Excel 10
W7754K,P,Q FAN COIL UNIT CONTROLLERS

HONEYWELL EXCEL 5000 OPEN SYSTEM

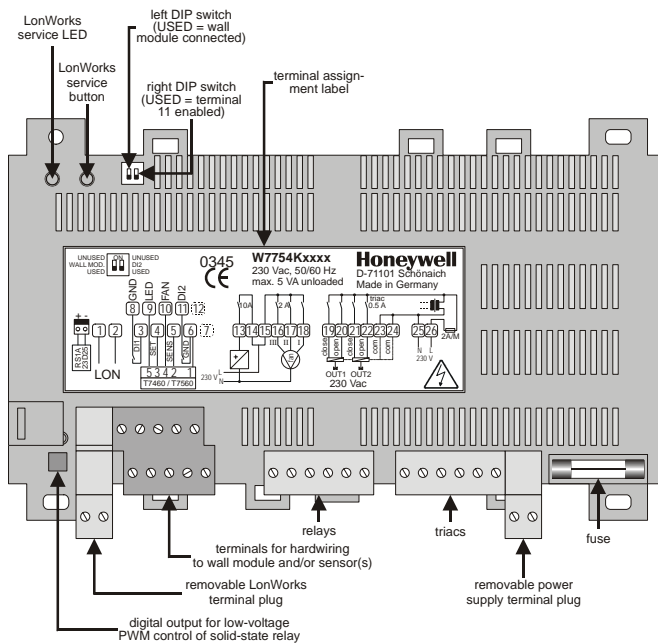INSTALLATION INSTRUCTIONS

GENERAL INFORMATION

Fig. 1. Top view of Excel 10 W7754 FCU Controller (optional terminal cover removed)

All three models of the Excel 10 W7754 Fan Coil Unit (FCU) Controller are equipped with a minimum of
- three relays,
- one LED digital output,
- three digital inputs, and
- two analog inputs.

Further, depending on the hardware requirements of your specific application, you can choose from among models equipped with the following additional features:

W7754K1001
- 230 Vac power supply
- one triac output
- one digital output, for the low-voltage Pulse-Width Modulated (PWM) control of a solid-state relay employed in high-current electrical reheat applications
- three relays

W7754P1000
- 230 Vac power supply
- four triac outputs
- an extra, fourth relay

W7754Q1008
- 24 Vac power supply
- four triac outputs
- an extra, fourth relay

See also Table 1 on page 3 for a complete overview of terminals and their functions.

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.

CE

EN1B-0251GE51 R0305C

MOUNTING

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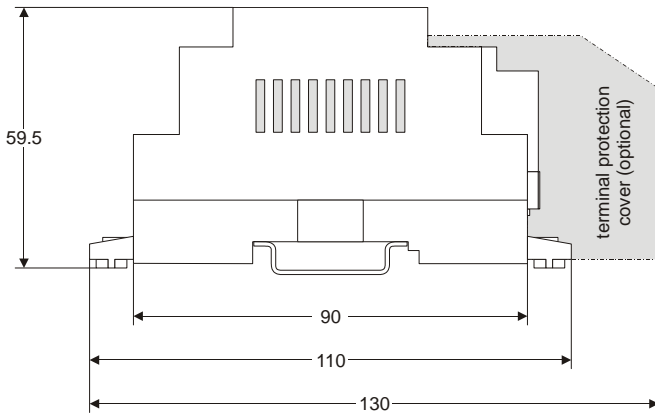

Fig. 2. Excel 10 W7754 dimensions (in mm)

The Excel 10 W7754 FCU Controller 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.

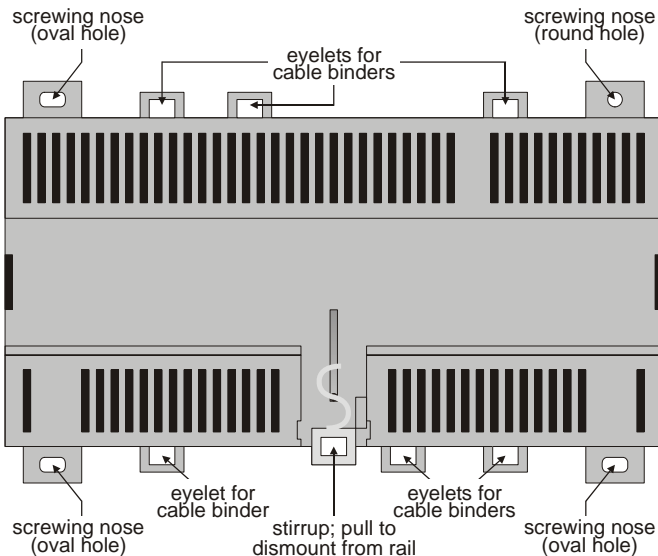## DIN Rail Mounting/Dismounting

Fig. 3. Housing base (view from below)

The Excel 10 W7754 FCU Controller 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 10 W7754 FCU Controller 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.
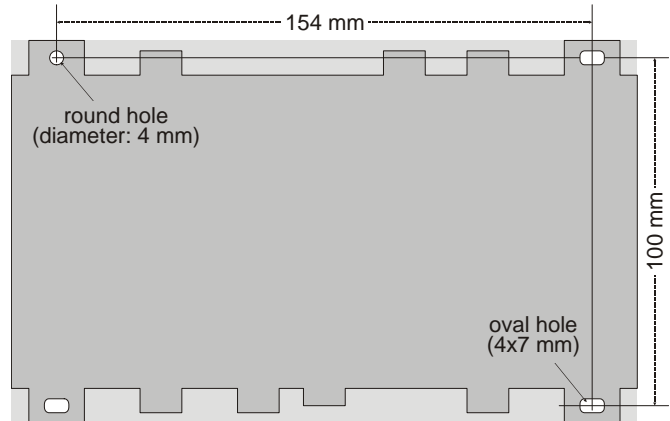

Fig. 4. Drilling template (view from above)

When equipped with the optional terminal protection cover (see section "Terminal Protection Cover" on page 7), the Excel 10 W7754 FCU Controller conforms to IP30.

After mounting the Excel 10 W7754 FCU Controller 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 10 W7754 FCU Controller features two rows of terminal blocks located on one side for the connection of cables to the relays, inputs, and outputs as well as for connecting the removable power supply terminal plug and removable LONWORKS terminal plug.

NOTE: All high-voltage terminal blocks are orange-colored.

Depending on the given hardware model, the controllers have different power supplies and are equipped with different numbers of triac outputs, relay outputs, etc. See Table 1 on page 3.

Every Excel 10 W7754 FCU Controller is therefore equipped with a terminal assignment label on the top of the housing (see Fig. 1 on page 1). This label is an adhesive sticker displaying the maximum complement of I/O's. Terminals not present in a given model are indicated by dotted lines.

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

See also Table 3 on page 6.

Table 1. W7754 Controller: Overview of terminals and functions (by model)

ter-minal #	function	model K	P	Q
1+2	receiving/sending data on the LONWORKS network; removable plug	X	X	X
3	a digital input, configurable (using the LNS plug-in) to read input e.g. from a hardwired window contact, occupancy sensor, etc.; suitable for dry contacts, only; max. voltage at open contact = 5 Vdc	X	X	X
4	an analog input, permanently configured to read input from a hardwired wall module's temperature setpoint adjustment knob; can be enabled/disabled using the **left** DIP switch[3]	X	X	X
5	an analog input, permanently configured to read input from a hardwired wall module's room temperature sensor (use NTC20k sensor, only; accuracy [w/o sensor] = 0.5 °C at 25 °C); can be enabled/disabled using the **left** DIP switch[3]	X	X	X
6	GND serving terminals 4, 5, 9, 10, and 11	X	X	X
7	not used	--	--	--
8	GND serving terminal 3	X	X	X
9	a digital output, permanently configured to write output switching the LED of a hardwired wall module ON/OFF; can be enabled/disabled using the **left** DIP switch[3]; max. voltage = 5 Vdc; max. current = 5 mA	X	X	X
10	an analog input, permanently configured to read input on whether a hardwired wall module's 3-speed fan control knob has been set to AUTO, OFF, LOW, MEDIUM, or HIGH and whether its "occupancy override" button has been pressed; can be enabled/disabled using the **left** DIP switch[3]	X	X	X
11	a digital input, permanently configured to read input on whether a window contact is "open" or "closed"; can be enabled/disabled using the **right** DIP switch[3]; suitable for dry contacts, only; max. voltage at open contact = 5 Vdc	X	X	X
12	not used	--	--	--
13+14	relay 4, permanently configured to write output to a hardwired electrical reheat coil, switching it ON/OFF; switching voltage = 24...230 Vac; switching current = 0.05...10 A	--	X	--
15	a common terminal for terminals 16, 17, and 18	X	X	X
16[1]	relay 3, permanently configured to write output to a hardwired three-speed fan, setting it to HIGH	X	X	X
17[1]	relay 2, permanently configured to write output to a hardwired three-speed fan, setting it to MEDIUM	X	X	X
18[1]	relay 1, permanently configured to write output to a hardwired three-speed fan, setting it to LOW	X	X	X
19[2]	a triac output, permanently configured to write output to OUT1, closing it	--	X	X
20[2]	a triac output, permanently configured to write output to OUT1, opening it	--	X	X
21[2]	a triac output, permanently configured to write output to OUT2, closing it	--	X	X
22[2]	a triac output, permanently configured to write output to OUT2, opening it	X	X	X
23[2]	a common terminal for terminals 19 and 20	X	X	X
24[2]	a common terminal for terminals 21 and 22	X	X	X
25+26	the "N" (25) and "L" (26) terminals of power supply; 24 Vac (±20%), 50/60 Hz or 230 Vac (-15%/+10%), 50/60 Hz, depending upon model; removable plug	230 Vac	230 Vac	24 Vac

[1] If all three relays (terminals 15 [common], 16, 17, and 18) are switched OFF, the three-speed fan will likewise be switched OFF. Switching voltage = 24...230 Vac; switching current = 0.05...3 A (max. 3 A for all three relays together).

[2] Switching voltage = 230 Vac (230-V models) or 24 Vac (24-V models), max. switching current = 0.5 A; max. peak (10 sec) current = 1 A

[3] Please use an appropriate tool (e.g. ball-point pen) to operate the DIP switch.

Additionally, the W7754K1001 features an extra socket (2-pin connector located to the left of the terminal blocks; see Fig. 1 on page 1) containing a digital output suitable for attachment to a solid-state relay (use only Carlo Gavazzi RS1A23D25-P64; max. voltage = 12 Vdc; max. current = 12 mA at 10 Vdc) employed for low-voltage PWM control in high-current electrical reheat applications.

Using Honeywell's LNS plug-in, you can configure the controller's triac outputs and relay outputs for a variety of different functions. E.g. the triac outputs can be configured for connection to either a floating drive or to a thermal actuator. Once the outputs have been configured, the corresponding devices can be directly connected to them.

Power Supply
General Information

NOTE: All wiring must comply with applicable electrical codes and ordinances. Refer to job or manu-facturers' drawings for details. Local wiring guide-lines (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 10 W7754 FCU Controllers to be disconnected from the power supply without disturbing the operation of other devices powered by the same source. See Fig. 5.
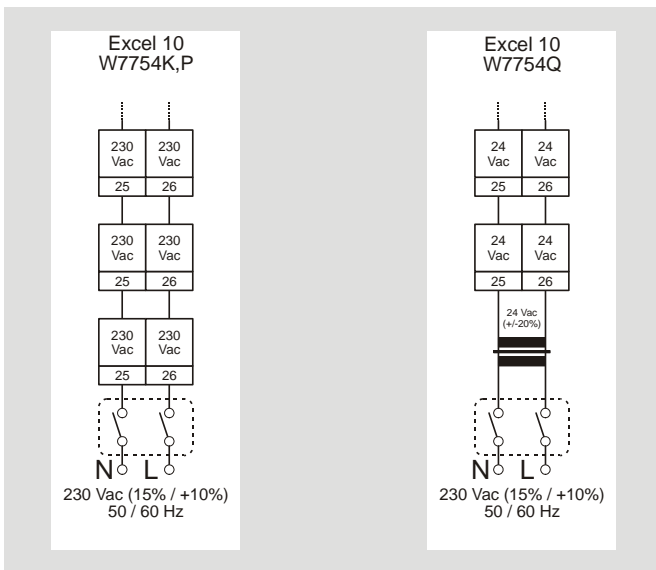

Fig. 5. Connection to power supply

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

Models with 230 Vac Power Supply (W7754K,P)
Models with 230 Vac power supply are equipped with a built-in 24 Vac transformer.
- Power supply: 230 Vac [-15% / +10%], 50/60 Hz).
- Power consumption: < 6 VA (device unloaded)

Model with 24 Vac Power Supply (W7754Q)
- Power supply: 24 Vac [±20%], 50 or 60 Hz, connected.
- Power consumption: < 3 VA (device unloaded)

Wall Modules
The T7460 and T7560 Wall Modules can be used in con-junction with Excel 10 W7754 FCU Controllers to perform room temperature sensing, set-point adjustment, fan speed manual override, and occupancy override. When hardwired to the controller (via terminals 4, 5, 6, 9, and 10), the wall module's LED/LCD can be configured to provide information about
- any override of the controller by e.g. manual operation of the wall module or the receipt by the controller of a network command (see section "Configuration of the LED to Display Info on Overrides" below);
- the controller's effective occupancy mode (see sections "Configuration of the LED to Display Info on Occupancy Mode" and "Configuration of the LCD to Display Info on Occupancy Mode" below).

NOTE: The left DIP switch located on the top of the con-troller (see Fig. 1 on page 1) is used to indicate that a wall module can be hardwired to the controller. Setting the left DIP switch to USED means that a wall module can be hardwired; setting it to UNUSED means that no wall module can be hardwired.

NOTE: The intended use of the wall module's buttons must be configured using Honeywell's LNS plug-in.

Table 2. Supported wall module functions

	T7560 button	override	unit ON/OFF	fan speed
T7460C		●		
T7460D				●
T7460E		●	●	
T7460F		●		
T7560A	left			●
	middle		●	
	right	●		
T7560B	left			●
	middle		●	
	right	●		

Example:
The T7560A has a left button which can be configured to act as a fan speed button, a middle button which can be con-figured to act as a unit ON/OFF button, and a right button for override. See T7460 Wall Modules Installation Instructions (form number 95-7610) and T7560 Digital Wall Module Installation Instructions (form number 95-7620) for details.

Configuration of the Wall Module's LED / LCD
When either a T7460 or a T7560 Wall Module has been hardwired to the Excel 10 W7754 FCU Controller, the module's LED can be configured (using Honeywell's LNS plug-in) to provide information about e.g. overrides or effective occupancy modes. Further, in the case of a T7560 Wall Module, its LCD can likewise be configured to display such information.

Configuration of the LED to Display Info on Overrides
The wall module's LED can be configured to indicate if an override has been activated by either the wall module's over-ride button being pushed or because the controller has re-ceived a network command. Specifically:

- If the wall module's LED is OFF, then no override (from the wall module or the LONWORKS network) is currently in effect.
- If the wall module's LED is ON continuously, the override button or a network command has placed the controller into the "occupied" or "override" mode (however, if the override button is again pushed or if a cancellation network command is received or if the override time expires, the controller will return to its scheduled occupancy mode).
- If the wall module's LED flashes once per second, the override button or a network command has placed the controller into the "unoccupied" mode (however, if the override button is again pushed or if a cancellation network command is received, the controller will return to its scheduled occupancy mode).
- If the wall module's LED flashes twice per second, a network command has placed the controller into either the "standby" or the "occupied" mode.
- If the wall module's LED flashes four times per second, the controller is responding to a network management "wink" command.

Configuration of the LED to Display Info on Occupancy Mode
The wall module's LED can also be configured to indicate the Excel 10 W7754 FCU Controller's effective occupancy mode. Specifically:
- If the wall module's LED is OFF, the controller is in the "unoccupied" mode.
- If the wall module's LED is ON, the controller is in the "occupied" mode.
- If the wall module's LED flashes once per second, the controller is in the "standby" mode.
- If the wall module's LED flashes four times per second, the controller is responding to a network management "wink" command.

Configuration of the LCD to Display Info on Occupancy Mode
The T7560 Wall Module's LCD can be configured to display various symbols to indicate the Excel 10 W7754 FCU Controller's effective occupancy mode. Specifically:
- If ☀ is displayed continuously, the controller is in the "occupied" or "override" mode; if it flashes, the given mode has been overridden.
- If ☽ is displayed continuously, the controller is in the "standby" mode; if it flashes, the "standby" mode has been overridden.
- If ☾ is displayed continuously, the controller is in the "unoccupied" mode; if it flashes, the "unoccupied" mode has been overridden.

NOTE: If all three of these symbols are flashing simultaneously, the controller is responding to a network management "wink" command.

- OFF means that the controller is OFF.
- OFF and ☽ mean that the controller is OFF, but that "frost protection" has been enabled.

LonWorks Communications
General Information
The Excel 10 W7754 FCU Controller 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 AK3781, AK3782, AK3791, or AK3792 cable (US part numbers). See Excel 50/5000 LONWORKS Mechanisms, EN0B-0270GE51, for details, including maximum lengths.

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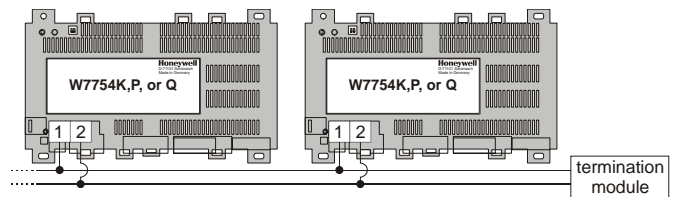

Fig. 6. Connection to LonWorks network and termination module (here: daisy-chain network configuration)

The Excel 10 W7754 FCU Controller is connected to the LONWORKS network via a removable terminal plug (attached to terminals 1 and 2) permitting individual Excel 10 W7754 controllers to be connected / disconnected from the LONWORKS network without disturbing the operation of other devices.

Depending upon the chosen network configuration, one or two terminations (see section "LONWORKS Termination" on page 7) 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.

Digital Inputs

The Excel 10 W7754 FCU Controller's digital inputs are suitable for connection with dry contacts, only.

Digital Outputs

The triac outputs or relay outputs can be configured (using Honeywell's LNS plug-in) for different functions.

You can configure the four triac outputs for connection to either a floating drive or to a thermal actuator. Once the outputs have been configured, the corresponding devices can be directly connected to them.

Table 3. Output assignments for various actuator types

output type	stage	OUT1		OUT2	
		19	20	21	22
floating	--	close	open	close	open
1-stage	0	--	OFF	--	OFF
	1	--	ON	--	ON
2-stage	0	OFF	OFF	OFF	OFF
	1	OFF	ON	OFF	ON
	2	ON	OFF	ON	OFF
3-stage	0	OFF	OFF	OFF	OFF
	1	OFF	ON	OFF	ON
	2	ON	OFF	ON	OFF
	3	ON	ON	ON	ON
PWM	--	--	PWM	--	PWM
thermal	--	--	ON/OFF	--	ON/OFF

Relay Outputs

The W7754K1001 is equipped with three relays; the W7754P1000 and W7754Q1008 have four relays.

Hardware Limits
- 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 (for relays 1, 2, and 3 together) and 10 A (relay 4), respectively.

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).

Triac Outputs

The Excel 10 W7754 FCU Controller is equipped (depending upon the model) with one to four triac outputs.

Hardware Limits for Excel 10 W7754K,P (230 Vac Power Supply)
- Low signal: 0 V; high signal: 230 Vac
- Maximum allowable continuous current for each individual triac output: 500 mA
- Maximum allowable peak current (for 10 seconds) for each individual triac output: 1 A
- Maximum allowable continuous current for all of the triac outputs together: 1 A.
- cos φ > 0.8

Hardware Limits for Excel 10 W7754Q1008 (24 Vac Power Supply)
- Low signal: 0 V; high signal: 24 Vac
- Maximum allowable continuous current for each individual triac output: 500 mA
- Maximum allowable peak current (for 10 seconds) for each individual triac output: 1 A
- Maximum allowable continuous current for all of the triac outputs together: 1 A.
- cos φ > 0.8

Analog Inputs

The Excel 10 W7754 FCU Controller is equipped with two analog inputs (for connection to a room sensor and to a wall module with temperature setpoint adjustment, respectively).

Table 4. Analog input usage

analog input	wall module
AI1	room sensor [1]
AI2	setpoint adjustment

1) If the sensor measures a temperature outside of the range of 0...70 °C, this is interpreted as a sensor break / short circuit.

Replacing the Fuse

NOTE: Before replacing the fuse (see also Fig. 1 on page 1), disconnect the controller 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.

When replacing the controller's fuse, please replace with the same type listed on the terminal assignment label (e.g.: F2.5H250V).

Troubleshooting

All Excel 10 W7754 FCU Controllers feature 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 on page 7 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 if the LONWORKS service LED's behavior is changed if you switch the power OFF/ON. Please contact Honeywell if this does not solve the problem.

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 5.

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**
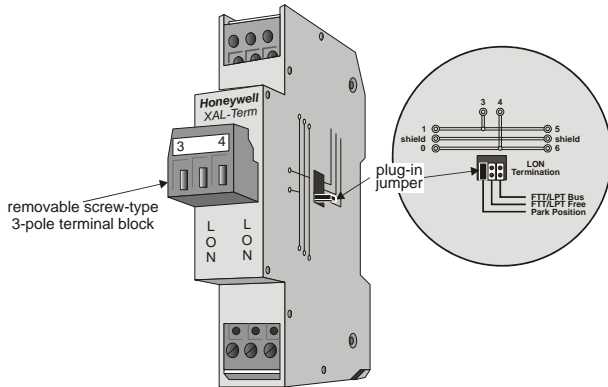

Fig. 7. LONWORKS connection and termination module

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.	
6d	OFF duration is indefinite (1...15 s to load internal EEPROM; remains OFF).	
7	LED remains OFF after a short ON duration.	Controller is configured and running normally.
8	LED flashes ON.	Controller has received WINK command from network. Other physical outputs are unaffected.

Honeywell

Subject to change without notice. Printed in Germany

Manufacturing location certified to <u>**DIN EN ISO**</u>
9001/14001