

**ER-110 Application Note
APP-004****Double EEV**

This application Note will describe how to use the ER-110 to control two electronic expansion valves from one ER-110A card. Both of the EEV's must be on the same condenser unit. Other options for single EEV and for EEV / EPR valves are also available.

Theory

The ER-110 uses a PID loop based off of the evaporator suction superheat. The superheat is calculated from the suction pressure and temperature. The EEV is a electronic valve with a stepper motor on a needle valve. This allows you to have a very accurate control of the amount of refrigerant being injected into the evaporator. The ER-110 has a evaporator super heat Setpoint, and the EEV is constantly adjusted to maintain the evaporator super heat.

Start Up

When initially starting up, the com terminal in Xbase should be used to monitor the sensors and values. Make sure that all sensors are reading correctly before firing the system up. On initial start up make sure that the suction pressure come up as anticipated. The Super Heat should stabilize with in 5 minutes of the LLS opening. It is a good idea to start with a higher Super Heat SP initially like 20 degrees, just to verify operation of the system.

Logic

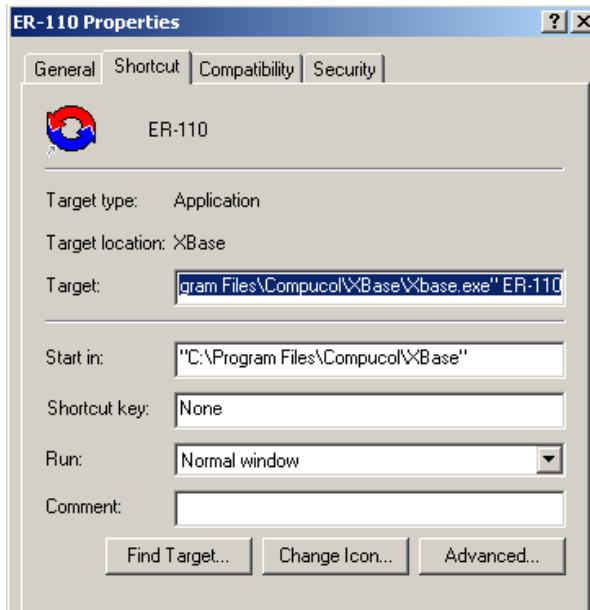
The ER-110 uses modes, like the CR-110. The four leds, counting from the right, will show the modes just like the CR-110. All leds off indicate a standby mode. Standby occurs when the liquid line solenoid is in the off position. The ER-110 uses a current donut with multiple wraps of one of the control wires for a 110VAC LLS valve. Thus, when the LLS opens, the current donut detects current and provides a dry contract closure on Input 5. This will tell the ER-110 card to go into the Refrig mode. In the Refrig mode, the ER-110 will open both EEV's to a initial position. The default value is 40%. Both valves will stay at this initial position for a settling time. The default value is 10 seconds. In reality, this settling time should be about 30 seconds. Initially, when the system first starts, the evap super heat will be well above 50 degrees. The super heat will rapidly decrease, so the settling time should be set to the amount

Xbase Software

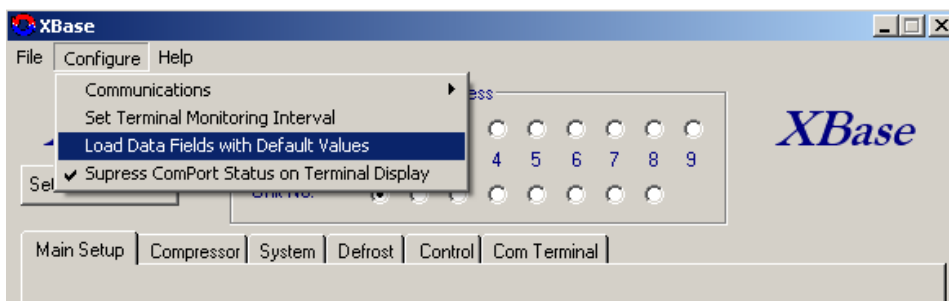
Xbase software is used to setup and test the ER-110. Xbase is used for a number of different applications, and has different configuration files. If you start Xbase with out a modified short cut, it will default to the xbase.inf file. This file is used for the CR-110. The ER-110 will use a ER-110.inf file to start xbase.

Create a short cut on your pc for the xbase.exe file. Right click and go to properties.

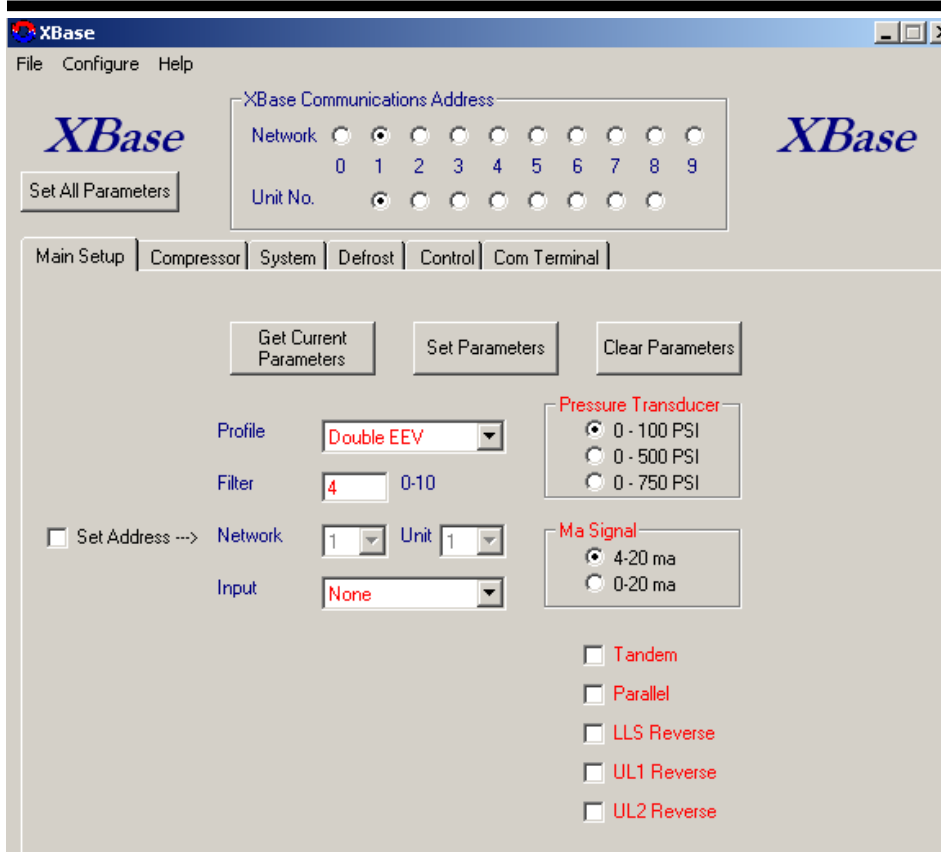
The Xbase software should be V4.0.8 or newer. The ER-110.inf file should have a date of 7-24-06.



On the target line, use a space after the “ then type in ER-110. Rename the shortcut ER-110. When using the short cut, you will now come up with the ER-110 unique settings.



If this is a new start up, you can pre load Xbase with the ER-110 default values by selecting the Configure drop down. This simply loads Xbase, you still need to set parameters.

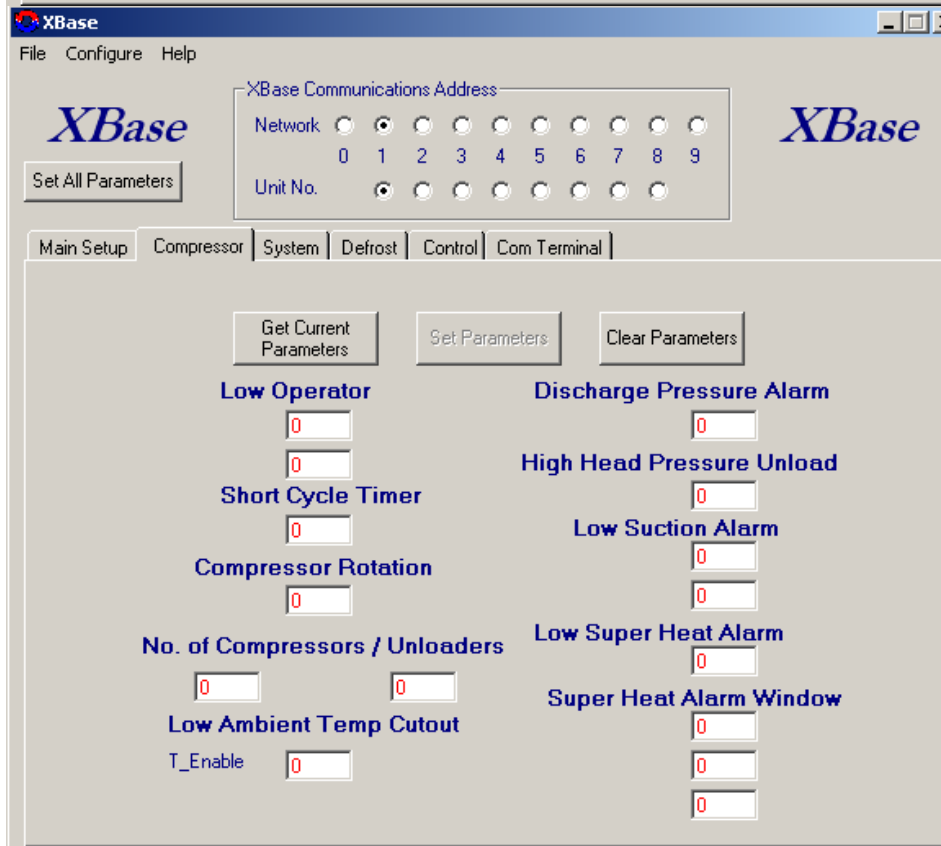


This profile uses Double EEV since we have two valves A & B. If you are using a single valve use the Single EEV profile.

The network for the ER-110 must be 1 higher than the CR-110 controlling the condenser unit. For XT panels the CR-110 must be a network 5 or 7 and the ER-110 must be a network 6 or 8.

It is highly recommended that you use only a 0-100 psi suction transducer.

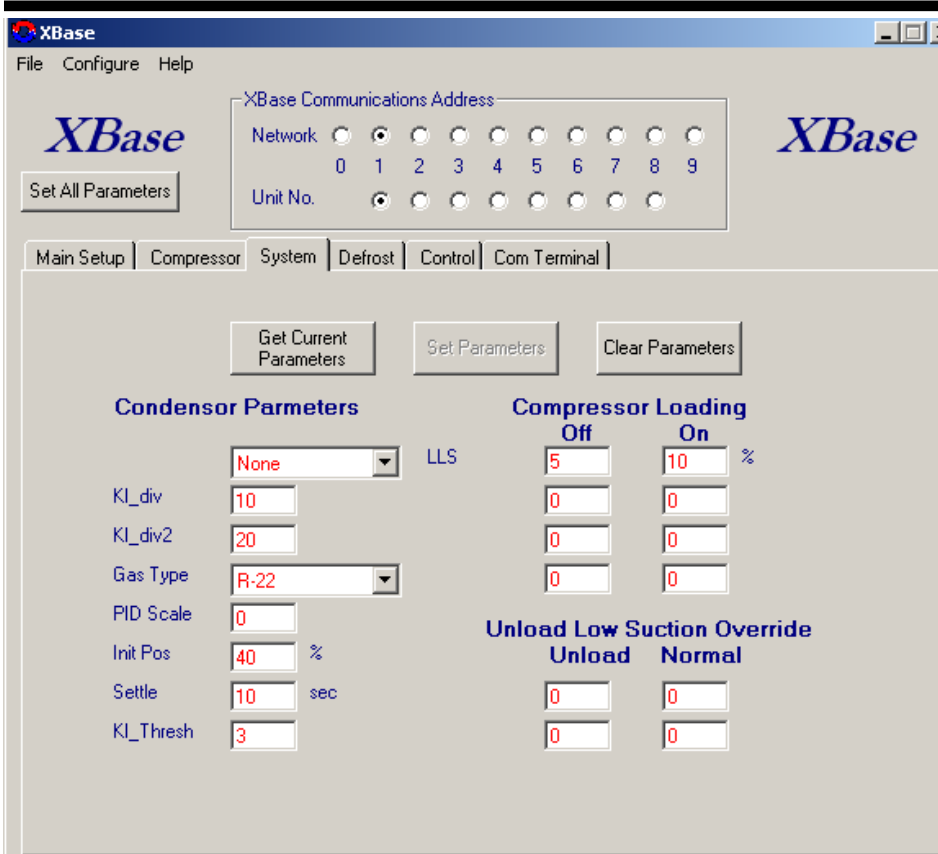
The Ma Signal is not used.



No values on the Compressor tab are used.

T_Enable stands for terminal enable. This is a special mode developed for R&D. If you change this value to 71, it will spit out a PID string every update of the PID loop. All other polling devices, XT or G55 should be disconnected from the communications when using the PID terminal puke. The terminal setting is 9600. The Com terminal on Xbase will not work for this application.

Be sure and turn it off when done.

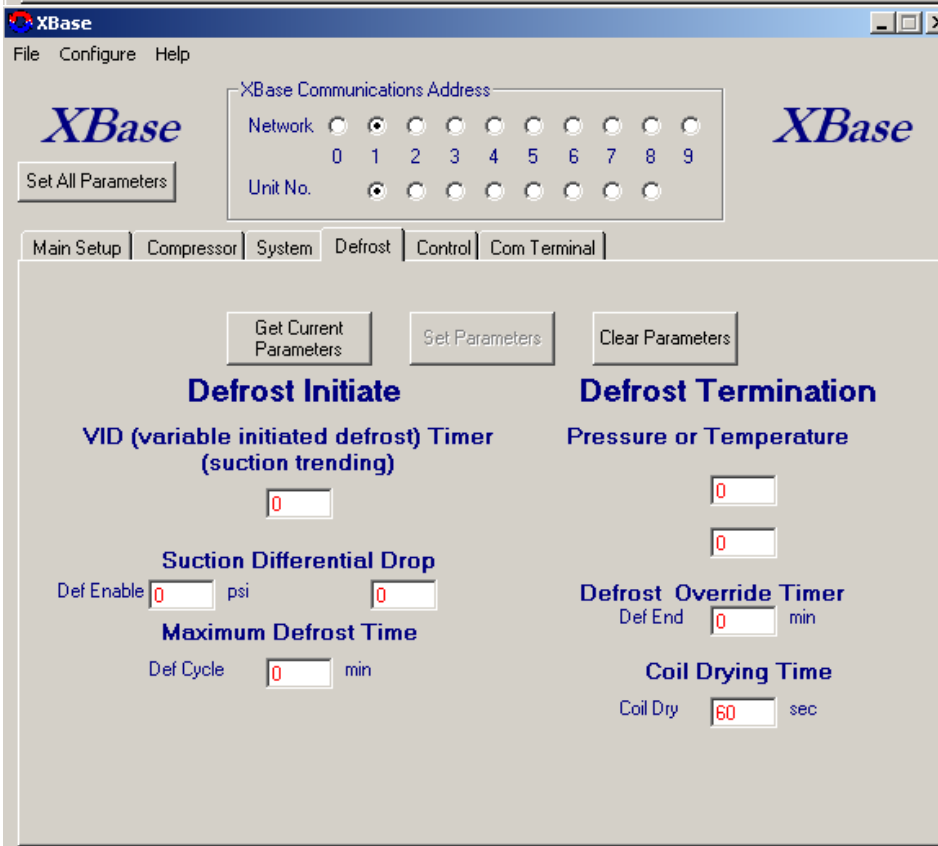


The KI_div, KI_div2 & KI_thresh are for factory use only and should not be used.

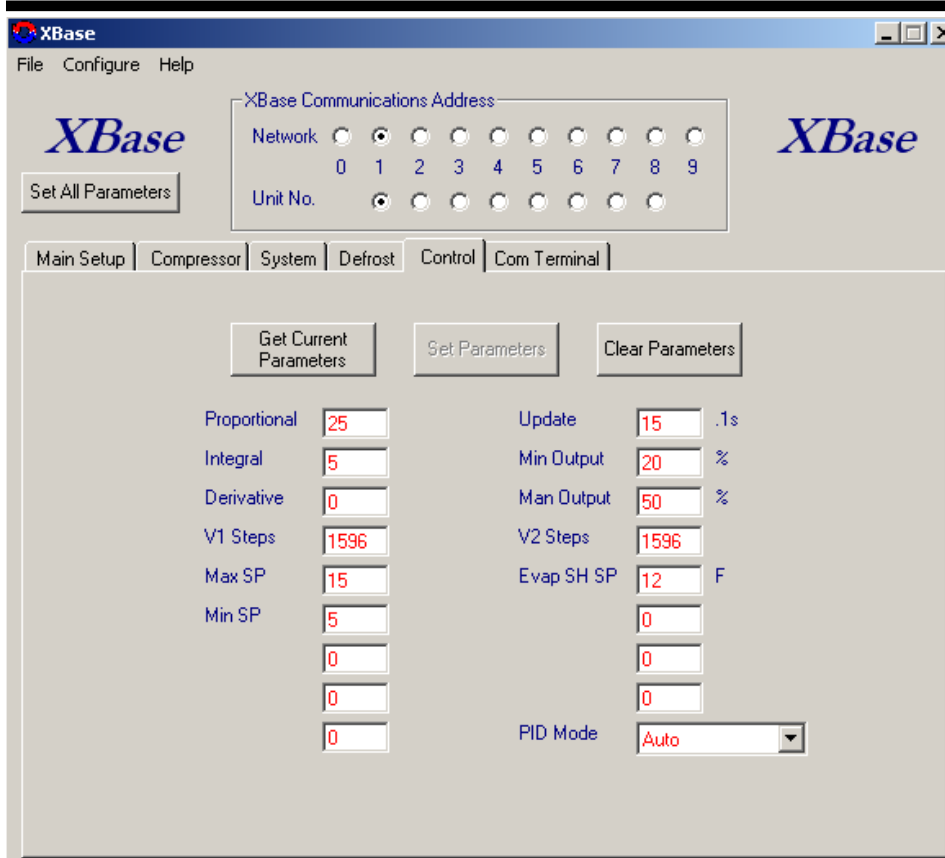
Ki_div allows you to scale the effect of the integral. Ki_div2 will scale the integral when the error is greater than the KI_Thresh. This will allow you to compensate for very large errors.

The Init Pos is the value both valves will initially travel to when the LLS first opens. The valves will stay in this position for the Settle time in seconds.

The compressor loading values are not used in this application.



On the Defrost tab no values are used.



The P value is a multiplier for the new error minus the old error. There must be a change for the P to have any effect.

The I value is the multiplier for the current error.

The D value is not used in this application and should be 0.

Update is the time between PID updates. This is in .1's of a second, and should be lengthened to slow the system down.

V1 & V2 steps. This is the number of steps in the valve motor. Most EEV's are 1596.

Max SP is the high window for the Evap SH SP when in the auto ramp mode and connected to the CR-110. This is the highest setting that the CR-110 can pulse the SP to.

Min SP is the low window and the lowest value the CR-110 can pulse the SP to.

The Min Output is the lowest setting that the PID can take the valve to.

The Man Output setting will allow you to change the PID mode to manual and would cause the valve to open to this position.

The Evap SH SP is the desired Super Heat Setpoint.

PID Mode. This should be in Auto, except when testing and you could use the manual mode. Great care should be used when running in manual. The manual mode would typically only be used at start up for testing or when evacuating the system initially.

The com terminal can be used to monitor the ER-110.