

ITB Customer Care Center

DG5.0 DX with ECWS Setup Instructions

Purpose: The purpose of this document is to provide a clear communication on how to install and set up a DX DG5.0 Controller with a digital Actuator.

How the ECWS [External Chilled Water Supply] Operation works.

Compressor Cooling

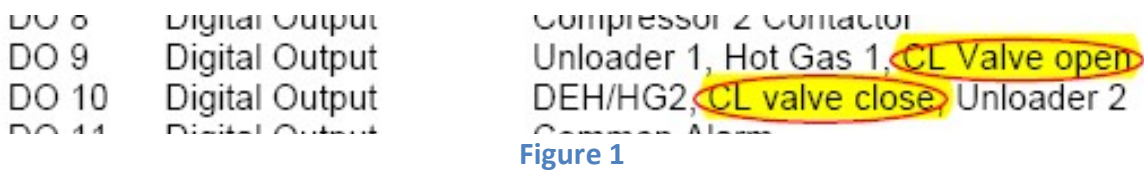
In the cooling mode, the lead compressor stage comes on when the return temperature reaches 50% of the setpoint plus the dead-band. If the unit has hot gas bypass, the corresponding hot gas is enabled only with the compressor in the same circuit. If the return temperature reaches 99% of the setpoint plus the dead-band and the inter-stage delay timer has expired the lag compressor comes on. When the return temperature drops to 20% of the setpoint plus the dead-band the lag compressor will shut off as long as its minimum-on timer has expired. When the return temperature drops to 1% of the setpoint plus the dead-band the lead compressor will shut off provided its minimum on-timer has expired. If the unit has ECWS mode the compressor cooling cycle is inhibited if the chilled water sensor indicates that the incoming chilled water is below the setpoint or the flow switch indicates that there is no water flow. If in compressor cooling and the water flow switch indicates no water flow, ECWS mode will enable and inhibit compressor cooling and shut off the compressors, provided their minimum on-timers have expired.

ECWS Cooling

When the unit is configured for ECWS, proportional cooling is mutually exclusive of compressor cooling. When the proportional cooling input is enabled, the proportional cool output is selected for ECWS (as opposed to PC), the chilled water sensor indicates that the chilled water temperature is below the maximum usable temperature, there is water flow, and the return air temperature rises above the setpoint, ECWS cooling occurs. Valve positioning is accomplished through a series of open and close pulse commands to the chilled water valve actuator. Upon power up, the valve is run closed. Turning on the CLOSE output for 125% of the stroke programmed in the valve option screen ensures that the valve is fully closed. When the temperature increases above the cool setpoint, the valve is driven toward the open point by a timed pulse of the OPEN output. The amount of time the valve is driven is proportional to the percent opening desired and the configured time for a full stroke. The proportional output is controlled by proportional-integral logic that increases or decreases the output over time as long as the error signal is non-zero. The error is the difference between the return air temperature and the setpoint with the PI band equal to the cooling band. The integral time is the valve stroke time. Whenever the required percentage cooling reaches 0% or 100%, the valve is run for 125% of the programmed run time to ensure the valve is indeed fully closed or open. If the valve is commanded to either 0% or 100% and has run the 125% of the stroke time, the appropriate OPEN or CLOSE output is periodically pulsed to keep it there. An analog voltage is also available on analog output 1. The start voltage corresponds to 0% cooling and the start voltage plus the span voltage corresponds to 100% cooling.

Follow these steps to program the controller for ECWS operation:

1. Press CONFIG
2. Press ENTER 2x [flashing cursor should be at CUSTOM SET-UP]
3. Press and release SPECIAL and CONFIG at the same time [cursor should be at the top of TECHNICIAN MENU] Press the DOWN ARROW to enter FACTORY SET-UP
4. Press ENTER
5. Press the DOWN ARROW and go to page 14 Analog Outputs
6. Press ENTER
7. Set Analog Output 1 to ECWS, and then Press ENTER till the cursor is at the top of the Analog Outputs page.
8. You will need to also go to page 12 and set Relay Output/Digital Output to CL Valve Open and page 13 to Relay Output/Digital Output to CL Valve Close [see Figure 1]



9. Once this is set Press ENTER till the cursor is at the top of the Relay Output/Digital Output page.
10. You may now press the STATUS button twice and press the DOWN arrow twice to view the following screen. If you do not see Figures 2 and 3 on the screen, ECWS is not configured properly.

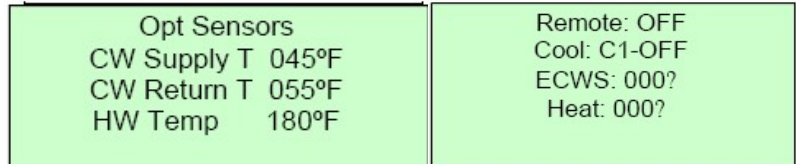


Figure 2

Figure 3

NOTE: Should you need to come out of External Chilled Water Supply (ECWS)

By the term "manual mode" I assume you mean Compressor mode, if this is the case, the path below will get you out of External Chilled Water Supply (ECWS) and allow the compressors to run.

Temp >> Down Arrow >> Down Arrow >> [You should see FreeCool: ECWS] >> Change the FreeCool OFF mode below your current water temp. This should cause the compressor to come on.

Follow these steps to wire up the controller for ECWS operation:

Need an NTC sensor pn# W360-0094. You have the option of using AI2 or AI3 for the CW Supply Temp. Typically, AI2 is used for the CW Supply and AI3 is used for CW Return Temp.

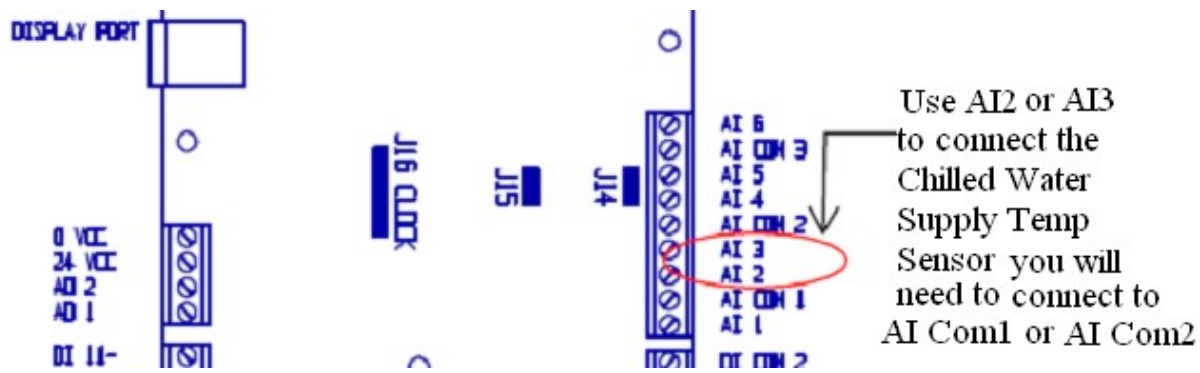


Figure 4

Once the above procedures are done, please wrap the sensor(s), on the pipe according to the example in figure 5. The sensor should be well insulated. Check for accuracy.

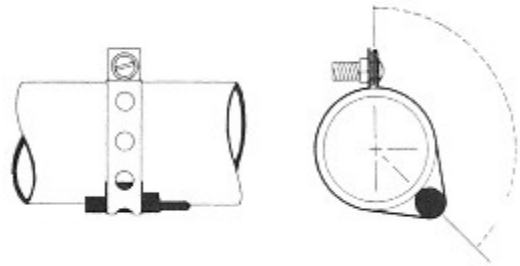


Figure 5

To test the ECWS change over, use a cup of hot and cold water. You want to test the ECWS to DX operation with the hot water and DX to ECWS with the cold water.