Honeywell

Manning

AirAlert™ 96d

Multi-Channel
Gas Monitoring System

Preliminary
Instruction and Installation Manual
Rev C

Contents

1 Introduction

Warning

To ensure your personal safety, read "Safety Information" (below) before you use the controller.

The AirAlert™96d system sets new standards in gas detection and in the measurement of environmental parameters.

Acting as the nerve center of a modular gas detection network, the AirAlert™96d provides continuous monitoring of up to 96 connected units on three distinct channels.

The AirAlert™96d provides a full array of displays. At a glance, it is possible to determine the status of the entire network. Field modifications are straight-forward. A menu driven program allows for minor fine-tuning of the sequence of operation all the way to the reconfiguration of the entire network.

Since no two projects are alike, the AirAlert™96d is designed to be highly customized. Combined with ease of installation, this unit represents the most affordable gas monitoring solution for institutional, commercial and light industrial applications.

For more advanced applications, the AirAlert™96d controller provides datalogging capacity within a cast aluminum enclosure. The perfect solution for even the most complex of industrial applications.

A Safety Information – Read First

Use the controller only as specified in this manual, otherwise the protection provided by the controller may be impaired.

Read the **Warnings** and **Cautions** on the following pages before using the controller.

Note: *This instrument contains a lithium battery. Do not mix with the solid waste stream. Spent batteries should be disposed of by a qualified recycler or hazardous materials handler.*

Caution

To avoid possible personal injury:

- *Warning:* **Substitution of components may impair intrinsic safety.**

- *Warning:* **To prevent ignition of flammable or combustible atmospheres, disconnect power before servicing.**
- **Do not use the controller if it is damaged. Before you use the controller, inspect the case.**
- **If the controller is damaged or something is missing, contact Honeywell Analytics immediately.**

To avoid possible damage to the controller:

- **Do not expose the controller to electrical shock and/or severe continuous mechanical shock.**
- **Do not attempt to disassemble, adjust, or service the controller unless instructions for that procedure are contained in the manual and/or that part is listed as a replacement part. Use only Manning replacement parts.**

The controller Warranty could be voided if customer personnel or third parties damage the controller during repair attempts.

B Getting Started

Intended Use

The AirAlert™96d controller will provide around the clock monitoring of the gas detection network. Moreover, a log of all the sensors concentrations and alarms will be created for analysis with the data-logger option. Also, the grouping/zoning capabilities will result in energy cost savings.

Figure 1. AirAlert™96d
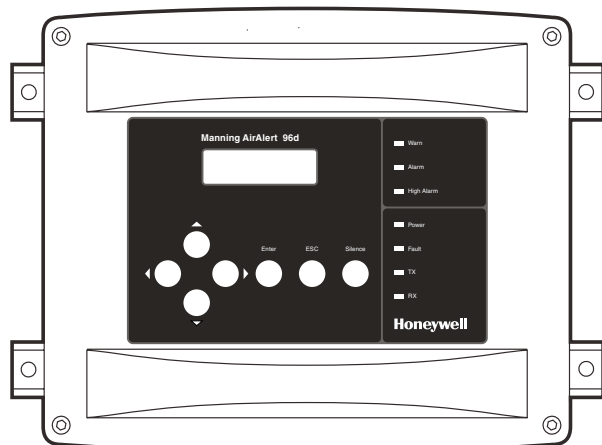
2 **Installation**

A Guidelines

These guidelines must be strictly observed to assure that the equipment will work properly. If they are not applied, Honeywell Analytics will not recognize any liability in case of improper operation.

- Make sure to locate all units easily accessible for proper service.
- Avoid any location where units could be subject to vibrations.
- Avoid any location close to any electro-magnetic interference.
- Avoid any location where there are large temperature swings.
- Verify local requirements and existing regulations, which may affect the choice of location.

Warning

A cable with more than one pair of wires is unacceptable for communication use.

B Mounting Installation

The suggested height for controller installation is 5 feet from the floor.

Figure 2. Installation
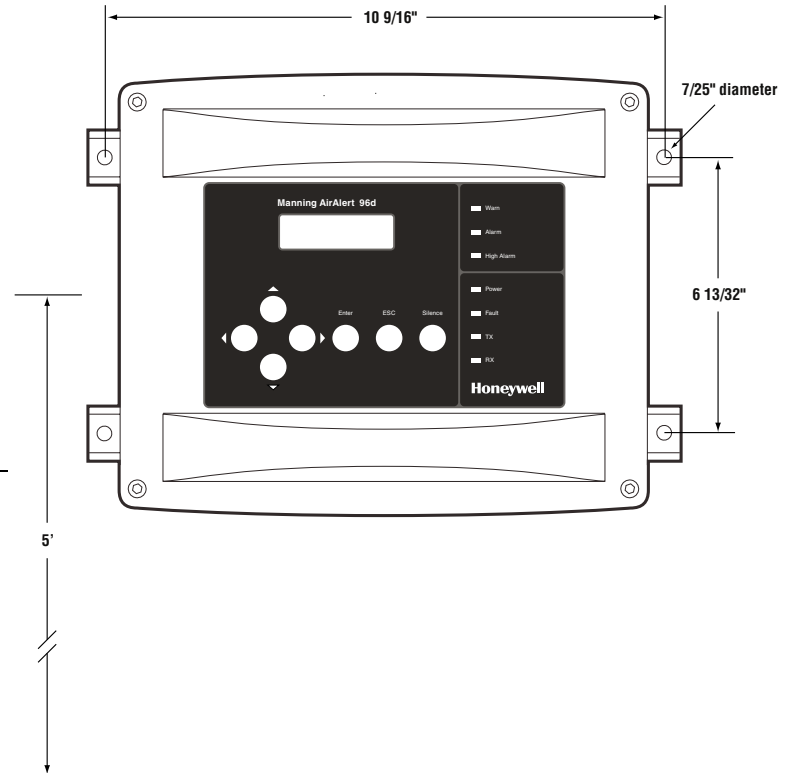
3 **Wiring**

Figure 3. System Wiring
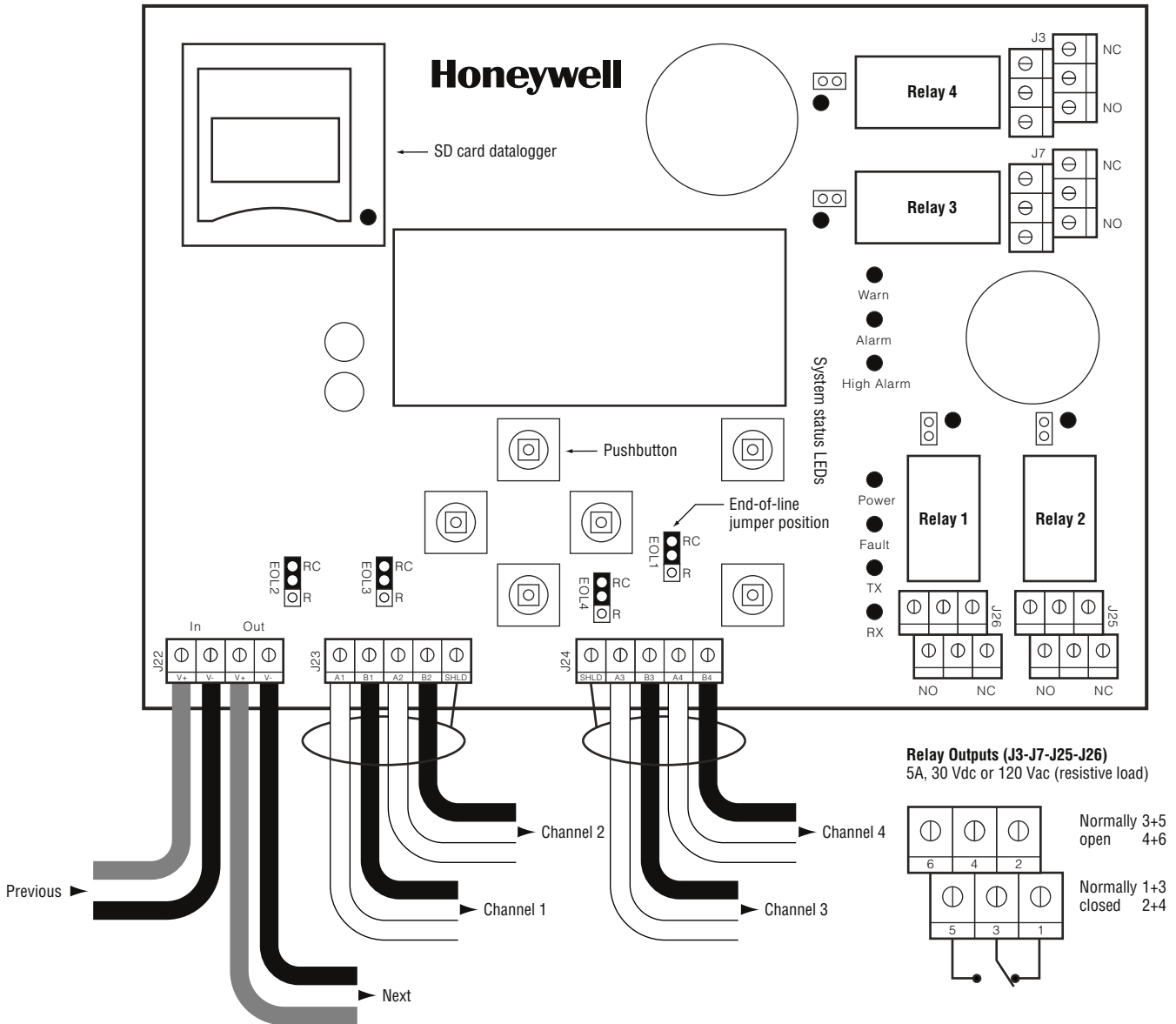
Power Requirements:

- 24 Vdc, 500 mA
- 14 AWG, 2 conductor, stranded cable (Belden 5100UE or equivalent)
- Up to 10 sensors per power supply
- Up to 1,000 feet max power cable length per power supply
- Larger power cable and/or additional power supplies may be required for longer cable runs and/or increased number of sensors

Contact Honeywell Analytics for help with all power requirements.

Communication Requirements:

- 24 AWG twisted pair, shielded (Belden 9841 or equivalent)
- Network can be up to 2,000 feet per channel
- Avoid "T-taps" if possible
- Do not exceed 65 feet per T-tap
- Do not exceen 130 feet total of all T-taps
- Communication wire shield must be connected to shield terminal(s) of controller (J23-J24)
- Channels 1-2-3: Modbus protocol – Communicates only with Modbus devices
- Channel 4: Modbus output only – No sensor can be connected to Channel 4

3 **Wiring** continued

Example of system wiring with network devices:

Figure 4. Sample Network Wiring

Power cable (V+)

Power cable (V-)

Channel 1 (A1 and B1 twisted pair)

- – – – – – RS-485 comm cable; Twisted pair, 24 AWG, shielded (Belden 9841)

——— Power cable; Two conductor, 14 AWG (Belden 5100UE)

——— 4/20 mA comm cable; Three conductor, 18 AWG, shielded, stranded (Belden 8770)

——— VL sensor cable; Four conductor, 16 AWG, non-shielded

3 **Wiring** continued

A Power

The power requirement range for the AirAlert™96d controller is 24 Vdc, 500 mA. The system must be grounded to the power supply. A dedicated circuit breaker should be used. Use 14 AWG two conductor, stranded cable (Belden 5100UE or equivalent), up to 1,000 ft.

If the controller is sharing a power supply with multiple sensors on the network, care must be taken to observe voltage drops (line loss) on the power cable. Supply voltages less than 17 Vdc can render some network devices inoperable. Any supply voltage less than 17 Vdc requires the installation of an additional power supply at that point on the power cable.

Depending on total power consumption, avoid powering more than 10 network devices with one power supply. Additional power supplies and/or decreased number of network devices may be required to compensate for line loss. Contact Honeywell Analytics for help with all power requirements.

Note: Terminal J27 must be grounded to mechanical ground.

Figure 5. Power Wiring
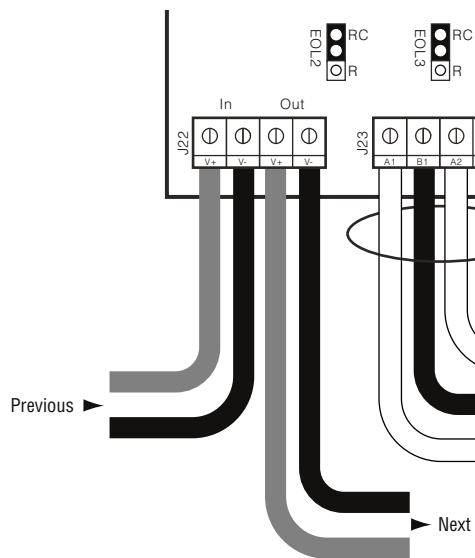
B Communication

The communication cables have to be grounded using the shield terminal. Up to 32 network devices can be installed on each channel.

Use 24 AWG two conductor, twisted and shielded cable (Belden 9841 or equivalent) for the connection. The network can be up to 2,000 feet per channel. The length of a T-tap can be a maximum of 65 feet (20 m). A maximum of 130 feet (40 m) for all the T-taps must be respected.

The communication cables have to be grounded using the shield terminal. Use twisted and shielded cable #24/2 AWG (Belden 9841) for the connection.

Note: Channel 4 is the slave communication channel to retransmit the MODBUS signal to PLC. No sensor can be connected to this channel.
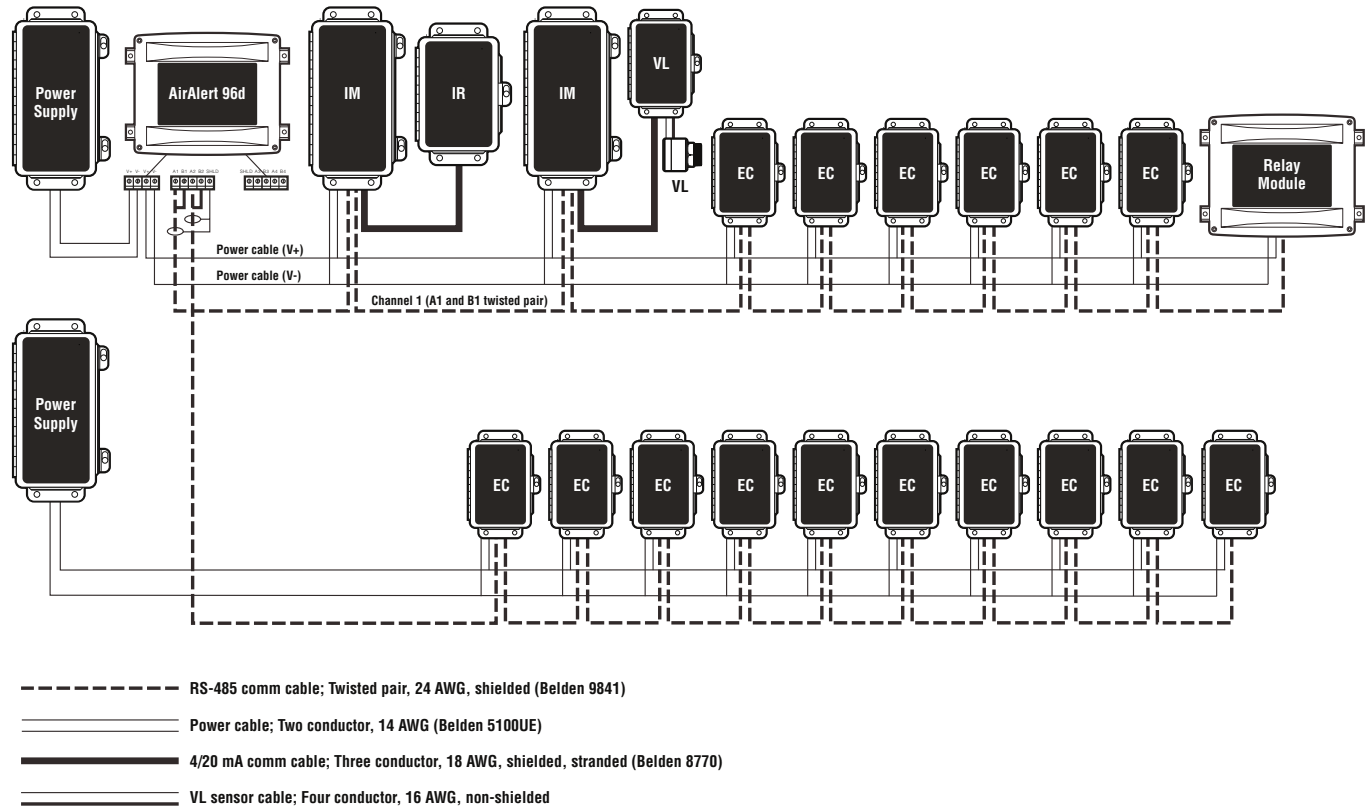
Figure 6. Communications Wiring
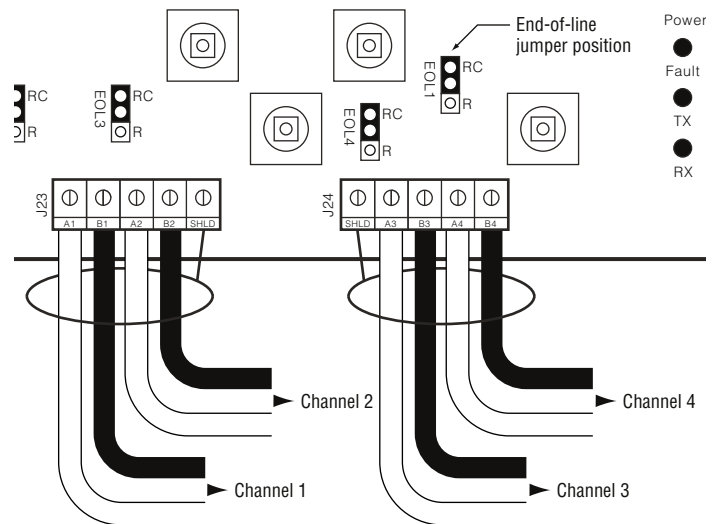
Communication Requirements:

- 24 AWG twisted pair, shielded (Belden 9841 or equivalent)
- Network can be up to 2,000 feet per channel
- Avoid "T-taps" if possible
- Do not exceed 65 feet per T-tap
- Do not exceen 130 feet total of all T-taps
- Communication wire shield must be connected to shield terminal(s) of controller (J23-J24)
- Channels 1-2-3: Modbus protocol – Communicates only with Modbus devices
- Channel 4: Modbus output only – No sensor can be connected to Channel 4

End-of-line specification:

The E.O.L. jumper for channels 1-2-3-4 must alwaysbe in E.O.L. position

3 **Wiring** continued

C Relay Outputs

The relay outputs will withstand up to 5 amps at 30 Vdc (resistive load only). They can be used to activate horns and strobes. Refer to Figure 7 for proper wiring. Each relay can be configured in the PROGRAMMING MENU.

Default setting is:

> Relay 1 (J25) = Warn
> Relay 2 (J26) = Alarm
> Relay 3 (J3) = High Alarm
> Relay 4 (J7) = Fault

Relay rating: 5 A, 30 Vdc (resistive load)

Figure 7. Relay Ouputs
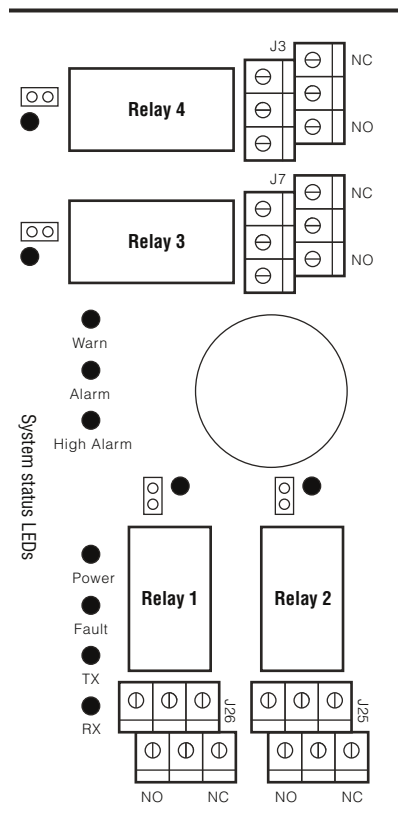
End-of-line specification:
The E.O.L. jumper for channels 1-2-3-4 must alwaysbe in E.O.L. position

Relay Outputs (J3-J7-J25-J26)
5A, 30 Vdc or 120 Vac (resistive load)

Normally open 3+5 4+6

Normally closed 1+3 2+4
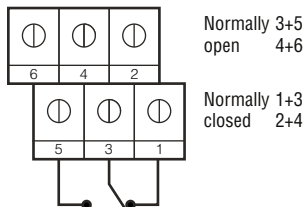
D Jumper Instructions

The different jumpers on the PCB enable the user to make different operations manually.

Jumper EOL1, EOL2, EOL3, EOL4: Enable the user to add an END-OF-LINE jumper to improve the communication signal. Two positions are possible, R or RC. It can vary in accordance with the system constraints. See the wiring detail for the EOL position.

Jumper SHDN: This jumper enables the user to reset or shut down the microcontroller temporarily. It is mainly used during minor modifications in the wirings of the system.

Jumper RELAY J29, J30, J31, and J32: They are used to test the relay. Short pins to test.

4 **Initial Startup**

Be sure to connect the system as shown in the wiring detail before powering up the unit. Apply power to the controller and all network devices. Then remove the SHDN jumper to start the unit.

A Datalogger (SDcard)

The DLC option for the controller collects data automatically and stores it on a digital flash Multi-MediaCard (SDcard). If the SDcard becomes full:

•   The information logging is stopped

•   No Sdcard flag is displayed on the screen

•   The Sdcard LED blinks

Note: For log activation or deactivation, please refer to the Acquisition section.

Warning

Always **deactivate datalogging function before removing the SDcard. *Never* remove the SDcard when the red LED is on.**

Figure 8. Datalogger
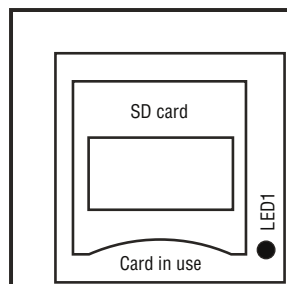
B User Interface

The main display indicates the firmware revision number, time and date, number of sensor/events/groups programmed in the controller, etc.

LED Definition:

Warn, Alarm and High Alarm – Red LEDs indicate that one or more sensors have reached the corresponding alarm level. If LED Warn is blinking, an Event is activated (no alarm).

Power: Green LED indicates that the controller is powered on and functioning properly.

Fault: Yellow LED indicates a fault (communication problem with a network device).

TX: Yellow LED will blink when the controller is sending information on the communication channel.

RX: Green LED will blink when a sensor sends information to the controller.

Figure 9. User Interface

5 **Operation**

The available system operations are based on four different modes: normal mode, single Tx mode, debug mode, and simulation mode. These system modes enable the user to use, analyse, debug, and simulate actions that can be taken by the system. Password is needed to access the different programming menus. The system services might be interrupted by some menu operations.

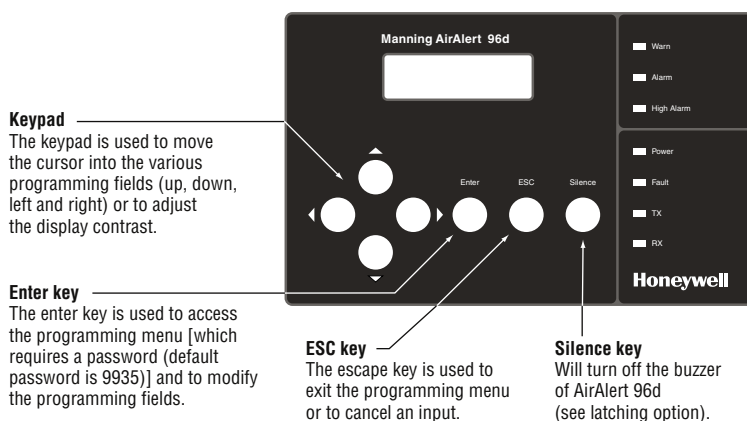## A   Normal Mode

When the system is in Normal Mode, some values can be changed without interrupting the system service. After changing a value in the menu fields, the new value will take effect right after the user gets back to the MAIN MENU. The Normal Mode is the normal system operation. Note: Entering the EVENT MENU will disable Event evaluation and reset their status – during that time, the system is out of service until the user goes back to the MAIN MENU.

Normal Mode Menu

1   Tx Info
2   Groups
3   Events (block Event evaluation if acceded)
5   Copy
7   Network

Warning

Any actions taken in these menus reset the Event status.

Note: *Displays details in the following pages.*

B   Single Tx Mode

The Single Tx Mode doesn't prevent Event evaluation. By entering this mode, the user is able to analyse one sensor at a time. Only the displayed device is interrogated by the controller, thus has its information updated.

C   Debug Mode

This mode is very helpful to evaluate the system, test the system operation without stopping any system services and calibrate the connected sensors. In fact, everything stays in operation except that no actions are taken by the Event. This way no relay is activated.

Note: If one of these modes is accessed, the system will automatically return to Normal Mode after 15 minutes.

D   Simulation Mode

- The Simulation Mode deactivates information update from the network communication.

- This mode simulates the gas concentration over associated scale range for each sensor, one after the other.

- The alarm level (A, B, C) are evaluated in accordance to the gas concentration simulated.

- Events are evaluated and actions are taken.

- During the simulation, the controller is unaware of the current status of the network device.

- Simulation Mode can be stopped in the TEST MENU at any time.

Note: Simulation Mode can be combined with any of the three previous ones (i.e., Normal Mode, Single Tx Mode, or Debug Mode). No other combinations are possible.

6 **Programming Menus**

Controller Information

Number of Groups

Product Name

Firmware Version

```
AirAlert-96d    ver 2.016
Ad:12   Gr:1   Ev:1
SDc
2006-02-11      09:07:16
```

Number of Sensors

Accessible Memory Card

Date

Number of Events

Time
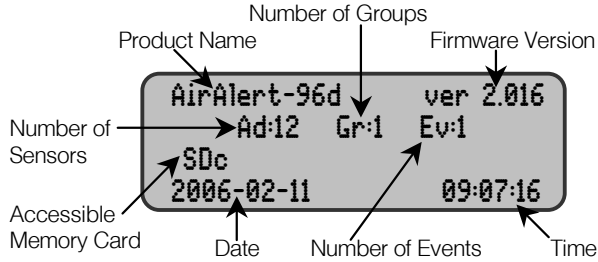
Relay and Annunciator Information

Label

Status

```
Guard Shack
Active Relays
- - 2 - - 4 -
AD:85          -normal-
```

Address

Active Relays

Sensor Information

Label

Type of Gas

Unit of Measurement

```
Engine Room

NH3      0      PPM
AD:03           -normal-
```

Status:
-COMM (no communication)
-A (Warn)
-B (Alarm)
-C (High Alarm)
-Normal

Address

Gas Concentration

Event Information

Event Source

Event Number

```
EVENT         001
-Sources-    -Action-
Tx001        trst: Ctrl
2006-02-11    Ref:#01
```

Activated Relay
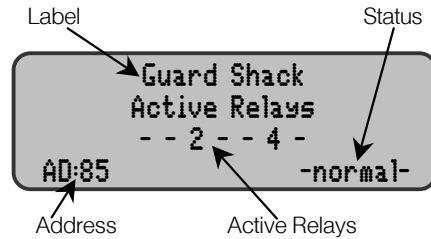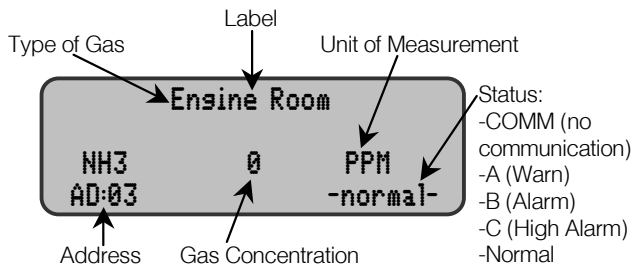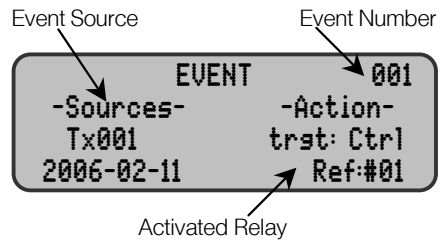
7 **Configuration**

A Main Menu

To access the MAIN MENU, press the *Enter* key and enter the password. The MAIN MENU offers the following eight programming fields:

```
      Menu        →
→1. Tx Info   3. Events
  2. Groups   4. Aquir
```

```
←     Menu        →
→5. Copy      7. Network
  6. Config   8. Tests
```

The cursor to the left of a field on the display indicates that this field is accessible. The arrows in the upper left and right corners indicate that a window is accessible at the left and right of the active window respectively. The keypad's four arrows serve to move the pointer in the MAIN MENU, and the *Enter* key is used to access the selected field.

Tx INFO (Programming the Parameters of a Sensor)

Sensor parameters are programmed via several different windows. There is also an additional information window indicating sensor life available for some sensors.

- Ident
- Com
- Detection
- Display
- Alarm A
- Alarm B
- Alarm C
- Servicing

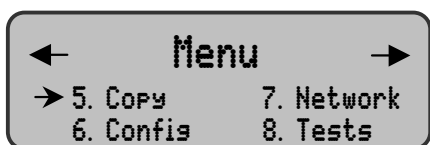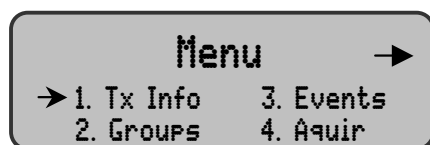The upper right-hand corner of each window indicates the address of the first sensor. When the Tx INFO field is accessed, the pointer is located to the left of the sensor address, thus signifying that the address could be put into editing mode in order to access the parameters of another sensor. The sensor address is put into editing mode using the *Enter* key, and the address begins to flash when it is editable. The keypad's *Up* and *Down* arrows are used to increment or decrement the address value. Once the correct value is obtained, the *Enter* key validates the address. The address then leaves the editing mode and stops flashing.

The following windows are accessible with the *Left* and *Right* arrows.

Ident (Identification of the Network Component)

```
     1. Tx Info    001 →
        -Ident-
→ EC-F9
  NH3
```
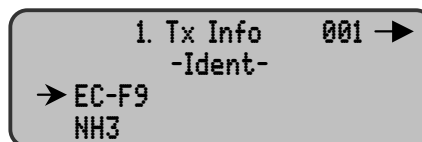
The identification of the network component is comprised of two parameters: the sensor name and the sensor type. A pre-programmed list of sensors is available for both.

Com (Communication Protocol)

```
←    1. Tx Info    001 →
        -COM-
→ Mdbs RTU 8D 2S NP
  9600 bauds
```
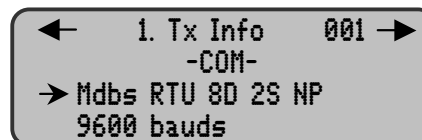
Each sensor's communication protocol is auto-matically established by the AirAlert™96d controller. (See the Network section).

If a sensor is compatible with several protocols, it can be modified by the programmer in accordance with one of the following four choices.

1 Vulbus
2 Mdbs ASCII 7D 2S NP 9600 bauds
3 Mdbs RTU 8D 2S NP 9600 bauds
4 Mdbs RTU 1S EP 9600 bauds

Note: *For MODBUS equipped sensors, the controller must be put into Vulbus mode to allow configuration. Once configuration is complete, return to MODBUS mode for normal operation. MODBUS sensors should be set at even parity, one bit-stop.*

Detection (Definition of the Detection Range and Unit of Measurement)

```
←    1. Tx Info    001 →
       -Detection-
→ scale: 0-100.0
  unit : ppm
```
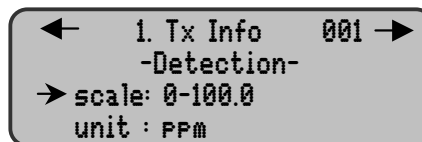
The DETECTION MENU does not appear for an AirAlert™96d-RM8 relay module or AirAlert™96d-AP annunciator panel.

7 **Configuration** continued

Display (programming the label)

```
←       1. Tx Info      001 →
            -Display-
→ edit    (20 char. Max)
    Engine Room
```

The "label" is a descriptive message of up to 20 characters appearing on the display for a network component. It applies to sensors, relay modules and annunciators panels and is located on the first line of the display. For a MODBUS sensor, the default label is composed of the name of the sensor or network component followed by the sensor type (if applicable) and the component address.

Alarm A (Programming Warning Levels)

```
←       1. Tx Info      001 →
            -Alarm A-
    MIN              MAX
→ 45.0PPm          50.0PPm
```

The MAX value is the level at which Alarm A (Warn) is activated (set). The MIN value is the level at which Alarm A (Warn) is deactivated (rest).

Alarm B (Programming Alarm Levels)

```
←       1. Tx Info      001 →
            -Alarm B-
    MIN              MAX
→ 140.0PPm         150.0PPm
```

The MAX value is the level at which Alarm B (Alarm) is activated (set). The MIN value is the level at which Alarm B (Alarm) is deactivated (rest).

Alarm C (Programming High Alarm Levels)

```
←       1. Tx Info      001 →
            -Alarm C-
    MIN              MAX
→ 240.0PPm         250.0PPm
```

The MAX value is the level at which Alarm C (High Alarm) is activated (set). The MIN value is the level at which Alarm C (High Alarm) is deactivated (reset).

Erase Current Tx (Erase Current Displayed Tx Configuration)

```
←       1. Tx Info  → 001 →

        Erase current Tx
```

Groups (Programming Groups of Sensors)

The programming of groups of sensors serves to combine several units in order to be able to take actions (events) based on a series of units rather than each individual one at a time. It is possible to program 126 distinct groups. Another group (GrAll) contains all the sensors within a network by default.

```
←       2. Group    → 001 →
 [001] [004] <end> [---]
 [---] [---] [---] [---]
    empty all groups
```

A group is comprised of a stack containing the address of each sensor included in the group. The pointer is represented in the stack by the flashing triangular brackets < >. The address within these brackets is editable. When the *Enter* key is pressed, the address begins to flash, and the brackets stop flashing. The address can then be modified using the up and down arrows. The address of each sensor programmed in 1. INFO **Tx** is available. The <DEL> function can be used to delete a particular sensor.

The <END> indicator represents the bottom of the stack. To add a sensor to the group, simply move the pointer towards that position and replace <END> with the address of the new sensor. The end of the stack will then move over one position.

The EMPTY ALL GROUPS function deletes all groups programmed in the AirAlert™96d controller.

7 **Configuration** continued

Event (Programming Events)

Default event configuration (EVENT MENU):

- Relay #1 will be activated when alarm A is reached.
- Alarm B will trigger relay #2.
- The buzzer will also be activated for any sensors that reach alarm B.
- Relay #3 will be activated when alarm C is reached.
- Pressing the silence key will acknowledge the latched Events and silence the buzzer.
- Relay #4 will be activated for any fault status.

Event programming serves to define particular actions. The following specific windows are used for such programming:

- Action
- Delay (Condition 1) (Condition 2)
- Delete

Action (Definition of Actions)

```
    3. Event      →001→
        -Action-
    Target: Ctrl
        Relay: #01
```
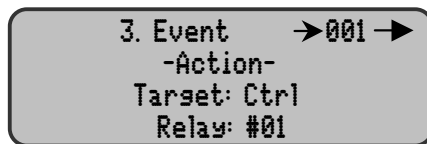
Actions are comprised of two parameters. **TARGET** identifies the component that will perform the action. The following three components may be programmed:

- Tx (Transmitter (sensor))
- Re (Relay Pack/Annunciator Panel)
- Ctrl (Controller)

RELAY identifies the output, which will be activated when the event is true. The output may be one of the following three:

- #XX (Activation of the component's relay #XX)
- Buzzer (Activation of the component's audible alarm)
- ALL (activation of all the component's relays and audible alarm)

Delay (Programming of Delays)

BEFORE and **AFTER** delays are used to retard the activation or deactivation of an action. The **BEFORE** delay retards the activation of an action. When an event becomes true, the action will only be activated after the indicated delay. The **AFTER** delay retards the action's deactivation. When the event is no longer true, the action remains until after the delay period.

```
  ←     3. Event      →001→
            -Delays-
    Before: - - - -
    After : 01min
```
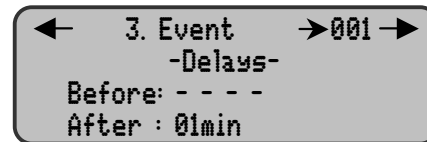
The **BEFORE** and **AFTER** delays may be programmed at 30 seconds, 45 seconds, or from 1 minute to 99 minutes by increments of 1 minute. The five dashes (- - - - -) indicate that no delay had been programmed. The **AFTER** delay can also be put into latch mode.

Latch Mode

- The latch function is executed on an EVENT state.
- It is possible to select the latch mode by editing the after-delay to the latch value.
- The EVENT stays activated until the SILENCE key is pressed.
- The silence key has two functions: silence the buzzer and unlatch the Event.

When the silence key is pressed, events in latch mode are unlatched and re-evaluated. If the Event conditions are still true, the given Event stays activated and returns into latch mode. If not, the Event is deactivated.
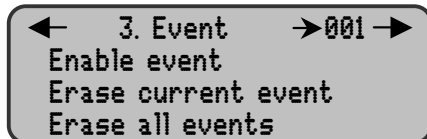
Conditions

Conditions serve to define which premises make an event true.

```
←      3. Event    →001→
          TX010
    =    Alarm A    )  AND
 (
```

```
←      3. Event    →001→
          Clock
 AND (   sta: 0800    )
         End: 1700
```

Each condition is defined by four elements, and two conditions may be combined to provide for greater flexibility.

The element in the lower right-hand corner of a condition indicates the source of the event. The source may be a sensor (Tx001), a group (Gr001), all sensors (GrAll), or the controller's clock (Time). The magnifying glass appearing to the right of the group number provides quick access to this group in order to view or edit it. Access to the GROUP MENU with the magnifying glass symbol. The ESC key returns the display to the condition's window.

The element in the lower left-hand corner indicates the quantifier of the source (applicable only to groups). The quantifier may be indicated as the average (mean), (max), (min), (3/4), (2/3), (1/2), (1/3), (1/4), (1or+) or (all) – applicable only to groups.

```
←      3. Event    →001→
  Enable event
  Erase current event
  Erase all events
```

B   Acquisition (Programming the Acquisition Mode)

Note: Only available with Datalogging option.

```
     4. Acquisition
→10 s delay mode
   Start Tx logging
   Start Event logging
```
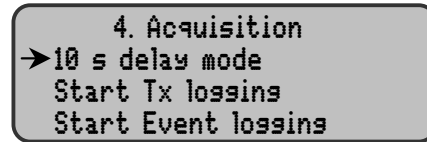
Acquisition Mode for Tx Logging

The ACQUISITION MENU is only accessible when an SDcard is present. This menu is used to enable or disable the logging of the system event or sensor information. This information is stored on the SDcard, however, the acquisition interval or condition must be defined first.

Acquisitions delay mode may be made at intervals of 10 to 59 seconds or 1 to 60 minutes. A threshold mode acquisition may also be made when a sensor's reading varies by 3% or more, 5% or more or 10% or more of its detection range.

Note: Due system latency, threshold values can be greater (but never less) than the selected one.

- 10 to 59 seconds interval
- 1 to 60 minute interval
- 3% threshold (acquisition if variation of 3% of the scale from the last logged value)
- 5% threshold (acquisition if variation of 5% or more of the scale from the last logged value)
- 10% threshold (acquisition if variation of 10% or more of the scale from the last logged value)

Example of Threshold Log Mode

```
2006-01-22  11:05:20;1;NH3;0;ppm;-normal-;
2006-01-22  11:06:02;1;NH3;12;ppm;-normal-;
2006-01-22  11:06:15;1;NH3;18;ppm;-normal-;
2006-01-22  11:06:28;1;NH3;6;ppm;-normal-;
2006-01-22  11:06:39;1;NH3;0;ppm;-normal-;
2006-01-22  11:30:45;1;NH3;15;ppm;-normal-;
2006-01-22  11:30:57;1;NH3;23;ppm;-normal-;
2006-01-22  11:31:08;1;NH3;20;ppm;-normal-;
```

7 **Configuration** continued

Start/Stop Tx Logging

When the display indicates Start log Tx, the acquisition mode is inactive. Acquisition will start by pressing **ENTER**. The log message displays on the screen in accordance to the Mode that has been choose. LED1 turns ON.

- Start log Tx (starts sensor acquisition)
  Opens an **ad1_48.log and ad49_96.log** file.
- Stop log Tx (stops sensor acquisition)

The **ad1_48.log** and **ad49_96.log** files contain a record of sensors 1 to 48 (**ad1_48.log**) and 49 to 96 (**ad49_96.log**). This register includes the date, time and address of the sensor(s), the sensor type, the concentration read, as well as the alarm status.

Start/Stop Event Logging

In addition, event information may also be acquired. As it is the case for sensor acquisition, the display indicates the function of the **ENTER** key.

- Start log even. (starts event acquisition)
  Opens an **events.log** file.
- Stop log even. (stops event acquisition)

The **events.log** file contains a record of the controller's events and key entries.

Example:

2006-01-21 16:27:51; Event logging enabled
2006-01-21 16:27:53; Menu exited
2006-01-21 16:28:11; Event accessed
2006-01-21 16:28:43; Event 1 setup modified
2006-01-21 16:28:45; Menu exited

The event file indicates the date and time, menu access and modifications, as well as events that were activated.

List of Events

List of Events	English
Power-up	"System Power-up"
Power-down	"System Power-down"
Menu accessed	"Menu accessed"
Menu exited	"Menu exited"
Event logging enabled	"Event logging enabled"
Event logging disabled	"Event logging disabled"
Transmitter logging enabled	"Transmitter logging enabled"
Transmitter logging disabled	"Transmitter logging disabled"
Transmitter info setup	"Transmitter X setup"
Alarm setup	"Tx X alarm level setup"
Event setup	"Event X setup"
Group setup	"Group X setup"
Clock setup	"Clock setup"
Language setup	"Language setup"
Scroll mode setup	"Scroll mode setup"
Silence activated	"Silence activated"
Event status changed	"Event X now True/False"
Alarm A, B, C, Fault, and X status changed	"Transmitter X Alarm X True/False"

Example:

2004-01-23 17:54:25; 001; NH3; 0: ppm:--------;002; CL2; 1.5; ppm;AL:-A;003; NH3; 0 ppm--------;004; CL2; 0.0; ppm;--------;005; NH3; 0; ppm;--------;
2004-01-23 17:55:25; 001; NH3; 0: ppm:--------;002; CL2; 7.5; ppm;AL:-A;003; NH3; 0 ppm--------;004; CL2; 0.0; ppm;--------;005; NH3; 0; ppm;--------;
2004-01-23 17:56:25; 001; NH3; 0: ppm:--------;002; CL2; 6.5; ppm;-------;003; NH3; 0 ppm--------;004; CL2; 0.0; ppm;--------;005; NH3; 0; ppm;-------;
2004-01-23 17:57:25; 001; NH3; 0: ppm:--------;002; CL2; 0.5; ppm;-------;003; NH3; 0 ppm--------;004; CL2; 0.0; ppm;--------;005; NH3; 0; ppm;-------;
2004-01-23 17:58:25; 001; NH3; 0: ppm:--------;002; CL2; 0.0; ppm;-------;003; NH3; 130; ppm;AL:-A;004; CL2; 0.0; ppm;--------;005; NH3; 0; ppm;-------;

Note: In this case, there is a reference to five sensors (addresses #1 to #5) – three NH_3 and two CL_2. We can see that the CL_2 at address #2 goes in alarm A and a few minutes later it's the NH_3 at address #3 that goes in alarm A.
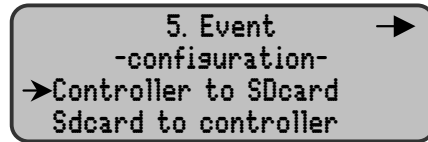
7 Configuration continued

Copy (Transferring Data and Copying Parameters)

The **COPY** function serves to transfer data and copy parameters within the following windows:

- Configuration
- Parameters

Configuration (Data Transfer)

```
     5. Event          →
    -configuration-
 →Controller to SDcard
   Sdcard to controller
```

This section of the COPY MENU is only accessible if an SDcard is present. Data can be transferred from the controller to the SDcard, or from the SDcard to the controller. Thus, an image of the controller's programming may be transferred and stored on a computer. Similarly, the controller's programming may be executed on a computer and then transferred to the controller.

- Controller to SDcard (transfer from the controller to the SDcard)
- SDcard to controller (transfer from the SDcard to the controller)

In order, the first command enables the user to save the controller configuration and parameters into a file named 'config.ini'. The second command enables the user to load the configuration and parameters from the same file. Keep in mind that the content of the 'config.ini' file can always be edited on a computer.

Before saving the current configuration and parameters, the system will look for the existence of any previous configuration. The following steps will be performed:

1 If a file named 'config.ini' already exists, the system looks for a file named 'config.bak';

2 If a file named 'config.bak' is found, it is deleted;

3 Then, the existing 'config.ini' file is renamed 'config.bak', thus keeping a backup of the previous configuration;

4 At last, a new 'config.ini' file with the current configuration is created.

Moreover, at card insertion, the controller system looks for an existing 'config.ini' file containing a tag named "autoload" equaled to '1' (meaning true). If so, the system will automatically load the content of the file and set "autoload" to '0' (meaning false). This feature is useful when you edit the file on a computer and want to avoid "menu manipulations" on the controller.

On a closer look, 'config.ini' is a text editable Windows .ini-style file. It can be accessed by any word processing software, but the simpler Notepad should be favored. The content of the file has the following format:

> [section 1]
>
> tag 1 = "string value 1"
> tag 2 = "string value 2"
> tag 3 = 53
>
> [section 2]
>
> tag 1 = true
> tag 2 = -12.3

[…]

See example on the next page.

7 Configuration continued

Example of saving a controller configuration

AirAlert96d = "Configuration"
Date = "2006-01-09 13:51:57:"

[CONFIG]	[ADDRESS_1]	[ADDRESS_2]	[GROUP_1]
language = 1	txtype = 1	txtype = 17	tx_0 = 1
scrollmode = 0	display = "ECF9 NH3 AD:01"	display = "ECF9 NH3 AD:02"	tx_1 = 2
relaymode = 0	protocol = 1	protocol = 1	tx_2 = 0
password = "2967"	baudrate = 9600	baudrate = 9600	[EVENT_1]
cie = 0	databits = 8	databits = 8	actiontarget = 14
priority = 0	stopbits = 2	stopbits = 2	actionrelay = 1
autoload = 1	parity = 0	parity = 0	delaybefore = 0
[SLAVE]	sensortype = 65	sensortype = 2	delayafter = 0
address = 1	fullscale = 102.000000	fullscale = 250.000000	cond1source = 1
protocol = 1	unit = 0	unit = 1	cond1logic = 1
baudrate = 38400	alarmAmin = 20.1000003	alarmAmin = 20.0000000	cond1alarm = 0
databits = 8	alarmAmax = 25.0000000	alarmAmax = 25.0000000	[EVENT_2]
stopbits = 2	alarmBmin = 45.000000	alarmBmin = 180.000000	actiontarget = 0
parity = 0	alarmBmax = 50.000000	alarmBmax = 200.000000	actionrelay = 1
	alarmCmin = 85.000000	alarmCmin = 218.000000	delaybefore = 255
	alarmCmax = 90.000000	alarmCmax = 225.000000	delayafter = 255
		databits = 7	cond1source = 129
		stopbits = 2	cond1stat = 9
		parity = 0	cond1logic = 7
			cond1min = 10.0000000
			cond1max = 15.0000000
			[FIN]

Parameters (Copying Parameters)

```
←        5. Copy      →001
          -parameters
 →Tx info to Tx info
   Event to Event
```

The copying of parameters serves to transfer one sensor's configuration to another, or one event to a second event. This function accelerates programming on the display when two entities have identical or close properties. **Tx Info to Tx Info** copies a sensor's parameters, and **Event to Event** copies the parameters of one event to another.

TxINFO to TxINFO
(copies the parameters of a sensor)

```
   Tx info to Tx info
 →source tx001
   target tx002
   COPY
```

Event to Event

```
   Event to Event
 →source #001
   target #002
   COPY
```

Config (Programming Display Parameters and the Access Code)

```
        6. Config        →
 →Manual scroll mode
   Set Date and Time
   Menu francais
```

The CONFIG MENU is used to program the display mode, adjust the time and date, select the display language in the first window, and to edit the password in the second window.

7 Configuration continued

The scroll mode is used to set the scroll interval of the information pages displayed on the screen. Scroll mode may be set to at three or five seconds, or it may be set to manual only. The information page displayed can always be controlled manually using the arrow keys. The display will remain on the last component selected only in manual mode.

- 3-Second Scroll
- 5-Second Scroll
- Manual Scroll

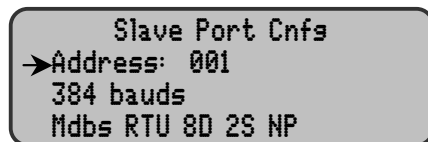The date and time are displayed in the following format:

> yyyy-mm-dd hh:mm:ss
> (ISO 8601 standard, 24 hours format)

The desired display language is selected via Menu Francais and English Menu. The selection is made with the *Enter* key. When the display shows Menu Francais, the current display language is English. The language may be changed by pressing the *Enter* key.

The user password can be edited and comes with a default value of 9935 (last four digits of Manning's toll free phone number).

```
◀         6. Config        ▶
➤Set User Password
           -9935-
   Slave Port Cnfg
```
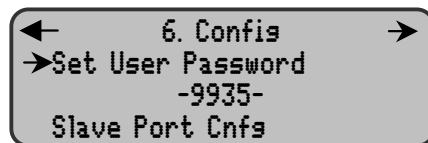
The Config window also features an option to configure the slave port.

```
      Slave Port Cnfg
➤Address:  001
   384 bauds
   Mdbs RTU 8D 2S NP
```

Relay configuration allows the relays to be set to normal or failsafe mode. In the event of loss of power to the controller, relays will change states if set to failsafe mode.

```
◀         6. Config
➤Relay Configuration
   AP Brdcst: auto
   Manning Systems
```
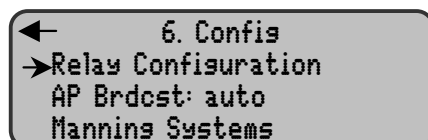
## Network (Auto-Programming of Network-Related Parameters)

The functions of the Network menu serve to reset or program information related to the network devices.

- Reset Database (Resets all Tx Info database – network device)
- Network Scan (Auto detection of the network devices)
- Reset & Scan (Resets all Tx info database and auto detection of the network devices)

```
        7. Network        ▶
➤Reset Database
   Scan Network
   Reset and Scan
```
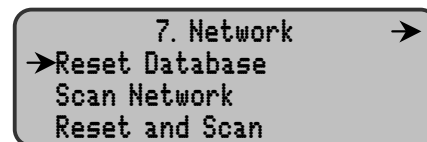
Resetting the network device affects only the Tx information: groups and events are not affected by these function.

Network scan serves as an auto detection service of network devices to configure the Tx information database.

```
◀         7. Network
➤Statistics
```
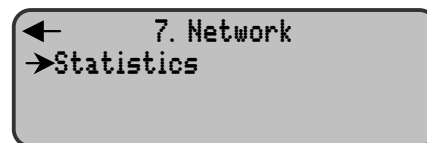
The statistics function allows the user to view details about the 16 last entries such as:

- Valid responses
- Communication errors
- Timeouts (no response)

7 Configuration continued

Tests (Sequential Test Mode)

Test Sequence

This simple test sequence enables the user to activate each output and validate the operation of each controller key and all display pixels, as well as the different communication protocols.

Start Sim. Sequ. & Stop Sim. Sequ. (Stop Simulation)

```
        8. Tests          →
→Test Sequence
  Start Sim Sequence
  Maximum load
```
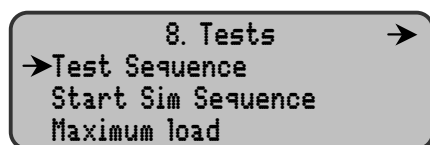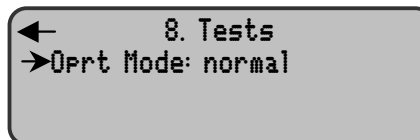
See Simulation Mode section for more details.

The simulation mode allows for the simulation of gas concentration over associated scale range on all sensors. The simulated gas concentration values are local to the controller.

- Start with Tx00X (simulation starts with sensor 00X)
- Confirm (simulation activation)

Maximum Load (Activation of All Controller Components)

Oprt Mode (Controller Operating Mode)

```
←       8. Tests
→Oprt Mode: normal
```

See System Operation section for more details.

1. Normal (normal controller operating mode)
2. Single Tx (activation of interrogation mode for a single sensor)
3. Debug (activation of service mode to allow for calibration without affecting events)

8 Specifications

Power Requirements
24 Vdc, 500 mA

Operating Environment
Ordinary location

Operating Temperature Range
-4°F to 122°F (-20°C to 50°C)

Operating Humidity Range
0 to 95% RH, (non condensing)

Operating Altitude
Up to 9843 ft. (3,000 m)

Network Capacity
Up to 96 sensors, 32 per channel
Channel 1, 2, and 3: MODBUS
Channel 4: Modbus output to PLC

Communication (length of lines)
Up to 2,000 feet (600 m) per channel
24 AWG #9841 Belden Cable
T-tap: 65 feet (20 m) maximum per t-tap,130 feet (40 m) total

User Interface
Graphic 122x82 dot matrix backlit display
User friendly keypad

Visual Indicators

Power On	Green LED
Warn	Red LED (blinking upon an event)
Alarm	Red LED
High Alarm	Red LED
Fault	Yellow LED
Tx	Amber LED (blink when used)
Rx	Green LED (blink when used)

Outputs
4 DPDT relays
5A, 30 Vdc or 250 Vac (resistive load)

Time Delays
0, 30, and 45 seconds, and1 to 99 minutes before and after alarm

Battery
Lithium battery, 3 volts

Enclosure
NEMA 4x, cast aluminium #A356.0T6

Overvoltage Category
II

Dimensions
9.50" (W) x 14.00" (H) x 3.50" (D)

Weight
11.4 lbs (5.2 kg)

9 Maintenance

The Manning AirAlert™96d is a maintenance free controller. Only the sensors need periodic inspection and calibration (see sensor manual).

Periodic Inspections and Calibration

Honeywell Analytics provides its customers with specialized gas detection equipment. Beyond the warranty period, the systems must be maintained and calibrated on a regular basis (normally two times a year).

Honeywell Analytics will not assume responsibility for the interruption of service or malfunctioning of its equipment as a result of the discontinuance of maintenance and calibration services.

If unit span or zero cannot be adjusted, the sensor may be approaching its end-of-life and must be replaced. Keep an operation log of all maintenance, calibrations and alarm events.

Replacement Parts

A replacement 3V lithium battery is also available. If the memory card option is present, spare SDcards are also available.

Due to continuous evolution of our products, please contact our service department for ordering parts or for more details.

Cleaning

Clean the exterior with a soft, damp cloth. Do not use solvents, soaps or polishers.

Battery Disposal

This instrument contains a lithium battery. Do not mix with the solid waste stream. Spent batteries should be disposed of by a qualified recycler or hazardous materials handler.

10 **Relay Module** (optional)

The AirAlert™96d-RM8 relay module acts as an output to the AirAlert™96d controller. The relay module provides eight programmable relays for the activation of ventilation and audible/visual alarm output devices at programmable alarm levels. Since the relay module is an output to the controller, it can be located at any point within the gas detection network.

AirAlert™96d-RM8 Features:

*   Fully compatible with the AirAlert™96d controller
*   Equipped with 8 programmable DPDT relays
*   RS-485 daisy chain installation
*   LED visual indication status of each relay

Specifications

Power Requirements
17 to 27 Vdc, 250 mA

Operating Temperature Range
32°F to 100°F

Operating Humidity Range
0 to 95% RH (non-condensing)

Outputs
8 DPDT relays; 5A
30 Vdc or 250 Vac (resistive load)

Maximum Distance between Relay Module and Controller
2,000 feet

Enclosure
NEMA 4x, cast aluminium #A356.0T6

Dimensions
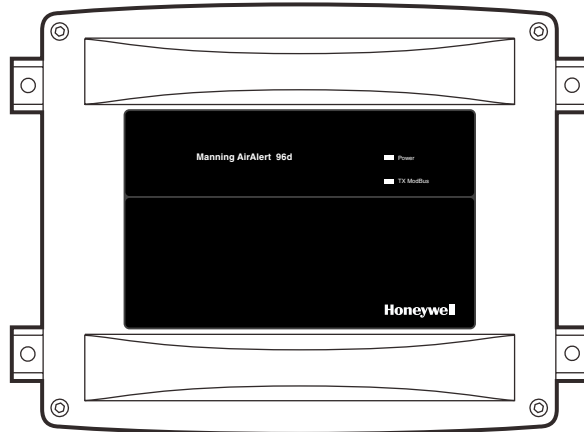9.50" (W) x 14.00" (H) x 3.50" (D)

Weight
11.4 lbs (5.2 kg)

LEDs

Two LEDs indicate the status of the relay module. The Power LED (green) indicates that the relay module is powered on. The Tx Modbus LED blinks when there is a data transfer between the relay module and the controller. If the communication breaks down, that LED will turn off.

Figure 10. AirAlert™96d-RM8

Dip Switches

The DIP switches are used to change the relay module addresses. The address ranges available begin at 81.

Modbus address	Position of the DIP switches			
	Dip 1	**Dip2**	**Dip 3**	**Dip 4**
081	Off	Off	Off	Off
082	On	Off	Off	Off
083	Off	On	Off	Off
084	On	On	Off	Off
085	Off	Off	On	Off
086	On	Off	On	Off
087	Off	On	On	Off
088	On	On	On	Off
089	Off	Off	Off	On
090	On	Off	Off	On
091	Off	On	Off	On
092	On	On	Off	On
093	Off	Off	On	On
094	On	Off	On	On
095	Off	On	On	On
096	On	On	On	On

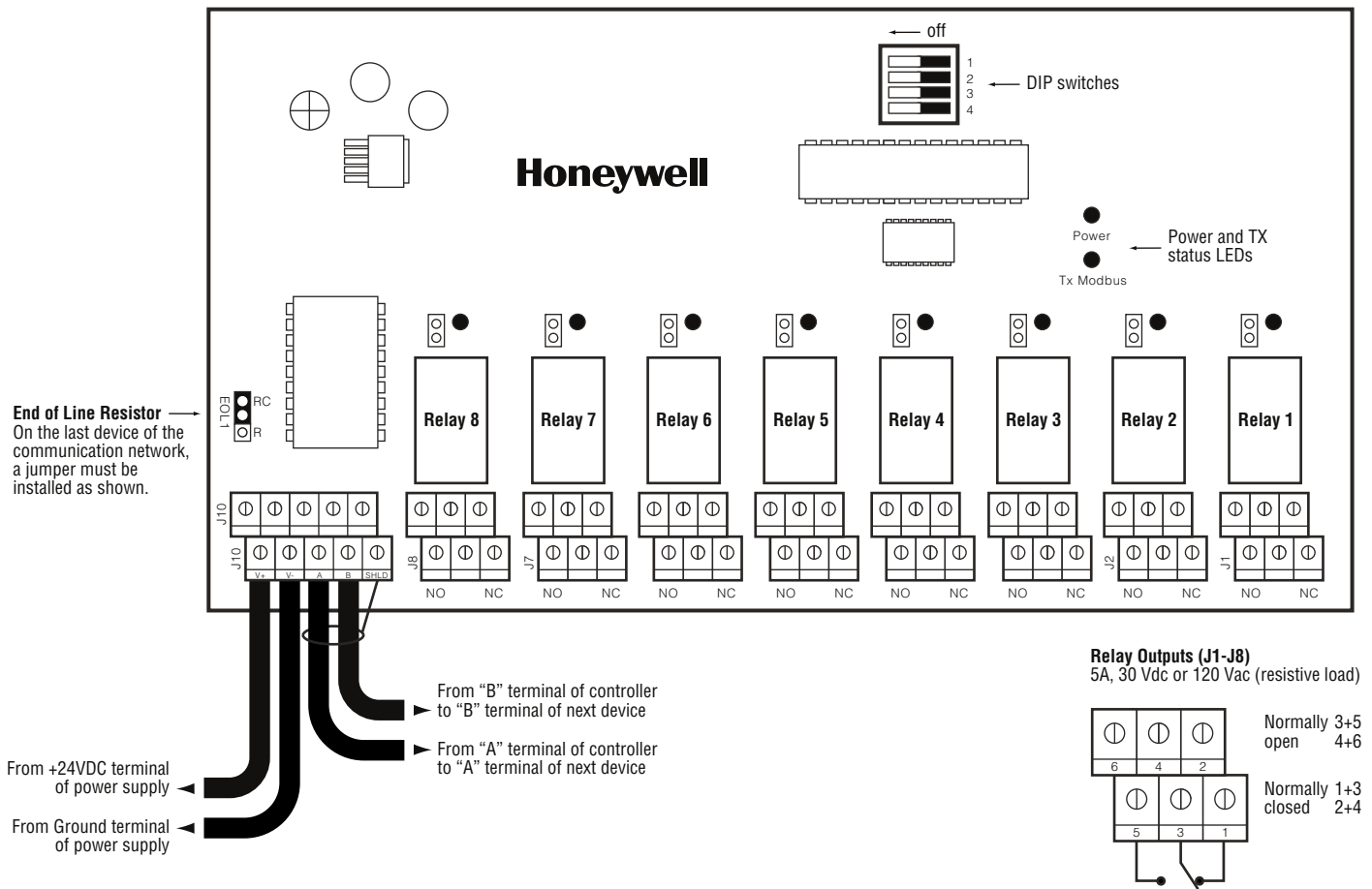# 10 **Relay Module** (optional) continued

Wiring Details

Power Supply Cable

- 14 AWG stranded cable or larger (see your network diagram provided by Honeywell Analytics sales department).

Communication Cable

- 24 AWG twisted pair (Belden # 9841 or equivalent).

Figure 11. Relay Module PCB

11 Limited Warranty

1. **Limited Warranty**

   Honeywell Analytics, Inc. warrants to the original purchaser and/or ultimate customer ("Purchaser") of Manning products ("Product") that if any part thereof proves to be defective in material or workmanship within eighteen (18) months of the date of shipment by Honeywell Analytics or twelve (12) months from the date of first use by the purchaser, whichever comes first, such defective part will be repaired or replaced, free of charge, at Honeywell Analytics' discretion if shipped prepaid to Honeywell Analytics at 11511 W. 83rd Terrace, Lenexa, Kansas 66214, in a package equal to or in the original container. The Product will be returned freight prepaid and repaired or replaced if it is determined by Honeywell Analytics that the part failed due to defective materials or workmanship. The repair or replacement of any such defective part shall be Honeywell Analytics' sole and exclusive responsibility and liability under this limited warranty.

2. **Exclusions**

   A. If gas sensors are part of the Product, the gas sensor is covered by a twelve (12) month limited warranty of the manufacturer.

   B. If gas sensors are covered by this limited warranty, the gas sensor is subject to inspection by Honeywell Analytics for extended exposure to excessive gas concentrations if a claim by the Purchaser is made under this limited warranty. Should such inspection indicate that the gas sensor has been expended rather than failed prematurely, this limited warranty shall not apply to the Product.

   C. This limited warranty does not cover consumable items, such as batteries, or items subject to wear or periodic replacement, including lamps, fuses, valves, vanes, sensor elements, cartridges, or filter elements.

3. **Warranty Limitation and Exclusion**

   Honeywell Analytics will have no further obligation under this limited warranty. All warranty obligations of Honeywell Analytics are extinguishable if the Product has been subject to abuse, misuse, negligence, or accident or if the Purchaser fails to perform any of the duties set forth in this limited warranty or if the Product has not been operated in accordance with instructions, or if the Product serial number has been removed or altered.

4. **Disclaimer of Unstated Warranties**

   THE WARRANTY PRINTED ABOVE IS THE ONLY WARRANTY APPLICABLE TO THIS PURCHASE. ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE ARE HEREBY DISCLAIMED.

5. **Limitation of Liability**

   IT IS UNDERSTOOD AND AGREED THAT HONEYWELL ANALYTIC'S LIABILITY, WHETHER IN CONTRACT, IN TORT, UNDER ANY WARRANTY, IN NEGLIGENCE OR OTHERWISE SHALL NOT EXCEED THE AMOUNT OF THE PURCHASE PRICE PAID BY THE PURCHASER FOR THE PRODUCT AND UNDER NO CIRCUMSTANCES SHALL HONEYWELL ANALYTICS BE LIABLE FOR SPECIAL, INDIRECT, OR CONSEQUENTIAL DAMAGES. THE PRICE STATED FOR THE PRODUCT IS A CONSIDERATION LIMITING HONEYWELL ANALYTICS' LIABILITY. NO ACTION, REGARDLESS OF FORM, ARISING OUT OF THE TRANSACTIONS UNDER THIS WARRANTY MAY BE BROUGHT BY THE PURCHASER MORE THAN ONE YEAR AFTER THE CAUSE OF ACTIONS HAS OCCURRED.