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MX52 CONTROL

Manual

80003-052
July 1999
MCN-233, 05/26/00
MCN-286, 10/17/02
MCN-300, 08/21/03
MCN-306, 10/03/03
MCN-360, 10/30/06

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Reference information:

NOTE: [important information about use of instrument – if not followed may have to redo some steps.]

CAUTION: [affects equipment – if not followed may cause damage to instrument, sensor etc...]

WARNING: [affects personnel safety – if not followed may cause bodily injury or death.]

1.0 Introduction

The **MX52 CONTROL** can include from 1 to 16 independent channels.

Each channel is connected to one or more 4-20 mA sensor/transmitters installed in the locations to be monitored.

The output from each sensor/transmitter (S/T) is displayed on the **MX52 CONTROL** and compared with alarm thresholds. If thresholds are exceeded, the control actuates relays that can be used to control external devices.

Each PCB installed in the **MX52 CONTROL** is equipped with circuits for two independent channels. The number of PCB's is always half the even number equal to or one greater than the number of channels installed.

NOTE: *All specifications stated in this manual may change without notice.*

1.1 Upon Receipt

1.1.2 Unpack

Unpack the **MX52 CONTROL** and examine it for shipping damage. If such damage is observed, notify both **ENMET** customer service personnel and the commercial carrier involved immediately.

Regarding Damaged Shipments

NOTE: It is your responsibility to follow these instructions. If they are not followed, the carrier will not honor any claims for damage.

- ☐ This shipment was carefully inspected, verified and properly packaged at our company and delivered to the carrier in good condition.
- ☐ When it was picked up by the carrier at **ENMET**, it legally became your company's property.
- ☐ If your shipment arrives damaged:
 - Keep the items, packing material, and carton "As Is." Within 5 days of receipt, notify the carrier's local office and request immediate inspection of the carton and the contents.
 - After the inspection and after you have received written acknowledgment of the damage from the carrier, contact **ENMET** Customer Service for return authorization and further instructions. Have your Purchase Order and Sales Order numbers available.
- ☐ **ENMET** either repairs or replaces damaged equipment and invoices the carrier to the extent of the liability coverage, usually \$100.00. Repair or replacement charges above that value are your company's responsibility.
- ☐ The shipping company may offer optional insurance coverage. **ENMET** only insures shipments with the shipping company when asked to do so in writing by our customer. If you need your shipments insured, please forward a written request to **ENMET** Customer Service.

Regarding Shortages

If there are any shortages or questions regarding this shipment, please notify **ENMET** Customer Service within 5 days of receipt at the following address:

ENMET Corporation
680 Fairfield Court
Ann Arbor, MI 48108
734-761-1270 734-761-3220 Fax

1.1.3 Check Order

Check the contents of the shipment against the purchase order. Verify that the **MX52 CONTROL** received is, as ordered. Each **MX52 CONTROL** is programmed with the target gas for each channel. If there are accessories on the order, ascertain that they are present. Check the contents of calibration kits. Notify **ENMET** customer service personnel of any discrepancy immediately.

1.1.4 Serial Numbers

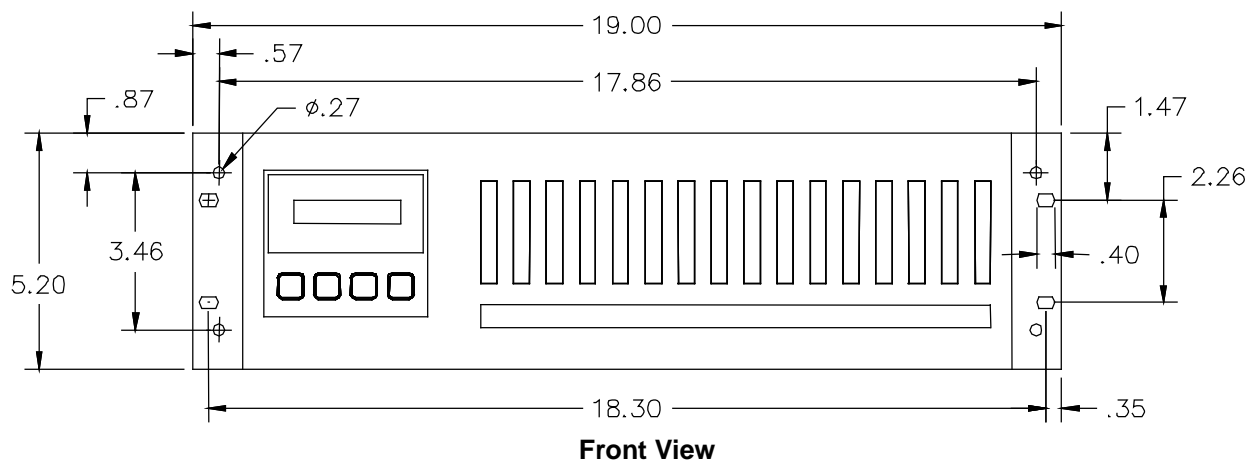
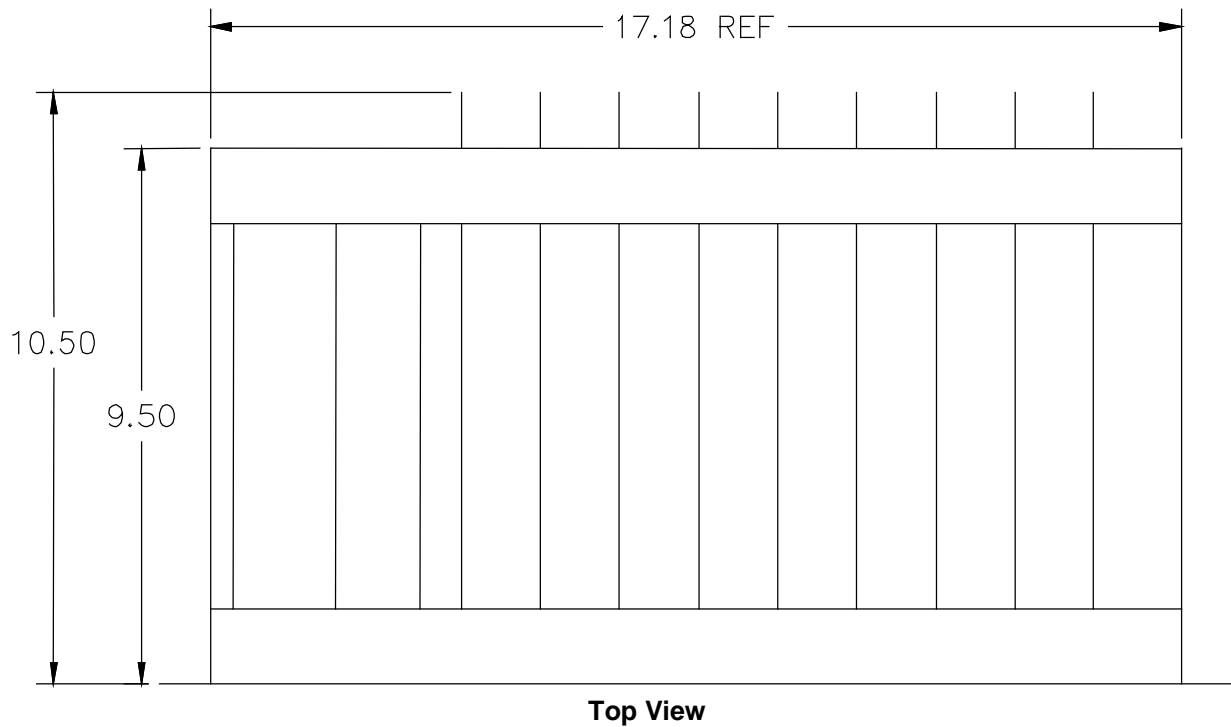
Each **MX52 CONTROL** is serialized. These numbers are on tags on the equipment and are on record in an **ENMET** database.

2.0 Specifications

See Figure 1 for overall dimensions and Figures 2 and 3 for front and rear views.

Enclosure:	
Overall dimensions	Rack 3U 19"
Function	Control
Capacity	16 measuring channels
Measurement	Continuous
Storage temperature	–20 C to +55 C
Operation temperature	–10 C to +45 C
Relative humidity	0 to 95% humidity, no condensation
Visual	
Display	Fluorescent display panel, 2 lines of 16 characters
Alarms	80 LED (power on, gas alarms, faults)
Audio Alarms	Alarm remote acknowledgement
Inputs	Active 2-wire or 3-wire shielded cables according to the type of sensor/transmitters Resistance in loop mode 4-20mA, 2-wire or 3-wire 56 Ω (2,000m with wire 1.5 mm ² at 20 C)
Signal Outputs	4-20mA analog per channel, maximum load resistance = 600 Ω Serial: RS 485 / J BUS, common
Relay Outputs	2 independent alarm relays per channel 1 common relay for alarm 3 or audio alarm transfer 1 common fault relay
Power Supply	AC or DC power supply 103 to 122 VAC 207 to 244 VAC (Optional) 21 to 31 VDC Power consumption: 300 Va or 240 W

NOTE: All specifications stated in this manual may change without notice.



Dimensions are in inches

Figure 1: MX52 Overall Dimensions

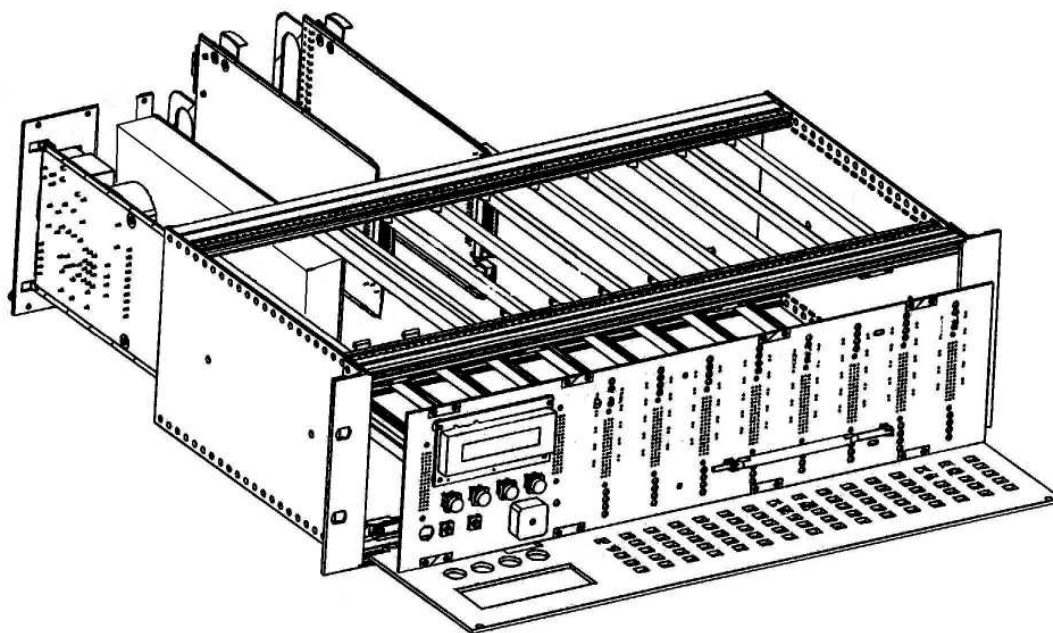


Figure 2: MX52 CONTROL Front View, Internal

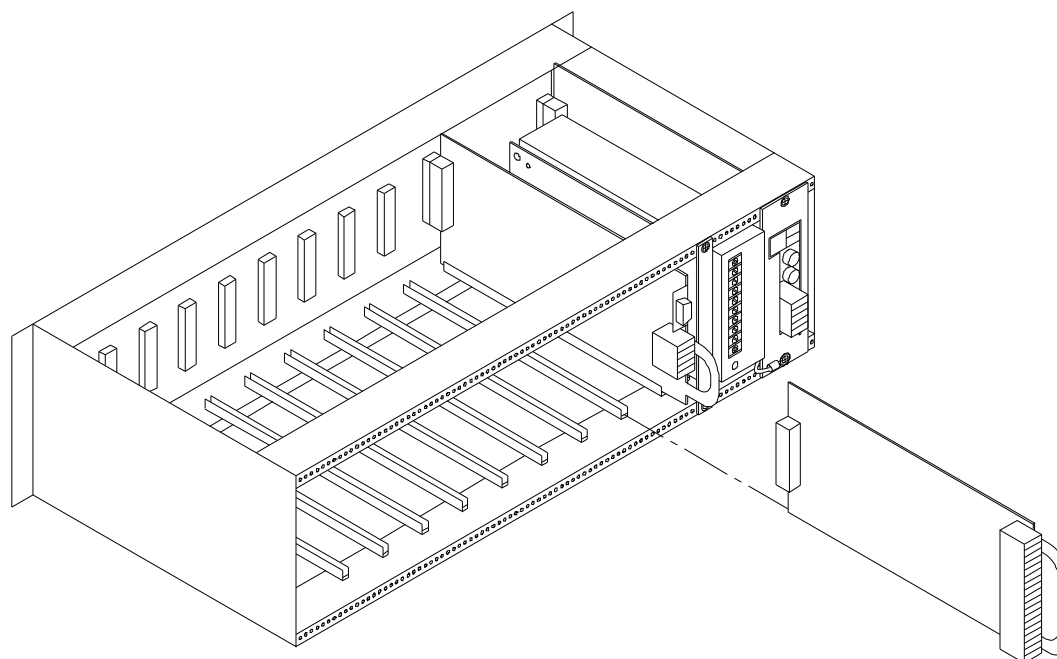


Figure 3: MX52 CONTROL Rear View

3.0 Features

See Figure 4 for features.

Description	Function
Power Card	Internal power supply See figures 5 for detail.
Display	For visual display of: Channel, Gas (type and reading), Data when programming etc...
On/Off Pushbutton Switch	To power up and remove power of the MX52 CONTROL
Keypad	Pushbutton switches used in programming and calibration See figure 10 for detail
Buzzer	For audio alarms
LEDs	For visual alarms
Interconnect board	Interface for: Channel boards, Display, Keypad, LED and Buzzer
Channel Boards	Control for each channel: .2 channels per board See figure 7 for detail.
Micro Board	Connection for remote access of MX52 See figure 9

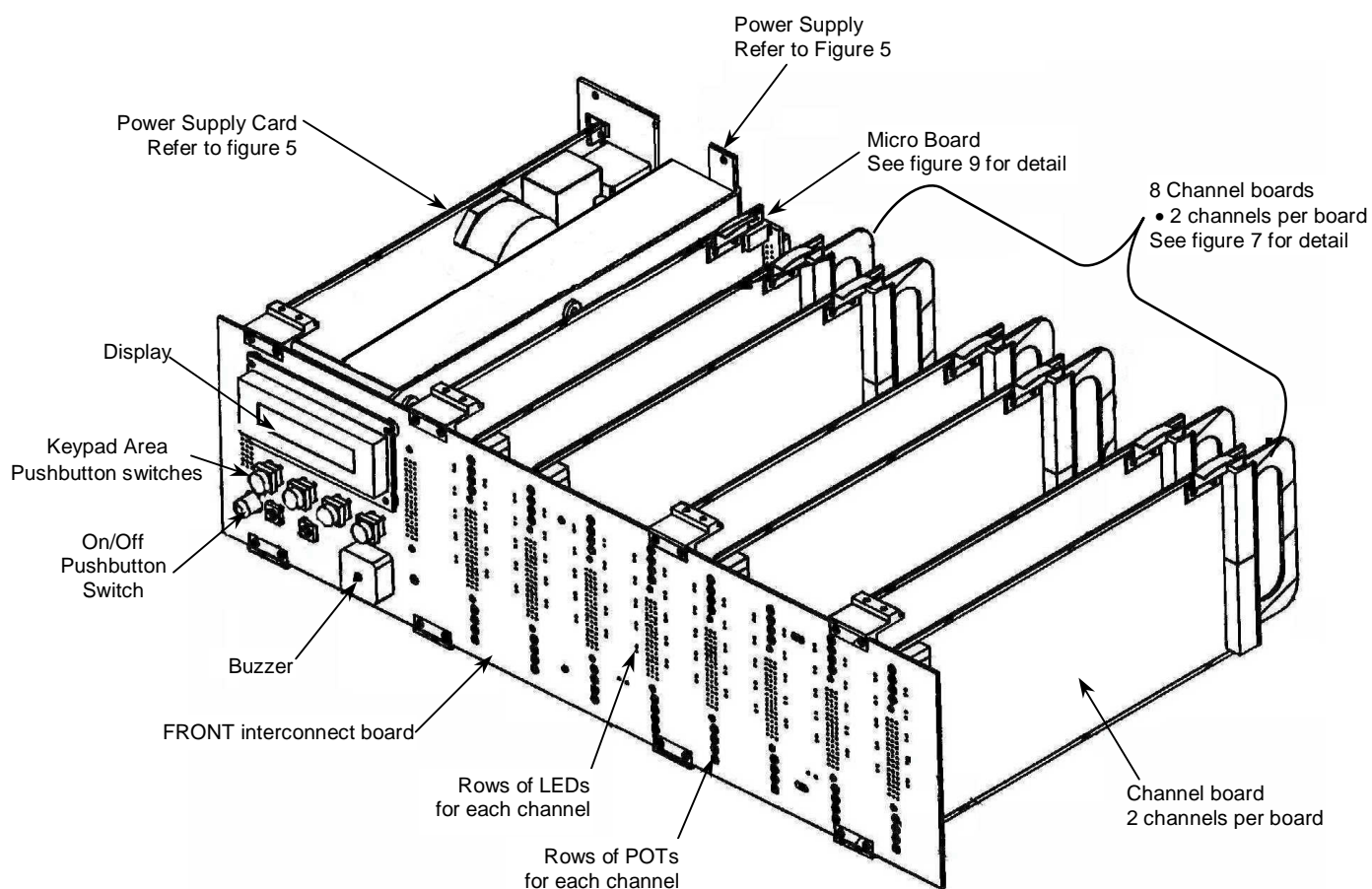


Figure 4: MX52 CONTROL Features

4.0 Installation

4.1 Installation recommendations

The **MX52 CONTROL** can be installed in any area without a hazardous atmosphere. It should preferably be placed in a ventilated and monitored location, such as guardhouse, control room, instrumentation room, etc.

The control can be mounted in any standard 19" rack. See Figure 1 for dimensions. Optional enclosures and wall shelves are available.

Before making any connections, switch off the power using the main On/Off switch below and to the left of the **FRONT** circuit (see Figures 4 and 10).

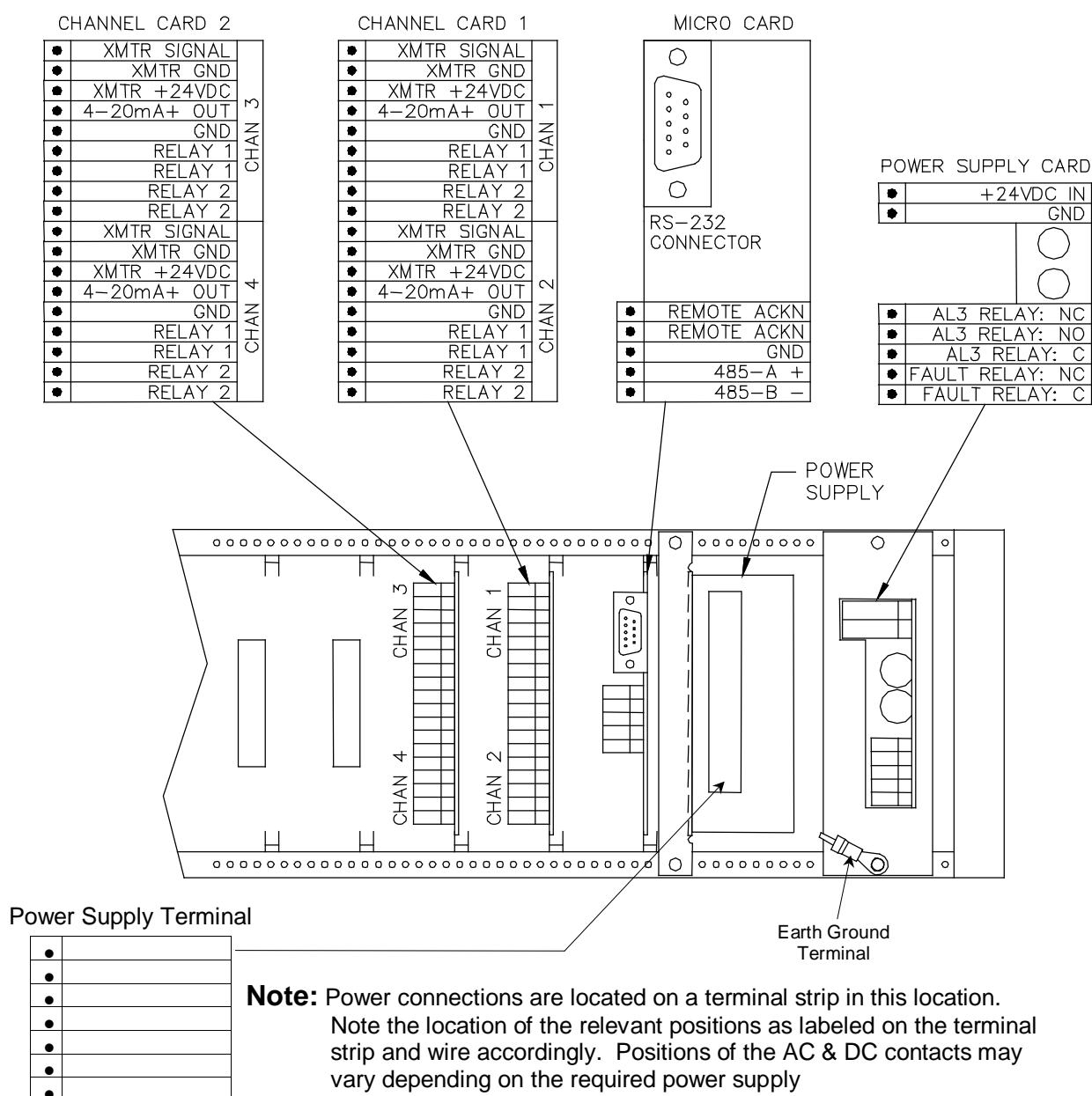


Figure 5: Power Board and Module

4.2 Electrical Connections of the MX52 CONTROL

4.2.1 Power Supply

- Voltage: 115 VAC (103 to 122 V) 50/60 Hz
- Maximum power: 300 VA
- Maximum current in cable: 1.5 A
- Power wire, 3 conductors, 16g
- Location of connection terminal blocks, see Figure 5
- Protection: Overvoltage Clamp, 130 – 150% & Current Limit 130% typ, Self-Reset Foldback
- Voltage: 207 to 244 VAC - 50/60 Hz on option

WARNING: Continuous gas detection and alarm systems (110VAC/220VAC /24VDC/12VDC powered) become inoperative upon loss of primary power. Contact factory for specifications and pricing of backup battery systems.

CAUTION: It is mandatory that the instrument must be grounded to earth ground. This normally occurs through the ground (green) wire of the AC power system. A terminal is also reserved for this purpose at the back of the power card, see Figure 5. The ground connection is required in order to ensure correct operation of the following

- Power interference filter
- Protective devices against electromagnetic interference

4.2.2 DC Power supply

- Voltage: 21 to 30 VDC
- Maximum power: 240 W
- Maximum current in cable: 12.5 A
- Cable: 2 x 14g
- Location of terminal block, see Figure 5
- Protection: Two fuses located at the back of the power card. See figure 5

4.3 Channel Board Connections

Each channel board includes terminal strips for each of two channels. The terminal strips for odd-numbered channels are at the top, the terminal strips for even-numbered channels are at the bottom of each channel board. Figure 7 shows these I/O terminal strips and identifies the positions on them.

4.3.1 Sensor/Transmitter

Sensor/Transmitters are connected to positions C1, C2 and C3 on each channel terminal strip. Connections are as follows:

Two Wire Sensor/Transmitter	
C1	Signal, minus
C2	Not used
C3	Signal, plus and +24VDC power

Three wire Sensor/Transmitter	
C1	Signal
C2	Ground
C3	+24VDC power

4.3.2 4-20mA Output Signal

The next two (+ 4-20mA –) positions in each terminal is the 4-20mA output from the CONTROL. The plus and minus sides of the loop are indicated on the terminal strip.

4.3.3 Relay Contacts

MX52 CONTROL relay contacts for the first two alarm levels are on the next four positions on the terminal strips, as indicated in Figure 7. These relays have a maximum capacity of 2 Amp at 230 Volts, and are programmed as described in Section 4.4.1. Open or closed contacts are selected with jumpers on the channel board as indicated in Figure 7.

Figure 8 shows an example of external devices controlled by the MX52 CONTROL relay contacts.

The system alarm relay contacts AL3 are on the power supply board, as shown in Figure 5.

4.3.4 Wiring Requirements

Sensor/Transmitters: Wiring to the sensor/transmitters should be by two or three wire shielded cable. The recommended cable is 18 gauge three wire, **ENMET** part number 66017-006, Alpha-1747C or equivalent.

Output Loop: Wiring to output loop should be similar two wire shielded cable.

Relay: Relay wiring must be suitable insulated wire.

4.4 Connecting the MX52 CONTROL to External Devices

4.4.1 Alarm Relays

The 16 channels of the MX52 CONTROL unit are each equipped with two relays that can be used to control external devices such as sirens, solenoid valves, extractors, telephone callers, etc... Auxiliary alarms should be powered from an independent power source separate from instrument power to avoid alarm failure due to controller malfunction. An example of connection is given in Figure 8

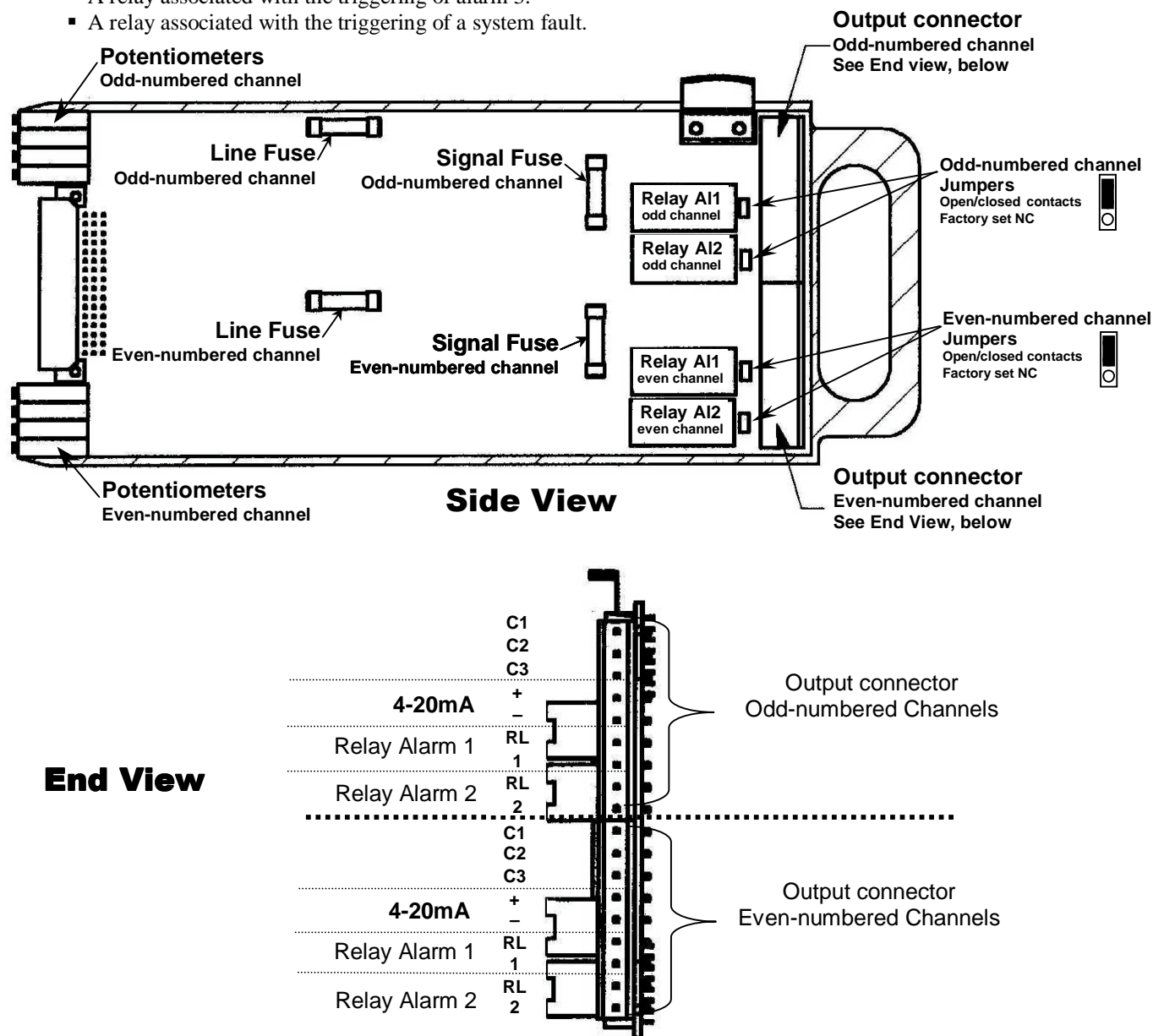
FOR EACH CHANNEL:

The following relays are available (see Figure 7 and 12):

- A relay associated with the triggering of alarm 1.
- A relay associated with the triggering of alarm 2.
- Use of open or closed contacts selected with a jumper (see Figure 7).
- Use of positive or negative safety selected by programming (see the CHANNEL programming menu).
- Contact outputs on the back of the two channel PCB (see Figure 12).

FOR SYSTEM RELAY:

- A relay associated with the triggering of alarm 3.
- A relay associated with the triggering of a system fault.



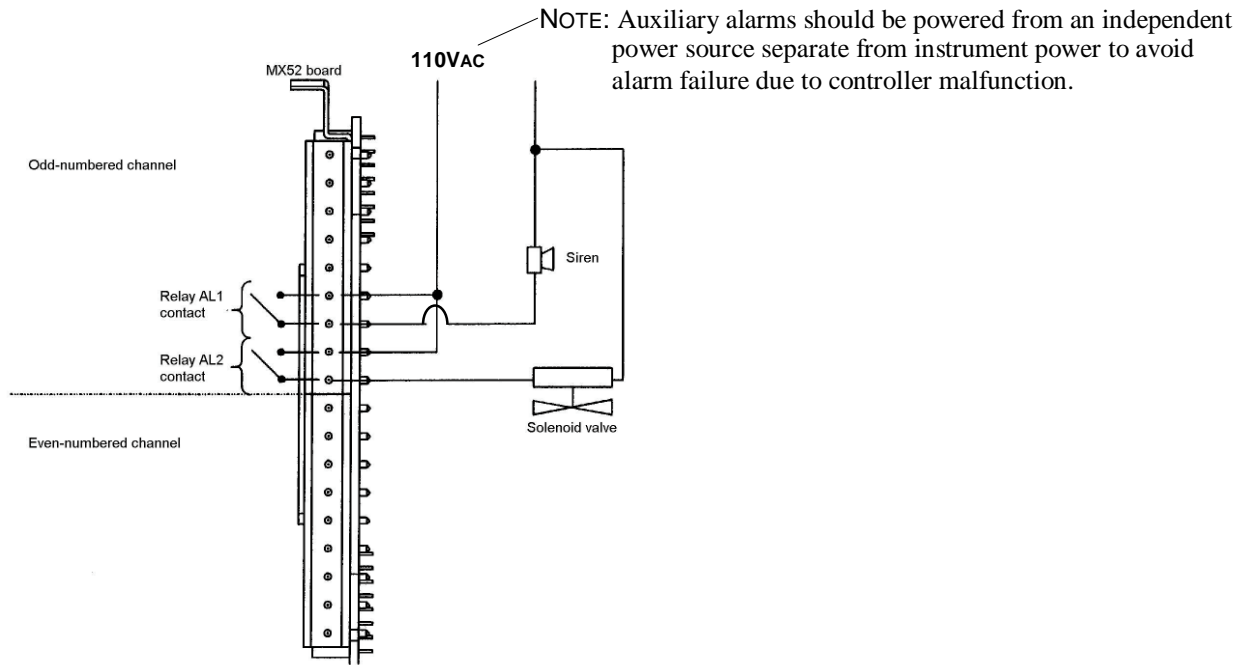


Figure 8: Example of External Device Connection

- A siren connected to relay AL1 is actuated when alarm 1 is triggered,
- A solenoid valve connected to relay AL2 is actuated when alarm 2 is triggered.

FOR ALL CHANNELS

A common relay is associated with the triggering of alarm 3 for any and all of the 16 channels.

By programming, this common relay can also be used for the remote transmission of the audio warning signal. This relay is then associated with all the control alarms. (See Figure 5)

A **Fault** relay associated with the triggering of channel faults (detector failures, electrical connections, excessively negative zero, etc.). The Fault Relay is normally closed, it opens when in fault condition.

Common relay contact outputs are on the back of the power card: Figure 5.

NOTE: The breaking capacity of the **MX52 CONTROL** relay contacts is 2 A / 250 VAC or 30 VDC, so external intermediate relays must be used if the devices to be controlled require high current levels.

4.4.2 The 4-20mA Current Outputs

For each channel, the **MX52 CONTROL** is equipped with a 4-20 mA output that can be used to retransmit sensor/transmitter outputs to a recorder, an external PLC or a computer. The maximum resistance in loop mode is 600 ohms. The ground connections for the 4-20 mA outputs are common. The 4-20 mA lines are not galvanically insulated one from the other. The current output varies according to the situation and has several conditions other than normal, as follows:

- On starting up the unit: $I < 1 \text{ mA}$
- With FAULT: $I < 1 \text{ mA}$
- In MAINTENANCE mode: $I = 2 \text{ mA}$
- ZERO MEASUREMENT: $I = 4 \text{ mA}$
- Full scale: $I = 20 \text{ mA}$
- Out of range or "in doubt": $I > 23.2 \text{ mA}$

4.4.3 Series Output

A single “sub. D” connector located on the back of the micro board is equipped with both an RS485 output in J-BUS format for the uploading of data from the MX52 unit to a computer and an RS 232 output for programming of the **MX52 CONTROL** external environment. See Figure 9A for details of the pinout of this connector.

CAUTION: A computer must be used in order to printout the data stored by the **MX52 CONTROL**.

Several **MX52 CONTROLS** can be connected to a single computer which is the “MASTER”. In this case, a SLAVE number is assigned to each **MX52 CONTROL**.

Pin No.:	
1: GND ISO for shielding RS485 (optional)	
2: TXD RS232	Link RS232
3: RXD RS232	
4: RX 485/232	
5: GND RS232	
6: 485-B	Link RS485
7: 485-A	
8: Do not connect	
9: Do not connect	

If you wish to use the RS485 link, pin 3 must be connected to pin 4.
For the RS232, there is no hookup.

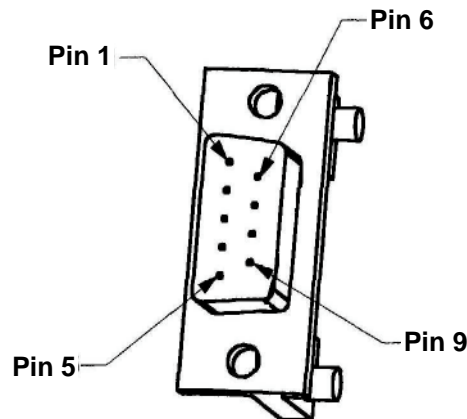
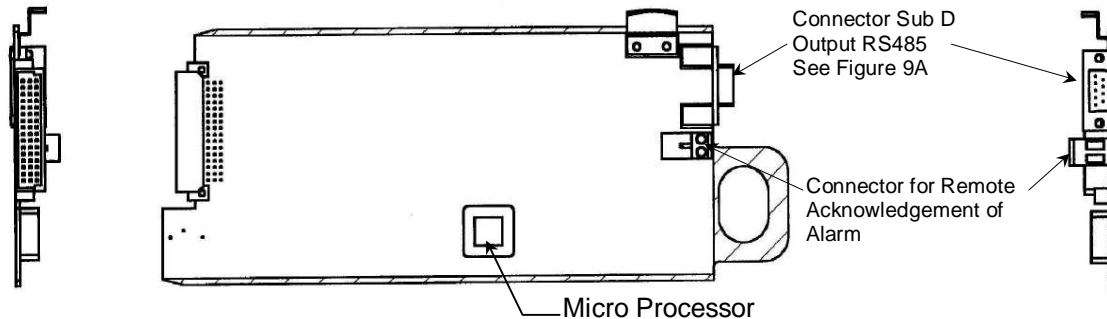


Figure 9A: Pinout of the MX52 Serial Link Connector Sub D

4.4.4 Remote Acknowledgement

It is possible to allow remote acknowledgement by connecting a momentary push-button, to the terminals provided for that purpose on the back of the micro board: see Figure 9.

MICRO BOARD: Standard
part number 02625-002



MICRO BOARD: with Galvanic Isolation
part number 02625-003

Used to isolate Signal Ground from Chassis Ground.

Desirable when connecting several MX52 control units together as in a “Master”, “Slave” situation, or when using a computer/PLC setup.

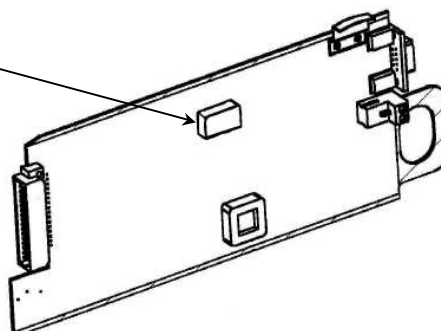


Figure 9: Micro Board

5.0 Operation

5.1 Starting Up

5.1.1 Checking the Installation

Ascertain that all connections have been made and that the complete installation complies with current standards in force.

WARNING: ENMET Corporation is not responsible for the compliance of the complete electrical safety system.

The **MX52 CONTROL** power input should be protected with circuit breakers provided for that purpose, and that assure protection of the power unit. The circuit breakers are to be selected according to the power consumption levels specified by the manufacturer and the length of the electric cables. The circuit breakers can also be used to interrupt power to the control

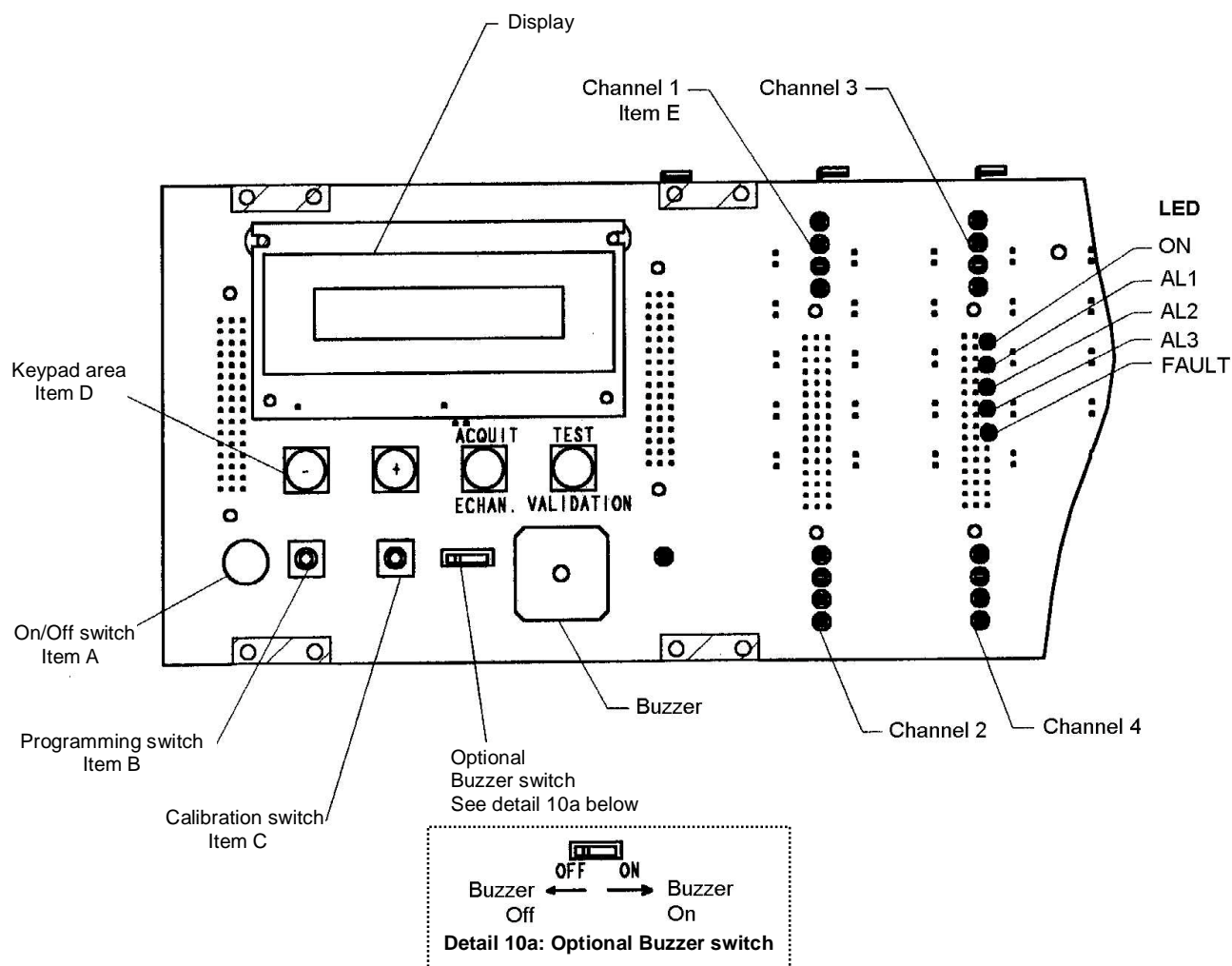


Figure 10: Operation Components

5.1.2 Switching the MX52 CONTROL On

To start up the **MX52 CONTROL**:

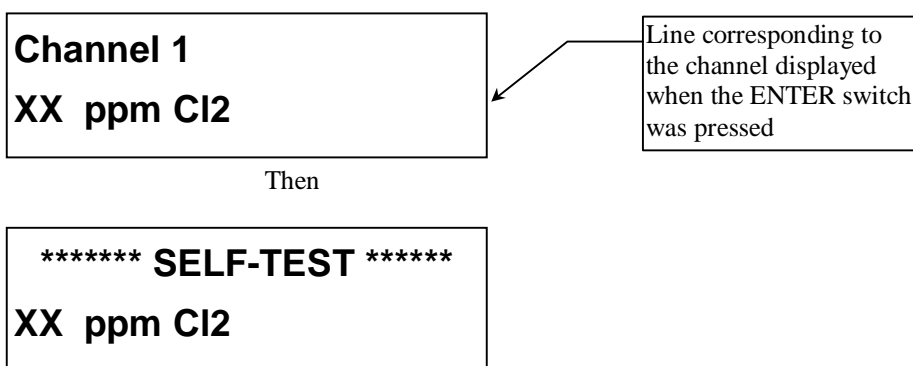
- Swivel the front panel.
- Press the ON/OFF button located to the bottom left-hand side of the FRONT circuit: see Figures 4 and 10 (item A).
- The display panel then shows, *for example*:

ENMET
MX48/52 V2.0r12

The unit then goes into INITIALIZATION mode for one minute. Consequently, all the alarms are inhibited and the current outputs are 1 mA for the channels in service. The unit then performs a self-test on its buzzer and all its light-emitting diodes. At the end of this one-minute period, the channels in service return to normal operation and the corresponding alarms and relays are enabled.

The user can carry out a “manual-self test” by pressing the test key at any time (see Figure 10).

This self-test lasts 20 seconds and the display panel may show the following displays one after the other, *for example*:



The user can interrupt the self-test cycle before it is completed by pressing the ACKNOWLEDGEMENT switch.

NOTE: In some applications, slight electronic noise between the Sensor/Transmitter and the Control can cause fluctuations in the display reading. These minor fluctuations are considered to be insignificant in terms of the range, detection limit and alarm values of the gas being monitored.

5.2 Operating Modes

5.2.1 Audio Alarm (Buzzer)

In normal operation, the audio alarm is triggered whenever a fault or an alarm threshold is exceeded. The audio alarm can be stopped by pressing the ACKNOWLEDGEMENT switch or by remote acknowledgement. The buzzer makes a continuous or pulsed sound, according to the programming of the control, when an alarm threshold is exceeded.

5.2.2 Light-emitting diodes (LED) (Figure 10)

Each channel is equipped with five LEDs, when are visible and identified on the FRONT panel.

LED	Extinguished	Illuminated steady mode	Flashing
GREEN	Channel not in service	Channel in service	Channel in service
1st red	AL1 not triggered	Threshold AL1 exceeded (automatic clearing)	Threshold AL1 exceeded (manual clearing)
2nd red	AL2 not triggered	Threshold AL2 exceeded (automatic clearing)	Threshold AL2 exceeded (manual clearing)
3rd red	AL3 not triggered	Threshold AL3 exceeded by mean or time (automatic clearing)	Threshold AL3 exceeded by mean or time (automatic clearing)
Yellow	No fault	Fault on channel	- Channel being calibrated or programmed - Detector being calibrated

5.2.3 Alarm Thresholds

Each of the three alarm thresholds can be programmed independently for each channel. (See the “Channel programming” menu).

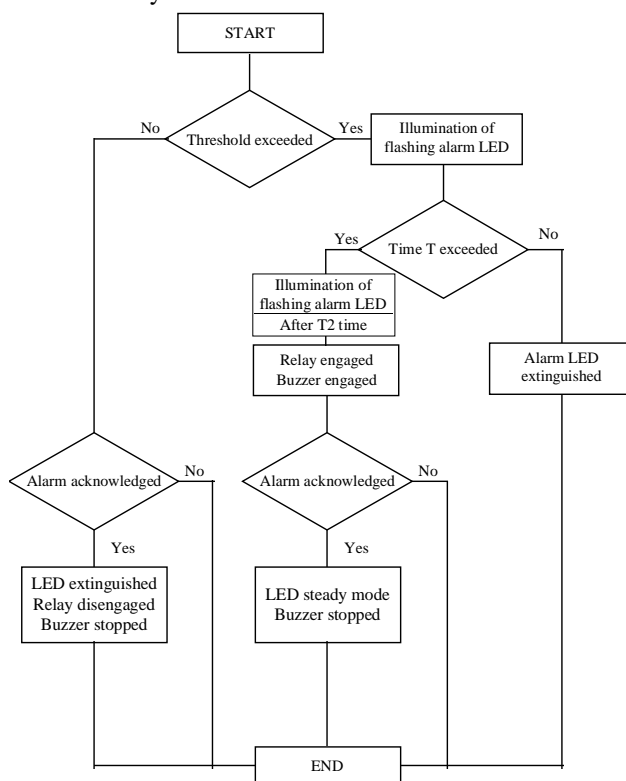
In normal operation, a gas alarm is only triggered after a preprogrammed time delay in order to avoid spurious alarms.

Alarm thresholds can be processed in the following manners:

- In normal cycle with manual clearing: block diagram 1.
- In normal cycle with automatic clearing: block diagram 2.
- In parking cycle: block diagram 3.

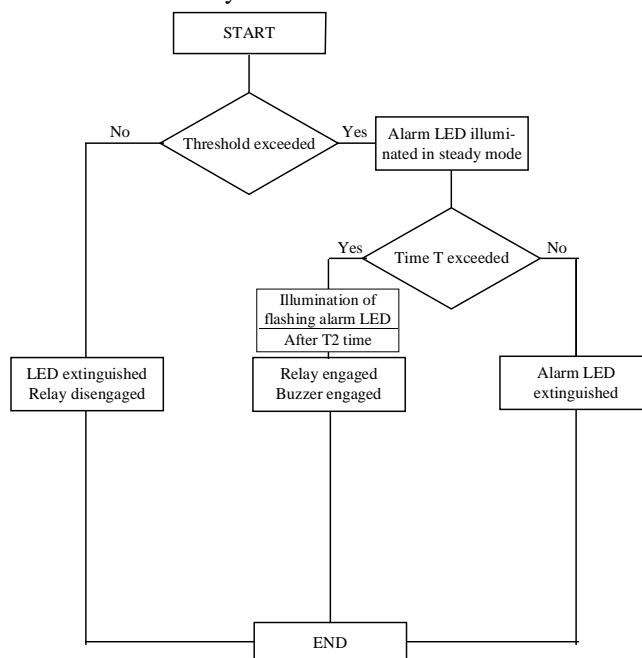
The alarm thresholds are to be selected according to the gases detected and the corresponding standards in force.

T = Time of 5 seconds or alarm 3 time delay



Block Diagram 1: Normal Cycle with Manual Clearing

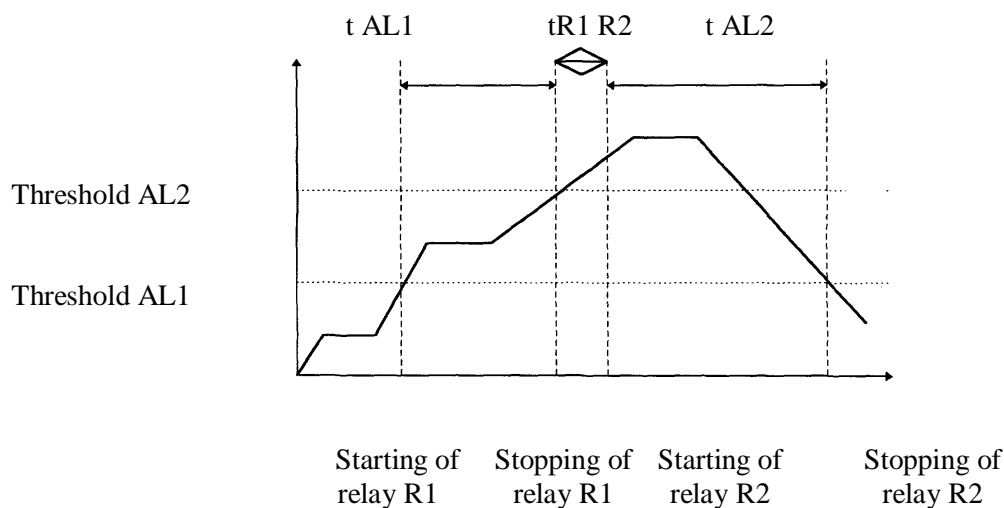
T = Time of 5 seconds or alarm 3 time delay



Block Diagram 2: Normal Cycle with Automatic Clearing

Alarm 3 operates in the same way as the normal cycle.

The times defined for alarms 1 and 2 (time delays) are, in this case, used to define the minimum operating time for each relay.



		min.
t_{AL1}	Min. operating time for alarm 1 (defined for each channel)	t_1
t_{AL2}	Min. operating time for alarm 2 (defined for each channel)	t_2
$t_{R1\ R2}$	Switching time from relay 1 to relay 2 (defined for the whole unit)	$t_{R1\ \&\ R2}$

Block Diagram 3: Parking Cycle

5.2.4 Fault Thresholds

Processing of detector faults, Each channel detects the following faults.

For toxic and explosive gas detectors:

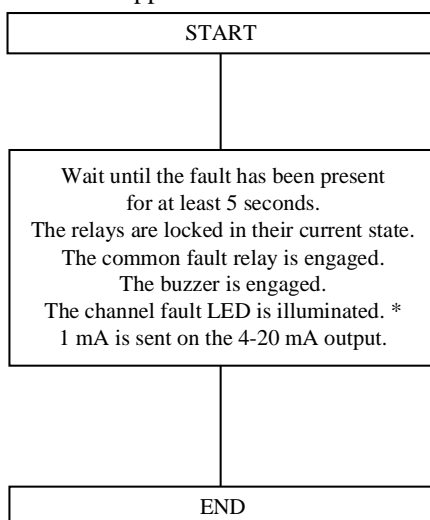
- line interrupted (0 mA),
- line short-circuited or excessive consumption,
- negative offset (more than 20% of measuring scale),
- line in calibration mode (2 mA) (if confirmed by programming).

For sensor/transmitter for combustible gas type (4-20 mA and 340 mA) in normal mode, if the measurement is greater than 100% of the measuring scale, the following occur immediately:

- Display: SUP
- The relays are actuated if the thresholds are exceeded.
- The general fault relay is actuated.
- The 4-20 mA output of the channel is greater than 20 mA.
- All these states are memorized and the only way of acknowledging them is to switch off the channel and then restart it.

Faults are valid after a preprogrammed time (in the same way as alarms).

* The LED is extinguished as soon as the fault disappears.



Block Diagram 4: Fault

5.2.5 Standard Display

One minute after starting up, and if no test action is performed on the keypad, the unit successively scans all the channels in service and displays the values.

Channel 1

XXX LEL CH4

OR

Examples of display:

Channel 2

XXX ppm Cl2

- Each channel is interrogated for 10 seconds.
- The user can interrogate a channel manually by selecting that channel with the + and – switches to obtain a manual display for one minute.
- The user can return to normal cyclic scanning during that one-minute period by simultaneously pressing the + and – switches. The display panel then shows alternating displays, three times in succession:

normal scan

XXX ppm CO

For example:

THEN


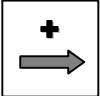






Channel 5

XXX ppm CO

5.3 Functions of Switches and Menus for Programming and Calibration of MX52 CONTROL

5.3.1 Keypad (see Figures 10 and 4)

The keypad is equipped with four touch switches accessible without opening and swiveling the MX52 CONTROL FRONT panel. See Item D, Figure 10

			
	<ul style="list-style-type: none"> - Manual display of previous channel - Manual display of previous menu - Decrease value, threshold, etc. - Display of previous choice (on ← off, etc.) - NO - Combined with the “PLUS” switch to restart the channel’s automatic display cycle. 		
	<ul style="list-style-type: none"> - Manual display of next channel - Manual display of next menu - Increase value, threshold, etc. - Display of next choice (on ← off, etc.) - YES - Combined with the “MINUS” switch to restart the channel’s automatic display cycle. 		
	<ul style="list-style-type: none"> - “Audio and visual” or “audio” clearing of an alarm - Exit from a current menu 		
	<ul style="list-style-type: none"> - Start a self-test manually - VALIDATE 		

5.3.2 Maintenance Switches

PROGRAMMING key (Item B, Figure 10): accessible after opening and swiveling the front panel.

- Combined with the “-” key to go back in a menu.
- To quit normal display mode and access the various menus (see block diagram of the various menus).
- To scroll through a menu.

CALIBRATION key (Item C, Figure 10): accessible after opening and swiveling the front panel.

- To set a channel to CALIBRATION mode.
- To quit that mode.

5.3.3 Potentiometers

On the FRONT circuit, each channel has four potentiometers (Item E in Figures 10 and 11). These are accessible by opening and swiveling the FRONT panel of the MX52 CONTROL and are laid out as follows (see Figure 11):

TOP (item A)	1 sensor/transmitter ZERO potentiometer 1 sensor/transmitter sensitivity potentiometer
BOTTOM (item B)	1 potentiometer 4 mA / current output 1 potentiometer 20 mA / current output (for full scale)

5.4 Menus

5.4.1 Menus and their Functions

The MX52 CONTROL has five menus that are accessed by pressing the “Programming” switch (Item B, Figure 10).

These five menus are as follows:


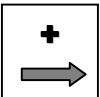

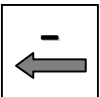



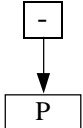



DESIGNATION	FUNCTION
“CHANNEL” programming	- To program the whole configuration of a channel (ON/OFF, range, alarm thresholds, etc...)
“SIMULATION” programming	- To artificially vary a channel measurement on: <ul style="list-style-type: none"> - the display panel, - the 4-20 mA current output. - To trigger the alarms (LED and relays) at the same time.
“CHANNEL COPY” programming	- To copy the complete programming from one channel to another (time saving)
“UNIT” programming	- To program the whole configuration of the MX52 CONTROL (language, slave number, etc.).
“UPLOADING” programming	- To transfer data, measurements and events, etc., from the unit to a computer via the MX52 CONTROL RS 485 / J BUS output.

The block diagrams for these menus are in sections 5.4.4 through 5.4.8.

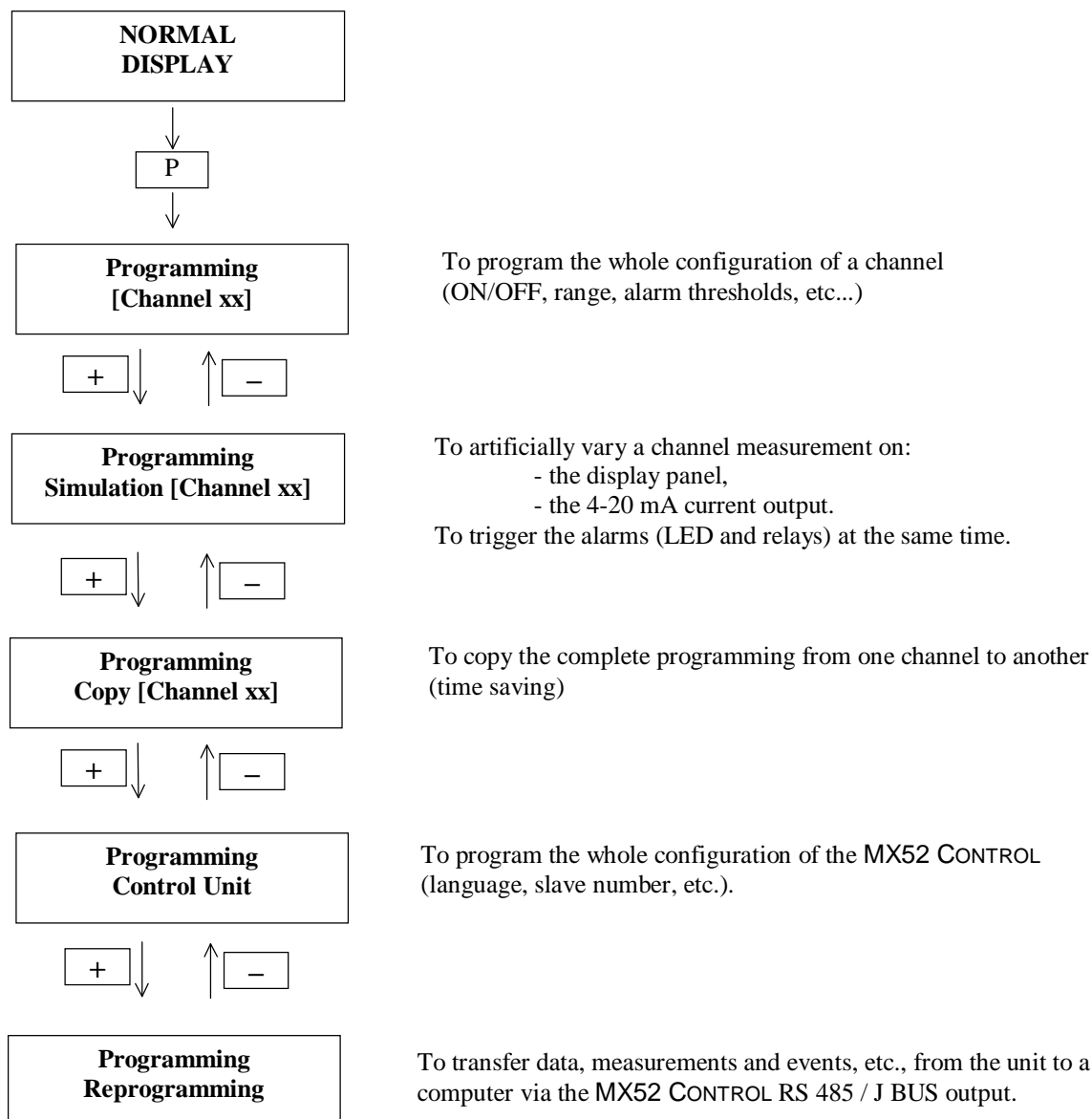
5.4.2 Legend for Block Diagrams of Programming Menus

It is easy to use these various menus by means of the switches on the keypad and the “Programming” switch (Items B and D, Figure 10).

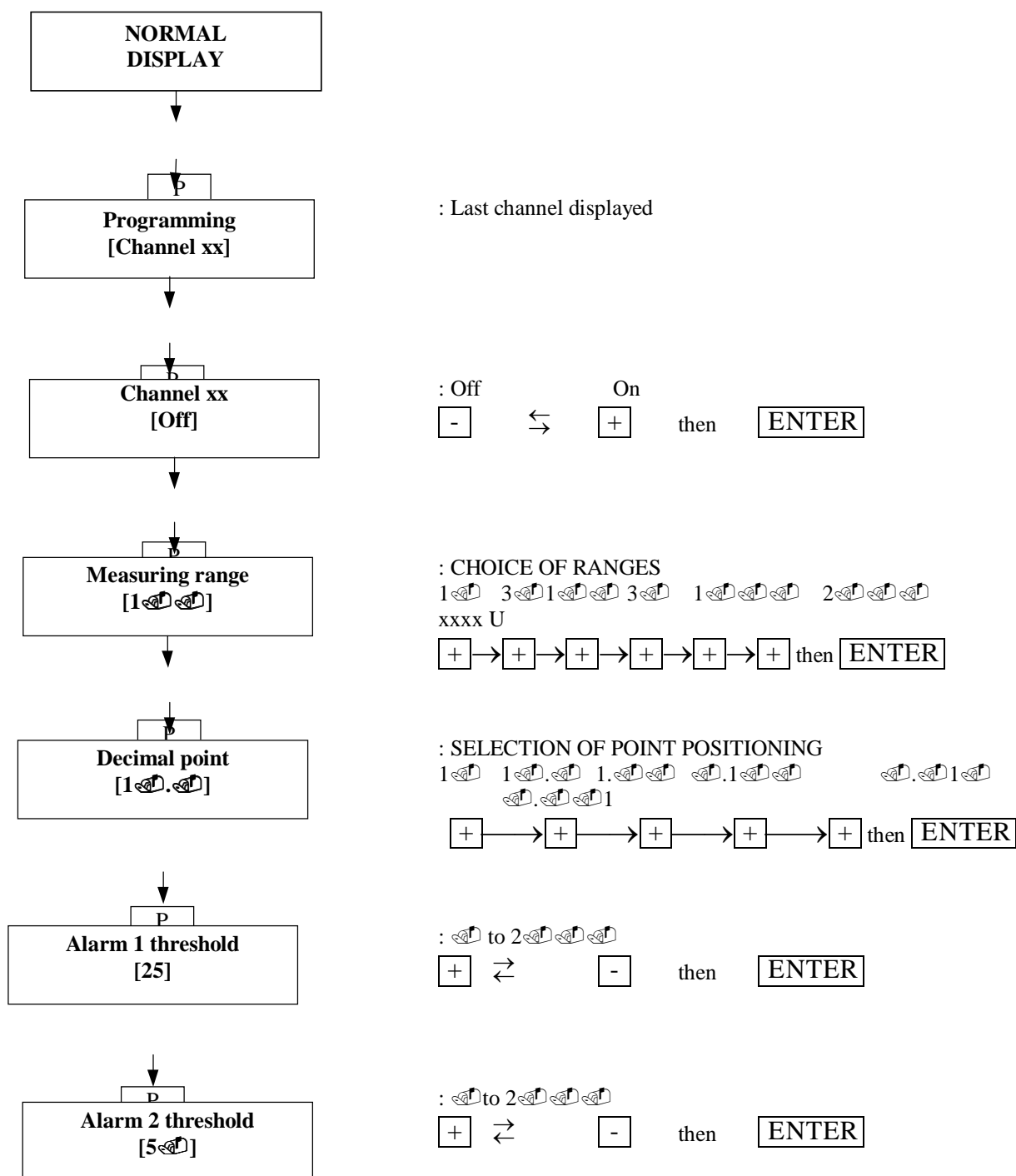
Detailed flow diagrams of the menu scrolling function and of each menu are given on the following sections.

	Programming switch
	 Switch used to move forward
	 Switch used to move in reverse
	 Switch used to enter data
	This switch can also be used to exit from the current menu.
	When in a menu, you can go back (to make checks or modifications, etc...) by pressing and <u>holding down</u> switch  and by successively <u>pressing and releasing</u> the Programming switch.
	Parameters specified in square brackets [] are the VALID parameters (in memory).
(1) Free	This means that the relay can be controlled freely in positive or normal safety mode (programming by MX52).
Set to  Set to 1	This means that the relay will be controlled, set to 0 or 1, and programmed directly via the J.BUS input and the “COM52” software.

5.4.3 Block Diagram of Scrolling Programming Menus



5.4.4 Block Diagram of Channel Programming Menu



Continued On Next Page

```
graph TD; Start(( )) --> P1[P]; P1 --> A3T[Alarm 3 threshold [75]]; A3T --> P2[P]; P2 --> A1[Alarm 1 [Increasing]]; A1 --> P3[P]; P3 --> A2[Alarm 2 [Increasing]]; A2 --> P4[P]; P4 --> A3[Alarm 3 [Increasing]]; A3 --> P5[P]; P5 --> Cycle[Cycle [Normal]]; Cycle --> P6[P]; P6 --> End(( ))
```

The flowchart illustrates the alarm sequence logic. It begins with a start point leading to a process block 'P'. This is followed by a decision block 'Alarm 3 threshold [75]'. If the threshold is reached, the flow proceeds to another process block 'P', then to a decision block 'Alarm 1 [Increasing]'. If this condition is met, it goes to process block 'P', then to a decision block 'Alarm 2 [Increasing]'. If this condition is met, it proceeds to process block 'P', then to a decision block 'Alarm 3 [Increasing]'. If this condition is met, it goes to process block 'P', then to a decision block 'Cycle [Normal]'. If this condition is met, it proceeds to process block 'P', and finally to an end point.

\rightleftharpoons then

: Increasing Decreasing
 $\boxed{-}$ \longleftrightarrow $\boxed{+}$ then $\boxed{\text{ENTER}}$

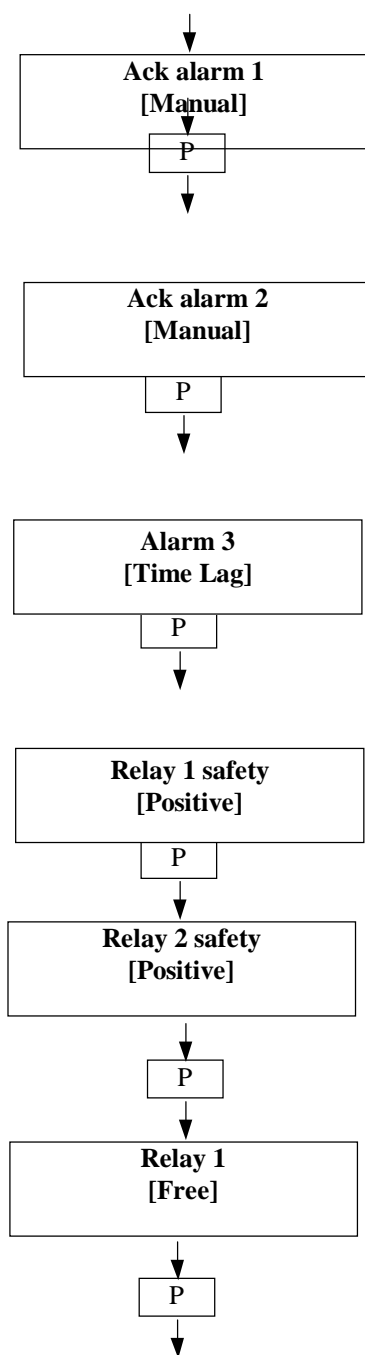
: Increasing Decreasing
 $\boxed{-}$ \longleftrightarrow $\boxed{+}$ then $\boxed{\text{ENTER}}$

: Increasing Decreasing
 ⇌ then

: Normal Parking

- $\begin{matrix} \leftarrow \\ \rightarrow \end{matrix}$ + then ENTER

20

Continued From Previous Page

Manual Automatic
☐ - \rightleftharpoons ☐ + then

Manual Automatic
☐ - \rightleftharpoons ☐ + then

Time delay Mean
☐ - \rightleftharpoons ☐ + then

Negative Positive
☐ - \rightleftharpoons ☐ + then

Negative Positive
☐ - \rightleftharpoons ☐ + then

Free Set to 0 Set to 1
☐ - \rightleftharpoons ☐ + \rightleftharpoons ☐ + then

Continued On Next Page

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Relay 2
[Free]

P

Relay 3
[Free]

P

Fault relay
[Free]

P

Auto Calibration
[No]

P

Channel xx
[Premises 1 channel] U

P

Flashing

Gas
[CH4]

P

Continued On Next Page

Free Set to 0 Set to 1
[-] ⇌ [+] ⇌ [+] then [ENTER]

Free Set to 0 Set to 1
[-] ⇌ [+] ⇌ [+] then [ENTER]

Free Set to 0 Set to 1
[-] ⇌ [+] ⇌ [+] then [ENTER]

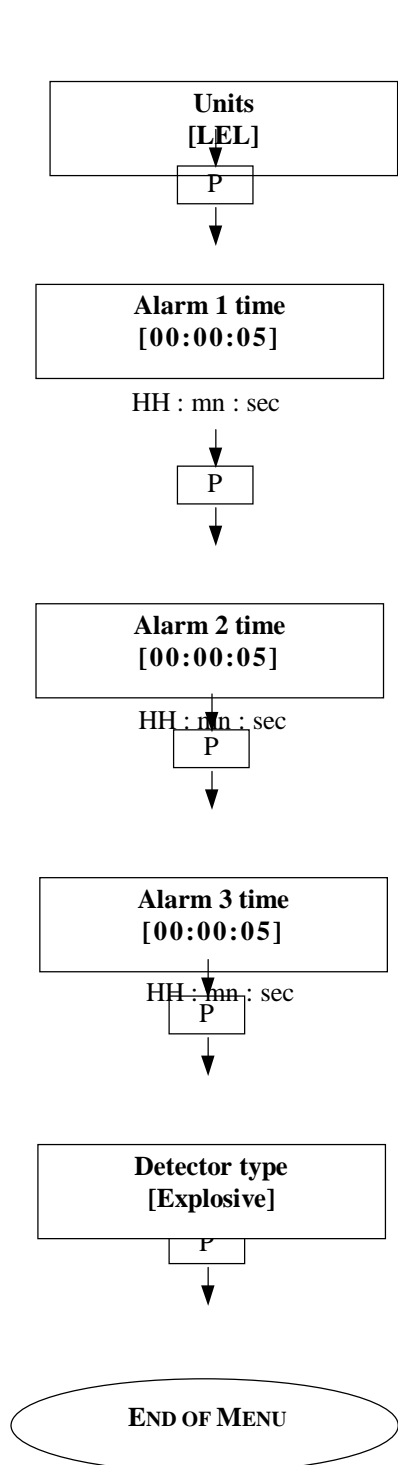
The MX52 unit can detect and indicate (with a flashing yellow LED) that a line has been placed in CALIBRATION mode on the detector.

No Yes
[-] ⇌ [+] then [ENTER]

Free display: A channel heading can be programmed (in 13 characters maximum). By default, the channel number is displayed in this area.

[+] ⇌ [-] then [ENTER]

CH4 CO 2S etc.
[-] ⇌ [+] ⇌ [+] then [ENTER]

Continued From Previous Page

LEL % ppm etc.
 ⇌ ⇌ then

Time: Time interval between the triggering of the AL LED and of the corresponding relay, or the minimum operating time of the relay in parking mode.

 ⇌ then

NOTE: Factory default setting is 5 seconds.

Display of time by using switches

 ⇌ then

NOTE: Factory default setting is 5 seconds.

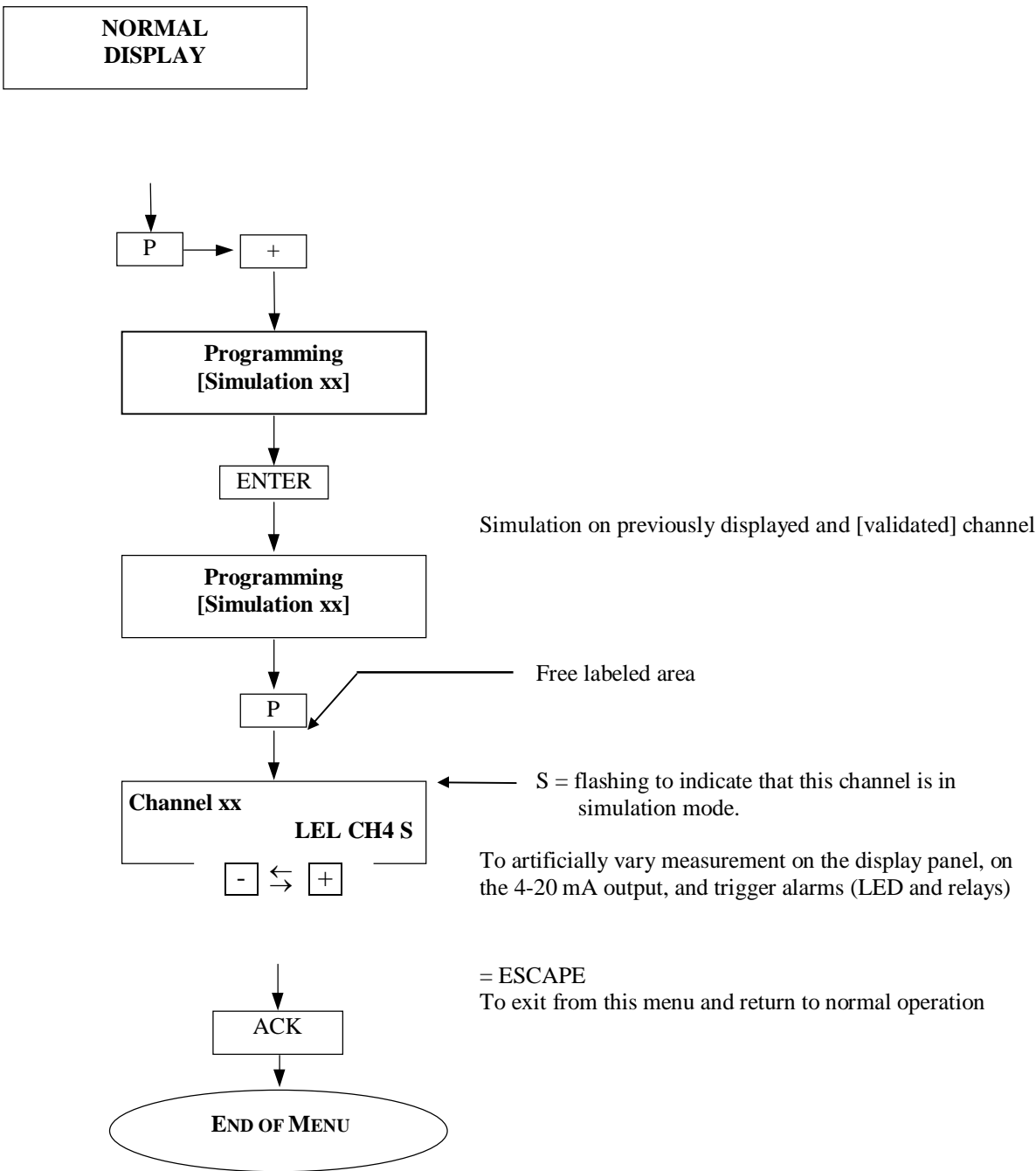
Text

 ⇌ then

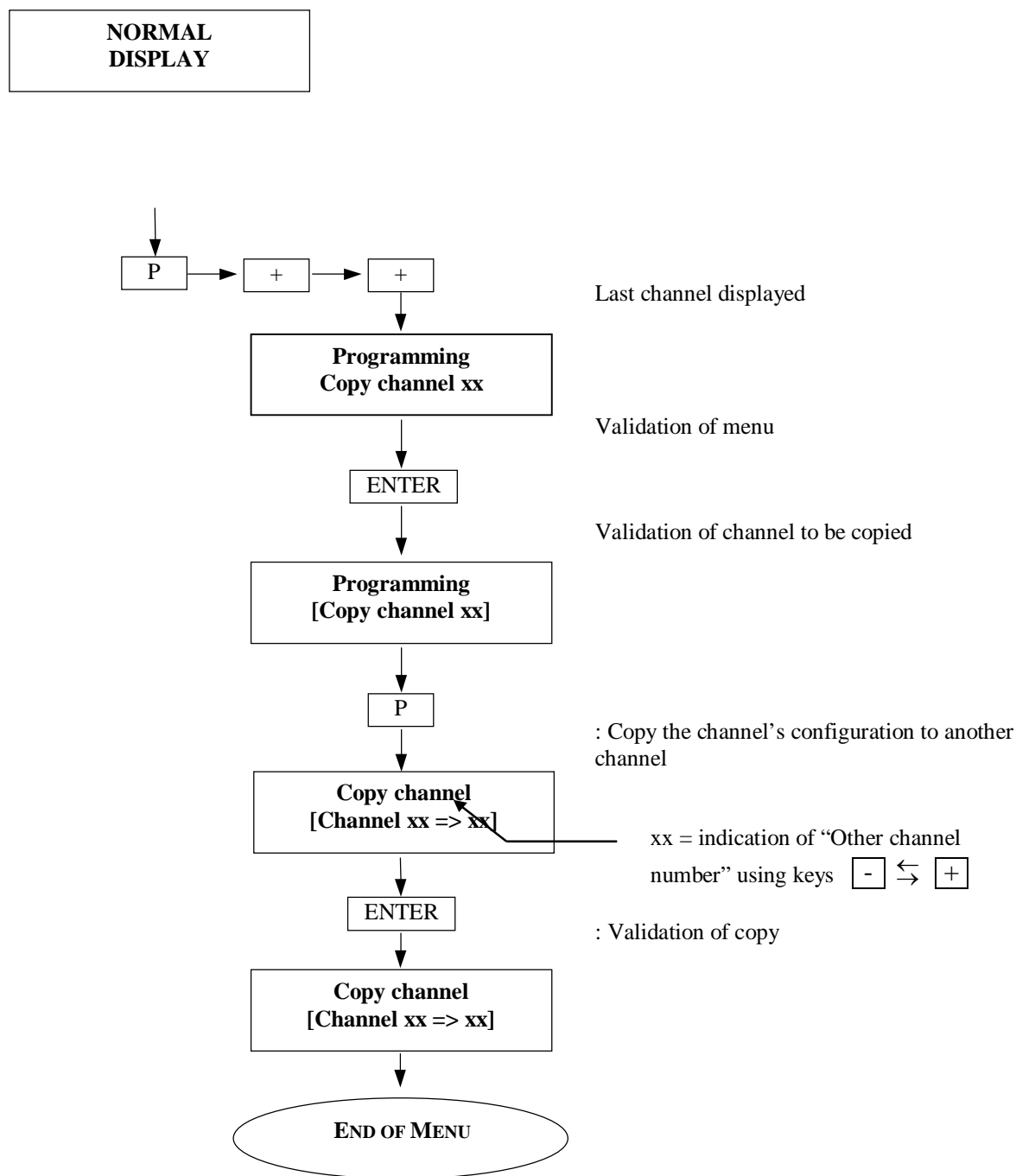
NOTE: Factory default setting is 5 seconds.

: Explosive Toxic Spec. tox.
 ⇌ ⇌ then

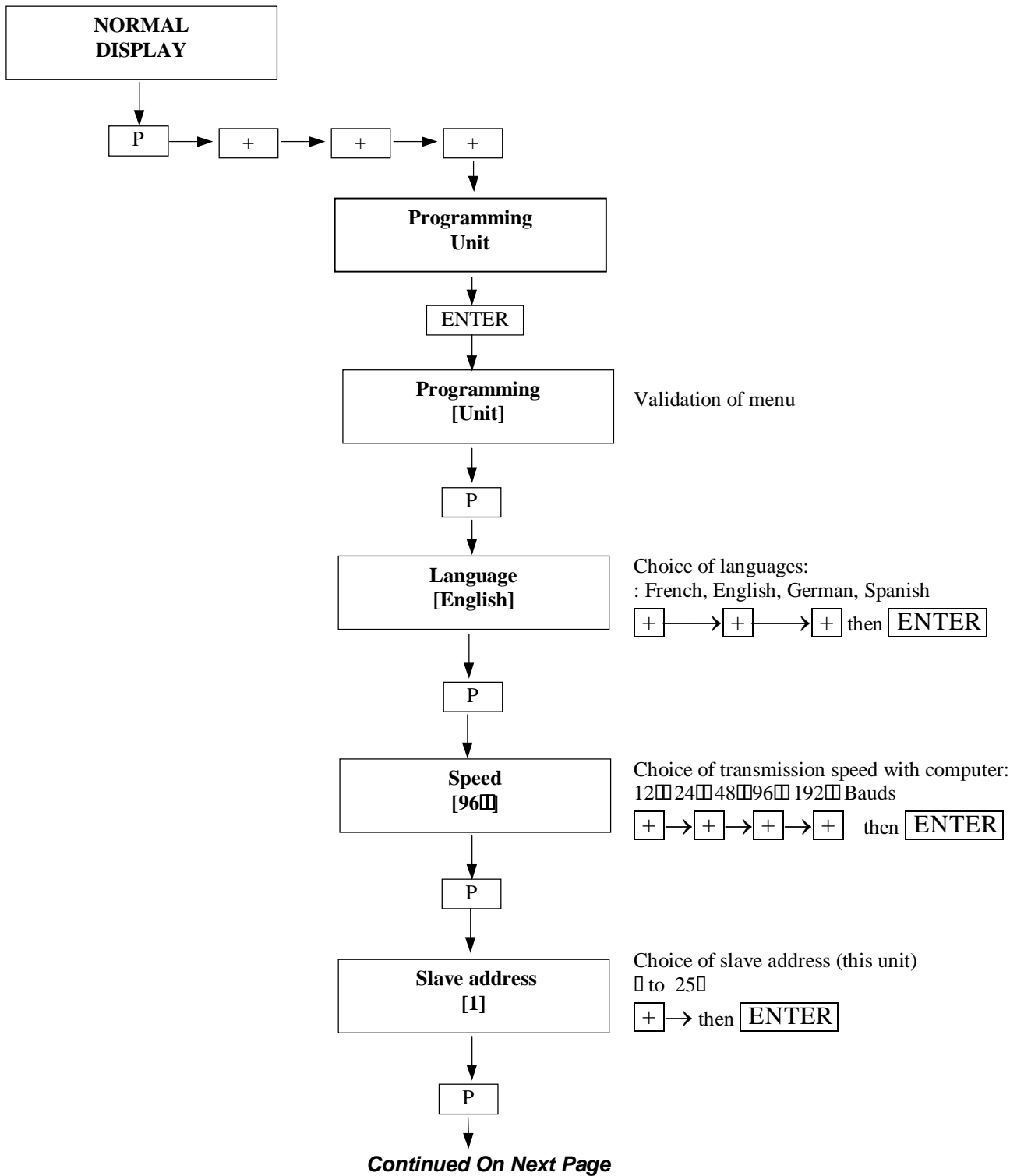
5.4.5 Block Diagram of Simulation Programming Menu



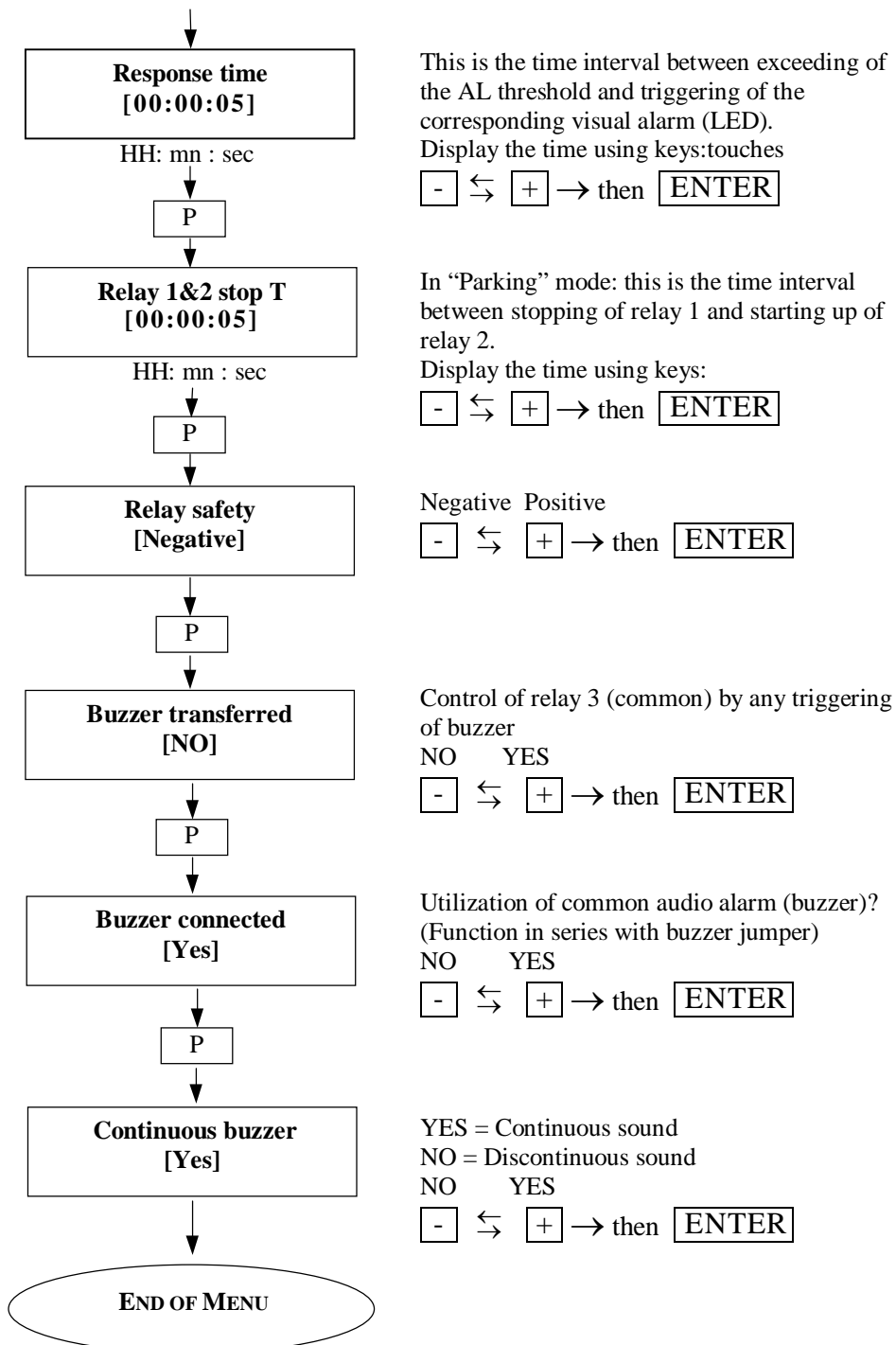
5.4.6 Block Diagram of Programming Copy Channel



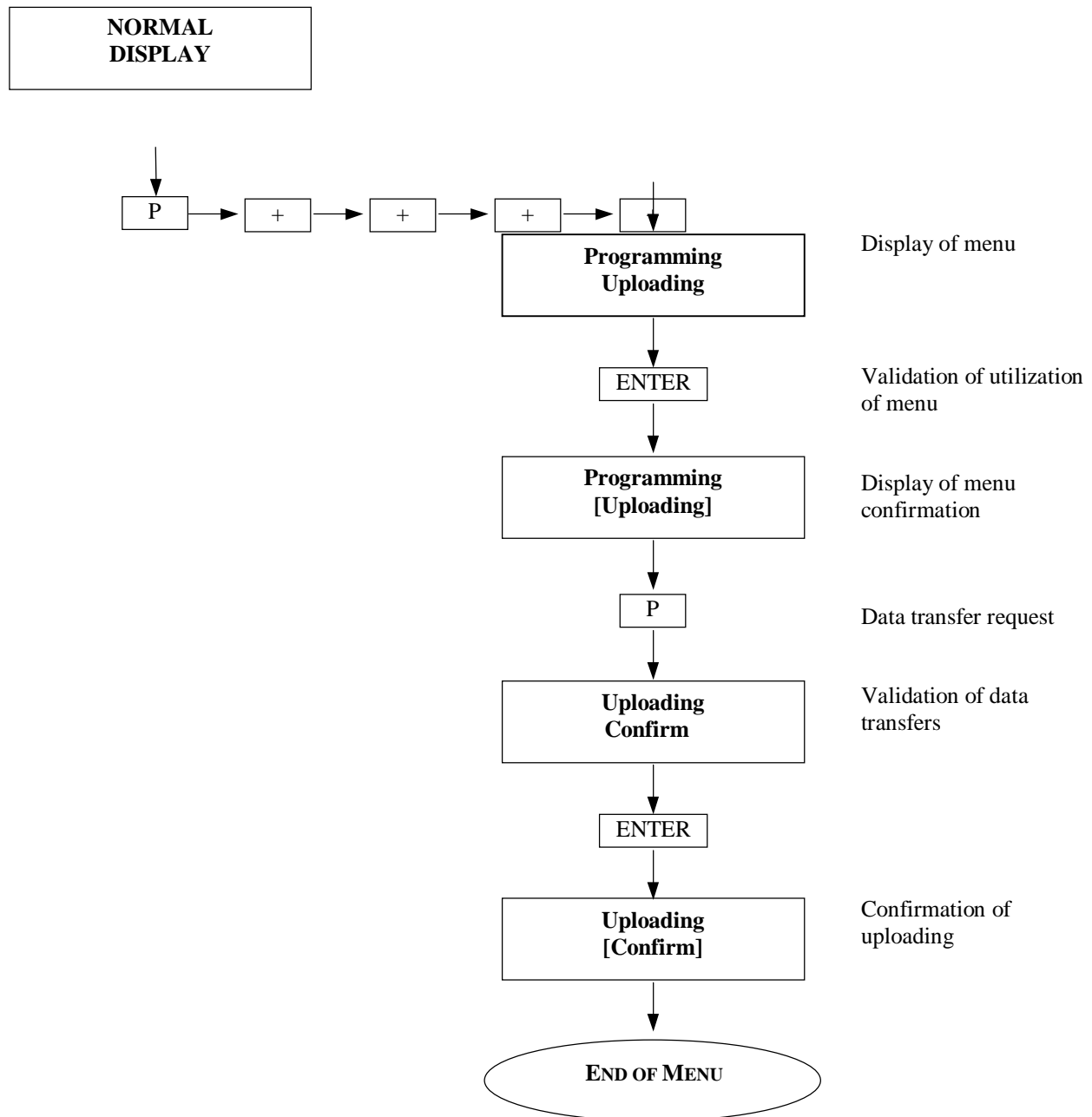
5.4.7 Block Diagram of Programming Control Unit



Continued From Previous Page



5.4.8 Block Diagram of Reprogramming Programming



5.5 Startup of the MX52 CONTROL

WARNING: The handling operations and adjustments described in this section must be performed by authorized personnel only, as they are liable to affect detection safety.

Once the control has been switched on, it can be programmed, the channels can be programmed according to the sensor/transmitter used, and the control and sensor/transmitter can be calibrated. The programming operations can be carried out directly on the MX52 CONTROL according to the following procedures, or by using a computer equipped with the “COM 52” software.

5.5.1 Programming the Control

To program the MX52 CONTROL the “Unit programming” menu must be used (see Section 5.4 on Menus) in conjunction with the keypad and the “Programming” switch. Then, the instructions in the menu should be followed carefully.

NOTE: If the control is left in the programming mode for more than 30 minutes, it automatically switches to fault mode.

5.5.2 Programming the Channels

• Programming

To program each channel according to the type of sensor/transmitter used, the “Channel programming” menu must be used (see Section 5.4 on Menus) in conjunction with the keypad and the “Programming” switch. Then, the menu instructions should be followed carefully.

When a channel is switched on, all its relays are in “off” mode and its current output is 1 mA. One minute later, the channel comes into effective operation, with relays ready and output of 4-20 mA.

NOTE: If the control is left in the programming mode for more than 30 minutes, it automatically switches to fault mode.

• Copy

In order to make the programming of ALL CHANNELS less TIME-CONSUMING when the same programming is required for a number of channels, it is recommended that the “COPY” menu be used (see Section 5.4 on Menus) in conjunction with the keypad and the “Programming” switch. Then, the instructions in this menu should be followed carefully.

5.5.3 Calibrations

When it is first switched on, with the CONTROL and channels programmed, CALIBRATING operations must be carried out on both the CONTROL and the Sensor/Transmitters.

Channel connected to a sensor/transmitter supplying a standard 4-20mA current.

Prepare the sensor/transmitter for calibration:

- Set the zero and gain of the sensor/transmitter according to the instructions furnished with that device.

NOTE: When the sensor/transmitter and CONTROL channel are calibrated at the same time. The sensor/transmitter should be in normal operating mode, but the MX52 CONTROL should be set to calibration mode in order to inhibit the relays.

Note that with **ENMET** sensor/transmitters there are two ways of checking the signal supplied to the control:

- By direct reading on the sensor/transmitter display.
- By using a milliammeter to measure the current on the terminals provided for that purpose (see the manual for the sensor/transmitter concerned).

Adjust the sensor/transmitter zero: If the ambient air is not pure, use air from a cylinder. When the signal is stable, adjust the sensor/transmitter zero current output to 4 mA.

Prepare the MX52 CONTROL for calibration:

Adjustment of the MX52 CONTROL potentiometers affect the other settings, so adjust them in the order listed.

1. First adjust MX52 CONTROL display to zero, adjust the Control channel zero by using on the ZERO potentiometer for the channel (Item A, Figure 11) read ZERO on the MX52 display.
2. Second adjust the MX52 CONTROL zero current output, adjust the 4-20mA current output to 4 mA by using the corresponding 4 mA potentiometer: (Item B, Figure 11).

This current is read by connecting a digital multimeter directly to the corresponding current output (see Figure 12).

Calibrate the sensor/transmitter:

- Adjust the sensor/transmitter gain.
- Apply appropriate calibration gas to the sensor.

When signal has stabilized, set the sensor/transmitter gain according to the instructions furnished with that device

Calibrate the MX52 CONTROL:

3. Third match the MX52 CONTROL display to the S/T display, set the value of the calibration gas on the MX52 display panel by using the channel sensitivity potentiometer (Item A, Figure 11).
4. Finally set the MX52 CONTROL current to the calibration output, adjust the current output by using the 20 mA potentiometer to the appropriate output for the calibration gas being used (Item B, Figure 11).

Example of calibration current output: For a channel with a scale of 0 – 100 ppm:

If 100ppm gas is used to calibrate the S/T, the calibration current output should be set to 20mA

If 50ppm gas is used to calibrate the S/T, the calibration current output should be set to 12mA

Conclude Calibration of the MX52 CONTROL:

- Stop the injection of calibration gas, wait for the measurement to return to zero (on the MX52 display panel). Then, press the “CALIBRATION” key (Item C, Figure 10). The flashing yellow LED goes out and the “C” on the display panel disappears. The channel now operates normally and calibration has been completed.

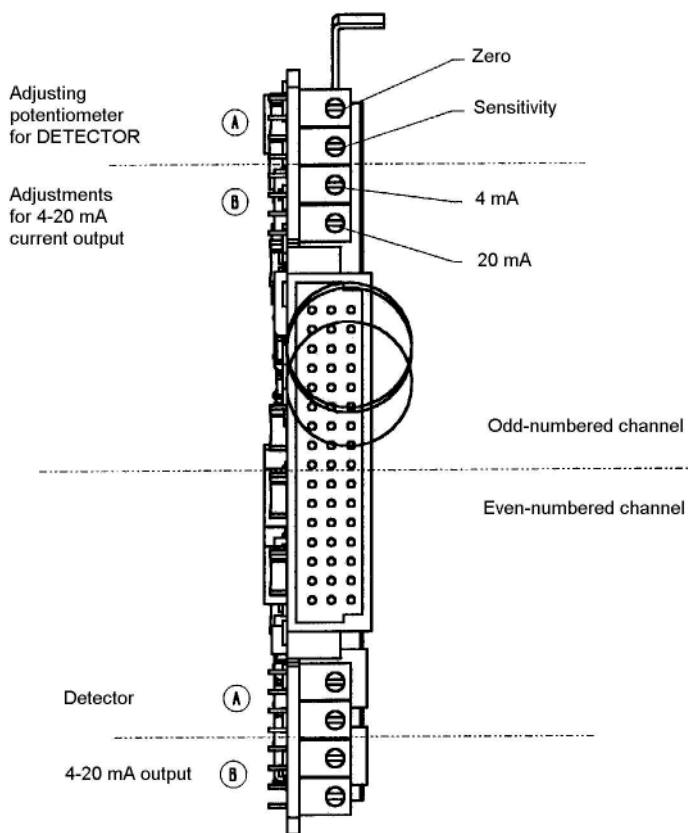


Figure 11: Potentiometer Layout on Front of Channel Board

6.0 Maintenance

WARNING: The handling operations and adjustments described in this section must be performed by authorized personnel, as they affect detection safety.

6.1 Periodic / Preventive Maintenance

6.1.1 On the MX52 CONTROL

The MX52 CONTROL requires a small amount of maintenance. However, it is recommended that the test functions available on the MX52 CONTROL unit be used to regularly test the essential functions of the control.

Check the functions of the control as follows:

- Use the TEST switch to check the correct operation of all the LEDs and the buzzer.
- Use the "SIMULATION" menu to check the correct operation of the display panel, the triggering of alarms (LED and relays), the auxiliary devices and the 4-20 mA current output.
- Cause a fault to occur (such as a line fault by disconnecting a detector wire) to check the correct operation of the fault indications.

6.1.2 On the Sensor/Transmitters

Sensor/transmitters must be calibrated periodically according to instructions furnished with those units.

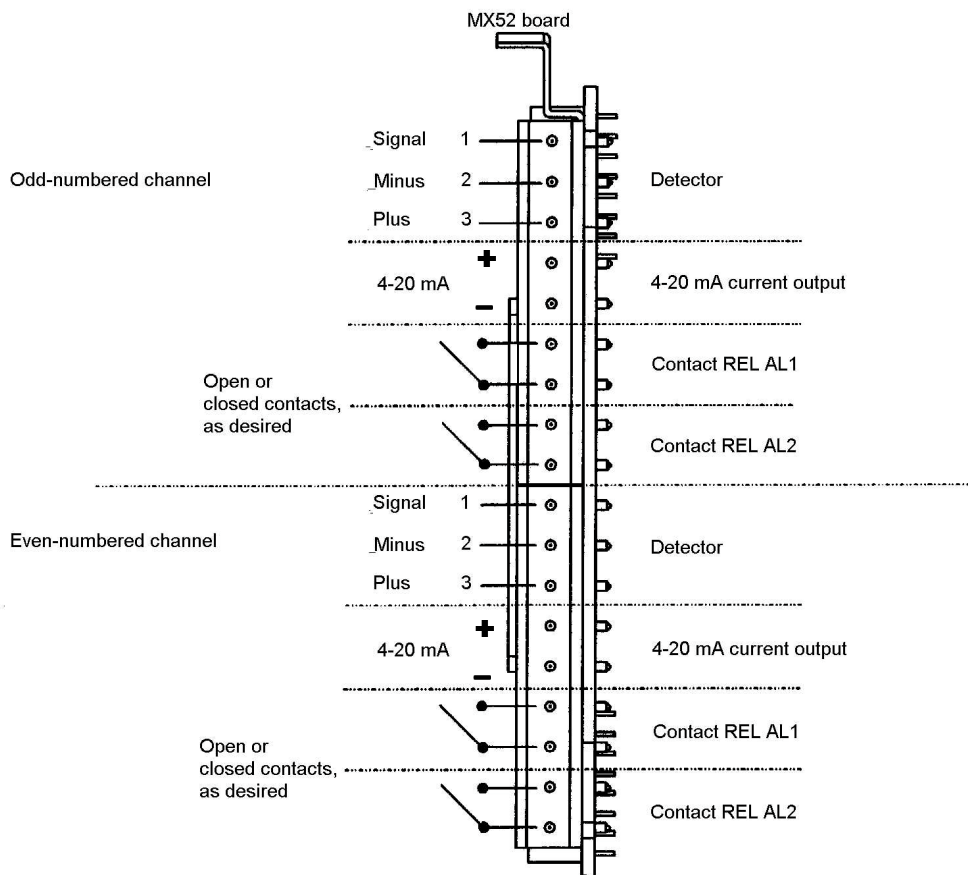


Figure 12: Channel Board, Outputs on Rear Connector

6.2 Troubleshooting: Symptoms and Remedies

NOTE: *ENMET* and our representatives and distributors are available to supply you with calibration gas or a maintenance contract.

SYMPTOMS	CAUSES	REMEDIES
Display channel not lighted and no indicator lights on.	On/Off switch in the Off position.	Set the switch to the On position (item A, Fig. 10).
	Problem with AC supply or DC power supply (24 V DC).	Check the supply voltages and, if necessary, check the electric power supply circuit breakers.
	Mains fuses blown.	Replace the mains fuses (see item A, Fig. 5).
	DC power (24 V DC) input fuses blown.	Replace the 24 V DC fuses located at the back of the MX52 unit (item B, Fig. 5).
	+24 V DC internal protection fuse blown.	Replace the +24 V DC fuse located on the power board (item C, Fig. 5).
CAUTION: When replacing a fuse, use the required type and rating.		
Fault indicator light on (in steady mode).	Faulty electrical connections on the 4-20mA sensor/transmitter wiring	Check the connections on the MX52 terminal block and the S/T terminal block. Check that there is no short circuit or break in the 4-20mA.
	Faulty sensor/transmitter.	Repair or replace the S/T.
	The type of S/T does not match the channel configuration.	Connect the correct type of S/T with the corresponding channel. CAUTION The channel or wiring may be damaged.
	Negative offset too great (more than 20% of measuring scale).	Perform calibration on the S/T and, then, on the control, if necessary. If the problem persists, the sensor must be replaced.
	Channel in maintenance mode for more than 30 minutes.	Return the channel to normal operation by pressing the Calibration key (Item C, Fig. 10).
Fault indicator light on (in steady mode) and SUP displayed.	The measurement is higher than 100% of the measuring scale.	To acknowledge the alarm, the channel must be switched off and then switched on again (by programming). If the problem persists and the measurement is not consistent with reality, the S/T must be calibrated.

Continued on next page

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An LED does not light up even though the corresponding threshold is exceeded and the buzzer and relay are actuated.	Faulty LED.	Perform a general test on the LEDs by pressing the TEST switch on the keypad (Figure 10) and, if the LED still does not light up, the programming must be modified by using the “Unit programming” menu (buzzer connected).
An alarm is triggered, the LED lights up and the relay is actuated but there is no audio alarm.	The buzzer switch is not correctly positioned.	Position the buzzer switch correctly (item F, Figure 10).
	The buzzer is not programmed as “in service”.	If the audio alarm is wanted, the programming must be modified by using the “unit programming” menu (buzzer connected?).
The audio alarm stops after 30 s although alarms are still actuated.	The buzzer is programmed to operate for 30 seconds only.	If the buzzer is to be sounded as long as the alarms are actuated, the programming must be modified by using the “Unit programming menu” (continuous buzzer?).
An alarm is triggered but the auxiliary devices are not actuated.	The relays are faulty.	Short-circuit or open the relay contact (as applicable) on the MX52 terminal block (Figure 12) and, if the auxiliary devices operate normally, the corresponding channel board must be repaired by an approved technician.
	Faulty electrical connections.	Short-circuit or open the relay contact (as applicable) on the MX52 terminal block (Figure 12) and, if the auxiliary devices still do not work, the connections must be checked on the MX52 connector and on the auxiliary devices.
Remote acknowledgement is impossible.	Faulty electric connections.	Check the connections on the MX52 connector (item B, Figure 9) and on the pushbutton switch.
	The pushbutton switch is faulty.	Replace the pushbutton switch.

7.0 WARRANTY

ENMET warrants new instruments to be free from defects in workmanship and material under normal use for a period of one year from date of shipment from **ENMET**. The warranty covers both parts and labor excluding instrument calibration and expendable parts such as calibration gas, filters, batteries, etc... Equipment believed to be defective should be returned to **ENMET** within the warranty period (transportation prepaid) for inspection. If the evaluation by **ENMET** confirms that the product is defective, it will be repaired or replaced at no charge, within the stated limitations, and returned prepaid to any location in the United States by the most economical means, e.g. Surface UPS/RPS. If an expedient means of transportation is requested during the warranty period, the customer is responsible for the difference between the most economical means and the expedient mode. **ENMET** shall not be liable for any loss or damage caused by the improper use of the product. The purchaser indemnifies and saves harmless the company with respect to any loss or damages that may arise through the use by the purchaser or others of this equipment.

This warranty is expressly given in lieu of all other warranties, either expressed or implied, including that of merchantability, and all other obligations or liabilities of **ENMET** which may arise in connection with this equipment. **ENMET** neither assumes nor authorizes any representative or other person to assume for it any obligation or liability other than that which is set forth herein.

NOTE: When returning an instrument to the factory for service:

- Be sure to include paperwork.
- A purchase order, return address and telephone number will assist in the expedient repair and return of your unit.
- Include any specific instructions.
- For warranty service, include date of purchase
- If you require an estimate, please contact **ENMET** Corporation.

There are Return for Repair Instructions and Form on the last pages of this manual. This Form can be copied or used as needed.

Appendix A: List of Units

SYMBOL	DESCRIPTION
LEL	Lower Explosive Limit
%	Percent
ppm	parts per million
ppb	parts per billion
UEG	Unter Explosion Grenze (= LEL in German)
LEL	Limite inférieure d'explosivité (= LEL in French)
bar	unit of pressure
mb	unit of pressure (millibar)
Rh	relative humidity
m/s	metres per second
mg	unit of weight (milligram)
unit + flashing U	free indication of unit <div style="text-align: center;"> <input type="text" value="-"/> ⇔ <input type="text" value="+"/> then <input type="text" value="ENTER"/> </div>

Replacement Part Numbers

ENMET replacement part numbers:

DESCRIPTION	PART NUMBER
Channel Board, controls 2 channels	02625-001
Micro Board	02625-002 – Verify before ordering See page 9 – 10
Micro Board, with Galvanic Isolation	02625-003 – Verify before ordering See page 9 – 10
Power Supply	67052-132

Appendix B: List of Gases

SYMBOL	DESCRIPTION
CH4	Methane
CO	Carbon monoxide
H2S	Hydrogen sulphide
N	Nitrogen
NO	Nitric oxide
NO2	Nitrogen dioxide
SO2	Sulphur dioxide
Cl2	Chlorine
H2	Hydrogen
HCL	Hydrochloric acid
HCN	Hydrocyanic acid
NH3	Ammonia
ETO	Ethylene oxide
PH3	Phosphine
HF	Hydrofluoric acid
CFC	Freons
CO2	Carbon dioxide
ASH	Arsine
SiH4	Silane
BUT	Butane
PRO	Propane
GNT	Natural gas
ETY	Ethylene
PNT	Pentane
HEX	Hexane
PRY	Propylene
ACY	Acetylene
ETA	Ethanol
ACO	Acetone
OPR	Propylene oxide
OET	Ethylene oxide
ISB	Isobutane
DIM	Dichloromethane
AET	Ethyl alcohol
BUN	2-Butanol
ISP	Isopropanol
XYL	Xylene
TOL	Toluene
ESS	Petrol (gasoline)
BUD	Butadiene
HYD	Hydrogen
Gas + flashing U	Free indication of name of gas: <div> <div>-</div> <div>↔</div> <div>+</div> <div>then</div> <div>ENTER</div> </div>



PO Box 979
680 Fairfield Court
Ann Arbor, Michigan 48106-0979
734.761.1270 Fax 734.761.3220

Returning an Instrument for Repair

ENMET instruments may be returned to the factory or any one of our Field Service Centers for regular repair service or calibration. The **ENMET** Repair Department and Field Service Centers also perform warranty service work.

When returning an instrument to the factory or service center for service, paperwork must be included which contains the following information:

- A purchase order number or reference number.
- A contact name with return address, telephone and fax numbers
- Specific instructions regarding desired service or description of the problems being encountered.
- Date of original purchase and copy of packing slip or invoice for warranty consideration.
- If a price estimate is required, please note it accordingly *and be sure to include a fax number.*

Providing the above information assists in the expedient repair and return of your unit.

Failure to provide this information can result in processing delays.

ENMET charges a one hour minimum billing for all approved repairs with additional time billed to the closest tenth of an hour. All instruments sent to **ENMET** are subject to a minimum \$30 evaluation fee, even if returned unrepaired. Unclaimed instruments that **ENMET** has received without appropriate paperwork or attempts to advise repair costs that have been unanswered, after a period of 60 days, may be disposed of or returned unrepaired COD with the evaluation fee.

Service centers may have different rates or terms. Be sure to contact them for this information.

Repaired instruments are returned by UPS/FedEx Ground and are not insured unless otherwise specified. If expedited shipping methods or insurance is required, it must be stated in your paperwork.

Note: Warranty of customer installed components.

If a component is purchased and installed in the field, and fails within the warranty term, it can be returned to **ENMET** and will be replaced, free of charge, per **ENMET**'s returned goods procedure.

If the entire instrument is returned to **ENMET** Corporation with the defective item installed, the item will be replaced at no cost, but the instrument will be subject to labor charges at half of the standard rate.



Repair Return Form

Mailing Address:

ENMET Corporation
PO Box 979
Ann Arbor, Michigan 48106

Shipping Address:

ENMET Corporation
Attn: Repair Department
680 Fairfield Court
Ann Arbor, Michigan 48108

Phone Number: 734.761.1270

FAX Number: 734.761.3220

Your Mailing Address:

Your Shipping Address:

Contact Name: _____

Your Phone: _____

Your PO/Reference Number: _____

Your FAX: _____

Payment Terms:

(Check one)

☐ **COD**

☐ **VISA / MasterCard**

Card number

Expiration

Return Shipping Method:

☐ UPS: ☐ Ground ☐ 3 Day Select ☐ Next Day Air ☐ ND Air Saver ☐ 2-Day Air

☐ Federal Express: ☐ Ground ☐ Express Saver ☐ P-1 ☐ Standard ☐ 2-Day Air

☐ FedEx Account number: _____

Would you like ENMET to insure the return shipment?

☐ No

☐ Yes

Insurance Amount: \$ _____

