Honeywell

Excel 50
CONTROLLER

HONEYWELL EXCEL 5000 OPEN SYSTEM

INSTALLATION INSTRUCTIONS

EN1B-0101GE51 R0909G

CONTENTS

REVISION OVERVIEW

On the following pages, changes have been made compared to the previous release of this document:

Page:	**Change:**
39	Deletion of APPENDIX 1: Smoke Control.

GENERAL

- When performing any work (installation, mounting, start-up), all instructions given by the manufacturer and in particular the safety instructions provided in these Installation Instructions are to be observed.
- The Excel 50 Controller may be installed and mounted only by authorized and trained personnel.
- If the unit is modified in any way, except by the manufacturer, all warranties concerning operation and safety are invalidated.
- Make sure that certain local standards and regulations are observed at all times. Examples of such regulations are VDE 0800 and VDE 0100.
- Use only accessory equipment coming from or approved by Honeywell.
- Before the system is dismantled, disconnect the power supply. Do this by removing the terminal block or by installing an additional 3rd-party switch onto the DIN rail close to the controller; see the following caution and note.

NOTE: The Excel 50 Controller has Pollution Degree 2, making it suitable for use in residential controls, commercial controls, in a clean environment, or non-safety controls for installation on or in appliances.

Safety Instructions

⚠ CAUTION

Disconnect the power supply before you start to install the Excel 50 Controller. Do not reconnect the power supply until you have completed installation.

IMPORTANT

To comply with CE requirements, devices with a voltage in the range of 50 to 1000 Vac or 75 to 1500 Vdc which are not provided with a supply cord and a plug or with other means for disconnection from the supply having a contact separation of at least 3 mm in all poles, must have the means for disconnection incorporated in the fixed wiring.

NOTE: To comply with CE requirements, the device should always be powered up using a Honeywell ETR2 or Honeywell-approved third-party transformer.

⚠ CAUTION

Disconnect the power supply before removing or plugging in the application module.

Hardware Overview

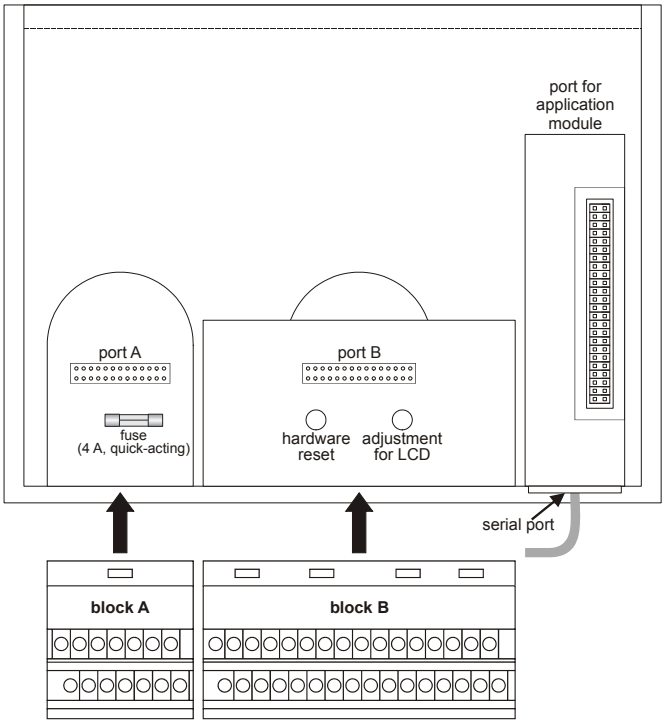


Fig. 1. Excel 50 Controller housing (rear view)

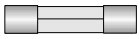


Fig. 2. Fuse, 4 A quick-acting (behind Terminal Block A)

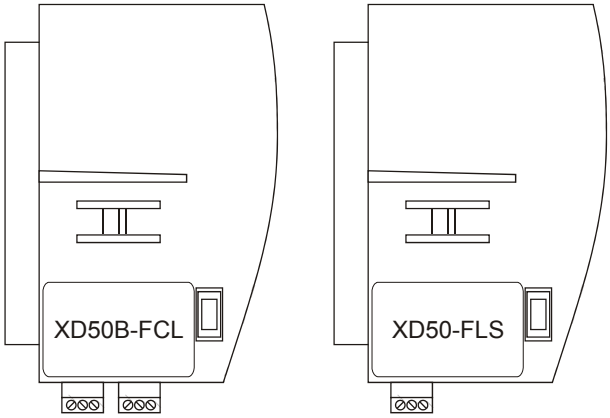


Fig. 3. Application modules (examples)

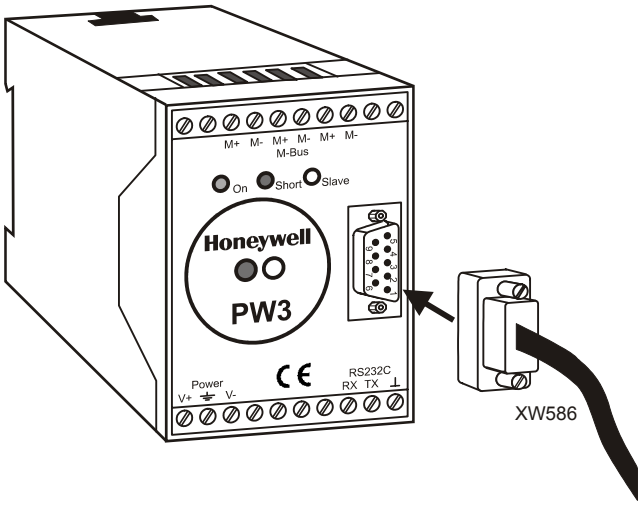


Fig. 4. Meter-Bus adapter

NOTE: The PW3 (or PW20) M-Bus adapter and XW586 M-Bus adapter cable are optional accessories which must be ordered separately.

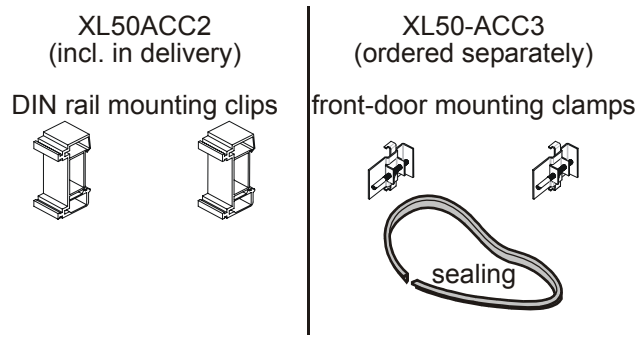


Fig. 5. Mounting accessories

Version Overview

Housing:
With Man-Machine-Interface (MMI)
Without MMI

Application Modules:
See Table 22.

Mounting:
In cut-out of front door (requires ordering XL50-ACC3)
Inside cabinet, front facing DIN rail

Terminals:
Screw terminal blocks A + B (XS50, incl. in delivery)

Dimensions

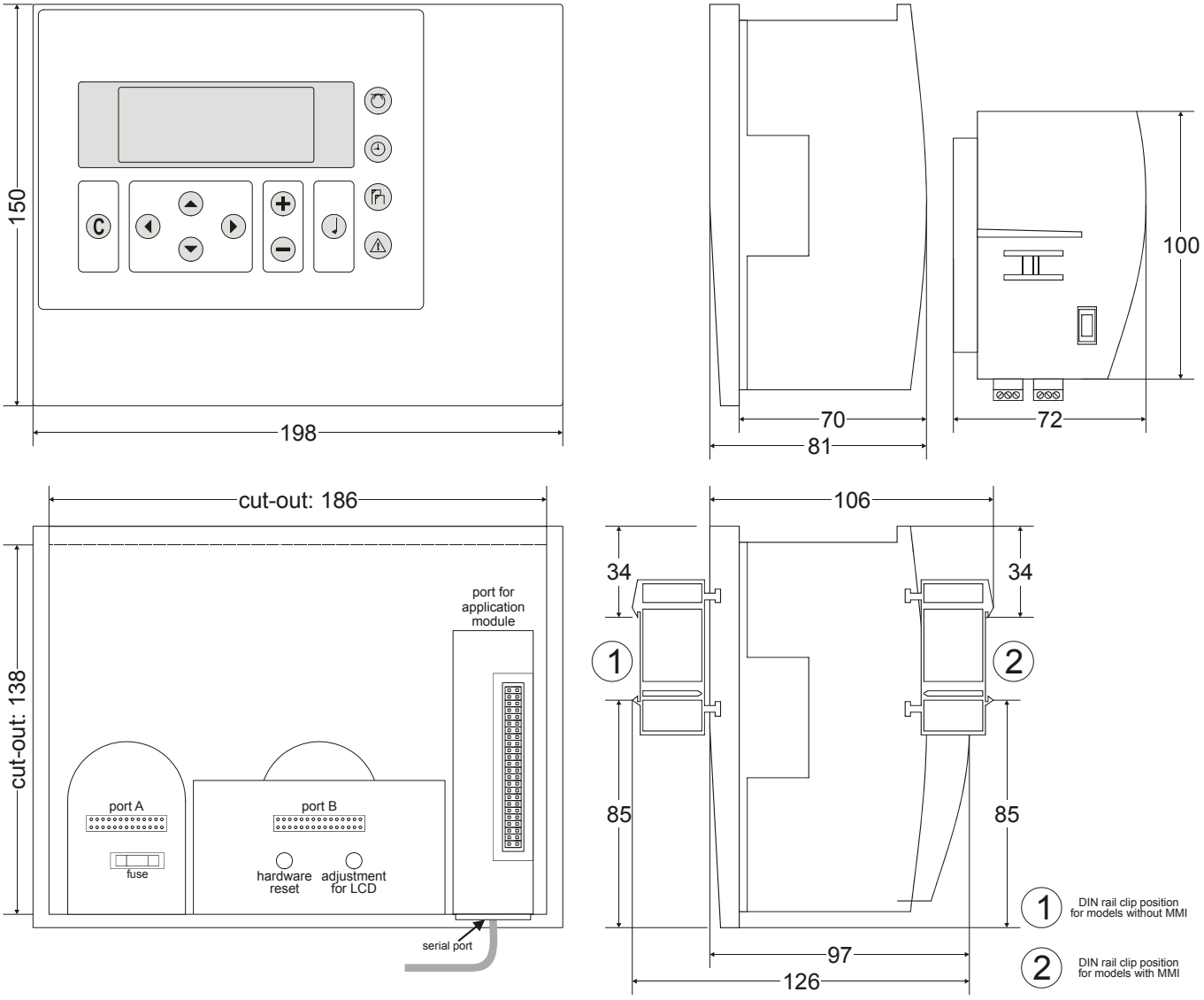


Fig. 6. Dimensions

MOUNTING

With MMI

Controllers with an MMI can be mounted either

- in the cut-out of the front door of a cabinet (the corresponding mounting kit consisting of a rubber sealing ring and front door mounting clamps is not part of the delivery and must be ordered separately; order no.: XL50-ACC3) or
- inside the cabinet on a DIN rail with the back facing towards the DIN rail (the set of DIN rail mounting clips is included in delivery; order no.: XL50ACC2.)

Without MMI

Controllers without an MMI are mounted inside the cabinet on a DIN rail with the front facing towards the DIN rail (the set of DIN rail mounting clips is included in delivery; order no.: XL50ACC2.)

Table 1. Mounting versions

version	mounting	accessory
with MMI	in cut-out of front door	XL50-ACC3 (not. incl.)
with MMI	on DIN rail in cabinet	XL50ACC2 (incl.)
without MMI	on DIN rail in cabinet	XL50ACC2 (incl.)

Front Door Mounting (with MMI)

1. Choose the position of the controller in the front door. Observe the min. and max. distances to other devices in the front door.
2. Cut a rectangle measuring 7-21/64 in. x 5-7/16 in. (186 mm x 138 mm) out of the front door (standard DIN cutout).

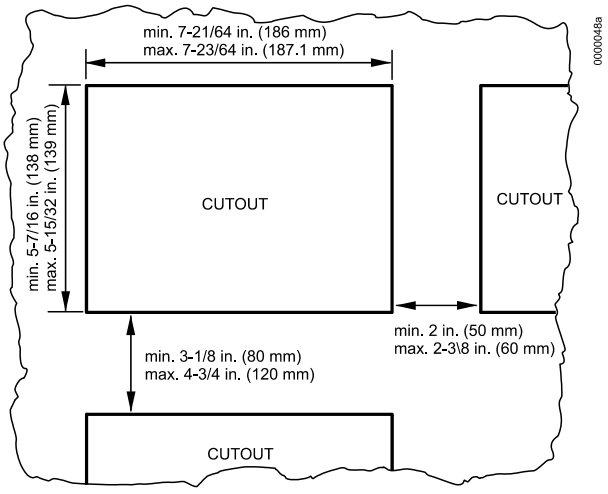


Fig. 7. Front door cutout dimensions

3. Insert the rubber sealing ring into the gap around the front plate of the Excel 50 Controller.

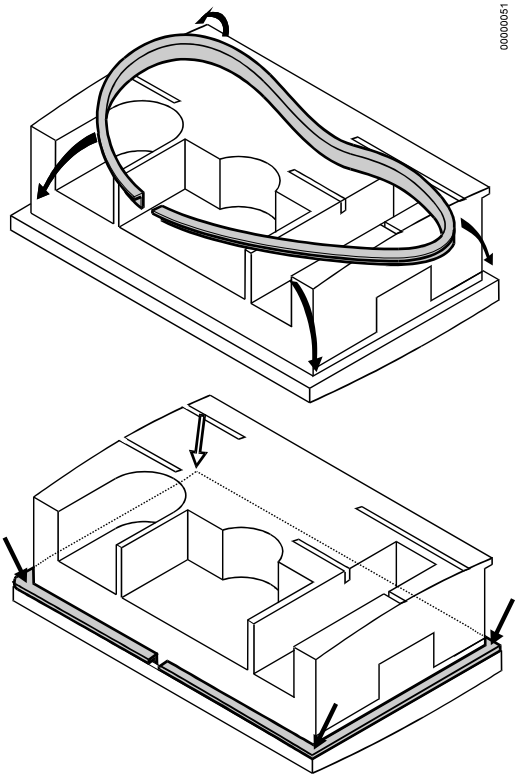


Fig. 8. Inserting sealing ring

4. Insert the controller into the cutout in the front door.

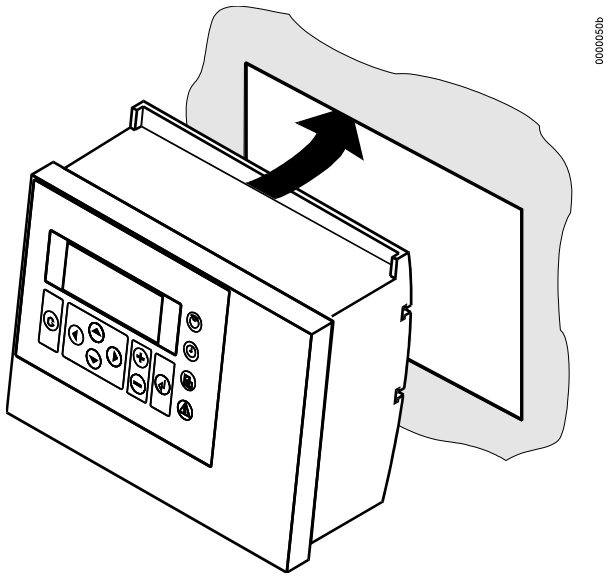


Fig. 9. Inserting controller in front door cutout

5. Attach Front Door Mounting clamps on both sides of the controller and tighten the screws with a screwdriver as shown in Fig. 10.

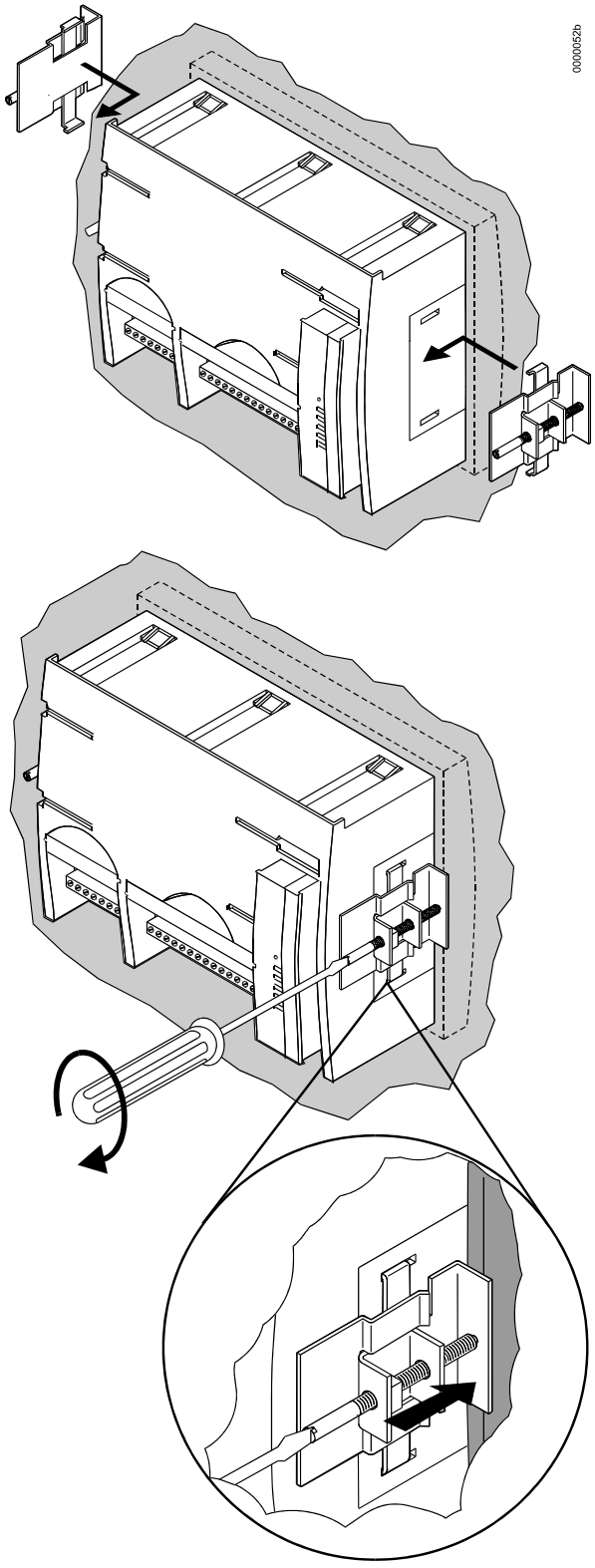


Fig. 10. Fixing controller with front door mounting clamps

Inside Cabinet Mounting (without MMI)

1. Break plastic tabs covering the slots on the controller for the DIN rail mounting clips using a screwdriver.
2. Attach the DIN rail mounting clips to the housing as shown in Fig. 11.
3. Mount the controller on the DIN rail as shown in Fig. 11.

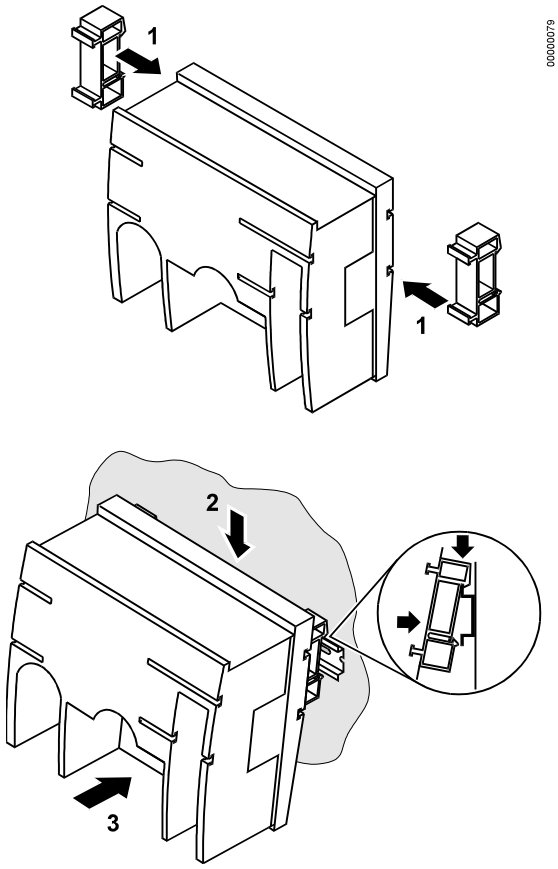


Fig. 11. Cabinet mounting without MMI

Inside Cabinet Mounting (with MMI)

The screw terminal blocks and the switch for the bus termination cannot be accessed after the controller with MMI is mounted on the DIN rail.

Although the bus terminal socket can still be plugged in and unplugged, it is easier to do the complete installation before mounting the controller on the DIN rail:

1. Plug in the application module as shown in Fig. 12.
2. Read the complete chapter "Installation" carefully.
3. Follow the instructions in section "Screw Terminal Block Installation Procedure".
4. *Optional:* Connect the C-Bus to the application module as described in section "C-Bus Connection Procedure" and/or connect the application module serial port to the Meter-Bus adapter as described in section “Meter-Bus Connection Procedure”.
5. Break plastic tabs covering the slots on the controller for the DIN rail mounting clips using a screwdriver.
6. Attach the DIN rail mounting clips at the housing as shown in Fig. 13.
7. Mount the controller on the DIN rail.

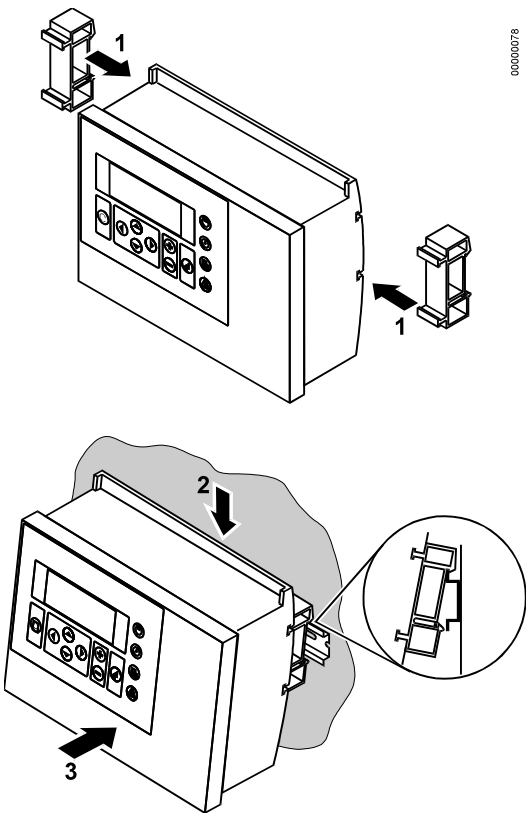


Fig. 12. Cabinet mounting with MMI

Application Module

⚠ CAUTION

Always insert the application module **before** connecting the power supply.

⚠ CAUTION

Always disconnect the power supply **before** unplugging the application module.

— Plug in the application module until it snaps into the controller housing.

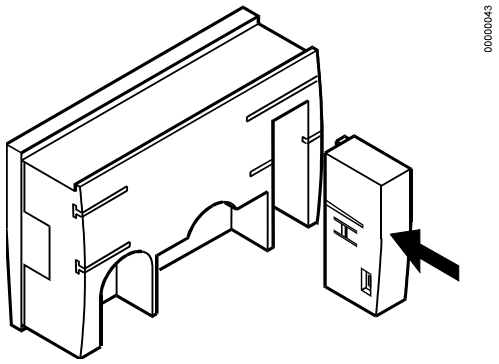


Fig. 13. Inserting application module

NOTE: If the application module has been replaced or removed and re-inserted, please push the reset button (behind I/O terminals) after power on.

ELECTRICAL CONNECTIONS

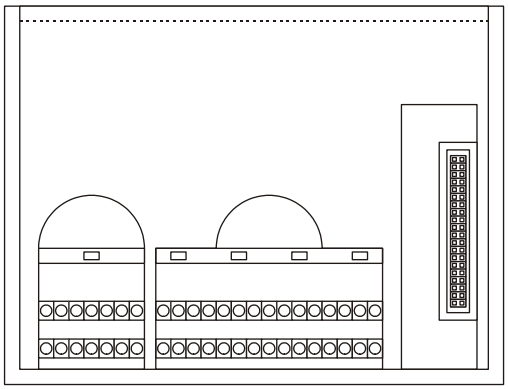
When connecting the controller, both VDE, National Electric Code NEC (or equivalent) and any local regulations concerning grounding and zero voltage must be observed.

Electrical work should be carried out by a qualified electrician.

The electrical connections must be made at the terminal blocks. Maximum torque for fastening the wiring terminal screws is 0.5 Nm (4.5 lb-in).

Direct wiring of the Excel 50 is performed using screw terminal blocks included in the delivery. For proper installation, follow these instructions. Read all of section "Electrical Connections" carefully.

SCREW TERMINAL BLOCKS



BLOCK A BLOCK B

Fig. 14. Wiring options

The two screw terminal blocks A and B (order no.: XS50) are attached directly to the controller housing.

Table 2. Terminal blocks

name	code	no. of terminals
screw terminal block	XS50 Block A	14
	XS50 Block B	34

Terminal Details

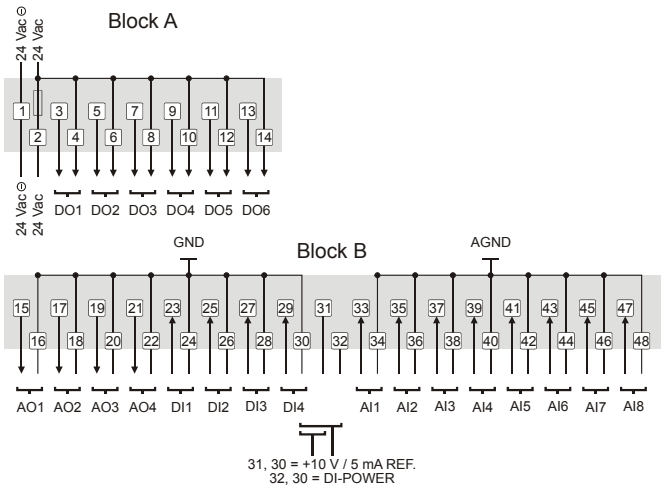


Fig. 15. Screw Terminal Blocks A and B

NOTE: The output (18...30 Vdc) of terminal 32 in screw terminal block B is not stabilized. If you wish to connect terminal 32 to a digital input via a potential-free relay, see Fig. 24 on page 20.

Cabling

Cable Routing

All signal (input/output, low voltage) cables are communication circuits in accordance with VDE 0100, VDE 0800 and local regulations and should therefore be routed separately from line voltage. All circuits are power-limited.

Table 3. Min. distances to line voltage

cable type	min. distance
unshielded cable	4 in. (100 mm)
shielded cable	3/8 in. (10 mm)

IMPORTANT

Avoid joining sensor cables.

Shielding

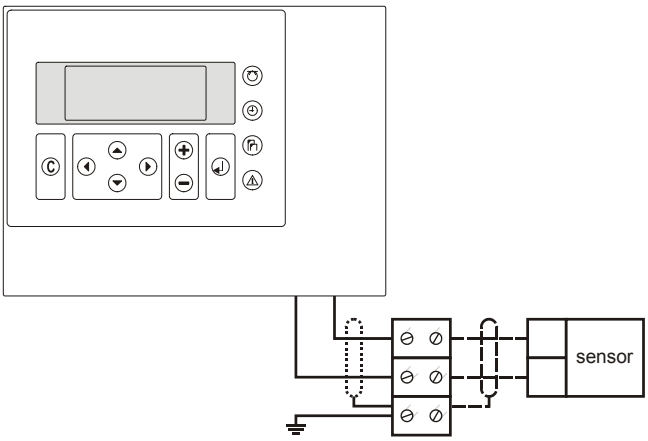


Fig. 16. Sensor shielding

Shielding of sensor and actuator cables with low protective voltages is not necessary if the general guidelines on cable routing are observed (see section "Cable Routing", page 13). If these guidelines cannot be observed, shielded cable must always be used. The shielded cable must be grounded as shown in Fig. 16.

IMPORTANT

Shielding of I/O cables that are connected to peripherals such as sensors and actuators must be grounded at the control cabinet side, only; this is in order to avoid ground loops.

All Honeywell actuators are RFI suppressed in accordance with VDE 0871/B and VDE 0875/N.

Lightning Protection

Please check with your local Honeywell representative for information on lightning protection.

NOTE: Use Honeywell surge protectors or Honeywell-approved third-party surge protectors.

Cable Lengths and Cross Sectional Areas

Table 4. Signal types and cross-sectional areas

type of signal	cross-sectional area		
	≤ 300 ft (100 m)	**≤ 550 ft (170 m)**	**≤ 1,300 ft (400 m)**
Power supply (24 Vac)	≤ 16 AWG (≥ 1.5 mm^2)	≤ 14 AWG (≥ 2.5 mm^2)	-
Low-current signals*	≤ 20 AWG (≥ 0.5 mm^2)		
*E.g. for 0...10 V sensors, totalizers, digital inputs, 0...10 V signals for actuators.			

IMPORTANT

The max. length of a signal cable with 24 Vac supply is 550 ft (170 m). The max. length of a two-wire, 0...10 Vdc signal cable is 1,300 ft (400 m). The secondary side of the transformer must not be connected to earth ground.

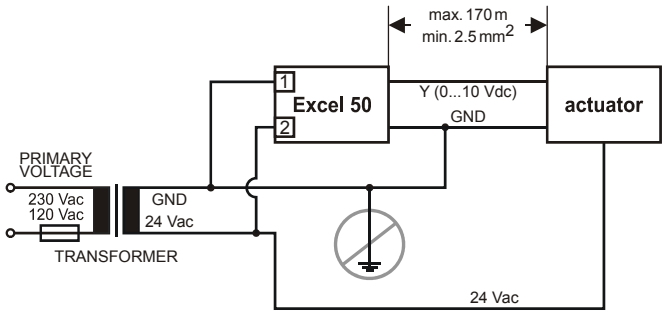


Fig. 17. Power for Excel 50 with 24 V actuator (single transformer)

If the distance between the controller and actuator or sensor with 24 Vac supply is greater than 550 ft (170 m), a separate external transformer for the actuator or sensor is necessary.

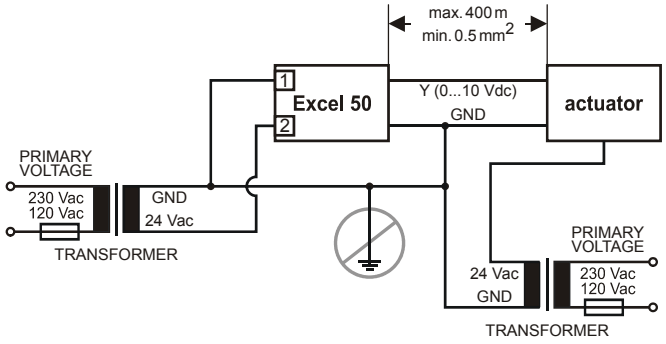


Fig. 18. Power for Excel 50 with 24 V actuator (separate transformers)

IMPORTANT

We recommend installing a fuse on the secondary side of the transformer in order to protect the devices against miswiring.

Analog Inputs

Technical Description

The analog inputs convert data from passive sensors and active sensors with voltage output. The analog inputs can be used as current inputs for active sensors, but then an external resistor parallel to the sensor is necessary. It is also possible to feed digital signals to the analog inputs (see also section "Sensors and Transducers" on page 18).

Technical Specification

Number: Eight analog inputs

Types of input signals:

NTC 20 kΩ

0 to +10 V (max. +11 V)

0 (4) to 20 mA (with an external resistor of 499 Ω ±0.25% [see Fig. 19])

Each input is switched automatically via software either as input for NTC 20 kΩ (low impedance) or voltage source 0...+10V (max. +11 V, high impedance).

NTC 20kΩ: Range = -58 … +302 °F (-50 … +150 °C)

Voltage source: Range = 0...10 V

IMPORTANT

The analog inputs are protected against short circuit and overvoltage up to 24 Vac and 40 Vdc. If any input is sourced with more than 40 Vdc or negative voltage, the other inputs will be influenced. This could result in wrong values.

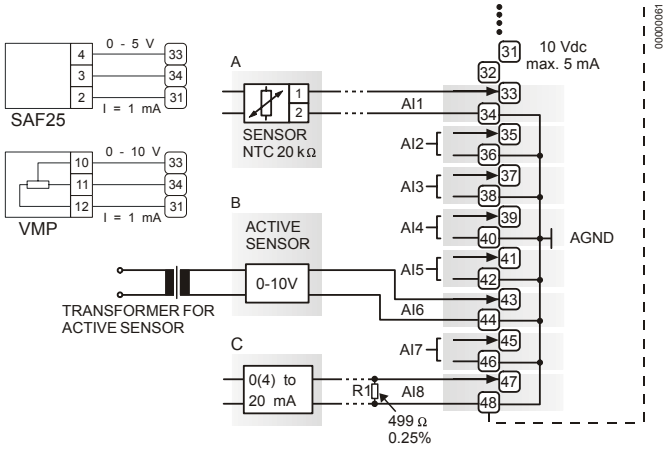


Fig. 19. Analog inputs, sensor connections

Analog Inputs Used as Digital Inputs (O.S. 2.03.xx or lower)

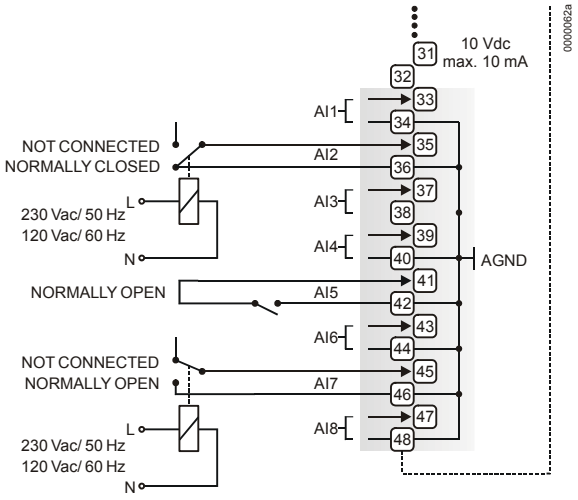


Fig. 20. Analog inputs used as digital inputs

For normally-open contacts, a digital signal must be switched via the changeover contact of an additional relay.

Unconnected analog inputs have a default voltage of 8.5 V. This is interpreted by the controller as a logical 1. This means that, in general, no external relay is needed for normally-open contacts.

IMPORTANT

The relay contact must be suitable for switching low voltage. In the case of long cable distances, the analog input signal may be sensitive to interference. In this case, an external relay may also be used for normally-closed contacts.

Analog Inputs Used as Digital Inputs (O.S. 2.04.xx or higher)

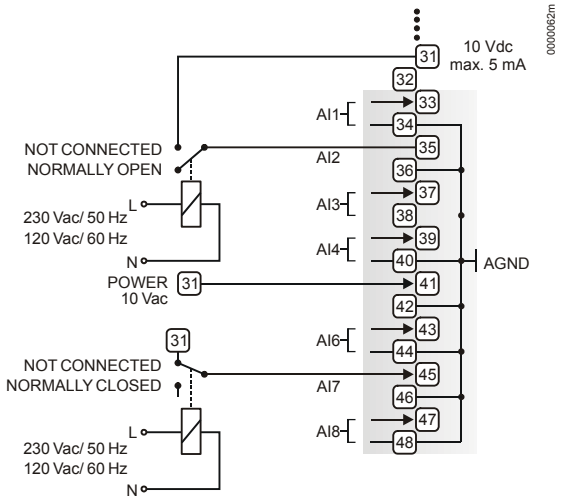


Fig. 21. Analog inputs used as digital inputs

Unconnected inputs have a default voltage of 0 V.

Table 5. Accuracy of analog inputs with NTC sensors

range	deviation / ± Kelvin (without sensor tolerance) NTC (20 kΩ)
-58...-40°F (-50...-40°C)	≤ 5.5 K
-40...-22°F (-40...-30°C)	≤ 3.0 K
-32...-4°F (-30...-20°C)	≤ 1.8 K
-4...14°F (-20...-10°C)	≤ 1.1 K
14...32°F (-10...0°C)	≤ 0.8 K
32...50°F (0...10°C)	≤ 0.6 K
50...122°F (10...50°C)	≤ 0.4 K
122...158°F (50...70°C)	≤ 0.6 K
158...194°F (70...90°C)	≤ 1.0 K
194...212°F (90...100°C)	≤ 1.5 K
212...248°F (100...120°C)	≤ 2.4 K
248...302°F (120…150°C)	≤ 5.3 K

Pull-Up Resistor Handling

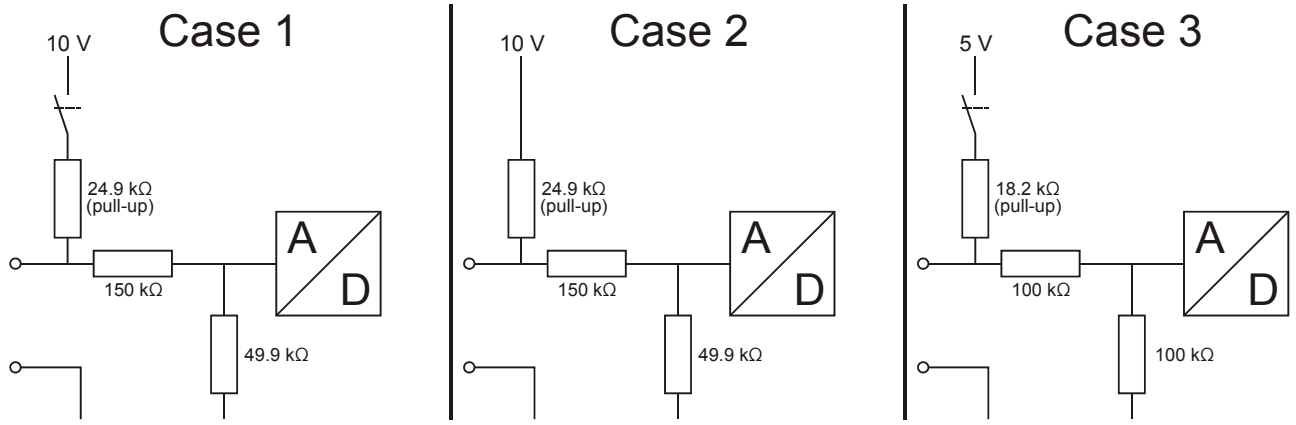


Fig. 22. Input circuit diagram

Table 6. Pull-up resistor handling

device	pull-up						input circuit diagram (Fig. 22)	load-free voltage	
	voltage	hardware	de-activated by @[8]	configured by DIP switch	configured by plug-in	activated for DI on AI		with NTC or low-impedance input	for voltage input or high-impedance input
XF521, XF521A	10 V	fixed	NO	NO	NO	YES	case 2	8.89 V	8.89 V
XF526		fixed	NO			YES	case 2		8.89 V
XFL521, XFL521A/B		optional switch-off	YES[3]		YES	config.[6]	case 1		0 V
Smart I/O XFC	5 V		YES[4]	NO		YES[7]	case 3	5 V	
XL20	10 V	fixed	NO		NO	YES	case 2	8.89 V	8.89 V
XL25A / XL50A		optional switch-off	YES[2]			YES[5]	case 1		0 V
XL100, XL100A		fixed	NO			YES	case 2		8.89 V
XL100B		optional switch-off		YES		configurable	case 1		0 V
XL100C			YES[1]	NO		YES[5]			

[1] controller firmware ≥ 2.03;
[2] controller firmware ≥ 2.02;
[3] controller firmware ≥ 2.03 (local/shared mode), CARE ≥ 5.00.01 (open mode);
[4] CARE ≥ 5.00.01;
[5] controller firmware < 2.04;
[6] controller firmware < 2.04 (local/shared mode), CARE ≥ 5.01.xx (open mode);
[7] CARE ≥ 5.01.xx;
[8] Assigning "@" as first digit of input characteristic name (e.g.: "@0-10V") in CARE text editor disables the pull-up resistor.

Sensors and Transducers

Table 7. Sensors suitable for use with Excel 50 (external transducer not required)

sensor type	range	characteristic in controller (set using CARE)
AF20 Outside Air Temperature Sensor	-20…+30° C	NTC
VF20A Strap-On Temperature Sensor	0…+110° C	
KTF20 Boiler Temperature Sensor	0…+100° C	
LF20 Duct Temperature Sensor	-30…+100° C	
AQS51 or C7110C1001 CO_2 Sensor	0...2000 ppm CO_2	0…10 V = 0..2000 ppm
C7110A1005 Air Quality (Mixed Gas) Sensor	0…100%	0…10 V = 0…100%
T7560C1006 Combined Room Temp. / Humidity Sensor or H7012B1023 Room Humidity Sensor	6…40°C	NTC
	20...95% relative humidity	0..10 V = 0...100%

Table 8. Room Temperature Sensors suitable for use with Excel 50 (external transducer not required)

sensor type	range	characteristic in controller (set using CARE)
T7460A1001 Room Temperature Sensor	6...40°C	NTC
	setpoint wheel	linear input
T7460B1009 Room Temperature Sensor	6...40°C	NTC
	setpoint wheel	linear input
TF22 Room Temperature Sensor	6…40°C	NTC
	setpoint wheel	linear input
	operating knob	-
T7460C1007 Room Temperature Sensor	6...40°C	NTC
	setpoint wheel	linear input
	occupancy button*	-
T7460E1002 Room Temperature Sensor	6...40°C	NTC
	setpoint wheel	linear input
	occupancy button*	-
	fan speed, 3 stages	
T7460F1000 Room Temperature Sensor	6...40°C	NTC
	setpoint wheel	linear input
	occupancy button*	-
	fan speed, 5 stages	
T7460A1000 Room Temperature Sensor	6...40°C	NTC
	setpoint wheel	linear input
	occupancy button*	-
	fan speed, 5 stages	
T7460C1006 Combined Room Temperature / Humidity Sensor	6…40°C	NTC
	20...95% r.h.	0..10 V = 0…100%
C7110D1009 Combined Room Temperature / Humidity Sensor	6..40°C	NTC
	0...2000 ppm CO_2	0..10 V = 0…2000 ppm
	setpoint wheel	linear input
	occupancy button*	-
T7560B1008 Combined Room Temperature / Humidity Sensor	6...40°C	NTC
	20...95% r.h.	0...10 V = 0...100%
	setpoint wheel	linear input
	occupancy button*	-
	fan speed, 5 stages	
*supported in AH03		

Table 9. Humidity Sensor suitable for use with Excel 50 (external transducer not required)

sensor type	characteristic in controller (set using CARE)	additional remarks
H7015B1020 Duct Humidity Sensor H7508A1042 Outside Humidity Sensor	0..10 V = 0...100%	set jumper to 0...10 V

Table 10. Flue Gas Sensors suitable for use with Excel 50 (external transducer required)

sensor type	characteristic in controller (set using CARE)	additional remarks
AGF1	0...10 V = 0…400 °C	requires LC-MV-1xPT1000.0-400°C: converts PT1000 to 0…10 V: order from: www.rinck-electronic.de

Table 11. Differential (+ Static Duct) Pressure Sensor suitable for use with Excel 50 (no external transducer required)

sensor type	range	characteristic in controller (set using CARE)	additional remarks
DPT500 Differential (+ Static Duct) Pressure Sensor	0...500 Pa	0..10 V = 0...500 Pa	set jumper to 0...500 Pa
	0... 1000 Pa	0..10 V = 0...1000 Pa	set jumper to 0...1000 Pa

Table 12. Differential Pipe Pressure Sensors suitable for use with Excel 50 (external transducer not required)

sensor type	range	characteristic in controller (set using CARE)	additional remarks
FHBN 3+ED1	0 – 2.5 bar	0...10 V = 0...250 kPa	ED1 is an integrated transducer with 0…10 V output
FHBN 5 +ED1	0 – 5 bar	0...10 V = 0...500 kPa	
FHBN 10 +ED1	0 – 10 bar	0...10 V = 0...1000 kPa	

Digital Inputs

Technical Description

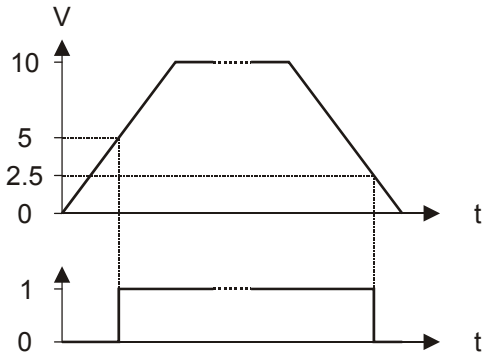


Fig. 23. Input switching voltages

The digital input signals can be DC voltage signals. If an input voltage is higher than 5 V, the digital signal switches to logic "1" status. With a hysteresis of 2.5 V, the input signal must fall below 2.5 V before the digital status switches to logic "0".

Three out of four digital inputs can be used as totalizers.

With V2.04.00 and higher firmware, the online point attribute "Normally Open / Normally Closed" (NO/NC) defines the relation between the physical state (open/closed) and its logical status. See Table 13.

Technical Specification

Number: 4 digital inputs

Type of signals: DC signal (max. 24 Vdc)

Input resistance: 10k Ω

IMPORTANT

The digital inputs are protected against short circuit and overvoltage up to 24 Vac and 40 Vdc.

Parameter Requirements:

If the digital inputs are used for normal digital or analog signals, the signals must meet the static and dynamic requirements stated in Table 13 and Table 14.

If three out of four digital inputs are used as totalizers, the signals at the totalizer inputs must fulfill the static and dynamic requirements stated in Table 13 and Table 15 while the signal at the fourth input must meet only the static requirements of Table 13.

Table 13. Static parameters of digital inputs

contact position	NO/NC attribute	logical status	input voltage
open	NO	0	≤ 2.5 V
closed	NO	1	≥ 5 V
open	NC	1	≤ 2.5 V
closed	NC	0	≥ 5 V

Table 14. Dynamic parameters of digital inputs

frequency	pulse duration	pause interval	bounce time
max. 0.4 Hz	min. 1.25 s	min. 1.25 s	max. 50 ms

Table 15. Dynamic parameters of totalizers

frequency	pulse duration	pause interval	bounce time
max. 15 Hz	min. 20 ms	min. 30 ms	max. 5 ms

Connection Examples

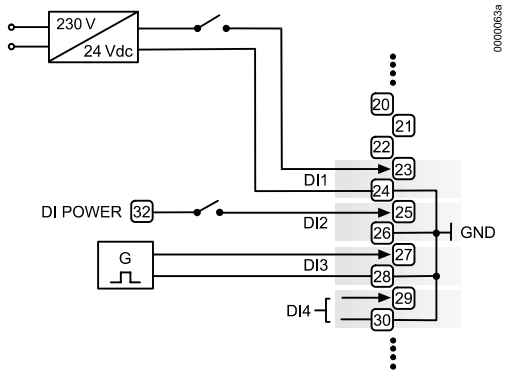


Fig. 24. Digital inputs, connection examples

Analog Outputs

Technical Description

Analog outputs can be used, for example, to operate valve or damper actuators. The characteristic curves for these actuators can be defined via MMI. These outputs are programmable.

Each analog output can also be used as a digital output.

Technical Specification

Number: Four analog outputs

Analog output details:

Table 16. Technical specifications of analog outputs

voltage	current	resolution	min. step	accuracy
0...10 V, max. 11 V	max. 1 mA	8-Bit	0.043 mV	±100 mV ±1 digit

Relay Modules

The relay modules facilitate the control of peripheral devices with high load via the analog outputs of the controller. The connection examples (for the relay modules MCD 3 and MCE 3) are shown here. These outputs are programmable.

IMPORTANT

The external supply of the relay modules must be 24 Vac, the same as of the supply of the controllers. The analog outputs are protected against overvoltage up to 24 Vac and 35 Vdc.

Supply:

Several relay modules can be connected in series via the bridged terminal pair:

24 Vac: Terminals 11/12 of the relay

24 Vac (-): Terminals 13 to 16 of the relay

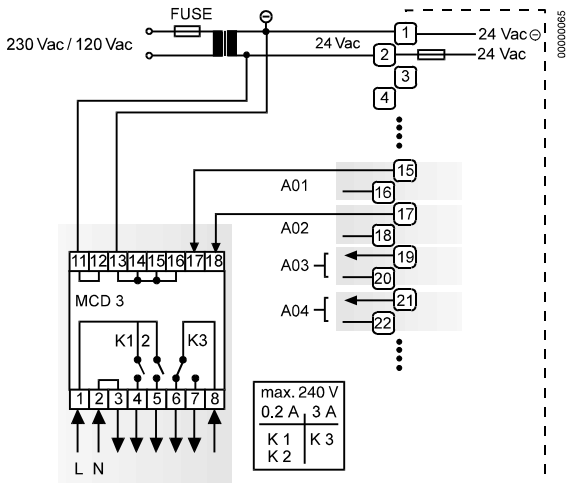


Fig. 25. Analog outputs, connection of relay MCD 3

MCD 3:

Relay terminal 17 controls the changeover contact K3.
Relay terminal 18 controls the ON contacts K1, K2.
Ground can be looped through terminals 2/3.

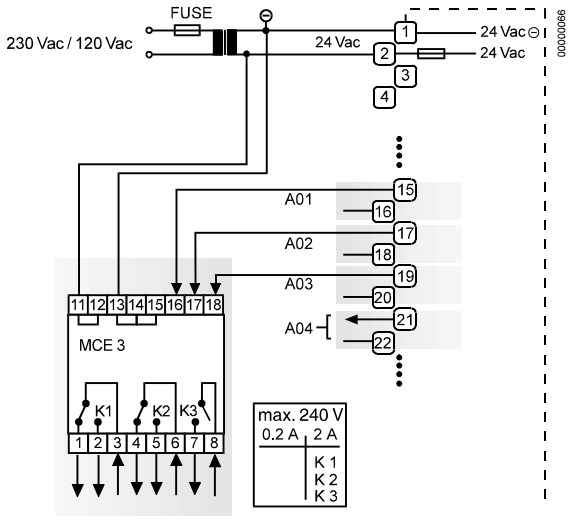


Fig. 26. Analog outputs, connection of relay MCE 3

MCE 3:

Relay terminal 16 controls the ON contact K3.
Relay terminal 17 controls the changeover contact K2.
Relay terminal 18 controls the changeover contact K1.

Digital Outputs

Technical Description

The digital outputs are switched by a triac that can be connected directly to an external relay. These outputs are programmable.

Technical Specification

Number: Six digital outputs

Output stages:

Low signal	0 V
High signal	24 Vac
Type	Close, only

Load:

Per output	min. 0.01 A
	max. 0.8 A
Total	max. 2.4 A
Cos φ	0.5 to 1

IMPORTANT

The digital outputs are protected against short circuit current via internal fuse, but they are not protected against overload. All digital outputs are protected via only a single fuse; if any digital output is short-circuited, the fuse will be blown and will interrupt the main power. In that case, the controller does not work. If the CPU is running into the WATCHDOG as a result of a software or hardware error, all digital outputs will be set to low signal, which means all digital outputs are inactive.

Beginning with V2.04.00 firmware, the online point attribute "Normally Open / Normally Closed" (NO/NC) defines the relation between the physical state (relay ON/OFF) and its logical status. See Table 17.

Table 17. Digital output parameters

relay ON/OFF	NO/NC attribute	logical status
ON	NO	1
OFF	NO	0
ON	NC	0
OFF	NC	1

Connection Examples

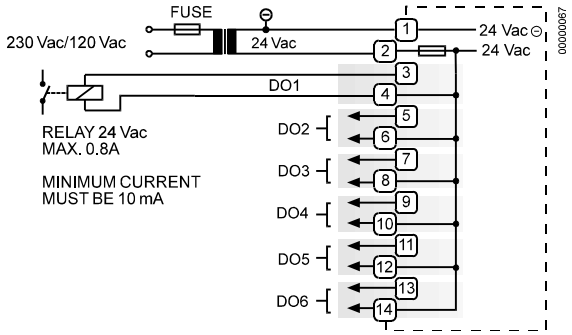


Fig. 27. Digital outputs, connection of relay

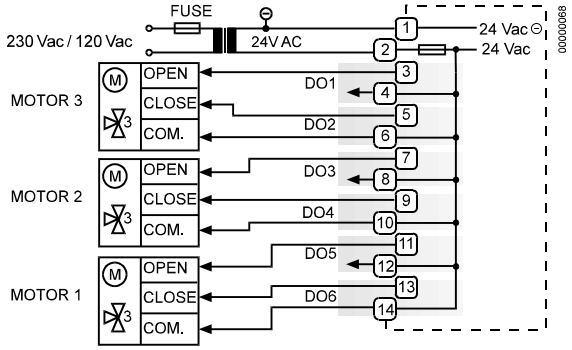


Fig. 28. Digital outputs, direct connection of 3-position actuators

Power Supply

The Excel 50 Controller is powered by an external transformer.

Transformer requirements for one Excel 50 Controller:

Voltage	24 Vac ±20%
Current	3 A, if fully equipped (6 DO's x 0.4 A)
	2 A, if current of DO's does not exceed 1.8 A
Power	72 VA, if fully equipped

The transformer, already installed in the cabinet, can be used to supply several controllers, communication devices or peripherals (actuators, etc.) if the transformer provides sufficient power.

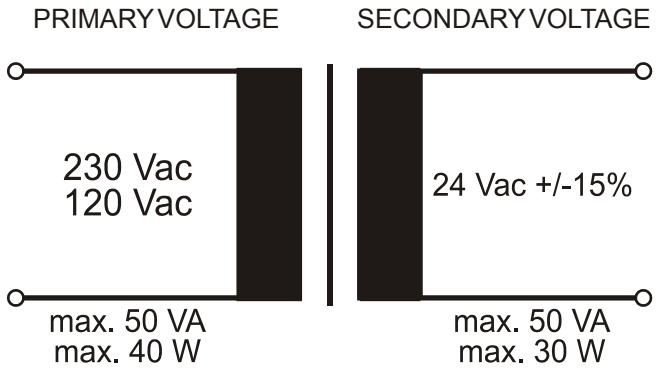


Fig. 29. Transformer example

CRT-Series

Table 18. No. of controllers connected to one transformer

transformer	Excel 50 controller
CRT 2	1 (1.8 A max.)
CRT 6	2
CRT 12	4

Use quick-acting backup fuse 10 A (or automatic H16 or L16) to protect the transformer primary side. On the primary side of the CRT 2, there is a fusible output of type M 0.315 A (T) 250 V for the purpose of fine fusing.

Table 19. 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

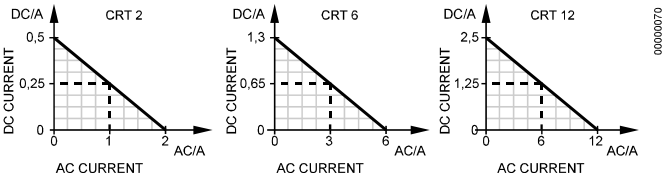


Fig. 30. AC/DC current graphs

1450 Series

Table 20. 1450 Series transformers

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

All transformers of the 1450 series are designed for 50/60 Hz AC and have insulated accessory outputs. The transformers include built-in fuses, line transient/surge protection and AC convenience outlets and meet NEC class 2 requirements.

Standard Transformers

Standard commercially available transformers must fulfill the following specifications:

Table 21. Requirements for standard transformers

output voltage	impedance	AC current
24.5 Vac to 25.5 Vac	≤ 1.15 Ω	max. 2 A
24.5 Vac to 25.5 Vac	≤ 0.40 Ω	max. 6 A
24.5 Vac to 25.5 Vac	≤ 0.17 Ω	max. 12 A

Screw Terminal Block Installation

1. Make sure that the power supply of the cabinet is disconnected.
2. Make sure that the power supply of the cabinet is disconnected and that the application module is plugged in the housing.
3. Choose the min. cross sectional areas for all cables to and from sensors, actuators, valves, relays, etc. you want to connect to the Excel 50 Controller from Table 4.
4. Connect sensors, transducers, etc. to the analog input terminals.

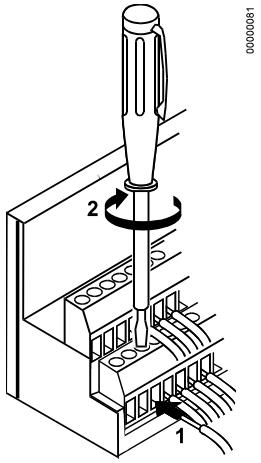


Fig. 31. Connecting a cable to a screw terminal

IMPORTANT

When installing a separate external transformer, do not connect the cabinet ground to the controller system ground.

5. If the distance between the controller and an actuator or sensor with 24 Vac supply is greater than 550 ft (170 m):

a) Choose a transformer from the transformers listed in section "

Power Supply".

b) Connect the chosen transformer directly to the actuator or sensor.

6. Connect sensors, transducers, etc. to the digital input terminals.

7. Connect valves, actuators, relays, etc. to the analog output terminals.

8. Connect relays, actuators etc. to the digital output terminals.

9. Select one of the transformers of the CRT series or 1450 series (Table 19 or Table 20) or use a commercially available standard transformer fulfilling the requirements in Table 21.

10. Make sure that the application module is plugged into the controller housing.

⚠ WARNING

High Voltage

Risk of death or electrical shock.

— Do not connect line power supply directly to the terminals.

— Insulate devices with 120 Vac / 230 Vac by a transformer.

IMPORTANT

The transformer feeding the Excel 50 Controller must be in the same cabinet. If field devices with DC load are used, when selecting the transformer, the max. DC current must be considered.

The secondary side of the transformer must not be connected to earth ground.

11. Connect the 24 Vac (-) on the secondary side of the transformer to terminal 1 on Screw Terminal block A.

12. Connect the 24 Vac on the secondary side of the transformer to terminal 2 on Screw Terminal block A.

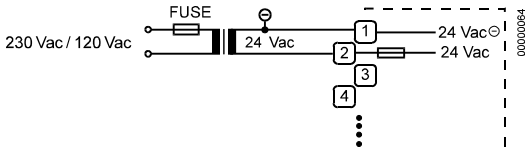


Fig. 32. Connecting the power supply

IMPORTANT

If there already are additional transformers, for example supplying actuators or active sensors:

— *Connect the 24 Vac (-) (secondary side) of the transformers together.*

13. Attach the terminal blocks to the housing as shown in Fig. 33.

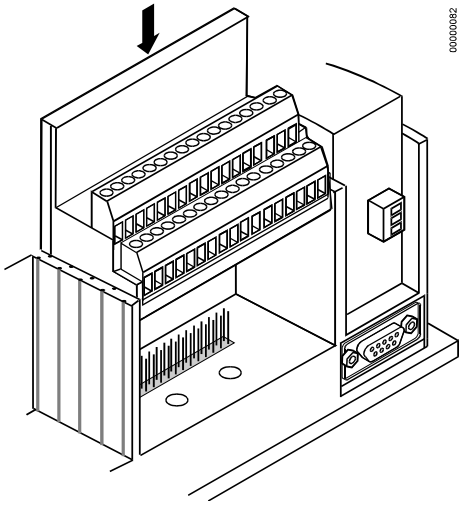


Fig. 33. Attaching of screw terminal blocks

Adjusting the MMI Display Contrast

Front Door Mounted with MMI

1. Unplug the screw terminal block B to Port B while the controller is connected to the power supply.
2. Adjust the display contrast with a slotted screwdriver or a cross-tip screwdriver.

IMPORTANT

Turn the display contrast potentiometer gently. Using excessive force may damage the potentiometer and disable the display.

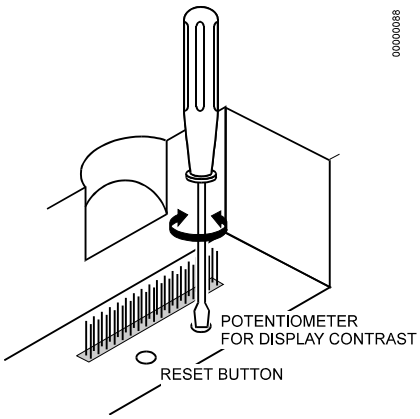


Fig. 34. Adjusting the display contrast

3. Attach screw terminal block B to Port B.

DIN Rail Mounted with MMI

1. Dismount the controller from the DIN rail.
2. Unplug the screw terminal block B to Port B while the controller is connected to the power supply.
3. Adjust the display contrast with a slotted screwdriver or a cross-tip screwdriver as shown in Fig. 34.

IMPORTANT

Turn the display contrast potentiometer gently. Using excessive force may damage the potentiometer and disable the display.

4. Attach screw terminal block B to Port B.
5. Mount the controller on the DIN rail again.

COMMUNICATION

The Excel 50 Controller can communicate with the Excel Building Supervisor (XBS/XBSi, and Enterprise Buildings Integrator) and other EXCEL 5000 devices via the C-Bus. The Excel 50 Controller also has the capability to communicate with devices on a LONWORKS network. A further communication option is connection to a Meter-Bus. All communications options are dependent upon the application module, and not all options are available on one module (see Table 22).

A modem/ISDN terminal adapter may be connected to Flash EPROM versions with V2.01.00 software or newer to allow remote communication with the controller.

Table 22. Application module versions

module	description
XD50B-F	Stand-alone; 2 MB Flash EPROM; 256 KB RAM; European and Chinese language support
XD50B-F-TW	Stand-alone; 2 MB Flash EPROM; 256 KB RAM; Taiwanese language support
XD50B-FC	Bus-wide access via C-Bus; 2 MB Flash EPROM; 256 KB RAM; European and Chinese language support
XD50B-FL	Bus-wide access via LONWORKS® Bus; 2 MB Flash EPROM; 256 KB RAM; European and Chinese language support
XD50B-FCL	Bus-wide access via C-Bus / LONWORKS® Bus; 2 MB Flash EPROM; 256 KB RAM; European and Chinese language support
XD50B-FL-TW	Bus-wide access via LONWORKS® Bus; 2 MB Flash EPROM; 256 KB RAM; Taiwanese language support
XD50B-FCL-TW	Bus-wide access via C-Bus / LONWORKS® Bus; 2 MB Flash EPROM; 256 KB RAM; Taiwanese language support
XD50-FCS	Bus-wide access via C-Bus / Meter-Bus; 1 MB Flash EPROM; 256 KB RAM
XD50-FLS	Bus-wide access via LONWORKS® / Meter-Bus; 2 MB Flash EPROM; 256 KB RAM

NOTE: Flash EPROM allows easy upgrading of the operating system by means of direct firmware download via serial port or C-Bus.

IMPORTANT

Electrostatic discharge can damage the application module. Always disconnect the power supply when plugging in and unplugging the application module.

C-Bus

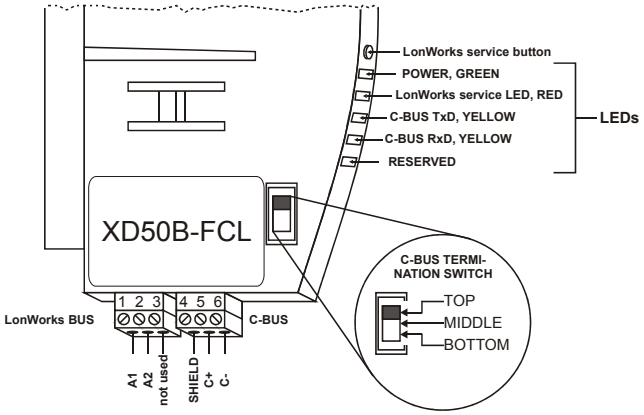


Fig. 35. C-Bus connection and LEDs (example)

Up to 30 controllers can communicate with one another and the Excel Building Supervisor PC (XBS) via the C-Bus.

Instead of an Excel 500/600 Controller, other C-Bus-compatible components can also be connected (Excel IRC Multicontroller; Excel EMC; Modem Device XM 100A).

C-Bus Termination

C-Bus-capable application modules are equipped with a DIP switch (see Fig. 35) for the C-Bus to set the bus termination appropriate for the communication speed.

Table 23. DIP switch settings for C-bus termination

DIP switch setting	communication speed (max.)	controller location	compatibility
up	9.6 Kbaud	-	XD505A, XL20XD
middle	76.8 Kbaud	middle of bus	XD508, XL20XD508
down	76.8 Kbaud	beginning or end of bus	XD508, XL20XD508

NOTE: Modules listed in "compatibility" column are used in Excel 20/100B/500/600 Controllers.

NOTE: The controllers with the termination must be switched ON prior to the controllers in the middle of the C-Bus. The C-Bus may not work if the controllers with termination are switched OFF.

Cable Specification

The max. cable length is 4,000 ft (1,200 m). There are regional differences as to whether shielded or unshielded cable must/can be used.

IMPORTANT

In Europe, only shielded cable is permitted while in the US, shielded or unshielded cable can be used.

Inside the cabinet: J-Y-(ST)Y 2 x 2 x 0.8

Outside the cabinet: A-Y-(ST) 2 x 2 x 0.8

In principle, data transmitting cables should be shielded in case of RFI.

Table 24 summarizes cable types and gives selection guidance. Note that baud rate and max. bus length are related to each other.

Table 24. C-Bus cable types

cable type	description	recommended for
J-Y-(ST)Y 2 x 2 x 0.8	shielded, twisted pair	Europe Inside cabinet
A-Y-(ST)Y 2 x 2 x 0.8	shielded, twisted pair	Europe Outside cabinet
AK 3702	unshielded, twisted pair	US not approved for Europe
AK 3740A	shielded	US (low-cost) not approved for Europe
Belden 9842	twisted pair	Europe US also possible
Belden 9841	shielded	US
AK 3702	unshielded, twisted pair	US not approved for Europe
AK 3740A	shielded	US (low-cost) not approved for Europe

Each end of the shield on the C-Bus should be connected to the shield terminal of the respective device. Do not connect it to the cabinet ground or any other ground points.

C-Bus Extension by Using Repeaters

The C-Bus length can be extended by using repeaters. Each repeater extends the bus length by 4,000 ft (1,200 m).

For the US the repeater is available either with or without housing. In Europe, only the version with housing is allowed.

Table 25. Order no. for repeaters

description	US order no.	European order no.
without housing	14507324-001	-
with housing	14507324-002	XD 509

C-Bus Connection Procedure

1. Choose a suitable C-Bus cable from Table 24.

IMPORTANT

Make sure that all bus devices connected to the same C-Bus are set to the same baud rate; otherwise, proper communication cannot be ensured.

2. Set the DIP switch according to Table 23.

IMPORTANT

The C-Bus must be connected through the individual controllers (open ring). Star connection is not permitted because uncontrollable line reflections could occur.

3. Connect the cable shield to C-Bus terminal 4 (Fig. 35).
4. Connect the C+ cable to C-Bus terminal 5 (Fig. 35).
5. Connect the C- cable to C-Bus terminal 6 (Fig. 35).
6. If the max. C-Bus length for the chosen cable (Table 24) is exceeded:
   — Use repeaters to extend to the max. C-Bus length (see section "C-Bus Extension by Using Repeaters").

It may take up to two minutes to re-initialize the bus when adding or removing a controller to/from the C-Bus. During this time, communication on the C-Bus is lost.

LONWORKS Network Interface

Excel 50 Controllers may be equipped with an application module (see Table 21) containing an FTT-10A Free Topology Twisted Pair Transceiver which allows communication with other device on a LONWORKS network. FTT-10A transceivers communicate at 78 Kbaud and provide transformer isolation so that the bus wiring does not have a polarity; that is, it is not important which of the two bus terminals are connected to each wire of the twisted pair. See also Fig. 35.

FTT devices can be wired in daisy chain, star, loop or any combination thereof as long as the max. wire length requirements given below are met. The recommended configuration is a daisy chain with two bus terminations. This layout allows for max. bus length, and its simple structure presents the least number of possible problems, particularly when adding on to an existing bus.

NOTE: A doubly-terminated bus may have stubs of up to 10 ft (3 m) from the bus to each node.

Table 26. Doubly-terminated bus specifications

cable type	max. bus length
Belden 85102	2,700 m (8,900 ft)
Belden 8471	2,700 m (8,900 ft)
Level IV, 22 AWG	1,400 m (4,600 ft)
JY (St) Y 2x2x0.8	900 m (3,000 ft)
TIA568A Categ. 5 24AWG, twisted pair	900 m (3,000 ft)

NOTES:

The cable types listed above are as recommended by Echelon. The cable recommended by Honeywell is the level IV, 22 AWG, solid core, nonshielded cable. Belden part numbers are 9H2201504 (plenum) and 9D220150 (non-plenum).

The FTT specification includes two components that must be met for proper system operation. The distance from each transceiver to all other transceivers and to the termination must not exceed the *max. node-to-node distance*. If multiple paths exists, the *max. total wire length* is the total amount of wire used.

Table 27. Free topology (singly-terminated) specifications

cable type	max. node-to-node distance	max. total wire length
Belden 85102	1,650 ft (500 m)	1,650 ft (500 m)
Belden 8471	1,300 ft (400 m)	1,650 ft (500 m)
Level IV, 22AWG	1,300 ft (400 m)	1,650 ft (500 m)
JY (St) Y 2x2x0.8	1,050 ft (320 m)	1,650 ft (500 m)
TIA568A Category 5 24AWG, twisted pair	825 ft (250 m)	1,500 ft (450 m)

IMPORTANT

Do not use different wire types or gauges on the same LONWORKS network segment. The step change in line impedance characteristics would cause unpredictable reflections on the network.

NOTE: In the event that the limit on the total wire length is exceeded, FTT physical layer repeaters (FTT 10A) can be added to interconnect segments and increase the overall length by an amount equal to the original specification for that cable type and bus type for each repeater used. For example, adding repeaters for a doubly-terminated bus using JY (St) Y 2x2x0.8 cable increases the max. length 3,000 ft (900 m) for each repeater.

LONWORKS Bus Termination

One or two Termination Modules, part no. 209541B or part no. XAL-Term, are required for a LONWORKS Bus with FTT devices on it, depending upon the configuration.

LONWORKS Service LED Diagnostics

The LONWORKS service LED is used to diagnose the state of the Excel 50 controller. In general:

— The controller is applicationless if the LED illuminates continuously*.

— The controller has an application but, if the LED is blinking, it is not configured.

— The controller is running normally if L2 is OFF.

The LONWORKS service LED is located on the application module.

Pushing the LONWORKS service button will force a new commissioning of the Excel 50. While commissioning, LED L2 continuously illuminates red for less than 1 minute and afterwards return to the normal state (L2 = OFF).

A more detailed diagnosis can be carried out by observing the duration of the ON and OFF states of the service LED in connection with power ON / OFF. The following figure illustrates the different service LED behaviors. These are the most common behaviors, but others are possible since the state of the service LED is under firmware control and can be affected both by hardware and software anomalies.

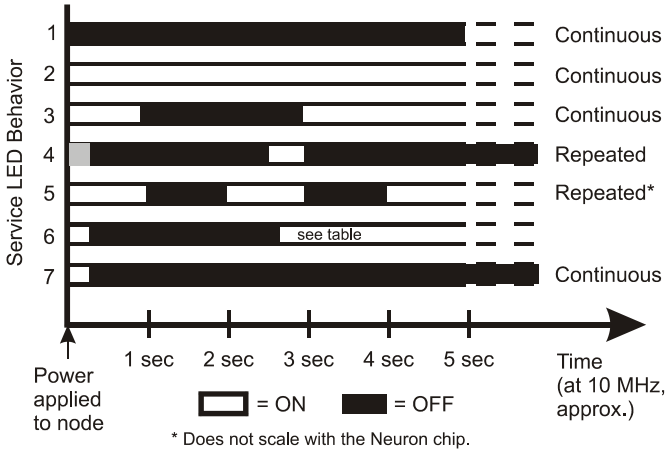


Fig. 36. LONWORKS Service LED behavior

Table 28 describes each of the behaviors shown in the previous figure under different contexts. Again, this list is not exhaustive and therefore does not provide explanations for every possible service LED behavior.

Table 28. LONWORKS Service LED behavior descriptions

behavior	context	likely explanation
1	Power-up of the controller	Controller hardware is defective.
2	Power-up of the controller	Controller hardware is defective.
3	Power-up / reset of the controller	The controller is applicationless. May be caused by the Neuron chip firmware when a mismatch occurs on application checksums.
4	Anytime	Possible corrupt EEPROM. Use a newly programmed PROM, or EEBLANK and follow bring-up procedure.
5	Anytime	The controller is unconfigured.
6a	First power-up, *Applicationless* firmware state exported	The OFF duration is approx. 1 second. Service LED should then turn ON and stay ON, indicating an applicationless state. The controller is defective – return to factory.
6b	First power-up, *Unconfigured* firmware state exported	The OFF duration is 1...15 seconds depending on the application size and system clock. Service LED should then begin flashing as in behavior 5, indicating an unconfigured state.
6c	First power-up, *Configured* firmware state exported	The OFF duration is indefinite (1...15 seconds to load internal EEPROM; stays OFF, indicating configured state.) The controller is configured and running normally.
7	Anytime	The controller is configured and running normally.

Controller Serial Port

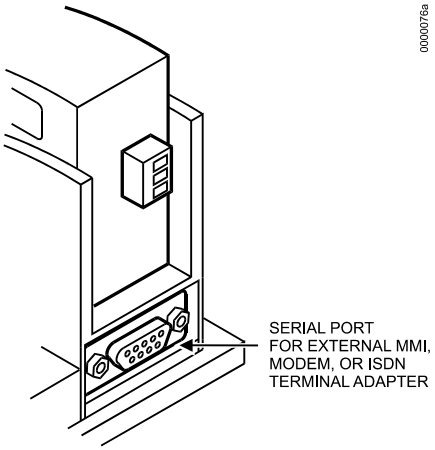


Fig. 37. Serial port

The serial port has a 9-pin sub-D connector and has a default communication speed of 9.6 Kbaud.

Table 29. Signals of serial port

signal type	controller output	controller input
Signal ground		
Transmit	x	
Receive		x
Carrier detect		x
Clear to send		x
Data terminal ready	x	
5 V	x	

MMI Connection

For direct communication the external operator interface XI582 and the PC-based XL-Online can be connected to the serial port.

When the cable from XI582 or XL-Online is plugged in during normal operation of an Excel 50 Controller with MMI, the functionality of the Excel 50 MMI is disabled.

After unplugging the external MMI it takes up to 30 sec until the local MMI activates again.

Cable Specifications

Ready-made cables with the shield already connected to the computer module plug end are available for the connection of external MMIs.

Table 30. Cable specifications

MMI type	cable	length
XI582 (remote MMI)	XW 582	17 ft (5 m)
XL-Online (PC-based MMI)	XW 585	17ft (5 m)

For connection to the XL-Online, a standard null modem cable may be used.

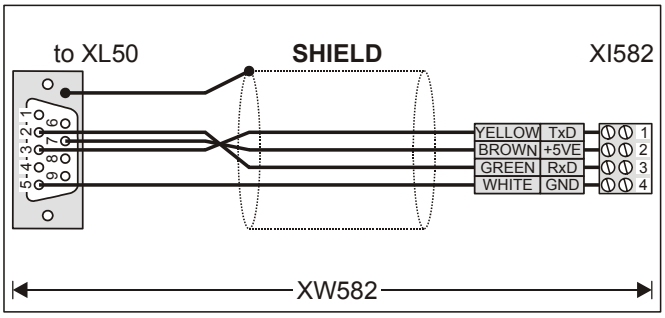


Fig. 38. Connecting XL50 via XW582 to XI582

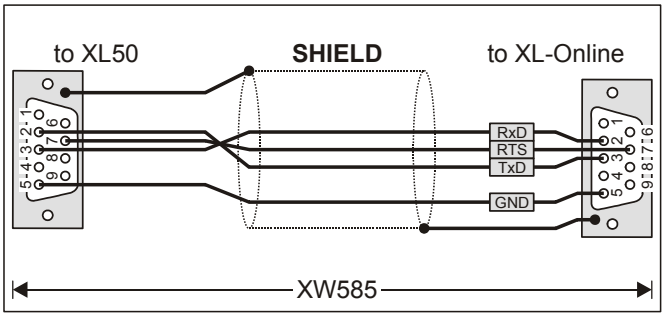


Fig. 39. Connecting XL50 via XW585 to XL-Online

Modem or ISDN Terminal Adapter Connections

For remote communications, a modem or ISDN terminal adapter can be connected directly to the serial port of all Flash-EPROM versions of the Excel 50 Controller.

NOTE: Remote communication via modem or ISDN terminal adapter requires firmware version 2.01.00 or higher.

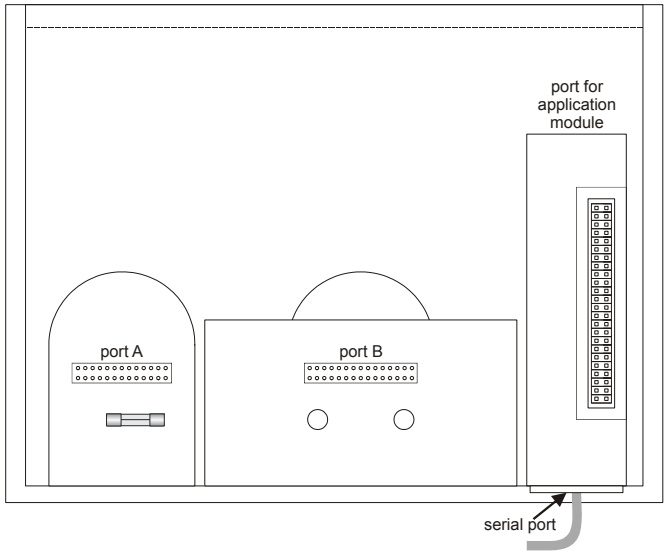


Fig. 40. Excel 50, modem connection (rear view)

The serial port of the Excel 50 controller accepts a standard modem cable with a female 9-pin connector. Use the cable that is supplied with the modem/ISDN terminal adapter. The communication speed is 9.6 Kbaud by default but can be set as high as 38.4 Kbaud. For more details, see section "Remote Communication".

Changing Between MMI and Modem Connection

The XL50 will detect when an MMI or modem/ISDN terminal adapter is connected and will adjust the communication speed automatically according to the preset values. This automatic detection can take up to 5 seconds.

REMOTE COMMUNICATIONS

Firmware version number 2.01.00 or later supports the direct connection of modems or ISDN terminal adapters for communications to up to three remote XBS building supervisors.

NOTE: XBSi building supervisors are not supported for remote communication.

NOTE: Communication via ISDN is applicable only for Europe.

Modem Requirements

- Modem must support Hayes compatible command set (not V150 or V151 = Microsoft command set)
- Modem must support alpha-numeric return codes
- Modem must follow serial baud rate of the CPU
- Modem must support auto-bauding (baud rate fall-back)
- When carrier detect (connect) is reported, the carrier must be ON simultaneously at both modems (on CPU side and on XBS side) ⇒ use same modem
- After a switch-on of the DTR line by the CPU or XBS, the modem must accept a dial command after 3 seconds
- Modem must answer AT commands in less than 3 seconds

No Set-Up for Standard Modem Behavior

If no special modem behavior is required, there is no need to set up or initialize the modem/ISDN terminal adapter. The Excel 50 Controller will automatically detect the device (MMI or modem) attached to the serial port, set the appropriate communication speed, and automatically adapt to alpha-numeric return codes used by the modem. This automatic detection and adjustment can take up to 5 seconds.

NOTE: It is highly recommended to use a state-of-the-art modem and leave it in its factory setting.

Automatic Baudrate Synchronization

The default communication speed between the Excel 50 Controller and the local modem/ISDN terminal adapter is 9.6 Kbaud.

The communication speed between the Excel 50 and XBS modems/ISDN terminal adapters is automatically synchronized by the two devices to the highest speed that both of the devices are capable of. This feature is called autobauding and is provided by all state-of-the-art modems / ISDN terminal adapters when left in their factory default settings.

The communication speed between the XBS and its modem / ISDN terminal adapter is part of the modem set-up at the XBS.

Auto / Manual Answer Detection

The Excel 50 Controller will automatically detect whether the modem/ISDN terminal adapter is initialized in auto-answer or manual answer mode, and it will set the modem to the manual answer mode (S0=0).

Resetting the Modem

For those cases where it is not clear if the modem to be used is in its factory setting, the modem can be reset to its factory setting by using the RESET MODEM command in the Start-Up sequence or through the HW Config. part of the System Info. sequence on the MMI. This will allow a quick and easy modem reset without having to run the modem set-up software or the Windows™ terminal program.

The RESET MODEM command causes the following commands to be sent to the modem:

1. ATZ: Executes hardware reset on modem
2. AT&FX3&W: Resets modem to factory configuration settings, configures the modem to not wait for the public phone system dial tone, and writes this to nonvolatile memory.

Set-Up for Special Modem Behavior

If special modem/ISDN terminal adapter behavior is required, the communication device should be set up according to the instructions provided with it. This typically involves running a set-up program on a computer with the device connected to the computer serial port or using the Windows™ terminal program.

Set-Up for In-House Telephone Systems

A common case of special modem behavior is when the modem is connected to an in-house telephone network requiring a prefix to be dialed before the destination number to provide access to the public telephone network. There are two important aspects of the special initialization of the modem to consider:

1. Do not wait for the public network dial tone. Typically, the init command ATX3 will trigger the modem to dial without waiting for a public network dial tone. Save this modem set-up in the modem EEPROM with the command AT&W. Check the modem handbook to verify the correct commands. Note that these commands are executed automatically with the RESET MODEM command in the Excel 50 Controller Start-Up Sequence.
2. Add the prefix required for accessing the public telephone network to the destination telephone number. Depending on the in-house telephone system, a certain prefix may have to be added to the destination number in the XBS system configuration/site definition screen before sending the set-up to the remote Excel 50.

Set-Up for Limited Communication Speed

The communication speed of the modem can be fixed to a lower rate in case of data transmission errors due to telephone line limitations. See section "Start-Up Sequence".

Troubleshooting

In case of any problems, the handbook of the modem or ISDN terminal adapter must be consulted.

A “Frequently Asked Questions and Troubleshooting” document is available via the Honeywell Technical Assistance Center (TAC) or, for Honeywell employees, on the HIVE.

METER-BUS CONNECTION (NOT AVAILABLE IN N. AMERICA)

The meter bus adapter PW3 is connected with the cable XW586 to the RJ45 plug of the XD50-FCS-HE01-xx ("xx"" depends upon the language). The cable XW586 has a length of 1.8 m.

Table 31. Cable XW586

RJ45 Plug, Pin Number	RS232 function	9-Pin -Sub-D Connector Pin No.
1	DCD	1
2	RxD	2
3	TxD	3
4	DTR	4
5	GND	5
6	DSR	6
7	RTS	7
8	CTS	8
	Not used	9

Up to three meter-bus devices can communicate with Excel 50 via the application card XD50-FCS-HE01-xx and the connected meter bus adapter PW3.

Meter-Bus Connection Procedure

1. Install PW3 Meter-Bus Adapter on DIN rail. Insert a screwdriver into the slot in the DIN rail clamp on the underside of the PW3 and pry downward to loosen clamp until the unit snaps onto the rail. See Fig. 41.

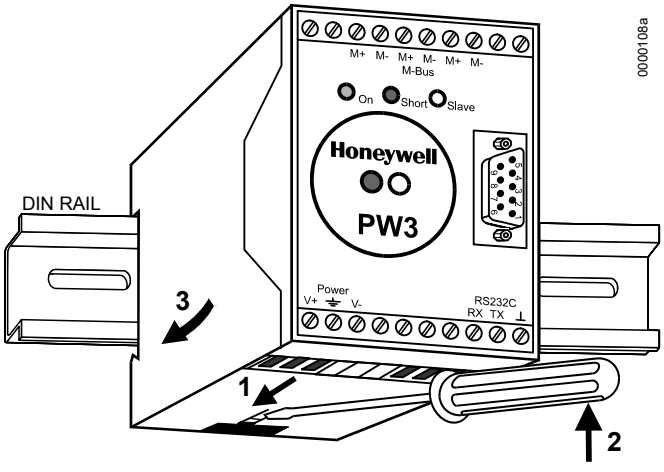


Fig. 41. Mounting of PW3

2. Connect Meter-Bus devices to PW3 Meter-Bus Adapter. See Table 32 for a list of supported devices. Insert wires into the terminals on the top of the PW3 and tighten the screws on the front of the unit.

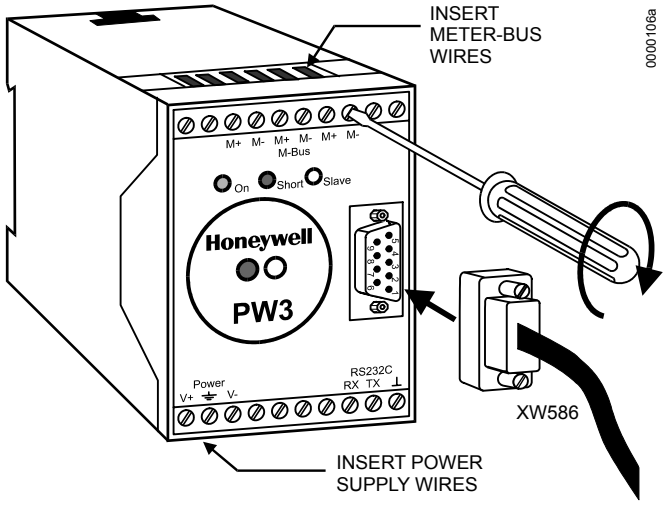


Fig. 42. PW3 Meter-Bus adapter connections

3. Connect PW3 Meter-Bus Adapter to Excel 50 Controller using XW586 cable.

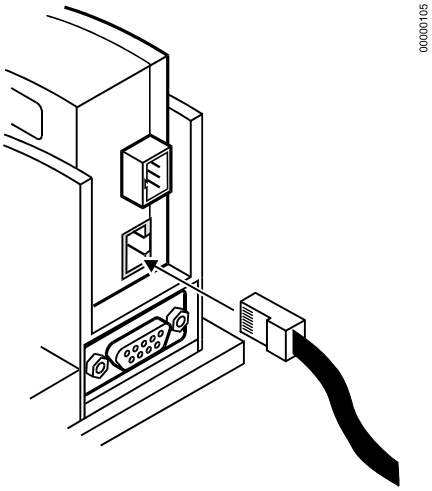


Fig. 43. Connecting Excel 50 to Meter-Bus adapter

4. Connect 24 V power to the Meter-Bus Adapter according to Fig. 1. Insert wires into the terminals on the underside of the PW3 and tighten the screws on the front of the unit.

⚠ CAUTION

Never connect V- of the PW3 to pin 2 of the Excel 50 Controller and V+ to pin 1. This could cause damage to the Excel 50.

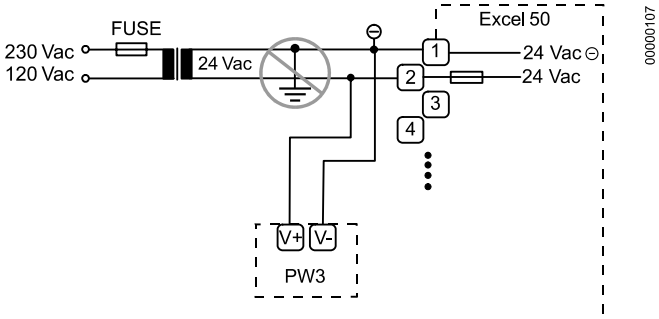


Fig. 1. PW3 Meter Adapter power connections

Meter-Bus activity can by monitored using the LEDs on the HE01 application module (see Fig. 2).

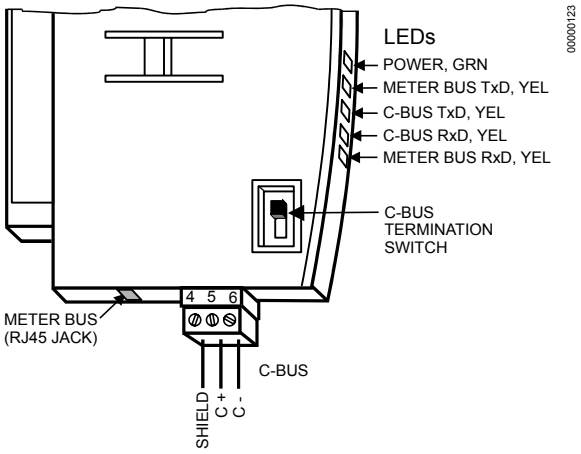


Fig. 2. XD50-FCS Application Module LEDs

Table 32. Supported M-Bus meters

manufacturer, type (H = heating, E = energy, W = water)	values					temperatures		auxiliary inputs		reference day				
	energy	cooling energy	volume	power	flow	T_{FORW} T_{RET}	ΔT	1	2	date	energy	cooling energy	aux1	aux2
ABB SVM 840 (H)	X	--	X	X	X	X	X	--	--	--	--	--	--	--
ABB RV F2 (H)	X	--	X	X	X	X	X	--	--	--	--	--	--	--
Actaris CF50 (H)	X	--	X	X	X	X	X	--	--	--	--	--	--	--
Actaris CF55 (H)	X	--	X	X	X	X	X	--	--	--	--	--	--	--
Berg BLMi461[1)] (E)	--	--	--	--	--	--	--	--	--	X	X	--	--	--
DZG Elektro S30[2)] (E)	X	--	--	--	--	--	--	--	--	--	--	--	--	--
Hydrometer BR 440 (H)	X	--	X	X	X	X	X	--	--	X	X	--	--	--
Hydrom. Energy-Int 5 (Danf. Infocal-5) (H)	X	--	X	X	X	X	X	--	--	--	--	--	--	--
Hydrometer BR 772 Sharky-Heat (H)	X	X	X	X	X	X	X	--	--	X	X	X[4)]	--	--
Hydrometer BR 773 Sharky-Heat (H)	X	X	X	--	X	X	--	X	X	--	X	--	--	--
Hydrometer BR 773 Sharky-Heat, m2 (H)	X	X	X	X	X	X	X	X	X	X	X	--	--	--
Kamstrup Multical 3 (H)	X	--	X	X	X	X	X	--	--	--	--	--	--	--
Kundo G07 (H)	X	--	X	X	X	X	X	--	--	--	--	--	--	--
Landis & Staefa Sonogyr WSD[3)] (H)	X	--	X	X	X	X	--	--	--	--	--	--	--	--
raab karcher Sensonic (H)	X	--	X	X	X	X	X	--	--	--	--	--	--	--
Relay PadPuls M1C (E)	X	--	--	--	--	--	--	--	--	--	--	--	--	--
Relay PadPuls M1C (W)	--	--	X	--	--	--	--	--	--	--	--	--	--	--
Relay PadPuls M4L (E)	X	--	--	--	--	--	--	--	--	X	X	--	--	--
Relay PadPuls M4L (W)	--	--	X	--	--	--	--	--	--	X	--	--	--	--
Schlumberger[5)] CF50 (H)	X	--	X	X	X	X	X	--	--	--	--	--	--	--
Schlumberger[5)] CF50 (H), ref. day mode	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Schlumberger[5)] Integral-MK MaXX (H)	X	--	X	--	X	X	X	--	--	--	X	--	--	--
Sensus Metering Systems PolluCom E (H)	X	--	X	X	X	X	X	--	--	--	--	--	--	--
Siemens/Pollustat 2WR4 (H)	X	--	X	X	X	X	X	--	--	--	--	--	--	--
Siemens/P. 2WR4 (H), fast-read mode	X	--	X	X	X	X	--	--	--	--	X	--	--	--
Sontex Supercal 539 (H)	X	--	X	X	X	X	--	--	--	--	--	--	--	--
Sontex Supercal 539 Plus (H)	X	--	X	X	X	X	--	X	X	--	X	--	X	X
Sontex Supercal 539 Heat/Cooling (H)	X	X	X	X	X	X	--	--	--	--	X	X	--	--
Sontex Supercal 539 Heat/Cooling Plus (H)	X	X	X	X	X	X	--	X	--	--	X	X	X	--
Spanner Pollux[6)] PolluTherm (H)	X	--	X	X	X	X	X	--	--	--	X	--	--	--
techem delta-tech Kompakt (H)	X	--	X	--	X	X	--	--	--	--	--	--	--	--
techem delta-tech Split (H)	X	--	X	--	X	X	--	--	--	--	X	--	--	--
Viterra Sensonic II / T25 (H)	X	--	X	X	X	X	X	--	--	--	X	--	--	--
Wehrle[1)] (W)	--	--	X	--	--	--	--	--	--	--	--	--	--	--
Zenner multidata S1[1)] (H)	X	--	X	X	X	X	X	--	--	--	--	--	--	--

All devices support baudrates of 300 and 2400, except 1) baudrate of 2400, only; 2) baudrates of 300, 2400, and 9600; 3) baudrate of 300, only. 4) Tarif Energy1 can be used for cooling energy. The counter must be configured for cooling energy; 5) Schlumberger is owned by Actaris; 6) Spanner Pollux is owned by Sensus Metering Systems.

Table 33. Unsupported M-Bus meters

manufacturer	**device type**	**meter category**
Pollustat	B501	heat
Schlumberger	Cvble M-bus Zähler	heat
ABB	Deltameter	electric

START-UP SEQUENCE

After powering up the controller or after a RESET the initial screen of the Start-Up sequence appears. A RESET can be achieved by pressing the 'DOWN' and '–' keys simultaneously.

NOTE: The screens of the Start-Up sequence are always displayed in English as they are a part of the operating system.

NOTE: In the case of XL50A controllers, if the firmware present in the application module is less than 2.07.00, then the screen of XL50A controllers with MMI will show all lines fully activated, and the screen of XL50A-CY will be blank. The latest firmware can be downloaded using XL-Online or XL-Touch to continue with further operations.

NOTE: The sequence shown is for embedded applications. The Start-Up sequence for standard and custom CARE applications is similar but does not include entry of configuration codes.

```
   Honeywell
     XL 50
V 2.04.00
           ►NEXT
```

This is the first screen of the Start-Up sequence. It shows the version of the company name, the controller name and the firmware version. Confirm with ENTER.

```
Date:►13.06.1998
Time:►17:35
Ctr  No:►1
           ►NEXT
```

Select:

— the 'Date' field to enter the current date.

— the 'Time' field to enter the current time.

— the 'Ctr. No' field to enter the controller number.

Confirm with ENTER.

If 'Date' is selected:

Set the date using the '+' or '–' keys. Use the arrow keys to move from field to field. Confirm with ENTER. Select BACK. Confirm with ENTER to return to the previous screen.

NOTE: The date must be entered in the following format: DD. MM. YYYY; for example, the 23rd of July 1997 must be entered as 23. 07. 1997. Press the CANCEL key to abort the operation or to cancel an incorrect entry before ENTER has been pressed. The value previously displayed will be restored.

If 'Time' is selected:

Set the time using the '+' or '–' keys. Use the arrow keys to move from field to field. Confirm with ENTER. Use the CANCEL key to return to the previous screen.

NOTE: The time must be entered in the following format: HH:MM in 24 hour clock format; for example: 9:30 a.m. must be 09:30 and 9:30 p.m. must be 21:30. Press the CANCEL key to abort the operation or to cancel an incorrect entry before ENTER has been pressed. The value previously displayed will be restored.

If 'Ctr. No.' is selected:

Set the controller number using the '+' or '–' keys. Confirm with ENTER.

IMPORTANT

If no controller number is set or if the number shown is not reconfirmed, the controller will not go online on the C-Bus after start-up.

Move the cursor to the 'NEXT' field with the ARROW keys. Confirm with ENTER.

```
Modem Part:
 <active/inactive>
Appl. Mem. Size
128 KB .  ►NEXT
```

This screen provides information about whether modem communication is enabled and about application memory size. Enabling modem communication and changing the value for application memory are done in a later screen. NEXT is highlighted. Confirm with ENTER.

```
►Contr. Setup
►Select Applic.
►Requ. Download
►DP Wiring Check
```

Select:

— 'Contr. Setup' to configure the controller-specific hardware interfaces.

— 'Select Applic.' to choose the application manually.

— 'Requ. Download' to download an application via XL-Online or the C-Bus.

— 'DP Wiring Check' to set up the test mode with default user addresses.

Confirm with ENTER.

Controller Setup

If 'Contr. Setup' has been selected, the following screen will appear:

```
HW-Interf. Cfg.
►B-Port          ↑
 C-Bus           1
 LON-Bus          ↓
```

The contents of this listbox will depend upon the exact hardware configuration of the controller. The listed interfaces to be configured will be from among the following:

- B-Port
- C-Bus.
- LON-Bus
- Meter Bus
- Modem

NOTE: In order to support use of the XL-Online User Interface, the C-Bus configuration option may appear even on controllers that do not have an application module containing a C-Bus connection.

B-Port

Select ‘B-Port” and confirm with ENTER. The following screen appears:

```
B-Port Config.

Baudrate: ►9600
          ►BACK
```

Move the cursor with the arrow keys to the field to set baud rate for the B-Port. Use the '+' and '–' keys to edit the fields. Confirm with ENTER.

NOTE: Live CARE is now capable of autodetecting the controller baud rate setting, then switching it temporarily to 38.4 Kbaud. When Live CARE is disconnected, the controller will switch back to the previous baud rate setting automatically within 15 seconds.

Move the cursor to the 'BACK' field with the arrow keys. Confirm with ENTER.

C-Bus

Select ‘C-Bus” and confirm with ENTER. The following screen appears:

```
C-Bus Config.
Baudrate: ►76800
Contr.No: ►
          ►BACK
```

NOTE: If you set the bus ID to a non-zero value, the C-bus baudrate will be immediately disabled (i.e. it is then no longer editable). See also section "

LON-Bus (i.e. LonWorks Network)" below.

If 'Baudrate' is selected:

Move the cursor with the arrow keys to the field to set baud rate for the C-Bus. Use the '+' and '–' keys to edit the fields. Confirm with ENTER.

If 'Contr. No.' is selected:

Set the controller number using the '+' or '–' keys. Confirm with ENTER.

IMPORTANT

If no controller number is set or if the number shown is not reconfirmed, the controller will not go online on the C-Bus after start-up.

Move the cursor to the 'BACK' field with the arrow keys. Confirm with ENTER.

LON-Bus (i.e. LonWorks Network)

Select ‘LON-Bus” and confirm with ENTER. The following screen appears:

```
LON-Bus Config.
Contr. Neuron ID
<neuron ID number>
Bus ID     ►BACK
```

IMPORTANT

The bus ID is a non-unique number (i.e. different Excel 500 controllers can have the same bus ID in common) between 0 and 99 (inclusive) which the user can edit after a reset during the controller's start-up sequence or by changing the configuration property nciXL500BusSetup. The factory default is "0", which enables C-Bus and Standard LONWORKS communication. Assigning a bus ID other than "0" will enable LONWORKS communication with Building Management functionality and disable C-Bus communication.

This screen displays the unique identification number for the Neuron chip in the controller.

Move the cursor to the 'BACK' field with the arrow keys. Confirm with ENTER.

Meter-Bus

Select ‘M-Bus” and confirm with ENTER. The following screen appears:

```
M-Bus Config.
Baudrate: ►9600

►BACK
```

Move the cursor with the arrow keys to the field to set baud rate for the Meter Bus. Use the '+' and '–' keys to edit the fields. Confirm with ENTER.

Move the cursor to the 'BACK' field with the arrow keys. Confirm with ENTER.

Modem Communication

Select ‘Modem’ and confirm with ENTER. The following screen appears:

```
Enable/Disable
Modem Part:
<ENABLE/DISABLE>
              ►NEXT
```

This screen allows the user to enable modem communication. If modem communication is enabled, 'DISABLE' will appear, while 'ENABLE' will appear if it is currently disabled. To change the current setting, move the cursor to the enable/disable field, and select it by pressing ENTER. Change the setting with the '+' or '-' keys. Confirm with ENTER.

If modem communication has been enabled, the following two screens appear, otherwise the sequence returns to the ENABLE/DISABLE screen.

```
Modem Config.
Baudrate:  9600
GSM PIN ********
Reset Modm ►NEXT
```

NOTE: GSM communication is not supported.

This screen appears only if modem communication is enabled. Select:

— 'Baudrate.' to set the baud rate for the modem/ISDN terminal adapter.

— 'Reset Modem' to return modem to factory settings, erasing any custom modem initialization. See section "Remote Communications" for more information.

Move the cursor with the arrow keys to the appropriate fields. Use the '+' and '–' keys to edit the fields.

Or select Reset Modem to send a reset command to the modem (if one is not yet attached to the controller, the controller will send a reset when one is detected).

IMPORTANT

Resetting the modem will restore the factory defaults and erase any custom initialization.

Confirm with ENTER. Move the cursor to the 'NEXT' field with the arrow keys. Confirm with ENTER.

```
Appl. Mem. Size
128 KB  RESTART
Rem. Trend Buf.
104 Entries►BACK
```

This screen is used to increase the size of the adjustable remote trend buffer by reducing the application memory size. The number of entries (trend samples) that can be stored in the buffer for Remote Building Central A is determined by a calculation by the controller based upon the Application Memory Size entered in this screen (remote trend buffer = (128 Kbytes minus the Application Memory Size) * 1024 bytes / 47 bytes). The default for the Application Memory Size is 128; the min. Application Memory Size is 38 Kbytes. The default number of Remote Trend Buffer Entries is 104.

If a new value for Appl. Mem. Size has not been entered, the cursor is at NEXT. Confirm with ENTER and continue to the next screen.

To increase the size of the buffer, use the arrow keys to select the digits for 'Appl. Mem. Size' and use the '+' and '–' keys to enter a new value. Then select RESTART and confirm with ENTER. The controller will reset again, and the 'Start-Up' sequence starts again from the beginning.

IMPORTANT

If the application being downloaded exceeds the Maximum Application Size entered in this screen, an error message will occur and the download will not be executed.

When this screen appears again, the cursor is at NEXT. The new application memory size and the new number of trend samples calculated by the controller are shown. Confirm with ENTER and continue to the next screen.

Select Application

```
►Contr. Setup
►Select Applic.
►Requ. Download
►DP Wiring Check
```

If 'Select Applic.' is then selected, the following screen will appear listing applications and their burn dates:

```
Select Applic.
►AH01            ↑
 <applic.> <date.> 1
 <applic.> <date.> ↓
```

Select the application using the ARROW keys. Confirm with ENTER.

```
   Honeywell
XL 50  V 2.03.00
AH01   V 1.00
         ►NEXT
```

The initialization screen of the chosen application will appear. It presents information about the versions of the controller and the application. Confirm with ENTER. If the Excel 50 controller is connected to a C-Bus, the following screen will appear:

```
Append Busnumber
to User Addr. ?
   ►YES
            ►NEXT
```

Move the cursor to the 'YES' field. Confirm with ENTER.

IMPORTANT

If more than one Excel 50 Controller having the same application program is connected to the C-Bus, the user addresses must have the bus numbers appended to them.

Move the cursor to the 'NEXT' field using the ARROW keys. Confirm with ENTER.

```
          ►CONFIG
C1►-1      C2►-1
C3►-1      C4►-1
C5►-1      C6►-1
```

The codes of the configurable application can be changed In this screen. The application codes can be generated with the 'LIZARD-Excel 50 Application Selector'. This screen does not appear with standard and custom CARE applications.

NOTE: Not all applications have six configuration code numbers. Applications with eight configuration codes have two on a second screen as shown below.

First screen:

```
C1►-1      C2►-1
C3►-1      C4►-1
C5►-1      C6►-1
           ►NEXT
```

Second screen:

```
          ►CONFIG

C7►-1      C8►-1
```

NOTE If the 'LIZARD-Excel 50 Application Selector' is not available, please contact your local Honeywell branch for support.

Select the appropriate code and change its value using the '+' and '–' keys.

Move the cursor to the 'CONFIG' field. Confirm with ENTER.

If the codes entered in the screen are allowed, the default screen of normal operation will show up:

```
<1. time program>Init
MON 13.06. 10:27
TO: 20:30  20°C
 ►TODAY    ►NEXT
```

If one or more codes entered are not allowed, the initialization screen will show up again. Change the screens by selecting NEXT and confirming with ENTER until you have reached the configuration screen again. Codes which are not allowed have the value '-1' instead of the previously entered code. Change the codes until all codes are correct.

You will now come to the default screen of normal operation:

```
<1. time program>Init
MON 13.06. 10:27
TO: 20:30  20°C
 ►TODAY    ►NEXT
```

Request Download

```
►Contr. Setup
►Select Applic.
►Requ. Download
►DP Wiring Check
```

If 'Requ. Download' has been selected from the screen shown above, the following screen appears.

```
Please execute
Download
```

Follow the instructions for a download given in the XL-Online User Guide or Lizard User Guide (if downloading via B-Port) or the User Guide for the Building Central (if by C-Bus).

NOTE: After download of an application, the controller checks the user ID via its checksum and will not start the application if it is invalid. An alarm “Invalid User ID” will be issued.

Datapoint Wiring Check

```
►Contr. Setup
►Select Applic.
►Requ. Download
►DP Wiring Check
```

If 'DP Wiring Check' has been selected from the screen shown above, default user addresses are generated following the following pattern:

- AI0101: Analog input, board 1, input 1
- AO0201: Analog output, board 2, output 1
- DI0301: Digital input, board 3, input 1
- DO0401: Digital output, board 4, output 1

NOTE: The board numbers shown above are internal references and are not relevant to the user. In Excel 50 Controllers the numbers are fixed for the I/O type, i.e. analog inputs are always AI01, digital inputs are always DI03, etc.

After generating the default addresses, the following screen appears:

```
►Default Points
►Alarm History
```

Select

— 'Default Points' to display I/O points for checking values and manually setting outputs for testing.

— 'Alarm History' to display current alarms. This feature allows the system to be checked out by a single person opening and closing inputs and then later reading the alarm buffer to see if they were detected by the controller.

Confirm with ENTER.

If ‘Default Points’ has been selected, the following screen will be displayed showing all default user addresses and their current values.

```
►<user addr.> <val>↑
►<user addr.> <val>1
►<user addr.> <val>
►<user addr.> <val>↓
```

To manually set outputs, move the cursor to select the output point from the list box using the arrow keys. Confirm with ENTER.

In the case of analog points, the following screen is displayed.

```
  <user addr.>
STATE/VALUE:
   ►  0.00%
```

Press ENTER to select the value. Change the value using the '+' or '–' keys. Confirm with ENTER. In the case of digital points, the following screen is displayed.

```
  <user addr.>
STATE/VALUE:
  ►0       %
```

Press ENTER to select the value. Change the value/state using the '+' or '–' keys. Confirm with ENTER.

Press CANCEL to return to the previous screen (list of user addresses).

If ‘Alarm History’ has been selected, the following screen will be displayed showing all points in alarm as well as any system alarms (max. 100 entries):

```
►<user addr.>        ↑
►<user addr.>        1
►<user addr.>
►<user addr.>        ↓
```

NOTE: Alarms are generated for changes of state/value on inputs, which allows shorting and opening the inputs at the switches and/or sensors and then checking the alarm buffer to verify the wiring.

To view an alarm, move the cursor to select the default user address from the list box using the arrow keys. Confirm with ENTER. The following screen will appear:

```
<date.>          <time>
<user addr.>
   <value>
<alarm text>
```

Press CANCEL to return to the previous screen.

IMPORTANT

Reset the controller after using the test options to clear the alarm buffer.

Honeywell

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