

E2 Enhanced Suction Group Setup Guide

Introduction

With the addition of E2's Enhanced Suction Group, several new modifications simplify the set up of the algorithm while at the same time provide more advanced control. The Enhanced Suction Group is set up in a very similar way to the previous Suction Group. This guide will define what has changed and describe new parameters with steps for setup.

What's New in Setup

- **Enhanced Switching**

Run Time Equalization, Minimize Switching, and Two Stage parameters have been removed from General Setup. The run time and switching parameters are no longer used because the Enhanced Suction Group algorithm automatically minimizes compressor switching and run-times. The Two Stage parameter is no longer supported by the algorithm.

- **Circuit Load Analysis**

Unlike the previous suction group algorithm, the Enhanced Suction Group includes Circuit Setup where you associate all circuits connected to the suction group. Once the circuits are set up, the suction group will use the circuit states to help determine current loads on the suction group. For example, when one or more circuits go into defrost, the Enhanced Suction Group determines that there is less of a load on the suction group than if all circuits were in refrigeration. With the appropriate circuits associated, the Enhanced Suction Group tailors its capacity to meet the load. Over time, the Enhanced Suction Group will build and store a profile for all the different combinations of circuit states encountered in the algorithm.

- **PID Removed: Control Compressors With New Control/Cycles Parameter**

The Normal tab (previously labeled Advanced) has a new parameter called Control/Cycles that allows you to adjust the overall behavior of the suction control algorithm instead of using PID (see *Figure 1*). With the addition of the Control/Cycles parameter, which is used to tune the control of the compressors, the PID tuning parameters have been removed as PID is no longer used by the algorithm.

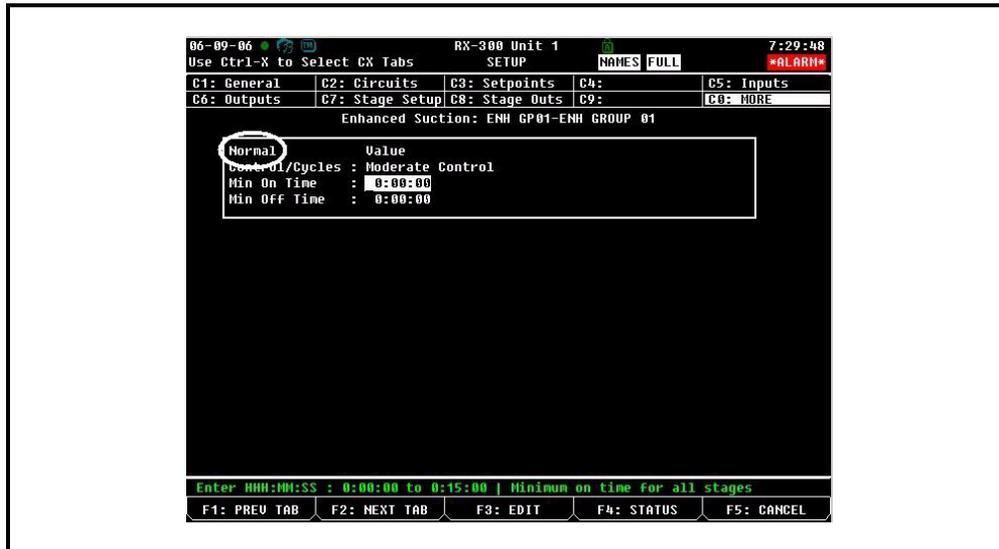


Figure 1 - Normal Setup Under the More Tab

The Control/Cycles parameter will default to the most appropriate setting based on what has been set in the **Type** fields under Stage Setup. But if too much compressor cycling is present, you may adjust the parameter to a setting that will reduce how many times (frequency) the compressors are switched. However, the reduction in cycling may reduce the accuracy of the suction pressure. You may choose between **Less Cycling** and **Least Cycling** to reduce compressor cycling. The **Moderate Control** setting offers a balance between the compressor cycling and the tightest control of the suction pressure. If you would like to improve the accuracy of the suction pressure and are not experiencing excessive compressor cycling, the parameter may be set to **Tight Control** or **Tightest Control**. By doing so, the suction pressure will be maintained in a tighter control range; however, an increase in compressor cycling will most likely result.

Removal of the compressor and unloader ON/OFF delays that are no longer used by the algorithm has greatly simplified the setpoints configuration. The Throttling Range (TR) pressure parameter has also been removed since the algorithm no longer uses PID to control the compressors.

 **NOTE: If compressor minimum ON/OFF times are still desired, you may set them up under the *More* tab under *Normal* Setup (see *Figure 1*).**

- **Digital Scroll Compressor Support**

The previous suction group algorithm included Comp Setup and Comp Outs tabs where you would enter the compressor type. These tabs are now called Stage Setup and Stage Outs. The Stage Setup tab has been expanded to support the digital scroll compressor (DS), and the ability to accept decimal numbers when entering a value for **Capacity** (the capacity is now unit-less so that

you may choose the preferred unit of capacity). Units of HP or AMPS may still be used or other units such as BTUs, which are more reflective of the actual capacity of the compressor.

Support for both Variable Speed compressors (VS) and the Digital Scroll compressor (DS) is located under Var Cap Setup (previously labeled VS Comp Setup). If a Digital Scroll compressor is defined in Stage Setup under **Type**, a new parameter called **DS Period** becomes available. The value of this parameter must match the Pulse Width Modulation (PWM) period that the Digital Scroll is using. The default is 20 seconds and should not be changed unless the Integrated Digital Compressor Module (IDCM) connected to the Digital Scroll has also been changed.

Setting Up Enhanced Suction



NOTE: Online Help is available for all properties in the Enhanced Suction Group application. If you need help understanding how to set a parameter, highlight the field and press the HELP key .

1. From the Home screen, press **F1** for Suction Groups and choose an Enhanced Suction Group (ENH GP).
2. Press **F5** to go to Setup.
3. Under the General tab, all the parameters will be set up the same as they would in the previous version Suction Group, except that Run Time Equalization, Minimize Switching, and Two Stage parameters have been removed from this tab.
4. Associate all the circuits that are connected to the Enhanced Suction Group under the Circuits tab. Up to 48 circuits may be associated.
5. Under the Setpoints tab, enter the desired Suction Pressure Setpoint. Note that the parameters Comp and Unloader ON/OFF delays have been removed along with Throttling Range (TR) because it is no longer used by the algorithm. Min ON/OFF times are still available, but are now located in Normal Setup under the More tab.
6. Configure all Inputs the same as the previous version Suction Group application under the Inputs tab.
7. Configure all Outputs the same as the previous version Suction Group application under the Outputs tab.
8. For Stage Setup, set the type of compressor or unloader in the **Type** field. Digital Scroll (DS) type compressors may now be configured in addition to Variable Speed (VS). Also, decimal numbers may now be entered in the **Capacity** field.
9. Configure all relay output points for the compressors or unloaders under Stage Outputs, similar to the previous Suction Group application.

10. Define the parameters under the Var Cap tab respective to what type of variable compressor has been defined in *Step 8* (DS or VS). If a Digital Scroll compressor has been defined, the **DS Period** field will become available (defaults to **20** seconds).
11. All tabs located under the More tab are identical to the previous Suction Group, with the exception of the Advanced tab, now called the Normal tab (as described earlier in this guide). If Min ON/OFF times are desired, they may be configured in the Normal tab.

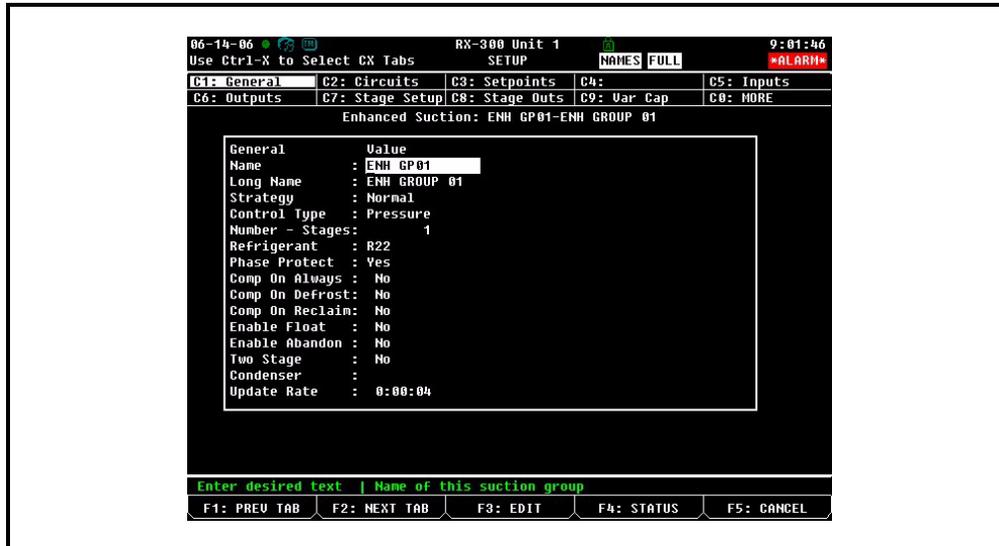


Figure 2 - E2 Enhanced Suction Group Setup View With Tabs

Learning Mode

When an Enhanced Suction Group application first begins operating, you may notice strange behavior, such as odd switching combinations. This is because the Enhanced Suction Group is a “learning” algorithm. For optimal performance, the Enhanced Suction Group studies the effect each circuit load and compressor stage has on the suction pressure and uses this data to fine-tune its compressor switching strategy, determining the best way to maintain suction pressure with a minimum of switching.

The learning process may take as long as 24 hours. If after 24 hours of operation the application is not behaving as expected, you may try a different setting in the **Control/Cycles** parameter to control suction pressure more tightly or minimize switching. This parameter can be found in the Normal tab of the Enhanced Suction Group setup screen (press Ctrl+0, then select **Normal** (D) from the menu).