Job:

Location:

Schedule No.:

System Designation:

Engineer:

Architect:

Location:

Date:

BACnet Gateway

For: Reference Approval Review Construction

FEATURES AND FUNCTIONS

- Control gateway that allows control and monitoring of Lennox Powered by Samsung HVAC systems via BACnet /IP
- Individual/Group control of up to 256 indoor units
- Operation mode, temperature setting, airflow direction, fan speed, temperature restriction settings, unoccupied mode setting, and discharge air temperature setting (for applicable duct unit models).
- Restrict use of wireless/wired remote controllers, mode, temperature, and set point.
- Outdoor and indoor unit cycle monitoring
- Convenient digital display allows for easy initial set up
- SD memory card slot for data storage and software updating (daily automatic backup, SD card purchased separately)
- LAN connection for upper level control options
- Available sophisticated control logic allows programming outputs based on various system inputs
- Dynamic security management
- Operation and error history management
- Maximum current control of outdoor unit(s) to limit current (50% - 100% of design current) adjustable at outdoor unit or VCTRL02P-1 (does not apply to all system models)
- Supports multiple user access (different usernames and access levels)
- Various user management level settings (HVAC system access, gateway permission access)
- Unoccupied room control settings adjustment capability (for compatible units)

Web Server Function
- Remote control with a public IP address via internet connection
- No management software required – PC-independent management through web browser (optimized for Internet Explorer)
- Multiple user accounts can be setup with the ability to specify what unit(s) each individual can monitor and control and what level of control permission is allowed.
- 2D Floorplan layout option for simplified project viewing.

Schedule Control Function Through Web Browser
- Up to 256 schedule settings
- Weekly and daily schedule setting
- Wireless/wired remote controller restriction setting
- Digital outputs can be incorporated into scheduling

Advanced Programmable Control Logic Setting
- Specify various system control point inputs (indoor units, outdoor units, DI, DO) and operators ($=, >, <, \leq, \geq, \neq$) to manipulate system operation (indoor units, outdoor units, DI, DO) based on the status of the specified variables.

Advanced Heat Pump Auto Changeover Logic
- Optional "weighted averaging" or "representative" setting for heat pump systems to provide optimal auto changeover while in Auto mode.

External Contact Interface
- Full indoor unit control with simple contact input (emergency/lock)
- 8 additional digital input terminals for monitoring options
- State output (operation/error) for synchronous control
- 6 general purpose outputs to control other components (on: 12VDC out; off: no voltage)
- Digital inputs and digital outputs can be incorporated into control logic
- Digital outputs can be incorporated into control logic and daily schedules to control other devices
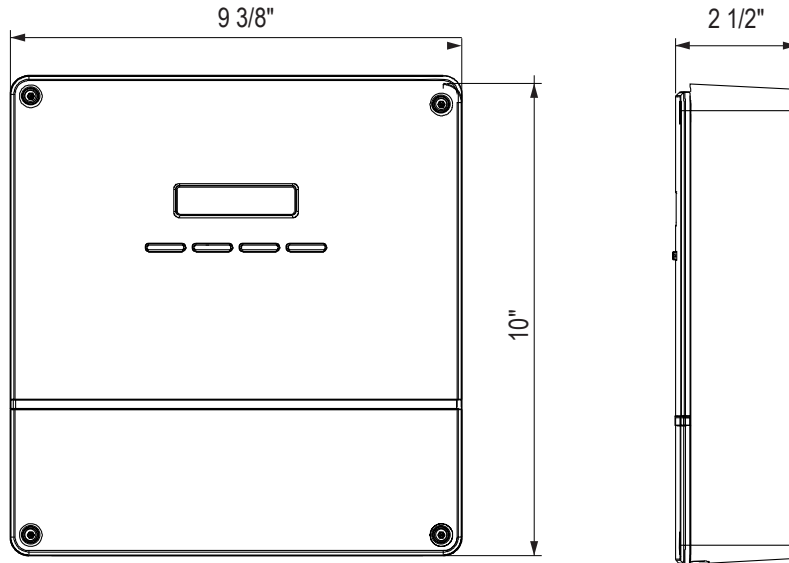
Energy Management / Power Distribution Function
- Ability to monitor, track, and query energy use from indoor unit(s) and systems with 37Y68 VCTRL08P-1 electricity meter interface module (purchased separately, requires 3rd party watt-hour meters with pulse output).
- When used with SNET 3 software, detailed PDF report generation is possible
- User defined daily time periods for energy use reports to accommodate on/off peak energy billing.
- Export energy usage and other data to Excel file
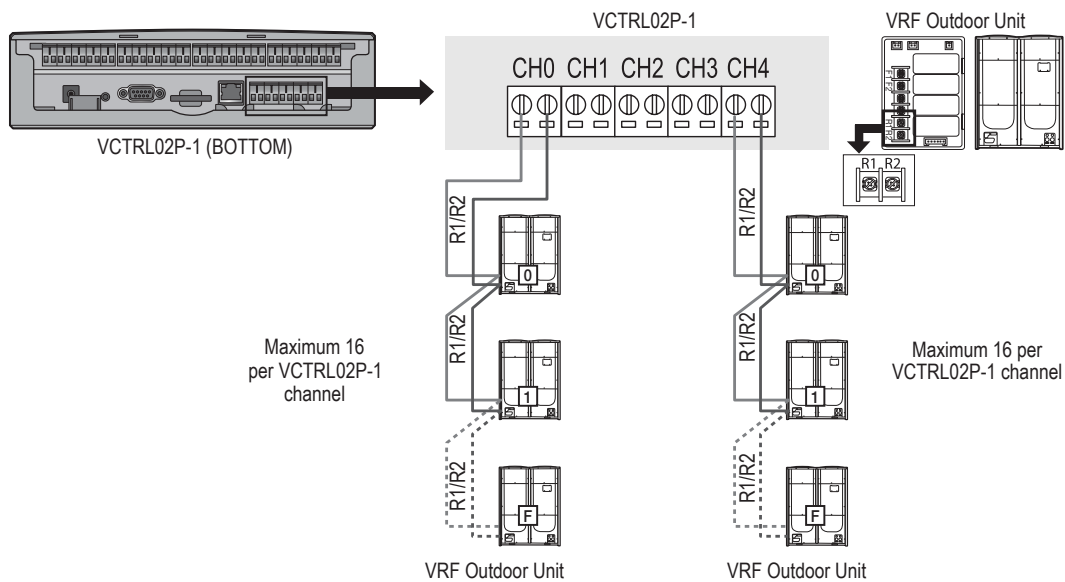
History Management
• Storage of all operation commands from gateway and other system controls (saves to SD card purchased separately).
• Storage of all error events for review (saves to SD card purchased separately).
• Storage of all operation logic control events (saves to SD card purchased separately).
• Error alerts via email that contain: error code, error explanation, units affected, time and date of error occurrence, and error status.
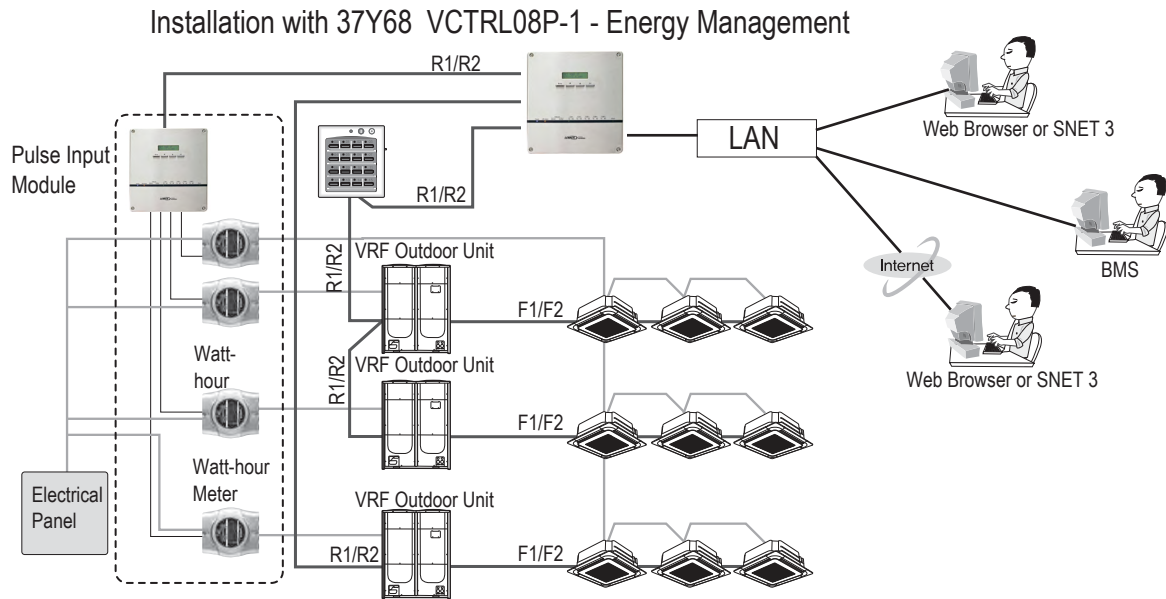
Specifications

• Fixed port number: 47808 (can be changed from 0 - 65535)

• Network ID can be assigned 1-16 (this number will determine device ID of gateway and all equipment)

• The gateway shall support BACnet/IP and provide functions to monitor status and control Lennox Powered by Samsung VRF, Mini-Splits, and Chillers.

• The gateway shall monitor status and control Lennox Powered by Samsung systems only via web client, BMS, and/or Samsung SNET 3 software.

• DC 12V, 3A power provided by AC/DC adapter (input 110-240VAC 50/60Hz, provided with gateway)

• Direct connection to VRF and Mini-Split MMLD and MMPD single zone outdoor units

• 16 AWG X 2 copper stranded, shielded cable between Samsung equipment and controls is recommended for proper operation

• Maximum number of RS485 connections:
  - Maximum 75 Touch Central Controllers (37Y72 VCTRL01P-1) to 1 gateway
  - Maximum 15 Touch Central Controllers (37Y72 VCTRL01P-1) to a single gateway channel
  - Maximum 16 systems to a single channel (5 total)
  - Maximum 16 Chiller FCU Interface Modules (37Y81 VCTRL05P-1) to a single channel (5 total, each 37Y81 VCTRL05P-1 supports up to 16 37Y80 VCTRL04P-1 FCU Kits)
  - Maximum 80 Chiller FCU Interface Modules (37Y81 VCTRL05P-1) connected direct (5 ports, 16 X 37Y81 VCTRL05P-1 per port)
  - Maximum 128 indoor units on a single gateway channel (MSB, air handlers)
  - Maximum 256 indoor units (MSB, air handlers to one gateway
  - Maximum 8 37Y68 VCTRL08P-1 Energy Meter Interface Modules per gateway (must connect to CH4 (COM5) on gateway)
  - Maximum 8 37Y68 VCTRL08P-1 Energy Meter Interface Modules per gateway (can connect to same channel as VRF outdoor units on gateway)

• Digital inputs and outputs:
  - DI terminals (X 10): Dry input (0V)
  - DO terminals (X 8): 12VDC, maximum 200 mA

• Segment capability
  - Segment requests supported window size: 1476
  - Segment responses supported window size: 1476

• BTL Certification to BACnet standard ISO 16484-5 protocol revision 1.12

• BACnet IP Data Link Layer (Annex J)
  BACnet Stanardized Device Profile (Annex L): BACnet Application Specific Controller (B-ASC)

• Refer to controls technical engineering handbook for more information

9 3/8"

10"

2 1/2"

Installation with Direct Connection to VRF Outdoor Units

VCTRL02P-1

VRF Outdoor Unit

CH0 CH1 CH2 CH3 CH4

VCTRL02P-1 (BOTTOM)

R1, R2

R1/R2

R1/R2

R1/R2

0

1

F

Maximum 16
per VCTRL02P-1
channel

R1/R2

R1/R2

R1/R2

0

1

F

Maximum 16 per
VCTRL02P-1 channel

VRF Outdoor Unit

VRF Outdoor Unit

Installation with 37Y68 VCTRL08P-1 - Energy Management

1. Indoor unit

Instance Number	Object	Object Type	Object Name	Unit		Status value			
				Inactive	Active				
				Text-1	Text-2	Text-3	Text-4	Text-5
1	Indoor temperature	AI	AC_RoomTemp_xx_xxxxxx	°C(°F)					
2	Set temperature	AV	AC_Temp_Set_xx_xxxxxx	°C(°F)					
3	Setting lower temperature limit	AV	AC_Cool_LimitTemp_xx_xxxxxx	°C(°F)					
4	Setting upper temperature limit	AV	AC_Heat_LimitTemp_xx_xxxxxx	°C(°F)					
5	The power value of an indoor unit after the basic date	AI	AC_Baseline_kWh_xx_xxxxxx	kWh					
6	The number of hours usage of an indoor unit after the basic date	AI	AC_Baseline_Minute_xx_xxxxxx	Minute					
7	Power value within period	AI	AC_Period_kWh_xx_xxxxxx	kWh					
8	The number of hours usage of an indoor unit within period	AI	AC_Period_Minute_xx_xxxxxx	Minute					
9(**)	Power On/Off	BV	AC_Power_xx_xxxxxx	Off	On				
10	Applying lower temperature limit setting	BV	AC_Cool_Limit_set_xx_xxxxxx	False	True				
11	Applying upper temperature limit setting	BV	AC_Heat_Limit_set_xx_xxxxxx	False	True				
12(**)	Filter sign status	BI	AC_FilterSign_xx_xxxxxx	False	True				
13(**)	Filter sign reset	BO	AC_FilterSign_Reset_xx_xxxxxx	False	True				
14(**)	Operation mode status	MV	AC_Operation_Mode_xx_xxxxxx	Auto	Cool	Heat	Fan	Dry
15	Fan speed status	MV	AC_FanSpeed_xx_xxxxxx	Auto	Low	Mid	High	
16	Air flow direction status	MV	AC_FanFlow_xx_xxxxxx	None	Vertical	Horizontal	All	
17(**)	Operation mode limit status	MV	AC_Mode_Limit_xx_xxxxxx	No Limit	Cool Only	Heat Only		
18(**)	Remote controller limit status	MV	AC_Remocon_Limit_xx_xxxxxx	Enable RC	Disable RC	Conditional RC		
19(**)	Integrated error code of both indoor unit and outdoor unit	AI	AC_Error_Code_xx_xxxxxx	Refer to Samsung integrated error code list					
20(*)	SPI setting	BV	AC_SPI_xx_xxxxxx	False	True				
21(*)	Human sensor setting	BV	AC_MDS_xx_xxxxxx	False	True				
22(**)	AC indoor notify	NC	AC_Notify_xx_xxxxxx	When the error occurred, send event to list of destination in the recipient_list. (Max : 8)					
23(**)	Discharge cooling set temperature	AV	AC_DisCoolTemp_Set_xx_xxxxxx	°C(°F)					
24(**)	Discharge heating set temperature	AV	AC_DisHeatTemp_Set_xx_xxxxxx	°C(°F)					
25(**)	Discharge current temperature	AI	AC_DisCurrentTemp_xx_xxxxxx	°C(°F)					

Temperature setting range can be different depending on model. The standard range is noted below:

- Auto: 18~30℃ (64~86℉)
- Cool: 18~30℃ (64~86℉)
- Heat: 16~30℃ (60~86℉)
- Fan: Temperature cannot be adjusted
- Dry: 18~30℃ (64~86℉)

(*) Mark is optionally supported. For OAP Duct unit (**) mark is supported.

2. VRF Multi-position AHU and AHU kit

Instance Number	Object	Object Type	Object Name	Unit		Status value		
				Inactive	Active			
				Text-1	Text-2	Text-3	Text-4	Text-5
1	Indoor temperature	AI	AHU_RoomTemp_xx_xxxxxx	°C(°F)				
2	Set temperature	AV	AHU_Temp_Set_xx_xxxxxx	°C(°F)				
3	Setting lower temperature limit	AV	AHU_Cool_LimitTemp_xx_xxxxxx	°C(°F)				
4	Setting upper temperature limit	AV	AHU_Heat_LimitTemp_xx_xxxxxx	°C(°F)				
5	The power value of an indoor unit after the basic date	AI	AHU_Baseline_kWh_xx_xxxxxx	kWh				
6	The number of hours usage of an indoor unit after the basic date	AI	AHU_Baseline_Minute_xx_xxxxxx	Minute				
7	Power value within period	AI	AHU_Period_kWh_xx_xxxxxx	kWh				
8	The number of hours usage of an indoor unit within period	AI	AHU_Period_Minute_xx_xxxxxx	Minute				
9	Power On/Off	BV	AHU_Power_xx_xxxxxx	Off	On			
10	Applying lower temperature limit setting	BV	AHU_Cool_Limit_set_xx_xxxxxx	False	True			
11	Applying upper temperature limit setting	BV	AHU_Heat_Limit_set_xx_xxxxxx	False	True			
12	Filter sign status	BI	AHU_FilterSign_xx_xxxxxx	False	True			
13	Filter sign reset	BO	AHU_FilterSign_Reset_xx_xxxxxx	False	True			
14	Operation mode status	MV	AHU_Operation_Mode_xx_xxxxxx	Auto	Cool	Heat	Fan	Dry
15	Operation mode limit status	MV	AHU_Mode_Limit_xx_xxxxxx	No Limit	Cool Only	Heat Only		
16	Remote controller limit status	MV	AHU_Remocon_Limit_xx_xxxxxx	Enable RC	Disable RC	Conditional RC		
17	Integrated error code of both indoor unit and outdoor unit	AI	AHU_Error_Code_xx_xxxxxx	Refer to Samsung integrated error code list				
18(*)	Discharge cooling set temperature	AV	AHU_DisCoolSetTemp_xx_xxxxxx	°C(°F)				
19(*)	Discharge heating set temperature	AV	AHU_DisHeatSetTemp_xx_xxxxxx	°C(°F)				
20(*)	Discharge current temperature	AI	AHU_Dis_CurrentTemp_xx_xxxxxx	°C(°F)				
21(**)	Humidification setting	BV	AHU_Humidification_xx_xxxxxx	Off	On			
22(**)	Outdoor air intake setting	BV	AHU_OAIntake_xx_xxxxxx	Off	On			
23(**)	Outdoor cooling setting	BV	AHU_OutdoorCool_xx_xxxxxx	Off	On			
24	Fan speed status	MV	AHU_FanSpeed_xx_xxxxxx	Low	Mid	High		
25(**)	Set humidity status	MV	AHU_SetHumidity_xx_xxxxxx	Low	Mid	High		
26(**)	Current humidity status	MI	AHU_CurrentHumidity_xx_xxxxxx	Low	Mid	High		
27	AHU Notify	NC	AHU_Notify_xx_xxxxxx	When the error occurred, send event to list of destination in the recipient_list. (Max : 8)				

*Not supported as standard, additional sensors and unit configuration required.

** Not supported for North American AHU models.

3. VRF Chiller

Instance Number	Object	Object Type	Object Name	Unit	Status value			
				Inactive	Active			
				Text-1	Text-2	Text-3	Text-4	Text-5
1	Chilled Water Temperature	AI	MC_WaterTemp_xx_xxxxxx	°C(°F)				
2	Set temperature	AV	MC_WaterTemp_Set_xx_xxxxxx	°C(°F)				
3	Demand limit setting	AV	MC_Demand_Set_xx_xxxxxx	%				
4	The number of hours usage of an indoor unit after the basic date	AI	MC_Baseline_Minute_xx_xxxxxx	Minute				
5	The number of hours usage of an indoor unit within period	AI	MC_Period_Minute_xx_xxxxxx	Minute				
6	Power On/Off operation	BV	MC_Power_xx_xxxxxx	Off	On			
7	Water Law	BO	MC_Water_Law_xx_xxxxxx	False	True			
8	Quiet	BV	MC_Quiet_xx_xxxxxx	Off	On			
9	Forced Fan	BV	MC_Forced_Fan_xx_xxxxxx	Off	On			
10	Operation mode status	MV	MC_Operation_Mode_xx_xxxxxx	Cool	Heat	Cool Storage	Hot Water	
11	Remote controller limit status	MV	MC_Remocon_Limit_xx_xxxxxx	Enable RC	Disable RC	Conditional RC		
12	Integrated error code	AI	MC_Error_Code_xx_xxxxxx					
13	VRF CHILLER Notify	NC	MC_Notify_xx_xxxxxx	When the error occurred, send event to list of destination in the recipient_list. (Max : 8)				

BACnet Device Object does not support master function of VRF CHILLER.

4. Digital input / output

Instance Number	Object	Object Type	Object Name	Unit	Status value			
				Inactive	Active			
				Text-1	Text-2	Text-3	Text-4	Text-5
1	Digital Input 1	BI	DI_01_xx_xx (BACnet Gateway Reserved)	Off	On			
2	Digital Input 2	BI	DI_02_xx_xx (BACnet Gateway Reserved)	Off	On			
3	Digital Input 3	BI	DI_03_xx_xx	Off	On			
4	Digital Input 4	BI	DI_04_xx_xx	Off	On			
5	Digital Input 5	BI	DI_05_xx_xx	Off	On			
6	Digital Input 6	BI	DI_06_xx_xx	Off	On			
7	Digital Input 7	BI	DI_07_xx_xx	Off	On			
8	Digital Input 8	BI	DI_08_xx_xx	Off	On			
9	Digital Input 9	BI	DI_09_xx_xx	Off	On			
10	Digital Input 10	BI	DI_10_xx_xx	Off	On			
11	Digital Output 1	BO	DO_01_xx_xx (BACnet Gateway Reserved)	Off	On			
12	Digital Output 2	BO	DO_02_xx_xx (BACnet Gateway Reserved)	Off	On			
13	Digital Output 3	BO	DO_03_xx_xx	Off	On			
14	Digital Output 4	BO	DO_04_xx_xx	Off	On			
15	Digital Output 5	BO	DO_05_xx_xx	Off	On			
16	Digital Output 6	BO	DO_06_xx_xx	Off	On			
17	Digital Output 7	BO	DO_07_xx_xx	Off	On			
18	Digital Output 8	BO	DO_08_xx_xx	Off	On			

Caution

• You may use ALL_OFF command to turn on all the indoor units but it is not recommended.

• If communication error occurs on devices such as SIM, On/Off Controller, Interface Module etc., other functions such as power distribution may also create a problem. You must have BMS system to check the errors and you must take action immediately.

5. Interface module (outdoor unit)

Instance Number	Object	Object Type	Object Name	Unit		Status value		
				Inactive	Active			
				Text-1	Text-2	Text-3	Text-4	Text-5
1	Outside temperature	AI	ODU_Outside_Temp_xx_xxxx	°C(°F)				
2(*)	Cool capacity compensation	AV	ODU_Cool_Compensation_xx_ xxxx			0 : 5~7°C(41~45°F) 1 : 7~9°C(41~48°F) 2 : 9~11°C(48~52°F) 3 : 10~12°C(50~54°F) 4 : 11~13°C(52~55°F) 5 : 12~14°C(54~57°F) 6 : 13~15°C(55~59°F) 14 : Auto control (from ODU)		
3(*)	Heat capacity compensation	AV	ODU_Heat_Compensation_xx_ xxxx			0 : 25kg/cm² 1 : 26kg/cm² 2 : 27kg/cm² 3 : 28kg/cm² 4 : 29kg/cm² 5 : 30kg/cm² 6 : 31kg/cm² 7 : 32kg/cm² 8 : 33kg/cm² 14 : Auto control (from ODU)		
4	Compressor status	BI	ODU_Comp_Status_xx_xxxx	False	True			
5	Interface module error code	AI	Repeater_Error_Code_xx_xxxx	Refer to the list of the integrated error code				
6	Interface module notify	NC	IM_Notify_xx_xxxx	When the error occurred, send event to list of destination in the recipient list. (Max : 8)				

* Only available for supported models

6. SIM (PIM)

Instance Number	Object	Object Type	Object Name	Status value
1	SIM (PIM) error code	AI	SIM_Error_Code_xx_xx	Refer to list of error code
2	SIM (PIM) Notify	NC	SIM_Notify_xx_xx	When the error occurred, send event to list of destination in the recipient list. (Max : 8)

7. BACnet Gateway)

Instance Number	Control and Monitoring	Object Type	Object Name	Status value
1	All device OFF	BO	ALL_OFF_xx	Inactive : All devices Off
1	DMS2.5 Status	AI	DMS2_Status_xx	0: Normal 8: Emergency stop 105: Tracking in progress 108: Tracking failed 10 : DMS2.5 / BACnet communication failed
1	BACnet error code	AI	BACnetApp_Error_ Code_xx	BACnet error code
2	Gateway Notify	NC	GW_Notify_xx	When the error occurred, send event to list of destination in the recipient_list. (Max : 8)