Synergy Controller Logic Programming Features

Introduction

Tidal Engineering's Synergy Controllers, including the Synergy Micro 2, Synergy Quattro, and the ¼ DIN Synergy Nano provide state-of-the-art usability and connectivity for environmental test control and data acquisition. They combine the functionality of a chamber controller and a data logger and are designed to improve test efficiency by supporting both factory automation and test and measurement protocols and standards. With the flexibility afforded by their multiple communication ports; Ethernet (10/100 Base-T), GPIB/IEEE 488, and RS-232, these controllers are perfect for today's dynamic testing environments.

The Synergy Controller software currently implements more than 30 high level functions (algorithms) called primitives which are designed to drive compressors, heaters, fans, and various refrigeration and humidity control components.

In addition, starting in Version 5.3.x these controllers have a variety of general-purpose programming features that can be used to implement control logic such as timers, thermostatic (On/Off) output functions, time proportioning outputs, selectors functions, Latch, and logic output (AND, OR, NAND and NOR) functions. This application describes these general-purpose primitives and provides examples.

Logic Feature	Instances Available
Time proportioning outputs (PWM).	18
On/Off output functions.	16
Selectors functions.	16
Logic output (AND, OR, NAND and NOR) functions.	32
Latch functions.	16
Counter Timers.	16

Contents

Primitive IDs

Primitive IDs are defined by the following table:

ID	Name	Description
0	NODEV	No Device
1	FAN	Fan
2	PID HEAT	Time Proportioning Heat Output
3	PID COOL	Time Proportioning Cool Output (TH)
4	PID COOL TO/TT	Time Proportioning Cool Output (TO)
5	BOOST HEAT	
6	FULL COOL	
7	ARTIFICIAL LOAD	
8	LOW ART LOAD	
9	HIGH ART LOAD	
10	COMPRESSOR	
11	LOW STAGE COMPRESS	Low Stage Compressor (ON/OFF)
12	HIGH STAGE COMPRESS	High Stage Compressor (ON/OFF)
13	CASCADE	Cascade Condenser
14	VACUUM	PID Output Decreases Pressure
15	VENT/BOOST COOL	PID Output Increases Pressure
16	AMBIENT	Ambient Coil for Cooling in Humidity mode
17	PID HUMIDITY	PID Humidify
18	DEHUMID COIL	PID De-Humidify
19	DRIER	
20	WICKPAN	Humidity Enable
21	MIRRORED OUTPUT	
22	EVENT	Event Output, Event 1 thru 6 And Alarm Relay 1 and 2
23	MULTI FUNCTION	
26	GENERIC HEAT ON/OFF	
27	INPUT RELAY	
28	GENERIC TIMED ON	On Delay
29	GENERIC TWO STATE TP	
30	LOW COMPRESS NO HUM	Not Used
31	INVERSE IO	
32	Copy Input	
33	Inverse Input	
34	PWM (DUAL)	Not Used
36	PWM (MULTI)	PWM Outputs, 8 available
37	On/Off (Thermostatic Output)	16 available
38	Selector	16 available
39	Logic	32 available
42	Latch	16 available

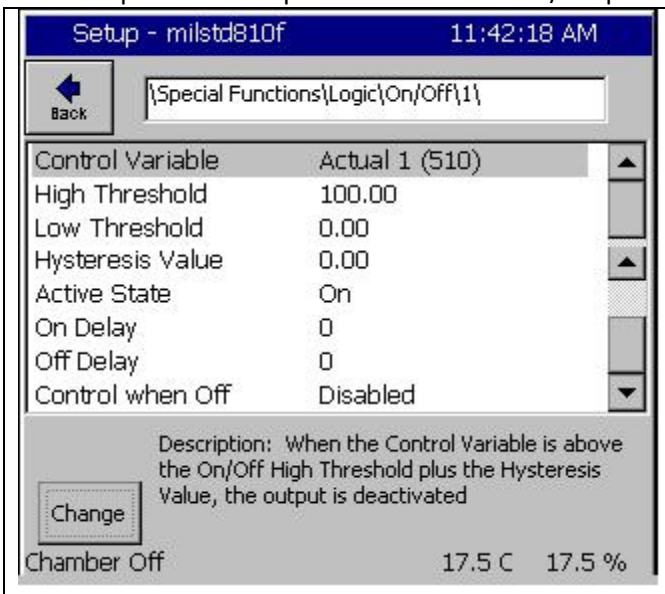
ON/OFF Thermostatic Function

The ON/OFF Thermostatic Primitive (referred to as On/Off primitive below) is full featured two threshold thermostatic output with programmable Activation and De-activation timers. The output is active when the source variable is within the limits defined by the High and Low Engineering Thresholds and the output is not active when the source variable is outside these thresholds. The output value of the primitive in the Active state can be set to On or Off. In addition, hysteresis can be enabled around the switch-points to prevent chatter and Activation and De-Activation Delay timers are individually settable.

The functionality of the On/Off primitive in its simplest form is as follows:

When the Active State parameter is set to On (1)	When the Active State parameter is set to Off (0)
$f(x) = \begin{cases} 0, & x < Low\ Eng.Threshold \\ 0, & x > High\ Eng.Threshold \\ 1, & otherwise \end{cases}$	$f(x) = \begin{cases} 1, & x < Low\ Eng.Threshold \\ 1, & x > High\ Eng.Threshold \\ 0, & otherwise \end{cases}$

The setup folders and parameters for the On/Off primitive are as follows:



Control When Off. When this parameter is Disabled, the output of this Logic function will always be off when the chamber is off. When this parameter is Enabled, this output is still calculated and can be On even if the chamber is Off.

Control Variable parameter defines the Control variable x in the equation above. ONOFF#_SRC

High Threshold parameter defines the high threshold; when the source parameter is above this threshold, the primitive output is inactive. ONOFF#_ENGMAX

Low Threshold parameter defines the Low threshold; when the source parameter is below this threshold, the primitive output is inactive. ONOFF#_ENGMIN

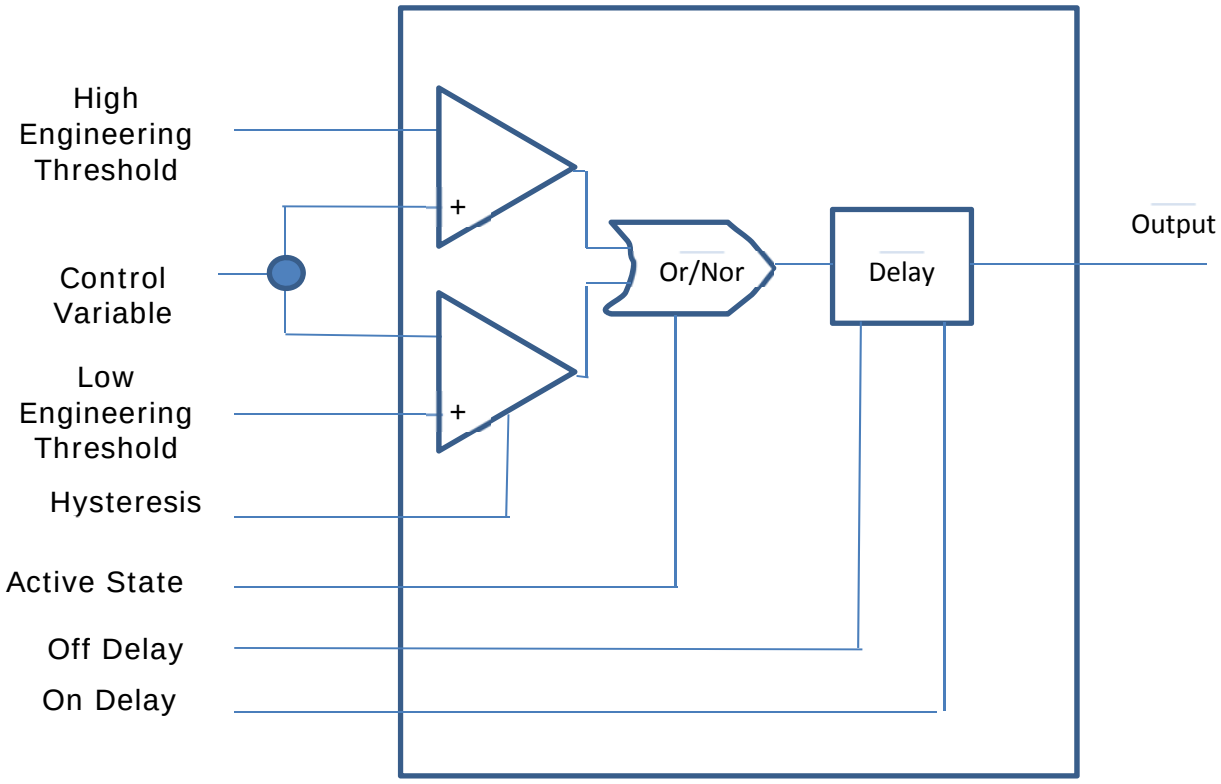
Hysteresis Value Parameter defines the switching Hysteresis. ONOFF#_HYST

Active State Parameter defines value of the output in the active state, On or Off. ONOFF#_ACTST

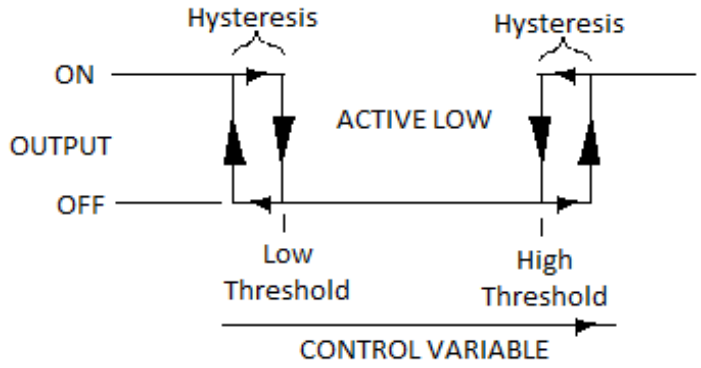
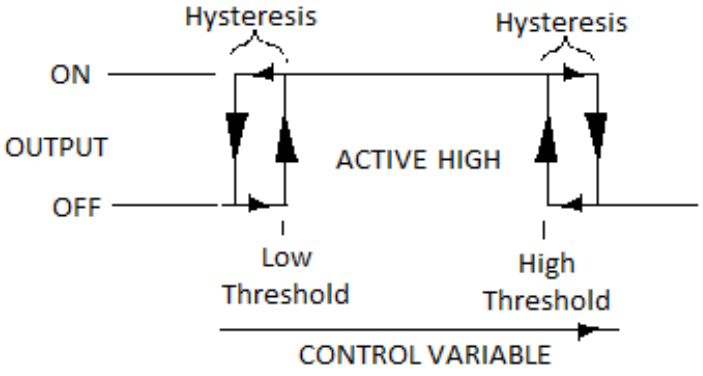
On Delay is the number of seconds of delay before the output state changes after the source parameter gets inside the threshold limits. ONOFF#_ONT

Off Delay is the number of seconds of delay before the output state changes after the source parameter goes outside the threshold limits. ONOFF#_OFFT

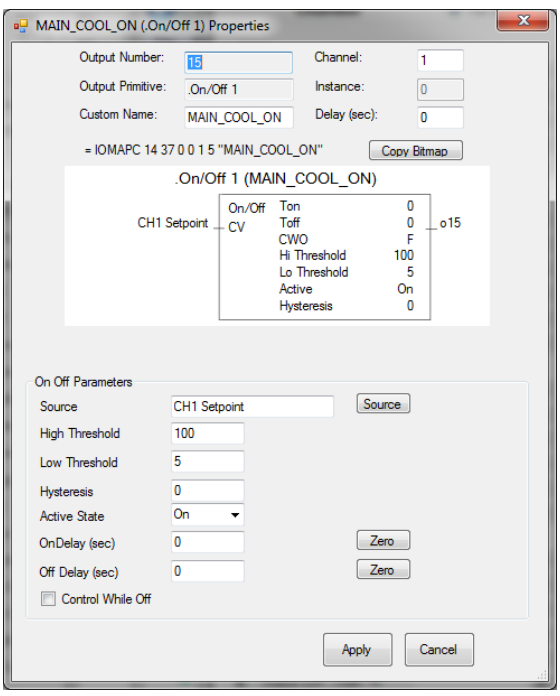
Block Diagram ON/OFF Primitive

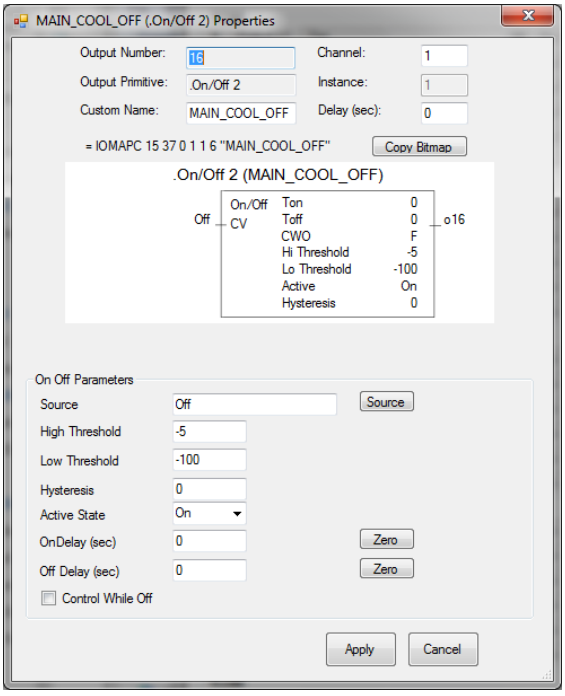


The two diagrams below describe how this function operates graphically.

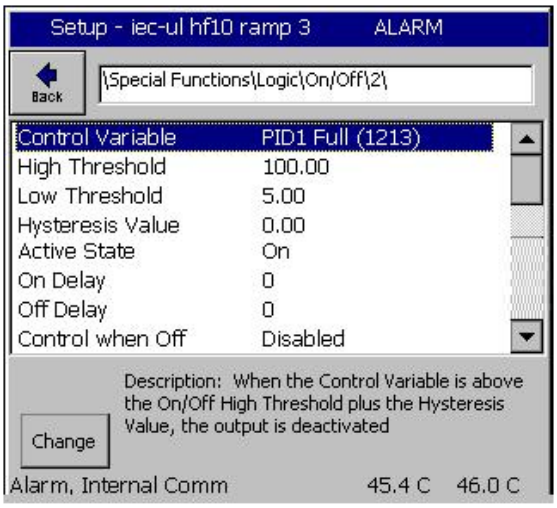
	On/Off Output Active Low
	On/Off Output Active High

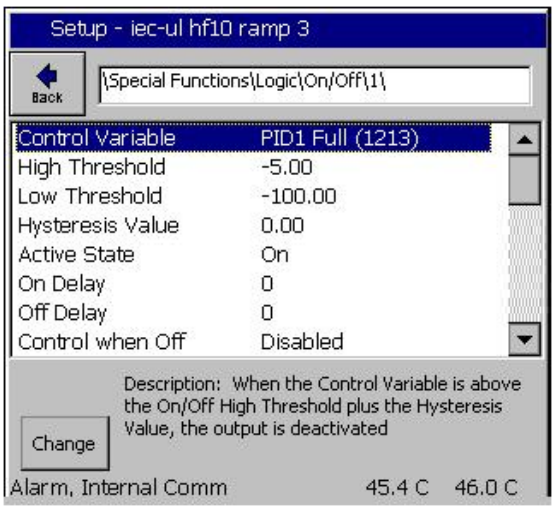
On/OFF Primitive Setup Examples on Synergy Controller CDF Editor



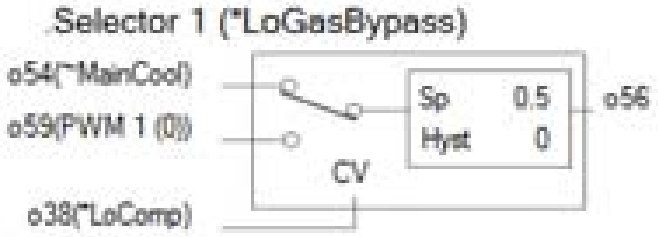


On/OFF Primitives Setup Examples on Synergy Controller Tocuh Screen





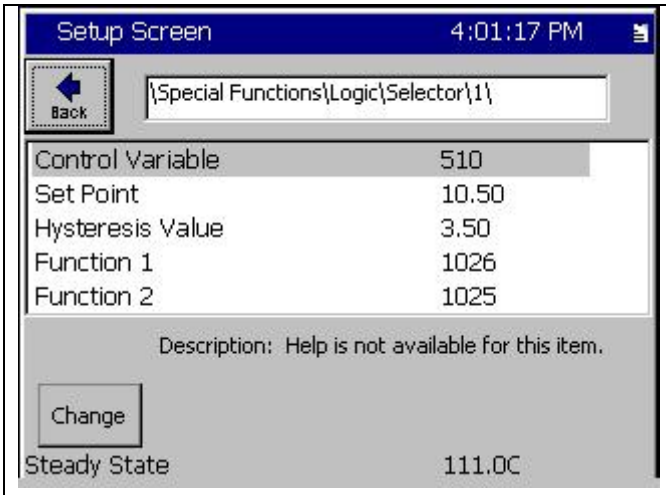
Selector Primitive Function



The Selector Primitive's output selects between two inputs based on the value of the Control Variable. The Function 1 input is copied to the Primitive's output when the value of when the Control Variable is less than the Set point and Function 2 input is copied to the Primitive's output when the Control Variable is less than or equal to the threshold.

The function of this primitive in its simplest form is as follows:

$$f(x) = \begin{cases} Function\ 1, & x > Threshold \\ Function\ 2, & x \leq Threshold \end{cases}$$



Control Variable parameter defines the source variable x in the equation above.
SELECTOR#_SRC

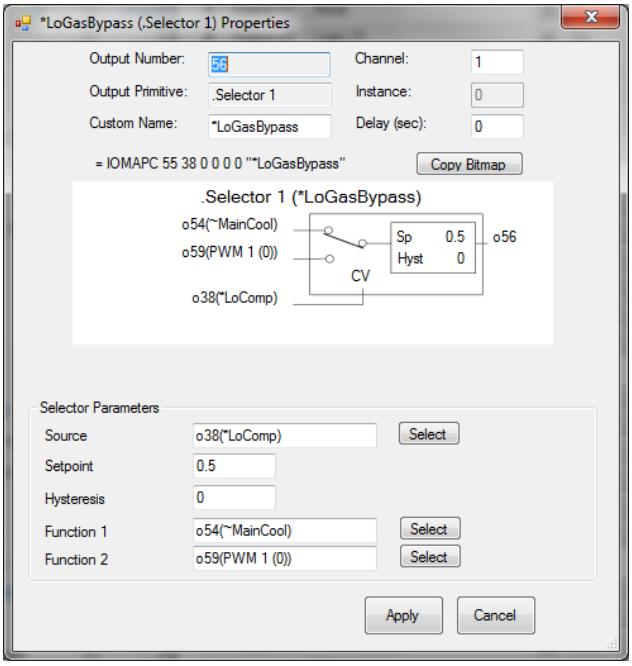
Set Point parameter defines the threshold that the source variable is compared with.
SELECTOR#_SP

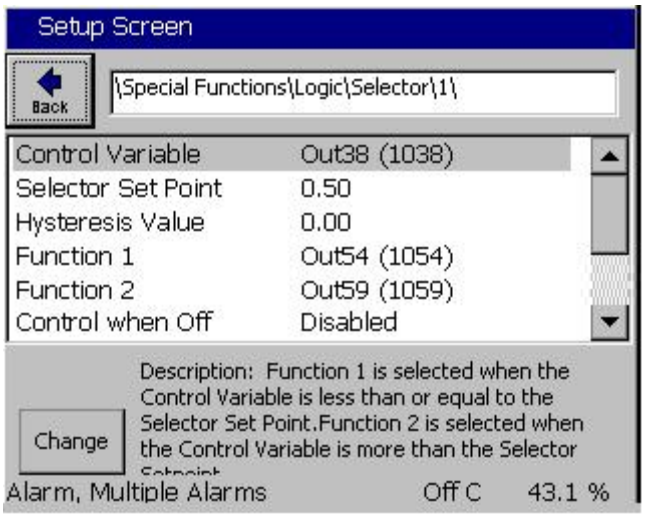
Hysteresis Value Parameter defines the switching Hysteresis
SELECTOR#_HYST

Function 1 parameter is used to select the Function 1 variable.
SELECTOR#_FUNC1

Function 2 parameter is used to select the Function 2 variable.
SELECTOR#_FUNC2

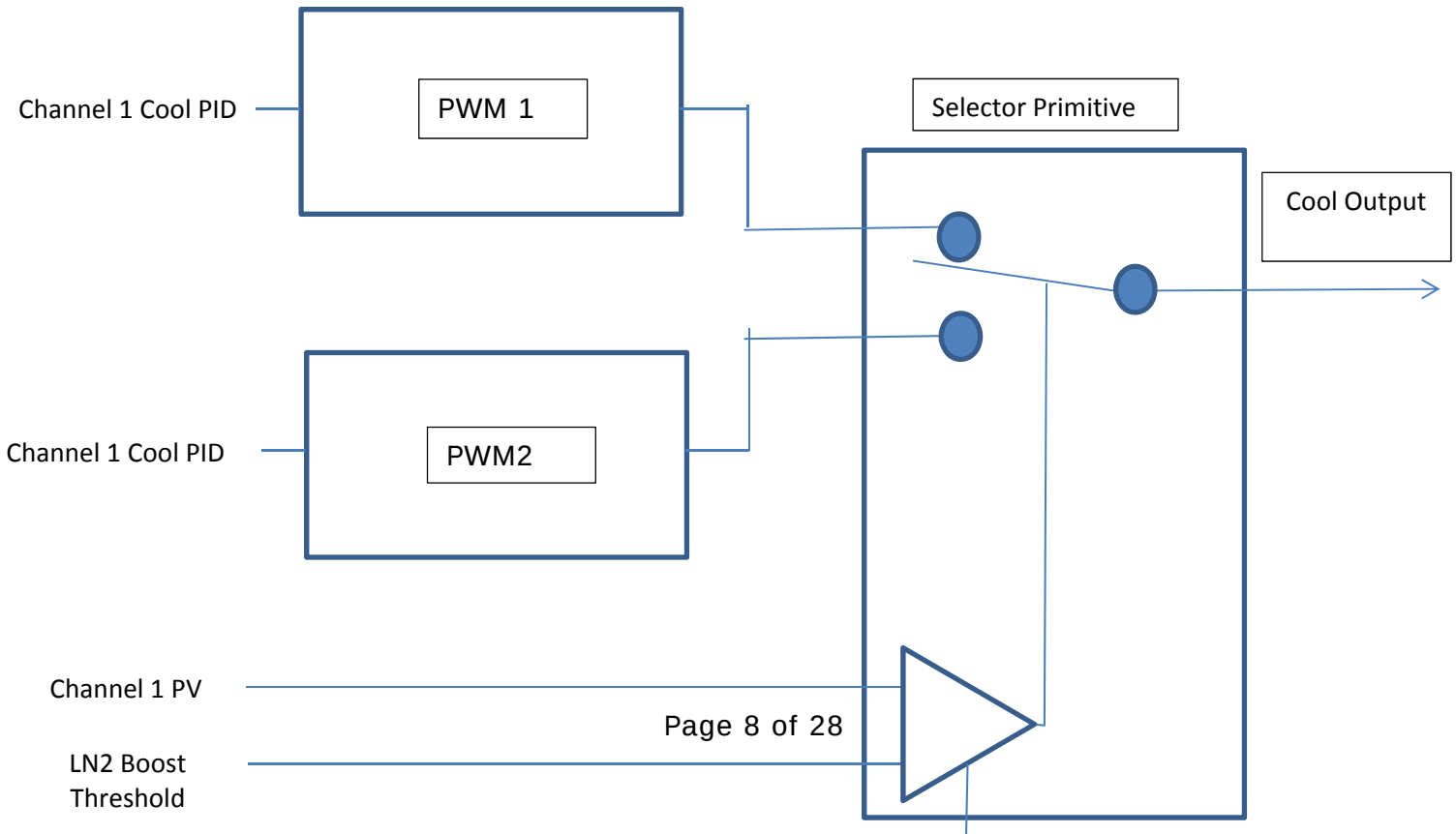
On/OFF Primitives Setup Examples





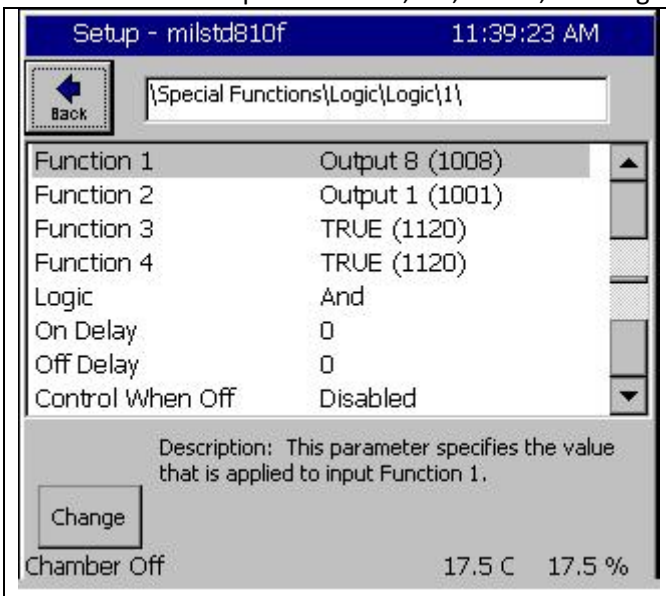
Selector output example

This Output switches between PWM1 and PWM 2 using the Selector Primitive.
PWM1 and PWM2 can be setup for different PV conditions.
The Selector Source variable is set to Actual Channel 1 (PV) and the threshold is setup for the switch temperature.



Logical Primitive Function

These functions implement AND, OR, NAND, NOR logic gates.



Function n Four input functions are selected from a drop-down list.
LOGIC#_FUNCn

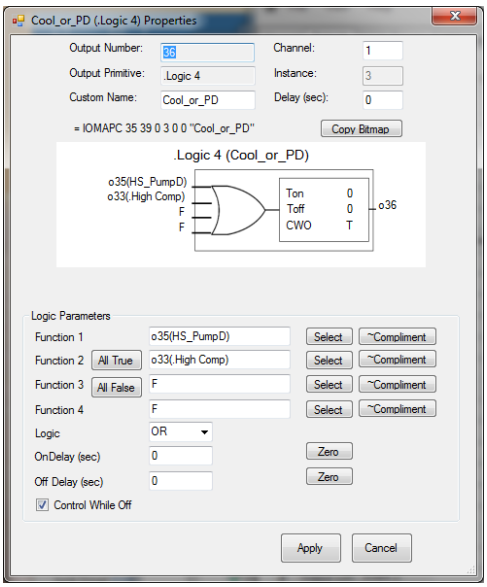
Logic set to AND, OR NAND, NOR.
LOGIC#_TYPE

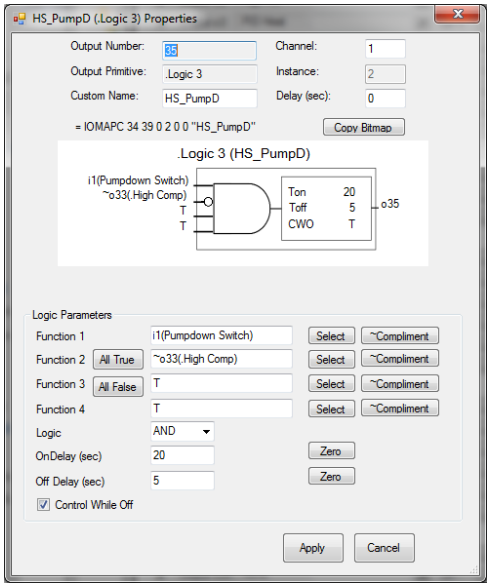
On Delay is the number of seconds of delay before the output state changes after the source parameter gets inside the threshold limits.
LOGIC#_ONT

Off Delay is the number of seconds of delay before the output state changes after the source parameter goes outside the threshold limits.
LOGIC#_OFFT

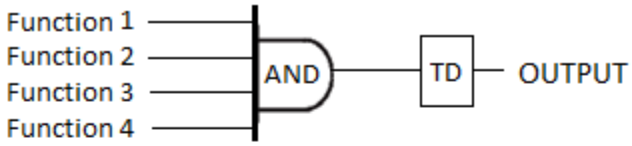
Control When Off. When this parameter is Disabled, the output of this Logic function will always be off when the chamber is off. When this parameter is Enabled, this output is still calculated and can be On even if the chamber is Off.

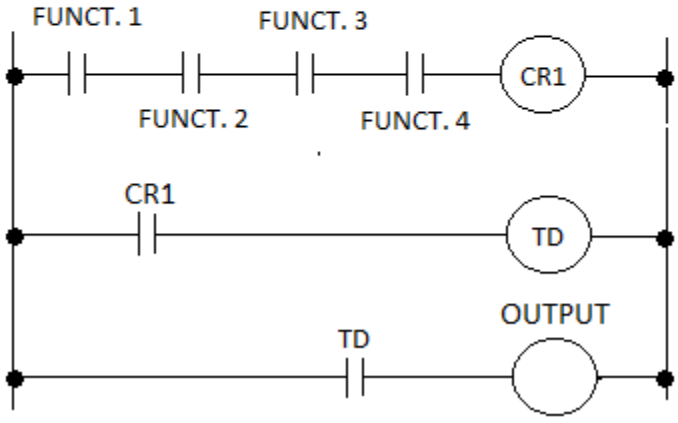
Logic OR and AND Example with equivalent Relay logic



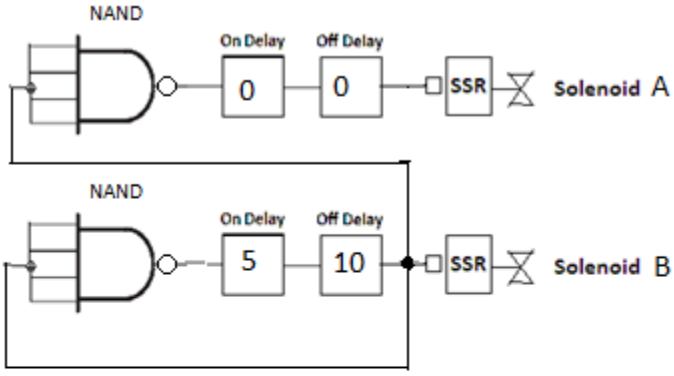


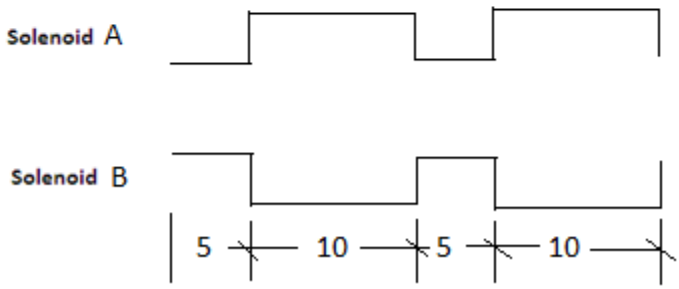
Logic AND Example with equivalent Relay logic





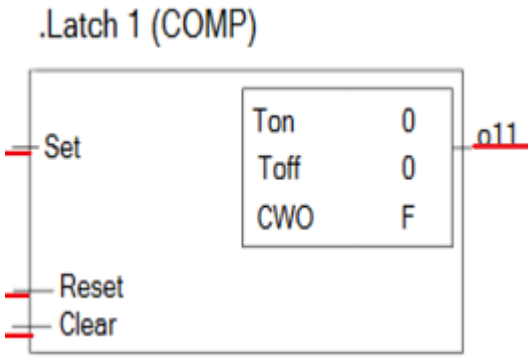
Logic NAND Example for periodic timer function

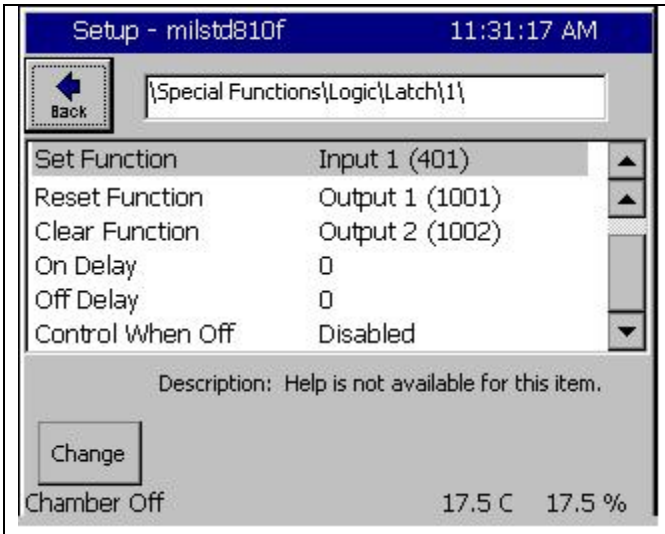




Latch Function

This function implements a Reset-Set (RS) Latch combined with both an On and Off Delay Timer.





Set Function This input turns the latch on unless Reset or Clear Inputs are active.

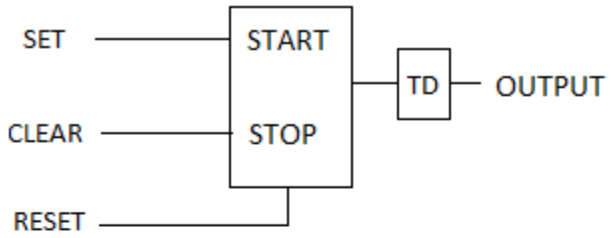
Reset Function This input turns the latch off unconditionally.

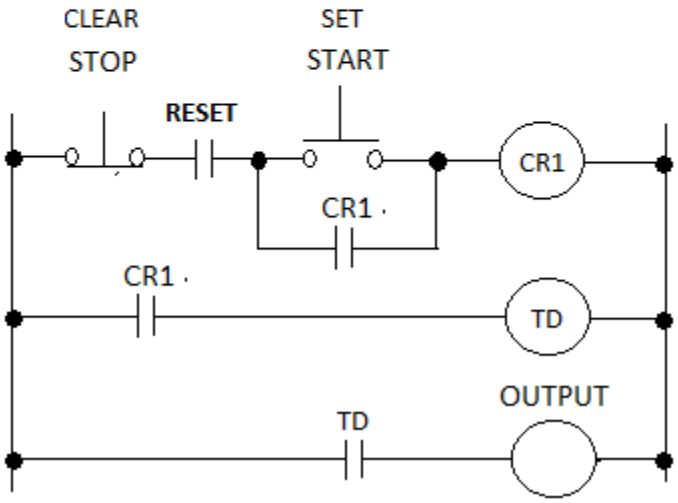
Clear Function This input turns the latch off.

On Delay is the number of seconds of delay before the output state changes after the Latch is set.

Off Delay is the number of seconds of delay before the output state changes after the Latch is cleared.

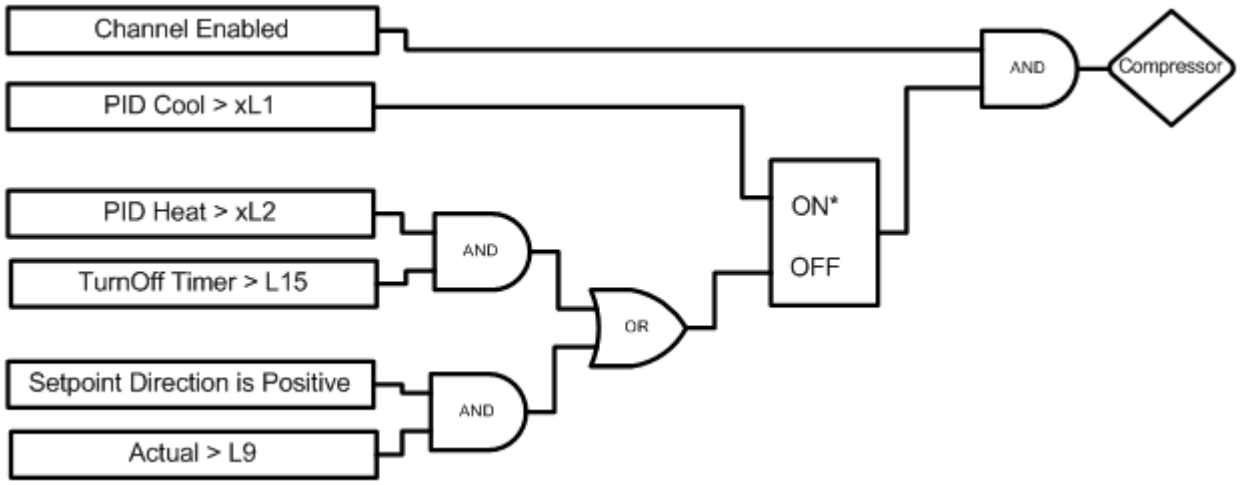
Control When Off. When this parameter is Disabled, the output of this latch will always be off when the chamber is off. When this parameter is Enabled, this output is still calculated and can be On even if the chamber is Off.


SET
START
TD
OUTPUT
CLEAR
STOP
RESET


CLEAR
STOP
SET
START
RESET
CR1
CR1
CR1
TD
OUTPUT
TD

Compressor

This output controls a compressor on Single Stage. (See High Comp. and Low Comp for Cascade Compressors)



Output is On/Off		
Control Parameters	**Default Value:**	**Range:**
xL1 Channel x Main Cooling Turn On	Cooling output required to turn on channel x cooling	
xL2 Channel x Main Cooling Turn Off	Heat output required to turn off channel x main cooling	
L9 Ramp Up Cooling	Temperature at which to turn off the cooling compressor while heating	
L15 Compressor	Delay in minutes required before turning off the compressor	

Notes:
Setpoint direction is Positive only when ramping a setpoint in a profile
* Denotes which signal has priority if both are true

Appendix A Logic Programming Commands

On/Off Primitive Function Commands

Command Noun	Actions	Syntax	Arguments	Examples
ON/Off Function Control Variable	ONOFF#_SRC Set	= ONOFF#_SRC ARG1	# - On/Off Instance 1-8 ARG1: 1-18	= ONOFF1_SRC 8 Set Source to CH1 Cool PID
	ONOFF#_SRC Query	? ONOFF#_SRC	# - On/Off Instance 1-8	? ONOFF1_SRC Response: 8
On/Off Function High Threshold	ONOFF#_ENGMAX Set	= ONOFF#_ENGMAX ARG1	# - On/Off Instance 1 - 8 ARG1: -200 to 5000	= ONOFF7_ENGMAX 30
	ONOFF#_ENGMAX Query	? ONOFF#_ENGMAX	# - On/Off Instance 1 - 8	? ONOFF7_ENGMAX Response: 30
On/Off Function Low Threshold	ONOFF#_ENGMIN Set	= ONOFF#_ENGMIN ARG1	# - On/Off Instance 1 - 8 ARG1: -200 to 5000	= ONOFF7_ENGMIN 10
	ONOFF#_ENGMIN Query	? ONOFF#_ENGMIN	# - On/Off Instance 1 - 8	? ONOFF7_ENGMIN Response: 10
On/Off Function Hysteresis	ONOFF#_HYST Set	= ONOFF#_HYST ARG1	# - On/Off Instance 1 - 8 ARG1: 0 -999	= ONOFF8_HYST 1.5
	ONOFF#_HYST Query	? ONOFF#_HYST	# - On/Off Instance 1 - 8	? ONOFF8_HYST Response: 1.5
On/Off Function Active State	ONOFF#_ACTST Set	= ONOFF#_ ACTST ARG1	# - On/Off Instance 1 - 8 ARG1: 0 - 3600 Seconds	= ONOFF 8_ ACTST 1
	ONOFF#_ ACTST Query	? ONOFF#_ ACTST	# - On/Off Instance 1 - 8	? ONOFF 8_ ACTST Response: 1
On/Off Function Activation (ON) Delay Timer	ONOFF#_ONT Set	= ONOFF#_ONT ARG1	# - Logic Instance 1 - 8 ARG1: 0 - 3600 Seconds	= ONOFF7_ONT 30
	ONOFF#_ONT Query	? ONOFF#_ONT	# - Logic Instance 1 - 8	? ONOFF7_ONT Response: 30
On/Off Function Deactivation (OFF) Delay Timer	ONOFF#_OFFT Set	= ONOFF#_OFFT ARG1	# - Logic Instance 1 - 8 ARG1: 0 - 3600 Seconds	= ONOFF8_OFFT 120
	ONOFF#_OFFT Query	? ONOFF#_OFFT	# - Logic Instance 1 - 8	? ONOFF8_OFFT Response: 120

Logic Primitive Function Commands

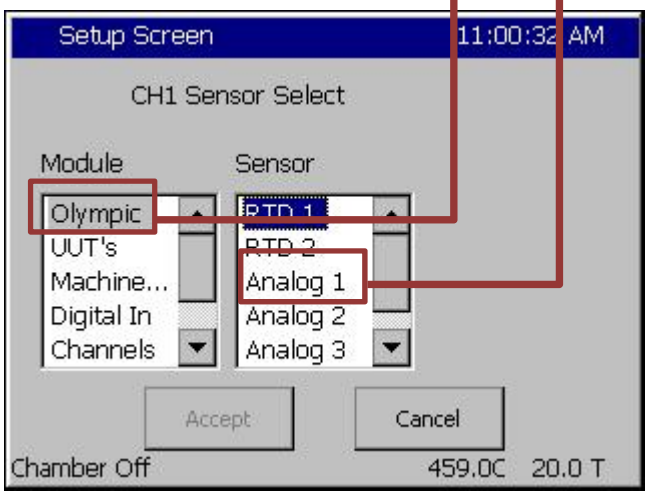
Command Noun	Actions	Syntax	Arguments	Examples
Logic Primitive Input Functions	LOGIC#_FUNCn Set	= LOGIC#_FUNCn ARG1	# - Logic Instance 1-8 n 1-4 ARG1: Seem table below	= LOGIC1_FUNC2 1003 Set Log 1 Function 2 to Output 3
	LOGIC#_FUNCn Query	? LOGIC#_FUNCn	# - Logic Instance 1-8 n 1-4	? LOGIC1_FUNC2 Response: 1003
Logic Primitive Function Type	LOGIC#_TYPE Set	= LOGIC#_TYPE ARG1	# - Logic Instance 1-8 ARG1: 0 - AND 1 - OR 2 - NAND 3 - NOR	= LOGIC1_TYPE 2
	LOGIC#_TYPE Query	? LOGIC#_TYPE	# - Logic Instance 1-8	? LOGIC1_TYPE Response: 2
Logic Primitive Activation (ON) Delay	LOGIC#_ONT Set	= LOGIC#_ONT ARG1	# - Logic Primitive 1 - 8 ARG1: 0 - 3600 Seconds	= LOGIC7_ONT 30
	LOGIC#_ONT Query	? LOGIC#_ONT	# - Logic Primitive 1 - 8	? LOGIC7_ONT Response: 30
Logic Primitive Deactivation (OFF) Delay	LOGIC#_OFFT Set	= LOGIC#_OFFT ARG1	# - Logic Primitive 1 - 8 ARG1: 0 - 3600 Seconds	= LOGIC8_OFFT 120
	LOGIC#_OFFT Query	? LOGIC#_OFFT	# - Logic Primitive 1 - 8	? LOGIC8_OFFT Response: 120

Selector Primitive Function Commands

Command Noun	Actions	Syntax	Arguments	Examples
Selector Primitive Control Variable	SELECTOR#_SRC Set	'= SELECTOR#_SRC ARG1	# - Selector Instance 1-8 ARG1: 110 - 1299	= SELECTOR1_SRC 1211 Set to Channel 1 PID Heat
	SELECTOR#_SRC Query	? SELECTOR#_SRC	# - Selector Instance 1-8	? SELECTOR1_SRC Response: 1211
Selector Primitive Set Point	SELECTOR#_SP Set	= SELECTOR#_SP ARG1	# - Selector Primitive 1 - 8 ARG1: Setpoint, float	= SELECTOR7_SP 30
	SELECTOR#_SP Query	? SELECTOR#_SP	# - Selector Primitive 1 - 8	? SELECTOR7_SP? Response: 30
Selector Primitive Hysteresis	SELECTOR#_HYST Set	= SELECTOR#_HYST ARG1	# - Selector Primitive 1 - 8 ARG1: Hysteresis, float	= SELECTOR8_HYST 120
	SELECTOR#_HYST Query	? SELECTOR#_HYST	# - Selector Primitive 1 - 8	? SELECTOR8_ HYST Response: 120
Selector Primitive Functions	SELECTOR#_FUNCn Set	= SELECTOR#_FUNCn ARG1	**# - Selector Instance 1-8** **n – 1 or 2** ARG1: Function	= SELECTOR1_FUNC1 1025 Set Function 1 to Output 25
	SELECTOR #_FUNCn Query	? SELECTOR#_FUNCn	# - Selector Instance 1-8 n – 1 or 2	? SELECTOR1_FUNC1 Response: 1025

Appendix B Control variables selection from the Sensor Selection screen.

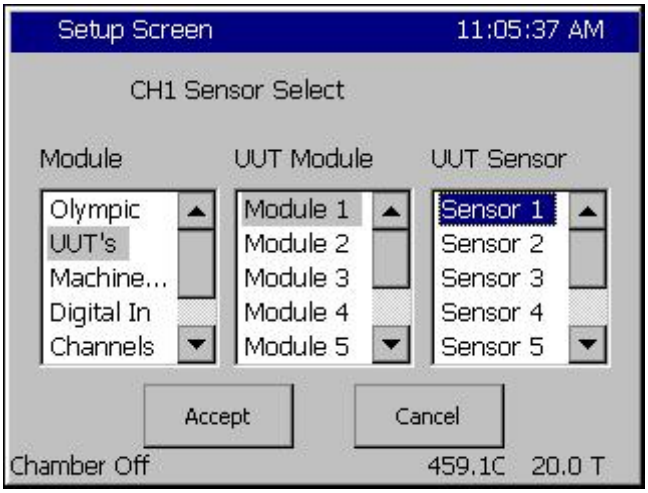
1. Select the Module from the list in the first column.
2. Then select the sensor or the sub-module from the Sensor list.
3. When necessary, select the sensor from the sensor list in third column.



Olympic (High Resolution Inputs)
RTD 1
RTD 2
Analog 1
Analog 2
Analog 3
Analog 4
TC 1*
TC 2*
UUT (Up to 64 T-type T/Cs)
Module 1 Thru 8
Sensor 1 thru Sensor 8
Machine Inputs (Low Resolution Inputs)
Low Res 1 thru 8
Digital Inputs
Dig. In. 1 thru 16
Channels (PV)
Act CH 1 thru Act CH 4
Setpoints (SP)
Setpt CH 1 thru Setpt CH 4
Virtual Sensors
Dual Press.
Wet Bulb/Dry Bulb
Virtual Kft
PIDS
PID CH 1 thru PID CH 4

Note: * Direct Thermocouple Inputs are not available on Synergy Micro 2.

Use the TE1908 Thermocouple Signal Conditioner if thermocouples are required.

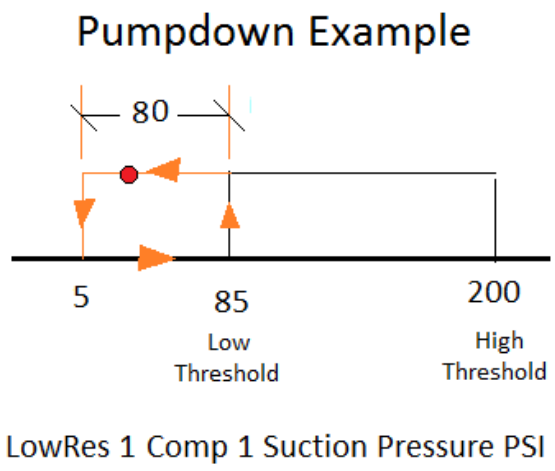


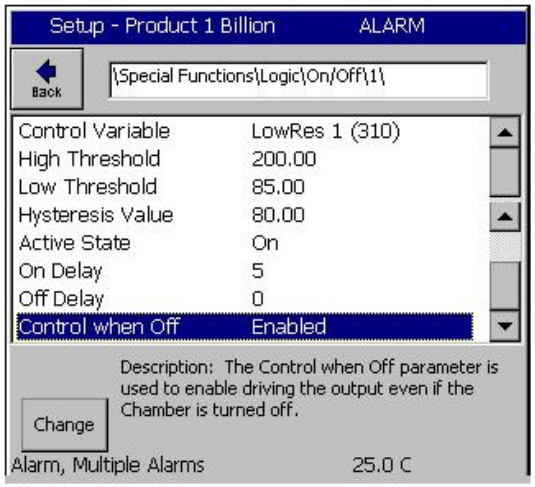
♦ <u>UUT Sensor Selection</u>
To select a sensor from the UUT Thermocouple module, Select UUTs from the Module column, and then select the UUT Module (1 thru 8) and then the Sensor (1 thru 8).

Control Variable IDs

Command Noun	Screen Identifier	Code	Examples
High Res Analog	RTD1,RTD2 Analog1-Analog 4	RTD1=110 RTD2=120 Analog 1=130 Analog 2=140 Analog 3=150 Analog 4=160	RTD1=110 RTD2=120 Analog 1=130 Analog 2=140 Analog 3=150 Analog 4=160
UUT	UUT n	2mn where m is the module and n is the sensor Module 1: 211, 212,..218 Module 2: 221, 222,..228 .. … .. Module 8: 281, 282,..288	UUT Module 2, Sensor 5 is 225 UUT Module 8, Sensor 8 is 288
Low Res Analog	LowRes n	3n0 where m is the input number 310, 320, .. 380	380 is Low Res Analog 8
Digital Inputs	Digital In	400 + n where n is the input number n=1.. 16	416 is Input 16
Actuals Process Variables	Actual n	510, 520, 530, 540	Channel 2 PV is 520 Channel 4 PV is 540
Setpoints	Setpoint n	7n0 where n is the Channel number 710, 720, 730, 540	Setpoint 2 is 720 Setpoint 4 is 740
Digital Outputs	Outputs	1000 + n	1030 is Digital Output 30
Constants	Logic	1110 is False 1120 is True	1110 is False 1120 is True
PIDS	12nx n is the Channel x is the PID type	12nx x = 0 Heat PID x = 1 Cool PID x = 2 Full PID x = 3 Cascade PID	1210 is Chan. 1 Heat 1211 is Chan. 1 Cool 1213 is Chan. 1 Full 1214 is Chan. 1 Cascade 1230 is Chan. 3 Heat 1231 is Chan. 3 Cool 1233 is Chan. 3 Full 1214 is Chan. 1 Cascade
Not Digital Inputs	!Digital In	1400 + n where n is the input number	1405 is Not Digital Input 5
Not Digital Outputs	!Outputs	1300 + n where n is the Output number	1330 is Not Digital Output 30

Appendix C Pump down Example.





In this simple example, the Synergy Controller's On/Off 1 (Thermostatic) primitive is used to signal a pump-down demand.

The Control Variable is set to LowRes 1 which has been connected and calibrated to the Low Side pressure transducer.

The Low and High Thresholds are set to 85 and 200 PSI respectively and the Active State is set to On.

When the pressure goes above the Low threshold, after the 5 second On Delay, the On/Off 1 primitive enters the Active State and its output turns on. Once in the active state, the pressure must drop by 80 PSI (the Hysteresis setting) before the output turns off.

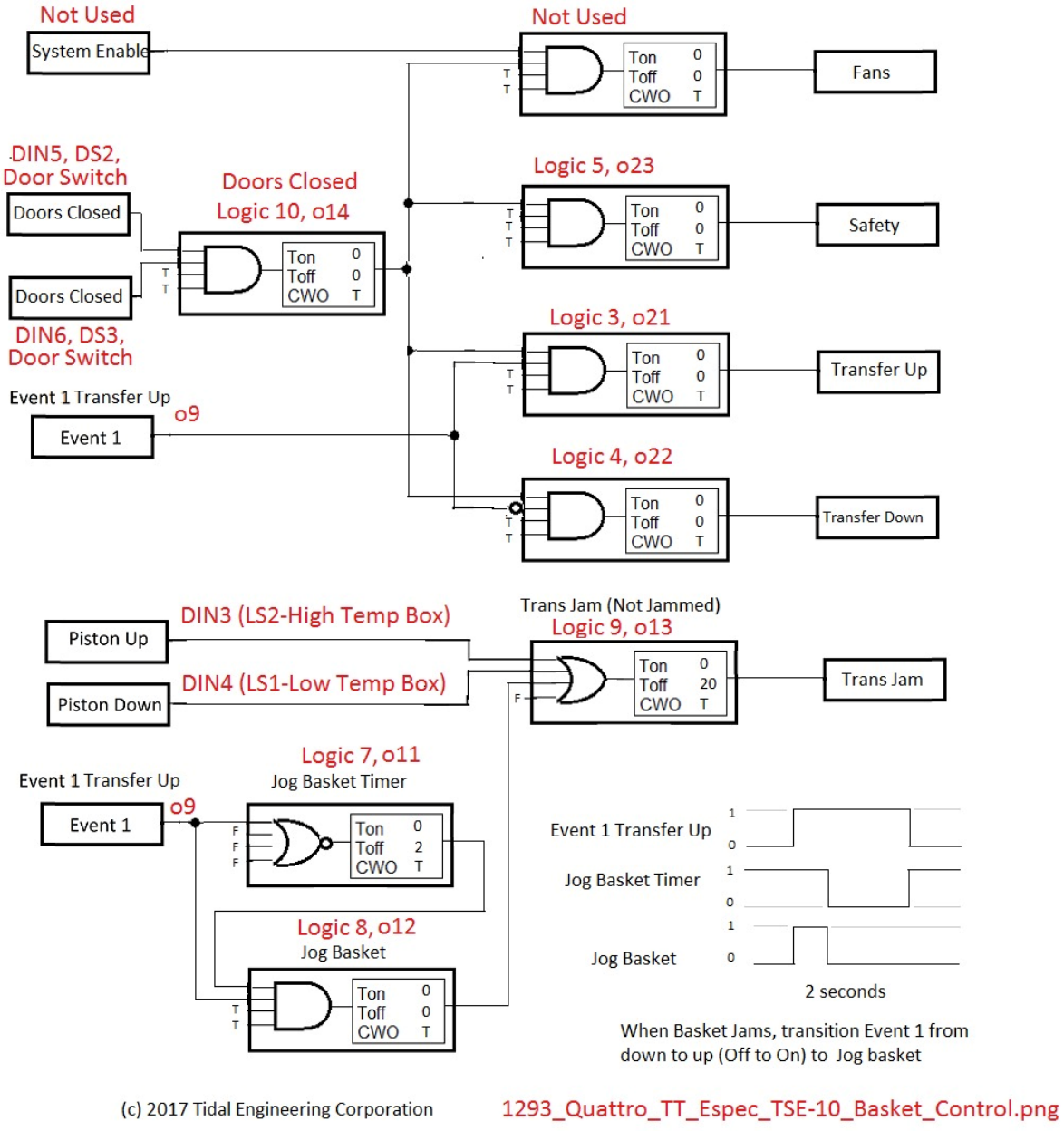
Additional logic is required in an actual implementation to make sure the there are no pressure or other faults that would prevent the compressor from running safely.

The On/Off Primitive is set to "Control when Off" to allow it to control pump down when the chamber is off as required. Note that all the logic associated with the pump-down function must also be set to "Control when Off".

Appendix D Basket Transfer Example.

When the basket transfers in a thermal shock application, the Synergy Controller can time the transfer and generate an alarm if it gets stuck or takes too long.

The logic below handles the Transfer Jam Function and includes a Job Basket input so that the operator can reattempt the transfer



Appendix E Defrost Timer Example.

Compressor On/Off (Energy Saver disabled)
1. Fans run continuously.
2. Any defrosting will be accomplished by a forced off cycle time for the compressor to allow room air to circulate over the evaporator surface and melt any accumulated frost When room temperature increases above the setpoint by a predetermined amount, the liquid refrigerant control valve will be energized. Refrigerant will begin to flow in the system and the compressor will start and continue to run.
3. When room temperature reaches the setpoint, the liquid refrigerant solenoid valve is de-energized, the compressor continues to run until the suction pressure drops to the low-pressure cutout switch setting, at which time
the compressor will shut down.

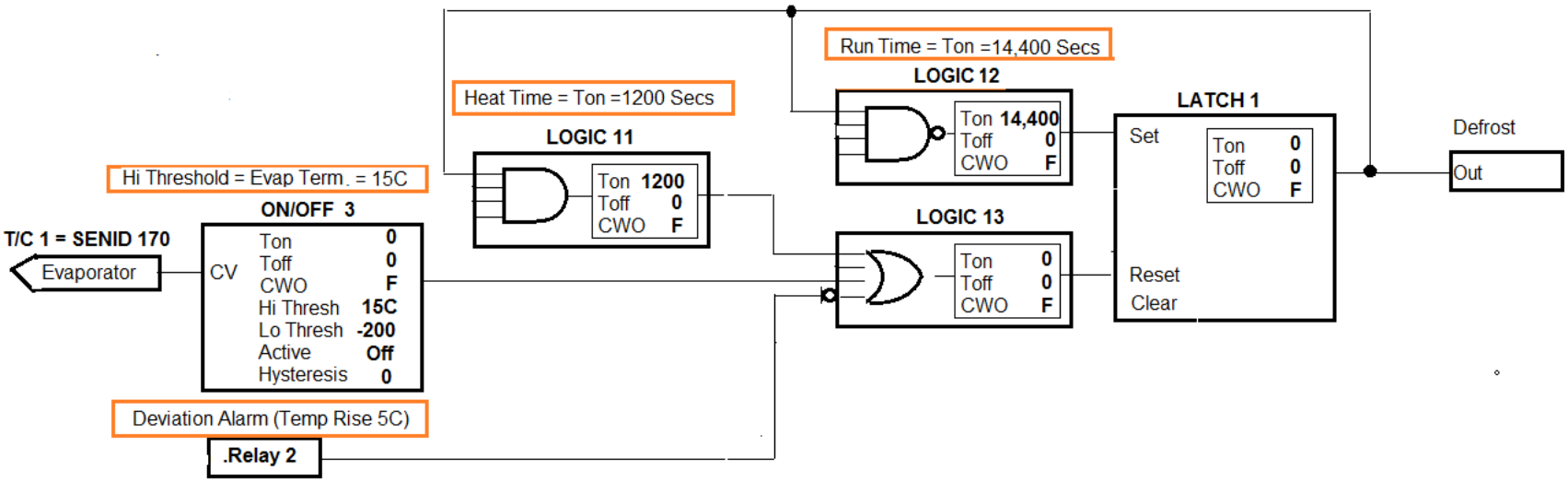
Energy Saver
Cooling system operates as described above for "Compressor On/Off", with the exception being that the defrost method can be any of the selectable options.

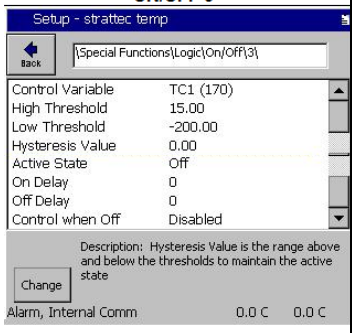
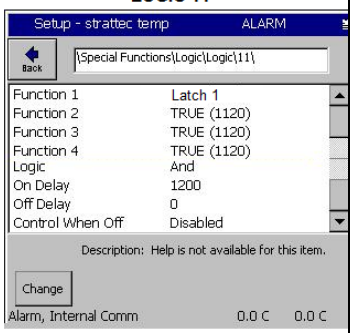
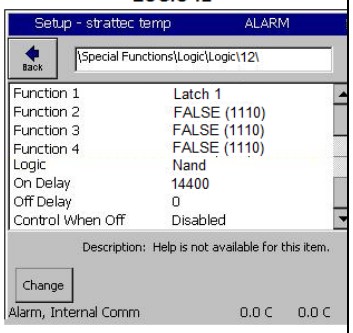
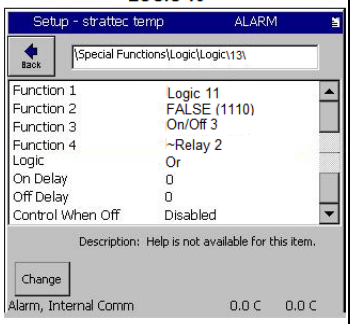
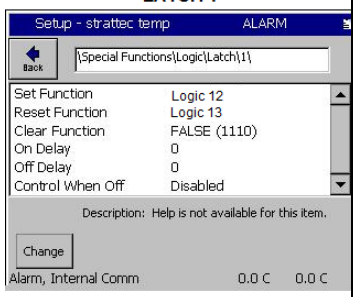
Alternating Hot Gas and Liquid Valves Mode

1. Fans run continuously.
2. The temperature control signal will be set to regulate either the defrost valve (hot gas) or liquid refrigerant flow. When the controller output is on, the selected valve is open, and the other valve is closed. When the output is off, the valves both reverse their previous position.
3. Defrost can be any of the available methods.

Defrost- Hot Gas
1. Fans will be off during defrost.
2. The defrost or hot gas bypass valve will be energized, allowing discharge gas to flow directly into the evaporator. 3. Liquid refrigerant valve is deenergized.
4. When the evaporator temperature increases to its termination setting, the defrost valve is closed and valve control returns to the normal scheme.
5. Fans will energize when the evaporator is cooled to the fan cut-in temperature, or a time delay elapses. The fan
controlling event is determined by the system setup.

6. Three additional events can terminate the defrost cycle.
a. An increase in the room temperature equal to the maximum allowable defrost temperature rise will terminate the
heating portion of the defrost cycle.
b. If the operator touches the DEFROST button on the Show Text screen.
c. the system stays in defrost for the maximum allowable time, the cycle will also terminate.

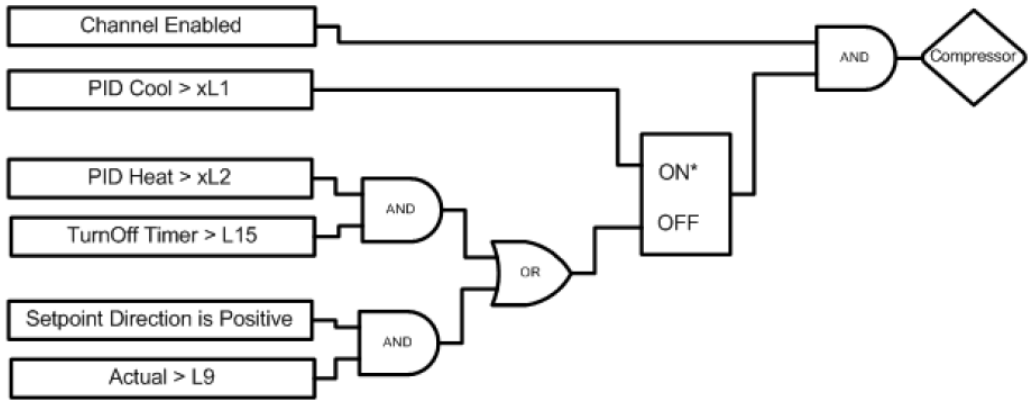


ON/OFF 3	LOGIC 11	LOGIC 12	LOGIC 13	LATCH 1
				
		Logic 12 is used to time the Defrost interval, the Run Time. When the Defrost Output is off the timer runs until 14,400 seconds elapses then the output turns on to set the Defrost Latch 1 On.		

Appendix F Built-In Compressor Logic

The Standard Compressor Logic is a High-Level Compressor algorithm that provides Hysteresis, Compressor Time Out, and Short Cycle Protection. It also aggregates Temperature Channel and Cooling Humidity Channel demand for systems that use Refrigeration for Dehumidification

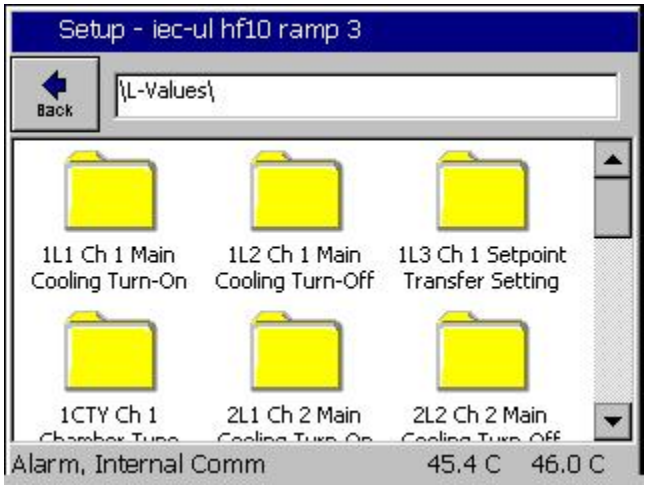
This output turns on a compressor.



Output is On/Off		
Control Parameters	**Default Value:**	**Range:**
xL1 Channel x Main Cooling Turn On	Cooling output required to turn on channel x cooling	
xL2 Channel x Main Cooling Turn Off	Heat output required to turn off channel x main cooling	
L9 Ramp Up Cooling	Temperature at which to turn off the cooling compressor while heating	
L15 Compressor	Delay in minutes required before turning off the compressor	

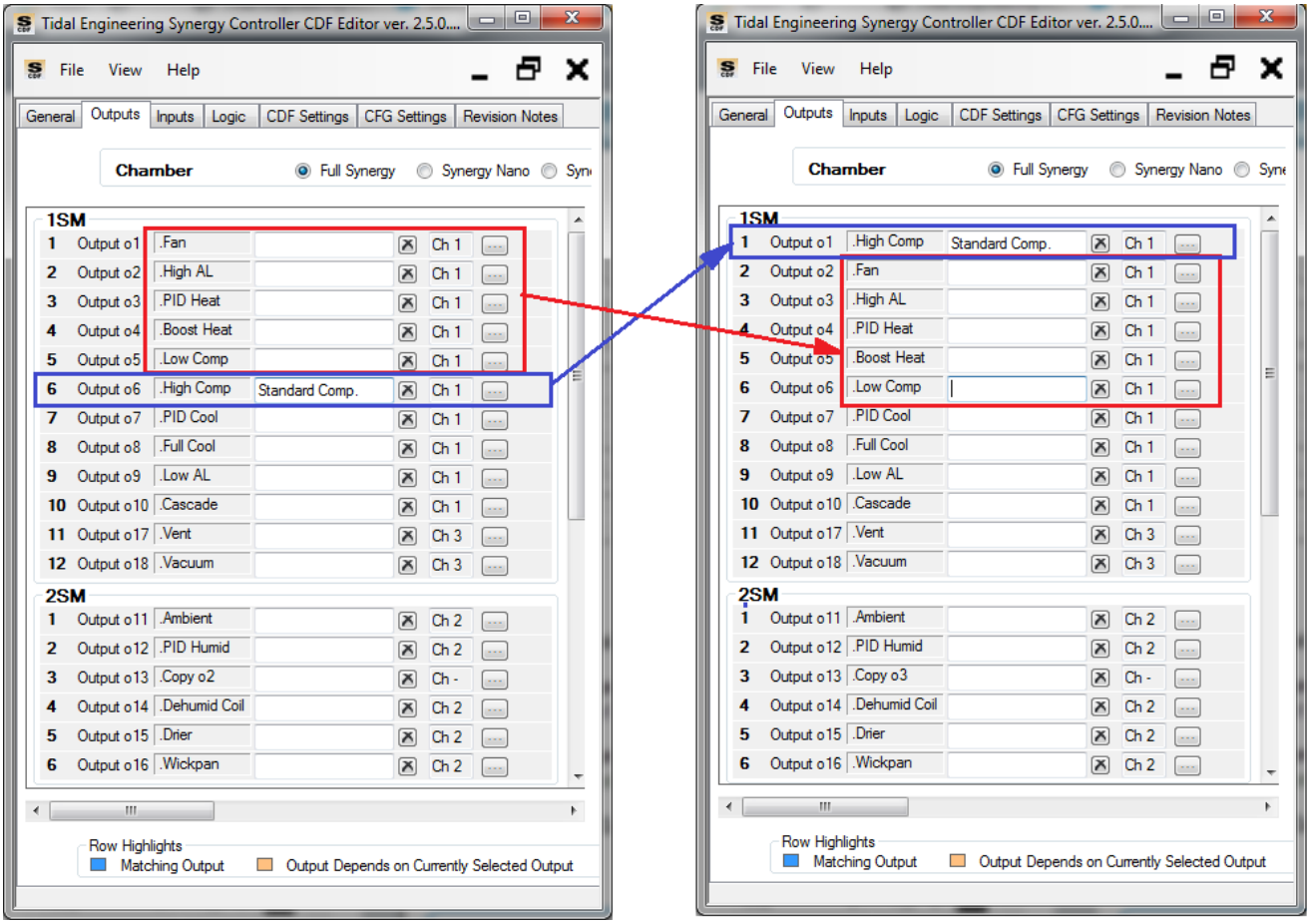
Notes:
Setpoint direction is Positive only when ramping a setpoint in a profile
* Denotes which signal has priority if both are true

Control Parameters are accessed for the SETUP\L-Values Folder as shown below.



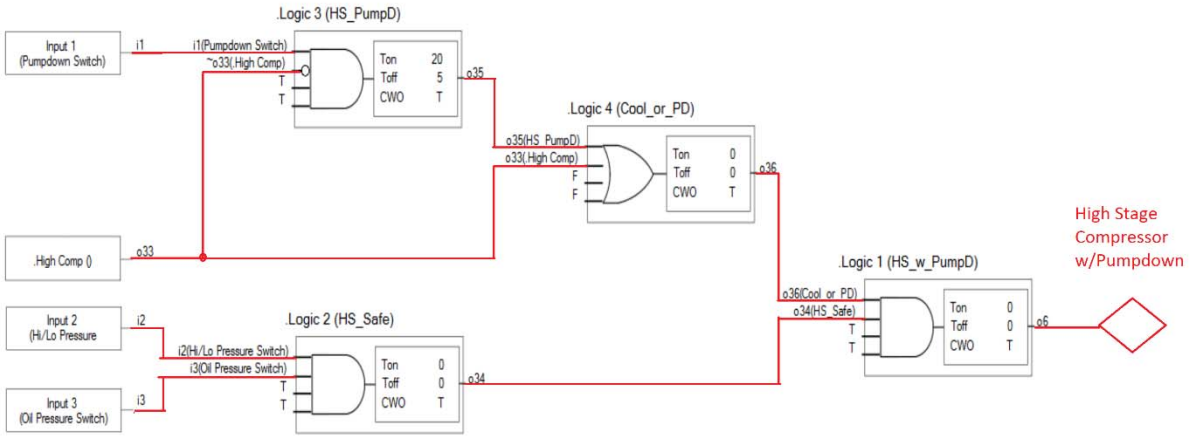
Appendix F Built-In Compressor Logic (continued)

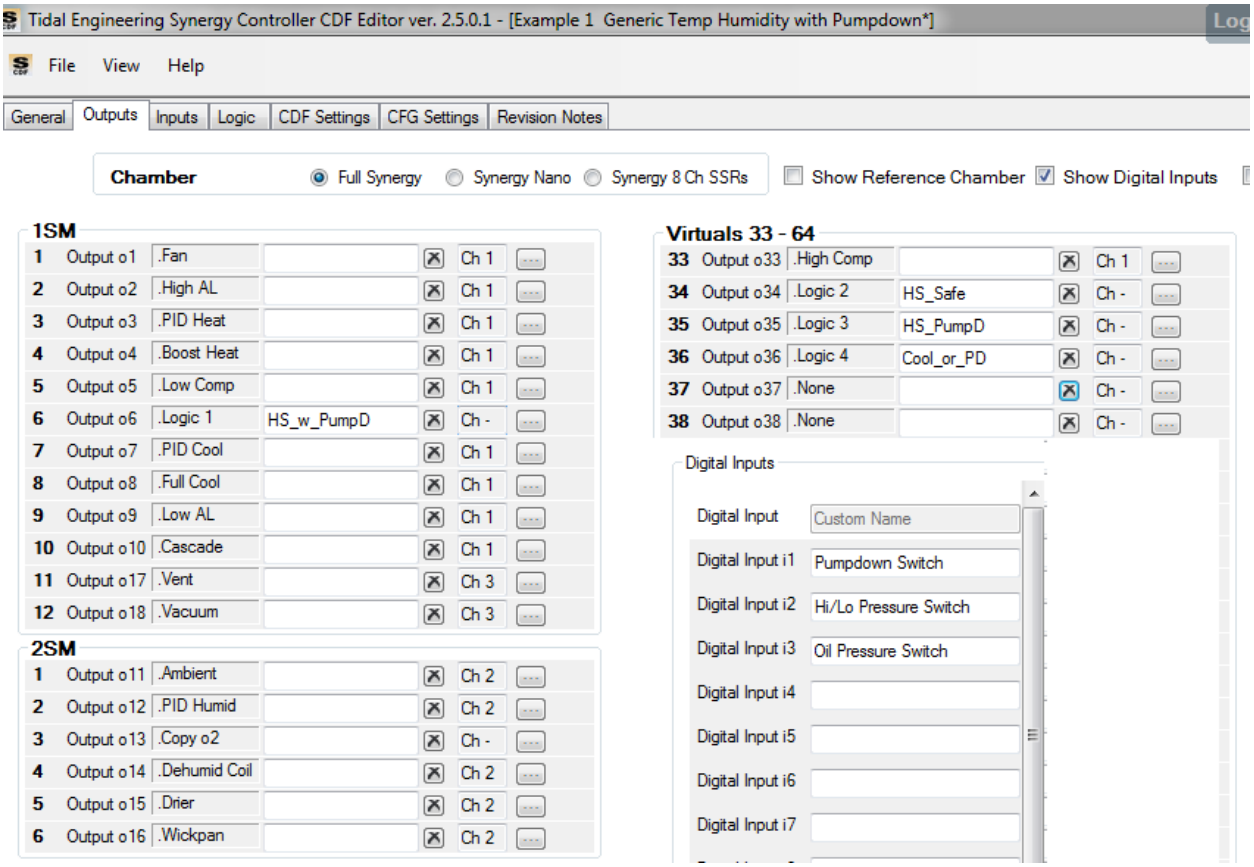
High-Level compressor Logic primitives can be rearranged on the controller's outputs as required using the Synergy Controller Chamber Definition Editor Program as shown below.



Appendix G Built-in Compressor Logic with Customized Pump down Feature

In the example below, the Standard Compressor Logic is enhanced with the Pump down Feature. The Pump down Feature utilizes a Pump down Pressure switch and two Compressor Fault Pressure switches.

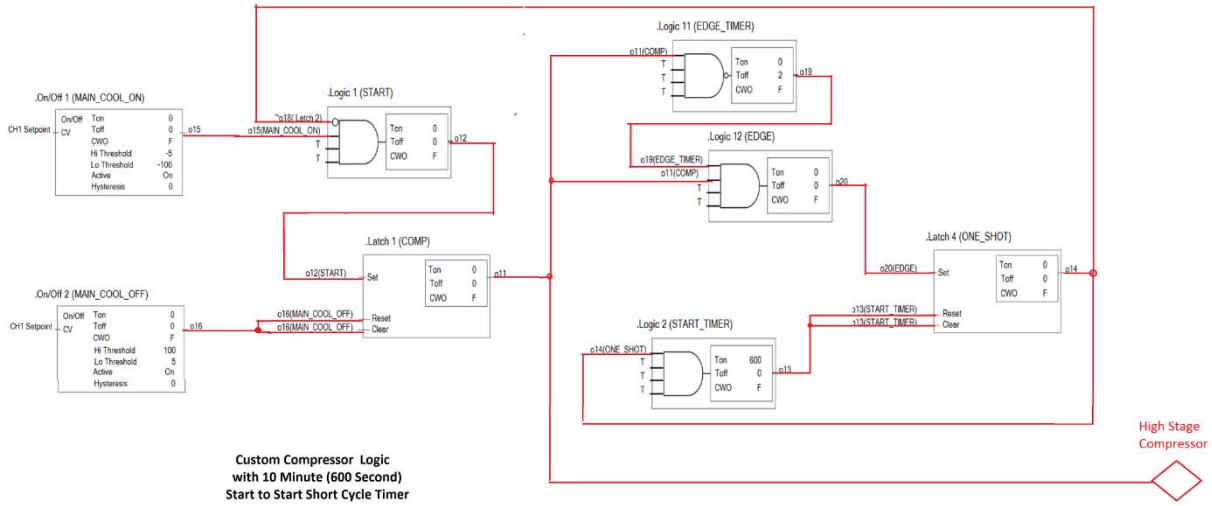




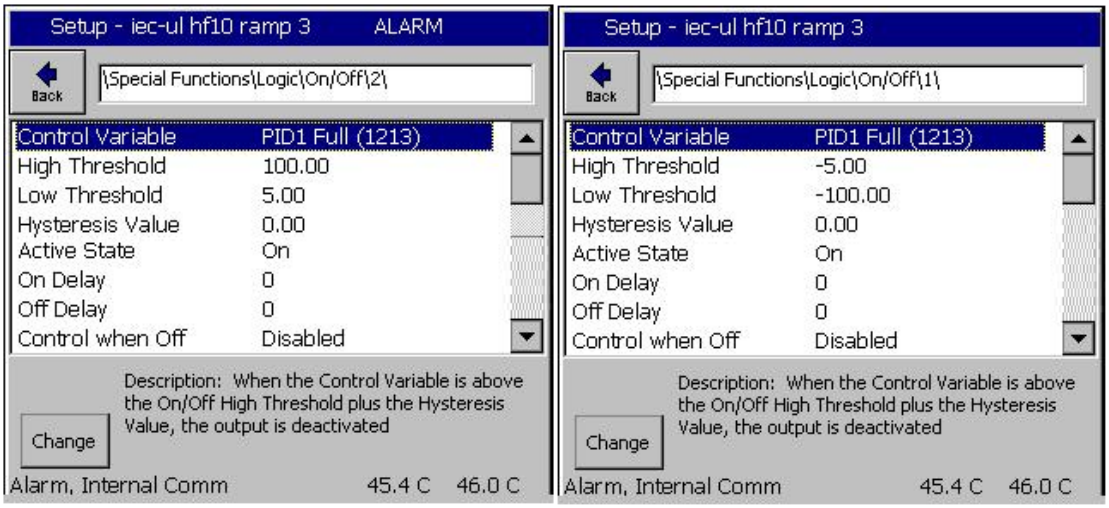
Appendix H Full Custom Compressor Logic

with 10 Minute Start to Start Short Cycle Timing

In the example below, the custom Compressor Logic is built to provide 10 Minute Start-Start Short Cycle Timing. This Logic Diagram shows the Logic Diagram for the implementation

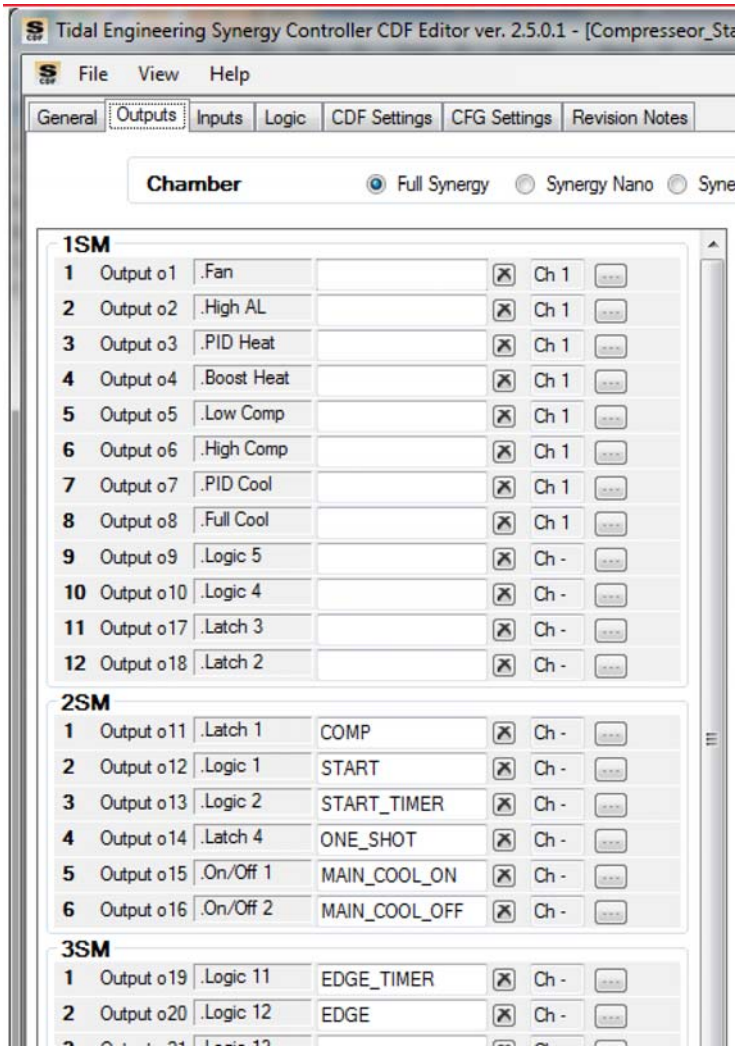


Custom Compressor Logic with 10 Minute (600 Second) Start to Start Short Cycle Timer



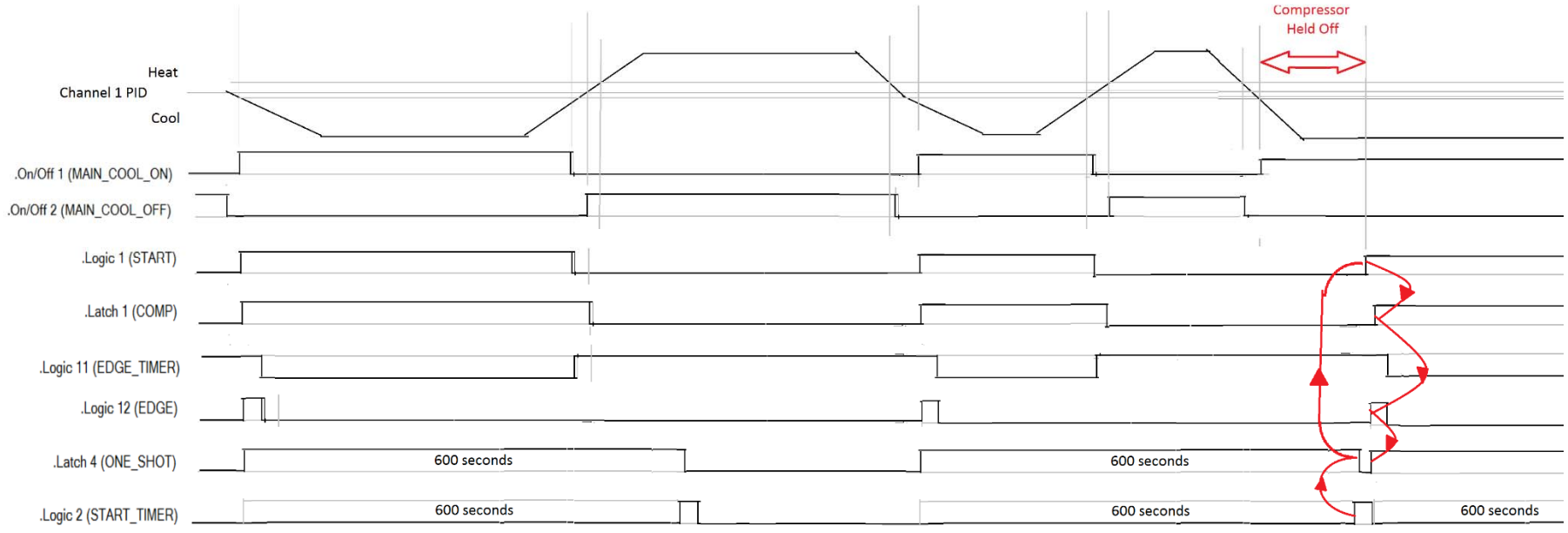
Appendix H Full Custom Compressor Logic (Continued)

This Synergy Controller CDF Editor Screenshot shows the Layout of the Outputs and Logic for this Full Custom compressor logic



Appendix H Full Custom Compressor Logic (Continued)

This Timing Diagram shows the operation of this Full-Customer custom compressor logic implementation.



About the Synergy Controller Family
Tidal Engineering's Synergy Controllers; the Synergy Micro 2, Synergy Quattro, and the ¼ DIN Synergy Nano provide state-of-the-art usability and connectivity for environmental test control and data acquisition and combine the functions of a chamber controller and a data logger and are designed to improve test efficiency by supporting both factory automation and test and measurement protocols and standards.

Synergy Controller feature highlights includes:

- ➔ Color touch screen
- ➔ Ethernet, RS-232 and GPIB communications
- ➔ Built in 100 MB Data logger with USB drive support
- ➔ Data Acquisition, up to 64 T-type thermocouples (Optional)
- ➔ Built-in Web Server for remote control; WebTouch Remote ™
- ➔ Compatible with Synergy Manager for PC based control, monitoring and programming.
- ➔ Built-in FTP Server for factory automation and test and measurement applications

For more information regarding these controllers please visit http://www.tidaleng.com/synergy.htm

About Tidal Engineering
Headquartered in Randolph, NJ, Tidal Engineering Corporation has been designing and building award-winning embedded hardware and software for test and measurement and data acquisition applications since 1992. The company is recognized for technical expertise in such areas as Embedded IEEE 488, and turnkey SCADA (Supervisory Control and Data Acquisition) systems.

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