

VCTH-03-04, -06, -08, -12, -16 4, 6, 8, 12 and 16 Zone PLC Timer Based Hydraulic Valve Gate Controller Systems



User Manual D-M-E Company

SAFETY

D-M-E Company products have been designed to be safe and simple to operate. As with any electronic equipment and hot runner system, you must observe standard safety procedures to protect both yourself and the equipment.

To Prevent Injuries:

- To avoid electrical shock or fire hazard, do not apply voltage to a terminal that exceeds the range specified for that terminal.
- To avoid mechanical injury, electrical shock or fire hazard, do not operate this product with covers or panels removed.
- To avoid electrical shock or fire hazard, do not operate this product when wet.
- To avoid injury or fire hazard, do not operate this product in an explosive atmosphere.
- To avoid burn hazards, do not operate valve gates with operator gates open. Correct hookup of valve gates should only be performed with all operator guards in place.
- To avoid burn hazards and possible damage to equipment, do not leave hot runner systems at elevated temperature for extended periods of time. When the mold and machine are not operating, disconnect the molding machines injection unit from the hot runner system so that pressure may discharge through the sprue or manifold extension nozzle. Make sure the molding machines purge guard is in place.
- DO NOT look into the hot runner system when actuating the valve gates in Auto or Manual Mode. Serious burns could occur. The molding machine gate should be closed when ever operating a valve gate.

To Prevent Product Damage:

- Do not operate this product from a power source that applies more than the voltage specified.
- Do not apply any external voltage to the injection forward input. Only a contact closure or solid state relay should be used as dry contact input or a +24Vdc Signal on different pins as described in this manual.
- Set hydraulic operating pressure before connection to the valve gate system. The system is capable of generating ten times the connected air pressure which could be higher than the recommended operating pressure of the valve gate system.

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WARRANTY

D-M-E Company warrants that this product will be free from defects in materials and workmanship for a period of ninety days (90 days) from the date of shipment. If any such product proves defective during this warranty period, D-M-E Company, at its option, either will repair the defective product without charge for parts and labor, or will provide a replacement in exchange for the defective product.

This warranty shall not apply to any defect, failure or damage caused by improper use or improper or inadequate maintenance and care. D-M-E Company shall not be obligated to furnish service under this warranty a) to repair damage resulting from attempts by personnel other than D-M-E Company representatives to repair or service the product; b) to repair damage resulting from improper use or connection to incompatible equipment; or c) to service a product that has been modified or integrated with other products when the effect of such modification or integration increases the time or difficulty of servicing the product.

VCTH-03-04, -06, -08, -12, -16 4, 6, 8, 12 & 16 Zone PLC Timer Based Hydraulic Valve Gate Controller Systems

GENERAL DESCRIPTION

This manual describes the installation, operation and servicing of the Valve Gate Control System.

The VCTH-03-04 provides four zones of hydraulic actuation. The VCTH-03-06 provides six zones of actuation. The VCTH-03-08 provides eight zones of actuation. The VCTH-03-12 provides twelve zones of actuation and the VCTH-03-16 provides sixteen zones of actuation.

The Hydraulic System uses a DME VCTB-03-024D-16 PLC Timer Based Valve Gate Controller which can be setup for 1 to 16 zones of Control. A separate Users Manual is packaged with this system that goes into greater details about the VCTB-03-024D-16 Controller. The controller uses solid state electronics to provide long life and high reliability. Each timer zone is capable of dual time functions so that each zone can be programmed with a "Delay Off" time and an "On Time". The timer zones in turn drive isolated solid state relays that are individually fused against faults.

The System is designed to operate from a wide range of operating voltages (115 to 250 Volts AC 50/60 Hz) so that this one device can be used with almost any available power source. This also makes it easier to relocate the controller between different plants. The standard product offering comes with a 120 volt AC plug (North American Standard). This plug may be removed and replaced with any number of 240 VAC plugs.

A Manual Mode is available to test each zone to assist in determining the correct hookup of each of the valves.

Hydraulic connections on the back of the controller allow for quick connect and disconnect of the hydraulic lines from the controller.

An air powered pump prevents potential burning of oil which is a typical problem with variable volume piston pumps. The air powered pump also saves electrical energy as the pump only runs when there is demand for flow. A hydraulic accumulator provides instantaneous flow for fast actuation of hydraulic cylinders.

The hydraulic system is capable of providing up to ten times the incoming air pressure. For example, if air pressure is 100 PSI, the hydraulic system is capable of delivering 1000 PSI. An air pressure regulator allows for adjusting the desired hydraulic pressure

UNPACKING AND INSPECTION

After unpacking, inspect your controller and check for any damage that may have occurred during shipment.

Check for proper operation of power switch by turning the switch on and off with no voltage applied. Check all electrical connectors for visual damage. If any damage is observed, return the controller to D-M-E for repair or replacement.

INSTALLATION

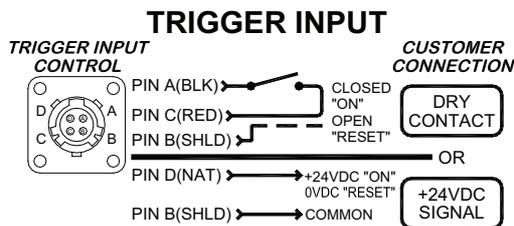
You are installing a piece of electronic equipment, which should not be subjected to any physical or environmental abuse. Select a cool, dry, well-ventilated, environmentally clean location, away from heat and moisture.

VCTB-03-024D-16 Valve Gate Time Based Controller Minimum Connections.

NOTE: Refer to the VCTB-03-024D-16 Users Manual for Operation Instructions and Electrical Connections.

Connection of Trigger Signal

Using the cable supplied with the controller, connect the controller to the injection molding machine.



Connection of AC Power to Controller

The standard offering of the controller is provided with a 120 VAC connector. Please refer to the VCTB-03-024D-16 Users Manual for more information.

NOTE: ALL NATIONAL AND LOCAL ELECTRICAL CODES MUST BE FOLLOWED WHEN CONNECTING THIS EQUIPMENT.

Fill the Hydraulic Reservoir

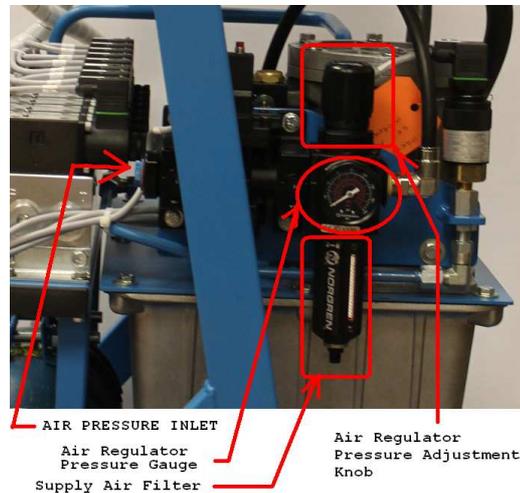
The hydraulic system is compatible with a large range of hydraulic fluids. In the absence of information regarding the valve gate system, Mobil DTE 25 or an equivalent is recommended. This has an ISO Grade of 46.



After making sure that the drain port on the front of the tank is tight, fill the reservoir to the top of the sight glass. Once the hydraulic connection lines are charged the first time, it may be necessary to add more hydraulic fluid.

Connect Air Pressure Supply

Connect an air line to the side of the unit. Quick connects are not recommended as they will limit air volume. Maximum recommended air pressure is 100 PSI. If the system is to run near continuously, it may require upwards of 50 CFM of air flow.



A dry air supply is recommended. While the pump is capable of handling moist air, water may be build up and leak onto the floor. The Air Filter provided will automatically dump filtered water when full onto the drip pan if not emptied manually.

Setting Hydraulic Pressure

Hydraulic pressure should be set prior to connection to the valve gate system. Maximum hydraulic pressure will be ten times the available air pressure.

Turn controller power on. The pump will run until the accumulator is charged. (The Emergency Stop Push Button must NOT be pushed/engaged or the hydraulic pump will not be supplied air to allow it to run.)



ACCUMULATOR DUMP VALVE CONTROL CABLE

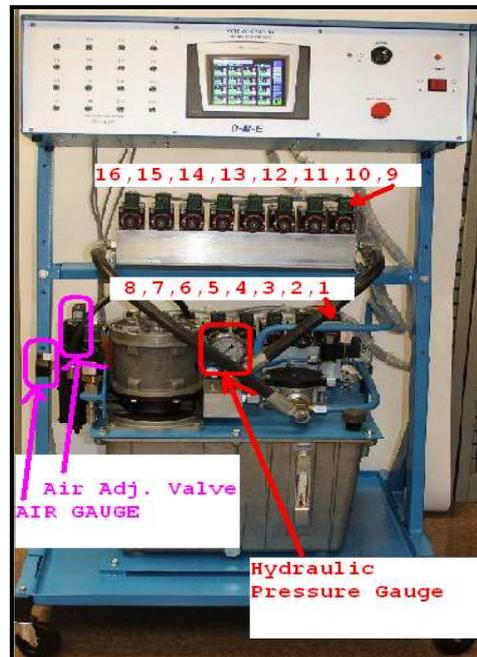
Disconnect the control cable from the Accumulator Dump Valve Solenoid to allow the valve to open and bleed off pressure.

There is an air pressure gage and a hydraulic pressure gage in the lower stand.

To adjust the hydraulic pressure, pull the top of the air regulator up and turn it to achieve the desired hydraulic pressure. (CW = Increase, CCW = Decrease)

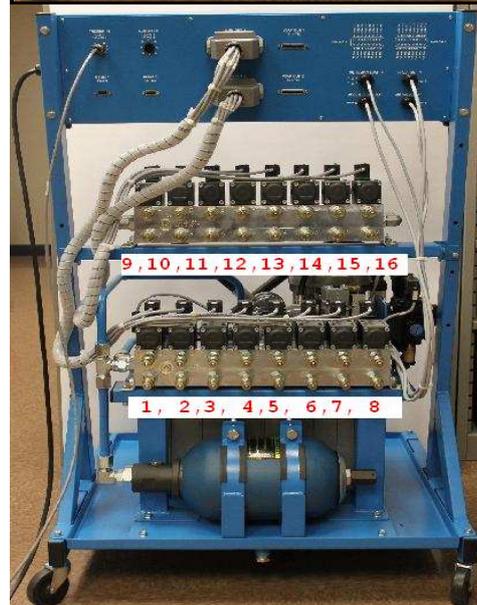
If hydraulic pressure is higher than required, adjust the air regulator to 1/10th of the desired hydraulic pressure. Continue making adjustments until the desired pressure is obtained.

Reconnect the control cable to the Accumulator Dump Valve Solenoid when pressure adjustments are complete.



Air Adj. Valve
AIR GAUGE

Hydraulic
Pressure Gauge



PORT "A" = PRESSURIZED WHEN TIMER ZONE IS "INACTIVE"
PORT "B" = PRESSURIZED WHEN TIMER ZONE IS "ACTIVE"

Alarms

The system is equipped with System Input Sensors LS1, TS1 and PS1.

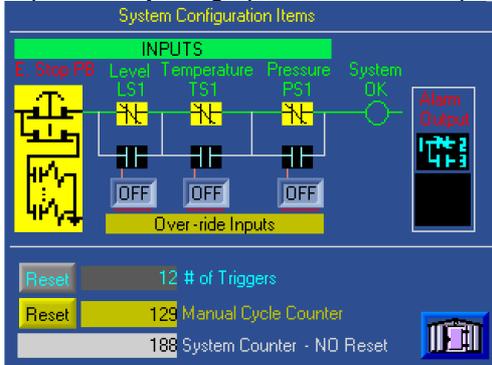
LS1 = Hydraulic Tank Oil Level Switch.

TS1 = Hydraulic Oil Temperature Switch.

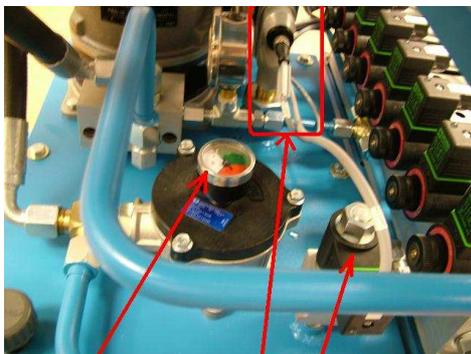
PS1 = Hydraulic Oil Pressure Switch.

The PLC Alarm Screen shows their status.

The status here shows NO ALARMS, all contacts are closed while system is powered up and NO Emergency Stop button pushed. Level OK, Temperature OK, Pressure OK. These signals have over-rides that disable them shown below each switch. Notice that all Solenoid Coil Power is removed if the Emergency Stop button is pressed by the graphical ICON E.StopPB.



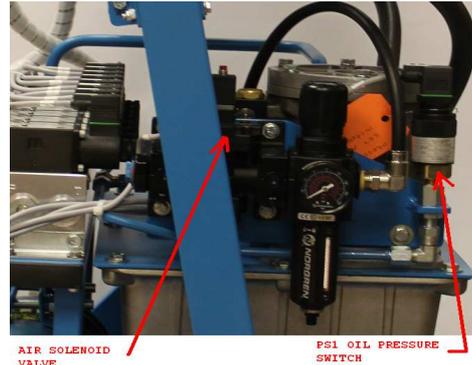
Inputs wired into back of Controller.



OIL FILTER CLOG GAUGE TS1 Temp Switch
LS1 Level Switch ACCUMULATOR DUMP SOLENOID VALVE

TS1 and LS1 are a high oil temperature switch and a low oil level switch. If either of these open, an alarm will occur.

If the alarm activates, shut the system down immediately. Overheating of oil could be an indication that mold cooling of the clamp plate is not in place. The over temperature alarm triggers at 150 +/- 10 F (65.5 +/- 5.5 C). The low oil level will alarm will trigger when oil falls below approximately 3.8 gallons (14.4 liters).



The PS1 Hydraulic Pressure Switch is factory set at 500 PSI decreasing, and a clogged oil filter gauge is also installed on the system.

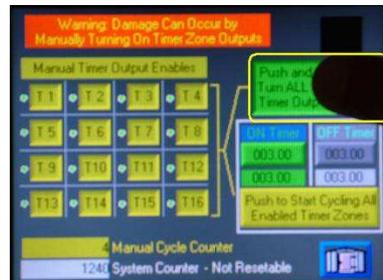
Note: The controller has a 5 second delay recognizing the TS1, PS1 and LS1 Alarm Input contacts to prevent nuisance alarms.

OPERATION

PLC Setup

Do not perform this step until all electrical connections are performed.

Turn controller power on. The PLC display should power up. Refer to the VCTB-03-024D-16 Users Manual for the Controller operation.



See the Manual Mode PLC Screen to test cycle the valves.

SPECIFICATIONS

HYDRAULIC

Hydraulic Pump

5 Gallon/Min. (18.9 Liters/Min.)

Air powered

30 — 100 PSI (2.07— 6.89 BAR)

Max volume: 50 CFM (1416 Liters/Min.)

10:1 Intensification ratio

(60 PSI air yields 600 PSI hydraulic)

Accumulator

1 Gallon (3.79 Liters)

With discharge valve

Depressurizes when power is off

Pre-charged with 400 PSI Nitrogen

Valves

D03 Form Factor

24 VDC Coils

Single solenoid, spring return

4,6,8,12 or 16 valve models

Hydraulic Quick Connects

HNV-14-M by PCI

Similar to Parker 60 Series

see DME MRO Items

991-2 Steel Hydraulic Male Coupler

990-2 Steel Hydraulic Female Coupler

see DME VCAH1500 15 Ft. Hyd. Hose

Air Regulator

Adjustable zero to 100%

Set to adjust hydraulic pressure

Alarm Sensors

Oil Temperature

Triggers at 150 +/- 10 °F

(65.5 +/- 5.5 °C)

Oil Level

Triggers at under 3.8 Gallons (14.4 liters)

Oil Pressure

Triggers at 500 PSI Decreasing

ELECTRICAL

AC Power Input

115 to 255 VAC, 50 or 60 Hz

Please see the VCTB-03-024D-16 Valve Gate Time Based Users Manual for electrical Controller Specs..

Theoretical Performance Discussion

These values are shown to help understand what the limitations of the DME Hydraulic System are and not a guaranteed performance specification. Many things contribute to performance, which include the supplied air pressure and flow rate. The flow of Hydraulic pressure is affected by the hose lengths, design of the Injection Mold hydraulic lines, reducing orifices such as found in the hydraulic quick couples and the hydraulic control solenoids, size and quantity of hydraulic cylinders to drive, hydraulic manifolds that might drive multiple zones in parallel, air that may get trapped in a hydraulic lines, clogged return oil filter, etc. all directly effect the performance and will be different for every system.

At the time of release of this product, DME ME group offers 3 different hydraulic valve gate cylinder sizes that we will consider. The 50 Series, the 200/500 Series and the 800/1000 series.

DME Facts to consider:

- The hydraulic pump can deliver up to 5 gallons per minute. This is equal to 1,155 cubic inches per minute or 19.25 cubic inches per second.
- The 1 Gallon accumulator stores 231 cubic inches of pressured hydraulic oil that can be delivered as fast as the flow can move to the valves due to restrictions and pressure losses.
- The pump at 5 GPM will take 12 seconds minimum to fill the entire discharged 231 cubic inch accumulator before it can be fully used for the next cycle.
- DME ME 50 Series Valve Gates have a Volume of 0.202 cubic inches for each extend and retract cycle for a total of 0.404 cubic inches per cycle..
 - 1 zone = 0.404 cubic inches per cycle.
 - 4 zones = 1.616 cubic inches per cycle
 - 6 zones = 2.424 cubic inches per cycle
 - 8 zones = 3.232 cubic inches per cycle
 - 12 zones = 4.848 cubic inches per cycle
 - 16 zones = 6.464 cubic inches per cycle
- DME ME 200/500 Series Valve Gates have a Volume of 0.399 cubic inches for each extend and retract cycle for a total of 0.789 cubic inches per cycle.
 - 1 zone = 0.798 cubic inches per cycle
 - 4 zones = 3.192 cubic inches per cycle
 - 6 zones = 4.788 cubic inches per cycle
 - 8 zones = 6.384 cubic inches per cycle
 - 12 zones = 9.576 cubic inches per cycle
 - 16 zones = 12.768 cubic inches per cycle

- DME ME 800/1000 Series Valve Gates have a Volume of 0.989 cubic inches for each extend and retract cycle for a total of 1.978 cubic inches per cycle.

- 1 zone = 1.978 cubic inches per cycle
- 4 zones = 7.912 cubic inches per cycle
- 6 zones = 11.868 cubic inches per cycle
- 8 zones = 15.824 cubic inches per cycle
- 12 zones = 23.736 cubic inches per cycle
- 16 zones = 31.824 cubic inches per cycle

These facts indicate that the system should be able to perform 2 second cycles theoretically with the DME components mentioned and a maximum volume of 31.824 cubic inches per cycle, and the pump being able to deliver 19.25 cubic inches per second or 38.50 cubic inches per 2 second cycle. Actual results will vary.

MAINTENANCE AND REPAIR

NOTE: DISCONNECT POWER BEFORE SERVICING. ONLY ELECTRICIANS OR TRAINED SERVICE PERSONNEL SHOULD REMOVE ACCESS PANELS TO SERVICE INTERNAL COMPONENTS.

Periodic Maintenance

At the rear right inside lower part of the unit, there is a clogged filter indicator. When the unit is running (pumping), check the gauge. The gauge should be in the green range. If it is in the red range, the filter is in need of replacement.



Also periodically inspect and clean the power supply fan on the side of the controller unit by blowing clean dry air thru the supply.

If the hydraulic pressure alarm goes off, this should be checked first.
Hydraulic oil quality should be periodically checked, as well.

Troubleshooting and Repairs

Please refer to the VCTB-03-024D-16 Valve Gate Time Based Controller Users Manual for electrical control issues.

REPLACEMENT PARTS

Description	Item Number
15 Ft. Long Hydraulic Hose Assembly with Female Quick Connector Couplers on each end. Two required per Zone	VCAH1500
Hydraulic Return Filter	RPM0110
Hydraulic Reservoir Fill Cap for Large HPU	RPM0111
Electrical Solenoid Plug and Cable	RPM0112
Hydraulic Valve and Solenoid without Electrical Plug	RPM0113
Electrical Solenoid	RPM0114
Air Line Filter Element	RPM0115
Hydraulic Pump Rebuild Kit - P820	RPM0116

RETURN POLICY

The D-M-E® VCTH-03-024D-16, -12, -08, -06, -04 controllers are warranted for 90-days parts and labor, excluding fuses. Contact D-M-E Customer Service for return authorization for repairs, or warranties. Replacement parts are also available through the Customer Service Department.

D-M-E Customer Service

In U.S.: 1-800-626-6653

In Canada: 1-905-677-6370

SERVICE CENTER U.S.A.

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NOTES:

ECN'S:

APPROVAL:

CHECKED BY: T. JOHNSTON DATE: 04/17/12

APPROVED BY: C. KOVACIC DATE: 04/19/12