



Overview

The **ECL-600 Series** are microprocessor-based programmable controllers designed to control a wide variety of HVAC systems such as Air Handling Units, Chillers, Boilers, pumps, Cooling Towers, and central plant applications. This series supports up to two ECx modules. These are Extension I/O 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 Controller.

This series contains two models as follows: ECL-600 and ECL-610. The ECL-600 series support various input types including resistance, voltage, and digital-based ones. Moreover, it provides digital, floating, pulse width modulation, and proportional control outputs for valves, pumps, heating elements, fan, and lighting applications. In particular, the ECL-610 has the added convenience of supervised Hand-Off-Auto (HOA) switches and potentiometers for manual override of an output.

All controller models work with a wide range of sensors, such as those in the EC-Smart-View series of communicating room sensors that feature a backlit display and graphical menus. These sensors are used for indoor temperature measurement, setpoint adjustment, fan speed selection, and occupancy state override. 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, a state-of-the-art object-oriented graphical programming interface tool. EC-gfxProgram is accessible from any multi-protocol platform software that supports LONWORKS devices, such as Distech Controls' EC-Net^{AX} Pro, which is powered by the Niagara^{AX} Framework® or from 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:
 - CO₂ 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

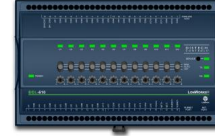
Features & Benefits

- 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 through EC-Net^{AX} Pro which is powered by the Niagara^{AX}-based management platform.
- LONMARK certified, guaranteeing interoperability and interchangeability with other manufacturers' LONMARK-approved controllers that use the same profile.
- 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.
- Accelerate custom programming development with gfxApplications (pre-built HVAC control sequences), included.
- 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.
- 0-20mA inputs and outputs use an internal jumper that eliminates the need for external resistors.
- 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.
- 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.
- Rugged hardware Inputs and Outputs eliminate need for external protection components, such as diodes for 12V DC relays.

Product Warranty & Total Quality Commitment

All Distech Controls product lines are built to meet rigorous quality standards and carry a two-year warranty. Distech Controls is an ISO 9001 registered company.

ECL-600 Series Controllers



| Model | ECL-600 | ECL-610 |
|---------------------------------------|---------------------|---------------------|
| Points | 28-Point Controller | 28-Point Controller |
| Universal hardware inputs | 16 ¹ | 16 ¹ |
| EC-Smart-Vue | 12 | 12 |
| Wireless inputs ² | 28 | 28 |
| 15 Vdc Power Supply | ■ | ■ |
| Universal outputs | 12 | 12 |
| HOA switch & potentiometer | | ■ |
| Number of Extension I/O (ECx) Modules | 2 | 2 |
| Product Number | CDIL-600X-00 | CDIL-610X-00 |

- The first four inputs are software configurable for pulse counting up to 50 Hz and are compatible with an SO rated (optically-isolated) output.
- 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.

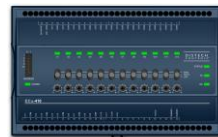
Recommended Applications

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

Objects List

| | |
|---|-----|
| Calendars | 2 |
| Schedules | 8 |
| PID Loop | 30 |
| Changeable Type Network Variable Inputs (NVI) | 35 |
| Changeable Type Network Variable Output (NVO) | 35 |
| Constants | |
| - Boolean | 248 |
| - Enumeration | 62 |
| - Numeric | 56 |
| nciSetpoint | 1 |
| Variables | |
| - Boolean | 248 |
| - Enumeration | 54 |
| - Numeric | 56 |

ECx-400 Series Extension I/O Modules



| Model | ECx-400 | ECx-410 | ECx-420 |
|---------------------------|-------------------------------|-------------------------------|-------------------------------|
| Additional Points | 24-Point Extension I/O Module | 24-Point Extension I/O Module | 12-Point Extension I/O Module |
| Universal hardware inputs | 12 | 12 | 12 |
| 15 Vdc Power Supply | ■ | ■ | ■ |
| Universal outputs | 12 | 12 | 0 |
| HOA switch | | ■ | |
| Product Number | CDIX-400X-00 | CDIX-410X-00 | CDIX-420X-00 |

Open-to-Wireless – Add-on



To reduce the cost of installation, and minimize the impact on existing partition walls, the Wireless Receiver enables every controller from this series to communicate with a line of wireless battery-less room sensors and switches.



- Wireless Receiver (315) - Receiver for EnOcean® 315MHz wireless-enabled sensors and switches
- Wireless Receiver (868) - Receiver for EnOcean® 868.3MHz wireless-enabled sensors and switches

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

For more information about the EnOcean technology and Open-to-Wireless, 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 at www.distech-controls.com.

Supported Platforms



EC-Net^{AX}

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



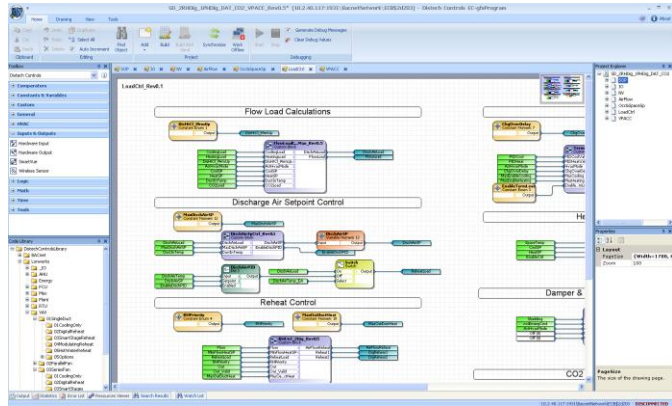
LONWORKS Network Services (LNS)

LNS® is a client-server platform that 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^{AX} Wizards and LNS Plug-Ins

EC-gfxProgram Graphical Programming Tool

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.



EC-gfxProgram Software Features:

- Program both ECP/ECL Series LonWorks and ECB Series BACnet controllers with the same tool
- Supplied as freeware – there are no associated licensing costs
- Block-oriented programming
- Live debugging allows user to view code execution, input/output values and to detect errors in real-time
- Furnished with gfxApplications: A library of standard pre-coded and tested HVAC sequences that suit most field applications while allowing you to make your own modifications if necessary.
- Extensive block library of the most commonly used functions divided into 11 convenient categories containing over 100 block objects
- A code library for managing your favorite or most commonly used code or code sections
- Backup / Restore function stores the complete code in the controller allowing the retrieval of all programming code features
- The following advanced features are available with the ECL Series and ECB Series controllers:
 - Advanced mathematical functions such as sin, cosine, power, exponential, logarithm, and so on
 - For loop can be used to find highest, lowest, and average values

Complementary Products

Temperature Sensors

Allure EC-Smart-Vue

Line of communicating sensors with backlight display and graphical menus.



| | |
|----------------|---|
| EC-Smart-Vue | Communicating room temperature sensor with backlight display and graphic menus |
| EC-Smart-Vue-H | Communicating room temperature and humidity sensor with backlight display and graphic menus |

Allure EC-Sensor

Line of discrete sensors



| | |
|---------------|--|
| EC-Sensor | Room temperature sensor with communication jack |
| EC-Sensor-O | Room temperature sensor with occupancy override button and communication jack |
| EC-Sensor-S | Room temperature sensor with setpoint adjustment and communication jack |
| EC-Sensor-SO | Room temperature sensor with setpoint adjustment, occupancy override button, and communication jack |
| EC-Sensor-SOF | Room temperature sensor with setpoint adjustment, occupancy override button, fan speed selection, and communication jack |

Open-to-Wireless Sensors and Switches (requires Wireless Receiver)

Allure Wireless Battery-less ECW-Sensor

Line of wireless, battery-less sensors. Available in EnOcean 315MHz and 868.3MHz versions.



| | |
|----------------|--|
| ECW-Sensor | Room temperature sensor |
| ECW-Sensor-O | Room temperature sensor with occupancy override button |
| ECW-Sensor-S | Room temperature sensor with setpoint adjustment |
| ECW-Sensor-SO | Room temperature sensor with setpoint adjustment and occupancy override button |
| ECW-Sensor-SOF | Room temperature sensor with setpoint adjustment, occupancy override button, and fan speed selection |

Wireless Sensors and Switches



| | |
|--------|--|
| SR-MDS | Wireless solar-cell powered motion detector and light sensor for room occupancy detection and/or lighting applications. Available in EnOcean 315MHz and 868.3MHz versions. |
|--------|--|



| | |
|--|--|
| 2-channel Light Switch 4-channel Light Switch | 2-/4-channel wireless light switches (European models). Available in EnOcean 315MHz and 868.3MHz versions. |
|--|--|



| | |
|-------------------|--|
| PTM265 PTM265D | 2-/4-channel wireless light switches (North American models). Available in EnOcean 315MHz and 868.3MHz versions. |
|-------------------|--|



| | |
|------|---|
| SR65 | Wireless, solar-cell powered outdoor temperature sensor. Available in EnOcean 315MHz and 868.3MHz versions. |
|------|---|



| | |
|----------|---|
| SR65 VFG | Wireless, solar-cell powered surface temperature contact sensor. Available in EnOcean 315MHz and 868.3MHz versions. |
|----------|---|



| | |
|-----------------|--|
| SR65 AKF Series | Wireless, solar-cell powered duct temperature sensor. Available in EnOcean 315MHz and 868.3MHz versions. |
|-----------------|--|

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 at www.distech-controls.com.

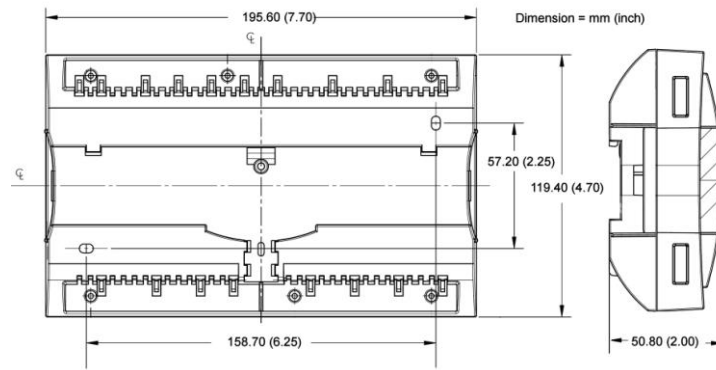
Relay and Relay Base



| | |
|------------|---|
| Relay | SPDT (NO/NC) dry contact relay; 12VDC coil. |
| Relay Base | Din-rail mountable socket base. |
| LED Module | Red LED for relay. |

For more information on these or other Distech Controls products please refer to our web site at www.distech-controls.com or contact sales@distech-controls.com.

ECL-600 Series Controller Dimensions



ECL-600 Series Product Specifications

Power

| | |
|-------------------|--|
| Voltage | 24VAC/DC; $\pm 15\%$; 50/60Hz; Class 2 |
| Protection | 3.0A user-replaceable fuse |
| Power Consumption | 22 VA typical plus all external loads 65 VA maximum |

Interoperability

| | |
|-------------------------------------|----------------------------|
| Communication | LonTalk protocol |
| Channel | TP/FT-10; 78Kbps |
| LONMARK Interoperability Guidelines | Version 3.4 |
| Device Class | Static Programmable Device |

LONMARK Functional Profile:

| | |
|-----------------------|---------------------------------|
| - Input objects | Open-Loop Sensor #1 |
| - Output objects | Open-Loop Actuator #3 |
| - Node object | Node object #0 |
| - Real Time Clock | Real Time Keeper #3300 |
| - Scheduler | Scheduler #20020 |
| - Calendar | Calendar #20030 |
| - Programmable Device | Static Programmable Device #410 |

Hardware

| | |
|--------------------|--|
| Processor | STM32 (ARM Cortex™ M3) MCU, 32 bit |
| CPU Speed | 72 MHz |
| Memory | 1 MB Non-volatile Flash (applications) 2 MB Non-volatile Flash (storage) 96 kB RAM |
| Status Indicator | Green LEDs: Power Status & LAN Tx Orange LEDs: Controller Status & LAN Rx |
| Communication Jack | TP/FT-10; 78Kbps, 1/8" (3.5mm) stereo audio jack |

Environmental

| | |
|-----------------------|------------------------------|
| Operating Temperature | 0°C to 50°C; 32°F to 122°F |
| Storage Temperature | -20°C to 50°C; -4°F to 122°F |
| Relative Humidity | 0 to 90% Non-condensing |

Enclosure

| | |
|--------------------------|--|
| Material | FR/ABS |
| Color | Black & blue casing & grey connectors |
| Dimensions (with Screws) | 7.7" x 4.7" x 2.0" (195.6mm x 119.4mm x 50.8mm) |
| Shipping Weight | 1.17lbs (0.53kg) |

Inputs

| | |
|---------------------|--|
| Input Types | Universal; software configurable |
| -Voltage | - 0 to 10VDC (40k Ω input impedance) - 0 to 5VDC (high input impedance) |
| -Current | 0 to 20mA with 249 Ω jumper configurable internal resistor |
| -Digital | Dry contact |
| -Pulse | UI1 to UI4; 50Hz maximum; Min 10ms On/10ms Off - SO output compatible UI5 to UI16: 1Hz maximum; Min 500ms On/500ms Off - Dry contact |
| -Resistor | 0 to 350 K Ω . All thermistor types that operate in this range are supported. The following temperature sensors are pre-configured: <i>Thermistor</i> 10K Ω Type 2, 3 (10K Ω @ 25°C; 77°F) <i>Platinum</i> Pt1000 (1K Ω @ 0°C; 32°F) <i>Nickel</i> RTD Ni1000 (1K Ω @ 0°C; 32°F) RTD Ni1000 (1K Ω @ 21°C; 69.8°F) |
| Input Resolution | 16-bit analog / digital converter |
| Power Supply Output | 15VDC; maximum 320mA (16 inputs x 20mA each) |

Outputs

| | |
|-------------------|--|
| Universal | 0-10VDC linear, digital 0-12VDC (on/off), floating PWM, or 0-20mA (jumper configurable); software configurable. Built-in snubbing diode to protect against back EMF, for example when used with a 12VDC relay. - PWM control: adjustable period from 2 to 65sec. - Floating control: - Min pulse on/off: 500msec. - Adjustable drive time period - HOA: Hand-Off-Auto switch (when equipped) - Hand position potentiometer range: 0-12.5VDC - 60mA max. @ 12VDC (60°C; 140°F) |
| Load resistance | - Minimum 200 Ω for 0-10VDC and 0-12VDC outputs - Maximum 500 Ω for 0-20mA output |
| Auto-reset fuse | - 60mA @ 60°C; 140°F - 100mA @ 20°C; 68°F |
| Output Resolution | 10-bit digital / analog converter |

ECL-600 Series Product Specifications (continued)

Wireless Receiver¹

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

Electromagnetic Compatibility

| | |
|--------------|--|
| 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 |



EC-Smart-Vue

| | |
|----------------------------------|--|
| 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 |

Extension I/O Modules (ECx Series)

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



Agency Approvals

| | |
|--|---|
| UL Listed (CDN & US) Material ³ | UL916 Energy management equipment UL94-5VA |
|--|---|

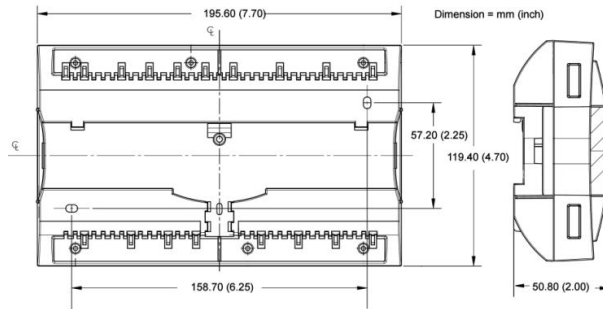


Communication Protocols



1. 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.
2. Some wireless modules may use more than one wireless input from the controller.
3. All materials and manufacturing processes comply with the RoHS directive  and are marked according to the Waste Electrical and Electronic Equipment (WEEE) directive .

ECx-400 Series Extendible I/O Module Dimensions



ECx-400 Series Extendible I/O Module Specifications

Power

| | |
|--------------------|---|
| Voltage | 24VAC/DC; $\pm 15\%$; 50/60Hz; Class 2 |
| Protection | 3.0A user-replaceable fuse |
| Power Consumption; | 22 VA typical plus all output loads |
| ECx-400/ECx-410 | 50 VA maximum |
| Power Consumption; | 10 VA typical |
| ECx-420 | 16 VA maximum |

Communication

| | |
|-------------------|------------|
| Communication Bus | RS-485 |
| Baud Rate | 38 400 bps |
| Addressing | Dip Switch |

Hardware

| | |
|------------------|--|
| Processor | STM32 (ARM Cortex™ M3) MCU, 32 bit; 64 MHz |
| Memory | 64 kB Non-volatile Flash (applications and storage) 20 kB RAM |
| Status Indicator | Green LEDs: Power Status & LAN Tx Orange LEDs: Module Status & LAN Rx |

Environmental

| | |
|-----------------------|------------------------------|
| Operating Temperature | 0°C to 50°C; 32°F to 122°F |
| Storage Temperature | -20°C to 50°C; -4°F to 122°F |
| Relative Humidity | 0 to 90% Non-condensing |

Enclosure

| | |
|--------------------------|--|
| Material | FR/ABS |
| Color | Black & blue casing & grey connectors |
| Dimensions (with Screws) | 7.7" x 4.7" x 2.0" (195.6mm x 119.4mm x 50.8mm) |
| Shipping Weight | 1.17lbs (0.53kg) |

Electromagnetic Compatibility


| | |
|--------------|--|
| 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 |



Agency Approvals

| | |
|-----------------------|-----------------------------------|
| UL Listed (CDN & US) | UL916 Energy management equipment |
| Material ⁴ | UL94-5VA |



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

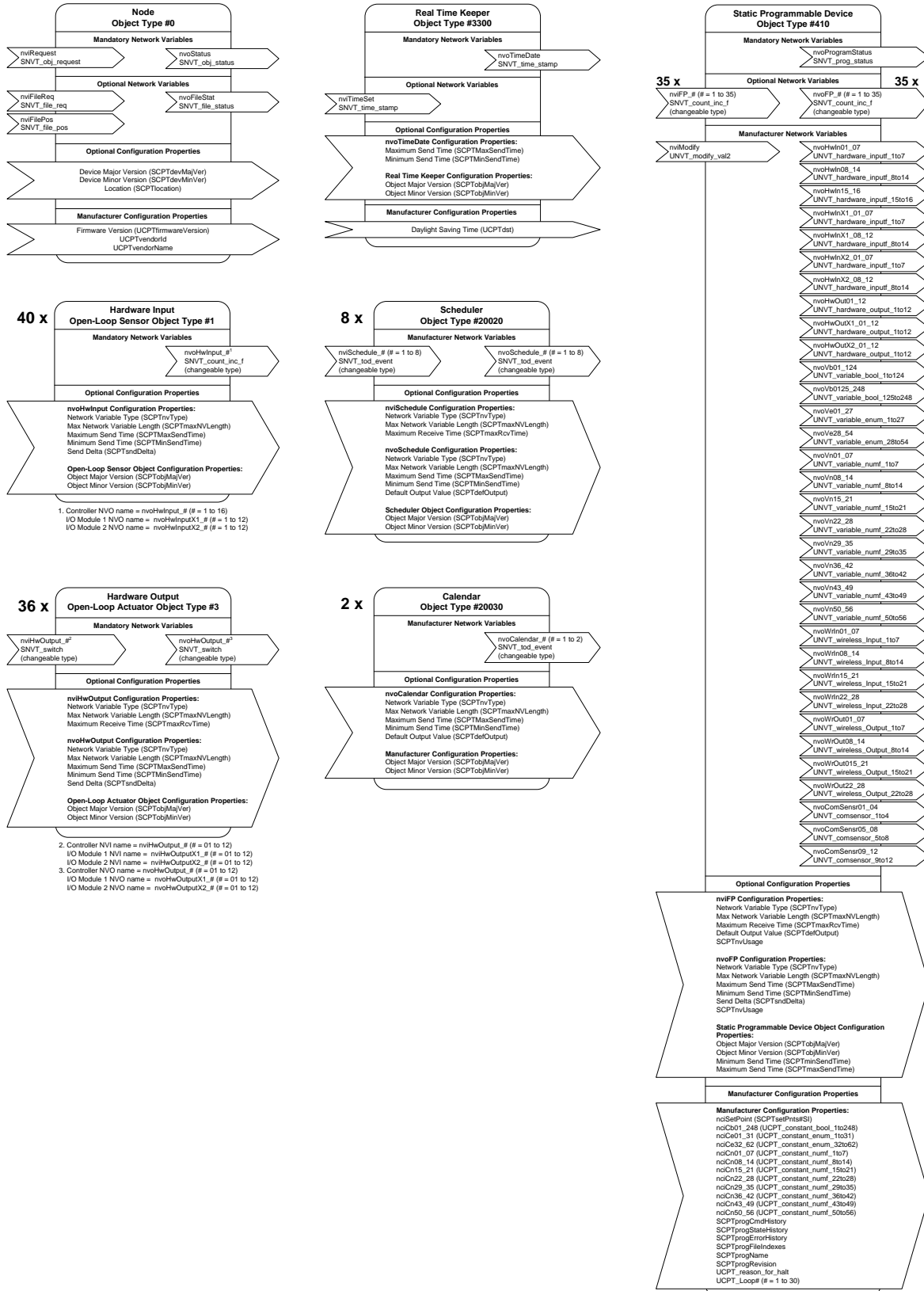
Inputs

| | |
|---------------------|--|
| Input Types | Universal; software configurable |
| -Voltage | - 0 to 10VDC (40k Ω input impedance) - 0 to 5VDC (high input impedance) |
| -Current | 0 to 20mA with 249 Ω jumper configurable internal resistor |
| -Digital | Dry contact |
| -Pulse | 1Hz maximum, 500ms On/500ms Off - Dry contact |
| -Resistor | 0 to 350 K Ω . All thermistor types that operate in this range are supported. The following temperature sensors are pre-configured: |
| <i>Thermistor</i> | 10K Ω Type 2, 3 (10K Ω @ 25°C; 77°F) |
| <i>Platinum</i> | Pt1000 (1K Ω @ 0°C; 32°F) |
| <i>Nickel</i> | RTD Ni1000 (1K Ω @ 0°C; 32°F) RTD Ni1000 (1K Ω @ 21°C; 69.8°F) |
| Input Resolution | 16-bit analog / digital converter |
| Power Supply Output | 15VDC; maximum 240mA (12 inputs x 20mA each) |

Outputs

| | |
|-------------------|--|
| Universal | 0-10VDC linear, digital 0-12VDC (on/off), floating PWM, or 0-20mA (jumper configurable); software configurable. Built-in snubbing diode to protect against back EMF, for example when used with a 12VDC relay. |
| | - PWM control: adjustable period from 2 to 65sec. |
| | - Floating control: |
| | - Min pulse on/off: 500msec. |
| | - Adjustable drive time period |
| | - HOA: Hand-Off-Auto switch (when equipped) |
| | - Hand position potentiometer range: 0-12.5VDC |
| | - 60mA max. @ 12VDC (60°C; 140°F) |
| Load resistance | - Minimum 200 Ω for 0-10VDC and 0-12VDC outputs |
| | - Maximum 500 Ω for 0-20mA output |
| Auto-reset fuse | - 60mA @ 60°C; 140°F |
| | - 100mA @ 20°C; 68°F |
| Output Resolution | 10-bit digital / analog converter |

Functional Profile – ECL-600



Specifications subject to change without notice.

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ECL-600 & ECx-400 Series

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