Set the main circuit breaker to the **OFF** position.

Lock the main circuit breaker. Use an approved lock and an approved safety tag.

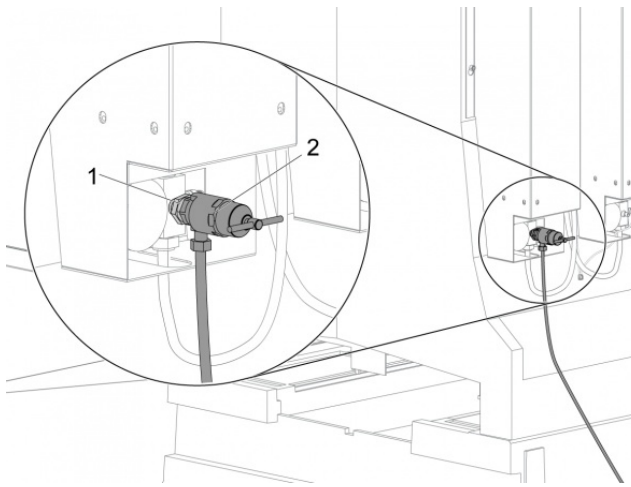
Disconnect the two-pin [2] end of the pressure switch cable from the pressure switch.

Remove the cap [1] from the Schrader filler valve.



**Note:** If your system has a double-ended tank system, a second Schrader valve is at the top of the tank(s). Remove the cap from the bottom valve.

## STEP 2



**Danger:** Before you do this step, put on eye protection.

With your fingers, tighten the charge/discharge-kit gas chuck [2] onto the Schrader valve [1].



**Note:** Make sure you turn the T-handle of the gas chuck fully counterclockwise.

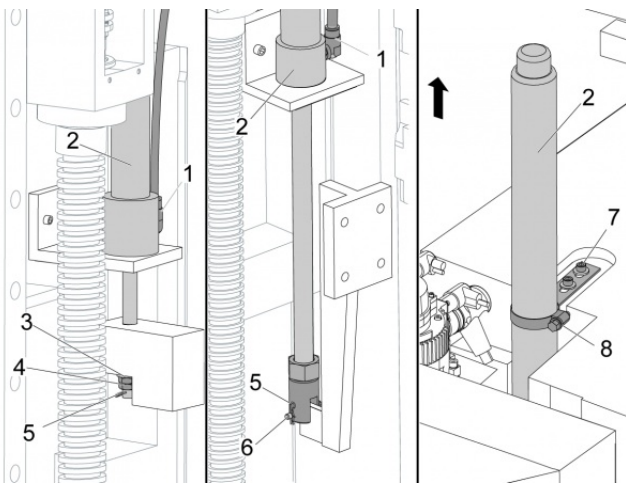
Put the other end of the hose in a bucket to contain the hydraulic oil.

Slowly turn the T-handle clockwise until the system starts to discharge. The time for this to complete is 10 minutes or less. Make sure the pressure gauge shows 0 psi.

Turn the T-handle fully counterclockwise and remove the gas chuck from the Schrader valve.

# VMC - Hydraulic Counterbalance - Cylinder and Tank Replacement

## STEP 1



Remove the screws that connect the Z-Axis waycover to the spindle head.

Record the direction the hydraulic hose connection [1] faces.

Remove these hydraulic cylinder parts:

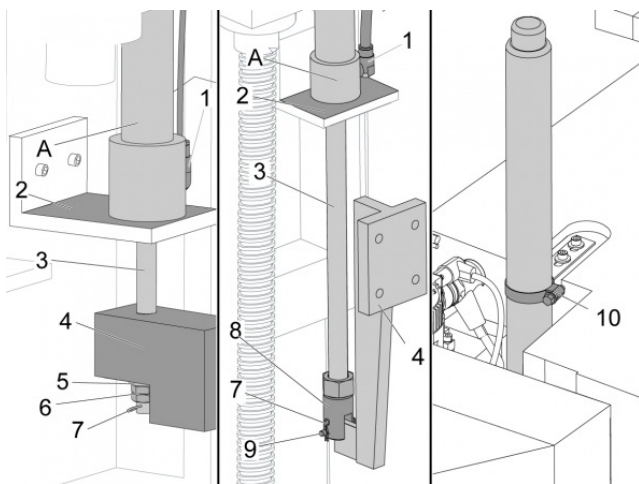
- Small/medium mill;
  - cotter pin [5]
  - jam nuts [4]
  - washer [3]
- Large mill
  - cotter pin [5]
  - clevis pin [6]

Loosen the (2) screws [7] on the cylinder support bracket. Remove the band clamp [8].

Disconnect the hydraulic hose from the tank.

Remove the hydraulic cylinder [2] from the top of the column.

## STEP 2



**⚠ Caution:** Fully clean the mating surface [2] on the mounting bracket for the hydraulic cylinder.

Install the HYDRAULIC CYLINDER **[A]** from the top of the column.

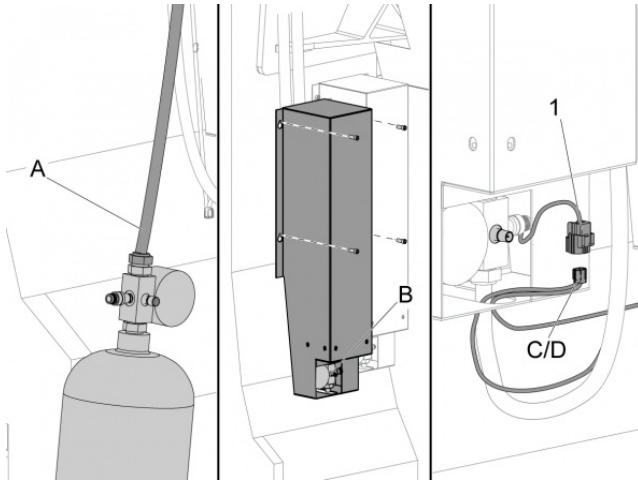
**⚠ Caution:** Make sure the hydraulic hose connection [1] faces the same direction as the one that was removed.

Do these steps to connect the hydraulic cylinder to the lift bracket:

- Small/medium mill
  - Pull the piston shaft [3] through the lift bracket [4].
  - Install the washer [5] and (2) jam nuts [6].
  - Install the cotter pin [7].
- Large mill
  - Pull the piston shaft [3] down until the clevis [8] fits over the lift bracket [4].
  - Install the clevis pin [9].
  - Install the cotter pin [7].

Install and tighten the band clamp [10].

### STEP 3



Remove the tank assembly from the column.

Remove the tank from the mount.

Install the hose from the new HYDRAULIC CYLINDER **[A]** onto the new tank.

Put the HYDRAULIC TANK into the tank mount.

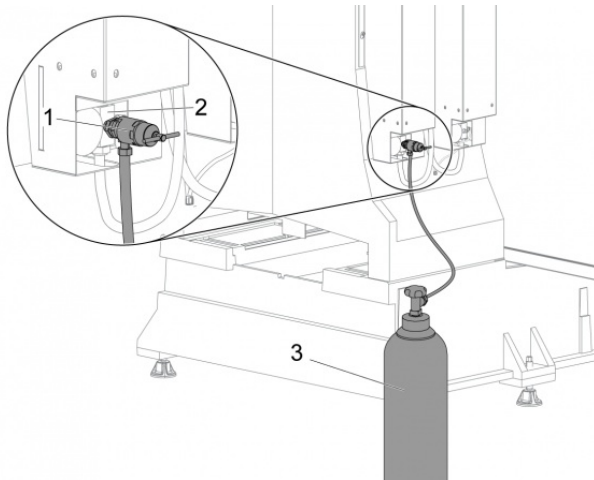
Install the HYDRAULIC TANK **[B]** onto the column.


Look at the connector on the pressure sensor cable installed in the machine.

- If the connector is the same as the connector on the tank [1], use the installed cable.
- If the connector is not the same as the connector on the tank [1], discard the installed cable. Install the PRESSURE SENSOR CABLE **[C]** or **[D]** from the kit.


Connect the two-pin end of the pressure cable to the pressure switch on the tank.


### STEP 4



 **Danger:** Before you do this step, put on eye protection.


With your fingers, tighten the gas chuck [1] on the charge/discharge kit to the Schrader valve [2].

 **Note:** Make sure you turn the T-handle of the gas chuck fully counterclockwise.

 **Note:** If your system has a double-ended tank system, a second Schrader valve is at the top of the tank(s). Use the bottom valve.

Attach the other end of the hose to the source pressure [3].

Slowly pressurize the system to the correct value. Refer to the chart at the end of this procedure.

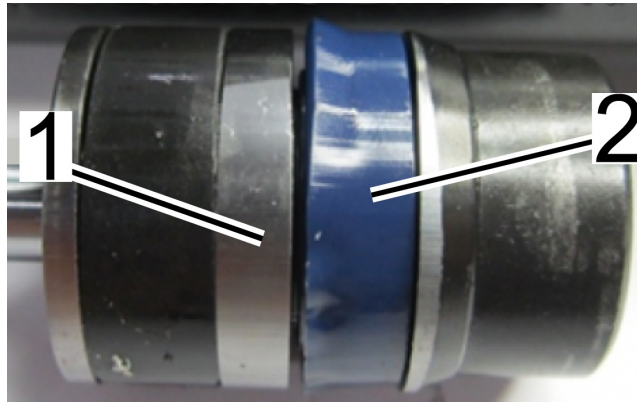
 Power up the machine.

Push **[ZERO RETURN]**. Push **[Z]**. Examine the tank and hoses for leaks or abnormal noises. Make sure the tank pressure is correct at the top of travel. Add nitrogen if necessary. Remove the charging system. Replace the valve cap.

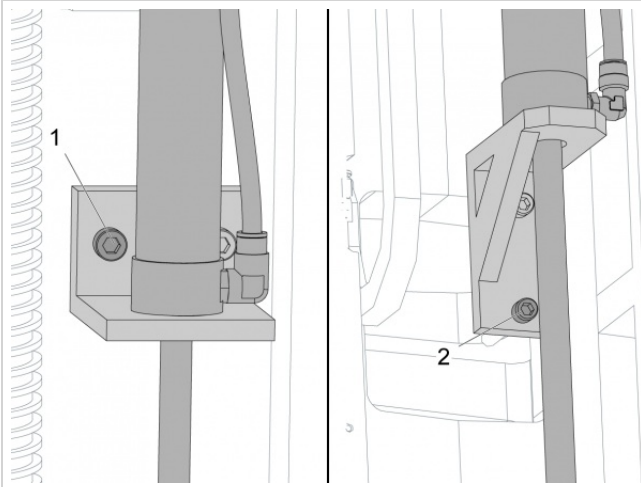


# VMC - Hydraulic Counterbalance - Cylinder - Alignment

If the hydraulic counterbalance cylinder is not correctly aligned, this causes seal distortion [1] and friction to the wear band [2]. This will ultimately cause the cylinder to fail. Do this procedure to align the cylinder.



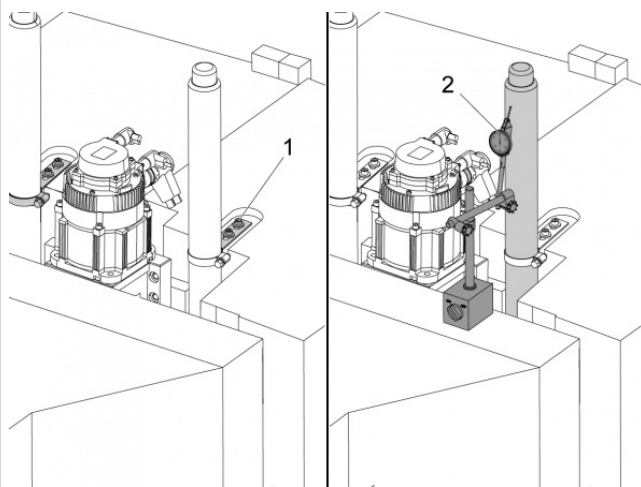
## STEP 1



Loosen (1) screw on the cylinder mounting bracket. Make sure the screw is sufficiently tight to hold the cylinder in position, but sufficiently loose to let you make the adjustment.

The illustration shows the cylinder mounting bracket for a large mill [1] and for a small/medium mill [2]

## STEP 2



Make sure the (2) screws [1] on the bracket are sufficiently tight to hold the cylinder in position, but sufficiently loose to let you make the adjustment.

Put an indicator [2] on the top of the spindle head casting. Put the tip of the indicator on the front of the cylinder.



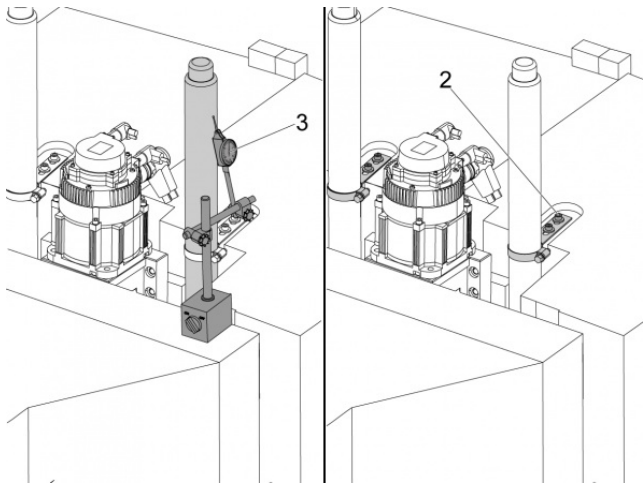
Jog the Z Axis to the top of travel. Set the indicator to zero.



Jog the Z Axis to measure the error from the top of the cylinder to the band clamp.

If the indicator moves more than 0.005", lightly tap the cylinder near the support bracket until it is aligned.

### STEP 3



Put the tip of the indicator [3] on the side of the cylinder.



Jog the Z Axis down to the lowest point that the indicator will reach. Set the indicator to zero.



Jog the Z Axis to measure the error from the top of the cylinder to the band clamp.

If the indicator moves more than 0.005", lightly tap the cylinder near the support bracket until it is aligned. Tighten the (2) screws [2] on the cylinder support bracket and the (1) screw on the cylinder mounting bracket. Make sure the cylinder did not move when you tightened the bracket.

If your machine has (2) cylinders, do this procedure for both cylinders.

## Counterbalance Pressure Chart

This chart shows the correct pressures for the counterbalance tank. Measure the pressure at the top of Z-Axis travel for VMCs and at the top of Y-Axis travel for HMCs. Pressure that is 50 psi (3 bar) higher than the value in the chart is permitted. But pressure that is lower than the value in the chart is not permitted.

Model	Made After	Pressure		Made After	Pressure		Made After	Pressure	
		PSI	BAR		PSI	BAR		PSI	BAR
-	-	PSI	BAR	-	PSI	BAR	-	PSI	BAR
<b>EC-1600/2000/3000</b>	3/15/2004	1000	70	9/13/2004	550	38	6/14/2005	800	55
<b>EC-630</b>	3/21/2006	800	55	-	-	-	-	-	-
<b>HS-1</b>	10/30/1997	600	51	-	-	-	-	-	-
<b>HS-3/4/7</b>	6/5/1998	1150	79	6/18/1999	1200	83	2/29/2000	1250	86
<b>VB-1</b>	6/5/1998	1550	107	-	-	-	-	-	-
<b>VF-3/4 (VCE 1000/1250)</b>	4/28/1995	1150	79	-	-	-	-	-	-
<b>VF-5 XRT</b>	10/8/2004	750	52	-	-	-	-	-	-
<b>VF-5, VM-3, VF-3YT (VCE 1300)</b>	7/21/1998	950	66	10/14/1998	875	60	-	-	-
<b>VF-5/50, VF-3YT/50 (VCE 1300)</b>	7/21/1998	1100	76	-	-	-	-	-	-
<b>VF-6/7/10/12 - 50 (VCE 1600, 2000, 3000)</b>	10/30/1997	1150	79	-	-	-	-	-	-
<b>VF-6/7/10/12 (VCE 1600, 2000, 3000)</b>	10/30/1997	750	52	-	-	-	-	-	-
<b>VF-8/9/11 - 50 (VCE 1600, 2000, 3000)</b>	7/21/1998	1550	107	-	-	-	-	-	-
<b>VF-8/9/11 (VCE 1600W, 2000W, 3000W)</b>	10/30/1997	750	52	-	-	-	-	-	-
<b>VF-O/OE/EXT/1/2 (VCE 475/500/550/700/750)</b>	4/28/1995	750	52	-	-	-	-	-	-
<b>VR-8/9/11</b>	10/30/1997	1800	124	7/21/1998	1100	76	10/14/1998	1025	71
<b>VS-1/2/3</b>	2/29/2000	1250	86	-	-	-	-	-	-
<b>VTC</b>	5/4/2002	1150	79	-	-	-	-	-	-