Micro Control Systems
APPLICATION NOTE
APP-016

Hot Gas Bypass (HGB)
CHLS05.00-c & -u Screw Control

Revision History

Date	Author	Description
02/08/99	John G. Walterick	Hot Gas Bypass control, Screw software CHLS05.00-u and greater

Theory

Hot Gas Bypass (HGB) was introduced into the screw compressor logic with Software version CHLS05.00-c

HGB was originally controlled based on the compressor being in the 'UNLOADED' state and either the leaving liquid temperature requiring HGB or the suction pressure requiring HGB. HGB was turned off only when both leaving liquid and suction pressure were satisfied.

With version CHLS05.00-u the software was enhanced to allow additional flexibility. Based on which set points are active determines HGB control.

Logic

Hot gas bypass (screw with oil, version CHLS05.00-u or higher)

There are two (2) groups of set points that may be active or not active to provide hot gas bypass control. There are two set points per group for a total of four (4) set points. They are as follows:

Set point #2-	HG TMP CUTIN	44F	These set point values may be adjusted within the
Set point #3-	HG TMP CTOUT	45F	upper & lower bounds set in the configurator
Set point #58-	HG PSI CUTIN	55P	program. If you use temp and or psi both cutin and
Set point #59-	HG PSI CTOUT	57P	coutout must be active for the set.

The following rules apply for Hot Gas Bypass.

1. UNLOADED state defination-
    1.1. The screw is in the 'UNLOADED' state when the compressor is on and the unloader solenoid has been pulsed for 45 seconds with no decrease in the compressor amps and there is no unloaded sensor input.
    1.2. The screw is in the 'UNLOADED' state when the compressor is on and we have an unloaded sensor input and the unloaded sensor input is 'ON'.
2. HGS / 'UNLOADED' state-
    2.1. If the above two sets of set points are not active the HGB solenoid is turned on when the screw is in the 'UNLOADED' state. The HGB solenoid is turned off when the compressor goes out of the 'UNLOADED' state. If an unloaded sensor input is provided the compressor goes out of the 'UNLOADED' state while 'LOADING' but may return

to the 'UNLOADED' state when loading is complete, if the unloaded sensor input is still on.

3. HGB / 'UNLOADED' state / temperature control-
    3.1. If the temperature cutin & cutout set points are active the HGB solenoid is turned on when the compressor is on, the compressor is in the 'UNLOADED' state and the leaving liquid temperature is below the temperature cutin.
    3.2. The HGB solenoid is turned off when the compressor is on and the leaving liquid temperature is above the coutout set point value or the screw in not in the 'UNLOADED' state.
4. HGB / 'UNLOADED' state / pressure control-
    4.1. If the pressure cutin & cutout set points are active the HGB solenoid is turned on when the compressor is on, the compressor is in the 'UNLOADED' state and the suction pressure is below the pressure cutin.
    4.2. The HGB solenoid is turned off when the compressor is on and the suction pressure is above the coutout set point value or the screw in not in the 'UNLOADED' state.
5. HGB / 'UNLOADED' state / temperature & pressure control-
    5.1. If both set of set points are active the HGB solenoid is turned on when the compressor is on, in the 'UNLOADED' state, the leaving liquid temperature is below its cutin or the suction pressure is below its cutin.
    5.2. The HGB solenoid is turned off when the compressor is on and the leaving liquid temperature is above the coutout set point value and the suction pressure is above the coutout set point value or the screw in not in the 'UNLOADED' state.