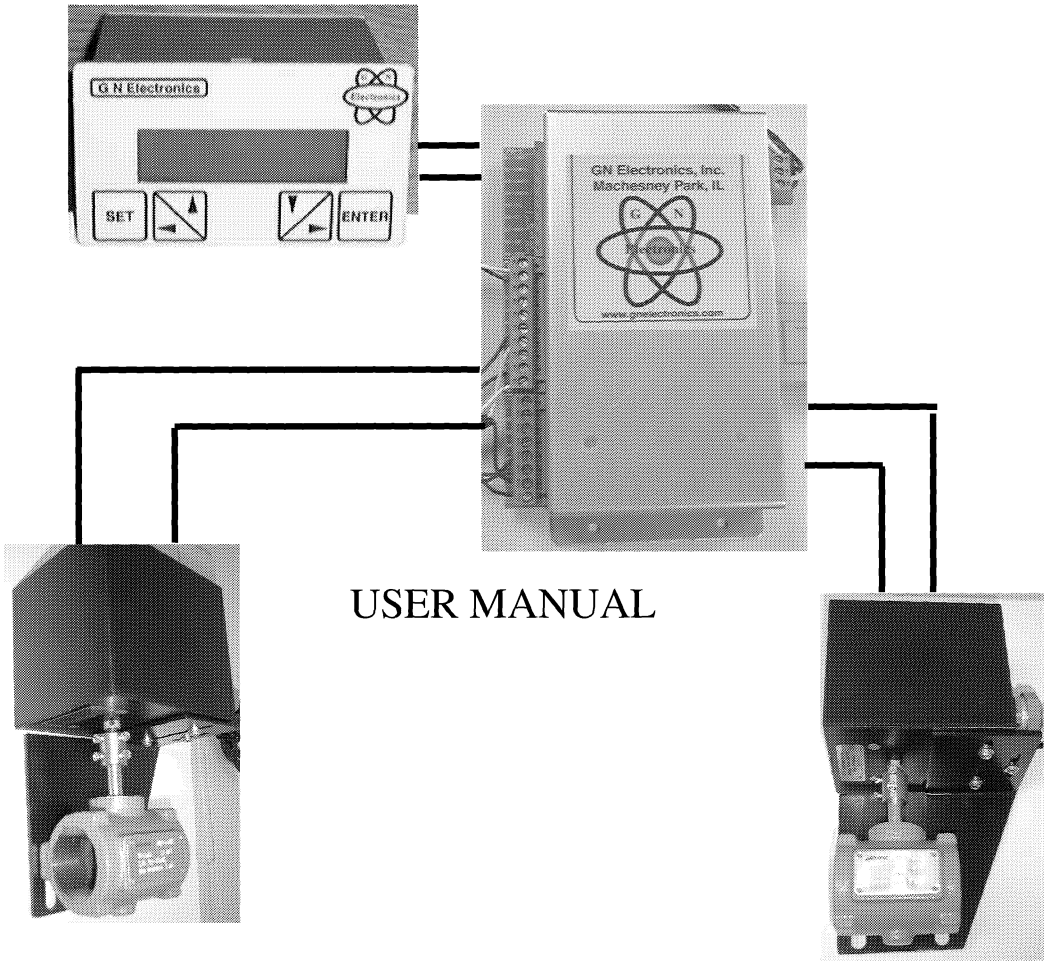
Ratio Control Module and Interface display
Model 7002-01



USER MANUAL

Revised: May 15, 2005

TERRACENE INTERNATIONAL LTD.

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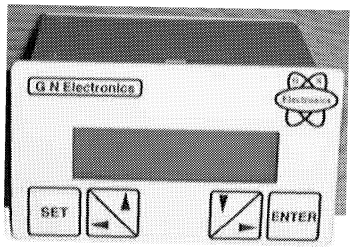
DESCRIPTION



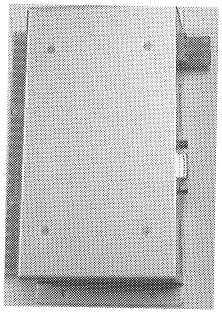
GN Electronics
1/8th DIN Panel Mount Programming Display

This is a microcomputer based Ratio control system. The ratio control will apply an independent function curve to each of the outputs based on the input signals. These curves are user selectable from one of 16 tables contained in memory or a table programmed by the user.

The 7002-01 Ratio Control will work with any 4 to 20 mA actuator in an open loop control system. It also functions as a closed loop control system with the GNT 100 Series actuators.

The display will indicate the value of the input and outputs during operation.

Ratio Control Module for controlling the ratio of two or more flowing mediums



FEATURES

- 2 X 16 segment back-lit display with NEMA 4 membrane front and sealing gasket
- Optional RS 485 Communication Interface
- Non Volatile Memory (16 standard ratio tables)
- Inputs and Outputs are all isolated from each other
- Will also work with any actuator accepting a 4 to 20 mA input
- Operator interface Key Pad on Display
- 1/8th DIN Display standard size
- Accepts 120 VAC 50/60 Hz or 24VDC supply
- User can select pre-programmed ratio table or program their own through the display

GNT Actuator controlled by the 7002-01 Ratio Controller

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Function Description

Internal Ratio Tables: The 7002-01 Ratio Control has 16 internal tables defining the ratio curve between the two controlled actuators. Each of these tables are preprogramed at the factory and are selectable by means of the DIP switches on the module. These tables can also be remotely selected by means of the limit inputs or through the RS485 Communication port.

User Programable Table: The user can program a nonvolitile ratio table through the keypad on the remote display. This is done by setting the individual points along the input curve and defining the associated points for the actuators position. The user can program a series of linear ramps between his selected points. He can program any number of points from 1 to 100 points over the input range. Movement between the points will be linear. This program can also be downloaded to the ratio control through the RS485 port.

Definable limit inputs: The Ratio Control has four (4) definable inputs (depending on the options specified). These are descrete inputs which can be used to drive the actuator to a specified location in case of alarm. They can also be used to switch between ratio tables. Alternatively they can serve as annunciation points to trigger the alarm contact output.

Isolated 4 to 20 outputs: The two analog outputs are electrically isolated and are used to drive the actuators.

Additional Analog input: There is an additional analog input which can be used as an input from an oxygen analyzer or some other instrument to bias or alter the ratio curve. This is commonly used as trim.

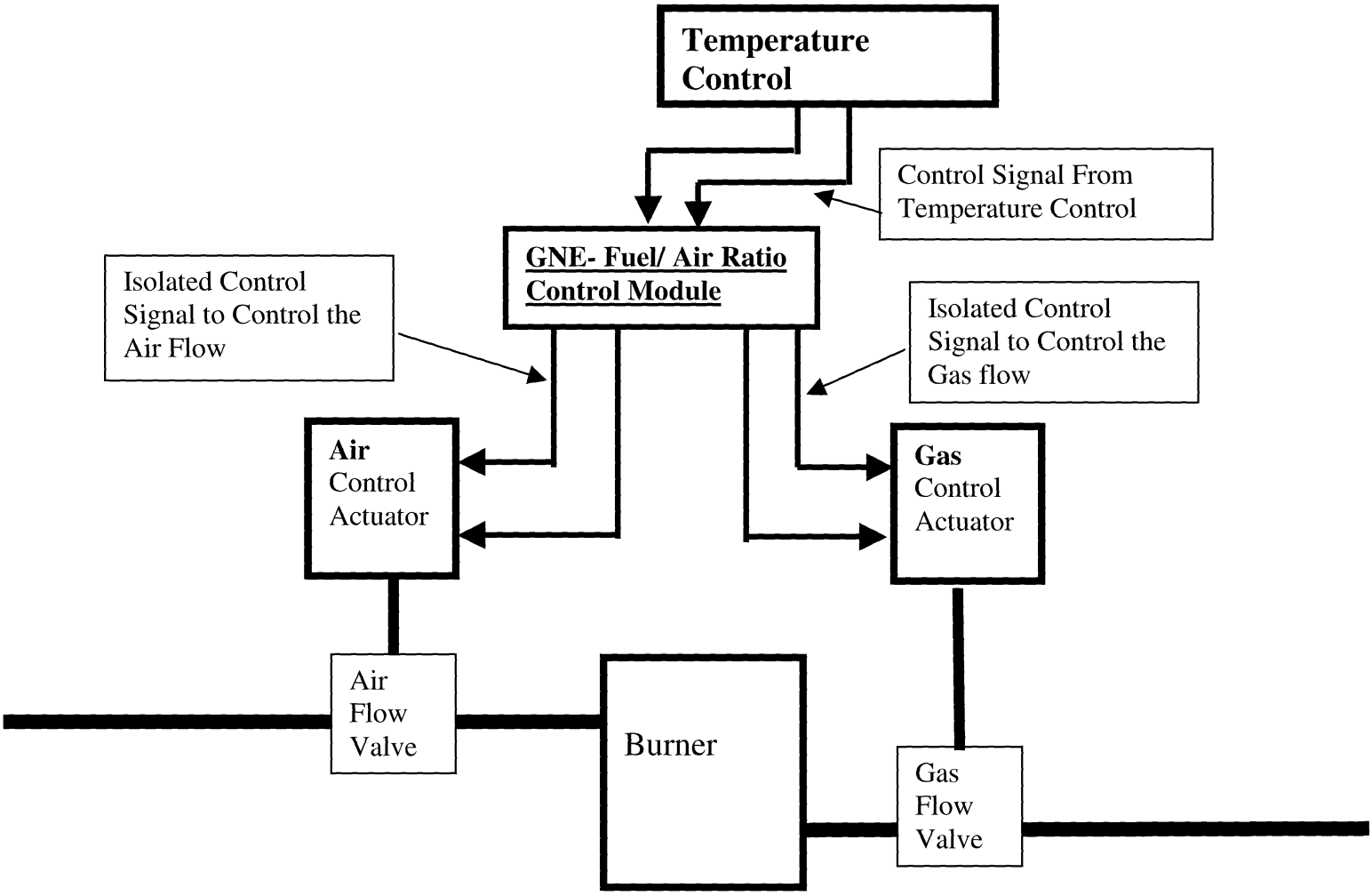
Isolated Contact Outputs: The two isolated contact outputs can be configured as event points or alarms. The trip level of each output is independent and can be tied to any of the analog inputs or outputs. The contact can also be configured to actuate based on the state of one or more of the four descrete inputs.

RS 485 Communication: The communication port allows the Ratio module to sent and receive information from a remote computer. It can also be used inconjunction with the GNT 100 series actuators to provide position feed back and closed loop system control.

Display Module: The display module along with its keypad permits the user to acess the control status and program the ratio table. This also serves as a remote display for the actuator position and status.

NEMA 4 enclosure: The 7002-01 Ratio module is also available in a NEMA 4 enclosure

120VAC or 24VDC Power: Will accept either 120VAC or 24VDC as primary power to the unit.



Process Block Diagram
Air and Fuel are control to desired ratio based on a customer-selected curve programmed into the GNE Ratio Control Module

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Internal Ratio Table Programming

Note: Before beginning the program procedure set SW1 in the down position and SW8 in the up position. These switches are located between the power connection terminals and the plug in connector for the display.

Displayed 2/4 seconds

Push **SET** Key For Record Table

← **Power Up Display**

Displayed 2/4 seconds

Stt: IN1=XX S=RA GAS =XX AIR =ZZ

Press [ENTER] To start the 4 second display cycle

Press [SET] To display:

Transmit Records UP=Yes

Use the UP  To enter Program Mode

To Display the Current Record

IN1 (XX)=XX S=T GAS =YY AIR = ZZ

XX ,YY, ZZ are numbers between 0 to 99 representing 0-20 mA: 0mA = 0%, 20mA=99%

Before you start programming always Linearize the Outputs (Output = Inputs) by setting XX=00;YY=00;ZZ=00

Use the "RIGHT" Key to move the curser and the "UP" Key to change the values
Press the Set Key to enter the value.

Remember: Record IN1(00) always contains the last records entered and is not used For outputs.

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Programming Example

Assuming the table has to be linearized based on the following parameters:

IN1 = 0 mA (00%) GAS = 0 mA (0%) AIR = 12 mA (60%)

IN1 = 4 mA (20%) GAS = 5 mA (25%) AIR = 8 mA (40%)

IN1 = 8 mA (40%) GAS = 6 mA (30%) AIR = 12 mA (60%)

IN1 = 12 mA (60%) GAS = 12 mA (60%) AIR = 12 mA (60%)

IN1 = 20mA (99) GAS = 14 mA (70%) AIR = 14 mA (70%)

1'St Settings:

IN1 = (00)=00 S=T
GAS =00 AIR = 60

Push **SET** Key

The display will indicate

IN1 = (00)=00 S=TA
GAS =00 AIR = 60

Note that S indicates the status and S=TA indicates that the transmission was acknowledged

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2'nd Settings:

IN1 = (20)=20 S=T
GAS =00 AIR = 60

Push **SET** Key
The display will indicate

IN1 = (20)=20 S=TA
GAS =00 AIR = 60

All the records from 0 to 20 inputs will have GAS = 00 AIR = 60

Push **SET** Key

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3'rd Settings:

IN1 = (20)=20 S=T
GAS =25 AIR = 40

Push **SET** Key
The records at 20 will have GAS 25
AIR 40

IN1 = (20)=20 S=TA
GAS =25 AIR = 40

The record 20 will have GAS = 25 AIR = 40

4'th Settings:

IN1 = (40)=40 S=T
GAS =30 AIR = 60

Push **SET** Key
The display will indicate

IN1 = (40)=40 S=TA
GAS =30 AIR = 60

The records from 20 to 40 will have GAS ramping from 25 to 30
AIR ramping from 40 to 60

5'th Settings:

IN1 = (60)=60 S=T
GAS =60 AIR = 60

Push **SET** Key
The display will indicate

IN1 = (60)=60 S=TA
GAS =60 AIR = 60

The records from 40 to 60 will have GAS ramping from 30 to 60
AIR will stay 60

6'th Settings:

IN1 = (99)=99 S=T
GAS =70 AIR = 70

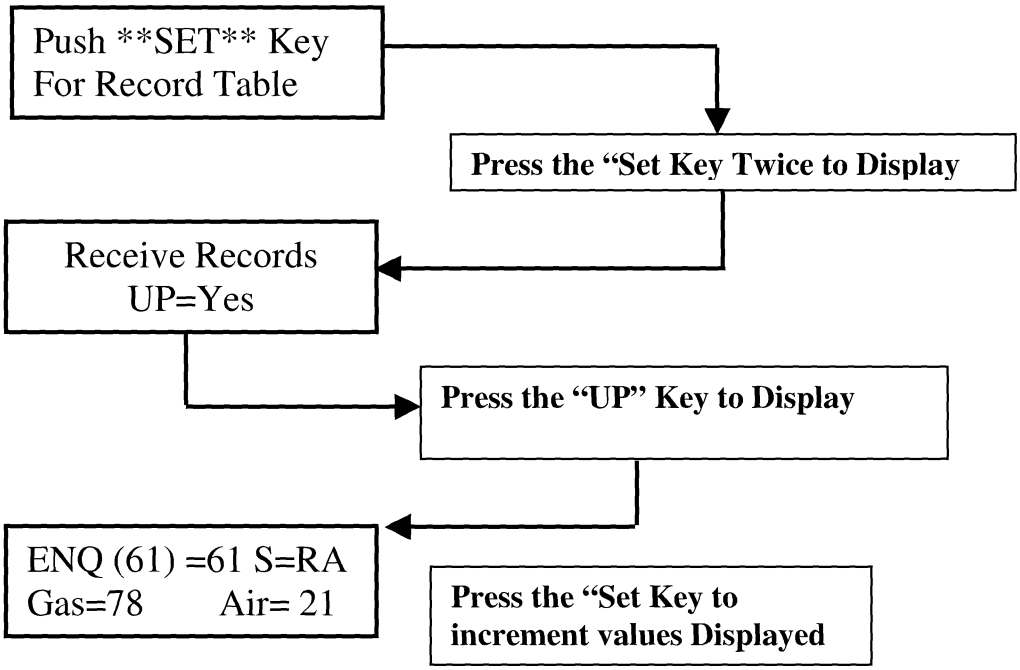
Push **SET** Key
The display will indicate

IN1 = (99)=99 S=TA
GAS =70 AIR = 70

The records from 60 to 99 will have GAS ramping from 60 to 70
AIR ramping from 60 to 70

Set SW8 = Down to prevent programming

Receiving Programmed Points in the Tables



Use RIGHT and UP keys to set the XX in the ENQ (XX). After XX is selected, use SET key to get the records.

REMEMBER: Push ENTER Key to return to normal display of IN and OUTs.

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Display Specifications

MECHANICAL:

Enclosure: 1¾" H by 3½" L by 3" D (1/8th DIN)

ELECTRICAL:
Supply: From Ratio Module
Power consumption: 2VA

Environmental:
Class: NEMA type 4 Membrane Front

Temperature rating: -20^{0}C to +60^{0}C (0^{0}F to 140^{0}F).

Module Specifications

MECHANICAL:

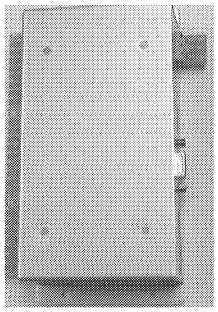
Enclosure: 5 7/8" H by 4 3/8" W by 1 1/8" D

ELECTRICAL:
Supply: 120VAC
Power consumption: 2VA

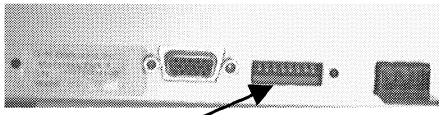
Installation Notes

- All installation, wiring, or service activities must only be performed by knowledgeable and qualified technicians.
- All system wiring should be run in accordance with the National Electrical Code and all local code requirements.
- Always remove all power to the system before wiring.

7002-01 Module



DIPswitches are located on the side of the unit opposite of the terminal strip



Select one of 16 Preprogrammed Tables (Switches 1 through 4)

Note: The internal Tables are factory programmed and are not field changeable. All the switches must be in the "DWN" (off) position when using the programmable nonvolatile table

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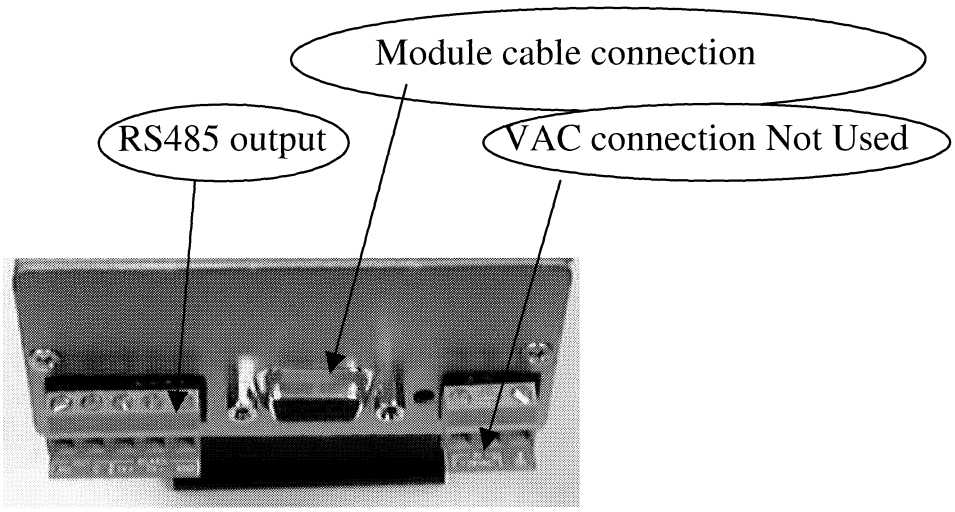
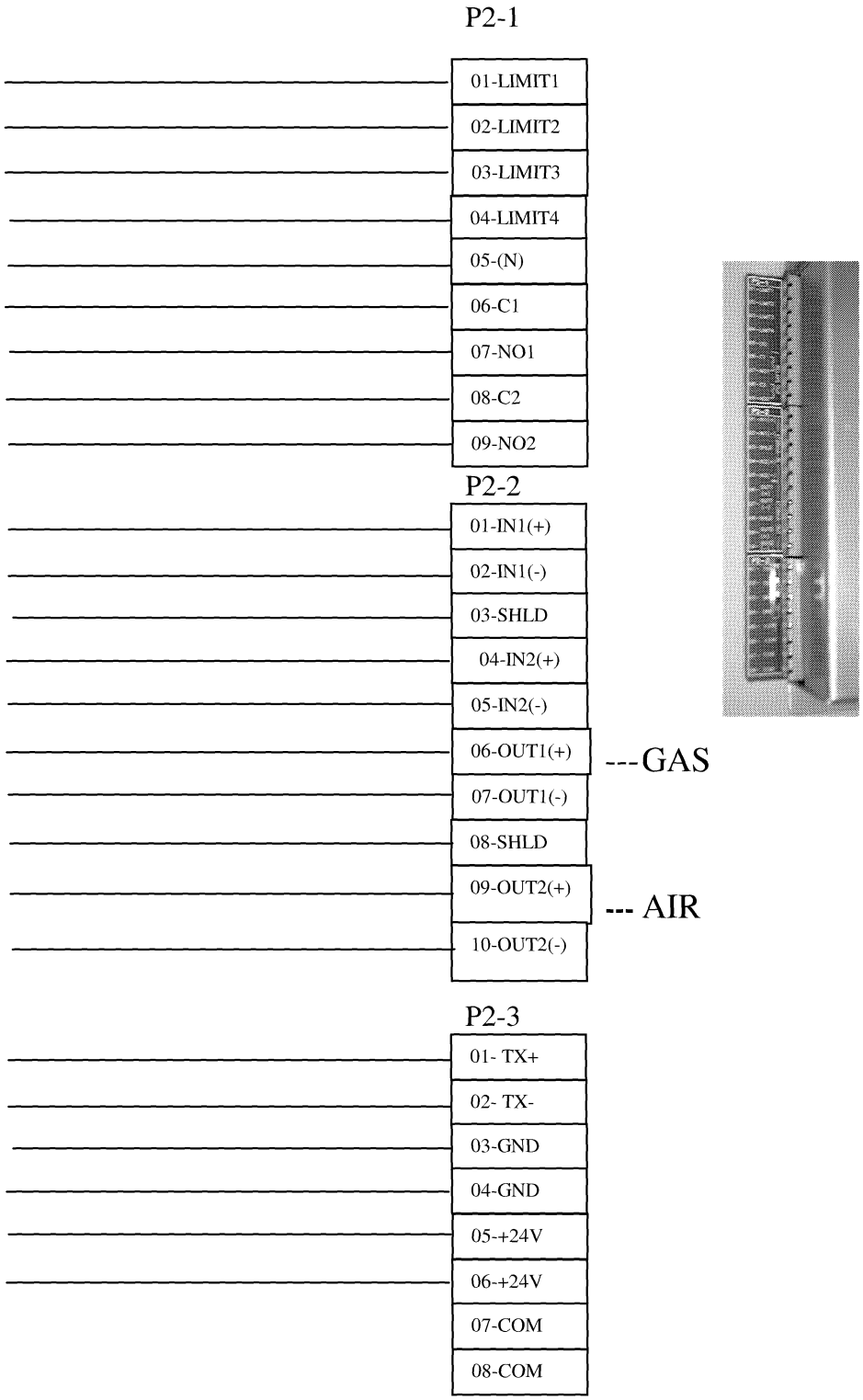
WIRING and CONNECTIONS



Wiring Diagram (Module Terminals)



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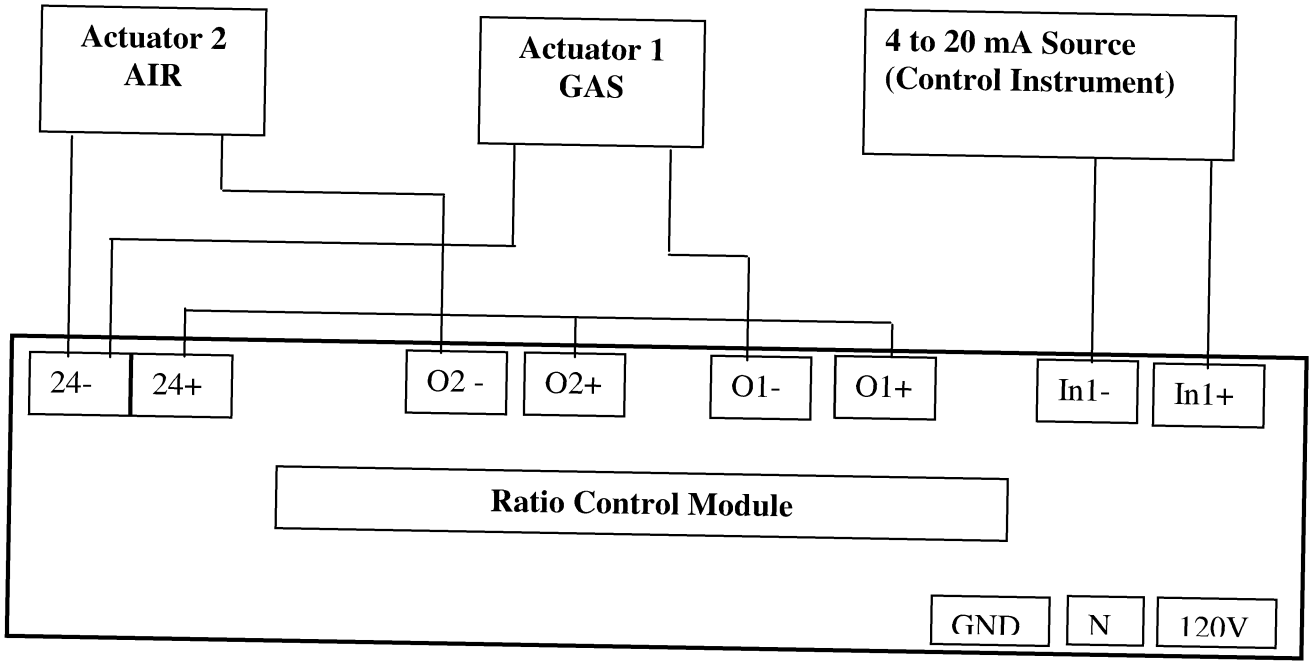
Wiring Diagram



Wiring Considerations

Depending on the output option used the wiring requirements will vary somewhat.

Output type	Suggested wire	Wiring run considerations
Contact	14 to 16 AWG	THHN or equivalent Nothing special- can be run with other wires in conduit
0 to 12VDC RS 485	14 to 16 AWG	THHN if wire is run in separate conduit
		Shielded cable if multiple wires are in one conduit
		Coax cable if long distance runs are required or if high level of electrical noise is present

Note

All wiring runs to the field on, or near, hot surfaces should be rated for 90°C (195°F) or at least 25°C (50°F) higher than the surface temperature.

Maintenance

Repairs

Defective units should be returned to G N Electronics for repair. Controls should be well packed in a suitable container encased in appropriate stuffing.

All products should **be shipped prepaid to:**

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Machesney Park, IL 61115

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Fax: (815)637-8626

www. gnelectronics. com