

Excel 100C CONTROLLERS



INSTALLATION INSTRUCTIONS

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Contents

REVISION OVERVIEW	5
INTRODUCTION.....	6
General Safety Instructions.....	6
Technical Requirements.....	6
Auxiliary Devices	6
DEVICE ASSEMBLY AND SYSTEM INSTALLATION.....	7
Assembly of Controller Housing.....	7
Control Cabinet Installation.....	8
Meaning of Control Lamp.....	9
Terminal Assignment Overview for Excel 100C.....	10
General Remarks to Electrical Connections	11
Cable Routing.....	11
Shielding of Sensor and Actuator Cables	11
Shielding of Data Transmitting Cables (System Bus and Operator Interface).....	12
System Ground	12
RFI Suppression.....	12
Cable Lengths and Cross Sectional Areas.....	13
Line Power Supply.....	14
Standard Transformers.....	14
Communication	14
C-Bus Termination.....	15
Lightning Protection	16
ELECTRICAL CONNECTION	17
Terminal Assignment for Analog Inputs	17
Specifications.....	17
Terminal Assignment for Digital Inputs	18
Terminal Assignment for Relay Modules.....	19
Specifications.....	19
Terminal Assignment for Relays and Actuators.....	21
Connection of Alarm Relays.....	22
Normally Open/Normally Closed Attribute	22
System Bus (C-Bus)	23
System Bus Cable Types.....	23
System Bus Extension by Using Repeaters.....	23
Connections to Operating Device.....	24
Wiring to XI582AH Operator's Unit	24
Wiring the XI584 Operator and Service Computer	24
Adapter Cable XI582 and XI584 to Excel 100B and C.....	25
Operator's unit XI582AH.....	27
REMOTE COMMUNICATIONS.....	29
Modem or ISDN* Terminal Adapter Connections	29
Modem Requirements.....	29

No Set-up for Standard Modem Behavior.....	30
Automatic Baud Rate Synchronization.....	30
Auto / Manual Answer Detection.....	30
Resetting the Modem	30
Set-up for Special Modem Behavior.....	31
Set-up for In-house Telephone Systems.....	31
Set-up for Limited Communication Speed.....	31
Troubleshooting	31
TCP/IP DIAL-UP VIA TCP/IP MODEM XM500.....	31
GSM COMMUNICATION (EUROPE ONLY)	33
M20T Safety Precautions	33
Required Third-Party Equipment	34
Serial Cable.....	35
GSM Antenna Requirements.....	35
GSM Antenna Installation.....	36
M20 Terminal Set-up	36
BACKLIGHT	38
Deactivating the Backlight of the Operator's Unit XI582AH.....	38
DIMENSIONS.....	39
U.S. SPECIFICATIONS	41
Electrical Connection of Sensors	41
Sensors and Transmitters	41
Further Connection Examples	42
Transformers	43
1450 Series	43
Cables	43
Relays	45
Repeaters	45
EUROPEAN SPECIFICATIONS.....	46
Electrical Connection of Sensors	46
Sensors and Transmitters	46
Further Connection Examples	48
Transformers	49
CRT-Series	49
Relays	49
Cables	49
Repeaters	51

REVISION OVERVIEW

The changes listed below show the revisions that have been made in comparison to the previous revision.

Page	Changes
12, 13	Added reference to regional requirements sections.
12	Transformer information relocated to regional requirements sections.
16	Added Lightning Protection section.
18	Relay information relocated to regional requirements sections.
22	Added Normally Open/Normally Closed Attribute section.
20	Cable and repeater information relocated to regional requirements sections.
24, 25	Revised figures for connection of XI582 and XI584.
29, 30	ISDN note added.
31	Added TCP/IP modem section.
34	Added telephone number information for MT20 SIM card.
37	Added note regarding Personal Unlocking Key.
41 - 45	Added section for US specifications.
46 - 51	Added section for European specifications.

NOTE: The Excel 100 has been developed to meet control requirements worldwide. Some referenced applications / accessories have been developed to meet specific regional requirements and may not be available or applicable in all locations.

INTRODUCTION

General Safety Instructions

Assembly by trained personnel

CAUTION

Assembly must be completed by trained personnel.

Persons who are not trained and authorized to carry out heating and electrical installation may not carry out assembly work even if this appears possible on the basis of the instructions.

Install with power off

CAUTION

All assembly work must be completed with power off.

If some parts of the system are nonfunctional or have not yet been received, assembly may proceed only if power is disconnected from those assemblies. Simply switching off the unit is insufficient.

Observe regulations

IMPORTANT

The regulations VDE 0800, VDE 0100, U. S. National Electric Code NEC or others that replace them, absolutely must be observed.

Follow instructions step by step

Follow instructions in accordance with the progress of the assembly step by step. Skip sections only when requested to do so in the text.

Technical Requirements

All devices ready?

Assembly can start only if all system components have been installed and are ready to be operated and the control and measuring sensor cables have been connected to the control cabinet.

All cables laid?

All cables must be clearly marked and laid with appropriate auxiliary accessories (cable ducts, cable ties).

Delivery complete?

The delivery of all system parts must be complete.

Auxiliary Devices

Use documentation

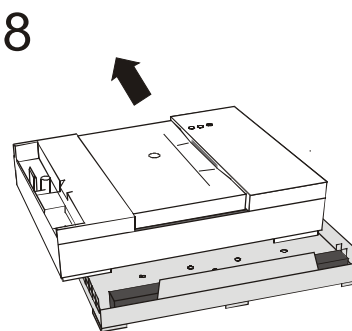
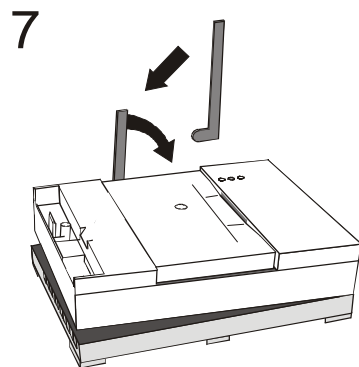
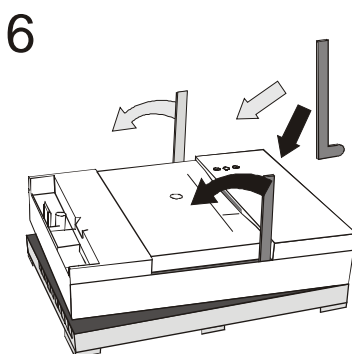
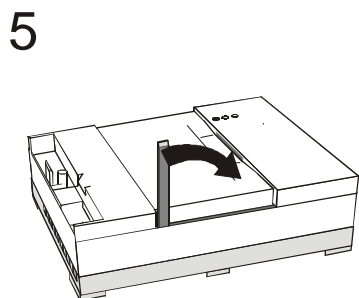
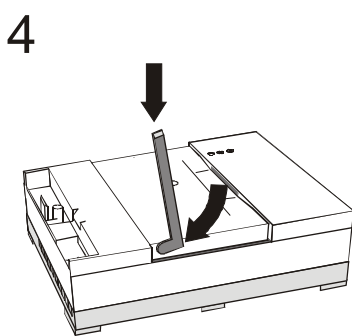
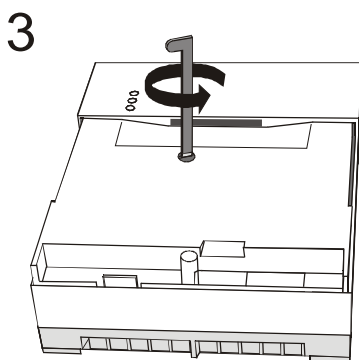
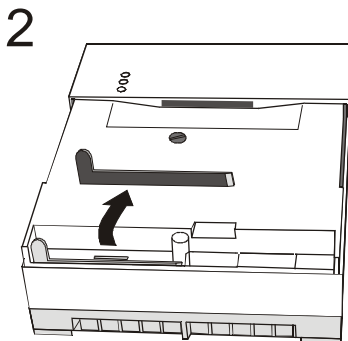
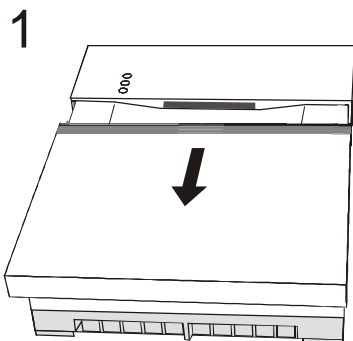
IMPORTANT

Install all devices according to the documentation supplied with the equipment.

The instructions are designed in such a way that they provide a suggestion for all foreseeable situations. Should you be confronted with problem during assembly, please contact your appropriate dealership (see last page). If there is no one to deal with your query at that particular moment, please contact technical sales support at the factory.

DEVICE ASSEMBLY AND SYSTEM INSTALLATION

Assembly of Controller Housing



1 Open cover

2 Remove tool

3 Remove screw

4 Loosen housing cover from base

5 Loosen front right

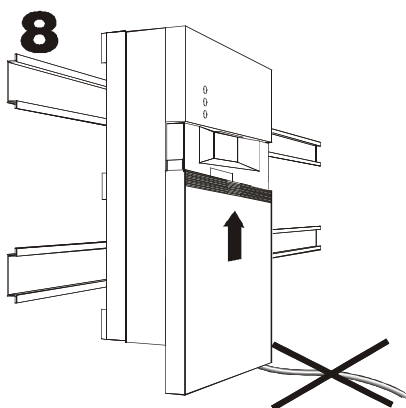
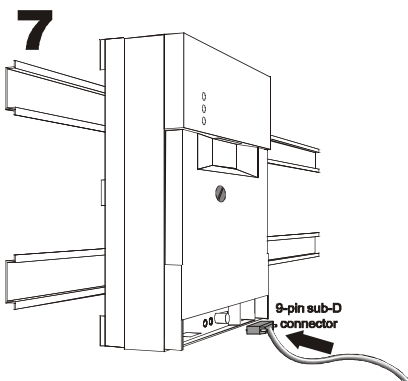
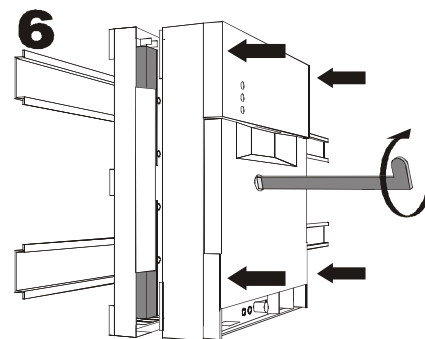
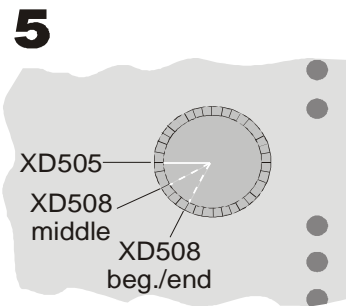
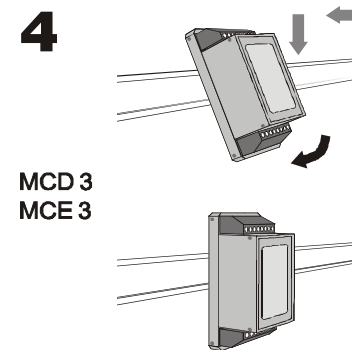
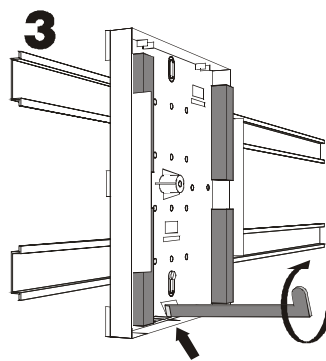
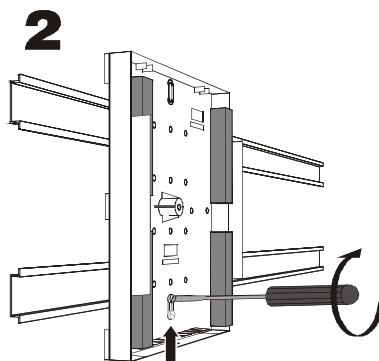
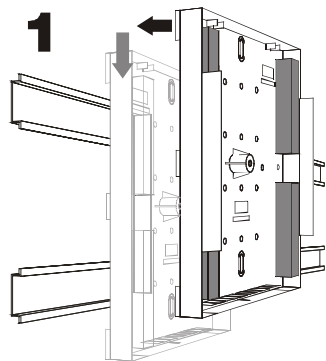
6 Loosen rear

7 Loosen left

8 Lift housing off base

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Control Cabinet Installation



IMPORTANT

The maximum ambient temperature for the Excel 100C depends on the mounting orientation:

Vertical mounting: max. 122°F (50°C)
Horizontal mounting: max. 113°F (45°C)

- 1 **Hang onto DIN rails**
(see pages 39 and 38 for mounting dimensions)
- 2 **Secure base**
- 3 **Cable holes**
- 4 **Snap relay modules into place (optional)**
Electrical connection
(see pages 10, 19 to 21)
- 5 **Set the bus termination switch on the back of the housing according to the system configuration**
(see page 15 for details).
- 6 **Fit housing**
Make sure it is straight
- 7 **Connect operating device**
(see pages 24 and up)

IMPORTANT

Set the port selector switch (left to the sub-D port) according to whether the front port or the rear terminals should be active (see page 28 for details).



Front port active



Rear terminals active

- 8 **Close cover**

NOTE: Cover cannot be mounted with front connector plugged.

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Meaning of Control Lamp

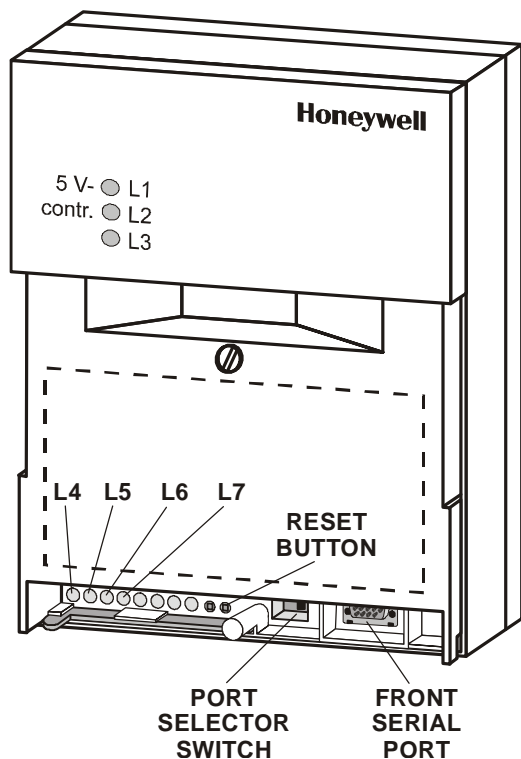


Table 1. Control Lamps and their meanings

LED	Color	Status/Meaning
L1	YELLOW	Lit if the main voltage is present
L2	GREEN	Lit: Program is running
		Dark: Program is stopped
L3	RED	Lit continuously: ALARM; program is stopped
L4	YELLOW	Lit : Controller is transmitting via B-port
L5	YELLOW	Lit: Controller is receiving via B-port
L6	YELLOW	Lit: Transmission via C-bus to system bus interface
L7	YELLOW	Lit: Reception via C-bus from system bus interface
L8, L9, L10, and L11 are for future use		

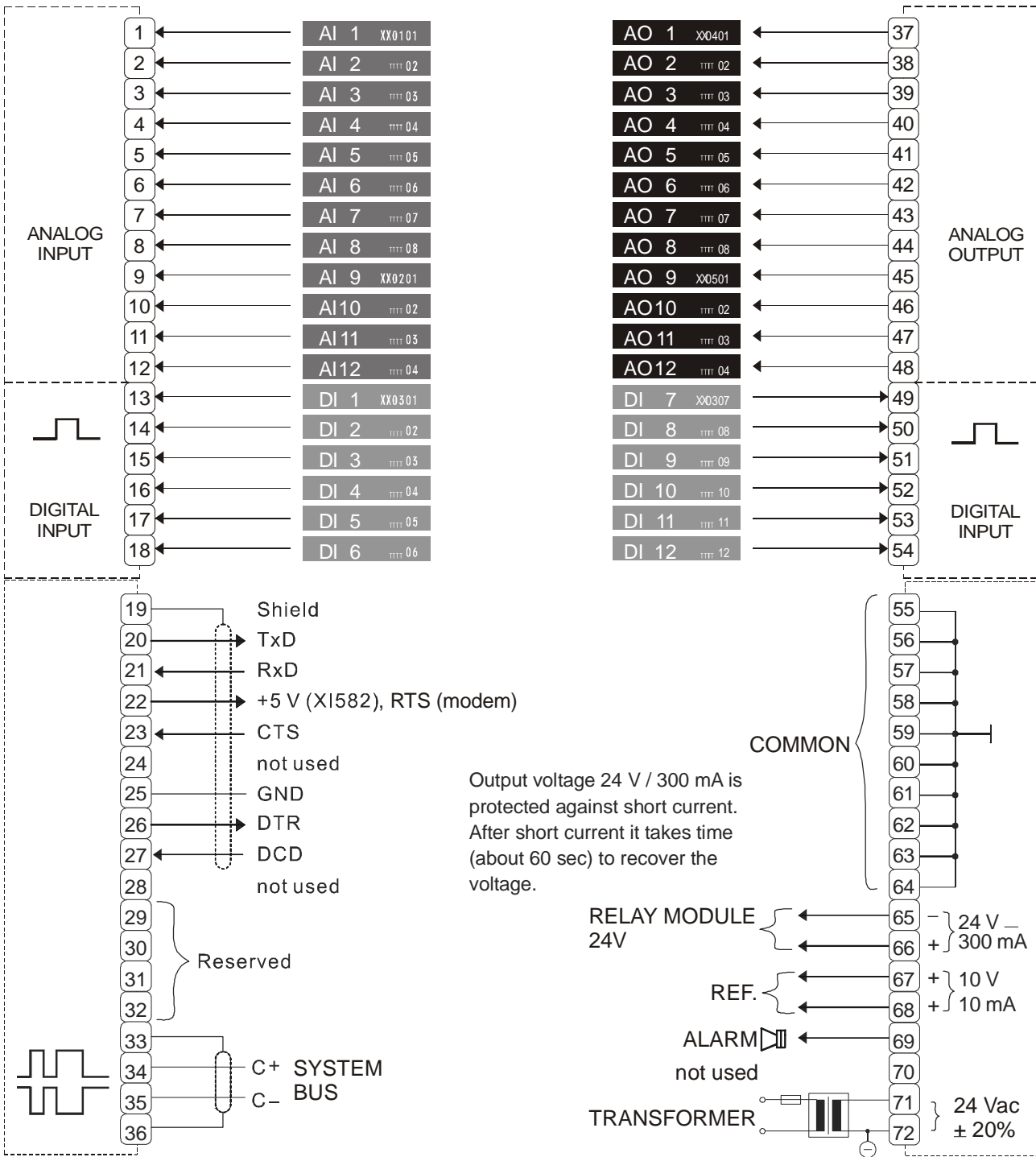
NOTE: L4 to L11 are visible only if the cover plate has been removed.

IMPORTANT

The RESET button reboots the controller's CPU. All plant specific data held in the controller will be lost after a reboot. Before rebooting it is highly recommended saving the current application to the flash EPROM.

See section "Setting the Port Selector Switch" on page 28 for details on setting the port selector switch and serial port.

Terminal Assignment Overview for Excel 100C



Output voltage 24 V / 300 mA is protected against short current. After short current it takes time (about 60 sec) to recover the voltage.

IMPORTANT

Do not connect system bus shield to earth. Use terminals 33 and 36.

NOTE: Use terminals 65 and 66 for relay modules MCD 3 or MCE 3 only. Do not use reference voltage 10 V (terminal 67, 68) to supply other devices.

General Remarks to Electrical Connections

Observe all general VDE, NEC and local wiring regulations when making electrical connections.

CAUTION

Electrical connection work is to be carried out by a qualified technician.

CAUTION

Using free terminals as support terminals can cause system damage.

Free terminals in the base plate must not be used as wiring support points under any circumstances! (Danger of damage). The electrical connection is to be made at the base plate. The appropriate connection diagrams are on pages 10 and 11. Further wiring diagrams are contained in the circuit diagrams.

IMPORTANT

Do not disconnect the Excel 100C controller from power supply for more than 72 hours.

The Excel 100C is equipped with a gold capacitor buffer that holds the RAM data and supplies the real-time clock for 72 hours in case of a power outage. Beyond this period of time, all RAM data and time information are lost.

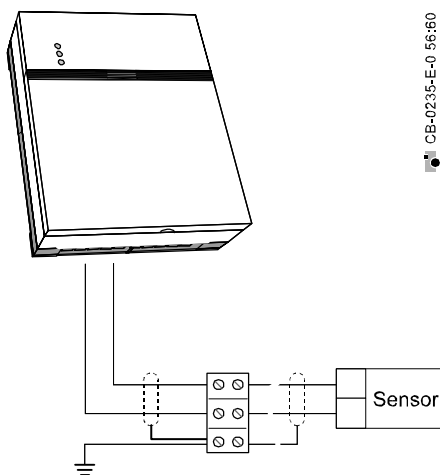
Cable Routing

Minimum distance to mains cables:

10 mm (0.4 in.)

All signal and output cables (low voltage) should be regarded as communication circuits in accordance with VDE 0100, VDE 0800 and NEC, it should therefore be routed separately from line voltage. Minimum distance 10 cm (4 in.) for unshielded cable. Minimum distance 10 mm (0.4 in.) for shielded cable. Joining sensor cables should be avoided.

Shielding of Sensor and Actuator Cables



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Shielding of sensor and actuator cables with low protective voltages is not necessary if the general guidelines on cable routing are observed (see "Cable Routing" on page 11). If, under certain circumstances, the routing guidelines can not be observed, shielded cable must always be used.

IMPORTANT

Shielded cables must be grounded on one side only.

The grounding of the shielded cable must be as shown in the diagram.

Shielding on one side at the control cabinet ground

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

Shielding of Data Transmitting Cables (System Bus and Operator Interface)

IMPORTANT

Data transmitting cables must always be shielded to prevent radio interference.

1. System Bus Cables

Connect shield of system bus cable on both sides

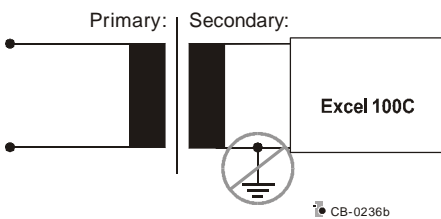
System bus cables must be shielded on both sides at the base plate terminal 33 and 36 of the controller device. Connection to the control cabinet ground or other ground points is not permitted (see WARNING below)!

2. Operator Interface (for external operating devices, only)

To connect remote operators units, ready-made cables are available (XW565; XW582, XW583) with the shield already connected to the computer module plug end.

For detailed information on cable types to be used in accordance with regional requirements, please refer to the U.S. and European Specifications chapters.

System Ground



! WARNING

High voltage

Risk of electrical shock or equipment damage

The controller's system ground must have no connection with the control cabinet ground!

NOTE: A document providing additional information on system grounding (if demanded) is available via the Honeywell Technical Assistance Center (TAC) or, for Honeywell employees, on the Docu Server under:

http://web.ge51.honeywell.de/dep/mc/TAC_Tips.

RFI Suppression

Honeywell actuators are RFI suppressed as standard in accordance with EN 50 081-1/EN 55 022.

Cable Lengths and Cross Sectional Areas

Cross sectional areas related to cable length

Table 2. Signal types and cross-sectional areas

Type of signal	Cross sectional area		
	£ 300 ft (100 m)	£ 550 ft (170 m)	£ 1300 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

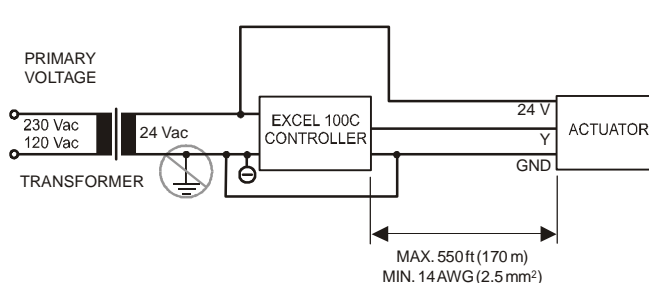
The max. length of a signal cable with 24 Vac supply is 550 ft (170 m).

The max. length of a two-wire, 0 to 10 Vdc signal cable is 1,300 ft (400 m).

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

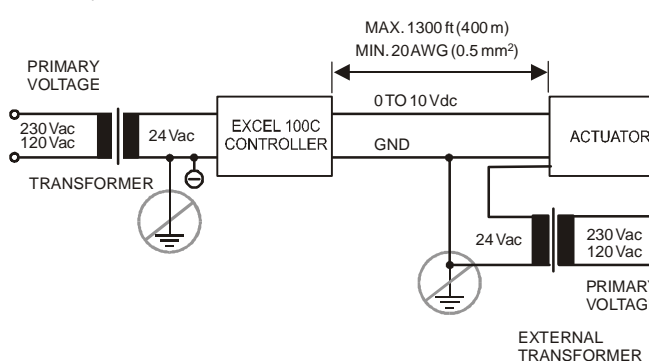
For detailed information on cable types to be used in accordance to regional requirements, please refer to the U.S. and European Specifications chapters.

Cabling of Actuator with 24 Vac Supply and max. 550 ft (170m).



Cabling of Actuator with 24 Vac Supply from External Transformer and max. 1,300 ft (400 m).

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.

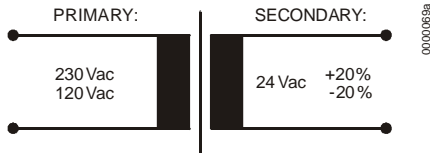


NOTE: The transformer must be chosen in accordance with specifications listed in the U.S. and European Specifications chapters.

IMPORTANT

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

Line Power Supply



The Excel 100C Controller is powered by an external transformer.

Transformer requirements for one Excel 100C Controller:

Secondary Voltage	24 Vac \pm 20% or 21-28 Vdc
Current	1.1 A
Power	15 VA (Excel 100C, only; no MCE/MCD) 25 VA (if fully equipped with MCE/MCD)

The transformer, already installed in the cabinet, can be used to supply several controllers, communication devices, or peripherals (e.g. actuators, etc.) – provided it delivers sufficient power.

For detailed information on transformers to be used in accordance to regional requirements, please refer to the U.S. and European Specifications chapters.

Standard Transformers

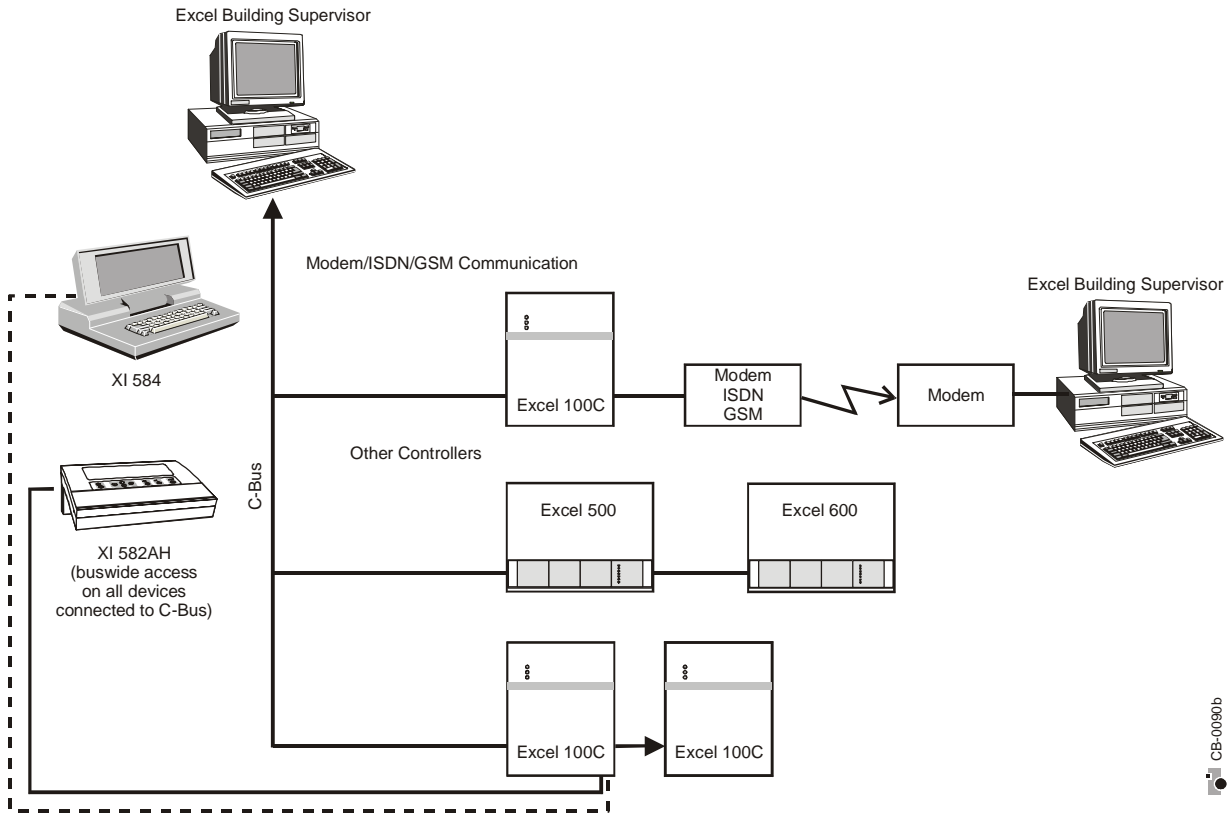
Requirements for standard transformers

Table 3. Requirements for standard transformers

Output voltage	Impedance	AC current
24.5 Vac to 25.5 Vac	\leq 1.15 ohms	max. 2 A
24.5 Vac to 25.5 Vac	\leq 0.40 ohms	max. 6 A
24.5 Vac to 25.5 Vac	\leq 0.17 ohms	max. 12 A

Communication

Excel devices may communicate in different modes and lines. The principal communication scheme is shown in the accompanying figure.



C-Bus Termination

Switch settings for C-Bus termination

The back of the Excel 100C housing is equipped with a rotary switch for the C-Bus to set the bus termination appropriate for the communication speed (see Table 4 and figure below).

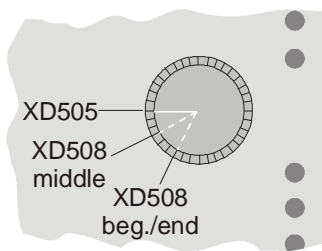


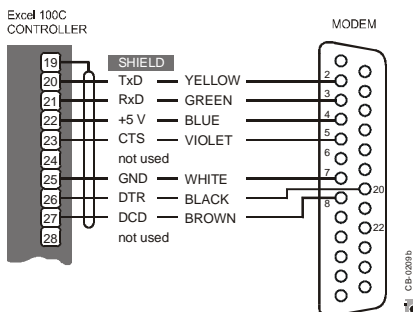
Table 4. Switch settings and communication speed

Switch setting	Communication speed	Controller location	Compatibility
up	max. 9.6 Kbaud	-	XD505A, XL20XD
middle	max. 76.8 Kbaud	middle of C-Bus	XD508, XL20XD508
down	max. 76.8 Kbaud	beginning or end of C-Bus	XD508, XL20XD508

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

Connection to modem

This figure shows the connection between Excel 100C and modem via cable XW571 (see page 29 for details).

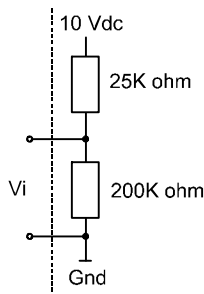


Lightning Protection

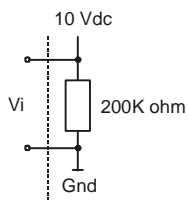
Please check with your local Honeywell representative for information on lightning protection.

ELECTRICAL CONNECTION

Terminal Assignment for Analog Inputs



**Analog input
low impedance
for RTD (resistive
temp. device) sensors**



**Analog input
high impedance
(selectable in CARE)**

Specifications

- Twelve inputs (AI1 to AI12)
0 to 10 Vdc (see left drawings for impedance)
0 to 20 mA (via external 500-ohm resistor)
4 to 20 mA (via external 500-ohm resistor)
NTC 20k ohms (-58°F to +302°F (-50°C to +150°C))
PT 1000 (-58°F to +302°F (-50°C to +150°C))
- Protected inputs up to 40 Vdc/24 Vac
- 12-bit resolution
- ±75 mV accuracy (0 to 10 V)

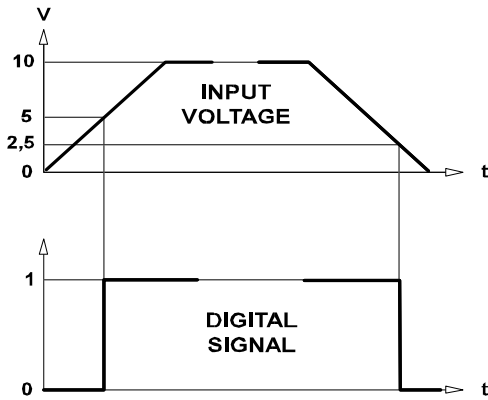
For examples on electrical connection of various sensors, refer to the U.S. and European Specifications chapters.

Accuracy of analog input sensors

Table 5. Accuracy of analog input sensors in relation to temperature

Range	MEASURE ERROR / ± KELVIN (WITHOUT SENSOR TOLERANCE)	
	Pt1000	NTC (20k ohms)
-58 to -4°F (-50 to -20°C)	≤ 1.2 K	≤ 5.0 K
-4 to 32°F (-20 to 0°C)	≤ 0.7 K	≤ 1.0 K
32 to 86°F (0 to 30°C)	≤ 0.5 K	≤ 0.3 K
86 to 158°F (30 to 70°C)	≤ 0.7 K	≤ 0.5 K
158 to 212°F (70 to 100°C)	≤ 1.2 K	≤ 1.0 K
212 to 266°F (100 to 130°C)	≤ 1.2 K	≤ 3.0 K
266 to 302°F (130 to 150°C)	≤ 1.2 K	≤ 5.5 K

Terminal Assignment for Digital Inputs

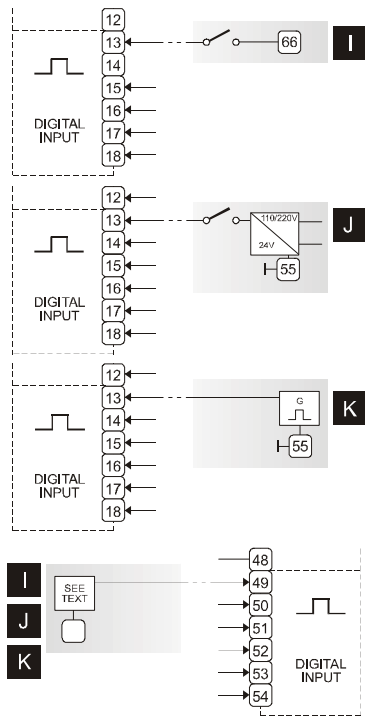


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DC voltage signals or AC voltage signals can be processed via the digital inputs. The Excel 100C has 12 digital inputs. From 5 V input voltage upwards, the digital signal is set to status 1. With a hysteresis of 2.5 V, the digital signal must fall below 2.5 V so that the digital status 0 is transmitted ($R_i = 15k\ \text{ohms}$).

IMPORTANT

Line voltage must not be present at any of the terminals under any circumstances. Devices with 110 V/230 Vac must be isolated by a transformer.



CB-0710-E-0 70:137

Six additional digital inputs are available at the terminals 49 to 54 for switching to **I**, **J**, or **K**.

Table 6. Use of input terminals as counter inputs

Input terminals	Frequency	Pulse duration	Pulse break	Bounce time
13 to 14	max. 15 Hz	min. 20 ms	min. 33 ms	max. 5 ms
15 to 18, 49 to 54	max. 0.4 Hz	min. 1.25 sec	min. 1.25 sec	max. 50 ms

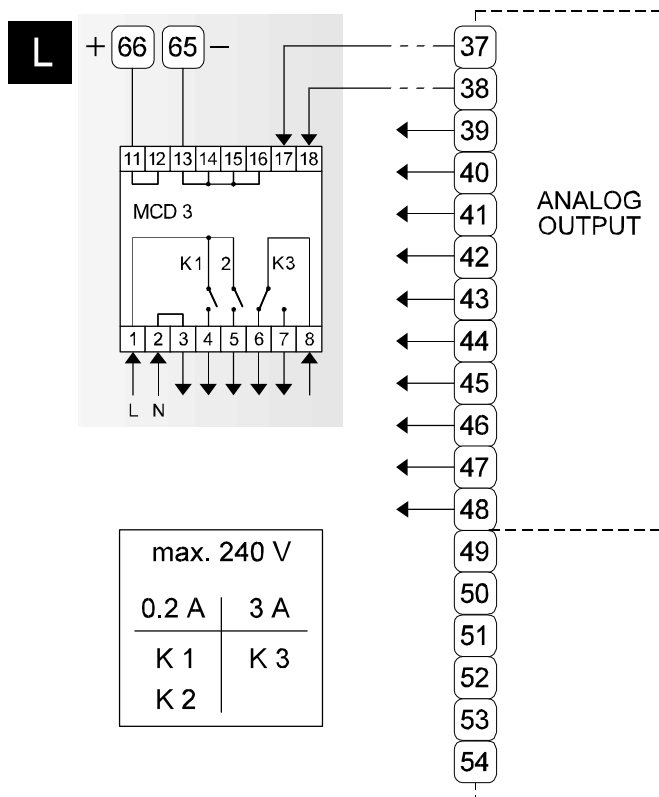
Terminal Assignment for Relay Modules

The relay modules facilitate the control of peripheral devices with high load via the analog outputs of the controller.

The analog outputs provide an output current of 0 to 20 mA. Via an external 500-ohm resistor, an actuator with an input impedance of 500 ohms can be used as 0 to 20 mA device.

Specifications

- Twelve outputs (AO1 to AO12)
0 to 10 Vdc (+10%) output
0 to 20 mA output current (via external 500-ohm resistor, see above)
0.1 mA max. sink output current
- Protected inputs up to 24 Vac
- 8-bit resolution
- ± 100 mV/ ± 1 LSB accuracy (1 LSB = 43 mV)
- ± 100 mV/ ± 1 LSB zero point (1 LSB = 43 mV)



The relay modules are supplied via the special relay connection of the controller (terminals 65/66)

IMPORTANT

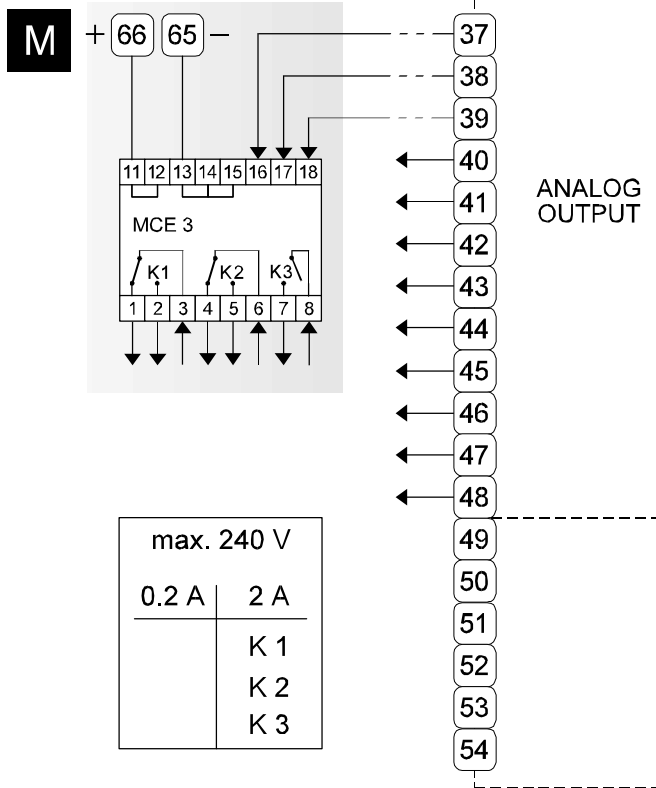
- Important during connection:*
1. Correct polarity
 2. Under no circumstances may a relay module be connected to the reference voltage.

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

Plus pole: Terminals 11/12 of the relay
Minus pole: Terminals 13 to 16 of the relay

MCD 3:

L (Fig. left)
Terminal 17 controls the changeover contact K3. Terminal 18 controls the ON contacts K1, K2. Ground can be looped through terminals 2/3.



MCE 3:

M (Fig. left)

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

IMPORTANT

It is not allowed to draw more than 300 mA out of terminal 65/66.

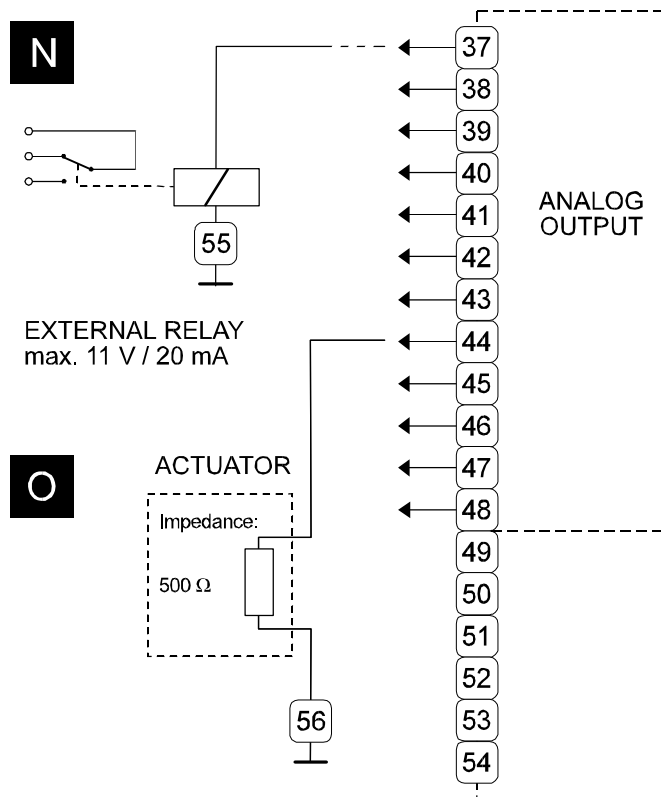
The number of MCE and MCD modules that can be used depends only on the available AOs.

This means:

- 5 MCE** 15 relays incl. watchdog alarm terminal 69
- or
- 6 MCD** 12 relays

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Terminal Assignment for Relays and Actuators



CB-0717-E-0 84:104

N Connection of external relays. Each analog output can be connected to an external relay which has similar data to the relays described under the U.S. and European Specifications chapter.

The impedance of the relay must be a min. of 500 ohms for an output voltage of 11 V; an impedance of less than 500 ohms can cause erroneous output voltage.

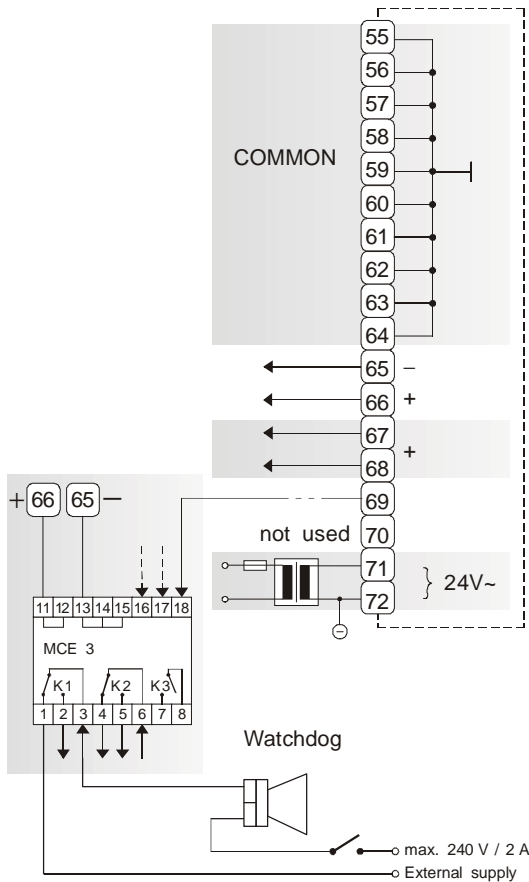
The output current is limited up to max. 20 mA.

O Type of connector for actuators with standard input signal 0 to 20 mA, but the sensor input impedance must be 500 ohms.

Each channel can be used as an analog output 0 to 10 V, or, respectively, as current output 0 to 20 mA with an external 500 ohms impedance.

The outputs are protected against over-voltage and overload 24 Vac.

Connection of Alarm Relays



The selection of a signal transmitter for the watchdog alarm is optional. It is recommended that a switch for turning off the alarm be provided.

NOTE:

Terminal 69 is used to control the module MCE 3, only. The digital output cannot be used for a relay.

Closed Attribute

Normally Open/Normally

Beginning with V2.04.00 firmware, the point attribute NO/NC defines the relation between the physical states (contact position and relay ON/OFF, respectively) at the digital inputs and outputs and their logical status. The following tables show the relationships.

Table 7. Digital input parameters

Contact position	NO/NC attribute	Logical status	Input voltage
Open	NO	0	≤ 2.5V
Closed	NO	1	≥ 5V
Open	NC	1	≤ 2.5V
Closed	NC	0	≥ 5V

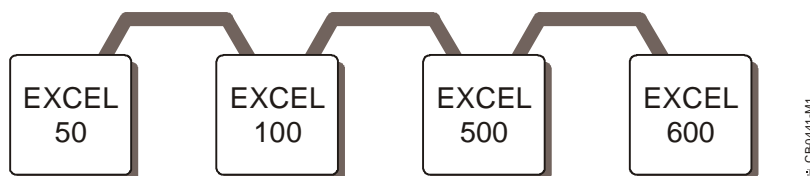
Table 8. Digital output parameters

Relay ON/OFF	NO/NC attribute	Logical status	Input voltage
On	NO	1	24V
Off	NO	0	0V
On	NC	0	0V
Off	NC	1	24V

System Bus (C-Bus)

Up to 30 controllers can communicate with one another and a PC central via the system bus. In addition to Excel 50, 100, 500/600 controllers, other system bus compatible components can also be connected (Excel IRC Multicontroller, Excel EMC). The system bus must be connected through the individual controllers (open ring).

Figure 1. Open-ring connection of controllers



NOTE: Star connection is not permissible because uncontrollable line reflections may occur.

For setting up the system bus in the right way, three steps have to be followed:

- cable specification for system bus
- baud rate selection

The maximum communication speed of the XC5010C/XCL5010/Excel 50 / Excel 100C is 76800 baud. These controllers can be mounted together with the XC6010 or Excel 100B (with XD505A or XD508 submodule) since the XC5010C / XCL5010 / Excel 50/Excel 100C communication speed can be adjusted to match either submodule.

NOTE: When changing the baud rate of bus devices, proper communication cannot be ensured until all bus devices are set to the same baud rate again.

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

See page 15 for details on setting the C-Bus termination on the Excel 100C.

IMPORTANT

For communication with more than 9600 baud it is required to enable the termination of the first and the last device on the C-bus (see page 15). The controllers with termination must be switched on prior to the controllers in the middle of the C-bus. The C-bus might not work if the controllers with termination are switched off.

System Bus Cable Types

The cable specification depends mainly on the baud rate. There are regional differences as to whether shielded or unshielded cable must/can be used.

For detailed information on cables to be used in accordance to regional requirements please refer to the U.S. and European Specifications chapters.

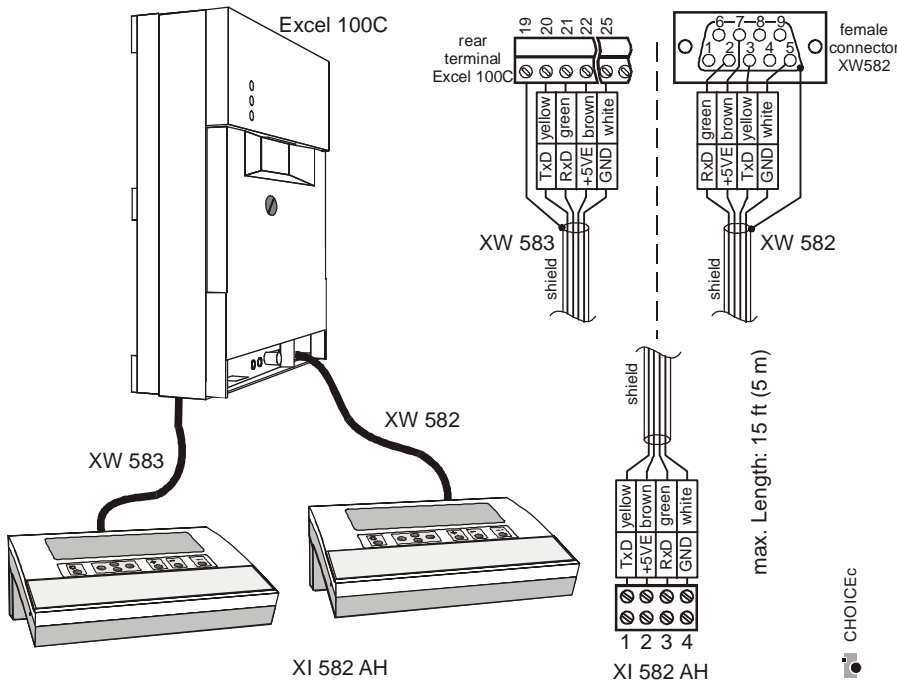
System Bus Extension by Using Repeaters

The system bus length can be extended by using repeaters. Each repeater extends the bus length by the amount of a single bus length. Due to differences in regional guidelines, the maximum number of repeaters that may be added to a bus varies.

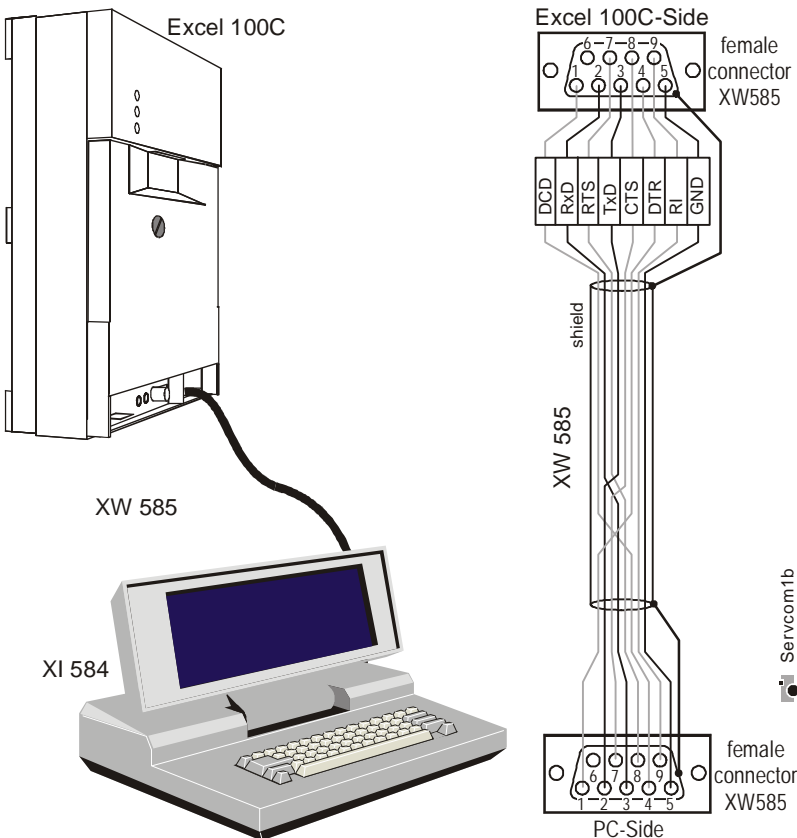
For detailed information on repeaters to be used in accordance to regional requirements please refer to the U.S. and European Specifications chapters.

Connections to Operating Device

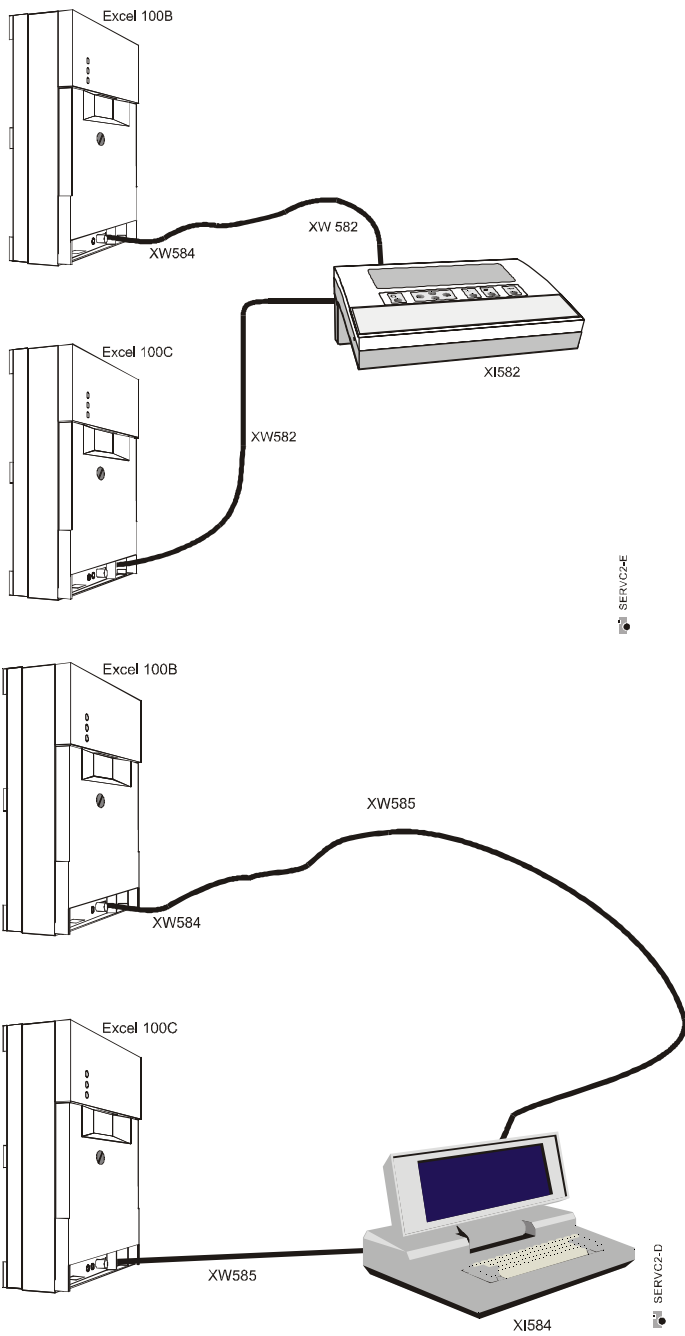
Wiring to XI582AH Operator's Unit



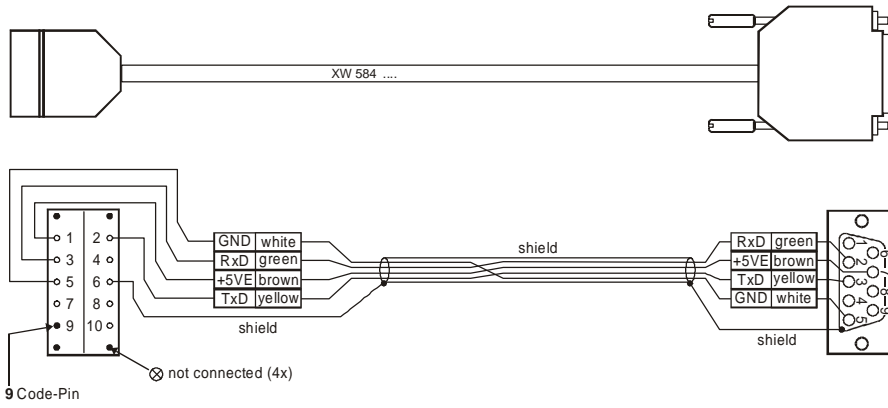
Wiring the XI584 Operator and Service Computer



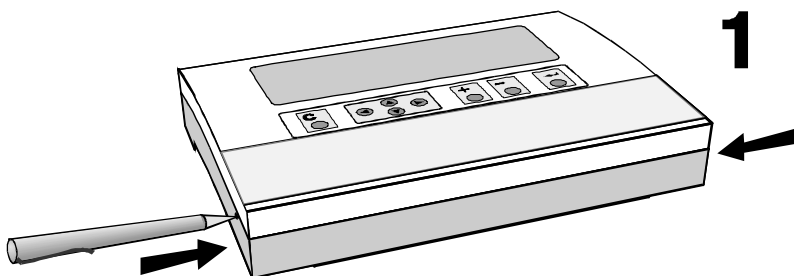
Adapter Cable XI582 and XI584 to Excel 100B and C



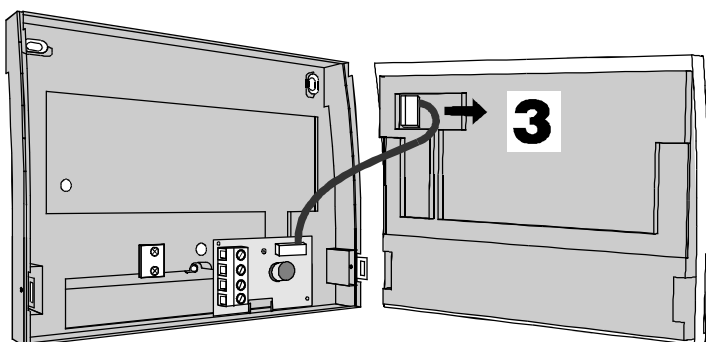
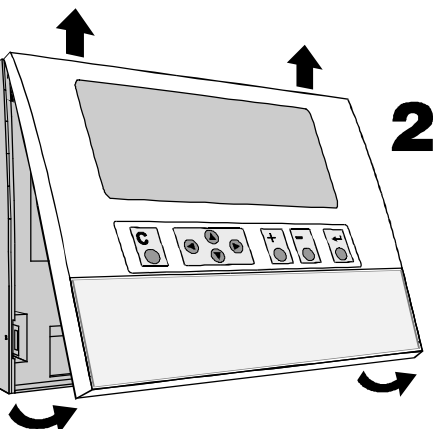
The adapter cable is needed when the same MMI unit XI582AH or XI584 is used on a site where there is a mix of Excel 100C and Excel 100B controllers. Always use the new cables XW582 and XW585 with the Excel 100C and the additional adapter cable XW584 for connecting to the Excel 100B.



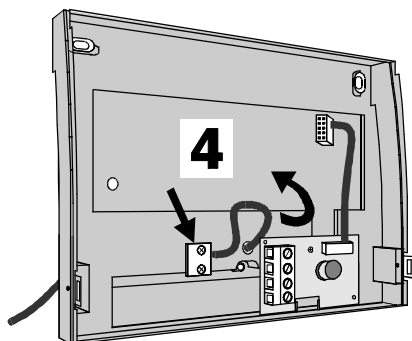
Operator's unit XI582AH



1, 2 Loosen cover

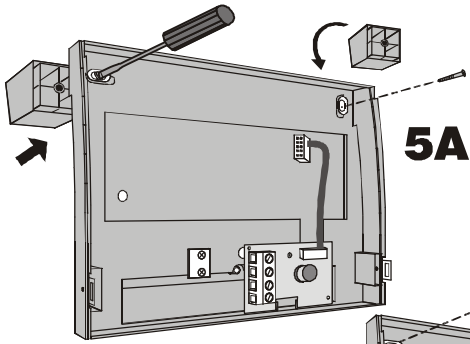


3 WALL MOUNTING ONLY:
Disconnect cable from panel
to make wall mounting easier

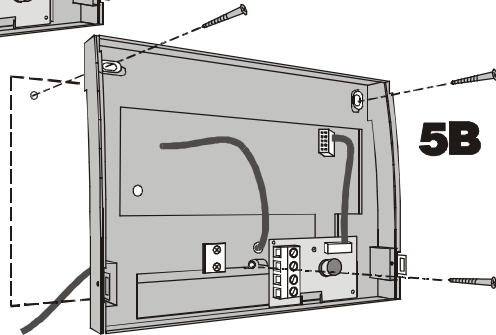


4 Cable route from Excel 100C

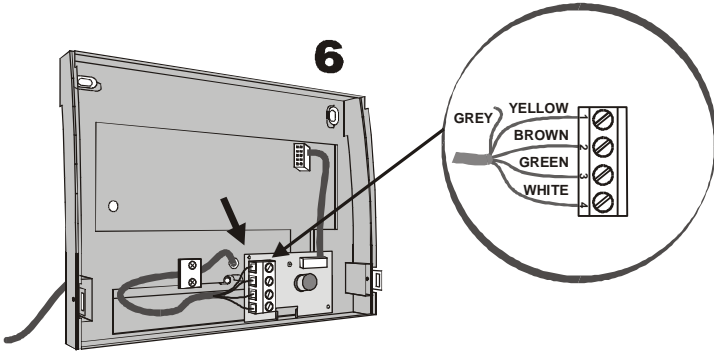
CB-0702a



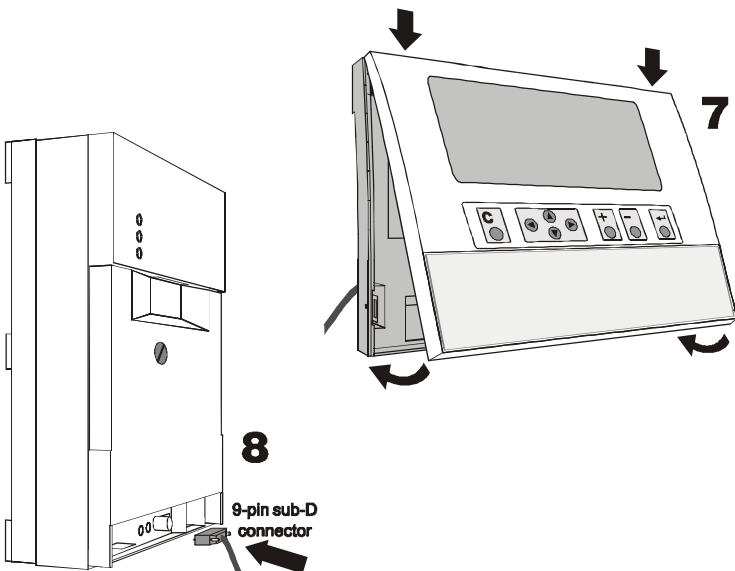
5A OPTION
Desktop position:
Assemble feet



5B Wall mounting:
Fix the housing to the wall



6 Electrical connections
(Grey wire not used)



7 Mount the cover

8 Connect cable to controller device

Setting the Port Selector Switch

IMPORTANT

It is imperative that you properly set the port selector (left to the front port, see figure on page 29); e.g. after having operated an MMI via the front port, the switch has to be set back to its left position to reactivate a modem being connected to the rear terminals. If the switch is set to "front

port", the rear terminals are deactivated, and vice versa.



Front port active



Rear terminals active

REMOTE COMMUNICATIONS

For remote communications with up to three XBS Building Centrals, a modem or ISDN* terminal adapter can be connected directly to the front serial port or the rear terminals on the base of the Excel 100C (see graphics below).

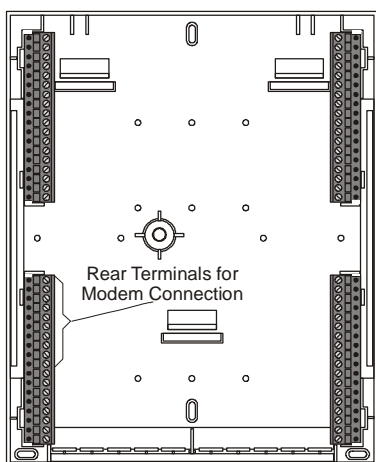
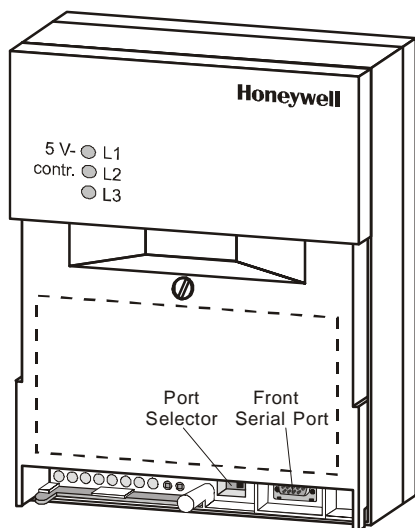
NOTES: Remote communication via modem or ISDN* terminal adapter requires firmware version V2.03.01 or higher.

XBSi building supervisors are not supported for remote communication.

Modem or ISDN* Terminal Adapter Connections

The front serial port of the Excel 100C accepts a standard modem cable with a female 9-pin connector. Use the cable that is supplied with the modem/ISDN* terminal adapter.

To connect to the rear terminals on the base of the Excel 100C, use cable XW571 (length: 6 ft (1.9m)).



CE-0 603-F

Table 9. XW571 Connection

Pin of Excel 100C	RS232 Signal	Wire Color
19	Shield	Clear
20	TxD	Yellow
21	RxD	Green
22	+5 V (RTS)	Blue
23	CTS	Violet
not used		
25	GND	White
26	DTR	Black
27	DCD	Brown
not used		

NOTE: Pin numbers shown are for the rear connector on the base of the Excel 100C controller (also see page 15).

IMPORTANT

Make sure the port selector switch is set appropriately. Failure to do so can cause erratic system operation (see page 28 for details).

***ISDN 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 controller
- 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 controller side and on XBS side) ⇒ use same modem
- After a switch-on of the DTR line by the controller 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 100C will automatically detect the device (MMI or modem) attached to the serial port and set the appropriate communication speed. The controller will also automatically adapt to alphanumeric return codes used by the modem. This automatic detection and adjustment can take up to 5 seconds.

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

Automatic Baud Rate Synchronization

The default communication speed between the Excel 100C and the local modem/ISDN* terminal adapter is 9600 BPS.

The communication speed between the Excel 100C 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 a feature that all state-of-the-art modems/ISDN* terminal adapters provide 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 100C will automatically detect whether the modem/ISDN* terminal adapter is initialized in auto-answer or manu-answer mode, and it will set the modem to manual answer mode (S0=0)

***ISDN NOTE:** Communication via ISDN is applicable only for Europe.

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 on the MMI. This will allow an quick and easy modem reset without the need 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 not to 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 setup program on a computer with the device connected to the computer serial port or using the Windows™ terminal program.

***ISDN NOTE:** Communication via ISDN is only applicable for Europe

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.
2. Add the prefix required for access to 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 prior to sending the set-up to the remote Excel 100C controller.

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 the XI581/582 Buswide Operator Interface User Guide, EN2B-126, for the procedure for fixing the baud rate.

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 under:

*Technical Assistance Center/Controllers/Excel 80 and 100 and 500 and 600/
technical literature/modemfaq.doc*

or on the Docu Server under:

http://web.ge51.honeywell.de/dep/mc/TAC_Tips/Modem_FAQ.doc

TCP/IP DIAL-UP VIA TCP/IP MODEM XM500

The Honeywell TCP/IP modem XM500 allows use of a TCP/IP network (e.g. Ethernet LAN/WAN networks) to achieve a dial-up connection between an XBS building supervisor and an Excel 100C controller. The set-up is identical to that of a telephone modem connection with the exception of the additional need for definition of the Ethernet address.

Details can be obtained from the XM500 Product Data Documentation on the Honeywell Intranet under:

http://web.ge51.honeywell.de/dep/mc/HVAC_Products/Automation_and_Control/Modem-Interface/xm500/xm500.zip

GSM COMMUNICATION (EUROPE ONLY)

For communication via the Global System for Mobile communications (GSM), a Siemens M20 Terminal (cellular engine) is required and must be connected directly to the serial port of the Excel 100C (either front or rear connection). The M20T translates the Excel CPU data received in transparent mode into the GSM standard. The M20T behaves like a Hayes-compatible modem connected to the Excel controller serial port, and it then transmits via GSM like a cellular (mobile) phone.

IMPORTANT

With the M20T, data communication is only possible in 900 MHz GSM networks. GSM networks operating at 1800 MHz or 1900 MHz are not supported.

The maximum communication speed is determined by the current GSM standard, which is 9600 baud. Due to a special transmission mechanism, the effective communication throughput is lower than 9600 baud – however this will be noticeable only when high data volumes are transmitted, e.g., when application download is performed.

M20T Safety Precautions



CAUTION

Use of the M20 Terminal on-board aircraft is forbidden.

Use of a Cellular Engine in an aircraft, such as for the purpose of wireless connection of an aircraft based HVAC system to an XBS central, can endanger navigation, it interferes with the cellular network and it is illegal. Failure to comply with this prohibition may lead to temporary suspension or permanent cancellation of Cellular Engine services for the person who disregards this prohibition and/or to legal action against said person.



CAUTION

Users are advised to NOT use the M20T in automotive service stations.

Users are reminded of the necessity of complying with restrictions regarding the use of radio devices in fuel depots, chemical plants and locations where explosives are ignited.

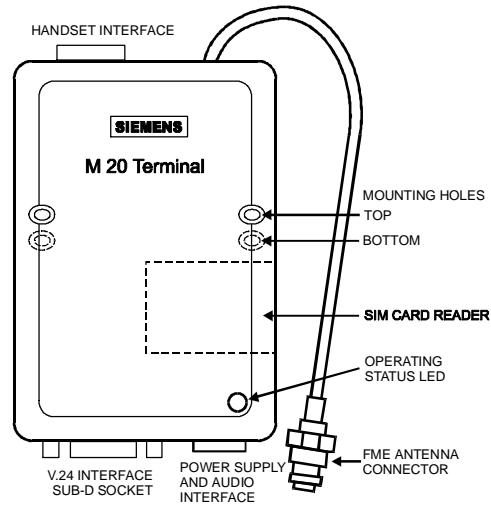
Additional precautions are as follows:

- When receiving calls on a public highway, such as a cooling control system of a refrigeration truck being called by an XBS central, the M20T is not permitted to use "warning" devices which permit the vehicle's horn to sound or the lights to flash.
- Drivers are advised not to use the handheld microphone or the telephone handset while their vehicle is in motion, except in emergencies. Use the hands-free facility to speak only if it does not divert your attention from the traffic.
- Operation of the M20T can disrupt the operability of inadequately protected medical devices. Please address all questions to a doctor or the manufacturer of the medical device.
- The M20 Terminal shall not be used within wet environment, such as in public baths.
- If your M20 Terminal, your SIM card, or both are lost, notify your network operator immediately in order to avoid misuse.

Required Third-Party Equipment

The Siemens M20 Terminal (shown below) is required for GSM communication. In addition, a 3 V Mini SIM card with personal identification number (PIN) is required for the M20T. The Mini SIM card, supplied by the GSM Network Provider, must be released for data communication at 9600 baud.

A separate telephone number is required for data communication with the same SIM card (one telephone number for voice communications and one for data).



Mechanical characteristics:

Weight	145 g
Dimensions (max.) LxWxH	107.0 x 63.5 x 31.3 mm
Temperature range	-20°C to 55°C
Protection-class	IP40
Mechanical vibrations	Amplitude 7.5mm at 5 to 200 Hz sine
Max. pulse-acceleration	30 g pulse with 18 ms duration
Air humidity	5–98%

Electrical characteristics:

Operating voltage range	8 to 28.8 Vdc, +/- 5% ripple
Undervoltage/overvoltage protection:	0 V / 45 V
Power consumption at 12V	<200 mA speech mode, <14 mA idle mode
Max. line-in/out cable length	2 m (e.g. modified NOKIA 2110 for M20T)
Protection fuse	1 A, fast blow
Max. RF power	2 W at 900 MHz
Power supply connector	6-pin modular

CE conformity:

- 89/336/EC (EMC guideline)
- 73/23/EC (Low voltage guideline)
- 91/263/EC (Telecommunications devices guideline)

Standards:

- EMC: ETS 300 342-1
- Safety: EN 60950
- GSM network: TBR 19, TBR 20

Serial Cable

For connecting the M20T to the Excel controller, a standard RS232 cable (9-pin V24 sub-D sockets) is required.

GSM Antenna Requirements

All major suppliers of GSM antennas can supply GSM900 Antennas with FME plugs to connect with the M20 Terminal for a variety of applications. Some antenna examples are shown below.

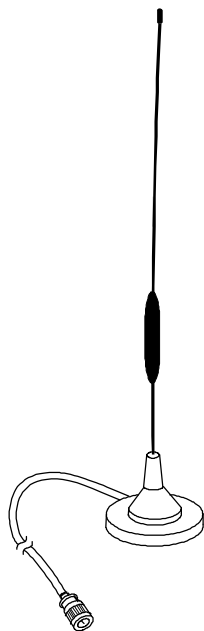
The antenna must satisfy the following electrical requirements:

Frequency TX	890-915 MHz
Frequency RX	935-960 MHz
Impedance	50 ohms
VSWR TX:	max. 1.7:1 installed
VSWR RX	max. 1.9:1 installed
Gain	> 1.5 dB referenced to $\lambda/2$ dipole
3dB width of cone	vertical: 80°; horizontal: 360°
Maximum power	1 W (cw), 2 W peak; at ambient temperature of 55°C

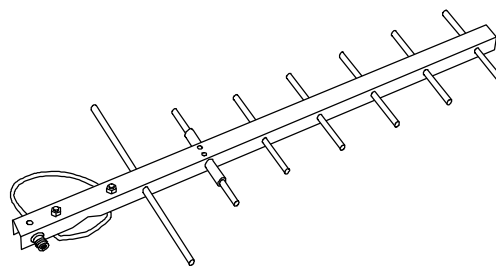
Depending on the application and the RF field at the local site, the GSM antenna may be mounted directly or via cable. The maximum antenna cable length is 8.0 m (including 20 cm M20 Terminal-cable)

NOTE: The maximum number of push/pull cycles shall not exceed 100.

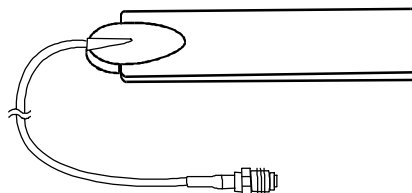
The antenna interface connector of the M20 unit is a FME connector (of type SMR nano (male)). Hence, the connector on the GSM antenna or antenna cable has to be of type SMR nano (female), or use a double female connector in between).



ROUND RADIATION ANTENNA,
MAGNETIC BASE, 5 dBi



DIRECTIONAL ANTENNA (YAGI), 12 Dbi



WINDOW PATCH ANTENNA, 2 dB

GSM Antenna Installation

The maximum antenna cable length is 8.0 m (including the 20 cm M20 Terminal cable). Use a cable that is specified by the supplier of the GSM antenna. Improper cables with resistances that are too high will reduce the amplification of the antenna.

- Ideally you should know in which direction the next GSM station is located in order to position of the antenna accordingly.
- The easiest way to check the signal quality is to operate a cellular (mobile) phone at the very place where you want to place the antenna.
 1. The cellular phone must operate in the same GSM network as the M20T.
 2. Drop-outs in voice communication indicate that the reception is too weak. The data communication will never work where you have drop-outs in voice communication with the cellular phone. The preferred way is to set-up the M20T on a terminal program and check the reception with the SIEMENS AT commands – see the M20T handbook.
 3. An alternative way to verify the signal quality is to use the terminal program on the CD, that is supplied with the M20T. You will find a special button on it that allows checking of the signal quality.
- Dipole antennas - e.g., antennas with a magnetic foot - must sit on metal ground to achieve the specified amplification. The larger the metal ground, the better.
- The antenna must be mounted vertically, NOT horizontally.
- Avoid barriers for the antenna signal. Ideally, within a range of approximately 3 meters there should not be any vertical barriers that would block the antenna signal, such as doors, PCs, cupboards, etc.
- Select the most suitable antenna. Location and mounting limitations may require that special antennas be used, such as antennas with higher amplification or directional antennas.
- Avoid loose contacts. All connections from the M20T to the antenna must be tight.
- Increase the distance between the antenna and Excel CPU if you experience electromagnetic interference of the antenna signal to the CPU. An indication of this might be that the functioning of the CPU's MMI is disturbed or that the outputs behave abnormally.

M20 Terminal Set-up

Prior to beginning the set-up, get the M20T manual. Everything is described in it and you will need it.

IMPORTANT

It is absolutely mandatory to use a serial data line monitor for the set-up of the M20T. Without such a device being connected between the serial port of the PC and the M20T, you will get no information on the set-up process.

1. Insert the SIM card into the M20T.
2. Connect the serial cable to the M20T and a PC or laptop.
3. Connect the antenna cable and antenna to the M20T connector.
4. Start a terminal program, e.g., Windows™ HyperTerminal
5. Connect the power supply to the M20 Terminal and plug into mains. The M20T LED will be blinking now.
6. Set terminal program to 19200 baud.
7. Verify the correct operation of the M20T serial interface by entering: AT. The M20T will respond: OK.

8. Change the M20T's baud rate from 19200 (factory default) to 9600: AT+IPR=9600.
9. Set terminal program back to 9600 baud.
10. Command the M20T to cut the line whenever the DTR signal is dropped (OFF) or toggled ON/OFF: AT&D2
11. Store setting in nonvolatile memory: AT&W.
12. You may now enter the PIN number or let the Excel CPU do this. If you want to enter the PIN number now, enter the PIN with the command AT+CPIN="xxxx", where xxxx represents the PIN number.

NOTE: Regarding the PIN entry, the M20T shows the same behavior as a regular cellular phone, as it uses the same type of SIM card. This means, for example, that after three false PIN inputs, the SIM card will lock and need to be released via the "PUK" Personal Unlocking Key (Master PIN). Repeated input of the wrong "PUK" (more than two false inputs) will destroy the SIM card irrevocably.

13. Once the M20 has accepted the PIN it will log into the GSM net. The terminal window will show "OK". The M20T LED will be on continuously.
14. Disconnect the serial cable from the PC/laptop and connect it to the Excel CPU.
15. Verify that the M20T dials out on the telephone number for data communication, otherwise its call will not be recognized by the XBS. The M20T can be forced to do so by adding the letter <i> to the telephone number, e.g.<ATDi1234567891234>

NOTE: As soon as the PIN is entered into the Excel controller, the following mechanisms will take place automatically:

- Cyclical check (once per minute) for existence of the PIN number in the M20 (AT+CPIN?)
- Sending of PIN number to M20T, if it has lost it. This guarantees communication will resume automatically after exchange of the SIM card or after power to the M20T has been lost.

Deletion of the PIN number or resetting the controller will stop the above mechanisms.

Verification of the PIN

You can verify the PIN without connecting a terminal program by following these steps:

1. Connect the XI582AH MMI.
2. Enter PIN.
3. Disconnect the XI582AH MMI.
4. Connect the M20T and wait 10 seconds.
5. Reconnect the XI582AH MMI.
6. View the "PIN" field.
7. If it shows "0", the PIN was wrong.
8. If it shows "PIN", the PIN was correct.

Additional information about the M20 terminal may be found at the following website:

<http://www.siemens.de/ic/products/cd/english/index/products/cellular/m20t.html>

BACKLIGHT

Deactivating the Backlight of the Operator's Unit XI582AH

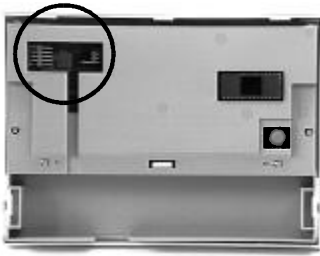


Fig. 1: Jumper Location

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The XI582AH operator's unit is equipped with an integrated backlit display to suit the display to the ambient lighting conditions. By default, this backlight is ON.

This can be disabled by means of a jumper if required.

The jumper is located at the back of the XI582AH cover (Fig. 1).

The figure above shows how to gain access to the jumper.

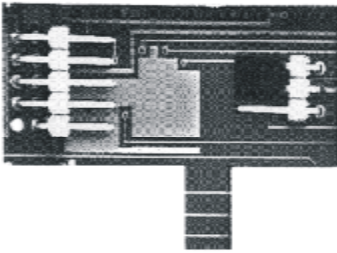


Fig. 2: Jumper ON Position

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To change jumper position we recommend to disconnect the connector first, then pull off jumper with tweezers or pincers and move to new position (Fig. 2, 3).

When the jumper is enabled (ON-position) the backlight will be activated with the first key press of any of the eight operating keys. If no entries are made for approximately two minutes, the backlight turns itself off automatically until the next key is pressed again.

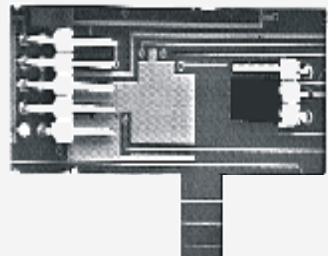


Fig. 3: Jumper OFF Position

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When the jumper is disabled (OFF-position) the backlight is permanently deactivated.



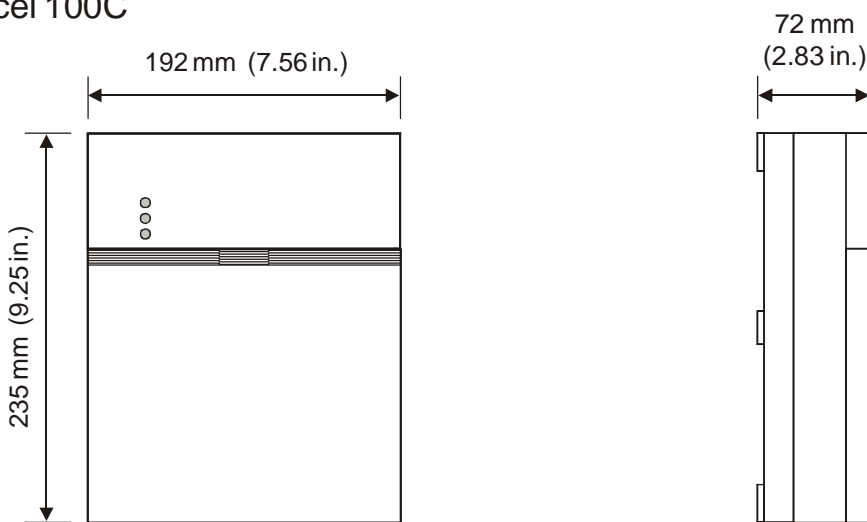
Fig. 4: Contrast Potentiometer

CB0284-E0 56:42

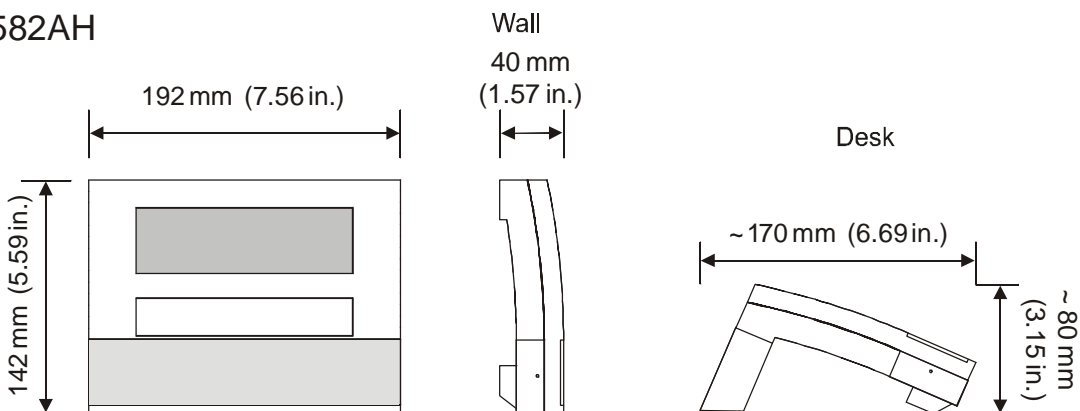
You may adjust contrast of the display using the potentiometer at the rear of the unit (Fig. 4).

DIMENSIONS

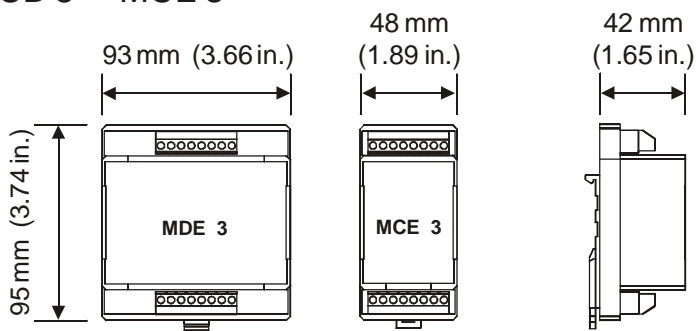
Excel 100C



XI582AH



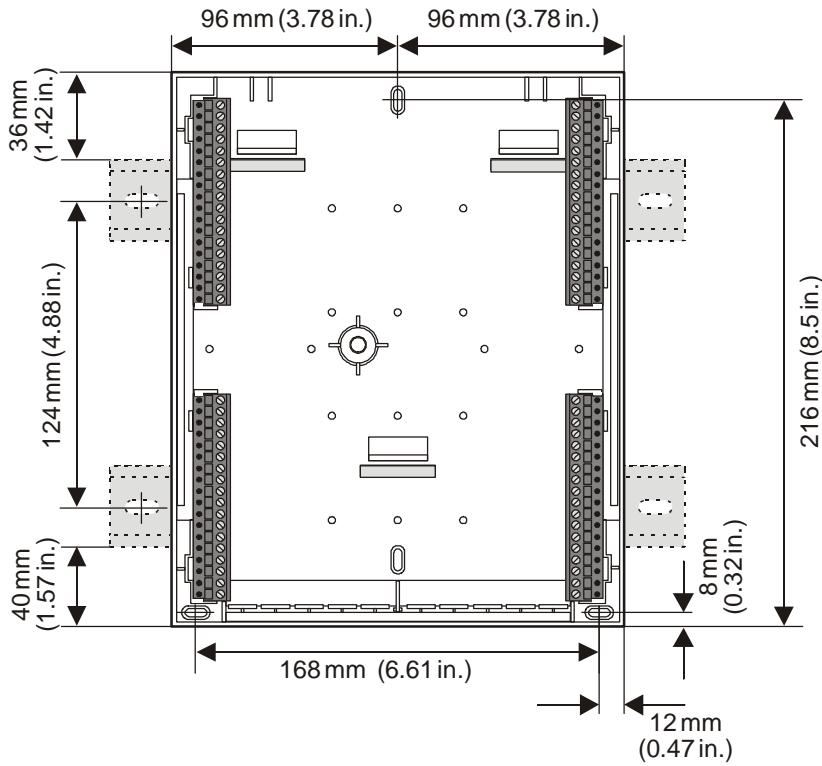
MCD 3 - MCE 3



CB-0285b

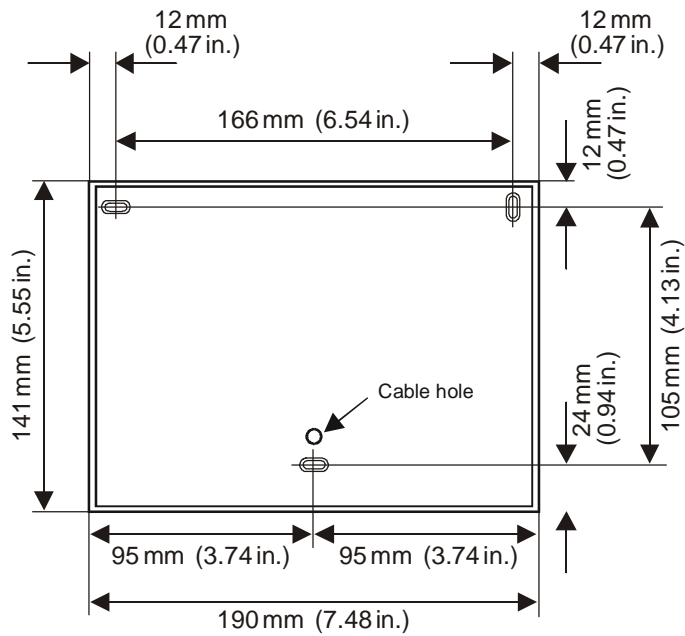
Base Excel 100C

(shown mounted on 35 mm (1.5 in.) DIN-rails (DIN/EN 50 022 35x15)
for wall mounting use screw holes located in the top center and bottom corners)



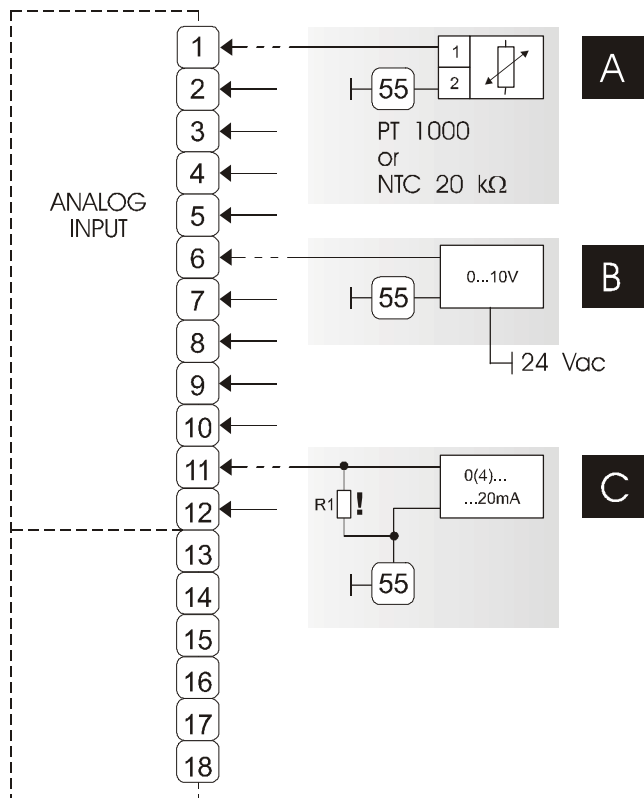
Base XI582AH

(wall mounting)



U.S. SPECIFICATIONS

Electrical Connection of Sensors



Sensors and Transmitters

A Type of connection for sensors

- 1.) PT 1000 / I (-58°F to +302°F) (-50°C to +150°C)
- 2.) NTC sensors 20k ohms

Example:

Room temperature sensors T7589, T7770A
 Discharge, Hot, or Chilled Water sensors C7031B, C, D
 Outside Air temperature sensor C7031F

B Type of connection for active sensors with standard output signal 0 to 10 V

Example:

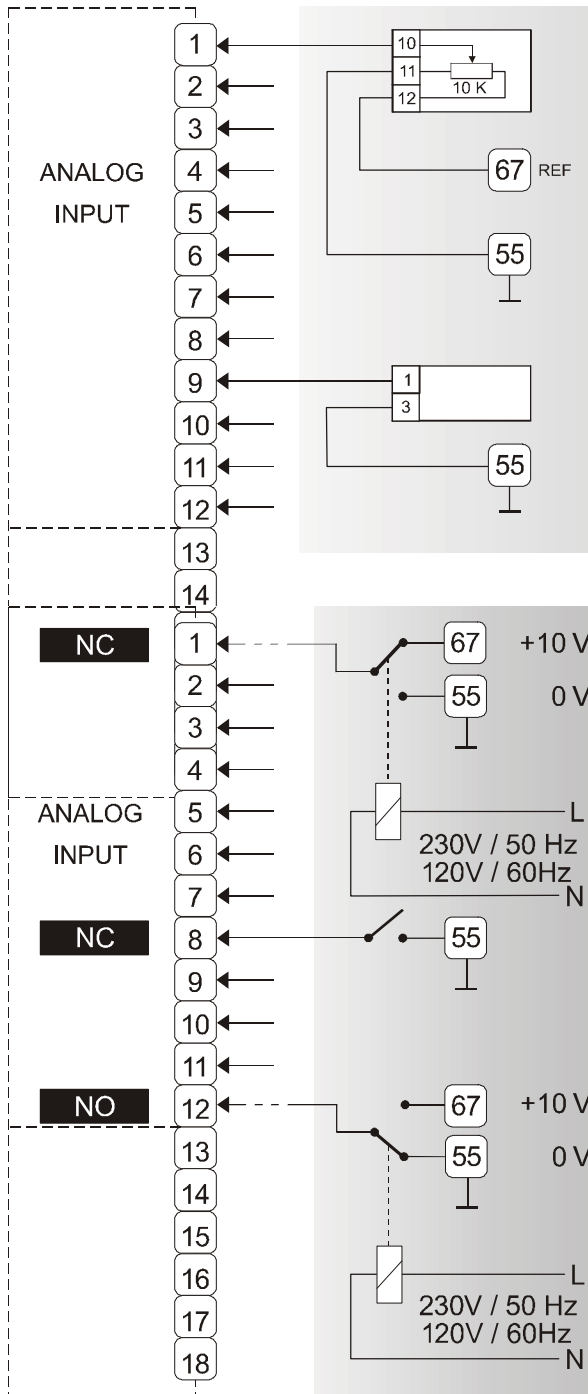
Humidity sensor C7600B

C Type of connection for active sensors with standard output signal 0 (4) to 20 mA to be clamped down with a connector resistor R1 499 ohms/ 0.25%

Example:

Humidity sensor C7031A, C

CB-0711-F



D

Further Connection Examples

D T7770B, C, D, E, F, G. Refer to individual model instructions for specific connection requirements

E

E 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 status of '1'. This means that, in general, no external relay is needed for normally closed contacts.

NOTE:
 The relay contact must be suitable for switching low voltage. For 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.

Transformers

1450 Series

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.

Table 10. Transformer specifications

Part #	Primary Side	Secondary Side
1450 7287		
-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

NOTE: For installations requiring UL1995 conformance, transformer primary voltage must not exceed 150 Vac.

Cables

The cable specification depends mainly on the baud rate. There are regional differences as to whether shielded or unshielded cable must/can be used. The table below summarizes cable types and gives selection guidance. Note that baud rate and maximum bus length are related to each other.

NOTE: In the U.S., shielded or unshielded cable may be used.

Table 11. Cable specifications

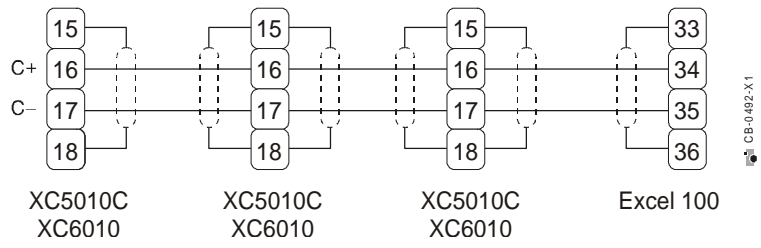
Max. baudrate	Max. bus length	Cable type	Description	Recommended for
76800	4,000 ft	AK 3702	unshielded or twisted pair	U.S.
76800	4,000 ft	AK 3740A	shielded	U.S. (low-cost)
76800	4,000 ft	Belden 9842	twisted pair	U.S.
76800	4,000 ft	Belden 9841	shielded	U.S.

The general specification for shielded system bus cable above 76.8 Kbaud is as follows:

- shielded twisted pair installation cable
- capacitance between data lines ≤ 42 pF/m (13 pF/ft)
- capacitance between data line and shield ≤ 76 pF/m (23 pF/ft)
- cross sectional area ≥ 0.5 mm² (24 AWG)

XC5010C/XC6010/Excel 100C only

If shielded cable is used then both ends of the shield must be connected to terminals 15 and 18, or 33 and 36, per following figure



Relays

Honeywell Relay:

Part Number	14500087004
Impedance	500 ohms
Nominal voltage	12 V
DC Pull-In voltage	9 V
DC Current	20 mA / 10 V
Further relays:	MU1S, MUS1C, RIBU1S, RIBU1C, R7600

Repeaters

Each repeater extends the bus length by the amount of the single bus length. The table below summarizes the number of repeaters allowed. Note that the maximum length depends on the cable specification as described under the cables chapter.

Table 12. Max. baud rate in relation to cable length and no. of repeaters

Max. baud rate	Max. no. of repeaters	Resulting max. bus length (depends upon cable specifications)
76.8 Kbaud	5	7,200 m (24,000 ft.)

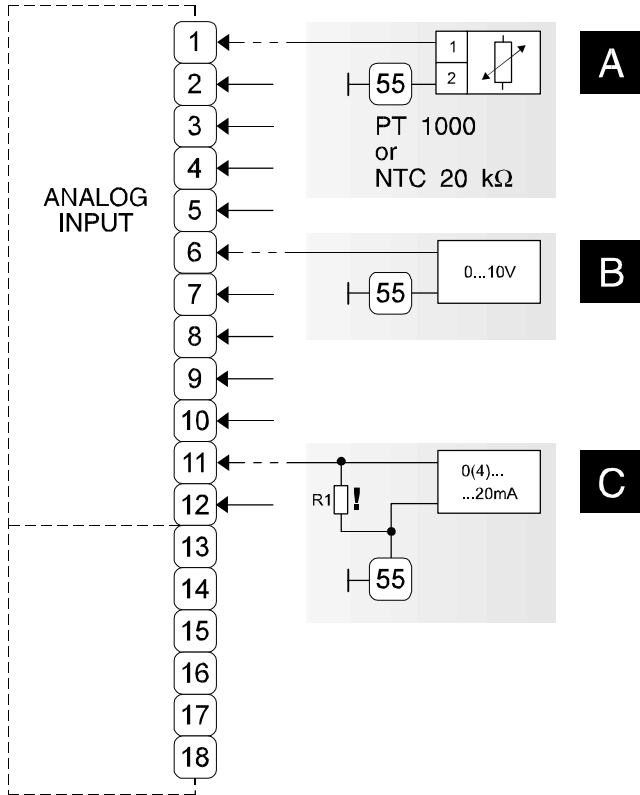
The repeater is available either with or without a housing. The ordering information is as follows:

Table 13. Ordering information for repeater

Description	OS no.
Repeater without housing	14507324 -001
Repeater with housing	14507324 -002

EUROPEAN SPECIFICATIONS

Electrical Connection of Sensors



Air duct temperature sensor LF 100

Sensors and Transmitters

A Type of connection for sensors

- 1.) PT 1000 / I (-58°F to +302°F) (-50°C to +150°C)
- 2.) NTC sensors 20k ohms

Example:

Room temperature sensor RF 20
Inlet temperature sensor VF 20 A
External temperature sensor AF20

B Type of connection for active sensors with standard output signal 0 to 10 V

Example:

Humidity sensor HKT 1, HRT 1

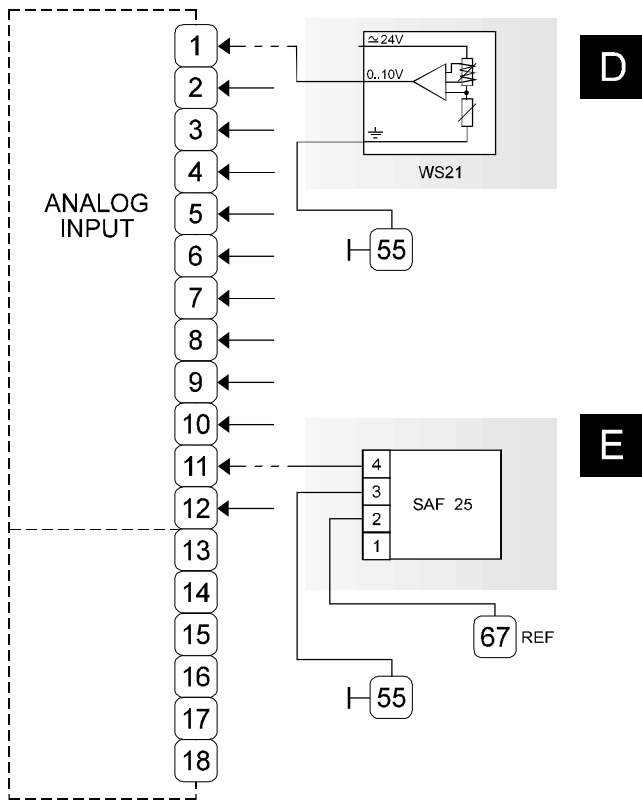
C Type of connection for active sensors with standard output signal 0 (4) to 20 mA to be clamped down with a connector resistor R1 499 ohms/ 0.25%

Example:

Immersion temperature sensor VF 100

CB-0711-E-0 84:104

Wind sensor WS21; Sun sensor SAF25



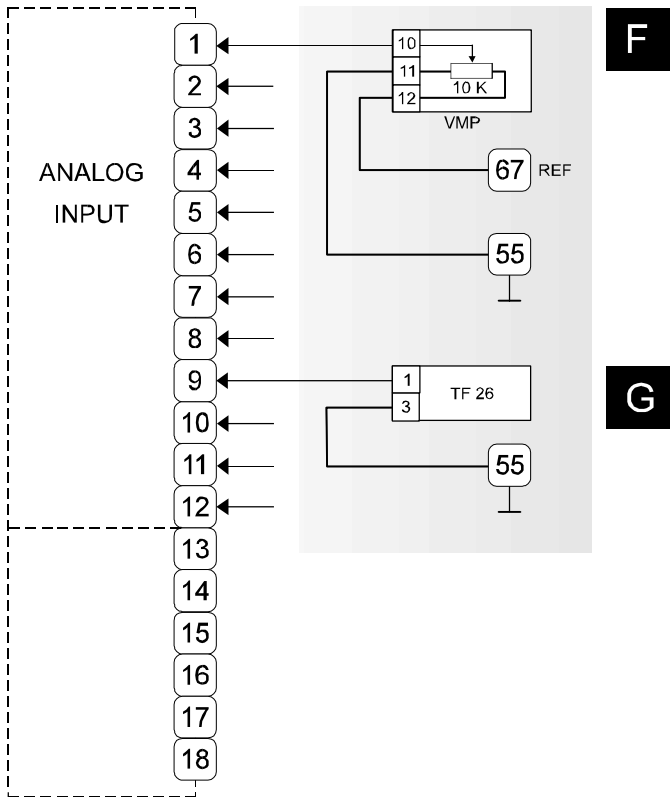
D

D To measure the wind effect, wind sensor WS21 should be used.

E

E To measure the solar effect, the SAF 25 sun sensor should be used. In order to operate the SAF 25, the reference voltage from terminal 67 of the controller device must be connected to terminal 2 SAF 25.

CB-0712a



F

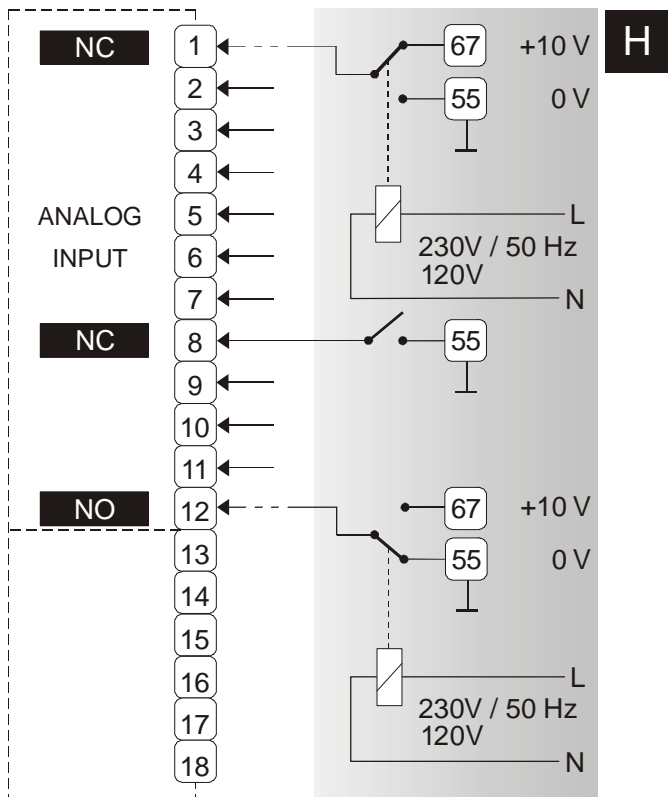
Further Connection Examples

F VMP (10k ohms total resistance) must be used for the feedback potentiometer. Connections as shown.

G

G TF26 must be used for temperature sensing. Connections as shown.

CB-0713-E-0 84:104



H

H For normally open contacts a digital signal must be switched via the change-over 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 status of '1'. This means that, in general, no external relay is needed for normally closed contacts.

NOTE:

The relay contact must be suitable for switching low voltage. For 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.

CB-0714-E1

Transformers

CRT-Series

Number of controllers connected to one transformer

Transformer	Controller Excel 100C no MCE/MCD		Controller Excel 100C with MCE/MCD	
	no. of contr.	max. line resist.	no. of contr.	max. line resist.
CRT 2	2	≤ 0.470 ohms	1	≤ 1.180 ohms
CRT 6	7	≤ 0.075 ohms	4	≤ 0.197 ohms
CRT 12	12	≤ 0.085 ohms	8	≤ 0.104 ohms

Backup fuse 10 A Use quick-acting backup fuse 10 A (or automatic H16 or L16) to protect 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.

Relays

FEME Relay:

Impedance:	625 ohms
Pull-In voltage:	6.7 Vac
Current at 10 Vdc:	16 mA
Current at 11 Vdc:	17.5 mA
Current at 12 Vdc:	19.2 mA

Cables

The cable specification depends mainly on the baud rate. The table below summarizes cable types and gives selection guidance. Note that baud rate and maximum bus length are related to each other.

Max. Baudrate	Max. Bus Length	Cable type	Description	Recommended for
76 800	1200 m	J-Y-(ST)Y 2 x 2 x 0.8	shielded, twisted pair	Europe Inside cabinet only
76 800	1200 m	A-Y-(ST)Y 2 x 2 x 0.8	shielded, twisted pair	Europe Outside cabinet only

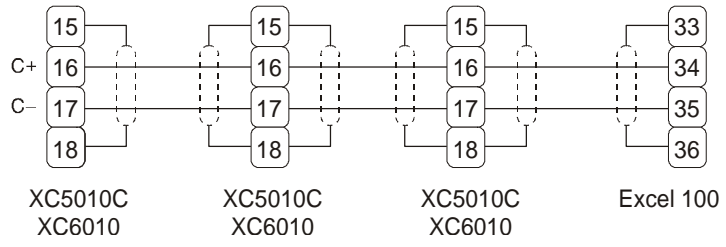
NOTE: In Europe only shielded cable is permitted. Cable J-Y-(ST)Y 2 x 2 x 0.8 is for internal applications (cables inside a panel) only. For external applications the equivalent type A-Y-(ST) 2 x 2 x 0.8 can be used.

The general specification for shielded system bus cable above 76 800 baud is as follows:

- shielded twisted pair installation cable
- capacitance between data lines ≤ 42 pF/m (13 pF/ft)
- capacitance between data line and shield ≤ 76 pF/m (23 pF/ft)
- cross sectional area ≥ 0.5 mm² (24 AWG)

XC5010C/XC6010/Excel 100C only

If shielded cable is used then both ends of the shield must be connected to terminal 15 and 18, or 33 and 36, per following figure:



Repeaters

Each repeater extends the bus length by the amount of the single bus length. The table below summarizes the number of repeaters allowed. Note that the maximum length depends on the cable specification as described under the cables chapter.

Max. Baud Rate	Max. No. of Repeaters	Resulting Max. Bus Length (depends on cable specification)
76 800 baud	5	7 200 m (24 000 ft)

The ordering information is as follows:

Description	OS No.
Repeater with housing	XD509

Honeywell

Home and Building Control

Honeywell Inc.
Honeywell Plaza
P.O. Box 524
Minneapolis, MN 55408-0524
USA
<http://www.honeywell.com>

Home and Building Control

Honeywell Limited-Honeywell Limitee
155 Gordon Baker Road
North York, Ontario
M2H 3N7
Canada
<http://www.honeywell.ca>

Home and Building Control Products

Honeywell AG
Böblinger Straße 17
D-71101 Schönaich
Germany

**DIN EN ISO
9001/14001**

<http://europe.hbc.honeywell.com>

95-7499-2 (U.S.)
EN1R-0144 GE51 R1000 (Europe)

printed in Germany

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