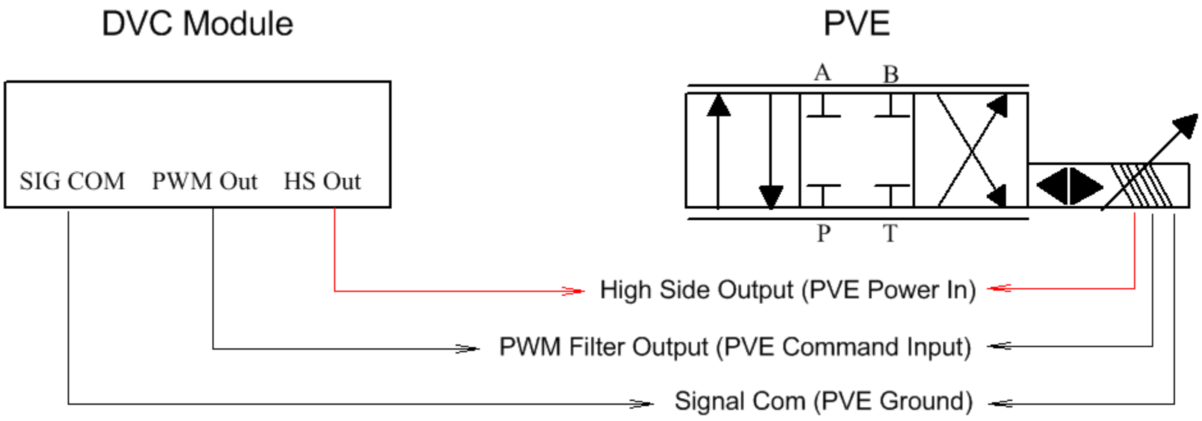
Using the “D” Type Output

Introduction

The DVC-10, DVC-50 and DVC750 may all be ordered with a “D” type output used for driving PVE type valves. The “D” Type output is a sourcing DC voltage output that has a range of 0 Volts to the +Power voltage. While it is typically used to drive PVE type valves it may also be used as a 0V to +Power voltage to drive other high impedance devices. The “D” output will supply up to 4mA on a 24 volt system and 2ma on a 12 volt system.

Simplified Wiring for PVE Valve


DVC Module
PVE
SIG COM
PWM Out
HS Out
A
B
P
T
High Side Output (PVE Power In)
PWM Filter Output (PVE Command Input)
Signal Com (PVE Ground)

Programming the DVC to Drive the PVE Valve

The following points should be considered when programming the DVC to drive the “D” output.

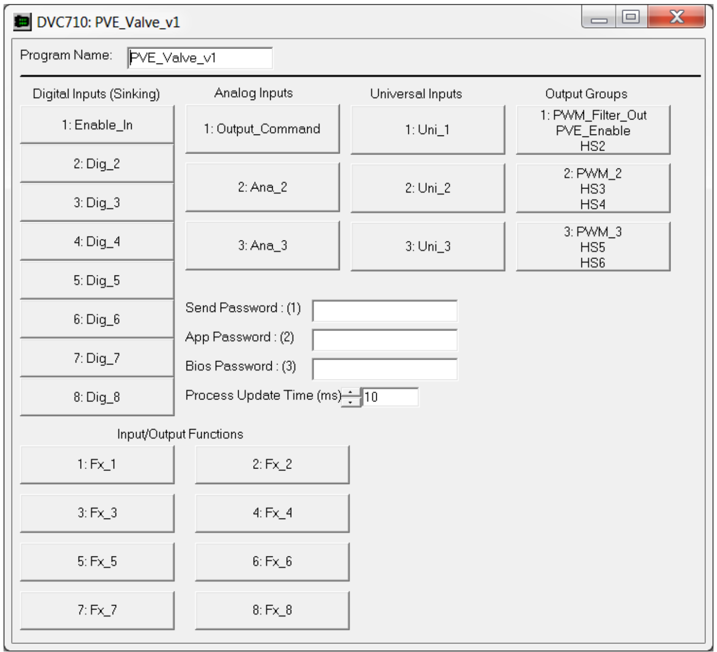
1. When commanding a device such as a PVE type valve using the “D” output, command to the device will be inversely proportional to the command to the PWM output. Therefore you must invert commands to the output in order to obtain standard directional outputs from the cylinder, motor, etc.
2. To prevent unexpected mechanical operation when initializing a system, enable and set the PWM output to a neutral setting (typically 50%) before enabling (applying power to) the PVE Valve with the HS output.
3. Run the PWM output group in Single Coil High Side, PWM Duty Cycle Mode.
4. When using a High Side Output to provide power to a PVE valve, set the variable *HSname*.opendisable to true to prevent false open detection on the High Side Output.

Sample DVC Code

This code example includes all considerations listed above as well as a Ramp feature that may be adjusted through EEMEM. Valid settings for the EEMEM variable, Ramp_Scaler are, 0 – 100. The program will automatically clamp this at 100. This corresponds to about 5 seconds per side or 10 seconds end to end.

The sample application is attached to this PDF file.

Module I/O Settings



DVC710: PVE_Valve_v1

Program Name: PVE_Valve_v1

Digital Inputs (Sinking)	Analog Inputs	Universal Inputs	Output Groups
1: Enable_In	1: Output_Command	1: Uni_1	1: PWM_Filter_Out PVE_Enable HS2
2: Dig_2	2: Ana_2	2: Uni_2	2: PWM_2 HS3 HS4
3: Dig_3	3: Ana_3	3: Uni_3	3: PWM_3 HS5 HS6
4: Dig_4			
5: Dig_5			
6: Dig_6			
7: Dig_7			
8: Dig_8			

Send Password : (1)

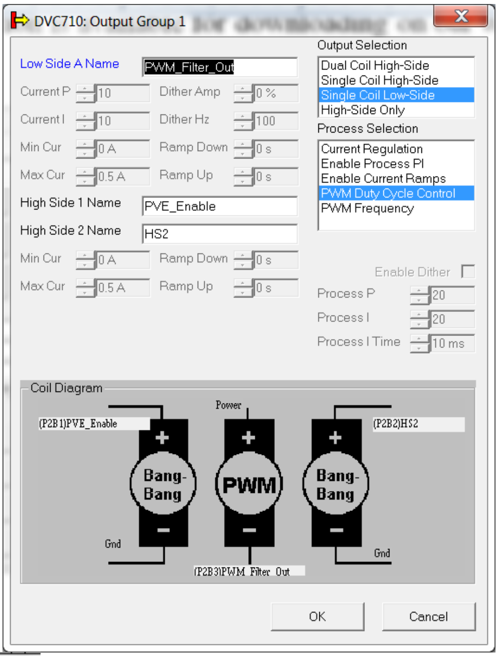
App Password : (2)

Bios Password : (3)

Process Update Time (ms) 10

Input/Output Functions

1: Fx_1	2: Fx_2
3: Fx_3	4: Fx_4
5: Fx_5	6: Fx_6
7: Fx_7	8: Fx_8



DVC710: Output Group 1

Low Side A Name: PWM_Filter_Out

Current P 10 · Dither Amp 0 %

Current I 10 · Dither Hz 100

Min Cur 0 A · Ramp Down 0 s

Max Cur 0.5 A · Ramp Up 0 s

High Side 1 Name: PVE_Enable

High Side 2 Name: HS2

Min Cur 0 A · Ramp Down 0 s

Max Cur 0.5 A · Ramp Up 0 s

Output Selection: Dual Coil High-Side / Single Coil High-Side / **Single Coil Low-Side** / High-Side Only

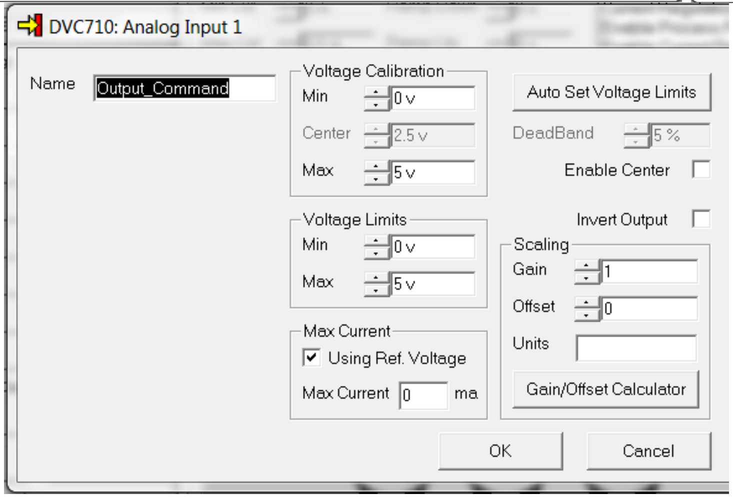
Process Selection: Current Regulation / Enable Process PI / Enable Current Ramps / **PWM Duty Cycle Control** / PWM Frequency

Enable Dither □

Process P 20

Process I 20

Process I Time 10 ms



DVC710: Analog Input 1

Name: Output_Command

Voltage Calibration: Min 0 v · Center 2.5 v · Max 5 v

Auto Set Voltage Limits

DeadBand 5 %

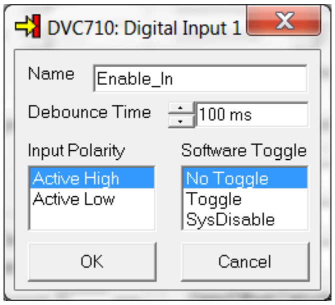
Enable Center □

Invert Output □

Voltage Limits: Min 0 v · Max 5 v

Scaling: Gain 1 · Offset 0 · Units

Max Current: ☑ Using Ref. Voltage · Max Current 0 ma



DVC710: Digital Input 1

Name: Enable_In

Debounce Time: 100 ms

Input Polarity: **Active High** / Active Low

Software Toggle: **No Toggle** / Toggle / SysDisable

Always Code

```
Output_Demand = 1023 - Output_Command
PWM_Filter_Out.enable = Enable_In
PVE_Enable.opendisable = 1

if (Enable_In = True) then
   if ((Output_Command < 460) OR (Output_Command > 563)) AND (Input_Ready = 0) then
      PWM_Filter_Out = 512
   else
      if (Output_Demand > PWM_Filter_Out) then
         if (Output_Demand > (PWM_Filter_Out + Ramp_Scaler)) then
            PWM_Filter_Out = PWM_Filter_Out + Ramp_Scaler
         else
            PWM_Filter_Out = Output_Demand
         end if

         if (PWM_Filter_Out > 1023) then
            PWM_Filter_Out = 1023
         end if
      else
         if (Output_Demand < (PWM_Filter_Out - Ramp_Scaler)) then
            if (PWM_Filter_Out > Ramp_Scaler) then
               PWM_Filter_Out = PWM_Filter_Out - Ramp_Scaler
            else
               if (PWM_Filter_Out > 0) then
                  PWM_Filter_Out = PWM_Filter_Out - 1
               end if
            end if
         else
            PWM_Filter_Out = Output_Demand
         end if
      end if

      Input_Ready = 1

   end if
else
   Output_Demand = 512
   Input_Ready = 0
end if

PVE_Enable = Input_Ready

if (Ramp_Scaler > 100) then
   Ramp_Scaler = 100
   eecommand = eewrite
else
   eecommand = 0
end if

'***** Program Variables *****
dim Ramp_Scaler as eemem

dim Input_Ready as uint
dim Output_Demand as uint
```