



13 - Through-Tool Air Blast

Chip Removal and Coolant - Service Manual

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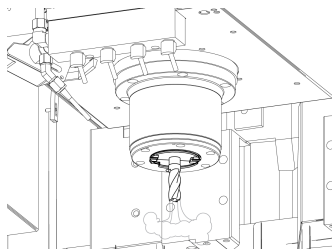
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13.1 TAB - INSTALLATION - CHC

VMC - Through-Tool Air Blast - Installation - CHC

AD0148

Introduction



This procedure tells you how to install Through-Tool Air Blast (TAB). Perform this procedure on mills:

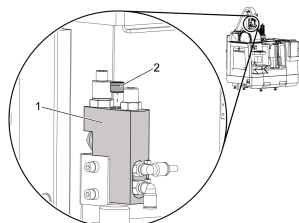
Machine Compatibility:

- made after September, 2014.
- with software version 18.21B or higher.
- with an inline spindle.
- equipped with the TSC option.
- Set setting **32 COOLANT OVERRIDE** to **NORMAL**

This procedure applies to the following service kit:

- **93-TAB** TOOL AIR BLAST 2016-2018 MC W/ BEARINGLESS

Through-Tool Air Blast - Installation - VMC



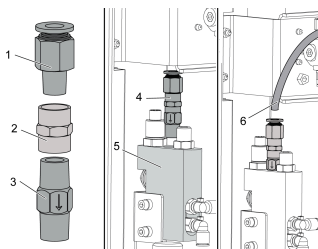
1

Press **[POWER OFF]**.

Set the main circuit breaker to the OFF position. Lock the main circuit breaker. Use an approved lock with an approved safety tag.

Remove the head covers from the machine.

Remove the plug [2] from the top-center port of the TSC check-valve [1].



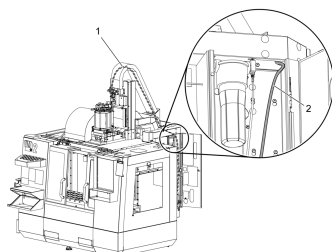
2

Connect a 1/4" NPT by 1/4" NPT adapter [2] to the 1/4" check-valve [3].

Connect a 1/4" NPT to 3/8" push-to-connect fitting [1] to the adapter.

Install the completed 1/4" check-valve assembly [4] to the TSC check-valve [5].

Install the 3/8" tube [6] to the push-to-connect fitting.

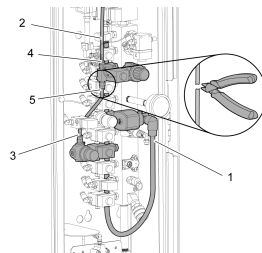


3

Put the 3/8" tube through the cable carrier [1] and behind the control cabinet.

Put the 3/8" tube [2] into the upper right of the air/lubrication cabinet.

Put the 3/8" tube through the back of the manifold assembly.



4

Connect the 3/8" tube to the push-to-connect fitting [1] on the Asco solenoid, as shown.

Find the gray 1/4" tube [2] connected to the TSC regulator [3].

Cut the tube near the TAB manifold.

Connect the upper end of the tube to the upper push-to-connect fitting [4] on the TAB solenoid.

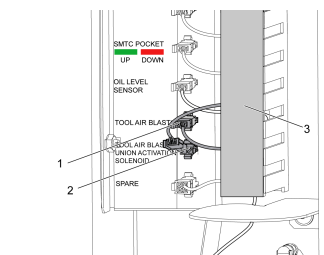
Connect the lower end of the tube to the lower push-to-connect fitting [5] on the TAB solenoid.

5

Connect the cable from the Asco solenoid into the connector labeled TOOL AIR BLAST [1].

Connect the cable from the remaining solenoid into the connector labeled TOOL AIR BLAST UNION ACTIVATION SOLENOID [2].

Put the cables into the cable manager [3].



COMMON	SOFTWARE	EMERGENCY	SYSTEM	AXES	COMPENSATION
PARAMETER					
0795	TSC PRESSURE DEACT			5000	
2736	TSC LOW PR. FLT			5000	
2737	TSC LOW TIME BURGE			15000	
2738	TSC MAX SPINDLE RPM			15000	
0000	TSC PRESSURE ON TIME			0	
1779	ENABLE BEARINGLESS TSC UNION (RELAY NO.)			40	
12781	TSC SENSOR MAX PRESS (PSI)			1125000	
12784	TSC SENSOR MAX PRESS (PSI)			1125000	
12786	TSC SENSOR THRESHOLD PRESS LOW (PSI)			50000	
12787	TSC SENSOR THRESHOLD PRESS HIGH (PSI)			0	
13099	TSC LOW AIR PRESSURE THRESHOLD (PSI)			50000	
13151	MAX SPINDLE RPM FOR TSC LOW PRESSURE ALARM			100	
13176	TAB VERSION			1	
13177	TAB LOW PRESSURE (RELAY NO.)			75	
13178	TAB MINIMUM AIR PRESSURE (PSI)			30000	
13179	TAB MINIMUM PRESSURE TIMEOUT (MS)			5000	
13098	TAB HI PRESSURE RESET TIME (MS)			1500	
13081	TAB AIR ON DELAY (MS)			400	
13082	TAB AIR OFF LOW PRESSURE DELAY (MS)			400	

Parameter 13176 TAB VERSION

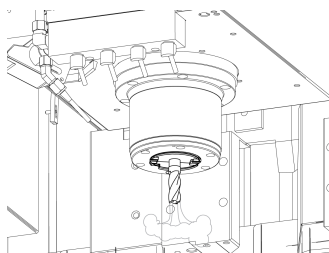
FULL DESCRIPTION: [F1] SEARCH TEXT: <TEXT> + [F2] SEARCH NUMBER: <#> + [F3]

6

Set the main circuit breaker to the ON position.

Press **[POWER ON]**.

For CHC: Set Parameter 13176, TAB VERSION, to 1.



7

Make sure the TAB system operates correctly. Operate this code in MDI mode:

M73;

G04 P5.;

M74;

G04 P3.;

M99;

M73 starts the TAB. M74 stops the TAB.

Manually operate the TAB:

Press **[AUX CLNT]**. Press the **[RIGHT]** cursor arrow.

The tool air blast starts.

Press **[AUX CLNT]**.

The tool air blast stops.

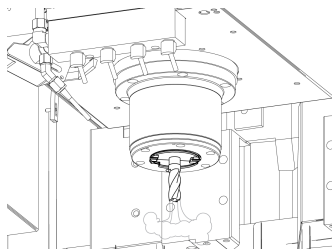
Install the head covers.

13.2 TAB - INSTALLATION - NGC

VMC - Compensating TSC - Through-Tool Air Blast - Installation - NGC

AD0457

Introduction



This procedure tells you how to install Through-Tool Air Blast (TAB). Perform this procedure on mills:

Machine Compatibility:

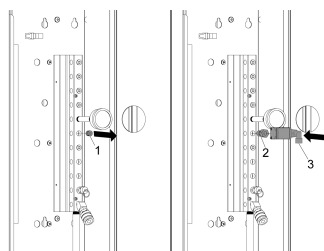
- Made after 2018
- With a compensating union
- With a pipe fitting TSC manifold
- Set setting **32 COOLANT OVERRIDE** to **NORMAL**
- Machine must be equipped with **one** of the following:
 - Full TSC option
 - TSC READY **and** software **100.22.000.1000** or later

Note: Machines built before **June 2019** and have the PROGRAMMABLE AIR/DUAL PROGRAMMABLE AIR or VF SMALL AUTO WINDOW option on their machine need to contact Haas Service to have a patch applied to enable the TAB option.

This procedure applies to the following service kit:

- **93-1000323** TOOL AIR BLAST
NGC MC W/COMPENSATING

Through-Tool Air Blast - Installation - VMC



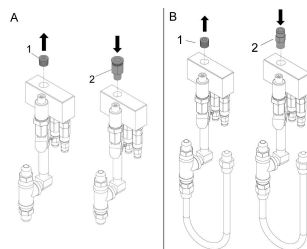
1

Turn off the machine air supply using the shutoff valve located at the bottom of the CALM cabinet. Bleed off the residual air pressure using the pressure relief valve located above the shutoff valve.

Remove the plug [1] located under the pressure gauge on the CALM manifold.

Using the compression fitting [2] install the TAB solenoid [3].

Route the TAB solenoid power cable through the cable carriers to the plug labeled "TAB AIR" and plug it in.



2

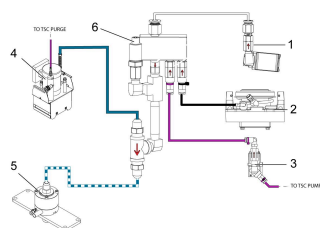
Remove the enclosure panel from spindle head and locate the TSC manifold.

NOTE: There are two types of TABs--the spring & ball [A] and the shuttle & ball [B].

Remove the plug [1] from the top of the TSC manifold.

Install the push-to-connect fitting [2] onto the TSC manifold.

Route the clear hose from the TAB solenoid through the cable carriers to the TSC manifold.



3

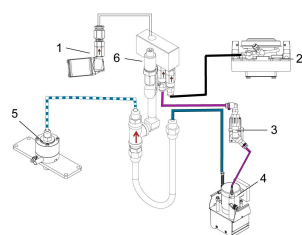
Spring & Ball Hose Routing

Connect air hose from TAB air check valve [1] into the top of the TAB manifold.

Connect air hose from TRP air blast [2] and TSC purge valve [3] into the TAB manifold.

Connect coolant hose from TSC pump [4] into TAB check valve input.

Connect coolant hose from TAB check valve output into the compensating union [5].



4

Shuttle & Ball Hose Routing

Connect air hose from TAB air check valve [1] into the top of the TAB manifold.

Connect air hose from TRP air blast [2] and TSC purge valve [3] into the TAB manifold.

Connect coolant hose from TSC pump [4] into TAB check valve input.

Connect coolant hose from TAB check valve output into the compensating union [5].

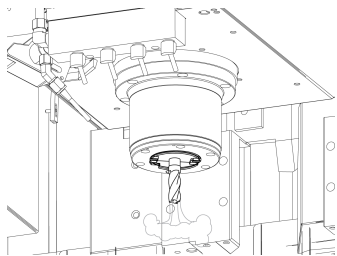
IMPORTANT: The TAB check valve coolant input and output are flipped from the spring & ball TAB check valve.

5

Follow the NGC [PATCH FILE](#) Installation procedure to download the required patches:

- Parameter Configuration Patch
- I/O Configuration Patch

TAB Test



1
Make sure the TAB system operates correctly. Operate this code in MDI mode:

M73;

G04 P5.;

M74;

G04 P3.;

M99;

M73 starts the TAB. M74 stops the TAB.

Manually operate the TAB:

Press [SHIFT]. Press [AUX CLNT].

The tool air blast starts.

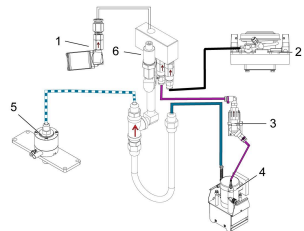
Press [SHIFT]. Press [AUX CLNT].

The tool air blast stops.

13.3 TAB - TROUBLESHOOTING

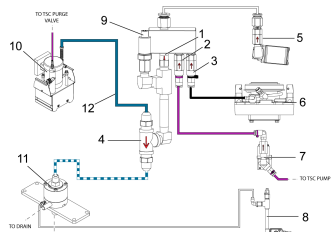
Through-Tool Air Blast (TAB) - Troubleshooting Guide

Shuttle & Ball - TAB Check Valve - System Diagram



- 1. **TAB Air Check Valve** - This check valve prevents coolant from entering the CALM system.
- 2. **TRP Air Blast** - This line provides air during a tool change or when TRP unclamp is activated.
- 3. **TSC Purge Valve**
- 4. **TSC Pump**
- 5. **Compensating Union**
- 6. **Analog TSC/TAB Pressure Sensor**

Spring & Ball - TAB Check Valve - System Diagram

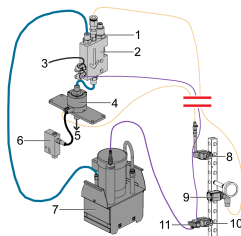


- 1. **TAB Air Check Valve** - This check valve prevents coolant from entering the CALM system.
- 2. **TSC Purge Check Valve**
- 3. **Air Blast Check Valve**
- 4. **Coolant Check Valve** - This check valve prevents coolant or air to backflow into the coolant system. There is a spring and ball inside this check valve.
- 5. **TAB Air Valve** - This solenoid turns on when TAB is activated.
- 6. **TRP Air Blast** - This line provides air during a tool change

or when TRP unclamp is activated.

7. **TSC Purge Valve**
8. **Spindle Air Valve**
9. **Analog TSC/TAB Pressure Sensor**
10. **TSC Pump**
11. **Compensating Union**
12. **High Pressure TSC Coolant Hose**

Built-in - TSC/TAB Check Valve - Diagram



1. **TAB Air Check Valve** - This check valve prevents coolant from entering the CALM system
2. **TAB Assembly**
3. **TRP Air Blast** - This line provides air during a tool change or when TRP unclamp is activated.
4. **TSC/TAB Compensating Union**
5. **To Spindle connection**
6. **Drain Assembly**
7. **TSC Pump**
8. **Spindle Air Valve**
9. **TAB Air Valve**
10. **TSC Purge Valve**
11. **TSC Purge Check Valve**

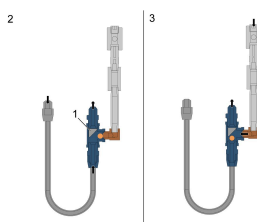
Symptom Table

SYMPTOM	POSSIBLE CAUSE	CORRECTIVE ACTION
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Alarm 2081 LOW TOOL AIR BLAST PRESSURE	Insufficient air supply to the machine	Verify that we are meeting the air supply requirements. TAB consumption ranges from 8 to 15 cfm (0.226 to 0.425 cmm). Alarm occurs when pressure drops below 30PSI. NOTE: Machines with software version 100.22.000.1000 or later will cause an alarm to occur when pressure drops below 15 PSI.
	Tool orifices are too large	Verify size of tool orifices. Add a restrictor to the tool orifice. Or add a pull stud with a smaller diameter through-hole as a restrictor.
	Compensating union defective	Verify the compensating TSC union, especially whether the piston is stuck
	Defective TSC pressure Switch	Verify the LOW TSC bit in diagnostics as TAB uses the same pressure switch.
	The check valve (spring & ball check valve only) is stuck internally.	See the Check Valve Inspection section below.
	VF-Small and Medium Machines (VF-1 through VF-5) built between 3/15/2023 and 5/19/2023 may not have the new slotted elbow fitting in the new TAB check valve.	Verify if the new TAB check valve has the new slotted elbow fitting. If the new slotted elbow fitting is not installed order PN 20-10157 and install it. HSG-A 5-24-2023
Tool Air Blast (TAB) causes coolant tank overflow.	The coolant check valve (spring & ball check valve only) has failed.	Troubleshoot the coolant check valve. Refer to the Coolant Check Valve section below.
Coolant fills the TAB air pneumatic line and blows out the muffler in the CALM cabinet.	The TAB air check valve (spring & ball check valve only) has failed.	Troubleshoot the TAB check valve. Refer to the TAB Air Check Valve Inspection section below.
TAB solenoid does not operate when commanded.	I/O mapping needs to be updated for machines built before June 2019 and have the Programmable Air/Dual Programmable Air or VF Small Auto Window option on their machine.	Contact Haas Service to have a patch applied to enable the TAB option.

Coolant Check Valve Inspection

Shuttle & Ball

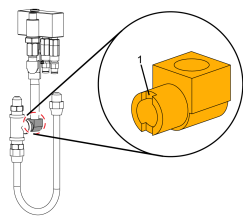


This check valve has a ball deflector [2] inside rather than a spring. The ball deflector acts as a shuttle by directing the ball from one location to another--either blocking the coolant or TAB opening.

As coolant flows into the valve, the ball gets pushed and deflected out of the way [3]. When TAB air flows

into the valve, the ball gets pushed back down due to both air and gravity [4].

The new shuttle and ball check valve also has a new elbow fitting that is slotted [1]. This elbow fitting allows a small amount of coolant or air pressure through to pressurize the pressure sensor.



Spring & Ball

Coolant pressure can push the ball into the spring and trap it, causing the check valve to fail. Without a functional check valve, air from the TAB may flow backward through the coolant system and cause the coolant tank to overflow and/or bubble.

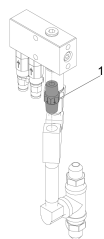


Corrective Action:

Disassemble and visually inspect the check valve for any deformities. Make sure the ball isn't trapped inside the spring. If it is, the spring would be pushing the ball against the countersink of the fitting.

TAB Air Check Valve Inspection

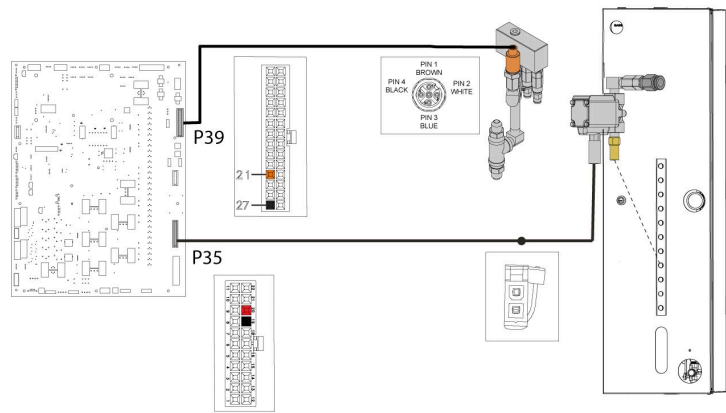
When the TAB air check valve [1] fails and TSC is turned on, coolant from the TSC pump will back flow through the TAB air line to the solenoid and blow out the muffler.



CORRECTIVE ACTION:

Replace the TAB air check valve.

Electrical Schematic





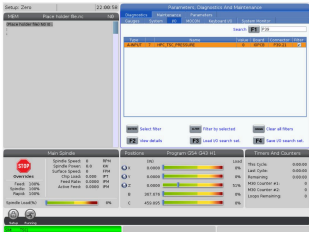
1
TAB Solenoid Output:

Go to **DIAGNOSTICS** and observe as:

- Air blast is triggered, Output 43 Through Air Blast Union should be 1 [1] and TAB Icon appears [2]
- Air blast stops, Output 43 Through Air Blast Union should be 0.

If TAB still doesn't act as expected, check the connection between the solenoid assembly. Ensure the solenoid assembly is connected to the Air and Lube cable **33-9085F** that plugs into the I/O board at P35.

With the cable still plugged in, use fine tip probes to check readings between Pin 35.20 TAB and Pin 35.19 Ground to measure the amount of voltage the TAB receives. The expected voltage should be around 110 - 120 VAC.

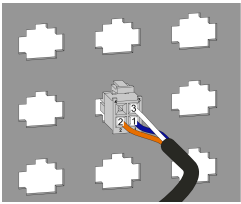


2
TAB Analog Sensor Input:

Go to **DIAGNOSTICS** and observe as:

- Air blast is triggered, A-Input 7 HPC TSC Pressure should increase in value.

If TSC pressure sensor still doesn't act as expected, check the connection. Make sure the pressure sensor is connected to the M12 cable that plugs into the I/O board at P39. The TSC Analog Pressure connection is Pin 39.21 and the Analog Ground connection is Pin 39.27.



3
Test TAB Analog Pressure Sensor with Multimeter:

You will need to remove the spindle head sheet metal panel to gain access to the spindle head inputs bracket. The machine must be powered on and at idle. Locate the M12 to 2x2 TAB pressure sensor cable. With the cable still plugged into the spindle head inputs bracket, use fine tip probes to check readings between pins. Refer to the table below for the correct readings. If the values are not within range, the TAB sensor is likely to be faulty.

RED MULTIMETER LEAD	BLACK MULTIMETER LEAD	EXPECTED READING
Pin 2	Pin 1	4.75VDC to 5.25VDC
Pin 3	Pin 1	0.490VDC to 0.510VDC (machine is at idle)

