Excel Smart I/O Compact

HONEYWELL EXCEL 5000 OPEN SYSTEM
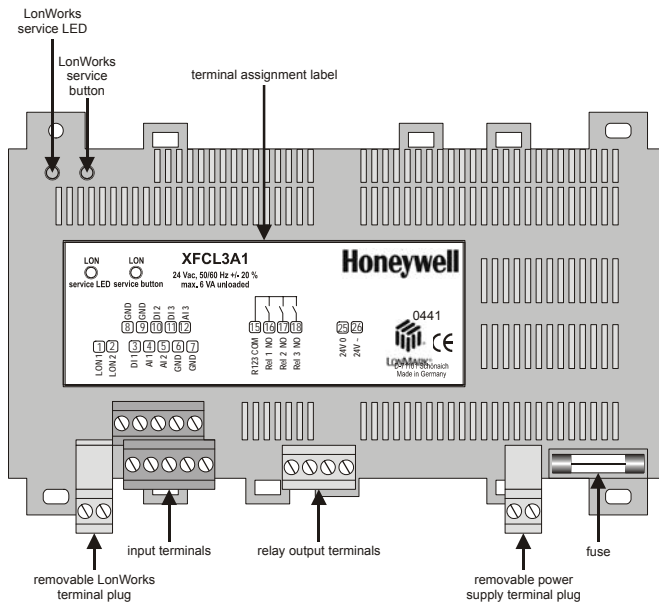
GENERAL INFORMATION

Fig. 1. Top view (optional terminal cover removed)

The Excel Smart I/O Compact is equipped with:

- three relays,
- three digital inputs, and
- three analog inputs, which may be used as slow digital inputs or as NTC20k temperature sensor inputs.

See also Table 1 on page 2 for a complete overview of terminals and their functions.

The two models of the Excel Smart I/O differ only in their power supply:

- **XFCL2A1**: 230 Vac power supply
- **XFCL3A1**: 24 Vac power supply

BEFORE INSTALLATION

IMPORTANT

It is recommended that the controller be kept at room temperature for at least 24 hours before applying power; this is to allow the evaporation of any condensation resulting from low shipping / storage temperatures.

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

⚠ CAUTION

To avoid electrical shock or equipment damage, you must switch OFF the power supply before attaching / removing connections to/from any terminals.

MOUNTING

Both models have the same dimensions (W x L x H = 110 x 180 x 60 mm) (see Fig. 2) and conform to IP20 (without optional terminal protection cover) or IP30 (with optional terminal protection cover; width is then 130 mm).
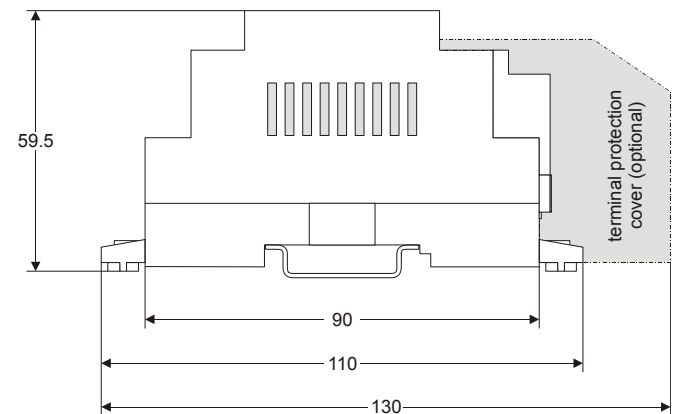

Fig. 2. Excel Smart I/O Compact dimensions (in mm)

The Excel Smart I/O Compact is suitable for mounting on a standard rail (DIN EN 50022-35 x 7,5), on walls/ceilings, as well as for installation in wiring cabinets or fuse boxes.
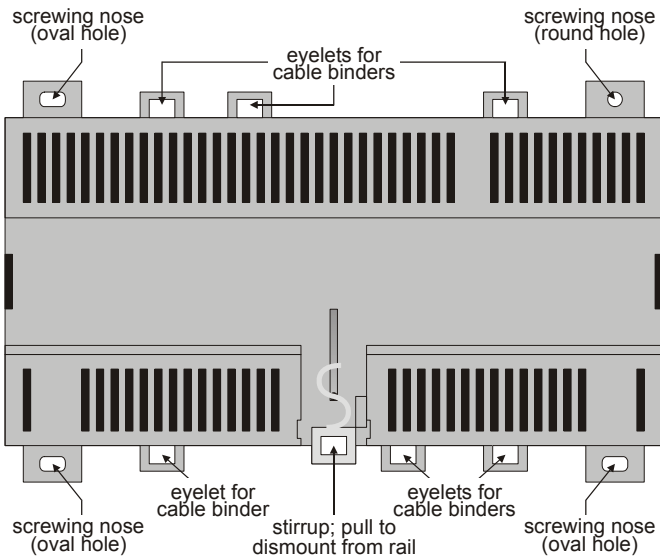
DIN Rail Mounting/Dismounting

Fig. 3. Housing base (view from below)

The Excel Smart I/O Compact can be mounted onto the DIN rail simply by snapping it into place. It is dismounted by gently pulling the stirrup located in the base of the housing (see Fig. 3). When mounted on a DIN rail, the unit must be secured in place with a stopper to prevent sliding.

Wall/Ceiling Mounting/Dismounting

The Excel Smart I/O Compact can be mounted on walls or ceilings in any desired orientation. In the case of ceiling mounting, however, it should not be operated at ambient temperatures exceeding 50 °C. The unit is mounted by inserting 3.5-mm dowel screws through the corresponding screwing noses.
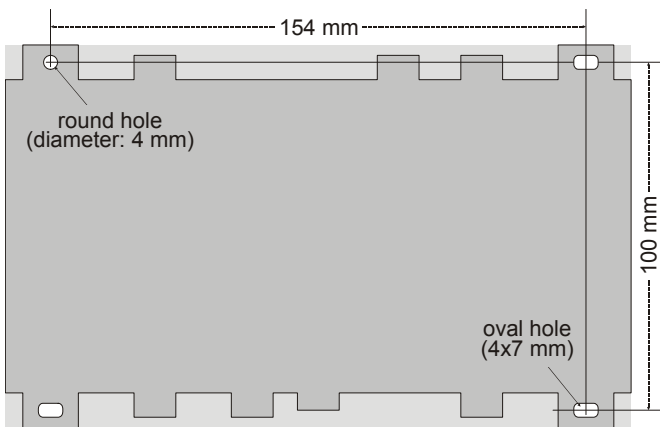

Fig. 4. Drilling template (view from above)

When equipped with the optional terminal protection cover (see section "Terminal Protection Cover" on page 6), the Excel Smart I/O Compact conforms to IP30.

After mounting the Excel Smart I/O Compact onto the wall or ceiling, provide for cable access by snipping out the terminal

protection cover's cut-out tabs and snap it (by hand) into place on the housing. To remove the cover, place a screwdriver in the leverage slot and pry it loose.

Terminal Assignment

The Excel Smart I/O Compact features two rows of terminal blocks located on one side for the connection of cables to the inputs and relay outputs as well as for connecting the removable power supply terminal plug and removable LONWORKS terminal plug.

NOTE: All relay and power supply terminal blocks are orange-colored.

NOTE: According to VDE guidelines, it is not allowed to mix low-voltage and high-voltage signals on the relays.

The Excel Smart I/O Compact is equipped with an adhesive terminal assignment label on the top of the housing (see Fig. 1 on page 1).

Table 1. Overview of terminals and functions

terminal #	function	model	
		XFCL2A1	XFCL3A1
1+2	removable LONWORKS connection plug	X	X
3	digital input #1	X	X
4	analog input #1	X	X
5	analog input #2	X	X
6, 7, 8, 9	GND terminals serving all signals	X	X
10	digital input #2	X	X
11	digital input #3	X	X
12	analog input #3	X	X
13+14	not used		
15	relay common for relays 1, 2, and 3	X	X
16	relay #1, normally-open contact	X	X
17	relay #2, normally-open contact	X	X
18	relay #3, normally-open contact	X	X
19 – 24	not used		
25+26	removable power supply plug	230 Vac	24 Vac

See also section "Configuring the Inputs and Outputs" on page 4.

Power Supply
General Information

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

NOTE: To comply with CE requirements, devices having a voltage of 50...1000 Vac or 75...1500 Vdc but lacking a supply cord, plug, or other means for disconnecting from the power supply must have the means of disconnection incorporated in the fixed wiring. This means of disconnection must have a contact separation of at least 3 mm at all poles.

Use a minimum of 18 AWG (1.0 mm^2) and a maximum of 14 AWG (2.5 mm^2) for all power wiring.

Power is supplied via a removable terminal plug (attached to terminals 25 and 26) permitting individual Excel Smart I/O Compacts to be disconnected from the power supply without disturbing the operation of other devices powered by the same source. See Fig. 5.
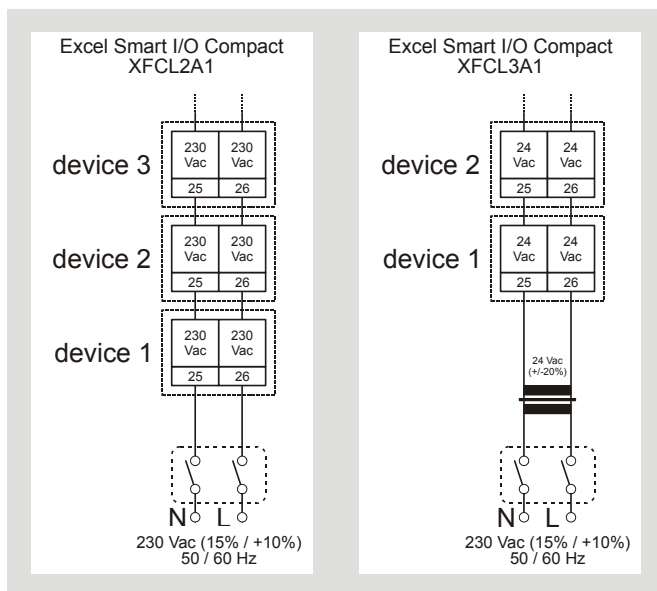

Fig. 5. Connection to power supply

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

XFCL2A1 with 230 Vac Power Supply

The XFCL2A1 with 230 Vac power supply is equipped with a built-in 24 Vac transformer.

Power supply: 230 Vac [-15% / +10%], 50/60 Hz).

Power consumption: < 6 VA (device unloaded)

XFCL3A1 with 24 Vac Power Supply

Power supply: 24 Vac [±20%], 50 or 60 Hz, connected.

Power consumption: < 3 VA (device unloaded)

LonWorks Communications
General Information

The Excel Smart I/O Compact is equipped with a free-topology transceiver for communication on LONWORKS® networks. The LONWORKS network is insensitive to polarity, eliminating the possibility of installation errors due to miswiring.

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

Connecting to the LONWORKS Network
IMPORTANT

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

IMPORTANT

Try to avoid installing in areas of high electro-magnetic noise (EMI).

The unit must be wired to the LONWORKS network using level IV 22 AWG (Belden part number 9D220150) or plenum-rated level IV 22 AWG (Belden part number 9H2201504) non-shielded, twisted-pair, solid-conductor wire. When possible, use Honeywell 111AK3781, AK3782, AK3791, or AK3792 cable (US part numbers). See Excel 50/5000 LONWORKS Mechanisms, EN0B-0270GE51, for details, including maximum lengths.

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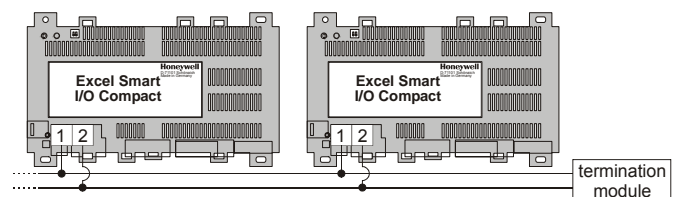

Fig. 6. Connection to LonWorks network and termination module (here: daisy-chain network configuration)

The Excel Smart I/O Compact is connected to the LONWORKS network via a removable terminal plug (attached to terminals 1 and 2) permitting individual Excel Smart I/O Compacts to be connected / disconnected from the LONWORKS network without disturbing the operation of other devices.

Depending upon the chosen network configuration, one or two terminations (see section "LONWORKS Termination" on page 6) may be required.

Inputs/Outputs

Wiring the Inputs/Outputs

Use a minimum size of 20 AWG (0.5 mm^2) and a maximum of 14 AWG (2.5 mm^2) for all input/output connections. The maximum length of all input/output cables is 400 m.

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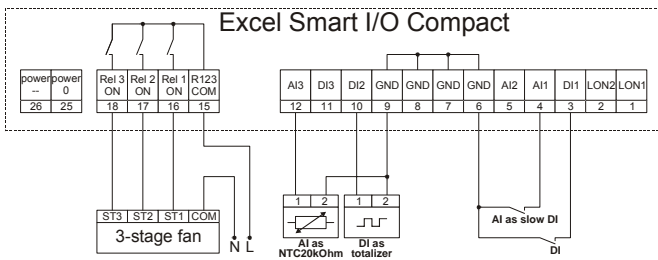

Fig. 7. Overview of inputs and outputs

Configuring the Inputs and Outputs

You can configure the Excel Smart I/O Compact's inputs and outputs using Honeywell's LNS plug-in or CARE.

NOTE: The switching logic functionality can be configured using CARE, only. The LNS plug-in does not support the switching logic functionality.

Digital Inputs

The Excel Smart I/O Compact is equipped with three digital inputs suitable for use as fast digital inputs (static digital inputs or push-buttons for flip-flop) or as totalizer inputs (square waves).

Table 2. Digital input characteristics

software detects inputs as	resistive input (dry contact)	voltage input	current out of terminal
closed	< 400 Ω	< 0.8 Vdc	max. 2.5 mA
open	> 1.5 kΩ	> 2.0 Vdc	0…1.5 mA

Totalizer input:

- digital input #1: up to 20 Hz; reacts on falling edge;
- digital input #2: up to 5 Hz; configurable (using Honeywell's LNS plug-in) to react on rising or falling edge;
- digital input #3: up to 5 Hz; configurable (using Honeywell's LNS plug-in) to react on rising or falling edge.

Analog Inputs

The Excel Smart I/O Compact is equipped with three analog inputs. The analog inputs may be used as NTC20k temperature sensor inputs or as slow digital inputs. The analog inputs do not support 0…10 V input.

Table 3. Slow digital input characteristics

software detects inputs as	resistive input (dry contact)	high/low switching at	current out of terminal
closed	< 200 Ω	< 1.5 Vdc	< 0.3 mA
open	> 50 kΩ	> 3.5 Vdc	< 0.1 mA

Table 4. Accuracy, resolution of inputs (NTC20k sensors)

temperature range	accuracy	resolution
-50 to -40 °C (-58 to -40 °F)	≤ 4.11 K	1.42 K
-40 to -30 °C (-40 to -22 °F)	≤ 2.12 K	0.77 K
-30 to -20 °C (-22 to -4 °F)	≤ 1.39 K	0.44 K
-20 to -10 °C (-4 to 14 °F)	≤ 0.65 K	0.27 K
-10 to 0 °C (14 to 32 °F)	≤ 0.42 K	0.17 K
0 to 10 °C (32 to 50 °F)	≤ 0.27 K	0.12 K
10 to 50 °C (50 to 122 °F)	≤ 0.30 K	0.11 K
50 to 70 °C (122 to 158 °F)	≤ 0.45 K	0.19 K
70 to 90 °C (158 to 194 °F)	≤ 1.17 K	0.35 K
90 to 100 °C (194 to 212 °F)	≤ 1.44 K	0.48 K
100 to 120 °C (212 to 248 °F)	≤ 2.29 K	0.92 K
120 to 150 °C (248 to 302 °F)	≤ 5.11 K	2.3 K

For all NTC20k sensor inputs, temperatures of ≤ -50 °C are interpreted as being due to a sensor break, and temperatures of ≥ +150 °C are interpreted as being due to a sensor short-circuit.

Relay Outputs

The Excel Smart I/O Compact is equipped with three normally-open relay outputs.

Current Limitations

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

- A min. current of 50 mA is required to ensure a reliable contact.
- The normally-open contacts are designed for a max. continuous current of 3 A at max. 230 Vac and cos φ = 1. The d.c. characteristic is shown in Fig. 8.
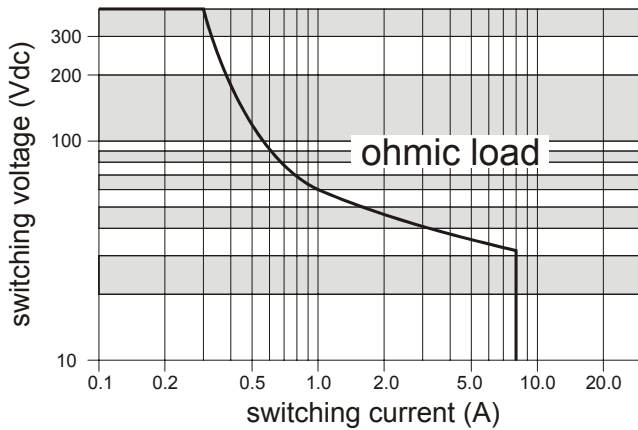
Fig. 8. Relay characteristic

Replacing the Fuse

NOTE: Before replacing the fuse (see also Fig. 1 on page 1), disconnect the Excel Smart I/O Compact from the power source by detaching the removable terminal plug attached to terminals 25 and 26.

⚠ CAUTION

Depending upon actual wiring, even after you have switched OFF the power supply, the relays may still be under high voltage.

Troubleshooting

The Excel Smart I/O Compact features a LONWORKS service LED and corresponding LONWORKS service button (see Fig. 1) for commissioning and troubleshooting.

When the service button is pressed, the service pin message is broadcast.

See Table 5 for a description of the meaning of the various different possible behaviors of the LONWORKS service LED. For more information on standard service LED behavior, refer to Motorola LONWORKS Technology Device Data Manual, page AL-190.

Possible Problems and Recommended Actions

Check to see if the LONWORKS service LED's behavior is changed when you switch the power OFF/ON. Please contact Honeywell if this does not solve the problem.

Table 5. LONWORKS Service LED Behaviors and Meanings

	LED blinking pattern	meaning
1	LED remains OFF after power-up.	Defective device hardware. Suspect power supply problems, clock problems, or defective Neuron Chip.
2	LED is lit continuously after first power-up.	Defective hardware.
3	LED flashes at power-up, goes OFF, then is lit continuously.	Controller lacks application.
4	LED flashes briefly periodically.	Controller is probably experiencing continuous watchdog resets, or external memory or EEPROM is corrupt.
5	LED repeatedly blinks ON for 1 s and OFF for 1 s.	Controller is unconfigured but has an application.
6a	OFF duration ≈ 10 s. Afterwards, the service LED turns ON and remains ON, indicating completion of the blanking process.	Using EEBLANK on a Neuron 3150 Chip-based custom node.
6b	OFF duration ≈ 1 s. Afterwards, the service LED is lit continuously.	First power-up with a new PROM on a Neuron 3150 Chip-based customized node. Application-less firmware state exported.
6c	OFF duration is 1...15 s, depending on application size and system clock. Afterwards, service LED repeatedly blinks ON for 1 s and OFF for 1 s.	First power-up with a new PROM on a Neuron 3150 Chip-based customized node. Unconfigured firmware state exported.
6d	OFF duration is indefinite (1...15 s to load internal EEPROM; remains OFF).	First power-up with new PROM on Neuron 3150 Chip-based customized node. Configured firmware state exported.
7	LED remains OFF after a short ON duration.	Controller is configured and running normally.
8	LED flashes for 1 minute in following pattern: 5x ON/OFF, 5 sec OFF, 5x ON/OFF	Controller has received WINK command from network. Other physical outputs are unaffected.
9	LED flashes continuously in following pattern: 4x ON/OFF followed by 5 sec pause.	Neuron communication failure or sensor break.

Accessories

Terminal Protection Cover

Required for wall/ceiling mounting. Set of eight covers.

order no.:　　　**XAL_COV_L**

LONWORKS Termination

One or two LONWORKS terminations are required, depending on the given LonWorks bus layout. See section "Connecting to the LONWORKS Network" on page 3.

Two different LONWORKS termination modules are available:

LONWORKS termination module, order no.:　　**209541B**

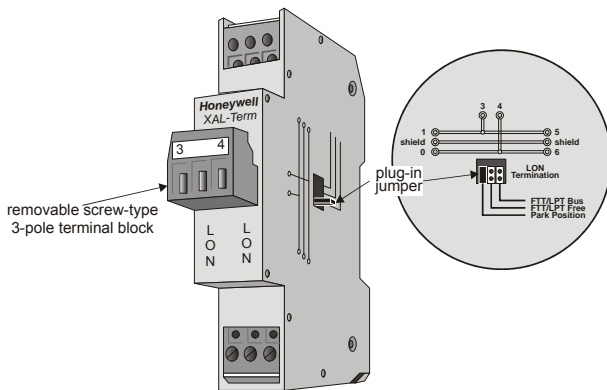LONWORKS connection / termination module (mountable on DIN rails and in fuse boxes), order no.:　　**XAL-Term**

Fig. 9. LONWORKS connection and termination module

Honeywell