Contents

NOTE: A screen button or indicator that is magenta indicates that that widget was not connected. Connected screens will not have magenta widgets.

Monitoring and Controls Screen

The Monitoring and Controls screen provides access to all other screens, allows averaging and interlocks to be reset, and an EPICS control indicator.

The screen is divided into two sections—the blue area accesses monitoring and the green accesses controls.

Below is a numbered picture of the screen, with explanations beneath the picture.
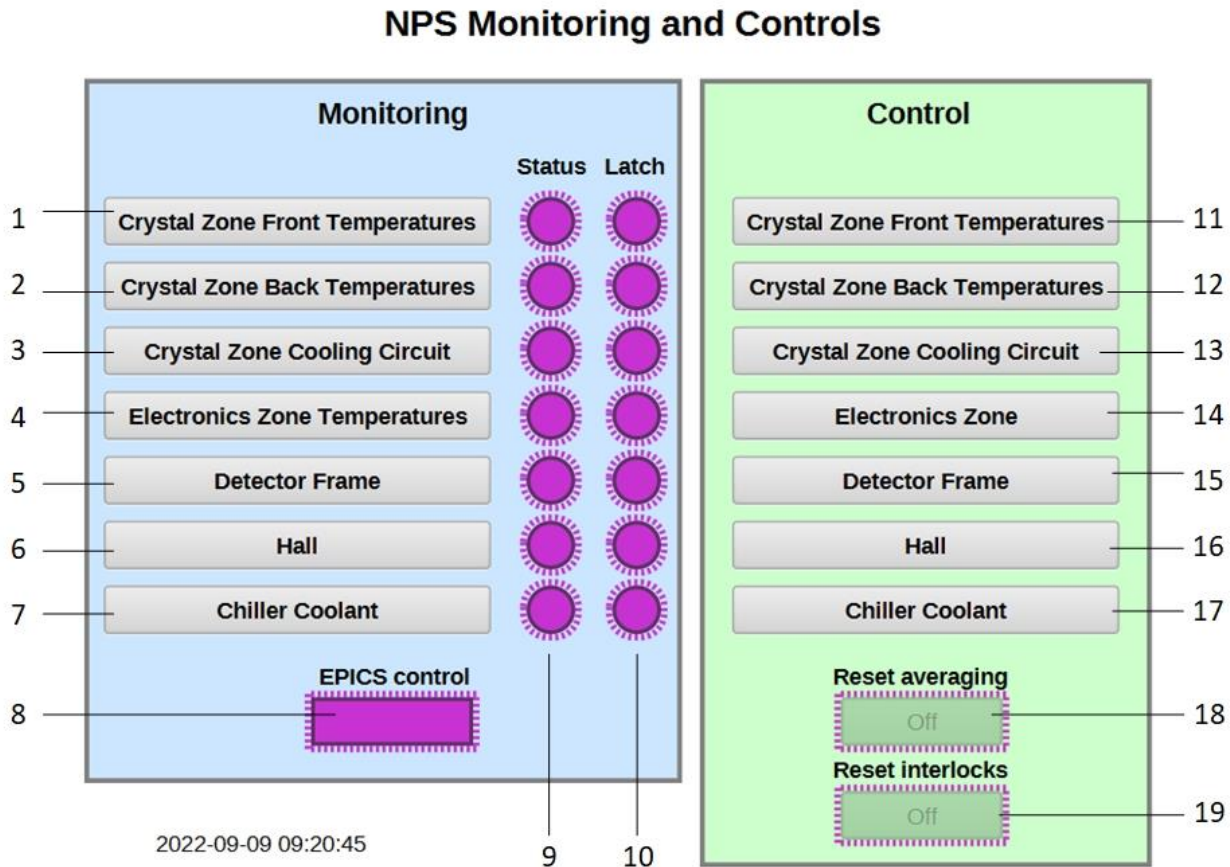
Items 1–10 are for monitoring.

1. Clicking the gray area opens the screen to monitor the 56 temperature sensors in the front crystal zone. See page 3 for details.
2. Clicking the gray area opens the screen to monitor the 56 temperature sensors in the back crystal zone. See page 3 for details.
3. Clicking the gray area opens the screen to monitor the temperatures of the sensors on the two inlet manifolds and two outlet manifolds of the crystal zone cooling circuit. See page 4 for details.
4. Clicking the gray area opens the screen to monitor the temperatures of the eight sensors in the electronics zone—two on the inlet manifolds, two on the outlet manifolds, two on the heat exchanger top, and two on the heat exchanger bottom. See page 5 for details.
5. Clicking the gray area opens the screen to monitor the temperatures, humidity, and dew points of the eight sensors in the detector frame. See page 6 for details.
6. Clicking the gray area opens the screen to monitor the temperatures, humidity, and dew points of the two sensors in the Hall. See page 7 for details.
7. Clicking the gray area opens the screen to monitor the temperatures, pressure, and flow of the two chillers, one in the crystal zone and one in the electronics zone. See page 8 for details.

8. Indicator is on (bright green) when under EPICS control.
9. The status LED indicators will be green, unless there is a sensor reading over a user-assigned limit, in which case an indicator will turn red. Each screen has its own status indicator, to the right of the gray, screen button.
10. The latch LED indicators will be green, unless there is a latched sensor, in which case an indicator will turn red. Each screen has its own status indicator, to the right of its status LED.

Items 11–19 are for controls.

11. Clicking the gray area opens the screen to control the 56 sensors in the front crystal zone. Low and high alarm limits, and the number of points to average can be input for each sensor. Sensor enable, averaging enable, interlock enable, and trip delay enable can be turned on and off for each sensor. The trip delay time can be input for all sensors. See page 9 for details.
12. Clicking the gray area opens the screen to control the 56 sensors in the back crystal zone. Low and high alarm limits, and the number of points to average can be input for each sensor. Sensor enable, averaging enable, interlock enable, and trip delay enable can be turned on and off for each sensor. The trip delay time can be input for all sensors. See page 9 for details.
13. Clicking the gray area opens the screen to control the sensors on the two inlet manifolds and two outlet manifolds of the crystal zone cooling circuit. Low and high alarm limits, and the number of points to average can be input for each sensor. Sensor enable, averaging enable, interlock enable, and trip delay enable can be turned on and off for each sensor. The trip delay time can be input for all sensors. See page 10 for details.
14. Clicking the gray area opens the screen to control the sensors in the electronics zone—two on the inlet manifolds, two on the outlet manifolds, two on the heat exchanger top, and two on the heat exchanger bottom. Low and high alarm limits, and the number of points to average can be input for each sensor. Sensor enable, averaging enable, interlock enable, and trip delay enable can be turned on and off for each sensor. The trip delay time can be input for all sensors. See page 11 for details.
15. Clicking the gray area opens the screen to control the eight sensors in the detector frame. Low and high alarm limits, and the number of points to average can be input for temperature, humidity and dew point for each sensor. Sensor enable, averaging enable, interlock enable, and trip delay enable can be turned on and off for temperature and humidity for each sensor. For dew point, averaging enable, interlock enable, and trip delay enable can be turned on and off for each sensor. A separate trip delay time can be input for temperature, humidity, and dew point for all sensors. See page 12 for details.
16. Clicking the gray area opens the screen to control the teo sensors in the Hall. Low and high alarm limits, and the number of points to average can be input for temperature, humidity and dew point for each sensor. Sensor enable, averaging enable, interlock enable, and trip delay enable can be turned on and off for temperature and humidity for each sensor. For dew point, averaging enable, interlock enable, and trip delay enable can be turned on and off for each sensor. A separate trip delay time can be input for temperature, humidity, and dew point for all sensors. See page 13 for details.
17. Clicking the gray area opens the screen to control the temperatures, pressure, and flow of the two chillers, one in the crystal zone and one in the electronics zone. Low and high alarm limits, and the number of points to average can be input for each parameter for each chiller. Sensor enable, averaging enable, interlock enable, and trip delay enable can be turned on and off for each chiller. A separate trip delay time can be input for temperature, pressure, and flow. See page 14 for details.
18. Clicking the green rectangle removes the current temperature averages and restarts averaging.
19. Clicking the green rectangle clears all interlock notifications.

Front and Back Crystal Zone Temperatures Sensor Monitoring Screens

    The Front Crystal Zone Temperature Sensor Monitoring screen and the Back Crystal Zone Temperature Sensor Monitoring screen are the same. The screen for the front crystal zone is shown below.

Front Crystal Zone Temperature Sensor Monitoring [°C]

Crystal	T	Avg	SD	Out of limit		Crystal	T	Avg	SD	Out of limit
0				🟢		540				🟢
5				🟢		550				🟢
10				🟢		560				🟢
15				🟢		570				🟢
20				🟢		684				🟢
25				🟢		689				🟢
30				🟢		694				🟢
35				🟢		699				🟢
180				🟢		704				🟢
185				🟢		709				🟢
190				🟢		714				🟢
195				🟢		719				🟢
200				🟢		864				🟢
205				🟢		869				🟢
210				🟢		874				🟢
215				🟢		879				🟢
360				🟢		884				🟢
365				🟢		889				🟢
370				🟢		894				🟢
375				🟢		899				🟢
380				🟢		1044				🟢
385				🟢		1049				🟢
390				🟢		1054				🟢
395				🟢		1059				🟢
509				🟢		1064				🟢
519				🟢		1069				🟢
529				🟢		1074				🟢
539				🟢		1079				🟢

2022-11-03 11:54:

(Callout labels: 1 → Crystal column; 2 → T column; 3 → Avg column; 4 → SD column; 5 → Out of limit column)

1. The numbers in the crystal column correspond to the crystal number where the sensors are located.
2. Column T is the current temperature.
3. Column Avg is a running average of the temperature.
4. Column SD is the standard deviation of the temperature.
5. An LED under Out of limit will turn red if that sensor is above, below, or equal to set limits.

Crystal Zone Cooling Circuit Temperature Sensor Monitoring Screen

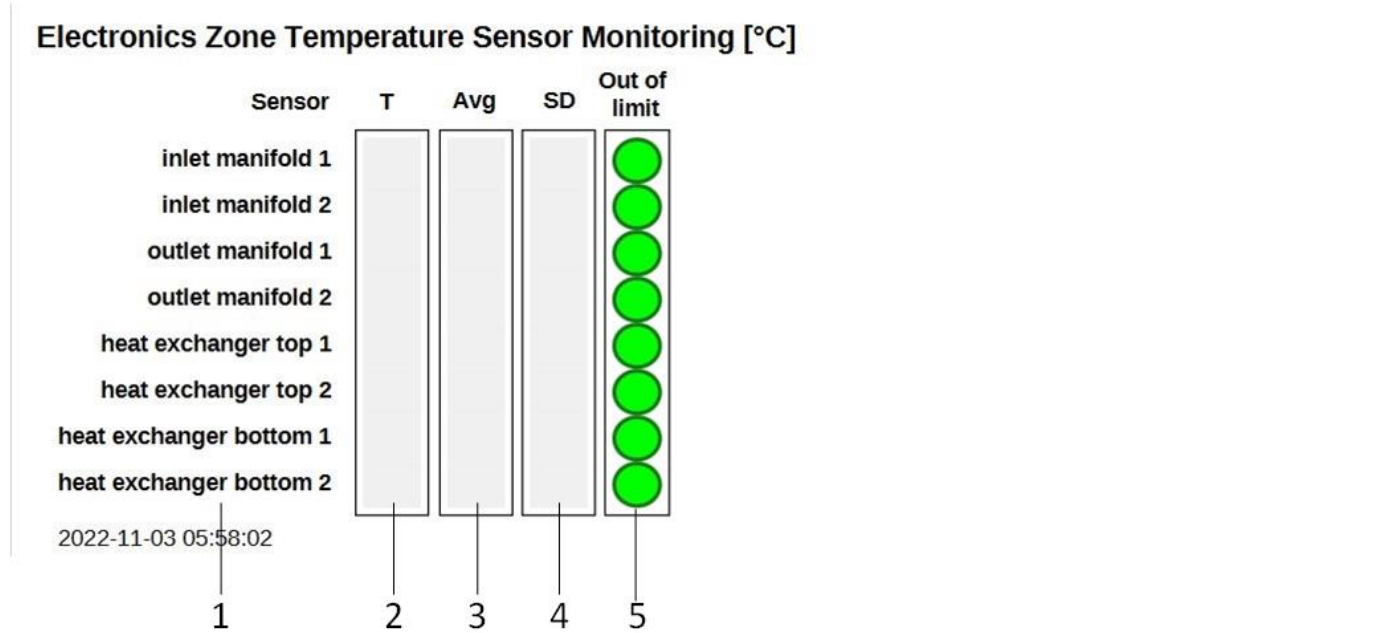## Crystal Zone Cooling Circuit Temperature Sensor Monitoring [°C]

Sensor	T	Avg	SD	Out of limit
Inlet manifold 1				🟢
Inlet manifold 2				🟢
Outlet manifold 1				🟢
Outlet manifold 2				🟢

2022-11-03 05:50:37

1   2 3 4 5

1. The location of the sensor.
2. Column T is the current temperature.
3. Column Avg is a running average of the temperature.
4. Column SD is the standard deviation of the temperature.
5. An LED under Out of limit will turn red if that sensor is above, below, or equal to set limits.

Electronics Zone Temperature Sensor Monitoring Screen

Electronics Zone Temperature Sensor Monitoring [°C]

Sensor	T	Avg	SD	Out of limit
inlet manifold 1				🟢
inlet manifold 2				🟢
outlet manifold 1				🟢
outlet manifold 2				🟢
heat exchanger top 1				🟢
heat exchanger top 2				🟢
heat exchanger bottom 1				🟢
heat exchanger bottom 2				🟢

2022-11-03 05:58:02

1   2   3   4   5

1. The location of the sensor.
2. Column T is the current temperature.
3. Column Avg is a running average of the number of temperature readings set on the monitoring screen. The minimum is 300.
4. Column SD is the standard deviation of the temperature.
5. An LED under Out of limit will turn red if that sensor is above, below, or equal to set limits.

Detector Frame Temperature, Humidity, and Dew Point Monitoring Screen

    The detector frame monitoring screen is divided into three sections of monitoring—temperature T, humidity RH, and dew point DPT. Each section has its own indicators. The temperature indicators are discussed below.
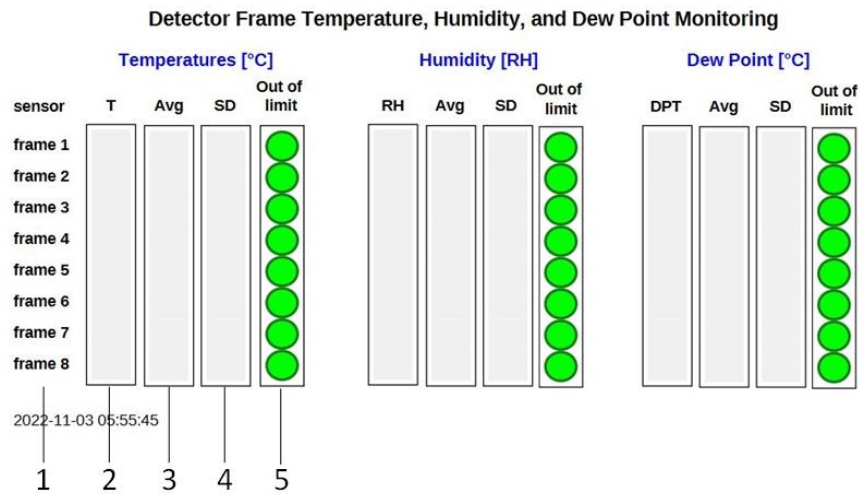
1. The number of the frame sensor.
2. Column T is the current temperature.
3. Column Avg is a running average of the temperature.
4. Column SD is the standard deviation of the temperature.
5. An LED under Out of limit will turn red if that sensor is above, below, or equal to set limits.

Hall Temperature, Humidity, and Dew Point Monitoring Screen

The Hall monitoring screen is divided into three sections of monitoring—temperature T, humidity RH, and dew point DPT. Each section has its own indicators. The temperature indicators are discussed below.

Hall Temperature, Humidity, and Dew Point Monitoring
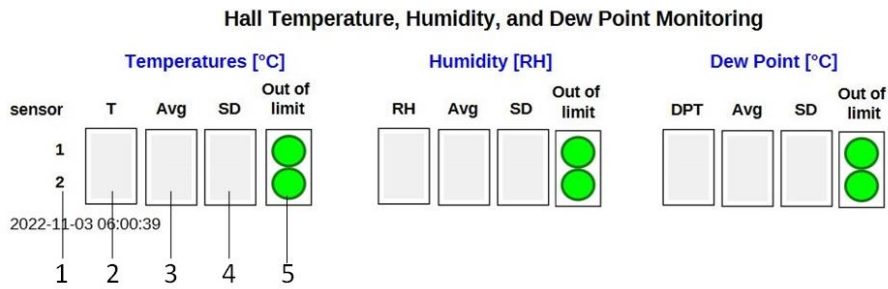
1. The number of the Hall sensor.
2. Column T is the current temperature.
3. Column Avg is a running average of the temperature.
4. Column SD is the standard deviation of the temperature.
5. An LED under Out of limit will turn red if that sensor is above, below, or equal to set limits.

Chiller Coolant Monitoring Screen

The Chiller Coolant Monitoring screen is divided into two areas of monitoring—the crystal zone chiller and the electronics zone chiller. Each area has its own indicators. The crystal zone indicators are discussed below.
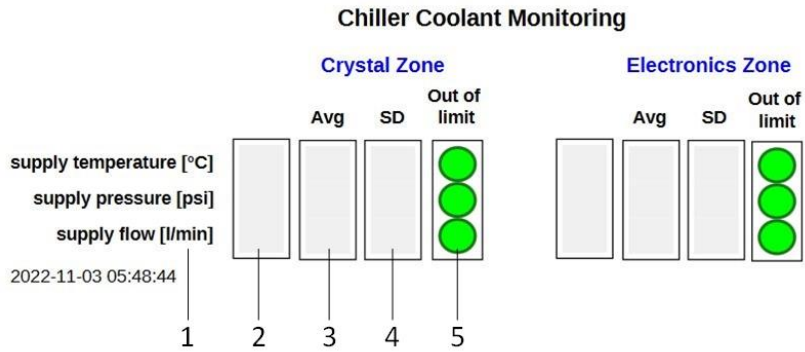
1. The item being monitored.
2. The current value of temperature, pressure, and flow.
3. Avg is a running average of the temperature, pressure, and flow.
4. SD is the standard deviation of the temperature, pressure, and flow.
5. An LED under Out of limit will turn red if that sensor is above, below, or equal to set limits.

Crystal Zone Temperature Sensor Controls Screen

The Front Crystal Zone Temperature Sensor Controls screen and the Back Crystal Zone Temperature Sensor Controls screen are the same. The screen for the front crystal zone is shown below.

Front Crystal Zone Temperature Sensor Controls

crystal	Alarm limit low	high	# of pts to avg	crystal	Alarm limit low	high	# of pts to avg
0				540			
5				550			
10				560			
15				570			
20				684			
25				689			
30				694			
35				699			
180				704			
185				709			
190				714			
195				719			
200				864			
205				869			
210				874			
215				879			
360				884			
365				889			
370				894			
375				899			
380				1044			
385				1049			
390				1054			
395				1059			
509				1064			
519				1069			
529				1074			
539				1079			

2022-11-03 11:52:35

1   2   3   4

1. The numbers in the crystal column correspond to the crystal number where the sensors are located.
2. A value can be input for a low alarm limit. If the temperature equals this value, or goes below, an interlock will occur.
3. A value can be input for a high alarm limit. If the temperature equals this value, or goes above, an interlock will occur.
4. A value can be input into # of pts to avg to set how many values to include in the running average.

Crystal Zone Cooling Circuit Controls Screen

Crystal Zone Cooling Circuit Temperature Sensor Controls

Sensor	Alarm limit low	Alarm limit high	# of pts to avg
Inlet manifold 1			
Inlet manifold 2			
Outlet manifold 1			
Outlet manifold 2			

2022-11-03 10:15:52

1   2   3   4

1. The location of the sensor.
2. A value can be input for a low alarm limit. If the temperature equals this value, or goes below, an interlock will occur.
3. A value can be input for a high alarm limit. If the temperature equals this value, or goes above, an interlock will occur.
4. A value can be input into # of pts to avg to set how many values to include in the running average.

Electronics Zone Cooling Circuit Controls Screen

Electronics Zone Temperature Sensor Controls

Sensor	Alarm limit low	high	# of pts. to avg
Inlet manifold 1			
Inlet manifold 2			
Outlet manifold 1			
Outlet manifold 2			
Heat exchanger top 1			
Heat exchanger top 2			
Heat exchanger bottom 1			
Heat exchanger bottom 2			

2022-11-03 10:36:45

    1   2   3   4

1. The location of the sensor.
2. A value can be input for a low alarm limit. If the temperature equals this value, or goes below, an interlock will occur.
3. A value can be input for a high alarm limit. If the temperature equals this value, or goes above, an interlock will occur.
4. A value can be input into # of pts to avg to set how many values to include in the running average.

Detector Frame Temperature, Humidity, and Dew Point Controls Screen

   The detector frame controls screen is divided into three sections of controls—temperature, humidity, and dew point. Each section has its own set of controls. The temperature controls are discussed below.

Detector Frame Temperature, Humidity, and Dew Point Controls

1. The location of the sensor.
2. A value can be input for a low alarm limit. If the temperature equals this value, or goes below, an interlock will occur.
3. A value can be input for a high alarm limit. If the temperature equals this value, or goes above, an interlock will occur.
4. A value can be input into # of pts to avg to set how many values to include in the running average.

Hall Temperature, Humidity, and Dew Point Controls Screen

The Hall controls screen is divided into three sections of controls—temperature, humidity, and dew point. Each section has its own set of controls. The temperature controls are discussed below.

Hall Temperature, Humidity, and Dew Point Controls

1. The sensor number.
2. A value can be input for a low alarm limit. If the temperature equals this value, or goes below, an interlock will occur.
3. A value can be input for a high alarm limit. If the temperature equals this value, or goes above, an interlock will occur.
4. A value can be input into # of pts to avg to set how many values to include in the running average.

Chiller Coolant Controls Screen

   The Chiller Coolant Controls screen is divided into two areas of controls—the crystal zone chiller and the electronics zone chiller. Each area has its own set of controls. The crystal zone controls are discussed below.


1. The item being monitored.
2. A value can be input for a low alarm limit. If the temperature equals this value, or goes below, an interlock will occur.
3. A value can be input for a high alarm limit. If the temperature equals this value, or goes above, an interlock will occur.
4. A value can be input into # of pts to avg to set how many values to include in the running average.
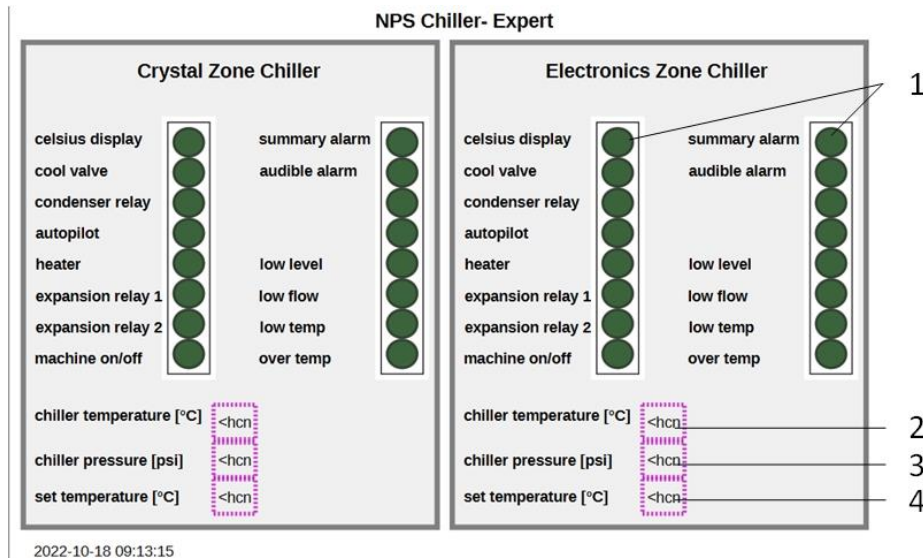
Chiller Screen

The Chiller screen is divided into two areas—the crystal zone chiller and the electronics zone chiller. Each area has its own set of controls and indicators.
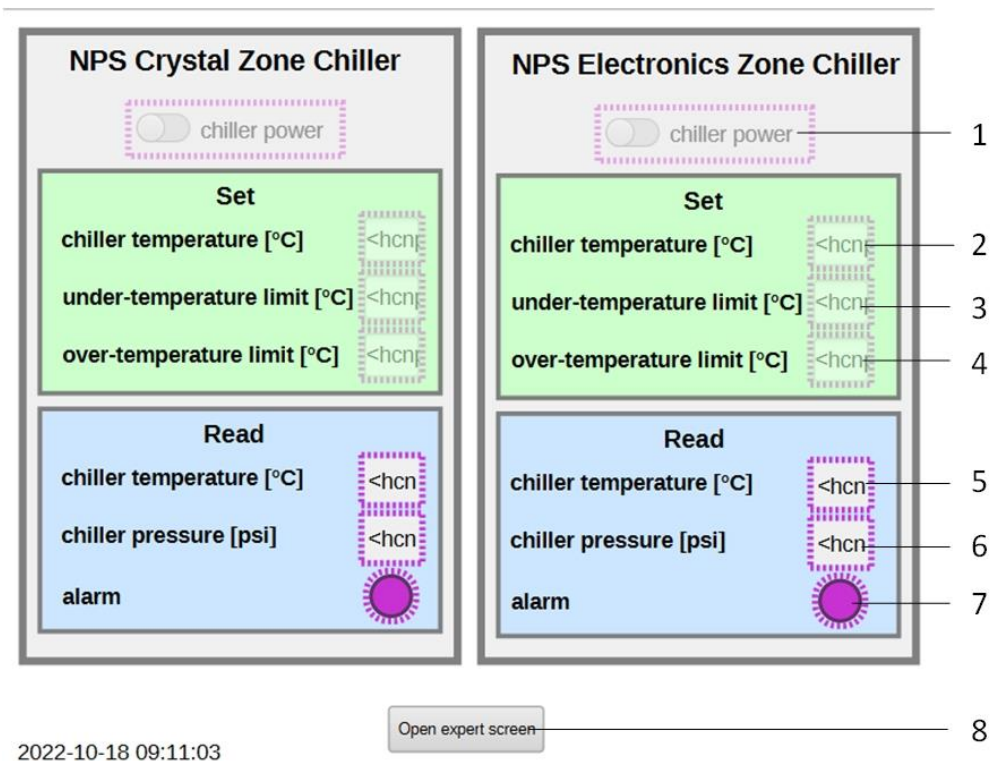
1. The slide button turns the chiller power off or on.
2. A value can be input to set the temperature for the chiller to maintain.
3. A value can be input to set the chiller's low temperature limit. A read value below or equal to this input will cause an alarm.
4. A value can be input to set the chiller's high temperature limit. A read value above or equal to this input will cause an alarm.
5. The current temperature of the chiller.
6. The current pressure of the chiller.
7. If any item alarms, this will turn red. (The usual color is green, but because at the time of the screenshot nothing was connected, it shows magenta.) Alarm details are shown on the expert screen.
8. Clicking the gray rectangle opens the chiller expert screen.

Chiller Expert Screen

The Chiller Expert screen is divided into two areas—the crystal zone chiller and the electronics zone chiller. Each area has its own set of indicators.

1. Two sets of LED indicators. If an indicator turns on, it will turn bright green. The indicators are as follows:
   Celsius display—refers to indicators on the chiller showing Celsius values vs Fahrenheit.
   cool valve—solenoid valve is open and chiller is cooling the process fluid.
   condenser relay—status of the chiller condenser relay.
   autopilot—not used
   heater—not used
   expansion relay 1—not used
   expansion relay 2—not used
   machine on/off— the chiller is on. Lights the temperature display and pressure indicator on the chiller panel.
   summary alarm—an alarm fault condition (low level, low flow, low temperature, over temperature).
   audible alarm—a sound will be heard from the chiller when an alarm occurs.
   low level—low fluid level in the tank.
   low flow—minimum flow requirement of the chiller is not being satisfied.
   low temp—water temperature is below or equal to the set under-temperature limit.
   over temp—water temperature is above or equal to the set over-temperature limit.
2. The current temperature of the chiller.
3. The current pressure of the chiller.
4. The temperature to which the chiller is set.