

VSD Frequently Asked Questions

Measured Amps at input to the VSD does not agree with rated FLA. The input current to the VSD will be considerably lower, compared to the output current. This is due to the power factor at the input to the VSD being greater than .95 and nearly unity when the IEEE-519 option is included. Chiller full load amps (FLA) must be measured at the motor terminals, where the power factor is the normal motor power factor. Use a true RMS reading meter to make these measurements.

Manual Speed Control is a bit more complicated than it was on earlier products. It first requires you to go into the "VSD Service Mode". Once in the "VSD Service Mode", make certain you are NOT in "Program" by pressing the "Program" button and watching the display. With the panel NOT in "Program", you can adjust the frequency setpoint using the increment and decrement keys which are combined with the vanes open and closed buttons. You can also select fixed 60HZ by pressing the 60HZ key. The VSD will begin to change speed, moving toward the manual setpoint you entered. It may take some time to attain the programmed frequency. To exit the manual VSD speed mode, press the "Auto" key. Be sure the unit is in auto speed mode before exiting the "VSD Service Mode"; otherwise, the unit will stay in the manual VSD speed mode after exiting the "VSD Service Mode".

Manual Vanes are controlled as before in the service mode (not VSD service). The panel must NOT be in "Program" mode, or these keys will program the turbo-guard boost pump.

Retrofit DV/DT Network is an 8-inch by 8-inch accessory box which connects to the motor leads at the motor terminal box on retrofits. This delta connected filter network suppresses excessively large and fast rising voltages that would otherwise be applied to the motor due to the combination of long wiring and the use of a PWM inverter. This DV/DT network must be connected directly across the motor windings.

On all VSD units, this same circuit is located on the red fiberglass vertical support located just to the left of the pole assemblies. Since this filter is already present inside the cabinet on all VSD units, some installers have questioned whether the internal circuit must be disabled when using the terminal box mounted accessory. The answer is no--you do not need to disconnect the filter inside the VSD cabinet.

Condenser Water Booster Pump is to be used for VSD units located remotely from the chiller. The subject is addressed in the retrofit drawings supplied with the VSD. This pump is field purchased, and its 120 VAC power must be supplied from an external source controlled through a pilot relay (also field supplied). The pilot relay is to be

energized by circuit #24. We suggest a Grundfos Model CR2-20/IU, which is rated at 10 GPM with 15 feet of head. Piping between the chiller and the VSD is to be 1" rigid pipe (also field supplied).

Condenser Water Strainer is supplied on all installations to prevent plugging of the flat-plate heat exchanger on the rear of the VSD. This strainer contains a 1.5 inch diameter stainless steel wire mesh element. This mesh is a woven material containing 20 wires per inch. A few early shipments contained elements which used a steel cylinder with punched holes. These strainers may plug prematurely and should be replaced by the woven wire type.

Anti-Recycle with VSD is now five (5) times in succession, followed by a ten-minute wait. After ten minutes, you get five more successive starts. This is permitted on VSD units only, due to the low inrush current and reduced motor heating during inrush.

YT Condenser Transducer for VSD is now 025-29148-009, which has a lower range of operation to address applications with low entering condenser water. Its range is 4 to 34 PSIA with a proportional output of 0.5 to 4.5 VDC. The VSD software for YT chillers requires the use of this transducer.

Auto-Calibration of the vane feedback potentiometer is difficult to recall without having a printed reference. The procedure is as follows:

1. Place the unit into the "VSD Service Mode".
2. Place the panel into the "Program Mode".
3. Press the "Open" key.
4. The display should show "Calibration in progress - vanes opening". The vane motor will begin running the vanes toward the full open position.
5. Once the feedback voltage is no longer changing, the display will switch to "Calibration in progress - Vanes Closing".
6. When the feedback voltage again stops changing, the display should indicate "Calibration Successful".
7. To accept this calibration, hit the "Enter" key.

Note: To abort calibration at any time during this procedure, hit the "Cancel" key.

If the vane motor reverses direction prematurely, it is likely the voltage feedback has not changed enough during successive program loops. Likewise, if the vane motor gets to the full open position and does not change direction, it is likely the voltage is still changing, even though the linkage is at the end of its travel. In some cases electrical

noise may be present on the signal, and the microprocessor is seeing this noise as a change in voltage. If you run into either of these situations, call the [YORK Product Service Group](#).

Wire #61 in the control panel on YK chillers is wired differently when a VSD is applied. The vent line solenoid and the oil return solenoid are both tied together and energized by wire #61. The vent line solenoid is no longer on #34 when a VSD is applied. Output to wire #34 now energizes the liquid line solenoid (gear cooling) alone and ONLY when the sump temperature rises above 140° F. Wire #34 now de-energizes when the sump drops below 135° F.

ACC print map is a feature which allows printing a record of all surge points stored in the ACC battery-backed memory. With a printer connected to the microboard in the normal manner, you can enable this feature while in the "VSD Service Mode" by entering "Program Mode" and pressing the front panel "Print" key. The display will say, "Enable Map Print? NO ; Restart Map? NO". Change "NO" to "YES" in both cases using the scroll key and pressing "Enter" each time. The printer will begin printing the map. This can take quite a long time; and, therefore, we do not suggest you try this with the Weightronix printer due to its slow printing speed. If you wish to leave a printer connected and log new surge points as they occur, you can answer "YES" plus "NO" to the above two questions. The printer will log all new points and will print out system data present at the time of each surge.

Stability Limit determines whether a surge is stored in the compressor map if the leaving water temperature is changing faster than the programmed rate. If a surge occurs and the leaving water is within the window of +0.3° F to -0.8° F, it will not be mapped if the temperature is changing. The stability limit index normal value is 4500 but may be changed to a value between 1000 and 7000. It is programmed in the VSD service mode by entering program mode and pressing the chilled liquid temps display key. Do not make changes unless directed to do so by the YORK Product Service Group.

Remote 1 to 11 Second Reset Pulse not working is the result of this feature being removed, in favor of support for FAX4500. If you have an existing installation using the 1 to 11 second PWM control (or a card file) and you find this feature is not working, call the [YORK Product Service Group](#). We can supply special software to re-enable this function on early production units. This feature has been reinstated as a standard offer on Style "B" VSD units.

Wire Ampacity to VSD and VSD to Chiller - Power wires are sized at 1.25 times the full-load amps (FLA) plus oil pump amps and control transformer amps. Note this differs from the 1.38 multiplier used on earlier drives. VSD to motor wires need only be 1.25 times the motor FLA, since the oil pump and control power are not part of the equation at this point.

Surge Counter - The surge counter increments each time the ACC detects a chiller surge. It is not uncommon to receive a chiller with some number of surges recorded in memory. The only way to "zero" this value is to zero the B-RAM memory which stores the compressor surge map and other non-volatile data. Zeroing of the B-RAM generally is not done unless some condition has caused false data to be stored (see Zeroing B-RAM below). Also, be aware it is not uncommon to find very high numbers of surges. We had one chiller which surged for two weeks, running 60 HZ, along with a fixed-speed chiller which was also surging due to tower problems. After two weeks, the customer decided it was time to fix the tower. In this case over 18,000 surges were logged.

Zeroing B-RAM - This memory, located on the ACC board, is maintained by an internal lithium battery. It stores the compressor surge map information and other data such as the vane pot calibration. There are only two cases where this memory should be cleared--when the chiller has been running and storing invalid surge information due to a mis-calibrated vane pot and when the chiller has been running and storing invalid data due to a faulty condenser or evaporator transducer. Vane position and refrigerant pressures are the basis of the surge map; and if these values are false, the map created with false information will be a false map. Any other conditions which may be abnormal will only cause the chiller to run at an abnormal part of the map but will still be valid data for the conditions. For example, if the cooling tower should by-pass water causing a false high-head, the chiller will figure out the best mode of operation for these conditions, even though they are abnormal. When the problem with the tower is fixed, the chiller will determine a new optimum operation on a different part of the map. Neither set of stored values is incorrect. If the same tower problem ever develops again, the chiller will already know what to do. If you believe you need to zero the B-RAM, call the [YORK Product Service Group](#) for assistance.

DV/DT Snubber Network Leads Too Short - On some large motor terminal boxes, there will be no location which permits the wires supplied to reach all three motor conductors. The instruction with the retrofit materials cautions not to lengthen these leads. It is acceptable to add 10" of wire, butt-spliced to each of these wires from the Snubber Network.

Isolation of Power Conduits - We no longer require a section of non-metallic conduit at entrance and exit to/from the VSD as we did on previous products. If any customer or installer wishes to continue to follow this practice, we have no objections.

Wiring ACC to Power Supply Board in Control Panel - The ACC is powered by +30 VDC Unregulated from the control panel's power supply board. There are two connectors on this power supply which can furnish +30 VDC Unregulated. The plug designated in the retrofit drawings is sometimes already being used by the liquid level control. It is permissible to daisy chain off this same wiring, or you may elect to utilize the alternate +30 VDC Unregulated connection.

Retrofit Instructions - There are 3 drawings shipped with each retrofit kit. These drawings are:

- Vane Pot Installation and Set-Up
 - Piping Installation
 - Control Panel Retrofit
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Booster Pump for Retrofits - On retrofits where the VSD is located away from the chiller shells, it is likely the condenser water to the VSD will be piped up to the ceiling and back down to the VSD. **This piping is to be 1" rigid pipe and may result in the inability to achieve 8 feet of pressure drop across the VSD heat-exchanger.** In this case a booster pump is necessary. The pump identified in the VSD retrofit drawings is to be purchased locally and will be wired to a pilot relay which we suggest you energize in parallel with the oil pump contactor. Be certain to place a YORK suppresser across the pilot relay.

12 Lead Motor Wiring - We have received many questions about how to wire a twelve-lead motor. Most of these motors actually have two sets of parallel windings and, therefore, have two one's, two two's, etc. VSDs and solid-state starters are connected to the motor in the delta configuration; that is 1&6, 2&4, 3&5. The T1 lug will then have two one's and two sixes tied to it.

There were a few motors, made several years ago, which were numbered 1 through 12. These motors had the first set of wires marked 1 to 6. Numbering then continued with the **second** 1 numbered 7, the **second** 2 numbered 8, and so on up to 12. In other words, take the numbers above 6, subtract 6 from the number, and re-label as the result.

Peak Input Voltage - The displayed value is the phase to ground voltage at the input to the drive in terms of peak voltage, as would be measured with an oscilloscope. Phase to ground is normally the phase to phase voltage divided by the square root of three, or 265 VAC phase to ground for a 460 VAC system. The peak value of the 265 VAC measurement is approximately that number times the square root of two, or 375 volts in this example.

KWH Meter Zeroing Procedure - This accumulator is reset by going into the "VSD Service Mode", making sure the panel is in "Program Mode", and pressing the "Operating Hours / Start Counter" button. The display will show "Reset Hours? Y/N". Use the "Advance day / Scroll" key to select "Y" and press "Enter".

Remote Setpoint Range - Note that 1 to 11 second temperature reset is not an offered feature in YT-VSD chillers prior to the B-Revision units. In early YK and in later "B-Revision" VSD chillers, the remote ranges are as follows:

Microboard Jumpers Set Temperature Range

Water, Non-TM
38 - 70 Degrees F
Water, TM
40 - 60 Degrees F
Brine, Non-TM
10 - 45 Degrees F
Brine, TM
34 - 54 Degrees F

The remote reset feature may be added to early YT-VSD chillers by contacting the YORK Product Service Group for a software update.

Clock Chip and BRAM Chips - If you are familiar with the RTC clock chip used on the control panel microboard, you may notice what appears to be clock chips on the ACC board and on the VSD logic board. These two boards contain similar black plastic chips which are battery backed random access memory (BRAM). They have a different number of pins from the RTC clock chips and cannot be replaced by the familiar clock chip.