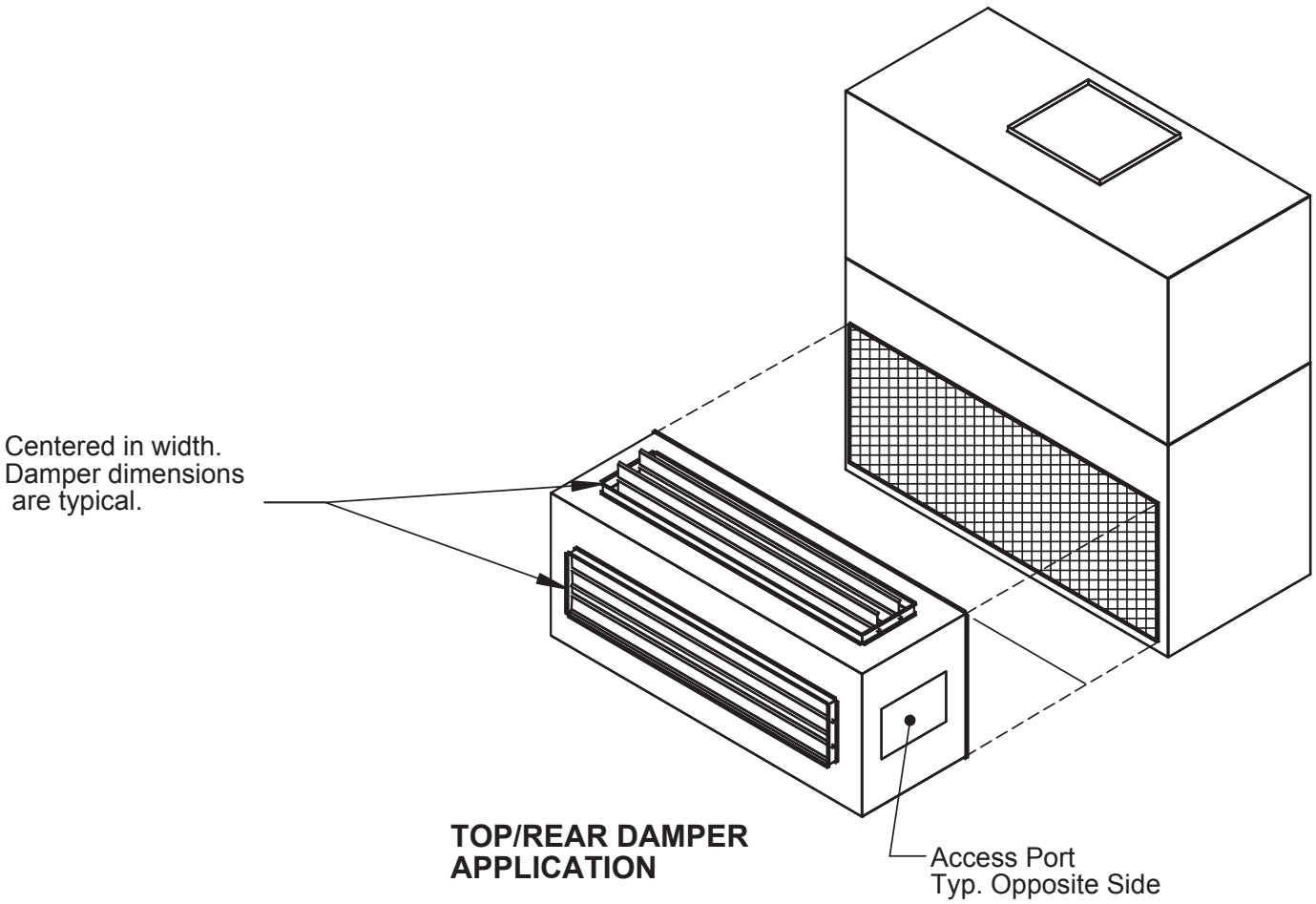
Mixing Box Wiring Diagrams for Split System Evaporative Blowers

Before Starting Installation

Warning
Shut power to unit prior to any work being done. Personal injury or death could result.
Only qualified HVAC service personnel should install, troubleshoot, repair or service HVAC and related HVAC equipment.

PARTS INCLUDED	QTY.
#12 x 3/4" Screw	1 Set

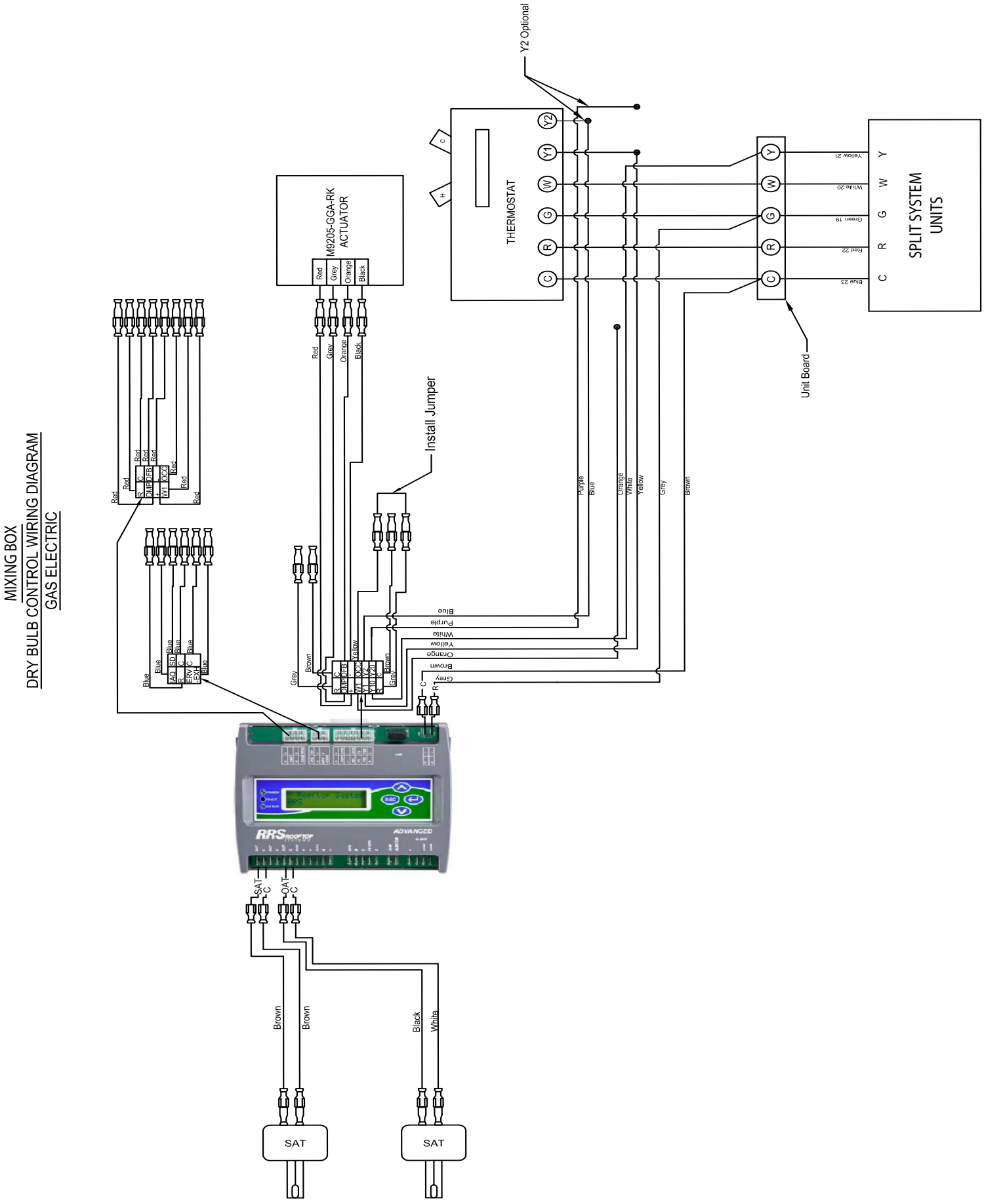
ILL. 1



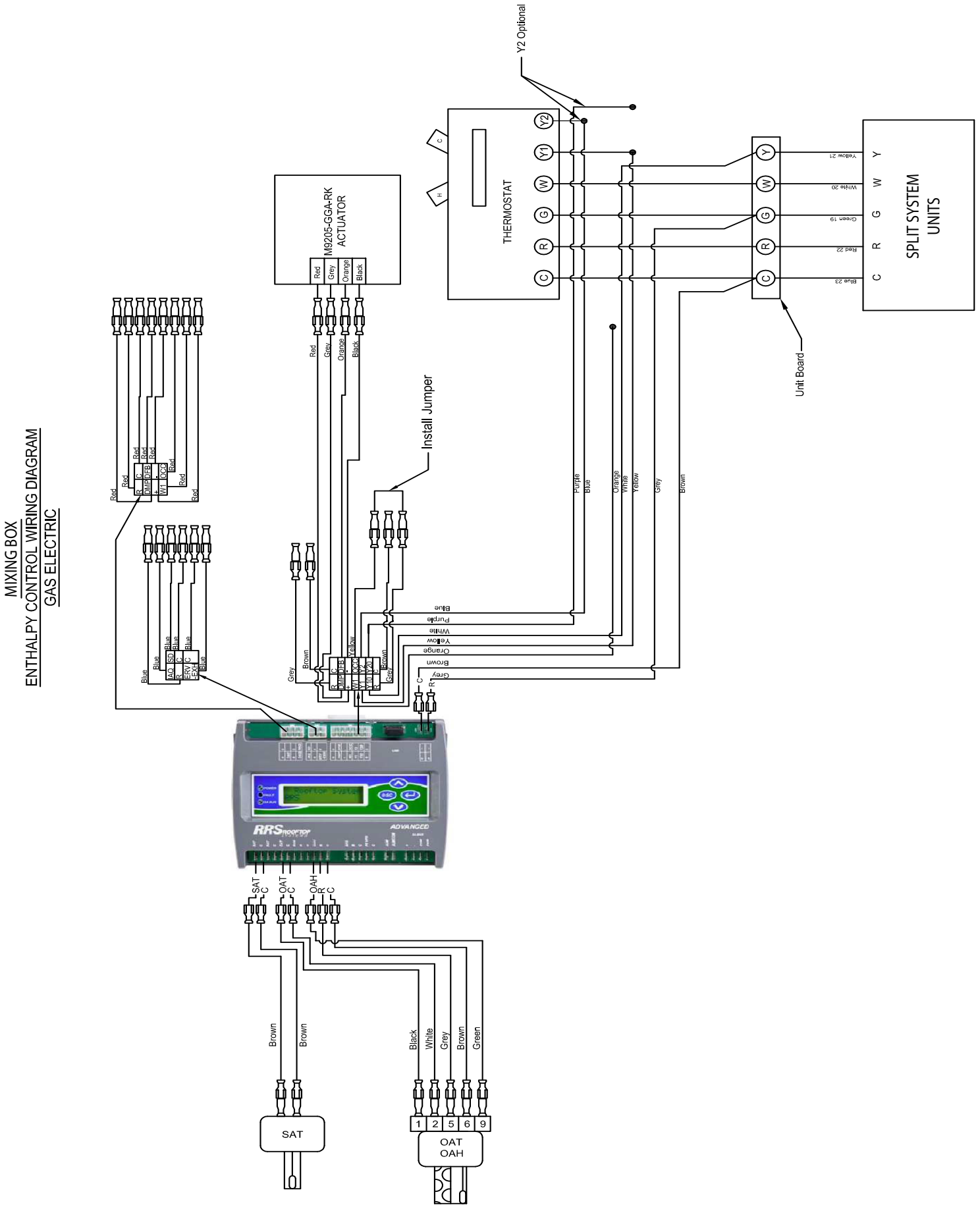
TOP/REAR DAMPER APPLICATION

3847 WABASH DRIVE
MIRA LOMA, CA 91752
Ph: (951) 685-1101 Fax: (619) 872-9799

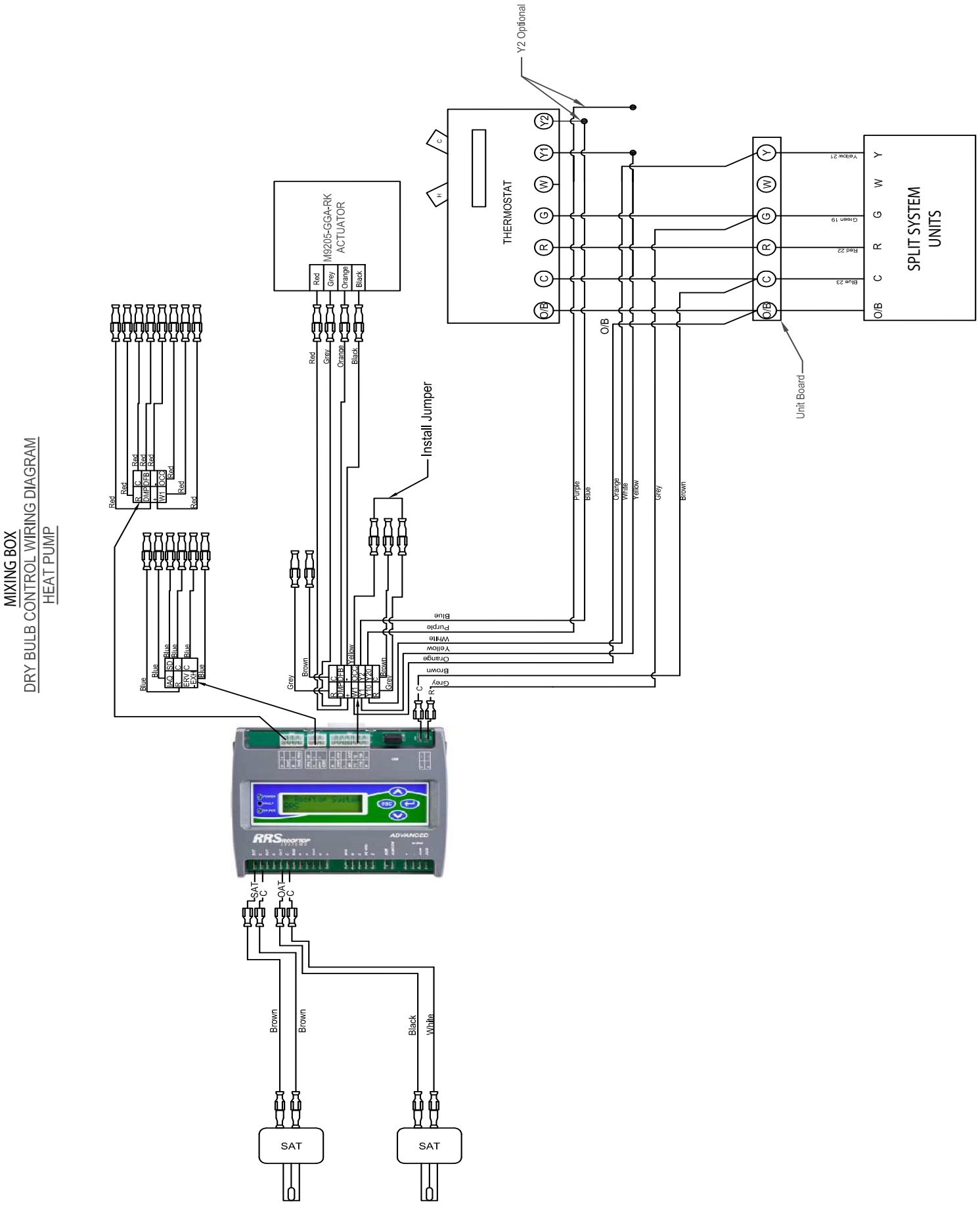
ILL. 2
Control Wiring Diagram



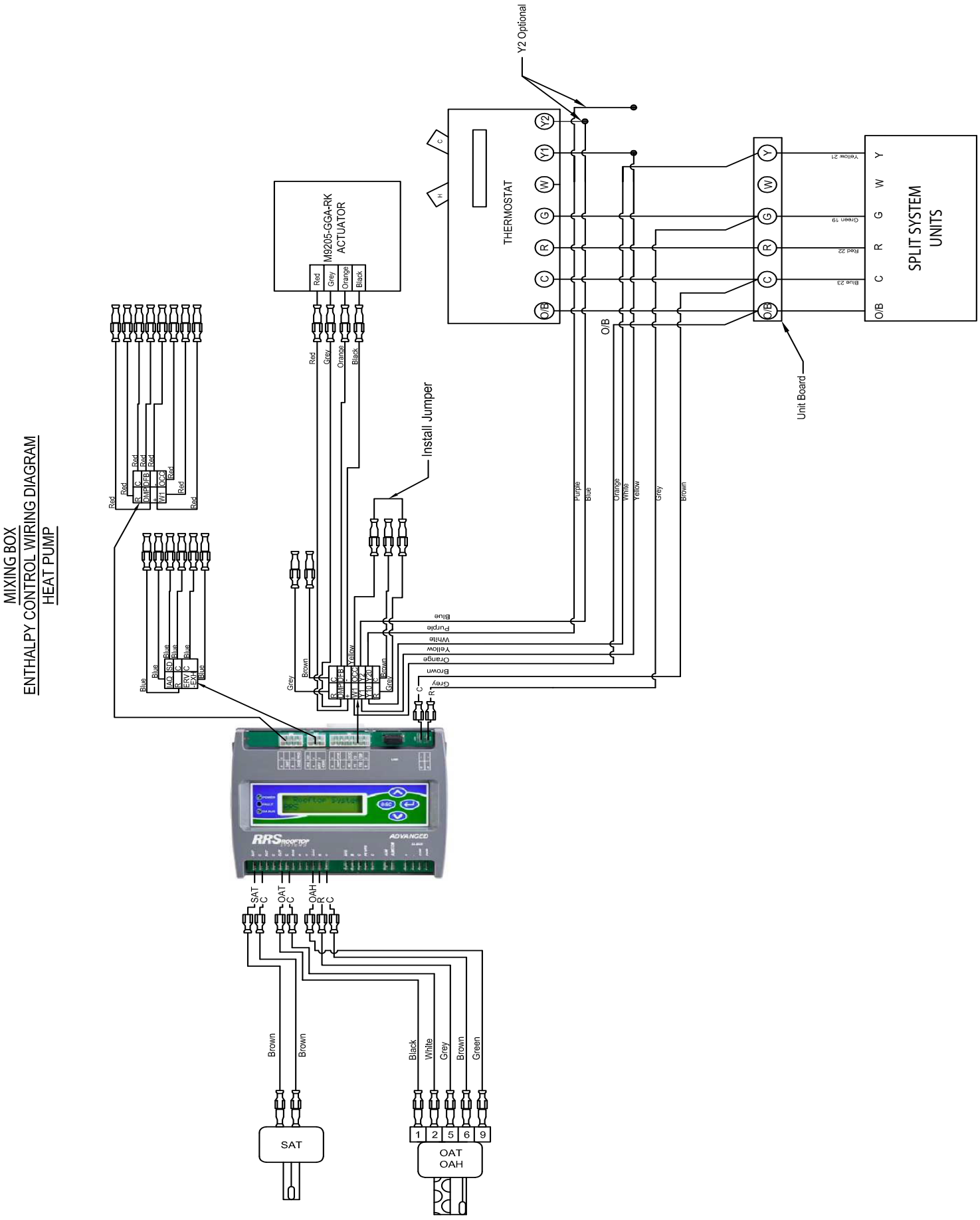
ILL. 3
Control Wiring Diagram



ILL. 4
Control Wiring Diagram



ILL. 5
Control Wiring Diagram



Ruskin Rooftop Systems (RRS) Economizer Quick Start Installation Instructions

RK-ECO1001-0, RK-ECO1011-0

Refer to the QuickLIT website for the most up-to-date version of this document.

Overview of Field Installation and Controller Configuration

To set up your RRS Economizer, perform the following:

- Install Economizer assembly with the included installation instructions.
- Install additional sensors. The factory installs the damper actuator and outdoor air sensor. You must field-install any other sensors and output connections.
- Configure the RRS Economizer Controller using the:
  - Local Display
  - Mobile Access Portal (MAP) Gateway (on Advanced model only)
- Run Self-Test to verify proper operation.

North American Emissions Compliance

United States

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Canada

This Class (B) digital apparatus meets all the requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la Classe (B) respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

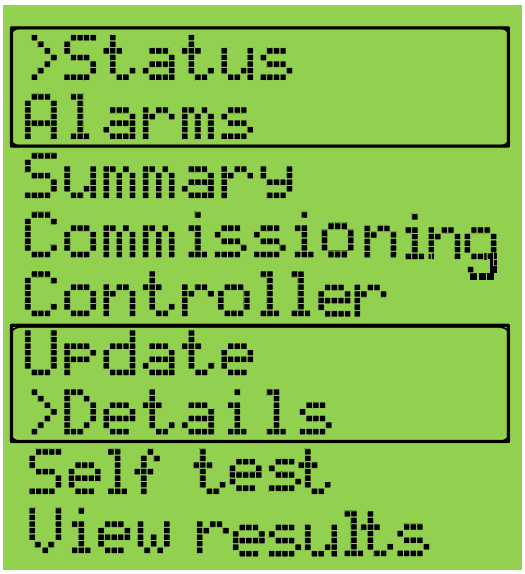
Understanding the Local LCD

After you apply power to your rooftop unit (RTU), a start-up countdown begins on the Economizer LCD. When the controller is ready, the screen is blank because no faults are present. Use the arrow push buttons next to the LCD to navigate through the menus (Figure 1).

Figure 1: LCD and Buttons on Economizer

Pressing the Up and Down arrows moves the cursor. Use the left and right arrows to scroll through the selections in the active section of the menu (Figure 2).

Figure 2: Economizer Top Level Menu



Each menu selection represents either a submenu or a property. Press the right arrow to display the items in the submenu or the values of the selected property. Use the up and down arrows to scroll through the menu items. Use the left arrow to return to the previous menu.

Select the parameter you want to adjust and press the right arrow to display the current value of the selected property. Move up or down with the arrows to display the values of other properties.

Wiring

⚠ WARNING

Risk of Electric Shock.
Disconnect the power supply before making electrical connections. Contact with components carrying hazardous voltage can cause electric shock and may result in severe personal injury or death.

⚠ ADVERTISSEMENT

Risque de décharge électrique.
Débrancher l'alimentation avant de réaliser tout branchement électrique. Tout contact avec des composants conducteurs de tensions dangereuses risque d'entraîner une décharge électrique et de provoquer des blessures graves, voire mortelles.

1. Connect the sensors to the inputs on the Economizer controller (Figure 3).
2. Use spade connectors to terminate the inputs and outputs with the Spade termination, as described in Table 1.

Note: Temperature inputs accept a 10k thermistor type 2 sensor; humidity inputs accept a 0 to 10 VDC sensor.

3. Use the Economizer wiring harness to connect the I/O with the pin connector termination type.

⚠ WARNING

Risk of Electric Shock and Property Damage.
Insulate and secure each unused wire lead before applying power to the Economizer. Failure to insulate and secure each unused wire lead may result in property damage, electric shock, and severe personal injury or death.

⚠ ADVERTISSEMENT

Risque de décharge électrique et dégâts matériels.
Isoler et protéger chaque fil non utilisé avant de mettre l'economizer sous tension. Le non-respect de cette obligation d'isolation et de protection de chaque fil non utilisé risque d'entraîner des dégâts matériels, des décharges électriques et des blessures graves, voire mortelles.

4. Install the sensors in the appropriate air stream (Figure 5 and Figure 4).

Figure 3: Rooftop Unit Wiring Example

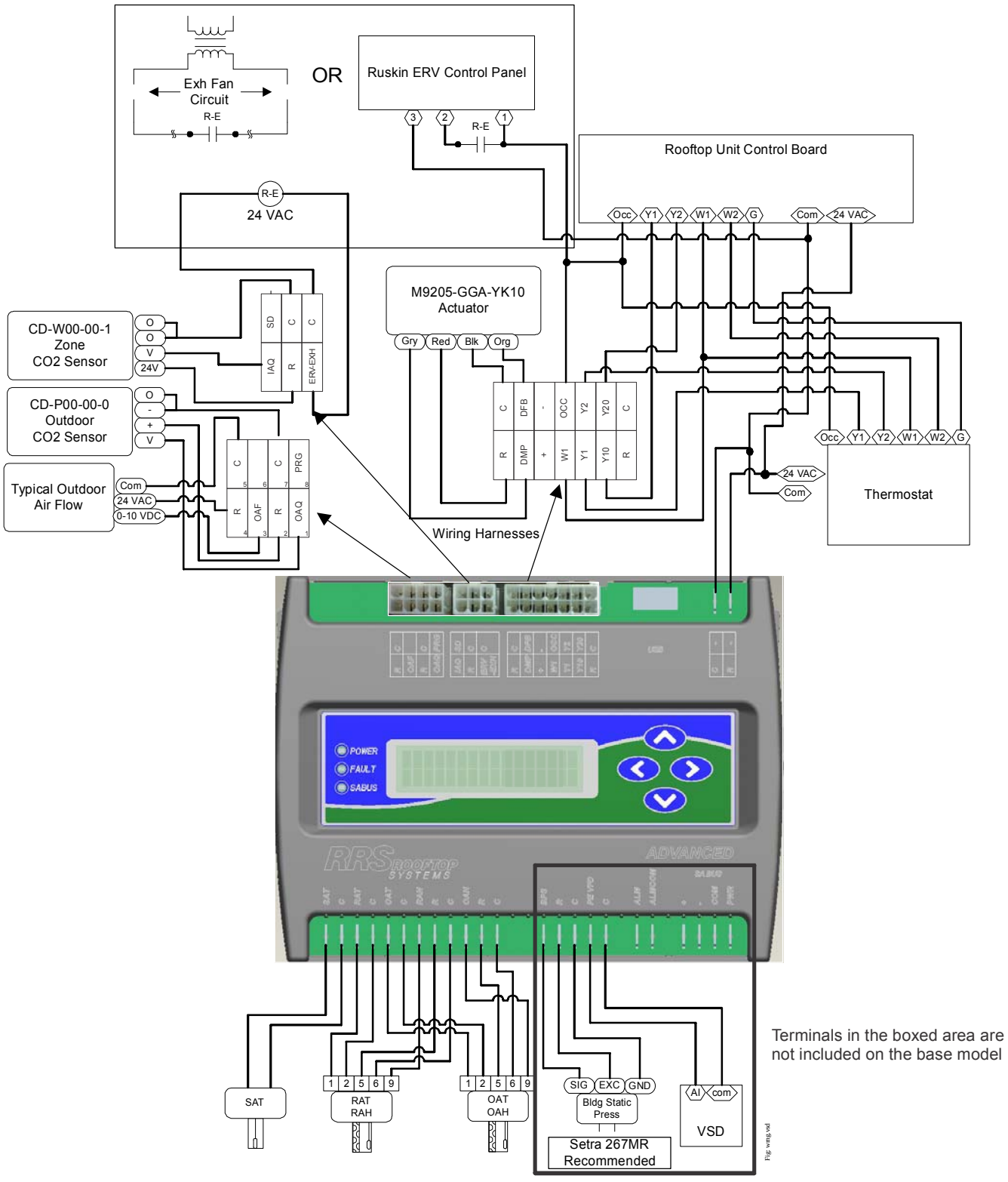


Figure 4: Heat Pump Wiring Example

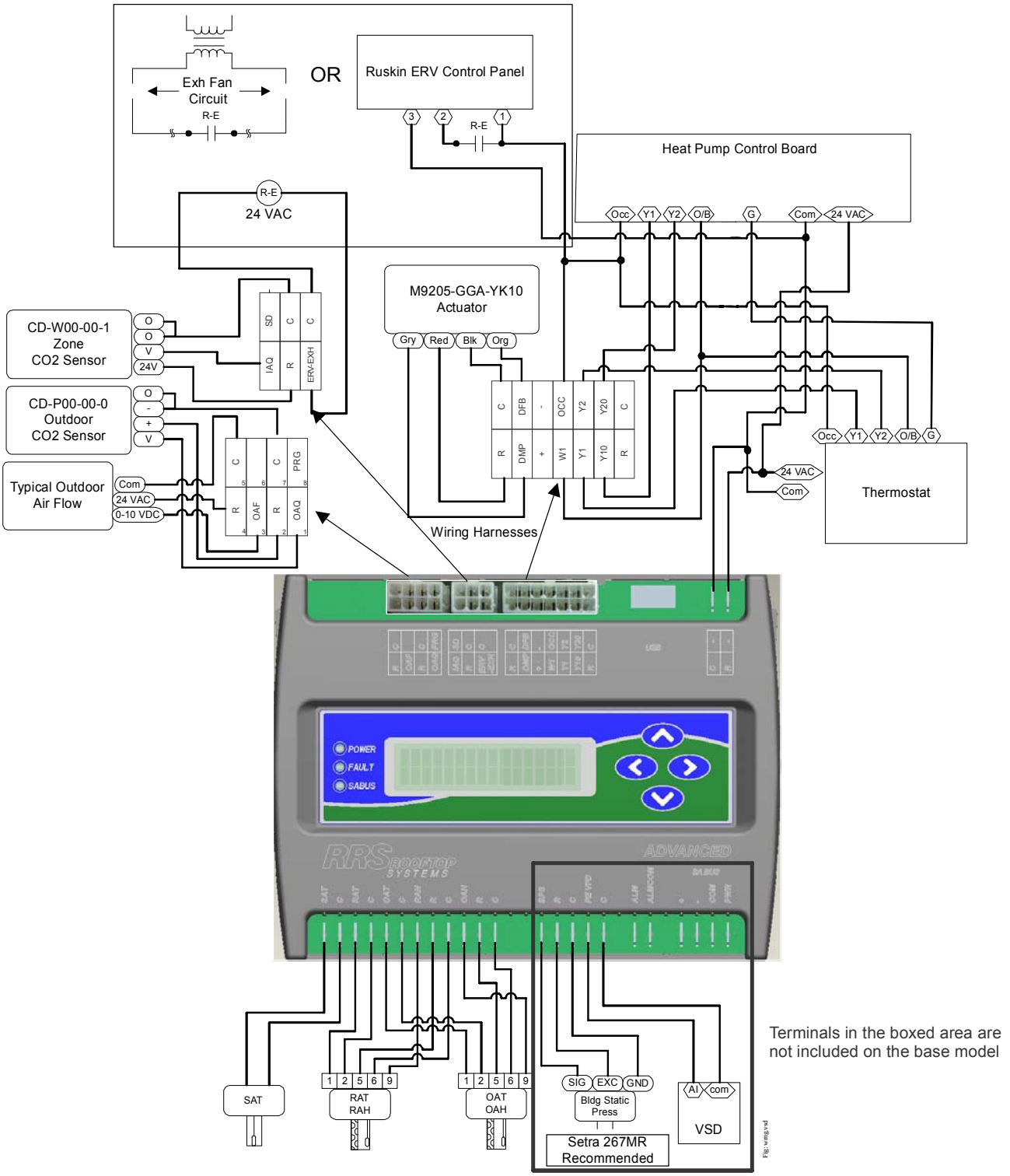


Figure 5: Sensor Placement Example

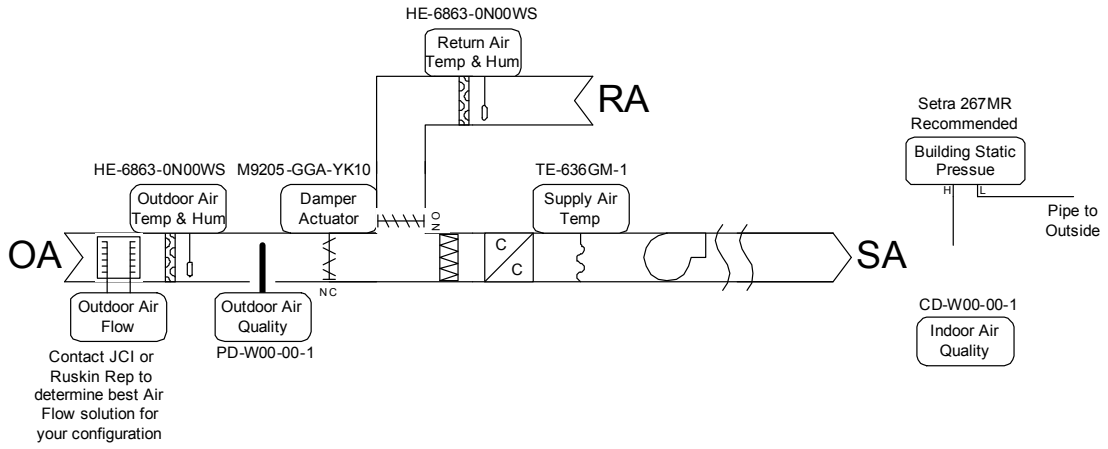


Table 1: Economizer Controller Terminations (Part 1 of 2)

Board Name[1]	Description	Type	Termination Type
Analog Inputs (AIs)			
SAT	Supply Air Temperature, C	Resistive	Spade
RAT	Return Air Temperature, C	Resistive	Spade
OAT	Outdoor Air Temperature, C	Resistive	Spade
OAH	Outdoor Air Humidity, R, C	0 to 10 V	Spade
RAH	Return Air Humidity, R, C	0 to 10 V	Spade
IAQ	Indoor Air Quality Input, R, C	0 to 10 V	Pin Connector
BPS*	Bldg Pressure Input, R, C	0 to 10 V	Spade
OAF*	Outdoor Air Flow, R, C	0 to 10 V	Pin Connector
OAQ*	Outdoor Air Quality, R, C	0 to 10 V	Pin Connector
DFB	Damper Feedback Position, C	0 to 10 V	Pin Connector
Analog Outputs (AOs)			
DMP	Damper Output	0 to 10 V	Pin Connector
PE VFD*	PE VFD Output, C	0 to 10 V	Spade
Binary Inputs (BIs)			
Y1O	Y1 Status	24 VAC	Pin Connector
Y2O	Y2 Status	24 VAC	Pin Connector
W1	W1 Status or O/B Status	24 VAC	Pin Connector
SD	Shutdown Status	24 VAC	Pin Connector
PRG*	Purge Status	24 VAC	Pin Connector
OCC	OCC Status	24 VAC	Pin Connector
Binary Outputs (BOs)			
ALM	Alarm Output, Output COM	Relay (dry contact)	Spade
Y1O	Y1 Output	Relay (24 VAC)	Pin Connector
Y2O	Y2 Output	Relay (24 VAC)	Pin Connector
ERV-EXH	Exhaust Fan/ERV Output	Relay (24 VAC)	Pin Connector
Additional Terminations			
R	R (24 VAC Class 2 Supply)	24 VAC	Spade

Table 1: Economizer Controller Terminations (Part 2 of 2)

Board Name[1]	Description	Type	Termination Type
C	C (24 VAC Class 2 Common)	24 VAC	Spade
SA Bus*	SA Bus	RS-485 Comm	Spade

1. The * denotes the Inputs and Outputs (I/Os) are only on the Advanced model.

Powering the Unit

⚠ WARNING

Risk of Electric Shock.
Disconnect or isolate all power supplies before making electrical connections. More than one disconnection or isolation may be required to completely de-energize equipment. Contact with components carrying hazardous voltage can cause electric shock and may result in severe personal injury or death.

⚠ ADVERTISSEMENT

Risque de décharge électrique.
Débrancher ou isoler toute alimentation avant de réaliser un branchement électrique. Plusieurs isolations et débranchements sont peut-être nécessaires pour -couper entièrement l'alimentation de l'équipement. Tout contact avec des composants conducteurs de tensions dangereuses risque d'entraîner une décharge électrique et de provoquer des blessures graves, voire mortelles.

When you apply 24 VAC power to the C and 24V terminals, the Economizer begins a start-up sequence.

The LCD scrolls the text **Johnson Controls Inc** on the top line and **JCI** on the bottom line.

The green Power LED remains lit as long as power is applied to the C and 24V terminals.

The red Fault LED lights, goes off briefly, and then flashes throughout the start-up sequence.

The green SA Bus LED lights briefly.

During the start-up sequence, the buttons are **not** functional.

The LCD shows a countdown on the top line.

After approximately 10 seconds, the green SA Bus LED does one of the following:

- Lights to indicate the Economizer has not established communication and is awaiting communication from SA Bus devices
- Flashes to indicate the Economizer established communication with SA Bus devices

After the start-up sequence finishes, the display is blank on both lines if no alarm is active. The red Fault LED stops flashing and turns off.

Commissioning with the Local LCD

Use the Commission menu to set up your Economizer controller. The commissioning view consists of the parameters described in Table 2.

Commission View Submenus

Your equipment configuration determines which menus appear in the Commission view. Use the arrows to move between the menu options. Press Enter to select an option. Table 2 describes the Commission View submenus.

The NA rows within Table 2 denote monitor-only points.

Table 2: Commission View Submenus (Part 1 of 6)

Level 1	Level 2	Level 3[1] (LCD Screen Name)	Level 4[2] (Default Values)	Available Values
Summary Menu	Economizer	Supply Temp	Sensor Input Reading	-40 to 150°F
		Return Temp	Sensor Input Reading	0 to 140°F
		Outdoor Temp	Sensor Input Reading	-40 to 140°F
		Outdoor Humidity	Sensor Input Reading	5 to 100%
		Return Humidity	Sensor Input Reading	5 to 100%
		Indoor Quality	Sensor Input Reading	250 to 2,000 ppm
		Damper Command	15%	0 to 100%
		Damper Feedback	Sensor Input	0 to 100%
		Free Clg Avail	Dependent on Conditions	Yes or No
		Dry Bulb Setpoint	68°F (20°C)	40 to 80°F
		OA Enth Setpt	27 BTU/lb	10 to 50 BTU/lb
		High OA Shutoff	75°F (24°C)	0 to 86°F
	Power Exhaust	Damper Command	15%	0 to 100%
		Damper % Fan Off	20%	0 to 100%
		Damper % Fan On	60%	0 to 100%
		Exhaust Setup	Non-modulating Control	None, ERV, Variable Frequency Fan, Non-modulating Control
		Exhaust Fan	0%	0 to 100%
		Exhaust Comment		
		Bldg Pressure	Sensor Input Reading	-0.25 to 0.25 w.c. inches
		Bldg Pressure Stpt	0.1	-0.25 to 0.25 w.c. inches
	Compressor	Compressor 1	Off	Off/On
		Compressor 2	Off	Off/On
		Compressor Stage Accumulated Runtime 1	0 minutes	10,000 minutes
		Compressor Stage Accumulated Runtime 2	0 minutes	10,000 minutes
		Reset Accumulator	No	Yes or No

Table 2: Commission View Submenus (Part 2 of 6)

Level 1	Level 2	Level 3[1] (LCD Screen Name)	Level 4[2] (Default Values)	Available Values
Commission	General	Economizer Enabled (Econ Enable)	Yes	Yes or No
		Compressor Enable (Comp Enable)	Yes	Yes or No
		Compressor 1 Lockout (Comp 1 Lockout)	Normal	Normal or Lockout
		Compressor 2 Lockout (Comp 2 Lockout)	Normal	Normal or Lockout
		Fault Detect Enable	Disable	Enable, Disable
		Supply Temperature Setpoint (Supply Temp Stpt)	55°F	38 to 70°F
		Damper Percent Fan Off (Damper % Fan Off)	60%	0 to 100%
		Damper Percent Fan On (Damper % Fan On)	20%	0 to 100%
		Building Pressure Setpoint (Bldg Pressure Stpt)	0.1 in. w.c.	-0.25 to 0.25 in. w.c.
		Low Ambient Lockout Enable (Low Ambient En)	Yes	Yes or No
		Low Ambient Setpoint (Low Ambient Stpt)	45°F	-45 to 80°F
		Dry Bulb Setpoint (Dry Bulb Stpt)	68°F	35 to 86°F
		Outdoor Air Enthalpy Setpoint (OA Enth Stpt)	27 Btu/lb	10 to 50 Btu/lb
		High Outdoor Air Shutoff (High OA Shutoff)	75°F	0 to 86°F
		Free Cooling Select (Free Clg Stpt)	Auto	Dry Bulb, Single Enthalpy, Dual Enthalpy, Auto
		Exhaust Proportional Band (Exhaust Prop Band)		
		Exhaust Integral time (Exhaust Int Time)		
		Damper Proportional Band (Damper Prop Band)		
		Damper Integral Time (Damper Int Time)		

Table 2: Commission View Submenus (Part 3 of 6)

Level 1	Level 2	Level 3[1] (LCD Screen Name)	Level 4[2] (Default Values)	Available Values
Commission	Calibrate	Supply Air Temperature Offset (SAT Offset)	0	-5 to 5°F
		Supply Temperature (Supply Temp)	Sensor Input Reading	
		Return Air Temperature Offset (RAT Offset)	0	-5 to 5°F
		Return Temperature (Return Temp)	Sensor Input Reading	
		Outdoor Air Temperature Offset (OAT Offset)	0	-5 to 5°F
		Outdoor Temperature (Outdoor Temp)	Sensor Input Reading	
		Outdoor Air Humidity Offset (OAH Offset)	0	-5 to 5°F
		Outdoor Humidity	Sensor Input Reading	
		Return Air Humidity Offset (RAH Offset)	0	-5 to 5°F
		Return Humidity	Sensor Input Reading	
		Indoor Air Quality Offset (IAQ Offset)	0	-5 to 5°F
		Indoor Quality	Sensor Input Reading	
		Building Static Pressure Offset (BSP Offset)*	0	-0.05 to 0.05 in.w.c.
		Building Pressure (Bldg Pressure)*	Sensor Input Reading	
		Fresh Air Intake Offset (FAI Offset)*	0	-100 to 100 cfm
		Fresh Air Flow*	Sensor Input Reading	
		Outdoor Air Quality Offset (OAQ Offset)	0	-100 to 100 ppm
		Outdoor Quality	Sensor Input Reading	
		Damper Minimum Voltage (Damper Min Value)	2 VDC	0 to 2 VDC
		Damper Feedback Minimum Voltage (Feedback Min Value)	2 VDC	0 to 2 VDC
		Fresh Air Range*	10,000 cfm	0 to 50,000 cfm
Controller	Brightness Setting		5	3 to 10
	Firmware Version		1.0.0.0139	≥ 1.0.0.0139
	Firmware Status		Ok	
	Language		English	
	Units		IP	IP/SI

Table 2: Commission View Submenus (Part 4 of 6)

Level 1	Level 2	Level 3[1] (LCD Screen Name)	Level 4[2] (Default Values)	Available Values
Update Menu	View Version	1.0.0.0139 Firmware Ok		
	Load Firmware	(Displays list of choices to be loaded)		
	Backup	Backup: Wait, Backup 0% Backup: Ok, Backup 0%		
	Restore	BackupConfig (file name to be restored)		
	Full Clone	No Full Clone		
	Partial Clone	No Partial Clone		
	Factory Default	Does not Display		
	Time	Does not Display		
	Export Trend	Exporting		
	Self Test Report	Export Done		
Details	Unit	Equipment Type	Conv RTU	Conv TRTU or Heat Pump
		Thermostat Type	W	W, B, or O
		PID Tuning Reset	False	True or False
	Setpoints	Supply Temp STPT	55°F	38 to 70°F
		Supply Air Temperature	Sensor Input Reading	
		Economizer Minimum Position Setpoint	0.25	0 to 100%
		Economizer Damper % Command	Sensor Output Reading	
		Low Ambient Economizer Setpoint	45°F	-45 to 80°F
		OAT Cooling Cutout	75°F	0 to 86°F
		Outdoor Air Temperature	Sensor Input Reading	
	Zone/Indoor	Supply Air Temperature	Sensor Input Reading	
		Return Air Temperature	Sensor Input Reading	
		Return Air Humidity	Sensor Input Reading	
		Indoor Air Quality	Sensor Input Reading	
		Occupancy	Sensor Input Reading	
	Zone/Outdoor	Outdoor Air Temperature	Sensor Input Reading	
		Outdoor Humidity	Sensor Input Reading	
		Outdoor Quality	Sensor Input Reading	
	Control/Compressor/ Status	Y1 - Thermostat	Sensor Input Reading	
		Y2 - Thermostat	Sensor Input Reading	
		W1 - Thermostat	Sensor Input Reading	
		Compressor 1	Sensor Input Reading	
		Compressor 2	Sensor Input Reading	
		Mechanical Thermostat Sequencer State	Satisfied	

Table 2: Commission View Submenus (Part 5 of 6)

Level 1	Level 2	Level 3[1] (LCD Screen Name)	Level 4[2] (Default Values)	Available Values
Details	Control/Compressor/ Setup	Compressor Stage Enabled	Yes	Yes or No
		Number of Cooling Stages Installed	2	1 to 2
		Compressor Min Off Time	300 Seconds	60 to 600 Seconds
		Compressor Min On Time	180 Seconds	60 to 600 Seconds
		Compressor 1 Lockout	Normal	Normal or Lockout
		Compressor 2 Lockout	Normal	Normal or Lockout
		Low Ambient Enabled	Yes	Yes, No
		Low Ambient Economizer Setpoint	45°F	-45 to 80°F
		Excessive SAT Setpoint	44°F	35 to 135°F
	Control/Economizer/ Status	Econ Free Cooling Available	Sensor Input Reading	
		Economizer Damper % Command	Sensor Input Reading	
		Economizer Damper Position	Sensor Input Reading	
		Outdoor Air Enthalpy	Sensor Input Reading	
		Return Air Enthalpy	Sensor Input Reading	
	Control/Economizer/ Setup	Economizer Enabled for Operation	Yes	Yes or No
		Fault Detection Enabled	Disable	Enable, Disable
		Free Cooling Selection	Auto	Dry Bulb Temperature, Single or Dual Enthalpy, Auto
		Economizer Minimum Position Setpoint	0.25	0 to 100%
		Supply Temp SPTP	55°F	38 to 70°F
		Dry Bulb Setpoint	68°F	35 to 86°F
		Economizer Outdoor Air Enthalpy Setpoint	27 BTU/lb Dry Air	10 to 50 BTU/lb Dry Air
		High Limit Shutoff	75°F	0 to 86°F
		Low Ambient Economizer Setpoint	32°F	0 to 60°F
		Low Ambient Economizer Minimum Position	0	0 to 80%
		Damper Low Ambient Enable	Yes	Yes or No
	Service/Input/ Sensors	Supply Air Temperature	Sensor Input Reading	
		Return Air Temperature	Sensor Input Reading	
		Outdoor Air Temperature	Sensor Input Reading	
		Outdoor Humidity	Sensor Input Reading	
		Return Air Humidity	Sensor Input Reading	
		Indoor Air Humidity	Sensor Input Reading	
		Outdoor Quality	Sensor Input Reading	
		Economizer Damper Position	Sensor Input Reading	
		Fresh Air Intake Value	Sensor Input Reading	

Table 2: Commission View Submenus (Part 6 of 6)

Level 1	Level 2	Level 3[1] (LCD Screen Name)	Level 4[2] (Default Values)	Available Values
Details	Service/Inputs/ Thermostat	Y1 - Thermostat	Status Input	On/Off
		Y2 - Thermostat	Status Input	On/Off
		W1 - Thermostat	Status Input	On/Off
		Binary Inputs	Status Input	On/Off
		Occupancy	Status Input	Occupied/Unoccupied
		Shutdown	Status Input	On/Off
		Purge	Status Input	Normal/Alarm
	Service/Outputs/ Relay	Compressor 1	Status Input	On/Off
		Compressor 2	Status Input	On/Off
	Service/Outputs/ Analog	Economizer Damper % Command	Sensor Input Reading	On/Off
	Service/Factory	Equipment Type	Conv RTU	Conv RTU or Heat Pump
		Thermostat Type	W	W, B, or 0
		Fan Control Type	Single Speed	Single Speed or Two Speed
		Altitude	0 ft	0 to 15,000 ft
		Exhaust Setup	None	None, Non-Modulating Control, Variable Frequency Fan, ERV
		Economizer Minimum Position Setpoint	0.25	0 to 100%
		Low Ambient Enabled	Yes	Yes or No
		Low Ambient Economizer Setpoint	45°F	-45 to 80°F
		Demand Ventilation Mode of Operation	Disabled	Enabled or Disabled
		Fresh Air Intake Enable	Off	On or Off
Self Test Menu	Self Test Status		Off Not Run: 0 min	
	Self Test Start	All Test/Equipment Test/ Acceptance Test	(all test) Confirm esc = No ent-yes	
	Equipment Test	(all Test) Confirm esc = No ent-yes		
	Acceptance Test	(all Test) Confirm esc = No ent-yes		
	Self Test Pause			
	Self Test Cancel			
	Self Test Reset			

1. The * denotes the Inputs and Outputs (I/Os) are only on the Advanced model.
2. NA rows denote monitor-only points.

Additional Common Settings

- Setting Damper Minimum Position
  (Details > Setpoint > Damper Minimum Position)
- Setting Equipment Type (Details > Unit > Equipment Type > Enter)
- Setting Thermostat Type (Details > Unit > Thermostat Type [W, O, or B])

Performing a Self-Test

The Economizer self-test verifies operation of all controls and outputs available for a particular unit configuration. The Acceptance Test, on the Advanced model, certifies the California Energy Code Title 24 compliance for retrofit units. Use the self-test to troubleshoot problems with the Economizer. You can select which self-test to run. The default setting runs all tests for the current equipment configuration. Table 3 shows the expected results of the self-test.

Table 3: Self-Test Results

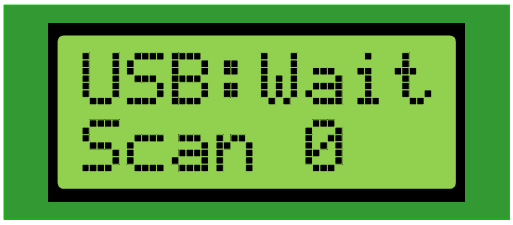
Test/Output	Y1	Y2	Exhaust Fan	ERV	Damper	Alarm
Alarm	Off	Off	Off	Off	0%	On
Compressor 1	On	Off	Off	Off	0%	Off
Compressor 2	Off	On	Off	Off	0%	Off
Power Exhaust Test	Off	Off	On/Ramp	Off	0%	Off
ERV Pivot Test	Off	Off	Off	On[1]	0%	Off
Damper Test	Off	Off	Off	Off	Ramp Open; Ramp Close	Off

1. Ramp with the Exhaust Fan VFD available, otherwise the Exhaust fan is On.

Connecting your Flash Drive

When you connect your flash drive to the USB port on the Economizer, **USB:Wait** appears (Figure 6).

Figure 6: USB Port Connection



You must be in the Update menu for the USB port to apply power to the flash drive. If you are not in the Update menu, the flash drive does not receive power.

Note: If you do not see **USB:Wait** after you connect your flash drive to the Economizer, ensure it is properly connected. If it is properly connected and you are in the Update menu, if you do not see the **USB:Wait** text, your flash drive may not be compatible with the Economizer.

After a few seconds, the top line of the Economizer displays **USB:OK** (Figure 7). The Scan number indicates the files and folders in the top level of the flash drive.

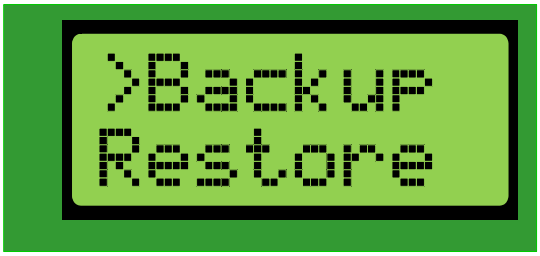
Figure 7: USB Scan

You can keep the flash drive connected to the Economizer after the scan completes.

Performing a System Configuration Backup

Insert your flash drive into the USB port. Navigate to the Update > Backup menu and press Enter (Figure 8).

Figure 8: Backup Menu Option



BKP:Wait appears while the backup is in progress. During the backup procedure, the colon (:) flashes on the top line and the percentage increases on the bottom line of the display.

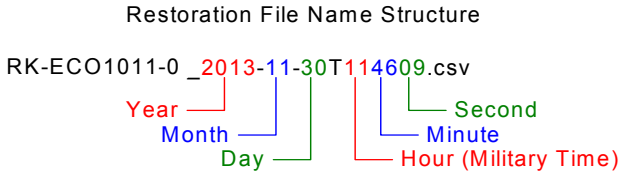
The backup completes in approximately 30 seconds and **BKP:OK** appears on the screen. The percentage shows 100.

Figure 9: Backup Complete

You may remove the flash drive from the USB port.

After the backup completes, a comma separated value (.csv) restoration file is created in the top level of the flash drive. The file name is drawn from the date and time settings in the Economizer at the time you create the file. The board does not contain a clock so the time is based on how long the unit has been powered. The restoration file size is generally less than 30 KB. Figure 10 shows an example of the .csv file name structure.

Figure 10: Restoration File Name Structure



You can restore the backup file to the unit and retrieve the configuration after you perform an upgrade or use the Upgrade > Restore feature to make setpoint changes.

Technical Specifications

RRS Economizer

Product Code Number	**RK-ECO1001-0** – Basic RRS Economizer **RK-ECO1011-0** – Advanced RRS Economizer
Power Supply Requirement	24 VAC (nominal, 20 VAC minimum/30 VAC maximum), 50/60 Hz, Power Supply Class 2 (North America)
Power Consumption	15 VA maximum **Note:** VA ratings do not include any power supplied to the peripheral devices connected to binary outputs (BOs).
Ambient Conditions	**Operating:** -40 to 158°F (-40 to 70°C); 10 to 90% RH noncondensing **UI Operating:** -4 to 158°F (-20 to 70°C); 10 to 90% RH noncondensing **Storage:** -40 to 194°F (-40 to 85°C); 5 to 95% RH noncondensing
Processor	RX631 Renesas® microcontroller
Memory	2 MB internal program flash, 32 KB internal E2Data flash, 4 MB external serial flash memory
Input and Output Capabilities	**Basic Model:** Seven AIs: three 10k RTD, four 0 to 10 VDC One AO: 2 to 10 VDC, 10 mA maximum Five BIs: 24 VAC inputs with contact cleaning circuits Four BOs: three 24 VAC relay outputs, one Dry Contact Alarm output **Advanced Model:** Ten AIs: three 10k RTD, seven 0 to 10 VDC Two AOs: 2 to 10 VDC, 10 mA maximum Six BIs: 24 VAC inputs with contact cleaning circuits Four BOs: three 24 VAC relay outputs, one Dry Contact Alarm output
Housing	UL94 5VB Plastic; self-extinguishing
Mounting	Horizontal on single 35 mm DIN rail mount or screw mount on flat surface
Dimensions (Height x Width x Depth)	5-7/8 x 6-1/2 x 2-1/8 in. (150 x 164 x 53 mm) **Note:** Mounting space requires an additional 2 in. (50 mm) space on top, bottom and front face of controller for easy cover removal, ventilation, and wiring terminations.
Shipping Weight	Basic Model: 1.0 lb (0.45 kg) Advanced Model: 1.0 lb (0.45 kg)
Compliance	**United States**: California Title 24 UL Recognized, File E107041, UL 916, Energy Management Equipment FCC Compliant to Part 15, Class B
	Canada: cUL Recognized, File E107041, CSA 22.2 No. 236, Signal Equipment Industry Canada, Industry Canada Compliant - ICES-003

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