

## Overview

The **ECL-600 Series** are microprocessor-based programmable controllers designed to control various building automation applications such as air handling units, chillers, boilers, pumps, cooling towers, and central plant applications. This series supports up to two ECx modules. These are I/O extension modules that operate off of a separate sub-bus, giving this controller a total of up to 40 universal inputs and 36 universal outputs. These controllers use the LonTalk® communication protocol and are LONMARK certified as a Static Programmable Device, guaranteeing compatibility and interoperability with other manufacturers' LONMARK certified controllers.

This series contains three models as follows: ECL-600, ECL-610, and ECL-650. The ECL-600 series models have universal inputs and outputs that are ideal for controlling a wide range of HVAC equipment. The ECL-650 model has a full-color backlit-display and a jog dial for turn and select navigation to access a wide range of internal controller functions: view, set, and override values, view and modify schedules, tune PID loops with system response graphing, and view connection and communication alarms. The ECL-610 model has the convenience of supervised Hand-Off-Auto (HOA) switches and potentiometers for supervised manual override of an output.

All controller models work with a wide range of sensors, such as those in the Allure™ EC-Smart-View series of communicating room sensors that feature a backlit-display and graphical menus. In addition, all controller models are Open-to-Wireless™ ready, and when paired with the Wireless Receiver, they work with a variety of wireless battery-less sensors and switches.

Custom program these controllers using EC-gfxProgram through either EC-Net™ Pro which is powered by the Niagara™ AX Framework® or through any LNS®-based software such as Distech Controls' Lonwatcher 3. This allows you to quickly and easily create your own control sequences capable of meeting the most demanding requirements of any engineering specification.

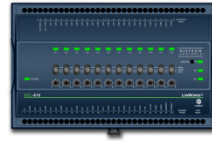
## Applications

- Meets the requirements of the following applications:
  - Central Plant
  - Air Handling Units
  - Multi-Zone Applications
  - Chillers
  - Boilers
  - Cooling Towers
  - Roof Top Units
  - Power Measurement
- Improves energy efficiency when combined with:
  - CO<sub>2</sub> sensors as part of a demand-controlled ventilation strategy that adjusts the amount of fresh air intake according to the number of building occupants
  - Variable-frequency drives to adjust motor speed according to the instantaneous demand of the application
- Works with a wide range of wireless battery-less sensors

## Features & Benefits

- Use the EC-gfxProgram's state-of-the-art visual programming wizard to create operation sequences that meet specific engineering specifications. EC-gfxProgram is accessible in both Niagara™ AX Framework-based and LNS-based software, allowing you to work with your preferred network management platform.
- Accelerate custom programming development by using pre-built HVAC control sequences supplied with EC-gfxProgram.
- Available with an optional Wireless Receiver that supports up to 28 wireless inputs, letting you create wire-free installations and use various wireless battery-less sensors and switches.
- LONMARK Static Programmable Device certified, guaranteeing interoperability and interchangeability with other manufacturers' LONMARK certified controllers that use the same profile.
- With 16 software configurable universal inputs and 12 software configurable universal outputs, this controller series covers all medium to large-size industry-standard HVAC applications. Four of these inputs also support fast pulse count reading up to 50 Hz frequency for gas, water, and electric meters.
- With up to two extendible I/O modules that operate off of a separate sub-bus, this controller can have a total of up to 40 universal inputs and 36 universal outputs.
- Highly accurate universal inputs support thermistors and resistance temperature detectors (RTDs) that range from 0 Ohms to 350 000 Ohms, giving you the freedom of using your preferred or engineer-specified sensors, in addition to any existing ones.
- Supervised HOA switches and potentiometers, allowing you to override control actions for testing purposes or when performing equipment maintenance.
- Rugged hardware Inputs and Outputs eliminate need for external protection components, such as diodes for 12V DC relays.

## ECL-600 Series Controllers



Model	ECL-600	ECL-610	ECL-650
Points	28-Point Controller	28-Point Controller with HOA	28-Point Controller with Color Display
Universal hardware inputs	16 <sup>1</sup>	16 <sup>1</sup>	16 <sup>1</sup>
Allure EC-Smart-Vue <sup>2</sup>	12	12	12
Wireless inputs <sup>3</sup>	28	28	28
15 Vdc Power Supply	■	■	■
Universal outputs	12	12	12
HOA switch & potentiometer		■	
Operator interface: interactive color display to monitor and override controller parameters			■
Number of ECx Modules Supported	2	2	2

1. The first four inputs are software configurable for pulse counting up to 50 Hz and are compatible with an S0 rated (optically-isolated) output.
2. A controller can support a maximum of two Allure EC-Smart-Vue models equipped with a CO<sub>2</sub> sensor. The remaining connected Allure EC-Smart-Vue models must be without a CO<sub>2</sub> sensor.
3. All controllers are Open-to-Wireless ready. Available when an optional Wireless Receiver is connected to the controller. Some wireless sensors may use more than one wireless input from the controller.

## Recommended Applications

Model	ECL-600	ECL-610	ECL-650
Air Handling Units	■	■	■
Multi-Zone Application	■	■	■
Chiller	■	■	■
Boiler	■	■	■
Cooling Tower	■	■	■
Central Plant	■	■	■

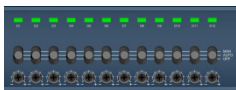
## ECx-400 Series I/O Extension Modules



Model	ECx-400	ECx-410	ECx-420
Additional Points	24-Point I/O Extension Module	24-Point I/O Extension Module	12-Point I/O Extension Module
Universal hardware inputs	12	12	12
15 Vdc Power Supply	■	■	■
Universal outputs	12	12	0
HOA switch & potentiometer		■	

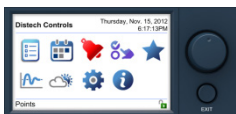
## Additional Features & Benefits

### HOA Switches & Potentiometers



Supervised Hand-Off-Auto (HOA) switches and potentiometers that provide feedback of an operator's manual override of an output to the controller's code. HOA switches are ideal for testing purposes or when performing equipment commissioning and maintenance.

### Operator Interface



A large color backlit-display that allows an operator to have immediate access to internal controller data.

- View, set, and override values. The status is color coded to show if the value is in alarm or overridden.
- Visually tune PID loops with system response graphing.
- View active connection and communication alarm list.
- View and modify schedules and calendars through a graphic interface. Also create or delete schedule events, special events, and calendar entries.
- Create a list of favorites to provide quick access to commonly-used values.
- Multi-User access management.
- Multilingual interface: English, French, German, etc.

## Open-to-Wireless Series – Controller Wireless Receiver Add-on



To reduce the cost of installation, and minimize the impact on pre-existing partition walls, the Wireless Receiver enables these controllers to communicate with a line of wireless battery-less room sensors and switches. These Wireless Receivers are available in EnOcean 315MHz and 868.3MHz versions.

Note that controllers have one wireless port to support a single Wireless Receiver.

For more information about the EnOcean and Open-to-Wireless technologies, refer to the Open-to-Wireless Solution Guide. For more information about the Wireless Receiver module, refer to the [Wireless Receiver Datasheet](#). These documents can be found on our web site.

## Supported Platforms



### EC-Net<sup>AX</sup> Solution

The EC-Net<sup>AX</sup> multi-protocol integration solution is web-enabled and powered by the Niagara<sup>AX</sup> Framework, establishing a fully Internet-enabled, distributed architecture for real-time access, automation and control of devices. The EC-Net<sup>AX</sup> open framework solution creates a common development and management environment for integration of LONWORKS<sup>®</sup>, BACnet<sup>®</sup> and other protocols. Regardless of manufacturer and protocol, the EC-Net<sup>AX</sup> system provides a unified modeling of diverse systems and data, providing one common platform for development, management and enterprise applications.

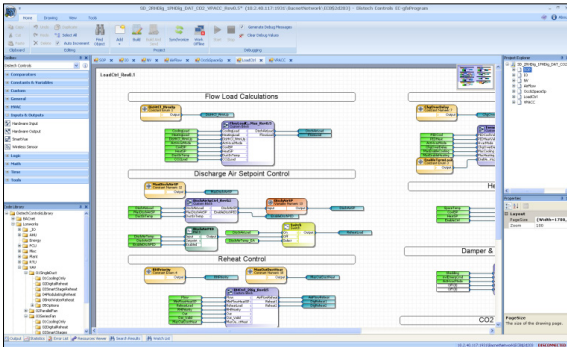


### LONWORKS Network Services (LNS)

The LNS<sup>®</sup> client-server platform allows multiple users, running different LNS-compatible applications, to access a common source for directory, installation, management, monitoring and control services for the network system being managed. Distech Controls' Lonwatcher is an example of a LNS-based network management tool that can use Plug-Ins to configure and monitor controllers and devices in the control system.

## EC-Net<sup>AX</sup> Wizards and LNS Plug-Ins

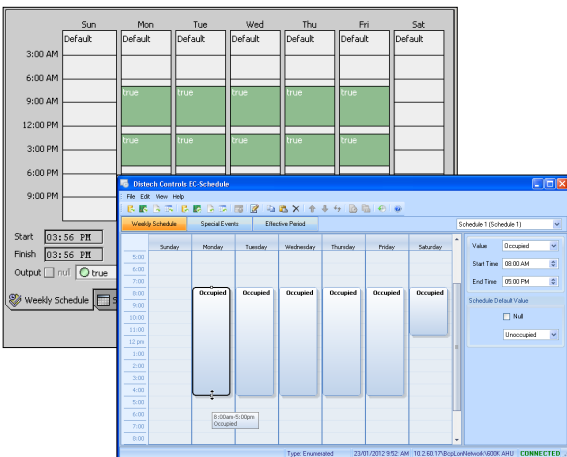
### EC-gfxProgram Graphical Programming Interface (GPI)



Distech Controls' EC-gfxProgram is a programming tool that allows you to quickly create control sequences by "dragging and dropping" block objects and then linking the objects with a simple "click, select and release". Select objects from an extensive library of over 100 commonly used functions as well as create your own custom blocks. With a user-friendly interface and intuitive programming environment, HVAC programming could not be easier. Refer to the EC-gfxProgram datasheet for more information.

- Program both ECP and ECL Series LONWORKS and ECB Series BACnet controllers with the same tool.
- Supplied as freeware – there are no associated licensing costs.
- Live debugging allows user to view code execution, input/output values and to detect errors in real-time.
- A code library for managing your favorite or most commonly used code or code sections.

### EC-Net<sup>AX</sup> Scheduling / EC-Schedule LNS Plugin / EC-gfxProgram EC-Schedule



Configure the controller's built-in schedules and holidays from the EC-Net<sup>AX</sup> solution (ECB and ECL series controllers), LNS (ECL series controllers), or directly from within EC-gfxProgram (ECB and ECL series controllers) with an easy-to-use point, drag, and click interface. It features a weekly schedule for regular, repeating, events by "time-of-day" and "day-of-week", while a holiday schedule is available to define events for specific days.


- Easily configure schedules using a graphical slider.
- Allows you to easily copy and paste entries. Duplicate a schedule entry for Monday to Friday.
- Special events allow you to set exceptions such as holidays to a schedule.
- Holidays can be set for recurring events such as the 9<sup>th</sup> day, or the 3<sup>rd</sup> Thursday of a given month.
- A schedule has an effective period during which it is active.
- Schedule provides Next State and Time to Next State that are ideal for use with programming functions such as Optimum Start or Morning Warm Up.

## Complementary Products

### Temperature Sensors

#### Allure™ EC-Smart-Vue Series



Line of communicating room temperature sensors with communication jack, a backlit-display and configurable graphic menus that allow occupants to set occupancy, setpoint adjustment, fan speed, or any other system parameters. Models are available with any combination of the following options: humidity sensor, motion sensor, and CO<sub>2</sub> sensor. The ECO-Vue™ icon (  ) shows how environmentally-friendly the zone's energy consumption is in real time.

#### Allure EC-Sensor Series



Line of discrete temperature sensors. Models are available with the following options: communication jack, occupancy override button, setpoint adjustment, and fan speed selection.

### Open-to-Wireless Sensors and Switches

#### Allure Wireless Battery-less ECW-Sensor Series



Line of wireless, battery-less room temperature sensors. Models are available with the following options: occupancy override button, setpoint adjustment, and fan speed selection.

These sensors are available in EnOcean 315MHz and 868.3MHz versions. The controller must be equipped with a [Wireless Receiver](#).

#### Wireless Sensors and Switches



A wide range of self-powered wireless sensors and switches, including the following: motion detector and light sensor, 2-/4-channel wireless light switches (North American and European models), outdoor temperature sensor, surface temperature contact sensor, duct temperature sensor, and more.

These sensors are available in EnOcean 315MHz and 868.3MHz versions. The controller must be equipped with a [Wireless Receiver](#).

For more information about the available wireless sensors and switches, refer to the [Open-to-Wireless Solution Guide](#) which can be found on our web site.

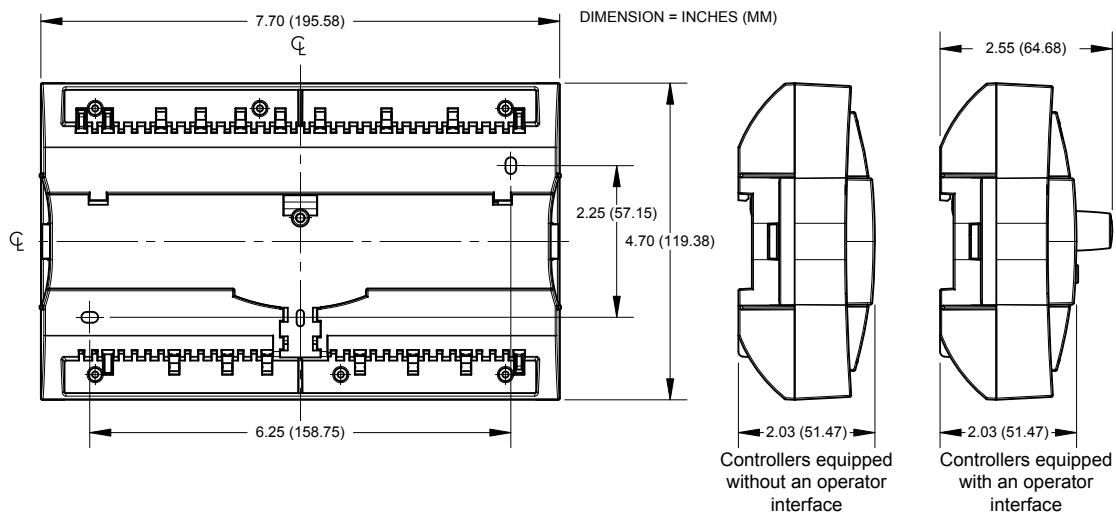
### Relay and Relay Base



A SPDT (NO/NC) dry contact relay with a 12VDC coil. This relay's low-power coil allows a controller's universal output to control high-power loads. Optional hardware available includes a din-rail mountable socket base and a red LED for relay status indication.

For more information on these or other Distech Controls products, refer to our web site.

## ECL-600 Series Controller Dimensions



## ECL-600 Series Product Specifications

Power		Inputs	
Voltage	24VAC/DC; $\pm 15\%$ ; 50/60Hz; Class 2	Input Types	Universal; software configurable
Protection	3.0A user-replaceable fuse	-Voltage	- 0 to 10VDC (40k $\Omega$ input impedance)
Power Consumption		-Current	- 0 to 5VDC (high input impedance)
- ECL-600/ECL-610	22 VA typical plus all external loads <sup>1</sup> , 65 VA max.	-Digital	0 to 20mA with 249 $\Omega$ jumper configurable internal resistor
- ECL-650	25 VA typical plus all external loads <sup>1</sup> , 68 VA max.	-Pulse	Dry contact
<b>Interoperability</b>		-Resistor	UI1 to UI4: 50Hz maximum; Min 10ms On/10ms Off
Communication	LonTalk protocol		- SO output compatible
Transceiver	FT 5000 Free Topology Smart Transceiver		UI5 to UI16: 1Hz maximum; Min 500ms On/500ms Off
Channel	TP/FT-10; 78Kbps		- Dry contact
LONMARK Interoperability	Version 3.4		0 to 350 K $\Omega$ . All thermistor types that operate in this range are supported. The following temperature sensors are pre-configured:
Guidelines		<i>Thermistor</i>	10K $\Omega$ Type 2, 3 (10K $\Omega$ @ 77°F; 25°C)
Device Class	Static Programmable Device	<i>Platinum</i>	Pt1000 (1K $\Omega$ @ 32°F; 0°C)
LONMARK Functional Profile		<i>Nickel</i>	RTD Ni1000 (1K $\Omega$ @ 32°F; 0°C)
- Input objects	Open-Loop Sensor #1		RTD Ni1000 (1K $\Omega$ @ 69.8°F; 21°C)
- Output objects	Open-Loop Actuator #3	Input Resolution	16-bit analog / digital converter
- Node object	Node object #0	Power Supply Output	15VDC; maximum 320mA (16 inputs $\times$ 20mA each)
- Real Time Clock	Real Time Keeper #3300	<b>Outputs</b>	
- Scheduler	Scheduler #20020	Universal	Linear (0-10VDC)
- Calendar	Calendar #20030		Digital (on/off), PWM, or floating (0 - 12VDC)
- Programmable Device	Static Programmable Device #410		0-20mA (jumper configurable); software configurable
<b>Hardware</b>			Built-in snubbing diode to protect against back-EMF, for example when used with a 12VDC relay.
Processor	STM32 (ARM Cortex™ M3) MCU, 32 bit		- PWM control: adjustable period from 2 to 65sec.
CPU Speed	72 MHz		- Floating control:
Memory	1 MB Non-volatile Flash (applications)		- Min pulse on/off: 500msec.
	2 MB Non-volatile Flash (storage)		- Adjustable drive time period
	96 kB RAM		- HOA: Hand-Off-Auto switch (when equipped)
Real Time Clock (RTC)	Built-in Real Time Clock with rechargeable battery		- Hand position potentiometer range: 0-12.5VDC
	Network time synchronization is initially required		- 60mA maximum @ 12VDC (140°F ; 60°C)
RTC Battery	20 hours charge time, 20 days discharge time	Load resistance	- Minimum 200 $\Omega$ for 0-10VDC and 0-12VDC outputs
	Up to 500 charge / discharge cycles		- Maximum 500 $\Omega$ for 0-20mA output
Status Indicator	Green LEDs: power status & LAN Tx	Auto-reset fuse	- 60mA @ 140°F; 60°C
	Orange LEDs: controller status & LAN Rx		- 100mA @ 68°F; 20°C
Communication Jack	LON® mono audio jack	Output Resolution	10-bit digital / analog converter
<b>Environmental</b>			
Operating Temperature	32°F to 122°F; 0°C to 50°C		
Storage Temperature	-4°F to 122°F; -20°C to 50°C		
Relative Humidity	0 to 90% Non-condensing		

1. External loads must include the power consumption of any connected modules such as an Allure EC-Smart-Vue. Refer to the respective module's datasheet for related power consumption information.

## ECL-600 Series Product Specifications (continued)

### Enclosure

Material	FR/ABS
Color	Black & blue casing & grey connectors
Dimensions	
- ECL-600/ECL-610	7.7 W × 4.7 H × 2.03" D (195.58 × 119.38 × 51.47mm)
- ECL-650	7.7 W × 4.7 H × 2.55" D (195.58 × 119.38 × 64.68mm)
Shipping Weight	
- ECL-600/ECL-610	1.17lbs (0.53kg)
- ECL-650	1.28lbs (0.58kg)

### Wireless Receiver<sup>1</sup>



Communication	EnOcean wireless standard
Number of wireless inputs <sup>2</sup>	28
Supported Wireless Receivers	Wireless Receiver (315) Wireless Receiver (868)
Cable	Telephone cord
- Connector	4P4C modular jack
- Length (maximum)	6.5ft; 2m

### Standards and Regulation

CE -Emission	EN61000-6-3: 2007; Generic standards for residential, commercial and light-industrial environments
-Immunity	EN61000-6-1: 2007; Generic standards for residential, commercial and light-industrial environments
FCC	This device complies with FCC rules part 15, subpart B, class B
<b>FC CE</b>	
UL Listed (CDN & US)	UL916 Energy management equipment
Material <sup>3</sup>	Plastic housing, UL94-5VB flammability rating Plenum rating per UL1995



CEC Appliance Database Appliance Efficiency Program<sup>4</sup>

- Available when an optional external Wireless Receiver module is connected to the controller. Refer to the [Wireless Resource Guide](#) for a list of supported EnOcean wireless modules.
- Some wireless modules may use more than one wireless input from the controller.
- All materials and manufacturing processes comply with the RoHS directive  and are marked according to the Waste Electrical and Electronic Equipment (WEEE) directive .
- California Energy Commission's Appliance Efficiency Program: The manufacturer has certified this product to the California Energy Commission in accordance with California law.

### ECL-650 Display

Display Type	Backlit-color LCD
Display Resolution	400 W × 240 H pixels (WQVGA)
Effective Viewing Area	2.4 W × 1.4" H (61.2 × 36.7mm) 2.8" (71mm) diagonal
Menu Navigation	Jog dial turn and select navigation with Exit button

### Allure EC-Smart-View

Communication	RS-485
Number of sensors per controller	Up to 12, in daisy-chain configuration
Cable	Cat 5e, 8 conductor twisted pair
Connector	RJ-45

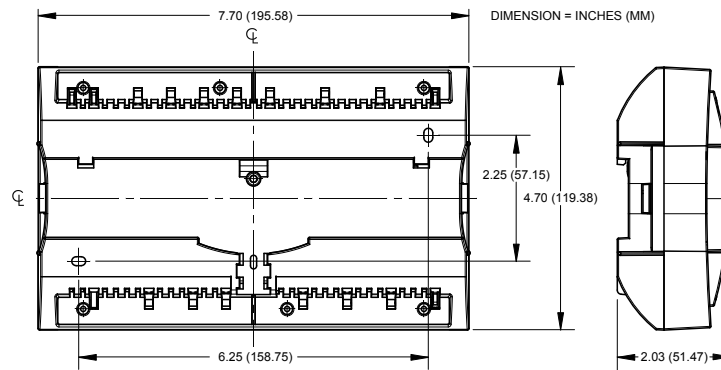
### I/O Extension Modules (ECx Series)

Communication	RS-485
Number of I/O Extension Modules per controller	Up to 2, in daisy-chain configuration

### Communication Protocols





## ECx-400 Series Extendible I/O Module Dimensions

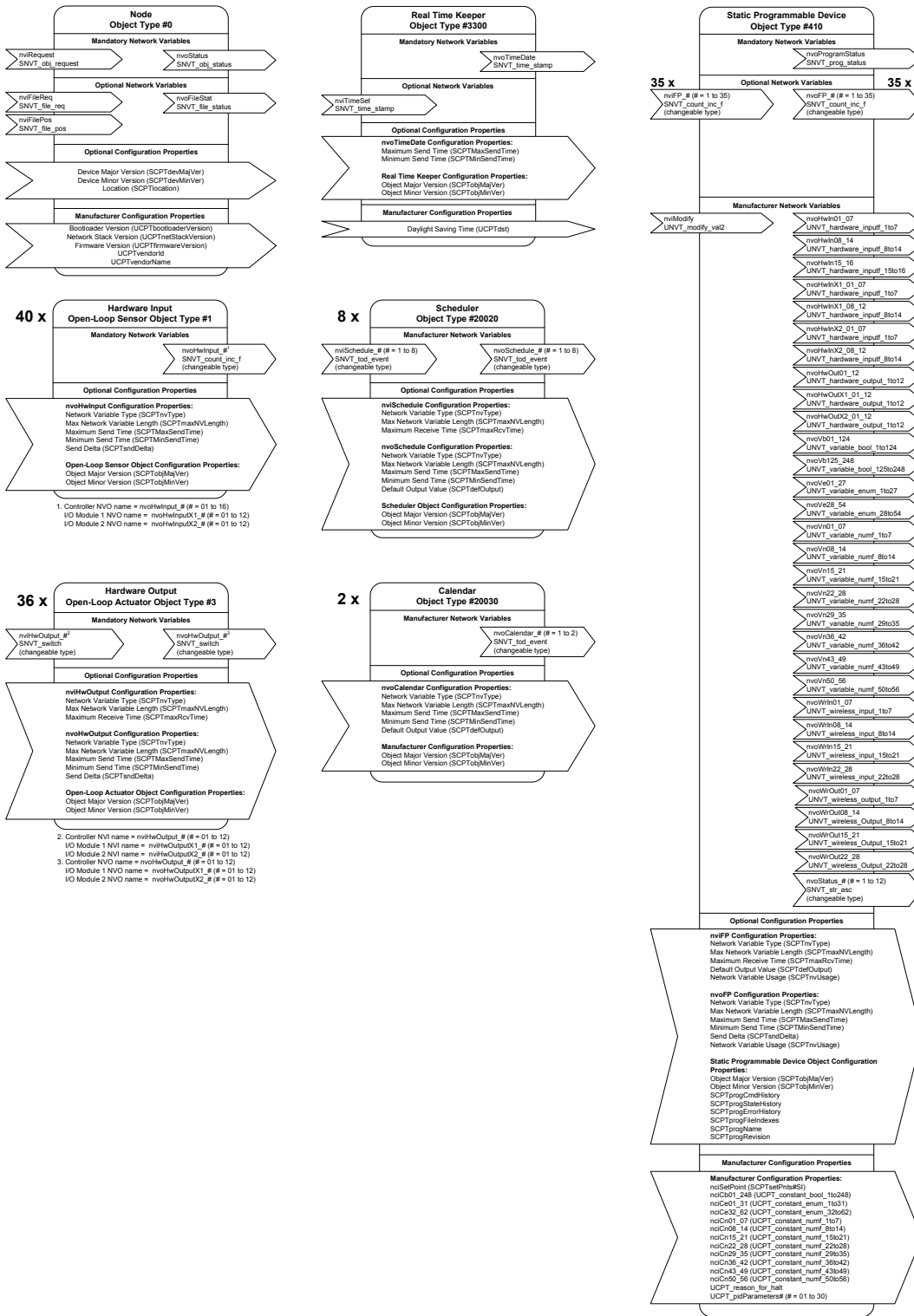


## ECx-400 Series Extendible I/O Module Specifications

Power		Inputs	
Voltage	24VAC/DC; $\pm 15\%$ ; 50/60Hz; Class 2	Input Types	Universal; software configurable
Protection	3.0A user-replaceable fuse	-Voltage	- 0 to 10VDC (40k $\Omega$ input impedance) - 0 to 5VDC (high input impedance)
Power Consumption;	22 VA typical plus all output loads	-Current	0 to 20mA with 249 $\Omega$ jumper configurable internal resistor
ECx-400/ECx-410	50 VA maximum	-Digital	Dry contact
Power Consumption;	10 VA typical	-Pulse	1Hz maximum, 500ms On/500ms Off - Dry contact
ECx-420	16 VA maximum	-Resistor	0 to 350 K $\Omega$ . All thermistor types that operate in this range are supported. The following temperature sensors are pre-configured:
Communication		<i>Thermistor</i>	10K $\Omega$ Type 2, 3 (10K $\Omega$ @ 77 $^{\circ}$ F; 25 $^{\circ}$ C)
Communication Bus	RS-485	<i>Platinum</i>	PT1000 (1K $\Omega$ @ 32 $^{\circ}$ F; 0 $^{\circ}$ C)
Baud Rate	38 400 bps	<i>Nickel</i>	RTD Ni1000 (1K $\Omega$ @ 32 $^{\circ}$ F; 0 $^{\circ}$ C) RTD Ni1000 (1K $\Omega$ @ 69.8 $^{\circ}$ F; 21 $^{\circ}$ C)
Addressing	Dip Switch	Input Resolution	16-bit analog / digital converter
Hardware		Power Supply Output	15VDC; maximum 240mA (12 inputs $\times$ 20mA each)
Processor	STM32 (ARM Cortex <sup>TM</sup> M3) MCU, 32 bit; 64 MHz	Outputs	
Memory	64 kB Non-volatile Flash (applications and storage) 20 kB RAM	Universal	Linear (0-10VDC) Digital (on/off), PWM, or floating (0 - 12VDC) 0-20mA (jumper configurable); software configurable Built-in snubbing diode to protect against back-EMF, for example when used with a 12VDC relay.
Status Indicator	Green LEDs: power status & LAN Tx Orange LEDs: module status & LAN Rx	- PWM control:	adjustable period from 2 to 65sec.
Environmental		- Floating control:	
Operating Temperature	32 $^{\circ}$ F to 122 $^{\circ}$ F; 0 $^{\circ}$ C to 50 $^{\circ}$ C	- Min pulse on/off:	500msec.
Storage Temperature	-4 $^{\circ}$ F to 122 $^{\circ}$ F; -20 $^{\circ}$ C to 50 $^{\circ}$ C	- Adjustable drive time period	
Relative Humidity	0 to 90% Non-condensing	- HOA: Hand-Off-Auto switch (when equipped)	
Enclosure		- Hand position potentiometer range:	0-12.5VDC
Material	FR/ABS	- 60mA maximum @ 12VDC (140 $^{\circ}$ F; 60 $^{\circ}$ C)	
Color	Black & blue casing & grey connectors	- Minimum 200 $\Omega$ for 0-10VDC and 0-12VDC outputs	
Dimensions (with Screws)	7.7 W $\times$ 4.7 H $\times$ 2.03" D (195.58 $\times$ 119.38 $\times$ 51.47mm)	- Maximum 500 $\Omega$ for 0-20mA output	
Shipping Weight	1.17lbs (0.53kg)	- 60mA @ 140 $^{\circ}$ F; 60 $^{\circ}$ C	
Standards and Regulation		- 100mA @ 68 $^{\circ}$ F; 20 $^{\circ}$ C	
CE -Emission	EN61000-6-3: 2007; Generic standards for residential, commercial and light-industrial environments	Load resistance	
-Immunity	EN61000-6-1: 2007; Generic standards for residential, commercial and light-industrial environments	Auto-reset fuse	
FCC	This device complies with FCC rules part 15, subpart B, class B	Output Resolution	10-bit digital / analog converter
<b>FC</b> <b>CE</b>			
UL Listed (CDN & US)	UL916 Energy management equipment		
Material <sup>1</sup>	Plastic housing, UL94-5VB flammability rating Plenum rating per UL1995		



1. All materials and manufacturing processes comply with the RoHS directive  and are marked according to the Waste Electrical and Electronic Equipment (WEEE) directive 



**Total Quality Commitment**

All Distech Controls product lines are built to meet rigorous quality standards. Distech Controls is an ISO 9001 registered company.

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