Honeywell

Excel 500/600
CONTROL SYSTEM

HONEYWELL EXCEL 5000 OPEN SYSTEM

SPECIFICATION DATA

GENERAL

The Excel 500/600 is a freely programmable control and monitoring system specifically designed for building management. Using the latest Direct Digital Control (DDC) technology, the modular design of the Excel 500/600 is particularly well suited for use in medium-sized buildings such as schools, hotels, offices, shopping centers, and hospitals.

In addition to control applications for heating, ventilation, and air conditioning (HVAC), the Excel 500/600 also performs a wide range of energy management functions, including optimum start/stop, night purge, and maximum load demand. Up to four Building Supervisors can be connected via the system bus.

The Excel 500 controller has a LONWORKS® bus interface, allowing interoperability with a wide range of Honeywell and third-party controllers and devices. Up to 512 LONWORKS network variables can be mapped to data points.

A modem or ISDN terminal adapter can be connected to the Excel 500 for communication via the public telephone network.

The modular design enables the system to be expanded to meet growing needs. The data point user addresses and plain language descriptors are stored in the controller and are therefore available for viewing locally at an external interface without the need of a central PC.

FEATURES

- **Various state-of-the-art communication options:** Open LONWORKS® bus (Excel 500, only) or C-bus (Excel 500/600) communication; modem or ISDN terminal adapter at up to 38.4 Kbaud (Excel 500, only)
- **Maximum of 5 housings per Excel 500/600 control system with up to 16 I/O modules**
- **128 physical data points and 256 pseudo points per Excel 500/600 controller (C-bus communication)**
- **Use with both internal, plug-in I/O modules, and Distributed I/O modules via LONWORKS bus (Excel 500, only)**
- **Unique features in open LONWORKS networks:** NV-Booster® reduces the number of required NVs and thus also the number of required controllers; NV bindings can be restored after controller reset (and thus need not be redone after exchanging controllers); 512 NVs supported for LONWORKS integration; autobinding with Honeywell Distributed I/O modules, Smart I/O modules and 3rd party LonWorks® devices makes NV binding unnecessary, thus saving considerable engineering time
- **Easy-to-use controls and six-line LCD display**
- **Front door or control panel mounting with DIN-rail**
- **Applications programmable with Honeywell's CARE programming tool and downloadable into Flash EPROM (Excel 500, only)**
- **Enhanced controller functions including:** alarm, trend and global broadcast hysteresis, network-wide time synchronization, firmware downloading via modem and C-Bus

Table 1. Modules for the Excel 500/600 System

modules	description
XC5010C	Computer module Excel 500 (required for Distributed I/O); UL916 and UL864-approved
XC5210C	Large RAM version of Excel 500
XC6010	Computer module Excel 600
XP502	Power supply module
XD505A/508	C-bus communication submodules (XL600, only)
XF521A/526	Analog input modules
XF522A/527	Analog output modules
XF523A	Digital input modules
XF524A/529	Digital output modules
XF525A	Three-position output module

CE

DESCRIPTION

The Excel 500/600 System is part of the EXCEL 5000 family of controllers. The Excel 500/600 System is freely programmable and can be used as a stand-alone controller or as part of a network of up to 30 controllers connected via a C-bus (9.6 Kbaud up to 76.8 Kbaud). The Excel 500/600 System provides energy management and control functions via internal plug-in I/O modules in the unit housing as well as via a 2-wire LONWORKS bus interface (Excel 500, only) to Honeywell Distributed I/O modules or Smart I/O modules.

The Excel 500/600 housing has four slots for plug-in modules (see Table 1). The primary unit consists of a CPU module (Excel 500 uses XC5010C, Excel 600 uses XC6010 for special high-performance requirements), a power supply module (XP502), and two additional I/O modules. Up to four more Excel 500/600 housings (without CPU and Power Supply module) can be connected in series providing slots for additional modules. An Excel 500/600 System can consist of up to 16 I/O modules (total number of plug-in and Distributed I/O modules (Excel 500, only)) with up to 128 inputs and outputs. A maximum of ten modules of the same type are allowed per system. In addition, the Excel 500 can communicate with any LONWORKS product. Up to 512 LONWORKS NVs can be mapped to data point.

There are two sources for Excel 500/600 program applications:

1. The controller is shipped with a wide range of standard functions permanently stored in EPROM. By selecting applications from these applications, the user program is assembled. No further programming is necessary.
2. Using Honeywell's Windows-based CARE programming tool, standard HVAC technology applications can be freely programmed, as needed.
3. The user program is then automatically generated based on the graphically designed schematic diagram, instrumentation, and control strategies.

SPECIFICATIONS

Electrical

Operating voltage
24 Vac, ± 20%

Power consumption
max. 40 VA (max. 30 W)

Memory buffer
XC5010C: gold capacitor buffer for 72 hours
XC6010: Lithium battery 3 V, (e.g. Varta CR ½ AA-3V)
RAM buffer for approx. 1 month.

Application security on power failure
Complete backup of total system for 15 min., UPS.
Optional XAPU 24-2F.

Overvoltage protection
All inputs and outputs are protected against 24 Vac and 40 Vdc overvoltage as well as short-circuiting.

Environmental

Ambient temperature
Operation: +32…+122°F (0…50°C)
Storage: -4…+158°F (-20…+70°C)

Ambient humidity (operation and storage)
5 to 93% r.h. noncondensing

Mechanical

Housing dimensions (H x W x D)
5-5/8 x 7-1/2 x 7-3/8 in.
(144 x 192 x 188 mm)

Housing material
Plastic, flame-retardant

Mounting methods
Panel (with DIN-rail) or front door

Calculated lifetime of weakest components
MTBF ≥ 60 years (for typical Excel 500 applications)

Protection class
IP 30

Communication

C-Bus

The C-bus transmits data between the EXCEL 5000® System controllers, devices, and building supervisors at 9.6 Kbaud up to 76.8 Kbaud. The maximum C-bus network length is 1,200 m (3,900 ft) or 15,700 ft. (4,800 m) using the XD507 repeater.

There is a maximum number of 30 controllers or devices allowed per C-bus. See Excel 100/500/600 Installation Instructions (EN1R-1047GE51) for wiring details.

LonWorks Bus (Excel 500, only)

The Excel 500 uses an FTT-10A Free Topology Transceiver, transmitting data at 78 Kbaud using LonTalk® protocol.

Cable length from 1,050 to 7,200 ft. (320 to 2,200 m). See Excel 100/500/600 Installation Instructions (EN1R-1047GE51) for wiring details.

Modem (Excel 500, only)

A modem or ISDN terminal adapter can be connected to the serial port for dial-up access at a transmission rate of up to 38.4 Kbaud.

INTERNAL MODULES

Computer Module XC5010C / XC5210C

- Toshiba TMP93CS41F 16-bit microprocessor
- 1.28 MB total memory; 2x512 KB Flash EPROM for operating system and applications; 2x128 KB RAM
  XC5210C, only: 1x128 KB plus 1x512 KB RAM
- Six operating status LEDs
- RS 232 port for MMI, modem or ISDN terminal adapter.
- RS 485 port for C-bus
- Coding pin (pin 8)
- Gold capacitor for data buffer
- Reset button
- Watchdog function
- Neuron® chip 3120
- LONWORKS service button and LED
- Firmware download

Computer Module XC6010

- Intel® i960 32-bit microprocessor
- 1.536 MB total memory
  2x512 KB EPROM
  4x128 KB RAM
  1x256 KB Flash EPROM
- Six operating status LEDs
- RS 232 port for attachment of operator interface
- RS port for C-bus
- Coding pin (pin 8)
- Buffer battery providing 30-day data
- Reset button
- Watchdog function

Power Supply Module XP502

- Provides low voltage to modules via internal bus
- Can be connected to UPS device XAPU 24-2F
- Three operating status LEDs
- Coding pin (pin 6)
- Watchdog function

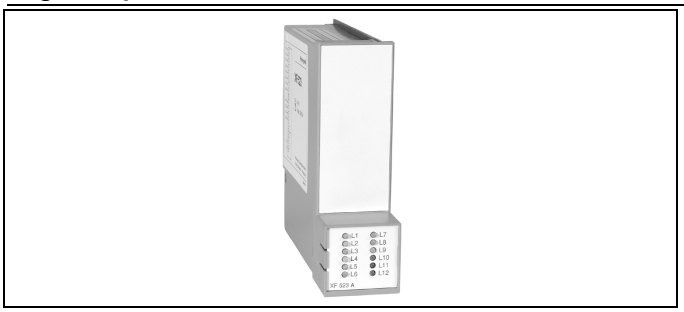
Analog Input Module XF521A/526

- Eight analog inputs (AI1 - AI8)
  0...10 Vdc
  0...20 mA (via external 500-ohm resistor)
  4...20 mA (via external 500-ohm resistor)
  NTC 20k ohm and PT 1000 (-50°C to +150°C)
  XF526, only:
  PT 1000 (0°C to +400°C), PT 3000, PT 100, Balco 500
- Protected inputs up to 40 Vdc / 24 Vac
- 12-bit resolution
- 1 sec (XC5010C) or 250 ms (XC6010) CPU polling time
- Coding pin (pin 7)

Analog Output Module XF522A/527

- Eight outputs (AO1 - AO8), short-circuit proof
- Signal levels 0...10 Vdc
  Umax. = 11 Vdc,
  Imax = +1 mA, -1 mA
- Protected outputs up to 40 Vdc / 24 Vac
- 8-bit resolution
- Zero point < 200 mV
- Accuracy ≤ ± 150 mV deviation from output voltage
- One red LED per channel
  light intensity proportional to output voltage
- Control updating every 1 sec (XC5010C) or 250 ms (XC6010) with CPU
- **XF522A, only**: manual override controls for five outputs

Digital Input Module XF523A



- Twelve inputs (DI1 - DI12), Ri = 15k ohm

inputs	1 - 2	3 - 12
max. freq.	15 Hz	0.4 Hz
min. pulse duration	20 msec	1.25 sec
min. pulse pause	33 msec	1.25 sec
max bounce time	5 msec	50 msec

- Switching conditions: OFF: Ui ≤ 2.5 V, ON: Ui ≥ 5 V
- Protected switching up to 40 Vdc / 24 Vac
- Coding pin (pin 9)
- One status LED per channel, invertible (NO/NC)
- 18 Vdc auxiliary voltage supply (unregulated)
- 1 sec (XC5010C) or 250 ms (XC6010) CPU polling time

Digital Output Module XF524A/529

- Five isolated change-over contacts and 1 NO contact
- Max. voltage Umax = 240 Vac per output
- Max. current Imax = 4 A per output
- 12-A total current per module
- Coding pin (pin 10)
- LED per channel
  OFF: LED off
  ON: LED illuminated (yellow)
- Cycle time 1 sec (XC5010C) or 250 ms (XC6010) with CPU
- **XF524A, only**: manual override switches for 5 outputs

Three Position Output Module XF525A

- Three three-position relays
- Max. load
  1.2 A at 24 Vac
  0.2 A at 240 Vac
- Coding pin (pin 12)
- Two LEDs per channel with manual override switches
  L1 (green): servo motor closes
  L2 (red): servo motor opens
  L3 (green): servo motor closes
  L4 (red): servo motor opens
  L5 (green): servo motor closes
  L6 (red): servo motor opens
- Cycle time 1 sec (XC5010C) or 250 ms (XC6010) with CPU

Module Locations

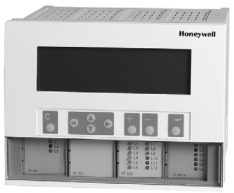
Each Excel 500/600 housing has four module slots numbered 1 through 4 from left to right. Table 2 indicates the possible slot positions for each module.

Table 2. Slot positions for the various Excel 500/600 modules

module		slot position
Computer module	XC5010C/XC5210C/XC6010	first Excel 500 housing, slot 4
Power Supply module	XP502	first Excel 500 housing, slot 1
Analog Input module	XF521A/526	any slot
Analog Output module	XF522A/527	any slot
Digital input module	XF523A	any slot
Digital Output module	XF524A/529	not in first Excel 500 housing
3-Position Output module	XF525A	not in first Excel 500 housing

NOTE: Also see the Distributed I/O Product Data sheet, EN0B-0090GE51.

OPERATOR INTERFACE XI581/XI582



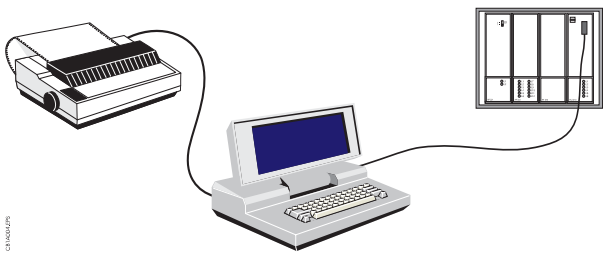
XI581

XI582

The XI581 or XI582 operator interface is the command and information center of the Excel 500/600 system. With them, data can be entered and displayed. Information such as current temperature values, control status, etc. can also be displayed. The menu-driven, six-line, backlit LCD graphic display with 34 characters per line, together with eight clearly marked keys, makes the device easy to use.

The operator interface is connected to the serial port at the front of the computer module. The XI582 unit can be mounted on the front cover or up to 48 ft. (15 m) away from the controller. A blank cover is also available.

OPERATOR AND SERVICE SOFTWARE XL-ONLINE



Excel 500/600 with XL-Online and printer

The PC-based XL-Online is the local intelligent operating and service software. It performs all the operating functions of the XI581/XI582 as well as having the advantages of a PC. Not only can the XL-Online make major modifications such as changing setpoint values and time program switching points, it also offers all service and commissioning functions.

The XL-Online can be operated at five different access levels, three of which are password protected. A printer can be connected to the parallel interface of the XL-Online to log alarms and error messages. As with the XI582, the PC with the XL-Online operator and service software can be placed up to 15 meters from the computer module.

PROGRAMMING

The Excel 500 system includes a comprehensive software package specially designed to meet the requirements of application engineers. The easy-to-use, menu-driven software features the following functions:

- data point description
- time program
- alarm handling
- application program (DDC program)
- password protection

Data Point Description

Data points are the basis of the Excel 500 system. They contain system-specific information such as values, status, limit values, and default settings. The user has easy access to data points and the information they contain. The user can recall and modify information in the data points.

Time Program

The time program can be used to enter the setpoint or status at any time for any data point. The following time programs are available:

- daily program
- weekly program
- annual program
- TODAY function
- special day list

Daily programs are used to create a weekly program. The annual program is created automatically by multiplying the weekly program and then incorporating daily programs. The TODAY function allows direct changes to the switching program. It allows you to allocate a setpoint or status to the selected data point for a defined period of time.

Alarm Handling

The alarm handling facility offers system security. Alarm signals can, for example, alert the operator to scheduled maintenance work. All alarms that occur are stored in data files and reported immediately. If your system configuration allows, you can also list alarms on a printer or transmit alarms to higher level devices.

There are two types of alarms, critical and non-critical. Critical alarms (e.g. system alarms caused by a fault in the controller) have priority over non-critical alarms. To distinguish between alarm types, you can generate your own alarm messages or use pre-programmed system messages. The following events all generate alarm messages:

- exceeding limit values
- overdue maintenance work
- totalizer readings
- digital data point changes of state

Application Program (DDC program)

You can use Honeywell's CARE (Computer Aided Regulation Engineering) programming tool to create application programs for your system. A particular advantage offered by CARE is the ability to create a fully functional control program without having to be familiar with the programming language.

Password Protection

The control system is also protected by passwords. This ensures that only authorized persons have access to system data. There are four operator levels, each protected by its own password.

Operator level 1: Read only. The operator can display information about setpoints, switching points, and operating hours.

Operator level 2: Read and make limited changes. The operator can display system information and modify certain pre-set values.

Operator level 3: Read and make changes. System information can be displayed and modified.

Operator level 4: Programming can be carried out.

Trending

The Excel 500 system provides controller-based trending. This feature allows historical values to be stored in the controller. Both time-based or value-hysteresis-based trending are possible

ACCESSORIES

Table 3 lists the accessories available for the Excel 500/600.

Table 3. Accessories for the Excel 500/600

order code	description
XD507	C-bus repeater
XS563	socket for wall mounting
XS564	socket for panel mounting
XH561	housing (empty, without socket)
XH562H	blank cover
XI581	operator interface, controller cover
XI582	operator interface, desktop/wall mounted
XW568	80 mm cable, horiz. housing connection, only
XW569	330 mm cable, vert. housing connection, only
XW564	cable to XI582
XW565	cable to XI582 (5 m)
XW567	cable to PC with XL-Online (2.5 m)
XW582	cable to XI582 (XC5010C, front)
XW583	cable to XI582 (XC5010C, rear)
XW584	adapter cable
XW585	cable to PC with XL-Online (5 m, XC5010C)

DISTRIBUTED I/O MODULES

See the Distributed I/O Product Data sheet, EN0B-0090GE51.

Honeywell

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