

Floating point control

How to setup floating point control

The design of some air handling equipment uses a pressure control switch, such as a Dwyer® Photohelic, to control pressure by varying mechanical parts of the air handler. The air handling equipment can be found on a wide range of applications, such as an air handler in a commercial high-rise building, or a paint booth at an auto body repair shop. In addition to air handling applications, these types of switches are also used on pumping systems to control pressure.

The 580 series drive can integrate easily with a pressure control switch in a retrofit or new application. The 580 series is made up of the ACH580, ACQ580 and ACS580.

Fixed speed applications (without a drive) have the pressure control switch vary mechanical devices to control system pressure. With the addition of a drive, the pressure control switch no longer varies mechanical devices to control system pressure, and instead the switch is wired directly to a drive. The drive controls the speed of the motor to control system pressure. Pressure control switches are an electro-mechanical device that allows for a setpoint to be set, usually with knobs on the front of the controller. The device will mechanically monitor the pressure. As the pressure increases or decreases, switches (usually Form-C relays) within the device will toggle on and off. This type of control in the HVAC industry is sometimes called *floating point control*. The toggling on/off of the relays can be used to control the speed of a drive.

Floating point control is the term used in the HVAC industry, but some industries use the term *motor potentiometer* or *MOP*. Drive documentation may reference one or both terms.

The 580 drive can easily be setup to operate from a Photohelic® or equivalent pressure control switch. The following procedure assumes an ACH580 drive configured with Primary Settings.

Step 1: Set the *Reference from* to *Floating point* by navigating to:

Primary Settings > Start, stop, reference > Primary auto control location > Reference from: Floating point

Step 2: There are three different configuration options that can be selected. Select the control configuration that best fits the application.

Primary Settings > Start, stop, reference > Primary auto control location > Floating point control > Configuration

A description of each configuration is described below:

- Init at power-up
 - The drive will always start at the same initial value reference point when a new run command is given. This setting always provides a consistent starting speed.
 - If the drive were cycled from AUTO, to HAND, and then back to AUTO mode, the drive will ramp to the last frequency it was running at in AUTO mode.
 - If this configuration is chosen, then set the *Initial value* by navigating to:
Primary Settings > Start, stop, reference > Primary auto control location > Floating point control > Initial value
 - The benefit of this configuration is upon every fresh run command in AUTO mode the starting reference is a known constant.

- Resume at power-up
 - The drive remembers the reference point it was last running at in AUTO mode when the run command is removed or power is lost. Upon a new run command the drive will ramp to the last reference point.
 - If the drive were cycled from AUTO, to HAND, and then back to AUTO mode, then the drive will ramp to the last frequency it was running at in AUTO mode.
 - The benefit of this configuration is the drive remembers the last reference point, which is helpful for installations that experience frequent power outages.

- Init to actual
 - The drive does not remember the last reference point after a power cycle, and will start at a reference of 0 after a power cycle.
 - If the drive was cycled from AUTO, to HAND, and then back to AUTO mode, then the drive will maintain the HAND reference as the new AUTO reference point.
 - If the run command is removed from either AUTO or HAND mode, upon a new run command in AUTO mode the last reference is used.
 - The benefit of this configuration is for installations that require frequent manual adjustments with HAND mode, as the transition from HAND to AUTO is seamless.

Step 3: Select the location to land the reference increase and decrease contacts on the drive:

Primary Settings > Start, stop, reference > Primary auto control location > Floating point control > Up from:

Primary Settings > Start, stop, reference > Primary auto control location > Floating point control > Down from:

Pro tip: Using the ACH580 as an example, use of DI5 and DI6 is typical, as those digital inputs are unassigned based on factory default settings. If different digital inputs are chosen, then verify they do not have any other conflicting functions assigned to them.

Step 4: Adjust *Minimum* and *Maximum* frequency settings as needed for the application:

Primary Settings > Start, stop, reference > Primary auto control location > Floating point control > Minimum

Primary Settings > Start, stop, reference > Primary auto control location > Floating point control > Maximum

Step 5: Adjust the *Ramp time* setting as needed for the application.

Primary Settings > Start, stop, reference > Primary auto control location > Floating point control > Ramp time

Pro tip: The *Ramp time* is based on both the *Minimum* to *Maximum* frequency settings adjusted in Step 4. HVAC applications rarely require reverse, so most technicians will set the *Minimum* value to 0 or a positive number.

The 580 series drive can integrate easily with a pressure control switch that may be existing on a piece of equipment. The above steps outline the procedure to configure the drive for this application. In lieu of using Primary settings, the drive parameters 22.71 through 22.80 can also be used to configure floating point control. Adding a drive to fixed speed equipment, thus allowing the equipment to become variable speed, will result in significant energy savings.