OPTIMIZER ADVANCED
PLANT CONTROLLER

The Advanced controllers are a family of next generation Integration & Plant controllers incorporating the Niagara framework & powered by an IMX8 64bit quad-core processor. The IP devices are freely programmable, with a dedicated suite of IO modules providing extremely flexible control options. Using the power of Niagara they provide both Ethernet & Serial integration options and are native BACnet™ Building Controllers ("B-BC").

The N-ADV-133-H, N-ADV-134-H, and N-ADV-112-H Advanced controllers are designed for a wide variety of complex applications. These devices feature RS485 channels for BACnet™ MS/TP, Panel Bus, Modbus RTU, M-Bus, and IO module devices, Ethernet ports for BACnet™ IP devices, and a RJ11 interface for HMI devices. These controllers also have touchflakes to connect with multiple IOs in series and a USB Type-C interfaces to connect with a computer for serial communication. These controllers can be mounted on either a DIN rail or on the wall mounted in either horizontally or vertically orientations.

FEATURES AND HIGHLIGHTS

SIMPLE AND FLEXIBLE ENGINEERING

- Conforms to BACnet™ Standard 135 protocol version 1.15 (ISO 16484-5).
- N-ADV-112-H controller has Ethernet ports - one isolated Ethernet port and one switched IP ports.
- N-ADV-133-H series controller has Ethernet ports - one isolated Ethernet port and three switched IP port.
- N-ADV-134-H controller has Ethernet ports - one isolated Ethernet port and three switched IP port.
- RJ11 interface to connect with an HMI device for field operations.
- Touch flake to support RS485 IO module devices.
- Support Peer-to-Peer communication.
- Supports DHCP (Automatic IP address assignment).
- Using devices with multiple Switch IP ports, Supports daisy chain connection.
- i.MX 8M Plus, quad Arm® Cortex®-A53 processor, long life industrial grade, Frequency: 1.2 GHz.
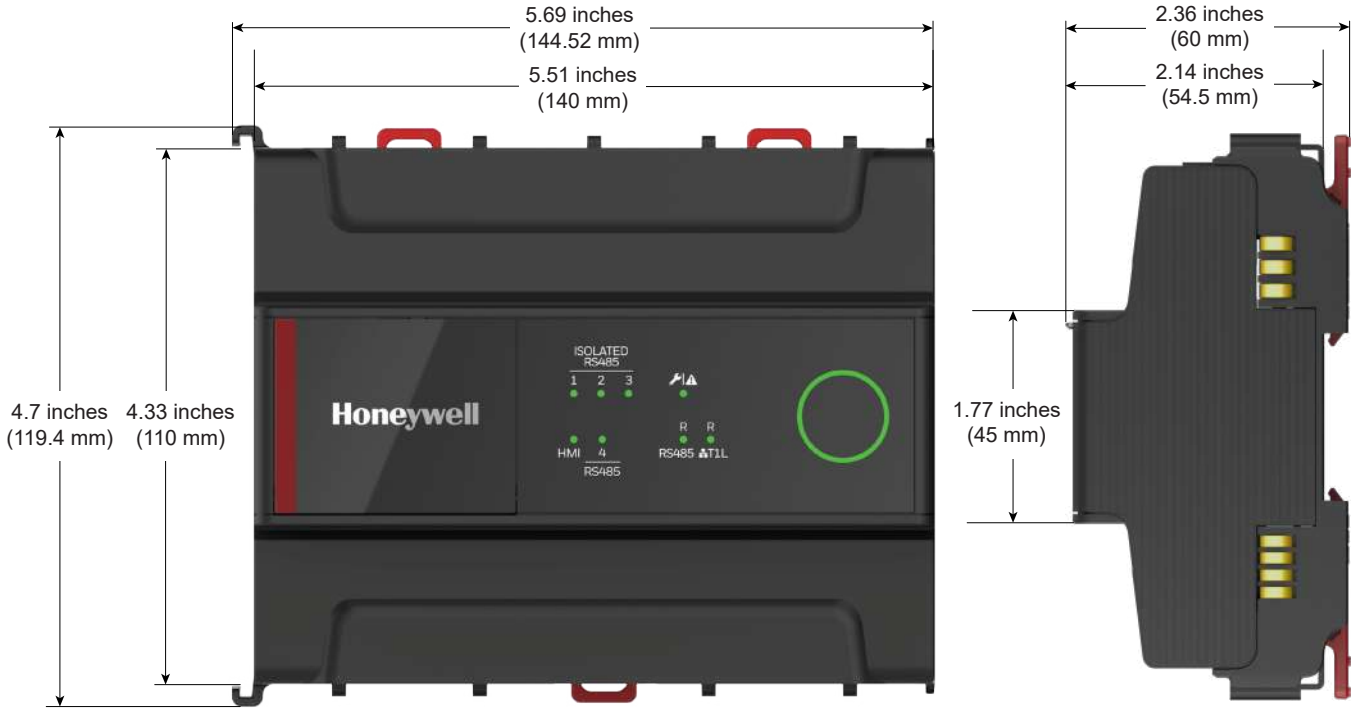
EFFICIENCY AND SAFETY ON SITE

- Multi-color LEDs to show the operational status of the isolated RS485 communications, HMI device, Ethernet connection, and Service state of the controller.
- Built-in advanced diagnostics software facilitating troubleshooting for IP and MS/TP devices.
- Ferroelectric RAM (FRAM) to store the live data for the controller, including storing the last known values when power is removed.
- UTF-8 and UCS-2 character encoding formats are supported.
- Protective end covers to protect the Touch flake.
- Ubuntu Core OS with snap container based modular software design (Cyber Secure).
- Processor featuring Neural Net Accelerator for future development of low latency AI/ML algorithms at the Edge.

EASY UPGRADE

- All RS485 channels support Panel Bus, BACnet™ MS/TP, Modbus RTU, and M-Bus.
- Removable terminal blocks with screw (factory installed) or Push-in terminals.
- Built-in Web server with HTML5 to support graphics.
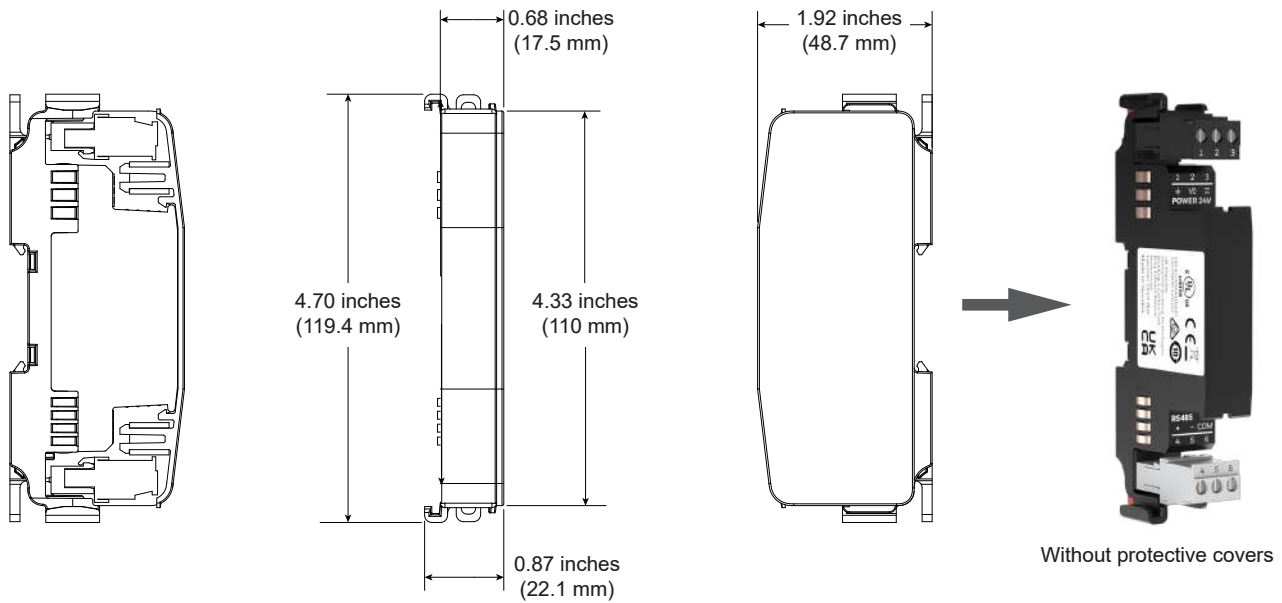- Supports for Azure IOT remote device management and update services.

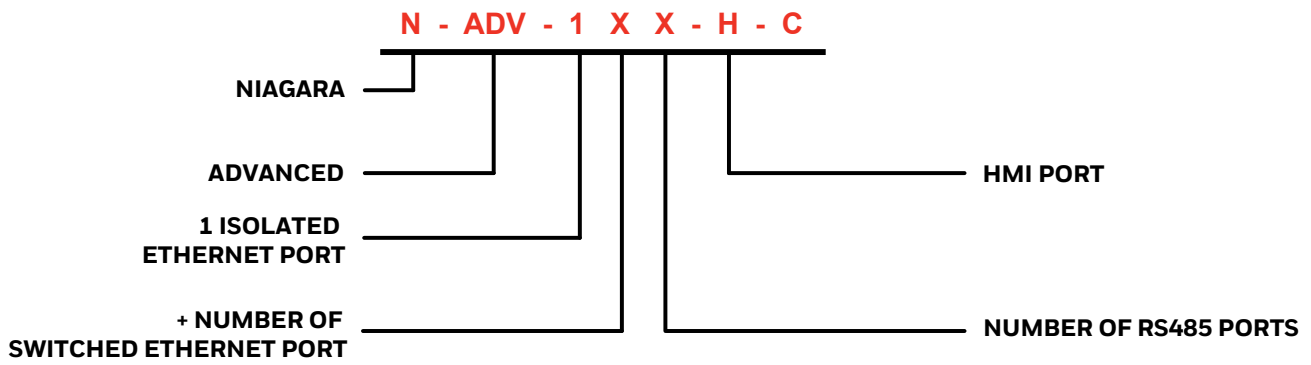## Honeywell

DIMENSIONS

ADVANCED PLANT CONTROLLER

5.69 inches
(144.52 mm)

5.51 inches
(140 mm)

2.36 inches
(60 mm)

2.14 inches
(54.5 mm)

4.7 inches
(119.4 mm)

4.33 inches
(110 mm)

ISOLATED
RS485
1   2   3

HMI   4
RS485

R
RS485

R
T1L

1.77 inches
(45 mm)

Honeywell

All dimensions are in inches (mm). For illustration, the N-ADV-134-H controller is shown.

WIRING ADAPTER

0.68 inches
(17.5 mm)

1.92 inches
(48.7 mm)

4.70 inches
(119.4 mm)

4.33 inches
(110 mm)

0.87 inches
(22.1 mm)

Without protective covers

All dimensions are in inches (mm).

CONTROLLER PART NUMBERS DESCRIPTION

N - ADV - 1 X X - H - C

- NIAGARA
- ADVANCED
- 1 ISOLATED ETHERNET PORT
- + NUMBER OF SWITCHED ETHERNET PORT
- HMI PORT
- NUMBER OF RS485 PORTS

ORDERING INFORMATION

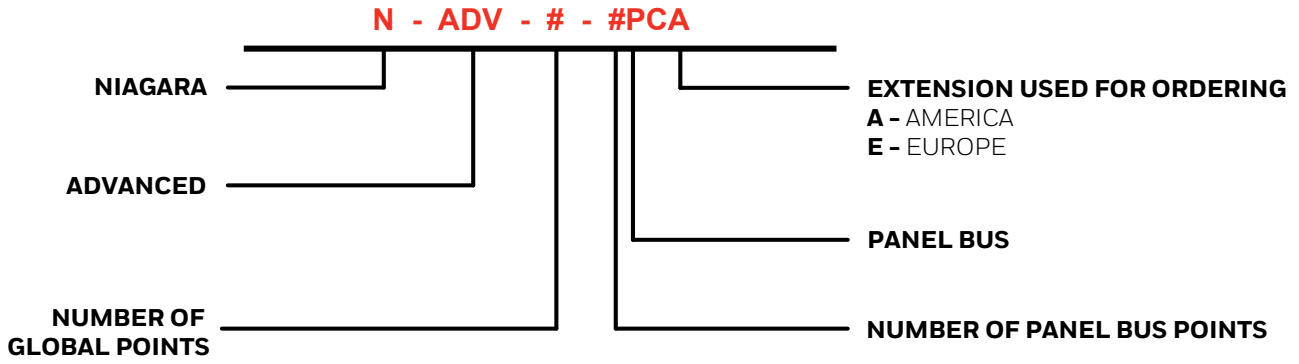| ORDERING INFORMATION					
PART NUMBER	ETHERNET PORTS	SWITCHED IP PORT	HMI PORTS	RS485 PORTS	TOUCH FLAKE (RS485-R)
N-ADV-134-H-C**#**	1	3	YES	4	YES
N-ADV-133-H-C	1	3	YES	3	YES
N-ADV-112-H-C	1	1	YES	2	YES

Note: For example, a customer wishing to buy an Advanced controller with 1 isolated Ethernet port, 3 Switched ports, and 3 serial ports, would order using part number N-ADV-133-H-C.

The N-ADV-134-H-C controller varient will be launched in the upcoming release.

ACCESSORIES AND REPLACEMENT PARTS	
PART NUMBER	DESCRIPTION
HMI-DN	Touch screen HMI with DIN Rail Mount
HMI-WL	Touch screen HMI with Panel Door/Wall Base
HMI-ACC-DN	DIN Rail base accessory
HMI-ACC-WL	Door/Wall base accessory
HMI-CABLE-S	0.82 ft. (0.25 m) length HMI cable, short
HMI-CABLE-L	9.84 ft. (3 m) length HMI cable, long
ENDCOVER-10	Protective end covers, pack of 10
TCVR-140-10	Terminal covers 5.5 inches (140 mm), pack of 10
SCRW-TB-3-BLK-50	Black 3 way screw terminals, pack of 50
SCRW-TB-3-GRY-50	Grey 3 way screw terminals, pack of 50
PUSH-TB-3-BLK-50	Black 3 way push terminals, pack of 50
PUSH-TB-3-GRY-50	Grey 3 way push terminals, pack of 50
DIN-CLIP-10	Din rail clip, pack of 10
IO-ADPT-S-2	Wiring adapters, Power & Comms, Serial, Pack of 2

Note: The controller is supplied with Din rail clips, Terminal covers, Protective end ver, and the appropriate screw terminal blocks for the variant. In addition to the HMI and wiring adapter, the accessories supplied with the controller can be ordered as spare parts should they be required.

SOFTWARE LICENSES AND UPGRADES

N - ADV - # - #PCA

NIAGARA

ADVANCED

NUMBER OF GLOBAL POINTS

EXTENSION USED FOR ORDERING
A – AMERICA
E – EUROPE

PANEL BUS

NUMBER OF PANEL BUS POINTS

ADVANCED CONTROLLER NIAGARA CORE LICENSES

A Niagara license is required run the core Niagara framework. Select one of the licenses from the below table.

ADVANCED CONTROLLER NIAGARA CORE LICENSES	
PART NUMBER	DESCRIPTION
N-ADV-00050-100PC *	Advanced core license with 3 Devices[1], 50 Global Pts, 100 Panel Bus Pts and 18 month initial SMA, + I/O
N-ADV-00500-100PC *	Advanced core license with 10 Devices[1], 500 Global Pts, 100 Panel Bus Pts & 18 month initial SMA, + I/O
N-ADV-01250-255PC *	Advanced core license with 25 Devices[1], 1250 Global Pts, 255 Panel Bus Pts and 18 month initial SMA, + I/O
N-ADV-05000-255PC *	Advanced core license with 100 Devices[1], 5000 Global Pts, 255 Panel Bus Pts and 18 month initial SMA, + I/O
N-ADV-10000-255PC *	Advanced core license with 200 Devices[1], 10000 Global Pts, 255 Panel Bus Pts and 18 month initial SMA, + I/O

[1] Device limit applies only outside of Europe. Panel Bus IOs do not count towards the device limit.

Note: * To reference your region for ordering. A is for America & rest of the world and E is for Europe.
Please contact your Honeywell Sales Representative if you have any questions.

For example, a customer wishing to buy a 500 global point controller with 100 Panel Bus points in the USA where device and point count limits apply, would order using part number N-ADV-00500-100PC**A**.

For example, a customer wishing to buy a 500 global point controller with 100 Panel Bus points in Europe where only the point count limits apply, would order using part number N-ADV-00500-100PC**E**.

ADVANCED CONTROLLER PANEL BUS POINT UPGRADE LICENSES

Advanced Controller core licenses can be upgraded with any of the following upgrade license.

PANEL BUS POINT UPGRADE LICENSES	
PART NUMBER	DESCRIPTION
N-ADV-0100P-UP	Upgrade License for 100 Panel Bus Pts
N-ADV-0255P-UP	Upgrade License for 255 Panel Bus Pts

ADVANCED CONTROLLER GLOBAL CAPACITY POINT UPGRADE LICENSES

Advanced Controller core Global points capacity licenses can be upgraded with any of the following upgrade licenses.

GLOBAL CAPACITY POINT UPGRADE LICENSES	
PART NUMBER	DESCRIPTION
PIN-DEV-1	Additional 1 Device**, 50 Global point capacity.
PIN-DEV-2	Additional 2 Device**, 100 Global point capacity.
PIN-DEV-10	Additional 10 Device**, 500 Global point capacity.
PIN-DEV-25	Additional 25 Device**, 1250 Global point capacity.
PIN-DEV-50	Additional 50 Device**, 2500 Global point capacity.

**** *Device limit applies outside of Europe only. Panel Bus IO module point do not count towards the device limit.*

SOFTWARE LICENSES AND UPGRADES

ADVANCED CONTROLLER SMA LICENSES

The Advanced Controller core licenses can be upgraded with the following SMA licenses.

SMA LICENSES	
PART NUMBER	DESCRIPTION
SMA-0001-1YR	1 year maintenance for 50 global Pts.
SMA-0001-3YR	3 years maintenance for 50 global Pts.
SMA-0001-5YR	5 years maintenance for 50 global Pts.
SMA-0010-1YR	1 year maintenance for 500 global Pts.
SMA-0010-3YR	3 years maintenance for 500 global Pts.
SMA-0010-5YR	5 years maintenance for 500 global Pts.
SMA-0025-1YR	1 year maintenance for 1250 global Pts.
SMA-0025-3YR	3 years maintenance for 1250 global Pts.
SMA-0025-5YR	5 years maintenance for 1250 global Pts.
SMA-0100-1YR	1 year maintenance for 5000 global Pts.
SMA-0100-3YR	3 years maintenance for 5000 global Pts.
SMA-0100-5YR	5 years maintenance for 5000 global Pts.
SMA-0200-1YR	1 year maintenance for 10000 global Pts.
SMA-0200-3YR	3 years maintenance for 10000 global Pts.
SMA-0200-5YR	5 years maintenance for 10000 global Pts.

Note: The number of global points is taken into consideration at the moment of licensing. If you have a valid SMA and you upgrade with a number of global points exceeding the SMA, the licenses will run until your SMA expires. If you extend your SMA after expiration, you will have to buy the SMA associated with the new number of global points.

INTERFACES AND BUS CONNECTIONS

Advanced Via its various interfaces and bus connections, N-ADV-112-H controller can be connected to a variety of devices and systems.

ETHERNET INTERFACES

Both Ethernet interfaces can connect the controller to a computer using an Ethernet crossover cable.

The user can upload, download, and debug the controller application using Niagara workbench from the computer. These connections also establish Internet connectivity.

The controller can be operated via a standard browser. By default, an integrated web-server provides all operation pages for a full browser-based operation. While browsing, the controller can remain connected to the Ethernet network without interruption.

ISOLATED ETHERNET PORT1

SWITCHED PORT
PORT1
PORT2
PORT3
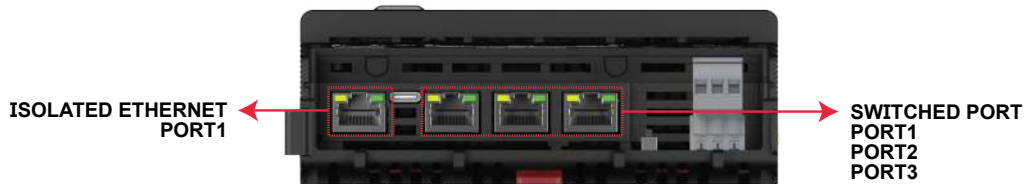
USB INTERFACES (USB 2.0 HOST INTERFACE)

The controller is built with two USB Type-C ports to connect with the computer and mobile/tablet devices using a USB cable to monitor and troubleshoot the controller. The USB2 port 2 can connect the IFLON2 gateway interface, allowing the Advanced controller to connect to a LON network.

C TYPE USB 2
(USED FOR LON COMMUNICATION)
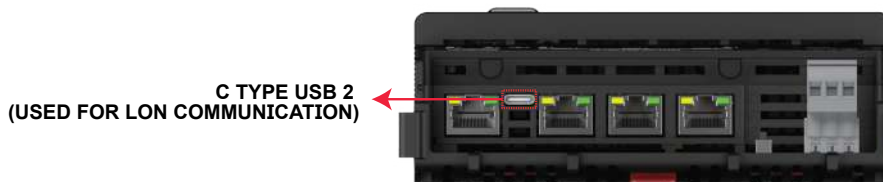
INTERFACES AND BUS CONNECTIONS

USB INTERFACES (USB 2.0 DEVICE INTERFACE)

The USB port 1 Device interface at the front, which is an Ethernet over USB connection. The permanent IP address of this USB interface is 192.168.255.241.

This interface allows connection of the Niagara workbench for programming and operation.

C TYPE USB 1

WIRING ADAPTER

Use the wiring adapter when power and the communication bus needs to be extended to the next DIN rail of IO modules or when an IO module is remotely mounted from the controller. The wiring adapter has a reversible cover that allows wiring left to right or right to left in the panel.

The wiring adapter has Touch flake connections on both left and right sides and provides a set of terminals for power and a set of terminals for the RS485 communication bus. The power and the communication bus are transferred to the IO modules by the Touch flake connections.
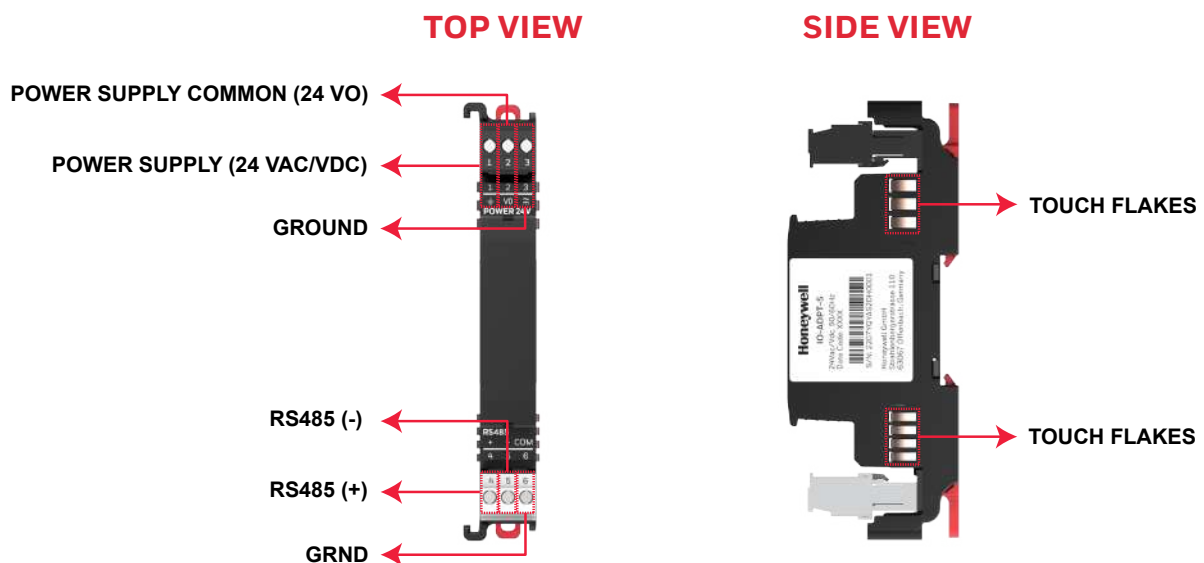
For terminal information, refer to the Interface of terminals in below figure. The wiring adapter has removable factory-installed screw terminal blocks.

The electrical ratings, environmental ratings, DIN standards, IP protection of the Touch flakes, life expectancy, and other compliance standards of the adapter are the same as IO modules.

RS485-R TERMINAL AND T1L TOUCH FLAKES

- RS485 Terminals - Touch flake connections extend RS485 communications from the Advanced Plant Controller to the IO modules.

- T1L Touch flakes - Touch flake connections extend T1L communications from the Advanced Plant Controller to future T1L IO modules and future T1L communication modules. This is a pass through connection only to allow RS485 and T1L modules to co-exist on the same DIN rail.

WIRING ADAPTER - INTERFACE

TOP VIEW   SIDE VIEW

POWER SUPPLY COMMON (24 VO)

POWER SUPPLY (24 VAC/VDC)

GROUND

RS485 (-)

RS485 (+)

GRND

TOUCH FLAKES

TOUCH FLAKES

PRODUCT SPECIFICATION

HARDWARE	
PARAMETER	**SPECIFICATION**
Ferroelectric RAM (FRAM)	768 KB
LPDDR4	2 GB
EMMC	8 GB
CPU	i.MX 8M Plus, quad Arm® Cortex®-A53 processor, long life industrial grade, Frequency: 1.2 GHz
Operating System	LINUX 64-bit
Real-Time Clock Timekeeping Accuracy	+/- 3 ppm: +/- 1.57 minutes per year (+/- 0.26 seconds per day)
Real-Time Clock Retention	Buffered for 72 hours by gold capacitor (3 day retention)

ELECTRICAL	
PARAMETER	**SPECIFICATION**
Operating Voltage (AC)	24 VAC (+/-20%) = 19 to 29 VAC 50/60 Hz
Operating Voltage (DC)	24 VDC (+/-20%) = 20 to 30 VDC
Overvoltage Protection	Protected against overvoltages of max. 29 VAC or 40 VDC. Terminals protected against short-circuiting.

POWER CONSUMPTION				
CONTROLLER	**POWER CONSUMPTION**		**CURRENT CONSUMPTION**	
	24 VAC	**24 VDC**	**24 VAC**	**24 VDC**
N-ADV-134-H	Max. 36 VA	Max. 13 W	1500 mA	540 mA
N-ADV-133-H	Max. 34 VA	Max. 12.5 W	1420 mA	520 mA
N-ADV-112-H	Max. 34 VA	Max. 12.5 W	1420 mA	520 mA

DIMENSIONS	
PARAMETER	**SPECIFICATION**
Dimensions	5.91x2.36x4.7 inches (150.2x60x119.4 mm)
Mounting	DIN rail or wall mounted

OPERATIONAL ENVIRONMENT	
PARAMETER	**SPECIFICATION**
Storage Temperature	-20 to 158 °F (-28.9 to +70 °C)
Operating temperature	-13 to 140 °F (-25 to 60 °C)
Humidity	5 to 95% relative humidity (non-condensing)
Vibration Under Operation	0.024" double amplitude (2 to 30 Hz), 0.6 g (30 to 300 Hz)
Dust, Vibration	According to EN60730-1
Protection	IP20 with optional terminal covers
Pollution Level	2
Altitude	13123 ft (4000m)

STANDARDS AND CERTIFICATIONS	
PARAMETER	**SPECIFICATION**
Protection Class	IP20
Product Standards	UL60730-1, UL60730-2-9, UL916, IEC/EN60730-1, Energy Management Equipment, IEC/EN60730-2-9, CAN/CSA-E60730-1:02, IEC/EN61326-1, and IEC/EN61010.
Testing Electrical Components	IEC68
Certification	UL60730-1, UL916, CE, BTL B-BC, BACnet™ Standard 135 version 1.14, ISO 16484-5, FCC Part15, WEEE, C-tick RCM, Subpart B, CAN ICES-3 (B)/NMB- 3(B), RCM, EAC, RoHS II, Ethernet Protocol version IEEEC 802.3, EN-1434-3 and EN-13757-3
Energy Performance	EN12098-1:2022 and EN ISO 52120-1:2022
System Transformer	The system transformer(s) must be safety isolating transformers according to IEC 61558-2-6. In the U.S.A. and Canada, NEC Class 2 transformers must be used.

Note: The device will be a BACnet B-BC device and approval is in progress

PRODUCT SPECIFICATION

CONNECTION TO BUSES						
PROTOCOLS	MAX. NO. OF DEVICES PER CHANNEL	RS485-1	RS485-2	RS485-3	RS485-4	RS485-R (WIRING ADAPTER)
#Panel Bus	64	Yes	Yes	Yes	Yes	Yes
#MSTP	64	Yes	Yes	Yes	Yes	Yes
Modbus RTU	32	Yes	Yes	Yes	Yes	Yes
*M-Bus	60	Yes	Yes	Yes	Yes	Yes

Note:

• The communication rate across each interface depends on the given communication protocol.

• #Up to 64 I/O modules are supported on a Panel Bus channel. 16 devices of each I/O module type are allowed up to the maximum of 64 devices on a bus.
For example, you can have 16 of the 8DOR with HOA, 16 of the 16UIO without HOA, 16 of the 16UIO with HOA, and 16 of the 16DI.

• *The controller can function as an M-Bus Master. It uses a standard-level converter (e.g., PW60) to connect to the M-Bus devices.

• A wiring adapter is required to establish communication and power supply over RS485-R (default channel). The default channel must be closed with the protective cover if it is not used.
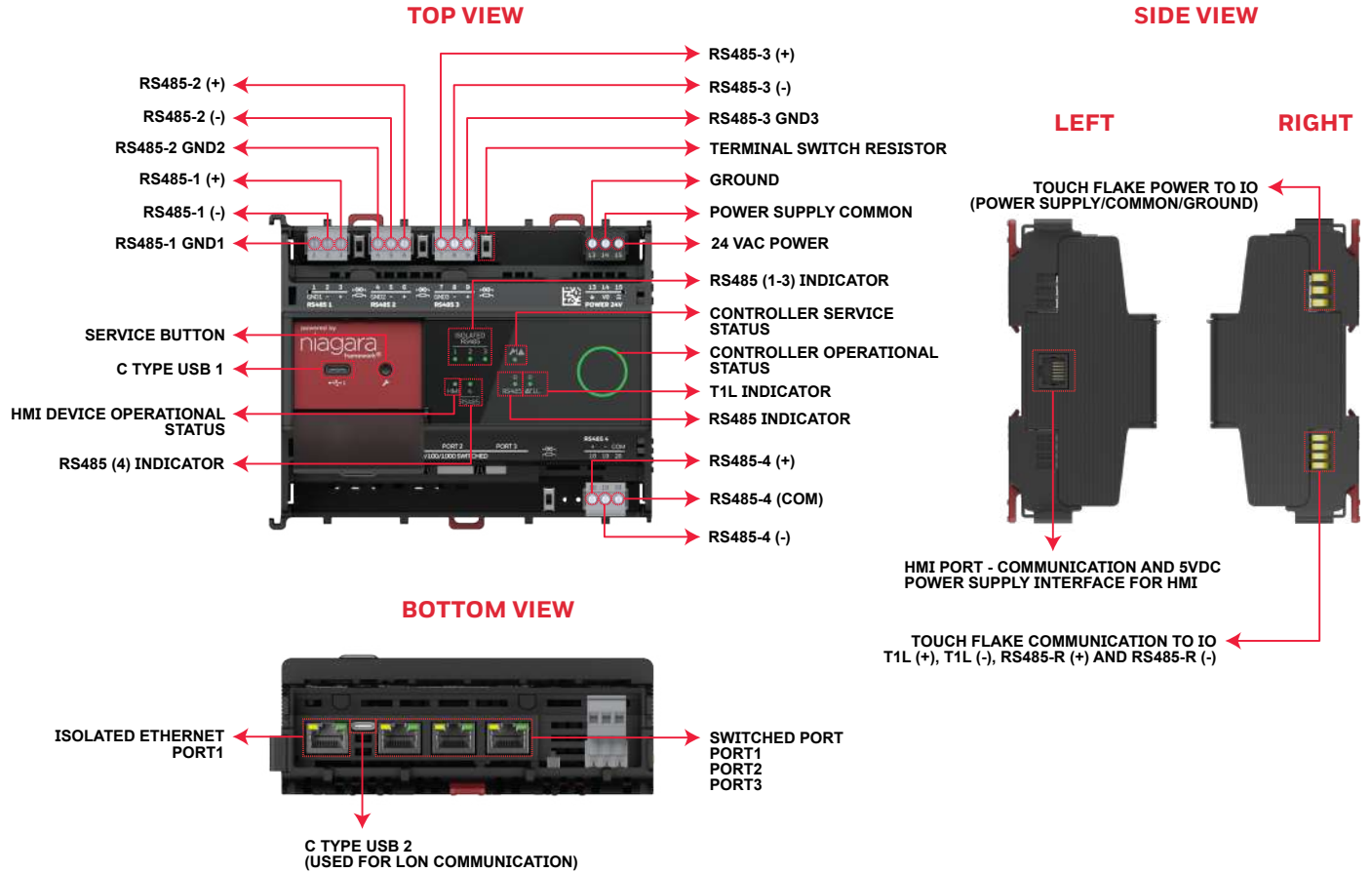
COMMUNICATION	
PARAMETER	SPECIFICATION
Ethernet Connection Speed	10/100/1000 Mbps, RJ45
IP Addressing Modes	• dhcp - Dynamic • Static

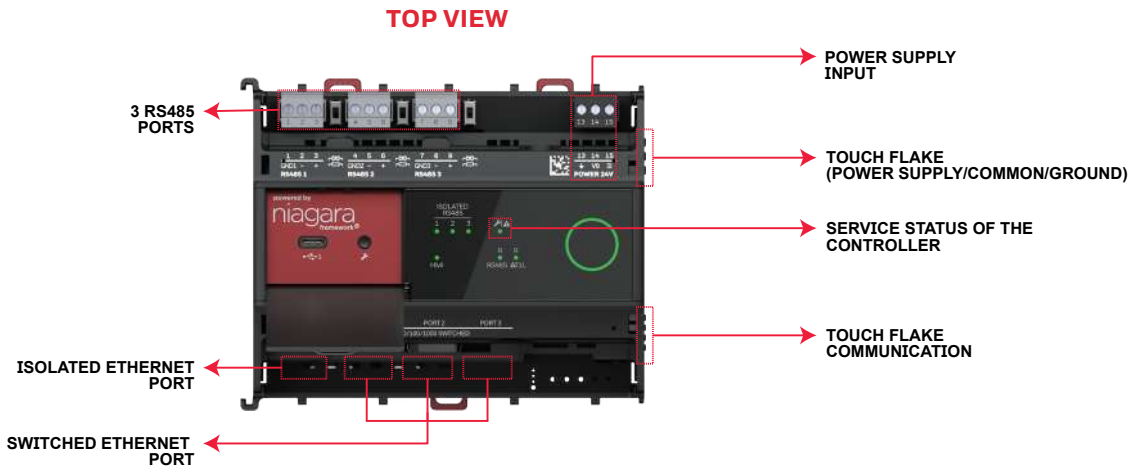| COMMUNICATION BAUD RATES	
PARAMETER	SPECIFICATION
M-Bus	0.3 to 19.2 Kbps
HMI Port	5 VDC power output and RS485-R
Modbus RTU	0.3 to 115.2 Kbps
BACnet® MS/TP	9.6, 19.2, 38.4, 76.8, and 115.2 Kbps
Panel Bus	115.2 Kbps

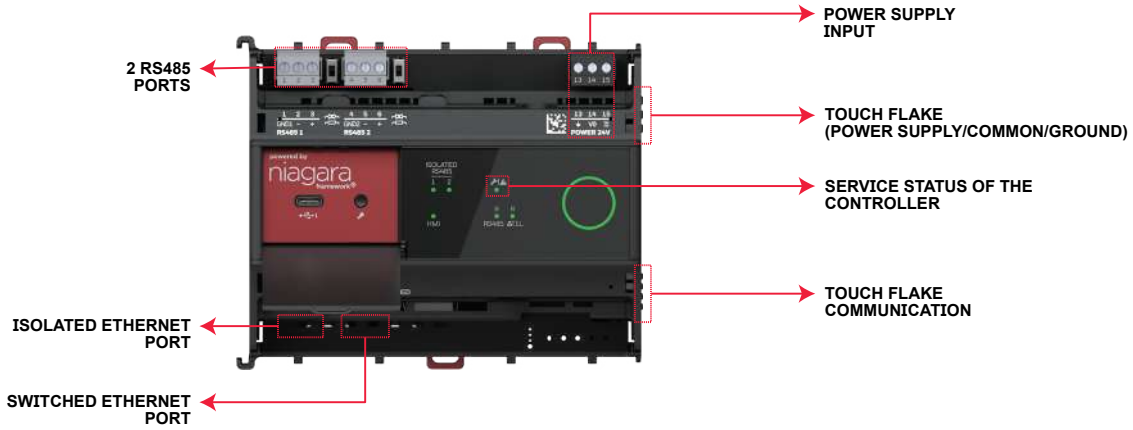| APPLICABLE TECHNICAL LITERATURE	
TITLE	REFERENCE
Mounting Instruction	31-00553
Installation Instruction and Commissioning	31-00584

PLANT CONTROLLER - INTERFACE

N-ADV-134-H

TOP VIEW

SIDE VIEW

RS485-2 (+)
RS485-2 (-)
RS485-2 GND2
RS485-1 (+)
RS485-1 (-)
RS485-1 GND1

RS485-3 (+)
RS485-3 (-)
RS485-3 GND3
TERMINAL SWITCH RESISTOR
GROUND
POWER SUPPLY COMMON
24 VAC POWER

LEFT   **RIGHT**

TOUCH FLAKE POWER TO IO
(POWER SUPPLY/COMMON/GROUND)

SERVICE BUTTON
C TYPE USB 1

HMI DEVICE OPERATIONAL
STATUS

RS485 (4) INDICATOR

RS485 (1-3) INDICATOR
CONTROLLER SERVICE
STATUS
CONTROLLER OPERATIONAL
STATUS
T1L INDICATOR
RS485 INDICATOR

RS485-4 (+)
RS485-4 (COM)
RS485-4 (-)

HMI PORT - COMMUNICATION AND 5VDC
POWER SUPPLY INTERFACE FOR HMI

TOUCH FLAKE COMMUNICATION TO IO
T1L (+), T1L (-), RS485-R (+) AND RS485-R (-)

BOTTOM VIEW

ISOLATED ETHERNET
PORT1

SWITCHED PORT
PORT1
PORT2
PORT3

C TYPE USB 2
(USED FOR LON COMMUNICATION)

N-ADV-133-H

TOP VIEW

POWER SUPPLY
INPUT

3 RS485
PORTS

TOUCH FLAKE
(POWER SUPPLY/COMMON/GROUND)

SERVICE STATUS OF THE
CONTROLLER

ISOLATED ETHERNET
PORT

TOUCH FLAKE
COMMUNICATION

SWITCHED ETHERNET
PORT

PLANT CONTROLLER - INTERFACE

N-ADV-112-H

TOP VIEW

- POWER SUPPLY INPUT
- TOUCH FLAKE (POWER SUPPLY/COMMON/GROUND)
- SERVICE STATUS OF THE CONTROLLER
- TOUCH FLAKE COMMUNICATION
- 2 RS485 PORTS
- ISOLATED ETHERNET PORT
- SWITCHED ETHERNET PORT

Honeywell