Corporation
AMICO

MICROPROCESSOR BASED

DIGITAL ALARM SYSTEM

ALERT-2

Installation and Maintenance Manual v4.3

Table of Contents

USER RESPONSIBILITY

The information contained in this Installation and Operation Maintenance Manual, pertains only to the ALERT-2 microprocessor based digital alarm. This product will perform to conformity with the descriptions contained in this manual, when assembled, operated, maintained and serviced in accordance with the installation instructions provided.

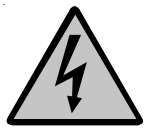
The alarm **must** be checked periodically. Parts that are broken, missing, worn, distorted or contaminated, **must** be replaced immediately. Should such repair or replacement become necessary, please contact Amico Corporation or their distributors.

All alarms should not be repaired, or altered without prior written or verbal approval of Amico Corporation or it's distributors. Failure to comply will void all warranty on the alarm.

Statements in this manual preceded by the words **WARNING**, **CAUTION**, **DANGER** and **NOTE** are of special significance. Please read these sections carefully.

WARNING: denotes steps which can prevent injury.

CAUTION: denotes steps which can prevent damage to equipment.



DANGER: denotes steps which can prevent electrical shock to equipment or to prevent serious injury and/or death.

INTRODUCTION

The AMICO medical gas alarm system (ALERT-2) incorporates the latest microprocessor technology for alarm and surveillance systems. The alarm has been designed to provide user flexibility and reliability. This manual will enable the customer to install, use and maintain the alarm properly.

All Gases or Vacuum are displayed with large red LED's for clear visibility. To facilitate the monitoring function by hospital personnel, a trend bar is provided to show the direction of the gas/vacuum pressure. Under normal operation, the gas trend indicator will be in the GREEN - OK position. If the gas pressure approaches alarm condition, the trend indicator will display a YELLOW - Caution indicator. If an alarm condition occurs, a RED - Alarm indicator will be displayed and the buzzer will sound.

There are two buttons located on the front face of the Annunciator module. They are the: "PUSH TO TEST" and "ALARM SILENCE" buttons. The function of the "Push to Test" button is to verify that the buzzer and all the alarm LED's are in normal working condition. The function of the "Alarm Silence" button is to silence an alarm that has occurred.

A master status module monitors source equipment such as: Oxygen, Nitrous Oxide, Air compressors, Vacuum pumps, Air dryers, high/low pressure switches, etc. This module can be connected to a "Building Management System", with a piggy-back computer interface board, that attaches to the master module.

FEATURES INCLUDE:

- Individual Microprocessor on each display, sensor and master module.
- Gas specific sensors can be mounted locally or remote, up to 5,000 feet, [1,500m] utilizing 22 gauge twisted pair (2 shielded wires).
- DISS gas specific sensor housed in a tamper proof enclosure.
- True digital LED display and trend indicator for each service monitored.
- Illuminated LED display that is visible at an angle or in dim lighting conditions.
- PSI, kPa or BAR display (switch selected).
- Self diagnostic circuitry with error display for problem identification.
- Highly accurate Solid State Pressure piezo-resistive transducer.
- Adjustable repeat alarm (1 to 60 minutes/or off) for the Area Alarm.
- Adjustable repeat alarm (5, 15, 30 minutes/or off) for the Master Alarm.
- Dry contacts for remote monitoring of High and Low alarm status on the display module.
- Modules are factory mounted on a hinged frame assembly for ease of installation and maintenance.
- Field programmable push buttons for adjustment of HI and LOW set-points on display module.
- Area alarms available in 1 to 6 display modules.
- Master alarms available in 10 to 60 points.
- Area Modules can be intermixed with Master Modules to create a combination alarm.
- Built-In relay for remote annunciator applications.
- Area Module indication for calibration (flashing bar graph).

DESCRIPTION OF THE ALARM

SHIPMENT DETAILS

When you receive an ALERT-2 series alarm from Amico Corporation, the package will consist of two main sections; the Alarm Back Box and the Frame/Module Assembly. The Frame/Module assembly will be pre-configured, with the appropriate display modules, based upon the customer's specifications

THE ALARM BACK BOX

The Alarm Back Box contains the auto-switchable System Power Supply with an ON/OFF switch, a built-in fuse and terminal blocks (115 VAC, or 220 VAC). The back box also incorporates the pipe stubs for applications that require locally (in box) mounted sensors.

THE FRAME/MODULE ASSEMBLY

The Frame/Module Assembly consists of the frame and all the modules that are pre-assembled to the customers specification. The hinged frame is designed to swing down from the back box to facilitate installation and servicing of the alarm. This design will reduce installation time and eliminate the risk of improper installation since all the modules are connected and tested at the factory.

DESCRIPTION OF MODULES

The ALERT-2 alarm is divided into (4) or (7) main modules:

COMMON TO ALL ALARMS

1 SYSTEM POWER SUPPLY.

The System Power Supply has been pre-installed into the back box assembly. The System Power Supply converts the AC voltage supply to the alarm into two voltages: 5 VDC (regulated) required by the microprocessor hardware and 12 VDC (unregulated) required by the buzzer and the LED's. This unit also contains the main ON/OFF power switch, the transformer, the heat sink, the main fuse and fuse cover, the rectifying circuitry, the terminal blocks and the low voltage DC power cable for connecting this unit to the annunciator module. The System Power Supply can be easily removed and reinstalled by unscrewing it from the back box.

2 ANNUNCIATOR MODULE.

The Annunciator Module contains the buzzer, a "Power On" LED, the "PUSH TO TEST" and the "ALARM SILENCE" buttons. The function of the "PUSH TO TEST" button is to verify that the buzzer and all the LED's are in working condition. An alarm will be heard when this button is pushed and all the LED's will light up. When the button is released, the alarm will silence. The "ALARM SILENCE" button is used to silence an alarm that has occurred. This module also contains a fail-safe relay that de-energizes when the buzzer is activated. This relay can be used with the "*Amico remote buzzer*", for applications requiring a remote audible alarm, for connection to an other Amico Alarm or a Building Management System.

3. BLANK MODULE.

The Blank Module is used as a filler board for future provisions of the alarm.

AREA ALARM

4. AREA DISPLAY MODULE.

The Area Display Module provides a digital display of the actual pressure/vacuum of a gas being monitored. In addition a gas trend indicator bar with HIGH and LOW alarms are displayed. The trend bar has three coloured LED's: GREEN for Normal condition, YELLOW for Caution condition, and RED for high and low Alarm conditions.

Each display module contains a gas specific colour coded label (USA or ISO colours are available). A space is also provided, at the base of the module, to identify the location that the display module monitors. The display module is field adjustable for pressure/vacuum settings, repeat alarm, and units of measure. Whenever the module is in calibration mode, the bargraph is flashing, indicating the calibration mode. Dry contacts for high and low alarms are available for remote monitoring of each module.

5. SENSOR MODULE.

The Sensor Module contains the transducer which converts the pressure/vacuum pressure source into a digital signal that is displayed on the display module. The sensor module is housed in a black ABS plastic fire rated enclosure to reduce the risk of tampering. Each sensor is clearly labelled and colour coded for the gas or vacuum being monitored. The sensor module contains a gas specific DISS fitting to ensure correct connection of the proper sensor to the respective gas. Each sensor has been factory calibrated for the specific gas shown on the sensor housing. If it is not connected to the appropriate gas display module, an error message (**E02**) will be displayed.

MASTER ALARM

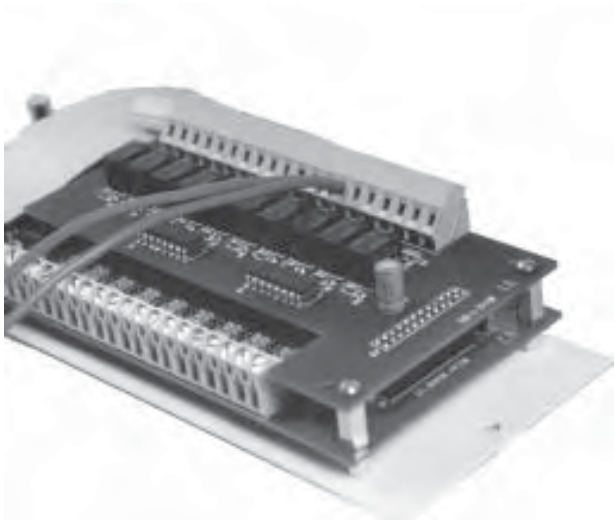
6. MASTER STATUS MODULE.

Each Master Status Module will continuously monitor up to 10 signals from source equipment and pressure switches. If any of the signals being monitored go into an alarm condition, a red LED will illuminate and the audible alarm will sound. The module has a *slow* and a *rapid* flashing LED rate. The last alarm condition always flashes at a *rapid* rate, while the previously acknowledged alarms always flash at a *slow* rate.

PLEASE NOTE: Contacts located on back of module are Dry Contacts only. DO NOT apply any voltage.

7. COMPUTER INTERFACE MODULE.

The Computer Interface Module is a piggyback board that fits on top of the master status module. This module plugs into the status module via a connector, located at the bottom end of the status module. There are three mounting screws provided to secure this module to the status module. This module provides dry contacts for interface to a "*Building Management System*". The module is "Fail-Safe", closed circuit monitoring.



INSTALLATION

THE ALARM BOX

Install the back-box to the studs of the wall at the desired height. Ensure that the box is securely in place. The mounting brackets are adjustable to suit the thickness of the wall. MAKE SURE the box is parallel, squared and flush with the **finished wall surface**, to ensure that the frame assembly will fit properly.

FOR LOCAL SENSOR ONLY

If the sensors are to be mounted locally (inside the back box), the pipe stubs must be connected to the pipeline. Using silver-brazing techniques, connect each pipe stub to it's appropriate gas or vacuum while ensuring that the bottom of the pipe stub is wrapped with a damp cloth. BE CAREFUL not to damage the DISS check-valve by overheating the lower portion of the copper pipe. When the brazing of pipe stubs has been completed, the system can be pressure tested.

STANDING PRESSURE TEST

Perform a standing pressure test on the piping system as per NFPA - 99 *"Health Care Facilities*" or CSA-Z305.1 "*Nonflammable Medical Gas Piping Systems*". Inspect all joints for leaks and make certain each gas is piped to a correspondingly labelled gas service.

FRAME/MODULE ASSEMBLY

Step #1 Remove the frame/module assembly from its protective box.

Step #2 Remove screws from the frame section (4 screws).

Step #3 Attach the flat head screws (provided with frame in plastic bag) to the hinge. This will line up with holes on the box.

Step #4 Attach the frame wire with 2 dome head screws (provided with frame in plastic bag).

Step #5 Close the frame panel and tighten the screws on the frame plate.

Step #6 Carefully place the front frame over the fastened plate. Refasten the screws that were removed in Step #2.

CAUTION: The microprocessor circuitry on the ALERT-2 alarm contains sophisticated integrated semiconductors. If it becomes necessary to remove a module, PLEASE hold the boards by the edges. **DO NOT TOUCH** any of the components on the board. Static discharge can cause the modules to malfunction, or become damaged.

SENSOR

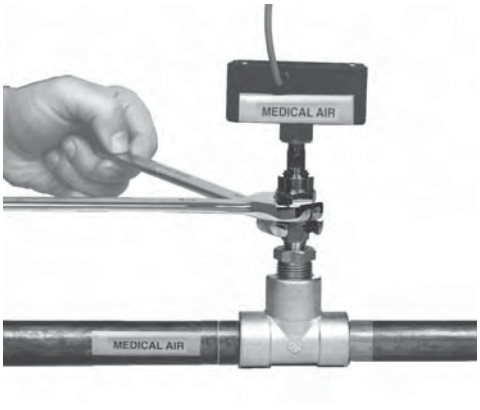
LOCAL (In the Back Box)

1. Locate the gas specific sensor module to be installed.
2. In the back box, there are colour coded gas labels located under the DISS Demand check valves. Each label identifies where each sensor module is to be placed.
3. The sensor module contains a gas specific DISS fitting. Push the sensor module hex-nut and nipple adapter up into the demand check-valve. With a wrench, tighten the nut so that it makes a good seal.

NOTE: Pressure on sensors are not to exceed

250psi for Pressure and Vacuum sensors

REMOTE (Outside the Back Box)



1. Connect a Tee (supplied by others) to the pipeline with a 1/4" NPT female connection that will accept the DISS Demand check-valve.
2. Locate the gas specific sensor module to be installed.
3. Thread the DISS Demand check-valve into the correct gas pipe line.
4. The sensor module contains a gas specific DISS fitting. Push the sensor module hex-nut and nipple adapter up into the demand check-valve. With a wrench, tighten the nut so that it makes a good seal.

WIRING

SYSTEM POWER SUPPLY

TURN OFF THE POWER SWITCH, BEFORE CHANGING ANY MODULES AND/OR DISCONNECTING ANY CABLES, OR ELSE THE FUSE WILL BLOW TO PROTECT THE CIRCUITRY.

1. Ensure that the ON/OFF switch is in the OFF position.
2. Through the top left side of the back box, bring in the AC power wires. Knockouts are provided for making conduit connections to the box. All wiring is to be installed according to local and national codes.
3. Connect the AC power to the terminal blocks as shown in the wiring diagram in Appendix A.

ANNUNCIATOR MODULE

1. The Annunciator Module has a female receptacle located at the top right side of the board (J1).

2. Connect the DC power cable from the System Power Supply into the receptacle connection located on the annunciator module. The connector is keyed and can only be plugged in one way, (Appendix B).

SENSOR MODULE

LOCAL (In the Back Box)

1. The sensor module is provided with a 20" [0.5m] twisted pair of wires. One wire is red (positive) and the other wire is black (negative). Connect the wires to the display module as shown in Appendix C. Take the red wire from the sensor and attach it to terminal “Sensor +”on the display module. Take the black wire from the sensor and attach it to terminal “Sensor -”. The terminal block on the display module is clearly marked for proper connection of the sensor wires.

2. Repeat the above procedures with the remaining sensor modules.

REMOTE (Outside the Back Box)

1. The sensor module is provided with a 20" [0.5m] twisted pair of wires. Connect the wires to a junction box (not supplied) located near the sensor as per the wiring diagram in Appendix D.

2. Connect a shielded twisted pair cable from the junction box to the back box assembly. Knockouts are provided throughout the alarm back box. Up to 5,000 feet [1,500m] of 22 Gauge shielded twisted pair cable can be used.

3. Connect the red wire from the cable to the terminal on the display module marked ”Sensor +”. Connect the black wire to terminal “Sensor -”.

4. Repeat the above procedures with the remaining sensor modules using the wiring diagram in Appendix D.

NOTE: When remote sensors are used, a shielded or twisted pair cable is required (BELDEN #8451 or equivalent, supplied by others). Ensure that the proper gas sensor module is connected to it’s corresponding area display module, otherwise an error message (**E02**) will be displayed on the Area Display module.

AREA DISPLAY MODULE

1. If the dry contacts for High and Low alarm are to be used for remote monitoring, connect the wires to the appropriate terminals, C, NO or NC, using the diagram in Appendix C or D.
2. See Appendix H for contact rating.

MASTER STATUS MODULE

1. Pull the remote signal wires into the alarm panel. Make the connections to the terminal blocks located on the side of the status module. The wiring is fail-safe normally closed (NC) connections from the source equipment. The signal level is 5 VDC.
2. Make the appropriate wiring connections as per the wiring diagram in APPENDIX E.
3. **ENSURE that the unused terminals in the master module are jumpered. If this is not done, the terminals that have not been jumpered will go into alarm.**

COMPUTER INTERFACE MODULE

1. Pull the remote signal wires from the “Building management system” into the alarm panel. Make the connections to the terminal blocks located on the side of the module. The wiring is fail-safe normally open, held closed, dry contacts to the monitoring equipment.
2. Make the appropriate wiring connections as per wiring diagram in Appendix F.

CLOSING THE FRAME/MODULE ASSEMBLY

1. Swing up the frame assembly, ensuring that the stopper wires are folded into the back box.

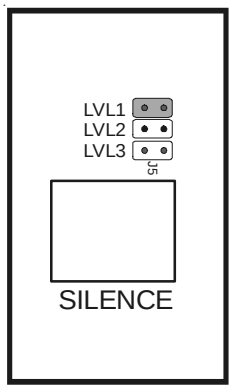
2. Screw in the frame module to the top of the back box assembly by using the screws provided with the frame/module assembly. The alarm is now ready for use!

FIELD ADJUSTMENTS

THE ANNUNCIATOR MODULE

NOISE LEVEL CONTROL

Factory Default: 90 Decibles



To decrease noise level:

1. Locate jumper at J5. Move jumper to:

   LVL1 = 90 dBa.

   LVL2 = 80 dBa.

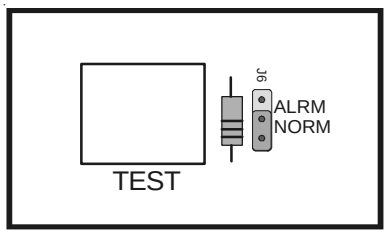
   LVL3 = 70 dBa.

CONTROL OF REMOTE ALARM BUZZER

Factory Default: Normal Condition

To silence remote alarm buzzer when silencing the annunciator module:

1. Locate jumper at J6. Move jumper to:



   NORM =

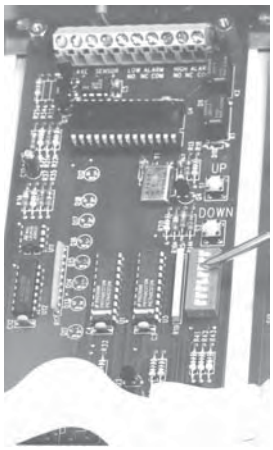
   Remote alarm buzzer will silence when annunciator module is silenced.

   ALRM =

   Remote alarm will not silence when annunciator module is silenced. The buzzer will only silence when alarm condition has been cleared.

THE AREA DISPLAY MODULE

A dip switch is located on the back of the display module which is used to identify the gas of the display module. The dip-switch contains ten switch settings.



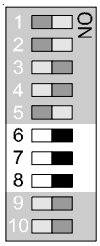
PRESSURE ONLY

Factory Default:

High = 60 Psi, Low = 40 Psi

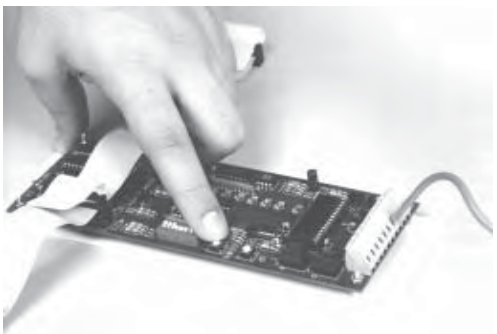
Repeat time = 30 min.

During Programming the *"Trend Bar"* will Flash!



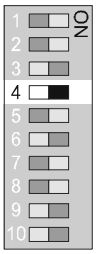
1. Set switch #6, #7 and #8 to the **ON** position.
2. The LED will display (*HI-*), followed by the current set point. Indicating the system is ready to accept a new High set point. Adjust set point, using the "UP" and "DOWN" push buttons, to the desired value.
3. Set switch #7 to the **OFF** position.
4. The LED will display (*LO-*), followed by the current set point. Indicating the system is ready to accept a new Low set point. Adjust set point, using the "UP" and "DOWN" push buttons, to the desired value.
5. Set switch #8 to the **OFF** position.
6. The LED will display (*I-I-*), followed by the current set point. Indicating the system is ready to accept a new Repeat time set point. Adjust set point using the "UP" and "DOWN" push buttons, to the desired value. [(Display dd=Disabled) Range from 1 to 99 Minutes]
7. Set switch #6 to the **OFF** position.

When you have completed step #7, the display module will automatically go into a "RESET" mode. This will store the data that you had entered.



PSI / kPa / BAR selection

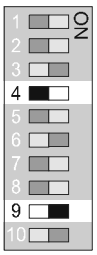
PSI



Factory Default - PSI

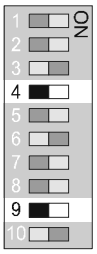
For PSI mode, set the switch #4 to the **ON** position. The LED PSI indicator located next to the GAS pressure reading will illuminate.

KPA



For kPa mode, set the switch #4 to the **OFF** position and switch #9 to the **ON** position. The LED kPa indicator located next to the GAS pressure reading will illuminate.

BAR



For BAR set the switch #4 to the **OFF** and the switch #9 to the **OFF** position. The LED kPa indicator located next to the GAS pressure reading will illuminate. (There is no separate indicator for BAR).

VACUUM ONLY

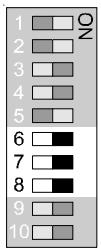
Vacuum alarm set-point adjustment

Factory Default:

High = 30”Hg, Low = 12”Hg

Repeat time = 30 min.

During Programming the *“Trend Bar”* will Flash!



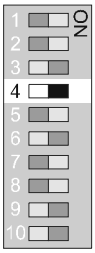
1. Set switch #6, #7 and #8 to the **ON** position.
2. The LED will display (*HI-*), followed by the current set point. Indicating the system is ready to accept a new High set point. Do not adjust this set point since the High set point is not used.
3. Set switch #7 to the **OFF** position.
4. The LED will display (*LO-*), followed by the current set point. Indicating the system is ready to accept a new Low set point. Adjust set point, using the “UP” and “DOWN” push buttons, to the desired value.
5. Set switch #8 to the **OFF** position.
6. The LED will display (*I-I-*), followed by the current set point. Indicating the system is ready to accept a new Repeat time set point. Adjust set point using the “UP” and “DOWN” push buttons, to the desired value.

   [(Display dd=Disabled) Range from 1 to 99 Minutes]

7. Set switch #6 to the **OFF** position.

When you have completed step #7, the display module will automatically go into a “RESET” mode. This will store the data that you had entered.

InchHg

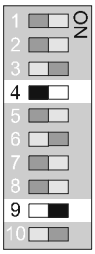


InchHg / KPA / BAR selections

Factory Default - InchHg

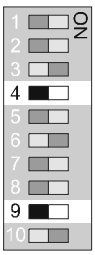
For InchHg mode, set the switch #4 to the **ON** position. The LED indicating InHg located next to the VACUUM source reading will illuminate.

KPA



For KPA mode, set the switch #4 to the **OFF** position and the switch #9 to the **ON** position. The LED indicating KPA located next to the VACUUM source reading will illuminate.

BAR



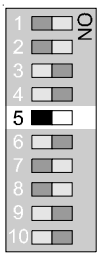
For BAR mode, the KPA indicating source must be changed to BAR by use of a label. Set the switch #4 to the **OFF** and the switch #9 to the **OFF** position. The LED indicating BAR located next to the VACUUM source reading will illuminate.

COMMON SETTINGS FOR PRESSURE AND VACUUM

Repeat Alarm Enable/Disable

Factory Default - Disable

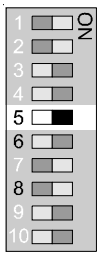
Disable



Set switch #5 to the **OFF** position to disable the repeat alarm.

NOTE: When the repeat alarm function is disabled, the alarm will not repeat.

Enable



Enable Mode: (Factory Default 30 min, when enabled).

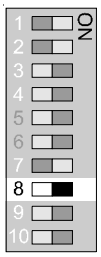
Set switch #5 to the **ON** position.

Note: The Module with the Lowest set Repeat Time is the one that controls the Repeat Time. For example if one Module is set for 5min and one for 30min and both are Repeat Alarm enabled, the Alarm will now Repeat every 5min.

SETTING FACTORY DEFAULT

To quickly reset the module (Pressure or Vacuum) to the factory default settings as follows:

- Pressure: High set-point 60 Psi, Low set-point 40 Psi.
- Nitrogen & HP Air: High set-point 195 Psi, Low set-point 140 Psi.
- Vacuum: Low set-point 12 inchHg.
- No Repeat alarm, but set for 30 min..



1. Set switch #8 to the **ON** position.
2. Turn the power off (wait 5 seconds) then back on.
3. Set switch #8 to the **OFF** position.

The module is now in the default mode.

SETTING GAS IDENTIFICATION SWITCHES

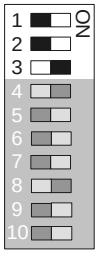
NOTE: DO NOT TAMPER WITH SWITCHES #1, 2 AND 3 ON THE DIP-SWITCH. TAMPERING WITH THESE POSITIONS WILL RESULT IN AN ERROR MESSAGE BEING DISPLAYED (EO2) AND WILL DISABLE THE ELECTRICAL INTERLOCK FROM THE GAS SPECIFIC SENSOR.

CHANGES TO THESE SWITCHES SHOULD ONLY BE DONE BY PROPERLY TRAINED PERSONNEL, WHEN CIRCUIT BOARDS HAVE TO BE CHANGED IN THE FIELD.

Switches # 1, 2 and 3 are used for the gas identification of the display module. These will be set at the factory and should not be tampered with in the field.

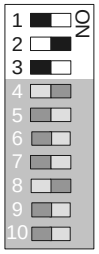
Oxygen

#1 - off
#2 - off
#3 - on



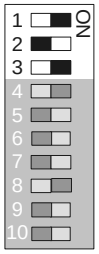
Vacuum

#1 - off
#2 - on
#3 - off



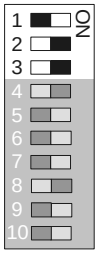
Medical Air

#1 - on
#2 - off
#3 - on



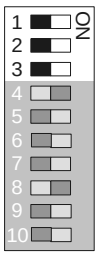
Nitrous Oxide

#1 - off
#2 - on
#3 - on



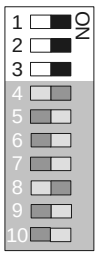
Nitrogen

#1 - off
#2 - off
#3 - off



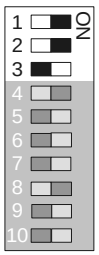
Carbon Dioxide

#1 - on
#2 - on
#3 - on



WAGD

#1 - on
#2 - on
#3 - off



HP Air

#1 - on
#2 - off
#3 - off

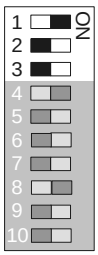


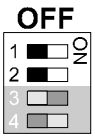
CHART OF GAS SPECIFIC SETTINGS OF DIP-SWITCHES

MASTER STATUS MODULE

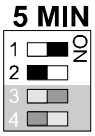
REPEAT ALARM

Factory Default - Disable

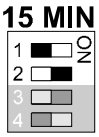
Disable Set switch #1 to the **OFF** position.
Set switch #2 to the **OFF** position.



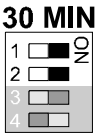
Enable 5 min Set switch #1 to the **ON** position.
Set switch #2 to the **OFF** position.



Enable 15 min Set switch #1 to the **OFF** position.
Set switch #2 to the **ON** position.



Enable 30 min Set switch #1 to the **ON** position.
Set switch #2 to the **ON** position.

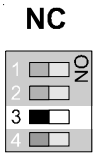


SIGNAL INPUT SELECTION

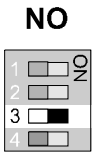
Factory Default - Normally Closed as **per NFPA 99** and **CSA Z305.1**

The Amico alarm can detect field devices in the Normally Open or Normally Closed position.

For Normally Closed Set switch #3 to the **OFF** position



For Normally Open Set switch #3 to the **ON** position



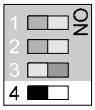
MAINTENANCE MODE

Factory Default - Disabled

The Maintenance (or Latch) mode is used to allow hospital personnel to identify loose wiring or faulty source equipment. By putting the master module into “Latch” mode, any alarms received; even transient ones, will be latched-on so that maintenance personnel can identify the source of the problem. The Maintenance mode will disable the automatic reset, if a fault condition has been rectified. The alarm indicator can only be turned-off by pushing the “*alarm silence*” button on the annunciator module twice. The “Maintenance” LED will illuminate whenever the maintenance mode is enabled.

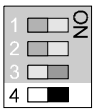
DISABLE

Disable Set switch #4 to the **OFF** position.



ENABLE

Enable Set switch #4 to the **ON** position.



TROUBLE SHOOTING GUIDE

NOTE: Ensure that the power is turned off before changing any modules!

SYMPTOM	CAUSE	CORRECTIVE ACTION
1. An error code appears on one or more display modules.	**a**. The Microprocessor detected a fault and has shutdown.	1. Turn power switch to OFF position. Wait for at least 5 seconds before turning on the power. The program will reset itself.
	b. Faulty wire connection between the sensor and display module.	2. Check error codes at the end of this section.
2. No power on the alarm. (No LED's illuminated).	**a**. AC power not available.	1. Ensure that the ON/OFF switch on the power supply module is turned ON .
		2. AC wiring not connected.
		3. Check the building electrical breaker to ensure that the power is ON.
		4. Check the voltage at the terminal block above the transformer. Ensure that 115VAC or 220 VAC is being supplied.
	b. Fuse is blown.	1. Check the fuse. The fuse is located on the upper-right corner of the system power supply. Replace the fuse if it is defective. See Appendix H.
	c. DC power plug not connected to the annunciator module.	1. Ensure that the DC power plug is firmly in it's socket on the annunciator module.
		2. Replace System Power Supply unit if all the above steps fail to resolve the problem.
	d. Defective Ribbon cable.	1. Replace the ribbon cable.

SYMPTOM	CAUSE	CORRECTIVE ACTION
3. Power light on the annunciator module is ON but LED's on other modules are not on.	**a**. DC power cable is not connected to the annunciator module.	1. Ensure that the DC power cable is firmly in it's socket on the annunciator module. 2. Ensure that the module(s) on the Frame/Module assembly are all connected to the ribbon-cable. 3. Replace the annunciator module.
4. No audible alarm and LED's are not illuminating.	**a.** DC power cable is disconnected or loose.	1. Ensure that the DC power cable from the system power supply is connected to the annunciator module snugly. 2. Depress "PUSH TO TEST" button. If the LED's come on and there is no audible, replace the annunciator module. If this does not work, try solutions to problem #2.
5. Audible signal will not silence.	**a**. Faulty display module.	1. Disconnect the ribbon cable from the back of the faulty display module(s) and replace the module(s).
	b. Connection of the DC power cable from system power supply to annunciator module is loose.	1. Disconnect the DC power cable from the annunciator module and then reconnect. If audible alarm still persists, replace the System Power Supply unit.
	c. Faulty annunciator module.	1. Replace annunciator module.
6. Alarm condition exists but LED's are not illuminating.	**a**. Display module not properly calibrated.	1. Ensure that the system was properly ordered. Factory default settings: Hi Pressure 60 Psi. Low Pressure 40 Psi. Low Vacuum 12 inHg.

SYMPTOM	CAUSE	CORRECTIVE ACTION
		2. If calibration is required, refer to setting HIGH and LOW calibration procedure on page 14.
	b. Faulty display module.	1. Replace the display module.
7. Gas reading incorrect.	**a**. Loose connection of DISS fittings.	1. Ensure that the sensor module is properly connected to the DISS demand check-valve.
	b. Sensor module is not properly wired to the display module.	1. Ensure that the sensor module is properly wired to the display module by using wiring diagram in Appendix C or D.
		2. Replace the sensor module.
	c. Defective sensor or requires calibration.	1. Pull out the ribbon cable and connect it back in again, while ensuring that it is seated properly.
	d. The ribbon-cable not properly connected to the display module.	1. Replace the display module.
	e. Defective display module.	

ERROR CODE MESSAGES ON THE DISPLAY MODULE

SYMPTOM	CAUSE	CORRECTIVE ACTION
E01	No sensor is connected.	Connect a sensor.
E02	Sensor and Display Module mismatched.	Ensure that the Sensor and Display Module are for the same gas.
E03	The High set-point was set below the Low set-point or vice versa.	Recalibrate the High and Low setpoint to proper values.
E04	Incorrect type of Sensor connected, (i.e. 250 psi sensor on a 100 Psi range).	Connect the correct Sensor to the matching Display Module.
E05	Communication error in the twisted pair cable between the Sensor and the Display Module.	Check twisted pair cable and connections and replace if defective.
E06	Cable between the sensor and display module shorted out or reversed polarity.	Reverse polarity or replace cable if defective.

MODEL NUMBERS

Area Alarm

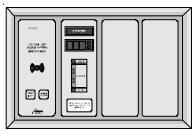
A2AL-U-XXXX

Type of sensor:
L = Local sensors
R = Remote sensors

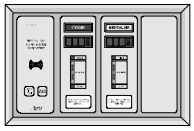
Language and colour:
U = English - NFPA
E = English - CSA
F = French - CSA
S = Spanish - NFPA

The X defines the Gas:

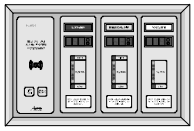
Oxygen	=	O
Medical Air	=	A
Med Vac	=	V
Nitrous Oxide	=	2
Nitrogen	=	N
Carbon Dioxide	=	C
WAGD	=	E
Master Module	=	M



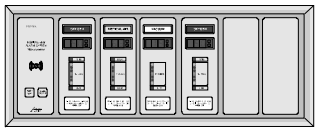
1 MODULE= A2AL-U-X



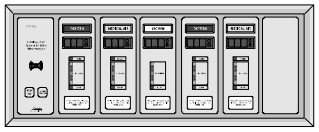
2 MODULES= A2AL-U-XX



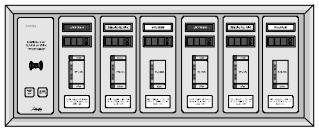
3 MODULES= A2AL-U-XXX



4 MODULES= A2AL-U-XXXX



5 MODULES= A2AL-U-XXXXX



6 MODULES= A2AL-U-XXXXXX

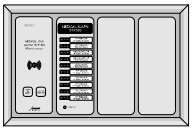
Example:
4 Gases, English CSA, Local Pressure Sensors, Oxygen, Vacuum, Medical Air and Nitrous Oxide = A2AL-E-OVA2

Master Alarm

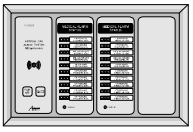
A2M-E-20

The fourth letter defines the language:

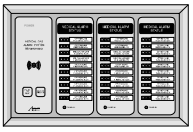
E = English (NFPA/CSA)
F = French (CSA)
S= Spanish (NFPA)



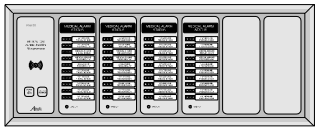
10 Functions= A2M-E-10



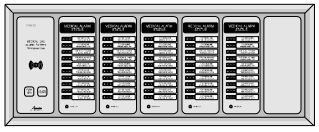
20 Functions= A2M-E-20



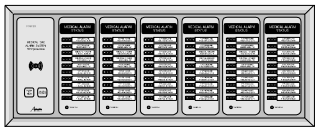
30 Functions= A2M-E-30



40 Functions= A2M-E-40



50 Functions= A2M-E-50



60 Functions= A2M-E-60

Example:
2 Modules, English (20 Functions) = A2M-E-20

Combination Alarm

Use the Model number for the Area Alarm and add “M” for each Master module.
Example: 3 Gases, English ISO, Local Pressure Sensors, Oxygen, Vacuum, Medical Air and 2 Master Modules = A2AL-E-OVAMM.

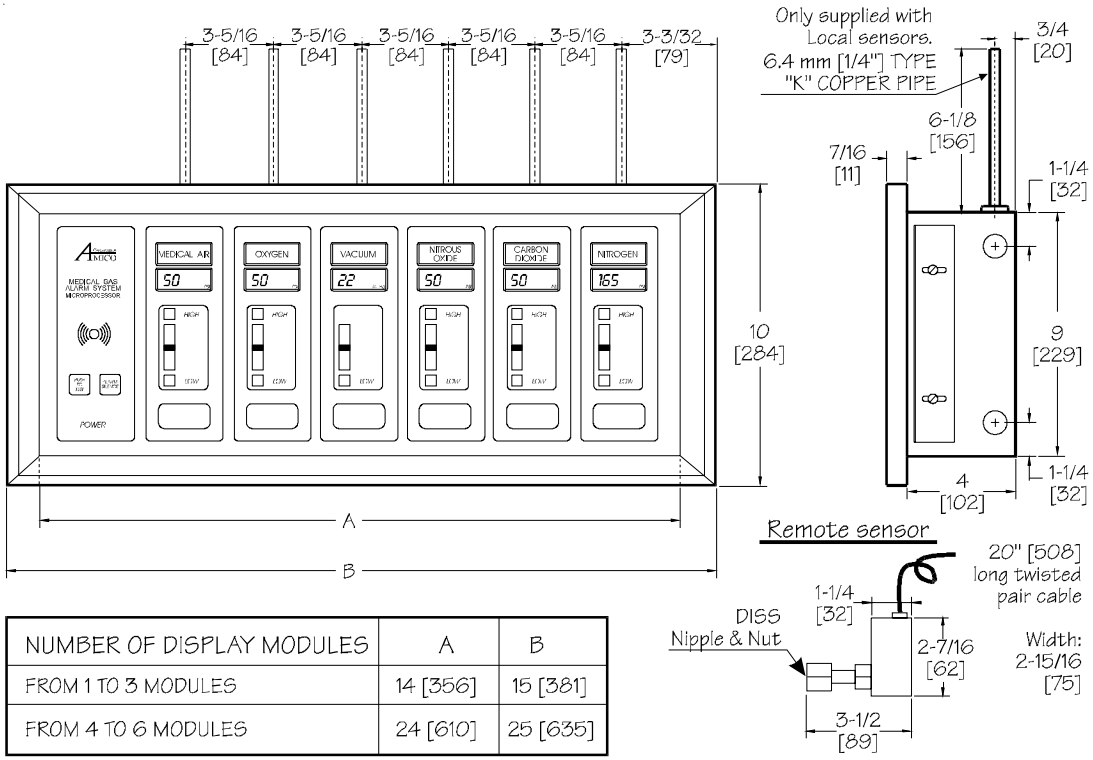
SPARE PARTS NUMBERS

Model Number	Description
A2-MAN-ALM-ENG	Alert-2 alarm manual English
A2P-ANNU-CB	Annunciator circuit board assembly
A2P-ANNU-EB	Annunciator module English Alert-2
A2P-ANNU-FB	Annunciator module French Alert-2
A2P-POWER-V2	Power supply module Alert-2
A2P-AREA-E-AIR	Area alarm module ISO-AIR Eng. Alert-2
A2P-AREA-E-CO2	Area alarm module ISO-CO2 Eng. Alert-2
A2P-AREA-E-EVA	Area alarm module ISO-EVA Eng. Alert-2
A2P-AREA-E-N2O	Area alarm module ISO-N2O Eng. Alert-2
A2P-AREA-E-NIT	Area alarm module ISO-NIT Eng. Alert-2
A2P-AREA-E-OXY	Area alarm module ISO-OXY Eng. Alert-2
A2P-AREA-E-VAC	Area alarm module ISO-VAC Eng. Alert-2
A2P-AREA-U-AIR	Area alarm module USA - AIR Alert-2
A2P-AREA-U-OXY	Area alarm module USA - OXY Alert-2
A2P-AREA-U-VAC	Area alarm module USA - VAC Alert-2
A2P-AREA-CB-AIR	Area circuit board assembly - AIR
A2P-AREA-CB-CO2 ..	Area circuit board assembly - CO2
A2P-AREA-CB-EVA ...	Area circuit board assembly - EVA
A2P-AREA-CB-N2O ...	Area circuit board assembly - N2O
A2P-AREA-CB-NIT	Area circuit board assembly - NIT
A2P-AREA-CB-OXY ...	Area circuit board assembly - OXY
A2P-AREA-CB-VAC ...	Area circuit board assembly - VAC
A2P-SENS-E-AIR	Sensor module ISO-AIR Eng. Alert-2
A2P-SENS-E-CO2	Sensor module ISO-CO2 Eng. Alert-2
A2P-SENS-E-EVA	Sensor module ISO-EVA Eng. Alert-2
A2P-SENS-E-N2O	Sensor module ISO-N2O Eng. Alert-2
A2P-SENS-E-NIT	Sensor module ISO-NIT Eng. Alert-2
A2P-SENS-E-OXY	Sensor module ISO-OXY Eng. Alert-2
A2P-SENS-E-VAC	Sensor module ISO-VAC Eng. Alert-2
A2P-SENS-U-AIR	Sensor module USA-AIR Eng. Alert-2
A2P-SENS-U-OXY	Sensor module USA-OXY Eng. Alert-2
A2P-SENS-U-VAC	Sensor module USA-VAC Eng. Alert-2

Model Number	Description
A2P-MAST-E-AME	Master alarm module - English 10 points
A2P-MAST-E-ISO	Master alarm module - ISO English10 points
A2P-MAST-F-AME	Master alarm module - French 10 points
A2P-MAST-CB	Master circuit board Assembly Alert-2
A2P-MAST-CB-ISO	Master circuit board Assembly ISO Alert-2
A2P-BLANK	Alert-2 alarm module blank (filler)
A2P-BOXASS-4	Alarm back box Assembly 4-station Alert-2
A2P-BOXASS-7	Alarm back box Assembly 7-station Alert-2
A2P-COMP-10	Computer interface Module English 10-pts.
A2P-FRMASS-4B	Alarm frame assembly 4-station Alert-2
A2P-FRMASS-7B	Alarm frame assembly 7-station Alert-2
A2P-PIPE	Pressure module pipe assembly (Alert-2)
A2P-RIBBON-4	Ribbon cable assembly 4-station Alarm
A2P-RIBBON-7	Ribbon cable assembly 7-station Alarm

DIMENSIONS

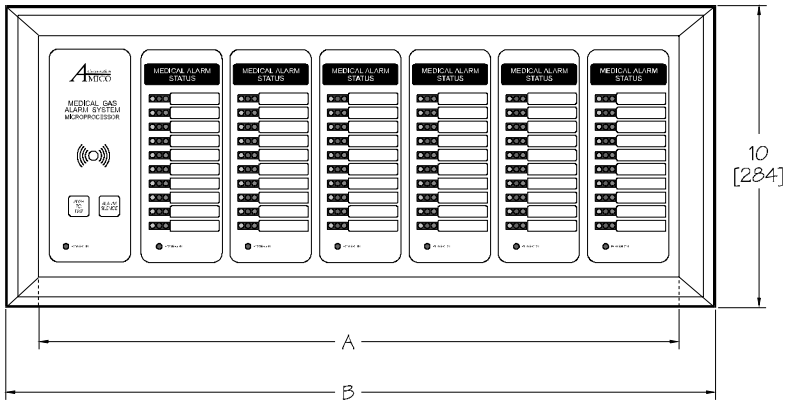
Area Alarm

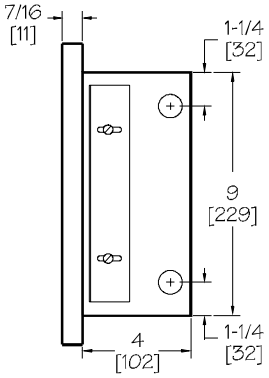


NUMBER OF DISPLAY MODULES	A	B
FROM 1 TO 3 MODULES	14 [356]	15 [381]
FROM 4 TO 6 MODULES	24 [610]	25 [635]

DIMENSIONS

Master Alarm

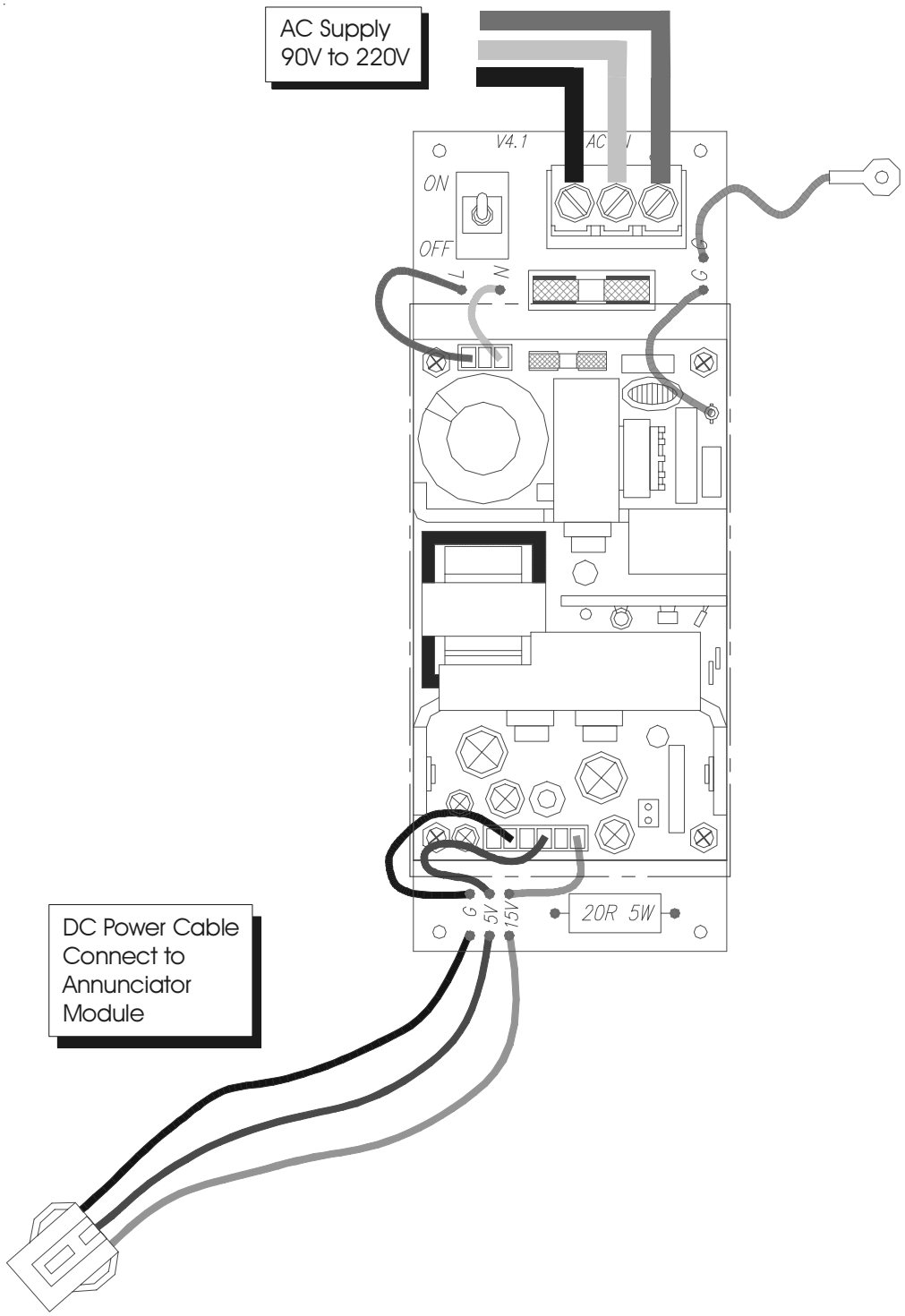




NUMBER OF DISPLAY MODULES	A	B
FROM 1 TO 3 MODULES	14 [356]	15 [381]
FROM 4 TO 6 MODULES	24 [610]	25 [635]

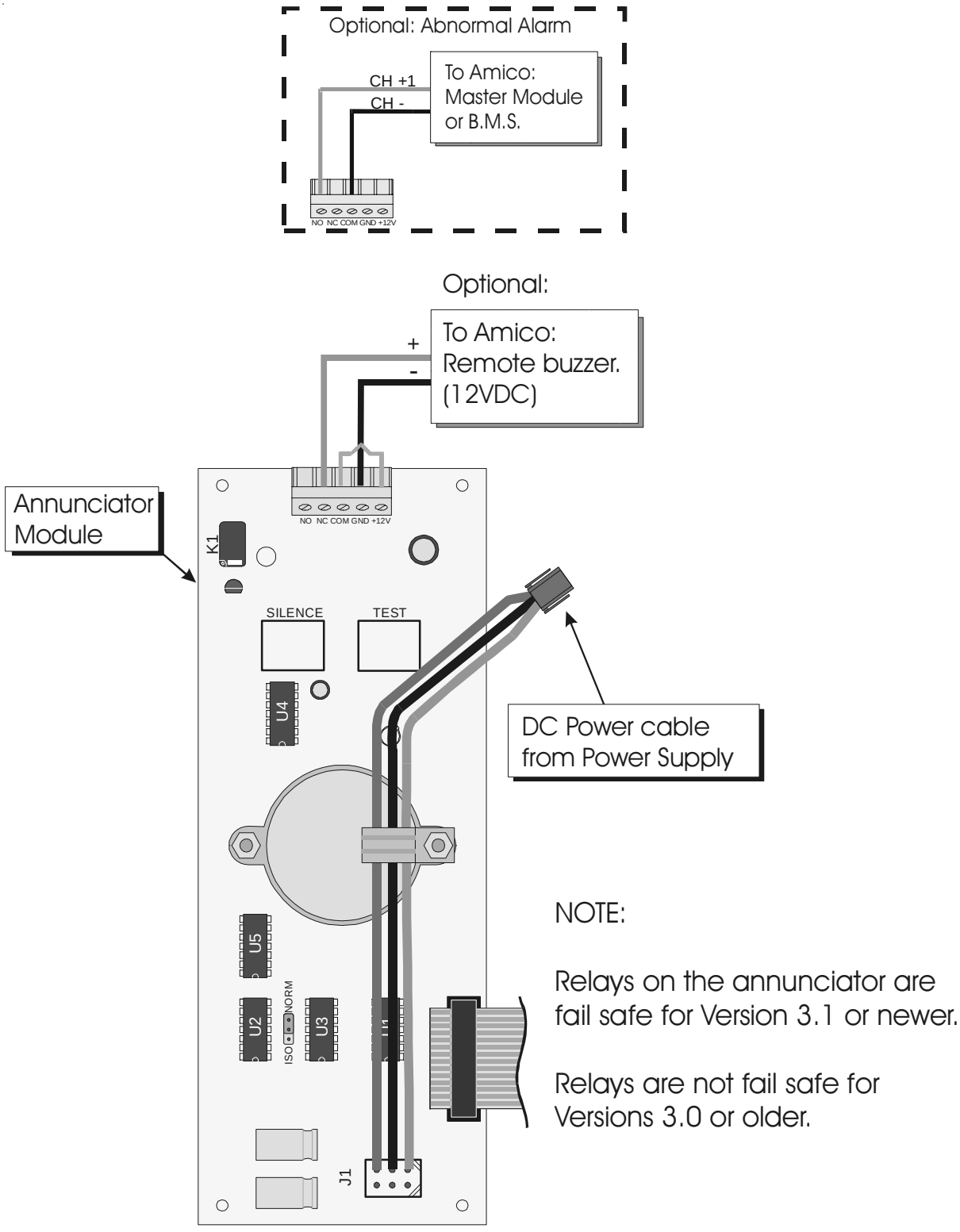
APPENDIX - A

Wiring Diagram - Auto-Switching Power Supply



APPENDIX - B

Wiring Diagram - Annunciator



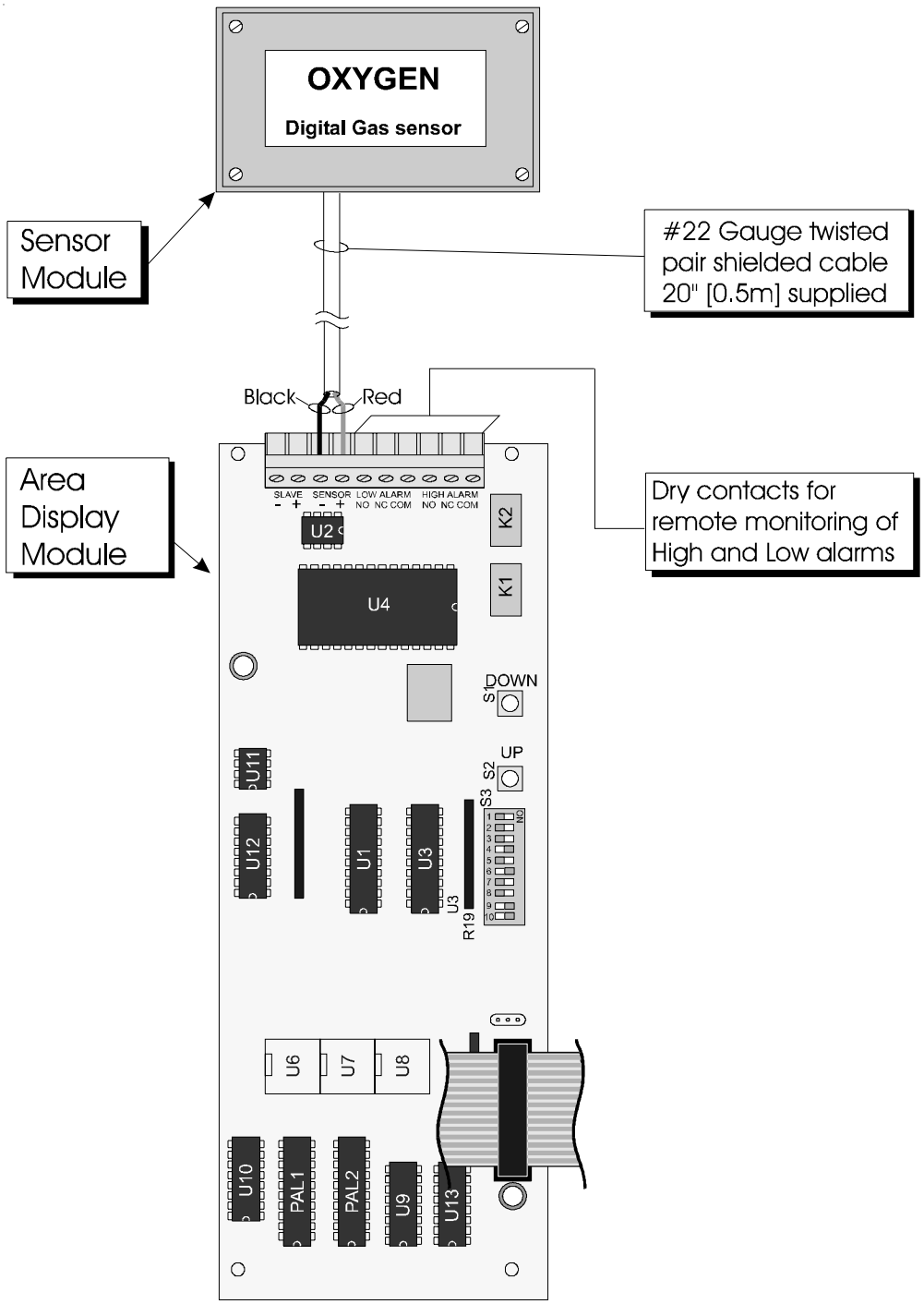
NOTE:

Relays on the annunciator are fail safe for Version 3.1 or newer.

Relays are not fail safe for Versions 3.0 or older.

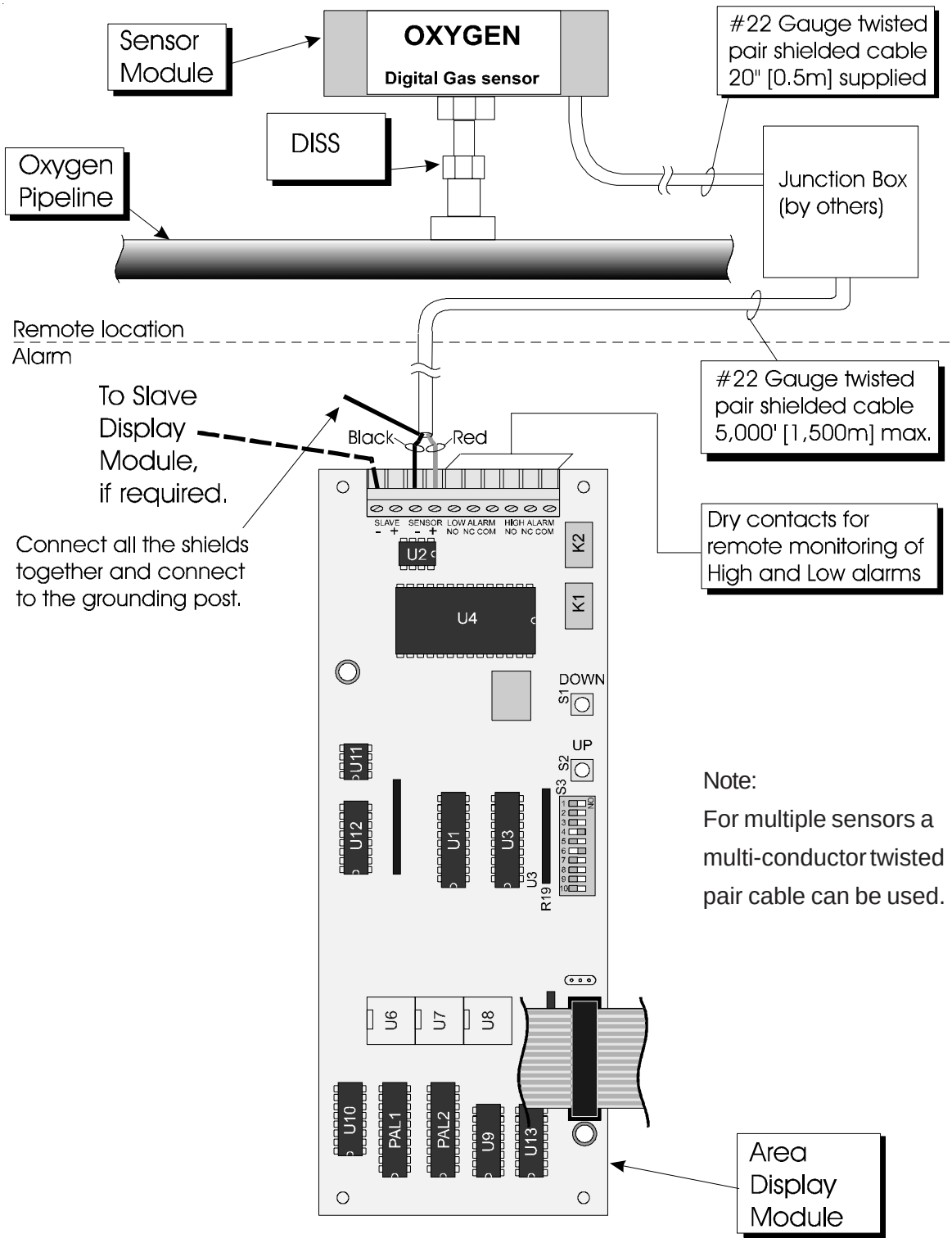
APPENDIX - C

Wiring Diagram - Area Display Module - Local Sensor



APPENDIX - D

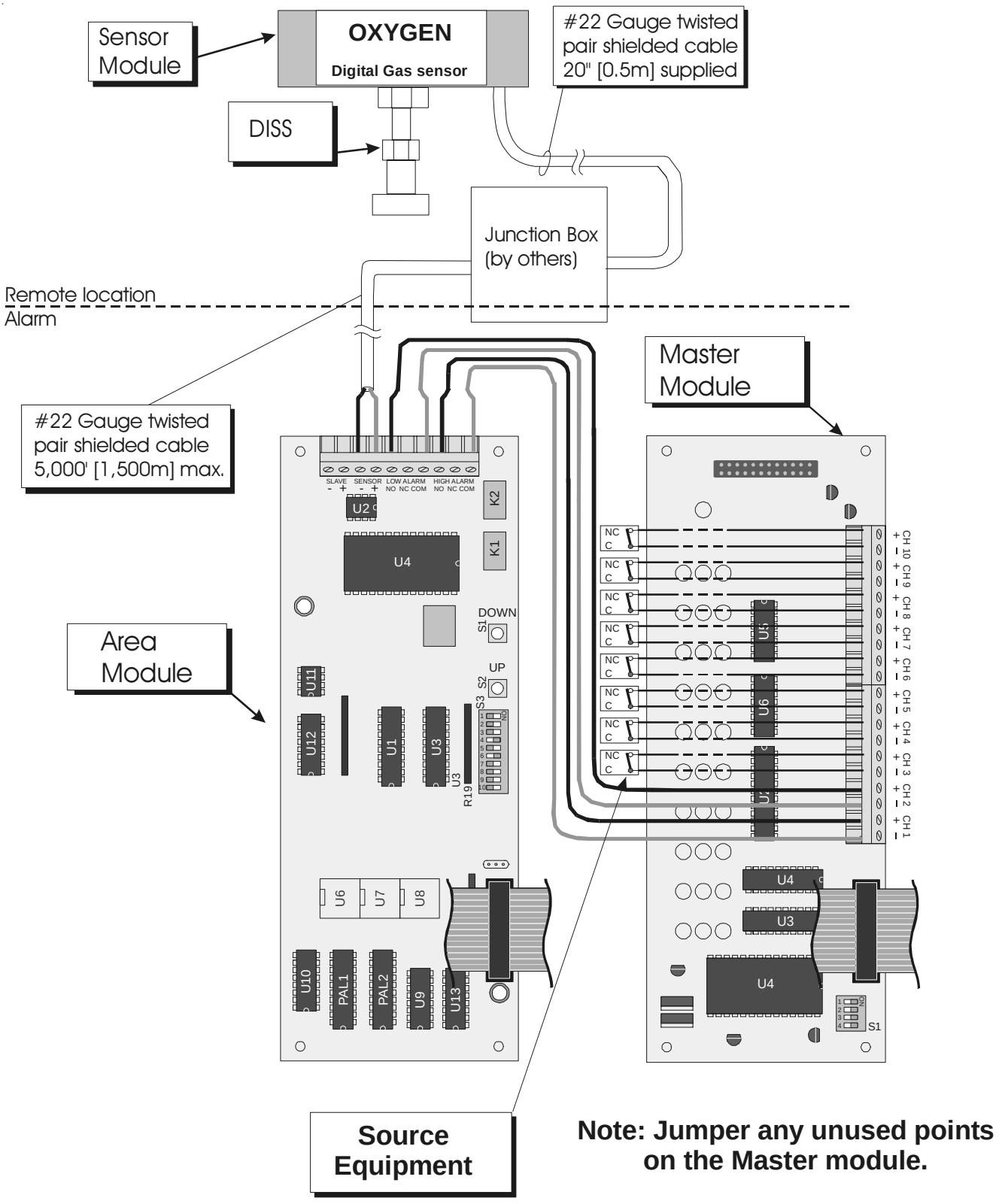
Wiring Diagram - Area Display Module - Remote Sensor



Note:
For multiple sensors a multi-conductor twisted pair cable can be used.

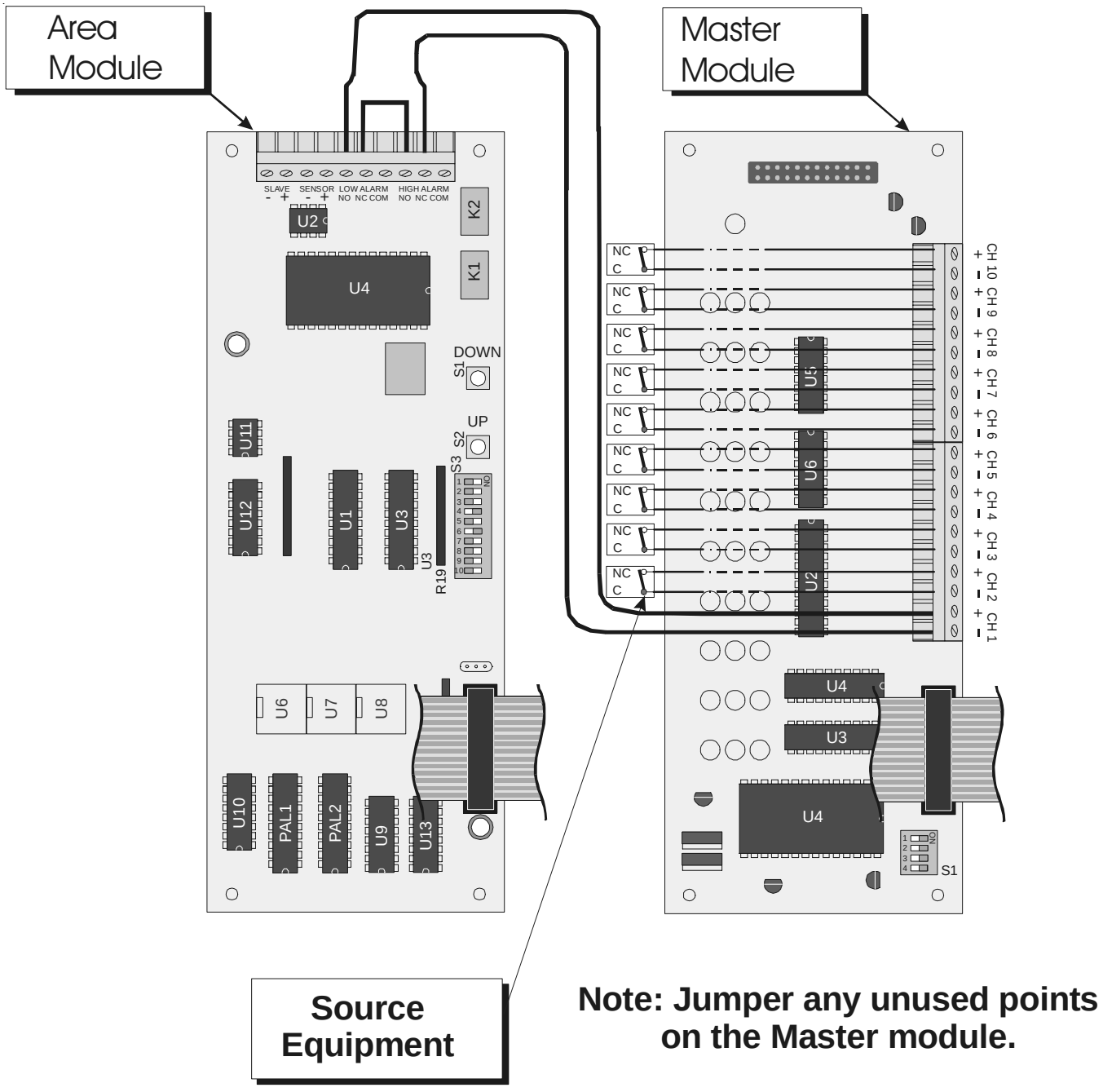
APPENDIX - E

Wiring Diagram - Area Module to Master Module



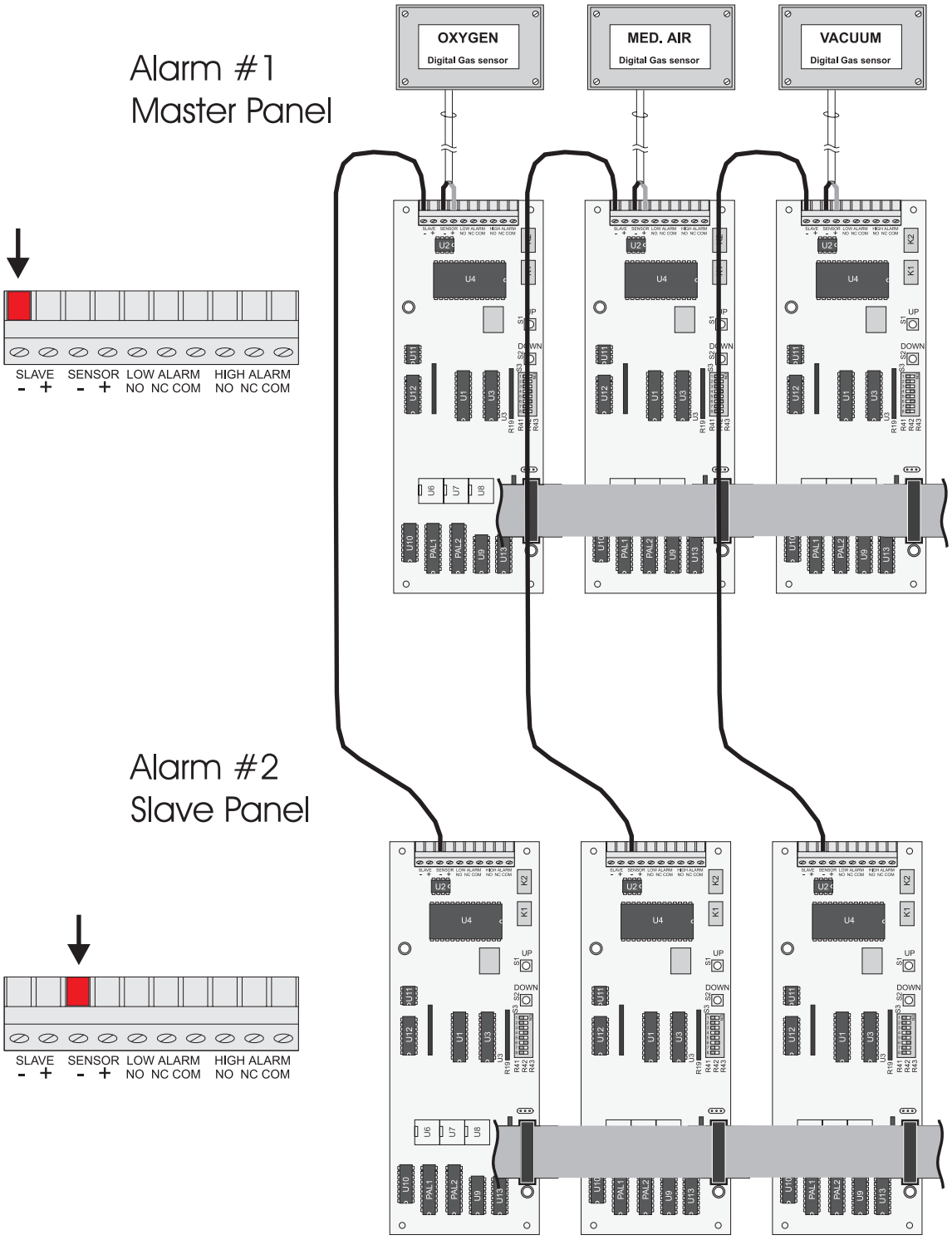
APPENDIX - F

Wiring Diagram - Abnormal Condition



APPENDIX - G

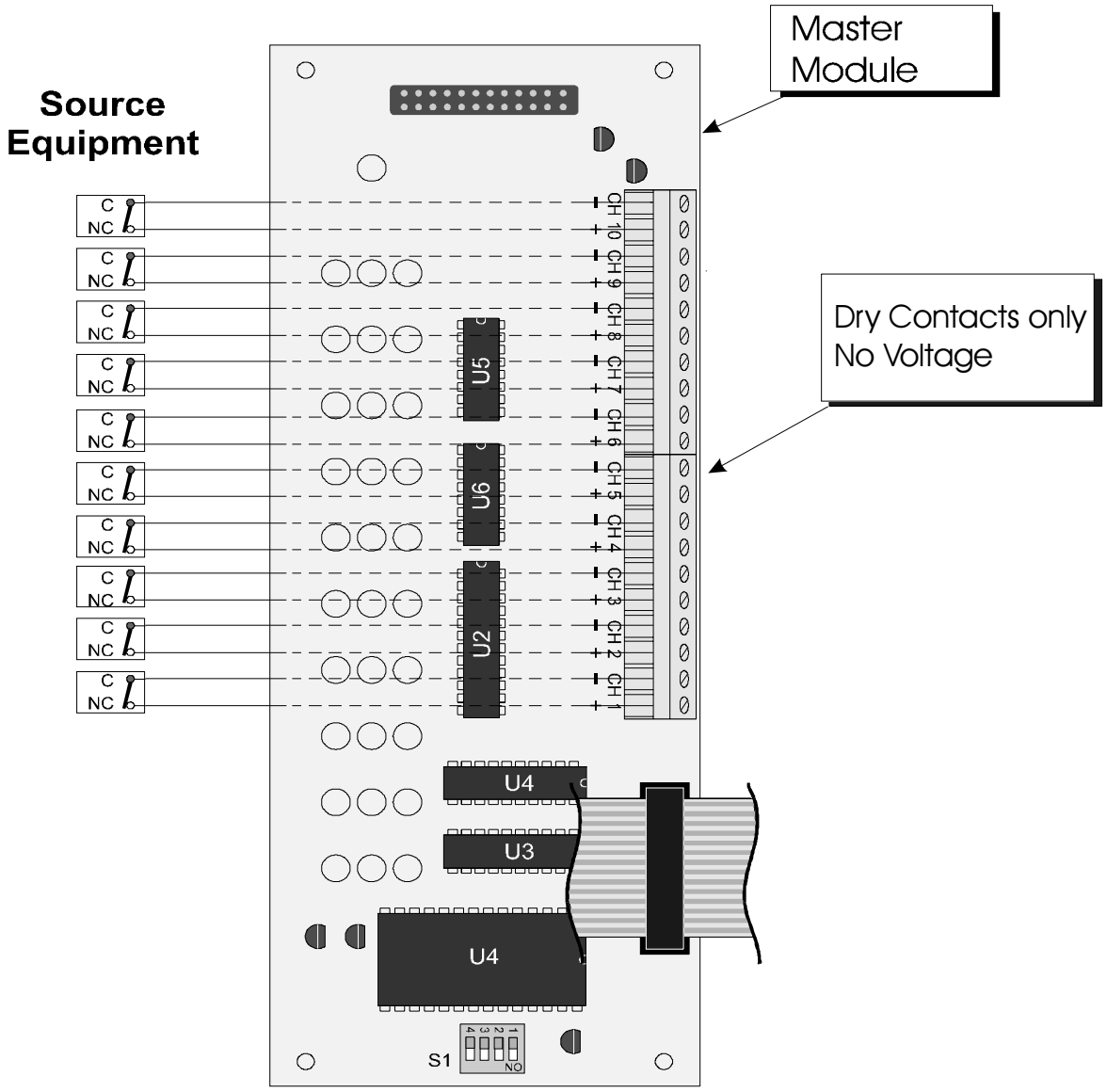
Wiring Diagram - Area Slave



APPENDIX - H

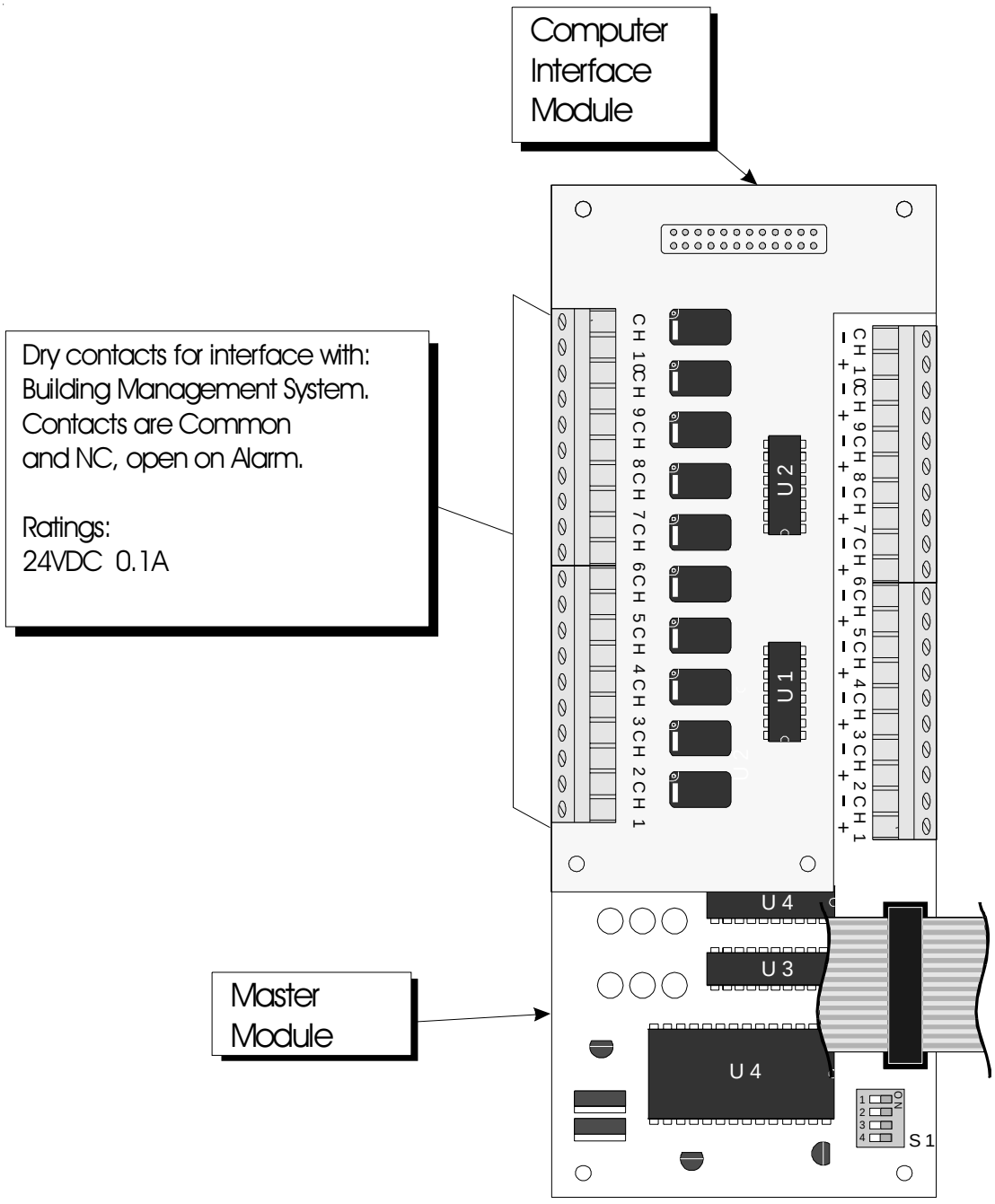
Wiring Diagram - Master Module

Note: Jumper any unused points.



APPENDIX - I

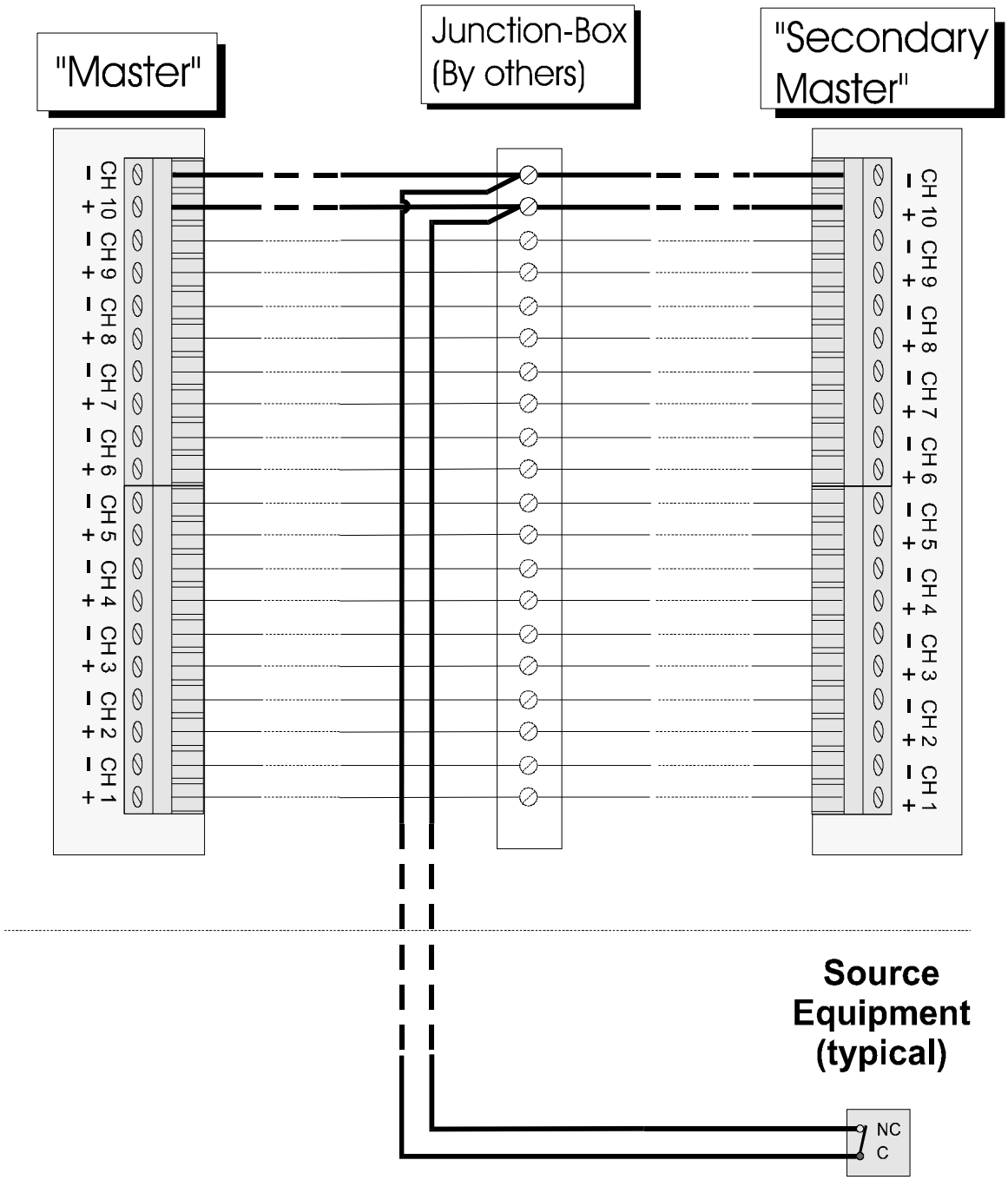
Diagram - Computer Interface Module



APPENDIX - J

Wiring Diagram - Master to Slave Module

Note: Jumper any unused points.



APPENDIX - K

Technical Specification

Supply Voltage: 90 to 220VAC - 50 to 60 Hz

Current Draw: 1 Amp.Max.

Fuse (1/4 * 1-1/4): Fast Blow 1 Amp.

Cable requirement:

Area Display Module to Remote Sensor:

Distance: Maximum 5,000 feet [1,500 m]

Cable: Belden # 8451 or equivalent.

#22 gauge shielded, twisted pair. (For multiple sensors a multi-conductor twisted pair cable can be used).

Signal: 13 VDC, 75 mA Maximum.

30 VDC	-	1.0 Amps.
80 VDC	-	0.3 Amps.
125 VDC	-	0.5 Amps.

Master Module to Source equipment:

Distance: Maximum 10,000 feet [3,000 m]

Cable: Minimum #22 gauge wire (does not have to be shielded, twisted pair).

Signal: 5 VDC, < 5 µA.

Computer Interface Board:

Output: Dry Contacts NC, open on Alarm.

Rating:

24 VDC	-	0.1 Amps.
30 VDC	-	1.0 Amps.
80 VDC	-	0.3 Amps.
125 VDC	-	0.3 Amps.

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