SHOP DRAWING REVIEW

- [ ] NOT REVIEWED
- [ ] REVIEWED
- [x] REVIEWED AS NOTED
- [ ] REVISE AND RESUBMIT

This review by Hilditch Architect Inc. is for the sole purpose of ascertaining conformance with the general design concept features only, and does not in any way constitute review of the design of engineering elements which form part of the Contract Documents prepared by others. This review shall not mean that Hilditch Architect Inc. approves the design detail inherent in the shop drawings, responsibility for which shall remain with the Contractor submitting same, and such review shall not relieve the Contractor of his responsibility for errors or omissions in the shop drawings or of his responsibility for meeting all requirements of the Contract Documents. The Contractor is responsible for dimensions to be confirmed and correlated at the job site, for information that pertains solely to fabrication processes or to techniques of construction and installation and for co-ordination of the work of all trades.

Hilditch Architect Inc.

By: Sasha Stairs

Project No: 1809

Date Rec'd:

Date Rev'd: 2025.05.27

GC/CM: 2025.05.20

Consultant: 2025.05.27

HAI; reviewed for architectural only; 58 pages total:

1. LOCATION OF BAS PANEL / CONTROLLER TO BE CONFIRMED WITH OWNER AND CONSULTANT PRIOR TO ROUGH IN.

2. GC TO ENSURE ALL PANELS, CONTROLLERS OR OTHER INTERFACE DEVICES REQUIRING REGULAR INSPECTION HAVE SUFFICIENT CLEARANCE, ACCESS PANELS ETC TO FACILITATE MAINTENANCE AND INSPECTION.

Submittal No.73

BAS - Shop Drawing

Project Name:
Neshama Hospice

Owner:
Neshama

Prime Consultant:
Hilditch Architect Inc

General Contractor: Renokrew

SHOP DRAWING / SUBMITTAL REVIEW	JOB NAME: Neshama Hospice JOB #: 24-130 DATE: May 20, 2025
REVIEWED REJECTED REVIEW & RESUBMIT REVIEW AS NOTED	This review is for general conformance of plans and specifications only. Approvals are subject to subcontractors performance within the confines of the contract documents. Review of dimensions will not serve to relieve the subcontractor of contractual responsibility for any deviation from the contract requirements. SPECIFICATION: 25 00 00 ✓ SHOP DRAWING PRODUCT DATA DOCUMENTATION LETTER CHECKED BY: REVIEWED BY: TOTAL PAGES: 58

SustainGlobe Ltd.

THIS DRAWING REVIEWED SOLELY FOR GENERAL CONFORMITY WITH DESIGN CONCEPTS. QUANTITIES, DETAILS, DIMENSIONS AND DESIGNS INHERENT IN THE SHOP DRAWINGS ARE THE CONTRACTOR'S RESPONSIBILITY TO VERIFY DATA WITH FIELD DIMENSIONS. CONTRACTOR IS SOLELY RESPONSIBLE FOR DESIGN OF MANUFACTURED ITEMS, FABRICATION PROCESSES AND TECHNIQUES OF CONSTRUCTION AND INSTALLATION OF EQUIPMENT.

DATE RECEIVED: May 20, 2025	✓ MECHANICAL ❑ ELECTRICAL ❑ OTHERS
THIS DRAWING IS: ✓ REVIEWED ❑ REVIEWED AS NOTED ❑ REVIEWED AND TO BE RESUBMIT	BY: TL DATE: May 27, 2025 PROJ. NO.: 18031

RENOKREW
TORONTO | OTTAWA

54 Audia Court, Unit 2
Concord, ON L4K 3N5
(905)-738-1400

Submittal 24-256-023

PROJECT NAME	PROJECT ADDRESS	DATE SUBMITTED
NESHAMA HOSPICE 24-256	3 Cadillac Avenue North York, ON M3H 1R9	May 20, 2025

TO	FROM
Taranjeet Singh	INZAMAN KHAN
COMPANY	COMPANY
1568796 ONTARIO INC. C/A RENOKREW	Consult Mechanical Inc.
EMAIL	EMAIL
taranjeet@renokrew.com	inzaman@consultmechanical.com
ADDRESS	ADDRESS
43 LEPAGE COURT TORONTO, ON M3J 1Z9	54 Audia Court, Unit 2 Concord, ON L4K 3N5

Title

BAS (25 00 00)

Description

Building Automation System

Package Items

SPEC	SUBSECTION	ITEM	TYPE

Neshama Hospice

250407

Drawing Number	Drawing Title
1	System Architecture
2	Glycol Heating System - Flow Diagram & Points List
2A	Glycol Heating System - Sequence of Operation
3	Air Handling Unit AHU-1 - Flow Diagram
3A	Air Handling Unit AHU-1 - Sequence of Operation 1
3B	Air Handling Unit AHU-1 - Sequence of Operation 2 & Points List
4	AHU-1 Space Temperature & Radiant Heaters
5	Air Handling Unit AHU-2 - Flow Diagram
5A	Air Handling Unit AHU-2 - Sequence of Operation 1
5B	Air Handling Unit AHU-2 - Sequence of Operation 2 & Points List
6	Roof Top Unit RT-1
7	Fan Powered VAV Boxes
8	Split Air Conditioner AC-5

Drawing Title

Drawing List

SUBMISSION	NO.	REVISION NOTE	ECN	DATE	BY
SUBMISSION	1	FOR SHOP DRAWING SUBMITTAL		2025/05/19	RX

REVISION TITLE	NO.	REVISION NOTE	ECN	DATE	BY

Sales Engineer	Project Manager	Application Engineer	DRAWN		APPROVED	
	Ron Xu	Ron Xu	BY JH	DATE 2025/05/19	BY RX	DATE 2025/05/19

Project Title

Neshama Hospice
3 Cadillac Avenue
North York, ON., M3H 1R9

IXL Technical Inc.

Branch Information

IXL Technical Inc.
29 Becca Hall Trail
Scarborough, Ontario
M1V 2T7
(416) 828-9285

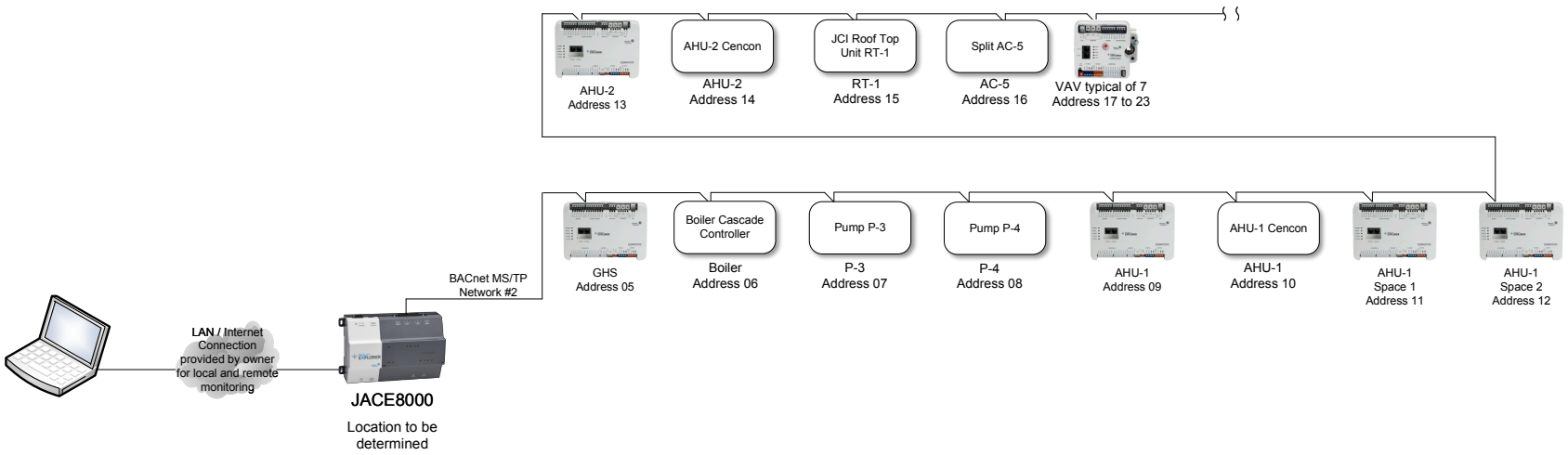
CONTRACT NUMBER

250407

DRAWING NUMBER

0

System Architecture Diagram



Tag	Qty	Code Number	Description
JACE8000	1	J-8025	JACE 8000 Controller, Licensed for 25 Device/1,250 Point

Drawing Title

System Architecture

NO.	REVISION TITLE	REVISION NOTE	ECN	DATE	BY
1	FOR SHOP DRAWING SUBMITTAL			2025/05/19	RX

Sales Engineer	Project Manager	Application Engineer	DRAWN		APPROVED	
	Ron Xu	Ron Xu	BY JH	DATE 2025/05/19	BY RX	DATE 2025/05/19

Project Title

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29 Becca Hall Trail
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M1V 2T7
(416) 828-9285

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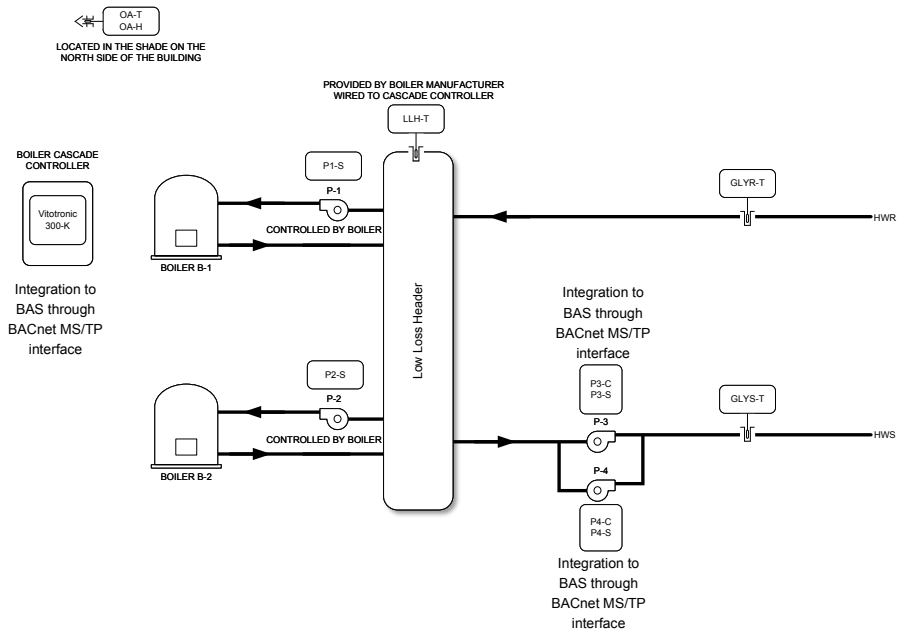
1

Glycol Heating System – Flow Diagram



Point #	Point Name	Point Description	Controller	Trunk Type	Trunk Nbr	Trunk Addr.	Device
UI1	OA-T	Outside Air Temp	CGM09090	MS/TP	2	5	
UI2	OA-H	Outside Air Humidity	CGM09090	MS/TP	2	5	
UI3	GLYS-T	Glycol Supply Temp	CGM09090	MS/TP	2	5	
UI4	GLYR-T	Glycol Return Temp	CGM09090	MS/TP	2	5	
UI5	P1-S	Pump P-1 Status	CGM09090	MS/TP	2	5	
UI6	P2-S	Pump P-2 Status	CGM09090	MS/TP	2	5	
UI7			CGM09090	MS/TP	2	5	
BI1	P3-S	Pump P-3 Status	CGM09090	MS/TP	2	5	
BI2	P4-S	Pump P-4 Status	CGM09090	MS/TP	2	5	
BO1	P3-C	Pump P-3 Command	CGM09090	MS/TP	2	5	
BO2	P4-C	Pump P-4 Command	CGM09090	MS/TP	2	5	
BO3			CGM09090	MS/TP	2	5	
CO1			CGM09090	MS/TP	2	5	
CO2			CGM09090	MS/TP	2	5	
CO3			CGM09090	MS/TP	2	5	
CO4			CGM09090	MS/TP	2	5	
AO1			CGM09090	MS/TP	2	5	
AO2			CGM09090	MS/TP	2	5	

Tag	Qty	Part Number	Description
CONTROLLER	1	F4-CGM09090-0	Johnson Controls, General Purpose Controller, 18 points, BACnet MS/TP
OA-T, OA-H	1	HSOSA224	Greystone, 2% Outside Humidity, 10k ohm type 2
GLYS-T, GLYR-T	2	TSAPA24B	Greystone, immersion temperature sensor, 10k ohm type 2, 4"
	2	T2-1/2N4P	Greystone thermowell, 4"
Px-C	2	RIBU1C	Functional Devices, Enclosed pilot relay
Px-S	4	C-2300	Senva, Go/No current swtiches, split core

Drawing Title

Glycol Heating System
Flow Diagram & Points List

NO.	REVISION TITLE	REVISION NOTE	ECN	DATE	BY
1	FOR SHOP DRAWING SUBMITTAL	SUBMISSION		2025/05/19	RX

Sales Engineer	Project Manager	Application Engineer	DRAWN	APPROVED
	Ron Xu	Ron Xu	BY JH DATE 2025/05/19	BY RX DATE 2025/05/19

Project Title

Neshama Hospice
3 Cadillac Avenue
North York, ON., M3H 1R9

IXL Technical Inc.

Branch Information
IXL Technical Inc.
29 Becca Hall Trail
Scarborough, Ontario
M1V 2T7
(416) 828-9285

CONTRACT NUMBER
250407

DRAWING NUMBER
2

Glycol Heating System

Glycol Heating Pumps P-3 and P-4 Operation:
The glycol heating pumps P-3 and P-4 supplies propylene glycol solution to the two air handling units AHU-1 and AHU-2. The heating pumps are constant speed pumps. The pumps shall operate in a parallel duty/standby fashion. Only one pump operates at any time.

- The duty pump shall run continuously.
- On failure of any of the duty pump for 3 minutes, the standby pump shall run and the failed pump shall turn off. An alarm shall be sent to the operator.

The designated standby pump shall rotate upon one of the following conditions (user selectable):

- Manually through a software switch
- If pump runtime (adj.) is exceeded

Pump alarms shall be provided as follows:

- Failure: Commanded on, but the status is off.
- Running in Hand: Commanded off, but the status is on.
- Runtime Exceeded: Status runtime exceeds a user definable limit.

Boiler Systems Operation:

The glycol heating system is provided by two Viessmann gas-fired boilers (B-1 and B-2). The boiler system is equipped with cascade controller. The following monitoring points shall be displayed in the BAS system.

- Target Supply Temperature to both boilers
- Glycol solution temperature at low loss header
- Boiler B-1 status:
  - Target Supply Temperature Actual
  - Burner Modulation Value
  - Burner: On/Off
  - Boiler circuit pump, P-1
- Boiler B-2 status:
  - Target Supply Temperature Actual
  - Burner Modulation Value
  - Burner: On/Off
  - Boiler circuit pump, P-1

Boiler Alarms shall be provided as follows:

- Failure: Boiler failure

Equal runtime of boilers B-1 and B-2 shall be monitored and maintained. Switch the role of lead boiler between two boilers.

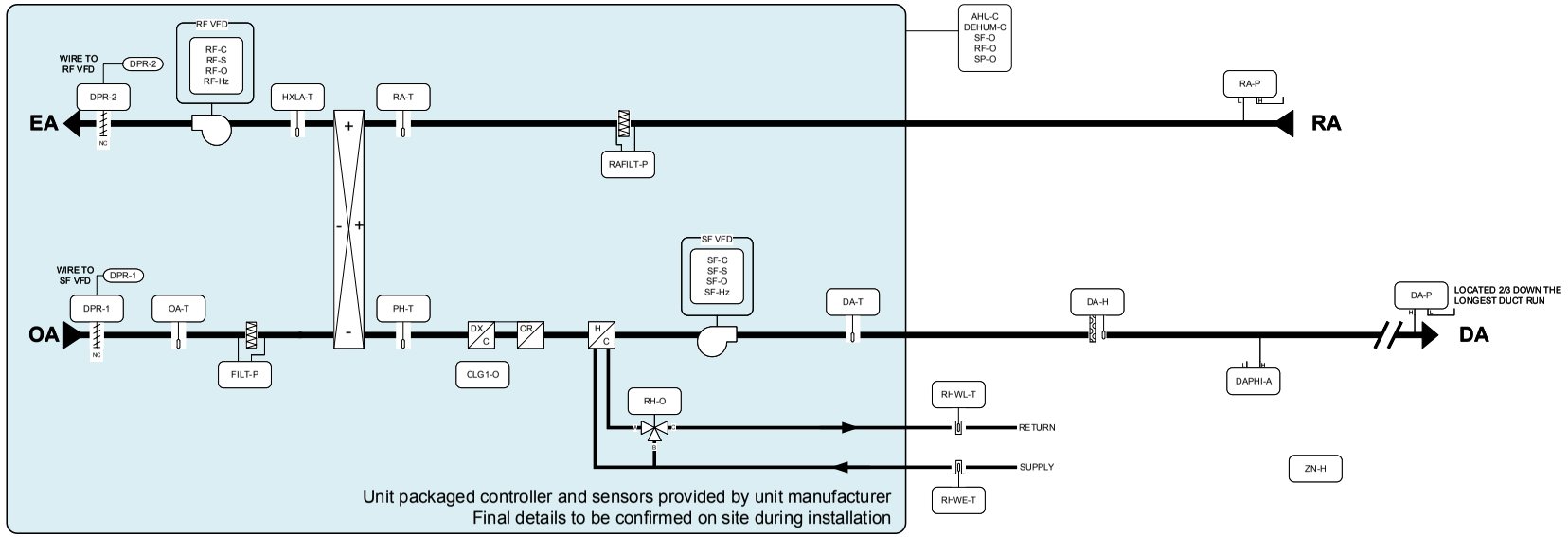
Temperature Monitoring:

The following temperatures shall be monitored:

- Hot glycol solution supply temperature
- Hot glycol solution return temperature

Drawing Title: Glycol Heating System Sequence of Operation						
	SUBMISSION	1	FOR SHOP DRAWING SUBMITTAL		2025/05/19	RX
	REVISION TITLE	NO.	REVISION NOTE	ECN	DATE	BY
	Sales Engineer / Project Manager: Ron Xu / Application Engineer: Ron Xu		DRAWN: BY JH DATE 2025/05/19		APPROVED: BY RX DATE 2025/05/19	
Project Title: Neshama Hospice 3 Cadillac Avenue North York, ON., M3H 1R9	IXL Technical Inc.		Branch Information: IXL Technical Inc. 29 Becca Hall Trail Scarborough, Ontario M1V 2T7 (416) 828-9285		CONTRACT NUMBER: 250407 DRAWING NUMBER: 2A	

Air Handling Unit AHU-1 – Flow Diagram



Tag	Qty	Part Number	Description
CONTROLLER	1	F4-CGM09090-0	Johnson Controls, General Purpose Controller, 18 points, BACnet MS/TP
RHWx-T	2	TSAPA24B	Greystone, immersion temperature sensor, 10k ohm type 2, 4"
	2	T2-1/2N4P	Greystone thermowell, 4"
DA-H	1	HSDTA200	Greystone, 2% Duct Humidity, selectable outputs
ZN-H	1	RH100B02	Greystone, 2% Room Humidity, selectable outputs
DA-P, RA-P	2	ELPB0002WS	Greystone, Low Pressure Transmitter, 0-2", +/-2" WC, Analog Output
DAPHI-A	1	GFS-86U-NPIKG	Greystone, Air D/P Switch, 500-2500 Pa adj. range

Drawing Title

Air Handling Unit AHU-1
Flow Diagram

NO.	REVISION NOTE	ECN	DATE	BY
1	FOR SHOP DRAWING SUBMITTAL		2025/05/19	RX

Sales Engineer	Project Manager	Application Engineer	DRAWN	APPROVED
	Ron Xu	Ron Xu	BY JH DATE 2025/05/19	BY RX DATE 2025/05/19

Project Title

Neshama Hospice
3 Cadillac Avenue
North York, ON., M3H 1R9

IXL Technical Inc.

Branch Information
IXL Technical Inc.
29 Becca Hall Trail
Scarborough, Ontario
M1V 2T7
(416) 828-9285

CONTRACT NUMBER
250407

DRAWING NUMBER
3

Air Handling Unit AHU-1 (100% Fresh Air Unit with Heat Exchanger)

The air handling unit AHU-1 shall run continuously to supply 100% fresh air to the building A.

Unit mounted non-fused disconnect switch 'on', service switch 'on', fire alarm contact 'closed'.

Unit on/off contact 'closed', blowers will delay on and run continuously. The Cencon controller, with a 0-10VDC setpoint signal from the building automation system will modulate heating/ economizer / cooling (cycling 2 stages of compressors) to maintain the required room air temperature.

The control algorithm for heating and cooling modes is listed below.

- Heating Mode: Signal sent to air handling unit based on setpoint of averaging temperature 20 deg C (Adj.) of all room temperature sensors (total of 15). The room sensors shall be a network sensor with temperature adjustable dial. The setpoint in each room shall be 21 deg C (Adj.) with 2 deg C (Adj.) according to dial adjustment. Building automation system turn on the electric heater to maintain set room temperature.

- Cooling Mode: Disable all electrical heaters. Signal sent to air handling unit based on maximum setpoint temperature of all room temperature sensors (total of 16).

Heat Mode operation of Air Handling Unit:

If there is a call for heating and the Cencon is in heating mode, the Cencon will output a 0-10 VDC signal to the glycol coil 3-way mixing valve, V-1. The discharge air temperature control band is from 50 deg F (10 deg C) to 90 deg F (32.2 deg C). The 3-way floating mixing valve will be controlled to control the set point supply air temperature. The glycol circulating pump P-4 will be de-energized when cooling is enabled.

Cool Mode:

If there is a call for cooing and the Cencon is in cooling mode, the C-XM controller module will be begin staging on the mechanical cooling. The discharge air temperature control band is from 50 deg F (10 deg C) to 90 deg F (32.2 deg C). Mechanical cooing is locked out below 50 deg F (10 deg C) ambient temperature.

Unit on/off contact 'open', outside air damper and exhaust air damper close, blowers shut down. Unit is off.

If the fire alarm contact 'open' (triggered by duct smoke detectors), equipment operation is disabled immediately. If the discharge air temperature falls below 40 deg F (4.4 deg C), the Cencon will shut down the blower, close dampers and indicate alarm.

The speed of the supply air fan and return air fan of AHU-1 shall be reduced to maintain the air pressure at supply air duct and return air duct. The set supply air and return air pressure is adjustable.

Outside Air Damper:

The outside air damper shall open anytime the unit runs and shall close anytime the unit stops. The supply fan shall start only after the damper status has proven the damper is open. The outside air damper shall close 10 sec (adj.) after the supply fan stops. Alarms shall be provided as follows:

- Outside Air Damper Failure: Commanded open, but the status is closed.

- Outside Air Damper in Hand: Commanded closed but the status is open.

Freeze Protection:

The unit shall shut down and generate an alarm upon receiving a low temperature alarm signal.

Supply Fan:

The supply fan shall run continuously.

The controller shall measure supply air pressure and modulate the supply VFD to maintain the required pressure setpoint. The following setpoints are recommended values. All setpoints shall be field adjusted during the commissioning period to meet the requirements of actual field conditions.

The controller shall modulate supply fan speed to maintain at 0.7" WG (adj.). The VFD minimum speed shall not drop below 30% (adj.).

Alarms shall be provided as follows:

- Supply Fan Failure: Commanded on, but the status is off.

- Supply Fan in Hand: Commanded off, but the status is on.

- VFD Fault.

Return Fan:

The return fan shall run continuously.

The controller shall measure return air pressure and modulate the return VFD to maintain the required pressure setpoint. The following setpoints are recommended values. All setpoints shall be field adjusted during the commissioning period to meet the requirements of actual field conditions.

The controller shall modulate return fan speed to maintain at 0.5" WG (adj.). The VFD minimum speed shall not drop below 30% (adj.).

Alarms shall be provided as follows:

- Return Fan Failure: Commanded on, but the status is off.

- Return Fan in Hand: Commanded off, but the status is on.

- VFD Fault.

Drawing Title: Air Handling Unit AHU-1 Sequence of Operation 1						
	SUBMISSION	1	FOR SHOP DRAWING SUBMITTAL		2025/05/19	RX
	REVISION TITLE	NO.	REVISION NOTE	ECN	DATE	BY
	Sales Engineer / Project Manager: Ron Xu	Application Engineer: Ron Xu	DRAWN: BY JH DATE 2025/05/19	APPROVED: BY RX DATE 2025/05/19		
Project Title: Neshama Hospice, 3 Cadillac Avenue, North York, ON., M3H 1R9	IXL Technical Inc.	Branch Information: IXL Technical Inc., 29 Becca Hall Trail, Scarborough, Ontario, M1V 2T7, (416) 828-9285		CONTRACT NUMBER: 250407		
				DRAWING NUMBER: 3A		

Supply Air Temperature Setpoint:

The controller shall monitor the supply air temperature and shall maintain supply air temperature setpoint. The supply air temperature setpoint shall reset for cooling as follows:

As outside air temperature drops from 90 deg F (adj.) to 0 deg F (adj.), the supply air temperature setpoint shall reset upwards from 65 deg F (adj.) to 70 deg F (adj.).

Alarms shall be provided as follows:

- High Supply Air Temp: If the supply air temperature is greater than 120 deg F (adj.).
- Low Supply Air Temp: If the supply air temperature is less than 45 deg F (adj.).

Ambient and Return Temperature:

The BAS shall monitor and display the following air temperature.

- Return air temperature from the building
- Outdoor ambient temperature
- Air temperature after the heat pipe heat exchanger
- Air temperature after the electric heating coil
- Supply air temperature

Dehumidification Control:

The controller shall monitor the relative humidity in space relative humidity and maintain the humidity setpoint. The setpoint shall be adjustable. The controller will command the air handling unit to turn on dehumidification mode when the humidity ratio exceeds the setpoint. Dehumidification will be enabled only during cooling mode.

Alarms shall be provided as follows:

- High humidity when the relative humidity detected by humidity sensor in building A exceeded 65%.

Heating Coil Valve:

When primary cooling/heating system is in heating mode, the controller shall measure the supply air temperature and modulate the heating coil valve to maintain supply air setpoint whenever the fan status is on.

Modulate 3-way control valve V-1 to maintain setpoint supply air temperature.

The heating coil valve shall close to 0% (adj.) whenever the low temperature alarm is on.

Display the supply and return water temperature to the heating coil.

Filter Differential Pressure Monitor:

The controller shall monitor the differential pressure across the filter.

Alarms shall be provided as follows:

- Final Filter Change Required: Final filter differential pressure exceeds a user definable limit (adj.).

Point #	Point Name	Point Description	Controller	Trunk Type	Trunk Nbr	Trunk Addr.	Device
UI1	RHWE-T	Reheat Coil Entering Temp	CGM09090	MS/TP	2	9	
UI2	RHWL-T	Reheat Coil Leaving Temp	CGM09090	MS/TP	2	9	
UI3	DA-H	Discharge Air Humidity	CGM09090	MS/TP	2	9	
UI4	DA-P	Discharge Air Pressure	CGM09090	MS/TP	2	9	
UI5	RA-P	Return Air Pressure	CGM09090	MS/TP	2	9	
UI6	ZN-H	Space Humidity	CGM09090	MS/TP	2	9	
UI7			CGM09090	MS/TP	2	9	
BI1	DAPHI-A	Discharge Air High Static Pressure Alarm	CGM09090	MS/TP	2	9	
BI2			CGM09090	MS/TP	2	9	
BO1	AHU-C	AHU Command	CGM09090	MS/TP	2	9	
BO2	DEHUM-C	Dehumidification Mode Command	CGM09090	MS/TP	2	9	
BO3			CGM09090	MS/TP	2	9	
CO1	SF-O	Supply Fan Speed Output	CGM09090	MS/TP	2	9	
CO2	RF-O	Return Fan Speed Output	CGM09090	MS/TP	2	9	
CO3	SP-O	AHU Setpoint Output	CGM09090	MS/TP	2	9	
CO4			CGM09090	MS/TP	2	9	
AO1			CGM09090	MS/TP	2	9	
AO2			CGM09090	MS/TP	2	9	

Drawing Title
Air Handling Unit AHU-1
Sequence of Operation 2 & Points List

SUBMISSION					
	1	FOR SHOP DRAWING SUBMITTAL		2025/05/19	RX

REVISION TITLE	NO.	REVISION NOTE	ECN	DATE	BY

Sales Engineer	Project Manager	Application Engineer	DRAWN	APPROVED
	Ron Xu	Ron Xu	BY JH DATE 2025/05/19	BY RX DATE 2025/05/19

Project Title
Neshama Hospice
3 Cadillac Avenue
North York, ON., M3H 1R9

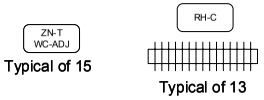
IXL Technical Inc.

Branch Information
IXL Technical Inc.
29 Becca Hall Trail
Scarborough, Ontario
M1V 2T7
(416) 828-9285

CONTRACT NUMBER
250407

DRAWING NUMBER
3B

AHU-1 Space Temperature & Radiant Heaters



Radiant Heater:
The BAS monitors space temperature and controls radiant heaters (RH-1) To maintain space temperature.

Point #	Point Name	Point Description	Controller	Trunk Type	Trunk Nbr	Trunk Addr.	Device
UI1			CGM09090	MS/TP	2	11	
UI2			CGM09090	MS/TP	2	11	
UI3			CGM09090	MS/TP	2	11	
UI4			CGM09090	MS/TP	2	11	
UI5			CGM09090	MS/TP	2	11	
UI6			CGM09090	MS/TP	2	11	
UI7			CGM09090	MS/TP	2	11	
BI1			CGM09090	MS/TP	2	11	
BI2			CGM09090	MS/TP	2	11	
BO1	RH1-C	Bed Room 1 Radiant Heater Command	CGM09090	MS/TP	2	11	
BO2	RH2-C	Bed Room 2 Radiant Heater Command	CGM09090	MS/TP	2	11	
BO3	RH3-C	Bed Room 3 Radiant Heater Command	CGM09090	MS/TP	2	11	
CO1	RH4-C	Bed Room 4 Radiant Heater Command	CGM09090	MS/TP	2	11	
CO2	RH5-C	Bed Room 5 Radiant Heater Command	CGM09090	MS/TP	2	11	
CO3	RH6-C	Bed Room 6 Radiant Heater Command	CGM09090	MS/TP	2	11	
CO4	RH144-C	Family Room 144 Radiant Heater Command	CGM09090	MS/TP	2	11	
AO1			CGM09090	MS/TP	2	11	
AO2			CGM09090	MS/TP	2	11	

Point #	Point Name	Point Description	Controller	Trunk Type	Trunk Nbr	Trunk Addr.	Device
UI1			CGM04060	MS/TP	2	12	
UI2			CGM04060	MS/TP	2	12	
UI3			CGM04060	MS/TP	2	12	
BI1			CGM04060	MS/TP	2	12	
BO1	RH7-C	Bed Room 7 Radiant Heater Command	CGM04060	MS/TP	2	12	
BO2	RH8-C	Bed Room 8 Radiant Heater Command	CGM04060	MS/TP	2	12	
CO1	RH9-C	Bed Room 9 Radiant Heater Command	CGM04060	MS/TP	2	12	
CO2	RH10-C	Bed Room 10 Radiant Heater Command	CGM04060	MS/TP	2	12	
CO3	RH11-C	Bed Room 11 Radiant Heater Command	CGM04060	MS/TP	2	12	
CO4	RH12-C	Bed Room 12 Radiant Heater Command	CGM04060	MS/TP	2	12	

Tag	Qty	Part Number	Description
CONTROLLER	1	F4-CGM09090-0	Johnson Controls, General Purpose Controller, 18 points, BACnet MS/TP
CONTROLLER	1	F4-CGM04060-0	Johnson Controls, General Purpose Controller, 10 points, BACnet MS/TP
ZN-T	15	NSB8BTN240-0	Johnson Controls, Network sensor, temp, fixed segment display

Drawing Title
AHU-1 Space Temperature & Radiant Heaters

NO.	REVISION NOTE	ECN	DATE	BY
SUBMISSION	1 FOR SHOP DRAWING SUBMITTAL		2025/05/19	RX

Sales Engineer	Project Manager	Application Engineer	DRAWN	APPROVED
	Ron Xu	Ron Xu	BY JH DATE 2025/05/19	BY RX DATE 2025/05/19

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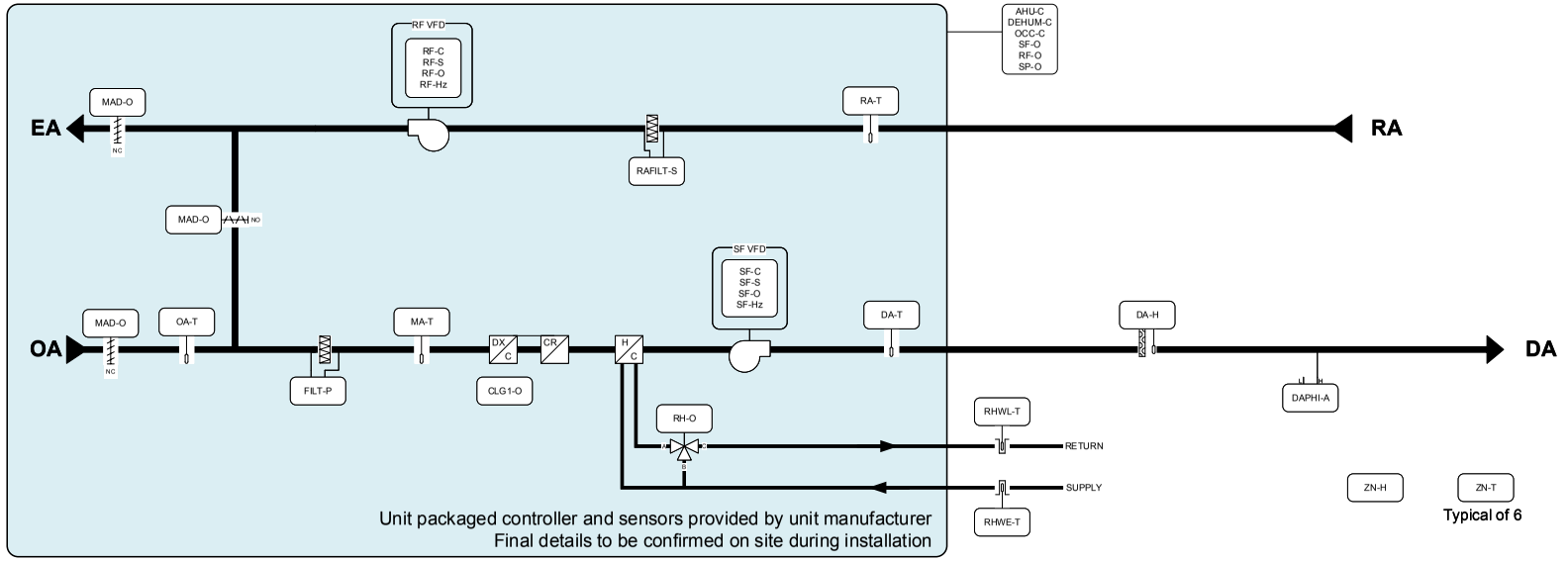
Scarborough, Ontario
M1V 2T7
(416) 828-9285

CONTRACT NUMBER
250407

DRAWING NUMBER
4

Air Handling Unit AHU-2 – Flow Diagram



Tag	Qty	Part Number	Description
CONTROLLER	1	F4-CGM09090-0	Johnson Controls, General Purpose Controller, 18 points, BACnet MS/TP
RHWx-T	2	TSAPA24B	Greystone, immersion temperature sensor, 10k ohm type 2, 4"
	2	T2-1/2N4P	Greystone thermowell, 4"
DA-H	1	HSDTA200	Greystone, 2% Duct Humidity, selectable outputs
DAPHI-A	1	GFS-86U-NPIKG	Greystone, Air D/P Switch, 500-2500 Pa adj. range
ZN-T	6	NSB8BTN040-0	Johnson Controls, Network sensor, no display
ZN-H	1	RH100B02	Greystone, 2% Room Humidity, selectable outputs

Drawing Title

Air Handling Unit AHU-2
Flow Diagram

NO.	REVISION NOTE	ECN	DATE	BY
SUBMISSION	1	FOR SHOP DRAWING SUBMITTAL		2025/05/19	RX

Sales Engineer	Project Manager	Application Engineer	DRAWN	APPROVED
	Ron Xu	Ron Xu	BY JH DATE 2025/05/19	BY RX DATE 2025/05/19

Project Title

Neshama Hospice
3 Cadillac Avenue
North York, ON., M3H 1R9

IXL Technical Inc.

Branch Information
IXL Technical Inc.
29 Becca Hall Trail
Scarborough, Ontario
M1V 2T7
(416) 828-9285

CONTRACT NUMBER
250407

DRAWING NUMBER
5

Air Handling Unit AHU-2 (Mixed Air Unit)

The air handling unit AHU-2 shall run continuously to supply air to the building B.

Unit on/off contact 'closed', blowers will delay on and run continuously. The Cencon controller, with a 0-10VDC setpoint signal from the building automation system will modulate heating/ economizer / cooling (cycling 2 stages of compressors) to maintain the required room air temperature.

The control algorithm for heating and cooling modes is listed below.

- Heating Mode: Signal sent to air handling unit based on setpoint of averaging temperature 21 deg C (Adj.) of all room temperature sensors (total of 5). The room sensors shall be a network sensor.
- Cooling Mode: Signal sent to air handling unit based on maximum setpoint temperature of all room temperature sensors (total of 5).

Mixing Air Damper:

The mixing air damper shall open anytime the unit runs at preset position to maintain fresh air and return air ratio and shall close anytime the unit stops. The supply fan shall start only after the damper status has proven the damper is open. The outside air damper shall close 10 sec (adj.) after the supply fan stops. Alarms shall be provided as follows:

- Mixing Air Damper Failure: Commanded open, but the status is closed.
- Mixing Air Damper in Hand: Commanded closed but the status is open.

Freeze Protection:

The unit shall shut down and generate an alarm upon receiving a low temperature alarm signal.

Supply Fan:

The supply fan shall run continuously.

The VFD is for air balancing purpose. The controller shall be able to modulate the supply VFD.

Alarms shall be provided as follows:

- Supply Fan Failure: Commanded on, but the status is off.
- Supply Fan in Hand: Commanded off, but the status is on.
- VFD Fault.

Return Fan:

The return fan shall run continuously.

The VFD is for air balancing purpose. The controller shall be able to modulate the return VFD.

Alarms shall be provided as follows:

- Return Fan Failure: Commanded on, but the status is off.
- Return Fan in Hand: Commanded off, but the status is on.
- VFD Fault.

Supply Air Temperature Setpoint:

The controller shall monitor the supply air temperature and shall maintain supply air temperature setpoint. The supply air temperature setpoint shall reset for cooling as follows:

As outside air temperature drops from 90 deg F (adj.) to 0 deg F (adj.), the supply air temperature setpoint shall reset upwards from 65 deg F (adj.) to 70 deg F (adj.).

Alarms shall be provided as follows:

- High Supply Air Temp: If the supply air temperature is greater than 120 deg F (adj.).
- Low Supply Air Temp: If the supply air temperature is less than 45 deg F (adj.).

Ambient and Return Temperature:

The BAS shall monitor and display the following air temperature.

- Return air temperature from the building
- Outdoor ambient temperature
- Mixed air temperature after the heat pipe heat exchanger
- Supply air temperature

Dehumidification Control:

The controller shall monitor the relative humidity in space relative humidity and maintain the humidity setpoint. The setpoint shall be adjustable. The controller will command the air handling unit to turn on dehumidification mode when the humidity ratio exceeds the setpoint. Dehumidification will be enabled only during cooling mode.

Alarms shall be provided as follows:

- High humidity when the relative humidity detected by humidity sensor in building B exceeded 65%.

Drawing Title: Air Handling Unit AHU-2 Sequence of Operation 1						
	SUBMISSION	1	FOR SHOP DRAWING SUBMITTAL		2025/05/19	RX
	REVISION TITLE	NO.	REVISION NOTE	ECN	DATE	BY
	Sales Engineer / Project Manager: Ron Xu	Application Engineer: Ron Xu	DRAWN: BY JH DATE 2025/05/19	APPROVED: BY RX DATE 2025/05/19		
Project Title: Neshama Hospice, 3 Cadillac Avenue, North York, ON., M3H 1R9	IXL Technical Inc.	Branch Information: IXL Technical Inc., 29 Becca Hall Trail, Scarborough, Ontario, M1V 2T7, (416) 828-9285		CONTRACT NUMBER: 250407		
				DRAWING NUMBER: 5A		

Heating Coil Valve:

When primary cooling/heating system is in heating mode, the controller shall measure the supply air temperature and modulate the heating coil valve to maintain supply air setpoint whenever the fan status is on.

Modulate 3-way control valve V-2 to maintain setpoint supply air temperature.

The heating coil valve shall close to 0% (adj.) whenever the low temperature alarm is on.

Display the supply and return water temperature to the heating coil.

Filter Differential Pressure Monitor:

The controller shall monitor the differential pressure across the filter.

Alarms shall be provided as follows:

- Final Filter Change Required: Final filter differential pressure exceeds a user definable limit (adj.).

Point #	Point Name	Point Description	Controller	Trunk Type	Trunk Nbr	Trunk Addr.	Device
UI1	RHWE-T	Reheat Coil Entering Temp	CGM09090	MS/TP	2	13	
UI2	RHWL-T	Reheat Coil Leaving Temp	CGM09090	MS/TP	2	13	
UI3	DA-H	Discharge Air Humidity	CGM09090	MS/TP	2	13	
UI4			CGM09090	MS/TP	2	13	
UI5			CGM09090	MS/TP	2	13	
UI6	ZN-H	Space Humidity	CGM09090	MS/TP	2	13	
UI7			CGM09090	MS/TP	2	13	
BI1	DAPHI-A	Discharge Air High Static Pressure Alarm	CGM09090	MS/TP	2	13	
BI2			CGM09090	MS/TP	2	13	
BO1	AHU-C	AHU Command	CGM09090	MS/TP	2	13	
BO2	DEHUM-C	Dehumidification Mode Command	CGM09090	MS/TP	2	13	
BO3	OCC-C	Occupancy Command	CGM09090	MS/TP	2	13	
CO1	SF-O	Supply Fan Speed Output	CGM09090	MS/TP	2	13	
CO2	RF-O	Return Fan Speed Output	CGM09090	MS/TP	2	13	
CO3	SP-O	AHU Setpoint Output	CGM09090	MS/TP	2	13	
CO4			CGM09090	MS/TP	2	13	
AO1			CGM09090	MS/TP	2	13	
AO2			CGM09090	MS/TP	2	13	

Drawing Title
Air Handling Unit AHU-2
Sequence of Operation 2 &
Points List

SUBMISSION	1	FOR SHOP DRAWING SUBMITTAL		2025/05/19	RX
REVISION TITLE	NO.	REVISION NOTE	ECN	DATE	BY

Sales Engineer	Project Manager	Application Engineer	DRAWN	APPROVED
	Ron Xu	Ron Xu	BY JH DATE 2025/05/19	BY RX DATE 2025/05/19

Project Title
Neshama Hospice
3 Cadillac Avenue
North York, ON., M3H 1R9

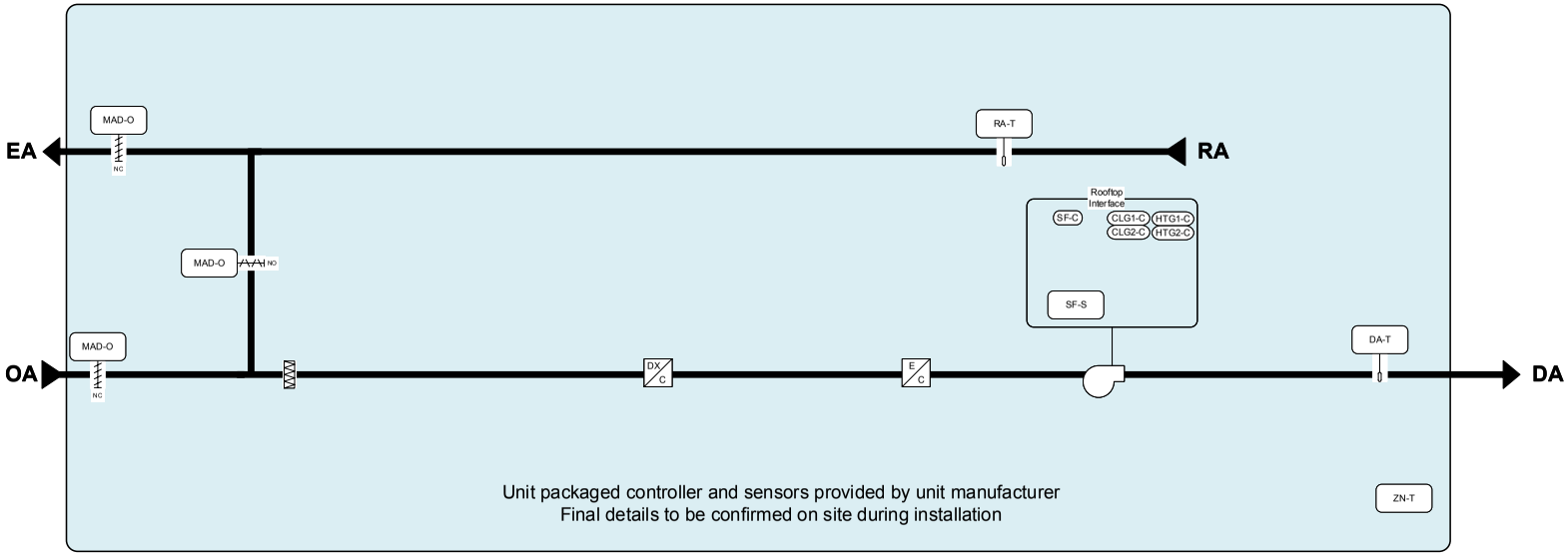
IXL Technical Inc.

Branch Information
IXL Technical Inc.
29 Becca Hall Trail
Scarborough, Ontario
M1V 2T7
(416) 828-9285

CONTRACT NUMBER
250407

DRAWING NUMBER
5B

Roof Top Unit RT-1

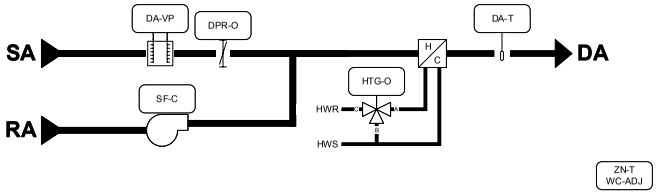


Roof Top Unit will be enabled through BAS based on time-of-day schedule or by the building operator.

BAS shall integrate Roof Top Unit factory controller Through BACnet MS/TP protocol.

Drawing Title: Roof Top Unit RT-1							
	SUBMISSION	1	FOR SHOP DRAWING SUBMITTAL		2025/05/19	RX
	REVISION TITLE	NO.	REVISION NOTE	ECN	DATE	BY
	Sales Engineer	Project Manager: Ron Xu	Application Engineer: Ron Xu	DRAWN: BY JH DATE 2025/05/19	APPROVED: BY RX DATE 2025/05/19		
Project Title: Neshama Hospice, 3 Cadillac Avenue, North York, ON., M3H 1R9	IXL Technical Inc.	Branch Information: IXL Technical Inc., 29 Becca Hall Trail, Scarborough, Ontario, M1V 2T7, (416) 828-9285		CONTRACT NUMBER: 250407			
				DRAWING NUMBER: 6			

Fan Powered VAV Boxes
Typical of 7



OCCUPIED MODE:
During this mode the parallel fan (SF-C) will cycle on upon a call for heat. When the zone temperature (ZN-T) is between the occupied heating (EFFHTG-SP) and cooling (EFFCLG-SP) setpoints (inside of the bias), the primary air damper (DPR-O) will be at the minimum CFM (SA-F) and there will be no mechanical heating. On a rise in zone temperature (ZN-T) above the cooling setpoint (EFFCLG-SP), the primary air damper (DPR-O) will increase the CFM (SA-F) and there will be no mechanical heating. On a drop in zone temperature (ZN-T) below the heating setpoint (EFFHTG-SP), the reheat coil will be used to maintain the zone temperature (ZN-T) and the damper (DPR-O) is controlled to provide a minimum CFM (SA-F).

UNOCCUPIED MODE:
When in this mode, while the zone temperature (ZN-T) is between the unoccupied heating (EFFHTG-SP) and cooling (EFFCLG-SP) setpoints (inside of the bias), the primary air damper (DPR-O) will be at the minimum CFM (SA-F) and there will be no mechanical heating, and the parallel fan (SF-C) will be off. On a rise in zone temperature (ZN-T) above the unoccupied cooling setpoint (EFFCLG-SP), the primary air damper (DPR-O) will increase the CFM (SA-F) (if available) and there will be no mechanical heating. On a drop in zone temperature (ZN-T) below the unoccupied heating setpoint (EFFHTG-SP), the parallel fan (SF-C) will cycle on, the reheat coil will be used to maintain the zone temperature (ZN-T), and the damper (DPR-O) will remain fully closed.

DISCHARGE AIR TEMP SENSOR:
A discharge air temp (DA-T) sensor is provided on each box for monitoring purposes.

Point #	Point Name	Point Description	Controller	Trunk Type	Trunk Nbr	Trunk Addr.	Device
UI1	DA-T	Discharge Air Temperature	CVM03050	MS/TP	2	17 to 23	
UI2			CVM03050	MS/TP	2	17 to 23	
UI3			CVM03050	MS/TP	2	17 to 23	
Integral	DA-VP	Discharge Air Velocity Pressure	CVM03050	MS/TP	2	17 to 23	
BO1	HTG-O	Heating Output (Open)	CVM03050	MS/TP	2	17 to 23	
BO2	HTG-O	Heating Output (Close)	CVM03050	MS/TP	2	17 to 23	
BO3	SF-C	Supply Fan Command	CVM03050	MS/TP	2	17 to 23	
CO1			CVM03050	MS/TP	2	17 to 23	
CO2			CVM03050	MS/TP	2	17 to 23	
Integral	DPR-O	Supply Air Damper Output	CVM03050	MS/TP	2	17 to 23	
STAT	ZN-T	Zone Temperature	CVM03050	MS/TP	2	17 to 23	
STAT	WC-ADJ	Warmer/Cooler Adjust	CVM03050	MS/TP	2	17 to 23	
STAT			CVM03050	MS/TP	2	17 to 23	

Tag	Qty	Part Number	Description
CONTROLLER	7	F4-CVM03050-0	Johnson Controls, General Purpose Controller, 18 points, BACnet MS/TP
DA-T	7	TSAPA24C	Greystone, immersion temperature sensor, 10k ohm type 2, 6"
ZN-T	7	NSB8BTN140-0	Johnson Controls, Network sensor, temp, warm/cool adjustment

Drawing Title
Fan Powered VAV Box

SUBMISSION	1	FOR SHOP DRAWING SUBMITTAL		2025/05/19	RX
REVISION TITLE	NO.	REVISION NOTE		ECN	DATE	BY

Sales Engineer | Project Manager: Ron Xu | Application Engineer: Ron Xu | DRAWN: BY JH DATE 2025/05/19 | APPROVED: BY RX DATE 2025/05/19

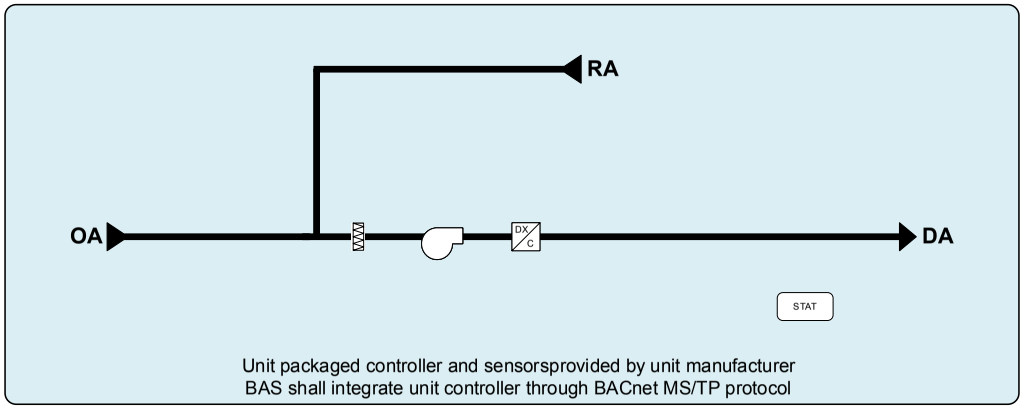
Project Title
Neshama Hospice
3 Cadillac Avenue
North York, ON., M3H 1R9

IXL Technical Inc.

Branch Information
IXL Technical Inc.
29 Becca Hall Trail
Scarborough, Ontario
M1V 2T7
(416) 828-9285

CONTRACT NUMBER: 250407
DRAWING NUMBER: 7

Split Air Conditioner AC-5



Split Air Conditioner AC-5

Split air conditioner AC-5 in Family/Activity Room (144) in Building A is to overcool the room when a body of a pass away patient to be placed in the room for a few days. The BAS shall be able to set the split air conditioner into two modes: Normal mode and overcooled mode.

During normal mode, the split air conditioner will be operated as an air conditioner to satisfy the setpoint temperature (adjustable). Under the overcooled mode, the following procedures shall be performed.

- Disable the electric heater in the room.
- Change the target set point to 19 deg C
- Disable the room temperature sensor functions within the Family/Activity Room to control the air handling unit AHU-1 including the average temperature setpoint calculation and controlling electric heater.

Drawing Title: Split Air Conditioner AC-5						
	SUBMISSION	1	FOR SHOP DRAWING SUBMITTAL		2025/05/19	RX
	REVISION TITLE	NO.	REVISION NOTE	ECN	DATE	BY
	Sales Engineer / Project Manager: Ron Xu	Application Engineer: Ron Xu	DRAWN: BY JH DATE 2025/05/19	APPROVED: BY RX DATE 2025/05/19		
Project Title: Neshama Hospice, 3 Cadillac Avenue, North York, ON., M3H 1R9	IXL Technical Inc.	Branch Information: IXL Technical Inc., 29 Becca Hall Trail, Scarborough, Ontario, M1V 2T7, (416) 828-9285		CONTRACT NUMBER: 250407	DRAWING NUMBER: 8	

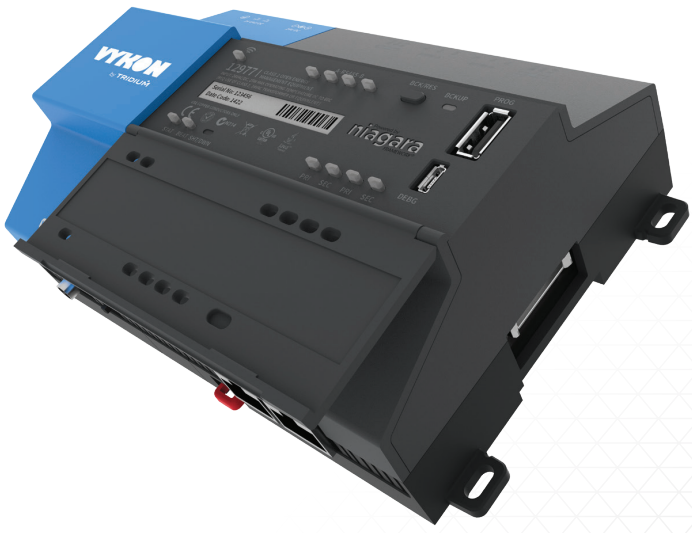
data sheet

JACE 8000 controller

PRODUCT DEFINITION

The JACE® 8000 is a compact, embedded IoT (Internet of Things) controller and server platform for connecting multiple and diverse devices and sub-systems. With internet connectivity and web-serving capability, the JACE 8000 controller provides integrated control, supervision, data logging, alarming, scheduling and network management. It streams data and rich graphical displays to a standard web browser via an Ethernet or wireless LAN, or remotely over the internet. VYKON Enterprise Security is an application that runs within the Niagara Framework® on the JACE 8000. VYKON Integrated Analytics is a data analytics extension to the Niagara Framework available on JACE 8000 controllers.

The licensing model for the JACE 8000 controller is simplified and features standard drivers, along with optional IO and field bus expansion modules for ultimate flexibility and expandability. The JACE 8000 controller operates with Niagara 4, the latest version of the Niagara Framework, for optimum performance. In larger facilities, multi-building applications and large-scale control system integrations, Niagara 4 Supervisors can be used with JACE 8000 controllers to aggregate information, including alarms, and historical and real-time data, to create a single, unified application.



HARDWARE SPECIFICATIONS

TI AM3352: 1000MHz ARM® Cortex™-A8
1GB DDR3 SDRAM
Removable micro-SD card with 4GB flash total storage/2GB user storage
Wi-Fi (Client or WAP) *IEEE802.11a/b/g/n* *IEEE802.11n HT20 @ 2.4GHz* *IEEE802.11n HT20/HT40 @ 5GHz* *Configurable radio (Off, WAP, or Client)* *WPAPSK/WPA2PSK supported*
USB type A connector *Back-up and restore support*
(2) isolated RS-485 with selectable bias and termination
(2) 10/100MB Ethernet ports
Secure boot
*Supply requirements: 24VAC rated at 24VA minimum, or 24VDC rated at 1A (24W) minimum
Runs Niagara 4: 4.1 and later
VYKON Integrated Analytics 2.1 is compatible with Niagara 4.4 and later
Real-time clock
Batteryless

**VYKON Enterprise Security requires four hours of standby power*

powered by niagara framework®

ORDERING INFORMATION: SOFTWARE & SOFTWARE MAINTENANCE

Every JACE 8000 comes with a Niagara 4 software license and Tridium's standard drivers. Purchase of a software maintenance agreement (SMA) is required with initial JACE licensing. The initial SMA is for 18 months, with extended agreements of 3 years and 5 years available for discounted rates.

Note: If a Software Maintenance Agreement is not in effect for any period, the price of maintenance for the next period for which it is purchased will be priced at a cost equal to the maintenance fee for the period(s) for which maintenance was not purchased, up to a maximum of 5 years, plus the maintenance fee for the next year.

ORDERING INFORMATION: VYKON INTEGRATED ANALYTICS

25 analytic points are included with every JACE 8000 license. VYKON Integrated Analytics licenses are conveniently and cost-effectively based on the number of analytical points and do not expire. Your Software Maintenance Agreement covers all VYKON Integrated Analytics enhancements, adding to the value of the SMA.

key features

- Data analysis at the onsite JACE controller level
- Real-time on-premise analytic control

Part number	Description
NA-EC-N4-100	VYKON Integrated Analytics Framework (on Niagara 4) license for 100 analytic points for an Embedded Controller (JACE 8000)
NA-EC-N4-250	VYKON Integrated Analytics Framework (on Niagara 4) license for 250 analytic points for an Embedded Controller (JACE 8000)
NA-EC-N4-500	VYKON Integrated Analytics Framework (on Niagara 4) license for 500 analytic points for an Embedded Controller (JACE 8000)
NA-EC-N4-1000	VYKON Integrated Analytics Framework (on Niagara 4) license for 1,000 analytic points for an Embedded Controller (JACE 8000)

Find additional data sheets for VYKON Integrated Analytics on VYKON's website

EXPANSION MODULE AND IO CONFIGURATIONS

MAXIMUM EXPANSION (MODULES SUPPORTED)

- NPB-8000-LON (4)
- NPB-8000-232 (4)
- NPB-8000-2X-485 (2)

MAXIMUM IO (MODULES SUPPORTED)*

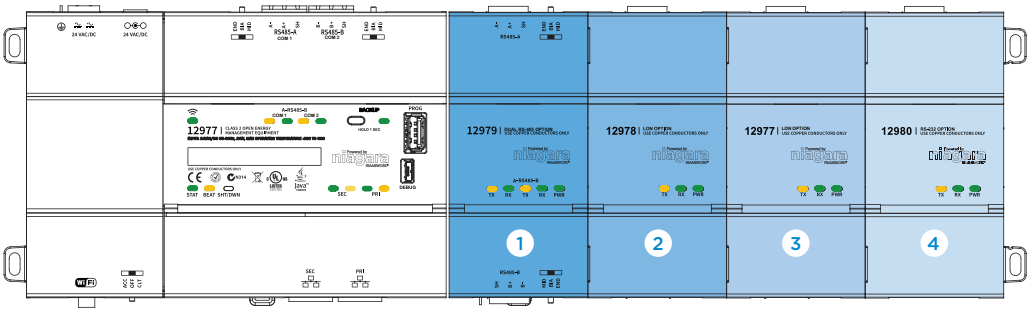
- IO-R-16 (16)*
- IO-R-34 (8)*

**See JACE 8000 IO R data sheet for configuration details*

MAXIMUM NIAGARA ENTERPRISE SECURITY (MODULES SUPPORTED)*

- SEC-R2R*
- SEC-RIO*

**16 total each or combined*



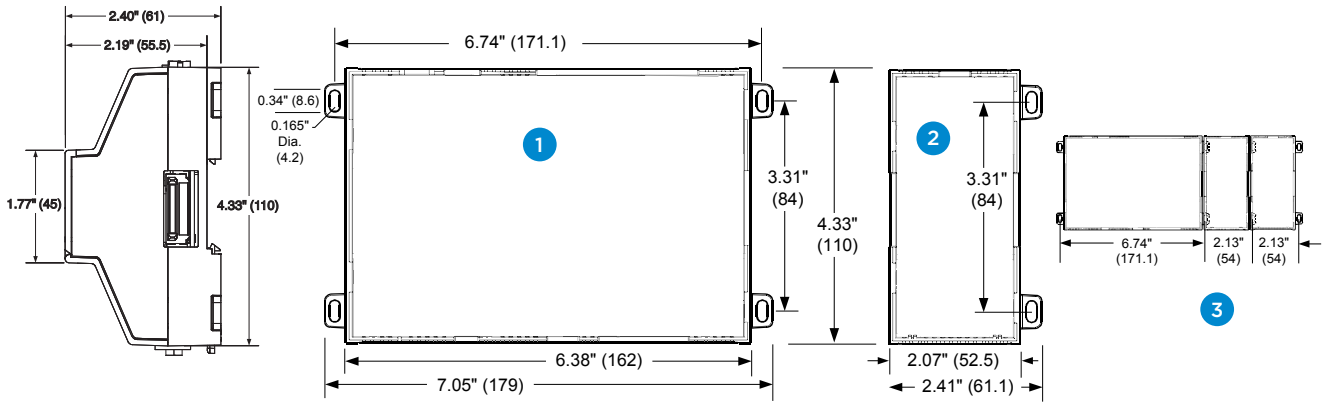
MAXIMUM COMBINATIONS

EXPANSION 1	EXPANSION 2	EXPANSION 3	EXPANSION 4
232 or LON	232 or LON	232 or LON	232 or LON
485 485	232 or LON	232 or LON	232 or LON
485 485	485 485	232 or LON	
485 485	485 485		

Expandability is dependent on the type of expansion module used

JACE® 8000 CONTROLLER MOUNTING & DIMENSIONS

1. JACE 8000 controller. Allow at least 1.5″ (38mm) clearance around all sides and minimum 3″ (76mm) at bottom for Wi-Fi antenna
2. Expansion module. Up to four (4) may be used. See "Expansion Module and IO Configurations"
3. Distances between center of tabs from one unit to another unit



Compatible with (DIN43880) enclosures
Suitable for mounting to a panel or to an EN50022 standard 35mm rail

Vizio stencils available upon request

AGENCY CERTIFICATIONS

- UL 916
- CE EN 61326-1
- RCM
- FCC Part 15 Subpart B, Class B
- FCC Part 15 Subpart C
- C-UL listed to Canadian Standards Association (CSA) C22.2 No. 205-M1983 "Signal Equipment"
- 1999/5/EC R&TTE Directive
- CCC
- SRRC
- RSS
- RoHS

ENVIRONMENTAL SPECIFICATIONS

- **Operating temperature:** -20–60°C
- **Storage temperature:** -40–85°C
- **Humidity:** 5%–95% — Non condensing
- **Shipping & vibration:** ASTM D4169, Assurance Level II
- **MTTF:** 10 years+

Contact **support@tridium.com** for the latest agency certifications or global shipping guide

JACE® 8000 ORDERING INFORMATION

Part number	Description
J-8005	JACE 8000 Controller, microSD card, 2 10/100 Mb Ethernet ports, 2 RS-485 serial ports. Licensed for 5 Device/250 Point Limit. Includes standard open drivers.
J-8010	JACE 8000 Controller, microSD card, 2 10/100 Mb Ethernet ports, 2 RS-485 serial ports. Licensed for 10 Device/500 Point Limit. Includes standard open drivers.
J-8025	JACE 8000 Controller, microSD card, 2 10/100 Mb Ethernet ports, 2 RS-485 serial ports. Licensed for 25 Device/1,250 Point Limit. Includes standard open drivers.
J-8100	JACE 8000 Controller, microSD card, 2 10/100 Mb Ethernet ports, 2 RS-485 serial ports. Licensed for 100 Device/5,000 Point Limit. Includes standard open drivers.
J-8200	JACE 8000 Controller, microSD card, 2 10/100 Mb Ethernet ports, 2 RS-485 serial ports. Licensed for 200 Device/10,000 Point Limit. Includes standard open drivers.
JACE-8000 Non-Wi-Fi	Identical in form and function to standard JACE-8000 model without the Wi-Fi module and peripherals.
JEC-834	JACE 8000 Equipment Controller with remote connected 34 point I/O module. Includes microSD card, 2 10/100 Mb Ethernet ports, 2 RS-485 serial ports and integration ready. Includes standard open drivers with 0 device & 0 point capacity. I/O module and Device expandable.
DEVICE-10	Up to 10 devices/500 point upgrade (can be purchased during initial licensing)
DEVICE-25	Up to 25 devices/1,250 point upgrade (can be purchased during initial licensing)
DEVICE-50	Up to 50 devices/2,500 point upgrade (can be purchased during initial licensing)
NPB-8000-2X-485	JACE 8000 controller — add on dual port RS-485 module
NPB-8000-LON	JACE 8000 controller — add on single port LON FTT10A module
NPB-8000-232	JACE 8000 controller — add on single port RS-232 module
WPM-8000	Universal power supply for JACE 8000 controller
IO-R-16	Optional 16 point IO RS485 module designed for use with the JACE 8000 — Includes 8 Universal Inputs, 4 Form A Relay Outputs and 4 0-10 VDC Analog Outputs
IO-R-34	Optional 34 point IO RS485 module designed for use with the JACE 8000 — Includes 16 Universal Inputs, 10 Form A Relay Outputs and 8 0-10 VDC Analog Outputs

VYKON by TRIDIUM

JACE® 8000 ORDERING INFORMATION: VYKON ENTERPRISE SECURITY

VYKON ENTERPRISE SECURITY ON THE JACE 8000

Part number	Description
SEC-J8-32	VYKON Enterprise Security license for JACE 8000 controller on N4 platform. Includes licensing for 32 readers (not included in capacity). Does not include the JACE 8000 controller.

JACE ACCESSORIES FOR VYKON ENTERPRISE SECURITY

Part number	Description
SEC-R2R	Security module for 2 readers/access doors and 2 digital inputs
SEC-RIO	Security module with 8 supervised inputs, 8 relay outputs and 2 digital inputs
SEC-ENC-LNP	Large enclosure with keyed lock, door status switch, and 2 din rails for mounting JACE 8000 controller and up to 4 remote reader modules or 2 remote IO modules. Several other combinations of devices may be mounted in this panel. Dimensions: 17"W x 22"H x 4"D.

Find additional data sheets for the VYKON Enterprise Security application on VYKON's website

The JACE 8000 controller is available through a wide variety of Niagara Community partners. Our open distribution business model and open protocol support allow a vendor-neutral application compatible with devices and systems throughout the world. Contact your VYKON partner today to get started.

Contact your VYKON partner today to get started.

VYKON by TRIDIUM

vykon.com

2023-0014VK

June 2023

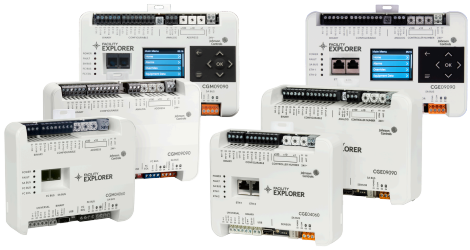
F4-CG General Purpose Application Controller Catalog Page

2023-12-12

LIT-1901108

General Purpose Application Controllers (CG Series)

Figure 1: F4-CG General Purpose Application Controllers



The CG series general purpose application controllers are well-suited for controlling a wide variety of facility and HVAC equipment, including fan coils, air handling units, packaged HVAC equipment, and central plant equipment. CG series controllers run pre-engineered and user-programmed applications.

CG series controllers include an integral real-time clock, which enables the controllers to monitor and control schedules, calendars, and trends, and operate for extended periods of time as standalone controllers when offline from the Facility Explorer system network. Some models feature an integral color display with a navigation keypad that enables enhanced local monitoring of controlled field equipment.

CGE controllers communicate using the BACnet® Secure Connect (BACnet/SC) or BACnet/IP communication protocols. CGM controllers are switchable to use either the BACnet MS/TP or N2 communications protocol. Equipment controllers in BACnet/SC, BACnet/IP, or BACnet MS/TP communication mode are BACnet network-compliant devices. You can use controllers running in N2 mode to maintain or modernize sites with installed legacy Johnson Controls® controllers.

For product application details, refer to the *Facility Explorer CG, CV Equipment Controllers Product Bulletin (LIT-12013225)*.

Features and benefits

Sleek and modern packaging and styling

Provides a modern, aesthetically pleasing industrial design.

Standard hardware and software platform

Uses a common hardware design throughout the family line to support standardized wiring practices and installation workflows. Also uses a common software design to support use of a single tool for control applications, commissioning, and troubleshooting to minimize technical training.

High memory capacity and fast processing power

Provides application engineers with the horsepower to meet sophisticated control requirements.

Auto-Tuned Control Loops

Proportional Adaptive Control (P-Adaptive) and Pattern Recognition Adaptive Control (PRAC) delivers continuous control loop tuning, which reduces commissioning time, eliminates change-of-season re-commissioning, and reduces wear and tear on actuators.

Standard BACnet protocol

Provides interoperability with other Building Automation System (BAS) products that use the widely accepted BACnet standard.

Models to support BACnet/IP and BACnet/SC communications

Provides higher speed communication with the Controller Configuration Tool (CCT) and improved bandwidth. BACnet/SC is a new protocol that provides a secure method of communication on IP networks. It uses standards widely accepted by the IT community thus eliminating many of the IT concerns.

Johnson Controls

Models to support wired BACnet MS/TP, ZFR wireless, and N2 with streamlined workflow

CGM controllers can support multiple communication protocols without the need to purchase a special model per protocol and without extra manual setup. If an application configured for N2 communication is loaded on the controller, it automatically communicates through N2. Controllers will otherwise default to MS/TP communication. If a ZFR Pro Wireless Field Bus Router is connected to the controller when the controller is initially powered on, it automatically enters wireless mode.

BACnet Testing Laboratories (BTL) listed and certified as BACnet Advanced Application Controllers (B-AAC)

Ensures openness and interoperability with other BTL-listed devices. BTL is a third-party agency, which validates that BAS vendor products meet the BACnet industry-standard protocol.

BACnet automatic discovery

Supports easy controller integration into a Facility Explorer (FX) BAS.

Device Security

Ensures device integrity while the system is rebooting and during normal operation. Embedded software in the CGE controller provides secure boot operation, firmware protection, secure communications, and secure firmware updates to comply with cyber security best practices.

FIPS 140-2 Level 1 compliance using FIPS validated components

CGE controllers are FIPS 140-2 Level 1 compliant using FIPS validated components. FIPS 140-2 is a U.S. government cyber security standard used to approve cryptographic modules and algorithms used for encryption. Assures operators that Facility Explorer uses leading cyber security techniques to help prevent unauthorized access to systems and data.

Wireless ZFR Pro support

Wireless ZFR Pro support provides a wireless alternative to hard-wired MS/TP networking, offering application flexibility and mobility with minimal disruption to building occupants, and also simplifies and speeds up replacements.

Integral real-time clock

An integral real-time clock, which enables the controllers to monitor and control schedules, calendars, and trends, and operate for extended periods of time as stand-alone controllers when offline from the FX system network.

Pluggable screw terminal blocks

Pluggable input/output wiring terminal blocks that can be removed from the controller provide electrical installers and field technicians the ability to quickly and easily install and service a controller without the need to disconnect and reconnect the input/output wiring.

Rotary switches for controller address/controller number

Easy-to-use rotary switches set the MS/TP address or controller number in for Ethernet controllers decimal format.

Universal Inputs and Configurable Outputs

Allows multiple signal options to provide input/output flexibility.

End-of-Line (EOL) switch in MS/TP equipment controllers

Enables equipment controllers to be terminating devices on the communications bus.

Default State for Input/Output wiring validation

Enables validation of the input and output terminals' wiring without having to download an application file.

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Background transfer coupled with enable/ disable logic options in Controller Configuration Tool (CCT)

Saves field technicians' time, enables productivity and minimizes equipment disruption, since the controllers are operating while file updates take place in the background and the application can be left disabled until the system is ready to run.

SA Bus device provisioning improvements

Saves field technicians time when commissioning SA Bus devices by enabling an equipment controller to transfer and apply firmware files to all the SA Bus devices (XPM, PCX, NS8000) connected to it.

Models with onboard display and navigation keypad

Provides an intuitive local interface for users to monitor point values and status, view alarms, view trends, override outputs, and adjust setpoints and parameters. The easy-to-use display provides the ability to quickly troubleshoot issues and restore control while being near the associated mechanical equipment.

Local Controller Display and the Mobile Access Portal (MAP) Support

Enable monitoring and commanding of I/O and configuration parameters.

CG series model information

Table 1: CG series information including point type counts

CG series information	Description		
Communication protocol	**CGM09090-0/0H and CGM04060-0:** BACnet MS/TP, N2, or Zigbee Wireless (using add-on modules) **CGE09090-0/0H and CGE04060-0:** BACnet/SC or BACnet/IP		
Modular jacks	**CGM09090-0/0H and CGM04060-0:** FC and SA Bus Modular Ports: RJ-12 6-Pin Modular Jacks **CGE09090-0/0H and CGE04060-0:** RJ-12 6-Pin Sensor Port		
Point types	**Signals accepted**	**CGM09090-0/0H** **CGE09090-0/0H**	**CGM04060-0** **CGE04060-0**
Universal Input (UI)	15 VDC Power Source (Provide 100mA total current) Analog Input - Voltage Mode (0–10 VDC) Analog Input - Current Mode (4–20 mA) Analog Input - Resistive Mode (0–600k ohm), RTD (1k Nickel [Johnson Controls sensor], 1k PT, A998 SI), NTC (10k Type L, 2.252k Type 2) Binary Input - Dry Contact Maintained Mode Universal Input Common	7	3
Binary Input (BI)	Binary Input - Dry Contact Maintained Mode Binary Input - Pulse Counter/Accumulator Mode Binary Input Common	2	1
Binary Output (BO)	Binary Output - 24 VAC Triac (External Power Source) Binary Output Common	3	2
Configurable Output (CO)	Analog Output - Voltage Mode (0–10 VDC) Binary Output - 24 VAC Triac Analog Output Signal Common Binary Output Signal Common	4	4

Johnson Controls

Table 1: CG series information including point type counts

CG series information	Description		
Analog Output (AO)	Analog Output - Voltage Mode (0–10 VDC) Analog Output - Current Mode (4–20 mA) Analog Output Signal Common	2	0
SA Bus	Supports up to 10 total wired SA Bus devices, including the XPM and PCX series expansion I/O modules.		
	Supports up to four NS Series Network Sensors.		
WRZ sensors	Supports up to nine WRZ sensors when using the ZFR or ZFR Pro Series wireless router configuration.		
	Supports up to five WRZ sensors when using the one-to-one WRZ-78xx wireless configuration.		

ⓘ **Note:** The models that end in **H** feature a built-in display.

CG series ordering information and accessories

Table 2: CG series ordering information

Product code number	Description
F4-CGM09090-0	18-point General Purpose Application MS/TP Controller Includes: MS/TP and N2 communication; 18 points (7 UI, 2 BI, 4 CO, 2 AO, 3 BO); real-time clock; 24 VAC input
F4-CGM09090-0H	18-point General Purpose Application MS/TP Controller with integral display Includes: MS/TP and N2 communication; 18 points (7 UI, 2 BI, 4 CO, 2 AO, 3 BO); real-time clock; 24 VAC input; Integral 2.4 inch color display and navigation keypad
F4-CGM04060-0	10-point General Purpose Application MS/TP Controller Includes: MS/TP and N2 communication; 10 points (3 UI, 1 BI, 4 CO, 2 BO); real-time clock; 24 VAC input
F4-CGE09090-0	18-point General Purpose Application Ethernet Controller Includes: BACnet/SC and BACnet/IP communication; 18 points (7 UI, 2 BI, 4 CO, 2 AO, 3 BO); real-time clock; 24 VAC input
F4-CGE09090-0H	18-point General Purpose Application Ethernet Controller with integral display Includes: BACnet/SC and BACnet/IP communication; 18 points (7 UI, 2 BI, 4 CO, 2 AO, 3 BO); real-time clock; 24 VAC input; Integral 2.4 inch color display and navigation keypad
F4-CGE04060-0	10-point General Purpose Application Ethernet Controller Includes: BACnet/SC and BACnet/IP communication; 10 points (3 UI, 1 BI, 4 CO, 2 BO); real-time clock; 24 VAC input

ⓘ **Note:** CGM and CGE models that comply with Buy American Act requirements are available. To order a model that complies with the Buy American Act requirements, add a G to the end of the product code. For example, F4-CGM09090-0G.

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Table 3: CG series accessories (order separately)

Product code number	Description
XPM Series Expansion Modules	Refer to the *F4-XPM Expansion Modules Catalog Page (LIT-1901150)* for a complete list of available Expansion Modules.
PCX Series Expansion Modules	Refer to the *FX-PC Series Programmable Controllers and Related Products Product Bulletin (LIT-12011657)* for a complete list of available Expansion Modules.
TL-CCT-0	License enabling Controller Configuration Tool (CCT) software for one user
FX-FCP-0	License enabling Facility Explorer Equipment Controller Firmware Package Files required for CCT
TL-CWCVT-0	Communications converter that provides a temporary wireless connection between a host device and equipment controllers that support the BACnet MS/TP protocol.
F4-DLK0350-0	Local Controller Display, 3.5 in. (89 mm) color display with navigation keypad
NS-ATV7003-0	Handheld VAV Balancing Tool
NS Series Network Sensors	Refer to the *NS Series Network Sensors Product Bulletin (LIT-12011574)* for specific sensor model descriptions.
AS-CBLTSTAT-0	Cable adapter for connection to 8-pin TE-6700 Series sensors
NS-WALLPLATE-0	Network Sensor Wall Plate
WRZ Series Wireless Room Sensors	Refer to the *WRZ Series Wireless Room Sensors Product Bulletin (LIT-12011653)* for specific sensor model descriptions.
WRZ-7860-0	Refer to the *WRZ-7860 Receiver for One-to-One Wireless Room Sensing Product Bulletin (LIT-12011640)* for a list of available products.
WRZ-SST-120	Refer to the *WRZ-SST-120 Wireless Sensing System Tool Installation Instructions (LIT-24-10563-55)* for usage instructions.
ZFR-HPSST-0	Wireless System Survey Tool. For use with the higher power WRG1830/ZFR183x System and lower power WRZ Sensors (10mW). Refer to the *Hi Power Survey Tool Installation Document (Part No.24-11461-00012)* for usage instructions.
WRG1830/ZFR183x Pro Series Wireless Field Bus System	For more information on products needed for wireless field bus installations and for a list of available products, refer to the *WRG1830/FX-ZFR183x Pro Series Wireless Field Bus System Catalog Page (LIT-1901153)*.
ZFR-USBHA-0	ZFR USB Dongle provides a wireless connection through CCT to allow wireless commissioning of the wirelessly enabled CGM and CVM controllers. It also allows use of the ZFR Checkout Tool (ZCT) in CCT. ⓘ **Note:** The ZFR-USBHA-0 is not compatible with the WRG1830/ZFR183x Pro Series. ⓘ **Note:** The ZFR-USBHA-0 replaces the IA OEM DAUBI_2400 ZFR USB dongle. For additional information about the ZFR-USBHA-0 ZFR dongle, refer to the *ZCT Checkout Tool Help LIT-12012292* or the *WNC1800_ZFR182x Pro Series Wireless Field Bus System Technical Bulletin (LIT-12012356)*.
Y64T15-0	Transformer, 120/208/240 VAC Primary to 24 VAC Secondary, 92 VA, Foot Mount, 72.2 cm (30 in.), Primary Leads and 76.2 cm (30 in.) Secondary Leads, Class 2
Y65A13-0	Transformer, 120 VAC Primary to 24 VAC Secondary, 40 VA, Foot Mount (Y65AS), 20.32 cm (8 in.), Primary Leads and 76.2 cm (30 in.) Secondary Leads, Class 2
Y65T31-0	Transformer, 120/208/240 VAC Primary to 24 VAC Secondary, 40 VA, Foot Mount (Y65AR+), 20.32 cm (8 in.), Primary Leads and Secondary Screw Terminals, Class 2
Y65T42-0	Transformer, 120/208/240 VAC Primary to 24 VAC Secondary, 40 VA, Hub Mount (Y65SP+), 20.32 cm (8 in.), Primary Leads and Secondary Screw Terminals, Class 2

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Table 3: CG series accessories (order separately)

Product code number	Description
MS-FIT100-0	The Field Inspection Tool or (FIT) is a portable handheld device with a user interface that is used to test and troubleshoot the BACnet protocol MS/TP RS-485 communications bus that connects supervisory controllers and equipment controllers to field point interfaces. The FIT can be used to check out the wiring of the MS/TP RS-485 bus as well as verify proper communications of supervisory controllers and equipment controllers connected to the bus. The FIT can be used on both the FC Bus and SA Bus.
TL-BRTRP-0	Portable BACnet/IP to MS/TP Router
ACC-TBKPWFCSA-0	Power, FC Bus, and SA Bus terminal block replacement kit for SNC, CG series, CV series, CCM, and XPM products. Kit includes 5 of each terminal block type. 15 terminal blocks in total.
ACC-TBKINOUT-0	Input and Output terminal block replacement kit for SNC, CG series, CV series, CCM, and XPM products. Kit includes 5 of each 2, 3, and 4 position Input and Output terminal blocks. 30 terminal blocks in total.

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CG series technical specifications

Table 4: Technical specifications for CG series controllers

Specification	Description
Power requirement	24 VAC (nominal, 20 VAC minimum/30 VAC maximum), 50/60 Hz, power supply Class 2 (North America), Safety Extra-Low Voltage (SELV) (Europe)
Power consumption	**F4-CGM models:** 14 VA maximum[1] **F4-CGE models:** 15 VA maximum ⓘ **Note:** The USB feature is not currently supported.
Power source	+15 VDC power source terminals provide 100 mA total current. **F4-CGM09090, F4-CGE09090:** Two +15VDC power sources terminal located in Universal IN terminals for active (3-wire) input devices **F4-CGM04060, F4-CGE04060:** One +15VDC power sources terminal located in Universal IN terminals for active (3-wire) input devices
Ambient conditions	**Operating:** 0°C to 50°C (32°F to 122°F); 10 to 90% RH noncondensing **Storage:** -40°C to 80°C (-40°F to 176°F); 5 to 95% RH noncondensing
Communications protocol	**F4-CGM models:** BACnet MS/TP, N2, ZFR Wireless also supported (at FC Bus and for Sensors) with additional hardware. **F4-CGE models:** BACnet/IP or BACnet/SC
Device addressing for BACnet MS/TP	Decimal address set using three rotary switches: valid controller device addresses 4-127
Device addressing for N2	Decimal address set using three rotary switches: valid controller device addresses 1-253
Controller number for Ethernet controllers	Three rotary switches to assign a unique number for each controller to physically identify the controller and relate it to the building drawings; valid controller numbers 0-999
Communications bus	**F4-CGM models** BACnet MS/TP (default); N2 3-wire FC Bus between the supervisory controller and equipment controllers **F4-CGE models** BACnet/IP (default); BACnet/SC Two Ethernet ports; 10/100 Mbps; 8-pin RJ-45 connector **All F4-CG models** 4-wire SA Bus between equipment controller, network sensors and other sensor/actuator devices, includes a lead to source 15 VDC supply power, from equipment controller, to bus devices.
Processor	RX64M Renesas® 32-Bit microcontroller
Memory	16 MB flash memory and 8 MB SDRAM
Real-time clock backup power supply	Super capacitor maintains power to the onboard real-time clock for a minimum of 72 hours when supply power to the controller is disconnected.

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Table 4: Technical specifications for CG series controllers

Specification	Description
Input and Output capabilities	**F4-CGM09090, F4-CGE09090** 7 - Universal Inputs: Defined as 0–10 VDC, 4–20 mA, 0–600k ohms, or Binary Dry Contact 2 - Binary Inputs: Defined as Dry Contact Maintained or Pulse Counter/Accumulator Mode 4 - Configurable Outputs: Defined as 0-10 VDC or 24 VAC Triac BO 2 - Analog Outputs: Defined as 0–10 VDC or 4–20 mA 3 - Binary Outputs: Defined as 24 VAC Triac (external power source only) **F4-CGM04060, F4-CGE04060** 3 - Universal Inputs: Defined as 0–10 VDC, 4–20 mA, 0–600k ohms, or Binary Dry Contact 1 - Binary Inputs: Defined as Dry Contact Maintained or Pulse Counter/Accumulator Mode 4 - Configurable Outputs: Defined as 0-10 VDC or 24 VAC Triac BO 2 - Binary Outputs: Defined as 24 VAC Triac (external power source only)
Universal Input (UI) resolution/ Analog Output (AO) accuracy	**Input:** 24-bit Analog to Digital converter **Output:** +/- 200 mV accuracy in 0–10 VDC applications
Terminations	**Input/Output:** Pluggable Screw Terminal Blocks **FC Bus, SA Bus, and Supply Power:** 4-Wire and 2-Wire Pluggable Screw Terminal Blocks **FC and SA Bus Modular Ports:** RJ-12 6-Pin Modular Jacks ⓘ **Note:** The FC Bus Terminal and FC Bus Port are only available on the CGM models
Mounting	Horizontal on single 35 mm DIN rail mount (recommended), or screw mount on flat surface with three integral mounting clips on controller
Housing	**Enclosure material:** ABS and polycarbonate UL94 5VB; Self-extinguishing Protection Class: IP20 (IEC529)
Dimensions (Height x Width x Depth)	**F4-CGM09090, F4-CGE09090:** 150 mm x 190 mm x 44.5 mm (5-7/8 in. x 7-1/2 in. x 1-3/4 in.) including terminals and mounting clips. **F4-CGM04060, F4-CGE04060:** 150 mm x 152 mm x 44.5 mm (5-7/8 in. x 6 in. x 1-3/4 in.) including terminals and mounting clips ⓘ **Note:** Mounting space requires an additional 50 mm (2 in.) space on top, bottom, and front face of controller for easy cover removal, ventilation, and wire terminations.
Weight	**F4-CGM04060,F4-CGE04060:** 0.29 kg (0.64 lb) **F4-CGM09090,F4-CGE09090:** 0.4 kg (0.89 lb) **F4-CGM09090-0H,F4-CGE09090-0H:** 0.47 kg (1.04 lb)
Compliance	**United States:** UL Listed, File E107041, CCN PAZX, UL 916, Energy Management Equipment FCC Compliant to CFR47, Part 15, Subpart B, Class A
	Canada: UL Listed, File E107041, CCN PAZX7 CAN/CSA C22.2 No. 205, Signal Equipment Industry Canada Compliant, ICES-003
CE	**Europe:** Johnson Controls declares that this product is in compliance with the essential requirements and other relevant provisions of the EMC Directive and RoHS Directive.
	**Australia and New Zealand:** RCM Mark, Australia/NZ Emissions Compliant

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Table 4: Technical specifications for CG series controllers

Specification	Description
	BACnet International: BACnet Testing Laboratories™ (BTL) Protocol Revision 18 Listed and Certified BACnet Advanced Application Controller (B-AAC), based on ANSI/ASHRAE 135-2020
UK CA	**United Kingdom:** Johnson Controls declares that this product is in compliance with Electromagnetic Compatibility Regulations, The Electrical Equipment (Safety) Regulations, and Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations.

1 The VA rating does **not** include any power supplied to the peripheral devices connected to Configurable Outputs (COs) or Binary Outputs (BOs), which can consume up to 12 VA for each CO or BO; for a possible total consumption of an additional 84 VA (maximum).

The performance specifications are nominal and conform to acceptable industry standard. For application at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls shall not be liable for damages resulting from misapplication or misuse of its products.

Repair information

If a controller, network sensor, or any related product fails to operate within its specifications, replace the product. For replacement products, contact the nearest Johnson Controls representative.

Product warranty

This product is covered by a limited warranty, details of which can be found at www.johnsoncontrols.com/buildingswarranty.

Patents

Patents: https://jcipat.com

Single point of contact

APAC	EU	UK	NA/SA
JOHNSON CONTROLS C/O CONTROLS PRODUCT MANAGEMENT NO. 32 CHANGJIANG RD NEW DISTRICT WUXI JIANGSU PROVINCE 214028 CHINA	JOHNSON CONTROLS VOLTAWEG 20 6101 XK ECHT THE NETHERLANDS	JOHNSON CONTROLS TYCO PARK GRIMSHAW LANE MANCHESTER M40 2WL UNITED KINGDOM	JOHNSON CONTROLS 5757 N GREEN BAY AVE. GLENDALE, WI 53209 USA

Contact information

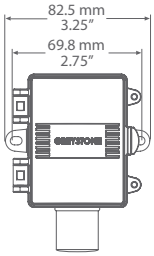
Contact your local Johnson Controls representative:
www.johnsoncontrols.com/locations
Contact Johnson Controls:
www.johnsoncontrols.com/contact-us

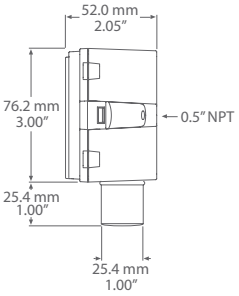
Johnson Controls

Johnson Controls

GREYSTONE
ENERGY SYSTEMS INC

OUTSIDE HUMIDITY TRANSMITTER





HSOS SERIES

PRODUCT DESCRIPTION

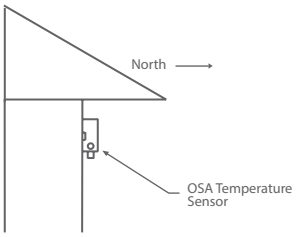
The outside humidity transmitter uses a highly accurate and reliable Thermoset Polymer based capacitance humidity sensor and state-of-the-art digital linearization and temperature compensated circuitry to monitor humidity levels. The sensor is encapsulated in a field replaceable sensor hub for protection from the elements. A weatherproof enclosure that provides ease of installation is provided. An optional integrated temperature sensor is available.

TYPICAL INSTALLATION

For complete installation and wiring details, please refer to the product installation instructions.

The outside transmitter should be mounted on an outside North facing wall, under the eaves which will provide protection from direct sunlight and wind.

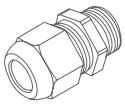
The outside transmitter can be mounted directly to buildings wall face using the provided mounting holes. There is a 0.86" hole for conduit connection of the back of the enclosure.



SPECIFICATIONS

SENSOR TYPE	Thermoset polymer based capacitive
SENSOR ACCURACY	±2, 3, or 5 %RH (5 to 95 %RH)
MEASUREMENT RANGE	0 to 100 %RH
RESOLUTION	±0.01 %RH
HYSTERESIS	±0.8 %RH @ 25°C (77°F)
RESPONSE TIME	8 seconds
STABILITY	<0.25% RH/year
AMBIENT OPERATING RANGE	-40 to 60°C (-40 to 140°F)
POWER SUPPLY	24 Vac/dc ~ ±10% typical
CONSUMPTION	22 mA maximum @24Vdc, 70mA @24Vac
OUTPUT SIGNAL	4-20 mA current loop, 0-5 Vdc, 0-10 Vdc, or 0-1 Vdc (field selectable)
OUTPUT DRIVE @ 24 VDC	**Current:** 550Ω max **Voltage:** 10,000Ω min
OPTIONAL TEMPERATURE SENSOR	**Feed Through Sensor:** Various RTD's and thermistors available as 2 wire resistance output
ENCLOSURE	**A:** Polycarbonate, UL94-V0, IP65 (NEMA 4X) **E:** Same as A, with cable gland fitting
TERMINATION	Screw terminal block (14 to 22 AWG)
COUNTRY OF ORIGIN	Canada

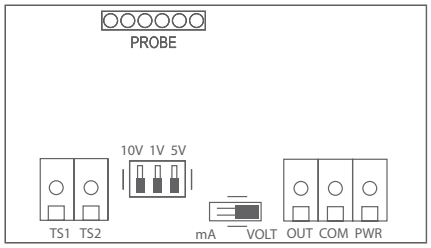
OPTIONAL ACCESSORIES - INCLUDED WITH E ENCLOSURE OPTION



CABLE GLAND FITTING

GREYSTONE
ENERGY SYSTEMS INC

WIRING INFORMATION



TERMINAL	FUNCTION
PWR	24 Vac/dc of controller or power supply
COM	GND or COMMON
OUT	Analog Output
TS1	Resistance Output
TS2	Resistance Output

ORDERING

PRODUCT	**HSOS**	Outside Humidity Transmitter
ENCLOSURE	**A**	Polycarbonate with hinged and gasketed cover
	E	Same as A, with cable gland fitting
RH ACCURACY	**2**	2%
	3	3%
	5	5%
OPTIONAL TEMPERATURE SENSOR	**00**	No Temperature Sensor Option
	02	100Ω Platinum, IEC 751, 385 Alpha, thin film, 3 wire
	05	1801Ω NTC Thermistor, ±0.2°C
	06	3000Ω NTC Thermistor, ±0.2°C
	07	10,000Ω Type 3, NTC Thermistor, ±0.2°C
	08	2.252KΩ NTC Thermistor, ±0.2°C
	12	1000Ω Platinum, IEC 751, 385 Alpha, thin film
	13	1000Ω Nickel, Class B, DIN 43760
	14	10,000Ω Type 3, NTC Thermistor, ±0.2°C c/w 11K shunt resistor
	20	20,000Ω NTC Thermistor, ±0.2°C
	24	10,000Ω Type 2, NTC Thermistor, ±0.2°C
	59	10,000Ω 25°C, ±%, B = 3435 ±1% (25/85)

PART NUMBER

HSOS

NOTE: Greystone Energy Systems, Inc. reserves the right to make design modifications without prior notice.

ORDERING - REPLACEMENT SENSOR MODULE

PRODUCT	**HRMOS**	Replacement Humidity Sensor Module - Hub
RH ACCURACY	**2**	2%
	3	3%
	5	5%
OPTIONAL TEMPERATURE SENSOR	**00**	No Temperature Sensor Option
	02	100Ω Platinum, IEC 751, 385 Alpha, thin film, 3 wire
	05	1801Ω NTC Thermistor, ±0.2°C
	06	3000Ω NTC Thermistor, ±0.2°C
	07	10,000Ω Type 3, NTC Thermistor, ±0.2°C
	08	2.252KΩ NTC Thermistor, ±0.2°C
	12	1000Ω Platinum, IEC 751, 385 Alpha, thin film
	13	1000Ω Nickel, Class B, DIN 43760
	14	10,000Ω Type 3, NTC Thermistor, ±0.2°C c/w 11K shunt resistor
	20	20,000Ω NTC Thermistor, ±0.2°C
	24	10,000Ω Type 2, NTC Thermistor, ±0.2°C
	59	10,000Ω 25°C, ±%, B = 3435 ±1% (25/85)

PART NUMBER

HRMOS

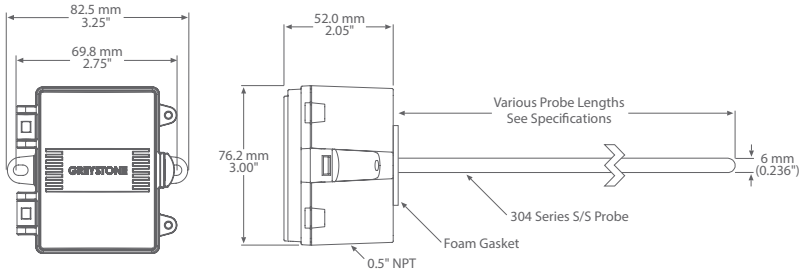
RoHS COMPLIANT

Greystone Energy Systems, Inc.
150 English Drive, Moncton,
New Brunswick, Canada E1E 4G7

Ph: +1 (506) 853-3057 Fax: +1 (506) 853-6014
North America: 1-800-561-5611
E-mail: mail@greystoneenergy.com

GREYSTONE
ENERGY SYSTEMS INC

ALL PURPOSE DUCT/IMMERSION TEMPERATURE SENSOR



TSAP SERIES

PRODUCT DESCRIPTION

The all purpose single point temperature sensor utilizes a precision sensor encapsulated in a 6 mm (0.236"), 304 series stainless steel probe and is available in various lengths. All probes provide excellent heat transfer, fast response and resistance to moisture penetration.

TYPICAL INSTALLATION

For complete installation and wiring details, please refer to the product installation instructions.

In duct applications the probes are installed in the side of the duct to monitor a single point temperature within the duct. Select a probe length that allows the probe to span the duct width. Install the probe in a straight section of duct at a suitable distance downstream from any heating, cooling, or humidification devices.

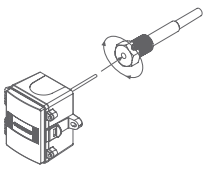
For immersion applications ensure the probe is installed in the appropriate length thermowell for the pipe size. Thermal conductive compound should be added inside the thermowell to provide optimum thermal transfer.

For immersion applications, a T2 Series thermowell is required. When using a T1 series thermowell an adapter will be required.

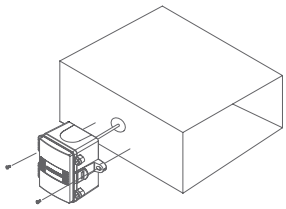
SPECIFICATIONS

SENSOR TYPE	Thermistor or RTD (see ordering chart)
SENSOR ACCURACY	**Thermistors:** ±0.2°C (±0.36°F) @ 25°C (77°F) **Platinum RTD's:** ±0.3°C (±0.54°F) @ 0°C (32°F) **Nickel RTD's:** ±0.4°C (±0.72°F) @ 0°C (32°F)
PROBE SENSING RANGE	-40 to 100°C (-40 to 212°F)
AMBIENT OPERATING RANGE	-40 to 50°C (-40 to 122°F), 5 to 95 %RH non-condensing
WIRE MATERIAL	PVC insulated, parallel bonded, 22 AWG
PROBE MATERIAL	304 series stainless steel
PROBE DIAMETER	6 mm (0.236")
STANDARD LENGTHS	50, 100, 150, 200, 300, and 450 mm (2", 4", 6", 8", 12", and 18")
ENCLOSURE	ABS, UL94-V0, IP65 (NEMA 4X) **C:** includes terminal block **E:** same as C, with thread adapter (1/2" NPT to M16), and cable gland fitting
TERMINATION	**A:** pigtail, 2 or 3 wire **C & E:** terminal block, 2 or 3 wire
COUNTRY OF ORIGIN	Canada

MOUNTING STYLES

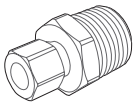


THERMOWELL MOUNTING

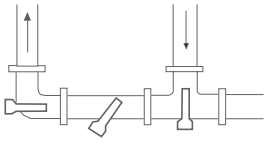


DUCT MOUNTING

(#0201001092)



T1-AP THERMOWELL ADAPTER



THERMOWELL PLACEMENT

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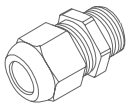
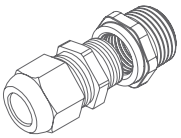
ENERGY SYSTEMS INC

ACCESSORIES - INCLUDED WITH E ENCLOSURE OPTION



CABLE GLAND FITTING

THREAD ADAPTER 1/2" NPT TO M16



ORDERING

PRODUCT	**TSAP**	All Purpose Duct/Immersion Temperature Sensor
ENCLOSURE	**A**	ABS, with hinged and gasketed cover
	C	Same as A, with terminal block
	E	Same as C, with thread adapter and cable gland fitting
SENSOR	**02**	100 Ω Platinum, IEC 751, 385 Alpha, thin film
	05	1801 Ω NTC Thermistor, ±0.2°C
	06	3000 Ω NTC Thermistor, ±0.2°C
	07	10,000 Ω Type 3, NTC Thermistor, ±0.2°C
	08	2.252K Ω NTC Thermistor, ±0.2°C
	12	1000 Ω Platinum, IEC 751, 385 Alpha, thin film
	13	1000 Ω Nickel, Class B, DIN 43760
	14	10,000 Ω Type 3, NTC Thermistor, ±0.2°C c/w 11K shunt resistor
	20	20,000 Ω NTC Thermistor, ±0.2°C
	24	10,000 Ω Type 2, NTC Thermistor, ±0.2°C
	59	10,000 Ω, 25°C, ±1%, B = 3435 ±1% (25/85)
PROBE LENGTH	**A**	50mm (2")
	B	100mm (4")
	C	150mm (6")
	D	200mm (8")
	E	300mm (12")
	F	450mm (18")

PART NUMBER

TSAP

NOTE: Greystone Energy Systems, Inc. reserves the right to make design modifications without prior notice.

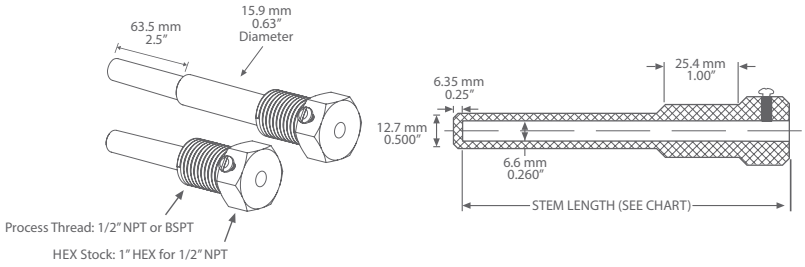
RoHS COMPLIANT

Greystone Energy Systems, Inc.
150 English Drive, Moncton,
New Brunswick, Canada E1E 4G7

Ph: +1 (506) 853-3057 Fax: +1 (506) 853-6014
North America: 1-800-561-5611
E-mail: mail@greystoneenergy.com

GREYSTONE
ENERGY SYSTEMS INC

THERMOWELLS



T2 SERIES

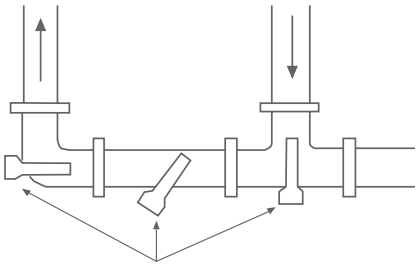
PRODUCT DESCRIPTION

The T2 series thermowell are available in 304 series and 316 series stainless steel. They are available in a wide range of lengths. Custom lengths and materials are also available.

TYPICAL INSTALLATION

The T2 series thermowell can be installed in various locations throughout the pipe, see the diagram below.

The required torque for the set-screw to ensure secure attachment and avoid damage to the probe is 5"/lbs.



Thermowell placement in pipe

SPECIFICATIONS

MATERIAL	**P:** 304 Series stainless steel **R:** 316 Series stainless steel
LENGTH	2", 4", 6", 8", 12", & 18" Standard Custom lengths available
THREAD SIZE	1/2" NPT or BSPT
CONSTRUCTION	Machined construction
COUNTRY OF ORIGIN	Canada

ORDERING

PRODUCT	**T2**	Thermowell with Set Screw
EXTERNAL THREAD SIZE	**1/2**	1/2"
EXTERNAL THREAD TYPE	**N** **B**	NPT BSPT
LENGTH	**2** **4** **6** **8** **12** **18**	50 mm (2") 100 mm (4") 150 mm (6") 200 mm (8") 300 mm (12") 450 mm (18")
MATERIAL	**P** **R**	304 Series stainless steel 316 Series stainless steel

PART NUMBER

T2

NOTE: Greystone Energy Systems, Inc. reserves the right to make design modifications without prior notice.

GREYSTONE
ENERGY SYSTEMS INC

T2 THERMOWELL PRESSURE AND FLOW SPECIFICATIONS

PART NUMBER	DESCRIPTION	MAXIMUM FLOW @ 750°F (400°C)				MAXIMUM PRESSURE			
		AIR AND STEAM		WATER		AT 200°F (100°C)		AT 750°F (400°C)	
		ft/s	m/s	ft/s	m/s	PSI	BAR	PSI	BAR
T2 - 1/2 (X) 2P	2" (50mm), 1/2" NPT/BSP, 0.026" (6mm) Bore, 304 S/S	65	19.8	48	14.6	6290	433	3805	263
T2 - 1/2 (X) 4P	4" (100mm), 1/2" NPT/BSP, 0.026" (6mm) Bore, 304 S/S	65	19.8	48	14.6				
T2 - 1/2 (X) 6P	6" (150mm), 1/2" NPT/BSP, 0.026" (6mm) Bore, 304 S/S	49	14.9	37	11.2				
T2 - 1/2 (X) 8P	8" (200mm), 1/2" NPT/BSP, 0.026" (6mm) Bore, 304 S/S	32	9.7	24	7.3				
T2 - 1/2 (X) 12P	12" (300mm), 1/2" NPT/BSP, 0.026" (6mm) Bore, 304 S/S	12	3.6	12	3.6				
T2 - 1/2 (X) 18P	18" (450mm), 1/2" NPT/BSP, 0.026" (6mm) Bore, 304 S/S	4	1.2	4	1.2				
T2 - 1/2 (X) 2R	2" (50mm), 1/2" NPT/BSP, 0.026" (6mm) Bore, 316 S/S	63	19.2	48	14.6	6615	456	5500	380
T2 - 1/2 (X) 4R	4" (100mm), 1/2" NPT/BSP, 0.026" (6mm) Bore, 316 S/S	63	19.2	48	14.6				
T2 - 1/2 (X) 6R	6" (150mm), 1/2" NPT/BSP, 0.026" (6mm) Bore, 316 S/S	47	14.3	37	11.2				
T2 - 1/2 (X) 8R	8" (200mm), 1/2" NPT/BSP, 0.026" (6mm) Bore, 316 S/S	31	9.4	24	7.3				
T2 - 1/2" (X) 12R	12" (300mm), 1/2" NPT/BSP, 0.026" (6mm) Bore, 316 S/S	12	3.6	12	3.6				
T2 - 1/2" (X) 18R	18" (450mm), 1/2" NPT/BSP, 0.026" (6mm) Bore, 316 S/S	4	1.2	4	1.2				

NOTE

(X) = N for NPT, B for BSP

1) These are worst-case velocity ratings for air, steam, and water. Based on air at 21°C (70°F), 6900 PSI (475 Bar), with a density of 35 lb/ft^3 (560 kg/m^3), steam at 400°C (750°F), 5500 PSI (379 Bar), with a density of 32 lb/ft^3 (512 kg/m^3), and water at 21°C (70°F), [6800 PSI (468 Var) for 316 S/S], with a density of 63.59 lb/ft^3 (1018 kg/m^3). Significantly higher velocities are possible when fluid/gases at lower densities.

2) Specification of a thermowell and the materials of construction are the sole responsibility of the designer of the system that incorporates the thermowell. Sole responsibility for ensuring compatibility of the process fluid with the system rests with the end user.

3) These ratings do not consider corrosion.

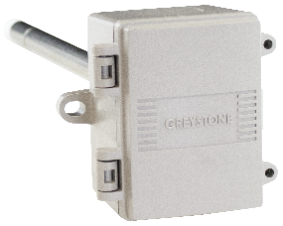
RoHS COMPLIANT

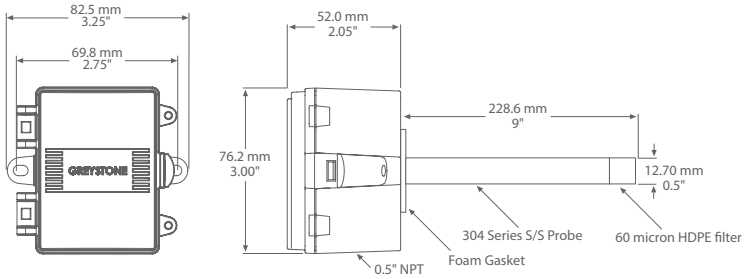
Greystone Energy Systems, Inc.
150 English Drive, Moncton,
New Brunswick, Canada E1E 4G7

Ph: +1 (506) 853-3057 Fax: +1 (506) 853-6014
North America: 1-800-561-5611
E-mail: mail@greystoneenergy.com

GREYSTONE
ENERGY SYSTEMS INC

DUCT HUMIDITY TRANSMITTER





HSDT SERIES

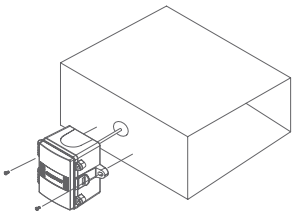
PRODUCT DESCRIPTION

The duct humidity transmitter uses a highly accurate and reliable Thermoset Polymer based capacitance humidity sensor and state-of-the-art digital linearization and temperature compensated circuitry to monitor humidity levels. The sensor is encapsulated in a 230 mm (9") long by 12.7 mm (0.5") diameter 304 S/S probe. An 60 micron HDPE filter protects the sensor for contaminants. Optional integrated temperature sensor is available.

TYPICAL INSTALLATION

For complete installation and wiring details, please refer to the product installation instructions.

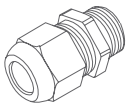
The immersion type probes are installed in the appropriate length thermowell for the pipe size. Thermal conductive compound should be added inside the thermowell to provide optimum thermal transfer.



SPECIFICATIONS

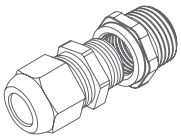
SENSOR TYPE	Thermoset polymer based capacitive
SENSOR ACCURACY	±2, 3, or 5 %RH (5 to 95 %RH)
MEASUREMENT RANGE	0 to 100 %RH
TEMPERATURE DEPENDENCE	±0.05 %RH/°C
HYSTERESIS	±1.5 %RH maximum
REPEATABILITY	±0.5 %RH typical
STABILITY	±1% RH typical at 50 %RH in 5 years
AMBIENT OPERATING RANGE	-40 to 50°C (-40 to 122°F)
OPERATING HUMIDITY	5 to 95 %RH non-condensing
POWER SUPPLY	24 Vac/dc ~ ±10% typical, 28 Vac/dc maximum
CONSUMPTION	22 mA maximum
INPUT VOLTAGE EFFECT	Negligible over specified operating range
PROTECTION CIRCUITRY	Reverse voltage protected and output limited
OUTPUT SIGNAL	4-20 mA current loop, 0-5 Vdc, 0-10 Vdc, or 0-1 Vdc (jumper selectable)
OUTPUT DRIVE @ 24 VDC	**Current:** 550Ω max **Voltage:** 10,000Ω min
INTERNAL ADJUSTMENTS	Clearly marked ZERO and SPAN pots
OPTIONAL TEMPERATURE SENSOR	Various RTD's and thermistors available as 2 wire resistance output
ENCLOSURE	**A:** ABS, UL94-V0, IP65 (NEMA 4X) **E:** Same as A, with thread adapter (1/2" NPT to M15) and cable gland fitting
PROBE	230mm (9") length x 12.7mm (1/2") diameter s/s with porous filter
TERMINATION	Screw terminal block (14 to 22 AWG)
COUNTRY OF ORIGIN	Canada

OPTIONAL ACCESSORIES - INCLUDED WITH E ENCLOSURE OPTION



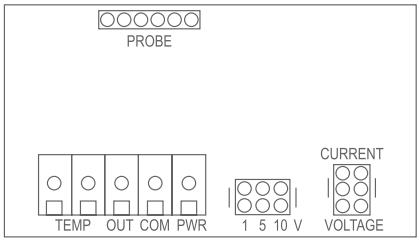
CABLE GLAND FITTING

THREAD ADAPTER 1/2" NPT TO M16



GREYSTONE
ENERGY SYSTEMS INC

WIRING INFORMATION



TERMINAL	FUNCTION
PWR	24 Vac/dc of controller or power supply
COM	COM GND or COMMON
OUT	Analog Output
TEMP	Resistance Output
TEMP	Resistance Output

ORDERING

PRODUCT	**HSDT**	Duct Humidity Transmitter
ENCLOSURE	**A**	ABS with hinged and gasketed cover
	E	Same as A, with thread adapter and cable gland fitting
RH ACCURACY	**2**	2%
	3	3%
	5	5%
SENSOR	**00**	No Temperature Sensor Option
	02	100Ω Platinum, IEC 751, 385 Alpha, thin film, 3 wire
	05	1801Ω NTC Thermistor, ±0.2°C
	06	3000Ω NTC Thermistor, ±0.2°C
	07	10,000Ω Type 3, NTC Thermistor, ±0.2°C
	08	2.252KΩ NTC Thermistor, ±0.2°C
	12	1000Ω Platinum, IEC 751, 385 Alpha, thin film
	13	1000Ω Nickel, Class B, DIN 43760
	14	10,000Ω Type 3, NTC Thermistor, ±0.2°C c/w 11K shunt resistor
	20	20,000Ω NTC Thermistor, ±0.2°C
	24	10,000Ω Type 2, NTC Thermistor, ±0.2°C
	59	10,000Ω 25°C, ±%, B = 3435 ±1% (25/85)

PART NUMBER

HSDT

NOTE: Greystone Energy Systems, Inc. reserves the right to make design modifications without prior notice.

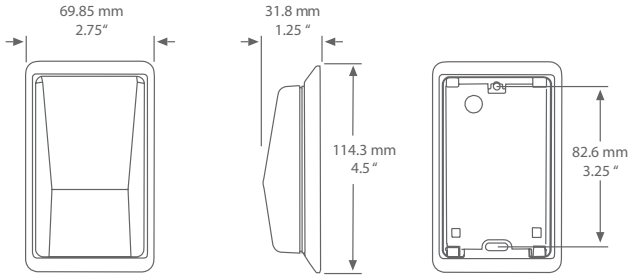
RoHS COMPLIANT

Greystone Energy Systems, Inc.
150 English Drive, Moncton,
New Brunswick, Canada E1E 4G7

Ph: +1 (506) 853-3057 Fax: +1 (506) 853-6014
North America: 1-800-561-5611
E-mail: mail@greystoneenergy.com

GREYSTONE
ENERGY SYSTEMS INC

ROOM HUMIDITY TRANSMITTER



RH100B SERIES

PRODUCT DESCRIPTION

The RH100B series uses a highly accurate and reliable Thermoset Polymer based capacitance humidity sensor and state-of-the-art digital linearization and temperature compensated circuitry in an attractive, low profile enclosure to monitor room humidity levels.

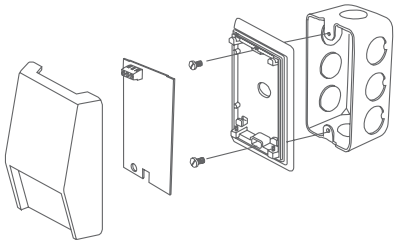
An optional temperature sensor is available.

TYPICAL INSTALLATION

For complete installation and wiring details, please refer to the product installation instructions.

The RH100B sensor installs directly on a standard electrical box and should be mounted five feet from the floor of the area to be controlled. Do not mount the sensor near doors, opening windows, supply air diffusers or other known air disturbances. Avoid areas where the sensor is exposed to vibrations or rapid temperature changes.

A terminal is provided for connection to the Building Automation System.

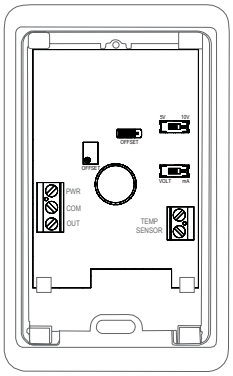


SPECIFICATIONS

SENSOR TYPE	Thermoset polymer based capacitive
OPTIONAL TEMPERATURE SENSOR	Various RTDs and thermistors available as 2 wire resistance output
ACCURACY	±2, 3, or 5 %RH (5 to 95 %RH)
MEASUREMENT RANGE	0 to 100 %RH
RESOLUTION	±0.01 %RH
HYSTERESIS	±0.8 %RH @ 25°C (77°F)
SENSOR RESPONSE TIME	8 seconds
STABILITY	<0.25 %RH/year
OPERATING TEMPERATURE	0 to 50°C (32 to 122°F)
POWER SUPPLY	18 to 35 Vdc, 15 to 26 Vac
CONSUMPTION	22 mA maximum
OUTPUT SIGNAL	4-20 mA/0-1, 0-5 or 0-10 Vdc (field selectable)
OUTPUT DRIVE @ 24 VDC	**Current:** 550Ω max **Voltage:** 10,000Ω min
ADJUSTMENT	RH offset potentiometer, +/-10% RH
ENCLOSURE	White ABS, IP20 (NEMA 1)
DIMENSIONS	70mm W x 114mm H x 30mm D (2.75" x 4.5" x 1.2")
TERMINATION	Screw terminal block (14 to 22 AWG)
COUNTRY OF ORIGIN	Canada

GREYSTONE
ENERGY SYSTEMS INC

WIRING INFORMATION



TERMINAL	FUNCTION
PWR	24 Vac/dc from controller or power supply
COM	GND or COMMON of controller
OUT	Analog Output
TEMP	Resistance Output
SENSOR	Resistance Output

ORDERING

PRODUCT	**RH100B**	Room Humidity Transmitter
ACCURACY	**02**	2%
	03	3%
	05	5%
OPTIONAL TEMPERATURE SENSOR	**L**	100Ω Platinum, IEC 751, 385 Alpha, thin film
	C	1000Ω Platinum, IEC 751, 385 Alpha, thin film
	F	1801Ω NTC Thermistor, ±0.2°C
	E	3,000Ω NTC Thermistor, ±0.2°C
	D	10,000Ω Type 3, NTC Thermistor, ±0.2°C
	J	10,000Ω Type 2, NTC Thermistor, ±0.2°C
	K	20,000Ω NTC Thermistor, ±0.2°C
	M	1000Ω Nickel, Class B, DIN 43760
	B	10,000Ω Type 3, NTC Thermistor, ±0.2°C c/w 11K shunt resistor
	G	2.252KΩ Thermistor, 0.2°C
	A	10,000Ω 25°C, ±1%, B = 3435 ±1% (25/85)

NOTE: Greystone Energy Systems, Inc. reserves the right to make design modifications without prior notice.

PART NUMBER

RH100B

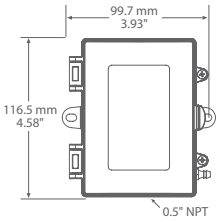
RoHS COMPLIANT

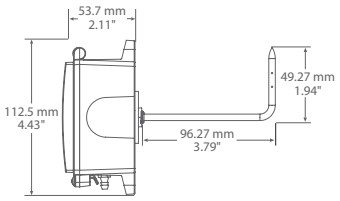
Greystone Energy Systems, Inc.
150 English Drive, Moncton,
New Brunswick, Canada E1E 4G7

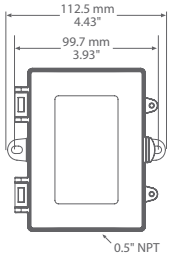
Ph: +1 (506) 853-3057 Fax: +1 (506) 853-6014
North America: 1-800-561-5611
E-mail: mail@greystoneenergy.com

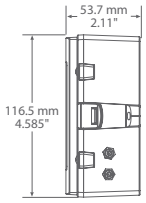
GREYSTONE
ENERGY SYSTEMS INC

LOW PRESSURE TRANSMITTER









ELP SERIES

PRODUCT DESCRIPTION

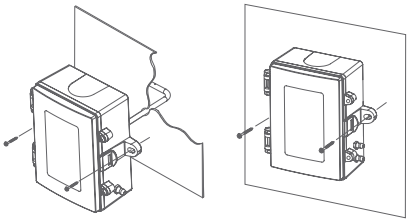
The Low Pressure Transmitter series is used to measure positive, negative or differential pressure. The piezoresistive sensor is ideal for monitoring the pressure of air or other clean inert gas. Typical HVAC applications include monitoring of filter differential pressure or VAV applications. An integrated static pressure probe provides ease of installation for duct mounting. Several accessories are available. A weatherproof polycarbonate enclosure is provided for electrical connections and ease of installation.

TYPICAL INSTALLATION

For complete installation and wiring details, please refer to the product installation instructions.

The ELP mounts on any surface using the two holes provided on the base of the unit. Make sure there is enough space around the unit to connect the pressure tubing without kinking and avoid locations where severe vibrations or excessive moisture are present.

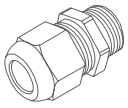
The enclosure provides mounting tabs for ease of installation.



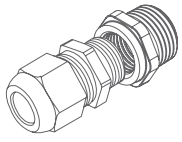
SPECIFICATIONS

ACCURACY	±1% F.S.O.
MEASUREMENT TYPE	Differential (single port), Static, Velocity, & Total Pressure
RESPONSE TIME	250 ms
STABILITY	<±1% F.S.O. per year
THERMAL EFFECTS	<±3% over compensated range
COMPENSATED RANGE	-25 to 85°C (-13 to 185°F)
PROOF PRESSURE	100" W.C. (200" for 5", 10" & 20" Models)
BURST PRESSURE	300" W.C. (500" for 20" Models)
OPERATING CONDITIONS	0 to 50°C (32 to 122°F), 5 to 95 %RH, non-condensing
POWER SUPPLY	20 to 28 Vac/dc (non-isolated half-wave rectified)
SUPPLY CURRENT	**Current:** 20 mA max **Voltage:** <4 mA
INPUT VOLTAGE EFFECT	Negligible over specified operating range
PROTECTION CIRCUITRY	Reverse voltage protected and output limited
OUTPUT SIGNAL	4-20 mA (2-wire), 0-10 Vdc (3-wire), field selectable
OUTPUT DRIVE CAPABILITIES	**Current:** 400 Ω max @ 24 Vdc **Voltage:** 10K Ω min
ZERO ADJUSTMENTS	Pushbutton auto-zero
WIRING CONNECTIONS	Screw terminal block (14 to 22 AWG)
PRESSURE CONNECTION	Barbed ports for 5 mm (0.170" ID) flexible tubing
CONDUIT CONNECTION	1/2" NPT conduit or cable gland
ENCLOSURE	Grey Polycarbonate UL-94-V0, IP65 (NEMA 4X)
APPROVALS	CE, ROHS
COUNTRY OF ORIGIN	Canada

ACCESSORIES - INCLUDED WITH F ENCLOSURE OPTION



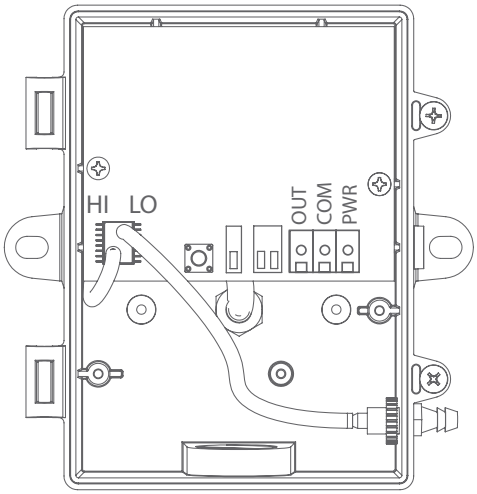
CABLE GLAND FITTING



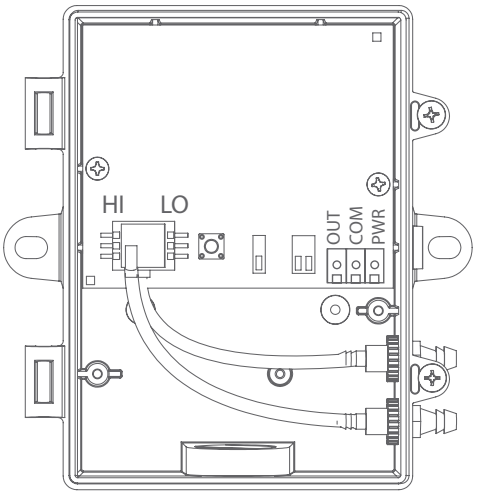
THREAD ADAPTER 1/2" NPT TO M16

GREYSTONE
ENERGY SYSTEMS INC

PCB CONFIGURATIONS



ELP-S



ELP-X

ORDERING

PRODUCT	**ELP**	Low Pressure Transmitter
ENCLOSURE	**B**	Polycarbonate with hinged and gasketed cover
	F	Same as B, with thread adapter (1/2" NPT to M16) & cable gland fitting
OUTPUT	**0001W**	±1" / 0-1 "WC
	0002W	±2" / 0-2 "WC
	0005W	±5" / 0-5 "WC
	0010W	±10" / 0-10 "WC
	0020W	±20" / 0-20 "WC
	0250P	±250 / 0-250 Pa
	0500P	±500 / 0-500 Pa
	1250P	±1250 / 0-1250 Pa
	2500P	±2500 / 0-2500 Pa
	5000P	±5000 / 0-5000 Pa
PROBE	**X**	No Probe
	S	Static Probe

NOTE: Greystone Energy Systems, Inc. reserves the right to make design modifications without prior notice.

PART NUMBER

ELP

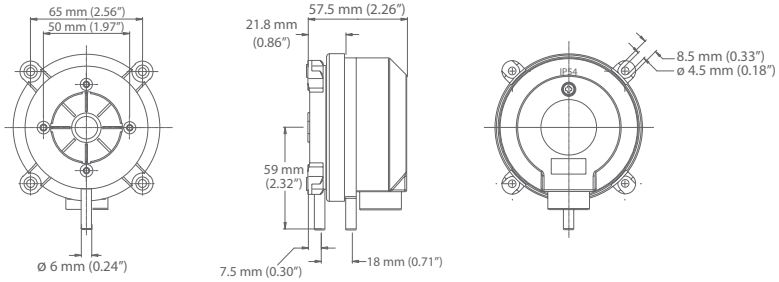
RoHS COMPLIANT

Greystone Energy Systems, Inc.
150 English Drive, Moncton,
New Brunswick, Canada E1E 4G7

Ph: +1 (506) 853-3057 Fax: +1 (506) 853-6014
North America: 1-800-561-5611
E-mail: mail@greystoneenergy.com

GREYSTONE
ENERGY SYSTEMS INC

DIFFERENTIAL PRESSURE SWITCH



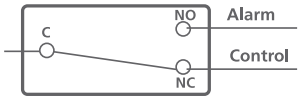
GFS SERIES

PRODUCT DESCRIPTION

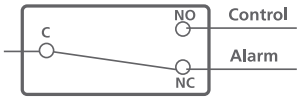
The differential pressure switch housing unit contains a diaphragm, a snap-acting SPDT switch, and a range adjustment knob with increments. The sample connections located on the side accept 6.35mm (0.25") OD tubing. There are 3 pressure ranges available. 2 pick up tubes and 2m (6.56') of PVC tubing are included. The enclosure cover guards against accidental contact with the live switch terminal screws and the setpoint adjustment knob with indication.

ALARM OR CONTROL

To prove excessive airflow or pressure



To prove insufficient airflow or pressure



SPECIFICATIONS

ADJUSTMENT RANGE	See product ordering information
ADJUSTMENT KNOB MARKINGS	Scaled in Pascal and "WC
SWITCH TOLERANCE	±15%
MAXIMUM OPERATING PRESSURE	1.45 PSI (10 kPa) for all pressure ranges
MEDIUM	Air, non-combustible, and non-aggressive gases
TEMPERATURE RANGE	**Medium and Ambient Temperature:** -20 to 60°C (-4 to 140°F) **Storage Temperature:** -40 to 85°C (-40 to 185°F)
DIAPHRAGM MATERIAL	Silicone, tempered at 200°C, free of gas emissions
PRESSURE CONNECTIONS	2 plastic pipe connection pieces (P1 and P2), external diameter 6.0mm P1 for connection to higher pressure P2 for connection to lower pressure
ELECTRICAL RATING	Max. 1.0A (0.4A) / 250 Vac, 50/60 Hz Max. 0.1A / 24 Vdc
ELECTRICAL CONNECTIONS	AMP flat plug 6.3mm x 0.8mm Push-on screw terminals Cable conduit with cable relief
MECHANICAL WORKING LIFE	Over 10 million switching operations
HOUSING MATERIALS	Switch body made of PA 6.6, cover made of PC
PROTECTION CATEGORY	IP54 with cover (NEMA 13)
WEIGHT	With cover 160g
INCLUDED ACCESSORIES	2 meters of PVC hose and 2 plastic tubes Set of 3 push-on screw terminals
APPROVALS	CE ETL Approves, No. 3192203 UL508 & CSA 22.2

ORDERING

PRODUCT	**GFS-**	Adjustable Differential Pressure Switch with Setpoint Indication
RANGE	**80**	20 to 300 Pa) (0.08" to 1.20 "WC), Switch differential 10 Pa (0.04 "WC)
	83	50 to 500 Pa (0.2" to 2.00 "WC), Switch differential 20 Pa (0.08 "WC)
	86	500 to 2500 Pa (2.00" to 10.00 "WC), Switch differenital 150 Pa (0.60 "WC)
ADDITIONAL DESCRIPTION	**U-NPIKG**	ETL & CE, 1/2" NPT & duct install kit, Greystone branded
	C-NPIKN	CE only, 1/2" NPT & duct install kit, Non-branded

PART NUMBER

GFS-

NOTE: Greystone Energy Systems, Inc. reserves the right to make design modifications without prior notice.

RoHS COMPLIANT

Greystone Energy Systems, Inc.
150 English Drive, Moncton,
New Brunswick, Canada E1E 4G7

Ph: +1 (506) 853-3057 Fax: +1 (506) 853-6014
North America: 1-800-561-5611
E-mail: mail@greystoneenergy.com

NS8000 Series Network Sensors Catalog Page

2024-09-17

LIT-1901099

Description

Figure 1: NS8000 Series Network Sensor models

The NS8000 Series Network Sensors function directly with Metasys® system Field Equipment Controllers (FECs), Metasys Network and Control Engines (NCEs), Advanced Application Field Equipment Controller (FACs), Metasys VAV Box Equipment Controllers (CVM) and General Purpose Application Controllers (CGM), VAV Modular Assembly (VMA16) Controllers, and Facility Explorer FX-PC Series Programmable Controllers (FX-PCGs, FX-PCVs, and FX-PCXs). The sensors are also compatible with Verasys and Johnson Controls® Smart Equipment.

The NS8000 Series Network Sensors monitor zone temperature, relative humidity (RH), carbon dioxide (CO_2), motion, and local temperature setpoint adjustments. The sensor transmits this data to a controller on the Sensor Actuator (SA) bus.

Some NS8000 Series Network Sensors models include an onboard passive infrared (PIR) occupancy sensor that detects motion to determine if a space is occupied. This feature maximizes up to 30% energy savings in high-energy usage environments such as schools, dormitories, offices, hospitals, and hotels by adjusting the temperature of the space based on the occupancy status. In addition, the PIR occupancy sensor facilitates trending of floor space usage in these environments.

Display models of the NS8000 Series Network Sensors are available with a backlit LCD fixed segment display or a full color graphical LCD interface. These models enable the user to view zone temperature, RH, CO_2, and adjust the zone temperature setpoint and fan speed. Graphical models provide a summary of sensor values at the base of the display. Fixed segment models have the capability to set the default display to temperature, RH, or temperature setpoint.

The user can also choose between degrees Fahrenheit (F) and degrees Celsius (C). To prevent tampering with the sensor, display models also include a screen lockout feature. The graphical display enables the user to choose between a light or dark color theme and to set the sleep mode to dim or turn off.

Some models also have a Warmer/Cooler interface to adjust the zone temperature. Instead of a display, these models have two cap touch buttons with seven LED lights that represent the current setpoint.The display models include the following fan speeds: automatic, off, low, medium, or high.

Interaction with the sensor sets the occupancy override function to signal to the controller that the zone is occupied and to override the scheduled mode. The full color graphical LCD models use the

graphical user interface to set a unique BACnet® address for applications that require multiple sensors. Other models have DIP switches to set a unique address for applications that require multiple sensors. All models ship standard with modular phone jacks and screw terminals to terminate wiring connecting the sensors to the controller.

ⓘ **Note:** To connect the NS8000 Series Network Sensor to the same SA bus segment, use only one of the two connection methods, either the modular phone jack or the screw terminals.

Each network sensor includes a SA bus access port, enableing for accessories to connect to the SA bus. Through this connector, the user can use accessories to service or commission the connected controller or gain access to any other controller on the same field controller (FC) bus.

ⓘ **Note:** Device programming for the NS8000 sensor connected to the controller does not include balancing functionality and features.

The NS8000 Series Network Sensors can be surface-mounted or vertical wallbox-mounted to meet the requirements of the specific application. All display models are optimized for the California Energy Code (Title 24).

Modern enclosures in a white design are available in the following styles:

- **LCD fixed segment and LCD full color graphical displays:** View zone temperature, RH, CO_2, occupancy status, and adjust the zone temperature setpoint and fan speed. These models have the capability to set the default display to temperature, RH, or temperature setpoint. On these display models, you can also choose between degrees Fahrenheit (F) and degrees Celsius (C).
- **Warmer/Cooler interface:** This interface incorporates cap touch buttons with seven LED lights that represent the current setpoint status.
- **No display:** The NS8000 Series Network Sensors are available in a high gloss white finish with or without the Johnson Controls logo.
- All sensors are serialized for quality and warranty purposes. Based on the serial number, the user can obtain a certificate of conformance.

See Table 1 through Table 6 for ordering information.

Refer to the *Vertical Wallbox-Mounted or Surface-Mounted NS8000 Series Network Sensors Product Bulletin (LIT-12013113)* for important product application and single point of contact information.

Features and benefits

- BACnet MS/TP protocol communication: provides compatibility with Metasys system field controllers, Facility Explorer programmable controllers as well as Verasys and Johnson Controls Smart Equipment in a proven communication network.
- Single and multifunctional sensors: choose temperature, RH, CO_2, and occupancy sensing depending on HVAC needs.
- Large backlit LCD fixed segment display or LCD full color graphical display on some models: provides real-time status of the environment with backlighting activated during user interaction.
- Simple temperature setpoint adjustment or Warmer/Cooler mode available on display models: configure simple setpoint adjustment or Warmer/Cooler mode.
- Onboard occupancy sensor available on PIR models: maximizes up to 30% energy savings in high-energy usage environments, and facilitates trending of floor space usage.
- Temporary occupancy included on all display and Warmer/Cooler models: provides a timed override command, which initiates a temporary occupancy state.

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- Field-selectable default display setting on display models: toggle between temperature, RH or temperature setpoint on the display, and set the required default for continuous viewing.
- Fahrenheit/Celsius (°F/°C) selectable on display models: display temperature in degrees Fahrenheit or degrees Celsius.
- All display models meet California Energy Code (Title 24): displays the required State of California Title 24 economizer fault conditions.
- All display models include a screen lockout: prevents sensor tampering.
- Serialized sensors and certificates: obtain certificate of conformance for all models.

Repair information

If the NS8000 Series Network Sensor fails to operate within its specifications, replace the unit. For a replacement sensor, contact the nearest Johnson Controls representative.

Ordering information

See Table 1 through Table 6 for the various NS8000 Series Network Sensor models available. See Table 7 for accessories.

Note: Product codes marked with an asterisk are made in America to meet the Buy American Standard.

Important: The NS8000 Series Network Sensor is intended to provide an input to equipment under normal operating conditions. Where failure or malfunction of the network sensor could lead to personal injury or property damage to the controlled equipment or other property, additional precautions must be designed into the control system. Incorporate and maintain other devices, such as supervisory or alarm systems or safety or limit controls, intended to warn of or protect against failure or malfunction of the network sensor.

Note: Keep the Metasys system software up to date as some NS8000 Series Network Sensor features are not supported in previous releases of Metasys, Facility Explorer, Verasys, or Johnson Controls Smart Equipment system software.

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Selection charts

All NS8000 Series Network Sensor models are available in white only.

Table 1: NS8000 Series Network Sensor: temperature, humidity and CO_2 models (3% RH)

Product code	Display and interface information	Johnson Controls logo	PIR occupancy sensor
NSB8BHC040-0	No display	Yes	No
NSB8BHC041-0		No	No
NSB8MHC040-0		Yes	Yes
NSB8MHC041-0		No	Yes
NSB8BHC040-0G*		Yes	No
NSB8MHC040-0G*		Yes	Yes
NSB8BHC240-0	Fixed segment display	Yes	No
NSB8BHC241-0		No	No
NSB8MHC240-0		Yes	Yes
NSB8MHC241-0		No	Yes
NSB8BHC240-0G*		Yes	No
NSB8MHC240-0G*		Yes	Yes
NSB8BHC140-0	Warmer/Cooler interface	Yes	No
NSB8BHC141-0		No	No
NSB8BHC340-0	Graphical user interface	Yes	No
NSB8BHC341-0		No	

Table 2: NS8000 Series Network Sensor: temperature and humidity models (3% RH)

Product code	Display and interface information	Johnson Controls logo	PIR occupancy sensor
NSB8BHN240-0	Fixed segment display	Yes	No
NSB8BHN241-0		No	No
NSB8MHN240-0		Yes	Yes
NSB8MHN241-0		No	Yes
NSB8BHN240-0G*		Yes	No
NSB8BHN040-0	No display	Yes	No
NSB8BHN041-0		No	No
NSB8MHN040-0		Yes	Yes
NSB8MHN041-0		No	Yes
NSB8BHN040-0G*		Yes	No
NSB8BHN140-0	Warmer/Cooler interface	Yes	No
NSB8BHN141-0		No	No
NSB8BHN140-0G*		Yes	No
NSB8BHN340-0	Graphical user interface	Yes	No
NSB8BHN341-0		No	No

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Table 3: NS8000 Series Network Sensor: temperature and CO_2 models

Product code	Display and interface information	Johnson Controls logo	PIR occupancy sensor
NSB8BTC040-0	No display	Yes	No
NSB8BTC041-0		No	No
NSB8MTC040-0		Yes	Yes
NSB8MTC041-0		No	Yes
NSB8BTC040-0G*		Yes	No
NSB8MTN040-0G*		Yes	Yes
NSB8BTC240-0	Fixed segment display	Yes	No
NSB8BTC241-0		No	No
NSB8MTC240-0		Yes	Yes
NSB8MTC241-0		No	Yes
NSB8BTC240-0G*		Yes	No
NSB8BTC340-0	Graphical user interface	Yes	No
NSB8BTC341-0		No	No

Table 4: NS8000 Series Network Sensor: temperature only models

Product code	Display and interface information	Johnson Controls logo	PIR occupancy sensor
NSB8BTN240-0	Fixed segment display	Yes	No
NSB8BTN241-0		No	No
NSB8MTN240-0		Yes	Yes
NSB8MTN241-0		No	Yes
NSB8BTN240-0G*		Yes	No
NSB8MTN240-0G*		Yes	Yes
NSB8BTN040-0	No display	Yes	No
NSB8BTN041-0		No	No
NSB8MTN040-0		Yes	Yes
NSB8MTN041-0		No	Yes
NSB8BTN040-0G*		Yes	No
NSB8BTN140-0	Warmer/Cooler interface	Yes	No
NSB8BTN141-0		No	No
NSB8BTN140-0G*		Yes	No
NSB8BTN340-0	Graphical user interface	Yes	No
NSB8BTN341-0		No	No

Table 5: NS8000 Series Network Sensor: CO_2 only models without display

Product code	Johnson Controls logo
NSB8BNC040-0	Yes
NSB8BNC041-0	No
NSB8BNC040-0G*	Yes

Johnson Controls

Table 6: NS8000 Series Network Sensor: temperature and humidity models (2% RH)

Product code	Display and interface information	Johnson Controls logo
NSB8BPN240-0	Fixed segment display	Yes
NSB8BPN241-0		No
NSB8BPN240-0G*		Yes

Table 7: Accessories

Product code	Description
NS-WALLPLATE-0	Wall plates fit seamlessly around the NS8000 Sensor models and enable you to mount a sensor where a larger one was previously mounted.

NS8000 Sensors with fault code capability error codes

The fault indication comes through the network sensor bus when you use a network sensor in the zone. The LCD indicates the code number for all the required state of California Title 24 economizer fault conditions.

Table 8: Fault code capability error codes

Display text	California Title 24 economizer fault condition	Possible problem
E00	Air temperature sensor failure/fault	Problem with one of the air temperature sensors. Check outdoor air, return air, or supply air sensors.
E01	Not economizing when it should	The economizer does not use outdoor air when it should.
E02	Economizing when it should not	The economizer is allowing outdoor air inside when the conditions are not suitable for economizer operation.
E03	Damper not modulating	The economizer damper is not able to modulate properly. Check damper, linkage to actuator, or the actuator.
E04	Excess outdoor air	The economizer is allowing excess outdoor air inside.

Johnson Controls

Technical specifications

Table 9: Vertical Wallbox-Mounted or Surface-Mounted NS8000 Series Network Sensors technical specifications

Specification			Description
Supply voltage			9.8 VDC to 16.5 VDC 15 VDC nominal from SA bus
Current consumption	Base current draw, graphical models	Screen off	18 mA maximum, non-transmitting
		Screen on	45 mA maximum
	Base current draw, other models		3 mA maximum, non-transmitting
	CO_2 models	LCD graphical	13 mA maximum additional current, during measurement
		Other models	15 mA maximum additional current, during measurement
	Fixed segment display models, backlight on		10 mA additional current
	Warmer/Cooler models, LEDs on		8 mA additional current
	ⓘ **Note:** SA bus applications are limited to a power load of 210 mA. The best practice when configuring an SA bus is to limit the total available operating power consumption to 120 mA or less. This power level enables you to connect a BTCVT Wireless Commissioning Converter temporarily or a DIS1710 Local Controller Display to the bus for commissioning, adjusting, and monitoring.		
Terminations			Modular jack and screw terminal block
Network sensor addressing	LCD graphical display models		Configurable through graphical user interface
	Other models		DIP switch set from 199 to 206, factory set at 199
Wire size	Modular jack models		24 AWG or 26 AWG (0.5 mm or 0.4 mm diameter), three twisted pair (six conductors)
	Screw terminal block models		18 AWG to 22 AWG (1 mm to 0.6 mm diameter), 22 AWG (0.6 mm diameter)
Communication rate			Auto-detect: 9.6 kbps, 19.2 kbps, 38.4 kbps, or 76.8 kbps
Temperature measurement range			32°F (0°C) to 104°F (40°C)
Temperature sensor type			Digital temperature sensor
Humidity sensor type			Thin film capacitive sensor
Ambient Conditions	Operating		32°F to 122°F (0°C to 50°C), 10% RH to 90% RH, noncondensing, 85°F (29°C) maximum dew point
	Storage	Display models	-40°F to 122°F (-40°C to 50°C), 5% RH to 95% RH, noncondensing
		Non-display models	-40°F to 185°F (-40°C to 70°C), 5% RH to 95% RH, noncondensing
Temperature resolution			±0.5°F (±0.5°C)
Temperature accuracy	NS8000 Series Network Zone Sensor		±1°F (±0.6°C)
	Temperature element only		±0.36°F (±0.2°C) at 70°F (21°C)

Johnson Controls

Table 9: Vertical Wallbox-Mounted or Surface-Mounted NS8000 Series Network Sensors technical specifications

Specification		Description
Humidity element accuracy	NSB8BPN24x-0 models	±2% RH for 20% RH to 80% RH at 50°F to 95°F (10°C to 35°C) ±4% RH for 10% RH to 20% RH and 80% RH to 90% RH at 50°F to 95°F (10°C to 35°C)
	NSB8BHxxxx-0 models	±3% RH for 20% RH to 80% RH at 50°F to 95°F (10°C to 35°C) ±6% RH for 10% RH to 20% RH and 80% RH to 90% RH at 50°F to 95°F (10°C to 35°C)
CO_2 measurement range	0 ppm to 2000 ppm	
CO_2 sensor accuracy	Accuracy	±30 ppm ±3% of CO_2 reading at 77°F (25°C) and 978 hPa (1,000 ft/300m)
	Temperature dependence	±1.4 ppm/°F (± 2.5 ppm/°C)
	Pressure dependence	Refer to the *NS8000 Series Network Sensors Installation Guide (24-11256-00007)* for CO_2 altitude compensation.
CO_2 sensor operation range		32°F to 122°F (0°C to 50°C)
Time constant		10 min nominal at 10 fpm airflow
Default temperature setpoint adjustment range		50°F (10°C) to 86°F (30°C) in 0.5° increments
CO_2 sensor lifespan		10 years under standard operating conditions
LCD lifespan for graphical display models		Screen timeout set to off > 10 years
		Screen timeout set to dim, at least 6 years
PIR occupancy sensor motion detection		Minimum 94 angular degrees up to a distance of 16 ft (5 m), approximately 47 degrees from center in horizontal and vertical directions.
Compliance	United States	UL Listed, File E107041, CCN PAZX,Under UL 60730-1, Energy Management Equipment
		FCC Compliant to CFR 47, Part 15, Subpart B, Class B
	Canada	cUL Listed, File E107041, CCN PAZX7,Under CAN/CSA E60730-1, Signal Equipment
		Industry Canada, ICES-003
CE	Europe	CE Mark – Johnson Controls declares that this product is in compliance with the essential requirements and other relevant provisions of the EMC Directive and RoHS Directive.
	Australia and New Zealand	RCM Mark, Australia/NZ Emissions Compliant
	China	RoHS2
Dimensions (H x W x D)		5 in. x 3.4 in. x 1.1 in. (127.5 mm x 86 mm x 28 mm)
Shipping weight		0.4 lb (0.18 kg)

The performance specifications are nominal and conform to acceptable industry standard. For application at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls shall not be liable for damages resulting from misapplication or misuse of its products.

Johnson Controls

Product warranty

This product is covered by a limited warranty, details of which can be found at www.johnsoncontrols.com/buildingswarranty.

Software terms

Use of the software that is in (or constitutes) this product, or access to the cloud, or hosted services applicable to this product, if any, is subject to applicable end-user license, open-source software information, and other terms set forth at www.johnsoncontrols.com/techterms. Your use of this product constitutes an agreement to such terms.

Patents

Patents: https://jcipat.com

Single point of contact

APAC	EU	UK	NA/SA
JOHNSON CONTROLS C/O CONTROLS PRODUCT MANAGEMENT NO. 32 CHANGJIANG RD NEW DISTRICT WUXI JIANGSU PROVINCE 214028 CHINA	JOHNSON CONTROLS VOLTAWEG 20 6101 XK ECHT THE NETHERLANDS	JOHNSON CONTROLS TYCO PARK GRIMSHAW LANE MANCHESTER M40 2WL UNITED KINGDOM	JOHNSON CONTROLS 5757 N GREEN BAY AVE. GLENDALE, WI 53209 USA

Contact information

Contact your local Johnson Controls representative: www.johnsoncontrols.com/locations
Contact Johnson Controls: www.johnsoncontrols.com/contact-us

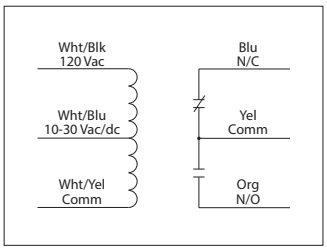
Johnson Controls

Functional Devices, Inc.™ (800) 888-5538 sales@functionaldevices.com www.functionaldevices.com

10 AMP PILOT CONTROL RELAYS

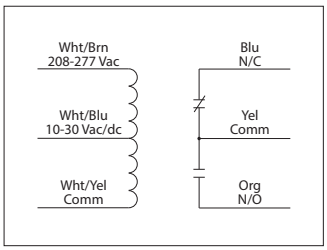
RIBU1C

Enclosed Relay 10 Amp SPDT with
10-30 Vac/dc/120 Vac Coil



RIBH1C

Enclosed Relay 10 Amp SPDT with
10-30 Vac/dc/208-277 Vac Coil



c UL us LISTED

Made in USA
Meets
"Buy American"
of ARRA 2009

RIBU1C-RD
RIBH1C-RD
• Red housing

RIBU1C-N4
RIBH1C-N4
• NEMA 4X housing, UL508 only

RELAYS

SPECIFICATIONS

 # Relays & Contact Type: One (1) SPDT Continuous Duty Coil
Expected Relay Life: 10 million cycles minimum mechanical
Operating Temperature: -30 to 140° F
Humidity Range: 5 to 95% (noncondensing)
Operate Time: 20ms
Relay Status: LED On = Activated
Dimensions: 1.70˝ x 2.80˝ x 1.50˝ with .50˝ NPT nipple
Wires: 16˝, 600V Rated
Approvals: UL Listed, UL916, UL864, C-UL California State Fire Marshal
Housing Rating: UL Accepted for Use in Plenum, NEMA 1
Gold Flash: Yes
Override Switch: No

Contact Ratings:
10 Amp Resistive @ 277 Vac
10 Amp Resistive @ 28 Vdc
480 VA Pilot Duty @ 240-277 Vac
480 VA Ballast @ 277 Vac
Not rated for Electronic Ballast
600 Watt Tungsten @ 120 Vac (N/O)
240 Watt Tungsten @ 120 Vac (N/C)
1/3 HP @ 120-240 Vac (N/O)
1/6 HP @ 120-240 Vac (N/C)
1/4 HP @ 277 Vac (N/O)
1/8 HP @ 277 Vac (N/C)

Coil Current:

33 mA @ 10 Vac	13 mA @ 10 Vdc
35 mA @ 12 Vac	15 mA @ 12 Vdc
46 mA @ 24 Vac	18 mA @ 24 Vdc
55 mA @ 30 Vac	20 mA @ 30 Vdc

28 mA @ 120 Vac (RIBU1C)
39 mA @ 208-277 Vac (RIBH1C)

Coil Voltage Input:
10-30 Vac/dc ; 120 Vac ; 50-60 Hz (RIBU1C)
10-30 Vac/dc ; 208-277 Vac ; 50-60 Hz (RIBH1C)
Drop Out = 2.1 Vac / 2.8 Vdc
Pull In = 9 Vac / 10 Vdc

Go/No Current Switches

- Go/No status
- 0.25-200A range
- Split and solid core models
- N.O. 30VAC/DC or 120VAC output
- Optional command relay

DESCRIPTION

Fixed threshold trip point detects the presence of current above low trip point to provide cost-effective status monitoring unit vents, exhaust fans, recirculation pumps, and other fixed loads where belt loss is not a concern.

APPLICATIONS

- Monitoring on/off status of electrical loads
- Monitoring direct-drive units, exhaust fans, and other fixed loads
- Verifying lighting run times

FEATURES

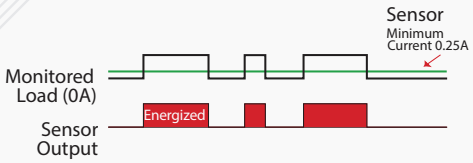
Reliable and cost-effective

- Solid-state—no moving parts to fail
- Less expensive than 277V relays for lighting status
- More reliable for status than relays across auxiliary contacts
- Industry leading 7 year limited warranty

PROUDLY MADE IN USA

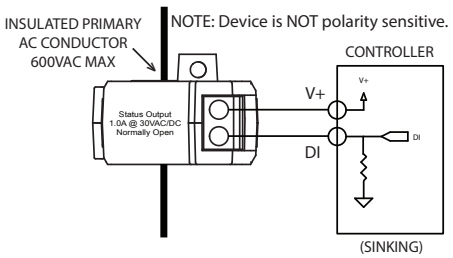
7 year limited warranty

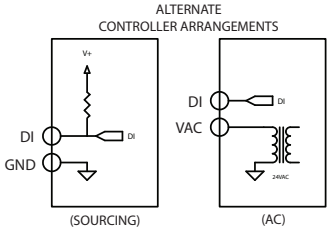
Run status based on current



The go/no series output changes state whenever current above the minimum turn-on is present. This provides "go/no" status on loads that are not subject to mechanical failures.

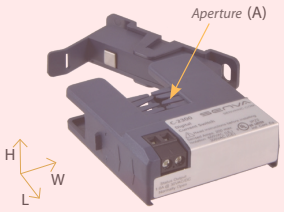
TYPICAL WIRING





Warning: *Refer to installation instructions that accompany product and heed all safety instructions.*

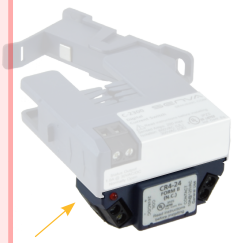
SPLIT CORE C-2300



L: 2.5″ H: 0.57″ W: 2.23″
A: 0.75″x. 0.75″

- Mount sensor without removing conductor for installation savings
- Clamp on conductor with iris, or use detachable base to screw or DIN mount
- Larger 0.75″ aperture accomodates oversize conductors

OPTIONAL RELAY



L: 0.84″ H: .72″ W: 2.06″

- Add to 2300 series to get start/stop/status in a single device
- Reduces the number of installed components... saves time and space
- Removable relay facilitates service

SPLIT CORE - MINI C-2200

L: 2.00″ H: .75″ W: 1.75″
A: .0.40″x 0.32″

- Mount sensor without removing conductor for installation savings
- Fits in small enclosures
- Clamp on conductor with iris, or screw mount detachable base

SOLID CORE C-1300

L: 2.27″ H: 1.04″ W: 1.6″
A: 0.52″ diameter

- Compact design
- Aperture accomodates spade terminals

SOLID CORE - MINI C-1200

L: 1.78″ H: .88″ W: 1.31″
A: 0.30″ diameter

- Super small—fits anywhere
- Low cost

ORDERING INFORMATION

SPLIT CORE	Min (on)	Max A	N.O. Output
C-2300	0.35A	200A	1.0A@30VAC/DC
C-2300HV	0.35A	100A	0.2A@120VAC
SPLIT CORE - MINI			
C-2200	0.5A	50A	1.0A@30VAC/DC
SOLID CORE			
C-1300	0.25A	50A	1.0A@30VAC/DC
SOLID CORE - MINI			
C-1200	0.25A	50A	1.0A@30VAC/DC
C-1200HV	0.25A	50A	0.2A@120VAC

COMMAND RELAY	Contact rating	Coil
CR3-24	N.O. 10A @ 125VAC	24VAC/DC 15mA nom.
CR4-24	N.C. 10A @ 125VAC	24VAC/DC 15mA nom.
CR3-12	N.O. 10A @ 125VAC	9-12VDC 30mA nom.
CR4-12	N.C. 10A @ 125VAC	9-12VDC 30mA nom.

SPECIFICATIONS

Standard Output Rating	1.0A@30VAC/DC
Line Voltage Output Rating	0.2A@120VAC (-HV MODELS ONLY)
Output Type	NO, solid-state FET
Temperature Rating	-15-60 ° C
Insulation Class	600V RMS. For use on insulated conductors only! Use minimum 75 ° C insulated conductor
Sensor Power	Induced
Frequency Range	50/60Hz