Control Panel: JACE

Vitocontrol-C with JACE®

Custom Control Panel

KWE Technologies Group

Overview Information

Cautionary Statement

The information presented in this document is only to be used by those familiar with its application and use.

C SA US LR 102874

IMPORTANT

Panel shown is for reference purposes only

About this document

Take note of all symbols and notations intended to draw attention to potential hazards or important product information. These include "WARNING", "CAUTION" and "IMPORTANT". See below.

WARNING

Indicates an imminently hazardous situation which, if not avoided, could result in death, serious injury or substantial product/property damage.

→ *Warnings draw your attention to the presence of potential hazards or important product information.*

CAUTION

Static sensitive components may be damaged by improper handling or work within the control. Ensure all possible measures are taken to eliminate build-up of static electricity.

CAUTION

Indicates an imminently hazardous situation which, if not avoided, may result in minor injury or product/property damage.

→ *Cautions draw your attention to the presence of potential hazards or important product information*

IMPORTANT

→ *Helpful hints for installation, operation or maintenance which pertains to the product.*

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Important Regulatory and Installation Requirements

Codes
The installation of this unit must be in accordance with local codes.

→ *Please carefully read this manual prior to attempting installation. Any warranty is null and void if these instructions are not followed.*

All electrical wiring is to be done in accordance with the latest edition of CSA C22,1 Part 1 and/ or local codes. In the U.S. use the National Electrical Code ANSI/NFPA 70.

→ *The completeness and functionality of field supplied electrical controls and components must be verified by those installing the device*

The installing contractor must comply with the Standard of Controls and Safety Devices for Automatically fired Boilers, ANSI/ ASME CSD-1 where required by the authority having jurisdiction.

WARNING

More than one live circuit. See wiring diagram in this manual. Turn off power supply to control and damper/blower before servicing. Contact with live electrical components can result in serious injury or death

Working on the equipment
The installation, adjustment, service and maintenance of this unit must be done by a licensed professional heating contractor or persons who are qualified and experienced in the installation, service, and maintenance of similar products. There are no user serviceable parts on this control.

Power supply
Install power supply in accordance with the regulation of the authorities having jurisdiction or in absence of such requirements, in accordance with National Codes.

Purpose of Device and Operation

The Vitocontrol-C is designed to perform the tasks that are outlined by customer wishes or supplied control specification. This includes, but not limited to, mixing valve operation, DHW pump control, high temperature circuit control boiler cascading, chiller staging and any other desired function or operation.

Generic Control Panel Specifications

Control Panel Overview
The control panel used in each of the custom control applications shall be CSA and/or UL approved for use in USA and Canada.

The enclosure shall be constructed of 16 ga. steel, the door of 14 ga. steel, and the sub panel of 11 ga. steel. The enclosure shall be electrostatically powder-coated with Viessmann orange, silver or white. The sub panel shall be zinc-plated. Enclosure rating shall be as follows: NEMA 1. Enclosure panel size depends on the extend of options specified.

Control panel door shall incorporate a key lock. Lock to be operated with supplied key or tool. The lock shall be of sufficient size or quantity to allow panel door to close flat for proper sealing of gasket to provide a moisture and dust resistant seal.

Control panel shall incorporate moisture gutter to allow accidental water splashes from entering cabinet when door closed.

Control panel door shall incorporate rubber, or dense foam to provide a moisture resistant seal water from entering panel.

Panel may provide opening for gland plate to facilitate hard wiring or conduit connection. Glad plate shall be supplied with one-piece gasket for moisture intrusion protection and be fastened in place with screws.

Components Within DIN Rails
Din rails shall be used where possible to facilitate mounting of internal components, including, but not limited to wire terminals, relays, fuse blocks and circuit breakers.

The DIN rails shall conform to standards 46277/1, /2, /3, EN 50.022, 50.045 and 50.035.

The rails shall be constructed from cold rolled steel and protected with an electrostatically applied coating.

Oval mounting holes shall be provided throughout the entire length of the DIN rail.
The DIN rails shall be mechanically fastened to the control panel back plate using sheet metal screws.

Wire Terminals
The wire terminals shall be suitable for environments of –5°C to +40°C, height of up to 2000m above sea level and an RH of 50% at +40°C and 90% at +20°C.

The wire terminals shall be mounted on DIN rail and held in place with end bracket.

The wire clamping mechanism shall be vibration resistant and of a design that locks the clamping screw from backing off.

The mechanical parts of the terminals clamping mechanism shall be made of hardened steel and shall provide a gastight and vibration resistant connection. The current carrying bar of the terminal block, shall be constructed from either copper or high quality brass.

Terminal blocks shall be constructed from thermoplastics such as Polymide, Wemid, and Thermoplastic polyester.

Wire
Wire used to interconnect the panel devices shall be of stranded, TEW type and shall be rated for 105 degree C (221 degrees F) at 600VAC. Where possible, all bare stranded connections shall be terminated with stainless steel ferrules or crimp on terminals. Wire gauge shall be sized according to electrical codes to satisfy amperage demands of control and output devices.

Wire Duct
Wires used within panel, where possible, shall be run in wire duct. The wire duct shall be sized appropriately for the specific gauge and quantity of wires.

Wire duct shall be made of PVC and have a continuous use temperature of 50 degrees C (122 degrees F).

Wire duct shall be of wide finger/slot design to allow unobstructed interconnection between duct work and electrical components.
Wire duct shall meet or exceed standards set by UL and/or CSA and conform to NFPA 79-2002 section 14.3.1 requirement for flame retardant material.

Generic Control Panel Specifications

Control Panel Overview Continued

Switch Blocks
The switch block shall be either a two position On/Off or three position Auto/Off/On configuration.

When configured as a two position switch, the switch block shall be comprised of one contact block. Lamp indication shall be included where necessary to indicate ON status.

When switch block configured as a three position switch, the switch block shall be comprised of two contact blocks. Lamp indication shall be included where necessary to indicate ON status.

The switch block shall have self cleaning contacts and shall be rated for no less than 6 amps at 110VAC. The switch block shall be rated for an electrical life of 500 000 cycles at 3 amps.

Relays
All relays and contactors shall have a minimum life expectancy of 0.7 million operations.

Circuit Breakers
All circuit breakers intended to protect outputs for pumps, valves, boilers, etc. shall be suitable for the specific load required and meet the following specifications: DIN-rail mounted, life expectancy of >4000 cycles, ambient temperature of 32 to 104°F / 0 to 40°C and be CSA and UL approved.

Main Disconnect
The main panel disconnect shall be UL and/or CSA approved for use in USA and Canada.

The disconnect shall use a clamp type system of wire fastening for all incoming and outgoing wire connections.

The disconnect switch shall show indication of either on or off. The switch handle shall allow a key lock to prevent the panel from being turned on by others than key holder.

Space Heating (If required)
A specified quantity of space heating control circuits shall be included in the control. Control of the heating circuits shall be by means of a 3- or 4-way mixing valve and actuator. The output signal to the mixing valve actuator shall be 120 or 24 VAC, 3-point floating type. A strap-on supply sensor shall be supplied by the control manufacturer for each circuit. A output for heating circuit pump must be included. Testing of the mixing valve actuator and pump shall be possible through the control's diagnostic system. Via digital communication with the boiler control processor and mixing valve control processor, a temperature differential shall be automatically maintained. This differential shall be factory pre-set to 15°F / 8°C and be field adjustable. In multiple mixing valve circuit applications, the boiler supply temperature shall maintain a reset schedule based on the highest mixing valve circuit curve plus the temperature differential.

DHW Control (If required)
The control of an indirect-fired domestic hot water tank shall be based on the actual tank temperature and required set-point temperature. If the domestic hot water tank temperature drops below the required setting (+ -3.6°F / + -2°C switching differential), the boiler(s) shall be activated. The boiler temperature shall be calculated to 36°F / 20°C above the required domestic hot water set-point. The boiler control shall energize/de-energize (and if applicable modulate) the burner to maintain that set-point automatically. The domestic hot water pump shall only be activated if there is a call for heat from the tank and the boiler temperature is 27°F / 15°C higher than the domestic hot water tank temperature.

The domestic hot water pump shall be de-activated on a time delay or immediately if space heating demand is present.

A output for domestic hot water re-circulating pump shall be included in the SCP.

A output for domestic hot water safety aquastat shall be included in the SCP.

Programmable energy-saving features shall include 7-day, 4-event per day setback programming for space heating and domestic hot water production.

High Temperature Zone Control (If required)
The SCP shall include an output for a high temperature radiator pump(s). A output for optional room thermostat(s) shall be included in the SCP.

Generic Control Panel Specifications

Control Panel Overview Continued

Pump Outputs (If required)
All outputs for pumps of 120/240 V, <12 FLA, 1 PH shall include ON/OFF/AUTO selector switch, pump status indication, and over-current protection.

All outputs for pumps of 120/240 V, >12 FLA, 1PH; 208 V, 3 PH; 460 V, 3 PH; 575 V, 3 PH shall include ON/OFF/AUTO selector switch, pump status indication, and overload protection.

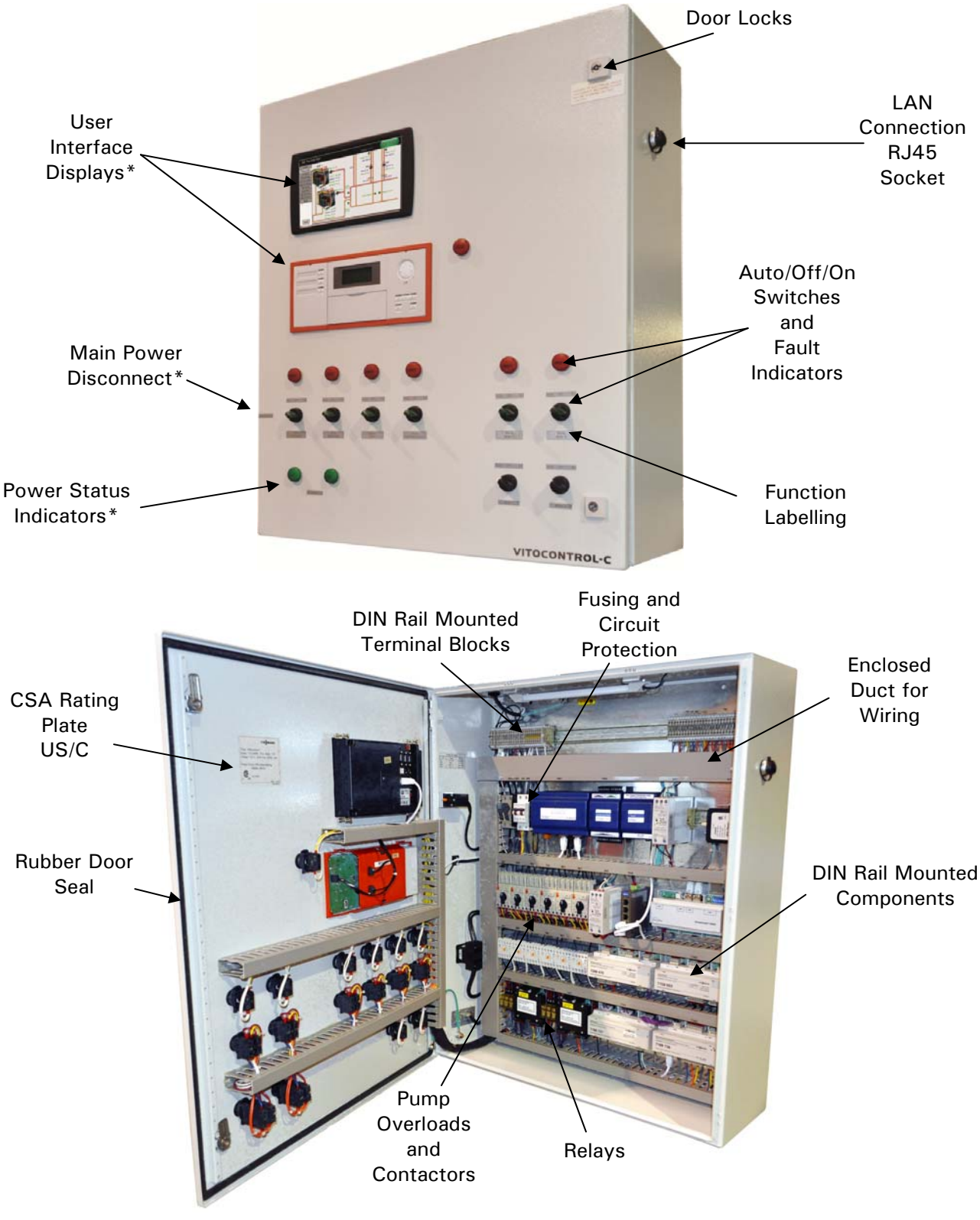
Installation:
Follow manufacturer's installation instructions. Before operating the boiler/burner unit, a qualified heating contractor shall carry out initial start-up.

The installation must conform to the requirements of the authority having jurisdiction or, in the absence of such requirements, to the following codes (latest editions):
- CSA C22.1 Canadian Electrical Code and/or local electrical codes (for Canada);
  ANSI/NFPA 70 National Electrical Code (for U.S.A.).

Once the installation work is complete, the heating contractor must familiarize the system operator/ ultimate owner with all equipment. A licensed professional heating contractor must perform the installation, adjustment, service, and maintenance of the equipment.

Control Panel Control Overview

Custom Control Panel Elements*



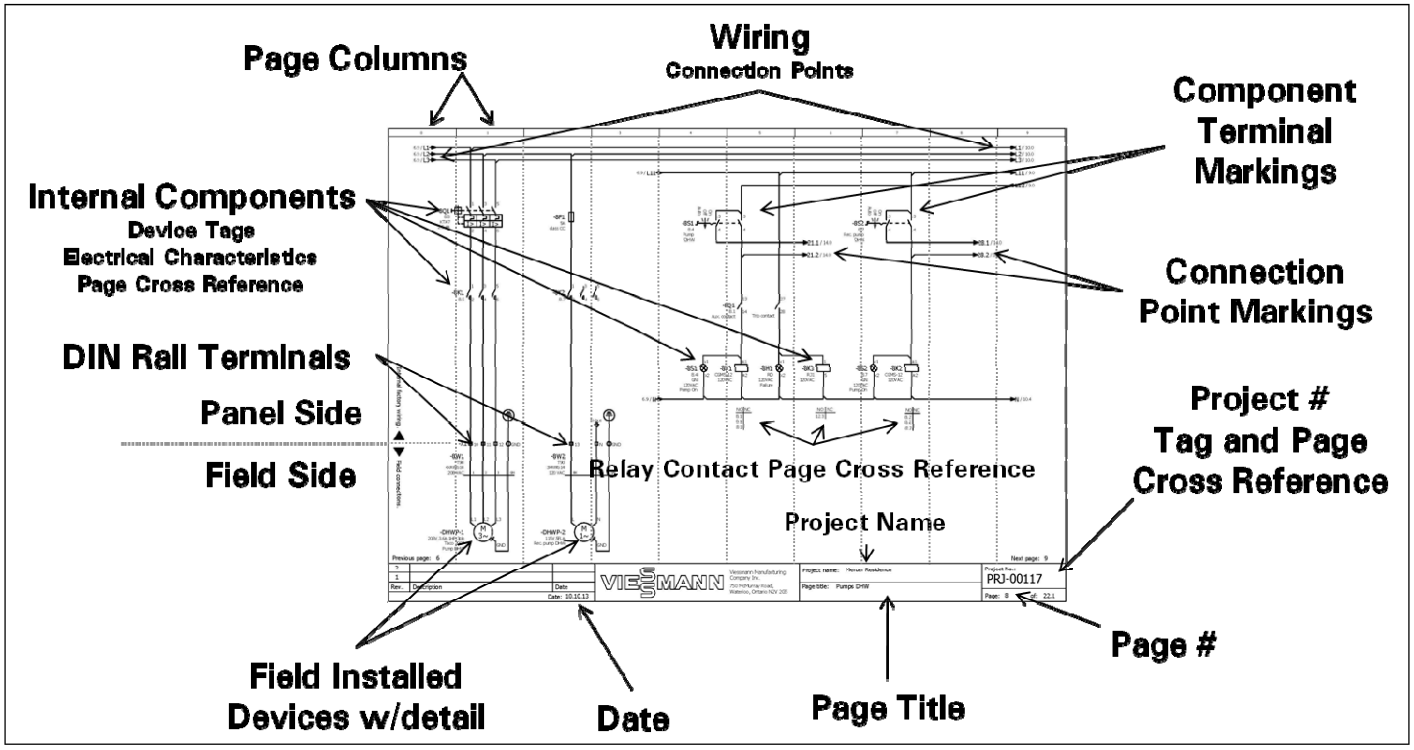
*Features, functions and accessories dependent on included control devices and equipment

Control Panel Schematic Overview

Schematic Information*

- Title Page
- Table of Contents
- Parts List
  - Quantity
  - Designation
  - Producer
  - Part Number
- Connection Overview
  - Wiring points "from-to"
  - Wire/Cable Type
  - Conductor Gauge
- Terminal Overview
  - Wiring details high and low voltage

Schematic Element Overview



Designation of Items

The wiring diagrams are continuously numbered. The devices on the single sheets are marked with page number designation letter and marking index.

Example: 18K2
Meaning: Second contactor/relay on page 18

This kind of designation makes it easier to find. If there is a contact 18K2 on page 15 of the schematic, then you will find the coil of this relay on page 18.

*Features, functions and accessories dependent on included control devices and equipment

PLC, Communications & Visualization

Overview

A complete control system is culmination of standard control devices/products and programmable PLC controls to achieve a desired control operation

The PLC controls are used to provide the specific functionality, where an off-the-shelf type of device simply does not provide the flexibility necessary.

It is the marriage between standard and custom control operations which provides the Vitocontrol panels its greatest benefits.

The foundation of the Vitocontrol-C and Versatronik-C Control Panels custom control solutions start with a JACE type control which is programmed and able to communicate to other Input and Output modules. The JACE control is a compact embedded controller and server platform. It combines integrated control supervision, data logging, alarming, scheduling and network management functions with Internet connectivity and web serving capabilities in a small, compact platform.

The JACE device is part of a suite of Java-based controller/server products, software applications and tools. They are designed to integrate a variety of devices and protocols into unified distribution systems. These products are powered by Niagara^{AX} Framework® the industries first software technology designed to integrate diverse system and devices into a seamless system.

The JACE supports a wide range of protocols including LonWorks®, BACnet® and internet standards. It also includes integrated network management tools to support the design, configuration, installation, and maintenance of interoperable networks.

A wide range of field buses for connection to remote I/O and standalone controllers is possible with the JACE product. As well, it serves data and rich graphical displays to a standard web browser via an Ethernet LAN or remotely over the Internet.

What does this mean for the end user? A system built on open communications and scalable solutions allows the flexibility to provide small to large system development.

A well thought out control strategy or a simple "check-list" is all that is required to start to build system.

Due to the remote communications capability with all the necessary IP communications in place allows on the fly changes to tweak and tune the system operation.

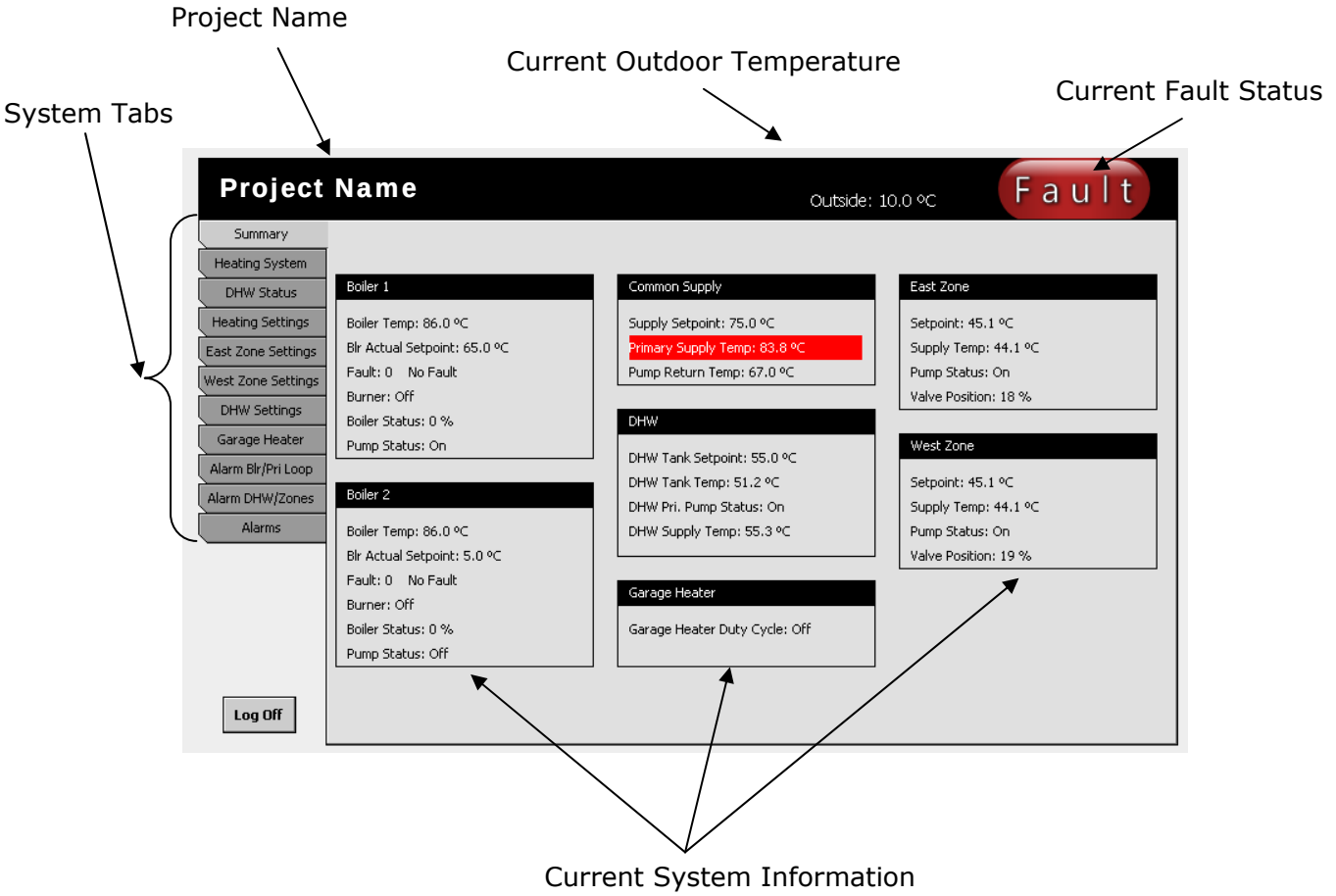
The last part of the puzzle is the addition of a touch screen to allow changes to be made locally and directly which are then communicated to the devices. The touch screen allows the graphical visualization of the systems. They can be configured to show temperatures, set points and alarm data.

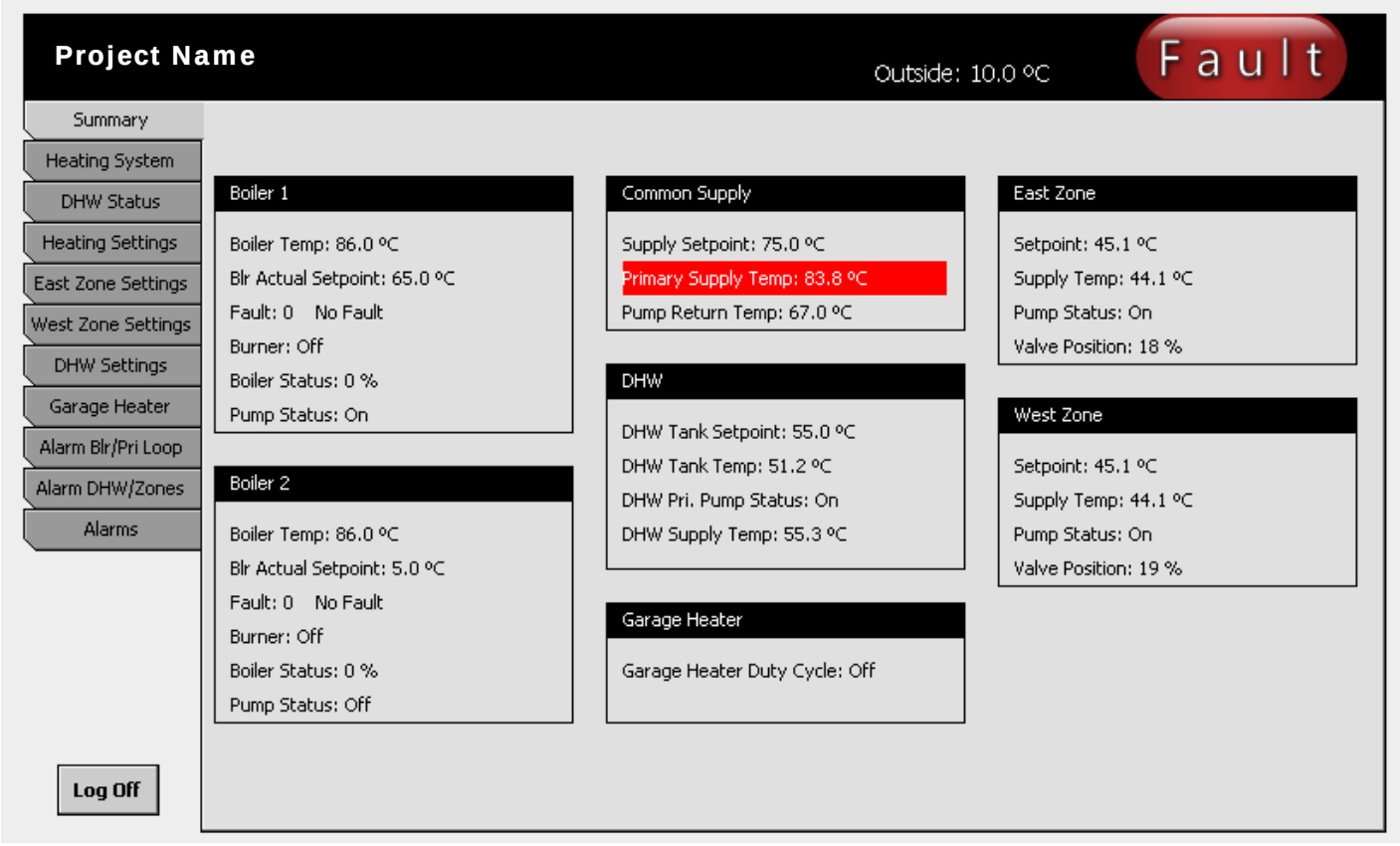
Communications & Visualization

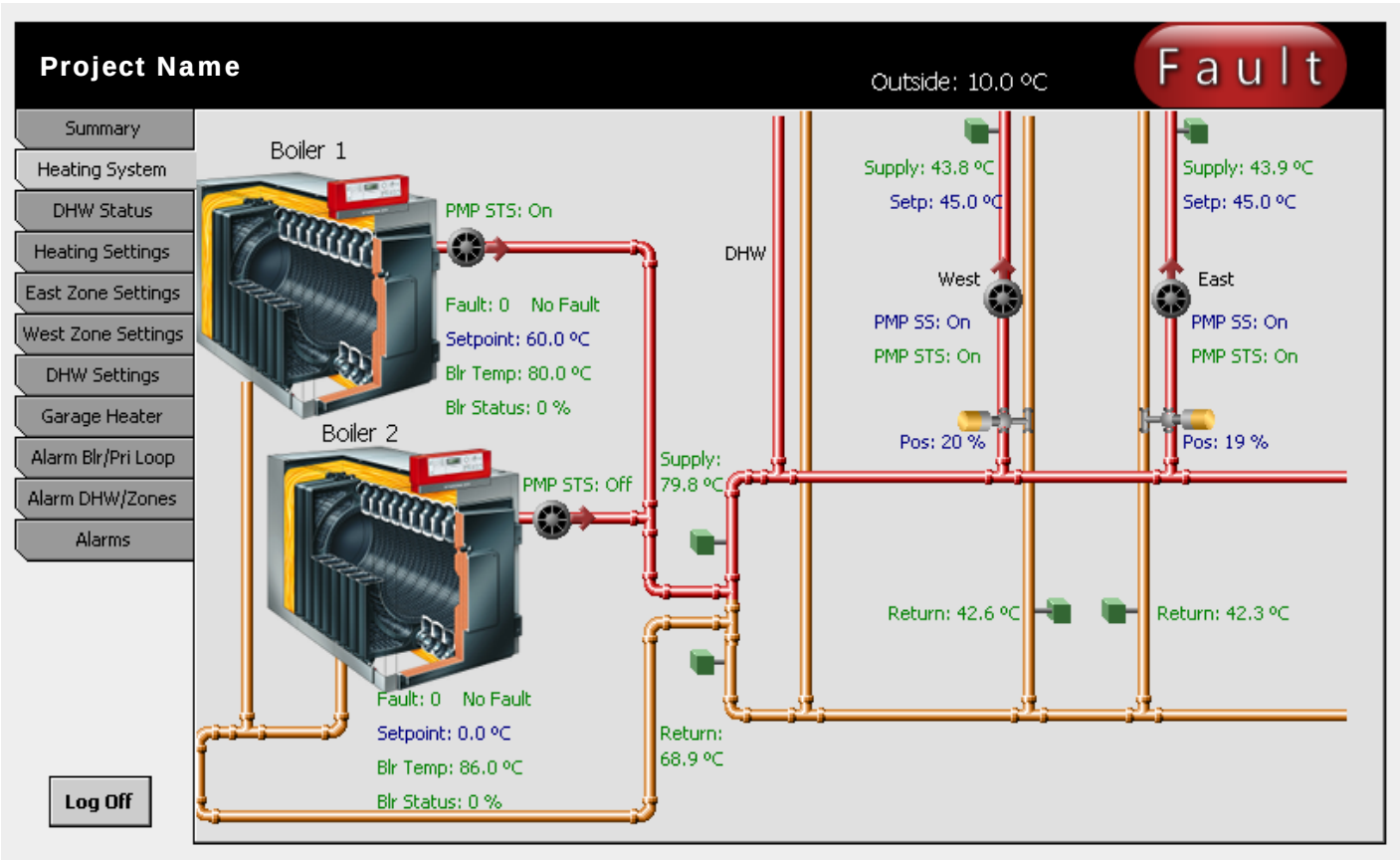
Overview

- Project Name
- Outdoor Temperature C/F
- Current Fault Status
- System Tabs
- Page Information
  - Actual Temperatures
  - Set Point Temperatures
  - Status Information

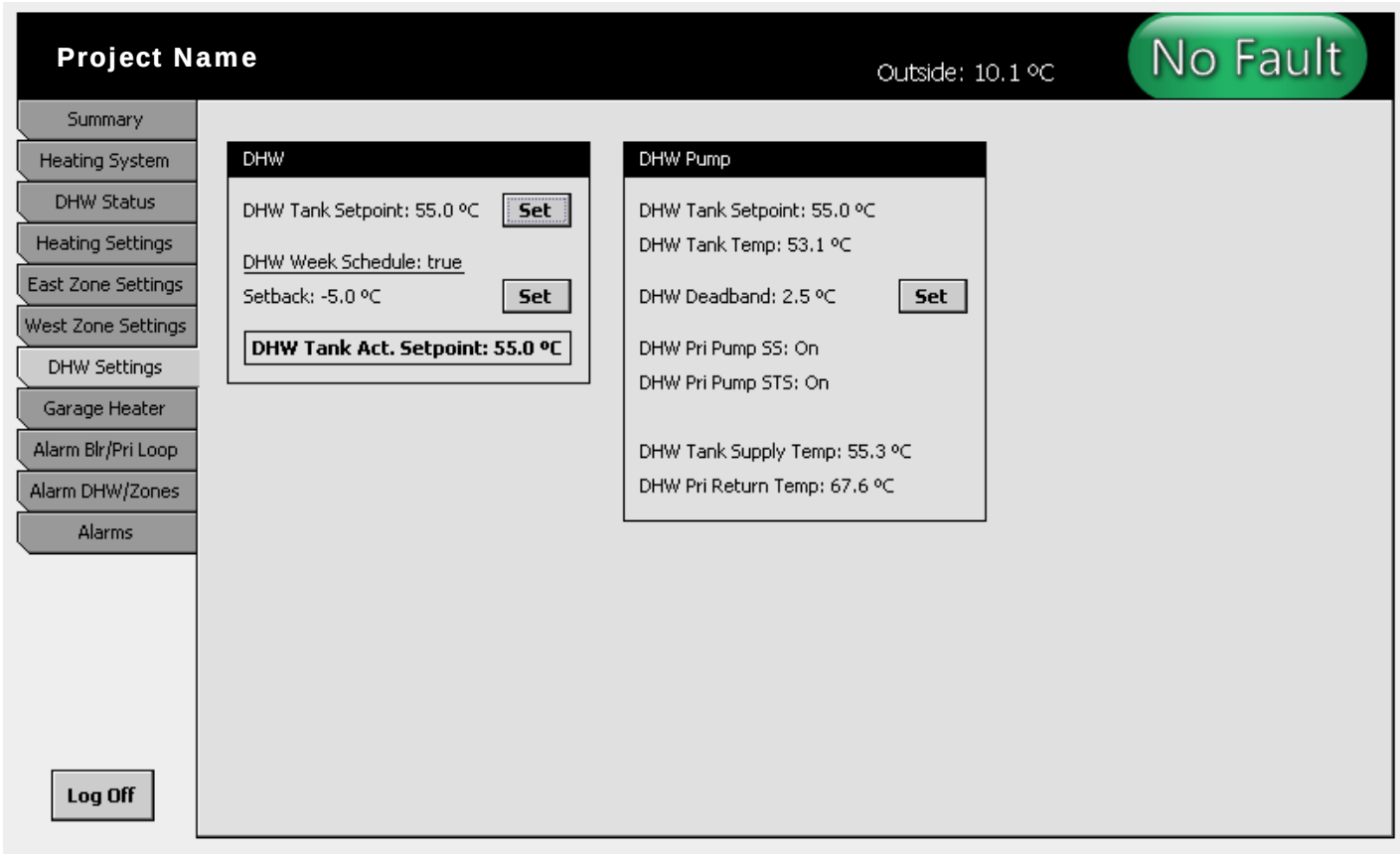
- By clicking on the individual tabs with a mouse or the touch screen with your fingers, navigation through the individual tabs is possible
- Set points can be adjusted on the touch screen when enabled. This allows for access in areas without worry of nuisance adjustments.
- Alarms are show in **Red**
- Status information can be shown in On/Off, %, or specific number output.

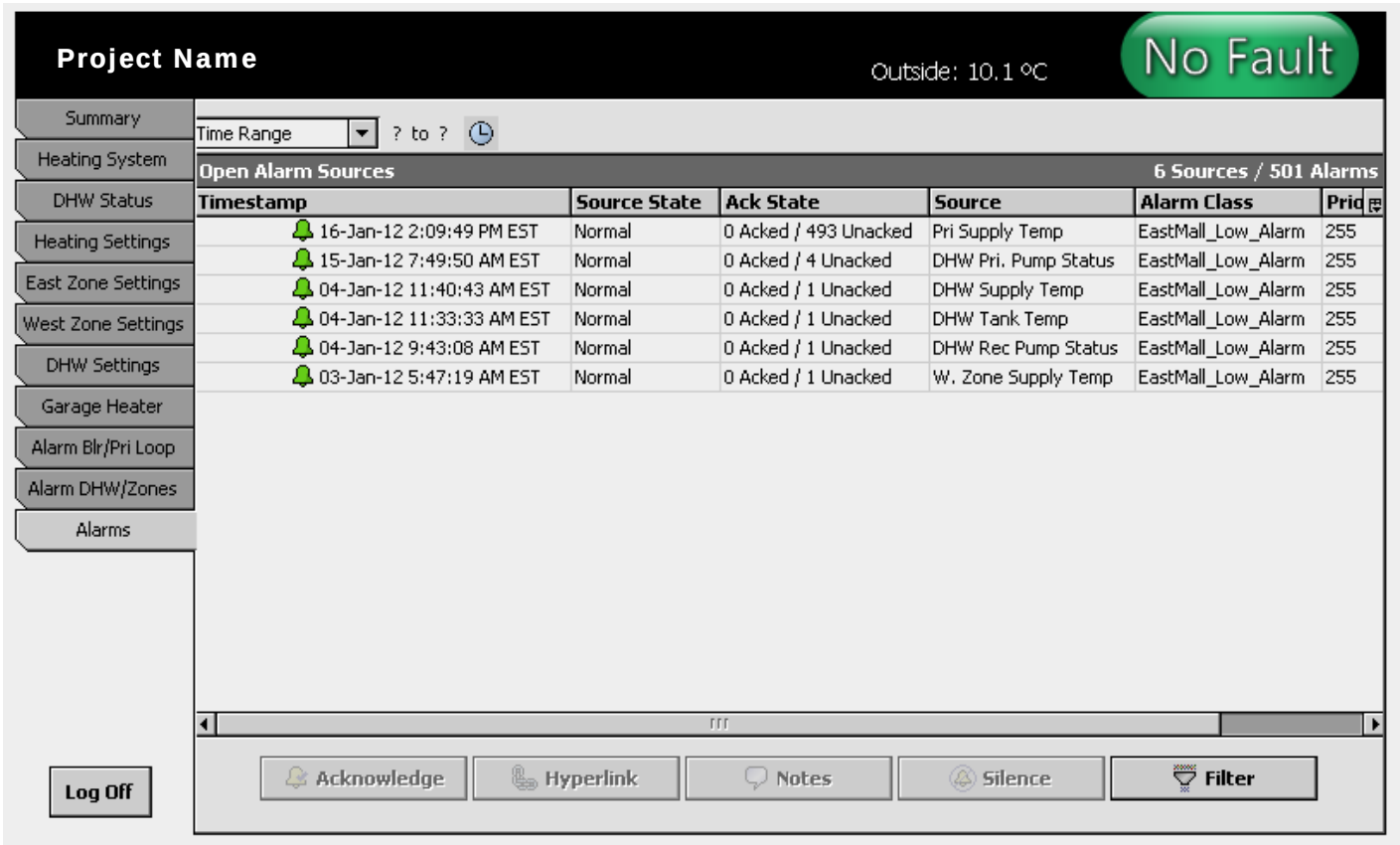






Communications & Visualization





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