

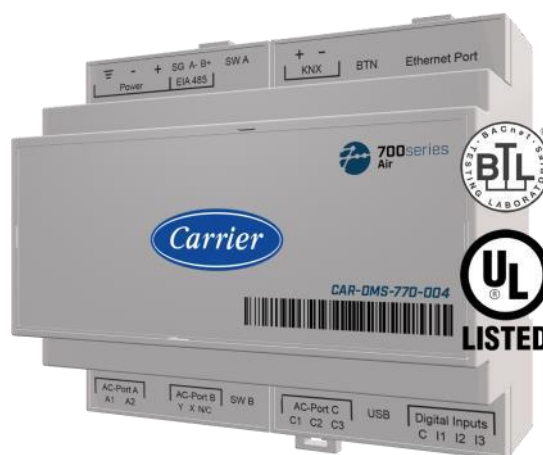
BACnet Server

Carrier Ductless Indoor Unit

Gateway for the integration of Carrier Air Conditioning into BACnet/IP or BACnet MS/TP control and monitoring systems

Submittal

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Gateway for the integration of Carrier Air Conditioning into BACnet/IP or BACnet MS/TP control and monitoring systems.

For model compatibility:

Please refer to "**Carrier Intesis DLS Gateway 1:1 and 4:1 Compatibility**" documentation, PMB24-076.

1 Description

1.1 Introduction

This document describes the integration of Carrier Ductless air conditioning systems into BACnet compatible devices and systems using the *BACnet Server – Carrier Ductless* gateway.

The aim of this integration is to monitor and control your Carrier air conditioning system, remotely, from your Control Center using any commercial SCADA or monitoring software that includes a BACnet/IP or BACnet MS/TP driver. To do so, the gateway allows BACnet/IP and BACnet MS/TP communication, acting as a server (B-AAC profile), allowing polling or subscription requests (COV).

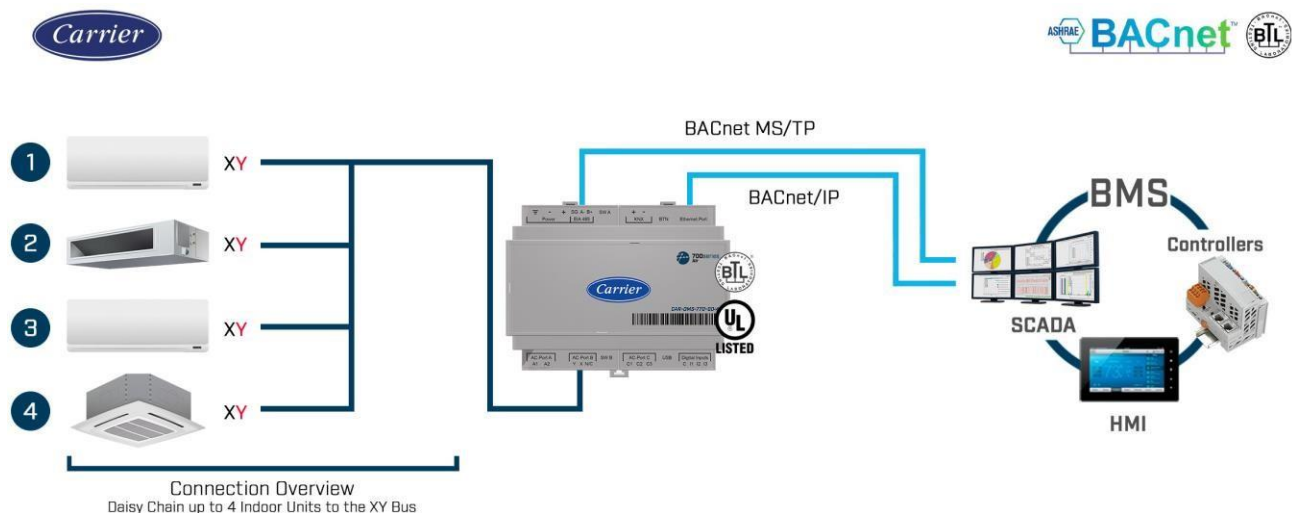
The gateway makes the Carrier Ductless conditioning system indoor units available through independent BACnet objects.

A fixed BACnet object IDs mapping based on Indoor unit addresses is provided. A simple configuration is needed: just select the appropriate communication parameters (IP address, baud rate...).

Up to 4 indoor units are supported, depending on the product version.

This document assumes that the user is familiar with BACnet and Carrier technologies and their technical terms.

Carrier Ductless System Integration to Building Automation using BACnet



1.2 Gateway capacity

Element	Max.	Notes
Number of indoor units	4	Number of indoor units that can be controlled through the gateway

1.3 Member objects

1.3.1 Type: Gateway

Object-name	Description	Object-type	Object-instance
Device CAR-DMS-770-004	Carrier Ductless to BACnet Gateway	Device	246 <i>Instance number of device object can be configured with MAPS</i>

1.3.2 Type: Central control

Object-name	Description	Object-type	Object-instance
On/Off (all units)	0-Off,1-On	BO	0
Mode (all units)	1-Heat, 2-Cool, 3-Fan, 4-Dry, 5-Auto	MO	0
FanSpeed (all units)	1-Auto, 2-Low, 3-Mid, 4-High	MO	1
Vane Position (all units)	0-Swing Off, 1-Swing On	BO	1
Temperature Setpoint (all units)	17..30°C / 62...88°F	AO	0
Operating mode force (all units)	0-No force, 1-force	BO	2
Remote control lock (all units)	0-Unlock, 1-Lock	BO	3

1.3.3 Type: Indoor Unit

Uxx is a generic prefix for the BACnet object name, where:

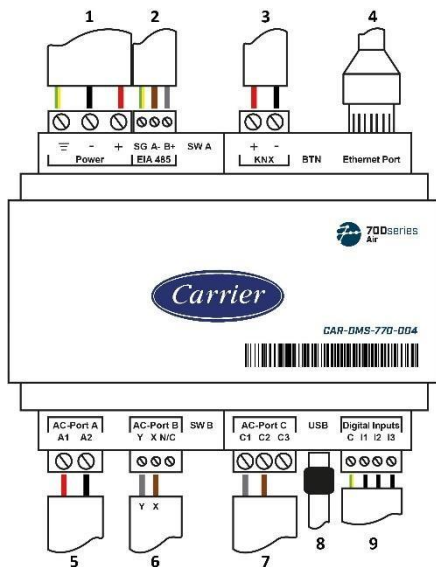
Variable	Description
"Uxx"	Indoor Unit index (1..N)

Object-name	Description	Object-type	Object-instance
Uxx_On/Off_S	0-Off,1-On	BI	(U[1..N]*100) + 0
Uxx_On/Off_C	0-Off,1-On	BO	(U[1..N]*100) + 0
Uxx_Mode_S	1-Heat, 2-Cool, 3-Fan, 4-Dry, 5-Auto	MI	(U[1..N]*100) + 0
Uxx_Mode_C	1-Heat, 2-Cool, 3-Fan, 4-Dry, 5-Auto	MO	(U[1..N]*100) + 0
Uxx_Setpoint_S	17...30°C / 62...88°F	AI	(U[1..N]*100) + 0
Uxx_Setpoint_C	17...30°C / 62...88°F	AO	(U[1..N]*100) + 0
Uxx_FanSpeed_S	1-Auto, 2-Low, 3-Med, 4-High	MI	(U[1..N]*100) + 1
Uxx_FanSpeed_C	1-Auto, 2-Low, 3-Med, 4-High	MO	(U[1..N]*100) + 1
Uxx_Vane position_S	0-Swing Off, 1-Swing On	BI	(U[1..N]*100) + 1
Uxx_Vane position_C	0-Swing Off, 1-Swing On	BO	(U[1..N]*100) + 1
Uxx_Room Temperature	-20...100°C / -4...212°F	AI	(U[1..N]*100) + 1
Uxx_Unit Error Code	0-No error, X-Error (0...255)	AI	(U[1..N]*100) + 2
Uxx_Communication Error IU	0-No error, 1-Error	BI	(U[1..N]*100) + 2
Uxx_Remote control lock_S	0-Unlock, 1-Lock	BI	(U[1..N]*100) + 3
Uxx_Remote control lock_C	0-Unlock, 1-Lock	BO	(U[1..N]*100) + 2
Uxx_Operating mode force_S	0-No force, 1-Force	BI	(U[1..N]*100) + 4
Uxx_Operating mode force_C	0-No force, 1-Force	BO	(U[1..N]*100) + 3
Uxx_Consumption_Yesterday_S	Wh/KWh	AI	(U[1..N]*100) + 3
Uxx_Consumption_Today_S	Wh/KWh	AI	(U[1..N]*100) + 4
Uxx_Consumption_Total_S	Wh/KWh	AI	(U[1..N]*100) + 5
Uxx_Consumption_Yesterday_Heat_S	Wh/KWh	AI	(U[1..N]*100) + 6
Uxx_Consumption_Today_Heat_S	Wh/KWh	AI	(U[1..N]*100) + 7
Uxx_Consumption_Total_Heat_S	Wh/KWh	AI	(U[1..N]*100) + 8
Uxx_Consumption_Yesterday_Cool_S	Wh/KWh	AI	(U[1..N]*100) + 9
Uxx_Consumption_Today_Cool_S	Wh/KWh	AI	(U[1..N]*100) + 10
Uxx_Consumption_Total_Cool_S	Wh/KWh	AI	(U[1..N]*100) + 11

* [1..N] refers to the unit index in Intesis MAPS, as shown in the Signals tab Carrier **Unit** column.

2 Connections

Find below information regarding the available gateway connections.



1. Power Supply (12-36 VDC / 24 VAC)
2. Port EIA-485
3. Port KNX
4. Ethernet
5. Not used
6. Carrier (Ductless: X/Y)
7. Not used
8. Console
9. Binary inputs (dry contact) optional

Power Supply

Must use NEC Class 2 or Limited Power Source (LPS) and SELV rated power supply.

If using DC power supply:

Respect polarity applied of terminals (+) and (-). Be sure the voltage applied is within the range admitted (check table below). The power supply can be connected to earth but only through the negative terminal, never through the positive terminal.

If using AC power supply:

Make sure the voltage applied is of the value admitted (24 Vac). Do not connect any of the terminals of the AC power supply to earth, and make sure the same power supply is not supplying any other device.

Ethernet / BACnet/IP

Connect the cable coming from the IP network to the Ethernet port of the gateway. Use an Ethernet CAT5 cable. If communicating through the LAN of the building, contact the network administrator and make sure traffic on the port used is allowed through all the LAN path (check the gateway User Manual for more information). Default IP is 192.168.100.246. DHCP is enabled by default.

AC-Port B / Carrier DUCTLESS

Connect the XY terminals of up to 4 Carrier Indoor Units to the X and Y connectors of the gateway's AC-Port B. WARNING: Respect the polarity!

EIA485 Port / BACnet MS/TP

Connect the EIA485 bus to the A-, B+, and SG connectors of the gateway's EIA485 port. Respect the polarity.

Note for EIA485 (RS485) Port; Remember the characteristics of the standard EIA485 bus: maximum distance of 1200 meters, maximum 32 devices connected to the bus, and in each end of the bus, there must be a termination resistor of 120 Ω . The port includes a DIP switch (SW A) for the configuration of the biasing circuit as well as the termination:

Position			Description
1	2	3	
OFF	X	X	120 Ω termination inactive
ON	X	X	120 Ω termination active
X	OFF	OFF	Polarization inactive
X	ON	ON	Polarization active

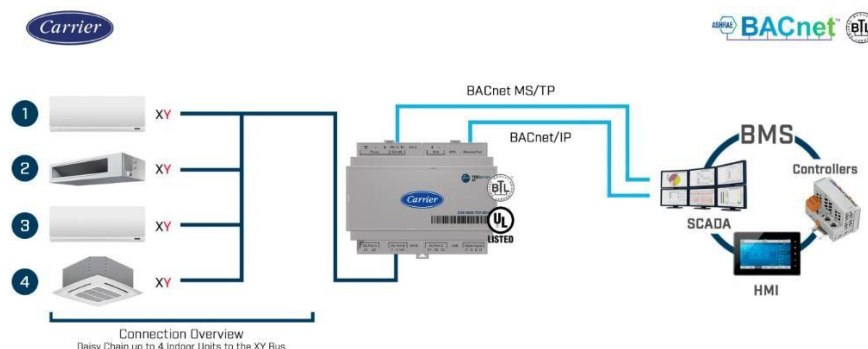
Default positions for SW A are: OFF, OFF, OFF (120 Ω termination and polarization inactive). Observe the ON indicator on the DIP switch as a reference.

If the gateway is installed at an end of the BACnet MS/TP bus, make sure the 120 Ω termination is active.

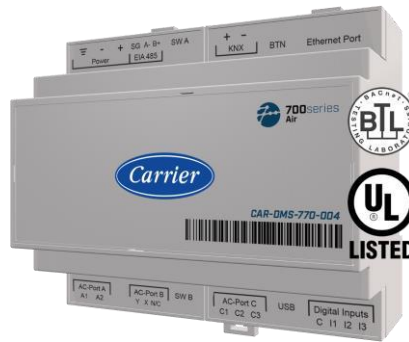
Console Port

Connect a mini-type B USB cable from your computer to the gateway to allow communication between the Configuration Software and the gateway. Remember that Ethernet connection is also allowed. Check the User Manual for more information.

Ensure proper space for all connectors when mounted (see section 4).

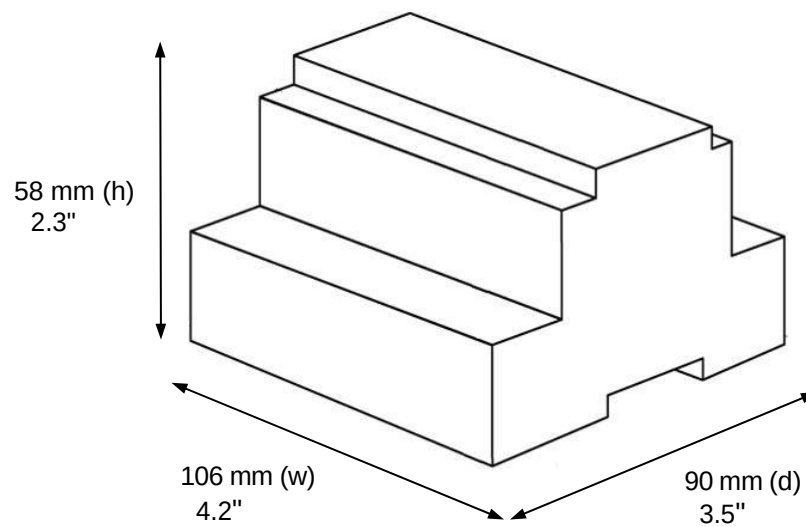


3 Electrical & Mechanical Features

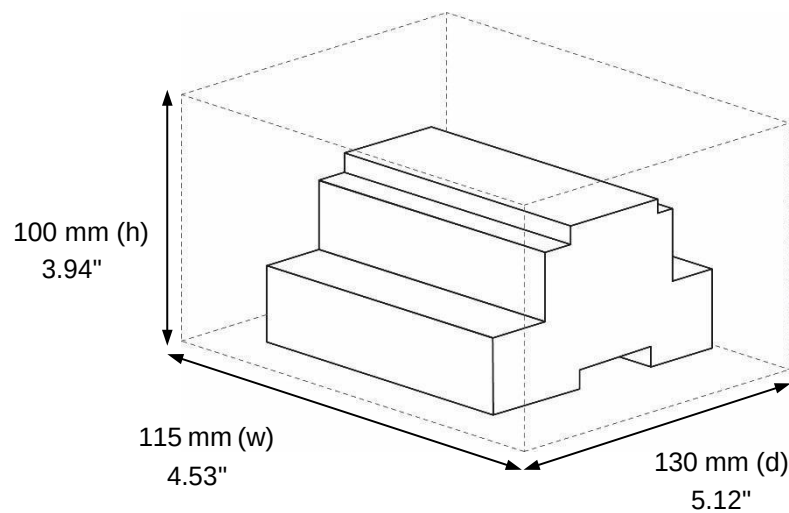


Housing	Plastic, type PC (UL 94 V-0) Color: Light Grey RAL: 7035 Net dimensions (d x w x h): Millimeters: 90 x 106 x 58 mm Inches: 3.5 x 4.2 x 2.3"	Console Port	USB Mini-B type 2.0 compliant 1500 VDC isolation
Mounting	Wall: Use M3 25mm (1") length screws Secure mounting: below 2 meters (6 feet) DIN rail (recommended mounting) EN60715 TH35	DIP Switches	2x DIP switch blocks for EIA-485 serial port configuration: SW A Position 1: On: 120 Ω termination active Off: 120 Ω termination inactive (default) Positions 2 and 3: On: Polarization active Off: Polarization inactive (default) SW B Position 1: On: 120 Ω termination active Off: 120 Ω termination inactive (default) Positions 2 and 3: On: Polarization active Off: Polarization inactive (default)
Wires (for power supply and low-voltage signals)	Wire cross-section/gauge per terminal: One core: 0.2 to 2.5 mm ² (24 to 14 AWG) Two cores: 0.2 to 1.5 mm ² (24 to 16 AWG) Three cores: Not permitted Use solid or stranded wires (twisted or with ferrule) For distances longer than 3.05 meters (10 feet), use class 2 cables	Push Button	1 x Push button Factory reset I-Am message (for BACnet only) Normal mode / programming mode switch (for KNX only)
Power	1 x Green pluggable terminal block (3 poles) 12 to 36 VDC $\pm$ 10%, Max.: 250 mA 24 VAC $\pm$ 10% 50-60 Hz, Max.: 127 mA Recommended: 24 VDC	Operational Temperature	Celsius: 0 .. 60°C Fahrenheit: 32 .. 140°F
Ethernet	1 x Ethernet 10/100 Mbps RJ45	Operational Humidity	5 to 95%. No condensation
Port EIA 485	1 x Green pluggable terminal block (3 poles) SGND (Reference ground or shield) 1500 VDC isolation from other ports	Protection	IP20 (IE60529)
Port KNX	1 x Orange pluggable terminal block (2 poles): A, B		
AC Ports	AC-Port A (serial, 2 poles): Not used AC-Port B (serial, 3 poles): AC bus connection (XY) AC-Port C (serial, 3 poles): Not used		
LEDs	2 x Run (Power/Error) 2 x Port EIA-485 TX/RX 2 x Port KNX TX/RX 1 x Button indicator	2 x Ethernet Link/Speed 2 x AC-Port A TX/RX 2 x AC-Port B TX/RX 2 x AC-Port C TX/RX	
Binary Inputs	1 x Green pluggable terminal block (4 poles) I1, I2, I3, and Common 1500 VDC isolation from other ports		

4 Dimensions



Recommended available space for its installation into a cabinet (wall or DIN rail mounting), with space enough for external connections:



5 Error codes

This list contains all possible values shown in Bacnet Object for “Error Code” for each indoor unit and outdoor unit.

Error Code	Error in Remote Controller	Error description
0	N/A	No active error
1	E0	Phase error or error in the phase sequence
2	E1	Communication error
3	E2	T1 sensor error
4	E3	T2A sensor error
5	E4	T2B sensor error
6	E5	T3 temperature and T4 temperature Compressor discharge temperature sensors error
7	E6	Zero cross error detection
8	E7	EEPROM memory error
9	E8	Indoor fan speed out of control
10	E9	Communication error between the main panel and the visualization panel
11	EA	Compressor's current overload error (4 times)
12	EB	Inverter module protection
13	EC	Cooling error
14	ED	Outdoor unit fault protection
15	EE	Water level fault detection
16	EF	Other errors
101	P0	Vaporizer temperature protection
102	P1	Thawing or cold air protection
103	P2	Condenser high temperatures protection
104	P3	Compressor temperature protection
105	P4	Evacuation duct temperature protection
106	P5	Discharge high pressure protection
107	P6	Discharge low pressure protection
108	P7	Current overload or under load protection
109	P8	Compressor's current overload protection
110	P9	Reserved
111	PA	Reserved
112	PB	Reserved
113	PC	Reserved
114	PD	Reserved
115	PE	Reserved
116	PF	Other protection measures
65535 (-1)	N/A	Error in the communication of CAR-DMS-770-004 with the AC unit
-100	N/A	License error / Indoor units not supported by current license
-200	N/A	Overconsumption error in XYE bus

In case you detect an error code not listed, contact your nearest Carrier technical support service.