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Enhancing User Experience: Colmac Coil HygenAir™ A+H Hygienic Air Handler Controller Interface Designed to ANSI/ISA-101.01-2015 Standards

ANSI/ISA-101.01-2015 HMI Design Standard

Colmac Coil has developed the HygenAir™ A+H controller user interface based on the ANSI/ISA-101.01-2015, Human Machine Interface (HMI) design for Process Automation Systems.

Written in 2015, this standard has been prepared by the ISA, the International Society of Automation, toward a goal of uniformity in the field of instrumentation. The purpose of this standard is to address the philosophy, design, implementation, operation, and maintenance of Human Machine Interfaces.

Key Goals of the Standard are:

- 1) Provide guidance to design, build, operate, and maintain HMIs to achieve a safer, more effective, and more efficient process control system under all operating conditions.
- 2) Improve the user's abilities to detect, diagnose, and properly respond to abnormal situations.

Colmac HMI Design Principles are Adapted from The Standard

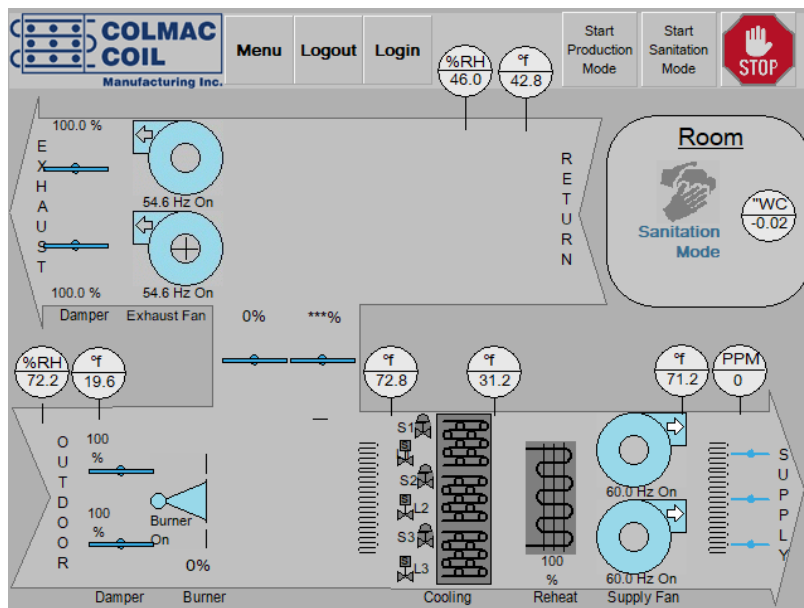


Figure 1 – Main status screen while in sanitation mode, an example of a level 1 screen.

- a) Consistency of design - the HMI is an effective tool for the safe and efficient control of the process.
- b) Situational awareness - the HMI assists in the early detection, diagnosis, and proper response to abnormal situations.
- c) Self-diagnostic - the HMI is structured to aid operators to prioritize response to major or multiple simultaneous system upsets.
- d) Failure of a display or items on the display are immediately apparent to the operator.



Technical Bulletin

Key ISA 101 Concepts Implemented in Colmac Coil Displays

- Use of color
- Display hierarchy - screen levels
- User types, The HMI security model
- Screen types

Use of Color

Due to limits to perception and cognition, only a limited number of colors can be used effectively on displays.

Color should be conservative and consistent. The overuse of color, especially bright colors may draw the operator's attention away from what is important. Bright colors and/or flashing of symbols are reserved to direct the operator's attention to newly developing critical situations.

The background should be an unsaturated or neutral color (e.g., light gray) to limit chromatic distortions.

Display Hierarchy

Level 1 displays – (The Main Status) used to provide an overall summary of the key parameters, alarms, calculated process conditions and disturbance.

Level 2 displays – are best described as high-level process displays. They typically contain more detail than the level 1 displays, focusing on an individual function of the equipment (Heating, Cooling, Drives, etc..).

Level 3 displays - displays are best described as system or subsystem detail displays. They typically contain further detail than the associated level 2 displays, and set points associated with the Level 2 display.

Level 4 displays – are best described as administration displays for equipment configuration. Provided mechanical options and related control may be selected on this display. Once the equipment is commissioned, these settings should be permanent; they should not be tampered with.

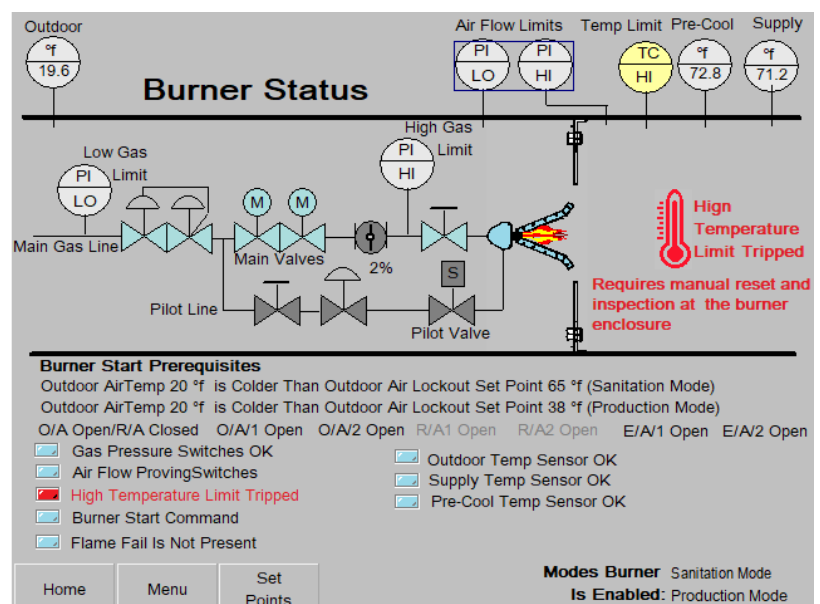


Figure 2 – Burner Status screen, an example of a level 2 screen.



Types of Displays

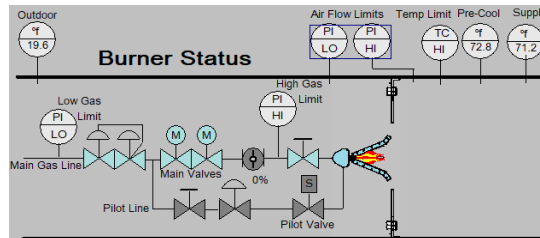
List Display - Rows or lists of data, Text and numeric data may be intermingled with process equipment symbols.

Figure 3 – Cooling setpoints page, an example of a level 3 screen.

Cooling Setpoints Page	
Set/Select	Set Point Description
180 Min	Defrost Delay Between Each Defrost Series <i>A Defrost Series is the completion of defrosting all three coils in sequence. Set to "0" if continual defrost cycling is required.</i>
20 Min	Defrost Time Per Individual Coil <i>Defrost duration time per coil, (Liquid on, Suction high)</i>
5 Min	Recovery Time Per Individual Coil <i>The time duration for the defrosted coil to re-cool at low suction before stepping to the next coil defrost. (Liquid On Suction Low)</i>
Enable	Cooling Low Temperature Limit Option <i>Temporarily stops liquid if room is over cooled</i>
32.0 °f	Cooling Low Limit Temperature Set Point <i>Stop liquid if room is < This Setpoint</i>
1.0 °f	Cooling Low Limit Temperature Set Point Differential <i>Cooling Differential Setpoint</i>
Enable	Production Mode Cooling Pull Down Option <i>High suction upon initial start up or after Sanitation until Pull Down set point is achieved</i>
50.0 °f	Production Mode Cooling Pull Down Option <i>Allows suction valve to go 1 low setting once room temp is < Pull Down Set Point</i>
Home	Defrost Schedule Weekly
	Hot Gas Defrost Schedule By Date
	Cooling Status

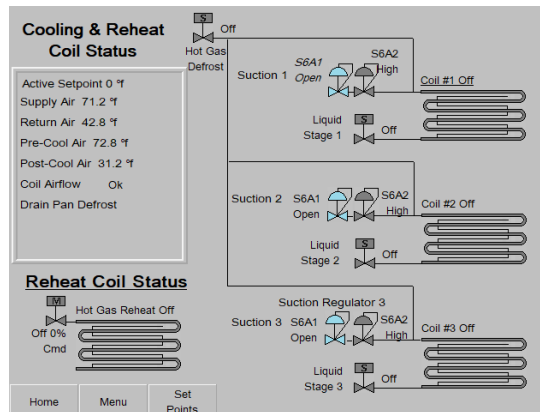
Process P&ID - Graphic representation of process equipment, piping, and instrumentation.

Figure 4 – Burner status screen, an example of a level 2/P&ID screen.



Functional Overview (Dashboard) - Representation of functional relationship of data types as required (e.g., key performance indicators)

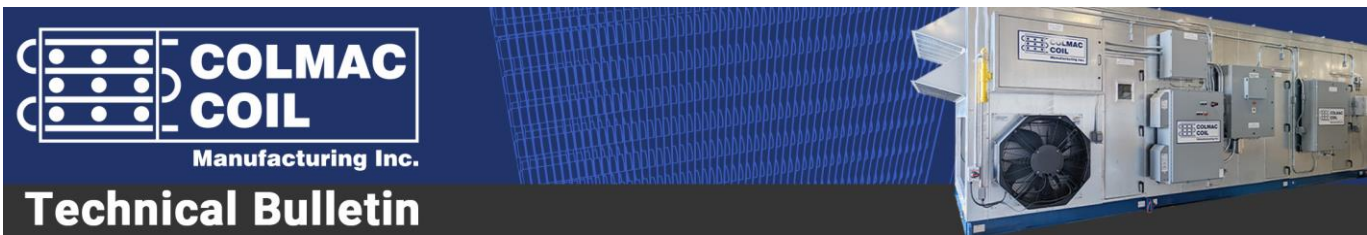
Figure 5 – Cooling & Reheat Coil Status screen, an example of a level 2 screen.



Alarms List/History - Display a list of status information.

Figure 6 – Alarm status screen, an example in list format.

Alarm Status	
Status	Alarm Description
N	E_Stop Tripped
N	Smoke Detector Tripped
N	Refrigerant Alarm Contact
N	Access Door Open
N	Blocked Coil
N	High Refrigerant PPM
N	High Room Pressure
N	Sply Dmpr 1&2 Did Not Open
N	Sply Dmpr 3&4 Did Not Open
N	Sply Dmpr 5&6 Did Not Open
N	Sply Fan 1 Fail to Start
N	Sply Fan 2 Fail to Start
N	Post Cool Low Temp Limit
N	OA Dmpr 1 Feedback Tolerance
N	OA Dmpr 2 Feedback Tolerance
N	R/A Dmpr 1 Feedback Tolerance
N	R/A Dmpr 2 Feedback Tolerance
N	E/A Dmpr 1 Feedback Tolerance
N	E/A Dmpr 2 Feedback Tolerance
N	Htg Mod Vlv Feedback Tolerance
N	Burner High Temp Limit
N	Burner Flame Failure
N	Burner Air Flow Sw Not Closed
N	Burner Velocity Out of Range
N	O/A 1 Mn for Burner Not Reached
N	O/A 2 Mn for Burner Not Reached
N	Gas Pressure Switch Tripped
N	Clogged Pre Filter
N	Clogged Final Filter
N	Alarm 0 29
Home	Alarm Status 2



User Types – The Security Model

Operations - users who monitor and perform control and operation of the plant or facility (Access to level 1 screens only).

Maintenance - users who perform troubleshooting and/or maintenance of the process, instrumentation, and final control elements (Access to level 1 and 2 screens).

Engineering - users who perform modifications, additions or deletions to the HMI or control system; (Access to level 1, 2, and 4 screens).

Administrators - users who perform updates to the configuration of the control system itself or assign security to other users (Full access to all screens including configuration. Reserved for factory or very qualified contractors only).

Colmac Coil's HygenAir™ A+H Controller User Interface represents a meticulous adherence to the ANSI/ISA-101.01-2015 standards for Human Machine Interfaces in process automation systems. By incorporating key principles such as consistency of design, situational awareness, and a structured user hierarchy, Colmac Coil has developed an interface that enhances both safety and efficiency in process control operations.

The HygenAir™ A+H Hygienic Air Handler is custom engineered to manage the temperature, pressure, humidity, and cleanliness of processing rooms for food processors to maintain high-quality standards and meet strict USDA requirements. An optimal processing environment is achieved with the HygenAir™ by providing adequate cooling, limiting air migration, managing condensation, and filtering out contaminants to deliver clean, sanitary air to the processing room.

Don't hesitate to contact Colmac Coil today to discover how their expertise can improve your operations.

For more information contact Colmac Coil Manufacturing, Inc.
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