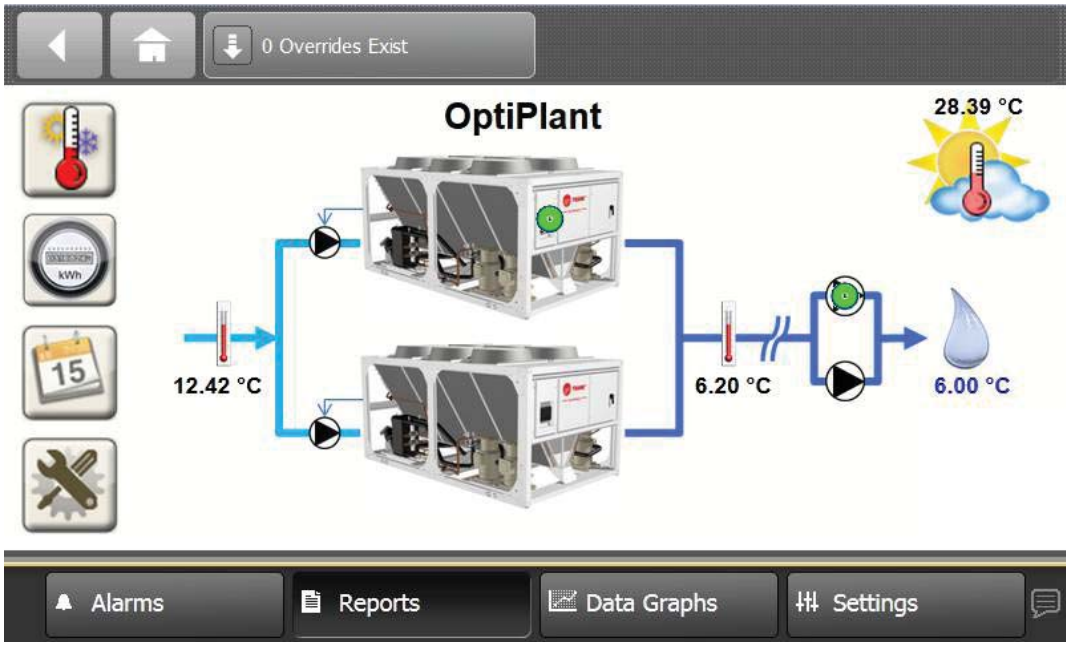
User Guide

OptiPlant: Trane Chiller Sequencer Kit (v2.00)



BAS-SVU027B-GB

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Introduction

Foreword

These instructions are given as a guide to good practice in the use of the Trane OptiPlant control panel. They do not contain the full service procedures necessary for the continued successful operation of this equipment. The services of a qualified service technician should be employed, through the medium of a maintenance contract with a reputable service company.

Warranty

Warranty is based on the general terms and conditions of the constructor. The warranty is void if the equipment is modified or repaired without the written approval of the constructor, if the operating limits are exceeded, or if the control system or the electrical wiring is modified. Damage due to misuse, lack of maintenance, or failure to comply with the manufacturer's instructions, is not covered by the warranty obligation. If the user does not conform to the instructions given in this document, it may entail cancellation of warranty and liabilities by the constructor.

General Features

The operation of the Trane OptiPlant application is based on:

- A Trane Tracer™ UC600 microprocessor control board, housed inside the electrical panel, integrating all the different preprogrammed functions to operate the chiller plant.
- A Trane Tracer™ TD7 graphic user interface allowing the user to interact with the system.

The preprogrammed functions integrated in the controller are:

- Sequencing and timed rotation of chillers
  - With enabling command for one system pump (if any).
  - With enabling commands for sequencing and timed rotation of system pumps (if any).
- Chilled water reset, based on outside ambient temperature or on return chilled water temperature

  Optional function which, assuming that a reduced -non sensitive- cooling load can be satisfied with warmer chilled water temperature, modifies (upward) the chilled water setpoint of the chillers (in order to improve their efficiency).

  In HVAC applications, the usual reference for cooling load reduction is the outside air temperature or the return chilled water temperature.
- System ambient lockout

  Function that prevents the chiller plant to operate below a given outside air temperature.
- Soft start

  Function that prevents excess capacity from being brought online when the OptiPlant application is enabled and the system chilled water supply temperature is far from its setpoint.
- Demand limiting

  Function limiting the operation to only one chiller, whatever the load requirement.
- Rotation

  Timed rotation that will reverse the LEAD/LAG roles for the two chillers.
- Failure Recovery

  LAG chiller (if off) starts if the LEAD chiller fails.
- Scheduling

  A schedule can be defined to enable/disable the OptiPlant operation (optional feature).

These functions require a number of parameters to be set at startup to manage the specificities of the chiller plant system that is controlled.

Benefits of applying chiller sequencing include:

- **Lower Utility Cost:**

  Through reduced operation of some components (such as pumps) and increased efficiency with better loaded chillers.
- **Reduced Maintenance:**

  Through reduced operating hours.
- **Lower Wear / Longer Equipment Lifetime:**

  Through reduced compressor stress.
- **Rotation:**

  Timed rotation that will reverse the LEAD/LAG roles for the two chillers.

Other benefits of having a Trane OptiPlant include features that improve the chilled water production with:

- **Failure Recovery:**

  LAG chiller (if off) starts if the LEAD chiller fails.
- **Alarming:**

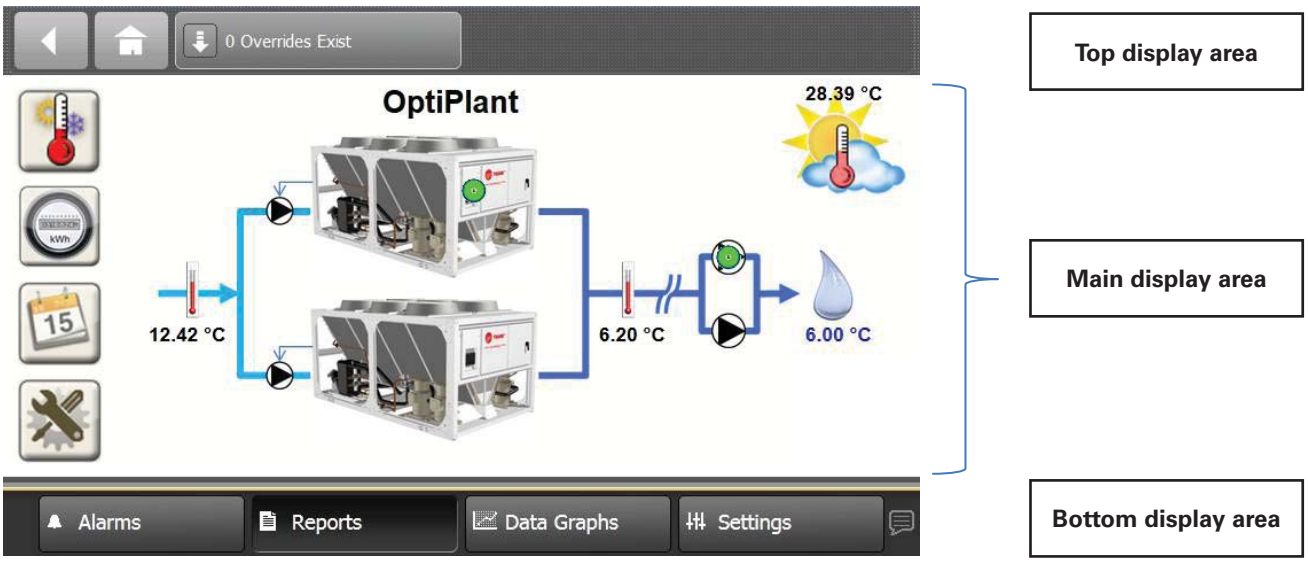
  A system fault is indicated by the pilot light and on the screen display. It can also be reported remotely (if wired).
- **System Temperature Trends:**

  For the traceability of the plant operation over the seven previous days.

User Interface

The user interface is the 7-inch colour touchscreen display mounted on the OptiPlant panel.

Figure 1: User Interface Description



There are three distinct areas on the screen:

- Top display area
- Main display area
- Bottom display area.

The top and bottom areas are displayed on all of the user screens.

Top display area

- button: returns to the last visited screen.
- button: navigates to the Main screen
- **Overrides** button: summarizes the current number of user overrides

The use of these buttons is not needed for common usage.

Bottom display area

-  icon: controls the brightness level of the display
- **Alarms** button: navigates to the Alarms screen.

  When an alarm is present, this button flashes red.

  Use this function to review alarms.
- **Reports** button: navigates to the Reports screen.

  This button is not used for common usage of the Trane OptiPlant.
- **Data graphs** button: opens the Data Graphs screen to view data logs in graphical format.

  Use this function to view data trends that are defined in the Trane OptiPlant. *Refer to the relevant chapter about the available trends.*
- **Settings** button: navigates to the Settings screen to access settings for UC600 and TD7.

  This function is not needed for common usage of the Trane OptiPlant.
-  button: navigates to the Language selection screen.

  This function is not needed for common usage of the Trane OptiPlant.

Main display area

The center area is the main display area. Data in this area will differ based on the user navigation. *Refer to the next section for more details.*

User Screens

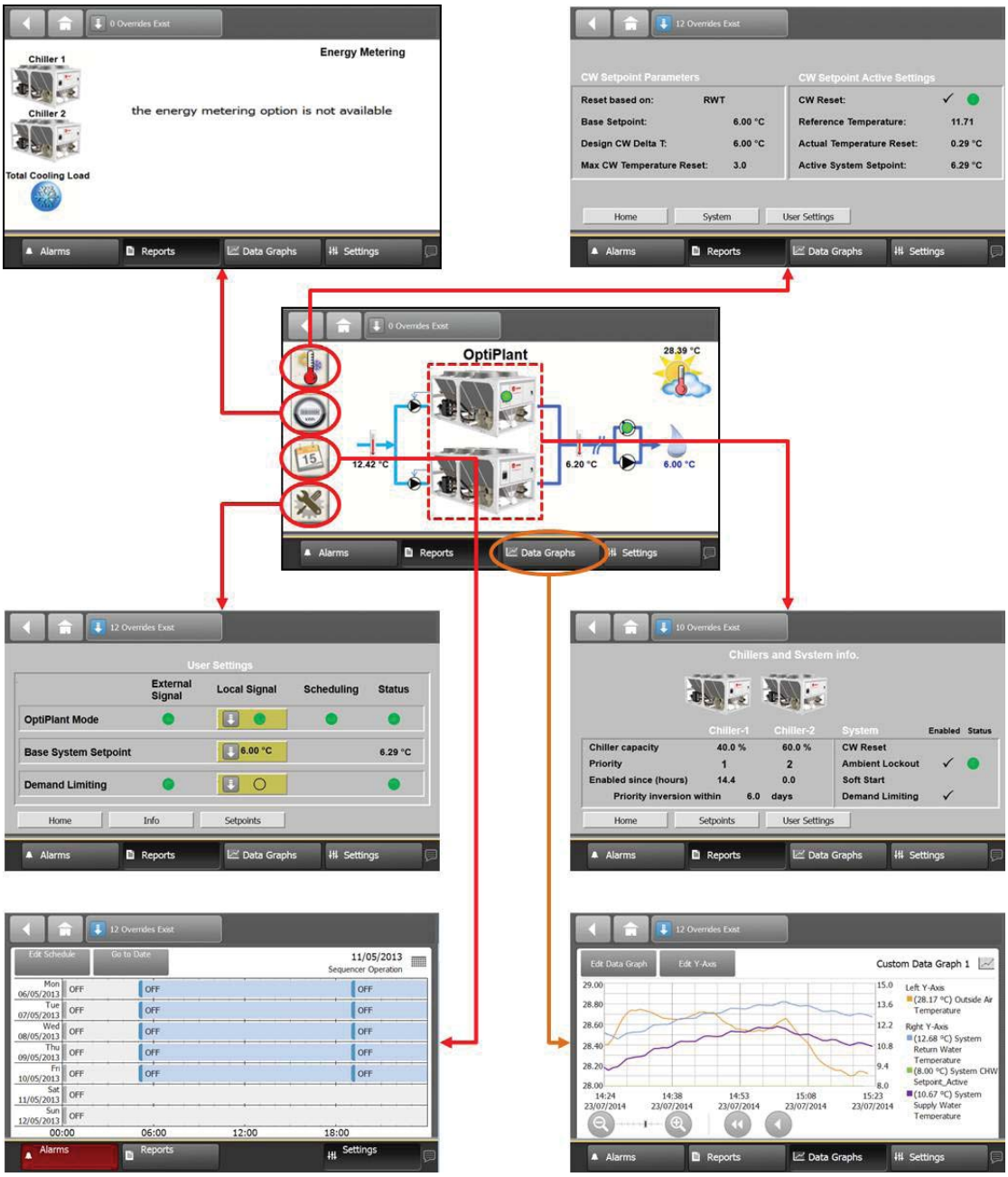
The user can navigate to different screens to view or set information.

From any screen, press the button to navigate back to the main screen.

Navigation overview

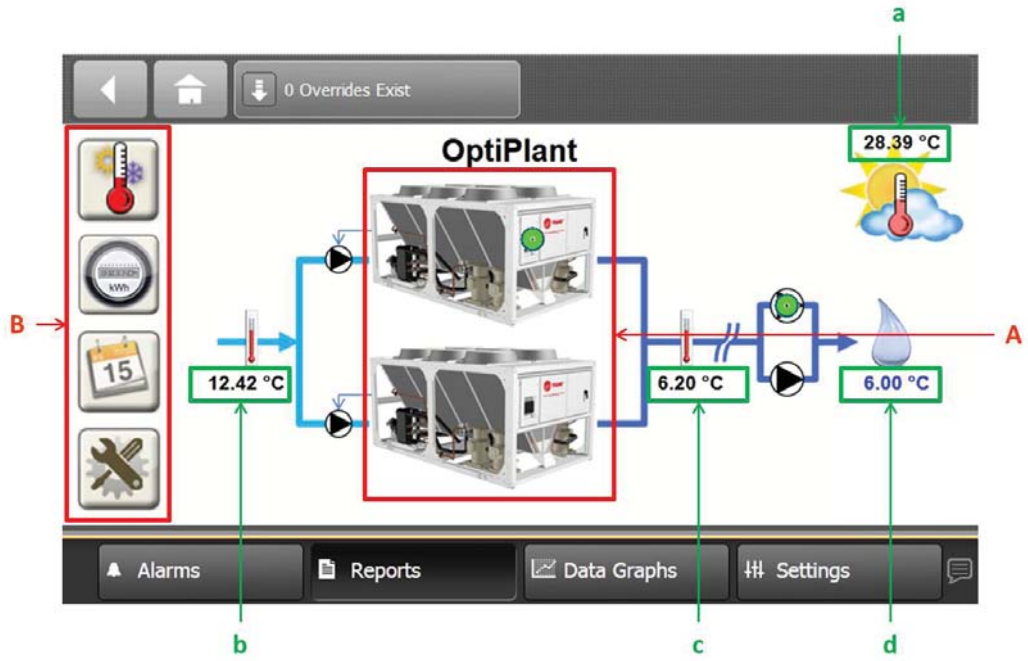
The synoptic below illustrates how to navigate among the different screens of the OptiPlant application.

Figure 2: Navigation overview



Main screen

Figure 3: Main Screen



The Main screen display includes:

- One main touch zone (Frame A) to navigate to the Info (System) screen and
- One list of four icons(Frame B) on the left-hand side of the screen:

To access the Info (Temperature) screen

To access the Energy Metering screen (if the metering option has been enabled)

To access the Scheduling screen (if the option is set up)

To access the User Settings screen

Other information shown on the main display includes:

a) Outside air temperature
b) System chilled water: Return temperature
c) System chilled water: Supply temperature
d) System chilled water: Setpoint temperature, with the influence of reset (if any)

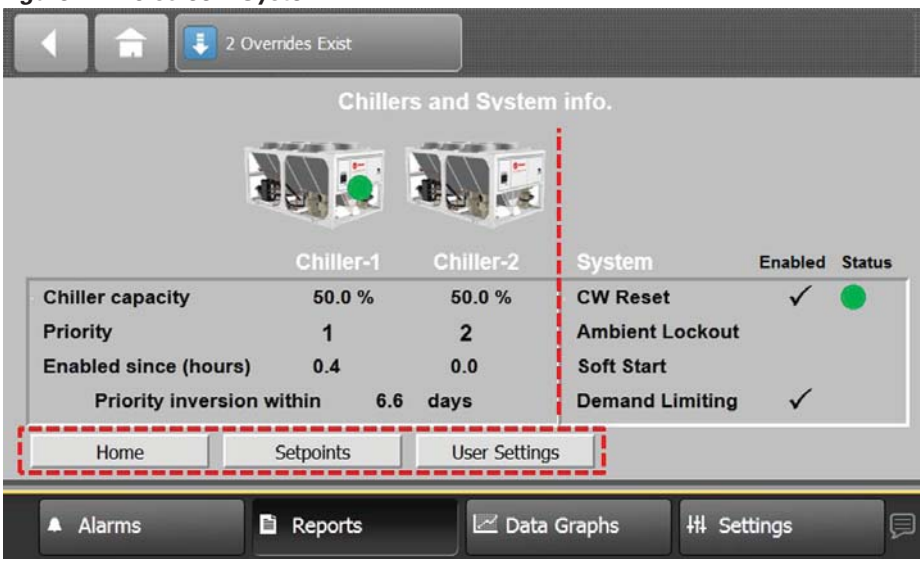
On this screen, the Correct or Fault icons can also appear to indicate the operation status of any components or of the global system.

User Screens

Info screen: System

From the main screen, press the chiller images to open the Info (System) screen.

Figure 4: Info screen: System



The information in this screen is split over two sections (separated with the vertical dotted red line):

The left section relates to the chillers:

The Correct or Fault icons will appear over the chiller images to reflect the chiller operation status.

Data underneath the chiller images display:

- The relative size of the chillers within the plant
- The priority of the chillers when requested to operate
- The number of hours the chillers have been enabled since the last counter reset
- The number of days till the next priority change, if this function has been enabled.

The right section indicates the functions of the system which have been enabled at commissioning (as indicated with the checked icon ✓) and if these functions are active (then indicated with the ON icon), then affecting the operation.

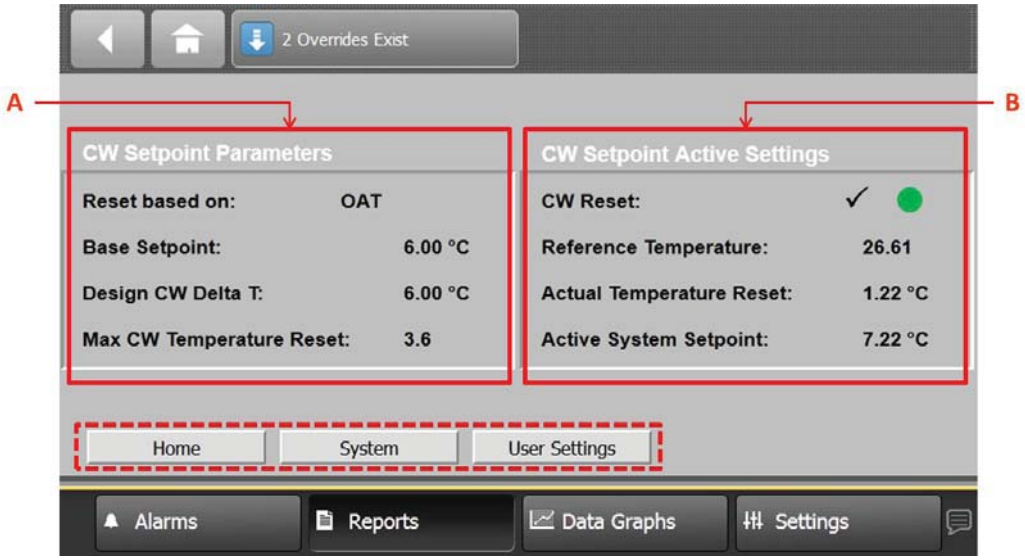
The following functions -as listed in General Features- are considered:

- Chilled water reset
- System ambient lockout
- Soft start
- Demand limiting

Info screen: Temperatures

From the main screen, press the temperature  icon to open the Info (Temperatures) screen.

Figure 5: Info screen: Temperatures



Information in this screen is split over two columns:

Column A:

Chilled Water Setpoint Parameters

These parameters are preset parameters, defined at commissioning.

They are used as a base for the calculation of active settings, such as:

- Line 1: Base of the reset calculation
  Can be OAT (Outside Air Temperature) or RWT (System Chilled Water Return Temperature)
- Line 2: Base Setpoint
  This is the chilled water setpoint for the chillers in operation, with no reset applied.
  If reset is active, the chilled water reset is added to this base setpoint in order to provide the chiller active setpoint.
- Line 3: Design Chilled Water Temperature Difference
  This is the theoretical maximum reset value.
- Line 4: Maximum Chilled Water Temperature Reset
  This is the actual maximum reset value.
  Limitation is mainly due to the chiller operating limits and defined at commissioning.

User Screens

Column B:

Chilled Water Setpoint Active Settings

This information provides the current system status:

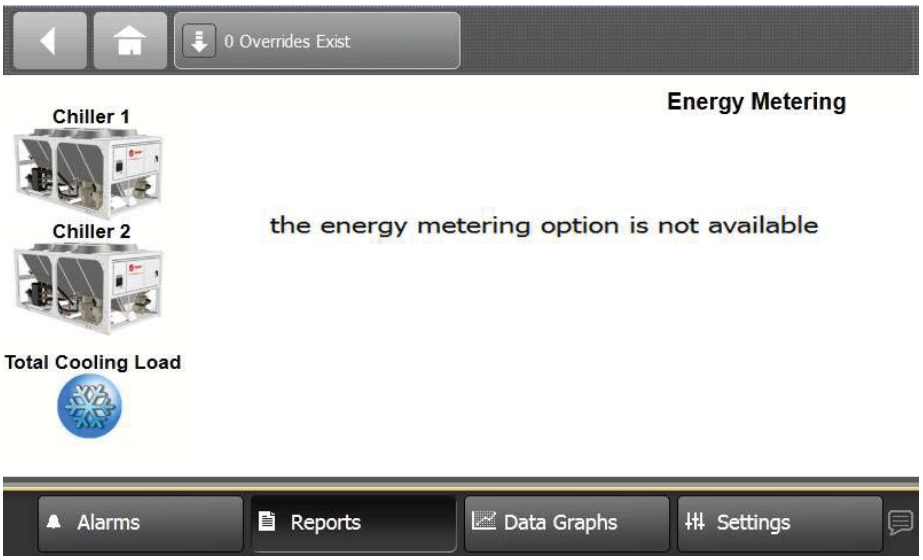
- Line 1: Chilled Water Reset Mode
  This is the current mode (Active or Inactive) of the reset function.
- Line 2: Reference Temperature
  Reset can be based on the OAT (Outside Air Temperature) or the RWT (System Chilled Water Return Temperature) as explained formerly.
  It is then the outside air temperature or the return water temperature that is used for reset calculation.
- Line 3: Actual Temperature Reset
  This is the calculated reset that will be applied to the Base Setpoint to generate a corrected setpoint for the chillers.
  This reset value will be 0 if the reset function is inactive.
- Line 4: Active System Setpoint
  This is the Base Setpoint with the influence of reset (if any) sent to the chillers.

This display integrates three touch buttons (shown in the red dotted box) to navigate to other screens.

Energy Metering screen (option)

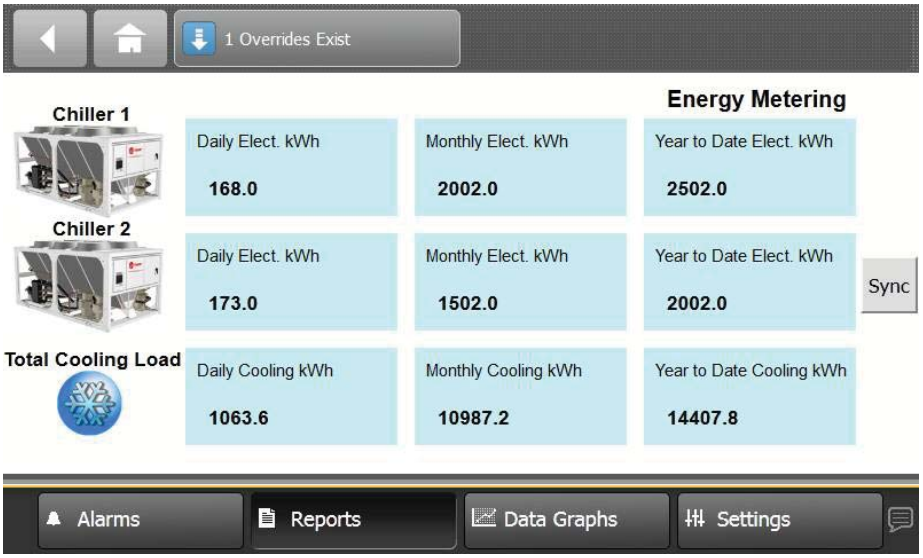
From the main screen, press the gauge icon to open the Energy Metering screen.

Figure 6: Energy Metering screen



The above screen is displayed when the metering option is not enabled.
For more details on the Energy Metering option, contact your Trane sales office.

Figure 7: Energy Metering screen (when installed)



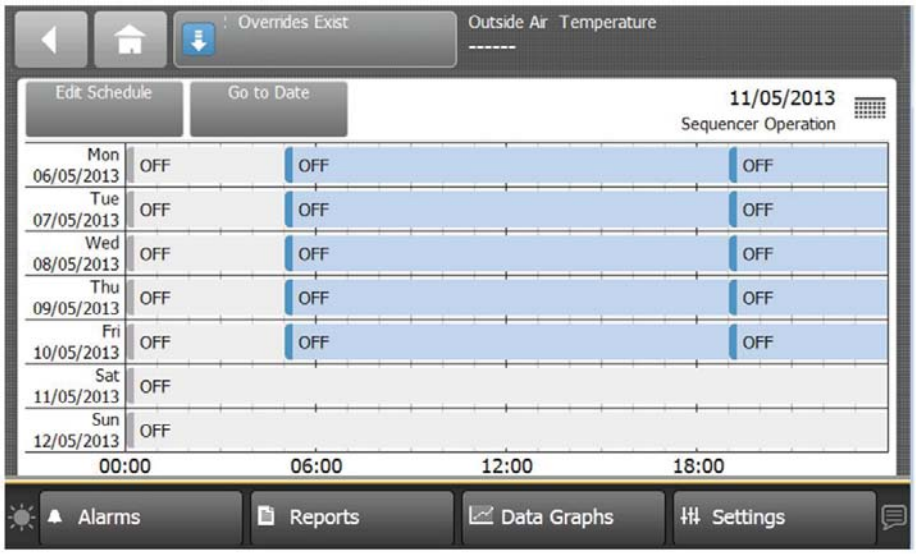
The above screen is displayed when the metering option is enabled.
Refer to the Metering Option in OptiPlant User Guide BAS-SVU028 for more details about the contents of this option.

User Screens

Scheduling (option)

If the scheduling option has been set up, use the calendar icon on the Main screen to navigate to the Scheduling setup screen.

Figure 8: Scheduling screen



A one week (seven days) schedule screen will appear as defined at commissioning.

The elapsed days of the current week appear without scheduling.

To review a (full) week, with each day of the week displaying a schedule, use the **Go to Date** action button and move the date one month forward.

To add exception dates, use the **Edit Schedule** action button and the **Exceptions** button.

Exception events can be single events or recurring events (Monthly or Yearly).

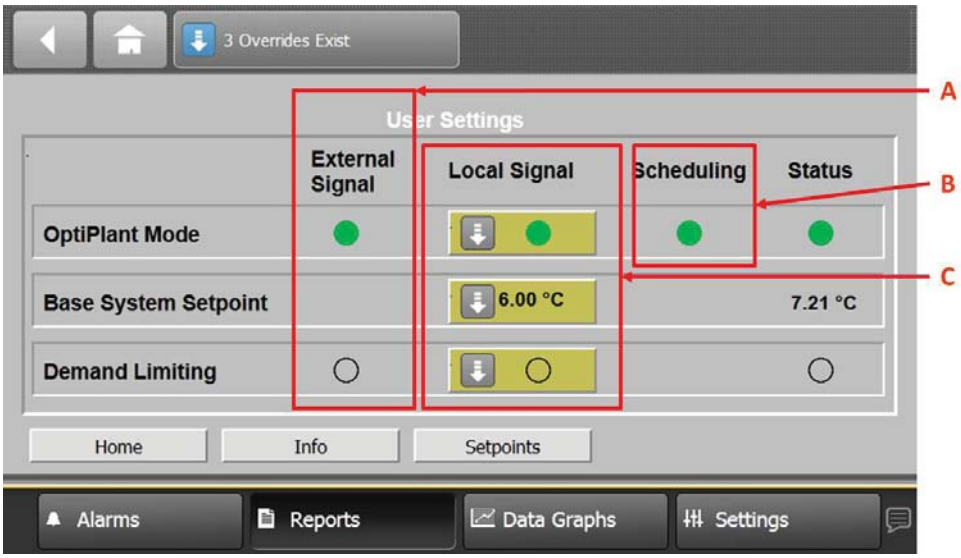
When an event is saved, it can be edited by pressing the relevant date line.

The **Add Event** button allows to enter a start time and an operation mode.

Note: The last described event for the day ends at the end of the day / midnight.

User Settings screen

Figure 9: User Settings screen



On this screen, the operating modes are indicated by the ON/Auto and OFF icons.
Synthesis information is displayed in the last column for:

- OptiPlant operating mode: Auto or OFF.

  The resulting mode is the conjunction of:

  A) Hardware (or external) command, if such a command has been wired.

  If no external command has been wired, a jumper is needed on the terminal board to default to Auto.

  And

  B) Scheduling, if such option has been setup, with periods of Auto or OFF modes.

  If no schedule has been defined, this input defaults to Auto.

  And

  C) User override.

  See User Override section below.

  Note: the three commands must be in Auto mode to result in a synthesis as Auto.

- Base System Chilled Water Setpoint that is the result of the user input only. (Frame C)
  Range of change is set at commissioning depending on the chiller type.

- Demand Limiting mode: ON or OFF.

  The resulting mode is the conjunction of:

  A) Hardware (or external) command, if such a command has been wired.

  If none, this input default to OFF.

  Or

  B) User override.

  See User Override section below.

  Note: One of the two commands in ON mode results in a synthesis as ON.
  Both the commands must be OFF to result to OFF.

The three operating parameters (Frame C) can be overridden by pressing the arrow buttons.

User Override

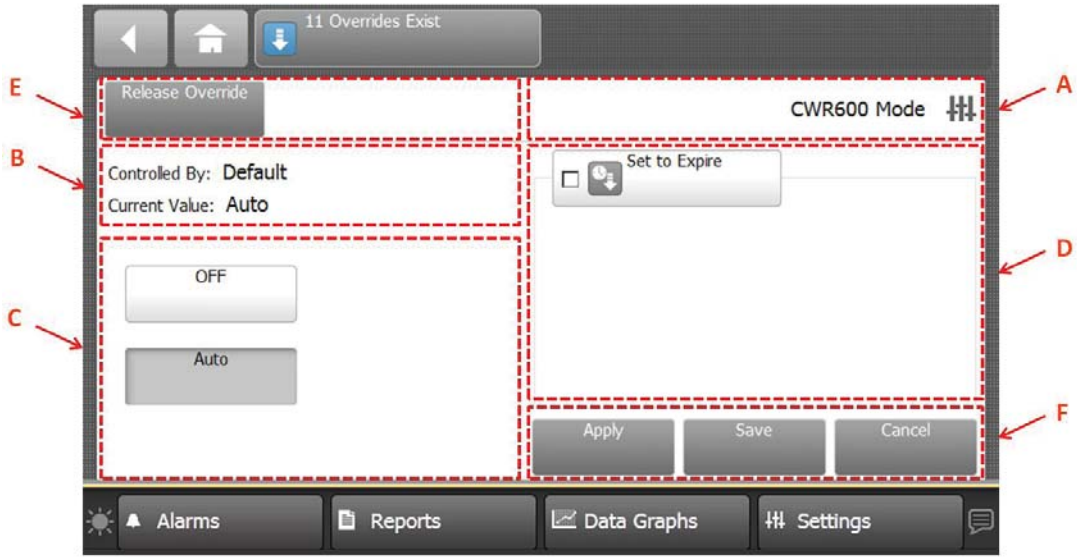
From the User Settings screen, the user can setup or override:

- Mode: OptiPlant mode or Demand Limiting mode
- Value: Base System Chilled Water Setpoint

To access the Override Screen, push the down arrow button.

1- Override screen

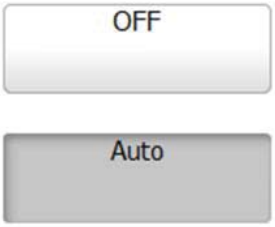
Figure 10: Override screen



The override screen is made of five different areas:

A. Point under control
B. Point Status area showing who is controlling the point
C. Override area for user changes
D. Temporary Override area (when box is checked)
E. Release button to release override
F. Action buttons to save or cancel the changes

2- Overriding mode



Press the relevant button in the Override area (C).
Press an action button (F) to save or cancel the change.

3- Overriding value

The Override area (C) provides two ways to change values:

- Use the up or down arrows or
- Touch the keypad icon (onto the left) to open the keypad screen and enter the desired value.

Trends

To access trends, press the **Data Graphs** button in the bottom display area.

1- Operating temperatures

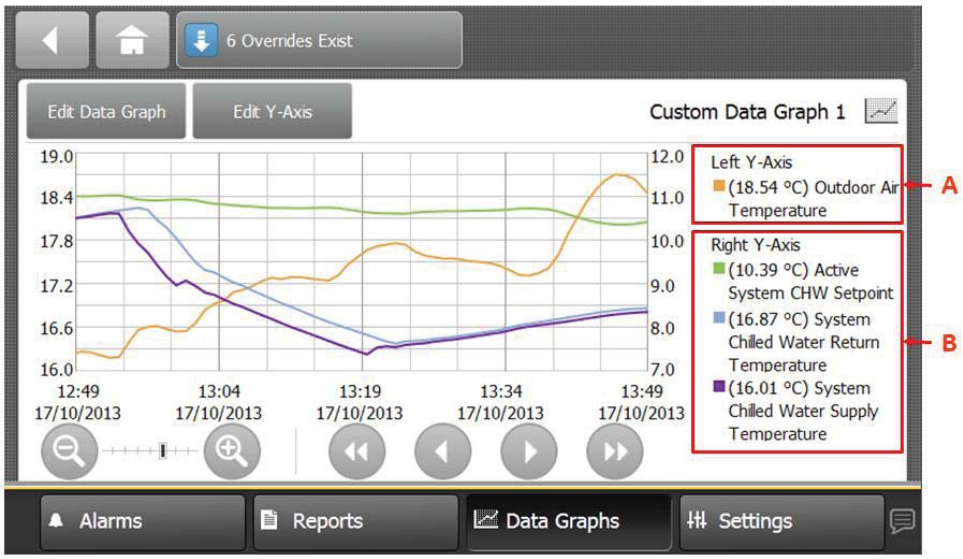
Press **Custom Data Graph 1** to access the Operating Temperatures graph

A) Left-side scale:
   - Outside Air Temperature (°C)

B) Right-side scale:
   - System Chilled Water Return Temperature (°C)
   - System Chilled Water Supply Temperature (°C)
   - Active Setpoint (°C)

One week measurements, 3-minute scan period.

Figure 11: Operating temperatures Graph



Notes

Trane optimizes the performance of homes and buildings around the world. A business of Ingersoll Rand, the leader in creating and sustaining safe, comfortable and energy efficient environments, Trane offers a broad portfolio of advanced controls and HVAC systems, comprehensive building services and parts. For more information visit www.Trane.com

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