

ACMV Pte Ltd

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Installation, Operation and Maintenance
Manual

ACMV AUTOMATIC TUBE BRUSHING
(ATB) SYSTEM

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SECTION 1

Important Installation and Operating Notes

1. Install butterfly isolation valves on pump and cooling tower side of valve.
2. Check location of Flow Switch unless flow switch bypass feature is provided in the control panel. Flow Switch, Differential Pressure Switch and Flow Meters should be on Cooling Tower or pump side of valve.
3. Tubes of Exchanger must be cleaned thoroughly prior to brush and basket installation.
4. Continuous (once per week) H Valve operation is recommended even when the rest of the system is shut down. This assures valve will not freeze up.
5. After a Shutdown, a manual cycle is recommended to properly seat all brushes into baskets. Hold "TEST" button in for 30 seconds and release.
6. In case brush removal or eddy current testing is desired, contact ACMV Pte Ltd for instructions.
7. Sticking Brushes: Upon draining a condenser, brushes often leave their cages and enter the tubes. These are not stuck. They may be pushed to a retaining cage by continuing all the way in the same direction, it is very difficult to reverse direction once it has entered a tube. It must continue in original direction to the end cage and then come back to the original cage.
8. The ATB System works with chemical treatment on a heat exchanger application. At all time, proper chemicals should be added to the system.
9. Most cooling towers have a 1/4" screen or smaller mesh to prevent debris from entering the system. If none is installed, one should be installed. Otherwise, scale chips can become lodged in brush and baskets.

SECTION 2 Control Panel

Installation and Operation of Controls

- 5.1 **Control Panel.** Location should be made to minimize length of run to the 4-way valve as well as for the incoming power.

Input: 400 V AC / 3phase / 50 Hz.
Output Control Wires: 10 x 1mm² wires Electric Actuator + Spare
Output Power Wires: L1, L2, L3, N, E, 2.5 mm² wires

See installation schematic and block-diagram of control panel for proper wiring connections.

SECTION 3

Model H Valves

3.0 Installation of 4-way model H Valves should be according to drawing submitted or as below.

3.1 Valve Installation: Model H Valves should be carefully installed to assure no piping stresses are transmitted to the valve. The valve should be fully supported as recommended in installation drawings. Piping misalignment should be corrected. Expansion or bellow joints are recommended on 2 of the 4 legs of the valve on the side of the chiller condenser.

3.2 Valve Start-up:

3.2.1 Adjust Valve turning speed prior to adding water to the system; adjust exhaust restrictors on air solenoid valve. Valve should turn in 3-5 seconds time (5 to 10 seconds on valves over 16"). *This applies to valves with pneumatic actuator.*

3.2.2 Flood system, start pump, finally adjust valve to meet criteria above.

3.2.3 Be sure valve turns smoothly.

3.2.4 Call factory if any problems.

- 3.3 Valve Maintenance(for Pneumatic Actuator only) - valves and actuators are lubricated at the factory and generally require no further lubrication. If a grease fitting is provided (larger valves), lubricate journal bearing every 3 months. If valve is disassembled for any reason, be sure to put mark on each piece to assure correct alignment during reassembly.
- 3.4 Caution: Do not work on valve or actuator unless all water has been bled from the system and all electrical disconnects have been made.

Section 4

Control System Sequence Of Automatic Tube Brushing (ATB) System

All 3 means of Activating Brush Cycle (shown below) is available in the ATB control Panel.

1. Activation of Brush Cycle by Pressing Test Button at ATB Control Panel
2. Automatic Activation of Brush Cycle by PLC's 24 hour Time Clock in ATB Control Panel
3. Remote Activation of Brushing Cycle by BAS through BAS Energizing Relay Coil Located in ATB Control Panel (optional)

Activation of Brush Cycle by Pressing Test Button at ATB Control Panel

1. Upon activation of Brush Cycle through any of the 3 above method, PLC in ATB Control Panel counts to 2 minutes of standby time. Upon 2 minutes, the PLC energizes the limit switch of the electric actuator and then contactor in the control panel. The Rotating Tube of the valve moves from Normal Position to Reverse Position. Control Panel Reverse Indication Lights up at the same time. The Brush Cycle Counter counts One
2. ATB Diverter Valve remains in Reverse position for 30 seconds (1/2 minutes).
3. Upon completion of 30 seconds the, PLC energizes the another set of limit switch of the electric actuator and then contactor in the control panel and causes the ATB Diverter Valve Rotating Tube to return to Normal Position and Control Panel Normal Indication Light up at the same time.
4. If ATB Diverter Valve takes longer than 15 seconds to move from Normal to Reverse or from Reverse to Normal and is in a mid position the Fault Indication Lights up.

Section 5

Change of Brushes

The brushes must be scheduled to be changed at the end of the 5th year of operation of the Automatic Tube Brushing System

Section 6

Suggested Spare Parts & Consumable List

1. 1 box of Fuse (2 amp)
2. 1 no. of PLC
3. 1 box of Indicating Bulbs
4. 1 set of Brushes and Basket for 1 chiller

Section 7

PROBLEM DETERMINATION FOR ATB SYSTEMS

PROBLEM	CAUSE	SOLUTION
Fault/Malfunction Light comes on	Valve turns too slowly or incompletely for time set. There is interference in the valve plug Electric Actuator Failure	Contact ATB service personnel
Reverse or Normal Light does not come on	Bulb burned out	Replace bulb
	Fuse blown	Replace fuse
	Bad connections	Check
	Limit Switch Not Properly set	Contact ATB service personnel
Valve does not Turn	Electric Actuator Failure	Contact ATB service personnel
	Valve stuck due valve plug interference	Contact ATB service personnel
	Loss of Power Supply	Contact ATB service personnel
	Air restrictors closed	Contact ATB service personnel

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ACMV ATB Systems

Automatic Tube Brushing (ATB) Systems
Service and Maintenance
ATB system with Electric Actuator
电动自动刷管系统季度服务与维修

Date:

日期:

Location:

地点:

Check Valve Support

Item	Equipment Tag (设备标签)	1	2	3	4	5
1	Check Overall of ATB system in good condition检查ATB系统总体状态是否良好。					
2	Adjacent Supports should be such to assure pipes do not move when water flow is reverse检查支架是否牢固，确保阀门转动时不会移动。					

Check Valve Rotation and Controls

检查阀门的旋转与控制

1	Perform these steps without the chiller and then again after the chiller is running. Turn on power: valve should be in normal flow position with power light and normal light on. 完成上述步骤后，再次运行机组，打开电源，阀门应在正常流动的方向，同时normal灯亮。					
2	Press Test Button. Check Valve is on reverse flow position after standby time of ___ minutes. Reverse light comes on 按下实验按钮，阀门转向反方向位后待机——分钟，同时Reverse灯亮。					
3	Press ESC button on PLC to Check Counter on control panel. Record Counter 按PLC控制面板上的ESC，记录计数值。					
4	Visually check that 15 or 30 secs later valve should return to Normal Flow and Normal light comes back on 15秒或30秒后阀门应回到正常位，同时Normal灯亮。					
5	Counter completes 1 count. At every brush cycle. Read and Record Counter 记录器完成一次计数。在每一个刷管周期，阅读并记录计数器。					
6	Pull back the packing gland and lubricate the shaft and gland area with never seize an adjust packing gland if necessary once a					

	year,定期检查润滑脂的多少，每年应加注一次。					
7	Check Electric Actuator: torque switch, limits switches, motor heaters, thermal overload, running amp, manual opening and closing with wheel handle every 4 months.每四个月检查一次电动执行器的扭矩开关，限位开关，电动机的热过载，运行电流，以及手动开启关闭的旋钮					
8	Check control panel actuator motor double contactor, 1 set of indicating lights, PLC, PLC program, relays, brush cycle counter every 3 months.每三个月检查控制面板上的电机双向接触器，一套指示灯，PLC及其程序，继电器，刷管周期计数器。					
9	Touch up Paint Painting of Diverter Valve 转向器阀们刷油漆。					

Service and Maintenance Performed By: 服务和维修完成者: <hr/> Names/Signature/Date 姓名/签字/日期 Mobile: 移动电话	Customer 客户 <hr/> -- Name/Signature/Company Stamp/Date 姓名/签字/公司/印章/日期	Other Representative 其他代表 <hr/> Name/Signature/Company Stamp/Date 姓名/签字/公司/印章/日期
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ACMV ATB Systems

Automatic Tube Brushing (ATB) Systems
Service and Maintenance
ATB system with Electric Actuator
电动自动刷管系统季度服务与维修

Date:

日期:

Location:

地点:

Condenser Approach Temperature Reading

Item	Chiller Designation	Condenser Approach Temp Deg C	Capacity of Chiller Percent	Date Taken	Reading

Videoscope Report

Suggestion and Recommendation :

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