

ACS320, ACH550 and ACH580 two speed setup

Setup for use with a two-stage air handler design

ABB variable frequency drives, such as the ACS320, ACH550 and ACH580 series, are used in air handling units. Some of these air handlers are two stage units, and are configured for two speed fan operation, a high speed and a low speed. Brand new air handlers may come with the drives preconfigured for that air handler and two speed operation. However, field replacement drives do require some basic programming and wiring to configure the drive to be used in this application. Technical Note 043 focuses on assisting the field technician in programming and wiring of the replacement drive to support two speed operation in two stage air handlers. This technical note is intended for a technician who already has general familiarity with ACS320, ACH550, and ACH580 drives.

The existing drive may or may not have a control panel installed. The replacement drive should be ordered with a control panel. The control panel allows field programming of the drive.

First confirm the existing drive is configured for two speed operation by reviewing the programming or control wiring to the drive. This may be done based on documentation from the air handler manufacturer. If no documentation is available, then further evaluate the installation. Due to the flexibility in controls, each air handler manufacturer can treat control wiring differently. If a technician is not sure if the drive is being used in a two-speed configuration, then ABB recommends evaluating the following items:

- Review the programming of the 1201 parameter in the existing drive.
 - The factory default of parameter 1201 is DI3. If this parameter has been changed from DI3, then this drive is likely being applied in a multiple constant speed application.
 - If the existing drive is not functional and parameters can't be reviewed, then review the following wiring related items identified below.
- Is an analog signal wired into AI1?
 - Lack of an AI1 input typically indicates the drive is receiving a speed command either via communication protocol or contact closures on digital inputs.
- Are there communication wires (i.e. BACnet, Modbus, etc) connected to the drive?
 - Lack of communication wires combined with the lack of an AI1 connection indicate the drive is most likely configured for constant speed operation.
 - Communication wires that are connected to the drive do not confirm nor deny the drive is used in a constant speed configuration.
- Extra control wiring into digital inputs
 - DI1 is typically a run/stop command. The most basic two speed designs will jumper DI1 closed.
 - DI2 and DI3 are often used to activate multiple constant frequencies.
 - DI4 is often used as the safety input, and may have a jumper installed if there is no safety connected.

ACS320 and ACH550

Assuming the technician verifies the drive is being used in a two-speed configuration, then follow these steps to configure the replacement ACS320 or ACH550 drive for two speed controls. Note these steps are assuming DI2 and DI3 are being used as the two constant speed commands. These steps also assume an ACS320 is replaced with an ACS320, or an ACH550 is replaced with an ACH550.

Step 1 Remove any control jumper wires from the existing drive and install them onto the replacement drive

- Step 2 Remove any external control wires from the existing drive and install them onto the replacement drive
- Step 3 Program parameter 1201 to DI2,3
- Step 4 Program parameter 1202 to the low speed, typically around 40 Hz
- Step 5 Program parameter 1203 to the high speed, typically around 60 Hz
- Step 6 Program parameter 1204 to the high speed, typically around 60 Hz

Instead of programming individual parameters, a control panel that has the parameter settings uploaded from the existing drive, can be used to download the existing drive parameter settings into the replacement drive. The steps listed above only address two speed operation parameters, and do not address the typical drive startup requirements, such as entering the motor data into Group 99.

ACH580

If an ACH580 is being used to replace an ACS320 or ACH550, then the ACH580 will be programmed differently. The following steps assume an ACH580 is replacing an ACH550. Replacement of an ACS320 with ACH580 would follow similar steps, however the control wiring terminal numbers will be different between the ACS320 and ACH580. For example, DI2 is terminal 13 on an ACS320 but DI2 is terminal 14 on an ACH580.

- Step 1 Remove any control jumper wires from the existing drive and install them onto the replacement drive
- Step 2 Remove any external control wires from the existing drive and install them onto the replacement drive
- Step 3 Verify parameter 19.11 is programmed to EXT1
- Step 4 Program parameter 28.21 Bit 0 to packed
- Step 5 Program parameter 28.22 to DI2
- Step 6 Program parameter 28.23 to DI3
- Step 7 Program parameter 28.26 to the low speed, typically around 40 Hz
- Step 8 Program parameter 28.27 to the high speed, typically around 60 Hz
- Step 9 Program parameter 28.28 to the high speed, typically around 60 Hz

Note that in this document we referred to the application as a two-speed air handler. As seen in the programming instructions in this document, from the drive viewpoint this is a two-frequency application. Due to the complexity and variety of different control schemes that may have been implemented by any particular air handler manufacturer, this document is intended as a guide and supplement to the following drive firmware manuals:

- 3AUA0000062599 – ACS320 drives
- 3AUA0000081823 – ACH550 drives
- 3AXD50000027537 – ACH580 drives