

FX40 Supervisory Controller

The FX40 brings a new generation of Web-based technology into the Facility Explorer product family. The FX40 manages a network of field controllers using standard communication protocols. It also supports a full set of building automation features and functions specifically designed for commercial facilities, including event scheduling, alarm management, histories, and totalization.

The FX40 can support up to 100 field controllers using any combination of N2, LONWORKS®, and BACnet® Internet Protocol (IP) protocols. The FX40 also provides onboard, hardwired input and output points for direct monitoring of equipment status or analog sensors and control of auxiliary devices or alarms.

The FX40 provides a user interface and configuration tool that users can access with a Web browser. Multiple users can concurrently connect to the FX40. Security and presentation preferences are managed through user profiles, logon IDs, and passwords. Remote access is easily achieved from an Internet, intranet, or a dial-up connection.



Figure 1: FX40



Features and Benefits	
<input type="checkbox"/> Web-Based User Interface	Requires no proprietary or desktop software to access the FX40. A Web browser is all that is needed.
<input type="checkbox"/> Adoption of Industry Standard Communication Protocols	Allows for the integration of a wide variety of field controllers. This includes Facility Explorer field controllers and controllers provided by others without intermediate gateways or translators.
<input type="checkbox"/> Onboard Configuration Tool	Allows configuration and system diagnosis from any Web browser.
<input type="checkbox"/> Onboard Inputs and Outputs	Allows direct control of auxiliary devices, which could reduce the number of field devices.

Overview

The FX40 provides integrated control supervision and network management services for one or more local networks of field controllers used to monitor and control Heating, Ventilating, and Air Conditioning (HVAC), lighting, and other electrical systems. The FX40 provides system-wide coordination of field controller activities to improve occupant comfort, reduce energy usage, and optimize operating efficiencies. The FX40 organizes system information into user displays, reports, and graphics that users can access from a Web browser.

Onboard Inputs and Outputs (I/Os)

The FX40 features 10 onboard inputs and outputs for direct control over auxiliary devices, such as temperature and humidity sensors, pressure transducers, alarm indicators, and energy meters.

The FX40 I/O complement includes:

- four form C Single-Pole, Double-Throw (SPDT) relay outputs rated for 24 VAC/DC @ 2 Ampere resistive each with Light-Emitting Diode (LED) indication
- six universal inputs for 10k ohm type III thermistors, 4-20 mA and 0-10 VDC active inputs, or dry contact binary inputs

Supported Field Controllers

The FX40 can interface with many different types of field controllers and monitoring devices. Three field-level network communication protocols are currently supported: N2, LONWORKS, and BACnet IP Ethernet.

N2 Communication

The FX40 includes one RS-485 communication port and an N2 protocol driver that allows integration of a wide variety of N2 field controllers. Supported N2 field controllers include:

- Facility Explorer Field Controllers fitted with an N2 Open Communication Card (for example, FX05, FX15, FX16, or MD20)
- Metasys® Application Specific Controller (ASC) devices (Air Handling Unit [AHU], Unitary [UNT], Variable Air Volume [VAV])
- Metasys System 91 Devices (DX-9100)
- Metasys Variable Air Volume Modular Assembly (VMA1400)
- third-party devices supporting N2 Open protocol (VND)

LONWORKS Communication

The FX40 includes one LONWORKS FTT-10A port and a LonTalk® device protocol driver that allows integration of LONMARK® devices, including:

- Facility Explorer field controllers fitted with a LONWORKS Communication Card (for example, FX05, FX15, or FX16)
- third-party LONMARK devices (compliant or certified)

BACnet IP Ethernet

The FX40 includes one 10/100 Mb Ethernet communication port and a BACnet IP driver that allows integration of BACnet devices. The FX40 can integrate field controllers that support standard BACnet objects and services.

To determine if a third-party BACnet device is supported, compare its Protocol Implementation Conformance Statement (PICS) with the FX40 PICS. This includes the supported BACnet Interoperability Building Blocks (BIBB) and details the level of BACnet conformance. Figure 2 displays an example of an FX40 configuration.

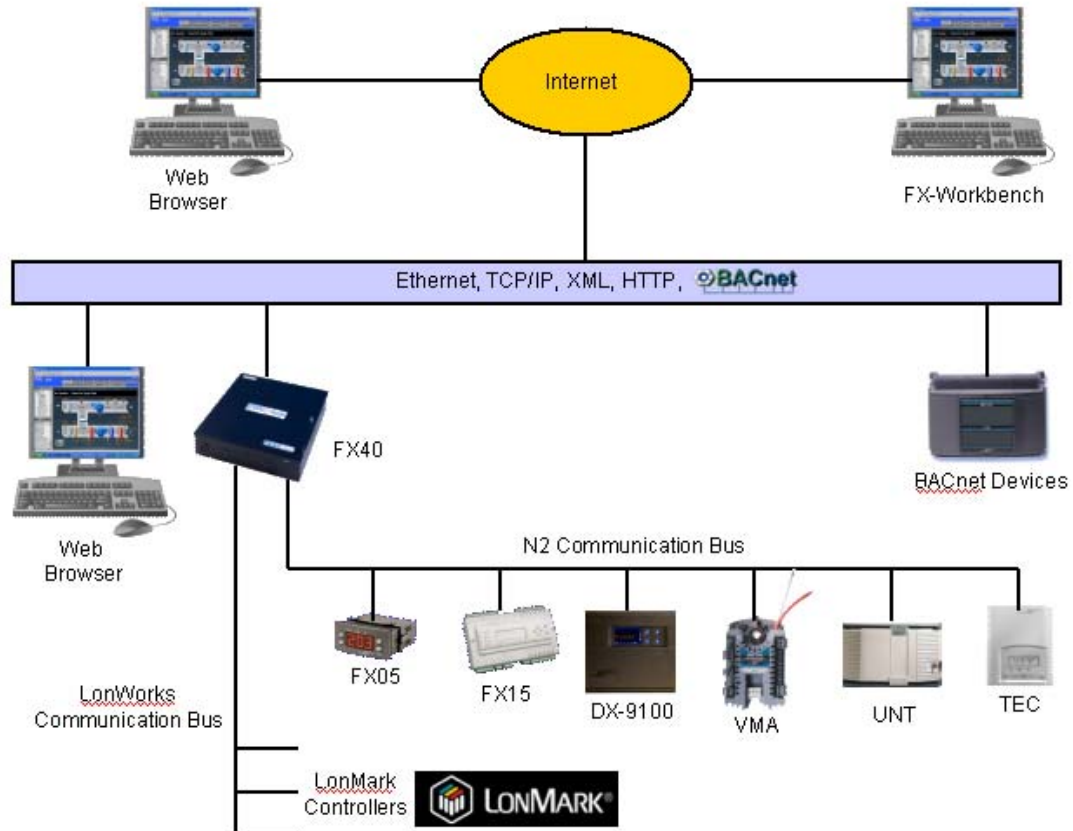


Figure 2: Example of an FX40 Configuration

FX Workbench

Users can configure the FX40 controller with the FX Workbench tool. FX Workbench can operate as a software application on a computer, or the FX40 can serve up the application for users to access via a Web browser.

In addition, users can configure the FX40 online while directly or remotely connected with FX Workbench. The PC version of FX Workbench allows users to create an FX40 configuration offline and then download it at a later time. FX Workbench also:

- provides the automatic discovery of LONWORKS and BACnet devices and points
- provides assisted importing of N2 device points
- provides a check box method of enabling and disabling point extensions, such as scheduling, histories, and totalization
- automatically links the field device's occupancy point to the scheduler
- automatically creates graphics and binds the graphics to point information

System User Interface

The FX40 User Interface (UI) provides the user with system-wide monitoring and controlling capability. The UI is embedded and provided by the FX40. This allows users to access the system from anywhere on the supervisory network via a Web browser.

System administrators can format the UI according to specific user preferences. The presentation of the information can be as rich or as limited as needed to support a variety of user interface hardware (computer, Personal Digital Assistant [PDA], or cell phone). For a richer user interface experience, the FX40 incorporates a full library of HVAC equipment and control symbols, ductwork and piping symbols, and animated graphics.

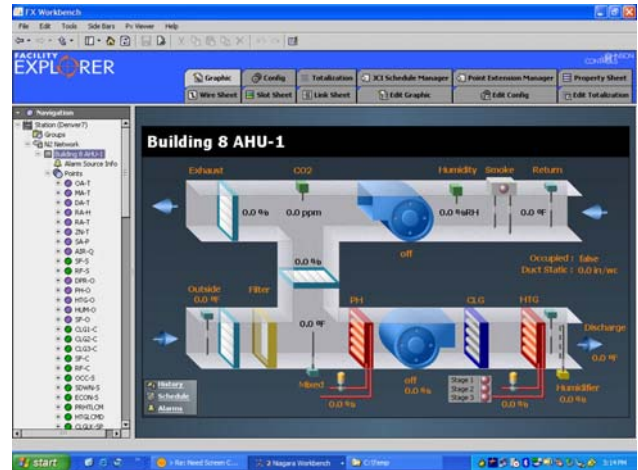


Figure 3: Facility Explorer User Interface

Building Automation Features

Event Scheduling

In Event Scheduling (Figure 4), users determine certain scheduling activities like building occupancy and the start and stop times of HVAC equipment based on regular, repeating, or unique events. The user interface provides a visual method to configure the schedule time and date.

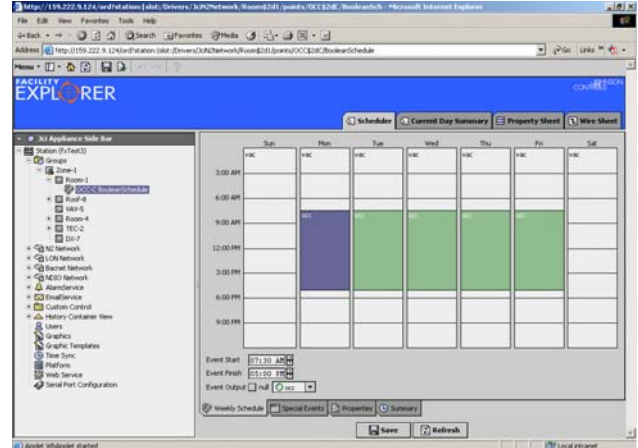


Figure 4: Event Scheduling

Histories

The Histories feature (Figure 5) allows the FX40 to collect, store, and display pertinent system data for analysis. This includes control performance indication, energy consumption, and system troubleshooting. Users can configure the FX40 to create a history on any data point in the FX40 system database. The Histories feature presents the stored data either graphically or in a sortable table. Users can export stored data in a TXT, PDF, or CSV format.

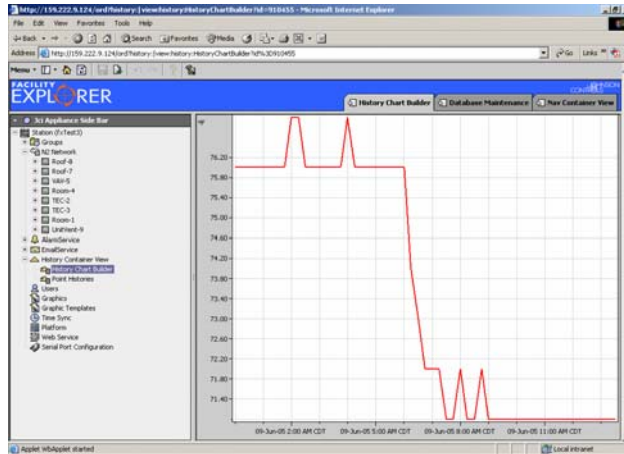


Figure 5: Histories

Alarming

The Alarm feature (Figure 6) allows the FX40 to route and manage alarms and events according to user-defined criteria. Users can configure the FX40 to generate alarms on any data point in the FX40 system database. Each alarm record contains valuable information, including the alarm and return-to-normal time and date, time duration in current state, text description, and alarm class.

The alarm class allows the routing of alarms with similar characteristics to common recipients. Users can create multiple alarm classes to have a variety of alarm routing options. Users can configure alarm recipients to receive alarms via a Web browser or e-mail. Alarm recipients have a variety of options to manage alarms, including sorting, acknowledging, silencing, and tagging.

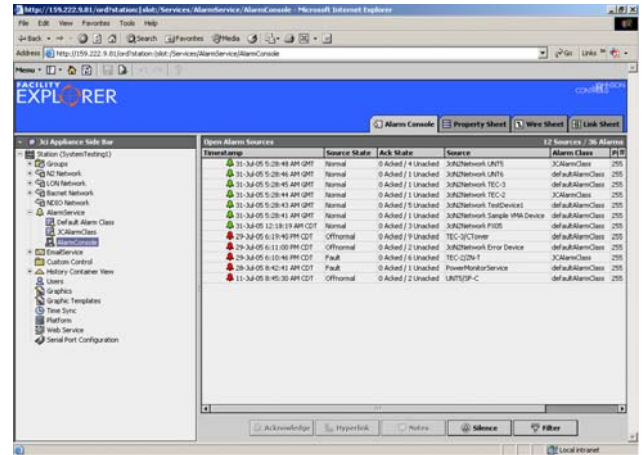


Figure 6: Alarms

Totalization

The Totalization feature allows the FX40 to accumulate data on a point over a period of time. Users can add a totalization extension to any data point in the FX40 system database to summarize runtime, to accumulate change of state counts, or to summarize dynamic analog data.

Software Upgrades

Each FX40 includes a 1-year software maintenance agreement. This agreement allows you to upgrade the FX40 software with any new or interim service release for 1 year from the date of purchase. Once the software maintenance agreement expires, you can order additional upgrades. See Table 1 for details.

Table 1: FX40 Ordering Information

Part Number	Description
LP-FX4020A-0	FX40 pre-loaded with FX Workbench, N2 Driver, LONWORKS Driver, BACnet IP driver. (Supports a maximum of 100 devices). Includes a 1-year software maintenance agreement.
LP-FX4022A-0	FX40 with factory installed modem. Pre-loaded with FX Workbench, N2 Driver, LONWORKS Driver, BACnet IP driver. (Supports a maximum of 100 devices). Includes a 1-year software maintenance agreement.
LP-FX40MA-0	One additional year of annual software maintenance for one FX40. Includes new releases and interim service releases for 1 year from the date of purchase. Covers all applications or drivers licensed for the FX40.
LP-FX40UPG-0	One time, new release software upgrade for one FX40. Includes all applications and drivers licensed for the FX40.
LP-FXTSUP-0	FX Workbench (PC version)
LP-FXTSUPP-0	FX Workbench Pro (PC version)

Technical Specifications

Table 2: FX40 Controller (Part 1 of 2)

Product Codes	LP-FX4020A-0, LP-FX4022A-0
Power Requirements	120 VAC, 50/60 Hz 25 VA maximum Lead wires for hot/neutral (wire nut), stud for ground connection
Environmental	Operating Temperature: 0 to 50°C (32 to 122°F) Storage Temperature: 0 to 70°C (32 to 158°F) Relative Humidity: 5 to 95%, noncondensing
General	Motorola® Reduced Instruction Set Computer (RISC) Processor @ 250 MHz Facility Explorer Control Engine with direct I/O support objects 128 MB RAM, 32 MB flash for database backup One 10/100 MB Ethernet RJ-45 connector FCC Class A computing device Wind River VxWorks® Operating System with Jeode® Java® Virtual Machine Facility Explorer Software with I/O control objects
Communications	One 10/100 Mb Ethernet port–RJ-45 connection One RJ-45 connector for RS-232 port One RS-485 port (up to 57,600 baud) One LONWORKS port–FTT-10 with Weidmuller connector Optional auto-dial/auto-answer 56k modem; RJ-11 connector (uses the RS-232 port when installed)
Inputs/Outputs	Four form C SPDT relay outputs rated for 24 VAC/DC @ 2 ampere resistive One LED indicator for each relay Six Universal Inputs for 10k ohm Type III (10k 4A1-International) Thermistor, 4/20 mA current loop, 0 to 10 volt, or dry contact 12-bit A/D converter Thermistor Sensor Range: 23.3 to 57.2°C (10 to 135°F). Input accuracy is in the range of ±1% of span, characteristic curve is customizable 0 – 10 volt or 4/20 mA accuracy is ±2% of span, without user calibration. Uses an external resistor for current input (four provided). Self-powered or board powered sensors accepted. Dry contacts (on UI) 20 Hz max. frequency (25 ms minimum pulse width) 3V open circuit, 300 µA short-circuit current 20 VDC @ 80 mA to drive 4/20 mA powered sensors. 24 VDC terminal and external resistor can be used if monitoring contacts that require higher voltages or higher current. All I/O uses screw terminals on 0.2 in. centers
Battery Backup	Provided for all on board functions including I/O. Monitored and trickle charged. Battery maintains processor operation through power failures for a predetermined interval, then writes all data to flash memory, shuts processor down, and maintains clock for a minimum of 5 years.

Table 2: FX40 Controller (Part 2 of 2)

Chassis – Housed in Metal Enclosure	Intended for indoor wall mounting only Cooling: Internal air convection Dimensions: 11 x 14 x 2.5 in. (27.94 x 35.56 x 6.35 cm) Weight: Net 4 lbs. (1.814 kg), gross 5 lbs. (2.268 kg)
Agency Listing	United States - UL Listed, File E107041, CCN PAZX, under UL 916, Energy Management Equipment FCC compliant to CFR 47, part 15, subpart B, class A Canada - UL Listed, File E107041, CCN PAZX7, under CSA C22.2 No. 205, Signal Equipment Industry Canada compliant to ICES-003

Table 3: FX Workbench Requirements

Processor	Intel® Pentium® 4, 1 GHz or higher
Operating System	Microsoft® Windows NT® Version 4.0 with SP 4.0 or later Microsoft Windows® 2000 Microsoft Windows XP Professional
Web Browser	Microsoft Internet Explorer Version 5.0 or later Netscape Communicator® Version 4.5 or later
Memory	512 MB minimum
Hard Disk	1 GB minimum, 5 GB recommended
Network Support	Ethernet 10/100 Mb with RJ-45 connector

The performance specifications are nominal and conform to acceptable industry standards. For application at conditions beyond these specifications, contact a Facility Explorer technical support resource. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products.

Federal Communications Commission (FCC) Statement

This equipment has been tested and found to comply with the limits for a Class A digital device pursuant to Part 15 of FCC Rules. These limits are designed to provide reasonable protection against harmful interference when this equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his/her own expense.

Industry Canada (IC) Statement

This Class (A) digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la Classe (A) respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.



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