FX16 Master Controller

The FX16 Master Controller is a high performance field controller in the Facility Explorer platform. The FX16 is designed for commercial Heating, Ventilating, Air Conditioning, and Refrigeration (HVACR) applications, such as chillers, rooftop units, packaged air conditioning units, Air Handling Units (AHUs), and close control units, as well as small distributed control systems with terminal units.

The FX16 has 27 physical inputs and outputs and supports a wide range of temperature sensors and actuator devices. Up to 64 additional physical inputs and outputs can be added using XT/XP expansion modules. The FX16 can manage a distributed control application with up to 16 slave FX controllers (FX05, FX06, FX07, FX14, or FX15). The FX16 can also monitor and control a number of N2 Open compatible devices through its gateway feature. Parameters in a distributed control application can be displayed and modified from optional integral or remote user interfaces.

The FX16 also features communications services to transmit event notification text messages via Short Messaging Service (SMS) or by e-mail. With its onboard Web server, you can browse and make adjustments to the application from a remote location.

The FX16 Master Controller is fully configurable or programmable, using the FX Tools software package, for a wide range of commercial HVAC and refrigeration applications.

N2 Open or LONWORKS® communication cards are available with the FX16 Master Controller for the integration of the controller into a compatible Building Automation System (BAS).

Figure 1: FX16 Master Controller

	Features and Benefits
❑ **Optional Integral or Remote User Interfaces (UIs)**	Provide a clear presentation of control system data on a menu-driven, scrolling, 4 line by 26 character Liquid Crystal Display (LCD) with backlight.
❑ **Distributed Control Application**	Provides the ability to control complex systems by coordinating the activities of multiple controllers in a single application.
❑ **Embedded Web Server**	Allows remote access to the data in the control system via a Web browser and modem connection to the FX16 Master Controller.
❑ **Communication Services**	Provide automatic reporting of events and alarms by e-mail or by Short Message Service (SMS) with optional acknowledgement.
❑ **Network Communications Options – N2 Open and LONWORKS Protocol**	Provide a cost effective method for stand-alone or networked operation.

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Features and Benefits (Cont.)	
❑ **Freely Programmable or Configurable Using FX Tools**	Is suitable for a wide range of applications for environmental and refrigeration control using the extensive programming features of the FX Tools software package.
❑ **Onboard Trend and Event Logging**	Provide the necessary information for analyzing the control system performance and diagnosing fault conditions.
❑ **Analog Input Types Selected in Software**	Allows choice of temperature and other sensors according to the control range and application.

Onboard Inputs and Outputs (I/Os)

Up to 27 physical inputs and outputs can be connected to the FX16 Master Controller, including:

- **6** Analog Inputs (AIs) – software configurable
- **8** Digital (Binary) Inputs (DIs) – for voltage free contacts
- **9** Digital (Binary) Outputs (DOs)
  - 9 relays with 230 VAC contacts or
  - 4 relays and 5 opto-isolated Triacs for 24 VAC
- **4** Analog Outputs (AOs) – 0 to10 VDC

Scalable I/O Expansions

The input/output capacity of the FX16 Master Controller may be extended by connecting up to four XT extension modules via the Local Link Bus.

Expansion Modules (XPs) provide input and output capabilities for the XT extension modules, as follows:

- XT91D00 Processor/Communication Module
- XP91D02 6 universal AIs + 2 AOs
- XP91D03 8 DOs (triacs)
- XP91D04 4 DIs + 4 DOs (triacs)
- XP91D05 8 DIs
- XP91D06 4 DOs (relays) 230 VAC (Europe only)
- XP91D07 4 DOs (relays) 24 VAC (North America only)

Embedded Web Server and Web Page Access

The FX16 Master Controller features an embedded Web server that enables a local or remote user to establish communication with the FX16 Master Controller from a computer and to browse live control data, active alarms and events, trend data, and configuration parameters. This feature provides an effective, low-cost monitoring system without the need for any special or proprietary supervisory software.

The Web pages are accessed using a direct serial line or telephone modem connection and the Point-to-Point Protocol (PPP) from any computer with Microsoft® Internet Explorer software that serves as a Web browser.

The FX16 Master Controller provides the formatted data for the requested pages starting with a home page from which other pages can be requested. Each page may contain graphic images, links to the other pages, and data windows for the display of live data from the control system.

The active values are transmitted by the embedded Web server in the FX16 Master Controller to the screen of the computer. Typically up to 16 values can be continuously updated on one page and the user may adjust or override values on the screen. Access to the Web pages is protected by a password system to prevent unauthorized data access and control actions.

In summary, the Web server interface provides the following features from any computer directly connected to the FX16 Master Controller or has access to the telephone system. The Web server interface:

- displays live variables in the monitored control system
- adjusts and commands variables in the control system
- displays and acknowledges active alarms
- displays the event history log
- displays trended data values and copy/paste to Microsoft Excel spreadsheet for storage and further processing
- enables and disables trend logs
- reads and modifies communication parameters including e-mail addresses, telephone numbers, and others

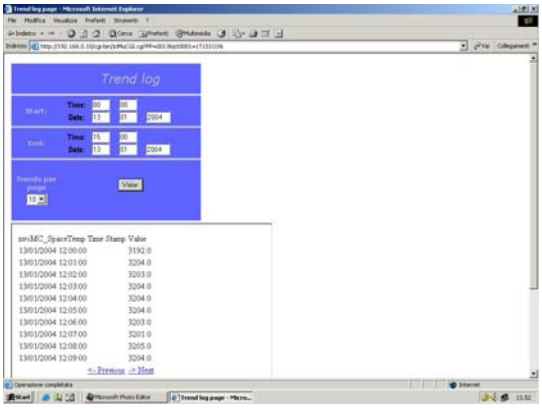

Figure 2: Web Page with Trend Data

Communication Services

The FX16 Master Controller can be programmed to send out e-mail and/or Short Message Service (SMS) text messages when connected to a modem and telephone line or to a GSM modem with an appropriate transmitter and antenna. E-mail messages are directed to an Internet Service Provider (ISP) that offers an e-mail forwarding service. SMS messages can be sent to a service center or directly to a mobile telephone. Messages are sent when an event goes into the active or alarm state and can be directed to a prioritized list of destinations.

Alternatively, if the user has access to a computer with Web browser and modem connection, the control system can be viewed on the Web pages that have been generated in the FX16 Master Controller.

You can also use the e-mail service to periodically send trend log data to a remote e-mail receiver for electronic storage and to prevent the loss of data in the FX16 Master Controller when the trend buffer is full.

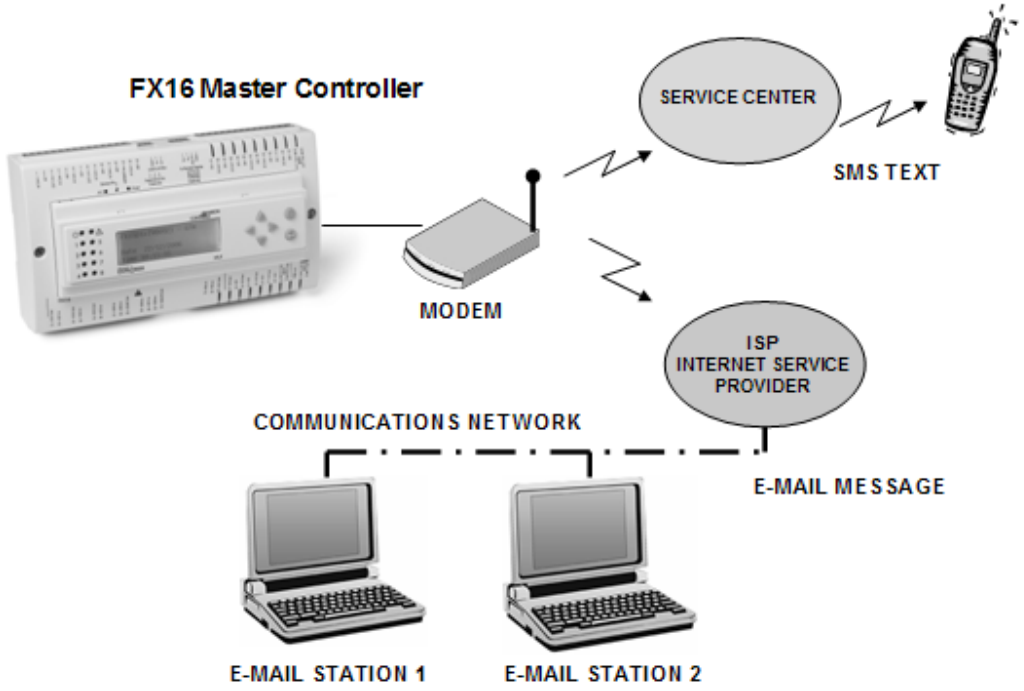

Figure 3: Communication Services

Distributed Application

A distributed application is a control strategy managed by the FX16 Master Controller but is executed concurrently in the FX16 Master Controller and in up to 16 FX slave controllers connected to the Local Link Bus. The communication between the controllers is defined by network variables in the distributed application and the FX16 Master Controller executes the communication in the most effective way to maintain the performance of the entire control system.

Distributed applications are used for the coordinated control of a central plant and the remote equipment that it serves. For example, a distributed application could be applied to an FX16 Master Controller controlling an air handling unit, an FX14 controller controlling a chiller unit, and a number of FX07 controllers controlling zone terminal units or fan coil units.

Another benefit of a distributed application is the ability to combine FX controllers to achieve the inputs and outputs required for the physical equipment interface. The application is automatically distributed and executed in the individual controllers forming a single control system.

Gateway Feature

The latest versions of the FX16X Master Controller feature a Gateway object. The Gateway object allows the FX16 to monitor up to 16 N2 Open devices (that are not slaves in a Distributed Application) on the Local Link Bus. These devices can be FX controllers fitted with an N2 Open communication card, Metasys® Application Specific Controllers (ASCs) (UNT, VAV, AHU), Metasys compatible N2 Open Vendor (VND) devices, or System 91 N2 devices (DX-9100 and TC-910x).

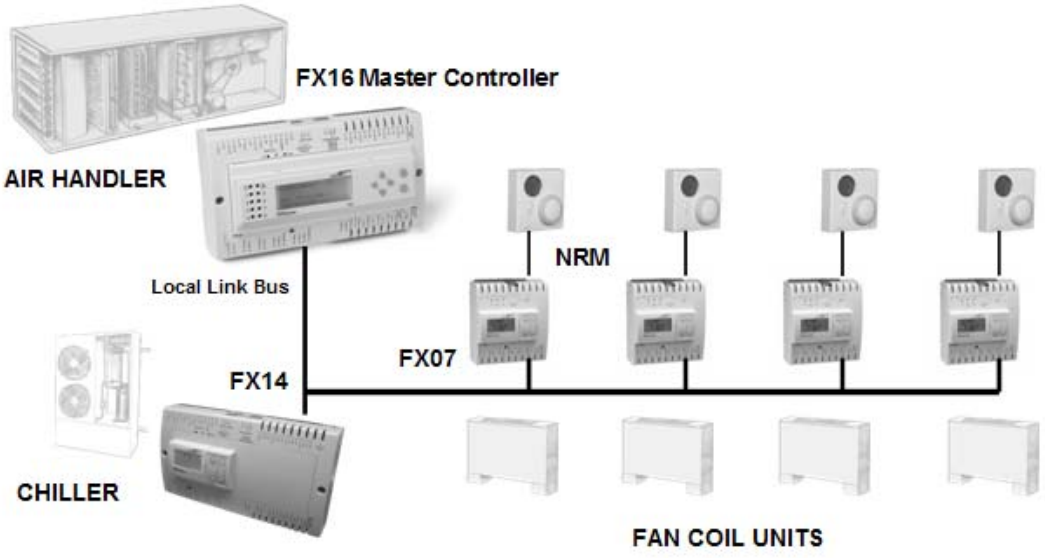

Figure 4: Distributed Application

Supervisory Options

You can integrate the FX16 Master Controller into a supervisory Building Automation System (BAS) for continuous monitoring of the control system. The FX16 Master Controller supports two methods of integration: N2 Open and LONWORKS network.

N2 Open Network

When fitted with an N2 Open Communication Card, the FX16 can connect to an N2 Open compatible BAS, providing access to control system variables and parameters.

LONWORKS Network

When fitted with a LONWORKS Communication Card, the FX16 can communicate peer-to-peer with other LONWORKS compatible devices and provide data access to a supervisory system.

Time Scheduling

The FX16 Master Controller has an embedded real-time clock that supports all real-time functions including the time and date display on the integral and remote displays, the time stamping of events, and trend data. The real-time clock also enables the time scheduling of start, stop, and occupancy commands for the plant being monitored and controlled. Scheduled commands may be configured to execute on one or more days of the week, and an exception day calendar allows for alternative time schedules on holidays or during special periods in the year.

Time schedules may be displayed and edited on the available user interfaces or in a Web page on a Web browser screen. The real-time clock is battery backed with an average battery life of more than 2 years.

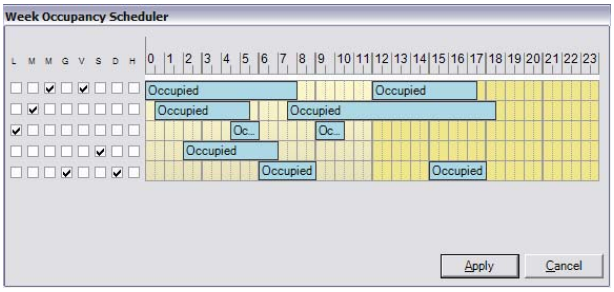

Figure 5: Occupancy Schedule Definition

Alarm and Event Management

The FX16 Master Controller manages and records events or errors that are generated by the operating system and events or alarms that are associated with data points or variables in the control application.

System events indicate to the user that the control system requires some attention and include events such as:

- system power up
- trend buffer full
- communication message failure (E-mail, SMS)
- device communication error
- application or display diagnostic error

Application events or alarms indicate to the user that the controlled equipment requires attention or that the controlled conditions are not within the expected limits. For example:

- Analog value is outside of a desired range.
- Status value represents a condition that is not normal.

When an event goes into the active state, it is entered into the table of active events and the event history log with the time and date of occurrence, and a message window appears on the display screen. The event can also be configured to send a text message to one or more of the following:

- E-mail Message Server
- Mobile Telephone with Short Message Service (SMS)

The system only removes the events from the table of active events when you acknowledge the event and the event returns to an inactive or normal state. You can acknowledge events from any of the connected user interfaces. Displays and the Web page have password protection. You can view the table of active events and the event history log on the integral or remote displays or on the Web browser screen.

Data Trend Logging

The FX16 Master Controller can be configured to record data samples at a defined interval for up to 40 variables within the control application. The sample interval is defined for each variable and can be set from every minute to once per day. In the latest LP-FX16X Rev. A version, the onboard memory can store trend log samples from 40 variables at 15 minute intervals for up to 100 days.

You can view trend data for each variable within a specified time period in text format on the connected user displays. You can also view trend log data from a Web browser; this allows you to copy and paste trend information into a spreadsheet application, such as Excel for further processing and electronic storage.

You can transmit trend logs at regular intervals, from 1 hour to every day via the telephone modem connection to an e-mail server. You can also upload Trend data with FX CommPro. FX CommPro then converts the data into a standard format for transfer to a computer.

A system event message is generated if the trend buffer is not configured in the circular recording mode and the buffer becomes full.

User Interfaces

The FX16 Master Controller supports two user interfaces, which can be integral and remote. These user interfaces feature a 4 line by 26 character Liquid Crystal Display (LCD), 6 push buttons, and 10 discrete status Light-Emitting Diodes (LEDs). The display and navigation menus are fully programmable within the control application using FX Builder.

The integral Medium User Interface (MUI) is built into the front face of the FX16, allowing direct access to the control system's points. FX16 models are available with and without the Integral MUI.

Two versions of the remote Medium User Interface are available for panel or wall mounting:

- **LP-DIS60P20-0C**: You can mount this MUI within a panel up to 3 m (10 ft) from the FX16. This user interface is powered by the FX16. The LP-KIT007-000C is a flat telephone cable needed to connect a power supply and data communications to the FX16.
- **LP-DIS60P21-0C**: You can mount this MUI within a panel or on a wall surface up to 300 m (1,000 ft) from the FX16. This user interface must be independently powered. The data communication requires a 3-wire shielded cable (not provided) connected to the FX16's Remote Display connection.

Figure 6: Medium User Interface

Multi-language Database

All the text on the available User Interfaces is fully programmable and can be entered in up to **five** different languages.

The user is then able to select the preferred language from the display menu when logging into the system. This feature has been designed for systems intended for installation in many countries in the world or for areas where more than one language is spoken.

FX Tools Software

The FX Tools software suite is used to program, download, test, and commission the FX devices, including the FX16. FX Tools is available on CD in two versions: FX Tools Pro and FX Tools Express (North America only).

FX Tools Pro CD includes:

- FX Builder – used to fully program an FX16. FX Builder provides complete flexibility in programming the FX16.
- FX CommPro N2 – used to download, test, and commission an FX16 on an N2 Open network
- FX CommPro LON – used to download, test, and commission an FX16 on a LONWORKS network
- FX Builder Express – used to select an FX16 application and configure it using graphical plug-ins (North America only).

The FX Builder Express CD does not include FX Builder (North America only).

Application Upload/Download

With the FX16, you can download and upload a full application file to and from the latest LP-FX16X Rev. A version using a computer with the FX CommPro N2 tool software. This way, the controller contains all the information for you to retrieve, view, and modify the application in FX Builder if the archived version of the file is not available. You can only download earlier versions of the controller with the application operating code using FX CommPro, and the full application file remains in the FX Builder archive.

Dimensions in mm (in.)

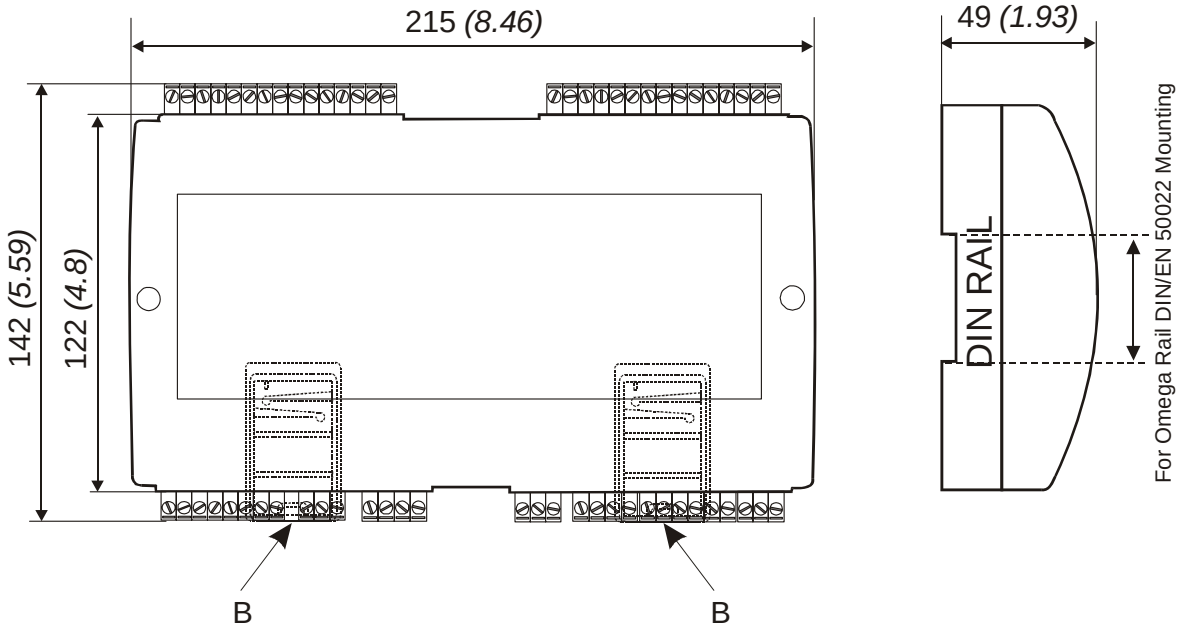

Figure 7: FX16 Master Controller Dimensions

Ordering Codes

Table 1: FX16 Master Controller - Standard Temperature Range Ordering Information

Product Code	Description
LP-FX16D00-000C	FX16, 6 AIs, 8 DIs, 4 AOs, 9 DOs (9 relays), no communications card
LP-FX16D01-000C	FX16, 6 AIs, 8 DIs, 4 AOs, 9 DOs (9 relays), N2 Open communications card
LP-FX16D02-000C	FX16, 6 AIs, 8 DIs, 4 AOs, 9 DOs (9 relays), LON communications card
LP-FX16D03-000C	FX16, 6 AIs, 8 DIs, 4 AOs, 9 DOs (9 relays), RS-232 communications card
LP-FX16D10-000C	FX16, 6 AIs, 8 DIs, 4 AOs, 9 DOs (4 relays, 5 triacs), no communications card
LP-FX16D11-000C	FX16, 6 AIs, 8 DIs, 4 AOs, 9 DOs (4 relays, 5 triacs), N2 Open communications card
LP-FX16D12-000C	FX16, 6 AIs, 8 DIs, 4 AOs, 9 DOs (4 relays, 5 triacs), LON communications card
LP-FX16D13-000C	FX16, 6 AIs, 8 DIs, 4 AOs, 9 DOs (4 relays, 5 triacs), RS-232 communications card

Table 2: FX16 Master Controller - Extended Temperature Range Controllers (Rev. A) Ordering Information

Product Code	Description
LP-FX16X00-000C	FX16, 6 AIs, 8 DIs, 4 AOs, 9 DOs (9 relays), no communications card
LP-FX16X01-000C	FX16, 6 AIs, 8 DIs, 4 AOs, 9 DOs (9 relays), N2 Open communications card
LP-FX16X02-000C	FX16, 6 AIs, 8 DIs, 4 AOs, 9 DOs (9 relays), LON communications card
LP-FX16X03-000C	FX16, 6 AIs, 8 DIs, 4 AOs, 9 DOs (9 relays), RS-232 communications card
LP-FX16X50-000C	FX16, with display, 6 AIs, 8 DIs, 4 AOs, 9 DOs (9 relays), no communications card
LP-FX16X51-000C	FX16, with display, 6 AIs, 8 DIs, 4 AOs, 9 DOs (9 relays), N2 Open communications card
LP-FX16X52-000C	FX16, with display, 6 AIs, 8 DIs, 4 AOs, 9 DOs (9 relays), LON communications card
LP-FX16X53-000C	FX16, with display, 6 AIs, 8 DIs, 4 AOs, 9 DOs (9 relays), RS-232 communications card
LP-FX16X10-000C	FX16, 6 AIs, 8 DIs, 4 AOs, 9 DOs (4 relays, 5 triacs), no communications card
LP-FX16X11-000C	FX16, 6 AIs, 8 DIs, 4 AOs, 9 DOs (4 relays, 5 triacs), N2 Open communications card
LP-FX16X12-000C	FX16, 6 AIs, 8 DIs, 4 AOs, 9 DOs (4 relays, 5 triacs), LON communications card
LP-FX16X13-000C	FX16, 6 AIs, 8 DIs, 4 AOs, 9 DOs (4 relays, 5 triacs), RS-232 communications card
LP-FX16X60-000C	FX16, with display, 6 AIs, 8 DIs, 4 AOs, 9 DOs (4 relays, 5 triacs), no communications card
LP-FX16X61-000C	FX16, with display, 6 AIs, 8 DIs, 4 AOs, 9 DOs (4 relays, 5 triacs), N2 Open communications card
LP-FX16X62-000C	FX16, with display, 6 AIs, 8 DIs, 4 AOs, 9 DOs (4 relays, 5 triacs), LON communications card
LP-FX16X63-000C	FX16, with display, 6 AIs, 8 DIs, 4 AOs, 9 DOs (4 relays, 5 triacs), RS-232 communications card

Table 3: FX16 Communications Cards (for Upgrade or Replacement) Ordering Information

Product Code	Description
LP-NET151-010C	N2 Open communication card for LP-FX16D and LP-FX16X (not Rev. A) controllers
LP-NET161-000C	N2 Open communication card for LP-FX16X Rev. A controllers
LP-NET152-010C	LON communication card for LP-FX16 controllers
LP-NET163-000C	RS-232 communication card for LP-FX16 controllers

Table 4: User Interfaces Ordering Information

Product Code	Description
LP-DIS60P20-0C	Medium User Interface for FX16 (non-isolated version); Can be mounted up to 3 m (10 ft) from the FX16 and includes panel mounting hardware.
LP-DIS60P21-0C	Medium User Interface for FX16 (isolated version); Can be mounted up to 300 m (1,000 ft) from the FX16 and includes panel and wall mounting hardware.

Table 5: Accessories Ordering Information

Product Code	Description
LP-KIT007-000C	Interface cable 3 m (9.8 ft) for Medium User Interface (LP-DIS60P20-0C) to FX16
LP-KIT007-001C	Interface cable for standard modem to FX16
LP-KIT007-013C	Null modem cable, 3 m (9.8 ft)
LP-KIT007-014C	Null modem cable, 15 m (49 ft)

Table 6: FX16 Accessories - Only Available in Europe Ordering Information

Product Code	Description
LP-KIT007-002C	Interface Cable (1.5 m/4.9 ft) for GSM modem to FX16 and Master Display
LP-KIT090-000C	GSM 900/1800 FastTrack Modem
LP-KIT090-001C	GSM Modem Plug-in Antenna
LP-KIT090-003C	GSM Modem Magnetic Mount Antenna with 2.5 m Cable
LP-KIT090-004C	GSM Modem Panel Mount Antenna with 5 m Cable
LP-KIT090-005C	GSM Modem Power Adapter, 230 VAC/12 VDC, Wall Plug
LP-KIT015-001C	Kit of Female Cage Clamp Connectors

Table 7: FX16 Demonstration Cases Ordering Information

Product Code	Description
LP-FX16DEM-051C	Demo Case with FX16 Master Controller, display, 9 relays, N2 Open card – 230 VAC power
LP-FX16DEM-052C	Demo Case with FX16 Master Controller, display, 9 relays, LON card – 230 VAC power
LP-FX16DEM-053C	Demo Case with FX16 Master Controller, display, 9 relays, RS-232 card – 230 VAC power
LP-FX16DEM-061C	Demo Case with FX16 Master Controller, display, 9 relays, N2 Open card – 120 VAC power
LP-FX16DEM-062C	Demo Case with FX16 Master Controller, display, 9 relays, LON card – 120 VAC power
LP-FX16DEM-063C	Demo Case with FX16 Master Controller, display, 9 relays, RS-232 card – 120 VAC power

Table 8: Expansion I/O Modules Ordering Information

Product Code	Description
LP-XT91D00-000C	Facility Explorer Extension Module
LP-XP91D02-000C	Facility Explorer Expansion Module - 6 AI, 2 AO
LP-XP91D03-000C	Facility Explorer Expansion Module - 8 DO (triacs)
LP-XP91D04-000C	Facility Explorer Expansion Module - 4 DI, 4 DO (triacs)
LP-XP91D05-000C	Facility Explorer Expansion Module - 8 DI
LP-XP91D06-000C	Facility Explorer Expansion Module - 4 relays, 230 VAC 3 A (Europe Only)
LP-XP91D07-000C	Facility Explorer Expansion Module - 4 relays, 24 V 3 A (North America Only)

Table 9: Software Tools Ordering Information

Product Code	Description
LP-FXTPRO-0	FX Tools Pro CD (FX Builder, FX Builder Express, FX CommPro N2, LON) - New User
LP-FXTPRO-6	FX Tools Pro CD (FX Builder, FX Builder Express, FX CommPro N2, LON) - Upgrade
LP-FXTEXP-0	FX Tools Express CD (FX Builder Express, FX CommPro N2) (North America only)

Technical Specifications

Table 10: I/O Details

Terminal Block	Channel	Type	Remark/Application
Analog Input (AI)			
TB1	AI1, AI2, AI3, AI4, AI5, AI6	See following table. 16 bit resolution	Software configurable Application: temperature, humidity, and pressure
	EXT-VDC	+16 V, 80 mA	0-10 V sensors or max. 4 0/4 - 20 mA sensors
	AVPS/EXT-VDC	AVPS = +5 V, 20 mA EXT-VDC = +16 V, 80 mA	Directly power ratiometric sensors with AVPS, or 0-10 V, 0/4 - 20 mA sensors with EXT-VDC AVPS or EXT-VDC selected by jumpers.
Digital Input (DI)			
TB2	DI1, DI2, DI3, DI4, DI5, DI6, DI7, DI8	Potential free contacts	Transition counter at 50 Hz max. Minimum time ON: 10 ms. Minimum time OFF: 10 ms Prescaler function: max. division by 100
	DI V~ Hot DI V~ Com	24 VAC	FX16 (not Rev. A): for isolation of DIs from the microprocessor, a separate 24 VAC power supply is required.
Digital Output (DO)			
TB3	DO1, DO2, DO3	SPST 8(3)A power relays	Max. switching power (relays): Motor: 240 W, 0.5 hp, 250 VAC Rating (resistive): 8A 125 VAC 8A 30 VDC 8A 250 VAC UL tested life (min. operations): 30,000 operations (at 360 operations x hour) Dielectric strength coil-contacts: 4000 V RMS for 1 minute
TB4	DO4, DO5	SPST 5(3)A power relays **or** 0.5 A/24 VAC triacs	Max. switching power (relays): Motor: 150 W, 0.25 hp, 250 VAC Rating (resistive): 5 A 125 VAC 5 A 30 VAC 5 A 250 VDC UL tested life (min. operations): 30,000 operations (at 360 operations x hour) Dielectric strength coil-contacts: 4000 V RMS for 1 minute
TB5	DO6, DO7, DO8	SPST 5(3)A power relays **or** 0.5 A/24 VAC triacs	
TB6	DO9	SPDT NC 8(3)A 250 V relay	Same as TB3 relays Fail relay for enhanced security. The relay returns to its Network Controller (NC) position not only at power fail but also in case the microprocessor should fail: for example, watch-dog or brown-out.
Analog Output (AO)			
TB7	AO1, AO2	0 -10 VDC FX16D/FX16X: 1.5 mA FX16X Rev. A: 5 mA	Used to drive analog actuators, frequency drives; 16 bit resolution.
TB8	AO3, AO4	0 -10 VDC FX16D/FX16X: 1.5 mA FX16X Rev. A: 5 mA	Used to drive analog actuators, frequency drives; 16 bit resolution.
	AO V~ Hot	24 VAC	FX16 (not Rev. A): for isolation of AOs from the microprocessor a separate 24 VAC power supply is required.

	AO V~ Com		

Table 11: Analog Sensor Types

Sensor Type	Linearization Range	Accuracy at 20°C (68° F) Ambient
Ni1000 JCI	-45°C (-49°F) to 120°C (248°F)	±0.5°C (±1°F)
Ni1000 JCI Extended Range	20°C (68°F) to 287°C (548.6°F)	±0.5°C (±1°F)
Ni1000 Siemens® (L&G)	-50°C (-58°F) to 160°C (320°F)	±0.5°C (±1°F)
Ni1000 DIN	-60°C (-76°F) to 180°C (356°F)	±0.5°C (±1°F)
Pt1000	-50°C (-58°F) to 605°C (1,121°F)	±0.5°C (±1°F)
A99	-50°C (-58°F) to 110°C (230°F)	±0.5°C (±1°F)
NTC 2.25 k	-40°C (-40°F) to 150°C (302°F)	±0.5°C (±1°F)
NTC 10 k	-40°C (-40°F) to 150°C (302°F)	±0.5°C (±1°F)
0 to 5 VDC Ratiometric	10 to 90% of supply voltage (0.5 to 4.5 V nominal)	±0.05 VDC
Active 0 to 10 VDC	0 to 10 Volts	±0.05 VDC
Active 0 to 20 mA	0 to 20 mA	±0.1 mA

FX16 Master Controller Standard and Extended Range Models

Product	FX16D Master Controller FX16X Rev. A Master Controller Extended Temperature Range	
Power Supply Requirements	24 VAC ±15%, 50/60 Hz - Class 2 Power Supply – Safety Extra-Low Voltage (SELV) in Europe	
Power Consumption	15 VA at max. load	
Internal Fuse	2 A, 250 V	
Protection Class	IP 20	
Ambient Operating Conditions	FX16D: -20°C (-4°F) to +50°C (122°F) ,10 to 95% RH (noncondensing) FX16X Extended Temperature Range: -40°C (-40°F) to +60°C (140°F) ,10 to 95% RH (noncondensing) (Integral Display may not operate below -20°C [-4°F])	
Ambient Storage Conditions	-40°C (-40°F) to +70°C (158°F), 10 to 95% RH (noncondensing)	
Dimensions (H x W x D)	142 x 215 x 49 mm (5.6 x 8.5 x 1.9 in.)	
Weight (with package)	0.74 kg (1.6 lb)	
Connection Terminals for Signals and Power Supply	Screw terminals for max 1 x 1.5 mm^2 (16 AWG) wires	
N2 Open Bus Connection Terminals	Screw terminals, cable size 0.5 mm to 1.5 mm^2, 24 AWG to 16 AWG, Belden cable, 4-core twisted pair with shield	
LON Network Connection Terminals	Screw terminals, cable size 0.5 mm to 1.5 mm^2, 24 AWG to 16 AWG, Belden cable, 2-core twisted pair with shield	
Connection for Extension Bus and Remote Display	Screw terminals, cable size 0.5 mm to 1.5 mm^2, 24 AWG to 16 AWG, Belden cable, 4-core twisted pair with shield	
Compliance	**Europe**	– 89/336/EEC, EMC Directive: EN 61000-6-3, EN 61000-6-1 – 72/23/EEC, Low Voltage Directive: EN 60730
	Canada	– UL Listed (PAZX7), CAN/CSA C22.2 No. 205, Signal Equipment – UL Recognized (XAPX8), CAN/CSA C22.2 No. 24, Temperature Indicating and Regulating Equipment – Industry Canada, ICES-003
	United States	– UL Listed (PAZX), UL 916, Energy Management Equipment – UL Recognized (XAPX2), UL 873, Temperature Indicating and Regulating Equipment – FCC compliant to CFR 47, Part 15, Subpart B, Class A

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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