Honeywell

Excel Web

XL1000B/C

HONEYWELL EXCEL 5000 OPEN SYSTEM

INSTALLATION INSTRUCTIONS

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CE

EN1B-0256GE51 R0609

OVERVIEW OF HARDWARE

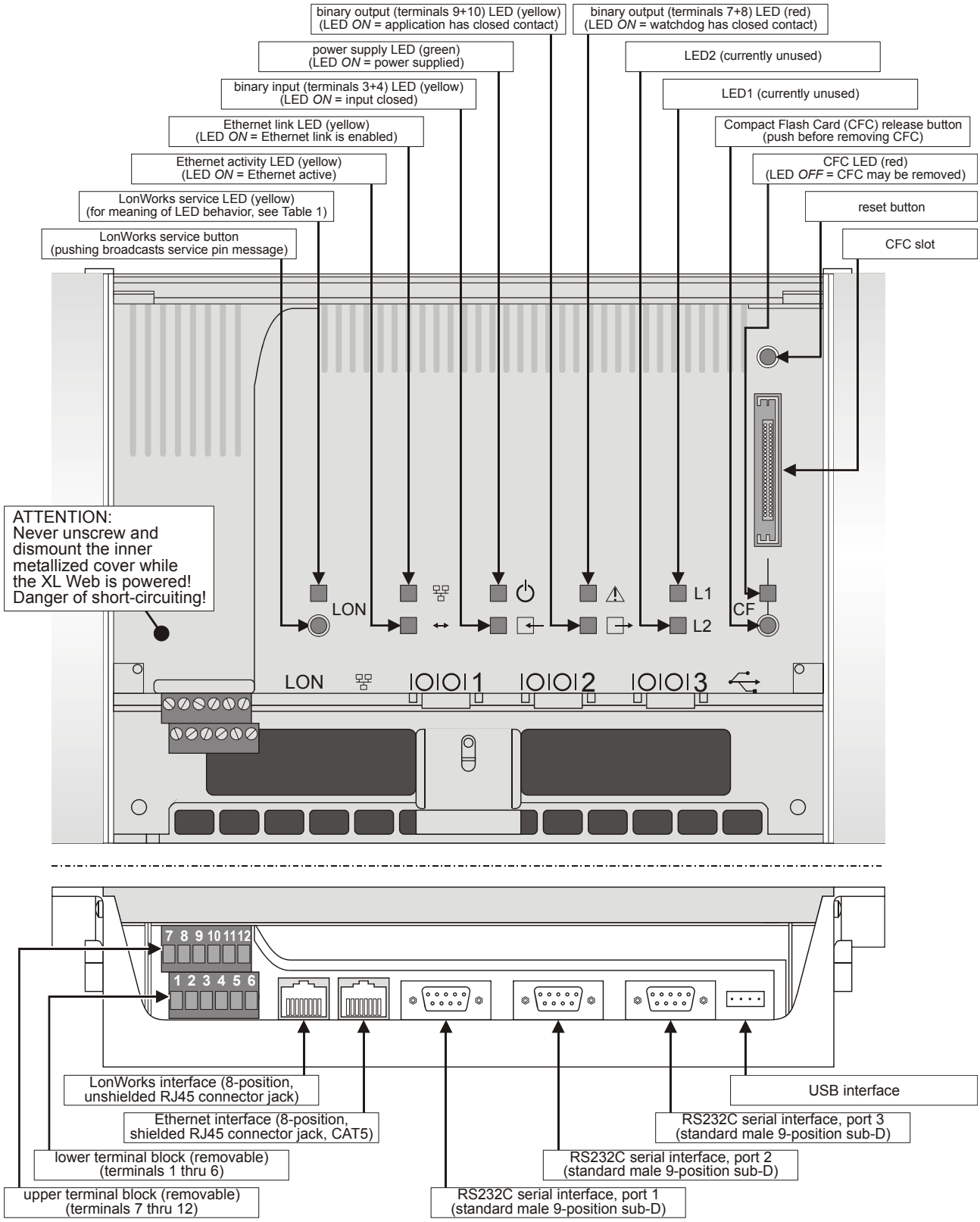

Fig. 1. Hardware features (top and front view)

Terminal Blocks

The Excel Web features two rows of removable terminal blocks (located at the front left-hand side; see Fig. 1 on page 2) for the connection of cables to the two binary outputs and the binary input as well as for connecting LONWORKS and the power supply. A nearby sticker provides an overview of the terminal assignment (see Fig. 2).

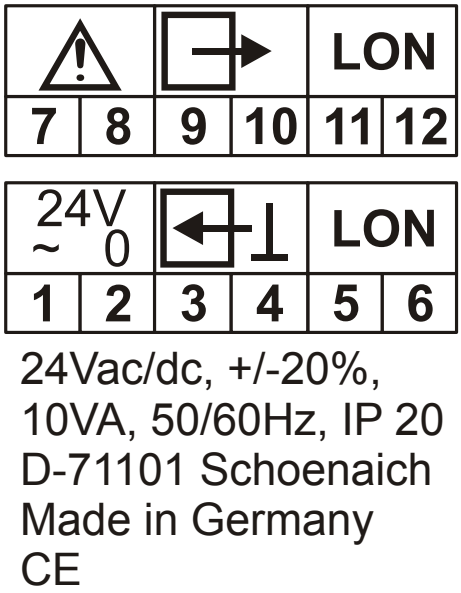

Fig. 2. Terminal assignment sticker

Maximum torque for fastening the wiring terminal screws is 0.5 Nm (4.5 lb-in).

Table 1 provides a more-detailed explanation of the terminals and their functions.

Table 1. Overview of terminals and functions

term.	function
1+2	power supply (24 Vac ± 20%, 19.2 to 38 Vdc)
3+4	a binary input (normally-open, 36 Vdc; pin 4 is the signal ground), freely configurable (using CARE 7) to read input from ***either*** 1) a field device ***or*** 2) a collective alarm input ***or*** 3) a 2nd Excel Web controller whose duties it could then assume in the event of its failure
5+6	LONWORKS
7+8	a binary output / "watchdog relay" (SPDT, normally closed, 24 Vac, max. 2 A permanent load), permanently configured to write output to an alarm device (which can then signal that Excel Web is malfunctioning)
9+10	a binary output (potential-free contact, SPST, normally-open, 24 Vac, max. 2 A permanent load), freely configurable (using CARE 7) to write output to ***either*** 1) a field device ***or*** 2) a 2nd Excel Web controller which could then assume the 1st Excel Web's duties in the event of its failure
11+12	LONWORKS

LonWorks Interface

The Excel Web is equipped with a LonWorks interface (specifically: an RJ45 jack) permitting communication on LONWORKS networks.

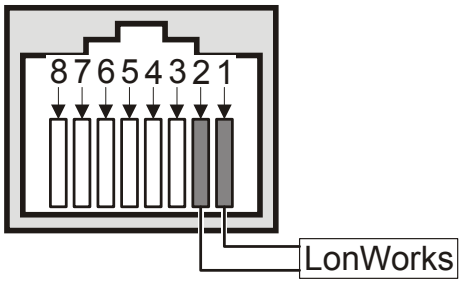

Fig. 3. LonWorks interface (RJ45 jack)

There are two methods of connecting the Excel Web controller to the LONWORKS networks (both or either connection method can be used):

- via terminals 5+6 and 11+12 of the terminal blocks (see Fig. 1 on page 2); and/or
- via the corresponding jack located to the right of the terminal blocks (see Fig. 3).

See also section "LonWorks Service LED and Service Button" on page 5 for details on the corresponding LONWORKS service LED and one LONWORKS service button.

Ethernet Interface

The Excel Web controller is equipped with a 10/100-Mbaud Ethernet interface (specifically: an RJ45 jack) permitting communication (as per IEEEC 802.3) on BACnet/IP networks.

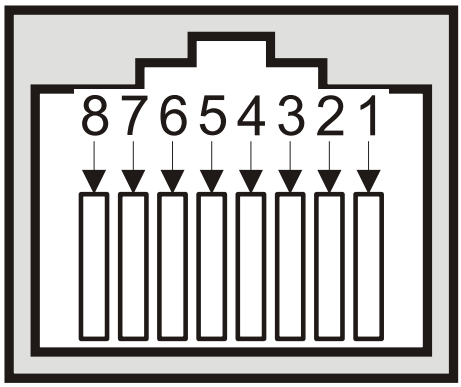

Fig. 4. Ethernet interface

When thus connected, the user sitting at a platform hosting EBI can thus e.g. view and edit the time programs, trend values, etc. of the other devices in the BACnet/IP network.

This Ethernet jack conforms to the specifications of the following two Ethernet sub-standards:

- 100Base-TX (twisted pair / star wiring; 100 Mbaud Ethernet based on Manchester signal encoding over category 5 or better twisted pair cable; max. segment length = 100 meters) and
- 10Base-T (twisted pair / star wiring; 10 Mbaud Ethernet based on Manchester signal encoding over category 3 or better twisted pair cable; max. segment length = 100 meters).

RS232C Serial Interface Ports

The Excel Web controller is equipped with three male 9-pin sub-D jacks into which corresponding female 9-pin sub-D plugs can be inserted for various different purposes (see following sub-sections). These ports allow data transmission rates of 9.6, 19.2, 76.8, or 115.2 kBaud (the default).

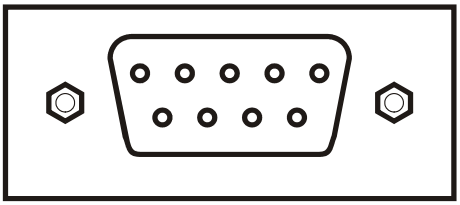

Fig. 5. RS232C serial interface

Using CARE 7, the user can configure the specific desired data transmission rate of each individual RS232C port; it is thus possible for the three ports to operate simultaneously at three different rates.

Port 1 (Factory Service Interface)

Port 1 is intended for the connection (as needed) of a platform for the purpose of servicing (in the factory, only) the Excel Web controller. In this context, "servicing" comprises a group of different activities including:

- updating portions of the Excel Web controller's Operating System (namely: LINUX, BACstack, Apache Web-Server) and
- diagnostics (Linux, firmware).

Port 2 (Browser Interface)

Port 2 is intended for the connection (as needed, or permanently) of a (portable) platform (which must host an Internet Explorer-compatible internet browser) for the purpose of operating the Excel Web controller.

This requires the establishment of a remote connection via RS232 on the PC, plus a null modem cable (RS232 cross-over cable). Because it offers a much higher speed, we recommend instead using the USB interface.

Port 3 (Modem Interface)

Port 3 is intended for the permanent connection (if needed) of a modem (e.g. an analog modem, an ISDN adapter, or an GSM adapter) for the purpose of communicating with other front-ends (e.g. 3rd-party BACnet front-ends) via modem.

CF Port LED, Request Button, and Slot

The Excel Web controller features a slot (type-II socket) into which type-II Compact Flash Cards (CF cards) – but also type-I CF cards – can be inserted.

Inserting a CF card allows the Excel Web controller's internal memory (for storing trend records) to be increased.

CF cards having a variety of storage sizes are available from wholesale and retailer dealers.

NOTE: Insert the CF card ***carefully*** and make sure that it has the proper orientation (see Fig. 6).

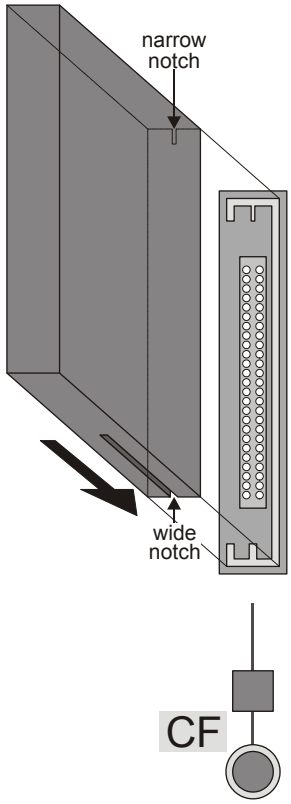

Fig. 6. Inserting a CF card into the slot

NOTE: Before removing a CF card, always first push the CF request button and wait (usually just a few seconds) until the CF LED turns OFF. Violating this rule could interrupt the transfer of data onto the card.

NOTE: Upon inserting a CF into a running Excel Web, the CF will be reformatted, if necessary. Specifically: If the CF already has the format EXT3, it will not be formatted; otherwise, it will be formatted, and any data already present on it will be irretrievably lost.

USB Interface Downloads

The Excel Web controller is equipped with a USB port into which a standard USB type-A connector can be inserted. This USB interface is the recommended interface for downloading applications and firmware via CARE 7 and for operating the Excel Web controller via Internet Browser in parallel to an Ethernet connection. The following USB host networking adapter has been approved: BELKIN DIRECT CONNECT (BELKIN order no.: F5U104 or F5U104G at www.belkin.com).

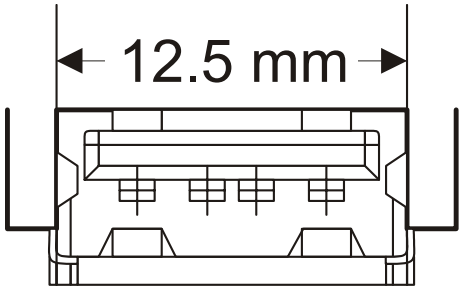

Fig. 7. USB interface

Alternatively, either of the following three adapters can also be used: SMC 2208USB/ETH; SMC 2209USB/ETH; or D-Link DUB-E100.

See section "Option 1: USB (recommended)" on page 9.

LEDs and Buttons

LonWorks Service LED and Service Button

The Excel Web controller is equipped with a LONWORKS service LED and a LONWORKS service button, together marked "LON" (see also Fig. 1 on page 2). They are used for commissioning the Excel Web controller and for troubleshooting.

LonWorks Service Button

When the LONWORKS service button is pressed, the service pin message is broadcast on the LONWORKS network, and all LONWORKS tools currently connected to the LONWORKS network will receive this message.

LonWorks Service LED

The LONWORKS service LED can display various behaviors having different meanings (see Table 2).

Table 2. LONWORKS service LED behaviors / meanings

	LED behavior	meaning
1	LED remains OFF after power-up.	Defective Excel Web hardware (e.g. power supply problems, clock problems, or defective Neuron Chip).
2	LED is lit continuously after first power-up.	Defective Excel Web hardware.
3	LED flashes at power-up, goes OFF, and then is lit continuously.	Neuron chip lacks LONWORKS interface program. Remedy: Use Excelon or LonMaker, set Excel Web online.
4	LED flashes briefly periodically.	Excel Web probably experiencing continuous watchdog resets, or external memory or EEPROM is corrupt.
5	LED repeatedly blinks ON for 1 s and OFF for 1 s.	Excel Web is unconfigured but has an application. Remedy: Commission Excel Web using CARE 7.
6a	OFF for approx. 10 s. Afterwards, the service LED turns ON and remains ON, indicating completion of the blanking process.	Return Excel Web to factory.
6b	OFF for approx. 1 s. Afterwards, the service LED is lit continuously.	Return Excel Web to factory.
6c	OFF for 1...15 s, depending on application size and system clock. Afterwards, service LED repeatedly flashes ON for 1 s and OFF for 1 s.	Excel Web is unconfigured but has an application. Remedy: Commission Excel Web using CARE 7.
7	LED remains OFF after a short ON duration.	Excel Web is configured and running normally.
8	LED flashes ON.	Excel Web received a WINK command from LONWORKS; other physical outputs are unaffected.

In case of a problem, check if the LONWORKS service LED's behavior is changed by resetting the Excel Web controller using the reset button. Please contact Honeywell if this does not solve the problem.

Power Supply LED

The LED marked " ⏻ " indicates whether or not the Excel Web controller is currently under power. Specifically, when it is lit, the controller is under power; when it is dark, the controller is not under power.

Binary Input (terminals 3+4) LED

The LED marked " ⊣ " indicates the state of the binary input (which is a normally-open contact) located at terminals 3 and 4. Specifically, when it is lit, the binary input is closed; when it is dark, the binary input is open.

Binary Output (terminals 7+8) LED

The LED marked " ⚠ " indicates the state of the binary output ("watchdog" relay) at terminals 7 and 8 (which is a normally closed contact). Specifically, when it is lit, the alarm contact is open; when it is dark, the alarm contact is closed.

For a detailed description of the "watchdog" relay behavior, see Excel Web User Guide (EN2B-0289GE51).

Binary Output (terminals 9+10) LED

The LED marked " ⊢ " indicates the state of the binary output at terminals 9 and 10 (which is a normally-open contact). Specifically, when it is lit, this means that the application has closed the relay; when it is dark, the relay is open.

Ethernet LEDs

The Excel Web controller is equipped with two Ethernet LEDs (see also Fig. 1 on page 2).

Ethernet Link LED

The LED marked " 🖧 " indicates the Ethernet link's status. Specifically, it is lit whenever an Ethernet jack has been inserted into the corresponding port and the software has established the Ethernet link. It is dark when the link has been disabled.

Ethernet Activity LED

The LED marked " ↔ " indicates whether or not the Ethernet link is currently active. Specifically, when it flashes, this means that signals are being transmitted / received on the Ethernet network; when it is dark, no messages are being transmitted/received.

LEDs L1 and L2

At present, these LED's are not in use.

Reset Button

The reset button can be pressed only using a long, thin tool (e.g. a screwdriver). Pressing it reboots the Excel Web controller's operating system and restarts the application.

MOUNTING

Before Installation

IMPORTANT

To allow the evaporation of any condensation resulting from low shipping / storage temperatures, keep the controller at room temperature for at least 24 h before applying power.

US requirement, only: This device must be installed in a UL-listed enclosure offering adequate space to maintain the segregation of line voltage field wiring and Class 2 field wiring.

In order to meet the criteria for CE certification, the XL1000 controller must be mounted inside an electrical panel.

Dimensions

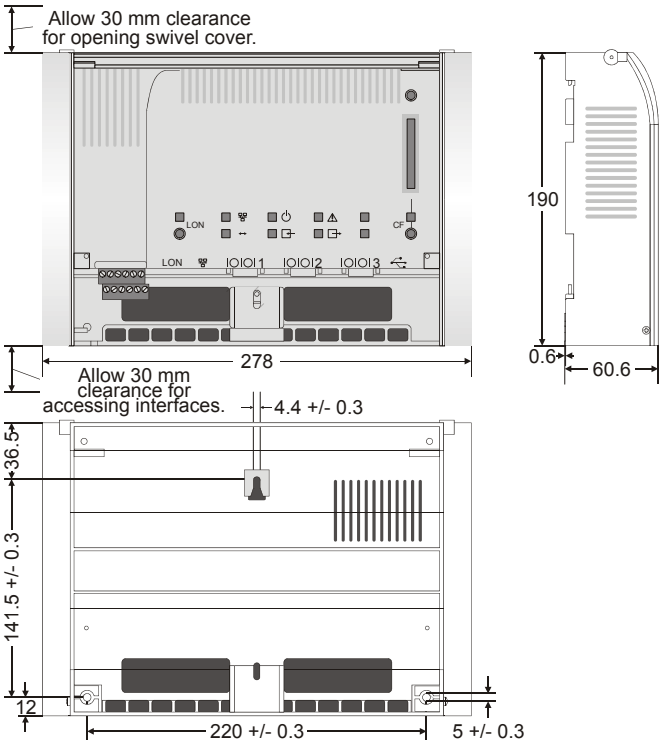

Fig. 8. Dimensions (in mm)

The Excel Web has the following dimensions (W x L x H): 278 x 190 x 61 mm. Its housing conforms to IP20. Its pollution degree (2) makes it suitable for use in residential controls, commercial controls, in a clean environment, or non-safety controls for installation on or in appliances.

The Excel Web is suitable for mounting on a standard rail (DIN EN 50022-35 x 7,5), on walls or in panels, as well as for installation in appropriately-sized wiring cabinets or fuse boxes. Allow sufficient clearance (approx. 30 mm) to access the interfaces and to open the swivel cover (see Fig. 8).

DIN Rail Mounting/Dismounting

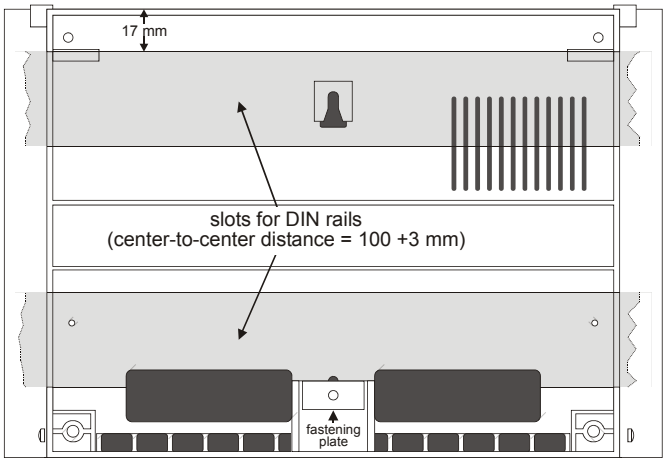

Fig. 9. Housing base (view from below)

The Excel Web controller can be mounted onto DIN rails as follows (refer also to Fig. 10):

1. Hang the upper slot onto the upper DIN rail.
2. Swing the unit down until it is flush with the lower DIN rail.
3. Slide the fastening plate and corresponding screw in the oval hole up against and ***behind*** the bottom edge of the lower DIN rail and screw it firmly into place.
4. If necessary, the swivel cover can be locked by inserting a small string lock, lead seal, or screw into either one of the two openings provided.

The unit is dismounted by loosening the fastening plate and lifting the unit out of place.

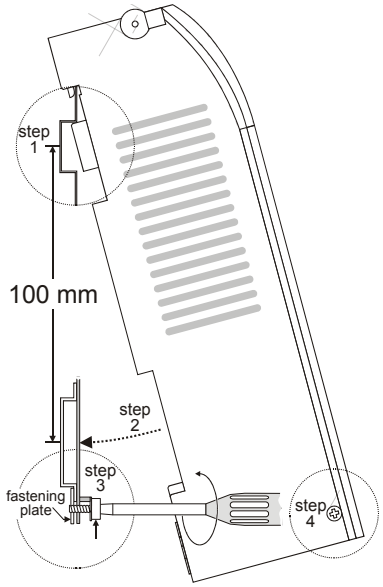

Fig. 10. Mounting the Excel Web on to two DIN rails

Wall/Panel Mounting/Dismounting

The Excel Web controller can be mounted on walls or in panels in any desired orientation. However, mounting the Excel Web controller upside down on ceilings should be avoided, insofar as the swivel cover would then swing open.

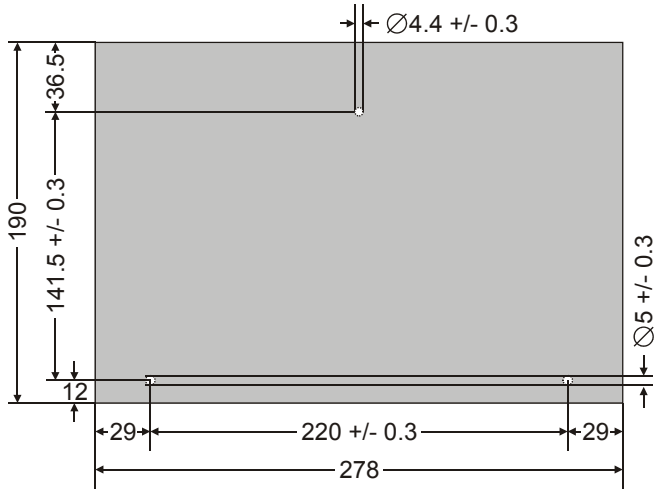

Fig. 11. Drilling template (view from above)

Swivel Cover Lock

The swivel cover can be locked by inserting a small string lock, lead seal, or screw into either one of the two openings provided (see Fig. 10).

POWER SUPPLY

Wiring

NOTE: All wiring must comply with applicable electrical standards and ordinances. Refer to job or manufacturers' drawings for details. Local wiring guidelines (e.g. VDE 0100) may take precedence over recommendations provided in these installation instructions.

- Power supply: 24 Vac [±20%], 50 or 60 Hz, or 24...38 Vdc, galvanically isolated;
- Power consumption = max. 10 VA (USB unloaded);
- Excel Web® and 24 Vac field devices can obtain their power from the same transformer;
- Several Excel Web controllers can share a single common transformer. In this case, you must ensure that terminal 1 of each of the Excel Web controllers is connected to 24 V and terminal 2 is connected to the minus pole (optionally, terminal 2 can additionally be connected to the earth) (see also Fig. 12).
- The power supply LED (see section "Power Supply LED" on page 5) indicates whether power is being supplied.
- In the event you wish to connect one of the 24 Vac pins to the earth ground, connect it via terminal 2 of the lower removable terminal plug (see also Fig. 12).

Table 3. Cable sizing (use only copper cables)

type of signal	cross-sectional area		
	≤ 300 ft (100 m)	≤ 550 ft (170 m)	≤ 1300 ft (400 m)
24 Vac power supply	16 AWG (1.5 mm^2)	14 AWG (2.5 mm^2)	-
low-voltage*	14 – 18 AWG (2.5 – 0.75 mm^2)		
*0...10 V sensors, totalizers, binary inputs, 0...10 V signals for actuators, etc.			

Power is supplied via terminals 1 and 2 of the lower removable terminal plug. The removable terminal plug permits individual Excel Web controllers to be disconnected from the power supply without disturbing the operation of other devices powered by the same source.

NOTE: Do not reverse the polarity of the power connection cables, and avoid ground loops (i.e. avoid connecting one field device to several controllers) as this may result in short-circuiting.

Transformer Data

Table 4. 1450 series transformers data

part # 1450 7287	primary side	secondary side
-001	120 Vac	24 Vac, 50 VA
-002	120 Vac	2 x 24 Vac, 40 VA, and 100 VA from separate transformer
-003	120 Vac	24 Vac, 100 VA, and 24 Vdc, 600 mA
-004	240/220 Vac	24 Vac, 50 VA
-005	240/220 Vac	2 x 24 Vac, 40 VA, and 100 VA from separate transformer
-006	240/220 Vac	24 Vac, 100 VA, and 24 Vdc, 600 mA

Table 5. Overview of CRT Series AC/DC current

transformer	max. AC current	max. DC current
CRT 2	2 A	0.5 A = 500 mA
CRT 6	6 A	1.3 A = 1300 mA
CRT 12	12 A	2.5 A = 2500 mA

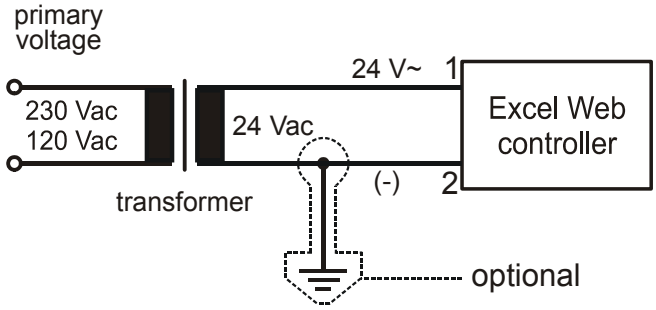

Fig. 12. Connection of Excel Web

Lightning Protection

Please contact your local Honeywell representative for information on lightning protection.

RIN-APU24

The RIN-APU24 Uninterruptable Power Supply can be directly wired to an Excel Web.

See RIN-APU24 Uninterruptable Power Supply – Mounting Instructions (EN0B-0382GE51) for a detailed wiring diagram.

LONWORKS COMMUNICATIONS

General Information

The Excel Web controller is equipped with a free-topology transceiver (FTT10A or FT-X1) for communication (at a data transmission rate of 78 Kbaud) on LONWORKS® networks (using the LonTalk protocol).

The LONWORKS network is insensitive to polarity, eliminating the possibility of installation errors due to miswiring.

Different network configurations (daisy-chain, loop, and star configurations, or any combination thereof) are possible (see also Excel 50/500 LONWORKS Mechanisms Interface Description, EN0B-0270GE51).

Connecting to the LONWORKS Network

IMPORTANT

Do not bundle wires carrying field device signals or LONWORKS communications together with high-voltage power supply or relay cables. Specifically, maintain a min. separation of 3 inches (76 mm) between such cables. Local wiring codes may take precedence over this recommendation.

IMPORTANT

Try to avoid installing in areas of high electromagnetic noise (EMI).

Cable Types

The unit must be wired to the LONWORKS network using either

- level IV 22 AWG (Belden part number 9D220150)

or

- plenum-rated level IV 22 AWG (Belden part number 9H2201504) non-shielded, twisted-pair, solid-conductor wire.

When possible, use Honeywell AK3781, AK3782, AK3791, or AK3792 cable (US part numbers). See Excel 50/5000 LONWORKS Mechanisms, EN0B-0270GE51, for details, including maximum lengths.

Use wire with a minimum size of 20 AWG (0.5 mm^2) and a maximum size of 14 AWG (2.5 mm^2).

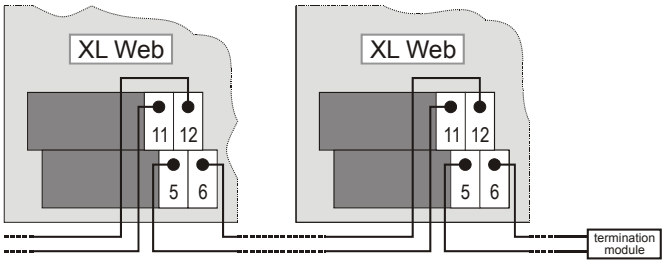

Fig. 13. Connection to LONWORKS network and termination module (here: daisy-chain network configuration)

The Excel Web controller can be connected to the LONWORKS network via terminals 5+6 and 11+12 of the removable terminal plug or via the LONWORKS jack (see also section "LonWorks Interface" on page 3).

This permits individual Excel Web controllers to be connected / disconnected from the LONWORKS network without disturbing the operation of other devices.

Depending upon the chosen network configuration, one or two terminations may be required.

Two different LONWORKS termination modules are available:

- LONWORKS termination module, order no.: **209541B**
- LONWORKS connection / termination module (mountable on DIN rails and in fuse boxes), order no.: **XAL-Term**

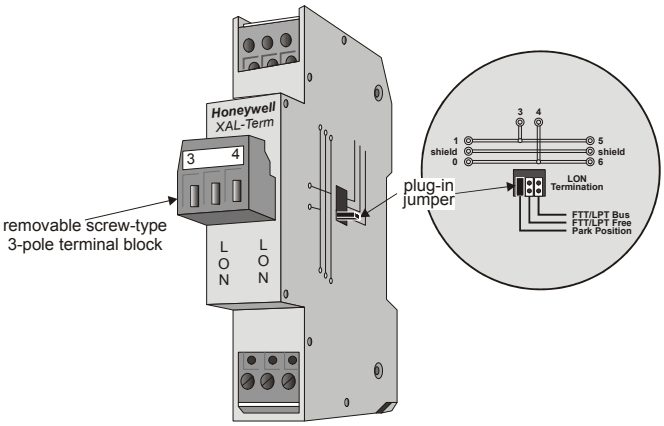

Fig. 14. LONWORKS connection and termination module

BINARY INPUT AND OUTPUTS

Wiring

When wiring the two binary outputs and the binary input, use a min. size of 20 AWG (0.5 mm^2) and a maximum of 14 AWG (2.5 mm^2). The max. length of all cables is 400 m.

Two wires with a total thickness of 14 AWG can be twisted together and connected using a wire nut (include a pigtail with this wire group and attach the pigtail to the individual terminal block). Deviations from this rule can result in improper electrical contact. Local wiring codes may take precedence over this recommendation.

Binary Input

The Excel Web controller's binary input (a normally-open contact) is ***not*** galvanically isolated. It is suitable for connection with / signalling via 0...36 Vdc voltage or external resistor or dry contact.

Table 6. Binary input specifications

purpose assigned to binary input by user using CARE 7	voltage at binary input	resistance at binary contact (ext. resistor or dry contact)	info
high-level detection (i.e. detection that binary input has opened)	3.8 to 36 Vdc	> 10 kΩ or open input	voltage at open terminals = 5 V
low-level detection (i.e. detection that binary input has closed)	0 to 0.8 Vdc	< 400 kΩ or when binary input shorted	current from shorted terminals = 2 mA

The binary input is protected against miswiring. Specifically, it is protected against voltages of up to 29 Vac; when miswired, the Excel Web controller is unable to detect a valid input signal.

Binary Outputs

The Excel Web controller is equipped with two binary outputs.

Hardware Limits

- A min. current of 50 mA is required to ensure a reliable contact.
- The binary outputs are designed for a max. continuous current of 2 A.
- Switching voltage = 24 Vac ± 20%.

NOTE: If inductive components are to be connected to the binary outputs and if these binary outputs switch more often than once every two minutes, these components must be prevented from causing harmful interference to radio or television reception (conformance with EN 45014).

ENGINEERING, COMMISSIONING

Please refer also to CARE 7 User Guide (Product Literature No.: EN2B-0182GE51) for more information.

Required Preparations

In order to access (with a laptop or PC) the Excel Web via Ethernet/IP for the first time, you may employ any one of the following three options:

Option 1: USB (recommended)

This USB interface is the recommended interface for downloading applications and firmware via CARE 7. The following USB host networking adapter has been approved: BELKIN DIRECT CONNECT (BELKIN order no.: F5U104 or F5U104G at www.belkin.com).

For access via USB, the Excel Web has a permanent default IP address 192.168.252.20 and Network Mask 255.255.255.0. Your PC's IP address must match the Excel Web controller's default IP address subnet: We recommend using 192.168.252.21 and Network Mask 255.255.255.0.

Option 2: Dedicated Ethernet Interface

For access via Ethernet, the Excel Web has a permanent default IP address 192.168.253.20 and Network Mask 255.255.255.0. Your PC's IP address must match the Excel Web controller's default IP address subnet: We recommend using 192.168.253.21 and Network Mask 255.255.255.0.

If the laptop or PC with which you wish to access the Excel Web via Ethernet/IP is not already equipped with an integrated Ethernet Card, or if you want to leave the IP settings of the integrated network card unchanged, buy and install (into your laptop or PC) an external Ethernet network card, e.g. Devolo MicroLink LAN USB Network Adapter (typical retail price: €30).

Option 3: Standard Ethernet Interface

For access via Ethernet, the Excel Web has a permanent default IP address 192.168.253.20 and Network Mask 255.255.255.0. Your PC's IP address must match the Excel Web controller's default IP address subnet: We recommend using 192.168.253.21 and Network Mask 255.255.255.0.

Change the (factory-set) configuration of the integrated Ethernet card so as to match the Excel Web IP address and IP subnet.

When using this default address, you must ensure that you have only one powered-up Excel Web controller on your Ethernet; otherwise, communication will fail because all Excel Web controllers have the same permanent default IP address. Alternatively, you can use an Ethernet cross-over cable between your PC and the Excel Web controller rather than having your PC and the Excel Web controller both connected to a LAN. In any case, your PC's IP address must match the Excel Web controller's default IP address subnet. We recommend using 192.168.253.21 and Network Mask 255.255.255.0.

NOTE: In order to (subsequently) operate on your standard Ethernet network (again), you will have to change the configuration back to the previous settings.

Engineering, Downloading, and Commissioning Procedure

1. The user must first create (on a Windows-compatible platform, using CARE 7) the application data for the Excel Web controller. Before downloading the application, it can be tested using the simulator (called "LIVE CARE OFFLINE").

2. The user then downloads (from the Windows-compatible platform) the application data (created in step 1) into the Excel Web controller (typically via the USB interface). After the very first set-up, the Excel Web controller gets the final IP address which you assigned offline during the engineering process using CARE. You can use this final IP address for further application / firmware downloads provided all of the Excel Web controllers are powered up.

3. Typically, testing and debugging (using the LIVE CARE functionality of CARE 7) is then performed (in a simulated environment, i.e. with the Excel Web controller connected to a test board).

4. The Excel Web is then physically installed in the wall, wiring cabinet, etc. In the course of doing this, the Excel Web controller's terminal blocks are wired and the corresponding RJ45 jacks are inserted into its LONWORKS interface and the Ethernet interface. If desired (i.e. if the Excel Web controller is to later communicate by modem, too), the corresponding jack can be inserted into the corresponding RS232C interface (namely: Port 3).

5. The user must now commission the Excel Web and the field devices to which it is connected via LONWORKS (i.e. their NV's must be bound and configured). This is performed with the same platform hosting CARE 7 as in step 3, via any LONWORKS access (e.g. terminals 5+6 and 11+12 or via the RJ45 LONWORKS jack).

6. Typically, the user again tests and debugs the Excel Web controller – this time in its actual working environment. Testing and debugging is again performed using the LIVE CARE functionality of CARE 7. Optionally, testing can be performed using an Internet browser on a laptop or PC with 800x600 resolution or higher. The tester/debugger can now perform audio-visual checking to see if the field devices are responding as predicted/desired.

7. Engineering, installation, and commissioning are now complete. The corresponding jack can now be removed from the USB port. The Excel Web controller begins operation.

Protocolling

In the context of the Excel Web controller, "protocolling" means creating a log of the values or states of the data-points **which have been assigned to this particular Excel Web controller**. Using the browser interface, the user must place the corresponding data-points into "trend." If, at some later point in time, i.e. after lengthy operation, a protocol of the Excel Web controller's history is desired, the corresponding trend data can be generated, viewed, and downloaded (in CSV format) via the browser interface. For the storage of larger amounts of trend data (more than 64,000 trend entries – corresponding to approx. 2 MB), a CF card (see section "CF Port LED, Request Button, and Slot") can be used.

Updating Firmware

If, at some later point in time, i.e. after the release of a new version of the firmware, the user wishes to download the new firmware into the Excel Web, this can be done using CARE 7 (via either USB or Ethernet) or using EBI (via Ethernet).

Honeywell

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